Lateral Precision Performance with Vertical Guidance – An Airports Discussion

Federal Aviation Administration

Presented to: FAA Western Pacific Airports Conference

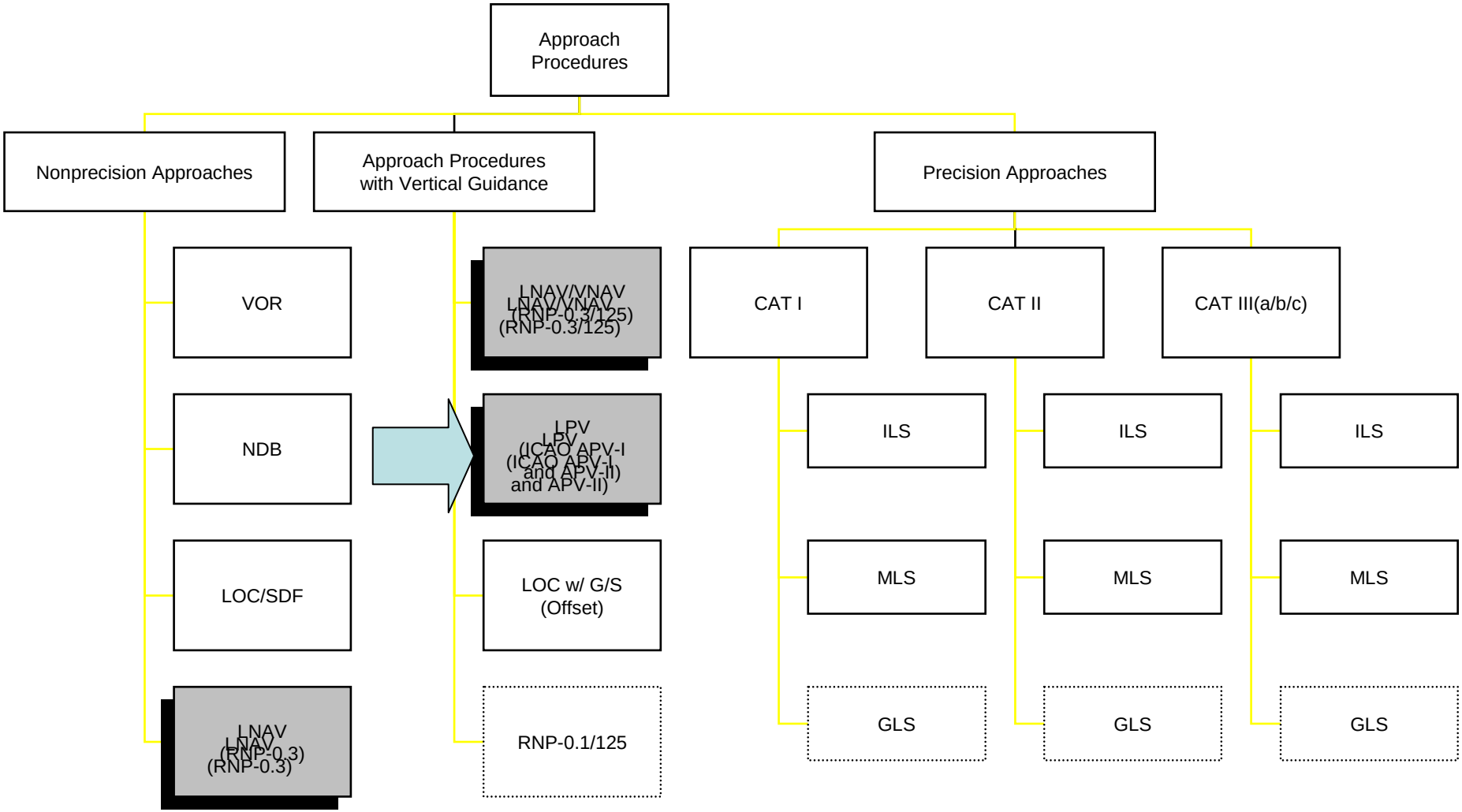
By: Edward N. Agnew, Manager,
Arkansas/Oklahoma Airports Development Office

Date: May 6, 2008

Briefing Objectives

- Background and Definitions
- Instrument Approaches: Past/Present/Future
- LPV at public airports – FAA Business Plan link
- How does my airport pursue LPV?
- Geometric Requirements/Survey Requirements
- Procedures/Guidance to assist airports
- Some initial “Lessons Learned”
- Questions

Classification/Naming Convention



A pilot waits for departure clearance from an Air Traffic Controller during Sun 'n Fun 2007. © Jon Ross / FAA

WARREN FOSTER *Supervisory Air Traffic Control Specialist, Air Traffic Organization, Western-Pacific Region* Warren, you suggested that we provide oversight on the quality of service on the Automated Flight Service Stations (AFSS), and your comment helped generate discussion with our senior executives. We agree with your suggestion and have added a new initiative to help us improve the quality of service. We will set quality standards and measure service received against these standards.

Initiatives

- Continue delivery of dependent surveillance to key sites. Provide text and graphical data through ... as Automa... ...nance-... ...on Service-..., and Flight Information Service Broadcast to the cockpit through flight information services. Increase situational awareness by improving the capabilities of small aircraft with integrated displays, data link, and traffic information.
- Develop and publish Wide Area Augmentation System (WAAS) approaches. In FY 2008, we will publish 300 WAAS approaches.
- Manage the Automated Flight Service Station (AFSS) contract to provide quality flight services to the contiguous United States, Puerto Rico, and Hawaii.

Strategy

Update and improve standard procedures and guidelines for general aviation operators.

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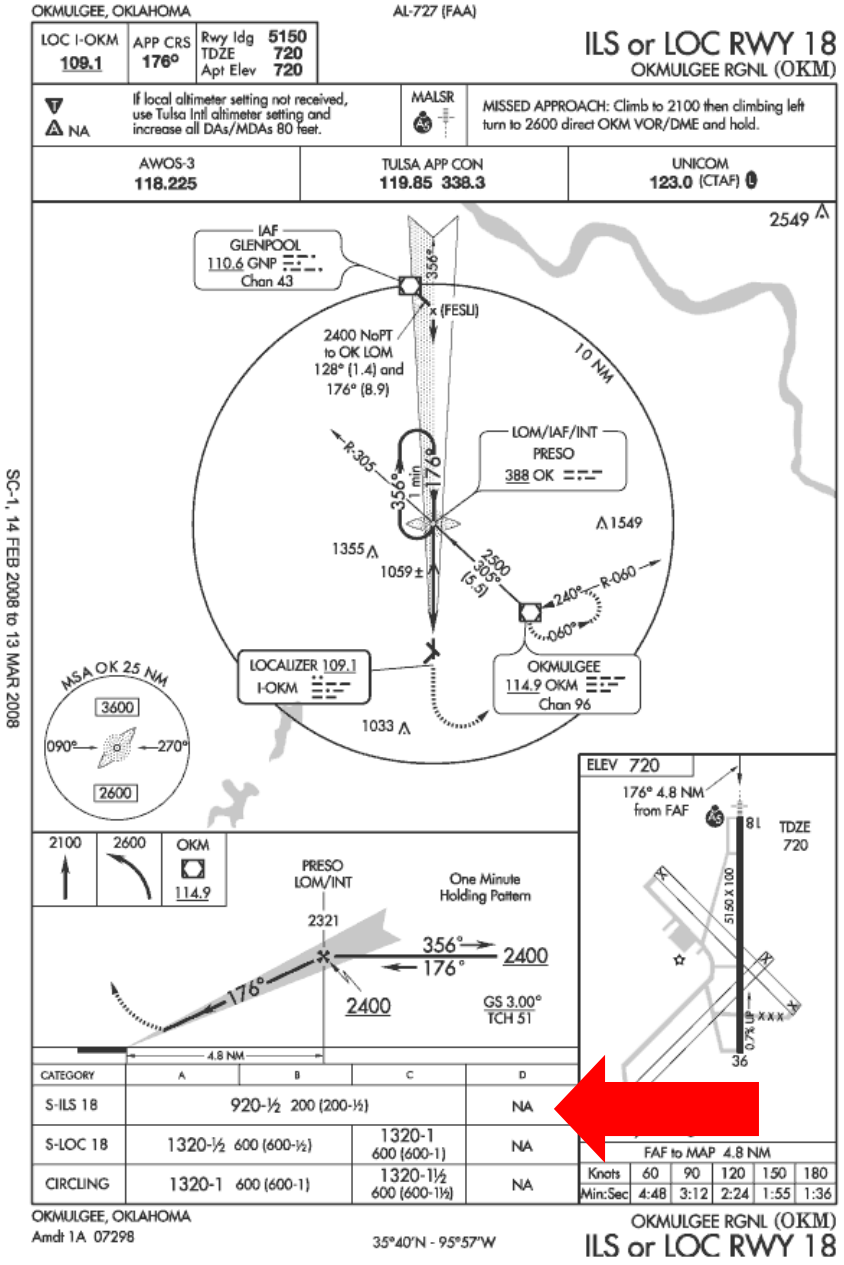
Definitions

- WAAS – Wide Area Augmentation System
- GPS – Global Positioning System
- RNAV – Area Navigation
- LNAV/VNAV – Lateral Navigation/Vertical Navigation
- LPV – Lateral Precision Performance with Vertical Guidance

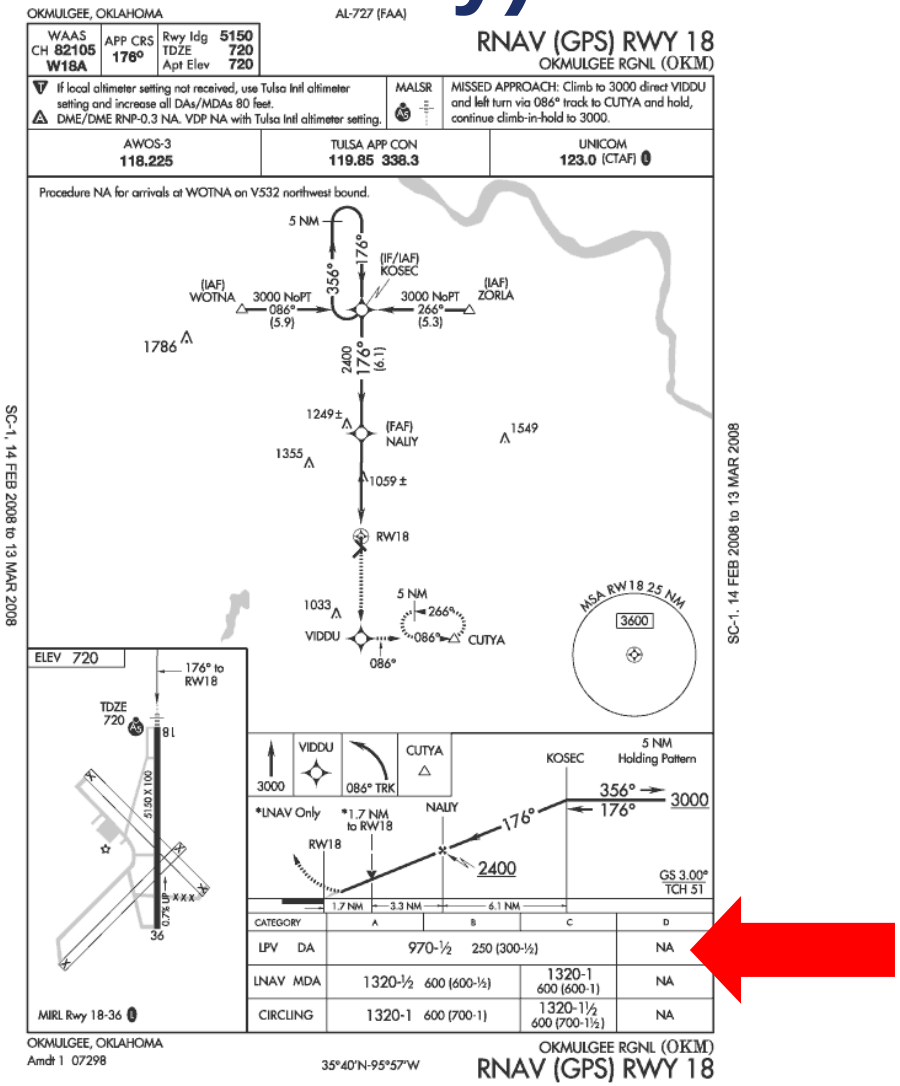
Airport Goal (Past)

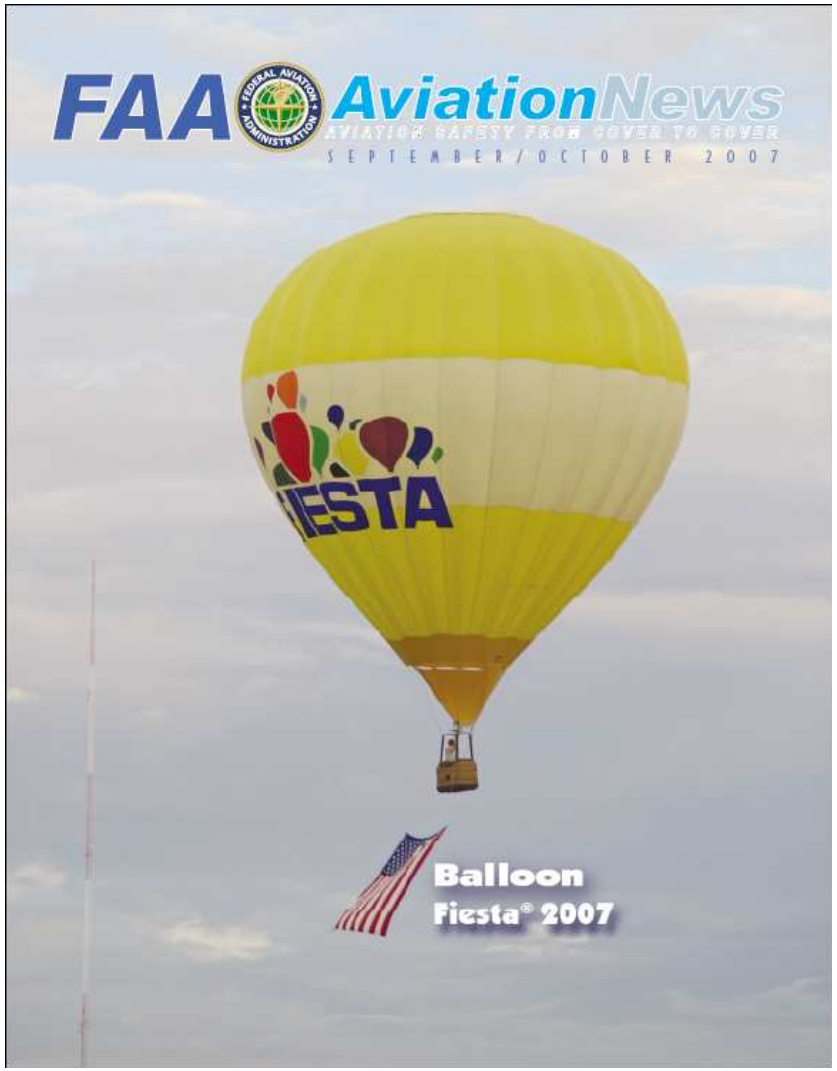
- **ILS Approach**
- **Ground Based Equip.**
  - Localizer antenna
  - Glide Slope antenna
  - Middle/Outer markers
  - Approach Lights (MALSR)
- **Standard Instrument Approach Plate**
- **Service**
  - ½ mile visibility minimum
  - 200’ ceiling



Airport Goal (Available today)

- **GPS Approach**
- **Satellite Based**
  - No ground based equip.
  - Approach Lights (MALSR)
- **Standard Instrument Approach Plate**
- **Service**
  - ½ mile visibility
  - 200 ft ceiling





HOW DO I GET A WAAS LPV APPROACH?

by the WAAS Operations Implementation Team

How does your airport get Wide Area Augmentation System (WAAS) instrument approach procedures? There are more than 950 WAAS LPV (localizer performance with vertical guidance) instrument approach procedures already published, and the Federal Aviation Administration (FAA) plans to publish at least 300 more each year for the next ten years. The FAA currently has more space-based LPV (localizer performance with vertical guidance) and LNAV (lateral navigation)/ VNAV (vertical navigation) vertically guided approaches than the total number of instrument landing systems (ILS). ILS and other ground-based navigational systems are limited resources, WAAS is not.

Airfields are normally compared to each other for new navigational aids based on weather patterns and traffic volume. These factors are part of the cost-benefit analysis used to determine which airports receive priority. Since WAAS doesn't require ground-based equipment, the FAA's intent is to publish WAAS approaches to all qualifying runways where an operational advantage can be gained. The reasons for the WAAS program are numerous, but the immediate payback is improved safety (provided by the vertical guidance) and improved airport access during low ceilings and visibility (provided by the improved GPS signal integrity). One long term objective is the cost avoidance of replacing worn out, ground-based navigational aids.

Before your airport requests an LPV approach, check to see if one already exists or is already in production. Many pilots have been surprised to learn that their airport already has WAAS approaches, since a majority of the WAAS LPV and LNAV/VNAV minima were incorporated in revisions of an existing area navigation or RNAV (GPS) procedure.

If there isn't an RNAV (GPS) approach chart with LPV minima for your airport, don't start the request process yet; there could be some LPV procedures already under development. The FAA's Aviation System Standards Web site, <http://avnweb.jccbi.gov/schedule/production>, has a search tool that can scan by airport, state, area, and even by type of procedure. Be sure to highlight "LPV" and "historical data" to learn what is available and what is in the production line.

If there isn't an LPV approach scheduled, talk with your airport manager(s). Management may already know about plans to develop LPVs to the airport. If the runway(s) qualify, the first step for airport management is to have an appropriate airport survey. An airport might have funded a survey, or received funding through a state aviation program, an airport improvement plan, or had a survey contracted by the FAA. If a survey does not exist, an airport can help speed the procedure development process by funding one. If the airport manager is unaware of any survey activity, the manager can talk to the local FAA airport district office (ADO) to find out the situation or status.

What is the minimum runway criterion for an LPV? The runway must be classified as Instrument Flight Rules (IFR), 3,200 feet long by 60 feet wide or larger, and have paved a surface. An IFR runway requires more than just the appropriate painting and signs. There are clear zones involved which affect the approach minima. The easiest way to know if a runway is classified as IFR is to check to see if an approach already exists. If uncertain, check with the airport manager. A Visual Flight Rules (VFR) runway might be able to be re-classified providing the airport can bring the runway into compliance with IFR requirements. Some airports are VFR because there wasn't a Navigational Aid nearby to provide an approach. GPS and WAAS provide nearly continuous coverage throughout North America which eliminates the lack of navigation signal problem.

Parallel taxiways are recommended to achieve the lowest approach minima. The lack of a parallel taxiway increases the lowest approach minimums the runway will support. Why? A parallel taxiway limits the time an aircraft occupies the runway, and increased visibility is required to determine if another aircraft is back taxiing. In addition, to best benefit the greatest number of pilots, the FAA focuses on airports with higher traffic volume, these airports usually have a parallel taxiway.

Requesting an LPV is the same process as requesting any other type of approach. If your runway qualifies, or could qualify, visit the FAA Web site for procedure development process <http://avn.faa.gov/index.asp?xml=ifp/index> and make your request on line: <http://avn.faa.gov/index.asp?xml=ifp/ifpform>.

As mentioned, having an appropriate airport survey is the key. The process is normally two years from contracting the survey to procedure development, if there are no other limiting factors. Airport managers work through the FAA's local ADO for most of their FAA interaction. Involving the ADO early in the planning stage helps smooth the LPV process. Be aware that any planned airport construction may delay the runway survey and subsequently the LPV procedure. Changing the size and location of a runway end will affect the instrument approach, and the FAA would rather wait and go through the process once, rather than twice.

Keep in mind that not all runway

•http://www.faa.gov/news/aviation_news/2007/media/SeptOct2007.pdf

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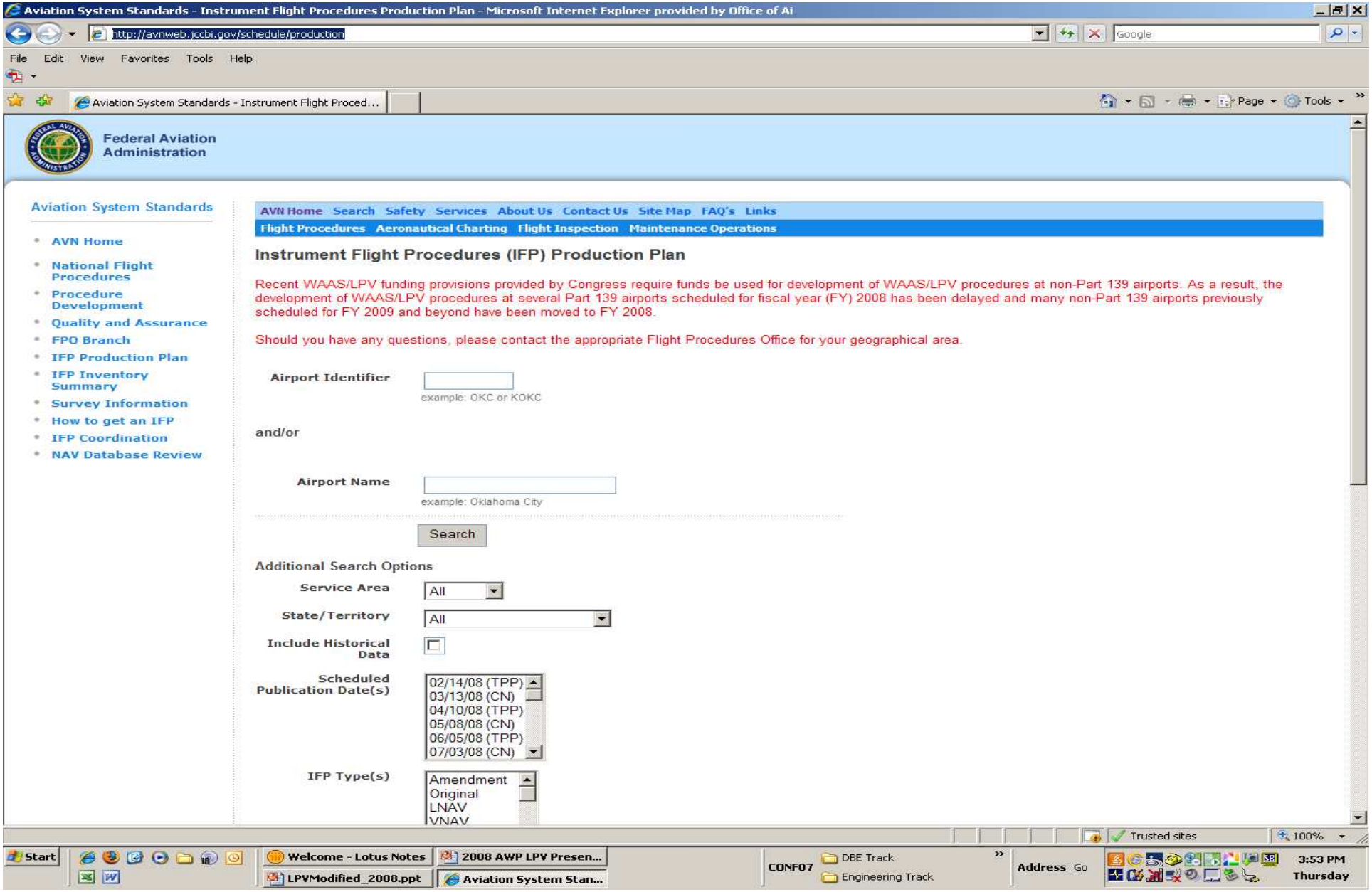
http://avnweb.jccbi.gov/schedule/production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Aviation System Standards
AVN Home
National Flight Procedures
Procedure Development
Quality and Assurance
FPO Branch
IFP Production Plan
IFP Inventory Summary
Survey Information
How to get an IFP
IFP Coordination
NAV Database Review
AVN Home Search Safety Services About Us Contact Us Site Map FAQ's Links
Flight Procedures Aeronautical Charting Flight Inspection Maintenance Operations
Instrument Flight Procedures (IFP) Production Plan
Recent WAAS/LPV funding provisions provided by Congress require funds be used for development of WAAS/LPV procedures at non-Part 139 airports. As a result, the development of WAAS/LPV procedures at several Part 139 airports scheduled for fiscal year (FY) 2008 has been delayed and many non-Part 139 airports previously scheduled for FY 2009 and beyond have been moved to FY 2008.
Should you have any questions, please contact the appropriate Flight Procedures Office for your geographical area.
Airport Identifier
example: OKC or KOKC
and/or
Airport Name
example: Oklahoma City
Search
Additional Search Options
Service Area
All
State/Territory
All
Include Historical Data
Scheduled Publication Date(s)
02/14/08 (TPP)
03/13/08 (CN)
04/10/08 (TPP)
05/08/08 (CN)
06/05/08 (TPP)
07/03/08 (CN)
IFP Type(s)
Amendment
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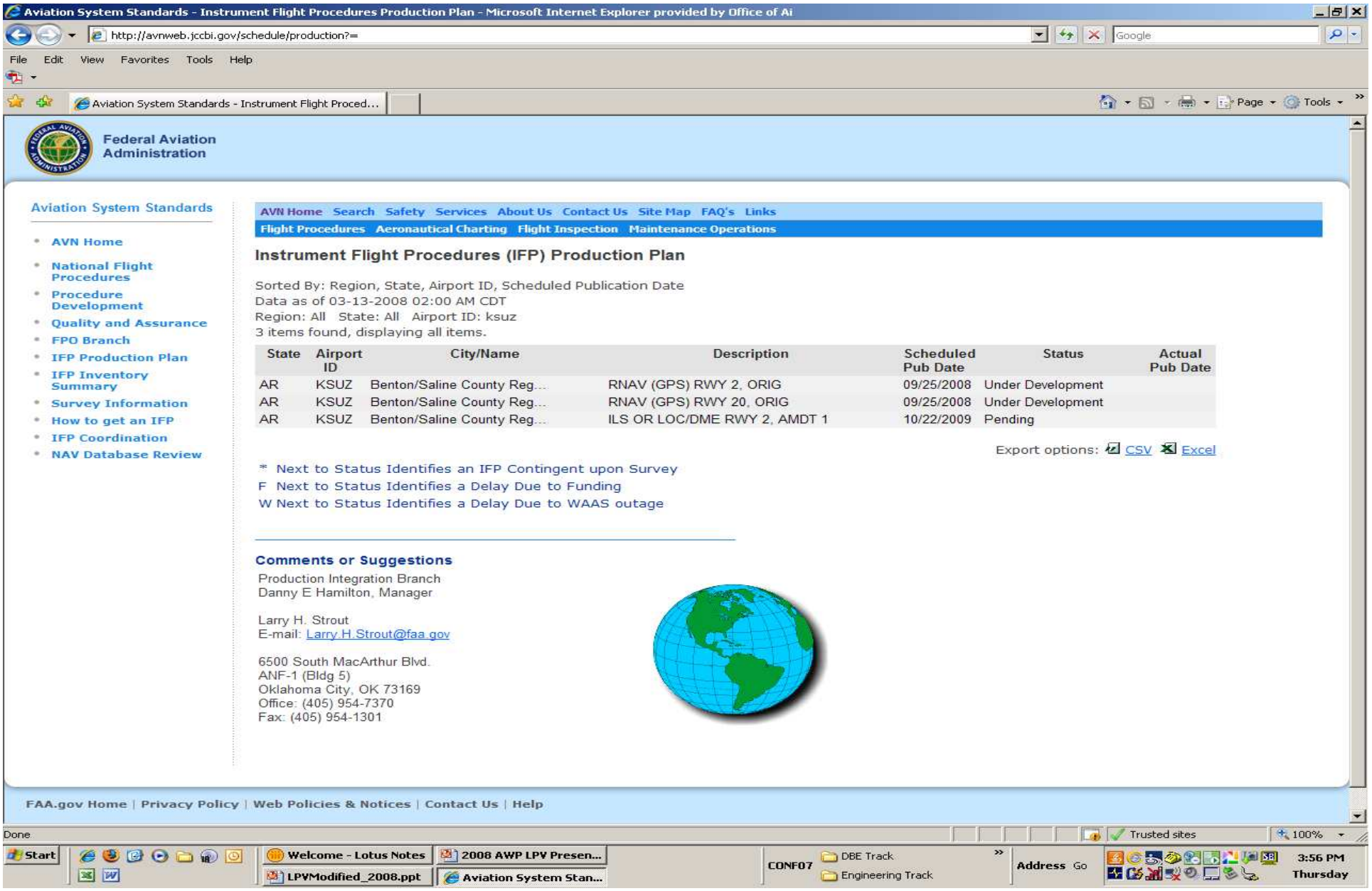
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How to get an IFP
IFP Coordination
NAV Database Review
AVN Home Search Safety Services About Us Contact Us Site Map FAQ's Links
Flight Procedures Aeronautical Charting Flight Inspection Maintenance Operations
Instrument Flight Procedures (IFP) Production Plan
Sorted By: Region, State, Airport ID, Scheduled Publication Date
Data as of 03-13-2008 02:00 AM CDT
Region: All State: All Airport ID: ksuz
3 items found, displaying all items.
State | Airport ID | City/Name | Description | Scheduled Pub Date | Status | Actual Pub Date
AR | KSUZ | Benton/Saline County Reg... | RNAV (GPS) RWY 2, ORIG | 09/25/2008 | Under Development
AR | KSUZ | Benton/Saline County Reg... | RNAV (GPS) RWY 20, ORIG | 09/25/2008 | Under Development
AR | KSUZ | Benton/Saline County Reg... | ILS OR LOC/DME RWY 2, AMDT 1 | 10/22/2009 | Pending
Export options: CSV Excel
* Next to Status Identifies an IFP Contingent upon Survey
F Next to Status Identifies a Delay Due to Funding
W Next to Status Identifies a Delay Due to WAAS outage
Comments or Suggestions
Production Integration Branch
Danny E Hamilton, Manager
Larry H. Strout
E-mail: Larry.H.Strout@faa.gov
6500 South MacArthur Blvd.
ANF-1 (Bldg 5)
Oklahoma City, OK 73169
Office: (405) 954-7370
Fax: (405) 954-1301
FAA.gov Home | Privacy Policy | Web Policies & Notices | Contact Us | Help
Done
Trusted sites
100%
Start
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LPVModified_2008.ppt
Aviation System Stan...
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Engineering Track
Address Go
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Thursday

How does an Airport Owner get started in LPV Planning?

Basic Questions for considering LPV:

- **Is your runway 3,200 ft long by 60 ft wide.**
- **Is your runway paved?**
- **Is your runway classified as an IFR runway?**
- **Does your runway have clear approaches on both ends?**

- **If you answered “YES” to the above questions, you satisfy the most basic fundamentals for an LPV approach.**

LPV Planning - Airports Geometric Criteria – Advisory Circular 150/5300-13

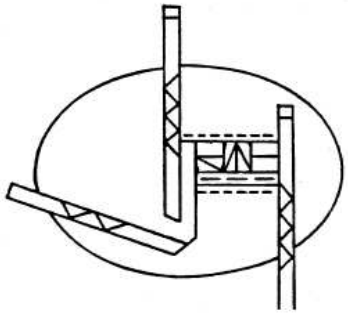
U.S. Department of Transportation
Federal Aviation Administration

AIRPORT DESIGN

/ INCORPORATES CHANGES 1 THRU 12 /

AC: 150/5300-13
Date: 9/29/89

Advisory Circular



Appendix 16. NEW INSTRUMENT APPROACH PROCEDURES

1. BACKGROUND. This appendix applies to the establishment of new authorized instrument approach procedures. For purposes of this appendix, an Instrument Approach Procedure (IAP) amendment or the establishment of a Global Positioning System (GPS) instrument procedure "overlaying" an existing authorized instrument procedure does not constitute a new procedure. However, a significant reduction in minima (i.e. ¼ mile reduction in visibility and/or 50 foot reduction in decision altitude or minimum descent altitude) would constitute a new procedure.

a. This appendix identifies airport landing surface requirements to assist airport sponsors in their evaluation and preparation of the airport landing surface to support new instrument approach procedures. It also lists the airport data provided by the procedure sponsor that the FAA needs to conduct the airport airspace analysis specified in FAA Order 7400.2, *Procedures for Handling Airspace Matters*. The airport must be acceptable for IFR operations based on an Airport Airspace Analysis (AAA), under FAA Order 7400.2.

b. FAA Order 8260, *TERPS*, reflects the contents of this appendix as the minimum airport landing surface requirements that must be met prior to the establishment of instrument approach procedures at a public use airport. This order also references other FAA requirements, such as a safety analysis to determine the need for approach lighting and other visual enhancements to mitigate the effects of a difficult approach environment. This is a consideration regardless of whether or not a reduction in approach minimums is desired. Airport sponsors are always encouraged to consider an approach lighting system to enhance the safety of an instrument procedure. In the absence of any identified benefits or safety enhancement from an approach light system, sponsors should at least consider installing lower cost visual guidance aids such as REIL or PAPI.

c. The tables provided in this appendix are for planning purposes only and should be used in conjunction with the rest of the document. All pertinent requirements within this AC and other FAA documents, as well as local siting conditions, ultimately will determine the lowest minimums obtainable.

2. INTRODUCTION. To be authorized a new instrument approach procedure, the runway must have an instrument runway designation. Instrument runways are runway end specific. The runway end designation is based on the findings of an AAA study (Refer to Order 7400.2). In addition, the instrument runway designation for the desired minimums must be depicted on the FAA-approved ALP. If not depicted, a change to the ALP is required. As part of the ALP approval process, the FAA will conduct an AAA study to determine the runway's acceptability for the desired minimums.

3. ACTION. The airport landing surface must meet the standards specified in tables A16-1 A through C, for each specified runway, direction and have adequate airspace to support the instrument approach procedure. When requesting an instrument procedure, the sponsor must specify the runway direction, the desired approach minimums, whether circling approach procedures are desired, and the survey needed to support the procedure. For all obligated National Plan of Integrated Airport Systems (NPIAS) airports, the sponsor must also provide a copy of the FAA-approved ALP showing the instrument procedure(s) requested. An ALP is also recommended for all other airports.

4. DEFINITIONS.

a. Precision Approach. An instrument approach procedure providing course and vertical path guidance conforming to ILS, or MLS, precision system performance standards contained in ICAO annex 10. Table A16-1A defines the requirements for ILS, LAAS, WAAS, MLS, and other precision systems.

b. Approach Procedure with Vertical Guidance (APV). An instrument approach procedure providing course and vertical path guidance that does not conform to ILS or MLS system performance standards contained in ICAO annex 10, or a precision approach system that does not meet TERPS alignment criteria. Table A16-1B defines the requirements for WAAS and authorized barometric VNAV.

c. Nonprecision Approach. An instrument approach procedure providing course guidance without vertical path guidance. Table A16-1C defines the requirements for VOR, NDB, LDA, GPS (TSO-129) or other authorized RNAV system.

5. AIRPORT AIRSPACE ANALYSIS SURVEYS.

a. Use the standards identified in ACs 150/5300-16, 1505300-17, and 150/5300-18 to survey and compile the appropriate data to support the development of instrument procedures.

b. When the runway has or is planned to have an approach that has vertical guidance (ILS, MLS or PAR, APV, LPV, RNP, TLS, LNAV/VNAV, etc.), use the Vertically Guided Airport Airspace Analysis Survey criteria in AC 150/5300-18.

c. When the runway has or is planned to have an approach without vertical guidance (VOR, VOR/DME, TACAN, NDB, LNAV, LP, etc.), use the Non-Vertically Guided Airport Airspace Analysis Survey criteria in AC 150/5300-18.

Airports Geometric Criteria - LPV

- **Table A16-1B applies to LPV**

Table A16-1B. Approach Procedure With Vertical Guidance (APV-RNP)

Approach Requirements				
Visibility Minimums[1]	< 3/4-statute mile	< 1-statute mile	1-statute mile	>1-statute mile[14]
Height Above Touchdown (HAT)[2]	250	300	350	400
TERPS Glidepath Qualification Surface (GQS)[3]	Table A2-1, Row 7, Criteria, and Appendix 2, par. 5a Clear			
TERPS Paragraph 251	34:1 clear	20:1 clear	20:1 clear, or penetrations lighted for night minimums (See AC 70/7460-1)	
Precision Obstacle Free Zone (POFZ) 200 x 800[4]	Required	Recommended		
Airport Layout Plan[5]	Required			
Minimum Runway Length	4,200 ft (1,280 m) (Paved)	3,200 ft (975 m)[6] (Paved)	3,200 ft (975 m)[6,7]	
Runway Markings (See AC 150/5340-1)	Precision	Nonprecision *(precision recommended)*	Nonprecision*	
Holding Position Signs & Markings (See AC 150/5340-1 and AC 150/5340-18)	Precision	Nonprecision *(precision recommended)*	Nonprecision*	
Runway Edge Lights[8]	HIRL / MIRL		MIRL/LIRL	
Parallel Taxiway [9]	Required		Recommended	
Approach Lights[10]	*Required*[11]		Recommended	
Runway Design Standards; e.g., Obstacle Free Zone (OFZ) [12]	<3/4-statute mile approach visibility minimums	≥ 3/4-statute mile approach visibility minimums		
Threshold Siting Criteria To Be Met [13]	Table A2-1, Row 4 and 9, Criteria		Appendix 2, Table A2-1, Lines 4 and 8, Criteria	
Survey Required for Lowest Minima	Vertically Guided Airport Airspace Analysis Survey			

1. Visibility minimums are subject to the application of FAA Order 8260.3 (TERPS) and associated orders or this table, whichever is higher.
2. The HAT indicated is for planning purposes only. Actual obtainable HAT is determined by TERPS.
3. The GQS is applicable to approach procedures providing vertical path guidance. It limits the magnitude of penetration of the obstruction clearance surfaces overlying the final approach course. The intent is to provide a descent path from DA to landing free of obstructions that could destabilize the established glidepath angle. The GQS is centered on a course from the DA point to the runway threshold. Its width is equal to the precision "W" surface at DA, and tapers uniformly to a width 100 feet from the runway edges. If the GQS is penetrated, vertical guidance instrument approach procedures (ILS/MLS/WAAS/LAAS/Baro-VNAV) are not authorized.
4. This is a new airport surface (see paragraph 306).
5. An ALP is only required for obligated airports in the NPIAS; it is recommended for all others.
6. Runways less than 3,200 feet are protected by 14 CFR Part 77 to a lesser extent (77.23(a)(2) is not applicable for runways less than 3,200 feet). However runways as short as 2400 feet could support an instrument approach provided the lowest HAT is based on clearing any 200-foot obstacle within the final approach segment.
7. Unpaved runways require case-by-case evaluation by regional Flight Standards personnel.
8. Runway edge lighting is required for night minimums. High intensity lights are required for RVR-based minimums.
9. A parallel taxiway must lead to the threshold and, with airplanes on centerline, keep the airplanes outside the OFZ.
10. To achieve lower visibility minimums based on credit for lighting, a TERPS specified approach light system is required.
11. ODALS, MALS, SSALS are acceptable. For LPV based minima approach lights are recommended not required.
12. Indicates what chart should be followed in the related chapters in this document.
13. Circling procedures to a secondary runway from the primary approach will not be authorized when the secondary runway does not meet threshold siting (reference Appendix 2), OFZ (reference paragraph 306) and TERPS paragraph 251 criteria.
14. For circling requirements, see Table 16-1C.

Table A16-1B. Approach Procedure With Vertical Guidance (APV-RNP) Approach Requirements

Visibility Minimums[1]	< 3/4-statute mile	< 1-statute mile	1-statute mile	>1-statute mile[14]
Height Above Touchdown (HAT)[2]	250	300	350	400
TERPS Glidepath Qualification Surface (GQS)[3]	Table A2-1, Row 7, Criteria, and Appendix 2, par. 5a Clear			
TERPS Paragraph 251	34:1 clear	20:1 clear	20:1 clear, or penetrations lighted for night minimums (See AC 70/7460-1)	
Precision Obstacle Free Zone (POFZ) 200 x 800[4]	Required	Recommended		
Airport Layout Plan[5]	Required			
Minimum Runway Length	4,200 ft (1,280 m) (Paved)	3,200 ft (975 m)[6] (Paved)	3,200 ft (975 m)[6,7]	
Runway Markings (See AC 150/5340-1)	Nonprecision (Precision Recommended)		Nonprecision[7]	
Holding Position Signs & Markings (See AC 150/5340-1 and AC 150/5340-18)	Nonprecision *(Precision Recommended)*		Nonprecision[7]	
Runway Edge Lights[8]	HIRL / MIRL		MIRL/LIRL	
Parallel Taxiway [9]	Required		Recommended	
Approach Lights[10]	*Required*[11]		Recommended	
Runway Design Standards; e.g., Obstacle Free Zone (OFZ) [12]	APV OFZ Required			
Threshold Siting Criteria To Be Met [13]	Table A2-1, Row 4 and 9, Criteria		Appendix 2, Table A2-1, Lines 4 and 8, Criteria	
Survey Required for Lowest Minima	Table A16-2, Row 6, Criteria			

Closer Examination of Appendix 16 Criteria

- **Parallel Taxiways**
- **Obstruction in the Approach**
- **Runway Obstruction Surveys**

Parallel and Entrance Taxiway Criteria

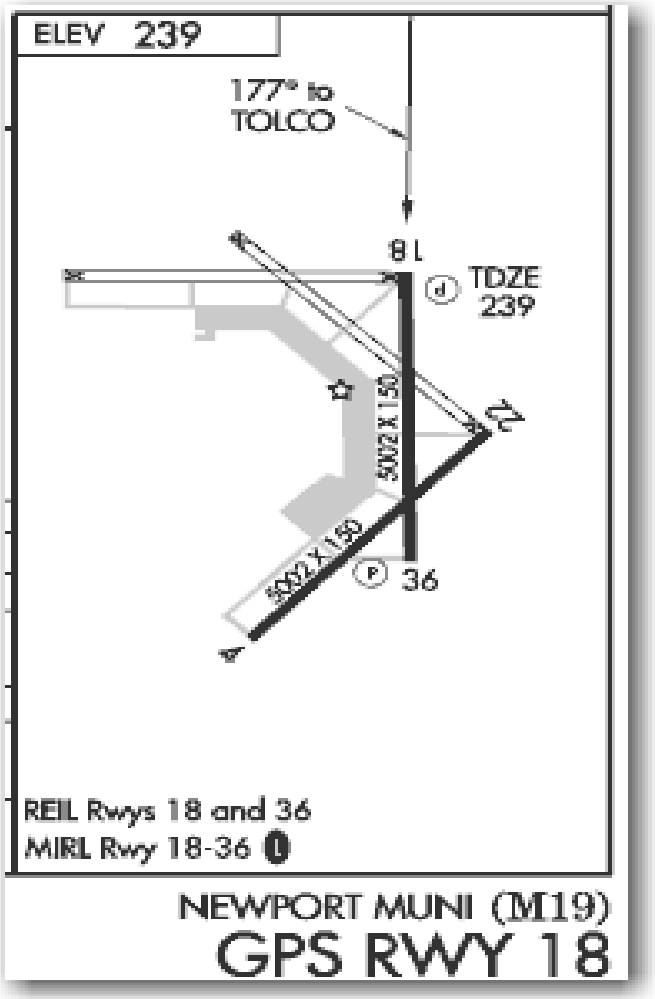
"A parallel taxiway must lead to the threshold and, with airplanes on centerline, must keep the airplanes outside the OFZ."

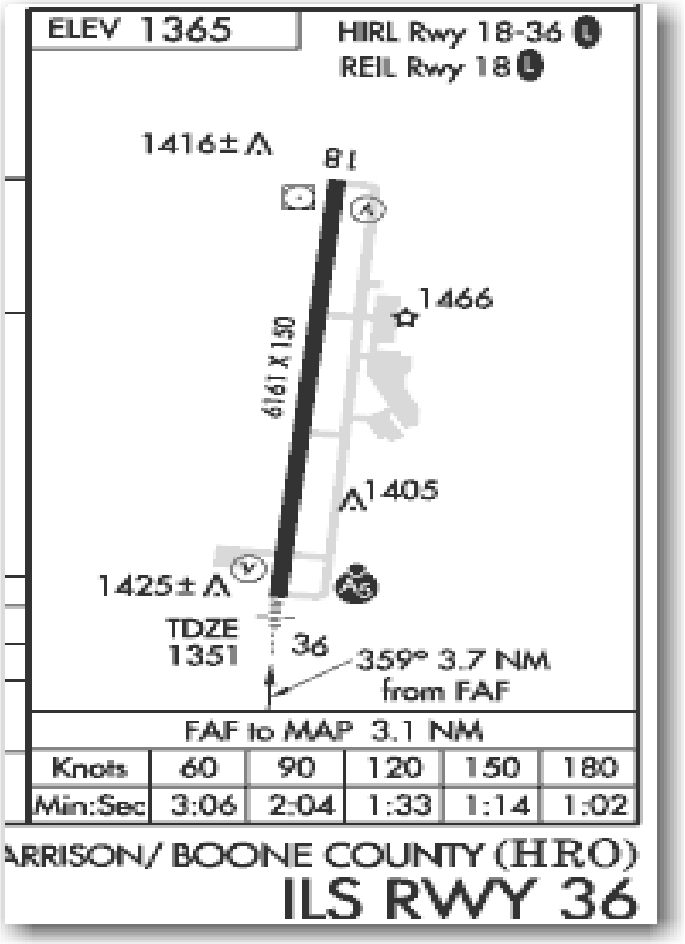
FAA AC 150/5300-13, Appendix 16, Table A16-1B, Note 9

"…normally in the form of an "L" taxiway intersection with a right angle connection to the runway."

FAA AC 150/5300-13, Chapter 4, Para. 407.a.

Parallel Taxiway Geometry



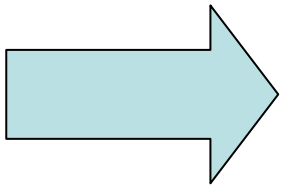


TERPS Procedures and Development

- "The runway landing surfaces must be adequate to accommodate the aircraft that can be reasonably expected to use the procedure. Appropriate runway markings, hold position markings and signs required by AC 150/5340-1 shall be in place, and runway design standards in 150/5300-13 Appendix 16 must be met."

Reference: FAA Order 8260.3B, Vol. 1, Para. 122.a.

Survey Requirements



5. AIRPORT AIRSPACE ANALYSIS SURVEYS.

a. Use the standards identified in ACs 150/5300-16, 1505300-17, and 150/5300-18 to survey and compile the appropriate data to support the development of instrument procedures.

b. When the runway has or is planned to have an approach that has vertical guidance (ILS, MLS or PAR, APV, LPV, RNP, TLS, LNAV/VNAV, etc.), use the Vertically Guided Airport Airspace Analysis Survey criteria in AC 150/5300-18.

c. When the runway has or is planned to have an approach without vertical guidance (VOR, VOR/DME, TACAN, NDB, LNAV, LP, etc.), use the Non-Vertically Guided Airport Airspace Analysis Survey criteria in AC 150/5300-18.

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FAA AC 150/5300-13, Appendix 16, Paragraph 5

Survey Guidance

- AC 150/5300-16, General Guidance and Specifications for Aeronautical Surveys
- AC 150/5300-17, Airport Imagery Acquisition & Submission to NGS
- AC 150/5300-18, Submission of Aeronautical Surveys to NGS

Survey Guidance

- AC 150/5300-16
  - Locating and establishing monuments (PACS and SACS)
  - Project Surveying Plans and Quality Control Plans for Surveyors
- AC 150/5300-17
  - Details for Remote Imagery Acquisition (Aerial Photography)
  - Providing Aerial Photo to NGS for Quality Assurance
  - Data formats
- AC 150/5300-18
  - Discussion of remotely senses (aerial photo) and field survey methods
  - Data to be collected; areas/slopes of Obstruction Identification Surfaces
  - Aeronautical Data Collection & Analysis Tool (ADCAT)

Threshold Siting Surface

Table A2-1. Approach/Departure Requirements Table

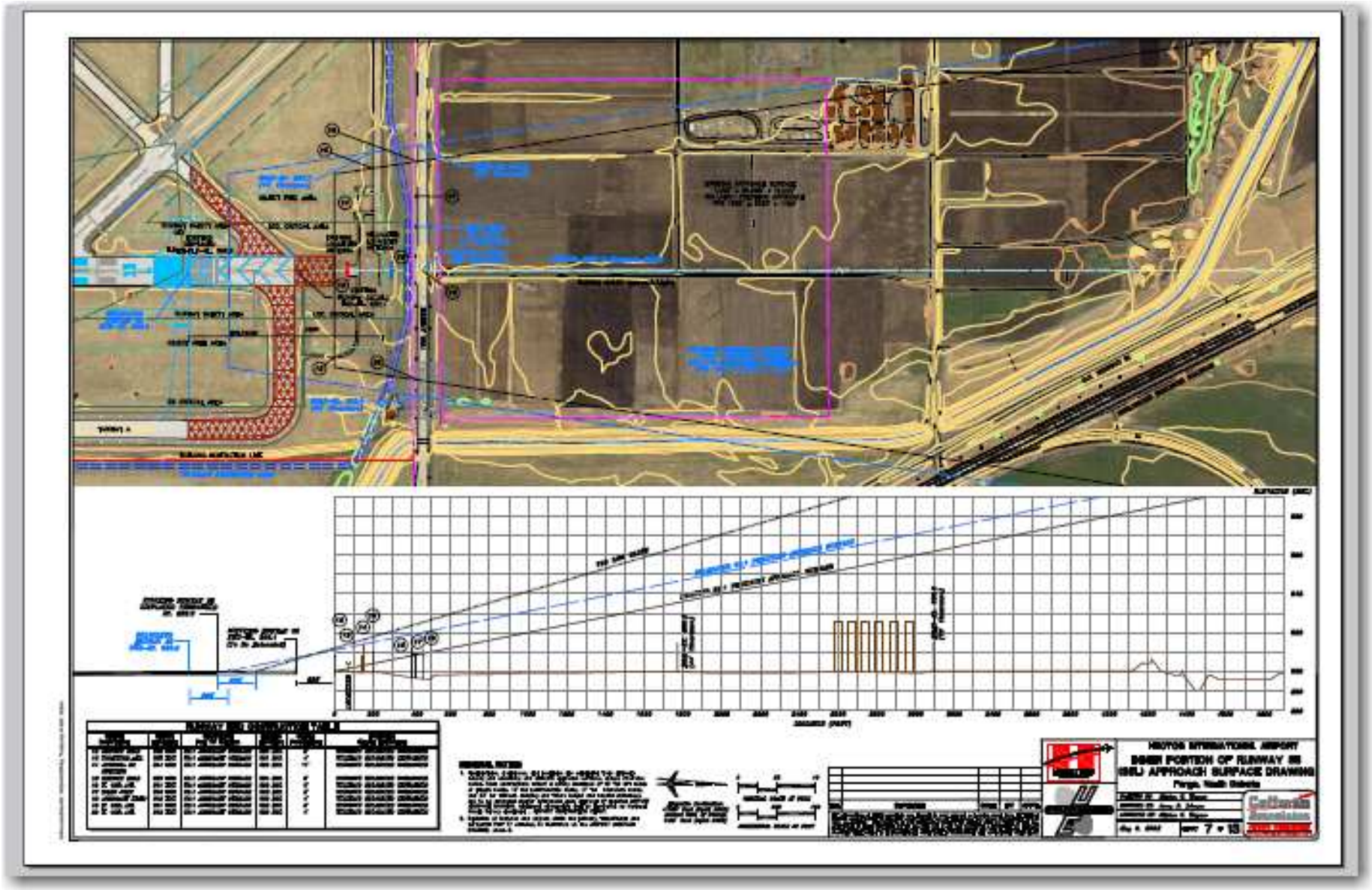
	Runway Type	DIMENSIONAL STANDARDS* Feet					Slope/ OCS
		A	B	C	D	E	
1	Approach end of runways expected to serve small airplanes with approach speeds less than 50 knots. (Visual runways only, day/night)	0	60	150	500	2,500	15:1
2	Approach end of runways expected to serve small airplanes with approach speeds of 50 knots or more. (Visual runways only, day/night)	0	125	350	2,250	2,750	20:1
3	Approach end of runways expected to serve large airplanes (Visual day/night); or instrument minimums ≥ 1 statute mile (day only).	0	200	500	1,500	8,500	20:1
4	Approach end of runways expected to support instrument night circling. [1]	200	200	1,700	10,000	0	20:1
5	Approach end of runways expected to support instrument straight in night operations, serving approach category A and B aircraft only. [1]	200	200	1,900	10,000 [2]	0	20:1
6	Approach end of runways expected to support instrument straight in night operations serving greater than approach category B aircraft. [1]	200	400	1,900	10,000 [2]	0	20:1
7 [3, 6, 7, 8]	Approach end of runways expected to accommodate approaches with positive vertical guidance (GQS).	0	½ width runway + 100	760	10,000 [2]	0	30:1
8	Approach end of runways expected to accommodate instrument approaches having visibility minimums ≥ 3/4 but < 1 statute mile, day or night.	200	400	1,900	10,000 [2]	0	20:1
9	Approach end of runways expected to accommodate instrument approaches having visibility minimums < 3/4 statute mile or precision approach (ILS, GLS, or MLS), day or night.	200	400	1,900	10,000 [2]	0	34:1

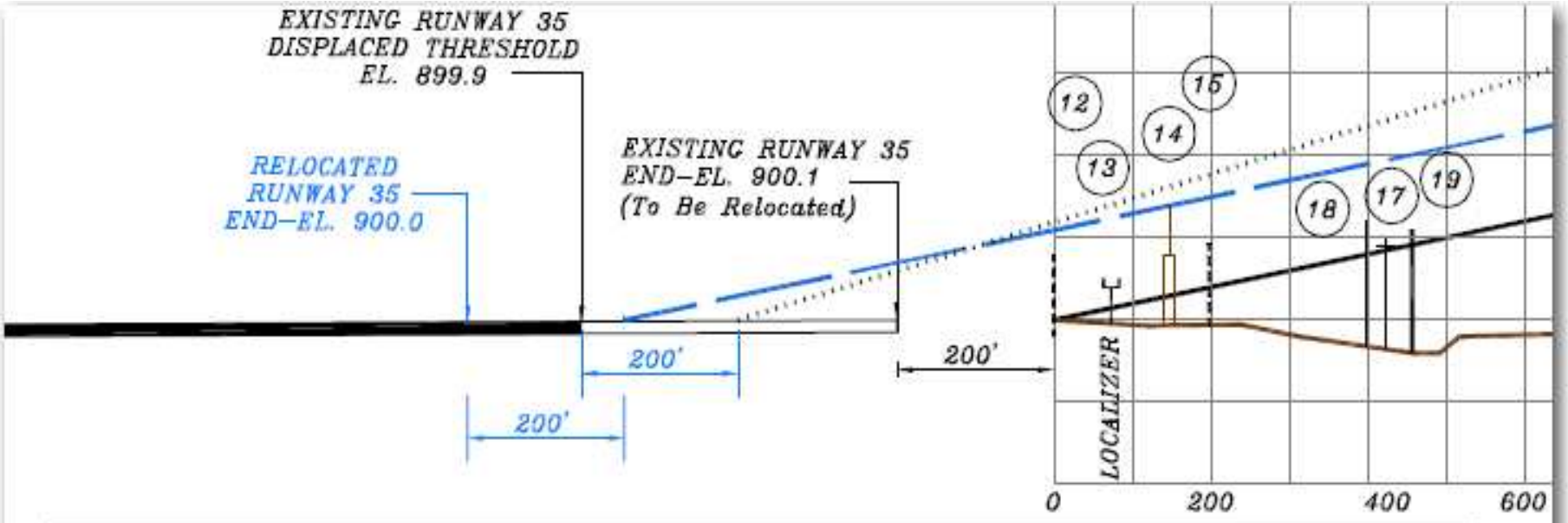
FAA AC 150/5300-13, Appendix 2, Table A2-1

Threshold Siting Surface Considerations

Possible Actions if objects bust TSS

- Object is removed or lowered
- Displace threshold with a resulting shorter landing distance
- Modify GPA and/or TCH
- Visibility minimums raised
- Night operations prohibited unless obstruction is lighted or VGSI is used





RUNWAY END OBSTRUCTION TABLE

Object Description	Object Elevation	Obstructed Part 77 Surface	Surface Elevation	Object Penetration	Proposed Object Disposition
12 SERVICE ROAD	908 MSL	50:1 APPROACH SURFACE	900 MSL	8'	ULTIMATE RELOCATED THRESHOLD
13 LOCALIZER ANT.	905 MSL	50:1 APPROACH SURFACE	901 MSL	4'	ULTIMATE RELOCATED THRESHOLD
14 ANTENNA ON BUILDING	914 MSL	50:1 APPROACH SURFACE	900 MSL	11'	ULTIMATE RELOCATED THRESHOLD
15 SERVICE ROAD	909 MSL	50:1 APPROACH SURFACE	904 MSL	5'	ULTIMATE RELOCATED THRESHOLD
16 N. 19th AVE.	911 MSL	50:1 APPROACH SURFACE	908 MSL	3'	ULTIMATE RELOCATED THRESHOLD
17 LIGHT POLE	910 MSL	50:1 APPROACH SURFACE	908 MSL	2'	ULTIMATE RELOCATED THRESHOLD
18 APPROACH LIGHT	912 MSL	50:1 APPROACH SURFACE	908 MSL	4'	ULTIMATE RELOCATED THRESHOLD
19 N. 19th AVE.	911 MSL	50:1 APPROACH SURFACE	908 MSL	3'	ULTIMATE RELOCATED THRESHOLD
20 N. 19th AVE.	912 MSL	50:1 APPROACH SURFACE	908 MSL	4'	ULTIMATE RELOCATED THRESHOLD

Flight Procedures Evaluation includes:

- Glide Path Qualification Surface (GQS)
- TERPS Paragraph 251
- Threshold Siting Criteria

Definitions surrounding Flight Procedures Review

1.4.15 Obstacle Clearance Surface (OCS).

The OCS is an inclined surface conforming to the lateral dimensions of the obstacle evaluation area. An OCS is normally associated with evaluation of 3-D final segments or missed approach/departure climb segments.

1.4.16 Obstacle Evaluation Area (OEA).

The OEA is an area within which obstructions are evaluated by application of the ROC, OCS, or OIS to achieve appropriate vertical clearance. The OEA conforms to the lateral RNP segment width limits.

1.4.17 Obstacle Identification Surface (OIS).

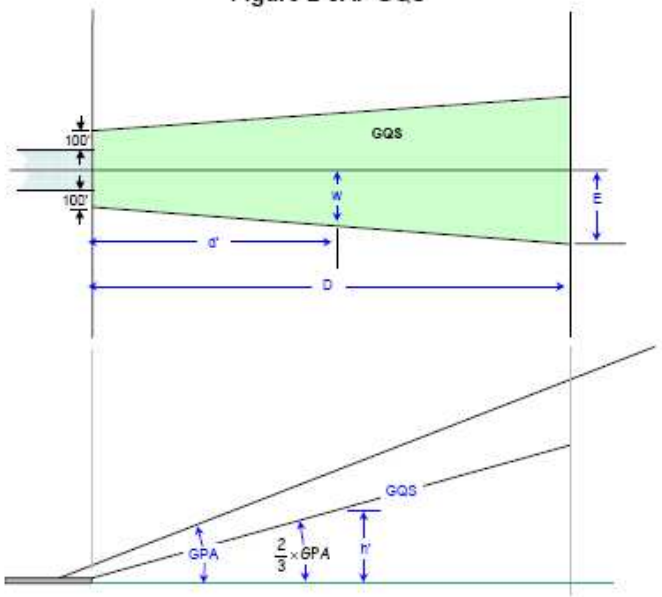
The OIS is an inclined surface conforming to the lateral dimensions of the OEA used for identification of obstacles that may require mitigation to maintain the required level of safety for the applicable segment. An OIS is normally associated with the visual portion of the FAS.

2.12 GLIDEPATH QUALIFICATION SURFACE (GQS)

The GQS extends from the runway threshold along the runway centerline extended to the DA point. It limits the height of obstructions between DA and RWT. When obstructions exceed the height of the GQS, an approach procedure with positive vertical guidance (ILS, MLS, TLS, GLS, VNAV, etc.) is not authorized (see figures 2-5A and 2-5B).

Glidepath Qualification Surface

Figure 2-5A. GQS



Calculate the half-width of the GQS (E) from the runway centerline extended at the DA point using the following formula:

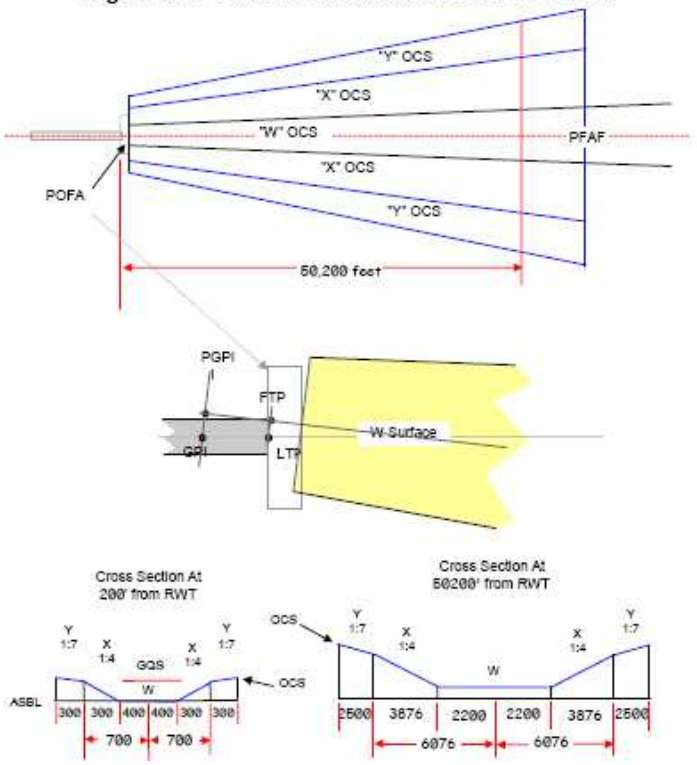
$$E = 0.036(D - 200) + 400$$

Where: D=the distance (ft) measured along RCL extended from RWT to the DA point
E=GQS half-width (ft) at DA

FAAO 8260.3B, Vol. 3, Para. 2-12.1

GQS overlies the "W" OCS

Figure 3-1. Precision Obstacle Clearance Areas



FAAO 8260.3B, Vol. 3, Fig. 3-1

TERPS PARAGRAPH 251
(VISUAL PORTION OF FINAL APPROACH SEGMENT)

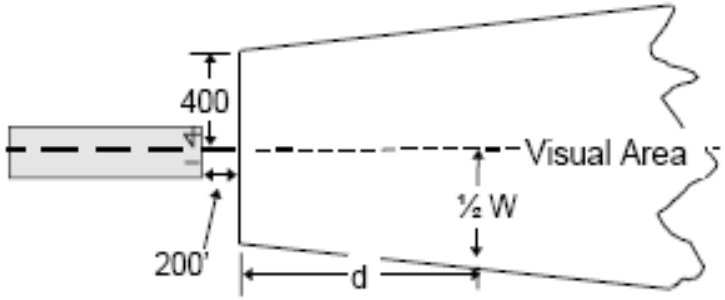


Figure 14-6 VISUAL AREA ORIGIN, Par 251a(2).

b. Obstacle Clearance. Two obstacle identification surfaces (OIS) overlie the visual area with slopes of 20:1 and 34:1, respectively. When evaluating a runway for circling, apply the 20:1 surface. When evaluating a runway for an approach procedure satisfying straight-in alignment criteria, apply the 20:1 and 34:1 surfaces. Calculate the surface height above threshold at any distance "d" from an extension of the area origin line using the following formulae:

$$20{:}1 \text{ Surface Height} = \frac{d}{20}$$

$$34{:}1 \text{ Surface Height} = \frac{d}{34}$$

(1) If the 34:1 surface is penetrated, take **ONE** of the following actions:

(a) Adjust the obstacle height below the surface or remove the penetrating obstacles.

(b) Limit minimum visibility to ¾ mile.

(2) In addition to the 34:1 evaluation, if the straight-in runway's 20:1 surface is penetrated, take **ONE** of the following actions:

(a) Adjust the obstacle height below the surface or remove the penetrating obstacles.

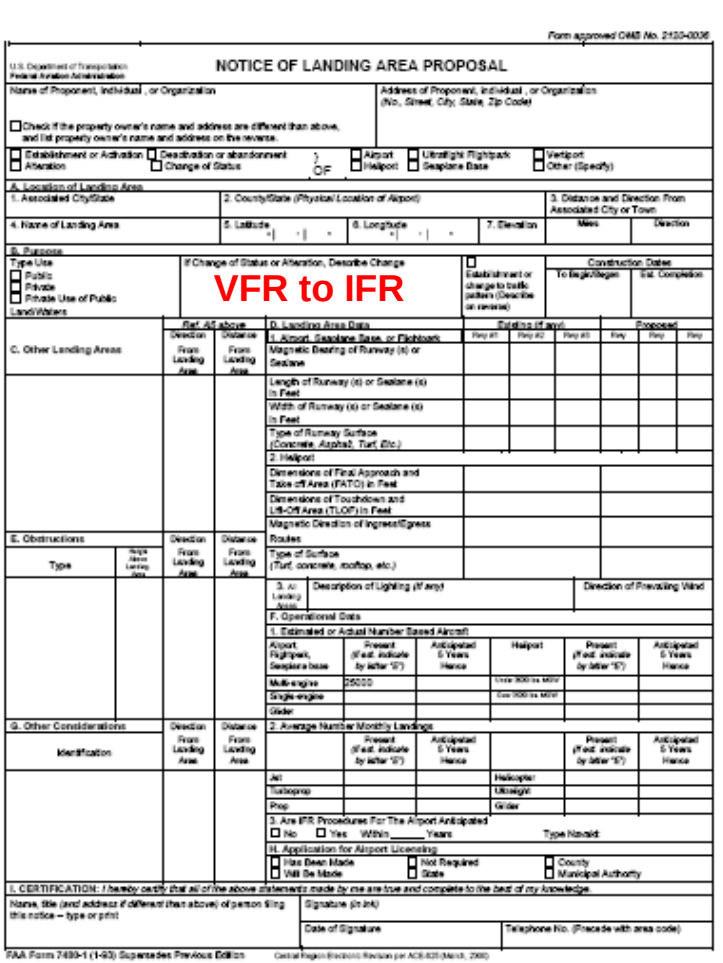
FAAO 8260.3B, Vol. 1, Para. 251

Recap of Steps for Securing an LPV approach

- **Consider the benefits of LPV to your airport**
- **Review your FAR Part 77 surfaces, your airport layout plan, your airport master plan, your airport zoning, your airport land interests (on and off the airport)**
- **Assess service levels with your current and planned airport infrastructure (AC 150/5300-13, Appendix 16)**
- **If feasible, secure "Instrument Runway" status for the runway(s).**
- **Develop plans to conduct an aeronautical survey for the airport ($30-50K)**
- **Formally request the LPV once the survey has been validated**
- **Monitor progress of LPV development**

Changing Runway from VFR to IFR

- **The Airport Owner submits the request for IFR runway**
- **FAA will conduct an aeronautical study and issue a determination to you.**
- **Next Step: Request an instrument procedure so that it can be considered by the Regional Airspace Procedures Team**



Form approved OMB No. 2120-0036

U.S. Department of Transportation
Federal Aviation Administration

NOTICE OF LANDING AREA PROPOSAL

Name of Proponent, Individual , or Organization

Address of Proponent, Individual , or Organization (No., Street, City, State, Zip Code)

☐ Check if the property owner's name and address are different than above, and list property owner's name and address on the reverse.

☐ Establishment or Activation ☐ Deactivation or abandonment ☐ Alteration ☐ Change of Status } OF ☐ Airport ☐ Heliport ☐ Ultralight Flightpark ☐ Seaplane Base ☐ Vertiport ☐ Other (Specify)

A. Location of Landing Area

1. Associated City/State | 2. County/State (Physical Location of Airport) | 3. Distance and Direction From Associated City or Town

4. Name of Landing Area | 5. Latitude | 6. Longitude | 7. Elevation | Miles | Direction

B. Purpose

Type Use ☐ Public ☐ Private ☐ Private Use of Public Land/Waters

If Change of Status or Alteration, Describe Change

VFR to IFR

☐ Establishment or change to traffic pattern (Describe on reverse) | Construction Dates: To Begin/Regin | Est. Completion

C. Other Landing Areas | Ref. All above: Direction From Landing Area | Distance From Landing Area

D. Landing Area Data | Existing (if any) | Proposed

1. Airport, Seaplane Base, or Flightpark

Magnetic Bearing of Runway (s) or Seaplane

Length of Runway (s) or Seaplane (s) in Feet

Width of Runway (s) or Seaplane (s) in Feet

Type of Runway Surface (Concrete, Asphalt, Turf, Etc.)

2. Heliport

Dimensions of Final Approach and Take-off Area (FATO) in Feet

Dimensions of Touchdown and Lift-Off Area (TLOF) in Feet

Magnetic Direction of Ingress/Egress Routes

E. Obstructions | Direction From Landing Area | Distance From Landing Area

Type | Height Above Landing Area

Type of Surface (Turf, concrete, rooftop, etc.)

3. (s) Landing Area(s) | Description of Lighting (if any) | Direction of Prevailing Wind

F. Operational Data

1. Estimated or Actual Number Based Aircraft

Airport, Flightpark, Seaplane base	Present (If est. indicate by letter "E")	Anticipated 5 Years Hence	Heliport	Present (If est. indicate by letter "E")	Anticipated 5 Years Hence
Multi-engine	25000		Over 9500 lbs MGW		
Single-engine			Over 9500 lbs MGW		
Glider					

G. Other Considerations | Identification | Direction From Landing Area | Distance From Landing Area

2. Average Number Monthly Landings

	Present (If est. indicate by letter "E")	Anticipated 5 Years Hence		Present (If est. indicate by letter "E")	Anticipated 5 Years Hence
Jet			Helicopter		
Turboprop			Ultralight		
Prop			Glider		

3. Are IFR Procedures For The Airport Anticipated ☐ No ☐ Yes Within ____ Years Type Navaid:

H. Application for Airport Licensing

☐ Has Been Made ☐ Will Be Made ☐ Not Required ☐ State ☐ County ☐ Municipal Authority

I. CERTIFICATION: *I hereby certify that all of the above statements made by me are true and complete to the best of my knowledge.*

Name, title (and address if different than above) of person filing this notice – type or print | Signature (in ink) | Date of Signature | Telephone No. (Precede with area code)

FAA Form 7480-1 (1-93) Supersedes Previous Edition

Aviation System Standards

- National Flight Procedures
- IFP General Information
- IFP Requirements
- IFP FAQ's
- IFP Requests
- Forms
- Definitions
- Links

AVN Home Search Safety Services About Us Contact Us Site Map FAQ's Links

Flight Procedures Aeronautical Charting Flight Inspection Maintenance Operations

So you want an Instrument Flight Procedure...

This site has been developed to provide information on obtaining an Instrument Flight Procedure (IFP).

An IFP may affect more than just your airport. It may affect neighbors, other airports, or the local air traffic system.

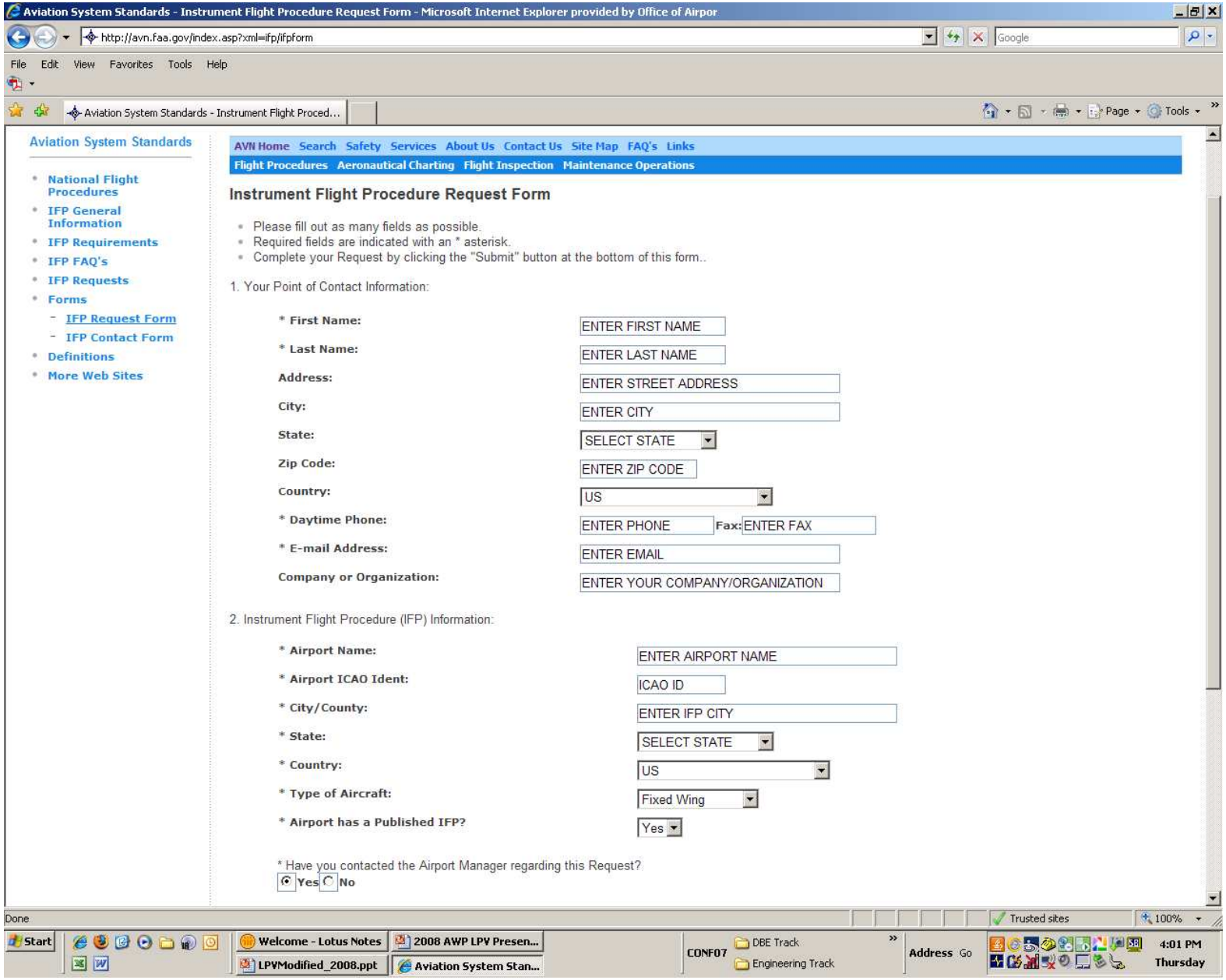
You can start the IFP process by completing a request form or contacting the Flight Procedures Office (FPO) in your region.

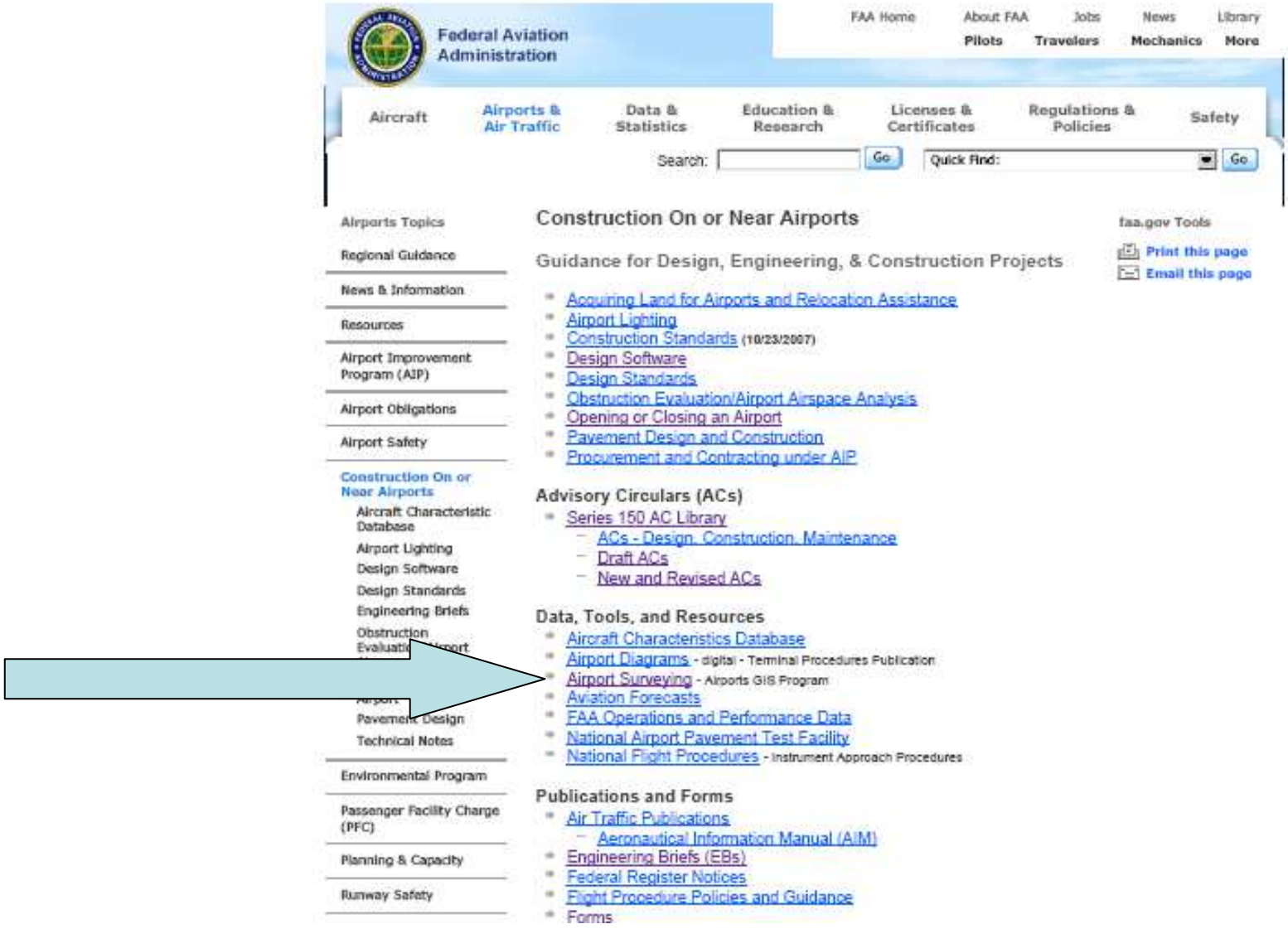
An IFP for private use will require reimbursement for development costs.

Certain information is required to assist the FAA to support your request:

- General
- Survey
- Airport Data
- Environmental Data
- Funding

http://avn.faa.gov/index.asp?xml=ifp/index


Aviation System Standards - Instrument Flight Procedure Request Form - Microsoft Internet Explorer provided by Office of Airpor
http://avn.faa.gov/index.asp?xml=ifp/ifpform
File Edit View Favorites Tools Help
Aviation System Standards - Instrument Flight Proced...
Page Tools
Aviation System Standards
National Flight Procedures
IFP General Information
IFP Requirements
IFP FAQ's
IFP Requests
Forms
IFP Request Form
IFP Contact Form
Definitions
More Web Sites
AVN Home Search Safety Services About Us Contact Us Site Map FAQ's Links
Flight Procedures Aeronautical Charting Flight Inspection Maintenance Operations
Instrument Flight Procedure Request Form
Please fill out as many fields as possible.
Required fields are indicated with an * asterisk.
Complete your Request by clicking the "Submit" button at the bottom of this form..
1. Your Point of Contact Information:
* First Name: ENTER FIRST NAME
* Last Name: ENTER LAST NAME
Address: ENTER STREET ADDRESS
City: ENTER CITY
State: SELECT STATE
Zip Code: ENTER ZIP CODE
Country: US
* Daytime Phone: ENTER PHONE Fax: ENTER FAX
* E-mail Address: ENTER EMAIL
Company or Organization: ENTER YOUR COMPANY/ORGANIZATION
2. Instrument Flight Procedure (IFP) Information:
* Airport Name: ENTER AIRPORT NAME
* Airport ICAO Ident: ICAO ID
* City/County: ENTER IFP CITY
* State: SELECT STATE
* Country: US
* Type of Aircraft: Fixed Wing
* Airport has a Published IFP? Yes
* Have you contacted the Airport Manager regarding this Request?
Yes No
Done
Trusted sites
100%
Start
Welcome - Lotus Notes
2008 AWP LPV Presen...
LPVModified_2008.ppt
Aviation System Stan...
CONF07
DBE Track
Engineering Track
Address Go
4:01 PM
Thursday



http://www.faa.gov/airports_airtraffic/airports/construction/

Federal Aviation Administration
Bringing Safety to America's Skies

Airport Surveying

Quick Links

- Home
- Airports
- Surveyors
- Airports
- Steps to Follow
- Airport Regions
- AIP
- AC 150/5300
- Contractor Security
- Airport Sponsor Benefits
- Airport Surveying Process
- Planning Considerations

Step 1 – Funding the Survey

The survey may be eligible for Airport Improvement Program (AIP) grant funds. To review AIP eligibility for the survey, contact your local FAA Airports District Office (ADO) or Airports Regional Office.

Step 2 – Hiring a Surveyor

To assist in the process of hiring a surveyor to do your survey, we have provided examples of the forms you will need:

- Request For Proposal
- Statement of Work (General)
- Statement of Work (LPV)
- Selection Process

These are examples only, and do not take the place of any State or local requirements, guidelines, or formats you may be required to follow.

Step 3 – Conducting the Survey

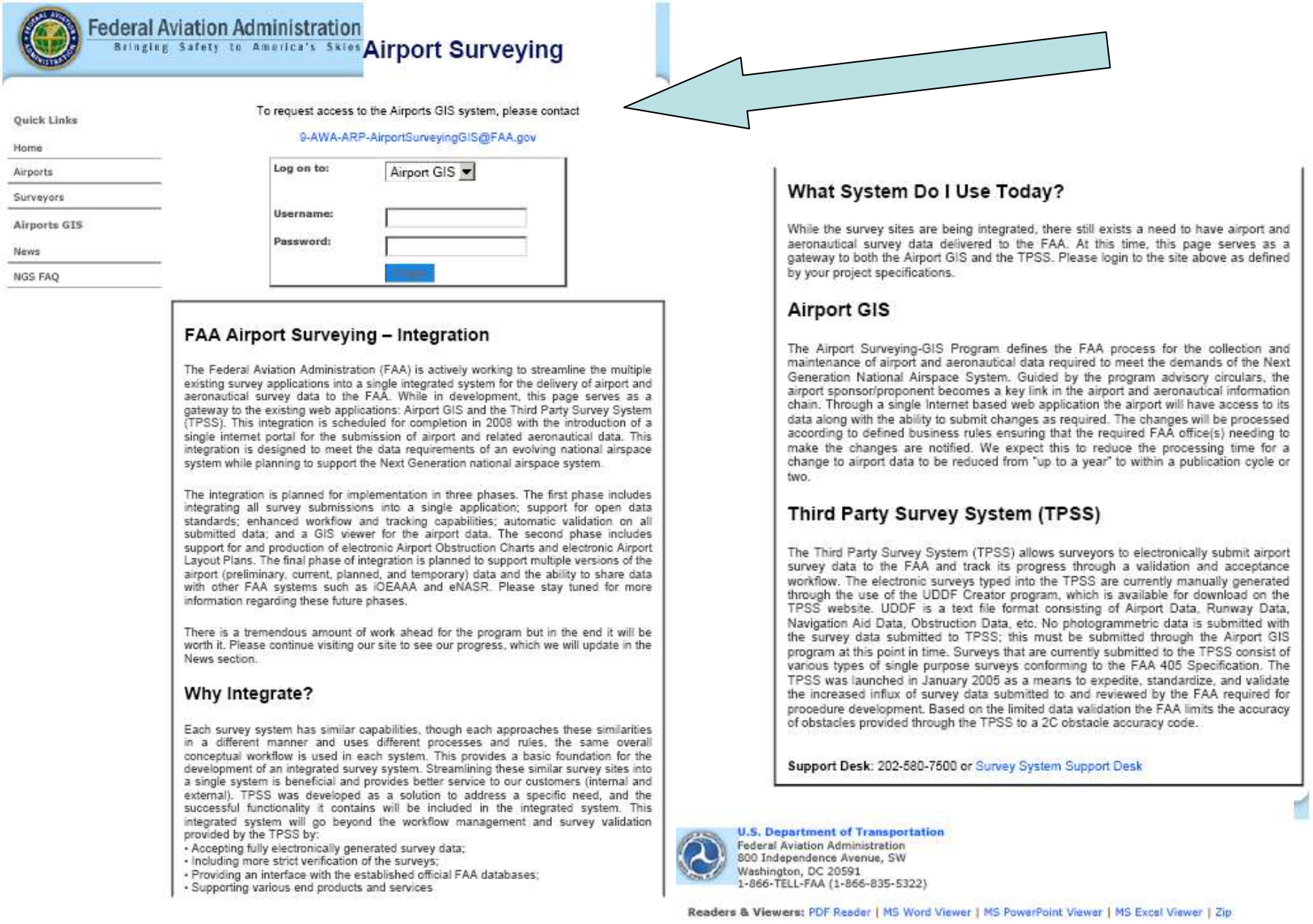
To ensure safety, all survey data collected by your contracted surveyor must meet the accuracy requirements in Advisory Circulars AC150/5300 listed below. These advisory circulars identify the procedures to follow so you collect the data to the required accuracies and submit your data in the proper format. All data must be in the proper format in order for the National Geodetic Survey (NGS) to validate the accuracy and approve the collected data.

- AC 150/5300-16 "General Guidance and Specifications for Aeronautical Surveys: Establishment of Geodetic Control and Submission to the National Geodetic Survey"
- AC 150/5300-17 "General Guidance and Specifications for Aeronautical Surveys: Airport Imagery Acquisition and Submission to the National Geodetic Survey"
- AC 150/5300-18 "General Guidance and Specifications for Aeronautical Surveys: Airport Survey Data Collection and Geographic Information System Standards"

Submission of the completed survey must be done through the Airport GIS web site. A link is available at the top right of this page.

Questions?

For additional information, please contact 9-AWA-ARP-AirportSurveyingGIS@FAA.gov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To request access to the Airports GIS system, please contact
9-AWA-ARP-AirportSurveyingGIS@FAA.gov
Log on to:
Airport GIS
Username:
Password:
FAA Airport Surveying – Integration
The Federal Aviation Administration (FAA) is actively working to streamline the multiple existing survey applications into a single integrated system for the delivery of airport and aeronautical survey data to the FAA. While in development, this page serves as a gateway to the existing web applications: Airport GIS and the Third Party Survey System (TPSS). This integration is scheduled for completion in 2008 with the introduction of a single internet portal for the submission of airport and related aeronautical data. This integration is designed to meet the data requirements of an evolving national airspace system while planning to support the Next Generation national airspace system.
The integration is planned for implementation in three phases. The first phase includes integrating all survey submissions into a single application; support for open data standards; enhanced workflow and tracking capabilities; automatic validation on all submitted data; and a GIS viewer for the airport data. The second phase includes support for and production of electronic Airport Obstruction Charts and electronic Airport Layout Plans. The final phase of integration is planned to support multiple versions of the airport (preliminary, current, planned, and temporary) data and the ability to share data with other FAA systems such as iOEAAA and eNASR. Please stay tuned for more information regarding these future phases.
There is a tremendous amount of work ahead for the program but in the end it will be worth it. Please continue visiting our site to see our progress, which we will update in the News section.
Why Integrate?
Each survey system has similar capabilities, though each approaches these similarities in a different manner and uses different processes and rules, the same overall conceptual workflow is used in each system. This provides a basic foundation for the development of an integrated survey system. Streamlining these similar survey sites into a single system is beneficial and provides better service to our customers (internal and external). TPSS was developed as a solution to address a specific need, and the successful functionality it contains will be included in the integrated system. This integrated system will go beyond the workflow management and survey validation provided by the TPSS by:
• Accepting fully electronically generated survey data;
• Including more strict verification of the surveys;
• Providing an interface with the established official FAA databases;
• Supporting various end products and services
What System Do I Use Today?
While the survey sites are being integrated, there still exists a need to have airport and aeronautical survey data delivered to the FAA. At this time, this page serves as a gateway to both the Airport GIS and the TPSS. Please login to the site above as defined by your project specifications.
Airport GIS
The Airport Surveying-GIS Program defines the FAA process for the collection and maintenance of airport and aeronautical data required to meet the demands of the Next Generation National Airspace System. Guided by the program advisory circulars, the airport sponsor/proponent becomes a key link in the airport and aeronautical information chain. Through a single Internet based web application the airport will have access to its data along with the ability to submit changes as required. The changes will be processed according to defined business rules ensuring that the required FAA office(s) needing to make the changes are notified. We expect this to reduce the processing time for a change to airport data to be reduced from "up to a year" to within a publication cycle or two.
Third Party Survey System (TPSS)
The Third Party Survey System (TPSS) allows surveyors to electronically submit airport survey data to the FAA and track its progress through a validation and acceptance workflow. The electronic surveys typed into the TPSS are currently manually generated through the use of the UDDF Creator program, which is available for download on the TPSS website. UDDF is a text file format consisting of Airport Data, Runway Data, Navigation Aid Data, Obstruction Data, etc. No photogrammetric data is submitted with the survey data submitted to TPSS; this must be submitted through the Airport GIS program at this point in time. Surveys that are currently submitted to the TPSS consist of various types of single purpose surveys conforming to the FAA 405 Specification. The TPSS was launched in January 2006 as a means to expedite, standardize, and validate the increased influx of survey data submitted to and reviewed by the FAA required for procedure development. Based on the limited data validation the FAA limits the accuracy of obstacles provided through the TPSS to a 2C obstacle accuracy code.
Support Desk: 202-580-7500 or Survey System Support Desk
U.S. Department of Transportation
Federal Aviation Administration
800 Independence Avenue, SW
Washington, DC 20591
1-866-TELL-FAA (1-866-835-5322)
Readers & Viewers: PDF Reader | MS Word Viewer | MS PowerPoint Viewer | MS Excel Viewer | Zip

Aerial Photography

4. **NGS will provide the contractor with the following information.**

a. Receipt Acknowledgment. The NGS ASP will acknowledge by email receipt of the imagery deliverables through the airport sponsor within 2 working days. This email will also signify the start of the NGS ASP acceptance review.

b. Imagery Acceptance Review. The NGS ASP will provide through the airport sponsor an Imagery Usability Report, via email, within 5 working days of the starting date. If NGS determines the imagery is acceptable, the contractor may then submit the airport ground survey data. If NGS determines the imagery is unacceptable, the contractor must re-submit new imagery as soon as possible for review. This is the primary reason for submitting the imagery well in advance of the airport ground survey portion. The imagery will be evaluated by the criteria listed below:

(1) Ground Sample Distance (GSD)—GSD is between 10 and 30 cm.

(2) Stereo Coverage—Imagery must have sufficient overlap to permit stereo coverage of the entire area for analysis.

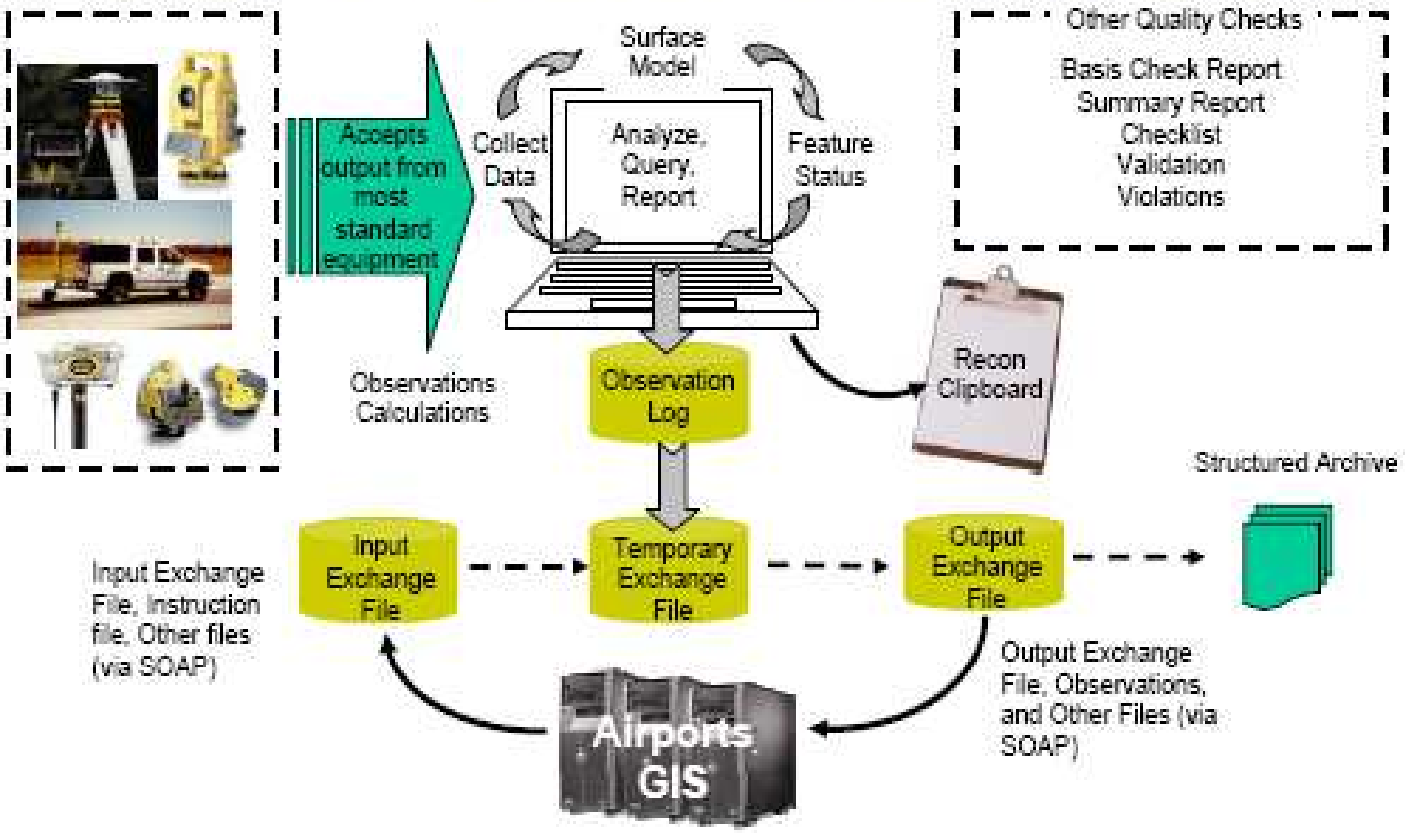
(3) Geometric Fidelity—Collection and processing of the image data will maintain, within accuracy requirements, the relationship between measurements made in the image model and real world coordinates.

(4) Geo-Referencing—The imagery is geo-referenced and the source data used for completing the geo-referencing is provided.

(5) Positional Accuracy—Positions of well-defined points determined from the stereo imagery must be within 1 meter relative to the National Spatial Reference System (NSRS) referenced to North American Datum of 1983 (NAD83) and the North American Vertical Datum of 1988 (NAVD88) at the 95 percent confidence level for Easting, Northing and Orthometric Height.

FAA AC 150/5300-17, page 8

How Does the ADCAT Work ?



www.faa.gov/airports_airtraffic/airports/topics/ then click on “Airport Surveying – GIS Program”

Lessons Learned

- **FAA will validate Third Party Surveys. (No major issues have been encountered to date.)**
- **States may want to consider prioritizing/sponsoring LPV surveys through "system planning" process.**
- **Assure NOAA, FAA, or some other agency has not already conducted, or has plans, to conduct a survey on your airport.**
- **If near a major highway, PACS/SACS may already be available. This may afford a key reduction in your survey cost.**
- **Once the survey has been submitted and validated, the airport owner needs to assure LPV is included in FAA's production plan.**
- **Bottom Line: LPV has been, and will continue to be, an "Evolving Process". Patience is critical.**


Questions???