AUTHORITY	DESCRIPTION	DATE
RFC-00177	Incorporation of IRN-001, 003, 004	24-SEP-2013

DISTRIBUTION STATEMENT A: Approved For Public Release; Distribution Is Unlimited

APPROVALS

Prepared By: Stephan Hillman **Checked By: Sam Vasquez**

AUTHORIZED SIGNATURES	REPRESENTING	DATE
	GPS Directorate Space & Missile Systems Center (SMC) – LAAFB	10 OCT 13
	Department of Homeland Security (DHS), United States Coast Guard (USCG), Navigation Center (NAVCEN)	
	Department of Transportation (DOT), Federal Aviation Administration (FAA)	
	Raytheon Company	
	AFSPC/ 50th Space Wing	

INTERFACE CONTROL DOCUMENT

UNLESS OTHERWISE SPECIFIED: NUMBERS ARE REPRESENTED IN DECIMAL FORM.

THIS DOCUMENT SPECIFIES TECHNICAL REQUIREMENTS AND NOTHING HEREIN CONTAINED SHALL BE DEEMED TO ALTER THE TERMS OF ANY CONTRACT OR PURCHASE ORDER BETWEEN ALL PARTIES AFFECTED

Interface Control Contractor:
Leidos Inc GPS SE&I
300 N. Sepulveda Blvd., Suite 3000
El Segundo, CA 90245

ICD TITLE:
NAVSTAR GPS Control Segment to User Support Community Interfaces

SIZE A	CODE IDENT 5UTE0	ICD NO. ICD-GPS-870
SCALE: N/A	REV: B	

AUTHORITY	DESCRIPTION	DATE
RFC-00177	Incorporation of IRN-001, 003, 004	24-SEP-2013

DISTRIBUTION STATEMENT A: Approved For Public Release; Distribution Is Unlimited

APPROVALS

Prepared By: Stephan Hillman **Checked By: Sam Vasquez**

AUTHORIZED SIGNATURES	REPRESENTING	DATE
	GPS Directorate Space & Missile Systems Center (SMC) – LAAFB	
John J Burns III, CDR, USCG	Department of Homeland Security (DHS), United States Coast Guard (USCG), Navigation Center (NAVCEN)	19 NOV 13
	Department of Transportation (DOT), Federal Aviation Administration (FAA)	
	Raytheon Company	
	AFSPC/ 50 OG	

INTERFACE CONTROL DOCUMENT

UNLESS OTHERWISE SPECIFIED: NUMBERS ARE REPRESENTED IN DECIMAL FORM.

THIS DOCUMENT SPECIFIES TECHNICAL REQUIREMENTS AND NOTHING HEREIN CONTAINED SHALL BE DEEMED TO ALTER THE TERMS OF ANY CONTRACT OR PURCHASE ORDER BETWEEN ALL PARTIES AFFECTED

Interface Control Contractor:
Leidos Inc GPS SE&I
300 N. Sepulveda Blvd., Suite 3000
El Segundo, CA 90245

ICD TITLE:
NAVSTAR GPS Control Segment to User Support Community Interfaces

SIZE A	CODE IDENT **5UTE0**	ICD NO. **ICD-GPS-870**
SCALE: N/A	REV: **B**	

AUTHORITY	DESCRIPTION	DATE
RFC-00177	Incorporation of IRN-001, 003, 004	24-SEP-2013

DISTRIBUTION STATEMENT A: Approved For Public Release; Distribution Is Unlimited

APPROVALS

Prepared By: Stephan Hillman **Checked By: Sam Vasquez**

AUTHORIZED SIGNATURES	REPRESENTING	DATE
	GPS Directorate Space & Missile Systems Center (SMC) – LAAFB	
	Department of Homeland Security (DHS), United States Coast Guard (USCG), Navigation Center (NAVCEN)	
Hank Shelli	Department of Transportation (DOT), Federal Aviation Administration (FAA)	4 Nov 2013
	Raytheon Company	
	AFSPC/ 50 OG	

INTERFACE CONTROL DOCUMENT

UNLESS OTHERWISE SPECIFIED: NUMBERS ARE REPRESENTED IN DECIMAL FORM.

THIS DOCUMENT SPECIFIES TECHNICAL REQUIREMENTS AND NOTHING HEREIN CONTAINED SHALL BE DEEMED TO ALTER THE TERMS OF ANY CONTRACT OR PURCHASE ORDER BETWEEN ALL PARTIES AFFECTED

Interface Control Contractor:
Leidos Inc GPS SE&I
300 N. Sepulveda Blvd., Suite 3000
El Segundo, CA 90245

ICD TITLE:
NAVSTAR GPS Control Segment to User Support Community Interfaces

SIZE A	CODE IDENT **5UTE0**	ICD NO. **ICD-GPS-870**
SCALE: N/A	REV: **B**	

AUTHORITY	DESCRIPTION	DATE
RFC-00177	Incorporation of IRN-001, 003, 004	24-SEP-2013

DISTRIBUTION STATEMENT A: Approved For Public Release; Distribution Is Unlimited

APPROVALS

Prepared By: Stephan Hillman **Checked By: Sam Vasquez**

AUTHORIZED SIGNATURES	REPRESENTING	DATE
	GPS Directorate Space & Missile Systems Center (SMC) – LAAFB	
	Department of Homeland Security (DHS), United States Coast Guard (USCG), Navigation Center (NAVCEN)	
	Department of Transportation (DOT), Federal Aviation Administration (FAA)	
	Raytheon Company	15 Jan 2014
	AFSPC/ 50 OG	

INTERFACE CONTROL DOCUMENT

UNLESS OTHERWISE SPECIFIED: NUMBERS ARE REPRESENTED IN DECIMAL FORM.

THIS DOCUMENT SPECIFIES TECHNICAL REQUIREMENTS AND NOTHING HEREIN CONTAINED SHALL BE DEEMED TO ALTER THE TERMS OF ANY CONTRACT OR PURCHASE ORDER BETWEEN ALL PARTIES AFFECTED

Interface Control Contractor:
Leidos Inc GPS SE&I
300 N. Sepulveda Blvd., Suite 3000
El Segundo, CA 90245

ICD TITLE:
NAVSTAR GPS Control Segment to User Support Community Interfaces

SIZE A	CODE IDENT 5UTE0	ICD NO. ICD-GPS-870
SCALE: N/A	REV: B	

AUTHORITY	DESCRIPTION	DATE
RFC-00177	Incorporation of IRN-001, 003, 004	24-SEP-2013

DISTRIBUTION STATEMENT A: Approved For Public Release; Distribution Is Unlimited

APPROVALS

Prepared By: Stephan Hillman **Checked By: Sam Vasquez**

AUTHORIZED SIGNATURES	REPRESENTING	DATE
	GPS Directorate Space & Missile Systems Center (SMC) – LAAFB	
	Department of Homeland Security (DHS), United States Coast Guard (USCG), Navigation Center (NAVCEN)	
	Department of Transportation (DOT), Federal Aviation Administration (FAA)	
	Raytheon Company	
	AFSPC/ 50 OG	29 Oct 13

INTERFACE CONTROL DOCUMENT

UNLESS OTHERWISE SPECIFIED: NUMBERS ARE REPRESENTED IN DECIMAL FORM.

THIS DOCUMENT SPECIFIES TECHNICAL REQUIREMENTS AND NOTHING HEREIN CONTAINED SHALL BE DEEMED TO ALTER THE TERMS OF ANY CONTRACT OR PURCHASE ORDER BETWEEN ALL PARTIES AFFECTED

Interface Control Contractor:
Leidos Inc GPS SE&I
300 N. Sepulveda Blvd., Suite 3000
El Segundo, CA 90245

ICD TITLE:
NAVSTAR GPS Control Segment to User Support Community Interfaces

SIZE A	CODE IDENT 5UTE0	ICD NO. ICD-GPS-870
SCALE: N/A	REV: B	

(This page intentionally left blank.)

REVISION RECORD			
DESCRIPTION		DATE	APPROVED
NC	Initial Release	August 13, 2010	August 13, 2010
Rev A	Update data formats for OCX (RFC-00041), including adding the A-S Status and ESHS files. Add IA requirements (data integrity) for this interface (RFC-00045)	June 15, 2011	November 01, 2011
IRN-870A-001	Incorporates Verification Cross Reference Matrix (VCRM)	September 27, 2012	February 15, 2013
IRN-870A-003	Addition of For Official Use Only Appendix.	January 22, 2013	April 17, 2013
IRN-870A-004	IRN 870A-003 content removed and ICD updated to reflect OCX baseline for generation and dissemination of public release GPS data products.	September 24, 2013	October 10, 2013
Rev B	Incorporates IRNs 870A-001, 870A-003, and 870A-004	September 24, 2013	October 10, 2013

TABLE OF CONTENTS

1 SCOPE 1
1.1 Scope 1
1.2 Key Events and Transition Plans 1
1.3 Interface Control Document Approval and Changes 2
2 APPLICABLE DOCUMENTS 3
2.1 Government Documents 3
2.2 Non-Government Documents 5
3 REQUIREMENTS 6
3.1 Interface Identification 6
3.1.1 GPS Control Segment 15
3.1.2 GPS User and User-support communities 16
3.2 Interface Definitions 16
3.2.1 Generation of Almanac Data 16
3.2.2 Generation of Operational Advisory Data 16
3.2.3 Generation of NANU Data 17
3.2.4 Generation of Anti-Spoofing (A-S) Status 17
3.2.5 Data Distribution 17
3.3 GPS MCS to GPS User Support Community Data Integrity 17
3.3.1 Digital Signatures 21
4 QUALITY ASSURANCE 21
5 PREPARATION FOR DELIVERY 24
6 NOTES 24
6.1 Acronyms and Abbreviations 24
7 APPROVAL 27
8 TBD 27
9 TBD 27
10 APPENDIX 1: NANU DATA FORMATS 27
10.1 Notice Advisory to Navstar Users 27
10.1.1 Scheduled Outages 28
10.1.2 Unscheduled Outages 32
10.1.3 General NANU Messages 34
10.1.4 Other Messages 35

10.2 NANU Notification Times 37
10.3 NANU Message Format 38
10.3.1 NANU Header 39
10.3.2 NANU Section 1 39
10.3.3 NANU Section 2 41
10.3.4 NANU Section 3 41
20 APPENDIX 2: OPERATIONAL ADVISORY DATA FILE 42
20.1 Operational Advisory 43
20.2 OA Header. 43
20.3 OA Section 1 44
20.4 OA Section 2 44
20.5 OA Section 3 45
30 APPENDIX 3: ALMANAC DATA FILES 46
30.1 Almanac Description 46
30.2 SEM Almanac Parameters Definition 46
30.3 SV Health Word 46
30.4 SEM Almanac Format 48
30.5 YUMA Almanac Format 54
39 TBD 55
40 APPENDIX 4: EXTENDED SIGNALS HEALTH STATUS FILES 55
40.1 Extended Signals Health Status 55
50 APPENDIX 5: ANTI-SPOOFING STATUS FILE 58
50.1 Anti-Spoofing Status 58
60 APPENDIX 6: LETTERS OF EXCEPTION 60
60.1 Scope 60
60.2 Applicable Documents 60
60.3 Letters of Exception 60

LIST OF TABLES

Table 3-I Information Product Information Exchange Matrix 12
Table 3-II Transition & Support Product Exchange Matrix 13
Table 3-III Mapping Information Products & Transformation Products into Desired Output Format 13
Table 10-I Scheduled Outages 28
Table 10-II Unscheduled Outages 32
Table 10-III Other Types of NANU Messages 35
Table 10-IV NANU Notification Times 38
Table 30-I Six-Bit SV Health Word in Almanac 47
Table 30-II SEM Almanac Description for Current.al3 49
Table 30-II SEM Almanac Description for Current.al3 50
Table 30-III SEM Almanac Description for Current.bl3 51
Table 30-III SEM Almanac Description for Current.bl3 52
Table 40-I Modernized Civil Signals 55

LIST OF FIGURES

Figure 3-1 Generic GPS Product Distribution Process 6
Figure 3-2 GPS Product End User Sequence Diagram 7
Figure 3-3 High Level GPS Product Ontology 8
Figure 3-4 Validate and Transform Utility Ontology 10
Figure 3-5 GPS Product Structure (XML native) 15
Figure 10-1 FCSTDV NANU Message Template 29
Figure 10-2 FCSTMX NANU Message Template 29
Figure 10-3 FCSTEXTD NANU Message Template 30
Figure 10-4 FCSTSUMM NANU Message Template 30
Figure 10-5 FCSTCANC NANU Message Template 31
Figure 10-6 FCSTRESC NANU Message Template 31
Figure 10-7 FCSTUUFN NANU Message Template 32
Figure 10-8 UNUSUFN NANU Message Template 33
Figure 10-9 UNUSABLE NANU Message Template 33
Figure 10-10 UNUNOREF NANU Message Template 34
Figure 10-11 General Message Format 35
Figure 10-12 USABINIT NANU Message Template 36
Figure 10-13 LEAPSEC NANU Message Template 36
Figure 10-14 LAUNCH NANU Message Template 37
Figure 10-15 DECOM NANU Message Template 37
Figure 10-16 NANU Message Template 38
Figure 10-17 NANU Header 39
Figure 10-18 Message Description 40
Figure 10-19 Reference Information 40
Figure 10-20 Satellite Identification Information 40
Figure 10-21 Outage Time 41

Figure 10-22 NANU Section 2 41
Figure 10-23 Contact Information 42
Figure 20-1 Sample Operational Advisory 43
Figure 20-2 OA Header 44
Figure 20-3 OA Section 1 44
Figure 20-4 OA Section 2 45
Figure 20-5 OA Section 3 45
Figure 30-1 SEM Data Sample for Current.al3 49
Figure 40-1 Extended Signals Health Status Data Sample 56
Figure 60-1 Letter of Exception 60

ID	ICD-GPS-870 RevB (24 Sep 2013) Navstar GPS Control Segment to User Support Community Interfaces
ICD870-1	# 1 SCOPE
ICD870-2	## 1.1 Scope
ICD870-3	This Interface Control Document (ICD) defines the Public Release products generated by the Global Positioning System (GPS) Control Segment (CS) and the GPS public User community during the GPS Next Generation Operational Control System (OCX) era. This ICD describes the GPS products provided by the CS and the means by which these GPS products are distributed.
ICD870-5	The GPS CS is operated by the 2d Space Operations Squadron (2 SOPS), administratively organized under 50th Space Wing (50 SW). The GPS User and User-support communities are comprised of the Department of Homeland Security (DHS) United States Coast Guard (USCG); Department of Transportation (DOT), Federal Aviation Administration (FAA); other Civil Users; and various GPS Users.
ICD870-4	All GPS products and tools described in this ICD are unclassified and are publicly releasable per the current GPS CS mode of operations and the 50th SW Memorandum for Record - 2 SOPS GPS Public Release Policy.
ICD870-303	In order to support Users who may not be able to update their code, the ASCII text file formats, as defined in Appendices 1-5, are not changing and ASCII text file Users are assured that they can continue to use these file types in the OCX era without changes to their systems. At the same time, the GPS CS announces that it has deprecated the ASCII text file formats and does not intend to make any future updates to these formats. Instead, any future additions or changes will only be captured in the modernized XML format messages. The GPS CS will still be required to coordinate a specific timeframe or process in a public ICWG for the removal of a currently supported file format.
ICD870-304	The new or modified file formats: .nnu (updated NANU), .ale (new ESHS), .blm (new YUMA), .bl3 (new SEM), .oa1 (updated OA) , and as2.txt (new A-S Status) handle a larger number of SVNs and/or PRNs and more clearly specify zero padding and whitespace so automated parsing can be done with less assumptions.
ICD870-6	In this document, from here on, the term CS, which stands for Control Segment, will be used instead of OCX (where applicable). In the OCX era, the OCX System will be the GPS Control Segment; therefore, the CS will be performing the functions stated in this ICD.
ICD870-7	## 1.2 Key Events and Transition Plans
ICD870-8	The major milestone for implementation of this document is the initial operating capability of the GPS Next Generation Operational Control System (OCX). The Air Force will prepare for and assess operational readiness of OCX prior to deactivating the legacy control segment (AEP) and declaring OCX Ready to Transition to Operations (RTO).

ID	ICD-GPS-870 RevB (24 Sep 2013) Navstar GPS Control Segment to User Support Community Interfaces
ICD870-643	The following transition strategy will ensure a low risk migration of users from the AEP era products (ICD-GPS-240) to the OCX era products (ICD-GPS-870), and then onward as future updates to OCX products are introduced;
ICD870-644	a) The CS may introduce new products and standards, yet will provide a means for supporting backward compatibility.
ICD870-645	b) New users and early adopters will be encouraged to adopt new products and features.
ICD870-646	c) Existing products within the ICD which are planned for retirement will be deprecated prior to being retired thus providing advance warning for users to initiate and complete migration away from the deprecated products.
ICD870-647	d) Users are encouraged to plan a migration to use the new GPS Products "as is" and thus eliminate the need for transition utilities.
ICD870-648	e) The GPS CS will still be required to coordinate a specific timeframe or process in a public ICWG for the removal of a deprecated product or service with a minimum of 12 months notice.
ICD870-649	The legacy AEP era Internet Web Site to the user community (i.e., ICD-GPS-240), currently https://gps.afspc.af.mil/gps, will be manually maintained for a period of time not less than 6 months following OCX being declared RTO, providing a transition window for public users to migrate from using the legacy 2 SOPS web site to use the USCG Navigation Information Service (NIS).
ICD870-650	In accordance with the CS requirement to be in compliance with the DoD Information Technology Standards Registry (DISR), the CS selected standards from the DISR for the GPS products with the intent to reduce impact to the user community during this transition. As a result, there is a wide variety of development COTS tools available to the users to independently develop tools to process the new GPS Products in their native (i.e., XML) formats. Government agencies are encouraged to work through the GPS Community of Interest (COI) POC for assistance during the transition.
ICD870-9	## 1.3 Interface Control Document Approval and Changes
ICD870-10	The Interface Control Contractor (ICC), designated by the government, is responsible for the basic preparation, approval, distribution, and retention of the ICD in accordance with the Interface Control Working Group (ICWG) charter GP-03-001.
ICD870-11	The following signatories must approve this ICD to make it effective. 1. Air Force Space Command (AFSPC), GPS Directorate (GP) Space and Missile Systems Center (SMC)

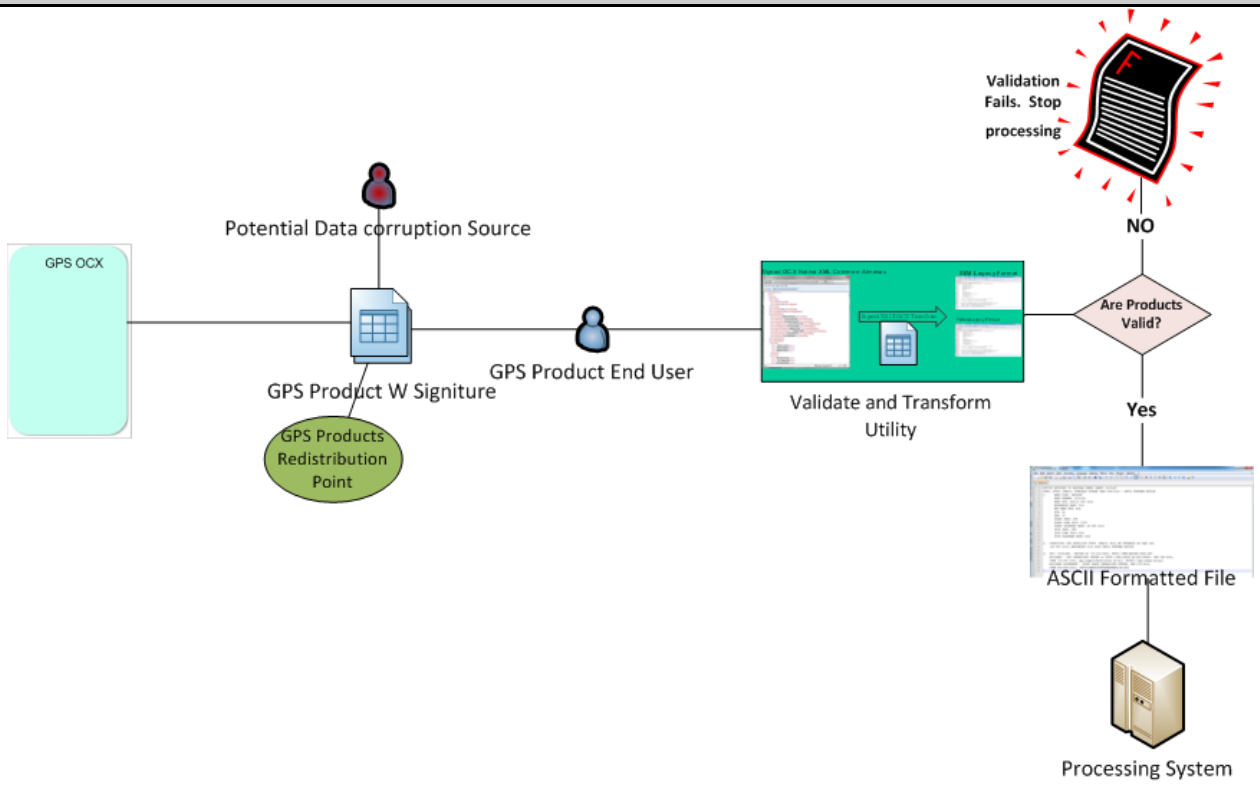
	2. Air Force Space Command (AFSPC), 50th Space Wing (50 SW) 3. Raytheon Company, OCX Contractor 4. Department of Homeland Security (DHS), United States Coast Guard (USCG), Navigation Center (NAVCEN) 5. Department of Transportation (DOT), Federal Aviation Administration (FAA)
ICD870-12	Initial signature approval of this ICD can be contingent upon a letter of exception delineating those items by paragraph numbers that are not a part of the approval. Such letter of exception can be prepared by any of the signatories and must be furnished to the ICC for inclusion in the printed distribution of the officially released version of the ICD.
ICD870-13	Changes to the approved version of this ICD can be initiated by any of the signatories and must be approved by all above signatories. The ICC is responsible for the preparation of the change pages, change coordination, and the change approval by all signatories. Designated signatories can approve proposed changes to this ICD without any increase in the scope of a specific contract by so specifying in a letter of exception. Such letters of exception must be furnished to the ICC for inclusion in the released version of the approved change and in the printed distribution of the approved ICD.
ICD870-14	Whenever all of the issues addressed by a letter of exception are resolved, the respective signatory shall so advise the ICC in writing. When a portion of the exceptions taken by a signatory are resolved (but not all), the signatory shall provide the ICC with an updated letter of exception. Based on such notifications - without processing a proposed interface revision notice (PIRN) for approval - the ICC will omit the obsolete letter of exception from the next revision of the ICD and will substitute the new one (if required).
ICD870-15	The typical review cycle for a PIRN is 45 days after receipt by individual addressees unless a written request for a waiver is submitted to the ICC.
ICD870-16	# 2 APPLICABLE DOCUMENTS
ICD870-17	## 2.1 Government Documents
ICD870-18	The following documents of the issue specified contribute to the definition of the interfaces in this ICD and form a part of this ICD to the extent specified herein.
ICD870-19	Specifications *Federal*

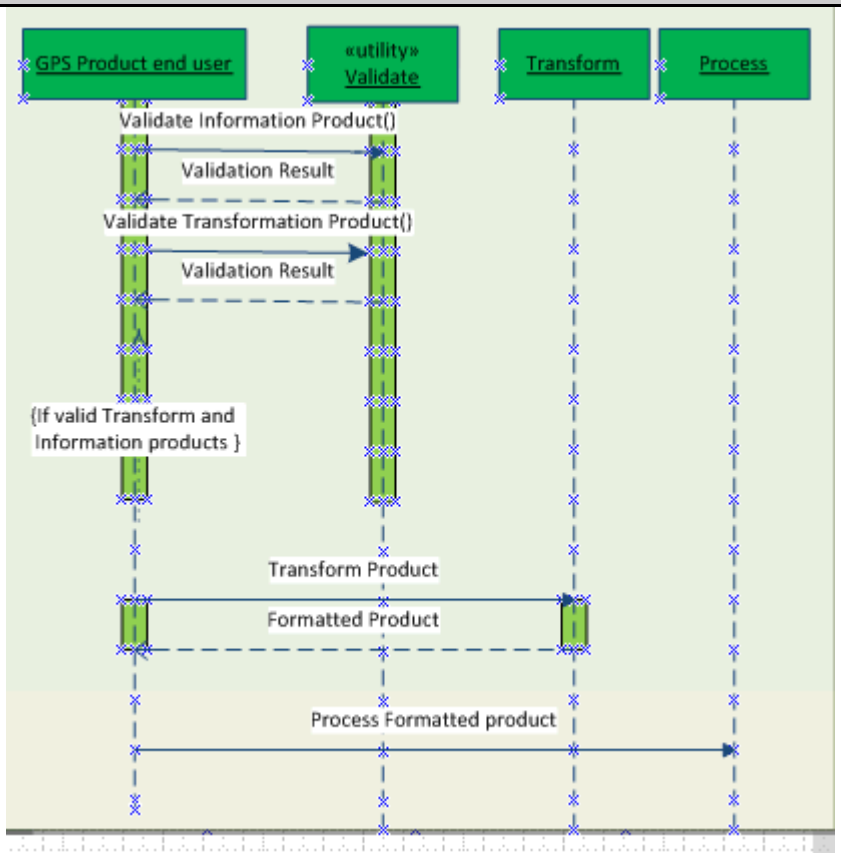
	None *Military* None *Other Government Activity* SS-CS-800 Current Version — GPS III Control Segment Specification Global Positioning Systems Wing (GPSW)
ICD870-20	Standards
ICD870-21	***Federal*** September 2008 — Global Positioning System Standard Positioning Service Performance Standard ***Military*** 23 April 2007 — DODD 8320.02 Data Sharing in a Net Centric Department of Defense July 2008 — DoD Discovery Metadata Specification (DDMS) Version 2.0 September 2010 — Department of Defense Public Key Infrastructure Functional Interface Specification 3.0. 24 May 2011 — Public Key Infrastructure (PKI) and Public Key (PK) Enabling (DoDI 8520.02)
ICD870-22	Other Publications
ICD870-23	IS-GPS-200 Current Version — Navstar GPS Space Segment / Navigation User Interface

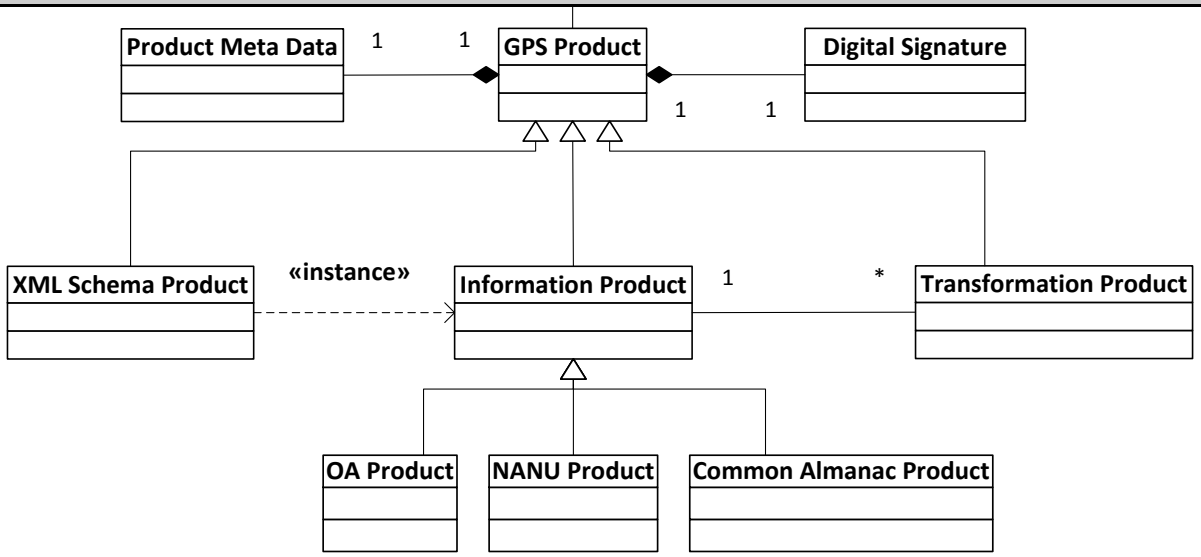
	IS-GPS-705 Current Version	Navstar GPS Space Segment / User Segment L5 Interfaces
	IS-GPS-800 Current Version	Navstar GPS Space Segment / User Segment L1C Interfaces
	GP-03-001A 20 April 2006	GPS Interface Control Working Group (ICWG) Charter
	MOA February 1992	Memorandum of Agreement Between the United States Coast Guard and the United States Space Command, "Distribution of Navstar Global Positioning System (GPS) Status Information" (Signatories: USCG/G-NRN and USSPACECOM/DO)
	MOA February 1996	Support Agreement Between the United States Coast Guard and the United States Air Force Space Command, "Distribution of Navstar Global Positioning System (GPS) Status Information" (Signatories: Commanding Officer NAVCEN and AFSPC/DO)
	MOA February 2010	Memorandum of Agreement between the Joint Functional Component Command for Space the U.S. Coast Guard Navigation Center and the FAA National Operations Control Center with respect to the Support of Users of the Navstar Global Positioning System
	Fiscal Year 2012	Federal Radionavigation Plan
	MFR 30 June 2011	Department of the Air Force, 50th Space Wing (AFSPC) Memorandum for Record - 2 SOPS GPS Public Release Policy
	6 February 2003	DODI 8500.2, Information Assurance (IA) Implementation
	4 May 2011	United States Department of Defense X.509 Certificate Policy

ICD870-24	## 2.2 Non-Government Documents
ICD870-25	The following documents of the issue specified contribute to the definition of the interfaces in this ICD and form a part of this ICD to the extent specified herein.

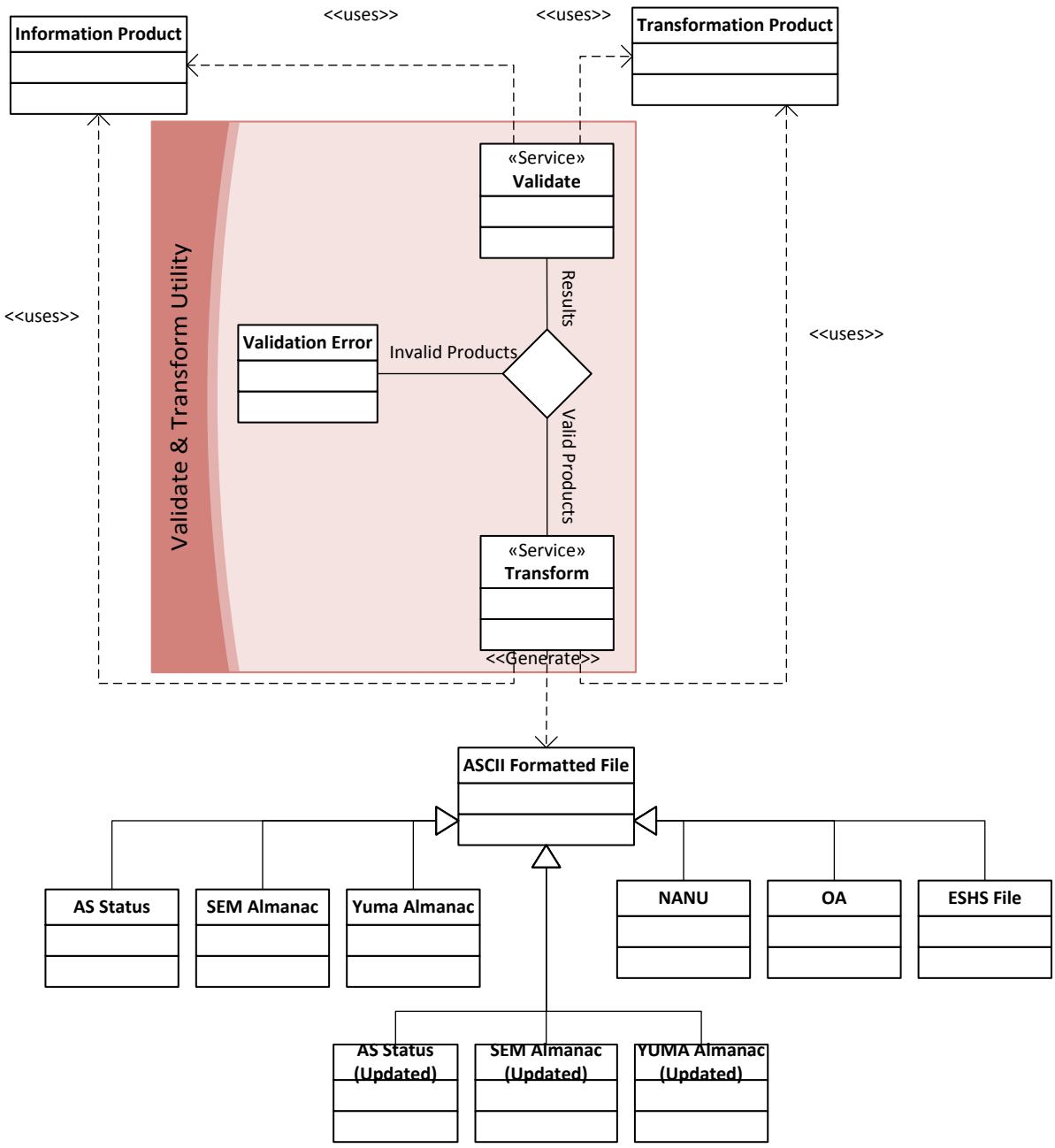
ID	ICD-GPS-870 RevB (24 Sep 2013) Navstar GPS Control Segment to User Support Community Interfaces
ICD870-26	Specifications None
ICD870-27	Standards November 1999 — W3C, XSL Transformations (XSLT) Version 1.0 November 2008 — W3C, Extensible Markup Language (XML) Version 1.0 (Fifth Edition) June 2008 — W3C, XML Signature Syntax and Processing (Second Edition) April 2006 — IETF, RFC4346, The Transport Layer Security (TLS) Protocol Version 1.1 June 1999 — IEFT, RFC 2616, Hypertext Transfer Protocol - HTTP/1.1
ICD870-28	Other Publications None
ICD870-29	**3 REQUIREMENTS**
ICD870-30	**3.1 Interface Identification**
ICD870-651	The GPS Products defined herein will be accessible via the USCG Navigation Information Service (NIS), see section 3.2.5.
ICD870-652	Figure 3-1 depicts a generalized GPS Product Distribution Process which begins with a ***End-User*** interacting with a GPS Product redistribution node (e.g., USCG NIS) to retrieve the desired GPS Products. The diagram reflects that a ***potential data Corruption Source*** actor may introduce data corruption at any time during this re-distribution process. The GPS Product End-User may then validate and/or transform the Information Product before use in a Processing System. The roles of ***Potential Data Corruption Source*** and ***GPS Product End-User*** may be performed by the same or by different individuals.
ICD870-653	**Figure 3-1 Generic GPS Product Distribution Process**

ID	ICD-GPS-870 RevB (24 Sep 2013) Navstar GPS Control Segment to User Support Community Interfaces
ICD870 -654	
ICD870 -659	A GPS Product End User sequence diagram (see figure 3-2) is provided to further explain the intended use of the Validate and Transform Utility provided by the CS. An overview of the activities performed by the GPS Product End User follows; a) Validate - an optional step performed by the end user to ensure that the GPS Products have not been corrupted through the process of redistribution b) Transform - an optional step performed by end users who may need information in the ASCII text file formats before processing c) Process – use the GPS Information typically ingesting files using an end user Automated Information System (AIS)
ICD870 -660	**Figure 3-2 GPS Product End User Sequence Diagram**

ID	ICD-GPS-870 RevB (24 Sep 2013) Navstar GPS Control Segment to User Support Community Interfaces
ICD870-661	
ICD870-662	In accordance with DODD 8320, *Data Sharing in a Net Centric Department of Defense*, this ICD defines and then uses a GPS domain specific information exchange vocabulary which users should adopt when discussing the public GPS products offered by the CS. Figure 3-3 depicts a high level entity relationship diagram summarizing the GPS Product Ontology.
ICD870-663	**Figure 3-3 High Level GPS Product Ontology**

ID	*ICD-GPS-870 RevB (24 Sep 2013) Navstar GPS Control Segment to User Support Community Interfaces*
ICD870 -664	
ICD870 -665	Appendices 1-5 of this ICD documents the minimum information content and formats which are required to achieve backward compatibility compliance. To also ensure compliance with DoD Information Technology Standards and Profile Registry (DISR) and enable rapid discovery, all published GPS Products will be defined using DoD Discovery Metadata Specification (DDMS) compliant meta data and XML compliant data schema. The GPS Ontology and schemas will be published in the USCG NIS web site, currently http://www.navcen.uscg.gov.
ICD870 -713	The GPS CS XML based products will contain data sufficient to derive all ASCII text file content identified in Appendices 1-5.
ICD870 -666	The CS will publish multiple categories of GPS Products including; Information Products, XML Schema Products and Transformation Products. Each GPS Product contains its respective Digital Signature and Product Meta data as shown in Figure 3-3 and Figure 3-5. a) Information Products provide users information about the state/status of the GPS System. b) XML Schema Products define the structure of an XML document associated with this interface. c) Transformation Products can be used to transform an Information Product into one of several formats supporting full backward compatibility with the ASCII text file formats.
ICD870 -31	The CS will publish different kinds of Information Products including; Common Almanac (which now consolidates all previous constellation state/status information), Operational Advisories (OAs), and the Notice Advisory to Navstar Users (NANUs) corresponding to all legacy signals and the new Civil signals L1C, L2C and L5.

ID	*ICD-GPS-870 RevB (24 Sep 2013) Navstar GPS Control Segment to User Support Community Interfaces*
ICD870-305	The CS will provide a downloadable utility for users to validate data integrity and if required to transform an Information Product into backward compatible ASCII file formats (see Appendix 1-5).
ICD870-668	This utility is provided to avoid the need for users to perform near term development prior to transition to the OCX RTO. Figure 3-4 depicts a high level entity relationship diagram summarizing the Validation and Transform Utility Ontology. Users are encouraged to plan a migration to use the new GPS Products in their native (i.e., XML) format and thus eliminate the need for this utility.
ICD870-32	**Figure 3-4 Validate and Transform Utility Ontology**

ID	ICD-GPS-870 RevB (24 Sep 2013) Navstar GPS Control Segment to User Support Community Interfaces
ICD870 -669	
ICD870 -34	The products defined in this ICD are listed in Table 3-I and Table 3-II, in the form of information exchange matrices.
ICD870 -670	The CS provides Information Products as shown in Table 3-I.
ICD870	These Information Products shall conform to the associated published XML schema Product as shown in Table

-671	3-III.
ICD870 -672	The CS provides Transition Utility and Support Products as shown in Table 3-II.
ICD870 -673	Using the Information Products and provided Transformation Products as shown in Table 3-III, the Validate and Transform Utility shall allow the user to validate the digital signature of GPS Products.
ICD870 -674	Given validated inputs, the Validate and Transform Utility shall produce the desired ASCII output as shown in Table 3-III.
ICD870 -675	As shown in Table 3-III, the names of XML Schema Products and associated Transformation Products shall be appended with a revision number (i.e., _vx.y) where "x" indicates the major revision and "y" indicates a minor revision.
ICD870 -676	Minor revisions shall be backward compatible within the same major revision.
ICD870 -35	**Table 3-I Information Product Information Exchange Matrix**

ICD870 -36

Producer	Data Exchange Identification	Information Description	Security
GPS CS	GPS Status Information	Information Product: **NANU (see Table 3-III)**	Unclassified Public Releasable Open Access
GPS CS	GPS Constellation Status Summary	Information Product: **OA (See Table 3-III)**	Unclassified Public Releasable Open Access
GPS CS	GPS Constellation Orbital and Performance Parameters, and SV Signal Health Status GPS Constellation Anti-Spoofing Status	Information Product: **Common Almanac (See Table 3-III)**	Unclassified Public Releasable Open Access

ICD870-677

Table 3-II Transition & Support Product Exchange Matrix

ICD870-678

Producer	Data Exchange Identification	Information Description	Security
GPS CS	XML Schema Definitions specifies content of each GPS Product	**XML Schema Products (See Table 3-III)**	Unclassified Public Releasable Open Access
GPS CS	XML Documents containing XSLT Transformations	**Transformation Products (See Table 3-III)**	Unclassified Public Releasable Open Access
GPS CS	Installable Application	**Validate and Transform Utility (see Table 3-III)**	Unclassified Public Releasable Open Access

ICD870-679

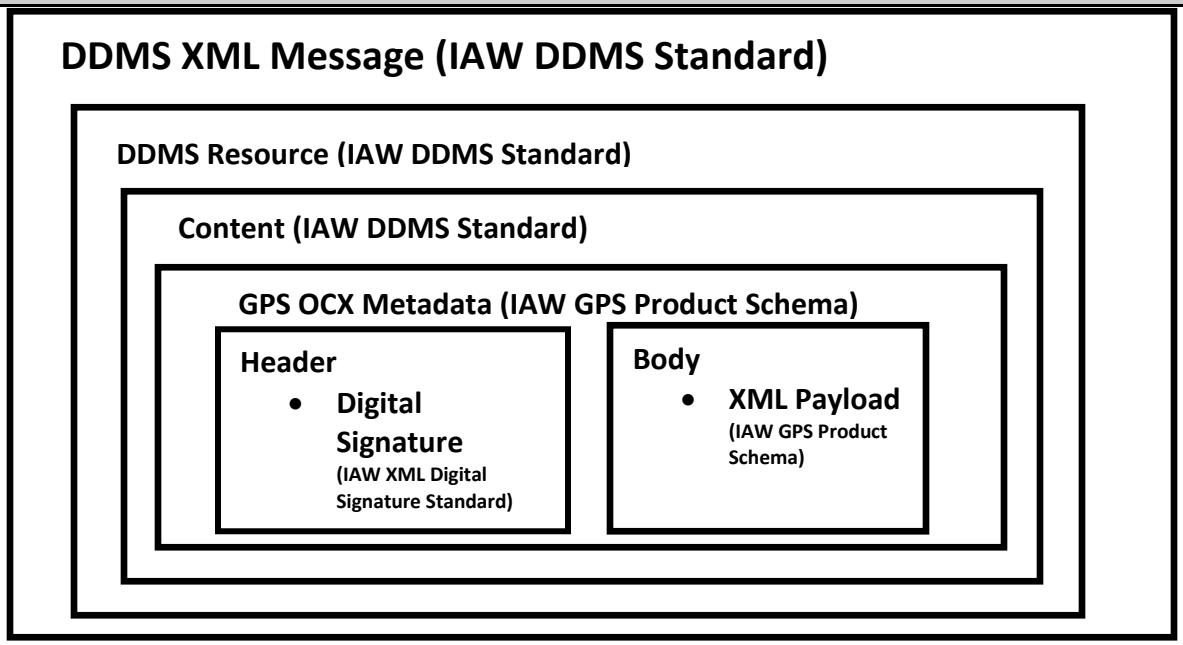
Table 3-III Mapping Information Products & Transformation Products into Desired Output Format

ICD870-680

Information Product Name	XML Schema Product Name	Transformation Product Name	Validation and Transform Utility Output
NANU *{time-stamp}* Note: time-stamp when NANU was created formatted as Zulu time as YYYYMMDDHHMMSS	NANU XML Schema_vx.y	NANU Transform_vx.y	ASCII Formatted File:NANU File (*default extension **.NNU) See Appendix 1, Notice to Navstar Users Data Formats.

ID	ICD-GPS-870 RevB (24 Sep 2013) Navstar GPS Control Segment to User Support Community Interfaces			
	OA *{time-stamp}* Note: time-stamp when Ops Advisory was created formatted as YYYYMMDDHH	OA XML Schema_vx.y *	OA Transform_vx.y	ASCII Formatted File:OA File (*default extension **.OA1). See Appendix 2, Operational Advisory Data File.
	Common Almanac *{GPS week : time of applicability}* Note: Non-modulo GPS week number : number of seconds since the beginning of the Almanac reference week.	Common Almanac XML Schema_vx.y	SEM AL3 Transform_vx.y	ASCII Formatted File:SEM Almanac File (*default extension**.al3). See Appendix 3: Almanac Data Files
			SEM BL3 Transform_vx.y	ASCII Formatted File:SEM Almanac File (*default extension **.bl3). See Appendix 3, Almanac Data Files
			YUMA ALM Transform_vx.y	ASCII Formatted File:Yuma Almanac File (*default extension **.alm). See Appendix 3, Almanac Data Files
			YUMA BLM Transform_vx.y	ASCII Formatted File:Yuma Almanac File (*default extension **.blm). See Appendix 3, Almanac Data Files
			ESHS ALE Transform_vx.y	ASCII Formatted File:ESHS File (*default extension **.ale). See Appendix 4, Extended Signals Health Status Files
			AS Status AS Transform_vx.y	ASCII Formatted File:AS Status File (default extension *.txt). See Appendix 5, ANTI-SPOOFING STATUS FILE
			AS Status AS2 Transform_vx.y	ASCII Formatted File:AS Status File (default extension *.txt). See Appendix 5, ANTI-SPOOFING STATUS FILE
ICD870-681	Multiple revisions of schema and transformations to support backward compatibility and to extend the migration time for the user community may be available.			

ID	ICD-GPS-870 RevB (24 Sep 2013) Navstar GPS Control Segment to User Support Community Interfaces
ICD870-682	Note: Information on release of a new major schema revision will be accomplished through the public ICWG process.
ICD870-37	### 3.1.1 GPS Control Segment
ICD870-38	The GPS CS is operated by the 2d Space Operations Squadron (2 SOPS), administratively organized under 50th Space Wing (50 SW). The GPS CS operations are performed primarily via the Master Control Station (MCS), Alternate Master Control Station (AMCS), Monitor Stations (MS), and Ground Antennas (GA).
ICD870-39	The MCS, located at Schriever Air Force Base (SAFB), is the central control point for the GPS CS. For this interface, the MCS is responsible for generating the Information Products in Table 3-I and providing these to the FAA and USCG NAVCEN for redistribution to the public. The AMCS, located at Vandenberg AFB (VAFB), is functionally identical to the MCS; either MCS facility is capable of controlling the GPS constellation for an indefinite period. In case the MCS experiences downtime, the AMCS takes over this interface function. The term "MCS", as now used throughout this document, refers to either the MCS or the AMCS, whichever MCS facility actively controls the GPS constellation.
ICD870-40	The MSs and GAs do not play a role in this interface.
ICD870-684	As depicted in Figure 3-5, all GPS Products available in the Portal shall comply with the following DISR standards: • W3C, Extensible Markup Language (XML) • DoD Discovery Metadata Specification (DDMS) • W3C XML Signature Syntax and Processing Standard
ICD870-685	The transformation products which can be used to convert Information Products into the various ASCII formats have a body which shall complies with the following additional DISR standard: • W3C, XSL Transformations (XSLT)
ICD870-686	These XSLT Transformation products are another kind of GPS Product in which the "XML Payload" is an XSLT-compliant document.
ICD870-687	**Figure 3-5 GPS Product Structure (XML native)**

ID	ICD-GPS-870 RevB (24 Sep 2013) Navstar GPS Control Segment to User Support Community Interfaces
ICD870-688	
ICD870-41	### 3.1.2 GPS User and User-support communities
ICD870-42	The GPS User and User-support communities include the Civil Users which are comprised of the Department of Homeland Security (DHS), United States Coast Guard (USCG); Department of Transportation (DOT), Federal Aviation Administration (FAA); other Civil Users.
ICD870-43	## 3.2 Interface Definitions
ICD870-46	### 3.2.1 Generation of Almanac Data
ICD870-47	The GPS CS generates the Common Almanac Information Product for the GPS constellation. The satellite Common Almanac contains orbital and performance parameters for operational GPS satellites, the health status of each of the modernized civil signals available for each SV - L1C, L2C and L5, as well as A-S status Information. As shown in Table 3-III , two ASCII System Effectiveness Model (SEM) format Almanacs plus two ASCII YUMA format Almanacs and one ASCII Extended Signals Health Status (ESHS) format Almanac can be produced using the Common Almanac Information Product and provided transformation products. Detailed ASCII data formats of the SEM (current.al3 and current.bl3) and YUMA Almanac (current.alm and current.blm) data are described in Appendix 3 of this ICD. Detailed ASCII data formats of the ESHS Almanac data (current.ale) are described in Appendix 4 of this ICD.
ICD870-48	### 3.2.2 Generation of Operational Advisory Data

ID	ICD-GPS-870 RevB (24 Sep 2013) Navstar GPS Control Segment to User Support Community Interfaces
ICD870-49	The GPS CS shall publish the Operational Advisory Information Product for the GPS constellation.
ICD870-692	The OA data are descriptive summaries of GPS constellation status. As shown in Table 3-III, ASCII O-A formats can be produced using the O-A Information Product and the provided transformation product. Detailed ASCII data formats of the OA data file (current.oa1) are described in Appendix 2 of this ICD.
ICD870-50	**3.2.3 Generation of NANU Data**
ICD870-51	The GPS CS shall publish the NANU Information Product for the GPS constellation.
ICD870-693	The NANU Information Product are messages that inform Users of satellite outages and other GPS issues. As shown in Table 3-III, the ASCII formats can be produced using the NANU Information Product and the provided Transformation Product. Detailed ASCII data formats of the NANU (current.nnu) data are described in Appendix 1 of this ICD.
ICD870-52	**3.2.4 Generation of Anti-Spoofing (A-S) Status**
ICD870-53	The GPS CS shall publish the Anti-Spoofing Status information for the GPS constellation as part of the Common Almanac Information Product.
ICD870-694	The A-S Status informs Users whether the Anti-Spoofing mode of each GPS SV is ON or OFF. As shown in Table 3-III, the ASCII format of the A-S status can be produced using the Common Almanac Information Product and the provided Transformation Product. Detailed ASCII data format of the A-S Status files (as.txt and as2.txt) are described in Appendix 5 of this ICD.
ICD870-54	**3.2.5 Data Distribution**
ICD870-55	Distribution of the GPS Products to the public is accomplished via the USCG NIS.
ICD870-58	NANU Information Products are provided whenever they are generated including weekends and holidays. The OA and Common Almanac Information Products are normally provided once per day, 24/7, 365 days a year, prior to 1700 Zulu time (10 am MST, 11 am MDT).
ICD870-64	**3.3 GPS MCS to GPS User Support Community Data Integrity**
ICD870	As the Authoritative Source for GPS Products described in this ICD, the CS publishes only digitally signed GPS

ID	*ICD-GPS-870 RevB (24 Sep 2013) Navstar GPS Control Segment to User Support Community Interfaces*
-698	Products to improve information assurance for GPS data at rest (i.e., resident on a storage device) within the GPS user community. Without digital signatures to ensure the integrity and proof of origin of the GPS Products at rest, Information Products originally from the CS could be corrupted (intentionally or unintentionally) during redistribution to the end user. The potential consequence of corrupted GPS Information products varies between end users. Some end users have Information Assurance critical applications (e.g. public utilities, safety of life systems) in which the potential consequence are significant and therefore unacceptable to the end user. Therefore; a) The CS will only distribute GPS Products (see section 3.1.1) which are digitally signed XML documents per the published XML schema for compliance with modern Net Centric and Information Assurance standards for non-repudiation. b) The CS publishes Transformation Products and also provides a downloadable Validate and Transform Utility to assist users with first validating then transforming Information Products into backward compatible ASCII formats. c) In order to maximize the benefit of information assurance, the CS recommends that End Users perform the transformation step as late as possible (just prior to ingesting). d) Validating the data integrity of GPS products is optional and is the responsibility of the user. End users must apply their knowledge of the criticality of their application in making the determination of whether they can accept the risks of ignoring CS provided digital signatures. e) Any US government user interested in redistributing GPS Products or products derived from GPS Products are advised to consult with the GPS CS before doing so to understand the tradeoffs and verify duplicative efforts are not being planned by the GPS CS.
ICD870 -65	Those consumers not interested in verifying the data integrity of Information Products can simply use the messages. The requirement is upon the GPS CS to provide data integrity and it is OPTIONAL for the consumer to take the steps needed to verify the integrity of the data. The following paragraphs describe what the GPS CS is required to do and optionally what the consumer would need to do to verify that a message is genuine and originates from the GPS CS.
ICD870 -66	The GPS CS shall use DoD Public Key Infrastructure (PKI) to digitally sign all GPS Products as described in section 3.3.1 and as per Department of Defense Public Key Infrastructure Functional Interface Specification 3.0.
ICD870 -699	Digital signatures shall use the Rivest-Shamir-Adleman (RSA) public key algorithm with 2048 bit keys and Secure Hash Algorithm-256 (SHA-256) for signatures.
ICD870 -700	As depicted in Figure 3-5, the header elements of the GPS Product Meta Data will contain the XML digital signature for the **entire** GPS Product (excluding the signature itself). This method of digital signing is referred to as an enveloped signature as defined in the W3C Signature Syntax Processing.

ID	*ICD-GPS-870 RevB (24 Sep 2013) Navstar GPS Control Segment to User Support Community Interfaces*
ICD870-701	As shown in Figure 3-2, the steps for a user to verify the data integrity where the user has an application which directly processes ASCII text file formats: 1. Download the desired Information Product and Transform Product (see Table 3-III). Note: Because the XML schema for an Information Product will change very infrequently, a Transformation Product can be downloaded once for a new schema revision and then reused repeatedly without downloading again. 2. Just prior to use, validate the Digital Signature of Information Product and the Transform Product using a W3C XML Digital Signature Compliant standard COTS/Library (e.g., JDK 1.6/1.7) and the currently published CS public certificate. 3. If the signatures do not validate in Step 2, then either the Information Product or the Transformation Product is not authentic (not produced by the CS) or has been corrupted. Do not use. The user should return to step 1. 4. If the signatures validate in both Step 2 and Step 3, then extract XSLT from the Product Meta Data Body Element (see Figure 3-3) and apply the XSLT using standard COTS/Library to produce the desired ASCII file format. Note: A user with a non-critical application who intends to bypass verifying data integrity only needs to perform Step 1 and then Step 4. Note: The provided Validate and Transform Utility (see figure 3-4) can be used to perform steps 2, 3 and 4. The user is required to download/install the CS public key on their system prior to using the Validate and Download Utility.
ICD870-702	As shown in Figure 3-2, the steps for a user to verify the data integrity where the user has a modern application which directly processing CS native XML formats; 1. Download the desired Information Product (see Table 3-III) 2. Just prior to use, Validate the Digital Signature of Information Product using a W3C XML Digital

	Signature Compliant standard COTS/Library (e.g. JDK 1.6/1.7) and the currently published CS public certificate. 3. If the signature does not validate in Step 2, then the Information product is either not authentic (not produced by the CS) or the information content has been corrupted. Do not use. The user should return to step 1. 4. If the signature validates in Step 2, then the GPS Product is authentic and the content has not been corrupted. Note: A user with a modern non-critical application who intends to bypass verifying data integrity only needs to perform Step 1 Note: The provided Validate and Transform Utility (see figure 3-4) can be used to perform step 2. The user is required to download/install the CS public key on their system prior to using the Validate and Download Utility.
ICD870-67	The GPS CS shall support modular addition or replacement of DoD PKI algorithms, key lengths, certificate authorities, certificates, and certificate structure with little or no code changes. Coordination in a public ICWG shall occur prior to any changes on the Public Release interface.
ICD870-68	The GPS CS unclassified certificate (and corresponding CS public key) will be made available to all consumers for data integrity verification via the USCG NIS web site.
ICD870-714	In this document, X.509 certificates are referred to as certificates.
ICD870-703	DoD PKI root certificates are available on the DoD Class 3 Public Key Infrastructure (PKI) website, currently http://dodpki.c3pki.chamb.disa.mil/, to verify the certificate chain.
ICD870-704	To encourage GPS users to validate data integrity and at the same time ensure backward compatibility to ASCII text files, the CS shall provide a downloadable transition support utility application referred to herein as "*Validate and Transform Utility*".
ICD870-705	This utility will present the user with a simple User Interface to validate the integrity of any downloaded GPS Product and to optionally apply the transform contained within a downloaded Transformation Product.

ID	ICD-GPS-870 RevB (24 Sep 2013) Navstar GPS Control Segment to User Support Community Interfaces
ICD870-715	The provided Utility will be an executable application installable on supported versions of Windows and Linux platforms, at a minimum Windows 7 and Redhat 5.8.
ICD870-716	User platform requirements for running the utility will be described on the NIS. The Utility will be digitally signed and users should validate the Authenticity of the certificate during installation.
ICD870-69	### 3.3.1 Digital Signatures
ICD870-70	All of the GPS Products shall be digitally signed.
ICD870-706	The CS digital signature shall be persistent and embedded within GPS Product itself (i.e., not tied to a transport protocol or session) to provide integrity for data at rest.
ICD870-707	A message shall always have its corresponding signature available to the consumer to verify the message independent of the delivery protocol.
ICD870-74	# 4 QUALITY ASSURANCE
ICD870-75	This section contains the verification matrix for the objects that contain requirements enumerated in this interface document. The verification matrix indicates what methodology will be used to assure these requirements are met. The information contained within this verification matrix is not intended to change any contractual obligations imposed upon the segment contractors by the government. Regardless of Highest Verification Level designation (System or Segment), the segment contractors still need to demonstrate compliance to all contractual interface documents. The column headings of the verification matrix are explained here:
ICD870-309	DOORS ID = Unique DOORS object identification number.
ICD870-310	Object Number = Paragraph number of the object.
ICD870-311	CS Effectivity = Effectivity of requirement allocated to CS (see Segment column) as defined in SS-CS-800.
ICD870-312	SS Effectivity = Effectivity of requirement allocated to SS (see Segment column) as defined in SS-SS-800.
ICD870	Highest Verification Level = The highest level (System or Segment) at which the requirement is verified. The Highest Verification Level is used to identify those requirements that require joint verification activity as

ID	*ICD-GPS-870 RevB (24 Sep 2013) Navstar GPS Control Segment to User Support Community Interfaces*
-313	explained below: A designation of System implies the requirement must be verified by a joint verification activity that includes both sides of the interface and may involve coordination of verification activities through the government. A designation of Segment implies the segment contractor retains full responsibility for conducting the verification event. The joint use of SS or CS assets such as the GSYS or GSS does not alter the Highest Verification Level designation from Segment.
ICD870 -314	Segment = Designated segment (Space (SV), Control (CS), or User (US) Segment) involved in the verification of the requirement. A designation of (EXTERNAL ORG) is used to identify the external organization (e.g., (NDS), (AFSCN), (NGA), etc.) involved in the verification of the requirement.
ICD870 -315	System Verification Method = Method for verifying system requirements. Verification method assignments for segment requirements will not be tracked in this ICD as they are formally described in the segment contractor verification planning CDRLs. The following verification method definitions are derived from SS-SYS-800.
ICD870 -524	Verification by Inspection (I) The inspection method verifies conformance of physical characteristics to related requirements without the aid of special laboratory equipment, procedures, and services. This method most commonly uses an examination by the senses (sight, sound, smell, taste, or touch) to determine requirements compliance and may also rely on gauges or simple measures.
ICD870 -523	Verification by Analysis (A) The analysis method verifies conformance to requirements based on studies, calculations, and modeling, or is based on the certified usage of similar components under identical or similar operating conditions (similarity). This method may consist of the technical evaluation of data using logic or mathematics to determine compliance with requirements. It is typically used in verification when a given attribute is impossible or extremely difficult to test, thereby enabling expansion of the verification beyond the range of the test. Review of software listings is considered to be verification by analysis.

ID	*ICD-GPS-870 RevB (24 Sep 2013) Navstar GPS Control Segment to User Support Community Interfaces*
ICD870-522	Verification by Demonstration (D) The demonstration method verifies the required operability of hardware and software by means that do not necessarily require the use of laboratory equipment, procedures, items or services. That is, compliance with requirements is verified by operation and function. More detail may be seen in MIL-HDBK-470 and MIL-STD-810. This method may be an un-instrumented test, with compliance determined by observation (e.g., maintenance task performance time).
ICD870-521	Verification by Test (T) The test method verifies conformance to required performance/physical characteristics and design/construction features by instrumented functional operation and evaluation techniques through the use of laboratory equipment procedures, items, and services. This method generally uses procedures and test/measuring equipment to verify compliance with requirements.

ICD870-316

DOORS ID	Object Number	CS Effectivity	SS Effectivity	Highest Verification Level	Segment	System Verification Method
ICD870-651	3.1.0-1	10	N/A	Segment	CS	Demonstration
ICD870-305	3.1.0-15	N/A	N/A	N/A		N/A
ICD870-671	3.1.0-21	10	N/A	Segment	CS	Demonstration
ICD870-672	3.1.0-22	10	N/A	Segment	CS	Demonstration
ICD870-673	3.1.0-23	10	N/A	Segment	CS	Test
ICD870-674	3.1.0-24	10	N/A	Segment	CS	Test
ICD870-675	3.1.0-25	10	N/A	Segment	CS	Demonstration
ICD870-676	3.1.0-26	10	N/A	Segment	CS	Demonstration
ICD870-681	3.1.0-33	10	N/A	Segment	CS	Demonstration
ICD870-684	3.1.1.0-4	10	N/A	Segment	CS	Demonstration
ICD870-685	3.1.1.0-5	10	N/A	Segment	CS	Demonstration
ICD870-49	3.2.2.0-1	10	N/A	Segment	CS	Demonstration
ICD870-51	3.2.3.0-1	10	N/A	Segment	CS	Demonstration
ICD870-53	3.2.4.0-1	10	N/A	Segment	CS	Demonstration
ICD870-66	3.3.0-3	10	N/A	Segment	CS	Demonstration
ICD870-699	3.3.0-4	10	N/A	Segment	CS	Demonstration
ICD870-67	3.3.0-8	10	N/A	Segment	CS	N/A
ICD870-68	3.3.0-9	10	N/A	Segment	CS	Demonstration
ICD870-704	3.3.0-12	10	N/A	Segment	CS	Demonstration
ICD870-70	3.3.1.0-1	10	N/A	Segment	CS	Demonstration

ICD870-706	3.3.1.0-2	10	N/A	Segment	CS	Demonstration
ICD870-707	3.3.1.0-3	10	N/A	Segment	CS	Demonstration

ICD870-76

5 PREPARATION FOR DELIVERY

ICD870-77

Not Applicable

ICD870-78

6 NOTES

ICD870-79

6.1 Acronyms and Abbreviations

ICD870-80

2 SOPS	2d Space Operations Squadron
50 SW	50th Space Wing
A-S	Anti-Spoofing
AFB	Air Force Base
AFSPC	Air Force Space Command
AMCS	Alternate Master Control Station
ANOM	Anomaly
ASCII	American Standard Code for Information Interchange
CS	Control Segment, Cesium
DD	Calendar Day (2 digits)
DECOM	Decommission
DHS	Department of Homeland Security
DO	Director of Operations
DOD	Department of Defense
DOT	Department of Transportation
DSN	Defense Switched Network
DTG	Day Time Group
e-mail	Electronic mail
ESHS	Extended Signals Health Status
FAA	Federal Aviation Administration

FCSTCANC	Forecast Cancellation
FCSTDV	Forecast Delta-V
FCSTEXTD	Forecast Extension
FCSTMX	Forecast Maintenance
FCSTRESCD	Forecast rescheduled
FCSTSUMM	Forecast Summary
FCSTUUFN	Forecast Unusable Until Further Notice
G-NRN	Radio Navigation Division
GA	Ground Antenna
GP	Global Positioning System Directorate
GPS	Global Positioning System
GPSOC	GPS Operations Center
GPSW	GPS Wing
HDBK	Handbook
HH	Hour (2 digits)
HTTP	Hypertext Transfer Protocol
HTTPS	Hypertext Transfer Protocol Secure
ICC	Interface Control Contractor
ICD	Interface Control Document
ICWG	Interface Control Working Group
ID	Identification
IERS	International Earth Rotation and Reference Systems Service
IP	Internet Protocol
IS	Interface Specification
JDAY	Julian Day of the Year
JJJ	Julian Date (3 digits)
LEAPSEC	Leap Second
LSB	Least Significant Bit
M	Meters
MCS	Master Control Station
MDT	Mountain Daylight Time
MIL	Military
MM	Minutes (2 digits)
MMM	Month (3 characters)
MOA	Memorandum of Agreement
MS	Monitor Station
MST	Mountain Standard Time
N/A	Not Applicable

NANU	Notice Advisory to Navstar Users
NAV	Navigation
NAVCEN	Navigation Center
NC	No Change
NNN	NANU Number (3 digits)
NOTAM	Notice to Airmen
OA	Operational Advisory
OCX	Next Generation Operational Control System
PIRN	Proposed Interface Revision Notice
PKI	Public Key Infrastructure
POC	Point Of Contact
PRN	Pseudorandom Noise (Signal Number)
RAD	Radians
RB	Rubidium
RFC	Request for Change
s	Seconds
SAFB	Schriever Air Force Base
SAIC	Science Applications International Corporation
SE&I	Systems Engineering and Integration
SEM	System Effectiveness Model
SIPRNet	Secret Internet Protocol Router Network
SMC	Space and Missile Systems Center
SPS	Standard Positioning Service
SQRT	Square Root
SUBJ	Subject
SS	System Specification
SSS	Seconds (3 digits)
STD	Standard
SV	Space Vehicle
SVID	Space Vehicle Identification
SVN	Space Vehicle Number
TBD	To Be Determined
TCP	Transmission Control Protocol
UNUNOREF	Unusable with no reference
UNUSABLE	Unusable with reference NANU
UNUSUFN	Unusable Until Further Notice
URA	User Range Accuracy
USABINIT	Initially usable

	USCG United States Coast Guard USNOF United States Notice to Airmen Office USSPACECOM United States Space Command UTC Coordinated Universal Time VAFB Vandenberg Air Force Base WN Week Number YYYY Year (4 digits) Z Zulu
ICD870-81	# 7 APPROVAL
ICD870-82	The signatories have approved this ICD with or without exception as their signature block implies and a copy of each approval sheet is included in this section.
ICD870-83	# 8 TBD
ICD870-84	# 9 TBD
ICD870-85	# 10 APPENDIX 1: NANU DATA FORMATS
ICD870-86	Appendix 1 describes the NANU types and the NANU message format.
ICD870-87	## 10.1 Notice Advisory to Navstar Users
ICD870-88	NANUs are used to notify Users of scheduled and unscheduled satellite outages and general GPS information. The paragraphs that follow describe the different types of NANUs. The NANU descriptions are arranged into four groups, as follows: • Scheduled outages • Unscheduled outages • General text message

- Others

ICD870-89

10.1.1 Scheduled Outages

ICD870-90

NANU types in the scheduled outage group forecast outages that are planned to begin in the near future. Table 10-I identifies NANU types in the scheduled outage group. The table describes the NANU acronym used in the message format, the name of the file and a description of the outages. NANU acronyms in this group all begin with "FCST" for "forecast."

ICD870-91

Table 10-I Scheduled Outages

ICD870-92

NANU ACRONYM	NAME	DESCRIPTION
FCSTDV	Forecast Delta-V	Scheduled outage times for Delta-V maneuvers.
FCSTMX	Forecast Maintenance	Scheduled outage times for non-Delta-V maintenance.
FCSTEXTD	Forecast Extension	Extends the scheduled outage time "Until Further Notice"; references the original forecast NANU.
FCSTSUMM	Forecast Summary	Exact outage times for the scheduled outage. This is sent after the maintenance is complete and the satellite is set healthy. It references the original forecast NANU. If a FCSTEXTD or a FCSTRESCD were required the FCSTSUMM will reference these.
FCSTCANC	Forecast Cancellation	Cancels a scheduled outage when a new maintenance time is not yet determined; it references the original forecast NANU message.
FCSTRESCD	Forecast rescheduled	Reschedules a scheduled outage referencing the original-FCST NANU message.
FCSTUUFN	Forecast Unusable Until Further Notice	Scheduled outage of indefinite duration not necessarily related to Delta-V or maintenance activities.

ICD870-93

The message templates for the NANU types listed in Table 10-I are shown in Figures 10-1 through 10-7, respectively.

ICD870-94

```
NOTICE ADVISORY TO NAVSTAR USERS (NANU) YYYYSSS
SUBJ: SVNXXX (PRNXX) FORECAST OUTAGE JDAY JJJ/HHMM - JDAY JJJ/HHMM
1.      NANU TYPE: FCSTDV
        NANU NUMBER: YYYYSSS
        NANU DTG: DDHHMMZ MMM YYYY
        REFERENCE NANU: N/A
        REF NANU DTG: N/A
        SVN: XXX
        PRN: XX
        START JDAY: JJJ
        START TIME ZULU: HHMM
        START CALENDAR DATE: DD MMM YYYY
        STOP JDAY: JJJ
        STOP TIME ZULU: HHMM
        STOP CALENDAR DATE: DD MMM YYYY

2.  CONDITION: GPS SATELLITE SVNXXX (PRNXX) WILL BE UNUSABLE ON JDAY JJJ
    (DD MMM YYYY) BEGINNING HHMM ZULU UNTIL JDAY JJJ (DD MMM YYYY) ENDING HHMM ZULU.

3.  POC: CIVILIAN - NAVCEN AT 703-313-5900, HTTP://WWW.NAVCEN.USCG.GOV
    CIVIL AVIATION - FAA National Operations Control Center
    MILITARY - GPS Support Center at HTTPS://GPS.AFSPC.AF.MIL/GPSOC, DSN 560-2541,
    COMM 719-567-2493, GPS_SUPPORT@SCHRIEVER.AF.MIL, HTTP://WWW.SCHRIEVER.AF.MIL/GPS
    MILITARY ALTERNATE - JOINT SPACE OPERATIONS CENTER, DSN 276-9994.
    COMM 805-606-9994, JSPOCCOMBATOPS@VANDENBERG.AF.MIL
```

ICD870-95

Figure 10-1 FCSTDV NANU Message Template

ICD870-96

```
NOTICE ADVISORY TO NAVSTAR USERS (NANU) YYYYSSS
SUBJ: SVNXXX (PRNXX) FORECAST OUTAGE JDAY JJJ/HHMM - JDAY JJJ/HHMM
1.      NANU TYPE: FCSTMX
        NANU NUMBER: YYYYSSS
        NANU DTG: DDHHMMZ MMM YYYY
        REFERENCE NANU: N/A
        REF NANU DTG: N/A
        SVN: XXX
        PRN: XX
        START JDAY: JJJ
        START TIME ZULU: HHMM
        START CALENDAR DATE: DD MMM YYYY
        STOP JDAY: JJJ
        STOP TIME ZULU: HHMM
        STOP CALENDAR DATE: DD MMM YYYY

2.  CONDITION: GPS SATELLITE SVNXXX (PRNXX) WILL BE UNUSABLE ON JDAY JJJ
(DD MMM YYYY) BEGINNING HHMM ZULU UNTIL JDAY JJJ (DD MMM YYYY)
ENDING HHMM ZULU.

3.  POC: CIVILIAN - NAVCEN AT 703-313-5900, HTTP://WWW.NAVCEN.USCG.GOV
CIVIL AVIATION - FAA National Operations Control Center
MILITARY - GPS Support Center at HTTPS://GPS.AFSPC.AF.MIL/GPSOC, DSN 560-2541,
COMM 719-567-2493, GPS_SUPPORT@SCHRIEVER.AF.MIL, HTTP://WWW.SCHRIEVER.AF.MIL/GPS
MILITARY ALTERNATE - JOINT SPACE OPERATIONS CENTER, DSN 276-9994.
COMM 805-606-9994, JSPOCCOMBATOPS@VANDENBERG.AF.MIL
```

ICD870-97

Figure 10-2 FCSTMX NANU Message Template

ICD870-98

```
NOTICE ADVISORY TO NAVSTAR USERS (NANU) YYYYSSS

SUBJ: SVNXXX (PRNXX) FORECAST OUTAGE EXTENDED UNTIL FURTHER NOTICE

1.      NANU TYPE: FCSTEXTD

        NANU NUMBER: YYYYSSS

        NANU DTG: DDHHMMZ MMM YYYY

        REFERENCE NANU: YYYYNNN

        REF NANU DTG: DDHHMMZ MMM YYYY

        SVN: XXX

        PRN: XX

        START JDAY: JJJ
```

ICD870-99

Figure 10-3 FCSTEXTD NANU Message Template

ICD870-100

```
NOTICE ADVISORY TO NAVSTAR USERS (NANU) YYYYSSS

SUBJ: SVNXXX (PRNXX) FORECAST OUTAGE SUMMARY JDAY JJJ/HHMM - JDAY JJJ/HHMM

1.      NANU TYPE: FCSTSUMM

        NANU NUMBER: YYYYSSS

        NANU DTG: DDHHMMZ MMM YYYY

        REFERENCE NANU: YYYYNNN

        REF NANU DTG: DDHHMMZ MMM YYYY

        SVN: XXX

        PRN: XX

        START JDAY: JJJ
```

ICD870-101

Figure 10-4 FCSTSUMM NANU Message Template

ICD870
-102

```
NOTICE ADVISORY TO NAVSTAR USERS (NANU) YYYYSSS
SUBJ: SVNXXX (PRNXX) FORECAST OUTAGE CANCELLED
1.      NANU TYPE: FCSTCANC
        NANU NUMBER: YYYYSSS
        NANU DTG: DDHHMMZ MMM YYYY
        REFERENCE NANU: YYYYNNN
        REF NANU DTG: DDHHMMZ MMM YYYY
        SVN: XXX
        PRN: XX
        START JDAY: JJJ
        START TIME ZULU: HHMM
        START CALENDAR DATE: DD MMM YYYY
        STOP JDAY: CANCELLED
        STOP TIME ZULU: N/A
        STOP CALENDAR DATE: N/A

2.  CONDITION: THE FORECAST OUTAGE FOR GPS SATELLITE SVNXXX (PRNXX) SCHEDULED FOR
    JDAY JJJ (DD MMM YYYY) BEGINNING HHMM ZULU HAS BEEN CANCELLED.

3.  POC: CIVILIAN - NAVCEN AT 703-313-5900, HTTP://WWW.NAVCEN.USCG.GOV
    CIVIL AVIATION - FAA National Operations Control Center
    MILITARY - GPS Support Center at HTTPS://GPS.AFSPC.AF.MIL/GPSOC, DSN 560-2541,
    COMM 719-567-2493, GPS_SUPPORT@SCHRIEVER.AF.MIL, HTTP://WWW.SCHRIEVER.AF.MIL/GPS
    MILITARY ALTERNATE - JOINT SPACE OPERATIONS CENTER, DSN 276-9994.
    COMM 805-606-9994, JSPOCCOMBATOPS@VANDENBERG.AF.MIL
```

ICD870
-103

Figure 10-5 FCSTCANC NANU Message Template

ICD870
-104

```
NOTICE ADVISORY TO NAVSTAR USERS (NANU) YYYYSSS
SUBJ: SVNXXX (PRNXX) FORECAST OUTAGE RESCHEDULED
1.      NANU TYPE: FCSTRESCD
        NANU NUMBER: YYYYSSS
        NANU DTG: DDHHMMZ MMM YYYY
        REFERENCE NANU: YYYYNNN
        REF NANU DTG: DDHHMMZ MMM YYYY
        SVN: XXX
        PRN: XX
        START JDAY: JJJ
        START TIME ZULU: HHMM
        START CALENDAR DATE: DD MMM YYYY
        STOP JDAY: JJJ
        STOP TIME ZULU: HHMM
        STOP CALENDAR DATE: DD MMM YYYY

2.  CONDITION: GPS SATELLITE SVNXXX (PRNXX) WILL BE UNUSABLE ON JDAY JJJ
    (DD MMM YYYY) BEGINNING HHMM ZULU UNTIL JDAY JJJ (DD MMM YYYY)
    ENDING HHMM ZULU. PLEASE REFERENCE NANU NUMBER YYYYNNN
    DTG DDHHMMZ MMM YYYY FOR THE ORIGINAL OUTAGE TIME.

3.  POC: CIVILIAN - NAVCEN AT 703-313-5900, HTTP://WWW.NAVCEN.USCG.GOV
    CIVIL AVIATION - FAA National Operations Control Center
    MILITARY - GPS Support Center at HTTPS://GPS.AFSPC.AF.MIL/GPSOC, DSN 560-2541,
    COMM 719-567-2493, GPS_SUPPORT@SCHRIEVER.AF.MIL, HTTP://WWW.SCHRIEVER.AF.MIL/GPS
    MILITARY ALTERNATE - JOINT SPACE OPERATIONS CENTER, DSN 276-9994.
    COMM 805-606-9994, JSPOCCOMBATOPS@VANDENBERG.AF.MIL
```

ICD870
-105

Figure 10-6 FCSTRESC NANU Message Template

ICD870-106

```
NOTICE ADVISORY TO NAVSTAR USERS (NANU) YYYYSSS
SUBJ: SVNXXX (PRNXX) FORECAST OUTAGE JDAY JJJ/HHMM – UNTIL FURTHER NOTICE
1.     NANU TYPE: FCSTUUFN
       NANU NUMBER: YYYYSSS
       NANU DTG: DDHHMMZ MMM YYYY
       REFERENCE NANU: N/A
       REF NANU DTG: N/A
       SVN: XXX
       PRN: XX
       START JDAY: JJJ
       START TIME ZULU: HHMM
       START CALENDAR DATE: DD MMM YYYY
       STOP JDAY: UFN
       STOP TIME ZULU: N/A
       STOP CALENDAR DATE: N/A

2.  CONDITION: GPS SATELLITE SVNXXX (PRNXX) WILL BE UNUSABLE NO EARLIER THAN JDAY JJJ
    (DD MMM YYYY) BEGINNING HHMM ZULU UNTIL FURTHER NOTICE.

3.  POC: CIVILIAN - NAVCEN AT 703-313-5900, HTTP://WWW.NAVCEN.USCG.GOV
    CIVIL AVIATION - FAA National Operations Control Center
    MILITARY - GPS Support Center at HTTPS://GPS.AFSPC.AF.MIL/GPSOC, DSN 560-2541,
    COMM 719-567-2493, GPS_SUPPORT@SCHRIEVER.AF.MIL, HTTP://WWW.SCHRIEVER.AF.MIL/GPS
    MILITARY ALTERNATE - JOINT SPACE OPERATIONS CENTER, DSN 276-9994.
    COMM 805-606-9994, JSPOCCOMBATOPS@VANDENBERG.AF.MIL
```

ICD870-107

Figure 10-7 FCSTUUFN NANU Message Template

ICD870-108

10.1.2 Unscheduled Outages

ICD870-109

NANU types in the unscheduled outage group describe unplanned outages that are ongoing or have occurred in the recent past. Table 10-II identifies NANU types in the unscheduled outage group. The table describes the NANU acronym used in the message format, the name of the file and a description of the outages. NANU acronyms in this group all begin with “UNU” or “UNUS” for “unusable.”

ICD870-110

Table 10-II Unscheduled Outages

ICD870-111

NANU ACRONYM	NAME	DESCRIPTION
UNUSUFN	Unusable Until Further Notice	Notifies Users that a satellite will be unusable to all Users until further notice.
UNUSABLE	Unusable with reference NANU	Closes out an UNUSUFN NANU and gives the exact outage times; references the UNUSUFN NANU
UNUNOREF	Unusable with no reference	Gives times for outages that were resolved before an UNUSUFN NANU could be sent.

ICD870-112

The message templates for the NANU types listed in Table 10-II are shown in Figures 10-8 through 10-10, respectively.

ICD870-113

```
NOTICE ADVISORY TO NAVSTAR USERS (NANU) YYYYSSS
SUBJ: SVNXXX (PRNXX) UNUSABLE JDAY JJJ/HHMM - UNTIL FURTHER NOTICE
1.      NANU TYPE: UNUSUFN
        NANU NUMBER: YYYYSSS
        NANU DTG: DDHHMMZ MMM YYYY
        REFERENCE NANU: N/A
        REF NANU DTG: N/A
        SVN: XXX
        PRN: XX
        START JDAY: JJJ
        START TIME ZULU: HHMM
        START CALENDAR DATE: DD MMM YYYY
        STOP JDAY: UFN
        STOP TIME ZULU: N/A
        STOP CALENDAR DATE: N/A

2.  CONDITION: GPS SATELLITE SVNXXX (PRNXX) WILL BE UNUSABLE ON JDAY JJJ
    (DD MMM YYYY) BEGINNING HHMM ZULU UNTIL FURTHER NOTICE.

3.  POC: CIVILIAN - NAVCEN AT 703-313-5900, HTTP://WWW.NAVCEN.USCG.GOV
    CIVIL AVIATION - FAA National Operations Control Center
    MILITARY - GPS Support Center at HTTPS://GPS.AFSPC.AF.MIL/GPSOC, DSN 560-2541,
    COMM 719-567-2493, GPS_SUPPORT@SCHRIEVER.AF.MIL, HTTP://WWW.SCHRIEVER.AF.MIL/GPS
    MILITARY ALTERNATE - JOINT SPACE OPERATIONS CENTER, DSN 276-9994.
    COMM 805-606-9994, JSPOCCOMBATOPS@VANDENBERG.AF.MIL
```

ICD870-114

Figure 10-8 UNUSUFN NANU Message Template

ICD870-115

```
NOTICE ADVISORY TO NAVSTAR USERS (NANU) YYYYSSS
SUBJ: SVNXXX (PRNXX) UNUSABLE JDAY JJJ/HHMM - JDAY JJJ/HHMM
1.      NANU TYPE: UNUSABLE
        NANU NUMBER: YYYYSSS
        NANU DTG: DDHHMMZ MMM YYYY
        REFERENCE NANU: YYYYNNN
        REF NANU DTG: DDHHMMZ MMM YYYY
        SVN: XXX
        PRN: XX
        START JDAY: JJJ
        START TIME ZULU: HHMM
        START CALENDAR DATE: DD MMM YYYY
        STOP JDAY: JJJ
        STOP TIME ZULU: HHMM
        STOP CALENDAR DATE: DD MMM YYYY

2.  CONDITION: GPS SATELLITE SVNXXX (PRNXX) WAS UNUSABLE ON JDAY JJJ
    (DD MMM YYYY) BEGINNING HHMM ZULU UNTIL JDAY JJJ (DD MMM YYYY)
    ENDING HHMM ZULU.

3.  POC: CIVILIAN - NAVCEN AT 703-313-5900, HTTP://WWW.NAVCEN.USCG.GOV
    CIVIL AVIATION - FAA National Operations Control Center
    MILITARY - GPS Support Center at HTTPS://GPS.AFSPC.AF.MIL/GPSOC, DSN 560-2541,
    COMM 719-567-2493, GPS_SUPPORT@SCHRIEVER.AF.MIL, HTTP://WWW.SCHRIEVER.AF.MIL/GPS
    MILITARY ALTERNATE - JOINT SPACE OPERATIONS CENTER, DSN 276-9994.
    COMM 805-606-9994, JSPOCCOMBATOPS@VANDENBERG.AF.MIL
```

ICD870-116

Figure 10-9 UNUSABLE NANU Message Template

ICD870-117

```
NOTICE ADVISORY TO NAVSTAR USERS (NANU) YYYYSSS
SUBJ: SVNXXX (PRNXX) UNUSABLE JDAY JJJ/HHMM - JDAY JJJ/HHMM
1.      NANU TYPE: UNUNOREF
        NANU NUMBER: YYYYSSS
        NANU DTG: DDHHMMZ MMM YYYY
        REFERENCE NANU: N/A
        REF NANU DTG: N/A
        SVN: XXX
        PRN: XX
        START JDAY: JJJ
        START TIME ZULU: HHMM
        START CALENDAR DATE: DD MMM YYYY
        STOP JDAY: JJJ
        STOP TIME ZULU: HHMM
        STOP CALENDAR DATE: DD MMM YYYY

2.  CONDITION: GPS SATELLITE SVNXXX (PRNXX) WAS UNUSABLE ON JDAY JJJ
    (DD MMM YYYY) BEGINNING HHMM ZULU UNTIL JDAY JJJ (DD MMM YYYY)
    ENDING HHMM ZULU.

3.  POC: CIVILIAN - NAVCEN AT 703-313-5900, HTTP://WWW.NAVCEN.USCG.GOV
    CIVIL AVIATION - FAA National Operations Control Center
    MILITARY - GPS Support Center at HTTPS://GPS.AFSPC.AF.MIL/GPSOC, DSN 560-2541,
    COMM 719-567-2493, GPS_SUPPORT@SCHRIEVER.AF.MIL, HTTP://WWW.SCHRIEVER.AF.MIL/GPS
    MILITARY ALTERNATE - JOINT SPACE OPERATIONS CENTER, DSN 276-9994.
    COMM 805-606-9994, JSPOCCOMBATOPS@VANDENBERG.AF.MIL
```

ICD870-118

Figure 10-10 UNUNOREF NANU Message Template

ICD870-119

10.1.3 General NANU Messages

ICD870-120

General NANU messages describe a GPS issue, problem, or event deemed noteworthy to the GPS user community. General NANU topics may include but are not limited to failures in meeting SPS Performance Standard requirements, space segment problems that cannot be conveyed through other NANU formats, and space vehicle (SV) disposal announcements. NANU messages of this type are all identified with the "GENERAL" NANU acronym.

ICD870-121

General NANU messages may be generically worded and may direct further detailed questions to the appropriate authorities. Recommendations or notes may be included, depending on the circumstances.

ICD870-122

The GENERAL message structure is a text paragraph format, such as, the generic example shown in Figure 10-11. The format consists of two sections. Section one contains a header indicating the type of message. Section two is the body of the message.

ICD870-123

```
1.      NANU TYPE: GENERAL

*** GENERAL MESSAGE TO ALL GPS USERS ***


MESSAGE WRITTEN IN PARAGRAPH FORM
```

ICD870-124

Figure 10-11 General Message Format

ICD870-125

10.1.4 Other Messages

ICD870-126

NANU types in the "other" group describe events that occur infrequently. Table 10-III identifies NANU types in the "other" outage group. The table describes the NANU acronym used in the message format, the name of the file and a description of the message.

ICD870-127

Table 10-III Other Types of NANU Messages

ICD870-128

NANU ACRONYM	NAME	DESCRIPTION
USABINIT	Initially usable	Notifies Users that an SV is set healthy for the first time.
LEAPSEC	Leap second	Notifies Users of an impending leap second.
LAUNCH	Launch	Notifies Users after the launch of a satellite.
DECOM	Decommission	Notifies Users that an SV has been removed from the current constellation identified within the broadcast Almanac, but does not necessarily signify permanent disposal.

ICD870-129

The message templates for the NANU types listed in Table 10-III are shown in Figures 10-12 through 10-15, respectively.

ICD870
-130

```
NOTICE ADVISORY TO NAVSTAR USERS (NANU) YYYYSSS
SUBJ: SVNXXX (PRNXX) USABLE JDAY JJJ/HHMM
1.     NANU TYPE: USABINIT
       NANU NUMBER: YYYYSSS
       NANU DTG: DDHHMMZ MMM YYYY
       REFERENCE NANU: N/A
       REF NANU DTG: N/A
       SVN: XXX
       PRN: XX
       START JDAY: JJJ
       START TIME ZULU: HHMM
       START CALENDAR DATE: DD MMM YYYY
       STOP JDAY: N/A
       STOP TIME ZULU: N/A
       STOP CALENDAR DATE: N/A

2.  CONDITION: GPS SATELLITE SVNXXX (PRNXX) WAS USABLE AS OF JDAY JJJ
    (DD MMM YYYY) BEGINNING HHMM ZULU.

3.  POC: CIVILIAN - NAVCEN AT 703-313-5900, HTTP://WWW.NAVCEN.USCG.GOV
    CIVIL AVIATION - FAA National Operations Control Center
    MILITARY - GPS Support Center at HTTPS://GPS.AFSPC.AF.MIL/GPSOC, DSN 560-2541,
    COMM 719-567-2493, GPS_SUPPORT@SCHRIEVER.AF.MIL, HTTP://WWW.SCHRIEVER.AF.MIL/GPS
    MILITARY ALTERNATE - JOINT SPACE OPERATIONS CENTER, DSN 276-9994.
    COMM 805-606-9994, JSPOCCOMBATOPS@VANDENBERG.AF.MIL
```

ICD870
-131

Figure 10-12 USABINIT NANU Message Template

ICD870
-132

```
NOTICE ADVISORY TO NAVSTAR USERS (NANU) YYYYSSS
SUBJ: LEAP SECOND
1.  CONDITION: THE INTERNATIONAL EARTH ROTATION SERVICE (IERS) HAS ANNOUNCED THE
    INTRODUCTION OF A LEAP SECOND TO OCCUR AT THE END OF MMM YYYY

2.  COORDINATED UNIVERSAL TIME (UTC) WILL SEQUENCE AS FOLLOWS:
              DD MMM YYYY  HH HOURS MM MINUTES SS SECONDS
              DD MMM YYYY  HH HOURS MM MINUTES SS SECONDS
              DD MMM YYYY  HH HOURS MM MINUTES SS SECONDS

3.  FOR GPS, AS WITH PREVIOUS LEAP SECOND UPDATES, THE UTC DATA IN SUBFRAME 4, PAGE 18 OF
    THE NAVIGATION MESSAGE WILL CHANGE IN ACCORDANCE WITH IS-GPS-200.

    FOR GPS, IF/AS AVAILABLE, THE UTC DATA IN MESSAGE TYPE 33 OF THE CNAV DATA FOR L2C
    WILL CHANGE IN ACCORDANCE WITH IS-GPS-200.

    FOR GPS, IF/AS AVAILABLE, THE UTC DATA IN SUBFRAME 3, PAGE 1 OF THE CNAV-2 DATA FOR
    L1C WILL CHANGE IN ACCORDANCE WITH IS-GPS-800.

    FOR GPS, IF/AS AVAILABLE, THE UTC DATA IN MESSAGE TYPE 33 OF THE CNAV DATA FOR L5
    WILL CHANGE IN ACCORDANCE WITH IS-GPS-705.

    BEFORE THE LEAP SECOND
    GPS-UTC IS XX (GPS IS AHEAD OF UTC BY XX SECONDS)

    AFTER THE LEAP SECOND
    GPS-UTC WILL BE XX (GPS WILL BE AHEAD OF UTC BY XX SECONDS)

4.  POC: CIVILIAN - NAVCEN AT 703-313-5900, HTTP://WWW.NAVCEN.USCG.GOV
    CIVIL AVIATION - FAA National Operations Control Center
    MILITARY - GPS Support Center at HTTPS://GPS.AFSPC.AF.MIL/GPSOC, DSN 560-2541,
    COMM 719-567-2493, GPS_SUPPORT@SCHRIEVER.AF.MIL, HTTP://WWW.SCHRIEVER.AF.MIL/GPS
    MILITARY ALTERNATE - JOINT SPACE OPERATIONS CENTER, DSN 276-9994.
    COMM 805-606-9994, JSPOCCOMBATOPS@VANDENBERG.AF.MIL
```

ICD870
-133

Figure 10-13 LEAPSEC NANU Message Template

ICD870-134

```
NOTICE ADVISORY TO NAVSTAR USERS (NANU) YYYYSSS
SUBJ: SVNXXX (PRNXX) LAUNCH JDAY JJJ
1.     NANU TYPE: LAUNCH
       NANU NUMBER: YYYYSSS
       NANU DTG: DDHHMMZ MMM YYYY
       SVN: XXX
       PRN: XX
       LAUNCH JDAY: JJJ
       LAUNCH TIME ZULU: HHMM

2.  GPS SATELLITE SVN XXX (PRN XX) WAS LAUNCHED ON JDAY JJJ A USABINIT NANU WILL BE SENT
    WHEN THE SATELITTE IS SET ACTIVE TO SERVICE.

3.  POC: CIVILIAN - NAVCEN AT 703-313-5900, HTTP://WWW.NAVCEN.USCG.GOV
    CIVIL AVIATION - FAA National Operations Control Center
    MILITARY - GPS Support Center at HTTPS://GPS.AFSPC.AF.MIL/GPSOC, DSN 560-2541,
    COMM 719-567-2493, GPS_SUPPORT@SCHRIEVER.AF.MIL, HTTP://WWW.SCHRIEVER.AF.MIL/GPS
    MILITARY ALTERNATE - JOINT SPACE OPERATIONS CENTER, DSN 276-9994.
    COMM 805-606-9994, JSPOCCOMBATOPS@VANDENBERG.AF.MIL
```

ICD870-135

Figure 10-14 LAUNCH NANU Message Template

ICD870-136

```
NOTICE ADVISORY TO NAVSTAR USERS (NANU) YYYYSSS
SUBJ: SVNXXX (PRNXX) DECOMMISSIONING JDAY JJJ/HHMM
1.     NANU TYPE: DECOM
       NANU NUMBER: YYYYSSS
       NANU DTG: DDHHMMZ MMM YYYY
       REFERENCE NANU: YYYYSSS
       REF NANU DTG: DDHHMMZ MMM YYYY
       SVN: XXX
       PRN: XX
       UNUSABLE START JDAY: JJJ
       UNUSABLE START TIME ZULU: HHMM
       UNUSABLE START CALENDAR DATE: DD MMM YYYY
       DECOMMISSIONING START JDAY: JJJ
       DECOMMISSIONING START TIME ZULU: HHMM
       DECOMMISSIONING START CALENDAR DATE: DD MMM YYYY


2.  CONDITION: GPS SATELLITE SVNXXX (PRNXX) WAS UNUSABLE AS OF JDAY JJJ (DD MMM YYYY) AND
    REMOVED FROM THE GPS CONSTELLATION ON JDAY JJJ (DD MMM YYYY) AT HHMM ZULU.

3.  POC: CIVILIAN - NAVCEN AT 703-313-5900, HTTP://WWW.NAVCEN.USCG.GOV
    CIVIL AVIATION - FAA National Operations Control Center
    MILITARY - GPS Support Center at HTTPS://GPS.AFSPC.AF.MIL/GPSOC, DSN 560-2541,
    COMM 719-567-2493, GPS_SUPPORT@SCHRIEVER.AF.MIL, HTTP://WWW.SCHRIEVER.AF.MIL/GPS
    MILITARY ALTERNATE - JOINT SPACE OPERATIONS CENTER, DSN 276-9994.
    COMM 805-606-9994, JSPOCCOMBATOPS@VANDENBERG.AF.MIL
```

ICD870-137

Figure 10-15 DECOM NANU Message Template

ICD870-138

10.2 NANU Notification Times

ICD870-139

NANU messages announcing scheduled events are normally distributed to the user community prior to the event. NANU messages announcing unscheduled events are normally distributed to the user community as soon as practical after the event. However, mission critical problems have priority over user notification and therefore may delay normal NANU distribution. NANU notification times typically vary by NANU group. Nominal and objective NANU notification times for the four NANU groups are summarized in Table 10-IV.

ICD870-140

Table 10-IV NANU Notification Times

ICD870-141

NANU Group	Nominal Notification Times	Objective
Scheduled	48 hrs prior to outage start	96 hrs prior to outage start
Unscheduled	Less than 1 hr after outage start	15 minutes after outage start
General	No Nominal – Timing determined on a case-by-case basis	
Other	No Nominal – Timing determined on a case-by-case basis	

ICD870-142

The length of the outage time specified in scheduled NANU messages is typically longer than the expected maintenance time to allow for minor variations in the time required to accomplish a particular maintenance activity.

ICD870-143

10.3 NANU Message Format

ICD870-144

The NANU message structure for all messages, except the General, LAUNCH, DECOM, and LEAPSEC messages, is based on a tabular format that simplifies the readability of data. A template for these messages is illustrated in Figure 10-16. These messages are arranged into a header and three sections. The following paragraphs explain this message format in more detail.

ICD870-145

```
NOTICE ADVISORY TO NAVSTAR USERS (NANU) YYYYNNN
SUBJ: SVNXXX (PRNXX) FORECAST OUTAGE JDAY JJJ/HHMM - JDAY JJJ/HHMM
1.  NANU TYPE: FCSTDV
     NANU NUMBER: YYYYNNN
     NANU DTG: DDHHMMZ MMM YYYY
     REFERENCE NANU: YYYYNNN
     REF NANU DTG: DDHHMMZ MMM YYYY
     SVN: XXX
     PRN: XX
     START JDAY: JJJ
     START TIME ZULU: HHMM
     START CALENDAR DATE: DD MMM YYYY
     STOP JDAY: JJJ
     STOP TIME ZULU: HHMM
     STOP CALENDAR DATE: DD MMM YYYY

2.  CONDITION: GPS SATELLITE SVNXXX (PRNXX) WILL BE UNUSABLE ON JDAY JJJ
     (DD MMM YYYY) BEGINNING HHMM ZULU UNTIL JDAY JJJ (DD MMM YYYY) ENDING HHMM ZULU.

3.  POC: CIVILIAN - NAVCEN AT (703)313-5900, HTTP://WWW.NAVCEN.USCG.GOV
    CIVIL AVIATION - FAA National Operations Control Center
     MILITARY - GPS Operations Center at HTTPS://GPS.AFSPC.AF.MIL/GPSOC, DSN 560-2541,
     COMM 719-567-2541, GPS_SUPPORT@SCHRIEVER.AF.MIL, HTTPS://GPS.AFSPC.AF.MIL
     MILITARY ALTERNATE - JOINT SPACE OPERATIONS CENTER, DSN 276-9994,
     COMM 805-606-9994, JSPOCCOMBATOPS@VANDENBERG.AF.MIL
```

ICD870-146

Figure 10-16 NANU Message Template

ID	ICD-GPS-870 RevB (24 Sep 2013) Navstar GPS Control Segment to User Support Community Interfaces
ICD870 -147	### 10.3.1 NANU Header
ICD870 -148	The first line of the header includes the title “NOTICE ADVISORY TO NAVSTAR USERS (NANU)” and the assigned identification (ID) number for that NANU message. The ID number consists of the four-digit year followed by a sequentially assigned three-digit number which begins at 001 for the first NANU on the first day of a new year. The ID number is incremented for each new NANU up to a maximum of 999 in any given calendar year, after which the ID number rolls over and begins numbering subsequent NANUs beginning with 001. The second line identifies the subject of the message including the Space Vehicle Number (SVN), SV Pseudo Random Noise (PRN) number, type of message, and effective dates for the event. The three digit SVN field and two digit PRN number are zero padded. The date is in Julian day-of-year format (JDAY), numbered from 001 to 366, and the time is Zulu referenced in a 24-hour, two digit hour (HH) and two digit minute (MM) format. The NANU header is illustrated in Figure 10-17.
ICD870 -149	YYYYNNN----------------------- NOTICE ADVISORY TO NAVSTAR USERS (NANU) YYYYNNN SUBJ: SVNXXX (PRNXX) FORECAST OUTAGE JDAY JJJ/HHMM - JDAY JJJ/HHMM 1. NANU TYPE: FCSTDV NANU NUMBER: YYYYNNN NANU DTG: DDHHMMZ MMM YYYY REFERENCE NANU: YYYYNNN REF NANU DTG: DDHHMMZ MMM YYYY SVN: XXX
ICD870 -150	**Figure 10-17 NANU Header**
ICD870 -151	### 10.3.2 NANU Section 1
ICD870 -152	Section 1 provides the message description, reference information, satellite identification and outage time in a tabular format.
ICD870 -153	#### *10.3.2.1 NANU Message Description*
ICD870 -154	The message description includes the NANU type acronym, NANU number, and Day Time Group (DTG). The NANU type acronym is as previously described in paragraphs 10.1.1, 10.1.2, and 10.1.4. The NANU number is as previously described in paragraph 10.3.1. The DTG provides the date the NANU was created. The DTG format is represented as DDHHMM “Z” MMM YYYY. The first two digits identify the calendar day (DD) followed by the hour (HH) and minutes (MM). The letter Z indicates that the time is given in Zulu reference. This is followed by the first three letters of the month (MMM) and the four-digit year (YYYY). This portion of the message is illustrated in Figure 10-18.

ICD870 -155	YYYYNNN---------- NOTICE ADVISORY TO NAVSTAR USERS (NANU) YYYYNNN SUBJ: SVNXXX (PRNXX) FORECAST OUTAGE JDAY JJJ/HHMM - JDAY JJJ/HHMM 1. NANU TYPE: FCSTDV NANU NUMBER: YYYYNNN NANU DTG: DDHHMMZ MMM YYYY REFERENCE NANU: YYYYNNN REF NANU DTG: DDHHMMZ MMM YYYY SVN: XXX
ICD870 -156	**Figure 10-18 Message Description**
ICD870 -157	### *10.3.2.2 NANU Reference Information*
ICD870 -158	As shown in Figure 10-19, the reference information serves to close, extend, cancel, or reschedule previously broadcast messages. The data conveyed in this section includes the message ID number (YYYYNNN) and DTG (REF NANU DTG) of a previously broadcast message. Both of these items will be noted as N/A if the current message is not a follow up message.
ICD870 -159	YYYYNNN---------- NOTICE ADVISORY TO NAVSTAR USERS (NANU) YYYYNNN SUBJ: SVNXXX (PRNXX) FORECAST OUTAGE JDAY JJJ/HHMM - JDAY JJJ/HHMM 1. NANU TYPE: FCSTDV NANU NUMBER: YYYYNNN NANU DTG: DDHHMMZ MMM YYYY REFERENCE NANU: YYYYNNN REF NANU DTG: DDHHMMZ MMM YYYY SVN: XXX PRN: XX
ICD870 -160	**Figure 10-19 Reference Information**
ICD870 -161	### *10.3.2.3 Satellite Identification*
ICD870 -162	As shown in Figure 10-20, the satellite identification information specifies the satellite that is the subject of the NANU. The identification information includes the satellite three-digit SVN and two-digit PRN number. The SVN field and PRN number are zero padded.
ICD870 -163	YYYYNNN---------- NOTICE ADVISORY TO NAVSTAR USERS (NANU) YYYYNNN SUBJ: SVNXXX (PRNXX) FORECAST OUTAGE JDAY JJJ/HHMM - JDAY JJJ/HHMM 1. NANU TYPE: FCSTDV NANU NUMBER: YYYYNNN NANU DTG: DDHHMMZ MMM YYYY REFERENCE NANU: YYYYNNN REF NANU DTG: DDHHMMZ MMM YYYY SVN: XXX PRN: XX START JDAY: JJJ START TIME ZULU: HHMM START CALENDAR DATE: DD MMM YYYY STOP JDAY: JJJ
ICD870	**Figure 10-20 Satellite Identification Information**

-164	
ICD870 -165	### *10.3.2.4 Outage Time*
ICD870 -166	As shown in Figure 10-21, the outage time variables include start and stop dates and times. The start day is provided in three-digit Julian Day-of-Year format (JJJ = 001 to 366) as well as calendar day-month-year format. The calendar day is represented as two digits (DD), followed by the first three letters of the month (MMM) followed by the four-digit year (YYYY). The start time is given in Zulu time in a 24-hour, two-digit hour (HH), and two-digit minute (MM) format. The stop dates and time follow the same formats as the start dates and time.
ICD870 -167	YYYYNNN---------- NOTICE ADVISORY TO NAVSTAR USERS (NANU) YYYYNNN SUBJ: SVNXXX (PRNXX) FORECAST OUTAGE JDAY JJJ/HHMM - JDAY JJJ/HHMM 1. NANU TYPE: FCSTDV NANU NUMBER: YYYYNNN NANU DTG: DDHHMMZ MMM YYYY REFERENCE NANU: YYYYNNN REF NANU DTG: DDHHMMZ MMM YYYY SVN: XXX PRN: XX START JDAY: JJJ START TIME ZULU: HHMM START CALENDAR DATE: DD MMM YYYY STOP JDAY: JJJ STOP TIME ZULU: HHMM STOP CALENDAR DATE: DD MMM YYYY
ICD870 -168	**Figure 10-21 Outage Time**
ICD870 -169	### 10.3.3 NANU Section 2
ICD870 -170	As shown in Figure 10-22, Section 2 is a summary of the NANU in paragraph format including the satellite three-digit SVN and two-digit PRN number, text description of the event, start and stop date(s) in Julian and calendar date formats, and start and stop time(s) in Zulu hours and minutes. The SVN field and PRN number are zero padded.
ICD870 -171	2. CONDITION: GPS SATELLITE SVNXXX (PRNXX) WILL BE UNUSABLE ON JDAY JJJ (DD MMM YYYY) BEGINNING HHMM ZULU UNTIL JDAY JJJ (DD MMM YYYY) ENDING HHMM ZULU.
ICD870 -172	**Figure 10-22 NANU Section 2**
ICD870 -173	### 10.3.4 NANU Section 3
ICD870	Section 3 of the NANU identifies points of contact for additional technical and support information. An

ID	ICD-GPS-870 RevB (24 Sep 2013) Navstar GPS Control Segment to User Support Community Interfaces
-174	example of this section is illustrated in Figure 10-23.
ICD870 -175	3. POC: CIVILIAN - NAVCEN AT (703)313-5900, HTTP://WWW.NAVCEN.USCG.GOV CIVIL AVIATION - FAA National Operations Control Center MILITARY - GPS Operations Center at HTTPS://GPS.AFSPC.AF.MIL/GPSOC, DSN 560-2541, COMM 719-567-2541, GPS_SUPPORT@SCHRIEVER.AF.MIL, HTTPS://GPS.AFSPC.AF.MIL MILITARY ALTERNATE - JOINT SPACE OPERATIONS CENTER, DSN 276-9994, COMM 805-606-9994, JSPOCCOMBATOPS@VANDENBERG.AF.MIL
ICD870 -176	**Figure 10-23 Contact Information**
ICD870 -177	**11 TBD**
ICD870 -178	**12 TBD**
ICD870 -179	**13 TBD**
ICD870 -180	**14 TBD**
ICD870 -181	**15 TBD**
ICD870 -182	**16 TBD**
ICD870 -183	**17 TBD**
ICD870 -184	**18 TBD**
ICD870 -185	**19 TBD**
ICD870 -186	**20 APPENDIX 2: OPERATIONAL ADVISORY DATA FILE**
ICD870 -187	Appendix 2 describes the Operational Advisory message format.

ICD870-188

20.1 Operational Advisory

ICD870-189

The Operational Advisory (OA) message provides a summary of the satellite constellation status. An example is shown in Figure 20-1. The OA is arranged in three sections. The following paragraphs describe each section and subsection of the OA.

ICD870-190

```
UNCLASSIFIED
GPS OPERATIONAL ADVISORY        086.OA1
SUBJ: GPS STATUS      27 MAR 2009

1. SATELLITES, PLANES, AND CLOCKS (CS=CESIUM RB=RUBIDIUM):
A. BLOCK I  : NONE
B. BLOCK II : PRNS 01, 02, 03, 04, 05, 06, 07, 08, 09, 10, 11, 12, 13, 14
   PLANE    : SLOT B2, D1, C2, D4, B6, C5, A6, A3, A1, E3, D2, B4, F3, F1
   CLOCK    :      RB, RB, CS, RB, RB, RB, RB, CS, CS, CS, RB, RB, RB, RB
   BLOCK II : PRNS 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28
   PLANE    : SLOT F2, B1, C4, E4, C3, E1, D3, E2, F4, D5, A5, F5, A4, B3
   CLOCK    :      RB, RB, RB, RB, RB, RB, RB, RB, RB, CS, RB, RB, CS, RB
   BLOCK II : PRNS 29, 30, 31, 32
   PLANE    : SLOT C1, B5, A2, E5
   CLOCK    :      RB, CS, RB, RB
C*.BLOCK III: PRNS 33, 34, 35
   PLANE    : SLOT A2, C3, F4
   CLOCK    :      RB, RB, RB
2. CURRENT ADVISORIES AND FORECASTS:
A. FORECASTS:           FOR SEVEN DAYS AFTER EVENT CONCLUDES.
NANU          MSG DATE/TIME       PRN  TYPE         SUMMARY (JDAY/ZULU TIME START - STOP)

2009022       261836Z MAR 2009    18   FCSTDV       092/1600-093/0630
B. ADVISORIES:
NANU          MSG DATE/TIME       PRN  TYPE         SUMMARY (JDAY/ZULU TIME START - STOP)

C. GENERAL:
NANU          MSG DATE/TIME       PRN  TYPE         SUMMARY (JDAY/ZULU TIME START - STOP)

2009020       202158Z MAR 2009         GENERAL      /-/
2009021       241836Z MAR 2009    01   LAUNCH       /-/
2009023       262212Z MAR 2009         GENERAL      /-/
3. REMARKS:
A. THE POINT OF CONTACT FOR GPS MILITARY OPERATIONAL SUPPORT IS THE GPS
OPERATIONS CENTER AT (719)567-2541 OR DSN 560-2541.
B. CIVILIAN:  FOR INFORMATION, CONTACT US COAST GUARD NAVCEN AT
COMMERCIAL (703)313-5900 24 HOURS DAILY AND INTERNET
HTTP://WWW.NAVCEN.USCG.GOV
C. MILITARY SUPPORT WEBPAGES CAN BE FOUND AT THE FOLLOWING
HTTPS://GPS.AFSPC.AF.MIL/GPS OR HTTPS://GPS.AFSPC.AF.MIL/GPSOC
```

*Note: Section 1.C of the example OA message shown above contains example data for the GPS III SVs to show the type of data that will go in this section in the OCX era. This example is not meant to represent the actual GPS constellation configuration.

ICD870-191

Figure 20-1 Sample Operational Advisory

ICD870-192

20.2 OA Header.

ICD870-193

The header includes the title “GPS OPERATIONAL ADVISORY,” the subject “SUBJ: GPS STATUS” and the date. The date is represented in a format that includes two-digit day (DD), the first three characters of the month (MMM), and four-digit year (YYYY). The OA header is illustrated in Figure 20-2.

ICD870-194

```
UNCLASSIFIED
GPS OPERATIONAL ADVISORY        086.OA1
SUBJ: GPS STATUS       27 MAR 2009
```

Figure 20-2 OA Header

ICD870-195

20.3 OA Section 1

ICD870-196

ICD870-197

Section 1 lists operational satellites by PRN number, assigned plane, and clock in current use. The PRN number is a two digit number that is zero padded. Subsection 1.A previously identified operational satellites in Block I. However, these satellites are no longer operational, so this subsection includes the word "NONE". Subsection 1.B identifies satellites within Block II that are currently in use. Subsection 1.C identifies satellites within Block III that are currently in use. The example data shown for Section 1 is not meant to represent the actual GPS constellation configuration. The abbreviations CS and RB are used to indicate Cesium and Rubidium clocks, respectively. An example of section 1 of the OA is illustrated in Figure 20-3.

ICD870-198

```
1. SATELLITES, PLANES, AND CLOCKS (CS=CESIUM RB=RUBIDIUM):
A. BLOCK I  : NONE
B. BLOCK II : PRNS 01, 02, 03, 04, 05, 06, 07, 08, 09, 10, 11, 12, 13, 14
   PLANE    : SLOT B2, D1, C2, D4, B6, C5, A6, A3, A1, E3, D2, B4, F3, F1
   CLOCK    :      RB, RB, CS, RB, RB, RB, RB, CS, CS, CS, RB, RB, RB, RB
   BLOCK II : PRNS 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28
   PLANE    : SLOT F2, B1, C4, E4, C3, E1, D3, E2, F4, D5, A5, F5, A4, B3
   CLOCK    :      RB, RB, RB, RB, RB, RB, RB, RB, RB, CS, RB, RB, CS, RB
   BLOCK II : PRNS 29, 30, 31, 32
   PLANE    : SLOT C1, B5, A2, E5
   CLOCK    :      RB, CS, RB, RB
C. BLOCK III: PRNS 33, 34, 35
   PLANE    : SLOT A2, C3, F4
   CLOCK    :      RB, RB, RB
```

Figure 20-3 OA Section 1

ICD870-199

20.4 OA Section 2

ICD870-200

ICD870-201

Section 2 contains a summary of current and recent advisories, forecasts, and general text messages. It is organized into three subsections. Subsection 2A summarizes scheduled NANU messages. Subsection 2B summarizes advisory messages (messages with prefix UNU). Section 2C summarizes general text messages. The PRN number is zero-padded. An example of section 2 of the OA is illustrated in Figure 20-4.

ICD870-202

```
2. CURRENT ADVISORIES AND FORECASTS:
A. FORECASTS:              FOR SEVEN DAYS AFTER EVENT CONCLUDES.
NANU          MSG DATE/TIME       PRN  TYPE         SUMMARY (JDAY/ZULU TIME START - STOP)

2009022       261836Z MAR 2009    18   FCSTDV       092/1600-093/0630
B. ADVISORIES:
NANU          MSG DATE/TIME       PRN  TYPE         SUMMARY (JDAY/ZULU TIME START - STOP)

C. GENERAL:
NANU          MSG DATE/TIME       PRN  TYPE         SUMMARY (JDAY/ZULU TIME START - STOP)

2009020       202158Z MAR 2009         GENERAL      /-/
2009021       241836Z MAR 2009    01   LAUNCH       /-/
2009023       262212Z MAR 2009         GENERAL      /-/
```

ICD870-203

Figure 20-4 OA Section 2

ICD870-204

20.5 OA Section 3

ICD870-205

Section 3 identifies points of contact for additional technical and support information. It is organized into three subsections, each in text format. An example of section 3 of the OA is illustrated in Figure 20-5.

ICD870-206

```
3. REMARKS:
A. THE POINT OF CONTACT FOR GPS MILITARY OPERATIONAL SUPPORT IS THE GPS
OPERATIONS CENTER AT (719)567-2541 OR DSN 560-2541.
B. CIVILIAN:  FOR INFORMATION, CONTACT US COAST GUARD NAVCEN AT
COMMERCIAL (703)313-5900 24 HOURS DAILY AND INTERNET
HTTP://WWW.NAVCEN.USCG.GOV
C. MILITARY SUPPORT WEBPAGES CAN BE FOUND AT THE FOLLOWING
HTTPS://GPS.AFSPC.AF.MIL/GPS OR HTTPS://GPS.AFSPC.AF.MIL/GPSOC
```

ICD870-207

Figure 20-5 OA Section 3

ICD870-208

21 TBD

ICD870-209

22 TBD

ICD870-210

23 TBD

ICD870-211

24 TBD

ICD870-212

25 TBD

ID	ICD-GPS-870 RevB (24 Sep 2013) Navstar GPS Control Segment to User Support Community Interfaces
ICD870-213	**26 TBD**
ICD870-214	**27 TBD**
ICD870-215	**28 TBD**
ICD870-216	**29 TBD**
ICD870-217	**30 APPENDIX 3: ALMANAC DATA FILES**
ICD870-218	Appendix 3 describes the SEM and YUMA Almanac message formats.
ICD870-219	**30.1 Almanac Description**
ICD870-220	The Almanac is a subset of GPS satellite clock and ephemeris data, with reduced precision. The CS provides the GPS Almanac in two formats, YUMA and System Effectiveness Model (SEM). Each Almanac format is broken into two files. YUMA files are named current.alm (PRNs 1-32) and current.blm (PRNs 1-63). SEM files are named current.al3 (PRNs 1-32) and current.bl3 (PRNs 1-63). The YUMA Almanac is an easy-to-read format of the Almanac data, while the SEM format is intended as input for software tools.
ICD870-221	**30.2 SEM Almanac Parameters Definition**
ICD870-222	The SEM Almanac parameters are defined in paragraph 20.3.3.5.1.2 of IS-GPS-200. The number of bits, scale factor for the least significant bit (LSB), range, and units of the Almanac parameters are specified in Table 20-VI of IS-GPS-200.
ICD870-223	**30.3 SV Health Word**
ICD870-224	While the orbital description data is generally usable for months, the satellite health may change at any time. The SEM and YUMA Almanac data formats also include an SV health word. The SV health word is defined in paragraph 20.3.3.5.1.3 and Table 20-VIII of IS-GPS-200. Table 30-I shows the 3 MCS health categories for satellites commonly used by 2 SOPS (ACTIVE, BAD & DEAD). The "OTHER" MCS health category is a generalized term for the remaining states/conditions defined by IS-GPS-200 which may be used by 2 SOPS in the future. Table 30-I also specifies the binary health words used in SV navigation (NAV) messages and the

equivalent decimal representations used by both the SEM and YUMA Almanacs. The SV health word is found in cell R-7 of each record in the SEM Almanac. It is found on the third line of each record in the YUMA Almanac. Users of the SEM and YUMA Almanacs should be prepared for any potential future 2 SOPS use of other MCS health categories, as defined by codes in IS-GPS-200, Table 20-VIII.

ICD870-225

Table 30-I Six-Bit SV Health Word in Almanac

ICD870-226

SV Health Category	Six Bit SV Health Word in NAV message	Numerical Representation of Six-Bit Health Word in SEM & YUMA Almanac
ACTIVE	000000	0
OTHER	000001	1
OTHER	000010	2
OTHER	000011	3
OTHER	000100	4
OTHER	000101	5
OTHER	000110	6
OTHER	000111	7
OTHER	001000	8
OTHER	001001	9
OTHER	001010	10
OTHER	001011	11
OTHER	001100	12
OTHER	001101	13
OTHER	001110	14
OTHER	001111	15
OTHER	010000	16
OTHER	010001	17
OTHER	010010	18
OTHER	010011	19
OTHER	010100	20
OTHER	010101	21
OTHER	010110	22
OTHER	010111	23
OTHER	011000	24
OTHER	011001	25
OTHER	011010	26
OTHER	011011	27
OTHER	011100	28
OTHER	011101	29
OTHER	011110	30
OTHER	011111	31
OTHER	100000	32
OTHER	100001	33

OTHER	100010	34
OTHER	100011	35
OTHER	100100	36
OTHER	100101	36
OTHER	100110	38
OTHER	100111	39
OTHER	101000	40
OTHER	101001	41
OTHER	101010	42
OTHER	101011	43
OTHER	101100	44
OTHER	101101	45
OTHER	101110	46
OTHER	101111	47
OTHER	110000	48
OTHER	110001	49
OTHER	110010	50
OTHER	110011	51
OTHER	110100	52
OTHER	110101	53
OTHER	110110	54
OTHER	110111	55
OTHER	111000	56
OTHER	111001	57
OTHER	111010	58
OTHER	111011	59
BAD	111100	60
OTHER	111101	61
OTHER	111110	62
DEAD	111111	63

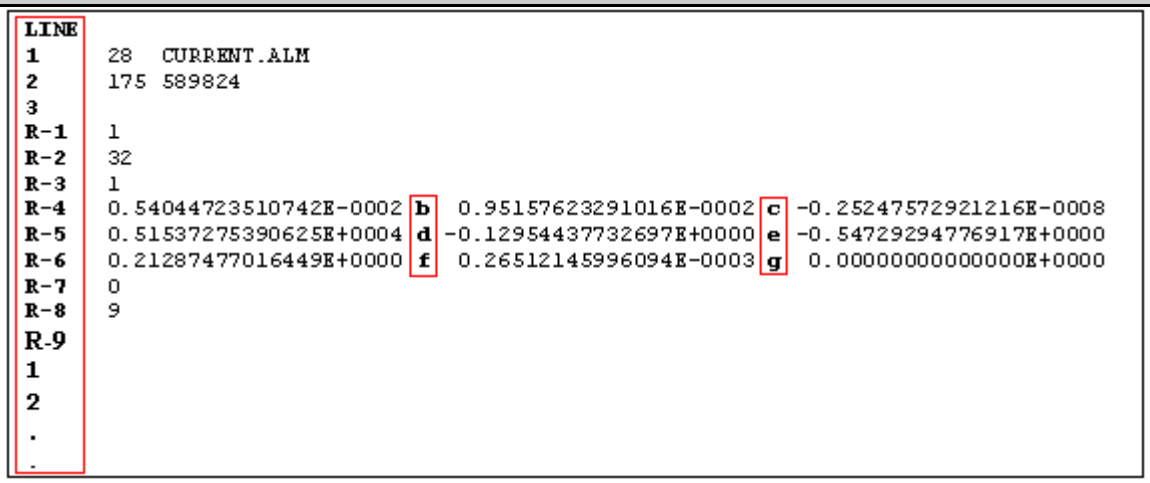
ICD870-227

30.4 SEM Almanac Format

ICD870-228

The SEM format file example in Figure 30-1 is arranged with a header that identifies the number of records (number of satellites) and file name (current.al3). The SEM Almanac sample illustrated below is a data sample of one record out of 28 in this sample file and its parameter definition, as stated in the note of Figure 30-1, is in Table 30-II. There is an additional SEM file with a file name extension of .bl3 that is identical to .al3, except for the number of records range, PRN number range and SVN number field. All parameters are listed in Table 30-III.

ICD870-229



ICD870-230

Figure 30-1 SEM Data Sample for Current.al3

ICD870-231

Note: The **bold** letters and numbers in the rectangles are not part of the SEM format; they are used for identification purposes in Table 30-II. Table 30-II identifies the characteristics of each parameter in the SEM Almanac.

ICD870-232

Table 30-II SEM Almanac Description for Current.al3

ICD870-233

(Sheet 1 of 2)

ICD870-234

Line No.	Almanac Name	Description	Units	Range	Accuracy	Precision
1	Number of records	The number of satellite Almanac records contained in the file	Records	0 to 32	1	2 significant digits
	Name of Almanac	Descriptive name for the Almanac in the file	N/A	Any combination of valid ASCII characters	N/A	24 significant characters
2	GPS Week Number	The Almanac reference week number (WNa) for all Almanac data in the file	Weeks	0 to 1023 *	1	4 significant digits

	GPS Time of Applicability	The number of seconds since the beginning of the Almanac reference week. The Almanac reference time (t_{oa}) for all Almanac data in the file	Second	0 to 602,112	1	6 significant digits
3	Blank line for format spacing					
Record Format						
R-1	PRN Number	The satellite PRN number. This is a required data item as it is the GPS user's primary means of identifying GPS satellites. It is equivalent to the space vehicle identification (SVID) number of the SV	None	1 to 32	None	2 significant digits
R-2	SVN	The SV reference number. Unique sequential number associated with each satellite	None	0 to 255 (zero denotes that this field is empty)	None	3 significant digits
R-3	Average URA Number	The satellite "average" URA** number. This is not an item in the raw Almanac file but is based on the average URA value transmitted by this satellite in subframe 1. The URA is taken in the range of 730 hours	None	0 to 15	1	2 significant digits
R-4	Eccentricity	This defines the amount of the orbit deviation from a circular orbit (e)**	Unitless	0 to 3.125 E-2	4.77 E-7	7 significant digits

ICD870-235

Table 30-II SEM Almanac Description for Current.al3

ICD870-236

(Sheet 2 of 2)

ICD870-237

Line No	Almanac Name	Description	Units	Range	Accuracy	Precision
b	Inclination Offset	Satellite Almanac orbital "inclination angle offset" (δ_i)** This does not include the 0.30 semicircle reference value (i_0)**	Semi circles	-6.25 E-2 to +6.25 E-2	1.91 E-6	7 significant digits

c	Rate of Right Ascension	Rate of change in the measurement of the angle of right ascension (Ω-DOT)**	Semi circles/ second	-1.1921 E-7*** to +1.1921 E-7***	3.64 E-12	7 significant digits
R-5	Square Root of Semi-Major Axis	Measurement from the center of the orbit to either the point of apogee or the point of perigee ($A^{1/2}$)**	$Meters^{1/2}$	0 to 8,192	4.88 E-04	9 significant digits
d	Geographic Longitude of Orbital Plane	Geographic longitude of the orbital plane at the weekly epoch" (Ω_0)**	Semi circles	-1.0 to +1.0	1.19 E-07	9 significant digits
e	Argument of Perigee	The angle from the equator to perigee (ω)**	Semi circles	-1.0 to +1.0	1.19 E-07	9 significant digits
R-6	Mean Anomaly	The angle which describes the position of the satellite in its orbit, relative to perigee. (M_0)**	Semi circle	-1.0 to +1.0	1.19 E-07	9 significant digits
f	Zeroth Order Clock Correction	The satellite Almanac zeroth order clock correction term (a_{f0})**	Seconds	-9.7657 E-4*** to +9.7657 E-4***	9.54 E-07	5 significant digits
g	First Order Clock Correction	The satellite Almanac first order clock correction term (a_{f1})**	Seconds/ second	-3.7253 E-9*** to +3.7253 E-9***	3.64 E-12	5 significant digits
R-7	Satellite Health	The satellite subframe 4 and 5, page 25 six-bit health code **	None	0 to 63	None	2 significant digits
R-8	Satellite Configuration	The satellite subframe 4, page 25 four-bit configuration code **	None	0 to 15	None	2 significant digits
R-9	Blank line for format spacing					

*GPS Week Number as distributed by the CS is a modulo 1024 (0-1023) decimal number representing the modulo 1024 binary week number broadcast from an SV (see IS-GPS-200). Some user applications (such as the SEM program) may require the user to replace the modulo 1024 week number in this format with the full decimal week number (e.g., 0-65,535) in order to determine the correct calendar date of the Almanac.
**As defined in IS-GPS-200.
***Rounded up from max range of IS-GPS-200 binary format.

ICD870-238

Table 30-III SEM Almanac Description for Current.bl3

ICD870-308

(Sheet 1 of 2)

ICD870-239

Line No.	Almanac Name	Description	Units	Range	Accuracy	Precision

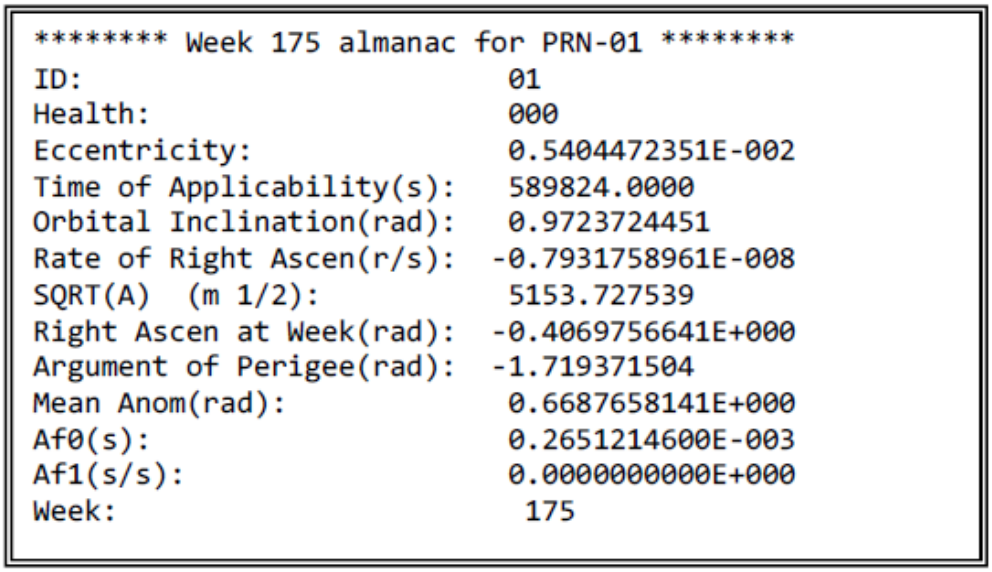
1	Number of records	The number of satellite Almanac records contained in the file	Records	00 to 63	1	2 significant digits
	Blank space for format spacing					
	Name of Almanac	Descriptive name for the Almanac in the file	N/A	Any combination of valid ASCII characters	N/A	24 significant characters
2	GPS Week Number	The Almanac reference week number (WNa) for all Almanac data in the file	Weeks	0 to 1023 *	1	4 significant digits
	Blank space for format spacing					
	GPS Time of Applicability	The number of seconds since the beginning of the Almanac reference week. The Almanac reference time (t_{oa}) for all Almanac data in the file	Second	0 to 602,112	1	6 significant digits
3	Blank line for format spacing					
Record Format						
R-1	PRN Number	The satellite PRN number. This is a required data item as it is the GPS user's primary means of identifying GPS satellites. It is equivalent to the space vehicle identification (SVID) number of the SV	None	01 to 63	None	2 significant digits
R-2	SVN	The SV reference number. Unique sequential number associated with each satellite**	None	000 to 255 (000 denotes that this field is empty)	None	3 significant digits
R-3	Average URA Number	The satellite "average" URA*** number. This is not an item in the raw Almanac file but is based on the average URA value transmitted by this satellite in subframe 1. The URA is taken in the range of 730 hours	None	0 to 15	1	2 significant digits
R-4	Eccentricity	This defines the amount of the orbit deviation from a circular orbit (e)***	Unitless	0 to 3.125 E-2	4.77 E-7	7 significant digits

ICD870 **Table 30-III SEM Almanac Description for Current.bl3**

ICD870
-307

Line No	Almanac Name	Description	Units	Range	Accuracy	Precision
b	Inclination Offset	Satellite Almanac orbital "inclination angle offset" (δ_i)*** This does not include the 0.30 semicircle reference value (i_0)***	Semi circles	-6.25 E-2 to +6.25 E-2	1.91 E-6	7 significant digits
c	Rate of Right Ascension	Rate of change in the measurement of the angle of right ascension (Ω-DOT)***	Semi circles/ second	-1.1921 E-7**** to +1.1921 E-7****	3.64 E-12	7 significant digits
R-5	Square Root of Semi-Major Axis	Measurement from the center of the orbit to either the point of apogee or the point of perigee ($A^{1/2}$)***	$Meters^{1/2}$	0 to 8,192	4.88 E-04	9 significant digits
d	Geographic Longitude of Orbital Plane	Geographic longitude of the orbital plane at the weekly epoch" (Ω_0)***	Semi circles	-1.0 to +1.0	1.19 E-07	9 significant digits
e	Argument of Perigee	The angle from the equator to perigee (ω)***	Semi circles	-1.0 to +1.0	1.19 E-07	9 significant digits
R-6	Mean Anomaly	The angle which describes the position of the satellite in its orbit, relative to perigee. (M_0)***	Semi circle	-1.0 to +1.0	1.19 E-07	9 significant digits
f	Zeroth Order Clock Correction	The satellite Almanac zeroth order clock correction term (a_{f0})***	Seconds	-9.7657 E-4**** to +9.7657 E-4****	9.54 E-07	5 significant digits
g	First Order Clock Correction	The satellite Almanac first order clock correction term (a_{f1})***	Seconds/ second	-3.7253 E-9**** to +3.7253 E-9****	3.64 E-12	5 significant digits
R-7	Satellite Health	The satellite subframe 4 and 5, page 25 six-bit health code ***	None	0 to 63	None	2 significant digits
R-8	Satellite Configuration	The satellite subframe 4, page 25 four-bit configuration code ***	None	0 to 15	None	2 significant digits
R-9	Blank line for format spacing					

*GPS Week Number as distributed by the CS is a modulo 1024 (0-1023) decimal number representing the modulo 1024 binary week number broadcast from an SV (see IS-GPS-200). Some user applications (such as the SEM program) may require the user to replace the modulo 1024 week number in this format with the full decimal week number (e.g., 0-65,535) in order to determine the correct calendar date of the Almanac.
** SVN Number as distributed by the CS is a modulo 256 (000-255) filled with leading zeros.
***As defined in IS-GPS-200.
****Rounded up from max range of IS-GPS-200 binary format.

ICD870-240	## 30.5 YUMA Almanac Format
ICD870-241	Parameters used in the YUMA format are not the same as used in the SEM format. The YUMA angular units are in radians whereas the SEM angular units are in semicircles. In addition, the YUMA Orbital Inclination is a direct measure of inclination angle (approximately 55 degrees), whereas the SEM Inclination Offset is relative to 0.30 semicircles (54 degrees). The parameters of the YUMA Almanac are identified within the message structure. Entries for ID, Health, and Week are represented in decimal format.
ICD870-242	Figure 30-2 illustrates one record in a current.alm YUMA Almanac file sample. The maximum number of records in a current.alm file is 32 and this file addresses PRNs 1-32. Line one of each record identifies the week in which the file was generated as well as the PRN number of the subject SV. There is an additional YUMA file with a file name extension of .blm that is identical to .alm, except that it addresses PRNs 01-63 and the range of number of records or ID number in a current.blm file is 00-63.
ICD870-243	
ICD870-244	Figure 30-2 YUMA Almanac Data Sample For Current.alm
ICD870	# 31 TBD

-245	
ICD870 -246	**32 TBD**
ICD870 -247	**33 TBD**
ICD870 -248	**34 TBD**
ICD870 -249	**35 TBD**
ICD870 -250	**36 TBD**
ICD870 -251	**37 TBD**
ICD870 -252	**38 TBD**
ICD870 -253	**39 TBD**
ICD870 -254	**40 APPENDIX 4: EXTENDED SIGNALS HEALTH STATUS FILES**
ICD870 -255	Appendix 4 describes the Extended Signals Health Status (ESHS) message format.
ICD870 -256	**40.1 Extended Signals Health Status**
ICD870 -257	The Extended Signals Health Status (ESHS) data message provides the health status of each of the modernized civil signals (L1C, L2C, and L5) for each SV, as defined in Table 40-I.
ICD870 -258	**Table 40-I Modernized Civil Signals**
ICD870 -259	

Modernized Civil Signal	L1C	L2C	L5
Reference Document	IS-GPS-800	IS-GPS-200	IS-GPS-705

Applicable SV Block/Iteration	III	IIR-M, IIF, III	IIF, III

ICD870-260

IS-GPS-200, Section 30.3.3.1.1.2, defines the signal health of L1, L2 and L5 as follows: "the three, one-bit, health indication in bits 52 through 54 of message type 10 refers to the L1, L2, and L5 signals of the transmitting SV. The health of each signal is indicated by:

0 = Signal OK,

1 = Signal bad or unavailable

ICD870-261

The ESHS format, as shown in Figure 40-1, contains a header that identifies the number of records (number of satellites), filename (extension .ale), and the health of each signal as described above. The ESHS sample shown in Figure 40-1 depicts one data record out of 28 in this sample file.

ICD870-262

LINE	Parameter Name	
1	# of Records/File Name	28 CURRENT.ALE
2	GPS Week #/GPS TOA	175 589824
3	Blank Line	
R-1	PRN	18
R-2	SVN	054
R-3	L1/L2/L5 Health Status	0-7 in binary format (000, 001, 010, 011, 100, 101, 110, 111)
R-4	Blank Line	

Note: The left columns are for information only and not part of the CURRENT.ALE file. The extended health Almanac sample (CURRENT.ALE) illustrated above is a data sample of one record out of 28 in this sample file.

After line R-4 of this example, lines R-1 through R-4 are repeated for each record in the CURRENT.ALE file.

ICD870-263

Figure 40-1 Extended Signals Health Status Data Sample

ICD870-264

Table 40-II identifies the characteristics of each parameter in the ESHS message.

ICD870

Table 40-II ESHS Description

-265

ICD870
-266

Line No.	Parameter Name	Description	Units	Range	Accuracy	Resolution
1	Number of records	The number of satellite ESHS records contained in the file	Records	00 to 63	1	2 significant digits
	Blank space for format spacing					
	Name of ESHS file	Descriptive name for the ESHS file	N/A	Any combination of valid ASCII characters	N/A	24 significant characters
2	GPS Week Number	The Almanac reference week number (WNa) for all data in the file	Weeks	0 to 1023*	1	4 significant characters
	Blank space for format spacing					
	GPS Time of Applicability	The number of seconds since the beginning of the Almanac reference week for all data in the file.	Seconds	0 to 602,112	1	6 significant characters
3	Blank Line for Format Spacing					
	Record Format					
R-1	PRN Number	The satellite PRN number. This is a required data item as it is the GPS user's primary means of identifying GPS satellites. It is equivalent to the Space Vehicle identification (SVID) number of the SV.	None	01-63	N/A	2 significant digits
R-2	SVN	The SV reference number. Unique sequential number associated with each satellite.	None	000-255 (000 denotes this field is empty)	N/A	3 significant digits
R-3	L1C/L2C/L5 Health Status	The health status of the L1C/L2C/L5 signals, defined as follows: 0 = Signal OK 1 = Signal bad or unavailable	None	0-7 in binary format (000, 001, 010, 011, 100, 101, 110, 111)	N/A	3 significant characters
R-4	Blank Line for Format Spacing					

*GPS Week Number as distributed by the CS is a modulo 1024 (0-1023) decimal number representing the modulo 1024 binary week number broadcast from an SV (see IS-GPS-200). Some user applications (such as the SEM program) may require the user to replace the modulo 1024 week number in this format with the full decimal week number (e.g., 0-65,535) in order to determine the correct calendar date of the Almanac.

ID	ICD-GPS-870 RevB (24 Sep 2013) Navstar GPS Control Segment to User Support Community Interfaces
ICD870-267	**41 TBD**
ICD870-268	**42 TBD**
ICD870-269	**43 TBD**
ICD870-270	**44 TBD**
ICD870-271	**45 TBD**
ICD870-272	**46 TBD**
ICD870-273	**47 TBD**
ICD870-274	**48 TBD**
ICD870-275	**49 TBD**
ICD870-276	**50 APPENDIX 5: ANTI-SPOOFING STATUS FILE**
ICD870-277	Appendix 5 describes the Anti-Spoofing Status message format.
ICD870-278	**50.1 Anti-Spoofing Status**
ICD870-279	The Anti-Spoofing (A-S) Status informs Users whether the Anti-Spoofing mode of each GPS SV is ON or OFF. There are two A-S Status files named as.txt and as2.txt. The message files are simple text files that identify each satellite in the GPS constellation by a two digit PRN number and a three digit SVN number and it shows the SV's A-S Status (ON/OFF). The difference between the two A-S Status files is the PRN Numbers. As.txt addresses PRNs 1-32 and as2.txt addresses PRNs 01-63. For the as2.txt file, the two digit PRN number and the three digit SVN field are zero padded. An example of the A-S Status (as.txt) is shown in Figure 50-1.

ICD870-280

```
            Anti Spoofing (A-S) Status

                 PRN   SVN    A-S
                  1    049    ON
                  2    061    ON
                  3    033    ON
                  4    034    ON
                  5    050    ON
                  6    036    ON
                  7    048    ON
                  8    038    ON
                  9    039    ON
                 10    040    ON
                 11    046    ON
                 12    058    ON
                 13    043    ON
                 14    041    ON
                 15    055    ON
                 16    056    ON
                 17    053    ON
                 18    054    ON
                 19    059    ON
                 20    051    ON
                 21    045    ON
                 22    047    ON
                 23    060    ON
                 24    024    ON
                 25    025    ON
                 26    026    ON
                 27    027    ON
                 28    044    ON
                 29    057    ON
                 30    030    ON
                 31    052    ON
                 32    023    ON
```

ICD870-281 Figure 50-1 Sample of the Anti-Spoofing Status file (as.txt)

ICD870-282 **51 TBD**

ICD870-283 **52 TBD**

ICD870-284 **53 TBD**

ICD870-285 **54 TBD**

ICD870-286 **55 TBD**

ICD870-287 **56 TBD**

ICD870 **57 TBD**

ID	ICD-GPS-870 RevB (24 Sep 2013) Navstar GPS Control Segment to User Support Community Interfaces
-288	
ICD870 -289	# 58 TBD
ICD870 -290	# 59 TBD
ICD870 -291	# 60 APPENDIX 6: LETTERS OF EXCEPTION
ICD870 -292	## 60.1 Scope
ICD870 -293	As indicated in paragraph 1.3, initial signature approval of this document, as well as approval of subsequent changes to the document, can be contingent upon a "letter of exception". This appendix depicts such "letters of exception" when utilized by any signatory of this document in the initial approval cycle and/or in the change approval process. The ICC will omit such letters of exception from subsequent revisions of this document based on written authorization by the respective signatory (without processing a proposed interface revision notice (PIRN) for approval). When some (but not all) of the exceptions taken by a signatory are resolved, the signatory shall provide the ICC with an updated letter of exception for inclusion in the next ICD revision (without processing a PIRN for approval.
ICD870 -294	## 60.2 Applicable Documents
ICD870 -295	The documents listed in Section 2.1 shall be applicable to this appendix.
ICD870 -296	## 60.3 Letters of Exception
ICD870 -297	If signature approval of this document -- as affixed to the cover page -- is marked by an asterisk, it indicates that the approval is contingent upon the exceptions taken by that signatory in a letter of exception. Any letter of exception, which is in force for the revision of the ICD is depicted in Figure 60-1. Signatories for whom no letter of exception is shown have approved this version of the document without exception.
ICD870 -298	
ICD870 -299	**Figure 60-1 Letter of Exception**

Raytheon
Customer Success Is Our Mission

Raytheon Company
16800 E. CentreTech Parkway
Aurora, Colorado
80011-9046 USA
303.344.6000

08 October 2013

In Reply, Please Refer to: GPS-13-143.GW

Department of the Air Force
HQ Space and Missile Systems Center (AFSPC)
Global Positioning System Directorate (GP)
483 N. Aviation Blvd.
El Segundo, CA 90245-2808

Attention: Mr. Michael Russo, Contracting Officer

Subject: Letter of Exception for Request for RFC-0177 (IRN-870A-004)

Reference: (a) Global Positioning System (GPS) Next Generation Operational Control System (OCX), Contract No.: FA8807-10-C-0001
(b) Department of the Air Force letter PCOL-OCX-13-048 dated 2 October 2013; Subject: Request for Rough Order of Magnitude for RFC-177; IRN-870A-004

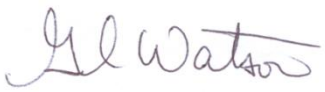
Dear Mr. Russo,

1. This letter is submitted pursuant to the Request for Rough Order of Magnitude (ROM) requested in the reference (b) letter. Raytheon Company has reviewed the IRN-870A-004, dated 24 September 2013 and Raytheon has taken exception to the following Verification Cross Reference Matrix (VCRM) entries:
    a. ID ICD870-68 (ICD-GPS-870A VCRM “is” table)
    b. ID ICD870-651 (ICD-GPS-870A VCRM “is” table)
    c. ID ICD870-681 (ICD-GPS-870A VCRM “is” table)

2. The rationale for the exceptions is that all three VCRM entries are incorrectly allocated to the Control Segment.
    a. ICD870-68: "The GPS Control Segment (CS) unclassified certificate (and corresponding CS public key) will be made available to all consumers for data integrity verification via the USCG NIS web site." This is not a requirement for the control segment. Raytheon GPS OCX is unable to ensure the NIS will make the OCX public key accessible to the Internet.
    b. ICD870-651: "The GPS Products defined herein will be accessible via the United States Coast Guard (USCG) Navigation Information Service (NIS), see section 3.2.5." This is not a requirement for the control segment. Raytheon GPS OCX is unable to ensure the NIS will make the products accessible to the Internet.
    c. ICD870-681: "Multiple revisions of schema and transformations to support backward compatibility and to extend the migration time for the user community may be available." This is not a requirement for the control segment but rather a statement of policy. There is no shall statement. The decision about when to retire old schema in conjunction with the issuance of new schema is an operational decision.

3. If you should have any technical questions please feel free to contact Michael Guerrero at (720) 858-4703 or by email at bmguerrero@raytheon.com. For contractual questions please feel free to contact the undersigned at (720) 858-5270 or by email at giwatson@raytheon.com.

Sincerely,
RAYTHEON COMPANY



Gabriele Watson
Contracts Manager

Cc:
T. Wlasick, SMC/PKP
Y. Berrien, SMC/PKP
H. Dendor, SMC/PKP
Capt. B. Sandoval, SMC/PKP
Lt. W. Alston, SMC/PKP
B. Stiffler, RTN/CMT
D. Lueneburg, RTN/CMT
M. Guerrero, RTN/CMT
D. Blea, RTN/CON
K. Geiger, RTN/CON
J. Knowles, RTN/CON