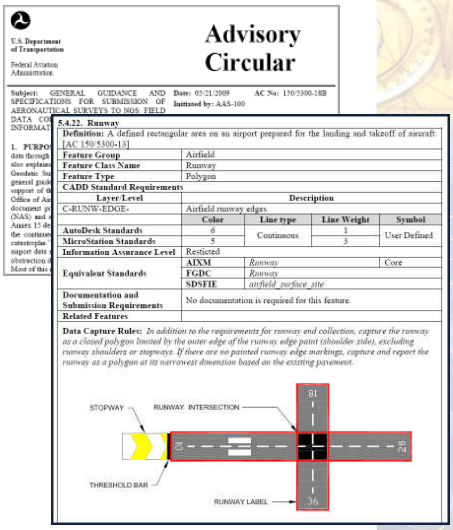

Airports GIS
AC 150/5300-18
Data Collection and Data Standards
Presented to | FAA Regions | Alaskan
By | Gil Neumann, APP-400 | Thomas Wade, ASW-611
Date | October 19-20, 2011


Agenda
Background (10 min)
Requirements (30 min)
Best Practices/Lessons Learned (10 min)

AC 150/5300-18 | Quality Control and Data Model

- **480 Pages!**
  - Chapter 1-4: 105 pages
  - Chapter 5 (Data Model): 315 pages
  - Appendices: 60 pages
- **Safety-Critical Data (Table 4-1)**
  - Runways, NAVAIDS, Obstacles, Geospatial (Profiles, Elevation, ARP)
  - NGS Verification
- **Verification vs. Validation**
- **Accuracy and Reporting Criteria**
- **Table 2-1**
- **Object Identification Surfaces**
  - Vertically Guided Approaches
  - Non VG Approaches
- **Data Translation, Use of Existing Data & Data Migration Tool**
- **GIS Schema (Data Model)**



U.S. Department of Transportation
Federal Aviation Administration

Advisory Circular

Subject: GENERAL GUIDANCE AND SPECIFICATIONS FOR SUBMISSION OF AERONAUTICAL SURVEYS TO NGS FIELD

Date: 05/21/2009 AC No: 150/5300-18B
Initiated by: AAS-100

5.4.22. Runway

Definition: A defined rectangular area on an airport prepared for the landing and takeoff of aircraft. [AC 150/5300-13]

Feature Group	Airfield			
Feature Class Name	Runway			
Feature Type	Polygon			
CADD Standard Requirements				
Layer/Level	**Description**			
C-RUNW-EDGE-	Airfield runway edges			
	Color	**Line type**	**Line Weight**	**Symbol**
AutoDesk Standards	8	Continuous	3	User Defined
MicroStation Standards	5		3	
Information Assurance Level	Restricted			
Equivalent Standards	**AIXM**	*Runway*		Core
	FGDC	*Runway*		
	SDSFIE	*airfield_surface_site*		
Documentation and Submission Requirements	No documentation is required for this feature.			
Related Features				

Data Capture Rules: *In addition to the requirements for runway and collection, capture the runway as a closed polygon limited by the outer edge of the runway edge paint (shoulder side), excluding runway shoulders or stopways. If there are no painted runway edge markings, capture and report the runway as a polygon at its narrowest dimension based on the existing pavement.*

-18 Highlights | Chapter 1

- **NSRS Datum**
  - NAD83, NAVD88, **GEOID09**
- **Naming Convention**
  - Files and Photos
- **Photographs**
  - Type 1 – close up
  - Type 2 – eye level at 5 to 6 feet
  - Type 3 – horizontally 10 to 30 feet

-18 Highlights | Chapter 2

- **Independent *verification* and *validation* of airport safety data**
  - **Airport Safety-Critical Data**: typically, features associated with the airport's movement areas, navigational systems, or those affecting navigable flight such as objects surrounding the airport
  - **Verification**: the confirmation by examination and provision of objective evidence that the specified requirements are fulfilled
  - **Validation**: the confirmation by examination and provisions of objective evidence showing the data set meets the particular requirements of the intended use
- **Survey and Quality Control Plans**
- **Final Report**
- **Table 2-1**

-18 Highlights | Chapter 2 (continued)

- **Project Types**
  - Landside, Airside, ALP, Mapping, Approach Procedure, etc.
- **Airport Airspace Analysis**
  - Runways with Vertically Guided Approaches (VG)
  - Runways w/o Vertical Guidance (NVG)
- **One Engine Inoperative**
  - Per AC 150/5300-13, Ch 15 (required until after January 1, 2012)*

**** Pending AAS approval***

Table 2-1 | Project Scoping

Table 2-1. Survey Requirement Matrix

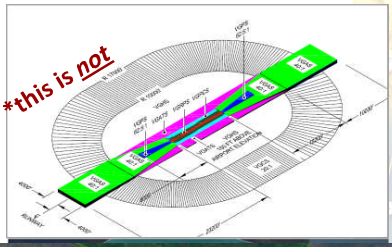
This table is designed for use in two ways. First, it defines in a general fashion the task required to meet a specific objective. Each task listed is generalized and the process to complete it many contain many other pieces. Users should refer to the text of the referenced AC to ensure that all the required subtasks are completed. The second way to use this matrix is as a checklist to ensure all the required data is collected either before leaving the field or submitting the data to the FAA.

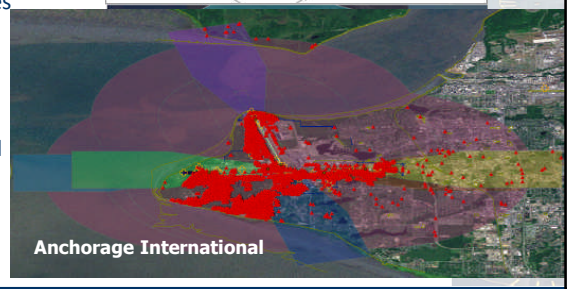
Intended End Use of the Data ► / Required Tasks ▼	AC Reference	Category II or III Operations	Navigational Aid Siting			Airport Layout Plan (ALP)	Airport Obstruction Chart	Construction		Instrument Procedure Development	Pavement Design, Construction, Rehabilitation or Roughness	Airport Mapping Database
			Non-Precision	Precision	Visual			Airside	Landside			
Provide a Survey and Quality Control Plan	150/5300-16/17/18	•	•	•	•	•	•	•	•	•	•	•
Establish or validate Airport Geodetic Control	150/5300-16	•	•	•		•	•	•		•	•	•
Perform, document and report the tie to National Spatial Reference System (NSRS)	150/5300-16	•	•	•	•	•	•			•		•
Survey runway end(s)/threshold(s)	150/5300-18	•		•	•	•	•	•[1]		•	•	•
Monument runway end(s)/threshold(s)	150/5300-18	•		•	•	•	•	•[1]		•	•	
Document runway end(s)/threshold location(s)	150/5300-18	•		•	•	•	•	•[1]		•[1]	•[1]	
Identify and survey any displaced threshold(s)	150/5300-18	•		•	•	•	•	•[1]		•	•	•
Monument displaced threshold(s)	150/5300-18	•		•	•	•[1]	•[1]	•[1]		•		
Document displaced threshold(s) location	150/5300-18	•		•	•	•	•	•[1]		•	•	•
Determine or validate runway length	150/5300-18	•				•	•	•[1]		•	•	•
Determine or validate runway width	150/5300-18	•				•	•	•[1]		•	•	•
Determine runway profile using 50 foot stations	150/5300-18			•[2]		•[2]	•[2]	•[1]		•	•[2]	•
Determine runway profile using 10 foot stations	150/5300-18	•		•[2]		•[2]	•[2]	•[2]		•	•[2]	•[2]
Determine the touchdown zone elevation (TDZE)	150/5300-18	•		•		•	•			•	•	
Determine and document the intersection point of all specially [illegible] runway(s)	150/5300-18	•				•	•					•

Required Tasks ▼		Operations	Non-Precision	Precision	Visual	Plan (ALP)	Chart	Airside	Landside	Development	Rehabilitation or Roughness	Database
Perform or validate a topographic survey	150/5300-18	•[1]	•	•		•		•	•	•[1]		
Collect and document runway and taxiway lighting	150/5300-18	•				•						•
Collect and document parking stand coordinates	150/5300-18											•
Collect cultural and natural features of landmark value	150/5300-18					•	•					•
Determine elevation of roadways at the intersecting point of the Runway Protection Zone (RPZ) or the runway centerline extended	150/5300-18	•				•						
Determine all Land Use to 65 DNL contour	150/5300-18					•						
Document features requiring digital photographs	150/5300-18	•	•	•	•	•		•		•		
Document features requiring sketches	150/5300-18	•	•	•	•	•		•		•		•
Collect position and type of runway markings	150/5300-18	•				•						•
Collect position and type taxiway markings	150/5300-18											•
Locate, collect, and document photo ID points	150/5300-17						•					
Identify collect, and document wetlands or environmentally sensitive areas	150/5300-18					•						
Collect imagery	150/5300-17	•				•	•			•		•
Provide a final Project Report	150/5300-16/18	•	•	•	•	•	•	•	•	•	•	•

Vertically-Guided Object Identification Surfaces

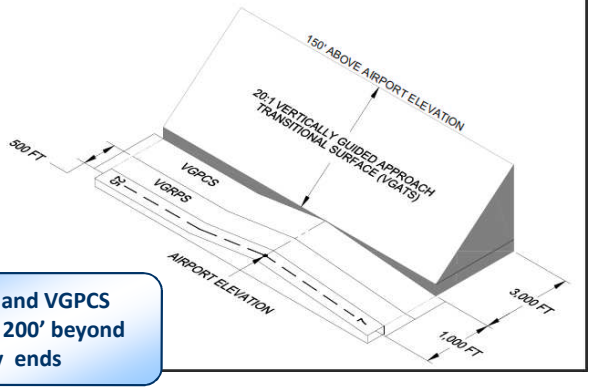
- **LPV and ILS Approaches require use of Vertically Guided Object Identification Surfaces**
  - -18, Sect. 2.7.1.1
- **One set of object identification surfaces per runway -**
  - not approach-end dependent
  - horizontal and conical surfaces not combined into an airport surface
- **Airport Airspace Analysis (object identification)**
  - requires airport elevation and ARP, therefore AAA for a runway requires information about all other runways





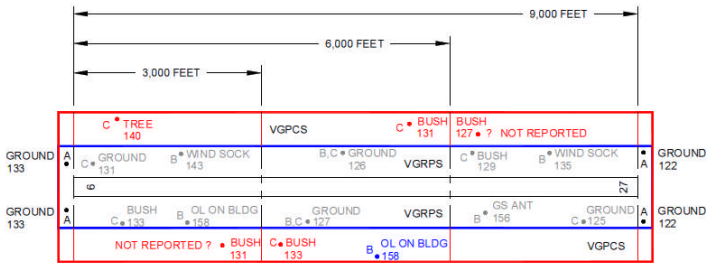
VGATS, VGRPS, and VGPCS

2.7.1.1.5. Vertically Guided Approach Transitional Surface (VGATS). The VGATS is a 3,000 foot wide, 20:1 (5%) sloping surface that extends outward from the outer edges of the VGPCS (from runway end to runway end) and along the VGAS tapered boundary, to a point 4,000 feet abeam the runway centerline (see Figure 2-6). The VGATS surface starts at the airport elevation along the VGPCS/VGATS edge (or imaginary extended edge for tapered area), and rises 150 feet above airport elevation abeam the runway centerline.



VGRPS and VGPCS Extend 200' beyond runway ends

VGRPS and VGPCS Analysis



NOTE:

THE OBSTACLE REPRESENTATION IN THE VGPCS AREA (RED RECTANGLE) MUST INCLUDE THE:

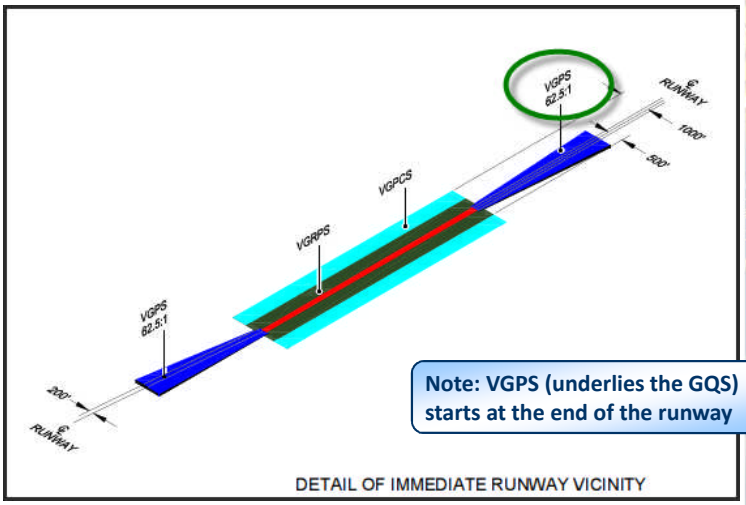
A - HIGHEST OBJECT OUTWARD FROM THE RUNWAY END

B - HIGHEST OBJECT IN EACH 1/3 SECTION OF RUNWAY LENGTH

C - HIGHEST NON-MANMADE OBJECT IN EACH 1/3 SECTION OF RUNWAY LENGTH

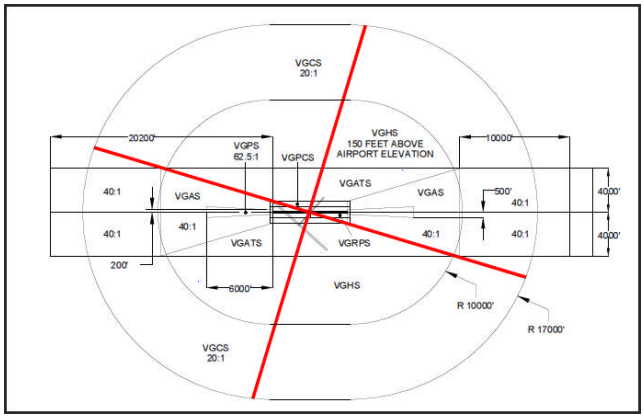
Figure 2-9. Illustrates the VGRPS and VGPCS object representations.

The VGPS



Note: VGPS (underlies the GQS) starts at the end of the runway

VG Horizontal and VG Conical Surface Analysis



- Divide the VGCS into quadrants (as depicted by the red lines in Figure 2-13), extended to the outer edge of the VGCS, centered on the meridian and parallel intersecting the ARP

-18 Highlights | Chapter 3

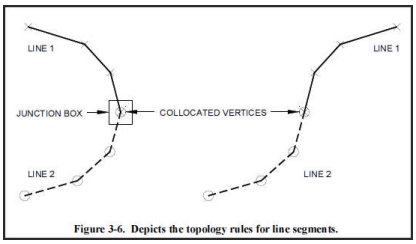
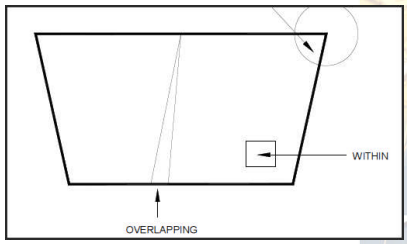


Figure 3-6. Depicts the topology rules for line segments.



- **Geometry**
  - For the purposes of these specifications: points, lines, and polygons describe geometry
  - Refer to Chapter 5 for specific requirements for each feature type

-18 Highlights | Chapter 4

Table 4-1. Airport-Related Safety Critical Data

The values published in these tables are the publication resolutions. The data should be collected to one decimal place more than required for publication for use in computations and to eliminate rounding errors in the final value.

Item	Publication Resolution (Unit of Measurement)	Integrity Classification
Airport Control Area (Airspace)	1 arc second in latitude and longitude	1×10^{-5}
NAVAIDs located at the airport/heliport	1/10 arc second in latitude and longitude	1×10^{-5}
Obstacles in the circling area and at the airport/heliport	1/10 arc second in latitude and longitude	1×10^{-5}

- **Use of Existing Data**
- **Safety Critical Data (Table 4-1)**
- **Data Migration Tool (no longer supported)**
- **DMT replaced by Templates (Download from Website)**

- **Safety Critical Features**
  - Runway
  - RW Ends (Thresholds)
  - CL Profile
  - ARP, Airport Elevation
  - Obstacle
  - NAVAID
  - Stopway, Clearway
  - Obstacle Identification Surfaces
  - Landmark Features

-18 Highlights | Chapter 5 – GIS Schema

- **Each feature is described by geometry type, feature group, information assurance level, requirements, positional accuracy, data capture rule, and the attributes required to provide the data to the FAA**

5.4.26. Runway End

Definition: The end of the runway surface suitable for landing or takeoff runs of aircraft. Runway Ends describe the approach and departure procedure characteristics of a runway threshold. The Runway End is the same as the runway threshold when the threshold is not displaced.				
Feature Group	Airfield			
Feature Class Name	RunwayEnd			
Feature Type	Point			
CADD Standard Requirements				
Layer/Level	**Description**			
C-RUNW-ENDP-	Runway endpoint			
	Color	**Linetype**	**Line Weight**	**Symbol**
AutoDesk Standards	5	Continuous	1	User Defined
MicroStation Standards	1		7	
Information Assurance Level	Restricted			
Equivalent Standards	**AIXM**	*RunwayDirectionExtension*		Extension
	FGDC	*RunwayEnd*		
	SDSFIE	*Airfield surface site*		
Documentation and Submission Requirements	*In addition to the requirements of paragraphs 1.5.2 and 1.5.3, document the selected location using four digital photographs:*			

Photograph Type #1 (Eye Level).
Photo taken from above the mark, showing an area around the mark about 1 meter in diameter.

Photograph Type #2 (Approach).
Photo showing tripod over the mark in foreground and approach in the background.

Photograph Type #3 (Across Runway).
Photo taken from the side of the runway looking across the end of the runway, with a tripod or arrow indicating the end point; include any features used to identify the runway end.

Photograph Type #4 (Close-in).
Close-up photo depicting nail, washer and markings.

Chapter 5 – GIS Schema (continued)

Related Features	
Data Capture Rule: *Establish the runway end on the runway centerline at the physical end, or specified location based on other supporting features. The area between the runway end and the displaced threshold should be marked with white arrows.*	
Monumentation	When the ends of the runway surface have been determined, mark the positions using a nail and washer with the setting company's name and year inscribed, chisel square, or paint if possible with a distinctive inscription to ensure future identification.
Survey Point Location	**Concrete Runway and No Aligned Taxiway** Survey Point Locator is the limit of construction or the trim line at the first good pavement, unless these lines are located on the approach side of runway end lights. Supporting features include: • Runway end lights near runway end • Threshold bar near runway end (usually present only if non-runway pavement is aligned with runway) • Threshold lights near runway end and usually in same fixture as runway end lights (if threshold not displaced) • Runway number near runway end (if threshold not displaced) • Runway edge lights (white or amber) extending to runway end Comments: The limit of construction usually defines the survey point for the ends of concrete runways. A surface discontinuity defines the limit of construction. Do not confuse the runway end with the end of a blast pad, stopway, or other non-runway surface. Refer to the figure below for an example of this scenario.

Paved/Non-concrete Runway and No Aligned Taxiway
Survey Point Locator is the limit of construction or the trim line at first good pavement, unless those lines are located on approach side of runway end lights. Supporting features include:
- Runway end lights near runway end
- Threshold bar near runway end (usually present only if non-runway pavement is aligned with runway)
- Threshold lights near runway end and usually in same fixture as runway end lights (if threshold not displaced)
- Runway number near runway end (if threshold not displaced)
- Runway edge lights (white or amber) extending to runway end

GIS Schema | Feature Attributes and Enumeration

Feature Attributes- RunwayEnd 5.4.26

Feature Attributes	
Attribute (Datatype)	**Description**
name (VARCHAR2(50))	Name of the feature.
description (VARCHAR2(255))	Description of the feature
ellipsoidHeight (Real)	The height above the reference ellipsoid, measured along the ellipsoidal outer normal through the point in question. Also called the geodetic height. [Source: NGS]
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
approachCategory (Enumeration: codeApproachCategory)	A grouping of aircraft based on 1.3 times their stall speed in the landing configuration at the certificated maximum flap setting and maximum landing weight at standard atmospheric conditions [Source: AC 150/5300-13]
approachGuidance (Enumeration: codeApproachGuidance)	The type of approach guidance in use for the runway end.
accelerateStopDistanceAvail (Integer)	The runway plus stopway length declared available and suitable for the acceleration and deceleration of an airplane aborting a takeoff. [Source: AC 150/5300-13]
magneticBearing (Real)	Magnetic runway bearing corresponding to threshold location valid at the day of data generation [Source: RTCA DO-272]
trueBearing (Real)	True bearing corresponding to the landing direction [Source: ICAO Annex 14]
designGroup (Enumeration: codeDesignGroup)	A grouping of airplanes based on wingspan and or tailheight, whichever is greatest. [Source: AC 150/5300-13]
displacedDistance (Integer)	The distance from the runway end to the landing threshold. When the thresholdType is normal, displacedDist = 0.
landingDistanceAvailable (Integer)	The runway length declared available and suitable for a landing airplane.
runwayEndDesignator	The designator for the runway end (i.e. 32L)
runwaySlope (Real)	Runway slope corresponding to landing direction [Source: RTCA DO-272]
takeOffDistanceAvailable	The takeoff run available plus the length of any remaining runway clearway beyond the far end of the takeoff run available. [Source: AC 150/5300-13]

Enumeration Tables

- Domain values (think pick lists)

5.15.54.CodeSurfaceMaterial

Value	Description
AG	Asphalt grooved
Ags	Asphalt and turf
ANG	Asphalt ungrooved
BE	Bare earth
CA	Concrete and asphalt
CG	Concrete grooved
CGS	Concrete and turf
CNG	Concrete ungrooved
DS	Desert/Sand
DT	Dirt
EMAS	Engineered Material Arresting System
FW	Fresh Water
GR	Gravel
GS	Turf
SI	Snow/Ice
SW	Salt Water
W	Water

5.15.55.CodeSurfaceType

Value	Description
P	Specially prepared hard surface—Paved
S	Specially prepared hard surface—Unpaved
U	Not a specially prepared hard surface

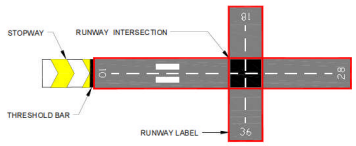
GIS Schema | Runway Collection/Attribution

5.4.22. Runway

Definition: A defined rectangular area on an airport prepared for the landing and takeoff of aircraft. [AC 150/5300-13]	
Feature Group	Airfield
Feature Class Name	Runway
Feature Type	Polygon
CADD Standard Requirements	

Layer/Level	Description			
C-RUNW-EDGE-	Airfield runway edges			
	Color	**Line type**	**Line Weight**	**Symbol**
AutoDesk Standards	6	Continuous	1	User Defined
MicroStation Standards	5		3	
Information Assurance Level	Restricted			
Equivalent Standards	**AIXM**	*Runway*		Core
	FGDC	*Runway*		
	SDSFIE	*airfield surface site*		
Documentation and Submission Requirements	No documentation is required for this feature.			
Related Features				

Data Capture Rules: *In addition to the requirements for runway end collection, capture the runway as a closed polygon limited by the outer edge of the runway edge paint (shoulder side), excluding runway shoulders or stopways. If there are no painted runway edge markings, capture and report the runway as a polygon at its narrowest dimension based on the existing pavement.*



The red lines encompassing the runway illustrate the collection of the runways at an airport.

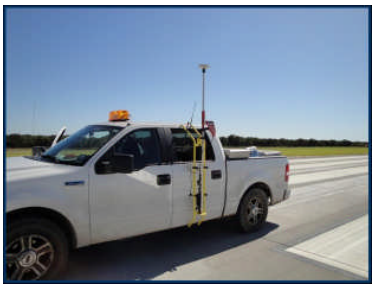
Monumentation	No monumentation required.	
Survey Point Location	**Horizontal**	**Vertical**
	N/A	N/A

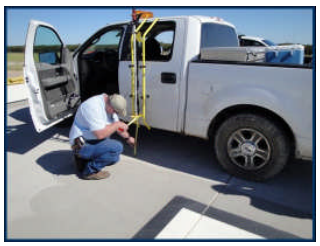
Accuracy Requirements (in feet)	**Horizontal**	**Vertical**	
		Orthometric	**Ellipsoidal**
	± 3 ft	± 5 ft	N/A
Resolution	**Geographic Coordinates**	**Distances and Elevations**	
	Hundredth of arc second	Nearest tenth of foot	

Feature Attributes	
Attribute (Datatype)	**Description**
name (VARCHAR2(50))	Name of the feature.
description (String 255)	Description of the feature
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
runwayDesignator (String 7)	Designator of the runway based on the magnetic bearing and position in relation to parallel runways (e.g. 33R/15L) [Source: AC 150/5340-1]
width (Real)	A perpendicular line to the surface centerline, extending to the edge of the runway pavement on both sides of the runway, through a runway end-point. If the runway width is less than 100 feet, the width is rounded up to the nearest 5 feet. If the runway width is more than 100 feet, the width is rounded to the nearest 10 feet. If the rounded width is different from the published width, NGS should be contacted for further advice. [Source: NGS]
length (Real)	The straight line distance between runway end points. This line does not account for surface undulations between points. Official runway lengths are normally computed from runway end coordinates and elevations.
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
surfaceType (Enumeration: codeSurfaceType)	A classification of airfield pavement surfaces for Airport Obstruction Charts [Source: NGS]
surfaceMaterial (Enumeration: CodeSurfaceMaterial)	A code indicating the composition of the related surface [Source: NFDC]
pavementClassificationNumber	A number that expresses the relative load carrying capacity of a pavement in terms of a standard single wheel load [Source: AC 150/5335-5]
surfaceCondition (Enumeration: codeSurfaceCondition)	A description of the serviceability of the pavement [Source: NFDC]
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

Lessons Learned and Best Practices

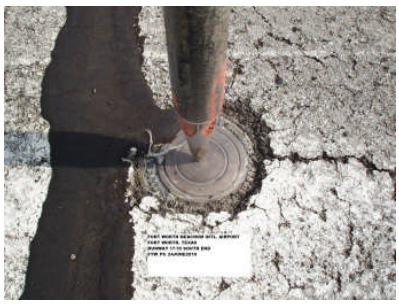
- **Real Time Kinematic (RTK)**
  - Runway Profiles
  - Collect Data Rapidly
  - Utilizes Base Station
  - Both Directions - Continuous Readings (10'-values)





Lessons Learned and Best Practices (continued)

- **Survey Documentation adds costs, but is necessary**



- **Runway End is not the end of Pavement**

Review Questions

1. **Where is the correct Horizontal and Vertical Survey location for a Localizer?**

-18B, 5.10.12.
NAVAID Equipment – LOC

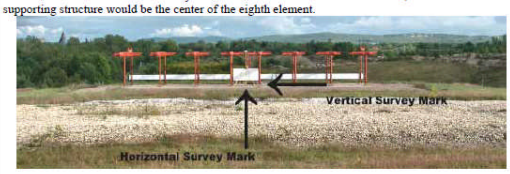
Determining the HSP and Vertical Point #1 of a Localizer

Localizer

A localizer (LOC) antenna array is normally located beyond the departure end of the runway (localizer 17 is on the south end of the runway) and generally consists of several pairs of directional antennas. The localizer operates as a component of the Instrument Landing System or ILS; however, it can be operated by itself. Since the localizer is made up of a set of arrays (antenna's) it provides a unique challenge in determining the center of the antenna unit. In the figure below, there are 14 antenna elements. The proper method of determining the HSP is to find the center of the supporting structure at the center of the antenna array. In this figure, this is the center of the center of structures supporting the seventh antenna element from each side.

Illustration of a localizer antenna array depicting each of the elements and the selection of the HSP and Vertical Point #1.

In order to locate the center of the supporting structure the surveyor, is required to first locate the center of the array and then the center of the supporting structure. In order to locate the center of the supporting structure in the figure above, the surveyor would locate the center of the space between the seventh element from each end. It is recommended the surveyor use tape measures or string to form a "X" and then use a plumb bob to locate the point at the base of the antenna. Another method of the same technique is to draw lines in between the bolts supporting the elements and forming an "X" to locate the center. If the antenna array has an odd number of elements such as 15, then the center of the supporting structure would be the center of the eighth element.



Accuracy Requirements (in feet)	Horizontal	Vertical	
		Orthometric	Ellipsoidal
	± 1 ft	± 0.25 ft	N/A
Resolution	Geographic Coordinates	Distances and Elevations	
	Hundredth of arc second	Nearest one foot	

- **Is Imagery required for a NAVAID siting project?**

-18B, Table 2-1

Intended End Use of the Data / Required Tasks	AC Reference	Category II or III Operations	Navigational Aid Siting: Non-Precision	Navigational Aid Siting: Precision	Navigational Aid Siting: Visual	Airport Layout Plan (ALP)	Airport Obstruction Chart	Construction: Airside	Construction: Landside	Instrument Procedure Development	Pavement Design, Construction, Rehabilitation or Roughness	Airport Mapping Database
Perform or validate a topographic survey	150/5300-18	•[1]	•	•		•		•	•	•[1]		
Collect and document runway and taxiway lighting	150/5300-18	•				•						•
Collect and document parking stand coordinates	150/5300-18											•
Collect cultural and natural features of landmark value	150/5300-18					•	•					•
Determine elevation of roadways at the intersecting point of the Runway Protection Zone (RPZ) or the runway centerline extended	150/5300-18	•				•						
Determine all Land Use to 65 DNL contour	150/5300-18					•						
Document features requiring digital photographs	150/5300-18	•	•	•	•	•		•		•		
Document features requiring sketches	150/5300-18	•	•	•	•	•		•		•		•
Collect position and type of runway markings	150/5300-18	•				•						•
Collect position and type taxiway markings	150/5300-18											•
Locate, collect, and document photo ID points	150/5300-17						•					
Identify collect, and document wetlands or environmentally sensitive areas	150/5300-18					•						
Collect imagery	150/5300-17	•				•	•			•		•
Provide a final Project Report	150/5300-16/18	•	•	•	•	•	•	•	•	•	•	•

- **The Sponsor has a proposed runway that is not needed (justified) for more than 10 years, what Status Code value should the Sponsor use to designate this runway?**

-18.5.4.22. Runway

5.15.51. CodeStatus

Value	Description
ABANDONED	Abandoned
ACTIVE	Active surface
AIRSPACED	A favorable airspace determination has been issued
AS_BUILT	
BROKEN	Broken or rough surface
CLOSED	Closed surface
CONDEMNED	
DEMOLISHED	
ENV_CLEARED	All required environmental actions and documentation described in FAAO 5050.4 "National Environmental Policy Act (NEPA) have been satisfied
FAILED_AID	Failure or irregular operation of visual aides
INACTIVE	
LIMITED	Limited operations]
LONG_TERM	Indicates the feature is part of a long term (11 + years) plan
MEDIUM_TERM	Indicates the feature is part of a midterm (6 - 10 year) plan
NON_OPERATIONAL	Non-operational
OCCUPIED	
OPERATIONAL	Operational (fully)
OTHER	
PARKED	Parked or disabled aircraft
PERMANENT	
PORTABLE	
RELEASED	Used to track land released by the airport
S_POWER	Secondary power supply in operation
SEMI_PERMANENT	
SHORT_TERM	Indicates the feature is part of a short term (0 - 5 year) plan
TBD	To be determined
TEMPORARY	
TERMINATED	Terminated no longer used
UNDER_CONSTRUCTION	Planned or under construction
UNKNOWN	
UNOCCUPIED	
WORK_IN_PROGRESS	Construction or work in progress
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

- **The Sponsor needs to delineate a wetlands area. What horizontal and vertical accuracy is required?**

-18.5.7.12. Wetland

5.7.12. Wetland

Definition: Transitional lands between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. The soils are predominantly saturated with water and the plants and animals that live there are specialized for this ecosystem.

Feature Group	Environmental			
Feature Class Name	Wetland			
Feature Type	Polygon			
CADD Standard Requirements				
Layer/Level	**Description**			
V-TOPO-WETL	Wetland			
	Color	**Linetype**	**Line Weight**	**Symbol**
AutoDesk Standards	2	Continuous	1 MM	User Defined
MicroStation Standards	4		7	
Information Assurance Level	Restricted			
Equivalent Standards	**AIXM**	*AirspaceExtension*		Extension
	FGDC	*Wetland*		Extension
	SDSFIE	*Wetland area*		
Documentation and Submission Requirements	None			
Related Features				

Data Capture Rules: *Collect a closed polygon to establish the boundary between wetlands and uplands (or non-wetlands). There are two delineation procedures developed at the federal level and several states have their own wetland delineation procedures. Contact federal/state/local environmental agency for assistance.*

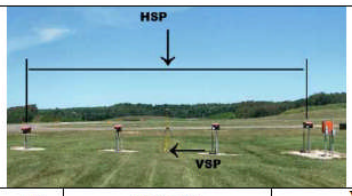
Monumentation	No monumentation required.		
Survey Point Location	**Horizontal**	**Vertical**	
	N/A	N/A	
Accuracy Requirements (in feet)	**Horizontal**	**Vertical**	
		Orthometric	**Ellipsoidal**
	± 5 ft	± 10 ft	N/A
Resolution	**Geographic Coordinates**	**Distances and Elevations**	
	Five hundredth of arc second	Nearest foot	

Feature Attributes

Attribute (Datatype)	Description
name (VARCHAR2 (50))	Any commonly used name for the wetland.
description (VARCHAR2 (255))	A description of the wetland.
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
featureType (String 16)	A descriptor of how the wetland is depicted graphically.

- **How many survey locations are required for a 4-box PAPI?**

-18.5.10.19. PAPI



Accuracy Requirements (in feet)	Horizontal	Vertical	
		Orthometric	Ellipsoidal
	± 5 ft	± 10 ft	N/A
Resolution	Geographic Coordinates	Distances and Elevations	
	Hundredth of arc second	Nearest one foot	

Feature Attributes

Attribute (Datatype)	Description
name (VARCHAR2 (50))	Name of the feature
description (VARCHAR2 (255))	A description or other unique information concerning the subject item, limited to 255 characters.
faaFacilityId (String 4)	Enter the identifier. When reporting on a glide slope, enter the identifier of the associated localizer. Do not enter the prefix "I" for ILS or "M" used with the MLS systems. Where more than one ASR is in operation at the same location or at an associated location, these equipments will be identified with the letters A, B, C, etc., following the identification (e.g., NQIB). The same applies to PAR identifiers. These alpha codes must be the same as those used to accomplish the daily flight log. For ARSR facilities, use "Z" plus the identifier of the controlling ARTCC or military installation. Light systems will use the airport identifier and runway number. [Source:FAA Order 8250-42]
navaidEquipmentType (Enumeration: CodeNavaidequipmentType)	Specifies the type of NAVAID

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