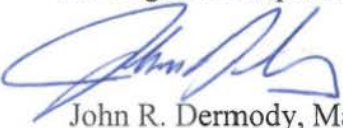




Federal Aviation Administration

Memorandum

Date: NOV 15 2013
To: All Regional Airports Division Managers
From:  John R. Dermody, Manager, Airport Engineering, AAS-100
Subject: INFORMATION: Engineering Brief No. 91, Management of Vegetation
in the Airport Environment

This Engineering Brief (EB) provides new information and requirements for the management of vegetation on and/or surrounding an airport. This EB provides information on the removal or topping of vegetation as well as the collection, submission, and management of the supporting data regarding vegetation.

Attachment



FAA
Airport Safety and Standards

ENGINEERING BRIEF #91

Management of Vegetation in the Airport Environment

I. Purpose.

This Engineering Brief (EB) details how airport owners and operators collect, submit, and manage the data describing vegetation, on or near the airport, that affects or has the potential to affect the safe and efficient use of the airport. This document explains how to limit the effects of existing airport airspace objects and prevent future airport object penetrations of airport surfaces by proactively collecting, reporting, and managing data about the vegetation on and/or surrounding an airport.

II. Background.

As the Federal Aviation Administration (FAA) and the aviation industry move toward a data-centric environment, airport owners and operators need to know how to proactively manage vegetation heights. Historically, determining and reporting the height of vegetation on and surrounding the airport was necessary only when the vegetation penetrated an airport surface or when the vegetation posed a potential to adversely affect airport operations such as an instrument approach. This reactive approach to the collection, reporting, and management of vegetation heights resulted in undesirable changes to instrument and visual operations at airports. When you proactively collect, submit, and manage the heights of vegetation on and/or surrounding your airport, the FAA can use these known heights to optimize the instrument approach minimum altitudes without compromising the minimum required obstacle clearance. Using known heights is preferable. The alternative is to rely upon Adverse Assumption Obstacles¹ or maximum vegetation heights when developing instrument flight procedures or determining the effect of the vegetation on visual operations at the airport.

III. Application.

We recommend airports implement the following proactive measures to mitigate the effects of existing airport airspace objects (specifically vegetation) and prevent future effects on airport operations by ensuring vegetation does not block or impair instrument or visual operations of the airport. This EB provides a supplemental means of compliance with standards outlined in Advisory Circulars AC 150/5300-18 and AC 150/5300-13.

¹ Pursuant to the provisions of 14 CFR § 77.9, “Construction or alteration requiring notice,” and FAA Order 8260.19, “Flight Procedures and Airspace,” an Adverse Assumption Obstacle (AAO) of 200 feet AGL is assumed to exist at and beyond a specified distance (radius) from the nearest landing surface at a given airport/helipad.

IV. Description.

This EB provides new information and requirements for the management of vegetation on and/or surrounding an airport. This EB provides information on the removal or topping of vegetation as well as the collection, submission, and management of the supporting data regarding vegetation.

V. Effective dates.

This EB is effective after signature by the Manager, FAA Airport Engineering Division, AAS-100.

VI. Applicable documents.**FAA Advisory Circulars:**

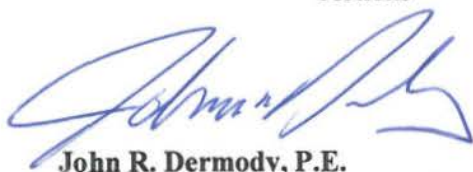
AC 150/5300-18 General Guidance and Specifications for Submission of Aeronautical Surveys to
NGS: Field Data Collection and Geographic Information System (GIS) Standards

AC 150/5300-13 Airport Design

FAA Orders:

Order 1050.1 Environmental Impacts, Policies and Procedures

Order 5050.4 National Environmental Policy Act (NEPA) Implementing Instructions for Airport
Actions



John R. Dermody, P.E.
Manager, Airport Engineering Division (AAS-100)

1.0 General

1.1 Protect the airport for instrument and visual operations

To maintain land use compatibility around airports and protect surfaces associated with instrument and visual operations of the airport, it is recommended to protect terminal airspace by clearing bushes and trees that penetrate or have the potential to penetrate any applicable navigable surfaces. It is recommended that airport operators ensure protection of these operations by removing, lowering, relocating, marking, lighting, or otherwise mitigating existing objects and preventing the existence of objects surrounding the airport that could impair future operations. For the purposes of this EB, the relevant area surrounding the airport includes the Approach/Departure Requirements surfaces defined in the approach/departure standards table in AC 150/5300-13 for protection of instrument and visual operations and any applicable surfaces defined in Order 8260.3, United States Standard for Terminal Instrument Procedures (TERPS).

1.2 Environmental considerations

Protection of our natural resources while maintaining the safety and efficiency of airports is a prime consideration in all projects. If the National Environmental Policy Act (NEPA) is triggered for the project, the FAA will determine what level of environmental review is required, and will evaluate the applicability of special purpose laws (e.g., federal laws, regulations, executive orders, or agency orders that are outside of NEPA and address particular resources). Coordination with the FAA Airports Regional or District Office to satisfy NEPA and other environmental obligations is only required for federally-funded projects or when the operator of a federally-obligated airport is proposing an activity that triggers a federal action. Airspace studies for clearing projects may be required for any project. NEPA requires Sponsors to disclose publicly a clear, accurate description of potential environmental impacts and reasonable alternatives to the proposed action. FAA Order 5050.4, National Environmental Policy Act (NEPA) Implementing Instructions for Airport Projects, and FAA Order 1050.1, Policies and Procedures for Considering Environmental Impacts, provide guidance for meeting NEPA requirements. Discuss environmental considerations with your respective FAA project manager and environmental specialist prior to planning or executing these projects utilizing federal grant funds.

1.3 Airport Improvement Program (AIP) eligibility

Sponsors should consult with FAA Regional/Airports District Office to discuss AIP eligibility and justification for a specific project. Should the FAA Region/ADO determine the project is eligible and justified, the grant should accommodate the cost for data collection according to Airport GIS requirements defined in AC 150/5300-18 and data submission to the FAA Airports GIS website.

2.0 Tree Removal and/or Topping

2.1 On-airport property

Determine the best alternative to protect the instrument and visual operations surfaces from penetration. Outside safety areas and object free areas (see AC 150/5300-13), environmental concerns or soil stabilization parameters may suggest methods preferred over tree removal. When removing trees, cut each one selected for removal flush to the ground and ensure no growth reoccurs. Growth can be stopped chemically or by physical removal of the stump. Clear all debris from airport property.

2.2 On private property (off-airport) using existing avigation easement

The preferred option is the complete removal of penetrating trees using chemical or physical means to ensure that no growth reoccurs. If necessary to gain an owner's agreement, offer to replace the trees with a lower growing tree species that provides the necessary clearance at its ultimate height. As a last option, top trees to provide the necessary clearance if permitted by the executed easement. Note, however, that topping trees will result in recurring costs and can be intrusive to property owners.

2.2.1 When topping trees, the resultant elevation Mean Sea Level (with respect to North American Datum of 1988 (NAVD-88) must provide for at least 5 years of growth below the instrument or visual surface requiring protection. A number of factors affect tree growth on a particular site. Some examples include: species; soil condition (texture, compaction, etc.); soil nutrients; moisture; space; genetics; whether the trees are native or exotic; and the interactions of these variables. Due to these complexities a one-size-fits-all approach is not feasible. Either use an annual normalized growth rate of 2.5 feet per year or determine the growth rate of similar trees near the airport with the assistance of the State Forester or the U.S. Forest Service. Include the documentation supporting the determination in the data collection project in Airports GIS.

2.2.2 In discussing with property owners which option is more suitable, be sure to advise them the U.S. Department of Agriculture warns against the topping of trees because this makes them more prone to decay and rot from organisms entering the wounds on the top of the tree. If the property owner prefers to top a tree rather than remove it, you should develop a Tree Maintenance Program (see paragraph 2.4) to ensure the growth of trees does not adversely affect airport operations.

2.3 On private property (off-airport) currently without avigation easement

These projects (i.e., involving tree removal and/or topping) generally are a two -step process. First, attempt to negotiate an avigation easement with the property owner. Second, assuming the airport is able to obtain an easement, remove or top trees located on the property. The preferred option is complete removal of penetrating trees using chemical or physical means to ensure that no growth recurs. However, many property owners value their vegetation, including trees, and may not agree to removal but would be open to permitting the topping of their trees to provide the necessary clearance.

2.3.1 When topping trees the resulting elevation Mean Sea Level (with respect to NAVD-88) must provide for at least 5 years of growth below the instrument or visual surface requiring protection. A number of factors affect tree growth on a particular site. Some examples include: species, soil condition (texture, compaction, etc.), soil nutrients; moisture; space; genetics; whether the trees are native or exotic; and the interactions of these variables. Due to these complexities a one size fits all approach is not feasible. Either use an annual normalized growth rate of 2.5 feet per year or determine the growth rate of similar trees near the airport with the assistance of the State Forester or the U.S. Forest Service. Include the documentation supporting the determination in the data collection project in Airports GIS.

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2.4 Tree maintenance program

When trees are topped rather than removed, there is a recurring need for tree maintenance to make sure tree growth does not penetrate the instrument or visual protection surfaces for the airport. Validate the

height of the topped trees at a minimum every 3 years to make sure the surfaces remain clear. This timeline should allow adequate time for budgeting and environmental analysis to accomplish any required maintenance without affecting airport operations. Prior to accomplishing any tree maintenance, provide advance notice to property owners, agencies, and other interested parties affected by the work.

3.0 Data Collection, Submission, and Management

3.1 Collecting and classifying data

3.1.1 Collect the data about vegetation requiring mitigation according to the standards and recommended practices of AC 150/5300-18 and this EB. In some cases, you may need to classify vegetation using the FloraSpeciesSite or ForestStandArea feature and as an obstacle/obstructing area within Airports GIS.

3.1.2 Classify individual vegetation using the FloraSpeciesSite feature and groups of trees or tree lines using the ForestStandArea feature. Enter the following required attributes; all others are optional.

3.1.2.1 FloraSpeciesSite

3.1.2.1.1 name: enter the word TREE

3.1.2.1.2 plantType: identify the type of tree as Deciduous or Evergreen

3.1.2.1.3 plantHeight: identify the height of the tree above ground level measured from the base of the tree.

3.1.2.1.4 endangeredSpeciesActSite: identify if the habitat is designated as a critical habitat under the Endangered Species Act. Valid entries are "C" for critical habitat or "N" for not identified.

3.1.2.2 ForestStandArea

3.1.2.2.1 Name: enter the words TREE LINE

3.1.2.2.2 Ensure the height of the bounding polygon equals the MSL elevation of the highest tree within the boundary.

3.1.3 Classify vegetation on or surrounding the airport penetrating an instrument or visual airport surface or meeting the criteria as a representative object as follows:

3.1.3.1 Identify individual trees using the Obstacle feature. Enter the following required attributes; all others are optional for these types of projects.

3.1.3.1.1 name: enter the word TREE.

3.1.3.1.2 obstacleSource: identify the method used to collect the data.

3.1.3.1.3 aboveGroundLevel: enter the above ground height of the tree measured from the base of the tree.

- 3.1.3.1.4 groupCode: indicate if the tree is part of a group of trees, if so enter “Y” for yes. If the tree is isolated, enter “N” for No.
- 3.1.3.1.5 heightAboveAirport: Calculate and report the AGL (above ground level) height of the tree above the official airport elevation.
- 3.1.3.1.6 heightAboveRunway: Calculate and report the AGL height of the tree over the official runway end elevation. Use the elevation of the runway end where the tree encroaches on the instrument or visual airport surface.
- 3.1.3.1.7 obstructionNumber: If known, provide the obstruction number the FAA obstacle database uses to uniquely identify the object.
- 3.1.3.2 Identify groups of trees using the Obstruction Area feature. Enter the following required attributes; all others are optional for these types of projects.
 - 3.1.3.2.1 name: enter the word TREES or TREE LINE.
 - 3.1.3.2.2 obstacleSource: identify the method used to collect the data.
 - 3.1.3.2.3 aboveGroundLevel: enter the above ground height of the tree defining the total height of the bounding polygon measured from the base of this group of trees. If the terrain differs significantly within the bounding polygon use the average AGL height and in the userFlag attribute, note this value and explain the method you used to determine this value.
 - 3.1.3.2.4 groupCode: Enter “Y” for yes to indicate the object is part of a group of trees.
 - 3.1.3.2.5 heightAboveAirport: Calculate and report the above ground height of the tree defining the total height of the bounding polygon measured from the base of the trees. If the terrain differs significantly within the bounding polygon use the average AGL height and in the userFlag attribute, note this value and explain the method you used to determine this value.
 - 3.1.3.2.6 heightAboveRunway: Calculate and report the above ground height of the tree defining the total height of the bounding polygon measured from the base of the object above the runway end elevation. Use the elevation of the runway end where the tree encroaches on the instrument or visual airport surface.
 - 3.1.3.2.7 obstructionNumber: If known, provide the state coded obstacle number the FAA obstacle database uses to uniquely identify the object.
 - 3.1.3.2.8 obstructionAreaType: enter the value “TREE”.
 - 3.1.3.2.9 length: Calculate and report the overall length of the bounding polygon at its greatest extents.
 - 3.1.3.2.10 width: Calculate and report the overall width of the bounding polygon at its greatest width.

3.2 Submitting data

3.2.1 To submit the required information for these projects, initiate an existing Airports GIS data project like the one shown in Figure 1.

BWI-128178 : Project Summary

« Airports GIS (DEMO Site) »

Print this page

Home Projects Airport View Administration Logout

Project Summary Survey Acceptance

Taurica, your next action(s): Upload Survey

Project Information

Project Type: Existing Airport Data
 Created By: Taurica Dyrnell McMillan on 02/03/2012
 Airport: BALTIMORE/WASHINGTON INTL THURGOOD MARSHAL
[View NASR Data for BWI](#)
 Airport Category: ND/PAS Part 135 Airport
 AIP Grant #: 1-56-1234-210-2011

Surveyor/Consultant Information

[Add/Modify](#)

Name	Organization	Phone	Email
There are no Surveyor/Consultant(s) associated with the Survey Project.			

Project History & Documents

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

Date	User	Action	Notes/Comments
02/03/2012 02:19 PM	Taurica McMillan	Created Project	

Airport Sponsor Information

Contact Name: Taurica Dyrnell McMillan
 Position: Airports GIS System Administrator
 Address: ISI, Inc.
 1201 Maryland Ave SW
 Ste 510
 Washington, DC 20024
 Phone: 202-618-5619
 Email: taurica.ctr.mcmillan@faa.gov

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

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Done

Figure 1 illustrates initiating an existing data project in Airports GIS

3.2.2 The airport or its consultant will use the data upload web page like the one shown in Figure 2 to upload and submit the survey file (.zip) containing the existing data collected previously.

BWI-128178 : Survey File Upload

Feature Schema: Advisory Circular 150/5300-18B

Survey file (zip only):

File Format: Autocad DWG/DXF

Coordinate System: LL-83 (NAD83 Latitude/Longitude, Degrees) or Field Survey AC 150/5300-18

Accuracy: ☐ Field Survey AC 150/5300-18

Description:

Vertical: ft

Horizontal: ft (Enter as "Feet at 95% Confidence Level")

Figure 2 illustrates the survey data upload web page

3.2.3 Once the existing survey file (.zip) has been uploaded and submitted to the system you can accept the survey. The survey data project is now complete and is archived on the Airport GIS website for future reference.

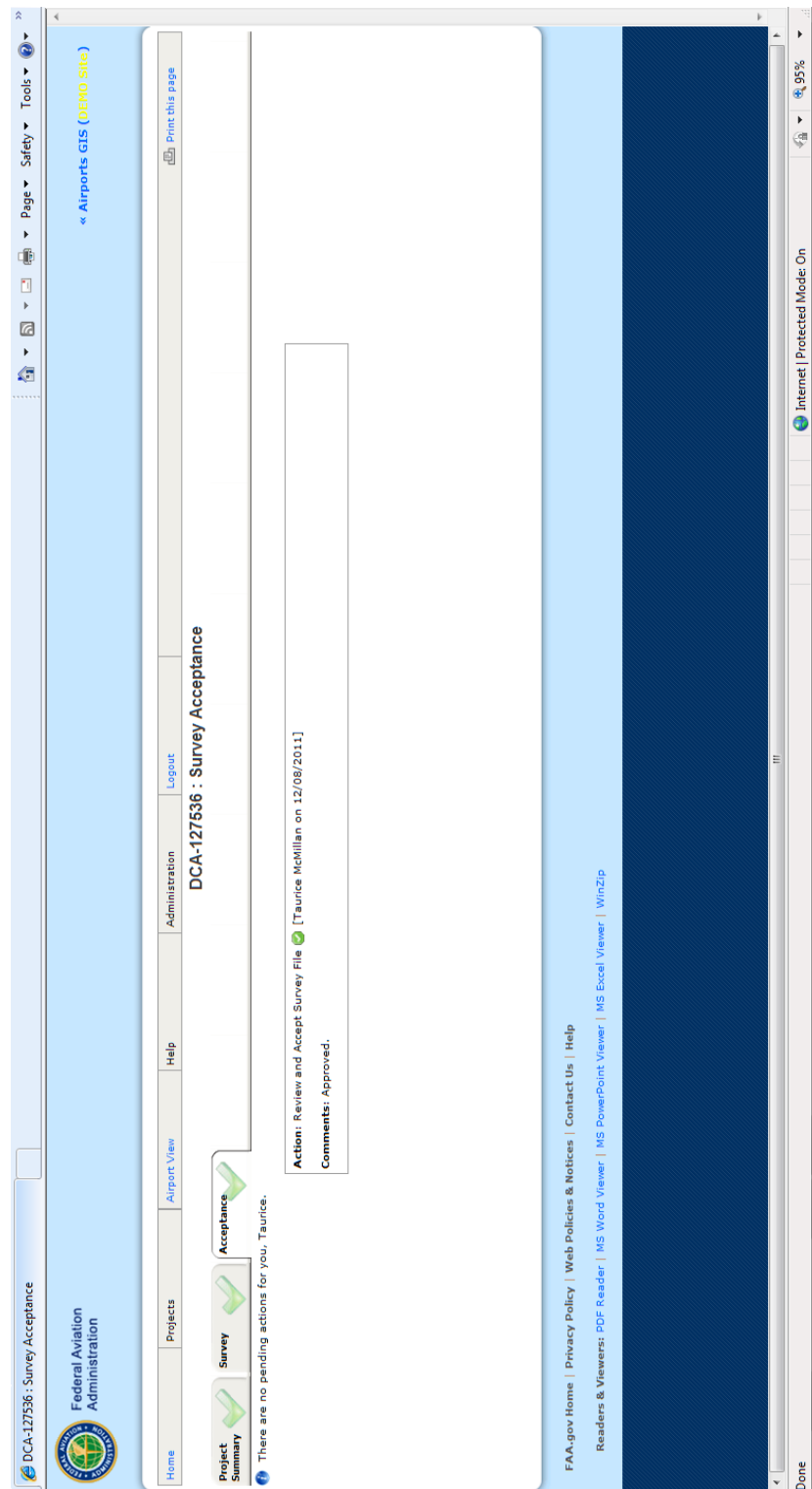


Figure 3 illustrates the survey acceptance web page

3.3 Managing data submissions

3.3.1 Data Submission

3.3.1.1 Figure 4 depicts an existing airport data project during the data submission upload and validation process.

20K-128190 : Survey File Details

Survey File Upload

Status: ▲ Survey file contains non-critical errors. Please review the Validation Summary.

Actions: [Re-Upload Survey File](#) | [Change Survey Parameters](#)

Date Processed: 01/31/2012 12:17 PM

Feature Schema: Advisory Circular 150/5300-18B

File: IAN_shapes_LL-83_127788.zip

Data Format: shape

Accuracy: Meets 530018

Coordinate System: LL-83

Description: There are non-critical errors, however you may still submit this survey.

[Submit for Acceptance](#)

[Force Submission](#)

Feature List

Item	Count
Total Features Uploaded:	6225
Number of Valid 530018 Features:	6225
Number of Invalid Features:	0
Number of Warnings & Errors:	1

Feature List

Feature Name	Count
AIRFIELD LIGHT (82)	1
AIRPORT CONTROL POINT (82)	1
AIRPORT SIGN (4)	1
APRON (1) / (64)	1
COORDINATE ID AREA (38)	1
DRIVEWAY AREA (24)	1
LANDMANSEMENT (134)	1
NAVAID EQUIPMENT (5)	1
OBSTACLE (4853)	1
OBSTRUCTION ID AREA (99)	1
OBSTRUCTION SURFACE (11)	1
ROOF (57)	1
RUNWAY (1)	1
RUNWAY CENTERLINE (1)	1
SHORELINE (528)	1
SHOULDER (5)	1
TAXISITE (2)	1
TAXIWAY (1)	1
TAXIWAY CENTERLINE (1)	1
UTILITY LINE (80)	1
UTILITY POINT (111)	1

Figure 4 illustrates the survey upload page

3.3.2 Once you upload the data and after validation is complete, the system displays the details of data submission on the upload page of the survey file details page.

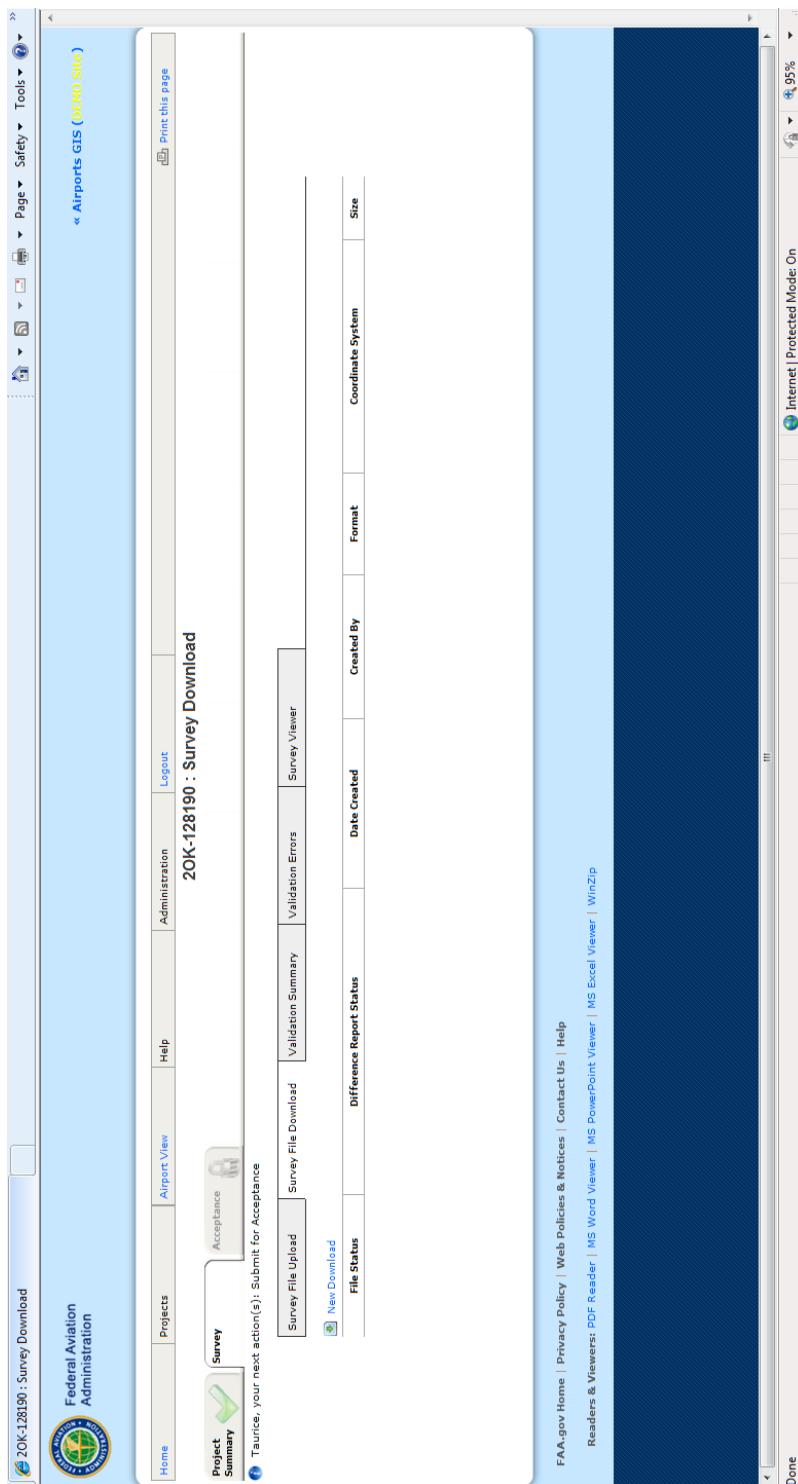


Figure 5 Airport proponents or their authorized representative use the Survey download page to download data in ESRI, AutoCAD, or MicroStation format

3.3.3 To identify errors the system detects, use the Validation Summary and Validation Errors pages.

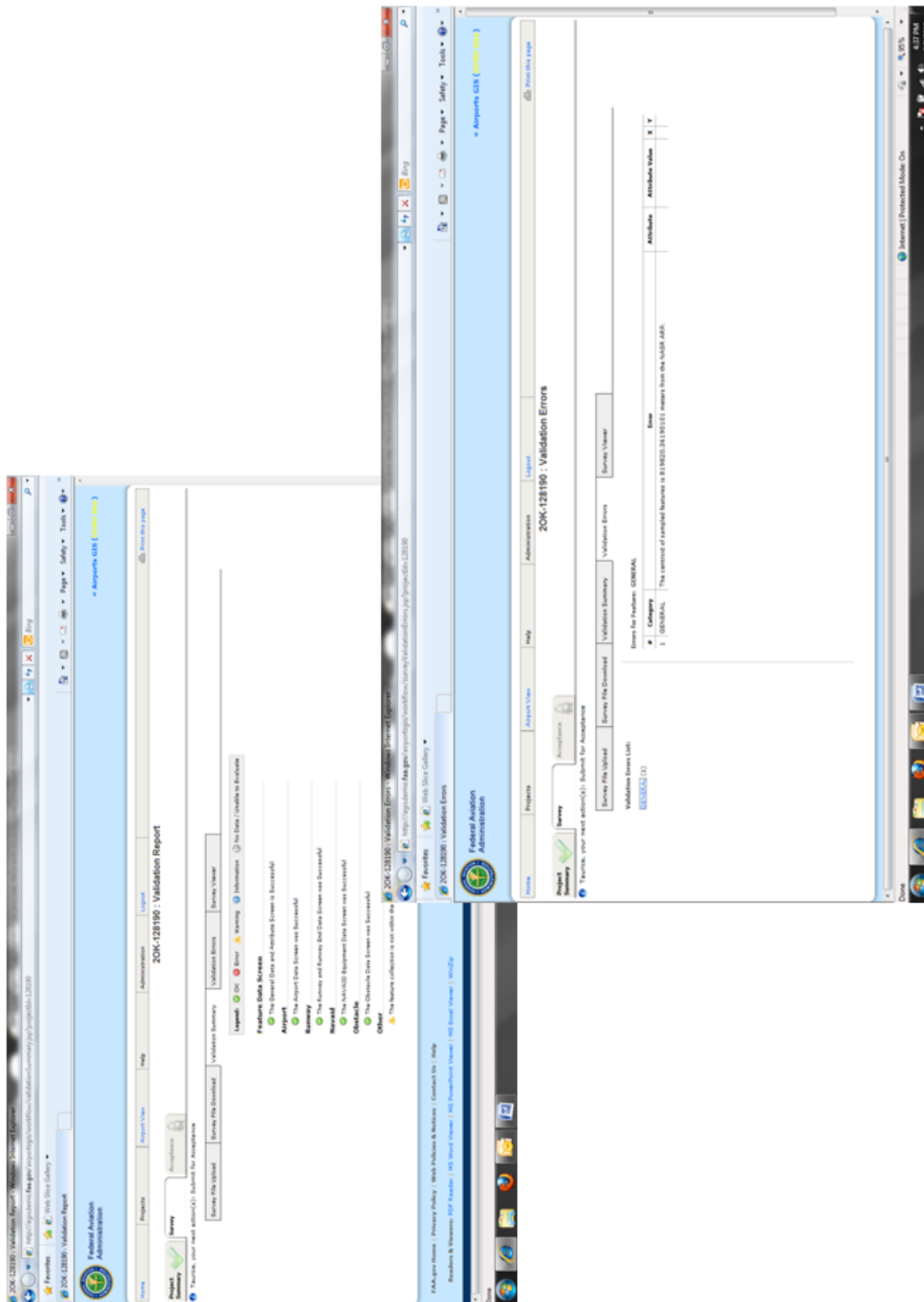


Figure 6 depicts the validation summary and error pages

3.3.4 Click on a specific error to see greater detail on the error.

20K-128190 : Validation Errors

Navigation: Home | Projects | Airport View | Help | Administration | Logout | Print this page

20K-128190 : Validation Errors

Project Summary | Survey | Acceptance

Tauntice, your next action(s): Submit for Acceptance

Survey File Upload | Survey File Download | Validation Summary | Validation Errors | Survey Viewer

Errors for Feature: GENERAL

#	Category	Error	Attribute	Attribute Value	Y
1	GENERAL	The centroid of sampled features is 819820,36190101 meters from the NASR ARP.			

Validation Errors List:

[GENERAL \(1\)](#)

Figure 7 illustrates the validation errors page

3.3.5 The Survey Viewer tool lets you view and analyze the data submission for specific errors. Figure 8 shows the web page containing the link you can click to launch the viewer.

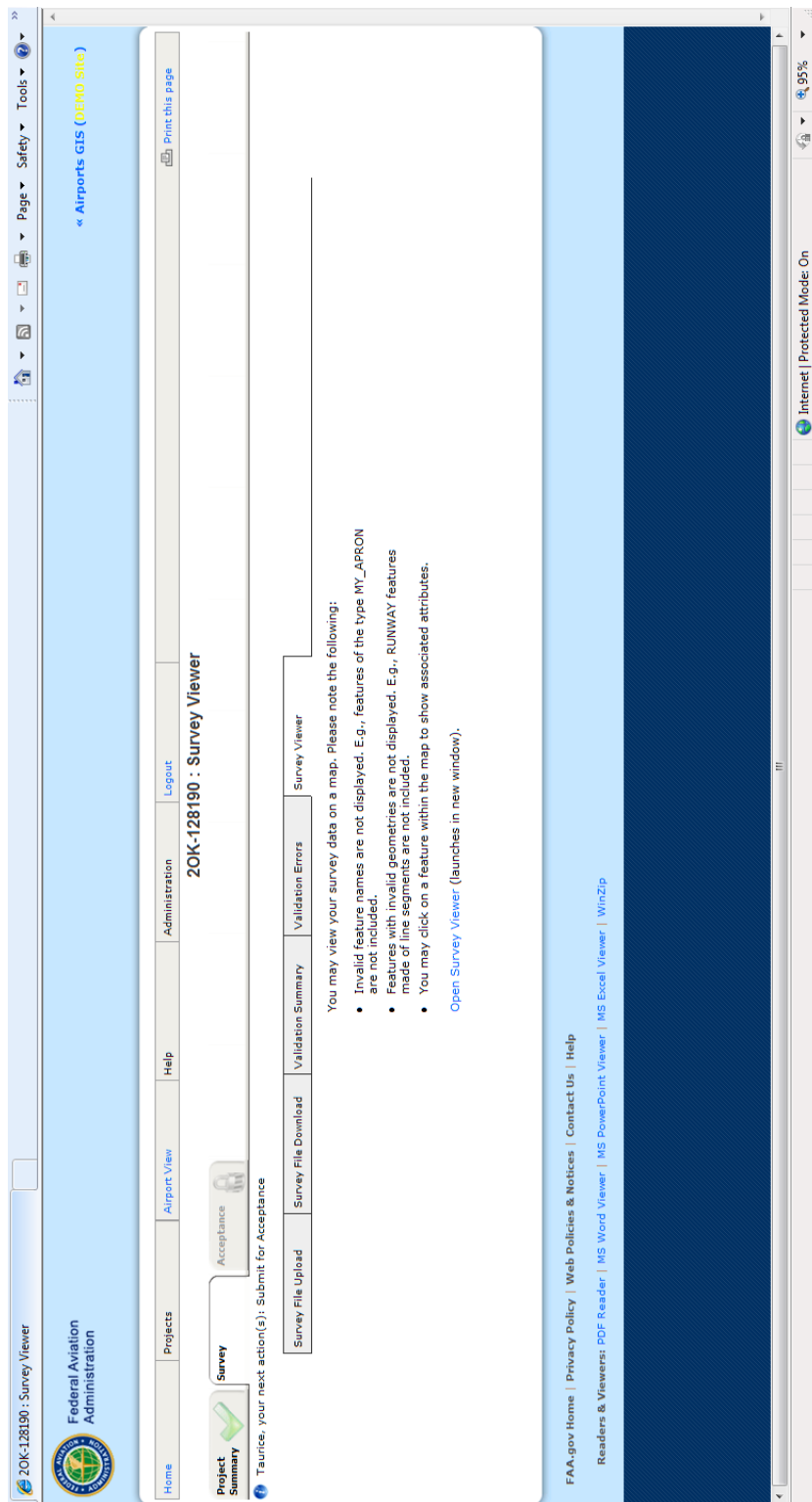


Figure 8 illustrates the launch page for the survey viewer

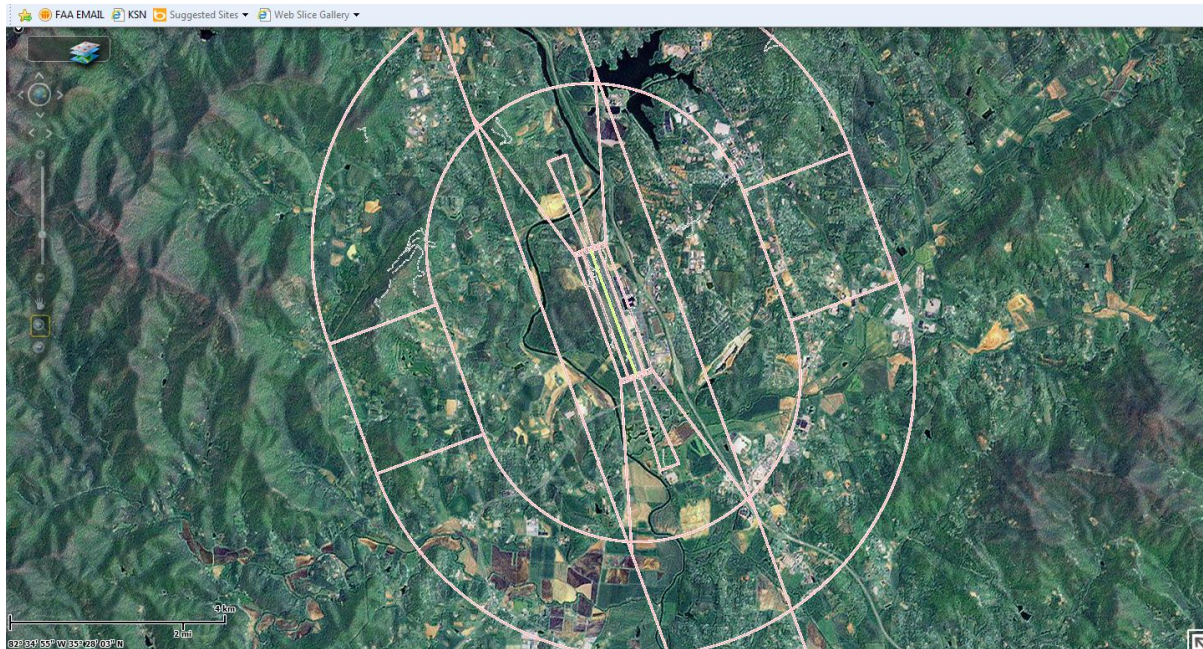


Figure 9 illustrates the survey viewer

3.3.6 Review and make the necessary corrections to the collected data. When you are satisfied with the changes, do the following:

- 3.3.6.1 Upload the revised survey file in the preferred compressed file format (.zip).
- 3.3.6.2 Complete the survey data project upload process by submitting the survey.
- 3.3.6.3 Once the system shows no validation errors, the airport owner/operator can accept the data as valid and complete the project. The survey data project is archived on the Airport GIS website for future reference.

DCA-127536 : Project Summary

« Airports GIS (DEMO Site)

Home Projects Airport View Help Administration Logout Print this page

Project Summary    There are no pending actions for you, Taurice.

Project Information
 Project Type: Existing Airport Data
 Created By: Todd Johnson on 12/08/2011
 Airport: RONALD REAGAN WASHINGTON NATIONAL
[View NASR Data for DCA](#)
 Airport Category: NP1AS Part 139 Airport

Airport Sponsor Information
 Contact Name: Todd Johnson
 Position: Airports GIS System Administrator
 Address: FAA Airport Safety & Standards Contract Support Team
 Suite 510
 Washington, DC 20024
 Phone: 623-980-8485
 Email: todd.g-ctrjohnson@faa.gov

Surveyor/Consultant Information

Name	Organization	Phone	Email
There are no Surveyor/Consultant(s) associated with the Survey Project.			

Project History & Documents
[View All History](#) | [View All Documents](#)

Date	User	Action	Notes/Comments
12/08/2011 03:50 PM	Saugat Joshi	Requested File/Document Download	DCA_shape_LL-83_127536.zip
12/08/2011 02:02 PM	Todd Johnson	Requested File/Document Download	DCA_EALP_AS-BUILT_DATA_FINAL_20111208.zip
12/08/2011 01:54 PM	Marvin Mitchell	Requested File/Document Download	DCA_EALP_AS-BUILT_DATA_FINAL_20111208.zip
12/08/2011 01:46 PM	Todd Johnson	Generated New Survey Download	format: shape, coord sys: LL-83
12/08/2011 12:38 PM	Taurica McMillan	Verified Survey	Approved.
12/08/2011 11:49 AM	Todd Johnson	Added Project Note	This survey data was forced due to non-standard locations for the localizer and glideslope for runway 19. The locations for these nav aids was verified with existing flight check data. TGI
12/08/2011 11:43 AM	Todd Johnson	Submitted Survey	format: autocad, coord sys: VA83-NF, description: This is an AC-18B compliant version of a survey that was previously completed.
12/08/2011 11:24 AM	Todd Johnson	Uploaded Survey File	
12/08/2011 11:23 AM	Todd Johnson	Created Project	

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Figure 10 shows the project summary for the completed project