# **Geospatial Intelligence**



## **U.S. Marine Corps**

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#### FOREWORD

Marine Corps Reference Publication (MCRP) 2-10B.4, *Geospatial Intelligence*, complements and expands upon the information included in Marine Corps Doctrinal Publication 2, *Intelligence*, and MCWP 2-1, *Intelligence Operations*. This publication details doctrine, tactics, techniques, and procedures for conducting geospatial intelligence and supporting Marine air-ground task force geospatial intelligence operations.

MCRP 2-10B.4 describes aspects of geospatial information and intelligence, imagery, and imagery intelligence operations, including doctrinal fundamentals, command and control, communications and information systems support, planning, execution, equipment security, and training. This publication provides information required for Marines to understand, plan, and execute geospatial intelligence operations in support of the Marine air-ground task force and provides support information to intelligence personnel who are responsible for planning and executing geospatial intelligence operations.

MCRP 2-10B.4, *Geospatial Intelligence*, supersedes MCRP 2-10B.4, *Geospatial Information and Intelligence*, dated 12 June 2014, erratum dated 2 May 2016, and change 1 dated 4 April 2018 and cancels MCRP 2-10B.5, *Imagery Intelligence*, dated 29 February 2016, erratum dated 2 May 2016, and change 1 dated 4 April 2018.

Reviewed and approved this date.

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## CHAPTER 1. FUNDAMENTALS OF GEOSPATIAL INTELLIGENCE

Geospatial intelligence (GEOINT) is defined by law in United States Code, Title 10, section 467 (5) as the exploitation and analysis of imagery and geospatial information to describe, assess, and visually depict physical features and geographically referenced activities on the earth. Joint Publication (JP) 2-0, *Joint Intelligence*, defines GEOINT as the exploitation and analysis of imagery and geospatial information to describe, assess, and visually depict physical features and geographically referenced activities on or about the Earth. Geospatial intelligence consists of imagery, imagery intelligence, and geospatial information." The full utility of GEOINT comes from the integration and use of imagery, imagery intelligence (IMINT), and geospatial information, enabling customers to gain a more comprehensive perspective, in-depth understanding, and a cross-functional awareness of the operating environment (JP 2-0).

Geospatial intelligence is the exploitation and analysis of imagery, IMINT, and geospatial information. Marine Corps Warfighting Publication (MCWP) 2-10, *Intelligence Operations*, includes the meteorological and oceanographic (METOC) discipline as well. Geospatial intelligence can enhance an information base and provide atmospherics to describe, assess, and visually depict physical features and geographically referenced activities on the Earth. Advances in technology, coupled with developing geospatial data standards, have created an environment in which the elements of GEOINT can be combined with each other as well as with other information sources.

Geospatial intelligence encompasses all activities related to the planning, collection, processing, exploitation, analysis, production, and dissemination of spatial information that is used to gain intelligence concerning national security or the operational environment. It visually depicts this knowledge and fuses the acquired knowledge with other information through analysis and visualization processes. This fusion of resources has enabled Marines to conduct complex analysis and create new specialized products.

**NOTE:** Refer to Marine Corps Reference Publication (MCRP) 2-10B.6, for the corresponding METOC information.

## **GEOINT ELEMENTS**

The three elements of GEOINT are imagery, IMINT, and geospatial information. MCWP 2-10, includes METOC as an element of GEOINT as it pertains to applying weather phenomena to spatial features and activities.

#### MCRP 2-10B.4, Geospatial Intelligence

#### Imagery

Imagery is "a likeness or presentation of any natural or man-made feature or related object or activity, and the positional data acquired at the same time the likeness or representation was acquired, including: products produced by space-based national intelligence reconnaissance systems; and likenesses or presentations produced by satellites, airborne platforms, unmanned aerial vehicles, or other similar means (except that such term does not include handheld or clandestine photography taken by or on behalf of human intelligence collection organizations)" (DoD Dictionary of Military and Associated Terms [hereafter referred to as the DoD Dictionary]).

#### **Imagery Intelligence**

Imagery intelligence is "the technical, geographic, and intelligence information derived through the interpretation or analysis of imagery and collateral materials" (DoD Dictionary).

#### **Types of Imagery**

Electro-optical (EO) imagery includes panchromatic and infrared. Other types of imagery include radar, multispectral, hyperspectral, and commercial. Certain policies apply to imagery of the United States.

The type of imagery exploitation depends on the sensor used to collect electromagnetic spectrum information and is categorized by either active or passive sensing:

- <u>Active Sensor</u>. Active sensors generate electromagnetic energy to illuminate the object being imaged. They broadcast energy and process returning portions of it to image the targeted area. Imagery sensing capabilities include real-aperture radar, synthetic aperture radar, moving target indicator, and light detection and ranging systems.
- <u>Passive Sensor</u>. Passive sensors use natural electromagnetic energy sources such as the sun, naturally occurring radiation, or objects that generate heat. They generate data by capturing the reflected or emitted electromagnetic energy from an object. Passive sensors, which operate in "receive" mode and do not emit energy, diminish the adversary's ability to detect the fact that they are being imaged. Electro-optical sensors (except lidar) are passive.

**Panchromatic Imagery.** Panchromatic imagery, which is derived from passive collection, employs digital imaging techniques to extend and complement other imagery. Panchromatic imagery is readily exploitable by automated processors and analytical aids. It uses the visual spectrum, so anything that impacts this spectrum, such as dust, smoke, haze, clouds, rain, fog, light level, or angle of illumination, will affect the quality of the imagery.

*Infrared Imagery.* Infrared imagery systems, which is commonly derived from passive collection, can operate day or night under favorable weather conditions. They are less effective during transition periods (dawn and dusk) or when backgrounds and targets have negligible differences in temperature.

Infrared imagery is created by remotely sensing the radiant temperature associated with a target. The system is used to measure the temperature differences between terrain features and surrounding objects on the ground, producing a near-optical-quality infrared image (see Figure 1-1).

With this unique capability, Marines can detect ongoing activity (based on heat levels), as well as past activity through residual thermal effects (JP 2-0).



Figure 1-1. Infrared Imagery.

**Radar Imagery.** Radar imagery, an active form of sensing, can be collected day or night and under all weather conditions. Generally, it is limited only by the capability of the platforms conducting the collection mission. Radar imagery is best used in conjunction with other imagery sensors. Unlike electro-optical imagery, it presents a nonliteral image of the battlespace, requiring special skills and time to analyze properly. Figure 1-2 is an example of synthetic aperture radar (SAR) imagery.



Figure 1-2. Synthetic Aperture Radar Imagery Example.

*Radar Reflection.* Radio-frequency energy is transmitted to, and reflects from, the reflecting object. A small portion of the energy is reflected and returns to the radar set. This returned energy is called an echo, similar to an echo in sound terminology. Variations in the pattern and tone of the echo are recorded and displayed as radar images.

*Doppler Shift.* The geometry and surface composition of targets and their surroundings can greatly affect the intensity of the radar pulse return. To detect moving targets, radar employs the principle of Doppler shift. Doppler shift is the result of a moving object causing a subtle change in the frequency of the reflected pulse energy. This change is detected by comparing the original pulse energy frequency to the frequency of the reflected energy. Figure 1-3 is an example of a moving target indicator (MTI) image.



Figure 1-3. Moving Target Indicator Imagery Example.

**Multispectral Imagery.** Multispectral imagery, a passive form of sensing, records multiple views in several spectral bands or frequencies simultaneously. The key to interpreting these images lies in identifying the spectral signatures of the various surfaces and targets. Whether self-generated or reflected, every surface or target gives off a unique radiation pattern. The shape of the pattern depends on the reflective qualities of the material, its heat, whether it is a solid or liquid, the smoothness of the surface, and several other factors.

*Hyperspectral Imagery.* Hyperspectral imagery sensors, a passive form of sensing, use hundreds of very narrow wavelength bands to see reflected energy from objects on the ground. This energy appears in the form of "spectral fingerprints" across the light spectrum. Once these fingerprints are detected, special algorithms—repetitive, problem-solving mathematical calculations—are used to assess them so that various natural and synthetic substances can be differentiated from one another. Signature libraries may also be used to identify specific materials (e.g., rooftops, parking lots, grass, mud) by comparing a library's pre-existing reference catalogs with freshly taken hyperspectral images of the battlefield from space. Image-processing equipment then portrays the

various types of terrain and objects on it in different colors, forming a "color cube," each based on the wavelength of the reflected energy captured by the image. These colors are subsequently "translated" into maps that correspond to specific materials and their composition, such as man-made features, agriculture, mineralogy, and environmental effects.

#### **Commercial Imagery**

The sensors attached to vehicles used for commercial imagery produce unclassified data. The US Government uses unclassified commercial data whenever possible, and is increasing its use of commercial systems as a primary source of data. In addition, products derived from commercial system data can be more easily shared with government and military organizations outside the intelligence community, non-governmental organizations (such as non-profit relief organizations), private industry partners, foreign allies, and other foreign nations.

#### **Domestic Imagery Collection**

Domestic imagery collection comprises satellite and aerial imagery of any part of the United States and its territories or possessions, including the 12 nautical miles seaward of these land areas. A proper-use statement is required before collecting domestic imagery in the aforementioned geographic areas. Central to this process is a thorough review of planned missions to ensure that the constitutional rights of US citizens are protected according to current laws and executive orders restricting intelligence activities directed against US citizens within the United States. Approved proper-use statements must be retained in the permanent files of the requesting unit and higher headquarters up through the combatant command headquarters. For additional information on domestic imagery collection, refer to the National System for Geospatial Intelligence (NSG) Instruction 1806, Domestic Imagery. Request channels for domestic imagery collection are—

- Marine Corps-specific requirements (proper use statements are submitted via the service chain of command to the Marine Corps Departmental Requirements Officer).
- Joint operations requirements (proper-use statements are submitted via the operational chain of command to the combatant commander for adjudication or follow-on action, as appropriate).

#### **Geospatial Information**

Geospatial information identifies the geographic location and characteristics of natural or constructed features and boundaries on the Earth. Geospatial information includes statistical data and information derived from remote sensing, mapping, and surveying technologies as well as mapping, charting, geodetic data and related products. For additional information, refer to United States Code, Title 10, Armed Forces.

#### Meteorological and Oceanographic

Meteorological and oceanographic information assesses and characterizes the current and future conditions, phenomena, and associated effects influencing the operational area's physical environment. Time-sensitive METOC essential elements of information (EEIs) are continuously integrated into the Marine Corps Planning Process (MCPP) to mitigate adverse conditions and exploit conditions of opportunity. Weather conditions reshape and redefine physical terrain characteristics, such as changes in beach faces and river morphing, which are critical factors when planning operations.

## **GEOINT PRODUCT DEVELOPMENT**

#### **Geospatial Analytics**

A primary objective of geospatial analysis is to implement a clear strategy for developing GEOINT products. The tools, data availability, and methods considered will impact the final output. Effective exploitation of GEOINT supports decision-makers with critical visual depictions and compelling analysis of complex data that geospatial information can provide.

Analysts perform exploitation and analysis by combining imagery and geospatial information organized in layers, resulting in a GEOINT product. According to the National Geospatial-Intelligence Agency (NGA) Publication 1.0, *Geospatial Intelligence (GEOINT) Basic Doctrine* (hereinafter referred to as Pub 1.0), analysts may incorporate the following to create a more dynamic, realistic, and advanced analytic product:

- <u>Elevation</u>. Most GEOINT products use one or more of the layers described above. However, adding elevation can create a three-dimensional (3D) model or simulation that provides a more realistic representation of an environment or object.
- <u>Time</u>. Temporal products track changes in speed, tides, wind direction, and daylight over time to reveal their effects on a mission or event.
- <u>Motion</u>. Motion analysis involves the collection and evaluation of multiple image frames over a period of time. The most common types of motion GEOINT include the following:
  - <u>Full-Motion Video (FMV)</u>. A FMV uses many frames per second to create a near-real-time video capability, which may be displayed as visible or IR and may be recorded by digital or analog means. This near-real time capability allows observation of rapidly developing events and is a valuable tool for ongoing operations. It also provides continuous observation of an object, such as a person or vehicle, to analyze its patterns over long periods.
  - <u>Moving Target Indicator (MTI)</u>. This predominantly radar capability shows only those objects that are in motion and provides information on the speed and direction that objects are moving. Some electro-optical sensors can detect motion in a small area but generally are not considered an MTI capability.
  - <u>Wide Area Motion Imagery (WAMI)</u>. A set of motion imagery sensors with a wide field of view (FOV) diameter of up to 8 km, which provides continuous surveillance of a broad area.
  - <u>Simulated Terrain</u>. Another element of motion in GEOINT may consider elements combined to create a virtual, interactive scene that allows users to familiarize or train in a simulated environment before operating in a real situation. Such simulations also allow analysts to experience different perspectives from which to analyze objects and scenarios.
- <u>Activity</u>. Most GEOINT analysis and products focus on providing as much information as possible about a specific object or area. However, activity-based analysis examines human, vehicular, and other activity related to an object or area, which can lead the analyst to different areas and reveal correlations between areas, people, and objects. This method allows

for a more complex level of analysis. Three processes that contribute to activity-based analysis include the following:

- <u>Object-Based Production</u>. Object-based production is the "intelligence communities' framework for organizing and sharing information, relating data from all sources to known objects (e.g., units, people, locations, or events)" (JP 2-0). The process brings together information from all available sources of intelligence—and from systems of different security levels—related to an object. Thus, the most comprehensive and up-to-date information is available to everyone at the same time, and analysts from any location or organization can rapidly access the data. Examples of objects include natural features, people, vehicles, buildings, and events.
- <u>Structured Observation Management</u>. Structured observation management is the framework for standardizing how geospatial intelligence observations are captured, organized, and shared (JP 2-0). This ensures that GEOINT information can be integrated into the intelligence community's structured observation management process.
- <u>Activity-Based Intelligence</u>. Activity-based intelligence is a method that incorporates the object-based production information into a process that can detect when the object changes or when activity related to an object occurs. It then provides an electronic alert to analysts interested in that object. By examining this new information about the object, analysts can discover relationships with other objects or locations and detect patterns of activity and behavior.

#### **Geospatial Data**

Geospatial data is information that describes objects, events, or other features located on or near the surface of the Earth. Geospatial data typically combines location and attribute information with temporal information when available. The location provided may be static in the short term or dynamic. Geospatial data typically involves large sets of spatial data gleaned from diverse sources in varying formats. Geospatial data is most useful when it can be discovered, shared, analyzed, and used in combination with traditional data.

#### **Products and Services**

Geospatial intelligence products range from standard geospatial data-derived products to specialized products that incorporate data from multiple sources.

**Standard Products.** Standard geospatial information products are data-derived products, such as maps, charts, imagery, or digital information used to support visualization activities (i.e., a common operational picture [COP] and common intelligence picture [CIP]). These products may be used alone or with multiple layers of data (e.g., vegetation, culture, languages, weather) and intelligence information. Standard products are derived primarily from various spatially enabled sensors and existing geospatial data. For additional information refer to MCWP 2-10.

**Specialized Products.** Specialized products may be developed using advanced technology to integrate multiple types of geospatial data, as well as data from other intelligence sources that may incorporate the dimension of time. These features enable analysts to create more comprehensive GEOINT products and services, such as two-color, multi-view, change detection, multispectral, hyperspectral, line-of-sight (LOS), and environmental intelligence products.

#### MCRP 2-10B.4, Geospatial Intelligence

**Geospatial Intelligence Services.** Geospatial intelligence services enable users to access, manipulate, and assess geospatial data. They draw on geophysical data collection, software development, tailored products, and services to support weapons systems, calculation of precise locations for targeting of precision munitions, training, commander's assessment, and on-site geospatial technical support.

## CHAPTER 2. GEOSPATIAL ENTERPRISE ACTIVITIES

## **GEOSPATIAL ENTERPRISE ACTIVITIES**

The Marine Corps GEOINT enterprise provides timely, relevant, and accurate GEOINT for planning, decision making, and action in support of Marine Corps, joint and combined operations. It integrates GEOINT systems, sensors, processes, and organizations into the larger Marine Corps intelligence, surveillance, and reconnaissance enterprise (MCISRE) architecture. This integration, both horizontal and vertical, provides a GEOINT enterprise that can support all Marine Corps operational objectives. The Marine Corps adheres to established data and finished GEOINT production standards to facilitate sharing across and outside the MCISRE. This compliance enables end users to benefit and build from existing data for their mission requirements rather than recollecting data from previously serviced targets.

## **GEOSPATIAL INFORMATION AND INTELLIGENCE**

Geospatial information and intelligence (GI&I) fuses data regarding terrain, inland and coastal water, climatology, meteorology, and cultural intelligence to display a single, comprehensive picture of the operational environment for the commander. Geospatial information encompasses several discrete functions and associated data, including the following:

- Defines requirements for training, exercises, and operations.
- Provides a command and Service focal point for geospatial information and services (GI&S) expertise and consultation.
- Coordinates force and staff GI&S products, data sets, and prototypes as well as specifications and standards developed and produced by the NGA.
- Provides guidance and coordination to the GI&I and other intelligence cycles. Geospatial information and intelligence is information concerning physical aspects, resources, and artificial features of the Earth.

Geospatial information and intelligence is independent of any other intelligence and can be used directly to support planning and conducting military operations. It is produced from terrain information interpreted in relation to its effects on personnel, equipment, and material (refer to Military Handbook NGA 850 [MIL-HDBK-850], *Glossary of Mapping, Charting and Geodetic Terms*).

The Marine Corps approaches GI&I as a component of GI&S within the GEOINT discipline. Geospatial information and intelligence can include cross-country movement (CCM) studies, LOS analyses, natural and constructed obstacles, and various terrain studies (e.g., road, railroad, airfield, bridge, port, landing zone [LZ]). Geospatial information and intelligence analysis—

- Supports intelligence preparation of the battlespace (IPB) by addressing Marine air-ground task force (MAGTF) intelligence requirements and the commander's critical information requirements (CCIRs) that are related to key terrain, observation, and fields of fire, cover and concealment, obstacles, and avenues of approach (KOCOA).
- Includes other categories of information such as political, military, economic, social, information, and infrastructure (PMESII) to ensure all elements of information are considered.
- Includes enhancement and verification of current information through comparison with data that is received from new sources.
- Incorporates clarifying detail and resolution to meet the defined tactical requirements, when required.

A traditional map product is not only geospatial information, but also a basic form of GI&I. Geospatial information and intelligence production combines maps, standard NGA digital products, and intelligence sources to produce specialized intelligence that is tailored to fulfill a specific requirement related to a mission, force, or weapon system. The value of the output that is produced from the GI&I cycle is limited by the quality of the data input and the limitations of the geographic information system (GIS) that processes the data.

Geospatial information provides the foundation for battlespace visualization construction. It may be produced and replicated in the form of hard copy maps, charts, surveying technologies and publications; digital simulation and modeling databases; photographs; or digitized maps and charts.

Geospatial information and intelligence replaced the traditional term geographic intelligence (i.e., mapping, charting, and geodesy) to reflect the increasing need for digital geospatial data to support the following warfighting functions and systems:

- Command and control (C2).
- Fires.
- Force protection.
- Information.
- Intelligence.
- Logistics.
- Maneuver.
- Mission planning.
- Program-of-record suite applications.

Military operations require geospatial information to provide the necessary foundation for the common operational picture (COP) or common tactical picture (CTP), which is the basis for all other relevant strategic, operational, and tactical information layering, subsequent planning, and

decision-making. Digital geospatial information forms the foundation for the MAGTF's battlespace visualization (see Figure 2-1).



Figure 2-1. Types of Geospatial Information.

The NSG integrates the technologies, policies, capabilities, and doctrine that are necessary to conduct GEOINT in a multi-intelligence environment. The director of NGA is the NSG functional manager. To exploit GI&I within the NSG, the Marine Corps must sustain a compatible global information infrastructure. It must also support joint and Service policies and doctrine; operations, systems, and technical architectures; data standards and specifications; equipment technologies; and personnel (to include their training and education).

The Marine Corps' global information infrastructure is a collaborative production environment that supports global expeditionary missions and provides responsive access to the NSG production network that supports Service, joint, and multinational operations.

## **GEOSPATIAL INFORMATION SUBCATEGORIES**

Marine Corps geospatial intelligence is derived from the analysis of geospatial information, which includes imagery, topography, foundation data, meteorological and oceanographic data, and mission-specific data, and is detailed in the following sections.

#### Imagery

Imagery is a likeness or presentation of any natural or man-made feature or related object, or activity and the positional data acquired at the same time the likeness or representation was collected.

#### Topography

Topography is the configuration of the ground (i.e., its relief and features) and addresses both dry land and the sea floor (i.e., underwater topography).

#### Foundation Data

The seven categories of geospatial information are: aeronautical, maritime, topographic, elevation, human geography, geographic names and boundaries, and geodetic. Collectively, and along with controlled imagery, these are known as foundation GEOINT and represent the base onto which products and services are generated.

Foundation GEOINT provides the basic framework for visualizing the joint COP. It is information produced by multiple sources and is streamed and stored using validated Department of Defense Information Technology Standards Registry interoperable data standards. GEOINT online on-demand services include tools that enable users to access and manipulate data and provide instruction, training, laboratory support, weapon systems analysis, and guidance for the use of geospatial data (JP 2-0).

The NGA's foundation data consists of any combination of the three components of GEOINT: imagery, imagery intelligence, and geographic information. The base (or foundation) usually is a map or image of a specific location and shows visible terrain, objects, and other features in that location. Geospatial intelligence images and maps contain highly accurate geo-coordinates of the location shown, as well as of any object or feature depicted in the map or image. Foundation data is—

- One of the principal components of the Department of Defense (DoD) GI&S readiness strategy designed to meet joint and MAGTF requirements.
- Relatively stable, generic information that is mission- and force-independent, specification compliant, and geopositioned to the World Geodetic System 1984 (WGS-84) datum.
- Used primarily to support initial planning (at 1:250,000 scale) and to establish the foundation for intensification of data within the objective area that is necessary to support specific operations.

#### Meteorological and Oceanographic

Meteorological and oceanographic data consists of environmental measurements from air, land, maritime, and space, using on site and remote sensing platforms. This data populates regional, theater, and global databases from which METOC services and products are created, providing the foundation for effective METOC Operations. Through the use of numerical models, expert systems, and human judgment, METOC personnel describe the anticipated future state of the meteorological, oceanographic, and space environment. Forecasts (computer and human based) include temporal and spatial assessments of atmospheric, terrestrial, marine, and space environmental features and associated elements (MCRP 2-10B.6).

#### **Mission-Specific Data**

Mission-specific data is information that is created to support specific operations, operation plans (OPLANs), training, and system development. Mission-specific data is not required to conform to established DoD data specifications and has the following characteristics:

• It is developed by enhancing the information contained in the foundation data set. It includes higher resolution imagery, elevation, or bathymetric depth information, and vector features (i.e., point, line, or polygon). It also includes data density, spatial accuracy, and the specificity

of the available descriptive information that differentiates mission-specific data levels. Levels 1 through 5 become increasingly dense, spatially accurate, and specific.

• It is managed, manipulated, and maintained by the geospatial intelligence specialist (military occupational specialty [MOS]). Updated mission-specific data is replicated across tactical and persistent data sites before being validated and synchronized with the Marine Corps geospatial database (MCGDB).

## **CATEGORIES OF GEOSPATIAL INFORMATION AND INTELLIGENCE**

Geospatial information and intelligence must be considered during each phase of an operation in order to minimize environmental impacts on friendly forces, while exploiting the effects of environment on enemy forces. Terrain and METOC conditions impact and alter traffic and visibility. Because terrain features, such as mountains and ridge lines, can influence local weather and oceanographic elements, METOC conditions and terrain features must be considered when planning ground, air, and logistic operations (see Figure 2-2). Geospatial information and intelligence may be classified as strategic, operational, or tactical, with each classification containing unique sets of characteristics. Planners tasked to develop strategic plans also prepare for potential problems that involve GI&I in particular areas (e.g., an entire country or a continent) and for various missions, while operational and tactical planners focus on missions in their area of responsibility (AOR).



Figure 2-2. Foundation GEOINT Data.

#### Strategic Geospatial Information and Intelligence

Strategic GI&I is continuously produced. It requires the compilation and interpretation of information by specialized GI&I personnel and must support theater and national plans. Strategic GI&I analysis is typically keyed to small-scale or low-density source equivalents (i.e., 1:1,000,000 or smaller scale charts) that support an entire country or regional area and include macro descriptions and analyses that can include the following:

- Beaches, ports, facilities, inland waterways, urban areas, and other major terrain features.
- Transportation networks and communication systems.
- Types of soils and rocks.
- Underground installations.
- Vegetation.
- Hydrography.
- METOC.

**Capabilities of Strategic Geospatial Information and Intelligence.** Strategic GI&I provides broad information that covers countries and regions. It focuses on developing a broad situational awareness to support the Office of the Under Secretary of Defense for Intelligence and Security [USD(I&S)], and the commanders of the combatant commands. Strategic GI&I, based on foundation data, provides a stable base for intelligence intensification. The base ensures a common operational view of the battlespace, both militarily and politically.

*Limitations of Strategic Geospatial Information and Intelligence.* Resolution and information density are the key limitations of strategic GI&I. Strategic GI&I, focusing on the macro view (an entire country or region), supports strategic planning completely. However, it does not provide the critical, focused, high-density, high-resolution information that is needed to support lower-level tactical planning efforts.

#### **Operational Geospatial Information and Intelligence**

Operational GI&I is used by the combatant commanders (CCDRs), joint task forces (JTFs), Service component commands, and MAGTF command elements. Operational GI&I is—

- Transient and requires the compilation and interpretation of information by specialized GI&I personnel who are located within the joint intelligence operations centers (JIOCs), joint analysis centers (JACs), and other intelligence centers.
- Focused on the theater of operations and is concerned with the effects that weather, enemy, and terrain (WET) have on mission accomplishment.
- Used for planning and coordinating missions within a theater and is based on information from national, theater, and other intelligence, surveillance, and reconnaissance (ISR) assets.
- Focused on support for several different types of missions, units, and weapon and mission planning systems within the commander's AOR.
- Keyed to small-scale or low-density source equivalents (i.e., 1:500,000 or smaller scale charts) supporting an entire theater of operations.

Operational GI&I includes information derived from strategic analysis but focuses more attention on detailed support for large military forces within the theater of operations. It consists of detailed analysis and production that can include the following:

- Landing areas and sites.
- Inland waterways.
- Urban environments.
- Transportation and communication systems.
- METOC and terrain effects on potential courses of action (COAs) within the theater of operations.

**Capabilities of Operational Geospatial Information and Intelligence.** Operational GI&I is produced for use by CCDRs, JTF command elements, and Marine expeditionary force (MEF) command elements to reduce uncertainty during IPB activities. Information is derived from strategic analysis. Operational GI&I includes the following capabilities:

- It supports several different missions, units, weapons, and mission planning systems that are operating at the same time within the commander's AOR.
- It supports the analysis of WET effects on MAGTF capabilities and plans within the area of interest (AOI). It provides detailed support for large maneuvers and other forces, such as a division or wing, within the AOI.

*Limitations of Operational Geospatial Information and Intelligence.* Operational GI&I has the following limitations:

- Lacks the needed resolution and information density to support specific tactical planning efforts.
- Is oriented toward large areas (e.g., a theater of war) for a macro view of the problem set and may include limited evaluation of specified beaches, landing zones, airfields, and road networks.
- Does not provide the critical information needed to support infantry and artillery regiments, Marine aircraft groups, and combat logistics regiments.

**Tactical Geospatial Information and Intelligence.** Tactical GI&I analysis and production includes information from the strategic and operational levels and provides greater detail than the other classes of GI&I. Tactical GI&I is derived from commercial imagery (civilian), military imagery, local mapping sources, local all-source intelligence collections, and production. Tactical GI&I is primarily concerned with the effects of the environment on a particular mission, unit, or weapon system. It is keyed to either medium- or large-scale map source equivalents and data density (i.e., 1:100,000) to support a specific mission or operation. Specific products of tactical GI&I may include CCM analysis, line of communications (LOC) analysis, and a more focused evaluation of the commander's logistical support requirements (e.g., staging areas or depot sites within the area of operations).

**NOTE:** MEF staff planners focus on the AOR at a 1:250,000 scale equivalent with the appropriate data density (although 1:50,000 and 1:100,000 scale products are needed for specific requirements). Major subordinate commands (MSCs) need analysis that contains greater detail to support specific mission requirements.

**Capabilities of Tactical Geospatial Information and Intelligence.** Tactical GI&I addresses the effects of METOC and terrain on specific operations of the MAGTF (i.e., a particular mission, unit, weapon, or mission planning system). Tactical analysis for each mission focuses on intensifying and integrating geospatial information from all geospatial sources and adds value to local, all-source intelligence.

#### The Fog Machine

In 1968, Marines were stationed at the combat base at Khe Sanh, South Vietnam, located on the eastern slopes of a plateau. The plateau drained into the Rao Quan River, creating what Marines called "the fog machine." Prevailing winds channeled moist, warm air up the drainage, forming orographic fog over the runway and open areas of the base, often when the rest of the plateau was cloud-free. Various other geographic and climatic factors caused nearly constant fog and low ceiling over this isolated Marine outpost for much of the year. Poor visibility often left the base without close air support or aerial resupply and placed the Marines at great risk from surrounding North Vietnamese forces.

Analysis taken by GI&I personnel in advance of tactical operations may have led to the selection of a site that would not have been as affected by the orographic fog; and therefore, more operationally suitable than Khe Sanh proved to be.

*Limitations of Tactical Geospatial Information and Intelligence.* With tactical GI&I, Marines have limited time to collect, integrate, process, analyze, and produce tailored products that support the MAGTF commander's intelligence requirements. Additionally, their ability to disseminate products across all data networks and echelons of command could be limited.

## **IMAGERY INTELLIGENCE**

Imagery and IMINT are mutually distinctive. Imagery is an image that contains information in the form of pixels, digits, or other forms of graphic representation and the data behind that portrayal (JP 2-0). It has not yet been analyzed or evaluated against other intelligence. Imagery interpretation, on the other hand, is the function that trained analysts perform involving integrating imagery analysis with other intelligence-related activities to convert the raw imagery into finished intelligence products. Imagery intelligence is "the technical, geographic, and intelligence information derived through the interpretation or analysis of imagery and collateral materials" (United States Code, Title 10, section 467). Imagery interpretation, and dissemination (TCPED) to the commander. Properly trained personnel, adequate time, and sophisticated equipment are needed to produce and provide IMINT. It includes exploiting imagery data derived from electro-optical (panchromatic and infrared), radar, multispectral, and laser sensors (JP 2-0). Raw imagery may be disseminated in accordance with the relevant security classification

support of operations; however, caution must be exercised to ensure commanders are aware of the potential for misleading information when intelligence is based on a single, unevaluated source. Imagery intelligence aids commanders and planners by providing—

- Situational awareness of the natural, constructed, and cultural environment in support of the intelligence preparation of the battlespace (IPB) and target development.
- Indications and warning (I&W).
- Patterns and trends.
- A source for confirming the analysis produced by other intelligence disciplines.

#### **Objective of Imagery Intelligence**

The objective of IMINT is to support the commander's decision-making process by reducing uncertainty about the situation and the surrounding environment. It supports the identification of hostile intelligence collection operations, aids with the identification of MAGTF vulnerabilities that could be exploited by the enemy and assists with the evaluation of friendly security measures to counter these vulnerabilities.

#### Capabilities and Limitations of Imagery Intelligence

Imagery intelligence has discipline-specific capabilities and limitations that often become the intelligence of choice for a commander to confirm or deny enemy activity or potential I&W.

**Capabilities.** Imagery intelligence provides detailed and precise information regarding the location and the physical characteristics of the threat and the environment in which it is operating. It is a key source of information concerning key terrain features, installations, and infrastructure used to build detailed intelligence studies, reports, and target materials. Intelligence functions that rely heavily on IMINT include order of battle (OOB) analysis, enemy course of action (COA) assessments, target intelligence development, battle damage assessment (BDA), and positive identification of dynamic targets.

*Limitations.* The general limitations to IMINT are tied to the availability of resources, such as collection platforms, exploitation systems, high-capacity communications, skilled personnel, and the time available to complete the TCPED cycle. The intelligence shortfalls associated with general limitations are compounded by weather effects; enemy air defense capabilities; and enemy camouflage, concealment, and deception (CCD) activities.

See appendix A for information on sensor limitations. The appendix describes the basic capabilities and limitations of electro-optical, radar, and infrared imagery sensors.

## SUPPORT TO INTELLIGENCE FUNCTIONS

During the deliberate planning process, GI&I provides information to support AOI battlespace visualization. This information enables planners to assess the enemy and friendly COAs based on potential environmental conditions within the AOI.

Before crisis planning, GI&I allows planners to initiate planning. The geographic intelligence specialist accelerates the GI&I production and intensification processes to provide mission-specific data required for MAGTF mission execution.

#### **Commander's Estimate**

Geospatial information and intelligence provide topographic, environmental, and meteorological information to support the commander's visualization of the battlespace and the estimate of the situation. Once GI&I has been analyzed, it can be fused with other intelligence to support the commander's situational awareness, planning, and decision making, allowing commanders at all levels to anticipate and react quickly to evolving situations.

#### **Situation Development**

When potential trouble spots are identified, MAGTF geographic intelligence specialists use existing geospatial databases to support planning and situational awareness. As the situation develops, geographic intelligence specialists rely on I&W to provide the lead time that is needed to collect information. They integrate terrain and METOC studies into the database and work to ensure that a seamless geospatial foundation is available to support MAGTF planning.

#### **Force Protection**

Geospatial information and intelligence use high-resolution data and mission-specific data to provide analysis to support maneuver, engineering, and barrier operations, as well as the unique missions that are associated with rear area operations. Geospatial information and intelligence are used to identify ingress and egress routes, locations for defensive barriers (natural and constructed features), potential obstacles needing reinforcement, and mobilization locations.

#### Targeting

Foundation data provides high-resolution, orthorectified, and georectified stereoscopic imagery for accurate identification and location of potential targets within the area of operations. Analysis of the surrounding environment supports evaluation of all military aspects of the terrain that could affect weapon delivery systems. Such analysis identifies collateral damage concerns as well as potential air and ground ingress and egress routes to be used in conjunction with planned fires.

#### **Combat Assessment**

The IPB process, including WET, is critical for situational awareness; COA development; and identification of targets, decision points, and tactical visualization of the battlespace. Geospatial information and intelligence provide the foundation for the integration of all assessment criteria (i.e., operations, logistics, and communications) and supports the rapid intensification and deconfliction of tactical intelligence within a target area.

## SUPPORT TO OPERATIONS

Because air, ocean, and land environments affect the composition, deployment, employment, sustainment, and redeployment of every MAGTF, MAGTF operations require a common geographic reference. Geospatial databases provide the common reference for different missions, forces, and weapon systems that are needed to create a common view of the battlespace. This geospatial foundation, portrayed in the COP and CTP, facilitates the accurate positioning of information in operational and tactical contexts. In addition, GI&I and METOC support the IPB and MCPP by portraying intelligence information in relationship to the environment, threat, and friendly forces. Geographic information and intelligence also support the evaluation of different COAs based on friendly and enemy capabilities and limitations related to environmental factors.

#### **Command and Control**

Command and control encompass critical support to all warfighting functions and operations, enabling a commander to recognize what must done and then direct the appropriate action to accomplish the task. The ability to visualize and assess the battlespaces, forces, weapon systems, and their interaction are essential to command and control.

Accurate depiction of the environment and all entities that are operating within it depends on the resolution level and detail of the GI&I and its integration with other intelligence. Although Marines engaged in C2 processes may have developed the ability to picture the battlespace, it is difficult to convey that picture and intent to other friendly forces without effective command and control and network access. This capability requires a well-developed GI&I foundation for anchoring mission-specific information. The requirements for higher levels of geospatial resolution and detail to support command and control have motivated GI&I to find more effective ways of providing the geospatial foundation for both the COP and CTP.

#### Maneuver

The C2 network, connectivity, and display directly support maneuver operations by providing detailed, mission-essential GI&I to the operating forces. Identifying key transportation and main supply routes to facilitate the rapid movement of personnel and materials is critical to battlefield support. Detailed visualization of the terrain supports rehearsal during all phases of operations and the rapid transition of maneuver and supporting forces from ship to shore during amphibious operations. Maneuver is affected by the following various natural and constructed conditions:

- Surface materials, such as soils, rocks, and vegetation.
- Surface configuration.
- Cultural and other human modifications of the terrain and their impact on the Earth's physical features (i.e., obstacles).
- Surface water conditions.
- Surface drainage.
- Hydrographic effects.
- Precipitation.
- Visibility.
- Wind.

Marines must also consider the effect of weather on soil and slope. Obstacle factors determine whether terrain is nonrestricted, restricted, or severely restricted. Obstacle factors include the following:

- Slopes that exceed the maximum angle that a vehicle can climb.
- Cultural modifications such as ditches, fences, plowed fields, irrigation, or drainage that may alter the natural soil strength.

In some areas, only one obstacle factor may determine whether terrain is navigable by vehicles. However, more commonly it is the combination of two or more factors that determines whether vehicles can move across terrain.

#### **Fire Support**

The accurate positioning of weapon systems and integrated GI&I ensure that fire support planners have the information needed to accurately place rounds on the target. The potential impact terrain and METOC could have on weapon systems must be reflected in the detailed descriptions of high-value targets and high-payoff targets.

#### Aviation

A thorough analysis of the airspace within the MAGTF's AOR must consider both GI&I and METOC. The GI&I analysis—

- Provides the geospatial foundation for determining the most effective deployment positions for enemy and friendly air defense weapons and radar.
- Assists the commander in maximizing battlespace air interdiction efforts and planning counter airborne and air assault operations.

When integrated with METOC analysis, GI&I-

- Provides the geospatial foundation for determining the routes by which aircraft can enter and exit an area of operations.
- Identifies air avenues of approach and air mobility corridors.
- Provides the geospatial foundation for determining where aircraft can ingress and egress target areas while being screened from enemy air defense weapons and radar, when terrain-masking analysis is integrated with aircraft attack profiles.
- Determines the best areas and approaches to those areas for LZs, drop zones (DZs), and forward arming and refueling points.

#### Logistics

Operational planners' key concerns are the extent and general nature of the transportation network. The GI&I support to logistic operations includes the transportation infrastructure analysis of an area (e.g., road networks, railways, or waterways on which forces and supplies can be moved). The importance of a particular facility is relative to both the type of operation and the units involved in that operation. For example, an area with a dense transportation network is typically favorable for major operations; whereas, an area crisscrossed with canals and railroads, but with few roads, can limit the use of wheeled vehicles and the maneuver of armor and motorized convoys.

Railroads and highways extending along the axis of advance may assume greater importance than those that are perpendicular to the axis. Therefore, when preparing GI&I studies and databases in support of MAGTF operations, planners must carefully evaluate all transportation capabilities and limitations to determine their effect on possible COAs.

## MULTILEVEL GEOINT SUPPORT OPERATIONS

#### Marine Expeditionary Force

The GEOINT support to operations for the MAGTF depends on the information provided by the GEOINT sections. To provide a push/pull information management capability to all levels of the MAGTF, the GEOINT section is tied to the MAGTF intelligence operations center (IOC) and the supporting network. The GEOINT specialist connects to the NSG and supports efforts to intensify and integrate multi-source geospatial databases as well as national, theater, and organic IMINT sources. The GEOINT and METOC personnel provide comprehensive support to all units via program-of-record hardware and software solutions. For additional information regarding MAGTF METOC support operations, refer to MCRP 2-10B.6. The GEOINT specialists provide organic support to the following MEF MSCs and by extension their major subordinate elements:

- Marine division (MARDIV).
- MEF information group (MIG).
- Marine aircraft wing (MAW).
- Marine logistics group (MLG).
- Marine expeditionary brigade (MEB).
- Marine expeditionary unit (MEU).

#### Marine Corps Forces Special Operations Command

The GEOINT specialists are organic to the Marine Forces Special Operations Command (known as MARFORSOC). These Marines are integrated into the Marine special operations team (MSOT) as special operations capability specialists–GEOINT and are responsible for—

- Providing operational GEOINT support (i.e., collection, analysis, production, and dissemination) within the assigned area of operations. This capability supports and facilitates tactical operations and collection of information supporting the commander's priority intelligence requirements (PIRs).
- Tracking and accounting for essential geospatial collection equipment deployed in support of a particular mission.
- Performing other roles, functions, and mission support activities within the Marine special operations company, Marine special operations team and other special operations units as required.

#### **Chemical and Biological Incident Response Force**

When directed, GEOINT personnel forward-deploy and respond to credible threats of chemical, biological, radiological, nuclear, or high yield explosives incidents to assist local, state, or Federal agencies and unified CCDRs in conducting consequence management operations. The chemical-biological incident response force provides capabilities for agent detection and identification, casualty search and rescue, personnel decontamination, and emergency medical care and stabilization of contaminated personnel.

#### Joint and Theater

During joint operations, GEOINT is connected to theater C2 networks, providing access to theater and Service-level geospatial databases. Access to JIOC and JAC GI&S branches provides GEOINT production support and a repository for tactical production to ensure a common foundation for visualization throughout the theater.

The theater geospatial libraries provide operational GEOINT to ensure standard interoperability among theater forces. When coalition or multinational partners are present within a theater, the geospatial libraries provide a common foundation across multiple networks.

#### National and Strategic Support

The Marine Corps Intelligence Activity (MCIA) is a coproducer in the National Distributive Intelligence Production Network (hereafter referred to as the national production network). The primary function of this network is to provide a dedicated geospatial production support capability to Marine Corps operating forces. The MCIA is the primary interface into this network and provides value-added, tactically collected data to the NSG as directed.

## CHAPTER 3. ORGANIZATION AND RESPONSIBILITIES

Within Headquarters, Marine Corps (HQMC), the Information Intelligence Division (IID) under the Deputy Commandant for Information is the primary stakeholder for GEOINT. The staff sections supporting IID conducts detailed coordination and develops GEOINT related plans, policy and strategy using Fleet Marine Corps input provided to the GEOINT Governance Board (GGB) to ensure a total-force approach to geospatial activities across the Marine Corps organization. Refer to Appendix B, Marines responsible for geospatial information and services for GI&S and geographic intelligence tasks. The IID Director of Intelligence (DIRINT) is the functional manager for GEOINT within Marine Corps intelligence and represents Marine Corps intelligence as a member of the NSG.

## **GEOSPATIAL INTELLIGENCE SUPPORT**

#### Headquarters Marine Corps, Information Intelligence Division

**Mission.** The IID is responsible for policy, plans, and staff supervision of the intelligence warfighting function for HQMC, including the MCISRE and supporting activities within the Marine Corps Information Environment Enterprise. On behalf of DCI, the DIRINT supports the Commandant of the Marine Corps (CMC) in the CMC's role as a member of the Joint Chiefs of Staff, and represents the Service in joint, Department of Navy, DoD, and intelligence community matters.

**Organization.** The GEOINT equities under IID consists of the Marine Corps GEOINT office, the occupational specialist manager, and the GEOINT plans and policy section:

- The Marine Corps GEOINT office is located in the National Geospatial-Intelligence Agency (NGA) East Facility and directly reports to the DIRINT and Marine Corps intelligence community mission manager (IMM).
- The occupational specialist manager is located within the Pentagon and supports combat development and integration MOS sponsorship for manning requirements in accordance with the total force structure process.
- The GEOINT plans and policy section is under the Strategy and Policy Branch (IIS) and directly reports to IID staff to advises on service positions regarding GEOINT systems, planning and programming, and policy reviews related to GEOINT doctrine and concepts of employment. It advises on all aspects of strategic, operational, and tactical intelligence capability requirements, including current and future programs and ensures compliance with intelligence community GEOINT plans, policies, and standards promulgated by the Director, National Geospatial Intelligence Agency as the intelligence community functional manager for GEOINT.

To support the DIRINT and the HQMC GEOINT mission, the Marine Corps GEOINT Governance Board (GGB) was chartered by the DIRINT to coordinate all Marine Corps activities involving GEOINT. GGB is chaired by HQMC, Information Intelligence Division, GEOINT team lead of the ISR Section. The GGB is a forum that addresses Marine Corps GEOINT related policy, planning, programming, personnel, and training issues raised by the GEOINT community of practice.

**Tasks.** The DIRINT is responsible for the administration of top secret/sensitive compartmented information (TS/SCI) network capabilities for the service and the oversight of intelligence system development. The DIRINT also develops and implements a synchronized strategy for the MCISRE's capability development efforts by performing the following functions: geospatial intelligence (GEOINT), signals intelligence (SIGINT), human intelligence (HUMINT), counterintelligence, measurement and signature intelligence (MASINT), METOC, open-source intelligence (OSINT), other intelligence-related functions and capabilities, foreign language, and defense attaché.

The GEOINT responsibilities, with the aid of the GGB, include-

- Administering the policy regulating the MCISRE position for all GEOINT related matters, which include adopting intelligence community standards and policy.
- Coordinating as required to assess and resolve issues that could hinder the development of the MCISRE geospatial community.
- Serving as the governance forum for identifying, prioritizing, and implementing guidelines on issues affecting the Marine Corps Geospatial-Intelligence Enterprise (MGE).
- Providing subject matter expertise to the DIRINT on issues that affect MGE support.
- Promulgating decisions and findings approved by the DIRINT to all elements of the MCISRE.

Responsibilities of HQMC IID include the-

- Providing a single point of contact (POC) for all Marine Corps GEOINT issues within national, international, DoD, joint, and Service forums.
- Supporting the operating forces, the Deputy Commandant for Combat Development and Integration, Marine Corps Systems Command (MARCORSYSCOM) and other organizations with technical assessments, evaluations, and review authority for all Marine Corps GEOINT.
- Representing the DIRINT on the GGB.
- Providing the Marine Corps direct interface to the NGA for all new GEOINT development and production.
- Identifying and coordinating issues related to intra-Service GEOINT to ensure that organic resources available to the Marine Corps are exploited fully.
- Establishing plans, policy, and strategies for disseminating GEOINT to the operating forces afloat or ashore, to include the following:
- Informing the Deputy Commandant for Combat Development and Integration on GEOINT issues related to training, education, doctrine, total force structure, and requirements.

- Informing MARCORSYSCOM on GEOINT issues related to equipment and software used by GEOINT Marines.
- Coordinating with Marine Corps component command (MCCC) headquarters, MEF command elements, MEF MSCs, intelligence battalions their assigned GEOINT elements to ensure interoperability, standardization, and compliance with Joint Chiefs of Staff, DoD, and Marine Corps directives.

#### Marine Corps Component Command, GEOINT Section

The MCCC GEOINT section, under the functional control of the G2, serves as the technical representative with subordinate GEOINT elements. In addition, the MCCC GEOINT section provides—

- A dedicated POC for GEOINT issues within the commander's specified theater or area of operations.
- An integrated approach to identifying, consolidating, and validating GEOINT production and collection requirements and supporting operations.

*Mission.* The mission of the MCCC GEOINT section is to coordinate the development, validation, and establishment of the MCCC's requirements for GEOINT priorities, standard products, and supporting operations with the appropriate unified and subordinate commands. It also represents the MCCC in GEOINT forums that are responsible for validating GEOINT resource allocations and system capabilities within the MCCC's AOR.

**Organization.** The organization of the GEOINT section varies, but it typically consists of at least one Geographic Intelligence Specialist and one Imagery Analysis Specialist staff non-commissioned officer. They assist in the coordination of geospatial issues concerning intelligence plans, operations, collections, production, targeting, dissemination, counterintelligence, and other staff sections.

Tasks. Responsibilities of the MCCC include-

- Validating requirements and coordinating the production of all requirements for the MCCC headquarters and MSCs.
- Validating the global sourcing of GEOINT Marines.
- Working with the MCCC staff sections in the following ways:
- G-3 to define the area of operations, mission objectives, and force list.
- G-4 to assist with the identification of required hard copy map holdings.
- G-5 to identify and manage GEOINT requirements within the MCCC family of plans.
- G-6 to coordinate network and data requirements for national, theater, and MAGTF operations.
- Providing MCCC oversight to theater functions, including policies, tactics, techniques, and procedures (TTP) architectures, technologies, and personnel related to GEOINT production and activities.
- Influencing the identification and development of unit and mission profiles to support operations.
- Ensuring interoperability of GEOINT standards within the area of operations, supporting tactical MAGTF systems and weapons delivery systems.

#### Marine Expeditionary Force, G2 Division

The MEF GEOINT section is a functional staff office under the cognizance of the MEF G-2 officer. It provides the MEF commander with a technical representative for all GEOINT activities and is designated as the single POC for MEF GEOINT issues within a particular theater or area of operations.

*Mission.* The MEF GEOINT mission includes the following:

- Coordinates all MAGTF area requirements for GEOINT priorities, products, and supporting operations in coordination with the appropriate MCCC and MSC GEOINT offices.
- Implements plans and policies and supports future collections, collaborative production, and the use of GEOINT.
- Provides professional, technical GEOINT advice and assistance to subordinate commanders.
- Develops, coordinates, and forwards all recommendations regarding GEOINT product specifications and standardization agreements to the appropriate MCCC GEOINT office(s).
- Represents the MEF in the appropriate Service and theater GEOINT forums that are responsible for validating GEOINT production resources and system capabilities within a particular theater of operations.

**Organization**. The MEF GEOINT section is located in the G-2. They assist the MEF staff with the coordination of geospatial issues concerning intelligence plans, collections, all-source production, dissemination, targeting, and other support as required. The MEF GEOINT section is staffed by a Geographic Intelligence Specialist and an Imagery Analysis Specialist.

*Tasks*. Responsibilities of the MEF GEOINT section include the following:

- Validating requirements, coordinating the production of all GEOINT requirements, and supporting operations for the command element and subordinate elements with appropriate GEOINT organizations, including the following:
- Coordinating with the NGA support team (NST) representatives assigned to the MEF.
- Providing recommendations to the G-2 regarding NST representatives assigned to the MEF.
- Validating the global sourcing of GEOINT personnel.
- Assisting the G-2, G-3, and G-5 with defining the area of operations, mission objectives, and force list.
- Assisting the MEF G-4 with the identification of required hard copy maps holdings.
- Identifying production requirements with the MEF G-5 and intelligence personnel for long-range objectives.
- Assisting the MEF G-2 and G-6 with coordinating network and data requirements for national, theater, and MAGTF GEOINT distribution.
- Coordinating the development and submission of all GEOINT requirements from all MEF command element staff.
- Coordinating, validating, prioritizing, and tasking all GEOINT requirements that are submitted by MEF subordinate units.
- Coordinating all standard NGA production requirements with the MCCC staff for validation and submission to the appropriate CCDR (for contingency planning and operational areas).
- Providing oversight of all MEF GEOINT functions, including policies, architectures, technologies, and personnel.
- Assisting the G-2 plans officer with identifying and developing unit and mission profiles that support operations within the area of operations to ensure that MEF requirements are being satisfied.
- Assisting the MEF G-2 operations officer with oversight of MAGTF GEOINT production and support to ensure compatibility with the intelligence concept of operations (CONOPS) and supporting plans, MEF operations, and communications and information systems (CIS) CONOPS and plans.

# Marine Expeditionary Force Major Subordinate Commands GEOINT

Each MEF MSC's G-2 must designate a single POC for GEOINT issues. This POC will help to consolidate, integrate, and validate GEOINT production requirements from the MSCs and participate in the planning and execution of supporting operations.

- The MEF MSCs are assigned organic GEOINT specialists in the following manner:
- The MARDIV has organic GEOINT Marines assigned to the G-2 section and subordinate elements down to the infantry battalion level.
- The MLG has organic GEOINT Marines assigned to the G-2 section.
- The MAW has organic GEOINT Marines assigned to the G2 and to various subordinate commands to include the Marine Unmanned Aerial Vehicle Squadrons.

*Mission.* The MEF MSC's GEOINT section coordinates all MAGTF area requirements for GEOINT priorities, products, and supporting operations.

The MEF MSC's GEOINT section—

- Implements plans, policies, and support to future plans regarding collections, collaborative production, and the use of GEOINT. The MEF MSC's GEOINT section also provides professional, technical GEOINT advice and assistance to subordinate commanders.
- Develops, coordinates, and forwards all recommendations regarding GEOINT product specifications and standardization agreements to the appropriate MEF GEOINT sections.
- Represents the MEF MSC in appropriate Service and theater GEOINT forums that are responsible for validating GEOINT production resources and system capabilities within a theater of operations.

**Organization.** The MEF MSC's G-2 designates a GEOINT representative within the G-2 section. The GEOINT representative reports to the G-2 intelligence operations officer.

**Responsibilities.** Responsibilities of the MEF MSCs GEOINT section include the following:

- Planning, directing, and coordinating GEOINT operations in support of the command's requirements.
- Validating and developing GEOINT requirements and supporting operations from other MSC staff divisions and subordinate commands (e.g., regiments, groups, battalions, squadrons) as the command's GEOINT POC.

- Developing unit and mission profiles that are needed to acquire mission specific GEOINT data for tactical operations (see Chapter 4).
- Providing guidance and assistance to support any command request for GEOINT.

# G-2 Intelligence Staff Section

The G-2 has staff responsibility for intelligence operations, including GEOINT. The MEF commander relies on the G-2 to provide the necessary information regarding the weather, terrain, enemy capabilities, status, and intentions. Using the OPLAN, supporting intelligence, and reconnaissance and surveillance plans, the MEF G-2—

- Identifies and validates intelligence requirements.
- Coordinates intelligence priorities.
- Integrates collection, production, and dissemination activities.
- Validates the allocation of intelligence resources.
- Validates the assignment of specific intelligence and reconnaissance missions to subordinate elements.
- Supervises the GI&S and overall intelligence and reconnaissance efforts in support of the MEF Commander's priorities.

Specific GEOINT responsibilities under the G2 include the following:

• Developing and answering outstanding PIRs and intelligence requirements that are submitted by the MEF and subordinate units by planning, directing, integrating, and supervising organic GEOINT and multidiscipline intelligence operations.

**NOTE:** These operations may be conducted by MEF assets or the assets of other supporting organizations.

- Preparing appropriate GEOINT and other intelligence plans and orders for the MEF.
- Reviewing and coordinating the GEOINT and other intelligence plans that are developed by JTFs, theaters, and other organizations.
- Ensuring that GEOINT and other intelligence is processed, analyzed, and incorporated into all-source intelligence products and then disseminated rapidly to all appropriate MEF and external units.
- Evaluating theater, national, JTF GEOINT, and all-source intelligence that support and adjust established intelligence requirements, when necessary.
- Coordinating and submitting and GEOINT collection, production, and dissemination requirements for JTF, theater, or national systems support.
- Identifying and correcting deficiencies in GEOINT and other intelligence and reconnaissance personnel and equipment resources.
- Incorporating exercise GEOINT into training exercises to improve MEF individual, collective, and unit readiness.
- Facilitating the understanding and use of GEOINT and other intelligence in support of the planning and execution of MEF operations.
- Assigning NST representatives within the MEF command element.

# **Other Staff Sections**

Other staff sections that have specific responsibilities for GEOINT in the Marine expeditionary force command element are the G-1, G-3, G-4, G-5, and G-6.

**G-1 - Personnel Staff Section.** The G-1 provides personnel support to the GEOINT effort, including coordinating augmentation by qualified personnel. Requests for GEOINT personnel augmentation will be developed by the MEF G-2 and provided to the G-1 for either internal sourcing or forwarding to higher headquarters for global sourcing.

**G-3 - Operations Staff Section.** The G-3 is responsible for planning, coordinating, and supervising the movement and employment of maneuver units and fires. Geospatial intelligence provides valuable support for each of those tasks. Consequently, G-3 personnel must understand the capabilities of the various GEOINT collection systems, exploitation capabilities and requirements, and the advantages and limitations of different types of GEOINT products.

Additionally, when planning current and future operations, the movement and employment of GEOINT personnel and their supporting units must be coordinated between the G-2 and G-3. Since some imagery supporting units also provide non-intelligence capabilities, close coordination between the G-2 and G-3 is necessary for mission prioritization and deconfliction.

**G-4 - Logistics Staff Section.** The G-4 is responsible for the logistic support for attached GEOINT units. All policies, procedures, and other support requirements should be coordinated between the G-4 and the supported GEOINT personnel as soon as possible. Special attention should be directed toward logistic requirements related to the unique (i.e., large, bulky) equipment organic to GEOINT units.

**G-5 - Future Plans Section.** The G-5 is responsible for all long-range (i.e., future) planning and joint planning matters. Typically, a G-5 is found only at the MEF and Marine Forces levels; at lower echelons of the MEF, the G-3 is responsible for the future planning task. The G-5 personnel must understand the capabilities of the various GEOINT collection systems, exploitation capabilities and requirements, and the advantages and limitations of different types of GEOINT products.

**G-6 - Communications Systems Section.** The G-6 provides and protects interior and exterior CIS connectivity and operations for the MEF, which includes providing the communication pathways, network accesses, and frequencies for GEOINT organizations organic, attached to, or supporting the command. Therefore, the G-6 requires significant systems knowledge across GEOINT and all-source intelligence CIS.

# Intelligence Officers at Marine Expeditionary Force Major Subordinate Commands

The MSC intelligence officers must understand GEOINT, as well as their capabilities and uses. Additionally, they must be able to integrate GEOINT support with other command intelligence and reconnaissance operations. Close coordination among all unit intelligence officers can identify opportunities where small adjustments to GEOINT requirements yield results that satisfy the collection and production tasks for more than one unit. Key GEOINT-related tasks for MSC intelligence officers include:

- Planning and implementing a concept for GEOINT support based on the mission, CONOPS, and commander's intent.
- Providing centralized direction for command intelligence operations, including GEOINT elements attached to and placed in direct support of the unit.
- Consolidating, validating, and prioritizing unit intelligence requirements and GEOINT needs.
- Submitting consolidated requests for external GEOINT support to the MEF command element.
- Coordinating operational and CIS links in support of external GEOINT collection and production elements and operations.
- Providing timely and accurate feedback from supported units regarding their level of satisfaction with the GEOINT support provided.

# **KEY GEOINT PRODUCERS' RESPONSIBILITIES**

# Geospatial Intelligence Science and Analysis Division, Marine Corps Intelligence Activity

The MCIA's Geospatial Intelligence Science and Analysis Division (GSD) includes the littoral exploitation branch (LEB) and the advanced analytics branch (AAB). The GSD focuses on characterizing the littoral environment in support of service requirements. The GSD is responsible for investing in advanced methodologies to apply in-depth analysis and tradecraft techniques while maintaining GEOINT analytic and professional standards.

The GSD, using web-based technologies, provides a limited reach-back capability for MAGTFs and other organizations that require tailored GEOINT. In addition, the GSD provides a dedicated production environment for supporting deliberate and crisis query, receipt, analysis, production, and dissemination of GEOINT for MAGTF requirements within the littoral regions of the world.

Geospatial intelligence must be detailed enough to support tactical analysis, planning, and decision making. It becomes the frame of reference for fusing information and intelligence from other sources (e.g., environmental, logistical, operational, intelligence, diplomatic). It also supports rapid intensification to meet mission-specific requirements for deployed MAGTFs (see Figure 3-1).

*Mission.* The GSD provides GEOINT support to the contingency planning efforts conducted by the Marine Corps forces and to other GEOINT requirements that are not satisfied by organic, theater, other Service, or national GEOINT research and analysis capabilities. The GSD also provides tailored GEOINT support to the CMC, the CMC's staff, and the extended supporting establishment.



Figure 3-1. Marine Corps Intelligence Activity Geographic Intelligence Division Geospatial Intelligence Support.

**Responsibilities.** The GSD is responsible for completing the following types of prioritized production tasking from the CMC, the operating forces, and the supporting establishment:

- Querying, retrieving, integrating, deconflicting, and analyzing multisource geospatial information and imagery from national, international, joint, coalition, and other Services to produce timely, relevant GEOINT in support of validated requirements.
- Supporting the HQMC in establishing policy and standards for implementing NGA and DoD databases, per the NSG.
- Assisting MAGTFs in exposing GEOINT products through the MCISRE Knowledge Gateway.
- Populating the Marine Corps repository for all littoral areas within the NSG production network. The common GEOINT server application (CGSA) capability helps intensify and generate detailed terrain studies using all-source geospatial information to create products (e.g., land use classification, slope, trafficability studies, LOC, soils, obstacle analysis). These products are geodetically referenced; produced in soft copy format; and disseminated in hard copy, electronic, or digital format. Unclassified data may be enhanced with digital high-resolution video products for the widest possible dissemination.
- Providing a technical forum for evaluating emerging databases and new products, systems, and software technologies. This evaluation supports interoperability and standardization by facilitating the formulation of integration and training requirements before new equipment and software are fielded to the Marine Corps operating forces.

Tasks. Refer to Appendix B for a list of GEOINT tasks.

# Geographic Intelligence Specialist Elements Intelligence Battalion

The geographic intelligence specialist elements in an intelligence battalion provide each MEF with an organic capability for geographic analysis, production, and dissemination. They offer MEFs tailored geographic views and other GEOINT support for intelligence requirements generated by the MEF and the supported commands.

During operations, the intelligence battalion (or its designated detachments) fall under the operational control of the supported unit's commander, with staff cognizance being executed by the supported unit's intelligence officer. The battalion or designated detachments receive production requirements from the intelligence battalion commander and intelligence support coordinator (ISC), with staff assistance by the G-2 geospatial section and the intelligence battalion's production and analysis (P&A) element. This coordination ensures both the availability and interoperability of the GEOINT products and services within a theater of operations and the effectiveness of overall MEF GEOINT operations and support.

*Mission.* The topographic platoon produces tailored geographic intelligence products that combine geospatial, mission, and all-source intelligence. These products and services support the MEF and other organizations, as directed.

**Organization.** The GEOINT section is focused on integrating and producing GEOINT. In addition, GEOINT populates the CGSA services in support of all elements of the MAGTF. During tactical operations, the focus of effort is on GEOINT analysis and production that supports MAGTF mission-specific requirements and intelligence requirements.

The intelligence battalion can simultaneously support a MEF and three MEUs, while providing two task-organized capabilities to various levels of the MAGTF geographic information support teams (GISTs) and GEOINT support teams (GST).

The GIST is the principal geographic intelligence support that an intelligence battalion provides to MSCs. Typically, a four-Marine team of geographic intelligence specialists who use specialized equipment, may either be attached to or placed in direct support of a MAGTF, MSC, or subordinate unit. Generally, the GIST operates under the staff cognizance of the unit intelligence officer. The mission, tasks, and functions of a GIST parallel those of an intelligence battalion.

The GST are the principal geographic intelligence support that an intelligence battalion provides to a MEU, support team section. When not deployed, GSTs are integrated into the intelligence battalion's regular operations. Generally, a GST is two Marine geographic intelligence specialists who use specialized equipment. The team is attached to the MEU command element and operates under the staff cognizance of the S-2. The mission, tasks, and functions of the GST parallel those of intelligence battalion.

**Responsibilities.** When planning MAGTF geographic intelligence operations per ISC tasking, and providing tailored support to MAGTFs and other commands as directed, the geographic intelligence elements have the following responsibilities:

- Providing tailored mission-oriented topographic map products to supplement standard NGA maps and charts.
- Coordinating with the collection management/dissemination officer (CM/DO); surveillance and reconnaissance cell (SARC) officer in charge (OIC); P&A cell OIC; and other MAGTF and supporting intelligence, reconnaissance, and combat units to collect, analyze, synthesize, produce, and disseminate GEOINT and to assist with all-source intelligence production (e.g., LZ studies).
- Preparing map substitutes, such as overlays, overprints, photomosaics, map revisions, and multicolor charts.

- Revising and reproducing combat charts, coastal charts, port charts, and harbor charts. Products may include 3-D [three dimensional] terrain models, LOS studies, line-of-sight analysis, terrain factor overlays, hydrographic charts, LZ studies, and similar products.
- Collecting coastal data regarding trafficability, routes of egress, and inland water bodies.
- Populating the CGSA with databases to support all MAGTF requirements.
- Supporting specific missions, target areas, and intelligence requirements by integrating and intensifying additional information rapidly.
- Operating the distributed common ground/surface system–Marine Corps (DCGS-MC) GEOINT, when functioning as a multi-workstation, high-end GIS, DCGS-MC GEOINT can integrate, deconflict, analyze, produce, and disseminate theater, Service, and national geospatial databases and GEOINT products (see Appendix C). The DCGS-MC GEOINT can provide the following three key capabilities for the commander:
- GEOINT processing, exploitation, and dissemination (PED) capability within a designated battlespace.
- Rapid integration and analysis of multispectral, hyperspectral, and national imagery with GEOINT and other intelligence.
- Ability to query, retrieve, integrate, deconflict, and analyze multisource GEOINT provided by the geospatial analysis branch, joint intelligence centers (JICs), JAC, other Services, and coalition databases.

Tasks. Refer to Appendix B for a list of GEOINT tasks.

### Imagery Analysis Specialist Elements, Intelligence Battalion

The imagery analysis specialist element is responsible for certain missions and tasks; its Marines are organized to provide IMINT to supported units and have a specified C2 relationship and a concept of employment.

*Mission.* The mission of the imagery analysis specialist elements is to provide IMINT support to MAGTFs. Imagery intelligence provides concrete, detailed, and precise information on the location and physical characteristics of the environment and the threat. It is the primary source of information concerning key terrain features, installations, and infrastructure used to build detailed intelligence studies and target materials. Specific tasks include the following:

- Exploiting and analyzing all-source, multi-sensor imagery to derive intelligence pertaining to installations, troop dispositions, strengths, and activities of various conventional and nonconventional forces.
- Planning and tasking multi-sensor platforms that include those organic to and external to the MAGTF.
- Conducting imagery exploitation and data management.
- Providing imagery derived products and reports to the MEF commander and other commanders.
- Conducting liaison with the Service-level intelligence center and external agencies for obtaining imagery products in support of MEF intelligence requirements.

**Organization.** The IMINT element is organic to the intelligence battalion and the MEF and its MSC or Marine subordinate elements as tasked. Intelligence battalions can support two tactical imagery analysis sections and three imagery analysis teams at any given time.

The intelligence battalion commander oversees command and control of the IMINT elements within the intelligence battalion, while the MEF staff has cognizance over their activities.

When supporting smaller MAGTFs, the intelligence battalion IMINT element (or its detachments) will operate under the command and control of either the intelligence detachment OIC or the supported unit's G-2/S-2.

The MEF commander exercises command and control over all intelligence battalion elements, including the IMINT elements, via MIG commander and the MEF G-2.

The imagery interpretation platoon (IIP) operates in general support of the MEF. Under this command relationship, the MEF commander, in consultation with both the G-2 MIG commander and ISC, determines priorities for intelligence collections and production support, locations of IMINT support nodes, and the means for IMINT and all-source intelligence dissemination.

Imagery intelligence task-organized detachments may be employed in direct support of, or attached to, a particular MSC or MEF unit, based on mission, enemy, terrain and weather, troops and support available-time available (METT-T) considerations. In these cases, the scope of the supported commander's C2 authority over assigned IMINT elements will be specified to ensure effective support to operations while allowing the MEF commander to maintain effective command and control of broader intelligence and IMINT operations. Direct support or attachment relationships may consist of dedicated imagery exploitation support, placement of IMINT assets with the supported unit, or simply establishing an IMINT node at the supported unit to provide direct dissemination of imagery and IMINT to the intelligence section or combat operations center (COC). In the latter of these relationships, an IMINT liaison element should be provided to the supported unit.

**Responsibilities.** Task-organized individual mobilization augmentee detachments may be attached to MAGTF command elements, either independently or as part of a larger intelligence battalion detachment, when supporting MAGTF operations.

The Reserve IIP conducts peacetime training and production activities in garrison at Buckley Space Force Base, Aurora, Colorado. The IIP and GEOINT directorate of the all-source fusion platoon participate in federated imagery production in support of MARFORRES units, the MCIA, or the CCMDs during regularly scheduled reserve drill periods. The Reserve IIP also provides services and task-organized detachments consisting of intelligence personnel to augment active component elements, joint commands, and national agencies in peacetime, times of crisis, contingency, or war.

The Marine imagery analysis specialists' primary imagery exploitation system is the DCGS-MC GEOINT family of systems (FoS). The modular and scalable DCGS-MC GEOINT employs commercial off-the-shelf, government off-the-shelf, and non-developmental item computer hardware and software to enable rapid upgrades and maintain commonality and interoperability with other Marine Corps and joint intelligence and imagery systems. The DCGS-MC GEOINT

provides the MAGTF commander with an organic capability to produce IMINT products in support of all operations. The DCGS-MC GEOINT uses the Twister antenna or the GEOINT Omni-directional lightweight expeditionary antenna to provide the capability to data-link imagery from theater and tactical assets as well as resourcing repositories via classified networks to support tailored imagery analysis. The DCGS-MC GEOINT also disseminates imagery products and exploitation reports to the MAGTF commander and subordinate commanders in support of tactical operations, strike planning, detection and location of targets of opportunity, and combat damage assessment for restrike planning and intelligence assessment.

**Communications and Information Systems.** The IIP requires a significant amount of communication resources to support internal and detachment C2 requirements. Additionally, the IIP needs access to various classified networks to conduct its operations.

*Maintenance Concept.* The chosen product support strategy involves using of contractor logistics support (CLS), supply chain management, field support representatives (FSRs), and the lead systems integrator (LSI). The strategy ensures appropriate warranty tracking, establishes maintenance contracts, provides software support solutions, and performs technology refreshes.

The MARCORSYSCOM DCGS-MC program office is responsible for budgeting and funding the CLS contract for the entire life cycle of the CGSA. The CGSA is supported by the two-level maintenance concept (field and depot) per MCO 4790.25.

The DCGS-MC FoS is supported by the two-level maintenance concept (field and depot) per Marine Corps Order (MCO) 4790.25, Ground Equipment Maintenance Program (GEMP). Tactical exploitation group FoS field-level maintenance is performed using Marine Corps standing operating procedures (SOPs) and organic personnel. The program manager office and maintenance Marines share server support via a lead systems integrator contract. Equipment requiring depot level maintenance is performed by CLS personnel. Depot-level software maintenance is performed by the LSIs. Depot-level hardware maintenance is performed by the equipment manufacturer.

With respect to unit-level maintenance, each intelligence battalion is responsible for organizational-level preventive maintenance on the CGSA and all associated organic Marine Corps equipment based on the unit's table of organization.

Regarding transportation, the intelligence battalion has limited organic rolling stock to support IIP operations. To simultaneously move all parts of the IIP requires external transportation support from the MEF headquarters groups, the MLG, the supported unit, and possibly all three.

# Marine Unmanned Aerial Vehicle Squadron

The Marine unmanned aerial vehicle squadron (VMU) is responsible for certain missions and tasks. It is organized to support the MEF with a specified command and control relationship and a concept of employment.

*Mission.* The VMUs provide day and night, real-time imagery reconnaissance, surveillance, and target acquisition in support of the MAGTF. The unique capabilities of the unmanned aircraft system (UAS) can also be used to support target engagement, assisting in the control of fires and supporting arms and maneuver. Squadrons are under the administrative control of the Marine

aircraft wing (MAW). However, because the number of assets is limited and they provide critical capabilities to the entire force, the MAGTF commander retains operational control of the VMU. Specific VMU tasks include the following:

- Conducting aerial reconnaissance (i.e., imagery collection and reporting), surveillance (i.e., airborne surveillance of designated target areas, MEF or other areas of interest, and other areas, as directed), and target acquisition.
- Conducting airborne surveillance for search and rescue and tactical recovery of aircraft and personnel.
- Conducting reconnaissance of helicopter approach and retirement lanes in supporting vertical assaults.
- Providing real-time target information to the direct air support center (DASC) and fire support coordination center(s) to facilitate adjusting fire missions and close air support.
- Providing real-time intelligence reporting to the SARC to support MEF intelligence requirements and to facilitate all-source intelligence operations.
- Providing information to assist adjusting indirect-fire weapons and to support and facilitate direct air support and air interdiction operations.
- Providing remote receive capability and liaison to designated units.
- Collecting information to support BDA and combat assessment.
- Supporting rear area security.

The VMU is organic to the MAW and is structured to operate as a subordinate unit of one of the Marine air control groups (MACGs).

The three active-component VMUs operate the MQ-9 Reaper Group 5 UAS platform. Each detachment can operate and maintain one UAS ground control station and one forward launch and recovery element (LRE).

The VMU Group 5 UASs are theater-level assets that are under the command of the MAW commanding general or the aviation combat element (ACE) commander (when deployed in support of MAGTFs smaller than a MEF). The supported commander exercises command and control via the ACE G-3/S-3 and the Marine air command and control system (MACCS) (refer to Marine Corps Tactical Publication [MCTP] 3-20F, Control of Aircraft and Missiles). Air operations (e.g., flight tasking, airspace deconfliction) are planned, coordinated, and controlled by the ACE G-3/S-3 via the Marine tactical air command center (TACC). However, intelligence missions are tasked per the intelligence and reconnaissance mission requirements designated by the MEF or supported unit commander; this action requires close coordination between the intelligence battalion IOC and the MAW Marine TACC.

Typically, a VMU operates in general support of the COCOM commander as a theater asset. The MEF commander, through the G-2, determines VMU intelligence priorities and information and intelligence dissemination flow when the VMU is operating in the general support role. The G-2 will exercise staff cognizance of VMU intelligence operations via the ISC.

Marine unmanned aerial vehicle squadron missions can be flown in direct support of particular MEF units or MSCs (e.g., the Marine division or its main effort). In such cases, the scope of the supported commander's C2 authority over VMU missions should be specified to ensure effective support to the operations while allowing the MAGTF commander to maintain effective command and control of broader intelligence and IMINT operations. Direct support missions may require that dedicated command and control, planning, and exploitation be provided to the supported unit via a VMU detachment.

**Responsibilities.** A VMU can support any size MAGTF; however, general employment would be as an integral unit of the MAGTF's ACE. The VMU can also conduct limited independent operations.

The VMU's intelligence section consists of two officers, ten intelligence specialists, and six imagery analysis specialists. The intelligence section is responsible for planning collections, collecting IMINT, producing and disseminating imagery reports, imagery products, and all-source intelligence analysis.

The VMU can conduct limited imagery exploitation and analysis. Generally, UAS imagery is screened by VMU imagery analysts for information of immediate tactical value per the intelligence collection and reporting criteria stipulated by the ISC or the supported unit's intelligence officer. In most cases, the information and imagery products are sent directly to the supported unit. Imagery is also disseminated by VMU to the IIP for further detailed imagery analysis and all-source intelligence production. The MAGTF intelligence officer is responsible for subsequent IMINT dissemination, including secondary imagery dissemination.

*Miscellaneous.* The miscellaneous issues that affect the VMU are communications and information systems, maintenance, and equipment.

**Communications and Information Systems.** Each VMU has sufficient CIS resources, which include those associated with the MACCS, to support internal and squadron command and control, operations, and intelligence requirements. The VMU typically needs access to Non-classified Internet Protocol Router Network (NIPRNET), Secret Internet Protocol Router Network (SIPRNET), and pertinent local area networks (LAN), and wide-area networks (WAN).

*Maintenance.* Each VMU can perform organizational maintenance on its aviation equipment. The squadron can also perform first echelon maintenance on assigned ground equipment, including motor transport, engineering, and communications equipment. The MLG or supporting combat logistics battalion performs third- and fourth-echelon maintenance on ground equipment.

*Equipment.* See Appendix G for VMU equipment and performance characteristics.

# Marine Fighter/Attack (All-Weather) Squadron

*Mission and Tasks.* The mission of the Marine fighter/attack (all weather) squadron VMFA(AW) is to attack surface targets, day or night, under adverse weather conditions; conduct multi-sensor

imagery reconnaissance; provide supporting arms coordination; and intercept and destroy enemy aircraft under all-weather conditions. Specific VMFA(AW) tasks include the following:

- Conducting airborne surveillance for search and rescue and the tactical recovery of aircraft and personnel.
- Conducting day and night close air support under all weather conditions.
- Conducting day and night deep air support under all weather conditions (e.g., armed reconnaissance, radar search and attack, air interdiction, and strikes against enemy installations) using all weapons that are compatible with the aircraft.
- Conducting multi-sensor imagery reconnaissance (e.g., pre-strike and post-strike target damage assessment and visual reconnaissance).
- Conducting day and night supporting arms coordination (e.g., forward air control, tactical air coordination, and artillery and naval gunfire spotting).
- Intercepting and destroying enemy aircraft in conjunction with ground and airborne fighter direction.
- Conducting battlespace and target illumination.
- Conducting armed escorts of friendly aircraft.
- Conducting the suppression of enemy air defense operations.

**Organization.** There are two F/A-18D VMFA(AW)s in the operating forces. The VMFA(AW) typically functions as a unit: it is structured to operate as a subordinate unit of a Marine aircraft group in support of the MAGTF. Key squadron intelligence personnel include the S-2, two all-source intelligence analysts, and four imagery analysts.

**Command and Control.** Each VMFA(AW) squadron falls under the command of its parent group commander. Overall, depending on the configuration of the MAGTF, operational control rests with the MAW or ACE commander. The commander exercises command and control via the ACE G-3/S-3 and the MACCS. Refer to MCTP 3-20F Control of Aircraft and Missiles for more information. Air operations (e.g., flight tasking, airspace deconfliction) are planned, coordinated, and controlled by the G-3/S-3 via the Marine TACC. However, intelligence missions are conducted according to the mission requirements designated by the MAGTF or supported unit commander and require close coordination among the intelligence battalion IOC, the Marine TACC, and supported commanders.

The VMFA(AW)s squadrons typically operate in support of the MAGTF as assigned in the air tasking order (ATO). However, their VMFA(AW) missions may be in direct support of a particular unit of the MAGTF (i.e., ground component, the ACE, or logistics combat element [LCE]) based on METT-T considerations. The ATO will identify the missions, command and control, and intelligence operations direction.

**Concept of Employment.** The VMFA(AW) squadron's concept of employment should be considered in terms of operations and intelligence. When viewed in operational terms, the VMFA(AW) squadron is typically employed as a unit of an ACE in support of MAGTF

operations. With respect to intelligence, the VMFA(AW), when equipped and tasked to conduct imagery collection missions, coordinates operations closely with the IOC, the MAW G-2, the IIP, and others as appropriate.

Imagery is processed at the VMFA(AW) squadron, using a common GEOINT workstation (CGW). Each VMFA(AW) squadron is equipped with a CGW-ruggedized (CGW-R) and has the capability to exploit and produce imagery, as well as IMINT products and reports in support of requirements. The imagery is screened by VMFA(AW) imagery analysts for information of immediate tactical value according to intelligence collection and reporting criteria. Exploited VMFA(AW) imagery could be hosted on a designated imagery server. Each VMFA(AW) aircraft can conduct limited imagery exploitation or analysis. Each VMFA(AW) aircraft can use the Twister antenna, providing near-real time (NRT) downlinking of selected images. The remaining imagery data will be processed with the CGW-R. Data may also be disseminated to the IIP for additional imagery exploitation support.

*Miscellaneous.* Each VMFA(AW) squadron has sufficient CIS resources to support internal and squadron command and control, operations, and intelligence requirements. The VMFA(AW) squadron needs access to various networks to conduct operations, including NIPRNET and SIPRNET as well as LANs and WANs.

The VMFA(AW) squadron can conduct first echelon maintenance on all assigned equipment and perform organizational maintenance on assigned aircraft and support equipment. Maintenance requirements that exceed these capabilities are provided by other ACEs and LCEs. Each VMFA(AW) squadron can fulfill its own administrative requirements.

# **NATIONAL SUPPORT**

# National Geospatial-Intelligence Agency

**Mission.** As directed by the Director of National Intelligence, the NGA develops systems to facilitate the analysis, dissemination, and incorporation of likenesses, videos, and presentations produced by ground-based platforms, including handheld or clandestine photography taken by or on behalf of human intelligence collection organizations or available as open-source information, into the National System for Geospatial Intelligence (United States Code, Title 10, Section 442(a)(2)).

**Organization.** The NGA is the lead federal agency for GEOINT and manages a global consortium of more than 400 commercial and government relationships. The director of NGA serves as the intelligence community functional manager for GEOINT and defense intelligence enterprise manager for GEOINT (DIEM-G), the head of the National System for Geospatial Intelligence (NSG) and the coordinator of the global Allied System for Geospatial Intelligence (ASG). In recognition of its unique responsibilities and global mission, the NGA is designated as a part of the US intelligence community.

**Responsibilities.** Responsibilities of the NGA include the following:

- Coordinating GEOINT collection and PED requirements among DoD, intelligence communities, the National Security Council, and other Federal Government agencies and departments.
- Serving as the clearinghouse for acquisition of commercial imagery collection and commodity geospatial data sets.
- Providing strategic direction support as follows:
- Identifying and obtaining products and services that are available from other activities to meet the needs of the customer.
- Establishing an easily accessible database with the information and applications required by customers.
- Transitioning from custom systems to flexible commercial solutions by using innovative and open systems technology to reduce overhead costs and provide the best solutions only developing custom systems when commercial solutions are inadequate.
- Defining and leading the NSG development, to include defining operational, technical, and systems views of the NSG architecture to permit organizations to share data, services, and resources.
- Sharing resources and workload by leveraging partnerships with other US and foreign government organizations, commercial organizations, and schools.
- Developing policies to facilitate NSG activities that support members' goals to provide information at the lowest possible classification level, establish partnerships, and purchase commercial products and services.
- Ensuring safety of navigation in the air and on the seas by maintaining the most current information and highest quality services for US military forces and global transport networks.
- Creating and maintaining the geospatial foundation data, knowledge and analysis that enable all other missions.

**Tasks**. Tasks of the NGA include consolidating and deconflicting the CCDR's GEOINT requirements and priorities that need approval by the joint staff and Under Secretary of Defense for Intelligence and Security, and then assign resources against the prioritized requirements for production and distribution.

Additional NGA tasks include the following:

- Providing a full range of geospatial databases, products, and services to support missions identified by the Joint Strategic Capabilities Plan, while continuing to provide the essential support required for navigation and flight safety.
- Maintaining an immediate crisis-response capability to support major regional conflicts, peace operations, intervention, and humanitarian assistance operations.
- Coordinating with other agencies or civilian contractors for surge support for crisis or contingency operation production.
- Deploying command support teams, at the request of DoD components, to assist in either support planning or the actual execution of GEOINT support.

- Maintaining a command, Service, and agency liaison program and conducting frequent staff assistance visits to identify and satisfy DoD component GEOINT requirements.
- Promoting unified, joint, combined, and coalition operations by adopting and promulgating GEOINT standards within the DoD, Federal Government, and international military and civil standard organizations.
- Acquiring and assessing foreign-generated GEOINT products and databases for use by the NSG.
- Acting as the primary DoD executive agent for purchasing satellite remote sensing data for the Services, CCDRs, and defense agencies.
- Promoting joint GEOINT operations and TTP development among the Services and federal agencies.
- Developing, maintaining, and operating the National GEOINT Data Library.
- Conducting or requesting Service GEOINT assets to conduct collection of conventional geodetic, satellite geodetic, topographic, hydrographic, bathymetric, geomagnetic data, and aerial cartographic photography.

# National Geospatial-Intelligence Agency Support Team

**Mission.** The NGA-Marine Corps is the focal point for NGA-related GEOINT requirements that help organize, train, and equip Marines to serve as the lead NST office. The team enhances partnerships within the Marine Corps and the NSG to maximize the GEOINT contribution. The NGA-Marine Corps is supported in the Fleet Marine Forces by local NST representatives. The local NST trains and works with the Service intelligence personnel to integrate GEOINT and future NSG capabilities into MCCC, MARSOC, and MEF operations. The NSTs also evaluate the use of GEOINT and NSG concepts and products that support the MAGTF mission. The NGA-Marine Corps engages with international military partners to synchronize and integrate agency support for expeditionary operations, future warfare capabilities, and deployed NGA personnel to provide timely, relevant, and accurate GEOINT to warfighters and other government agencies. The NSTs are collocated within the Marine operating forces and employed under the guidance of the MEF G-2. They are an extension of the NGA-Marine Corps and the NSTs at US Pacific Command and US Special Operations Command. The MEF memorandum of agreement dictates how each NST representative will be implemented. The NSTs provide direct access to the NGA geospatial information libraries (GILs), the imagery product libraries, and support interoperability between the Marine Corps and NGA. The NSTs execute all tasks with guidance provided by the DIRINT's staff.

**Responsibilities.** Responsibilities of the NGA-Marine Corps include the following:

- Providing GEOINT analysis and production support at MCIA and a reach-back capability to produce or coordinate production of Marine Corps GEOINT requirements.
- Providing access to and supplying NGA GEOINT data, products, and services as requested by Marine Corps units.
- Coordinating onsite and mobile GEOINT training at designated locations.
- Providing GEOINT subject-matter expertise to staffs at designated commands and in support of acquisitions and training at the Service level.

- Providing access to NGA GEOINT support; and coordinating and deconflicting support provided by various elements within the NGA.
- Assisting in developing GEOINT plans and policy by providing Marine Corps senior leadership a unified view of NGA support and recommendations concerning employment of NGA support. The team ensures that Marine Corps senior leadership is informed regarding current and emerging GEOINT issues and potential COAs.

Responsibilities of the local NST include the following:

- Assisting each MEF in identifying GEOINT requirements.
- Installing and maintaining NGA application software, including and prototypes and products, and familiarizing Marine GEOINT personnel with the software applications.
- Training MEF intelligence personnel in the use of NGA data and applications for planning and integration into organizational systems.
- Developing, maintaining, and presenting demonstrations of current and projected GEOINT capabilities.
- Evaluating GEOINT software and data.
- Reporting evaluation findings to NST chief(s), their Marine supervisor, and HQMC intelligence staff.
- Coordinating all actions affecting MAGTFs that include NST chief(s), their Marine supervisor, and HQMC intelligence staff.
- Providing technical support for NGA products used in MAGTF systems.
- Assisting in developing TTP to support the rapid generation of new data or intensifying existing data sets.
- Assisting in technical reviews of developmental data sets, products, systems, and associated documents to ensure that standard NGA data is used and new product requirements are promptly identified.
- Assisting Marine Corps forces and MCCC in the technical use of GEOINT and NSG products.
- Assisting with integrating NGA's technical NSG concept into existing MAGTF architectures and migration plans.

Tasks. Not applicable.

# National Reconnaissance Office

The National Reconnaissance Office (NRO) designs, builds, and operates the nation's reconnaissance satellites. These satellites comprise one of the primary collection sources for GEOINT data and provide significant imagery to support DoD requirements related to targeting and mapping. The data is used for I&W, monitoring of arms control agreements, and the planning and execution of military operations. Once GEOINT data is collected, processed, and stored, the NGA takes the lead with respect to analysis and access and distribution for both national and DoD customers.

### **Defense Intelligence Agency**

The Defense Intelligence Agency (DIA) is both a national and DoD-level intelligence agency and is designated as a CSA. The DIA is subordinate to the Secretary of Defense and the Under Secretary of Defense for Intelligence. The DIA has various programs that it manages and has certain responsibilities and management roles within the intelligence community. The director of the DIA is the functional manager for the non-GEOINT-related components of MASINT.

# MARINE CORPS SUPPORTING ESTABLISHMENT ORGANIZATIONS

The supporting establishments for imagery intelligence organizations in the Marine Corps are Headquarters, Deputy Commandant for Capabilities Development and Integration; Systems Command; MCIA; and NSTs.

# Headquarters, United States Marine Corps

Within HQMC, GEOINT support falls under the Deputy Commandant for Information, Information Intelligence Division, Strategy and Policy Branch, and Intelligence, Surveillance, and Reconnaissance Section.

**GEOINT Sub-Section**. Headquarters, United States Marine Corps' IIS and ISR GEOINT serves as the principal Marine Corps representative for the DIRINT within the national and joint GEOINT communities. Its personnel are responsible for developing and coordinating Marine Corps GEOINT programs. Specific its personnel responsibilities include the following:

External to the Marine Corps

- Representing the DIRINT in meetings with the national agencies and other Services regarding policies affecting the planning and direction, collection, processing and production, dissemination, and use of GEOINT.
- Coordinating and validating Marine Corps Service-level GEOINT special collections and standing requirements for submission to the NGA source directorate.
- Ensuring Marine Corps GEOINT architectures are interoperable with primary and alternate national imagery dissemination paths.
- Conducting liaison with the NGA and the Central Intelligence Agency Office of General Counsel regarding matters related to IMINT oversight and domestic coverage.
- Responding to the Freedom of Information Act Office for requests to the Marine Corps for GEOINT materials, products, and derivative textual information/analytical methodologies.

Internal to the Marine Corps

- Identifying and coordinating issues related to intra-Service GEOINT to ensure that organic resources available to the Marine Corps are exploited fully.
- Establishing policy guidance for disseminating national-level GEOINT to the operating forces afloat or ashore.

- Coordinating with the Deputy Commandant for Combat Development and Integration, Capabilities Development Directorate, MARCORSYSCOM, and other HQMC staff elements on GEOINT issues related to:
  - GEOINT requirements and capabilities.
  - Dissemination architectures.
  - The Marine Corps Concept Based Requirements System process for GEOINT.

### Deputy Commandant for Combat Development and Integration

The DC CD&I develops fully integrated warfighting capabilities (i.e., doctrine, organization, training, materiel, leadership and education, personnel, and facilities) to enable the Marine Corps to field combat-ready forces.

### **Marine Corps Systems Command**

Marine Corps Systems Command serves as the Commandant's principal agent for equipping the operating forces so they can accomplish their warfighting mission. Marine Corps Systems Command plans and manages research, development, and acquisition programs through equipment production and fielding for employment by MAGTF forces, including most equipment programs that support GEOINT.

# CHAPTER 4. PLANNING

# **PLANNING PROCESS**

### **Marine Corps Planning Process**

Geospatial intelligence supports the MCPP, which helps to organize the commanders' and their staffs' thought processes throughout planning and executing MAGTF operations. The MCPP, which is based on the Marine Corps expeditionary maneuver warfare philosophy, focuses on both the threat and the mission. It takes advantage of unity of effort and helps to establish and maintain operational momentum. See Figure 4-1 for the MCPP steps. For additional information on the MCPP and TTP, refer to MCWP 5-10, *Marine Corps Planning Process*.



Figure 4-1. Marine Corps Planning Process.

### Joint Planning Process

Joint Publication 5-0, *Joint Planning*, provides information on the joint planning process (JPP), which includes how GEOINT supports joint planning. See Table 4-1 for a comparison of the MCPP and JPP.

Steps	Joint Planning Process*	Marine Corps Planning Process**
1	Planning Initiation	Problem Framing
2	Mission Analysis	COA Development
3	COA Development	COA Wargaming
4	COA Analysis and Wargaming	COA Comparison and Decision
5	COA Comparison	Orders Development
6	COA Approval	Transition
7	Plan/Order Development	
	*Planning, whether in daily operations or in response to a crisis, uses the same construct to facilitate unity of effort and the transition from planning to execution (JP 5-0).	**The rapid response planning process (R2P2) is a time-constrained, six-step process that mirrors the MCPP (MCWP 5-10).

Table 4-1. Joint Planning Process andMarine Corps Planning Process Comparison.

### **Roles of GEOINT in the Marine Corps**

The DoD and Marine Corps GEOINT capabilities support MAGTF requirements by providing accurate, high-resolution, mission focused GEOINT. Support includes the following:

- Robust analytical capabilities.
- Interoperability among coproducers and across diverse systems.
- Foundational geospatial data of the area of operations, which includes standard topographic line maps (TLMs) for tactical planning and smaller-scale products (e.g., joint operations graphics (JOGs), for operational planning).
- Consistent and documented set of foundation data with near-global coverage.
- Foundation data intensification capability that meets mission-specific information and intelligence needs.
- Mission-specific data sets derived from various sources, adding capability to create tailored views.
- Improved access to digital information using web-based technologies.
- Consistent data quality information (i.e., positional accuracy, currency, completeness, correctness of attribution) to support a more informed exploitation by users.
- Any additional information required to support and enhance collaborative planning throughout the MAGTF.

# **GEOINT Planning Considerations**

**Essential Elements Information.** During initial planning, GEOINT is used to identify gaps that will have to be filled to predict the effect of the terrain on friendly and enemy operations. The gaps must be answered to complete an accurate presentation of the battlespace. The EEIs aid in answering information gaps from planners' and commanders' intelligence requirements as well as helping to generate new intelligence requirements for submission to the MAGTF intelligence fusion officer. The collections requirement manager (CRM) and the collection operations manager (COM) must identify tactical, theater, or national sources to answer defined EEIs and intelligence requirements.

**Coordination Requirements.** The MEF GEOINT section is the focal point for coordinating external GEOINT requirements for major subordinate commands (MSCs) and internal federated production. The MEF command element establishes coordination procedures as part of the staff planning process to limit duplication of effort. Coordination ensures that GEOINT related identification, prioritization, analysis, collection, production, and dissemination are provided to all MAGTF elements.

**Position and Navigation.** The MAGTF must be prepared to conduct operations in all physical domains, as well as the information environment (i.e., cyberspace). During peacetime, MAGTF units and collection platforms must conform to applicable national and international agreements for controlled airspace and coastal and inland areas. The MAGTF's position and navigation systems must have access to global foundational geospatial data coverage, effective real-time response, standard grid and reference systems, and map data information. Increased emphasis on urban terrain and urban environments requires more refined information and resolution to provide a stable and accurate geospatial foundation.

**Geodetic Data.** In geographic terms, a datum is a mathematical model of the Earth's shape that is used as a basic reference to make maps and calculate position coordinates, heights, and distances. The datum is the origin or point of reference. Many countries have developed their own types of datum, which usually differ from those of neighboring countries. The World Geodetic System-1984 (WGS-84) is the standard horizontal datum for all US operations, which is a type of geographic coordinate system (GCS). Geographic coordinate systems are developed with angular units of measurements for a spherical plane while projected coordinate systems are considered a plane (2-D surface) and are calculated in linear units (ft, meters). The CCDR or JTF commander designates another datum only when necessary to support multinational operations.

**Standard Grid and Reference System.** All forces must operate with the same grid and associated reference system. Computer systems today can function in multiple coordinate systems; however, multiple systems ultimately induce operational friction. The military grid reference system (MGRS), overlaid on the Universal Transverse Mercator coordinate system, is the American standard per Chairman of the Joint Chiefs of Staff Instruction (CJCSI) 3900.01E, Position (Point and Area) Reference Procedures. The MGRS is used for operations either involving or in support of ground forces. The MGRS is the positional reference standard when aviation assets are providing close air support. Geographic coordinates can be used in operations that do not directly involve ground forces.

**Global Navigation Satellite System.** The global navigation satellite system (GNSS) provides position, navigation, and timing to operational forces. It is a critical part of GEOINT, command and control, mission planning, fire support, intelligence, weapons, and logistic operations and systems. All GNSS must be linked by a common reference system. The WGS-84 datum is the default geodetic reference system used by GNSS. In some operations, the mapping datum must be shifted to local datum (e.g., Tokyo datum) for combined or multinational support. When using GNSS, it must be set to the designated datum to ensure that navigation is safe and that common coordinates are being exchanged among all forces involved in the operation.

**Product Accuracy.** The accuracy of all GEOINT products depends on the scale, resolution, and the source used to produce them. Accuracy must be considered when comparing map coordinates to the coordinates derived through various methods. The NGA's digital point positioning database (DPPDB) is the primary source recommended for deriving coordinates for precision weapons; however, NGA provides certification and accreditation of other mensuration methods.

# Support to the Joint Planning Process

Marine air-ground task force GEOINT products and services must be introduced early into the JPP and Joint Conventional Ammunition Policies and Procedures. This early introduction facilitates timely and effective force planning because of the characteristics of modern joint operations and the broad scope of operational and warfighting functional requirements.

# Specific Planning for Imagery Intelligence

Planning for IMINT includes implementing and integrating imagery intelligence planning considerations with the intelligence process and understanding planning responsibilities.

**Theater and National Collection Resources.** Theater and national collection resources include unmanned airborne ISR platforms, manned ISR platforms, commercial and national technical means satellites, and other component services capabilitities. When external resources are used, competition for the priority of collection becomes more difficult because they provide services to the joint force and larger intelligence community. The justification statements for external collections must establish how satisfying collection needs helps the larger joint service enterprise and how, if not collected, the impact will be detrimental.

*Processing and Exploitaton.* In its rudimentary first stage, digital imagery and geospatial data is collected externally via a system solution (an onboard CPU or at ground station) and then delivered or made available to the analysts in a usable format for further analysis.

The next step in processing data prior to exploitation is to incorporate different types of information into a process called layering. This process places additional information onto the foundation to provide more detail and context. However, the information must be geospatially referenced. Various information can be added to customize the image for its intended purpose (NGA Pub 1).

Once the desired data sources are complied, an analyst interprets the information to ensure that the intelligence and operational requirement can be met or if further analysis needs to be conducted. If so, a new collection request must drafted to fill the information gap that remains. Many

operational planning graphics (e.g., LZ studies, graphic reference guide, overview and close up graphics, and mensurations) only require preliminary information and not the full extent of analysis and production because of limited requirements for incorporating information.

*Analysis and Production.* Requirements for IMINT analysis are defined in terms of three phases. Each phase represents a greater degree of analysis and a longer period of time available to accomplish the level of exploitation and associated production.

<u>Phase One.</u> The first phase includes rapidly exploiting newly acquired imagery, and reporting imagery-derived intelligence and intelligence information within a specified period of time after receipt. Phase One satisfies priority requirements related to immediate needs and identifies changes or activity of immediate significance. Traditional imagery analysis production timelines differ from FMV Imagery production standards as traditional. Phase One is 24 hours or less while FMV requires Phase One to be conducted under an hour. This requirement is set if the Imagery PED Cell is in receipt of direct downlink and can view imagery in NRT.

<u>Phase Two.</u> Phase Two includes the detailed exploitation of newly acquired imagery; however, the reporting of imagery-derived intelligence and intelligence information is weighed by analytic requirements and timeliness of need. Phase Two provides for an organized and comprehensive account of the intelligence or intelligence information extracted from newly acquired imagery and is supported by other intelligence source materials, as appropriate. Production can take from 24 hours to seven days for traditional imagery analysis of still imagery, while FMV Imagery Phase Two production is expected under two and half hours if footage is being viewed in NRT.

<u>Phase Three</u>. Phase Three includes the in-depth analysis of available imagery pertinent to an intelligence requirement and the reporting of results within a specified time (can be more than seven days—FMV can be more than tow and a half hours). In response to intelligence requirements, Phase Three provides the most comprehensive analysis of a target or topic using imagery as the primary data source but, when appropriate, incorporates data and intelligence from other sources. Activity-based intelligence (ABI), advanced target development, and long-duration analysis production requirements.

*Dissemination.* Imagery intelligence products are disseminated as hardcopy or softcopy products. Hardcopy products are disseminated via couriers or the mail system. Softcopy products may also be distributed as hardcopy products or electronically via the MAGTF communications network. The requestor and the supporting G-2/S-2s, with assistance from units' G-6/S-6, must ensure that the requested product can be transmitted over the available supporting CIS.

*Use.* The last step of the IMINT planning and execution process (effective utilization) is the most important. Commanders and other imagery and IMINT users should notify the G-2/S-2 regularly regarding the quality of the products and how well particular products met the CCIRs and intelligence requirements. Additionally, intelligence requirements that result from new imagery and IMINT should be identified and action initiated to plan future operations effectively. Finally, providing the G-2/S-2 and IMINT elements with feedback helps to identify problems, allowing improvements to be developed and implemented quickly.

### Integrating GEOINT Planning with the Intelligence Cycle

The intelligence cycle is a procedural framework used for developing mission-focused intelligence support for a range of military operations. The intelligence cycle should be applied in a manner that develops the required intelligence in the most effective way. The application of the intelligence cycle varies during mission planning and execution. Application of the intelligence cycle is driven by intelligence requirements. In theory, a unique iteration of the intelligence cycle is carried out for each intelligence requirement. However, realistically, intelligence requirements are grouped together and satisfied through a single intelligence development process that concurrently addresses all intelligence requirements, including GEOINT requirements.

During planning, the application of the intelligence cycle supports mission analysis, COA development, and COA wargaming by providing basic intelligence, including GEOINT, in the form of intelligence estimates, supporting studies, and IPB analyses that describe the battlespace and threat.

During COA comparison and analysis, orders development, and transition, the intelligence cycle is applied to satisfy emerging intelligence requirements and updating the intelligence estimate and IPB products—all of which may be supported by GEOINT.

During execution, the intelligence cycle is applied to implement the intelligence collection, production, and dissemination plan; it refines the IPB analysis, and generates mission-specific multidiscipline intelligence operations and intelligence products—all of which are integrated with the CONOPS.During execution, intelligence requirements are satisfied individually and new intelligence requirements are generated in response to specific operational needs. Each intelligence requirement is unique and must be satisfied in a timely manner to facilitate rapid decision making and generate or maintain tempo (see Figure 4-2).



Figure 4-2. Application of the Intelligence Cycle.

### **GEOINT Planning Considerations**

The GEOINT plan should reflect proven planning principles. Considerations for GEOINT planning are discussed in the following sections.

*Fulfill the Stated Requirements.* The GEOINT plan should fulfill the stated requirements and ensure GEOINT data is collected, processed, and reported to satisfy the intelligence requirements set forth in the commander's guidance and collection plan. Particular attention must be paid to the timeliness and formats of the data provided.

*Integrate with Other Intelligence Plans.* The GEOINT plan should be integrated with other intelligence plans. Effective GEOINT planning and execution require close coordination, liaison, and integration with all-source intelligence elements. Frequently, GEOINT collection management is driven by cross-cueing from SIGINT, HUMINT, and other sources of intelligence. Also, fusion of GEOINT with other intelligence ultimately drives the conduct of future GEOINT operations and the development of GEOINT products.

*Integrate with Other Operations.* The GEOINT plan must consider the location and activities of the supported units. Planned missions must be scheduled where and when they can best collect sensor data. Additionally, command and control and CIS arrangements must be coordinated to ensure GEOINT data is reported to the supported units. Because enemy activity may be anticipated at certain phases of military operations, GEOINT operations and analytical personnel must have a situational awareness of intelligence estimates and ongoing operations to focus their efforts at a particular time and area. Finally, the requirement for timeliness in processing and reporting may vary depending upon the stage of the operation; personnel must be aware of current timeliness requirements as well as the availability of CIS resources throughout supported commands.

*Integrate into the Overall Collection Plan.* The GEOINT plan should be integrated with other intelligence and reconnaissance operations to ensure the required data can still be acquired even when a planned mission is canceled or if critical equipment malfunctions. The ability to provide this redundancy depends upon the number of missions available, capability of other intelligence resources to acquire the information needed, and the availability of production resources.

*Make Use of All GEOINT Resources.* The GEOINT plan should make use of all available collection resources. While some collection resources may be held in reserve, most units and systems can fulfill multiple missions and should be employed. Close coordination and integration of operations and intelligence activities aids in identifying and prioritizing multipurpose missions. The GEOINT production resources should not be held in reserve.

**Support the Concept of Operations.** The GEOINT plan should support the CONOPS and efforts must support and adapt to the MAGTF commander's intent, concepts of intelligence and operations, and the supporting scheme of maneuver. Key questions to be answered regarding supporting the CONOPS include:

- What are the MAGTF's area of operations and AOI?
- What are the MAGTF CONOPS, task organization, and main and supporting efforts?

- What are the standing PIRs and intelligence requirements? Which requirements have been tasked to supporting GEOINT units? What specific information most interests the commander?
- What is the concept of MAGTF fires support? How will MAGTF target development and target intelligence be conducted? What are the specific GEOINT needs in support of tasks?
- What are the GEOINT and intelligence CONOPS for other JTFs, component, and theater resources? What are the task-organization and command and support relationships for all MAGTF intelligence and reconnaissance units?
- How can external assets be incorporated to support MAGTF operations?

**Consider the Environment.** The GEOINT plan should consider environment, including terrain, weather, and the cyberspace domain. Terrain factors have a significant impact on collection operations, such as the ability of sensors to see through vegetation and requirements for line of sight (LOS) communications. Accordingly, planners must assess the effects of mountains, defilade, vegetation, and other potential terrain obstacles on all planned collection operations, as well as elements of spatial relevance involving the cyberspace domain.

**Consider Weather as a Key Limiting Factor.** Bad weather degrades the identification and location of targets and can limit the type of GEOINT collection capabilities employed. In addition, low ceilings and poor visibility decrease visual reconnaissance effectiveness and the resolution of photographic systems. Weather factors to consider include the following:

- <u>Precipitation</u>. Visible moisture degrades optical and visual reconnaissance systems. Also, precipitation and excessive humidity will degrade UAS capabilities.
- Wind. A UAS is significantly more affected by wind than traditionally piloted aircraft.
- <u>Clouds, Haze, and Smoke</u>. In addition to affecting the aircrew's ability to conduct visual reconnaissance, cloudy, hazy, and smoky conditions also affect EO.
- <u>Daylight, Sun Angles, and Shadows</u>. The angle of the sun affects visual, EO, and forward looking infrared (FLIR) observations differently. The quality of FLIR imaging decreases as the sun rises and reaches a point where a target can be seen visually. At this point, the target cannot be detected by a FLIR. Prior to sunset and just after sunrise, long shadows are cast by large terrain features and can obscure objects in the FLIR's path. The ideal time to take photographs or observe a target is mid-morning or mid-afternoon. During these periods, shadows are cast long enough to add definition and dimension to a target.

**Consider the Threat.** Threats can be general or aviation related. For a general threat, a detailed threat analysis must be conducted to determine which sensors and platforms can be employed effectively against a given enemy target, and then how to employ the limited resources available to the MAGTF to obtain the required GEOINT. In turn, the enemy can impede GEOINT operations by employing CCD activities and focusing their air defense capabilities.

Enemy air defenses have a direct effect on aerial imagery collection missions. Since aircraft must stay beyond threat air defense ranges, significant antiaircraft artillery and surface-to-air missile threats may degrade visual reconnaissance. Planners must assess threat air defense and air-to-air

threats when evaluating risk and determining routes. Finally, threat electromagnetic warfare capabilities must be identified and assessed to determine the effects on UAS and staffed platforms, radio uplinks, and data downlinks.

**Consider the Type of Collection.** The GEOINT plan considers the various types of organic and non-organic imagery collection capabilities and which ones are available to a MAGTF. The following planning considerations are critical to effective direction and employment of these resources. Collection resources readily locate and identify large threat forces, moving vehicles, weapon systems, structures and other geographic features that contrast with their surroundings. Conversely, small, stationary and well-camouflaged enemy forces blending into their surroundings can be difficult to locate and identify. Generally, it is better to employ imagery collection resources against point targets rather than in a wide area search mode. Effective integration with other intelligence operations can cue collectors to key targets, reducing the search area, and thereby reducing the time required to produce actionable intelligence.

Area Reconnaissance. Area reconnaissance is the systematic and complete coverage of an area using visual and imaging means and is generally used to locate and identify specific targets for further collection and analysis. It is also used to support terrain analysis. Area reconnaissance imagery can be collected two different ways. First, by imaging back and forth across a predetermined area so that flight lines and individual images overlap. This process provides complete coverage of all objects within the area at the expense of increased sensor utilization time. Second, by adjusting focal lengths and altitudes to allow a lesser number of images to cover the target area. This process reduces time on target (TOT), as well as the PED time at the expense of reduced resolution. Types of area reconnaissance imagery missions include broad area coverage and surveillance and directed search area missions.

Broad area coverage and surveillance are area reconnaissance imagery collection tactics that provide an overview of an entire area. However, they should not be the primary collection tactics used to collect against known point targets. During area collection operations, the flight tracks and routes are planned and the image exposures adjusted so that each successive image will overlap the previous one. During the early phases of an operation broad area coverage and surveillance may be conducted for two intelligence purposes. First, to provide a basis for the procurement of larger scale imagery of selected areas for subsequent detailed analysis; and second, to serve as a comparative baseline for determining the nature and extent of changes identified on subsequent missions.

Directed search area missions provide focus and detail, and are useful for OOB confirmation counts.

**Point Targets.** Point targets are typically tasked to provide the highest possible resolution of a specific target that allows for detailed analysis. Point targets can vary in size and include command posts, bridges, airfields, and SAM sites.

*Line of Communications.* Line of communications collections involve imaging along specific transportation routes, such as roads, railroads, or waterways. This type of reconnaissance is generally conducted to determine enemy movement or potential usability of a route. It can also

support mapping or terrain analysis requirements. The line of communications methodology is good for maneuverability studies, but generally requires significant time for effective exploitation. Line of communications missions should be conducted ahead of time as a contingency baseline.

### **Planning Responsibilities**

Imagery intelligence planning is a continuous function that requires close interaction between the G-2/S-2 and IMINT unit planners. Key objectives include the following:

- Identifying IMINT requirements.
- Preparing IMINT operations plans.
- Planning and establishing the IMINT support system.
- Issuing orders and tasking to IMINT units.
- Supervising and coordinating IMINT operations.

G-2/S-2. Primary staff responsibility for the planning of IMINT operations lies with the G-2/S-2. Specific responsibilities of the G-2/S-2 include the following:

- Preparation of integrated, multidiscipline intelligence and reconnaissance operations and supporting IMINT plans, orders, annexes, and appendices.
- Coordination with the G-3/S-3 to ensure the planned IMINT plan supports both the CONOPS and scheme of maneuver.
- Coordination with the G-6/S-6 officer for CIS support to the IMINT elements, including circuits, network access, frequency assignment, equipment, and call signs.
- Liaison with IMINT agencies and units external to the MAGTF. Identifying, preparing, and locating IMINT or all-source intelligence liaison elements to support MAGTF IMINT operations is a critical early planning action. The IMINT liaison teams will have few members due to the limited availability of imagery personnel.
- Coordination with the G-4/S-4 to ensure adequate logistic support of IMINT elements.

*Intelligence Battalion Commander/Detachment Officer in Charge.* The intelligence battalion commander and detachment OIC are responsible to the MIG Commander and G-2/S-2 for the planning, directing, and execution of MAGTF IMINT operations. Specific duties of the battalion commander and detachment OIC include the following:

- Advising the G-2/S-2 on IMINT employment and its integration with other Services, JTF, theater, and national IMINT operations.
- Preparing MAGTF IMINT plans and orders in conjunction with other intelligence section staff officers and key intelligence battalion subordinates.
- Planning, supervising, and assisting IMINT collection requirements and tasking for MAGTF operations in conjunction with the CM/DO.
- Coordinating the movement, operation, and reporting of IMINT units in coordination with the SARC OIC and the G-3/S-3.
- Coordinating MAGTF IOC analyst exchanges with IMINT analysts and the integration of GEOINT products with all-source intelligence production in conjunction with the MAGTF IOC OIC. The battalion commander or detachment OIC must consider the

strenuous mental and physical demands on imagery analysts during sustained operations, particularly when planning watch schedules for imagery analysts performing detailed imagery exploitation tasks.

- Planning for the timely reporting of IMINT to both MAGTF and external elements and the rapid handling of time sensitive information in coordination with the CM/DO.
- Planning and coordinating IMINT communications paths and information systems management and operations in conjunction with the G-6/S-6.

### **Aerial Imagery Collection Missions**

Aerial imagery collectors provide the flexibility to respond rapidly to changing battlespace conditions. Unmanned aircraft systems provide both the added advantage of operating in areas of heavy enemy air defenses and the needed intelligence without the risk of exposure of traditionally piloted aircraft. Intelligence imagery collection planners establish detailed preplanned imagery collection routes, areas, and point targets encompassing the AOI using the results of IPB, the MAGTF's CONOPS, and scheme of maneuver.

Aerial imagery collection missions require detailed operational planning, particularly with respect to integration with other ACE operations. Since all aerial imagery collection platforms are multipurpose, close coordination between MAGTF command element imagery planners and ACE operational planners is necessary to identify, reconcile, prioritize, and integrate competing requirements for resources. Additionally, all aerial imagery missions must be included in the ATO and coordinated with other air operations and, where pertinent, supporting arms. This coordination is particularly critical concerning UAS operations. Unmanned aircraft systems enter the airspace control system via the appropriate airspace control agency, typically the DASC. Unmanned aircraft system controllers maintain communications with the appropriate ACE C2 agency, such as the DASC, during missions to receive routing, altitude, and other pertinent airspace control information.

The commander who directly tasks or controls an imagery collection mission will receive the most responsive support. The responsiveness of the mission to other commanders depends on the number of echelons through which the mission request and resulting intelligence must flow. Accordingly, when planning imagery collection operations, the advantages and disadvantages of dedicating missions to a single command (i.e., direct support) must be assessed against the MAGTF's total intelligence requirements and the current situation. Previously acquired imagery and IMINT products should always be reviewed to see if they can satisfy intelligence requirements without need of additional imagery collection missions.

Often, the intelligence acquired from an imagery collection mission (vice the actual image) will be all that is required to satisfy many intelligence requirements. Likewise, dissemination challenges are generally simpler and faster when users' intelligence requirements can be satisfied without the images. Accordingly, to ensure optimum support, commanders must understand the pros and cons of various imagery-related intelligence requirements.

Typically, collected imagery will require additional processing and fusing with other intelligence to provide the necessary support. Depending on the situation, this may be a time-intensive task. Commanders should assess likely processing and production timelines and other requirements when developing IMINT plans.

#### MCRP 2-10B.4, Geospatial Intelligence

Intelligence acquired from numerous imagery collectors may be disseminated directly to users with minimal additional intelligence processing and all-source intelligence analysis. Supporting dissemination plans must ensure identification for the type of products likely disseminated, as well as the technical requirements associated with these products. In the case of resources (i.e., UAS) dissemination planning includes the establishment of dedicated communications links directly between the collector and the supported unit.

### **Preplanned Missions**

Preplanned aerial imagery missions (i.e., UAS) are requested using the joint tactical air reconnaissance/surveillance (JTAR/S) request format (see Appendix H). Within the MAGTF, preplanned aerial imagery requests are routed through the intelligence chain and consolidated by the MAGTF command element's intelligence section for validation, prioritization, and follow-on planning and coordination.

### **Immediate Missions**

Immediate requests for aerial imagery collection are submitted via the operational chain of command to the DASC. However, this is rarely done because available resources are generally limited and operate in general support of MAGTF requirements. The joint tactical air strike request format (see Appendix H) may be used to request immediate aerial imagery collection support. When approved, the mission may be executed in one of the following ways:

- An ongoing mission can be diverted by its controlling authority to conduct the immediate mission.
- An on-call or standby mission can be allocated.

# Air Planning and the Air Tasking Cycle

The air tasking cycle is the key tool used by MAGTF planners to plot most air operations (i.e., pre-planned and immediate) to support mission accomplishment. By using and completing the air tasking cycle, planners can ensure that aviation assets are prioritized and used effectively, while maintaining command and control and CIS in support of the MAGTF.

**The Air Tasking Order.** The principal planning product of the air tasking cycle is the MAGTF ATO or air plan. The ATO is a document generated by the joint force air component commander or the ACE commander. It tasks and disseminates the specific missions and targets of projected air sorties, capabilities, and forces to JTF components, subordinate units, and C2 agencies. It typically provides both general and specific instructions, including call signs, targets, and controlling agencies. The airspace control order is included in the ATO. Special instructions that provide amplifying notes, important details, and changes are included in the ATO or issued separately. The ATO, airspace control order, and special instructions provide operational and tactical direction at appropriate levels of detail. For further information on the air tasking order, refer to MCTP 3-20F.

**Phases of the Air Tasking Order.** The six phases of the ATO cycle are command aviation guidance, target and air support mission development, allocation and allotment, tasking, force execution, and combat assessment (see Figure 4-3).



Figure 4-3. The Six-Phase Aviation Tasking Cycle.

# Requesting Joint Task Force, Theater, and National Imagery Support

Significant imagery and IMINT support is available to the MAGTF from external sources, ranging from dissemination of existing imagery and products through the integration of existing information into new products and execution of new imagery collection and IMINT production. The MAGTF intelligence requirements that cannot be satisfied by organic resources are submitted to the next higher command echelon for validation, prioritization and, if possible, satisfying the requests for information (RFI) or collection requirements through its organic resources before forwarding it to the next higher command echelon. The specific intelligence requirement will determine how it is identified and submitted. Techniques include the use of the standard RFI and the use of collection and production management systems and procedures. Figure 4-4 identifies the two different tracks that external imagery and IMINT requirements may take.

# Processing, Exploitation, and Dissemination of Imagery and Imagery Intelligence

Processing imagery and IMINT involves the conversion of collected data into information that is suitable for the production of intelligence.



Figure 4-4. Requesting Imagery and Imagery Intelligence Support

### Exploitation

Exploiting imagery and IMINT converts information into intelligence. It fuses new information and existing intelligence from all sources to provide meaningful knowledge that can be used for decision making. Exploitation involves the evaluation, interpretation, integration, analysis, and synthesis of all information that is relevant to a particular intelligence requirement to answer the question(s) that have been asked.

*Imagery Derived Products.* Imagery-derived products are secondary products that can be used to facilitate disclosure and release to coalition partners. They are useful for various planning and decision making activities. Examples of the most requested products include the following:

- Beach studies.
- LZ studies.
- Raid studies.
- Point target.
- Indications and Warning studies.

*Imagery Intelligence Text Products.* Imagery intelligence text products are selected to meet the specific needs of the commander. Appendix F provides the format and instructions for completing the basic IMINT reports described in the following sections.

**Reconnaissance Exploitation Report.** The reconnaissance exploitation report (RECCEXREP) is used to report the results from the first rapid analysis of imagery and includes the debriefing of the aircrew when possible. It addresses the targets requested in the original imagery-collection mission tasking, generally with each target addressed separately. It is prepared by intelligence personnel, such as the Intelligence Battalion, MAW, or MLG, based on input from the supporting collecting unit's intelligence section. The report is then disseminated according to the dissemination plan. The SOP designates the specified time frame in which the RECCEXREP must be completed and disseminated.

*Initial Photo Interpretation Report.* The initial photo interpretation report (IPIR) provides information regarding tasked imagery-collection missions not previously reported (e.g., in the RECCEXREP), when extensive or detailed data from a systematic review of the imagery is required, or when the rapid response required by the RECCEXREP would be hindered by the format, size, or quality of the imagery involved. It also is prepared by the IIP with input from the supporting collecting unit's intelligence section and disseminated in accordance with the dissemination plan. The timeline for completing this report is in accordance with the unit's SOP.

**Supplemental Photographic Interpretation Report.** The supplemental photographic interpretation report (SUPIR) provides information not previously included in a RECCEXREP or initial photo interpretation report. It reports on significant targets covered by the mission and other required supplemental data. It is prepared by intelligence personnel (e.g., IIP, MAW, MLG) based on input from the supporting collecting unit's intelligence section. The report is then disseminated in accordance with the dissemination plan. The SOP designates the specified time frame in which the SUPIR must be completed and disseminated.

**Size, Activity, Location, Unit identification, Time, and Equipment.** The enemy activity report is presented in a standard (size, activity, location, unit identification, time, and equipment) "SALUTE" format, which is used to report any known or suspected enemy activity. It may also be used to report any characteristics of the area of operations that affect mission accomplishment. The report may be used by a VMU, ground reconnaissance unit, aircrew, or other personnel to report key information obtained during ongoing imagery collection operations. It will be disseminated in accordance with the dissemination plan, generally from the collector to the SARC or directly from the collector to other supported units.

*Imagery Intelligence Support to Other All-Source Intelligence Products.* Imagery alone will provide useful intelligence to commanders and planners (see Appendix C). However, intelligence requirements usually will be satisfied more effectively and in greater detail via the complementary combination of an image and supporting IMINT or all-source intelligence products. Review Appendix H for an understanding of how the intelligence value of a complementary imagery and intelligence report product is greater than a simple image product. Target analysis and target material production are examples of such support.

*Target Analysis.* Generally, the imagery analyst's first responsibility is to detect and accurately identify areas and activities for situation development and support to targeting. Target detection begins with either general or specific search modes.

A general search is undertaken in response to requests for broad area intelligence and usually involves the analytical examination of the entire image. Such searches should be kept to a minimum.

A specific search is undertaken in response to an intelligence requirement that requires point, strip, or route reconnaissance imagery. Its scope and objectives are more limited than a general search. Target identification consists of interpreting visual cues or distinctive features of targets and objects detected during collection. The distinctive features are analyzed using the six Ss: size, shape, shadow, shade, surroundings, and signal strength. The depth and scope of the analysis is highly dependent upon the purpose of the analysis and the time constraints of the associated intelligence requirement. Target identification may include the following:

- Determining the OOB and BDAs of threat units and systems at different echelons.
- Identifying equipment and its intended use by the threat forces.
- Determining the purpose and composition of ports, harbors, waterways, airfields, roadways, railways, and installations.
- Detecting and identifying non-threat forces and equipment and sensitive targets (e.g., religious facilities).

Target coordinate mensuration imagery intelligence Marines may be required to perform target coordinate mensuration (TCM) tasks as outlined in CJCSI 3505.01E, *Defense Support for Chemical, Biological, Radiological, and Nuclear Incidents on Foreign Territory.* Services provide programs for training, certification, maintaining credentials, and tracking proficiency of personnel performing TCM. Services monitor joint desired point of impact reports and help ensure that Service target material production work centers adhere to performance standards. Services can establish TCM training programs, standards, and certification beyond the minimum joint standards in the NGA-accredited program. Services appoint TCM program managers to serve as primary POCs for accredited programs. The TCM program managers request access to the joint registry from Joint Staff Targeting, and are responsible for entering the names of certified individuals into the registry. Upon request, Services provide NGA, other Services, or CCMDs with access to their record of certified individuals.

**Dissemination and Reporting.** Imagery intelligence dissemination planning and management involves establishing dissemination priorities, stipulating dissemination and reporting criteria, selecting dissemination means, and monitoring the flow of IMINT reporting. The goal of this process is to deliver IMINT products to the appropriate user in the proper format at the right time, while preventing the dissemination of irrelevant products and avoiding information overload. The following sections address the most common considerations for intelligence dissemination planners when developing IMINT dissemination plans.

*Identify Dissemination Requirements.* When identifying requirements, the "Ws" (who, where, what, when, etc.) are a good start for determining the broad scope of dissemination needs.

**Who.** Refer to commander preferences, standing theater OPLANs and concept plans, type mission analyses, unit SOPs, TTP, playbooks, and previous post-exercise analyses and lessons learned reports for identifying organizations, units, and other elements to which the intelligence section must disseminate imagery and IMINT. Identifying and grouping by common imagery and IMINT product requirements by typical command relationship and task organization provides the operational perspective to begin dissemination planning. Who receives this imagery can either be internal or subordinate elements and units.

Internal MEF and MAGTF headquarters include a current operations center, future operations center, tactical command echelon (when deployed), force fires coordination center, rear area operations center (when established), and civil-military operations center (when established). The subordinate elements and units include the following:

- Intelligence sections of the ground combat element (GCE), ACE, and LCE.
- Other MAGTFs and independent task forces.
- Organic, attached, and direct support intelligence and reconnaissance units over which the MEF retains operational control (via either the SARC, other G-2 sections, geospatial support team, and direct to the intelligence and reconnaissance units' command posts).
- Other C2 nodes and facilities, when required (e.g., DASC, enemy prisoners of war compound, rear area operations center, airfield arrival control group).

**Where.** Generally, the answer to the "where" question will be the location of each identified "who". However, command relationships, the specific operational phase, task organization, or other factors may identify additional answers to where requirements are to be disseminated.

**What.** With the above information, dissemination planners seek answers to the what of each requirement. Here, planners strive to establish or anticipate what type of intelligence support (e.g., finished intelligence, particular formats) the who would require to support their planning and decision making needs. As with the who determinations, commander preferences, standing theater OPLAN and concept plans, type mission analyses, unit SOPs, TTP and playbooks, and previous post-exercise analyses and lessons learned reports provide the dissemination SOP foundation and isolate the necessary information. Additionally, planners' research should encompass how differing intelligence resource task organizations affect such requirements and to how they have been historically combined to satisfy the who requirements. Cross-referencing the who and what addresses the following considerations:

- <u>Product Type</u>. Typical standalone imagery, IMINT products and support, and all-source intelligence products.
- <u>Required Support</u>. Alarm intelligence support (e.g., I&W reports, time-sensitive target of opportunity reporting).
- <u>Classification</u>. Preferred level(s) of classified information that the who desires (further subdivided into what they require access to and what they can retain on hand).

**When.** The final dissemination planning information requirement is to define the stated when. The same sources used to research the previous Ws likewise are recommended for acquiring initial when answers and baseline planning criteria. However, this factor is arguably the most variable during tactical operations. Key planning considerations include the following:

- Nature of the requirement (e.g., is it a PIR or in support of another functional information requirement?).
- Feasibility of satisfying the decision maker's or planner's stated latest time intelligence is of value: Is intelligence already on-hand? Can organic assets acquire or produce needed intelligence? Will external support be needed?
- Communications and networks transmission requirements to support the desired format (e.g., voice, text, digital, bulk delivery).
- Capabilities and current status of MAGTF CIS.

**Develop Dissemination Plan.** Once the four Ws have been completed, the answers can be translated into an IMINT dissemination plan. Imagery intelligence personnel must maintain close coordination with all G-2/S-2 officers, G-3/S-3 planners, and intelligence personnel at higher, adjacent, supporting, and subordinate organizations.

**Design and Coordinate Architecture.** The architecture should be designed schematically so that it depicts organizations, types of intelligence systems; and CIS connectivity among the forces' (i.e., MAGTF, national, theater) intelligence collectors, producers, and the supported decision makers and planners. Because planned architectures must incorporate sufficient flexibility to adjust quickly to changing tactical circumstances, they must depict primary and alternate pipeline and alarm channels and the demand-pull and supply-push methodologies. The large data communications bandwidths associated with imagery dissemination require close planning and coordination between MAGTF intelligence and CIS planners. See Appendix J for additional technical information on national imagery transmission format compression that is useful when designing and coordinating CIS support for IMINT dissemination.

**Establish Imagery Intelligence Dissemination Procedures.** For intelligence dissemination to be effective, comprehensive MAGTF-wide integrated operations (i.e.,CIS) intelligence procedures are mandatory. The answers to the four Ws form the foundation on which the MEF's intelligence dissemination architecture and operations can be built.

**Allocate or Obtain Resources.** The G-2/S-2, in concert with the unit's CIS officer and G-3/S-3, will allocate available resources to accommodate dissemination of the requested IMINT. If resources do not exist to transmit the required information, a request for augmentation from higher headquarters or assistance from lateral units should be immediately initiated. It may be necessary to arrange for intelligence to be delivered directly from the producer to the requester if means are in place.

**Coordinate.** Once IMINT requirements have been identified and the initial plans developed, planners should develop and coordinate detailed dissemination plans.
*Monitor Execution.* Following the dissemination of imagery or IMINT products to the requester, evaluate the flow of information to determine whether or not the user is satisfied with the quantity and quality of intelligence and to ensure that preplanned filters are eliminating circular reporting. Frequent checks with the requester can ensure intelligence use and preclude unanticipated demands on the G-2/S-2 staff.

#### Imagery Intelligence Use

The specific use of IMINT is based on the CONOPS and the imagery application being employed. Commanders, G-2/S-2s, and G-3/S-3s must evaluate IMINT products and reports continuously for timeliness, usefulness, overall quality, and responsiveness to stated PIRs and intelligence requirements. Additionally, evaluators should provide feedback to the MAGTF G-2/S-2 and IMINT planners to improve future IMINT operations.

#### Imagery Intelligence Operations Appendix

Guidance for conducting IMINT operations comes from many sources. The DIA and the NGA issue policies, direction, guidance, and instructions regarding compliance with national IMINT standards, architectures, and request procedures. Deployed MAGTFs may also need to reference pertinent combatant, joint force, fleet orders, and guidance. Tactics, techniques, and procedures are necessary to identify unique operating concepts, methodologies, support procedures, and formats. Marine IMINT plans and orders are prepared by the G-2/S-2 (under the staff lead of the ISC and with the assistance of the other G-2 section and intelligence staff officers and commanders) and the commanding officers and OICs of the supporting IMINT units. The MAGTF IMINT plans, and orders appear as Appendix 7 of the intelligence annex of the MAGTF OPLAN or operation order (OPORD) and will focus on internal MAGTF IMINT requirements, operations, and TTP.

Appendix 7 (Imagery Intelligence) to Annex B (Intelligence) of an OPLAN or OPORD provides detailed planning and direction for conducting MAGTF IMINT operations. The ISC is responsible for the appendix and annex development. The product should be prepared consistently with the format outlined in the Joint Operation Planning and Execution System, tailored as necessary to remain consistent with the situation and the particular needs of the MAGTF (see Appendix K for a sample IMINT operation appendix format). The IMINT operations appendix should identify friendly IMINT forces to be used along with the following:

- Personnel augmentation requirements.
- IMINT units of adjacent or other theater forces and support expected.
- Joint force maritime component commander and naval task force and amphibious force IMINT elements that provide support to the landing force in amphibious operations.
- IMINT capabilities and support from the JTF headquarters, combatant command's JIOC, and other component commanders and task forces within JTF operations.
- Planned arrangement and employment of external IMINT support, including special collection, production, dissemination, and CIS.
- Coordinating instructions for the planning and control of IMINT operations, including the technical support expected from higher headquarters.
- Tasking of MAGTF IMINT elements.

- IMINT production, priorities, and plans.
- IMINT dissemination priorities and plans, including CIS support to the MAGTF IMINT effort.
- Equipment and logistic requirements unique to IMINT.

#### Imagery Intelligence Planning Considerations in Other Portions of Annex B

The following are other portions of Annex B (in addition to Appendix 7) where IMINT is incorporated:

- Appendix 11 (Intelligence Estimate). The format for the intelligence estimate is found in MCTP 2-10B, *MAGTF Intelligence Production and Analysis*.
- Appendix 14 (Reconnaissance and Surveillance Plan):
- Tab C (Unmanned Aircraft System Plan) (see Appendix L).
- Tab D (Aerial Imagery Plan) (see Appendix M).
- Appendix 16 (Intelligence Operations Plan):
- Tab A (Intelligence Collections Plan). The format for the intelligence collection plan is found in MCTP 2-10A, *MAGTF Intelligence Collection*.
- Tab B (Intelligence Production Plan). The format for this plan is found in MCTP 2-10B.
- Tab C (Intelligence Dissemination Plan). The format for this plan is found in MCTP 2-10C, *Marine Air-Ground Task Force Intelligence Dissemination*.
- Tab D (Intelligence Communications). The format for this tab is found in MCTP 2-10C.
- Tab E (Intelligence Reports). The format for this tab is found in MCTP 2-10B.
- Appendix 17 (Support to Survival, Evasion, Resistance, and Escape—SERE).

#### **Collection Planning**

Intelligence collection planning requires that the G-2 plans and GEOINT section coordinate with the ISC, CM/DO, and the G-3/S-3 future operations officer to ensure that GEOINT, EEI, and intelligence requirement shortfalls have been identified, prioritized, and included in the MAGTF collection plan. Current mapping imagery is critical for supporting GEOINT requirements. Mapping imagery supports the intensification and value adding of features and attributes within the geospatial library, the production of new edition standard base maps, and the development of other GEOINT products. Hydrographic collection assets provide tactical information that supports identification and positioning of features and attributes to assist in populating the geospatial libraries with tailored, mission-specific data within defined target and objective areas. Geospatial information and intelligence planners must evaluate the following types of information when developing the GEOINT requirements for the collection plan:

- Type of unit(s) conducting the operation (e.g., infantry, long-haul truck, reconnaissance, aviation, civil affairs).
- Type of environment in which the unit will be operating (e.g., urban, amphibious).
- Type of mission being conducted (e.g., raid, humanitarian, amphibious landing, maneuver warfare).

- Type of information and level of resolution that is needed to support the mission (normally established in the unit and mission profiles).
- Type of geospatial database shortfalls.
- Type of available sources and prioritization based on the MAGTF commander's intent, commander's critical information requirements (CCIRs), and CONOPS.

#### Processing, Exploitation, and Production Planning

The most critical factors in GEOINT processing, exploitation, and production planning are the commander's PIRs (as the intelligence component of the CCIRs) and the production center's adjustments to keep abreast of changing conditions within the battlespace. This planning requires the ISC and GEOINT section to be engaged with staff sections to keep abreast of requirements and keep the GEOINT production assets updated.

The ISC is responsible for coordinating with the G-2 operations and plans officers, P&A cell OIC, and topographic platoon commander to prioritize GEOINT. The ISC is responsible for ensuring that the GEOINT production schedules supporting MAGTF requirements are maintained.

#### **Dissemination Planning**

The ISC must coordinate the dissemination of GEOINT products throughout the MAGTF. The ISC is responsible for—

- Identifying standard MAGTF GEOINT product requirements.
- Coordinating the prioritization of MAGTF GEOINT requirements with the G-2 plans and operations officer(s) and the intelligence officer(s) at subordinate units.
- Coordinating CM/DO Marine Corps Enterprise Network (MCEN) support with the MAGTF G-6/S-6 to ensure satisfactory connectivity and support.

## **GEOSPATIAL INTELLIGENCE TO SUPPORT PLANNING**

#### **Geospatial Foundation Data**

Geospatial foundation data is one of the principal components of the DoD GI&I readiness strategy that is designed to satisfy joint and MAGTF GI&I requirements. Fusion of foundation data with other sources of GI&I provides near-worldwide coverage to support planning requirements. Foundation data provides specific, accurate, standardized GI&I data. This data is geopositioned to the WGS-84 standard DoD datum to provide interoperability and commonality across Services, mission areas, systems, and forces. The basic components of foundation data can be fused to create a standard base map view that is used for planning and some operations. Foundation data supports 3-D visualization and some analytic activities. It also serves as the base for intensifying and integrating new categories of information.

#### **Foundation Feature Data**

Foundation feature data depicts selected features (e.g., roads, streams, lakes) with additional attributes arranged in relational thematic layers and mission-specific data standard content. Feature density depends on the specific geographic region and will generally look like a traditional TLM.

Common foundation data includes the following:

- Transportation and drainage networks.
- Geodetic control points.
- Populated areas.
- Boundaries.
- Vegetation.
- Natural and cultural features of high interest.

**Digital Terrain Elevation Data.** Digital terrain elevation data (DTED) is a uniform matrix of terrain elevation values. The matrix provides basic quantitative data for all MAGTF systems requiring terrain elevation, slope, and surface roughness information. Digital terrain elevation data has a post spacing of approximately 30 meters (1 arc second) and provides the macro relief that is necessary to support most mission planning. The information content is the approximate equivalent to the contour information presented on a 1:50,000 scale map. Table 4-2 provides basic information concerning the various levels of DTED.

**NOTE:** Posting values decrease near the polar areas to cope with meridian convergence.

	Level 0	Level 1	Level 2	Level 3
Posting	30 arc seconds	3 arc seconds	1 arc second	0.4 arc second
At the equator	+ 900 meters	+ 90 meters	+ 30 meters	+ 12 meters
At 45° latitude	+ 630 meters	+ 63 meters	+ 21 meters	+ 9 meters

Table 4-2. Digital Terrain Elevation Levels.

**Digital Nautical Chart.** A digital nautical chart is a vector-based digital product designed to provide the mariner with an up-to-date, seamless database of the world. Digital nautical charts portray selected significant navigational features in a format suitable for computerized navigation and GIS applications. A digital nautical chart is produced in the standard Vector Product Format, allowing for modeling real-world features in digital geographic databases. The database uses a table-based, geo-relational data model and supports GIS applications such as mission planning, command and control, and situational awareness.

*Imagery Base Map.* Imagery base maps must conform to intelligence community directives (ICDs) and meet open geospatial consortium compliance standards. The data ranges from imagery collected using national technical means to unclassified commercial collection. The imagery base map selected for use as foundation data should meet the intended needs of the mission. The imagery base map supports—

- Various C2 and weapon systems.
- Theater battle management.
- Mission planning.
- Digital, moving map displays.
- Terrain analysis.

- Simulations.
- Intelligence systems.
- CIS.

**Digital Point Positioning Database.** The DPPDB is a classified, deployable set of geodetically controlled, stereoscopic imagery containing associated support data. Both NGA and other producers develop DPPDBs that provide users the capability to derive accurate positional data for any identifiable feature within a specified area. Analysts need specific hardware and software to exploit DPPDB.

**Qualified Data.** Qualified data includes other data sets of known quality and accuracy that have been neither integrated nor deconflicted with foundation data and mission-specific data sets (MSDSs). The NGA standard digital products are a core component of qualified data (see Appendix A). Available national and international government databases that satisfy identified requirements can be assessed and integrated into the production plan as qualified data. The assessment is based on established standards for accuracy, currency, resolution, content, and format.

Commercially available products and databases are a data source of growing importance to the MAGTF. Commercial geospatial production tools have introduced a wealth of worldwide GEOINT data. Products and databases with documented accuracy and quality performance that will help meet unfulfilled requirements can be procured and integrated into the production plan to meet mission requirements. Data collected by tactical units can be assessed and integrated as qualified data and add value to support tactical operations.

#### **Geospatial Information and Intelligence**

The foundation GEOINT data analysis determines the intensification level required to develop mission-specific data that forms the next layer of the geospatial foundation. Enhancing baseline information of the foundation data develops mission-specific data. This information includes high-resolution controlled imagery; elevation and bathymetric information; and high-resolution, heavily attributed, vector features that are needed to meet defined mission requirements. Analysis and production of mission-specific GEOINT is conducted to support the requirements detailed in the following sections.

*Intelligence Preparation of the Battlespace.* Intelligence preparation of the battlespace is a systematic, continuous process and an analytical methodology employed by intelligence personnel to reduce WET uncertainties for all types of operations. The IPB builds an extensive intelligence database and specific products for each potential area in which a unit may be required to operate. These areas are analyzed in detail to determine the impact of WET on MAGTF operations. That analysis is incorporated into graphic and other intelligence product forms. Geospatial intelligence provides a stable geopositional framework that supports the integration and analysis of WET effects on specific COAs.

The GEOINT IPB database development is labor intensive and requires the dedicated efforts of GEOINT specialists and staff personnel, the direction and focus of the MAGTF staff, and the cooperation of numerous elements within and outside the MAGTF. Geospatial information and intelligence IPB support uses foundation data to define the AOI. Definition of the AOI is followed

by efforts to intensify and add value to the data of critical features within the area of operations. Marines may need to further intensify identified targets and objectives in the area of operations to meet tactical requirements for lower echelon units. The primary function of GEOINT within the IPB process is to reduce the uncertainties regarding natural and constructed terrain features on MAGTF operations; therefore, terrain analysis examines KOCOA and mobility corridors. For additional information, refer to MCRP 2-10B.1, Intelligence Preparation of the Battlespace.

**Modified Combined Obstacle Overlay.** The modified combined obstacle overlay (MCOO) is the foundation for battlespace analysis. It provides the basic view of the battlespace area evaluation, GEOINT production, and METOC analyses and products of the IPB process (most other IPB products are based on this foundation). Typically, the MCOO depicts all obstacles to mobility and may depict CCM classifications (e.g., restricted), objectives, avenues of approach and mobility corridors, defensible terrain, probable engagement areas, and key terrain. Pertinent information may be depicted using either standard base maps and overlays or an electronic GEOINT database that renders the effects of the battlespace on military operations within MCEN resources.

Although MCOO is a form of graphic geospatial analysis, it differs from the other views within the IPB process. It presents information that is generally included on the combined obstacle overlay (COO), the avenue of approach overlay, and the friendly operational graphic (i.e., friendly boundaries for the area of operations and AOI, objectives, battle positions). The MCOO also depicts key terrain and known or potential enemy objectives.

Two IPB templates or overlays are prepared at all MAGTF command echelons' (i.e., MCOO and a G-2/G-3) co-produced decision support templates. The actual level of detail depicted on the MCOO depends on the echelon where it is prepared, the command echelons it supports, and the available preparation time. The level of detail depicted on the MCOO also depends on the commander's guidance, mission requirements, and type of unit preparing the MCOO. At a minimum, the MCOO should contain the following description, based on mission-specific criteria and specifications of suitability:

- Severely restricted terrain (i.e., terrain that severely hinders or slows movement in combat formations unless some effort is made to enhance mobility).
- Restricted terrain (terrain that hinders movement).
- Built-up areas, line of transportation, rivers, and water obstacles.

# CHAPTER 5. GEOSPATIAL INTELLIGENCE OPERATIONS

Geospatial intelligence supports every phase of a military operation to limit potential effects on friendly forces while exploiting the potential impact on enemy forces. When planning MAGTF operations in relation to the enemy force structure, the interrelated factors of terrain, inland and coastal waters, weather, and other non-terrain spatial data must be considered together in conjunction with intelligence. Weather elements can dramatically alter terrain features and trafficability. Terrain features, such as mountains and ridgelines, can influence elements of local weather and maritime conditions. In every operation, the relationship between terrain, maritime conditions, and weather must be carefully considered to provide an accurate description of how environmental factors could impact a particular mission (see Figure 5-1).



Figure 5-1. Geospatial Information and Intelligence Underpins the MAGTF Operations.

The GEOINT concept of employment serves as a guide for the analysis, production, dissemination, and use of GEOINT. It defines and explains the requirements for integrating, deconflicting, and disseminating a seamless geospatial foundation for all types of missions. Full employment of GI&I is based on the following assumptions:

- Foundation feature data will be available to support the defense information infrastructure and MAGTF mission requirements in a timely manner.
- GEOINT reproduction and replication capabilities will be available to support MAGTF operational and tactical requirements for hard copy products.
- Marine Corps doctrine, joint doctrine, SOPs, and TTP employed within the theater will facilitate the collaborative and distributive development of GI&I.
- Proliferation of MAGTF systems requiring GI&I will increase proportionally to GI&I functions and applications, timelines, and level of detail of GI&I products (see Appendix K).

## MAGTF GEOSPATIAL INFORMATION AND INTELLIGENCE SUPPORT

The MEF G-2, via the ISC and GI&S section, oversees the planning and direction, collection, production, and dissemination of GI&I to the MAGTF. The ISC is the focal point for the development of GI&I collection, production, and dissemination requirements. In addition, the ISC validates GI&I requests, prioritizes the production requirements for organic and supporting topographic assets, and supports the following functional capabilities:

- Staff coordination.
- User profile development.
- Mission profile development.
- Information requirements (identification and GI&I production report).
- Product prioritization.
- Database management.
- Dissemination management.

#### **Staff Coordination**

Coordination with all elements of the MEF command element for GI&I support ensures requirements are identified early in the planning process. Comprehensive coordination must consider the following staff sections, units, and elements:

- G-2 (operations, plans) and intelligence battalion elements (support cell, collections management and dissemination [CMD] section, P&A cell).
- G-3 (future and current operations, fires).
- G-4 (engineers, transportation, supply).
- G-5 (future plans).
- G-6 (MCEN plans, systems control).

#### **User Profile Development**

The G-2 plans GEOINT section and ISC, with assistance from the intelligence officers at all command echelons, are responsible for maintaining the planning factors database (PFDB) user profiles for all units within the MAGTF. User profiles are established to identify the types of GI&I product support that each MAGTF unit and section requires. The user profile identifies—

- Dissemination methods available to the unit.
- Types of views or products generally used and standard quantities needed.
- Communication links and information systems resources.
- POC.

#### **Mission Profile Development**

The ISC and topographic platoon develop and maintain the mission profiles in the PFDB. The mission profile identifies the critical features and attributes that are needed to support a unit conducting a particular operation. The profile changes as the mission assigned to that unit changes. Basic profiles are identified within the PFDB for easy access and modification to meet tailored requirements. The mission profile, when used in conjunction with the user profile, rapidly identifies the requirements for tailored GI&I views and products.

#### **Information Requirements**

*Information Requirements Identification.* All levels of the MAGTF must identify their unique information requirements. These information requirements are then submitted through intelligence channels for validation, prioritization, and subsequent tasking as follows:

- While in garrison, the G-2 operations officer, with assistance from the MEF GEOINT chiefs, must validate, prioritize, and task all requirements to the intelligence battalion for follow-on action by either the GEOINT elements or federated production by an external organization.
- During operations, the ISC is responsible for validating, prioritizing, and tasking consistent with the G-2's direction.

In garrison and during operations, the topographic platoon commander is responsible to the P&A cell and the intelligence battalion commander or ISC for maintaining quality control and meeting production timelines.

**Geospatial Information and Intelligence Production Report.** During peacetime operations, the topographic platoon provides a monthly GI&I production report (see Appendix J) to the intelligence battalion commander and MEF GEOINT section via intelligence channels. This report identifies ongoing and completed activities. The MEF GEOINT section ensures that production timelines and resources are prioritized and used efficiently. During operations, the topographic platoon and detachments prepare and forward this report to the ISC.

#### **Production Prioritization**

The ISC and the MEF GI&S section use the PFDB to develop the list of GI&I production requirements for supporting a particular mission. The MEF GI&S section, in coordination with the G-3, develops a list of production requirements, establishes priorities, and sets production requirement deadlines using information listed on the force list, time-phased force deployment list (TPFDL), and mission objectives. The ISC prioritizes the production requirements and then tasks

the intelligence battalion's organic and supporting topographic assets to begin GI&I analysis and production. The ISC may request support from theater and national production assets through the operational chain of command. The distributive and collaborative nature of the production network provides the MAGTF with enhanced production support and allows tactical topographic assets to focus efforts on intensifying objectives for mission-specific views.

#### **Database Management**

Database management includes the following:

- The MSC's geographic intelligence specialists are responsible for oversight and management of the geospatial database.
- The topographic platoon is responsible for oversight and management of the MEF's geospatial library.
- The MCIA is responsible for the quality assurance of geospatial information from all echelons through the CGSA. The CGSA is made accessible to the NSG.

#### **Dissemination Management**

Dissemination is the timely conveyance of GEOINT in an appropriate form and by any suitable means to organizations and individuals who need it. The CGSA provides a dissemination capability to the MAGTF commander and planners, MAGTF subordinate elements, and other forces and organizations. The ability to rapidly disseminate updated GEOINT to all users through a smart publishing and subscription capability ensures that critical intelligence and other information are readily available to the entire MAGTF.

The DCGS-MC program of record uses an open technical architecture supporting the GEOINT domain, which has evolved within the NSG architecture. It supports receipt and dissemination of GEOINT data external to operational and tactical forces with primary access to the topographic assets within the theater of operations, ensuring that all users have the tailored products necessary to support their specific missions.

### **TOPOGRAPHIC PLATOON SUPPORT**

The topographic platoon provides a seamless, discoverable, geospatial database to support all levels of the MAGTF via the MCGDB. This database provides a geospatial information foundation that supports all MAGTF operations (see Figure 5-2). Developing and sustaining a standards-based, near-real-time, integrated foundation supports battlespace situational awareness, planning, and decision making.

Responsibilities related to the MCGDB include the following:

- Topographic platoons are responsible for the expeditionary-based MCGDB.
- Intelligence battalions are responsible for the garrison based MCGDB supporting the MEF's AOR.
- MCIA is responsible for the fixed-site global MCGDB.



Figure 5-2. Marine Corps Geospatial Database.

The MCGDB is the initial (i.e., baseline) frame of reference for the fusion of information from other environmental, logistical, operational, and intelligence or diplomatic sources. This database supports updates and modifications, ensuring the data contained therein meets the mission-specific requirements of a high-tempo battlespace.

#### Topographic Platoon Tasks

Topographic platoon tasks include the following:

- Providing tailored, mission-oriented topographic map products and services to supplement standard maps and charts.
- Coordinating with the MEF G-2, ISC, CMD section, and the P&A cell to collect, analyze, synthesize, and disseminate terrain information and intelligence.
- Preparing map substitutes, such as overlays, overprints, photomosaics, map revisions, or multicolor charts.
- Revising and reproducing combat charts, coastal charts, port charts, and harbor charts. Products might include electronic 3-D terrain models, LOS studies, line-of-sight analysis, terrain factor overlays, hydrographic charts, and landing zone studies.
- Collecting coastal data and preparing GI&I products that depict trafficability, routes of egress, and inland water bodies.
- Preparing or assisting in the preparation of additional intelligence products, such as CCM, cover and concealment, observation and fields of fire, avenues of approach, flooding and drainage, stream and river gauging, LOCs, and obstacles.
- Assisting with the preparation of all-source intelligence products.

#### **Mission Effectiveness Criteria**

The ability of the topographic platoon to perform the following functions determines the effectiveness of the GI&I mission:

- Collecting, querying, accessing, validating, receiving, processing, storing, managing, integrating, exploiting, intensifying, analyzing, visualizing, producing, and disseminating all source GI&I.
- Developing, storing, retrieving, displaying, and disseminating the geospatial foundation at varying resolutions and data density to support COA development and mission planning.
- Preparing, storing, retrieving, displaying, printing, and disseminating tailored and timely GI&I views, such as overlays with various resolution and data density, to support all MAGTF command echelons (i.e., command and control, current and future intelligence, operations, logistics, aviation, engineering, navigation, communications, and information systems).
- Exchanging information across communication networks following Global Command and Control System (GCCS), MAGTF, and Joint Maritime Command Information System protocols and standards.
- Providing a client and server smart push/pull configuration that has the capability to acknowledge data receipt and delivery status.
- Importing, integrating, deconflicting, and disseminating available data from GI&I and other sources, such as vector product format, raster product format, text product standard, object-oriented grid, software applications, or video formats.
- Producing and displaying 2-D and 3-D graphic GI&I, imagery, and all-source intelligence models to support visual walk-throughs and fly-throughs with a rapid terrain and feature identification capability. This capability enhances battlefield situational awareness and provides the baseline for database analysis and production and MAGTF planning.
- Displaying, analyzing, and generating stereoscopic GI&I images and importing hard copy products by scanning and digitizing.

#### **Command and Control**

Because the topographic platoon is a subordinate unit of the intelligence battalion, operations company P&A cell, there are special considerations concerning staff cognizance and support relationships. Staff cognizance and support relationship considerations are discussed further in the following sections.

*Marine Expeditionary Force Command Element Staff Cognizance.* The MEF commander exercises command and control over intelligence battalion elements, including the topographic platoon. The MEF G-2 supports the MEF commander's intelligence requirements through staff cognizance of the ISC. This structure allows for the topographic platoon to effectively integrate its activities with other MEF GI&I and broader all-source intelligence activities.

*Support Relationships.* Support relationships concerning command and control include general, direct, and attached.

*General Support.* The topographic platoon can provide general support to the MEF. Under this relationship, the MEF commander, through the G-2 and the ISC determines priorities of intelligence collections and production activities and support, the task organization and locations of GI&I support nodes, and all-source intelligence dissemination. The ISC exercises command and control of topographic platoon through the intelligence battalion operations officer.

*Direct Support and Attached*. Elements of the topographic platoon could be employed in direct support of or attached to a particular unit of the MEF, as directed by the ISC. A topographic platoon liaison element can be employed to assist the supported unit as a way to fully exploit the direct support relationship. The topographic element of the direct support team provides focused GI&I support, including direct connectivity to the MCGDB via the MCEN and dedicated GI&I production and dissemination capabilities.

#### **Concept of Employment**

A single topographic platoon supports one MEF and three MEUs or a special purpose Marine air-ground task force (SPMAGTFs) simultaneously. Task-organized topographic platoon elements can support MEBs, smaller MAGTFs, MSCs, or other designated forces. The intelligence battalion commander configures GISTs and GITs to support MAGTF-wide operational requirements that are based on the priorities established by the G-2/S-2. The following applies concerning concept of employment:

- <u>MEF</u>. One topographic platoon can support one MEF, to include reinforcing or filling global sourcing requests from other MEFs or Marine Corps organizations.
- <u>MARDIV, MAW, or MLG</u>. Typically, one GIST will support a MARDIV, MAW, or MLG. A typical GIST consists of two-to-six geographic intelligence specialists.
- <u>MEB</u>. Notionally, one GIST will support a MEB. Since the range of missions and size of a MEB can vary, topographic support will be tailored based on the MEB's mission.
- <u>MEU or SPMAGTF</u>. Typically, one geospatial intelligence team (GIT) will support either a MEU or SPMAGTF. A typical GIT consists of two geographic intelligence specialists.

#### **Distribution and Production**

The DCGS-MC can access GI&I, from theater, MCIA, and other production centers that are supporting the other Services. The modular design of CGSA systems enables the topographic platoons with the ability to task-organize to provide distributive and collaborative production support to all MAGTF operations, such as GISTs support to MSCs and other forces with either dedicated or tailored support from a consolidated production center. The major systems that make up the CGSA include the following:

- <u>Marine Corps Common Intelligence Server</u>. The Marine Corps Common Intelligence Server (MCCIS) is a MEF-level asset and serves as a data repository for GI&I in support of MAGTF operations.
- The MCCIS and workstations are organic to the topographic platoons and GISTs that support MEBs, MEUs, SPMAGTFs, and JTFs. It is the primary tool used for transforming geospatial information into GEOINT.
- <u>Common GEOINT Workstations</u>. The CGWs and CGW-R are organic to GISTs that support MEBs and other MEF MSCs and may be available to GITs that support MEU or SPMAGTF command elements. These systems are used to support simultaneous operations afloat and

ashore. The CGW-R is employed in conjunction with the CGW to augment production requirements of the organization that it is supporting.

#### **Communications and Information Systems Configurations**

Using the appropriate equipment, topographic platoon Marines perform various missions while remaining fully integrated with naval systems; forces afloat; and joint, supporting, and allied forces within and external to the joint operations area. The topographic platoon connects to GCCSJ, Joint Maritime Command Information System, and MAGTF using a client and server design. The highly modularized nature of the topographic platoon and its equipment provides a flexible range of employment options. The mission, enemy, terrain and weather, troops and support available-time available (METT-T) factors dictate which option to employ. Refer to Appendix C for additional DCGS-MC information. The following applies to communications within specific levels of command:

- <u>MEF</u>. Typically, the entire DCGS-MC with the full client server will deploy with a MEF. Four-to-six geographic intelligence specialists with a single CGSA (i.e., single server and multiple workstations) can be deployed to support the lead echelon of the MEF command element.
- <u>MSC</u>. A GIST with a CGW generally deploys in support of a MEB or an MSC. The GIST's GI&I capabilities parallel those of the DCGS-MC.
- <u>MEU and SPMAGTF</u>. A geospatial support team with two CGWs generally deploys with a MEU or SPMAGTF. The GIT's GI&I capabilities parallel those of the DCGS-MC and the CGW.

#### Marine Corps Intelligence Activity Support

The MCIA develops prepositioned GI&I databases to provide tailored views, mission-specific intensification for intelligence AOIs, nonstandard views for future operations and GI&I, and all source product development. The MCIA's support provides the following:

- Direct access to the national production network.
- Support to GI&I requirements for specific MAGTF missions across the range of operations.
- A Service-level GI&I production capability focused on future requirements for the following purposes:
  - Integrating diverse data sets (e.g., national, commercial, scientific, academic).
  - Deconflicting information content.
  - Intensifying MAGTF-specific features and attributes.
  - Analyzing environmental factors.
  - Storing information to support MAGTF deployments.
  - Virtual reach-back support to deployed MAGTFs.
  - Support to the distributive and collaborative production network with tailored, mission intensified views within the littorals, including the integration, intensification, and distribution of tailored amphibious views to support MAGTF expeditionary operations.
  - Housing for the CGSA within the office of the Marine Corps enterprise information officer. The CGSA is a global littoral data warehouse connected to multiple communication networks for easy query, retrieval, and processing by topographic assets. It provides both standard and nonstandard GI&I views based on user requirements.

#### **Geospatial Intelligence Directorate Support**

The GID is the Service-level GEOINT center for the Marine Corps. It provides several key intelligence capabilities and support to the operating forces and HQMC staff sections, including the following:

- Service-level production and repository for GI&I that facilitates building an integrated, deconflicted, and seamless view of any battlespace.
- Access to the national intelligence network.
- Ready source of geospatial and imagery fused intelligence information focused on the global littoral environment by integrating the land, air, and maritime GI&I required by expeditionary forces.
- Support to forces conducting deliberate planning for contingency and OPLANs, expeditionary training and exercises, and intelligence production requirements.
- Virtual staffing and reach-back capability for crisis. All GID support should be accessed as follows:
  - Requests for GID support should be submitted through intelligence command channels to the director, MCIA, to the attention of the operations officer.
  - Support to deployed MAGTFs under CCDR or JTF operational control must be submitted via the operational chain of command and validated by the CCDR prior to submission to MCIA. Prior identification and coordination of production requirements with the GID is recommended.

#### **National Production Network Support**

The GID is the Marine Corps Service-level participant within the national production network (see Figure 5-3). This standards-based network is a distributive, collaborative production infrastructure that supports the planning, prioritization, and development of GI&I. It allows the

MEF topographic platoon to receive GI&I data sets that support a defined mission area by using a single query into the network. The network consists of the following organizations:

- NGA.
- DIA.
- CIA.
- National Reconnaissance Office.
- Civil, academic, and Service production centers, such as the National Ground Intelligence Center.



Figure 5-3. National Distributive Intelligence Production Network.

## SUPPORT TO MAGTF OPERATIONS

The topographic platoon provides the MAGTF with the ability to add value to, integrate, and deconflict geospatial information to develop a seamless geospatial database. This database is the geospatial foundation for the COP and CTP, other planning, and decision making. Organic topographic resources can be task organized to perform various GI&I missions, while remaining fully integrated with joint and allied forces. Collaborative reach back provides a robust production capability, reducing the deployed footprint. Software applications and collaborative production will assist with battlespace C2 planning, terrain and weather effects analysis, visualization, and logistic planning.

#### **Amphibious Operations**

The sea constitutes a maneuver space that supports the landing force movement from ships to the objectives ashore. Heavy seas, hidden reefs, and marshes beyond the beach can impede or jeopardize an entire operation. Geospatial information and intelligence provide the detailed geospatial foundation needed to integrate and deconflict a seamless land, air, or maritime operation within the littorals.

A task-organized topographic platoon detachment attached to a forward-deployed MAGTF can provide the geospatial foundation needed to support each phase of the operation. Topographic assets aboard naval ships moving to the objective area are used to support planning and database development. Amphibious operations require detailed studies of the terrain, inland and coastal hydrography, weather, and other environmental factors in the littoral areas. These environmental conditions affect the following:

- Littoral penetration points, helicopter landing platforms, LZs, and DZs.
- Beaching and unloading conditions.
- Speed of vessels.
- Air support and visibility.
- Beach trafficability.
- Ingress and egress obstacles and routes.

#### **Sustained Operations Ashore**

Sustained operations ashore (SOA) are extended operations in which a MAGTF fights predominately as a land force with naval and other support. Marine air-ground task forces conducting SOA require enhanced MAGTF capabilities ashore and an established MAGTF area of operations. The SOA force size often drives the MAGTF to use several geographically separated sites for logistic points, airfields, port facilities, and other purposes.

The complexity and demands of operating in an SOA environment forces MAGTFs to employ a full topographic platoon in a supporting role. In such scenarios, topographic assets can operate as multifunctional GI&I nodes afloat and specialized GI&I nodes ashore. Primary topographic nodes (i.e., GISTs and GITs with networked MCCIS, and CGW) within the MAGTF area of operations provide direct support to MAGTF forces ashore, based on METT-T and the intelligence CONOPS. Some topographic nodes deploy forward. These forward-deployed nodes are tasked with conducting and coordinating geospatial database management; battlespace COA, tactical decision aid, and visualization support; and other terrain analysis production functions.

Other principal nodes orchestrate the fusion, integration, adding value to and intensifying of GI&I production and support to all-source intelligence production in general support of the MAGTF. By adding modules and personnel, these nodes can support increased mission requirements. For example, a specialized node ashore within the MAGTF GCE command element intelligence section ashore provides direct support to GCE operations, while another node within the MAGTF command element intelligence section afloat operates in general support of the MAGTF.

#### Military Operations on Urbanized Terrain

Military operations on urban terrain (MOUT) requires an accurate and detailed understanding of the battlespace to underpin operational planning and subsequent execution of the planned operation. These operations also require knowledge of the key characteristics of urban areas in the conduct of civil affairs, intelligence, CIS, logistics, and force protection operations. A substantial intelligence collection and production effort is needed to provide the detail required from urban GI&I. Urban GI&I analysis and production consists of collecting data and developing focused products for particular aspects of the area of operations, including the following:

- Terrain, such as physical composition, vulnerability, and accessibility.
- Productive capacity.
- Military resources.
- Road and communication networks.

- Water and sewer systems.
- Building structures and layout.
- Cultural centers.
- Physical dimensions.
- Geographic location.

### PRE-DEPLOYMENT REQUIREMENTS: ECONOMIC AND POLITICAL CONSIDERATIONS

Several processes begin immediately after a unit receives a warning order (i.e., a preliminary notice of order or action). The processes progress independent of each other until completed. Functions may be separated by command levels or differing MAGTF, Navy, and JTF GI&I requirements. Intelligence battalion and G-2 personnel should use the GI&I planning checklists provided in Appendix E to ensure all areas of support are addressed during advance force and pre assault operations. The checklists help planners ensure that all GI&I operations and production requirements are identified and prioritized to support the various missions that are included within the operation.

#### **Planning Requirements**

Intelligence preparation of the battlespace is the principal analytical methodology employed to reduce enemy and environmental uncertainties inherent within an operation. Geospatial information and intelligence provide the foundation for the IPB process as well as critical support to all source intelligence assessments by analyzing how the battlespace affects both enemy and friendly forces (see Figure 5-4).



Figure 5-4. MAGTF Geospatial Information and Intelligence Planning Requirements.

The following five GI&I functions support the IPB process:

- Defining the environmental characteristics of the battlespace.
- Analyzing the military aspects of the terrain.
- Analyzing the effects of terrain on specific COAs.
- Providing the foundation for integrating threat COAs.
- Supporting visualization of COAs for wargaming and rehearsals.

#### **Product Requirements**

Geospatial information and intelligence products are needed to conduct the following in support of initial MAGTF planning requirements:

- Problem framing.
- Situation development.
- COA development, analysis, and wargaming. Initially, the topographic platoon queries local, Service, and national networks for available GI&I within the area of operations and AOI. Next, the topographic platoon intensifies the data and generates the tailored views needed to support MAGTF operations. In most cases, GI&I products are fused with other intelligence to create all-source intelligence products as described in the following sections.

**Foundation Feature Data.** Foundation feature data provides an initial level of information resolution (equivalent to medium-scale maps) to allow planning to begin. Foundation feature data provides an overview of the AOI from which mission-specific data requirements can be identified. Foundation feature data will support some missions without intensification; however, for most MAGTF operations, the ISC will task the topographic platoon with producing tailored views for MAGTF tactical operations within the area of operations.

*Mission-Specific Data.* The topographic platoon must integrate and intensify specific objective or target areas within the area of operations to generate tailored mission-specific data views for tactical forces. Mission-specific data may range from simple road networks for the MAGTF LCE to a detailed TLM for an infantry platoon conducting patrols.

*Tactical Study of the Terrain.* Analyzing terrain, weather, and other factors throughout the commander's area of operations and AOI serves as a basis for developing specific MAGTF COAs and determining enemy capabilities. This analysis allows commanders and planners to see the battlespace in four dimensions:

- Width.
- Depth.
- Height (airspace).
- Time.

The P&A cell produces Tab A (Tactical Study of the Terrain) to Appendix 11 (Intelligence Estimate) to Annex B (Intelligence) of an OPLAN (see Appendix G of this publication for the format and an example of a tactical study of the terrain).

**Beach Studies.** Beach studies determine the environmental effects that the terrain, coastal ocean, riverine, and weather have on beaches. Each beach is analyzed with respect to the environmental effects on a specific point within the littoral. A beach study could include traditional beaches, rivers, or any place where the operating forces might travel or conduct activities. A beach study includes the following:

- Intelligence affecting mobility.
- Enemy defenses.
- Potential exit routes.
- Vegetation.
- Gradients.
- Obstacles.
- Surface materials.
- Site suitability.

The P&A cell produces Tab B (Beach Studies) to Appendix 11 (Intelligence Estimate) to Annex B (Intelligence) to an OPLAN (see Appendix H for an example format of a beach studies tab).

*Helicopter Landing Zone and Drop Zone Studies.* The LZ and DZ studies provide the commander and staff with intensified information and analysis covering a landing that may be needed for air operations. The LZ and DZ studies contain the following:

- Analysis for potential obstacles.
- Analysis of enemy defenses.
- Identification of potential exit routes to support movement of forces in the objective area.

The P&A cell produces Tab E (Helicopter Landing Zone and Drop Zone Studies) to Appendix 11 (Intelligence Estimate) to Annex B (Intelligence) to an OPLAN. Refer to Appendix I in this publication for an example of a LZ and DZ study format.

*Harbors and Ports Studies.* Harbors (sheltered sea areas) and ports (natural or man-made facilities for loading and unloading goods) studies are prepared by the P&A cell and may be included as a tab to the intelligence estimate or disseminated via other means. Information concerning harbors and ports is essential when estimating items of interest needed to support and sustain MAGTF operations, such as their capacity, capability, or vulnerability. Large-scale modern warfare requires the control of harbors and ports to support operations ashore. Aerial bombing, artillery, mortars, missiles, sappers, and other forms of ground attack can easily damage or neutralize ports.

*Airfield Studies.* Airfields, like ports, can be easily disrupted or shut down because any surface degradation or parked disabled aircraft can impede air operations. Seizure, construction, operation, and subsequent control of airfields are essential to most MAGTF operations. Airfields are normally situated near cities, large facilities, or along strategic air routes. They are typically located on elevated terrain that is removed from the natural and cultural impediments to flight.

Airfields are important throughout every phase of an operation. Military and civilian airfields are part of a nation's transportation system. Their size and features determine their capabilities and inherent military value. Airfield studies identify the following airfield characteristics:

- Type of airfield.
- Physical dimensions of the airfield.
- Construction material.
- Nature and capability of an airfield's support facilities.
- Condition of the airfield and supporting facilities.

Airfield studies are produced by the P&A cell and may be issued as either a tab to the intelligence estimate or as a separate intelligence product.

## **OPERATIONS SUPPORT REQUIREMENTS**

Topographic platoon operational support requirements include nine categories, as detailed in the following sections.

#### **Query Requirements**

The topographic platoon deploys with foundation data that is located in prepositioned databases. As a mission evolves, the platoon uses the United States Imagery and Geospatial Information System (USIGS) to query the national production network for new and updated GI&I within the AOI. To conduct queries, the topographic platoon must access national and theater military, civil, and academic databases. In addition, this capability usually requires connectivity with the GCCS, INTELINK, Joint Worldwide Intelligence Communications System (JWICS), SIPRNET, or Global Broadcast Service.

#### **Retrieval Requirements**

Once the topographic platoon has identified available databases that support GI&I operational requirements, they must be able to pull information from the databases through the CIS network to update the foundation data. The topographic platoon then stores the databases in the CGSA for additional processing and subsequent production or direct access by subordinate commands in the following manner:

- During peacetime, databases should be developed to support contingency plans and then prepositioned for timely operational support. For example, since MEUs deploy with prepositioned GI&I covering the anticipated area of operations, their supporting GIT could pull updated GI&I to value add to the existing database to fulfill mission-specific needs.
- During tactical operations, command echelon databases below the command element should be preloaded with GI&I databases to preclude the need to pull large database files from the CGSA.

#### Integration Requirements

The topographic platoon integrates database information that it collects during the query and retrieval process with the prepositioned foundation data to populate additional feature and attribute databases. This process includes integrating the oceanographic and landform databases from geospatial information and other sources into a single, seamless data set to support MAGTF requirements.

#### **Deconfliction Requirements**

Often the integration and deconfliction processes can be completed concurrently. For example, when different databases represent the same feature, such as a building, in two different locations, the topographic platoon must use a supplemental source to determine whether there is more than one building in the area and, if so, which of the provided locations is the more accurate. Similarly, the shoreline from an oceanographic database (lowest water level) and the shoreline from a landform database (mean sea level) must be properly annotated as the same features, but with differences in location attributes.

#### Intensification Requirements

Intensification takes place at three different levels in support of combat operations: tactical, theater, and national. The topographic platoon focuses on the intensification of information collected by tactical forces. This information can be retrieved from numerous sources, such as—

- Engineer and ground reconnaissance reports.
- Bridge reports.
- Surf reports.
- LOC reports.
- HUMINT, SIGINT, and IMINT reports.
- Imagery.
- Reports from civil affairs teams.
- Battle damage assessment reports.

Tactical intensification can include information and intelligence provided by combatant forces to update existing data, such as bridges or buildings being destroyed, new roads being built, or rice paddies being flooded. These changes are forwarded to the topographic platoon through the MAGTF network. The topographic platoon validates and modifies the changes and then updates the CGSA.

#### **Analysis Requirements**

The topographic platoon is responsible for analyzing the terrain within the objective or target area to determine how environmental factors may impact MAGTF missions and enemy capabilities. Each proposed COA must then be evaluated in reference to the findings. When conducting a mission-specific analysis, the topographic platoon and the P&A cell must consider the following:

- KOCOA.
- Commander's intent and guidance.
- Intelligence requirements.

- Scheme of maneuver and types of units that are conducting the operation.
- Weapons platforms that are associated with the units conducting the operation, both organic and supporting.
- Types of systems that are available within the units that are conducting the operation capable of exploiting the information.

#### **Production Requirements**

The topographic platoon is the largest organic GI&I production asset within the MAGTF. Using high-end GIS, the topographic platoon can exploit all-source GI and value-added tactical information and can analyze this data for mission-specific criteria. The topographic platoon produces tailored views and products of the battlespace to support specific types of units or functions, such as logistic, maneuver, close air support, or amphibious. The topographic platoon can disseminate the analysis in several media formats based on the user's requirements. Production requirements are prioritized by the ISC with assistance from the CM/DO and the P&A cell and are based on the G-2's direction and priorities.

#### **Storage Requirements**

Storage requirements for data include CGSA and information management:

- <u>CGSA</u>. CGSA provides the topographic platoon a substantial data store to query for information, request updates, or identify new production requirements. It holds the raw data coverage for the entire AOI, including the intensified information within the area of operations and objective areas. The topographic platoon establishes, updates, validates, and maintains the CGSA for the MAGTF AOI and may post tailored views for each functional area of the MAGTF on the CGSA.
- <u>Information management</u>. Tactical management of GI&I must allow all users to define their view of the battlespace. The MAGTF and subordinate commanders must be able to push updated information, knowledge, and understanding to higher headquarters (HHQ), subordinates, and adjacent units.

Prepositioning the relevant GI&I that commanders require is critical to planning and conducting missions successfully. Prepositioned GI&I will include the initial foundation data and all mission-specific data available when deployment takes place. As the operation progresses, the baseline database will be refreshed and supplemented using either an automatic push or an intentional pull within the tactical infosphere.

#### **Dissemination Requirements**

The topographic platoon can disseminate GI&I through the MAGTF, using electronic media, hard copy media, or web-based media.

**MAGTF Tactical Data Network.** The CGSA is a smart push/pull client and server capability that allows every echelon of the MAGTF to access specific views tailored to their operational and functional requirements. It allows the topographic platoon to value-add information and push it to subordinate command echelons. The CGSA is incorporated into the MAGTF to support all MAGTF systems.

*Electronic Media.* The topographic platoon can generate electronic views or products from the CGSA for dissemination to subordinate units. The ability to transfer data to electronic media provides additional security and backup for systems if a failure occurs.

*Hard Copy Media.* The topographic platoon can produce limited (i.e., 50 copies or fewer) hard copy GI&I products for dissemination to requesting units. Hard copy output can also be supported at all command echelons by using either the Marine Corps Common Intelligence Workstation (MCCIS) or tactical combat operations printers for small quantity output of views generated on the CGSA. The ability to create hard copy media at all echelons of the MAGTF allows distribution to occur at the lowest level possible without interrupting production requirements.

# CHAPTER 6. COMMUNICATIONS AND INFORMATION SYSTEMS

Shifts in DoD policies regarding GI&I operations have changed how MAGTFs access and use GI&I. The NGA has transitioned its production processes to populate digital geospatial data libraries and initiated a multiyear phasing out of traditional hard copy mapping products. The NGA's intent is for tactical commanders and other users to access digital data libraries to retrieve basic data, value add to the base data locally, and tailor the view of the battlespace to fit mission-specific data and other intelligence requirements.

This paradigm shift presents new challenges to the MAGTF, particularly in the way the topographic platoons are supported by the MAGTF CIS networks. The dissemination of geospatial data files, which range in size from hundreds of megabytes to gigabytes, through MAGTF communications systems and tactical data network (TDN) requires careful planning to support MAGTF GI&I CIS requirements, while maintaining CIS support to all other MAGTF operations and warfighting functions.

Geospatial information and intelligence planners must coordinate with the CIS staff that is under the direction of the G-6/S-6 to ensure connectivity between the MAGTF and supporting JTF, theater, national, and Service GI&I producers. In addition, data management functions must be coordinated early in the planning process to preclude mismanagement of the control and dissemination of GI&I. The CM/DO that is under the ISC is responsible for coordinating with the G-6/S-6 to ensure that the MAGTF's subordinate units can use the MCGDB. This database helps form the geospatial framework of the COP and CTP within the joint operations area.

Refer to MCRP 3-30B.2, *MAGTF Communications System*, for additional information regarding MAGTF CIS operations.

### **COMMUNICATIONS AND INFORMATION SYSTEMS REQUIREMENTS**

#### **Command and Control Subordinate Topographic Units**

The intelligence battalion commander, P&A cell OIC, SARC OIC, and topographic platoon commander must be able to command and control subordinate units, while integrating the operations of topographic units with the intelligence battalion, MAGTF, and other applicable organizations. In most cases, topographic elements will be collocated with the intelligence sections of the supported units; thus, allowing them to use the CIS capabilities servicing the supported headquarters. In semi static situations, telephones or secure electronic mail using LANs and WANs may be the primary means for establishing connectivity. Cellular telephones, satellite

communications, very high frequency radios, and high frequency radios may provide connectivity when the situation is more fluid, and the topographic elements must remain mobile. The CIS architecture must support both communications and the flow of digital information among the following organizations:

- MAGTF command element and the topographic platoon's GISTs and GITs supporting subordinate units.
- MAGTF GI&I elements, JTF, and other external all-source intelligence and GEOINT production centers.
- MAGTF GI&I elements and supported intelligence battalion and MAGTF operations, intelligence, and other C2 centers.

#### Manage Subordinate Imagery Intelligence Units

Intelligence officers and IMINT element OICs must maintain positive command and control of subordinate units and integrate their operations with broader MAGTF and external intelligence and operational command and control. Traditionally, single-channel radio and recorded message traffic has been used to support command and control of MAGTF IMINT elements. In semi-static situations, secure e-mail or telephones may be the method for communicating; whereas, in highly fluid or mobile scenarios, cellular telephones, satellite communications (SATCOM), and radio may be used.

#### **Receive Information and Collected Geospatial Information Data**

Marine air-ground task force topographic elements may receive collected geospatial information data and information over high capacity JWICS, SIPRNET, or NIPRNET. This connectivity allows MAGTF topographic Marines to access a wide range of GI&I databases, coordinate planning, conduct analyst-to-analyst exchanges, and disseminate GEOINT. Topographic elements supporting the MAGTF command element need access to all three networks. Topographic elements elements supporting MAGTF subordinate units only need access to SIPRNET and NIPRNET.

The CIS architecture must enable topographic elements to receive and exploit information collected by intelligence and combat units, such as IMINT, ground and air reconnaissance, or engineer. The architecture must support the digital transmission of collection reports, files, and GI&I product reports via fiber, wire, radio, and intelligence broadcasts. The information should be transmitted in formats that can be used by both the topographic platoon and all-source analysts for the production of intelligence.

#### Provide Geospatial Information and Intelligence Products

At all command echelons, effective GI&I operations require the timely dissemination of foundation data and other tailored, accurate GEOINT products to commanders and functional planners. Additionally, MAGTF intelligence and GEOINT personnel must ensure that their communications architectures support the pushing and pulling of information to and from all consumers.

#### Receive Data and Information from Organic and External Imagery Intelligence Organizations

Communication and information systems architecture must provide connectivity between organic and supporting IMINT elements, IMINT production and analysis centers, and supported MAGTF operations and intelligence centers. Requirements include the ability to transmit images and related data files and IMINT reports digitally via fiber optics, wire and radio in voice and data formats that are readily usable by imagery and all-source intelligence analysts.

#### Provide Intelligence to Supported Commanders

Imagery intelligence CIS requirements are influenced by the supported commanders' intent, CONOPS and intelligence, command relationships, and standing PIRs and intelligence requirements. Communication and information systems architecture must be capable of integrating IMINT element command and control and supporting CIS operations with the primary CIS channels used by the supported commanders.

#### Provide Imagery Intelligence Products and Reports to

National Intelligence Centers, Theater, Joint Task Force, MAGTF, and Other Components Imagery intelligence products are provided to designated organizations via the MAGTF's organic secured and non-secured communications networks.

### SUPPORT TO COMMAND AND CONTROL NODES

The topographic platoon is the only organic MAGTF asset containing the mission, personnel, equipment, and training needed to support GI&I users. Every command element staff division and MAGTF major subordinate element has unique functional requirements for tailored GI&I views of the battlespace. These views—

- Are critical to the development of the COP and CTP and increase the situational awareness across the command element, which improves the effectiveness of planning efforts and enhances the commander's overall decision-making process.
- Can be accessed through the MAGTF command element's CGSA. The ability of each MAGTF's subordinate units to access, query, retrieve, and use GI&I depends on how well their CGSA is integrated into the MAGTF communications and TDN architectures.

# Marine Expeditionary Force Command Element Intelligence Command and Control Nodes: Combat Operations Center and Intelligence Operations Center

The COC, with its subordinate elements, is the first of two principal MAGTF intelligence C2 nodes that provides the facilities and infrastructure for directing the MEF's comprehensive intelligence, counterintelligence, and reconnaissance operations. Because the combat intelligence center (CIC) must support the entire MAGTF, the CIC must be responsive to the requirements of all elements of the MAGTF (see Table 6-1).

G-2 Plans	The G-2 plans section is the main element for coordinating and providing intelligence support to the MEF command element future plans team as well as providing leadership and direction to the G-2's GEOINT, SIGINT, and METOC sections.
G-2 Operations	The G-2 operations section is the main element for coordinating and providing intelligence support to the MEF command element commanding general, battle staff and current operations center elements, target intelligence support to the force fires and future operations, G-2 intelligence requirements management activities, red cell support, and MEF intelligence liaison with external commands and organizations.
IOC	The IOC is the principal MEF intelligence operations and C2 center that is established by the intelligence battalion. It performs intelligence requirements management, staff cognizance of ongoing organic and supporting collection operations, intelligence analysis and production, and intelligence dissemination.
	<b>Support Cell.</b> The support cell is the primary element for conducting MEF-wide intelligence requirements management, METOC support, collections and dissemination planning and direction, and intelligence staff cognizance of MEF organic and supporting intelligence and reconnaissance operations.
	<b>P&amp;A Cell.</b> The P&A cell is the primary analysis and production element of the MEF. It processes and produces all-source intelligence products in response to requirements of the MEF and is the principal IMINT and GEOINT production element of the MEF.
	<b>SARC.</b> The SARC is the primary element for the supervision of MEF collection operations. It directs, coordinates, and monitors intelligence collection operations conducted by organic, attached, and direct support collection assets.
Counterintelligence/ HUMINT Company Command Post	The counterintelligence/HUMINT company command post is the primary element for conducting counterintelligence/HUMINT planning and direction, command and control, and coordination of MEF counterintelligence/HUMINT operations with external counterintelligence/HUMINT organizations.
OCAC	The OCAC is the main node for the command and control of radio battalion SIGINT operations and overall coordination of MEF SIGINT operations. It processes, analyzes, produces, and disseminates SIGINT-derived information and directs the ground-based electronic warfare activities of the radio battalion.
Reconnaissance Operations Center	The reconnaissance operations center is the main node for the command and control of force reconnaissance company operations and the overall coordination of MEF ground reconnaissance operations. It processes, analyzes, produces, and disseminates ground reconnaissance-derived information in support of MEF intelligence requirements.

# Table 6-1. Marine Expeditionary Force Command Element Combat Intelligence Center/Intelligence Operations Center Key Elements.

**G-2 Section.** The G-2 nodes support the MEF command element's cross-functional cellular staff organization and CONOPS as follows:

- The G-2 plans section is aligned to provide intelligence support to the MEF command element's future plans cell and red cell.
- The G-2 operations section is aligned to provide intelligence support to the MEF command element's current operations center, future operations center, and force fires center, while managing the MEF's external intelligence liaison teams (see Figure 6-1).



Figure 6-1. MEF Command Element Cross-Functional Cellular Organization and Intelligence Support.

*Intelligence Operations Center.* The IOC is the second principal intelligence C2 node within the MEF command element. The IOC provides the facilities, CIS, and other support needed by the ISC and the intelligence battalion to accomplish the following tasks:

- Provide centralized direction for MEF intelligence operations under the cognizance of the G-2. The IOC, as the core for this task, receives key assistance from the G-2 plans officer and operations officer.
- Consolidate, validate, and prioritize IRs from the entire force, consistent with the commander's priorities. The CMD section within the IOC's support cell is responsible for completing these tasks. Intelligence specialists from all disciplines, including GEOINT, are typically assigned to this section.
- Plan, develop, and direct the MEF's collection, production, and dissemination plans and operations. The CMD section, with assistance from the P&A cell, is responsible for completing these tasks.
- Submit consolidated requests for external intelligence support through the Marine component headquarters to the appropriate agencies. The CMD section, with assistance from the P&A cell, is responsible for completing these tasks.
- Enable the ISC to exercise principal staff cognizance of the MEF's organic and supporting intelligence, counterintelligence, and reconnaissance operations, including SIGINT, GEOINT, HUMINT, MASINT, ground reconnaissance, and aerial reconnaissance.
- Coordinate and manage MEF organic collection assets through the IOC's SARC. Most organic and supporting intelligence and reconnaissance units provide command and control and reporting of ongoing intelligence operations through their representatives in the SARC.
- Maintain a consolidated, all-source intelligence production center in the P&A cell that is resident in the MEF IOC.
- Coordinate with the radio battalion's operations control and analysis center (OCAC).
- Link the MEF command element to national, theater, joint, and other Service and multinational intelligence assets and operations.

All intelligence battalion and G-2 nodes have common capabilities to perform critical tasks within particular functions. The IOC typically has unique intelligence communications capabilities, in addition to MEF command elements common communications pathways provided by the communications battalion (see Figure 6-2).



Figure 6-2. MEF Command Element COC and IOC Key Elements Structure.

The COC is the overarching IOC established within the MEF main command post. It encompasses the primary functions of the MEF intelligence section and intelligence battalion and includes G-2 plans and operations, IOC, counterintelligence/HUMINT company command post, OCAC, and reconnaissance operations center.

**CIS Support.** Communications and information systems support to CIC and IOC operations may vary based upon METT-T. All nodes will either possess or have access to MCCIS and the joint deployable intelligence support system (JDISS); other specialized applications; and connectivity with a full range of communications, such as JWICS, SIPRNET, NIPRNET, defense switching network (DSN), defense message system, voice, video teleconferencing, through either MEF command element common communications or unique intelligence battalion CIS capabilities. Examples of unique intelligence CIS assets include the following:

- VMU squadron remote receiving station.
- Radio battalion technical control and analysis center.
- Ground sensor platoon's tactical remote sensor system.
- IIP tactical exploitation group.
- Marine tactical electronic warfare squadrons' tactical electronic reconnaissance processing and evaluation system.
- Counterintelligence/HUMINT automated tool set.

#### **Geospatial Intelligence Communications and Information Systems Support**

*Marine Expeditionary Force.* Within the COC, the primary interfaces for GI&I access and retrieval include the MCCIS and the common GEOINT workstations (CGWs). These interfaces support the integrated production concept when connected to the MAGTF's LAN(s), WAN(s), and TDN. The integrated production concept is a basic principle of the NGA's emerging production processes to support the Services, CCDRs, and JTFs. The integrated production concept, supported by the geographic intelligence specialists and all-source intelligence analysts in the P&A cell, provides a collaborative production environment for GEOINT and all source intelligence products.

Connectivity between the MCCIS and imagery repositories mirror national geospatial information activities. This connectivity leverages the technologies and standards developed for collaborative planning, production, and dissemination. Intelligence analysts need a fundamental, common picture of the environment (i.e., COP and CTP) to provide all-source intelligence products to commanders, their staffs, and subordinate units.

Intelligence production collaboration between geographic intelligence specialists and all-source intelligence analysts is a key factor in developing and sustaining the COP and CTP and satisfying MAGTF intelligence requirements.

Effective GI&I support to the MAGTF staff depends on the connectivity of C2 systems and supporting CIS to the MCCIS. Appendix K contains a list of current and emerging MAGTF systems that need GI&I support. Linking each of these systems through the MAGTF TDN will enhance GI&I distribution and provide a collaborative environment to support hyper-linking critical information and intelligence into and out of the topographic platoon's geospatial database. Common usage of this geospatial database across all MAGTF systems supports the development of the COP and CTP and provides an integrated structure for battlefield visualization.

Figure 6-3 depicts a MEF battalion's C2 relationships and the flow of intelligence support. Figure 6-4 notionally depicts the integration of key topographic platoon elements into MAGTF command element intelligence operations and the CIS connectivity with subordinate units.

*Imagery Intelligence and Related Command and Control Nodes.* Within a theater, there are different levels of nodes, such as the combatant commander JIOC, the JTF J-2, and the JISE. Refer to Chapter 2 for national nodes for imagery intelligence, NST, and NRO information.

**Combatant Commander Joint Intelligence Operation Center.** The combatant commander, JIOC is responsible for fulfilling the intelligence requirements of the combatant commander and the subordinate commanders. By providing finished intelligence products supporting theater mission planning and execution, the JIOCs are the primary sources where subordinate JTFs receive intelligence support for their AOI.

*Collection.* Combatant commander J-2s retain full collection management authority over all ICRs against targets within their AOR. This authority may be delegated to a subordinate joint force commander (JFC). Validated collection requirements that cannot be satisfied by organic means, including imagery collection, are submitted to the CCMD JIOC.



Figure 6-3. MEF Intelligence and Intelligence Battalion Command and Control Relationships and MEF Intelligence Support Flow.

*Processing and Exploitation.* Each JIOC processes and exploits imagery in its particular theater. Downlinked imagery data signals may be transmitted to workstations for immediate exploitation and archiving.

*Production.* Combatant command and other Service intelligence centers production responsibilities are clearly delineated within the Department of Defense Intelligence Production Program (DoDIPP). The DoDIPP is structured to capitalize on the analytical and production resources of the entire DoD intelligence production community. The community on-line intelligence system for end users and managers automates DoDIPP procedures for stating and tracking theater intelligence requirements and other intelligence production requirements. Results from imagery exploitation and the annotated images may be incorporated into all-source intelligence products, standalone IMINT products, or various GEOINT databases.

*Dissemination.* Dissemination of digital products is done via the DCGS-MC; however, the primary dissemination medium for intelligence is SIPRNET. Along with e-mail distribution, the JIOC uses websites and portals as hubs to collaborate and post finished intelligence products.



Figure 6-4. Notional MEF G-2 CIS Architecture and Topographic Elements.

**Naval Forces.** During amphibious operations, the amphibious task force (ATF) and the MAGTF command element intelligence sections integrate operations. The principal intelligence C2 node is the amphibious task force intelligence center (ATFIC), located aboard the ATF flagship. The ATFIC is composed of designated shipboard spaces containing installed CIS systems that support the intelligence operations for the ATF and landing force. Standard CIS connectivity is available via JWICS, SIPRNET, NIPRNET, defense message system, and DSN. Access is provided through

the flagships general service (message) communication center and the special intelligence communications center within the ATFIC's ship's signals exploitation space. Similar support may be available to other landing force elements embarked on amphibious ships within the ATF.

Geospatial information and intelligence support is provided to the ATF intelligence center and other C2 centers via the JWICS network. Embarked geographic intelligence specialists and their equipment must be integrated into the ship's CIS network to be able to receive and disseminate GI&I. The integration of GEOINT assets must be coordinated with the ship's communication officer and the ATF's CIS officer to ensure access to the national production network and facilitate distributive production support. Access is necessary to enable pulling GI&I from afloat and other naval task force intelligence and GEOINT support facilities and providing tailored mission views to forward units in the MAGTF to support land-based operations.

This communications configuration also supports split-based ATF and landing force operations with focused support from reach-back facilities when shipboard topographic assets are either limited or not available.

#### National

**National Intelligence Support Team.** National level all-source, GEOINT, and other intelligence assets may deploy in support of JTF operations as well as to provide critical support through reach back and collaborative capabilities. National level intelligence assets may even function in direct support of the MAGTF. The national intelligence support team (NIST) is a tailored, national-level, all-source intelligence team deployed in support of commanders who are typically at the JTF headquarters level. However, support may also be provided to other commands during crisis or contingency operations. National intelligence support teams provide the following services:

- Support for coordinating with various national intelligence agencies.
- Analytical expertise.
- Indications and warnings.
- Special assessments.
- Support for targeting.
- Streamlined access to national intelligence databases.
- Other products and assistance facilitating RFI management.

National intelligence support teams are task organized based on mission, duration, team composition, and the capabilities required. Each deployed NIST is unique, though not self-contained. The teams depend on the supported command for logistic and other support because organic capabilities are limited to intelligence and unique CIS support.

**NOTE:** National intelligence support team members are typically drawn from the DIA, National Security Agency, CIA, and NGA (see Table 6-2). The DIA controls NISTs through the J-2 for deployment and administrative purposes. Once deployed, a member of any of the represented intelligence agencies may act as the leader of the NIST.

Central Intelligence Agency	Defense Intelligence Agency			
Two analysts	Three or more analysts			
Two communicators	One or more technicians			
Associated CIS systems	Associated CIS systems			
National Security Agency	National Geospatial-Intelligence Agency			
<ul> <li>Five to 12 personnel that include analysts, technicians, and communicators</li> <li>Associated CIS systems</li> </ul>	<ul> <li>One or more imagery analyst</li> <li>One or more geospatial analyst</li> <li>Associated CIS systems</li> </ul>			
Each NIST is task organized for the supported commander's mission needs. CIS systems will include JDISS, JWICS, JMICS, Global Broadcast Service, IBS, and other secure voice communications, imagery exploitations suites, special communications links, and systems.				

Table 6-2.	Notional Com	position of a	National Intellige	ence Support Team.
			mational interinge	

National intelligence support team CIS capabilities are also task organized and may range from a single agency element with voice connectivity to a fully equipped NIST with JDISS and JWICS video teleconferencing capabilities. Methods of operation continue to rely on communications paths to support deployed NIST elements that are provided by the agency and supported command. National intelligence support teams are attached in direct support of the JFC or other supported command for operations concerning command and control through the JTF J-2. The NIST analyzes the J-2's RFI, collection, and production requirements to determine which sub element(s) should be responsible for each request for action. Then the leaders of the tasked NIST elements conduct liaison with their parent agencies. All intelligence generated by the NIST is available to the J-2, JFC, and other elements of the JTF, with restrictions based on clearance and programs.

**NGA.** The Director, NGA, coordinates national CIS support to the Services and national intelligence agencies. The NGA establishes CIS interoperability standards and data formats for all GI&I operations. The Services and intelligence agencies use these standards and data formats to support interoperable planning, direction, production, and dissemination of GI&I.

An NGA customer support response team may either be integrated into a NIST or deployed in direct support of a military force. The customer support response team typically has a deployable imagery and geospatial server that is known as the quick response system (QRS). The QRS is a self-contained unit, requiring only satellite communications channel access support from the JTF or another supported unit. The JTF J-2 coordinates the required satellite communications channel and specific communications security support for the QRS through the J-6. The NIST may need other mission-specific CIS and related support from the supported unit, including information systems technical support and an access controlled secure area that is within the supported unit's tactical sensitive compartmented information facility.

During operations, the customer support response team for the QRS can provide a MAGTF with a range of imagery and geospatial information support. In garrison, NGA's geospatial, technical representatives within each MEF's command element assist with NGA coordination, special assessments, access to databases, and requests for intelligence. When needed, NGA can provide MAGTFs with temporary specialized equipment to meet unique operational needs or to

satisfy critical deficiencies. For example, the modular remote replication system has been provided to deploying MEUs as a bridge reproduction system until the Marine Corps acquires an organic capability.

Joint Task Force J-2. The JTF J-2 organizational structure is determined by the JFC and varies with the situation and the mission. The JISE is the principal intelligence C2 node within the JTF J-2 and is the focus for JTF intelligence operations. The JISE provides the JFC and component commanders with situational awareness and other intelligence support regarding adversary air, space, ground, and maritime capabilities and activities. If a NIST is provided in support of the JTF, it generally will integrate its operations within the JISE. The following are some key JISE functions and capabilities:

- Providing collection management support.
- Providing order of battle analysis.
- Identifying threat centers of gravity and critical vulnerabilities, including critical capabilities, requirements, and vulnerabilities.
- Providing intelligence support to targeting and force protection.

All GI&I collection, production, and dissemination activities will be conducted within the JISE. Once initial GI&I products and support have been provided to a JTF and its components, updates will be accomplished by the JISE using push/pull dissemination techniques. Intelligence based on JDISS and JWICS CIS gives the JTF the ability to query theater and national GEOINT servers and databases to obtain the most current intelligence (see Figure 6-5).



Figure 6-5. National Intelligence Support Team Reach Back Capabilities.
*Multinational.* Geospatial information and intelligence sharing between the MAGTF and allied forces is an important accommodation during both combined and multinational operations. Combatant commands and subordinate JTFs can request from NGA the authority to disclose and release geospatial information to coalition and allied nations.

A JTF must be interoperable with and have access to theater geospatial databases as well as allied and coalition force databases and GI&I dissemination systems. For example, GI&I may be stored on a system, such as the Linked Operational-Intelligence Centers, Europe. This automated system serves as the primary means for exchanging information with members of the North Atlantic Treaty Organization.

## **JOINT COMMUNICATIONS AND INFORMATION SYSTEMS**

A range of national, theater, and component CIS is available to joint and subordinate commanders. The continuing evolution of national and DoD CIS technologies and architectures provides a robust, flexible capability that can be leveraged by the MAGTF (see Figure 6-6). While these systems are designed and used primarily to transfer traditional intelligence and operational information, they can also be used to disseminate basic, current, and estimated GI&I. However, the existence of these capabilities does not ensure that GI&I can be disseminated without significant planning and coordination across all command echelons.



Figure 6-6. Joint Counterintelligence and Security Communications Architecture.

#### Planning

When planning CIS requirements, the CCDR, JTF GEOINT officer, and MEF ISC identify the mission and tasks, formulate, and coordinate the CONOPS, consider joint and Service doctrine and capabilities, and then determine the specific mission requirements. Each echelon of command must work closely with all force intelligence and CIS staffs and subordinate commanders to determine GEOINT data bandwidth requirements and data transmission priorities. They must also work together to develop primary and alternate CIS plans. Supporting communications paths should address connectivity with the Defense Information Systems Network to allow for the transmission of large geospatial information and GEOINT files.

#### **Mission Objectives**

As specific mission objectives of the JFC and each of the subordinate component commanders are framed, intelligence and GEOINT planners develop a list of the subordinate joint force GI&I assets and assets assigned from national and Service sourcing. Following the specific timelines for planned operations, planners will produce an estimate of the data bandwidth and other CIS requirements needed to fill gaps in geospatial data transmissions.

### **Communications and Information Systems Plans**

The JTF and MEF J-6/G-6/S-6, assisted by the J-2/G-2/S-2, determine the specific CIS plan to ensure GI&I CIS interoperability between the MAGTF and the other components of the joint force. The plan should include—

- A node-to-node layout of existing and planned CIS transmission routes and modes.
- Identity of all organizations and units to be included in the CIS architecture.

# **MAGTF COMMUNICATIONS AND INFORMATION SYSTEMS**

#### **Architecture Planning**

The transmission and dissemination of GI&I is evolving continually. The DoD GEOINT community is involved in ongoing research to develop newer, faster, and more effective ways to transfer the large data files associated with GI&I.

The MAGTF GI&I and CIS staffs and intelligence battalion must carefully plan and then coordinate CIS architecture requirements with the intelligence and CIS officers from the CCDRs and other Services; JTF, NGA, and other continental United States (CONUS)-based GI&I support activities; and the G-2, G-3, and G-6 of subordinate units. Prepositioned geospatial databases reduce MAGTF TDN bandwidth requirements for the transmission of GI&I throughout the MAGTF; therefore, units should deploy with the most current GI&I on electronic media. The ISC, in coordination with the MEF G-2, G-6, and GEOINT section, must develop, acquire, and establish adequate GI&I CIS support for higher, adjacent, and subordinate commands prior to operational deployment.

### System Planning

Marine air-ground task force communications links include satellite, microwave, radio, landline, LANs, and WANs. After the G-2/S-2 and ISC identify and coordinate intelligence CIS operational requirements with the G-6/S-6, the system planning and engineering process is used to determine the type and number of circuits required, circuit routes, and frequency and bandwidth management communications protocols (e.g., bit rate and parity). The process also determines network protocols and security, management requirements, and other considerations required to make the MAGTF CIS architecture function effectively. Concurrently, the ISC and intelligence battalion's systems administrator must design and modify intelligence databases to meet mission-specific requirements. They must also ensure all echelons of the MAGTF can understand and access intelligence databases. The MAGTF will need CIS connectivity with the following staffs, units, and organizations:

- Subordinate commanders.
- JTF headquarters.
- Other Service components headquarters and key subordinate units.
- NGA.
- Marine Corps CGSAs.
- Other national assets with geospatial database holdings.
- Coalition geospatial databases.

The MAGTF G-6/S-6 may request Defense Information Systems Agency [DISA] leased or nonorganic theater communications resources. The G-6/S-6 requires the following detailed information from the ISC for formal request documentation:

- Type(s) of telecommunications support.
- Planned location(s).
- Operational activation and duration times.
- CIS equipment to be used at all locations.
- Estimated digital geospatial traffic volumes, precedence, and security levels.
- Recommended establishment and restoration priorities.
- Funding.

## **Planning Considerations**

**Client and Servers.** Geospatial information and intelligence operations are moving toward more effective push/pull capabilities. The push function requires that national- and theater-level producers of GI&I automatically send updated data or data required for navigation safety to either every node in the force or to a special distribution list of known users. The pull function allows forces to browse through geospatial data files and acquire relevant information based upon their specific needs. Data may reside on a distributed network that remains virtually transparent to users; however, the data is accessible to many global servers.

**Database Management.** The ISC, assisted by the MEF GEOINT section, must identify the database management requirements for each particular operation. All users should be able to add value to and update the geospatial database. Updated data must be disseminated quickly to all

pertinent users in the area of operations, to the theater database, and to NGA for inclusion in the DoD geospatial information warehouse. The GEOINT officer (in coordination with subordinate command GI&I representatives), the ISC, and the CM/DO should identify a single POC for all MAGTF in-theater database management actions. This database manager reviews and validates any value-added data before it is disseminated. Typically, this POC resides with the intelligence battalion CM/DO, P&A OIC, or the topographic platoon commander.

Alternate Methods of Dissemination. The ISC and CM/DO must identify and evaluate alternate methods (e.g., hard drive, CD-ROM [compact disc read-only memory], tape) to distribute GI&I to subordinate units that lack sufficient bandwidth connectivity to receive electronic products. Distribution of such products via courier must be coordinated with the G-1/S-1 and the receiving unit's intelligence officers. Dissemination of bulk GI&I products (e.g., maps) must be coordinated with the G-4/S-4 supply officer to ensure that standard supply distribution support is available. Refer to MCRP 3-30B.2 for additional information regarding MAGTF CIS planning and operations.

# UNITED STATES IMAGERY AND GEOSPATIAL INFORMATION SYSTEM

The USIGS is an NGA-developed architecture compatible with the DoD Joint Technical Architecture and defense information infrastructure common operating environment. The USIGS provides a client and server capability for the storage and dissemination of imagery, IMINT, GI, and GEOINT. File servers or CGSAs will exist at different command echelons and intelligence agencies to support mission needs. The National Information Library—the largest of the national GILs—stores national imagery, selected tactical imagery, and thematic layers of geospatial information and GEOINT. The CGSA CCDR maintains theater-specific data to support particular missions. Connectivity between national, theater, and tactical CGSAs affords the MAGTF the ability to leverage the collaborative and distributed production capability inherent in the design of the USIGS architecture.

# MARINE CORPS PLANNING FACTORS DATABASE

The Marine Corps PFDB provides a digital process by which the GEOINT section and intelligence battalion staff can identify and prioritize MAGTF GI&I requirements. The PFDB can be used to develop and submit digital and hard copy area requirements in support of the deliberate and crisis planning processes. The PFDB uses selectable user profiles, system databases, quantity matrices, and mission profiles to establish required features and attributes to support current or future operations. Each user and mission profile, with associated requirements list, can be forwarded to the Imagery and Geospatial Intelligence Branch, HQMC, for updating the Marine Corps PFDB. Submissions on geographic area requirements should be forwarded to the appropriate combatant command through the operational chain of command. The PFDB incorporates Marine Corps common hardware and software and is interoperable with both national and theater requirements analysis systems. The PFDB uses standard LAN and WAN networks to access NIPRNET, SIPRNET, and JWICS architecture via the MAGTF TDN.

## **OPERATIONS AND SUPPORTING COMMUNICATIONS AND INFORMATION SYSTEMS**

Specific task organization, command relationships, and CIS supporting MAGTF GEOINT operations is specified within Annexes B, C, and K of the OPORD or in a subsequent fragmentary order. Five key aspects of MAGTF GI&I operations include:

- The task organization and command and support relationships of MAGTF GEOINT units. The topographic platoon is collocated with the MEF command element G-2/S-2 and other elements of the intelligence battalion. The topographic platoon operates in general support of the MAGTF, with GISTs and GITs either attached to or in direct support of MSC and major subordinate element headquarters as required.
- The principal GI&I systems (e.g., CGSA and CGW) employed within and in support of the MAGTF.
- The communications connectivity, communications pathways, means, and level of security classification.
- The key information systems (e.g., tactical combat operations, MCCIS) supported by GI&I.
- The principal GI&I activities and product reports to be disseminated by communications pathways.

The DCGS-MC integrates surveillance and reconnaissance processing and exploitation capabilities into a single integrated net-centric capability (see Figure 6-7). The first increment of the DCGS-MC will integrate the CGSA and the topographic production capability into a common hardware or software baseline for GEOINT support. The DCGS-MC is interoperable with other DCGSs including—

- DCGS-Army.
- DCGS-Air Force.
- DCGS-Navy.
- DCGS-Special Operations Forces.
- DCGS-intelligence community.

Using the Distributed Common Ground/Surface System Integration Backbone (DIB) standards allows DCGS-MC interoperability with all other agencies that comply with DIB standards, such as NGA, NSA, NRO, DIA, and some allied and coalition forces, as well as the national intelligence architecture. The DCGS-MC supports multidiscipline joint, national, multinational (coalition and allied) force commanders, JTF commanders, and below with critical multi-source, multi-intelligence data and products to support JTF-level campaign planning and execution.

While aboard ships conducting amphibious operations, MAGTF units use the DCGS-MC in conjunction with DCGS-Navy assets for all ISR requirements. Once it is transitioned ashore, the DCGS-MC enterprise supports the naval forces through DCGS interoperability. The DCGS-MC connects intelligence analysts to multidiscipline national, joint and multinational organic

collection assets, data sources, and analytic assessments. It is the backbone of the MAGTF's ability to produce targeting information, correlate surveillance data and other intelligence, and rapidly disseminate information to MAGTF commanders to achieve decision superiority.



Figure 6-7. The Marine Corps Intelligence, Surveillance, and Reconnaissance Enterprise.

The DCGS-MC data feeds the COP. The DCGS-MC provides local data discovery and exposes designated MAGTF intelligence data, reports, and products to the DoD DCGS enterprise. The DCGS-MC can integrate sensor data from the broad range of current and planned Marine Corps tactical ISR and nontraditional ISR assets. It accommodates receipt of data via MAGTF command and control, LANs, the Global Information Grid, and directly from intermediate systems, such as UASs via direct data link, ground control stations, or the removable memory media. The DCGS-MC has three nodes: fixed, garrison, and expeditionary.

The MCISRE fixed-site node is hosted at the MCIA and supports information searching, archiving, and collaboration. The MCISRE fixed site provides data repository services and metadata tagging services that enable a requester to access specific information, data, products, or services. The MCISRE fixed site is the DCGS-MC exposure site for Marine Corps intelligence data and the Marine Corps metadata registry and catalog. Additionally, when bandwidth restrictions or the characteristics of combat prevent DIB exposure by a deployed MAGTF, the fixed site will serve as an entry point to MAGTF-produced information for national-level intelligence agencies and other external organizations, data, and products.

Garrison nodes, located at each MEF, provide the DCGS-MC with DIB-enabled functional capabilities (i.e., GEOINT, all-source analysis, SIGINT, MTI). They mirror the basic capabilities of expeditionary nodes and, where required, include increased capability (e.g., additional data storage). Garrison nodes can be deployed if necessary. Garrison nodes provide the MEF with the capacity to duplicate capabilities of deployed MAGTFs while serving broader remain behind MEF elements. Garrison nodes are also located at each MEF intelligence center, regional intelligence training center, and joint reserve intelligence center. These centers provide reach-back support to deployed forces, expose data to the larger DCGS enterprise, and provide a baseline intelligence capability for federated production with MCISRE guidelines.

The expeditionary nodes are linked to the garrison and fixed site nodes. Expeditionary node equipment and capabilities can be scaled to support any size MAGTF. The primary role of the expeditionary nodes is to provide processing, exploitation, analysis, and production capabilities to deployed MAGTFs. When deployed with a MAGTF, expeditionary node capabilities include the ability to maintain local, tactical intelligence data storage and expose MAGTF intelligence data within the MAGTF, as well as to multidiscipline joint, national, multinational partners. Due to frequent bandwidth restricted operations (i.e., aboard ship or during remote operations), the MAGTF commander retains control of the amount of information exposed directly to the larger DoD DCGS enterprise, MCISRE garrison nodes, and the fixed-site node.

#### **Geospatial Intelligence Information Management Services**

Geospatial intelligence information management services provide the MAGTF and other users with a comprehensive national and commercial imagery collection management capability. As the primary tool for imagery collection needs, geospatial intelligence information management services—

- Allow MEF collection managers to generate national and commercial imagery requests, search, and order simple to complex GEOINT products, visualize data, and provide mission awareness.
- Enable collection managers to compute, display, and monitor enterprise metrics.
- Task and transmit to collection, exploitation, production, and dissemination organizations the geospatial intelligence needs (formally known as nominations), which, upon validation and prioritization are automatically transferred to the appropriate review authority.

#### **Unmanned Aircraft Systems**

Full-motion video feeds have been the most effective use of UAS. This live video coverage of enemy actions or friendly events has contributed more to the commander's situational awareness than any other system in the commander's inventory. See Appendix G for additional information regarding UAS equipment and performance characteristics. The following sections discuss UAS CIS resources.

**MQ-9 Reaper.** The MQ-9 Reaper is primarily employed as an intelligence-collection asset and because of its significant time over target capabilities and wide-range sensors, the multi-mode communications suite can also preform surveillance and reconnaissance, among other missions.

*Video and Data Distribution Networks.* Video and data distribution networks provide a multilayer distribution capability that ensures multiple paths for UAS imagery and reduces latency for high priority users.

Supported units in the field can receive video and telemetry directly from the UAS using organic systems. Other units or headquarters equipped with a transmitter and within range of the UAS can also receive the same video imagery.

For situations where a remote unit or agency desires video and telemetry data, communications architecture that can facilitate the transmission of large volumes of FMV and telemetry data need to be developed by the MAGTF G-6.

Marine UASs provide an interoperable data stream that is compliant with NATO STANAG [standardization agreements]. The data stream interfaces or plugs in to systems devised by the MAGTF G-6. The plug-in would be applied to a system integral to the unit operations center and COC. The unit operations center and COC would then provide the interface for the DCGS-MC. Consequently, all MAGTF units connected to the DCGS-MC should have access to the video and telemetry data provided by the UAS; however, the data should be at an increased level of imagery latency (see Figure 6-8).



NOTE

MCIA and the Imagery Interpretation Platoon & Topographic Platoon are the Marine Corps' principal Imagery Intelligence/Geospatial Intelligence processing and production organizations. Within the MEF, the Production and Analysis Cell, Intelligence Battalion is the principal all-source processing and production organization.



Figure 6-8. Marine Corps Imagery Architecture.

*Wide-Area Airborne Surveillance Sensor and Moving Target Indicator.* The wide-area airborne surveillance sensor and the MTI are the primary operating modes for the radar. They detect, locate, and identify slow-moving targets. By focusing on smaller terrain areas, the radar image can be enhanced for increased resolution display. High resolution enables analysts to identify moving targets.

**Synthetic Aperture Radar and Fixed Target Indicator.** The SAR and fixed target indicator (FTI) produce a photo-like image or map of a selected geographic region. A SAR data map contains precise locations of critical non-moving targets, such as bridges, harbors, airports, buildings, or stopped vehicles. The FTI display is available when users are operating in the SAR mode to identify and locate fixed targets within the SAR area. The SAR and FTI capability, used in conjunction with MTI and MTI history display, allow for post-attack assessments made by onboard or ground operators following a weapon attack on hostile targets.

#### **Geospatial Intelligence Communications and Information Systems Planning Considerations**

The MAGTF CIS requirements and planning considerations for GEOINT operations include the following:

- Ensuring the MAGTF command element and subordinate elements are included in the distribution of IMINT-related address indicator groups to receive pertinent tactical, theater, and national intelligence and GEOINT products.
- Determining, establishing, and coordinating communication requirements and operational procedures in support of GEOINT operations.
- Coordinating IMINT CIS activation and restoration priorities and supporting procedures.
- Identifying and procuring community security materiel system requirements for unique IMINT communications.
- Determining and coordinating intelligence network information systems requirements in support of IMINT operations, such as hardware, software, internet protocol addresses, accreditation, or authority to connect and operate.
- Integrating MAGTF IMINT element CIS operations with those of other MAGTF, pertinent JTF, and other components intelligence and reconnaissance units, such as mutual support and cueing.
- Integrating CIS of IMINT elements employed in general support with collocated GCE, ACE, LCE, and other MAGTF elements.
- Coordinating MAGTF GEOINT databases administration and operations.
- Coordinating GEOINT CIS and TCPED operations and procedures with other Services, as well as allied and coalition forces.

# CHAPTER 7. SECURITY

## RESPONSIBILITIES

The DoD and NGA are responsible for DoD GI&S activities, to include security. Marine Corps personnel preparing, storing, distributing, and using GI&I and related data are responsible for ensuring security, classification, and proper release in compliance with Department of Defense Instruction (DoDI) 5200.01, DoD Information Security Program and Protection of Sensitive Compartmented Information (SCI). Unit security managers are responsible for administering the GI&I classification management program through its classified material control center. All personnel are responsible for safeguarding GI&I and related data at a security classification level commensurate with its sensitivity.

## CLASSIFICATION

National Geospatial-Intelligence Agency GEOINT products and related data should be classified to the degree needed to assure adequate protection against unauthorized disclosure. Security classification and control marking requirements for GEOINT products and data are based on the same criteria used for other military intelligence products and data. However, the following unique security requirements should be considered when handling NGA products and data:

- Requirements established by other governments as spelled out in bilateral agreements must be honored. Some bilateral agreements specify that the GI&I products prepared or obtained under the agreement shall be classified. However, NGA prefers to publish unclassified GI&I products whenever possible to facilitate their storage, handling, and distribution.
- Most NGA medium- and large-scale products of foreign areas are typically not releasable outside the US Government without prior approval, even though they are unclassified. Maps in this category are marked with both controlled unclassified information and limited distribution statements. Likewise, most products either prepared or obtained under bilateral agreements are restricted from release outside the US Government without prior approval from NGA.
- The release of GI&I products of foreign areas may be governed by international agreements and policy considerations.
- National security policy may direct that certain GI&I products covering areas of strategic or tactical importance and prepared from sensitive source materials be classified commensurate with the security classification guidance of the primary sources used in their preparation.

- The source having the lowest classification or least restrictive requirements should be used as the cover source when several sources—which may have different classification and release restrictions—are equally available for production.
- Marines must be aware of the rules regarding classification of the products they produce as well as those produced by other professionals. Marines must reference the Consolidated NGA Security Classification Guide, Executive Order 13526, Classified National Security Information, and Executive Order 12951, Release of Imagery Acquired by Space-Based National Intelligence Reconnaissance Systems, are just two of the references on classified material.

# CLASSIFICATION GUIDANCE FOR NEW GEOSPATIAL INFORMATION AND INTELLIGENCE

The topographic platoon commander, subject to the direction of the intelligence battalion commander and the operations company commander, is responsible for assigning both the classification level and the duration the classification must remain in force for all MAGTF-generated GI&I products and databases. The topographic platoon commander follows the classification guidance established by MEF, JTF, or other authority. Additionally, the topographic platoon must develop local security procedures for preparing and monitoring production and dissemination plans and for project specifications based on guidance from the MEF G-2, intelligence battalion commander, and command security manager.

#### **Geospatial Information and Intelligence Products and Databases**

The following factors must be considered when maintaining GI&I products and databases within the MAGTF:

- Maintenance, recompilation, value adding, intensification, or revision of planimetric and relief features previously compiled will require review of security classification based on the new sources used.
- Products and databases must be classified with the same classification as the revision sources if classified features are identified and added.
- Information depicted in the margins of GI&I products and databases cannot reveal that classified sources were used, either by date or other pertinent recorded information.

#### **Guide Preparation Considerations**

The factors discussed in the following sections must be considered when preparing a security classification guide or before providing final security classification guidance for new or revised GI&I products and databases.

**Bilateral Agreements.** Bilateral agreements provide for classification of GI&I products and databases. Some bilateral agreements stipulate that products and databases resulting from sources subject to the terms of the agreements must be classified. Consequently, large- and medium-scale GI&I products and databases covering certain countries must be classified to protect US relations with those nations.

*International.* Security classification requirements for an international organization, such as NATO, must be considered in the production of GI&I products and databases related to that particular international pact organization.

*Military Installations.* A large-scale GI&I product or database that identifies military installations must be classified unless public knowledge of the installation and its location is readily available in the news media or other open sources. The minimum level of classification required to protect sensitive installations is CONFIDENTIAL. If the source information is classified at a higher level and there is no requirement for sanitizing, then the product must be classified commensurate with the source. The following criteria should be considered in determining the classification of GI&I products and databases related to installations:

- An installation is considered sensitive if it serves a critical military function and if the knowledge of its existence and location would make it a primary target during wartime.
- For products prepared under cooperative agreements, the security classification indicated by the country involved will be honored and all sensitive installations so indicated will be appropriately protected.

*International Boundaries.* Security classification and control of GI&I products and databases portraying international boundaries should conform to the following criteria:

- If one of the portrayed nations participates with the United States in a bilateral agreement that requires security classification of products and databases prepared under that agreement, then the security classification must be honored unless the nation waives the requirement for similarly protected border sheets.
- If the security classification on any of the previously prepared GI&I products or databases was based on either sensitive sources or sensitive installations, then these products should be examined for the current sensitivities and declassified when appropriate.

# DISCLOSURE AND RELEASE OF NATIONAL GEOSPATIAL-INTELLIGENCE AGENCY CLASSIFIED PRODUCTS AND DATABASES

Only NGA or the CCDR can disclose and release classified NGA products, databases, or related data to requesters not affiliated with the Marine Corps or DoD. The ISC must provide detailed justification to support all decisions to disclose or release classified NGA products.

## National Geospatial-Intelligence Agency Policy

Disclosure may be made only with the approval of NGA. Classified NGA products and databases may be shared with foreign countries and international organizations only when there is a clearly defined US advantage. Disclosure of classified GI&I products and databases must comply with the guidance set forth in the JTF's published security guidance.

#### **Disclosure Procedures**

Handling a request for disclosure should be done expeditiously to maintain good relations and to ensure good treatment for pending or subsequent US disclosure requests. All requests for GI&I products and databases to support war plans and combat operations should be forwarded thorough the appropriate GI&I channels to the theater or CCDR geospatial officer for action. The ISC or unit G-2/S-2 is responsible for this process within MAGTF units. Requests for release of NGA GI&I products and databases may be approved if they meet the criteria outlined in appropriate NGA directives. An authorized NGA disclosure official must approve all disclosures and denials. Requests that do not meet the stated criteria will be denied unless an exception to national defense policy is granted.

#### Release of National Geospatial-Intelligence Agency Classified Material

Only the Director, NGA can authorize the physical release of NGA classified material to a representative of a foreign country. Physical release must conform to the policies set forth in DoDD 5230.11, *Disclosure of Classified Military Information to Foreign Governments and International Organizations*.

# RELEASE OF NATIONAL GEOSPATIAL-INTELLIGENCE AGENCY UNCLASSIFIED PRODUCTS AND DATABASES

It is the policy of NGA to provide unclassified GI&I products and databases to US Government agencies, the general public, and domestic commercial firms whenever possible. These products and databases are provided without compromising DoD plans, programs, and operations that require protection in the interest of national security. All NGA products and databases are the property of the DoD and are to be used in the best interest of the US Government.

#### **Release Categories**

Release of unclassified NGA GI&I products and databases is divided into three categories: fully releasable, releasable at NGA's option, and not releasable.

*Fully Releasable.* The products and databases in this category are typically offered for public sale as listed in pertinent NGA directives and catalogs.

**Releasable at the Option of NGA.** Certain NGA products and databases, including medium-scale (1:250,000) and large-scale (1:100,000, 1:50,000, and larger) materials covering foreign territories, are releasable at the option of NGA. Consequently, they may carry cautionary notes and handling warnings as set forth in DoDI 5230.24, *Distribution Statements on DoD Technical Documents*.

*Not Releasable.* Certain unclassified NGA products and databases may not be releasable to requesters outside the DoD because of existing bilateral agreements that preclude further dissemination or distribution. These products or databases typically carry cautionary notes or release warnings reflecting the specific restrictions.

#### **Release Guidance**

Geospatial information and intelligence products and databases are technical information packages prepared to meet DoD requirements. The release of this information depends on National Security Policy considerations. When possible, NGA products and databases are produced, stored, and distributed on an unclassified basis to facilitate their use by military forces. However, their release to either private or international users is subject to review by a designated NGA official. This review ensures that national security policy considerations and certain provisions of bilateral and international agreements are not compromised. In general, small-scale (1:500,000 resolution or smaller) NGA products and databases are releasable to the general public. Exceptional circumstances preclude some special or specific products from being released. Requests for releasing GI&I products and databases must be confirmed through appropriate GI&I channels with either the CCDR or the Imagery and Geospatial Intelligence Branch prior to release.

## DISPOSAL OF GEOSPATIAL INFORMATION AND INTELLIGENCE PRODUCTS AND DATABASES

In time, the NGA GI&I products will become obsolete, be declared surplus, or be superseded by other products, requiring disposal. The appropriate manner for disposing of these products is determined by the security classification level or affixed handling warnings.

#### **Disposal of Classified Products and Databases**

Classified GI&I products and related data must be destroyed per the regulations governing the destruction of classified materials described in SECNAVINST M5510.36, *Department of the Navy Information Security Program*, and appropriate NGA directives.

#### **Disposal of Unclassified Products and Databases**

The NGA policy for disposing of superseded and obsolete products and databases that are not authorized for public sale contains the following provisions:

- Disposal of unclassified GI&I products and databases at scale densities of 1:500,000 equivalent and smaller can be used for pulping, reclamation, destruction, or any ecologically compatible manner that precludes resale. The products can be reused as memo pads, forms, calendars, or for any requirements of the US or local Government.
- Disposal of unclassified GI&I products and databases at scale densities of 1:250,000 equivalent and larger (e.g., 1:50,000 or city graphics) must be destroyed by pulping, shredding, burning, destruction, or other ecological compatible manner that precludes the reuse of that product. These products cannot be reused as memo pads, forms, or calendars.
- Recycling process requires excess stock be cut and bound for use as memo pads, calendars, scratch pads, and similar use items.
- Recycling process (cutting and intermixing) of excess stock must be done within a US Government or military facility by personnel assigned to the respective agency or facility.
- Recycling must be accomplished in such a manner so that users cannot easily reconstruct the original product.

- Recycled products may only be made available to personnel assigned to such facilities with specific instructions that will preclude further distribution.
- Recycled products are not to be made available for public sale.
- Maximum pad size produced from excess limited-distribution stock must not exceed one fourth the size of the original product.

The MEF GI&I section must be notified to coordinate the movement of the excess stock to the nearest for disposition when unclassified excess stock cannot be recycled for use within a command or properly destroyed. At the Defense Logistics Agency Disposition Services office, the product will be destroyed using the appropriate process, such as shredding, pulverizing, or burning.

# CHAPTER 8. TRAINING

Headquarters, Marine Corps IID, IIS and ISR-GEO, in conjunction with the Training and Education Command, the National Geospatial Intelligence College (NGC), and Marine Corps Intelligence Schools (MCIS) are responsible for designing, implementing, and maintaining a GEOINT training and education program that includes the following:

- Local training plans that reflect GI&I training. Topics should cover—Datums.
- Coordinate conversions.
- Requisition procedures.
- Support capabilities.
- Geodesy.
- Computer operating systems.
- Geodetic control and coordinate computations.
- Surveying operations.
- Synthesis of GI.
- Remote sensing concepts and applications.
- GIS concepts and applications.

Unit training plans should cover-

- Imagery.
- Imagery platforms and sensors.
- GEOINT data types.
- Post-processing techniques.
- Collection plans.
- Software and hardware
- Established and emerging dissemination techniques.
- Production management.
- Full spectrum geospatial intelligence.

## **ORGANIC TOPOGRAPHIC TRAINING**

The topographic platoon commander and topographic platoon chief are responsible to the intelligence battalion commander for implementing training requirements, including the following:

- Database management training.
- MOS proficiency sustainment.
- Unit SOPs for production.
- Equipment operation and maintenance.
- The leadership within imagery, FMV, and MTI sections are responsible to the imagery analysis specialist, geographic intelligence specialist, and unit commanding officer for implementing training requirements.

#### Requirements

Initial training for all geographic intelligence specialists assigned to GI&I billets is conducted via the basic geographic intelligence specialist course (BGIS) at MCIS, which is located in Dam Neck, Virginia. The occupational field sponsor for the geographic intelligence specialist community at HQMC, IID, IIS, manages the assignment to intermediate training via the intermediate geographic intelligence specialist (IGIS).

Initial training for all imagery analysis specialists is conducted via the tactical imagery analysis course (TIAC), which is taught at MCIS located in Dam Neck, Virginia. The HQMC-IID, IIS, Occupational Field Management Section, in conjunction with the occupational field monitor and sponsor, manages student assignments to the operating forces as well as orders to many of the follow-on and intermediate training courses.

#### **Training Objectives**

Training for MAGTF geographic intelligence specialists should include the following:

- Topographic production planning and employment.
- Terrain analysis.
- Hydrographic analysis.
- System administration.
- Geospatial database management.
- IPB application.
- METOC use.

Training for MAGTF intelligence officers assigned to GI&I billets should include the following:

- Overview of Marine Corps GEOINT capabilities.
- Orientation and familiarization of topographic production.
- MAGTF mission profiles and typical GI&I products.
- NGA standard products and services.

Training for MAGTF IMINT specialists should include the following:

- IC, DoD, and Marine Corps intelligence structure and policies.
- FMV platforms, sensors, and exploitation systems.
- MTI platforms, sensors, and exploitation systems.
- Strategic, theater, organic, and commercial imagery platforms and sensors.
- DoD and Marine Corps imagery exploitation networks, systems, hardware, and software, as well as basic system administration.
- Identification of tactical orders-of-battle.
- Report writing and dissemination systems.
- Support to MAGTF through imagery and IMINT products.
- Exploitation techniques to extract EEIs.
- Tools for discovery, retrieval, and exploitation of imagery and geospatial data.
- Littoral studies in support of amphibious operations.
- LZ studies in support of fixed- and rotary-wing MAGTF assets.
- LOC studies in support of MAGTF assets.

#### **Planning and Employment Training**

Geographic information and intelligence planning and employment training is provided as part of the formal training for—

- Intelligence Officers (MOS 0202).
- Ground Intelligence Officers (MOS 0203).
- Air Intelligence Officers (MOS 0207).
- Intelligence Operations and Fusion Warrant Officers (MOS 0205).
- Intelligence Specialists (MOS 0231).
- Intelligence Analysts (MOS 0239).
- Imagery Analysis Specialists (MOS 0241).
- Geographic Intelligence Specialists (MOS 0261).

Training for GI&I planning and employment is taught at a GIS staff officers' course. Planning and employment is also addressed in specialized courses on intelligence collection, processing, production, and mapping taught at the NGC. The topics discussed in the following sections are addressed during planning and employment training.

Planning and employment training is essential to preparing the IMINT specialist for intelligence operations in support of the MAGTF. This training provides—

- Familiarity with the nuances of setting up and configuring equipment for use on classified networks.
- Firsthand experience operating within the systems' constraints created by an expeditionary environment.
- Understanding of when and how to adjust production workflows to fulfill the MAGTF commander's intelligence requirements.

**Program of Record Training.** Marines receive basic system administration training on the DCGS-MC program of record during the tactical imagery analysis and the basic geospatial intelligence specialist courses. Subsequent formal and managed on-the-job training is needed to ensure analysts have a working knowledge of equipment set up, configuration, utilization, and tear down in austere environments. Each unit should establish its own training cycle to develop and enhance system administration proficiency.

*Maintenance Training.* First-echelon equipment maintenance is included as part of the BGIS and TIAC courses. Students are taught the fundamentals of how to set up and use the CGSA, including basic troubleshooting, during the introductory portion of. They then learn advanced troubleshooting and establishment of CGSA on the MCCIS. Supplemental maintenance training is completed within the units.

**Database Management Training.** Initial database management training is included as part of the BGIS and TIAC courses. Follow-on training is conducted during the IGIS course and is supplemented by other courses taught at NGC.

Production elements require significant amounts of storage space on local and network servers. The proper management of these storage elements—directory structure, proper data archive, and production workflows—ensures production cycles are not hindered by server failures and assists in federated production and collaboration through centrally located and properly managed working files.

## **MAGTF** Training

Geospatial information and intelligence production is incorporated into all MAGTF training. During training exercises, GI&I operations are conducted using various C2 support relationships to improve flexibility concerning organization and employment. Repeated exposure to GI&I capabilities and employment strategies enhances the MAGTF's ability to use GI&I effectively to increase situational awareness and shape operations.

**Command Post Exercise and Staff Exercise.** The production and use of GI&I should be included in all exercises. Training exercises should emphasize the planning of GI&I support requirements and production procedures, the dissemination of GI&I within MAGTF MCEN systems, and the use of GI&I within the MCPP. During an exercise, the unit intelligence officer should use the planning cycle and develop a realistic GI&I production plan. Geographic intelligence specialists and imagery analysis specialists are provided to the exercise control group, validate the planning and production plan, and demonstrate how to simulate the dissemination of mission-specific data from national and theater production facilities.

*Field Training Exercise.* Field training exercises may be used to practice geophysical data collection methods, such as geodetic surveys, topographic surveys, data collection, and terrain analysis. Field training exercises can be used to introduce analysts to exploitation procedures within the MAGTF IOC. They also provide operational context to integrate, intensify, produce, and disseminate tailored mission-specific data in support of command and control, intelligence, fire support, aviation, logistics, and maneuver operations.

The topographic platoon coordinates with staffs and units at all echelons of command. Interaction helps to increase the supported organization's understanding of GI&I in general and the capabilities therein. Geospatial information and intelligence detachments can be used in exercises at the regimental and Marine aircraft group levels.

# **TRAINING COURSES**

Basic and intermediate level GI&I training programs are available at MCIS, Dam Neck, Virginia. Alternative GI&I programs include correspondence courses and contractor- and vendor-supported training. Changes in operational concepts, individual training standards, and new technologies may cause significant changes in course offerings and curricula.

#### **Basic Level Courses**

**Basic Geospatial Intelligence Specialist Course.** The BGIS course, which lasts 130 training days, teaches the fundamentals of geospatial analysis to entry-level Marines (private through sergeant). The course is taught in two phases. The first phase is geodetic survey, which covers the basics of survey mathematics and computations, advanced map reading, GPS, total-station operations, and digital-level operations. The geodetic survey phase ends with a comprehensive phase completion exercise during which students employ all of the skills that were taught. The second phase is geospatial analysis, which addresses intelligence fundamentals; introduction to data types and formats; and familiarization of geodatabase functionality, GIS, and fundamentals of remotely sensed imagery (RSI). This phase concludes with an extensive cumulative course exercise, during which the students must perform to standards with a geospatial support team.

*Fundamentals of Spectral Exploitation and Analysis I.* Fundamentals of Spectral Exploitation and Analysis I is a one-week course taught at NGC on RSI fundamentals based on high-resolution imagery and terrain products. This course employs a combination of lecture and hands-on training. Students learn about basic multispectral satellite orbital concepts and commercial, civil, and military multispectral sensors; imagery import and digital enhancements; multispectral image interpretation; image terrain perspective views; and image map product generation. This course addresses the needs of entry level geographic intelligence specialists, MAGTF intelligence officers, and restricted intelligence officers assuming GI&I billets.

*Fundamentals of Spectral Exploitation and Analysis II.* Fundamentals of Spectral Exploitation and Analysis II is a one-week course taught at NGC. It is a follow-on to Fundamentals of Spectral Exploitation and Analysis I and employs a combination of lecture and hands-on training. The course provides students with a more advanced education on spectral imagery processing and literal and nonliteral spectral imagery analysis techniques. The course builds on the multispectral interpretation and manipulation techniques and processes previously taught and adds advanced digital image enhancement techniques, display and exploitation of hyperspectral imagery, terrain categorization, and fly-through techniques, emphasizing multiple image fusion. This course addresses the needs of entry-level geographic intelligence specialists, MAGTF intelligence officers, and restricted intelligence officers assuming GI&I billets.

**Geospatial Digital Data Users Course.** The GIS 2150 is an introductory-level course taught at NGC that provides instruction on exploiting the four data types using basic GIS software loads. Lessons introduce geospatial fundamentals and geographic translation software (GEOTRANS) and cover ordering NGA products using the Defense Logistics Agency map catalog. The course is taught using a combination of direct instruction followed by practical exercises that center on military scenarios. This course addresses the needs of entry-level geographic intelligence specialists, MAGTF intelligence officers, and restricted intelligence officers assuming GI&I billets.

*Fundamentals of Geographic Information Systems.* The GIS 2101 is taught at NGC and is designed for the beginner GIS user. It provides a working foundation in GIS to exploit NGA digital data and solve GEOINT problems. This course is recommended for MAGTF intelligence officers and restricted intelligence officers assuming GI&I duties.

**MAGTF Intelligence Analysis Course.** The MAGTF Intelligence Analysis Course educates Marine corporals up to the rank of gunnery sergeant, and is available to all Intelligence, SIGING, and METOC fields. Upon completion, intelligence analysts will be expected to exhibit a high degree of proficiency in analytic theory and application, the conduct of intelligence operations, and be knowledgeable in the supervisory aspects of managing the intelligence cycle across the MAGTF and wider JTF construct. Intelligence analysts also serve as the command's resident all-source training subject matter experts.

**Basic-Level:** Tactical Imagery Analysis Course. Active duty students in the tactical imagery analysis course are traditionally sergeants or senior corporals. Reservists are typically privates through sergeants. The tactical imagery analysis course is divided into 10 annexes and spans 91 training days (approximately 5 months). Each annex includes multiple graded events and ends with a comprehensive phase completion exercise during where students employ all skills taught within that annex as follows:

- <u>Annex A</u>: information assurance, classification procedures, intelligence doctrine, operations, maps and charts, intelligence writing, and impromptu briefing.
- <u>Annex B</u>: principles of imagery interpretation, sensor phenomenology, imagery platforms, the ATO, and collections.
- <u>Annex C</u>: identification of orders of battle and facilities.

- <u>Annex D</u>: research techniques and tools, use of software for production, symbology, and cross-referencing geographic locations between various data sources.
- <u>Annex E</u>: production techniques for extracting, analyzing, and annotating completed intelligence studies.
- <u>Annex F</u>: an introduction to full spectrum GEOINT and critical thinking.
- <u>Annex G</u>: dissemination methods.
- <u>Annex H</u>: imagery reports and briefs.
- <u>Annex I</u>: setup, basic systems administration, and teardown of the current imagery exploitation workstation.
- <u>Annex J</u>: the capstone exercise to familiarize the students with operating in a MAGTF IOC.

#### Intermediate-Level Courses

*Intermediate Geospatial Intelligence Specialist Course.* The second phase of the geographic intelligence specialist's technical and professional development is the Intermediate Geospatial Intelligence Specialist course. It is an intensive, 65-day training course that builds on the following key areas of technical proficiency introduced in the BGIS course:

- Conducting quality control of geodetic survey data.
- Importing and postprocessing geodetic data.
- Synthesizing GI.
- Creating and using geospatial databases.
- Developing a production strategy.
- Electronically disseminating products.
- Conducting predictive site selection.
- Conducting hydrographic analysis.
- Developing understanding and competence with advanced remote sensing concepts and applications.
- Understanding cultural analysis.

The course concludes with a comprehensive exercise covering the three levels of operations. The target population for this course is corporal through staff sergeant.

*Intermediate Geographic Information System for Analysis.* The Intermediate GIS for Analysis course is taught at the NGC and builds on the fundamentals in introductory level GIS courses. Students focus on using GIS to conduct geospatial analysis in a homeland security setting. Topics covered include geodesy, geodatabases, geocoding, geostatistical analysis, network analysis, spatial analysis, and 3-D analysis as well as building geoprocessing models. Students are evaluated with a comprehensive capstone project that encompasses the various concepts and techniques taught throughout the course. This course is intended for intermediate geographic intelligence specialists within the ranks of corporal through staff sergeant.

#### MCRP 2-10B.4, Geospatial Intelligence

*Intermediate Spectral Exploitation and Analysis I.* The Intermediate Spectral Exploitation and Analysis I course is taught at NGC and covers the basics of exploiting and analyzing multispectral imagery (MSI). This course is taught using a combination of lecture and hands-on training focused on the concepts and principles of RSI and GIS. Students learn about more advanced tactical and strategic sensors that allow analysts to perform common and advanced image processing routines more efficiently. This course is intended for intermediate geographic intelligence specialists within the ranks of corporal through staff sergeant.

*Intermediate Spectral Exploitation and Analysis II.* The Intermediate Spectral Exploitation and Analysis II course is taught at NGC and introduces the extraction and literal and nonliteral exploitation and analysis of spectral signatures using commercial and military hyperspectral data. This course combines lecture and hands-on training and covers more advanced hyperspectral sensors, atmospheric correction, anomaly and target detection, and the use of spectral libraries. This course is intended for intermediate geographic intelligence specialists within the ranks of corporal through staff sergeant.

**Geodatabase Design and Maintenance.** The Geodatabase Design and Maintenance course, taught at NGC, introduces students to the structure and capabilities of the geodatabase. Students learn how to create, manage, edit, and maintain data within the geodatabase framework. The course investigates several advanced concepts including building and managing networks in a geodatabase, creating and managing subtypes and domains, topological relationships, and schemas. Courseware is designed around the file geodatabase. This course is intended for intermediate geographic intelligence specialists in the ranks of corporal through staff sergeant.

*Intermediate-Level Training.* Intermediate level training is available in various skill areas by multiple government and nongovernment entities. Unit training managers should determine the most effective method of training for ensuring that IMINT analysts are properly prepared to meet mission requirements.

*Government and Nongovernment Training Sources.* The following list contains government and nongovernment training sources:

- Federal agencies.
- DoD agencies.
- Services.
- Corporations.
- Base education centers.
- Colleges and universities.

Delivery Methods for Training. The following list contains delivery methods for training:

- Resident courses and /formal schools.
- Primer courses.
- Mobile training teams.
- Computer-based training.
- Web-based training.

- Distance courses.
- On the Job Training.

*Training Considerations.* Since most follow-on training is provided by organizations outside the Marine Corps, leadership of imagery sections must ensure that analysts are able to integrate tactics and techniques into the MAGTF mission using existing methods while following established or emerging Marine Corps intelligence doctrine and operational concepts. Training managers are also responsible for ensuring that the knowledge and experience gained through training supports the unit mission and the Marine Corps mission by considering the following:

- Special hardware or software to make use of advanced exploitation techniques.
- Classification and releasability.

*Training Entities.* Creative utilization of available training resources ensures the individual analyst, unit, and occupational field are prepared to support the MAGTF mission. Funding and unit mission should be carefully scrutinized, and training managers should ensure training dollars are spent on the most qualified and deserving analysts. Training is available from the following resources:

- NGA College.
- Joint Intelligence Virtual University.
- National Intelligence University.
- Software vendors.
- Hardware vendors.

*Follow-On Training Subject Areas.* The subject areas discussed in the following sections should be considered essential to the continued development of individual analysts.

*Intelligence Writing.* The Intelligence Writing course, taught at NGC, is designed to improve communications, and give participants career-enhancing intelligence writing skills. The course includes a discussion of NGA style and community standards to be applied while planning, writing, and revising various NGA products. Core NGA intelligence products are used as the foundation of and examples for this course. The course focuses on defining the topic, significance, and outlook (what, so what, and then what) of intelligence issues; extracting information from collateral information to support a product; synthesizing data into clear, concise statements; and communicating well-organized, written information to defined customers. Students identify and apply aspects of critical thinking throughout the course. This course is intended for intermediate geographic intelligence specialists.

The ability to communicate the numerous pieces of information and intelligence on written reports is a skill needed by all intelligence analysts. Completed imagery and IMINT studies can often be difficult to disseminate due to network constraints and may need to be supplemented by textual reports.

#### Measurement and Signature Intelligence Introductory Courses

*Introduction to Commercial Remotely Sensed Imagery.* Introduction to Commercial RSI is a oneday course at NGC that teaches students the basics of commercial RSI. Due to the nature of the required course content, the course is delivered as a basic-level primer. The course ensures students can identify foundational RSI principles as follows:

- Facts and terms.
- Comprehend the general principles of:
  - Fundamental knowledge and theory.
  - Imagery systems and products.
  - How to obtain commercial RSI products.

Students learn basic commercial RSI facts regarding-

- Processes for acquiring and distributing data, products, and services.
- Security and protection requirements necessary for the operation of space systems and handling of commercial RSI-derived products.

This course is recommended for intermediate geospatial intelligence specialists, and MAGTF intelligence officers and tactical intelligence officers assuming GI&I billets.

**Commercial Imagery.** Marines must understand proper copyright procedures, as well as how licensing affects the dissemination of commercial imagery and data outside of licensed users. This knowledge affects the way Marines—

- Share data with various governments, agencies, nongovernmental organizations, and personnel during MAGTF operations, which can often be hindered by security classifications.
- Research, retrieve, exploit, and disseminate essential commercial data available to DoD entities.

# APPENDIX A.

# GEOSPATIAL INFORMATION AND INTELLIGENCE STANDARD PRODUCTS AND RESOURCES

## **STANDARD PRODUCTS**

#### **Beach Studies**

Beach studies provide detailed information on beaches and other points along the coastline that could support amphibious operations. See Appendix H for an example format of a beach study.

#### Helicopter Landing Zone and Drop Zone Studies

These all-source intelligence studies identify potential LZs and DZs based on terrain factors. These factors include vegetation, slope, surface materials, and obstacles. The analysis also identifies approach patterns, potential exits, total area, as well as major and minor axes of the LZ and DZ. Imagery and intelligence personnel provide commanders and planners with additional detailed intelligence analysis of potential LZs and DZs. See Appendix I for an example of an LZ and DZ study format.

#### **Hydrographic Studies**

Hydrographic studies focus on the oceans and inland bodies of water (e.g., rivers, lakes, streams) and littoral environments within the area of operations to support transportation and other requirements. These studies identify potential obstacles and their impact on maneuvering forces.

#### **Cover from Flat Trajectory Weapons Studies**

Cover analysis is a study identifying the key areas that offer protection and natural cover (e.g., ravines, hollows, reverse slopes) and artificial cover (e.g., buildings, trenches) The study considers surface roughness and vegetation.

#### **Concealment from Aerial Detection Overlays**

Concealment is protection from observation. This overlay is important for judging where the enemy might be located. It is particularly important in areas where guerilla forces might be operating because it helps the commander predict attacks. Concealment may be provided by woods, underbrush, snowdrifts, tall grass, cultivated vegetation, roof coverage, or any other feature that denies observation.

#### Lines of Communication Studies

All-source LOC intelligence studies provide detailed information on the transportation infrastructure within the area of operations. Studies regarding LOCs include textual and graphical information on the roads, railroads, bridges, tunnels, airfields, and by-passes. Imagery and intelligence personnel conduct detailed intelligence analysis of the transportation infrastructure to support logistics and operational forces.

#### **Tactical Studies of the Terrain**

The topographic platoon prepares studies of the terrain by using NGA baseline data sets to analyze the terrain within an area of operations. These studies focus on the military aspects of the terrain, referred to as KOCOA. Initially, the analysis is completed using foundation data that supports the IPB. Then, the analysis is intensified, producing MSDS, and is fused with operational all-source intelligence to provide detailed information on mission objective and target areas. See Appendix G for an example format of the tactical study of the terrain.

#### **Urban Studies**

Urban studies are high-resolution, specialized studies of the urban environment to support MOUT. The analysis is completed initially using foundation data in support of IPB and provides 2-D and 3-D battlespace views to support planning and rehearsal. Intensifying the analysis within defined objective and target areas and fusing with other intelligence provides tailored information in MSDS and other intelligence products.

#### **Cross-Country Movement Studies**

Cross-country movement studies identify severely restricted, restricted, and unrestricted terrain (i.e., terrain that is free of restrictions to movement) that is not improved specifically for vehicular traffic. It also identifies the types of vehicles that may travel across that terrain. Analysis includes factors such as vehicle and vegetation types as well as terrain slope, surface, and subsurface materials. The CCM analysis does not imply that a particular vehicle or group of vehicles cannot be operated in a severely restricted area; it identifies that maneuver may require modification to tactics and procedures. Typically, CCM databases are developed on enemy and friendly forces traveling in main battle tanks, medium track vehicles, and medium- and light-wheeled vehicles. The CCM information is not developed to reflect foot mobile forces because they are generally not restricted by any type of terrain environment.

#### **Modified Combined Obstacle Overlays**

A MCOO is an intelligence product used to depict the effects of the battlespace on military operations. It is a graphic terrain analysis on which significant IPB products and analysis are based. The MCOO may be portrayed using either actual maps and overlays or basic digital databases of the battlespace area evaluation, terrain analysis, and weather analysis phases of the IPB process. Modified combined obstacle overlays are fused products of GEOINT (i.e., GI&I, METOC, IMINT, and intelligence analysis). Typically, MCOOs depict all obstacles to mobility and consist of the following:

- CCM.
- Transportation infrastructure.
- Built-up areas.

- Rivers and water obstacles.
- Key terrain.
- Natural and constructed obstacles.
- Avenues of approach.
- Axes of advance.
- Mobility corridors.
- Friendly and enemy objectives.
- Contaminated areas.
- Air avenues of approach.

Modified combined obstacle overlays are produced during the IPB cycle, with significant collaboration between geographic intelligence specialists and MAGTF intelligence analysts.

#### Land Cover Analysis

Land cover analysis, often mistakenly called terrain categorization, is an analysis conducted from MSI or hyperspectral imagery. The primary purpose of this is to identify key vegetation and materials on the Earth's surface that would aid in mobility, cover, concealment, and vegetation analysis.

*Terrain Categorization Studies.* Terrain categorization studies are primarily land cover analysis amplified by infusing surface roughness effects on the terrain. They are primarily derived from MSI or hyperspectral imagery analysis and fused with digital elevation information.

#### **Three-Dimensional Visualization**

Visualization products in 3-D are split into the following three primary categories:

- <u>Static</u>. A static 3-D product is one that statically depicts terrain in three dimensions. It is computer generated from screen captures using various software. It can contain views from different perspectives and is typically printed using a standard printer. Product subtypes differentiate between different types of overlays draped on the terrain, such as imagery, maps, and vector data.
- <u>Dynamic</u>. A dynamic 3-D product, more commonly known as a fly-through, is a product that depicts a fixed-path animation over 3-D representation of terrain. Fly-throughs are typically delivered in standard digital movie formats (MPEG [moving picture experts' group] or AVI [audio video interleave]). Product subtypes differentiate between the types of overlays draped on the terrain, such as imagery, maps, and vector data.
- <u>Interactive</u>. An interactive fly-through is a product that shows a 3-D representation of terrain and allows the user to interact with the environment and change perspective on the computer. Products may include multiple intelligence sources related to the terrain and are typically distributed as VRML [virtual reality modeling language] data sets or GIS viewer kits. Product subtypes differentiate between the types of overlays draped on the terrain, such as imagery, maps, and vector data.

**Relief Products.** Relief products detail a spatial surface by depicting areas of elevation and depression and are commonly represented by contours, shading, digital terrain modeling, or spot elevations. Relief products can be produced from the series of digital elevation models that are currently in use by the GEOINT community, including the following:

#### • DTED.

- Digital elevation models from the US Geological Survey.
- Shuttle radar topography mission.
- Light detection and ranging.

Product subtypes differentiate with the types of overlays draped on the terrain (e.g., aspect, slope, elevation tint, shaded relief).

**Terrain Analysis Graphics.** A terrain analysis graphic is a custom product that fuses tailored analysis, depictions of a specific area, or hand-held photos in an effort to explain the terrain environment. Products may include many standard products, all depicted in one product over the same area. Product subtypes include standard terrain analysis graphics, beach analysis graphics, riverine analysis graphics, and terrain factor studies.

**Tailored Maps.** A tailored map is a product made to create, augment, or replace a standard NGA mapping product that requires specific mission elements, is not a suitable scale, is not current, or does not contain desired features. Product subtypes include imagery, vector, relief and vector data, scanned map derived, and radar. Imagery maps are differentiated by medium or high resolution (at or greater than 5 megapixels) and type of imagery (multispectral or panchromatic).

# DATABASES

#### Controlled Image Base Database

A CIB (controlled image base) database is an unclassified seamless data set of orthophotos made from rectified grayscale aerial images. It supports various weapons, command and control, CIS, mission planning, digital moving map, terrain analysis, simulation, and intelligence systems. A CIB database provides the following:

- Rapid overview of areas of operations.
- Map substitute for emergencies and crises.
- Metric foundation for anchoring other data in systems or image exploitation.
- Positionally correct images for draping in terrain visualization.
- Image background for mission planning and rehearsal.

#### Digital Aeronautical Flight Information File

A digital aeronautical flight information file contains airports, heliports, navigational aids, airspace, and low en route structures worldwide. The information from this database is used

in automated flight planning systems, flight simulators, GIS, and flight management computer systems.

#### **Digital Bathymetric Database**

The DBDB was developed by the naval oceanographic office and contains gridded bathymetric data. Depths are given in uncorrected meters for the post spacing of the given database. Available post spacing includes DBDB 5 minute (DBDB5), DBDB 0.5 minute (DBDB.5), and DBDB 0.1 minute (DBDB.1) of latitude and longitude. The database information is used to develop small- and large-scale bathymetric contour charts, planning graphics, and digital displays. The Navy controls distribution of these products.

#### **Digital Nautical Chart Database**

The digital nautical chart database is a vector-based digital database containing selected maritime physical features that are collected from harbor, approach, coastal, and general charts. This information is formatted for computerized Marine navigation and GIS applications. A digital nautical chart is used for chart displays, CIS, and GIS.

#### **Digital Point Positioning Database**

The DPPDB is a deployable set of geographically controlled imagery with associated support data. The DPPDB can help quickly and accurately identify positional data for any area feature that may be stored in the database. This includes accurate geodetic latitude, longitude, and elevation.

The DPPDB is a data-only product. The exploitation of the data is defined by each user's hardware and software capabilities. The primary purpose of the DPPDB is to provide operational and tactical forces with a database that can be used in the field. It enables trained personnel to derive accurate coordinates for any feature within the database area. This is a classified product, only releasable to DoD customers with valid requirements.

#### **Digital Terrain Elevation Database**

Digital terrain elevation database is a uniform matrix of terrain elevation values. It provides a basic quantitative database for all military systems that require terrain elevation, slope, and surface roughness information. To support operations, this data is produced in the following resolutions:

- Level 1 post spacing is 3 arc seconds or approximately 100 meters.
- Level 2 post spacing is 1 arc second or approximately 30 meters.
- Levels 3 through 5 post spacing have not been formalized yet but will be approximately 10 to 1 meter resolution ratio.

#### **Foundation Database**

A foundation database is a seamless, integrated geospatial database consisting primarily of imagery, elevation data, and map feature information. The primary focus of foundation data is to support initial planning and establish the framework for intensification of data within the area of operations necessary to support planning and decision making. Predominantly, foundation data is at a medium-scale resolution (similar to a 1:250,000 scale chart).

Foundation data forms the base of a geospatial framework from which all additional data is referenced. It is one of the principal components of the DoD readiness strategy designed to meet MAGTF requirements. Foundation data is relatively stable background information that is mission and force independent, specification compliant, and geopositioned to the WGS-84 datum.

#### Foundation Feature Database

A foundation feature database is selected feature data with some attribution that has been arranged in relational thematic layers. Feature density depends on the specific geographic region, though it will generally approximate that of a traditional TLM. A foundation feature database includes transportation and drainage networks, geodetic control points, populated places, boundaries, vegetation, and natural and cultural features of high interest or visibility.

#### **Mission-Specific Data Sets Database**

An MSDS database is any user-defined enhancement of foundation data that is required to conduct a mission. It supports the DoD readiness strategy designed to meet MAGTF requirements. The MSDS is developed by enhancing the information contained in the foundation data set. It includes higher resolution-controlled imagery, elevation, and bathymetric depth information and vector features that are needed to meet a defined mission. An MSDS is focused on a specific area, type of force, and mission.

## LEGACY NATIONAL GEOSPATIAL AGENCY DIGITAL PRODUCTS

#### Compressed Equal Arc Second Raster Chart/Map Digitized Raster Graphics

A compressed equal arc second raster chart or map is a coordinated common compression of the equal arc second raster chart or map arc digitized raster graphic (ADRG) for use in any application requiring rapid display of a map image or manipulation of a map image in raster form. A compressed ADRG achieves a nominal compression ratio of 55:1. The compressed ADRG is intended for use in various systems requiring map backgrounds, coordinate selection, and perspective view generation, such as mission planning systems, theater battle management systems, or intelligence systems.

#### **Urban Vector Map Program**

The urban vector map (VMap) program is designed to provide vector-based geospatial data with city graphic content. The VMap program separates data into 10 thematic layers (boundaries, elevation, hydrography, industry, physiography, population, transportation, utilities, vegetation, and data quality). This thematic data is collected at a density of detail that approximates the detail of NGA city graphics (CG) and military city map products.

The urban VMap is designed to support GIS. It is used as a database for various situations and map background displays, as well as a core database for the spatial indexing of other information. The urban VMap will support MOUT and noncombatant evacuation operations.

**Vector Map: Level 1.** Vector map level 1 (VMapL1) is designed to provide vector-based geospatial data at medium resolution (e.g., JOG equivalent information content and density). The VMapL1 program separates data into the 10 thematic layers. Designed to support GIS, VMapL1 is used as a database for various situation and map background displays.

**Vector Map: Level 2.** Vector map level 2 (VMapL2) is designed to provide vector-based geospatial data at high resolution (e.g., TLM equivalent information content and density). The VMapL2 program separates data into the 10 thematic layers. Designed to support GIS, VMapL2 may be used as both a database for various situations and map background displays and a core database for the spatial indexing of other information.

**Vector Product Interim Terrain Data.** Vector interim terrain data is designed to provide digital terrain analysis data. It consists of contiguous digital data sets covering specified geographic areas. These data sets are composed of attributed and unsymbolized feature information with enhanced transportation files. Vector interim terrain data is used by the topographic platoons to provide terrain analysis information that assists maneuver, fires, intelligence, and logistic planners in the performance of the following automated tasks:

- Terrain visualization.
- Route and site selection.
- Mobility and counter mobility planning.
- Communications planning.
- Navigation.
- Fire support planning and execution.

# LEGACY NATIONAL GEOSPATIAL-INTELLIGENCE AGENCY HARD COPY PRODUCTS

## **City Graphics**

A city graphic map is a large-scale (1:12,500) lithographic map made up of populated places and environs portraying streets and route information. Features of a city graphic map include important buildings, airfields, military installations, industrial complexes, embassies, government buildings, hospitals, schools, utilities, and places of worship as well as militarily significant relief. A city graphic map is used to support administrative and tactical planning for urban area operations.

## **Evasion Charts**

An evasion chart is composed of 8 to 10 JOG charts that are printed on both sides of waterproof, tear-resistant material.

**NOTE:** Joint operations graphics ground charts are the preferred source when composing evasion charts; however, JOG air charts are used when ground charts are not available.

An evasion chart's border and open-water areas contain supplemental survival information, such as plant identification, land navigation aids, survival techniques, ocean currents, time zones, winds, and weather. An evasion chart is designed to assist aircrews downed in hostile areas to survive, escape, and evade the enemy. It is distributed to aircrew members as part of standard survival equipment, and it folds to accommodate stowage in a flight suit or survival vest.

#### Harbor, Approach, and Coastal Charts

Harbor, approach, and coastal charts provide detailed navigational information that supports ships maneuvering in close-quarter areas. These charts assist in berthing and anchoring, keeping in the channel while entering and exiting port or navigating in close proximity to dangers associated with close shore and harbor approach areas.

#### **Joint Operations Graphic-Air**

The joint operational graphic-air (JOG-A) is the standard DoD medium-scale (1:250,000) map that displays topographic data, such as relief, drainage, vegetation, populated places, cultural features, and coastal hydrography. The JOG-A supports tactical and other air activities, including low-altitude visual navigation. The JOG-A includes an aeronautical overprint depicting obstructions, aerodromes, special-use airspace, navigational aids, and related data. The contour line elevation values on a JOG-A are reflected in feet.

#### **Operational Navigation Charts**

The operational navigation chart (ONC) is the worldwide standard, small-scale (1:1,000,000) aeronautical chart series. It contains cartographic data with an aeronautical overprint depicting obstructions, aerodromes, special-use airspace, navigational aids, maximum elevation figures, and related data. The ONC is designed for medium altitude, highspeed, visual, and radar navigation. In the absence of tactical pilotage charts, the ONC also satisfies en route visual and radar navigation requirements for low-altitude operations. It is used for mission planning and analysis and intelligence briefings. The ONC is also used as a source for navigational filmstrips and cockpit and visual display products.

#### **Special Aeronautical Information Requests**

A special aeronautical information request satisfies the requirement for the latest information on airfields by using airfield photography and automated air facilities information file data.

#### **Tactical Pilotage Charts**

The tactical pilotage chart is the worldwide standard medium-scale (1:500,000) aeronautical chart series. The tactical pilotage chart provides essential cartographic data. It is overprinted with stable aeronautical information, such as obstructions, aerodromes, special-use airspace, navigational aids, maximum elevation figures, and related data. Because of the scale, some features are generalized (e.g., only the highest obstruction within an urban quadrant is shown). A military grid is overprinted on the chart for interoperability, especially in regions without JOG coverage. The tactical pilotage chart is designed for very low-altitude through medium-altitude, highspeed, visual, and radar navigation. It is used for mission planning and analysis and intelligence briefings and in navigational filmstrips and cockpit and visual display products.

#### **Topographic Line Maps**

The TLM is a lithographic map that portrays topographic and cultural information in two scales: 1:50,000 and 1:100,000. Relief is shown by contours and spot elevations, with values in meters. The map is a true representation of terrain detail, depicting drainage, vegetation, populated places, cultural features, roads, railroads, and coastal hydrography. Primarily, TLMs are used by land and air forces in support of ground operations for planning and tactical operations.

## **SOFTWARE PRODUCTS**

### **Digital Point Positional Databases Point Drop Program**

The NGA has developed the DPPDB point drop program software to use geographic point measurements from the NGA's DPPDB product. This software provides the capability to access, roam, zoom, and measure NGA DPPDB image geographic point readings in both monoscopic and stereoscopic modes.

### **Geographic Transformation Software**

Geographic translation software is an application program that easily converts geographic coordinates among a wide variety of coordinate systems, map projections, and datums. Geographic translation software runs in Microsoft Windows and UNIX Motif environments. The user interface of GEOTRANS is similar to that of a calculator. To convert a set of coordinates, perform the following the steps:

- 1. Select the coordinate system or map projection and the datum where the coordinates are defined.
- 2. Enter the source coordinates.
- 3. Elect the coordinate system or map projection and the datum where the coordinates are to be converted.
- 4. Click on the CONVERT button. The converted coordinates will be displayed.

**NOTE:** Because the GEOTRANS application stores previous selections, additional coordinate sets can be converted from the same source by entering the new coordinates and clicking the CONVERT button. The coordinate system, map projection, or datum selections can be changed at any time. Currently, GEOTRANS software supports 25 different coordinate systems, map projections, grids, coding schemas, and more than 200 different datums.

Geographic translation software can also be used to efficiently convert large numbers of coordinates contained in text files. The file format is simple. A multiline file header defines the coordinate system or map projection and datum of the coordinates that are contained in the file. Following the header, each line contains a single set of coordinates, separated by commas. Using the GEOTRANS file processing interface, the user selects an existing file of coordinates to be converted, defines the coordinate system or map projection and the datum to convert the coordinates, and specifies the name and location of the output file that is to be created. Geographic translation software then converts the input file and creates the output file as a single operation.
# APPENDIX B. GEOSPATIAL INFORMATION AND INTELLIGENCE TASKS

				GI&S			GEOINT				
No.	Tasks	ISR- GEO	MARF OR	MEF G-2	MSC G-2	MEU S-2	Topo pit Intel BN	GIST	GIT	GAB/ MCIA	
1	Coordinate and assist in the recruitment and organization of Marine Corps GI&S assets to conduct two (nearly) simultaneous major regional conflicts.	x									
2	Determine GI&S support requirements for development; test and evaluation; and training of emerging forces, weapons, and systems in accordance with DoDI 5000.56, Programming Geospatial-Intelligence (GEOINT), Geospatial Information and Services (GI&S), and Geodesy Requirements for Developing Systems.	x									
3	Provide professional and technical advice and assistance to the DIRINT, DC CD&I, MARCORSYSCOM, Marine Corps University, Marine Corps Warfighting Laboratory, and MCIA on matters pertaining to GI&S and the production and usage of GEOINT.	x									
4	Coordinate doctrine for employment of Marine Corps GI&S assets.	х	х								
5	Assist Marine Corps forces with identification of procedures and responsibilities for intratheater distribution operations required to support deploying and deployed forces.	x	х	x							
6	Develop and implement a Marine Corps GI&S strategic plan to build, manage, and disseminate a dynamic master geospatial database.	х	х								
7	Continually evaluate command Gl&I requirements.	х	х	х	х	х	х				
8	Develop a plan for receiving support from NGA, the theater database manager, other Services, host nation, allied forces, and assigned and supporting topographic assets.	х	х	х	х	х					

				GI&S			GEOINT				
No.	Tasks	ISR- GEO	MARF OR	MEF G-2	MSC G-2	MEU S-2	Topo pit Intel BN	GIST	GIT	GAB/ MCIA	
9	Coordinate GI&S support plans with the intelligence collection, production, and dissemination plans to facilitate GI&S access to national, theater, and organic imagery systems as well as other external intelligence assets.	х	x	х	x	x	x				
10	Assign responsibility for management of the MCGIL. State how often the database is updated, how the media will be used, and how the dissemination will occur.	x	x	x		x					
11	Coordinate information flow to theater, Marine Corps forces, MEUs, and the NGA national library.	х	x	х			х				
12	Coordinate MAGTF's user evaluations of digital and hard copy maps, charts, and related products. Provide response to the geospatial analysis branch (MCIA) for consolidation.	x	x	x			x				
13	Coordinate with higher, adjacent, and subordinate commands for GI&S production requirements to reduce duplication of effort and to coordinate the establishment of the geospatial framework for the COP and CTP.	х	x	x		x	x				
14	Coordinate with GAB (MCIA) to identify requirements of GEOINT products in support of the IPB process and file structure architecture.	х	x	х		х	х				
15	Ensure availability of GI&S products to support the command element and subordinate elements during an operation.	х	x	х	x	x	х				
16	Receive, validate, and task requirements for cartographic, geodetic, and terrain analysis products from the intelligence operation officer or collection manager.	x	x	x	x	x	х				
17	Coordinate the development and dissemination of GI&I and GEOINT products with intelligence battalion and topo plt.			х		x	х				
18	Coordinate with NGA, other Services, GAB (MCIA), and subordinate topo plts and P&A cell for GI&S to establish production requirements, to reduce duplication of effort, and to coordinate the establishment of the geospatial framework for the COP and CTP.	х	x	х			Х				

#### MCRP 2-10B.4, Geospatial Intelligence

				GI&S	-	GEOINT				
No.	Tasks	ISR- GEO	MARF OR	MEF G-2	MSC G-2	MEU S-2	Topo pit Intel BN	GIST	GIT	GAB/ MCIA
19	Coordinate with higher, adjacent, and subordinate commands for GI&S production requirements to reduce duplication of effort and to coordinate the establishment of the geospatial framework for the COP and CTP.		x	х	x	x	х			
20	Determine Marine Corps-specific training, Marine Corps new systems research and development, and Marine Corps intelligence GI&S requirements in accordance with CJCS and NGA directives and instructions. Assist Marine operating forces with identification of operational requirements for GI&S support.	х	Х	х	х	х				
21	Coordinate with HQMC, installations and logistics, to define procurement and storage and to disseminate hard copy GI&S products, in accordance with NGA and DLA instructions.	x	х	х		x				
22	Propose selected GI&S programming issues for evaluation in the Marine Corps and DoD program assessments.	х	х							
23	Coordinate with MARCORSYSCOM for the development and fielding of GI&S systems and software.	х	x	х						
24	Assist data collection programs by clearly prioritizing support needs and deconflicting source requirements with the responsible agency or Service when NGA identifies GI&S shortfalls in data sources resulting from competition for source (e.g., imagery, ship surveys).	Х	Х	х						
25	Task the P&A cell and topo plt with development of Tab A (Tactical Study of Weather and Terrain), Tab B (Beach Studies), and Tab E (LZs), of Appendix 11 (Intelligence Estimate).			х			Х			
26	Maintain a PFDB to identify and track Marine Corps forces, systems, and weapons that require GI&I and GEOINT.	х	x	х			х			
27	Coordinate with HQMC to define and establish communications network requirements for electronic dissemination of GI&I and GEOINT throughout the MAGTF.	х	х	х			Х			
28	Coordinate with DC CD&I for the development and integration of Marine Corps GI&S architectures in support of national, DoD, theater, multi-Service, naval, and MAGTF interoperability.	Х	х	Х			Х			

		GI&S					GEOINT				
No.	Tasks	ISR- GEO	MARF OR	MEF G-2	MSC G-2	MEU S-2	Topo pit Intel BN	GIST	GIT	GAB/ MCIA	
29	Define common GI&S standards for the direct transmission and maintenance of GI&I and GEOINT to ensure interoperability between MAGTFs, DoD, federal agencies, and other joint or coalition forces.	Х	Х	Х			Х				
30	Coordinate and forward the Marine Corps recommendations on GI&S product specifications and standardization agreements to NGA.	х									
31	Coordinate and submit consolidated Marine Corps evaluations of prototype digital and hard copy maps, charts, and related products to NGA.	х									
32	Review and comment on GI&S product specifications and standardization agreements.		х	х			х				
33	Identify and validate war reserve stock requirements for the command element and subordinate commands.		х	x							
34	Identify, validate, and maintain the war reserve stock planning allowance for the command element.		Х	х							
35	Coordinate with G-2, G-3, G-4, G-5, and G-6 to identify requirements of GEOINT products in support of the IPB process.		Х	x							
36	Coordinate and task all production to appropriate JIC and JAC or MCIA in accordance with Marine Corps procedures identified in Chapter 5 of this publication.		х								
37	Coordinate with the G-6/S-6 to establish communication and information systems network requirements for electronic dissemination of GI&I and GEOINT throughout all levels of the MAGTF.			x			х				
38	Assist G-4/S-4 in the identification of procedures and responsibilities for intra-theater distribution operations required to support deploying and deployed forces.		х								
39	Coordinate with the G-4/S-4 for procurement, storage, and dissemination of hard copy GI&S products, in accordance with NGA and DLA instructions.			х			Х				
40	Submit and coordinate with the GEOINT section (MEF G-2) for review and completion of Appendices 11 and 15 of Annex B, and Annex M for each OPLAN and contingency plan.		x				X				

		GI&S				GEOINT				
No.	Tasks	ISR- GEO	MARF OR	MEF G-2	MSC G-2	MEU S-2	Topo pit Intel BN	GIST	GIT	GAB/ MCIA
41	Draft Appendix 11 to Annex B (Intelligence) and Annex M (Geospatial Information and Services) to an OPORD.		х							
42	Coordinate Marine Corps forces GI&S activities with the appropriate combatant commands. Coordination includes, but is not limited to, determining and developing GI&S area requirements; implementing GI&S plans, policies, procedures, and programs; and maintaining liaison with NGA.		Х							
43	Coordinate MEF GI&S activities with the appropriate combatant commands. Coordination includes, but is not limited to, determining and developing GI&S area requirements; implementing GI&S plans, policies, procedures, and programs; and maintaining liaison with NGA.		х	х						
44	Determine operational GI&S requirements in accordance with Chairman of the Joint Chiefs of Staff and NGA directives and instructions for all OPLANs and contingency plans. Forward requirements to Marine Corps forces for submission to appropriate combatant commands.		x	х						
45	Provide recommendations to NGA and Marine Corps forces concerning GI&S planning required to ensure that MAGTFs can support operations.	x	х	х						
46	Provide recommendations to the plans section concerning GI&S planning and training required to ensure that MAGTFs can support operations.	х	x							
47	Develop and implement a command GI&S OPLAN to build, manage, and disseminate a dynamic geospatial database. The plan should include receiving support from the MEF topo plt, NGA, JIC, JAC, theater database manager, MCIA, host nation, allied forces, as well as assigned and supporting topographic assets. Assign responsibility for the management of the MSC GI&S database. State how often the database will be updated, how the media will be used, and how the dissemination will occur. Address information flow back to theater, NGA, and MCIA.	x	X	x			x			

				GI&S		GEOINT				
No.	Tasks	ISR- GEO	MARF OR	MEF G-2	MSC G-2	MEU S-2	Topo pit Intel BN	GIST	GIT	GAB/ MCIA
48	Provide management oversight for the production of GI&I, covering the Marine Corps global database based on the Marine Corps midrange threat estimate (current year) and priorities input by the Marine Corps forces and MEF intelligence divisions.	х	х	х		х				Х
49	Collect, integrate, analyze, synthesize, and disseminate terrain information as GI&I to support MAGTF commanders.						х	х	х	х
50	Validate requirements for GI&I and GEOINT production, as well as geodetic and topographic surveys. Coordinate and task all production to appropriate topo plt, P&A cell, JIC, JAC, or MCIA in accordance with Marine Corps procedures identified in Chapter 5 of this publication.		х	х		х	х			
51	Manage the MAGTF CGSA database under the authority of the MEF commander and in accordance with direction and guidance from the MEF GEOINT section.			x			х			
52	Manage MCGIL under the authority of the DIRINT and in accordance with direction and guidance from geospatial analysis branch (MCIA).	x								х
53	Conduct topographic surveys in conjunction with geodetic surveys to accurately collect and produce GI&I.						х			
54	Conduct high-order, ground-control surveys in support of geospatial collection, weapons delivery systems, LOS communications, and inertial navigation systems.						х			
55	Conduct intensification, scale changes, enlargements, or reductions of an existing digital or hard copy product.						х	х	х	х
56	Produce terrain analysis products, such as beach studies, port and harbor studies, CCM studies, and transportation studies, to provide GEOINT to the commander.						Х	х	х	х
57	Produce a quick map substitute to fill a need where no acceptable product exists, using NGA databases (CIB and DTED) to generate an interim product. This may require external reproduction support.						Х	х	х	х

		GI&S					GEOINT				
No.	Tasks	ISR- GEO	MARF OR	MEF G-2	MSC G-2	MEU S-2	Topo pit Intel BN	GIST	GIT	GAB/ MCIA	
58	Develop special beach penetration charts that include hydrographic approach and topographic data.						х	х	х	х	
59	Analyze port and harbor data to support the maritime prepositioned force pier side and instream unloading operations.						x	x	x	x	
60	Intensify and analyze riverine data to create products using identification of bridging, ferrying, and fording sites and using the river as an LOC.						x	х	x	x	
61	Intensify and analyze coastal hydrographic data to support the MAGTF's OPLAN and objectives for ship-to-objective maneuver. Integration of terrain, coastal, and environmental data provides a seamless, deconflicted database to support amphibious operations within the littorals.						x	x	x	x	
62	Provide rapid updated products and information for dissemination to deploying forces.						х	х	х	х	
63	Produce, analyze, and integrate port and harbor, coastal, beach, and riverine survey data in support of imminent and future amphibious landings and subsequent operations ashore.						x			x	
64	Integrate information from topo plt high-order, ground-control surveys in support of geospatial collection, weapon delivery systems, LOS communications, and inertial navigation systems.						x	x	x	x	
65	Manipulate, analyze, supplement, and complement NGA geospatial information to create special products for the Marine Corps with tailored, mission-specific views of the area of operations.						x	x	x	x	
66	Analyze multispectral and hyperspectral data to collect GEOINT features and attributes for intensification and updating NGA standard products to support a specific mission as an interim or to substitute products when standard geospatial data is unavailable.						X	Х	Х	Х	
67	Provide analysis of the littoral zones to reduce the uncertainties regarding the effects of natural and constructed features on military operations.						x			x	

			-	GI&S	-	-	GEOINT				
No.	Tasks	ISR- GEO	MARF OR	MEF G-2	MSC G-2	MEU S-2	Topo pit Intel BN	GIST	GIT	GAB/ MCIA	
68	Collect, integrate, analyze, synthesize, and disseminate terrain information as GI&I to support the MAGTF's requirements within the littorals.						Х	х	х	х	
69	Manipulate and analyze NGA geospatial databases to tailor special products for the MAGTF commander.						х	х	х	x	
70	Provide initial reference points on airfields for Marine aircraft to initialize ACE on board inertial navigation systems.						х				
71	Coordinate and assist in the training of Marine Corps GI&S support forces to conduct two nearly simultaneous major regional conflicts.	х	х	х							
72	Receive and validate standard GI&S products requirements for exercises and consolidate a single requisition to NGA no later than 3 months prior to required delivery date.		х	х		х	х				
73	Receive and validate nonstandard GI&S production requirements for exercises. Products not listed in NGA catalog, such as special exercise products, must be submitted to the I&M section 6 months prior to the required delivery date.	х	х	х		х	Х				
74	Assess NGA responsiveness to Marine Corps needs.	х	х	Х	х	Х	х	х	х	х	
75	Continually evaluate and improve the Marine Corps GI&S and GI&I requirements and supporting plans and operations.	х	х	х	х	х	х	х	x	x	
76	Notify the MEF G-2 GEOINT section and intel BN of all GI&I requirements (i.e., electronic, digital, hard copy) necessary to support combat analysis simulations and exercises.	х	х	х	x	х	Х	х	х	х	
77	Notify the MEF G-2 GEOINT section and intel BN of all GI&I requirements (i.e., electronic, digital, hard copy) necessary to support combat analysis planning and operations.	х	х	х	х	х	Х	х	х	x	
78	Coordinate with the MEF G-2 GEOINT section and intel BN to establish prioritization for collection, production, and dissemination of GI&I and GEOINT products, databases, and services for exercises.	Х	Х	Х	Х	Х	Х	x	x	x	

			GI&S					GEOINT				
No.	Tasks	ISR- GEO	MARF OR	MEF G-2	MSC G-2	MEU S-2	Topo pit Intel BN	GIST	GIT	GAB/ MCIA		
79	Coordinate with the MEF G-2 GEOINT section and intel BN when involved with the procurement, development, or use of GI&S systems or databases.	x	x	х	x	x	х	х	х	x		
80	Provide professional and technical advice and assistance to the command element, supported headquarters, and subordinate commands on matters pertaining to GI&S and GI&I.	x	х	х			Х	х	х	х		
81	Coordinate with the MEF G-2 GEOINT section when involved with the procurement, development, or use of GI&S systems or databases to support simulations and other analysis.	х	x	Х	х	х	х			х		
82	Request standard NGA GI&S products and digital GI&S data for local unit training via local units' supply office.	x	х	х	x	x	х	х	х	х		
LEGI	END											
DLA DoDI GAB Intel ISR-0 MAR topo WRA	Defense Logistics Agency         Department of Defense Instruction         Geospatial Analysis Branch         BN       Intelligence Battalion         GEO       ISR Section, GEOINT Team         FOR       Marine Corps Forces         plt       Topographical Platoon         war reserve stock											

# APPENDIX C. TOPOGRAPHIC PRODUCTION

Topographic products (e.g., images, maps, surveys) provide the MAGTF with integrated, intensified, deconflicted, and seamless GI&I. Geospatial information and intelligence is needed to provide the framework for the COP and CTP required by various missions, systems, and weapons.

Topographic production uses a network of GISs that enable the MAGTF to receive, process, exploit, analyze, produce, disseminate, store, and retrieve GI&I. Topographic production uses state-of-the-art hardware, software, and input and output devices to provide automated access to the geospatial database and other geospatial products. It is employed in command posts and the IOC.

Topographic production can be connected to the MAGTF CGSA, the USIGS, and the GCCS. It significantly reduces the physical size and logistical footprint of the existing topographic platoon equipment suite. The hardware components are modular and Marine-portable, which enables the topographic platoon to scale up or down, depending on the type of mission, size of the force, and specified geospatial requirements.

The equipment suite includes robust communications software. It is compatible with all military communications requirements and provides access to multi-spectrum data communications. The processing and display modules use hardware from the Marine Corps common hardware suite and software that is compliant with the defense information infrastructure-common operating environment.

Marine Corps emerging operational concepts require an integrated, deconflicted, and seamless view of the battlespace and topographic assets that can be operated from various ships and austere bases ashore. Under these concepts, some C2 nodes and elements may remain sea based, while others go ashore to support MAGTF elements. Topographic products enable the G-2/S-2 to task-organize to perform various missions while remaining fully integrated with naval systems, forces afloat, and joint and allied forces throughout the joint operating area.

Topographic production can be employed by accessing existing communications media, such as radio, wire, fiber optic cable, LANs, WANs, and circuit and voice switching systems that form a MAGTF-wide MCCIS and information grid.

The modularized nature of CGSA equipment supports the following employment options:

• <u>Topographic set</u>. The entire topographic set (also known as topo set) can be deployed by the intelligence battalion to support the MEF command element. It is connected to the CCDR JIOC, CCDR JAC, MCIA, or other GI&I and intelligence elements using the GCCS and MAGTF MCCIS.

- <u>CGW</u>. Generally, a CGW is organic to a GEOINT support team. The team may be attached to or placed in direct support of the GCE, ACE, and LCE intelligence sections. Connectivity is similar to topographic set.
- <u>CGSA</u>. Generally, a CGSA is organic to the GIST. The team is attached to a MEB command element or a SPMAGTF. Connectivity is similar to topographic set and CGW.

Topographic products increase the MAGTF's abilities to accomplish the following critical tasks:

- Receive, exploit, analyze, and disseminate a common, NRT, integrated environmental view of the battlespace with the timeliness and accuracy necessary to facilitate command and control, intelligence, maneuver, fires, and logistics.
- Access theater and national geospatial information sources to support both a COP and CTP that are tailored to MAGTF missions.
- Increase interoperability by using an open architecture and defense information infrastructure-common operating environment compliant systems.
- Increase operational flexibility by using common hardware and software that supports the task organization and distributed production of all geospatial information for the MAGTF.
- Participate in a joint, fused GI&I production network with multilevel security and accurate data.
- Enhance mobility of the CGW nodes and improve support for the operational maneuver from the sea concept by reducing the physical size and increasing the modularity of the CGW equipment.

Topographic production capacity can be split into two functional roles to provide the MAGTF with battlespace visualization and the framework needed to plan future tactical operations. First, GI&I direction is accomplished through the deliberate planning process. Topographic maps help identify geospatial requirements, access and review existing data holdings, identify information shortfalls, and define the AOR and interest. Second, geospatial information collection begins with the requisition of EETI and hydrographic information. The CGSA database networks can be queried for potential solutions, source materials, and request for information for tactical collection. The CGSA can access multisource intelligence reports (e.g., IMINT, SIGINT, and HUMINT) and tactical reconnaissance reports (e.g., route reconnaissance, bridge studies, and engineering reports). In addition, the CGSA can store and manipulate tactical geodetic, topographic, and oceanographic surveys as well as terrain reconnaissance and photo reconnaissance imagery that includes video.

# APPENDIX D.

# GEOSPATIAL INFORMATION AND INTELLIGENCE ESTIMATE: APPENDIX 15 TO ANNEX B OF OPERATION PLAN/OPERATION ORDER

The GI&I estimate is a major part of the intelligence estimate and a key foundation for the MAGTF's selection of a COA and follow-on planning. The MEF G-2 future plans section, GEOINT staff, and intelligence battalion complete an appraisal of the available GI&I for a specific situation or mission and include that analysis in the OPLAN or OPORD. Geospatial intelligence is used to determine the supportability of COAs. Course of action wargaming and selection depends on the MAGTF's GI&I requirements for planning and execution.

The GI&I estimate also provides a detailed format to support development of the collection, production, and dissemination plans for geospatial information and MAGTF GEOINT operations. This appendix addresses the key points that are emphasized for GI&I estimate development.

# **ANALYSIS OF COURSE OF ACTION**

The intelligence officer uses the GI&I estimate to evaluate various COAs and to identify critical shortfalls within the scope of the operation. The estimate addresses EETIs and intelligence requirements that could negatively affect planned operations. It also identifies GI&I personnel; equipment shortfalls; and unique geospatial collection, production, and dissemination requirements to meet mission objectives.

# INTELLIGENCE PREPARATION OF THE BATTLESPACE PROCESS

The GI&I estimate supports initial intelligence estimates and collections, production, and dissemination planning for the IPB process during initial planning. Identification of the area of operations and AOI is critical for prioritizing, intensifying, and value adding to meet mission-specific requirements. The IPB process analysis and production timelines require that the estimate identify potential objectives, intelligence requirements, and specific EETIs. This ensures that tailored products are available to support all MAGTF planning and decision-making requirements.

# DISTRIBUTIVE AND COLLABORATIVE PRODUCTION NETWORK

The GI&I estimate provides critical intelligence to support the development of the geospatial information infrastructure supporting the MAGTF. This estimate also enables the MAGTF plans staff and intelligence battalion to identify key MAGTF CIS requirements and to coordinate collaborative support from other geospatial assets, such as MCIA GID, and the national production network.

# **RISK MITIGATION AND ASSESSMENT**

Within the joint GI&I community, risk mitigation encompasses activities accomplished early in deliberate planning. Only when an OPLAN is activated will the NGA conduct a risk assessment to apprise the supported CCDR of the pertinent GI&I production plans and activities status. A GI&I estimate provides a process for the MAGTF G-2 staff and intelligence battalion to perform a risk assessment for each COA based on available GEOINT. Mission success or failure depends on the types of data available for specific missions and systems used in the MAGTF. Availability of GI&I products is evaluated based on the following priorities and readiness levels.

# Priorities

A priorities process is used to determine the appropriate level of readiness required for the plan based on the likelihood of execution, calculation of preparation times, MAGTF intelligence requirements, and indications and warnings. Levels of readiness are determined using the following priorities:

- Priority 1: Geospatial data and product unavailability will prevent performance of the mission.
- Priority 2: Geospatial data and product unavailability will significantly impact performance of the mission.
- Priority 3: Geospatial data and product unavailability will have minor impacts on performance of the mission.

### **Readiness Levels**

The GI&I estimate is a planning tool that the MEF G-2 and intelligence battalion use to determine how much effort is required for a particular OPLAN to meet MAGTF requirements. This information is articulated to the JTF, CCDR GI&I officer, and other intelligence personnel, using the following GI&I readiness levels:

- C-1: All required products and information must exist as standard or substitute products and information. All products can be made adequate and delivered within the time required for the plan.
- C-2: All priority 1 and 2 products and information must exist as standard, substitute, or interim products and information that can be generated and delivered within the command's required timeline. Deficiencies exist in the coverage of priority 3 products and information. Priority 1

and 2 products and information can be made adequate within the required timeline based on each plan. Existing priority 3 products and information cannot be made adequate within the required time for each plan.

- C-3: All priority 1 products and information must exist as either standard or substitute products and information, as acceptable interim products and information, or as products and information that can be generated and delivered within the command's required time. Significant deficiencies exist in the coverage of priority 2 and 3 products and information. Existing products and information cannot be made adequate within the required time for each plan.
- C-4: Major deficiencies may exist in products with priority levels 1, 2 and 3. The following sample GEOINT estimate format is provided to support MAGTF intelligence estimate and follow-on planning and decision making.

### CLASSIFICATION

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### APPENDIX 15 TO ANNEX B TO OPERATION ORDER (Number) (U) GEOGRAPHIC INTELLIGENCE (U)

### (U) REFERENCES:

- (a) Unit SOPs for intelligence and counterintelligence.
- (b) List those NGA maps, charts, related products, and other forms of GI&S data references that are required for an understanding of this appendix.
- (c) List other documents that provide guidance required for the planning functions relevant to GI&S and supporting operations.
- 1. (U) Situation.

a. (U) Definition of the Area of Operations and AOI. Describe the limits of the area of operations and AOI in terms of natural or cultural features and/or latitude and longitude coordinates. If the area of operations limits are difficult to describe, a map with the appropriate boundaries should be appended.

b. (U) Assigned MAGTF Organic and Supporting GI&S Assets. Identify those organic and supporting forces that perform the following GI&S functions. A unit may perform more than one function.

#### Page Number

- (1) (U) Map and chart distribution.
- (2) (U) Digital dissemination of data.
- (3) (U) Battlespace analysis.
- (4) (U) Paper map or chart production.
- (5) (U) Digital data production.
- (6) (U) Command and control of GI&I assets.
- (7) (U) Geospatial database management.
- (8) (U) Value adding to GI&S data sets.
- (9) (U) Construction of modeling and simulation databases.

c. (U) <u>Facts and Assumptions</u>. State facts and assumptions generated during the problem framing process. These may include items pertaining to release and disclosure of GI&I products to multinational forces, transportation availability, and available digital communications.

- d. (U) Facts and Assumptions.
  - (1) (U) Datum determination.
  - (2) (U) Standard GI&I product and data availability.
  - (3) (U) Data currency.
  - (4) (U) Availability of national source imagery and commercial imagery.
  - (5) (U) GI&I support to and from multinational forces.
  - (6) (U) Existing GI&I agreements between foreign countries.
  - (7) (U) War Reserve System (WRS) and basic load considerations.
  - (8) (U) Sustainment of geospatial data.
  - (9) (U) Sustainment of GI&I assets and personnel.
  - (10) (U) Creation and staffing of forward map depots.

#### Page Number

(11) (U) Other considerations that impact this OPLAN or OPORD.

2. (U) Mission and Concept of Intelligence Operations.

a. (U) <u>Mission</u>. State of assigned task and its purpose. The mission of the command is taken from the commander's problem framing, planning guidance, or other statement.

b. (U) Concept of Intelligence Operations.

3. (U) <u>Analysis of Course of Action</u>. List factors that the intelligence officer and his/her three key subordinate officers—the G-2 plans officer, G-2 operations officer, and the ISC—can use to weight COAs for a given OPLAN or OPORD. Develop a separate analysis for each COA being considered.

a. (U) <u>GI&I Forces and Functions</u>. Discuss employment of forces to cover the GI&I functions.

b. (U) <u>Datums and Interoperability</u>. Compare forces and systems to the actual geographic footprint of the area of operations and its associated data.

- c. (U) Allied and Coalition Operations.
  - (1) (U) Discuss allied/coalition operations.
  - (2) (U) State the release authority.
  - (3) (U) Discuss reduced system capability.
  - (4) (U) List datum differences.
  - (5) (U) Identify GPS capability.

d. (U) <u>Geospatial Information Coverage</u>. List the available geospatial data for the area of operations.

e. (U) <u>NGA Surge and Crisis Production Supportability</u>. Discuss NGA's surge print ability and production operations to support MAGTF requirements within the COA.

f. (U) <u>MCIA Surge and Crisis P&A Supportability</u>. Discuss MCIA's surge analysis ability and production operation to support MAGTF requirements within the COA.

# Page Number

g. (U) <u>GI&I Distribution and Digital Dissemination</u>. Discuss the alternatives for distributing paper products, digital media, and electronic dissemination for each COA.

h. (U) <u>Command and Control of GI&I Assets</u>. Discuss the following aspects of the plan from the C2 perspectives.

(1) (U) Integration and synchronization of the theater P&A plan across all forces in support of MAGTF requirements.

- (2) (U) Distributive and collaborative production support.
- (3) (U) Tasking and prioritization authority.

i. (U) <u>Unit Basic Loads and WRS</u>. Discuss operational forces' requirements for paper and digital geospatial data and available stocks.

4. (U) <u>Comparison Courses of Action</u>. Using the stated factors and other information, either the G-2 plans officer or the ISC compares the COAs to advise the G-2/S-2 and commander if GI&I capability will support execution of the OPLAN or OPORD.

5. (U) <u>Conclusion</u>. Once the analysis is complete, the G-2 plans officer or the ISC either recommends to the G-2/S-2 a single COA or states that none of the COAs are impacted by the current GI&I situation.

6. (U) <u>Planning Requirements</u>. Provide a clear, concise statement of the GI&I planning requirements to support the plan.

7. (U) <u>Execution Requirements</u>. Provide a clear, concise statement of the GI&I operations execution requirements to support the plan.

#### ACKNOWLEDGE RECEIPT

Name Rank and Service Title

TABS: (As appropriate) OFFICIAL:

/S/ Name Rank and Service Title

Page Number

# APPENDIX E. GEOSPATIAL INFORMATION AND INFORMATION AND INTELLIGENCE PLANNING ACTIVITIES

Table E-1 identifies key actions of the MAGTF command element and GI&S actions taken by the G-2 GEOINT staff, the GI&S section, and the intelligence battalion during each phase of the MCPP. Actions listed in the following table are associated with the column headings; there is no one-to-one linkage between items in the first column with items in the second column. All actions are interrelated as influenced by METT-T.

Problem Framing									
MAGTF Command Element Actions	GI&S Actions								
Identify the HHQ and supported headquarters intent. Identify tasks.	Review HHQ and MAGTF standing intelligence plans (e.g., Annex B to the OPLAN), GI&S plan (e.g., Annex M to the OPLAN), and pertinent memoranda of understanding								
Determine the area of operations and AOI. Review available assets and identify personnel and equipment resource shortfalls. Determine constraints and restraints. Determine the commander's recommended critical information requirements, such as PIRs, friendly force information requirements, and EEIs. Identify requests for information. Determine assumptions. Draft the mission statement. Present a problem framing brief. Draft the warning order.	<ul> <li>OPLAN), and pertinent memoranda of understanding.</li> <li>Help determine the MAGTF area of operations and AOI.</li> <li>Assess NGA, CCDR, and other external organizations' geospatial coverage of the area of operations and AOI.</li> <li>Provide maps, charts, digital data, and other GI&amp;I products to ensure subordinate commanders' initial planning support needs are met.</li> <li>Determine specified, implied, and essential GI&amp;S tasks.</li> <li>Develop proposed GI&amp;S mission statement, coordinate with intelligence battalion, and obtain G-2/S-2 approval.</li> <li>Identify organic and supporting GEOINT elements and subordinate units' GI&amp;S representatives; acquire an operational status report from each representative; determine personnel and equipment deficiencies, paying</li> </ul>								
Refine the commander's intent.	special attention to data management, value adding, production, and distribution.								
Develop the commander's planning guidance.	provide recommendations.								
	Identify JTF and multinational GI&S interoperability issues and provide recommendations.								
	Establish, review, and update the MAGTF CGSA to-								
	Assess foundation data availability and deficiencies.								
	Determine mission-specific data requirements.								
	Determine initial GI&S information requirements and coordinate with intelligence battalion's CM/DO officer.								

#### Table E-1. Problem Framing.

Problem Framir	Problem Framing (Continued)									
MAGTF Command Element Actions	GI&S Actions									
	Identify other GEOINT product substitutes.									
	Identify external organizations' GEOINT production plans and assess against MAGTF's initial requirements, determine deficiencies, and initiate augmentation requests.									
	Coordinate with support coordinator and the P&A cell OIC.									
	Assign and task-organize organic GEOINT elements (e.g., GI&I support teams to major subordinate elements and GI&I team to the MAGTF future plans team) and stipulate C2 relationships.									
	Validate and update JTF GI&S TTP and MAGTF GI&S SOPs; coordinate with HHQ and subordinate units.									
	Validate and prioritize GI&S and GEOINT requirements, focusing on requirements for developing COA and wargaming.									
	Begin development of GEOINT estimate, issue orders to GI&I production elements, and coordinate with P&A cell OIC.									
	Coordinate preparation of initial MCOO and coordinate with the P&A cell OIC.									
	Determine initial GEOINT CIS requirements and dissemination plan, identify deficiencies, and coordinate with CM/DO and G-6/S-6.									
	Validate GI&S database management procedures and coordinate with the JTF.									
	Ensure subordinate units' GI&S representatives are kept advised of pertinent actions and developments.									
Course of Action	n Development									
MAGTF Staff Actions	GI&S Actions									
Continue IPB throughout all steps of the planning process. Array friendly forces.	Develop and continue to update the intelligence estimate (Appendix 11 to Annex B) and emphasize the following GEOINT and all-source intelligence products:									
Analyze centers of gravity and critical vulnerabilities	Tactical study of the terrain.									
Brainstorm possibilities	Hydrographic, beach, LZ, DZ, port and harbor, airfield.									
Develop rough COAs	LOC studies.									
Review the commander's input	MCOO.									
Refine COA(s). Validate COA(s).	Assist the MAGTF command element intelligence section, other staff sections, and the ISC and IOC with COA development.									
Develop graphic and narrative COA(s).	Develop a GI&S CONOPS for each COA; continue to									
Prepare and present COA(s) briefing.	prepare and update the following documents:									
Select and/or modify COA(s) (commander's action). Conduct COA analysis wargaming.	Appendix 15 (Geographic Intelligence) to Annex B (Intelligence).									

## Table E-1. Problem Framing. (Continued)

Course of Action Development (Continued)								
MAGTF Staff Actions	GI&S Actions							
Refine staff estimates and estimates of supportability.	Annex M (Geospatial Information and Services).							
Develop concepts based on warfighting functions. Prepare COA analysis brief.	Help the intelligence section develop other portions of Annex B.							
	Determine the need and plan for the establishment of map depots within the joint operations area, determine the use of WRS, and coordinate with JTF and other Service and functional components.							
	Actions for each COA include the following:							
	Determine GI&S capabilities that are required.							
	Identify limitations.							
	Coordinate production of the necessary GEOINT products.							
	Continue development of GI&S estimate of supportability.							
	Ensure that subordinate units' GI&S representatives are kept advised of pertinent actions and developments.							
	Complete GI&S estimates of supportability							
	Help the G-2/S-2 and ISC complete the intelligence estimate and the friendly intelligence estimate of supportability.							
	Continue to monitor and update GI&I collections, production, and dissemination operations.							
	Ensure that the subordinate units receive the necessary GEOINT products, verify understanding, and identify and update subordinates concerning current and new GI&I intelligence requirements.							
	Validate, update, and prioritize GI&S and GI&I intelligence requirements.							
	Ensure that the subordinate units' GI&S representatives are kept advised of pertinent actions and developments.							
Course of Action Com	parison and Decision							

## Table E-1. Problem Framing. (Continued)

MAGTF Staff Actions	GI&S Actions			
Evaluate each COA.	Help the IOC and the MAGTF command element intelligence			
Compare COAs.	section evaluate and compare each COA.			
Decide on COA (commander's action).	Continue development of Annex M and Appendix 15 to Annex B consistent with the selected COA			
Issue the warning order.	Validate undate and prioritize GI&S intelligence			
Refine the commander's intent. Convert CONOPS into an OPORD or a fragmentary order. Update and convert staff estimates and other planning documents into OPORD annexes and appendices. Approve the OPORD (commander's action).	requirements and GI&I collection, production, and			
	dissemination requirements for the selected COA and issue the appropriate orders to GEOINT elements.			
				Coordinate GEOINT element task organization and

Course of Action Comparison and Decision (Continued)				
MAGTF Staff Actions	GI&S Actions			
	Continue coordination with the G-6/S-6 regarding GI&S CIS requirements and coordinate with G-1/S-1 for delivery of GEOINT products to subordinate units.			
	Continue coordination with the G-4/S-4 regarding GI&S supply and transportation requirements.			
	Review actions for satisfying GI&S personnel and equipment deficiencies that are associated with the selected COA.			
	Ensure that subordinate units receive pertinent GEOINT products, verify understanding, and identify and update subordinates' current GI&I intelligence requirements.			
	Validate and prioritize MAGTF GI&S and GI&I intelligence requirements.			
	Ensure that subordinate units' GI&S representatives are kept advised of pertinent actions and developments.			
	Complete development of Annex M and Appendix 15 to Annex B, provide copies to subordinate units, and ensure units understand the order.			
	Update, validate, and prioritize GI&S intelligence requirements and associated collection operations.			
	Monitor ongoing GI&I production operations and update and issue orders to GEOINT elements.			
	Ensure that the pertinent GEOINT products are disseminated to all subordinate units.			
	Complete actions associated with map depots, WRS, personnel and equipment augmentation, datum interoperability issues, and multinational dissemination.			
	Complete GI&S-related CIS, transportation, and supply actions.			
	Maintain coordination with external GI&S elements.			
Transition				
MAGTF Staff Actions	GI&S Actions			
Give the transition brief. Conduct drills.	Assist the MAGTF command element intelligence section and the IOC with the transition brief.			
Plan required refinements.	Modify GI&S plans.			
	Monitor ongoing GI&I collection and production operations and update and issue orders to GEOINT elements.			
	Ensure that subordinate units' GI&S representatives and GI&S officers in JTF and other components understand plans and standing requirements and ensure that they receive the necessary GEOINT products.			
	Participate in drills.			
	Remain engaged in MAGTE tuture plans activities			

## Table E-1. Problem Framing. (Continued)

# APPENDIX F. GEOSPATIAL INFORMATION AND SERVICES ANNEX TO OPERATION PLANS AND ORDERS

The following sample format provides notional information and guidance for the development of Annex M to either an OPLAN or an OPORD. All Fleet Marine Forces will use the annex format to ensure commonality and interoperability during planning.

#### CLASSIFICATION

Copy no. \_\_\_\_ of \_\_\_\_ copies OFFICIAL DESIGNATION OF COMMAND PLACE OF ISSUE Date-time group Message reference number

# ANNEX M TO OPERATION ORDER (Number) (U) GEOSPATIAL INFORMATION AND SERVICES (U)

(U) REFERENCES:

(a) List unit SOPs for intelligence and counterintelligence.

(b) List JTF, naval task force, other components, theater and national intelligence and counterintelligence plans, orders, TTP, and multinational agreements pertinent to MAGTF intelligence operations.

(c) List those NGA maps, charts, related products, and other forms of GI&S data references required for an understanding of this annex.

(d) List other relevant documents that provide guidance required for the necessary planning functions relevant to GI&S and supporting operations.

(e) Appendix 15 (Geographic Intelligence) to Annex B (Intelligence).

1. (U) Situation.

a. (U) <u>Geospatial Information and Intelligence Requirements</u>. List the types of hard copy and digital GI&I products that are required to support this OPORD.

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Number	Nomenclature	Abbreviation	Scale	
(1) (U) Aerospace Products				
A	Global navigation chart	GNC	1:5,000,000	
В	Jet navigation chart	JNC	1:2,000,000	
С	Operational navigation chart	ONC	1:1,000,000	
D	Tactical pilotage chart	TPC	1:500,000	
E	Joint operations graphic-air	JOG-A	1:250,000	
F	Flight information publications	FLIP	Documents	
G	Escape and evasion chart	EVC	Various	
(2) (U) Hydrogra	aphic Products		1	
A	General nautical charts	NC	Various small	
В	Coastal nautical charts	CC	Various medium	
С	Harbor and approach charts	HAC	Various large	
D	Sailing directions	SD	Publications	
E	Littoral Planning charts	LPC	1:50,000	
F	Tide tables	TT	Publications	
G	Miscellaneous		Publications	
(3) (U) Topograj	ohic Products		1	
A	Topographic line map	TLM1	1:100,000	
В	Topographic line map	TLM5	1:50,000	
С	City graphic	CG	Various	
D	Tactical terrain analysis database	TTADB	1:50,000	
E	Road map	RD	Various	
F	Landsat image map (interim)	LIM	Various	
G	Water resource overlay	WRO	1:50,000	
(4) (U) Target M	aterial Products			
A	Joint operations graphic-radar	JOG-R	1:250,000	
В	Gridded airfield photo	GAP	Various	
С	Gridded installation photos	GIP	Various	
(5) (U) Digital Data				
A	Vector interim terrain data	VITD	1:50,000 density	
В	Digital point positioning database	DPPDB	Digital imagery (classified)	
С	Vector map-level 2	VMap2	1:250,000 density	
D	Vector map-level 3	VMap3	1:50,000 density	
E	Digital topographic data	DTOP	1:50,000 density	
F	Littoral warfare data	LWD	1:5,000,000 density	
G	Digital nautical chart	DNC	Various densities	

Page Number

b. (U) <u>Enemy GI&I Capabilities</u>. Refer to Annex B (Intelligence) of this OPORD for the basic enemy situation. List enemy GI&I capabilities and limitations, including distribution points, production capabilities, accuracy of products, data collection capabilities, and deception capabilities.

- (1) (U) Enemy distribution capabilities and points.
- (2) (U) Enemy GI&I production capability.
- (3) (U) Accuracy of enemy GI&I products.
- (4) (U) Enemy data collection capabilities.
  - (a) (U) Satellite collection.
  - (b) Aerial photography collection.
- (5) (U) Enemy deception capabilities.

c. (U) <u>Friendly Support</u>. Refer to Annex C (Operations) of this OPORD. List the GI&I forces or agencies that are not assigned or attached to the unit, but that will be required to provide GI&I support for the implementation of this order. Specify the type of command relationship desired for each agency or command and the type and duration of support required.

- (1) (U) National Geospatial-Intelligence Agency.
- (2) (U) Marine Corps Intelligence Activity.
- (3) (U) Combatant Command's Joint Intelligence Center/Joint Analysis Center.

d. (U) <u>Assumptions</u>. List any assumptions on which this annex is based. State expected conditions pertinent to GI&I support over which the commander has no control. Describe planning and early deployment assumptions concerning the availability of basic loads and NGA's ability to meet crisis demand.

(1) (U) GI&I requirements represent available classified and unclassified aeronautical, hydrographic, topographic, and air target materials. These include, but are not limited to, digital data, standard maps and charts, and other data in both graphic and textual formats. Requirements must be specified as hard copy or digital. Digital requirements should identify formats required if different than NGA standard formats.

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(2) (U) The combatant command's GEOINT officer will coordinate all requirements for out-of-theater support, including generation of precise points for targeting support. Within the MAGTF, this task will be handled by the ISC, who is assisted by the MEF G-2 future plans officer and the geospatial information and intelligence officer.

(3) (U) The combatant command's GI&I officer will appoint the theater database manager and will publish requirements for reports generation, information requests, and tasking authority. The ISC will do the same for the MAGTF.

(4) (U) Component commanders and planning staffs will have required operational quantities of maps, charts, and digital data to conduct operational-level planning; MAGTF commanders and staffs will have required quantities of operational and tactical maps, charts, and digital products.

(5) (U) Rapidly generated maps, charts, and digital data at the tactical scales will be available within 72 hours for a 90 km by 90 km area and within 12 days for a 300 km by 300 km area.

(6) (U) Sufficient warning prior to execution will allow NGA to meet increased requirements through crisis support systems.

e. (U) <u>Available GI&I Products</u>. Provide a general statement regarding the availability and adequacy of the listed GI&I data, products, and related material required to support the OPORD. Refer to the GI&I WRS plan for detailed accounting regarding GI&I product availability and adequacy. Refer to Appendix 1 (GI&I Requirements List) of this annex. Complete coverage consisting of topographic, hydrographic, and aeronautical products exists to support this OPORD. In some areas, 1:100,000 scale imagery may be used to support operations.

Mission	Products Available	Product Types	Product Datum	Coverage Adequate
Command and Control	Yes	ONC JOG-A TLM CG	WGS-84	Yes
Intelligence	Yes	ONC JOG-A TLM CG	EGS-84	Yes

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Mission	Products Available	Product Types	Product Datum	Coverage Adequate
Command and Control of Aircraft	Yes	ONC JOG-A TLM CG	WGS-84	Yes
Antiair Warfare	Yes	ONC JOG-A TLM CG	WGS-84	Yes
Direct Fire and Maneuver	Yes	ONC JOG-A TLM CG	EGS-84	Yes
Fire Support	Yes	ONC JOG-A TLM CG	WGS-84	Yes
Amphibious Landing	Yes	Littoral Planning Chart	WGS-84	Yes
Close Air Support	Yes	ONC JOG-A TLM CG	WGS-84	Yes
Supply and Maintenance	Yes	ONC JOG-A TLM CG	WGS-84	Yes
Engineering	Yes	ONC JOG-A TLM CG	WGS-84	Yes
Electromagnetic Warfare	Yes	ONC JOG-A TLM CG	WGS-84	Yes
Transportation	Yes	ONC JOG-A TLM CG	WGS-84	Yes

# Page Number

Mission	Products Available	Product Types	Product Datum	Coverage Adequate
Health Services	Yes	ONC JOG-A TLM CG	WGS-84	Yes
Urban Operations	Yes	ONC JOG-A TLM CG	WGS-84	Yes

f. (U) <u>Available Services</u>. Describe any special geospatial services that will be provided for the operation (e.g., precise point production, data transformations, commercial imagery purchase and orthorectification, and surveying). Identify those GI&I units that are assigned or attached in theater. List information concerning other forces or agencies outside the theater that may affect the provision of GI&I products.

#### g. (U) Capabilities.

(1) (U) List those GI&I forces organic, assigned, or attached to the unit. Show the latest arrival date at point of departure for each GI&I unit contained in the time-phased force deployment data and list information concerning other forces or agencies that may affect the provisions of GI&I products required to support the OPORD.

Geospatial Information and Intelligence Forces	Point of Departure	Latest Arrival Date	Assigned or Attached Unit
MEF GI&I (MEF command element lead echelon)	Norton AFB, CA	30 Mar XX	MEF staff G-2
MEF GI&I (complete)	Norton AFB, CA	15 Apr XX	MEF staff G-2
Topographical platoon (MEF command element lead echelon)	Norton AFB, CA	30 Mar XX	MEF staff G-2
Topographical platoon (2d cluster)	Norton AFB, CA	9 Apr XX	MEF staff G-2
Topographical platoon (3d cluster)	Norton AFB, CA	15 Apr XX	MEF staff G-2
Topographical platoon (complete)	Norton AFB, CA	30 Apr XX	MEF staff G-2
GIST (GCE)	Norton AFB, CA	5 Apr XX	Division staff G-2
GIST (ACE)	Norton AFB, CA	10 Apr XX	Wing staff G-2
GIST (LCE)	Norton AFB, CA	20 Apr XX	MLG staff G-2
GIST (G-3)	Norton AFB, CA	5 Apr XX	MEF staff G-3 (future operations)
NGA technical representative	Norton AFB, CA	15 Apr XX	MEF staff G-2
MCIA detachment	McGuire AFB, NJ	30 Mar XX	Marine Corps forces staff G-2

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(2) (U) Commander, Marine Corps forces (COMMARFOR) will advise and support the JTF commander concerning requirements for GI&I products and support for all Marine Corps forces. Coordination between Service and functional components and other supporting organizations will be conducted through the Marine Corps forces G-2 section and the IOC at MEF G-2/S-2.

(3) (U) COMMARFOR/MEF G-2 or ISC will coordinate with NGA in conjunction with the JTF to provide the full range of GI&I products to support intelligence and operational requirements.

(4) (U) Coastal hydrographic survey ships and deep ocean bathymetric survey ships are expected to be transferred to the combatant command for use by operating forces under conditions of national emergency. At such time this OPORD is implemented, the survey ships will be used in assignments involving hydrographic data collection and chart production as appropriate to the operation or to the overall mission of the command.

2. (U) <u>Mission</u>. Provide a clear, concise statement of the GI&I mission in support of the OPORD. COMMARFOR and/or MEF will direct, coordinate, validate, and provide GI&I products and services as required in support of this OPORD.

- 3. (U) Execution.
  - a. (U) <u>Concept of GI&I Operations</u>.

(1) (U) <u>General</u>. Provide a broad statement of how the command will provide the GI&I support necessary to meet the commander's overall mission requirement. Include the organic topographic and supporting units involved; the time-phasing of operations; the general nature and purpose of GI&I operations to be conducted; the interrelated or cross-Service support; and support provided by agreements, coordination, and cooperation necessary for the successful implementation of this OPORD. Describe the scope and extent of host nation support available to enhance MAGTF GI&I operations in support of the OPORD.

(a) (U) Forces deploying in support of this OPORD are required to arrive with a 30-day (or as directed) basic load of GI&I products.

(b) (U) Resupply or sustainment stocks and following-on supplies of maps and charts will be provided via normal supply channels.

(c) (U) Substitute products and quick response products may be provided by NGA and other Service agencies to supplement available coverage.

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(d) (U) Subordinate units with GI&I assets retain primary responsibility for their own quick response products.

(e) (U) Marine expeditionary units are required to deploy with 100 percent of their topographic requirements.

(f) (U) Follow-on requirements will be coordinated with COMMARFOR and/or MEF ISC, with information copies to the JTF and combatant command intelligence section.

(g) (U) Supporting plans will specify the required maps, charts (including series, sheet number, and total quantities), and digital databases; geographic intelligence and terrain analysis requirements; cartographic and geodetic survey requirements; procedures for requesting standard and nonstandard topographic production support; and guidance for hard copy and electronic distribution. Requirements for special products and materials will also be included in supporting plans.

(h) (U) A full-time, GI&I POC will be established at each MSC that is responsible for requirements and capabilities. The POC name, SIPRNET and NIPRNET e-mail address(es), and telephone number(s) will be provided in writing to the MEF command element (G-2/S-2) and the IOC (attn: ISC). Provide updates when changes occur or within 30 days of receipt of this OPORD and its updates.

(2) (U) <u>Deployment</u>. Summarize the requirements for deploying organic GI&I forces and necessary depot activities from their normal peacetime locations to the area of operations. Pay particular attention to the time-phasing of these deployments to affect an orderly transition from current to planned organizational configurations.

(a) (U) Intelligence battalion's topographic platoon will integrate and develop the MAGTF CGSA for the MAGTF AOR and AOI.

(b) (U) Subordinate units will ensure communications connectivity for attached GIST and GITs to support GEOINT operations.

(c) (U) Subordinate units will maintain and deploy with a 15-day basic load of GI&I stocks.

(d) (U) Automatic distribution change requests and updates for validation will be forwarded to the MEF G-2 (attn: ISC).

(e) (U) All subordinate units will update the list of deployment and GI&I basic load requirements and submit them to the MEF G-2 (attn: ISC).

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(f) (U) Basic load airlift or sealift transportation from CONUS to the port of entry will be arranged per established TPFDL procedures and transportation priorities established by the MEF G-3.

(g) (U) Transportation and movement of WRS or sustainment stocks to subordinate units will be coordinated with the MEF G-4 supply.

(3) (U) <u>Employment</u>. Describe in general terms how MAGTF and supporting GI&I forces are to be employed in the conduct of GI&I operations.

(a) (U) The intelligence battalion topographic platoon will maintain the MAGTF GIL within the joint operating area, MAGTF area of operations, and AOI according to ISC direction.

(b) (U) Establishment and operation of a forward map depot to distribute hard copy and digital media products will be coordinated with MEF G-4 supply.

(4) (U) <u>Interoperability</u>. Provide specific technical guidance and procedures to ensure interoperability of GI&I operations and materials, particularly the proper sources, datum documentation, and use of coordinates derived from GI&I products. Provide guidance to ensure that MAGTF sources, methods, and procedures deliver the required accuracy.

b. (U) <u>Tasks</u>. In separate numbered subparagraphs, list the GI&I tasks assigned to each element of the MAGTF and to those supporting external units or agencies. For each of the tasks, provide a concise mission statement to be performed in further planning or execution of the OPORD. Provide sufficient details in these task assignments to ensure that essential elements to the concept of the operation are described properly.

(1) (U) Marine Corps forces G-2 GI&I Branch.

(a) (U) Act as the POC for all Marine component GI&I issues.

(b) (U) Coordinate all validated GI&I collection, production, and dissemination requirements with the JTF, combatant command, and other external organizations.

(c) (U) Coordinate all production requirements tasked by HHQ affecting Marine Corps forces topographic assets.

(2) (U) MEF GI&I Branch.

(a) (U) Identify specific GI&S needs that are not included in appendix 1 of this annex.

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(b) (U) Identify specific services required from MAGTF topographic units, NGA, MCIA, or other organizations that support the MAGTF mission.

(c) (U) Identify the distribution of the GI&I basic load to all MAGTF units.

(d) (U) Identify distribution, storage, and management of GI&I depot stocks.

(e) (U) Identify the priorities for GI&I collection, production, and dissemination.

(f) (U) Identify procedures for the transmission of geographic coordinates.

(g) (U) Identify responsibilities for GI&I database systems administration, management, and replication.

(h) (U) Identify command and control, administration, and maintenance of the GI&I depot.

(i) (U) Identify releasability of GI&I products and information to host nation, media, and multinational forces.

(j) (U) Maintain an updated, prioritized list of required GI&I products and databases. Provide this list to COMMARFOR/MEF (G-2/GI&S) within \_\_days of receipt of this OPORD and its updates.

(k) (U) Identify prioritized GI&I requirements for maps, charts, and digital databases currently not in production to COMMARFOR/MEF (G-2/GI&S) annually or within 60 days of receipt of this OPORD and its updates.

(3) (U) <u>Intelligence Battalion</u>. Plan and direct, collect, process, produce and disseminate intelligence and provide counterintelligence support to the MEF, MEF MSCs, subordinate MAGTFs, and other commands as directed.

(a) (U) Intelligence Battalion Commander/Intelligence Support Coordinator.

1 Plan and, upon G-2 approval, implement a concept of intelligence operations based upon the mission, threat, commander's intent, guidance, and CONOPS. This concept of intelligence operations will include a supporting GEOINT CONOPS.

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2 Establish and supervise operation of the MEF IOC, which includes the support cell, the SARC, and the P&A cell. Task-organize and integrate GI&I elements within the IOC and other elements of the MEF command element's CIC as appropriate; collocate the IOC with the MEF command element's main command post.

3 Develop, consolidate, validate, and prioritize recommended PIRs and intelligence requirements to support MAGTF planning and operations for G-2 approval.

4 Plan, develop, integrate, and coordinate MEF intelligence collection, production, and dissemination plans, including the effective organic and external integration and employment of MAGTF GI&I and MEF IMINT, SIGINT, counterintelligence, human resources intelligence, ground remote sensors, ground reconnaissance, and tactical air reconnaissance operations.

5 Plan, develop, coordinate and maintain intelligence CIS architecture, to include its integration with and support of MEF GI&I requirements.

6 Coordinate and integrate MEF GI&I operations with the Marine Corps forces headquarters, other Service components, JTF, theater, national intelligence operations, and all aspects of reachback support.

7 Monitor the flow of GI&I throughout the MAGTF and ensure that it is delivered to intended recipients in a timely fashion and satisfactorily meets their needs.

8 Evaluate the effectiveness of MEF and supporting GI&I operations and support; initiate and/or recommend to the G-2 necessary corrective actions and improvements.

(b) (U) <u>Support Cell OIC</u>.

1 Develop and coordinate GI&I and all-source intelligence collection plans, coordinating and integrating these with MEF, other components, JTF, theater, and national intelligence production operations.

2 Identify and prepare GI&I requests for intelligence that are beyond organic capabilities and prepare submissions to HHQ and external agencies for support.

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3 Plan, coordinate, conduct, and supervise geodetic and topographic surveys as required.

4 Plan, coordinate, conduct, and supervise collection of coastal data regarding trafficability, routes of egress, inland water bodies, and similar information as required to support MAGTF operations.

5 Develop, coordinate, and maintain GI&I dissemination priorities, intelligence reporting criteria, and dissemination means.

6 Develop and coordinate GI&I dissemination OPLANs and supporting architectures for voice and data network communications, coordinating and integrating these architectures with MEF, other components, JTF, theater, and national GI&I and intelligence CIS and dissemination operations.

7 Disseminate terrain information and intelligence and other GI&I products throughout the MAGTF to support requirements.

# (c) (U) <u>P&A Cell OIC</u>.

1 Develop, administer, and maintain the geospatial framework to support MEF planning, intelligence, command and control, maneuver, fires, logistics, and other operations and processes.

2 Maintain all-source automated GI&I and intelligence databases, files, workbooks, country studies, and other intelligence studies to support MAGTF requirements.

3 Analyze, synthesize, and produce terrain information and intelligence and other GI&I products to support MAGTF requirements.

4 Prepare GI&I and all-source intelligence products to support MAGTF requirements, to include MCOOs, terrain models (3-D models), LOS studies, line-of-sight analysis, terrain factor overlays, hydrographic charts, landing zone studies, and similar cartographic and digital products.

5 Prepare map substitutes, such as overlays, overprints, photomask, map revisions, and multicolor charts.

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6 Revise and reproduce in limited quantities combat charts, coastal charts, port charts, and harbor charts. Products may include terrain models (3-D models), LOS studies, line-of-sight analysis, terrain factor overlays, hydrographic charts, landing zone studies, and similar products.

(4) (U) <u>Major Subordinate Commands</u>. Establish full-time, GI&I POC at each MSC to be responsible for requirements and capabilities. Provide the POC's name and phone number in writing to MEF G-2/GI&S and the ISC/IOC as changes occur or within \_\_\_\_\_ days of receipt of this OPORD and its updates.

c. (U) <u>Coordinating Instructions</u>. Reference Appendix 15 (Geographic Intelligence) to Annex B (Intelligence) of the OPORD. List, in separate numbered subparagraphs, the instructions that are applicable to two or more elements of the MAGTF and supporting units and agencies that are necessary for proper coordination of the GI&I support. Specify the points of contact within the command that can authorize the release of WRS held or that can resolve command GI&I problems. Also, include a brief description of the time sequencing of notifications and how forces and agencies will be notified.

(1) (U) The US MGRS will be used for operations involving or in support of ground forces. Ensure that the map, chart, or digital database datum information is included when passing coordinates.

(2) (U) The MGRS prescribed for use by ground forces in the area will become the standard when aviation forces are providing close air support.

(3) (U) Geographic coordinates may be used in operations that do not directly involve ground forces.

(4) (U) The WGS-84 is the datum of preference for all US operations. The CCDR or JTF commander will designate another datum only when necessary to support multinational operations.

4. (U) Administration and Logistics.

a. (U) <u>Supply and Storage</u>. Provide instructions regarding GI&I supply and storage procedures and responsibilities. Include the planned locations of command and non command storage sites and facilities. Refer to the command GI&I WRS plan to define detailed packaging and activation instructions at storage facilities. Specify the types and quantities of products or timeframe required (e.g., 15 days of maps and charts) to be held by the supporting command's units or agencies. Outline the intra theater distribution plan to be implemented by unit logistic organizations.

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(1) (U) Maps and charts for bulk distribution to MEF units are stored at (identify location).

(2) (U) City graphic MEF will requisition planning stock and the 15-day basic load (unit-held WRS) directly from NGA.

(3) (U) The ISC will coordinate with the MEF G-4 to establish quantity requirements and storage location for bulk resupply.

b. (U) <u>Transportation</u>. Provide general instructions regarding GI&I material transportation requirements. Use a separate appendix to list detailed transportation requirements and procedures.

(1) (U) The ISC will coordinate with the MEF G-4 to establish transportation requirements for bulk and individual unit resupply.

(2) (U) Detailed transportation information is included in appendix 2.

c. (U) <u>Support</u>. Provide instructions and procedures for obtaining logistics in support of the OPLAN. Identify priorities, times required, and other necessary information.

(1) (U) Requests for bulk-map stock replenishment will be forwarded through normal supply channels to MEF G-2/ISC for validation of quantities.

(2) (U) Request for theater resupply will be forwarded through normal supply channels to MEF G-2/ISC for validation and submission.

(3) (U) Requests for GI&I products and services (other than requisitions of stocked products) that exceed the MEF's capabilities will be submitted to the ISC for validation, prioritization, and submission to the commander (or JTF) for follow on action.

5. (U) <u>Command and Control</u>.

a. (U) <u>Priorities</u>. Provide guidance for establishing command GI&I support priorities.

b. (U) <u>Command Relationships</u>. Include primary and alternate locations of organic GI&I units and specify the C2 relationships among the MAGTF GI&I support structure and external GI&I units or agencies if not previously addressed. Refer to Annex B (Intelligence) and Annex J (Command Relationships) of this OPORD. All requests for GI&I support and production will be coordinated through the MEF G-2 and the ISC.

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c. (U) <u>Communications and Information Systems</u>. Refer to Annex K (Combat Information Systems). Identify CIS requirements, priorities, and other pertinent information to support unit GI&I operations.

d. (U) <u>Reports</u>. Specify organizations and elements responsible for GI&I reports. Include the format for preparation and times, methods, and classification of submission. Add necessary instructions for updating maps, charts, and digital databases. This information can be added here or in Appendix 3 (Geospatial Information and Services Reports) of this annex.

### ACKNOWLEDGE RECEIPT

Name Rank and Service Title

### **APPENDICES:**

1 - Geospatial Information and Intelligence Requirements List

2 - Geospatial Information and Intelligence Transportation Requirements

3 - Geospatial Information and Intelligence Reports

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### <u>APPENDIX 1 TO ANNEX M TO OPERATION ORDER (Number) (U)</u> GEOGRAPHIC INFORMATION AND INTELLIGENCE REQUIREMENTS LIST (U)

(U) <u>Requirements List</u>. Identify the known-to-date GI&I products required for the execution of this order. Include the scale, national stock number, quantity on hand, and status. The lists of series and sheet numbers encompass the total number of requirements submitted by the MEF and validated by Commander, United States Marine Corps Forces, Pacific; the JTF; and CCDRs.

(U) Command Element Req	uirements		
Product Scale	National Stock Number	Quantity On Hand	Status
(U) GCE Requirements			
Product Scale	National Stock Number	Quantity On Hand	Status
(U) ACE Requirements			
Product Scale	National Stock Number	Quantity On Hand	Status
(U) LCE Requirements			
Product Scale	National Stock Number	Quantity On Hand	Status

Page Number

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### APPENDIX 2 TO ANNEX M TO OPERATION ORDER (Number) (U) GEOGRAPHIC INFORMATION AND INTELLIGENCE TRANSPORTATION REQUIREMENTS (U)

1. (U) <u>General</u>. Provide general transportation requirements that pertain to deploying forces, which may include a listing of transportation shortfalls (e.g., reduced stock requirements) in required support of GI&I operations if full transportation requirements cannot be provided.

a. (U) The DLA provides transportation of GI&I products and data from NGA depots to the points of embarkation or other CONUS locations designated by Service component commanders.

b. (U) Units will deploy with a 30-day (or as directed) basic load of GI&I products.

c. (U) GI&I products are a Class IIE supply items. The United States Transportation Command provides assets per the TPFDD to push additional GI&I products to deployed forces. Shipping priority is the same as Class VIII (medical) unless prioritized higher by the MEF G-3.

2. (U) <u>Personnel</u>. List movement requirements of GI&I personnel in the TPFDD, including in place GI&I personnel and shortfalls. List any transportation shortfalls in required support of GI&I operations if full transportation requirements cannot be provided.

3. (U) <u>Equipment</u>. List movement requirements of GI&I equipment in the TPFDD, including in place GI&I equipment and shortfalls. List any transportation shortfalls in required support of GI&I operations if full transportation requirements cannot be provided.

4. (U) <u>Map Stocks.</u> List movement requirements for both map stocks held and WRS GI&I holdings in the TPFDD. Include future transportation requirements for GI&I sustainment. List any transportation shortfalls in required support of GI&I operations if full transportation requirements cannot be provided.

### Page Number

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### <u>APPENDIX 3 TO ANNEX M TO OPERATION ORDER (Number) (U)</u> GEOSPATIAL INFORMATION AND INTELLIGENCE REPORTS (U)

Provide a detailed description and format for each report. Identify transmission methods and POC to receive each report.

- 1. (U) Safety of Navigation Reports
- 2. (U) Marine Information Reports
- 3. (U) Port Information Reports
- 4. (U) Product Discrepancy Reports
- 5. (U) Beach Reports
- 6. (U) Low Stock Reports
- 7. (U) Request for GI&S and/or GEOINT Support

Page Number

# APPENDIX G. TACTICAL STUDY OF THE TERRAIN

A tactical study of the terrain determines the terrain's effects on enemy and friendly operations within the area of operations. It includes an analysis of weather, terrain, and other factors, such as economy, sociology, and religion, throughout the commander's AOI. The study serves as a basis for developing specific, friendly COAs and determining enemy capabilities in commander and staff estimates. Thorough terrain analysis allows the commander and staff to see and assess the battlespace in width, depth, height (airspace), and time dimensions.

The intelligence officer has staff responsibility for initiating, coordinating, completing, and disseminating the analysis of the area of operations. A key product resulting from this process is Tab A (Tactical Study of the Terrain) to Appendix 11 (Intelligence Estimate) to Annex B (Intelligence) of an OPLAN. Other staff sections contribute within their respective fields so the final analysis represents a coordinated effort. Typical contributions include the following:

- The topographic platoon's terrain and infrastructure studies.
- The P&A cell's all-source intelligence estimates on sociological, political, economic, technological, and related conditions.
- The staff METOC officer's operational weather forecasts and other weather and climatic information, including meteorological effects decision aids. For additional information, see Annex H (Meteorological and Oceanographic Services) to the OPLAN or OPORD.
- The engineer's analysis of route reconnaissance information and other information on rear area activities.
- The military information support operations officer's information on the psychological environment.

Graphic representations of weather and terrain data developed during the IPB process are included as part of Tab A. An abbreviated analysis will usually be included as part of the intelligence estimate. The latter is more common at lower levels of a command when a previously prepared analysis is updated in conjunction with an ongoing operation, or when time does not permit preparation of a detailed study.

When preparing the analysis of the area of operations, the intelligence officer uses other sources of information and intelligence, including national intelligence surveys and locally produced studies and periodicals. When possible, the intelligence officer prepares a tactical study of the terrain and an analysis of the area of operations based upon an anticipated mission before the actual mission has been received. Upon receipt of the mission, the intelligence officer reevaluates the analysis in terms of the AOI, the area of operations, the commander's initial problem framing, initial planning guidance, and intelligence requirements. As the operation progresses, changes in operational factors require analysts to update their initial findings.

The following sample format of Tab A (Tactical Study of the Terrain) to Appendix 11 (Intelligence Estimate) to Annex B (Intelligence) to an OPORD provides instructions and notional information to support the development of this analysis.

### CLASSIFICATION

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## TAB A TO APPENDIX 11 TO ANNEX B TO OPERATION ORDER (Number) (U) TACTICAL STUDY OF THE TERRAIN (U)

### (U) REFERENCES:

(a) List unit SOPs for intelligence and counterintelligence.

(b) List maps, documents, and other forms of GI&I data or sources that provide guidance relevant to the construction of this tab.

(c) List those NGA products and databases and other forms of GI&I data references required for an understanding of this tab.

(d) List other documents that provide guidance required for the necessary planning functions relevant to GI&I and supporting operations.

1. (U) <u>Purpose</u>. State the assigned task and its purpose (e.g., to analyze the terrain within the I MEF's area of operations for OPORD [number]).

2. (U) <u>Mission</u>. The mission of the command is taken from the commander's problem framing, planning guidance, or other statement (e.g., defend in sector west of the Columbia River; be prepared to attack/counterattack enemy forces within the MEF area of operations.

3. (U) General Description of the Area.

a. (U) <u>Climate Weather Conditions</u>. Provide a general description of the area of operation's climatic weather conditions for a defined timeframe.

(1) (U) <u>Timeframe</u>. For example, weather forecast for period 1-30 April 2000.

(2) (U) <u>Climatic Summary</u>. The following are example entries for aspects of the climatic summary.

Page Number

(a) (U) <u>Precipitation</u>. Precipitation is sparse during the month of April, averaging less than ½ inch. The absolute maximum is only 1½ inches. Almost all precipitation falls in the form of rain. Thunderstorms occur on fewer than one day per month; while snow, if it occurs at all, is only a trace.

(b) (U) <u>Temperature</u>. During the month of April, temperatures are usually moderate. The mean monthly maximum is 64 °F with the mean monthly low temperature of 34°F. Temperatures can be expected to dip below freezing 13 days of the month.

(c) (U) <u>Wind</u>. During the month of April, prevailing winds are westerly throughout the area of operations. Wind speeds of 5-12 mph are normal, occurring an average of 16 days throughout the month. Wind speeds of greater than 20 mph can be expected on 6 days during the month.

(d) (U) <u>Ceiling and Visibility</u>. If present, clouds are generally high, thin cirrus. Visibility is generally greater than 5 miles. During the month of April, visibility is greater than 3 miles with ceilings greater than 1,000 feet on an average of 24 days. Visibility of less than ½ mile occurs on an average of only 1½ days during April and is usually associated with blowing dust or an isolated thunderstorm. Lowest visibility usually occurs between the hours of midnight and 0900.

(e) (U) <u>Illumination</u>. Use local standard time to list beginning of morning nautical time, end of evening nautical time, sunrise, sunset, moonrise, and moon set.

(f) (U) <u>Moon Phases</u>.

(3) (U) <u>Atmosperic Pressure</u>. Average pressure is \_\_\_\_\_.

b. (U) Terrain. The following are examples of general descriptions of te terrain within the area of operations.

	BMNT	EENT	SR	SS	MR	MS
1 April	0435	1938	0542	1831	2130	1000
11 April	0413	1954	0522	1844	0243	1722
21 April	0352	2010	0504	1858	1115	2145
1 May	0332	2027	0447	1911	1750	0315
LEGEND		*	•	-	•	•

BMNT	Beginning of Morning Nautical Time	MS	Moon Set
EENT	End of Evening Nautical Time	SR	Sun Rise
MR	Moonrise	SS	Sun Set

Page Number

Moon I	Phases
New Moon	4 April
First Quarter	11 April
Full Moon	19 April
Last Quarter	27 April

(1) (U) <u>Relief and Drainage Systems</u>. The area of operations is drained by two major north-south flowing rivers—the Yakima River to the west and the Columbia River to the east. Drainage within the MEF's area of operations consists primarily of east-west flowing streams and canals. Most drainage systems within the area of operations have high, steep banks with slopes greater than 30 percent. The area is dominated by numerous parallel ridges running principally from the northwest to the southeast. This area is heavily eroded and dissected by steep valleys, canyons, and wadis.

(2) (U) <u>Vegetation</u>. Natural vegetation within the area of operations consists of arid and semiarid rangeland. Grasses and shrubs are the primary vegetative cover, with some scattered trees found along stream bottoms. Cultivated vegetation in the area consists primarily of food crops, such as short grain and vegetables, in the northwestern corner of the MEF's area of operations and orchards, vineyards, and short grain crops in the southwestern corner of the MEF's area of operations.

(3) (U) <u>Surface Materials</u>. Surface materials within the low and high plains consist primarily of alkaline silty loam, with small, scattered deposits of sandy loam along larger streams. Surface materials within hills, mountains, and ridges consist of shallow, stony soils mixed with silt. Soils are less than 1 m thick, with multiple layers of basalt in the bedrock.

(4) (U) <u>Constructed Features</u>. The two principle east-west roads through the area are Interstate 90 (a four-lane divided highway) in the north and Highway 24 (a two-lane paved road) in the south. Two principal north-south roads are located in the MEF's rear: Interstate 82 (a four-lane divided highway) and Highway 821 along the east bank of the Yakima River. Two single-track, standard-gauge railroads are located within the area of operations. One runs east-west in the north and one runs north-south in the MEF's rear. The major built-up areas are Yakima, population of 45,588 (FG9164), and Ellensburg, population unknown (FH8607). There are two major airfields: one located 2 km west of Yakima and the other located 3 km north of Ellensburg. Numerous smaller paved and unpaved airstrips and landing strips are located within the area of operations.

#### Page Number

4. (U) Military Aspects of the Area. Provide a general description of terrain effects on military operations within the area of operations. Focus on the MAGTF mission and address KOCOA. The following subparagraphs are examples.

### a. (U) Key Terrain

(1) (U) <u>Ryegrass Mountain (Vicinity GH272014)</u>. This terrain feature is located in the center of mobility corridor 1a and controls movement along the major east west road in the MEF's area of operations.

(2) (U) <u>Saddle Mountain (Vicinity GG261930</u>). This terrain feature controls movement along mobility corridor 1b and the east-west railroad lying therein.

(3) (U) <u>Hill 530 (Vicinity GG258825)</u>. This hill controls movement along mobility corridor 3.

(4) (U) <u>Hill 811 (Vicinity GG197856)</u>. This hill is located between mobility corridors 2 and 3 and provides excellent observation and fields of fire.

(5) (U) <u>Hill 952 (Vicinity GG253682) and 949 (Vicinity GG251659)</u>. These hills are located in mobility corridor 4 and control the east-west movement along the secondary road network.

(6) (U) <u>Hill 739 (Vicinity GG230573)</u>. This hill mass controls movement on mobility corridor 5 and Highway 24.

(7) (U) <u>Vanderbilt Gap (Vicinity FG962950</u>). Controls movement along Interstate 82 in the MEF's rear area.

(8) (U) Interstate 82 Bridges.

(a) (U) Over Squaw Creek (vicinity GH015683).

(b) (U) Over Selah Creek (vicinity FG956747).

(9) (U) <u>Bridges Over Yakima River (Railroad)</u>. Vicinity FH907971, FG936801, FG920730, and FG923653.

(10) (U) <u>Bridges Over Yakima River (Vehicle)</u>. Vicinity FG919724, FG934643, FG940559, and FG955532.

**Note:** Interstate 82 and Highway 821 bridge cross Yakima River off existing maps at approximately FG900675.

Page Number

### b. (U) Observation and Fields of Fire.

(1) (U) <u>Weather Conditions</u>. Limited restrictions to visibility are most likely to occur between the hours of midnight and 0900 because of blowing dust and haze. Prevailing winds favor friendly use of smoke and chemicals.

(2) (U) <u>Relief</u>. Good to excellent observation, as well as excellent long-range fields of fire, exist from the dominant ridges and hills. High ground along the west bank of the Columbia River provides excellent observation and fields of fire at all possible crossing sites. Observation and fields of fire within mobility corridors will be fair to good with numerous features providing most of the cover and concealment.

(3) (U) <u>Vegetation</u>. Isolated orchards and vineyards are prominent east of Yakima. Other vegetation will not significantly limit observation and fields of fire.

(4) (U) <u>Constructed Features</u>. Constructed features will not be a limiting factor, except in the built-up areas of Yakima and Ellensburg.

### c. (U) Cover and Concealment.

(1) (U) <u>Relief</u>. The rolling, dissected terrain within the area of operations will provide good to fair cover from direct fire weapons and good to fair concealment from ground observation. Cover from indirect fires and concealment from aerial observation will be poor throughout the entire sector.

(2) (U) <u>Vegetation</u>. No cover or concealment will be provided within the area of operations because of the lack of significant vegetation.

(3) (U) <u>Constructed Features</u>. With the exception of the built-up areas around Yakima, there are no significant constructed features that will afford cover or concealment.

### d. (U) Obstacles.

(1) (U) <u>Relief</u>. Terrain favors the defense because of the numerous micro relief features, such as gullies, canyons, and steep stream banks. Most micro relief features will not stop vehicle off-road movement, but these features will significantly slow or impede vehicle advance. Very little engineer effort will be required to make these linear obstacles impassable. Both the Columbia and Yakima Rivers are major natural obstacles and are not fordable. Major engineering efforts will be required to cross at sites where bridges do not exist.

### Page Number

(2) (U) <u>Vegetation</u>. Vegetation is not a significant limiting factor except in the vicinity of Yakima, where vineyards and orchards will restrict the movement of wheeled vehicles.

(3) (U) <u>Surface Materials</u>. The surface materials within the area of operations are extremely stable in the existing arid climate. Within the valleys, shallow excavation is possible with the use of hand tools. Soils may permit easy ditching and expansion of existing natural obstacles. Soils on the ridgelines are shallow and course and can be used as minefields.

(4) (U) <u>Constructed Features</u>. Numerous cuts and fills are located on the major roads and railroads within the area. Most of the bridges across the Yakima River are located in the vicinity of the built-up area, which will force most traffic into or near the city of Yakima. Movement through Yakima will be restricted to the existing road network.

e. (U) <u>Avenues of Approach</u>. Provide a general description of terrain effects on available avenues of approach and mobility corridors within the area of operations. There are five avenues of approachs from the Columbia River into and through the MEF's sector.

- (1) (U) Corridors available to friendly forces for movement into our position:
  - (a) (U) Axis GH280027 to GH910047 (Interstate 90).
  - (b) (U) Axis GG280840 to GG960990.
  - (c) (U) Axis GG280820 to GG000790.
  - (d) (U) Axis GG290660 to FG940700.
  - (e) (U) Axis GG290550 to FG950610.
- (2) (U) Corridors available to friendly forces for movement into the enemy's position:

(a) (U) Axis GG080030 to GG100963 (Boylston Mountain) to GG084916 (Badger Gap) to GG040670 (Yakima Ridge).

(b) (U) Axis FG910990 to FG920700 (Interstate 82).

f. (U) <u>Combat Service Support Aspects</u>. The following subparagraphs would be completed under the intelligence officer's direction as a coordinated effort between the GI&I analyst; intelligence analysts; weather analysts; and other combat, combat support, and combat service support staff members.

Page Number

- (1) (U) Personnel.
- (2) (U) Logistics.
- (3) (U) Civilian-military operations.
- 5. (U) Effects of Area Characteristics
  - a. (U) On enemy courses of action.
    - (1) (U) Enemy defense.
    - (2) (U) Enemy attack.
    - (3) (U) Enemy air.
    - (4) (U) Enemy use of weapons of mass destruction.
  - b. (U) On friendly course of action.
    - (1) (U) Friendly defense.
    - (2) (U) Friendly attack.
    - (3) (U) Friendly air.
    - (4) (U) Friendly use of weapons of mass destruction.

### ACKNOWLEDGE RECEIPT

Name Rank and Service Title

### EXHIBITS:

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Name Rank and Service Title

### Page Number

# APPENDIX H. BEACH STUDIES

The geographic specialist within the intelligence section and battalion often has staff responsibility for initiating, coordinating, and ensuring the completion and dissemination of analysis for beaches within the area of operations. Other staff sections contribute within their respective fields so that the final analysis provides a coordinated, fused intelligence product. Typical contributions include the following:

- Imagery.
- Reports from ground and air reconnaissance.
- Reports from SEAL [sea-air-land] teams.
- All-source intelligence analysis.
- Intelligence databases.

High resolution graphic views developed during the IPB process are attached to this study. An abbreviated analysis may be prepared as part of the intelligence estimate. More common at lower levels of command, the abbreviated analysis is used when a previously prepared analysis is updated in conjunction with an ongoing operation or when time does not permit preparation of a detailed study.

The intelligence battalion's P&A cell within the IOC uses various sources, such as national intelligence surveys, locally produced studies, and periodicals to prepare the analysis of the area of operations. Analyses prepared by other headquarters are also valuable sources of information and intelligence.

When possible, an analysis of the beaches within the area of operations is prepared before the actual mission has been received. Upon receipt of the mission, the G-2 GI&I officer and the intelligence battalion ISC re-evaluate the analysis in terms of the commander's AOI, area of operations, and intelligence requirements. As the operation progresses, changes in the mission and the commander's requirements drive revision of the analysis.

The following sample format of Tab B (Beach Studies) to Appendix 11 (Intelligence Estimate) to Annex B (Intelligence) of an OPORD supports the development of this analysis.

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### TAB B TO APPENDIX 11 TO ANNEX B TO OPERATION ORDER (Number) (U) BEACH STUDIES (U)

(U) REFERENCES:

(a) List unit SOPs for intelligence and counterintelligence.

(b) List those NGA products, databases, and other forms of GI&I data references that are required for an understanding of this tab.

(c) Marine Corps Reference Publication (MCRP) 2-10B.1, *Intelligence Preparation of the Battlespace* and Army Techniques Publication 3-34.80, *Geospatial Engineering*. List any other relevant documents that provide guidance required for the necessary planning functions relevant to GI&I and supporting operations, including pertinent maps.

1. (U) <u>BEACH 1</u>. Provide the information indicated in the attached form. Where appropriate, reference should be made to associated graphic views generated to support visualization of specified beaches, landing areas, and landing sites.

2. (U) BEACHES 2 through X, as required.

ACKNOWLEDGE RECEIPT

Name Rank and Service Title

EXHIBITS:

OFFICIAL:

/S/ Name Rank and Service Title

Page Number

# APPENDIX I. HELICOPTER LANDING ZONE AND DROP ZONE STUDIES

Helicopter LZ and DZ studies are detailed intelligence studies that are used to determine the environmental effects of potential LZ and DZ sites. These studies include critical information and intelligence that affect mobility, exits, vegetation, gradients, obstacles, surface materials, urban proximity, and the military aspect of the terrain to support the mission. The analysis provides the commander and staff with critical GI&I that affects the width, depth, height (airspace), and time dimensions of the battlespace to support the decision making process and final site selection by the commander.

The P&A cell, intelligence battalion, and IOC have principal MEF responsibility for the preparation of LZ and DZ studies. Typically, the topographic platoon leads the development of these studies with key support from the IIP and all-source intelligence analysts. The intelligence battalion commander and ISC has staff responsibility for initiating, coordinating, completing, and disseminating LZ and DZ studies of the area of operations. Other staff sections may contribute within their respective fields so that the final analysis represents a coordinated effort. Typical contributions include the following:

- Imagery.
- Reports from air and ground reconnaissance.
- Engineer reports.
- Intelligence databases.

High resolution graphic views developed during the IPB process are attached to a LZ and DZ study. An abbreviated analysis may be prepared as part of the intelligence estimate. The abbreviated analysis is more common at lower levels of command. It is used when a previously prepared analysis is updated in conjunction with an ongoing operation or when time does not permit preparation of a detailed study.

Production and analysis cell analysts use a variety of sources (e.g., national intelligence imagery, surveys, locally produced studies, periodicals) to prepare LZ and DZ studies. When possible, an analysis of the LZ and DZs within the area of operations is prepared before the actual mission has been received. Upon receipt of the mission, the ISC re-evaluates the analysis in terms of the commander's area of operations, AOI, and intelligence requirements. As the operation progresses, changes in the mission, the commander's intent and guidance, and intelligence requirements will require revision of the analysis.

The following sample format of Tab E (Helicopter Landing Zone/Drop Zone Studies) to Appendix 11 (Intelligence Estimate) to Annex B (Intelligence) to an OPORD is provided to support the development of this analysis.

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### TAB E TO APPENDIX 11 TO ANNEX B TO OPERATION ORDER (Number) (U) HELICOPTER LANDING ZONE/DROP ZONE STUDIES (U)

### (U) REFERENCES:

(a) List unit SOPs for intelligence and counterintelligence.

(b) List NGA products, databases, and other forms of GI&I data references required for an understanding of this tab.

(c) List other relevant documents that provide guidance required for GI&I and supporting operations planning functions.

1. (U) Helicopter Landing Zone/Drop Zone. Identify the information indicated in the attached report form (i.e., the standard LZ/DZ reporting form). Where appropriate, reference should be made to associated graphic views generated to support visualization of each LZ and DZ.

2. (U) Helicopter Landing Zone/Drop Zone 2. Provide the information indicated in the following form (i.e., the standard LZ/DZ reporting form).

Page Number

## HELICOPTER LANDING ZONE/DROP ZONE

Designation
Date
Longitude and latitude
Military grid coordinates
Charts/Maps reference
1. Terrain Description
Suitability
Landing obstructions
Shape
Size
Remark
Slope
Elevation
<ol> <li>Surface Description</li> <li>Materials</li> </ol>
Trafficability
Condition
Compression bearing ration
Exits
Page Number

Cover and concealment	
Landmarks remarks	
3. Vegetation	
Location (Point of Origin)	
Туре	
Density	
Direction from point of origin	
Distance from point of origin	
4. LZ/DZ orientation photograph/sketch	
Show principal features and, if available, provide annotated	photographs.
ACKNOWLEDGE RECEIPT	
	Name
	Rank and Service
	Title
EXHIBITS:	
OFFICIAL:	
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Name	
Rank and Service	
1110	
Page Number	
CLASSIFICATION	

# APPENDIX J. GEOSPATIAL INFORMATION AND INTELLIGENCE PRODUCTION REPORT SAMPLE FORMAT

The sample format contained in this appendix defines the critical elements of a GI&I production report. During peacetime and garrison operations, a monthly production report should be compiled by the topographic platoon and forwarded via the intelligence battalion commander to the MEF G-2 GI&I section to ensure that GEOINT production timelines and resources are being adequately identified, prioritized, and employed. During tactical operations, the topographic platoon and detachment provide this report to the MAGTF command element intelligence officer via the intelligence battalion commander or ISC.

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GEOSPATIAL INFORMATION AND INTELLIGENCE PRODUCTION REPORT

1. (U) <u>Current Production Tasks</u>. Provide a listing of current production tasks. Include completed tasks for one cycle to identify final production status.

Task Number	Date Received	Priority	Description	Requesting Unit(s)	POC(s)	Due Date

2. (U) <u>Total Labor Hours Expended</u>. Detail total number of labor hours used during this reporting period.

3. (U) <u>Equipment Issues</u>. Describe equipment issues or malfunctions identified during this reporting period.

Page Number

4. (U) <u>Personnel Issues</u>. Describe personnel issues identified during this reporting period.

5. (U) <u>Communications and Information Systems Issues</u>. Describe issues dealing with CIS, electronic dissemination, or related queries identified during the reporting period.

6. (U) <u>Anticipated GI&I Production Delays</u>. Describe anticipated production delays for identified tasks; give the reason for each delay (e.g., equipment, personnel, communication, source).

7. (U) <u>Remarks</u>. Provide additional remarks or comments.

### ACKNOWLEDGE RECEIPT

Name Rank and Service Title

EXHIBITS:

OFFICIAL:

/S/

Name Rank and Service Title

Page Number

# APPENDIX K. GEOGRAPHIC INTELLIGENCE AND GEOSPATIAL INTELLIGENCE ANNUAL TRAINING PLANS

The following annual plan formats (Tables K-1 and K-2) help track recommended training for the MEF command element G-2, geospatial intelligence and imagery section, and the intelligence battalion topographic platoon. The MEF-level plan identifies training criteria for other headquarters' staff personnel and more detailed requirements for headquarters staff and MEF intelligence personnel, including the planning and use of GI&I. The topographic platoon training program addresses collection, exploitation, and production of GEOINT using standard equipment suites. Tables K-1 and K-2 show annual training plan formats.

	lat	ole N-1. Sample C	ommand	Liement	Imagery	/ ang ma	bound of	SCTION AI	inual ir	aining P	lan.				
									Monthly	Hours					
Subject	References	Participating Unit/Section	Total Hours	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	JuL	Aug	Sep
Datums, grids, and ellipsoids															
NGA production capabilities															
Limitations of FD															
MSDS requirements definitions															
Accessing the TGL															
Terrain Support to the IPB process															
LEGEND						-		-							
FD foundation ds TGL	ita														
topo plt topographic p	olatoon														

al Training Plan. ÿ ù ū č 20 ິຍ K\_1 Tahla

							,			,					
									Monthly	Hours					
Subject	References	Participating Unit/Section	Total Hours	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Datums, grids, and ellipsoids															
Topo plt capabilities															
Topo plt limitations															
NGA production capabilities															
Limitations of FD															
Terrain Support to the IPB process															
MSDS requirements definitions															
Accessing the TGL															
Terrain support to the IPB process															
Develop GEOINT estimate (appendix 11 to annex B of OPLAN/OPORD															
Develop annex M to the OPLAN															
Develop terrain factor database															
Develop the MCOO															
Develop MSDS															
Identify MSDS information															
Develop LZ/HDZ studies															
Develop transportation studies															
Develop urban studies															
Develop beach studies															
LEGEND															
FD foundation data															
Topo plt topographic platoon															

Table K-2. Sample Command Element Imagery and Mapping Section Annual Training Plan.

# APPENDIX L. GEOGRAPHIC INTELLIGENCE SPECIALIST CORE TASKS

## **CONDUCT A COMBINED OBSTACLE OVERLAY ANALYSIS**

The COO analysis is conducted by collecting, exploiting, and synthesizing multiple geospatial information products. These products are incorporated into a COO for an area of operations in support of the commander's PIRs and CCIRs. Supporting products of this analysis include the CCM overlay, which considers the environmental effects of terrain; LOC overlay, which depicts road infrastructure; and an obstacle overlay, which includes constructed and natural features.

## **CONDUCT A CONCEALMENT ANALYSIS**

Concealment is protection from enemy air, ground, and space observation and is vital to an operation's security and deception. It can be provided by woods, underbrush, snowdrifts, tall grass, cultivated vegetation, roof coverage, or any other feature that denies observation. Concealment is critical in the rear area. The concealment analysis must ensure that vulnerable rear area command and control facilities, support units, and logistic facilities are protected from enemy air and ground observation. The concealment overlay depicts best, good, fair, or poor concealment for summer or winter seasons within the area of operations.

## **CONDUCT A COVER ANALYSIS**

Cover (e.g., rocks, riverbanks, vegetation, quarries, walls, and buildings) is protection from the effects of direct fire weapons and is a vital part of military operations. A cover analysis identifies key areas that provide protection and natural cover (e.g., ravines, hollows, reserve slopes) and artificial cover (e.g., building, trenches). When conducting the cover analysis, cover overlays will depict good, fair, and poor cover conditions, considering the effects of terrain features within the given area of operations.

## CONDUCT A CROSS-COUNTRY MOVEMENT ANALYSIS

A CCM analysis is depicted by a graphic or series of graphics with supporting text and tables portraying off-road movement conditions for a specific vehicle or a group of vehicles. Considerations include the effects of terrain features and weather conditions within the given area of operations. It is usually overprinted on a medium- or large-scale topographic map. When conducting a CCM analysis, multiple geospatial information products are collected, exploited, and synthesized to be incorporated into a CCM overlay of a given area of operations in support of the commander's PIRs and CCIRs.

## CONDUCT A LINE-OF-SIGHT ANALYSIS

The terrain within the target area heavily influences the effectiveness of direct fire weapons. An LOS analysis will determine how terrain affects optical and electronic LOS. The LOS views can graphically portray the relative capabilities of direct fire weapons, communications, collection, and target acquisition systems. An LOS analysis will also assist in identifying key terrain with greater precision.

## CONDUCT A LINE OF COMMUNICATIONS ANALYSIS

Line of communications intelligence analysis provides detailed information on the transportation infrastructure within the area of operations. The analysis will include textual and graphical information on the roads, railroads, bridges, tunnels, and airfields.

## **CONDUCT A CONSTRUCTED FEATURES ANALYSIS**

A constructed feature analysis considers the effect of unnatural geographic features on military operations. These features can be annotated on GEOINT products to help visualize the battlespace. The GEOINT products can also be used to add value to existing geospatial information.

## CONDUCT A MULTISPECTRAL IMAGERY ANALYSIS

An MSI analysis is used to extract features and categorize terrain. Information extracted from an MSI can also be used to value add to existing geospatial information.

## CONDUCT AN OBSTACLE ANALYSIS

Conducting an obstacle analysis provides detailed information on any obstructions that are designed or employed to disrupt, fix, turn, or block the movement of forces and to impose additional losses in personnel, time, and equipment. Obstacles can be natural, constructed, or a combination of both.

## CONDUCT A SITE SELECTION ANALYSIS

A site selection analysis depicts a graphic or series of graphics portraying specific sites, based on a set of requirements for the mission and the commander's intent. This analysis can be used to identify potential LZ, zones of entry, and river crossing sites to enhance the mobility of forces.

## **CONDUCT A SURFACE CONFIGURATION ANALYSIS**

Commanders must have accurate intelligence on the surface configuration of the terrain; hence, they will conduct a surface configuration analysis. Ravines, embankments, ditches, plowed fields, boulder fields, and rice field dikes are typical configurations that influence military activities. Elevations, depressions, slopes, landform type, and surface roughness are some of the terrain factors that affect movement of troops, equipment, and materials. Surface configuration analysis can be incorporated in the COO and CCM for specific information of the battlespace. The analysis can also be used to value add to existing geospatial information.

## CONDUCT A SURFACE DRAINAGE ANALYSIS

A surface drainage analysis focuses on rivers, streams, and open bodies of water within the area of operations to support movement and other requirements. These studies identify potential water obstacles and their impact on maneuvering forces. The analysis can be incorporated in the COO and CCM for specific information of the battlespace and can also be used to value add to existing geospatial information.

## CONDUCT A SURFACE MATERIALS ANALYSIS

Military planners rely heavily on soil analysis because soils vary in their ability to bear weight and withstand vehicle passes, as well as the ability to dig. The surface material analysis breaks down soil types, characteristics, and distribution. The analysis can be incorporated in the COO and CCM for specific information of the battlespace. The analysis can also be used to value add to existing geospatial information.

## CONDUCT AN URBAN AREA ANALYSIS

An urban area analysis is a graphic or series of graphics portraying building types, building heights, points of interest, and building utilization. These features can be annotated on urban analysis products to help visualize the battlespace.

## **CONDUCT A VEGETATION ANALYSIS**

Vegetation analysis shows natural and cultivated vegetated areas, with information about type, size, and density. The analysis is used to determine CCM, cover and concealment, and LOS; they can also be used to add value to existing geospatial information.

## **CONDUCT ORAL PRESENTATIONS AND BRIEFS**

Oral presentations or briefs are vital to inform target audiences of the analytical procedures that went into the GEOINT products. These presentations or briefs will ensure that products are fully understood and used properly.

## DISSEMINATE GEOSPATIAL INTELLIGENCE PRODUCTS

Geospatial intelligence products must be disseminated in a timely, appropriate form by any suitable means to the requesting body. Such products must be effectively disseminated to the MAGTF commander, planners, and other forces and organizations in time for decision makers to assess and use it to affect COA development, analysis, and other planning and decision making activities unless directed otherwise. Geospatial intelligence products should be made available to the widest extent possible, and dissemination should not be limited to or end with the requestor. Geospatial intelligence products include geophysical data collection and specially tailored mapping products or information.

## PRODUCE A TACTICAL STUDY OF THE TERRAIN

The geographic intelligence specialist is required to produce a Tab A (Tactical Study of the Terrain) to Appendix 11 to Annex B (see Appendix G). Analysis of the area of operations is a comprehensive study to determine the effects of the terrain on enemy and friendly operations. It includes an analysis of such factors as weather, terrain, economy, sociology, and religion throughout the commander's AOI. It serves as a basis for developing specific friendly COAs and for determining enemy capabilities and in commander and staff estimates.

## USE A GEOSPATIAL DATABASE

A geospatial database can be used to store and manipulate geospatial information and GEOINT data in an organized and logical format to conduct analysis and production. Proper use includes following set data parameters and data relationships.

## CONDUCT MAP READING

The most basic form of terrain analysis is done using a standard hard copy map. Marines should know basic map reading principles, such as standard scales and types of maps, identifying marginal information, terrain recognition, datums and grid reference systems, plotting points, and measuring distances.

## IMPORT GEOSPATIAL INFORMATION

Geographic intelligence specialists must import raw data into the GIS to use geospatial information for analysis, manipulation, and production. Geospatial information that can be imported includes vector, raster, and matrix data.

## CONDUCT QUALITY CONTROL OF GEOSPATIAL INFORMATION

Geospatial information must be verified using current sources; current imagery is used to compare the information visually. Geographic intelligence specialists verify data accuracy by using raster data (i.e., overhead imagery) to identify cultural changes that have not been annotated and updated in vector data. Vector data is the primary source for geospatial information synthesis to provide analysis to the commander on products such as CCM and COO. Quality control of vector data ensures the most accurate data is used during the analysis.

## **PRODUCE GEOSPATIAL INTELLIGENCE PRODUCTS**

A GEOINT product is the fusion of geophysical or analytical data into a synthesized format for dissemination as hard or soft copy. These products can be produced from a user-defined basic map template and include required data, analysis, and marginal information or metadata to describe the product to the end user. The GEOINT product will be used to assist commanders in their decision making process.

## APPLY INTELLIGENCE DISSEMINATION SECURITY GUIDELINES

The intelligence product methods of release and disclosure must match the level of classification of the product.

## MANAGE SYSTEMS SUPPORT

System support management involves ensuring GEOINT systems are operational and properly maintained. Management functions include ensuring record jackets and GEOINT systems are maintained and with an understanding of GIS architecture, GEOINT systems requirements, and the roles and responsibilities of contractor support. Geographic intelligence specialists will be able to properly use existing maintenance procedures to ensure GEOINT systems are operational.

## DETERMINE CONSUMER'S GEOGRAPHIC INTELLIGENCE REQUIREMENTS

Geospatial intelligence requirements can be vague. The geographic intelligence specialist will refine the consumer's RFI to satisfy GEOINT requirements.

## **CONDUCT CULTURAL GEOGRAPHIC INTELLIGENCE ANALYSIS**

Cultural geographic analysis is the analytical procedure used to determine cultural areas, patterns, and points of interest. These elements are determined by using multiple information sources and specific criteria to query against demographic, regional, and cultural information. The analysis is used to give the commander a better understanding of cultural features and trends within the AOI.

## **CONDUCT HYDROGRAPHIC ANALYSIS**

Sea or hydrographic analysis is the study of areas containing shorelines. Intelligence of coasts and landing beaches is important to military planners because the coast is a country's first line of defense. Intelligence personnel conduct hydrographic analysis to evaluate coastal conditions that support amphibious operations. The geographic intelligence specialist will provide geographic support with current geospatial data to determine the most suitable landing beaches and zones of entry.

## CONDUCT INFRASTRUCTURE ANALYSIS

Infrastructure analysis includes compiling, consolidating, and graphically illustrating GEOINT. The analysis produces a depiction of transportation, communications, and utility infrastructure of interest in support of commanders' force protection posture.

## CONDUCT A MULTIDIMENSIONAL GEOGRAPHIC INTELLIGENCE ANALYSIS

Multidimensional GEOINT is geospatial information that is represented in more than two dimensions. This information can be used to extract terrain or features to value add to existing data sets. Some examples of analytical products include 3-D modeling, static or interactive fly through, digital elevation models, and perspective views. Geographic intelligence specialists can create and exploit multidimensional data and can produce GEOINT.

## **CONDUCT PREDICTIVE ANALYSIS**

Predictive analysis involves multiple environment variables that are combined into a predictive model, which when subjected to analysis, can be used to forecast future probabilities with an acceptable level of reliability. In predictive modeling, data is collected, a statistical model is formulated, predictions are made, and the model is validated or revised as additional data becomes available. This event supports IPB and the MCPP.

## CONDUCT SITE SELECTION ANALYSIS

Site selection analysis is the analytical procedure used to determine areas or points of interest. These areas are determined by using multiple information sources and specific criteria against which to query. The analysis is very specific, based on the commander's criteria, and usually time sensitive.

## **CONDUCT PATTERN ANALYSIS**

Pattern analysis is used to explore spatial patterns for describing phenomena, such as urban pattern changes, influence of disease on a population, and land use change over time. The pattern analysis tasks also contribute to the geographic intelligence specialist's use of aspects of cultural geography, geostatistical analysis, site selection techniques, and predictive analysis.

## PROVIDE ANALYSIS OF REMOTELY SENSED IMAGERY

Remote sensing is used to gather and process information about an object without direct physical contact. Remotely sensed imagery sources vary in type and capability. Examples include MSI, hyperspectral imagery, ultra spectral imagery, SAR, and light detecting and ranging. These sources are used to extract the Earth's features and add value to existing geospatial information.

## **CONDUCT ELECTRONIC DISSEMINATION**

Electronic dissemination of GEOINT and geospatial information should be conducted through local, Service, and national level architecture in accordance with the intelligence dissemination plan.

## **CREATE A NON-ENTERPRISE GEOSPATIAL DATABASE**

A geospatial database can be used to store and manipulate geospatial information and GEOINT data in an organized and logical format to conduct analysis and production. The creation of a non-enterprise geospatial database includes the following operations:

- Storing spatial and attribute data.
- Developing topology rules.
- Developing standard behaviors.
- Developing relationships.
- Editing databases.

## **USE ENTERPRISE GEOSPATIAL DATABASE**

A geospatial database can be used to store and manipulate GEOINT data in an organized and logical format to conduct analysis and production. Geospatial databases are used for the following:

- Performing spatial and attribute data storage.
- Following rules for topology, standard behavior, and validation.
- Following database editing rules to include versioning and multiuser editing.
- Performing editing, analysis, and production.

## CREATE A USER-DEFINED SEQUENCE

User-defined sequences are steps in software that allow users to set up repetitive analytical or collection tasks. These sequences can be used to conduct quality control and ensure production and collection timelines are maximized. These processes assist in the timely and accurate collection or analysis of data to produce geophysical or GEOINT products.

## **DEVELOP A PRODUCTION STRATEGY**

Developing a production strategy includes compiling and identifying resources to plan and schedule GEOINT production and geophysical data collection projects in support of GEOINT requirements. The production strategy will identify staffing, material, and schedule shortfalls in production requirements, which will allow the timely completion of GEOINT and geospatial information products.

## CONDUCT QUALITY CONTROL

Quality control of data and analytical techniques is vital for ensuring accurate GEOINT and geophysical products are produced. Quality control must be implemented throughout the production and dissemination processes. Geographic intelligence specialists will ensure accurate geospatial information is used to produce GEOINT products.

## CONDUCT AN AERONAUTICAL SURVEY

Airfield obstruction and navigational aid surveying operations involve obtaining accurate and complete obstruction and geodetic positioning data for the navigational aid and its associated airport or heliport. Precise geographic positioning of navigational facilities is required to support the Federal Aviation Administration and a wide range of National Airspace System activities. Per Code of Federal Regulations, Title 14, Volume 2, Chapter 1, Subchapter 3, Part 77, *Safe, Efficient Use, and Preservation of the Navigable Airspace* data is collected for runways; stop ways; navigational aids; aircraft movement aprons, prominent airport buildings; selected roads; and other traverse ways.

## MANIPULATE GEOPHYSICAL DATA COLLECTION INFORMATION

Geophysical data includes the features on the Earth's surface. These features are usually represented in three dimensions and require extensive calculations and adjustment procedures to annotate them on a common grid. Geographic intelligence specialists postprocess and adjust geophysical information to value add to existing geospatial databases and produce GEOINT products.

## **APPLY ADVANCED THEORIES OF GEOSPATIAL INFORMATION**

The geospatial information data sets are continually evolving with emerging technologies. Geographic intelligence specialists must understand emerging technologies and exploitation techniques to ensure geospatial information is being used and exploited accurately and is assisting commanders in their decision making process. Some methods of exploitation include network analysis, pattern analysis, and geocoding.

# APPLY ADVANCED THEORIES OF REMOTELY SENSED IMAGERY

Advances in imaging technologies have resulted in new generations of RSI platforms that are capable of collecting high-resolution terrain data and spectrums of light beyond the reflective region. This new data requires advanced theories for processing and exploitation into GEOINT products. Advanced theories and applications of RSI focus on radar, hyperspectral imagery, ultra spectral imagery, and MASINT.

## MANAGE DISSEMINATION OF GEOSPATIAL INTELLIGENCE PRODUCTS

Dissemination management involves establishing dissemination priorities, selecting dissemination means, and monitoring the flow of GEOINT throughout the intelligence community. The objective of dissemination management is to deliver the required GEOINT to the appropriate user in the proper form at the right time. Dissemination management is also used for security control that does not impede the timely delivery or subsequent use of GEOINT but that does protect intelligence sources and methods.

## MANAGE GEOSPATIAL INTELLIGENCE OPERATIONS

Managing GEOINT operations provides a tailored view of the battlespace by supporting the various operations within the MAGTF. Geospatial intelligence must satisfy the following requirements:

- Query.
- Retrieval.
- Integration
- Deconfliction.
- Intensification.
- Analysis.
- Production.
- Storage.
- Dissemination.

Geospatial intelligence operations must be linked throughout planning, decision, execution, and assessment at all echelons.

# MANAGE AN ENTERPRISE GEOSPATIAL DATABASE

A geospatial database can be used to store and manipulate geospatial information and GEOINT data into an organized and logical format to conduct analysis and production. The management of a geospatial database is vital to ensure accurate geospatial information and products. Management operations includes the following:

- Verifying geospatial database schema.
- Supervising production strategy using an enterprise database.
- Maintaining geospatial database file structure.
- Overseeing geospatial database rules and relationship establishment.

## PRODUCE AN ANNEX M

Annex M (Geospatial Information and Services) is the GI&S annex to OPLANs and OPORDs. Annex M provides the commander with a list of products required, information and databases available, and agencies and Services that can support the operation.

# PRODUCE AN APPENDIX 15 TO ANNEX B

The geographic intelligence specialist is required to produce a GI&I estimate. Appendix 15 (Geographic Intelligence) is a critical step between the Tab A and Annex M.

## **MANAGE PRODUCTION STRATEGIES**

The geographic intelligence specialist manages the planning and scheduling of multiple GEOINT production strategies in support of operational and intelligence requirements. Production management identifies manning, material, and budgeting and scheduling shortfalls in production requirements. It also allows for timely completion of GEOINT products.
# GLOSSARY

# ABBREVIATIONS AND ACRONYMS

3-D	
	three-dimensional
ACE	aviation combat element
ADRG	arc digitized raster graphic
AOI	area of interest
AOR	area of responsibility
ATF	amphibious task force
ATFIC	amphibious task force intelligence center
BDA	battle damage assessment
C2	command and control
CCD	camouflage, concealment, and deception
CCDR	combatant commander
CCIR	commander's critical information requirement
ССМ	cross-country movement
CIB	controlled image base
CIC	combat intelligence center
CIS	communications and information systems
CJCSI	Chairman of the Joint Chiefs of Staff instruction

# CMC

Commandant of the Marine Corps

# CMD

collections management and dissemination

## CM/DO

collection management/dissemination officer

# COA

course of action

# CONOPS

concept of operations

## CONUS

continental United States

#### **COO**

combined obstacle overlay

#### COP

common operational picture

#### СТР

common tactical picture

#### DIA

Defense Intelligence Agency

# DIRINT

Director of Intelligence

# DoD

Department of Defense

# DPPDB

digital point positioning database

# DZ

drop zone

# EEI

essential elements of information

# °F

degrees Fahrenheit

# FMV

full-motion video

# G-1

assistant chief of staff, personnel staff section

# G-2

assistant chief of staff, intelligence/intelligence staff section

# G-3

assistant chief of staff, operations and training/operations and training staff section

<b>C A</b>	
G-4	assistant chief of staff. logistics/logistics staff section
G-5	
0-5	assistant chief of staff, plans/plans staff section
G-6	
00	assistant chief of staff, communications/communications system staff section
GCCS	
	Global Command and Control System
GCE	
	ground combat element
GEOIN	т
	geospatial intelligence
GI&I	
	geospatial information and intelligence
GI&S	
	geospatial information and services
GIL	
	geospatial information library
GIS	
	geographic information system
GIST	
	geographic information support team
GIT	
	geospatial intelligence team
GPS	Clabel Desitioning System
	Global Positioning System
GS	general service
ннц	higher headquarters
ПОМС	
ΠΟΙΝΙΟ	Headquarters, Marine Corps
ними	JT
	•• human intelligence
I&W	
	indications and warning
IIP	
	imagery interpretation platoon
IMINT	
	imagery intelligence

INTELINK Intelligence Link	
IOC	intelligence operations center
IPB	intelligence preparation of the battlespace
ISC	intelligence support coordinator
ITD	interim terrain data
J-2	intelligence directorate of a joint staff
J-6	communications system directorate of a joint staff
JDISS	joint deployable intelligence support system
JFC	joint force commander
100	joint intelligence operations center
JOG	joint operations graphic
JOG-A	joint operations graphic-air
JPP	joint planning process
JP	joint publication
	joint task force
km	Joint Worldwide Intelligence Communications System
KOCO	kilometer(s)
	A key terrain, observation and fields of fire, cover and concealment, obstacles, and avenues of approach
	local area network
LCE	logistics combat element

# LOC

line of communications

#### LOS

line of sight

# LΖ

landing zone

# MAGTF

Marine air-ground task force

# MARCORSYSCOM

Marine Corps Systems Command

# MARDIV

Marine division

# MASINT

measurement and signature intelligence

# MCCC

Marine Corps component command

# MCEN

Marine Corps enterprise network

# MCISRE

Marine Corps Intelligence, Surveillance, and Reconnaissance Enterprise

# MCOO

modified combined obstacle overlay

# MCPP

Marine Corps Planning Process

# MCWP

Marine Corps warfighting publication

# MEB

Marine expeditionary brigade

# MEF

Marine expeditionary force

# METOC

meteorological and oceanographic

# METT-T

mission, enemy, terrain and weather, troops and support available-time available

# MEU

Marine expeditionary unit

# MGRS

military grid reference system

# MLG

Marine logistics group

MOS	military occupational specialty
MOUT	military operations on urban terrain
mph	miles per hour
MSC	major subordinate command
MSDS	mission-specific data set
MSI	multispectral imagery
NGA	National Geospatial-Intelligence Agency
NGC	National Geospatial Intelligence College
NIPRN	ET Nonsecure Internet Protocol Router Network
NIST	national intelligence support team
NRO	National Reconnaissance Office
NST	National Geospatial-Intelligence Agency support team
OCAC	operations control and analysis center
OIC	officer in charge
ONC	operational navigation chart
OOB	order of battle
OPLAN	l operation plan
OPOR	operation order
P&A	production and analysis
PIR	priority intelligence requirement

POC	point of contact
QRS	
RFI	quick response system
DCI	request for intelligence
KOI	remotely sensed imagery
S-1	personnel officer/office
S-2	intelligence officer/office
S-3	intelligence onicely onice
S-4	operations and training officer/office
5 4	logistics officer/office
S-6	communications system officer/communications staff office
SAR	synthetic aperture radar
SARC	· · ·
SIGINT	surveillance and reconnaissance cell
CIDDNI	signals intelligence
SIPKING	SECRET Internet Protocol Router Network
SOA	sustained operations ashore
SOP	standing operating procedures
SPMAG	STF
TCPFD	special purpose Marine air-ground task force
	tasking, collection, processing, exploitation, and dissemination
TDN	tactical data network
TPFDL	time-phased force and deployment list
ттр	
	tactics, techniques, and procedures

# UAS

unmanned aircraft system

# US

United States

USIGS

United States Imagery and Geospatial Information System

WAN

wide-area network

# WET

weather, enemy, and terrain

# WRS

War Reserve System

The following acronyms pertain to processes and entities specific to this publication series.

**Glossary-8** 

# ABI activity-based intelligence BGIS basic geospatial intelligence specialist CGSA common GEOINT server application DCGS distributed common ground/surface systems DBDB digital bathymetric database DTED digital terrain elevation data GCS geographic coordinate system **GEOTRANS** geographic translation software GSD Geospatial Intelligence Science and Analysis Division IGIS intermediate geographic intelligence specialist IMM intelligence community mission manager JIC joint intelligence center JAC joint analysis center

# JMCIS

Joint Maritime Command Information System

MCCIS

Marine Corps Common Intelligence Serve

#### m

meter(s)

# MCGDB

Marine Corps Geospatial Database

# NGC

National Geospatial Intelligence College

# NSG

National System for Geospatial Intelligence

# PFDB

planning factors database

# RECCEXREP

reconnaissance exploitation report

# SUPIR

supplemental photographic interpretation report

# TIAC

tactical imagery analysis course

# TLM

topographic line map

# WGS 84

World Geodetic System 1984

# VMap

vector map

# VMapL

vector map level

# SECTION II. TERMS AND DEFINITIONS

## aeronautical chart

A specialized representation of mapped features of the Earth, or some part of it, produced to show selected terrain, cultural and hydrographic features, and supplemental information required for air navigation, pilotage, or for planning air operations. (DoD Dictionary)

#### aerospace

Of, or pertaining to, Earth's envelope of atmosphere and the space above it; two separate entities considered as a single realm for activity in launching, guidance, and control of vehicles that will travel in both entities.

#### all-source intelligence

Intelligence products and/or organizations and activities that incorporate all sources of information, most frequently including human intelligence, imagery intelligence, measurement and signature intelligence, signals intelligence, and open-source data in the production of finished intelligence. (Part 1 of a 2-part definition.) (DoD Dictionary)

#### area of interest

That area of concern to the commander, including the area of influence, areas adjacent thereto, and extending into enemy territory. This area also includes areas occupied by enemy forces who could jeopardize the accomplishment of the mission. **Also called AOI.** (DoD Dictionary)

#### avenue of approach

An air or ground route of an attacking force of a given size leading to its objective or to key terrain in its path. **Also called AA.** (DoD Dictionary)

#### base map

A map or chart showing certain fundamental information, used as a base upon which additional data of specialized nature are compiled or overprinted. Also, a map containing all the information from which maps showing specialized information can be prepared. (MIL-HDBK-850)

#### battlespace

The environment, factors, and conditions that must be understood to successfully apply combat power, protect the forces, or complete the mission. It includes the physical environment (air, land, maritime, and space domains); the information environment (which includes cyberspace); the electromagnetic spectrum; and other factors. Included within these are friendly, enemy, adversary, and neutral entities contained within or having an effect on the operational areas, areas of interest, and areas of influence. (USMC Dictionary)

#### cartography

The art and science of expressing graphically, by maps and charts, the known physical and political/ administrative features of the Earth, or of another celestial body. (MIL-HDBK-850)

#### chart

1. A special-purpose map, generally designed for navigation or other particular purposes, in which essential map information is combined with various other data critical to the intended use. (Part 1 of a 2-part definition.) (MIL-HDBK-850)

#### coastal chart

A nautical chart intended for offshore navigation of vessels having a need for positions relative to the coast. Depicted information supports coastal navigation and military operations. Produced from 1:100,000 to 1:1,000,000 scale. (MIL-HDBK-850)

**Glossary-11** 

## collection

(See DoD Dictionary for core definition. Marine Corps amplification follows.) The gathering of intelligence data and information to satisfy the identified requirements. (USMC Dictionary)

#### commander's critical information requirement

(See DoD Dictionary for core definition. Marine Corps amplification follows.) Information regarding the enemy and friendly activities and the environment identified by the commander as critical to maintaining situational awareness, planning future activities, and facilitating timely decision-making. The two subcategories are priority intelligence requirements and friendly force information requirements. **Also called CCIR.** (USMC Dictionary)

#### command and control

The exercise of authority and direction by a properly designated commander over assigned and attached forces in the accomplishment of the mission. Command and control functions are performed through an arrangement of personnel, equipment, communications, facilities, and procedures employed by a commander in planning, directing, coordinating, and controlling forces and operations in the accomplishment of the mission. (JP 1-02) This means by which a commander recognizes what needs to be done and sees to it that appropriate actions are taken. Command and control is one of the six warfighting functions. **Also called C2**. (USMC Dictionary)

#### concealment

The protection from observation or surveillance. (USMC Dictionary)

#### contour line

A line on a map or chart connecting points of equal elevation. (MIL-HDBK-850)

#### control marking

A note or other form of caveat shown on a mapping, charting, and geodetic product indicating a need for special handling and for controlled dissemination. (MIL-HDBK-850)

#### cover

In intelligence usage, those measures necessary to give protection to a person, plan, operation, formation, or installation from the enemy intelligence effort and leakage of information. (DoD Dictionary)

#### cross-country movement study

A graphic or series of graphics and supporting text or tables portraying off-road movement conditions for specific vehicles or a group of vehicles. It is usually overprinted on a medium- or large-scale topographic map base. (MIL-HDBK-850)

### database

Information in the form of physical files or formatted automated data processing system data files that is normally structured and indexed for user access and review. Databases may exist. (DoD Dictionary)

#### datum

Any numerical or geometrical quantity or set of such quantities which may serve as reference or base for other quantities. Where the concept is geometric, the plural form is "datums" in contrast to the normal plural "data." (USMC Dictionary)

#### datum (geodetic)

1. A reference surface consisting of five quantities: the latitude and longitude of an initial point, the azimuth of a line from that point, and the parameters of the reference ellipsoid. (Part 1 of a 2-part definition.) (DoD Dictionary)

# **Defense Information Systems Network**

Integrated network, centrally managed and configured to provide long-haul information transfer services for all Department of Defense activities. It is an information transfer utility designed to provide dedicated point-to-point, switched voice and data, imagery, and video teleconferencing services. **Also called DISN.** (DoD Dictionary)

#### displacement

1. (cartography) The horizontal shift of the plotted position of a topographic feature from its true position, caused by required adherence to prescribed line weights and symbol sizes. (Part 1 of a 2-part definition.) (MILHDBK-850)

#### dissemination

Conveyance of intelligence to users in a suitable form. (USMC Dictionary)

#### drainage

In mapping, all features associated with water, such as shorelines, rivers, lakes, marshes, etc. (MIL-HDBK-850)

#### electromagnetic spectrum

The range of frequencies of electromagnetic radiation from zero to infinity. It is divided into 26 alphabetically designated bands. (DoD Dictionary) The entire range of wavelengths or frequencies of electromagnetic radiation extending from gamma rays to the longest radio waves and including visible light. Most remote sensing systems are designed to operate within the electromagnetic spectrum. (MIL-HDBK-850)

# equal arc second raster chart/map digitized raster graphic

Digital raster representations of paper graphics products. Maps/charts are converted into digital data by raster scanning and transforming the map image into the Equal Arc Second Raster Chart/Map System frame of reference. Used for electronic map displays. **Also called ADRG.** (MIL-HDBK-850)

#### estimate

1. An analysis of a foreign situation, development, or trend that identifies its major elements, interprets the significance, and appraises the future possibilities and the prospective results of the various actions that might be taken. 2. An appraisal of the capabilities, vulnerabilities, and potential courses of action of a foreign nation or combination of nations in consequence of a specific national plan, policy, decision, or contemplated course of action. 3. An analysis of an actual or contemplated clandestine operation in relation to the situation in which it is or would be conducted to identity and appraise such factors as available as well as needed assets and potential obstacles, accomplishments, and consequences. (DoD Dictionary)

#### fires

The use of weapon systems to create specific lethal or nonlethal effects on a target. (DoD Dictionary Those means used to delay, disrupt, degrade, or destroy enemy capabilities, forces, or facilities as well as affect the enemy's will to fight. Fires is one of the seven warfighting functions. (USMC Dictionary)

# flight information and air facilities data

Data concerning airfields and seaplane stations and related information required for the operation of aircraft. (MIL-HDBK-850)

#### force protection

Preventive measures taken to mitigate hostile actions against Department of Defense personnel (to include family members), resources, facilities, and critical information. Actions or efforts used to safeguard own centers of gravity while protecting, concealing, reducing, or eliminating friendly critical vulnerabilities. Force protection is one of the seven warfighting functions. **Also called FP.** (USMC Dictionary)

#### gazetteer

An alphabetical list of place names giving feature identification and geographic and/or grid coordinates. (MIL-HDBK-850)

#### general chart

A nautical chart intended for offshore coastwise navigation. A general chart is of smaller scale than a coast chart, but of larger scale than a sailing chart. (MIL-HDBK-850)

#### geodesy

The science which deals with the determination of the size and figure of the Earth. (MIL-HDBK-850)

#### geodetic and geophysical data

Information or earth data, pertaining to the sciences of geodesy and geophysics. Typically includes gravity information, geodetic point positioning data, datum definition, etc. (MIL-HDBK-850)

#### geodetic survey

A survey in which the figure and size of the Earth is considered. It is applicable for large areas and long lines and is used for the precise location of basic points suitable for controlling other surveys. (MIL-HDBK-850)

# geographic (geographical)

Signifying basic relationship to the Earth considered as a globe shaped body. The term geographic is applied alike to data based on the geoid and on other spheroids. (MIL-HDBK-850)

#### geographic coordinates

The quantities of latitude and longitude which define the position of a point on the surface of the Earth with respect to the reference spheroid. (DoD Dictionary)

#### geoid

The equipotential surface in the gravity field of the Earth which approximates the undisturbed mean sea level extended continuously through the continents. The geoid is the surface of reference for astronomic observations and for geodetic leveling. (MIL-HDBK-850)

# geospatial information

Information that identifies the geographic location and characteristics of natural or constructed features and boundaries on the Earth, including: statistical data and information derived from, among other things, remote sensing, mapping, and surveying technologies; and mapping, charting, geodetic data and related products. (DoD Dictionary)

#### geospatial, information, and intelligence priorities

The priorities defined by the JCS for indicating the relative importance of GI&I geographical area and weapons systems support requirements. The priorities are used as one of the factors in allocating NGA production resources. Priority definitions are contained in the Joint Strategic Planning Document. (CJCSI 3901.01)

# geospatial information and services

The collection, information extraction, storage, dissemination, and exploitation of geodetic, geomagnetic, imagery (both commercial and national source), gravimetric, aeronautical, topographic, hydrographic, littoral, cultural, and toponymic data accurately referenced to a precise location on the Earth's surface. 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. **Also called GI&S.** (DoD Dictionary)

# geospatial intelligence

The exploitation and analysis of imagery and geospatial information to describe, assess, and visually depict physical features and geographically referenced activities on the Earth. Geospatial intelligence consists of imagery, imagery intelligence, and geospatial information. **Also called GEOINT.** (DoD Dictionary)

## **Global Command and Control System**

A deployable command and control system supporting forces for joint and multinational operations across the range of military operations with compatible, interoperable, and integrated communications systems. **Also called GCCS.** (DoD Dictionary)

#### global information infrastructure

The worldwide interconnection of communications networks, computers, databases, and consumer electronics that make vast amounts of information available to users. The global information infrastructure encompasses a wide range of equipment, including cameras, scanners, keyboards, facsimile machines, computers, switches, compact disks, video and audio tape, cable, wire, satellites, fiber-optic transmission lines, networks of all types, televisions, monitors, printers, and much more. The friendly and adversary personnel who make decisions and handle the transmitted information constitute a critical component of the global information infrastructure. **Also called GII.** (DoD Dictionary)

#### gradient

The rate of inclination to horizontal expressed as a ratio, such as 1:25, indicating a one unit rise to 25 units of horizontal distance. (DoD Dictionary) 1. A rate of rise or fall of a quantity against horizontal distance expressed as a ratio, decimal, fraction, percentage, or the tangent of the angle of inclination. Also called the percentage of slope. 2. The rate of increase or decrease of one quantity with respect to another. (MIL-HDBK-850)

#### graphic

Any and all products of the cartographic and photogrammetric art. A graphic may be either a map, chart, mosaic, or even a film strip that was produced using cartographic techniques. (MIL-HDBK-850)

#### grid

1. Two sets of parallel lines intersecting at right angles and forming squares; the grid is superimposed on maps, charts, and other similar representation of the Earth's surface in an accurate and consistent manner in order to permit identification of ground locations with respect to other locations and the computation of direction and distance to other points. 2. A term used in giving the location of a geographic point by grid coordinates. (DoD Dictionary)

#### harbor chart

A nautical chart intended for navigation and anchorage in harbors and smaller waterways. (MIL-HDBK-850)

#### hydrographic chart

A nautical chart showing depths of water, nature of bottom, contours of bottom and coastline, and tides and currents in a given sea or sea and land area. Also called marine map; nautical chart. (MIL-HDBK-850)

#### hydrography

 The science which deals with the measurements and description of the physical features of the oceans, seas, lakes, rivers, and their adjoining coastal areas, with particular reference to their use for navigational purposes.
That part of topography pertaining to water and drainage features. (MIL-HDBK-850)

#### intelligence

(See DoD Dictionary for core definition. Marine Corps amplification follows.) Knowledge about the enemy or the surrounding environment needed to support decision making. Intelligence is one of the seven warfighting functions. (USMC Dictionary)

#### intelligence cycle

A six-step process by which information is converted into intelligence and made available to users. The six steps are planning and direction, collection, processing and exploitation, production, dissemination, and utilization. (USMC Dictionary)

#### intelligence operations

The variety of intelligence and counterintelligence tasks that are carried out by various intelligence organizations and activities within the intelligence process. (DoD Dictionary)

#### intelligence preparation of the battlespace

(See DoD Dictionary for core definition. Marine Corps amplification follows.) The systematic, continuous process of analyzing the threat and environment in a specific geographic area. **Also called IPB.** (USMC Dictionary)

#### intelligence requirement

(See DoD Dictionary for core definition. Marine Corps amplification follows.) Questions about the enemy and the environment, the answers to which a commander requires to make sound decisions. **Also called IR.** (USMC Dictionary)

#### interoperability

1. The ability to operate in synergy in the execution of assigned tasks. 2. The condition achieved among communications-electronics systems or items of communications-electronics equipment when information or services can be exchanged directly and satisfactorily between them and/or their users. The degree of interoperability should be defined when referring to specific cases. (DoD Dictionary)

#### jet navigation chart

A 1:2,000,000 scale, coordinated series of multicolored charts, designed to satisfy long range navigation of high-altitude, high-speed aircraft. **Also called a JNC.** (MILHDBK-850)

#### joint force

A general term applied to a force composed of significant elements, assigned or attached, of two or more Military Departments operating under a single joint force commander. (DoD Dictionary)

#### joint force commander

A general term applied to a combatant commander, sub unified commander, or joint task force commander authorized to exercise combatant command (command authority) or operational control over a joint force. **Also called JFC.** (DoD Dictionary)

#### joint operation planning

Planning activities associated with joint military operations by combatant commanders and their subordinate joint force commanders in response to contingencies and crises. (DoD Dictionary)

#### Joint Operation Planning and Execution System

An adaptive planning and execution system technology. Also called JOPES. (DoD Dictionary)

#### joint operations

A general term to describe military actions conducted by joint forces and those Service forces employed in specific command relationships with each other, which of themselves, do not establish joint forces. (DoD Dictionary)

#### joint operations graphic

The standard 1:250,000 scale Department of Defense cartographic product which may be produced in any of the following three versions to meet the validated unified and specified commands and military departments

area requirements: the JOG/G (Series 1501) is designed to meet ground use requirements; JOG/A (Series 1501 Air) is designed to meet air use requirements; and JOG/R (Series 1501 Radar) is the Air Target Material version in support of radar/intelligence planning and operations requirements. **Also called JOG.** (MIL HDBK-850)

## Joint Worldwide Intelligence Communications System

The sensitive compartmented information portion of the Defense Information System Network. It incorporates advanced networking technologies that permit point-to point or multipoint information exchange involving voice, text, graphics, data, and video teleconferencing. **Also called JWICS.** (DoD Dictionary)

## key terrain

Any locality, or area, the seizure or retention of which affords a marked advantage to either combatant. (DoD Dictionary)

#### large-scale map

A map having a scale of 1:75,000 or longer. (DoD Dictionary)

#### level of detail

Within the current joint planning and execution system, movement characteristics for both personnel and cargo are described at six distinct levels of detail. Levels I, V, and VI describe personnel and Levels I through IV and VI for cargo. Levels I through IV are coded and visible in the Joint Operation Planning and Execution System automated data processing. Levels V and VI are used by Joint Operation Planning and Execution System automated data processing feeder systems.

a. level I-personnel: expressed as total number of passengers by unit line number. Cargo: expressed in total short tons, total measurement tons, total square feet, and total thousands of barrels by unit line number.

b. level II-cargo: expressed by short tons and measurement tons of bulk, oversize, outsize, and non-air transportable cargo by unit line number. Also square feet for vehicles and non self-deployable aircraft and boats by unit line number.

c. level III-cargo: detail by cargo category code expressed as short tons and measurement tons as well as square feet associated to that cargo category code for an individual unit line number.

d. level IV-cargo: detail for individual dimensional data expressed in length, width, and height in number of inches, and weight/ volume in short tons/measurement tons, along with a cargo description. (Each cargo item is associated with a cargo category code and a unit line number).

e. level V-personnel: any general summarization/aggregation of level VI detail in distribution and deployment.

f. level VI-personnel: detail expressed by name, Service, military occupational specialty and unique identification number.

Cargo: detail expressed by association to a transportation control number or single tracking number or item of equipment to include federal stock number/national stock number and/or requisition number. Nested cargo, cargo that is contained within another equipment item, may similarly be identified. **Also called JOPES level of detail.** (DoD Dictionary)

# line of communications

A route, either land, water, and/or air, that connects an operating military force with a base of operations and along which supplies and military forces move. **Also called LOC.** (DoD Dictionary)

# logistics

Planning and executing the movement and support of forces. It includes those aspects of military operations that deal with: a. design and development, acquisition, storage, movement, distribution, maintenance, evacuation, and disposition of materiel; b. movement, evacuation, and hospitalization of personnel; c. acquisition or construction, maintenance, operation, and disposition of facilities; and d. acquisition or furnishing of services. (DoD Dictionary) 1. The science of planning and executing the movement and support

of forces. 2. All activities required to move and sustain military forces. Logistics is one of the six warfighting functions. (USMC Dictionary)

#### maneuver

1. A movement to place ships, aircraft, or land forces in a position of advantage over the enemy. 2. A tactical exercise carried out at sea, in the air, on the ground, or on a map in imitation of war. 3. The operation of a ship, aircraft, or vehicle, to cause it to perform desired movements. 4. Employment of forces in the operational area through movement in combination with fires to achieve a position of advantage in respect to the enemy. (DoD Dictionary) The movement of forces for the purpose of gaining an advantage over the enemy. Maneuver is one of the six warfighting functions. (USMC Dictionary)

#### map

1. A graphic representation, usually on a plane surface and at an established scale of natural and artificial features on the surface of a part or the whole of the Earth or other planetary body. The features are positioned relative to a coordinate reference system. 2. To prepare a map or engage in a mapping operation. (MIL-HDBK-850)

#### mapping

The transformation of likelihood vectors from a given object class into another object class by application of mapping matrices. (AAP-28)

#### map series

A group of maps or charts usually having the same scale and cartographic specifications, and with each sheet appropriately identified by producing agency as belonging to the same series. (MIL-HDBK-850)

#### marginal data

All explanatory information given in the margin of a map or chart which clarifies, defines, illustrates, and/or supplements the graphic portion of the sheet. Also called border data; border information; margin information. (MIL-HDBK-850)

#### **Marine Corps Planning Process**

A six-step methodology which helps organize the thought process of the commander and staff throughout the planning and execution of military operations. It focuses on the mission and the threat and is based on the Marine Corps philosophy of maneuver warfare. It capitalizes on the principle of unity of command and supports the establishment and maintenance of tempo. The six steps consist of problem framing, course of action development, course of action war game, course of action comparison and decision, orders development, and transition. **Also called MCPP.** (USMC Dictionary)

#### medium-scale map

A map having a scale larger than 1:600,000 and smaller than 1:75,000. (JP 1-02)

#### meteorology

The study dealing with the phenomena of the atmosphere including the physics, chemistry, and dynamics extending to the effects of the atmosphere on the Earth's surface and the oceans. (DoD Dictionary)

#### military grid reference system

1. The alphanumeric position reporting system used by US Military. 2. (JCS) A system which uses a standardscaled grid square, based on a point of origin on a map projection of the Earth's surface in an accurate and consistent manner to permit either position referencing or the computation of direction and distance between grid positions. **Also called MGRS.** (MIL-HDBK-850)

#### mission-specific data set

Further densification of global geospatial foundation data. Information created to support specific operations, operation plans, training, or system development. Information conforms to established Department of Defense data specifications. **Also called MSDS.** (DoD Dictionary)

#### mobility corridor

Areas where a force will be canalized due to terrain restrictions. They allow military forces to capitalize on the principles of mass and speed and are therefore relatively free of obstacles. (DoD Dictionary)

#### modified combined obstacle overlay

A joint intelligence preparation of the operational environment product used to portray the militarily significant aspects of the operational environment, such as obstacles restricting military movement, key geography, and military objectives. **Also called MCOO.** (DoD Dictionary)

#### national intelligence support team

A nationally sourced team composed of intelligence and communications experts from various intelligence community agencies and groups. Also called NIST. (DoD Dictionary)

#### noncombatant evacuation operations

Operations directed by the Department of State or other appropriate authority, in conjunction with the Department of Defense, whereby noncombatants are evacuated from foreign countries when their lives are endangered by war, civil unrest, or natural disaster to safe havens as designated by the Department of State. **Also called NEOs.** (DoD Dictionary)

#### obstacle

Any natural or man-made obstruction designed or employed to disrupt, fix, turn, or block the movement of an opposing force, and to impose additional losses in personnel, time, and equipment on the opposing force. (DoD Dictionary)

#### oceanography

The study of the sea, embracing and integrating all knowledge pertaining to the sea and its physical boundaries, the chemistry and physics of seawater, and marine biology. From a military perspective, oceanography includes basic oceanography plus the study of bathymetry, hydrography, geophysics, astrometry and precise time; supported by ocean engineering, operational supercomputing, and operations research. (DoD Dictionary)

#### operational navigation chart

The standard worldwide small-scale (1:1,000,000) aeronautical chart series. It contains cartographic data with an aeronautical overprint depicting obstructions, aerodromes, etc., designed for medium altitude high-speed visual and radar navigation. Also used for mission planning/analysis and intelligence briefings. **Also called ONC.** (MIL-HDBK-850)

#### original classification

An initial determination that information requires, in the interest of national security, protection against unauthorized disclosure. The original classification authority is an individual authorized in writing, either by the President, or by agency heads or other officials designated by the President, to classify information in the first instance. (Executive Order 12958)

#### orthorectification

In photogrammetry, the process of removing geometric distortions in an image caused by sensor tilt and terrain relief, and projecting the resulting image onto a map projection system. (AAP-06)

# overprint

1. Information printed or stamped upon a map or chart, in addition to that originally printed, to show data of importance or special use. **Also called surprint.** 2. A feature of a composite map image incidentally printed so as to interfere with another feature. (MIL HDBK 850)

# planning factors database

Databases created and maintained by the Military Services for the purpose of identifying all geospatial information and services requirements for emerging and existing forces and systems. The database identifies: unit requirements at the information content level, for geospatial data and services; system requirements for standard Department of Defense geospatial data and services; research, development, test, and evaluation requirements for developmental systems, identified by milestone; and initial operating capability and full operating capability for emerging systems. **Also called PFDB.** (DoD Dictionary)

# priority intelligence requirement

An intelligence requirement, stated as a priority for intelligence support, that the commander and staff need to understand the adversary of other aspects of the operational environment. **Also called PIR.** (DoD Dictionary) (Marine Corps amplification follows.) An intelligence requirement associated with a decision that will critically affect the overall success of the command's mission. (USMC Dictionary)

#### profile

1. A vertical section of the surface of the ground, or of underlying strata, or both, along any fixed line. 2. Elevation of the terrain along some definite line. Elevations are measured at a sufficient number of points to enable defining the configuration of the ground surface. (MIL HDBK-850)

#### reachback

The process of obtaining products, services, and applications, or forces, or equipment, or material from organizations that are not forward deployed. (DoD Dictionary) (Marine Corps amplification follows.) The ability to exploit resources, capabilities, expertise, etc., not physically located in the theater or joint operations area, when established. (USMC Dictionary)

#### recompilation

The process of producing a map or chart that is essentially a new item and which replaces a previously published item. Normally, recompilation of a map or chart involves significant change to the horizontal position of features, revision of vertical values, improvement in planimetric or navigational data, or any combination of these factors. (MIL-HDBK-850)

#### reconnaissance

A mission undertaken to obtain, by visual observation or other detection methods, information about the activities and resources of an enemy or adversary, or to secure data concerning the meteorological, hydrographic, or geographic characteristics of a particular area. **Also called RECON.** (DoD Dictionary)

#### relief

Inequalities of elevation and the configuration of land features on the surface of the Earth which may be represented on maps or charts by contours, hypsometric tints, shading, spot elevations, or hachures. (MIL-HDBK-850)

#### road map

A medium- or small-scale special purpose map, generally showing only planimetric detail, with emphasis upon the road network and related data. Its main purpose is to furnish pertinent road information for tactical and administrative troop movement. (MIL-HDBK-850)

#### sailing chart

A small-scale chart used for offshore sailing between distant coastal ports and for plotting the navigator's position out of sight of land and as he approaches the coast from the open ocean. They show offshore soundings and the most important lights, outer buoys, and natural landmarks which are visible at considerable distances. (MIL-HDBK-850)

#### sailing directions

A descriptive book for the use of mariners, containing detailed information of coastal waters, harbor facilities, etc. **Also called coast pilot.** (MIL-HDBK-850)

#### scale

1. The ratio or fraction between the distance on a map, chart, or photograph and the corresponding distance on the surface of the Earth. 2. A series of marks or graduations at definite intervals on a measuring device or instrument. 3. Measurement by means of a scale. (MIL HDBK-850)

#### situational awareness

Knowledge and understanding of the current situation that promotes timely, relevant, and accurate assessment of friendly, enemy, and other operations within the battlespace in order to facilitate decision making. An informational perspective and skill that foster an ability to determine the context and relevance of events that are unfolding. **Also called SA.** (USMC Dictionary)

#### source material

Data of any type required for the production of geospatial information and intelligence products including, but not limited to ground control, aerial and terrestrial photographs, sketches, maps, and charts; topographic, hydrographic, hypsographic, magnetic, geodetic, oceanographic, and meteorological information; intelligence documents and written reports pertaining to natural and man-made features of the area to be mapped or charted. (MIL HDBK-850)

#### staff cognizance

The broad responsibility and authority over designated staff functions assigned to a general or executive staff officer (or their subordinate staff officers) in their area of primary interest. These responsibilities and authorities can range from coordination within the staff to the assignment or delegation to the staff officer by the commander to exercise the commander's authority for a specified warfighting function or subfunction. Staff cognizance includes the responsibility for effective use of available resources and may include the authority for planning the employment of, organizing, assigning tasks, coordinating, and controlling forces for the accomplishment of assigned missions. Marine Corps orders and doctrine provide the notional staff cognizance for general or executive staff officers, which may be modified by the commander to meet mission requirements. (USMC Dictionary)

#### stereoscopic

Of or pertaining to the science which deals with three-dimensional effects and the methods by which they are produced. (MILHDBK-850)

#### sustained operations ashore

The employment of Marine Corps forces on land for an extended duration. It can occur with or without sustainment from the sea. **Also called SOA.** (USMC Dictionary)

#### tactical intelligence

Intelligence required for the planning and conduct of tactical operations. (DoD Dictionary) (Marine Corps amplification follows.) Intelligence concerned primarily with the location, capabilities, and possible intention of enemy units on the battlefield and the tactical aspects of terrain and weather within the battlespace. (USMC Dictionary)

# terrain analysis

The collection, analysis, evaluation, and interpretation of geographic information on the natural and manmade features of the terrain, combined with other relevant factors, to predict the effect of the terrain on military operations. (DoD Dictionary)

#### topographic map

A map which presents the vertical position of features in measurable form as well as their horizontal positions. **Also called JCS.** (MIL-HDBK-850)

#### topography

The configuration of the ground to include its relief and all features. Topography addresses both dry land and the sea floor (underwater topography). (DoD Dictionary)

## warfighting functions

The seven mutually supporting military activities integrated in the conduct of all military operations. The seven warfighting functions are command and control, fires, force protection, information, intelligence, logistics, and maneuver. (USMC Dictionary)

#### war reserve stock

That portion of total materiel assets designated to satisfy the war reserve materiel requirement. Also called WRS. (DoD Dictionary)

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3-20	Aviation Operations

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