

ENG- Work Instruction	GUIDELINES FOR EDITING THE KENNEDY SPACE CENTER GEOGRAPHIC INFORMATION SYSTEM (KSCGIS)			Number: ENG-I-GIS01	
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PURPOSE

The purpose of this document is to provide guidelines to be used by the Base Operations & Spaceport Services Contract (BOSS) Geographical Information System (GIS) Support Group when editing the Kennedy Space Center Geographic Information System (KSCGIS). To maintain quality control and consistency in editing practices, this instruction has been written to provide guidance in editing GIS features and quality factors.

SCOPE AND APPLICABILITY

Under the scope of the BOSS, the GIS Support Group shall maintain and update the Kennedy Space Center (KSC) spatial and non-spatial data within KSC's real property boundaries in accordance with the BOSS Contract. Data integrity is maintained by a controlled data versioning process, with all versions reviewed by the GIS Analyst as part of the quality control procedures performed prior to being posted to KSCGIS. This instruction states how the GIS Support Group performs its maintenance duties.

PROCESS

1. GENERAL WORKFLOW AND PROCESSING

The process of compiling and editing GIS data can be categorized into the following operations: Assignment/Task Management, Data Collection, Data Editing, Data Quality Control and Posting. While some of these tasks have a natural sequence, this process can be iterative with tasks being re-assigned, more data collected, and QC tasks being re-submitted (see Figure 1).

1.1. Creating Assignments and Managing Tasks

The process of managing GIS assignments is performed by the GIS Analyst. All assignments shall be entered and maintained in the GIS Assignment Database (herein known as "GISDB"). The GIS Analyst is responsible for assessing new work, assigning priority to an assignment, assigning projects to the appropriate GIS staff, reviewing data supplied by the BOSS Survey Group and other contractors, conducting quality control on GIS assignments, and coordinating with utility system experts including the BOSS Survey/Locator Supervisor.

1.2. Prioritizing Assignments

The GIS Analyst is responsible for prioritizing all assignments in the GISDB. Assignment priorities are listed as levels 1, 2, and 3, with level 1 being the highest priority. The routine tasks of GIS improvements is considered priority level 3 work. A priority level of 2 is used for assignments that have a deadline, such as a document closure request. Priority 1 assignments are revisions that need to be performed quickly, generally within 48 hours.

2. DATA COLLECTION

2.1. Source Data

The GIS Technician has a number of data sources to assist in the completion of a GIS assignment. Depending on the specific requirements of the assignment, the Technician, with approval from the GIS Analyst, will use various data sources including: aerial photography, asset management system data (Maximo), CAD data, facilities information (FIC), field measurements, GIS/GPS data, maps, photos, schematics, and survey data.

2.2. Research and Collecting Data in the Field

2.2.1. Research

The GIS Technician is responsible for and shall perform research on their assignments when necessary. Research consists of collecting appropriate data in the field, reviewing digital resources (See 2.4 Integrating Data From Other Resources), and conferring with subject matter experts (SME). SMEs such as systems engineers can be consulted when specific questions arise about the infrastructure being mapped.

BOSS staff may use a GPS (Global Positioning System) device to collect non-critical data. To ensure the highest possible accuracy, the Survey Group will be tasked with the collection of the critical infrastructure once it is determined that that data does not exist or is not current. Non-critical infrastructure may be collected through either field measurements or Handheld GPS by various GIS users.

2.2.2. Collecting Data in the Field

GIS data can be obtained in the field using items such as a tape measure, measuring wheel, hand-held laser measuring device, or a GPS device. Because these devices vary in capability and accuracy, attention shall be given to ensure the appropriate device is used in order to meet KSCGIS accuracy requirements stated in Figure 2. Handheld GPS devices shall be used by BOSS staff in the field to record non-critical infrastructure data. GIS staff will ensure data collected in the field exceeds the KSCGIS minimum accuracy standards stated in Figure 2.

Survey Group support will be tasked to locate and record critical infrastructure, such as underground utilities and facilities as well as, any other assets that require precise measurement.

2.3. Integrating Survey Data

Survey data from the BOSS Survey Group may be provided to the GIS Support Group for inclusion into the KSCGIS. The GIS Analyst can initiate a request to the Survey Supervisor for survey data to support GIS assignments. Requests to the Survey Group will be associated to a GIS assignment and will be assigned to the Survey Group

("Survey Assigned") in the GISDB. When multiple assignments are outstanding, emphasis shall be placed on assignment priority in completing. The GIS Analyst will communicate regularly with the Survey Supervisor on the progress of all survey requests. Upon receiving survey data, the GIS Analyst will review the data and then task the assignment to a GIS Technician. Any discrepancies or questions the GIS Technician finds should be communicated with the GIS Analyst and the Survey Group for further action.

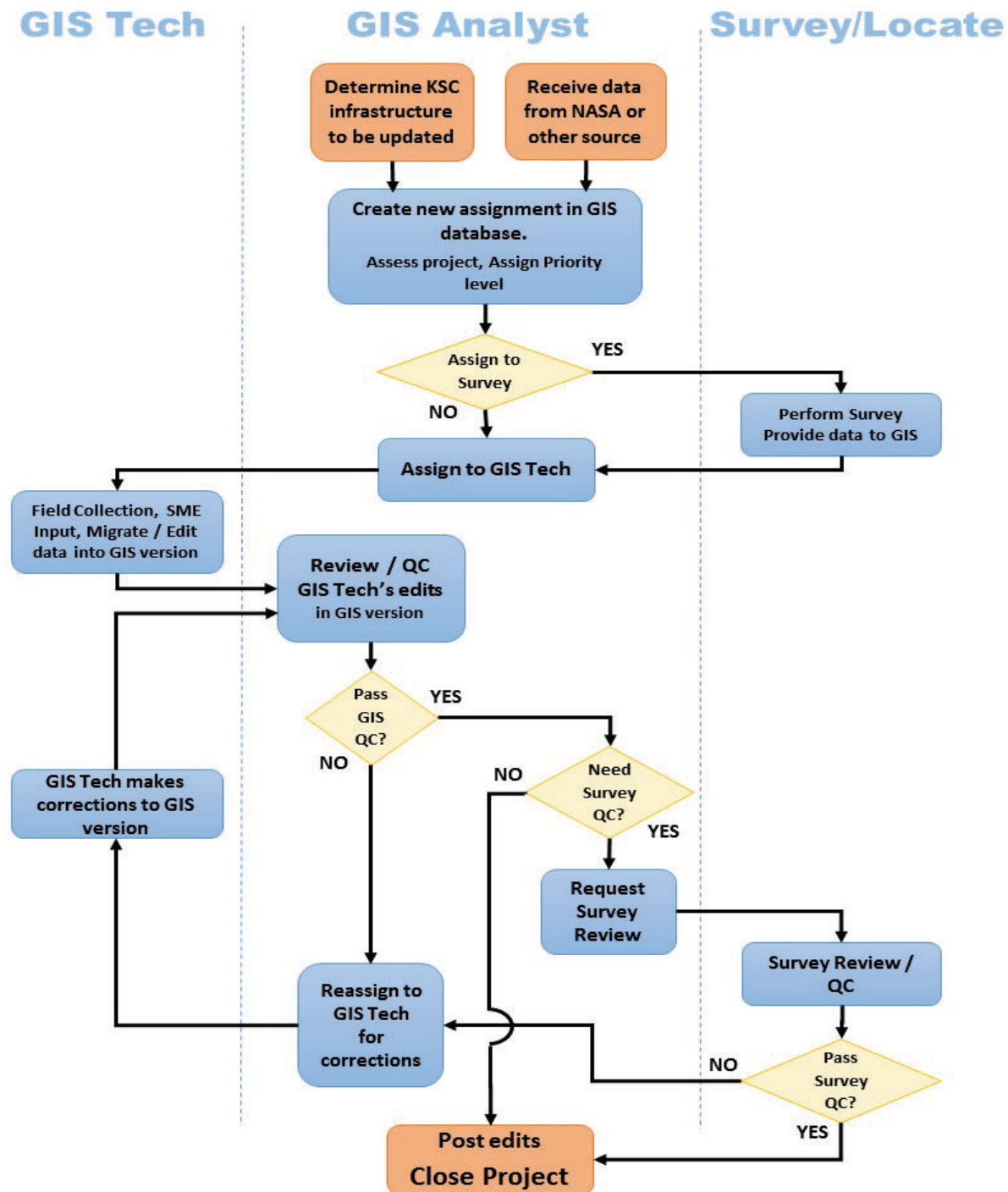
After the GIS Technician completes their work on the assignment, the Technician will update the assignment status of their current project to, "QC Assigned" in the GISDB, which informs the GIS Analyst that the assignment is ready for QC. When the GIS Analyst completes the QC process, the Analyst shall notify the Survey Supervisor that the assignment is ready for review by the Survey Group, and the assignment status in the GISDB will be changed to "Survey/Peer Review". Upon concurrence from the Survey Supervisor, the GIS Analyst shall post the assignment version to the default KSCGIS database version and change the assignment status to, "Posted" in the GISDB.

2.4. Integrating Data from Other Sources

Spatial data may be provided by other sources, such as, other NASA contractors. This data may be in the form of as-built drawings, CAD data, or actual GIS data. Upon receipt of this data, the GIS Analyst will assess the completeness and accuracy of the data. If the accuracy is unclear, the GIS Analyst may assign the Survey Group to ground truth the data. If the data is survey data, the GIS Analyst will assign it to the Survey Group for review of the data. The Survey Group shall have 14 days to review and respond with any concerns. If no response is received, the GIS Analyst will assign the data to GIS Tech for inclusion in the KSC GIS. If the Survey Team does respond with concerns, the GIS Analyst shall consider those concerns in assigning the work.

Other examples of data sources that can be used to supply information for GIS assignments are: FIC, Maximo, OMEU, Projectwise, and TechDoc. These web-based KSC resources contain current engineering drawings, asset management data, and schematics that can be used to update KSCGIS when appropriate.

FIGURE 1: WORKFLOW OF GIS UPDATES



Creating and Editing GIS Features

2.5. Editing Features

The GIS Technician begins the editing process once they have reviewed their assignment, the supporting documentation, and collected all of the necessary project data. The following is the general editing workflow for GIS assignments:

- Log into ArcMap using the GIS Technician's user account.
- Add GIS feature classes from the DEFAULT version of KSCGIS (GISPROD) that are to be edited, plus any other KSCGIS features that are needed for reference.
- Add assignment data from Survey Group or other sources as appropriate.
- Create a new version from DEFAULT (See 3.2 Opening a Version).
- Start an edit session.
- Add new features, or edit existing features of the target KSCGIS layers, using the supplied project data and research for guidance.
- Stop editing and save edits.
- Run the "Version Changes" tool in ArcMap against the DEFAULT version to produce a list of all edits in the GIS assignment version.
- Record all edits in the GISDB under "Edit Details". Record edits by specific feature class edited.
- Update the current status of the GIS assignment to "QC Assigned" in the GISDB.

2.6. Opening a Version

The edit process starts with opening a version. To open a version the GIS Technician needs to have access to ArcMap GIS software. A version is started by selecting either "Version Manager" or "Create New Version" from the Versioning Toolbar and must be created from the "SDE.DEFAULT" (master version) in order to not cause any system errors. The version shall be named after the assignment or task to be worked and should be 20 characters or less. In order for the GIS Analyst and others to access the file the version needs to be made "Public", and a brief description of the version entered in the "Description" field. Also in the creation process, "Switch to this new version" must be selected before proceeding with the given assignment.

2.7. Proximity Edits

Within the general proximity of the assignment area, the GIS Technician should endeavor to fix any evident topology or attribute problems of existing KSCGIS data. This will lessen future assignments and contributes heavily to the data integrity. If additional problems are identified outside the scope of work of the current assignment, it is at the GIS Supervisor's or GIS Analyst's discretion to fix these items within the current assignment. If these additional problems are to be edited then all parts of these additional features should be checked and follow the same procedures as the features within the scope of the assignment. Both geometry and attributes shall be assessed for accuracy. If the additional problems are chosen not to be fixed at this time, the GIS Technician shall request a new assignment number.

2.8. Assignment Directory

The GIS assignments directory contains all of the supporting files for GIS assignments, organized by year and assignment number. It is important that the folder names follow the Assnxxxx nomenclature for proper operation of the GISDB. All members of the GIS Support Group have access to this directory. All copies of source data, field photos, maps, email correspondence, notes, and any other important documents will be stored in each assignment folder.

2.9. Standards

2.9.1. Positional Accuracy

All new and edited features should adhere to the minimum required accuracy for that data type. The KSCGIS is held to certain accuracy requirements as outlined in Figure 2 of this document. Although meeting the minimum required accuracy is acceptable, it is more desirable and highly encouraged, when possible, to exceed the accuracy requirements for all data types in the KSCGIS. The minimum accuracy requirements are outlined here in Figure 2:

FIGURE 2: ACCURACY REQUIREMENTS FOR KSCGIS

Data Layer	Accuracy
Planimetric	Within 10 feet
Utilities	Within 3 feet
Public Safety	Within 100 feet
Political/Administrative Districts	Within 10 feet
Environmental Sites	Within 50 feet
Land Use/Land Cover	Within 200 feet
Wetlands Areas	Within 50 feet
Soils	Within 100 feet
Topography	Within 50 feet
Street Centerlines	Within 1 foot
Orthoimagery	Within 5 feet
Geodetic/Survey Control Points	FGDC standard survey practices

2.10. Topology

Topology should be maintained between coincident features. Snapping capabilities, edge and/or vertex, should be used at all times.

2.11. Working with Survey Points and Point Features

2.11.1. Survey Data

Survey data is considered ground truth and should be used as such at all times. No feature should be spatially edited different than its original surveyed location for any reason. If there is a question about a surveyed point, a request will be sent by the GIS Analyst to the Survey Supervisor, for that feature to be clarified and/or resurveyed. Survey data is provided in a variety of digital formats.

2.11.2. Survey Points

Survey data shall not be moved. Survey points can be loaded directly into a version or identical points can be created in a version by snapping to the provided survey points.

2.11.3. Snapping

Use snapping when creating polygons or lines from survey points. The Survey Group often provides data that represents line feature or corners of a polygon. Survey points should be snapped to in order to create the necessary feature.

2.11.4. Survey Information

Transfer all information provided by the Survey Group to the attribute table of the feature class associated with the provided survey points. This information should be transferred as provided unless another source contradicts the surveyed attribute provided. Clarification will then be requested.

2.11.5. Receiving Survey Data

Notice of new survey data from the Survey Supervisor for a GIS assignment is sent to the GIS Analyst who will review the data and then assign one of the GIS Technicians to import the data to the KSCGIS.

2.12. Working with Line and Polygon Features

2.12.1. Line and Polygon Features

Line and polygon features should accurately depict the location and shape of the real world features as closely as possible. This accuracy shall be best obtained through the use of survey data, field collected GPS data, or field measuring.

2.12.2. Creating and Editing

When creating and editing buildings and other structures with perpendicular sides, straight lines and 90-degree or other appropriate angles should be used to accurately represent the feature.

2.12.3. Lines

Straight lines should be drawn with no vertices between the endpoints. If vertices are needed for edge matching purposes, draw the line first then add the necessary vertices. These vertices will be used to assure no gaps exist between features.

2.12.4. Specific Angles/Lengths

Specific degree angles or segment lengths can be created by using the commands in the Sketch Tool context menu.

2.12.5. Professional Curves

To create smooth professional curves to correctly represent real world features, use the Arc Tool. To create polygon or line coincident with an existing curved feature, use the Trace Tool to trace the existing curved feature.

2.12.6. Overlaps/Gaps

There should be no overlaps or gaps between features unless it exists this way in the real world.

2.13. Working with Multipart Features

2.13.1. Multipart Feature

A multipart feature is a feature that is represented by more than one physical part but only references one attribute record in the database. Examples include branching lines, roads, and donut polygons. When working with multipart features, special care has to be taken not to modify or adversely affect the other parts of the feature that are not being edited.

Determine if the feature being edited is a multipart feature. Use the Sketch Properties dialog box to identify multipart features. The left column in the box lists all parts of a feature.

Use the Convert Part to Feature tool to isolate the necessary part of the feature before editing. This tool takes one part of a multipart feature and separates it into its own feature so that it can be edited. This tool can be found in the edit sketch context menu.

If features are separated from a multipart feature for editing purposes, ensure that after editing has been completed, the separated features are merged back into a single multipart feature if necessary.

When making attribute changes to a multipart feature, determine if attribute changes apply to all parts of the multipart feature. If attribute changes do not apply to all parts, then the multipart feature needs to be split into separate features based on the attributes.

2.14. Working with Attributes

2.14.1. Attribute Text

Use sentence (or mixed) case for attribute text. When encountered, any residual Upper Case text should be updated to Mixed Case.

2.14.2. Consistency

Maintain consistency with existing attributes in the KSCGIS.

When editing a layer, determine which attributes have generally been populated for other features in the same feature class in the KSCGIS. These commonly populated attributes should be populated for all new features that are added into the KSCGIS, as data is available. Always attempt to determine these same attributes for the newly added feature. Attribute values meaning the same thing should not vary throughout the attribute field. When populating an attribute value for a feature, determine existing attribute values for other features within the same feature dataset and, if possible, use an existing value.

2.14.3. Survey Attribute Values

Attribute values from a survey source should not be changed unless it has been determined as incorrect by a verifiable source (See 3.7.4 Survey Information). Transfer values exactly as they are provided. The Calculate tool is helpful when a bulk transfer is necessary.

2.14.4. Spelling

Ensure accurate spelling of all attribute values.

2.14.5. Domains

All attribute values should adhere to the required domains. A domain establishes valid values or ranges of values for an attribute field and minimizes data entry mistakes by prohibiting invalid values. For example, if "Open" and "Closed" were the domain values for a water valve status field, it would not be possible to enter other values in the attribute table. If the proper domain value is not available, the GIS Analyst will make the determination on how to complete the attribute.

2.14.6. SPATIALQUALITY Field

Populate the "SPATIALQUALITY" field for all features. This field gives users of the KSCGIS information about the spatial accuracy of a particular feature. Select from KSC Survey Quality, Surveyed by outside contractor, Sub-meter GPS collected by non-survey staff, Field Measured generally from a surveyed ref point, Field verified but not measured from a ref point, Engineering Drawing-may not be spatially accurate, Unknown origin and accuracy, Unknown Quality: Part of feature was previously

surveyed, 2012 4 Band 1f Imagery, 2009 True Color .5m Imagery, 2008 True Color .3m Imagery, 2005 Natural Color Imagery, 2000 Color Infrared Orthophotos, or 2000 Panchromatic Imagery for this field.

2.14.7. INSTALLATIONID Field

Every record in the database shall have the “INSTALLATIONID” field filled in according to the location of the installation in the real world. Valid domain values for the field are listed in Figure 2. Most features in KSCGIS should have the value, “Kennedy Space Center” for the INSTALLATIONID field.

FIGURE 3: INSTALLATION VALUES

Installation
Cape Canaveral Air Force Station
Kennedy Space Center
Patrick Air Force Base
Jonathan Dickinson Missile Annex
Fort Pierce Microwave Relay Annex
Malabar Transmitter Annex
Melbourne Beach Optical Tracking Annex
Wabasso Microwave Relay Annex
Stuart Microwave Relay Annex
Cocoa Beach Tracking Annex
Ti-Co Airport Weather Annex
Not located on NASA or DOD property

2.14.8. FACILITYID Field

Populate the “FACILITYID” field for all features for which one exists. The “FACILITYID” field shall only be used for numbers that correspond to the facility number in the Facility Information Center (FIC). This field should be populated if the item has been assigned a facility number by BOSS Real Property Office, Engineering Site Services Department.

2.14.9. Attributes About a Feature

All known attributes about a feature should be entered into their appropriate fields. If an appropriate field for an attribute is not easily discernible, then the matter should be taken to the GIS Analyst for discussion.

2.14.10. Populating Attributes

When populating attributes in the KSCGIS for Real Property features, those attributes that are currently represented in the FIC, other than “FACILITYID”, “BUILDINGID”, and

“LONGNAME”, should not be duplicated. For example, “built date” is stored in the FIC so there is no reason to populate this value in the KSCGIS as well.

3.10.11 Saving Edits

During an ArcMap editing session, a general best practice is to save edits frequently. Please note that SAVING EDITS IS IRREVERSABLE and that the undo function does not exist after an edit save. If a GIS Tech encounters an error such as an accidental saving of incorrect data, the Tech shall notify the GIS Analyst of the inconsistency for further action.

3. QUALITY ASSURANCE AND CONTROL OF ASSIGNMENTS AND POSTING

The Quality Assurance and Control (QA/QC) process conducted by the GIS Analyst is an integral piece in maintaining a superior GIS product. QA is the systematic process of checking to see whether the GIS product being developed is meeting specified requirements. QC is an iterative process where a GIS Technician’s work is validated and verified before any data is posted to the default version of the KSCGIS. These procedures help maintain data integrity in the KSCGIS. The QC process is conducted before any revisions to data are updated in the KSCGIS.

3.1. Quality Assurance Categories

3.1.1. Typical QA/QC Categories

Listed below are the typical Quality Assurance/Quality Control (QA/QC) categories as they apply to the KSCGIS. An assignment is considered complete and correct when the resulting data has all of the following qualities:

Completeness – This category refers to the adherence of the data to the database design. All of the data conforms to requirements for topology, precision and all necessary attributes are present.

Field Accuracy – This is the measure of conformity to real world configurations, both in topology and attribution. Features should be shaped like the object they represent as much as the geometry will allow. All objects in the field that can be categorized in a feature class that is maintained shall be entered into the KSCGIS. Attributes shall be accurate to field conditions.

Logical Consistency – This is the measure of the interaction between the values of two or more functionally related attributes. Care should be taken to maintain consistency of populated values with other attributes already in the database. For example, when height, length and/or area values are populated for the feature, the units of measure for that feature should also be populated in the corresponding attribute field.

Physical Consistency – This is the measure of the topological correctness and geographic extent of the database. Some properties/characteristics to observe are proper snapping, dangles and edge matching between adjacent features.

Positional Accuracy – This measures the precision of representation of a feature in the database as compared to its true location. True location may be measured from survey data or coordinates, as well as GPS data, and field measurements.

Referential Integrity – This measures the thoroughness of data relationship modification. When modifying the database, it is important that data in all associated tables affected by the modification are all updated. For example, if a building that has a stairwell and an awning is demolished, the data for all three features (the building, the stairwell and the awning) must be deleted from the KSCGIS.

Validity – This measures the attribute accuracy of the database. Each entered attribute must adhere to the data standards and the domain for that field. Care should be taken to maintain consistency of populated values with other attributes already in the database. Some research may be necessary to verify the accuracy of the attributes being entered into the KSCGIS. For example, for feature types that would be represented in the FIC, such as buildings, the features' "BUILDINGID" and "LONGNAME" attribute values should be cross-checked with the FIC to ensure that those attribute values match in both systems.

3.2. QC Rule

Rarely should the GIS Analyst change the data that they are evaluating. These changes shall be limited to the basic operation of updating a feature's attribute fields, or correcting a snapping error. Corrections shall be revised by the original GIS Technician.

3.3. Monitor Assignment Database

The GIS Analyst shall monitor the GISDB for any new assignments placed in the "QC Assigned" status. While notification of assignments may also be performed by email, or in person, the GISDB must have a corresponding assignment representing the revised GIS version.

3.4. Supporting Documentation Review

Once the task is assigned, the GIS Analyst shall review any supporting documentation (site plans, field photos, survey drawings, measurements) attached to the assignment in the GISDB.

3.5. Conducting QC

3.5.1. Compare Documentation to Version

The GIS Analyst shall compare the supporting documentation and project data from the GIS assignment folder to the edited version. Any errors found will be recorded by the GIS Analyst in the format determined most appropriate for the assignment. Errors can be recorded in list format using, text files, and spreadsheets, or graphically, using maps to highlight areas with errors. All QC notes will list the unique id of the feature in

question (from OBJECTID field), and a brief explanation of the error. All QC notes shall be saved to the assignment folder of the assignment being reviewed. The GIS Analyst shall notify the originating GIS Technician when errors are found, provide appropriate documentation, and update the GISDB to 'Tech Assigned'.

3.5.2. Types of Errors

The following list is only an example of some of types of errors that may be identified. This is NOT a comprehensive list; therefore, other types of errors not on this list may be identified and will be handled on a case-by-case basis. These will only apply to those layers that were edited.

A. Snapping Error – Points, lines and polygons in the KSCGIS should be snapped to survey data when available. When survey data is available, the Survey Group shall verify this step as outlined in procedure 2.3. Any features that “touch” or are in contact with each other in the real world should be snapped together in the KSCGIS.

B. Edge-matching Error – Polygon features that abut each other in the real world should have coincident boundaries in the database. If overlaps exist or the polygons do not share the exact boundary, an error is marked.

C. Incorrect Attribute – Some examples are, but not limited to, misspelled attributes, facility numbers or names that do not match the FIC, or attributes that are different in the supporting documentation compared to attributes in the database.

D. Missing Attribute – This occurs when a commonly populated attribute of a layer is not populated and no accompanying explanation for the omission is included in the supporting documentation for the designated feature. (e.g., a wastewater line that is missing a value for the line size attributes)

E. Features present in the supporting documentation but not in database – the supporting documentation is used as a reference to verify what changes should have been made to the database. If there are feature changes shown in the supporting documentation, but not incorporated in the database, an error will be marked.

F. Features present in database but not in the supporting documentation – This error represents discrepancies occurring when features are shown in the KSCGIS, but not in the supporting documentation.

G. Placement Error – If the location of the edited feature differs with survey data or other project data, and the discrepancy is not explained in the supporting documentation, an error is marked.

H. Categorization Error – This error is assigned when a feature is placed into the improper KSCGIS layer. (e.g. a septic tank put in the lift stations layer.)

I. Line Error – Lines should be made up of smooth curves and straight lines.

J. Duplicate Entry – Duplicate entries of the same feature.

3.6. Resolving Identified Problem Area

3.6.1. Error Correction

Upon being notified by the GIS Analyst of any QC errors, the originating GIS Technician will review the assignment update in the GISDB, review QC notes in the assignment folder, and correct all errors. After correcting all errors, the GIS Technician will update the assignment to, "QC Assigned", notifying the GIS Analyst of the status change.

3.6.2. Repeat QC

The GIS Analyst will repeat steps outlined in process 4.5.

3.7. Survey Verification

If the GIS revision is based on BOSS Survey-sourced data, the GIS Analyst shall notify the Survey Supervisor by email requesting verification of the version. The assignment's status shall be updated to 'Survey/Peer Review' in the GISDB.

Upon receiving Survey's response of concurrence, the GIS Analyst will prepare the assignment version for posting to KSCGIS.

If Survey's response is negative, the originating GIS Technician shall be notified and the assignment shall be updated back to "Tech Assigned" in the GISDB. When the GIS Technician has concluded revising the assignment, the GIS Analyst will request verification from the Survey Supervisor. The GIS Analyst shall update/enter all correspondence into the GISDB.

3.8. Posting & Task Completion

3.8.1. Pre-Posting

Once the GIS Analyst has verified the edited version conforms to the supporting documentation, the version is ready for KSCGIS posting. The GISDB status for the assignment should still be "QC Assigned".

3.8.2. Reconcile the Version to be Posted

The GIS Analyst will perform the following steps in ArcMap:

1. Log into ArcMap using the SDE administrator user account.
2. Switch to the version to be posted.
3. Start Editing.
4. Reconcile the version.

3.8.3. Resolve Conflicts

The GIS Analyst shall resolve any conflicts identified during reconciliation by reviewing in the conflict manager tool. If the conflict(s) can only be resolved by discarding edits generated in another current version, notify the authoring GIS Technicians of both versions to determine which version will need to have its edit(s) discarded and re-edited. Once all conflicting edits have been addresses, the GIS Analyst will then choose a resolution state and complete reconciliation in the conflict manager.

3.8.4. Verify Assignment Edit Count

Before posting the reconciled version, the GIS Analyst shall verify that the correct number of edited features are recorded in the GISDB by feature type. By selecting Edit Details in the assignment details window in the GISDB, the GIS Analyst will ensure that the GIS Technician has entered the correct GIS staff member name, edited GIS feature class, and quantity edited. The GIS Analyst will also ensure that the proper edit type (Spatial vs Data) is recorded in the GISDB. Edit counts and types are essential for contract performance metrics.

3.8.5. Posting

The GIS Analyst shall post the reconciled version. *Please note: Posting a version is **IRREVERSIBLE**.* Any features edited whether intentionally or accidentally will be permanently updated in the default KSCGIS. There is no undo functionality for posting a version.

The GIS Analyst performs the following steps in ArcMap:

1. Stop Editing.
2. Switch the version back to the DEFAULT version.
3. View the assignment area to visually confirm the updates have taken place.

3.8.6. Update Assignment Status

The GIS Analyst shall update the assignment status in the GISDB to "Posted".

RECORDS

The following records are retained by the organizations listed below:

Record	Responsible Organization
GIS Database	BOSS Engineering
Editing Datasheet	BOSS Engineering

AFFECTED DIVISIONS/OFFICES

Engineering Services
FSEU and OM&E

MANAGEMENT ROLES AND RESPONSIBILITIES

BOSS Program Manager: Ensures BOSS compliance to the requirements stated in this procedure. Reviews and approves or disapproves waiver requests written against this standard.

Division Manager: Ensures compliance within the Division to the requirements stated in this procedure.

Branch Manager: Ensures compliance at the branch level to the requirements stated in this procedure.

FUNCTIONAL ROLES AND RESPONSIBILITIES

GIS Analyst: Serves as the central point of contact for the maintenance of KSCGIS data, assigns and manages GIS data updates, validates the quality of revisions, determines GIS data standards, administers and executes data export requests, and is the only GIS system user with permissions to reconcile and post versions to the default version of the KSCGIS database.

GIS Supervisor: Serves as the Geographic Information System coordinator to determine standards resolutions and system procedures.

GIS Support Group: The group that updates and maintains the Geographic Information System.

GIS Technician: Serves as a primary editor of GIS data. Utilizes GIS tools such as ArcMap and ArcCatalog to create and update GIS features and data. When necessary collects and verifies in the field, information to be used in the KSCGIS.

BOSS Survey Supervisor: Serves as the supervisor of the BOSS Survey Group and coordinates with the GIS Analyst when survey support is requested for GIS assignments.

BOSS Survey Group: Group and individuals that provide survey support for precise location measurements on geographic features.

REFERENCE DOCUMENTS

The following documents are referenced in this procedure:

Document Number	Title
NA	

ACRONYMS

BOSS - Base Operations & Spaceport Services Contract
CAD- Computer Aided Design
CCAFS- Cape Canaveral Air Force Station
FIC- Facility Information Center
GIS- Geographical Information System
GISDB – GIS Support Group Assignment Database
GISPROD – KSCGIS Production Database
GPS – Global Positioning System
KIAC – Kennedy Infrastructure, Applications and Communications Contract
KSC – Kennedy Space Center
KSCGIS – Kennedy Space Center Geographical Information System
NASA – National Aeronautics and Space Administration
OMEU – Operations Maintenance Engineering User
QA/QC – Quality Assurance/Quality Control
QC- Quality Control
SME – Subject Matter Expert
TBD- To Be Determined
TechDoc – NASA/KSC Technical Documentation Search Engine

DEFINITIONS

Domain: An attribute domain is used to constrain the values allowed in any particular attribute for a table, feature class, or subtype. An attribute domain can be shared across feature classes and tables in a geodatabase. Types of attribute domains include range and coded value domains.

Feature: Representation of real world objects that are stored in the KSCGIS. These can be points, lines or polygon features. All features in the KSCGIS are geographically referenced. This includes, but is not limited to, buildings, roads, water lines, and electrical switches.

FGDC: Federal Geographic Data Committee is an interagency committee, organized in 1990, that promotes the coordinated use, sharing, and dissemination of geospatial data on a national basis.

Ground Truth: Ground truth is usually done on site, performing surface observations and measurements of various properties of the feature. It also involves taking geographic coordinates of the ground feature with GPS technology.

Kennedy Space Center (KSC): The geographic areas within the boundaries of NASA's Kennedy Space Center (KSC).

KSC Geographic Information System (KSCGIS): An integrated system of computer hardware, software, and trained personnel linking topographic, demographic, utility, facility, image and other resource data that is geographically referenced data for the Kennedy Space Center (KSC). ESRI ArcGIS is the KSCGIS project approved software.

Orthoimagery: Combines the image characteristics of an aerial photograph with the geometric qualities of a map. Unlike a normal aerial photograph, distortion and relief displacement is removed so ground features are displayed in their true planimetrically correct position.

Planimetric: Two-dimensional; showing no relief (*mapping*). A map indicating only the horizontal positions of features, without regard to elevation, in contrast with a topographic map, which indicates both horizontal and vertical positions. Also known as line map.

Quality Assurance (QA): – A systematic process of checking to see whether a product or service being developed is meeting specified requirements.

Quality Control (QC): An iterative process where edits to a version of the KSCGIS are validated and verified before any data is posted to the default version of the KSCGIS. This helps maintain the KSCGIS's data integrity.

Survey: . The act of using applied mathematics to determine the area of any portion of the earth's surface, the lengths and directions of bounding lines, and the contour of the surface. Surveys for the KSCGIS are performed by, or under the direct control of professional surveyors and are referenced to the North American Datum of 1983 and the North American Vertical Datum of 1988. All survey data provided will be in the Florida State Plane East projection and will be in feet.

Topology: Relationships between connected features in a geometric network or shared borders between features in a planar topology.

REVISION RECORD

The following revisions have been applied to this document:

Revision Number	Change Description	Date
0	Initial Release due to contract change	10/01/09
1	Minor Revisions; Update Template & Records Table. No Formal Review Required per QPO	07/19/11
2	Combined with ENG-I-GIS02, reviewed and revised all sections to accurately document current policy and practices.	10/16/15
3	Minor updates to align with BOSS Contract	2/10/20

DOCUMENT APPROVALS

2/11/2020

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2/10/2020

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