U.S. Coast Guard Navigation Center

NAVCEN Overview
## Personnel Strength of Armed Forces

<table>
<thead>
<tr>
<th>Service</th>
<th>Military personnel</th>
<th>Percent of total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Army</td>
<td>1,015,100</td>
<td>47%</td>
</tr>
<tr>
<td>Air Force</td>
<td>491,700</td>
<td>23%</td>
</tr>
<tr>
<td>Navy</td>
<td>386,700</td>
<td>18%</td>
</tr>
<tr>
<td>Marine Corps</td>
<td>222,900</td>
<td>10%</td>
</tr>
<tr>
<td>Coast Guard</td>
<td>47,992</td>
<td>2%</td>
</tr>
<tr>
<td>Total</td>
<td>2,164,392</td>
<td>100%</td>
</tr>
</tbody>
</table>

*Active duty and Reserve Estimates*  
*Source: DOD FY16 Defense Manpower Requirements Report*
US Coast Guard’s Missions

By Law, the US Coast Guard has 11 Missions:

• Marine Safety
• Aids to Navigation
• Ports, Waterways, and Coastal Security
• Search and Rescue
• Marine Environmental Protection
• Living Marine Resources
• Other Law Enforcement
• Drug Interdiction
• Defense Readiness
• Migrant Interdiction
• Ice Operations
USCG Atlantic and Pacific Commands

Atlantic Area

Pacific Area

Pacific Area
USCG Service Structure
USCG Sector Commands
NAVCEN Mission Statement

The Navigation Center provides services to enhance the safety, security, and efficiency of U.S. waterways, and respond to the needs of civil Global Positioning System (GPS) users. These services include:

- Operating the Nationwide Differential GPS (DGPS) System
- Operating the Long Range Identification and Tracking (LRIT) business helpdesk
- Operating the Nationwide Automatic Identification System (NAIS)
- Publishing Notices to Mariners and the Light List
- Managing the US Aids to Navigation Information Management System (USAIMS)
- Managing electronic charting portfolios for U.S. Coast Guard units
- Serving as the primary U.S. government interface with GPS users (except aviation and DOD)
- Receiving and coordinating investigation of GPS outage reports
- Disseminating navigation information through 24/7 operations center and the NAVCEN website

Homeland Security
# Nationwide Differential GPS (NDGPS)

## System Description
- 44 Nationwide Remote Broadcast Sites throughout the United States and territories (39 USCG and 5 USACE)
  - System in operation since 1996
  - Better than 10 meter accuracy (~1m)
  - Sites equipped with out-of-tolerance user alerting

## Operations
- Redundant equipment at sites
- Redundant controls stations at NAVCEN

## Stakeholders
- U.S. Army Corps of Engineers (USACE)
- National Oceanic & Atmospheric Administration (NOAA)
  - National Geodetic Survey, Continuously Operating Reference Stations (CORS) network
Long Range Identification & Tracking (LRIT)

**System Description**
- Assist U.S. flagged ships subject to SOLAS regulation
- Uses existing INMARSAT/Iridium equipment
- Tracking U.S. SOLAS ships worldwide
- Tracking inbound vessels on Int’l voyages, or traveling within 1,000 NM of the U.S. that are:
  - Passenger ships, 300+ GT cargo ships, or self-propelled offshore drill unit, not on site
  - Available for search and rescue surface picture

**Operations**
- Around the clock watch to provide assistance
- Conformance testing
- Verification of vessel reporting (4x/day)
- Currently track 700+ U.S. vessels worldwide
- Track over 7,000 vessels within the US border

**Stakeholders**
- Over 100 countries participate in LRIT
- Polestar (Private Contractor Data Management)
- Internally used within the Coast Guard to serve as:
  - Search and Rescue
  - Harbor Approach Early Notification
**Nationwide Automatic Identification System (NAIS)**

### System Description

- Track vessels transiting throughout the NAIS areas
- Support coordinated information sharing with U.S. organizations and port partners
- 50 NM receive range, 24 NM transmit range
  - Interim Receive - Operate
  - Permanent Transceive System - Operate
  - Includes VTS AIS Transceiver - Only monitor
  - Marine Exchange Alaska - Only monitor

### Operations

- Around the clock monitoring the performance of the NAIS sites
- Remote troubleshooting
- Monitor data connection to users

### Stakeholders

- Bidirectional data sharing with Canada and the St. Lawrence Seaway
- Partnerships with U.S. Departments of Defense (DOD), Transportation (DOT), Homeland Security (DHS), and Commerce (DOC)
- U.S. Coast Guard operational units
### Local Notice to Mariners (LNM)

#### System Description
- A region based method by which the public is informed of changes to aids to navigation
- LMSs are a carriage requirement onboard all commercial vessels
- NAVCEN website is the single authoritative source for LNMs and the chart corrections contained therein, as well as Light Lists

#### Operations
- U.S. Coast Guard Districts create LNM
- LNM’s distributed via NAVCEN Website (33 CFR 72.01-5)
- Users subscribe to a list server for notification that the NAVCEN website is updated

#### Stakeholders
- Service to all mariners who navigate the waters of the United States
- National Oceanic and Atmospheric Administration (NOAA)
- National Geospatial-Intelligence Agency (NGA)
US Aids to Navigation Information Management System (USAIMS)

System Description
- USAIMS is the official electronic record of USCG and private Aids to Navigation (ATON)
- NAVCEN supports District Prevention Department Waterway Management staffs (dpw) and ATON Units with application support (e.g., special queries, tutorials, document system change requests)
- Automate production of weekly and annual Light List for NAVCEN website
- Produce print files for the annual version of the Light List

Operations
- Produce annual Light List for NAVCEN website and printing
- Produce weekly Light List updates (PDF and XML) for NAVCEN website
- Manage updates and maintenance of the system. Perform system testing, and training

Stakeholders
- Service to all mariners who navigate the waters of the United States.
- CG ATON Units
- District Waterways
# Electronic Chart Portfolio Management

## System Description
- **USCG Electronic Chart Portfolio Manager**
- Provide electronic charts to the USCG cutter fleet and boat forces
  - 321 cutters (49’+) & 1190 boats
- Provide help desk service, Electronic Chart Display and Information System (ECDIS) lab
- Electronic charts covering U.S., Caribbean, Mesoamerican waters, and other select areas

## Operations
- Subject matter experts on policy and acquisitions for electronic charts
- Liaison with NOAA, NGA, and USACE for charting and maritime information

## Stakeholders
- International and national agencies
- National Oceanic and Atmospheric Administration (NOAA)
- National Geospatial-Intelligence Agency
- U.S. Army Corps of Engineers
# Electronic Tracking (E-Tracking)

## System Description

### Data Management Processes:
- Commercial AIS error notification
- CG and Port Partner AIS error notification
- NAIS historical and live data request processing

### MIOC application support:
- LRIT Business Help Desk (BHD) application administration
- System Operation Center (SOC) tool administration

### NAIS infrastructure analysis:
- Monitor and troubleshoot system performance criteria
- Technical liaison to system sponsor and Product Line

## Key Outcomes

- NAIS meets functional and operational requirements
- International Maritime Organization (IMO) vessel assistance and notification of AIS infractions
- CG assets meet AIS requirements
- NAIS data product delivered to customers

## Stakeholders

- USCG Program Offices
- Internal Revenue Service (IRS), Department of Justice (DOJ), Department of Defense (DOD), Customs and Border Patrol (CBP)
- Civilian Legal Offices, Port Partners, Educational Institutions
- Freedom of Information Act (FOIA)
Navigation Information Service (NIS)

System Description

• Primary interface to disseminate information on GPS, DGPS, AIS, NAIS, LRIT Maritime Safety, Maritime Communications, Maritime Regulations & Local Notice to Mariners
• Over 275,000 hits monthly on the NAVCEN website
• 21,000+ List Server subscribers for GPS status, GPS advisories, and LNMs
• Coordinate civilian, non-aviation GPS Interference Detection and Mitigation (IDM) response

Operations

• Around the clock NAVCEN point of contact for maritime and civil non-aviation GPS users
• Main dissemination point of information for NAVCEN
• GPS testing coordination for USCG assets

Stakeholders

• General Public
• Maritime and public entities include:
  o Maritime users
  o Civil GPS users
  o Other non-Department of Defense (DOD) users
Navigation Information Service (NIS)

926 Total Inquiries in 2016

- Charting/LNMs: 21%
- AIS: 15%
- Laws / Regs: 5%
- Maritime Communications: 9%
- Miscellaneous: 12%
- Merchant Marine: < 1%
- Maritime Communications: 9%
- NAV Rules: 8%
- GPS: 8%
- WEB Services / Website: < 1%
- DGPS LRIT: 1%
- Administration: < 1%
- Recruiting: < 1%
- Other CG Missions: 8%
- Vessel Documentation: 2%
- Mobile ATON: 1%
# Operational Civil Interface Duties

## System Description
- 1986 – GPS became a dual-use (Military/Civil) system, DOD formed a MOU with DOT for GPS Civil Interface
- Civil GPS Service Interface Committee (CGSIC) was formed as liaison between the world’s civil GPS users and U.S. GPS Authorities
- DOT assigned operational interface responsibilities to U.S. Coast Guard for dissemination of GPS operational information, CG retained responsibility after shifting to DHS

## Operations
- Interface with the civil GPS community
- Publish GPS operational files for public use
- Accept and respond to GPS inquiries and problem/interference reports

## Stakeholders
- U.S. Air Force GPS Operations Center (GPSOC)
- FAA National Airspace System Security and Enterprise Operations (NASEO)
- Other agencies of the U.S. government for response to GPS inquiries
- Civil, non-aviation users
Civil GPS Service Interface Committee (CGSIC)

**System Description**

- 1986 DOT takes lead for civil users
- 1991 – Civil GPS Service Interface Committee (CGSIC):
  - Chair, Director, Office of Positioning, Navigation and Timing & Spectrum Management, (DOT OST-R)
  - Deputy Chair, Commanding Officer NAVCEN
  - Executive Secretariat (NAVCEN Staff)

**Operations**

- CGSIC Provides:
  - Liaison for world’s civil GPS users
  - Advocate for civil use of GPS
  - Technical information exchange with civil GPS users
  - Identify issues for resolution by U.S. GPS authorities

**Committee**

**CGSIC Subcommittees**
- Survey, Mapping & Geo-Sciences
- Timing
- U.S. States & Local Government
- International Information

**CGSIC Advisors**
- Land
- Aviation
- Marine
- GPS Industry Council

56th CGSIC in Portland, OR, 2016
## GPS Interference Detection and Mitigation (IDM)

### System Description
- 2014 Interagency GPS User Support Memorandum of Agreement (MOA)
- Multi-agency user segment representation
- Multi-agency IDM Coordination
- Designated by USCG as GPS testing focal point for all GPS band testing and Other Government Agency (OGA) testing events

### Operations
- Support civil mission planning and user requirements
- Provide Satellite Constellation Status
- Provide User Advisories
- Coordinate GPS Testing for USCG assets
- Process GPS disruption reports
- GPS related Committees and Working Groups

### Stakeholders
- U.S. Air Force GPS Ops Center (GPSOC)
- FAA National Airspace System Security and Enterprise Operations (NASEO) and FAA Air Traffic Control System Command Center (ATCSCC)
- Federal Communications Commission Ops Center (FCCOC)
- DHS National Coordinating Center for Communications (NCC)
- U.S. Naval Observatory (USNO)
www.navcen.uscg.gov

The primary means of information dissemination used by the NIS is the NAVCEN website. It is the focal point of NAVCEN data regarding GPS, DGPS, NAV Rules, NAIS, LRIT, and much more.
NAVCEN’s Federal Partners

DEPARTMENT OF STATE
- FEDERAL REGULATORY ADMINISTRATION

DEPARTMENT OF TRANSPORTATION
- RESEARCH AND INNOVATIVE TECHNOLOGY ADMINISTRATION (RITA)

DEPARTMENT OF HOMELAND SECURITY
- COAST GUARD HEADQUARTERS
- NATIONAL CYBERSECURITY & COMMUNICATIONS INTEGRATION CENTER
- ATLANTIC / PACIFIC AREA COMMANDS
  - NAVIGATION CENTER (NAVcen)
  - DIS NATIONAL COORDINATION CENTER (DNCC)
  - GPS OPERATIONS CENTER (GPOCC)

DEPARTMENT OF DEFENSE
- AIR FORCE
- ARMY
- NAVY
- NATIONAL GEOINTelligence AGENCY (NGA)

DEPARTMENT OF COMMERCE
- NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION (NOAA)

USCG NAVIGATION CENTER MISSIONS
- DIFFERENTIAL GPS
- LONG RANGE IDENTIFICATION & TRACKING (LRIT)
- NATIONWIDE AUTOMATIC IDENTIFICATION SYSTEM (NAIS)
- NOTICE TO MARINERS AND LIGHT LISTS
- CHARTING
- US GOVERNMENT INTERFACE FOR GPS (CIVILIAN LAND AND MARITIME USERS)
- INTERFERENCE DETECTION AND MITIGATION
NAVCEN’s Federal Partners

- DEPARTMENT OF STATE
  - FEDERAL REGIONAL ADMINISTRATION
  - OFFICE OF OCEANS AND INTERNATIONAL ENVIRONMENTAL AFFAIRS
  - OFFICE OF OPERATIONS, RESEARCH AND DEVELOPMENT
  - NATIONAL DIRECTIONAL IDENTIFICATION SYSTEM CENTER (NIDIS)
  - AIR TRAFFIC CONTROL SYSTEM COMMAND CENTER (ATCC)

- DEPARTMENT OF TRANSPORTATION
  - RESEARCH AND INNOVATIVE TRANSPORTATION ADMINISTRATION (RITA)
  - NATIONAL AVIATION ADMINISTRATION (NAA)

- DEPARTMENT OF HOMELAND SECURITY
  - COAST GUARD HEADQUARTERS
  - NATIONAL CYBERSECURITY & COMMUNICATIONS INTEGRATION CENTER
  - NAVAL CYBER COMMAND
  - NAVAL SURFACE WARFARE CENTER
  - NAVAL RESEARCH LABORATORY
  - NAVAL SAFETY OFFICE (NSO)

- DEPARTMENT OF DEFENSE
  - ARMY
  - NAVY
  - NATIONAL GEOINT INTELLIGENCE AGENCY (NGA)

- DEPARTMENT OF COMMERCE
  - NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION (NOAA)
  - NATIONAL MINE HUNTER RESCUE CENTER (NHRC)
  - OFFICE OF RESPONSE AND RESTORATION (ORR)

USCG NAVIGATION CENTER MISSIONS

- DIFFERENTIAL GPS
- LONG RANGE IDENTIFICATION & TRACKING (LRIT)
- NATIONWIDE AUTOMATIC IDENTIFICATION SYSTEM (NAIS)
- NOTICE TO MARINERS AND LIGHT LISTS
- CHARTING
- US GOVERNMENT INTERFACE FOR GPS (CIVILIAN LAND AND MARITIME USERS)
- INTERFERENCE DETECTION AND MITIGATION (DIM)
NAVCEN’s Federal Partners
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DEPARTMENT OF STATE
  - FEDERAL REGIONAL ADMINISTRATION

DEPARTMENT OF TRANSPORTATION
  - RESEARCH AND INNOVATIVE TRANSPORTATION ADMINISTRATION (RITA)
  - FEDERAL AVIATION ADMINISTRATION (FAA)

DEPARTMENT OF HOMELAND SECURITY
  - COAST GUARD HEADQUARTERS
  - NAVAL CYBER SECURITY & COMMUNICATIONS INTEGRATION CENTER
  - AIR TRAFFIC CONTROL SYSTEMS CENTER (ATCSC)

DEPARTMENT OF DEFENSE
  - NAVY
  - NATIONAL GEOSPATIAL-INTELLIGENCE AGENCY (NGA)

DEPARTMENT OF COMMERCE
  - NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION (NOAA)

NAVSURPAC (NAVIGATION SURVEY AND CHARTING CENTER)
- DIFFERENTIAL GPS
- LONG RANGE IDENTIFICATION & TRACKING (LRIT)
- NATIONWIDE AUTOMATIC IDENTIFICATION SYSTEM (NAIS)

USCG NAVIGATION CENTER MISSIONS
- NOTICE TO MARINERS AND LIGHT Lists
- CHARTING
- US GOVERNMENT INTERFACE FOR GPS (CIVILIAN LAND AND MARITIME USERS)
- INTERFERENCE DETECTION AND MITIGATION (IDM)
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