

U.S. COAST GUARD GPS INFORMATION CENTER (GPSIC) AND ITS FUNCTION WITHIN THE CIVIL GPS SERVICE (CGS)*

Lieutenant Luann Barndt

Chief, Global Positioning System Information Center Branch
U.S. Coast Guard Omega Navigation System Center

Abstract

The Global Positioning System Information Center (GPSIC) was created to provide civil users of the Global Positioning System with timely system status and other GPS satellite information. The GPSIC began providing basic services on a test and evaluation basis in March 1990. Since then we have improved these services, formalized the information gathering processes, and expanded GPSIC operations to meet GPS user needs.

The GPSIC serves as a central point of contact for civil users to make their interests and needs known to the system operator, the Department of Defense (DOD) under the management of the U.S. Air Force. The GPSIC provides GPS information to civil users through Operational Advisory Broadcasts (OAB) containing GPS performance data. The OABs are disseminated through numerous sources including 24 hour access to a voice telephone recording and a computer bulletin board system (BBS). The GPSIC staff also responds to individual user inquiries, comments, or concerns about civil access to and use of the GPS during normal working hours.

This paper provides an overview of the Civil GPS Service as well as the details of the type of information and services that are available through the GPSIC and how they can be obtained. It will also address the future expansion of GPSIC responsibilities.

THE GLOBAL POSITIONING SYSTEM INFORMATION CENTER

The mission of the Global Positioning System Information Center (GPSIC) is to:

- * gather,
- * process, and
- * disseminate

*The views expressed herein are those of the author and are not to be construed as official or reflecting the views of the Commandant or of the U.S. Coast Guard.

timely GPS status information to civil users of the global positioning satellite navigation system. Specifically, the functions to be performed by the GPSIC include the following:

- * Provide the Operational Advisory Broadcast Service (OAB)
- * Answer questions by telephone or written correspondence
- * Provide information to the public on the GPSIC services available
- * Provide instruction on the access and use of the information services available
- * Maintain tutorial, instructional and other relevant handbooks and material for distribution to users
- * Maintain records of GPS broadcast information, GPS data bases or relevant data for reference purposes
- * Maintain data bases of users by category, receiver manufacturers, providers of various services which use GPS, and other information sources
- * Maintain bibliography of GPS publications
- * Maintain and augment the computer and communications equipment as required
- * Develop new user services as required

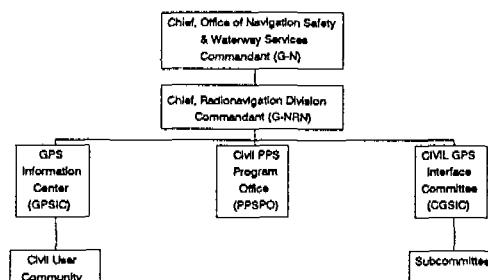
OVERVIEW OF THE CIVIL GPS SERVICE (CGS)

In 1987, the Department of Defense (DOD) formally requested the Department of Transportation (DOT) assume responsibility for establishing and providing an office that would respond to non-military user needs for GPS information, data, and assistance. In February 1989, the Coast Guard assumed the responsibility as the lead agency within DOT for this project. Three areas requiring interaction were identified:

- * Near real-time operational status reporting
- * Distribution of the precise satellite ephemerides
- * Civil use of the precise positioning service

In 1988, the U.S. Space Command (USSPACECOM) invited the U.S. Coast Guard to assist in the development of the DOD Operational Capability (OPSCAP) reporting system. Since that time, the U.S. Coast Guard Radionavigation Division has worked with USSPACECOM to develop requirements and implement a plan to provide the requested interface with the nonmilitary GPS community. Most of these civil GPS services are now in place; others are planned to be ready by the time GPS is fully operational.

As the Department of Transportation (DOT) operational agency, the U.S. Coast Guard is responsible for the oversight and management of the Civil GPS Service. The function is implemented by the following organizational elements:



Chief, Office of Navigation Safety and Waterway Services (G-N), located at Coast Guard Headquarters, provides top-level oversight and management of the CGS program. The primary responsibility is the provision of broad, high-level policy guidance. This direction is provided in support of:

- * DOT positions
- * Congressional mandates
- * Federal Radionavigation policies

This office is the focal point for information feedback from the Civil GPS Service Interface Committee. Members of this staff interface with the heads of other Federal agencies with an interest in the Civil GPS Service program.

Chief, Radionavigation Division (G-NRN), also located at Coast Guard Headquarters, is the program manager responsible for the activities of the PPSPO and the GPSIC operations. This office assists with the budgetary planning for these services.

The Civil GPS Service consists of four main elements:

GPS Information Center (GPSIC) is the operational entity of the CGS which provides GPS status information to civilian users of the Global Positioning System based on input from the:

- * GPS control segment
- * Department of Defense (DOD)
- * Other sources

PPS Program Office (PPSPO) is responsible for administering the program which will allow qualified civil users to have access to the Precise Positioning Service (PPS) signal. This program office is currently under development in the Radionavigation Division of the Office of Navigation Safety and Waterways Service (G-NRN-2) located at Coast Guard Headquarters in Washington, D.C.

Civil GPS Service Interface Committee (CGSIC) was established to identify civil GPS user technical information needs in support of the Civil GPS Service program. Its purpose and goal is of an information exchange nature only.

Differential GPS (DGPS) was established to develop an extension of GPS to enhance the Standard Positioning Service for civil users in the maritime regions of the United States.

The DOT Navigation Council and the DOT Radionavigation Working Group will continue in their traditional roles in the oversight of navigation including radionavigation.

Two other DOT agencies have Civil GPS Service functions:

The Federal Aviation Agency (FAA) handles aviation issues, including Notices to Airmen (NOTAM), the National Aviation Standard for GPS, and GPS integrity as it relates to aviation.

The Research and Special Programs Administration (RSPA) handles intermodal navigation issues and planning.

Although the DOT has assumed the principal oversight and management responsibilities for the Civil GPS Service, other federal agencies will play a role. The involvement of Federal agencies, other than those under DOT, will be particularly appropriate with regard to users outside of the navigation community.

THE GLOBAL POSITIONING SYSTEM INFORMATION CENTER (GPSIC)

The GPSIC began providing basic services on a test and evaluation basis in March 1990.

Since then, the GPSIC has improved these services, formalized the information gathering processes and expanded GPSIC operations to meet GPS user needs.

The GPSIC serves as a central point of contact for civil users to make their interests and needs known to the system operator, the Department of Defense, under the management of the U.S. Air Force.

Operated and maintained by the U.S. Coast Guard for the Department of Transportation, the GPSIC is a branch within the U.S. Coast Guard Omega Navigation System Center (ONSCEN) located in Alexandria, Virginia.

The development of the GPSIC is evolving as an extension of the Coast Guard's existing involvement in providing information on worldwide Radionavigation systems. The GPSIC will continue to be responsive to the needs of the user and remain flexible in its implementation plan to ensure that the user's needs are considered when implementing new services or changing existing ones.

The overall implementation effort consists of three phases:

Phase I has been completed: The GPSIC was established at ONSCEN and began operations on a test and evaluation basis in March 1990.

Phase II will coincide with the completion of working level agreements which detail the information passing responsibilities between ONSCEN and the Master Control Station (MCS). We expect to realize a sharp increase in users as the number of satellites increases. In anticipation of this, the GPSIC accomplished the following tasks:

- * Obtained additional personnel
- * Produced user documentation
- * Developed and implemented the GPS Road Show

Phase III will occur when DOD declares the system operational. (Expected in 1993, refer to FRP for details). The increase in the number of satellites as well as users may increase the amount of available information and demand for it. If these major increases occur and we realize a worldwide GPS reference network/interface, the GPSIC may implement a second watch position in order to increase the hours personnel are available to provide real-time information.

The GPSIC is currently in a test and evaluation phase which means:

- * Some services are not on line yet
- * Details of information content and format have not been finalized
- * Changes may be made without prior notice
- * Operational standards have not yet been established for continuity of operation, and allowable time delays

Users of GPS are also cautioned that the Global Positioning System is not yet fully operational. Signal availability and accuracy are subject to change without warning due to an incomplete satellite constellation and operational test activities.

In general, the GPS Information Branch personnel are responsible for the day-to-day operations of

the GPSIC. This includes collecting the information and data required to create the Operational Advisory Broadcast (OAB) and then transforming this information and data into required formats for the various information services accessed by the GPSIC. The GPSIC branch consists of the following personnel:

- * Branch Chief
- * Operations Officer
- * Navigation Information Specialist
- * Telecommunications Specialist
- * Navigation Information Clerk

GATHERING GPS INFORMATION

A Memorandum of Agreement (MOA) establishes policies and procedures for the exchange of GPS status information between the U.S. Space Command (USSPACECOM) and the Coast Guard. This agreement addresses relative roles and responsibilities of each organization. A similar MOA is being drafted between the Air Force and the Coast Guard.

The U.S. Air Force Second Satellite Control Squadron (2SCS), which operates the GPS Master Control Station (MCS) in Colorado Springs, provides the following GPS information for the GPSIC:

Notice Advisory to NAVSTAR Users (NANU) are near real-time operational status capability reports. NANUS are issued to notify users of future, current, or past satellite outages, system adjustments, or any condition which might adversely affect users. NANUS are generated by 2SCS as events occur.

GPS Status Message contains general information that is downloaded daily from the 2SCS's bulletin board. The message contains information about the satellite orbit (plane/slot), clocks, and current or recent NANUS. Status Messages are generated by 2SCS once a day Monday through Friday.

Almanacs contain the orbital information and clock data of all the satellites. The almanac for all satellites can be obtained from downloading the continuously transmitted data stream from any satellite.

In addition to receiving information from the MCS, the GPSIC works with representatives of National Geodetic Survey (NGS) to offer NGS computed precise GPS orbit data to the public via the GPSIC bulletin board.

NGS provides data products "SP3" (in ASCII format) and "EF18" (in binary format). In the past NGS distributed this information to some users on diskettes by mail.

Precise ephemeris data describes the orbit of each satellite as observed by numerous ground stations. It is useful in making a refined determination of where the satellites were at some time in the past. For more information about Precise Ephemeris Data contact:

National Geodetic Information Branch (N/CG174)
Charting and Geodetic Services
National Ocean Service
National Oceanic and Atmospheric Administration
Rockville, MD 20852
Telephone: (301) 443-8631

Features of the GPSIC services are created and improved in response to suggestions from our users. The GPSIC will continue to work with GPS organizations to ensure the continuation and development of the best possible user services. Specifically, the GPSIC will:

- * Maintain liaison with other U.S. Government agencies as necessary to sustain GPS system status, technical information exchange and resource availability
- * Maintain liaison with the Civil GPS Interface Committee and international civil GPS organizations to establish the requirements for GPS information exchange.

DISSEMINATING GPS INFORMATION

The GPSIC sends GPS status information to civil users through Operational Advisory Broadcasts (OAB). These broadcasts contain the following general categories of GPS performance data:

- * Current constellation status
- * Recent outages
- * Scheduled outages
- * Almanac data

The Operational Advisory Broadcast (OAB) consists of textual matter containing the GPS performance data listed above. Conditions that impair the GPS for navigational purposes receive special attention and wide distribution.

The Operational Advisory Broadcast is updated by the GPSIC staff at a minimum of once per day Monday through Friday except Federal Holidays. OAB's are updated more frequently if information on changes in the constellation are received prior to 4:00 p.m. EST. The following table outlines the update schedule for sources of GPS information received by the GPSIC:

| SOURCE | UPDATE SCHEDULE |
|----------------|--|
| NANU | The GPS staff processes NANUS received during GPSIC working hours as soon as possible. NANUS received after hours or on weekends are processed immediately the next normal working morning. |
| STATUS MESSAGE | The GPSIC watchstanders access this information at 1300 EST Monday through Friday except Federal Holidays. |
| ALMANAC | The almanac is distributed once a week or when changes that appreciably affect system coverage occur. |
| NGS | NGS provides the precise ephemeris data to the GPSIC two weeks after the period it describes. Data will be updated weekly. Data sets from at least the last six weeks will be posted on the GPSIC BBS. |

The Operational Advisory Broadcast is disseminated through the following media:

- * GPSIC Computer Bulletin Board System (BBS)
- * GPSIC 24-Hour Status Recording
- * WWV/WWVH worldwide high-frequency radio broadcasts
- * Coast Guard Marine Information Broadcasts (MIB)
- * DMAHTC Broadcast Warnings
- * DMAHTC Weekly Notice to Mariners
- * DMA Navigation Information Network (NAVINFONET)
- * NAVTEX Data Broadcast

Some of these services have limited time or space available for GPS information. The following paragraphs describe each service and the GPS information available.

GPSIC BULLETIN BOARD SYSTEM (BBS)

The GPSIC Bulletin Board System (BBS) provides information in data format via telephone modem. The only costs associated with the service are the fees charged by the user's phone company for the telephone call.

The GPSIC BBS connection information is contained in the following table:

| PHONE NUMBER | SPEED | PROTOCOL | MODEM |
|----------------|-------|---------------|-----------------------|
| (703) 866-3890 | 300 | Bell 103 | Supra-Modern |
| | 1200 | Bell 212A | |
| | 2400 | CCITT V.22bis | 2400 |
| (703) 866-3894 | 1200 | CCITT V.22bis | Digicom Systems, Inc. |
| | | CCITT V.22 | |
| | | Bell 212A | |
| | 2400 | CCITT V.22bis | 9624 |
| | 4800 | CCITT V.32 | |
| | 9600 | CCITT V.32 | |

The main body of information within the bulletin board is contained in Subject Information Groups (SIGS). These are a collection of bulletins, some of which have attached files. They contain all of the GPSIC's information about GPS. The following table provides a description of the SIGS:

| SIG | DESCRIPTION |
|---------|---|
| HELLO | Short introduction to the SIGS, Plus background and miscellaneous information, CGSIC announcements, Road Show schedule. |
| SUMMARY | Summaries of recent events, outages. |
| NANU | Notice Advisory to NAVSTAR Users messages. 30 most recent NANUS messages maintained on BBS. |
| ALMANAC | Data describing the orbit of each satellite. Previous 3 months data maintained on BBS. |
| SEM | Almanacs formatted for use by the System Effectiveness Model (SEM) software V 3.5. |
| STATUS | Contains excerpts from Operational Control's stsus message. |
| OMEGA | U.S. Coast Guard weekly status summaries for the Omega radio-navigation system. (An independent system, not part of GPS.) |
| NGS | Precise ephemeris data from NGS. Contains 8 day segments. |

The size of the GPSIC data files are as follows:

| | |
|-------------------------------|------|
| * NANU (batch of 10) | 7K |
| * NANU (single) (estimated) | 1K |
| * Status Message | 2K |
| * Almanac (16 satellites) | 10K |
| * Almanac (24 satellites) | 15K |
| * SEM Almanac (16 satellites) | 4K |
| * SEM Almanac (24 satellites) | 6K |
| * Precise Ephemeris SP2 | 274K |
| * Precise Ephemeris SP3 | 371K |
| * Precise Ephemeris EF13 | 80K |
| * Precise Ephemeris EF18 | 110K |

The GPSIC BBS has 8 incoming phone lines with the capability to expand up to 64. The BBS is also accessible via SprintNet. SprintNet is a major public data network (X.25) which enables high-speed, error-free data transfer to most major cities within the United States and a number of locations abroad. The GPSIC BBS net address is: 202 1328.

In order to use SprintNet, an account must be established with Sprint. This involves a connection charge and monthly billing for the service. To obtain more information about setting up an account:

Telephone: U.S. (800) 736-1130
 International (913) 541-6876

An account with a similar network may be able to "gateway" over to SprintNet and access the GPSIC BBS without establishing an account with Sprint. Consult your network representative about how to use the gateway and resulting billing. The more complete gateway net address is: 311020201328.

Users may connect with the GPSIC BBS using the U.S. domestic telephone network or any other dial-up voice grade telephone system that interfaces with it. To connect with the GPSIC BBS, users need:

- * Personal computer
- * Modem
- * Communications software package

The GPSIC BBS can accommodate baud rates from 300 to bits per second (bps). The user has the option of a modem rate setting of 300, 1200, 2400, 4800 or 9600 bps. Regardless of the baud rate selected, the modem should be configured as follows:

- * Asynchronous communications
- * 8 data bits
- * 1 stop bit
- * No parity
- * Full duplex

First time bulletin board users can register on line. Users must provide their names and addresses and establish a user ID and password. The BBS also has a Page System Operator (SysOp) function which allows the user to page the system operator for on line assistance during normal working hours.

GPSIC 24-HOUR GPS STATUS RECORDING

The 24-hour status recording provides information in voice format. The amount of information is strictly limited since the maximum tape length is 92 seconds long.

The telephone number for the status recording is:

(703) 866-3826

The following information is available on the 24-hour status recording depending on the space available. The information is prioritized as listed below:

- * Cautionary
- * Current system status
- * Forecast outages
- * Historical outages
- * Other changes in the GPS

OTHER DISTRIBUTION MEDIA

GPS information available from each of these additional sources is prepared and assembled at the GPSIC. These sources were chosen because they were already established to provide other types of information. Most of these services are already used by a portion of the GPS user community, primarily marine navigators. These services offer significant advantages in coverage and accessibility. The following section provides:

- * Description of each information source
- * Type of GPS information available
- * How the user can obtain the GPS information

WWV/WWVH: Since 1923, the National Institute of Standards and Technology (NIST), formerly National Bureau of Standards, has provided a highly accurate time service to the national and

international time and frequency community. NIST currently broadcasts continuous signals from its high frequency radio stations. Services provided by WWV/WWVH include:

- * Time announcements
- * Standard time intervals
- * Standard frequencies
- * Geophysical alerts
- * Marine storm warnings
- * Omega Navigation System status reports
- * Universal Time Coordinated (UTC) time corrections
- * BCD time code
- * GPS information

GPS information is broadcast in voice on WWV/WWVH at the following times and frequencies:

| STATION | LOCATION | FREQUENCY | TIME |
|---------|---------------------------|--------------------------|----------------------|
| WWV | Fort Collins, Colorado | 2.5, 5, 10 15, 20 MHz | Minutes 14 and 15 |
| WWVH | Kauai, Hawaii | 2.5, 5, 10 15 MHz | Minutes 43 and 44 |

The time for the WWV/WWVH GPS broadcast is strictly limited. Depending on the space available the GPS information is prioritized as listed below:

- * Cautionary
- * GPSIC operating hours and phone number
- * Current system status
- * Forecast outages
- * Other changes in GPS Status

USCG AND DMA MIB: USCG Marine Information Broadcasts and DMA Broadcast Warnings are methods by which important maritime navigation information is disseminated in the most expedient manner. This system covers a variety of topics of interest to mariners including:

- * Status of navigation aids
- * Weather
- * Search and Rescue (SAR) operations
- * Military exercises
- * Marine obstructions
- * Ice reports
- * Changes in channel conditions
- * Important bridge information

Within the United States, the U.S. Coast Guard and the Defense Mapping Agency Hydrographic-Topographic Center (DMAHTC) are responsible for broadcasting navigation information described above. Each agency has a particular geographic area of responsibility:

| AGENCY | AREA OF RESPONSIBILITY | | | | |
|-------------|--|------------|---|-------------|---|
| USCG | Local and coastal navigation information broadcasts from sources within the U.S and its possessions. | | | | |
| DMAHTC | Long-range navigation broadcasts from countries within the NAVAREA IV and NAVAREA XII. | | | | |
| | <table border="1"> <tr> <td>NAVAREA IV</td><td>Covers the Atlantic coast eastward to 35 degrees W.</td></tr> <tr> <td>NAVAREA XII</td><td>Covers the Pacific coast westward to 172 degrees E.</td></tr> </table> | NAVAREA IV | Covers the Atlantic coast eastward to 35 degrees W. | NAVAREA XII | Covers the Pacific coast westward to 172 degrees E. |
| NAVAREA IV | Covers the Atlantic coast eastward to 35 degrees W. | | | | |
| NAVAREA XII | Covers the Pacific coast westward to 172 degrees E. | | | | |

The Coast Guard provides vital maritime information in voice format via an established system of VHF and HF radio broadcasts. These Marine Information Broadcasts (MIB) include the following types of messages:

Urgent Messages concern the safety of a person, ship, aircraft or other vehicle.

Safety Messages contain important navigational or meteorological warnings that cannot be delayed because of hazardous conditions.

Scheduled Broadcasts include:

- * Notice to Mariners (NTM)
- * Hydrographic information
- * Storm warnings
- * Advisories
- * Other important marine information
- * Safety and urgent messages which remain in effect

Cancellation Messages are sent by the originator to cancel previous broadcast when action is no longer necessary.

USCG Marine Information Broadcasts are issued via voice and continuous wave (CW) transmissions. The following table outlines the MIB frequencies:

| STATION | COVERAGE |
|----------------------------|---|
| VHF-FM Cha 16 Ch 22A | Information that applies to inland waters seaward to 25 nautical miles. |
| MF 2182 kHz 2670 kHz | Duplicate VHF-FM broadcasts and additionally covers waters out to 200 nautical miles. |
| HF-CW 500kHz | Info that applies for waters from the coastline to 200 nautical miles. |

Broadcasts are scheduled several times a day depending on the location of the broadcasting site. Stations designated to make regularly scheduled broadcasts are listed in the *Coast Guard Radio Frequency Plan*. The length of messages broadcast is kept to a minimum.

DMAHTC is responsible for broadcasting navigation information concerning the "high seas" Information is provided in message format via an established system of message dissemination. DMA broadcasts are known as NAVAREA, HYDROLANT, or HYDROPOAC and are generally geared to the deep draft mariner.

DMAHTC also publishes a weekly Notice to Mariners (NTM) containing USCG Marine Information Broadcasts and DMA Broadcast Warnings for a seven day period.

GPS status information is found in Section III of the Notice to Mariners, which summarizes voice or data broadcast warnings.

Additional information on the DMA Notice to Mariners Information is available from:

Director, Defense Mapping Agency
Hydrographic/Topographic Center
Attention: MCNM
6500 Brokes Lane
Washington, DC 20315-0030
Telephone: (301) 227-3126

DMA NAVINFONET: In carrying out its mission to produce Notices to Mariners, DMA has developed a data base called Automated Notice to Mariners System (ANMS). This data base contains information dealing with navigational safety. It is a supplemental source of up-to-date maritime information for the user. The software developed for this data base provides remote query capabilities which DMA makes available to the entire maritime community through the Navigation Information Network (NAVINFONET). NAVINFONET provides information in data format via telephone modem. Information includes:

- * Chart Corrections
- * Broadcast Warnings
- * MARAD Advisories
- * DMA List of Lights
- * Anti-Shipping Activities Messages
- * Oil Drill Rig locations
- * Corrections to DMA Hydrographic Product Catalogs
- * U.S. Coast Guard Light Lists & GPS

The following GPS information is available from the DMA NAVINFONET under item 8 in the bulletin board menu:

- * Cautionary
- * Current system status
- * Forecast outages
- * Historical outages
- * Almanac data
- * Civil GPS Service information

Users must register for the NAVINFONET bulletin board off-line before they will be granted access to the system. For a user ID and information book contact DMA at the address listed above:

Attention: MCN/NAVINFONET

Telephone: (301) 227-3296

NAVTEX: NAVTEX is an internationally adopted radio telex system used to broadcast marine navigational warnings and other safety related information to ships. This system assures worldwide coverage by transmitting on an international frequency of 518 KHz. Vessels' NAVTEX receiver/teleprinters are permanently tuned to the worldwide frequency and remain on standby to receive and print out all the messages automatically. Navigation information broadcasted through NAVTEX includes:

- * Notices to mariners
- * Weather warnings and forecasts
- * Ice warnings
- * Other marine information

Coast Guard Atlantic and Pacific Area Commanders coordinate NAVTEX broadcasts transmitted by all Coast Guard Communications. NAVTEX messages are normally broadcasted four times a day which may be increased to six broadcasts with a maximum duration of 40 minutes.

NAVTEX messages are categorized by subject area. GPS status messages are currently available in NAVTEX category "K"; Other Electronic Navaid System messages. GPS information available from NAVTEX includes the following:

- * Cautionary
- * Current system status
- * Forecast outages
- * Other changes in GPS Status

ADDITIONAL GPSIC SERVICES

The GPSIC publishes documents which provide detailed information about GPS, other radionavigation systems, the GPS Information Center and how to obtain these services. The following table describes the GPSIC publications available:

| PUBLICATION | DESCRIPTION |
|-------------------------|--|
| GPSIC BROCHURE | Describes information services provided by the GPSIC |
| GPSIC USERS' MANUAL | Provides detailed instruction on the access and use of the services available at the GPSIC |
| GPS/RA POSTCARDS | Lists publications available on a self addressed postcard |
| GPS FACTS & FIGURES | Describes the system, its concept, accuraccies and applications |
| OMEGA FACTS & FIGURES | Describes the Omega radionavigation system |
| LORAN-C FACTS & FIG | Describes LORAN-C |
| RADIOBEACON Facts & FIG | Describes Radiobeacons. |

The GPSIC distributes documents provided by other GPS interested organizations. The following table describes other GPS publications available through the GPSIC:

| PUBLICATION | PUBLISHER | DESCRIPTION |
|---------------------------------------|-----------------------|---|
| NAVSTAR GPS USER EQUIPMENT | JPO | Describes the system, equipment applications & capabilities |
| GPS NAVSTAR OVERVIEW | JPO | Provides general information about GPS |
| GPS A GUIDE TO THE NEXT UTILITY | Trimble Navigation | Describes what GPS is and how it works |

The GPSIC no longer distributes copies of the ICD-200. The revised Public Release Version of this document is available through the GPS Joint Program Office. For more information contact:

CDR Dennis McLean, USCG
Space Division MZT
PO Box 92960 WPC
Los Angeles, CA 90009-2960
Phone: (213) 363-0354
Fax: (213) 363-2930

In an effort to make the public aware of the services offered by the GPSIC, the GPSIC sets up a GPS display at trade shows throughout the United States. The display includes a model of a satellite and rocket loaned by GE Astrospase and McDonnell Douglas respectively. The GPSIC staff distributes brochures and answers questions about GPS in order to educate users about the system.

The GPSIC responds to individual user inquiries, comments, and concerns about civil access to, and use of the GPS. The GPSIC fields requests for information Monday though Friday from 8:00 a.m. to 4:00 p.m. Eastern Standard Time. Most inquiries can be answered immediately over the phone. Some technical questions or requests are referred to a more authoritative source.

If you would like to comment on any of these services or ask questions about present or future services write to:

Commanding Officer (GPSIC)
US Coast Guard Omega Navigation System Center
7323 Telegraph Road
Alexandria, Virginia 22310-3998
Or call (703) 866-3806

An answering machine records messages after working hours. Messages are normally returned the following workday.

FUTURE PLANS FOR GPSIC

The Coast Guard plans to evaluate the possibility of expanding the GPS Information Center into a Radionavigation or Navigation Information Center. As such, the Information Center would provide navigation information on all navigation systems involving the Coast Guard both nationally and internationally.

Information concerning other radionavigation systems the Coast Guard is involved with would be posted on the BBS. As a first step in this direction, the GPSIC currently provides the Omega weekly status message on the BBS.

DIFFERENTIAL GPS (DGPS)

Consistent with its role as the civil interface for GPS, the U.S. Coast Guard has a research and development project to develop an extension of GPS, known as differential GPS (DGPS). This is an enhancement to the Standard Positioning Service which should achieve accuracies of 10 meters or better for civil users in the maritime regions of the United States.

Based on encouraging results of operational testing of a prototype reference station, a project has been initiated to implement DGPS in U.S. near-coastal areas to improve upon current harbor and harbor-approach navigation accuracy. Project plans are being formulated. Additional prototypes began operation during September/October 1991. If fully funded, an operational system is expected by the end of 1995.

For additional information on DGPS, contact:

Commandant (G-NRN)
U.S. Coast Guard
2100 2nd Street, S.W.
Washington, DC 20593
Telephone: (202) 267-0283
Fax: (202) 267-4427

PRECISE POSITIONING SERVICE PROGRAM OFFICE (PPSPO)

The Precise Positioning Service Program Office (PPSPO) will administer civil applications and collect fees for access to encoded PPS capabilities.

The Government will publish detailed guidance for users interested in requesting access to PPSPO once policy is established for the following:

- * Submitting applications
- * Granting approval for user access
- * Establishing operational procedures and compliance requirements for accessing data from the GPS PPS

The Federal Radionavigation Plan (FRP) contains general criteria for qualified civil use of PPS.

Access determination will be made on a case by case basis. The following criteria may be refined as Government policy is developed:

- * Access is in the U.S. national interest
- * Security requirements can be met
- * There are no other means reasonably available to the civil user to obtain a capability equivalent to that provided by the GPS PPS

For additional information on the PPSPO, contact Commandant (G-NRN) at the address listed above or call:

Telephone: (202) 267-0298

CIVIL GPS SERVICE INTERFACE COMMITTEE (CGSIC)

The roles of the Civil GPS Service Interface Committee (CGSIC) are to:

- * Provide a forum for exchanging technical information in the civil GPS user community regarding GPS information needs
- * Identify types of information and methods of distribution to the civil GPS user community
- * Identify any issues that may need resolution by the CGS program office

The CGSIC will work with the following organizations:

- * U.S. Coast Guard Office of Navigation Safety and Waterway Services (Civil GPS Program Office)
- * DOT Navigation Working Group
- * Joint DOD/DOT Radionavigation Working Group

The Civil GPS Service Interface Committee is comprised of representatives from relevant private, government, and industry user groups, both U.S. and international.

The CGSIC consists of:

- * General Committee
- * Five Subcommittees

The Committee is jointly chaired by the U.S. Coast Guard and the DOT Research and Special Programs Administration (RSPA). The joint chair is based on the USCG being DOT's lead agency for the civil GPS service which includes the government's interface with civil GPS users, and RSPA's responsibility to coordinate intermodal navigation planning with DOD.

The Civil GPS Service Interface Committee may create subcommittees to identify specific areas of civil GPS user information needs and facilitate technical information exchange as required. Standing subcommittees have been established for:

- * Surveying and Positioning Information
- * Timing Information
- * International Information
- * Reference Station, Technology, and Applications
- * Real-time Carrier Phase Applications

The International Information Subcommittee (IISC) of the Civil GPS Service Interface Committee is investigating the feasibility of a regional international information media. The GPSIC would provide the OAB into an electronic mailbox designated, controlled, and financed by the IISC.

The Civil GPS Service Interface Committee meets as necessary to exchange technical information regarding civil GPS information needs.

For additional information on the CGSIC, contact:

Volpe National Transportation Systems Center (VNTSC)
55 Kendall Square
Cambridge, MA 02142-1093
Telephone: (617) 494-2432
Fax: (617) 494-2628

FEDERAL RADIONAVIGATION PLAN (FRP)

The Federal Radionavigation Plan contains the official statement of government policy on civil use of GPS. This plan covers other government operated radionavigation systems in addition to GPS. Information provided includes:

- * Policy and plans for the future radionavigation systems mix
- * GPS System description
- * Table of SPS and PPS signal characteristics
- * Various other topics

In order to obtain the user's perspective on Federal policies and future plans for U.S. Government provided radionavigation systems, the DOT conducts open meetings for all interested persons. Users are encouraged to attend FRP conferences to provide inputs for the 1992 edition. FRP Conferences are scheduled for Alexandria, Virginia in November and Seattle, Washington in December. For more information on these conferences, contact: Volpe National Transportation Systems Center (VNTSC) at the address listed above attention:

Conference Office (DTS-930)
Telephone: (617) 494-2307

Navigation systems that will be discussed at these conferences include:

- * Loran-C
- * Omega
- * Transit
- * Radiobeacons
- * VOR/DME
- * MLS/ILS
- * GPS

ACKNOWLEDGMENTS

The author wishes to express appreciation to the GPSIC and Omega staff who helped in preparing and updating this manuscript. This paper has been updated as of 30 October 1991.

REFERENCES

- Bennett, CDR Verne and David J. Pietraszewski, The U.S. Coast Guard Civil GPS Program, 1990.
- Civil GPS Service Interface Committee, Charter For The Civil GPS Service Interface Committee (CGSIC), 1991.
- Defense Mapping Agency Hydrographic/Topographic Center, Navigation Information Network Users Manual, 1990.
- Defense Mapping Agency Hydrographic/Topographic Center, Notice to Mariners No. 32, 1991.
- Department of Defense & Department of Transportation, Federal Radionavigation Plan, U.S. Government Printing Office, 1990.
- Desilets, CWO Gary E., The U.S. Coast Guard's Role in the Civil GPS Service, Coast Guard Omega Navigation System Center, 1991.
- Omega Navigation System Center, GPS Operations Manual, ONSCEN Instruction 16575, Coast Guard Omega Navigation System Center, 1991.
- Radio Technical Commission For Maritime Services, Maritime Navigational Safety Information Sources, RTCM, 1991.
- U.S. Coast Guard, Global Positioning System Program Plan Civil GPS Service, U.S. Coast Guard Printing Office, 1991.
- U.S. Coast Guard GPSIC, GPS Information Center, U.S. Coast Guard Printing Office, 1990.
- U.S. Coast Guard GPSIC, GPS Information Center Users Manual, U.S. Coast Guard Printing Office, 1990.
- U.S. Coast Guard, Telecommunications Manual (TCM), COMDTINST M2000.3B, U.S. Coast Guard Printing Office, 1988.
- U.S. Space Command, U.S. Coast Guard, Memorandum of Agreement: Distribution of NAVSTAR Global Positioning System (GPS) Status Information, 1990.

THE GPSIC QUICK REFERENCE OAB DISTRIBUTION

The GPS Information Center provides the Operational Advisory Broadcasts through the following services:

| SERVICE | AVAILABILITY | INFO TYPE | CONTACT NUMBER |
|--|--------------------------------|--|--|
| GYPSIC WATCHSTANDER WATCH-STANDER | 8AM-4PM Monday through Friday | USER INQUIRIES | (703) 866-3806 FAX (713)866-3825 |
| GYPSIC COMPUTER BULLETIN BOARD SERVICE | 24 hours | STATUS FORE/HIST OUTAGES NGS DATA OMEGA/FRP MISC INFO | (703) 866-3890 300-2400 BAUD (703) 866-3894 UP TO 9600 BAUD Sprintnet (x.25) 202-1328 |
| GYPSIC VOICE TAPE RECORDING | 24 hours | STATUS FORECASTS HISTORIC | (703) 866-3826 |
| WWV | Minutes 14 & 15 | STATUS FORECASTS | 2.5, 5, 10, 15 and 20 MHz |
| WWVH | Minutes 43 & 44 | STATUS FORECASTS | 2.5, 5, 10 15 MHz |
| USCG MIB MIB | When broadcasted | STATUS FORECASTS | VHF Radio, marine band |
| DMA BROADCAST WARNINGS BROADCAST WARNINGS | When broadcasted | STATUS FORECASTS OUTAGES | |
| DMA WEEKLY NOTICE TO MARINERS | Published & mailed weekly | STATUS FORECASTS OUTAGES | (301) 227-3126 |
| DMA NAVINFONET AUTOMATED NOTICE TO MARINERS SYSTEM | 24 hours | STATUS FORECASTS HISTORIC ALMANACS FOR MORE INFO CALL | (301) 227-3351 300 BAUD (301) 227-5925 1200 BAUD (301) 227-4360 2400 BAUD (301) 227-3296 |
| NAVTEX DATA BROADCAST | When broadcasted 4-6 times/day | STATUS FORECAST OUTAGES | 518 kHz |

