**PROPOSED INTERFACE REVISION NOTICE (PIRN)**

<table>
<thead>
<tr>
<th>Affected ICD/IS:</th>
<th>PIRN Number:</th>
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<tbody>
<tr>
<td>ICD-GPS-870</td>
<td>PIRN-870B-001</td>
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<tr>
<th>Authority:</th>
<th>PIRN Date:</th>
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<tr>
<td>RFC-00308</td>
<td>20-JUN-2016</td>
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**CLASSIFIED BY:**

**DECLASSIFY ON:**

<table>
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<tr>
<th>Document Title:</th>
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<tbody>
<tr>
<td>Update ICD-GPS-870 and ICD-GPS-240 to align with ICD-GPS-875</td>
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</table>

**Reason For Change (Driver):**

ICD-GPS-875 has been updated to describe the new OCX-NGA and OCX-USCG interfaces. ICD-GPS-870 now needs to be updated to describe the data format changes for the public users of the USCG data. This will also address numerous formatting errors in the publicly released version of ICD-GPS-870. ICD-GPS-870 and ICD-GPS-240 require updates to clarify NANU outage codes.

**Description of Change:**

Update the descriptions of the data public users can access on the US Coast Guard server in ICD-GPS-870. Add a definition of "outage" for NANU messages to ICD-GPS-240 and to ICD-GPS-870.

<table>
<thead>
<tr>
<th>Prepared By: George Farmer</th>
<th>Checked By: Adrienne Harrington</th>
</tr>
</thead>
</table>

**DISTRIBUTION STATEMENT A:** Approved For Public Release; Distribution Is Unlimited
ICD870-650:

**WAS:**
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.

**IS:**
In accordance with the standards CS-based requirement approach to be in compliance with the DoD Information Technology Standards Registry (DISR), the CS selected standards from the GPS DISRs employed their GPS order products to minimize 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.

ICD870-11:

**WAS:**
The following signatories must approve this ICD to make it effective.
1. Air Force Space Command (AFSPC), GPS Directorate (GP) Space and Missile Systems Center (SMC)
2. Air Force Space Command (AFSPC), 50th Space Wing (50 SW)
3. Raytheon Company, OCX Contractor
4. Department of Homeland Security (DHS), United States Coast Guard (USCG), Navigation Center (NAVCEN)
5. Department of Transportation (DOT), Federal Aviation Administration (FAA)

**IS:**
The following signatories must approve this ICD to make it effective.
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2. Air Force Space Command (AFSPC), 50th Space Wing (50 SW)
3. Raytheon Company, OCX Contractor

4. Department of Homeland Security (DHS), United States Coast Guard (USCG), Navigation Center (NAVCEN)

5. Department of Transportation (DOT), Federal Aviation Administration (FAA)

---

ICD870-21:

WAS:

**Federal**

**Military**
- 23 April 2007  DODD 8320.02 Data Sharing in a Net Centric Department of Defense
-  September 2010  Department of Defense Public Key Infrastructure Functional Interface Specification 3.0.
-  24 May 2011  Public Key Infrastructure (PKI) and Public Key (PK) Enabling (DoDI 8520.02)

IS:

**Federal**
-  NDR 1.3  National Information Exchange Model (NIEM) Naming Design Rules

**Military**
September 2010  Department of Defense Public Key Infrastructure
Functional Interface Specification 3.0.

ICD870-23:

WAS:

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<th>Navstar GPS Space Segment / Navigation User Interface</th>
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<tr>
<td>Current Version</td>
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<td>IS-GPS-705</td>
<td>Navstar GPS Space Segment / User Segment L5 Interfaces</td>
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<tr>
<td>Current Version</td>
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<td>IS-GPS-800</td>
<td>Navstar GPS Space Segment / User Segment L1C Interfaces</td>
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<tr>
<td>Current Version</td>
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<td>GP-03-001A</td>
<td>GPS Interface Control Working Group (ICWG) Charter</td>
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<td>MOA</td>
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<td>(Signatories: USCG/G-NRN and USSPACECOM/DO)</td>
</tr>
<tr>
<td>MOA</td>
<td>Support Agreement Between the United States Coast</td>
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<tr>
<td>February 1996</td>
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<td>Status Information”</td>
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<td>(Signatories: Commanding Officer NAVCEN and AFSPC/DO)</td>
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<tr>
<td>MOA</td>
<td>Memorandum of Agreement between the Joint Functional</td>
</tr>
<tr>
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<td>Component Command for Space the U.S. Coast Guard</td>
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<td>Navigation Center and the FAA National Operations</td>
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<td>Control Center with respect to the Support of Users of</td>
</tr>
<tr>
<td></td>
<td>the Navstar Global Positioning System</td>
</tr>
<tr>
<td>Fiscal Year 2012</td>
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<tr>
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<td>Federal Radionavigation Plan</td>
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</table>
MFR 30 June 2011 Department of the Air Force, 50th Space Wing (AFSPC) Memorandum for Record - 2 SOPS GPS Public Release Policy

6 February 2003 DODI 8500.2, Information Assurance (IA) Implementation Policy


<table>
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<tr>
<td>IS-GPS-200 Current Version</td>
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<td>Navstar GPS Space Segment / Navigation User Interface</td>
</tr>
<tr>
<td>IS-GPS-705 Current Version</td>
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<tr>
<td>Navstar GPS Space Segment / User Segment L5 Interfaces</td>
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<tr>
<td>IS-GPS-800 Current Version</td>
</tr>
<tr>
<td>Navstar GPS Space Segment / User Segment L1C Interfaces</td>
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<tr>
<td>GP-03-001A 20 April 2006</td>
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<tr>
<td>GPS Interface Control Working Group (ICWG) Charter</td>
</tr>
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<td>MOA February 1992</td>
</tr>
<tr>
<td>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)</td>
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<td>MOA February 1996</td>
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<tr>
<td>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)</td>
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<td>MOA February 2010</td>
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<tr>
<td>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</td>
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<tr>
<td>MOA June 2014</td>
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<tr>
<td>Interagency Memorandum of Agreement with Respect to Support of Users of the Navstar Global Positioning System (GPS)</td>
</tr>
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</table>
Fiscal Year 2014 Federal Radionavigation Plan
(Signatories: Department of Homeland Security, Department of Transportation, Department of Defense)

MFR
30 June 2011 Department of the Air Force, 50th Space Wing (AFSPC)

Memorandum for Record - 2 SOPS GPS Public Release Policy

6 February 2003 DODI 8500.2, Information Assurance (IA) Implementation


ICD870-27:

WAS:

Standards
November 1999 W3C, XSL Transformations (XSLT) Version 1.0

November 2008 W3C, Extensible Markup Language (XML) Version 1.0 (Fifth Edition)

June 2008 W3C, XML Signature Syntax and Processing (Second Edition)


June 1999 IETF, RFC 2616, Hypertext Transfer Protocol - HTTP/1.1

IS:

Standards
November 1999 W3C, XSL Transformations (XSLT) Version 1.0
ICD870-651 :

WAS :
The GPS Products defined herein will be accessible via the USCG Navigation Information Service (NIS), see section 3.2.5.

IS :
The GPS Products defined herein will be accessible via the USCG Navigation Information Service (NIS) users, see section 3.2.5.
In accordance with DODD 8320, *Data Sharing in a Net Centric Department of Defense*, this ICD defines and then uses a GPS domain specific information exchange vocabulary which users should adopt when discussing the public GPS products offered by the CS. Figure 3-3 depicts a high level entity relationship diagram summarizing the GPS Product Ontology.

This ontology captures the modernized GPS Product relationships including compliance with the latest government standards for data sharing and interoperability including National Information Exchange Model (NIEM).
ICD870-664:

WAS:

```
+----------------+      +----------------+      +----------------+
| Product Meta Data | 1    | GPS Product    | 1    | Digital Signature |
|                  +-------+            +-------+                |
|                  |      |                  |      |                  |
|                  |      |                  |      |                  |
|                  |      |                  |      |                  |
|                  +-------+            +-------+                |
|                  |      |                  |      |                  |
|                  +----------------+      +----------------+      +----------------+
| XML Schema Product | «instance» | Information Product | 1 | * Transformation Product |
|                  +----------------+      +----------------+      +----------------+
| OA Product       |      | NANU Product     |      | Common Almanac Product |
|                  +----------------+      +----------------+      +----------------+
```

UNCLASSIFIED
UNCLASSIFIED

IS:

ICD870-665:

WAS:
Appendices 1-5 of this ICD documents the minimum information content and formats which are required to achieve backward compatibility compliance. To also ensure compliance with DoD Information Technology Standards and Profile Registry (DISR) and enable rapid discovery, all published GPS Products will be defined using DoD Discovery Metadata Specification (DDMS) compliant meta data and XML compliant data schema. The GPS Ontology and schemas will be published in the USCG NIS web site, currently http://www.navcen.uscg.gov.
IS:
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 Ontology meta, including data Transition and XML compliant data schema. The GPS Ontology and Support schemas Products will be published in the USCG NIS web site, currently http://www.navcen.uscg.gov.

ICD870-721:
Insertion after object ICD870-665

WAS:
N/A

IS:
The GPS CS will employ schema versioning whereby new data dissemination data/schema will be made available early in a pre-production form to allow synchronized development of automated ingestion and processing systems by users. In addition, operational data will be available in a production-full support form and in a production-deprecated form to allow graceful transition and retirement of obsolete data/schema.

ICD870-666:

WAS:
The CS will publish multiple categories of GPS Products including; Information Products, XML Schema Products and Transformation Products. Each GPS Product contains its respective Digital Signature and Product Meta data as shown in Figure 3-3 and Figure 3-5.

a) Information Products provide users information about the state/status of the GPS System.

b) XML Schema Products define the structure of an XML document associated with this interface.

c) Transformation Products can be used to transform an Information Product into one of several formats supporting full backward compatibility with the ASCII text file formats.

IS:
The CS will publish multiple categories of the GPS Products Community including:

UNCLASSIFIED
Information Products, XML Schemas and Products Transition and Transformation Support Products. Each GPS Product created contains by its respective CS Digital Signature and associated Product XML Meta Digital data Signature as shown in Figure 3-3 and Figure 3-5.

a) **CS produced** Information Products provide users with information about the state/status of the GPS System.

b) **GPS Community produced** XML Schemas define the structure of the XML information documents associated with this interface.

c) **Transformation CS produced** Style Sheets within the IEPDs can be used to transform an Information Product into one of several formats supporting full backward compatibility with the ASCII text file formats.

---

**ICD870-31**

**WAS:**
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.

**IS:**
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.

---

**ICD870-305**

**WAS:**
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).
IS:
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).

ICD870-669:
WAS:

UNCLASSIFIED
ICD870-671 :

WAS :
These Information Products shall conform to the associated published XML schema Product as shown in Table 3-III.
CS Effectivity: 10

IS :
These Information Products shall conform to the associated published XML schema Product as shown in Table 3-III.
ICD870-672:

WAS:
The CS provides Transition Utility and Support Products as shown in Table 3-II.
CS Effectivity: 10

IS:
The CSGPS Community provides Transition Utility and Support Products for GPS authoritative data as shown in Table 3-HIII.
CS Effectivity: 10/N/A

ICD870-673:

WAS:
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 Information Products.
CS Effectivity: 10

IS:
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 Information Products and XSLT stylesheet.
CS Effectivity: 10/N/A

ICD870-674:

WAS:
Given validated inputs, the Validate and Transform Utility shall produce the desired ASCII output.
as shown in Table 3-III.
CS Effectivity: 10

**IS:**
Given validated inputs, the Validate and Transform Utility *shall use XSLT stylesheets to produce the desired ASCII output format* as shown listed in Table 3-III.
CS Effectivity: 10 N/A

---

**ICD870-675:**

**WAS:**
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.
CS Effectivity: 10

**IS:**
As shown in major Table revision 3-III, the names of XML schema Schema becomes Products operational, and the associated superceded Transformation schema Products version shall will be remain appended available with for a revision period number of (i.e., no _vx.y) less where than “x” indicates year after the new major revision — and “y” indicates a is minor operationally revision available.
CS Effectivity: 10 N/A

---

**ICD870-676:**

**WAS:**
Minor revisions shall be backward compatible within the same major revision.
CS Effectivity: 10

**IS:**
Minor revisions *shall will be backward compatible within the same major revision.*
CS Effectivity: 10 N/A
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<thead>
<tr>
<th>Producer</th>
<th>Data Exchange Identification</th>
<th>Information Description</th>
<th>Security</th>
</tr>
</thead>
<tbody>
<tr>
<td>GPS CS</td>
<td>GPS Status Information</td>
<td>Information Product: NANU (see Table 3-III)</td>
<td>Unclassified Public Releasable Open Access</td>
</tr>
<tr>
<td>GPS CS</td>
<td>GPS Constellation Status Summary</td>
<td>Information Product: OA (See Table 3-III)</td>
<td>Unclassified Public Releasable Open Access</td>
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<tr>
<td>GPS CS</td>
<td>GPS Constellation Orbital and Performance Parameters, and SV Signal Health Status GPS Constellation Anti-Spoofing Status</td>
<td>Information Product: Common Almanac (See Table 3-III)</td>
<td>Unclassified Public Releasable Open Access</td>
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<table>
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<tr>
<th>Producer</th>
<th>Modern &amp; Legacy Data Exchange Identification</th>
<th>Description</th>
<th>Security Classification</th>
</tr>
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<td>CS</td>
<td>Modern Identification: GPS Advisory Legacy Identification: Notice Advisory to Navstar Users (NANU)</td>
<td>The GPS Advisory exchange information product includes a single advisory notification concerning a GPS space event and associated GPS space vehicle. See GPS Advisory IEPD for more details. Published on a periodic basis, based on</td>
<td>Unclassified / Open / Public Releasable</td>
</tr>
<tr>
<td>CS</td>
<td>Modern Identification: Ops Status</td>
<td>The Ops Status Exchange information product includes an Ops Status notification concerning the GPS constellation and relevant GPS space events. See Ops Status IEPD for more details. Nominally published once daily.</td>
<td>Unclassified / Open / Public Releasable</td>
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**ICD870-722:**
Insertion below object ICD870-36

**WAS:**
N/A

**IS:**
*Table 3-II not used*
ICD870-677:
WAS: Table 3-II Transition & Support Product Exchange Matrix
IS: Table 3-III Transition & Support Product Information Exchange Matrix

ICD870-723:
Insertion below object ICD870-677
WAS:
N/A
IS:

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<th>Producer</th>
<th>Data Exchange Identification</th>
<th>Information Description</th>
<th>Security Classification</th>
<th>Included Transformation Stylesheet(s)</th>
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<tr>
<td>GPS Community</td>
<td>GPS Advisory IEPD</td>
<td>A collection of artifacts that describe the construction and content (including schemas, transformation stylesheets, etc.) of a GPS Advisory information exchange. Published on a periodic bases with each new schema version.</td>
<td>Unclassified / Open / Public Releasable</td>
<td>纳NU.XSL: Stylesheet for producing ASCII formatted ICD-870 Appendix 1 NANU Data Format.</td>
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<tr>
<td>GPS Community</td>
<td>Ops Status IEPD</td>
<td>A collection of artifacts that describe the construction and content (including schemas, transformation stylesheets, etc.) of a GPS Ops Status Advisory</td>
<td>Unclassified / Open / Public Releasable</td>
<td>OpsAdvisory.XSL: Stylesheet for producing ASCII formatted ICD-870 Appendix 2 Operational Advisory Data File Format</td>
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<td>information exchange. Published on a periodic basis with each new schema version.</td>
<td>Unclassified / Open / Public Releasable</td>
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<td></td>
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<td>A collection of artifacts that describe the construction and content (including schemas, transformation stylesheets, etc.) of a GPS Public Common Almanac information exchange. Published on a periodic basis with each new schema version.</td>
<td>SEMAL3.XSL: Stylesheet for producing ASCII formatted ICD-870 Appendix 3 SEM (AL3) Almanac Data File Format</td>
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WAS:

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<td>specifies content of each</td>
<td>(See Table 3-III)</td>
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<td>XSLT Transformations</td>
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<td>Validate and Transform</td>
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CS Effectivity: N/A
SS Effectivity: N/A

IS:
<DELETED OBJECT>

ICD870-679:
WAS:
Table 3-III Mapping Information Products & Transformation Products into Desired Output Format
CS Effectivity: N/A
SS Effectivity: N/A

IS:
<DELETED OBJECT>

ICD870-681:

WAS:
Multiple revisions of schema and transformations to support backward compatibility and to extend
the migration time for the user community may be available.
CS Effectivity: 10

IS:
Multiple revisions of schema and transformations to support backward compatibility and to extend
the migration time for the user community may be available.
CS Effectivity: 10 N/A

ICD870-39:

WAS:
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.

IS:
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.

ICD870-684 :

WAS :
As depicted in Figure 3-5, all GPS Products available in the Portal shall comply with the following DISR standards:

- W3C, Extensible Markup Language (XML)
- DoD Discovery Metadata Specification (DDMS)
- W3C XML Signature Syntax and Processing Standard

CS Effectivity: 10

IS :
As depicted in Figure 3-5, all GPS Products available in the Information Portal shall comply with the following DISR standards:

- W3C, Extensible Markup Language (XML)
- DoD Discovery Metadata Specification (DDMS)
- W3C XML Signature Syntax and Processing Standard

CS Effectivity: N/A

ICD870-685 :

WAS :
The transformation products which can be used to convert Information Products into the various ASCII formats have a body which shall comply with the following additional DISR standard:

- W3C, XSL Transformations (XSLT)

CS Effectivity: 10

IS :
The transformation stylesheets within the IEPD, as depicted in Figure 3-3 and which can be used to convert Information Products into the various ASCII legacy formats have a body which shall comply with the following additional DISR standard:
ICD870-686:

WAS:
These XSLT Transformation products are another kind of GPS Product in which the “XML Payload” is an XSLT-compliant document.

IS:
These XSLT Transformation products are another kind of GPS Product in which the “XML Payload” is an XSLT-compliant XML document.

ICD870-688:

WAS:

```
```

DDMS  XML  Message  (IAW  DDMS

DDMS  Resource  (IAW  DDMS

Content (IAW DDMS Standard)

GPS  OCX  Metadata  (IAW  GPS  Product

Header
- Digital Signature
  (IAW XML Digital Signature Standard)

Body
- XML Payload
  (IAW GPS Product Schema)
```
ICD870-46:

WAS:
Generation of Almanac Data

IS:
Generation of Public Common Almanac Data Product

ICD870-47:

WAS:
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.

CS Effectivity: 10
IS:
The GPS CS generates the Public 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 transformation XSLT products stylesheet. 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.

CS Effectivity: 10 N/A

ICD870-48:

WAS:
Generation of Operational Advisory Data

IS:
Generation of OperationalOps AdvisoryStatus DataProduct

ICD870-49:

WAS:
The GPS CS shall publish the Operational Advisory Information Product for the GPS constellation.
CS Effectivity: 10

IS:
The GPS CS shall publish generate the OperationalOps AdvisoryStatus Information Product for the GPS constellation.
CS Effectivity: 10 N/A
ICD870-692 :

WAS :
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.

IS :
The OAOps Status information product is a descriptive summary of GPS constellation status. As shown in Table 3-III, ASCII O-A formats can be produced using the OAOps Status Information Product and the provided transformationXSLT productstylesheet. Detailed ASCII data formats of the OA data file (current.oa1) are described in Appendix 2 of this ICD.

ICD870-50 :

WAS :
Generation of NANU Data

IS :
Generation of NANUGPS Data Advisory Product

ICD870-51 :

WAS :
The GPS CS shall publish the NANU Information Product for the GPS constellation.
CS Effectivity: 10

IS :
The GPS CS shall publish the NANU GPS Advisory Information Product for the GPS constellation.
CS Effectivity: 10N/A
ICD870-693:

WAS:
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.

IS:
The NANUGPS Advisory 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 NANUGPS Advisory Information Product and the provided Transformation XSLT Product stylesheet. Detailed ASCII data formats of the NANU (current.nnu) data are described in Appendix 1 of this ICD.

ICD870-52:

WAS:
Generation of Anti-Spoofing (A-S) Status

IS:
Generation of Legacy Anti-Spoofing (A-S) Status

ICD870-53:

WAS:
The GPS CS shall publish the Anti-Spoofing Status information for the GPS constellation as part of the Common Almanac Information Product.
CS Effectivity: 10
IS:
The GPS-CS shall publish newly created Public Common Almanac Information Product from which, as shown in Table 3-III, the Anti-Spoofing Status information will be produced using the GPSXSLT constellation stylesheet. As part of the Common A-S Almanac Status Information Product (as.txt and as2.txt), detailed ASCII data formats are described in Appendix 5 of this ICD.
CS Effectivity: 10 N/A

ICD870-694:

WAS:
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.
CS Effectivity: N/A
SS Effectivity: N/A

IS:
<DELETED OBJECT>

ICD870-55:

WAS:
Distribution of the GPS Products to the public is accomplished via the USCG NIS.
CS Effectivity: 10

IS:
Distribution of the GPS Products Portal to users, USCG with NIS, is accessible from the public Internet.
CS Effectivity: 10 N/A

ICD870-724:
Insertion below object ICD870-55
ICD870-718:
Insertion after object ICD870-55

WAS:
N/A

IS:
*Figure new01 GPS Public Product Distribution Overview*

---

ICD870-719:
Insertion after object ICD870-718

WAS:
N/A
IS: As shown in Figure new01, the NAVCEN Information System (NIS) is the distribution point for authoritative GPS Products disseminated to the public. The NAVCEN receives these products from the GPS Control Segment (OCX) and the GPS community (led by the Air Force GPS Program Office). The GPS products consist of regularly published operational GPS information products (see Table 3-I) as well as Transition and Support Products (see Table 3-III).

ICD870-58:

WAS: 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).

CS Effectivity: 10

IS: NANU GPS Advisory Information Products are provided whenever they are generated including weekends and holidays. The Ops OA Status 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).

CS Effectivity: 40 N/A

ICD870-698:

WAS: As the Authoritative Source for GPS Products described in this ICD, the CS publishes only digitally signed GPS Products to improve information assurance for GPS data at rest (i.e., resident on a storage device) within the GPS user community. Without digital signatures to ensure the integrity and proof of origin of the GPS Products at rest, Information Products originally from the CS could be corrupted (intentionally or unintentionally) during redistribution to the end user. The potential consequence of corrupted GPS Information products varies between end users. Some end users have Information Assurance critical applications (e.g. public utilities, safety of life systems) in which the potential consequence are significant and therefore unacceptable to the end user. Therefore;

a) The CS will only distribute GPS Products (see section 3.1.1) which are digitally signed XML documents per the published XML schema for compliance with modern Net Centric and Information Assurance standards for non-repudiation.
b) The CS publishes Transformation Products and also provides a downloadable Validate and Transform Utility to assist users with first validating then transforming Information Products into backward compatible ASCII formats.

c) In order to maximize the benefit of information assurance, the CS recommends that End Users perform the transformation step as late as possible (just prior to ingesting).

d) Validating the data integrity of GPS products is optional and is the responsibility of the user. End users must apply their knowledge of the criticality of their application in making the determination of whether they can accept the risks of ignoring CS provided digital signatures.

e) Any US government user interested in redistributing GPS Products or products derived from GPS Products are advised to consult with the GPS CS before doing so to understand the tradeoffs and verify duplicative efforts are not being planned by the GPS CS.

IS:
As the Authoritative Source for GPS Information Products described in this ICD, the CS publishes only digitally signed GPS Products to improve information assurance for GPS data at rest (i.e., resident on a storage device) within the GPS user community. Without digital signatures to ensure the integrity and proof of origin of the GPS Products at rest, Information Products originally from the CS could be corrupted (intentionally or unintentionally) during redistribution to the end user. The potential consequence of corrupted GPS Information products varies between end users. Some end users have Information Assurance critical applications (e.g. public utilities, safety of life systems) in which the potential consequence are significant and therefore unacceptable to the end user. Therefore;

a) The CS will only distribute GPS Products (see section 3.1.1) which are digitally signed XML documents per the published XML schema for compliance with modern Net Centric and Information Assurance standards for non-repudiation.

b) The CS publishes Community Transformation provides Products IEPDs and which also include provides XSLT stylesheets downloadable with their associated detached XML digital signatures that can be used in conjunction with the Validate and Transform Utility to assist users with first validating then transforming GPS Information Products into backward compatible ASCII formats.

c) In order to maximize the benefit of information assurance, the CS recommends that End Users perform the transformation step as late as possible (just prior to ingesting).

d) Validating the data integrity of GPS products is optional and is the responsibility of the user. End users must apply their knowledge of the criticality of their application in making the determination of whether they can accept the risks of ignoring CS provided digital signatures.

e) Any US government user interested in redistributing GPS Products or products derived from GPS Products are advised to consult with the GPS CSCommunity before doing so to understand the tradeoffs and verify duplicative efforts are not being planned by the GPS CSCommunity.
ICD870-65:

WAS:
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.

IS:
Those consumers not interested in verifying the data integrity of GPS Information Products can simply use the messages. The requirement is upon the GPS CS to provide data integrity and it is OPTIONAL for the consumer to take the steps needed to verify the integrity of the data. The following paragraphs describe what the GPS CS is required to do and optionally what the consumer would need to do to verify that a message is genuine and originates from the GPS CS.

ICD870-66:

WAS:
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.
CS Effectivity: 10

IS:
The GPS CS shall use DoD Public Key Infrastructure (PKI) to digitally sign all GPS Products as described in section Tables 3-I and 3-I-III and as per Department of Defense Public Key Infrastructure Functional Interface Specification 3.0.
CS Effectivity: 10 N/A

ICD870-699:

WAS:
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.
CS Effectivity: 10
**IS :**
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.
CS Effectivity: **40**N/A

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**ICD870-700 :**

**WAS :**
As depicted in Figure 3-5, the header elements of the GPS Product Meta Data will contain the XML digital signature for the entire GPS Product (excluding the signature itself). This method of digital signing is referred to as an enveloped signature as defined in the W3C Signature Syntax Processing.

**IS :**
As depicted in Figure 3-5, the header elements of the GPS Product MetaOCX DataContent will contain the XML digital signature for the entire GPS Information 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.

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**ICD870-701 :**

**WAS :**
As shown in Figure 3-2, the steps for a user to verify the data integrity where the user has an application which directly processes ASCII text file formats:

1. Download the desired Information Product and Transform Product (see Table 3-III). Note: Because the XML schema for an Information Product will change very infrequently, a Transformation Product can be downloaded once for a new schema revision and then reused repeatedly without downloading again.

2. Just prior to use, validate the Digital Signature of Information Product and the Transform Product using a W3C XML Digital Signature Compliant standard COTS/Library (e.g., JDK 1.6/1.7) and the currently published CS public certificate.
3. If the signatures do not validate in Step 2, then either the Information Product or the Transformation Product is not authentic (not produced by the CS) or has been corrupted. Do not use. The user should return to step 1.

4. If the signatures validate in both Step 2 and Step 3, then extract XSLT from the Product Meta Data Body Element (see Figure 3-3) and apply the XSLT using standard COTS/Library to produce the desired ASCII file format.

Note: A user with a non-critical application who intends to bypass verifying data integrity only needs to perform Step 1 and then Step 4.

Note: The provided Validate and Transform Utility (see figure 3-4) can be used to perform steps 2, 3 and 4. The user is required to download/install the CS public key on their system prior to using the Validate and Download Utility.

IS:
As shown in Figure 3-2, the steps for a user to verify the data integrity where the user has an application which directly processes ASCII text file formats:

1. Download the desired Information Product and Transformation Product IEPD (see Table 3-III) from USCG NIS web site or an alternate redistribution site. Note: Because the XML schema IEPD for an Information Product will change very infrequently, the Transformation Product step can be downloaded performed once for a new schema IEPD revision and then reused repeatedly without downloading again.

2. Just prior to use, validate the Digital Signature of the Information Product and the Transformation Product stylesheet signature file using a W3C XML Digital Signature Compliant standard COTS/Library (e.g., JDK 1.6/1.7) and the currently published CS public certificate.

3. If the signatures do not validate in Step 2, then either the Information Product or the Transformation Product stylesheet is not authentic (not produced by the CS) or has been corrupted. Do not use. The user should return to step 1.

4. If the signatures validate in both Step 2 and Step 3, then extract XSLT from the Product Meta Data Body Element (see Figure 3-3) and apply the XSLT stylesheet using standard COTS/Library to produce the desired ASCII file format.

Note: A user with a non-critical application who intends to bypass verifying data integrity only needs to perform Step 1 and then Step 4.

Note: The provided Validate and Transform Utility (see figure 3-4) can be used to perform steps 2, 3 and 4. The user is required to download/install the CS public key on their system prior to using the Validate and Download Utility.
ICD870-702:

**WAS:**
As shown in Figure 3-2, the steps for a user to verify the data integrity where the user has a modern application which directly processing CS native XML formats:

1. Download the desired Information Product (see Table 3-III)

2. Just prior to use, Validate the Digital Signature of Information Product using a W3C XML Digital Signature Compliant standard COTS/Library (e.g. JDK 1.6/1.7) and the currently published CS public certificate.

3. If the signature does not validate in Step 2, then the Information product is either not authentic (not produced by the CS) or the information content has been corrupted. Do not use. The user should return to step 1.

4. If the signature validates in Step 2, then the GPS Product is authentic and the content has not been corrupted.

*Note: A user with a modern non-critical application who intends to bypass verifying data integrity only needs to perform Step 1*

*Note: The provided Validate and Transform Utility (see figure 3-4) can be used to perform step 2. The user is required to download/install the CS public key on their system prior to using the Validate and Download Utility.*

**IS:**
As shown in Figure 3-2, the steps for a user to verify the data integrity where the user has a modern application which directly processing CS native XML formats;

1. Download the desired Information Product (see Table 3-III) [from the USCG NIS web site](#)

2. Just prior to use, Validate the Digital Signature of Information Product using a W3C XML Digital Signature Compliant standard COTS/Library (e.g. JDK 1.6/1.7) and the currently published CS public certificate.
3. If the signature does not validate in Step 2, then the Information product is either not authentic (not produced by the CS) or the information content has been corrupted. Do not use. The user should return to step 1.

4. If the signature validates in Step 2, then the GPS Information Product is authentic and the content has not been corrupted.

Note: A user with a modern non-critical application who intends to bypass verifying data integrity only needs to perform Step 1.

Note: The provided Validate and Transform Utility (see figure 3-4) can be used to perform step 2. The user is required to download/install the CS public key on their system prior to using the Validate and Download Utility.

ICD870-67:

WAS:
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. CS Effectivity: 10

IS:
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. CS Effectivity: N/A

ICD870-68:

WAS:
CS Effectivity: 10
IS:
CS Effectivity: 40 N/A

ICD870-704:

WAS:
To encourage GPS users to validate data integrity and at the same time ensure backward compatibility to ASCII text files, the CS shall provide a downloadable transition support utility application referred to herein as “Validate and Transform Utility”.
CS Effectivity: 10

IS:
To encourage GPS users to validate data integrity and at the same time ensure backward compatibility. The USCG ASCII Portal text will make the CS shall provide standalone offline downloadable Validate transition and support Transform utility—application—referred—to—herein as available “Validate on the Transform public Utility” Internet.
CS Effectivity: 40 N/A

ICD870-705:

WAS:
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.

IS:
This utility will present the user with a simple User Interface to validate the integrity of any downloaded GPS Information Product and/or to XSLT optionally stylesheet apply included in the transform EPDs contained as well as downloaded Transformation Product optionally apply the appropriate XSLT stylesheet transform.
ICD870-715:

WAS:
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.

IS:
The provided CS Utility Validate will and be Transform an Utility executable will application be installable on supported versions of Windows and Linux platforms, at a minimum Windows 7 and Redhat 5.8.

ICD870-716:

WAS:
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.

IS:
User platform requirements for running the utility Validate and Transform Utility will be described on the USCG NIS website. The Utility will be digitally signed and users should validate the Authenticity of the certificate during installation.

ICD870-70:

WAS:
All of the GPS Products shall be digitally signed.
CS Effectivity: 10

IS:
All of the GPS Information Products shall will be digitally signed.
CS Effectivity: 10 N/A
UNCLASSIFIED

ICD870-720:
Insertion after object ICD870-70

WAS:
N/A

IS:
All XSLT stylesheets will be signed using detached XML digital signatures with the signature stored on separate files as shown in figure 3-3.

ICD870-706:

WAS:
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.
CS Effectivity: 10

IS:
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.
CS Effectivity: 10

ICD870-707:

WAS:
A message shall always have its corresponding signature available to the consumer to verify the message independent of the delivery protocol.
CS Effectivity: 10

IS:
A message shall always have its corresponding signature available to the consumer to verify the message independent of the delivery protocol.
CS Effectivity: 10
NANUs are used to notify Users of scheduled and unscheduled satellite outages and general GPS information. The paragraphs that follow describe the different types of NANUs. The NANU descriptions are arranged into four groups, as follows:

- Scheduled outages
- Unscheduled outages
- General text message
- Others

NANUs are used to notify Users of scheduled and unscheduled satellite outages and general GPS information. An outage is defined to be a period of time that the satellite is removed from service and not available for use. This occurs when the satellite meets the conditions for "unhealthy" provided in Section 2.3.2 of the Standard Positioning Service Performance guide. The paragraphs that follow describe the different types of NANUs. The NANU descriptions are arranged into four groups, as follows:

- Scheduled outages
- Unscheduled outages
- General text message
- Others

<table>
<thead>
<tr>
<th>NANU ACRONYM</th>
<th>NAME</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>FCSTDV</td>
<td>Forecast Delta-V</td>
<td>Scheduled outage times for Delta-V maneuvers.</td>
</tr>
<tr>
<td>FCSTMX</td>
<td>Forecast Maintenance</td>
<td>Scheduled outage times for non-Delta-V maintenance.</td>
</tr>
<tr>
<td>FCSTEXTD</td>
<td>Forecast</td>
<td>Extends the scheduled outage time &quot;Until Further&quot;</td>
</tr>
<tr>
<td>NANU ACRONYM</td>
<td>NAME</td>
<td>DESCRIPTION</td>
</tr>
<tr>
<td>-------------</td>
<td>-----------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>Extension</td>
<td>Notice”; references the original forecast NANU.</td>
</tr>
<tr>
<td>FCSTSUMM</td>
<td>Forecast Summary</td>
<td>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>FCSTCANC</td>
<td>Forecast Cancellation</td>
<td>Cancels a scheduled outage when a new maintenance time is not yet determined; it references the original forecast N nuanced message.</td>
</tr>
<tr>
<td>FCSTRESCD</td>
<td>Forecast rescheduled</td>
<td>Reschedules a scheduled outage referencing the original-FCST NANU message.</td>
</tr>
<tr>
<td>FCSTUUFN</td>
<td>Forecast Unusable</td>
<td>Scheduled outage of indefinite duration not necessarily related to Delta-V or maintenance activities.</td>
</tr>
<tr>
<td></td>
<td>Until Further Notice</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
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<th>NAME</th>
<th>DESCRIPTION</th>
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</tr>
<tr>
<td>FCSTMX</td>
<td>Forecast</td>
<td>Scheduled outage times for non-Delta-V maintenance.</td>
</tr>
<tr>
<td></td>
<td>Maintenance</td>
<td></td>
</tr>
<tr>
<td>FCSTEXTD</td>
<td>Forecast Extension</td>
<td>Extends the scheduled outage time “Until Further Notice”; references the original forecast NANU.</td>
</tr>
<tr>
<td>FCSTSUMM</td>
<td>Forecast Summary</td>
<td>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>FCSTCANC</td>
<td>Forecast Cancellation</td>
<td>Cancels a scheduled outage when a new maintenance time is not yet determined; it references the original forecast NANU message. May be issued after the start time of the referenced NANU.</td>
</tr>
<tr>
<td>FCSTRESCD</td>
<td>Forecast rescheduled</td>
<td>Reschedules a scheduled outage referencing the original-FCST NANU message.</td>
</tr>
<tr>
<td>FCSTUUFN</td>
<td>Forecast Unusable Until Further Notice</td>
<td>Scheduled outage of indefinite duration not necessarily related to Delta-V or maintenance activities.</td>
</tr>
</tbody>
</table>
ICD870-141:

**WAS:**

<table>
<thead>
<tr>
<th>NANU Group</th>
<th>Nominal Notification Times</th>
<th>Objective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scheduled</td>
<td>48 hrs prior to outage start</td>
<td>96 hrs prior to outage start</td>
</tr>
<tr>
<td>Unscheduled</td>
<td>Less than 1 hr after outage start</td>
<td>15 minutes after outage start</td>
</tr>
<tr>
<td>General</td>
<td>No Nominal – Timing determined on a case-by-case basis</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>No Nominal – Timing determined on a case-by-case basis</td>
<td></td>
</tr>
</tbody>
</table>

**IS:**

<table>
<thead>
<tr>
<th>NANU Group</th>
<th>Nominal Notification Times</th>
<th>Objective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scheduled</td>
<td>48 hrs prior to outage start</td>
<td>96 hrs prior to outage start</td>
</tr>
<tr>
<td>Unscheduled</td>
<td>Less than 1 hr after outage start</td>
<td>15 minutes after outage start</td>
</tr>
<tr>
<td>General</td>
<td>No Nominal – Timing determined on a case-by-case basis</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>No Nominal – Timing determined on a case-by-case basis</td>
<td></td>
</tr>
</tbody>
</table>

**Verification Cross Reference Matrix:**
Only those objects that are being added, modified or deleted in this IRN/SCN will be shown in the "Was" and "Is" fields in the VCRM.

**WAS:**


<table>
<thead>
<tr>
<th>DOORS ID</th>
<th>Object Number</th>
<th>CS Effectivity</th>
<th>SS Effectivity</th>
<th>Highest Verification Level</th>
<th>Segment</th>
<th>System Verification Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICD870-671</td>
<td>3.1.0-21</td>
<td>10</td>
<td>N/A</td>
<td>Segment CS</td>
<td>CS</td>
<td>Demonstration</td>
</tr>
<tr>
<td>ICD870-672</td>
<td>3.1.0-22</td>
<td>10</td>
<td>N/A</td>
<td>Segment CS</td>
<td>CS</td>
<td>Demonstration</td>
</tr>
<tr>
<td>ICD870-673</td>
<td>3.1.0-23</td>
<td>10</td>
<td>N/A</td>
<td>Segment CS</td>
<td>CS</td>
<td>Test</td>
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<tr>
<td>ICD870-674</td>
<td>3.1.0-24</td>
<td>10</td>
<td>N/A</td>
<td>Segment CS</td>
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<td>Test</td>
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<tr>
<td>ICD870-675</td>
<td>3.1.0-25</td>
<td>10</td>
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