

A Guide to Airport Surveys

**AC 150/5300-16, AC 150/5300-17, AC 150/5300-18,
and Airports-GIS (AGIS)**



May 15, 2009

Federal Aviation Administration (FAA)
800 Independence Ave., SW
Washington, D.C. 20591

FOREWARD

The Federal Aviation Administration (FAA) has begun a groundbreaking initiative to streamline the airport survey process and centralize airport data storage into one integrated web-based Geographic Information System (GIS) appropriately called “Airports-GIS (AGIS).” The AGIS program defines the FAA process for the collection and maintenance of airport and aeronautical data. We established these new processes to meet the demands of the next generation National Airspace System (NAS) which requires accurate survey data. The AGIS system is designed to be a complete “one-stop-shopping” site for obtaining and maintaining airport data.

The FAA’s initiative to centralize data storage through AGIS, combined with the new Advisory Circular (AC) requirements for geospatial and aeronautical data formulation, created a paradigm shift in the way we gather and process airport survey data. These new processes also bring a number of procedural application questions, such as “how do I initiate a project within AGIS?” and “how are the drawing groups, features, and attributes set up within the drawing?” and “where do I obtain the additional attribute data for this feature?” just to name a few.

This document’s primary goal is to answer common questions the FAA has received within the past 6 months and to provide an educational tool for AC criteria and their associated system processes.

Disclaimer: This paper is intended for informational and educational use only. It is not an FAA directive, nor does it contain any FAA directive material. It does not take the place of regulatory and procedural guidance or mandatory criteria set forth by the FAA. All subjects in this paper are discussed in general terms to ensure that all people from different educational and knowledge backgrounds can understand it.

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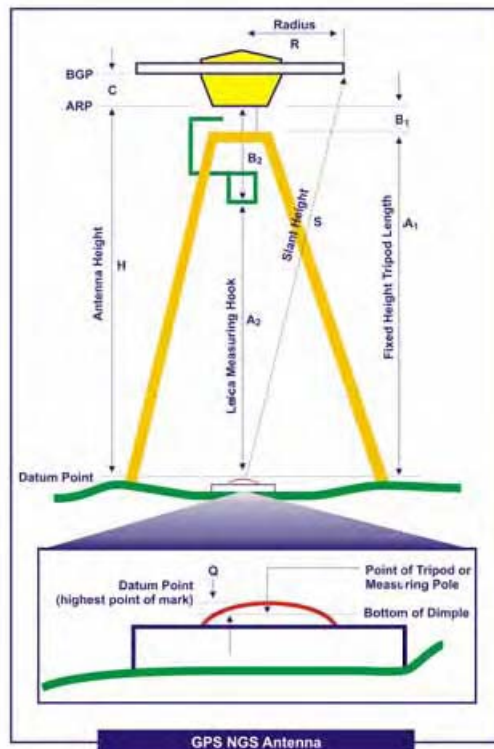
INTRODUCTION

The document is separated into five sections:

- 1.) Airport Sponsors and Proponents
- 2.) Surveyors and Contractors
- 3.) Advisory Circular Specific Issues
- 4.) The AGIS System
- 5.) Future Tools In Development

Each section will focus on responsibilities, processes, documentation, criteria, and specific issues relating to that section. It answers some common questions about airport surveys and the new AC criteria, and shows how to navigate through some portions of AGIS.

(Note: Readers will identify several bits of repeated information throughout this document. **If a topic is discussed more than once, it is very important.**)



SECTION 1: AIRPORT SPONSORS and PROPONENTS

The core of the AGIS program places Airport Sponsors and Proponents (AS/P) as the owner of all data for their airport. Through the use of the AGIS system, the AS/P has complete control (outside the FAA) of their airport data. To ensure the correct data is gathered for a specific type of project, the AS/P (or his designated contractor) must ensure that all documentation is complete, accurate, and meets criteria outlined in the ACs. Data accuracy begins with the creation of the project's Statement of Work (SOW).

The Statement of Work

In order to ensure all FAA survey and project requirements are addressed, airport sponsors should utilize the SOW template (form) provided within the AGIS website and included in Appendix A of this document. If the AS/P decides to use the SOW of a contractor, the SOW must comply with the AC's SOW requirements. AS/Ps who chose this route should provide the contracting firm with the FAA SOW template so that the contractors understand what will be required. If all of the AC requirements are not met, AS/Ps can expect the SOW to be rejected in AGIS with action for it to be re-accomplished.

AS/Ps should use the "Survey Requirements Matrix" in Table 2-1 of [AC 150/5300-18](#) to ensure that the SOW is complete. This table contains sets of recommended task requirements that complete a specific survey objective. We have broken them down into eight primary survey types (depicted as columns in the SOW) based on the intended use of the gathered data:

- Category II or III Operations
- Navigational Aid Siting (Non-Precision, Visual, or Precision)
- Airport Layout Plan (ALP)
- Airport Obstruction Chart (AOC)
- Construction (Airside or Landside)
- Instrument Procedures Development
- Pavement Design, Construction, Rehabilitation, or Roughness
- Airport Mapping Database

Each primary survey type identifies a recommended set of tasks (these tasks will have the symbol "●" next to them) to be completed by the contractor. The AS/P must ensure that the SOW either describes (in detail) all survey requirements necessary to complete the project, or references Table 2-1 and the specific survey type "column" name (described above) as the expected deliverable. The SOW should describe, in detail, any additional survey or data requirements that are not identified in Table 2-1 (see "PACS/SACS" and "Airport Obstruction Surfaces" below). When the survey is complete, the Airport Sponsor can use Table 2-1 as an internal checklist to ensure all deliverables have been completed and received by the contractor.

An SOW must be a clear and concise representation of what is required to complete a task (or several tasks). It must be sufficiently detailed so that everyone involved with the project has no doubts as to the expected outcome. Ultimately, the SOW sets the overall tone for the entire project.

PACS/SACS

Airport control stations are physical ground monuments that a surveyor uses to establish geodetic control and maintain survey data accuracy. All AS/Ps should know the type and location of every Primary Airport Control Station (PACS) and Secondary Airport Control Station (SACS) located on their airport.

“These survey marks must be used for future aeronautical and engineering projects related to runway/taxiway construction, navigational aid siting, obstruction clearing, road building, and other airport improvement activities.” (AC 150/5300-16)

You must clearly note the establishment or validation of permanent and temporary PACS and SACS in the SOW. The FAA requires certified airports (FAR Part 139) to have a minimum of one PACS and two SACS in order to maintain airport data and control station integrity. The FAA recommends that National Plan of Integrated Airport Systems (NPIAS) airports have at least one permanent PACS (see AC 150/5300-16, Para 2.2.1.).

Permanent Control—The FAA requires Regional Airports Divisions to determine which airports under their control require permanent PACS and SACS. The amount of PACS and SACS that an airport requires should be thoroughly discussed with contracted airport surveyors and should be based on the following:

- The amount of airport activity (operational or proposed future construction) at the airport
- Overall airport land area (present and future)
- Control station intervisibility (line-of-site between each control stations)
- Global Positioning System (GPS) satellite reception and visibility (present and future)

Records of established PACS and SACS should be kept either locally (at the airport) or regionally for future survey and SOW reference.

Temporary Control—If you use temporary control stations for any type of airport survey work, you must first obtain Regional Airport Divisional approval. Control stations must be tied to the National Spatial Reference System (NSRS) through the use of the National Geodetic Survey (NGS) Online User Positioning System (OPUS). You must also include these requirements in the SOW.



Airport Airspace Analysis (AAA) Surveys

Some of the problems AAS-101 has encountered since the implementation of AC 150/5300-18 have to do with AAA surface construction and evaluation. We have reviewed and updated the textual construction descriptions and figure illustrations associated with AAA surfaces in order to ensure a better understanding of their construction.

It is essential that AS/Ps reference “current criteria when establishing SOW requirements for AAA surveys.” We have received SOWs requesting approval for a “LPV only survey for RWY 03.” This type of survey (LPV) no longer exists. “LPV only” survey criteria existed in a document entitled “FAA No. 405” which was rescinded in 2006 and replaced with the three survey ACs we have today. AC 150/5300-18 contains surface construction criteria for AAA surfaces.

LPV stands for “Localizer Performance with Vertical Guidance.” Since there are only two types of AAA surfaces (“Runways with Vertical Guidance (VG)” and “Runways without Vertical Guidance (NVG)”), an LPV procedure would require the use of the “Runway with Vertical Guidance” AAA surfaces to support it.

AS/Ps must understand that AAA surfaces not only identify potential hazardous approach obstacles, they also identify potential obstacles within the departure area. As such, surveyors and contractors must survey the entire AAA surface identified in AC 150/5300-18 (VG or NVG). SOWs that do not include a survey for both sides of a runway will be rejected by the FAA as not meeting established criteria. The SOW must clearly define the type of survey required (VG or NVG).

(Note: AAA surfaces must be designed using the “runway ends” and not “displaced landing thresholds.” Establish AAA surfaces at the runway end points to ensure obstacles are evaluated from the useable portion of the runway. A runway 36 departing aircraft *can* roll past a runway 18 displaced landing threshold because the pavement beyond is still useable. If the runway 18 approach surface is established at the displaced landing threshold, an aircraft departing runway 36 could potentially be below the evaluated runway 18 obstacle surface even before wheels are off the ground.)

Imagery and Ground Surveys

We require current airport imagery for AAA surveys. The FAA considers airport imagery “current” when it has been reviewed and approved by NGS within a maximum of six months *prior* to the beginning of the ground survey phase. The life cycle for imagery is around 18–24 months.

Surveyors and contractors must produce two imagery products: Digital Stereo Imagery and Orthoimagery. We require these products to be physically delivered to separate locations due to file upload size limitations and validation requirements.

IMPORTANT NOTES:

- 1) Do not send imagery DVDs via the United States Postal Service (USPS). CDs and DVDs sent by USPS are destroyed by security prior to delivery.
- 2) Imagery obtained by sources other than outlined in AC 150/5300-17 (e.g., Google Earth) do not meet imagery criteria and will be promptly returned to the AS/P for re-accomplishment.

NGS Deliverable (Digital Stereo Imagery): Digital Stereo Imagery must conform to the standards set in AC 150/5300-17. You must place required deliverables on a DVD or a USB

compatible external hard drive and send them to NGS by a certified mail courier (e.g., UPS or FEDEX) to the following address:

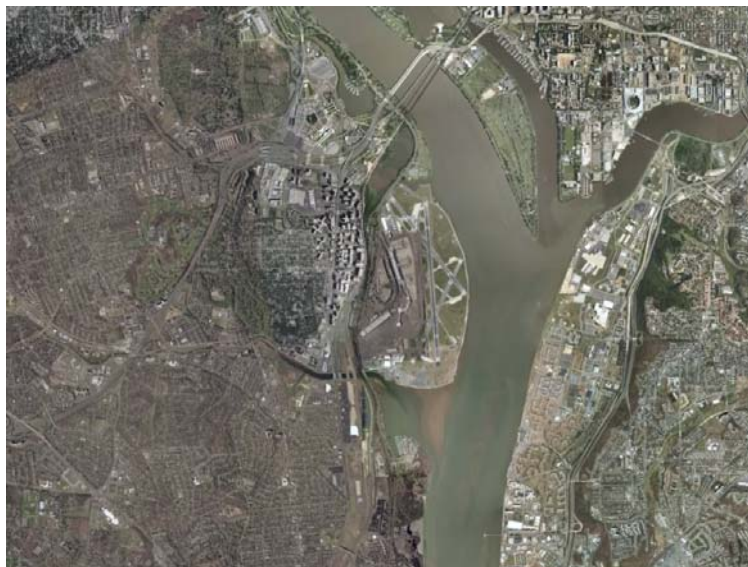
Imagery Review Coordinator
National Geodetic Survey, NOAA
ATTN: N/NGS33; SSMC3, Sta. 5359
1315 East-West Highway
Silver Spring, MD 20910

Once NGS has formally accepted the submitted imagery and uploaded an imagery usability report to AGIS, the contractor may then upload the ground survey data. If NGS determines that the submitted imagery does not meet the AC criteria, they will submit a document to AGIS outlining the specific criteria the imagery does not meet. The contractor must then re-submit *new* imagery to NGS for another acceptance review. This is the primary reason for submitting the imagery well in advance of the airport ground survey.

FAA Deliverable (Orthoimagery): Digital airport orthoimagery must conform to the standards set in AC 150/5300-17. You must place required deliverables on a DVD or a USB compatible external hard drive and send them to NGS by a certified mail courier (e.g., UPS or FEDEX) to the following address:

Federal Aviation Administration
Airport Engineering Division (AAS-100)
Airport Surveying-GIS Program Manager
Attn: AAS-100-Anthony Nguyen
800 Independence AVE., SW
Suite 621
Washington, DC 20591

(Note: AS/Ps who develop SOWs must keep in mind that imagery must be collected “...to show full tree leaf coverage...” in order to facilitate photogrammetric tree height determination. This requirement limits the acquisition window depending on season and geographic location. NGS cannot validate tree heights on imagery taken without leaves on the trees. If NGS receives this type of imagery, it will be rejected by NGS and returned to the contractor for re-accomplishment.)



Airport Sponsor—Wrapping Up

Below is an important list of points to remember when creating a survey SOW. The list covers all of the topics that were discussed within this section, and include some topics that were not discussed but are just as important:

- 1.) In order to create an accurate SOW you must (at a minimum) be familiar with the AC requirements and criteria associated with the project. The AAS-101 team has received phone calls from field personnel asking about AC requirements. We cannot emphasize enough that it is very important to read and understand the ACs. Many of your questions can be answered by looking at the ACs prior to calling Headquarters.
- 2.) *Do not use rescinded criteria* as reference to any type of airport survey work. SOWs containing references to rescinded criteria (i.e., FAA No. 405) will be rejected and returned to the AS/P for re-accomplishment.
- 3.) If you are *adding* additional survey requirements outside of the recommended survey set items contained in Table 2-1 (AC 150/5300-18) ensure that you identify them in the SOW. Include specific reasons why the requirement was added and ensure all contractor requirements and deliverables are clearly stated.
- 4.) Contractors must obtain airport imagery and NGS must approve that imagery no more than six months *prior* to a scheduled ground survey (AC 150/5300-17, Para. 20a). Ground surveys *must not begin* until the AS/P has received NGS imagery approval through AGIS.
- 5.) Contractors and surveyors *must* take airport imagery with “...*full tree leaf coverage*” (AC 150/5300-17, Para. 15). Imagery that does not meet this criteria will be rejected and returned to the AS/P for re-accomplishment. In extreme cases, a waiver to imagery criteria may be requested through the airport’s FAA region. For example, a waiver might be requested for items such as the lack of available “leaf-type” trees within the vicinity of the airport (Phoenix, Arizona (AZ) is a good example of this). If the AS/P requests a waiver to imagery criteria, it must be uploaded into AGIS as a separate supporting document in the same location as the uploaded SOW. Ensure all requested waivers and the imagery plan are approved through AGIS *before any imagery data is gathered*. Regional waiver approvals should also be uploaded into the AGIS program (with the Imagery Plan) for project tracking and review purposes.
- 6.) Airport imagery “...*must meet the highest professional standards.*” A low grade scanner (used to convert medium format film into a digital file) might not capture enough detail/clarity to allow NGS to validate obstacle data. AS/Ps should ensure that the contractor will deliver airport imagery products using the highest quality equipment currently available.
- 7.) Contractors and surveyors cannot “borrow” airport imagery from online resources (e.g., Google Earth). This imagery *does not meet any established imagery gathering criteria* outline in the ACs.
- 8.) Airport obstruction surveys (VG and NVG) must contain a “validated” Airport Elevation (AE). This will require *all* physical runway surfaces to be surveyed per AC 150/5300-18 in order to re-validate the AE (AC 150/5300-18).
- 9.) *There is no such thing as an LPV only survey to one runway.* (See #2 above). There is, however, a VG AAA survey that supports an LPV procedure. Contractors and surveyors must accomplish AAA surveys for *both* ends of the runway (as depicted in

AC 150/5300-18, Figure 2-7). SOWs that request airport obstruction surveys to only *one* runway will be rejected and returned to the AS/P for re-accomplishment.

(Note: An LPV is a vertically guided flight procedure and requires an AAA survey using the VG criteria in AC 150/5300-18, Para. 2.7.1.1.)

- 10.) Contractors and surveyors must accomplish all AAA surveys using the highest runway designation (i.e., Runway 36 is VG, Runway 18 is NVG, evaluate both sides of the runway using VG surfaces).
- 11.) When requesting an AAA survey, ensure that you include both runways in the SOW (i.e., RWY 18/36 or RWY 9/27, etc). SOWs with only one runway designated for survey will be rejected and returned to the AS/P for re-accomplishment.

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: SOW and Project Concurrency

Project Summary: Complete
SOW / Concurrency: Active
Plans: Locked
Geodetic Control Data: Locked
Imagery Data: Locked
Survey: Locked
Verification: Locked

your next action is: Re-Upload Statement of Work

Not Approved by [User] on 02/17/2009
Request to be re-written. Please incorporate your original scope of services using the generic Statement of Work posted on the Airports GIS website.

Action: Upload Statement of Work

1. Add required documentation:

Date	Added By	Category	File Name	Action	Description
02/13/2009		Statement of Work	_Survey_Scope[1].pdf (0.1MB)	delete	Statement of Work
02/06/2009		Statement of Work	_Survey_Scope.pdf (0.1MB)	-	-Scope of Work
02/04/2009		Statement of Work	Runway_-_Survey_8_QC_Plan.zip (0.2MB)	-	Survey-Scope and QA Plan

+ Add Document

Example of a Rejected SOW (in AGIS)

SECTION 2: SURVEYOR and CONTRACTOR

Responsibilities

AC 150/5300-16 states that contractors:

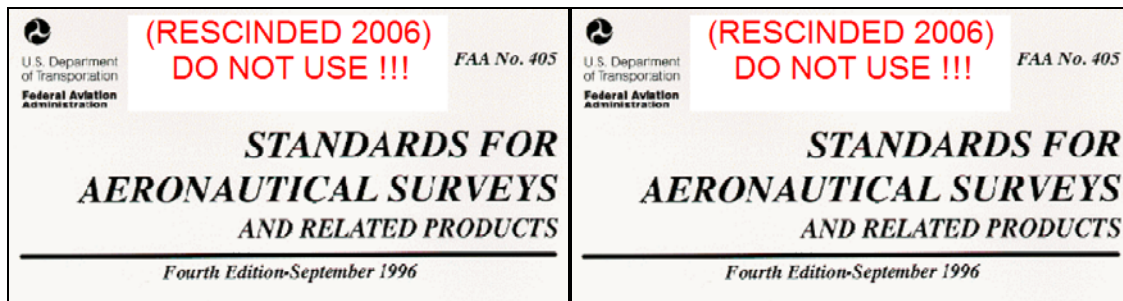
- “...must provide all labor, equipment, supplies, materials, and transportation to produce and deliver data and related products as required...”
- “...must submit in writing requests for modifications to or deviations from...specifications to the contractor issuing authority, NGS, and FAA points of contact (POCs) as soon as a need for them is identified.”
- “...must notify the contract issuing authority of any unusual circumstances occurring during the performance of the tasks identified...that affect the deliverables or their quality...”
- “...must submit a weekly project status report, a Quality Control Plan..., a Project Survey Plan..., and a Final Project Report...to the contract issuing authority.”
- Must retain “...observation logs and other original records generated during (the completion of a) project...and must be retained for data accountability by the Airport Authority.”

Understanding the Airport Sponsor’s Needs

The AS/Ps does not always comprehend the specific requirements of an airport survey. The surveyors and contractors are the Subject Matter Experts (SME) when it comes to survey requirements. They should have thorough knowledge of all requirements set forth by the ACs and be able to answer any questions the AS/Ps will ask.

Close communications with airport management is critical in the completion of an airport survey. Make appointments with airport officials well in advance of the start of a survey project. Discuss the SOW, survey requirements, AC criteria, airport access requirements, contractor needs, and any additional support required for the completion of the survey. If the SOW is lacking the detail or uses outdated criteria (i.e., FAA No. 405), ask the AS/P to clarify requirements using current criteria.

We can’t say it enough!



The Survey and Quality Control Plan

Contractors and surveyors must submit a Survey and Quality Control Plan (SQCP) (and have it approved by AGIS) prior to beginning any field work. If the FAA approves this plan, the AS/P should authorize the contractor to start working. If this plan is rejected, the AS/P must inform the contractor that they must make corrections to the plan and resubmit it to AGIS within ten business days of the rejection. Approval or rejection letters and comments will be posted to AGIS.

“In these plans, detail the methodologies for data collection, data safeguarding and quality assurance. Provide insight into how you will completely check all data to ensure it is complete, reliable, and accurate. Identify data safeguards used to protect this sensitive and safety critical data. Utilize a checklist based quality control process with definable and repeatable standards for each element ensuring consistency of work between different personnel within an organization.” (AC 150/5300-18)

The Survey and Quality Control Plan (SQCP) (Ref AC 150/5300-18, Para 2.6.2)

The SQCP must describe how the contractor will meet the technical specifications required for the project. The SQCP must address (but is not limited to) each of the following areas:

- Project Observation (Execution) Plan
- Geo-Referencing
- Feature Extraction
- Obstruction Analysis
- Prior Survey Data
- Field Survey Methods
- Geodetic Control
- Runway Data
- Navigational Aid Data
- Airport Feature Data
- Equipment Listing
- Quality Assurance Process

Quality Control

“The Survey and Quality Control Plan must include the quality control (including error analysis) procedures and practices followed during data collection and provide traceability and adherence to the requirements of this guidance. At a minimum, the plan will include the following:”

- *A summary of methods to be used to ensure high-quality data*
- *Quality control measures for obtained data*
- *Evidence of collection feature collection methods*
- *Data backup and archive procedures to maintain data integrity*
- *Methods used to “...check all file formats and provide a summary of the file-naming convention for all electronic files*

- A check of all manual computations (including check marks and initials)
- A check of all manual data computer entries
- A check of file formats
- A check of all reports and data submitted
(AC 150/5300-18, Para 2.6.2.3.)

The contractor or surveyor must also describe how they will ensure original data is not modified or overwritten.

The following are the reference paragraphs for this section:

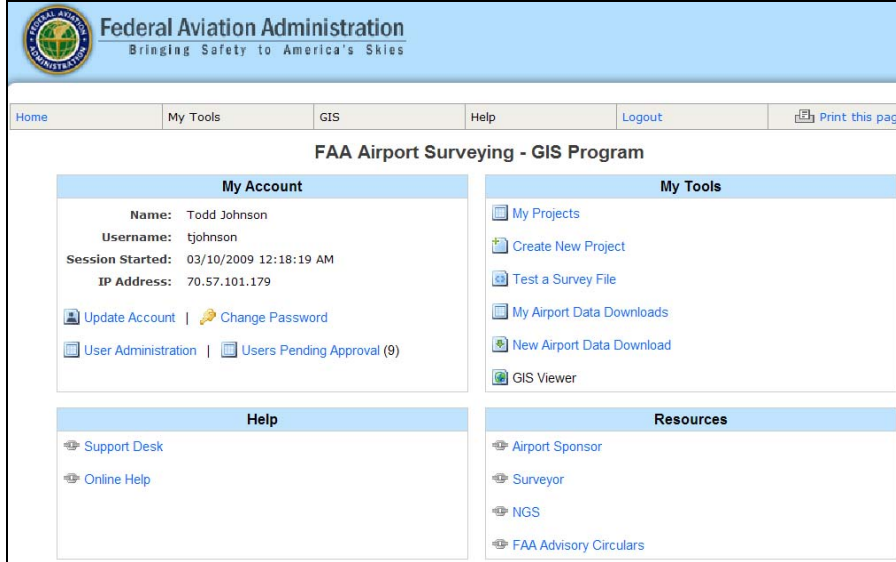
AC 150/5300-16

- Paragraph 5.1.: Quality Control Plan
- Paragraph 8.3.: Project Survey Plan

AC 150/5300-18

- Paragraph 2.6.2.: Survey and Quality Control Plan
- Paragraph 2.6.2.3.: Quality Control

Templates for these plans can be found after logging into AGIS and clicking “Surveyor” under the “Resources” section of the front page, and then navigating down the page to “Survey and Quality Control Plan Templates.”



Survey and Quality Control Plan Templates

- [Download](#) sample template for Survey and Quality Control Plan (AC 150/5300-18)
- [Download](#) sample template for Imagery Plan (AC 150/5300-17)
- [Download](#) sample template for Geodetic Control Plan (AC 150/5300-16)

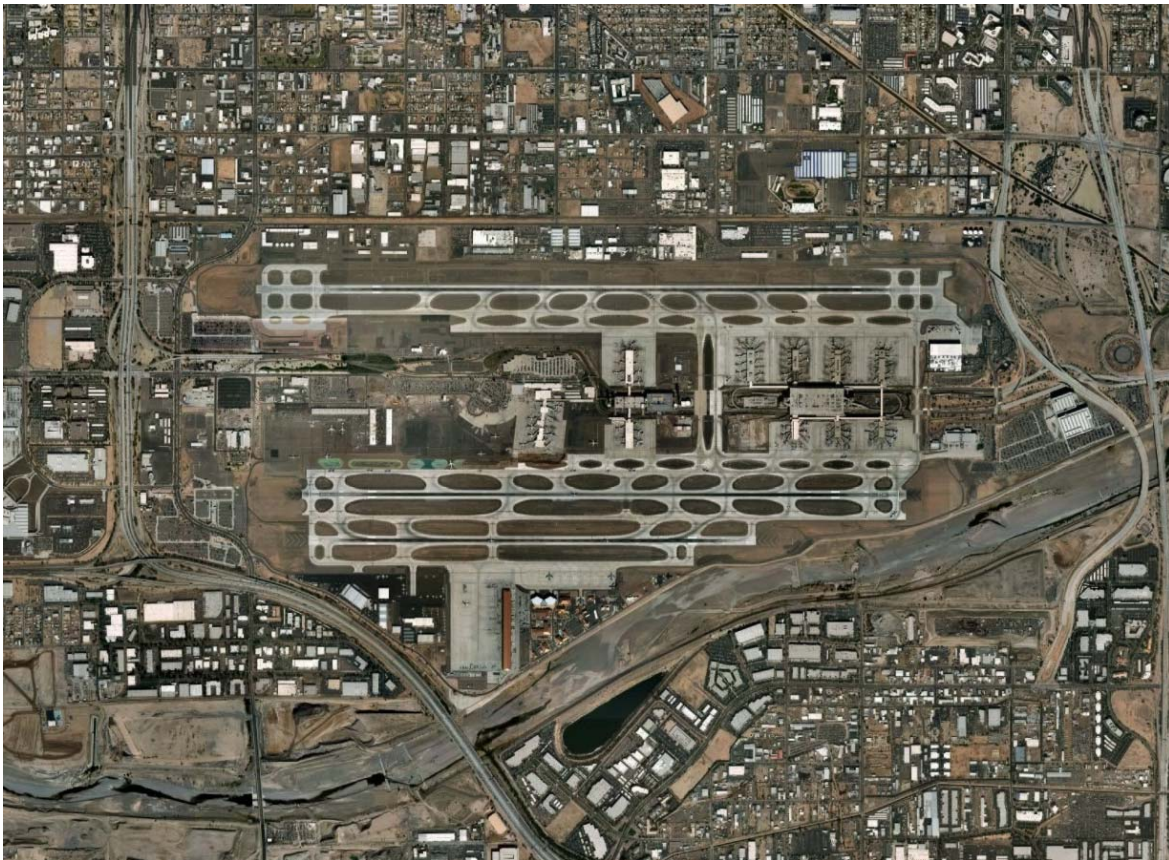
The Imagery Plan

[AC 150/5300-17](#) “...provides guidance and specifications for contractors to acquire and submit airport imagery in support of FAA airport surveys.” Any deviation from the processes outlined in AC 150/5300-17 must be justified, in writing, to the FAA and NGS through the AS/P and AGIS.

Contractors and surveyors must validate position determination of all image control check points through the NGS [OPUS](#). Contractors and surveyors must include OPUS validation solutions for each check point in the imagery plan.

Contractors and surveyors must use AGIS to track all contractor deliverable submissions to NGS, to include: Digital Imagery (see page 9), Imagery Control Points, Geo-Referencing, the Flight Report, and the Final Report. Contractors and surveyors must upload all Imagery Plans into AGIS in a non-editable file format (i.e., Adobe Acrobat PDF). The FAA must review and approve these plans through AGIS before the collection of any imagery data.

(Note: Contractors should go back and read pages 8–11. These pages contain important information about Airport Imagery and its collection.)



Imagery of Phoenix Sky Harbor Airport, AZ

The Project Survey Plan/Geodetic Control Plan (GCP)

The need for geodetic control is critical in ensuring the accuracy of the survey data gathered. Contractors “...*must not begin mark setting or data collection until the plan is approved by NGS.*” [AC 150/5300-18](#) states that contractors and surveyors will “*Describe in detail the plan for connecting to and verifying all existing airport control planned for use during the survey.*” This plan must identify the methods that will be used to establish accurate connection to the NSRS (i.e., establishing permanent geodetic control, validating existing control, or establishing temporary geodetic control). This plan must, *at a minimum*, contain the following sections:

- *Airport Summary Report*
- *Station Table*
- *Airport Control Plot*
- *Photographs*
- *Station Location Sketch and Visibility Diagrams*
- *Station Descriptions*
- *GPS Observing Scheme*
- *Project Vector Diagram*
- *Proposed Instrumentation List*
- *Data Processing Software*
- *Quality Control Plan*

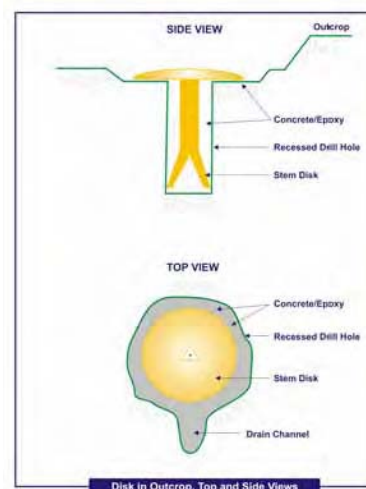
(ref. AC 150/5300-16, Para. 8.3)

Submitted GCPs that do not include the above information will be disapproved by NGS and extend the time period for plan approval. (Note: Failure to list all of the above information has been identified as one of the most common contractor errors.)

PACS and SACS

Contractors and surveyors must:

- Describe *in detail* the plan for connecting to and verifying *all* existing airport control planned for use during the survey;
- Make horizontal and vertical datum ties directly between the PACS and the NSRS;
- Verify the unmoved position and elevation of the PACS and SACS; and
- Provide the raw-data files collected that contain the data used for the establishment and verification of geodetic control in both the survey system manufacture’s format and RINEX II format.



A listing of airports with PACS and SACS and the dates of observation are available from the NGS website:

<http://www.ngs.noaa.gov/cgi-bin/airports.pr1?TYPE=PACSAC>.

Contractors must also research the availability of High Accuracy Reference Network (HARN) control points through the NGS OPUS site prior to stating that HARNs do not exist for the survey airport. *“Note: An existing HARN station (“A” or “B” order station) does not necessarily qualify to be a PACS; it must still meet PACS stability and siting requirements.”*

Uploading Plans to AGIS

The screenshot shows a dashboard with several status boxes: 'Project Summary' (Complete), 'SOW / Concurrence' (Complete), 'Plans' (Active), 'Geodetic Control Data' (locked), 'Imagery Data' (locked), 'Survey' (locked), and 'Verification' (locked). Below these is a notification: 'Todd, your next actions are: Upload Survey & Quality Control Plan, Upload Geodetic Control Plan, Upload Imagery Plan'. A navigation bar contains 'Geodetic Control Plan', 'Imagery Plan', and 'Survey & Quality Control Plan'. An 'Action' section is titled 'Upload Geodetic Control Plan' and contains a step: '1. Add required documentation:' with a '+ Add Document' button and the text '(No documents have been added)'.

Ensure you are in the correct location when uploading documents. Click on “Plans → Geodetic Control Plan → +Add Document” and upload the GCP. After the upload is complete, click on “Imagery Plan → +Add Document” and upload the Imagery Plan. Do the same for the “Survey and Quality Control Plan.”

Drawing Setup and Data Preparation (GIS vs. CADD)

CADD drawings should be setup in a logical hierarchal manner. The foundation of these drawings is the “Master Drawing.” The Master Drawing file name should be one of the following:

- The full airport name and the date the drawing was saved in MMDDYYYY format (e.g., Phoenix_Sky_Harbor_02152009.dwg).
- The airport’s ICAO three-letter identifier and the date the drawing was saved in MMDDYYYY format (i.e., PHX_02152009).
- Any achievable method desired by the airport sponsor that identifies a unique set of drawings that are distinguishable from all previously saved or submitted files.

In addition to the Master Drawing are the subsets of drawings that contain airport data associated with certain “feature groups.” AC 150/5300-18 places all survey data into 11 main feature groups, each with their own drawing title (e.g., Airfield, Airspace, Cadastral, Environmental, Geospatial, Man-Made Structures, Navigational Aids, Seaplane, Security, Surface Transportation, and Utilities). These drawings do not need to be labeled for archiving and should always remain the same for external referencing purposes. When the “feature group” drawings are updated, the name of the Master Drawing should be changed to reflect the current version or saved date.

The layer names in each drawing should be the titles of the AC 150/5300-18 “Feature Class Name” of each specific feature. For instance, the “Runway” polygon should be in the layer “Runway” inside the “Airports” drawing. This layer should only contain runway polygons. The “Wetland” polygon should be in the layer “Wetland” inside the “Environmental” drawing. This layer should only contain “Wetland” polygons.

SECTION 3: ADVISORY CIRCULAR SPECIFIC ISSUES

AC 150/5300-16

http://www.faa.gov/airports_airtraffic/airports/resources/advisory_circulars/media/150-5300-16A/150_5300_16a.pdf

There are no additional issues relating to this AC.

AC 150/5300-17

http://www.faa.gov/airports_airtraffic/airports/resources/advisory_circulars/media/150-5300-17a/150_5300_17a.pdf

There are no additional issues relating to this AC.

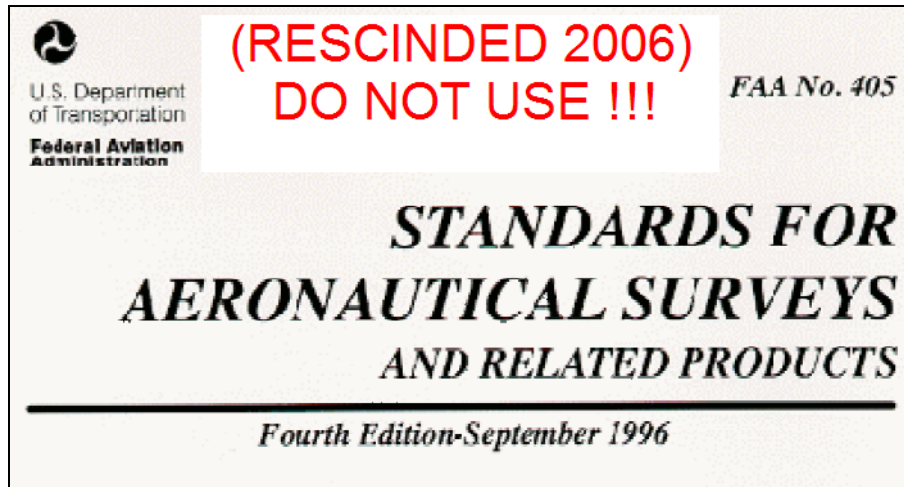
AC 150/5300-18

http://www.faa.gov/airports_airtraffic/airports/resources/advisory_circulars/media/150-5300-18B/150_5300_18B_planning_guidance_only.pdf

Watch for the new version of this AC to be posted at any time.

FAA No. 405

This document was rescinded in 2006. Do not include references to this regulation in any SOWs or survey related plans.



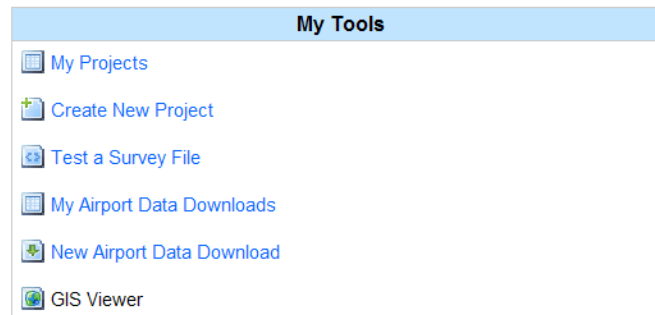
SECTION 4: AGIS

The Validation and Acceptance Workflow

The FAA AGIS website functions using a data “Validation and Acceptance” workflow. Contractors and surveyors submit project data to a specific project for approval and the system tasks the next individual responsible for continued action. The approval process continues until all project requirements have been met and approved. Everything that occurs within the system is tracked (including data uploads and downloads).

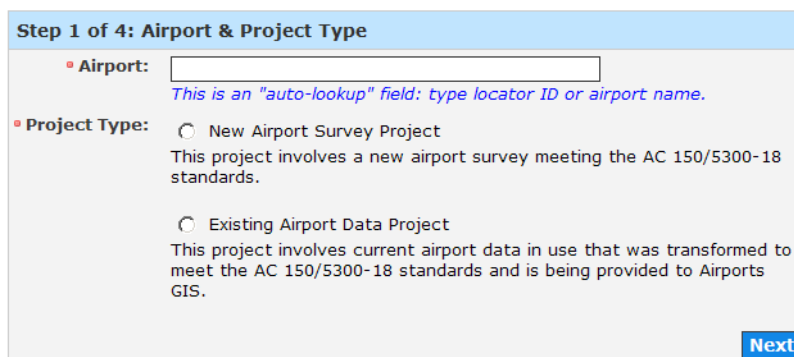
Starting a Project

After logging in to the AGIS website, the AS/P will want to navigate to the “My Tools” box on the right side of the page and select the “Create New Project” link. The “Create New Project” link can also be accessed from within “My Projects.”



Throughout this section I will be referring to the “AS/P” as the “User.” The program will walk you through a number of data gathering screens about the project. The first screen (shown below) shows the first step in creating a new project. The system asks the project initiator for his or her Airport ID. Follow the instructions below the selection box (in blue letters). Select the appropriate airport from the drop-down menu (Note: the drop-down box will only contain airports for which the project initiator is responsible).

New Project Form



Step one of project creation (shown above) contains one of the top ten errors users make during the project creation process, the “Project Type.” Read the definition of each “Project Type” carefully and select type that fits the project. After completing both items, click the “Next” box in the lower right hand side.

Step two requires the user to select the “Airport Category & Level of Verification.”

New Project Form

Step 2 of 4: Airport Category & Level of Verification

▪ **Airport Category:** NPIAS Part 139 Airport
 NPIAS Non-Part 139 Airport
 Non-NPIAS Airport

Verification Options: *please select an airport category first*

Back **Next**

When the user selects the “Airport Category,” it will show a definition of that type of airport below the selection buttons (see image below). Read the description of the selection thoroughly. If it doesn’t match the type of airport the project is for, make another selection. When the user is sure of the selection, click the “Next” button.

New Project Form

Step 2 of 4: Airport Category & Level of Verification

▪ **Airport Category:** NPIAS Part 139 Airport
 NPIAS Non-Part 139 Airport
 Non-NPIAS Airport

Verification Options: For a **Certified (Part 139) Airport** survey project, Imagery and Geodetic Control Data submission and verification are required.

Back **Next**

Step three requires the user to select the “Purpose of Survey.”

New Project Form

Step 3 of 4: Additional Data

▪ **Purpose of Survey:** Airport Airspace Analysis - Non-Vertically Guided
 Airport Airspace Analysis - Vertically Guided
 Airport Layout Plan - Airport Design or Planning
 Airport Layout Plan - Airport Movement Area Construction
 Airport Layout Plan - Airport Non-Movement Area Construction
 Airport Layout Plan - Obstruction Removal IFR Operations
 Airport Layout Plan - Obstruction Removal VFR Operations
 Airport Layout Plan - Periodic Update
 Airport Mapping Database - Initial Development
 Airport Mapping Database - Periodic Update
 Airport Obstruction Chart - Initial Development
 Airport Obstruction Chart - Periodic Update
 Construction - Airside
 Construction - Landside
 NAVAID Siting - Non-Precision/Visual
 NAVAID Siting - Precision

AIP Grant Number:
format like: 3-36-1234-012-2005 (must have dashes)

Back **Next**

(Note: During the initial creation of an AGIS project, please ensure that you refer to Table 2-1 in [AC 150/5300-18](#) when entering the “Survey Type” (or Intended End Use of the Data) project

information. This sets the systems data validation baseline for contractor file uploads into AGIS. This has been identified as one of the top ten errors made by AS/Ps during the creation of a project.)

The final step requires the user to review all selections made during project creation and submit the project for processing. After the user has validated their project selections, click the “Submit” button in the lower right corner.

New Project Form

Step 4 of 4: Confirmation

Please confirm your project before submitting:

Airport Locator ID: PHX - PHOENIX SKY HARBOR INTL (KPHX)

Project Type: New Airport Survey

Airport Category: NPIAS Part 139 Airport

Verification Options: Imagery
Geodetic Control

Purpose of Survey: Airport Airspace Analysis - Non-Vertically Guided

AIP Grant Number: 3-36-1234-012-2009

[Back](#)
[Submit](#)

AGIS has now created the new or existing project. The user is tasked to Add or Modify “Surveyor or Consultant Information” and upload the SOW. Project creation is complete and the project screen should look similar to the one below.

[Home](#) | [My Tools](#) | [GIS](#) | [Help](#) | [Logout](#) | [Print this page](#)

: Project Summary

Project Summary Complete	SOW / Concurrence Active	Plans 	Geodetic Control Data 	Imagery Data 	Survey 	Verification
--	------------------------------------	-----------	---------------------------	------------------	------------	------------------

your next action is: Upload Statement of Work

Project Information

Project Type: New Airport Survey

Created By: on 02/20/2009

Airport: - MUNI

Airport Category: NPIAS Non-Part 139 Airport

AIP Grant #:

Purpose: Airport Airspace Analysis - Vertically Guided

Verification:

- Geodetic Control
- Imagery
- Survey

Surveyor/Consultant Information

[Add/Modify](#)

Project Actions, Notes, & Documents

[Add New Note](#) | [View All / Print](#) | [View All Documents](#)

Date	User	Action	Notes/Comments
02/20/2009 02:47:27 PM		Added Consultant to Project	
02/20/2009 02:47:14 PM		Created Project	

Airport Sponsor Information

Contact Name:

Position: Engineer

Address: Department of Aeronautics

Phone:

Email:

Administration: [Terminate this Project](#) | [Change Sponsor](#) | [Add Document](#)

Submitting Initial Documents

The AGIS system will task the AS/P to upload the SOW after the creation of the project and assignment of authorized contractors. The example below shows what the AS/P (will see when they click the “SOW Concurrence” box (shown here as “Active”). The AS/P will select the “Add Document” link and will be shown a box to select the correct location of the file to upload.

The screenshot shows a navigation bar with six tabs: Project Summary (Complete), SOW / Concurrence (Active), Plans (locked), Imagery Data (locked), Survey (locked), and Verification (locked). Below the navigation bar, a message states: "Todd, your next action is: Upload Statement of Work". An action box titled "Action: Upload Statement of Work" contains a blue bar with the text "1. Add required documentation:" and a link "+ Add Document (No documents have been added)".

After the SOW is approved, the system will then task the selected contractor with uploading three possible plans based on the airport category:

- 1) Survey and Quality Control Plan (e.g., PHX_Survey_and_QC_Plan_18B.pdf)
- 2) The Geodetic Control Plan (e.g., PHX_Geodetic_Control_Plan_16A.pdf)
- 3) The Imagery Plan (e.g., PHX_Imagery_Plan_17B.pdf)

(Note: Ensure all files are named appropriately (as they are shown in the examples above) and that they are uploaded into the correct location (the image below shows that the “Geodetic Control Plan” has been selected and the system is ready for you to upload or “Add Document”). Also, ensure that the plan “Description” includes which version of the applied AC regulation you used for the survey. You must click the “Complete” button after each upload has been completed. Plans may be uploaded in any order.)

The screenshot shows the navigation bar with 'SOW / Concurrence' as 'Complete' and 'Plans' as 'Active'. The message below the navigation bar states: "Todd, your next actions are: Upload Survey & Quality Control Plan, Upload Geodetic Control Plan, Upload Imagery Plan". Below this, three tabs are visible: "Geodetic Control Plan" (selected), "Imagery Plan", and "Survey & Quality Control Plan". An action box titled "Action: Upload Geodetic Control Plan" contains a blue bar with the text "1. Add required documentation:" and a link "+ Add Document (No documents have been added)".

Continue uploading all supporting files and documents before moving on to the next plan upload. After the Geodetic Control Plan and its supporting files have been uploaded to the system, you will see an information box appear describing details about the uploaded files (as shown below). Next, select the “Imagery Plan” link (if required) and repeat the file upload process. Complete the same process for the “Survey and Quality Control Plan” (if required).

After all plans and supporting files have been uploaded, the system will task NGS with reviewing

The screenshot shows the navigation bar with 'Project Summary', 'SOW / Concurrence', and 'Plans' all as 'Complete'. The message below the navigation bar states: "Todd, your next actions are: Upload Geodetic Control Data, Upload Imagery Data". Below this, three tabs are visible: "Geodetic Control Plan", "Imagery Plan", and "Survey & Quality Control Plan" (selected). An action box titled "Action: Upload Survey & Quality Control Plan" [] on 10/14/2008" contains a table with the following data:

Date	Added By	Category	File Name	Description
10/14/2008		Survey & Quality Control Plan	_Survey_and_QC_Plan_18B.pdf (0.1MB)	Survey and QC Plan 18B

and either approving or disapproving each plan. If a plan is “disapproved,” the system will then task the contractor to resubmit (upload) a “revised” plan that meets established criteria. Make sure all revised plans are labeled as revisions (e.g., Rev 1, Rev 2, etc.).

Testing and Submitting the Survey File

Surveyors and contractors can test their drawing files before they upload them to AGIS for validation. Running this “offline” test saves the contractor the time it would take to upload the file to the system, while providing the same level of validation feedback. You can find this “offline” testing tool on the front page of AGIS under “My Tools → Test a Survey File.” The system will ask the user to identify the airport (follow the directions in blue under the input box). Click the “Submit” button after the airport selection has been completed.

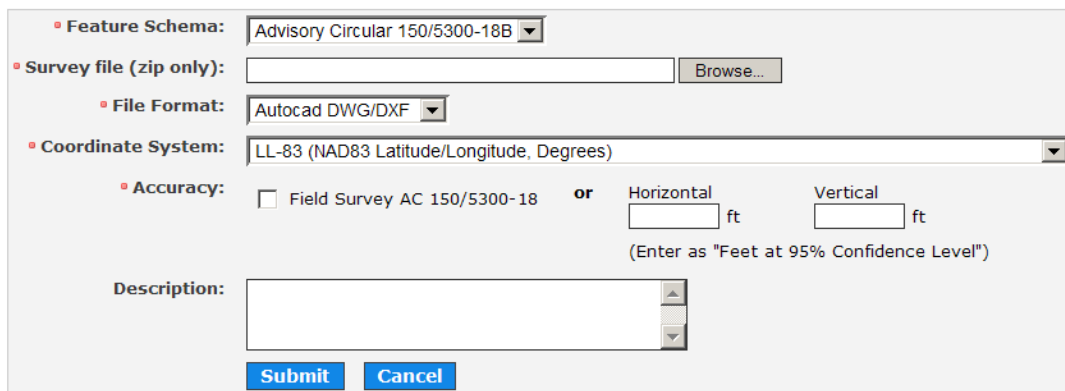
New Survey File Test



The system advances the user to the data inquiry screen below. The user must fill out all information pertaining to the survey file. After all data has been selected, click on the “Submit” button at the bottom of the page.

: Survey File Upload

This project is to **test** survey files for data standard compliance. | [Start a New Survey File Test](#)



The system will now show a blue “Uploading” screen. After the system has loaded the survey file into the test program, it will produce a “Survey File Details” page. Next to “Status:” there will be two rotating arrows and the words “Transforming Features.” The validation process is not complete until the two arrows are replaced with the results of the validation.

Survey File Upload	Survey File Download	Validation Summary	Validation Errors	Feature Viewer
--------------------	----------------------	--------------------	-------------------	----------------

Status: Transforming Features
Actions: Re-Upload Survey File | Change Survey Parameters
Date Processed: 03/02/2009 01:50 PM
Feature Schema: Advisory Circular 150/5300-18B
File: _Intl_Airport.zip
Data Format: autocad
Accuracy: Meets 5300/18

Item	Count
Total Features Uploaded:	
Number of Valid 5300/18 Features:	
Number of Invalid Features:	
Number of Attribute Errors:	
Number of General Errors:	

After the file has been validated, the “Status:” will change (to look like the screen below). It is now ready for your review.

: Survey File Details

This project is to **test** survey files for data standard compliance. | [Start a New Survey File Test](#)

Survey File Upload	Survey File Download	Validation Summary	Validation Errors	Feature Viewer
--------------------	----------------------	--------------------	-------------------	----------------

Status: Survey file contains 1 errors.
 Please review [validation errors](#).
 Then modify your survey file, and re-upload.
Actions: [Re-Upload Survey File](#) | [Change Survey Parameters](#)
Date Processed: 03/02/2009 01:56 PM
Feature Schema: Advisory Circular 150/5300-18B
File: _Airport.zip
Data Format: autocad
Accuracy: Meets 5300/18
Coordinate System: 83-NF
Description:
Administrators only: TransactionID: 100887, Node: 192.168.1.129, Log: [View](#)

Item	Count
Total Features Uploaded:	3513
Number of Valid 5300/18 Features:	3513
Number of Invalid Features:	0
Number of Attribute Errors:	0
Number of General Errors:	1

Feature List

AIRFIELDLIGHT (133)	FENCE (333)	OBSTRUCTIONAREA (86)	SHORELINE (3)
AIRPORTBOUNDARY (1)	FLORASPECIESSITE (83)	OBSTRUCTIONIDSURFACE (22)	SHOULDER (1)
AIRPORTCONTROLPOINT (204)	FORESTSTANDAREA (164)	PARKINGLOT (44)	TANKSITE (27)
APRON (2)	GATE (8)	ROADSEGMENT (60)	TAXIWAYELEMENT (18)
BRIDGE (5)	MARKINGAREA (57)	RUNWAY (2)	TAXIWAYHOLDINGPOSITION (16)
BUILDING (253)	MARKINGLINE (74)	RUNWAYBLASTPAD (1)	TOWER (7)
CONSTRUCTIONAREA (4)	NAVAIDEQUIPMENT (12)	RUNWAYCENTERLINE (2)	UTILITYPOINT (107)
DRIVEWAYAREA (13)	OBSTACLE (1710)	RUNWAYEND (4)	WETLAND (57)

A “Feature List” summary is shown at the bottom of the page. This list identifies the number of each feature that is located in the file. Surveyors should focus on the “Validation Summary” tab and the “Validation Errors” tab. These two pages will list all errors associated with feature and attributes in the survey file.

Testing a Survey File—Validation Summary Example

The following is a sample “Validation Summary” screen:

: Validation Report

This project is to **test** survey files for data standard compliance. | [Start a New Survey File Test](#)

Survey File Upload	Survey File Download	Validation Summary	Validation Errors	Feature Viewer
--------------------	----------------------	--------------------	-------------------	----------------

Legend: OK Error Information No Data / Unable to Evaluate

Feature Data Screen

- Required Attributes Containing Null Values
- Attributes Not Matching the Stored Enumerations
- Attributes Containing Invalid Data Types
- Invalid AC5300/18 Feature Names
- Invalid Feature Geometry Types

Airport

- Check Feature Distance From Selected NASR Airport 1
- Check Validity of Airport Reference Point
- Check Validity of Airport Elevation Value

Navaid

- Check Validity of NAVAID Equipment Type
- Check Validity of NAVAID Equipment Point
- Check Validity of NAVAID Equipment Elevation
- Check Validity of NAVAID Equipment Facility Id

Obstacle

- Check Validity of Obstacle Point
- Check Validity of Obstacle Type Code
- Check Validity of Obstacle Elevation
- Check Validity of Obstacle Marking Type Code
- Check Validity of Obstacle Source Code

Other

- Check for Valid NASR Airport Value

Runway

- Check Validity of Runway Geometry
- Check Validity of Runway Status
- Check Validity of Runway Length
- Check Validity of Runway Width
- Check Validity of Runway Surface Type
- Check Validity of Runway Surface Material
- Check Validity of Runway Surface Condition
- Check Validity of Runway Identifier
- Check for Two Existing Ends Per Runway
- Check Validity of Calculated Lengths (based on ends)
- Check Calculated Runway Length Against Stored Attribute
- Check Validity of Calculated Widths
- Check Calculated Runway Width Against Stored Attribute
- Check Validity of Runway End Identifier
- Check Validity of Runway End Point
- Check Validity of Runway End Point Elevation
- Check Validity of Touchdown Zone Elevation
- Check Validity of Ellipsoid Elevation
- Check Validity of Runway End Threshold Type
- Check Validity of Runway End True Bearing
- Check Validity of Calculated Bearing (based on ends)

Testing Survey Files—Validation Errors Summary

Click on the item listed under the “Validation Errors List:” to see detailed information about each error.

: Validation Errors

This project is to **test** survey files for data standard compliance. | [Start a New Survey File Test](#)

Survey File Upload	Survey File Download	Validation Summary	Validation Errors	Feature Viewer
--------------------	----------------------	--------------------	-------------------	----------------

Validation Errors List:

[General Errors \(1\)](#)

Errors for Feature: GENERAL

#	Category	Error	Attribute	Attribute Value	Latitude	Longitude
1	GENERAL	The centroid of sampled features is 1022.3 Nautical Miles from the airport		NULL		

Common Mistakes Made With the Airport GIS System

AS/Ps Common Mistakes

These come directly from the AAS-100 AGIS Program Manager:

- 1.) Not knowing or understanding AC 150/5300-16/-17/-18 survey requirements.
- 2.) Using a SOW from the engineering firm in lieu of their own SOW—contractor SOWs normally do not include all required items.
- 3.) Not pressing the “Complete” button after uploading or re-uploading the SOW.
- 4.) Not seeing the Airport Location IDs from the drop-down list (Multiple Airport Authority).
- 5.) Not identifying the correct purpose for the survey from AC 150/5300-18: Table 2-1 during project initiation.
- 6.) Not knowing that the AIP grant number is an optional field on the New Project Form.
- 7.) Only identifying one runway in a SOW for an AAA.
- 8.) Not knowing the difference (in term of workflow process) between “New Airport Survey” and “Existing Airport Data” project type.
- 9.) Not knowing the difference (in term of Workflow process) between “Data Verification and Analysis” and “Data Validation” option on the New Project Form.

Contractors and Surveyors Common Mistakes

These come directly from the AAS-100 AGIS Program Manager:

- 1.) Not knowing or understanding AC 150/5300-16/-17/-18 survey requirements.
- 2.) Placing the plan in the wrong document workspace (e.g., Placing the SQCP under the SOW workspace, or placing the GCP under the SQCP workspace, etc.)
- 3.) Not pressing the “Complete” button after uploading or re-uploading a plan or data.
- 4.) Entering comments and pressing the “Complete” button before uploading the plan or data (as a result, the workspace is locked out and the user is unable to upload plans or data).
- 5.) Mixing AC 150/5300-18A and AC 150/5300-18B features and attributes in drawings (Data Migration Tool (DMT) issue).
- 6.) Modeling airport surfaces from displaced thresholds instead of the runway end.
- 7.) Not knowing the difference between FAA No. 405 Survey Requirements and AGIS requirements (AC 150/5300-16/-17/-18).
- 8.) Not knowing who will take the next step of action for his or her project.
- 9.) Not knowing that he or she can use the “Add New Note” function to add project comments or submit Project Weekly Reports.

Reserved

SECTION 5: FUTURE TOOLS IN DEVELOPMENT

AAS-101 has been working to come up with educational solutions that will improve everyone's understanding of the working processes associated with an airport survey. We would like to share with you some of the issues we have been dealing with as well as the solutions AAS-101 personnel have come up with to eliminate and reduce their impact.

Knowledge Based FAQ Generator

Issue #1: Repeatedly Asked Questions (and Their Answers)

The first issue we have been having is the number of calls and e-mails we have been receiving from AS/Ps, contractors, and surveyors about the new ACs.

Solution: AAS-101 is currently pursuing the purchase of a software package that will allow us to create an online information knowledge base of Frequently Asked Questions (FAQ) and documented cross references. Users will be able to log-in, select a specific AC, and query the database for questions containing specific words, data, or query topics on a specific paragraph. The system will then display a list of questions in the database related to the query. The user will be able to select the question that most fits what they are looking for and see the answer that was provided by AAS-101. If the user can't find their question, users can "post" a question to the system. The question is reviewed by a system administrator and forwarded to the specific SME for processing. The final solution is e-mailed to the user and the question and answer are added to the AC knowledge base. AAS-101 is looking to implement this as soon as we get purchase approval.

AC Web-Based Training

Issue #2: Educational Resources for AAS-101 ACs

AAS-101 understands there is a need for educational resources for airport associated personnel. Because of Issue #1 above, community education has become one of our focal points.

Solution: AAS-101 has recently created requirements for an online distance learning website geared for airports personnel, surveyors, and contractors. This online training site will focus on three tiers of training: AS/Ps, regional and multi-airport supervisory personnel, and surveyors and contractors.

AGIS Web-Based Training

Issue #3: AGIS Training


AAS-101 has been asked several times about adding additional "in-house" AGIS training classes. The original training classes were given to select Airport District Office and Regional managers so they could act as site support for their region.


Solution: AAS-101 understands the need for AGIS training classes. We are planning to add additional classes in the near future (possibly the June–July 2009 timeframe). The "where and when" of these classes has yet to be determined.


SECTION 6: IN CLOSING

AAS-101 hopes that this document has given you some insight into the new survey ACs and the procedures contained within them. Our ultimate goal is to ensure all airport survey criteria is accurate, up-to-date, and organized. This will ensure all survey data we receive is the same way.

Be sure to watch for the next quarterly newsletter for updates and information on web-based training and the new Frequently Asked Questions website we will be hosting.

 U.S. Department of Transportation Federal Aviation Administration	<h1>Advisory Circular</h1>
<hr/>	
Subject: General Guidance and Specifications for Aeronautical Surveys: Establishment of Geodetic Control and Submission to the National Geodetic Survey	Date: 9/15/2007 AC No: 150/5300-16A Initiated by: AAS-100 Change:

 U.S. Department of Transportation Federal Aviation Administration	<h1>Advisory Circular</h1>
<hr/>	
Subject: General Guidance and Specifications for Aeronautical Survey Airport Imagery Acquisition and Submission to the National Geodetic Survey	Date: 9/29/08 AC No: 150/5300-17B Initiated by: AAS-100 Change:

 U.S. Department of Transportation Federal Aviation Administration	<h1>Advisory Circular</h1>
<hr/>	
Subject: GENERAL GUIDANCE AND SPECIFICATIONS FOR SUBMISSION OF AERONAUTICAL SURVEYS TO NGS: FIELD DATA COLLECTION AND GEOGRAPHIC INFORMATION SYSTEM (GIS) STANDARDS	Date: DRAFT AC No: 150/5300-18B Initiated by: AAS-100

SECTION 7: ACRONYMS

AAA	Airport Airspace Analysis
AAS-101	Office of Airport Safety & Standards—Airport Engineering Division
AC	Advisory Circular
ADO	Airport District Office
ADT	Airport Design Tool
AE	Airport Elevation
AOC	Airport Obstruction Chart
AS/P	Airport Sponsor/Proponent
ATC	Air Traffic Control
AZ	Arizona
CADD	Computer-Aided Design and Drafting
CORS	Continuously Operating Reference Stations
e-ALP	Electronic Airport Layout Plan
FAA	Federal Aviation Administration
FAQ	Frequently Asked Questions
GIS	Geographic Information System
GCP	Geodetic Control Plan
GPS	Global Positioning System
HARN	High Accuracy Reference Network
LPV	Localizer Performance with Vertical Guidance
NAS	National Airspace System
NGS	National Geodetic Survey
NPIAS	National Plan of Integrated Airport Systems
NSRS	National Spatial Reference System
NVG	Non-Vertically Guided (Runway use designation)
OE	Obstruction Evaluation
<u>OPUS</u>	NGS Online Positioning User Service
PACS	Primary Airport Control Station
POC	Point of Contact
<u>RMSE</u>	Root Mean Squared Error
SACS	Secondary Airport Control Station
SOAR	System of Airports Reporting
SOW	Statement of Work
SQPC	Survey Quality Control Plan
USPS	United States Postal Service
VG	Vertically Guided (Runway use designation)

SECTION 8: REFERENCES AND WEB LINKS

Request for Proposal

A sample can be found on the [AGIS](#) website main page under “[Resources—Airport Sponsor—Step 2: Hiring a Surveyor—Request For Proposal](#)”

SOW (General)

A sample can be found on the [AGIS](#) website main page under “[Resources—Airport Sponsor—Statement of Work \(General\)](#).” It has also been included in Appendix A of this document.

AirportIQ 5010 Website

<http://www.gcr1.com/5010web/>

FAA AGIS (Jeffrey Steele) <http://www.ngs.noaa.gov/AERO/eAOC/p1635.pdf>

SOW—Use and Implementation Instructions

We extracted the following sample SOW from the AGIS website main page under “Resources—Airport Sponsor—Statement of Work (General).” It is for example use only and does not constitute an official SOW, nor does it take the place of any State or local requirements, guidelines, or formats required by official sources. It is not meant as official guidance but rather an explanation of how the SOW should be developed for each project. It is up to the Region and ADO on the exact use and implementation of this information. (Note: this document refers to the traceability of existing data. We define traceability as “documented evidence (electronic or paper) demonstrating an unbroken trail of the data back to the source (measurements made at the time and point of collection).”)

The first thing that must be identified in the SOW is a generic “Scope of Services” that will be required for the completion of all associated projects. It provides suggested individual statements to define more specific requirements based on the needs of the project. After all of the general requirements have been set forth, identify all specific work experience details about the contractor (these details will be helpful in the selection process (i.e., company or individual survey licenses and qualifications, previous experience with airport surveys, previous experience with dealing with NGS, software experience, etc.).

When collecting data or proposing the use of existing data, each feature (bridge, road, runway, runway end, etc.) must meet the appropriate accuracies (horizontal and vertical) stated in the appropriate advisory circulars at a 95 percent (2 sigma) confidence level before being used. If existing data cannot be traced to the source at this confidence level then it should be recollected.

The AGIS program provides access to the system solely to the airport sponsor and proponent. However, the AS/P may provide their access credentials to a Consultant on a temporary project specific basis, with responsibility for the accuracy and completeness of the data remaining the responsibility of the AS/P.

The requirements identified in Table 2-1 of AC 150/5300-18, “General Guidance and Specifications for Aeronautical Surveys: Airport Survey Data Collection and Geographic Information System Standards” are the minimum necessary for each of the provided examples. However, Regions and ADO’s should specify any additional requirements other than those listed in the SOW supplemental work section by listing the required element to collect as listed or identified in the appropriate advisory circular.

It is expected that Regions and ADO’s will craft the SOW to meet the current and long term needs of the airport and the FAA resulting in the most cost effective data collection project. Where practicable, the data collection requirements of an airport with multiple projects planned or programmed should be specified rather than separate efforts.

APPENDIX A—SAMPLE STATEMENT OF WORK (SOW)

Statement of Work

Airport and Aeronautical Survey Services Supporting Airport Planning, Design and Construction Activities

SCOPE OF SERVICES

The Scope of Services must include all necessary professional engineering, surveying, planning, and project management services related to the completion of the required airport and aeronautical data collection supporting the planning, development or construction activities at _____ . The Advisory Circulars identified below detail the data collection requirements and accuracies for this project.

- AC 150/5300-13 “*Airport Design*”
- 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.*”

Data providers should make maximum use of existing data for the airport which is traceable to the source to meet the requirements of this SOW before undertaking additional data collection. Data collected or proposed for use in a project must meet the tolerances specified in the above Advisory Circulars at the 95 percent confidence level (RMSE) before being used in the project or as part of the required deliverables.

The Consultant will submit all data collected and associated required deliverables in the format(s) specified as outlined in the appropriate advisory circular to the AS/P who will ensure the data is submitted to the FAA Office of Airports, Airport Surveying-GIS Program. All data submissions to the FAA will be through the program’s web site at <http://Airports-GIS.faa.gov>. The web site also provides guidance on the proper preparation of data for National Geodetic Survey (NGS) for verification.

The Consultant will submit weekly project status reports on the project through the program web site. The reports will contain progress updates and any significant issues with the project including deviations from the planned schedule.

At the conclusion of this contract, a copy of all the data collected will be turned over to the AS/P.

Specific services must include but are not limited to:

- Prior to commencement of fieldwork, the Consultant will submit Survey and Quality Control Plans to the Airport Surveying – GIS Program Manager via the Airports Geographic Information System website at <https://airports-gis.faa.gov> for review and approval. No fieldwork will be performed prior to review and acceptance of the plan by the governing agencies. A separate plan will be developed for each airport. Consultants should identify any special circumstances or unusual conditions which may impact the team’s approach to completion of fieldwork.
- The Consultant will tie the airport survey to the National Spatial Reference System (NSRS) using a (*select one*) [permanent](#) or [temporary](#) connection processed according to [AC 150/5300-16](#). Consultants will provide the required deliverables identified in the appropriate AC through the AGIS web site.

If the project involves the collection of Airport Safety Critical Data as defined in AC 150/5300-18, the following statement must be included.

- In support of the data collection efforts and government photogrammetric analysis and acceptability determination, the Consultant will acquire imagery and submit the required deliverables as specified in AC 150/5300-17 “General Guidance and Specifications for Aeronautical Surveys: Airport Imagery Acquisition and Submission to the National Geodetic Survey.” The Consultant will ensure they collect digital stereo aerial imagery covering the entire area of analysis including required sidelap and overlap. The imagery will be used for government verification ensuring the survey data adheres to the quality requirements set forth by FAA AC 150/5300-18. Submission of field data will not occur without government acceptance of aerial imagery. Aerial photography or imagery will be submitted directly to NGS at the address listed in AC 150/5300-17 on an appropriately labeled recordable media such as CD, DVD, portable hard drive etc., with the label identifying the airport and company contact information. In order to provide the most current imagery for analysis, it should be collected within 6 months of the start of field survey operations.

If the project involves the completion of an Airport Airspace Analysis as defined in AC 150/5300-18 or the determination of objects affecting navigable airspace under 14 CFR 77 the following statement must be included.

- The Consultant will conduct an Airport Airspace Analysis for runways _____ (i.e., 18/36 or 09/27) using the standards established for (select one) Vertically Guided or Non-Vertically Guided instrument approach procedures.

or

- The Consultant will conduct an Airport Airspace Analysis for objects affecting navigable airspace according to 14 Code of Federal Regulations Part 77 and AC 150/5070-6 “Airport Master Plans.” (select one) Vertically Guided or Non-Vertically Guided instrument approach procedures.

NOTE: Since the representation for instrument approach development (representative objects) and Part 77 (all objects penetrating) Regions/ADO’s should consider combining these requirements when practicable.

If the project involves the collection/determination of navigational aids defined in AC 150/5300-18 the following statement must be included identifying which navigational aids should be collected.

- Collect the position, elevation, and where required, the appropriate navigational aid perpendicular point of (specify one or both conditions) all electronic and visual navigational aids (NAVAIDS) on the airport and/or associated with a current instrument approach servicing the airport,

If the project involves the collection/determination of runway elevation profiles as defined in AC 150/5300-18 the following statement must be included identifying which defined standard (interval) should be collected. At certificated airports, a 10 foot interval and associated supplemental offset collection is required.

- The Consultant will collect and submit runway elevation profiles for (specify all or specific runways) according to the standards in AC 150/5300-18 at (specify) 10 or 50 foot intervals. The Consultant (select one) will or will not collect and provide 10-foot supplementary offset runway elevation profiles.

If the project involves the collection/determination of Sub-surface Utilities specify the level of collection required as defined in AC 150/5300-18. You should specify the collection level required which is not always the most accurate, sound judgment should be used to ensure against over inflating the requirement and driving up the cost.

- The Consultant will locate, identify, and classify the sub-surface utilities (or specific utilities) to Quality Level (specify level using letters A – D, with quality level A being the highest level of confidence and quality level D being of the lowest confidence). Classify the utilities according to the standards as outlined in AC 150/5300-18.

If the project involves a runway end supporting Category II/III operations, the collection/determination of topographic information for the Category II and III operation area as defined in AC 150/5300-18 the following statement must be included identifying the required contour interval.

- The Consultant will determine and provide topographic relief of the Category II and III operations area as defined in AC 150/5300-18 using ____ (specify) foot contours.

If the project involves a the collection of topographic information for the airport as defined in AC 150/5300-18 or AC 150/5070-6, the following statement must be included identifying the required contour interval.

- The Consultant will provide topographic relief for the Airport Operations Area using ____ (specify) foot contours.

If the project involves the collection of data supporting the development of an Airport Mapping Database (moving map) as defined in AC 150/5300-18, the following statement must be included identifying what information is required.

- The Consultant will locate, identify, and classify (according to AC 150/5300-18) all vertical objects exceeding 1.5 feet above the nearest movement area surface within 165 feet laterally of the edge of the movement area, excluding the runways. For all runways, analyze, identify, classify and report all vertical objects exceeding 1.5 feet above the elevation of the nearest runway surface surrounding the runway. The lateral area of consideration for runway analysis begins at the edge of the runway and extends until it is 300 feet from the centerline. Additionally, the consultant will locate and classify all (select one or both) [airport movement area markings](#) and/or [all non-movement area markings](#) according to the standard of AC 150/5300-18.
- This task must be completed within _____ calendar days from Notice-To-Proceed.

SPECIFIC PROJECT REQUIREMENTS

Prior to execution of the work order, the Consultant must provide to the sponsor / proponent the following:

1. Identify the Project Manager who should be a registered licensed surveyor or professional engineer in the (select one) [State of](#), [Commonwealth of](#), [District of](#), XXXXXXXXXXXXXXXXXXXXXXXX.
2. Written summary of:
 - a. Experience in survey projects, especially those utilizing Global Positioning System collection methods.
 - b. Experience with NGS specifications, standards, and software. Give examples of using required data submission formats and required survey accuracies, etc.
 - c. Knowledge of the National Spatial Reference System (NSRS), NGS Continuously Operating Reference Stations (CORS), horizontal and vertical controls, and the High Accuracy Reference Network (HARN).
 - d. Experience using CORS data to establish geodetic ties to NSRS.
 - e. Experience in establishing aerial photography, photo control points, reading and annotating information on aerial photography.
 - f. Experience in recovering marks, setting marks, and writing station descriptions of survey marks to NGS standards.
3. Description of the methodology for surveying/consulting services to be provided in the Scope of Work (identify action items, timeliness, necessary airport resources and information).
4. Document(s) detailing how the Consultant will manage, track, and oversee the project execution from start to finish. The Consultant will identify any project management software/tools they expect to use.
5. If not already accomplished under the Consultant’s Agreement, insurance of the types and in the amounts considered reasonable and within normal customs or required by law must be purchased and maintained by the Consultant and any of its sub-contractors during the life of the project and for the period following completion thereof.
6. A project schedule identifying the milestones through the life of the project.

SUPPLEMENTAL WORK

At any time during the period of the project, AS/P may request that the Consultant expand the services identified in the scope of work to include additional aeronautical surveys for the airport or other airports. If these services become needed, AS/P would request the Consultant for an amended Scope of Work.