

GEOFidelis

Data Management Guide

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1.0 INTRODUCTION

1.1 PURPOSE

The GEOFidelis Data Management Guide has been developed to facilitate accomplishing the policy and goals set forth in Marine Corps Order (MCO) 11000.25, Installation Geospatial Information and Services. MCO 11000.25 provides policy, guidance and standards for acquiring, protecting, utilizing and implementing Marine Corps Installation Geospatial Information and Services (IGI&S), also referred to as GEOFidelis, in support of Marine Corps installation management. This guide is in compliance with Executive Order 12906, "Coordinating Geographic Data Acquisition and Access", and with the National Spatial Data Infrastructure and Office of Management and Budget's (OMB) Circular A-16, "Coordination of Geographic Information and Related Spatial Data Activities."

The GEOFidelis Data Management Guide will provide technical guidance and procedures to meet MCO 11000.25 directives and the guidance set forth in the Commandant of the Marine Corps (CMC) document titled, *Guidance Regarding Implementing Geospatial Information Systems (GIS), Computer Aided Design And Drawing (CADD) And Related Technologies For Installation Management* (15 April 2003). The referenced document dictates, "Each Marine Corps installation will have a geospatial information system (GIS) that provides precise and reliable information at the installation and enterprise level." IGI&S is a necessity in a variety of applications that support the Marine Corps Installation 2020 vision and the Marine Corps Vision and Strategy 2025, such as land management, facility planning, environmental compliance, base operations, military training, and other management processes. The purpose of the GEOFidelis Data Management Guide is to provide documentation of required procedures to create and maintain geospatial data for Marine Corps use and dissemination.

The GEOFidelis goal is to ensure that United States Marine Corps (USMC) installation geospatial data is complete, accurate, current, and available as a USMC-wide resource.

1.2 APPLICABILITY

This document provides guidance for GEOFidelis geospatial data management. This guide shall be cited for geospatial data management, collection, and dissemination by all IGI&S offices and contractors that are responsible for geospatial data associated with GEOFidelis. This guide is also applicable to USMC installation management functional areas having responsibility for or possessing a stake in IGI&S geospatial data. A formal review of this guide will occur annually and will be updated as necessary.

The provisions of this guide are applicable to data management practices for non-tactical IGI&S. Geospatial information for tactical and intelligence purposes are excluded from the provisions of this guide.

1.3 SCOPE

GEOFidelis data and staff take on an important role in the USMC installation management decision-making processes. Geospatial information and services are a core capability supporting the various activities that involve installation management responsibilities. Within an integrated installation management structure, geospatial data is used to support many departments and functions. GEOFidelis geospatial data is being utilized at all levels of the Department of Defense (DoD) to support various projects/programs and has an increasingly critical role in decision making. Current and accurate geospatial data is required across the USMC to support these roles and decision-making procedures. GEOFidelis will utilize this guide to create and implement comprehensive data management plans to satisfy regional and installation requirements and improve geospatial data quality.

2.0 ROLES AND RESPONSIBILITIES

MCO 11000.25 has established and defined roles and responsibilities covering all levels of IGI&S management. This guide describes in detail the roles and responsibilities for USMC IGI&S geospatial data management policy, compliance, and overall quality assurance.

2.1 GEOFIDELIS GEOSPATIAL INFORMATION OFFICER (GIO)

The GEOFidelis GIO, as appointed by Headquarters Marine Corps, Installations and Logistics Department, Facilities and Services Division (HQMC I&L/LF) with leadership and oversight responsibilities for GEOFidelis, will oversee the GEOFidelis Program; implement policy and guidance required by MCO 11000.25. The GEOFidelis GIO will provide the leadership, functional advocacy, central direction and oversight for implementing and utilizing IGI&S to support Marine Corps installation management. The GEOFidelis GIO will establish goals, policies, guidance and standards for GEOFidelis including, but not limited to, data management, data accuracy, data security, data sharing and metadata.

The GEOFidelis GIO roles and responsibilities include:

- Serve as functional liaison and geospatial representative to DoD and other government agencies
- Participate in geospatial policy and standards development ensuring GEOFidelis goals and strategies are in compliance with DoD and Federal geospatial policy
- Coordinate geospatial policy acceptance and incorporation for GEOFidelis
- Coordinate with HQMC Departments to ensure business process integration and elimination of redundant data holdings
- Ensure implementation of access and release controls for USMC geospatial data holdings
- Select, approve, and sponsor accreditation of software and applications that will benefit GEOFidelis data management and quality assurance

2.2 GEOFIDELIS REGIONAL GIO

The GEOFidelis Regional GIO, as appointed by Regional Commanders with installation management responsibilities, will oversee the regional command's IGI&S efforts and will enforce Marine Corps GEOFidelis policy and guidance as directed by the GEOFidelis GIO. The Regional GIO will provide expertise to the regional commander, and ensure the implementation at the region and installation level of all GEOFidelis standards, policies and procedures. The Regional GIO will develop a regional data management plan to ensure proper data acquisition, sustainment, and quality assurance of all geospatial data assets maintained by USMC installations that comprise the region. The Regional GIO shall implement the policy and guidelines for IGI&S capability across his/her respective area of responsibility according to guidelines established by the GEOFidelis GIO.

The GEOFidelis Regional GIO roles and responsibilities include:

- Chair Regional GIS Working Group
- Review and approve Data Management Plans for each installation in the region
- Develop Regional Data Management Plan
- Establish quality control and quality assurance plan guidelines for integration at each installation within the region
- Develop quantitative procedures and reports to ensure geospatial data quality control and quality assurance at the installations
- Manage geospatial data requests as directed by the GEOFidelis GIO or when specific to the region

2.3 GEOFIDELIS IGI&S MANAGER

The Installation IGI&S Manager, as appointed by the Installation Command, will oversee his/her installation's IGI&S effort. The IGI&S Manager will provide stewardship of the installation's geospatial data holdings, defined in the GEOFidelis Data Model, in support of the installation management mission. The IGI&S Manager shall coordinate with the Regional GIO to develop an installation data management plan to ensure proper data acquisition, sustainment, dissemination, and quality assurance of all geospatial data assets is maintained.

The IGI&S Manager roles and responsibilities include:

- Chair the Installation GIS Working Group
- Coordinate IGI&S data responsibilities
- Coordinate the implementation of standards and polices
- Maintain oversight of the installation's geospatial data assets
- Create and maintain installation's geospatial data management plan
- Create and maintain installation's geospatial quality assurance plans
- Improve management and quality assurance of GIS data
- Ensure that all GEOFidelis required metadata elements are accurate and complete for the installation's GIS data
- Participate in the Regional GIS Working Group

- Coordinate the implementation of geospatial data access and release standards and policies
- Coordinate with the installation functional area Subject Matter Expert (SME) for access and release policy implementation
- Ensure that the release of installation geospatial data includes documentation that conveys the limitations and use constraints of the specific geospatial information

2.4 FUNCTIONAL DATASET LEAD

A Functional Dataset Lead, as defined in MCO 11000.25, is an agency, department, activity or organization that has lead responsibility for coordinating the collection, coverage and stewardship, including maintenance and update, of a specific spatial data theme or mission dataset. Each Functional Dataset Lead is responsible for creating, purchasing and providing individual datasets to the enterprise. This includes funding the portion of the data and services required to support their specific operational needs in accordance with the policies set forth in this Order. The Functional Dataset Lead for each Marine Corps dataset will determine the level of access and release constraint for each dataset.

Appendix H provides a matrix that aligns the *GEOFidelis* datasets from the *GEOFidelis* Data Model version 1.x with the Dataset Lead's functional area of responsibility as defined in MCO 11000.25.

The Functional Dataset Lead Geospatial Data Access and Release roles and responsibilities include:

- Assign access and release designations with drivers to datasets requiring controls
- Annually review geospatial data access and release controls and constraints for each dataset under their functional area of responsibility
- Establish clear guidelines adhering to standards that ensure interoperability and data sharing across the Marine Corps
- Ensure for their functional area of responsibility, that installation level data stewards and subject matter experts adhere to policy and procedures outlined in this guide

2.5 INSTALLATION AND REGIONAL FUNCTIONAL AREA SUBJECT MATTER EXPERT

At the installation level, there are many data subject matter experts (SME) working within a single functional area. Each installation will designate one Functional SME to approve access and release of data under his/her functional supervision. The Functional SME will coordinate with all appropriate individual data subject matter experts when making data access and release determinations.

The Installation Functional Area Subject Matter Expert roles and responsibilities include:

- Participate in GEOFidelis data management communication by coordinating with the Regional Functional Area SME and the Functional Data Set Lead.
- Coordinate among all installation data subject matter experts within the functional area when assigning or approving data access and release.
- Ensure for the functional area of responsibility, that geospatial data access and release adhere to policy and procedures outlined in this guide.

Regional SMEs oversee the management of each functional area across the installations within the Regional area of responsibility (AOR). Therefore the Regional Functional Area SMEs will participate in GEOFidelis data management communications and contribute to the requirements for geospatial data structure and content. However, an installation's geospatial data access and release is not determined at the Regional level but at the installation level where data stewardship responsibility lies.

The Regional Functional Area Subject Matter Expert roles and responsibilities include:

- Participate in GEOFidelis data management communication by coordinating with the Functional Data Set Lead and Installation Functional Area SMEs.
- Establish clear guidelines for his/her area of responsibility adhering to standards that ensure interoperability and data sharing across the Marine Corps.

The GEOFidelis Data Access and Release Guidelines are discussed further in Section 7.0.

2.6 DATA SUBJECT MATTER EXPERT

Installation level SMEs possess a stake in the installation's GIS data. Installation level SMEs are responsible for a particular function or resource on an Installation. In the development of GIS data, an SME is a person who is knowledgeable about the domain or field being represented. The SME may not be knowledgeable of GIS or the technology used to represent geospatial data. For example, a Wetland Biologist understands the wetlands delineation process and the compliance requirements for its management, but may not have the experience to create the data layer in GIS. The SME coordinates with the IGI&S Manager and GIS Specialists on what data needs to be captured and what accuracy level is needed to support management decisions. The SME may interact directly with the data, possibly through a simplified interface, or may assist in developing, documenting, and validating the data for use by others. SME involvement in geospatial data matters will create an organizational partnership to ensure data integrity.

The data SME is responsible for assuring that data is properly attributed and collected to meet their needs and the requirements of the business process. The SME will review sources for data collection and conversion to assure the most current data is captured.

The Data SME roles and responsibilities include:

- Ensure geospatial data meets business area requirements
- Identify datasets to be collected to support business processes
- Ensure geospatial data meets SME professional practices and standards
- Coordinate IGI&S related contract and data acquisition efforts with the IGI&S Manager
- Review project deliverables to ensure that the geospatial data are returned in a useable and compliant form
- Review and validate all relevant metadata, especially the abstract and attribution

2.7 GEOSPATIAL DATA EDITOR

Geospatial data editors work closely with each SME. In some cases, the SME may edit and maintain data layers that are applicable to their functional area. In other cases, an SME may delegate editing responsibilities but will oversee and approve data content that was edited on their behalf. Each editor of geospatial data will ensure compliance with *GEOFidelis* geospatial data policy and procedures as defined in this guide.

The Geospatial Data Editor roles and responsibilities include:

- Document all required elements in the metadata
- Ensure that the most accurate data source, as provided by the SME, is used in editing, collection, and creation of geospatial layers
- Minimize error when registering source material
- Apply *GEOFidelis* quality assurance and quality control procedures

2.8 GEOFIDELIS REGIONAL CENTERS

The *GEOFidelis* Regional Centers host the authoritative geospatial data for each installation they serve. They provide the systems and technical support needed to accomplish geospatial data management activities.

The *GEOFidelis* Regional Center roles and responsibilities include:

- Host authoritative geospatial data holdings for each installation.
- Provide backup, recovery, and archival services for authoritative data holdings.
- Coordinate with the *GEOFidelis* GIO, Regional GIO, and Installation IGI&S Managers to execute data requests and apply appropriate data access and release controls.
- Deploy approved applications and tools in accordance with the *GEOFidelis* enterprise architecture to enable all aspects of geospatial data management activities.

3.0 GEOSPATIAL DATA STANDARDS

GEOFidelis policy and practices related to geospatial data standards, collection, and maintenance, detailed herein, are provided to ensure compliance with government and industry standards. These standards also maximize interoperability in support of USMC business process integration and aid in eliminating poor spatial data maintenance practices. The GEOFidelis standards for geospatial data follow USMC and DoD policy. Common data models are the basis for interoperable protocols and services. The following standards will be a key element for GEOFidelis in system engineering to build and support interoperable systems.

Spatial data has an inherent risk of error and uncertainty. IGI&S personnel need to understand the factors that place limitations on the positional accuracy of their spatial data in order to guide their users in the appropriate uses of that data. Effective spatial data management, to minimize the effects of error and uncertainty, requires several factors be implemented including:

- **Professional Trade Craft** - Foster the skill sets and training within GEOFidelis that encourage proficiency in the geospatial trade craft.
- **Procedures** - Develop, monitor and enhance appropriate procedures to ensure that data is captured, managed and utilized appropriately and that work is performed consistently.
- **Quality** - Implement appropriate quality assurance procedures to monitor and check that work is performed to the desired standard and that spatial data captured or manipulated is of a suitable quality.
- **Documentation** - Implement the appropriate level of metadata to document and describe each individual spatial entity.

3.1 VECTOR DATA STANDARDS

Vector data in GIS is used to represent discrete features that are defined as points, lines, and polygons in a geographic information system (GIS). Vector data represent features as pairs of x,y coordinates. All three of these types of vector data are commonly used and suitable for USMC Installation IGI&S mapping applications.

- **Points** - Point data are the simplest type of spatial object. A point is defined as a discrete location (x,y) with one or more attributes. Examples of point vector data models used in IGI&S include hydrants, meters, or firing points.
- **Lines** - Line data are created using an ordered set of coordinates that represent the shape and length of a linear feature. A line can be defined by two end points (for example, a planned survey line) or a series of smaller straight line segments (for example, coastline). Examples of line vector data used in IGI&S include road centerlines, water mains, and fence lines.
- **Polygons** - The third type of vector data is a polygon. These are areas completely bounded by one or more polylines. A building would be represented by a polygon and the entire area within the polygon is defined by one or more attributes, such as a

facility number. Polygons are often used to represent two-dimensional areas of geography such as species habitat. For example, the interpretation of aerial remote sensing imagery generally entails digitizing polygons around areas that visually appear similar such as vegetation, and then assigning an attribute such as “vegetation type” to the area.

3.1.1 GEOFIDELIS DATA MODEL

The GEOFidelis Data Model is the standard for all USMC IGI&S geospatial data. The GEOFidelis Data Model is maintained by the GEOFidelis GIO and is compliant with DoD policy and standards. Based on the Spatial Data Standards for Facilities, Infrastructure, and Environment (SDSFIE) geospatial data standard, the GEOFidelis Data Model was developed to maintain a common USMC IGI&S data standard that provides all USMC installations with a common structure for core data layers and attributes. The requirements are defined through coordination with the Functional Data Set Leads and examination of USMC enterprise-wide business requirements. All USMC installations will implement the GEOFidelis Data Model to enhance interoperability and enterprise integration. The GEOFidelis Data Model will adapt to meet the needs of the GEOFidelis community and will be re-published as required.

3.1.2 GEOFIDELIS COMMON INSTALLATION PICTURE (CIP)

The GEOFidelis Common Installation Picture (CIP) is a defined set of geospatial layers and imagery that create the core USMC installation base map. These datasets are the most common layers utilized in all aspects of IGI&S mapping and by all functional areas. The GEOFidelis CIP provides the baseline upon which other data layers can be integrated to support the functional areas, missions, and processes. The datasets that comprise the CIP are a subset of the GEOFidelis Data Model and are published in the GEOFidelis Data Model document or subsequent releases. The current CIP data layers are listed in Appendix G.

3.1.3 SPATIAL DATA STANDARDS FOR FACILITIES, INFRASTRUCTURE, AND ENVIRONMENT (SDSFIE)

The standard for all geospatial data in the GEOFidelis Program and all DoD component IGI&S programs is the Spatial Data Standards for Facilities, Infrastructure, and Environment (SDSFIE). The SDSFIE is the basis upon which the GEOFidelis Data Model is created. GEOFidelis operations will reference the SDSFIE to meet functional area requirements and the GEOFidelis GIO will ensure common requirements are captured in the GEOFidelis Data Model. The GEOFidelis GIO will represent the USMC IGI&S community in the SDSFIE organizational structure that determines the strategic direction and implementation of the SDSFIE standards. When an installation requires additional data layers or attributes that are not included in the GEOFidelis Data Model, those additional layers or attributes are required to follow the GEOFidelis-SDSFIE process.

3.2 GEOSPATIAL DATA ACCURACY STANDARDS

The Federal Geographic Data Committee (FGDC) specifies that the National Standard for Spatial Data Accuracy (NSSDA) be used to evaluate and report the positional accuracy of geospatial data produced, revised, or disseminated by or for the Federal Government. Executive Order 12906, "Coordinating Geographic Data Acquisition and Access: the National Spatial Data Infrastructure" designates the FGDC as responsible for setting these standards.

The NSSDA describes a way to measure and report positional accuracy of features found within a geographic data set. Approved in 1998, the NSSDA recognizes the growing need for digital spatial data and provides a common language for reporting accuracy.

Situations will arise where meeting *GEOFidelis* accuracy standards is not possible due to source limitations or when a data layer's intended use allows for a greater variance in positional accuracy. These exceptions are allowed through coordination between an SME and the IGI&S Manager and must be documented in all applicable metadata.

3.2.1 FGDC STANDARD GEOSPATIAL POSITIONING ACCURACY STANDARDS, PART 3: NATIONAL STANDARD FOR SPATIAL DATA ACCURACY

FGDC Standard 007.1-1998, NSSDA, states, "horizontal accuracy shall be reported as the radius of a circle of uncertainty, such that the true or theoretical location of the point falls within that circle of uncertainty N-percent of the time" and that the "magnitude of the displacement of a feature's recorded horizontal position in a digital data set from its true or more accurate position, as measured radially and not resolved into absolute x, y coordinate values."

Positional accuracy reported at the 90% confidence level means that 90% of positional accuracies would be equal to or smaller than the reported accuracy value. The reported accuracy value is the cumulative result of all uncertainties, including those introduced by local project control coordinates, field topographic surveys, photogrammetric compilation, or final extraction of ground coordinate values in the spatial data.

GEOFidelis, to meet FGDC standards, requires a 95% confidence level for both horizontal and vertical accuracy.

4.0 GEOSPATIAL DATA COLLECTION PROCEDURES

GEOFidelis data is obtained through a variety of methods. Whether data is collected by staff at an installation, acquired by the *GEOFidelis* GIO for IGI&S, contracted through GIS specific projects, or obtained through functional area projects, all geospatial data created or maintained for *GEOFidelis* must meet the requirements of this guide.

4.1 GEOFIDELIS STATEMENT OF WORK SPECIFICATIONS

Geospatial data is used to support many planning and infrastructure projects for USMC Installations. The IGI&S Manager will coordinate with applicable SMEs, project leads, and contracting offices to assure that any contract concerning their Installation and that potentially includes the use, development, or improvement of geospatial data will have that data delivered for inclusion into the Installation's GIS. Additionally, the GEOFidelis GIO and the Regional GIOs will utilize these specifications for any USMC-wide or Regional contracting effort. Appendix C includes text that will be used in any applicable Statement of Work. The text will be modified by each IGI&S Manager to document specific information relevant to the installation. The IGI&S Manager will coordinate with SMEs, project managers, and the Contracting Office to assure the text is acceptable for the Installation and for these contacts to alert the GIS Office of contracts and any Statement of Work that may have a geospatial component.

4.2 GEOSPATIAL VECTOR DATA COLLECTION

4.2.1 ARMY CORPS OF ENGINEERS (ACOE) ENGINEERING MANUAL FOR PHOTOGRAMMETRIC MAPPING EM1110-1-1000

Topographic and planimetric feature collection may be accomplished with photogrammetric mapping. To be used as a guide for photogrammetric mapping, the ACOE Engineering Manual for Photogrammetric Mapping EM1110-1-1000 provides standard procedures, minimum accuracy requirements, instrumentation and equipment requirements, product delivery requirements and quality control (QC) criteria. This includes aerial photography and standard line mapping (topographic or planimetric) products, including digital spatial data for use in computer-aided design and drafting (CADD) systems and GIS. The manual is intended to be a primary reference specification for contracted photogrammetric services. It should be used as a guide in planning mapping requirements, developing contract specifications, and preparing cost estimates for all phases of aerial photography and photogrammetric mapping.

Imagery acquisition will only occur as required and when proven to be the most economical solution. Every effort will be made to reduce costs by scheduling installations in a manner that leverages geographic locations.

4.2.2 GLOBAL POSITIONING SYSTEMS

Global Positioning Systems (GPS) have become a cost-effective and widely used technology for geospatial data collection. A variety of GPS hardware and software combinations provide users with various levels of horizontal accuracy, typically categorized into recreational, mapping, and survey grades.

Recreational grade GPS data collection is not recommended for most data sets used in installation management processes. For the majority of GEOFidelis data collection, mapping

grade horizontal accuracy will meet or exceed requirements. To obtain the highest level of horizontal accuracy possible when using mapping grade GPS equipment, the data collected must be differentially corrected. Even higher horizontal accuracies can be obtained through use of survey grade GPS data collection, but this is typically beyond the scope of most GIS requirements. However, when available, survey grade data can be utilized within the GIS whether collected by traditional survey methods or through survey grade GPS. Since survey processes are regulated by federal, state, and/or local technical and licensing requirements, it is highly recommended that any survey grade GPS data collection be performed by licensed professionals. Otherwise, the data collected cannot claim to be of survey grade and the metadata must reflect this distinction. Also of note, caution should be used when overlaying data of various accuracy grades since the features may not spatially align.

Geospatial data collected for the USMC with GPS will comply with the FGDC, Geospatial Positioning Accuracy Standards Part 3, National Standard for Spatial Data Accuracy, FGDC-STD-007.3-1998 (NSSDA).

4.2.3 HARDCOPY DATA SOURCES AND DATA CREATION METHODS

Vector data collection and maintenance could involve utilizing existing hardcopy sources for GEOFidelis feature layers. GEOFidelis, through SME coordination, will ensure that the best possible sources are utilized in the collection and modification of IGI&S data. Data Editors will follow guidelines for each method of data creation and document the process following the GEOFidelis Metadata Guidelines (Section 5).

4.2.3.1 ROOT MEAN SQUARE (RMS) ERROR

Error may be introduced in the conversion of source data (hardcopy or digital). The amount of error can be expressed quantitatively in terms of Root Mean Square (RMS) error. RMS error is a measure calculated when registering a hardcopy/paper map to a digitizer or spatially adjusting a digital file, indicating the discrepancy between known point locations and their digitized locations. The lower the RMS error, the more accurate the digitizing and the less amount of rectification error is introduced. The RMS error will be kept between 0.003 and 0.005 digitizer inches to ensure minimal propagation of positional error. All RMS error results will be included in metadata.

4.2.3.2 SPATIAL ADJUSTMENT

Spatial adjustment, or rubber sheeting, can be performed in several different fashions, but typically involves establishing non-uniform links between coordinates in the target CADD or GIS data file with corresponding locations in a reference CADD or GIS data file that is registered to a known coordinate system. Rubber sheeting typically introduces some amount of error to horizontal positional accuracy.

4.2.3.3 DIGITIZING

The creation and collection of geospatial data for *GEOFidelis* may require digitizing maps. Digitizing is when hardcopy/paper map sources are placed on a digitizing tablet, registered to the known real-world coordinate system shown on the paper map, and relevant boundary features are manually digitized (traced using a mouse cursor) by a technician. The amount of boundary interpretation and digitizing error introduced is dependent on the skills of the digitizing technician. The amount of rectification error introduced is dependent on the ability of the technician to register the hardcopy/paper map, once placed on the digitizing tablet, to the known real-world coordinate system.

When a hardcopy map is the most appropriate data source for the creation of geospatial data, the data editor will be responsible for accurate data collection and documentation of that source.

In some cases, digitizing from imagery directly in the application may be the best approach to data collection. This process is known as "Heads-Up Digitizing" because the attention of the user is focused up on the screen, and not on a digitizing tablet. Data collection is performed by tracing features from a scanned document (see section 4.2.3.4) or imagery. Data collection from rectified imagery must be noted in the metadata and reference the imagery's accuracy.

4.2.3.4 SCANNING

When equipment and expertise is available, IGI&S may find scanning hardcopy sources as the most efficient way to collect data. Scanning is when hardcopy/paper map sources are converted into digital picture format and operator tracing of relevant boundaries to create digital geospatial data features. This option may be viable when the hardcopy/paper source map is georeferenced to known real-world coordinates and the boundaries depicted are clearly discernable. Assuming the source map is accurately georeferenced and boundaries are accurately delineated on the source map, this option introduces little boundary interpretation or digitizing error. Rectification error is added only if the map, once scanned to digital picture format, is not properly registered to the known real-world coordinate system.

Whether the scanning is performed in-house or out-sourced, the IGI&S Manager will be responsible for the delivery of digital data meeting *GEOFidelis* standards.

4.2.3.5 COORDINATE GEOMETRY (COGO)

Geospatial features can be created by entering geometric information such as survey coordinates, traverses, etc. This process is known as coordinate geometry or COGO. Assuming the geometric information provided is correct, COGO entry introduces no boundary interpretation or digitizing error, and – if the survey ground control points are correctly recorded, COGO introduces no rectification error.

4.3 IMAGERY AND REMOTE SENSING DATA STANDARDS

4.3.1 DIGITAL ORTHOPHOTOGRAPHY AND SATELLITE IMAGERY

Imagery combined with accurate and reliable feature data provide users with the complete view of their installation and surrounding environment. *GEOFidelis* utilizes imagery with analytic overlays that depict vegetation, development, encroachment, environmental impact, and many other management concerns. Imagery provides an immediate visual cue, detailed visualization, and situational awareness for users. The acquisition of current and accurate imagery will provide the basis for a successful GIS when used to revise older digital vector files and topographic and planimetric maps.

Orthophotography combines the image characteristics of an aerial photograph with the geometric qualities of a map. Unlike a typical aerial photograph, distortions due to relief displacement (hills, stream valleys, and buildings), camera lens, and aircraft attitude have been removed so that all ground features are shown in their correct ground positions. This permits direct measurement of distances, areas, angles, and the detailed portions of ground features. In a digital format, orthophotography fulfills a fundamental role as a geometrically accurate base map.

High resolution satellite imagery has proven its usefulness in mapping and installation management. Continuing to increase its capability to produce accurate and high resolution products, the commercial satellite imagery industry is gaining on traditional aerial products. Current sensors are obtaining sub-meter resolution and 1:2400 National Mapping Accuracy Standards (NMAS) accuracy. This will allow for more cost-effective data collection, change detection, and installation management decision support.

4.3.2 DIGITAL ORTHOPHOTOGRAPHY AND SATELLITE IMAGERY SPECIFICATIONS

GEOFidelis Imagery will meet the following minimum specifications:

Satellite Imagery

- 1 meter or better (sub-meter) ground resolution imagery
- Visible spectrum panchromatic and color ("pan sharpened")
- Orthorectified 4-meter CE-90 horizontal accuracy
- 20% cloud cover or less
- Facility Management Imagery
 - Leaf off, snow free, same-season / same-year imagery
- Environmental Management Imagery
 - Optimal vegetation growing period, snow free, same-season / same-year imagery. Color Infrared may be preferred.

Aerial/Orthophotography

- 6 inch ground resolution imagery for developed areas
- 1 foot ground resolution for the entire installation (including the developed areas)
- Aerial Photography will be used to create 24-bit color digital Orthophoto images for the installations and facilities
- Photography to be completed at a mapping scale of 1" = 100', photo scale of 1" = 500' and a pixel resolution of six (6) inches to achieve National Mapping Accuracy Standards (NMAS)
- Photography, to the greatest practical extent, will be free of clouds, cloud shadows, smoke, haze, snow, and any other blemishes that interfere with the intended purpose of photography
- Every effort shall be made to acquire all photography for the installation on the same day
- Facility Management Photography
 - Photography shall not be collected during the peak of the vegetative growing season
- Environmental Management Photography
 - Photography shall be collected during the optimal period of the vegetative growing season. Color Infrared may be preferred.

4.3.3 DIGITAL ORTHOPHOTOGRAPHY AND SATELLITE IMAGERY ACQUISITION

GEOFidelis will establish refresh rates for imagery based on regional and installation requirements. GEOFidelis will leverage the improved resolution and accuracy of satellite imagery to augment an installation's imagery needs and reduce costs. Every effort will be made to satisfy the requirement through existing resources such as the Army Geospatial Center (AGC), National Geospatial Intelligence Agency (NGA) and other government agencies.

Imagery Acquisition Process:

1. Installation imagery requirements submitted to Regional GIO
2. Regional GIO will review and submit imagery acquisition recommendation to GEOFidelis GIO
3. GEOFidelis GIO will review and verify that new acquisition is necessary. If approved:
 - Aerial digital orthophotography request funded
 - Satellite imagery request submitted following steps detailed in Figure 1.

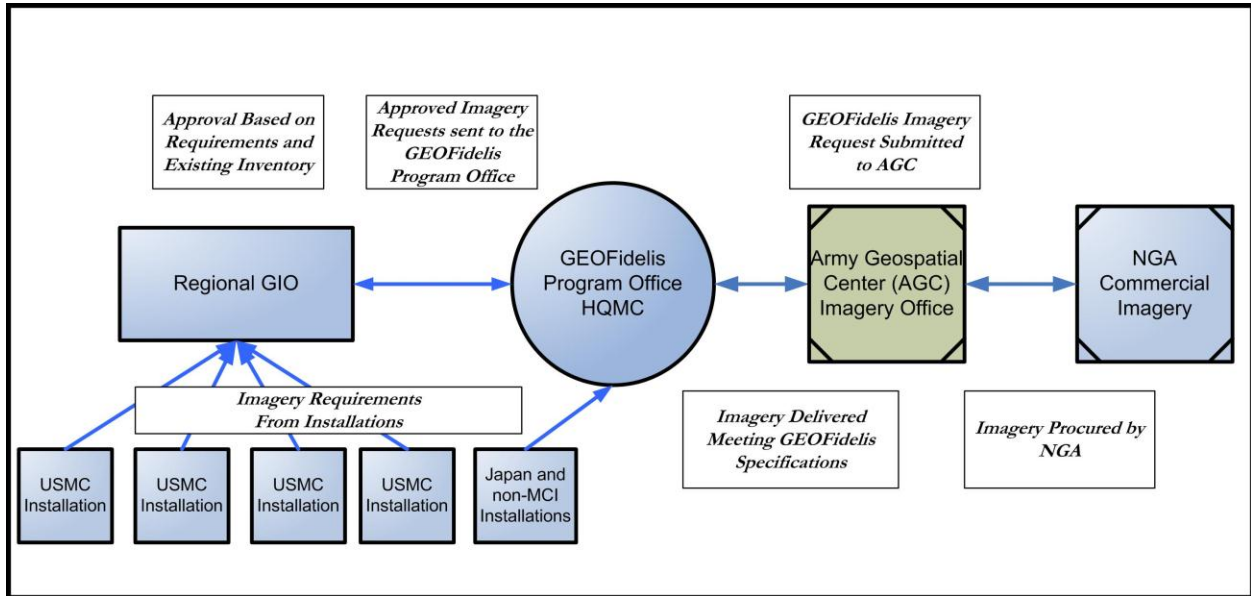


Figure 1 - Steps for Satellite Imagery Acquisition

4.3.4 LIGHT DETECTION AND RANGING

A Light Detection and Ranging (LiDAR) collection system uses a powerful laser sensor comprised of a transmitter and receiver, a geodetic-quality Global Positioning System (GPS) receiver and an Inertial Navigation System (INS) unit. The laser sensor is precision mounted to the underside of an aircraft. Once airborne, the sensor emits rapid pulses of infrared laser light, which are used to determine ranges to points on the terrain below. Ranges are determined by computing the amount of time it takes light to leave an aircraft, travel to the ground and return to the sensor. A sensing unit's precise position and attitude, instantaneous mirror angle and the collected ranges are used to calculate 3-D positions of terrain points. As many as 10,000 positions or "mass points" can be captured every second. LiDAR in its raw format is represented by mass points, which are inherently vector based.. The derived products of the data collection are raster datasets and may be used in conjunction with imagery. LiDAR allows for the efficient capture of digital terrain models (DTMs) for large-scale, high-accuracy mapping.

A LiDAR system can differentiate among multiple returns from the same pulse. The tops of terrain and bare Earth can be mapped simultaneously amid trees, power lines and high vegetation. In general, the last return for each pulse represents a point on the ground. Manmade structures such as buildings and roads also are mapped as ground points. These features are removed from the DTM through post-processing filtering techniques to create "bare earth" models. LiDAR data collections can be used to support line-of-sight analysis, tree canopy studies, simulate "fly throughs", and support obstruction analysis.

LiDAR can be utilized for large-scale mapping, especially for processing digital orthophotography and contour generation. LiDAR technology can produce DTMs faster and less expensively than traditional stereo-compilation methods. For large-scale mapping,

however, it is recommended that data are reviewed in stereo to verify accuracy. LiDAR data will support the creation of 2-foot contours to American Society of Photogrammetry and Remote Sensing (ASPRS) Class 1 accuracy if two conditions are met: First, the data must be stereo-edited for accuracy. Second, the data must be enhanced with breaklines along significant breaks in the terrain, such as along sharp road edges and hydrographic features. Contours can be developed from any elevation dataset. However, users are cautioned that the accuracy of a contour map depends on the elevation data used. LiDAR products that have not been stereo edited and have not had breaklines applied, will not create accurate contours.

LiDAR specifications can vary greatly based on the required and intended use of the derived products. Derived products can include DTMs (First Return, Last Return, Bare Earth) and can cover specific project areas or an entire installation. Due to these variations, the IGI&S Manager and Regional GIO will determine each project's specification.

4.4 IMAGERY ACQUISITION COMMAND APPROVAL

GEOFidelis acknowledges the requirements of DoDI 5200.8, "Security of DoD Installations and Resources" and the intent of other similar DoD policies and directives protecting military installations. Therefore, any GEOFidelis-sponsored initiative to capture ground or aerial imagery at Marine Corps Installations will require Commanding Officer approval prior to the commencement of operations. Acceptable approval of the operation will be, at a minimum, by direction of the Commanding Officer. IGI&S Managers will obtain and file such approval at the Installation IGI&S office. A copy of the approval will also be provided to the Regional GIO.

5.0 GEOSPATIAL METADATA STANDARDS

Metadata is a vital component of geospatial data management. Metadata provides information about an organization's data and data catalogues. From a data management perspective, metadata maintains the GEOFidelis investment in spatial data by recording a data layer's history, source, and currency. Metadata benefits the USMC in the following ways:

- Provides a description or inventory of data assets
- Determines and maintains the value of data
- Defines the reliability, currency, accuracy of data
- Documents any data licensing issues
- Supports decision making and cost savings
- Improves acquisition strategies by providing clearer understanding of when or if data needs to be updated

Implementing geospatial metadata standards is required. GEOFidelis will maintain metadata for all geospatial data and sustain these records as geospatial data is updated. Each IGI&S Manager will implement the standards presented in this document and ensure that metadata is current and accurate for their installation's geospatial data.

5.1 METADATA BACKGROUND

In 2003, the International Standards Organization (ISO) 19115:2003 *Geospatial Information – Metadata* was adopted and inserted into the Department of Defense Information Technology Standards Registry (DISR), emphasizing the need for the Department to employ well-structured standards with the ability to support discovery, accessibility, and clear understanding of vocabulary and use of semantics. This common metadata framework provides for sharing of geospatial data in accordance with the DoD Discovery Metadata Specification (DDMS) 1.3 and ensures the goals of the DoD Net-Centric Enterprise Service (NCES) data strategy (as outlined in DoD Directive 8320.2 *Data Sharing in a Net-Centric Department of Defense*) are supported.

5.2 DEFENSE INSTALLATION SPATIAL DATA INFRASTRUCTURE GEOSPATIAL METADATA PROFILE

To date, the metadata standard employed by GEOFidelis has been the Federal Geographic Data Committee (FGDC) Content Standard for Digital Geospatial Metadata (CSDGM), currently at Version 2. The FGDC CSDGM is not based on the ISO 19115 framework but rather it is a collection of existing International or National Standards. In 2009, a new ISO 19115 compliant metadata profile, known as the Defense Installation Spatial Data Infrastructure (DISDI) Geospatial Metadata Profile (DGMP), was adopted for all DoD IGI&S activities. This new profile was created to satisfy the needs of a wide range of user communities that require detailed information to describe and understand datasets developed within the DoD Business Mission Area. As referenced in the DISDI Guidance Memo, DoD Initial Guidance for IGI&S Capability Implementation, 14 April 2009, GEOFidelis must transition from the FGDC to the new DGMP.

5.3 GEOFIDELIS METADATA STANDARDS FOR VECTOR DATA

Although the capability exists to maintain metadata in an ISO 19115 compliant format, within the core GIS software suite used by GEOFidelis the software does not yet contain the validation checks to ensure metadata is compliant to the specific DGMP. Until this capability is inherent to the software, GEOFidelis will continue to maintain metadata in the FGDC standard. However, during this transition period, the GEOFidelis GIO may direct translation of the GEOFidelis metadata from the FGDC profile to the new DGMP using tools provided by the DISDI Office. Such translation efforts may be necessary to meet DoD level data calls, reporting requirements, or metadata discovery capabilities. Any translated metadata will be stored separately from the production geodatabases.

To further assist GEOFidelis IGI&S Managers in metadata management activities, GEOFidelis has identified a number of core metadata elements which are considered key for maintaining useful metadata. These core elements can be found in Appendix F. Though full compliance with the entire FGDC standard is still required, these core elements can provide a useful reference in daily operations and metadata maintenance activities.

5.4 GEOFIDELIS METADATA STANDARDS FOR IMAGERY

DISDI, in coordination with the Component Services is developing a profile for raster datasets which will be based on ISO 19115-2:2009. ISO 19115-2:2009 extends the existing geographic metadata standard by defining the schema required for describing imagery and raster data. GEOFidelis is participating with DISDI on this effort. This effort is not complete at the time of this writing. Until a DoD requirement is established, GEOFidelis Raster Metadata specifications will adhere to the standards established in the FGDC CSDGM version 2.

6.0 GEOSPATIAL DATA MANAGEMENT

GEOFidelis will ensure that geospatial data is maintained and managed consistently across the USMC installations and that the data is thoroughly checked in accordance with quality control and assurance procedures and standards.

6.1 DATA MANAGEMENT PLAN GUIDELINES

Each Regional GIO and Installation IGI&S Manager will develop a data management plan to document procedures for data collection, maintenance, review, and archiving. Data maintenance procedures will leverage the roles and responsibilities as defined by this document. Each data management plan will include, at a minimum, the following procedures:

- Data Collection
 - Integrate GEOFidelis Generic Statement of Work into acquisition process
 - Create Data Collection Plan of Action and Milestones (POAM)
 - Prioritize Data Collection Layers
 - Assign Geospatial Data SME to Layers
- Data Quality Assurance Plan
 - Document Quality Controls
 - Document Deliverable Review Procedures
- Data Maintenance
 - Develop Maintenance Schedules
 - Coordinate Schema Updates
- Data Review
 - Review data completeness (minimum annually)
 - Coordinate SME Acceptance utilizing SME Review Template
 - Review and Publish Metadata
- Data Archival
 - Coordinate Annual Archival of Authoritative and Published Installation Data
 - Coordinate SME or Project Archival requirements
- Document Progress in Quarterly Status Reports

6.2 GEOSPATIAL DATA ARCHIVAL

GEOFidelis geospatial data management procedures mandate an annual archival of each installation's data holdings. This will create an annual authoritative data archive for each USMC installation. The annual archival will occur within 2 weeks of 30 September.

Storage and delivery of archives will meet the following criteria:

- Archives (vector and imagery) will be stored at the GEOFidelis Regional Centers with a copy of the vector archive provided to the installation. Installations not served by a Regional Center will store the archive locally.
- Archives will be provided to the GEOFidelis Program Office on an as-needed/as-requested basis using a predetermined media format or data exchange mechanism.
- Archives must be stored in a format which allows efficient and timely retrieval of data if needed.
- Archived catalogues, for each installation, will be available through the GEOFidelis Regional Center system or local system for installations not served by a Regional Center.

Geospatial data may also require special archival in support of USMC installation specific projects. This requirement will be determined by the SME or project lead at the installation. The archival will be coordinated between the SME, IGI&S Manager, and the Regional Center. Specifications of the archival will be determined by the SME or project lead.

6.3 QUALITY ASSURANCE AND QUALITY CONTROL

When used in GIS analysis, a data set's quality significantly affects confidence in the results. Unknown data quality leads to tentative decisions, increased liability, and loss of productivity. Decisions based on data of known quality are made with greater confidence and are more easily explained and/or defended.

There are many factors that affect the quality of geospatial data. These factors range from computational to organizational and each could have a negative effect on the accuracy and usability of geospatial data. The implementation of a Quality Assurance (QA) Plan with supporting Quality Control (QC) will allow an installation to integrate procedures into day-to-day operations and improve its ability to provide users the most complete and accurate data possible.

Definitions from Environmental System Research Institute (ESRI):

- **Quality Assurance:** An all-encompassing management approach combining technical aspects of quality, qualitative methods, and human resources in a system designed to meet the customer's expectations
- **Quality Control:** An individual task or set of tasks performed at a given level of the production process that is measured and aimed at ensuring integrity of a product, output, or action

6.3.1 QUALITY ASSURANCE PLAN DEVELOPMENT

Each IGI&S Manager will develop and implement a Quality Assurance Plan with Quality Control measures for their installation. The plan must be based on industry standards and GEOFidelis policy and procedure. The Regional GIO will review and approve (based on compliance with GEOFidelis policy and procedure and industry standards) the installation QA Plan.

The QA Plan will leverage other areas defined in this document and cover the areas detailed in Figure 2. The QA Plan will encompass internal (installation data collection) and external (contracted data collection) data deliveries, and both will utilize the approved QA/QC acceptance workflow.

GEOFidelis Quality Assurance	
Management	Design
<ul style="list-style-type: none"> ■ Establish process and scope of internal and external assessment ■ Document Objectives ■ Identify Roles and Responsibilities ■ Define Workflow and Develop Procedures 	<ul style="list-style-type: none"> ■ Apply Data Management Procedures ■ Comply with the GEOFidelis Data Model ■ Utilize GEOFidelis SOW for internal and external deliverables ■ Determine quality sampling controls
Data Assessment	Data Review
<ul style="list-style-type: none"> ■ Illustrate Quality Control Tasks and Workflow ■ Automate QC Checks ■ Assess Topology ■ Document QC Checks ■ Identify Relevant Documents 	<ul style="list-style-type: none"> ■ Streamlines spatial data quality tasks ■ Outlines a systematic approach for resolving data problems ■ Allows for review and assessment of plan and procedures

Figure 2 - GEOFidelis Quality Assurance

6.3.2 TEST DEVELOPMENT

A QA Plan will develop several tests of geospatial data quality. The tests will allow for a measurable and attainable set of acceptance criteria. The tests will become a part of day-to-day operations for the continuous quality control process. Tests will be communicated to contractors to assure acceptable deliveries. Figure 3 outlines the minimum quality control tests.

GEOFidelis Quality Control Test Areas				
GEOFidelis Data Model	Geometry	Topology	Visual QC	Feature Counts & Content
<ul style="list-style-type: none"> ■ Database Compliance ■ Database Properties ■ Spatial References ■ Field and Attribute Properties 	<ul style="list-style-type: none"> ■ Undershoots ■ Overshoots ■ Null Geometry ■ Self Intersection ■ Overlapping Features ■ Sliver Polygons ■ Validation Rules 	<ul style="list-style-type: none"> ■ Cluster Tolerance ■ Cracking/Clustering ■ Adhere to Rules (Point, Line, Polygon) 	<ul style="list-style-type: none"> ■ Digital Review ■ Hardcopy Review ■ Source Comparison ■ Labeling ■ Symbology 	<ul style="list-style-type: none"> ■ Feature Classes ■ Tables ■ Source Vs. Delivered ■ Attribute Content

Figure 3 - Quality Control Test Areas

7.0 DATA ACCESS AND RELEASE GUIDELINES

GEOFidelis data and staff take on an important role in USMC installation management decision-making processes. Geospatial information and services are a core capability supporting the various activities with installation management responsibilities. Within an integrated installation management structure, geospatial data is used to support many departments, functions, various projects/programs, and has an increasingly critical role in decision making.

Marine Corps Order 11000.25 designates the roles and responsibilities of two key areas of USMC geospatial data management: the IGI&S community and functional communities. The functional communities must facilitate communication (Figure 4) through Headquarters, Regions, and Installations to ensure:

- GEOFidelis policies and procedures are known and followed
- Advanced notice of GEOFidelis data requests are provided to all involved IGI&S managers and functional area SMEs
- All requests include the required information and documentation

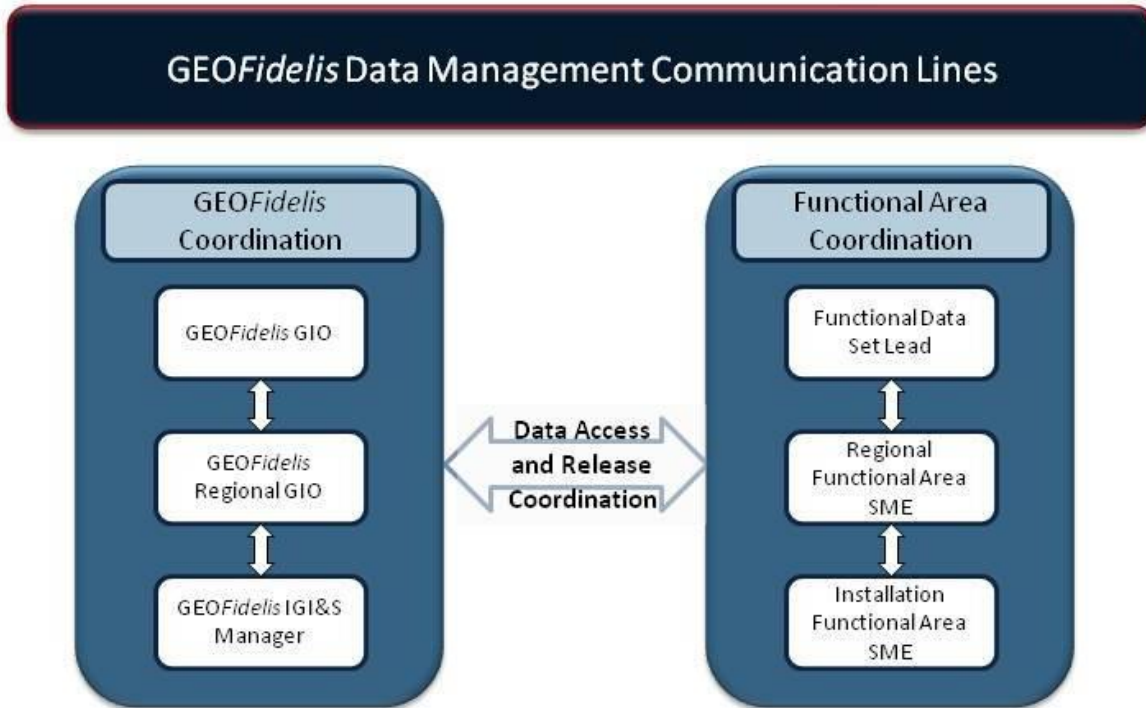


Figure 4 – GEOFidelis and Functional Communication Lines

GEOFidelis authored the GEOFidelis Data Access and Release Guidelines to provide policy and procedures for implementation by functional managers and GEOFidelis managers and users. The guidelines will provide a consistent approach to the management of geospatial data in the areas of user access to data sets and the release of geospatial data through data requests. The GEOFidelis Data Access and Release Guidelines have been developed to facilitate accomplishing the policy and goals set forth in Marine Corps Order 11000.25, Installation Geospatial Information and Services. A detailed access and release matrix can be found in Appendix H. Implementation of the policy and procedures of this guide and compliance with USMC Information Assurance ensures all geospatial data is managed at a minimum requirement, "For Official Use Only" level for continued operation of GEOFidelis on the Unclassified but Sensitive Internet Protocol (IP) Router Network (NIPRNet).

7.1 GEOFIDELIS DATA DESIGNATION AND CONTROLS

MCO 11000.25 directed that GEOFidelis geospatial data assets are, at a minimum level of control, to be designated "For Official Use Only" (FOUO). MCO 11000.25 also directs Functional Data Sets leads to review the current GEOFidelis geospatial data assets and determine if additional access and release controls are required due to Federal mandates or other constraints. GEOFidelis will manage geospatial data using the following designations.

7.1.1 FOR OFFICIAL USE ONLY (FOUO)

The primary designation for geospatial data under the stewardship of the GEOFidelis Program is "For Official Use Only", or FOUO. FOUO designation and marking is applied by DoD to its unclassified information that may be exempt from mandatory release to the public under Section 552 of Title 5, U.S.C., "Freedom of Information Act (FOIA)." DoD Directive 5400.7, "DoD Freedom of Information Act Program," implements FOIA within DoD. See DoD Regulation 5200.1-R for further guidance in this area. The exemptions specified under FOIA are contained within Appendix D.

GEOFidelis utilizes this designation to assist its IGI&S managers primarily in data release. The specific release and use directives provide clear procedures to authenticate the release, intended use, and destruction of data following project fulfillment. GEOFidelis IGI&S managers, following the data release procedures, can disseminate FOUO data under the following guidelines:

- FOUO information may be disseminated within the DoD Components and between officials of the DoD Components and DoD contractors, consultants, and grantees as necessary in the conduct of official business. FOUO information may also be released to officials in other Departments and Agencies of the Executive and Judicial Branches in performance of a valid Government function.
- In the above case, dissemination of FOUO information/products will be made only after the holder of the information has verified:
 - Identification of the prospective recipient
 - DoD or Federal sponsorship of prospective recipient
 - Recipient's "need to know" in connection with official duties
- All delivery of geospatial data will include a cover letter (sample cover letter included in Appendix E) that includes the following distribution statement: The data and enclosures are provided For Official Use Only (FOUO). FOUO Distribution Restriction Statement: "Distribution authorized to the U.S. Government and their contractors only; contains technical or operational information. FOUO data will not be duplicated, nor will there be secondary distribution of the original data. Upon termination of use, all data shall be removed from computer systems."
- If the geospatial information request is routine in nature and the information is not restricted by Functional Dataset Lead controls, release can be made to DoD entities with an appropriate cover letter as found within Appendix E.

7.1.2 FOR OFFICIAL USE ONLY WITH AUTHORIZATION

GEOFidelis geospatial data can also require additional access and release constraints based on Federal policy, sensitivity, and Functional Dataset Lead determination. Per MCO 11000.25, Installation Geospatial Information and Services:

"Each Functional Dataset Lead is responsible for creating, purchasing and providing individual datasets to the enterprise. This includes funding the portion of the data and services required to support their specific operational needs in accordance with the policies set forth in this Order."

Associated with the responsibilities outlined above, the Functional Dataset Leads, listed in Appendix H, will determine the level of access and release constraints for each dataset designated to be within their functional area oversight. To meet these requirements, GEOFidelis added a "For Official Use Only with Authorization" designation. "For Official Use Only with Authorization" will require approval from the appropriate Functional Area SME Lead, as defined in Section 2.5 of this guide, for the command approving and/or fulfilling the request.

7.2 GEOFIDELIS "FOUO WITH AUTHORIZATION" DATA ACCESS GUIDELINES

Users access the GEOFidelis geospatial data through geospatial databases via core geospatial desktop software, web map viewers, and other geo-enabled applications used by functional communities. Access to the data via any of these methods requires a valid DoD Common Access Card (CAC) and certificates to login to the IT environment and access the data. This configuration and access control allows approved users access to the FOUO GEOFidelis data.

For GEOFidelis geospatial data that has been designated as "FOUO with Authorization" by the Functional Dataset Leads identified in MCO 11000.25, additional constraints must be applied to the individual layers that require authorized access. To identify authorized users, each IGI&S manager will coordinate with the Installation Functional Area SME Lead, as defined in Section 2.5 of this guide, to obtain a list of names and the data layers they are authorized to access. The IGI&S Manager will maintain a list of authorized users for each geospatial data layer that requires FOUO with Authorization. The list will be provided to the appropriate GEOFidelis Regional Center (via the Regional GIO if applicable) or Japan installation which will apply controls to the access list for all applications within the GEOFidelis Enterprise Configuration. Unauthorized users will not have access to these layers. This process is depicted in the following chart (Figure 5):

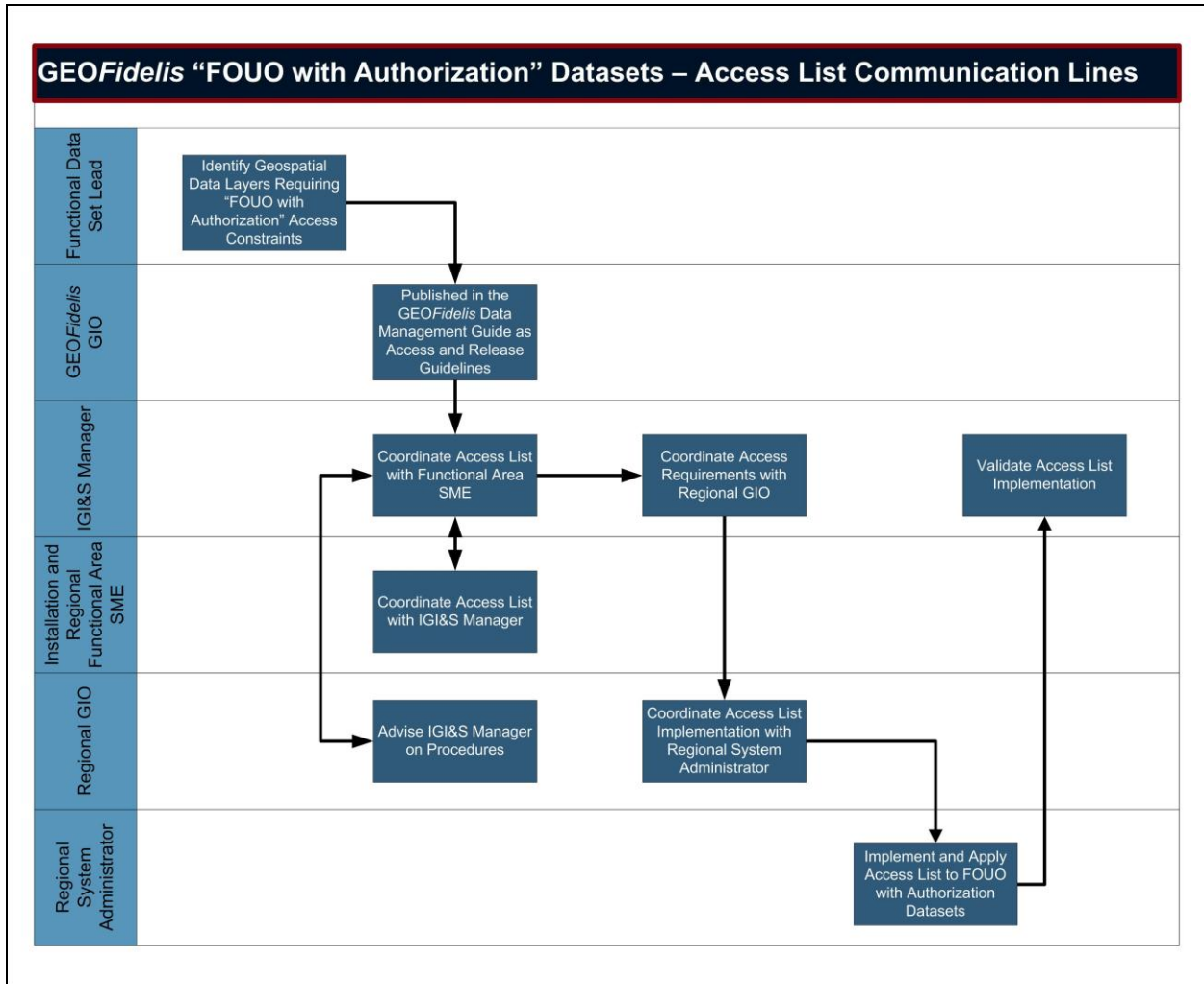


Figure 5 – GEOFidelis FOUO with Authorization Data Access Procedures

7.3 GEOFIDELIS "FOUO WITH AUTHORIZATION" DATA RELEASE GUIDELINES

"FOUO with Authorization" are data layers that have been identified by MCO 11000.25 Functional Dataset Leads as data that requires additional access and/or release constraints and approval. The procedural flow of events for "FOUO with Authorization" release is similar to releasing standard FOUO geospatial data. The primary difference is to ensure that the installation Functional Area SME, as defined in Section 2.5 of this guide, has approved or authorized the release of this geospatial data. Authorization to release the data will be provided in writing or by email. This documentation must be kept as part of the data request record.

Figure 6 depicts the flow of information and checks for “FOUO with Authorization” data release. The key requirements for managing release of “FOUO with Authorization” geospatial data are the communication lines between all USMC GEOFidelis and functional area managers and SMEs.

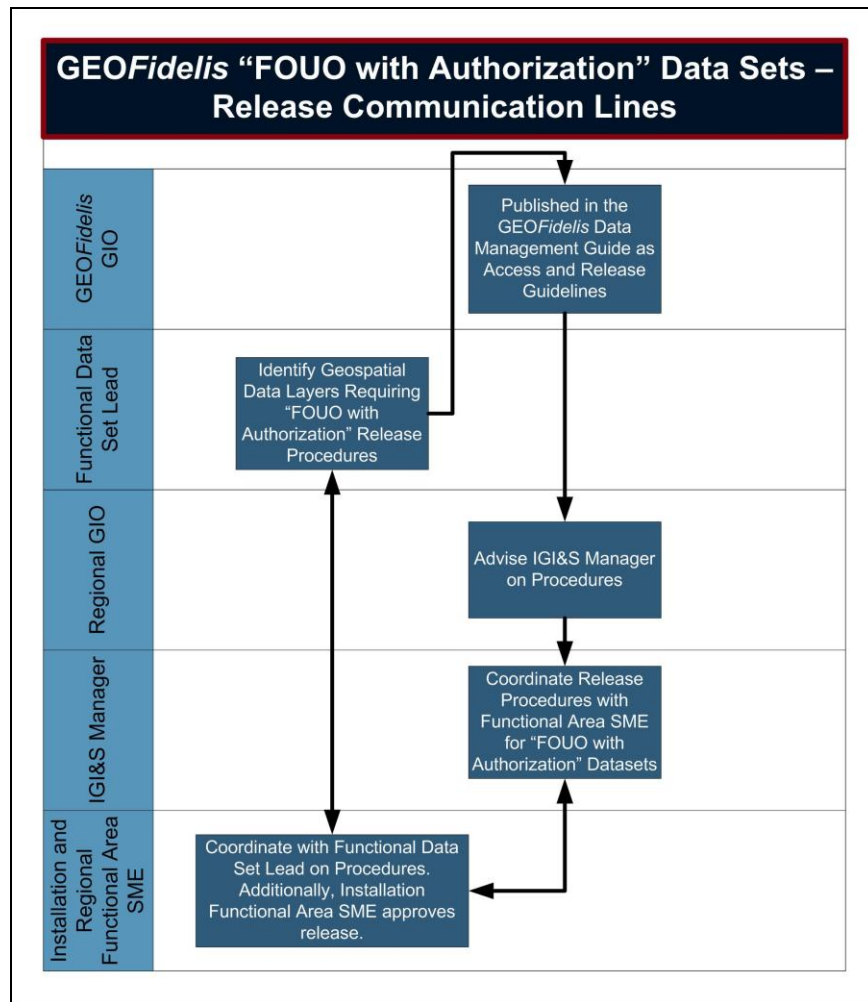


Figure 6 - GEOFidelis "FOUO with Authorization" Data Sets - Release Communication Lines

8.0 DATA REQUEST REQUIREMENTS AND WORKFLOWS

8.1 GEOFIDELIS DATA RELEASE PROCEDURES AND COORDINATION

Geospatial data sharing between government agencies, specifically within DoD, provides the USMC with significant cost savings through eliminating data duplication, redundant data expenditures, and improved efficiencies in installation management. GEOFidelis receives and processes geospatial data requests from within the USMC, other DoD, federal, state and local government agencies. These requests provide a great return on investment to the

USMC by supporting contracted project work across USMC installations. The majority of data requests are for FOUO geospatial data and are fulfilled based on a demonstrated and validated need to know, including validation from a USMC project sponsor, USMC approved purpose, and valid scope of work for the request. The following are the general requirements for any GEOFidelis Data Request:

- USMC Project Sponsor
- Requested Data Layer(s) List
- GEOFidelis Validated Purpose
- Statement of Work - as required for additional validation and understanding of the specific data layers needed for the project or to be modified by the project

8.1.1 USMC DATA AT REST (DAR)

The GEOFidelis Program and data release procedures will be impacted by Data at Rest (DAR) policies from the Office of Management and Budget (OMB) M-06-16 and DoD CIO Memo, "Encryption of Sensitive Unclassified Data at Rest on Mobile Computing Devices and Removable Storage Media". To meet the policy requirements and to ensure common data release procedures, GEOFidelis will implement a common removable media data encryption policy for all data and documents. The NMCI Data at Rest encryption solution affords functionality to enable the automatic encryption of DoD data during transfer from hard disc to removable storage (i.e., CD-ROM, DVD, or USB Hard Drives). The following guidelines are meant to enable the efficient and standardized use of this encryption software as it applies to GEOFidelis geospatial data management.

Data Request packages will be encrypted with the "password only" option to support decryption on non-NMCI machines without CAC authentication capability. The GEOFidelis Data Request cover letter should include verbiage obligating the user/recipient to comply with DoD Data At Rest encryption policies while in possession of the data package. Additionally, every data package should contain instructions for re-encrypting the data using the DAR data utility.

8.1.2 DATA REQUEST SCOPE VALIDATION

GEOFidelis will determine the appropriate request fulfillment procedures of the data request by utilizing the communication lines between the GEOFidelis GIO, GEOFidelis Regional GIOs, and the USMC IGI&S Managers. A significant number of data requests appear to be installation specific until cross-checked across GEOFidelis. Only with proper communication can USMC-wide data requests be identified and fulfilled. When GEOFidelis data requests are fulfilled, the request will be logged at the appropriate Regional Center or Japan installation.

The following figures (7, 8, and 9) provide common workflow or communication lines to ensure that each request is handled properly and as efficiently as possible. From HQMC to the Regions and Installations, all GEOFidelis managers will communicate throughout GEOFidelis data request processes.

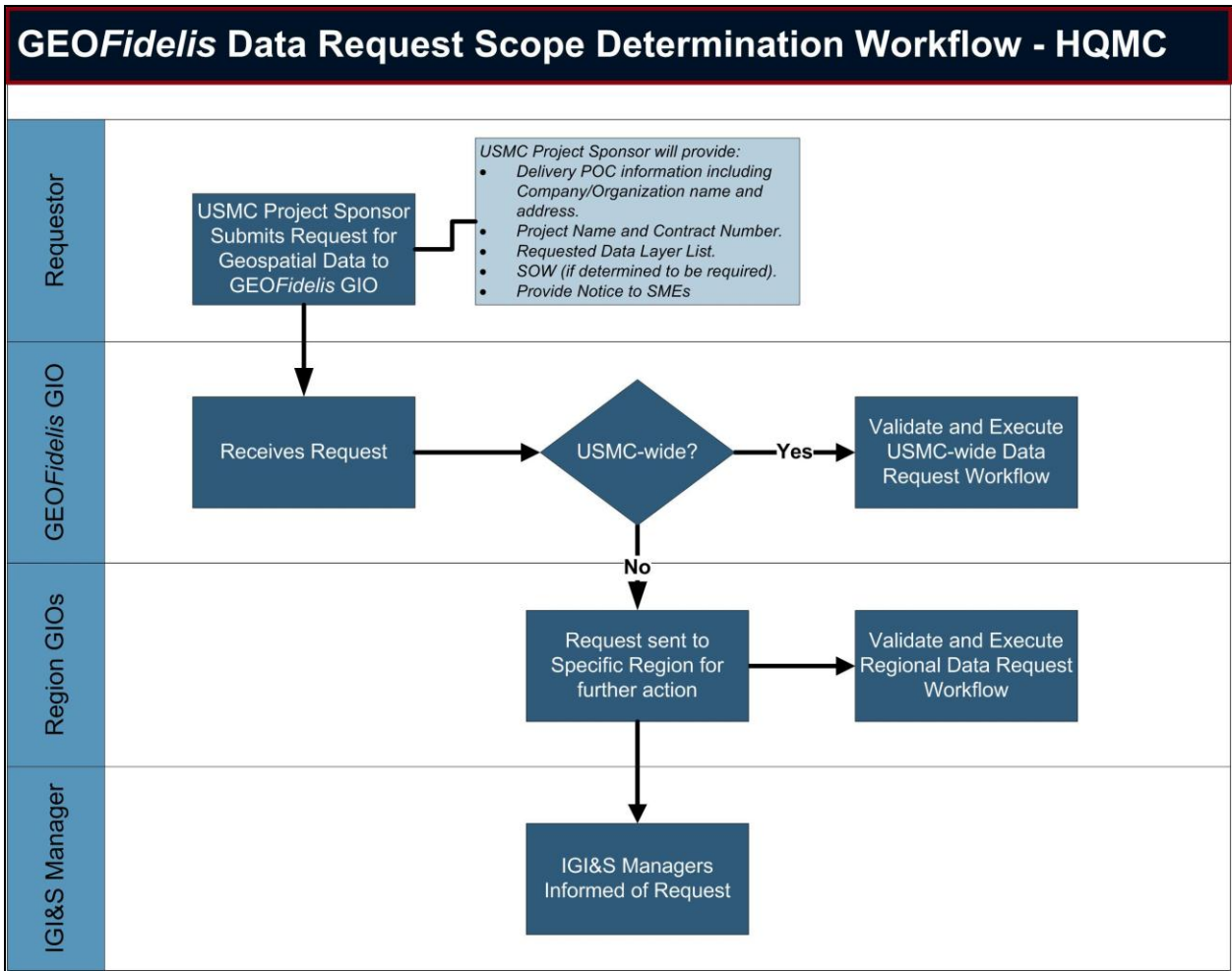


Figure 7 - Data Request Scope Determination - HQMC

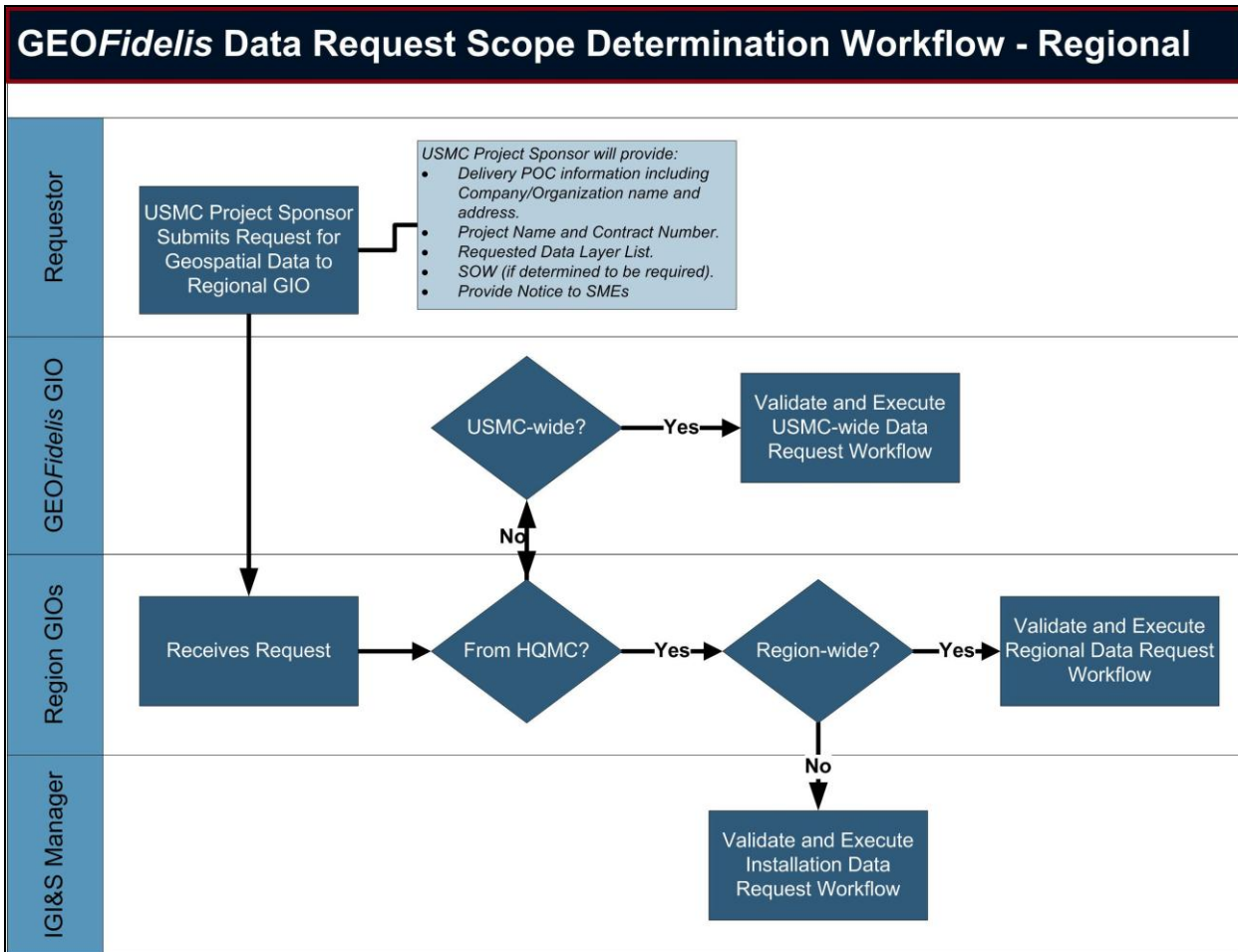


Figure 8 – Data Request Scope Determination - Regions

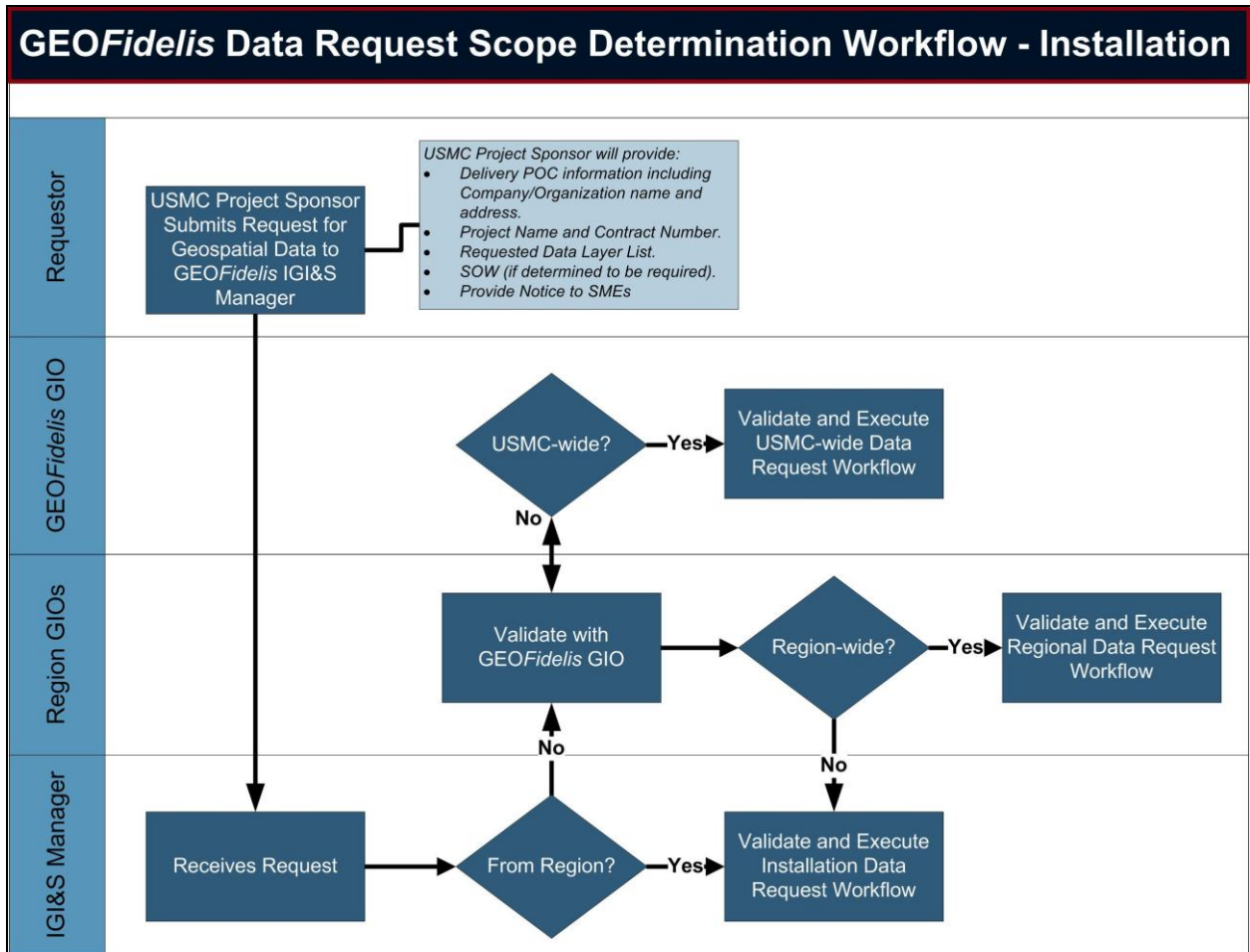


Figure 9 – Data Request Scope Determination – Installation

8.1.3 DATA REQUEST PACKAGES AND FULFILLMENT

Following request validation, GEOFidelis will fulfill the data request based on the requirements. All requests will include the following:

- Only Requested and Approved Dataset Layers
- Release Letter, on Command letterhead (with appropriate authority signature), with FOUO Statement that is accepted by the requestor upon receipt
- Metadata for Datasets
- Data at Rest (DAR) Password
- All requests are logged at the Regional Center

8.2 USMC-WIDE DATA REQUESTS

The GEOFidelis GIO will coordinate all USMC-wide GEOFidelis data requests. A USMC-wide IGI&S data request consists of multiple installations from multiple regions or determined at the discretion of the GEOFidelis GIO.

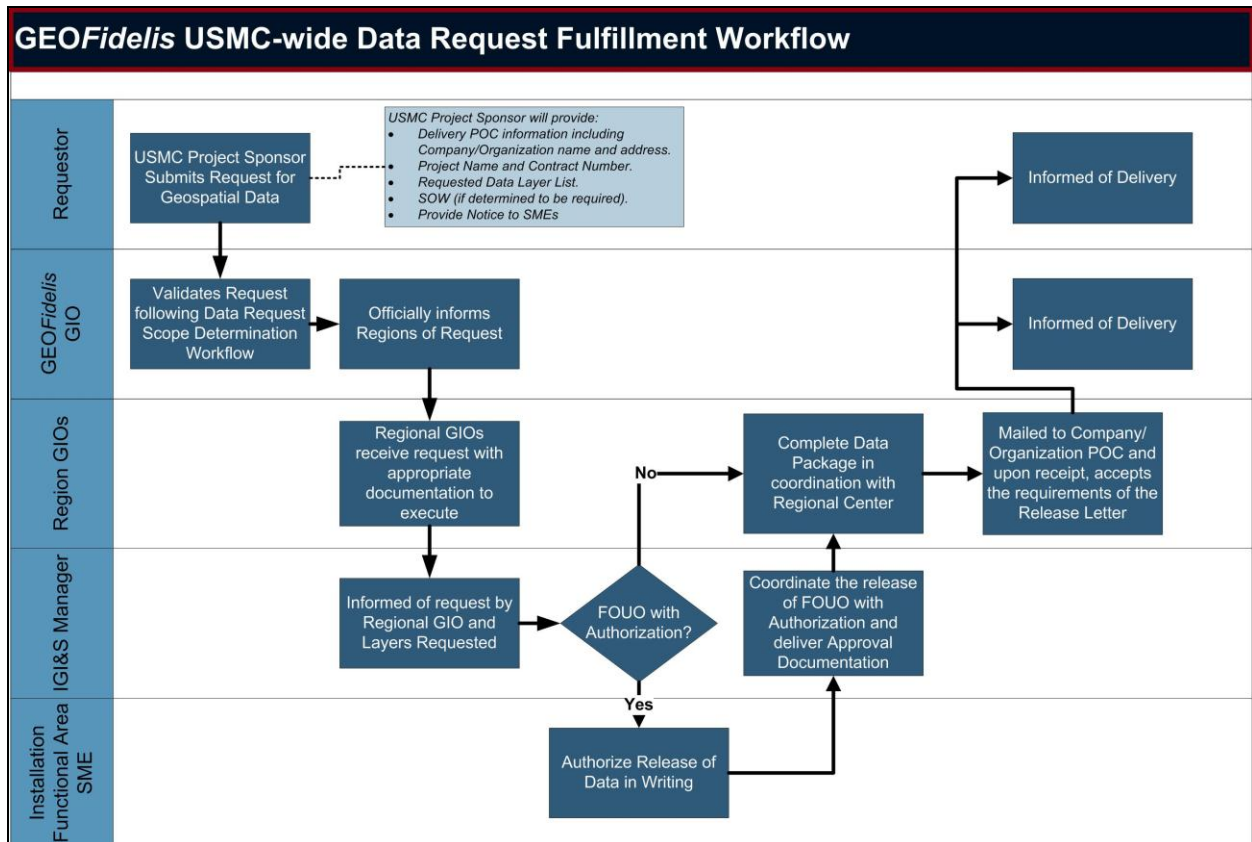


Figure 10 - GEOFidelis USMC-wide Data Request Fulfillment Workflow

8.3 REGIONAL DATA REQUESTS

GEOFidelis Regional data requests are specific to a particular Marine Corps Installations (MCI) region. Communication between the Regional GIO and the GEOFidelis GIO is imperative to determine the level and appropriate action for the data request.

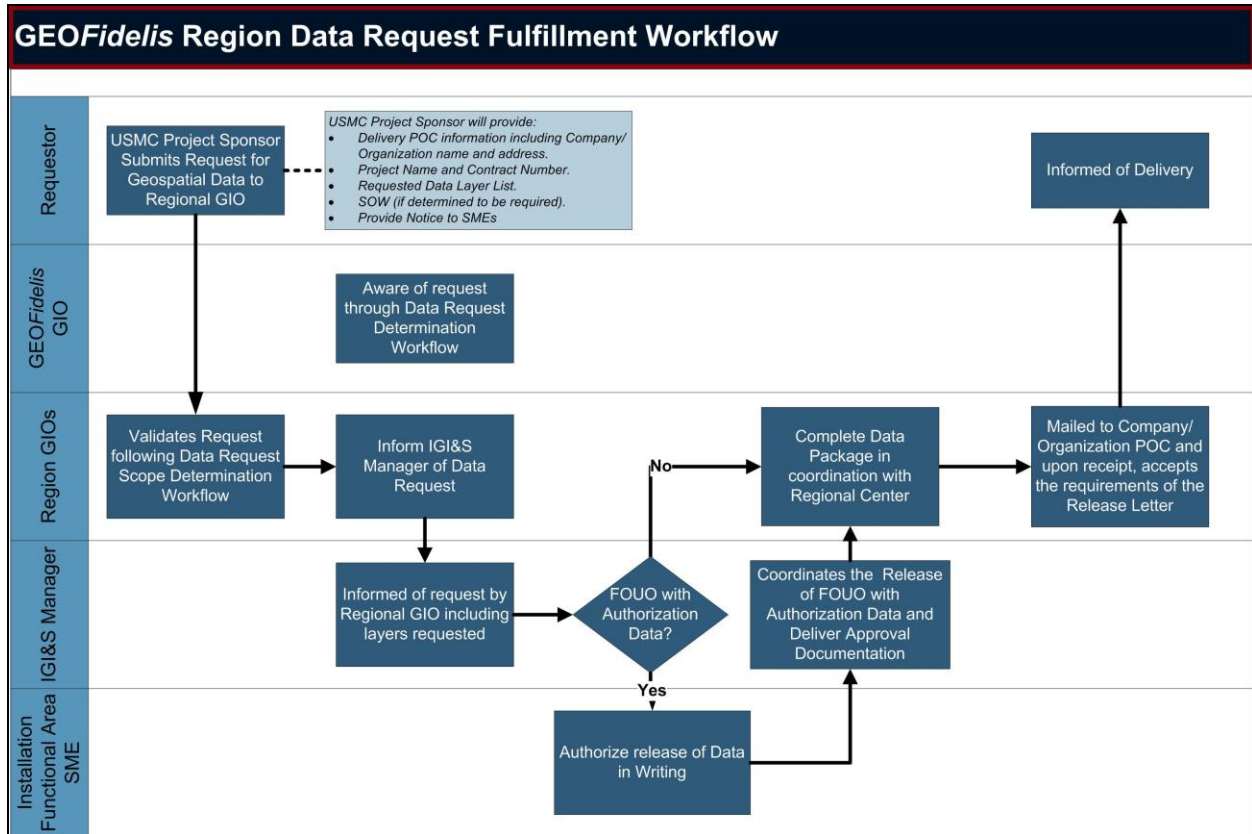


Figure 11 - GEOFidelis Regional Data Request Fulfillment Workflow

8.4 INSTALLATION DATA REQUESTS

GEOFidelis Installation data requests are specific to a particular installation. These data requests can be initiated by the Command, installation staff, or pertain only to that installation. Communication between the IGI&S Manager and the Regional GIO is imperative to determine the level and appropriate action for the data request.

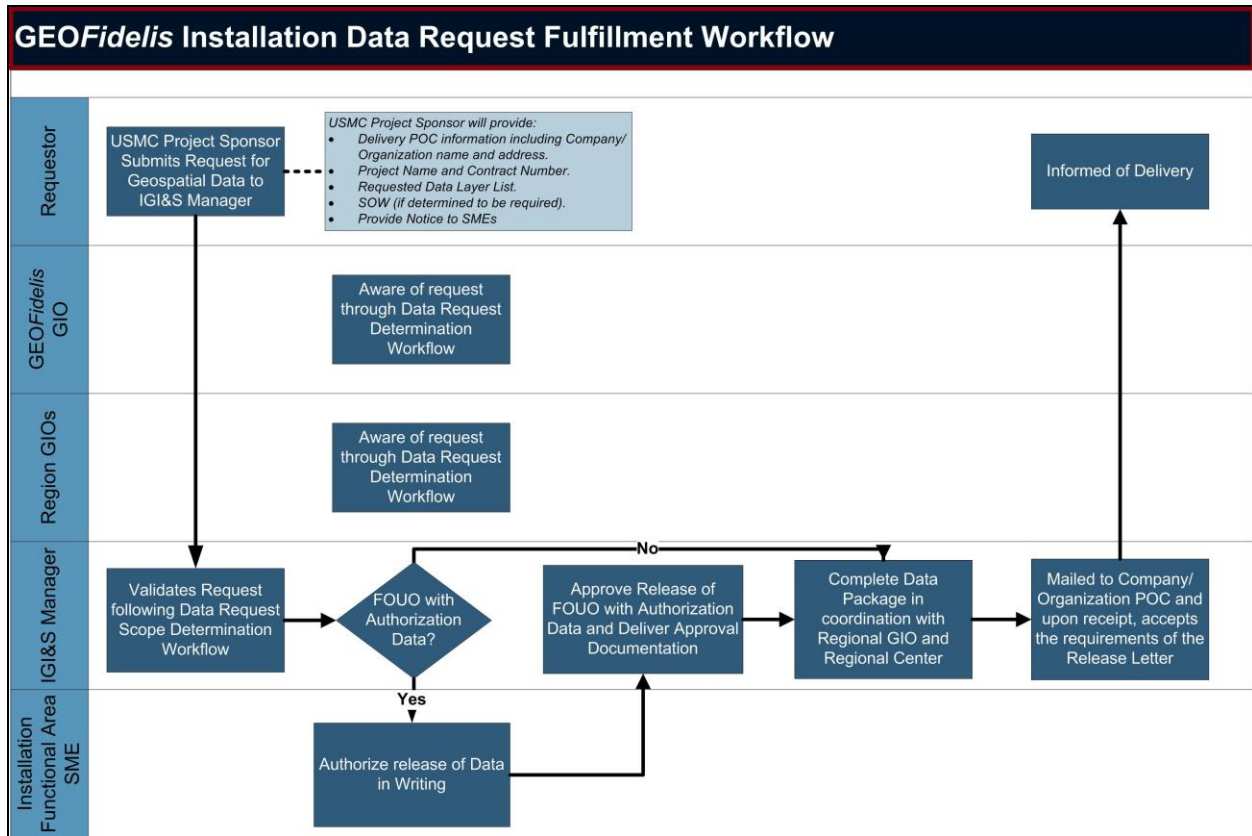


Figure 12 - GEOFidelis Installation Data Request Fulfillment Workflow

9.0 EXTERNAL SOURCE GEOSPATIAL DATA MANAGEMENT

GEOFidelis recognizes the advantages of data sharing with federal, state, and local agencies. Utilizing data from other agencies is a significant benefit to USMC installation management. The nature of geospatial data allows GEOFidelis to overlay this information with geospatial data under USMC stewardship. This provides users with additional information to improve decision making in the many installation management areas including, but not limited to, facility management, environmental compliance, and natural resource management.

GEOFidelis will enter into agreements for geospatial data with data providers outside of the USMC. Agreements for geospatial data to be used across USMC installations in the

GEOFidelis Program are entered into by HQMC and the GEOFidelis GIO. The agreement will be managed by the GEOFidelis GIO and the data and use agreement information will be provided to managers throughout GEOFidelis. This includes procured data that is licensed and the USMC has entered into license agreements.

Under no circumstances will GEOFidelis release data obtained or procured from external sources and not recognized as data under GEOFidelis stewardship, unless a license agreement or formal data sharing agreement exists and allows such action. This does not imply a mandate or requirement to share data when a license or formal data sharing agreement exists. Referring the requester to the data source or data owner is a valid option. The GEOFidelis GIO will be notified of any request for data that is not owned or managed by GEOFidelis for further action and official response.

10.0 MAPPING GUIDELINES

Cartographic and map based products require guidelines to ensure that the user of this data product is given the necessary information to fully understand the data depicted. Additionally, IGI&S Managers must provide oversight for publically released map products and ensure that these products are approved for release by the Public Affairs Office.

The following are the minimum requirements for GEOFidelis produced maps. GEOFidelis maps are products produced from IGI&S data through GEOFidelis systems. The requirements represent best business practices in hardcopy cartographic production. One important requirement for GEOFidelis maps and products is that the IP address or server names will not be displayed on the map or product. If this information is necessary to manage the maps and products it should be referenced by the map number and documented internally.

As every requirement is slightly different, these guidelines should be adjusted as needed to suit specific installation requirements. IGI&S Managers are required to comply with these guidelines on all GEOFidelis map products.

GEOFidelis Map Product Requirements	
Map Title	GEOFidelis map products will always include a title that best explains the contents of each map produced.

<p>Scale Statement</p>	<p>GEOFidelis map products will include a representative fraction (RF) and a scale bar.</p> <p>Maps should never be made at odd scales such as 1:52,374. Use only whole number scales (i.e., 1:100,000) when adding map frames. Depending on the project, maps should be made at standard scales (1:24,000, 1:25,000, 1:50,000, 1:100,000, and 1:250,000).</p> <p>Maps should always have scale bar that is created in standard units to allow users to perform measurements on the map.</p>
<p>Projection and Datum Statement</p>	<p>GEOFidelis map products will include a reference notation listing the projection and datum used to create the map.</p>
<p>North Arrow</p>	<p>Each GEOFidelis map product will include a north arrow.</p>
<p>Legend</p>	<p>Each GEOFidelis map product will include a legend representing all symbols displayed on the map.</p>
<p>Map Disclaimer</p>	<p>All GEOFidelis map products will include the following disclaimer:</p> <p><i>Although every effort has been made to ensure the accuracy of the information, errors and conditions originating from physical sources to develop the database may be reflected in the data supplied. The user must be aware of data conditions and ultimately bear responsibility for the appropriate use of the information with respect to possible errors, original map scale, collection methodology, currency of the data, and other conditions specific to certain data. This information does not depict all possible resources. Field verification of all data is required for site-specific projects. This information is deemed reliable, but not guaranteed.</i></p>
<p>Contact Information</p>	<p>All GEOFidelis map products will include, at a minimum, the following information:</p> <ul style="list-style-type: none"> • Organization (installation, region, etc.) • Department • Phone Number • Date Created
<p>Map Number</p>	<p>Implement a numbering approach to maintain an internal record of the map product.</p>
<p>FOUO Statement</p>	<p>MCO 11000.25 directed that GEOFidelis geospatial data assets are, at a minimum level of control, to be designated "For Official Use Only" (FOUO). GEOFidelis Map Products, that include GEOFidelis data, will be marked FOR OFFICIAL USE ONLY.</p>

<p>Commercial Imagery Copyright</p>	<p>If a GEOFidelis map contains commercial imagery, such as Digital Globe or Space Imaging, place a copyright statement in an appropriate location on the map. For example, if the image was taken in 2002 and the vendor was Digital Globe, the copyright statement should reflect:</p> <p>©2002 Digital Globe</p> <p>If the map contains several images with a range of dates, the copyright should reflect the most current date.</p> <p>If the map frame contains images from multiple vendors, the copyright must reflect each vendor (i.e., ©2002 Digital Globe/©2003 Space Imaging).</p>
<p>Source Statement</p>	<p>If a GEOFidelis map product contains data that was generated by non-USMC sources, a statement of ownership of that data is required. This statement covers those sources that were not specifically generated for the USMC.</p>
<p>Official Map Series Statements</p>	<p>All GEOFidelis map products that are a part of a map series or atlas should be labeled with edition, series, and sheet information.</p>

10.1 COMMERCIAL IMAGERY DISTRIBUTION

GEOFidelis coordinates with NGA and the Army Geospatial Center (AGC) office on the acquisition of commercial satellite imagery. Through this relationship there is an added responsibility of controlling imagery distribution. There will be numerous requests for imagery, and it is the responsibility of GEOFidelis to make sure that requests are being handled properly and not distributed to any person or persons that do not fall under the licensing agreement. GEOFidelis must adhere to the license requirements that are placed on commercial satellite imagery. The license agreements stipulate which organizations can use the imagery and to whom the USMC can distribute.

10.1.1 BRAC 2005 IVT IMAGERY AND TITLE 50

IVT imagery may be released to the following DoD/Title 50 organizations:

- Military Departments (United States Air Force (USAF), United States Navy (USN), United States Marine Corps (USMC), United States Army (USA))
- Defense Agencies (including, but not limited to, Defense Threat Reduction Agency (DTRA), Joint Program Office (JPO), Defense Logistics Agency (DLA), etc.)
- Allies/coalition partners when working on a joint operation
- Intelligence community, including:
 - Central Intelligence Agency (CIA)

- National Security Agency (NSA)
- Defense Intelligence Agency (DIA)
- National Reconnaissance Office (NRO)
- Intel elements at United States Coast Guard (USCG), Department of Homeland Security (DHS), Federal Bureau of Investigation (FBI), Department of Treasury, and Department of Energy
- Bureau of Intelligence and Research at the Department of State

IVT imagery **may not** be released to the following:

- Other elements within DHS, USCG, etc., that do not fall within the Intelligence Element of those organizations
- Any Federal government organization not mentioned in the previous list
- State and local governments
- Non-governmental organizations (NGOs)
- Commercial, or private entities
 - Contractors working on government contracts may utilize IVT imagery but must delete or destroy it upon completion of the contract of task order, as per standard terms of reuse of government-furnished information

As a note, NGA's ClearView contract distribution rights **do not** apply to IVT imagery.

10.1.2 NGA CLEARVIEW GENERAL SPECIFICATIONS

NGA ClearView imagery may be released to the following organizations:

- U.S. Government including all branches, departments, agencies, and offices
- Temporary Licensed Users
- U.S. Government (USG) may provide the imagery to the following organizations when the organization is working with the USG on a joint project
 - State governments
 - Local governments
 - Foreign governments and inter-governmental organizations
 - NGO's and other non-profit organizations
- "Joint project" means cooperation between USG and others
- Coalition force operations
 - Exercises
 - Co-production
 - Relief efforts
 - U.S. homeland security
- "Joint project" does not include activities that serve a non-federal Government purpose
 - City, county, or state planning
 - Property tax assessment
 - Transportation infrastructure management
 - General purpose mapping, etc.
- The imagery provided for a joint project may only be used for purposes of the "Joint project". Normally commercial data:
 - May not be retained by other than USG

- Must be returned to the USG after completion of the joint project; the right to use the data and all copies are restricted to USG
- Always consult the licensing agreement or contact NGA if there are any questions

10.1.3 NGA NEXTVIEW GENERAL SPECIFICATIONS

NGA NextView imagery may be released to the following organizations:

- U.S. Government including, all branches, departments, agencies, and offices
- Other Licensed Users (The U.S. Government may provide imagery to these users):
 - State governments
 - Local governments
 - Foreign governments and inter-governmental organizations
 - NGO's and other non-profit organizations
- Always consult the licensing agreement or contact NGA if there are any questions

APPENDIX A REFERENCES

- a) Marine Corps Order P11000.25, Installation Geospatial Information and Services, 26 March 2007.
- b) USMC, GEOFidelis Data Model Design Description, Version 1.0, dated 31 January 2007.
- c) Department of the Army, Army Corps of Engineers, Geospatial Data and Systems (EM 1110-1-2909), 15 September 2005.
- d) Department of the Army, Army Corps of Engineers, Engineering and Design Photogrammetric Mapping (EM 1110-1-1000), 31 July 2002.
- e) Department of Defense Directive 8320.2, Data Sharing in a Net-Centric Department of Defense, 2 December 2004.
- f) Department of Defense Directive 8320.2-G, Guidance for Implementing Net-Centric Data Sharing, 12 April 2006.
- g) Executive Order 12906, Coordinating Geographic Data Acquisition and Access: The National Spatial Data Infrastructure (NSDI), 11 April 1994.
- h) National Spatial Data Infrastructure and Office of Management and Budget's (OMB) Circular A-16, "Coordination of Geographic Information and Related Spatial Data Activities." (Reorder).
- i) Guidance Regarding Implementing Geospatial Information Systems (GIS), Computer Aided Design And Drawing (CADD) And Related Technologies For Installation Management (15 April 2003).
- j) Federal Geographic Data Committee (FGDC) Standard 001-1998, Content Standards for Digital Geospatial Metadata (CSDGM) Version 2.
- k) FGDC Standard 007.1-1998, Geospatial Positioning Accuracy Standards, Part 1: Reporting Methodology.
- l) FGDC Standard 007.2-1998, Geospatial Positioning Accuracy Standards, Part 2: Geodetic Control Networks.
- m) FGDC Standard 007.3-1998, Geospatial Positioning Accuracy Standards, Part 3: National Standard for Spatial Data Accuracy.
- n) FGDC Standard 007.4-2002, Geospatial Positioning Accuracy Standards, Part 4: Standards for Architecture, Engineering, and Construction (A/E/C) and Facility Management.
- o) Department of Defense, Installation Visualization Tool - Quality Assurance Plan Version 1.1, 31 December 2003.
- p) Department of Defense, Defense Installation Spatial Data Infrastructure, DISDI Metadata Profile Version 1.0, 2 June 2008.
- q) Photogrammetric Engineering and Remote Sensing, Journal of the American Society for Photogrammetry and Remote Sensing, Volume 67, Number 11, "Laser Altimetry: From Science to Commercial LiDAR Mapping" Martin Flood.
- r) DoD Policy Memorandum, "Protection of Sensitive DoD Data at Rest on Portable Computing Devices," 18 April 2006
- s) DoD Policy Memorandum, "Encryption of Sensitive Unclassified Data at Rest on Mobile Computing Devices and Removable Storage Media," 3 July 2006

- t) Office of Management and Budget M-06-16, 23 June 2006
- u) DoD Directive 8500.1, Information Assurance (IA), 24 October 2002
- v) DoD Directive 5400.7-R, DoD Freedom of Information Act Program, 4 September 1998.
- w) HQ USNORTHCOM FORCE PROTECTION (FP) DIRECTIVE 08-058, February 2008
- x) DoD Instruction 5200.8, Security of DoD Installations and Resources, 10 December 2005
- y) DoD Initial Guidance for IGI&S Capability Implementation, 14 April 2009

APPENDIX B DEFINITIONS

Circular Error	<p>Horizontal spatial accuracy is defined by circular error. Circular error is based on the sample standard deviation of the difference between the data set coordinate value and the coordinate value determined by an independent check survey of higher accuracy for the same point.</p> <p>Accuracy reported at the 95% confidence level means that 95% of positional accuracies will be equal to or smaller than the reported accuracy value. The reported accuracy value is the cumulative result of all uncertainties, including those introduced by geodetic control coordinates, compilation, and final extraction of ground coordinate values in the spatial data.</p>
Data At Rest (DAR)	Refers to all data in computer storage. This includes data on desktop and laptop hard drives. It also includes data on all removable storage devices such as Universal Serial Bus (USB) hard drives, flash drives, compact discs (CD), digital video discs (DVD), and Blackberry devices.
Digital Elevation Model (DEM)/Digital Terrain Model (DTM)	DEM/DTM are data files that contain the elevation of the terrain over a specified area, usually at a fixed grid interval over the surface of the earth. The intervals between each of the grid points will always be referenced to some geographical coordinate system.
Functional Dataset Lead	An agency, department, activity or organization that has lead responsibility for coordinating the collection, coverage and stewardship, including maintenance and update, of a specific spatial data theme.
GEOFidelis	The common pseudonym given to the Marine Corps IGI&S program.

<p>GEOFidelis Geospatial Information Officer (GIO)</p>	<p>Responsible for oversight of the GEOFidelis program and the development and implementation of the policy and guidance required by Marine Corps Order 11000.25. Provides leadership and coordination in meeting the geospatial information requirements of USMC IGI&S.</p>
<p>Geospatial Information</p>	<p>Data that identifies the geographic location and characteristics of natural or constructed features and boundaries on the Earth and includes: (a) statistical data and information derived from, remote sensing, mapping, and surveying technologies, among others; and (b) mapping, charting, and geodetic data, and related products.</p>
<p>Geospatial Information System (GIS)</p>	<p>A computerized tool used to input, edit, store, retrieve, manage, analyze, and present geographic or geospatial information. GIS may refer to hardware, software, data or any combination of the three.</p>
<p>Ground Resolution</p>	<p>A measure of the smallest linear separation between two objects that can be resolved by an imagery sensor. For example, the smallest detectable feature that a 1-meter sensor can detect is 1-meter in diameter in photographs and 1-meter square in digital imagery. However, spatial (or image) resolution has no direct correlation to positional accuracy. It is a common misconception that that the higher the pixel resolution, the more accurate the image will be. In fact, accuracy is related to ground control and the scale of the image, yet not the scale of the image alone. Other image characteristics that do relate directly to spatial resolution are scale; types of features that can be extracted from the image (typically larger than the image resolution itself); file size; and geographic extent of single scene/frame.</p>

<p>IGI&S Manager</p>	<p>The Installation IGI&S Manager, as appointed by the Installation Command, will oversee his/her installation’s IGI&S effort. The IGI&S Manager will provide stewardship of the installation’s geospatial data holdings, defined in the GEOFidelis Data Model, in support of the installation management mission. The IGI&S Manager shall coordinate with the Regional GIO to develop an installation data management plan to ensure proper data acquisition, sustainment, dissemination, and quality assurance of all geospatial data assets is maintained.</p>
<p>Installation Functional Area Subject Matter Expert (SME)</p>	<p>At the installation level, there are many data SMEs working within a single functional area. Each installation will designate one Functional SME to approve access and release of data under his/her functional supervision. The Functional SME will coordinate with all appropriate individual data subject matter experts when making data access and release determinations.</p>
<p>LiDAR Bare Earth DEM</p>	<p>Generated using a manual processes or algorithms that removes obstructions to create a bare earth terrain model.</p>
<p>LiDAR Intensity Image</p>	<p>Intensity image information provides a panchromatic image of the return surface. Intensity values vary depending from which type of surface the LiDAR reflection is obtained and this translates into a series of tonal differences. The intensity value is a measure of the return signal strength. It measures the peak amplitude of return pulses as they are reflected back from the target to the detector of the LiDAR system. Intensity values are relative rather than absolute and vary with altitude, atmospheric conditions, directional reflectance properties, and the reflectivity of the target. In its balanced image format the data serves mainly as a backdrop providing some reference to the current ground surface vegetative state at the time of LiDAR acquisition.</p>
<p>LiDAR First Return DEM</p>	<p>Digital Elevation Model representing elevation of canopies, building elevations, and other un-obstructed surfaces.</p>
<p>LiDAR Last Return DEM</p>	<p>Additional sensor that penetrates beyond the obstructions encountered on first return readings. Used to determine Bare Earth DEM.</p>

<p>Linear Error</p>	<p>Vertical spatial accuracy is defined by linear error. Linear error is based on sample standard deviation of the difference between the data set elevation and the elevation determined by an independent check survey of higher accuracy for the same point.</p> <p>Accuracy reported at the 95% confidence level means that 95% of positional accuracies will be equal to or smaller than the reported accuracy value. The reported accuracy value is the cumulative result of all uncertainties, including those introduced by geodetic control coordinates, compilation, and final extraction of ground coordinate values in the spatial data.</p>
<p>Marine Corps Installation Geospatial Information and Services (IGI&S)</p>	<p>The data, people, hardware, software, procedures and policies required to perform installation management GIS support functions such as installation management, mission support, critical infrastructure protection, force protection, homeland security, and training. Geospatial information provides the basic framework for installation visualization. It includes information produced by multiple sources and adheres to common interoperable data standards. It may be presented in the form of: printed maps, charts and publications; digital simulations and modeling databases; photographic and remotely sensed images; or digitized maps and charts or attributed centerline data. Geospatial services include tools that enable users to access and manipulate data, and also include instruction, training, laboratory support, and guidance for the use of geospatial data.</p>
<p>Orthorectified</p>	<p>A process of correcting imagery to remove distortion caused by camera optics, camera tilt, and differences in elevation.</p>
<p>Panchromatic</p>	<p>An image collected in the broad visual wavelength range but rendered in black and white. The term has historically referred to a black and white photograph of a color scene.</p>
<p>Pan Sharpened</p>	<p>Image sharpening where the spatial information from a "high-resolution" image is merged with the radiometric information from a "low-resolution" image. Pansharpening algorithms improve the spatial resolution of the multispectral image while simultaneously retaining its spectral information.</p>

<p>Regional Functional Area Subject Matter Expert (SME)</p>	<p>Regional SMEs oversee the management of each functional area across the installations within the Regional area of responsibility (AOR).</p>
<p>Regional Geospatial Information Officer (GIO)</p>	<p>The Regional GIO, as appointed by Regional Commanders with installation management responsibilities, will oversee the regional command's IGI&S efforts and will enforce Marine Corps <i>GEOFidelis</i> policy and guidance as directed by the <i>GEOFidelis</i> GIO. The Regional GIO will provide expertise to the regional commander, and ensure the implementation at the region and installation level of all <i>GEOFidelis</i> standards, policies and procedures.</p>
<p>Root Mean Square (RMS) Error</p>	<p>Square root of the average of the squared differences between data set coordinate values and check survey coordinate values for identical points.</p>

APPENDIX C STANDARD STATEMENT OF WORK SPECIFICATIONS**Instructions for the Project Manager:**

The following paragraphs represent the FORMAT and documentation required for electronic files being delivered as part of a contracted effort. These paragraphs do not specify CONTENT or what the electronic files should contain. The content represented or specific data being collected should be specified separately in the Tasks section of the scope/statement of work (SOW). For example, the scope of work would contain a directive paragraph that tasks the Contractor with the actual work to be performed. This paragraph would include items such as:

- *What features are actually being collected,*
- *What attributes are required,*
- *Whether the deliverables should be provided in GIS or CADD format, or a combination thereof,*
- *What form of data collection should be used; i.e., mapping grade or survey grade Global Positioning System (GPS),*
- *When data is expected to be delivered during the course of the project, etc.*

In all projects, the Project Manager should include the following paragraphs in the Deliverables section of your contract SOW -OR- as an Attachment and referenced in the SOW; i.e., "Data shall be provided in accordance with the attachment". All paragraphs are relevant unless designated in italics and with an -OR- statement, in which case the Project Manager would choose between the two options presented, or in some cases include both options when both GIS and CADD data deliverables are required for your project. All {} brackets in the following paragraphs denote instances where installation specific and/or State specific information is required to be substituted. In these cases, examples are provided to clarify the type of information needed.

This cover sheet should not be included in the SOW. Questions about the use of these specifications or requests for assistance in developing SOWs that include data deliverables should be addressed to your Installation's IGI&S Manager. Each installation's IGI&S Office reviews SOWs that include geospatial data deliverables to: ensure clarity of scope relative to the data, minimize impact on existing applications as data changes may occur, and reduce duplication of data collection efforts at Marine Corps installations.(cut and paste only the paragraphs on the following pages into your Scope/Statement of Work)

#. SPECIFICATIONS FOR DIGITAL DATA. Any maps, drawings, figures, sketches, geospatial data, spreadsheets, or text files prepared for this contract shall be provided in both hard copy and digital form. The hard copy deliverables are defined in another section of this SOW.

A. Text, Spreadsheet, and Database Files: The Marine Corps standard computing software is Microsoft Office <insert current version>. Final Reports and other text documents shall be provided in Microsoft Word <insert current version> format **AND** Adobe Portable Document

Format (PDF). Spreadsheet files shall be provided in Microsoft Excel <insert current version> format. Databases shall be provided in Microsoft Access format, unless specified otherwise, as approved by the Government. **Prior to database development, the contractor shall provide the Government with a Technical Approach Document** for approval, which describes the contractor's technical approach to designing and developing the database. All text, spreadsheet, and database files shall be delivered on a Compact Disc read-only memory (CD-ROM) or Digital Versatile Disc read-only memory (DVD-ROM).

B. Maps, Drawings, and Sketches (Digital Geospatial Data):

1. Geospatial Data Software Format: Geographic data **must** be provided in a form that does **not** require translation, preprocessing, or post processing before being loaded to the installation's regionally hosted geodatabase. The Contractor shall validate any deviation from this specification in writing with the Government (Installation Geospatial Information & Services (IGI&S) Manager via the Project Manager). Digital geographic maps and the related data sets shall be delivered in the following software format:

a. GIS: *File or Personal geodatabase format (Access database file) using ArcGIS <insert current version>. The file or personal geodatabase must be importable to a multi-user geodatabase using ArcSDE <insert current version>.*

-AND / OR-

b. CADD: *The Government may approve the use of AutoCAD when it is determined that the format will not compromise the spatial accuracy or structure of the delivered data and that the data will easily integrate with the enterprise GIS system. All CADD data shall be provided in AutoCAD <insert current version> and shall be in the same projection and use the same coordinate system, datum, and units as stated below in the paragraph titled Geospatial Data Projection. Drawing files shall be full files, uncompressed, unzipped, and georeferenced.*

-AND / OR-

c. LiDAR: *LiDAR deliverables will be provided in .las format or <insert format>.*

(NOTE: ARC/INFO, ArcGIS, and ArcSDE are geographic information system software produced by the Environmental Systems Research Institute (ESRI) of Redlands, California. This software is used by the Marine Corps GEOFidelis Program. AutoCAD is software produced by Autodesk, Inc.)

2. Geospatial Data Structure:

a. GIS Data Sets – *When developing/delivering geospatial data, the Contractor shall develop the initial structure consistent with the most current version of the GEOFidelis Data Model. The GEOFidelis Data Model shall be followed for geospatial database table structure,*

nomenclature, and attributes. If the GEOFidelis Data Model does not adequately address subject datasets, the Contractor shall consult with the Government (IGI&S Manager) for direction and approval for proposed data structures. The Government may approve such modifications if they comply with the GEOFidelis-SDSFIE adaptation process. Copies of the GEOFidelis Data Model may be obtained from the GEOFidelis Portal or the IGI&S Manager via the Project Manager.

When delivering updates to existing feature classes, the Contractor shall obtain a copy of the subject data in a personal geodatabase to use as a template for all subsequent data collection processes. If further modifications to structure are required as a result of this Scope, the Contractor will consult with the Government (IGI&S Manager) for direction and approval for proposed data structures. The Government may approve such modifications if they comply with the GEOFidelis-SDSFIE adaptation process.

-AND / OR-

b. CAD Drawings/Data – The Contractor shall develop all CADD data in conformance with the latest version of the following standards and policies:

- U. S. National CAD Standards (NCS)
- CAD/BIM Technology Center’s AEC CADD Standards (<https://caddim.usace.army.mil/>)
- NAVFACINST 4250.1, Electronic Bid Solicitation

- 3. Geospatial Data Projection:** Geographic data (regardless of format) shall be provided in {insert unit of measure here, such as meters} and **projected** into the **{insert projection system and zone/FIPS here, e.g. Universal Transverse Mercator (UTM) Zone 18}** projection system. This projection requirement applies to all CADD drawings such as as-designed and as-built project plans, as well as GIS data layer deliverables. Each data set shall have a projection file if appropriate based on format. Map or drawing **scales** will be determined by the Project Manager, if applicable. Mapping **accuracy** for the agreed scales will conform to the American Society for Photogrammetry and Remote Sensing (ASPRS) "Accuracy Standards for Large-Scale Maps", "Interim Accuracy Standards for Large-Scale Maps", and "Geospatial Positioning Accuracy Standards". Copies of these standards can be obtained on the Internet at <http://www.asprs.org>, and/or at <http://www.fgdc.gov>, or by contacting:

American Society for Photogrammetry and Remote Sensing
5410 Grosvenor Lane, Suite 210
Bethesda, MD 20814-2160

4. Geospatial Data Collection:

a. Mapping grade Global Positioning System (GPS) data collection (sub-foot, sub-meter, and sub-5 meter) shall be performed when specified in the statement of work and shall be completed in accordance with state and local guidelines and standards including **{insert applicable state guidelines and standards here}**. Default horizontal accuracy for mapping grade GPS data collection efforts shall meet a sub-meter threshold unless otherwise specified to be survey grade, sub-foot or sub-5 meter in the statement of work. Only base stations included in **{insert applicable approved statewide base stations}** shall be used for mapping grade GPS data collection. Spatial accuracy requirements are as follows:

- Sub foot: 95% of all points are within ± 12 inches
- OR-
- Sub meter: 95% of points are within ± 1 Meter
- OR-
- Sub 5 meter: 95% of points are within ± 5 Meter

-AND / OR-

b. Survey grade GPS data collection shall be performed when specified in the statement of work. As survey processes are highly regulated by federal, state, and/or local technical and licensing requirements, they are in general beyond the scope of this document. However, survey grade GPS data collection shall at a minimum use the Geoid2003 CONUS epoch (or a more current epoch if available at the time of this project) and spatial accuracy requirements for survey grade are 95% of GPS points are within ± 1 centimeter. Every effort shall be made to capture feature locations without using offsets unless obstructions are present. Any offsets used shall be annotated in the "user flag" field.

NOTE: None of the GPS collection information is to be included in the table structure of the delivery, unless it is specifically part of the SDSFIE or established installation feature format.

5. Media for Geospatial Data Deliverables: Geographic data shall be delivered on a separate Compact Disc read-only memory (CD-ROM) -or-, Digital Versatile Disc read-only memory (DVD-ROM), or other digital media such as external hard drives if approved by the government. This media shall **contain only the value-added data sets** as designated in the Task sections of the statement of work. Do not include the Contractor's working files or original installation data sets that may have been used by the Contractor to develop the deliverables. "READ ME" files may be included on the geographic data media if such files provide explanation of the delivered data sets. However, these "READ ME" files should not be delivered in lieu of standard metadata.

6. Geographic Data Documentation (METADATA): For each digital file delivered containing geographic information (regardless of format), **the Contractor shall provide documentation** consistent with the Federal Geographic Data Committee (FGDC) Content Standards for Digital Geospatial Metadata (CSDGM). Both 'Mandatory' and 'Mandatory as Applicable' fields shall be completed for each geographic data set. The documentation shall include, but not be limited to, the following:

- The name, description, abstract, and purpose of the data set/data layer
- The source of the data and any related data quality information such as accuracy and time period of content
- Descriptions of the receiver and other equipment used during collection and processing, base stations used for differential corrections, software used for performing differential corrections, estimated horizontal and vertical accuracies obtained, and conversion routines used to translate the data into final geographic data delivery format.

- Type of data layer (point, line, polygon, etc.)
- Field names of all attribute data and a description of each field name
- Definition of all codes used in the data fields
- Ranges of numeric fields and the meaning of these numeric ranges
- The creation date of the map layer and the name of the person who created it
- A point of contact shall be provided to answer technical questions

Metadata generation tools included in the ArcGIS suite of software (or equivalent technology) shall be used in the production of the required metadata in XML format. Regardless of the tools used for metadata creation, the Contractor must ensure that the metadata is delivered in XML format and can be easily imported to the installation's enterprise geodatabase. Copies of the FGDC metadata standard can be obtained on the Internet at <http://www.fgdc.gov> or by contacting:

FGDC Secretariat
c/o U.S. Geological Survey
590 National Center
Reston, Virginia 22092
(703) 648-5514

NOTE: The metadata should be formatted from the installation database perspective, not the Contractor project perspective. Therefore such items as Point of Contact should be the installation POC currently associated with the data and NOT the Contractor's Project Manager. The Contractor shall use language and format consistent with existing installation metadata.

7. Geographic Data Review: The digital geographic maps, related data, and text documents shall be included for review in the draft and final contract submittals. The data will be analyzed for discrepancies in subject content, correct format in accordance with these specifications, and compatibility with the existing GIS system. The Contractor shall incorporate review comments to data and text prior to approval of the final submittal. For each review of digital geospatial data deliverables, the Contractor shall provide a technical consultant to meet on-site at the installation with the IGI&S Manager and functional area subject matter experts to visually review the data deliverables on a Windows XP compatible system unless otherwise approved by the government.

C. Ownership: All digital files, final hard-copy products, source data acquired for this project, and related materials, including that furnished by the Government, shall become the property of the installation and will not be issued, distributed, or published by the Contractor.

APPENDIX D FOR OFFICIAL USE ONLY (FOUO)**Explanation of “For Official Use Only (FOUO)”**

The following information governs the use of the term FOUO and is taken from DoD 5200.1-R, *Information Security Program*, dated January 1997.

a. “For Official Use Only (FOUO)” is a designation that is applied to *unclassified* information that may be exempt from mandatory release to the public under the Freedom of Information Act (FOIA). The FOIA specifies nine exemptions that may qualify certain information to be withheld from release to the public if, by its disclosure, a foreseeable harm would occur. Information that is currently and properly classified can be withheld from mandatory release under the first exemption category. FOUO is applied to information that is exempt under one of the other eight categories.

- (1) Information that is currently and properly classified.
- (2) Information that pertains solely to the internal rules and practices of the agency. (This exemption has two profiles, “high” and “low.” The “high” profile permits withholding of a document that, if released, would allow circumvention of an agency rule, policy, or statute, thereby impeding the agency in the conduct of its mission. The “low” profile permits withholding if there is no public interest in the document, and it would be an administrative burden to process the request.)
- (3) Information specifically exempted by a statute establishing particular criteria for withholding. The language of the statute must clearly state that the information will not be disclosed.
- (4) Information such as trade secrets and commercial or financial information obtained from a company on a privileged or confidential basis that, if released, would result in competitive harm to the company, impair the government’s ability to obtain like information in the future, or protect the government’s interest in compliance with program effectiveness.
- (5) Inter-agency memoranda that are deliberative in nature; this exemption is appropriate for internal documents that are part of the decision-making process and contain subjective evaluations, opinions, and recommendations.
- (6) Information the release of which could reasonably be expected to constitute a clearly unwarranted invasion of the personal privacy of individuals.
- (7) Records or information compiled for law enforcement purposes that (A) could reasonably be expected to interfere with law enforcement proceedings; (B) would deprive a person of a right to a fair trial or impartial adjudication; (C) could reasonably be expected to constitute an unwarranted invasion of the personal privacy of others; (D) disclose the identity of a confidential source; (E) disclose investigative techniques and procedures; or (F) could reasonably be expected to endanger the life or physical safety of any individual.

(8) Certain records of agencies responsible for supervision of financial institutions.

(9) Geological and geophysical information concerning wells.

b. Information that is currently and properly classified can be withheld from mandatory release under the first exemption category. "For Official Use Only" is applied to information that may be exempt under one of the other eight categories. So, by definition, information must be unclassified in order to be designated FOUO. If an item of information is declassified, it can be designated FOUO if it qualifies under one of those other categories. This means that (1) information cannot be classified and FOUO at the same time, and (2) information that is declassified may be designated FOUO, but only if it fits into one of the last eight exemption categories (categories 2 through 9).

c. The FOIA provides that, for information to be exempt from mandatory release, it must fit into one of the qualifying categories and there must be a legitimate Government purpose served by withholding it. Simply because information is marked FOUO does not mean it automatically qualifies for exemption. If a request for a record is received, the information must be reviewed to see if it meets this dual test. On the other hand, the absence of the FOUO marking does not automatically mean the information must be released. Some types of records (for example, personnel records) are not normally marked FOUO, but may still qualify for withholding under the FOIA.

APPENDIX E DATA RELEASE LETTER FORMAT

From: <COMMAND INFORMATION>
To: <DATA REQUESTOR AND ORGANIZATION>
Subj: <REQUEST INFORMATION>
Ref: (a) <GOVT POC VALIDATION>
(b) <AUTHORIZATION IF REQUIRED>
() <ADDITIONAL INFORMATION>

Encl: (1) <ENCLOSURE DETAILS>

1. In accordance with the reference(s), <DELIVERY INFORMATION>.
2. <REQUIRED TEXT:> The data and enclosures are provided For Official Use Only (FOUO). FOUO Distribution Restriction Statement: "Distribution authorized to the U.S. Government and their contractors only; contains technical or operational information. FOUO data will not be duplicated, nor will there be secondary distribution of the original data. Upon termination of use, all data shall be removed from computer systems." The recipient of this data package will acknowledge receipt within 7 days and assumes responsibility for conforming to all DoD data encryption policies. Although every effort has been made to ensure the accuracy of the information, errors and conditions originating from physical sources to develop the database may be reflected in the data supplied. The user must be aware of data conditions and ultimately bear responsibility for the appropriate use of the information with respect to possible errors, original map scale, collection methodology, currency of the data, and other conditions specific to certain data. At the completion of your project, it is requested that the information received from this office be removed from your system.

<ADDITIONAL INFORMATION FOUO WITH AUTHORIZATION DATASETS, IF APPLICABLE>

3. If you have any questions concerning the data provided, please contact <CONTACT INFORMATION>.

<AUTHORITATIVE SIGNATURE>

Copy to:

<USMC PROJECT SPONSOR>

APPENDIX F GEOFIDELIS CORE METADATA ELEMENTS

1. Identification	
a. General	
	i. Abstract (Note: Entity Type Definition from GEOFidelis Data Model version 1.0)
	ii. Purpose
	iii. Access Constraints
	iv. Use Constraints
b. Contact	
	i. Point of Contact
	1. Person
	2. Organization
	3. Position
	4. General
	a. Contact Telephone
	b. Contact Email
	5. Address
	a. Address Type
	b. Address
	c. City
	d. State
	e. Postal Code
	f. Country
c. Citation	
	i. Title
	ii. Originator
	iii. Publication Date
	iv. Presentation Form
d. Time Period	
	i. Currentness Reference
	ii. Calendar Date
e. Status	
	i. Progress
	ii. Update Frequency
f. Spatial Domain	
	i. Bounding Coordinates
g. Keywords	
	i. Theme Keyword
	ii. Place (Minimum - Installation Name)
2. Data Quality	
a. Positional Accuracy	
	i. Horizontal Accuracy
	1. Accuracy Report
b. Source Information	
	i. Source Citation
	1. Citation Title

	a. Title
	b. Originator
	c. Publication Date
	d. Geospatial Data Presentation Form
	2. Source Time Period of Content
	a. Currentness Reference
	b. Calendar Date
c. Process Step	
	i. Process Description
	ii. Process Software
	iii. Process Date
	iv. Process Contact
	1. Person
	2. Organization
	3. Position
	4. General
	a. Contact Telephone
	b. Contact Email
	5. Address
	a. Address Type
	b. Address
	c. City
	d. State
	e. Postal Code
	f. Country
3. Spatial Reference	
a. General (Auto-Populated by ArcCatalog)	
	i. Geographic Coordinate System
	ii. Projected Coordinate System
	iii. Horizontal Datum Name
	iv. Ellipsoid Name
	v. Semi-major Axis
	vi. Denominator of Flattening Ratio
4. Metadata Reference	
a. General	
	i. Metadata Date
	ii. Contact
	1. Person
	2. Organization
	3. Position
	4. General
	a. Contact Telephone
	b. Contact Email
	5. Address
	a. Address Type
	b. Address
	c. City
	d. State
	e. Postal Code
	f. Country

APPENDIX G GEOFIDELIS COMMON INSTALLATION PICTURE

Buildings	
structure_existing_area	This entity type will illustrate the location of buildings and certain structures that the Marine Corps has a legal interest. This includes facilities that are located on USMC installations or owned/managed by the Marine Corps. Buildings and structures that do not meet the criteria should not be included. A building is defined as an existing structure created by humans for occupation, storage, or to facilitate an activity. The following types of structures will be included in this layer as well; sheds, towers, canopies, carports, bleachers, and magazines.
Cadastre	
dod_rpi_site_area	Represents the geographic extent of all contiguous land parcels in which the DoD has legal interest. This includes owned lands (such as DoD holds fee-simple title to the land), and "non-owned" lands including leased land and other less-than-fee surface rights and interests currently held by DoD.
Environmental_Hazards	
regulated_aboveground_storage_tank_point	A receptacle or chamber used for storage of which 90 percent or more is located above the surface of the ground.
regulated_underground_storage_tank_point	A receptacle or chamber used for storage of which 10 percent or more is located below the surface of the ground.

Future_Projects	
future_projects_area	A future project area is a potential future construction project which is funded by the Marine Corps' Military Construction (MILCON) program, the Department of Navy or by Operation and Maintenance (O&M) funds. Projects that are being funded by a Host Nation, excluding the United States should not be included. An example of a feature that would belong in future project area is a proposed building.
future_projects_point	A future project point is a potential future construction project which is funded by the Marine Corps' Military Construction (MILCON) program, the Department of Navy or by Operation and Maintenance (O&M) funds. Projects that are being funded by a Host Nation, excluding the United States should not be included. An example of a feature that would belong in future project point is a manhole.
future_projects_line	A future project line is a potential future construction project which is funded by the Marine Corps' Military Construction (MILCON) program, the Department of Navy or by Operation and Maintenance (O&M) funds. Projects that are being funded by a Host Nation, excluding the United States should not be included. An example of a feature that would belong in future project line is a proposed fence.
Hydrography	
shoreline	A shoreline is the line of average low or high water along a portion of the coast that is in direct contact with the open sea or ocean which marks the seaward limit of inland waters.
surface_water_body_area	A lake and pond is a standing body of water that can be natural or man-made. Not including swimming pools or oceans.
surface_water_course_area	A river or stream is a flowing course of water.

Improvement	
athletic_court_area	An athletic court is a paved or other specially prepared surface which is used for recreational activities (basketball, tennis, volleyball, handball, etc.).
athletic_field_area	An athletic field is a field of grass or dirt which is specifically allocated for athletic events (baseball, football, soccer, etc).
golf_course_area	A golf course area is an area which comprises a golf course, including fairways, tees, greens, practice areas, and club houses. These specific features may be included as separate entity types but are not required.
swimming_pool_area	A swimming pool is a built structure placed on top of the ground or hollowed into the ground, filled with water, and used for athletic swimming and/or diving.
fence_line	A fence is a structure serving as an enclosure, a barrier, or a boundary, usually made of posts or stakes joined together by boards, wire, or rails.
gate_point	A gate point is the point of entry and exit to a secured area. This includes installation access points.
miscellaneous_recreation_area	A miscellaneous outdoor recreation area is an area set aside for use in general recreation activities. The following features will be collected with this entity type; campgrounds, day use areas, drive-in theatres, fishing sites, playgrounds, picnic areas, recreational parks, swimming sites, and any other outdoor recreational area that is not list or collected with another entity type that is defined in the GEOFidelis Foundation Layers.
recreation_trail_centerline	A recreational trail is a trail that is used for recreational activities (running/walking, biking, and hiking).

Land_Status	
land_management_zone_area	A land management zone is used to divide a land area into management zones. This can be used to define service areas, architectural style zones, or just some arbitrary division of the land.
Military_Operations	
military_range_area	A military range is a designated land or water area set aside, managed, and used to conduct research on, develop, test, and evaluate military munitions and explosives, other ordnance, or weapon systems, or to train military personnel in their use and handling. Ranges include firing lines and positions, maneuver areas, firing lanes, test pads, detonation pads, impact areas, and buffer zones with restricted access and exclusionary areas.
Transportation	
airfield_surface_area	Airfield surface areas are areas that aircraft utilize. These include runways, taxiways, parking ramps, landing strips, helipads which may be components of airport and heliport facilities.
footbridge_area	A footbridge is an elevated pedestrian walkway.
pedestrian_sidewalk_area	A sidewalk is a paved or concrete pad used as a pedestrian walkway.
mooring_facility_area	A mooring facility is any fixed structure which can be used to moor or tie-up vessels such as a pier, dock, or wharf.
railroad_bridge_area	A railroad bridge is a structure used by a railroad that allows passage over an obstacle such as a river, chasm, mountain, or road.

<p>railroad_centerline</p>	<p>A railroad centerline is the center of a railway as measured from the outside edge of the rails. The centerline will be comprised of segments that represent rail portions with similar characteristics such as the number of tracks or the segment between two switches.</p>
<p>road_bridge_area</p>	<p>A road bridge is a structure used by vehicles that allows passage over or under an obstacle such as a river, chasm, mountain, road or railroad.</p>
<p>road_centerline</p>	<p>A road centerline is the center of the roadway as measured from the edge of the paved surface. The segments of a road centerline will coincide with the road segments in order to have similar characteristics.</p>
<p>road_area</p>	<p>A road area is an open, generally public way for the passage of vehicles with similar characteristics such as the number of lanes or surface type.</p>
<p>vehicle_driveway_area</p>	<p>A vehicle driveway is an access to a residence or other vehicle parking lot or storage area.</p>
<p>vehicle_parking_area</p>	<p>A vehicle parking area is an area used for parking vehicles not including residential streets and driveways.</p>

APPENDIX H FUNCTIONAL DATA ACCESS AND RELEASE MATRIX

The following tables align the GEOFidelis Data Model version 1.x with the Dataset Lead’s functional area of responsibility as defined in MCO 11000.25. In the matrix are the determinations of FOUO or FOUO with Authorization for each dataset. The datasets that are designated “FOUO with Authorization” include a driver for this designation.

The Functional Data Set Lead Matrix includes information detailing the Access and Release controls on GEOFidelis data sets. Data Access via “Web” does not imply public World Wide Web access. See Section 7.2 for more information. The following legends detail the level of control for both Access and Release:

GEOFidelis Data Set Access

X	Geospatial data layer that is For Official Use Only (FOUO) and is available to all approved GEOFidelis users.
X	Geospatial data layer that requires authorization to access.

GEOFidelis Data Set Release

X	Geospatial data layer that is For Official Use Only (FOUO) and is available to all approved GEOFidelis data requests.
X	Geospatial data layer that requires authorization for release from the Functional Area SME Lead.

The GEOFidelis Program allows each installation the flexibility to add additional datasets to their geodatabase if the required dataset is neither included in nor applicable to the GEOFidelis Data Model. For datasets that are in use at an installation but not in the Data Model, access and release are still coordinated with the Installation Functional Area SME.

Data Access and Release Guidelines for GEOFidelis Data Model Version 1.x

LFL 1 – Natural and Cultural Resources Datasets

Layer Name and Description	Data Access			Data Release		Driver
	FOUO	Requires Authorization		FOUO	Requires Authorization	
		Web	Desktop			
Cultural Resources						
<p>archeological_artifact_point</p> <p>An archeological artifact point is a large, point-provenienced artifact (e.g. petroglyphs, salt pans, etc). It should not be used to note the locations artifacts mapped and collected as part of an excavation or survey grid.</p>		X	X		X	Archaeological Resources Protection Act (ARPA) 1979
<p>cemetery_area</p> <p>A cemetery area is a place or ground set apart for the burial of the dead; a graveyard; a churchyard; a necropolis (Webster, 1913).</p>	X			X		
<p>cultural_restricted_area</p> <p>A cultural restricted area is an area that has not been surveyed for archaeology, but is considered to retain a moderate or high potential for sites.</p>	X			X		

Data Access and Release Guidelines for GEOFidelis Data Model Version 1.x

LFL 1 – Natural and Cultural Resources Datasets

Layer Name and Description	Data Access			Data Release		Driver
	FOUO	Requires Authorization		FOUO	Requires Authorization	
		Web	Desktop			
<p>cultural_sensitive_area</p> <p>A cultural sensitive area is any specific, discrete, narrowly delineated location on Federal land that is identified by an Indian tribe or Native Hawaiian organization, or Indian/Hawaiian individual determined to be an appropriately authoritative representative of an Indian/Hawaiian religion, as sacred by virtue of its established religious significance to, or ceremonial use by, an Indian/Hawaiian religion, provided that the tribe/organization or appropriately authoritative representative of an Indian/Hawaiian religion has informed the agency of the existence of such a site. Indian/Hawaiian sacred sites may include; topographic features; past occupation sites; burial areas; building ruins; plant, animal, or mineral gathering areas; or spirit sites such as caves or other geological structures.</p>		X	X		X	Archaeological Resources Protection Act (ARPA) 1979
<p>cultural_survey_area</p> <p>A cultural survey area is an area where detailed investigation has been conducted for cultural resources. This investigation could involve test pits, excavation areas, surface surveys, etc.</p>	X			X		
<p>historic_district_area</p> <p>A historic district is any area which contains historic properties, buildings with similar or related architectural characteristics, cultural cohesiveness or any combination thereof that is included in or eligible for inclusion on the National Register of Historic Places.</p>	X			X		

Data Access and Release Guidelines for GEOFidelis Data Model Version 1.x

LFL 1 – Natural and Cultural Resources Datasets

Layer Name and Description	Data Access			Data Release		Driver
	FOUO	Requires Authorization		FOUO	Requires Authorization	
		Web	Desktop			
<p>historic_feature_area</p> <p>A historic feature is a historically or culturally significant point of interest. This includes monuments, memorials, landscape element, historic markers, interpretive sites, etc.</p>	X			X		
<p>terrestrial_archeological_area</p> <p>A terrestrial archeological area depicts the location of archaeological resource as defined in the Archeological Resources Protection Act. This includes; terrestrial, and submerged sites.</p>		X	X		X	Archaeological Resources Protection Act (ARPA) 1979
Natural Resources						
<p>ecology_habitat_area</p> <p>An ecology habitat area is a location that supports a particular ecological community or population set.</p>	X			X		
<p>fauna_hazard_area</p> <p>A fauna hazard area is an area where there are hazards due to wildlife activities. This includes bird aircraft strike hazard (BASH) areas, and deer strike areas.</p>	X			X		
<p>fauna_management_habitat_buffer_zone_area</p> <p>A fauna management habitat buffer zone is an area surrounding an identified habitat for one or more fauna species.</p>	X			X		

Data Access and Release Guidelines for GEOFidelis Data Model Version 1.x

LFL 1 – Natural and Cultural Resources Datasets

Layer Name and Description	Data Access			Data Release		Driver
	FOUO	Requires Authorization		FOUO	Requires Authorization	
		Web	Desktop			
<p>fauna_special_species_area</p> <p>A fauna special species area is a site or location where the specific species associated with the habitat require special attention according to law. These are normally threatened, sensitive, or endangered species habitats.</p>		X	X		X	Endangered Species Act of 1973 as amended
<p>flora_fire_area</p> <p>A flora fire area is an area where planned or historically recorded fire has occurred. The fires may be wild or man-made prescribed burns.</p>	X			X		
<p>flora_special_species_area</p> <p>A flora special species area is a site or location where there are threatened, endangered, invasive or sensitive floral species.</p>		X	X		X	Endangered Species Act of 1973 as amended
<p>flora_study_area</p> <p>A flora study area is a geographic area created for the study of flora.</p>	X			X		
<p>forest_stand_area</p> <p>A forest stand is a forest flora community with similar characteristics.</p>	X			X		
<p>hunting_area</p> <p>A hunting area is an area specifically designated for the controlled hunting of one or more wildlife species.</p>	X			X		

Data Access and Release Guidelines for GEOFidelis Data Model Version 1.x

LFL 1 – Natural and Cultural Resources Datasets

Layer Name and Description	Data Access			Data Release		Driver
	FOUO	Requires Authorization		FOUO	Requires Authorization	
		Web	Desktop			
<p>land_vegetation_area A land vegetation area is a discrete area where land flora has been classified.</p>	X			X		
<p>marine_protected_area A marine protected area is any area of the marine environment that has been reserved by Federal, State, territorial, tribal, or local laws or regulations to provide lasting protection for part or all of the natural and cultural resources therein.</p>	X			X		
<p>migration_corridor_line A migration corridor is an area or route along which certain species are known to migrate from one habitat to another.</p>	X			X		
<p>nesting_point A nesting point is a known nesting site of fauna species.</p>	X			X		
<p>nesting_area A nesting area is an area that contains one or more known nesting points.</p>	X			X		
<p>preserve_area A preserve area is a vegetated area that is being managed as a special management area due to its unique characteristics such as an old growth area or good species habitat area.</p>	X			X		

Data Access and Release Guidelines for GEOFidelis Data Model Version 1.x

LFL 1 – Natural and Cultural Resources Datasets

Layer Name and Description	Data Access			Data Release		Driver
	FOUO	Requires Authorization		FOUO	Requires Authorization	
		Web	Desktop			
<p>shoreline</p> <p>A shoreline is the line of average low or high water along a portion of the coast that is in direct contact with the open sea or ocean which marks the seaward limit of inland waters.</p>	X			X		
<p>soil_map_unit_area</p> <p>A soil map unit area is an area with similar soil characteristics. The size of the units used for an installation will depend on the mapping done by the Natural Resources Conservation Service (NRCS).</p>	X			X		
<p>species_forage_area</p> <p>A species forage area is an area where a fauna species or various species of fauna are known to search for food.</p>	X			X		
<p>surface_water_body_area</p> <p>A lake and pond is a standing body of water that can be natural or man-made. Not including swimming pools or oceans.</p>	X			X		
<p>surface_water_course_area</p> <p>A river or stream is a flowing course of water.</p>	X			X		
<p>surface_water_course_centerline</p> <p>A river and stream centerline is the center of a flowing course of water, normally measured at a location equidistant opposite shorelines or waterlines.</p>	X			X		

Data Access and Release Guidelines for GEOFidelis Data Model Version 1.x

LFL 1 – Natural and Cultural Resources Datasets

Layer Name and Description	Data Access			Data Release		Driver
	FOUO	Requires Authorization		FOUO	Requires Authorization	
		Web	Desktop			
<p>timber_harvest_area</p> <p>A timber harvest areas is an area where timber has been cut or is planned to be cut in the future. Areas where forest management activities such as stand thinning, removal of diseased and/or dead trees, commercial timber harvest or fuel load reduction have occurred or will occur shall be included.</p>	X			X		
<p>watershed_area</p> <p>A watershed is the region or area drained by, or to, a particular body of water.</p>	X			X		
<p>wetland_area</p> <p>Wetlands are lands on which water covers the soil or is present either at or near the surface of the soil or within the root zone, all year or for varying periods of time during the year. The recurrent or prolonged presence of water (hydrology) at or near the soil surface is the dominant factor determining the nature of soil development and the types of plant and animal communities living in the soil and on its surface.</p>	X			X		
<p>yarding_area</p> <p>A yarding area is an area where cut logs are stored prior to loading and hauling. They are generally temporary in nature and are closed once the timber harvest operation is completed. This layer will contain all areas used for yarding of cut timber during timber harvest operations and should contain all areas that have been closed as well as those currently in use.</p>	X			X		

Data Access and Release Guidelines for GEOFidelis Data Model Version 1.x

LFL 2 – Facilities Planning Datasets

Layer Name and Description	Data Access			Data Release		Driver
	FOUO	Requires Authorization		FOUO	Requires Authorization	
		Web	Desktop			
<p>ammunition_storage_area An ammunition storage area is an area that may be fenced off where ordnance or other explosive/hazardous devices are stored, loaded, and unloaded.</p>	X			X		
<p>explosive_conveyance_area Explosive conveyance areas are areas of potential risk where ammunition is transferred but not stored.</p>	X			X		
<p>land_management_zone_area A land management zone is used to divide a land area into management zones. This can be used to define service areas, architectural style zones, or just some arbitrary division of the land.</p>	X			X		
<p>military_quantity_distance_arc_area An explosive safety quantity distance (ESQD) arc is an area associated with munitions storage. Each of the following ESQD arcs will be collected, if applicable at each installation; HDD, HFD, IBD, ILD, IMD, MFD, PTR.</p>		X	X		X	OPSEC Determination for DISDI Portal

Data Access and Release Guidelines for *GEOFidelis* Data Model Version 1.x

LFL 2 – Facilities Planning Datasets

Layer Name and Description	Data Access			Data Release		Driver
	FOUO	Requires Authorization		FOUO	Requires Authorization	
		Web	Desktop			
<p>potential_explosive_area</p> <p>A potential explosive area is the location of a quantity of explosives that will create a blast, fragment, thermal, and/or debris hazards in event of accidental explosion of its contents. Quantity limits for ammunition/explosives at a potential explosive area are determined by the distance to an exposed site.</p>	X			X		

Data Access and Release Guidelines for GEOFidelis Data Model Version 1.x

LFL 3 – Real Estate Datasets

Layer Name and Description	Data Access			Data Release		Driver
	FOUO	Requires Authorization		FOUO	Requires Authorization	
		Web	Desktop			
<p>air_accident_zone_area</p> <p>Air accident zones are areas at the end of runways or beneath approach and departure flight paths where there is a higher potential for aircraft accidents. These areas include clear zones, and accident potential zones (APZ) I and II.</p>	X			X		
<p>agricultural_outleased_area</p> <p>An agricultural outlease area is a Department of Defense land area that is leased to private concerns for agricultural use. The Department of Defense receives lease payment and the land is maintained by the private concern.</p>	X			X		
<p>dod_rpi_disposal_area</p> <p>All activities associated with the final disposition of an asset, including land. It includes, but is not limited to, reassignment to other DoD entities, transfer to another DoD or non-DoD entity, exchange, donation, and loss by disaster, demolition, and sale.</p>	X			X		
<p>dod_rpi_land_parcel_area</p> <p>Represents the researched boundaries of land in which DoD holds fee-simple title (owned) or has retained certain less-than-fee surface rights and interests (non-owned).</p>	X			X		

Data Access and Release Guidelines for GEOFidelis Data Model Version 1.x

LFL 3 – Real Estate Datasets

Layer Name and Description	Data Access			Data Release		Driver
	FOUO	Requires Authorization		FOUO	Requires Authorization	
		Web	Desktop			
<p>dod_rpi_outgrant_area</p> <p>Conveys/authorizes the use of a DoD-managed real property item to either a government agency or private entity for a specified consideration. Outgrants temporarily convey use rights and potentially some management responsibilities, but at the end of the terms of the agreement, the property remains with the original land owner.</p>	X			X		
<p>dod_rpi_site_area</p> <p>Represents the geographic extent of all contiguous land parcels in which the DoD has legal interest. This includes owned lands (such as DoD holds fee-simple title to the land), and "non-owned" lands including leased land and other less-than-fee surface rights and interests currently held by DoD.</p>	X			X		
<p>land_restriction_area</p> <p>Land restriction areas area areas which are subject to local limitations on actions which can be performed on the land.</p>	X			X		
<p>land_use_area</p> <p>Land use describes man’s categorization of the use of land and water.</p>	X			X		

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LFL 3 – Real Estate Datasets

Layer Name and Description	Data Access			Data Release		Driver
	FOUO	Requires Authorization		FOUO	Requires Authorization	
		Web	Desktop			
<p>noise_zone_area Noise zone areas are noise levels that are generated from military. This includes noise generated from fixed wing aircraft flight and rotary wing aircraft flight, associated ground maintenance activities, and large caliber weapons.</p>	X			X		
<p>political_jurisdiction_area A political jurisdiction area is an area of land and water under the right, power, or authority of various local, state, and national governments.</p>	X			X		

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LFL 4 – Military Construction (MILCON) Datasets

Layer Name and Description	Data Access			Data Release		Driver
	FOUO	Requires Authorization		FOUO	Requires Authorization	
		Web	Desktop			
<p>future_projects_area</p> <p>A future project area is a potential future construction project which is funded by the Marine Corps’ Military Construction (MILCON) program, the Department of Navy or by Operation and Maintenance (O&M) funds. Projects that are being funded by a Host Nation, excluding the United States should not be included. An example of a feature that would belong in future project area is a proposed building.</p>	X			X		
<p>future_projects_point</p> <p>A future project point is a potential future construction project which is funded by the Marine Corps’ Military Construction (MILCON) program, the Department of Navy or by Operation and Maintenance (O&M) funds. Projects that are being funded by a Host Nation, excluding the United States should not be included. An example of a feature that would belong in future project point is a manhole.</p>	X			X		
<p>future_projects_line</p> <p>A future project line is a potential future construction project which is funded by the Marine Corps’ Military Construction (MILCON) program, the Department of Navy or by Operation and Maintenance (O&M) funds. Projects that are being funded by a Host Nation, excluding the United States should not be included. An example of a feature that would belong in future project line is a proposed fence.</p>	X			X		

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LFL 4 – Military Construction (MILCON) Datasets

Layer Name and Description	Data Access			Data Release		Driver
	FOUO	Requires Authorization		FOUO	Requires Authorization	
		Web	Desktop			
<p>host_nation_projects_area</p> <p>A host nation project area is a potential future construction project which is funded by a Host Nation, excluding the United States which should be included in the entity type future_projects_area. An example of a feature that would belong in host nation project area is a proposed building.</p>	X			X		
<p>host_nation_projects_point</p> <p>A host nation project point is a potential future construction project which is funded by a Host Nation, excluding the United States which should be included in the entity type future_projects_point. An example of a feature that would belong in future project point is a manhole.</p>	X			X		
<p>host_nation_projects_line</p> <p>A host nation project line is a potential future construction project which is funded by a Host Nation, excluding the United States which should be included in the entity type future_projects_line. An example of a feature that would belong in future project line is a proposed fence.</p>	X			X		

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LFL 6 – Environmental Datasets

Layer Name and Description	Data Access			Data Release		Driver
	FOUO	Requires Authorization		FOUO	Requires Authorization	
		Web	Desktop			
<p>air_emissions_source_point An air emissions source point is a specific point where an air emission originates (e.g., one chimney).</p>	X			X		
<p>air_sample_collection_location_point An air sample collection location point is the physical location at which an air sample is taken.</p>	X			X		
<p>building_environmental_concern_point A building environmental concern point is the site of building or structure which contains one or more building environmental hazards.</p>	X			X		
<p>dust_abatement_area A dust abatement area is a specific area were dust is generated or an area where dust abatement methods are in place.</p>	X			X		
<p>environmental_restoration_area An environmental restoration site is a geographic area where an active environmental study or project is underway to remediate pollutants located in the soil, sediment, surface water, or groundwater.</p>	X			X		

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LFL 6 – Environmental Datasets

Layer Name and Description	Data Access			Data Release		Driver
	FOUO	Requires Authorization		FOUO	Requires Authorization	
		Web	Desktop			
<p>groundwater_pollution_plume_area</p> <p>A groundwater pollution plume area is an area on either a two or three dimensional plane in the groundwater which represents a constant measured or modeled pollution chemical constituent value (e.g., concentration) considered too dangerous to the environment.</p>	X			X		
<p>groundwater_sample_collection_location_point</p> <p>A groundwater sample collection location point is the physical location at which a groundwater sample is taken.</p>	X			X		
<p>hazardous_materiels_storage_area</p> <p>A hazardous material storage area is a defined area designated for the storage of contained hazardous materials.</p>	X			X		
<p>hazardous_waste_storage_location_point</p> <p>A hazardous waste storage location is a location points or areas where hazardous waste is stored.</p>	X			X		
<p>historic_impact_area</p> <p>A historic impact area is an impact area, duded or non-duded, no longer in use which may pose potential risk.</p>	X			X		
<p>landfill_gas_collection_well_point</p> <p>A landfill gas collection well is a shaft drilled in the earth for the purpose of collecting and conveying gas from underneath a landfill to the ground's surface.</p>	X			X		

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LFL 6 – Environmental Datasets

Layer Name and Description	Data Access			Data Release		Driver
	FOUO	Requires Authorization		FOUO	Requires Authorization	
		Web	Desktop			
<p>munition_constituents_area</p> <p>A munition constituents area is a location within an operational area where munition constituents have been deposited over time.</p>	X			X		
<p>munition_waste_disposal_area</p> <p>A munitions waste disposal area is a location where munitions waste (conventional, chemical, or biological) has been disposed of (e.g., pit, buried containers, etc.).</p>	X			X		
<p>operable_unit_area</p> <p>An operable unit area is one or more areas possessing environmental contamination characteristics which are amenable to the same type of remediation, treatment, or management procedure.</p>	X			X		
<p>ordnance_explosive_waste_area</p> <p>An ordnance explosive waste area is an area where ordnance and explosive waste residues are present or buried in the water, soil, or sediment.</p>	X			X		
<p>pollution_source_point</p> <p>A pollution release point is the point of origin of a chemical, radioactive, medical, or mixed non-permitted waste discharge, spill, or uncontrolled release which can result in pollution to the environment.</p>	X			X		

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LFL 6 – Environmental Datasets

Layer Name and Description	Data Access			Data Release		Driver
	FOUO	Requires Authorization		FOUO	Requires Authorization	
		Web	Desktop			
<p>potential_env_concern_area A potential environmental concern area is a site of suspected environmental contamination.</p>	X			X		
<p>regulated_aboveground_storage_tank_point A receptacle or chamber used for storage of which 90 percent or more is located above the surface of the ground.</p>	X			X		
<p>regulated_underground_storage_tank_point A receptacle or chamber used for storage of which 10 percent or more is located below the surface of the ground.</p>	X			X		
<p>soil_sample_collection_location_point A soil sample collection location point is the physical location at which a soil sample is taken.</p>	X			X		
<p>solid_waste_landfill_area A solid waste landfill is a facility or site, permitted by a regulatory authority, which is specifically designed and managed for the land disposal of solid waste.</p>	X			X		
<p>surface_water_sample_collection_location_point A surface water sample collection location point is the physical location at which a surface water sample is taken.</p>	X			X		

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LFL 6 – Environmental Datasets

Layer Name and Description	Data Access			Data Release		Driver
	FOUO	Requires Authorization		FOUO	Requires Authorization	
		Web	Desktop			
<p>water_well_point</p> <p>A water well is an excavation point where the intended use is for location, acquisition, development, or artificial recharge of groundwater.</p>		X	X		X	GIO Determination

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LFF1 – Special Projects (Utilities, Energy, and Fire Protection) Datasets

Layer Name and Description	Data Access			Data Release		Driver
	FOUO	Requires Authorization		FOUO	Requires Authorization	
		Web	Desktop			
<p>compressed_air_pipe_line A compressed air pipe line is a pipe used to carry compressed air from location to location.</p>	X			X		
<p>conduit_centerline A conduit line is a pipe, structure, tube, or tile used to house or protect piping, cables, or wires for various utilities.</p>		X	X		X	LFF-1 Determination
<p>electrical_cable_line An electrical cable line is a group of conductors used to carry electrical energy from point to point.</p>		X	X		X	LFF-1 Determination
<p>electrical_meter_point A device installed in a line for measuring the electrical power supplied to a facility or through a section of line.</p>		X	X		X	LFF-1 Determination
<p>electrical_substation_point A facility in an electrical system where the voltage is reduced from transmission levels to distribution levels.</p>		X	X		X	LFF-1 Determination
<p>electrical_switch_point A device which closes and opens (connects and disconnects) an electrical circuit.</p>		X	X		X	LFF-1 Determination
<p>electrical_transformer_bank_point An electrical transformer bank point is a location containing one or more transformers.</p>		X	X		X	LFF-1 Determination

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LFF1 – Special Projects (Utilities, Energy, and Fire Protection) Datasets

Layer Name and Description	Data Access			Data Release		Driver
	FOUO	Requires Authorization		FOUO	Requires Authorization	
		Web	Desktop			
exterior_lighting_point Locations of point sources of general external lighting.	X			X		
fuel_line A fuel line is a pipe used to carry fuel from location to location (main line, service line, vent line, etc).		X	X		X	LFF-1 Determination
heat_cool_line A heating and cooling line is a pipe used to carry heating/cooling substances from location to location (main line, service line, vent line, etc).	X			X		
heat_cool_meter_point A device installed in a line for measuring the quantity and or rate of water flowing to a facility or through a section of line.	X			X		
heat_cool_plant_area A heat/cool plant area is an area that includes all equipment, buildings, and facilities related to producing water temperature/pressure combinations which are distributed to other buildings and facilities.	X			X		
manhole_point A manhole is an access point to underground utilities.	X			X		
natural_gas_fitting_point A natural gas fitting is hardware used to cap, plug, or join pieces of pipe.		X	X		X	LFF-1 Determination

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LFF1 – Special Projects (Utilities, Energy, and Fire Protection) Datasets

Layer Name and Description	Data Access			Data Release		Driver
	FOUO	Requires Authorization		FOUO	Requires Authorization	
		Web	Desktop			
natural_gas_line A natural gas line is a pipe used to carry natural gas from location to location (main lines, service line, vent line, etc).		X	X		X	LFF-1 Determination
natural_gas_meter_point A device installed in a line for measuring the quantity and or rate of gas to a facility or through a section of line.		X	X		X	LFF-1 Determination
natural_gas_valve_point A natural gas valve is a fitting or device used for shutting or throttling flow through a natural gas line.		X	X		X	LFF-1 Determination
oil_water_separator_point An oil and water separator is a device or structure placed in a stormwater, waste water, or industrial waste stream to separate water from oil products.	X			X		
pipeline_line A pipeline is an interstate or intrastate transmission line through which gas, oil, or hazardous liquid is transported for the purpose of supplying a local utility.		X	X		X	LFF-1 Determination
saltwater_line A saltwater line is a pipe used to carry saltwater from location to location.	X			X		
storm_sewer_culvert_line A culvert intercepts and removes ground water or surface water.	X			X		

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LFF1 – Special Projects (Utilities, Energy, and Fire Protection) Datasets

Layer Name and Description	Data Access			Data Release		Driver
	FOUO	Requires Authorization		FOUO	Requires Authorization	
		Web	Desktop			
<p>storm_sewer_discharge_point</p> <p>A storm sewer outfall is a point where runoff discharges from a sewer pipe, ditch, or other conveyance to a receiving body of water.</p>	X			X		
<p>storm_sewer_drainage_basin_area</p> <p>A storm sewer drainage basin is an area where storm sewer water drains to a point of interest.</p>	X			X		
<p>storm_sewer_fitting_point</p> <p>A storm sewer fitting is an item used to connect, cap, plug or otherwise alter a pipe carrying storm sewage.</p>	X			X		
<p>storm_sewer_infiltration_trench_area</p> <p>An infiltration trench (a.k.a. infiltration galley) is a rock-filled trench with no outlet that receives stormwater runoff. Stormwater runoff passes through some combination of pretreatment measures, such as a swale or sediment basin, before entering the trench. Runoff is then stored in the voids of the stones, slowly infiltrated through the bottom and into the soil matrix over a few days. The primary pollutant removal mechanism of this practice is filtering through the soil.</p>	X			X		
<p>storm_sewer_inlet_point</p> <p>A storm sewer inlet is the location where water is collected and received into the utility system.</p>	X			X		

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LFF1 – Special Projects (Utilities, Energy, and Fire Protection) Datasets

Layer Name and Description	Data Access			Data Release		Driver
	FOUO	Requires Authorization		FOUO	Requires Authorization	
		Web	Desktop			
storm_sewer_lagoon_area A storm sewer lagoon area is a shallow man made pool or pond for the purpose of providing treatment of stormwater.	X			X		
storm_sewer_line A storm sewer line is a pipe used to carry storm sewer water from location to location (main line, service line, vent line, etc).	X			X		
storm_sewer_valve_point A storm sewer valve is a fitting or device used for shutting or throttling flow through a storm sewer line.	X			X		
utility_pole_tower_point A utility pole is a structure used to elevate wires, cables, or other lines above the ground surface.	X			X		
wastewater_discharge_point Any location where wastewater pipes directly discharge effluent.	X			X		
wastewater_drain_field_area The area of influence where perforated pipe placed in gravel trenches carries effluent from a waste storage containment for percolation into the earth.	X			X		
wastewater_fitting_point A storm sewer fitting is an item used to connect, cap, plug or otherwise alter a pipe carrying storm sewage.	X			X		

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LFF1 – Special Projects (Utilities, Energy, and Fire Protection) Datasets

Layer Name and Description	Data Access			Data Release		Driver
	FOUO	Requires Authorization		FOUO	Requires Authorization	
		Web	Desktop			
wastewater_inlet_point The location where waste water is collected and received into the utility system.	X			X		
wastewater_lagoon_area A shallow man made pool or pond for the purpose of providing treatment of domestic wastewater.	X			X		
wastewater_line A wastewater line is a pipe used to carry all waste water, including industrial wastewater from location to location (main line, service line, force main line, etc).	X			X		
wastewater_meter_point A device installed in a line for measuring the quantity and or rate of water flowing to a facility or through a section of line.	X			X		
wastewater_pump_point A mechanical device for wastewater system that draws material into itself through an entrance port and forces the material out through an exhaust port.	X			X		
wastewater_treatment_plant_area A wastewater treatment plant area is an area that includes all equipment, buildings, and facilities used to treat and remove unwanted constituents from wastewater.	X			X		

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LFF1 – Special Projects (Utilities, Energy, and Fire Protection) Datasets

Layer Name and Description	Data Access			Data Release		Driver
	FOUO	Requires Authorization		FOUO	Requires Authorization	
		Web	Desktop			
wastewater_valve_point A wastewater valve is a fitting or device used for shutting or throttling flow through a wastewater line.	X			X		
water_fitting_point A water fitting is an item used to connect, cap, plug or otherwise alter a pipe carrying water.		X	X		X	LFF-1 Determination
water_hydrant_point A fire hydrant is an apparatus which dispenses fluids.	X			X		
water_line A water line is a pipe used to carry water from location to location (main line, service line, vent line, etc).		X	X		X	LFF-1 Determination
water_meter_point A device installed in a line for measuring the quantity and or rate of water flowing to a facility or through a section of line.		X	X		X	LFF-1 Determination
water_pump_point A mechanical device for water system that draws material into itself through an entrance port and forces the material out through an exhaust port.		X	X		X	LFF-1 Determination
water_treatment_plant_area A water treatment plant area is an area that includes all equipment, buildings, and facilities used to treat water		X	X		X	LFF-1 Determination

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LFF1 – Special Projects (Utilities, Energy, and Fire Protection) Datasets

Layer Name and Description	Data Access			Data Release		Driver
	FOUO	Requires Authorization		FOUO	Requires Authorization	
		Web	Desktop			
<p>water_valve_point A water valve is a fitting or device used for shutting or throttling flow through a water line.</p>		X	X		X	LFF-1 Determination

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LFF2 – Facilities Sustainment, Restoration, and Modernization Datasets

Layer Name and Description	Data Access			Data Release		Driver
	FOUO	Requires Authorization		FOUO	Requires Authorization	
		Web	Desktop			
<p>airfield_surface_area Airfield surface areas are areas that aircraft utilize. These include runways, taxiways, parking ramps, landing strips, helipads which may be components of airport and heliport facilities.</p>	X			X		
<p>athletic_court_area An athletic court is a paved or other specially prepared surface which is used for recreational activities (basketball, tennis, volleyball, handball, etc.).</p>	X			X		
<p>athletic_field_area An athletic field is a field of grass or dirt which is specifically allocated for athletic events (baseball, football, soccer, etc).</p>	X			X		
<p>control_point A control point is a permanently monumented survey control point (benchmark) constructed with an original purpose of establishing spatial location in one or more dimensions from a known reference or datum.</p>	X			X		
<p>curb_line A curb is a rim of concrete or joined stones that forms the edge of the roadway and beginning of a sidewalk, if present, or a dividing barrier.</p>	X			X		

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LFF2 – Facilities Sustainment, Restoration, and Modernization Datasets

Layer Name and Description	Data Access			Data Release		Driver
	FOUO	Requires Authorization		FOUO	Requires Authorization	
		Web	Desktop			
<p>ditch_aqueduct_centerline</p> <p>An aqueduct centerline is a manmade or improved waterway designed to transport water for irrigation or other use.</p>	X			X		
<p>dredged_bank_area</p> <p>A dredged bank area is an area where spoils have been deposited from various dredging operations.</p>	X			X		
<p>elevation_contour_line</p> <p>An elevation contour line is a connecting points on the surface of the earth of equal vertical elevation representing some fixed elevation interval.</p>	X			X		
<p>equipment_point</p> <p>An equipment point is the location of a piece of equipment that is not inside a building or structure. Types of equipment include but are not limited to; compressor, generator, hydraulic device, etc.</p>	X			X		
<p>fence_line</p> <p>A fence is a structure serving as an enclosure, a barrier, or a boundary, usually made of posts or stakes joined together by boards, wire, or rails.</p>	X			X		

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LFF2 – Facilities Sustainment, Restoration, and Modernization Datasets

Layer Name and Description	Data Access			Data Release		Driver
	FOUO	Requires Authorization		FOUO	Requires Authorization	
		Web	Desktop			
<p>flood_zone_area</p> <p>The U.S. Army Corps of Engineers (USACE) defines a “floodplain” as the portion of any river valley that has historically been inundated by a river during floods. The Federal Emergency Management Agency (FEMA) defines a “floodplain” as the relatively flat lowland that borders a river, coastal area, lakeshore, or other low-lying area, usually dry but subject to flooding.</p>	X			X		
<p>footbridge_area</p> <p>A footbridge is an elevated pedestrian walkway.</p>	X			X		
<p>gate_point</p> <p>A gate point is the point of entry and exit to a secured area. This includes installation access points.</p>	X			X		
<p>gate_line</p> <p>A gate is a door-like movable barrier in a fence or wall.</p>	X			X		
<p>golf_course_area</p> <p>A golf course area is an area which comprises a golf course, including fairways, tees, greens, practice areas, and club houses. These specific features may be included as separate entity types but are not required.</p>	X			X		

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LFF2 – Facilities Sustainment, Restoration, and Modernization Datasets

Layer Name and Description	Data Access			Data Release		Driver
	FOUO	Requires Authorization		FOUO	Requires Authorization	
		Web	Desktop			
<p>levee_area A levee is an embankment for controlling the waters of the sea, river or other water bodies.</p>	X			X		
<p>military_control_point A military control point is a point at which the flyer or ground based personnel should verify their location. It can be a well-defined point, easily distinguishable visually and/or electronically, used as a starting point for a bomb run to a target.</p>	X			X		
<p>military_incident_point A military incident point is the location of an accident, mishap, or incident which is of interest to the general public.</p>	X			X		
<p>miscellaneous_feature_area This layer will illustrate ready service lockers. A ready service locker is a container where ammunition is store for near term tactical or training use.</p>	X			X		

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LFF2 – Facilities Sustainment, Restoration, and Modernization Datasets

Layer Name and Description	Data Access			Data Release		Driver
	FOUO	Requires Authorization		FOUO	Requires Authorization	
		Web	Desktop			
<p>miscellaneous_recreation_area</p> <p>A miscellaneous outdoor recreation area is an area set aside for use in general recreation activities. The following features will be collected with this entity type; campgrounds, day use areas, drive-in theatres, fishing sites, playgrounds, picnic areas, recreational parks, swimming sites, and any other outdoor recreational area that is not list or collected with another entity type that is defined in the GEOFidelis Foundation Layers.</p>	X			X		
<p>mooring_facility_area</p> <p>A mooring facility is any fixed structure which can be used to moor or tie-up vessels such as a pier, dock, or wharf.</p>	X			X		
<p>pedestrian_sidewalk_area</p> <p>A sidewalk is a paved or concrete pad used as a pedestrian walkway.</p>	X			X		
<p>railroad_bridge_area</p> <p>A railroad bridge is a structure used by a railroad that allows passage over an obstacle such as a river, chasm, mountain, or road.</p>	X			X		

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LFF2 – Facilities Sustainment, Restoration, and Modernization Datasets

Layer Name and Description	Data Access			Data Release		Driver
	FOUO	Requires Authorization		FOUO	Requires Authorization	
		Web	Desktop			
<p>railroad_centerline</p> <p>A railroad centerline is the center of a railway as measured from the outside edge of the rails. The centerline will be comprised of segments that represent rail portions with similar characteristics such as the number of tracks or the segment between two switches.</p>	X			X		
<p>railroad_yard_area</p> <p>A railroad yard is an area containing a system of tracks for storage and maintenance of cars and the making-up of trains.</p>	X			X		
<p>recreation_trail_centerline</p> <p>A recreational trail is a trail that is used for recreational activities (running/walking, biking, and hiking).</p>	X			X		
<p>road_area</p> <p>A road area is an open, generally public way for the passage of vehicles with similar characteristics such as the number of lanes or surface type.</p>	X			X		
<p>road_bridge_area</p> <p>A road bridge is a structure used by vehicles that allows passage over or under an obstacle such as a river, chasm, mountain, road or railroad.</p>	X			X		

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LFF2 – Facilities Sustainment, Restoration, and Modernization Datasets

Layer Name and Description	Data Access			Data Release		Driver
	FOUO	Requires Authorization		FOUO	Requires Authorization	
		Web	Desktop			
<p>road_centerline</p> <p>A road centerline is the center of the roadway as measured from the edge of the paved surface. The segments of a road centerline will coincide with the road segments in order to have similar characteristics.</p>	X			X		
<p>road_feature_point</p> <p>A road feature is a feature associated with a road such as road signs, and traffic lights.</p>	X			X		
<p>security_perimeter_line</p> <p>This layer will illustrate barricades. A barricade is a structure set up across a route of access to obstruct passage.</p>		X	X		X	GIO Determination
<p>slab_area</p> <p>A feature that is generally on the ground, typically composed of concrete, brick, asphalt, or rock that was designed to provide a base for structures other than buildings, for used as a recreation surface or as a patio.</p>	X			X		
<p>structure_demolished_area</p> <p>A demolished structure is structure that no longer exists but at one time was used for occupation, storage, or to facilitate an activity. This includes the following features; sheds, towers, canopies, carports, and bleachers.</p>	X			X		

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LFF2 – Facilities Sustainment, Restoration, and Modernization Datasets

Layer Name and Description	Data Access			Data Release		Driver
	FOUO	Requires Authorization		FOUO	Requires Authorization	
		Web	Desktop			
<p>structure_existing_area</p> <p>This entity type will illustrate the location of buildings and certain structures that the Marine Corps has a legal interest. This includes facilities that are located on USMC installations or owned/managed by the Marine Corps. Buildings and structures that do not meet the criteria should not be included. A building is defined as an existing structure created by humans for occupation, storage, or to facilitate an activity. The following types of structures will be included in this layer as well; sheds, towers, canopies, carports, bleachers, and magazines.</p>	X			X		
<p>swimming_pool_area</p> <p>A swimming pool is a built structure placed on top of the ground or hollowed into the ground, filled with water, and used for athletic swimming and/or diving.</p>	X			X		
<p>vehicle_driveway_area</p> <p>A vehicle driveway is an access to a residence or other vehicle parking lot or storage area.</p>	X			X		
<p>vehicle_parking_area</p> <p>A vehicle parking area is an area used for parking vehicles not including residential streets and driveways.</p>	X			X		

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LFF2 – Facilities Sustainment, Restoration, and Modernization Datasets

Layer Name and Description	Data Access			Data Release		Driver
	FOUO	Requires Authorization		FOUO	Requires Authorization	
		Web	Desktop			
<p>wall_line A wall is a continuous structure of masonry or other material forming a rampart.</p>	X			X		

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C4 – Communication Datasets

Layer Name and Description	Data Access			Data Release		Driver
	FOUO	Requires Authorization		FOUO	Requires Authorization	
		Web	Desktop			
<p>communications_antenna_point</p> <p>A communication antenna point is a metallic apparatus used to send or receive communication signals.</p>		X	X		X	GIO Determination Pending Further Guidance by C4
<p>communications equip_point</p> <p>A communications equipment point is an outdoor device which is specifically used for notifying emergency services. Such as; fire alarm boxes, and call boxes.</p>		X	X		X	GIO Determination Pending Further Guidance by C4
<p>communications_other_type_cable_line</p> <p>A communication cable line is a physical media used to provide transmission of communications signals.</p>		X	X		X	GIO Determination Pending Further Guidance by C4
<p>electromagnetic_radiation_hazard_area</p> <p>An electromagnetic radiation hazard area is the hazard area that emanates from electromagnetic radiation sources. The types are hazards of electromagnetic radiation to ordnance (HERO), personnel (HERP), and fuels (HERF). HERO areas are also divided into HERO Susceptible and HERO Unsafe.</p>		X	X		X	GIO Determination Pending Further Guidance by C4

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TECOM – Training and Ranges Datasets

Layer Name and Description	Data Access			Data Release		Driver
	FOUO	Requires Authorization		FOUO	Requires Authorization	
		Web	Desktop			
<p>dedicated_impact_area</p> <p>A dedicated impact area is an area that is permanently designated within the training complex and used indefinitely to contain fired or launched ammunition and explosives and the resulting fragments, debris, and components. Dedicated impact areas are normally used for non-sensitive ammunition and explosives.</p>	X			X		
<p>firing_area</p> <p>A firing area is a designated area in which firing points and gun positions may be located.</p>	X			X		
<p>firing_point</p> <p>A firing point is the designated point within a firing lane and firing fan where the weapon is discharged or fired – usually the point of convergence of firing fan. This point can be dynamic, in which case, the point can take place anywhere in/on a live fire range. This point can also be stationary and when it is – it is usually a surveyed/registered position.</p>	X			X		

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TECOM – Training and Ranges Datasets

Layer Name and Description	Data Access			Data Release		Driver
	FOUO	Requires Authorization		FOUO	Requires Authorization	
		Web	Desktop			
<p>firing_line</p> <p>A firing line is the line between firing points from which firing takes place. Two or more firing points constitute a firing line on a range; however there can be any number of firing points on a firing line.</p>	X			X		
<p>high_hazard_impact_area</p> <p>A high hazard impact area is an area that is permanently designated within the training complex and used to contain sensitive high explosive ammunition and explosives and the resulting fragments, debris, and components. High hazard impact areas are normally established as part of dedicated impact areas where access is limited and strictly controlled due to the extreme hazard of dud ordnance (that is, ICM, HEAT, 40mm, and other highly sensitive ammunition and explosives).</p>	X			X		
<p>military_landing_and_drop_zone_area</p> <p>A military landing/drop zone area is an unimproved area where aircraft (typically helicopters) can land to pickup or offload troops and cargo, and where parachute training is conducted.</p>	X			X		
<p>military_landing_zone_point</p> <p>Individual locations within a landing zone area for specific pickup/drop-off activities.</p>	X			X		

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TECOM – Training and Ranges Datasets

Layer Name and Description	Data Access			Data Release		Driver
	FOUO	Requires Authorization		FOUO	Requires Authorization	
		Web	Desktop			
<p>military_observation_point</p> <p>An observation point is a position from which military observations are made, or fire directed and adjusted.</p>	X			X		
<p>military_range_area</p> <p>A military range is a designated land or water area set aside, managed, and used to conduct research on, develop, test, and evaluate military munitions and explosives, other ordnance, or weapon systems, or to train military personnel in their use and handling. Ranges include firing lines and positions, maneuver areas, firing lanes, test pads, detonation pads, impact areas, and buffer zones with restricted access and exclusionary areas.</p>	X			X		
<p>military_special_use_airspace_area</p> <p>USMC subdivided NGA Special Use Airspace (SUA) is a three-dimensional region of airspace for activities which must be confined because of their nature. Limitations may be imposed upon aircraft operations that are not a part of the airspace activities. Special use airspace includes any associated underlying surface and subsurface training areas. The types of SUA are Alert Area, Controlled Firing Area, Military Operating Area (MOA), Prohibited Area, Restricted Area, and Warning Area.</p>		X	X		X	TECOM Determination

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TECOM – Training and Ranges Datasets

Layer Name and Description	Data Access			Data Release		Driver
	FOUO	Requires Authorization		FOUO	Requires Authorization	
		Web	Desktop			
<p>military_surface_danger_zone_area</p> <p>Surface danger zones are the ground and airspace designated within the training complex (to include associated safety areas) for vertical and lateral containment of projectiles, fragments, debris, and components resulting from the firing, launching, or detonation of weapon systems to include explosives and demolitions.</p>		X	X		X	TECOM Determination
<p>military_target_area</p> <p>A target area is an area within the surface danger zone where targets (static/moving, point/array) are emplaced for weapon system engagement.</p>	X			X		
<p>military_target_point</p> <p>A target point is a point used for military training on operational ranges.</p>	X			X		
<p>military_training_sub_area</p> <p>A military sub-training area is a land area used for military training which itself is a portion of a larger military training area. This includes military operations in urban terrain (MOUT) areas and MOUT assault course (MAC) areas.</p>	X			X		
<p>tank_trail_line</p> <p>A tank trail is used for driving tanks.</p>	X			X		

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TECOM – Training and Ranges Datasets

Layer Name and Description	Data Access			Data Release		Driver
	FOUO	Requires Authorization		FOUO	Requires Authorization	
		Web	Desktop			
<p>training_area</p> <p>This entity type includes areas where military training is conducted. May be Restricted Area where access and/or activity is limited due to one or more reasons such as security, safety, environmental, cultural, no-fly, etc.</p>	X			X		

APPENDIX F DOCUMENT HISTORY

Version	Date	Description
2.0	12/31/2009	Initial Final Release
2.0.1	9/23/2011	Edited water_well_point for "Requires Authorization" for release