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><strong>Total</strong></td>
<td><strong>2,164,392</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

*Active duty and Reserve Estimates*

*Source: DOD FY16 Defense Manpower Requirements Report*
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
USCG Service Structure

[Map showing the USCG service structure with districts and regions labeled.]
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
# 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

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[Map of North America showing U.S. SOLAS Class VSLs and other vessels tracked by LRIT]
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
**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

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<table>
<thead>
<tr>
<th><strong>Key Outcomes</strong></th>
<th><strong>Stakeholders</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>NAIS meets functional and operational requirements</td>
<td>USCG Program Offices</td>
</tr>
<tr>
<td>International Maritime Organization (IMO) vessel assistance and notification of AIS infractions</td>
<td>Internal Revenue Service (IRS), Department of Justice (DOJ), Department of Defense (DOD), Customs and Border Patrol (CBP))</td>
</tr>
<tr>
<td>CG assets meet AIS requirements</td>
<td>Civilian Legal Offices, Port Partners, Educational Institutions</td>
</tr>
<tr>
<td>NAIS data product delivered to customers</td>
<td>Freedom of Information Act (FOIA)</td>
</tr>
</tbody>
</table>
# 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:
  - Maritime users
  - Civil GPS users
  - Other non-Department of Defense (DOD) users
Navigation Information Service (NIS)

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

926 Total Inquiries in 2016
## 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 process 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 Services Interface Committee (CGSIC)**

### System Description

- **1989** – DOT takes lead for civil users
- **1991** – Civil GPS User 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
  - Technical information exchange with civil GPS users
  - Identify issues for resolution by U.S. GPS authorities
  - Advocate for civil use of GPS

### Stakeholders

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

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

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56th CGSIC in Portland, OR, 2016
GPS Information Sharing & 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)
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
NAVCEN’s Federal Partners
NAVCEN’s Federal Partners

DEPARTMENT OF STATE
- FEDERAL REGIONAL ADMINISTRATION

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

DEPARTMENT OF HOMELAND SECURITY
- FEDERAL AVIATION ADMINISTRATION (FAA)
- COAST GUARD HEADQUARTERS
- ATLANTIC/PACIFIC REGIONS COMMANDS
- NAVIGATION CENTER (NAVCEN)
- AIR TRAFFIC CONTROL SYSTEM COMMAND CENTER (ATCSCC)
- DOD NATIONAL COORDINATION CENTER (DNCC)
- GPS OPERATIONS CENTER (POSC)
- US ARMY CORPS OF ENGINEERS (USACE)
- NAVAL RESEARCH LABORATORY

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

DEPARTMENT OF COMMERCE
- NATIONAL OCEANIC AND ATOMIC ADMINISTRATION (NOAA)
- NATIONAL OCEANIC AND AERIAL ADMINISTRATION (NOAA)
- OFFICE OF RESPONSE AND RESTORATION (ORR)

USCG NAVIGATION CENTER MISSIONS
- DIFFERENTIAL GPS
- LONG RANGE IDENTIFICATION AND TRACKING (LRIT)
- NATIONWIDE AUTOMATIC IDENTIFICATION SYSTEM (NAIS)
- NOTICE TO MARINERS AND LIGHT LISTS
- CHARTING
- U.S. GOVERNMENT INTERFERENCE FOR GPS (SPECIALIZED LAND AND MARITIME USES)
- INTERFERENCE DETECTION AND MITIGATION SYSTEMS
NAVCEN’s Federal Partners
NAVCEN’s Federal Partners

DEPARTMENT OF STATE
- FEDERAL REGIONAL ADMINISTRATION
- OFFICE OF OCEANS AND INTERNATIONAL ENVIRONMENTAL AND SCIENTIFIC AFFAIRS

DEPARTMENT OF TRANSPORTATION
- NATIONAL TRANSPORTATION SYSTEMS CENTER (NTPS)
- OFFICE OF POSITION, NAVIGATION, AND TIMING (OPNTD)
- NATIONAL AVIATION ADMINISTRATION (FAA)

DEPARTMENT OF SECURITY
- FEDERAL AVIATION COMMAND CENTER (FAO)
- AIR TRAFFIC COMMAND CENTER (ATCC)
- NAVIGATION CENTER (NAVcen)
- NATIONAL CYBERSOCIETY & COMMUNICATIONS INTEGRATION CENTER

DEPARTMENT OF DEFENSE
- AIR FORCE
- ARMY
- NAVY

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
- CARTOGRAPHY
- INTERFERENCE DETECTION AND MITIGATION
- US GOVERNMENT INTERFACE FOR GPS (CIVILIAN LAND AND MARITIME USERS)