ORDER

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Changes 1 - 11

AIRWAY PLANNING STANDARD NUMBER ONE - TERMINAL AIR NAVIGATION FACILITIES AND AIR TRAFFIC CONTROL SERVICES

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DEPARTMENT OF TRANSPORTATION
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FOREWORD

This order contains the policy and criteria used in establishing the eligibility of terminal locations for terminal air navigation facilities and air traffic control services.

The safety and efficiency of air traffic determine requirements 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 is related to air traffic activity levels. This order specifies minimum activity levels for terminals to become candidates for, to qualify for, or to retain primary terminal air navigation facilities and air traffic control services. For certain types of facilities, the order also establishes a requirement for additional cost benefit and other analyses prior to facility commissioning or decommissioning. Satisfying criteria specified herein does not constitute a commitment by the Federal Aviation Administration to provide, modify, or discontinue eligible facilities or services.

Donald D. Engen
Administrator

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CHAPTER 1. GENERAL

1. PURPOSE. This order contains the policy and criteria used in establishing the eligibility of terminal locations for terminal air navigation facilities and air traffic control services.

2. DISTRIBUTION. This order is distributed to the division level in Washington, regions, and centers with a branch level distribution in the regional Airway Facilities, Airports, Air Traffic, and Flight Standards Divisions and the Planning Staffs; a limited distribution to all Airway Facilities Sectors, Airports District Offices, Air Route Traffic Control Centers, Airport Traffic Control Towers, Flight Service Stations, and International Flight Service Stations.

3. CANCELLATION. Order 7031.2B, Airway Planning Standard Number One - Terminal Air Navigation Facilities and Air Traffic Control Services, dated September 20, 1974, is cancelled.

4. BACKGROUND.

a. Since 1951, FAA and its predecessor organizations have used the establishment criteria published in the airway planning standards as the primary means of allocating air navigation facilities and air traffic control services. The result has been an orderly distribution of facilities and services at locations where they benefit the greatest number of users for the lowest cost to the government consistent with safety and operational efficiency.

b. After the establishment of an operational requirement, air traffic demand determines nearly all requirements for air navigational facilities and air traffic control services. However, since the agency must operate, maintain, and improve the air navigation system within defined budgetary limitations, it is impossible, and it is not economically feasible to satisfy all operational requirements. The facilities and services must be allocated to locations where the greatest benefit will be derived from their cost. Therefore, a second consideration must necessarily be economics. This is also the primary factor in considering improvements to existing facilities or services.

c. Generally, the total present value of the benefits over the life cycle of an improvement to a primary facility or service must exceed the total present value of the life cycle costs for establishment and maintenance of the improvement.

d. Activity levels at which the primary terminal air navigation facilities and air traffic control services either qualify, become candidates, or do not qualify for improvements, additional facilities, and/or services are contained in the criteria. The primary air navigation facilities and associate air traffic control services are:

(1) Airport Surveillance Radar System.

(2) Airport Traffic Control Tower.

(3) Microwave Landing System with Approach Lights.

(4) Instrument Landing System with Approach Lights.

(5) Terminal Instrument Approach Systems.

5. EXPLANATION OF CHANGES. This revision:

a. Incorporates the current pages of and all changes to Order 7031.2B. The revised order contains new pagination and follows the current FAA directives system format, but does not revise previously approved establishment or discontinuance criteria nor include any substantive changes.

b. Updates Appendix 3, Summary of "Critical Values", to also provide unit economic values in current dollars for 1981, 1982, and 1983, in addition to 1980 dollars.

c. Groups similar subjects in chapters that follow the content as published in the FAA's Airman's Information Manual.

d. Contains a delegation of authority for the Director of Aviation Policy and Plans to issue nonsubstantive changes.

6. AUTHORITY TO CHANGE THIS ORDER. After coordination with affected organizational elements, the Director of Aviation Policy and Plans is authorized to issue changes to this order provided the changes do not affect policy, a delegation of authority, an assignment of responsibility, or contain significant unresolved issues.

7. POLICY. FAA shall determine the eligibility of terminal locations for the establishment, modification, or discontinuance of terminal air navigation facilities and air traffic control services in accordance with the following policy; however, eligibility determinations do not constitute a commitment to provide such facilities or services.

a. Public Airports, as defined in the Airport and Airway Improvement Act of 1982, are candidates for the various facilities and services provided they meet the criteria specified herein.

b. New Public Airports and Other Public Airports Designated as Regional Airports qualify for facilities and services provided the forecasts of activity made by the FAA indicate that the criteria specified herein would be met within 3 years after the airport begins operation.

c. Privately-Owned Airports open to and available for use by the Public which are recognized by and contained within the National Plan of Integrated Airport Systems are also candidates for the various facilities and services described herein provided that they meet the same facility establishment standards and implementation criteria as those specified for publicly-owned airports, and, in addition, that owner(s) of such airports enter into appropriate assurances and covenants to guarantee:

(1) Compliance with that portion of Section 308(a) of the Federal Aviation Act dealing with the prohibition of exclusive rights.

(2) Compliance with anti-discrimination regulations and practices in terms of race, color, religion, sex or national origin.

(3) That any fees charged for services shall be fair and reasonable for all types, kinds and classes of aeronautical uses.

(4) Protection of the government investment and public interest through continuing operation as public use facilities for long enough periods to permit the amortization of such investment.

(5) Compliance with the same safety requirements and obstacle clearance criteria applicable to publicly owned airports.

(6) That FAA will be furnished land without cost for the construction of facilities.

(7) That compatible land use will be accomplished where feasible with the land in the immediate vicinity of the airport.

(8) That there will be compliance with the equal opportunity clause of Executive Order 11246.

NOTE: For additional details and the operations agreement format, refer to Order 6030.40, FAA Policy for Receiving Assurances When Establishing F&E Facilities at Privately Owned Public-Use Airports.

d. Military Facilities. FAA acquisition and operation of military facilities will be covered by arrangements between DOD and FAA. No FAA facility will be established where an existing military facility satisfies FAA operational requirements.

e. Establishment of Air Navigation Facilities and Air Traffic Control Services.

(1) Candidacy and Qualification under Air Traffic Demand Criteria. An airport that meets the criteria specified herein for one or more terminal air navigation facilities or air traffic control services becomes a candidate location for those facilities or services. It becomes qualified for the establishment of the particular facilities or services when:

(a) It meets the criteria specified herein 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 FAA estimates of the demand for the facility or service may be used), and

(b) It is recommended by a regional director as necessary to satisfy an operational requirement and is economically justified by a cost/benefit study, and

(c) The recommendation of the regional director is concurred with by the Administrator.

(2) Remote Locations. When the qualifying criterion is a benefit/cost ratio, and the proposed site is a remote location as defined in Appendix 1, Remoteness - Compensation for Benefit/Cost Criteria, the evaluation required by paragraph 7e(1)(b) will be based on the remoteness-compensated benefit/cost ratio. This does not affect the candidacy standards, which apply equally to remote and non-remote sites.

(3) Exception to Air Traffic Demand Criteria. If the community served by an airport is identified in a federally approved economic development program, such as the "new communities" program of the Department of Housing and Urban Development, the airport may be considered for establishment of a single-equipment instrument approach system, or may be considered a candidate for TVOR or LDA without meeting the requirements set forth in the subsequent paragraphs of this order.

(4) Reexamination Prior to Survey or Construction. FAA will, prior to the start of surveys or construction for the establishment of a new facility or service, reexamine the basis on which the project was justified. If the eligibility factors have changed or are expected to change significantly, such as discontinuance of air carrier services, closing of a military base, new airport plans, etc., either prior to or after budgetary approval, the region shall advise the Office of Management and Budget of the situation and its recommendations promptly.

f. Discontinuance of Air Navigation Facilities and Air Traffic Control Services. Whenever the activity level of an air navigation facility or air traffic control service falls to or below the discontinuance criteria specified herein, 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 counts, the facility or service shall be discontinued unless its retention can be specifically justified. If the discontinuance criterion is a benefit/cost ratio, and the facility is remote as defined in appendix 1, evaluation will be based on the remoteness-compensated (benefit enhancement only) benefit/cost ratio.

8. SCOPE.

a. The Federal Aviation Administrator is empowered to provide air navigation facilities and air traffic control services to insure efficient utilization of the navigable airspace 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. This order contains criteria for the establishment of the various terminal air navigation facilities and air traffic control services provided by the agency and funded through the facility and equipment (F&E) appropriation. Criteria for other air navigation facilities and air traffic control services are contained in the appropriate airway planning standard or agency directive.

b. The criteria contained herein are primarily based on air traffic demand since volume of traffic is a tangible and measurable indication of the need for air navigation facilities and air traffic control services. They 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 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.

c. 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 requirement cannot be established which must also be considered are the general terrain features in the vicinity of the terminal, the nature of the operation, and the frequent and predictable occurrence of severe climatological phenomena such as heavy snow, ice, fog, or other local conditions that can adversely affect aircraft operations or the safety of the flying public.

d. Non-Federal Terminal Facilities. Non-Federal terminal air navigation and approach aids and air traffic control facilities purchased and installed by other than the Federal Government may be eligible for inclusion in the National Airspace System. FAA will assume ownership, operation, maintenance, and logistic support of equipment and facilities provided appropriate FAA standards and requirements, as outlined in applicable agency directives, are met.

e. Criteria for Provision of Electrical Power. Criteria for the provision of electrical power configuration at National Airspace System facilities is contained in Order 6030.20C, Electrical Power Policy. This order prescribes the power configuration and characteristics of power systems which are standard for various types of operating conditions. Guidance for the uniform implementation of Order 6030.20C is contained in agency Order 6950.2B, Electric Power Policy Implementation at National Airspace System Facilities.

f. Summaries of Criteria and Critical Economic Values. The establishment and discontinuance criteria and the critical economic values utilized in the development of investment criteria are summarized in the following appendices to this order:

(1) Appendix 2, Summariy of Establishment and Discontinuance Criteria.

(2) Appendix 3, Summary of "Critical Values."

9.-19. RESERVED.

CHAPTER 2. NAVIGATION AIDS

SECTION 1. AIR NAVIGATION RADIO AIDS

20. MICROWAVE LANDING SYSTEM (MLS) WITH APPROACH LIGHTS.

a. Establishment. A runway where scheduled turbojet operations are conducted on a sustained basis and are expected to continue without long periods of interruption, or any runway or heliport not currently equipped with an operating precision approach system and meets the annual instrument approach criteria in paragraph 20b, is a candidate for MLS with an approach light system for Category I operation as provided in paragraphs 20a(1) through 20a(3).
* Note that Supplemental MLS Criteria apply to initial establishment at commercial service airports, paragraph 20d, and reliever airports, paragraph 20e. *

(1) A comprehensive evaluation of the runway to be served by the MLS indicates that it meets applicable FAA airport design and operational standards and that the operations to be conducted will be safe and the type(s) of aircraft which will use or are forecast to use the MLS can be accommodated safely. Furthermore, it must be technically feasible and practical for the airport sponsor to protect the MLS critical areas.

(2) Runway length and width dimensions are in accordance with FAA policies and directives. At a minimum, a runway must be 4200 feet long and 75 feet wide in order to receive an MLS. These criteria do not apply to heliports or short-take-off-and-landing (STOL) runways. The required heliport or STOL runway dimensions will be in accordance with FAA policies and directives.

(3) Approved runway and heliport lights must be installed or programmed.

b. Annual Instrument Approach (AIA) Criteria. An airport that meets the provisions of paragraph 20a is a candidate for MLS with approach lights when the annual instrument approaches recorded for the runway on which the MLS is to be installed meet or exceed the following conditions:

User Category	MLS Qualifying (Required) AIA Count for Stated Non-Precision Approach Minimums					
	300-3/4	400-3/4	400-1	500-1	600-1	800-1
Air Carrier						
Hub	500	250	200	150	100	50
Non Hub	900	500	400	300	200	100
Air Taxi	500	475	450	400	350	300
General Aviation	2700	2300	2000	1700	1400	900
Military	1100	1000	900	800	650	450

NOTE: The AIA levels apply only when the MLS will give minimums of 200-1/2 or the equivalent; if other minimums are achievable, consult with the Office of Aviation Policy and Plans (APO) to determine procedures (criteria) that are applicable.

(1) To determine whether an airport meets the Phase I or annual instrument approach (AIA) criteria contained in paragraph 20b:

(a) Determine the lowest non-precision approach minimums currently authorized for the largest aircraft using the runway in question, e.g., 500-1.

(b) Reference the above table to select the qualifying number of AIA's on the candidate runway for each user category, e.g., Air Carrier Hub-150, Air Taxi-400, General Aviation-1700, Military-800.

(c) Estimate the number of recorded AIA's on the candidate runway by one of the following procedures:

1 An on-site survey of IFR activity on the candidate runway.

2 Estimate the percentage of total airport AIA's on the candidate runway. Multiply total AIA's by this percentage to determine the runway AIA's. If specific data are not available, use 70 percent for the initial precision approach runway, 25 percent for the second precision approach runway. For third and subsequent runways a site survey of projected IFR runway usage will be required.

3 Use the AIA estimating model developed in Report FAA-APO-83-10, Establishment and Discontinuance Criteria for Precision Landing Systems.

(d) Enter estimated recorded and required AIA's for the candidate runway as indicated below. The contributions of each category toward meeting the criteria are summed. A runway with a total ratio of 1.0 or more meets the AIA Phase I criteria for MLS establishment.

User Category		
Air Carrier	$\frac{\text{Recorded AIA's}}{\text{Required AIA's}}$ =	x.xx
Air Taxi	$\frac{\text{Recorded AIA's}}{\text{Required AIA's}}$ =	x.xx
General Aviation	$\frac{\text{Recorded AIA's}}{\text{Required AIA's}}$ =	x.xx
Military	$\frac{\text{Recorded AIA's}}{\text{Required AIA's}}$ =	x.xx
Total Ratio		x.xx

c. Benefit/Cost Screening. MLS candidates identified by the criteria specified in paragraph 20a will be screened in FAA headquarters using the benefit/cost technique described in Report FAA-APO-83-10, Establishment and Discontinuance Criteria for Precision Landing Systems. FAA regional offices shall submit data required for screening purposes as specified in the Annual Call for Estimates. Establishment of MLS also may be justified when documented benefits exist. The justification and expected benefits of operations based on the following additional capabilities must be documented for each location:

(1) Resolve airspace conflicts between two airports during IFR operations.

(2) Reduce delays encountered in approach and/or departure operations under IFR conditions.

(3) Provide different approach paths for various aircraft weight classes to relieve wake vortex restrictions.

(4) Provide for other operations which may increase airport capacity or significantly reduce noise impact.

(5) Provide, by establishment of MLS networks, demonstrable improvement in user operating reliability or operating efficiency.

* d. Supplemental MLS Criteria for Commercial Service Airports.

(1) Establishment. A runway at a commercial service airport (defined by the Airport and Airway Improvement Act of 1982 to mean "...a public airport which is determined by the Secretary to enplane annually 2,500 or more passengers and receive scheduled passenger service of aircraft.") which meets the technical considerations of paragraphs 20a(1), 20a(2), and 20a(3) but which fails to satisfy paragraph 20c may qualify for an initial MLS establishment under the conditions which follow.

(a) A commercial service airport is a candidate for MLS (meets Phase I Supplemental Criteria) when the runway on which the MLS is to be installed meets or exceeds the following requirements:

1 The commercial service airport has connecting scheduled passenger service to an associated major hub airport (small, medium, or large hub). Such service should have existed for at least the previous 3 consecutive years and be reasonably expected to continue.

2 Agency forecasts for the commercial service airport should indicate that total annual enplaned passengers (in scheduled and nonscheduled service) are not expected to fall below 2,500.

3 The commercial service airport does not have a precision landing system and has not been programmed for one.

4 The commercial service airport and its associated major hub airport have a combined Phase I total ratio greater than or equal to 1. To determine the combined total ratio:

(aa) Determine the Phase I total ratio for the commercial service airport according to paragraph 20b.

(bb) Determine the Phase I total ratio for the primary runway—runway with the most instrument approaches—at the associated major hub airport according to paragraph 20b.

(cc) Sum the ratios for the commercial service airport and its associated major hub airport and divide by 2.

(b) A commercial service airport identified in paragraph 20d(1) is qualified for an MLS (meets Phase II Supplemental Criteria) when the commercial service airport and the primary runway of its associated major hub airport have a combined Phase II total ratio greater than or equal to 1, where the combined ratio is defined as the sum of the benefits at the two airports (as calculated in Report FAA-APO-83-10, Establishment and Discontinuance Criteria for Precision Landing Systems) divided by the sum of their life-cycle costs.

(2) Discontinuance. An MLS established under this paragraph shall be considered for discontinuance as follows. *

* (a) An MLS at an airport continuing to receive connecting scheduled passenger service to an associated major hub airport shall be a candidate for discontinuance if the combined Phase I benefit/cost ratio drops below .3 for 3 consecutive years. The decommissioning of an MLS shall be justified by a benefit/cost study which considers the combined benefits and costs generated by MLS at the commercial service airport and the primary instrument runway of its associated major hub airport.

(b) An MLS at an airport which has not received scheduled passenger service for the past 3 years shall be a candidate for discontinuance as prescribed in paragraph 20g.

e. Supplemental MLS Criteria for Reliever Airports.

(1) Establishment. A runway at a reliever airport (as identified in the National Plan of Integrated Airport Systems) which meets the technical considerations of paragraphs 20a(1), 20a(2), and 20a(3) but fails to satisfy paragraph 20c may qualify for MLS provided that the benefits of the proposed establishment exceed the costs. For purposes of this paragraph, benefits will be deemed to include not only those enumerated in Report FAA-APO-83-10, Establishment and Discontinuance Criteria for Precision Landing Systems, but also the value of reduced congestion and improved safety at the relieved major airport. Establishments under this paragraph shall be supported by a staff study based upon quantitative and qualitative analyses and conducted according with established FAA procedures.

(2) Discontinuance. An MLS established under this paragraph shall be qualified for discontinuance when the operations and maintenance costs of providing the service exceed the benefits derived including the value of reduced congestion and improved safety at the relieved airport. The decommissioning of an MLS shall be justified by a benefit-cost study. *

f. ILS Replacement with MLS. All required services which are satisfied by the ILS will continue to be provided after an MLS has replaced the ILS and for the duration of the requirement. ILS replacement with MLS will be accomplished in accordance with provisions set forth in Report APO-81-1, Microwave Landing System Transition Plan. Specific quantitative criteria are not provided at this time. However, the Transition Plan recommends implementation in user networks of city hub airports according to hub enplanements.

g. MLS Discontinuance. The new MLS program must have sufficient opportunity for implementation and growth that will not be hindered by a premature imposition of discontinuance criteria. The MLS program should be fully operational (i.e., a significant number of MLS's are in operation and 98 percent of the general aviation fleet that flies IFR is equipped with MLS avionics) before MLS discontinuance criteria are enforced. It is recognized that in the earlier stages of the program, avionics equipage would be minimal. However, as the number of MLS's increases, the willingness of users to purchase the necessary avionics should increase as well. The general aviation community

is usually slower about acquiring new avionics than are commercial user groups. Given this point, it appears more useful to observe the general aviation equipage rate in evaluating widespread system use. Once the program becomes fully operational it is then more valid to put discontinuance criteria in force. The following discontinuance criteria would then apply.

(1) At a runway where scheduled turbojet operations are conducted, the MLS shall not be decommissioned. At a runway where turbojet operations are discontinued and are not expected to resume, the discontinuance criteria in paragraph 20g(2) shall apply.

(2) Runways having no scheduled turbojet operations are candidates for MLS decommissioning when instrument approach activity falls below 30 percent of the qualifying level (i.e., Phase I sum of ratio value less than 0.30) and remains below this level for 3 consecutive years. The decommissioning of an MLS shall be justified by a benefit/cost study as documented in Report Number FAA-APO-83-10, Establishment and Discontinuance Criteria for Precision Landing Systems, and by a review and assessment of operational and environmental factors pertinent to the affected locality or localities.

h. RVR with MLS. The criteria of paragraph 21c(1) shall apply to MLS.

i. MLS Training Installations. Regulations require pilots to conduct flight training on the MLS to achieve and maintain a high level of proficiency. An airport within or convenient to a geographical area served by one or more airports recording 200,000 or more annual total operations and 50,000 or more annual instrument operations may be selected as a candidate for a training MLS provided the airport is capable of accommodating the types of aircraft used to conduct MLS training. Approach lights will not be established until the airport qualifies for an MLS in accordance with the criteria specified in paragraph 20a.

j. MLS for Noise Abatement. Noise abatement problems at some airports, usually jet terminals, may sometimes be alleviated by an MLS to localize and minimize the noise created by arriving and departing aircraft. The problem varies at different locations. The justification and expected benefits must be documented in a separate study for each location.

k. MLS for Category II/III Operations. Reserved.

21. INSTRUMENT LANDING SYSTEM (ILS) WITH APPROACH LIGHTS.

a. Establishment. Reserved.

b. Discontinuance. At a runway serviced by scheduled turbojet aircraft, an ILS will not be decommissioned unless it is to be replaced by a Microwave Landing System (MLS) in accordance with Report APO-81-1, Microwave Landing System Transition Plan. Otherwise, a runway is a candidate for ILS decommissioning when instrument approach activity on the runway fails to meet any combination of the following conditions:

User Category	ILS Discontinuance Minimum AIA Count for Stated Nonprecision Approach Minima					
	300-3/4	400-3/4	400-1	500-1	600-1	800-1
Air Carrier						
Hub	200	100	80	50	40	20
Non Hub	400	200	170	120	85	40
Air Taxi	225	200	190	170	150	110
General Aviation	1100	950	850	700	600	400
Military	500	400	375	325	275	200

NOTE: These AIA levels apply only when the ILS gives minimums of 200-1/2 or the equivalent; if lesser minimums are achievable, consult with the Office of Aviation Policy and Plans to determine procedures (criteria) that are applicable.

(1) To determine whether a runway is a candidate for ILS discontinuance based upon Annual Instrument Approach (AIA) criteria:

(a) Determine the lowest nonprecision approach minimums currently authorized for the largest aircraft using the runway in question, e.g., 500-1.

(b) Reference the above table to select the required minimum number of AIA's on the candidate runway for each user category, e.g., Air Carrier Hub-50, Air Taxi-170, General Aviation-700, Military-325.

(c) Estimate the number of AIA's recorded on the candidate runway.

(d) Enter the recorded and required AIA's for the candidate runway as indicated below. The contributions of each user category toward meeting the criteria are summed. A runway with a total ratio below 1.0 is a candidate for discontinuance.

User Category		
Air Carrier	$\frac{\text{Recorded AIA's}}{\text{Required AIA's}}$ =	x.xx
Air Taxi	$\frac{\text{Recorded AIA's}}{\text{Required AIA's}}$ =	x.xx
General Aviation	$\frac{\text{Recorded AIA's}}{\text{Required AIA's}}$ =	x.xx
Military	$\frac{\text{Recorded AIA's}}{\text{Required AIA's}}$ =	x.xx
Total Ratio		x.xx

(2) Recommendations to decommission an ILS shall be justified by a benefit/cost study similar to that documented in Report Number APO-83-10, Establishment and Discontinuance Criteria for Precision Landing Systems, and by a review and assessment of operational and environmental factors pertinent to the affected locality or localities.

c. Supplemental ILS Facilities.

(1) RVR with ILS.

* (a) Establishment. A Category I precision instrumented runway (i.e., equipped with a Category I Instrument Landing System or Microwave Landing System) qualifies as a candidate for establishment of a Touchdown RVR System provided the following requirements are met:

1. An acceptable method is available for immediate dissemination of RVR value data to pilots (e.g., airport traffic control tower, combined station/tower, or where appropriate, a remote approach control facility); and

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. A Phase I value, computed using the methodology outlined in Table 21c(1)(a), equals or exceeds 1.00. *

* Table 21c(1)(a)

Phase I Criteria For Touchdown RVR System at Category I Precision Instrumented Runway

User Class				Contribution
Air Carrier:	ACAP / 145	+	ACITN / 6,500	= x.xx
Air Taxi:	ATAP / 10,000	+	ATITN / 73,000	= x.xx
General Aviation:	GAAP / 8,900			= x.xx
Military:	MILAP / 1,900			= + x.xx
Subtotal				x.xx
x RVR System Design Factor				x x.xx
Subtotal				x.xx
x Runway Utilization Factor				x .xx
Phase I Value				x.xx

For each of the first 3 years of operation: ACAP, ATAP, GAAP, and MILAP are the numbers of annual instrument approaches by user class; ACITN and ATITN are the numbers of annual itinerant operations of the air carrier and air taxi user classes; the RVR system design factor is from Table 21c(1)(b); and the runway utilization factor is the percentage of total airport operations that can be expected to use the candidate runway during instrument weather conditions. If a site-specific runway utilization factor is unavailable and cannot be estimated, the appropriate national average default value from Table 21c(1)(c) may be substituted. *

*

TABLE 21c(1)(b)
RVR System Design Factors

System Design of Proposed RVR Investment	No. of Currently Existing RVR Systems* of this Design Type	Factor
"New Generation"	0	1.00
	≥ 1	3.17
Tasker 500	≥ 0	0.60

* Category I, II, or III.

TABLE 21c(1)(c)
Default Runway Utilization Factors

(Use only if site-specific value is unavailable and cannot be estimated)

Total Number of Precision Instrumented Runways at Airport (All Categories)	Runway Utilization Factor per Runway (%)				
	1	2	3	4	5
1	100				
2	61	39			
3	45	35	20		
4	42	32	18	8	
≥ 5	41	31	17	8	3

For example, if the airport has three precision instrumented runways with one being Category II and two being Category I, the default runway utilization factors for the first and second Category I runways would be 35 and 20 percent, respectively.

(b) Discontinuance. An existing Touchdown RVR System installation at a Category I precision instrumented runway qualifies for discontinuance when the Phase I value, computed using the methodology outlined in Table 21c(1)(a), falls beneath 0.40. Discontinuance of a Touchdown RVR System installation must be justified by a benefit/cost analysis (as provided in paragraph 21c(1)(c)) and an assessment of operational and environmental factors pertinent to the affected runway. *

* (c) Benefit/Cost Screening. Candidate runways which meet the requirements of paragraph 21c(1)(a) or 21c(1)(b) will be screened under the Phase II benefit/cost criteria developed and outlined in Report Number FAA-APO-87-__, "Establishment and Discontinuance Criteria for Runway Visual Range at Category I Precision Landing System Runway." In cases where unique site-specific operational factors exist that may warrant special consideration (e.g., troublesome terrain features, significant remoteness of the runway from the tower, etc.), narrative and explanatory reference should be included in the Annual Call for Estimates. *

22. NONPRECISION INSTRUMENT APPROACH SYSTEMS.

a. Establishment. An airport at which no scheduled air carrier turbojet operations are conducted on a sustained basis which records 200 or more annual instrument approaches or 1,825 or more scheduled annual passenger originations (as recorded in validated counts acceptable to the FAA) is a candidate for one of the two following nonprecision instrument approach systems (single equipment) when the existing instrument approach procedure and associated navigation aids do not provide landing minimums of a 400-foot minimum decision altitude (MDA) and one-mile visibility (400 MDA/1) or better.

(1) Localizer Direction Aid (LDA) System. The basic IFR approach system consists of a localizer and a 75 MHz marker beacon. A basic IFR approach system may be established when:

(a) The existing instrument approach procedure is based on an adjacent VHF navigation aid.

(b) An adjacent VHF navigation aid can be used for transition to the localizer.

(c) A DME (single equipment) may be substituted for the marker beacon provided an individual justification indicates that the DME is necessary to achieve the 400 MDA/1 minimums or to provide opposite direction approach capability where needed because of wind or traffic considerations. L/MF facilities should not be considered for this requirement.

(2) TVOR. A TVOR may be installed when:

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

(b) The existing instrument approach procedure is based on an L/MF navigation aid.

(c) An adjacent VFR navigation aid would not provide transition to a localizer.

(d) A 75MHz marker beacon may be considered at new or existing TVOR locations provided an individual justification indicates that it is necessary in order to achieve 400 MDA/1 minimums. A DME (single equipment) may also be considered for new or existing TVOR locations provided that an individual justification indicates that it will provide more efficient handling of traffic, or a reduction of the adverse effect of obstructions on landing miminums, or an otherwise tangible improvement in the IFR capability of the airport.

(3) DME with Localizer/Marker Beacon. A runway having a localizer and marker beacon but no glide slope is a candidate for DME establishment (single equipment) when the annual instrument approach activity on the runway satisfies the activity formula below with a total ratio value of 1.0 or greater.

(a) Table 22a(3) contains the qualifying number of AIA's for the candidate runway for each user category. Instructions are given below on how to use the table and the following activity formula.

User Category	Activity Ratio
Air Carrier:	$\frac{\text{AIA's on Runway}}{\text{Qualifying AIA's}} = \text{x.xx}$
Air Taxi:	$\frac{\text{AIA's on Runway}}{\text{Qualifying AIA's}} = \text{x.xx}$
General Aviation/military:	$\frac{\text{AIA's on Runway}}{\text{Qualifying AIA's}} = \text{x.xx}$
	Total Ratio Value x.xx

To determine whether a runway meets activity criteria:

1 Compute the number of AIA's on the candidate runway for each user category by site survey or by estimating the percentage of airport AIA activity on the runway.

2 Determine: (a) the lowest approach localizer minimums currently authorized, and (b) minimums projected for use with DME for the largest category of aircraft (i.e., A, B, C, D, or E) consistently using the runway.

3 Select hub designation as determined by enplanements at the candidate airport.

4 Table 22(a)(3) contains the qualifying number of AIA's on the candidate runway for each user category using the localizer minimums and localizer/DME minimums developed in paragraph. If approach minimums do not coincide with the values listed in the table, round off to the nearest entry.

5 Enter the computed and qualifying AIA's for the candidate runway in the formula in paragraph. The total ratio value is determined by summation. An ILS runway having a total ratio value of 1.0 or greater meets the activity criteria.

(b) DME candidates identified under this subparagraph will be evaluated in FAA Headquarters using the benefit/cost technique described in Report FAA-ASP-78-7, Establishment Criteria for Distance Measuring Equipment with Instrument Landing System and/or Localizer Approach Aids.

Table 22a(3)
Qualifying AIA's at Localizer Runways

User Group	Hub Size	Localizer Minima											
		400 1/2	400 1	500 1/2	500 1	600 1/2	600 1	600 1-1/2	700 1/2	700 1	700-1-1/4	700 1-1/2	700-2
LOC/DME Min - 300 1/2													
AC	Large	67	34	30	21	18	14	10	11	10	8	7	5
AC	Medium	92	46	41	29	24	19	14	15	13	12	10	7
AC	Small	116	58	51	36	30	24	18	19	17	15	13	9
AC	Non	156	78	69	48	41	33	24	26	22	20	17	12
AT	All	1,105	554	488	342	289	232	168	186	158	139	123	87
GA/Mil	All	5,845	2,931	2,580	1,812	1,527	1,227	888	983	838	736	652	460
LOC/DME Min - 300 1													
AC	Large		81		34		20	13		12	10	9	6
AC	Medium		111		46		27	18		17	14	12	8
AC	Small		139		58		34	22		21	18	16	11
AC	Non		188		79		45	30		28	24	21	14
AT	All		1,327		556		322	215		201	172	150	101
GA/Mil	All		7,020		2,940		1,702	1,137		1,062	911	793	537

NOTE: Localizer minima are ceiling and prevailing visibility associated with the Height Above Touchdown (HAT).

Table 22a(3)(Continued)
Qualifying AIA's at Localizer Runways

User Group	Hub Size	Localizer Minima										
		400 1/2	400 1	500 1/2	500 1	600 1/2	600 1	600 1-1/2	700 1/2	700 1	700 1-1/4	700 1-1/2	700-2
LOC/DME Min - 400 1/2													
AC	Large	71	56	32	25	19	13	14	12	10	9	6	
AC	Medium	98	77	44	34	26	17	20	16	14	12	8	
AC	Small	123	96	55	43	32	22	25	20	18	15	10	
AC	Non	166	130	74	58	44	30	33	28	24	21	14	
AT	All	1,171	921	525	413	310	209	236	196	168	147	100	
GA/Mil	All	6,197	4,874	2,775	2,185	1,642	1,107	1,250	1,035	891	777	528	
LOC/DME Min - 400 1													
AC	Large			61		27	16		15	13	11	7	
AC	Medium			83		37	22		21	17	15	10	
AC	Small			104		46	28		26	22	18	12	
AC	Non			141		63	38		35	29	25	16	
AT	All			998		445	269		248	207	177	115	
GA/Mil	All			5,281		2,352	1,421		1,310	1,096	936	609	

NOTE: Localizer minima are ceiling and prevailing visibility associated with the Height Above Touchdown (HAT).

(4) Visual Approach Slope Indicator (VASI) for Straight-in Nonprecision Approach Procedure. A Four-Box VASI may be installed as a component to an existing straight-in nonprecision approach facility when the candidate runway satisfies the following criteria:

$$\frac{\text{Landings}}{14{,}000} + \frac{\text{AIA's}}{120} = 1.0 \text{ or more}$$

Where

Landings = Recorded annual landings on the candidate runway.

AIA's = Annual instrument approaches on the candidate runway.

(a) To determine the number of landings and AIA's on the candidate runway, use actual runway utilization of the runway utilization table shown in paragraph 31c(3).

(b) To accommodate regular use by long-bodies or jumbo aircraft such as the B-747 or C5A which are unable to use a standard Four-Box VASI because of their greater wheel-to-cockpit height, a third bar may be added, provided Four-Box criteria are satisfied.

(5) Other Lighting Aids for Nonprecision Approach.

(a) An airport at which no scheduled air carrier turbojet operations are conducted on a sustained basis with a nonprecision approach system installed or programmed which records 300 or more annual instrument approaches, or 2,725 annual passenger originations, is a candidate for a Medium Intensity Approach Light System (MALS) provided the installation will reduce landing visibility minimums.

(b) Alternatives. An Omni Directional Approach Light System (ODALS) may be installed in lieu of MALS if the nonprecision approach aid does not permit a straight-in approach or operational conditions require a curved flight path to a specific runway.

(6) RVR for Nonprecision Instrumented Runway.

* (a) Establishment. A nonprecision 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 the following requirements are met:

1. The airport has one or more RVR-equipped precision instrumented runways. To the extent that this includes Category I runways, the first and (if applicable) second Category I runways must be equipped with and satisfy the criteria for RVR at Category I runways, as outlined in paragraph 22c(1).

2. The provisions of Order 6560.10B, Runway Visual Range, and the siting and installation standards of FAA-STD-008 can be met. *

3. The ratio of life-cycle benefits to life-cycle costs equals or exceeds one, based on the benefit/cost methodology outlined in Report FAA-APO-88-14, "Establishment Criteria for Runway Visual Range (RVR) System at Nonprecision Instrumented Runway."

(b) Discontinuance. Reserved.

* (7) LORAN-C Nonprecision Approach.

(a) Establishment. Establishment criteria have been promulgated through administrative regulation. The Final Rule, published in the Federal Register on August 11, 1993, is reproduced in Appendix 5, Establishment and Discontinuance Criteria for LORAN-C Nonprecision Approaches--Final Rule. The benefit/cost analysis underlying the Final Rule is presented in Report FAA-APO-90-5, "Establishment Criteria for LORAN-C Approach Procedures." The regions shall submit site-specific data required to apply the criteria and validate candidacy with their response to the annual Call for Estimates. *

* (b) Discontinuance. A LORAN-C nonprecision approach is a candidate for discontinuance as specified in administrative regulations published in the Federal Register on August 11, 1993, and reproduced in appendix 5. *

b. Discontinuance.

(1) An LDA (paragraph 22a(1)), TVOR (paragraph 22a(2)), or lighting system for nonprecision approach (paragraph 22a(5)) at an airport recording less than 100 annual instrument approaches and 1,095 scheduled passenger originations is a candidate for discontinuance.

(2) A DME with localizer/marker beacon is a candidate for discontinuance when the total ratio value formula of paragraph 22a(3) is less than 0.6 and when justified by a benefit/cost analysis.

(3) A VASI, established as a component of a straight-in nonprecision approach facility, is a candidate for decommissioning when the ratio value computed through use of the formula in paragraph 22a(4) is less than 0.50 for one annual count period.

c. Improvements and New Facilities. Existing terminal instrument approach systems frequently require improvements and/or additional facilities. Such improvements are usually made only when there exists a reasonable relationship between the operational benefits to be realized and the costs involved in accordance with the following provisions:

(1) A terminal instrument approach system with 500 or more annual instrument approaches or 4,500 or more scheduled annual passenger originations qualifies for those improvements and/or new facilities that satisfy an operational requirement or facilitate the flow of IFR traffic at the airport. A level of 500 or more annual instrument approaches or 4,500 or more scheduled annual passenger originations normally assures a cost per instrument approach that is commensurate with the benefit derived from the improvement and/or additional facility.

(2) A terminal instrument approach system with 200 to 499 annual instrument approaches and 1,825 to 4,499 or more scheduled annual passenger originations is a candidate for improvements and/or additional facilities that satisfy an operational requirement or facilitate the flow of IFR traffic at the airport provided that the additional cost does not result in a cost per instrument approach that exceeds the benefit derived from the improvement and/or additional facility.

(3) A terminal instrument approach system with less than 200 annual instrument approaches and less than 1,825 scheduled annual passenger originations is not a candidate for improvements or additional facilities. At that activity level, the additional cost per instrument approach resulting from the improvement or additional facility is not commensurate with the benefit derived. Any improvements to terminal instrument approach systems at airports in this category will be limited to the correction of a critical situation and shall be justified by an individual staff study.

d. Dualization of Localizer/Markers or Terminal VORs. Dual equipment may be provided when a study confirms an operational requirement supported by cost versus benefit analysis.

23. VOR TEST SIGNAL (VOT).

a. Establishment. Installation of a VOR Test Signal (VOT) providing service to one or more airports is authorized when there is no other reasonable means of complying with subparagraph b or c of Federal Aviation Regulation 91.25. The relocation of a VOT is authorized when consolidation (area concept) of existing VOT's can be achieved. However, this consolidation shall not deprive locations that continue to have a requirement for VOT signals.

b. Discontinuance. The VOR Test Signal (VOT) shall be discontinued when the installation of a new VOR eliminates the need for a VOT.

24.-25. RESERVED.

SECTION 2. RADAR SERVICES

26. AIRPORT SURVEILLANCE RADAR WITH AIR TRAFFIC CONTROL RADAR BEACON SYSTEM AND AUTOMATED RADAR TERMINAL SYSTEM (ASR/ATCRBS/ARTS).

a. Establishment. ASR establishment criteria for FAA approach control towers are two-phased. Phase I is a set of simple generalized criteria designed to initially identify potential candidates. Under Phase I an airport ratio value is computed by summing the relative contributory benefits of ASR. If the airport ratio value obtained is equal to or greater than 1.0, the location satisfies the Phase I criteria for ASR/ATCRBS/ARTS establishment. If radar coverage will be provided at or below initial approach altitude at secondary or satellite airports, an area ratio value is computed by summing the airport ratio values of the airports making up the radar service area. The Office of the Associate Administrator for Air Traffic will determine eligible locations under the area concept on a case-by-case basis. ASR coverage encompassing two or more airports may dictate changes in the operational responsibilities within the radar service area. Prudent management of resources may require that radar service ultimately be provided from that location, regardless of its current facility status, which can best serve the area.

(1) Phase I establishment criteria and nomenclature are outlined below.

Contributing Benefit		Ratio Value
Delay Reduction:		
$\frac{\text{ACPRIM}}{3{,}400 - (.0013 \times \text{PRIM})}$	=	xxxx
$\frac{\text{ATPRIM}}{26{,}000 - (.0096 \times \text{PRIM})}$	=	xxxx
$\frac{\text{GAPRIM}}{53{,}300 - (.0196 \times \text{PRIM})}$	=	xxxx
$\frac{\text{MLPRIM}}{8{,}600 - (.0032 \times \text{PRIM})}$	=	xxxx
Safety:		
$\frac{\text{ACITN}}{107{,}400}$	=	xxxx
$\frac{\text{ATITN}}{539{,}600}$	=	xxxx
$\frac{\text{GAITN} + \text{GALCL}}{847{,}200}$	=	xxxx

$\frac{\text{MLITN + MLLCL}}{376{,}200}$	=	xxxx
Sum of Ratio Values		If 1 or greater, location satisfies Phase I criteria

If the denominator for any user class results in a value equal to or less than zero, disregard all denominators and use all of the following instead. For the air carrier user class: 9,300 - (.0034 x PRIM); for the air taxi user class: 71,200 - (.0262 x PRIM); for the general aviation user class: 146,000 - (.0538 x PRIM); and for the military user class: 23,400 - (.0086 x PRIM).

(a) ACPRIM, ATPRIM, GAPRIM, and MLPRIM, for a primary airport, are the numbers of annual primary instrument operations of the air carrier (FAR 121, 127, and 129), air taxi (FAR 135), general aviation (FAR 91), and military (FAR 91) user classes, respectively. For a qualified secondary airport, these terms are the numbers of annual primary instrument operations of the secondary airport by user class, or the respective numbers of secondary instrument operations by user class of the primary airport associated with or allocable to the secondary airport, whichever are greater.

(b) PRIM, for a primary airport, is the number of total annual primary instrument operations (i.e., the sum of ACPRIM, ATPRIM, GAPRIM, and MLPRIM). PRIM, for a qualified secondary airport, is the number of total annual primary instrument operations of the secondary airport, or the number of total annual secondary instrument operations of the primary airport associated with or allocable to the secondary airport, whichever is greater.

(c) ACITN, ATITN, GAITN, and MLITN are the numbers of annual itinerant operations of the air carrier, air taxi, general aviation, and military user classes, respectively.

(d) GALCL and MLLCL are the numbers of annual local operations of the general aviation and military user classes, respectively.

(2) Phase II is a site-specific computerized benefit/cost screening process under which candidates identified under Phase I are further evaluated. If an airport benefit/cost ratio or an area benefit/cost ratio of 1.0 or greater is computed, the location satisfies the Phase II criteria for ASR/ATCRBS/ARTS establishment. The ASR subroutine, integrated into the Terminal Area Forecast Data System, requires the following manual input data:

(a) System acquisition and installation costs (FAA Form 2500-40, F&E Cost Estimate Summary).

(b) Percent of time that IFR weather prevails at the proposed location, if available. For the purpose at hand, IFR weather is defined as weather in which visibility is less than 3 miles and/or the ceiling below 1,500 feet.

(c) Fraction of the air carrier user class represented by each of the following aircraft type categories:

Turbofan, 4-engine, wide body
Turbojet, 4-engine
Turbofan, 4-engine, regular body
Turbofan, 3-engine, wide body
Turbofan, 3-engine, regular body
Turbofan, 2-engine, wide body
Turbofan, 2-engine, regular body
Turboprop
Piston

If this data is not available from local sources, the Official Airline Guide, or the Terminal Area Forecast Data System, national averages will be used as default values in the Phase II screening process.

(d) Fraction of secondary instrument operations of each user class (air carrier, air taxi, general aviation, and military) of the primary airport allocable to each secondary or satellite airport.

NOTE: This data is required only for those secondary or satellite airports that are provided "qualified" radar coverage by the proposed candidate airport at or below initial approach altitude.

b. Discontinuance. Like ASR establishment criteria, ASR discontinuance criteria are two-phased. To determine whether an ASR facility meets the Phase I discontinuance criteria, a ratio value is calculated by the same sum-of-ratios approach described above for Phase I establishment criteria. If the ratio value so obtained is less than 0.35, the location satisfies Phase I discontinuance criteria. The 0.35 figure is an approximation of the level where the benefits just offset recurring annual operations and maintenance costs, after allowing for salvage value, relocation costs, etc. Initial acquisition and installation costs are irrelevant when an ASR system is being considered for discontinuance since they are sunk costs. Locations satisfying Phase I discontinuance criteria will be further screened under the Phase II benefit/cost screening process. If the benefit/cost ratio so obtained is less than 0.35, the ASR installation may be considered for discontinuance.

c. Improvements. Existing FAA approach control facilities equipped with ASR systems frequently require improvements (e.g., ARTS implementation, relocation of facilities to correct siting problems, component replacement, etc.). Such improvements are normally made when the operational benefits expected to be realized exceed the costs involved. Based on current practice:

(1) An FAA radar approach control facility recording 25,000 or more annual instrument operations qualifies for those improvements that satisfy an operational requirement and/or facilitate the provision of terminal area radar service. A benefit/cost study may be required for "major" improvements to terminal radar facilities in this category.

(2) An FAA radar approach control facility recording between 15,000 and 25,000 annual instrument operations may be a candidate for improvements. It qualifies for those improvements that satisfy an operational requirement and/or facilitate the provision of terminal area radar service. A benefit/cost study may be required for "major" improvements to terminal radar facilities in this category.

(3) An FAA radar approach control facility recording less than 15,000 annual instrument operations is not a candidate for improvements. Any improvement to terminal radar facilities in this category will be limited to the correction of a critical situation and shall be justified by an individual staff study.

NOTE: Improvements to FAA-staffed RAPCON's/RATCF's may be considered on an individual basis but the above criteria shall remain a major determinant in considering FAA civil facilities for improvement.

d. Remoted Radar Bright Display Scope. An FAA VFR control tower at an airport, which is a satellite of the primary airport of a radar approach control facility, is a candidate for a remoted radar display scope in the tower cab when:

(1) At least 30,000 annual itinerant operations are recorded; and

(2) Operationally adequate low altitude coverage is assured at the satellite airport.

e. Terminal Radar Approach Control in Tower Cab (TRACAB) and Terminal Radar Approach Control (TRACON).

(1) Establishment. An initial ASR/ATCRBS/ARTS installation shall be a TRACAB facility consisting of appropriate displays placed in the tower cab except when any of the following situations prevail:

(a) If the official agency forecasts indicate an ASR/ATCRBS/ARTS candidate location will exceed 125,000 annual itinerant operations or 60,000 annual instrument operations within 2 years of the year of budget submission for the facility, the initial installation should be planned as a TRACON rather than a TRACAB, subject to an operational determination by the Associate Administrator for Air Traffic Services. Instrument operations at secondary airports may be included in this forecast provided radar coverage at these locations is expected to exist at or below initial approach altitude.

(b) If an ASR/ATCRBS/ARTS candidate location cannot physically accommodate radar approach control in the tower cab, then individual justification shall be required to go directly to a TRACON facility.

(c) When the complexity of the facility operation warrants, individual justification and consideration shall be given to locating the ASR/ATCRBS/ARTS in a TRACON rather than a TRACAB.

(2) Discontinuance. A TRACAB will be discontinued when the ASR system is decommissioned or when the radar approach control function is transferred to a TRACON.

(3) Conversion to TRACON. A TRACAB location is a TRACON candidate when the facility has at least 125,000 annual itinerant operations or 60,000 annual instrument operations. Instrument operations at secondary airports that receive radar service at or below initial approach altitude may be included in this count. Also, when the complexity of the facility warrants, individual justification and consideration should be given to relocating from a TRACAB to a TRACON.

27. PRECISION APPROACH RADAR (PAR). Reevaluation of the usefulness and utilization of existing PAR facilities indicates that the benefits being derived by civil aviation at some airports are not commensurate with the cost of providing the service. No stated requirement exists for PAR service in future reduced minimal instrument landing systems. Therefore, PAR facilities will be retained or established only at those airports where peculiar circumstances or a military requirement justifies the need for PAR services. This determination will be based on individual evaluation of requirements peculiar to a specific location. Such an evaluation will consider airport complexity, military requirements, and the need for a backup or supplement to the primary instrument approach systems.

* 28. NON-FEDERALLY OWNED AIRPORT SURVEILLANCE RADAR (ASR).

a. The FAA will consider making capital and staffing investments at FAA air traffic control facilities to facilitate a non-Federal radar installation if the following criteria in paragraphs 28a(1) through 28a(3) are satisfied:

(1) The non-Federal ASR meets recognized aviation standards and complies with current FAA design and performance specifications.

(2) The benefits to airspace users equal or exceed FAA investment costs, quantified in accordance with the logic and procedures outlined in Report Number FAA-APO-83-5, Investment Criteria for Airport Surveillance Radar.

(3) The release and use of radar data to outside interests comply with the policy/procedures contained in Order 1200.22B, Use of National Airspace System (NAS) Computer and Radar Data or Equipment by Outside Interests.

b. Satisfaction of these candidacy criteria does not entail automatic qualification or commitment of Federal funding. Benefit/cost analysis and screening is but one of several considerations in the FAA decisionmaking process relative to investment in ASR facilities. Investment decisions will be made on the basis of all pertinent considerations (e.g., current policy on consolidation of air traffic services and/or facilities, availability of funds, and extent to which beneficiaries are dominated by specific commercial interests). *

29. RESERVED.

CHAPTER 3. AERONAUTICAL LIGHTING AND AIRPORT MARKING AIDS

30. RUNWAY END IDENTIFICATION LIGHTS (REIL).

a. Establishment. A runway is a candidate for REIL if:

(1) It is not currently equipped with or programmed for an approach light system.

(2) It is lighted and approved for night operations.

(3) The Regional Flight Standards Division Manager determines that it has a runway end identification problem which will be corrected or improved by REIL, as described in Order 8260.18A, Establishing Requirements for Visual Approach Aids, or as determined by the Director of Flight Operations.

(4) Either paragraph 30a(4)(a) or 30a(4)(b) is satisfied.

(a) Runways shall be REIL candidates if the runway ratio value, as defined below, equals or exceeds 1.0.

1 Type of Operation	Ratio Value
$\frac{\text{Annual Air Carrier Landings at Airport}}{4900}$	= x.xx
+	
$\frac{\text{Annual Air Taxi (Including Commuter) Landings at Airport}}{1200}$	= x.xx
+	
$\frac{\text{Annual General Aviation + Military Landings at Airport}}{7300}$	= x.xx
Airport Ratio Value	= x.xx

Runway Ratio Value = Airport Ratio Value x Runway Utilization

(REIL candidate if runway ratio value equals or exceeds 1.0.)

2 If actual runway utilization is not available, the runway utilization may be taken from the following table. In the row corresponding to the number of active lighted runways at the airport, the busiest runway is assigned the first percentage of total landings, the next busiest runway is assigned the second percentage, and so on. After all airport runways have been ranked according to activity, the percentage obtained from the table for the REIL candidate runway can be used as the runway utilization factor.

Runway Utilization
(for use if actual data is not available)
Percentage of Total Landings

Number of lighted Runways 1/	Busiest Runway				Least Busiest Runway							
2	70	30										
4	50	25	15	10								
6	30	20	15	15	10	10						
8	30	20	15	10	10	5	5	5				
10	25	15	10	10	10	10	5	5	5	5		
12	20	15	10	10	10	5	5	5	5	5	5	5

1/ Number of runways refers to the ends of all active hard-surface runways.

(b) Pursuant to the provisions of paragraph 8b, runways not meeting the above conditions in paragraph 30a(4)(a) shall be eligible for REIL when exceptional safety requirements dictate. This determination shall be made by the Director of Flight Operations upon written recommendation and justification by the regional director.

b. Discontinuance. A runway shall be a candidate for decommissioning if the runway ratio value falls below .5. This provision shall not apply to REIL systems established in response to exceptional safety requirements. Such systems shall become candidates for decommissioning when the runway ratio value is less than .5 and exceptional safety requirements no longer indicate the need for REIL.

c. Benefit/Cost Analysis. Candidates identified by the above procedure for either establishment or discontinuance will be evaluated in FAA Headquarters using the benefit/cost technique described in Report No. FAA-ASP-79-4, Establishment Criteria for Runway End Identification Lights (REIL). This provision does not apply to runways that qualify under paragraph 30a(4)(b). FAA regional offices shall submit data required for evaluation purposes with their responses to the annual Call for Estimates or with reprogramming requests for REIL establishment. Required data consist of: annual operations for air carrier, air taxi, general aviation, and

military users; certification that the proposed runway is not equipped with or programmed for an approach light system; the runway utilization (estimate by table of paragraph 30a(4)(a)2 if data not available); fraction of time that IFR weather--visibility less than 3 miles and the ceiling below 1,500 feet--prevails, if available; fraction of operations occurring at night by user type, if available; and certification by regional Flight Standards Division Manager that a REIL correctable runway end identification problem, as described in Order 8260.18A, Establishing Requirements for Visual Approach Aids, exists for the runway.

31. VISUAL APPROACH SLOPE INDICATOR (VASI) VFR ONLY. No reduction of IFR (instrument flight rules) visibility minimums is authorized for VASI installations. Because of the possibility for confusion and conflict between an electronic glide slope and a VASI glide slope, no runway which has or is programmed for an electronic glide slope is eligible for any Walker Three-Bar VASI system. The Two-Bar VASI may be established on runways with electronic glide slope as provided herein.

NOTE: Criteria in this paragraph do not apply to VASIs included as part of the Nonprecision Instrument Approach Procedures.

a. Establishment.

(1) Two-Bar VASI.

(a) Four-Box VASI. When operationally justified any runway is a candidate for a Four-Box VASI provided that the runway has a net ratio value greater than 1.0, as computed by use of the methodology outlined in paragraph 31c.

(b) Twelve-Box VASI. Any runway at an international airport where there is a stated planning requirement listed in ICAO (International Civil Aviation Organization) documents 8733, Air Navigation Plan for the Caribbean and South American Regions and 8755, Air Navigation Plan for the Caribbean and South American Regions is a candidate for a Twelve-Box VASI provided that the runway is eligible for, or has installed, a Four-Box VASI.

(2) Walker Three-Bar VASI.

(a) Walker Six-Box VASI. Any runway may be a candidate for a Walker Six-Box VASI provided that the runway:

1 Is eligible for, or has installed, a Four-Box VASI,

2 Does not have an electronic glide slope installed or programmed, and

3 Is regularly used by B-747, C5A, or similar aircraft unable to use a standard Four-Box VASI because of their greater wheel-to-cockpit height.

(b) Walker Sixteen-Box VASI. Any runway at an international airport where there is a stated planning requirement listed in ICAO documents 8733 and 8755, may be a candidate for a Walker Sixteen-Box VASI provided that the runway:

1 Is eligible for, or has installed, a Twelve-Box VASI,

2 Does not have an electronic glide slope installed or programmed, and

3 Is regularly used by B-747, C5A, or similar aircraft unable to use a standard, Twelve-Box VASI because of their greater wheel-to-cockpit height.

b. Discontinuance.

(1) Two-Bar VASI

(a) Four-Box VASI. A Four-Box VASI is a candidate for decommissioning when it has a net ratio value less than 0.5, as computed by use of the methodology outlined in paragraph 31c. The decommissioning shall be justified by a benefit/cost study.

(b) Twelve-Box VASI. A Twelve-Box VASI is a candidate for reduction to a Four-Box VASI when the stated ICAO requirement is withdrawn.

(2) Walker Three-Bar VASI.

(a) Walker Six-Box VASI. A Walker Six-Box VASI is a candidate for reduction to a Four-Box VASI when operations using B-747, C5A, or similar aircraft are discontinued on that runway and not forecast to be resumed, or when an electronic glide slope is installed on that runway.

(b) Walker Sixteen-Box VASI. A Walker Sixteen-Box, Three-Bar VASI is a candidate for reduction to a Twelve-Box, Two-Bar VASI when operations with the B-747, DC-10, L-1011, stretch DC-8, and C5A are discontinued on that runway and not forecast to be resumed, or when an electronic glide slope is installed on that runway.

NOTE: Criteria for Twelve-Box, Two-Bar VASI and the Walker Sixteen-Box, Three-Bar VASI are incorporated in Airway Planning Standard Number One to meet ICAO commitments.

c. Net Ratio Value Criteria. A runway having any combination of air carrier, air taxi and general aviation activity is a candidate for a VASI if it satisfies the net ratio value criteria described below:

(1) A ratio value for each user class is computed for the airport as a whole, and the three ratios are added to obtain a total ratio value. This total ratio value is then multiplied by the runway utilization (percentage of all operations accounted for by the particular runway) to obtain a net ratio value. If the net ratio value is equal to or greater than 1, then the location is a candidate.

User Class	Ratio Value	
Air Carrier:	$\frac{\text{Recorded (AC) Landings}}{\text{Qualifying (AC) Landings}}$	= x.xx
Air Taxi:	$\frac{\text{Recorded (AT) Landings}}{\text{Qualifying (AT) Landings}}$	= x.xx
General Aviation:	$\frac{\text{Recorded (GA + Mil) Landings}}{\text{Qualifying (GA + Mil) Landings}}$	= x.xx

Total ratio value x runway utilization = Net Ratio Value. See paragraph 31c(2), c(3)and c(4) for determination method.

(2) The number of recorded landings refers to the airport's total number of landings by user class. If this traffic information is not actually recorded, the most accurate available estimate should be used. The following sources are examples (source must be cited with data): FAA traffic survey, Terminal Area Forecast, regional estimate, or reasonable FAA Form 5010-1 entries.

(3) To determine the number of qualifying landings select from the following table the non-ILS (Instrument Landing System) or ILS runway activity that is appropriate to determine eligibility for a Four-Box VASI system.

RUNWAY ACTIVITY - Qualifying Landings

User Class	Non-ILS	ILS
Air Carrier (AC)	6,000	1/
Air Taxi (AT)	8,500	28,000
General Aviation (GA) & Military (MIL)	14,000	18,500

1/ On an ILS equipped runway, the air carrier ratio value is zero. Air carriers are ILS equipped and the VASI serves only as a visual backup for the pilot during final approach.

(4) If actual runway utilization is not recorded, and no better estimate is available, the runway utilization percentage should be taken from the following table. In the row corresponding to the number of active runways at the airports, the busiest runway is assumed to have the first percentage of all landings, the next busiest runway is assumed to have the second percentage, and so on.

Runway Utilization
(for use if actual data is not available)
Percentage of Total Landings

Number of lighted Runways 1/	Busiest Runway											
									Least Busiest Runway			
2	70	30										
4	50	25	15	10								
6	30	20	15	15	10	10						
8	30	20	15	10	10	5	5	5				
10	25	15	10	10	10	10	5	5	5	5		
12	20	15	10	10	10	5	5	5	5	5	5	5

1/ Number of runways refers to the ends of all active hard-surface runways.

d. Benefit/Cost Analysis. VASI candidates identified under paragraphs 31a or 31b above will be validated using the benefit versus cost technique described in report number FAA-ASP-76-2, Establishment Criteria for Visual Approach Slope Indicator (VASI). Offices, services, and regions will submit the following data for every VASI candidate with their response to the Annual Call for Estimates:

(1) Recorded number of operations by user class (AC, AT, GA, MIL).

(2) Number of runways at the airport.

(3) Whether an ILS is installed or programmed for the candidate runway.

(4) Number and type of VASI's already installed or programmed for other runways at the same airport.

(5) Runway utilization if available.

e. Special Operational Considerations. Offices, services, and regions can nominate special locations for the installation of a VASI in order to satisfy a special safety requirement. Each special location must be justified by a specific staff study at the time of nomination. The staff study format should be in accordance with Order 1800.7A, Staff Studies.

32. RETROFIT OF RUNWAY APPROACH LIGHTING SYSTEMS.

a. Background. FAA's Approach Lighting System Improvement (ALSI) Program modifies runway lighting systems built before 1975 to meet current installation standards. A major feature of this program is the retrofitting of rigid light support structures with low-impact resistant (LIR) supports. The benefit/cost (B/C) formulae listed below will determine LIR installation priorities. Rigid lighting systems will be retrofitted according to B/C value for each of three subprograms of paragraphs 32b(1), (2), and (3). Implementation will continue within approved funding levels for each subprogram in accordance with the application of these criteria.

b. Benefit/Cost Criteria.

(1) Retrofit ALSF-2 to LIR ALSF-2/SSALR. Conversion of rigid high-intensity approach lighting systems with sequenced flashers, Category II/III configuration (ALSF-2) to LIR ALSF-2, switchable to the simplified short approach lighting system with runway alignment indicator lights (SSALR), for use when visibility conditions permit:

$$\frac{\text{Annual airport air carrier operations} \times \text{Fraction air carrier usage on candidate runway}^{1/} \times 14.59 + 52{,}700}{\text{Washington + Regional F\&E Cost}} = \text{B/C Ratio Value}$$

(2) Retrofit ALSF-1 to LIR MALSR. Conversion of high-intensity approach lighting systems with sequenced flashers, Category I configuration (ALSF-1), not designated for ALSF-2 retrofit, to LIR medium-intensity approach lighting systems with runway alignment indicator lights (MALSR).

$$\frac{\text{Annual airport air carrier operations} \times \text{Fraction air carrier usage on candidate runway}^{1/} \times 14.59 + 132{,}900}{\text{Washington + Regional F\&E Cost}} = \text{B/C Ratio Value}$$

(3) Retrofit MALSR to LIR MALSR. Retrofit of rigid MALSR to LIR MALSR with no other improvements:

$$\frac{\text{Annual airport air carrier operations} \times \text{Fraction air carrier usage on candidate runway}^{1/} \times 14.59}{\text{Washington + Regional F\&E Cost}} = \text{B/C Ratio Value}$$

1/ Air carrier usage should include activity at both approach and departure ends for runways having rigid lighting systems at opposite ends.

c. Nonstandard Approach Lighting System Conversions. Requests for LIR conversion of approach lighting systems not included as part of the ALSI program will be considered on a case-by-case basis. Wherever possible, the procedure described in Report FAA-ASP-78-5, Installation Criteria for the Approach Lighting System Improvement Program, shall be used to rank nonstandard conversions with lighting system retrofits approved under the program.

d. Exceptions to Benefit/Cost Criteria. Priority consideration shall be given for LIR conversion of rigid approach lighting systems which fail to comply with obstruction clearance criteria contained in Order 6850.2, Visual Guidance Lighting Systems, and where such obstructions can be eliminated at the time of retrofit. LIR retrofit shall not commence at other locations having intervening structures or topography which may otherwise negate safety benefits provided by frangible lighting systems. In such instances, remedial action must be initiated before retrofit approval.

e. Regional Data Submission. Regional offices shall rank ALSI candidates according to benefit/cost ratio value in response to the annual Call for Estimates or with reprogramming requests using the formulae in paragraph 32b. Regions shall consult the Call for Estimates for the typical Washington office or service F&E costs for insertion in B/C formulae when specific Washington office-furnished equipment costs are not available. Regions shall also indicate if there are exceptions to benefit/cost ranking criteria under the provisions of paragraph 32d.

33.-39. RESERVED.

CHAPTER 4. AIR TRAFFIC CONTROL

40. FAA AIRPORT TRAFFIC CONTROL TOWER.

* a. Establishment. Establishment criteria have been promulgated through administrative regulation. The final rule, published in the Federal Register on January 3, 1991, is reproduced in Appendix 4, Establishment and Discontinuance Criteria for Airport Traffic Control Tower Facilities—Final Rule. The benefit/cost analysis underlying the final rule is presented in Report FAA-APO-90-7, "Establishment and Discontinuance Criteria For Airport Traffic Control Towers." The regions shall submit site-specific data required to apply the criteria and validate candidacy with their response to the annual Call For Estimates.

b. Discontinuance. Discontinuance criteria have been promulgated through administrative regulation. The final rule, published in the Federal Register on January 3, 1991, is reproduced in appendix 4. The benefit/cost analysis underlying the final rule is presented in Report FAA-APO-90-7, "Establishment and Discontinuance Criteria For Airport Traffic Control Towers." The regions shall submit site-specific data required to apply the criteria and validate candidacy with their response to the annual Call For Estimates. *

41. APPROACH CONTROL SERVICE.

a. Establishment. Approach control service may be implemented by an FAA control tower at an airport having a radio navigational aid that is suitable for holding purposes or an approved approach procedure, or if the airport has an ILS installed or programmed, provided that the service can be implemented within the existing resources of the facility. This service may be extended to an adjacent airport within 30 n.m. using direct or indirect communications if air/ground coverage exists at the final approach altitude over the navigational aid serving the adjacent airport. Communications equipment (VHF and/or UHF, as required) necessary to provide a discrete approach control channel and associated landlines may be requested when:

(1) At FAA Tower Airport. 5,000 or more annual instrument operations are recorded or the airport has an ILS installed or programmed.

(2) At Adjacent Non-Tower Airports. 1,500 or more annual instrument operations or 1,825 or more scheduled annual passenger originations (as recorded in Airport Activity Statistics, CAB/FAA, or other counts acceptable to the FAA) are recorded and the airport is within 30 n.m. of the approach control facility.

b. Discontinuance. Approach control service that was made available within existing resources may continue to be provided regardless of activity if it facilitates operational safety or efficient utilization of airspace. Additional facilities required for the provision of approach control service under paragraphs 41a(1) or 41a(2) are candidates for decommissioning when:

(1) At FAA Tower Airports. 3,500 or less annual instrument operations and 1,095 or less scheduled annual passenger originations are recorded.

(2) At Adjacent Non-Tower Airports. 1,000 or less annual instrument operations and 1,095 or less scheduled annual passenger originations are recorded.

42. COMBINED STATION/TOWER (CS/T).

a. Establishment. CS/T's are established at FAA tower locations where there is a requirement for 24 hour staffed, air/ground en route communications services that are normally associated with FSS functions. The number of existing and programmed CS/T facilities adequately satisfies that requirement.

b. Separation of CS/T's. The station functions of a CS/T will be separated from the FAA air traffic control tower:

(1) in conjunction with the establishment of radar approach control which will be provided from the tower cab; or

(2) when the air/ground en route communications services can be provided remotely by an adjacent FSS and separation of the facility will result in a positive cost/benefit; or

(3) when increased activity, personnel, and equipment at the CS/T have overcrowded the tower cab to the point where the required operating positions cannot be accommodated in the space available; or

(4) when the air/ground en route communications service that are normally associated with FSS functions are no longer required for adequate communications coverage.

43. TERMINAL EN ROUTE CONTROL SERVICE.

a. Establishment. Tower en route control service may be established between two adjacent approach control facilities whose control areas share a common boundary and when the operational benefit will outweigh any possible operational penalties resulting from the allocation of altitudes for the service, provided:

(1) The service can be established within the resources currently allocated to the facility, and:

(a) There are five or more IFR peak day flights exchanged.

(b) Air/ground communication coverage exists along the entire route(s) at the altitude(s) involved by either direct means from the tower en route control facilities or by relay through an FSS or company radio.

(c) Landlines exist between the tower en route control facilities.

(d) Sufficiently trained personnel are available to assume the tower en route control function.

(2) Additional communications and/or landlines required to provide tower en route control service may be requested when the volume of IFR peak day traffic exchanged between the approach control facilities exceeds 25 flights.

b. Discontinuance. Tower en route service provided within existing resources as outlined in paragraph 43a(1) may be continued as long as an operational benefit results. When the volume of IFR peak day traffic exchanged between the approach control facilities is less than 10 flights, the additional communications equipment and/or landings provided under paragraph 43a(2) are candidates for decommissioning.

44. AIRPORT SURFACE DETECTION EQUIPMENT (ASDE).

* a. Establishment. An FAA towered airport qualifies as an establishment candidate for ASDE:

(1) if the present value of incremental life-cycle benefits exceeds the present value of incremental life-cycle costs, using the benefit-cost methodology outlined in Report Number FAA-APO-93-12, "Establishment Criteria for Airport Surface Detection Equipment (ASDE) III"; or

(2) for those locations which do not qualify under paragraph 44a (1), the location may still qualify for an ASDE if the Administrator determines that an aeronautical requirement exists due to operational or safety factors, such as runway configuration, military operations, historical record of high incidence of runway incursions, frequent and predictable occurence of severe climatological phenomena such as heavy snow, ice, fog, or other local conditions that can adversely affect aircraft operations or the safety of the flying public. *

* b. Discontinuance. An ASDE will be subject to discontinuance:

(1) if the present value of the continued cost of operation and maintenance less the cost of termination of the ASDE exceeds the present value of its remaining life-cycle benefits; or

(2) if a previously identified aeronautical requirement is judged to no longer exist. *

45. AUTOMATIC TERMINAL INFORMATION SERVICE (ATIS).

a. Establishment. An FAA tower airport is a candidate for ATIS if it is a Level II or higher level facility, or records 50,000 or more annual itinerant operations.

NOTE: The Office of Associate Administrator for Air Traffic maintains a current list of facility levels for each tower which is determined by a traffic density measure defined in the air traffic control series positions classification standard.

b. Continued Service. ATIS service may continue to be provided at an air traffic control tower regardless of activity if such service facilitates operational safety or efficiency. ATIS will be automatically discontinued if associated air traffic control services are discontinued.

46. AUTOMATED WEATHER OBSERVING SYSTEM (AWOS) AND AUTOMATED SURFACE OBSERVING SYSTEM (ASOS).

a. FAA Towered Airports. All FAA towered airports where the surface weather observation function is the responsibility of the FAA qualify for AWOS/ASOS establishment, except those locations identified as tower discontinuance candidates under the provisions of paragraph 40. Priority of AWOS/ASOS establishment will be given to part-time facilities, followed by full-time facilities, in recognition of the relatively greater benefits of AWOS/ASOS when facilities are closed. Criteria for the establishment and discontinuance of AWOS/ASOS at non-Federal towered airports and locations identified as tower discontinuance candidates are outlined in paragraph 46c.

ASOS will be the system employed at the great majority of FAA towers where FAA has the responsibility for the surface aviation observation.

b. Flight Service Stations. Where an automated flight service station is obligated to take weather observations, that location qualifies for AWOS establishment. Other locations with flight service stations qualify if they satisfy either the provisions of paragraphs 46a or 46c. ASOS may also be employed at flight service stations.

c. Non-Towered and Non-Federal Towered Airports. Establishment and discontinuance criteria for AWOS/ASOS at non-towered and non-Federal towered airports are two-phased. Phase I criteria are simple, generalized criteria designed to identify potential candidates initially. Under Phase I a ratio value is computed by summing the benefits provided to each user class and dividing the sum by the life-cycle cost. If the ratio value obtained

is equal to or greater than the thresholds specified below, the airport becomes a candidate for Phase II screening. Phase II is a site-specific computerized life-cycle benefit/cost evaluation of candidates identified in Phase I using the techniques described in Report Number FAA-APO-83-6, Establishment and Discontinuance Criteria for Automated Weather Observing System (AWOS).

(1) Phase I Establishment Criteria.

(a) Non-Towered and Non-Federal Towered Airports With Existing Standard Instrument Approach Procedures (SIAP) Or With Prospective SIAP With AWOS

Air Carrier and Air Taxi (Lesser of (ACITN+ATITN) or (3,000)) x $25.38 = $xxxx

General Aviation and Military	Per Itinerant Operation	Per Local Operation
Wind Sensor	$ 3.80	$ 2.28
Temperature/Dew Point Sensors	.04	.02
Altimeter Sensor	2.16	
Ceiling and Visibility Sensors	15.43	
Precipitation Sensor(s)	.06	.04
Thunderstorm Sensor	.01	.01

(GAITN+MILITN)x$\overline{\$TOTAL}$ = xxxx

(GALCL+MILLCL)x$\overline{\$TOTAL}$ = xxxx

Phase I Value (If 1.0 or greater, location satisfies Phase I Establishment Criteria) $\frac{\text{Total x AR}}{\text{LCC}}$

where the terms are as defined below:

1 ACITN, ATITN, GAITN, and MILITN are the respective numbers of annual air carrier (AC), air taxi (AT), general aviation (GA), and military (MIL) itinerant operations; and GALCL and MILLCL are the respective numbers of annual general aviation (GA) and military (MIL) local operations. Operations counts may be obtained from the "Terminal Area Forecasts" (published annually by FAA-APO), the Airport Master Record (FAA Form 5010-1), the Airport Master File (maintained by FAA's National Flight Data Center), the airport manager, or any other generally accepted source. Values for these activity variables in the Phase II criteria described below will be derived from the Terminal Area Forecast Data System.

2 LCC is the applicable life-cycle cost from Table 46a.

3 AR is an adjusting proximity penalty or remoteness premium reciprocal. For candidate airports located in non-precipitous terrain and less than 10 nautical miles from a full-time, non-automated FAA/NWS/NWS contract surface weather observation station with homogeneous weather, a

proximity penalty reciprocal of .50 applies. For candidate airports that are located 90 or more nautical miles from the nearest full-time, non-automated FAA/NWS/NWS contract surface weather observation station, a remoteness premium reciprocal of 1.25 applies. The adjustment reciprocal for all other candidate airports is 1.0.

TABLE 46a

Life-Cycle Cost (LCC)

LCC = Fixed Cost of $49,617 + Sum of Variable Costs Unique to Applicable Sensoring Devices# + $21,535 if System has Longline Communications

#Variable Costs Unique to Sensoring Devices:

Wind	$ 1,999
Temperature/Dew Point	1,615
Altimeter	3,974
Ceiling	41,881
Visibility	28,517
Liquid Precipitation	1,367
Freezing Precipitation	3,687
Thunderstorm	23,175

(b) Other Non-Towered and Non-Federal Towered Airports

Air Carrier and Air Taxi (Lesser of (ACITN+ATITN) or (3,000)) x $25.38 = $xxxx

General Aviation and Military	Per Itinerant Operation	Per Local Operation
Wind Sensor	$ 3.80	$ 2.28
Temperature/Dew Point Sensors	.04	.02
Altimeter Sensor	.00	
Ceiling and Visibility Sensors	.00	
Precipitation Sensor(s)	.06	.04
Thunderstorm Sensor	.01	.01

(GAITN+MILITN)x$\overline{\$TOTAL}$ = xxxx

(GALCL+MILLCL)x$\overline{\$TOTAL}$ = xxxx

Phase I Value (If 1.0 or greater, location satisfies Phase I Establishment Criteria) $\frac{\text{Total x AR}}{\text{LCC}}$

where the terms are as defined in paragraph 46c(1)(a).

(2) Phase I Discontinuance Criteria. To determine whether an AWOS installation at a non-towered or non-Federal towered airport meets Phase I discontinuance criteria, a ratio value is calculated by the same procedure for establishment criteria described in paragraph 46c(1). If the ratio value so obtained is less than 0.45, the system meets Phase I discontinuance criteria.

(3) Phase II Criteria. Candidate airports for AWOS identified by the above criteria will be evaluated by the computerized benefit/cost subroutine developed in Report Number FAA-APO-83-6. If a benefit/cost ratio of 1.0 or greater (for establishment) or less than .45 (for discontinuance) is computed, the airport becomes a candidate. The subroutine requires the following supplemental site-specific data:

(a) System acquisition and installation costs (FAA Form 2500-40, F&E Cost Estimate Summary).

(b) Whether or not optional longline communications are proposed, and if required, the annual cost.

d. Sensor Configuration. The typical AWOS configuration includes sensors for wind direction and speed, temperature, dewpoint, altimeter, ceiling, visibility, and liquid precipitation. However, AWOS installations may include additional or fewer sensors. For example, a cloud height (ceiling) sensor may not be justified at certain locations in close proximity to another observation site, while additional sensors, such as for freezing precipitation and thunderstorms, may be added if cost effective.

e. Non-Federal AWOS. There will be no takeover of AWOS purchased and installed by parties other than the Federal Government. This provision is an exception to the general policy of paragraph 8 which provides eligibility for inclusion of non-Federal terminal facilities in the National Airspace System with FAA assumption of ownership, operation, maintenance, and logistic support.

47. POLICY ON ADMINISTRATIVE COMBINATION OF TERMINAL FACILITIES.

a. Background. A study of the efficiency of administratively combined terminal air traffic control facilities revealed that certain types of combinations derogate rather than improve service to the user. Air traffic control personnel can be placed in a difficult position when they apply multiple fields of specialization on a part-time rotating basis. This is reason to consider decombining certain air traffic control facilities.

b. Policy. Terminal air traffic control facilities shall not be administratively combined.

c. Separation. All combined facilities shall be separated except as follows:

(1) Tower-RAPCON/RATCC facilities at specific locations designated by the regional administrator as exceptions to this policy.

(2) One tower of a three-facility complex should be operationally and administratively separated. The remaining tower-RAPCON/RATCC combinations should be reevaluated as in paragraph 47c(1). No further "tri-complexes" are authorized.

(3) The station functions of a Combined Station/Tower (CS/T) combined with a RAPCON/RATCC shall be physically separated, even though the tower-RAPCON/RATCC combination continues as an exception as in paragraph 47c(1).

*48. LOW-LEVEL WINDSHEAR ALERT SYSTEM (LLWAS).

a. Establishment. Provided that a site does not qualify for more than one system under paragraphs 48, 49, 50, and 51, an FAA-towered airport qualifies as an establishment candidate for LLWAS if the present value of incremental life-cycle benefits exceeds the present value of incremental life-cycle costs, using the benefit-cost methodology outlined in Report Number FAA-APO-90-13, "Establishment Criteria For Integrated Windshear Detection Systems: Low-Level Windshear Alert System (LLWAS), Terminal Doppler Weather Radar (TDWR), and Modified Airport Surveillance Radar." If the site meets the criteria for more than one system, then the one with the highest (positive) net present value is the qualifying system.

b. Discontinuance. Reserved. *

*49. TERMINAL DOPPLER WEATHER RADAR (TDWR).

a. Establishment. Provided that a site does not qualify for more than one system under paragraphs 48, 49, 50, and 51, an FAA-towered airport qualifies as an establishment candidate for TDWR if the present value of incremental life-cycle benefits exceeds the present value of incremental life-cycle costs, using the benefit-cost methodology outlined in Report Number FAA-APO-90-13, "Establishment Criteria For Integrated Windshear Detection Systems: Low-Level Windshear Alert System (LLWAS), Terminal Doppler Weather Radar (TDWR), and Modified Airport Surveillance Radar." If the site meets the criteria for more than one system, then the one with the highest (positive) net present value is the qualifying system.

b. Discontinuance. Reserved.

50. AIRPORT SURVEILLANCE RADAR (ASR) MODIFICATION FOR WINDSHEAR DETECTION.

a. Establishment. Provided that a site does not qualify for more than one system under paragraphs 48, 49, 50, and 51, an ASR site qualifies as a candidate for ASR modification for wind shear detection if the present value of incremental life-cycle benefits exceeds the present value of incremental life-cycle costs, using the benefit-cost methodology outlined in Report Number FAA-APO-90-13, "Establishment Criteria For Integrated Windshear Detection Systems: Low-Level Windshear Alert System (LLWAS), Terminal Doppler Weather Radar (TDWR), and Modified Airport Surveillance Radar." If the site meets the criteria for more than one system, then the one with the highest (positive) net present value is the qualifying system.

b. Discontinuance. Reserved.

51. INTEGRATED WINDSHEAR DETECTION SYSTEMS: LLWAS, TDWR AND MODIFIED ASR.

a. Establishment. Provided that a site does not qualify for more than one system under paragraphs 48, 49, 50, and 51, an FAA-towered airport qualifies as an establishment candidate for an integrated windshear detection system if the present value of incremental life-cycle benefits exceeds the present value of incremental life-cycle costs, using the benefit-cost methodology outlined in Report Number FAA-APO-90-13, "Establishment Criteria For Integrated Windshear Detection Systems: Low-Level Windshear Alert System (LLWAS), Terminal Doppler Weather Radar (TDWR), and Modified Airport Surveillance Radar." If the site meets the criteria for more than one system, then the one with the highest (positive) net present value is the qualifying system.

b. Discontinuance. Reserved. *

*52. METROPLEX CONTROL FACILITY (MCF).

a. Establishment. An MCF may consist of a single terminal radar approach control facility (TRACON) but, more commonly, an MCF will consist of a consolidation of several TRACONs. For the purpose of this criterion, a TRACON or set of TRACONs, will be considered to be a candidate to become an MCF only (1) if airspace which will be under control of the MCF will be restructured from current TRACON and/or en route airspace, (2) if establishing an MCF improves traffic management, or (3) if establishing an MCF results improved air traffic control procedures. The regions shall submit the names of TRACONs which they believe will make likely candidates for becoming an MCF. The regions shall assess MCF candidates according to an operational screen, Phase I and Phase II Criteria.

(1) Operational Screen. Details of the Operational Screen may be found in Report FAA-AAT-93-2, "Operational Requirements and Facility Investment Criteria for Metroplex Control Facilities (MCF) and Terminal Radar Approach Control (TRACON) Facilities," available from ATR-310. The Operational Screen is summarized below:

(a) The proposed candidate MCF consists of a single TRACON or the consolidation of two to seven TRACONs. If more than seven TRACONs are proposed for consolidation into an MCF, the proposed candidate MCF does not qualify.

(b) The proposed candidate MCF will generate benefits to the National Airspace System by the restructuring of terminal or terminal and en route airspace, improved traffic management, and/or improved air traffic control procedures. If it cannot be demonstrated that at least one of these three types of efficiencies will be realized, the proposed candidate MCF does not qualify.

(2) Phase I Criteria. Phase I Criteria are simple tests for identifying possible candidate sites for MCFs:

(a) A proposed candidate MCF passes Phase I Criteria if the previous fiscal year's Air Carrier Instrument Operations or Air Carrier Enplanements are greater than specific numbers (which vary by fiscal year). See Report Number FAA-APO-93-7, "Establishment Criteria for Metroplex Control Facilities (MCFs)" for the specific values to be used. For decision year FY 1993, the respective values are 432,000 Instrument Operations in FY 1992 for Air Carrier Instrument Operations or 23.3 million passengers enplaned in FY 1992 for Air Carrier Enplanements. *

* (b) If a proposed candidate MCF does not have the volume of Instrument Operations or Enplanements needed to quality under Phase I Criteria as identified in paragraph 48a(2)(a), it still may qualify in accordance with the test in this paragraph:

Let

AC	=	Air Carrier Instrument Operations
ATCOM	=	Air Taxi and Commuter Instrument Operations
GA	=	General Aviation Instrument Operations
MI	=	Military Instrument Operations

Then, using the previous fiscal year's actual data on instrument operations as reported in "FAA Air Traffic Activity" Report, (e.g., Table 9, Instrument Operations by FAA-Operated ATCT's, TRACONs, CERAPS, & RAPCONS by State) calculate the Phase I Establishment Ratio Sum is:

$$[(a * AC) + \beta * ATCOM) + (\gamma * GA) + (\delta * MI)] / 43,600,000$$

where the specific values of a, β, γ, and δ, vary by fiscal year. See Report Number FAA-APO-93-7, for the specific values to be used in the Phase I Establishment Ratio Sum. For decision year FY 1993, the Phase I Establishment Ratio Sum is:

$$[(100.96*AC) + (11.39*ATCOM) + (3.31*GA) + (9.84*MI)] / 43,600,000.$$

If this ratio sum is greater than or equal to one, then the proposed site becomes a candidate for MCF establishment. There is an alternative to the Phase I Establishment Ratio Sum based on enplanements. (See Report Number FAA-APO-93-7, for the specific number of enplanements to use.)

NOTE: Candidate facilities for MCFs which have already accomplished a study comparing the benefits and costs of consolidating airspace which will be controlled by the candidate MCF should go directly to Phase II Criteria.

(3) Benefit/Cost Criteria (Phase II). Phase II Criteria, detailed in Report Number FAA-APO-93-7, compare the present value of MCF benefits with the present value of costs over a 20 year time frame, using site-specific analyses to develop the benefits and the costs. A location meets MCF establishment criteria when the ratio of benefits to costs is 1.0 or greater.

(4) Phase I is used to identify a potential candidate and Phase II verifies its economic justification. *

* b. Waiver. A location may be exempted from meeting Phase I Criteria and be considered an establishment candidate because of other special factors. In these cases a site-specific analysis must be performed and adequate justification presented to the Associate Administrator for Air Traffic (AAT-1) for approval. The site specific analysis should include, but not be limited to:

(1) Factors unique to the location such as airspace restrictions, weather, seismic conditions, topography, and impact on adjacent facilities.

(2) Specific trend analysis and/or forecast data that predict significant changes in traffic activity attributable to unique local conditions, thus necessitating replacement or refurbishment of an existing facility.

(3) Military requirements.

c. Discontinuance. Approach control service that was available within existing resources may continue to be provided regardless of activity if it facilitates operational safety or efficient utilization of airspace. Based on the history for the formation of these facilities, it is highly unlikely that it will be more operationally or economically advantageous for an MCF to cease rather than continue operation. In the event that unique circumstances exist, the regions will identify any MCF candidate for discontinuance of service or decommissioning based on a site-specific operational and economic analysis. *

*53. TERMINAL RADAR APPROACH CONTROL (TRACON) FACILITY.

a. Identification and evaluation of requirements to modernize or relocate TRACON facilities will be accomplished in accordance with Order 6480.17, Terminal Facility Modernization/Relocation Survey and Evaluation Handbook. Alternatives analyses will consider the operational and cost benefits or combining airspace and co-location with adjacent terminal, or terminal capable facilities as outlided in FAA-AAT-93-2, "Operational Requirements and Facility Investment Criteria for Metroplex Control Facilities (MCF) and Terminal Radar Approach Control (TRACON) Facilities".

b. FAA Regional Offices will identify their operational needs and justification during submission of the annual F&E budget call response to FAA Headquarters. Order 6480.17 will be used to determine the proper classification of facility based on cost-effectiveness. Upon approval by the Associate Administrator for Air Traffic (AAT-1), proposed projects will be considered for inclusion in the Capital Investment Plan (CIP) and FAA budget request. TRACONs approved for funding will normally by included in existing CIP projects. TRACONs which meet the MCF criteria requirements will be included in existing or new CIP projects. The provisions of Order 1810.1F, Acquisition Policy, will be applied when applicable. *

* 54. PRECISION RUNWAY MONITORS (PRM).

a. Establishment. An FAA towered airport qualifies as an establishment candidate for PRM:

(1) if the present value of incremental life-cycle benefits exceeds the present value of incremental life-cycle costs, using the benefit-cost methodology outlined in Report Number FAA-APO-97-5, "Establishment Criteria for Precision Runway Monitor (PRM)"; or

(2) for those locations which do not qualify under paragraph 54a (1), the location may still qualify for a PRM if the Administrator determines that an aeronautical requirement exists due to operational or safety factors, such as runway configuration, terminal approach procedures, or delay at feeder or receiver airports or elsewhere in the National Airspace System (NAS) which can be related to delay at the PRM candidate airport. *