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FLIGHT PROCEDURES INSPECTOR'S HANDBOOK

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DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

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FOREWORD

This order implements standardized direction and procedures for Flight Standards personnel assigned to the regional Flight Procedures Branches.

The coordination of efforts affecting the promotion of aviation safety and the consistency and accuracy of the services provided to the public require users of this handbook to be thoroughly familiar with the contents and make every effort to comply with the instructions herein. For this purpose, we have attempted to provide standardized instructions, criteria, procedures, and guidance during handbook development. The handbook is not complete. Some chapters are currently under development while others may be in coordination. Incomplete portions will be published as they are finished.

Compliance with the instructions in this handbook is not a substitute for sound judgment and common sense. All possible site-specific circumstances, as well as all-inclusive criteria for new and changing technologies, cannot be included in this handbook. Flight Procedures Branch personnel are expected to exercise initiative and take appropriate action in recognizing the limitations of this guidance in association with the limitations and capabilities of aircraft, airborne equipment, and navigational aids. Aviation safety is the prime concern.

We have employed the talent and experience of individuals from the Flight Procedures Branches and other Flight Standards/Aviation Standards organizations to develop this order. We are also using formats and material from other Flight Standards inspector handbooks. We express our appreciation to those who have, directly or indirectly, contributed their time and energies to this effort.

Thomas C. Accardi
Director, Flight Standards Service

TABLE OF CONTENTS

CHAPTER 1. GENERAL CONCEPTS, GUIDANCE, AND INFORMATION

SECTION 1. GENERAL HANDBOOK INFORMATION

Paragraph		Page
1.	Purpose	1-1
2.	Distribution	1-1
3.	Definitions, Abbreviations, and Acronyms	1-1
4.	Implementation	1-20
5.	Handbook Organization and Use	1-20
6.	Handbook Revisions	1-24
7.thru 19.	Reserved	1-24
	Figure 1-1. Inspector Feedback Sheet	1-25

SECTION 2. HISTORY OF THE FAA AND ITS ORGANIZATION AND AUTHORITY

20.	History of the Federal Aviation Administration	1-31
21.	History and Organization of Aviation Standards/Flight Standards	1-33
	Figure 1-2. AXO & AVR/AVS Organizational Chart	1-34
22.	The Public Law	1-36
23.thru 29.	Reserved	1-38

SECTION 3. THE INTERNATIONAL CIVIL AVIATION ORGANIZATION

30.	History	1-39
31.	ICAO Objectives	1-40
32.	Location of ICAO Offices	1-40
33.	Organizational Structure	1-40
	Figure 1-3. ICAO Organizational Chart	1-42
34.	ICAO Publications	1-42
35.	Annexes to the Convention	1-43
36.	Regional Planning	1-45
37.thru 39.	Reserved	1-46

SECTION 4. REGULATIONS: CODE OF FEDERAL REGULATIONS, FEDERAL AVIATION REGULATIONS, AND THE REGULATORY PROCESS

Paragraph Page

40. The Code of Federal Regulations....................1-47
41. Title 14, Aeronautics and Space....................1-47
42. Chapter I - Federal Aviation Administration, Department of Transportation....................1-48
43. FAA Regulatory Actions............................1-48
44. FAA Regulatory Procedures.........................1-48
45. FAA Regulatory Responsibilities...................1-49
46. The Process of Public Petitions...................1-49
47. The Process of Initiating Proposed Rules..........1-49
48. The Regulatory Process and Flight Procedures Program..1-50
49. Reserved..1-50

SECTION 5. FLIGHT PROCEDURES STANDARDS

50. History and Concepts..............................1-51
51. Pilot and Aircraft Increases......................1-51
52. Evolution of Standards............................1-51
53. Flight Procedures.................................1-52
54. Continuing Changes................................1-53
55. Problems in Standards Development.................1-54
56. Current Flight Procedures Standards Development..1-55
57. Flight Procedures Criteria Development...........1-56
58. TERPS Criteria Concepts...........................1-56
59. TERPS Criteria and FAA Standards..................1-57
60. Determining the Need for New Standards...........1-58
61. Testing and Data Gathering Requirements..........1-59
62. Collected Data and Evaluation.....................1-62
63. Instrument Procedures Design Standards...........1-63
64. Test Result Report................................1-64
65. Other Uses of Test Data...........................1-65
66. Issuing New Standards.............................1-65
67. Reserved..1-67

SECTION 6. THE REGIONAL FLIGHT PROCEDURES PROGRAM

68. Authority...1-69
69. Program Responsibilities..........................1-69
70.thru 199. Reserved..............................1-71

CHAPTER 2. FACILITIES AND EQUIPMENT PROGRAM

SECTION 1. F&E GENERAL

Paragraph Page

200. Purpose....................................2-1
201. Background.................................2-1
202. The Budget Process.........................2-1
203. The F&E Budget.............................2-3
204.thru 219. Reserved..........................2-5

SECTION 2. THE FPB F&E RESPONSIBILITIES

220. General....................................2-7
221. Library of References......................2-7
222. Tracking Candidate Locations...............2-10
223. Files and Records..........................2-12
224. Maintaining F&E Records....................2-12
225.thru 229. Reserved..........................2-14

Figure 2-1. ADA Request Form...................2-15
Figure 2-2. FAA Air Traffic Activity...........2-16
Figure 2-3. Climatological Study...............2-17
Figure 2-4. Airport Data/Activity..............2-18
Figure 2-5. Airport Data/Facilities............2-19
Figure 2-6. Form Completion-Airport Data/Activity..............................2-20
Figure 2-7. Form Completion-Airport Data/Facilities............................2-21
Figure 2-8. Completed Airport Data/Activity....2-23
Figure 2-9. Completed Airport Data/Facilities..2-24

SECTION 3. CALL FOR ESTIMATES AND APS-1

230. General....................................2-25
231. The Call-Order 2500.55.....................2-25
232. Applicable Flight Standards Portions of the Call.......................................2-28
233. APS-1 and the Benefit/Cost Process.........2-30
234. Applicable Flight Standards Portions of APS-1...2-32
235.thru 239. Reserved..........................2-34

Figure 2-10. Sample Defer Memo.................2-35

SECTION 4. APS-1 APPLICATION AND CALCULATIONS

240. General....................................2-39
241. Explanation of Call Items..................2-39

Paragraph Page

Figure 2-11. RVR Call Item....................2-40
Figure 2-12. ILS Call Item....................2-43

242. Specific Explanation of APS-1 Criteria..........2-47
243. MLS or ILS, APS-1 Paragraph 20, and Handbook Figure 2-13....................................2-47
244. Supplemental Criteria for MLS/ILS Establishment at Commercial Service Airports, APS-1 Paragraph 20d, and Handbook Figure 2-14.................2-50
245. Supplemental ILS/MLS Criteria for Reliever Airports, APS-1 Paragraph 20e.................2-51
246. RVR with ILS or MLS, APS-1 Paragraph 20h, and Handbook Figure 2-15..........................2-51
247. Localizer and Marker Beacon, APS-1 Paragraph 22a(1), and Handbook Figure 2-16..............2-52
248. TVOR, APS-1 Paragraph 22a(2), and Handbook Figure 2-17....................................2-52
249. DME with Localizer, APS-1 Paragraph 22a(3), and Handbook Figure 2-18......................2-53
250. VASI/PAPI with Non-Precision Approach Procedures, APS-1 Paragraph 22a(4), and Handbook Figure 2-19..........................2-53
251. MALS or ODALS with Non-Precision Approach Procedure, APS-1 Paragraph 22a(5), and Handbook Figure 2-20..........................2-53
252. RVR for Non-Precision Instrumented Runway, APS-1 Paragraph 22a(6).......................2-54
253. REIL, APS-1 Paragraph 30, and Handbook Figure 2-21....................................2-54
254. VASI/PAPI (VFR Only), APS-1 Paragraph 31, and Handbook Figure 2-22..........................2-55
255. Criteria for Other Systems......................2-55
256.thru 259. Reserved..............................2-55

Figure 2-13. APS-1 - ILS/MLS...................2-56
Figure 2-14. APS-1 - Supplemental ILS/MLS......2-57
Figure 2-15. APS-1 - RVR Precision.............2-58
Figure 2-16. APS-1 - Localizer.................2-59
Figure 2-17. APS-1 - TVOR......................2-60
Figure 2-18. APS-1 - DME with Localizer........2-61
Figure 2-19. APS-1 - VASI/PAPI Non-Precision...2-62
Figure 2-20. APS-1 - MALS/ODALS Non-Precision..2-63
Figure 2-21. APS-1 - REIL......................2-64
Figure 2-22. APS-1 - VASI/PAPI VFR.............2-65
Figure 2-23. APS-1 - Abbreviated ILS/MLS.......2-66
Figure 2-24. APS-1 - Abbreviated Supplemental ILS/MLS..2-66

Paragraph Page

Figure 2-25. APS-1 - Abbreviated RVR Precision....................................2-67
Figure 2-26. APS-1 - Abbreviated Localizer.....2-67
Figure 2-27. APS-1 - Abbreviated TVOR..........2-68
Figure 2-28. APS-1 - Abbreviated DME with Localizer....................................2-68
Figure 2-29. APS-1 - Abbreviated VASI/PAPI Non-Precision................................2-69
Figure 2-30. APS-1 - Abbreviated MALS/ODALS Non-Precision................................2-69
Figure 2-31. APS-1 - Abbreviated REIL..........2-70
Figure 2-32. APS-1 - Abbreviated VASI/PAPI VFR................................2-70

SECTION 5. F&E SUBMISSIONS

260. General..2-71
261. Candidate Decisions..............................2-71
262. Submission Requirements in the Call and APS-1...2-73
263. Associated Problems and Considerations for Submissions.................................2-74
264. The Submission...................................2-78
265.thru 269. Reserved...............................2-79

Figure 2-33. ILS Staff Study Guide.............2-80
Figure 2-34. Instructions for ILS Data Worksheet.......................................2-82
Figure 2-35. ILS Data Worksheet................2-84
Figure 2-36. Sample ILS BCR....................2-86
Figure 2-37. Sample Completed ILS Staff Study..2-87
Figure 2-38. Sample Completed ILS Data Worksheet.......................................2-90
Figure 2-39. Sample Staff Study 1..............2-92
Figure 2-40. Sample Staff Study 2..............2-93
Figure 2-41. Sample Flight Standards Cover Letter..2-94
Figure 2-42. Sample ILS List...................2-95
Figure 2-43. Sample PAPI Non-Precision List....2-96
Figure 2-44. Sample PAPI Visual List...........2-97
Figure 2-45. Sample REIL List..................2-98
Figure 2-46. Sample RVR List...................2-99

SECTION 6. RELATED F&E REQUIREMENTS

Paragraph		Page
270.	General	2-105
271.	Regional Working Groups	2-105
272.	Flight Standards Participation in Working Groups	2-106
273.	Changes to an F&E Budget	2-107
274.	F&E Inquiries	2-108
275.	Changes to Policy	2-111
276.	Flight Standards Projects and Budgeting Conflicts	2-113
277.thru 299.	Reserved	2-114

SECTION 7. JOB TASK #10 - DEVELOP AIR NAVIGATION FACILITIES INPUT FOR FACILITIES AND EQUIPMENT (F&E) BUDGET (RESERVED) (TBD*)
(Reserved 2-115 thru 2-120)

*TBD=TO BE DEVELOPED

CHAPTER 3. STANDARD TERMINAL INSTRUMENT PROCEDURES (RESERVED) (TBD*)
(Reserved 3-1 thru 3-99)

CHAPTER 4. OTHER INSTRUMENT PROCEDURES TASKS (RESERVED) (TBD*)
(Reserved 4-1 thru 4-99)

*TBD=TO BE DEVELOPED

CHAPTER 5. OBSTRUCTION EVALUATION

SECTION 1. GENERAL

Paragraph Page

500. Purpose....................................5-1
501. Background....................................5-1
502. Statutory Basis for Obstruction Evaluations.....5-1
503. Regulatory Basis for Obstruction Evaluations....5-4
504. Other Considerations Concerning the Statutes and the Regulations....................5-9
505.thru 519. Reserved....................................5-11

SECTION 2. REGIONAL OBSTRUCTION EVALUATION PROGRAM

520. General....................................5-13
521. Order 7400.2, Procedures for Handling Airspace Matters....................................5-13
522. The Regional OE Process....................................5-17
523. Preservation of Navigable Airspace..............5-22
524. Standards of the Other Operational Services.....5-23
525. Division of Responsibilities....................5-23
526. Release of Information..........................5-24
527. Public Demand on FPB Time.......................5-24
528. Negotiations....................................5-25
529. A New Facility from the Construction Proponent (Reserved)....................................5-25
530. Aeronautical Studies of Existing Objects........5-25
531. Coordination Within Flight Standards/Aviation Standards....................................5-26
532.thru 535. Reserved....................................5-27

Figure 5-1. Sample FAA Form 7460-1, Notice of Proposed Construction or Alteration...........5-34
Figure 5-2. Sample FAA Form 7460-2, Notice of Actual Construction or Alteration.............5-35
Figure 5-3. Sample FAA Form 7460-7, Acknowledgement of Notice of Proposed Construction or Alteration...................5-36
Figure 5-4. Sample FAA Form 7460-8, Aeronautical Study of Proposed Construction or Alteration................................5-37
Figure 5-5. Sample FAA Form 7460-9, Determination of No Hazard to Air Navigation..5-39
Figure 5-6. Sample FAA Form 7460-10, Determination of Hazard to Air Navigation.....5-41

SECTION 3. FPB REQUIREMENTS AND GUIDELINES FOR OBSTRUCTION EVALUATIONS

Paragraph Page

536. General....................................5-43
537. References for Obstruction Evaluations..........5-43
538. Obstruction Evaluation Training.................5-43
539. Common Sense....................................5-44
540. Accuracy in Evaluations.........................5-45
541. Instrument Procedure Design Concepts............5-45
542. Changing Procedures.............................5-49
543. Procedures Criteria that Segregates Proposed Obstacles from Existing Obstacles............5-52
544. Proposal Accuracies.............................5-52
545. Errors in Existing Instrument Procedures Discovered During the Obstruction Evaluation..5-55
546. Airspace Where Adjustments Increase Operational Altitudes (Reserved)..........................5-56
547. Temporary Obstructions..........................5-56
548. Considering Procedural Changes..................5-56
549. Procedural Changes and Environmental Assessments...................................5-56
550. Evaluating VFR Effects..........................5-57
551. Overview of the Flight Standards Application Policies......................................5-58
552. Tools for Obstruction Evaluations...............5-58
553.thru 555. Reserved...............................5-64

Figure 5-7. Sample Site Survey................5-65
Figure 5-8. Sample Computer Generated 7460-1 Form....................................5-66
Figure 5-9. Computer Generated OE Response Form #1......................................5-67
Figure 5-10. Computer Generated OE Response Form #2......................................5-67
Figure 5-11. Sample Yearly OE Status Listing...5-68
Figure 5-12. Sample Prose Printout.............5-69
Figure 5-13. Sample TERPS Calculator Printout..5-70
Figure 5-14. Sample GEODES Printout............5-71
Figure 5-15. Sample GEODET Printout............5-72
Figure 5-16. Obstruction Evaluation Job Aid....5-73

SECTION 4. THE FPB OBSTRUCTION EVALUATION

Paragraph Page

556. General..5-81
557. The More Obscure Factors of the OE Analysis.....5-81
558. The Obstruction Evaluation (OE).................5-84
559. Altitude/Height Verification....................5-84
560. Screening.......................................5-84
561. En Route IFR Operations.........................5-86
562. Terminal Area IFR Operations....................5-89
563. VFR Operations..................................5-104
564. Minimum Safe Altitude (MSA).....................5-106
565.thru 569. Reserved..............................5-106

SECTION 5. FPB RESPONSIBILITIES AFTER THE OBSTRUCTION EVALUATION

570. General..5-117
571. Response to Air Traffic.........................5-117
572. Air Traffic Actions After the Flight Standards Response..5-118
573. FAA Form 7460-8, Aeronautical Study of Proposed Construction or Alteration...................5-119
574. Determinations: FAA Form 7460-9, Determination of No Hazard to Air Navigation and FAA Form 7460-10, Determination of Hazard to Air Navigation.....................................5-120
575. Construction Notice: FAA Form 7460-2, Notice of Actual Construction or Alteration..........5-122
576. Washington Reviews of Regional OE Determinations...................................5-124
577.thru 599. Reserved..............................5-126

Figure 5-17. Obstruction Evaluation Response Form...5-127
Figure 5-18. Completed Obstruction Evaluation Response Form...............................5-128
Figure 5-19. Obstruction Evaluation Response Form Memo....................................5-129
Figure 5-20. Completed Obstruction Evaluation Response Form Memo...........................5-130

SECTION 6. TASK #14 - EVALUATE A NOTICE OF PROPOSED CONSTRUCTION (RESERVED) (TBD*)
(Reserved 5-131 thru 5-135)

SECTION 7. TASK #5 - CONDUCT AN AERONAUTICAL STUDY (RESERVED) (TBD*)
(Reserved 5-136 thru 5-142)

SECTION 8. TASK #26 - PROCESS A DETERMINATION OF HAZARD/NO HAZARD (RESERVED) (TBD*)
(Reserved 5-143 thru 5-149)

SECTION 9. TASK #27 - PROCESS A NOTICE OF ACTUAL CONSTRUCTION (RESERVED) (TBD*)
(Reserved 5-150 thru 5-156)

*TBD=TO BE DEVELOPED

CHAPTER 6. NON-RULEMAKING ACTIONS (RESERVED) (TBD*)
(Reserved 6-1 thru 6-99)

CHAPTER 7. DEVIATIONS TO STANDARDS AND CRITERIA (RESERVED) (TBD*)
(Reserved 7-1 thru 7-99)

CHAPTER 8. SYSTEM SURVEILLANCE (RESERVED) (TBD*)
(Reserved 8-1 thru 8-99)

CHAPTER 9. PUBLIC SERVICES (RESERVED) (TBD*)
(Reserved 9-1 thru 9-99)

CHAPTER 10. ENVIRONMENTAL (RESERVED) (TBD*)
(Reserved 10-1 thru 10-99)

CHAPTER 11. MISCELLANEOUS TASKS (RESERVED) (TBD*)
(Reserved 11-1 thru 11-99)

*TBD=TO BE DEVELOPED

FLIGHT PROCEDURES INSPECTOR'S JOB TASKS

The following are the Flight Procedures Inspector's Job Tasks and the chapter and page where the abbreviated task accomplishment steps are located:

Number		Chapter	Page
Duty 2.3:	**AIR OPERATOR SURVEILLANCE**		
2.3.4	Conduct a FAR Part 121 Cockpit En Route Inspection	8	
Duty 4.3:	**EVALUATION OF FLIGHT PROCEDURES**		
4.3.1	Analyze a Change in Weather Reporting Capability	4	
4.3.2	Coordinate Development of Original Terminal Instrument Procedure	3	
4.3.3	Conduct a Feasibility Study	3	
4.3.4	Conduct Annual Review of Standard Instrument Approach Procedures	4	
4.3.5	Conduct an Aeronautical Study	5	5-136
4.3.6	Coordinate Development and Distribution of Notice to Airmen (NOTAM)	4	
4.3.7	Coordinate Review of Air Traffic Division Requests	4	
4.3.8	Coordinate Approval of Category II or Category III Authorizations	4	
4.3.9	Coordinate Development of an En Route Procedure	4	
4.3.10	Develop Air Navigation Facilities Input for Facilities and Equipment (F&E) Budget	2	2-115
4.3.11	Evaluate a Foreign Instrument Procedure	3	

Number		Chapter	Page
4.3.12	Evaluate an Instrument Flight Procedure	4	
4.3.13	Evaluate Establishment of a Category II or Category III Instrument Approach Procedure	4	
4.3.14	Evaluate a Notice of Proposed Construction	5	5-131
4.3.15	Evaluate an Airport Surface Movement Guide Plan	6	
4.3.16	Evaluate a Noise Abatement Proposal	10	
4.3.17	Evaluate a Proposed Change to a National Standard	11	
4.3.18	Participate in Joint Planning Conference	6	
4.3.19	Participate in Preconstruction Conference	6	
4.3.20	Conduct an Airport/Airspace Analysis	6	
4.3.21	Conduct an Airport Safety Inspection	6	
4.3.22	Conduct a Facility Shutdown Study	6	
4.3.23	Conduct an Environmental Analysis	10	
4.3.24	Conduct an In-flight Evaluation	8	
4.3.25	Process a Flight Procedures Waiver	7	
4.3.26	Process a Determination of Hazard/No Hazard	5	5-143
4.3.27	Process a Notice of Actual Construction	5	5-150
4.3.28	Provide Geodetic Technical Support	11	
4.3.29	Provide Technical Support for Alternate Means of Navigation	4	

Number Chapter Page

4.3.30 Represent the FAA at Safety and Planning Conferences....................11

4.3.31 Respond to a Public Inquiry............9

4.3.32 Review Preapplication for Airport Improvement Program (AIP) Funded Project................................6

Duty 4.4: ACCIDENT PREVENTION

4.4.11 Provide Presentations to Organized Groups.................................11

Duty 4.8: GENERAL

4.8.5 Make a Deposition or Court Appearance..11

4.8.9 Provide Technical Assistance to Legal Counsel..........................11

4.8.10 Provide Technical Assistance..........11

CHAPTER 1. GENERAL CONCEPTS, GUIDANCE, AND INFORMATION

SECTION 1. GENERAL HANDBOOK INFORMATION

1. **PURPOSE.** This handbook provides standards for aviation safety inspectors (ASI) and other personnel in the regional Flight Procedures Branches (FPB) concerning the performance of their primary job functions. This handbook also provides the concepts and procedures needed to administer the regional flight procedures program.

2. **DISTRIBUTION.** This order is distributed to all addressees on special distribution list ZFS-821.

3. **DEFINITIONS, ABBREVIATIONS, AND ACRONYMS.** The FAA, other government and military organizations, and the rest of the aviation community use a specialized language and jargon for both formal and informal communication. A word like "AIM", for Airman's Information Manual, has a meaning different from what can be found in a dictionary. Acronyms are also in general use and both written and spoken communication have to include these acronyms for expediency and better understanding. The facility type "VORTAC" is used rather than very high frequency omnidirectional range/tactical air navigation. Then there are acronyms that have very limited or specialized instrument procedure uses; for example, FAF for final approach fix and MAP for missed approach point. The intent of this paragraph is to list and define most of the words, phrases, and acronyms that may not be understood by everyone that could be expected to read this handbook. The intent is NOT to redefine terms when the Airman's Information Manual, Federal Aviation Regulations (FAR), specific orders and directives, and other formal guidance have already established the proper definition. In many cases, the listings may be used to "define" the meaning for this handbook only or in relation to the Flight Procedures Branch and the individual inspector.

a. Use of Acronyms. Throughout the handbook text, acronyms are normally defined by the formal title followed by the acronym in parenthesis; for example, Federal Aviation Administration (FAA). This formal presentation serves two functions: the acronym is formally defined and the upcoming text may use the acronym and its meaning should be understood. For each chapter, the first time an acronym is used, the formal title followed by the acronym in parenthesis should be used. Because handbooks are not always read from the beginning of the chapter to the specific area of interest, the formal acronym presentation may not have been read. For this reason, this paragraph will list all stand-alone abbreviations and acronyms used throughout the handbook. If the acronym was only used in one chapter, that chapter will be listed; for example, -Chap1-.

b. Listing.

AAA Airport Airspace Analysis.

ABU Office of Budget. The specific office in the FAA organizational structure whose responsibilities include fiscal budgeting matters.

AC Advisory Circular.

ACR Used only in a Chapter 2 job aid to conserve space referring to Air Carrier operation numbers normally reported by Air Traffic. -Chap2-

ADA Aviation Data and Analysis System. An Office of Aviation Policy, Plans, and Management Analysis (APO) computer system used for storage and access of official FAA airport, activity, and activity forecast data. Also see Terminal Area Forecast (TAF). -Chap2-

ADO Airport District Office. The field office for the regional Airports Division. Some regions have no ADO's.

AEG Aircraft Evaluation Group.

AEP Annual Enplaned Passengers. The annual fiscal year total count of revenue passengers boarding at the named airport. This count is available on computer disk from the TAF data for a fiscal year as reported from the annually published Airport Activity Statistics of Certificated Route Air Carriers. -Chap2-

AF Airway Facilities. When used in this handbook, AF refers to the Airway Facilities organization within the FAA or individuals/groups within the AF organization. In most cases, AF will be the appropriate branch/contact within the regional Airway Facilities Division (400 division), but may refer to field/sector offices or headquarters Airway Facilities offices.

AFS Flight Standards Service. The service in the FAA organizational structure whose responsibilities include operational standards of flight.

AGL Above Ground Level. Usage: AGL is normally used in reference to the height above the ground of obstacles, but may refer to other flight procedures requirements such as airspace, radar altimeter, etc., which use AGL. Also, see MSL.

AIA Actual Instrument Approach. An approach made to an airport by an aircraft on an IFR flight plan, when the visibility is less than 3 miles or the ceiling is at or below the minimum initial approach altitude. AIA count is reported by the Air Traffic Control facility having clearance responsibility for the approach procedure. Traffic counts are collated regionally in the Air Traffic Division and reported to Air Traffic Plans and Requirements Service, ATR-1, for publication within the specific fiscal year FAA or Federal Air Traffic Activity. This data is available on computer disk from the ADA TAF and is also in a bound, hard copy by fiscal year. Interim current data can be obtained from the regional Air Traffic Division. These counts for each airport are broken down by Air Carrier, Air Taxi, General Aviation, and Military. -Chap2-

AIM Airman's Information Manual.

AIP Airport Improvement Program. An airport grants program from the Airport and Airway Trust Fund administered by the Airports organization of the FAA.

AIP Aeronautical Information Publications. ICAO publication containing aeronautical information essential to air navigation for a particular country.

ALP Airport Layout Plan.

ALPA Airline Pilots Association. ALPA is the largest labor union and professional organization of U.S. airline pilots. It is affiliated with the AFL-CIO and holds bargaining rights for 42,000 airline pilots and 44 airlines. The union is a major advocate for aviation safety and has initiated or participated in most of the safety improvements over the past 60 years.

ALS Approach Lighting System. When used in this handbook, ALS will refer to a runway lighting facility sited at and prior to the threshold providing runway recognition and visual alignment guidance to landing aircraft. Normally, ALS installations will provide a reduction in the landing minimums for instrument approaches. Typical ALS types include:

ALSF-1 - Approach lighting system with sequenced flashing lights used in ILS Cat-I configuration.

ALSF-2 - Approach lighting system with sequenced flashing lights used in ILS Cat-II configuration.

SALS/SSALS/SALSF/SSALSF/-SSALR - Short (S) or simplified short (SS) approach lighting system without sequenced flashing lights, with sequenced flashing lights (F), or with runway alignment indicator lights (R).

MALS/MALSF/MALSR - Medium intensity approach lighting system without sequenced flashing lights, with sequenced flashing lights (F), or with runway alignment indicator lights (R).

ODALS - Omnidirectional approach lighting system.

RAIL - Runway alignment indicator lights.

LDIN - Sequenced flashing lead-in lights.

ALSIP Approach Lighting System Improvement Program. A multiyear program to install lightweight, frangible structures, and energy and maintenance savings changes at existing approach lighting facilities. -Chap2-

AMIS Airman's Management Information System. A computer system and data base managed by the Office of Aviation System Standards (AVN) that contains, along with numerous other elements, the facility, airport, and obstacle data used in instrument procedure development and flight inspection.

AMP Airport Master Plan.

AND Office of the Associate Administrator for NAS Development.

ANN Program Director for Navigation and Landing.

AOPA Aircraft Owners and Pilots Association.

APO Office of Aviation Policy, Plans, and Management Analysis. The specific office in the FAA organizational structure whose responsibilities include aviation policy.

APS-1 Airway Planning Standard Number One, Order 7031.2. Contains criteria and cost/benefit calculations which apply to qualifying candidates for F&E funding, discontinuance, and takeover. Usage: The acronym "APS-1" normally refers to the order or the criteria and guidance contained in the order.

ASI Aviation Safety Inspector.

ASOS Automated Surface Observing System.

ASR Airport Surveillance Radar.

AT Air Traffic. When used in this handbook, AT refers to the Air Traffic organization within the FAA or individuals/groups within the Air Traffic organization. In most cases, AT will be the appropriate branch/contact within the regional Air Traffic Division (500 division), but may refer to tower/center or headquarters AT offices.

ATA Air Transport Association of America. ATA is a trade and service organization for the nation's scheduled airlines. The purpose of the ATA is to support and assist its member carriers by promoting the air transport industry and the safety, cost effectiveness, and technological advancement of its operations; advocating common industry positions before Federal, state, and local government; conducting designated industry-wide programs; and assuring governmental and public understanding of all aspects of air transport.

ATC Air Traffic Control.

ATCT Air Traffic Control Tower.

ATX Used only in a Chapter 2 job aid to conserve space referring to Air Taxi operation numbers normally reported by Air Traffic. Chap2-

AVN Office of Aviation System Standards. Previously, the Aviation Standards National Field Office. Located in Oklahoma City, AVN is the specific office in the Flight Standards/Aviation Standards organizational structure whose responsibilities include, along with numerous other duties, development, standardization, and flight inspection of instrument flight procedures.

AVR Office of the Associate Administrator for Regulation and Certification.

AVS Office of the Associate Administrator for Aviation Standards.

AWOS Automated Weather Observing System.

AXO Office of the Executive Director for System Operation.

B/C Ratio or BCR Benefit/Cost Ratio. The ratio of the present value of benefits to the present value of costs for a proposed undertaking such as a navigational facility or air traffic service. This ratio reflects the timing of both benefits and costs over the life of a project. A B/C ratio of 1 or more indicates that benefits are estimated to equal or exceed costs and that, in general, a facility or service may be considered to be a candidate for establishment. The benefit and cost factors for

Flight Standards application calculations are primarily provided in APS-1. Some facilities and services have both a Phase I ratio and a Phase II ratio. A Phase I ratio is a qualification ratio based on national averages and is accomplished by the regions. A Phase II ratio may use site-specific data such as weather and does use a more complicated cost calculation. A Phase II ratio is accomplished in Washington and is the actual BCR. Usage: Within this handbook, B/C ratio or BCR may be the ratio number (1.0) or the process resulting in a ratio number such as "A BCR must be completed". -Chap2-

CAA Originally, in 1938, Civil Aeronautics Authority. In 1940, Civil Aeronautics Administration. The CAA became the FAA in 1958.

CAEG Computer Aided Engineering Graphics. A hardware/software computer system used for engineering graphics. Originally, each region had a CAEG.

CAR/CAM Civil Aviation Regulations/Civil Aviation Manuals. Forerunners to the current FAR.

Call Call for Estimates Facilities and Equipment (F&E), Order 2500.55. Annual order which provides program guidance and instructions for the development and preparation of a fiscal year budget estimates for the F&E (Airport and Airway Trust Fund) appropriation.

CFR Code of Federal Regulations. General and permanent rules issued by the executive departments and agencies of the Federal Government.

CIP Aviation System Capital Investment Plan. As the successor to the National Airspace System (NAS) Plan, the CIP documents the FAA's NAS policies and strategies. The Plan addresses safety, efficiency, traffic demands, aging equipment and facilities, airspace use, and new technologies. In addition, the annual CIP adjustment procedures, the relationship to the F&E budget process, the major facility acquisition policy, and other policies are described.

Close-in Obstruction Generically, a close-in obstruction is one that is close to the runway or airport/heliport that affects the design and minimums of a terminal instrument procedure. Specifically for departures, a close-in obstruction is one that penetrates the diverse departure obstacle clearance slope and a departure procedure cannot be designed to miss the obstruction. A set distance from the runway is not a factor; the limits established in the departure criteria determine if the obstruction is close-in. When a diverse departure slope is penetrated, "other than standard" take-off minimums will be required.

CRM Collision Risk Model. A computerized model based on extensive test and evaluation data used to predict the mathematical risk of an aircraft in flight hitting obstacles under instrument meteorological conditions (IMC). Currently, only an Instrument Landing System (ILS) CRM is certified and used. The ILS CRM is designed to evaluate obstacles in the final segment and beginning of the missed approach segment for that small percentage of aircraft expected to execute a missed approach. Designed for ILS CAT I and CAT II, this CRM conducts no final approach evaluation closer to the runway than the decision height (DH) point (missed approach point) except as applied to the missed approach obstacle evaluation for aircraft commencing the climb.

Departure Procedures When used in this handbook, takeoff minimums and departure procedures refer to FAR Part 97 Instrument Flight Rules (IFR) Takeoff Minimums and Departure Procedures as developed or charted based on the appropriate FAR and United States Standard for Terminal Instrument Procedures (TERPS), Chapter 12. Also, see standard instrument departure (SID).

DER Departure End of Runway.

DH Decision Height. With respect to the operation of aircraft, decision height means the height at which a decision must be made, during a precision instrument approach, to either continue the approach or to execute a missed approach. For procedure design and obstacle protection, DH is a specific point on the glide path and this point is also the missed approach point.

DME Distance Measuring Equipment. Equipment (airborne and ground) used to measure, in nautical miles, the slant range distance of an aircraft from the DME navaid.

DNE Does Not Exceed. As applies to obstruction evaluation (OE), an obstacle DOES NOT EXCEED an obstruction standard defined in FAR Part 77. -Chap5-

DOT Department of Transportation.

EA Environmental Assessment. A formal review process, required by the statutes, evaluating the environmental impact of specific FAA actions. The EA can result in a finding of no significant impact (FONSI) or require an environmental impact statement (EIS). The EA, FONSI, and EIS are also the written documents resulting from an environmental review.

EIS Environmental Impact Statement. The document that reflects FAA's final evaluation of the environmental impact of a proposed action. An EIS may be one result of an environmental assessment (EA). Also see EA.

FAA Originally, in 1958, Federal Aviation Agency. After 1967, Federal Aviation Administration.

FA Act Federal Aviation Act of 1958.

FAF Final Approach Fix. A fix, identifying the start of a SIAP final approach segment, from which the final approach to an airport/heliport is executed.

FAR Federal Aviation Regulations. Code of Federal Regulations (CFR), Title 14, Aeronautics and Space, Chapter I, Federal Aviation Administration, Department of Transportation (Parts 1-199).

FCC Federal Communications Commission.

F&E Facilities and Equipment.

FIAO Flight Inspection Area Office. Previously, the Flight Inspection Field Office (FIFO). At overseas locations, the International Flight Inspection Office (IFIO).

Flight Standards When used in handbook, Flight Standards refers to the Flight Standards organization within the FAA under the Flight Standards Service (AFS) or individuals/groups within this organization. This includes AFS, the regional 200 divisions (and AEG), and the field offices. The abbreviation "FS" is NOT used in this handbook.

FMS Flight Management System.

FONSI Finding of No Significant Impact. An FAA document briefly presenting the reasons why an action, not otherwise excluded, will not have a significant effect on the human environment and for which an environmental impact statement therefore will not be prepared. Also see EA.

FPB Flight Procedures Branch. Regional 220 Branch for which this handbook was developed. A Flight Procedures Branch exists in AVN and if referred to in this handbook, AVN-220 will be used. There is also a Flight Procedures Standards Branch, AFS-420. Other FAA organizations such as Air Traffic may have a branch with a title similar to the Flight Procedures Branch.

FPP Flight Procedures Program. The FPP is that program administered by the Flight Procedures Branches for their geographical area of responsibility concerning all aspects of the establishment, safety, revision, and discontinuance of terminal and en route flight procedures. Charted instrument procedures under FAR Parts 95 (en route) and 97 (terminal) are the primary procedures addressed in this handbook. However, the regional FPP also includes uncharted and visual procedures. In addition, the FPP includes the safety of airport ground movement in low visibility and adverse weather conditions.

FRC Facilities Review Committee. A regional committee of division managers whose major activity is oversight of F&E staff work accomplished by the Interdivisional Working Committee (IDWC). -Chap2-

FSDO Flight Standards District Office.

FTE Flight Technical Error. FTE is the accuracy with which the pilot controls the aircraft as measured by success in causing the indicated aircraft position to match the desired indicated position. For an autopilot, FTE refers to the accuracy with which the autopilot controls the aircraft as demonstrated by success in causing the aircraft position to match the desired position as measured by the deviation signals input to the autopilot. FTE does not include procedural blunders. Usage: FTE is the actual error determined by analysis of airborne/simulator flight test data.

FTT Flight Technical Tolerance. FTT is that part of the total system error budget allocated to the pilot or autopilot. This tolerance considers the pilot's or autopilot's ability to maintain the vertical and lateral course deviation indications in the desired position referred to as nulled deviation indication. FTT is normally used in minimum operational performance standards, documents providing obstacle clearance criteria, and other applications to specify the allowance provided to accommodate flight technical error (FTE).

FY Fiscal Year. A year's period (October 1 to September 30) used for Federal budgeting. FY90 began October 1, 1989 and ended September 30, 1990.

GA General Aviation. All civil aviation operations other than scheduled air services and nonscheduled air transport operations for remuneration or hire.

GEODES or GEODET Two similar programs, Geodesic and Geodetic, written by Flight Standards personnel for personal computers and used for procedural course, distance, and location (latitude and longitude) calculations.

GPS Global Positioning System. A navigational system consisting of earth orbiting satellites in a constellation used for three-dimensional positioning. Usage: In this handbook, GPS normally refers to satellite and aircraft equipment or the instrument procedures designed for operators/aircraft with this capability.

GS Glide Slope. Facility within the ILS used for vertical guidance.

GT-CALC Geodetic/TERPS Calculator. A personal computer program, utilizing a data base, that was developed by Flight Standards personnel and used for complex TERPS calculations.

HAA Height Above Airport. Published for circling minimums, the HAA is the height of the minimum descent altitude (MDA) above the airport elevation.

HAT Height Above Touchdown. Published for straight-in minimums, the HAT is the height of the MDA or DH above the touchdown zone elevation.

HIRL High Intensity Runway Lights. Runway edge lights capable of high intensity. Runway lights may also be medium intensity (MIRL) and low intensity (LIRL).

Hub The term "hub" as applied to air transportation is used primarily to describe an airline route structure in which flights radiate out from a major "hub" airport like spokes from the hub of a wheel, with the major airport serving as a transfer point for passengers changing between flights. Hub airports are classified as large (L), medium (M), small (S), or non (N) hub airports depending upon the percentage of the total national passenger enplanements for which they account: (L) 1% or more, (M) 0.25-1.00%, (S) 0.05-0.25%, (N) less than 0.05%. Reference: National Plan of Integrated Airport Systems (NPIAS) 1990-1999, Chapter 1.

IAPA Instrument Approach Procedures Automation. A computer system designed to develop instrument procedures.

ICAO International Civil Aviation Organization.

IDWC Interdivisional Working Committee. A working level regional committee for planning and approving the annual F&E regional budget submission and regional reprogramming actions. -Chap2-

IFR/VFR IMC/VMC Instrument Flight Rules/Visual Flight Rules. Instrument Meteorological Conditions/-Visual Meteorological Conditions. IFR and VFR are the rules of flight specified in the FAR. IMC and VMC are internationally recognized terms differentiating instrument from visual weather conditions. Neither IMC nor VMC is used in the FAR, but they are common terms and indicate the weather conditions, as delineated in the FAR, for which instrument or visual rules may apply. In conversation, IFR/IMC and VFR/VMC are sometimes used interchangeably and can lead to misinterpretation and confusion.

ILS Instrument Landing System. A ground navigation system providing aircraft with precision approach guidance to the specific landing runway. See definitions for localizer (LOC) and GS.

ILS CAT I ILS Category I. ILS provides the basic precision approach minimums to a decision height (DH) of not less than 200 feet above the runway touchdown zone elevation (TDZE) and visibility of 1/2 mile or runway visual range (RVR) 2400 feet or RVR 1800 feet if runway centerline lighting and touchdown zone lighting are installed.

ILS CAT II ILS Category II. ILS Cat II provides a reduction of basic precision approach minimums for approved operators to either RVR 1600 feet visibility and DH 150 feet above TDZE or RVR 1200 feet visibility and DH 100 feet above TDZE.

ILS CAT III ILS Category III. ILS Cat III provides an additional reducion below CAT II minimums for approved operators to RVR 700 feet visibility or less (as published or approved under Operations Specifications). No DH restriction applies.

IM Inner Marker. A basic electronic component of an ILS CAT II, used to designate a specific point on the localizer course which marks the Category II DH point (normally 100 feet above the TDZ elevation). Provides an extremely localized identifiable aural code signal (6 dots per second continuously) and activates an aircraft instrument panel light of white color.

LLWAS Low Level Windshear Alert System. -Chap 2-

LOC Localizer. Facility within an ILS used for horizontal guidance. Without a GS antenna installation, the LOC may provide the basis for a non-precision approach.

LORAN-C A long-range radio navigational system that uses ground waves transmitted at low frequency to provide user position information. Usage: In this handbook, normally referring to the ground or airborne equipment, the entire system, or the instrument procedures designed for operators/aircraft with this capability.

LOM Locator Outer Marker. Also called compass locator (COMLO), the LOM is an nondirectional beacon (NDB) collocated with the outer marker and associated with a precision ILS approach or a non-precision localizer approach.

MAP Missed Approach Point. A point prescribed on the final approach course at which a pilot must execute the missed approach procedure if the required visual reference does not exist.

MCA Minimum Crossing Altitude. The published lowest altitude at certain fixes at which an aircraft must cross when proceeding in the direction of a higher MEA. MCA's are normally required to meet signal or obstacle clearance requirements.

MDA Minimum Descent Altitude. The lowest altitude, expressed in feet above mean sea level, to which descent is authorized on final approach or circling maneuvers for a non-precision instrument approach procedure.

MEA Minimum En Route IFR Altitude. The published lowest altitude between radio fixes which assures acceptable navigational signal coverage and meets obstacle clearance requirements.

MHA Minimum Holding Altitude. The lowest altitude prescribed for a holding pattern which meets the requirements for navigational signal coverage, communications, and obstacle clearance.

MIA Minimum IFR Altitude. When used in this handbook, MIA is the minimum IFR altitude ithin a specified area used by Air Route Traffic Control Center personnel. This altitude meets IFR obstacle clearance criteria.

Military Operation Any type of aircraft operation by an aircraft of the various military services. Abbreviated as MIL in Chapter 2 job aids to conserve space.

Minimums Minimums, rather than minima, is used in this handbook and normally denotes the ceiling and/or visibility required to conduct a specific fli ght operation.

MLS Microwave Landing System. A precision instrument approach system operating in the microwave frequency spectrum which normally consists of the following components: (1) Azimuth Station, (2) Elevation Station, (3) Precision Distance Measuring Equipment (P-DME). May presently be used to provide MLS Category I minimums to a height above touchdown of not less than 200 feet and a runway visual range of not less than 1800 feet. Category II/III minimums will be defined in the future.

MM Middle Marker. An electronic ground component of an ILS used to designate a point on the localizer course at approximately the Category I DH point. Provides a highly localized identifiable aural code signal (alternate dots and dashes) and activates an aircraft instrument panel light of amber color.

MOCA Minimum Obstruction Clearance Altitude. The published lowest altitude between radio fixes on airways and routes which meet obstacle clearance requirements.

MSA/ESA Minimum Safe Altitude/Emergency Safe Altitude. One common altitude or more than one sector altitude published on SIAP's providing at least 1000 feet of obstacle clearance for emergency use within a specified distance from a navigation facility. MSA's are normally 25 NM from the facility while ESA's are 100 NM and used on military high altitude SIAP's. RNAV procedures have MSA's within a 25 NM radius of the runway waypoint or airport waypoint. TERPS provides criteria for developing both MSA's and ESA's.

MSL/AMSL Mean Sea Level/Above Mean Sea Level. The expression of elevation, height, or altitude of a point on the earth, a location on an object (normally the top) fixed to the earth, or a level above the surface of the earth measured above the mean level of the sea. MSL is often used following a number expressed in feet (as opposed to AGL for above ground level); for instance, 1200 feet MSL. A barometric altimeter depicts the MSL altitude when the current barometric pressure is set. Most charted altitudes are MSL.

MTA Maximum To Avoid. As applies to OE, the maximum MSL height an obstacle can be to not affect a specified obstruction standard. MTA has the same meaning as no exceed height (NEH) and may appear in FPB computer programs. -Chap5-

MVA Minimum Vectoring Altitude. The minimum MSL altitude an IFR aircraft can be radar vectored within a specified area. This altitude meets IFR obstacle clearance criteria.

NAS National Airspace System.

Navaid Navigational Aid. Any ground or space based navigational equipment that aids a pilot in maintaining a specified ground track, providing vertical guidance, or identifying the exact position of an aircraft.

Navigable Airspace Airspace at and above minimum flight altitudes including airspace needed for safe takeoff and landing. Reference: FAR Part 1, Definitions.

NEH No Exceed Height. As applies to OE, the maximum height of a structure so as not to exceed an obstruction standard defined in FAR Part 77 and appropriate FAA directives. This MSL height is reported to Air Traffic when the proposed structure's height exceeds standards. -Chap5-

NDB Nondirectional Beacon/Radio Beacon. A low, medium, or ultrahigh frequency radio beacon transmitting nondirectional signals whereby the pilot of an aircraft equipped with the direction finding equipment can determine his bearing to or from the radio beacon and "home" on or track to or from the station. Can be used as the sole navaid required for a non-precision instrument approach, or in conjunction with the OM, as a LOM for a precision ILS.

NFDC National Flight Data Center. A division within the Office of Air Traffic System Management, specifically ATM-600, whose responsibilities include data for airports, facilities, and communications, as well as NOTAM and flight procedure data.

NFDD National Flight Data Digest. A publication issued by NFDC as a means of rapidly disseminating information on changes to navaids, Flight Service Stations, airports/heliports, etc.

NM Nautical Mile. One nautical mile equals 6076.1 feet as defined in TERPS.

NOAA National Oceanic and Atmospheric Administration.

Nonfed Nonfederal. A common abbreviation normally referring to nonfederal ownership of facilities.

NOS National Ocean Service.

NOTAM Notice to Airmen.

NPIAS National Plan of Integrated Airport Systems.

NPRM Notice of Proposed Rule Making.

NR Nonrulemaking. Normally used in numbering studies involving navigational aids.

NRA Nonrulemaking Action. Normally used in numbering studies involving airports.

NTSB National Transportation Safety Board.

NWS National Weather Service.

Obstacle An object, whether man-made or naturally occurring, that MAY affect an obstruction standard. An OBJECT becomes an OBSTACLE when obstruction standards are applied; an OBSTACLE becomes an OBSTRUCTION when an obstruction standard is exceeded or the application of an obstruction standard is affected.

Obstruction An object, whether man-made or naturally occurring, that exceeds an obstruction standard or is the controlling factor in applying an obstruction standard.

OC Obstruction Chart. A chart surveyed and produced by NOS at airports having or expected to have a precision approach facility.

OE Obstruction Evaluation. Application of specified obstruction standards to existing or proposed objects whether man-made or naturally occurring.

OIS Obstacle Identification Surface. A surface, normally 40 to 1, used for evaluating IFR departures. See TERPS Chapter 12.

OM Outer Marker. A basic electronic component of an ILS system used to designate a specific point on the localizer course after intercepting glide slope. Provides a highly localized identifiable aural code signal (2 dashes per second) and activates an aircraft instrument panel light of blue color.

OMB Office of Management and Budget. A cabinet level office of the executive branch of government responsible for governmental management and national budgeting.

Operational Divisions or Services Operational divisions refer to the regional Flight Standards division (200), Airway Facilities Division (400), Air Traffic Division (500), and Airports Division (600) and their field offices and units. For Services, this term refers to the complete organizations of Flight Standards, Airways Facilities, Air Traffic, and Airports, including headquarters. These terms are not intended to slight other headquarters offices, regional offices, and field offices involved in operational decisions, but refers to the divisions or services (rather than constantly listing them) for which extensive coordination is required to administer the Flight Procedures Program (FPP).

OpSpecs Operations Specifications.

OST Office of the Secretary of Transportation. The headquarters office of the DOT.

Other than Standard Minimums The FAR, TERPS, and other documents establish standard minimums; for example, standard takeoff minimums, standard alternate minimums, etc. These same documents may also specify that minimums higher or lower than standard may be required or authorized under specific conditions or circumstances. Because some minimums may be higher or lower than standard or contain conditional requirements, they are referred to as "other than standard" minimums. Example: Takeoff Minimums, "Rwy 10, 300-1, or standard with minimum climb of 280′ per NM to 1800."

PANS Procedures for Air Navigation Services. ICAO publications covering operating procedures for safe and efficient air navigation.

PAPI See VASI.

PAR Precision Approach Radar.

PC Personal Computer.

POI Principal Operations Inspector.

Proponent Used throughout this handbook, proponent or sponsor refers to an individual or group that has proposed, requested, or petitioned the FAA for considerations or actions. In some situations, an FAR requirement is being met as in a Notice of Proposed Construction or Alteration. For SIAP requests, the proponent or sponsor is normally a flying group or the airport manager/authority. The FAA may also initiate action and become the sponsor, for example when a facility is installed under the F&E program and a SIAP is developed. Consultants, engineers, lawyers, or members of Congress may represent a proponent or may act as a proponent. Because of these complexities, this handbook will use both proponent and sponsor to cover all possible situations or individuals.

PROSE Preliminary Regional Obstacle Screening Evaluator. A computer program developed as a preliminary screening tool for the Flight Standards evaluation of an individual OE case.

Quad Chart 7 1/2-Minute Quadrangle Chart.

RCL Runway Centerline Lighting. Flush centerline lights spaced at 50 foot intervals. Normally installed on designated instrument runways and may permit additional reduction of visibility minimums for landings or departures wheninstalled in conjunction with RVR, TDZL, and HIRL.

REIL Runway End Identifier Lights.

RNAV Area Navigation. A method of navigation that permits aircraft operation on any desired course within the coverage of the station-referenced navigation signals or within the limits of a self-contained system capability. In this handbook, normally referring to the instrument procedures designed for operators/aircraft with this capability.

ROC Required Obstacle Clearance. A frequently used flight procedures acronym referring to the clearance required over obstacles as defined by TERPS or appropriate directives.

RVR Runway Visual Range. Equipment providing an electronic means of measuring horizontal visibility along the runway reported in hundreds of feet. Commonly associated with low visibility precision landings and departures on runways having HIRL and airports with an Air Traffic Control Tower (ATCT). Very low visibility operations (CAT II-CAT III) are supported by a touchdown zone, a mid-field, and roll-out end RVR installations. In some cases, RVR may refer to visibility minimums that are required or charted.

PTRS Program Tracking and Reporting System.

SDF System Design Factor. A variable criteria factor for candidacy for an RVR system installation based upon whether this is the first system at the airport or not. -Chap2-

SMGCS Surface Movement Guidance and Control System, AC 120-57. The control or regulation of facilities, information, and advice necessary for pilots of aircraft and drivers of ground vehicles to find their way on the airport during low visibility operations (below 1200 feet RVR) and to keep the aircraft or vehicles on the surfaces or within the areas intended for their use.

SIAP Standard Instrument Approach Procedure. For this handbook, SIAP refers to the entire approach procedure as developed. This includes the possibility of multiple initials and feeder routes to initials, the individual approach segments, a missed approach procedure, minimum segment altitudes and minimum safe altitudes, courses and distances, course reversal and holding, fixes, approach minimums, and procedural notes. In some cases, SIAP may refer to the finished product (8260 series form where the procedure is documented) or the chart itself.

SID Standard Instrument Departure. An ATC procedure charted for pilot use to provide transition from the terminal area to the en route structure. A primary purpose for SID's is to reduce pilot/controller radio communication for complex clearances. Commonly, SID's contain turns, altitudes, headings, courses, and routes for departures.

Sponsor See Proponent.

STAR Standard Terminal Arrival. An Air Traffic Control procedure charted for pilot use to provide transition from en route to a terminal area. Commonly, STAR's provide new aircraft routes allowing descent away from departure and airway traffic.

TAF Terminal Area Forecast. The air traffic activity forecast for the large number of airports in APO's ADA System. A number of models and variables are used by APO to develop these forecasts. As APO developed the ADA System, not only was forecast data stored, but past data, current data, and critical airport information were included. Current terminal activity is the same as the FAA or Federal Air Traffic Activity which is an FAA publication issued annually containing terminal and en route air traffic activity information of the NAS. Usage: The acronym has evolved to mean more than just the forecast data; but actually, TAF now refers to all data of the ADA System, especially that data used in APS-1 calculations. -Chap2-

Takeoff Minimums See Departure procedures.

TCH Threshold Crossing Height. The theoretical height above the runway threshold if the aircraft maintains the appropriate precision final approach slope. For ground based vertical guidance navaids, the TCH is from the aircraft's receiving antenna. TCH's are also identified with visual approach slope systems and then, the theoretical height would be from the pilot's eyes. Obviously, the height of the aircraft (wheels/tail) over the threshold is lower than a published TCH.

TCL Taxiway Centerline Lighting System. Semiflush inset lights installed to lead an aircraft off the landing runway centerline, along the taxiway centerline, and along designated taxiing paths in portions of runways, ramp, and apron areas.

TDZ Touchdown Zone. The first usable 3,000 feet of a landing runway.

TDZE Touchdown Zone Elevation. The highest MSL elevation in the first 3,000 feet of the landing surface.

TDZL Touchdown Zone Lights. Two rows of transverse light bars located symmetrically about the runway centerline normally at 100 foot intervals in the first 3,000 feet of the runway.

TERPS United States Standard for Terminal Instrument Procedures (TERPS), Handbook/Order 8260.3 (latest edition). Usage: The acronym "TERPS" is normally used to refer to the order or the criteria and guidance contained in the order.

TERPS Calculator A personal computer program, utilizing a data base, that was developed by Flight Standards personnel and used for complex TERPS calculations.

TVOR Terminal Very High Frequency Omnidirectional Range. A low-powered standard navigation facility used primarily to service non-precision instrument approach procedure requirements to airports/heliports in a terminal area, (25 NM service volume area) as opposed to en route navigation usage of a standard VOR facility.

UHF, VHF and H/M/LF Ultra High Frequency, Very High Frequency, Medium, and Low Frequency. Frequencies of the radio band normally associated with ground navigational or communications facilities.

VASI/PAPI Visual Approach Slope Indicator and Precision Approach Path Indicator Systems. A system, normally consisting of lights, that is sited beyond the runway threshold used to provide a preset, visual approach slope or path to the pilot. Horizontal baffling is normally used to set the approach angle (optimum 3 degrees) for viewing lights and/or color. Vertical baffling may also be included, as in the PAPI, for a visual course reference.

VDP Visual Descent Point. A defined point on the final approach course of a non-precision straight-in approach procedure from which normal descent from MDA to the runway touchdown point may be commenced, provided required visual reference is established.

VFR/VMC See IFR.

VOR Very High Frequency (VHF) Omnidirectional Range. A medium powered or high powered navigational facility, radiating omnidirectional courses, and used for standard en route low altitude or high altitude navigation. (Also see TVOR) When DME is collocated, the facility is referred to as VOR/DME; when also collocated with a Tactical Air Navigation (TACAN) facility, which radiates separate omnidirectional courses, the facility is referred to as VORTAC.

VOT VOR Test Signal. Facility used by pilots prior to departure to test the aircraft VOR navigation receivers for accuracy within plus or minus 4 degrees in preparation for IFR operations and in accordance with FAR Part 91.

4. IMPLEMENTATION. During the development of this handbook, sections of task chapters will be published as they are completed. Future changes will add to or complete individual chapters. Material that is planned but not yet ready for publication will be indicated by the acronym "TBD" (to be developed).

5. HANDBOOK ORGANIZATION AND USE. This handbook has been designed to serve as a multipurpose document that will meet the needs of new Flight Procedures Branch employees entering the FAA work force, FAA employees new to flight procedures, and individuals with many years of flight procedures experience. Extensive new guidance has been written for this handbook where none has existed in the past. Historical information regarding flight procedure's evolution is included and information, currently found in many separate documents, has been compiled to make the handbook as comprehensive as possible.

a. Other Orders. No orders are canceled at this time. Much of the existing Flight Procedures Branch guidance is contained in the latest edition of Order 8260.19, Flight Procedures and Airspace, and some guidance is provided in other directives such as the latest edition of Order 7400.2, Procedures for Handling Airspace Matters. These other orders define areas of responsibility for different programs. Inspectors should continue to refer to the appropriate directives even after definitive task accomplishment guidance is expanded in this handbook.

b. Directive Information. In this handbook, directive information is instruction that is considered imperative. The handbook will use the directive terms "shall" and "must" and means that the actions are MANDATORY. Use of the terms "shall not" and "must not" indicates a PROHIBITED action. These terms do not permit inspector discretion and shall be followed unless specifically authorized by headquarters division managers with concurrence of the regional division manager. The term "will" is not directive in nature and is used to indicate an assumption that an event would normally be expected to happen.

c. Guidance Information. Guidance information is material that is guiding in nature and contains terms such as "should" or "may". These terms indicate actions that are desirable or permissible, but not mandatory. Flexibility on the part of the inspector is allowed.

d. Handbook Development. A primary objective in the organization and development of this handbook is to make it as comprehensive and as easy to use as possible. Paragraphs have been reserved in each section, pages have been reserved within a chapter for sections that will be developed, and chapters have been reserved for the tasks. Reservation of paragraphs, sections, and chapters allows for expansion without re-issuing extensive handbook material.

e. Chapters Represent Tasks. When completed, the handbook will consist of a compilation of major and minor tasks performed by the aviation safety inspector. A list of the tasks is located after the Table of Contents for easy chapter and page reference.

(1) For chapter sequencing, Chapter 1 is general in nature. The remaining chapters contain one or more associated tasks. Chapters and

tasks are grouped based on similar subjects. The first two task chapters (Chapters 2 and 3) are work intensive, have high visibility, and are relatively complex. F&E and flight procedures are the subjects discussed. Another chapter involving flight procedures is sequenced next. The remaining major tasks, OE and NRA, are then discussed along with their associated tasks. The remaining chapters complete the inspector task list.

(2) The tasks were initially identified in the 1985 Job and Task Analysis, reviewed and updated in 1992/-1993, and will probably be revised in the future as inspector responsibilities change.

f. Chapter Content Organization. Each of the following chapters has an initial section allocated for general information and one or more sections that describes the procedures on how to complete a task.

(1) Section 1, General, explains the objectives of a given subject, presents the relevant historical considerations, and states current FAA policy related to the task or tasks discussed.

(2) The remaining sections contain step-by-step procedures and a flow chart of how to perform the specific task. Although all steps necessary for task completion are included, some steps may be discreet tasks. PTRS codes for each task will be included.

(3) Some subjects are very complex and in these cases background information and policies may be provided in more than one chapter section; procedures also may be very complex and organized into more than one section. A later section may relate several sections to each other or explain the differences between the several sections for a specific or additional requirement. An ending section will briefly review the specific procedural steps for accomplishing a single task.

(4) Consequently, the number of sections and order of sections within a chapter will depend upon the details that need to be presented, the normal progression from general to specific guidance, and the segregation of individual tasks to include the accomplishment steps.

g. Inspector References. This handbook will use the terms "aviation safety inspector," "flight procedures inspector," and "inspector" to refer to the technical individuals and manager in the Flight Procedures Branch.

(1) Occasionally, inspector references may include a task title such as "F&E inspector" or "OE inspector". This reference is normally used within a chapter devoted to a specific task or group of tasks and denotes the FPB individual accomplishing the task(s).

(2) The term "specialist" will only be used for

individuals outside the FPB, no matter what their official title may be; for example, the Air Traffic OE specialist or procedures specialist, referring to AVN personnel developing procedures.

h. Advisory Circulars, Orders, and FAR References. Although the intent is to include in this handbook the material the inspectors need to accomplish their tasks, references to other orders, handbooks, or the FAR will be made to indicate that these sources should be used for more guidance or more definitive criteria. FAA directive and AC numbers will be listed without their ending letter designator, if one exists; for example, Order 8260.3B will be Order 8260.3. This method enables the handbook to retain currency as other guidance is rewritten.

i. Handbook Enumeration. Pages and figures will be numbered in this handbook in the following manner:

(1) Pages. The pagination of each chapter is designed to ease the discovery, revision, and replacement of subjects. Each page is numbered by stating the chapter followed by the page; for example, Page 5-2 would indicate the second page of chapter 5. Page headers present the handbook number (and change number, if appropriate) and date of page issuance. Footers indicate the page number and the first paragraph number for the page. If a paragraph commences on one page and continues on a following page, that paragraph number will appear in the footer of the following page.

(2) Figures. The numbering of figures, like the numbering of pages, uses the chapter number followed by the figure number. For example, Figure 8-3 is the third figure in Chapter 8.

j. Location of Figures. Forms, job aids, letters, etc., will be entitled "FIGURE" and normally placed at the end of each appropriate section. Placement of figures at the end of the section allows close proximity for reference, but does not interfere with the natural flow of the text. Figures may also be placed before or after a paragraph and these will be used to emphasize the material presented.

k. Figure Use. When composing a letter or completing a form, the inspector should use the figures as a guideline only.

(1) Letters composed in the regional offices must adhere to the style and format indicated in the FAA Correspondence Manual.

(2) Sample material will state, "SAMPLE" in the figure title.

(3) Material that is to be used word-for-word will use "FORM", as in "FORM LETTER", in the figure title.

(4) This handbook does not initiate any new offi-

cial FAA forms. However, job aids have been included in the format of a form for all inspectors to utilize. These job aids may be newly designed or refinements of tools that have been used successfully in some flight procedures branches for many years.

6. HANDBOOK REVISIONS. The Flight Standards Service is responsible for all revisions to this order and its appendixes, as appropriate. Regional supplements to this handbook are prohibited. Individuals at all levels of the FAA and individuals in the aviation industry are encouraged to make suggestions for handbook revisions.

a. Handbook Revision Process. Development and revision of this handbook is accomplished by the Flight Procedures Standards Branch, AFS-420. AFS-420 will initiate revisions based on discovered deficiencies, changing aviation requirements, and new FAA policies. AFS-420 will also review and research suggested revisions. After development, draft revisions will be coordinated with other flight standards divisions and interested parties. After obtaining the Flight Standards Service Director's approval, the formal handbook change will be printed and distributed through the FAA distribution system.

b. Information Currency. Any deficiencies found, clarifications needed, or improvements to be suggested regarding the content of this order should be forwarded for consideration to:

Federal Aviation Administration
Flight Procedures Standards
Branch, AFS-420
800 Independence Avenue, S.W.
Washington, D.C. 20591

c. Your Assistance is Welcome. An Inspector Feedback Sheet, Figure 1-1, is included at the end of this section for your convenience. If an interpretation is urgently needed, you may call AFS-420 for guidance at (202) 267-8277. In addition, use the response sheet as a follow-up to verbal conversation.

7.-19. RESERVED.

FIGURE 1-1. INSPECTOR FEEDBACK SHEET

Subject: [X] Order 8200.34, Flight Procedures Inspector's Handbook
[ ] Order 8300.10, Airworthiness Inspector's Handbook
[ ] Order 8400.10, Air Transportation Operations Inspector's Handbook
[ ] Order 8700.1, General Aviation Operations Inspector's Handbook

To: Manager, Flight Procedures Standards Branch, AFS-420
Telemail Address: AFS420

Please check all appropriate items. Attach a copy of affected pages.

[ ] An error (procedural or typographical) has been noted in Chapter______, Section______, paragraph______, on page______.

[ ] Recommend in Chapter______, Section______, paragraph______, on page______, be changed as follows (attach separate sheets if necessary):

[ ] Recommend a change to National Policy in Chapter______, Section______, paragraph______, on page______ as follows:

[ ] In a future change to this directive, please cover the following subject (briefly describe what you want added):

[ ] I would like to discuss the above. Please contact me.

Submitted by: ________________________________ Date: ______________
Telephone Number: _________________________ Routing Symbol: _______
Telemail Address: _________________________

SECTION 2. HISTORY OF THE FAA AND ITS ORGANIZATION AND AUTHORITY

20. HISTORY OF THE FEDERAL AVIATION ADMINISTRATION.

a. Early Regulatory Authority and Responsibilities.

(1) Aviation regulatory authority in the United States began with the enactment of the Air Commerce Act of 1926. This legislation was passed in response to requests from the aviation industry. Leaders in the aviation industry believed that commercial use of the airplane could not reach its fullest potential without federal regulation of aviation safety. The Air Commerce Act commissioned the Secretary of Commerce to promote air commerce, issue and enforce air traffic rules, certificate pilots and aircraft, establish airways, and operate and maintain air navigation aids. The Department of Commerce assumed the task of controlling en route air traffic in 1936. Regulation of en route air traffic became the department's most demanding civil aviation responsibility.

(2) In order to cope with increased aviation and air traffic control needs, the Civil Aeronautics Act was passed in 1938. This act established a new, independent agency known as the Civil Aeronautics Authority (CAA) which was given the additional authority to issue air carrier route certificates and regulate airline fares. In 1940, President Franklin Roosevelt divided the CAA into the Civil Aeronautical Board (CAB) and the Civil Aeronautics Administration, again the CAA. The CAB was established as an independent agency and was given the authority and responsibility for economic and safety rulemaking and accident investigation. The CAA was reassigned to the Department of Commerce and it was given responsibility to regulate air traffic control, airman and aircraft certification, safety enforcement, and airway development. In 1946, Congress created a program for federal aid to airports and assigned its administration to the CAA.

b. Establishment of the FAA.

(1) In the 13 years following World War II, air commerce, aviation technology, and public demand for air services reached unforseen levels of complexity. Under the Department of Commerce, the CAA could not efficiently fulfill its responsibilities or solve many of the difficulties caused by this rapid growth and increasing complexity. Congress passed the Federal Aviation Act of 1958 (FA Act) that created an independent agency, the Federal Aviation Agency (FAA). It empowered the FAA with sole responsibility for developing and maintaining a combined civil and military system of air navigation and air traffic control. The FAA absorbed the responsibilities of the CAA and

the safety rulemaking functions of the CAB.

(2) In 1967, the Federal Aviation Agency was placed in the newly created Department of Transportation (DOT) and renamed the Federal Aviation Administration (again, FAA). This action was based on the beliefs of Congress, the executive branch, and the transportation industry that integrated and balanced transportation systems were necessary for the nation's transportation needs and that such systems could best be managed by a single, cabinet level department. Subsequently, the FAA acquired additional responsibilities through various amendments to the FA Act. The FAA became responsible for such issues as aviation security, aircraft noise abatement, and airport certification. Later legislation authorized the FAA Administrator to establish minimum safety standards for airports and to issue operating certificates to air carrier airports meeting those standards.

c. History of the FAA Organization. In 1927, the Department of Commerce employed 234 persons working in the Air Regulations Division and the Air Information Division. When the CAA was created, it was administered by five appointed officials who held authority to regulate civil aviation. Its associated agency, the Air Safety Board, was responsible for investigating accidents, determining probable cause of each accident, and making recommendations for accident prevention. From 1938 to 1958, the number of CAA employees grew from 2938 to 25,805. By 1958, six domestic regions, one international region, the Aeronautical Center, and a Technical Development and Evaluation Center (FAA Technical Center) were directly responsible to the CAA Administrator. Within CAA headquarters a major operational office was directed by the Assistant Administrator for Operations. A subordinate office to the Assistant Administrator for Operations was called the Office of Aviation Safety and was the predecessor of the Bureau of Flight Standards. Other offices subordinate to the Assistant Administrator for Operations were the Office of Federal Airways, the Office of Airports, and Washington National Airport.

(1) In 1959, the first year of the newly formed independent FAA, the Washington Headquarters organizational structure was as follows:

(a) Three staff level Assistant Administrators consisting of Management Services, Plans and Requirements, and Personnel and Training.

(b) Five specialized offices consisting of General Counsel, Civil Air Surgeon, Congressional Liaison, Public Affairs, and International Coordination.

(c) Five operational bureaus consisting of Research and Development (including the FAA Technical

Center), Flight Standards, Facilities and Material, Air Traffic Management, and National Capital Airports.

(2) The FAA's regional organizational structure in 1959 included six domestic regions, one international region, and the Aeronautical Center.

d. Current FAA Structure. As of 1992, the FAA employs more than 45,000 personnel and its organization is largely decentralized. At Washington Headquarters, five specialized offices perform staff functions for the FAA Administrator and Deputy Administrator. Three Executive Directors and five Assistant Administrators report directly to the Administrator for the remaining FAA functions. Eight Associate Administrators, many headquarters offices and services, and the nine regional offices as well as the Aeronautical and Technical Centers, report to the Executive Directors. Headquarters is responsible for developing policy, regulations, and operational methods and functions. Generally, the regional offices and the Aeronautical Center administer to a specific geographic area or have special operational responsibilities.

NOTE: Although not always current, organizational charts may be found in the FAA and DOT telephone directories.

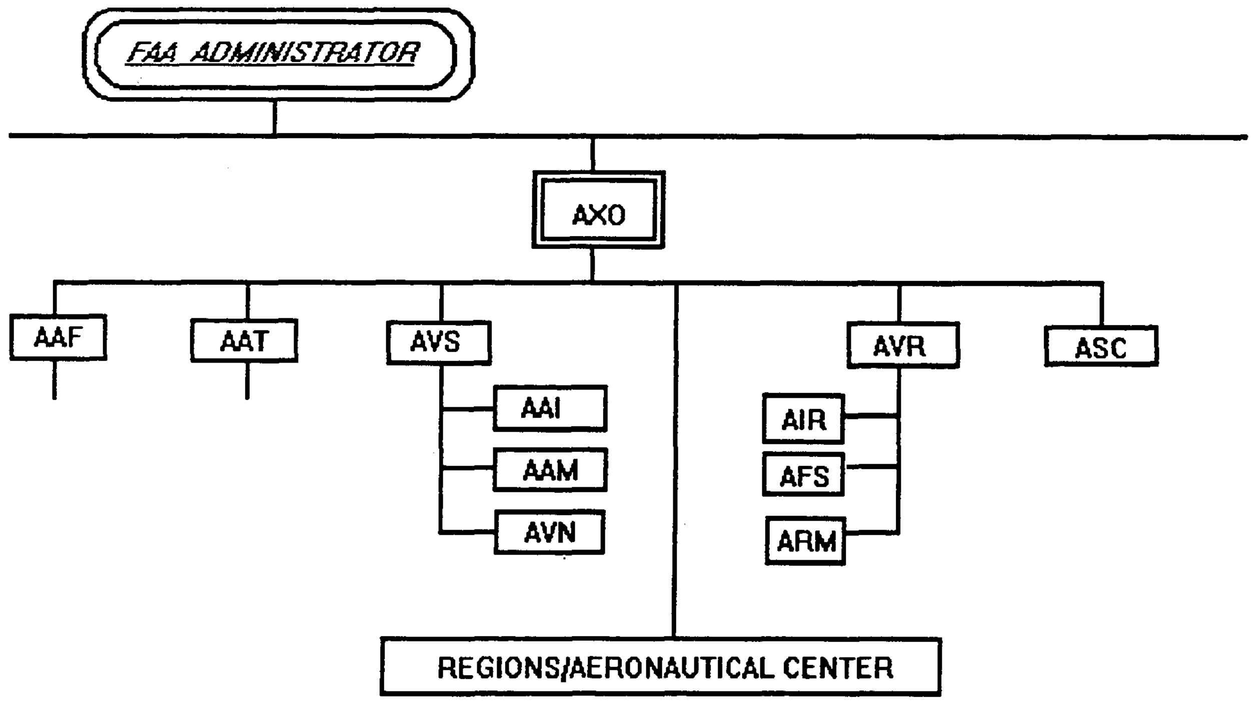
21. HISTORY AND ORGANIZATION OF AVIATION STANDARDS/FLIGHT STANDARDS.

a. Early History of Flight Standards. When the FAA was created in 1958, the Bureau of Flight Standards was established as one of the five operating bureaus within the FAA. This bureau included most safety functions of the previous Department of Commerce Aeronautics Branch and its successors, such as the Flight Operations Service and the Office of Flight Operations and Airworthiness. In 1967, the name of the Bureau of Flight Standards was changed to Flight Standards Service. The director of this service reported directly to the FAA Administrator. The Flight Standards Service was later assigned as one of several offices within the Office of Associate Administrator for Aviation Standards that had been established in January 1979. In July of 1979, three new offices for flight operations, airworthiness, and aviation safety, absorbed the safety functions previously assigned to the Flight Standards Service. Most headquarters flight standards operational functions were performed by the Office of Flight Operations and the Maintenance Division of the Office of Airworthiness. In 1984, the Office of Aviation Safety was reassigned as a staff office reporting directly to the Office of the Administrator.

b. Organization of Regulations, Standards, and Compliance. Many organizational changes occurred in the latter part of the 1980's; the most significant change was the appointment of executive directors above the Associate Administrators in 1988. Organizational adjustments were also made in 1991 when the Flight Standards offices were joined with Air Traffic and Airway Facilities under one operational structure.

(1) Headquarters Organizations. The Executive Directorate for System Operation (AXO) consists of the Associate Administrators of Air Traffic (AAT) and Airway Facilities (AAF), the Office of System Capacity and Requirements (ASC), Regions and Aeronautical Center, and the Associate Administrator for Regulation and Certification (AVR) and the Associate Administrator for Aviation Standards (AVS).

FIGURE 1-2. AXO & AVR/AVS ORGANIZATIONAL CHART



(2) <u>AVR/AVS Organization</u>.

(a) <u>AVR</u>.

<u>1</u>. Aircraft Certification Service (AIR), four divisions.

<u>2</u>. Flight Standards Service (AFS), six divisions.

<u>3</u>. Office of Rulemaking (ARM), two divisions.

(b) <u>AVS</u>.

<u>1</u>. Office of Accident Investigation (AAI), two divisions.

<u>2</u>. Office of Aviation Medicine (AAM), eight divisions.

<u>3</u>. Office of Aviation System Standards (AVN), five divisions.

c. <u>Regional Organization</u>. The regions are organized into special staffs and operating divisions similar to Washington Headquarters. One of the regional divisions is the Flight Standards Division, commonly referred to as the "200 Division". Flight Standards District Offices (FSDO), report directly to their respective regional Flight Standards Division managers. Regional Flight Standards Divisions and Flight Standards District Offices are responsible for accomplishing special regional programs as well as implementing the national policies and programs developed by the Flight Standards Service (AFS). Regional Flight Standards Division managers report directly to the Director, Flight Standards Service.

d. <u>Flight Procedures Organization</u>. The regional Flight Procedures Program is administered by the Flight Standards Division, and specifically, the regional Flight Procedures Branch within the division. Program policy guidance is provided by the Technical Programs Division, AFS-400. Within AFS-400, guidance is primarily provided by the Flight Procedures Standards Branch, AFS-420, but is also provided by the All Weather Operations Branch, AFS-410. Flight procedure development and flight inspection of ground facilities to support the procedures are accomplished by the Office of Aviation System Standards (AVN). The primary support divisions are the Flight Procedures and Inspection Division, AVN-200, and the Airspace System Assurance Division (AVN-800). Under AVN, both individual Flight Inspection Area Offices (FIAO) and the National Flight Procedures Development Branch, AVN-830 develop procedures. Technical procedure development standardization is provided by the Flight Procedures Branch, AVN-220. The Standards Development Branch, AVN-210, accomplishes much of the flight procedures criteria development. The Data Analysis Branch, AVN-820, provides data support.

e. Flight Procedures Branch (FPB) Organization. A typical FPB is comprised of a manager, a clerk/administrative assistant, and several aviation safety inspectors. The manager establishes the areas of responsibility for each of the inspectors. The manager assigns tasks based on an individual's specialized expertise (obstacle evaluation, flight procedures, etc.) or according to a geographic area. The manager has the prerogative to set priorities and use the inspector's skills according to the quantity of work and the number of employees available.

22. THE PUBLIC LAW.

a. The Federal Aviation Act of 1958. The Federal Aviation Act (FA Act) of 1958 created the FAA and empowered it to promote safety of flight in air commerce by prescribing safety standards. It gave regulatory authority of aviation functions to two independent agencies: the FAA and the Civil Aeronautics Board (CAB). The CAB retained the responsibility for economic regulation of air carriers and investigation of aircraft accidents. The FAA was given five basic responsibilities. These responsibilities are summarized in the FA Act, Title I, Section 103, General Provisions of the FA Act, as amended.

(1) The regulation of air commerce in such manner as to best promote its development and safety and fulfill the requirements of national defense.

(2) The promotion, encouragement, and development of civil aeronautics.

(3) The control of the use of navigable airspace of the United States and the regulation of both civil and military operations in such airspace in the interest of the safety and efficiency of both.

(4) The consolidation of research and development with respect to air navigation facilities, as well as the installation and operation thereof.

(5) The development and operation of a common system of air traffic control and navigation for both military and civil aircraft.

(6) The provision of assistance to law enforcement agencies in the enforcement of laws relating to the regulation of controlled substances, to the extent consistent with aviation safety.

b. Evolution of Safety Regulations. Section 8, Article 1, of the United States Constitution gives Congress the power to regulate and control interstate commerce. Interstate highway, railway, and water modes of transportation were regulated for many years before the advent of air transportation. The Air Commerce Act of 1926 empowered the Secretary of Commerce to establish the necessary regulatory system to control and regulate air commerce. The regulatory system which was initially established evolved into an organized system of Civil Aviation Regulations (CAR). The CAR's were supplemented by appropriately numbered Civil Aviation Manuals (CAM) which contained policies, procedures, and interpretations of each CAR section. The CAR and CAM became outmoded with the rapid growth of air transportation and the introduction of turbojet transport category airplanes in the 1950's. Recodification of the CAR began in 1961 and was completed in 1964 with the adoption of the Federal Aviation Regulations (FAR).

c. Aviation Promotion and Regulation. Promotion and regulation of civil aviation are clearly identified by the FA Act as major responsibilities of the FAA. The FAA promotes safe and efficient civil aviation by such activities as establishing and maintaining Federal Airways (including navigational aids), supporting airport development, providing air traffic control services, and supporting aviation education programs. The principle objective of regulation, from the FAA's point of view, is to assure safety at all levels of aviation activity. In fostering safety through regulation, the FAA promotes the use of civil aviation and helps to ensure its future. Safety of flight is dependent upon regulation and enforcement of these regulations. Many other nations use United States Federal Aviation Regulations as regulatory models for their civil aviation programs.

d. National Transportation Safety Board. The National Transportation Safety Board (NTSB) was established by the Department of Transportation (DOT) Act and was made a part of DOT in 1967. The NTSB was given the CAB functions, powers, and duties concerning aviation accident investigations, findings, and formulation of aviation safety improvement recommendations. In 1975, the NTSB was made an independent agency. This independence allowed the NTSB to properly fulfill its responsibilities to form conclusions and make recommendations which may be critical of the DOT/FAA or its officials. FAA personnel participate in aviation accident investigations conducted by the NTSB. However, FAA representatives are not permitted to participate in determining the "probable cause" of any aviation accident investigated by the NTSB. At the request of NTSB, certain aviation accidents are investigated by the FAA. The facts, conditions, and circumstances of these accidents are reported to the NTSB which then determines "probable cause".

e. Civil Aeronautics Board. The Civil Aeronautics Board was established by the FA Act in 1958 and lost accident investigation functions to the NTSB in 1967. The Airline Deregulation Act (ADA) of 1978, expressed the intention of Congress to diminish the functions of the Federal Government in regulating airline economics. To accomplish this, Congress directed that the CAB be abolished at the end of 1984 and that CAB functions be transferred to the Office of the Secretary of Transportation (OST) by 1985. Included in these remaining CAB functions is the requirement that air carriers be found fit, willing, and able to perform as air carriers. These air carriers must hold economic certificates or an exemption under the FA Act in order to provide air transportation to the public.

23.-29. RESERVED.

SECTION 3. THE INTERNATIONAL CIVIL AVIATION ORGANIZATION

30. HISTORY. An overview of the International Civil Aviation Organization (ICAO) is included in this general chapter to familiarize the inspector with the history, structure, objectives, and influence of the organization and its standards and recommended practices.

a. The Chicago Convention.

(1) World War II had a major effect on the technical development of aircraft, and condensed one quarter century of normal, peace-time development into 6 years. Many post-war political and technical problems had to be solved to benefit and support a world at peace. Safety and regularity in air transportation necessitated airports, installation of navigational aids, and weather reporting systems. Standardization of methods for providing international services was fundamentally important to preclude unsafe conditions caused by misunderstanding or inexperience. Establishment of standards for rules of air navigation, air traffic control, personnel licensing, airport design, and for many other important issues related to air safety required international action.

(2) In 1944, the U.S. initiated talks with allied nations concerning commercial and legal rights and arrangements for airlines to fly into and through foreign territories. On the basis of these talks, invitations were sent to allied and neutral states to meet in Chicago in November 1944.

(3) The "Chicago Convention" of 1944 produced a treaty that required contracting states to agree to pursue stated objectives, to assume certain obligations, and to establish an international organization that became known as the International Civil Aviation Organization (ICAO).

b. U.S. Participation in ICAO.

(1) As a charter member of ICAO, the U.S. fully supported the organization's goals from its inception, and has been especially concerned with technical matters. Through ICAO, the U.S. strives to achieve the highest practical and uniform air regulations, standards, and procedures for aircraft, personnel, airways, and aviation services throughout the world. At the same time, the U.S. depends upon ICAO to ensure that navigation facilities, airports, weather, and radio services provided by other nations meet international standards.

(2) Through active support and participation in ICAO, the FAA strives to improve worldwide safety standards and procedures to make international flying more effi-

cient and economical. The FAA also provides technical assistance to other nations when needed.

(3) In 1988, the FAA had 168 agreements with 62 foreign countries to provide technical assistance in areas such as flight inspection, training, air traffic development, loan of equipment and navigational aids, and supply support. The specific terms of these arrangements may be found in those memorandums of agreement that describe the services, special conditions, financial provisions, liability information, effective dates, termination dates, and other information required for particular situations.

31. ICAO OBJECTIVES. The objectives of ICAO are to develop the principles and techniques of international air navigation and to foster the continued development of international air transportation in the following ways:

a. Promote safe and orderly growth of civil aviation throughout the world.

b. Foster the technical arts of aircraft design and operation for peaceful purposes.

c. Encourage the development of airways, airports, and air navigation facilities for international civil aviation.

d. Meet the needs of the people of the world for safe, regular, efficient, and economical air transportation.

e. Prevent economic waste caused by unreasonable competition.

f. Ensure that the rights of contracting states are fully respected and that every contracting state has an equal opportunity to operate international airlines.

g. Avoid discrimination among contracting states.

h. Promote the development of all aspects of international civil aeronautics.

32. LOCATION OF ICAO OFFICES. ICAO headquarters is based in Montreal, Canada. Seven ICAO regional offices are maintained in Bangkok, Cairo, Dakar, Lima, Mexico City, Nairobi, and Paris, each one accredited to a group of contracting states. These offices work with regional air navigation plans and are available as technical consultants for studying specific problems and recommending remedial action.

33. ORGANIZATIONAL STRUCTURE. ICAO is recognized by the United Nations as a specialized agency for international civil aviation. An agreement between these organizations exists and is designed to ensure an efficient working relationship and mutual recognition of their respective roles. ICAO is not subordinate to, and does not receive any line-of-command authority from, the United Nations.

a. Representative Bodies of ICAO.

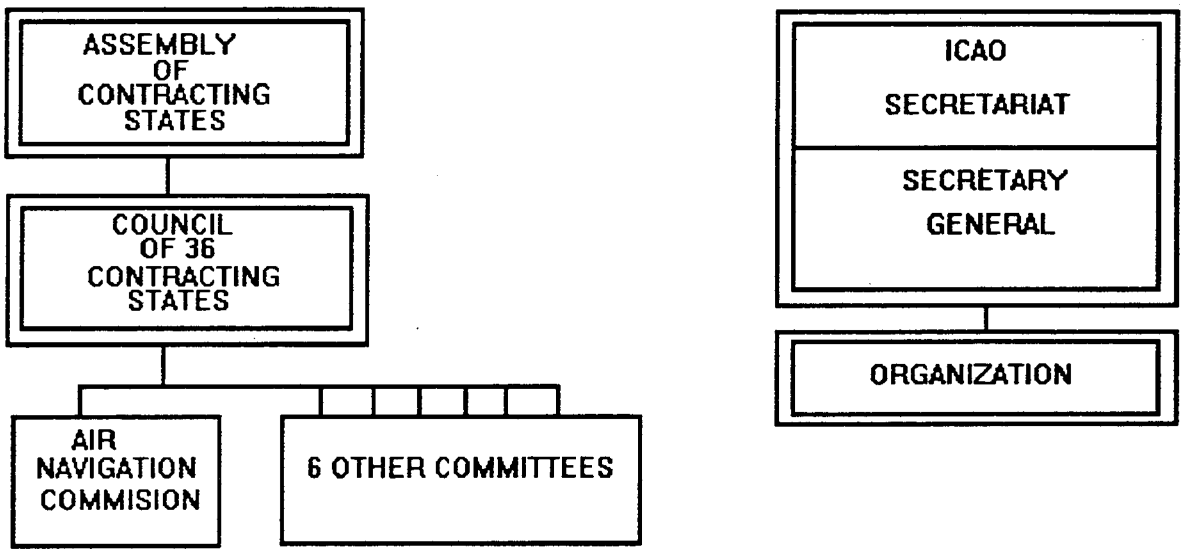
(1) Assembly. The Assembly is the sovereign body of ICAO. It meets every 3 years for a detailed review of the organization's technical, economic, legal, and technical assistance programs, and offers guidance concerning the future work of other ICAO bodies. Each nation has one vote in the Assembly and unless the convention provides otherwise, a majority rules. In 1990, there were 162 ICAO member nations.

(2) Council. The Council is composed of Assembly elected representatives from 33 member states. It investigates situations that might create obstacles to international air navigation and takes action as necessary to protect global air safety and order. When required, it also serves as an arbiter between member states on aviation matters.

(3) Air Navigation Commission. Appointed by the Council, the Air Navigation Commission is composed of 15 individuals, each considered an expert in a technical field of aviation. This group is concerned with the development of ICAO Standards and Recommended Practices.

(4) Committees. There are a number of formal committees, whose members are elected by the Council, that are not under the area of responsibility of the Air Navigation Commission. These include the Air Transport Committee (economic matters), Joint Support Committee (financial arrangements for facilities or services), Committee on Unlawful Interference (security), Legal Committee, Finance Committee, and Personnel Committee.

FIGURE 1-3. ICAO ORGANIZATIONAL CHART



b. The ICAO Secretariat. The Secretariat, headed by a council-appointed Secretary General, provides for ICAO's daily needs. Made up of permanent positions, the Secretariat consists of senior personnel and staff members recruited on a broad geographical basis and selected for technical competence in their respective fields. The Secretariat is organized into bureaus roughly corresponding to ICAO's Air Navigation Commission and the different committees. The organization serves as the technical and administrative staff of the representative bodies of ICAO.

34. ICAO PUBLICATIONS.

a. ICAO Bulletin. This document is published 12 times annually and contains a digest of ICAO meetings and activities for the previous period. Semi-annually, it publishes a table that indicates the status of all ICAO publications involving air navigation.

b. Final Reports of Meetings. The final reports of divisional, regional, and panel meetings include the proceedings and recommendations of each meeting. These recommendations are not effective until reviewed by the Air Navigation Commission or another appropriate committee, and approved by the ICAO Council. Approved recommendations are separately referred to the affected states for implementation.

c. Annexes to the Convention. ICAO standards and recommended practices are designated as Annexes to the Convention, and are published separately for each technical field after adoption by the Council.

d. Procedures for Air Navigation Services (PANS). The uniform application of certain operating procedures is necessary for safe and efficient air navigation. Operating procedures covering aircraft operations, construction of visual and instrument flight procedures, ICAO abbreviations and codes, rules of the air, and air traffic services have been adopted by ICAO. They are updated at divisional and panel meetings.

e. Supplementary Procedures. Certain procedures apply only to specific regions and those are published as supplementary procedures. A supplementary procedure can explain and amplify, but cannot conflict with, international standards. For convenience, all regional supplementary procedures applicable to 2 or more regions are published together.

f. Field Manuals. These manuals have no formal status and they derive their authority from the International Standards, Recommended Practices, and PANS from which they are compiled. They are prepared primarily for the use of personnel engaged in operations in the field.

g. ICAO Circulars. ICAO circulars are issued by the Secretary General to make specialized information available to contracting states. ICAO circulars include statistical studies, summaries of treaties or agreements, analyses of technical documents, and technical studies. These circulars are neither adopted nor approved by the council.

h. Availability of ICAO Publications. The publications discussed in this paragraph and other publications published and distributed by ICAO are available at the following address:

Public Information Office
International Civil Aviation
  Organization
1000 Sherbrooke Street West,
  Suite 400
Montreal, Quebec
Canada H3A, 2R2

35. ANNEXES TO THE CONVENTION.

a. Standardization of ICAO Practices. Since the creation of ICAO, its primary technical achievement is standardization of the operation of safe, regular, and efficient air services. This standardization has resulted in high levels of reliability in those areas that collectively shape international civil aviation, particularly with respect to aircraft, the crews that operate them, and ground-based facilities and services.

b. Annexes as Instruments of Standardization. Standardization has been achieved through the creation, adoption, and amendment of annexes to the Convention on International Civil Aviation known as, International Standards and Recommended Practices. The "International Standards" are direc tives which ICAO contracting members agree to follow. If a member has a standard different from an ICAO Standard, that member must notify ICAO of the difference. "Recommended Practices" are ICAO preferred practices that members are not required to follow. The basic criteria for deciding whether or not a particular issue should be an ICAO standard depends on whether it is essential that all contracting States adhere to it. The applicability of an ICAO standard may be subject to certain mitigating conditions relating to terrain, traffic density, stages of flight, and climate.

c. The 18 Annexes. ICAO annexes contain the Standards and Recommended Practices that have been adopted through international agreement. The 18 annexes are described as follows:

(1) Annex 1, Personnel Licensing, provides information on licensing of flight crews, air traffic controllers, and aircraft maintenance personnel.

(2) Annex 2, Rules of the Air, contains rules relating to conducting flight by visual and instrument flight rules.

(3) Annex 3, Meteorological Service for International Air Navigation, provides for meteorological services for international air navigation and reporting of meteorological observations from aircraft.

(4) Annex 4, Aeronautical Charts, contains specifications for aeronautical charts used in international aviation.

(5) Annex 5, Measurement Units Used in Air and Ground Operations, lists dimensional systems to be used in air and ground operations.

(6) Annex 6, Operation of Aircraft, enumerates specifications which ensure that a level of safety above a prescribed minimum is adopted for similar operations worldwide. The three parts of this Annex are Part I, International Commercial Air Transport-Airplanes, Part II, International General Aviation-Airplanes, and Part III, International Operations-Helicopters.

(7) Annex 7, Aircraft Nationality and Registration Marks, specifies requirements for registration and identification of aircraft.

(8) Annex 8, Airworthiness of Aircraft, specifies uniform procedures for certification and inspection of aircraft.

(9) Annex 9, Facilitation, provides for simplification of border-crossing formalities.

(10) Annex 10, Aeronautical Telecommunications, volume 1, provides for standardization of communications equipment and systems, and volume 2 standardizes communications procedures.

(11) Annex 11, Air Traffic Services, includes information on establishing and operating air traffic control, flight information, and alerting services.

(12) Annex 12, Search and Rescue, provides information on organization and operation of facilities and services necessary for search and rescue.

(13) Annex 13, Aircraft Accident Investigation, provides for uniformity in notification, investigation, and reporting on aircraft accidents.

(14) Annex 14, Aerodromes, contains specifications for the design and equipment of aerodromes.

(15) Annex 15, Aeronautical Information Services, includes methods for collecting and disseminating aeronautical information required for flight operations.

(16) Annex 16, Environmental Protection, contains specifications for aircraft noise certification, noise monitoring, and noise exposure units for land-use planning (volume 1) and aircraft engine emissions (volume 2).

(17) Annex 17, Security-Safeguarding International Civil Aviation Against Acts of Unlawful Interference, specifies methods for safeguarding international civil aviation against unlawful acts of interference.

(18) Annex 18, The Safe Transport of Dangerous Goods by Air, contains specifications for labeling, packing, and shipping dangerous cargo.

36. REGIONAL PLANNING. Although ICAO is basically involved with civil aviation on a world-wide scale, there are many subjects it considers on a regional basis. ICAO regional air navigation meetings are held periodically to consider the requirements for special air operations in specialties such as facilities and services, increases in traffic density, new air routes, and the introduction of new types of aircraft. The meeting minutes are reviewed by the Air Navigation Commission and the minutes are presented in publications of the Air Navigation Plan.

a. Air Navigation Plans. Air Navigation Plans provide details about the facilities, services, and procedures required for international air navigation within specific areas. Affected governments can be assured that if the recommended facilities and services are furnished in accordance with the plan, they will form an integrated air navigation system adequate for the foreseeable future. The plans are amended periodically to reflect changes in requirements and in the status of the implementation of the facilities and services.

b. Aeronautical Information Publications (AIP). Each member state is responsible for developing an Aeronautical Information Publication (AIP) which is intended to satisfy international requirements for the exchange of aeronautical information essential to air navigation for that particular state. Each AIP contains information on air traffic, airports, navaid's, special use airspace, weather, and other data vital to flight crews coming into or flying through the airspace of a particular state. AIP's contain lists of significant differences between the national regulations and practices of the state, and the standards, recommended practices, and procedures of ICAO. NOTAM's are issued when information is temporary or cannot be made available quickly enough by an AIP amendment.

37.-39. RESERVED.

SECTION 4. REGULATIONS: CODE OF FEDERAL REGULATIONS, FEDERAL AVIATION REGULATIONS, AND THE REGULATORY PROCESS

40. THE CODE OF FEDERAL REGULATIONS. The Code of Federal Regulations (CFR) is a codification of the general and permanent rules issued by the executive departments and agencies of the federal government. New rules and changes to existing rules are published in the Federal Register. The code is divided into 50 titles which represent broad areas subject to federal regulation. Each title is divided into chapters which usually bear the name of the issuing agency.

a. Published Volumes. Each of the 50 titles are published by volume and updated annually from rules published in the Federal Register. These volume revisions are staggered through four different dates (January 1, April 1, July 1, and October 1), until all titles are revised. Published volumes may be purchased by volume number from:

Superintendent of Documents,
Government Printing Office,
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b. The Federal Register. The Federal Register is used to publish the current changes to the CFR's.

c. Incorporation by Reference. Incorporation by reference was established by statute and allows federal agencies to meet the requirements to publish regulations in the Federal Register by referring to materials already published elsewhere. The legal effect of incorporation by reference is that the material is treated as if it were published in full in the Federal Register. This material, like any other properly issued regulation, has the force of law. Public instrument approach procedures are prime examples of incorporation by reference. Only the proper title of the procedure, amendment number, and effective date are included in the Federal Register. The full procedure document is published in an FAA transmittal containing numerous procedures.

41. TITLE 14, AERONAUTICS AND SPACE. Title 14 of the 50 CFR's is divided into the following four chapters:

a. Chapter I, Federal Aviation Administration, Department of Transportation, Parts 1-199.

b. Chapter II, Office of the Secretary, Department of Transportation, Aviation Proceedings, Part 200-399.

c. Chapter III, Office of Commercial Space Transportation, Department of Transportation, Parts 400-499.

d. Chapter V, National Aeronautics and Space Administration, Parts 1200-1299.

42. CHAPTER I - FEDERAL AVIATION ADMINISTRATION, DEPARTMENT OF TRANSPORTATION. CFR Title 14, Chapter I, is the Federal Aviation Regulations (FAR). The FAR are divided into subchapters and parts, as follows:

a. Subchapter A - Definitions (Part 1).

b. Subchapter B - Procedural Rules (Parts 11-15).

c. Subchapter C - Aircraft (Parts 21-59).

d. Subchapter D - Airmen (Parts 60-67).

e. Subchapter E - Airspace (Parts 71-77).

f. Subchapter F - Air Traffic and General Operating Rules (Parts 91-109).

g. Subchapter G - Air Carriers, Air Travel Clubs, and Operators for Compensation or Hire: Certification and Operations (Parts 121-139).

h. Subchapter H - Schools and Other Certificated Agencies (Parts 141-149).

i. Subchapter I - Airports (Parts 150-169).

j. Subchapter J - Navigational Facilities (Part 171).

k. Subchapter K - Administrative Regulations (Parts 183-191).

l. Subchapters L-M - Reserved.

m. Subchapter N - War Risk Insurance (Part 198).

43. FAA REGULATORY ACTIONS.

a. Authority. Within the executive branch of the federal government, regulatory agencies carry out the will of Congress, expressed in public law, which is considered to be in the public interest. One such agency is the Federal Aviation Administration (FAA) which was established by the Federal Aviation Act of 1958. In fulfilling the FAA's regulatory responsibility, the FAA Administrator must consider the general provisions of the act (see paragraph 22).

b. Regulatory Process. It is with broad public considerations in mind that the FAA Administrator regulates air commerce. The regulatory process is interactive and its pace is affected by the need to involve the public and coordinate with the Department of Transportation (DOT), and the Office of Management and Budget (OMB). Only in an emergency may the normal regulatory process be accelerated.

44. FAA REGULATORY PROCEDURES. FAA general rule-making procedures are explained in FAR Part 11. These procedures require the establishment of a public docket, that is an official, FAA record of each rule-making action. Certain rule-making responsibilities have been delegated; for example, the responsibility for issuing instrument procedure changes to FAR Parts 95 and 97 are delegated to the Flight Standards Service and specifically to AFS-1. However, the Administrator is the final authority with respect to all aviation safety rule-making actions.

45. FAA REGULATORY RESPONSIBILITIES. To fulfill the FAA's regulatory responsibility, the Administrator gives full consideration to the obligation of air operators and air agencies to perform their services with the highest degree of safety in the public interest. The Administrator also considers any differences that may occur between civil aviation and air commerce. Safety standards, rules, regulations, and certificates are prescribed and revised continuously in recognition of those differences.

46. THE PROCESS OF PUBLIC PETITIONS. Any interested person may petition the Administrator to issue, amend, exempt, or rescind a FAR requirement. The public has the right to be aware of and to comment on any proposed FAA rule or rule change. A summary of each public petition is published in the Federal Register to allow for public comment. Normally, the public has 60 days to submit comments on these petitions. After the close of the public comment period, the FAA considers all comments received and decides whether to accept or deny the petition. If the decision is to deny, a denial of petition is prepared, coordinated, signed, and mailed to the petitioner. The final FAA action on each petition is published in the Federal Register.

47. THE PROCESS OF INITIATING PROPOSED RULES. If the FAA initiates rule-making action or accepts a petition for rule-making, a Notice of Proposed Rule-Making (NPRM) is prepared by the appropriate FAA office. With few exceptions, each NPRM is published in the Federal Register. A public hearing may also be held. The length of the public comment period may vary because it is based on the complexity and significance of the proposed regulatory action. After the close of the public comment period, the FAA considers all comments received and decides whether to withdraw the NPRM, change the NPRM, or to proceed with a final rule. Usually, a final rule is effective 30 days after publication in the Federal Register. The preceding description of the rule-making process is greatly simplified here and this information cannot replace information provided in FAR Part 11 and associated Acts, Executive Orders, DOT policies and procedures, or FAA rule-making policies and procedures.

48. THE REGULATORY PROCESS AND THE FLIGHT PROCEDURES PROGRAM. The regional Flight Procedures Program (FPP) is not the sole authority for the administration of any FAR; however, the FPP is responsible for supporting several FAR directed activities, as administered by other services. The FPP has direct input and affect on the rule making process and the methodology for implementation of the program is covered in various regulations, directives, and advisory publications that will be more fully described in following chapters.

49. RESERVED.

SECTION 5. FLIGHT PROCEDURES STANDARDS

50. HISTORY AND CONCEPTS. The aviation community discovered early that standard operating procedures ("standards") would be required for flying aircraft. As far back as the Wright Brothers, the "pilots" conducted extensive research to find conditions and terrain favorable to flight before selecting the location at Kitty Hawk. They decided upon a plan: a short, straight flight at low level, in favorable winds, during daylight hours. The same basic formula remains in effect today. A pilot evaluates the collective capability of the aircraft, the flightcrew, and the navigation system to arrive at a safe plan of action or, a flight procedure.

51. PILOT AND AIRCRAFT INCREASES. During the early years of aviation, the individual pilot accomplished all investigation and analysis relative to the procedures he developed and used. As aviation expanded, the more experienced pilots began to develop and author procedures which provided safety guidance for the less experienced. Soon, traffic density around landing areas and along certain routes required anti-collision measures. The pilots discussed the problems and agreed on procedures to be followed in these areas. These agreements involved individuals and companies that began carrying passengers for hire. Many of the agreed to "rules of the air" were relatively simple, but gradually became complex and in some cases, became unique to specific sites or routes. While these procedures were satisfactory for a time, the day soon arrived when traffic volume required some sort of allocation of priority for their use. Thus, air traffic control became a real safety requirement.

52. EVOLUTION OF STANDARDS. Originally, the aviation procedures and standards were developed by the individuals or groups who built the aircraft, flew the aircraft, were responsible for the takeoff and landing areas (airports), or were responsible for the navigation/lighting and communication equipment, both on the ground and in the air. With the growth in aviation and at the request of the aviation industry, the federal government was empowered by law to "standardize the standards".

a. The basic framework of today's standards was developed by the users of this new, growing aviation system. Between the world wars, military aviation was also developing and in conjunction with the new civil organization, built upon the procedures already in place. Originally, the standards were gathered, agreed to, and sanctioned based upon the knowledge of the multitude of users of the system. Technological advances like new and faster aircraft, passenger service, ground and air navigational systems, and all-weather operations soon dictated that more than just human experience and knowledge were required to establish new standards. Procedures and systems would have to be tested using pilots and aircraft to properly evaluate what the new standard must be.

b. The new Civil Aviation Authority (CAA) tried to catch up and keep up with aviation growth in all phases of its regulatory and standards development authority. The requirement to involve the flying public, both civil and military, in establishing appropriate standards necessitated very comprehensive, detailed studies and justification. A set of procedures were established to develop standards and to coordinate, within the CAA itself, the aviation community, and with the public, the information available concerning the proposed standard. The results were the Civil Aviation Regulations, (followed by the Federal Aviation Regulations-FAR), and a complex set of directives, criteria, and guidance for both internal CAA use and in some cases, for use by the entire aviation community.

53. FLIGHT PROCEDURES. Flight procedures can be loosely defined as any predetermined, preplanned set of actions occurring in flight. The takeoff and departure, en route, and arrival phases of flight are the flight procedures of concern in this handbook, rather than how to accomplish an acrobatic maneuver like a barrel roll. Standardization of flight procedures was a primary objective of the CAA and later, the FAA. Instrument flying, flight operations using cockpit instruments (normally in low visibility or poor weather conditions), greatly complicated this CAA standardization objective. With the pilot not always being able to see and avoid other aircraft, a separate set of standards, instrument flight rules (IFR), had to be established in conjunction with visual flight rules (VFR). Also, a method of aircraft separation had to be established for the IFR aircraft. The result was the air traffic control system.

a. Air Traffic Control (ATC) is an integral part of flight procedures because controllers on the ground, as opposed to pilots in the air, allocate airspace for different aircraft (separate aircraft) in the terminal and en route environment. Consequently, the standards for ATC were developed supplementing the standards for the pilots in the air (VFR/IFR). Note that in the current FAR, Subchapter F, Parts 91 through 109, is titled Air Traffic and General Operating Rules.

b. With the end of World War II, the demands upon the CAA and its personnel expanded far beyond their capability. War surplus aircraft were released at minimum prices and the civil aircraft population soared. Pilots and other technical personnel were returning to civil life in great numbers, many of them electing to stay in aviation. Two of the greatest impacts were the increase in the number of air carriers, both scheduled and nonscheduled, and the increase in business and corporate aircraft operators. The potentials of air freight volume also attracted many new operators. Business and corporation executives began adjusting their sales and management operations based on the use of air travel. This fueled air carrier growth and produced large fleets of twin and multi-engine aircraft for business use.

c. The manpower and budgetary limitations of the CAA did not provide for a commensurate increase in terminal and en route navigational aids, instrument flight procedures, and air traffic control. The CAA airway system still primarily used the low frequency range which gave audible course guidance. Having no alternative, the air carriers, municipalities, and corporate aircraft operators began installing and operating their own navigation aids. War surplus non-directional beacons (NDB's) made it possible to navigate, for the first time, in instrument meteorological conditions (IMC) using cockpit navigation displays. The growth of nonfederal (nonfed) NDB's produced off-airway routes nearly equal in volume to the CAA airway system. The CAA had to "scramble" to produce new standards for this new navigational system. Also, many of these new operations were being conducted in uncontrolled airspace. A re-evaluation of airspace allocation was required to safely protect en route and terminal IFR operations.

d. The major problem though, was the increase in congestion and traffic delays being experienced at major terminals, particularly by air carriers. By law, these operators were required to use only the routes and procedures contained in their specifications. During peak periods, saturation became the general rule. ATC needed flexibility and the first departure routes were developed as flight procedures. In like manner, the holding procedure was developed to provide a delaying technique for arriving aircraft. Thus the fundamental navigation and flight procedure requirements were established: the departure procedures, the en route procedures, the holding procedures, and the approach procedures.

54. CONTINUING CHANGES. Beyond this era (approximately 1948-1949), history and events did not change the basic flight procedure requirements, but only added to he complexity of the problem. Major events were:

a. Implementation of the Instrument Landing System (ILS).

b. Implementation of VOR.

c. The Korean War, recreating numerous air bases for the new jet aircraft.

d. Implementation of radar as a navigation aid and for ATC use.

e. Introduction of Distance Measuring Equipment (DME).

f. Resolution of the VOR/DME (civil) and TACAN (military) controversy and development of the VORTAC system.

g. Introduction of jet, high speed, pressurized aircraft, especially in civil transports, for operations in a high altitude environment where flight, crew capability, and navigational aids have characteristics vastly different from those found at basic altitudes.

h. The series of mid air collisions that vividly indicated the "see and be seen" or "see and avoid" concepts must be replaced, in many locations, with navigation and flight procedures.

55. PROBLEMS IN STANDARDS DEVELOPMENT. The phenomenal growth of aviation in this country is evident in the related history. For the CAA/-FAA, or at least many of its departments, this growth so over-taxed standards development capabilities that a proper job could not be done. Many of the difficulties can be traced to insufficient trained personnel and budgetary constraints, but it was the pace of aviation growth and rapid change, both for civil and military operations, that were the main problems.

a. Some of the following situations arose:

(1) Proposed standards obsolete before the drafts could be completed.

(2) Regulations not always realistic; appropriate revision agreements could not be reached.

(3) Coordination time extensive.

(4) Gray areas of jurisdiction evident.

(5) Once a standard was in place, revising and updating impossible because of higher priority requirements.

b. Some matters were frequently so urgent from a safety standpoint that the decisions were made by the inspector/-specialist in the field. Other situations were referred to the regional offices. The more complex problems were handled at Washington Headquarters. There were wide variances in the handling of a given situation by field personnel and even by regions. There were occasions when headquarters had to over-rule a field decision.

c. There were also cases when specific operators, organizations, or governmental bodies were dissatisfied and brought their problems direct to Washington. Washington personnel had to devote so much time to the analysis and settlement of field problems that the development of necessary standards, criteria, and policy had to be neglected. Absence of such field guidance created additional variances and the problem compounded itself.

> **NOTE: This historical perspective of problems is presented only to reflect the general atmosphere of CAA/FAA operations in developing flight procedures standards. Critics, outside the FAA, may say that this is a typical bureaucratic operation, where leadership and regulation are expected, but pushing and prodding are required. Critics, inside the FAA, may say that this is exactly what is happening today. Although there is a small amount of truth in both critics' statements, the real truth is that the FAA has come a long way in establishing standards, criteria, and policy. FAA's flight procedure standards are accepted for use by countries all over the world. Much of the FAA's work was used as the foundation for ICAO standards. The current Flight Standards organization can greatly expand upon what has been and is being accomplished.**

56. CURRENT FLIGHT PROCEDURES STANDARDS DEVELOPMENT. For flight procedures standards development, the 1950's and 1960's have been generally considered as "catch-up time" and the 1970's and 1980's as "trying to keep up time". The first complete book of criteria was CAA's U.S. Manual of Criteria for Standard Instrument Approach Procedures. The current criteria handbook, Order 8260.3, United States Standard for Terminal Instrument Procedures (TERPS), superseded the CAA manual and was issued in 1966 with major revisions in 1970 (8260.3A) and 1976 (8260.3B), with numerous changes since. Order 8260.19, Flight Procedures and Airspace, is a "how to" manual and was originally designed to consolidate numerous orders, guidance, and policy and specifically, to provide additional instructions for applying TERPS. Order 8260.19 was issued in 1970, revised after many changes in 1984 (8260.19A), and revised again in 1991 (8260.19B). Throughout this 40 year span, additional guidance has been issued in other directives and advisory circulars. Many of these will be discussed in the following chapters.

a. The economic conditions in the aviation industry go through cycles where large expansion occurs, followed by a period of consolidation or contraction. Even with these cycles, the average air operations have steadily grown since

World War II. The FAA, by contrast, is not as affected by economic cycles as is aviation. The executive government and Congress control FAA's personnel, budgetary, and regulatory expansion. Nevertheless, the FAA has also grown steadily trying to meet the ever increasing demands of the flying public. Many times, appropriate standards are not in place when required because FAA staffing is only beginning to expand in these major upsurges in aviation. This is the case in one of the recent economic upturns caused by good economic conditions and airline deregulation.

b. Standard development requirements normally come from new technology (aircraft, avionics, and navigation facilities), but recently, these requirements are also coming from terminal area congestion. Capacity issues are forcing the FAA to restudy and reevaluate current standards, both on the ground (airports) and in the air (air traffic procedures and terminal procedures). New and larger airports are one answer, but these take years of planning and large amounts of money and still may not solve all the problems. Refinements to current standards are needed to accomplish capacity gains. Desired increases in capacity require innovative ideas and concepts, use of current and new technology (including air and ground computerization), extensive feasibility testing, and then, establishing a new standard or modifying an old one.

57. FLIGHT PROCEDURES CRITERIA DEVELOPMENT. Terminal area congestion and new technology are the major cause for standard development requirements and will be for years to come. Establishing new flight procedures standards and modifying old standards will be a continuing process and is the responsibility of Flight Standards. The flight procedures criteria development process can roughly be broken down to three steps: determine the need, test and evaluate, and establish the standard. Actually, the process is normally a lot more complicated than just these three steps.

58. TERPS CRITERIA CONCEPTS. The primary objective of flight procedures criteria is to design instrument procedures that utilize the National Airspace System (NAS) economically and efficiently, and meet an acceptable level of safety.

a. Criteria contained in TERPS must provide for all normal IFR operations. Emergency situations such as loss of an engine, loss of communications, loss of signal from the facility, etc., are not considered when establishing the basic criteria.

b. The concept of flight procedure criteria is to provide a predetermined envelope of airspace, vertically below and horizontally under the IFR aircraft, starting at take-off and ending where a visual landing can be made. This envelope of airspace protects the aircraft from collision with the ground or ground objects and is known as obstacle clearance.

c. Based upon the requirement for navigation, four types of errors may have to be taken into consideration for criteria development: ground system error, signal propagation error, airborne system error, and flight technical error (pilot error).

d. The size of the airspace envelope is normally determined by extensive flight test and mathematical test evaluation to produce a safety probability on the order of 1×10^{-7} (1 chance in 10 million of hitting an object). Because of the need to protect ALL aircraft SAFELY, TERPS criteria are understandably conservative.

59. TERPS CRITERIA AND FAA STANDARDS. The standards and criteria of other FAA organizations, in many cases, supplement or are designed around the safety requirements of TERPS criteria. After all, an IFR aircraft operation must take off from an airport, depart the terminal area, fly to destination, and land at the destination airport. The minimums and flight procedures (takeoff, departure, en route, sometimes holding, and approach) used in this IFR operation are designed by Flight Standards based on TERPS criteria.

a. Air Traffic (AT) Standards. The major responsibility of AT is the separation of aircraft. Their separation standards are based on the same airspace envelope concept as TERPS except vertical protection above an aircraft is also required. In some cases, their horizontal and vertical aircraft protection is based on the TERPS area of protection. When AT utilizes published instrument procedures developed by Flight Standards, obstacle clearance protection is assured. If AT vectors IFR traffic off published instrument procedure routes, they provide obstacle clearance protection. TERPS obstacle clearance standards are used. AT, as an organization, has responsibility over designation of airspace. In many cases, the TERPS area of protection is used to define the shape of airspace; for example, airways, controlled airspace, etc.

b. Airports Standards. Many of the Airports standards are predicated on TERPS criteria or related guidance; for instance, runway separation, obstacle free zones and runway slopes, runway and taxiway lighting, taxiway location, etc.

c. Airways Facility (AF) Standards. Because TERPS criteria are normally based on a ground facility used for navigation, AF standards for facility performance must conform to the originally defined facility limits used to establish the TERPS area of protection. These standards are continually verified by flight inspection aircraft. Also, facility siting standards may be predicated on TERPS criteria.

d. Flight Standards. From a purely self-centered, self-serving point of view, it could be rationalized that TERPS criteria are the "guiding forces" or "central authorities" for many of the standards of the above three operational services. In reality, this is not true. The safety standards established by one service must be agreed to by all the other operational services. In many cases, joint agreements are reached or flight procedures standards originate from the existing standards of other services. Whatever the origin, compatible standards are established by each service for safety and continuity.

60. DETERMINING THE NEED FOR NEW STANDARDS. Most of the need for new standards originates from within the FAA, but some do come from outside the FAA.

a. Within the FAA, research and development projects, Flight Standards projects, and projects of the other operational services are the major source of new standards requirements. Occasionally, some requirements come from International, Environment, Safety, and other offices.

(1) Large projects, like introducing a whole new navigational system or aircraft type, sometimes require a special office to be established in headquarters. This new office's main job is to facilitate and coordinate. Regional working groups may be established for these large projects.

(2) Other standards requirement projects may have working groups established with headquarters and regional representatives, cooperating to complete the project. Generally, these working groups are made up of members of AT, AF, Airports, and Flight Standards, but may be dominated by a specific service. The military, civil companies, and aviation organizations may also be asked to participate.

(3) The last type of project is one by an individual service or office. These types of projects are normally handled by one person or a small group from the same service.

(4) The problem with all these types of projects is recognizing early that some standards need to be developed or changed to complete the project. Also, because of the interdependence of standards for all the operating services, standards changes for one service normally affect other services. Consequently, many of the headquarters standards development requirements are well thought out and planned, but there are always occasions when a breakdown in communications causes disharmony between services and a delay in the needed standards.

b. Outside the FAA, standards development requirements can come from anyone in the aviation community. Problems and recommendations are brought to the attention of the FAA through their field offices, regional offices, or even, headquarters. These problems and recommendations may become projects based on FAA's responsibility to serve the flying public. The projects, in turn, generate the need for standards.

(1) The military is a major source for new standards. Because of their special operations and mission requirements, various branches of the armed services bring problems/solutions to the FAA.

(2) Air carriers and other flying companies have site specific problems that need to be solved. In most cases, these problems involve their company's operational efficiency, but may have direct safety and capacity possibilities that, when solved, may affect more than one company or be used for more than one site.

(3) Aviation organizations that represent individuals, groups, or companies generally petition the FAA with broad concepts and proposals that can affect all aviation users. These recommendations may be very difficult to evaluate and establish as a project. Yet again, the requests may be relatively simple. Standard changes may or may not be required.

(4) The remainder of the aviation community, from manufacturers to local governments to individual pilots, constitute another source for standards requirements. Projects derived from their problems and recommendations may be of any size or scope.

61. TESTING AND DATA GATHERING REQUIREMENTS. Many of the Flight Standards projects requiring standards development also require testing, data gathering, and data/test evaluation. This is especially true for TERPS criteria.

a. Early in the project, a determination of the testing and data gathering requirements must be made. Some projects just require data gathering and evaluation but not testing. Standards requiring only weather conditions or traffic count are examples. Most projects though, require extensive testing.

b. Normally, the first step in establishing testing requirements is to develop the test plan. The test plan is a formal document that spells out, in detail, the different phases of the test, exactly how each phase will be conducted, what data will be collected and how, how many tests are expected, what are the minimum data required for each phase, where will the tests be held, and what are the expected results for each phase. Most test plans are very thorough and comprehensive. Generally, the project manager works very closely with the data collectors and evaluators in organizing and writing the test plan. The Standards Development Branch, AVN-210, accomplishes most TERPS criteria planning, testing, and development as well as participating in many other Flight Standards projects. Consequently, AVN-210 helps determine the material to be included in the test plan and, in many cases, writes the test plan.

c. Depending upon what types of tests will be required, other organizations within the FAA may be included in the planning phase. Offices within the Technical Center and the Aeronautical Center as well as any of the different headquarters or regional offices that may be participating or involved in the tests will be consulted during the planning. Outside the FAA, organizations, manufacturers, consultants, and other government agencies, including the military, may be consulted.

d. Flight test is the most commonly considered form of testing. Because of the cost of flight testing and possible disruption of air traffic in busy terminal areas, simulators represent another frequently used viable option. Air Traffic has a target generating radar simulator for air traffic control at the Technical Center. Many Air Traffic/-Flight Standards joint projects are tested there. Aircraft flight simulators owned by the FAA and the National Aeronautics and Space Administration (NASA) are commonly used for standards development tests. Occasionally, airline and aircraft manufacturers flight simulators are used. With today's technology, an innovative concept, of telephone linkage of flight simulator output to a terminal ATC computer system, has produced a mixture of live traffic and simulator targets on the terminal controller's radar scope. With this capability, many types of new concepts (like simultaneous operations to closely spaced or converging runways) and "pilot blunder" scenarios can be introduced and evaluated without having to use multiple test aircraft, interrupting traffic, or risk aircraft collision.

e. Terminal instrument procedure criteria development uses data collected from both actual flight tests and flight simulator tests. Tests are based on subject pilots with different levels of experience; aircraft are representative of those operating or expected to be operating in the NAS; airborne and ground navigation systems have operating and error characteristics the same as production systems; operationally valid instrument flight conditions are used; and meteorological conditions that would affect the instrument approach procedure most adversely are incorporated. To assure that test data is operationally representative, the test conditions that normally would be followed are discussed below.

(1) Pilots. A representative cross section of active pilots, with experience ranging from limited to highly experienced, should be included. Private, commercial, and transport rated pilots should all be used. If possible, sub-

ject pilots should be obtained from each segment of the aviation community including general aviation, business, and air carrier operations. Under some conditions, government, military, or test pilots may be used, but the data should not be based exclusively on such subjects.

(2) Aircraft. Aircraft performance and flight characteristics have a direct effect on the airspace and visibility required to perform terminal instrument maneuvers, such as circling to land, achieving a departure or missed approach climb, descent/ascent gradient, or making final alignments to land. TERPS criteria are based on aircraft speed (approach categories A through E defined in FAR Part 97). However, in the development phase of the criteria, aircraft performance factors such as climb gradient, holding speed, balked landing, etc., and flight characteristics such as roll characteristics, control forces, stability levels, stability augmentation, etc., are considered. The particular aircraft configuration may have to be coordinated with an operations inspector or project manager to assure the proper determination of criteria as it applies to turn radii, minimums, obstacle clearance areas and surfaces, etc. Any criteria to be revised or developed should account for these aircraft differences. Some test programs typically include only one or two aircraft approach categories. To develop suitable criteria for the full range of approach categories, a data sample from each category or a suitable mathematical model which will predict appropriate characteristics for the ones not tested should be provided. Aircraft or flight simulators used in a data collection program should be representative of those expected to utilize the IFR system and should be fully certified.

(3) Navigation Systems. Airborne and ground navigation systems should be representative of those available or proposed for operational conditions. If prototype systems are used, then data samples or a suitable predictive model should substantiate that operating and error characteristics are the same as those anticipated for production systems.

(4) Inflight Procedures. All proposed instrument inflight procedures should be examined for operational validity. New aircraft designs, navigation systems, displays, computers, system integration, auto pilots, etc. may introduce approach profiles not presently covered by TERPS criteria. All proposed test profiles should be reviewed by an operations inspector or the project manager for their operational value before flight tests are performed. Those determined to be feasible should be tested to establish appropriate criteria.

(5) Cockpit Discipline. Flight test or ground simulation involving flight crews should be carried out

under conditions that simulate actual flight conditions with comparable workload and crew duties. Every attempt should be made to provide operational flight conditions as contrasted to laboratory type conditions.

(6) Meteorological Conditions. Flight tests should be conducted under a full range of meteorological conditions, including high wind velocity, wind direction variability, turbulence, wind shear, limited visibility, and high density altitudes. Particular attention should be given to those conditions that affect the test procedures most adversely. If flight tests are not performed under IMC, then an approved device should be provided to restrain the subject pilot's visibility outside the cockpit.

62. COLLECTED DATA AND EVALUATION. The primary purpose of the collected data is to determine the volume and shape of airspace required to provide appropriate obstacle protection or to conduct an instrument operation. Some of the data collected are referred to as flight track data. Flight track data on a given navigation system provide positive information with regard to one or more dimensions. For example, VOR provides information in only one dimension, azimuth; VOR/DME increases this to two, azimuth and range; while MLS provides information in three dimensions, azimuth, elevation, and range. The flight track data are obtained by using sophisticated optical tracking devices, radar tracking, or simulator computer tracking. The mathematicians and statisticians evaluate the data to validate an operational assumption of the airspace volume required to protect an instrument flight procedure, or to develop or validate a mathematical model of the distribution of probable flight tracks of aircraft expected to fly this procedure.

a. Validate an Operational Airspace Assumption. The total system error (ground equipment, signal, airborne equipment, and pilot) must be statistically tested against the operational assumption to validate the airspace requirements. Essentially, this statistical test determines that no significant difference exists between observed error and hypothesized error. Validation will be considered satisfactory when the original hypothesis cannot be rejected at a 95 percent confidence level.

b. Produce or Validate a Model. Standard, though complicated, statistical analysis methods are used to develop or validate the mathematical or probability model of aircraft dispersion. Flight track data are statistically characterized (graphed, charted, and digitalized-computers being indispensable). The model is again based on total system error derived from data obtained, in conjunction with proper analysis. The purpose of the model is to calculate the deviation probability of an aircraft from the intended flight track during approach, missed approach, or departure.

(1) The error data should be measured along the intended flight track throughout the entire procedure with measurements made at least once per second in the three axis (azimuth, elevation, and range). Ideally, a data rate of five times per second is preferred.

(2) Adequate collision avoidance with fixed objects along the flight path must be provided for in the extreme limits of the vertical and crosstrack distributions. Since random sampling will not likely produce sufficient data to model the extreme limits to the order of 1×10^{-7}, the test should be designed to include factors that contribute to significant lateral and vertical excursions. The collected data from comprehensive testing may be used to model the extreme limits of the distribution or a suitable "extreme value" model may be used.

(3) Statistics should account for estimates of appropriate sampling error. All data related to blunders or unusual events should be documented and an determination made whether to include or exclude the sample.

(4) Pilot questionnaires are used to gain a complete perspective of the flight operation being performed. Although not factored into the model, pilot comments are valuable to determine if an individual sample is appropriate.

NOTE: This handbook will not detail the complexity of the statistical and mathematical data analysis process that must be performed. Statistical methods and applications like standard deviation, kurtosis, skewness, correlation coefficient, null hypothesis, etc., all relate to the evaluation and may be part of this process. The evaluation is methodical and uses standard statistical analysis procedures. The resultant criteria support the analysis and are open for review by any interested party.

63. INSTRUMENT PROCEDURES DESIGN STANDARDS. The main purpose of the testing, data collection, and data evaluation is to establish or validate a specific flight procedure standard. This criteria development process has produced the design standards that exists in TERPS today. Most of TERPS has been tested over several years of operational use and are generally understood and accepted. A relatively small amount of testing may be required to refine or establish some new criteria based upon past tests and experience. However, with the introduction of new terminal approach/departure systems such as MLS and the flight management system (FMS), or aircraft with new flight characteristics such as the tiltrotor, new approach/departure profiles must be tested and evaluated. New concepts such as curved approach/departure segments, with onboard computed course guidance, also require careful testing.

a. The validation of procedural design values also must consider the pilot. Pilot factors such as flight technical error, maintenance of airspeed, rate of descent or climb, power input frequencies, heading changes, etc., are built into the test and evaluation. Subjective values such as cockpit workload, crew coordination, and pilot orientation must rely on the pilot questionnaire or comments. A good cross section of pilots expected to use the procedure is important. Airborne and simulator observer logs may also be critical. In any event, all pilot factors must be favorable to operationally validate these design values.

b. The determination of minimums is a prime component of TERPS criteria.

(1) Minimum altitudes are charted for cockpit use and are defined as the lowest altitude authorized in IMC. Minimum altitudes are determined by adding the volume of airspace height (required obstacle clearance), based upon the horizontal airspace limits (area of protection), to the highest obstacle.

(2) Approach minimums also include visibility minimums which provide adequate time for visual transition from instrument flight to visual maneuvering and landing.

(3) For approach minimums, altitude and visibility go hand-in-glove to provide adequate obstacle clearance, minimize surface contact on go-arounds, provide adequate maneuvering airspace for landing, provide sufficient time and visual conditions for visual transition, and provide for a margin of safety to accommodate the effects of uncertain navigation system factors.

c. TERPS criteria also allow minimums adjustment for specific approach lighting systems, terrain, a remote altimeter source, excessive final approach length, or to satisfy obstacle clearance requirements. Under other circumstances, some minimums can not be approved unless the crew is properly qualified and special equipment is available, such as ILS Cat II/III. Test data evaluation must substantiate or modify the existing minimums adjustment criteria.

64. TEST RESULT REPORT. A report describing the details of the test will be issued by AVN-210. Normally, flight track data will be in graphic form as well as being explained in paragraph form. The methods used in determining the recommended area of protection and obstacle clearance requirements will be documented. Any other information deemed critical to the final flight procedure design standard will be included, such as pilot questionnaires, operationally critical problems encountered, what data was not used and why, criteria limiting factors discovered, etc. This report normally precedes the issuing of the new standard, but in some cases, tests are multi-year in duration and some preliminary standards are required earlier.

65. OTHER USES OF TEST DATA. Other than new standards development, test data may have broader uses. The primary expected value of the tests is to validate already existing standards. Minor adjustments may result to existing standards based on extensive testing required for the new standards. Also, test data is shared with other segments of the aviation community and may affect future equipment/aircraft production and future operational policies and procedures. Test data is also shared with the international aviation community, especially ICAO, which may affect international standards. The ILS Collision Risk Model (CRM), which is accepted by ICAO, resulted from extensive U.S. and foreign tests. Data collection and evaluation will produce other internationally accepted CRM's.

66. ISSUING NEW STANDARDS. The ideal sequence of events is to test and evaluate, issue report, write new criteria, and publish a TERPS change. This is an overly simplistic sequence because the operational demand for new criteria, especially with new systems, aircraft, and concepts, requires preliminary standards to even complete the operational testing. Also, because of the interdependence of TERPS criteria with the standards of AT, AF, and Airports, time is necessary for coordination and for the evolution of compatible standards. Flight Standards typically issues "TERPS type" interim criteria in advisory circulars and existing/new orders. This type of action will allow procedure design with continued testing and data evaluation, as well as allowing the necessary time required for the aviation community and other FAA/Government offices to adjust. Interim criteria are typically conservative because of safety concerns and may not adequately cover all details a TERPS change would require. After continued testing/evaluation, finalized criteria are normally more thorough and comprehensive.

a. Examples. Area Navigation (RNAV) criteria resided in an advisory circular for years before it was incorporated into TERPS. The criteria were refined over this period of time. MLS criteria went through a series of orders before finalized criteria were decided upon. There is also the incremental method of standards development used in ILS CAT II/III. Lower and lower minimums were authorized (II, IIIa, IIIb) as the ground and airborne systems and flight crew requirements were being defined, tested, and redefined. A series of advisory circulars were used.

b. Writing Criteria. Writing good TERPS criteria is an art. Good criteria are written so that a specialist in a field or regional office, using maps, can design a procedure and determine minimums. Precise language must be used which will have the same meaning to all TERPS users. The criteria must also be thorough enough to allow for computer programming; more and more procedure development concepts and criteria are being computerized to ease the time consuming, map study methods. Although the test data supposedly set the obstacle clearance and area of protection parameters, obstacle clearance may be a slope and the area is generally trapezoidal. Consequently, the mathematics of procedure design is necessarily complex, but basic trigonometry is used. For more complex mathematical calculations, a graph, table, or chart is designed. Of course, there are always a multitude of diagrams to show what the words of the criteria are explaining. Establishing minimums is very important and both charts and words are commonly used in TERPS. The final test for new criteria is real-world application. The criteria must be comprehensive enough, yet precise enough, to account for all aircraft types, unique airport designs, different terrain features, specific operational requirements, etc. Typically, interim criteria are not this thorough, but criteria incorporated into TERPS must be.

c. Coordination. Criteria, whether interim or final, require extensive coordination. Because TERPS is a joint-use document with the military services, discussions are ongoing with military counterparts. A TERPS Working Group (TWG), consisting of FAA TERPS specialists and military TERPS specialists, was formally established with the main objective of enhancing this coordination process and expediting TERPS changes. Coordination with the Flight Standards users is important, as well as other Flight Standards offices. Other FAA offices, especially the operational offices of AT, AF, and Airports, require continuing coordination. Aviation organizations and the aviation community in general are not left out of the coordination process. In many cases, informational meetings are held in Washington headquarters or Oklahoma City to discuss and explain proposed criteria. Draft criteria will go through many revisions before finally issued. Coordination is a lengthy process.

d. Need to Inform. New systems and new concepts require information exchange with the entire aviation community. Explanations are normally included in the AIM and in official FAA publications. Informative videotapes are often produced for meetings at headquarters or in the field. Information for the public is the responsibility of the program office or office of primary interest. Many times, new standards require a change in the FAR. FAR changes are part of the coordination process, but these changes also go through the rulemaking process for public comment.

67. RESERVED.

SECTION 6. THE REGIONAL FLIGHT PROCEDURES PROGRAM

68. AUTHORITY. The Flight Standards Division mission, structure, and functions are described in Order 1100.5, FAA Organization - Field. The Flight Procedures Branch (FPB) responsibilities to the division are described below.

69. FPB RESPONSIBILITIES. The Flight Procedures Branch is comprised of aviation safety inspectors who have technical knowledge and skills in all-weather terminal operations. The FPB accomplishes its primary responsibility, AVIATION SAFETY, by authorizing, maintaining, and canceling terminal instrument procedures. These three tasks are the FPB's core functions. The FPB has additional responsibility to support regional programs by accomplishing obstruction evaluations (OE), airport airspace analyses (AAA), and facilities and equipment (F&E) navaid and visual landing aid evaluations. Although subsequent chapters will discuss these functions, detailed information may be found in the following FAA Orders. Terminal procedure development is discussed in Orders 8260.3, United States Standard for Terminal Instrument Procedures (TERPS), and 8260.19, Flight Procedures and Airspace; obstructions evaluation and airspace analysis are described in Order 7400.2, Procedures for Handling Airspace Matters, and the facilities and equipment navaids/visual landing aids evaluation is discussed in Order 7031.2, Airway Planning Standard Number One - Terminal Air Navigation Facilities and Air Traffic Control Services. Additional responsibilities related to development and maintenance of the National Airspace System (NAS) are listed in paragraph c, below.

a. Coordination. To accomplish these functions, the FPB must directly interface with other regional divisions, aviation users, and industry groups. National program policy guidance is provided by the Technical Programs Division, AFS-400, primarily through the Flight Procedures Standards Branch, AFS-420, and the All Weather Operations Branch, AFS-410. The FPB coordinates with AFS-420, AFS-410, and AFS-400 when additional guidance is required and to solve unique problems. The FPB also interfaces with the Planning and Program Management Branch, AFS-12 for the facilities and equipment program and the Office of Aviation System Standards, AVN, to resolve specific technical issues that impact the Flight Procedures Program.

b. Flight Procedures. At the regional level, the Flight Standards Division has overall responsibility for the flight procedures program. The FPB accomplishes the instrument procedures tasks. The FPB determines whether or not terminal instrument procedures and facilities are required, authorizes procedure development, assures published procedures incorporate upcoming and recent changes in their region, and determines whether or not terminal procedures are canceled. The Flight Procedure and Inspection Division (AVN-200) in Oklahoma City, establishes national policy for the implementation of portions of the flight procedures and airspace program. The Airspace System Assurance Division (AVN-800) is responsible for practical procedure development, review and changes to existing procedures, and flight inspection of procedures. The National Flight Procedures Development Branch (AVN-830), the Flight Inspection Area Offices (FIAO), and the International Flight Inspection Offices (IFIO) accomplish these tasks. Practical procedure development would include applying the design parameters and minimum standards, determining controlling obstructions, and completing the appropriate procedural forms and routing them for publication.

(1) Procedure Authorization. The FPB may generate the need for terminal procedures within the region or receive a request for a procedure. Instrument procedure authorization may be based on an existing navigation aid or based on establishing a new facility through either the F&E program or the non-federal (nonfed) navigation aid program (FAR Part 171, Navigational Facilities). The FPB also authorizes special procedures for use by a specific individual or group. Additionally, the FPB becomes involved with and is instrumental in the successful introduction of new procedural concepts, navigation systems, and landing technologies such as simultaneous converging instrument approaches, closely spaced parallel runway approaches, curved approaches, long range navigation (LORAN-C), microwave landing system (MLS), CAT III ILS Surface Movement Guidance and Control System (SMGCS), and global positioning system (GPS).

(2) Procedure Maintenance. Once a terminal or en route procedure is published, it is the responsibility of the FPB to maintain the safety and integrity of that procedure. The Obstruction Evaluation and Airport Airspace Analysis Programs (OE/AAA) have a major impact on the maintenance and modification of all procedures. OE/AAA analyses are conducted by the FPB in response to the dynamic growth present in today's commerce and aviation sectors. Through these programs, Flight Standards along with Air Traffic, Airway Facilities, and Airports administer the safe and efficient growth of the NAS. Airport studies are conducted by the FPB in support of these programs and cover a wide variety of airport proposals including environmental reviews, airport/heliport design and construction, and airport capacity. Other input, such as users complaints, programmed facility shutdown, and industry recommendations are analyzed by the FPB in a continuing effort to maintain or enhance the NAS.

(3) Efficiency Evaluations. Maintenance of terminal procedures includes the responsibility to determine the efficiency of terminal operations; that is, the cost to the government cannot exceed the benefit of the service. The FPB is responsible for making many of these technical determinations and authorizing cancellation of instrument procedures as necessary.

c. Other Related Responsibilities. Additional FPB program responsibilities include, but are not limited to the following tasks:

(1) Conducts en route evaluations of the airspace system.

(2) Responds to a legal request for deposition or appearance in court trials or formal hearings.

(3) Responds to a freedom of information act requests.

(4) Conducts presentations at accident prevention seminars.

(5) Responds to public inquiries.

(6) Conducts an environmental assessment.

(7) Initiates flight procedures waivers.

(8) Reviews proposed changes to orders, notices, or advisory circulars.

70.-199. RESERVED.

CHAPTER 2. FACILITIES AND EQUIPMENT PROGRAM

SECTION 1. GENERAL

200. PURPOSE. In support of the regional flight procedures program, this chapter provides flight procedures inspectors with a consistent planning, coordination, and implementation process for all Facilities and Equipment (F&E) programs and projects that are the responsibility of the regional Flight Standards Division.

201. BACKGROUND. The Federal Aviation Act of 1958 legislates the FAA responsibility for establishing and maintaining a safe and efficient National Airspace System (NAS). In compliance with this mandate, the FAA establishes policy and publishes directives/guidance to provide for the establishment of federal terminal navigation aids or the takeover of privately owned aids. The FAA budgets, purchases, installs, owns, and operates facilities and equipment based on congressional appropriations using funds from the Airport and Airway Trust Fund. Prior to this directive, there were no existing national directives providing detailed guidance for Flight Standards to execute their portion of the F&E program at the regional level. Within each region, the Flight Standards Division's Flight Procedures Branch (FPB) is assigned the responsibility for planning, prioritizing, and evaluating activities governing the location of terminal air navigation equipment (except terminal radar) and visual landing aides. Through longstanding informal procedures, the individual FPB F&E programs worked well and delivered acceptable finished products. This chapter will provide standardized guidance for the regional Flight Standards portion of the F&E program and emphasize the cooperative F&E planning required in a complex NAS environment to improve the Flight Standards F&E product.

202. THE BUDGET PROCESS. The congressionally mandated FAA budget process is ongoing and a complex mechanism where work may begin on a given annual budget as early as 4 years prior to the beginning of the fiscal year (October 1) and can continue after the end of the fiscal year. Consequently, responsible offices may be planning, beginning, correcting, spending, or closing out as many as five or more different budgets. As an example only, the remainder of this chapter will be using fiscal year 1990 as a base year for the 1991, 1992, and 1993 budgets.

a. FAA Budget. The FAA budget is primarily divided into four portions which are generally administered separately. Occasionally, a smaller, separate budget is added to the four listed.

(1) Operations Budget - wages, etc.

(2) Facilities and Equipment Budget.

(3) Grants-In-Aid Budget - Airport Improvement Program (AIP).

(4) Research, Engineering, and Development Budget.

b. Budget Responsibilities. Individual FAA services or offices are responsible for completing different portions of the total budget. Submission is then made to the Office of Budget (ABU) which is responsible for the entire FAA budget. Individual branches in ABU handle the completion and processing of the four separate budgets.

c. Fiscal Year 1990 (FY90) FAA Budget. For comparative value purposes, the following is the FY90 FAA budget approved by the United States Congress (funds in million $):

Operations	3,824
Facilities and Equipment	1,721
Grants-In-Aid	1,651
Research, Engineering, and Development	170
Total FY90 Budget	7,366

d. Tracking a FY Budget. A given FY budget leaves the FAA for the Office of the Secretary of Transportation (OST) approximately 14 months before it will become effective. This means that the FY91 budget, which became effective on October 1, 1990, was sent to OST in June 1989. Around September, 1989, the FY91 FAA budget was added to the Department of Transportation (DOT) budget and was sent by OST to the Office of Management and Budget (OMB). OMB finalized the DOT and other government FY91 budgets for the President by the end of calendar year 1989. The President then presented the government's budget to Congress. Congress, in turn, had 7 or 8 months to evaluate, hold hearings, negotiate, and act on the total FY91 budget with hearings beginning in the spring of 1990.

e. Coordination of a Budget. Both formal and informal meetings, briefings, discussions, and telephone conversations occur throughout the entire budget process. This happens in planning meetings, during the original completion of a budget by the appropriate offices and regions, while it is being reviewed and analyzed at FAA Headquarters offices, and while at OST, OMB, and the U. S. Congress. Offices may be called upon to justify items submitted in their budgets by the current reviewing authorities. This coordination is important because in the final steps of the budget process, smaller budgets are being consolidated into larger budgets. There is only a certain amount of money available for each of the smaller budgets and many times this total dollar amount or proportion may change due to prioritizing, costing, and consolidating. Coordination by the affected offices is critical for an effective budget process.

203. THE F&E BUDGET. In the region, the Airway Facilities Division is responsible for compiling the F&E budget. Besides Airway Facilities, other regional divisions, especially Air Traffic and Flight Standards, have direct input to the budget. The F&E budget is completed and forwarded to Washington prior to the established due-date. The regional F&E budget submissions for the FY92 budget were sent to Washington at the end of January, 1990.

> **NOTE: The document specifying the annual F&E project items is Order 2500.55, Call for Estimates Facilities and Equipment (F&E). This order is referred to as the "Call for Estimates", the "National Call", or just the "Call" and is explained in detail in section 3 of this chapter. A specific fiscal year's published Call may be issued after the regional submissions are due in Washington. An earlier DRAFT Call for Estimates is made available the prior August or September to enable the regions to complete their F&E submissions on a timely basis.**

a. <u>FPB F&E Budget Handling</u>. The FPB F&E budget program is ongoing throughout the entire calendar year, but the actual work on the specific FY submissions is started a few months before they are due in Airway Facilities. Regions may set different submission due-dates to Airway Facilities based upon local orders or practices. The submissions procedure is also determined by the regions and as specified in the Call, with automation such as the Resource Tracking Program (RTP) becoming more prevalent. A typical calendar year in an FPB and chronological events for F&E budgets (1990 chosen) follows:

January 1990:

- FY92 Budget sent from regions to FAA Headquarters based on the draft Call.
- Feedback is received in regions on FY91 Budget items as submitted by OMB to Congress.

Spring 1990:

- FY92 published Call received by regions.
- Began work on FY93 Flight Standards submissions (varies based on regional due-date).
- Ongoing discussions with Planning and Program Management Branch, AFS-12, regarding the FY92 submissions.
- Possible AFS-12 meeting in Washington to finalize FY92 Flight Standards F&E budget items (FPB's send representatives).

June 1990:

- Feedback received in regions on FY92 Budget items submitted by FAA to OST.

Summer or Fall 1990:

- Submitted FY93 items to Airway Facilities based on local due-date. (Utilizing FY92 published Call and FY93 draft Call.)

September and October 1990:

- Received FY93 draft Call. An FAA Headquarters meeting may have been held to discuss the draft Call. (FPB invited.)
- Feedback to region on FY92 Budget items as submitted by OST to OMB.
- Congress approved and the President signed the FY91 F&E budget.

End of Year 1990:

- Region finalized FY93 submission (using draft Call, feedback on FY92 submissions, and the FY91 approved budget).
- Regional Facilities Review Committee and the Regional Administrator approved the FY93 budget to be submitted to Washington.

b. Headquarters Handling. The regional submissions are sent to ABU where all the budgets are consolidated and forwarded to the appropriate offices for review.

(1) ABU forwards a copy to the Flight Standards Service (AFS) and specifically, the Planning and Program Management Branch, AFS-12. AFS-12's major responsibilities at this point of the budget process is to review and validate the submissions. Clarifications and questions about individual submissions may be discussed with the regional FPB F&E inspector.

(2) The F&E budget then is forwarded to Headquarters Airway Facilities personnel for costing and validating, then to APO for application of benefit/cost analysis prescribed in APS-1, returned to ABU for consolidation, and directed to AFS-12 for final prioritizing based on allotted moneys and costing.

(3) Again coordination may be required between AFS-12 and the FPB concerning individual problem areas for the finalized budget submission. AFS-12 will have a meeting in Washington to prioritize and finalize Flight Standards budget items. Regional F&E inspectors will attend. Discussions may include facility requirements for future F&E budgets.

(4) The budget is completed, consolidated, and approved by the different offices within the FAA. By the middle of May 1990, the appropriate executive directors have agreed to the FY92 F&E budget. Through the remainder of the budget process (reviews by OST, OMB, and Congress), AFS-12 may be called upon to justify the finalized F&E budget determined from the FPB submitted lists and written justifications.

c. Specific AFS Roles and Responsibilities. The Flight Standard Service is responsible for providing technical guidance on F&E items that they sponsor or co-sponsor, reviewing and validating submissions to the annual Call For Estimates, providing guidance to the regions for the annual draft Call for Estimates, serving as technical representatives of joint budget and program office sponsored F&E working groups, preparing and defending budget justification material in support of Flight Standards F&E requests, and submitting new initiatives and their supporting mission need statements to the Aviation System Capital Investment Plan (CIP).

d. OST, OMB, and Congressional Handling. The FAA's F&E budget is reviewed by OST and OMB and submitted to the U. S. Congress. Congress reviews and legislates the final FAA F&E budget. The final budget amount and, in some cases, specific facilities and locations are established by Congress based upon the submitted recommendations, the current national economic priorities, and the desires of Congress.

e. Active F&E Budget Proposals. During the calendar year 1990, Congress was primarily working on the FY91 budget; FAA Headquarters, OST, and OMB were working on the FY92 budget; and the regions were working on the FY93 budget.

204.-219. RESERVED.

SECTION 2. THE FPB F&E RESPONSIBILITIES

220. GENERAL. Order 1100.5, FAA Organization - Field, paragraph 250, describes the Flight Standards Division mission, structure and functions. Included in these mission statements is the requirement to determine regional needs for new visual landing aids and terminal air navigation aids (except radar), including justification, priorities, and place names for all items to be included in the region's F&E annual budget submission. Each region's Flight Procedures Branch (FPB) is responsible for this task. This section discusses the regional FPB F&E responsibilities and the methods, documents, and job aids the inspector can use to manage the Flight Standards portion of this program.

221. LIBRARY OF REFERENCES. Guidance, data, and a record-keeping system are required in order to have an effective FPB F&E program. The following subparagraphs contain lists of recommended references needed to manage this program. Most of the documents are subscriptions or are available through normal regional distribution channels, but the office of primary responsibility is included in case copies cannot be obtained normally.

a. Major FAA Orders. Besides this handbook, the following are the two major orders used to determine the benefit/cost ratio required to list candidate locations for terminal facilities. (The next two sections of this handbook are dedicated to the explanation and use of these two orders.)

(1) Order 2500.55, Call for Estimates Facilities and Equipment (F&E) (RIS BU-2500-4). Yearly, the Call for estimates is published and provides program guidance and instructions for the development and preparation of a fiscal year budget estimates for the F&E (Airport and Airway Trust Fund) appropriation. This budgeting order will apply to a fiscal year beginning more than 2 years in the future. Earlier, a draft of this order is released to the regions, normally late summer or early fall. This draft is used to complete regional budgeting submissions. The order is issued by the Office of Budget, Capital Division, ABU-300.

(2) Order 7031.2, Airway Planning Standard Number One - Terminal Air Navigation Facilities and Air Traffic Control Services. Referred to as APS-1, this order contains the policy and criteria used in establishing the eligibility of locations for terminal air navigation facilities and air traffic control services. This order will be the primary source used in determining benefit/cost qualifications for installing and maintaining facilities and equipment. Although primarily used by the inspector for F&E submissions, APS-1 criteria also apply to

FAA takeover of nonfederally-funded facilities. (While APS-1 does not formally apply to AIP expenditures, it is sometimes used internally to evaluate proposed AIP projects.) APS-1 also contains facility discontinuance criteria. This order is issued by the Office of Aviation Policy, Plans, and Management Analysis, Systems Analysis Division, Economic Analysis Branch, APO-220.

b. Other Reference Material. Additional reference documents that should be part of the F&E inspector's library are:

(1) Capital Investment Plan (CIP). The Aviation System Capital Investment Plan replaced the National Airspace System (NAS) Plan and describes the aviation system capital planning programs and infrastructure improvements for system enhancement and modernization. The annual F&E Call for Estimates enables funding of the FAA's plans for capital investments. The CIP is a Congressional mandate and is updated annually by the NAS Planning Division, APM-300.

(2) The FAA Administrator's Precision Approach Landing System Policy. This policy was published in the Federal Register, Vol 54, No. 247, dated December 27, 1989. The policy limits eligibility for both the Microwave Landing System (MLS) and Instrument Landing System (ILS) installations during the MLS transition and implementation period. Also included is FAA's takeover policy of ILS systems privately purchased under FAR Part 171 and purchased using Airport Improvement Program (AIP) funds. Copies are available from the Associate Administrator for NAS Development, MLS Program Office, AND-30.

(3) Report FAA-APO-83-10, Establishment and Discontinuance Criteria for Precision Landing Systems. This report describes the development of establishment criteria for MLS with approach lights. The document contains a model (Appendix C) to estimate actual instrument approach (AIA) counts from counts of total operations. This model is useful in the absence of AIA counts or when AIA counts are suspected of being in error. This report is issued by APO-220, Economic Analysis Branch and is available from the National Technical Information Service, Springfield, Virginia, 22161.

(4) Order 7210.3, Facility Operation and Administration. This order contains direction and guidance for the day to day operation of Air Traffic facilities. Chapter 14, Section 4, contains the definition of Actual Instrument Approach (AIA) and procedures for reporting of AIA count. This order is issued by the Air Traffic Rules and Procedures Service, Procedures Division, ATP-100.

(5) Order 8260.18, Eligibility Requirements for Visual Approach Aids. This order provides procedures for establishing requirements for

visual approach aids, selection of the appropriate type facility, and priority for planning purposes. The Technical Programs Division, AFS-400, is responsible for this order and it is available from the Flight Standards Service, Administrative Management Branch, AFS-13.

(6) Federal Register. The Federal Register contains general and permanent rules by the executive departments and agencies of the federal government. Occasionally, policy and information concerning FAA's F&E budget program is contained in the Federal Register.

c. Data Documents. Data is required to complete a benefit/cost ratio and to determine eligible runways and airports for terminal aids. The commonly used data sources are:

(1) The National Plan of Integrated Airport Systems (NPIAS). Section 504a of the Airport and Airway Improvement Act of 1982 (Public Law 97-248) required the Secretary of Transportation to publish a national plan for the development of public-use airports in the United States. This FAA plan is limited to those airports that are potentially eligible for federal funding. The NPIAS is available through regional distribution or the regional Airports Division.

(2) Aviation Data and Analysis System (ADA). The ADA computer program provides access to official FAA activity reported during each FY and the approved benefit/cost methodology for airports reported by the system. The program was developed by Office of Aviation Policy, Plans, and Management Analysis (APO). Access to the program, maintained in Washington, D.C., can be obtained from APO. An International Business Machine (IBM) compatible, personal computer program has been developed for use at each region. The program may be obtained from APO-130, Information Systems Branch, by using the request form in Figure 2-1. The program requires about 10 to 40 megabytes of hard disk space, depending on the number of regions contained in the data base requested, and runs under Microsoft Disk Operating System (MS-DOS). In August of each year, the Programs and Planning Branch, AFS-12, requests from APO-130 the previous fiscal year's activity data which includes airport actual instrument approaches, aircraft operations, and passenger enplanements. When the data disk is received, AFS-12 forwards a copy to each FPB. This current data can then be used in calculations for the F&E submissions and for queries throughout the year. The disk saves considerable time in loading data for use in automated candidate review programs.

(3) FAA or Federal Air Traffic Activity. This FAA publication is issued annually (for the past fiscal year) and contains terminal and en route air traffic activity information of the National Airspace System (NAS). This document is normally available in August and is issued by the Management

Standards and Statistics Division, AMS-400. See Figure 2-2.

(4) DOT-FA75WAI-547, Ceiling-Visibility Climatological Study and Systems Enhancement Factors. This report, published June 1975, gives ceiling/visibility data for major airports based on hourly reports for 5 to 15 years. The percentage of time for VFR, IFR, VOR, and ILS weather conditions are shown by hour groups and by months. This report is available from the National Technical Information Service, Springfield, Virginia 22151. Advice in using this report in benefit/cost analysis is provided by the Office of Aviation Policy, Plans, and Management Analysis (APO). See Figure 2-3.

d. Airport Information. The FPB F&E inspector must be aware of the existing facilities on the region's airports to be able to recommend additional facilities. Also, other information like runway width and length, existing instrument approaches, weather reporting facilities, etc., are important for the F&E evaluation. The following are some of the information sources used by the FPB.

(1) Order 5010.4, Airport Safety Data Program and FAA Form 5010-1, FAA Airport Master Record. The order establishes requirements for the collection, maintenance, and dissemination of airport data. The FAA Form 5010-1 lists all the facilities and equipment installed at an specific airport as well as much additional information. The order is issued by AAS-330, Airport Safety Data Branch, and completion of the form is the responsibility of the Airport District Offices (ADO), or in some cases, within the Airports Division in the regions.

(2) Airport/Facility Directory (AFD). These books are published by the U.S. Department of Commerce, National Ocean Service (NOS). They contain communications data, navigational facilities, and list special notices and procedures of all airports, seaplane bases and heliports open to the public. The data source is FAA's National Flight Data Center (NFDC). These books are available through subscription.

(3) U.S. Terminal Procedures Publication (TPP). These books are also published by the NOS and contain the instrument approach procedures authorized for use by the public. A pictorial airport/heliport sketch with runway and lighting information is handy for visualizing current facilities. The data source is also NFDC. These books are available through subscription.

(4) National Flight Data Digest (NFDD). The NFDD is issued by NFDC as a means of rapidly disseminating information on changes to the NAS including navaids, Flight Service Stations, Airports, etc.

222. TRACKING CANDIDATE LOCATIONS. A recommended method of data record keeping for the F&E

inspector is to use the two airport data job aids included at the end of this section. See Figure 2-4, Airport Data/-Activity, and Figure 2-5, Airport Data/Facilities. Having this information readily available before starting an F&E candidate listing will make the job much easier. Then, all the needed information does not have to be researched to complete a benefit/cost ratio.

a. Determining What Airports to Track. Obviously, not all the airports in the region need to have airport data forms completed. Candidate airports would be ones with a high level of activity, high actual instrument approaches (AIA), or numerous scheduled annual passenger originations. Public instrument flight rules (IFR) airports that may be eligible for government F&E funding are definitely candidates. All public IFR airports may be tracked, but a more reasonable suggestion is to track those airports having an average of 200 AIA's for the past 3 years. Even this list would contain airports not normally considered for F&E funding. Public visual flight rules (VFR) airports with activity amounts that produce 200 or more predicted instrument approaches (using model in FAA-APO-83-10) are possible candidates. APS-1 contains other considerations that may produce candidates such as remote locations, reliever airports, and airports with unique community economic status.

b. Completing the Airport Data Form. Figures 2-6 and 2-7 explain a standardized format for competing the forms and where the data may be found. Figures 2-8 and 2-9 show a complete set of airport data. The reason for a standardized format is that entries can easily be programmed for computerization. The airport data included on the form is most of the information the Call or APS-1 require for computation and criteria purposes for the facilities and equipment for which Flight Standards is responsible.

c. Updating Airport Data Forms. Accumulation of information is not nearly as hard as keeping a data base updated. The FPB F&E inspector is responsible for maintaining the accuracy and currency of the airport data.

(1) During the reviews of the regional F&E budget submission by higher authorities, information will be received on items that have been validated and forwarded for the next level of review. Some may be validated but deferred (dropped out) and some may be non-validated (also dropped out). If an item drops out, the inspector should revise the data sheet to reflect that the item is no longer in process. Simply change the "P##" and put in "N". If the item was validated but deferred, put a note in the F&E budget folder as a reminder to consider it next fiscal year for resubmission.

(2) If an item is non-validated, attempt to determine why it was non-validated. The AFS-12 contact will be the inspector's primary source of information for items dropped out. Reasons for non-validation may be that the facility has already been installed under FAR Part 171 (nonfed) or AIP, or it is no longer valid due to a decrease in activity.

(3) A review of the NFDD will aid in keeping the airport data records current. If a facility is added, the NFDD will list the airport, runway, and other information associated with the addition. If the added facility was not installed as an F&E project but is funded in an F&E budget (noted on the airport data sheet), contact Airways Facilities and advise them that the F&E proposed facility is no longer required. Be prepared to recommend reprogramming to an alternate location which meets benefit/cost criteria. See Section 6 for an explanation of reprogramming.

223. FILES AND RECORDS. This handbook will not dictate exactly how regional files and records must be set up by the FPB. But, an F&E budget filing system must be maintained and this handbook does require specific tracking of information. The filing system may be kept at the F&E inspector's desk or may be a branch file. The following are files and records that, through experience, are recommended systems that aid the inspector in accomplishing the branch's F&E responsibilities.

a. Airport Record Files (Airport Data Forms). These may be kept in a single binder, state binders, or individual folders. Copies of the instrument approach procedures (SIAP's) can be added as a quick visual reference of existing procedures and for determining future needs.

b. Previous Calls. Some prior fiscal year's Call for Estimates must be retained, especially the preceding year. These will be used for beginning analysis of a fiscal year's budget submissions.

c. Previous Submissions. The past 3 FY F&E budget submissions must be known to begin a new fiscal year's submission list. Also, the worksheets and supporting information should be retained for 3 years and can be utilized for the new budget.

d. Facility Lists. In many cases, a complete list of eligible candidates for a specific facility (REIL or PAPI, for instance) may be used for future submissions or shared with Airways Facilities for possible reprogramming actions.

224. MAINTAINING F&E RECORDS. The F&E budgeting process is ongoing throughout the calendar year. The F&E inspector must have appropriate reference material and maintain an up-to-date filing system for planned submissions, to calculate current benefit/cost ratios, to track the fiscal year submissions already forwarded, and be aware of procedures and policy changes.

a. "To Do" File or "Next Year's Budget" File. Throughout the calendar year the F&E inspector will receive queries or requests for facilities to be installed at various locations within the region. Attendance at Airport Joint Planning Conferences and other gatherings will also reveal possible requirements for needed facilities. A file should be maintained by the branch or F&E inspector for these requests. This file could be as simple as jotting down the locations, items requested, source of the request, and any information providing justification. The file may be 1 folder or as complex as having many folders for different F&E projects or using airport data files with F&E notations. Whatever type of filing system that serves the need of the individual FPB is the one that should be maintained. Copies of written requests and responses committing the FAA to considering a candidate must be included. This file or set of files can then be reviewed at the start of the next budget cycle in order to consider all items and locations for which a request or need has been identified.

b. Tracking F&E Projects. The F&E budget is submitted to the FAA Headquarters by the regions by the end of January of each year. The FAA, OST, and OMB must all pass on the items submitted before they are presented to Congress for funding. Items can be expected to drop out at each of the above offices or new items may be inserted. Finally, Congress will determine which of the remaining budget items will be funded. Feedback will be received regarding the status of budget items at each step of the process. This will normally be in the form of spread sheets indicating which items have been approved and which have been deferred or dropped out at each level of review. Although various offices in FAA Headquarters may forward feedback data to the region, the primary FPB source is AFS-12. The F&E inspector shall establish a system to track the status of budget items. This tracking system will facilitate answers to queries as to the status of various projects and determine what items to submit or resubmit in subsequent budget years. Inspectors should utilize the AF F&E coordinators and their computer system to maintain the tracking system.

c. Changes to Policy. The FAA may issue policy guidance or changes to policy in the form of published items in the Federal Register. The Federal Register should be reviewed specifically for items listed under the DOT/FAA. The inspector should make copies of the policies for reference in discussing these issues with the public or other government entities. In addition, policy will be received from various interrelated offices at FAA Headquarters which should be reviewed and used for guidance. Policy changes must be part of the inspector's F&E record-keeping procedure.

d. File Policies. Good F&E files are required. Although the primary task discussed in this chapter is the process for Flight Standards F&E submissions, FPB responsibilities extend beyond just annually submitting a list and justifications. Tracking individual projects is required as stated in subparagraph b above. In addition to answering inquiries, the F&E files may be inspected by different offices within the FAA or other government review organizations. The FPB F&E files shall be complete enough to answer individual site submission questions. Establishing a minimum file retention time is difficult because individual site information will normally be a part of a list; for instance, submission list, facility installation list, etc. However, the Flight Standards policy is that individual site F&E files need not be retained beyond facility commissioning. The inspector shall periodically review the F&E files and discard outdated records.

225.-229. RESERVED.

FIGURE 2-1. ADA REQUEST FORM

ADA PACKAGE REQUEST FORM

Forward to	From	
Carlton Wine	Name:	________________
Federal Aviation Administration	Title:	________________
APO-130, Room 936-B	Organization:	________________
800 Independence Avenue, S.W.	Phone:	________________
Washington, D.C. 20591	Address:	________________
		________________
		________________
		________________
		________________

Please forward a copy of the ADA manual and the ADA software including data for the following State(s):

____

____

____

Note: Circle which floppy disk density you prefer.

DSDD (320 K), or
High Capacity (1.2 M)

FIGURE 2-2. FAA AIR TRAFFIC ACTIVITY

TABLE 12 - FISCAL YEAR 1989

INSTRUMENT APPROACHES BY AIRPORT IN ALPHABETICAL SEQUENCE-CONTINUED

Airport	State	Hub	Fac	Rept Fac Loc	Total	Air Carrier	Air Taxi	General Aviation	Military
FORT BRIDGER	WY	N		ZLC	3	0	0	3	0
FORT CAMPBELL AAF	KY	N	1	HOP	0	0	0	0	0
FORT COLLINS	CO	N		ZDV	37	0	0	37	0
FORT LAUDERDALE	FL	L	1	MIA	2147	1087	558	482	20
FORT LAUDERDALE EXECUTIVE	FL	L	1	MIA	1034	0	80	854	0
FORT LEAVENWORTH	KS	N	1	MCI	88	0	0	37	61
FORT MYERS PAGE FIELD	FL	S	1	RSW	1110	0	501	607	2
FORT MYERS REGIONAL	FL	S	1	RSW	1550	860	464	187	39
FORT POLK	LA	N		ZHU	43	0	0	10	33
FORT RILEY	KS	N		ZKC	5	0	0	3	2
FORT SCOTT	KS	N		ZKC	7	0	0	7	0
FORT SMITH MUNICIPAL	AR	N	1	FSM	2833	2	806	1748	277
FORT WAYNE	IN	S	1	FWA	[illegible]	2003	1288	2421	256
FORT WORTH MEACHAM	TX	L	1	D10	1759	1	83	1674	1
FORT WORTH OAK GROVE	TX	L	1	D10	1	0	0	1	0
FOSTORIA	OH	S	1	TOL	148	0	0	148	0
FRANK FEDERER MEMORIAL	AR	N		ZME	2	0	0	2	0
FRANKFORT	IL	L	1	CBC	66	0	0	66	0
FRANKFORT MUNI	IN	N	1	LAF	22	0	0	22	0
FRANKFORT/CAPITAL CITY	KY	N	1	LEX	256	0	6	185	65
FRANKFORT/CITY-COUNTY	MI	N							
FRANKLIN	IN	M	1						
FRANKLIN CHESS LAMBERTON	PA	N	1						
FRANKLIN COUNTY	VT	N	1						
FRANKLIN MUNI-J B ROSE	VA	N	1						
FRANKLIN/MACON COUNTY	NC	N							
FREDERICK	MD	M	1						
FREDERICKSBURG	TX	N							
FREEMONT MUNICIPAL	NE	N	1						
FREEPORT	IL	N	1						
FREMONT MUNICIPAL	MI	N	1						
FREMONT PROGRESS	OH	N	1						
FRENCH LICK MUNICIPAL	IN	N							
FRENCHVILLE NC AROOSTOOK	ME	N							
FRESNO AIR TERMINAL	CA	S	1						
FRESNO CHANDLER	CA	S	1						
FRIDAY HARBOR	WA	N							
FT BELVOIR	VA	L	1						
FT BRAGG	NC	S	1						
FT COLLINS-LOVELAND MUNI	CO	N							
FT DODGE	IA	N							
FT INDIANTWN GAP/MUIR AAF	PA	S	1						
FT LEONARD WOOD FORNEY AAF	MO	N							
FT MADISON	IA	N							
FT MCCOY/SPARTA AAF	WI	N							
FT ORD	CA	S	1						
FT WAYNE SMITH FIELD	IN	S	1						
FT YUKON	AK	N							
FULLERTON MUNICIPAL	CA	L	1						
FULTON	NY	M	1						
GADSDEN	AL	N	1						
GAGE	OK	N							
GAITHERSBURG	MD	N	1						
GAINESVILLE	FL	N							
GAINESVILLE MUNICIPAL	TX	N							
GAINESVILLE/L GILMER MEM	GA	N							
GALENA	AK	N							
GALESBURG MUNICIPAL	IL	N	1						
GALION	OH	N	1						
GALLATIN	TN	N	1						
GALLUP SENATOR CLARK FLD	NM	N							
GALVESTON	TX	N	1						
GAMBELL	AK	N							
GARDEN CITY	KS	N							
GARDNER	MA	N							
GARDNER MUNICIPAL	KS	L	1						
GARY	IN	L	1						
GASTONIA	NC	N	1						
GAYLORD	MI	N							
GEAUGA	OH	N	1						
GEORGETOWN	OH	N							
GEORGETOWN COUNTY	SC	N	1						
GEORGETOWN MUNICIPAL	TX	N	1						
GIDEON MEMORIAL	MO	N							
GILLETTE	WY	N							
GILMER-UPSHUR COUNTY	TX	N	1						
GLADEWATER MUNICIPAL	TX	N	1						
GLADWIN	MI	N	1						
GLASGOW	KY	N							
GLASGOW INTL	MT	N							

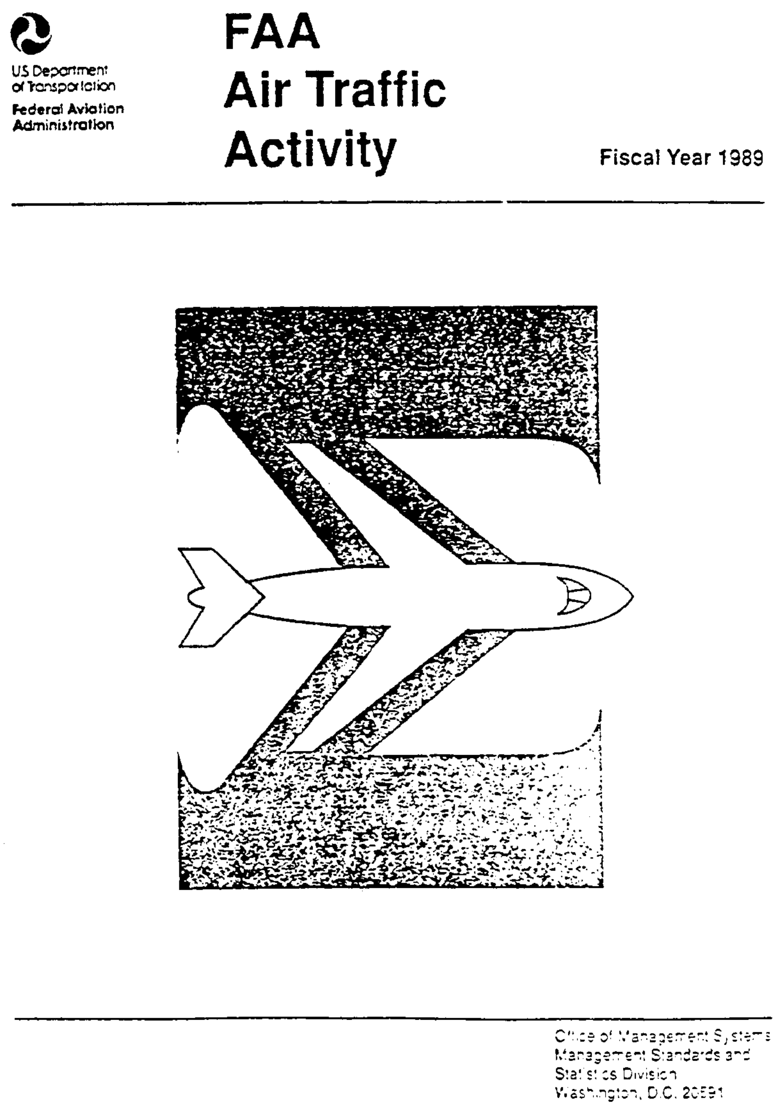

FIGURE 2-3. CLIMATOLOGICAL STUDY

CEILING-VISIBILITY CLIMATOLOGICAL STUDY and SYSTEMS ENHANCEMENT FACTORS

JUNE 1975

FINAL REPORT

Document is available to the public through the National Technical Information Service, Springfield, Virginia 22151

Prepared for

DEPARTMENT OF TRANSPORTATION
Federal Aviation Administration
Systems Requirement Division
Office of Aviation System Plans
Washington, D.C. 20591

CEILING VS. VISIBILITY CLIMATOLOGICAL STUDY

STATION=93819 INDIANAPOLIS, INDIANA

HOUR GROUP	NO.OF OBS	CEILING-VISIBILITY CATEGORIES (%) (1)	(2)	(3)	(4)	(5)	(6)
JAN ALL	12637	70.5	29.5	22.7	4.4	1.3	1.0
FEB "	11533	74.7	25.3	19.9	3.5	1.0	0.9
MAR "	12626	81.0	19.0	15.7	2.2	0.4	0.6
APR "	12227	87.9	12.1	11.4	0.6	0.1	0.0
MAY "	12642	90.8	9.2	8.4	0.6	0.1	0.1
JUN "	12230	93.3	6.7	6.2	0.3	0.0	0.1
JUL "	12638	92.4	7.6	6.6	0.6	0.2	0.1
AUG "	12625	92.5	7.5	6.0	0.7	0.3	0.4
SEP "	12225	92.2	7.8	6.8	0.7	0.2	0.2
OCT "	12631	89.0	11.0	9.2	0.9	0.2	0.6
NOV "	12235	82.9	17.1	14.5	1.5	0.4	0.7
DEC "	12634	74.7	25.3	19.8	3.2	1.2	1.2
ANN 07-13	43425	81.9	18.1	15.4	1.8	0.4	0.5
14-21	49636	89.5	10.5	9.0	1.0	0.3	0.2
22-06	55823	83.9	16.1	12.7	1.9	0.6	0.5
ALL	148884	85.2	14.8	12.2	1.6	0.5	0.5

STATION=14827 FORT WAYNE, INDIANA PERIOD OF RECORD 1/48-12/54

HOUR GROUP	NO.OF OBS	CEILING-VISIBILITY CATEGORIES (%) (1)	(2)	(3)	(4)	(5)	(6)	SYSTEM ENHANCEMENT FACTORS (%) VOR	CAT1	CAT2	MIN*
JAN ALL	12634	72.2	27.8	21.8	3.7	1.2	1.1	78.4	13.4	4.4	3.8
FEB "	11536	75.8	24.2	19.6	3.0	0.9	0.6	81.2	12.4	3.8	2.6
MAR "	12640	79.9	20.1	17.1	2.1	0.5	0.5	84.8	10.5	2.2	2.4
APR "	12235	86.4	13.6	12.0	1.2	0.2	0.2	88.1	8.7	1.6	1.5
MAY "	12640	91.2	8.8	7.8	0.6	0.2	0.2	88.8	7.2	2.2	1.8
JUN "	12230	93.3	6.7	6.0	0.4	0.1	0.2	89.4	5.4	2.1	3.1
JUL "	12647	93.6	6.4	5.8	0.5	0.1	0.1	90.0	7.7	1.0	1.4
AUG "	12645	93.2	6.8	5.6	0.5	0.3	0.4	83.1	7.5	3.7	5.7
SEP "	12233	92.2	7.8	6.5	0.6	0.2	0.5	84.3	7.3	2.4	6.0
OCT "	12642	88.9	11.1	9.3	0.7	0.3	0.9	83.9	5.9	2.5	7.7
NOV "	12236	82.7	17.3	14.4	1.5	0.5	0.9	83.4	8.7	2.6	5.9
DEC "	12639	73.9	26.1	20.7	3.3	0.9	1.3	79.2	12.5	3.3	5.0
ANN 07-13	43448	82.3	17.7	15.3	1.5	0.4	0.5	86.4	8.4	2.3	2.9
14-21	49660	88.9	11.1	9.5	1.1	0.3	0.2	85.6	9.9	2.3	2.1
22-06	55849	84.5	15.5	12.2	1.9	0.6	0.9	78.4	12.0	4.0	5.7
ALL	148957	85.3	14.7	12.2	1.5	0.4	0.6	83.0	10.2	3.0	3.8

CEILING VISIBILITY CONDITIONS (% OF TOTAL OBSERVATIONS)

(1) ≥ 1500 FEET AND 4 MILES
(2) < 1500 FEET AND/OR 3 MILES
(3) < 1500 FEET AND/OR 3 MILES, BUT ≥ 400 FEET AND 1 MILE
(4) < 400 FEET AND/OR 1 MILE, BUT ≥ 200 FEET AND 1/2 MILE
(5) < 200 FEET AND/OR 1/2 MILE, BUT ≥100 FEET AND 1/4 MILE
(6) < 100 FEET AND/OR 1/4 MILE

SYSTEMS ENHANCEMENT FACTORS (CEILING VISIBILITY CONDITIONS)

VOR=FREQ (3)/FREQ(2)
CAT1 ILS=FREQ(4)/FREQ(2)
CAT2 ILS=FREQ(5)/FREQ(2)
*BELOW MINIMUMS=FREQ(6)/FREQ(2)

FIGURE 2-4. AIRPORT DATA/ACTIVITY

STATE		CITY		IDENT		SITE NUMBER	
AIRPORT NAME				RELIEVER		TOWER CODE	
HUB TYPE		AWOS		LLWAS		VOR RECEIVER CHECK POINT	
NEAREST WEATHER REPORTING AIRPORT				DISTANCE		CONGRESSIONAL DISTRICT	

199 ACTIVITY STATISTICS

AIA		OPS	LANDINGS	AEP
	AC			
	AT			
	GEN			
	MIL			
	TOT			

199 ACTIVITY STATISTICS

AIA		OPS	LANDINGS	AEP
	AC			
	AT			
	GEN			
	MIL			
	TOT			

199 ACTIVITY STATISTICS

AIA		OPS	LANDINGS	AEP
	AC			
	AT			
	GEN			
	MIL			
	TOT			

199 ACTIVITY STATISTICS

AIA		OPS	LANDINGS	AEP
	AC			
	AT			
	GEN			
	MIL			
	TOT			

FIGURE 2-5. AIRPORT DATA/FACILITIES

STATE		CITY		AIRPORT		IDENT	

AIRPORT DATA / FACILITIES

RWY NO.	LENGTH	WIDTH	% USE		LIGHTS				RVR	REIL	DMEL	VASI PAPI	RWY APP TYPE	CAT A		CAT B		LARGEST	
			TOT	IFR	R	APP	T	C						MINS	VIS	MINS	VIS	MINS	VIS

FIGURE 2-6. FORM COMPLETION-AIRPORT DATA/ACTIVITY

Airport Data/Activity

State - Two letter state identifier

City - Copy from "U.S. Terminal Procedures" book, or AFD

Ident - Copy from "U.S. Terminal Procedures" book, or AFD

Site Number - Copy from FAA Form 5010-1

Airport Name - Copy from FAA Form 5010-1

Reliever - Copy from "ADA" Program - under reliever, or NPIAS

Tower Code - Copy from "ADA" Program

Hub Type - Copy from "19XX-FAA Air Traffic Activity" book, Table 12

AWOS - Airport/Facility Directory - Weather Data Sources

LLWAS - Airport/Facility Directory - Weather Data Sources

VOR Receiver Check Point - Airport/Facility Directory - listed under VOR Receiver Check Points and VOR Test Facilities (VOT)

Nearest Weather Reporting Airport - Use the nearest FAA towered airport that takes and reports the weather - or the nearest National Weather Service reporting station. An additional reference is the - Ceiling - Visibility Climatological study and System Enhancement Factors - Report (DOT-FA75WAI-547), which contains historical ceiling and visibility data. Nearest Weather Reporting Airport Distance - To be computed

Congressional District - Airway Facilities Division - Usually the Airways Facilities Division has a list of congressional districts associated with each airport. This item is not required for F&E computations but is used as reference information only

AIA Counts - FAA Air Traffic Activity or ADA Program

Operations - ADA Program or possibly, FAA Form 5010-1

Landings - Operations divided by 2

AEP - Annual enplaned passengers - FAA Air Traffic Activity or ADA Program.

FIGURE 2-7. FORM COMPLETION-AIRPORT DATA/FACILITIES

Airport Data/Facilities

State - Copy from Fig 2-1

City - Same as previous

Airport - Same as previous

Ident - Same as previous

Rwy No. - U.S. Terminal Procedures book or Airport Facility Directory. For Runway 1 thru 9 use 01 thru 09. If runway is right, left or center use 09R or 22L

Length - U.S. Terminal Procedures book or Airport Facility Directory

Width - Same as above

% Use - TOT (Total) For towered airports, it is suggested you request Air Traffic write a letter to each tower re questing their best estimate. For non-towered airports use wind rose information contained on airport layout plan (ALP) or your best estimate - suggest you use APS-1 runway utilization contained on page 36 and/or 40

% Use - IFR (When weather is lower than VFR) same as above except highest use will be on instrumented runways. For non-instrumented runways, the use would be very low but may have some use during circling conditions

LIGHTS. The following light information can be obtained from the Airport/Facility Directory and/or the U.S. Terminal Procedures book. Additional information may be obtained from the ALP or FAA Form 5010-1

Lights - R (Runway)
- H = High Intensity (HIRLS)
- M = Medium Intensity (MIRLS)
- L = Low Intensity (LIRLS)
- N = None

Lights - APP (Approach) ALSF1, ALSF2, MALSR, MALSF, SALSR, MALS, ODALS, LDIN, etc. If you have submitted the runway for F&E lights, use P92 for planned - 92 F&E submission

FIGURE 2-7. FORM COMPLETION-AIRPORT DATA/FACILITIES (Cont'd.)

Lights - T (Touchdown) Y (Yes) or N (No) normally CAT II or CAT III runways will have touchdown zone lights

Lights - C (Centerline) Y (Yes) or N (No)

RVR - U.S. Terminal Procedures Book - Y (Yes) if visibility is listed as a 2 digit number. N (No) if visibility is not listed as a 2 digit number. Also obtainable from FAA Form 5010-1

PXX - programmed - XX F&E year

REIL - U.S. Terminal Procedures Book or Airport Facility Directory
Y (Yes) installed
N (No) not installed
P## - programmed - ## - F&E year

DMEL - U.S. Terminal Procedures Book
Y (Yes) if localizer frequency box has channel listed
N (No) if localizer frequency box does not have channel listed

VASI or PAPI - U.S. Terminal Procedures Book or Airport Facility Directory
N (No) not installed
V4L = 4 box VASI installed on left side
P4L = 4 box PAPI installed on left side
PXX - P - Programmed, XX - F&E year

Runway APP Type (Runway Approach Type)
P = Precision - Precision approach to the runway
NP = Non-Precision - Non-Precision approach to the runway
V = Visual Flight Rules (VFR) - No approach published to the runway

Ceiling & visibility data is used to obtain estimated AIA counts using airport operations and weather data
CAT A - Mins (Ceiling) - U.S. Terminal Procedures Book, HAT not MSL
CAT A - Vis (Visibility) - Whole number and decimal of statute miles
CAT B - Mins - Same as above
CAT B - Vis - Same as above
Largest - Mins - Same as above, list for largest category of approach
Largest - Vis - if only CAT B authorized, input CAT "B" info again

FIGURE 2-8. COMPLETED AIRPORT DATA/ACTIVITY

STATE	IN	CITY	Fort Wayne	IDENT	FWA	SITE NUMBER	05282.A
AIRPORT NAME	Fort Wayne Municipal/Baer Field			RELIEVER	N	TOWER CODE	1
HUB TYPE	S	AWOS	P NWS	LLWAS	N	VOR RECEIVER CHECK POINT	Y
NEAREST WEATHER REPORTING AIRPORT			FWA	DISTANCE	Ø	CONGRESSIONAL DISTRICT	4

19 87 ACTIVITY STATISTICS

AIA		OPS	LANDINGS	AEP
2376	AC	29384	14692	
937	AT	10975	5488	
2829	GEN	77460	38730	
393	MIL	7074	3537	
6535	TOT	124893	62447	305634

1988 ACTIVITY STATISTICS

AIA		OPS	LANDINGS	AEP
1296	AC	28219	14110	
804	AT	17479	8740	
1573	GEN	74114	37057	
128	MIL	6537	3268	
3801	TOT	126349	63175	338157

19 89 ACTIVITY STATISTICS

AIA		OPS	LANDINGS	AEP
2003	AC	28577	14289	
1288	AT	16035	8018	
2421	GEN	61788	30894	
256	MIL	5498	2749	
5968	TOT	111898	555949	325773

19 ACTIVITY STATISTICS

AIA		OPS	LANDINGS	AEP
	AC			
	AT			
	GEN			
	MIL			
	TOT			

FIGURE 2-9. COMPLETED AIRPORT DATA/FACILITIES

STATE	IN	CITY	Fort Wayne	AIRPORT	Fort Wayne Municipal	IDENT	FWA

AIRPORT DATA / FACILITIES

RWY NO.	LENGTH	WIDTH	% USE		LIGHTS				RVR	REIL	DMEL	VASI PAPI	RWY APP TYPE	CAT A		CAT B		LARGEST	
			TOT	IFR	R	APP	T	C						MINS	VIS	MINS	VIS	MINS	VIS
05	12000	150	50	50	H	ALSF2	Y	Y	Y	N	N	N	P	200	.375	200	.375	200	.375
23	"	"	20	20	H	N	N	Y	N	N	N	V4L	NP	360	1	360	1	360	1.25
14	8500	150	10	10	H	N	N	N	N	Y	N	P4L	NP	200	.75	200	.75	200	.75
32	"	"	20	20	H	P92	N	N	Y	Y	N	N	NP	423	1.0	423	1	423	1.25

SECTION 3. CALL FOR ESTIMATES AND APS-1

230. GENERAL. The two major documents used by the inspector for F&E submissions are: Order 2500.55, Call for Estimates Facilities and Equipment (F&E), and Order 7031.2, Airway Planning Standard Number One - Terminal Air Navigation Facilities and Air Traffic Control Services. This section discusses these documents and provides guidance to the inspector concerning what portions of the orders apply to Flight Standards.

231. THE CALL-ORDER 2500.55. Order 2500.55 is the basic guidance for implementing the annual submission of the facilities and equipment requests of the regions. This order is published annually to cover a specified fiscal year (FY) of funding authorization.

a. The Document. The October 16, 1992 order for FY-95 consists of a standard FAA Order cover sheet, four appendixes, and a table of contents. It is initiated by the Capital Division, ABU-300, signed by the Director of Budget, ABU-1, and distributed under the list ZBU-250. The document contains over 160 pages.

b. Order Cover Sheet. The order cover sheet contains the standard purpose, distribution, cancellation, etc. Except for distribution, the following are included:

(1) Purpose. The order provides program guidance and instructions for the development and preparation of a single specific fiscal year budget estimate for the F&E (Airport and Airway Trust Fund) appropriation by Congress.

(2) Cancellation. The prior fiscal year Order 2500.55 is canceled annually by publication of the current order.

(3) Explanation of Changes. The current Order 2500.55 revises the program guidance dollar amounts and instructions for the development and preparation of budget estimates for the specified fiscal year F&E appropriation.

(4) Formulation Requirements. F&E submissions for the specified budget FY shall be based on the Call, Airway Planning Standard Number One (APS-1/Order 7031.2), statistical data, and FAA policies currently in effect.

c. Appendix 1, Objectives and Formulation of Programs. This is a 16-page appendix which lays out the "ground rules" for the submissions and contains background information.

(1) Development of Program Estimates. This first paragraph explains the process of developing program estimates. The process consists of the three following phases:

(a) Planning. Planning is conducted through the Aviation System Capital Investment Plan (CIP) mission need process.

(b) Programming. Programming is matching dollars available against the most critical needs and priorities established in the planning process (in the CIP).

(c) Budgeting. Budgeting involves the refinement of detailed costs and conversion of program structured data into budget structured data. The result is an actual budget submission.

(2) Submission Requirements. The regions (along with the headquarters offices, services, and centers) are required to submit detailed narrative justifications, cost estimates and project material lists for each candidate location submitted in response to individual program items within the Call for Estimates. An explanation of congressionally mandated changes to the FAA's F&E program is included.

(3) Budget Year Ceilings. An estimated level of F&E funding for the specified fiscal year will be stated (FY-95 level is $2.8 billion).

(4) Relationship of CIP to Budget Process. The relationship of the CIP and the F&E budget is explained as well as recent changes to the CIP process. Mission need statements were required to "revalidate" existing CIP programs and for any new programs. New CIP programs must compete against all other existing CIP programs for funding.

(5) Due Dates. The Regions are required to submit their consolidated F&E budget input under a cover letter from the Regional Administrator to the Office of Budget, ABU-1 (Attn: ABU-310).

(a) Regional budgets are also submitted electronically on the Resource Tracking Program.

(b) An extensive list of dates for the CIP and F&E programs are included in the Call.

(c) Submissions are due in the FAA's Office of Budget on the first Monday in February, 2-1/2 years prior to the start of the FY being acted upon. To meet this date, a regional Order normally specifies target dates for the latest submission of candidates to the Airway Facilities Division in order to apply cost estimates, develop material lists, consolidate the submission, coordinate the final priorities, brief division managers and the Regional Administrator, and publication. It is not unusual for this divisional submission target date to be prior to or in September.

(6) Revisions to F&E Budget Submissions. Revisions submitted by the regions after the initial due date require special handling and will slow

down the Washington office review and pricing processes, as well as budget updating and reports processes. If revisions are necessary, they should be forwarded to the sponsor and ABU-310 WITHIN TWO WEEKS after the due-date of the budget submission, with a cover letter summarizing why they were submitted.

(7) Definitions. A list of definitions is included.

d. Appendix 2, National Program/Criteria Items. This section of the Call provides the actual national program Call items identified for the fiscal year national program, their specified FY funding levels, a description of each item, instructions, specific criteria and guidance, detailed justifications required, and the office symbol, name, and FTS telephone number of Headquarters contacts if explanations are needed. This appendix provides the detailed information necessary for the decisions involved in formulation of the F&E candidate lists and prioritization of candidates submitted to the Airway Facilities Division. The beginning of this appendix should be read in its entirety in order to understand the overall F&E program.

e. Appendix 3, Regional Originated Within-Ceiling Projects. Appendix 3 of the Call for Estimates provides the definitions and descriptions of regional originated modernization or improvement projects and the dollar ceiling amounts (broken down by region) of the specific fiscal year submission. Any required priority project not listed as a national program in Appendix 2 must be submitted as a regional-originated project within established dollar ceilings. Individual project submissions depend upon regional priorities. The guidelines within Appendix 3 provide assistance in developing justification for individual submissions, and also, provide program direction. Since the priorities are set within the region, the FPB F&E inspector may be required to vigorously defend the priority of the safety related Flight Standards projects submitted under Appendix 3. If not, these projects may not survive the regional competition for the F&E dollars available for that fiscal year.

f. Appendix 4, Submission Format and Required Exhibits. Appendix 4 provides detailed information on the format of the regional F&E submission. This includes explanation of the organization, format, arrangement, and preparation of regional cost estimates and required figures. Examples of figures, tables, and forms are provided. The majority of this information applies to Airway Facilities Division which compiles, formats, and publishes the submission. However, the Flight Standards F&E inspector should be aware that when completing their F&E submissions, selected information or examples in this appendix may be helpful.

232. APPLICABLE FLIGHT STANDARDS PORTIONS OF THE CALL. Although the entire Call has Flight Standards applicable portions, Appendix 2, National Program/Criteria Items, is the section requiring extensive FPB input for the regional F&E submissions. These Items may change from year-to-year. Therefore, the Call must be referenced annually to identify changes which are applicable to Flight Standards.

a. Items Flight Standards is Responsible for Submitting. Within Appendix 2 of the Call, budget activity group 2D, Landing and Navigational Aids Programs, contains items which may require Flight Standards input and submission of prioritized candidates and their justification. The other activity groups are not normally Flight Standards' responsibility. The items under 2D include terminal navaids (other than radar) and visual landing aids. The Flight Standards F&E inspector must screen the items within group 2D and determine which are their responsibility, determine items which other divisions might have greater vested interest, and determine which items are definitely the responsibility of other divisions.

b. Defer Notification. Once inspectors make the determination as to which items in area 2D they do not intend to submit as candidates, they should notify in writing their counterpart representatives within the Airway Facilities Division (with copies to the Air Traffic Division and Airports Division). This will clearly inform the other divisions that Flight Standards does not intend to make inputs on the specified items and clearly make these the responsibility of other divisions. A combined notification listing should be developed and sent to the appropriate F&E office within those divisions. The listing should identify the FY, and clearly state that Flight Standards is deferring to those offices for submission of the appropriate items. Issuance of this notification will free the inspector to concentrate on Call items which are the sole responsibility of Flight Standards. See Figure 2-10.

c. Examples of Items Which Might Be Deferred. The inspector may determine that Flight Standard's submission for a particular FY should exclude the following items:

(1) VOR/DME/TACAN Network Plan. The VOR/DME/TACAN Network Plan, dated August 1986, identifies facilities to be relocated, converted, upgraded, combined, established, replaced, or deleted to meet the requirements of the National Airspace System (NAS). With Flight Standards input, the majority of these locations are already identified for support of the en route airway structure and are of prime interest to Air Traffic and Airway Facilities. An exception is a terminal VOR (TVOR). Field input requesting a TVOR normally comes from an Air Traffic Control Tower (ATCT). Flight

Standards accomplishes the benefit/cost analysis and includes the TVOR in their list of submissions.

(2) Replace/Sustain VOR and Other Equipment. Since these items are a replacement or general maintenance of existing facilities, Air Traffic and Airway Facilities have prime interest.

(3) Approach Lighting System Improvement Program (ALSIP). Flight Standards is primarily concerned with installation of new ALS systems, but is also a joint sponsor of ALSIP because of the frangibility safety issue. The FPB must also be involved when existing ALS are due reconstruction and are upgraded at the same time. For example, it may be desired to upgrade a MALS to a MALSR, or a MALSR to an ALSF-2 at the same time that frangibility is provided. Therefore, the inspector must work closely with Airway Facilities personnel to ensure Flight Standards requirements are being met and upgrades are properly coordinated. However, the Airway Facilities Division is the repository for information regarding existing ALS. They know which location's runway approach ends already have frangible support systems and which do not. Also, they are aware where power cables need replacement and rust or corrosion is extensive. Therefore, Airway Facilities should be "primary" for specifying locations for frangibility/cost reduction and for working this budget item. ALSIP submissions may require activity information to be provided by the F&E inspector in support of the AF submission.

d. Significance of Draft Call. There is a fundamental administrative problem in regard to working the F&E program. That problem is the untimely publication and receipt of the annual Call for Estimates within the region. It is a factor which must be dealt with and overcome in order to produce a timely Flight Standards and regional F&E budget submission. For example, the FY-92 F&E submission was forwarded by the regions January 1990 and the published FY-92 Call for Estimates was not received in the regions until late March 1990.

(1) This deficiency is overcome by using the FY-91 (previous fiscal year) Call during the initial stages of working up the FY-92 submission. This can be done because most program items are multi-year in nature and the submission criteria do not change significantly for multi-year items.

(2) The draft of the FY-92 Call was received in the regions for comments in September 1989. The draft gave the FY-92 changes to the Call items, criteria, and dollar amounts (or in some cases, number of locations). Using the draft Call, all regional F&E representatives must rapidly determine the Call changes and concentrate on finalizing

the FY-92 candidate lists and priorities.

(3) The Flight Standards F&E inspector must submit the lists (or in some regions, updated lists) to the Airway Facilities F&E office as soon as possible. Consequently, the late receipt of the FY-92 Call can be overcome by using the FY-91 Call and the draft FY-92 Call. Delay in receiving the draft Call greatly compresses the time allotted to complete the regional submission.

(4) Not having a published Call, or even the draft Call, before starting the candidate lists is inconvenient but not impossible to overcome.

233. APS-1 AND THE BENEFIT/-COST PROCESS. The FAA Administrator is empowered to provide air navigation facilities and air traffic control services to ensure efficient utilization of the navigable airspace (including that required for takeoff and landing) and the safe and expeditious flow of air traffic. To discharge this responsibility, the FAA provides terminal facilities and services at airports to assist aircraft in starting and terminating their flights. The policy and criteria used in establishing the eligibility of terminal locations for terminal air navigation facilities are contained in Order 7031.2, Airway Planning Standard Number One - Terminal Air Navigation Facilities and Air Traffic Control Services (APS-1).

a. Philosophy. The safety and efficiency of air traffic operational requirements determine the need for air navigational facilities and air traffic control services, but these facilities and services should only be established at locations where the benefits of service exceed the cost to the government. Economic consideration of benefits and costs for both new establishments and improvements to existing facilities or service are related to air traffic activity levels and other parameters such as capacity, etc. Since the FAA operates within defined budgetary limitations, the facilities and services must be allocated to locations where the greatest benefit will be derived from their cost. Therefore, APS-1 specifies minimum activity levels for airports to become candidates for, to qualify for, or to retain primary terminal air navigation facilities and air traffic control services. Generally, the total present value of the benefits over the life cycle of an improvement or service must exceed the total present value of the life cycle costs for establishment and maintenance of the facility or service.

b. Disclaimer. Satisfying criteria specified in APS-1 DOES NOT CONSTITUTE A COMMITMENT by the FAA to provide, modify, or discontinue eligible facilities or services. Eligible candidates are evaluated and prioritized based on known aircraft traffic conditions, national capacity requirements, numbers and funding in each

Call, and regional priorities. Also, inclusion into the CIP as part of a national program is generally required and a lengthy review process occurs. Ultimately, the U.S. Congress acts to approve and fund those facilities and services which survive a fiscal year's F&E budget process.

c. Evaluation Phases. There may be two phases to some facilities and equipment analysis. Phase I is accomplished in the region using the APS-1 criteria and any special parameters included in the Call. For certain types of facilities, APS-1 also establishes requirements for a final benefit/cost analysis (Phase II). In this case, Phase I is a qualifications ratio. Phase II calculations are applied at FAA Headquarters, normally using more than the data supplied by the region and required by the Call. Phase II evaluation normally involves a site specific, complex formula established by a report from the Office of Aviation Policy, Plans, Management Analysis (APO). The reports may be specified in APS-1. Any facilities and equipment submitted by the regions that do not meet these Phase II requirements are deleted from the budget submission by FAA Headquarters.

d. Responsibility. The FAA shall determine the eligibility of candidates and their qualification for submission for F&E funding consideration by the U.S. Congress. For terminal navaids and visual aids, this responsibility falls upon the F&E inspector within the Regional Flight Procedures Branch. The following APS-1 guidance pertain specifically to Flight Standards responsibilities to the F&E budget process.

(1) Establishing Candidacy. An airport/runway that meets the criteria specified in APS-1 for one or more air navigation facilities becomes a candidate location for the particular facilities.

(2) Establishing Qualification. A candidate facility or service becomes qualified for establishment when:

(a) It meets the criteria specified in APS-1 for three consecutive FAA annual counts (An FAA annual count is a fiscal year or a calendar year activity summary. Where actual traffic counts are unavailable or not recorded, adequately documented estimates of the demand for the facility or service may be used; for example, an Air Traffic Control Tower or consultant study.), and/or

(b) It meets the criteria specified in APS-1, Chapter 1, paragraph 7, reference to remote locations, new airports, or the "new communities" program, or the exceptions as specified in APS-1, paragraph 8, (also see paragraph e below), and

(c) It is recommended by a Regional Administrator as necessary to satisfy an operational requirement and is economically justified by a benefit/cost study, and

(d) The recommendation of the Regional Administrator is concurred with by the FAA Administrator.

(3) Discontinuance of Facilities or Services. Whenever the activity level of an air navigation facility falls to or below the discontinuance criteria specified within APS-1, or if factors other than activity level were used to justify establishment and these cease to exist or change significantly, the facility or service is a candidate for decommissioning. If the activity level remains at or goes below the discontinuance level for three consecutive FAA annual counts, the facility or service shall be discontinued unless its retention can be specifically justified.

e. APS-1 Criteria and Variations Within the Criteria. APS-1 contains screening criteria for the establishment of the various terminal facilities and air traffic control services. Criteria for other than terminal air navigation facilities and air traffic control services are contained in the appropriate airway planning standard or agency directive.

(1) The criteria contained in APS-1 are primarily based on air traffic demand (count) since volume of traffic is a tangible and measurable indication of the need for air navigation facilities and air traffic control services. These criteria do not however, cover all situations which may arise and shall not be used as a sole determination in denying a location a terminal facility or service for which there is a demonstrated operational requirement or air traffic control requirement. Similarly, air traffic demand does not by itself always constitute a requirement for an air navigation facility or air traffic control service.

(2) A true aeronautical requirement may exist for facilities and/or services that cannot be measured with reference to the volume of air traffic activity alone. Other factors (wherein a fixed count requirement cannot be established) which must also be considered are the general terrain features in the vicinity of the airport, the nature of the operation, the frequent and predictable occurrence of severe climatological phenomena such as heavy fog, snow or ice, or other local conditions that can adversely affect aircraft operations or the safety of the flying public.

234. APPLICABLE FLIGHT STANDARDS PORTIONS OF APS-1. The following subparagraphs of APS-1 are applicable for reviews and calculations by the Flight Standards F&E inspector.

a. Chapter 2. Navigation Aids; Section 1. Air Navigation Radio Aids. Provides benefit/cost establishment criteria and discontinuance criteria for:

(1) 20. Microwave Landing System (MLS) with approach lights (The same criteria apply to ILS).

(2) 20.d. Supplemental criteria for MLS/ILS establishment at commercial service airports.

(3) 20.e. Supplemental MLS Criteria for Reliever Airports.

(4) 21.c.(1) Runway Visual Range (RVR) with MLS/-ILS.

(5) 22.a.(1) Non-precision Localizer and 75 MHZ Marker Beacon.

(6) 22.a.(2) Terminal Very High Frequency Omni Range (TVOR).

(7) 22.a.(3) Distance Measuring Equipment (DME) with Localizer/Marker Beacon.

(8) 22.a.(4) Visual Approach Slope Indicator (VASI), for straight-in non-precision approach procedure. (The same criteria apply to Precision Approach Path Indicator, PAPI).

(9) 22.a.(5)(a)/(b) Establish MALSR or ODALS (Non-precision Approach).

(10) 22.a.(6) Runway Visual Range (RVR) for non-precision runway.

(11) 23. VOR Test Signal (VOT).

b. Chapter 3. Aeronautical Lighting and Airport Marking Aids. Provides benefit/-cost establishment criteria and discontinuance criteria for:

(1) 30. Runway End Identification Lights (REIL) and Omni-REIL.

(2) 31. Visual Approach Slope Indicator (VASI) for VFR only (the same criteria apply to Precision Approach Path Indicator, PAPI.)

(3) 32. Retrofit of Runway Approach Lighting System (ALS). Involves retrofitting of rigid light support structures with low impact resistant support. This is also referred to as the Approach Lighting Systems Improvement Program (ALSIP). Various types of approach lighting systems are replaced or upgraded under the ALSIP program.

c. Chapter 4. Air Traffic Control; Paragraph 46, Automated Weather Observing System (AWOS); subparagraph c. Non-Towered and Non-Federal Towered Airports. This is the only subject item in this chapter for which the Flight Standards F&E inspector has partial responsibility. Establishment and discontinuance Phase 1 benefit/cost criteria are provided for in 46.c, AWOS at airports with no tower. Air Traffic has responsibility for federal tower and non-federal tower locations.

d. Appendix 2. Summary of Establishment and Discontinuance Criteria.

(1) Figure 1 - Criteria Summary for Chapter 2, Navigation Aids Section 1. - Air Navigation Radio Aids. By individual subject facilities, this figure summarizes establishment and discontinuance criteria for each subject item.

(2) Figure 2 - Summary of Establishment and Discontinuance Criteria for Chapter 3. Aeronautical Lighting and Airport Marking Aids. By individual subject facilities, this figure summarizes establishment and discontinuance criteria for each item.

235.-239. RESERVED.

FIGURE 2-10. SAMPLE DEFER MEMO

U.S. Department of Transportation
Federal Aviation Administration

Memorandum

Subject: INFORMATION: FY-1994 F&E Budget

Date:

From: Manager, Flight Procedures Branch, ASO-220

Reply to Attn of: Mitchell:x7455

To: Manager, Resource and Planning Branch, ASO-420

We are not yet in receipt of the FY-94 Draft F&E Call for Estimates. We normally receive that in September. In the interest of furthering the FY-94 F&E coordination process, we are informing you that if the following items appear in the forthcoming draft FY-94 F&E Call for Estimates, ASO-220 does not at this time intend to submit candidates for any of the following items. We defer to ASO-514 and ASO-424. We will provide information to assist them as it is requested.

VOR/TACAN Network Plan
Sustain VOR/VORTAC
Replace TACAN Antennas
LORAN-C, Monitor Enhancements
MLS
ILS GRN-27 Replacements
Replace ILS (Mark IA, IB, IC)
ALSIP
ASOS
Upgrade LLWAS
Retrofit MALSR with Threshold Lights
Retrofit Visual Facilities with Remote Radio Control
Replace Traveling Wave Antenna

We do intend to make candidates submissions to ASO-424 for the following items by not later than October 1, 1991. This allows for receipt of the Draft F&E Call for Estimates (FY-94) in September.

ILS/MALSR/ALSF2
RVR
NDB at OM (LOM)
DME at Localizer
PAPI
REIL

If you have questions contact Merle Mitchell of our office.

Dale C. Anderson

CC: ASO-510, ASO-530, ASO-610, ATL-ADO, JAN-ADO, MEM-ADO, ORL-ADO

SECTION 4. APS-1 APPLICATION AND CALCULATIONS

240. GENERAL. This section will step through the procedures for applying the criteria in APS-1 and the Call in order to establish eligibility for candidates for the F&E submissions. Other orders and documents are included that contain supporting criteria. Call examples and job aids are included. The job aids at the end of this section can be copied for office use. Because APS-1 calculations are simple mathematics, they are easily programmable and most FPB's have usable programs already established.

241. EXPLANATION OF CALL ITEMS. Call items are not hard to read and understand. Two examples from a recent Call are included in this handbook for the purpose of showing what Section 3 described. These are examples only. Future Calls will contain changes and different requirements. Numbering conventions for Call items may also change. The first example contains a detailed explanation of a Call item. The second example shows the complex ILS Call item.

a. RVR Call Item Example. In Appendix 2 of the Call, under Budget Activity 2, Air Traffic Control Facilities and Equipment, and under 2D., Landing and Navigational Aids Program, is 2D07, Runway Visual Range (RVR).

(1) This system is listed under project number 34-08 of the Capital Investment Plan (CIP). The programmed total dollar amount is 3 million for various locations. The full coding is the Call numbers, followed by the title, and ending with the code numbers. The program sponsors are both Flight Standards and the Program Director for Navigation and Landing (ANN). A headquarters organizational contact list is included at the end of the item.

(2) This Call item is for RVR with ILS/MLS for Category I systems. Also, criteria are included for RVR installations on a non-precision instrumented runway. Note that APS-1 criteria apply and these calculations must be submitted. The criteria define minimum number of low visibility observations required at the airport for eligibility.

FIGURE 2-11. SAMPLE RVR CALL ITEM

2D07	**NP**	**<u>Runway Visual Range (RVR) - Establish</u>**			
		CIP No:	**34-08**	**Amount:**	**$3,000,000**
		Coding:	**3471-0-119**	**Locations**	**Various**
		Sponsor:	**AFS/ANN**		

This item establishes a touchdown zone RVR measuring system on Category I ILS/MLS runways at towered airports. This item also establishes RVR systems on non-precision runways for takeoff or capacity enhancement in accordance with Airway Planning Standard Number One (APS #1) criteria, Order 7031.2C. This system will provide a standardized, instantaneous, and accurate method of measuring actual meteorological visibility of an ILS/MLS equipped runway. Significant changes in runway visibility will be immediately discernible and can be given to the pilot of an aircraft prior to reaching a condition that could be potentially hazardous for completion of the approach and landing.

This item is only for Category I ILS/MLS with approach lights and high intensity runway lights (HIRL's) because RVR systems are integral components of Category II and III systems. Candidate locations shall be determined in accordance with APS No. 1, paragraph 21c(1).

Any towered airport with less than 15 annual hourly observations of visibility of one-half of a mile or less will not qualify for an RVR system regardless of the RVR installation index value.

A non-precision instrumented runway (i.e., not equipped with an Instrument Landing System or Microwave Landing System) qualifies as a candidate for establishment of an RVR provided: (1) the airport has one or more RVR-equipped precision instrumented runway; (2) the provisions of Order 6560.10B, Runway Visual Range, and the siting and installation standards of FAA-STD-008 can be met; and (3) the ratio of life-cycle benefits to life cycle cost equals or exceeds 1.0.

In order to achieve reduction of takeoff visibility minima authorized under provisions of Order 6560.10B, Air Carrier runways are eligible as candidates for RVR funding even in the absence of a precision or non-precision instrument approach procedure to that runway. High intensity runway edge lighting (HIRL), runway centerline lighting, and a means of reporting current RVR readings must be available or committed to be available prior to the RVR installation. Achievement of this RVR capability will reduce takeoff minima from 1/2 statute mile to as low as RVR 600 feet visibility for both ends of that runway. This is a significant operational benefit and capacity enhance-

FIGURE 2-11. SAMPLE RVR CALL ITEM (Cont'd.)

ment. Regions will use APS-1, RVR for a non-precision instrument runway for a ratio of life-cycle benefits to life cycle costs and shall equal or exceed a ratio of 1.0.

Regions will submit their calculations in accordance with the methodology contained in APS No. 1, paragraph 21c(1), for each location.

New generation RVR systems will be procured in support of this program. This equipment will be based on the use of single point sensors, data processing unit, ambient light sensor, runway light intensity monitor, and displays. New generation RVR's are based on technology other than the transmissometer, so no baseline considerations are required. The new RVR sensor will be capable of being mounted on a single concrete pad approximately five feet square. One display per controller position and one display where a touchdown recorder is authorized for NWS use. APS-400 letter of August 28, 1985 to all regional airway facilities divisions, subject RVR's, describes the technical aspects of the new generation RVR systems and the procurement strategy.

"Budget Item Summary" and FAA Forms 2500-40 (regional cost) and 4650-1 (PML) are required. Regions are requested to prioritize their locations.

FAA Program Manager: Gary Skillicorn, ANN-200, (202) 267-6675
ANN Contact: John Saledas, ANN-140, (202) 267-6529
ATR Contact: Andy Oltmanns, ATR-120, (202) 267-9179
AFS Contact: Marcia Bisenius/Joe Tintera, AFS-12, (202) 267-3820/7773

b. ILS Call Item. This item is of prime importance to the FPB F&E inspector. An ILS requires extensive work to apply criteria, determine eligibility and qualification, and justify the submission with a written staff study.

(1) Note that the eligibility criteria are extensive but well presented. Some of the criteria are explicit while some allows flexibility.

(2) Category II/III systems require special criteria. These will also require a phase II benefit/cost analysis by headquarters. Documentation with the staff study is required for the airport authority agreements and to assure carriers can provide Category II/III approved crews and equipment.

(3) The additional facilities and equipment for ILS systems are listed under separate code numbers.

FIGURE 2-12. SAMPLE ILS CALL ITEM

2D04	**NP**	**Instrument Landing System (ILS) - Establish/Upgrade**				
		CIP No:	**34-06**	**Amount:**	**$45,000,000**	
		Coding:	**See Below**	**Locations:**	**Various**	
		Sponsor:	**See Below**			

Cross Reference Airport name and Runway Number for all below:

2D04A	**NP**	**ILS - CAT I-Establish**			
		CIP No:	**34-06**	**Amount:**	**TBD**
		Coding:	**3131-0-101**	**Locations:**	**Various**
		Sponsor:	**AFS**		
2D04B	**NP**	**ILS - CAT II-Establish**			
		CIP No:	**34-06**	**Amount:**	**TBD**
		Coding:	**3131-0-138**	**Locations:**	**Various**
		Sponsor:	**AFS**		
2D04C	**NP**	**ILS - CAT III-Establish**			
		CIP No:	**34-06**	**Amount:**	**TBD**
		Coding:	**3131-0-139**	**Locations:**	**Various**
		Sponsor:	**AFS**		
2D04D	**NP**	**RVR - Establish for CAT I ILS**			
		CIP No:	**34-06**	**Amount:**	**TBD**
		Coding:	**3471-0-137**	**Locations:**	**Various**
		Sponsor:	**AFS/ANN**		
2D04E	**NP**	**RVR - Establish for CAT II/III ILS**			
		CIP No:	**34-06**	**Amount:**	**TBD**
		Coding:	**3471-0-138**	**Locations:**	**Various**
		Sponsor:	**AFS/ANN**		
2D04F	**NP**	**DME - Establish for CAT I ILS**			
		CIP No:	**34-06**	**Amount:**	**TBD**
		Coding:	**3124-0-137**	**Locations:**	**Various**
		Sponsor:	**AFS/ANN**		
2D04G	**NP**	**DME - Establish for CAT II/III ILS**			
		CIP No:	**34-06**	**Amount:**	**TBD**
		Coding:	**3124-0-138**	**Locations:**	**Various**
		Sponsor:	**AFS/ANN**		
2D04H	**NP**	**LOM - Establish for CAT I ILS**			
		CIP No:	**34-06**	**Amount:**	**TBD**
		Coding:	**3224-0-137**	**Locations:**	**Various**
		Sponsor:	**AFS/ANN**		

FIGURE 2-12. SAMPLE ILS CALL ITEM (Cont'd.)

Items 2D04H and 2D04I establish non-directional beacons in conjunction with either ILS/LOC or MLS to provide navigational guidance to the final approach course or area or azimuth coverage (MLS). Certain ILS/MLS runways are not in an area of VOR coverage sufficient to provide necessary non-radar pilot navigation to the final approach fix or to provide missed approach holding. Depending upon the individual site requirements, more than one NDB could be provided if a special statement of justification is provided by the Regional Flight Procedures Branch. These items also support non-precision navigation guidance for airports in need of IFR approach guidance where a VOR or Localizer installation is not justified or otherwise practical. These items are intended to be a stopgap measure to permit needed IFR approach service until sufficient aircraft are equipped with a future authorized means of area navigation (LORAN-C, GPS, etc.). As a minimum for qualification, an airport, or specific runway should be expected to support at least 50 actual instrument approaches annually as a result of the NDB installation.

2D04J NP <u>ALSF-2 - Establish</u>

CIP No:	**34-06**	**Amount:**	**TBD**
Coding:	**3317-0-101**	**Locations:**	**Various**
Sponsor:	**AFS**		

2D04K NP <u>MALSR - Establish</u>

CIP No:	**34-06**	**Amount:**	**TBD**
Coding:	**3326-0-101**	**Locations:**	**Various**
Sponsor:	**AFS/ANN**		

2D04L NP <u>ILS - Upgrade Partial to Full ILS</u>

CIP No:	**34-06**	**Amount:**	**TBD**
Coding:	**3132-0-536**	**Locations:**	**Various**
Sponsor:	**AFS/ANN**		

2D04M NP <u>Engine Generators - Establish for CAT II/III ILS</u>

CIP No:	**34-06**	**Amount:**	**TBD**
Coding:	**3131-0-185**	**Locations:**	**Various**
Sponsor:	**AFS/ANN**		

The Precision Approach Landing System Policy dated December 27, 1989, permits the establishment of ILS on a basis of the following eligibility criteria:

a. Meet MLS establishment criteria contained in "Airway Planning Standard Number One" (APS #1), Order 7031.2C, and must have a current benefit/cost ratio of 1.0 or greater.

FIGURE 2-12. SAMPLE ILS CALL ITEM (Cont'd.)

b. Meet a documented critical safety requirement.

c. Have an immediate and critical requirement for precision approach that cannot be delayed until MLS becomes available; e.g., storm damage systems, immediate capacity needs, new runways, etc.

d. Be documented by a complete staff study.

e. Have their operational need validated by the Associate Administrator for Regulation and Certification.

Include the total project requirements within this budget item (e.g., CAT III ILS with ALSF II, engine generator, or CAT I ILS with MALSR, DME, Wide Aperture Antenna). Do not budget for these items/subitems elsewhere within your response to the Call. We must have a clear definition of project including all necessary equipment, benefit/cost ratio, project material lists (PML), etc. Do not buy Sub-line item equipment in your PML. Identify the requirement by responding to each budget sub-line item.

"Staff Study Guide," "ILS Data Worksheet," "ILS Checklist", "Budget Item Summary," and FAA Forms 2500-40 (regional cost) and 4650-1 (PML) are required.

FAA Program Manager: Gary Skillicorn, ANN-200, (202) 267-6675
AFS Contact: Marcia Bisenius/Joe Tintera, AFS-12, (202) 267-3820/7773
ANN Contact (CAT I): Mike Rivers, ANN-120, (202) 267-6543
ANN Contact (CAT II/III): William McPartland, ANN-120, (202) 267-6554
ATR Contact: Andy Oltmanns, ATR-120, (202) 267-9179

FIGURE 2-12. SAMPLE ILS CALL ITEM (Cont'd.)

ILS CATEGORY II/III ESTABLISHMENT/UPGRADE CRITERIA

The following requirements must be met for an Category II/III establishment or upgrade of an existing ILS.

a. The candidate runway must meet all appropriate FAA technical standards and requirements.

b. The airport authority must agree to install and maintain the required facilities and equipment (i.e., centerline lights, touchdown zone lights, etc.). Documentation to this effect must be provided with the staff study.

c. The air carrier(s) which will utilize the Category II/III facilities must be able to provide Category II/III approved crews and equipment. Written assurance of this requirement must accompany the staff study. This documentation should be requested through the regional flight standards district office which has certificate responsibility for the carrier.

d. The Airport must have reached 2500 air carrier annual instrument approaches (AIA's) for the past three fiscal years.

e. Category II/III systems to be procured under F&E for runways meeting conditions a through d must be validated by a benefit/-cost analysis by the Office of Aviation Policy, Plans, and Management Analysis.

f. Requests by sponsors for FAA assumption of ownership, operations, and maintenance of Category II/III systems acquired under part 171 must meet requirement e.

The format on the following pages is to be used in preparing the individual staff studies for candidate locations:

> **NOTE: The Call then has a Staff Study Guide, a 2 page ILS Data Worksheet, and Instructions For ILS Data Worksheet. These will be discussed in Section 5, F&E Submissions. Also, an ILS Project Checklist is included in the Call which is completed by Airway Facilities.**

d. Submission Requirements. Examples of the "Budget Item Summary" and the FAA Form 2500-40 "F&E Cost Estimate Summary" (regional cost) that were mentioned in the Call items samples are included in the Call, Appendix 4. The form 4650-1 is the "Project Material List" (PML). These are accomplished by Airway Facilities.

242. SPECIFIC EXPLANATION OF APS-1 CRITERIA. The APS-1 job aids at the end of this section are listed in the order established in APS-1. They are in a full page format and abbreviated format. Although the Call items above are fairly explicit, the APS-1 criteria are more complicated to read through and apply. An attempt is made in this section to list the significant criteria items for each facility type and add these to the full page job aids. These significant criteria will normally appear in the general data portion of the job aid. The calculations portion follows the general data on the full page job aids and are the only portion of abbreviated job aids. APS-1 and the Call must be used concurrently when beginning the F&E analysis process because the requirements and criteria in both compliment each other. In some cases, the APS-1 criteria are very specific and rigid; in other cases, judgment determinations can be made if sufficiently justified through detailed documentation. The purpose of this section of the chapter is to discuss the criteria, but not to quantify all options nor set uncompromising standards that were not included nor intended. But, where additional guidance is needed and not presently available, this section includes that guidance. Each airport situation is unique with special problems that must be considered. Using good judgment and the criteria guidelines, the FPB F&E inspector can substantiate, in writing, the candidate facility installation sites that will enhance the NAS and produce a safer environment for the flying public.

243. MLS OR ILS, APS-1 PARAGRAPH 20, AND HANDBOOK FIGURE 2-13. APS-1 lists the requirements for establishing an MLS and the Call specifies that to establish an ILS, APS-1 MLS criteria apply. There is no separate ILS establishment guidance in APS-1.

a. Establishment. To be a candidate for Category I MLS-/ILS with an approach light system, a runway must have scheduled turbojet operations conducted on a sustained basis (and expected to continue uninterrupted), or a runway or heliport must meet the annual instrument approach criteria. Also, a comprehensive runway or heliport evaluation is required to determine if applicable FAA airport design and operational standards are met and that the operations to be conducted will be safe. Airport sponsor protection of the electronic facilities' critical areas must be technically feasible and practical. A minimum runway length of 4200 feet and width of 75 feet are required. Runway or heliport lights are also required.

b. Annual Instrument Approach (AIA) Criteria. APS-1, paragraph 20b, has a table from which is obtained the "qualifying AIA's" for insertion in the calculation formula. To use this table, determine if the airport is an air carrier hub or non-hub because different calculation numbers apply. (Hub information is located in the current FAA or Federal Air Traffic Activity.) Also, determine the lowest non-precision approach minimums currently authorized for the largest aircraft to the candidate runway end in order to enter the proper column of the minimums table in APS-1. The table is designed so that the higher the existing non-precision minimums, the lower the required "qualifying AIA's". The table is also designed to achieve precision minimums of 200-1/2. If achievable minimums will be higher, the Office of Aviation Policy, Plans, and Management Analysis (APO) will be consulted to determine the applicable criteria. APS-1 also gives information on determining the percentage of IFR runway use for insertion in the formula. A resulting benefit/cost ratio of 1.0 or greater qualifies the candidate.

c. Benefit/Cost Screening. Screening of the candidate MLS/ILS will be accomplished in Washington for all candidates. APS-1 and the Call lists additional justification and expected benefits that may be used in the staff study. The Call requires the staff study to be submitted for each candidate location.

d. Additional Guidance. The following are situations where MLS/ILS guidance is not available or explicit.

(1) Applying Airport and Safety Standards. APS-1 implies that all applicable runway safety standards have to be met before a runway can be a candidate. This is not always true. A candidate can be submitted before a runway is extended or before a heliport is even built. Because of the long lead time required for F&E budgeting, regional planning and coordination must be accomplished for construction and upgrading. Required facilities should be submitted in the FY budget based on the planned construction schedule. The intent of the criteria are to demand safety; the intent is not to restrict candidacy until all construction is complete. This explanation is substantiated in the Call, which specifically states, "new runways".

(2) Determining Current Minimums and Table Reference. For ceilings, use the minimums on the approach chart for entering the table. When the ceiling is 700 feet, use the 800-1 column. High visibilities are very restrictive for aircraft utilizing an approach. When the ceiling is 300 feet but the visibility is 1 mile, use the 400-1 column. For visibilities in excess of 1 mile, use the least qualifying

AIA's regardless of the ceiling (800-1 column).

(3) New Runways or Runways without Approaches. The APS-1 table requires existing minimums to enter the table. With no approaches, minimums are not available. Use the HIGHEST circling minimums (for largest aircraft expected to use the runway) required at that airport. Because of TERPS Table 11, rarely will this circling visibility not exceed 1 mile. Consequently, the 800-1 column is normally used. The 800-1 column should also be used when circling is not authorized (published) at that airport.

(4) New Airports. Again, there are published minimums. Use VFR minimums (1000-3) which equates to the highest minimums in the table: 800-1. AIA counts will not be available and must be estimated.

(5) Cat II/III. APS-1 has no criteria for Cat II/III ILS or MLS. However, APO-220 is able to provide some independent estimates of B/C ratios for such systems on the basis of guidance contained in Establishment and Discontinuance Criteria for Precision Landing Systems, FAA-APO-83-10. In addition, the Call example has some criteria. Normally, Cat II/III systems are well planned and well thought-out installations. The Airport Master Plan (AMP) will show when these systems are planned, the airport authority begins installation of required taxiway and lighting systems, etc. (usually with AIP assistance), the four regional operational divisions have discussed and studied all factors of the installation and agree to dates, and the carriers have made plans for the systems and may have made major economic decisions based on the installation. Rarely will a Cat II/III request from a zealous airport authority or carrier occur and be a surprise to the F&E inspector. The problems come from the F&E process itself where the system must be submitted years in advance of target dates and all of the problems associated with the installation may not have been solved. The burdens that fall on the F&E inspector are to determine the need for the Cat II/III system, determine if the runway/airport will meet Cat II special obstacle clearance surface requirements, determine whether it will qualify, and justify the F&E submission by a staff study. In the absence of formal guidance, the following criteria can be used.

NOTE: Although this subparagraph will discuss some Call criteria contained in the previous samples, these criteria may change with the issuance of the current annual FY Call.

(a) Determining Need. The purpose of Cat II/III systems is to allow air carrier operations during low weather conditions (less than 200-1/2). Consequently, low weather conditions and air carrier AIA's are the major factors for determining need. To even qualify for a Cat I RVR system, the Call example requires 15 or more annual hourly observations where visibilities are 1/2 mile or less. For a Cat II/III system, this annual observation count should be higher than the 15. The ILS Call example requires 2500 annual air carrier AIA's to the airport for each of the past 3 years. (The 2500 AIA requirement was established in FAA-ASP-76-1, Establishment Criteria for Category II Instrument Landing System (ILS), completed by APO.) The 2500 air carrier AIA's and 15 annual hourly observations shall be the absolute minimum for determining need.

(b) Determining Qualification. The primary qualification factor is that the runway meets current ILS Cat I criteria. This means it meets APS-1 Phase I ratio of 1.0 or higher or other special criteria specified in APS-1 or the Call. Most Cat II/III systems are upgrades from a Cat I system and will meet this criteria. Where a runway is newly constructed and an original Cat II/III system will be installed, this evaluation will have to be made. Assure Cat II special obstruction clearance areas can and will be protected, and that airport design criteria are met. The airport must have a control tower. The candidate runway must meet all appropriate FAA technical standards and requirements. The airport authority must agree to install and maintain the required signs, lighting, and marking. The air carrier(s) must be able to provide approved crews and equipment as specified in AC 120-28, Criteria for Approval of Category III Landing Weather Minima. If CAT III is to be established, the airport must be capable of establishing a low visibility Surface Movement Guidance and Control System plan in accordance with AC 120-57.

(c) Justification. Justification for a Cat II/III submission is contained in the staff study. Use the staff study guide discussed in the next section of this handbook. Include all information and documentation required in the Call and discussed in this Cat II/III subparagraph.

244. SUPPLEMENTAL CRITERIA FOR MLS/ILS ESTABLISHMENT AT COMMERCIAL SERVICE AIRPORTS, APS-1 PARAGRAPH 20d, AND HANDBOOK FIGURE 2-14. Commercial service airports are defined as a public airport which is determined by the FAA to enplane annually 2,500 or more passengers and receive scheduled passenger service by aircraft. This definition is from the Airport and Airway Improvement Act of 1982. The procedure is relatively simple. Complete an ILS/MLS benefit/cost ratio (BCR) on the candidate runway. If the BCR is less than 1.0 and the following conditions exist, the supplemental criteria can apply: if this airport has connecting scheduled passenger service to an associated hub airport which is expected to continue; if the total scheduled/non-scheduled annual enplaned passengers are not expected to fall below 2,500; and if the airport does not have a precision landing system and is not programmed for one. The next step is to complete a BCR on the PRIMARY runway of the associated hub airport. The two combined BCR's divided by 2 is the combined ratio. This combined ratio must be 1.0 or greater to qualify for candidacy. The staff study should thoroughly explain the thought processes for the commercial airport submission and specify that the above criteria have been met.

245. SUPPLEMENTAL ILS/MLS CRITERIA FOR RELIEVER AIRPORTS, APS-1 PARAGRAPH 20e. Although not included as a job aid, APS-1 addresses reliever airport criteria. The value of reduced congestion and improved safety at the relieved major airport can be considered an additional benefit to determine if benefit exceeds the cost. Although no numbers (specific criteria formula) are stated, the supporting documentation required is a thorough staff study based upon quantitative and qualitative analyses. These analyses should include the number of operations, AIA's, and/or landings at the primary airport and the congestion reduction estimates the new system at the reliever airport could provide. Additional information that may be appropriate like air traffic control planning, training precision approach numbers, noise problems, military training flights, etc., should also be included.

246. RVR WITH ILS OR MLS, APS-1 PARAGRAPH 20h, AND HANDBOOK FIGURE 2-15. APS-1 lists the criteria for establishing an RVR with these precision systems. The RVR Call example expands upon the requirements and is only for touchdown RVR associated with Category I systems. Note that establishing midpoint and rollout RVR with Category II/III systems is under the Establish Instrument Landing System (ILS) Call item. Category II/III systems have special facilities and equipment requirements which include RVR. The F&E inspector must be familiar with these requirements. Also, the RVR Call item for Category I systems states that approach lights and HIRL's are required. Inspectors must be aware that TERPS Chapter 3 levies additional requirements. To chart RVR approach and takeoff minimums, HIRL and precision runway markings (or touchdown zone and centerline lighting) are required. To obtain the lower approach minimums authorized with RVR in TERPS Table 9, full approach lights (with RAIL) are required. For RVR approach minimums of 1800 feet, a full approach lighting system and touchdown zone and centerline lights are required.

a. Establishment. A Category I precision instrumented runway qualifies as a candidate for establishment of a Touchdown RVR System provided: an acceptable method is available for immediate dissemination of RVR value data to pilots; the provisions of Order 6560.10, Runway Visual Range, and the siting and installation standards of FAA-STD-008 can be met; and finally, the Phase I value BCR equals or exceeds 1.0. The Call example for RVR requires an Air Traffic Control Tower (ATCT), which is the standard method for immediate dissemination of RVR values to the pilot. Because of this requirement, an ATCT is included in the job aid.

b. Benefit/Cost Parameters. The benefit/cost calculations use both air carrier and air taxi AIA's and operations. The system design factor (SDF) is a variable based upon whether this is the first RVR system at the airport or not. APS-1 also gives a third factor for a system that is not "new generation". Because of the RVR equipment policy explained in the Call, this system design factor was not even added to the job aid. The job aid does have an entry for type of system and number of RVR's. The formula has runway use-IFR percentage and a job aid entry is included. APS-1 gives a default runway use-IFR table if a site specific value is unavailable or cannot be estimated.

c. Benefit/Cost Screening. Headquarters will screen all candidates for RVR. APS-1 does state special consideration may be given for unique, site specific operational factors like troublesome terrain, significant remoteness of the runway from the tower, etc. In these cases, a narrative and explanatory reference should be included with the RVR submission.

247. LOCALIZER AND MARKER BEACON, APS-1 PARAGRAPH 22a(1), AND HANDBOOK FIGURE 2-16. The first of 6 facility types (3 navigational and 3 not navigational) under APS-1, Paragraph 22, Non-precision Instrument Approach Systems, is a localizer and associated marker. The APS-1 qualifiers are AIA's or AEP's. Other requirements are that existing published minimums are greater than 400-1 and an existing VHF navigation aid can be used for transition to the localizer. These are listed on the job aid as is an explanation of when DME can be a candidate in lieu of the outer marker. The inspector must keep in mind that the localizer may be upgraded to a full ILS in the future (see Call item on ILS), therefore minimum runway length of 4,200 feet and width of 75 feet will be required before upgrade. When using the calculations for AIP funding and takeover requirements (see Section 6), the runway width and length become important and the sponsor should be made aware of this requirement. For this reason, the runway length/width requirement is listed on the LOC job aid.

248. TVOR, APS-1 PARAGRAPH 22a(2), AND HANDBOOK FIGURE 2-17. The TVOR requirements are similar to localizer. A TVOR may be installed when an instrument approach procedure is not possible from an adjacent VHF navigation aid or the existing instrument approach procedure is based on an L/MF navigation aid (an NDB). APS-1 states that a 75MHz marker beacon may be considered to achieve 400/1 minimums, but "fan marker" installations with VOR's haven't been in a Call for some time and was not added to the job aid. APS-1 provides for including DME at the TVOR with proper justification. Establishing TVOR and DME falls under the Call item VOR/DME/-TACAN Network Plan. More detail on this Plan is provided in Section 5.

249. DME WITH LOCALIZER, APS-1 PARAGRAPH 22a(3), AND HANDBOOK FIGURE 2-18. DME with localizer is not included in the recent Call items except when needed to establish a Visual Descent Point (VDP). The requirements are more complicated for determining the qualifying AIA's to insert in the formula because they come from the large, 2 page APS-1 Table 22a(3). The table's variables are the hub size for air carriers, air taxi, combined general aviation and military, the current minimums of the largest user aircraft, and the projected LOC/DME minimums for the largest user aircraft. These have been included on the job aid for easy reference. The only other qualifier is no glide slope.

250. VASI/PAPI WITH NON-PRECISION APPROACH PROCEDURE, APS-1 PARAGRAPH 22a(4), AND HANDBOOK FIGURE 2-19. In this paragraph of APS-1, only VASI criteria are included. The PAPI Call item for straight-in non-precision approaches states that the APS-1 VASI criteria shall apply until PAPI criteria can be developed. For this reason, the job aid states both VASI/PAPI. This is the first time that landings are qualifiers rather than AIA's, AEP's, or operations. Since landing data are not always available, operations divided by 2 can be used. Note that the landings and AIA's are for that runway only. Either actual runway utilization or the table following APS-1 paragraph 31c(4) can be used.

251. MALS OR ODALS WITH NON-PRECISION APPROACH PROCEDURE, APS-1 PARAGRAPH 22a(5), AND HANDBOOK FIGURE 2-20. Although APS-1 specifically states MALS rather than MALSR, local conditions and safety concerns as well as future operational plans for that runway should be considered when evaluating whether MALS or MALSR would be appropriate. The same criteria apply to both types of approach light systems.

a. Criteria. Approach light system qualifiers are a specified number of airport AIA's or AEP's. Additionally, a non-precision approach must exist or be planned and the system must reduce landing visibility minimums. ODALS rather than MALS may be installed under certain conditions. (Recently, MALS and ODALS systems for non-precision approach runways have not been a Call item. Check the current Call for their possible inclusion, since the CIP includes this item.)

b. Possible Conflicts in Criteria. Anyone that has applied TERPS criteria knows that to receive visibility reduction credit for approach lights, a straight-in procedure is required. Yet, APS-1 requires landing visibility minimums reduction for MALS and ODALS, but then allows ODALS in lieu of MALS when the procedure does not permit a straight-in approach. This can be interpreted as conflicting criteria. For guidance, the F&E inspector must consider the safety aspects of the approach and actual or planned final approach alignment before determining the need for ODALS. If the need is substantiated for procedures not permitting straight-in, the visibility minimums reduction requirement does not apply, but the safety aspects of installing ODALS rather than omni-directional REIL's must be considered. These factors are also true for FAA takeover of ODALS.

c. Other TERPS Considerations. When considering submissions for these approach lighting systems, specific paragraphs in TERPS Chapter 3 referring to visibility reductions must be understood. For example, TERPS paragraph 332 requires a clear 20:1 slope for visibilities below 1 mile and a clear 34:1 slope for visibilities below 3/4 mile. Also, TERPS paragraph 343 requires proper runway markings and the final approach course must place the aircraft within the operational coverage of the lights.

252. RVR FOR NON-PRECISION INSTRUMENTED RUNWAY, APS-1 PARAGRAPH 22a(6). APS-1 states that to be a candidate for RVR: the runway must be non-precision instrumented (not equipped with ILS or MLS); the airport has one or more RVR equipped precision instrumented runways (and all Category I runways must already be RVR equipped and satisfy criteria for RVR at Category I runways); the provisions of Order 6560.10 and siting and installation standards of FAA-STD-008 can be met; and the benefit/cost methodology outlined in FAA-APO-88-14 is 1.0 or greater. Report FAA-APO-88-14, dated November, 1988, contains very complex benefit/cost criteria. The criteria were applied to a list of 106 prospective candidate airports (most major airports) and 43 qualified with a B/C ratio of 1.0 or more. The report also lists more than 300 non-prospective candidate airports (no B/C ratio completed) and lists the reasons for non-candidacy. No job aid has been included for RVR for non-precision runways at this time. Note that this item is included in the recent Call and is in the first sample Call item.

253. REIL, APS-1 PARAGRAPH 30, AND HANDBOOK FIGURE 2-21. REIL installation may be funded under either F&E or AIP. Close coordination with Airports is necessary when submitting for REIL. The Call usually includes both establishing REIL and converting to omnidirectional REIL. The qualifiers are: landings; the runway is not currently equipped with or programmed for an approach light system; the runway has approved edge lights for night operations; and a runway end identification problem exists.

Runway end identification problems are detailed in Order 8260.18. Exceptional safety requirements may dictate establishing a REIL when not meeting these qualifications. This determination will be made in Washington based upon the region's written recommendation and justification. The actual runway utilization percentage or the table on page 36 is the final formula requirement to determine the runway ratio value.

254. VASI/PAPI (VFR ONLY), APS-1 PARAGRAPH 31, AND HANDBOOK FIGURE 2-22. VASI/PAPI installations may be funded under AIP or F&E. Close coordination with Airports is necessary when submitting for VASI/PAPI. Order 8260.18 discusses requirements for visual approach aids and should to be part of F&E evaluations for PAPI candidate runways. The Call usually provides for PAPI's on non-precision approach runways (see paragraph 250) and for other runways. Caution must be taken to use the correct criteria when making submissions under these Call items. The Call just states, without paragraph reference, that APS-1 criteria apply until PAPI criteria can be developed. APS-1 requires that an electronic glide slope not be installed or programmed to qualify for SOME VASI's. The latest Call states that priority consideration will be given to air carrier runways not equipped with vertical guidance devices and lists different priorities. APS-1 requires that every candidate runway submission include: number of airport operations; number of runways; whether an ILS is installed or programmed for the runway; number and type of VASI's already installed or programmed for other runways; and runway utilization percentage. Note that these are all on the job aid. The criteria used in the formula are based on landings, and both non-ILS OR ILS qualifying landing numbers are available. APS-1 paragraph 31e states that locations can be nominated to satisfy a special safety requirement, but a specific staff study must be submitted at the time of nomination.

255. CRITERIA FOR OTHER SYSTEMS. APS-1 contains other criteria for systems the F&E inspector may occasionally need to use, for instance, VOT. These criteria may be referred to when needed.

256.-259. RESERVED.

FIGURE 2-13. APS-1 - ILS/MLS

ESTABLISH CATEGORY I MLS OR ILS (WITH MALSR)
(APS-1, Paragraph 20, Pages 11-14)

Date____________

General Data

Airport Name:_____________________________________ Ident.________
Runway Number__________

Data Source: (T) TAF:_____ (F) FAA 5010:_____ (O) Other _________
Date (Year) of Data:____________

Air Carrier AIA's:_____________ Air Taxi AIA's:_____________

Gen. Aviation AIA's:___________ Military AIA's:_____________

Runway Length (in Feet)__________(at least 4,200 feet required)
Runway Width (in Feet)___________(at least 75 feet required)

Is this a HUB? _____(Yes); _____(No)

Enter Percent of Runway Use-IFR__________

Lowest Ceiling Published for Largest Aircraft__________
Lowest Visibility Published for Largest Aircraft__________

Benefit/Cost Calculations (Paragraph 20b)

Air Carrier	$\frac{\textbf{(Recorded AIA's)}}{\textbf{(Qualifying AIA's)}}$	____________ =	
			+
Air Taxi	$\frac{\textbf{(Recorded AIA's)}}{\textbf{(Qualifying AIA's)}}$	____________ =	
			+
Gen. Aviation	$\frac{\textbf{(Recorded AIA's)}}{\textbf{(Qualifying AIA's)}}$	____________ =	
			+
Military	$\frac{\textbf{(Recorded AIA's)}}{\textbf{(Qualifying AIA's)}}$	____________ =	
			____________ **Total**

Percent of Runway Use-IFR_________ **X** ____________ **=** ______________
(Total) **Total Ratio**

QUALIFIED - 1.0 or Greater Total Ratio
*UNQUALIFIED - Less than 1.0 Total Ratio.
*(See Supplemental Criteria - Commercial Service Airports/Reliever Airports, paragraph 20d/e.)

FIGURE 2-14. APS-1 - SUPPLEMENTAL ILS/MLS

SUPPLEMENTAL CRITERIA FOR MLS/ILS ESTABLISHMENT AT COMMERCIAL SERVICE AIRPORTS
(APS-1, Paragraph 20d, Page 14)

Date______________

General Data

Airport Name:____________________________________ Ident.:_________

Runway Number:_______

Benefit/Cost calculations under paragraph 20b resulted in a Total Ratio of __________ - UNQUALIFIED on its own merit.

This airport has connecting scheduled passenger service to an associated hub airport which is expected to continue.

Total scheduled/non-scheduled annual enplaned passengers are not expected to fall below 2,500. This airport does not have a precision landing system and is not programmed for one.

Benefit/Cost Calculations

Determine the Total Ratio value of the primary runway at the associated hub airport under paragraph 20b.

Hub Ident.: _________.

The Total Ratio for the hub is ______________.

Sum (add) the ratios of the commercial service airport and its associated hub airport and divide by 2.

Commercial Service Airport Ratio =
+
Hub Primary Runway Total Ratio =

$$\frac{\rule{6cm}{0.4pt}}{2} = \rule{5cm}{0.4pt}$$

Combined Total Ratio

QUALIFIED - 1.0 or greater Combined Total Ratio.
UNQUALIFIED - Less than 1.0 Combined Total Ratio.

FIGURE 2-15. APS-1 - RVR PRECISION

ESTABLISH RVR WITH ILS OR MLS
(APS-1, Paragraph 21.c.(1), Page 16)

Date____________

General Data

Airport Name:___________________________________ Ident.:__________
Runway Number:________
Data Source: (T) TAF:______ (F) FAA 5010:______ (O) Other_________
Date (Year) of Data: ____________

Air Carrier AIA's:_____________ Air Taxi AIA's:_____________

Air Carrier OP's: _____________ Air Taxi OP's: _____________

Gen. Aviation AIA's:___________ Military AIA's:_____________

Enter percent of Runway Use-IFR:__________
System type to be installed:______________(N) for new generation.
Enter number of existing RVR's at airport:__________
This airport has an ATCT in operation full or part time.

Benefit/Cost Calculations - Tables 21c(1)(a)/(b)/(c)

Air Carrier	**(Recorded AIA's)** / **145**	_____ / **145**	=	
				+
	(Recorded Operations) / **6,500**	_____ / **6,500**	=	
				+
Air Taxi	**(Recorded AIA's)** / **10,000**	_____ / **10,000**	=	
				+
	(Recorded Operations) / **73,000**	_____ / **73,000**	=	
				+
Gen. Aviation	**(Recorded AIA's)** / **8,900**	_____ / **8,900**	=	
				+
Military	**(Recorded AIA's)** / **1,900**	_____ / **1,900**	=	

(Subtotal A) ________
Subtotal A:__________ **x #SDF:**______ **= (Subtotal B)** ________
Subtotal B:__________ **x Runway Use-IFR** _________ **=** ________
Phase I Value

QUALIFIED - 1.0 or greater Phase I Value
UNQUALIFIED - Less than 1.0 Phase I Value
#SDF - System Design Factor for first RVR is 1.0; subsequent RVR is 3.17.

FIGURE 2-16. APS-1 - LOCALIZER

ESTABLISH LOCALIZER AND MARKER BEACON
(NON-PRECISION APPROACH)
(APS-1, Paragraph 22a, Page 17)

Date______________

General Data

Airport Name:________________________________ Ident.:__________
Runway Number:__________

Data Source: (T) TAF:_____ (F) FAA 5010:_____ (O) Other:__________
Date (Year) of Data:__________

Air Carrier AIA's: ________________

Air Taxi AIA's: ________________

Gen. Aviation AIA's: ________________

Military AIA's: ________________
+
Total AIA's: ________________

Annual Enplaned Passengers (AEP):__________________

Lowest Minimums Published:_______________ Existing published minimums are greater than 400-1.

An existing VHF navigation aid can be used for transition to the localizer.

Benefit/Cost Calculations, Paragraph 22.a

(Total Recorded AIA's) ________ = _________ **Total Ratio (AIA's)**
(Qualifying AIA's 200) 200

(OR)

(Total Recorded AEP's) ________ = _________ **Total Ratio (AEP's)**
(Qualifying AEP's 1,825) 1,825

QUALIFIED - 1.0 or greater Total Ratio (AIA), or
1.0 or greater Total Ratio (AEP).
UNQUALIFIED - Less than 1.0 Total Ratio AIA, and
Less than 1.0 Total Ratio AEP

NOTE: A DME may be substituted for the marker beacon provided it is necessary to achieve 400-1 minimums or to provide a need for opposite direction approach capability.

FIGURE 2-17. APS-1 - TVOR

ESTABLISH TVOR (NON-PRECISION APPROACH)
(APS 1, Paragraph 22a(2), Pages 17-18)

Date______________

General Data

Airport Name:____________________________________ Ident.:_________
Runway Number:__________
Data Source: (T) TAF:_____ (F) FAA 5010:_____ (O) Other:__________
Date (Year) of Data:__________

Air Carrier AIA's: ________________

Air Taxi AIA's: ________________

Gen. Aviation AIA's: ________________

Military AIA's: ________________
+
Total AIA's: ________________

Annual Enplaned Passengers (AEP):__________________

Lowest Minimums Published:_______________ Existing published minimums are greater than 400-1.

An instrument approach procedure is not possible from an adjacent VHF navigation aid.

Benefit/Cost Calculations

(Total Recorded AIA's) ________ = _________ **Total Ratio (AIA's)**
(Qualifying AIA's 200) **200**
(OR)
(Total Recorded AEP's) ________ = _________ **Total Ratio (AEP's)**
(Qualifying AEP's 1,825) **1,825**

QUALIFIED - 1.0 or greater Total Ratio (AIA), or
1.0 or greater Total Ratio (AEP).
UNQUALIFIED - Less than 1.0 Total Ratio AIA, and
Less than 1.0 Total Ratio AEP

NOTE: A DME may also be considered for new or existing TVOR locations provided justification is submitted indicating it would provide more efficient handling of air traffic, a reduction of the adverse effect of obstructions on landing minima, or an otherwise tangible improvement in the IFR capability of the airport.

FIGURE 2-18. APS-1 - DME WITH LOCALIZER

ESTABLISHED DME (WITH LOCALIZER)
(APS-1, Paragraph 22a(3), Pages 18-21)

Date_______________

General Data

Airport Name:____ Ident.:__________

Runway Number:__________

Data Source: (T) TAF:_____ (F) FAA 5010:_____ (O) Other:___________

Date (Year) of Data:___________

Air Carrier AIA's: __________________

Air Taxi AIA's: __________________

Gen. Aviation AIA's:__________________
+
Military AIA's: __________________

Total GA & Mil AIA's: __________________

The runway has a localizer and marker beacon, but no glide slope.

Hub size:__________

Lowest minimums published for largest user aircraft:_______________

Projected minimums for largest user aircraft:________________________

Benefit/Cost Calculations
Paragraph 22a(3)(a) and *Table 22a(3)

Air Carrier	**(Recorded AIA's)** / ***(Qualifying AIA's)**	__________ *	=
			+
Air Taxi	**(Recorded AIA's)** / ***(Qualifying AIA's)**	__________ *	=
			+
Gen. Aviation & Military	**(Recorded AIA's)** / ***(Qualifying AIA's)**	__________ *	=

Total Ratio Value ______________

QUALIFIED - 1.0 or greater Total Ratio Value
UNQUALIFIED - Less than 1.0 Total Ratio Value

FIGURE 2-19. APS-1 - VASI/PAPI NON-PRECISION

ESTABLISH VASI/PAPI (NON-PRECISION APPROACH)
(APS-1, Paragraph 22a(4), Page 22)

Date______________

General Data

Airport Name:______________________________________ Ident.:________

Runway Number:__________________

Data Source: (T) TAF:_____ (F) FAA 5010:_____ (O) Other:__________

Date (Year) of Data:__________

Air Carrier Landings	____________	Air Carrier AIA's	____________
Air Taxi Landings	____________	Air Taxi AIA's	____________
Gen. Aviation Landings	____________	Gen. Aviation AIA's	____________
Military Landings	____________	Military AIA's	____________
Total Landings	____________	Total AIA's	____________
x		x	
% Runway Use	____________	% Runway Use	____________
Total Recorded Landings	____________	Total Recorded AIA's	____________

This VASI/PAPI is in support of straight-in non-precision operations.

Benefit/Cost Calculations
Paragraph 22a(4), Page 22 and
Paragraph 31c(3) Table, Page 39

(Total Recorded Landings) __________ =
(Qualifying Landings - 4,000) **4,000**

\+

(Total Recorded AIA's) __________ =
(Qualifying AIA's - 120) **120**

________ **Total Ratio**

QUALIFIED - 1.0 or greater Total Ratio
UNQUALIFIED - Less than 1.0 Total Ratio

FIGURE 2-20. APS-1 - MALS/ODALS NON-PRECISION

ESTABLISH MALS OR ODALS (NON-PRECISION APPROACH)
(APS-1, Paragraph 22a(5)(a)/(b), Page 22)

Date______________

General Data

Airport Name:____________________________________ Ident.:__________
Runway Number:___________

System:_________________ (M) MALS:_____ (O) ODALS_____

Data Source: (T) TAF:_____ (F) FAA 5010:_____ (O) Other:___________

Date (Year) of Data:___________

Air Carrier AIA's: ________________

Air Taxi AIA's: ________________

Gen. Aviation AIA's: ________________

Military AIA's: ________________
+
Total AIA's: ________________

Annual Enplaned Passengers (AEP):____________________

A non-precision approach exists or is planned to this runway. This approach light system will reduce landing visibility minimums.

Benefit/Cost Calculations
Paragraph 22a(5)(a) and Paragraph 22a(5)(b)

(Total Recorded AIA's)	_______	=	_________	**Total Ratio (AIA's)**
(Qualifying AIA's 300)	**300**			
(OR)				
(Total Recorded AEP's)	_______	=	_________	**Total Ratio (AEP's)**
(Qualifying AEP's 2,725)	**2,725**			

QUALIFIED - 1.0 or greater Total Ratio (AIA), or
1.0 or greater Total Ratio (AEP).
UNQUALIFIED - Less than 1.0 Total Ratio AIA, and
Less than 1.0 Total Ratio AEP.
NOTE: ODALS may be installed in lieu of MALS if the non-precision approach aid does not permit a straight-in approach or operational conditions require a curved flight path to a specific runway.

FIGURE 2-21. APS-1 - REIL

ESTABLISH REIL
(APS-1, Paragraph 30, Pages 35-37)

Date______________

General Data

Airport Name:____________________________________ Ident.:__________
Runway Number:___________
Data Source: (T) TAF:_____ (F) FAA 5010:_____ (O) Other:___________
Date (Year) of Data:__________

Air Carrier Ops.____________divided by 2 = ACR Landings___________

Air Taxi Ops. ____________divided by 2 = ATX Landings___________

Gen. Av. Ops. ____________divided by 2 = GA Landings___________
+
Military Ops. ____________divided by 2 = Mil Landings___________

Total GA & Mil Landings_____________

______% of landing utilization this runway (Ref. Table, Page 36).
No approach light system is installed or programmed for this runway end. This runway has approved runway edge lighting.
Runway end identification problem exists. (Reference Order 8260.18)

Benefit/Cost Calculations, Paragraph 30a(4)(a)

Air Carrier	**Recorded (AC) Landings** / **Qualifying (AC) Landings**	___________ / **4,900**	=	_________
			+	
Air Taxi	**Recorded (AT) Landings** / **Qualifying (AT) Landings**	___________ / **1,200**	=	_________
			+	
Gen. Av. & Mil.	**Recorded (GA and MIL) Landings** / **Qualifying (GA and MIL) Landings**	___________ / **7,300**	=	_________

Airport Ratio Value (ARV) = _________

ARV ______ **X Percent Runway Use** ______=_______ **Runway Ratio Value**

QUALIFIED - 1.0 or greater Runway Ratio Value
*UNQUALIFIED - Less than 1.0 Runway Ratio Value
*See Order 8260.18 for safety qualification consideration.

FIGURE 2-22. APS-1 - VASI/PAPI VFR

ESTABLISH VASI/PAPI (VFR ONLY)
(APS-1, Paragraph 31, Pages 37-40)

Date______________

General Data

Airport Name:_____________________________________ Ident.:__________
Runway Number:__________________
Data Source: (T) TAF:_____ (F) FAA 5010:_____ (O) Other:__________
Date (Year) of Data:_________________

Air Carrier Ops.____________divided by 2 = ACR Landings___________

Air Taxi Ops. ____________divided by 2 = ATX Landings___________

Gen. Av. Ops. ____________divided by 2 = GA Landings___________
+
Military Ops. ____________divided by 2 = Mil Landings___________

Total GA & Mil Landings___________

Number of Runways at this Airport:_________

No ILS is installed or programmed for this runway. True/False_____

Number and type of VASI/PAPI already installed or programmed for other runway ends at this airport.______________________________

_____% Landing Utilization for this runway (Ref. Table, Page 40).

Benefit/Cost Calculations (Paragraph 31c)

		Non-ILS		OR	ILS		
Air Carrier	**Recorded Ldgs.** / **Qualifying Ldgs.**	________ / **6,000**	=		________ / **0**	=	**0**
			+			+	
Air Taxi	**Recorded Ldgs.** / **Qualifying Ldgs.**	________ / **8,500**	=		________ / **28,000**	=	
			+			+	
Gen. Av. & Mil.	**Recorded Ldgs.** / **Qualifying Ldgs.**	________ / **14,000**	=		________ / **18,000**	=	
				__________	**Totals**		__________

Total Ldgs________X Percent Runway Use_____=______Net Ratio Value

QUALIFIED - 1.0 or greater Net Ratio Value
*UNQUALIFIED - Less than 1.0 Net Ratio Value.
*See Para. 31e, page 40 for special qualifying considerations.

FIGURE 2-23. APS-1 - ABBREVIATED ILS/MLS

ESTABLISH CATEGORY I MLS OR ILS (WITH MALSR)
(APS-1, Paragraph 20, Pages 11-14)

Date______________

Airport Ident ________________ Runway Number __________

Benefit/Cost Calculations (Paragraph 20b)

Air Carrier	**(Recorded AIA's)** / **(Qualifying AIA's)**	____________ =	
		+	
Air Taxi	**(Recorded AIA's)** / **(Qualifying AIA's)**	____________ =	
		+	
Gen. Aviation	**(Recorded AIA's)** / **(Qualifying AIA's)**	____________ =	
		+	
Military	**(Recorded AIA's)** / **(Qualifying AIA's)**	____________ =	
			____________ **Total**

Percent of Runway Use-IFR_________**X**____________=______________
(Total) **Total Ratio**

QUALIFIED - 1.0 or Greater Total Ratio
*UNQUALIFIED - Less than 1.0 Total Ratio.
*(See Supplemental Criteria - Commercial Service Airports/Reliever Airports, paragraph 20d/e.)

FIGURE 2-24. APS-1 - ABBREVIATED SUPPLEMENTAL ILS/MLS

SUPPLEMENTAL CRITERIA FOR MLS/ILS ESTABLISHMENT AT COMMERCIAL SERVICE AIRPORTS
(APS-1, Paragraph 20d, Page 14)

Date______________

Airport Ident ________________ Runway Number __________

Benefit/Cost Calculations

Determine the Total Ratio value of the primary runway at the associated hub airport under paragraph 20b.

Hub Ident.: _________.
The Total Ratio for the hub is ______________.
Commercial Service Airport Ratio =
+
Hub Primary Runway Total Ratio =

________________ = ______________
2 **Combined Total Ratio**

QUALIFIED - 1.0 or greater Combined Total Ratio.
UNQUALIFIED - Less than 1.0 Combined Total Ratio.

FIGURE 2-25. APS-1 - ABBREVIATED RVR PRECISION

ESTABLISH RVR WITH ILS OR MLS
(APS-1, Paragraph 21.c.(1), Page 16)

Date______________

Airport Ident ________________ Runway Number __________

Benefit/Cost Calculations - Tables 21c(1)(a)/(b)/(c)

Air Carrier	**(Recorded AIA's)** / **145**	______ / **145**	=	+
	(Recorded Operations) / **6,500**	______ / **6,500**	=	+
Air Taxi	**(Recorded AIA's)** / **10,000**	______ / **10,000**	=	+
	(Recorded Operations) / **73,000**	______ / **73,000**	=	+
Gen. Aviation	**(Recorded AIA's)** / **8,900**	______ / **8,900**	=	+
Military	**(Recorded AIA's)** / **1,900**	______ / **1,900**	=	

(Subtotal A) ______________

Subtotal A:__________ **x #SDF:**________ **= (Subtotal B)** ______________

Subtotal B:__________ **x Runway Use-IFR** __________ **=** ______________

Phase I Value

QUALIFIED - 1.0 or greater Phase I Value
UNQUALIFIED - Less than 1.0 Phase I Value
#SDF-System Design Factor for first RVR 1.0; subsequent RVR 3.17.

FIGURE 2-26. APS-1 - ABBREVIATED LOCALIZER

ESTABLISH LOCALIZER AND MARKER BEACON
(Non-Precision Approach)
(APS-1, Paragraph 22a, Page 17)

Date______________

Airport Ident ________________ Runway Number _________

Benefit/Cost Calculations, Paragraph 22.a

(Total Recorded AIA's) __________ =__________ **Total Ratio (AIA's)**
(Qualifying AIA's 200) **200**

(OR)

(Total Recorded AEP's) __________ =__________ **Total Ratio (AEP's)**
(Qualifying AEP's 1,825) **1,825**

QUALIFIED - 1.0 or greater Total Ratio (AIA), or
1.0 or greater Total Ratio (AEP).
UNQUALIFIED - Less than 1.0 Total Ratio AIA, and
Less than 1.0 Total Ratio AEP

NOTE: A DME may be substituted for the marker beacon if it is necessary to achieve 400-1 minimums or to provide opposite direction approach capability.

FIGURE 2-27. APS-1 - ABBREVIATED TVOR

ESTABLISH TVOR (NON-PRECISION APPROACH)
(APS 1, Paragraph 22a(2), Pages 17-18)

Date__________

Airport Ident __________ Runway Number ________

Benefit/Cost Calculations

(Total Recorded AIA's) / **(Qualifying AIA's 200)**	____ / **200**	= ____	**Total Ratio (AIA's)**
(OR)			
(Total Recorded AEP's) / **(Qualifying AEP's 1,825)**	____ / **1,825**	= ____	**Total Ratio (AEP's)**

QUALIFIED - 1.0 or greater Total Ratio (AIA), or
1.0 or greater Total Ratio (AEP).
UNQUALIFIED - Less than 1.0 Total Ratio AIA, and
Less than 1.0 Total Ratio AEP

NOTE: A DME may also be considered for new or existing TVOR locations provided justification is submitted indicating it would provide more efficient handling of air traffic, a reduction of the adverse effect of obstructions on landing minima, or an otherwise tangible improvement in the IFR capability of the airport.

FIGURE 2-28. APS-1 - ABBREVIATED DME WITH LOCALIZER

ESTABLISHED DME (WITH LOCALIZER)
(APS-1, Paragraph 22a(3), Pages 18-21)

Date__________

Airport Ident __________ Runway Number ________

Benefit/Cost Calculations
Paragraph 22a(3)(a) and *Table 22a(3)

Air Carrier	**(Recorded AIA's)** / ***(Qualifying AIA's)**	____ / *	= +
Air Taxi	**(Recorded AIA's)** / ***(Qualifying AIA's)**	____ / *	= +
Gen. Aviation & Military	**(Recorded AIA's)** / ***(Qualifying AIA's)**	____ / *	=
		Total Ratio Value	____

QUALIFIED - 1.0 or greater Total Ratio Value
UNQUALIFIED - Less than 1.0 Total Ratio Value

FIGURE 2-29. APS-1 - ABBREVIATED VASI/PAPI NON-PRECISION

ESTABLISH VASI/PAPI (NON-PRECISION APPROACH)
(APS-1, Paragraph 22a(4), Page 22)

Date_______________

Airport Ident _________________ Runway Number __________

Benefit/Cost Calculations
Paragraph 22a(4), Page 22 and Paragraph 31c(3) Table, Page 39

(Total Recorded Landings) __________ =
(Qualifying Landings - 4,000) 4,000 +

(Total Recorded AIA's) __________ =
(Qualifying AIA's - 120) 120

_____________**Total Ratio**

QUALIFIED - 1.0 or greater Total Ratio
UNQUALIFIED - Less than 1.0 Total Ratio

FIGURE 2-30. APS-1 - ABBREVIATED MALS/ODALS NON-PRECISION

ESTABLISH MALS OR ODALS (NON-PRECISION APPROACH)
(APS-1, Paragraph 22a(5)(a)/(b), Page 22)

Date_______________

Airport Ident _________________ Runway Number __________

Benefit/Cost Calculations
Paragraph 22a(5)(a) and Paragraph 22a(5)(b)

(Total Recorded AIA's) _________=_____________**Total Ratio (AIA's)**
(Qualifying AIA's 300) 300
(OR)
(Total Recorded AEP's) _________=_____________**Total Ratio (AEP's)**
(Qualifying AEP's 2,725) 2,725

QUALIFIED - 1.0 or greater Total Ratio (AIA), or
1.0 or greater Total Ratio (AEP).
UNQUALIFIED - Less than 1.0 Total Ratio AIA, and
Less than 1.0 Total Ratio AEP.

NOTE: ODALS may be installed in lieu of MALS if the non-precision approach aid does not permit a straight-in approach or operational conditions require a curved flight path to a specific runway.

FIGURE 2-31. APS-1 - ABBREVIATED REIL

ESTABLISH REIL
(APS-1, Paragraph 30, Pages 35-37)

Date________________

Airport Ident ________________ Runway Number __________

Benefit/Cost Calculations, Paragraph 30a(4)(a)

Air Carrier	**Recorded (AC) Landings**	____________	=__________
	Qualifying (AC) Landings	**4,900**	**+**
Air Taxi	**Recorded (AT) Landings**	____________	=__________
	Qualifying (AT) Landings	**1,200**	**+**
Gen. Av.	**Recorded (GA and MIL) Landings**	____________	=__________
& Mil.	**Qualifying (GA and MIL) Landings**	**7,300**	

Airport Ratio Value (ARV) = ______________

ARV________**X Percent Runway Use**_______=________**Runway Ratio Value**

QUALIFIED - 1.0 or greater Runway Ratio Value
*UNQUALIFIED - Less than 1.0 Runway Ratio Value
*See Order 8260.18 for safety qualification consideration.

FIGURE 2-32. APS-1 - ABBREVIATED VASI/PAPI VFR

ESTABLISH VASI/PAPI (VFR ONLY)
(APS-1, Paragraph 31, Pages 37-40)

Date________________

Airport Ident ________________ Runway Number __________

Benefit/Cost Calculations (Paragraph 31c)

		Non-ILS		OR	ILS		
Air Carrier	**Recorded Ldgs.**	__________	=		__________	=	**0**
	Qualifying Ldgs.	**6,000**	+		**0**		
Air Taxi	**Recorded Ldgs.**	__________	=		__________	=	
	Qualifying Ldgs.	**8,500**	+		**28,000**		
Gen. Av.	**Recorded Ldgs.**	__________	=		__________	=	
& Mil.	**Qualifying Ldgs.**	**14,000**			**18,000**		
				__________	**Totals**		__________

Total Ldgs_______**X Percent Runway Use**_____=_______**Net Ratio Value**
QUALIFIED - 1.0 or greater Net Ratio Value
*UNQUALIFIED - Less than 1.0 Net Ratio Value.
*See Paragraph 31e, page 40 for special qualifying considerations.

SECTION 5. F&E SUBMISSIONS

260. GENERAL. This section will detail the thought processes for determining candidates for yearly F&E submissions and provide guidance for actual submissions. Numerous job aids and examples are included. Although the intent of this handbook is to standardize FPB operations, regions may have different established procedures and directives for the F&E process and for submission requirements. This section should be used to supplement regional procedures and to standardize operations where no guidance is provided.

261. CANDIDATE DECISIONS. During normal day-to-day operations throughout the calendar year, the F&E inspector will become aware of numerous possible candidates for terminal navaids and lighting systems. Unsolicited proposals will be randomly received from various sources by letters, telephone calls, and meetings. In some cases, an APS-1 BCR may already have been required. A good FPB record-keeping system is a necessity.

a. Old Candidates. A key input for candidate lists is feedback received on prior FY F&E submissions. The inspector should review and evaluate these candidates based on which were validated and funded, which were deferred, and which were non-validated. This evaluation is normally the first step in the FPB F&E candidate identification process.

b. New Candidate Input. Beside using a day-to-day record keeping system, new candidate input should be solicited by one regional directive/letter or operational divisions letters. Most regions use one of these methods. Input is particularly important from FAA field offices and organizations outside the agency such as state aviation directors and Air Transport Association of America (ATA).

(1) Timely candidate solicitation is important so the F&E inspector has sufficient time to perform required analysis, identify qualified candidates, complete required justifications, establish priorities, and format, type, and finalize the submission.

(2) The solicitations should be sent no later than the end of May or as directed in regional F&E guidance. A May date will normally allow sufficient time for the responses to be sent to the region and for the F&E inspector to complete the analysis and submission.

c. Candidate Priority. Regional priorities are important because the higher the priority attached to the candidate location, the better the chance exists for the candidate to survive the review process and to achieve funding approval by Congress. For the submitted lists, the F&E inspector normally establishes the priority of qualified candidates, but in some cases, priorities may be dictated by the Call. The submission list figures at the end of this section illustrate priority listings.

(1) The list priorities may be arranged in descending numerical values based on the individual candidate's BCR's. Some Call items may require this priority.

(2) Some Call items specify a priority based on specific criteria with designations of 1a, 1b, etc. Submissions shall specify these priorities.

(3) When the F&E inspector is aware of other overriding concerns, the numerical priorities within some listings may be adjusted to reflect urgencies and practical realities. Situations leading to priority adjustments other than by BCR could include critical operational or safety needs, known regional objectives, urgent time-frames, aviation user group interest, etc.

(4) The F&E inspector may wish to consult individuals within the branch or other offices before finalizing the priority lists. Unknown factors may surface that may change the list.

(5) The final lists will be reviewed by the appropriate regional committees and approved by the Regional Administrator.

d. Candidate Quantity. Determining the number of candidates to submit for each Call item can be a difficult task. If the list of qualifying candidates is very long, hard decisions have to be made to select how many should be included and how many to submit in later fiscal years. Typically, less money is available than is desired, but occasionally, some regions have few or no candidates for certain Call items.

(1) Submitting the region's fair share of a Call item is the most commonly used method of determining submissions numbers.

(a) Each of the Call items has a dollar amount and, in some cases, the number of locations. Although these numbers are not always what are eventually appropriated by Congress, they are the indicators as to the number of locations that each region should submit.

(b) Each region has a percentage of the total aviation activity and public use airports. With this percentage, the F&E inspector can determine the fair share for the region. If this percentage is not known, the percentage of the dollar amount from the regional originated within-ceiling projects, in appendix 3 of the Call, can be used.

(c) If location numbers are included in the Call, the regional percentage of that number is the region's fair share. If location numbers are not included, the regional percentage of the dollar amount is the region's fair share. Airway Facilities personnel can provide average installation costs for that Call item to equate dollars to location numbers.

(d) The F&E inspector should submit the region's fair share plus a reasonable additional number. The reason for the additional number are many. Some candidates will be "dropped out" anyway and having too many is not a detriment. Some regions may not submit their fair share allowing the additional locations to be funded. Also, safety or congressional interests may produce over estimate funding. Even though this is a rare occurrence, candidate locations will be available in Washington to quickly add to a budget.

(e) An excessive number of candidates should not be submitted. Unreasonably excessive lists create an enormous workload for Airway Facilities for site studies, cost estimates, and equipment lists. An added workload is also placed on headquarters review personnel if the full list is submitted by the region.

(2) Rather than using the fair share method of determining submission numbers, past appropriations may be used. If the region is typically funded for two systems, the system list should be three or four. If a list of 10 is normally submitted, numbers should be decreased. However, Call wording and region or headquarters submission policies may require an extensive list and should not be decreased.

(3) The above guidance cannot account for every situation. The most important consideration for submission numbers is NEED. If the region needs five ILS's that fiscal year and one ILS is the region's fair share, then submit for the five ILS's, rather than one fair share and one extra. Not all candidates may pass the headquarter's review process, but F&E inspectors determine and submit the location numbers needed. Conversely, if no ILS's are really needed that fiscal year, do not submit for that budget item. This action will increase the possibly of funding for regions having a greater need.

262. SUBMISSION REQUIREMENTS IN THE CALL AND APS-1. The National Call for Estimates and APS-1 may require specific documentation to be included in the regional submission. This paragraph contains an explanation of these requirements and examples for which the F&E inspector is responsible.

a. Reason for Special Documentation. After the region submits an FY F&E budget, an extensive review process is necessary before actual appropriation. Many individuals scrutinize the lists. When determining which candidates to forward to higher levels of review, more information is needed besides regional priorities and BCR's. Information such as proposed runway construction, unique safety issues, figures in the BCR calculation, capacity issues, and proposed traffic increases are important points when considering which candidates should be forwarded and which should be "dropped out". Also, in some cases, the APS-1 calculation methodology is required to complete the review or phase II study in Washington.

b. When to Complete Additional Documentation. The best time to complete these special requirements is at the time the BCR is completed and the decision is made to possibly include that facility in the Flight Standards submission. At that time, all the data and specifics are known about the airport or runway. Waiting until the total submission is put together can lead to pertinent information not being included in the justification or an added review of all data would be required. Even if the facility does not make the regional list, the additional documentation can serve as a reminder for upcoming fiscal years and small changes can bring the information up-to-date.

c. ILS Staff Study and Data Sheet. The Call currently requires a staff study and data sheet to be completed for all ILS candidates. Figures 2-33, 2-34, and 2-35 contain the ILS Staff Study Guide, ILS Data Worksheet, and Instructions for ILS Data Worksheet. The next three figures are completed examples of a BCR, staff study, and data worksheet. When the BCR is completed, much of the information is needed for the staff study and worksheet. This is why all should be completed at the same time. Note that the sample staff study has more information than the minimum required in the staff study guide. A concerted effort should be made to include all pertinent information in the staff study. Part of the study should include results of a coordinated ILS study, including input from Airway Facilities, Air Traffic, and Airports.

d. Other Staff Study Requirements. Throughout the Call, and especially in APS-1, references are made to "justification" or "additional justification" that is required when the Call or APS-1 criteria were not met or submissions were made under appendix 3 of the Call for regional within-ceiling and overceiling projects. These justifications for Flight Standards submissions shall be in a staff study format.

(1) The simple staff study format of three headings (problem, solution, and remarks, if required) is normally sufficient for these justifications.

(2) Two sample staff studies are included as examples. See Figures 2-39 and 2-40.

263. ASSOCIATED PROBLEMS AND CONSIDERATIONS FOR SUBMISSIONS. This chapter has described the processes and procedures for evaluating sites to be included in FPB F&E budget submissions. Guidance is provided so that the inspector understands the F&E process, knows how to use the appropriate directives and job aids, and can accurately and confidently submit a list of needed facilities. This process is work intensive and has been simplified as much as possible. However, there exists problems and considerations that the inspector must understand which may complicate the oversimplified processes previously described.

a. The Draft Call. The items and dollar amounts included in the draft Call portray the programs and policies of the FAA at the time the draft was being completed. The draft Call supports the FAA's CIP. The dollar amounts are only "best guess" because the draft is put together nearly 3 years before Congress will legislate this budget. During the long lead time, programs and policies may change.

(1) The FAA is part of the executive branch of government and many of the FAA's programs and policies may change based on the emphasis and direction of governmental policy makers. The state of the economy and overall budget considerations effect these decisions. The President, OMB, DOT, and even the FAA may determine changes in direction or spending are required. Consequently, the budget submitted to Congress may be considerably different from the contents of the draft Call.

(2) Congress, as the legislative branch of government, legislates and appropriates the F&E budget. Again, based on the law passed by Congress, changes to programs and policies may occur. Congress may delete a specific program or even legislate facilities to be installed at specific named sites.

(3) The F&E inspector may become frustrated to see deserving candidates not being funded. Candidate airport A may not even be forwarded to DOT for consideration, while airport B may be funded for a facility when it was not even submitted. Inspectors must be aware that decisions are made that are beyond their control and that programs and policies can change or be changed as a given FY budget progresses through the budget process. The draft Call is only the original guide. The inspector should not be discouraged and deserving candidates must be tracked and resubmitted, if not approved.

b. Phase II Evaluations. Many of the facility candidates require a Phase II evaluation. These are required by APS-1 or the Call and are accomplished in Washington.

(1) The simplified criteria contained in APS-1 are Phase I criteria. Its purpose is to provide minimum qualification standards for a given facility and site. A full benefit/cost comparison is a much more complicated process.

(2) The Phase II evaluations take into consideration many more variables than just traffic or passenger count. Based on the specific facility type, these computer programs may evaluate actual dollar amounts for installation and maintenance over the expected life of the facility. Type of terrain may be considered. Actual weather conditions, frequency of bad weather, etc. may be evaluated. Actual air traffic conditions, count, and frequency of congestion (in relation to weather) may be considered. The traffic count data used is supplied by the inspector in the staff study. Forecast data may be from the ADA data base. Extremely complex mathematical formulas are used to complete the Phase II evaluations and they portray a more complete benefit over cost relationship.

(3) The F&E inspector should be aware that the Phase II evaluations do not disqualify a candidate that meets Phase I criteria. However, Phase II numerical ratios may result in a candidate not being forwarded to the next review level.

c. Feedback. A critical element for the F&E inspector is tracking the previously submitted candidates. Feedback on the progress of a specific fiscal year's budget, especially in relation to the submitted candidates, is the only way the inspector will know that sites have dropped out. The inspector may want to resubmit these sites.

(1) AFS is making a concerted effort to assure timely feedback on a given budget. The inspector's main point of contact is AFS-12.

(2) The inspector must realize that if a site was sent to Congress and not funded, an immediate effort is needed to re-insert that site location (if desired) in the budget that is still at the region. If this can not be accomplished, funding may be delayed yet another year while the budget in the region is already for 2 years in the future.

(3) Sometimes, budget feedback is received in the region, especially at Airway Facilities, before similar information is available from AFS. A good working relationship with F&E counterparts in the other regional operational divisions is essential for timely exchange of budget information.

d. Data. Airport operations and AIA counts are proportionally the critical data for determining candidacy for facilities. The inspector must be aware that this data is mostly from air traffic controllers logging these operations as they happen or later from the progress strips. The controller's main responsibility is controlling air traffic and these required counts are only an additional duty. The controller must also determine if the aircraft carries more that 30 passengers which separates air carrier from air taxi counts. For AIA counts, the weather conditions at the time of the approach applies, as stated in the AIA definition in Order 7210.3. Taking all these factors into consideration, the inspector will understand why the data may not be absolutely accurate.

(1) Operations for airports without air traffic control towers are normally taken from the Form 5010's for that airport. Data from the Form 5010 are normally contracted to the state aviation organization with reimbursement from the FAA. The states regularly update Form 5010 data every 2 years by surveys and site inspections. Obviously, the traffic counts are not as accurate as those taken by air traffic controllers.

(2) Even though the data may not be accurate, it is official FAA data and can be used for applying APS-1 criteria. This data is part of the ADA system.

(3) The inspector does have some data accuracy options. Report FAA-APO-83-10, listed as a recommended library reference, contains a model to estimate AIA's from total operations counts. Also, working with Air Traffic and Airports, the inspector may be able to acquire more accurate data. APO issued Report FAA-APO-85-7, Statistical Sampling of Aircraft Operations at Non-Towered Airports, which contains procedures for obtaining more accurate counts.

e. <u>Submissions for TVOR's</u>. VOR's, whether terminal or en route, are a part of the VOR/-DME/TACAN Network Plan. The VOR/DME/TACAN Network Plan identifies those facilities, by name, to be relocated, converted, upgraded, combined, established, replaced, or deleted to meet the requirements of the NAS. New equipment procurement will be accomplished by headquarters.

(1) The Network Plan was put together from regional input. Critical decisions were mostly made by AF personnel, in relation to facilities, and by AT personnel, in relation to facilities needed to support aircraft traffic. Flight Standards personnel attended these regional meetings and added input concerning instrument procedures. Occasionally, regional requirements change and the VOR/DME/TACAN Network Plan must be updated.

(2) The F&E inspector must be aware that submission for a new TVOR does not automatically change this Network Plan. Changing the Network Plan is a separate procedure which must be initiated by the regional Airway Facilities Division. If the inspector plans to submit for a new TVOR, take steps ahead of time to initiate a change to the VOR/DME/TACAN Network Plan by contacting the AF Network Plan representative. Agreement by the regional Network Plan members will be needed before a change is forwarded to Washington. The VOR/DME/-TACAN Network Plan must contain the new facility name before it

will be considered for the FAA F&E budget.

264. THE SUBMISSION. Each Flight Standards 200 division is responsible for preparing a detailed submission for each FY F&E Call for Estimates. The submission is accomplished by the FPB in accordance with guidance provided in the annual Call order and specific regional orders and requirements. Historically, this submission is in type-written form. However, due to the proliferation of electronic data capabilities, a computer file on a main frame system or a floppy disk using a common word processing format is often required and submitted. Computerized formatting allows for easy altering of candidate lists, easy combining of all lists for the final regional budget including all supporting documentation, and rapid printout of the budget or individual portions.

a. Submission Copy Requirements. The F&E inspector may prepare the submission for the signature of the Flight Standards Division manager. The printed package with floppy disk may be submitted to Airway Facilities Division and print copies may be forwarded to Air Traffic Division and Airports Division for information. The FPB F&E inspector should retain a copy of submissions for working reference.

b. Cover Letter. A sample cover letter for the submission is included in Figure 2-41. Note the paragraph on release of budget information.

c. Individual Facility Lists. Examples of the facility lists are provided in Figures 2-42 through 2-46. Past experience has shown that all information on each candidate should be included on the list. Adding the information to the list saves time and effort for regional questions and also, the information is available on one sheet of paper for questions from higher reviewing authorities. Some specific Call items require specific information that must be listed; for example, PAPI.

d. Justifications and Special Submission Requirements. Include all additional staff studies, BCR's, etc., that are required.

e. Other. A table of contents or index may be included. For easy reference, the file names on the computer disk could be part of the table of contents.

f. Submission Deadlines. Typically, the Flight Standards F&E submission should be at the Airway Facilities Division not later than October 1. Meeting this target date will enable AF to run site specific cost estimates and to finalize the F&E budget for interdivisional review in December, Regional Administrator briefing early in January, and printing and forwarding budget to Washington by January 30. Draft individual facility lists may be sent to the Airway Facilities F&E Section before the October 1 date by mutual agreement and with the understanding that the formal submissions will be forthcoming from the Flight Standards division manager.

265.-269. RESERVED.

FIGURE 2-33. ILS STAFF STUDY GUIDE

STAFF STUDY GUIDE

EXECUTIVE SUMMARY - (if warranted by complexity of the study and associated issues).

1. INTRODUCTION

This staff study was completed by ________________________________ in support of a request for a Category I ILS at __________________ __________________________ in compliance with the "FAA MLS Transition Policy." This study examines the proposed ILS to be purchased under (list option contained in MLS transition policy).

2. FACTS

The City of _______________________ has completed extensive construction on ______________________________ Airport which included the extension of runway __________ which now requires precision instrument capability. Additionally, the FAA has received numerous letters from users indicating a need for this approach. The airport authority agrees with this requirement and has designed the runway as a precision instrument runway. A preliminary study indicates no known environmental considerations. (Provide additional supporting information as warranted to permit in depth analysis of the proposal. Consider at least the following factors and provide quantifiable data where appropriate:

1. Safety
2. Airport and NAS capacity enhancement
3. Regional priority
4. Regional workload
5. User priority
6. Total traffic and instrument approach count
7. Benefit/cost ration
8. Passenger enplanements)

3. ANALYSIS

The ___________________ Region has completed a "Phase I" benefit/cost for runway __________ at ______________________ Airport using APS No. 1 with a resulting total ratio of _____________. The airport had ________________ enplanements in FY ________ and there has been scheduled turbojet operations for _____________ years.

FIGURE 2-33. ILS STAFF STUDY GUIDE (Cont'd.)

(Sentence/paragraph on each of the applicable "factors" listed in the policy statement.)

4. LIST OPTIONS (as applicable)

Consider that ILS's installed under this policy will be operated and maintained for a minimum of 10 years from the date of commissioning. Why must this site receive ILS versus MLS?

5. CONCLUSIONS

The _______________ Region has determined that there is a critical aeronautical need to provide a precision instrument approach (ILS) at _________________________ Airport, runway ________, with MALSR. This will fulfill an FAA objective to provide increased (safety, capacity, traffic flow, user capability, etc.) within the __________________ metropolitan area.

FIGURE 2-34. INSTRUCTIONS FOR ILS DATA WORKSHEET

ILS Worksheet

Item 1, 2, and 3: Self-explanatory.

Item 4: Use identifier listed in Order 7350.5.

Item 5: Self-explanatory.

Item 6: Use existing length and width, if less than 4,200 (per APS No. 1), justify installation.

Item 7 & 8: As designated in the "National Plan of Integrated Airport Systems" (NPIAS).

Item 9: Use minima for the largest category of aircraft utilizing the runway in question.

Item 10: As indicated in Order 7031.2, paragraph 20B.

Item 11: Indicate the number of ILS's currently installed. (Include in number any ILS that have been approved for installation but have not been installed.)

Item 12: Best estimate of lowest minima obtainable. If greater than 200-1/2, explain in staff study.

Item 13, 14, 15: Self explanatory.

Item 16: Indicate up to three air carrier operators by designated letter identifier.

Item 17: Category II/III submittal only.

Item 18: Indicate total AIA's for the airport by category of user as indicated.

Item 19, 20, 21: Self-explanatory.

Item 22: Compute total ratio in accordance with Order 7031.2, paragraph 20b, or for a Category II/III system upgrade use air carrier AIA's divided by 2500 equals total ratio.

Item 23: Category II/III submittal only.

FIGURE 2-34. INSTRUCTIONS FOR ILS DATA WORKSHEET (Cont'd.)

Item 24: Copy of letter from airport authority (Airport Manager) that states: 1. A desire for Category II/III; 2. Understands requirement for center line and touchdown zone lights, etc.

Item 25: For Category II/III only; show columns 5 and 6 cumulative data ("all") from "Ceiling-Visibility Climatological Study and System Enhancement Factors," DOT-FA75WAI-547.

Item 26 & 27: Self explanatory.

FIGURE 2-35. ILS DATA WORKSHEET

ILS DATA WORKSHEET

Proposal for ILS, part 171 __________ AIP __________ F&E __________

1. CITY: ______________________________ 2. STATE: ______________

3. AIRPORT NAME: ______________________ 4. IDENTIFIER: ________

5. RUNWAY NUMBER: _______ 6. RUNWAY LENGTH AND WIDTH: __________

7. RELIEVER (YES/NO): ____________ 8. HUB (YES/NO): ____________

9. NON-PRECISION APPROACH MINIMA: _______________________

10. ESTIMATED IFR USE ON CANDIDATE RUNWAY: ________________%

11. TOTAL ILS SYSTEMS: _______________________

12. POTENTIAL LOWEST ILS MINIMA: _______________________

13. CATEGORY ILS REQUESTED: CAT I ___________ CAT II/III _________

14. ALS: CURRENT ___________________ REQUIRED ____________________

15. PART 135/121 SCHEDULED PASSENGER SERVICE (YES/NO): ___________

16. SCHEDULED AIR CARRIER IDENTIFIERS (up to three):

	ID	TURBOJET
1.	_________	YES/NO
2.	_________	YES/NO
3.	_________	YES/NO

17. A PERCENT OF CATEGORY II/III EQUIPPED AIR CARRIERS USING THE AIRPORT ______________%

18. ACTUAL INSTRUMENT APPROACH DATA

	AIR CARRIER	AIR TAXI	GENERAL AVIATION	MILITARY
1. FY _____				
2. FY _____				
3. FY _____				

FIGURE 2-35. ILS DATA WORKSHEET (Cont'd.)

---

19. AIA DATA SOURCE:

    AIR TRAFFIC ACTIVITY/TAF: ______________

    SURVEY: ______________

    ESTIMATE: ______________

20. ENPLANEMENT DATA:

    TOTAL ENPLANEMENT

    1. FY ____
    2. FY ____
    3. FY ____

21. FORECAST ENPLANEMENTS FOR YEAR OF INSTALLATION: ______________

22. TOTAL RATIO: ______________

23. AIR CARRIER COMMITMENT LETTER (for Category II/III only): ___

24. AIRPORT SPONSOR COMMITMENT LETTER (for Category II/III only): __________

25. WEATHER DATA FOR CATEGORY II/III QUALIFICATION:

    COLUMN 5 "ALL" ______________ COLUMN 6 "ALL" ______________

26. SITE PREPARATION AND ANCILLARY EQUIPMENT INFORMATION:

    A. WILL AIP FUNDS BE REQUIRED FOR SITE PREPARATION? YES/NO

    IF SO, ESTIMATE TOTAL FEDERAL FUNDS REQUIRED ______________

    B. FOR CATEGORY II/III, WHAT RVR EQUIPMENT IS REQUIRED

    ____

    ESTIMATE TOTAL FEDERAL FUNDS REQUIRED ______________

27. SUMMARY OF EQUIPMENT REQUIRED ______________

    ____

FIGURE 2-36. SAMPLE ILS BCR

ESTABLISH CATEGORY I MLS OR ILS (WITH MALSR)
(APS-1, Paragraph 20, Pages 11-14)

Date 8/8/90

General Data

Airport Name : Ocean View Airport Ident. KFOG
Runway Number 16L

Data Source: (T) TAF: X (F) FAA 5010: ____ (O) Other ____
Date (Year) of Data: 1989

Air Carrier AIA's: 269 Air Taxi AIA's: 208

Gen. Aviation AIA's: 122 Military AIA's: 84

Runway Length (in Feet) 8200 (at least 4,200 feet required)
Runway Width (in Feet) 150 (at least 75 feet required)

Is this a HUB? X (Yes); ____ (No)

Enter Percent of Runway Use-IFR 30%

Lowest Ceiling Published for Largest Aircraft 722 (circling)
Lowest Visibility Published for Largest Aircraft 2 1/2

Benefit/Cost Calculations (Paragraph 20b)

Air Carrier	**(Recorded AIA's) / (Qualifying AIA's)**	**269 / 50**	=	**5.38**
				+
Air Taxi	**(Recorded AIA's) / (Qualifying AIA's)**	**208 / 300**	=	**.69**
				+
Gen. Aviation	**(Recorded AIA's) / (Qualifying AIA's)**	**122 / 900**	=	**.14**
				+
Military	**(Recorded AIA's) / (Qualifying AIA's)**	**84 / 450**	=	**.19**
				6.4 Total

Percent of Runway Use-IFR .30 **X** 6.4 **(Total)** **=** 1.92 **Total Ratio**

QUALIFIED - 1.0 or Greater Total Ratio
*UNQUALIFIED - Less than 1.0 Total Ratio.
*(See Supplemental Criteria - Commercial Service Airports/Reliever Airports, paragraph 20d/e.)

FIGURE 2-37. SAMPLE COMPLETED ILS STAFF STUDY

STAFF STUDY
ILS, OCEAN VIEW AIRPORT, RWY 16L
FY 93 F&E BUDGET SUBMITTAL

1. INTRODUCTION

This staff study was completed by the Flight Procedures Branch, AWP-220, in support of a request for a Category I ILS, runway 16L, at Ocean View Airport, Fog Island, Arizona, in compliance with the "FAA MLS Transition Policy."

This request meets the following eligibility criteria:

a. MLS establishment criteria contained in APS No. 1 with a current benefit/cost ratio greater than 1.0.

b. Located at a medium hub airport as defined in the "National Plan of Integrated Airport Systems".

c. Due to the nearly completed new runways (16L/34R), the forecast of increased activity indicates there is an immediate requirement to install precision approach capability and institute simultaneous ILS procedures with runway 16R. This capacity increase necessity cannot be delayed until MLS becomes available.

2. FACTS

Ocean County is completing extensive construction of Runway 16L/34R at Ocean View Airport. In addition, the passenger terminal has been modernized, new concrete ramps and 15 new gates were constructed, and the general aviation ramp area was greatly expanded. The Fixed Base Operator, G. Straight Enterprises, is also developing ocean front property and advertising nationwide for fly-in vacation sites.

Air carrier operators have agreed to increase scheduled flights and hub operations at the airport expecting dual ILS procedures to separate general aviation traffic from the air carrier traffic. The necessary Air Traffic Control Tower equipment, personnel, and training were included in the FY92 and FY93 budgets.

Fog Island has residential and commercial property available, an excellent beach, deep sea fishing and whale watching excursions from the 4 marinas, a wilderness area, and a national wildlife refuge consisting of both semidesert and seashore areas. As development continues, the FY89 enplanements of 34,670 are expected to increase to 50,000 in 1996 and the FY89 general

FIGURE 2-37. SAMPLE COMPLETED ILS STAFF STUDY (Cont'd.)

aviation annual instrument approaches of 122 should reach 200 in 1996. These forecasts are based on a private, county contracted study completed in 1986 and was used to justify the extensive airport construction.

The new runway was needed to service the expected increase in air traffic for the Fog Island recreation area and now requires precision instrument capability. The airport authority agrees with this requirement and has designated the runway as a precision instrument runway.

An extensive feasibility study was completed prior to runway construction. The comprehensive evaluation considered safety, efficiency, and environmental issues such as IFR/VFR traffic patterns, noise issues, and final approach courses to other nearby airports. Based on available land, facility siting is feasible and there are no known environmental considerations.

3. ANALYSIS

The Western-Pacific Region has completed a "Phase I" benefit/cost for runway 16L at Ocean View Airport using APS No. 1 with a resulting total ratio of 1.92. The airport had 34,670 enplanements in FY89 and there have been scheduled turbojet operations for at least 20 years.

Because of the air traffic mix of air carrier and general aviation, two runways are required to separate the different aircraft speed categories. Even in the desert environment, the close proximity to the ocean produced 50 IFR days (or partial IFR days) in 1989. To enhance capacity and safety, parallel precision runways are required and simultaneous ILS approaches are planned to effectively handle the anticipated increase of air traffic. The new runway meets or exceeds applicable FAA directives for a precision approach and simultaneous ILS approaches.

The airport management has effectively planned and coordinated the construction project to satisfy air traffic growth projections. In the many past hearings attended by the user groups, all agreed with the construction plans and stressed the priority need for dual precision runways. The Western-Pacific Region agrees with the growth projections, even with the current economic downturn.

FIGURE 2-37. SAMPLE COMPLETED ILS STAFF STUDY (Cont'd.)

4. MLS OPTION

Ocean View Airport is in need of a precision approach for the new runway to effectively handle the forecasted increase in air carrier and general aviation operations. Very few (if any) of the users have MLS receivers at this time. This site should receive an ILS due to the delayed implementation of MLS. MLS implementation at this airport is doubtful prior to FY 2002.

5. CONCLUSION

The Western-Pacific Region has determined that there is a critical aeronautical need to provide a precision instrument approach (ILS) at Ocean View Airport, runway 16L, with MALSR. This will fulfill an FAA objective to provide increased safety and capacity within the Fog Island metropolitan area.

FIGURE 2-38. SAMPLE COMPLETED ILS DATA WORKSHEET

ILS DATA WORKSHEET

Proposal for ILS, part 171 __________ AIP __________ F&E X

1. CITY: Fog Island 2. STATE: Arizona

3. AIRPORT NAME: Ocean View Airport 4. IDENTIFIER: KFOG

5. RUNWAY NUMBER: 16L 6. RUNWAY LENGTH AND WIDTH: 8200/150

7. RELIEVER (YES/NO): No 8. HUB (YES/NO): Yes

9. NON-PRECISION APPROACH MINIMA: N/A (800-1)

10. ESTIMATED IFR USE ON CANDIDATE RUNWAY: 30 %

11. TOTAL ILS SYSTEMS: 1 Installed

12. POTENTIAL LOWEST ILS MINIMA: 200 - 1/2

13. CATEGORY ILS REQUESTED: CAT I X CAT II/III ________

14. ALS: CURRENT ____________________ REQUIRED MALSR

15. PART 135/121 SCHEDULED PASSENGER SERVICE (YES/NO): Yes

16. SCHEDULED AIR CARRIER IDENTIFIERS (up to three):

	ID	TURBOJET
1.	AA	YES
2.	DL	YES
3.	UA	YES

17. A PERCENT OF CATEGORY II/III EQUIPPED AIR CARRIERS USING THE AIRPORT N/A %

18. ACTUAL INSTRUMENT APPROACH DATA

		AIR CARRIER	AIR TAXI	GENERAL AVIATION	MILITARY
1.	FY 89	269	208	122	84
2.	FY 88	249	175	120	93
3.	FY 87	256	139	105	67

FIGURE 2-38. SAMPLE COMPLETED ILS DATA WORKSHEET (Cont'd.)

19. AIA DATA SOURCE:

AIR TRAFFIC ACTIVITY/TAF: ______X______

SURVEY: ____________

ESTIMATE: ____________

20. ENPLANEMENT DATA:

	TOTAL ENPLANEMENT
1. FY 89	34,670
2. FY 88	31,419
3. FY 87	33,603

21. FORECAST ENPLANEMENTS FOR YEAR OF INSTALLATION: ____45,000____

22. TOTAL RATIO: ____1.92____

23. AIR CARRIER COMMITMENT LETTER (for Category II/III only):N/A

24. AIRPORT SPONSOR COMMITMENT LETTER (for Category II/III only): __N/A____

25. WEATHER DATA FOR CATEGORY II/III QUALIFICATION: N/A

COLUMN 5 "ALL" ____________ COLUMN 6 "ALL" ____________

26. SITE PREPARATION AND ANCILLARY EQUIPMENT INFORMATION:

A. WILL AIP FUNDS BE REQUIRED FOR SITE PREPARATION? NO

IF SO, ESTIMATE TOTAL FEDERAL FUNDS REQUIRED ____________

B. FOR CATEGORY II/III, WHAT RVR EQUIPMENT IS REQUIRED ____N/A____________

ESTIMATE TOTAL FEDERAL FUNDS REQUIRED ____________

27. SUMMARY OF EQUIPMENT REQUIRED LOC, GS, MM, LOM OR DME, MALSR, TOUCHDOWN RVR

FIGURE 2-39. SAMPLE STAFF STUDY 1

NDB Staff Study

Establish Non-directional Beacon Locator at the outer marker, RWY 02, Lovell Field, Chattanooga, Tennessee.

PROBLEM: MORRT intersection/OM for the ILS RWY 02 approach to Lovell Field, Chattanooga, Tennessee, does not have a collocated non-directional beacon locator. Instead it is a fan marker/intersection identified by the RWY 02 localizer course and the 258 degree radial of Chattanooga VORTAC. Following are problems as a result of not having a collocated NDB at MORRT OM/INT:

A. Prevailing winds favor use of RWY 02 approximately 50 percent of the time. In event of ILS inoperative, no backup approach is available. Installation of NDB at MORRT would provide a backup NDB RWY 02 approach.

B. Transition from Chattanooga VOR is required to clear aircraft for the ILS RWY 02 approach. Installation of an NDB at MORRT would permit direct tracking to MORRT, saving users time and fuel.

C. Holding altitudes at MORRT are restricted to 5,000 feet. Installation of NDB at MORRT would enable increased capability of holding up to 10,000 feet.

D. Pilots must monitor a cross radial from Chattanooga VORTAC to identify passage of the final approach fix. Installation of NDB at MORRT would provide immediate identification of passage of final approach fix.

E. Existing missed approach procedure for approaches to RWY 20 is a climbing left turn to Chattanooga VORTAC. Installation of NDB at MORRT would permit a missed approach straight ahead climb to MORRT.

SOLUTION: Install an NDB (LOM) collocated at MORRT outer marker.

NOTE: Consideration should be given to making this a Region item to ensure action.

FIGURE 2-40. SAMPLE STAFF STUDY 2

DME Staff Study

Establish Distance Measuring Equipment (DME) at the localizer serving the precision ILS RWY 18R and non-precision localizer RWY 18R instrument approach procedures, Orlando International Airport, Florida.

PROBLEM: Inability to automatically provide actual distance from the runway to aircraft conducting the precision and non-precision approaches to RWY 18R at Orlando International Airport.

SOLUTION: Installation of DME equipment at the localizer antenna, RWY 18R, Orlando International Airport.

REMARKS: 1987 landing usage for RWY 18R was 40 percent. Since then a third parallel runway has been commissioned, and a fourth parallel runway is projected to be commissioned September 1993. At that time landings will be on the outboard runways with priority given to south operations due to prevailing winds and noise mitigation. Therefore, RWY 18R is projected to be utilized at least 32 percent for landings. Due to lack of a Non-directional Beacon (LOM), radar vectoring and positioning is required for the ILS RWY 28R instrument approach procedure. Installation of DME at the 18R localizer would substitute for the lack of a LOM, and would enable use of the instrument approach procedure without reliance on radar. This would benefit aircraft operations, relieve controller workload and smooth traffic flow for landings, increasing efficiency of air traffic movement at this large hub airport.

AIA Counts (AC/AT/GA/MIL)	Priority
4,426/465/687/55	1a

NOTE: This is important enough to include as a region funded item, in order to assure its accomplishment.

FIGURE 2-41. SAMPLE FLIGHT STANDARDS COVER LETTER

U.S. Department of Transportation

Federal Aviation Administration

Memorandum

Subject: INFORMATION: FY-93 Facilities and Equipment NAVAIDS/Visual Aids Budget Submission

Date: SEP 28 1990

From: Manager, Flight Standards Division, ASO-200

Reply to Attn. of: Mitchell:x7455

To: Manager, Airway Facilities Division, ASO-400

In response to the FY-93 Draft Call for Estimates - Facilities and Equipment (F&E), attached are the candidate locations, priorities and supporting data for terminal area air navigation facilities (other than radar) and visual landing aids. This information is for the attention of your Program and Planning Branch, Facilities and Equipment Section, ASO-422, so that they may apply cost data. In addition to this hard copy, a computer disc is attached (Word Perfect 5.0 is Used).

This budget information is not for release outside the Federal Aviation Administration, pending final action by the U.S. Congress. Any questions should be directed to our Flight Procedures Branch, ASO-220, Merle Mitchell, extension 7455.

William M. Berry, Jr.

Attachments

cc:
ASO-500 (all cc with attachments)
ASO-600

FIGURE 2-42. SAMPLE ILS LIST

ILS

Establish precision Instrument Landing System (ILS) at medium and large hub airports and their reliever airports which meet APS-1 cost/benefit ratio of 1.0 or greater, and have an immediate critical requirement. These are all supported by an individual staff study (copy attached). If additional information is needed, contact Merle F. Mitchell (404) 763-7455.

Reg. Pty.	Location (Ident.)	RWY	HUB	AIA Counts AC/AT/GA/MIL	NPI MINS	% RWY Use	B/C Ratio
1.	Orlando, FL (MCO)	17L	Large	4,426/465/ 687/55	1500-3	18	18.2
	(ALSF-2 Required) (Category I/II/III Required)						
2.	Orlando, FL (MCO)	35R	Large	4,426/465/ 687/55	1500-3	1	1.01
	(MALSR Required) (Future Use 8%=8.1 B/C Ratio)						
3.	Memphis, TN (MEM)	35	Large	8,824/2,798/ 2,116/353	1500-3	20	44.2
	(ALSF-2 Required) (Category I/II/III Required)						
4.	Memphis, TN (MEM)	17	Large	8,824/2,798/ 2,116/353	1500-3	15	33.3
				(MALSR Required)			
5.	Knoxville, TN (TYS)	23L	Med.	1,203/1,141/ 1,802/459	700-2	15	4.6
				(MALSR Required)			
6.	Ft. Myers, FL (RSW)	24	Med.	1,771/1,160/ 398/107	600-2	30	12.0
				(MALSR Required)			
7.	W. Palm Beach, FL (PBI)	27R	Large	1,348/643/ 1,477/39	400-1	25	2.2
				(MALSR Required)			
8.	Raleigh, NC (RDU)	23R	Med.	8,031/3,467/ 3,536/322	100-1/4	50	12.3
	(ALSF-2 Installed) (Category III Upgrade Required)						
9.	Jacksonville, FL (JAX)	25	Med.	1,973/1,047/ 1,132/564	500 - 1-1/4	25	4.29

\- Last Entry -

FIGURE 2-43. SAMPLE PAPI NON-PRECISION LIST

PAPI-Non-precision

Establish Precision Approach Path Indicator (PAPI) for straight-in non-precision approaches. Coding 3319-0-101-B.

Reg. Prty.	Location (Ident.)	RWY	Total Annual Landings AC/AT/GA/MIL	Total AIA	RWY Use %	Net Ratio
1.	Pascagoula, MS (PGL)	13	0/86/23,200/0	105	50	3.35
	Priority 3 - Visual Reference Deficiency					
2.	New Port Richey, FL (X41)	08	0/225/47,405/0	13	70	2.39
	Priority 3 - Visual Reference Deficiency					
3.	Vicksburg, MS (VKS)	01	0/0/14,000/250	41	100	1.36
	Priority 3 - Visual Reference Deficiency					
4.	Cullman, AL (3A1)	19	0/100/8,000/50	115	70	1.08
	Priority 3 - Visual Reference Deficiency					
5.	Cleveland, MS (RNV)	17	0/0/18,425/0	26	70	1.07
	Priority 3 - Visual Reference Deficiency					

- Last Item -

FIGURE 2-44. SAMPLE PAPI VISUAL LIST

PAPI-Visual

Establish Precision Approach Path Indicator (PAPI) visual approach equipment in order to provide vertical descent guidance to the runway. Coding 3319-0-101-A.

Reg. Pty.	Location (Ident.)	RWY	Annual Landings AC/AT/GA/MIL	% RWY Use	Net Ratio	ILS	Pty.
1.	Birmingham, AL (BHM)	18	20,817/7,777 56,130/8,600	15	1.35	N	1b
	(Safety Factor - Turbojet)						
2.	New Port Richey, FL (X41)	08	0/275/47,405/0	70	2.39	N	3
	(Safety Factor - Visual Reference Deficiency)						
3.	Evergreen, AL (39J)	18	0/0/2,400/ 63,999	70	3.32	N	3
	(Safety Factor - Visual Reference Deficiency)						
4.	Tamiami, FL (TMB)	09L	0/6/148,034/ 215	20	2.12	N	3
	(Safety Factor - Visual Reference Deficiency)						
5.	Fajardo, PR (X95)	07	0/24,350/1,250/ 0	70	2.07	N	3
	(Safety Factor - Visual Reference Deficiency)						
6.	Tamiami, FL (TMB)	27L	0/0/146,317/100	15	1.57	N	3
	(Safety Factor - Visual Reference Deficiency)						
7.	Lexington, KY, (LEX)	26	10,809/9,713/ 40,105/1,438	25	1.48	N	3
	(Safety Factor - Visual Reference Deficiency)						
8.	St. Pete., FL (PIE)	09	1,976/566/ 72,786/6,047	20	1.21	N	3
	(Safety Factor - Visual Reference Deficiency)						

- Last Item -

FIGURE 2-45. SAMPLE REIL LIST

REIL

Establish Runway End Identification Lights (REIL) on non-precision, circling or visual runways at primarily commercial service airports. Coding 4c(11)(a)NP.

Reg. Prty.	Location (Ident.)	RWY	Annual Landings AC/AT/GA/MIL	RWY Use %	Net Ratio
1.	St. Thomas, VI (STT)	28	3,863/30,344/ 11,928/738	30	8.34
	(Visual Reference Deficiency)				
2.	West Palm Beach, FL (LNA)	15	0/1,000/ 51,450/0	20	7.88
	(Overriding Lights)				
3.	Ft. Lauderdale, FL (FLL)	09R	48,606/21,258/ 41,140/608	20	6.67
	(Overriding Lights)				
4.	San Juan, PR (SIG)	09	0/4,164/ 47,236/1,869	70	6.18
	(Overriding Lights)				
5. 0	Fajardo, PR (X95)	25	0/24,350/ 1,250/0	30	6.14
	(Visual Reference Deficiency)				
6.	Isla de Vieques, PR (VQS)	09	0/10,000/ 3,000/0	70	6.12
	(Visual Reference Deficiency)				
7.	West Palm Beach, FL (PBI)	09R	28,760/13,344/ 71,693/1,015	20	5.39
	(Overriding Lights)				
8.	Ft. Lauderdale, FL (FLL)	27L	45,606/21,258/ 41,140/608	15	5.0
	(Overriding Lights)				
9.	Boca Raton, FL (BCT)	05	0/500/44,475/ 25	70	4.56
	(Overriding Lights)				

\- Last Entry-

Note: Estimated total remaining requirements - 100 REIL.

FIGURE 2-46. SAMPLE RVR LIST

RVR

Establish touchdown, RVR for Category I ILS equipped runways which have HIRL's and approach lights, at towered airports, Coding 3471-0-101.

Reg. Pty.	Location (Ident.)	RWY	HUB	AEP	AIA	% RWY Use	B/C Ratio
1.	Savannah, GA (SAV)	36	S	566,215	3,370	25	9.5
2.	Nashville, TN (BNA)	13	M	3,278,132	19,943	15	17.8
3.	Asheville, NC (AVL)	16	S	233,515	2,567	70	2.4
4.	Miami, FL (MIA)	12	L	11,911,364	15,464	10	35.0
5.	Columbia, SC (CAE)	05	S	632,817	4,188	15	6.1
6.	Ft. Myers, FL (RSW)	24	M	1,561,308	3,436	30	8.0
7.	Raleigh, NC (RDU)	23L	M	3,185,188	15,356	25	60.6
8.	W. Palm Bch, FL (PBI)	27R	L	2,394,115	3,507	25	2.2
9.	Knoxville, TN (TYS)	23L	S	608,500	4,605	15	4.61

- Last Item -

SECTION 6. RELATED F&E REQUIREMENTS

270. GENERAL. There are many Flight Standards responsibilities relating to the Facilities and Equipment program that are not part of the budget submission process covered in the previous sections of this chapter. This section will address these functions and will discuss the regional working groups. The Aviation Safety Inspector assigned to F&E duties is the focal point for Flight Standards responsibilities regarding Facilities and Equipment and is expected to provide technical expertise to other operating divisions and to the public.

271. REGIONAL WORKING GROUPS. With the FAA straightline reorganization in 1988, standardized regional F&E policies and procedures were recognized as a requirement to promote effective coordination. Based on the revised organizational responsibility and budgetary role of the Regional Administrators, teamwork through interorganizational working groups was perceived as highly critical in the F&E process. Some regions were already using a division management level Facility Review Board and a working level Interdivisional Working Group. Flight Standards supports the Airway Facilities attempt to institutionalize these groups in all regions. Order 1110.117, Regional Facilities Review Committees and Interdivisional Working Committees, formally establishes these two committees in the regions and prescribes the responsibilities of each. The following are regional working groups that may be utilized for the F&E and related programs.

a. Facilities Review Committee (FRC).

(1) Membership. The FRC consists of Managers of the Airway Facilities, Flight Standards, Air Traffic, and Airports Divisions, with the Regional Administrator (or his deputy, if delegated) as the chairperson. Other members may be added as the Regional Administrator deems necessary, with the Budget and Logistics Divisions normally participating. The Airway Facilities Division Manager serves as executive secretary, schedules meetings, and publishes minutes.

(2) Activities. The major activity of the FRC is oversight of the F&E staff work accomplished by the Interdivisional Working Committee (IDWC). The FRC approves or disapproves the recommendations of the IDWC in procedural matters relating to the F&E budget process, the F&E budget to be submitted to Washington, and changes in budget submissions. The FRC approves or disapproves changes to the current F&E program. The FRC also reviews the Quarterly F&E Fiscal Summary Review (FSR), together with a review of the individual reprogramming requests to be submitted to Washington.

b. Interdivisional Working Committee (IDWC).

(1) Membership. The IDWC consists of designated representatives of Airway Facilities, Flight Standards, Air Traffic, and Airports, the Regional Administrator, and the Budget and Logistics Divisions. The Airway Facilities Division representative chairs the committee, schedules meetings, and publishes minutes.

(2) Activities. Most of the F&E program is completed by informal coordination by the representatives. At meetings, the IDWC plans and approves the annual F&E regional budget submission and also approves regional reprogramming actions. The IDWC recommends to the FRC the regional and national F&E program items in priority order. The IDWC establishes subworking groups, such as a Navigation Aids Committee, as necessary. It advises the FRC if additional regional resources are needed for the budget process. The IDWC assures adequate project documentation, airspace acceptability, and conformance with current airport planning, including record of airspace considerations, site inspection, and airport owner coordination, as appropriate. In the case of ILS/MLS components, the IDWC assures precision instrument runway (PIR) designation prior to inclusion in the budget by developing the coordination procedures to allow timely PIR designation.

c. Regional Facility Board. A Regional Facility Board or similarly designated committee may be organized (or activated for special projects) to coordinate commissioning, decommissioning, and shutdowns of both federal and nonfederal facilities within the region. Although not necessarily established by the IDWC for F&E only projects, this board serves the important function of coordinating all endeavors required by the different divisions for these facility actions.

272. FLIGHT STANDARDS PARTICIPATION IN WORKING GROUPS. Flight Standard representation is required on all F&E committees.

a. Facilities Review Committee (FRC). The Flight Standards Division Manager is the member. The Flight Procedures F&E inspector shall keep the Manager of the Flight Procedures Branch informed of the current status of F&E projects. The branch manager shall keep the Flight Standards Division Manager informed on all matters he will be addressing as a member of the FRC.

b. Other Groups. The FPB F&E inspector normally serves as the Flight Standards member of the Interdivisional Working Committee (IDWC) and the Regional Facility Committee. The inspector shall represent the Flight Standards Division in all discussions and decisions made by these committees. The inspector is responsible for flight standards input relative to aviation safety or TERPS criteria and must determine any necessary flight standards actions required based upon committee decisions.

273. CHANGES TO AN F&E BUDGET. After an FY F&E budget leaves the region, submitted changes to this budget can be broken down to two types: changes before the budget is acted on by Congress, known as resubmissions, and changes to an approved budget, known as reprogramming.

a. Resubmissions. Occasionally, a revision to a budget submission will be necessary after being forwarded to headquarters. This action will require special handling because of the regional and Washington offices involved. Based upon the provisions in the Call and when revisions are necessary, they should be forwarded within 3 weeks of the due date for the budget submission. They should be enclosed with a letter summarizing why they were submitted.

(1) Resubmission Process. All formal resubmissions must be coordinated with the different regional divisions or approved by the appropriate committees and all members. The resubmissions are routed to headquarters in the same manner as the original budget.

(2) Resubmissions After the Three Week Deadline. Because different Washington offices are involved in the budget review, costing, and consolidating process, late resubmissions are not encouraged. If it is absolutely imperative that a resubmission is required after the three week deadline, the appropriate Washington offices must be made aware that late changes will be forthcoming. Telephone coordination is required to help smooth the disruptions the resubmission will cause.

b. Minor Errors or Changes. Minor errors and the need for simple changes may be discovered in the region and during the review and costing process in Washington. These changes may be made to the budget if they are discovered early and are kept to an absolute minimum. Telephone coordination with the AFS-12 specialist is required to incorporate these minor changes. Coordination with other headquarters offices will then be accomplished by AFS. If budget changes must be made, they should occur while the budget is at the FAA. Although changes to a FY F&E budget while at OST, OMB, or Congress are not impossible, submitting changes while the budget is at these reviewing and approving authorities is not an action the FAA desires.

c. Reprogramming Action. The major difference between the F&E budget and an FAA operational budget is that, once approved and appropriated, the money for an F&E fiscal year may be spent anytime within 3 years of the appropriation date. All appropriated F&E money is held in escrow by Airway Facilities in Washington until the region is ready to begin the budgeted project. Current F&E projects are normally reviewed by the regional Interdivisional Working Committee (IDWC) quarterly and adjustments are made as necessary to locations or funding. These adjustments are handled as reprogramming actions, documented in the Fiscal Summary Review (FSR), and submitted to the Facility Review Committee (FRC). The FRC approves the FSR and forwards it to headquarters which permanently changes the given fiscal year F&E budget. Approved budget changes may be made for many reasons and the following are prime examples.

(1) A request by the airport authority to change the runway location of a facility.

(2) A determination that there is no longer a need for a planned F&E facility project due to a commitment for a nonfederal funded or Airport Improvement Plan (AIP) funded installation.

(3) Lesser or more funds required than budgeted for a project.

(4) A need to add radio control to lighting projects.

(5) Nonavailability of equipment that may require a project delay or cancellation.

(6) Delays due to the installation contractors, runway/taxiway and other airport construction, and zoning/environmental problems.

d. Reprogramming for Special Projects. Due to an aircraft accident, accident investigation, or an unique operational requirement, a decision may be made at FAA Headquarters or in the region that a site specific facility/equipment component is needed immediately. This may simply require the region to install the system from material on hand and reprogram the budget. On the other hand, the component may not be available in the region and has to be borrowed from another region or intercepted during shipment from the manufacturer to another region. In either case, two or more regions are involved in the reprogramming. These are not unusual situations and components may be borrowed from other regions for various reasons other than in an "emergency". The F&E inspector may become involved in these types of situations and must be aware that timely coordination within the region, with the other region, and with AFS-12 in Washington is critical to solving the immediate installation problem and assuring the appropriate reprogramming actions are properly completed.

274. F&E INQUIRIES. The FPB F&E inspector will often receive random inquiries from the public or other government entities regarding establishing terminal facilities and equipment for a particular airport. The ASI should be prepared to discuss the benefit/cost ratio (BCR) for the specific location, TERPS criteria, and other technical matters relating to Flight Standards.

a. Airport Improvement Program (AIP). This program provides partial federal funds to airports for capital improvements including funds for facilities and equipment. The regional Airports Division or Airports District Office will occasionally request Flight Standards to complete a BCR for terminal navigation aids based on APS-1. Flight Standards may provide assistance to the Airports Division in determining APS-1 requirements and computing BCR's, using the methodology described in APS-1 and in Section 4 of this chapter. Flight Standards may be requested to provide technical guidance regarding TERPS criteria, flight safety considerations, and any special knowledge they have concerning the airport, when the regional Airports Division is considering AIP funded projects.

b. Takeover of Nonfederal (Nonfed) Facilities. Nonfed terminal air navigation and approach facilities are privately owned facilities (state, local authority, or private) which were purchased without federal funds or partially funded under the Airport Improvement Program (AIP). If eligible under the APS-1 criteria, the FAA may then assume ownership, operation, maintenance, and logistic support of these facilities and equipment provided FAA standards and requirements, as outlined in applicable agency directives, are met. The regional Airway Facilities (AF) Division has the responsibility to determine if a facility meets takeover requirements and whether it should be considered. AF may request Flight Standards to compute the BCR using the methodology described in APS-1. The ASI may provide AF the BCR results and any requested technical guidance regarding application of TERPS criteria and possible aviation safety problems.

c. Discontinuance Inquiries. On rare occasions, the ASI may be asked by Airways Facilities or others to conduct a discontinuance BCR on a facility. The criteria for discontinuing a facility are approximately one-half that required to establish the facility. Specific discontinuance criteria for each navigation aid are contained in APS-1. With ever increasing air traffic, the need for such a review is rarely necessary. Conditions may exist though, when a facility becomes outmoded and should be discontinued. If requested, the F&E inspector will conduct the BCR and provide any additional input that the facility discontinuance may have on flight procedures and safety.

d. Congressional Inquiries. Occasionally, the F&E inspector may receive queries from congressional sources (congressional staff, DOT/FAA congressional liaison, etc.) indicating congressional interest in facilities for an airport in their district. (Unless regional guidance specifies a different point-of-contact, inquiries to the FPB directly from congressional staffs should be referred to the regional public affairs office.)

(1) To answer these inquiries, a BCR may have to be completed. The inquiry may request an update on the status of a facility installation. The ASI must be aware of the status of all ongoing and proposed F&E projects for which Flight Standards has budgeting responsibilities. When appropriate, coordinate with AFS-12 and other interested divisions, especially Airway Facilities.

(2) Congressional inquiries are sensitive in nature and as such, require an accurate and timely response. (Also see f. below.)

e. Other Inquiries. Facilities and Equipment inquiries can come from any source: state and local aviation officials, airport managers or operators, flying clubs, aviation companies, resident companies with aircraft, resident military organizations, professional organizations, or individual pilots. To properly discuss and answer these inquiries, the FPB F&E inspector must be knowledgeable about the entire F&E program, the status of Flight Standards F&E projects, possible options for getting facilities funded and installed, TERPS, and aviation safety considerations. A concise and accurate answer must be provided for all inquiries. If the query is in regard to F&E submissions which are pending congressional action, the information on their status should be deferred until Congress has acted.

f. Sensitivity of Submitted Facilities Lists. The F&E budget process is long and complicated. Obviously, the entire submitted candidate list for any facility type may not be included in the final budget presented to Congress by the President. Congress, in turn, is the final authority in determining the candidates to be funded. Because all regional candidates will not be funded, the FAA policy is that candidate lists are confidential.

(1) Of course, specific sites and the candidate lists must be discussed with FAA regional and headquarters personnel during the submission, coordination, and review processes. The required confidentiality does not apply within the FAA.

(2) Outside the FAA, extreme care must be exercised by FPB personnel answering inquiries concerning the specifics of a given candidate list. Although some of the individuals seeking F&E information may understand our budget process, most will not. The obvious misconception is that regionally submitted facility lists will be appropriated by Congress. The FAA does not want to imply that installation commitments are made based solely on meeting APS-1 criteria and being submitted by the regions.

This is the reason for the confidentiality policy.

(3) Specific discussions that should be avoided are the candidate site names on a list, number of candidates on a list, priorities assigned to a candidate, and supposition as to which candidates may be approved by Congress.

(4) The inspector is not restricted from discussing a specific facility candidate with interested individuals. The inspector may state that the site was included in the "FAA's FY 19XX Facilities & Equipment Budget Planning Process". However, a follow-up statement may be required stressing that this is only the beginning of the "budget planning process", the adjusted FAA budget will be submitted to Congress by the President, Congress has the final authority over that budget, and rarely are all the region's candidates funded by Congress.

(5) No restrictions apply after Congress has acted on the FAA F&E budget. The funded locations for the approved facilities may be discussed with all interested parties.

g. Special Studies or Proposals. Whether initiated by the FAA or coming from outside the FAA, a capacity enhancement study which requires a facility installation is a specific type of inquiry requiring careful review. Often, these studies propose nonstandard use or siting of terminal navaids that may not meet the criteria established in APS-1, TERPS, or facility installation orders. The F&E inspector should thoroughly analyze and comment on the proposal based upon Flight Standards F&E obligations, current Flight Standards considerations of "safety of flight operations", and the impact the proposal will have on existing and planned instrument approach procedures.

h. Specific Requests from AFS-12. Occasionally, a written request is received in the region from AFS-12 concerning facilities related issues. In these cases, AFS-12 is acting as a data gathering office for information not available in headquarters. AFS-12 will normally be reacting to requests from Congress, OMB, OST, or upper management at FAA Headquarters. Gathering the requested data may be very work intensive for the FPB. If the data is available, the F&E inspector should promptly and accurately respond to these requests. Questions concerning the requests can be answered by a telephone call to AFS-12.

275. CHANGING F&E POLICY. The FPB F&E inspector is considered one of the prime Flight Standards sources of information on matters pertaining to facilities and equipment. As such, the ASI has to apply the policy and guidance provided by Headquarters and their region. The inspector is also the individual in the position to evaluate the safety needs of airports in the region. Policies may need to be changed. If a change is needed, the inspector should initiate a recommendation for change through the Flight Standards Service.

a. Changes to the CIP. The F&E program supports the FAA's long range facilities planning program documented in the CIP. Consequently, the CIP is the source document for items in the F&E Call. The F&E inspector should discuss with AFS-12 F&E Call changes requiring new CIP initiatives. In turn, AFS-12 will discuss with F&E inspectors Flight Standards policies requiring CIP changes.

(1) At the same time the F&E Call for Estimates is being accomplished in the regions, a similar "Call" for new CIP initiatives is made. Prompt regional input is important.

(2) The CIP change process is formal and complicated. Specific forms have to be completed and numerous Headquarters offices are involved. For Flight Standards, CIP change initiatives are the responsibility of the Technical Analysis and Support Branch, AFS-450. Flight Standards, and specifically AFS-12, determine which new CIP initiatives are required based on current policies and regional recommendations. AFS-450 will then marshal the proposed change through the appropriate procedural steps.

b. Changes to the Call. The F&E inspector must be aware that the draft Call they will be using for their submissions is just that: a draft Call. Changes will be made before the Call is finally issued as an order the following spring.

(1) Normally, small word changes to the Call can easily be incorporated during meetings held to discuss the draft Call. As an example, guidance for evaluating candidacy may need refining. AFS-12 is the point of contact.

(2) If the Flight Procedures Branch believes additional or new facilities and equipment should be added to the National Call for Estimates, the F&E inspector should discuss these types of changes with AFS-12. CIP change initiatives may be required to add new facilities and equipment to the F&E Call. Timely discussions are important to enable completion of the CIP change initiative process.

(3) If CIP changes are not required, certain Call items may possibly be added or incorporated within an item list; for example, a needed localizer only installation.

(4) The F&E inspector must be aware that there are other methods of budgeting a unique facility for a specific site instead of changing the Call to include the facility. A VOT may be an example. Regional originated within-ceiling projects is one method. Another is including the facility/site as a Flight Standards budget submission and not a regional submission. Close

coordination is required with AFS-12 to determine the process and procedures for this type of situation. This is not a normal procedure for budgeting a facility and extensive justification may be required.

c. Changes to Other F&E Guidance. Washington level changes or Flight Procedure Branch proposed changes to other F&E guidance is required from time to time. The Technical Programs Division, AFS-400, is the designated office for receipt and coordination of these proposals.

(1) APS-1. Certain policy changes to APS-1 require public involvement and will be promulgated by rulemaking. Whenever possible, AFS-400 will coordinate with each region on these proposed changes prior to publication in the Federal Register.

(2) Regional Proposals. Proposed F&E policy and guidance changes should be forwarded from the Flight Standards Division to AFS-400. A staff study may or may not be required for the proposal. The detail of the submissions will depend upon the subject. Headquarters will evaluate the proposals. AFS-400 will return proposals when more detail and study are required.

(3) Headquarters Initiated Changes. Proposed F&E policy and guidance changes will be forwarded to the regions for coordination by AFS-400. If these types of changes arrive at the regions without proper headquarters coordination, AFS-400 must be notified immediately. The Flight Procedures Standards Branch, AFS-420, is the primary point of contact. F&E changes that alter the scope of national and regional Flight Standards responsibilities and involvement, without proper Headquarters coordination and concurrence, are unacceptable.

276. FLIGHT STANDARDS PROJECTS AND BUDGETING CONFLICTS. Flight Standards sponsored projects are as important as projects proposed by Airway Facilities and Air Traffic. Occasionally, project budgeting or budget reprogramming may result in conflicts between regional divisions.

a. Project Involvement. The FPB F&E inspector and the Flight Standards Division Manager must be assertive in the entire F&E process (from planning to installation) and, especially, in committee meetings where the major decisions are being made. Flight procedures requirements and operational safety projects require an active participation by Flight Standards personnel to assure appropriate distribution of the limited funding resources.

b. Conflicts. Where facility need is great and F&E funding limited, even some of the best working relationships can end in conflict. Common sense, tact, and compromise should always prevail. Conflicts should be resolved at the regional working level or branch manager level, whenever possible. When not possible, division level management resolutions may be required with the Regional Administrator as mediator. If required, conflicts may be elevated to the appropriate Associate Administrators for resolution.

277.-299. RESERVED.

SECTION 7. JOB TASK #10 - DEVELOP AIR NAVIGATION FACILITIES INPUT FOR FACILITIES AND EQUIPMENT (F&E) BUDGET (RESERVED) (TBD*)

*TBD=TO BE DEVELOPED

CHAPTER 5. OBSTRUCTION EVALUATION

SECTION 1. GENERAL

500. PURPOSE. In support of the regional flight procedures program, this chapter provides flight procedures inspectors with a detailed explanation of the FAA's Obstruction Evaluation (OE) program and prescribes the policies, criteria, and procedures applicable to accomplishing the OE responsibilities of the regional Flight Standards Division. Guidelines within this chapter will standardize the inspector's OE applications.

> **NOTE: This chapter discusses Obstruction Evaluations under FAR Part 77. Although FAR Part 121 operators are required by FAR Sections 121.97, 121.177, and 121.189 to perform a type of obstruction evaluation, this requirement is not directly associated with the FAA OE program discussed in this chapter.**

501. BACKGROUND. The Federal Aviation Act of 1958 (FA Act), and subsequent amendments, legislates the FAA's responsibility for maintaining a safe National Airspace System (NAS). One portion of this responsibility concerns Objects Affecting Navigable Airspace which is the title of FAR Part 77. Through this regulation and internal directives, the FAA complies with the FA Act and evaluates objects that may have an effect on navigable airspace.

a. OE Handbook. The primary FAA directive concerning the OE program is Order 7400.2, Procedures for Handling Airspace Matters, and specifically, Part 2 of the handbook, which has the same title as FAR Part 77, Objects Affecting Navigable Airspace. Also in the Handbook, Part 3, Airport Airspace Analysis, discusses on-airport construction that requires an obstruction evaluation.

b. OE Responsibilities. Handbook 7400.2 specifies that the OE program is administered by regional Air Traffic (AT) personnel. The System Management Branch, (regional 530 branch), with coordinated assistance from personnel in Airports, Airway Facilities (AF), and Flight Standards, accomplishes the OE tasks. The regional Flight Procedures Branch (FPB) is primarily responsible for accomplishing OE tasks of Handbook 7400.2 assigned to Flight Standards. Due to the large volume of proposals, obstruction evaluations can be the most time consuming task accomplished by the FPB.

502. STATUTORY BASIS FOR OBSTRUCTION EVALUATIONS. The FA Act of 1958 and the Airport and

Airway Improvement Act of 1982 form the primary basis for agency actions with respect to natural obstructions or man-made structures that may interfere with or be hazardous to air navigation and air commerce. The provisions and declarations in these public laws are implemented through Federal Aviation Regulations (FAR) and executed through the agency's obstruction evaluation program. The following are pertinent portions of these statutes concerning obstructions affecting navigable airspace and an explanation of the limitations imposed by the laws.

a. <u>FA ACT of 1958</u>.

(1) Section 104, Public-Right of Transit. Contains a recognition and declaration of the public right of freedom of transit through the navigable airspace of the United States.

(2) Section 307, Airspace Control and Facilities. Authorizes and directs the Administrator to develop plans for and formulate policy with respect to the use of the navigable airspace; and assign the use of the navigable airspace under such terms, conditions, and limitations as he may deem necessary in order to ensure the safety of aircraft and the efficient utilization of such airspace.

(3) Section 313, Other Powers and Duties of the Administrator. Empowers the Administrator to perform such acts, to conduct such investigations, to issue and amend such general or special rules, regulations and procedures, pursuant to and consistent with the provisions of the Act, as he shall deem necessary to carry out the provisions of, and to exercise and perform his powers and duties under the Act.

(4) Section 1001, Conduct of Proceedings. Authorizes the Administrator to conduct his proceedings in such a manner as will be conducive to the proper dispatch of business and to the ends of justice, subject to the provisions of the FA Act and the Administrative Procedures Act.

(5) Section 1101, Hazards to Air Commerce. Directs the Administrator to require all persons to give public notice of construction or alteration, or of the proposed construction or alteration, of any structure where notice will promote safety in air commerce.

b. <u>Airport and Airway Improvement Act of 1982</u>.

(1) Section 505, Airport Improvement Program. Authorizes the FAA, through the Secretary of the Department of Transportation, to make grants of funds for airport/heliport development and planning.

(2) Section 509, Submission and Approval of Project Grant Applications. Authorizes the establishment of standards for, among other

things, airport design and safety of approaches.

(3) Section 511, Project Sponsorship. Authorizes the requiring of assurances in writing that the aerial approaches to the airport will be adequately cleared and protected by removing, lowering, relocating, marking or lighting, or otherwise mitigating existing airport hazards and by preventing the establishment or creation of future airport hazards and the requiring of assurances in writing that appropriate action, including the adoption of zoning laws, has been or will be taken, to the extent reasonable, to restrict the use of land adjacent to or in the immediate vicinity of the airport to activities and purposes compatible with normal airport operation, including landing and takeoff of aircraft.

c. Court Decisions and the Statutes. Occasionally, the FAA is taken to federal court based on an individual OE case determination. The case is argued before a federal judge to determine if the FAA was "arbitrary and capricious" in its determination. The court will consider if the determination was based on internal FAA guidance, the FAR's, and the laws. A court's decision against the FAA normally will stress deficiencies in the FAA's internal guidance, procedures, or the FAR's, but may even further define the extent or limits of the law.

d. Overview of the Statutes. Many people mistakenly believe that the FAA has the authority to limit the height of structures or prohibit construction if it affects navigable airspace or air commerce. A review of the pertinent parts of the laws shows that there is no specific authorization for federal regulations which would limit structure heights, prohibit construction, or even require structures to be obstruction marked and lighted. Congress chose to withhold that authority. Since this authority would involve federal zoning regulations and due process actions, including the taking of property and the paying of compensation, the statutes left the matter in the hands of the land owners and state and local authorities.

(1) The FAA's obstruction evaluation program is to a great extent dependent upon the cooperation of construction sponsors, zoning authorities, government agencies, and others who have a function or responsibility relating to planning, approving, or constructing buildings and other structures. Much of the program's success is traceable to the efforts of persons engaged in these activities to conform to the FAA obstruction standards at the outset of construction planning.

(2) No judicial decision has been issued on the extent to which ground structures may constitute an unlawful interference with the public freedom of transit through the navigable airspace recognized in the FA Act. Until au-

thoritative guidance is received or express legislative authority is conferred on that point, the agency actions in the field of ground hazards to air navigation will be limited to the areas presently covered in FAR Part 77.

503. REGULATORY BASIS FOR OBSTRUCTION EVALUATIONS. By adoption of FAR Part 77, the Administrator implemented the provision of the FA Act to accomplish the following: 1. Require all persons to give public notice of proposed construction or alteration of any structure where notice will promote safety in air commerce; and 2. Provide the agency with the means of exercising the powers and authority vested in him with respect to actions related thereto to ensure the safety of aircraft and the efficient utilization of navigable airspace.

a. Measures Adopted.

(1) Establishing requirements and standards for notice to the Administrator of proposed construction or alteration.

(2) Establishing standards for determining obstructions to air navigation.

(3) Providing for aeronautical studies of obstructions to air navigation to determine their effect on the safe and efficient use of airspace.

(4) Providing for public hearings and other review on the hazardous effect of proposed construction or alteration on air navigation.

(5) Publishing recommendations for the marking and lighting of obstructions to air navigation.

b. Notice Requirements. The requirements for giving notice to the Administrator of proposed construction or alteration appear in Subpart B of FAR Part 77. The requirements for notice are authoritative and there is a penalty, as specified on FAA Form 7460-1, Notice of Proposed Construction or Alteration, for failure to comply.

(1) Notice standards are established to provide construction sponsors with guidelines for determining whether their construction or alteration requires notice to the FAA. Since the standards are used principally by the non-aeronautically orientated public, they are designed to be simple and easy to apply. To determine if notice is required a person needs only to know if the overall height of the proposed structure at its site would exceed 200 feet above ground, and if less than 200 feet, whether the structure will exceed an airport slope of 100 to 1, 50 to 1, or 25 to 1. The guidelines are specified in the notice standards and in Advisory Circular 70/7460-2, Proposed Construction or Alteration of Objects That May Affect the Navigable Airspace, and are applied to the nearest airport/heliport listed in the

Airport/Facility Directory and appropriate Alaska and Pacific supplements.

(2) Some notices submitted to the FAA do not actually exceed the FAR standards for giving notice. However, since the notice standards do not cover all possibilities which might be of interest to the FAA, normally all notices received are processed for evaluation.

c. Obstruction Standards. Standards for determining obstructions to air navigation appear in Subpart C of Part 77.

(1) The regulations state that only public use airports, planned public use airports, and military airports are afforded protection under FAR Part 77.

(2) The obstruction standards are different than those for giving notice. In most, BUT NOT ALL cases, the obstruction standards are less restrictive than the notice requirements. An exception is the construction of an obstruction under 200 feet AGL and below the 100 to 1 surface, which will have an effect on an instrument approach minimum altitude, thus exceeding FAR Part 77.23(a)(3).

(3) The obstruction standards have several functions, the most important is to identify ground structures that could affect air navigation. If a proposed obstacle does not penetrate one of these established obstruction standards, then it is not an obstruction to air navigation. FAA requests for public comment on proposals and the petitioning process for determinations are only for those proposed structures that exceed an obstruction standard.

(4) If a proposed obstacle penetrates one of these established obstruction standards, then by definition, it is an obstruction to air navigation.

(a) Some of the FAR Part 77 obstruction standards are relatively simple numerical standards associated with the common airspace requirements of airports, heliports, and seaplane bases. Known as Civil Airport Imaginary Surfaces or "Part 77 Surfaces", they are similar to the notice standards with specific values assigned to all surfaces. These standards indirectly serve as guidelines in airport design and in airport zoning. It is these standards that protect the airspace needed in aeronautical operations from intrusion by obstructions.

(b) Other portions of FAR Part 77 obstruction standards are the relatively complex standards associated with the airspace requirements of airways, off-airway routes, all terminal operations and procedures, and VFR operations. These standards, although referred to in the FAR's, are defined in appropriate FAA directives.

(c) In addition to being used to identify obstructions, obstruction standards are used in administering the Airport Improvement Program (AIP), developing technical standards and guidance in the design and construction of airports/heliports, deciding which structures should be marked and lighted, and determining which obstructions should be depicted on aeronautical charts to warn pilots of their presence.

(d) All structures which exceed FAA obstruction standards are obstructions. These obstructions may or may not be hazards to air navigation. An aeronautical study is used to determine if an obstruction is or is not a hazard.

d. <u>The Aeronautical Study</u>. "Aeronautical Study" is the name given to the procedures established in Subpart D of FAR Part 77 for studying and evaluating proposed structures affecting navigable airspace. These procedures provide the forum and the means by which the agency gives full and equal consideration to the interests of the construction sponsor and to the public interest of safe air commerce and the efficient use of navigable airspace.

(1) The aeronautical studies are fact-finding in nature. Therefore, those considerations given significant weight in the studies are those based on fact. Suppositions, guesses, opinions, and other intangible matters, although considered, are given little weight.

(2) All obstructions are presumed to be hazards until the aeronautical study determines otherwise. The aeronautical study evaluates such factors as the number of aircraft operations, aircraft operational capabilities, electronic and procedural requirements, and airport/heliport standards.

(3) When deemed necessary by the FAA to gather facts, an informal airspace meeting of aeronautical persons/organizations may be convened. Effects on future aeronautical operations and procedures may be considered. Plans for such future operations and procedures may either be known by the FAA, on file with the FAA, or surface as a result of the OE process.

(4) When substantial argument against or objection to the proposal is received or the agency's own evaluation shows substantial adverse effects, a meeting may be held with the construction sponsor to explore possible changes in the construction proposal that would eliminate or alleviate the conflicting demands for airspace.

e. <u>Determinations</u>. Whereas there are standards with specific, assigned values for giving notice and for identifying obstructions, there are no similar criteria-type standards established for determining hazards to air navigation.

(1) In the absence of established standards for determining hazards, each determination represents a judgement decision based on the best factual information that can be obtained during an aeronautical study of the effects of the proposed structure upon the safe, efficient utilization of navigable airspace and on air navigation facilities.

(2) When the total adverse effect is found to be substantial, the proposed structure is determined to be a hazard; otherwise, it is determined to be no hazard. Thus, a determination is made only after a full and complete study has been conducted and all facts relevant to the structure's effect on aviation have been thoroughly evaluated. The determination is given to the construction sponsor and copies are distributed to all known interested parties.

f. <u>Reviews</u>. An aeronautical study may continue beyond the issuance of an initial determination because Subpart D of FAR Part 77 provides for review of these determinations.

(1) The sponsor of any proposed construction, any person who stated a substantial aeronautical objection to it in an aeronautical study, or any person who has a substantial aeronautical objection to it but was not given an opportunity to so state, may, within 30 days after issuance of a determination, petition the Administrator for a review. If there are valid grounds for a review, the petition is granted and a review is conducted.

(2) FAR Part 77 procedures provide that a review may be on the basis of either written materials or a public hearing. A review on the basis of written materials is, essentially, a review of the case records whereas a review on the basis of a public hearing involves additional fact-finding. In either case, the objective of any review is the same as in the preliminary study, that is to determine the effect of the proposed construction on the operation of air navigation facilities and the safe and efficient use of navigable airspace. Final determinations are issued at the close of a review and copies are provided to all interested parties.

(3) Final determinations are advisory opinions issued to all concerned parties. The determination is relative to the agency's finding on the hazardous effect of the proposed construction on air navigation.

g. <u>Overview of the Regulations</u>. By requiring notice prior to construction for structures that may affect air navigation, the FAA is given an opportunity to study, evaluate, and resolve problems that could be caused by the construction of the structure. The FAA's role as the airspace use expert, coordinator, and arbitrator is effective and the integrity of the navigable airspace is maintained at a high level. The obstruction evaluation program and the issuance of hazard or no hazard determinations have proven to be an effective method of dealing with ground structures over which the agency actually has no authoritative control.

(1) A determination of "no hazard" specifically means that the obstruction would not have a substantial adverse effect on air navigation as determined by the FAA's aeronautical study. This determination does not necessarily mean that the obstruction, when built, has no effect on operational and instrument procedures. Consequently, when the sponsor is notified of the determination by the region, FAR Part 77 requires supplemental notices by the sponsor to the FAA prior to beginning actual construction and prior to the structure reaching its greatest height. These notices are required to insure timely completion of FAA actions needed for maintaining safe aeronautical operations.

(2) Of the thousands of cases studied in the OE program, few structures have been constructed after the FAA determined the proposal to be hazardous. When a structure is built against the FAA's advice that it would be a hazard to air navigation, the agency takes appropriate action to ensure continued safety of aircraft operations and procedures. That action may be to increase an established minimum instrument flight altitude, modify an established instrument approach procedure, require a restriction on instrument departures, or other necessary adjustment of procedures or operations to maintain an acceptable level of safety. In addition, appropriate cautionary notices and information may be published on aeronautical charts and in other publications to warn pilots of the hazardous condition.

(3) Even though the FAA has no legal or regulatory authority to restrict construction of hazardous structures, the FAA determination does directly and indirectly affect a proponent's decision to build such structures.

(a) When a structure is under the control of an airport authority having a grant agreement with the FAA under the provisions of the Airport and Airway Improvement Act, penalties may be imposed or federal funds for airport improvement withheld pending compliance with agreements for keeping airport approaches clear of hazards. These actions by the FAA will pressure the airport authority to take whatever steps that are necessary to mitigate the hazardous structures.

(b) The Federal Communications Commission (FCC) has licensing authority concerning proposed construction of radio, television, microwave relay, or other broadcasting facilities and also issues construction permits for the appropriate structures. The FCC requires an FAA determination and agrees that structures hazardous to air navigation should not be built or operated.

(c) Insurability and associated costs may be a deterrent to construction. The FAA has no control over insurance rates; however, extremely high operating costs and the legal responsibilities associated with these types of structures are a deterrent to construction.

504. OTHER CONSIDERATIONS CONCERNING THE STATUTES AND THE REGULATIONS. Congress has established the laws and the FAA has issued the FAR. The procedures for accomplishing the OE program are incorporated in the FAA's internal orders. The OE program is an integral part of and interrelated with nearly everything for which the FAA has responsibility. This includes the AIP program, the Airspace program, obstacle clearance requirements, capacity restriction problems, aircraft safety, aircraft performance, protecting navigable airspace, and promoting air commerce.

a. Past Benefits. Administration of the OE program has required the FAA to take action in related areas of responsibility to provide broad guidance imposed by the statutes. The following are examples and situations relative to obstruction evaluations.

(1) Airport/Heliport Design Standards. The FAA has the responsibility to develop airport/heliport design standards. Such standards are normally issued in the form of advisory circulars.

(a) Advisory circulars on airport/heliport design define criteria which the airport/heliport owner may use to ensure protection of the airspace needed for the airport/heliport now and in the future. The FAA coordinates these standards with the international community through the International Civil Aviation Organization (ICAO).

(b) The airport/heliport design criteria emphasize runway obstacle protection especially in the innermost portion of the approach and departure areas. Local agencies are required to adopt these criteria if the airport/-heliport is developed under the Airport Improvement Program (AIP). The intent of the criteria, especially in conjunction with AIP funds, is that obstructions near the airport/-heliport will be prevented.

(c) Airport management prepares an approach and clear zone plan in accordance with obstruction standards in FAR Part 77. Such a plan outlines the area surrounding an airport/heliport to be protected from tall structures or other objects. More detailed information on the imaginary surfaces can be found in FAR Part 77 and Order 7400.2. These imaginary surfaces are important because the underlying area determines the boundaries for land use planning for the airport.

(d) Airport management is responsible for ensuring that the height restriction ordinances adopted by the local jurisdiction is in agreement with the FAR Part 77 imaginary surfaces. Thus, if an airport owner wishes to protect the airport from obstructions, close coordination is required with the local zoning jurisdiction to assure that a local height restriction ordinance is adopted and enforced. AC 150/5190-4, A Model Zoning Ordinance to Limit Heights of Objects Around Airports, dated 1988, provides model ordinances for different types of airports.

(2) Obstruction Marking and Lighting. The statutes do not contain a basis for the mandatory marking and lighting of structures to warn pilots of their presence. Therefore, guidelines on how to mark and light structures to provide the minimum necessary conspicuity have been provided in AC 70/7460-1, Obstruction Marking and Lighting. The basis is contained in FAR 77.11(b)(3). After an aeronautical study is completed and the FAA recommends that the structure be obstruction marked and lighted, the public can use the AC for FAA's recommended standard. The AC is free of charge.

(a) While compliance with the standards in AC 70/7460-1 for marking and lighting of obstructions is not mandatory, it is usually to the mutual benefit of both the property owners and aeronautical interests. As an example, noncompliance could mean the determination the FAA has issued is now invalid. In total, the vast majority of obstructions to air navigation are marked and lighted, including all radio and television transmitting towers over which the FCC has authority and requires compliance when it is a condition of an OE determination of "no hazard".

(b) In certain situations, less than minimum marking and lighting, as defined by the AC, may be found acceptable but only after a special aeronautical study has been made to determine that such action would not result in the creation of a hazard to air navigation.

(3) Aeronautical Study of Existing Obstacles. Aeronautical studies of existing objects are conducted under the authority of Sections 307(a) and 313(a) of the FA Act of 1958, as amended. A notice received under FAR Part 77 for proposed construction or alteration that has already been started is considered an existing object.

(a) As a practical matter, there are few differences between the way an existing obstacle is studied and the way a proposed obstacle is evaluated. The differences lie in how the case is administratively handled.

(b) Determinations or recommendations concerning existing objects are not subject to review under the provisions of FAR Part 77. Petitions or requests for review are granted or denied at the discretion of the Regional Administrator. Should a review be granted, it is processed outside the regulatory framework of FAR Part 77.

b. Section Summary. This section of the handbook covers the underlying laws, in association with the FAR, dealing with objects affecting navigable airspace. Pertinent points must be emphasized and are listed below.

(1) While the FAA has no authority to deny or restrict construction or alteration of any ground structures, the FAA does have the authority to require prior notification for the construction or alteration of structures. Notification standards are specified in FAR Section 77.13.

(2) The FAA has established standards for determining obstructions to air navigation. These standards are specified in FAR Part 77, Subpart C.

(3) Obstructions to air navigation may or may not be determined to be hazardous.

(4) The FAA conducts aeronautical studies on the proposed construction or alteration of structures to determine the effects upon the operation of air navigation facilities and the safe and efficient utilization of navigable airspace.

(5) Upon completion of the aeronautical study, the FAA issues a determination of hazard or no hazard.

(6) For a hazard determination, the aeronautical study must find that the construction would have a SUBSTANTIAL ADVERSE EFFECT on the safe and efficient utilization of the navigable airspace or on the operation of air navigation facilities.

(7) The FAA has no authority to require obstructions to be marked and lighted. However, FAA recommends obstruction marking and lighting as provided in AC 70/7460-1.

c. Changes. Congress has and will change the laws and the FAA will update the FAR in response to changing legislative, judicial, and executive dictates. New technologies and airport capacity enhancements will also require changes to the FAR and the FAA's internal directives. Changes will directly or indirectly effect the region's OE program.

505.-519. RESERVED.

SECTION 2. REGIONAL OBSTRUCTION EVALUATION PROGRAM

520. GENERAL. This section provides an overview of the regional OE program with emphasis on Flight Standards duties, responsibilities, and policies.

> **NOTE: Because an obstruction evaluation on a proposed or existing structure are essentially the same, the remainder of this chapter will refer to all OE cases as if they were proposals. In this manner, qualifying statements such as "The structure will affect, or if existing, does affect . . ." will not be necessary. Only when emphasis or qualifiers are required will proposed and existing structures be separately addressed.**

521. ORDER 7400.2, PROCEDURES FOR HANDLING AIRSPACE MATTERS. As stated in Section 1, paragraph 501a, the primary FAA directive concerning the OE program is Order 7400.2 and specifically, Part 2 of the handbook which has the same title as FAR Part 77, Objects Affecting Navigable Airspace.

a. Basic Policies Outlined in Order 7400.2. Part 2 of this order primarily addresses the mechanics of administrating the regional OE program for Air Traffic personnel. However, scattered throughout the six chapters are significant FAA policies, criteria, and guidelines which are applicable to Flight Standards.

(1) The obstruction standards apply to existing and proposed man-made objects including mobile objects, objects of natural growth, and terrain. (Paragraph 4-4.)

(2) The FAA's prime objective in administering the OE program is to ensure the safety of aircraft and efficient utilization of navigable airspace by aircraft. (Paragraph 4-5.)

(3) The FAA recognizes there are varied interests for the use of the nation's airspace. When airspace use conflicts arise, the FAA emphasizes the need for conserving the navigable airspace, preserving the integrity of the national airport system, and protecting air navigation facilities from either electromagnetic or physical encroachments which would preclude them from performing their operational functions. (Paragraph 4-5.)

(4) Each of the four regional operational divisions shall review all notices of proposed construction or alteration received. (Paragraph 4-6b.)

(a) A no hazard acknowledgment or determination shall be issued only after all operating divisions agree that the proposal will not create a hazard to air navigation. This is true whether notice criteria were exceeded or not. (Paragraph 4-6b.)

(b) Should there be a disagreement between the operational divisions in the airspace findings, the disagreement shall be resolved before issuance of the official FAA determination. (Paragraph 8-2.)

(5) Objects that exceed the standards of FAR Part 77, Subpart C, are presumed to be hazards to air navigation unless an aeronautical study determines otherwise. (Paragraph 7-1b.)

(a) Once an aeronautical study has been initiated, other standards in addition to those in FAR Part 77, Subpart C, shall be used to determine if the object being studied would actually be a hazard to air navigation. The additional standards used are those established by the FAA to satisfy operational, procedural, and electronic requirements. (Paragraph 7-1b.)

(b) A proposed structure which would exceed a height of 2000 feet above ground level will be presumed to be a hazard (have a substantial adverse effect upon the safe and efficient use of navigable airspace) unless the sponsor, at the time of filing, makes a clear and compelling case to the contrary. (Paragraph 4-11.)

(6) An adverse aeronautical effect occurs when an object: exceeds the obstruction standards of FAR Part 77, Subpart C (includes by reference, the TERPS surfaces); derogates airport capacity/efficiency; or is found to have an adverse physical effect (for example, signal blockage or reflection) or is found to have an electromagnetic radiation effect (for example, signal interference) on the operation of air navigation facilities. To be a SUBSTANTIAL ADVERSE EFFECT, a significant volume of aeronautical operations would be affected. (Paragraph 7-3 & 7-4.)

(7) Evidence of adverse effect is not sufficient justification for a determination of hazard. However, a finding of a SUBSTANTIAL physical or electromagnetic adverse effect normally requires issuance of a determination of hazard. (Paragraph 8-2.)

(8) Throughout Part 2 of Order 7400.2, guidance, policies, and procedures are provided for a multitude of OE subjects. Examples are: shielding, antenna farms, airport imaginary surfaces, distribution of 7460 series forms, multiple applicants for a single site, multiple sites, multiple structures, negotiations, airspace meetings, structures under the jurisdiction of the FCC, National Ocean Service (NOS) involvement, agricultural

aircraft operations, temporary construction, existing objects, petitioned reviews, sensitive cases, and marking and lighting. Flight Standards inspectors may or may not be involved with every aspect of OE cases but must be familiar with the entire OE program and the contents of Order 7400.2.

b. 7460 Series Forms Used in the Regional OE Program. Examples of completed 7460 series forms normally used by the OE inspector are included as Flight Standards figures at the end of the section (completed examples are not included in Order 7400.2). Although these completed forms contain actual OE cases, they are representative only and may not be entirely correct or conform to current AT guidance for proper completion of the forms.

(1) FAA Form 7460-1, Notice of Proposed Construction or Alteration. See figure 5-1. This is the form that is completed by the construction proponent and forwarded to the FAA. The bottom of this form may be used by AT to acknowledge receipt of the proposal in lieu of FAA Form 7460-7 listed below.

(2) FAA Form 7460-2, Notice of Actual Construction or Alteration. See figure 5-2. This form is forwarded to AT prior to actual construction. Distribution is then made to interested offices.

(3) FAA Form 7460-5, Obstruction Evaluation Log. This OE log form is normally used by AT. It may be used by the other operational divisions to log OE cases.

(4) FAA Form 7460-6, Obstruction Evaluation Worksheet. This form is primarily used by AT when evaluating proposals applicable to FAR Part 77 criteria: notice criteria, obstruction standards, and airport imaginary surfaces.

(5) FAA Form 7460-7, Acknowledgment of Notice of Proposed Construction or Alteration. See figure 5-3. This form may be used by AT to acknowledge the original proposal sent by the proponent. It also states that an internal FAA study was conducted to determine if the proposal would be an obstruction, if marking and lighting is required, and if supplemental notice is required. Appropriate blocks are established to show the result of the FAA study. If further aeronautical study is necessary, the block is checked stating the proposal is presumed to be a hazard pending completion of further study.

(6) FAA Form 7460-8, Aeronautical Study of Proposed Construction or Alteration. See figure 5-4. This form is completed and distributed by AT to invite public comment on the proposal when an aeronautical study is initiated.

(7) FAA Form 7460-9, Determination of No Hazard to Air Navigation. See figure 5-5. This form is completed and distributed by AT when the aeronautical study determined

that the proposal would not be a hazard to air navigation.

(8) FAA Form 7460-10, Determination of Hazard to Air Navigation. See figure 5-6. This form is completed and distributed by AT when the aeronautical study determined that the proposal would be a hazard to air navigation.

(9) FAA Form 7460-11, Project Status Request. This form is sent to the proponent by AT for no hazard determinations when a notice of start of construction by the proponent is required and the notice has not been received by the FAA within a reasonable time frame.

c. Dates and Time Limits. FAR Part 77 and Order 7400.2 establish effective/expiration dates and time limits in relation to the OE process. A brief list of the important dates and time limits are included in this handbook without the detailed circumstances and exceptions included.

(1) A proponent must file a notice of proposed construction or alteration 30 days prior to beginning construction or prior to filing for a construction permit.

(2) Although no FAA notice response time is specified, the FAR's 30 day limit required for the notice allows construction to begin after 30 days.

(3) When requested, supplemental notice is required 48 hours prior to the start of construction and 5 days after the construction reaches it greatest height.

(4) Normally, for circularized OE proposals, 30 days are established as a comment period for response by interested persons.

(5) For petition of an OE determination, 30 days are provided following the issuance of the determination.

(6) The effective date (date determination becomes final if not petitioned) of both hazard and no hazard determinations is 40 days after the issuance date.

(7) Occasionally, a determination will be corrected based on new or updated information. Corrected determinations are effective upon issuance, except that in no case will the effective date be prior to the effective date of the original determination.

(8) Determinations on existing objects are effective upon issuance and do not have expiration dates.

(9) Due to the ever changing aeronautical environment, no hazard determinations have an expiration date. This expiration date is 18 months from the effective date of the determination.

(10) If a petition for review is filed, the re-

gional determination is not final until the petition is resolved. If the effective date of a final determination is changed as a result of a petition or review, the expiration of the determination is adjusted accordingly.

(11) For proposed structures coming under the jurisdiction of the licensing authority of the FCC, the expiration date for a no hazard determination is 6 months from the effective date unless the sponsor makes application to the FCC for a construction permit. For timely FCC application and permit approval, the expiration date is the expiration date specified in the FCC construction permit.

522. THE REGIONAL OE PROCESS. Although Order 7400.2 establishes the policies and procedures of the regional OE program, an adequate insight into the actual process for handling cases is not detailed. Also, each region may handle the OE process somewhat differently. An attempt is made in this paragraph to provide the inspector with the basic, but typical, processes of a regional OE program. OE processing explanations are provided only when they directly affect Flight Standards responsibilities and involvement in the program.

a. AT Receipt of Notice. FAR Section 77.17 requires that construction or alteration proposals be submitted to the Air Traffic Division of the FAA region having jurisdiction over the location of the structure.

(1) Air Traffic is the central control and "primary" for administration of the regional OE program. AT responsibilities include receiving notices, responding to the proponent, initiating aeronautical studies, negotiating with the sponsor, issuing determinations, and specifying marking and lighting provisions.

(2) On receipt of the notice of proposed construction or alteration (FAA Form 7460-1), an AT OE specialist assigns an aeronautical study number, verifies information, and determines if notice is required as specified under FAR Sections 77.13 and 77.15. Normally, these actions can be accomplished in a relatively short period of time, providing the information on the form is complete and accurate.

(3) Plotting the proposal on a sectional chart, 7 1/2-minute quadrangle chart (referred to as a quad chart), and/or an obstruction chart (OC) is normally accomplished or is provided by the proponent.

(4) The AT specialist may discuss the case with the proponent if problems were found on the FAA Form 7460-1 or if the proponent hand-carries the form or additional material to the region.

b. Coordination. Coordination is normally accomplished by exchanges of paper, use of the computer, or a combination of both.

(1) AT will input the case into the OE automation program and/or forward the 7460-1 to the other operational divisions. Accompanying the 7460-1 may be other aids to the evaluation such as a copy of the quad or sectional chart depicting the proposed site, proponents drawings, AT worksheet, etc. For all operating divisions and especially for the FPB, an accompanying chart is a useful tool.

(2) If the proposal is near a military airport/heliport, military training route, etc., AT will coordinate with the military representative. Some regions coordinate all 7460-1's with the military.

(3) AT may coordinate with other entities such as state & local aviation organizations.

c. Evaluations. The operational divisions, including AT, complete their evaluations. Many regions have a staggering OE workload. The larger regions handle 2000 or more OE cases a year. With this workload and limited resources, only the most controversial cases will have Flight Standards involvement beyond the initial response. Therefore, the inspector should assure that all appropriate Flight Standards references in the original response to AT are technically accurate because the final determination will likely contain this wording. (A brief review of the evaluation responsibilities for AT, AF, and Airports are included, but Flight Standards responsibilities are more detailed.)

(1) Air Traffic.

(a) Studies the structure's effect on aeronautical operations, air traffic control procedures, and airport/heliport traffic patterns.

(b) Coordinates with the other divisions on the problems and results of the study.

(2) Airway Facilities. AF evaluates the potential physical or electromagnetic effect of proposals on air navigation and communications facilities and ATC tower line-of-sight requirements.

(3) Airports. Airports provides input concerning existing and planned airports/heliports including potential restrictions and impacts on airport operations, capacity, efficiency, and development.

(4) Flight Standards. As stated in 7400.2, Paragraph 4-23a(3) Responsibilities - Screening of Notice, Flight Standards primarily has the responsibility for FAR Sections 77.23(a)(3) and 77.23(a)(4). Paraphrased, these FAR sections state that an object is an obstruction to air navigation if it creates less than the required obstacle clearance within a terminal or en route obstacle clearance area. In conjunction with FAR

references, Flight Standards' responsibilities also include the effect of a proposal on IFR and VFR operations. (Paragraph 4-31d.)

(a) VFR Traffic. Determine the effect upon VFR routes, airport and terminal operations, or other concentrations of VFR traffic. (Paragraph 5-11b(1).)

(b) Terminal Area IFR Operations. Determine the effect upon terminal area IFR operations including transitions, feeder routes, radar vectoring, holding, Standard Terminal Arrival Routes (STAR), and Standard Instrument Departures (SID). (Paragraphs 5-11b(2), 7-2c.)

(c) Instrument Approach/Departure Procedures. Determine the effect upon any segment of a standard/-military/special instrument approach procedure including approach light systems. Evaluate both existing and proposed procedures. Determine the effect upon departure procedures. (Paragraphs 4-31c, 5-11b(2), 7-2c.)

(d) En Route IFR Operations. Determine the effect upon Minimum En Route Altitudes (MEA), Minimum Obstacle Clearance Altitudes (MOCA), Minimum Crossing Altitudes (MCA), Minimum Holding Altitudes (MHA), and turning areas. (Paragraphs 5-11b(3), 7-33a.)

(e) Flight Standards/Aviation Standards Coordination. When required, consult with the Flight Standards District Office (FSDO) and Flight Inspection Area Office (FIAO). (Paragraphs 7-32, 8-2.)

(f) Airway Facilities Coordination. In coordination with AF, evaluate the effect of possible navaid interference and reduced performance on the appropriate instrument flight procedure and flight inspection requirements. (Paragraphs 4-31c, 5-2, 5-11, 5-11b(4).)

(g) Airports Coordination. In coordination with Airports, evaluate whether the penetration of a FAR Part 77 surface creates an unacceptable safety risk. Also, provide input concerning the TERPS surface penetrations and the special CAT II obstacle clearance surfaces if applicable, which are associated with future instrument approaches and planned or programmed changes at the airfield. (Paragraphs 4-31b, 5-2, 5-11.)

(h) Air Traffic Coordination. In coordination with AT, evaluate the possible effect on AT operations and aircraft operations in association with AT procedures; for example, MOCA increase within 25 statute miles of a facility, loss of cardinal altitude, added departure restriction on a SID, etc. (Paragraphs 5-11, 7-33b.)

(i) AC 70/7460-1, Obstruction Marking and Lighting. Based on the criteria provided in the AC and when requested by AT, evaluate whether obstruction marking and lighting is necessary and to what extent. Evaluate modifications and deviations specifically proposed by the sponsor. (Paragraphs 9-3, 9-20.)

(j) Adjustments. If the structure will have an adverse effect on an instrument flight procedure, determine procedural and structural adjustments that can be made to eliminate or mitigate the adverse effects. Some procedural changes may require an environmental assessment and environmental impact statement. (Paragraphs 5-11b(5), 7-34a.)

(k) Response. If the proposed construction or alteration will have an adverse effect on VFR or IFR aircraft operations, procedures, or minimum IFR flight altitudes, the Flight Standards evaluation should clearly state the extent of these effects. (Paragraphs 4-23b, 7-3.)

d. Responses. Because a proponent may begin construction 30 days after filing the 7460-1, a timely response to AT is expected from all evaluators.

(1) Certain cases may be very complicated and time consuming for the FPB OE inspector. AT should be notified if a specific case will have an abnormally long response time.

(2) The inspector should assure that the original response to AT is technically accurate because the final determination will likely contain the effects as submitted.

e. Acknowledgements. AT responds back to the proponent. This is called an acknowledgement but may actually be a final determination. If the internal FAA study (responses from evaluators) definitely shows the proposal will not be a hazard, the FAA acknowledgement to the proponent is the final determination. Some of the OE cases processed in the region are completed and closed out within 30 days.

(1) If a proposed obstruction is determined to be a hazard, the AT OE specialist will contact the proponent to determine if the structure can be moved or lowered. Some adjustments may be possible so that a hazard determination is not issued. This is accomplished through negotiation with the proponent.

(2) When requested, the FPB will be involved in these negotiations. A no exceed height (NEH) is very important. NEH is an example of the Order 7400.2 requirement for possible structure adjustments. Structure movement and possible procedure adjustments can be discussed at the negotiations.

NOTE: Order 7400.2 uses terms such as a study, preliminary study, internal FAA study, and aeronautical study. To preclude any possi-

ble confusion, Flight Standards personnel normally accomplish only one study. The intent of the FAR and Order 7400.2 requiring an aeronautical study is met when the inspector accomplishes the Flight Standards portion of the study and responds to AT. However, the Flight Standards responsibility to the individual OE case is not complete until a final determination is issued. A decision to circularize a case for public comment may require additional inspector responses or involvement.

f. Circularization. An opportunity to participate in the study input may be made known to the aeronautical community through circularization. When AT decides to distribute a public notice to conduct a full aeronautical study, AT will circularize the FAA Form 7460-8, containing a graphic of the proposal's location. Order 7400.2 contains policy examples when circularization is required and when not required.

(1) The effects on aeronautical operations, as denoted from the responses of the operational divisions, are included.

(2) The FPB will receive a copy of the FAA Form 7460-8.

(3) The OE inspector may want to recheck all calculations on the original response. The inspector may contact Flight Standards/Aviation Standards field offices (FSDO or FIAO) concerning all aspects of the individual case. The volume of air traffic concerning a specific operational effect may be supplied by the FSDO and new aeronautical effects may also be furnished. The FIAO may provide additional TERPS effects or flight inspection information. The comment period on the circularization gives the OE inspector time to reevaluate and consolidate all Flight Standards comments. A second response to AT (whether formal or informal) may be appropriate. If there is a reversal of the Flight Standards objection or no objection on the original response, a written second response is preferred.

(4) Although relatively rare because of the large volume of OE cases processed each year, an informal airspace meeting may be convened by AT to gather additional facts and information. Flight Standards participation may be requested.

g. OE Determinations. Based on the aeronautical study results, AT will complete the appropriate determination form. The determination will list all factors considered in reaching the final FAA conclusion. All timely and appropriate public comments will be detailed.

(1) AT may request additional information and justification from the OE inspector on the case's aeronautical effects based on the Flight Standards response and other comments received.

(2) Prior to issuing a final determination, AT may again attempt to negotiate with the proponent for lowering or moving the structure. Flight Standards participation may be requested.

(3) Before issuing the final FAA determination, AT may discuss the specifics of the case with the OE inspector and representatives from the other operational services. A meeting may be held. These discussions may include the proper phrases and terms that should be used in the determination. For no hazard determinations, any service originally objecting to the proposal must agree to the final decision.

(4) Final no hazard determinations are important to the OE inspector especially when instrument procedure adjustments are required. However, construction notices may be more important because required procedure adjustments may need immediate action.

(5) Generally, the OE no hazard determination and construction notice forms will be the only indication of a negotiated reduction in the proposed structure's height or negotiated movement of the structure.

h. Reviews. The sponsor or other interested parties may petition any determination, whether hazard or no hazard, for review by Washington Headquarters. See Section 5 of this chapter for headquarters reviews.

NOTE: The following paragraphs will list general Flight Standards policies on the OE program. Some application policies or examples may be included as a continuation of a general policy. Specific evaluation and criteria application policies will be discussed in the following sections of this chapter.

523. PRESERVATION OF NAVIGABLE AIRSPACE. Navigable Airspace is defined in FAR Part 1 and that definition is included in Chapter 1. Navigable Airspace is airspace at and above minimum flight altitudes including airspace needed for safe takeoff and landing.

a. In order to maintain an acceptable level of safety, aircraft require a buffer between operational altitudes and objects. When considering proposed structures, the buffer may be achieved by limiting aircraft operations, by limiting the location and height of these objects, or by a combination of these factors.

b. The inspector should understand that navigable airspace is a limited national resource. Congress has charged the FAA to administer this airspace in the public interest and to ensure the safe and efficient utilization of such airspace. Full consideration shall be given to the requirements of national defense, of commercial and general aviation, and to the public right of freedom of transit through the airspace.

c. Once airspace is allotted to ground structures, it is considered not retrievable for aircraft use. The inspector must be accurate in the evaluation to prevent inadvertent loss of airspace.

d. While a sincere effort shall be made to negotiate equitable solutions to conflicts over airspace use, preservation of the navigable airspace for aviation must receive primary emphasis.

524. STANDARDS OF THE OTHER OPERATIONAL SERVICES. Flight Standards supports the standards, and the operational decisions based on the standards, of the other operational services.

a. As stated in the first chapter of this handbook, the standards and criteria of each operational service compliment, and in some cases even duplicate, the standards of other operational services. Even with the areas of responsibility defined in Order 7400.2, gray areas may still exist concerning who makes the final determination on a specific standard.

b. Flight Standards is not concerned about who applies the standards. Flight Standards is definitely concerned that the standards shall apply and that the defined levels of safety are maintained.

525. DIVISION OF RESPONSIBILITIES. Flight Standards accepts and supports the division of responsibilities concerning obstruction evaluations as defined in Order 7400.2.

a. Because of the overlap in areas of responsibility, the other operational divisions should closely coordinate with the FPB OE inspector concerning problem areas that may fall under Flight Standards jurisdiction.

b. In addition, the OE inspector's evaluation is based on detailed knowledge of the geographic area of concern and the availability of other division's documents that may affect Flight Standards responsibilities. Consequently, the other operational divisions must assure the tools and information needed by Flight Standards are supplied. Examples are proposed nonfederal facility locations from Airway Facilities or runway construction projects from Airports.

c. Many regions have interdivisional agreements designating one office to be responsible for a specific element of the evaluation but not necessarily as defined in Order 7400.2. When other services accomplish evaluations that are Flight Standards responsibilities, the OE inspector should be available for telephone conferences and to answer questions. Flight Standards may support these local agreements, especially if the evaluation process can be expedited. An example is the local AT facility evaluating minimum vectoring altitude (MVA) effects.

d. Flight Standards expertise is occasionally requested concerning the safety aspects of certain proposed obstruction effects in relation to another service's standards. Based on the specific OE case, the OE inspector should candidly discuss the operational aspects of the effects. The inspector should not attempt to limit or define another service's standard, but should discuss criteria interrelationships as they pertain to safety. Stated differently, the OE inspector is NOT responsible for trying to determine "how safe is safe enough" for another service's standards. The inspector should stress compliance to ALL standards.

526. RELEASE OF INFORMATION. Requests from the public for access to or copies of information contained in OE case files should be referred to the Airspace Management Branch, regional 530, who will process them in accordance with the Freedom of Information Act (5 U.S.C. 552) and Order 1200.23, Public Availability of Information. In addition, requests for verbal information on the status, possible changes to the original proposal, and possible FAA determinations on any OE case should also be forwarded to the Airspace Management Branch.

527. PUBLIC DEMAND ON FPB TIME. The FPB is not staffed for extensive instruction or training of proponents, consultants, and other representatives of construction sponsors concerning all the aspects of Flight Standards obstruction evaluations. This is especially true for prefiling evaluations trying to find a least offensive location or determining the maximum height for a specific location. There are sufficient public sector consultants that are proficient in these standards application areas.

a. General responses to questions on standards application are appropriate and professional courtesy to public inquiries is required.

b. The aeronautical study of the OE process as defined in FAA regulations and orders is the only approved method to reach a final determination. The inspector should be cautioned against stating or even inferring that the FAA would issue a determination of no hazard on a given informal proposal prior to the formal submission to the region.

528. NEGOTIATIONS. Negotiations to find a equitable solution to airspace conflicts is fully supported by Flight Standards. Normally, the AT OE specialist will negotiate with the sponsor for adjustments to the proposal. The OE inspector will participate in OE negotiations when requested by AT.

a. The OE inspector should be aware of all aspects of the specific OE case prior to participating in a negotiating session with the proponent. If the inspector is not familiar with the case but the proponent is at the region for a meeting, participation is still possible and recommended. The inspector should tell all meeting members immediately that they are unfamiliar with the case and explain that the FPB participation may be limited to stating policies and explaining criteria application. Final Flight Standards concurrence on all agreements may be withheld until a later date.

b. The inspector shall negotiate in good faith. However, the appropriate standards and policies may limit the degree of negotiation that is even possible. Solutions must be consistent with these standards and policies.

c. During negotiation sessions, an in-depth discussion of issues is appropriate and verbal conflicts between meeting members must be avoided. Verbal abuse may be a negotiating tactic of a few proponents or consultants. The inspector must portray a high degree of professionalism during any type of negotiating session.

529. A NEW FACILITY FROM THE CONSTRUCTION PROPONENT. RESERVED. TBD.

530. AERONAUTICAL STUDIES ON EXISTING OBJECTS. The following contains Flight Standards background and justification for expanding the Order 7400.2 evaluation process on aeronautical studies of existing structures that have not been previously studied by the region.

a. During field visits, Flight Standards inspectors and other FAA personnel occasionally find newly constructed obstacles that affect IFR and VFR aircraft operations.

b. The Flight Standards policy is that any newly discovered structure, from whatever source, that may effect aircraft operations should be reported to the regional FPB. The location coordinates and mean sea level (MSL) height, to the highest accuracy possible, should be provided. The reason for this policy is aircraft safety.

c. The OE inspector should determine if a previous OE study has been accomplished. A review of the OE cases may be required. FIAO assistance may be needed and issue a Notice to Airmen (NOTAM), if appropriate.

d. If the structure was previously studied, AT should be informed of the construction.

e. If no regional filing was previously accomplished, all known information on the structure, including the VFR and IFR effects, should be forwarded in writing to the Airspace Management Branch. Based on the policies and procedures established in Order 7400.2, AT will determine if an aeronautical study is appropriate.

f. AT forwards the data to NOS for inclusion in the NOS Quarterly Obstacle Memo - Digital Obstacle File so that the appropriate obstruction data bases, which are used by numerous agencies and organizations, are updated. In all instrument procedure development, the procedures specialist utilizes the NOS Quarterly Obstacle Memo - Digital Obstacle File as a source document.

531. COORDINATION WITHIN FLIGHT STANDARDS/AVIATION STANDARDS. The policy that the FAA shall speak with one voice also applies within Flight Standards. For Flight Standards responses to regional OE studies, that voice is the FPB.

a. Occasionally, Flight Standards field offices, FIAO's, and even other regional Flight Standards branches may become involved with individual OE cases. This involvement is normally limited to requests for assistance from the FPB. Any questions, information, comments, or objections to an individual OE case must be addressed to the FPB.

b. The FPB must be aware if other Flight Standards/-Aviation Standards offices are on the distribution lists for the 7460 forms originating from AT. If other offices receive the forms, these offices must be aware of any required actions they must perform. The FPB shall inform these offices of their responsibilities, if any. Agreements between the FPB and the other offices concerning the required actions may be appropriate.

c. In most OE cases, the FPB can complete the full evaluation. However, cases may arise that require the FPB to request assistance from the FIAO. Normally, these situations will be extremely "close calls" or when the FPB requires additional data, procedure information/expertise, chart work, or flight inspection results.

(1) FPB initiated telephone or written requests to the FIAO, should include the specific information needed, so as to avoid burdening the FIAO with work that can be or has been accomplished in the region.

(2) If a full obstruction evaluation by the FIAO is required, the request shall be in a written format and should contain all the information forwarded to the FPB from AT. A temporary personnel shortage is normally the reason the FPB would request a full evaluation by the FIAO.

(3) A good working relationship and understanding are required between the FPB and FIAO concerning obstruction evaluations because OE cases are normally time critical.

d. Requests for assistance from FSDO's and other Flight Standard offices are normally for information about a geographical area or airport/heliport, information and opinions about operations specifications (OpSpecs), and questions about aircraft performance, onboard avionics, etc.

e. The FPB shall determine which information received from other Flight Standards/-Aviation Standards offices is pertinent to the OE case and incorporate this information into their response to AT.

532.-535. RESERVED.

FIGURE 5-1. SAMPLE FAA FORM 7460-1, NOTICE OF PROPOSED CONSTRUCTION OR ALTERATION

DO NOT REMOVE CARBONS — *Please Type or Print on This Form* — Form Approved OMB NO. 2120-0001

US Department of Transportation
Federal Aviation Administration

Notice of Proposed Construction or Alteration

Aeronautical Study Number: 93 AGL 2646 OE

1. Nature of Proposal

A. Type: [X] New Construction [ ] Alteration *

B. Class: [X] Permanent [ ] Temporary (Duration ______ months)

C. Work Schedule Dates: Beginning: Upon FAA approval; End: ASAP

* If Alteration, provide previous FAA Aeronautical Study Number, if available:

3A. **Name, address, and telephone number of individual, company corporation, etc. proposing the construction or alteration.** (Number, Street, City, State, and Zip Code)

John Horrigan
Cellwave, Inc.
2500 Terminal Tower
Cleveland, Ohio 44113-2241
(216) 621-8369
Area Code / Telephone Number

3B. Name, address and telephone number of proponent's representative, if different than 3A. above.

Shahram Hojati
Lukas, McGowan, Nace & Gutierrez
1819 H Street, N.W., Suite 700
Washington, D.C. 20006
(202) 857-3500
Area Code / Telephone Number

2. Complete Description of Structure

Please describe, on a separate sheet of paper if necessary, the proposed construction or alteration.

A. For proposals involving transmitting stations, include effective radiated power (ERP) and assigned frequency of all proposed or modified transmitters on the structure. (If not known, give frequency band and maximum ERP).

B. For proposals involving overhead wire, transmission lines, etc., include the size and the configuration of the wires and their supporting structures.

C. For all proposals, include site orientation, dimensions, and construction materials of the proposed or altered structure.

D. **Optional**— Describe the type of obstruction marking and lighting system desired for your structure. The FAA will recommend appropriate marking and lighting for the structure in accordance with the standards of Advisory Circular AC 70/7460-1. An FAA marking and lighting recommendation will reflect the minimum acceptable level of conspicuity necessary to warn pilots of the presence of an object. However, the FAA, under certain circumstances, will not object to the use of a system (such as a medium intensity flashing white light system or a dual lighting system) other than the recommended standard.

4. Location Of Structure

A. Coordinates (to hundredths of seconds, if known)
Latitude: 40° 09' 42"
Longitude: 82° 37' 21"

4D. Source of coordinate information for item 4A. above.
[ ] USGS 7.5' Quad Chart [X] Survey [ ] Other Specify

Indicate the reference datum of the coordinates, if known.
[ ] NAD 27 [ ] NAD 83 [X] Other Specify: See attached survey

B. Nearest City or Town and State: Johnstown, OH
(1). Distance to 4B: 3.0 miles
(2). Direction to 4B: West

C. Nearest public or military airport, heliport, flightpark, or seaplane base: Kearns Pvt.
(1). Distance from structure to nearest point of nearest runway: 7.0 miles
(2). Direction from structure to airport: Southwest

5. Height and Elevation (to nearest foot)

A. Elevation of site above mean sea level.	1295'
B. Height of structure including all appurtenances and lighting above ground or water.	314'
C. Overall height above mean sea level (A + B)	1609'

4E. Describe, on a separate sheet of paper, the location of the site with respect to highways, streets, airports, prominent terrain features, existing structures, etc. Attach a copy of a U.S. Geological Survey quadrangle map 7.5 minute series (or equivalent) showing the construction site. If available, attach a copy of a documented site survey with the surveyor's certification.

FAILURE TO PROVIDE ALL REQUESTED INFORMATION MAY DELAY PROCESSING OF YOUR NOTICE

Notice is required by Part 77 of the Federal Aviation Regulations (14 C.F.R. Part 77) pursuant to Section 1101 of the Federal Aviation Act of 1958, as amended (49 U.S.C. app. § 1501). Persons who knowingly and willfully violate the Notice requirements of Part 77 are subject to a civil penalty of $1,000 per day until the notice is received, pursuant to Section 901(a) of the Federal Aviation Act of 1958, as amended (49 U.S.C. app § 1471(a)) as well as the fine (criminal penalty) of not more than $500 for the first offense and not more than $2,000 for subsequent offenses, pursuant to Section 902(a) of the Federal Aviation Act of 1958, as amended (49 U.S.C. app § 1472(a)).

I HEREBY CERTIFY that all of the above statements made by me are true, complete, and correct to the best of my knowledge. In addition, I agree to obstruction mark and/or light the structure in accordance with established marking & lighting standards as necessary.

Date: 8-17-93
Typed or Printed Name and Title of Person Filing Notice: Shahram Hojati/Consulting Engineer
Signature: Shahram Hojati

FOR FAA USE ONLY — *FAA will either return this form or issue a separate acknowledgement.*

The Proposal:

[ ] Does not require a notice to FAA.
[ ] Is not identified as an obstruction under any standard of FAR, Part 77, Subpart C, and would not be a hazard to navigation.
[ ] Is identified as an obstruction under the standards of FAR, Part 77, Subpart C, but would not be a hazard to navigation.
[ ] Should be obstruction [ ] marked [ ] lighted per FAA Advisory Circular 70/7460-1, Chapters ______
[ ] Obstruction marking and lighting are not necessary.

Supplemental Notice of Construction, FAA Form 7460-2, is required any time the project is abandoned, or

[ ] At least 48 hours before the start of construction.
[ ] Within five days after the construction reaches its greatest height.

This determination expires on ______ unless:
(a) extended, revised or terminated by the issuing office;
(b) the construction is subject to the licensing authority of the Federal Communications Commission (FCC) and an application for a construction permit is made to the FCC on or before the above expiration date. In such cases the determination expires on the date prescribed by the FCC for completion of construction, or on the date the FCC denies the application.

NOTE: Request for extension of the effective period of this determination must be postmarked or delivered to the issuing office at least 15 days prior to the expiration date.

If the structure is subject to the licensing authority of the FCC, a copy of this determination will be sent to that agency.

Remarks

NAD 83 Coordinates (Use these coordinates for any future correspondence with the FAA) — Latitude ° ' . " — Longitude ° ' . "

Issued in / Signature / Date

FAA Form 7460-1 (1-93) — *Do Not Remove Carbons*

FIGURE 5-2. SAMPLE FAA FORM 7460-2, NOTICE OF ACTUAL CONSTRUCTION OR ALTERATION

FEB 05 1991
FORM APPROVED OMB NO. 2120-0001

SUPPLEMENTAL NOTICE

SUBMISSION INSTRUCTION: *For Advance Notice of Actual Construction or Alteration. Please type or firmly print information requested. Complete items 1, 2, 3A(1), 3A(2), and 6. If applicable, also complete items 4 and 5. Detach part 1. Fold and tape at bottom. Mail to the FAA Regional Office for your area. Part 1A is provided for your file.*

Aeronautical Study No. 89-ANE-357-OE

U.S. Department of Transportation
Federal Aviation Administration

NOTICE OF ACTUAL CONSTRUCTION OR ALTERATION

1. CONSTRUCTION

Type and Description of Construction: Construction of Building

2. CONSTRUCTION LOCATION — HEIGHT

A. Coordinates (To tenths of seconds, if known)

	°	'	"	."
Latitude	41	18	25	
Longitude	72	55	29	

B. Location (Distance and direction from nearest city or town. Include street address if any.)
Connecticut Financial Center
157 Church St.
New Haven Ct. 06508

C. Construction Height
Above Ground Level: AGL 394' 6" Ft.
Total Height (Construction & Site) Above Mean Sea Level: AMSL 421' Ft.

D. Site Elevation Determined By
☐ Actual Survey ☐ Map Contour ☐ Other

E. Name of Nearest Public-Use Airport - include Distance and Direction
Tweed-New Haven Airport
Three Miles South of Structure

3. CONSTRUCTION NOTIFICATIONS

A. Notification (Notice is Critical to flight Safety—FAR Part 77 Required ★)	Date	B. Construction/Project	Date
★ (1) Construction will start (Submit at least 48 hrs. in advance)	11/89	(1) Project Abandoned	
(2) Estimated Completion	4/91		
★ (3) Structure Reached Greatest Height (Submit within 5 days)	1/91	(2) Construction Dismantled	

4. MARKING AND LIGHTING

A. Marked
☑ Yes ☐ No ☐ Temporary

B. Lighted
☐ High Intensity White ☑ Red ☐ Temporary
☐ Dual (High Intensity White and Red) ☐ None

5. ANTENNA REQUIRING FCC LICENSE

A. Call Sign	B. Frequency	C. Date Applied for FCC Construction Permit	D. Date Construction Permit Issued
N/A		N/A	

6. PREPARER'S CERTIFICATION

SUBMITTED BY. (If submitted by proponent's representative, please also complete item B.)

A. Proponent's Representative
Name: Communications Site Mgmt.
Address: 1 Corporate Center
Hartford Ct. 06103
Tel. No.: (203)525-6507 (Include Area Code)

B. Construction Proponent
Name: Enterprise Construction Co. LTD
Address: 1 Commercial Plaza
Hartford Ct. 06103
Tel. No.: (203)549-1674 (Include Area Code)

I CERTIFY INFORMATION PROVIDED IS TRUE, COMPLETE, AND CORRECT TO THE BEST OF MY KNOWLEDGE

Signature	Title	Date
[signature]	Division Manager	1-14-91

NOTICE is required by Part 77 of the Federal Aviation Regulations (14 C.F.R. Part 77) pursuant to Section 1101 of the Federal Aviation Act of 1958, as amended (49 U.S.C. 1101). Persons who knowingly and willfully violate the notice requirements of Part 77 are subject to a fine (criminal penalty) of not more than $500 for the first offense and not more than $2,000 for subsequent offenses, pursuant to Section 902(A) of the Federal Aviation Act of 1958, as amended (49 U.S.C. 1472(A)).

FAA Form 7460-2 (4-83) SUPERSEDES PREVIOUS EDITION

ADVANCE NOTICE OF CONSTRUCTION
SUBMIT WITHOUT DELAY

FIGURE 5-3. SAMPLE FAA FORM 7460-7, ACKNOWLEDGEMENT OF NOTICE OF PROPOSED CONSTRUCTION OR ALTERATION

U.S. Department of Transportation
Federal Aviation Administration

FEDERAL AVIATION ADMINISTRATION, ANE
12 NEW ENGLAND EXECUTIVE PARK
BURLINGTON, MA 01803

IN REPLY REFER TO
AERONAUTICAL STUDY
NO. 90-ANE-344-OE

ACKNOWLEDGMENT OF NOTICE OF PROPOSED CONSTRUCTION OR ALTERATION

SPONSOR	Two Way Radio Service 100 Marion Drive Kingston, MA 02364	CONSTRUCTION LOCATION PLACE NAME Quincy, MA	
		LATITUDE 42°14'47"	LONGITUDE 71°02'55"
CONSTRUCTION PROPOSED	DESCRIPTION Guyed Tower	HEIGHT IN FEET ABOVE GROUND 669'	ABOVE MSL 849'

The Federal Aviation Administration hereby acknowledges receipt of notice dated September 7, 1990 concerning the proposed construction or alteration described above.

A study has been conducted under the provisions of Part 77 of the Federal Aviation Regulations to determine whether the proposed construction would be an obstruction to air navigation, whether it should be marked and lighted to enhance safety in air navigation, and whether supplemental notice of start and completion of construction is required to permit timely charting and notification to airmen. The findings of that study are as follows:

- ☐ The proposed construction does not require a notice to FAA.
- ☐ The proposed construction is not identified as an obstruction under any standard of FAR, Part 77, Subpart C and would not be a hazard to air navigation.
- ☐ The proposed construction is identified as an obstruction under the standards of FAR, Part 77, Subpart C but would not be a hazard to air navigation.
  - ☐ The structure should be obstruction marked and lighted per FAA Advisory Circular AC 70/7460-1, "Obstruction Marking and Lighting," Chapters ________
  - ☐ Supplemental notice is required at least 48 hours before the start of construction and within five days after construction reaches its greatest height (use the enclosed FAA form).

This determination expires on unless:

(a) extended, revised or terminated by the issuing office;
(b) the construction is subject to the licensing authority of the Federal Communications Commission and an application for a construction permit is made to the FCC on or before the above expiration date. In such case the determination expires on the date prescribed by the FCC for completion of construction, or on the date the FCC denies the application.

NOTE: Any request for extension of the effective period of this determination must be postmarked or delivered to the issuing office at least 15 days prior to the expiration date.

- ☒ The proposed construction would exceed Part 77 obstruction standards and further aeronautical study is necessary to determine whether it would be a hazard to air navigation. Pending completion of any further study, it is presumed the construction would be a hazard to air navigation. Further study:
  - ☐ Has been initiated by the FAA.
  - ☒ May be requested by the sponsor within 30 days of date of this acknowledgement.
- ☐ If the proposed structure were reduced in height to not exceed 490 ft. above ground level (670 ft. above sea level), it would not exeed Part 77 obstruction standards.

If the structure is subject to the licensing authority of the FCC, a copy of this acknowledgment will be sent to that Agency.

NOTICE IS REQUIRED ANYTIME THE PROJECT IS ABANDONED OR THE PROPOSAL IS MODIFIED.

The proposed construction would exceed the Obstruction Standards of Federal Aviation Regulations, Part 77, Sections 77.23(a)(1) and 77.23(a)(2) by 179 feet.

Maurice Georgian

SIGNED Maurice Georgian TITLE Airspace Technical Specialist

ISSUED IN Burlington, MA 01803 ON November 26, 1990

FAA FORM 7460-7

FIGURE 5-4. SAMPLE FAA FORM 7460-8, AERONAUTICAL STUDY OF PROPOSED CONSTRUCTION OR ALTERATION

U.S. Department of Transportation
Federal Aviation Administration

Great Lakes Region
Illinois, Indiana, Michigan, Minnesota, North Dakota, Ohio, South Dakota, Wisconsin

System Management Branch
Attention, AGL-530
2300 East Devon Avenue
Des Plaines, Illinois 60018

IN REPLY REFER TO
AERONAUTICAL STUDY NO.
91-AGL-125-OE

AERONAUTICAL STUDY OF PROPOSED CONSTRUCTION OR ALTERATION

SPONSOR		CONSTRUCTION LOCATION	
	Total Communications of Marinette, Inc. 2009 1/2 Hall Avenue Marinette, WI 54143	PLACE NAME Marinette, WI	
		LATITUDE 45° 07' 19"	LONGITUDE 87° 51' 07"

CONSTRUCTION PROPOSED	DESCRIPTION	HEIGHT (IN FEET)	
		ABOVE GROUND	ABOVE MSL
	14' Addition to existing tower 860-880, 150-162, 450-470 MHz.	514	1274

A notice has been filed with the Federal Aviation Administration that the above described structure is proposed for construction. As proposed the structure would exceed the standards of Subpart C of Part 77 of the Federal Aviation Regulations and would be identified as a obstruction to air navigation. Accordingly the FAA is conducting an aeronautical study of the proposal to determine is effect upon the safe and efficient use of the navigable airspace by aircraft and on the operation of air navigation facilities.

In the study, consideration will be given to all facts relevant to the effect of the proposal on existing and planned airspace use; air navigation facilities; airports; aircraft operations, procedures and minimum flight altitudes; and the air traffic control system. However, only those plans on file with the FAA, on the date the notice concerning the above described proposed construction was received, will be considered.

Interested persons are invited to participate in the aeronautical study by submitting comments to the FAA office issuing this notice. To be eligible for consideration, comments must be relevant to the effect the proposed construction would have on aviation, provide sufficient detail to permit a clear understanding, and be received on or before May 9, 1991.

Please refer to the aeronautical study number printed in the upper right hand corner of this notice.

This notice may be reproduced and recirculated by any interested person.

The proposed structure would be located approximately 9 nautical miles east of the Menominee-Marinette Twin County Airport, Marinette, WI. It would exceed the obstruction standards of the Federal Aviation Regulations, Part 77 as follows:

Section 77.23(a)(1) by 14 ft. - a height more than 500 ft. AGL

A chart is on the reverse side.

SIGNED Thomas E Johnson for Douglas F. Powers TITLE Manager, System Management Branch, AGL-530

ISSUED IN Des Plaines, Illinois ON APR 11 1991

AIRPORT MANAGERS - PLEASE POST

COMMENTS INVITED

Page 1 of 2 Pages

FIGURE 5-4. SAMPLE FAA FORM 7460-8, AERONAUTICAL STUDY OF PROPOSED CONSTRUCTION OR ALTERATION (Cont'd.)

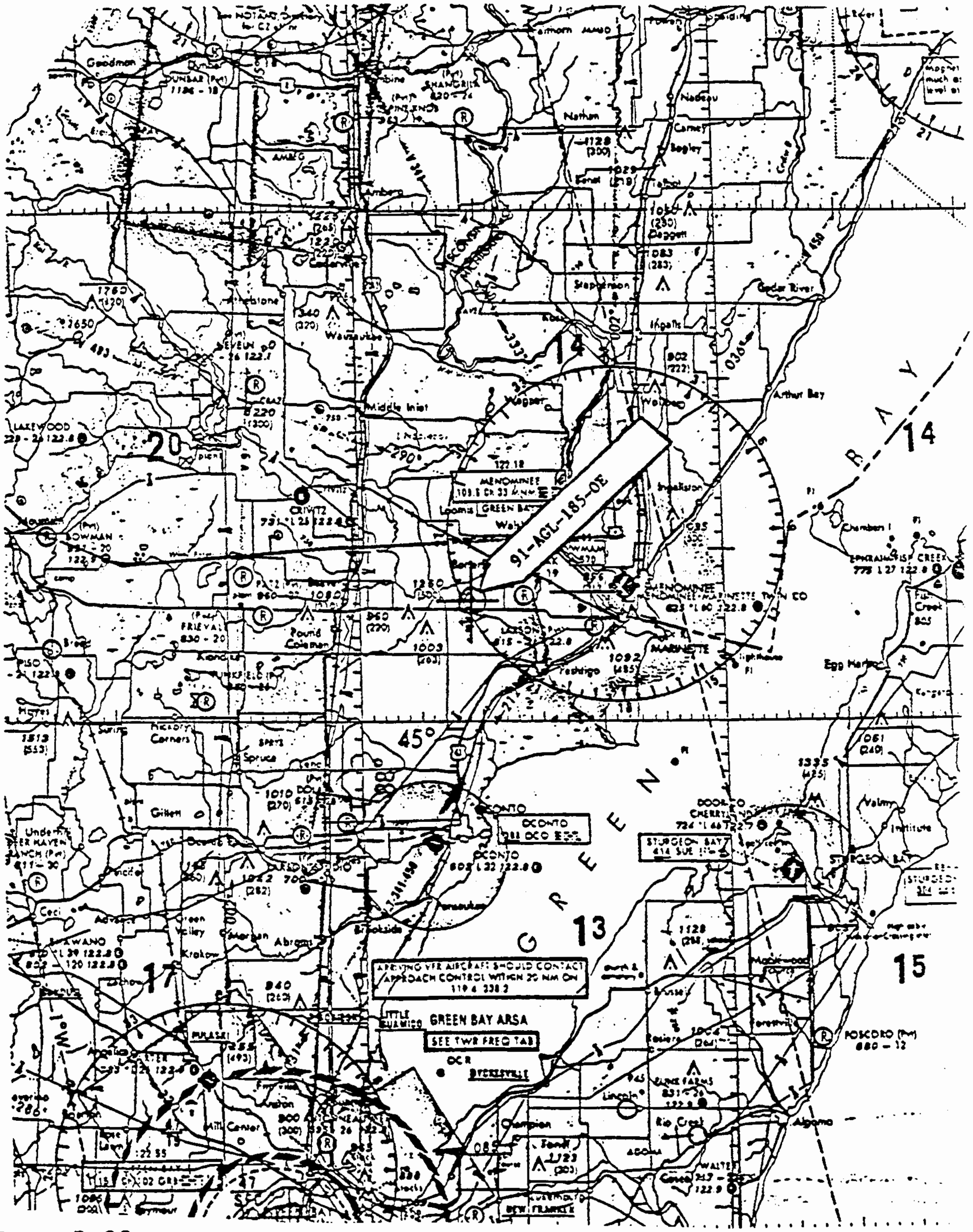

FIGURE 5-5. SAMPLE FAA FORM 8460-9, DETERMINATION OF NO HAZARD TO AIR NAVIGATION

US Department of Transportation
Federal Aviation Administration

Great Lakes Region/AGL-530
2300 East Devon Avenue
Des Plaines, Illinois 60018

IN REPLY REFER TO
AERONAUTICAL STUDY NO. 93-AGL-2574-OE

DETERMINATION OF NO HAZARD TO AIR NAVIGATION

		CONSTRUCTION LOCATION	
SPONSOR	Mr. John Pearson RAM/BSE Paging Co., L.P. 10 Woodbridge Center Drive Suite 900 Woodbridge, NJ 07095	PLACE NAME Lowell, MI	
		LATITUDE 42°56'28.11"	LONGITUDE 85°20'02.05"
CONSTRUCTION PROPOSED	DESCRIPTION Antenna Tower Frequency 454.025 MHz, ERP 500 Watts	HEIGHT (IN FEET) ABOVE GROUND 99	ABOVE MSL 859

An aeronautical study of the proposed construction described above has been completed under the provisions of Part 77 of the Federal Aviation Regulations. Based on the study it is found that the construction would have no substantial adverse effect on the safe and efficient utilization of the navigable airspace by aircraft or on the operation of air navigation facilities. Therefore, pursuant to the authority delegated to me, it is hereby determined that the construction would not be a hazard to air navigation provided the following conditions are met:

Conditions:

The structure is marked and lighted in accordance with Chapters 3, 4, 5, and 13 of FAA Advisory Circular AC 70/7460-1, "Obstruction Marking and Lighting."

Supplemental notice of construction is required any time the project is abandoned (use the enclosed FAA form), or

- [X] At least 48 hours before the start of construction (use the enclosed FAA form).
- [X] Within five days after the construction reaches its greatest height (use the enclosed FAA form).

This determination expires on JUN 2 2 1994 unless:

(a) extended, revised or terminated by the issuing office;
(b) the construction is subject to the licensing authority of the Federal Communications Commission and an application for a construction permit is made to the FCC on or before the above expiration date. In such case the determination expires on the date prescribed by the FCC for completion of construction, or on the date the FCC denies the application.

NOTE: Request for extension of the effective period of this determination must be postmarked or delivered to the issuing office at least 15 days prior to the expiration date.

This determination is subject to review if an interested party files a petition on or before DEC 1 2 1993. In the event a petition for review is filed, it should be submitted in triplicate to the Manager Flight Information and Obstructions Branch, AAT-210, Federal Aviation Administration, Washington, D.C. 20591, and contain a full statement of the basis upon which it is made.

This detemination becomes final on DEC 2 2 1993 unless a petition for review is timely filed, in which case the determination will not become final pending disposition of the petition. Interested parties will be notified of the grant of any review.

An account of the study findings, aeronautical objections, if any, registered with the FAA during the study, and the basis for the FAA's decision in this matter will be found on the following page(s).

If the structure is subject to the licensing authority of the FCC, a copy of this determination will be sent to that Agency.

This determination, issued in accordance with FAA Part 77, concerns the effect of this proposal on the safe and efficient use of the navigable airspace by aircraft and does not relieve the sponsor of any compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local government body.

SIGNED Georgene A. McDonough for Robert A. Frink TITLE Manager, System Management Branch, AGL-530

ISSUED IN Des Plaines, Illinois ON NOV 1 2 1993

FAA Form 7460-9 (2/83) SUPERSEDES PREVIOUS EDITION

Page 1 of 2 Pages

FIGURE 5-5. SAMPLE FAA FORM 8460-9, DETERMINATION OF NO HAZARD TO AIR NAVIGATION (Cont'd.)

The proposed construction would be located approximately .89 nautical miles southeast of the Lowell City Airport, Lowell, Michigan. It would exceed the obstruction standards of the Federal Aviation Regulations, Part 77 as follows:

Section 77.23(a)(5) by 28 ft. - a height exceeding the horizontal imaginary surface as applied to Lowell City Airport.

The proposal was circularized for public comment by letter dated September 27, 1993. One letter of objection was received as a result of circularization. The Kent County Department of Aeronautics objected on the basis that the proposal would affect the flight operations at Lowell City airport and reduce the useability of the airport.

Aeronautical study disclosed the proposal would have no effect on any existing or planned instrument flight rules (IFR) operations, procedures, minimum flight altitudes, or air navigation and communication facilities.

Study for visual flight rules (VFR) effect disclosed that the proposal would be within the confines of traffic pattern airspace for Category A aircraft at Lowell City Airport for runways 15/33. The airport's other four runways have published right hand traffic patterns and standard left hand traffic patterns and thus would not be affected by the tower's presence. Additionally, runway 15/33 is a turf runway and it is closed during the winter months. Consequently, it was determined the impact would be minimal on aircraft in the traffic pattern at Lowell City Airport and the proposal could be accommodated.

Study also disclosed that at 99 feet above ground level, the proposal would not penetrate altitudes considered available for VFR enroute operations.

The structure would be appropriately obstruction marked and lighted to assure aeronautical conspicuity.

The cumulative impact resulting from the proposed construction, when combined with the impact of other existing or proposed structures, was negligible.

Therefore, it is determined the proposed structure would have no substantial adverse effect on the safe and efficient utilization of the navigable airspace by aircraft or on the operation of air navigation facilities and would not be a hazard to air navigation.

This decision is based solely on the foregoing description of the structure, which includes location, height, ERP, and operating frequency.

The FAA hereby requests that proper notice be given for any future construction or alteration that would exceed the above described heights, including any increase to the ERP, alteration to the transmitting frequency, and/or addition of any other transmitting devices.

This determination does not include temporary construction equipment such as cranes, derricks, etc., which may be used during the actual construction phase of this proposal. Such equipment which has a height greater than the proposed structure and a height which would exceed the notice standards of Part 77 of the Federal Aviation Regulations requires separate notice. If prior notice for temporary construction equipment is required, please complete and return the enclosed FAA Form 7460-1.

Page 2 of 2 Pages

Aeronautical Study No. 93-AGL-2574-OE

FIGURE 5-6. SAMPLE FAA FORM 8460-10, DETERMINATION OF HAZARD TO AIR NAVIGATION

U.S. Department of Transportation
Federal Aviation Administration

IN REPLY REFER TO
AERONAUTICAL STUDY
NO. 91-AGL-1028-OE

GREAT LAKES REGION/AGL-530
2300 East Devon Avenue
Des Plaines, Illinois 60018

DETERMINATION OF HAZARD TO AIR NAVIGATION

SPONSOR	North American Broadcasting Company, Inc. KDUZ Box 10 Hutchinson, MN 55350	CONSTRUCTION LOCATION PLACE NAME: Hutchinson, MN	
		LATITUDE: 44° 54' 33"	LONGITUDE: 94° 22' 00"
CONSTRUCTION PROPOSED	DESCRIPTION: 135' Increase to Existing Antenna Tower (Freq: 107.1 MHz, & 1260 KHz, ERP 6KW/1KW)	HEIGHT (IN FEET) ABOVE GROUND: 346	ABOVE MSL: 1441

An aeronautical study of the proposed construction described above has been completed under the provisions of Part 77 of the Federal Aviation Regulations. Based on the study it is found that the construction would have a substantial adverse effect on the safe and efficient utilization of the navigable airspace by aircraft or on the operation of air navigation facilities. Therefore, pursuant to the authority delegated to me, it is hereby determined that the construction would be a hazard to air navigation.

This determination is subject to review if a petition is filed by the sponsor on or before AUG 23 1992. In the event a petition for review is filed it should be submitted in triplicate to the Manager, Flight Information and Obstructions Branch, AAT-210, Federal Aviation Administration, Washington, D.C. 20591, and contain a full statement of the basis upon which it is made.

This determination becomes final on SEP 2 1992 unless a petition for review is timely filed, in which case the determination will not become final pending disposition of the petition. Interested parties will be notified of the grant of any review.

An account of the study findings, aeronautical objections, if any, registered with the FAA during the study, and the basis for the FAA's decision in this matter will be found below and/or on the following page(s).

If the structure is subject to the licensing authority of the FCC, a copy of this determination will be sent to that Agency.

This determination, issued in accordance with FAR Part 77, concerns the effect of this proposal on the safe and efficient use of the navigable airspace by aircraft and does not relieve the sponsor of any compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local government body.

SIGNED for William V. [signature] Douglas F. Powers TITLE Manager, System Management Branch, AGL-530

ISSUED IN Des Plaines, Illinois 60018 ON JUL 24 1992

FAA Form 7460-10 (4-83) SUPERSEDES PREVIOUS EDITION

Page 1 of — Pages

FIGURE 5-6. SAMPLE FAA FORM 8460-10, DETERMINATION OF HAZARD TO AIR NAVIGATION (Cont'd.)

The proposed construction would be located approximately 3.08 nautical miles north northeast of Hutchinson Municipal-Butler Field Airport, Hutchinson, MN.

The proposal exceeds the obstruction standards of Federal Aviation Regulations, Part 77, as follows:

Section 77.23 (a)(2) by the full height of the addition a height above (ground level) exceeding 208 feet within 3.08 nautical miles as applied to Hutchinson Municipal Airport.

Section 77.23 (a)(3) by 117' a height that increases a minimum instrument flight altitude within a terminal area (TERPS criteria).

The proposal would necessitate increasing the minimum descent altitudes (MDA's) from 1820' to 1940' AMSL for the NDB runway 15 straight-in and circling instrument approach procedures (IAP).

The proposal was circularized for public comment by letter dated April 21, 1992. No letters of objection were received as a result of circularization.

Study for visual flight rules (VFR) effect disclosed the proposal would be beyond all known public-use airport traffic pattern airspace areas and at 346 feet above ground level would not penetrate altitudes considered available for VFR enroute operations.

The aeronautical study did disclose that the proposal would necessitate an increase of 120 feet to the MDA for the NDB runway 15 SIAP as described above. This increase would force aircraft to a higher altitude as they sought to maintain contact with the airport while circling to a runway or landing straight-in. The proposal would eliminate the usefulness of a lower altitude which would more easily enable a pilot to successfully complete the landing maneuver.

The loss of these altitudes would have an adverse effect on the benefit gained from their use. The adjustments necessary to accommodate the proposal would eliminate the usefulness of a portion of the national airspace system. Study also revealed that the affected approach procedure is the only one providing a straight-in approach to runway 15.

A collateral study discovered that during fiscal year 1990, 87 aircraft utilized instrument approach procedures at Hutchinson Municipal Airport under actual instrument weather conditions. This usage constitutes a significant volume of operations. Therefore, it is determined that the proposed construction would have a substantial adverse effect on the safe and efficient utilization of the navigable airspace by aircraft and would be a hazard to air navigation.

Aeronautical Study No. 91-AGL-1028-OE

Pages 2 of 2 Pages

SECTION 3. FPB REQUIREMENTS AND GUIDELINES FOR OBSTRUCTION EVALUATIONS

536. GENERAL. The obstruction evaluation process places a heavy demand upon the FPB OE inspector in both time and expertise. Exact evaluations require a detailed understanding of TERPS and all forms of airspace utilization. Sound judgement and common sense are important requirements. This section provides an overview of the elements that inspectors use to carry out their responsibilities to the regional OE program. Flight Standards policies and practices for evaluating proposed obstacles are included.

537. REFERENCES FOR OBSTRUCTION EVALUATIONS. The following are material referred to in this handbook or other guidance that may be needed for conducting obstruction evaluations.

a. <u>FAR Part 77, Objects Affecting Navigable Airspace</u>. Establishes standards for determining obstructions in the navigable airspace and sets forth requirements for notice to the Administrator of certain proposed construction or alteration. It provides for aeronautical studies and public hearings to determine the effects of such proposals on the navigable airspace.

b. <u>Order 7400.2, Procedures for Handling Airspace Matters</u>. Addresses the structure, forms, and procedures for processing obstruction studies.

c. <u>Order 8260.3, United States Standard for Terminal Instrument Procedures (TERPS)</u>. Contains criteria used to formulate, review, approve, and publish procedures for instrument approach and departure.

d. <u>Order 8260.19, Flight Procedures and Airspace</u>. Provides guidance to Flight Standards/Aviation Standards personnel regarding the obstruction evaluation process and provides guidance on accuracy standards for obstructions.

e. <u>Advisory Circular 150/5190-4, A Model Zoning Ordinance to Limit Heights of Objects Around Airports</u>. Provides a model zoning ordinance to be used as a guide to control the heights of objects around airports.

f. <u>Advisory Circular 150/5300-13, Airport Design</u>.

g. <u>Advisory Circular 70/7460-1, Obstruction Marking and Lighting</u>.

h. <u>Advisory Circular 70/7460-2, Proposed Construction or Alteration of Objects that May Affect the Navigable Airspace</u>.

538. OBSTRUCTION EVALUATION TRAINING, NATIONAL OE MEETINGS, AND ASSOCIATED PREREQUISITES. The following are formal training courses, conferences, meetings, and prerequisites that provide the recommended training and knowledge for the Flight Standards OE inspector to perform obstruction evaluations.

a. FAA Course 12051, Basic Obstruction Evaluation and Airport/Airspace Analysis (104 hours). This course is primarily designed for Air Traffic, Flight Standards, Airports, and Airway Facilities personnel involved in the Obstruction Evaluation and Airport/Airspace Analysis Programs at the Regional and Washington Headquarters level. The course consists of classroom instruction and laboratory exercises. Content includes application of FAR 77 criteria, evaluation of aeronautical effect, issuance of hazard/no hazard determinations, obstruction marking and lighting, FAR 157 and AIP airport processing, and issuance of airport airspace determinations.

b. FAA Course 12052, Introduction to Flight Procedures Analyses (120 hours). This course is designed for Flight Standards, Airports, Air Traffic, and Airway Facilities personnel involved in the conduct of the agency's obstruction evaluation program whose related training need is limited to the area of en route and terminal flight procedures analysis. It will also fulfill the training needs of persons in each of the four subject services whose duties include a requirement for comprehension of en route and terminal flight procedures.

c. Periodic Obstruction Evaluation and Airport/Airspace Analysis (OE/AAA) Conference. Attendance at the OE/AAA week long conference is expected because the knowledge gained is available no where else. Most of the meeting is for government personnel to discuss pertinent OE/AAA issues. One day of the meeting provides a government and industry forum that encourages a free exchange of ideas, techniques, and sharing of hard-earned knowledge on OE/AAA problem areas.

d. Meetings to Discuss Changes to Order 7400.2. Occasionally, Air Traffic in Washington, and specifically, the Airspace and Obstruction Evaluation Branch, ATP-240, hosts a meeting to discuss changes to Order 7400.2. Regional participation is expected and FPB inspectors must be adequately represented.

e. Instrument Procedures. A comprehensive knowledge is required of the concepts of criteria application and the procedure development process addressed in TERPS, Order 8260.19, and AC 120-29.

f. Air Operations. A comprehensive knowledge is required of general aviation, air carrier, and military aviation practices in both fixed wing and rotor aircraft, for evaluating both IFR and VFR effects.

539. COMMON SENSE. Established criteria are not a substitute for sound judgement and common sense. The criteria do not relieve inspectors from exercising initiative or taking appropriate action in recognizing both the capabilities and limitations of aircraft and navigational aid performance.

a. Generally, hazard determinations are issued for proposed construction only when the obstruction results in a substantial adverse effect upon aviation. Order 7400.2, paragraph 7-4, states that in order for the adverse effect to be considered substantial, a significant volume of aeronautical operations should be affected.

b. The inspector is encouraged to make comments where safety is concerned, regardless of traffic volume and written criteria. There may be occasions where a proposed obstacle less than 500 feet above the ground is in a heavily used VFR route and known terrain/-lighting conditions will make the obstacle a hazard to the VFR operations. Unlit, multiple structures like a tall power line may be an example. Where flight safety is questionable, the inspector should take the initiative and request that Air Traffic negotiate a modification or require lighting to this type of proposal.

540. ACCURACY IN EVALUATIONS. The OE inspector must make every effort to conduct a complete and thorough evaluation of each case. Accuracy is a necessity, particularly since no independent check of the inspector's work is normally accomplished.

a. An unfortunate characteristic of the OE program is that errors made by an inspector may not become apparent for years until a revision or review is made to a particular procedure and the conflict between the new obstruction and the old minimums is identified. The new obstruction may have substantial adverse effects upon important IFR procedures that may have been overlooked. Once the obstruction is built, the effects may be irreversible and the error will result in the minimums being raised.

b. Penetrating obstructions determined to be a hazard to the flying public are potentially dangerous. Also, the adverse effect of penetrating obstructions as defined by criteria may not always be mitigated by raising minimums. The OE inspector must realize that the accuracy of each calculation and decision made on a specific segment of the evaluation potentially affects the safety of aircraft. For this reason, the obstruction evaluation, though tedious, is extremely important and must be accurate.

541. INSTRUMENT PROCEDURE DESIGN CONCEPTS. The procedures specialist who originally designs an instrument procedure will utilize the TERPS criteria to provide the best possible product to the pilot. Existing obstacles, high terrain, desired aircraft tracks by Air Traffic Control (ATC), and environmental concerns are all considered in the final procedure design.

a. SIAP's. Approach procedures are normally designed to be as simple as possible consistent with the lowest possible minimums. Final approach course alignment to a runway is designed as close as possible to runway alignment.

(1) Missed Approach Procedures. Missed approach is an integral part of an approach procedure and must be obstacle free. Although statistically used only one percent of the time (based on collision risk model data), missed approaches must be available to both the pilot and ATC. Missed approaches are designed to return the pilot to the en route structure or to reposition the aircraft for another approach. ATC requirements or environmental considerations may dictate a specific missed approach ground track or holding fix. Missed approach criteria make no assumptions as to aircraft configuration such as loss of an engine. Turns during a missed approach are based on the median speed of the aircraft approach categories.

(2) Circling Approach Minimums. Circling approach maneuvers are used by a pilot to land on any runway at an airport no matter where the final approach course is aligned. Consequently, circling minimums are published on approach procedures and minimum altitudes are provided which contain TERPS obstruction clearance requirements. Actual circling approaches are common at smaller airports. They are uncommon at high activity airports because of aircraft congestion, multiple approach facilities, and ATC procedures. Circling minimums must be protected at all airports with circling minimums because, like the missed approach procedure, this maneuver may be required.

(3) Course Reversal. A procedure turn or other type of course reversal procedure is normally designed into the SIAP. Course reversal procedures are required for a pilot approaching the airport/heliport from a direction which does not allow direct entry into the procedure. This maneuver positions the aircraft so that the final approach course can be entered directly and in stabilized flight.

(4) Initials and Transitions. These segments are designed into the SIAP to allow routes for pilots to transition from the en route environment to the final segment. Because of chart clutter, only the commonly used or requested routes will be published. Routes not requiring a course reversal are provided whenever possible. ATC may develop a Standard Terminal Arrival Route (STAR) to transition to a SIAP as the traffic conditions warrant.

(5) Minimum Safe Altitudes. Minimum safe altitudes (MSA) are minimum obstacle clearance altitudes for emergency use. They normally include a 25 mile radius from the primary navaid supporting the approach and are depicted on most SIAP's. Emergency safe altitudes (ESA) include a 100 mile radius from a navaid and

are depicted on some military SIAP's. Navigational reception is not guaranteed at the MSA and ESA distances. These altitudes are determined and published to establish the safe limits if the pilot, for whatever reason, must descend to the lowest possible altitude. MSA's and ESA's are designed for emergency use only and are not routinely used by pilots or by ATC.

(6) ATC Minimum Altitudes. ATC has minimum vectoring altitudes (MVA) for terminal radar vectoring and minimum instrument altitudes (MIA) for en route center use. These ATC minimum IFR altitudes may have to be considered for SIAP development when radar vectoring is required for the procedure.

(7) Use of Navaids and Cockpit Workload. Most segments of the SIAP require positive course guidance from/to a navaid or waypoint. Within the original design of the SIAP, navaids in the terminal area are utilized to minimize cockpit workload during the approach. Positive course guidance is provided whenever practical. Consistent with operationally significant minimums, SIAP's should be designed with single pilot operations in mind and consider the minimum navigation equipment required by the FAR. The requirement to tune and identify facilities which are not derived from the final approach facility should be limited to only what is required for the procedure and what would be advantageous to the pilot to obtain lower landing minimums.

(8) Descent Gradients. Each approach segment of a SIAP, up to the missed approach point, has maximum and optimum descent gradients specified in TERPS. The intermediate segment usually has the lowest descent gradient. This flatter segment is designed into the procedure so the pilot can slow the aircraft to approach speed and reconfigure the aircraft for entry into the final approach. In order to reduce the aircraft noise associated with the approach, other segment minimum altitudes are normally the highest possible consistent with optimum descent gradients.

b. Takeoff Minimums and Departure Procedures. Normally, takeoff and departure procedures are designated only for those airports/heliports that have an instrument approach.

(1) Review of departure procedures at VFR airports may be conducted as required under FAR Section 135.215(d).

(2) Review of "engine out" departures may be conducted, if requested by the principal operations inspector, under FAR Sections 121.177, 121.189, 135.367, 135.379, and 135.398.

(3) When an airport originally becomes an IFR airport and an approach procedure is designed, all runways authorized for instrument departures are studied. Like approach

procedures, periodic reviews of departure procedures are accomplished by the FIAO.

(4) FAR Part 97 IFR takeoff minimums and departure procedures are established by the FAA to provide a margin of safety for all IFR operations. The optimum departure is a diverse departure which is, in essence, an unrestricted departure (straight ahead climbs or turns in any direction). A 40:1 obstacle identification surface (OIS) is used for the evaluation. This 40:1 OIS equates to a rate of 152 feet per nautical mile (NM). The TERPS criteria assume the aircraft will climb at a minimum of 200 feet per NM or approximately 30:1. Therefore, the aircraft is constantly gaining altitude at a minimum rate of 48 feet per NM over obstacles which do not penetrate the OIS.

(5) If penetrations of the 40:1 surface within the diverse departure area occur in other than Zone 1 (small area at the end of the departure runway), the procedures specialist normally attempts to establish a route which has a clear 40:1 OIS. This route is the departure procedure. Departure procedures are designed to be as simple as possible and the majority are runway heading climbs to an altitude before turning. The procedure specialist's evaluation will attempt to produce the least restrictive (lowest) takeoff minimums along with the least complicated and safest departure procedure. When possible, the runway will have standard takeoff minimums.

(6) For penetrations of Zone 1 or if a departure route cannot be designed that has a clear 40:1 OIS, higher than standard takeoff minimums or a higher than standard climb gradient will be specified. The ceiling and visibility established by the takeoff minimums shall be sufficient for the pilot to see and avoid the obstructions. The climb gradients shall provide 48 feet per NM obstacle clearance.

(7) For the pilot, higher than standard takeoff minimums (ceiling and visibility) are the most restrictive action that can be taken to provide a safe instrument departure. Consequently, a specified minimum climb gradient to safely overfly the penetrating obstruction may be established. If the pilot determines the specified climb gradient can be maintained to the appropriate altitude, standard takeoff minimums may again apply; if not, the higher takeoff minimums apply. Unrealistically high climb gradients (normally for tall, close-in obstructions) are not established. In cases of numerous close-in penetrating obstructions, a climb gradient is not provided and the pilot is required to see and avoid the obstructions as provided by the takeoff minimums. TERPS paragraph 1205d requires a note to be published stating that the obstruction(s) exist and should be considered by the pilot.

(8) Departure procedures may not always be compatible with ATC preferred departure routes or Standard Instrument Departures (SID). Although every attempt is made to provide ATC compatible procedures, the requirement to provide the pilot with the least restrictive takeoff minimums and departure procedures may dictate what is eventually published under FAR Part 97, IFR Takeoff Minimums and Departure Procedures. SID's are ATC designed departure procedures, not FAR Part 97 procedures, and may contain higher takeoff minimums and climb gradients than are published under FAR Part 97 for that runway.

(9) Pilots flying under FAR Part 91 are not obligated to comply with IFR takeoff minimums nor departure procedures. See FAR Section 91.175f.

c. <u>IFR En Route Procedures</u>. En route airways and facilities are planned prior to establishment to best utilize airspace, expedite the movement of air traffic, and preserve the environment. Routes through and around congested terminal areas are extensively studied to provide optimum ATC utilization and to minimize delays.

(1) Placement of the en route facility normally dictates the airway centerline to the next facility. Exceptions are dogleg airways. Availability of land for purchase or lease often dictate facility locations.

(2) The minimum operational altitudes on these airways (MEA, MOCA, etc.) can be determined by the existing obstacles and terrain in the appropriate areas of protection established in TERPS Chapter 17. However, minimum signal in space requirements may produce MEA altitudes considerably higher than required by obstacle clearance.

(3) Dogleg airways are normally established for ATC use to divert opposite direction traffic when congestion or extensive climbs and descents occur. Because of ATC separation rules and the need to reduce any delay for the aircraft on the dogleg, these routes are normally established 15 degrees left or right of the primary airway.

542. CHANGING PROCEDURES. When IFR procedures are originally developed, all obstructions are considered and the best pilot oriented chart is produced consistent with safety, navaid and runway orientation, and ATC requirements, if any. There are numerous locations on and around airports/heliports where structures of varying size and height can be accommodated without changing the IFR procedures. The basic Flight Standards policy is that major IFR procedural changes should not be considered to accommodate proposed construction. This is especially true when the change would be detrimental to the flying public.

a. Prior to even considering any instrument procedural changes, Flight Standards advocates negotiations with the proponent to move or lower the proposal. Every effort should be made to negotiate airspace conflicts without changing instrument procedures.

b. The current Flight Standards policy is that no required procedure revision will be initiated until construction is imminent on the new obstruction. The reason for this policy is, in the past, instrument procedures may have been changed based on a no hazard determination and construction never occurred. In essence, navigable airspace was "given away" prematurely and for no reason. When discovered, the procedures would then have to be revised again to retrieve this navigable airspace (return to the lower minimums). During this time period when the minimums were higher, a proponent for new construction can rightfully claim that current instrument procedures do not require this airspace. Also, instrument procedure revisions are work intensive and expensive. Consequently, instrument procedures will not be revised until receipt of the construction notice.

c. The most commonly required IFR procedure change is an increase in the minimum altitude for a specific segment. Change in some segment's minimum altitude may be necessary to accommodate new construction. A secondary effect of an altitude increase is that the climb or descent gradients from the preceding and to the succeeding segments are affected. Climb/descent gradients are based on the minimum altitudes at one fix to the minimum altitude at the next fix. The Flight Standards policy is that climb/descent gradients should not exceed optimum, or if currently above optimum, should not be increased.

d. The following is a noninclusive list where changes to IFR procedures should not be considered, or may be considered, in order to accommodate new construction.

(1) SIAP changes that should NOT be considered.

(a) Major changes or complete procedure redesign.

(b) Increase to straight-in or circling minimums.

(c) Increase to descent gradients above optimum, or if already above optimum, any increase to descent gradients.

(d) Adding a stepdown fix to the intermediate or final approach segment utilizing a navaid not required by the procedure.

(e) Changing the final approach course.

(f) An increase to any minimum segment altitude that would significantly disrupt normal aircraft handling by ATC; for instance, loss of a cardinal altitude.

(g) Changes that would increase cockpit workload in the intermediate, final, and missed approach segments of flight.

(h) Adding a requirement for additional equipment to fly the procedure or to obtain the lowest approach minimums allowed by the SIAP; for example, change a VOR procedure to a VOR/DME.

(i) Raising a glide slope angle above optimum.

(2) SIAP changes that may be considered.

(a) An increase to a minimum altitude of a segment.

(b) An addition of a stepdown fix in an approach segment.

(c) Moving a fix.

(d) Changing the course reversal direction to the other side of the course.

(e) A change to the missed approach instruction.

(f) Increasing MSA/ESA.

(g) Deleting an unneeded or unused transition or initial approach segment of the approach.

(h) Replacing a needed segment by adding or modifying a transition or initial approach segment.

(3) IFR Takeoff Minimums and Departure Procedure changes that should NOT be considered.

(a) Increasing the takeoff minimums or climb gradient.

(b) Adding a departure procedure where none previously existed.

(4) IFR Takeoff Minimums and Departure Procedure changes that may be considered: Changing a departure procedure providing the change is not overly restrictive on the pilot.

(5) En route and ATC IFR procedure changes that should NOT be considered.

(a) Increasing the takeoff minimums or climb gradient of a SID.

(b) Increasing an airway MEA or MCA affecting significant numbers of aircraft.

(c) Any minimum altitude changes for STAR's, MVA's, or airways that would increase descent gradients above optimum on the first segment into SIAP's.

(6) En route and ATC IFR Procedure changes that may be considered: A minor change that would not adversely affect a significant amount of aircraft or disrupt the normal aircraft handling capabilities of ATC.

543. PROCEDURES CRITERIA THAT SEGREGATES PROPOSED OBSTACLES FROM EXISTING OBSTACLES. Procedures criteria have two locations where the evaluations for existing obstacles and proposed obstacles may be different. The first is TERPS paragraph 289, Obstacles Close to a Final Approach or Stepdown Fix, which specifically states the criteria apply to existing obstacles. The second is TERPS Chapter 12, Departure Procedures, which states, at numerous locations, that the obstacle identification surface (OIS) begins no higher than 35 feet above the elevation of the departure end of the runway. The OIS is established for each runway on the original departure evaluation, based on existing obstacles.

a. This TERPS wording is restrictive. The regional OE inspector must use logic and common sense when applying TERPS paragraph 289 and the TERPS departure criteria. These are the criteria, but not all site-specific peculiarities can be included in the general criteria.

b. An example of common sense application to TERPS paragraph 289 may be a proposed obstruction which is lower, further off final centerline, and further from the runway than an existing paragraph 289 obstacle. However, a tall antenna farm located at the FAF or final stepdown fix is not desired, nor should an established fix without an existing paragraph 289 obstacle ever have a paragraph 289 obstacle.

c. For departures, an example may be a 1 foot penetration to the existing OIS (if this OIS start elevation is less than 35 feet above the departure end of the runway), by a proposed obstruction over 2 miles from the departure runway. In essence, this action adjusts the previously established OIS which was not the intent of TERPS. A minor adjustment to the OIS may be considered for a proposal some distance from the departure runway end, but should not be considered for Zone 1 obstructions.

544. PROPOSAL ACCURACIES. Obstacle data accuracy is not absolute. The accuracy depends upon the source of data. The size of the error does not preclude the use of the data, provided it is identified and taken into account. Therefore, all obstacle data underlying a flight procedure will have an accuracy code assigned to it that is directly related to the uncertainty associated with the source of the data.

a. Order 8260.19, Chapter 2, Section 11, identifies the requirement for accuracy coding of obstacle data used in the development of instrument procedures and provides information on the application of these coding standards.

(1) For precision approaches, raw data with an accuracy code of 1A (3 feet vertical and 20 feet horizontal) can be used without further adjustment. For all other procedures raw data with an accuracy of 2C (20 feet vertical and 50 feet horizontal) or better, can be used without adjustment.

(2) All raw data with higher (greater than 2C) accuracy codes must have the horizontal uncertainty (associated with the obstacle's accuracy code) applied to the position of the obstacle in the direction of greatest impact, and the vertical uncertainty added to the reported height of the obstacle.

(3) If higher minimums or excessive climb or descent gradients can be attributed directly to the uncertainty in obstacle position or height, then a survey should be used to provide a higher order of accuracy prior to the next revision or periodic review of the procedure.

(4) Since Flight Standards does not currently have funds for contracting out of surveys, the FPB inspector has essentially two options: first, request a flight inspection fly-by, which will result in a 4D accuracy code (50 feet vertical and 250 feet horizontal); or, second, request the assistance of the airport management. In most cases, the airport management can obtain survey coordinates through their respective city, county, or state surveyor's office or have surveys completed in order to mitigate the effect on instrument procedure minimums. Occasionally, the National Ocean Service (NOS) may provide a survey.

b. The primary source for obstacle data used in developing instrument procedures is the Quarterly Obstacle Memo - Digital Obstacle File which is an obstacle database of NOS. NOS assigns each obstacle on the list an accuracy code. The assigned coding is based on the source of the data. The NOS codes have the same footage parameters as the accuracy codes used by the FAA, but the printed codes are not necessarily the same codes used by the FAA for instrument procedure evaluation.

(1) NOS obtains approximately 80 percent of the new obstacles in its database through the OE process. The regional AT OE office sends the FAA Forms 7460-1 and 7460-2 to NOS when the structure exceeds FAR Part 77. Other obstacles are added to the list by NOS aerial photography or individuals sending information to NOS.

(2) When NOS receives a FAA Form 7460-1 and 7460-2, they send a quadrangle map and a questionnaire to the owner of the structure. If the obstruction is marked by the owner on a 7 1/2-minute quad chart with 5-foot or 10-foot contour intervals, it is as-

signed a 5D accuracy code. If the quad chart has a 20-foot contour interval, the accuracy code is 5E. The horizontal code of 5 (+/- 500 feet) is assigned anytime the information is derived from an owner on a quad chart.

(3) Since the FAA uses these accuracy codes for procedure development, 5D and 5E codes may have an undesirable effect on instrument minimums. No matter what the assigned NOS accuracy code, the FAA uses 4D for all obstacles studied under the OE program. Also, NOS accuracy codes may be improved if the region can furnish OE survey data to NOS.

c. With respect to proposed obstruction evaluations, accuracy codes should be applied when performing aeronautical studies. This ensures that effects of the obstruction are properly evaluated.

(1) Past experience has shown that proponents of new construction are fairly accurate on the proposed height of their structure above the ground. However, inaccuracies are common in regard to the base elevation above mean sea level (MSL), upon which their structure will be built and the location (latitude and longitude).

(2) For Flight Standards obstruction evaluations, the most important factors of a new proposal are the MSL height at the top of the structure and its location. Without a survey of the proposed construction site, the possible inaccuracies of the proposal height and location must be considered.

d. The following are Flight Standards policies and practices for application of accuracy standards for obstruction evaluations.

(1) The standards of Order 8260.19 apply.

(2) An OE accuracy code of 4D (50 feet vertical and 250 feet horizontal) should be used on all segment controlling obstructions if required by Order 8260.19. (Note that Order 8260.19 requires no adjustments, using 4D coding, be applied to studies involving IFR departure surfaces in zones 2 and 3, intermediate areas, and all procedures with 1000/-2000 foot ROC such as en route, holding, procedure turns, transition/feeder routes, and MVA.)

(3) Exceptions for using a less restrictive accuracy code may be for proposals on airport property where good surveys or an Obstruction Chart (OC) exists. Knowing the base MSL elevation and having measured distances from a runway, may eliminate the need to apply an accuracy code. Another exception may be proposals at mean sea level (on ocean beaches or tidal marshes) where the base elevation is known within +/- 3 feet (vertical accuracy A). Another example would be relatively short objects not exceeding the height of tree growth. Local procedure development policies specifies tree heights for obstacle protection

(for example, 100 feet) and existing segment minimums should already have considered tree height above the terrain.

(4) If improved accuracy would eliminate an adverse effect, AT shall be notified. Based on the other services' evaluation results, AT may determine a site survey is appropriate and request the proponent to provide this survey.

(5) The FPB OE inspector should not concur to a no hazard determination with adverse effects without reviewing a requested survey. The review should assure that survey documentation is from a legitimate source, such as a licensed surveyor or licensed professional engineer. The information should be in the form of geographic coordinates and feet above mean sea level. The datum standard must be stated. There should be a statement of the degree of accuracy of the data (+/- footage horizontal and vertical). Surveyed coordinates should be to the nearest tenth of a second. Usually, the originally filed coordinates are not this precise and the location should change. See Figure 5-7 for a sample site survey from the proponent.

(6) The survey has to be forwarded to NOS with the FAA Form 7460-2 so the appropriate accuracy code can be included with the new listing on the Quarterly Obstacle Memo - Digital Obstacle File. The OE inspector also must inform the FIAO of the accuracy code used, especially if procedures have to be revised.

(7) If a survey would eliminate adverse effects, the OE inspector should not concur to a no hazard determination based on a promise that the proponent will furnish a survey after construction is completed.

545. ERRORS IN EXISTING INSTRUMENT PROCEDURES DISCOVERED DURING THE OBSTRUCTION EVALUATION. Occasionally, errors in existing procedures may be found when accomplishing the obstruction evaluation. Actions must be taken by the OE inspector or the error conveyed to another FPB inspector for action.

a. <u>Action</u>. The first action the inspector should take is to discuss the discovery with the FIAO. The apparent error may be nothing more than an improperly documented flight inspection result or some other factor not apparent on the procedures forms. Actual errors require further action.

(1) If minimums are too low and must be raised, immediate NOTAM action by the FIAO procedures specialist is probably required. Other errors discovered besides minimums may also require NOTAM action.

(2) If minimums are too high or other minor errors exist, immediate action may not

be required but procedure revision steps should be initiated.

b. Procedural Changes Affect the Obstruction Evaluations. For errors in minimums lower than required, the OE inspector must note the procedural changes required based on the discovered error and evaluate the proposal based on what the procedure minimums should be. Do not evaluate the proposal based on a procedure that is incorrect and must be changed.

546. AIRSPACE WHERE ADJUSTMENTS INCREASE OPERATIONAL ALTITUDES. RESERVED. TBD.

547. TEMPORARY OBSTRUCTIONS. Order 7400.2, paragraph 7-37, provides the guidance on temporary structures and temporary construction equipment.

a. The general policy stated in Order 7400.2 is that a temporary structure of 30 days or less should be accommodated by reasonable adjustments provided there is no substantial adverse affect on aeronautical operations or procedures.

b. A temporary Flight Data Center (FDC) NOTAM may have to be issued for temporary structures and temporary construction equipment which affect instrument procedures.

c. Instrument procedure revisions may have to be made if construction equipment use is planned for 120 days or more. This 120-day limit is the temporary FDC NOTAM time limit specified in Order 8260.19, Chapter 2, Section 6.

d. In the event an instrument procedure has to be temporarily revised based on construction equipment, the airspace required by the original procedure is still reserved for aircraft. The OE inspector is cautioned to evaluate new obstruction proposals based on the original procedure and not the temporary procedure. Precise record keeping is necessary for all procedures changed based on temporary construction equipment to ensure proper evaluation of any new proposals and to ensure procedures are revised to the original form when the equipment is removed.

548. CONSIDERING PROCEDURAL CHANGES. When a procedure change is considered to accommodate new construction, do not overlook any design limitations addressed in Order 8260.19. For example, do not concur with a proposal when the FIAO cannot make the appropriate change because a final stepdown fix does not save 60 feet or reduce visibilities.

549. PROCEDURAL CHANGES AND ENVIRONMENTAL ASSESSMENTS. Order 1050.1, Policies and Procedures for Considering Environmental Impacts, establishes FAA policies and procedures for implementing the National Environmental Policy Act of 1969 (NEPA), and specifies Flight Standards environmental responsibilities. One category of responsibility includes new instrument approach procedures, departure procedures, en route procedures, and modifications to currently approved instrument procedures. Also see Chapter 10.

a. During an aeronautical study, the OE inspector determines if modification of the instrument procedure to accommodate a proposed obstruction is technically possible. If modification is possible and prior to stating that it may be possible to modify the procedure, an analysis of the environmental consequences of the action is required.

b. The categorical exclusions in Order 1050.1 do not apply in noise sensitive areas or at a location of known environmental activism. When considering changing procedures, an environmental assessment is required if the change is apt to be controversial.

c. Recognizing that cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time, a review is necessary to determine the cumulative impact of past, present, and reasonably foreseeable future in order to judge whether significant changes in noise will occur.

d. All proposed changes to a procedure not categorically excluded will require an environmental assessment to determine the extent of the impact. If the result of the assessment is a Finding Of No Significant Impact (FONSI), then it may be possible to modify the procedure. Requirements for an Environmental Impact Statement (EIS) may possibly result in no modification to the procedure being considered. The proposal proponent seeking the revision may consider paying for an environmental assessment to speed the OE determination process.

550. EVALUATING VFR EFFECTS. Order 7400.2 provides most of the FAA's written guidance for evaluating the possible VFR effects of a proposed structure. In conjunction to this guidance, the OE inspector must apply any knowledge they may have concerning the local VFR operations or discuss these types of operations with the controlling FSDO.

a. Proposals near an airport/heliport must be very closely evaluated, especially when located in the traffic pattern area. Climbs for departing aircraft and descents for landing aircraft within the traffic pattern area are important considerations.

b. Any local helicopter operations require special attention.

c. Local conditions such as weather and terrain may have an effect on the evaluation.

d. The OE inspector should recommend marking and lighting, even if not specifically indicated by the existing guidelines in Order 7400.2, at locations where visual identification by the pilot is deemed appropriate.

e. Proposals less the 500 feet AGL require a thorough review, but, for en route effects, any proposal exceeding 500 feet AGL requires an extensive evaluation of VFR routes.

f. While one particular proposal may not impose an adverse effect upon a VFR operation, the FPB OE inspector must consider the cumulative effect it could have when existing obstacles in the general area are considered.

551. OVERVIEW OF THE FLIGHT STANDARDS APPLICATION POLICIES. The FAA has a congressional mandate to manage navigable airspace. Every effort should be made to negotiate a reduction in height of proposals or relocation to maintain current levels of safety.

a. The Flight Standards policy, based on the guidance in Order 7400.2 and this handbook, is that proposed structures can be accommodated provided their construction would not have an substantial adverse effect on IFR and VFR operations. A major concern is aircraft safety.

b. In conjunction with criteria application, the inspector should evaluate the proposal based on the pilot's viewpoint. Flying in the area of the proposal can provide insight not always apparent from a map study.

c. If a thorough evaluation reveals that there would be an adverse effect on IFR or VFR operations, the inspector is obligated to object to the proposal.

552. TOOLS FOR OBSTRUCTION EVALUATIONS. There are some tools available to assist the OE inspector in the obstruction evaluation. The most productive tools are the newer automation aids. There are also manual aids such as maps, charts, and forms, that have been used successfully for years. Today, automation programs assist in the evaluation process, but cannot fully replace the manual tools which still are used for complex cases.

a. <u>Automation Tools</u>. The use of computer programs has expanded in the past few years. Several OE automation tools are utilized in the regions. These programs were developed by FPB personnel for local use. Through lack of a national program, they are now shared between regions. The FPB developed programs are occasionally updated or expanded by the developers. The automation information presented in this handbook is meant for guidance and understanding for those using the programs. Use of the automation tools is not mandatory, but for some evaluations automation is almost indispensable. The following are common automation tools used in the regions.

(1) <u>The OE Networks</u>. Currently, 2 different networks are being used. One is a local area network based tracking system developed by a contractor for Air Traffic in

Washington. Some regions now have an automated OE network available. Networks have been criticized for being slow and cumbersome. However, each offers a database which contains a current status for each and every OE case. Networks are a tracking system only and have no calculating capability for Flight Standards evaluations.

(a) The OE network system manager generally is located in the regional Air Traffic Division. Users require a network cable connection and a network card in their computer.

(b) The focal office for the OE database is the regional Air Traffic 530 branch. The 530 office receives a new FAA Form 7460-1 from an construction proponent. They enter the information from that form into the OE network database and assign an OE case number. Once the information resides in the network, a user from any of the operating divisions may access the data.

(c) Some AT offices transmit the OE case via the computer network only to the other operating divisions. A hard copy of the FAA Form 7460-1 and map are not circulated. Other regions still use a hard copy 7460-1 form and a map with the obstruction plotted, but use the computer network for responses.

(d) One advantage of the OE network is that the OE data can be loaded to the Preliminary Regional Obstacle Screening Evaluator (PROSE-see paragraph (2) below) very readily on the computer and the need for manual data entry by the FPB is eliminated. Some FPB's have print capabilities for the computer generated 7460-1 form and down load all cases into a FPB OE tracking program. All these actions occur at the same time PROSE is being utilized.

(e) After analysis of the proposed obstruction by the operating divisions, a response may be made via the OE network. Each user is assigned a user ID and password. Response fields in the OE network may only be accessed by the appropriate user; that is, only Flight Standards may make a response in the Flight Standards response field. Once the response is made, it is "locked" by the user. No one is then able to change that response.

(f) Figure 5-8 shows an example of a computer generated 7460-1 form. Figures 5-9 and 5-10 show two examples of a computer OE network response form. Note that the space for comments is very limited, but an additional page is available. Figure 5-11 is the first page of a yearly status listing that is part of some FPB's internal OE case automated records.

(2) <u>Preliminary Regional Obstacle Screening Evaluator (PROSE)</u>. This software was planned by a Flight Standards committee, mainly from different FPB's. The

software was developed by Mr. Thomas Hilquist from the AGL-220 office. The program is written in Basic and is used as an OE "rough" screening device. Although this program has not been "officially" certified by the FAA, it was validated by AGL-220 before it was put into operational use. Since 1986, PROSE has been extensively used and field tested by both AGL-220 and ASO-220. Changes and updates were made immediately upon discovery of any error. At the time of this writing, there were no known errors or discrepancies in the program.

(a) To use this software, a database must be created consisting of all the existing and planned airports/heliports, approaches, airways, and facilities in the region. The database generation may take several weeks. Some regions have already created this database, and only need to make additions or corrections as new procedures are developed or other procedures are modified. The major drawback of PROSE is the database creation and maintenance.

(b) The PROSE program defines airways, approach trapezoids, and other airspace requirements by approximating these areas with circles. These circles are always large enough to encompass all possible areas of an instrument procedure. A PROSE evaluation is very thorough and may identify more problems than actually exist. It is an excellent screening program which will identify almost all potential problems, with the exception of VFR effects and safety issues. Based on the PROSE results, the areas "flagged" for possible effect will require further study. Areas not "flagged" will not require further study.

(c) A major operational benefit of using PROSE is that it eliminates errors due to inadvertently overlooking any area in an obstruction evaluation. This screening process, by omission of a program print-out, also allows for a quicker review. Of course, a properly maintained and accurate database is critical.

(d) A starter package explaining how to initialize the PROSE program can be obtained from AGL-220. Tom Hilquist or another inspector can help with any questions for initial setup.

(e) Once the PROSE program and database are set up, the branch secretary or clerk can input the new daily OE information into PROSE. This can be done directly or through data file manipulation if the OE data is entered into another program like an OE index. In those regions where AT is using an automated OE management system, the AT program builds a daily OE file that the PROSE program can use without having to enter each OE case directly. The secretary can then run the PROSE program and distribute the results to the appropriate

OE inspector for further processing. The inspector can then do a quick screen and separate the OE cases that have no effect. These cases can usually be evaluated very quickly. A rapid turnaround for the cases is the main administrative benefit of PROSE.

(f) A PROSE print-out for a typical OE case is shown in Figure 5-12. Some important terms and their definitions regarding the reading of a PROSE print-out are discussed in the following section, where the evaluation of en route and approach segments are thoroughly discussed.

(3) <u>SUPERPROSE</u>. SUPERPROSE is a follow-on program to PROSE. This program initially runs the PROSE program but retains the results internally rather than producing a print-out. The operator is then provided a new menu from which to chose non-precision, precision, or radar/departure/circling evaluations. Using the TERPS Calculator programs (see paragraph (4) below), the program evaluates every approach of the selected type at an airport if the PROSE program had previously determined that there may be an effect. SUPERPROSE then prints specific results for each evaluated approach at that airport.

(a) The following are examples of SUPERPROSE print-outs for evaluated non-precision approaches at an airport (XYZ is the airport identifier):

"XYZ VOR-A - OK"
"XYZ NDB RWY 21 - OK"
"XYZ NDB-B - EXCEEDS"
"XYZ VOR/DME RWY 03 - CONTROLLING"

(b) If the results are not "OK", then an individual print-out is made of the TERPS Calculator results of that particular non-precision approach.

(c) Similar results are obtained when the precision or radar/departure/circling menu items are selected.

(4) <u>TERPS Calculator</u>. This software was also developed by Mr. Thomas Hilquist using BASIC for the programming. TERPS Calculator software provides a precise and specific analysis of one requested evaluation at a time.

(a) The program provides an evaluation of the final and missed approach segments of the instrument procedure.

(b) Although a database is required, the program provides for keyboard data entry without first putting it into a database. Also, this software can utilize the PROSE database and is extremely valuable in determining OE effects. TERPS Calculator is generally used after potential effects have been defined by PROSE or manual screening. A TERPS Calculator printout is shown in Figure 5-13.

(5) GEODES/-GEODET. Often in the OE process, distances and courses based upon latitude/longitude information are necessary. Two programs were developed in BASIC which accomplish this task. Mr. James Mast, of ANM-220, wrote GEODES, and Mr. Thomas Hilquist, of AGL-220 wrote GEODET. No database is required to use these programs. They are stand-alone programs that are very user friendly. An example of a GEODET printout is shown in Figure 5-15.

(6) GT-CALC: Geodetic/TERPS Calculator. In 1991, Jim Mast, ANM-220, developed GT-CALC which consists of a set of application modules and an on-line database of navigational aids, airports, and airway data. GEODES is one of the interconnected modules. Besides database utilization and geodetic computations, GT-CALC has modules for ILS, MLS, diverse departure, holding, and procedure turn. GT-CALC is a useful program for initial development work for instrument procedures, obstacle analysis, and data retrieval. However, there is no provision for updating the on-line database. This capability must be developed because data become obsolete quickly. An example of a GT-CALC printout, including the main menu listing GEODES as an option, is shown in Figure 5-14.

(7) Instrument Approach Procedures Automation (IAPA). The development of IAPA first began in 1974. The Flight Procedures Branch, AVN-220, is the software and hardware manager of IAPA. Unfortunately, the primary function of IAPA has been limited to development of instrument approach procedures. Rapid OE analysis is rarely possible on IAPA. The capabilities of IAPA are increasing and new equipment is expected to be installed in all FIAO's, regional 220 offices, and Washington Headquarters in the 1994 time-frame.

(a) Presently, IAPA is of limited use in the OE program. IAPA may sometimes be helpful in the analysis of a complex OE case such as determining the effects in a turning missed approach area. However, creating an IAPA workfile to perform this analysis would be necessary. This can be a very time consuming task.

(b) Even after the workfile creation, the complete final approach portion of the approach procedure has to be built prior to evaluating something like a missed approach. Normally, a manual map evaluation or using the PC programs listed above is much easier and quicker. However, IAPA has the advantage of being a certified program that produces certified results.

(c) When the new IAPA equipment is available, workfile creation will be relatively quick and existing procedures will be stored in a file until they are canceled. Stored existing procedures should be able to be retrieved directly by FPB inspectors and IAPA will become an increasingly important OE tool.

(d) One issue that is a problem in using the current IAPA program is the display of graphics. The FPB's do not have IAPA graphics terminals and printers, and the workfile must be sent from the FPB PC to a FIAO or AVN-220 terminal to view the graphics. The assisting office must then manipulate the graphics terminal to view the area of interest. Then a print copy is made and the piece of paper has to be forwarded to the FPB. This is a rather cumbersome procedure. The initial purchase of the new IAPA equipment will resolve this particular problem.

(e) IAPA is a menu driven program. The menu results of segment development can be printed using the PC print screen function. IAPA segment programs are useful for trying alternate missed approaches, finals with stepdown fixes, and new initial/feeder routes, should the inspector determine that procedural changes may be appropriate.

(f) Currently, it is possible to obtain a workfile out of IAPA by using any PC and modem, delete words from the workfile, and display the procedure graphics on a regional computer aided engineering graphics (CAEG) system. All regions originally had CAEG equipment and efforts were being made to make use of CAEG equipment in OE applications. However, hardware issues and lack of progress on programming this project are delaying CAEG for obstruction evaluation use. The future of this project is in doubt, because the new IAPA equipment will have most of the CAEG capabilities and some regions do not have CAEG.

(8) Airman's Management Information System (AMIS). The AMIS database is helpful to the inspector because it contains required airport/heliport and navaid data with the appropriate accuracies required for instrument procedure design and flight inspection. Although the AMIS database is more extensive than airport/navaid data, these are the primary data used by the FPB. Also, AMIS services the data need for IAPA. Most regions have an AMIS terminal. The Data Analysis Branch, AVN-240, manages AMIS information. AMIS is the FAA official airport and navaid data source for FPB database creation and for obstruction evaluations.

b. Manual Evaluation Tools. There are a number of manual evaluation tools which are required or desired to properly complete obstruction evaluations.

(1) Basic Supplies. A sharp pencil (.05 mm mechanical pencil is recommended), dividers, an engineers scale ruler, and an engineers calculator are considered the minimum requirements for obstruction evaluations. A drafting

table is also desired for the extensive map study that may be required for obstruction evaluations (and also for the numerous other map tasks accomplished by the FPB).

(2) Maps and Charts. The major maps and charts needed are: current instrument approach charts, sectional charts, VFR terminal area charts, current en route low altitude airway charts, and airport obstruction charts (OC). A set of 1:250,000 topographic charts and quad charts are occasionally needed. Also helpful is a SIAP graphic consisting of approach segments drawn on a sectional chart or produced by IAPA.

(3) Other Tools. Besides access to FAA Form 5010-1's and airport/facility directories for the regional area of responsibility, the primary remaining tool is the FAA Form 8260 series forms containing the instrument procedure data. Of prime importance is the FAA Form 8260-9, Standard Instrument Approach Procedure Data Record. This form contains the controlling obstructions for all segments of the approach, as well as ROC, minimum altitude adjustments, etc. Plastic trapezoidal templates or transparent segment overlays for different scale maps may speed analysis time.

(4) Job Aid. Figure 5-16 is a job aid that lists the primary IFR procedures and VFR operations that should be evaluated for each obstruction evaluation. This standardized obstruction evaluation listing was selected from examples of job aids currently used in FPB's. The OE inspector is encouraged to use this job aid to document any effects discovered for an individual proposal. The completed job aid can also be used for the response to AT and as a permanent record of any effect discovered. The obstacle evaluation process detailed in the next section uses this job aid as the format for the evaluation.

553.-555. RESERVED.

FIGURE 5-7. SAMPLE SITE SURVEY

DONALD L. HAMLIN
CONSULTING ENGINEERS, INC.
ENGINEERS AND LAND SURVEYORS

Please Reply to:

☒ P.O. Box 9
Essex Junction
Vermont 05453

☐ P.O. Box 5202
St. Thomas
U.S.V.I. 00801

136 Pearl Street
Essex Junction, Vermont
and
#40 SubBase
Charlotte Amalie – St. Thomas
U.S. Virgin Islands

Tel. (802) 878-3956
(802) 878-5123

Tel (809) 776-3388

July 27, 1992

Contact Communications
1 Blair Park Suite 17
Williston, Vermont 05495

attn.: Mr. Paul Valois

RE: Antenna Tower
3097 Williston Road
So. Burlington, VT

Dear Mr. Valois:

We have completed the location of the proposed antenna tower site at the above mentioned address and the results are as follows:

Latitude - 44° 27' 29.12"
Longitude - 73° 08' 25.23"

The above is based on monumentation established in the 1983 datum obtained from the Vermont Agency of Transportation Central Vermont GPS Network Densification conducted in October 1991.

Elevation - Base of Tower 353.5 feet (USGS 1929)

Information obtained from the Airport Engineer indicates the highest portion of the east-west runway is at elevation 341 feet (USGS 1929).

Please contact me if you should require any additional information.

Sincerely;

Ronald E. Gauthier

Ronald E. Gauthier, Vt L.S. #574

WATER SUPPLY AND DISTRIBUTION
WASTE WATER COLLECTION AND TREATMENT
STREETS AND HIGHWAYS
AIRPORTS

SUBDIVISIONS
SKI LIFTS
RECREATION AND INDUSTRIAL PLANNING
SOIL BORINGS

LABORATORY ANALYSIS
(WATER AND WASTE WATER)
LAND SURVEYING
SOLID WASTE MANAGEMENT

Engineering – "The link between what we have and what we need"

FIGURE 5-8. SAMPLE COMPUTER GENERATED 7460-1 FORM

```
                            7460-1 File Control Screen - CURRENT
Study         :92-ASO-0100-OE                      MSL          :   160
Received      :01/16/92  Entry Date:  01/17/92     AGL   (AGL1) :   296        296
Proponent     :AT&T                                AMSL (AMSL1):    456        456
Attn.   of    :GARY MALIK                          Prior Study :72-SO-659-OE
Address       :4410 ROSEWOOD DR., RM 1180          On Airport   :N
Cty,St,Zip:PLEASANTON, CA 94588                    Traverseway :NO
Tel,Name      :510-224-3438                        Status       :DNE
Bldg,Descp:ANTENNA TOWER HEIGHT INCREASE; EXISTING 3750-4170 MHZ AT 5.2 WATTS;
PROPOSED ADDITION 451.325 MHZ - 221 WATTS
Type Struct :ANTENNA TOWER                         Fini Date         :02/24/92
Power           :    0.221   KW                    Submitted         :01/10/92
Frequency       :   451.325 MHZ    Mult:N          Circularized      :  /  /
Latitude        : 29-56-53.00                      Terminated        :  /  /
Longitude       :082-33-29.00                      Acknowledged      :02/24/92
City            :ELLISVILLE                        Type of Ack       :DNE/MLS
State           :FL                                Follow up date:  /  /
Nearest Airport: NONE WITHIN 10 NM                 MOCA    :          MVA   :
Specialist:   Alfred P. Smith                      MEA     :          Terrain  :
Remarks:       HEIGHT REDUCED TO 296 AGL FROM 308 AGL PER LTR DATED 03/12/92 APS
_EXISTING TOWER NO INCREASE
                         S C R E E N    O P T I O N S
FIND CASE BY  S)Study # P)Prop L)Lat  F)Freq  C)City  T)Date  U)St W)Pwr D)c/o
Q)Quit
                         NUM LOCK                           CAPS LOCK
```

FIGURE 5-9. COMPUTER GENERATED OE RESPONSE FORM #1

```
                              AIRSPACE MANAGEMENT  Response                 Page

Study No.:  91-ASO-1343-OE           City: COLLIERVILLE      State:TN
Proponent:BELLSOUTH MOBILITY, INC.             Lat:35-02-31.00 Lon:089-41-09.00
*****************************AIRPORT RESPONSE*********************************
REMARKS:                         DATE:05-AUG-91       SPECIALIST:MEM

                 We Have no objection to the subject proposal

*************************FLIGHT STANDARDS RESPONSE*****************************
REMARKS:                         DATE:11-SEP-91       SPECIALIST:TWJ

                 We Have no objection to the subject proposal



                              S C R E E N   O P T I O N S
FIND CASE RESPONSES    S)Study #       Q)Quit
                       E)Enter Resp.   A)Auto Response
Cancel AUTO-RESPONSE? (Y/N)
                        NUM LOCK
```

FIGURE 5-10. COMPUTER GENERATED OE RESPONSE FORM #2

```
                              AIRSPACE MANAGEMENT  Response                 Page 2

 Study No.:  91-ASO-1342-OE           City: OAK GROVE         State:AL
 Proponent:BELLSOUTH MOBILITY                    Lat:33-11-58.00 Lon:086-18-04.00
 *****************************AIRPORT RESPONSE*********************************
 REMARKS:                         DATE:05-AUG-91       SPECIALIST:JAN
STANDARDS EXCEED VIOLATES 77.25(B) BY 222'
CONICAL SURFACE 569+150=719+10=729' CONICAL SURFACE ELEVATION
951-729=222
 *************************FLIGHT STANDARDS RESPONSE*****************************
 REMARKS:                         DATE:09-SEP-91       SPECIALIST:TWJ
NO EFFECT ON 77.23(A)(3) OR (4).  HOWEVER REQUEST SUPPLIMENTAL NOTICE BE
GIVEN TO ATL FIFO SINCE THIS WILL BECOME  THE HIGHEST OBSTRUCTION IN THE
CAT C CIRCLING AREA.Q



                              S C R E E N   O P T I O N S
FIND CASE RESPONSES    S)Study #       Q)Quit
                       E)Enter Resp.   A)Auto Response

                        NUM LOCK
```

FIGURE 5-11. SAMPLE YEARLY OE STATUS LISTING

9/11/91 Standard Report Page

OE #	CITY	ST	EFFEC	LATITUDE	LONGITUDE	AMSL	MSA
91-0001	JACKSONVILLE	FL	NE	302927	814114	84	N
91-0001A	JACKSONVILLE	FL	NE	302928	814114	205	N
91-0002	ATLANTA	GA	E	333924	842454	1289	N
91-0003	STONY LANDING	SC	NE	331230	795915	370	N
91-0004	ALBERMARLE	NC	NE	352915	800544	590	N
91-0005	ALBERMARLE	NC	NE	352512	800852	573	N
91-0006	ALBERMARLE	NC	NE	352423	800931	608	N
91-0007	ALBERMARLE	NC	NE	352512	800858	593	N
91-0008	ALBERMARLE	NC	NE	352423	800930	619	N
91-0009	ALBERMARLE	NC	NE	352542	800824	615	N
91-0010	SOMERSET	KY	E	370221	843845	1210	N
91-0011	WADESBORO	NC	E	350442	801708	1634	Y
91-0012	NEW HOLLAND	GA	NE	341911	834615	1574	N
91-0013	TAMPA	FL	NE	275922	823026	124	N
91-0014	TAMPA	FL	NE	275922	823026	185	N
91-0015	BLACK MOUNTAIN	NC	NE	353619	822100	2499	N
91-0016	RICHMOND	KY	NE	374255	841615	1285	N
91-0017	KEY WEST	FL	NE	243442	814449	179	N
91-0018	MARATHON	FL	NE	244220	810437	155	N
91-0019	STRINGER	MS	E	314917	891837	842	N
91-0020	MIAMI	FL	N	254832	801242	253	N
91-0021	CORAL GABLES	FL		0	0	0	
91-0022	ATLANTA	GA	NE	334839	841742	1151	N
91-0023	HAMLET	NC	NE	344844	794338	837	N
91-0024	ROANOKE RAPIDS	NC	NE	363012	774447	588	N
91-0025	CREOLA	AL	N	305405	880435	308	N
91-0026	COLUMBIANA	AL	NE	331228	863440	1198	N
91-0027	GOLDSBORO	NC	NE	352210	780053	305	N
91-0028	CALERA	AL	NE	330744	864759	828	N
91-0029	LINN CROSSING	AL	NE	334113	865841	818	N
91-0030	HOMEWOOD	AL	NE	332900	864838	1120	N
91-0031	PLEASANT GROVE	AL	NE	332930	865713	998	N
91-0032	JASPER	AL	NE	335143	872149	838	N
91-0033	HOLLYWOOD	FL	E	260430	801155	209	N
91-0033A	HOLLYWOOD	FL	E	260408	801155	209	N
91-0034	ST. PETERSBURG	FL	NE	274608	823744	60	N
91-0035	HILTON HEAD IS	SC	E	321410	804127	50	N
91-0036	ERLANGER	KY	NE	390230	843810	980	N
91-0037	DYER	TN	NE	360510	885439	708	N
91-0038	ALVATON	KY	NE	365035	861530	1143	N
91-0039	MONTICELLO	KY	NE	365101	845132	1000	N
91-0040	MADISON	TN	NE	361524	864437	1000	N
91-0041	FAYETTEVILLE	NC	NE	350257	785133	253	N
91-0042	LABELLE	FL	NE	264016	812606	327	N
91-0043	LABELLE	FL	NE	264200	812604	326	N
91-0044	YORK	SC	NE	345932	811236	900	N
91-0045	POLK CITY	FL	NE	281536	815211	625	N
91-0046	WINTER PARK	FL	NE	283537	812053	224	N
91-0047	ORLANDO	FL	NE	283347	812158	263	N
91-0048	VERSAILLES	KY	NE	380310	844152	1220	N
91-0049	CULEBRA	PR	NE	181939	651805	813	N

FIGURE 5-12. SAMPLE PROSE PRINTOUT

```
File:  92-0301 031492.OE  Date: 03-17-1992
Case:  92-0301 may exceed MEA/MOCA near HYK.
Case:  92-0301 may exceed a 1000 ft ROC at BRY.Bear: 331.67
          Dist(NM): 21.67
Case:  92-0301 may become 1000 ft Ctrl Obs at BRY.Bear: 331.67
          Dist(NM): 21.67
Case:  92-0301 may exceed MVA at LEX.Bear: 276.63 Dist(NM): 52.92
Case:  92-0301 may become MVA Ctrl Obs at LEX.Bear: 276.63
          Dist(NM): 53.92
Case:  92-0301 may exceed a 1000 ft ROC at LOU.Bear: 203.76
          Dist(NM): 6.2
Case:  92-0301 may become 1000 ft Ctrl Obs at LOU.Bear: 203.76
          Dist(NM): 6.2
Case:  92-0301 may exceed a 500 ft ROC at LOU.Bear: 203.76
          Dist(NM): 6.2
Case:  92-0301 may become 500 ft Ctrl Obs at LOU.Bear: 203.76
          Dist(NM): 6.2
Case:  92-0301 may exceed Non-Prec MDA at LOU.Bear: 203.76
          Dist(NM): 6.2
Case:  92-0301 may exceed Dept/Missed area at LOU.Bear: 203.76
          Dist(NM): 6.2
Case:  92-0301 may exceed a 1000 ft ROC at SDF.Bear: 159.37
          Dist(NM): 2.65
Case:  92-0301 may become 1000 ft Ctrl Obs at SDF.Bear: 159.37
          Dist(NM): 2.65
Case:  92-0301 may exceed MVA at SDF.Bear: 159.37 Dist(NM): 2.65
Case:  92-0301 may become MVA Ctrl Obs at SDF.Bear: 159.37
          Dist(NM): 2.65
Case:  92-0301 may exceed a 500 ft ROC at SDF.Bear: 159.37
          Dist(NM): 2.65
Case:  92-0301 may become 500 ft Ctrl Obs at SDF.Bear: 159.37
          Dist(NM): 2.65
Case:  92-0301 may exceed Non-Prec MDA at SDF.Bear: 159.37
          Dist(NM): 2.65
Case:  92-0301 may exceed Circling MDA at SDF.Bear: 159.37
          Dist(NM): 2.65
Case:  92-0301 may exceed Dept/Missed/ILS area at SDF.Bear: 159.37
          Dist(NM):2.65
Case:  92-0301 may exceed a 1000 ft ROC at FTK.Bear: 40.21
          Dist(NM): 18.33
Case:  92-0301 may become 1000 ft Ctrl Obs at FTK.Bear: 40.21
          Dist(NM): 18.33
Case:  92-0301 may exceed MVA at FTK.Bear: 40.21 Dist(NM): 18.33
Case:  92-0301 may become MVA Ctrl Obs at FTK.Bear: 40.31
          Dist(NM): 18.33
Case:  92-0301-OE, State:KY, Lat: 380800, Long: 854300,
          Ht: 2000, VA: 50
```

FIGURE 5-13. SAMPLE TERPS CALCULATOR PRINTOUT

```
                * * * FAA OBSTRUCTION EVALUATION MENU * * *

   1) PRECISION APPROACHES

      * ILS        * MLS

   2) NON PRECISION APPROACHES

      * ASR        * DF        * LOCALIZER       * LORAN-C

      * NDB        * RNAV      * SDF        * TACAN       * VOR

   3) AIRWAY  *  TRANSITION ROUTES

   4) SUPPLEMENTAL CALCULATIONS

      * CIRCLING AREA       * DEPARTURE AREA       * HOLDING AREA

      * INTERMEDIATE AREA   * PROC-TURN AREA       * RADAR VECTOR AREA

   5) EXIT PROGRAM

    * * *  TERPS CALCULATOR  * * *  DATE: 04-07-1993  TIME:15:15:57

                  * * *  NDB EVALUATION  * * *

        ***  NDB INFORMATION  ***

AIRPORT IDENT: MGM                          RUNWAY NO: 09
NDB IDENT: MARRA                            NDB MAGNETIC VARIATION,(EAST-).
NDB LATITUDE: 321841.7                      NDB LONGITUDE: 863038
NDB FREQUENCY:  245                         STEP-DOWN FIX (Y)ES or (N)O: N
FINAL APPROACH COURSE (FAC): 97             FAF - (W)ITH OR (N)O: W
FINAL APPROACH COURSE IS (T)O or (F)ROM THE NAV-AID: F
NAV-AID TO MISSED APP POINT (NM): 5.1       NAV-AID TO FAF DISTANCE (NM): 0

        ***  STUDY INFORMATION  ***

STUDY COMPLETED BY: TERRY JENNINGS          ROUTING SYMBOL: ASO-220/J
PROSE FILE NUMBER: AL.OE                    AIRSPACE CASE NO: 93-0497
OBSTRUCTION LATITUDE: 321834                OBSTRUCTION LONGITUDE: 863018
OBSTRUCTION HEIGHT: 577                     VERTICAL ACCURACY (FEET): 0

        ***  RESULTS  ***

OBJECT DISTANCE OUT (FT): 1788.44           DISTANCE OVER (FT):-594.44
OBJECT DISTANCE OUT (NM): .29               DISTANCE OVER (NM):-.1
DIRECT DISTANCE (FT). 1884.64               DIRECT DISTANCE (NM): .31
TRUE AZIMUTH FROM NDB TO OBJECT: 114.39
NDB 1/2 WIDTH OF PRIMARY (FT): 7744.16      TOTAL NDB 1/2 WIDTH (FT): 7863.37
NDB WIDTH OF SECONDARY (FT): 119.22
UNCORRECTED MDA (AMSL): 877  COMPUTED ROC:  300
```

FIGURE 5-14. SAMPLE GT-CALC PRINTOUT

```
[ Exit  Options ]

    Geodes
  ► ILS Calculator
    MLS Calculator
    NonPrec Calculato
    Departure Calc.
    Holding
    State Plane
    Search Routine
    System SetUp
    Exit to DOS
```

```
Mode: GEODETIC  NAD83      ***  ILS CALCULATOR  ***                     OFZ:Yes

               ILS VARIABLES                        |         OBSTACLE VARIABLES
Fid:JAV  Aptid:KORD  Rwy:09L   Mvar:00E  Cat: 1     |
        LAT            LON          Elev  Brg/Ang   |       NAME:
LOC: 41-59-02.048  087-53-10.502   643.0   89.98    |        LAT:  42-00-05.000
G/S: 41-59-08.107  087-54-51.336   658.4    3.00    |        LON: 087-40-32.000
RWY: 41-59-02.027  087-55-06.077   660.0   89.98    |       Elev:  3000
Len:  7966     Gpi#: 1096.8  TDZ:  660.0            |   C/L Dist#: 65998.4
 DH: 860  ALS Typ:      Lngth:3000  Apt Elv:  667   | Abeam# Dist#:-6445.0
Acft CAT: D Type: L  Wing Span: 200                 |

Missed Approach Affected
TRAP. AREA              Pri MA
Missed Appr. Section    Two
DESIRED DH (MSL)        860
REVISED DH (MSL)        860

AMT. of PENETRATION     547.7

Hi-lighted items used in computation..

  Compute Auto    Erase   Mode    PiDs    RWYs    Ofz    Path    ESC    ^Exit
Compute ILS precision affect by obstacle
```

FIGURE 5-15. SAMPLE GEODET PRINTOUT

```
***** GEODETIC CALCULATOR MENU *****

1) INVERSE * DISTANCE AND BEARING BETWEEN TWO POINTS.
2) TANGENT * DISTANCE OUT AND OVER FROM KNOWN POINT AND BEARING.
3) DIRECT * COORDINATES FROM KNOWN POINT, DISTANCE AND BEARING.
4) INTERSECTION * COORDINATES FROM TWO POINTS WITH BEARINGS.
5) TO CALCULATE FIX_ERROR.
6) TO CALCULATE MLS SET-BACK or CONFIRM MLS INFORMATION.
7) TO CONFIRM NEW INSTRUMENT APPROACH INFORMATION and COMPUTE FAC.
8) COMPUTE FIX ERROR USING FIX/FACILITY DATA BASES.
9) COMPUTE RNAV ALONG/CROSS TRACK ERRORS.
10) COMPUTE DEGREES OF TURN FOR MISSED APPROACH.
11) TO EXIT PROGRAM.

*** GEODETIC CALCULATOR ***

*** DISTANCE OUT AND OVER FROM KNOWN POINT AND BEARING ***

FROM - POINT A, (LATITUDE)? 320000          (LONGITUDE)? 850000
BEARING FROM POINT A (Mag - Degrees,ie 127 or 90.87)? 45
MAGNETIC VARIATION (-) for EAST, (+) for WEST? 0
 TO  - POINT B, (LATITUDE)? 323333.33       (LONGITUDE)? 843251

***** RESULTS *****

DISTANCE OUT (FT): 242670.39          DISTANCE OVER (FT): 45491.9
DISTANCE OUT (NM): 39.94              DISTANCE OVER (NM): 7.49
DISTANCE OUT (METERS): 73966.83       DISTANCE OVER (METERS): 13866.1
DIRECT DISTANCE FROM A TO B (FT): 246897.62    DISTANCE (NM): 40.63
TRUE AZIMUTH FROM POINT A TO POINT B: 34.38    DISTANCE OUT (NM): 39.94
DO YOU HAVE ANOTHER OUT AND OVER CASE (Y)es or (N)o?
```

FIGURE 5-16. OBSTRUCTION EVALUATION JOB AID

OBSTACLE EVALUATION WORKSHEET

CASE NO. ____-_____-______-OE
YR -Region- No.

Specialist Initials ________

	Result	Remarks/ Comments
1. Confirm Site Location......................		
2. Altitude/Height Verification...............		
3. Enroute IFR Operations A. Airways..............................		
B. Holding..............................		
C. MVA..................................		
4. Terminal Area IFR Operations A. Approach Segments.................... (1). Feeder/Initial Segments		
(a). Feeder Routes...........		
(b). Initial/Proc. Turn......		
(2). Intermediate Segments.........		
(3). Final Approach Segments.......		
B. Missed Approach......................		
C. Cat II/III Missed Approach...........		
D. Circling.............................		
E. IFR Departures.......................		
F. Proposed IAPs........................		
G. Procedure Adjustments (MTA)...........		
5. VFR Operations.............................		
A. VFR Flyways (over 500')...............		
B. VFR Approach Slopes..................		
C. VFR Terminal Operations..............		
D. Charted Visual Approach..............		
E. Marking and Lighting.................		
6. Minimum Safe Altitude (MSA)................		

SECTION 4. THE FPB OBSTRUCTION EVALUATION

556. GENERAL. The level of difficulty involved in an obstruction evaluation will depend upon the location and height of the proposal in relation to approach procedures and other instrument procedures and operations. The OE inspector must have an intimate knowledge of TERPS criteria and principles. In addition, the inspector must be familiar with the procedures and operations of the FPB and the assigned area of responsibility. After discussing obscure factors of the OE analysis, this section will methodically describe the individual steps for accomplishing an obstruction evaluation. To assure a complete evaluation, the job aid in the previous section lists the typical steps involved and is the evaluation format detailed in this section.

557. THE MORE OBSCURE FACTORS OF THE OE ANALYSIS. Study of aeronautical effects of proposed construction must consider more than the airports and FAR Part 97 instrument procedures charted in the terminal procedures publication. Public seaplane bases, public heliports, special instrument approach procedures and departures, proposed procedures, radar approaches, and direction finder (DF) approaches are also included in the aeronautical evaluation process. Consideration of these more obscure procedures and airfields may be difficult since they may not have published charts. Therefore, listings of all the special SIAP's, proposed procedures, heliports, and direction finder approaches should be constructed and maintained for easy reference.

a. Use of the Official 8260 Series Forms. As part of the aeronautical evaluation process, an important habit to establish is to always refer to the 8260 series forms for the approach or departure procedures at the airport/heliport being evaluated. Commercial and government produced approach charts are good for a quick visual reference, but the official procedure is documented on the appropriate 8260 series forms.

(1) The detail provided on these forms disclose information, such as a remote altimeter penalty, which may otherwise escape consideration. The 8260 series forms may also be the only source of information on direction finder approaches, Army and Air Force procedures maintained by the FAA, and special procedures.

(2) Appropriate copies of all 8260 series forms must be maintained in the FPB for easy reference. Coordination should be accomplished, as required, with other ASI's in the branch when the proposal falls on the border of two areas of responsibility. Coordination with another region should be accomplished when the proposal is located near re-

gional boundaries. OE analysis in an area of responsibility of another inspector or region may be possible but is not recommended without coordination. Access to the information contained in the appropriate 8260 series forms is a major reason for the coordination.

b. Minimum Sector Altitudes (MSA)/Emergency Safe Altitudes (ESA). Another obscure area of the obstruction evaluation is the maintenance of MSA/ESA. Generally, SIAP's will provide altitudes for emergency use in the form of MSA/ESA's. ESA's are limited to some military procedures. The OE analysis must consider MSA/ESA's as part of the total process. Some regions maintain databases on MSA/ESA's and use automation for this evaluation. A proposal requiring an altitude increase of an MSA or ESA will not normally be sufficient cause to support a determination of hazard; however, notification to the FIAO is important for OE cases which, upon receipt of the construction notice, raise the MSA or ESA.

c. Proposed SIAP's. As part of the evaluation process, the inspector must protect airspace for proposed approaches. This protection is particularly critical when a precision approach is proposed for a particular runway or future Category II/III capability is desired.

(1) In order to object to a particular construction proposal based on a proposed SIAP, the need for the procedure must be known by the OE inspector. Obviously, a specific written request to develop an instrument approach procedure at an airport/heliport would be one example. The term "plan on file" commonly refers to future IFR runways on Airport Layout Plans (ALP's), but can actually refer to any SIAP request known by the inspector.

(2) Other examples of proposed SIAP's may be precision runways on a reviewed ALP or Airport Master Plan (AMP), a planned navaid installation under the facilities & equipment (F&E) budget process or an Airports Division funded airport improvement project, a nonrule making action (NRA) case, or any proposed action that is otherwise documented and known by the inspector. However, the designation of a precision instrument runway is not sufficient alone to generate precision approach protection. Plans must be supported by installation (within the near future) of the necessary equipment to support the approach.

(3) Common sense and good judgement should apply so as not to over-protect for all possible non-precision SIAP's. Because a runway is shown on an ALP as non-precision instrument (NPI) is not justification for protecting all possible facility site locations for all types of navaids. This type of evaluation is just not possible. However, specific written requests are not always required for additional non-precision

approaches to runways based on existing navaids.

(4) Protection for new technology SIAP's like long range navigation (LORAN) or global positioning system (GPS) require a specific written request that the FPB has approved or plans to approve. Or, the airport/heliport must be designated on an FAA procedure implementation list and the specific runway(s) must also be listed so that the final approach course on runway alignment is known.

(5) Departure evaluations for VFR airports/heliports which will become IFR based on a proposed procedure must be considered. This evaluation may require that a complete departure analysis be performed to determine what the takeoff minimums and/or departure procedure would be prior to, and in conjunction with, the evaluation based on the proposal.

(6) A recent court decision may redefine what constitutes a proposed instrument approach procedure and when appropriate airspace protection is required for proposed construction or alteration. The comment period for circulated OE proposals may surface a need for a procedure. Changes to Order 7400.2 may be forthcoming on the definition of a proposed procedure or a plan on file. For Flight Standards, the major point is that the OE inspector must know that there exists a need for a terminal instrument procedure before any actions can be taken to protect the necessary airspace.

d. Air Carrier Operations. During obstruction evaluations, the inspector must be knowledgeable of airports/heliports with present or planned air carrier activity.

(1) Airlines perform their own obstruction studies to comply with regulations regarding obstruction clearance and aircraft performance. FAR Sections 121.189 and 135.398 describe some of the requirements of this nature which may result in load limitations for the aircraft.

(2) Additionally, an advisory circular (AC) is being drafted which addresses airport obstacle analysis for air carriers. The guidance in this AC may be more demanding than the FAR. Some airlines are using more stringent departure evaluations in accordance with ICAO standards. FAR Section 121.189 requires specific clearances 300 feet from the departure track, whereas ICAO standards define a departure path which splays with increasing distance and reaches much greater widths.

(3) There are occasions when a regional OE departure analysis based on TERPS will not be as restrictive as that required by an airline. This is particularly true in an evaluation close to the departure end of the runway. For this reason, the inspector may request circularization of OE cases at air carrier airports

where the location may be in an air carrier departure corridor. This action will allow the airlines the opportunity to comment on the proposal.

e. Special Routes and FAR Part 95 Direct Routes. Consider the special routes that are part of an air carrier's operations specifications (OpSpecs) and other direct routes which are not charted. Although most of these routes may be in the high altitude structure, some may have low MEA's which definitely could be affected by new construction. Each OE inspector should maintain a list of these routes for their use.

558. THE OBSTRUCTION EVALUATION (OE). Usually the FPB receives an OE case from the regional Air Traffic Airspace Branch via an FAA Form 7460-1, Notice of Proposed Construction or Alteration. Accompanying the FAA Form 7460-1 may be other information to more clearly explain the intent of the proposal and location; for example, regional Air Traffic (AT) worksheet and a copy of a sectional chart, quad chart, Airport Layout Plan (ALP), Airport Obstruction Chart (OC), or any other type drawing with the obstacle plotted.

a. Obstruction Evaluation Items. The following paragraphs are expanded explanations of each item on the OE job aid (see figure 5-15) in the sequence they would normally be accomplished. Shortcuts, "rule-of-thumb", helpful hints and reminders, common errors, and automation aids are explained where appropriate.

b. Criteria and Safety. TERPS and other criteria (FAR, orders, etc.) may not be explained in detail but appropriate references are included. If there is a safety issue that becomes apparent to the OE inspector but is not covered by the job aid, it is the inspector's responsibility to include an appropriate comment in their response to AT.

559. ALTITUDE/HEIGHT VERIFICATION. The mean sea level (MSL) height should be checked by verifying the simple addition of the site elevation and the obstacle height above ground level (AGL). The site elevation can sometimes be checked by referring to contour lines on a quad chart or it may be available from additional data which AT may have submitted. Note whether dimensions are in feet or meters. An accuracy coding determination should be made. Accuracy standards are contained in Order 8260.19, Flight Procedures and Airspace.

560. SCREENING. Although not an item on the worksheet, a quick inspection of the proposal, along with the OE inspector's intimate knowledge of the area, may eliminate the need for further evaluation. Many OE cases can be evaluated very quickly by initial screening.

a. Manual Screening. Many of the obstacle's effects can be determined by plotting the location on a sectional chart. Once the obstacle is plotted, a number of things can be evaluated based on knowledge of the area.

(1) Sometimes an OE proposal will have an MSL elevation that is below nearby IFR airports/heliports; this will likely have no effect to SIAP's at those airports/heliports.

(2) If the obstacle is not within 6 NM of an airway, there will usually be no airway effect. Turning areas and airway splay, if the airway is over 51 NM from a facility, are examples when 6 NM are exceeded. In the airway secondary area, the required obstruction clearance (ROC) is at least 500 feet less than the primary. This reduced ROC is usually sufficient to rule out any effect. Dividers may be used to measure rough distances.

(3) If a charted obstacle of equal or greater MSL height lies within 4 NM of the same airway segment, there should be no additional effect on that airway.

(4) If a charted obstacle of equal or greater height lies in a straight line between the proposal and an airport/heliport, then the obstruction is shielded and usually there would be no effect on the SIAP's at that airport/heliport. An exception to shielding may be if the airport/heliport has an arc initial segment.

(5) Many IFR airports/heliports can be identified easily on sectional charts by the 700 foot floor of controlled airspace shown by the magenta colored IFR airspace. If the proposal is more than 30 NM from the nearest IFR airport, then usually there will be no effect on SIAP's to that airport.

(6) Special attention must be given to very tall proposals. The more familiar an inspector is with the area of evaluation the more comprehensive the screening can be. For example, a tall obstacle may not be identified as a problem using the previous examples but could have an effect on long transition routes, uncharted airways, or departures at an airport/heliport many miles away.

(7) Area familiarity is important for proposals that could have VFR effects. A tall obstruction may not be identified as a procedure problem, but could have a VFR effect on VFR flyways or departure/arrival at VFR airports/heliports.

b. Automation Screening. Preliminary Regional Obstacle Screening Evaluator (PROSE), is a useful but uncertified tool used for screening. In essence, this program accomplishes the manual IFR screening listed above. It does not screen for VFR effects. Plotting the obstruction on a sectional chart for quick visual screening is still recommended.

(1) If the PROSE answer is "DNE A4", the pub-

lished airways are not affected; and if "DNE A3", SIAP's probably are not affected. DNE A4 and DNE A3 mean that the obstacle "does not exceed" FAR Sections 77.23(a)(4) or 77.23(a)(3).

(2) Use the sectional chart plot to check for VFR effects, nearby VFR airports/heliports that may have a SIAP proposal on file, and/or an IFR airport/heliport very near that was not identified by PROSE. If discovered, that usually means that the PROSE database for that airport/heliport has an error that needs to be identified and corrected. This is one of the reasons for plotting the obstacle on a sectional chart even if PROSE alerts "DNE A3" and "DNE A4".

(3) Maximum use can be made from PROSE if the inspector reviews each day's batch of obstruction evaluations run on PROSE and isolates those that say "DNE A3", along with those that have "may exceed MVA" as the only A3 effect. Usually these cases can be separated, plotted, verified, and answered in the shortest time. This quick response and turn around time is a good justification for the use of PROSE as a screening tool.

(4) The remaining PROSE cases that have other A3 and A4 effects need to be processed manually using the steps that follow.

561. EN ROUTE IFR OPERATIONS. Reference: FAR Section 77.23(a)(4). When the screening step indicates that there may be an effect on en route operations, the inspector must determine exactly what that effect is. Flight Standards is charged with the responsibility to identify the effect on minimum en route altitude (MEA), minimum obstruction clearance altitude (MOCA), minimum crossing altitude (MCA), minimum holding altitude (MHA), turning areas, and sometimes Minimum Vectoring Altitudes (MVA) and Minimum IFR Altitudes (MIA).

a. Airways. Reference: Order 8260.19, Chapter 3, En Route Procedures. The evaluation must be accomplished for FAR Part 95 routes (airways and direct routes) and routes not covered by FAR Part 95.

(1) FAR Part 95 routes are those that are charted on en route low altitude IFR charts and also those that are not publicly charted but have been published in the federal register as a FAR Part 95 route.

(2) Routes not covered by FAR Part 95 (known as off-airway routes) are those routes where a portion is through uncontrolled airspace or use private facilities and have been developed for specific users using standard TERPS en route criteria.

(3) A master list is maintained by the National Flight Data Center (NFDC). The Air Route Traffic Control Center (ARTCC) keeps a list of direct routes and the FIAO has

a list of routes in their area of responsibility.

(4) All airways and direct routes are to be evaluated using the criteria of TERPS, Chapter 17. Where criteria require that an airway be at least 1500 feet above terrain, a quick rule-of-thumb is that any obstacle less than 500 feet AGL will have no effect an any airway MOCA. A inspector must be very familiar with their area to use this rule-of-thumb because some sections of the country have large areas of airspace with a 700-foot airspace floor and mountainous terrain.

(5) Particular attention should be given to those obstacles that lie within 4 NM of the centerline of an airway segment and are beyond an MEA change point but would be a penetration to the climb gradient to the new MEA even though there is no effect on the MEA of the new segment. This would cause an increase to a MCA or require an MCA to be established where there was not a MCA previously.

b. Holding. If an obstacle is near a fix, determine if holding is authorized at that fix. This information is available on the FAA Form 8260-2, Radio Fix and Holding Data Record, and may or may not be published on the en route chart. Holding pattern airspace is larger than that protected by en route criteria and has a similar 2 NM secondary area. Do not forget holding secondary areas when using the holding area templates. Also, some holding patterns have a MHA that is lower than the associated MEA of the airway. Each FPB should maintain a list of those unusual holding situations.

c. MVA/MIA. Criteria for evaluating MVA/MIA charts are found in Order 8260.19, Chapter 3, Section 7, and are classified as en route subjects, whereas Order 7400.2 lists MVA under the heading of terminal area IFR operations. En route obstacle clearance criteria apply to both MVA's and MIA's and are grouped here because of this similarity. Air Traffic Facility Management, Order 7210.3, is the base order governing MVA charts. Report MVA effects as terminal effects under FAR Section 77.23(a)(3) and MIA effects as en route effects under FAR Section 77.23(a)(4).

(1) Each AT tower or approach control develops their own MVA chart and is responsible for keeping it updated. Each center develops their own MIA chart and is responsible for keeping it updated. Flight Standards involvement with MVA/MIA charts is as a quality control office and the forwarding of charts to the FIAO for determination of accuracy in obstruction clearance. For the OE program, MVA/MIA obstruction evaluation is the responsibility of Flight Standards based upon Order 7400.2, paragraph 7-2c.

(2) The regional AT division has the responsibility

to forward to the FPB a current copy of the MVA/MIA chart and associated information if the inspector accomplishes the evaluation. The MVA/MIA chart should be drawn on a sectional chart and be accompanied by FAA Forms 7210-7 (MVA) or 7210-9 (MIA) for documenting controlling obstructions in accordance with Orders 7210.3 and 8260.19.

(3) The terminal area chart may be useful in the evaluation. The proposed structure may be plotted directly on the MVA/MIA chart. Add 1000 feet ROC (the ROC may be higher than 1000 feet in some areas-mountainous, precipitous terrain, etc.) to the proposed MSL of the obstacle and compare the result to the MVA/MIA chart altitude for that area. Another method is to check the height of the controlling obstruction on the FAA Forms 7210-7 or 7210-9 to see if the proposal is higher.

(4) For MVA's, if an obstacle is within 40 NM of the radar antenna and is within 3 NM of an area boundary, the adjacent area would be affected. All areas have a 3 NM buffer. Draw a 3 NM ring around the obstacle. That part of the ring that may intersect a lower altitude area would need to be raised which causes an effect on the MVA chart.

(5) Likewise, if an obstruction is close to but not exactly on an existing area protected by 3 NM ring, the new obstruction would need it's own 3 NM ring (or the whole area MVA would need to be raised) which would change the shape of that protected area. This would be an MVA effect, however slight.

(6) If an obstruction is beyond 40 NM from the radar antenna, the MVA 3 NM ring expands to a 5 NM ring and this extrapolates to a 5 NM buffer around sector boundaries beyond 40 NM on the chart. The same 5 NM boundary buffer is used for MIA's.

d. Automation Tools. When PROSE alerts "may exceed MEA/MOCA near XXX" this is a flag that requires the inspector to manually check airways. The XXX is usually a VOR identifier but is of no aid to the inspector in determining if or where there may be an airway effect. It only identifies the line of data in the database where the obstacle first exceeds programmed en route parameters.

(1) When PROSE alerts "may exceed MVA XYZ. Bear: 67.43 Dist(NM): 28.18", refer to the XYZ MVA chart and estimate the location of the obstacle (using the bearing of 67 degrees true, and 28 NM from the center of the airport) rather than plotting by coordinates. This technique will quickly identify whether closer evaluation is needed.

(2) TERPS calculator (see preceding section of this chapter), has an airway program that can be used as a tool to ascertain the exact distance a proposal's coordinates are from the centerline of a published

airway radial. Also, if the obstruction is in the secondary area, this program provides an uncorrected MEA/MOCA using the appropriate ROC.

(3) TERPS calculator also has a program to analyze holding patterns and radar MVA charts.

(4) The geodetic calculator mode of IAPA is another tool that can be used to determine an proposal's distance from centerline of an airway. The inspector must first calculate the direct route between navaids to determine the exact airway centerline. For dogleg airways, the courses will be a full 15 degrees from another airway at the facility or be a whole true radial from a facility. This exact route centerline is adjusted for variation and rounded to the nearest whole number before it is published on airway charts. Therefore, the radials and distances published on IFR charts are not useful for exact geodetic calculations. The inspector will need to calculate the ROC if the proposal's distance is between 4 and 6 NM.

562. TERMINAL AREA IFR OPERATIONS. Reference: FAR Section 77.23(a)(3). Terminal area IFR operations include approach areas, terminal routes, departure area, and circling approach area. The FPB evaluates all proposed obstructions using TERPS criteria referencing terminal instrument procedures for which 8260 series forms and other information are available. This includes all FAR Part 97 Standard Instrument Approach Procedures (SIAP), Special SIAP's, and Military SIAP's for which the FAA is responsible. The Army, Navy, and Air Force receive and review some of the OE cases in order to protect their air operations. FAA responsibility is only for those military SIAP's developed and maintained by the FPB/FIAO, which are Army, Coast Guard, and military SIAP's at joint civil/military use airports.

a. Standard Terminal Arrival Routes (STAR's). Although not listed on the OE Worksheet (and considered to be en route), OE effects on STAR's are the responsibility of Flight Standards. Order 7400.2, paragraph 5-11, denotes that STAR's are in the Terminal Area. The OE inspector shall evaluate the effects of the proposal on the minimum altitudes published. En route TERPS criteria apply. If a route segment minimum altitude is affected, assure that the next segment descent gradient is not excessive and respond to AT the FAR Section 77.23(a)(3) effect.

b. Approach Segments. The approach from entry to landing can be broken into three segments: Terminal/initial, intermediate, and final. The missed approach segment, is a separate entry on the checklist and is covered separately in this section. Each segment has a different ROC. The inspector should refer to the FAA Form 8260-9 for each approach affected to determine if the obstruction would cause an increase in a minimum altitude or become the controlling obstruction in any approach segment. If there is an increase in any approach segment minimum altitude it must be reported to AT as exceeding the standards of FAR Section 77.23(a)(3). One way to determine if an obstacle will cause an increase in a minimum altitude is to add the MSL height of the obstacle to the ROC plus any adjustments (including obstruction accuracy adjustments). Compare this figure to the charted minimum altitude. If it is higher than the charted altitude, it exceeds FAR Section 77.23(a)(3). If it is not higher than the charted altitude but higher than the noted controlling ob struction on the FAA Form 8260-9, then AT should be notified of this fact and requested to require the proponent to give supplemental notice by FAA Form 7460-2, Notice of Actual Construction or Alteration. Use the SIAP graphic, if possible, to visually determine if the obstruction may lay within the area boundaries of an approach segment. The obstruction can then be plotted. Plotting is difficult on an IAPA graphic, so a sectional should be used. Also, some of the older IAPA generated SIAP's were submitted to the FPB without a completed FAA Form 8260-9. Evaluating an proposal accurately without FAA Form 8260-9 information is time consuming. The responsible FIAO should be requested to supply completed FAA Form 8260-9's to the FPB for all SIAP's.

(1) <u>Feeder/Initial Segments</u>. These segments generally have a ROC of 1000 feet except in mountainous areas or the secondary area of protection. Refer to Order 8260.19, paragraph 807, Terminal Routes. Any increase in these segment altitudes will require a descent gradient check in the succeeding segment. Also see TERPS table 1A for altitude limitations for procedure turns. Any increase of segment descent gradient above optimum is an FAR Section 77.23(a)(3) effect.

(a) <u>Feeder Route Segments</u>. For criteria, the reference is TERPS paragraph 220. Identification and determination of the effect of an proposed obstacle on feeder routes may be difficult without the aid of automation. The 500 foot AGL airway rule-of-thumb may apply. This could remove most OE cases from further consideration on feeder routes. If the determination is made that further evaluation is needed for possible feeder effects, SIAP's at all airports within feeder range need to be evaluated. Further screening can be accomplished by noting an estimated direction and distance a proposed obstruction is from an airport and consulting the approach plates for feeder routes and altitudes. The FAA Form 8260-9 is not very helpful in this screening. Once it has been determined that an obstacle might have an effect on a feeder route, that route should be plotted on a sectional chart along with the obstacle and then en route obstacle clearance criteria must be applied to determine the exact effect, if any, that the case would have. Caution must be taken to apply the correct route width and secondary ROC requirements when a feeder uses a nondirectional beacon (NDB) for positive course guidance. These criteria are contained in TERPS, chapter 17, paragraph 1750.

(b) Initial Segments. Reference: TERPS Chapter 2, Section 3. An initial approach may be an arc, radial, course, heading, radar vector (or a combination thereof), or a procedure turn or holding pattern in lieu of procedure turn. Dead reckoning or heading segments without positive course guidance are wider than airways. Except for procedure turns and holding patterns, the FAA Form 8260-9 is of little use in identifying if the obstacle is within the area confines of an initial segment. The approach plate should be consulted to identify the general area of the initial segments. If the obstacle is in the general area, the initial segments may need to be plotted on a sectional chart and evaluated. If close to segment boundaries, higher scale maps or automation use may be required.

(c) Feeder/Initial Automation Tools. PROSE can be used to great advantage in this phase of evaluation. When PROSE alerts, "may exceed a 1000 ft ROC at ABC.Bear: 279.07 Dist: 34.56", it has identified a need for the inspector to take a closer look at the terminal routes for ABC airport. It also gives an exact bearing and distance to the obstacle from the ABC airport. This information makes it easier to review the plates for a possible effect. PROSE has also identified those and only those airports where a terminal route may be affected. This narrows down the search area. The TERPS Calculator has programs that can be used to evaluate a specific obstacle's effect on procedure turn areas and holding patterns, and the airway program can often be used to evaluate feeder routes. IAPA has the capability for determining minimum altitudes based upon a specific proposed obstacle entered in the system. The geodetic calculator mode of IAPA can also be used to find the distance from an obstacle's coordinates to the centerline of a feeder route or initial.

(2) Intermediate Segment. The intermediate approach segment blends the initial approach segment into the final approach segment. Refer to TERPS, chapter 2, section 4 for an in-depth discussion of the intermediate segment.

(a) Intermediate Segment Evaluation. On airport facility, No Final Approach Fix (No FAF) SIAP's do not have an intermediate segment. Intermediate ROC is 500 feet in the primary area, and 500 feet at the inner edge tapering to zero at the outer edge of the secondary area. To evaluate the intermediate segment, the obstacle must be plotted on each applicable SIAP graphic and a determination made as to whether it is within the area confines of the intermediate segment. Some close cases may require that the FIAO plot the proposed obstruction's coordinates on the official SIAP quadrangle chart. The proposal has an FAR Section 77.23(a)(3) effect if it lies within the intermediate area and the obstruction MSL elevation plus ROC and adjustments rounded to the nearest 100-foot increment is higher than the published intermediate altitude. This is usually a one line entry on the FAA Form 8260-9 that have an intermediate segment. The controlling obstruction and ROC is listed on this line.

(b) Intermediate Increases Effect Final. Unless there is a fix between the obstruction and the FAF, any increase to the intermediate altitude is a corresponding increase to the FAF altitude. If the proposed obstruction increases the intermediate altitude and hence the FAF altitude, the final approach segment needs to be assessed to determine the effect on the descent gradient, or possibly the minimum descent altitude (MDA) (reference: TERPS paragraph 252). Although an increase in the intermediate altitude is an FAR Section 77.23(a)(3) effect, AT usually does not consider this to be significant or a substantial adverse effect if it is the ONLY effect. The final descent gradient is computed from the FAF altitude to the touchdown zone elevation for straight-in approaches and from the FAF altitude to the circling MDA for a circling only SIAP. An altitude increase in the intermediate segment may cause a final MDA increase (for circling only SIAP's) or the loss of straight-in minimums, due to a final segment rate of descent exceeding the maximum allowed. Also, any final approach descent gradient above optimum is considered an adverse effect.

(c) Intermediate Automation Tools. When PROSE alerts "may exceed a 500 ft ROC at ABD.Bear: 279.16 Dist(NM): 17.01", an evaluation of intermediate segments of all SIAP's with a FAF at ABD airport must be accomplished as explained above. TERP's calculator has a program to evaluate the impact an obstruction may have on an intermediate area. IAPA or the intermediate area drawn on a quad chart are other vehicles that can provide a definitive answer for intermediate segment effects. The information from out and over (tangent) programs of various geodetic calculators can also be used to mathematically determine if the obstruction is in the intermediate area.

(3) Final Approach Segment. Reference: TERPS paragraph 250. Final approach segments vary and applicable TERPS criteria are contained in chapters designated for specific navigation facilities.

(a) Non-precision Final Approach Segment Evaluation. Plot the proposed obstacle on the SIAP graphic; if SIAP graphic is not available, construct a graphic based on the charted procedure. If it is within the confines of the final approach segment, refer to the FAA Form 8260-9. If the MSL height of the obstacle is higher than the controlling obstruction as listed on the FAA Form 8260-9 (and the full final ROC was used meaning the controlling obstruction is in the primary area), add the ROC and any adjustments to the MSL height of the proposed obstacle and round to the next higher 20 foot increment. Compare this new figure with the charted MDA; if it is greater, the proposed obstruction exceeds FAR Section 77.23(a)(3). Another method is to compare the obstruction's MSL height to the missed approach elevation (item #3 on the front of the FAA Form 8260-9). Examples of FAA Form 8260-9 can be found in Order 8260.19, Appendix 9. If it is greater, there will be an increase in the MDA. Although final approach segment areas vary, there are some particulars that need to be kept in mind.

1 The length of final for an on-airport facility/no FAF SIAP is normally 10 NM. The final approach segment outer limit begins 10 NM from the facility with no fix error. The inner limit ends at the facility with no fix error.

2 A stepdown fix within the final area will have a fix error that may need to be computed. The obstruction is considered to be in the inner area (that closest to the runway) and is the determining factor in the stepdown MDA, if it is closer to the runway than the most outer limit of the stepdown fix error.

3 An obstruction in the outer final area (that area outside the inner area) may effect the charted MDA when not using the stepdown fix. If one or two sets of MDA's are charted, the charted minimum altitude at the stepdown fix will increase and the descent gradient for the inner area will increase.

4 TERPS paragraph 289, concerning 7:1 driftdown, is NOT applicable to OE studies. It is criteria to be used only for existing obstacles. See paragraph 543 of this handbook.

5 The outer limit of a final approach segment that has a FAF begins at the facility (if overheading the facility) which identifies the FAF, except for a fan marker. A FAF identified as a fix formed by a DME, fan marker, radar fix, area navigation (RNAV) waypoint, or intersecting radial has an associated fix error and the outer limit of the final approach segment area is extended prior to the FAF by the amount of the fix error. Use caution when a FAF is made up with more than one fix error; the most restrictive or greater error must be applied.

6 The inner limit of the final approach segment area normally ends at or abeam the runway for approaches where the missed approach point (MAP) is predicated upon timing from the FAF. Where the MAP is identified by a fan marker, DME fix, or RNAV waypoint, the fix error must be extended beyond the runway end or MAP, as applicable, and that becomes the inner limit for the final approach segment area. The MAP for a no FAF final is at the facility which may be well beyond the runway end.

7 Under certain conditions excessive FAF fix error may add to the MAP fix error, see TERPS paragraph 287c.

8 The ROC in the primary area varies depending upon the type of SIAP. The applicable chapter of TERPS applies. The ROC is also on the FAA Form 8260-9.

9 Except for airport surveillance radar (ASR) approaches, all final areas have a secondary area where the ROC tapers or slopes from the primary ROC at the outer edge of the primary to the outer edge of the secondary.

(b) Precision Final Approach Segment Evaluation. For a 3 degree glide slope, the ROC for an ILS can be summed up as a 34:1 obstacle clearance plane extending outward along the centerline from a point 200 feet or more from the approach threshold beginning at the threshold height. A 5000 foot 7:1 transition area extends outside the primary area. These ILS criteria will also suffice for MLS except for the MLS center area which may be a few feet lower. At present, current guidance directs that all new ILS's be developed to the new MLS criteria, therefore proposed obstructions may need to be evaluated using both criteria. An OC chart is useful in evaluating the close-in ILS area. Transparencies or templates made to the OC scale with boundaries of ILS CAT II/-III missed approach area, (reference: AC 120-29, paragraph 8), ILS section 1 missed approach area, (reference: TERPS paragraph 942a.), and Zone 1 departure area, (reference: TERPS paragraph 1202a.), are helpful overlay tools to determine if a proposed obstacle lies within the subject boundaries on an OC chart.

(c) Final Segment Automation Tools. PROSE gives two messages that alert the inspector to check the final approach for penetrations to the FAR Section 77.23(a)(3) standard. One example is "may exceed Non-Prec MDA at ABC. Bear: 291.94 Dist(NM): 8.43". This message means that the MSL height of the proposed obstacle is greater than the controlling obstruction in at least one non-precision SIAP final at ABC airport. The inspector may choose either of two ways to check this: find which SIAP(s) have lower controlling obstructions, then plot on the SIAP graphic to check if the proposal is within the confines of the final approach segment; or reverse the procedure and check area(s) first, then check the controlling obstruction height. The other PROSE example is "may exceed Dept/Missed/ILS area at ABC.Bear:291.94 Dist(NM): 8.43". This message means that the proposed obstacle penetrates a programmed slope at the ABC airport, and the inspector needs to check for possible penetrations of the glide slope on the ILS.

1 The TERPS calculator does final approach calculations for all types of approaches, both non-precision and precision. The limitations of the program must be taken into consideration when interpreting the answers provided by the TERPS calculator; for example, the length of the final approach segment from the FAF to the MAP is not considered in the answer and the proposed obstruction may not be within the fore/aft confines of the actual final approach area. If the TERPS calculator is being used to evaluate an obstruction, then it would be wise to evaluate a proposal near the final approach area by using both the ILS and MLS programs. The ILS program evaluates the 34:1 slope, and uses a calculated ROC to determine a no exceed height (NEH) for the glide slope. (The TERPS calculator program uses the acronym MTA, maximum to avoid, rather than NEH.) If the cases are loaded into the PROSE program, the data will not have to be reloaded into the TERPS Calculator since this program uses the prose database. This avoids having to manually enter all the data for each TERPS calculator operation; just enter the file and OE case number.

2 The Geodetic Calculator has a program to calculate fix error and gives a graphic printout of the answer to help visualize the answer.

3 IAPA is another automation tool that can be used to determine exactly what effect an proposed obstruction may have on an SIAP; however, it is a lengthy process to build a new workfile. But it may be worth the effort when an proposal has multiple effects (different SIAP's, final, circling, missed approach, etc.).

c. Missed Approach Segment. Reference: TERPS Chapter 2, Section 7 and Chapter 9, Section 4. Missed approach evaluations have a tendency to become complicated. A straight ahead missed approach is relatively simple. However, an immediate turning missed approach or a short straight climb section followed by one or more turns, creates a complex area and evaluation process. A good SIAP graphic is helpful to visually determine if the obstacle is in the missed approach area of protection. Often it is necessary to manually plot or request the FIAO to plot the obstruction on the quad chart in order to determine if it is within the area and the exact effects.

(1) Missed Approach Segment Evaluation. Normally, the missed approach surface is a 40:1 slope starting at the MAP at the missed approach elevation. The surface evaluation begins over the MAP at a height determined by subtracting the final approach ROC and adjustments from the MDA/DH (MAP elevation). This elevation can be found on the front of FAA Form 8260-9 in item number 3. Care must be taken to assure the 40:1 slope starts at the MAP or starts beyond the MAP required by the final criteria. Proposed obstructions that plot a short distance beyond the MAP are easy to figure. Divide the slope distance by 40 and add the answer to the MAP elevation. This will give the maximum MSL height for the obstruction without causing an increase to the MDA. MLS missed approach areas are different from ILS missed approach areas. Three missed approach slopes have to be used. These may change depending on the distance from the plotted MAP.

(2) Missed Approach Segment Automation Tools. PROSE can provide an alert such as "may exceed Dept/Missed (/ILS) area at ABC.Bear 327.44 Dist(NM): 2.5". The ILS alert only appears for those airports with an ILS. For those airports without an ILS, the missed approach evaluation may be ignored if there is not also a PROSE alert, "may exceed Non-Prec MDA at ABC.Bear 327.44 Dist(NM): 2.5", since the proposal's MSL height is below the lowest final approach controlling obstruction for that airport/heliport.

(a) TERPS calculator makes an evaluation of the missed approach area in all modes. Out and over information is supplied by the TERPS Calculator and this information can aid in manually analyzing the missed approach area. Most missed approach penetrations need to be manually analyzed.

(b) Other geodetic calculators with an out and over program can also be used by mathematically adept inspectors.

(c) IAPA computes the effect of an obstacle on the MDA. MDA adjustments are required if there is any effect. Using IAPA, the final must be developed (to determine the MAP, width of final at the MAP, missed approach elevation, and the straight-in MDA's). Circling must be developed if straight-in is not authorized (to determine the MAP elevation and circling MDA's), and then, the missed approach can be developed.

d. CAT II/III ILS Missed Approach. Reference: AC 120-29, appendix 2, paragraphs 7, 8, & 9. The areas of concern are the touchdown area, touchdown area transitional surface, and missed approach area. These areas are distinctly different from any other TERPS areas.

(1) CAT II/III ILS Missed Approach Evaluation. The best way to check if an

proposed obstruction is within the lateral confines of the areas is to plot the obstruction on an OC chart. (Accuracy standards may have to be applied.) Measure the distance of the obstruction from the centerline of the runway and from the approach end of the runway. A transparency or template with these areas drawn on them is helpful in speeding the evaluation. No penetrations of the applicable primary surfaces are allowed and CAT III ILS minimums are denied if any surface is penetrated. The criteria only provide for adjustments to CAT II visibility minimums when the transitional surface is penetrated.

(2) <u>CAT II/III ILS Missed Approach Automation Tools</u>. There is no specific PROSE alert for CAT II/III missed approach. TERPS Calculator used in the ILS mode does evaluates the CAT II/III touchdown area, touchdown area transitional area, and section 1 of the missed approach area. Note that CAT II/III criteria allow climb gradients to be specified in the missed approach. The evaluation must consider existing specified climb gradients.

e. <u>Circling Area</u>. Reference: TERPS, paragraph 260. The circling areas of protection are incrementally increasing distances from the runways for each aircraft speed category published on the procedure. When the proposed obstacle is close to the airport, the circling area may be difficult to accurately evaluate without automation unless the obstacle can be plotted on an OC.

(1) <u>Circling Area Evaluation</u>. If the obstacle is not obviously further from the airport than the maximum circling area and the obstruction's MSL height is greater than the lowest (generally CAT A) controlling obstruction, a closer evaluation of the circling area is necessary.

(a) If the obstacle is on or near an airport with an OC chart, it may be accurately plotted and studied. The circling areas may need to be drawn on the OC chart to identify exactly in which circling category area the obstruction is located. Once the category is determined, compare the obstruction's MSL height to the controlling obstruction height, as found on the FAA Form 8260-9 part 4; if it is greater, add 300 feet ROC plus any adjustments to the MSL, round to the next higher 20-foot increment and compare to the charted MDA for that circling category. If the answer is greater, then the proposed obstruction exceeds FAR Section 77.23(a)(3) for that category.

(b) Check the higher categories for possible effect; for example, a proposed obstruction that affected CAT C circling MDA may also have an effect on CAT D and E MDA's because these areas also encompass CAT C.

(c) Where the circling MDA is controlled by the straight-in MDA or by TERPS table 11, it is possible for a proposed obstacle to be of greater height than the controlling obstruction listed on Form 8260-9 for that applicable circling category. In this case, the obstruction's MSL height plus 300 feet plus adjustments may not be greater than the charted MDA for that circling category and would not be a FAR 77.23(a)(3) effect.

(2) Circling Area Automation Tools.

(a) PROSE makes an initial evaluation by comparing the proposed obstruction's MSL height with the lowest circling controlling obstruction and a distance from the airport reference point (ARP). If the proposal's MSL height is greater and the distance is less than the parameters, PROSE gives the alert, "may exceed Circling MDA at ABC.Bear: 37.44 Dist(NM) 1.8".

(b) TERPS Calculator has a circling program that accurately gives the circling category location for the proposed obstruction.

(c) Various geodetic programs can be used by the inspector to determine the proposal's distance from a runway.

(d) IAPA can also determine where the obstruction is in relation to the circling category areas and compute the MDA. In the automation reviews, the runway end coordinates must be known or be in a database, to compute the distances and give precise answers.

f. IFR Departures. Reference: TERPS chapter 12. The effect of an obstacle on departures will depend on its location relative to a runway and application of the criteria. Evaluation problems require determining what is the departure end of the runway (DER), what altitude to start the obstacle identification surface(s) (OIS), applicable climb gradients and how are they computed, a takeoff minimum if required, an IFR departure procedure if required, and finally, how the evaluation is completed on this new obstacle if the runway currently has a takeoff minimum (especially with climb gradients) and an IFR departure procedure. Also see departure philosophies in the preceding section.

(1) IFR Departure Zones.

(a) Zone 1 is a relatively small trapezoid extending 2 NM in the direction of the departure. The OIS begins at the departure end of the runway (DER) at the DER MSL elevation. TERPS allows the OIS to begin no higher than 35 feet above the DER elevation when establishing the need for FAR Part 97 IFR Takeoff Minimums and Departure Procedures. For obstruction evaluations, the DER elevation or the elevation (up to 35 feet above DER elevation) determined to negate existing obstructions is used. What this means is, to determine the effect of a proposed obstruction, the same criteria parameters used on existing obstructions must be used on the proposed obstruction.

(b) Zone 2 is a large area extending to the en route environment. The OIS for Zone 2 begins at the height of the OIS at the end of Zone 1 and measurements to the proposed obstacle shall be made from the runway edge or edge of Zone 1, whichever is the shorter distance. The OIS height at the end of Zone 1 is always 303.8 feet (2 NM divided by 40) above the start elevation at the DER. Zone 2 OIS continues at 40:1 to the point where it reaches the minimum en route altitude authorized.

(c) Zone 3 is a large area in the opposite direction from takeoff and extends to the en route environment. The OIS for Zone 3 begins 400 feet above the airport elevation and measurements to the proposed obstacle are made along the closest runway edge. The 400 feet is based on the assumption that departing aircraft will reach an altitude of at least 400 feet above the airport prior to exiting Zone 2. A 40:1 OIS is used starting at 400 feet.

(2) The Evaluation.

(a) Departure Evaluation. The determination of the height of the OIS at the proposal location is very difficult without automation. The accurate distance(s) required for evaluation may be measured from a quad chart plot or in some instances, an OC chart. The OIS ends at the en route altitude. This evaluation end point can be many miles from the airport. Departures can be rough screened on a sectional chart if the proposed obstruction is not in Zone 1. This rough screen is to measure the distance on a sectional chart from the runway end to the proposed obstruction plot, then divide that footage distance by 40, and add the runway elevation. If the obstruction's MSL height is less than that answer, there would probably be no effect. If the tangent data relative to the runway threshold are submitted with the OE case, the obstruction's location can be determined and the Zone 1 OIS height can be calculated. If the proposal's location data are only coordinates, then a geodetic calculator is needed to determine the exact out and over information for the obstruction. Once the determination is made that the obstruction exceeds the departure criteria, it is necessary to develop an effect to give to AT. If the obstacle is in Zone 1, a ceiling and visibility restriction would be required. A climb gradient may be appropriate. For other zone penetrations, a departure procedure may suffice. A departure procedure should provide obstacle clearance in accordance with TERPS paragraph 1203. The assigned altitude before turning should be the results of criteria application and may equal or exceed the MSL height of the obstruction due to the required ROC of 48 feet per NM. The turning altitude shall be in 100-foot increments.

(b) Automation Tools. When PROSE alerts, "may exceed Dept/Missed(/ILS) area at ABC.Bear: 291.94 Dist(NM): 8.43", the inspector should manually screen for departure effect and then use the TERPS Calculator when further evaluation is warranted. TERPS Calculator gives an exact evaluation and tells which departure zone the proposal is located, the NEH, and the minimum climb rate in feet per NM to clear the obstruction. (The TERPS calculator program uses the acronym MTA, maximum to avoid, rather than NEH.) The NEH can then be compared to the proposed obstruction's MSL height and if greater, the proposal has an FAR Section 77.23(a)(3) effect. Any geodetic calculator with an out and over (tangent) program can be useful, but the mathematics to determine exact height of the OIS at the proposed obstruction site may be cumbersome when the proposal is not in Zone 1 or straight out from Zone 1. Requests for assistance from the FIAO may be required. IAPA does not have a certified program to evaluate departures at this time.

(c) Standard Instrument Departures (SID's). Like STAR's, SID's are not on the worksheet but the proposed obstruction's effects on a SID must be reviewed by Flight Standards (reference: Order 7400.2, paragraph 5-11). The effects of the obstruction on the IFR takeoff minimums and departure procedures applies to all departures (including SID's) unless the SID specifies a route, turn, or altitude that differs from the results of the departure evaluation. In these cases, a full study on the effects of the proposed obstruction on the published SID is required and the results may require a separate SID ceiling, visibility, and climb gradient. The route itself may require a climb gradient and this is the only time a route climb gradient will be considered. The proposal's effect on the published SID will be reported to AT. This may be as simple as changing a turn altitude or as complex as extensive departure restrictions. Based upon the inspector's knowledge of local traffic handling by AT, a new route may even be suggested that is less restrictive.

(3) Reporting the Effects.

(a) IFR Takeoff Minimums (Ceiling and Visibility). FAR Part 91 and TERPS table 13 prescribe the standard civil takeoff minimums in visibility only. If, due to obstructions penetrating the OIS, it becomes necessary to require higher that standard takeoff minimums, the minimums shall be no less than ceiling 300 feet height above the airport (HAA) and 1 statute mile visibility (300-1). Ceilings/visibilities of 300-1 or more will also be required when a route to miss the obstruction is not possible. A penetrating obstruction in Zone 1 or right after Zone 1 into Zone 2 and covered by both the left and right turning radius, is normally the location requiring the higher than standard takeoff minimums. Another example is when other penetrating obstructions in the airport area may limit the routes that can be used in the departure and the proposed obstruction is located in the only obstacle free area remaining (like down the mountain valley or fjord).

(b) Establishing Ceilings. A ceiling of 300 is the minimum ceiling even if the proposed obstruction is much less that 300 feet HAA. If the proposal exceeds 300 feet HAA, a ceiling above 300 is appropriate and shall be established in 100 foot increments (400, 500, etc.). An assumption of obstruction overflight would require a ceiling at or above the top of the proposed obstruction and that ceiling shall be the effect. Common sense and good judgement should prevail especially if the proposal is several miles from the airport and in mountainous areas. The assumption of homogeneous weather, zero altimeter errors, and standard lapse rates are all implicit in TERPS, but may not be valid as the distance from the airport increases.

(c) Establishing Visibilities. If a proposed obstruction penetrates an OIS and is within 1 statute mile of the departure runway, the minimum visibility to be established is 1 mile. Establishing a 1 mile visibility disallows the 1/2 mile visibility authorized by the FAR's and the lower than standard takeoff minimums authorized for some carriers in their operations specifications. If the penetrating obstruction is more than 1 mile from the departure runway, establish 2 miles visibility when equal to or less than 2 statute miles, and if more than 2 statute miles, establish 3 miles visibility. Visibilities in excess of 3 miles (basic VFR) are not normally required assuming the proposed obstruction would be marked and lighted according to AC 70/7460-1, Obstruction Marking and Lighting. Again, common sense and good judgement should apply. Visibilities at the airport and 3 miles from the airport may be different. Local conditions must be considered and minimum visibility in excess of 3 miles may be appropriate.

(d) Establishing Climb Gradients. Criteria are established to allow a climb gradient to be published for those aircraft capable of safely overflying an obstruction penetrating an OIS. TERPS specifies that anytime a climb gradient is published, ceiling and visibility minimums shall also be established for those aircraft that may not be able to maintain the climb gradient to the specified altitude. The pilot, while on the ground, can take all factors into consideration to determine if the aircraft can maintain the specified climb gradient or if the ceiling and visibility minimums must apply. A minimum climb expected on a standard departure is 200 feet per nautical mile. The 40:1 OIS equates to

152 feet per nautical mile creating a 48 feet per nautical mile buffer or ROC. When a climb gradient is to be published, the ROC of 48 feet per nautical mile shall be used. Order 8260.19, chapter 4, section 7, provides pictorial guidance for computing climb gradients. The climb gradient shall be defined in feet per NM, followed by the altitude at which continued use of the climb gradient is no longer required. Many climb gradient examples are available in the published FAR Part 97 IFR Takeoff Minimums and Departure Procedures.

g. Proposed Instrument Approach Procedures. Reference: Order 7400.2, paragraph 7-3. A proposed obstruction may have an adverse effect on future IFR operations indicated by a plan on file.

(1) Proposed SIAP Evaluation. All proposed SIAP's need to have their assumed minimums and departure procedures protected from degradation. Each FPB shall keep a record of all proposed SIAP's or plans on file and assure that they are considered in each obstruction evaluation. In some cases the proposed SIAP has already been developed and the proposal's effects on segments can be evaluated based on the already determined minimums. At other times, the plan is only in a conceptual stage and no minimums or final approach courses have been assigned. An evaluation in this instance must use the most probable approach and nominal criteria; and then, compare the proposed obstruction with existing obstructions. If the proposed obstruction's MSL height is greater than existing controlling obstructions and a segment altitude would increase, then an FAR Section 77.23(a)(3) effect would occur. Common sense and good judgement should apply, especially if there is uncertainty in airport data (runway end coordinates, etc.).

(2) Automation Tools. Provided the database has been constructed, PROSE can identify airports/heliports that have plans on file for an original SIAP. This is particularly helpful in the screening process since airports/heliports without a SIAP are not identified as IFR with magenta airspace and in initial screening, do not appear to be a problem when a proposed obstruction is plotted on a sectional chart. New SIAP proposals can be added to the PROSE airport database with nominal airspace values that will be sure to alert the inspector when a proposed obstruction is near a proposed IFR airport. TERPS Calculator can be used to evaluate a proposed obstruction regarding a proposed SIAP almost as easily as an existing SIAP if airport data is available. IAPA can be used to build a workfile for a new SIAP and determine if a proposed obstruction would be a controlling obstruction.

h. Procedural Adjustments. Reference: Order 7400.2, paragraph 5-11b(5).

"If the structure will affect an instrument flight procedure, provide a statement as to what adjustments can be made to the procedure/structure to eliminate the adverse effects." Flight Standard's compliance with the referenced paragraph is normally limited to a no exceed height (NEH) for the structure, the increase in minimums, and the FAR Part 77 section affected. An NEH height, which may include an appropriate allowance for accuracy, shall be given for all FAR Section 77.23(a)(3)&(4) adverse effects. The following are some other obstacle and procedure adjustment factors.

(1) Occasionally, a proposed obstruction may be located at the very outer edge of a TERPS area of protection which would cause an adverse effect on a SIAP. The inspector should consider responding to AT on small movements of the obstruction such as moving a site 100 feet or less. Do not forget the 250 feet horizontal uncertainty, if applicable.

(2) If specifically requested by AT, the OE inspector can recommend a site relocation where the proposed obstruction would have no or limited effect at the same or amended MSL height. Normally, the proponent will have limited land available for the proposed structure. Occasionally, the proponent will have alternate sites and discuss that fact with AT. The inspector will not evaluate alternate site locations as a normal course of action, but should be prepared to assist AT when requested, or participate in an AT sponsored meeting with the proponent. A proponent's contacts and visits directly with Flight Standards without AT involvement is neither appropriate nor encouraged.

(3) Occasionally, a proponent will submit multiple filings for a single structure and these filings may not be apparent to the AT specialist during their preliminary review. Reference: Order 7400.2, paragraph 5-4. Discussions with AT will be necessary to determine the reason for a second or additional filings and AT, in turn, may have to contact the proponent. Whatever the reason, Flight Standards will not evaluate multiple filings on one structure unless a single refiling is, in fact, a new case based on the withdraw of the original OE case or based on an imminent or actual hazard determination on the original case. If discussions with the AT OE specialist are not possible, multiple filings on a single structure will be returned to AT, without evaluation but with an appropriate explanation, for their handling.

(4) The OE inspector should be prepared to discuss with the proponent in an AT sponsored meeting any factors including changes to the proposed height or location of the obstruction. Changes to instrument procedures can also be discussed. The Flight Standards policy on procedure chan-

ges is provided in the previous section, paragraph 542.

563. VFR OPERATIONS. References: FAR Section 77.23(a)(1), Order 7400.2, paragraph 5-11b(1), and Order 8260.19, paragraph 502. Flight Standards has the responsibility for evaluating the effects a proposed obstruction would have on operational safety including VFR operations. Whenever a proposed obstruction is more than 500 feet AGL or penetrates an airport imaginary surface, it is considered to be a penetration to VFR airspace. VFR flyways and VFR practice areas need special consideration. When evaluating VFR effect, special attention must be given to those aeronautical operations that are usually conducted under VFR; for example helicopters, seaplanes, and agriculture aircraft. Much of the time, coordination is necessary and the inspector should request input from the FSDO to substantiate, verify, and identify VFR impacts. The following are areas of VFR interest.

a. VFR Routes. Reference: Order 7400.2 paragraph 7-22a. A proposed obstruction would have "an adverse effect upon VFR air navigation if its height is more than 500 feet above the surface at its site, and it is within 2 STATUTE miles of any regularly used VFR route." Examples of VFR routes are, direct routes between airports/heliports, routes underlying a victor airway, a VOR radial to an airport/heliport, a 4 (or more) lane divided highway such as an Interstate, a railroad track, a charted pole or pipe line, a river, and other prominent series of landmarks that aircraft may track visually.

b. VFR Approach Slopes. Nearly all airports, both VFR and IFR, have visual runways that need a clear 20:1 approach slope surface. A clear 34:1 approach slope may be needed for the lowest possible visibility minimums for non-precision approaches, but a clear 20:1 is required for safety. A proposed obstruction that exceeds a 20:1 approach slope surface may not have an effect on a minimum instrument altitude, but will be objectionable based on VFR effect. Although the responsibility for protecting the VFR approach area resides with the Airports Service, an obvious violation of the approach surface standards, especially for a runway having a non-precision procedure, should be an objectionable Flight Standards item based on safety.

c. VFR Terminal Operations. Reference: Order 7400.2, paragraph 7-23a, "A structure that penetrates a plane 300 feet beneath the airport traffic pattern altitude has an adverse effect." The evaluation guidelines in Order 7400.2 do not recognize the fact that an aircraft may be departing a runway and is climbing in the traffic pattern or has to leave the traffic pattern altitude and descend in order to land. Flight Standards is responsible for completing a safety analysis for the aeronautical operation on aircraft climbing on a cross wind leg or descending on the base leg and turn to final. In addition, a pilot's attention is necessarily on other items while departing or preparing to land, such as maintaining airspeed while changing power settings, climb/descent rate, and landing gear and flap positions. These are all distractions to seeing and avoiding an obstacle during a turning climb/descent.

d. Charted Visual Approach. There are numerous charted visual approaches throughout the country. They may have recommended routes and altitudes. These need to be protected and included in the obstruction evaluation. They do not have a FAR Section 77.23(a)(3) effect but can be objectionable due to safety reasons.

e. Marking and Lighting. While the recommendation for marking and lighting are the responsibility of AT, Flight Standards has input concerning safety of flight. AT usually refers to AC 70/7460-1, as amended, Obstruction Marking and Lighting, in their OE determinations. Flight Standards can make a recommendation based on safety at any time, but usually becomes involved with marking and lighting when AT gets a request from a sponsor to deviate from the recommendations of the AC. Unless the proponent submits overwhelming mitigating arguments for an equivalent level of safety, the OE inspector should recommend continued compliance with the recommended procedures established in the AC. In making a decision to reduce recommended marking and lighting, the applicable FSDO should be consulted and a site visit may be required. When evaluating a request to reduce marking and lighting, the inspector must keep in mind that marking and lighting is mainly for VFR traffic including helicopters, gliders, ultralights, and balloons, which may have special visual clearance requirements.

f. VFR Automation Tools. Very little help can be derived from automation tools for VFR evaluations since documentation of VFR routes is minimal. If a direct route between airports/heliports is involved, a geodetic calculator could be used to find the direct route and then an out and over program can determine if the proposed obstruction is within 2 statute miles of the calculated direct route. In the same way, TERPS Calculator could be used on airways and a VOR radial.

g. Site Visits. Familiarity with the inspector's area of responsibility and knowledge of local aircraft operations is critical for proper VFR evaluations. Site visits to airports/heliports and FSDO's should be routinely scheduled. Visits to Air Traffic facilities (center and approach control) on VFR days can be used to view VFR traffic and determine heavily traveled VFR routes. These site visits for a single OE case may be appropriate.

564. MINIMUM SAFE ALTITUDE (MSA). The last item on the job aid is MSA's and is listed as a reminder to accomplish this evaluation. Although Handbook 7400.2 does not recognize MSA as an instrument flight altitude, a proposed obstruction may cause an MSA or ESA to increase and require a change to the SIAP. If the FPB processes OE cases using PROSE, it is a simple matter to evaluate each day's batch of cases using the MSA-CK program. Building the database for the program is not very hard or time consuming. The advantage is knowing what procedures will have to be amended. Without using PROSE, a careful evaluation is required for possible effects on MSA's and ESA's. A 4 NM buffer is used around all segment boundaries.

565.-569. RESERVED.

SECTION 5. FPB RESPONSIBILITIES AFTER THE OBSTRUCTION EVALUATION

570. GENERAL. The primary FPB responsibility after an obstruction evaluation is sending the response to Air Traffic (AT) on the results of the Flight Standard analysis. After the initial response to AT, receipt of any 7460 series forms on the specific OE case can require additional actions by the OE inspector. The OE inspector's responsibilities to an OE case does not end until a final FAA determination is issued. Even after a regional determination is made, an appeal of that determination to Washington can cause additional FPB involvement with the case. This section will detail additional actions required of the OE inspector concerning individual OE cases up to the final determination, including Washington level reviews.

571. RESPONSE TO AIR TRAFFIC. Following a thorough obstruction evaluation, accurately communicating the Flight Standards findings is required. The OE inspector is also responsible for informing AT of any Flight Standards objections to the OE case. If Flight Standards has no objections to the case, that information also must be understood by AT. This handbook encourages agreements between the FPB and regional AT on the form and wording of inspector responses to reduce unnecessary paperwork. Misunderstandings between the two offices concerning any Flight Standards objections is unacceptable.

a. Response by Computer. For those offices using the automated OE network, a Flight Standards response space is available. Figures 5-9 and 5-10 give two sample responses when Flight Standards has no objections to the case.

(1) If Flight Standards determines the case has numerous effects on VFR operations or instrument procedures, a paper response should be made if the available space on the OE automated network is insufficient.

(2) Some FPB offices make all responses using the OE network, but follow-up with a paper response for all cases that exceed standards, in order to fully describe the elements of the objection.

(3) This handbook will not dictate the method of response or format. After the OE automated network is fully developed and in use at all regions, appropriate policies may be established.

b. Response by Form or Form Memo. Over the years, many FPB's have established forms or form memos to respond to AT.

(1) Figures 5-17 (blank) and 5-18 (completed) contain a form designed by the New England Region. It may be used to respond to AT if desired. The reason for the de-

tail on the form is explained in paragraph 572.

(2) Figures 5-19 (blank) and 5-20 (completed) are form memos that may be used to respond on an OE case.

(3) Note that both the form and the form memo specifically state, by checking the appropriate block, that Flight Standards objects to the proposal.

c. Verbal Response. Verbal only responses are not encouraged because there is no permanent record of the Flight Standards response. When verbally requested by the AT OE specialist, verbal responses may be appropriate if a follow-up computer or written response is made.

(1) One formal FPB response is required even if a case has been discussed and agreements made in a regional meeting or after a negotiation session with the proponent.

(2) After forwarding the formal Flight Standards response, additional discussions and agreements may be made verbally.

572. AIR TRAFFIC ACTIONS AFTER THE FLIGHT STANDARDS RESPONSE. The final determination of "hazard to aviation" versus "no hazard to aviation" is made by the focal OE office in the Air Traffic Division based upon the degree of the effects on aviation. That office makes the decision of which situations have substantial adverse effect on aviation and which do not.

a. Contents of Flight Standards Response and AT Actions. In the response to AT, the condition/minimums which currently exist and the condition/minimums which would be required if the proposed construction occurs, should be clearly defined.

(1) If errors were found on existing procedures during the obstruction evaluation but Flight Standards still objects to the proposal, a more comprehensive response, explaining all details of the evaluation, is required. This is also true if minimums were raised based on a temporary obstruction and the airspace is still reserved for the lower minimums. The AT specialist must have a thorough understanding of the actual effects the proposal will have. All facts are needed to enable AT to make decisions, negotiate, and accurately write a determination.

(2) If the objectional effects of the proposal are only based on accuracy coding, AT must be notified in the FPB response that a survey is needed. See paragraph 544 on accuracy coding.

(3) If a procedural change (like MSA's) will be required but Flight Standards does not object to the proposal, the response should request supplemental notice of actual construction.

(4) The no exceed height (NEH), the maximum height of the structure without having an adverse effect, should be stated. A NEH may be given for each effect the structure would have. This height gives the AT OE specialist the information necessary to negotiate with the proponent. The proponent may be persuaded to lower the structure to a lesser height in order to obtain a determination of no hazard.

(5) Some cases can affect more than one instrument procedure or more than one segment of a procedure. More than one NEH's may exist and the AT specialist may discuss options with the OE inspector. This may occur prior to or after negotiations with the proponent. The Flight Standards policy on procedures changes is stated in paragraph 542. Normally, the AT specialist understands this Flight Standards policy, but the OE inspector shall determine which instrument procedures changes are appropriate and which are not.

(6) In some cases, procedural changes may be appropriate from a Flight Standards viewpoint, but are not acceptable to AT. Disruption of normal air traffic flows is a prime example. These decisions are made by AT.

(7) In option discussions with AT, the OE inspector should suggest possible solutions based on the Flight Standards areas of responsibility. Do not attempt to make decisions for AT. Conversely, do not permit AT to make Flight Standards' decisions.

b. Negotiations with the Proponent. Upon request, the OE inspector should assist the AT OE specialist with negotiations. Possible options, like movement of the structure, may be presented by the proponent. See paragraph 528 on negotiations.

c. AT Decisions Based on Responses. After the operational divisions have responded, AT will determine the next course of action. A determination may be made immediately or the case may be circularized for public comment. In response to AT, OE inspectors can and should recommend circulation when the Flight Standards evaluation indicates that benefits may be derived from public comment.

573. FAA FORM 7460-8, AERONAUTICAL STUDY OF PROPOSED CONSTRUCTION OR ALTERATION. AT has their own parameters for deciding whether an OE case should be circularized. Proposed structures near an airport/heliport or towers higher that 500 feet AGL are examples commonly circularized. FAA Form 7460-8 is used for this purpose. Figure 5-4 is an example of an FAA Form 7460-8.

a. Contents of Form. Other than the basic information on the structure, the FAA Form 7460-8 will state the effects as reported by the operational divisions.

b. OE Inspector Actions. Upon receipt of the FAA Form 7460-8, the inspector should review the effects. If there are effects based on the FPB response, the accuracy of these effects should be checked. The inspector should also assure that there are no changes in location or structure height.

(1) If the FAA Form 7460-8 was not forwarded to the appropriate Flight Standards field office (based on the regional distribution list), the inspector should determine if field office input is required. If required, send a copy to the field office. A cover routing slip may be appropriate.

(2) The inspector should evaluate the comments received from the field offices.

(3) Based on input, new information, or changes to the proposal, the inspector should re-evaluate the proposal. This may be as simple as checking calculations or as complex as conducting another complete evaluation. The final adverse effects and recommendations should be determined.

(4) If an environmental analysis is required, have AT inform the proponent of what is required. If the proponent is unwilling to complete an analysis, a procedure change may not be considered. See paragraph 549 on procedural changes and environmental assessments.

(5) Most regional AT offices do not require another response from the FPB unless the effects noted in the original response change. Minor changes or minor inaccuracies discovered may be made verbally. Major changes require a formal response, especially when a Flight Standards objection/no objection is reversed.

(6) The FAA Form 7460-8 should be filed in the OE case file.

574. DETERMINATIONS: FAA FORM 8460-9, DETERMINATION OF NO HAZARD TO AIR NAVIGATION AND FAA FORM 8460-10, DETERMINATION OF HAZARD TO AIR NAVIGATION. Determinations are issued by AT based on the results of an internal FAA study and the circularized aeronautical study.

a. Flight Standards Policy on a No Hazard Determination. The Flight Standards policy is that the Air Traffic office shall coordinate with the FPB prior to release of a FAA Form 7460-9 (no hazard) when the FPB has an objection to the particular OE case. The preferred coordination method is the OE inspector's initials on a no hazard determination grid sheet.

(1) There are a number of reasons for this policy, but the policy stated in Order 7400.2, concerning the FAA speaking with one voice and that all internal disagreements will be resolved, is the primary reason.

(2) Commonly, discussions and eventual agreements occur between the AT OE specialist and the OE inspector when Flight Standards objects to an OE case. The initials on the determination are written confirmation of the agreements.

(3) Coordination is not necessarily required when, through negotiations, the proposal was moved or lowered based on the FPB response or discussions. However, a change in the proposal differing from the FPB response and not discussed, may need further evaluation and shall be coordinated.

(4) The OE inspector shall not initial a no hazard determination until a requested survey is received and reviewed or a required environmental assessment is completed.

NOTE: On reviewing a proponent funded environmental assessment (EA) on a required procedure change, the OE inspector must assure the EA only addresses the government actions needed to accommodate the structure. Once accepted, the EA becomes an FAA EA. Also see chapter 10.

b. <u>OE Inspector Actions</u>. Flight Standards has no required coordination policy when a no hazard determination is issued and the FPB had no objections or when a hazard determination is issued. However, if extensive Flight Standards comments are a part of the determination, Flight Standards recommends that AT coordinate with the OE inspector to insure accurate explanation of the effects.

(1) <u>Actions, No Hazard</u>. Issuing an FAA Form 7460-9 indicates that the structure may be built. The OE inspector should assume the structure will be built at the location and height stated on the form.

(a) The data on the structure should be checked. Changes may have occurred since the FAA Form 7460-1 was received. Any changes to the effects discovered by the inspector should be discussed with the AT OE specialist. Significant changes may require an amendment to the determination.

(b) If the location or height of the structure changed, a re-evaluation of the proposal may be required. This is the time to determine all Flight Standards effects, and not when construction actually begins.

(c) If a required environmental analysis was not completed, do not have AT issue a determination of no hazard.

(d) The FAA Form 7460-9 should be filed in the OE case file.

(2) <u>Actions, Hazard</u>. Issuing an FAA Form 7460-10

indicates that the structure probably will not be built. The OE inspector should assume the structure will not be built. Except for an environmental analysis, the OE inspector should take the same actions on a hazard determination as with a no hazard determination.

575. CONSTRUCTION NOTICE: FAA FORM 7460-2, NOTICE OF ACTUAL CONSTRUCTION OR ALTERATION. Receiving an FAA Form 7460-2 indicates that the structure is actually being built or construction will begin in the very near future. The OE inspector's actions may be many or few depending upon the effects the structure will have on aeronautical operations.

a. Effects on Instrument Procedures. The main concern of the OE inspector is rapidly rising structures where immediate action is needed to maintain instrument procedure safety margins as required by TERPS. For this reason, receipt of an FAA Form 7460-2 has the highest handling priority of any of the 7460 series forms.

(1) When the FAA Form 7460-2 is received, the air traffic office should forward any survey data received from the proponent to NOS for their use in assigning an accuracy code. A copy of the survey should have already been sent to the FPB for their review. The FIAO should use the previously determined accuracy code in procedural modifications and NOTAM's.

(2) Duplication of effort must be avoided. The FPB has already determined procedural effects the structure would have and that information should be shared with the FIAO.

b. OE Inspector Actions.

(1) Analyze the aeronautical effects based on the data specified on the FAA Form 7460-2. If there are no changes to the location or height of the structure, the aeronautical study and determination of effects should have been accomplished previously.

(a) If there are changes to the location or height of the structure, a review of the aeronautical study must be accomplished. Negotiated movement or height reductions may have occurred and the FAA Form 7460-2 may be the only indication to the OE inspector that the actual structure will have no effect or different effects.

(b) Normally, changes to the structure's location and height are the results of negotiations, but may be refinement of the data originally submitted by the proponent. Occasionally, a complete re-evaluation of the effects will be required.

(2) Determine if procedural changes are required.

(a) If procedural changes are required, the OE inspector must take the appropriate actions to revise or amend the instrument procedures.

(b) For structures being constructed over a longer period of time, normal procedure amendments may be appropriate. The estimated completion time of the structure listed on the proponent's submitted FAA Form 7460-2 should indicate if amendments can be timely accomplished.

(c) Whether procedural changes are required or not, temporary construction cranes may effect instrument altitudes. Coordinate with the AT OE specialist as required to determine the extent of instrument procedures affected. AT in turn should coordinate with the proponent.

(3) Determine if a Notice to Airmen (NOTAM) is required.

(a) On rapidly rising structures and construction sites having temporary cranes, an OE case that affects instrument procedures will probably require immediate issuance of a FDC NOTAM.

(b) Because of the length of time required to amend and publish an instrument procedure, an FDC NOTAM may have to be issued even for slower rising structures. In this case, the NOTAM can be planned for future issuance.

(c) Coordinate with the FIAO, normally by telephone, for the development and distribution of required FDC NOTAM's.

(4) Determine if environmental assessment was required. If a procedure change is required, file a copy of the assessment in the official SIAP file.

(5) Determine if the procedure change requires further actions such as waivers or airspace:

(a) If a flight procedures waiver is required, initiate the waiver.

(b) If airspace action is required, coordinate with the appropriate FIAO and AT office for airspace action.

(6) Notify the FIAO for required procedural changes.

(a) Some FPB's notify their FIAO of procedural changes required when a no hazard determination is issued and then have AT forward the construction notice direct to the FIAO. This can be accomplished by providing the FIAO with a constantly updated list of OE cases and their effects. Flight Standards supports any FIAO/FPB agreements that can reduce paperwork provided procedures are not changed until construction begins.

(b) Because of procedure work backlog, some FPB's and FIAO's use written requests for procedure changes including prioritizing the changes with other procedural workload.

(7) The FAA Form 7460-2 should be filed in the OE case file.

576. WASHINGTON REVIEWS OF REGIONAL OE DETERMINATIONS. Guidance on Washington office reviews are contained in Order 7400.2, chapter 8, section 5.

a. What Can Be Reviewed. All regional OE determinations, whether hazard or no hazard, may be petitioned for review.

(1) Commonly, the sponsor of a structure will petition a hazard determination while any interested party may petition a no hazard determination.

(2) AC 70/7460-1, Obstruction Marking and Lighting, deviation requests are also forwarded to Washington after the regional aeronautical study has been completed.

b. Primary Washington Offices for Petitions. The Airspace and Obstruction Evaluation Branch, ATP-240, is responsible for processing petitions for review of regional OE determinations. Like in the region, this focal Air Traffic office coordinates with the other 3 operational services of Airway Facilities, Airports, and Flight Standards. For Flight Standards, the Flight Procedures Standards Branch, AFS-420, is the focal office.

c. AT Actions.

(1) On receipt of a petition for review, ATP-240 assigns a docket number to the petition. More than one petition of the same case are given separate docket numbers. (Although not written into the federal register, the Headquarters determinations are formally written in docket format.)

(2) ATP-240 informs the appropriate offices, including the sponsor, that the determination is not final pending disposition of the petition.

(3) ATP-240 coordinates the petition and background information with the different operational services.

(4) Based upon the AT evaluation of the case and petition, including input from the other operational services, ATP-240 determines the best course of action for handling the petition.

(a) The normal decision will be to grant a review or not grant a review. Other options available are returning the case to the region for re-evaluation and continued negotiations.

(b) Without a review, a regional determination may be affirmed and made final, revised and made final, or reversed and made final.

(5) If a review is granted, the case is essentially reopened for additional input and a complete re-evaluation. Any and all aspects of

the case are reviewed. A review is a time consuming process which may take months to reach a final determination.

(6) After the review, the regional determination may again be affirmed, revised, or reversed. Occasionally, the proponent or their representatives may offer options and the case may be returned to the region to finalize actions.

d. <u>Regional and Headquarters Flight Standards Actions</u>.

(1) The general Washington level practice concerning petitions for review is to first determine if the petitioner has presented a valid reason for a review. Reasons for a review may be inaccuracies or untruths in the determination, not applying standard FAA policies and practices, and not meeting the provisions of FAR Part 77. However, even if the petitioner did not present a valid reason for a review, a review may still be granted or a determination reversed based on these same reasons. This is why petitions to Washington may be disposed of with or without a formal review.

(2) AFS-420's involvement with a petition begins when the petition, the regional determination, and a cover letter from ATP-240 is forwarded to the branch. AFS-420 evaluates information presented by the petitioner, determines if Flight Standards area of responsibility effects listed in the determination are correct, and analyzes other areas of concern that may need to be reviewed.

(3) During this initial evaluation, AFS-420 may call the FPB concerning any factors that may need to be explained. Discovering what appears to be an error normally precipitates the call.

(a) The regional OE inspector should not be concerned that one of their cases may be reviewed. Some proponents petition all unfavorable determinations. A petition for review is specifically addressed in FAR Part 77. Washington level evaluation is required.

(b) The regional OE inspector's evaluation and detailed response to AT, along with AT's discussions of these Flight Standards effects in the OE determination, are very important to determine if a case review is appropriate. For this reason, precise evaluations and required coordination must be accomplished at the regional level for all OE cases.

(c) AFS-420 may request additional information on the case that is not available from the determination and published information. The OE inspector must understand that AFS-420 has only limited maps available and does not have the FAA Form 8260-9 for the affected procedure. Data is limited to what is available in the Airport/Facility Directory or in IAPA. AFS-420 has no knowledge of accuracy codes used in the regional evaluation, charted minimums that may have been raised because of temporary cranes, NOTAM's that may have been recently issued, proposed procedures, etc., that may have affected the regional evaluation unless specifically mentioned in the determination.

(d) The OE inspector should refer to the case file when questions are posed by AFS-420. Any relevant information on the case should be volunteered besides the questions specifically asked.

(4) AFS-420 evaluates all Flight Standards aspects of the case. IAPA is commonly used for detailed TERPS evaluations.

(5) AFS-420 forwards a written response to ATP-240 stating that the Flight Standards evaluation indicated that a review is appropriate or is not appropriate. If AFS-420 recommends a review, a detail of the reasons will be included.

(6) Actions to be taken by ATP-240 are coordinated with the appropriate operational services. If a review is granted, Flight Standards involvement continues. Prior to the review or during the review, meetings may be convened to discuss the case. Lawyers may be involved, both for the FAA and the petitioner. Any new information gained from the review is shared. AFS-420 will again respond to ATP-240 on their results of the formal review. Information should be detailed enough for ATP-240 to write the final determination. Coordination is accomplished prior to issuing the final determination.

e. Overview of Washington Office Actions. The Washington level actions on petitions for review of regional OE determinations are very similar to regional actions on the original case. The operational services evaluate the case and respond to a focal Air Traffic office. AT then determines the next course of action. Information may be sufficient for an immediate determination. The regional circulated aeronautical study can be compared to the formal Washington review when additional input is deemed appropriate. Based on all input, a final determination is made. All operational services agree with the final determination.

577.-599. RESERVED.

FIGURE 5-17. OBSTRUCTION EVALUATION RESPONSE FORM

FEDERAL AVIATION ADMINISTRATION — NEW ENGLAND REGION
FLIGHT STANDARDS DIVISION, ANE-200

OBSTRUCTION EVALUATION

LOCATION ______ CASE NO: ______ ANE- ______ OE

NEAREST AIRPORT ______ STRUCTURE ______

GROUND ELEVATION: ______

HEIGHT OF STRUCTURE ABOVE GROUND: ______

MSL TOP OF STRUCTURE: ______

77.23(a)(3): A HEIGHT WITHIN A TERMINAL OBSTACLE CLEARANCE AREA WHICH WOULD RESULT IN THE VERTICAL DISTANCE BETWEEN ANY POINT ON THE OBJECT AND AN ESTABLISHED MINIMUM FLIGHT ALTITUDE TO BE LESS THAN THE REQUIRED OBSTACLE CLEARANCE. ______ NOT APPLICABLE.

PROPOSAL WILL REQUIRE INCREASING THE FOLLOWING ALTITUDE OF THE AL - ______

APPROACH ______ AIRPORT.

HOLDING AIRSPACE ______ TO ______ FT PROCEDURE TURN ______ TO ______ FT

INITIAL ______ TO ______ FT INTERMEDIATE ______ TO ______ FT

FINAL ______ TO ______ FT CIRCLING ______ TO ______ FT

MISSED APPROACH ______ TO ______ FT DEPARTURE ______ TO ______ FT

HEIGHT THAT WOULD NOT REQUIRE THE INCREASE NOTED ______

EXCEEDS BY ______ FEET

DOES NOT EXCEED ______

77.23(a)(4): A HEIGHT WITHIN AN EN ROUTE OBSTACLE CLEARANCE AREA OF A FEDERAL AIRWAY OR APPROVED OFF-AIR ROUTE THAT WOULD INCREASE THE MINIMUM OBSTACLE CLEARANCE ALTITUDE (MOCA). ______ NOT APPLICABLE

RELATED AIRWAYS (______) MOCA: ______

AMSL PROPOSED ______ PLUS ROC ______ EQUALS ______

EXCEEDS BY ______

DOES NOT EXCEED ______

THE ABOVE PROPOSAL DOES ______ DOES NOT ______ EXCEED FLIGHT STANDARDS PROCEDURES PERTAINING TO PART 77 AND ______ IS ______ IS NOT OBJECTIONABLE TO THIS OFFICE.

COMMENTS: ______

______

______

______

______ REVIEWER'S SIGNATURE ______ DATE

NE 7460-11 (12/71)

FIGURE 5-18. COMPLETED OBSTRUCTION EVALUATION RESPONSE FORM

FEDERAL AVIATION ADMINISTRATION — NEW ENGLAND REGION
FLIGHT STANDARDS DIVISION, ANE-200

OBSTRUCTION EVALUATION

LOCATION DANBURY, CT CASE NO: 93 ANE- 15 OE

NEAREST AIRPORT DANBURY STRUCTURE TOWER

GROUND ELEVATION: 910

HEIGHT OF STRUCTURE ABOVE GROUND: 250

MSL TOP OF STRUCTURE: 1160

77.23(a)(3): A HEIGHT WITHIN A TERMINAL OBSTACLE CLEARANCE AREA WHICH WOULD RESULT IN THE VERTICAL DISTANCE BETWEEN ANY POINT ON THE OBJECT AND AN ESTABLISHED MINIMUM FLIGHT ALTITUDE TO BE LESS THAN THE REQUIRED OBSTACLE CLEARANCE. ________ NOT APPLICABLE.

PROPOSAL WILL REQUIRE INCREASING THE FOLLOWING ALTITUDE OF THE AL - VOR-A

APPROACH DANBURY AIRPORT.

HOLDING AIRSPACE		TO		FT	PROCEDURE TURN		TO		FT
INITIAL		TO		FT	INTERMEDIATE		TO		FT
FINAL	1400	TO	1500	FT	CIRCLING		TO		FT
MISSED APPROACH		TO		FT	DEPARTURE	700	TO	800	FT
						CEILING			

HEIGHT THAT WOULD NOT REQUIRE THE INCREASE NOTED 1056

EXCEEDS BY 104 FEET

DOES NOT EXCEED ________

77.23(a)(4): A HEIGHT WITHIN AN EN ROUTE OBSTACLE CLEARANCE AREA OF A FEDERAL AIRWAY OR APPROVED OFF-AIR ROUTE THAT WOULD INCREASE THE MINIMUM OBSTACLE CLEARANCE ALTITUDE (MOCA). ________ NOT APPLICABLE

RELATED AIRWAYS (V3 CMK to RACEY) MEA ~~MOCA~~: 2100

AMSL PROPOSED 1160 PLUS ROC 1000 EQUALS 2200

EXCEEDS BY 11

DOES NOT EXCEED 1149

THE ABOVE PROPOSAL DOES X DOES NOT ____ EXCEED FLIGHT STANDARDS PROCEDURES PERTAINING TO PART 77

AND X IS ____ IS NOT OBJECTIONABLE TO THIS OFFICE.

COMMENTS:

S. Hull 3/4/93

REVIEWER'S SIGNATURE DATE

FIGURE 5-19. OBSTRUCTION EVALUATION RESPONSE FORM MEMO

U.S. Department of Transportation
Federal Aviation Administration

Memorandum

Subject: INFORMATION: Obstruction Evaluation
ASO- OE

Date:

From: Manager, Flight Procedures Branch, ASO-220

Reply to Attn. of:

To: ASO-532

We have reviewed the subject Obstruction Evaluation case in accordance with FAA Handbook 7400.2.

( ) The proposal has no aeronautical effect on the areas for which we are responsible (77.23(a)(3) and (4)).

( ) The proposal has the following adverse aeronautical effects. Based upon the listed effect(s), consider this our objection to the proposal.

( ) ENROUTE ( ) IFR ( ) VFR

Dale C. Anderson

FIGURE 5-20. COMPLETED OBSTRUCTION EVALUATION RESPONSE FORM MEMO

M E M O R A N D U M

U.S. DEPARTMENT
OF TRANSPORTATION

FLIGHT STANDARDS DIVISION
FLIGHT PROCEDURES BRANCH, ASO-220

FEDERAL AVIATION
ADMINISTRATION

SUBJECT: INFORMATION: Obstruction Evaluation 92-ASO-1187-OE, Memphis, TN

August 19, 1992

FROM: Manager Flight Procedures Branch, ASO-220

TO: ASO-532

We have reviewed the subject Obstruction Evaluation case in accordance with FAA Handbook 7400.2C.

The proposal has the following adverse aeronautical effects. Based upon the listed effect(s), consider this our objection to the proposal.

IFR

Increase the following IFR minimums at Memphis International:

1. ILS RWY 18L (LOCALIZER MINIMUMS ONLY)

   a. St-in, all cats, MDA from 760 to 900 (neh-460)*

   b. Circling, Cat A & B, MDA from 800 to 900.

   c. St-in, Viz, Cat C from 40 to 60, CAT D from 50 to 1.5

2. ILS RWY 18R (LOCALIZER MINIMUMS ONLY)

   a. St-in, all Cats, MDA from 760 to 860 (neh-490)*

   b. Circling, Cat A & B, MDA from 800 to 860

   c. St-in, Viz, Cat C from 40 to 50, Cat D from 50 to 60

* An obstacle accuracy code of 4D (+/-250' horz., +/-50' vert.) was used to evaluate this obstacle. We would reconsider this OE with a certified survey of at least 2.C. accuracy (+/-50' horz., +/-20' vert.)

NOTE 2.C. accuracy will reduce the effects but will not eliminate them.

Dale C. Anderson

SECTION 6. TASK #14 - EVALUATE A NOTICE OF PROPOSED CONSTRUCTION (RESERVED) (TBD*)

***TBD=TO BE DEVELOPED**

SECTION 7. TASK #5 - CONDUCT AN AERONAUTICAL STUDY (RESERVED) (TBD*)

***TBD=TO BE DEVELOPED**

SECTION 8. TASK #26 - PROCESS A DETERMINATION OF HAZARD/NO HAZARD (RESERVED) (TBD*)

***TBD=TO BE DEVELOPED**

SECTION 9. TASK #27 - PROCESS A NOTICE OF ACTUAL CONSTRUCTION (RESERVED) (TBD*)

***TBD=TO BE DEVELOPED**

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