# Document/Change Number: ICD-GPS-870, IRN 001

ICC Name: Jaime O. Valdivia

T	ID	was  ort Community OCX Data Formats	IS	RATIONALE (Reason For Change)
Sect 10, pg. 10-1		Appendix 1 describes the NANU types and the NANU message format that are used in the OCS/AEP era. The next revision of this ICD (Rev A) will contain the OCX NANU data formats which will account for the increase in SV constellation and the inclusion of the GPS III fleet during the OCX era.	Appendix 1 describes the NANU types and the NANU message format.	Deleted sentences after NANU message format. Data formats are being updated for OCX, thus those sentences are not needed anymore
Sect 10, Figures		SVNXX	SVNXXX	Increased the SVN # field from 2 to 3 digits due to SV constellation increase in the OCX era (32 to 63 SVs). See Figures 10-1 through 10-10, 10-12, 10-14 through 10-16
Sect 10, Figure 10- 13		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 ICD-GPS-200.	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.	1. The LEAPSEC NANU message template (line #3) describes the leap second update only for the legacy NAV broadcast. This NANU should be modified to also describe the leap second update for the modernized signals:  L2C – IS-GPS-200, Message Type 33  L5 – IS-GPS-705, Message Type 33  L1C – IS-GPS-800, Subframe 3, Page 1  M-Code (MNAV) – ICD-GPS-700, Message Type XX (M-Code reference in data will not be shown)  2. Delete redundant L5
Sect 10, Figure 10- 17 through 10-23		Old Figures and Figure Titles from ICD Initial Release version	See new Figures in Section 10 and Figure Titles	Replaced Figures 10-17 through 10-23, which contained an actual NANU example, with Figures of a NANU template. Deleted Example from Title of Figures 10-17 through 10-22

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CP NUMBER	SECTION NUMBER	 WAS	IS	RATIONALE (Reason For Change)
	Sect 10.3.2.3 & 10.3.3, 1st paras	Sect 10.3.2.3 The identification information includes the satellite two-digit SVN and two-digit PRN number. Sect 10.3.3Section 2 is a summary of the NANU in paragraph format including the satellite two-digit SVN and two-digit PRN number		Increased the SVN # field from 2 to 3 digits due to SV constellation increase in the OCX era (32 to 63 SVs).
	Sect 20, pg. 20-1	Appendix 2 describes the Operational Advisory message format that is used in the OCS/AEP era. The next revision of this ICD (Rev A) will contain the OCX OA data formats which will account for the increase in SV constellation and the inclusion of the GPS III fleet during the OCX era.	<u> </u>	Deleted sentences after Operational Advisory message format. Data formats are being updated for OCX, thus those sentences are not needed anymore
	20.1 Fig 20-1 & 20.3 Fig 20-3		C. BLOCK III: PRNS 33, 34, 35 PLANE: SLOT A2, C3, F4 CLOCK: RB, RB, RB Add Note to Figure 20-1: *Note: Section 1.C of the OA message 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. Add sentence, similar to note, in Section 20.3: 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.	1. Added Section 1C in Figure 20-1 (OA) to account for GPS III SVs in the OCX era. Entered TBDs under PRNs, Slot and Clock 2. Recommend replacing the TBDs in section 1.C with some dummy data to better show what goes in this section.

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ICC Name: Jaime O. Valdivia TIM Date: RFC 41: 7-OCT-2010 RFC 45: 17-NOV-2010

CP NUMBER	SECTION NUMBER	 WAS	IS	RATIONALE (Reason For Change)
	Section 20, Fig 20- 2 thru 20- 5		See updated format of Figures in Section 20	Updated the format of Figures 20-2 through 20-5 which contains the same information as the old figures, except for Figure 20-3, which now accounts for the GPS III SVs
	Sect 30, pg. 30-1	Appendix 3 describes the SEM and YUMA Almanac message formats that are used in the OCS/AEP era. The next revision of this ICD (Rev A) will contain the OCX Almanacs data formats which will account for the increase in SV constellation and the inclusion of the GPS III fleet during the OCX era.	Appendix 3 describes the SEM and YUMA Almanac message formats.	Deleted sentences after Almanac message format. Data formats are being updated for OCX, thus those sentences are not needed anymore
	Sect 30-3, pg. 30-1	Table 30-I shows the 3 MCS health categories for satellites commonly used by 2 SOPS.	Table 30-I shows the 3 MCS health categories for satellites commonly used by 2 SOPS (ACTIVE, BAD & DEAD).	Added the three health categories for clarification
	Section 30.3.1, pg. 30-3	Section 30.3.1 & Table 30-II no longer exist. Content moved to new Appendix 4		Delete Section 30.3.1

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CP NUMBER	SECTION NUMBER	7	WAS	IS	RATIONALE (Reason For Change)
	Sect 40			See newAppendix 4	1. Add to new Appendix 4 to capture Extended Signals Health Status (ESHS). In the OCX era, three new GPS civil signals (L1C, L2C and L5) will be available, in addition to current L1 C/A signal. Therefore, the implementation of the new signals requires that the almanac data also contain the health status of each signal for each SV. We have created an Extended Signals Health Status (ESHS) file to fully make use of the health status of the new civil signals. See Appendix 4 for this new implementation 2. The statement about SEM and YUMA is not necessary in this ESHS section 3. The modulo-1024 representation for GPS Week number is zero-based, permitting a range of 0-1023 4. The modulo-1024 representation for GPS Week number is zero-based, permitting a range of 0-1023
	Section 60, App 6		Appendix 4 was Letters of Exception. Letters of Exception Section is now Appendix 6:  40 APPENDIX 4: LETTERS OF EXCEPTION	New Appendix 4 is now Extended Signals Health Status Files: 60 APPENDIX 6: LETTERS OF EXCEPTION	Move Letters of Exception Section to Appendix 6
	Section 30.4, Fig 30-1		R-2 row: 32 Line 1: CURRENT.ALM	R-2 row: 032 Line 1: CURRENT.AL3	Increased the SVN # field from 2 to 3 digits by adding a zero infront of 32. Change file name to Current.al3

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CP NUMBER	SECTION NUMBER	-	WAS	IS	RATIONALE (Reason For Change)
	Section 30.4, Table 30- II		Table 30-III	Table 30-II ( <i>Note on Figure 30-1 and Table Title</i> )	Table 30-III is now 30-II because Table 30-II was moved to Appendix 4. The Notes to Table 30-II have been moved to the bottom row of the Table and are now part of the Table
	Section 30.5, 2nd para		Figure 30-2 illustrates one record in a sample YUMA almanac file. Line one of each record identifies the week in which the file was generated as well as the PRN number of the subject SV. The maximum number of records in a YUMA almanac file is 32.	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 33-63 and the maximum number of records is 31.	In the OCX era, there will be two YUMA Almanac files, current.alm and current.blm. Current.blm is a new file and the Number of records of this file is 31 (PRNs 33-63)
	Title Page, Section 1.3, and more		Title Page & Sections 1.1 & 1.3: United States Coast Guard (USCG) Navigation Center (NAVCEN)	Title Page & Sections 1.1 & 1.3: Department of Homeland Security (DHS) United States Coast Guard (USCG) Delete NAVCEN from the following areas: Figure 1, Table I, Section 3.1.2 1st para, Section 3.2 1st para, Section 3.2.6 Title, Section 3.2.6 1st para, Section 3.2.6 2nd para, Section 3.2.8 1st para, & Table II Add DHS to the following areas: Figure 1, Table I, Section 3.1.2 1st para, Section 3.2 1st para, Sect 6.1 Add USCG to the following areas: Section 3.2.5 Title, Section 3.2.5 1st para, Section 3.2.5 2nd para, Section 3.2.7 1st para, & Table II	Per USCG request, change USCG NAVCEN signature block to DHS USCG.

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CP NUMBER	SECTION NUMBER	WAS	IS	RATIONALE (Reason For Change)
	Sect 2.1,		ICD-GPS-700	Added ICD 700 to Government Documents,
	pg. 3		Current Version	since it is being referenced in Figure 10-13
			Navstar GPS Military-Unique Space Segment / User	(M-Code (MNAV) – ICD-GPS-700, Message
			Segment Interfaces	Type 11)
	Sect 3.1,	Table I:	Table I:	Added Extended Signals Health Almanac
	Table I	GPS Constellation Orbital and Performance	GPS Constellation Orbital and Performance	implementation
		Parameters	Parameters, and SV Signal Health Status	
	Sect 3.2.1, pg. 7	constellation, one current System Effectiveness	The GPS OCX generates the Almanac data for the GPS constellation, two current System Effectiveness Model (SEM) format Almanac (current.al3 and current.bl3), two current YUMA format Almanac (current.alm and current.blm), and one current Extended Signals Health Status (ESHS) format Almanac (current.ale). The satellite SEM and YUMA Almanac data contains orbital and performance parameters for operational GPS satellites. Detailed data formats of the SEM and YUMA Almanac data are described in Appendix 3 of this ICD. The satellite ESHS Almanac data contains the health status of each of the modernized civil signals available for each SV – L1C, L2C and L5. Detailed data formats of the ESHS Almanac data are described in Appendix 4 of this ICD.	1. Added Extended Signals Health Almanac implementation 2. Add references to the new almanac files, current.blm and current.bl3, for PRNs 33-63 3. Clarification on last sentence (modernized civil signals) to make the paragraph easier to read
	Sect 6.1 Global Global	SIPRNET internet	DHS Department of Homeland Security SIPRNet Internet	Added DHS to Acronym list Standardize capitalization of SIPRNet Standardize capitalization of Internet
	Global	<u>a</u> lmanac	Almanac	Standardize capitalization of Almanac

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СР	SECTION	-	WAS	IS	RATIONALE
MOINIRER	NUMBER	ID			(Reason For Change)
	Sect 1.1		The GPS OCX is operated by the 2nd Satellite	The GPS OCX is operated by the 2nd Satellite	Grammar change; Acknowledge that there
			Operations Squadron (2 SOPS), administratively	Operations Squadron (2 SOPS), administratively	are other Civil users outside of DHS/USCG
			organized under 50th Space Wing (50 SW). The GPS	organized under 50th Space Wing (50 SW). The GPS	and DOT/FAA
			user and user-support communities are comprised of	user and user-support communities are comprised of	
			the United States Coast Guard (USCG) Navigation	the Department of Homeland Security (DHS) United	
			Center (NAVCEN), Department of Transportation	States Coast Guard (USCG); Department of	
			(DOT), Federal Aviation Administration (FAA), and	Transportation (DOT), Federal Aviation	
			various Military GPS users. The interfaces between	Administration (FAA); other Civil users; and various	
			the GPS OCX and the NAVCEN, FAA and the GPS OCX	Military GPS users. The interfaces between the GPS	
			and the Military GPS user community are	OCX and the USCG, FAA, other Civil users, and the	
			implemented using electronic mail (e-mail), internet	Military GPS user community are implemented using	
			and SIPRNET. This ICD does not include detailed	electronic mail (e-mail), Internet and SIPRNet. This	
			technical descriptions of the e-mail system, internet	ICD does not include detailed technical descriptions	
			or SIPRNET.	of the e-mail system, Internet or SIPRNet.	
	Sect 1.2		GPS OCX system beginning with Effectivity 10	GPS OCX system beginning with Effectivity 10 as defined in SS-CS-800	Add reference to SS-CS-800 in order to define "Effectivity 10"
	Sect 1.3		5. Raytheon Company	5. Raytheon Company, OCX Contractor	Identify why Raytheon is a signatory like
	Figure 1		MCS (top of left box), SAFB (bottom of left box)	MCS/AMCS (top of left box), SAFB/VAFB (bottom of	Need to call out backup since both MCS at
				left box)	SAFB and AMCS at VAFB provide the same services
	Figure 1		DHS USCG/DOT FAA (top sub-box in right box)	DHS USCG/DOT FAA/Other Civil Users (top sub-box in	Acknowledge that there are other Civil
				right box)	users outside of DHS/USCG and DOT/FAA
	Table I		DHS USCG / DOT FAA * (three locations)	DHS USCG / DOT FAA / Other Civil Users * (four	Acknowledge that there are other Civil
				locations)	users outside of DHS/USCG and DOT/FAA

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CP NUMBER	SECTION NUMBER	 WAS	IS	RATIONALE (Reason For Change)
	3.1.2	The GPS user and user-support communities involve the Civil and Military GPS users which are comprised of the United States Coast Guard (USCG) Navigation Center (NAVCEN), Department of Transportation (DOT) Federal Aviation Administration (FAA), and various Military GPS users.	The GPS user and user-support communities involve the Civil and Military GPS 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; and various Military GPS Users.	Grammar change; Acknowledge that there are other Civil users outside of DHS/USCG and DOT/FAA
	3.2	The following subsections define the functional requirements and physical interface between the GPS OCX and the USCG NAVCEN, DOT FAA and the Military GPS user community.	The following subsections define the functional requirements and physical interface between the GPS OCX and the DHS USCG, DOT FAA, other Civil Users, and the Military GPS User Community.	Acknowledge that there are other Civil users outside of DHS/USCG and DOT/FAA
	Table II	(none)	(add row for section 3.2.8 and note) 3.2.8 GPS MCS to the United States Notice to Airman Office Interface N/A* N/A* * No verifiable requirements in this section.	Indicate "N/A" for both the Verification Method and Verification Level since there are no verifiable requirements in that section. No verification row exists for section 3.2.8 of the document
	10.3	The NANU message structure for all messages, except the General, LAUNCH and DECOM messages	The NANU message structure for all messages, except the General, LAUNCH, DECOM, and LEAPSEC messages	The LEAPSEC NANU message also has a unique message structure
	10.3.1	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 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.	Recommend adding a sentence that states the NANU number will roll over from 999 to 001 for the 1000th message and beyond
	Fig 10-17	SUBJ: SVNXXXX (PRNXX)	SUBJ: SVNXXX (PRNXX)	There are 4 X's instead of the actual 3 X's in

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CP NUMBER	SECTION NUMBER	7	WAS	IS	RATIONALE (Reason For Change)
	Fig 10-17 Fig 10-18 Fig 10-19		XXX (none of the three X's is marked as change)	XXX (mark one of the three X's as a change in this revision)	The SVN number increases from two digits to three, so all locations need to have one of the X's marked as a change in this rev of
	Fig 10-20 Fig 10-21 Fig 10-22				the 870
	10.3.2 20.3 Fig 20-3		Section One	Section 1	Standardize numerical section numbers in appendix
	10.3.3 20.4 Fig 20-4		Section Two	Section 2	Standardize numerical section numbers in appendix
	10.3.4 20.5 Fig 20-5		Section Three	Section 3	Standardize numerical section numbers in appendix
	20.3		Subsection 1.B identifies satellites within Block II that are currently in use. The abbreviations CS and RB are used to indicate Cesium and Rubidium clocks, respectively.	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.	Need to add sentence for 1.C similar to those for 1.A and 1.B.
	30.3		· · · · · · · · · · · · · · · · · · ·	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.	We cannot put a requirement on the users     Provide additional information to complete this sentence - a quantifier sentence
	30.5, 1st para		The SEM parameters are the same as defined in IS-GPS-200 and broadcast from an SV.		This sentence is not necessary in this YUMA section
	Sect 1.1, 2nd para		Almanacs (SEM and YUMA)	Almanacs (SEM, YUMA, and Extended Signals Health Status (ESHS))	Acknowledge that there is a new Almanac called ESHS

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СР	SECTION	REO			RATIONALE
NUMBER		ID	WAS	IS	(Reason For Change)
	Sections 3.2.5, 3.2.6, 6.1		Section 3.2.5: File Transfer Protocol (FTP) Section 3.2.6: FTP Section 6.1: FTP File Transfer Protocol	Section 3.2.6: Hypertext Transfer Protocol Secure (HTTPS) Section 3.2.7: HTTPS Section 6.1: HTTPS Hypertext Transfer Protocol Secure	Downloads of data is not via FTP. Replace FTP with HTTPS. 2 SOPS website is HTTPS
	30.4		The SEM format, as shown in Figure 30-1, is arranged with a header that identifies the number of records (number of satellites) and file name (extension .al3). The SEM almanac sample illustrated below is a data sample of one record out of 28 in this sample file.	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	Add new current.bl3 SEM file for OCX - PRNs 33-63. Each Almanac format is broken into two files. YUMA files are named current.alm (PRNs 1-32) and current.blm (PRNs 33-63). SEM files are named current.al3 (PRNs 1-32) and current.bl3 (PRNs 33-63).
	30.4			Please see Table 30-III (new) Table 30-III SEM Almanac Description for Current.bl3	Add table showing current.bl3 parameters that are different from the current.al3 file
	30.5		Figure 30-2 illustrates one record in a sample YUMA almanac file. Line one of each record identifies the week in which the file was generated as well as the PRN number of the subject SV. The maximum number of records in a YUMA almanac file is 32. Figure 30-2 YUMA Almanac Data Sample	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 33-63 and the maximum number of records is 31.  Figure 30-2 YUMA Almanac Data Sample for Current.alm	named current.al3 (PRNs 1-32) and current.bl3 (PRNs 33-63)

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СР	SECTION		WAS	IS	RATIONALE	
NUMBER	NUMBER	ID	WAS	13	(Reason For Change)	
	Арр 1		3. POC: CIVILIAN - NAVCEN AT 703-313-5900,	3. POC: CIVILIAN - NAVCEN AT 703-313-5900,	Add Civil Aviation POC as TBD in NANU	
	Figures:		HTTP://WWW.NAVCEN.USCG.GOV	HTTP://WWW.NAVCEN.USCG.GOV	data formats, Section 3	
	Figs 10-1			CIVIL AVIATION - TBD		
	thru 10-					
	10 &					
	Figs 10-12					
	thru 10-					
	15					
	New			Section 3.2.4: Generation of Anti Spoofing Status	A-S Status is currently posted on the 2	
	Section			50 APPENDIX 5: ANTI SPOOFING STATUS FILE	SOPS website. Will OCX have to post the A-	
	(3.2.4),			Global: Add Anti Spoofing (A-S) reference, where	S Status as well? Yes, there are SEM Users	
	New App			applicable	that need the A-S Status file	
	(5), &					
	global					
RFC-00045	: Informati	on As	surance Requirements Standardization across OCX Into	erface Documents		
	New			3.3 GPS MCS to GPS User Support Community	Add IA requirements for data integrity.	
	Section			Information Assurance Requirements	OCX must ensure to all Users that ICD-870	
	3.3			GPS OCX will sign all ICD-GPS-870 information with a	information is genuine and originates from	
				DoD Public Key Infrastructure (PKI) provided	the OCX MCS	
				certificate specific for this purpose. This will ensure		
				that the information provided by this interface is		
				genuine and originates from the GPS MCS.		
				The OCX certificate (and corresponding public key)		
				will be made available to all users for data integrity		
				verification and source authentication. DoD PKI root		
				certificates are available on the DoD Class 3 Public		
				Key Infrastructure (PKI) website,		
				http://dodpki.c3pki.chamb.disa.mil/, to verify the		
				certificate chain.		
	8.1			3.3 GPS MCS to GPS User Support Community	Add new IA requirements to VCRM	
				Information Assurance Requirements		

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	6.1			DoD - Department of Defense PKI - Public Key Infrastructure	Add DoD and PKI to the Acronym's list

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