

**Global Positioning System (GPS)
Public Interface Control Working Group (ICWG) & Public Forum**

2022 Public ICWG & Public Forum Meeting Minutes

*Hosted by the MILSATCOM & PNT Program Executive Office (SSC/CG),
Space Systems Command (SSC), United States Space Force (USSF)*

Meeting Details:

Wednesday, 26 October 2022
08:30 – 17:00 PDT

Primary Meeting Information (via ZoomGov)

Meeting ID: 160 335 3663

Passcode: 621616

Dial-in: +1 571-200-1700; Meeting ID: 160 335 3663#; Passcode: 621616#

Alternate Meeting Information (Not Used)

Dial-in: +1 410-874-6740 Meeting ID: 326 120 515#

Agenda:

Est. Time	Topic	Presenter
	1st Half of Day	
20m	GPS Public ICWG and Public Forum Meeting Overview and Roll Call, Rules of Engagement	Capt. Adam Sweeten (USSF)
20m	Opening Remarks / GPS Overview	Maj. Stewart Brandon (USSF)
	2022 Public ICWG Request For Change (RFC) Discussion	
120m	RFC-495 (2022 Proposed Changes to the Public Documents)	Mr. Tony Anthony (SAIC – SE&I)
20m	Open RFC Discussion Session / Action Items	
	Special Topics Presentations	
30m	Expected Almanac Behavior in OCX Era	Dr. Andrew Hansen (DoT)
	New Action Item Review	
	LUNCH	
	2nd Half of Day	
	Special Topics Presentations – Continued	
20m	Mitigate Legacy Navigation (LNAV) Default Nav Anomaly	Hamza Abduselam (FAA)
20m	Civil Navigation (CNAV) Message Schedules	Bert Hayden (Aerospace Corp.)
20m	Inter-Signal Correction (ISC) and Clock Ephemeris Integrity (CEI) Data Set Table	Karl Kovach (Aerospace Corp.)

20m	Data ID Issue	Karl Kovach (Aerospace Corp.)
	Walk-on Topics, Open Discussion	
	Public Requirements Accountability Tool (PRAT) Existing Action Item Review	Mr. Tony Anthony (SAIC – SE&I)
	PRAT New Action Item Review	Mr. Tony Anthony (SAIC – SE&I)
	Closing Remarks	Maj. Stewart Brandon (USSF)

Minutes and Actions:

GPS Overview
<ul style="list-style-type: none"> No comments during the GPS Overview

RFC-495 (2022 Proposed Changes to the Public Documents)
<ul style="list-style-type: none"> Slide 31: (Above The Allowed US Maximum Commitment) M. Mabileau (Europa) referred to Institute of Navigation (ION) paper co-authored by Karl Kovach (Aerospace Corp) regarding the Integrity Support Message (ISM) container concept where the Global Navigation Satellite System (GNSS) ID is key. Bert Hayden (Aerospace Corp) indicated if the container concept is used then the generic bit definition could be updated; clarify this is for GPS only in the adjudication. Slide 34: (Define MFD_{const}) (with Action): M. Mabileau (Europa) to readdress discussion regarding varying (not fixed) fault threshold when Karl Kovach (Aerospace Corp) can discuss. Post-PICWG Update: discussion agreed to remove the parenthetical in the proposed language <ul style="list-style-type: none"> PRAT Action Item 2022-01: “Reassess the relevance of the Integrity Status Flag (ISF) 5.73 factor to the definition of Major Status Failure (MSF); potential special topic for next year by Karl Kovach” Slide 36: (Define R_{const}) M. Mabileau (Europa) (Europa), Bert Hayden (Aerospace Corp) to readdress discussion regarding varying (not fixed) fault threshold when Karl Kovach (Aerospace Corp.) can discuss. Post-PICWG Update: discussion agreed to remove the parenthetical in the proposed language Slides 37 & 38: (Define R_{sat} and MFD_{sat}) M. Mabileau (Europa), same discussion as slides 34 & 36 – readdress discussion regarding varying (not fixed) fault threshold when Karl Kovach (Aerospace Corp.) can discuss. Post-PICWG Update: discussion agreed to remove the parenthetical in the proposed language for R_{sat} (slide 38) Slide 39: (Define MFD_{sat}) M. Mabileau (Europa), discussion recommends removing parenthetical in the proposed language Slide 40: (Data ID) D. Godwin (USSF), Jed Dennis (FAA) interested on discussing. This is the subject of the Special Topic later this afternoon **REVISIT after Special Topic** Slide 42: (Specific Alarm Condition c)) Jeff Stevens (MITRE) questions setting bits 61 thru 298 to 0’s or 1’s would cause a parity failure. Bert Hayden (Aerospace Corp.) response is No it wouldn’t; CRM #49 <ul style="list-style-type: none"> Task: Bert Hayden and Jeff Stevens to draft note to add to text, will be included in the updated Interface Control Document (ICD) Revision Notices (IRN)s. Slide 44 (with Task): (MT40 content only applicable GNSS ID For GPS?) Jeff Crum (LMCO) paragraph IS200 numbering is incorrect should be IS705; update chart Slide 46 (with Task): (IS-GPS-705 Table 20-XIc) Denis Bouvet (Thales) and Karl Kovach (Aerospace Corp.)

Bert Hayden (Aerospace Corp.)/Mikael Mabilieu (Europa) to add clarifying note to the table. If new note isn't ready for Public Affairs review, then SBAS column will be removed.
CRM #51

- **Slide 48 (with Action): (Sample Change for b_{nom} Clarification) Bert Hayden (Aerospace Corp.)** action to perform analysis and determine if a clarifying note is needed on equal applicability of the b_{nom} computation LNAV and CNAV (also see slides 63 & 70)
 - **PRAT Action Item 2022-04:** Determine if a clarifying note is needed on equal applicability of the b_{nom} computation for LNAV and CNAV.
- **Slide 50 (with Task): (RTCA/DO-246E Protocol Decision) Dan Godwin (USSF)** Jason Burns to email new proposed text to remove reference to proprietary document; readdress this during today's meeting to resolve. During meeting Jason Burns sent proposed text:
 - "The text below is from International Civil Aviation Organization (ICAO) annex 10 and defines the same polynomial to be used for the ISM/ISD 32-bit CRC. This text would be revised to replace "Final approach segment" and "FAS" with ISD.
 - Language stating, "...corresponds to the Most Significant Bit (MSB) of the Vertical Alert Limit (VAL) field" would be adapted to the ISM/ISD bits covered by the 32-bit CRC. I need to review 705 more carefully to confirm the exact words."

3.9 Cyclic redundancy check

Each CRC shall be calculated as the remainder, $R(x)$, of the Modulo-2 division of two binary polynomials as follows:

$$\left\{ \begin{array}{l} [x^k M(x)] \\ G(x) \end{array} \right\}_{\text{mod } 2} = Q(x) + \frac{R(x)}{G(x)}$$

where

k = the number of bits in the particular CRC;
 $M(x)$ = the information field, which consists of the data items to be protected by the particular CRC represented as a polynomial;
 $G(x)$ = the generator polynomial specified for the particular CRC;
 $Q(x)$ = the quotient of the division; and
 $R(x)$ = the remainder of the division, contains the CRC:

$$R(x) = \sum_{i=1}^k r_i x^{k-i} = r_1 x^{k-1} + r_2 x^{k-2} + \dots + r_k x^0$$

- Task for Tony Anthony (SAIC - SE&I)/Bert/Jason Burns/Aero to produce final language; reword the Standards and Recommended Practices (SARPS) to include IS to be included in updated IRNs
- **Slide 53 (with Task): (Message Types 36 and 15 Text Messages) CRM #54** remove the International Organization for Standardization (ISO) document reference and replace it with "CCSID 437, code page 437", Bert Hayden (Aerospace Corp.) will to provide specific text wording; to be included in the updated IRNs
- **Slide 54 (with Task): (CM-Code Signal Clarification)** Change "30's" to "30 through 37"
- **Slide 56 (with Task): (Clarification on 6.4.6.3 Marginal Indications)** Before "Notes 1 and 2" add the description provided from Bert. Move Notes 1 and 2 into current bullet 1. Reword Item 1 sentence: "The Satellite" is replaced by "The CM-code signal". Brent Renfro asked why reference to paragraph 30.3.3 was deleted and clarify what is meant by "consistent". Karl Kovach (Aerospace Corp.) indicated all T_{OP} usage is consistent see IS-705 section 6.4.5.1.2 Alarm conditions.
 - There was a preliminary discussion and decision to initiate a PRAT item to add to Item 1 something to the effect of "in accordance with rules for t_{oc} , t_{oe} and t_{op} in section 30.3.4.4". However, the exact solution became apparent during the Public ICWG and a PRAT item was not needed and not initiated.
- **Slide 59: (Table 6-I-1) WN_{Op}** message change "30-37" to just "30"; move WN_{Op} in the table up to being just under the T_{gd} row entry

- **Slide 60: (Type 30 Rate)** Possible action or task to be determined with in Bert’s Special Topic - ****REVIST after briefing****
- **Slide 70: (Proposed 30.3.3.10.2 Use of ISM Data)** SAIC - SE&I to scrub DOORS Technical Baseline for the use of b_{nom} (see also slide 48)
- **Slide 72: (30.3.3.10.1.7 Satellite Fault Rate)** incorrect data; replace data shown with the correct data from CRM #68
 - **PRAT Action Item 2022-02:** Baseline search for b_{nom} to determine if there are other documents that may require an update.

Open RFC Discussion

- No comments during the RFC discussion

Expected Almanac Behavior in Next Generation Operational Control System (OCX) Era

- **Slide 77/78 (with Task): (Time of Almanac (t_{oa}) Behavior Comparison) Jeff Crum (LMCO)** asked a question “is t_{oa} rules/behavior in others ICDs (401, 601, or 801)” Dr. Hansen (DoT) to research and provide follow-up. Include Anne Kastenholtz (Boeing) and Bill Witwicki (Boeing).
- **Discussion:** Does the OCX selection of T_{oa} take into consideration the satellite? – Yes. Satellites ensures it is less than 3.5 days. Include GPS IIs and IIIs.

Mitigate Legacy Navigation (LNAV) Default Navigation Anomaly

- No comments during the LNAV Default Navigation Anomaly presentation

Civil Navigation (CNAV) Message Schedules

- **PRAT 2022-03: Bert Hayden (Aerospace Corp)** “Investigate CNAV Schedules Technical Baseline changes for 2023 Public Documents Updates.” Include Jed Dennis (FAA), Denis Bouvet (Thales), Jason Burns, CGJ (Army, Navy, Civils), SAIC - SE&I (Straton), PNT-MAT (COCOM, SpOC) during this investigation. ***Reference slides 40 and 60

ISC and CEI Data Set Table

- **PRAT 2021-03:** Continue with this PRAT item and existing Pre-RFC 1201. “Karl Kovach (Aerospace Corp.) to investigate with SAIC - SE&I drafting the recommended CEI Table parameters for 2023 PICWG.” Include Denis Bouvet (Thales), Rhonda Slattery (Aerospace Corp.), and Jeff Stevens (MITRE) during investigation.
- Discussion: This effort may interact with the CNAV Message Schedules (see PRAT 2022-03 above). Impact could be to more than just the public documents. Clarification needed on how OCX would do this. A question raised is does ISC trigger a t_{op} change? This was not immediately answered.

Data ID Issue

- **Task:** The initial request to add a new concern was not acted on because Pre-RFC-1203 “Data ID Other Than 2” is currently open and covers this subject adequately. Also, PRAT 2021-05 “Data ID Issue” will be upgraded to cover “solving” this issue to the satisfaction of all parties.

- The Pre-RFC 1203 for this subject will be presented for solving with the RFC “2023 Update Public Documents”.
- **Discussion:** for current Interface Specification, clarify what to do for unknown Data ID, which is to disregard. An example was given that perhaps if we want to support GPS Space Vehicles (SVs) in geosynchronous orbit we might create a new Interface Specification (IS) that would define a Data ID zero value as meaning the subframe will hold orbit inclination data. The point is that a legacy receiver does not have the software to handle geosynchronous SVs, the receiver hasn’t been designed to interface with this IS and the “unknown” zero Data ID value means the software should disregard this information and just use the SVs it is programmed to handle.

Walk-On Topics, Open Discussion

- **Jeff Crum (LMCO)** “What is the process for PCN updates after the Public ICWG? Will there be another opportunity to review changes?” The Government is committed to producing a “courtesy copy” review for defense partners prior to the ERB.
- Discussed if a Delta AWG would be needed for possible technical changes for the b_{nom} equation and the addition of the polynomial from the SARPS replacing the DO 246E reference. Decision is to provide courtesy copy for public review before RFC gets final approval.
- Task: Perform a quick, turn quality assessment (QA) to include extra stakeholders

PRAT Action Item Review

- **Task:** SAIC - SE&I to provide list of 2022 PRAT items to Dan Godwin (USSF) and document in minutes.
- **General Discussion:**
 - Dan Godwin (USSF) – in general, when RFCs are approved it is up to the programs to implement which doesn’t always happen.
 - Anne Kastenholtz question: what is the process for the public to find out the status of Concerns? Dan Godwin (USSF) response: Read the Public ICWG minutes and/or can use the email (smcgper@us.af.mil) to request Concern status.
 - Dan Godwin (USSF): action to create/open Concerns for any 2023 PICWG items. Be sure to include the Concern numbers in the PRAT item notes.

Appendix A – PRAT Action Items

Existing Open PRAT Action Items reviewed and new status						
Yr	#	Description	Status	Originator	POC	Notes
2014	26	PRN expansion is coming	In Progress	Karl Kovach (Aerospace Corp.)	Karl Kovach (Aerospace Corp.)	26 Oct 22: Explore presenting at the 2023 PICWG. 23 Aug 18: PRN expansion is still in internal development. Specific questions related to this topic can be addressed to the GPS Public Forum or the GPS Directorate spectrum management team.
Updated the note to indicate this is a possible Special Topic for the next Public ICWG (2023).						
2015	1	Remove the UTC offset error (UTCOE) accuracy performance numbers from all ICDs	Complete	Karl Kovach (Aerospace Corp.)	Daniel Froerer (SAIC – SE&I)	26 Oct 22: As of this Public ICWG, this action is completed due to the cancelation of Pre-RFC 897. 18 Aug 22: Pre-RFC-897 has been canceled by CGU leadership. 13 Jan 22: being considered for inclusion in 2022 Public Document Update.
Closed. Update note to state Pre-RFC 897 was cancelled by GPS leadership; no ICD updates were made.						
2018	1	Update GPS products depicted in ICD-GPS-870	In Progress	CWO Rebecca Ruch/ Rick Hamilton (USCG)	Stephan Hillman (Aerospace Corp.)	26 Oct 22: RFC 477 will possibly be held in an out-of-cycle PICWG in 1 st half of 2023. US Government working to gain PA approval on material, Will release to the Public as soon as possible. 13-Jan-2022: Being solved as part of RFC-477.
Updated note stating ICD-GPS-870 not opened this year. The Extensible Markup Language (XML) Schema products will be addressed via the new Schema change process. Stephen Hillman (Aerospace Corp.) is the Subject Matter Expert (SME) on this subject. The XML Schema will be a special topic for the next ICWG (first half of 2023). The United States Coast Guard (USCG) can't put the XML Schema on the website until Public Affairs' approval is given. Public Affairs will work to release the XML Schema and the tool used to read the Schema.						
2020	1	The "alert" in the HOW is still applicable	Complete	Denis Bouvet (Thales)	Tony Anthony (SAIC - SE&I)	26 Oct 22: This action has been completed with the CCB approval of RFC 467 on 18 Apr 22 which resulted in the publication of IRN-IS-200M-001. 13 Jan 22: On track to be completed with RFC-467 CCB.
Updated note to list the specific IRN and Interface Specification (IS)-200 revision letter of the updated documents released. Closed since RFC-467 has been approved and the documents updated for the As-Built information.						
2020	2	IS200 Section 6.4.6.2.1 doesn't match current safety-of-life equipment implementation	Complete	Denis Bouvet (Thales)	Tony Anthony (SAIC - SE&I)	26 Oct 22: Action is completed with the agreement of the originator. 2 Mar 22: Action is being closed as Complete per the previous comment. 24-Feb-2022: Denis Bouvet has approved that the presentation given at the 2021 Public ICWG is sufficient to close this Action.
Closed as satisfied per agreement with the originator – Denis Bouvet (Thales).						
2020	3	Make documents	In Progress	Rhonda Slattery	Tony Anthony	26 Oct 2022: Discussed at 2022 Public ICWG. Assess for feasibility with public documents 1st, then address the rest of the baseline.

Yr	#	Description	Status	Originator	POC	Notes
		consistent between using the notation "x10^-1" and "1E-1"		(Aerospace Corp.)	(SAIC - SE&I)	Concern #126Y has been assigned; will give public documents priority. 30 Sep 2020: Action derived from RFC-413 comment. Will explore how many objects are affected.
Updated note to include what concern was opened. Has not significantly advanced. Added note to assess for feasibility of at least working the public documents for consistency.						
2020	4	Remove the 7-Day Repeat Rule for IODC	Complete	Karl Kovach (Aerospace Corp.)	Tony Anthony (SAIC - SE&I)	26 Oct 22: Action is closed by the 2022 Public ICWG. Completed with the CCB approval of RFC 467 on 18 Apr 22 which resulted in the publication of IRN-IS-200M-001.
Action is completed with RFC-467 and closed as part of this public forum. Updated note to list the specific IRN and IS revision letter of the updated documents released resulting from the approval of RFC-467.						
2021	1	Default Navigation data within sub frame 4 and 5	Complete	Mr. John Foley (Garmin)	Mr. Hamza Abduselam (FAA)	26 Oct 22: Closed by the 2022 Public ICWG. Mr. Hamza Abduselam presented a Special Topic which the originator agreed satisfied the action item.
Closed with Hamza Abduselam's Special Topic on Default Navigation data within Subframe 4 and 5. Mr. Abduselam will email Mr. John Foley, the comment originator, to confirm concurrence (Copy RE Tony Anthony).						
2021	2	Create a concern to investigate info on Table IS200-2078 for RFC 467 and develop any changes needed	In Progress	Mr. Albert H. Hayden (SAIC - SE&I)	Bert Hayden (Aerospace Corp.)	26 Oct 22: Assessment not complete. Will consider Pre-RFC-1202 for 2023 Public Documents Update RFC. 29 Sep 21: Mr. Albert H. Hayden (SAIC - SE&I) accepted an action to investigate the information on Table 200-2078 for RFC 467.
Updated note for concern to be included in 2023. Updated title to state that the table is for Almanac Accuracy. Action: Tony Anthony (SAIC – SE&I) to get a summary description from Bert Hayden (Aerospace Corp.).						
2021	3	Create a concern regarding the removal of Inter Signal Corrections from the Core CEI Data and develop changes needed	In Progress	Mr. Karl Kovach (Aerospace Corp.)	Karl Kovach (Aerospace Corp.)	26 Oct 22: The Special Topic presentation advanced the subject, but had specific recommendations for baseline requirements changes. Will consider Pre-RFC-1201 for 2023 Public Documents Update RFC. Include Denis Bouvet, Rhonda Slattery and Jeff Stevens during investigation. Mr. Albert H. Hayden (SAIC - SE&I) accepted an action to create a concern regarding the removal of Inter Signal Corrections from the Core CEI Data in the public documents.
Updated note to include the Pre-RFC-1201. Bert Hayden (Aerospace Corp.) presented the Special Topic during the Public Forum. This is to be brought to 2023 Public ICWG in a new RFC. Get any action and comments from the special topic to include in the PRAT notes.						

Yr	#	Description	Status	Originator	POC	Notes
2021	4	Create a concern regarding the use of Pconst instead of Rconst and MFDconst in CNAV ISM	Complete	Dr. Andrew Hansen (DoT)	Tony Anthony (SAIC - SE&I)	26 Oct 22: A Concern was created and RFC 495 is satisfying this Action Item. 2022 PICWG closed this action. Mr. Albert H. Hayden (SAIC - SE&I) accepted an action to write a concern regarding the use of Pconst instead of Rconst and MFDconst in the CNAV and CNAV2 Integrity Support Messages
Closed as part of this public forum based on the recommendation of the originator, Dr. Andrew Hansen (DoT). Updated note to include the concern number. Also stated in note that the requested changes were made in RFC-495.						
2021	5	Create a Concern for the Data ID Issue and develop changes needed	In Progress	Mr. Denis Bouvet (Thales Group)	Karl Kovach (Aerospace Corp.)	26 Oct 22: assessed to remain open, Karl provided special topic presentation for document changes in the 2023 PICWG. Mr. Albert H. Hayden (SAIC - SE&I) accepted an action to write a concern regarding the backward compatibility of transmitting a Data ID other than 2.
A Concern is currently open for Pre-RFC-1203 "Data ID Other Than 2". Karl Kovach (Aerospace Corp.) presented as a special topic, Data ID Issue. There are to be text changes for 2023.						

Summary of PRAT Action Items created during 2022 PICWG						
Yr	#	Description	Originator	POC	Notes	
2022	1	Reassess the relevance of the ISF 5.73 factor to the definition of MSF and develop any requirements baseline changes needed to satisfy any consistency shortfalls or operational needs	2022 PICWG Team	Karl Kovach (Aerospace Corp.)	26 Oct 22: Initiated at the 2022 Public ICWG. Consider developing a special topic presentation for the 2023 Public ICWG.	
2022	2	Baseline search for Bnom to determine if there are other documents that may require an update	2022 PICWG Team	Jason Bolger (SAIC - SE&I)		
2022	3	Investigate CNAV Schedules Technical Baseline changes for 2023 Public Documents Updates	2022 PICWG Team	Bert Hayden (Aerospace Corp.)	26 Oct 22: Include FAA (Jason Burns), CGJ (Army, Navy, Civils), SAIC - SE&I (Straton), PNT-MAT during this investigation.	
2022	4	Determine if a clarifying note is needed on equal applicability of the b_{nom} computation for LNAV and CNAV	Dan Godwin	Bert Hayden (Aerospace Corp.)	26 Oct 22: Initiated at the 2022 Public ICWG. Originator specifically asked a Concern be created to implement this effort.	

Appendix B – Meeting Attendees

Aaron Kuhn (SAIC - SE&I)
Andrew Hansen (DoT)
Anne Kastenholz (Boeing)
Barbara Hemmerich Shaw (SAIC - SE&I)
Bert Hayden (Aerospace Corp.)
Bill Witwicki (Boeing)
Brent Renfro (University of Texas)
Brett Kachel (SAIC - SE&I)
Cheryl Ford (PNT Program Office)
Claudina Tiznado (L3Harris)
Capt Andrew Sweeten (USSF – SSC/CG)
CWO Frank Crisafulli (USCG)
Dan Godwin (USSF – SSC/CG)
Danielle Mansour (SAIC - SE&I)
Danny Froerer (SAIC - SE&I)
Denis Bouvet (Thales)
Don Latterman (SAIC - SE&I)
Eduardo Villalba
Emily Reed
Ettore Canestri (Europa)
Fan Liu
Gary Hallbauer
Greg Hatten
Ha Nguyen (FAA)
Hamza Abduselam (FAA)
Hernando Valencia
James (JP) Fernow (MITRE)
James Lake
Jamie Dougherty
Jason Bolger (SAIC - SE&I)
Jason Burns (FAA)
Jeff Crum (LMCO)
Jeff Stevens (MITRE)
Jim Semler (L3Harris)
Joanna Hinks
John Emilian (MITRE)
John Studenny
Jon Maenpa (Raytheon)
Karl Kovach (Aerospace Corp.)
Kevin Lui
Laura Duffy
Lewis Benham
Major Stewart C Brandon (USSF – SSC/CG)
Michael H Cole (Aerospace Corp.)

Mikael Mabileau (Europa)
Miquela Stein (ARL:UT)
Mary Villegas (MITRE)
Matt Forsyth (LMCO)
Nancy Morrison (LMCO)
Nandhini Sudarsanan (SAIC - SE&I)
Parker Owen (Boeing)
Patrick J. Oliver (SAIC - SE&I)
Pervis Basic (DOT)
Peter Stacey
Ralph Anthony (SAIC - SE&I)
Randall Grossman (SAIC - SE&I)
Randy Sena
Ranwa Haddad (Aerospace Corp.)
Rex Clair (LMCO)
Rhonda Slattery (Aerospace Corp.)
Rick Hamilton (USCG)
Roger Kirpes (BAE)
Shayne Douglass (SAIC - SE&I)
Steven Hutsell (USSF - 2SOPS)
Tim Cashin
Todd Kawakami (NGA)
Todd Walter
Vince Quan (SAIC - SE&I)
Wanda Alex
Wayne Su (SAIC - SE&I)

Unresolved Attendee Information:

Unknown Participant #1 (brjohnson)
Unknown Participant #2 (jowen)
Unknown Participant #4 (via phone)

Appendix C – Acronyms and Terms

Acronyms

Acronym	Meaning
CEI	Clock, Ephemeris, Integrity (Data Set)
CNAV	Civil Navigation
FAS	Final Approach Segment
GNSS	Global Navigation Satellite System
GPS	Global Positioning System
ICAO	International Civil Aviation Organization
ICWG	Interface Control Working Group
ION	Institute of Navigation
IRN	Interface Control Document (ICD) Revision Notice
ISC	Inter-Signal Correction
ISD	Integrity Support Data
IS	Interface Specification
ISF	Integrity Status Flag
ISM	Integrity Support Message
ISO	International Organization for Standardization
LNAV	Legacy Navigation
MOPS	Minimum Operational Performance Specification
MSF	Major Service Failure
MSB	Most Significant Bit
OCX	Next Generation Operational Control System
PA	Public Affairs
PRAT	Public Requirements Accountability Tool
RFC	Request for Change
SARPS	Standards and Recommended Practices
SME	Subject Matter Expert
USCG	United States Coast Guard
XML	eXtensible Markup Language

Parameters Mentioned

Term	Meaning
b_{nom}	Additive Term for Nominal Pseudorange Error Bias
R_{sat}	Satellite Fault Rate
T_{GD}	Group Delay Differential
t_{oa}	Almanac Reference Time
t_{op}	CEI Data Sequence Propagation Time of Week
WN_{op}	CEI Data Sequence Propagation Week Number