

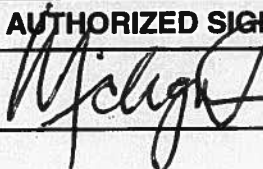
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RFC-00177	Incorporation of IRN-001, 003, 004	24-SEP-2013

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.

**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**

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

SIZE A	CODE IDENT <b>5UTE0</b>	ICD NO. <b>ICD-GPS-870</b>
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	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**

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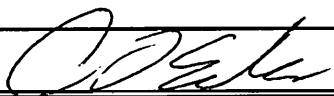
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AUTHORIZED SIGNATURES	REPRESENTING	DATE
	GPS Directorate Space & Missile Systems Center (SMC) – LAAFB	
	Department of Homeland Security (DHS), United States Coast Guard (USCG), Navigation Center (NAVCEN)	
<i>Hank Sholeli</i>	Department of Transportation (DOT), Federal Aviation Administration (FAA)	<i>4 Nov 2013</i>
	Raytheon Company	
	AFSPC/ 50 OG	
<b>INTERFACE CONTROL DOCUMENT</b>		
UNLESS OTHERWISE SPECIFIED: NUMBERS ARE REPRESENTED IN DECIMAL FORM.	<b>Interface Control Contractor:</b> Leidos Inc GPS SE&I 300 N. Sepulveda Blvd., Suite 3000 El Segundo, CA 90245	
	ICD TITLE: <b>NAVSTAR GPS Control Segment to User Support Community Interfaces</b>	
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	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	
<b>INTERFACE CONTROL DOCUMENT</b>		
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	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
<b>INTERFACE CONTROL DOCUMENT</b>		
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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

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ID	<i>ICD-GPS-870 RevB (24 Sep 2013) Navstar GPS Control Segment to User Support Community Interfaces</i>
ICD870 -1	<b>1 SCOPE</b>
ICD870 -2	<b>1.1 Scope</b>
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 50 <sup>th</sup> 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 50 <sup>th</sup> 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	<b>1.2 Key Events and Transition Plans</b>
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	<b>ICD-GPS-870 RevB (24 Sep 2013) Navstar GPS Control Segment to User Support Community Interfaces</b>
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 <a href="https://gps.afspc.af.mil/gps">https://gps.afspc.af.mil/gps</a> , 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	<b>1.3 Interface Control Document Approval and Changes</b>
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	<p>The following signatories must approve this ICD to make it effective.</p> <ol style="list-style-type: none"> <li>1. Air Force Space Command (AFSPC), GPS Directorate (GP) Space and Missile Systems Center (SMC)</li> </ol>

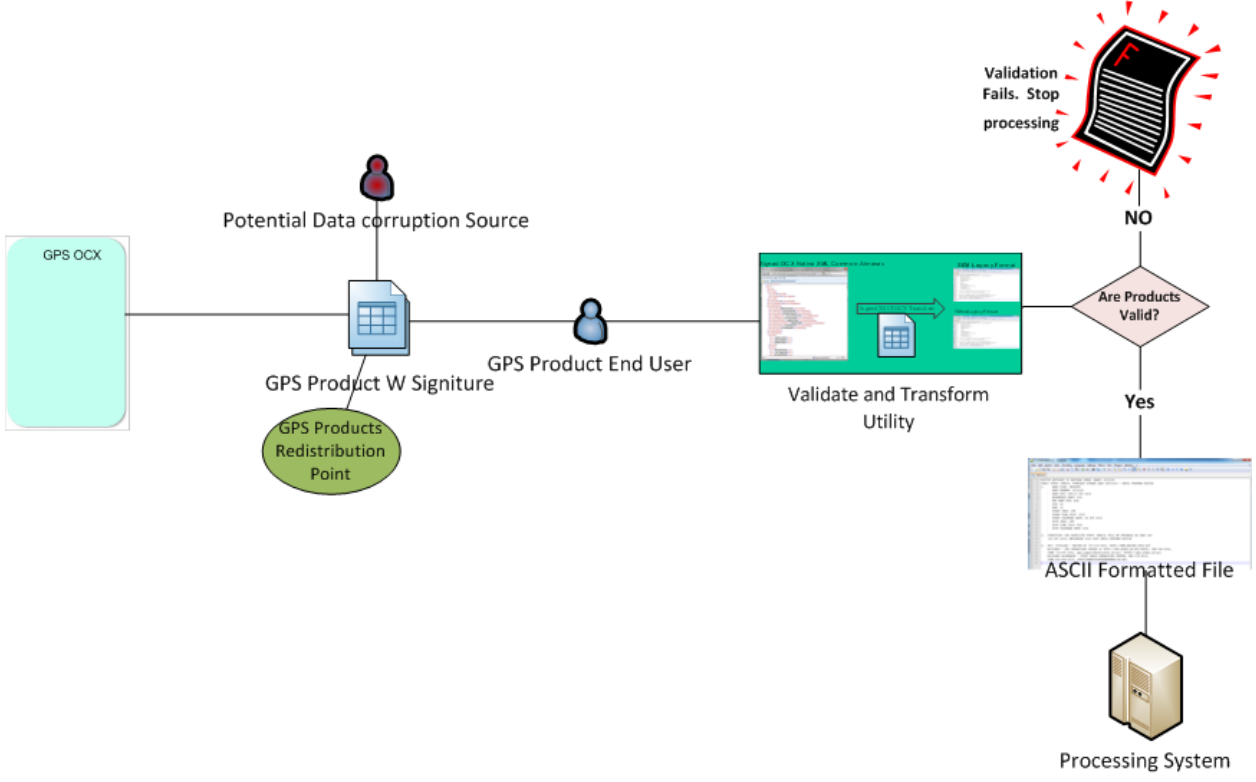
ID	<b>ICD-GPS-870 RevB (24 Sep 2013) Navstar GPS Control Segment to User Support Community Interfaces</b>
	<p>2. Air Force Space Command (AFSPC), 50<sup>th</sup> Space Wing (50 SW)</p> <p>3. Raytheon Company, OCX Contractor</p> <p>4. Department of Homeland Security (DHS), United States Coast Guard (USCG), Navigation Center (NAVCEN)</p> <p>5. Department of Transportation (DOT), Federal Aviation Administration (FAA)</p>
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	<b>2 APPLICABLE DOCUMENTS</b>
ICD870-17	<b>2.1 Government Documents</b>
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	<p><u>Specifications</u></p> <p><i>Federal</i></p>

ID	ICD-GPS-870 RevB (24 Sep 2013) Navstar GPS Control Segment to User Support Community Interfaces
	<p style="text-align: center;">None</p> <p><i>Military</i></p> <p style="text-align: center;">None</p> <p><i>Other Government Activity</i></p> <p>SS-CS-800            GPS III Control Segment Specification Global Positioning Current Version        Systems Wing (GPSW)</p>
ICD870 -20	<u>Standards</u>
ICD870 -21	<p><b><i>Federal</i></b></p> <p>September 2008    Global Positioning System Standard Positioning Service Performance Standard</p> <p><b><i>Military</i></b></p> <p>23 April 2007        DODD 8320.02 Data Sharing in a Net Centric Department of Defense</p> <p>July 2008            DoD Discovery Metadata Specification (DDMS) Version 2.0</p> <p>September 2010     Department of Defense Public Key Infrastructure Functional Interface Specification 3.0.</p> <p>24 May 2011        Public Key Infrastructure (PKI) and Public Key (PK) Enabling (DoDI 8520.02)</p>
ICD870 -22	<u>Other Publications</u>
ICD870 -23	<p>IS-GPS-200            Navstar GPS Space Segment / Navigation User Interface Current Version</p>

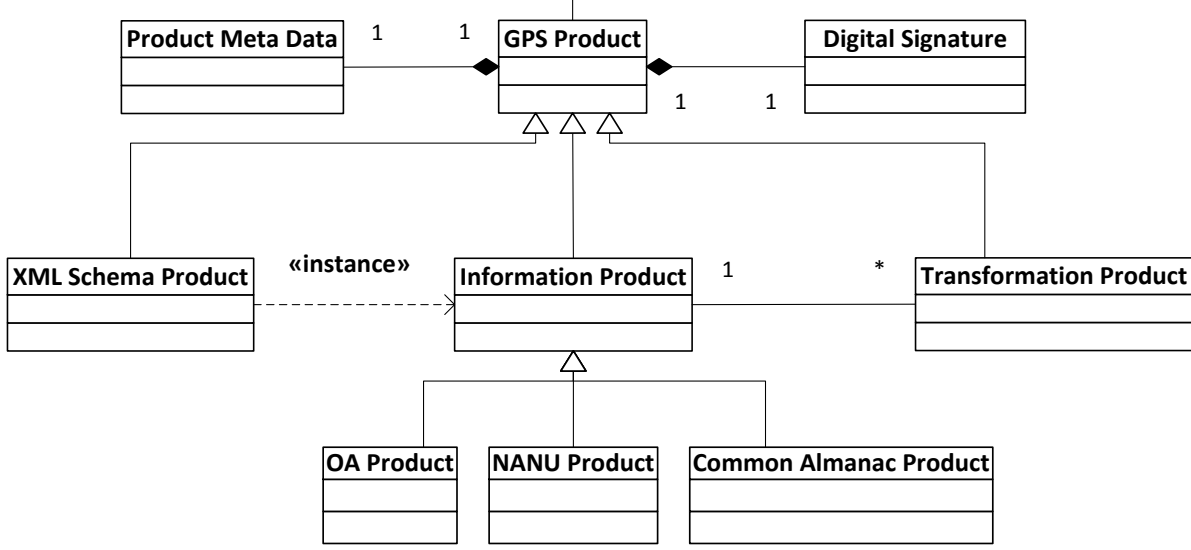
ID	<i>ICD-GPS-870 RevB (24 Sep 2013) Navstar GPS Control Segment to User Support Community Interfaces</i>
	<p>IS-GPS-705 Current Version      Navstar GPS Space Segment / User Segment L5 Interfaces</p> <p>IS-GPS-800 Current Version      Navstar GPS Space Segment / User Segment L1C Interfaces</p> <p>GP-03-001A 20 April 2006      GPS Interface Control Working Group (ICWG) Charter</p> <p>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)</p> <p>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)</p> <p>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</p> <p>Fiscal Year 2012      Federal Radionavigation Plan</p> <p>MFR 30 June 2011      Department of the Air Force, 50th Space Wing (AFSPC) Memorandum for Record - 2 SOPS GPS Public Release Policy</p> <p>6 February 2003      DODI 8500.2, Information Assurance (IA) Implementation</p> <p>4 May 2011      United States Department of Defense X.509 Certificate Policy</p>
ICD870 -24	<b>2.2 Non-Government Documents</b>
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	<u>Specifications</u>  None
ICD870 -27	<u>Standards</u> 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             IEF, RFC 2616, Hypertext Transfer Protocol - HTTP/1.1
ICD870 -28	<u>Other Publications</u>  None
ICD870 -29	<b>3 REQUIREMENTS</b>
ICD870 -30	<b>3.1 Interface Identification</b>
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 <b>End-User</b> interacting with a GPS Product redistribution node (e.g., USCG NIS) to retrieve the desired GPS Products. The diagram reflects that a <b>potential data Corruption Source</b> 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 <b>Potential Data Corruption Source</b> and <b>GPS Product End-User</b> may be performed by the same or by different individuals.
ICD870 -653	<b>Figure 3-1 Generic GPS Product Distribution Process</b>

ID	ICD-GPS-870 RevB (24 Sep 2013) Navstar GPS Control Segment to User Support Community Interfaces
ICD870-654	 <p>The diagram illustrates the workflow for a GPS Product End User. It starts with a 'GPS OCX' box on the left. A line connects it to a 'Potential Data corruption Source' (represented by a person icon) and a 'GPS Product W Signature' (represented by a document icon). Below the document icon is a green oval labeled 'GPS Products Redistribution Point'. A line then connects to a 'GPS Product End User' (represented by a person icon). This leads to a 'Validate and Transform Utility' box, which shows a software interface with a document icon and an arrow. From there, a decision diamond asks 'Are Products Valid?'. If the answer is 'NO', a red document icon with a large 'F' and radiating lines indicates 'Validation Fails. Stop processing'. If the answer is 'Yes', the flow goes to an 'ASCII Formatted File' box (showing a code editor) and then to a 'Processing System' box (showing server racks).</p>
ICD870-659	<p>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;</p> <ol style="list-style-type: none"> <li>Validate - an optional step performed by the end user to ensure that the GPS Products have not been corrupted through the process of redistribution</li> <li>Transform - an optional step performed by end users who may need information in the ASCII text file formats before processing</li> <li>Process – use the GPS Information typically ingesting files using an end user Automated Information System (AIS)</li> </ol>
ICD870-660	<p><b>Figure 3-2 GPS Product End User Sequence Diagram</b></p>

ID	ICD-GPS-870 RevB (24 Sep 2013) Navstar GPS Control Segment to User Support Community Interfaces	
ICD870-661	<pre> sequenceDiagram     participant User as GPS Product end user     participant Validate as «utility» Validate     participant Transform as Transform     participant Process as Process      User-&gt;&gt;Validate: Validate Information Product()     Validate--&gt;&gt;User: Validation Result     User-&gt;&gt;Validate: Validate Transformation Product()     Validate--&gt;&gt;User: Validation Result     Note over User, Validate: {If valid Transform and Information products }     User-&gt;&gt;Transform: Transform Product     Transform--&gt;&gt;User: Formatted Product     User-&gt;&gt;Process: Process Formatted product     </pre>	
ICD870-662	<p>In accordance with DODD 8320, <i>Data Sharing in a Net Centric Department of Defense</i>, 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.</p>	
ICD870-663	<p><b>Figure 3-3 High Level GPS Product Ontology</b></p>	

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ICD870-664	 <pre> classDiagram     class ProductMeta[Product Meta Data]     class GPSParent[GPS Product]     class DigitalSignature[Digital Signature]     class XMLSchema[XML Schema Product]     class Information[Information Product]     class Transformation[Transformation Product]     class OA[OA Product]     class NANU[NANU Product]     class Almanac[Common Almanac Product]      GPSParent "1" *-- "1" ProductMeta     GPSParent "1" *-- "1" DigitalSignature     GPSParent &lt; -- XMLSchema     GPSParent &lt; -- Information     GPSParent &lt; -- Transformation     Information "1" -- "*" Transformation     XMLSchema ..&gt; Information : «instance»     Information &lt; -- OA     Information &lt; -- NANU     Information &lt; -- Almanac </pre> <p>The diagram illustrates the structure of GPS Products. At the top level is the <b>GPS Product</b> class. It has two 1-to-1 associations with <b>Product Meta Data</b> and <b>Digital Signature</b>, both using filled diamond notation. Below <b>GPS Product</b> are three subclasses: <b>XML Schema Product</b>, <b>Information Product</b>, and <b>Transformation Product</b>. A dashed arrow labeled «instance» points from <b>XML Schema Product</b> to <b>Information Product</b>. <b>Information Product</b> has a 1-to-many association with <b>Transformation Product</b>. At the bottom level, <b>Information Product</b> has three subclasses: <b>OA Product</b>, <b>NANU Product</b>, and <b>Common Almanac Product</b>.</p>
ICD870-665	<p>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 <a href="http://www.navcen.uscg.gov">http://www.navcen.uscg.gov</a>.</p>
ICD870-713	<p>The GPS CS XML based products will contain data sufficient to derive all ASCII text file content identified in Appendices 1-5.</p>
ICD870-666	<p>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.</p> <ol style="list-style-type: none"> <li>Information Products provide users information about the state/status of the GPS System.</li> <li>XML Schema Products define the structure of an XML document associated with this interface.</li> <li>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.</li> </ol>
ICD870-31	<p>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.</p>

<i>ID</i>	<i>ICD-GPS-870 RevB (24 Sep 2013) Navstar GPS Control Segment to User Support Community Interfaces</i>
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	<b>Figure 3-4 Validate and Transform Utility Ontology</b>

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ICD870-669	<p>The diagram illustrates the structure of the ICD870-669 interface. It features two main product classes: <b>Information Product</b> and <b>Transformation Product</b>. A central utility, <b>Validate &amp; Transform Utility</b>, is shown as a red-shaded area. This utility contains a <b>«Service» Validate</b> class and a <b>«Service» Transform</b> class. The <b>Validate</b> service outputs <b>Results</b> to a decision diamond that categorizes products as <b>Invalid Products</b> (leading to a <b>Validation Error</b> class) or <b>Valid Products</b> (leading to the <b>Transform</b> service). The <b>Transform</b> service is annotated with <b>&lt;&lt;Generate&gt;&gt;</b>. The utility also generates an <b>ASCII Formatted File</b>. This file is represented as a base class with several subclasses: <b>AS Status</b>, <b>SEM Almanac</b>, <b>Yuma Almanac</b>, <b>NANU</b>, <b>OA</b>, and <b>ESHS File</b>. Additionally, there are updated versions of the almanac files: <b>AS Status (Updated)</b>, <b>SEM Almanac (Updated)</b>, and <b>YUMA Almanac (Updated)</b>. Dashed arrows labeled <b>&lt;&lt;uses&gt;&gt;</b> indicate dependencies from the utility to the product classes and from the product classes to the utility.</p>
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

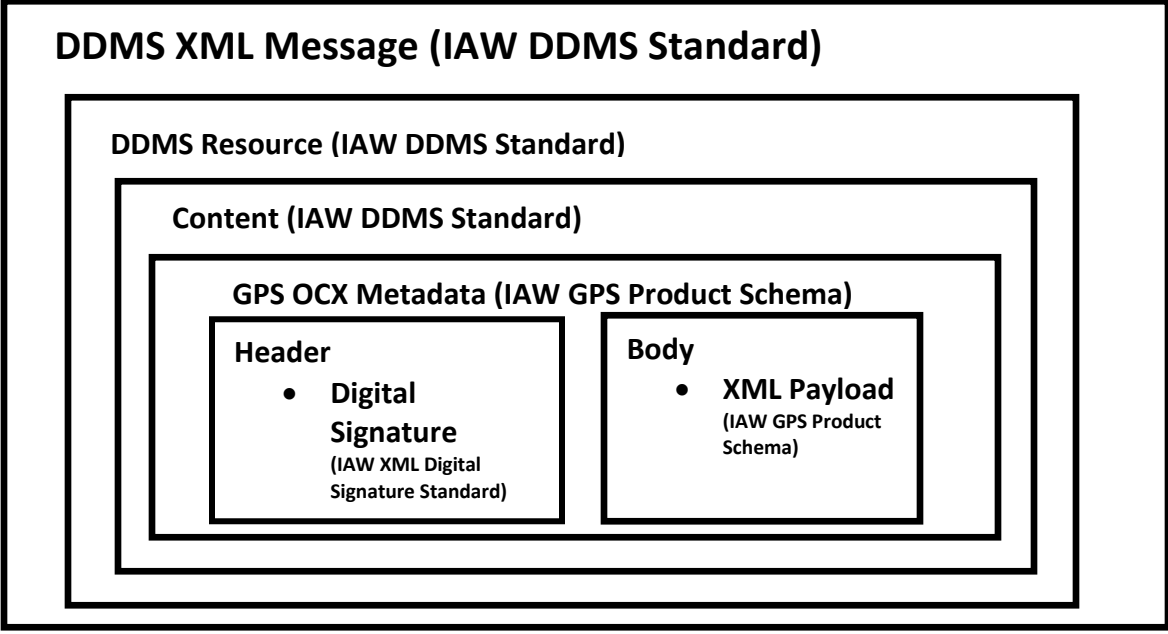
ID	<i>ICD-GPS-870 RevB (24 Sep 2013) Navstar GPS Control Segment to User Support Community Interfaces</i>				
-671	3-III.				
ICD870 -672	The CS provides Transition Utility and Support Products as shown in Table 3-II.				
ICD870 -673	Using the Information Products and provided Transformation Products 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	<b>Table 3-I Information Product Information Exchange Matrix</b>				
ICD870 -36		<b>Producer</b>	<b>Data Exchange Identification</b>	<b>Information Description</b>	<b>Security</b>
		GPS CS	GPS Status Information	Information Product: <b>NANU</b> <b>(see Table 3-III)</b>	Unclassified Public Releasable Open Access
		GPS CS	GPS Constellation Status Summary	Information Product: <b>OA</b> <b>(See Table 3-III)</b>	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: <b>Common Almanac</b> <b>(See Table 3-III)</b>	Unclassified Public Releasable Open Access

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ICD870-677	<b>Table 3-II Transition &amp; Support Product Exchange Matrix</b>				
ICD870-678		<b>Producer</b>	<b>Data Exchange Identification</b>	<b>Information Description</b>	<b>Security</b>
		GPS CS	XML Schema Definitions specifies content of each GPS Product	<b>XML Schema Products (See Table 3-III)</b>	Unclassified Public Releasable Open Access
		GPS CS	XML Documents containing XSLT Transformations	<b>Transformation Products (See Table 3-III)</b>	Unclassified Public Releasable Open Access
		GPS CS	Installable Application	<b>Validate and Transform Utility (see Table 3-III)</b>	Unclassified Public Releasable Open Access
ICD870-679	<b>Table 3-III Mapping Information Products &amp; Transformation Products into Desired Output Format</b>				
ICD870-680		<b>Information Product Name</b>	<b>XML Schema Product Name</b>	<b>Transformation Product Name</b>	<b>Validation and Transform Utility Output</b>
		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 ( <i>default extension *.NNU</i> )  See Appendix 1, Notice to Navstar Users Data Formats.



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

ID	<i>ICD-GPS-870 RevB (24 Sep 2013) Navstar GPS Control Segment to User Support Community Interfaces</i>
ICD870-682	Note: Information on release of a new major schema revision will be accomplished through the public ICWG process.
ICD870-37	<b>3.1.1 GPS Control Segment</b>
ICD870-38	The GPS CS is operated by the 2d Space Operations Squadron (2 SOPS), administratively organized under 50 <sup>th</sup> 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: <ul style="list-style-type: none"> <li>• W3C, Extensible Markup Language (XML)</li> <li>• DoD Discovery Metadata Specification (DDMS)</li> <li>• W3C XML Signature Syntax and Processing Standard</li> </ul>
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: <ul style="list-style-type: none"> <li>• W3C, XSL Transformations (XSLT)</li> </ul>
ICD870-686	These XSLT Transformation products are another kind of GPS Product in which the “XML Payload” is an XSLT-compliant document.
ICD870-687	<b>Figure 3-5 GPS Product Structure (XML native)</b>

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ICD870-688	 <p><b>DDMS XML Message (IAW DDMS Standard)</b></p> <p><b>DDMS Resource (IAW DDMS Standard)</b></p> <p><b>Content (IAW DDMS Standard)</b></p> <p><b>GPS OCX Metadata (IAW GPS Product Schema)</b></p> <p><b>Header</b></p> <ul style="list-style-type: none"> <li>• <b>Digital Signature</b> (IAW XML Digital Signature Standard)</li> </ul> <p><b>Body</b></p> <ul style="list-style-type: none"> <li>• <b>XML Payload</b> (IAW GPS Product Schema)</li> </ul>
ICD870-41	<b>3.1.2 GPS User and User-support communities</b>
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	<b>3.2 Interface Definitions</b>
ICD870-46	<b>3.2.1 Generation of Almanac Data</b>
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	<b>3.2.2 Generation of Operational Advisory Data</b>

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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	<b>3.2.3 Generation of NANU Data</b>
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	<b>3.2.4 Generation of Anti-Spoofing (A-S) Status</b>
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	<b>3.2.5 Data Distribution</b>
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	<b>3.3 GPS MCS to GPS User Support Community Data Integrity</b>
ICD870	As the Authoritative Source for GPS Products described in this ICD, the CS publishes only digitally signed GPS

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-698	<p>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;</p> <ul style="list-style-type: none"> <li>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.</li> <li>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.</li> <li>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).</li> <li>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.</li> <li>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.</li> </ul>
ICD870-65	<p>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.</p>
ICD870-66	<p>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.</p>
ICD870-699	<p>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.</p>
ICD870-700	<p>As depicted in Figure 3-5, the header elements of the GPS Product Meta Data will contain the XML digital signature for the <b>entire</b> 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.</p>

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ICD870-701	<p>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:</p> <ol style="list-style-type: none"> <li data-bbox="310 327 1463 478">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.</li> <li data-bbox="310 596 1511 705">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.</li> <li data-bbox="310 823 1503 932">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.</li> <li data-bbox="310 1050 1520 1159">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.</li> </ol> <p>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.</p> <p>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.</p>
ICD870-702	<p>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;</p> <ol style="list-style-type: none"> <li data-bbox="310 1734 1057 1766">1. Download the desired Information Product (see Table 3-III)</li> <li data-bbox="310 1883 1479 1911">2. Just prior to use, Validate the Digital Signature of Information Product using a W3C XML Digital</li> </ol>

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	<p>Signature Compliant standard COTS/Library (e.g. JDK 1.6/1.7) and the currently published CS public certificate.</p> <p>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.</p> <p>4. If the signature validates in Step 2, then the GPS Product is authentic and the content has not been corrupted.</p> <p>Note: A user with a modern non-critical application who intends to bypass verifying data integrity only needs to perform Step 1</p> <p>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.</p>
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 <a href="http://dodpki.c3pki.chamb.disa.mil/">http://dodpki.c3pki.chamb.disa.mil/</a> , 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 " <i>Validate and Transform Utility</i> ".
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.

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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	<b>3.3.1 Digital Signatures</b>
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	<b>4 QUALITY ASSURANCE</b>
ICD870-75	<p>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.</p> <p>The column headings of the verification matrix are explained here:</p>
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



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-313	<p>explained below:</p> <p>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.</p> <p>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.</p>
ICD870 -314	<p>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.</p>
ICD870 -315	<p>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.</p>
ICD870 -524	<p>Verification by Inspection (I)</p> <p>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.</p>
ICD870 -523	<p>Verification by Analysis (A)</p> <p>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.</p>

ID	<b>ICD-GPS-870 RevB (24 Sep 2013) Navstar GPS Control Segment to User Support Community Interfaces</b>						
ICD870-522	<p>Verification by Demonstration (D)</p> <p>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).</p>						
ICD870-521	<p>Verification by Test (T)</p> <p>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.</p>						
ICD870-316	<b>DOORS ID</b>	<b>Object Number</b>	<b>CS Effectivity</b>	<b>SS Effectivity</b>	<b>Highest Verification Level</b>	<b>Segment</b>	<b>System Verification Method</b>
	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

ICD-GPS-870 RevB (24 Sep 2013) Navstar GPS Control Segment to User Support Community Interfaces																																															
	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	<b>5 PREPARATION FOR DELIVERY</b>																																														
ICD870-77	Not Applicable																																														
ICD870-78	<b>6 NOTES</b>																																														
ICD870-79	<b>6.1 Acronyms and Abbreviations</b>																																														
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ID	<i>ICD-GPS-870 RevB (24 Sep 2013) Navstar GPS Control Segment to User Support Community Interfaces</i>	
	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

ID	<i>ICD-GPS-870 RevB (24 Sep 2013) Navstar GPS Control Segment to User Support Community Interfaces</i>	
	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

ID	<i>ICD-GPS-870 RevB (24 Sep 2013) Navstar GPS Control Segment to User Support Community Interfaces</i>
	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	<b>7 APPROVAL</b>
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	<b>8 TBD</b>
ICD870-84	<b>9 TBD</b>
ICD870-85	<b>10 APPENDIX 1: NANU DATA FORMATS</b>
ICD870-86	Appendix 1 describes the NANU types and the NANU message format.
ICD870-87	<b>10.1 Notice Advisory to Navstar Users</b>
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: <ul style="list-style-type: none"> <li>• Scheduled outages</li> <li>• Unscheduled outages</li> <li>• General text message</li> </ul>

ID	<i>ICD-GPS-870 RevB (24 Sep 2013) Navstar GPS Control Segment to User Support Community Interfaces</i>																										
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ICD870-89	<b>10.1.1 Scheduled Outages</b>																										
ICD870-90	<p>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."</p>																										
ICD870-91	<b>Table 10-I Scheduled Outages</b>																										
ICD870-92	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th data-bbox="228 720 451 810">NANU ACRONYM</th> <th data-bbox="451 720 716 810">NAME</th> <th data-bbox="716 720 1471 810">DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td data-bbox="228 810 451 865">FCSTDV</td> <td data-bbox="451 810 716 865">Forecast Delta-V</td> <td data-bbox="716 810 1471 865">Scheduled outage times for Delta-V maneuvers.</td> </tr> <tr> <td data-bbox="228 865 451 955">FCSTMX</td> <td data-bbox="451 865 716 955">Forecast Maintenance</td> <td data-bbox="716 865 1471 955">Scheduled outage times for non-Delta-V maintenance.</td> </tr> <tr> <td data-bbox="228 955 451 1045">FCSTEXTD</td> <td data-bbox="451 955 716 1045">Forecast Extension</td> <td data-bbox="716 955 1471 1045">Extends the scheduled outage time "Until Further Notice"; references the original forecast NANU.</td> </tr> <tr> <td data-bbox="228 1045 451 1230">FCSTSUMM</td> <td data-bbox="451 1045 716 1230">Forecast Summary</td> <td data-bbox="716 1045 1471 1230">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.</td> </tr> <tr> <td data-bbox="228 1230 451 1350">FCSTCANC</td> <td data-bbox="451 1230 716 1350">Forecast Cancellation</td> <td data-bbox="716 1230 1471 1350">Cancels a scheduled outage when a new maintenance time is not yet determined; it references the original forecast NANU message.</td> </tr> <tr> <td data-bbox="228 1350 451 1440">FCSTRESCD</td> <td data-bbox="451 1350 716 1440">Forecast rescheduled</td> <td data-bbox="716 1350 1471 1440">Reschedules a scheduled outage referencing the original-FCST NANU message.</td> </tr> <tr> <td data-bbox="228 1440 451 1560">FCSTUUFN</td> <td data-bbox="451 1440 716 1560">Forecast Unusable Until Further Notice</td> <td data-bbox="716 1440 1471 1560">Scheduled outage of indefinite duration not necessarily related to Delta-V or maintenance activities.</td> </tr> </tbody> </table>			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.
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ICD870-93	<p>The message templates for the NANU types listed in Table 10-I are shown in Figures 10-1 through 10-7, respectively.</p>																										

ID	ICD-GPS-870 RevB (24 Sep 2013) Navstar GPS Control Segment to User Support Community Interfaces
ICD870 -94	<p>NOTICE ADVISORY TO NAVSTAR USERS (NANU) YYYYYSSS  SUBJ: SVNXXX (PRNXX) FORECAST OUTAGE JDAY JJJ/HHMM - JDAY JJJ/HHMM</p> <ol style="list-style-type: none"> <li>1. NANU TYPE: FCSTDV  NANU NUMBER: YYYYYSSS  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</li> <li>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.</li> <li>3. POC: CIVILIAN - NAVCEN AT 703-313-5900, <a href="http://www.navcen.uscg.gov">HTTP://WWW.NAVCEN.USCG.GOV</a>  CIVIL AVIATION - FAA National Operations Control Center  MILITARY - GPS Support Center at <a href="https://gps.afspc.af.mil/gpsoc">HTTPS://GPS.AFSPC.AF.MIL/GPSOC</a>, DSN 560-2541,  COMM 719-567-2493, <a href="mailto:GPS_SUPPORT@SCHRIEVER.AF.MIL">GPS_SUPPORT@SCHRIEVER.AF.MIL</a>, <a href="http://www.schriever.af.mil/gps">HTTP://WWW.SCHRIEVER.AF.MIL/GPS</a>  MILITARY ALTERNATE - JOINT SPACE OPERATIONS CENTER, DSN 276-9994.  COMM 805-606-9994, <a href="mailto:JSPOCCOMBATOPS@VANDENBERG.AF.MIL">JSPOCCOMBATOPS@VANDENBERG.AF.MIL</a></li> </ol>
ICD870 -95	<p><b>Figure 10-1 FCSTDV NANU Message Template</b></p>
ICD870 -96	<p>NOTICE ADVISORY TO NAVSTAR USERS (NANU) YYYYYSSS  SUBJ: SVNXXX (PRNXX) FORECAST OUTAGE JDAY JJJ/HHMM - JDAY JJJ/HHMM</p> <ol style="list-style-type: none"> <li>1. NANU TYPE: FCSTMX  NANU NUMBER: YYYYYSSS  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</li> <li>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.</li> <li>3. POC: CIVILIAN - NAVCEN AT 703-313-5900, <a href="http://www.navcen.uscg.gov">HTTP://WWW.NAVCEN.USCG.GOV</a>  CIVIL AVIATION - FAA National Operations Control Center  MILITARY - GPS Support Center at <a href="https://gps.afspc.af.mil/gpsoc">HTTPS://GPS.AFSPC.AF.MIL/GPSOC</a>, DSN 560-2541,  COMM 719-567-2493, <a href="mailto:GPS_SUPPORT@SCHRIEVER.AF.MIL">GPS_SUPPORT@SCHRIEVER.AF.MIL</a>, <a href="http://www.schriever.af.mil/gps">HTTP://WWW.SCHRIEVER.AF.MIL/GPS</a>  MILITARY ALTERNATE - JOINT SPACE OPERATIONS CENTER, DSN 276-9994.  COMM 805-606-9994, <a href="mailto:JSPOCCOMBATOPS@VANDENBERG.AF.MIL">JSPOCCOMBATOPS@VANDENBERG.AF.MIL</a></li> </ol>
ICD870 -97	<p><b>Figure 10-2 FCSTMX NANU Message Template</b></p>



ID	ICD-GPS-870 RevB (24 Sep 2013) Navstar GPS Control Segment to User Support Community Interfaces
ICD870 -98	<p>NOTICE ADVISORY TO NAVSTAR USERS (NANU) YYYYSSS</p> <p>SUBJ: SVNXXX (PRNXX) FORECAST OUTAGE EXTENDED UNTIL FURTHER NOTICE</p> <p>1. NANU TYPE: FCSTEXTD</p> <p>NANU NUMBER: YYYYSSS</p> <p>NANU DTG: DDHMMZ MMM YYYY</p> <p>REFERENCE NANU: YYYYNNN</p> <p>REF NANU DTG: DDHMMZ MMM YYYY</p> <p>SVN: XXX</p> <p>PRN: XX</p> <p>START JDAY: JJJ</p>
ICD870 -99	<p><b>Figure 10-3 FCSTEXTD NANU Message Template</b></p>
ICD870 -100	<p>NOTICE ADVISORY TO NAVSTAR USERS (NANU) YYYYSSS</p> <p>SUBJ: SVNXXX (PRNXX) FORECAST OUTAGE SUMMARY JDAY JJJ/HHMM - JDAY JJJ/HHMM</p> <p>1. NANU TYPE: FCSTSUMM</p> <p>NANU NUMBER: YYYYSSS</p> <p>NANU DTG: DDHMMZ MMM YYYY</p> <p>REFERENCE NANU: YYYYNNN</p> <p>REF NANU DTG: DDHMMZ MMM YYYY</p> <p>SVN: XXX</p> <p>PRN: XX</p> <p>START JDAY: JJJ</p>
ICD870 -101	<p><b>Figure 10-4 FCSTSUMM NANU Message Template</b></p>

ID	ICD-GPS-870 RevB (24 Sep 2013) Navstar GPS Control Segment to User Support Community Interfaces
ICD870 -102	<p>NOTICE ADVISORY TO NAVSTAR USERS (NANU) YYYYSSS  SUBJ: SVNXXX (PRNXX) FORECAST OUTAGE CANCELLED</p> <ol style="list-style-type: none"> <li>1. NANU TYPE: FCSTCANC  NANU NUMBER: YYYYSSS  NANU DTG: DDHMMZ MMM YYYY  REFERENCE NANU: YYYYNNN  REF NANU DTG: DDHMMZ 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</li> <li>2. CONDITION: THE FORECAST OUTAGE FOR GPS SATELLITE SVNXXX (PRNXX) SCHEDULED FOR JDAY JJJ (DD MMM YYYY) BEGINNING HHMM ZULU HAS BEEN CANCELLED.</li> <li>3. POC: CIVILIAN - NAVCEN AT 703-313-5900, <a href="http://www.navcen.uscg.gov">HTTP://WWW.NAVCEN.USCG.GOV</a>  CIVIL AVIATION - FAA National Operations Control Center  MILITARY - GPS Support Center at <a href="https://gps.afspc.af.mil/gpsoc">HTTPS://GPS.AFSPC.AF.MIL/GPSOC</a>, DSN 560-2541,  COMM 719-567-2493, <a href="mailto:GPS_SUPPORT@SCHRIEVER.AF.MIL">GPS_SUPPORT@SCHRIEVER.AF.MIL</a>, <a href="http://www.schriever.af.mil/gps">HTTP://WWW.SCHRIEVER.AF.MIL/GPS</a>  MILITARY ALTERNATE - JOINT SPACE OPERATIONS CENTER, DSN 276-9994.  COMM 805-606-9994, <a href="mailto:JSPOCCOMBATOPS@VANDENBERG.AF.MIL">JSPOCCOMBATOPS@VANDENBERG.AF.MIL</a></li> </ol>
ICD870 -103	<p><b>Figure 10-5 FCSTCANC NANU Message Template</b></p>
ICD870 -104	<p>NOTICE ADVISORY TO NAVSTAR USERS (NANU) YYYYSSS  SUBJ: SVNXXX (PRNXX) FORECAST OUTAGE RESCHEDULED</p> <ol style="list-style-type: none"> <li>1. NANU TYPE: FCSTRESCD  NANU NUMBER: YYYYSSS  NANU DTG: DDHMMZ MMM YYYY  REFERENCE NANU: YYYYNNN  REF NANU DTG: DDHMMZ 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</li> <li>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 DDHMMZ MMM YYYY FOR THE ORIGINAL OUTAGE TIME.</li> <li>3. POC: CIVILIAN - NAVCEN AT 703-313-5900, <a href="http://www.navcen.uscg.gov">HTTP://WWW.NAVCEN.USCG.GOV</a>  CIVIL AVIATION - FAA National Operations Control Center  MILITARY - GPS Support Center at <a href="https://gps.afspc.af.mil/gpsoc">HTTPS://GPS.AFSPC.AF.MIL/GPSOC</a>, DSN 560-2541,  COMM 719-567-2493, <a href="mailto:GPS_SUPPORT@SCHRIEVER.AF.MIL">GPS_SUPPORT@SCHRIEVER.AF.MIL</a>, <a href="http://www.schriever.af.mil/gps">HTTP://WWW.SCHRIEVER.AF.MIL/GPS</a>  MILITARY ALTERNATE - JOINT SPACE OPERATIONS CENTER, DSN 276-9994.  COMM 805-606-9994, <a href="mailto:JSPOCCOMBATOPS@VANDENBERG.AF.MIL">JSPOCCOMBATOPS@VANDENBERG.AF.MIL</a></li> </ol>
ICD870 -105	<p><b>Figure 10-6 FCSTRESC NANU Message Template</b></p>

ID	<b>ICD-GPS-870 RevB (24 Sep 2013) Navstar GPS Control Segment to User Support Community Interfaces</b>														
ICD870 -106	<p>NOTICE ADVISORY TO NAVSTAR USERS (NANU) YYYYSSS  SUBJ: SVNXXX (PRNXX) FORECAST OUTAGE JDAY JJJ/HHMM - UNTIL FURTHER NOTICE</p> <ol style="list-style-type: none"> <li> 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 </li> <li> CONDITION: GPS SATELLITE SVNXXX (PRNXX) WILL BE UNUSABLE NO EARLIER THAN JDAY JJJ (DD MMM YYYY) BEGINNING HHMM ZULU UNTIL FURTHER NOTICE. </li> <li> POC: CIVILIAN - NAVCEN AT 703-313-5900, <a href="http://www.navcen.uscg.gov">HTTP://WWW.NAVCEN.USCG.GOV</a>  CIVIL AVIATION - FAA National Operations Control Center  MILITARY - GPS Support Center at <a href="https://gps.afspc.af.mil/gpsoc">HTTPS://GPS.AFSPC.AF.MIL/GPSOC</a>, DSN 560-2541,  COMM 719-567-2493, <a href="mailto:GPS_SUPPORT@SCHRIEVER.AF.MIL">GPS_SUPPORT@SCHRIEVER.AF.MIL</a>, <a href="http://www.schriever.af.mil/gps">HTTP://WWW.SCHRIEVER.AF.MIL/GPS</a>  MILITARY ALTERNATE - JOINT SPACE OPERATIONS CENTER, DSN 276-9994.  COMM 805-606-9994, <a href="mailto:JSPOCCOMBATOPS@VANDENBERG.AF.MIL">JSPOCCOMBATOPS@VANDENBERG.AF.MIL</a> </li> </ol>														
ICD870 -107	<b>Figure 10-7 FCSTUUFN NANU Message Template</b>														
ICD870 -108	<b>10.1.2 Unscheduled Outages</b>														
ICD870 -109	<p>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.”</p>														
ICD870 -110	<b>Table 10-II Unscheduled Outages</b>														
ICD870 -111	<table border="1" data-bbox="228 1388 1474 1745"> <thead> <tr> <th data-bbox="228 1388 451 1482"><b>NANU ACRONYM</b></th> <th data-bbox="451 1388 716 1482"><b>NAME</b></th> <th data-bbox="716 1388 1474 1482"><b>DESCRIPTION</b></th> </tr> </thead> <tbody> <tr> <td data-bbox="228 1482 451 1570">UNUSUFN</td> <td data-bbox="451 1482 716 1570">Unusable Until Further Notice</td> <td data-bbox="716 1482 1474 1570">Notifies Users that a satellite will be unusable to all Users until further notice.</td> </tr> <tr> <td data-bbox="228 1570 451 1659">UNUSABLE</td> <td data-bbox="451 1570 716 1659">Unusable with reference NANU</td> <td data-bbox="716 1570 1474 1659">Closes out an UNUSUFN NANU and gives the exact outage times; references the UNUSUFN NANU</td> </tr> <tr> <td data-bbox="228 1659 451 1745">UNUNOREF</td> <td data-bbox="451 1659 716 1745">Unusable with no reference</td> <td data-bbox="716 1659 1474 1745">Gives times for outages that were resolved before an UNUSUFN NANU could be sent.</td> </tr> </tbody> </table>			<b>NANU ACRONYM</b>	<b>NAME</b>	<b>DESCRIPTION</b>	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.
<b>NANU ACRONYM</b>	<b>NAME</b>	<b>DESCRIPTION</b>													
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.													

ID	ICD-GPS-870 RevB (24 Sep 2013) Navstar GPS Control Segment to User Support Community Interfaces
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	<pre> 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, <a href="http://www.navcen.uscg.gov">HTTP://WWW.NAVCEN.USCG.GOV</a>     CIVIL AVIATION - FAA National Operations Control Center     MILITARY - GPS Support Center at <a href="https://gps.afspc.af.mil/gpsoc">HTTPS://GPS.AFSPC.AF.MIL/GPSOC</a>, DSN 560-2541,     COMM 719-567-2493, <a href="mailto:GPS_SUPPORT@SCHRIEVER.AF.MIL">GPS_SUPPORT@SCHRIEVER.AF.MIL</a>, <a href="http://www.schriever.af.mil/gps">HTTP://WWW.SCHRIEVER.AF.MIL/GPS</a>     MILITARY ALTERNATE - JOINT SPACE OPERATIONS CENTER, DSN 276-9994.     COMM 805-606-9994, <a href="mailto:JSPOCCOMBATOPS@VANDENBERG.AF.MIL">JSPOCCOMBATOPS@VANDENBERG.AF.MIL</a> </pre>
ICD870 -114	<b>Figure 10-8 UNUSUFN NANU Message Template</b>
ICD870 -115	<pre> 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, <a href="http://www.navcen.uscg.gov">HTTP://WWW.NAVCEN.USCG.GOV</a>     CIVIL AVIATION - FAA National Operations Control Center     MILITARY - GPS Support Center at <a href="https://gps.afspc.af.mil/gpsoc">HTTPS://GPS.AFSPC.AF.MIL/GPSOC</a>, DSN 560-2541,     COMM 719-567-2493, <a href="mailto:GPS_SUPPORT@SCHRIEVER.AF.MIL">GPS_SUPPORT@SCHRIEVER.AF.MIL</a>, <a href="http://www.schriever.af.mil/gps">HTTP://WWW.SCHRIEVER.AF.MIL/GPS</a>     MILITARY ALTERNATE - JOINT SPACE OPERATIONS CENTER, DSN 276-9994.     COMM 805-606-9994, <a href="mailto:JSPOCCOMBATOPS@VANDENBERG.AF.MIL">JSPOCCOMBATOPS@VANDENBERG.AF.MIL</a> </pre>
ICD870 -116	<b>Figure 10-9 UNUSABLE NANU Message Template</b>

ID	ICD-GPS-870 RevB (24 Sep 2013) Navstar GPS Control Segment to User Support Community Interfaces
ICD870 -117	<p>NOTICE ADVISORY TO NAVSTAR USERS (NANU) YYYYSSS  SUBJ: SVNXXX (PRNXX) UNUSABLE JDAY JJJ/HHMM - JDAY JJJ/HHMM</p> <ol style="list-style-type: none"> <li>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</li> <li>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.</li> <li>3. POC: CIVILIAN - NAVCEN AT 703-313-5900, <a href="http://www.navcen.uscg.gov">HTTP://WWW.NAVCEN.USCG.GOV</a>  CIVIL AVIATION - FAA National Operations Control Center  MILITARY - GPS Support Center at <a href="https://gps.afspc.af.mil/gpsoc">HTTPS://GPS.AFSPC.AF.MIL/GPSOC</a>, DSN 560-2541,  COMM 719-567-2493, <a href="mailto:GPS_SUPPORT@SCHRIEVER.AF.MIL">GPS_SUPPORT@SCHRIEVER.AF.MIL</a>, <a href="http://www.schriever.af.mil/gps">HTTP://WWW.SCHRIEVER.AF.MIL/GPS</a>  MILITARY ALTERNATE - JOINT SPACE OPERATIONS CENTER, DSN 276-9994.  COMM 805-606-9994, <a href="mailto:JSPOCCOMBATOPS@VANDENBERG.AF.MIL">JSPOCCOMBATOPS@VANDENBERG.AF.MIL</a></li> </ol>
ICD870 -118	<b>Figure 10-10 UNUNOREF NANU Message Template</b>
ICD870 -119	<b>10.1.3 General NANU Messages</b>
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	<pre> 1.      NANU TYPE: GENERAL  *** GENERAL MESSAGE TO ALL GPS USERS ***  <b>MESSAGE WRITTEN IN PARAGRAPH FORM</b> </pre>

ID	<i>ICD-GPS-870 RevB (24 Sep 2013) Navstar GPS Control Segment to User Support Community Interfaces</i>																	
ICD870 -124	<b>Figure 10-11 General Message Format</b>																	
ICD870 -125	<a href="#">10.1.4 Other Messages</a>																	
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	<b>Table 10-III Other Types of NANU Messages</b>																	
ICD870 -128	<table border="1" data-bbox="228 716 1468 1119"> <thead> <tr> <th data-bbox="228 716 451 804"><b>NANU ACRONYM</b></th> <th data-bbox="451 716 683 804"><b>NAME</b></th> <th data-bbox="683 716 1468 804"><b>DESCRIPTION</b></th> </tr> </thead> <tbody> <tr> <td data-bbox="228 804 451 856">USABINIT</td> <td data-bbox="451 804 683 856">Initially usable</td> <td data-bbox="683 804 1468 856">Notifies Users that an SV is set healthy for the first time.</td> </tr> <tr> <td data-bbox="228 856 451 909">LEAPSEC</td> <td data-bbox="451 856 683 909">Leap second</td> <td data-bbox="683 856 1468 909">Notifies Users of an impending leap second.</td> </tr> <tr> <td data-bbox="228 909 451 961">LAUNCH</td> <td data-bbox="451 909 683 961">Launch</td> <td data-bbox="683 909 1468 961">Notifies Users after the launch of a satellite.</td> </tr> <tr> <td data-bbox="228 961 451 1119">DECOM</td> <td data-bbox="451 961 683 1119">Decommission</td> <td data-bbox="683 961 1468 1119">Notifies Users that an SV has been removed from the current constellation identified within the broadcast Almanac, but does not necessarily signify permanent disposal.</td> </tr> </tbody> </table>			<b>NANU ACRONYM</b>	<b>NAME</b>	<b>DESCRIPTION</b>	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.
<b>NANU ACRONYM</b>	<b>NAME</b>	<b>DESCRIPTION</b>																
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.																	

ID	ICD-GPS-870 RevB (24 Sep 2013) Navstar GPS Control Segment to User Support Community Interfaces
ICD870 -130	<p>NOTICE ADVISORY TO NAVSTAR USERS (NANU) YYYYSSS  SUBJ: SVNXXX (PRNXX) USABLE JDAY JJJ/HHMM</p> <ol style="list-style-type: none"> <li>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</li> <li>2. CONDITION: GPS SATELLITE SVNXXX (PRNXX) WAS USABLE AS OF JDAY JJJ (DD MMM YYYY) BEGINNING HHMM ZULU.</li> <li>3. POC: CIVILIAN - NAVCEN AT 703-313-5900, <a href="http://www.navcen.uscg.gov">HTTP://WWW.NAVCEN.USCG.GOV</a>  CIVIL AVIATION - FAA National Operations Control Center  MILITARY - GPS Support Center at <a href="https://gps.afspc.af.mil/gpsoc">HTTPS://GPS.AFSPC.AF.MIL/GPSOC</a>, DSN 560-2541,  COMM 719-567-2493, <a href="mailto:GPS_SUPPORT@SCHRIEVER.AF.MIL">GPS_SUPPORT@SCHRIEVER.AF.MIL</a>, <a href="http://www.schriever.af.mil/gps">HTTP://WWW.SCHRIEVER.AF.MIL/GPS</a>  MILITARY ALTERNATE - JOINT SPACE OPERATIONS CENTER, DSN 276-9994.  COMM 805-606-9994, <a href="mailto:JSPOCCOMBATOPS@VANDENBERG.AF.MIL">JSPOCCOMBATOPS@VANDENBERG.AF.MIL</a></li> </ol>
ICD870 -131	<p><b>Figure 10-12 USABINIT NANU Message Template</b></p>
ICD870 -132	<p>NOTICE ADVISORY TO NAVSTAR USERS (NANU) YYYYSSS  SUBJ: LEAP SECOND</p> <ol style="list-style-type: none"> <li>1. CONDITION: THE INTERNATIONAL EARTH ROTATION SERVICE (IERS) HAS ANNOUNCED THE INTRODUCTION OF A LEAP SECOND TO OCCUR AT THE END OF MMM YYYY</li> <li>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</li> <li>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)</li> <li>4. POC: CIVILIAN - NAVCEN AT 703-313-5900, <a href="http://www.navcen.uscg.gov">HTTP://WWW.NAVCEN.USCG.GOV</a>  CIVIL AVIATION - FAA National Operations Control Center  MILITARY - GPS Support Center at <a href="https://gps.afspc.af.mil/gpsoc">HTTPS://GPS.AFSPC.AF.MIL/GPSOC</a>, DSN 560-2541,  COMM 719-567-2493, <a href="mailto:GPS_SUPPORT@SCHRIEVER.AF.MIL">GPS_SUPPORT@SCHRIEVER.AF.MIL</a>, <a href="http://www.schriever.af.mil/gps">HTTP://WWW.SCHRIEVER.AF.MIL/GPS</a>  MILITARY ALTERNATE - JOINT SPACE OPERATIONS CENTER, DSN 276-9994.  COMM 805-606-9994, <a href="mailto:JSPOCCOMBATOPS@VANDENBERG.AF.MIL">JSPOCCOMBATOPS@VANDENBERG.AF.MIL</a></li> </ol>
ICD870 -133	<p><b>Figure 10-13 LEAPSEC NANU Message Template</b></p>

ID	ICD-GPS-870 RevB (24 Sep 2013) Navstar GPS Control Segment to User Support Community Interfaces
ICD870 -134	<p>NOTICE ADVISORY TO NAVSTAR USERS (NANU) YYYYSSS  SUBJ: SVNXXX (PRNXX) LAUNCH JDAY JJJ</p> <ol style="list-style-type: none"> <li>1. NANU TYPE: LAUNCH  NANU NUMBER: YYYYSSS  NANU DTG: DDHMMZ MMM YYYY  SVN: XXX  PRN: XX  LAUNCH JDAY: JJJ  LAUNCH TIME ZULU: HHMM</li> <li>2. GPS SATELLITE SVN XXX (PRN XX) WAS LAUNCHED ON JDAY JJJ A USABINIT NANU WILL BE SENT WHEN THE SATELLITE IS SET ACTIVE TO SERVICE.</li> <li>3. POC: CIVILIAN - NAVCEN AT 703-313-5900, <a href="http://www.navcen.uscg.gov">HTTP://WWW.NAVCEN.USCG.GOV</a>  CIVIL AVIATION - FAA National Operations Control Center  MILITARY - GPS Support Center at <a href="https://gps.afspc.af.mil/gpsoc">HTTPS://GPS.AFSPC.AF.MIL/GPSOC</a>, DSN 560-2541,  COMM 719-567-2493, <a href="mailto:GPS_SUPPORT@SCHRIEVER.AF.MIL">GPS_SUPPORT@SCHRIEVER.AF.MIL</a>, <a href="http://www.schriever.af.mil/gps">HTTP://WWW.SCHRIEVER.AF.MIL/GPS</a>  MILITARY ALTERNATE - JOINT SPACE OPERATIONS CENTER, DSN 276-9994.  COMM 805-606-9994, <a href="mailto:JSPOCCOMBATOPS@VANDENBERG.AF.MIL">JSPOCCOMBATOPS@VANDENBERG.AF.MIL</a></li> </ol>
ICD870 -135	<p><b>Figure 10-14 LAUNCH NANU Message Template</b></p>
ICD870 -136	<p>NOTICE ADVISORY TO NAVSTAR USERS (NANU) YYYYSSS  SUBJ: SVNXXX (PRNXX) DECOMMISSIONING JDAY JJJ/HHMM</p> <ol style="list-style-type: none"> <li>1. NANU TYPE: DECOM  NANU NUMBER: YYYYSSS  NANU DTG: DDHMMZ MMM YYYY  REFERENCE NANU: YYYYSSS  REF NANU DTG: DDHMMZ 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</li> <li>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.</li> <li>3. POC: CIVILIAN - NAVCEN AT 703-313-5900, <a href="http://www.navcen.uscg.gov">HTTP://WWW.NAVCEN.USCG.GOV</a>  CIVIL AVIATION - FAA National Operations Control Center  MILITARY - GPS Support Center at <a href="https://gps.afspc.af.mil/gpsoc">HTTPS://GPS.AFSPC.AF.MIL/GPSOC</a>, DSN 560-2541,  COMM 719-567-2493, <a href="mailto:GPS_SUPPORT@SCHRIEVER.AF.MIL">GPS_SUPPORT@SCHRIEVER.AF.MIL</a>, <a href="http://www.schriever.af.mil/gps">HTTP://WWW.SCHRIEVER.AF.MIL/GPS</a>  MILITARY ALTERNATE - JOINT SPACE OPERATIONS CENTER, DSN 276-9994.  COMM 805-606-9994, <a href="mailto:JSPOCCOMBATOPS@VANDENBERG.AF.MIL">JSPOCCOMBATOPS@VANDENBERG.AF.MIL</a></li> </ol>
ICD870 -137	<p><b>Figure 10-15 DECOM NANU Message Template</b></p>
ICD870 -138	<p><b>10.2 NANU Notification Times</b></p>
ICD870 -139	<p>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.</p>



ID	<i>ICD-GPS-870 RevB (24 Sep 2013) Navstar GPS Control Segment to User Support Community Interfaces</i>																	
ICD870 -140	<b>Table 10-IV NANU Notification Times</b>																	
ICD870 -141	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th data-bbox="250 327 472 384">NANU Group</th> <th data-bbox="472 327 1016 384">Nominal Notification Times</th> <th data-bbox="1016 327 1490 384">Objective</th> </tr> </thead> <tbody> <tr> <td data-bbox="250 384 472 438">Scheduled</td> <td data-bbox="472 384 1016 438">48 hrs prior to outage start</td> <td data-bbox="1016 384 1490 438">96 hrs prior to outage start</td> </tr> <tr> <td data-bbox="250 438 472 493">Unscheduled</td> <td data-bbox="472 438 1016 493">Less than 1 hr after outage start</td> <td data-bbox="1016 438 1490 493">15 minutes after outage start</td> </tr> <tr> <td data-bbox="250 493 472 548">General</td> <td colspan="2" data-bbox="472 493 1490 548">No Nominal – Timing determined on a case-by-case basis</td> </tr> <tr> <td data-bbox="250 548 472 602">Other</td> <td colspan="2" data-bbox="472 548 1490 602">No Nominal – Timing determined on a case-by-case basis</td> </tr> </tbody> </table>			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	
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	<b>10.3 NANU Message Format</b>																	
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	<pre> 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, <a href="https://GPS.AFSPC.AF.MIL">HTTPS://GPS.AFSPC.AF.MIL</a>    MILITARY ALTERNATE - JOINT SPACE OPERATIONS CENTER, DSN 276-9994,    COMM 805-606-9994, JSPOCCOMBATOPS@VANDENBERG.AF.MIL </pre>																	
ICD870 -146	<b>Figure 10-16 NANU Message Template</b>																	

ID	<i>ICD-GPS-870 RevB (24 Sep 2013) Navstar GPS Control Segment to User Support Community Interfaces</i>
ICD870 -147	<b>10.3.1 NANU Header</b>
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	<pre> YYYYNNN----- NOTICE ADVISORY TO NAVSTAR USERS (NANU) YYYYYNNN SUBJ: SVNXXX (PRNXX) FORECAST OUTAGE JDAY JJJ/HHMM - JDAY JJJ/HHMM 1. NANU TYPE: FCSTDV    NANU NUMBER: YYYYYNNN    NANU DTG: DDHHMMZ MMM YYYY    REFERENCE NANU: YYYYYNNN    REF NANU DTG: DDHHMMZ MMM YYYY    SVN: XXX </pre>
ICD870 -150	<b>Figure 10-17 NANU Header</b>
ICD870 -151	<b>10.3.2 NANU Section 1</b>
ICD870 -152	Section 1 provides the message description, reference information, satellite identification and outage time in a tabular format.
ICD870 -153	<b>10.3.2.1 NANU Message Description</b>
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.

ID	<i>ICD-GPS-870 RevB (24 Sep 2013) Navstar GPS Control Segment to User Support Community Interfaces</i>
ICD870 -155	<pre> YYYYNNN----- NOTICE ADVISORY TO NAVSTAR USERS (NANU) YYYYYNNN SUBJ: SVNXXX (PRNXX) FORECAST OUTAGE JDAY JJJ/HHMM - JDAY JJJ/HHMM 1. NANU TYPE: FCSTDV    NANU NUMBER: YYYYYNNN    NANU DTG: DDHHMMZ MMM YYYY    REFERENCE NANU: YYYYYNNN    REF NANU DTG: DDHHMMZ MMM YYYY    SVN: XXX </pre>
ICD870 -156	<b>Figure 10-18 Message Description</b>
ICD870 -157	<i>10.3.2.2 NANU Reference Information</i>
ICD870 -158	<p>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.</p>
ICD870 -159	<pre> YYYYNNN----- NOTICE ADVISORY TO NAVSTAR USERS (NANU) YYYYYNNN SUBJ: SVNXXX (PRNXX) FORECAST OUTAGE JDAY JJJ/HHMM - JDAY JJJ/HHMM 1. NANU TYPE: FCSTDV    NANU NUMBER: YYYYYNNN    NANU DTG: DDHHMMZ MMM YYYY    REFERENCE NANU: YYYYYNNN    REF NANU DTG: DDHHMMZ MMM YYYY    SVN: XXX    PRN: XX </pre>
ICD870 -160	<b>Figure 10-19 Reference Information</b>
ICD870 -161	<i>10.3.2.3 Satellite Identification</i>
ICD870 -162	<p>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.</p>
ICD870 -163	<pre> YYYYNNN----- NOTICE ADVISORY TO NAVSTAR USERS (NANU) YYYYYNNN SUBJ: SVNXXX (PRNXX) FORECAST OUTAGE JDAY JJJ/HHMM - JDAY JJJ/HHMM 1. NANU TYPE: FCSTDV    NANU NUMBER: YYYYYNNN    NANU DTG: DDHHMMZ MMM YYYY    REFERENCE NANU: YYYYYNNN    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 </pre>
ICD870	<b>Figure 10-20 Satellite Identification Information</b>

ID	<i>ICD-GPS-870 RevB (24 Sep 2013) Navstar GPS Control Segment to User Support Community Interfaces</i>
-164	
ICD870 -165	<b>10.3.2.4 Outage Time</b>
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	<pre> YYYYNNN----- NOTICE ADVISORY TO NAVSTAR USERS (NANU) YYYYYNNN SUBJ: SVNXXX (PRNXX) FORECAST OUTAGE JDAY JJJ/HHMM - JDAY JJJ/HHMM 1. NANU TYPE: FCSTDV    NANU NUMBER: YYYYYNNN    NANU DTG: DDHHMMZ MMM YYYY    REFERENCE NANU: YYYYYNNN    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 </pre>
ICD870 -168	<b>Figure 10-21 Outage Time</b>
ICD870 -169	<b>10.3.3 NANU Section 2</b>
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	<pre> 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. </pre>
ICD870 -172	<b>Figure 10-22 NANU Section 2</b>
ICD870 -173	<b>10.3.4 NANU Section 3</b>
ICD870	Section 3 of the NANU identifies points of contact for additional technical and support information. An

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-174	example of this section is illustrated in Figure 10-23.
ICD870 -175	<div style="border: 1px solid black; padding: 5px;"> <p>3. POC: CIVILIAN - NAVCEN AT (703)313-5900, <a href="http://www.navcen.uscg.gov">HTTP://www.NAVCEN.USCG.GOV</a>  CIVIL AVIATION - FAA National Operations Control Center  MILITARY - GPS Operations Center at <a href="https://gps.afspc.af.mil/gpsoc">HTTPS://GPS.AFSPC.AF.MIL/GPSOC</a>, DSN 560-2541,  COMM 719-567-2541, <a href="mailto:GPS_SUPPORT@SCHRIEVER.AF.MIL">GPS_SUPPORT@SCHRIEVER.AF.MIL</a>, <a href="https://gps.afspc.af.mil">HTTPS://GPS.AFSPC.AF.MIL</a>  MILITARY ALTERNATE - JOINT SPACE OPERATIONS CENTER, DSN 276-9994,  COMM 805-606-9994, <a href="mailto:JSPOCCOMBATOPS@VANDENBERG.AF.MIL">JSPOCCOMBATOPS@VANDENBERG.AF.MIL</a></p> </div>
ICD870 -176	<b>Figure 10-23 Contact Information</b>
ICD870 -177	<b>11 TBD</b>
ICD870 -178	<b>12 TBD</b>
ICD870 -179	<b>13 TBD</b>
ICD870 -180	<b>14 TBD</b>
ICD870 -181	<b>15 TBD</b>
ICD870 -182	<b>16 TBD</b>
ICD870 -183	<b>17 TBD</b>
ICD870 -184	<b>18 TBD</b>
ICD870 -185	<b>19 TBD</b>
ICD870 -186	<b>20 APPENDIX 2: OPERATIONAL ADVISORY DATA FILE</b>
ICD870 -187	Appendix 2 describes the Operational Advisory message format.

ID	ICD-GPS-870 RevB (24 Sep 2013) Navstar GPS Control Segment to User Support Community Interfaces
ICD870 -188	<b>20.1 Operational Advisory</b>
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	<pre> 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                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 </pre> <p>*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.</p>
ICD870 -191	<b>Figure 20-1 Sample Operational Advisory</b>
ICD870 -192	<b>20.2 OA Header.</b>
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.

ID	<i>ICD-GPS-870 RevB (24 Sep 2013) Navstar GPS Control Segment to User Support Community Interfaces</i>
ICD870 -194	<div style="border: 1px solid black; padding: 5px;">           UNCLASSIFIED            GPS OPERATIONAL ADVISORY                    086.OA1            SUBJ: GPS STATUS                            27 MAR 2009         </div>
ICD870 -195	<b>Figure 20-2 OA Header</b>
ICD870 -196	<b>20.3 OA Section 1</b>
ICD870 -197	<p>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.</p>
ICD870 -198	<div style="border: 1px solid black; padding: 5px;"> <pre> 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           </pre> </div>
ICD870 -199	<b>Figure 20-3 OA Section 1</b>
ICD870 -200	<b>20.4 OA Section 2</b>
ICD870 -201	<p>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.</p>

ID	ICD-GPS-870 RevB (24 Sep 2013) Navstar GPS Control Segment to User Support Community Interfaces																																																																		
ICD870 -202	<table border="1"> <tr> <td colspan="6">2. CURRENT ADVISORIES AND FORECASTS:</td> </tr> <tr> <td colspan="6">A. FORECASTS: FOR SEVEN DAYS AFTER EVENT CONCLUDES.</td> </tr> <tr> <td>NANU</td> <td>MSG DATE/TIME</td> <td>PRN</td> <td>TYPE</td> <td colspan="2">SUMMARY (JDAY/ZULU TIME START - STOP)</td> </tr> <tr> <td>2009022</td> <td>261836Z MAR 2009</td> <td>18</td> <td>FCSTDV</td> <td colspan="2">092/1600-093/0630</td> </tr> <tr> <td colspan="6">B. ADVISORIES:</td> </tr> <tr> <td>NANU</td> <td>MSG DATE/TIME</td> <td>PRN</td> <td>TYPE</td> <td colspan="2">SUMMARY (JDAY/ZULU TIME START - STOP)</td> </tr> <tr> <td colspan="6">C. GENERAL:</td> </tr> <tr> <td>NANU</td> <td>MSG DATE/TIME</td> <td>PRN</td> <td>TYPE</td> <td colspan="2">SUMMARY (JDAY/ZULU TIME START - STOP)</td> </tr> <tr> <td>2009020</td> <td>202158Z MAR 2009</td> <td></td> <td>GENERAL</td> <td colspan="2">/-/</td> </tr> <tr> <td>2009021</td> <td>241836Z MAR 2009</td> <td>01</td> <td>LAUNCH</td> <td colspan="2">/-/</td> </tr> <tr> <td>2009023</td> <td>262212Z MAR 2009</td> <td></td> <td>GENERAL</td> <td colspan="2">/-/</td> </tr> </table>	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	/-/	
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ICD870 -203	<b>Figure 20-4 OA Section 2</b>																																																																		
ICD870 -204	<b>20.5 OA Section 3</b>																																																																		
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	<table border="1"> <tr> <td colspan="2">3. REMARKS:</td> </tr> <tr> <td colspan="2">A. THE POINT OF CONTACT FOR GPS MILITARY OPERATIONAL SUPPORT IS THE GPS OPERATIONS CENTER AT (719)567-2541 OR DSN 560-2541.</td> </tr> <tr> <td colspan="2">B. CIVILIAN: FOR INFORMATION, CONTACT US COAST GUARD NAVCEN AT COMMERCIAL (703)313-5900 24 HOURS DAILY AND INTERNET <a href="http://www.navcen.uscg.gov">HTTP://WWW.NAVCEN.USCG.GOV</a></td> </tr> <tr> <td colspan="2">C. MILITARY SUPPORT WEBPAGES CAN BE FOUND AT THE FOLLOWING <a href="https://gps.afspc.af.mil/gps">HTTPS://GPS.AFSPC.AF.MIL/GPS</a> OR <a href="https://gps.afspc.af.mil/gpsoc">HTTPS://GPS.AFSPC.AF.MIL/GPSOC</a></td> </tr> </table>	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 <a href="http://www.navcen.uscg.gov">HTTP://WWW.NAVCEN.USCG.GOV</a>		C. MILITARY SUPPORT WEBPAGES CAN BE FOUND AT THE FOLLOWING <a href="https://gps.afspc.af.mil/gps">HTTPS://GPS.AFSPC.AF.MIL/GPS</a> OR <a href="https://gps.afspc.af.mil/gpsoc">HTTPS://GPS.AFSPC.AF.MIL/GPSOC</a>																																																											
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ICD870 -207	<b>Figure 20-5 OA Section 3</b>																																																																		
ICD870 -208	<b>21 TBD</b>																																																																		
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ICD870 -213	<b>26 TBD</b>
ICD870 -214	<b>27 TBD</b>
ICD870 -215	<b>28 TBD</b>
ICD870 -216	<b>29 TBD</b>
ICD870 -217	<b>30 APPENDIX 3: ALMANAC DATA FILES</b>
ICD870 -218	Appendix 3 describes the SEM and YUMA Almanac message formats.
ICD870 -219	<b>30.1 Almanac Description</b>
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	<b>30.2 SEM Almanac Parameters Definition</b>
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	<b>30.3 SV Health Word</b>
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

ID	<i>ICD-GPS-870 RevB (24 Sep 2013) Navstar GPS Control Segment to User Support Community Interfaces</i>																																																																																																											
	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	<b>Table 30-I Six-Bit SV Health Word in Almanac</b>																																																																																																											
ICD870 -226	<table border="1"> <thead> <tr> <th data-bbox="269 529 529 600">SV Health Category</th> <th data-bbox="529 529 886 600">Six Bit SV Health Word in NAV message</th> <th data-bbox="886 529 1471 600">Numerical Representation of Six-Bit Health Word in SEM &amp; YUMA Almanac</th> </tr> </thead> <tbody> <tr><td>ACTIVE</td><td>000000</td><td>0</td></tr> <tr><td>OTHER</td><td>000001</td><td>1</td></tr> <tr><td>OTHER</td><td>000010</td><td>2</td></tr> <tr><td>OTHER</td><td>000011</td><td>3</td></tr> <tr><td>OTHER</td><td>000100</td><td>4</td></tr> <tr><td>OTHER</td><td>000101</td><td>5</td></tr> <tr><td>OTHER</td><td>000110</td><td>6</td></tr> <tr><td>OTHER</td><td>000111</td><td>7</td></tr> <tr><td>OTHER</td><td>001000</td><td>8</td></tr> <tr><td>OTHER</td><td>001001</td><td>9</td></tr> <tr><td>OTHER</td><td>001010</td><td>10</td></tr> <tr><td>OTHER</td><td>001011</td><td>11</td></tr> <tr><td>OTHER</td><td>001100</td><td>12</td></tr> <tr><td>OTHER</td><td>001101</td><td>13</td></tr> <tr><td>OTHER</td><td>001110</td><td>14</td></tr> <tr><td>OTHER</td><td>001111</td><td>15</td></tr> <tr><td>OTHER</td><td>010000</td><td>16</td></tr> <tr><td>OTHER</td><td>010001</td><td>17</td></tr> <tr><td>OTHER</td><td>010010</td><td>18</td></tr> <tr><td>OTHER</td><td>010011</td><td>19</td></tr> <tr><td>OTHER</td><td>010100</td><td>20</td></tr> <tr><td>OTHER</td><td>010101</td><td>21</td></tr> <tr><td>OTHER</td><td>010110</td><td>22</td></tr> <tr><td>OTHER</td><td>010111</td><td>23</td></tr> <tr><td>OTHER</td><td>011000</td><td>24</td></tr> <tr><td>OTHER</td><td>011001</td><td>25</td></tr> <tr><td>OTHER</td><td>011010</td><td>26</td></tr> <tr><td>OTHER</td><td>011011</td><td>27</td></tr> <tr><td>OTHER</td><td>011100</td><td>28</td></tr> <tr><td>OTHER</td><td>011101</td><td>29</td></tr> <tr><td>OTHER</td><td>011110</td><td>30</td></tr> <tr><td>OTHER</td><td>011111</td><td>31</td></tr> <tr><td>OTHER</td><td>100000</td><td>32</td></tr> <tr><td>OTHER</td><td>100001</td><td>33</td></tr> </tbody> </table>	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		
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ICD870 -227	<b>30.4 SEM Almanac Format</b>																																																																																												
ICD870 -228	<p>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.</p>																																																																																												

ID	ICD-GPS-870 RevB (24 Sep 2013) Navstar GPS Control Segment to User Support Community Interfaces																																	
ICD870 -229	<pre> <b>LINE</b> <b>1</b> 28 CURRENT.ALM <b>2</b> 175 589824 <b>3</b> <b>R-1</b> 1 <b>R-2</b> 32 <b>R-3</b> 1 <b>R-4</b> 0.54044723510742E-0002 <b>b</b> 0.95157623291016E-0002 <b>c</b> -0.25247572921216E-0008 <b>R-5</b> 0.51537275390625E+0004 <b>d</b> -0.12954437732697E+0000 <b>e</b> -0.54729294776917E+0000 <b>R-6</b> 0.21287477016449E+0000 <b>f</b> 0.26512145996094E-0003 <b>g</b> 0.00000000000000E+0000 <b>R-7</b> 0 <b>R-8</b> 9 <b>R-9</b> <b>1</b> <b>2</b> . . </pre>																																	
ICD870 -230	Figure 30-1 SEM Data Sample for Current.al3																																	
ICD870 -231	<p><b>Note:</b> The <b>bold</b> 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.</p>																																	
ICD870 -232	Table 30-II SEM Almanac Description for Current.al3																																	
ICD870 -233	(Sheet 1 of 2)																																	
ICD870 -234	<table border="1"> <thead> <tr> <th data-bbox="220 1333 285 1409">Line No.</th> <th data-bbox="293 1333 505 1409">Almanac Name</th> <th data-bbox="505 1333 837 1409">Description</th> <th data-bbox="837 1333 959 1409">Units</th> <th data-bbox="959 1333 1162 1409">Range</th> <th data-bbox="1162 1333 1292 1409">Accuracy</th> <th data-bbox="1292 1333 1463 1409">Precision</th> </tr> </thead> <tbody> <tr> <td data-bbox="220 1409 285 1514" rowspan="2">1</td> <td data-bbox="293 1409 505 1514">Number of records</td> <td data-bbox="505 1409 837 1514">The number of satellite Almanac records contained in the file</td> <td data-bbox="837 1409 959 1514">Records</td> <td data-bbox="959 1409 1162 1514">0 to 32</td> <td data-bbox="1162 1409 1292 1514">1</td> <td data-bbox="1292 1409 1463 1514">2 significant digits</td> </tr> <tr> <td data-bbox="293 1514 505 1640">Name of Almanac</td> <td data-bbox="505 1514 837 1640">Descriptive name for the Almanac in the file</td> <td data-bbox="837 1514 959 1640">N/A</td> <td data-bbox="959 1514 1162 1640">Any combination of valid ASCII characters</td> <td data-bbox="1162 1514 1292 1640">N/A</td> <td data-bbox="1292 1514 1463 1640">24 significant characters</td> </tr> <tr> <td data-bbox="220 1640 285 1745">2</td> <td data-bbox="293 1640 505 1745">GPS Week Number</td> <td data-bbox="505 1640 837 1745">The Almanac reference week number (WNa) for all Almanac data in the file</td> <td data-bbox="837 1640 959 1745">Weeks</td> <td data-bbox="959 1640 1162 1745">0 to 1023 *</td> <td data-bbox="1162 1640 1292 1745">1</td> <td data-bbox="1292 1640 1463 1745">4 significant digits</td> </tr> </tbody> </table>	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						
Line No.	Almanac Name	Description	Units	Range	Accuracy	Precision																												
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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																												

ID								ICD-GPS-870 RevB (24 Sep 2013) Navstar GPS Control Segment to User Support Community Interfaces							
		GPS Time of Applicability	The number of seconds since the beginning of the Almanac reference week. The Almanac reference time ( $t_{0a}$ ) for all Almanac data in the file	Second	0 to 602,112	1	6 significant digits								
<b>3</b>		Blank line for format spacing													
<b>Record Format</b>															
<b>R-1</b>	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									
<b>R-2</b>	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									
<b>R-3</b>	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									
<b>R-4</b>	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		<b>Table 30-II SEM Almanac Description for Current.al3</b>													
ICD870-236		<b>(Sheet 2 of 2)</b>													
ICD870-237		<b>Line No</b>	<b>Almanac Name</b>	<b>Description</b>	<b>Units</b>	<b>Range</b>	<b>Accuracy</b>	<b>Precision</b>							
		<b>b</b>	Inclination Offset	Satellite Almanac orbital "inclination angle offset" ( $\delta_i$ )** 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							

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	<b>c</b>	Rate of Right Ascension	Rate of change in the measurement of the angle of right ascension ( $\dot{\Omega}$ -DOT)**	Semi circles/second	-1.1921 E-7*** to +1.1921 E-7***	3.64 E-12	7 significant digits
	<b>R-5</b>	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 <sup>1/2</sup>	0 to 8,192	4.88 E-04	9 significant digits
	<b>d</b>	Geographic Longitude of Orbital Plane	Geographic longitude of the orbital plane at the weekly epoch" ( $\Omega_0$ )**	Semi circles	-1.0 to +1.0	1.19 E-07	9 significant digits
	<b>e</b>	Argument of Perigee	The angle from the equator to perigee ( $\omega$ )**	Semi circles	-1.0 to +1.0	1.19 E-07	9 significant digits
	<b>R-6</b>	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
	<b>f</b>	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
	<b>g</b>	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
	<b>R-7</b>	Satellite Health	The satellite subframe 4 and 5, page 25 six-bit health code **	None	0 to 63	None	2 significant digits
	<b>R-8</b>	Satellite Configuration	The satellite subframe 4, page 25 four-bit configuration code **	None	0 to 15	None	2 significant digits
	<b>R-9</b>	Blank line for format spacing					
<p>*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.</p> <p>**As defined in IS-GPS-200.</p> <p>***Rounded up from max range of IS-GPS-200 binary format.</p>							
ICD870-238	Table 30-III SEM Almanac Description for Current.bl3						
ICD870-308	(Sheet 1 of 2)						
ICD870-239	<b>Line No.</b>	<b>Almanac Name</b>	<b>Description</b>	<b>Units</b>	<b>Range</b>	<b>Accuracy</b>	<b>Precision</b>

ICD-GPS-870 RevB (24 Sep 2013) Navstar GPS Control Segment to User Support Community Interfaces							
ID	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					
	2	Name of Almanac	Descriptive name for the Almanac in the file	N/A	Any combination of valid ASCII characters	N/A	24 significant characters
		Blank space for format spacing					
	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					
	2	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
		Blank space for format spacing					
	3	Blank line for format spacing					
	<b>Record Format</b>						
	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						

ID	ICD-GPS-870 RevB (24 Sep 2013) Navstar GPS Control Segment to User Support Community Interfaces																																																																																										
-306	(Sheet 2 of 2)																																																																																										
ICD870 -307	<table border="1"> <thead> <tr> <th data-bbox="220 359 285 430">Line No</th> <th data-bbox="293 359 513 430">Almanac Name</th> <th data-bbox="513 359 841 430">Description</th> <th data-bbox="841 359 967 430">Units</th> <th data-bbox="967 359 1170 430">Range</th> <th data-bbox="1170 359 1300 430">Accuracy</th> <th data-bbox="1300 359 1468 430">Precision</th> </tr> </thead> <tbody> <tr> <td data-bbox="220 430 285 590">b</td> <td data-bbox="293 430 513 590">Inclination Offset</td> <td data-bbox="513 430 841 590">Satellite Almanac orbital "inclination angle offset" (<math>\delta_i</math>)*** This does not include the 0.30 semicircle reference value (<math>i_0</math>)***</td> <td data-bbox="841 430 967 590">Semi circles</td> <td data-bbox="967 430 1170 590">-6.25 E-2 to +6.25 E-2</td> <td data-bbox="1170 430 1300 590">1.91 E-6</td> <td data-bbox="1300 430 1468 590">7 significant digits</td> </tr> <tr> <td data-bbox="220 590 285 726">c</td> <td data-bbox="293 590 513 726">Rate of Right Ascension</td> <td data-bbox="513 590 841 726">Rate of change in the measurement of the angle of right ascension (<math>\Omega</math>-DOT)***</td> <td data-bbox="841 590 967 726">Semi circles/second</td> <td data-bbox="967 590 1170 726">-1.1921 E-7**** to +1.1921 E-7****</td> <td data-bbox="1170 590 1300 726">3.64 E-12</td> <td data-bbox="1300 590 1468 726">7 significant digits</td> </tr> <tr> <td data-bbox="220 726 285 856">R-5</td> <td data-bbox="293 726 513 856">Square Root of Semi-Major Axis</td> <td data-bbox="513 726 841 856">Measurement from the center of the orbit to either the point of apogee or the point of perigee (<math>A^{1/2}</math>)***</td> <td data-bbox="841 726 967 856">Meters<sup>1/2</sup></td> <td data-bbox="967 726 1170 856">0 to 8,192</td> <td data-bbox="1170 726 1300 856">4.88 E-04</td> <td data-bbox="1300 726 1468 856">9 significant digits</td> </tr> <tr> <td data-bbox="220 856 285 957">d</td> <td data-bbox="293 856 513 957">Geographic Longitude of Orbital Plane</td> <td data-bbox="513 856 841 957">Geographic longitude of the orbital plane at the weekly epoch" (<math>\Omega_0</math>)***</td> <td data-bbox="841 856 967 957">Semi circles</td> <td data-bbox="967 856 1170 957">-1.0 to +1.0</td> <td data-bbox="1170 856 1300 957">1.19 E-07</td> <td data-bbox="1300 856 1468 957">9 significant digits</td> </tr> <tr> <td data-bbox="220 957 285 1031">e</td> <td data-bbox="293 957 513 1031">Argument of Perigee</td> <td data-bbox="513 957 841 1031">The angle from the equator to perigee (<math>\omega</math>)***</td> <td data-bbox="841 957 967 1031">Semi circles</td> <td data-bbox="967 957 1170 1031">-1.0 to +1.0</td> <td data-bbox="1170 957 1300 1031">1.19 E-07</td> <td data-bbox="1300 957 1468 1031">9 significant digits</td> </tr> <tr> <td data-bbox="220 1031 285 1161">R-6</td> <td data-bbox="293 1031 513 1161">Mean Anomaly</td> <td data-bbox="513 1031 841 1161">The angle which describes the position of the satellite in its orbit, relative to perigee. (<math>M_0</math>)***</td> <td data-bbox="841 1031 967 1161">Semi circle</td> <td data-bbox="967 1031 1170 1161">-1.0 to +1.0</td> <td data-bbox="1170 1031 1300 1161">1.19 E-07</td> <td data-bbox="1300 1031 1468 1161">9 significant digits</td> </tr> <tr> <td data-bbox="220 1161 285 1262">f</td> <td data-bbox="293 1161 513 1262">Zeroth Order Clock Correction</td> <td data-bbox="513 1161 841 1262">The satellite Almanac zeroth order clock correction term (<math>a_{f0}</math>)***</td> <td data-bbox="841 1161 967 1262">Seconds</td> <td data-bbox="967 1161 1170 1262">-9.7657 E-4**** to +9.7657 E-4****</td> <td data-bbox="1170 1161 1300 1262">9.54 E-07</td> <td data-bbox="1300 1161 1468 1262">5 significant digits</td> </tr> <tr> <td data-bbox="220 1262 285 1365">g</td> <td data-bbox="293 1262 513 1365">First Order Clock Correction</td> <td data-bbox="513 1262 841 1365">The satellite Almanac first order clock correction term (<math>a_{f1}</math>)***</td> <td data-bbox="841 1262 967 1365">Seconds/second</td> <td data-bbox="967 1262 1170 1365">-3.7253 E-9**** to +3.7253 E-9****</td> <td data-bbox="1170 1262 1300 1365">3.64 E-12</td> <td data-bbox="1300 1262 1468 1365">5 significant digits</td> </tr> <tr> <td data-bbox="220 1365 285 1465">R-7</td> <td data-bbox="293 1365 513 1465">Satellite Health</td> <td data-bbox="513 1365 841 1465">The satellite subframe 4 and 5, page 25 six-bit health code ***</td> <td data-bbox="841 1365 967 1465">None</td> <td data-bbox="967 1365 1170 1465">0 to 63</td> <td data-bbox="1170 1365 1300 1465">None</td> <td data-bbox="1300 1365 1468 1465">2 significant digits</td> </tr> <tr> <td data-bbox="220 1465 285 1568">R-8</td> <td data-bbox="293 1465 513 1568">Satellite Configuration</td> <td data-bbox="513 1465 841 1568">The satellite subframe 4, page 25 four-bit configuration code ***</td> <td data-bbox="841 1465 967 1568">None</td> <td data-bbox="967 1465 1170 1568">0 to 15</td> <td data-bbox="1170 1465 1300 1568">None</td> <td data-bbox="1300 1465 1468 1568">2 significant digits</td> </tr> <tr> <td data-bbox="220 1568 285 1608">R-9</td> <td colspan="6" data-bbox="293 1568 1468 1608" style="text-align: center;">Blank line for format spacing</td> </tr> </tbody> </table>	Line No	Almanac Name	Description	Units	Range	Accuracy	Precision	b	Inclination Offset	Satellite Almanac orbital "inclination angle offset" ( $\delta_i$ )*** 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 ( $\Omega$ -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 <sup>1/2</sup>	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" ( $\Omega_0$ )***	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 ( $\omega$ )***	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. 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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.</p> <p>** SVN Number as distributed by the CS is a modulo 256 (000-255) filled with leading zeros.</p> <p>*** As defined in IS-GPS-200.</p> <p>**** Rounded up from max range of IS-GPS-200 binary format.</p>					
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ID	<i>ICD-GPS-870 RevB (24 Sep 2013) Navstar GPS Control Segment to User Support Community Interfaces</i>
ICD870 -240	<b>30.5 YUMA Almanac Format</b>
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	<div style="border: 1px solid black; padding: 10px; margin: 10px 0;"> <pre> ***** Week 175 almanac for PRN-01 ***** ID:                01 Health:            000 Eccentricity:      0.5404472351E-002 Time of Applicability(s): 589824.0000 Orbital Inclination(rad): 0.9723724451 Rate of Right Ascen(r/s): -0.7931758961E-008 SQRT(A) (m 1/2):   5153.727539 Right Ascen at Week(rad): -0.4069756641E+000 Argument of Perigee(rad): -1.719371504 Mean Anom(rad):    0.6687658141E+000 Af0(s):            0.2651214600E-003 Af1(s/s):          0.0000000000E+000 Week:              175 </pre> </div>
ICD870 -244	Figure 30-2 YUMA Almanac Data Sample For Current.alm
ICD870	<b>31 TBD</b>

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-245				
ICD870 -246	<b>32 TBD</b>			
ICD870 -247	<b>33 TBD</b>			
ICD870 -248	<b>34 TBD</b>			
ICD870 -249	<b>35 TBD</b>			
ICD870 -250	<b>36 TBD</b>			
ICD870 -251	<b>37 TBD</b>			
ICD870 -252	<b>38 TBD</b>			
ICD870 -253	<b>39 TBD</b>			
ICD870 -254	<b>40 APPENDIX 4: EXTENDED SIGNALS HEALTH STATUS FILES</b>			
ICD870 -255	Appendix 4 describes the Extended Signals Health Status (ESHS) message format.			
ICD870 -256	<b>40.1 Extended Signals Health Status</b>			
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	<b>Table 40-I Modernized Civil Signals</b>			
ICD870 -259	Modernized Civil Signal	L1C	L2C	L5
	Reference Document	IS-GPS-800	IS-GPS-200	IS-GPS-705

ID	<i>ICD-GPS-870 RevB (24 Sep 2013) Navstar GPS Control Segment to User Support Community Interfaces</i>																										
	Applicable SV Block/Iteration	III	IIR-M, IIF, III																								
ICD870-260	<p>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:</p> <p>0 = Signal OK, 1 = Signal bad or unavailable</p>																										
ICD870-261	<p>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.</p>																										
ICD870-262	<table border="1" data-bbox="373 861 1367 1276"> <thead> <tr> <th>LINE</th> <th>Parameter Name</th> <th></th> </tr> </thead> <tbody> <tr> <td>1</td> <td># of Records/File Name</td> <td>28 CURRENT.ALE</td> </tr> <tr> <td>2</td> <td>GPS Week #/GPS TOA</td> <td>175 589824</td> </tr> <tr> <td>3</td> <td>Blank Line</td> <td></td> </tr> <tr> <td>R-1</td> <td>PRN</td> <td>18</td> </tr> <tr> <td>R-2</td> <td>SVN</td> <td>054</td> </tr> <tr> <td>R-3</td> <td>L1/L2/L5 Health Status</td> <td>0-7 in binary format (000, 001, 010, 011, 100, 101, 110, 111)</td> </tr> <tr> <td>R-4</td> <td>Blank Line</td> <td></td> </tr> </tbody> </table> <p data-bbox="373 1291 1367 1386">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.</p> <p data-bbox="373 1396 1367 1465">After line R-4 of this example, lines R-1 through R-4 are repeated for each record in the CURRENT.ALE file.</p>			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	
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ICD870-263	<p><b>Figure 40-1 Extended Signals Health Status Data Sample</b></p>																										
ICD870-264	<p>Table 40-II identifies the characteristics of each parameter in the ESHS message.</p>																										
ICD870	<p><b>Table 40-II ESHS Description</b></p>																										

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ICD870 -266	<table border="1"> <thead> <tr> <th data-bbox="212 285 293 342">Line No.</th> <th data-bbox="293 285 505 342">Parameter Name</th> <th data-bbox="505 285 824 342">Description</th> <th data-bbox="824 285 971 342">Units</th> <th data-bbox="971 285 1159 342">Range</th> <th data-bbox="1159 285 1317 342">Accuracy</th> <th data-bbox="1317 285 1484 342">Resolution</th> </tr> </thead> <tbody> <tr> <td data-bbox="212 342 293 438">1</td> <td data-bbox="293 342 505 438">Number of records</td> <td data-bbox="505 342 824 438">The number of satellite ESHS records contained in the file</td> <td data-bbox="824 342 971 438">Records</td> <td data-bbox="971 342 1159 438">00 to 63</td> <td data-bbox="1159 342 1317 438">1</td> <td data-bbox="1317 342 1484 438">2 significant digits</td> </tr> <tr> <td colspan="7" data-bbox="212 438 1484 470" style="text-align: center;">Blank space for format spacing</td> </tr> <tr> <td data-bbox="212 470 293 590"></td> <td data-bbox="293 470 505 590">Name of ESHS file</td> <td data-bbox="505 470 824 590">Descriptive name for the ESHS file</td> <td data-bbox="824 470 971 590">N/A</td> <td data-bbox="971 470 1159 590">Any combination of valid ASCII characters</td> <td data-bbox="1159 470 1317 590">N/A</td> <td data-bbox="1317 470 1484 590">24 significant characters</td> </tr> <tr> <td data-bbox="212 590 293 686">2</td> <td data-bbox="293 590 505 686">GPS Week Number</td> <td data-bbox="505 590 824 686">The Almanac reference week number (WNa) for all data in the file</td> <td data-bbox="824 590 971 686">Weeks</td> <td data-bbox="971 590 1159 686">0 to 1023*</td> <td data-bbox="1159 590 1317 686">1</td> <td data-bbox="1317 590 1484 686">4 significant characters</td> </tr> <tr> <td colspan="7" data-bbox="212 686 1484 718" style="text-align: center;">Blank space for format spacing</td> </tr> <tr> <td data-bbox="212 718 293 869"></td> <td data-bbox="293 718 505 869">GPS Time of Applicability</td> <td data-bbox="505 718 824 869">The number of seconds since the beginning of the Almanac reference week for all data in the file.</td> <td data-bbox="824 718 971 869">Seconds</td> <td data-bbox="971 718 1159 869">0 to 602,112</td> <td data-bbox="1159 718 1317 869">1</td> <td data-bbox="1317 718 1484 869">6 significant characters</td> </tr> <tr> <td data-bbox="212 869 293 903">3</td> <td colspan="6" data-bbox="293 869 1484 903" style="text-align: center;">Blank Line for Format Spacing</td> </tr> <tr> <td colspan="7" data-bbox="212 903 1484 934" style="text-align: center;"><b>Record Format</b></td> </tr> <tr> <td data-bbox="212 934 293 1270">R-1</td> <td data-bbox="293 934 505 1270">PRN Number</td> <td data-bbox="505 934 824 1270">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.</td> <td data-bbox="824 934 971 1270">None</td> <td data-bbox="971 934 1159 1270">01-63</td> <td data-bbox="1159 934 1317 1270">N/A</td> <td data-bbox="1317 934 1484 1270">2 significant digits</td> </tr> <tr> <td data-bbox="212 1270 293 1421">R-2</td> <td data-bbox="293 1270 505 1421">SVN</td> <td data-bbox="505 1270 824 1421">The SV reference number. Unique sequential number associated with each satellite.</td> <td data-bbox="824 1270 971 1421">None</td> <td data-bbox="971 1270 1159 1421">000-255 (000 denotes this field is empty)</td> <td data-bbox="1159 1270 1317 1421">N/A</td> <td data-bbox="1317 1270 1484 1421">3 significant digits</td> </tr> <tr> <td data-bbox="212 1421 293 1610">R-3</td> <td data-bbox="293 1421 505 1610">L1C/L2C/L5 Health Status</td> <td data-bbox="505 1421 824 1610">The health status of the L1C/L2C/L5 signals, defined as follows: 0 = Signal OK 1 = Signal bad or unavailable</td> <td data-bbox="824 1421 971 1610">None</td> <td data-bbox="971 1421 1159 1610">0-7 in binary format (000, 001, 010, 011, 100, 101, 110, 111)</td> <td data-bbox="1159 1421 1317 1610">N/A</td> <td data-bbox="1317 1421 1484 1610">3 significant characters</td> </tr> <tr> <td data-bbox="212 1610 293 1644">R-4</td> <td colspan="6" data-bbox="293 1610 1484 1644" style="text-align: center;">Blank Line for Format Spacing</td> </tr> <tr> <td colspan="7" data-bbox="212 1644 1484 1812"> <p>*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). 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	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																																																																																																		
<b>Record Format</b>																																																																																																			
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																																																																																																		
<p>*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.</p>																																																																																																			

ID	<i>ICD-GPS-870 RevB (24 Sep 2013) Navstar GPS Control Segment to User Support Community Interfaces</i>
ICD870 -267	<b>41 TBD</b>
ICD870 -268	<b>42 TBD</b>
ICD870 -269	<b>43 TBD</b>
ICD870 -270	<b>44 TBD</b>
ICD870 -271	<b>45 TBD</b>
ICD870 -272	<b>46 TBD</b>
ICD870 -273	<b>47 TBD</b>
ICD870 -274	<b>48 TBD</b>
ICD870 -275	<b>49 TBD</b>
ICD870 -276	<b>50 APPENDIX 5: ANTI-SPOOFING STATUS FILE</b>
ICD870 -277	Appendix 5 describes the Anti-Spoofing Status message format.
ICD870 -278	<b>50.1 Anti-Spoofing Status</b>
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.

ID	ICD-GPS-870 RevB (24 Sep 2013) Navstar GPS Control Segment to User Support Community Interfaces																																																																																																			
ICD870 -280	<div style="border: 1px solid black; padding: 10px; text-align: center;"> <p>Anti Spoofing (A-S) Status</p> <table border="1"> <thead> <tr> <th>PRN</th> <th>SVN</th> <th>A-S</th> </tr> </thead> <tbody> <tr><td>1</td><td>049</td><td>ON</td></tr> <tr><td>2</td><td>061</td><td>ON</td></tr> <tr><td>3</td><td>033</td><td>ON</td></tr> <tr><td>4</td><td>034</td><td>ON</td></tr> <tr><td>5</td><td>050</td><td>ON</td></tr> <tr><td>6</td><td>036</td><td>ON</td></tr> <tr><td>7</td><td>048</td><td>ON</td></tr> <tr><td>8</td><td>038</td><td>ON</td></tr> <tr><td>9</td><td>039</td><td>ON</td></tr> <tr><td>10</td><td>040</td><td>ON</td></tr> <tr><td>11</td><td>046</td><td>ON</td></tr> <tr><td>12</td><td>058</td><td>ON</td></tr> <tr><td>13</td><td>043</td><td>ON</td></tr> <tr><td>14</td><td>041</td><td>ON</td></tr> <tr><td>15</td><td>055</td><td>ON</td></tr> <tr><td>16</td><td>056</td><td>ON</td></tr> <tr><td>17</td><td>053</td><td>ON</td></tr> <tr><td>18</td><td>054</td><td>ON</td></tr> <tr><td>19</td><td>059</td><td>ON</td></tr> <tr><td>20</td><td>051</td><td>ON</td></tr> <tr><td>21</td><td>045</td><td>ON</td></tr> <tr><td>22</td><td>047</td><td>ON</td></tr> <tr><td>23</td><td>060</td><td>ON</td></tr> <tr><td>24</td><td>024</td><td>ON</td></tr> <tr><td>25</td><td>025</td><td>ON</td></tr> <tr><td>26</td><td>026</td><td>ON</td></tr> <tr><td>27</td><td>027</td><td>ON</td></tr> <tr><td>28</td><td>044</td><td>ON</td></tr> <tr><td>29</td><td>057</td><td>ON</td></tr> <tr><td>30</td><td>030</td><td>ON</td></tr> <tr><td>31</td><td>052</td><td>ON</td></tr> <tr><td>32</td><td>023</td><td>ON</td></tr> </tbody> </table> </div>	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
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ICD870 -281	Figure 50-1 Sample of the Anti-Spoofing Status file (as.txt)																																																																																																			
ICD870 -282	<b>51 TBD</b>																																																																																																			
ICD870 -283	<b>52 TBD</b>																																																																																																			
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ID	<i>ICD-GPS-870 RevB (24 Sep 2013) Navstar GPS Control Segment to User Support Community Interfaces</i>
-288	
ICD870 -289	<b>58 TBD</b>
ICD870 -290	<b>59 TBD</b>
ICD870 -291	<b>60 APPENDIX 6: LETTERS OF EXCEPTION</b>
ICD870 -292	<b>60.1 Scope</b>
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	<b>60.2 Applicable Documents</b>
ICD870 -295	The documents listed in Section 2.1 shall be applicable to this appendix.
ICD870 -296	<b>60.3 Letters of Exception</b>
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	<b>Figure 60-1 Letter of Exception</b>



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,

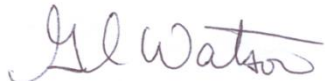
1. This letter is submitted pursuant to the Request for Rough Order of Magnitude (ROM) requested in the reference (b) letter. Raytheon Company has reviewed the IRN-870A-004, dated 24 September 2013 and Raytheon has taken exception to the following Verification Cross Reference Matrix (VCRM) entries:
  - 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.



GPS-13.143.GW  
08 October 2013  
Page 2 of 2

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