NATIONAL GEOSPATIAL-INTELLIGENCE AGENCY

FOUNDATION GEOINT GROUP

CONTENTS

FOUNDATION GEOINT GROUP

INTRODUCTION **4**
Lines of Effort 6

FOUNDATION GEOINT CONTENT AREAS

EARTH SCIENCE
Office of Geomatics & Targeting **8**
Accurate & Precise Measurements 10
Assured Positioning, Navigation, Timing, & Targeting 12
TOPOGRAPHY
Office of Geography **14**
US Armed Forces Mission Spectrum 16
Global Geography 18
SAFETY OF NAVIGATION
Maritime Safety Office **20**
Maritime Navigation 22
Aeronautical Navigation Office **24**
Department of War & US Coast Guard Aviation Navigation 26

SUPPORT

OPERATIONS & ENGAGEMENTS
Foundation GEOINT Operations Office **28**
NSG Foundation GEOINT Requirements 30
Foundation GEOINT — Satisfying Mission Partners' Requirements 32
Humanitarian Assistance & Disaster Response 34

THE WAY AHEAD

FOUNDATION DIGITAL TWIN **36**

FOUNDATION GEOINT GROUP HISTORY

HISTORY OF THE FOUNDATION GEOINT GROUP **40**

FOUNDATION GEOINT GROUP

Understanding the Earth from its core to the Space Domain

NGA provides the basis for intelligence integration through a global geospatial operational framework describing the physical and cultural characteristics of the world from the center of the Earth to the space domain. This framework is a critical part of NGA's mission to satisfy intelligence, defense, civil, and commercial needs with foundation data, innovative products and services—whether delivered through geographic information system-enabled applications or hard copy map products.

Supporting that framework are the NGA content areas that encompass the earth sciences, gravity, magnetics, geodetic surveys, elevation, precise imagery, coordinate systems, global navigation satellite systems, topography, cartography, geographic names, human geography, political geography, and safety of navigation for the maritime and aeronautical domains.

GROUP'S MISSION

Provide assured, timely, relevant, and accurate geospatial foundation data, products, and services in support of prioritized requirements of the warfighter, our national security objectives, and the Safety of Navigation needs of the US government.

WE ARE LEADERS IN ...

- The global geospatial operational framework for military operations, intelligence analysis and humanitarian assistance
- The art and science of depicting the Earth's surface
- The forces of gravity and magnetics, the depths of the seas, and the physical and cultural landscape of the world

WE WORK WITH

- US Government
- US Military
- Allied and Partner Countries

WORKFORCE

- US Government
- US Military
- Contractor Personnel

WORK ROLES

- Aeronautical Analyst
- Bathymetrist
- Cartographer
- Data Analyst
- Data Scientist
- Data Steward
- Database Manager
- Foundation GEOINT Officer
- GEOINT Capabilities Integration Officer
- Geodetic Earth Scientist
- Geodetic Orbit Scientist
- Geodetic Surveyor
- Geospatial Analyst
- Imagery Analyst
- Imagery Production Specialist
- IT Operations Engineer
- Human Geographer
- Human Geography Linguist
- Librarian
- Maritime Analyst
- Open Source Research Analyst
- Photogrammetrist
- Requirements and Integration Analyst
- Systems Engineer
- Visual Information Specialist

LOCATIONS

- National Capital Region (NCR)
- NGA St. Louis
- Other locations, CONUS and OCONUS

PARTNERSHIPS

- Maximizing cooperations and international sharing with 280+ international partnership agreements and arrangements
- Interoperable data
- Co-production and mapping solutions
- Integration and exchanging expertise

GEOMATICS & TARGETING

Provide accurate positioning, navigation, timing, and targeting content and services in support of critical infrastructure and the national security objectives of the US government (USG).

Data

- 350 million square kilometers of elevation data coverage
- 100 percent of the earth's surface has 12-meter high-resolution elevation data
- 185+ million gravity records
- 118 million square kilometers of precise imagery
- 3,600+ geodetic and geophysical surveys
- 104 million square kilometers of mono-orthorectified imagery

Services

- Earth sciences
- Gravity, magnetics & elevation
- Geodetic surveys
- Precise imagery & engagement
- Coordinate system
- Global Navigation Satellite Systems
- Target Development
- Target Vetting
- Functional Management of GEOINT Support to Targeting

TOPOGRAPHIC FEATURE PRODUCTION

Topographic data, products and services of information captured, generated, and enhanced, depicting in a graphical manner and delineating natural and man-made features of any place on the Earth, showing relative positions and elevations, geographic names, and international land and maritime boundaries.

Data

- 5+ billion topographic features in the management database
- 90,000 topographic maps

Services

- Topography
- Topographic maps
- Topographic features
- Geographic names
- Geographic boundaries
- Standards

HUMAN & POLITICAL GEOGRAPHY

An examination of human populations and their collective identities, community systems and stability, providing insights into the activities of human population segments.

Data

- 9.2 million features with 15 million geographic names database in the Geographic Names Database (GNDB)
- 2+ million human geography features
- Boundaries: 900+ international land & maritime, 74,000+ administrative

Services

- Name, place & association
- Governance organization
- Collective identities & geopolitical issues
- Community systems & stability events
- Sovereignty & statehood
- Political identities & movements

SAFETY OF NAVIGATION

Prepare, compile, publish, distribute and maintain databases, products and services for worldwide maritime and aeronautical safety of navigation.

MARITIME

Data

- 70 million hydrographic features
- 20,000 submarine electronic navigational charts
- 12,800 electronic navigation charts
- 3,900 nautical hard copy charts
- 1,400 tactical ocean data libraries

Services

- Notice to Mariners
- Nautical Charts
- Maritime Safety Watch
- Nautical Publications
- Bathymetry

AERONAUTICAL

Data

- 1.8 billion Aeronautical Data Elements
- 24.5 million man-made Vertical Obstructions (VOs)
- 49,000+ airfields in the Automated Air Facilities Intelligence File (AAFIF)
- 34,000 Instrument Flight Procedures (IFPs) in USG (DOW/Federal Aviation Administration (FAA)) Flight Information Publications (FLIPs)
- 32,000 IFPs Coded in the Digital Aeronautical Flight Information File (DAFIF®)

Services

- Aeronautical Mobile Application ("Aero App")
- Aeronautical Content Exploitation System (ACES)
- Aeronautical Source Packaging Service (ASPS)
- Centralized Flight Procedures (CFP)
- WebDVOF

GEOINT CONTENT DISSEMINATION

Discover, distribute, and deliver Foundation GEOINT.

Products

- City Graphics
- Aeronautical Instrument Flight Rules (IFR) Enroute and Area Charts
- Image City Maps
- Topographic Maps
- Navigation Planning Charts
- Joint Operations Graphics
- 3D Terrain Maps
- Special Publications
- Ancillary, Crisis, & Custom printing

GEOINT RESEARCH CENTER

Provide full-spectrum data gathering and research services, specializing in the discovery, use and application of geospatial open-source information. Assistance in acquiring open-source resources, cataloging services for maps and text with online access, and providing a ground photography collection.

OFFICE OF GEOMATICS & TARGETING

MISSION

Provide accurate positioning, navigation, timing, and targeting content and services in support of critical infrastructure and the national security objectives of the US government.

SERVICES

Geosciences

Encompasses a collection of sciences, technology, and tradecraft measuring and modeling the globe to provide three-dimensional accuracy of every point in, on, or about the earth. It provides the ACCURACY to GEOINT, allowing identification of WHERE something or someone is. Delivers Geospatial Intelligence accuracy through the fusion of data collection, processing, evaluation, analysis, and geoscientific modeling.

Data

- Reference Frame (precise global coordinates)
- Earth Gravitational Model (EGM) (defines mean sea level)
- World Magnetic Model (WMM) (defines bearing and azimuth)
- 185+ million gravity records
- Geotechnical Hazards, Indications and Potentials (GeoHIP)

Products

- World Geodetic System 1984 (WGS 84)
- Coordinate Systems Analysis
- Global humanitarian assistance and disaster relief, and advanced mobility analysis
- Inertial Navigation System (INS) support

Elevation

Provides foundational expertise for the production, validation, and management of terrain elevation content in support of academia, disaster relief, humanitarian aid, international cooperation, scientific research, and national security objectives. Provides global coverage of digital elevation models (DEM) at various resolutions for numerous missions including targeting, mission planning, Safety of Navigation, and 3D GEOINT.

Data

- 350 million square kilometers of elevation data
  - ◊ Shuttle Radar Topography Mission (SRTM), Digital Terrain Elevation Data (DTED), Defense Gridded Elevation Data (DGED), TanDEM-X etc.
- Bare Earth/reflective data
- Geospatial Repository and Data Management (GRiD) system
- 100 percent of the Earth's surface has 12-meter high-resolution elevation data
- 33 nations in the TanDEM-X High Resolution Elevation Data Exchange (TREX) Program

Products

- Global, regional, local and specialized datasets
- Auto-generation capability
- Supercomputing partnerships to support 3D GEOINT
- Elevation models
  - ◊ Terrain contour-matching sciences
  - ◊ High Resolution Terrain Elevation 4 (HRTE4) products

Geodetic Surveys

Provides high-accuracy geodetic and geophysical ground truth data and analysis to the Department of War (DOW), Intelligence Community and other federal agencies to support the operation, maintenance, calibration, and evaluation of weapons, navigation, and collection systems, fulfilling US national security and intelligence objectives.

- Space launch and weapons system support
- DOW flight safety
- Survey technical expertise

Data

- 30 Holloman High Speed Test Track Surveys (10-mile track, 1,020 survey marks)
- 3,600+ geodetic and geophysical surveys
- 580 airfield surveys (TAGGS, or Terminal Aeronautical GNSS Geodetic Survey)
- Astronomic azimuth, astronomic positioning, Deflection of Vertical, gravity, magnetic and geodetic positioning

Products

- Geodetic and geophysical data collection and analysis

Precise Imagery

Provides accurate, and timely global coverage Geospatial Intelligence imagery, photogrammetric products, and imagery services to worldwide partners.

- Imagery accuracy improvement, exploitation, and evaluation

Data

- 118 million square kilometers of precise imagery
  - ◊ 19,965 Digital Point Positioning Database (DPPDB) titles
  - ◊ 35,983 Controlled Imagery Regional Ortho-mosaic (CIRO) ¼ cells
  - ◊ 40,108 Controlled Image Base 1M (CIB01) ¼ cells
  - ◊ 11,126 Controlled Image Base 5M (CIB05) 1-degree cells
- 104 million square kilometers of mono-orthorectified imagery

Products

- Digital Point Positioning Database (DPPDB) — stereo precision targeting product
- Controlled Image Base (CIB) — global ortho-mosaic mission planning product
- Commercial Imagery Regional Ortho-mosaic (CIRO) — Unclassified ortho-mosaic imagery products
- Near-global stereo imagery content

Precision Targeting

Delivers essential products and services support for mission success. Key capabilities include targeting analysis and precise point mensuration services for accurate operational planning.

Services

- Target Development
- Target Vetting
- Functional Management of GEOINT Support to Targeting

Global Navigation Satellite Systems (GNSS)

Applies cutting-edge principles to build, maintain, and enhance the globally interoperable World Geodetic System 1984 (WGS 84) Reference Frame between National System for Geospatial Intelligence (NSG) and international reference frames. Uses collection monitor stations to provide quality real-time GNSS data and analysis to a range of partners in support of Assured Positioning, Navigation, Timing, and Targeting.

Data

- Earth-Fixed Reference Frame
  - ◊ Built from NGA's GNSS collection stations' data
  - ◊ Provides a single set of global coordinates for navigation and targeting
- Real-time GNSS dataflow

Products

- GPS precise orbit production
- Earth-orientation parameter predictions

Integration

Enables GEOINT accuracy through the integration of efficient technical and business support solutions providing cloud migration support and developing geomatics tradecraft advancement.

Products

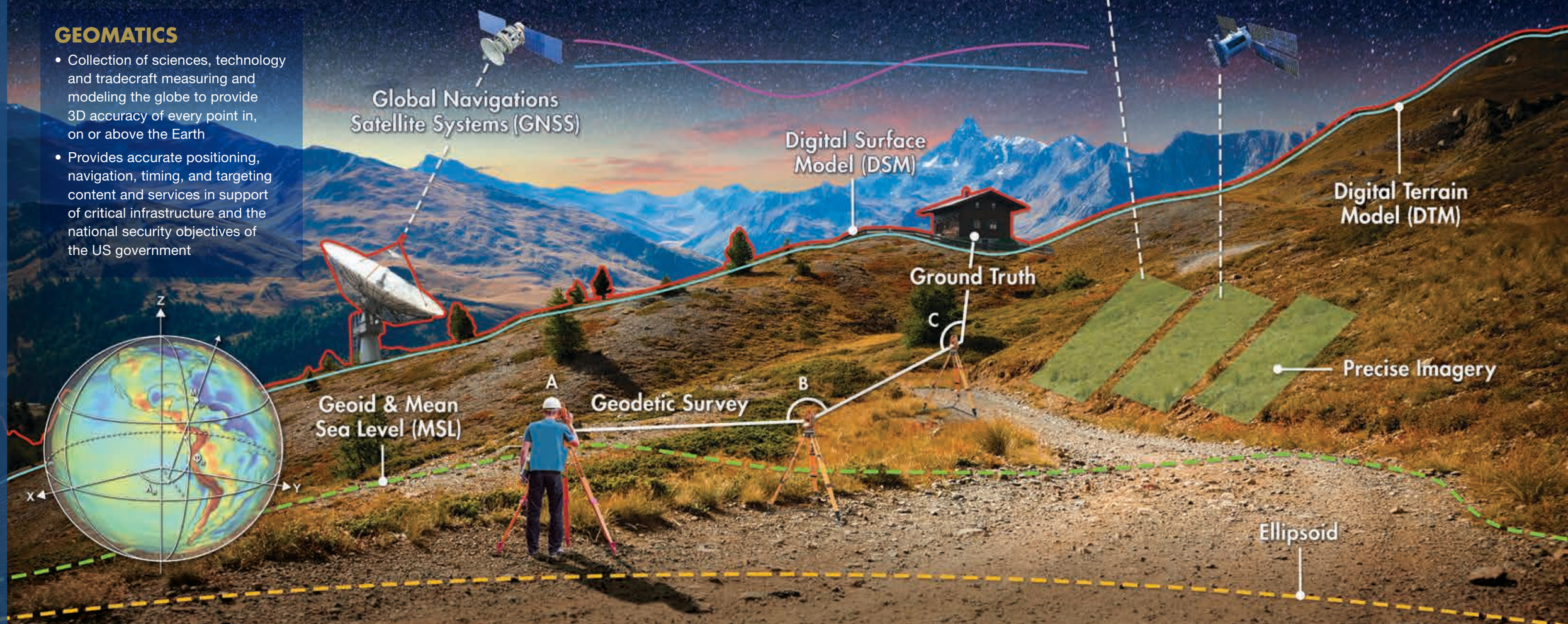
- Standards for the geomatics field

ACCURATE & PRECISE MEASUREMENTS

GLOBAL COVERAGE

GEOMATICS

- Collection of sciences, technology and tradecraft measuring and modeling the globe to provide 3D accuracy of every point in, on or above the Earth
- Provides accurate positioning, navigation, timing, and targeting content and services in support of critical infrastructure and the national security objectives of the US government



GEOSCIENCES

Geotechnical Hazards, Indications & Potentials (GeoHIP)

Earth Gravitational Model (EGM)

World Magnetic Model (WMM)

Coordinate System Analysis

3D & 4D Modeling

ELEVATION

Low Resolution – Shuttle Radar Topography Mission (SRTM)/ Digital Terrain Elevation Data (DTED)

TanDEM-X (Global 12 meter) Bare Earth/Reflective

High Resolution Terrain Elevation (HRTE4)

Defense Gridded Elevation Data (DGED)

GLOBAL NAVIGATION SATELLITE SYSTEMS (GNSS)

Global Positioning System (GPS) Precise Orbit Production

Maintain & Enhance the World Geodetic System 1984 (WGS 84) Reference Frame

Earth Orientation Parameter Predictions (EOPP)

GNSS Monitor Station Network

PRECISE IMAGERY

Commercial Imagery Regional Ortho-mosaic (CIRO)

Controlled Image Base (CIB) & Enhanced CIB

Digital Point Positioning Database (DPPDB)

Near Global Stereo

GEODETIC SURVEYS

Geophysical: Astronomic Positioning & Asimuth (POS & AZ), Gravity & Magnetic

Airfield Surveys (Terminal Aeronautical GNSS Geodetic Survey, TAGGS)

Geodetic: Positioning & Azimuth, Light Detection & Ranging (LiDAR), Deflection of Vertical (DOV) & Precise Leveling

TARGETING

Targeting Standards

Federated Targeting Capabilities

Leverages Precise Imagery, Elevation, Geosciences & GNSS

ASSURED POSITIONING, NAVIGATION, TIMING AND TARGETING (APNT&T)

GLOBAL COVERAGE

CRITICAL FOR

- Maritime and Aeronautical Safety of Navigation
- Ground Navigation
- Space Launch, Telemetry and Tracking
- Sea, Land and Air Based Weapon Systems Support
- Infrastructure Sectors Support
- Global Navigation Satellite System (GNSS)
- Terminal Aeronautical GNSS Geodetic Survey (TAGGS)
- Elevation Data, Models and Repository

CONSUMERS

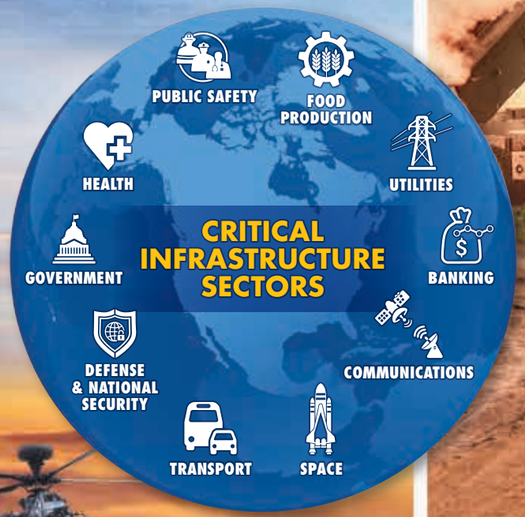
- US Army
- US Marine Corps
- US Navy
- US Air Force
- US Space Force
- US Coast Guard
- Combatant Commands
- Missile Defense Agency (MDA)
- DOW Test Ranges
- Intelligence Community
- National Reconnaissance Office (NRO)
- Allies
- National Aeronautics and Space Administration (NASA)
- National Oceanic and Atmospheric Administration (NOAA)
- National Geodetic Survey (NGS)
- Scientific Community
- Research Laboratories
- Universities
- 4 billion Global Positioning System (GPS) Users

SPACE

AIR

LAND

SEA



POSITIONING

- World Geodetic System 1984 (WGS 84) Reference Frame
- Precise Latitude/Longitude/Elevation
- Ground Truth Geodetic Surveys
- GPS Constellation Positioning

NAVIGATION

- Terrain Contour Matching (TERCOM)
- Inertial Navigation System (INS)
- Magnetic/True/Grid Navigation
- GPS Navigation
- Airfield Surveys

TIMING

- Critical National Infrastructure
- GPS Constellation Timing
- Communications Network
- Atomic Clocks

TARGETING

- Digital Point Positioning Database (DPPDB)
- Coordinate Guided Munitions
- Deflection of Vertical (DOV)
- GPS Guided Munitions
- Target Development
- Target Vetting

OFFICE OF GEOGRAPHY

MISSION

Provide geographic data, products, and services in support of our military, Intelligence Community, and international partners, enabling them to make informed decisions and execute successful operations.

SERVICES

Topographic

Provides data and maps supporting combat operations, humanitarian assistance, disaster relief, and military training; this includes data collection, quality assurance, integration, management, and distribution.

Data

- 5+ billion topographic features including geometry and attributes for roads, rails, hydrography, land cover, buildings, and industrial and cultural features

Products

- 90,000 topographic maps disseminated across nine product lines
- Topographic maps
  - Joint Operations Graphic-Air Charts
  - Evasion Charts (EVCs)
  - Image City Maps (ICMs)
  - NAVPLAN charts — Tactical Pilotage Charts (TPCs), Jet Navigation Charts (JNCs), Operational Navigation Charts (ONCs), and Global Navigation and Planning Charts (GNCs)

Human Geography

Examines human populations and their collective identities, community systems, and stability, providing insights into the activities of human population segments within customers' operating environments. Describes demographics of populations, and their collective identities including ethnicity, religion, language, politics and ideology; identifies community systems for communications, economics, education, energy, elections, health, security, transportation, water, worship, and cultural heritage, focusing on social stability and conflict at the regional, national and sub-national levels. Maintains analytic linguistics capabilities for 37 foreign languages.

Data

- 2+ million human geography features describing population demographics, community systems and stability

Products

- Populated Place Framework: geolocated population attributes of settlements, villages, cities, and neighborhoods

Political Geography

Maintains the federal government's official repository of geographic names, international land and maritime boundaries, and country codes, in direct support of the Department of War, Intelligence Community and Department of State. The official repository of all foreign geographic names, sanctioned by the United States Board on Geographic Names (BGN), the Geographic Names Server (GNS) receives an annual average of 16 million hits.

Data

- 9.2 million features with ~15 million geographic names in the Geographic Names Database (GNDB)

Products

- Geographic Names Database (GNDB)
- DiB Data Download Application (DDA)

Boundaries

- 900+ international land and maritime boundaries
- 74,000+ administrative (internal) boundaries
- 2,500+ claimed maritime limits and zones
- 2.85+ million miles of high-resolution shoreline data

Technology & Integration

Provides succinct support solutions through technology development and integration for Foundation GEOINT Modernization (FG MOD), production management of data and products, Amazon Web Services (AWS) storage, utilization of Cloud migration to increase computing performance.

Partnerships

Leading partnerships across international, defense, and academic geospatial communities. Co-producing and collaboratively innovating to better satisfy warfighter requirements.

- Embedded support to combatant commands at nine global locations through the Defense Geospatial Co-Production Program (DGCP)
- Collaboration with FVEY partners through Allied System Geospatial Intelligence Geography Group (AGG) and Communities of Interest
- NATO coordination through Geospatial Requirements Working Group (GRWG)
- 75+ nations have agreements or arrangements for foundation data and products
- 32 nations co-producing 1:50K scale topographic feature data via the Multinational Geospatial Co-Production Program (MGCP)
- 25 nations co-producing 1:5K scale topographic feature data via the MGCP Urban Group
- 18 nations co-producing human geography data via the International Program for Human Geography (IPHG)
- Oak Ridge National Laboratory — LandScan Global and LandScan HD
- US Board of Geographic Names — maintain uniform geographic name usage throughout the Federal Government
- Chairing and serving as US representatives at multinational forums
- Education partnerships and data exchange with academia

Quality Assurance Capability

Providing the GEOINT community a tool to ensure data integrity across various data formats, in any environment.

Standards

Lead, influence, lead and coordinate Foundation GEOINT standards activities across the NGA, NSG and international standards communities, including Multinational Geospatial Co-production Program (MGCP) and Defence Geospatial Information Working Group. Develop, maintain, and document standards to increase interoperability and compatibility across products and services.

US ARMED FORCES MISSION SPECTRUM

WORLDWIDE SUPPORT

PRODUCING FOUNDATION GEOINT DATA, PRODUCTS AND SERVICES TO ACCOMPLISH WORLDWIDE MISSIONS

STRATEGIC | **OPERATIONAL** | **TACTICAL**

NGA DATA STORES

- **TOPOGRAPHY**
- **POLITICAL GEOGRAPHY**
  - Geographic Names
  - Digital Boundaries
- **HUMAN GEOGRAPHY**
  - Populated Places Framework
- **PARTNERSHIP CO-PRODUCTION**

Jet Navigation Charts **1:2M**

Tactical Pilotage Charts **1:500K**

Operational Navigation Charts **1:1M**

Image City Maps **~1:12K**

Language Maps

Global Navigation Charts **1:5M**

Evasion Charts **1:250K**

Topographic Maps **1:100K** **1:50K**

MISSION PLANNING

Home Station Predeployment Activities

Mission Analysis

Intelligence Preparation of the Battlespace

Course of Action Development

DEPLOYMENT

Safety of Navigation

Airfield Point of Embarkation/Debarkation

Sea Point of Embarkation/Debarkation

RECEPTION & STAGING

Intermediate Staging Base

Continue Mission Planning

Lines of Communication
- Ground Convoy
- Inter-Theater Airlift

ONWARD MOVEMENT & INTEGRATION

Tactical Assembly Area

Main Supply Routes

Mission Rehearsal

CONDUCT OPERATIONS

Actions on Objective

Actions Enroute

Change of Mission

GLOBAL GEOGRAPHY

HUMAN GEOGRAPHY

Providing insights into the activities of human population segments through examination of human populations, their collective identities, community systems, and stability.

NAME/PLACE ASSOCIATION

- Populated Places

COLLECTIVE IDENTITIES

- Ethnic
- Religious
- Linguistic
- Political
- Ideological

COMMUNITY SYSTEMS

- Education
- Health
- Economic
- Water
- Energy
- Places of Worship
- Cultural Heritage

POLITICAL GEOGRAPHY

Providing an authoritative US Government database for geographic names and boundaries, supporting diplomatic engagements, land/maritime territorial claims and boundaries, and freedom of navigation and naval operations.

FOREIGN GEOGRAPHIC NAMES

BOUNDARIES

- Comprehensive worldwide land and maritime boundaries
  - International land boundaries
  - Claimed maritime limits and boundaries
  - Internal administrative boundaries
  - Dynamic world coastline

MARITIME SAFETY OFFICE

MISSION

Provide global maritime geospatial intelligence in support of national security objectives, including commercial and defense Safety of Navigation (SoN), international obligations and joint military operations.

SERVICES

Notice to Mariners

Published weekly, Notice to Mariners (NtM) are corrections to nautical charts, which contain information vitally important to safety at sea. These have been published unclassified since 1869.

Products

- Critical Safety of Navigation (SoN) updates to all NGA, nautical hard copy charts and publications
- Monthly classified version of the NtM

Nautical Charts

Depicting the configuration of the shoreline and seafloor, these charts provide water depths, locations of dangers to navigation, locations and characteristics of aids to navigation, anchorages, and other features, and are essential for safe navigation.

Data

- 70 million hydrographic features

Products

- 3,300 NGA and 9,700 foreign partner produced electronic navigational charts (ENCs)
- 3,900 digital nautical charts (DNCs)
- 24,000 Submarine electronic navigational charts (SMENCs)
- 580 littoral planning charts (LPCs)
- 700 standard nautical hard copy charts
- 1,400 tactical ocean data (TOD) libraries
- 29 CPENC operational areas and 3 additional military layers (AML)
- 1,100 CPENC hard copy charts

Maritime Safety Watch

Provide Internationally coordinated 24/7 broadcast of urgent maritime safety information to mariners at sea in support of the International Hydrographic Organization's World-Wide Navigational Warning Service (WWNWS) for the NAVAREAS IV and XII, North Western Atlantic and North Eastern Pacific, respectively to commercial, international and US government ships.

Data

- Receives 200,000 messages per year; 8,500 messages are promulgated globally as a NAVAREA IV, NAVAREA XII, HYDROLANT, HYDROPAC or HYDROARC

Products

- 25 critical navigational warnings and distress messages published for US and international mariners daily
- Closure areas, icebergs, and US maritime alerts and advisories

Nautical Publications

Nautical publications are technical documents used for maritime navigation, providing essential information for safe and efficient vessel operation. These publications cover a wide range of topics including charts, aids to navigation, tide tables, and navigation rules.

Products

- 79 nautical publications
- Bowditch — The American Practical Navigator, Volumes I & II
- Sailing Directions (enroute and planning guides) — 42 publications
- NGA List of Lights — seven volumes
- Fleet Guides — Atlantic and Pacific
- World Port Index
- Radio Navigation Aids

Bathymetry

Bathymetry describes the shape of Earth's surface and the features of the seafloor, like seamounts and trenches, below sea level. SFH receives, obtains, evaluates, processes, and disseminates 3D seafloor depth data to support Safety of Navigation.

Data

- 30,000+ points in bathymetric dataset

Products

- Bathymetric datasets for SoN portfolio
- Custom bathymetric products

Partnerships

Leverages NGA's international partnership agreements and arrangements, maximizing partner contributions to meet Foundation GEOINT requirements.

- 40+ International agreements or arrangements
- Primary Charting Authority responsibilities for 12 foreign partners
- Tri-Service (NOAA, Navy, and NGA) member of the US Delegation to the International Hydrographic Organization (IHO)
- Provides analytical support to the International Hydrography Organization (IHO) technology and standards modernization
- ASG Maritime Group (AMG)

MARITIME NAVIGATION

DELIVERING ACCURATE, RELIABLE AND TIMELY MARITIME NAVIGATION PRODUCTS

Daily support to naval vessels, US Navy sailors and Marines underway

Over 30 critical navigational warnings and distress messages sent to US and international Mariners daily

NAVIGATIONAL PRODUCTS

Electronic Navigational Charts (ENCs)

Submarine Electronic Navigational Charts (SMENCs)

Certified Print Electronic Navigational Charts (CPENCs)

Tactical Ocean Data (TOD)

Additional Military Layers (AMLs)

MARITIME SAFETY INFORMATION

24/7 Maritime Watch

Navigational Warnings

Closure Areas

World-Wide Navigational Warning Service (WWNWS)

FOUNDATIONAL MARITIME GEOINT

Nautical Features and Information

Authoritative Bathymetry

Maritime Content Dissemination Portal (MCDP)

Electronic Synchronization (ESYNC)

INTERNATIONAL PARTNERSHIPS

International Hydrographic Organization (IHO)

International Maritime Organization (IMO)

Foreign Partner Primary Charting Authority (PCA)

AERONAUTICAL NAVIGATION OFFICE

MISSION

Acquire, prepare and distribute aeronautical geospatial intelligence (GEOINT) for US government and partner organizations in support of national strategy and interests.

SERVICES

Foundation Aero Data

Maintains data on over 49,000 airfields worldwide as the Intelligence Community's Responsible Producer (RESPROD) for this data, detailing their geographical position, physical description, vertical obstructions, operational characteristics and status.

Data

- 17,500+ airfields with Airfield Foundation Data (AFD) vectors collected
- 24.5+ million vertical obstructions (VOs) worldwide
  - ≥150 feet worldwide
  - ≥50 feet within seven miles of 9,800 priority airfields

Products

- Airfield Foundation Data (AFD)
- Automated Air Facilities Intelligence File (AAFIF)
- Layered Airfield Graphics (LAGs)

Enroute Aero Data

Provide 24/7 digital access to worldwide aeronautical data, lifesaving collision and terrain avoidance systems, and Intelligence Community support for operations including planning, targeting, force protection, and humanitarian aid and disaster relief. It also is responsible for aeronautical Safety of Navigation for DOW and allied partners maintaining multiple geospatial intelligence and aeronautical information databases, which are accessible by internet, and users can package the information into the format of their choice. This information is disseminated through the DOW's Aeronautical Mobile Application (which is available on iOS, Android, and Windows with 50,000 current users) and the Aeronautical Content Exploitation System (ACES), currently used by 9,830 active users.

Data

- Enroute information data for critical aeronautical information
- 8,100 navigation aids (navaids)
- 150,7000 waypoints
- 9,900 airways
- 17,800 boundaries
- 18,000 special use airspace (SUA)

Products

- 147 Instrument Flight Rules (IFR) Enroute and Area charts depicting navaids, airways, airports, airspace boundaries, SUA and safe altitudes
- 8 Enroute Supplements
- 17 Planning books and Military Training Route (MTR) charts

Terminal Aero Data

Provide critical aeronautical information/data to enable pilots to land and depart airfields during inclement weather. These include arrival, approach, and departure procedures with precise headings and altitudes to safely operate in terminal (area near airfields) airspace.

Data

- 32,000 IFPs coded in the Digital Aeronautical Flight Information File (DAFIF®)

Products

- 6500+ Instrument Flight Procedures (IFPs) in the DOW Flight Information Publication (FLIP)
- 15,000+ IFPs in Federal Aviation Administration (FAA) FLIP
- 12,500+ IFPs in NGA's Electronic Instrument Procedure Library (E-IPL)
- 28 Terminal books

Aero Database

Maintain three aeronautical databases used to produce DOW FLIP and DAFIF®, Airfield Foundation Data and associated products, and the Digital Vertical Obstruction File (DVOF).

Data

- 1.8 billion data elements
- 150K updates every 28 days, based on the international Aeronautical Information Regulation and Control (AIRAC) cycle

Aero Dissemination

Maintain the means to collect all available foreign aeronautical source documents: distribute NGA's aeronautical content and data via hard-copy publications and DVDs, web-based and mobile applications, in accordance with the standard 28-day AIRAC cycle.

Products

- 260+ foreign Aeronautical Information Publications (AIPs) and other source documents, hosted on the web-enabled Aeronautical Source Processing Service (ASPS)
- 7.5 million hard-copy DOW, FAA and Canadian FLIP products distributed via Defense Logistics Agency accounts
- Aeronautical Content Exploitation System (ACES) on NIPRNet, SIPRNet, JWICS, and the WWW
- Aeronautical Mobile Application — "Aero App" — available in iOS and Android formats
- Aero Data Server (ADS) application for local Aero App updates in disconnected environments
- WebDVOF web-enabled portal for the DVOF

Partnerships

Leverages NGA's international partnership agreements and arrangements, maximizing partner contributions to meet Foundation GEOINT requirements.

- 410 national, international and industry working relationships
- 170+ nations with agreements for foundation data and products
- Allied System for GEOINT Aeronautical Group (AAG) — aeronautical co-production, data comparison, and development of FVEY standards

DEPARTMENT OF WAR AND US COAST GUARD AVIATION NAVIGATION

WORLDWIDE SUPPORT

PRODUCING SAFETY OF NAVIGATION PRODUCTS AND DATA EVERY 28 DAYS TO ACCOMPLISH DOW WORLDWIDE MISSIONS

PERFORMANCE-BASED NAVIGATION (PBN) — TRANSFORMING TO DATA-DRIVEN, SPACE-BASED NAVIGATION

MISSION	PLANNING	TAKE OFF	DEPARTURE	ENROUTE	ARRIVAL	APPROACH	LANDING
Aero platforms Supported throughout USG	Dissemination via Web-Enabled & Mobile Applications	Airfield Foundation Data (AFD)	Standard Instrument Departures (SIDs)	Airway Structure	Standard Terminal Arrivals (STARs)	Instrument Approach Procedures (IAPs)	Vertical Obstructions (VOs)

FOUNDATION GEOINT OPERATIONS OFFICE

MISSION

The Foundation GEOINT Operations Office serves as authoritative source for geospatial intelligence, delivering mission-critical products and services that drive operational success worldwide. Coordinating, consolidating and executing the National System for Geospatial Intelligence (NSG) Foundation GEOINT (FG) requirements and delivering timely geospatial data across the Department of War (DOW) and Intelligence Community (IC) through effective business processes, and technology integration.

SERVICES

Requirements

Oversees and synchronizes collection, reporting, and prioritization of Foundation GEOINT (FG) requirements across the National System for Geospatial Intelligence (NSG), assisting partners to create, refine, and submit them when necessary. Coordinates strategic engagements with NSG and Allied System for Geospatial Intelligence (ASG) partners. Maintains and enhances the requirement management system to enable efficient submission, validation, tracking, and querying of requirements.

Readiness & Assessment

Serves as the lead for mission-readiness reviews, against stated requirements.

Operations

Facilitates cross-functional FG activities and reports accomplishments to DOW, the Intelligence Community, and US Government decision-makers, and leads FG engagements with international partners, while serving as the FG crisis manger and producing and disseminating NEO products.

Non-combatant Evacuation Operations (NEO) Support

Support US Government (NEOs) and contingency operations worldwide with the most current FG products for NEO sites.

Products

- Maintains and disseminates authoritative "Listing of Products" for each of over 600 NEO sites in 189 countries worldwide to support contingency operations.

Modernization

Maintains FG Information Technology (IT) governance across the Group, serving as the Integrator across the Foundation GEOINT Group (SF) for coordinating the Group's comprehensive data management, modernizes GEOINT workflows and content integration services, leveraging outreach and partner engagement to identify, develop, and/or deploy AI/ML capabilities.

GEOINT Content Access, Discovery & Dissemination

Coordinating, processing, digitizing, and disseminating tailored geospatial products on-demand while maintaining extensive research centers and digital collections that enable in-depth analysis for consumer conveyance and discoverability requirements worldwide.

- Provide data management support for Cedalion and the GEOINT Information Management Services (GIMS)
- Oversee conversion of archived NTM and airborne film imagery into digital format for NSG partner

Product & Prints

Managing the Print-on-Demand (POD) program and overseeing both mapping and digital distribution of foundation products to the community worldwide.

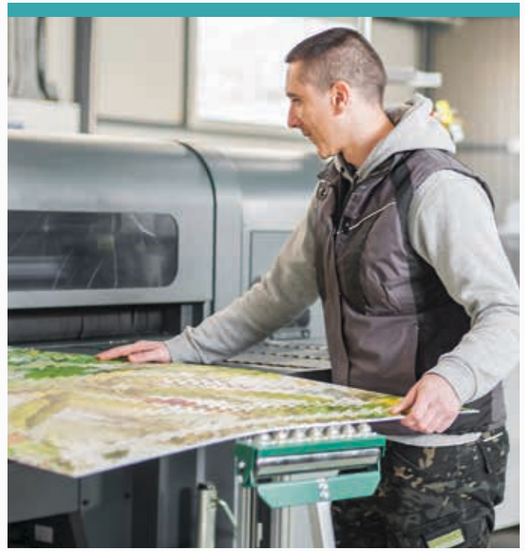
- Validate Foundation GEOINT data integrity and synchronize the PoD and DLA catalogs
- Manage Compressed ARC Digitized Raster Graphics (CADRG) production and functional oversight
- Manage modernization of the CADRG software suite
- Manage the automatic ingest of red-light, readable SPOT layered PDFs
- Facilitate automatic distribution from the PoD
- Coordinate production with Production Management Working Group (PMWG) members, DLA, and NGA FG NOX
- Provide Safety of Navigation (SoN) support
- Provide 3D terrain models and custom map products

GEOINT Research Center

Central storehouse for a vast collection of geospatial-intelligence materials, digitizing decades of print editions of maps and charts and microfiche format. Conduct in-depth open-source resource and collection based on collection requirements.

International Engagement

Enhancing sharing and enabling seamless support to Combatant Commands requirements through international sharing agreements with other nations.



Partnerships

Aligning with NGA vision and policies, lead the development and execution of an engagement strategy with international sharing agreements or arrangements. Identifying opportunities to enhance NGA/NSG global data through exchange, co-production, and burden-sharing activities.

Business Operations

Lead corporate activities, manpower, and career service requirements, taskers, business continuity planning, workspace planning, information assurance, and IT infrastructure. Provides senior-level support as well as communications and engagement coordination. Manages the SF Awards Program along with travel, training, and supply budgets on behalf of the group.

NATIONAL SYSTEM FOR GEOSPATIAL INTELLIGENCE (NSG)

REQUIREMENTS ARE SUBMITTED TO NGA THROUGH THE FOUNDATION GEOINT NSG OPERATIONS EXECUTIVE (FG NOX) PROCESS

MISSION PARTNERS

Geographic Combatant Commands

Functional Combatant Commands

Military Services

Intelligence Community

Civil Agencies

FG NOX

FOUNDATION GEOINT PRODUCERS

- Office of Geomatics & Targeting
- Office of Geography
- Maritime Safety Office
- Aeronautical Navigation Office
- Geospatial Planning Cells (GPCs)
- International Program for Human Geography (IPHG)
- Army Geospatial Center (AGC)
- Multinational Geospatial Co-Production Program (MGCP)
- Allied System for Geospatial Intelligence (ASG)
- TanDEM-X High Resolution Elevation Data Exchange (TREx)

STANDING REQUIREMENTS

(2-Year Cycle)	QTR 4	QTR 1	QTR 2	QTR 3	QTR 4
Planning Year	Data Call	Gap Analysis	Prioritization	Plan Approval	
Production Year	Production Plan Approval	Execute Production Plan			

EMERGENT & CRISIS REQUIREMENTS

Partner identifies unforecasted need

Partner identifies crisis requirement

Partner crisis POC engages with FG NOX who coordinates with Producers to meet need

FOUNDATION GEOINT — SATISFYING MISSION PARTNERS' REQUIREMENTS

WORLDWIDE SUPPORT

DISSEMINATING FOUNDATION GEOINT TO DECISION-MAKING AT STRATEGIC, OPERATIONAL, AND TACTICAL LEVEL

FOUNDATION GEOINT PRODUCTION

- GEOMATICS
- AERONAUTICAL
- MARITIME
- TOPOGRAPHIC
- HUMAN & POLITICAL GEOGRAPHY

NGA DATA STORES

DISCOVERY

Expert, analytic, and AI-assisted **searching** and **recommending** of existing GEOINT content to meet customer's mission needs.

DISTRIBUTION

End-to-end **tracking** and **optimizing** of GEOINT content dissemination processes, movement, and content consumption.

DELIVERY

Safe and secure **sending** and **receiving** of GEOINT content to customers and consumers through the right systems, services, and security.

DISSEMINATION PRODUCT AND SERVICE LINES

GEOINT RESEARCH CENTER

Research Analysis, Full Spectrum Data Gathering & Research Services

Content Acquisition Acquiring Open Source Resources

Online Access of Cataloged Maps & Text

Worldwide Ground Photo Collection

PRINT ENTERPRISE

Print on Demand (PoD)

Custom Products & 3D Printed Terrain Maps

Safety of Navigation Dissemination — CADRG/ECRG & GRMC

CUSTOM PRODUCTS & PROCESSING

Modernizing of Imagery Digitization

Digital Delivery Modernization

Custom Media

DATA MIGRATION, MODERNIZATION & TACTICAL SUPPORT

Distributed Operations

Regional Content Managers/Geo-Presence

TARGETING

Target Identification

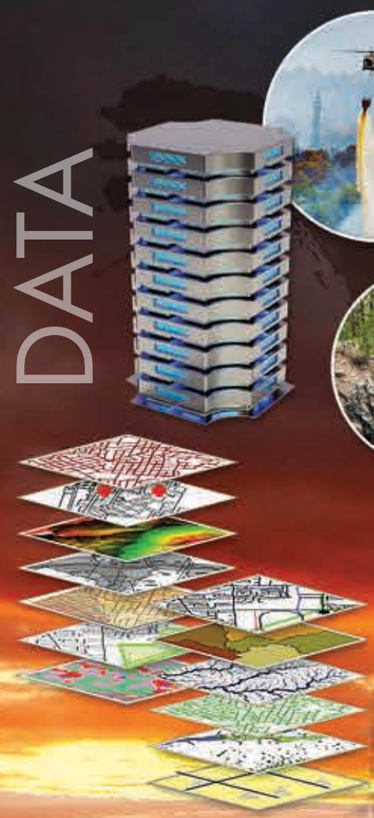
Target Vetting

GEOINT Target Development

HUMANITARIAN ASSISTANCE & DISASTER RESPONSE

MISSION

Providing geospatial data, products and services to inform and enhance both domestic and international disaster response, humanitarian aid and security.



GEOMATICS

Geodetic Surveys

Elevation Models

Precise Imagery

Global Models

LAND

Topographic Maps

Human Geography

Political Geography

SEA

World-Wide Navigational Warning Service

Navigation Publications

Notice to Mariners

Nautical Charts

AIR

Flight Information Publications

Digital Aeronautical Flight Information File

Vertical Obstructions

NGA FOUNDATION DIGITAL TWIN

A digital twin is a set of *virtual information constructs* that mimic the structure, context, and behavior of a natural, engineered, or social system (or system-of-systems), is dynamically updated with data from its physical twin, has a predictive capability, and informs decisions that realize value.[1]

Digital Twins are often used by industry, academia, and government to improve efficiency from prototyping new products to monitoring real world operations.

Data-centricity is the concept and practice of positioning data as the core, existing independently of a singular application/technology.

The **Foundation Digital Twin (FDT)** leverages these concepts to further evolve NGA as a geospatial content provider by enabling multi users to get the latest, fully integrated, and all-domain data delivered in the formats they need—to use in creation of their standard products, experiment with scenarios, derive custom content, or explore new data sources.

[1]National Academies of Sciences, Engineering, and Medicine (NASEM), 2024. Foundational Research Gaps and Future Directions for Digital Twins. Washington, DC: The National Academies Press. https://doi.org/10.17226/26894.

NGA Foundation GEOINT's data centricity means that we no longer collect geospatial data to build specific hard copy products. We collect geospatial data to build a variety of products and services, ranging from our military specification products, autonomous navigation systems, and Common Operating Picture by integrating feature-level data from all domains. Our infrastructure (IT and processes) is designed around data requirements, rather than trying to make data fit the infrastructure.

THE FOUNDATION DIGITAL TWIN WILL:

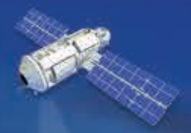
- Integrate and deliver Foundation GEOINT data to all NGA consumers with the most relevant and current information in support of various missions.
- Connect the data and mission relationships across organizations, increasing sharing and reducing redundant collection, processing, and storage.
- Meet customer demands to support uninterrupted military and intelligence operations under all conditions.

THIS INCLUDES:

- Improved requirements satisfaction and condensed timelines
- Services to register and integrate new data
- Timely and accurate geospatial positioning, navigation, and timing information

NGA FOUNDATION DIGITAL TWIN — A DATA-CENTRIC ENVIRONMENT

The Foundation Digital Twin will provide an authoritative and easily discoverable dynamic Digital Twin of the world at the speed of mission need, harnessing the modernization efforts across all Foundation GEOINT domains.



COLLECTION MANAGEMENT DATA	FOUNDATIONAL GEOINT DATA STORES	CORRELATION AND REFINEMENT	DECISION MODELING DATA	GEOSPATIAL DATA STEWARDS	GLOBAL GEOINT ENTERPRISE	USER INTERFACE
Automated Sourcing & Collection Requests		Automated Data Content & Suitability Evaluation	Complex Neural Network	Internal Management	Automated Product Library, Alerts & Notifications, User Defined Data Interface	

Initial Pass

GEOMATICS
- Deliver 3D GEOINT
- Automatic WGS 84 Reference Frame Alignment

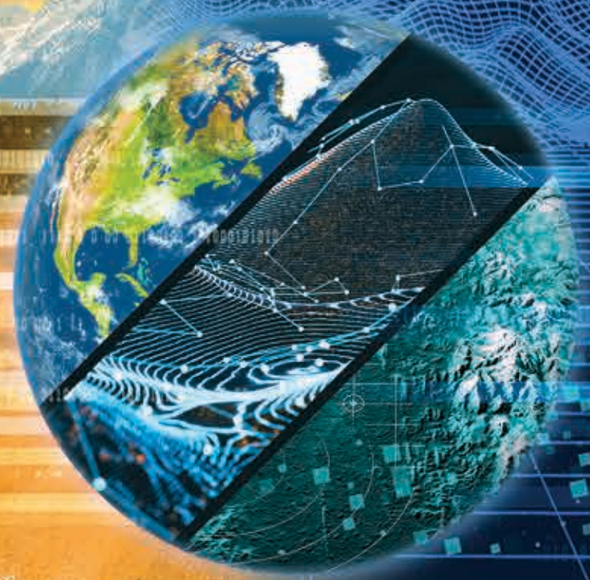
AERONAUTICAL SAFETY OF NAVIGATION
- Performance-Based Navigation
- Airfield Change Detection

Follow on Pass

TOPOGRAPHIC FEATURE PRODUCTION
- Automate Production
- Feature Extraction

Follow on Pass + N

HUMAN & POLITICAL GEOGRAPHY
- Population Density Tables
- GEONames



- Foundation GEOINT
- GEOINT Partners
- Commercial

MARITIME SAFETY OF NAVIGATION
- S-100 Compliance
- ENC Change Detection

- Registration
- Foundation Relevant
- Change Detection
- Data Quality Control

- Monitoring
- Quality Control
- Security Management
- Safety Measures

- Priorities
- Requests
- Data & Performance Feedback

- Dissemination
- Products
- 3D Immersion

History

1777 Office of Geographer Continental Army

1830 Depot of Charts and Instruments US Navy

1910 Central Map Reproduction Plant US Army

1928 Map Unit, Information Division US Army Air Corps

1942 Army Map Service US Army

1944 Aeronautical Chart Service US Army Air Force

1946 Inter-American Geodetic Survey Caribbean Defense Command

1952 Aeronautical Chart and Information Center US Air Force

1962 US Naval Oceanographic Office (NAVO) formed

1972 Defense Mapping Agency (DMA) formed

1996 National Imagery and Mapping Agency (NIMA) formed

2003 National Geospatial-Intelligence Agency (NGA), NIMA changes its name to NGA

2005 Foundation Based Operations (FBO/SF) formed, offices included Geomatics & Geography

2011 Foundation GEOINT Group (SF) renamed after FBO combined with the Office of Global Navigation (Maritime Safety & Aeronautical Navigation)

Today

THE FOUNDATION GEOINT GROUP

The Foundation GEOINT Group traces its lineage back over 249 years. In 1777, General George Washington established the Office of Geographer for the Continental Army, which consisted of cartographers and surveyors. In 1830, the US Navy's Depot of Charts and Instruments was established. By 1962, this office evolved into the US Naval Oceanographic Office (NAVO). In 1910, the US Army's Central Map Reproduction Plant was established, evolving into the Army Map Service in 1942. In 1928, the Map Unit, part of the Information Division of the US Army Air Corps, was established, evolving into the Aeronautical Chart Service in 1944 and subsequently to the US Air Force Aeronautical Chart Information Center in 1952. In 1946, under presidential directive, the Inter-American Geodetic Survey formed under the Caribbean Defense Command.

These organizations, along with other entities, eventually combined to form the Defense Mapping Agency (DMA) in 1972. The Foundation GEOINT Group inherited key missions of the original DMA mission that was assimilated into the National Imagery and Mapping Agency (NIMA) and then NGA. Below is a summary of the chronicle of events that resulted in the formation of the Foundation GEOINT Group.

1971 DMA

A presidential memorandum directed the consolidation of the Department of Defense (DOD) mapping, charting and geodesy operations.

1972

The DOD established DMA to provide mapping, charting, and geodesy to support the Secretary of Defense, military departments, Joint Chiefs of Staff, and other DOD components.

In establishing DMA, DOD combined the selective activities of the US Army Topographic Command (including the Army Map Service); the Department of Topography of the US Army Engineer School; the Inter-American Geodetic Survey of the US Army; and the chart production, nautical information, and distribution activities of the US Navy Oceanographic Office, the Aeronautical Chart and Information Center operations, the 1st Geodetic Survey Squadron, and elements of the 15th Reconnaissance Technical Squadron of the US Air Force.

Those organizations formed DMA's four operational offices: the Inter-American Geodetic Survey, the Topographic Center, the Hydrographic Center and the Aerospace Center.

Through these four organizations, DMA support spanned the next quarter century, providing for the production, worldwide distribution, and support of maps, charts and geodesy. This also included precise positioning data and digital data for strategic and tactical military operations, weapons systems, and Safety of Navigation.

1996 NIMA

NIMA was formed to bring our nation's most capable imagery and geospatial assets together into a single agency. NIMA brought together DMA, Central Imagery Office, the Defense Dissemination Program Office and the National Photographic Interpretation Center. It also incorporated parts of the Central Intelligence Agency, the Defense Airborne Reconnaissance Office, the Defense Intelligence Agency, and the National Reconnaissance Office. Subsequently, DMA's offices and missions were distributed across various NIMA offices.

NIMA in 2003 established the Source Operations and Management Directorate, responsible for acquiring, managing, and delivering imagery and other source data and information to the National System for Geospatial Intelligence (NSG).

2003 NGA

The Defense Authorization Bill included a provision renaming NIMA as the National Geospatial-Intelligence Agency.

2005

The NGA Director commissioned a review of current agency missions. As a result of its findings, an entity within the Source Directorate, Foundation Based Operations (FBO), with an NSG Operations Executive (NOX), was formed. Offices included in the FBO were Geomatics and Geography.

The offices of Maritime Safety and Aeronautical Navigation were in the Analysis and Production Directorate in the Office of Global Navigation with a Safety of Navigation (SON) NSG Operations Executive (NOX).

2011

The foundation mission activities of FBO and the Office of Global Navigation were combined to form the Foundation GEOINT Group (SF).

TODAY

Today, the SF is organized in a similar manner to that of DMA. The organization of DMA's former four operational offices correlates to a certain degree to that of the SF operational offices of today: the Inter-American Geodetic Survey to the Office of Geomatics & Targeting (SFN), the Topography Center to the Office of Geography (SFG), the Hydrography Center to the Maritime Safety Office (SFH), and the Aerospace Center to the Aeronautical Navigation Office (SFA).

SF has one Group level support office, Foundation GEOINT Operations Office (SFP) managing partner mission requirements, content dissemination, modernization and corporate business activities.

The SF workforce consists of military, government and contractor personnel. Their distribution in the National Capital Region, St. Louis, and locations around the world reflects the agency's varied geographical roots and global presence to provide world-class data, products and services describing the physical and cultural characteristics of the Earth and space.

NOTES

NGA.mil

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