



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS SPACE AND MISSILE SYSTEMS CENTER (AFSPC)
LOS ANGELES AIR FORCE BASE, CALIFORNIA

Global Positioning System (GPS) Directorate
2015 Public Interface Control Working Group (ICWG)
Meeting Minutes

Date: 9 Dec 2015
Minutes By: Rhonda Porter, Peggy Frasz, Capt Robyn Anderson
Meeting Time: 0830 – 1630 HRS (Pacific Time)
Location: Salient Facility (121 N. Douglas St El Segundo, CA 90245), Room 3/4
Organizer: Capt Robyn Anderson
Dial In: (877) 249 – 2489; Conference Code: 8069960874
DCS: <https://conference.apps.mil/webconf/2015PICWG>

Attendees:

Name	Org	Present	Online
Hamza Abduselam	FAA	X	
Robyn Anderson (Capt)	SMC/GPE	X	
Mark Banyai	MITRE	X	
Pauline Bennett	TASC SE&I	X	
Steven Brown	Lockheed Martin	X	
Bruce Charest	SMC/GPE	X	
Frank Czopek	Microcosm Inc	X	
Benika Dali	MITRE	X	
Frank Fabian	Army PM-PNT	X	
Peggy Frasz	TASC SE&I	X	
Charles Frey	Lockheed Martin	X	
Daniel Godwin	SMC/GPE	x	
Randall Grossman	TASC SE&I	X	
Laura Hainline	MITRE Corp	X	
Barbara Hemmerich-Shaw	TASC SE&I	X	
Justin Hopkins	NASA, Ames Research Center	X	
James Horejsi	SMC/GPE	X	
Raymond Hughey	NSWC COR/GPS	X	
Karl Kovach	Aerospace	X	
James Lake	SMC/GPE	X	
Reginald (Reggie)Little	Iris Technology Inc.	X	
Craig Martin	TASC SE&I	X	
Timothy Martin	Aerospace	X	
Mauricio Menjivar	TASC SE&I	X	
David Metzger	SMC/GPS	X	
Calvin Miles	FAA	X	
Stephen Mitchell	USNO	X	
Purvis Naick	SMC/GPC	X	
Ha Nguyenhuu	SMC/GPC	X	
Huey Nguyenhuu	TASC SE&I	X	



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John Nielson	Rockwell Collins	X	
Kevin Pi	Raytheon	X	
Joe Pool	SMC/ENE	X	
Matthew Poisson	SMC/GPU	X	
Rhonda Porter	TASC SE&I	X	
Edward Powers	USNO	X	
Brent Renfro	ARL:UT	X	
Tenny Sharpe	Aerospace	X	
Rhonda Slattery	Aerospace	X	
Mike Stanitis	Aerospace	X	
Ron Trenotola	SMC/GPE	X	
Felicia Unangst	TASC SE&I	X	
Albert VanDierendonck	AJ Systems (FAA/NASA)	X	
Colt Wallace	Raytheon Missile Systems	X	
Matthew Weaver	SMC/GPEA	X	
Andrew Zinn (Lt Col)	SMC/GPE	X	

Meeting started: 0830 HRS (Pacific Time)

Meeting ended: 1015 HRS (Pacific Time)

Agenda:

Opening Remarks

Roll Call

Meeting Logistics

Meeting Purpose

RFC-266 Coordinated Universal Time Offset Error Disconnects

RFC-268 Incorrect Civil Navigation-2 (CNAV-2) Message Structure Reference for Integrity Assured User

Range Accuracy (IAURA) Parameters

RFC-269 Incorrect P-Code Phase Assignments

RFC-288 Data Message Validation Parameters and Clarifications

RFC-267 L5 and L1C Phase Noise Plot

Action Item Review

Day 2 Preview

Adjourn



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Meeting Purpose (Anderson)

The purpose of the public interface control working group (ICWG) is to update the public on GPS public document revisions and collect issues/comments for analysis and possible integration into future GPS public document revisions. The proposed interface revision notices (PIRNs) for each public document discussed during the public ICWG are available for viewing on GPS.gov.

RFC-266 Coordinated Universal Time Offset Error (UTC OE) Disconnects (Charest/ Menjivar)

The Government reviewed the proposed changes to IS-GPS-200 to enforce consistency across the technical baseline for UTC OE values. The ICWG accepted the proposed changes as published with the action (AI 15-1) to ensure this consistency remains true for user equipment technical requirements documents. However, this action calls for a relocation of UTC OE values from the interface specifications to the user equipment technical requirements documents, an act that the user equipment development team finds unacceptable. This issue will be resolved in additional technical interchange meetings prior to change control board (CCB) approval.

RFC-268 Incorrect CNAV-2 Message Structure Reference for Integrity Assured User Range Accuracy Non-Elevation Data (IAUR_{NED}) Parameters (Charest/Nguyenhuu)

The Government reviewed the proposed changes to IS-GPS-800 to correct the reference to IAUR_{NED} calculation parameters, which are located in subframe 2, not message type 10 as the document currently suggests. The ICWG accepted the proposed changes as published.

RFC-269 Incorrect P-Code Phase Assignments (Charest/Hemmerich)

The Government reviewed the proposed changes to IS-GPS-200 to correct the first 12 octal chips for P-code in Table 6-I, which currently are not consistent with the octal chips that the described P-code algorithm actually produces. The ICWG accepted the proposed changes as published.

RFC-288 Data Message Validation Parameters and Clarifications (Anderson/Grossman)

The Government reviewed the proposed changes to IS-GPS-200 to establish valid/invalid boundaries for parameters in the navigation message that currently have equivocal range definitions. The group discussion centered on the technical definitions of valid/invalid, the rationale behind the selection of certain bounding values, and the inclusion of these clarifications into other related documents to enforce consistency in navigation message definitions. The Government team took actions to re-calculate the upper limit for Ω in table 20-III (AI 15-2) and to produce a draft version of these clarifications as translated to L5 in IS-GPS-705 and L1C in IS-GPS-800 for ICWG review before the public forum on 10 Dec 2015 (AI 15-3).

RFC-267 L5 and L1C Phase Noise Plot (Charest/Menjivar)

The Government reviewed the proposed changes to IS-GPS-705 and IS-GPS-800 to address the removal of phase noise spectral density plots in interface specifications. Based on feedback from the civil user community, the ICWG resolved to reverse the original disposition to remove the plots from the specification documents and continue including the phase noise spectral density plots in the interface specifications until the Government develops the proper medium to communicate design notes. As such, the group reviewed the PIRN to insert the phase plots for GPS III L5 and L1C into IS-GPS-705 and IS-GPS-800 respectively. The ICWG accepted the proposed changes as published.



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Action Item Review (Capt Anderson):

2015 PUBLIC ICWG ACTION ITEMS (12/09/15)				
AI No.	RFC	Description	Originator	RE/POC
15-1	266	Remove the UTC offset error (UTC OE) accuracy performance numbers from all ICDs and put it into the MGUE technical requirements documents.	Karl Kovach	Charest/Menjivar
15-2	288	Work with MITRE (L. Hainline) to calculate the proper "valid range" for $\dot{\Omega}$ given the allowed parameter values for inclination	Karl Kovach	Anderson/Grossman
15-3	288	SE&I to produce rough draft of proposed changes to IS-GPS-705 and IS-GPS 800 for discussion during public forum. Will circulate PIRN draft to contractors for review immediately following ICWG for inclusion in public ICWG RFC ERBs	Steven Brown	Anderson/Grossman



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Global Positioning System (GPS) Directorate
2015 Public Forum
Meeting Minutes

Date: 10 Dec 2015
Minutes By: Zena Walker, Adrienne Harrington, Capt Robyn Anderson
Meeting Time: 0830 – 1630 HRS (Pacific Time)
Location: Salient Facility (121 N. Douglas St El Segundo, CA 90245), Room 3/4
Organizer: Capt Robyn Anderson

Attendees:

Name	Org	Present	Online
Hamza Abduselam	FAA	X	
Robyn Anderson (Capt)	SMC/GPE	X	
Mark Banyai	MITRO	X	
Pauline Bennett	TASC SE&I	X	
Steven Brown	Lockheed Martin	X	
Frank Czopek	Microcosm Inc	X	
John Duffy	Aerospace		X
Frank Fabian	Army PM-PNT	X	
Jasmine Gano	SMC/GPN		
Daniel Godwin	SMC/GPE	x	
Randall Grossman	TASC SE&I	X	
Laura Hainline	MITRE Corp	X	
Adrienne Harrington	TASC SE&I	X	
Barbara Hemmerich-Shaw	TASC SE&I	X	
Justin Hopkins	NASA, Ames Research Center	X	
James Horejsi	SMC/GPE	X	
Raymond Hughey	NSWC COR		
Karl Kovach	Aerospace	X	
Reginald (Reggie) Little	Iris Technology Inc.	X	
Craig Martin	TASC SE&I	X	
Timothy Martin	Aerospace	X	
Mauricio Menjivar	TASC SE&I	X	
David Metzger	SMC/GPA	X	
Calvin Miles	FAA	X	
Stephen Mitchell	USNO	X	
Ned Morimoto	TASC SE&I	X	
Purvis Naick	SMC/GPC	X	
Ha Nguyenhuu	SMC/GPC	X	
Huey Nguyenhuu	TASC SE&I	X	



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Kevin Pi	Raytheon	X	
Joe Pool	SMC/ENE	X	
Brent Renfro	ARL:UT	X	
Rebecca Ruch	USCG NAVCEN		X
Rhonda Slattery	Aerospace	X	
Ron Trerotula	SMC/GPE		
Zena Walker	TASC SE&I	X	
Michael Zmuda (Lt Col)	SMC/GPE	X	

Dial In: (877) 249 – 2489; Conference Code: 8069960874

DCS: <https://conference.apps.mil/webconf/2015PICWG>

Meeting started: 0830 HRS (Pacific Time)

Meeting ended: 1642 HRS (Pacific Time)

Agenda:

Reconvene

Roll Call

RFC-288 Follow-Up Discussion

Review of 2014 Public Forum Topics

Time of Clock Clarification

Probability of Satellite & Constellation Fault

GPS **Offline** Industrial, Scientific, and Mechanical (ISM) Band

GPS **Online** Industrial, Scientific, and Mechanical (ISM) Band

Public Release of Satellite Outage File

Non-ICWG Comments

Open Discussion

Closing Remarks

Action Item Review

Adjourn



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RFC-288 Follow-Up Discussion (Anderson/Grossman)

The Government presented the proposed changes to IS-GPS-705 that are in concert with the changes proposed to IS-GPS-200 to define the valid ranges of navigation message parameters. The ICWG accepted the changes to IS-GPS-705 as published with the caveat that if these changes are not approved by the GPS review board, the complimentary changes to IS-GPS-200 will be rescinded to maintain consistency between the public interface specification document definitions of the CNAV message (AI 15-6). While the changes to IS-GPS-705 are comparable to the IS-GPS-200 clarifications, the team determined that translating these clarifications to IS-GPS-800 would require significant effort and took the action to open a new request for change to ensure these changes are addressed (AI 15-4).

Review of 2014 Public Forum Topics (Bennett)

The Government conducted a thorough review of the critical and substantive comments received during the 2014 public forum to provide a status update to stakeholders and identify any action items that remain unresolved. The 2014 comments are provided on GPS.gov for reference. The Government took an action to document the disposition for each comment (AI 15-5). Below is a summary of the discussion on the 2014 comments and the corresponding disposition.

CID	Topic	Discussion Notes
1	NANU	Will be initiated as a formal concern
2	NANU	Topic addressed during special topic discussion led by USCG (CWO Ruch)
3	NANU	Will be initiated as a formal concern
38	P-Code	Issue resolved with RFC-269
39	P-Code	Issue resolved with RFC-269
41	P-Code	Issue resolved with RFC-269
46	P-Code	Deemed administrative; no action taken at this time
49	CNAV	Not a technical baseline change; no action taken at this time
50	PRN	Currently processing RFC to address PRN expansion; K. Kovach will investigate further
51	RINEX	Topic is not ready for public discussion; K. Kovach will investigate further
52	PRN ID	Will be addressed by new RFC or added to scope of existing RFC with related topic
53	PRN ID	Will be addressed by new RFC or added to scope of existing RFC with related topic
54	PRN ID	Will be addressed by new RFC or added to scope of existing RFC with related topic
55	PRN ID	Will be addressed by new RFC or added to scope of existing RFC with related topic
56	Disclaimer	Append to existing or open new RFC to add “pre-operational use” disclaimer statement to IS-GPS-705
57	Eccentricity	Will be addressed with new RFC to add parameter range clarifications to IS-GPS-800 (see AI 15-4)
58	P-Code	Will address in new RFC for IS-GPS-800
59	P-Code	Currently addressed in Pre-RFC 517; need to separate as new, independent RFC and resubmit concern
60	P-Code	Currently addressed in Pre-RFC 517; need to separate as new, independent RFC and resubmit concern
61	P-Code	Currently addressed in Pre-RFC 517; need to separate as new, independent RFC and



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		resubmit concern
63	UTCOE	Issue resolved with RFC-266

Time of Clock Clarification (Brown)

Steven Brown (Lockheed Martin) presented a public forum briefing to readdress the issue of inaccurate information in the public interface specifications as it relates time of clock (toc) and time of ephemeris (toe). When presented to the SMC/GPS Directorate review board, this change proposal was rejected due to minimal program impact. The Government team took an action to re-initiate this effort and ensure the interface specifications reflect the accurate information (AI 15-8).

Probability of Satellite & Constellation Fault (Kovach)

Karl Kovach (Aerospace) presented a public forum briefing to discuss the use of probability of satellite fault (P_{sat}) and probability of constellation fault (P_{const}) as database parameters in an integrity support message (ISM) within GPS CNAV and MNAV. These numbers would be specified in the performance standards for GPS as well as the performance standards for other global navigation satellite systems (GNSSs) and broadcasted in the ISM. P_{sat} and P_{const} are key factors in the GPS team’s study on positioning signal integrity and continuity assurance (PSICA).

GPS Offline Integrity Support Message (ISM) (Kovach)

Karl Kovach (Aerospace) presented a public forum briefing to discuss a possible implementation of the offline ISM for Galileo (SBAS) and GPS (CNAV).

GPS Online Integrity Support Message (ISM) (Kovach)

Karl Kovach (Aerospace) presented a public forum briefing to discuss a possible implementation of the online ISM for Galileo and GPS. This implementation would leverage ISM via wide area GPS/GNSS enhancement 2⁺ (WAGE-2⁺).

Public Release of Satellite Outage File (SOF) (Ruch)

CWO Rebecca Ruch (USCG) led a public forum discussion about publishing the publicly releasable information in the GPS Satellite Outage File (SOF) for worldwide consumption, enabling the U.S. Coast Guard Navigation Center to “provide a complete and up-to-date statement of past, current, and forecasted satellite outages in the GPS constellation. The Government team created a formal change request for this topic and took an action to ensure it is progressed through the SMC/GPS Directorate change management process in a timely manner (AI 15-10).

Non-ICWG Comments (Anderson)

The group reviewed comments that were submitted for public forum discussion. Any comments submitted and validated by the ICWG during the public forum will be addressed as concerns with potential for future classification as a formal request for change to GPS technical baseline documentation. Below is a summary of the discussion about these comments and the corresponding disposition.

CID	Topic	Discussion Notes
1	PIRN Production	The Government team agreed that the presentation of public interface revision notices (PIRNs) in the WAS/IS format is cumbersome for reviewers. The Government took an action to investigate the procedures for producing redlines for future PIRNs (AI 15-12)
2	Autonav URA	The group discussed the validity of URA properties when a satellite is in autonomous



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		navigation mode. Autonav is not currently an executable GPS mode. This issue will be investigated further to provide a comprehensive response to all questions concerning autonomous navigation.
3	Autonav URA	The group discussed clarity of URA description when a GPS IIR/IIR-M satellite is in autonomous navigation mode. Autonav is not currently an executable GPS mode. This issue will be investigated further to provide a comprehensive response to all questions concerning autonomous navigation.
4	Leap Second Announcement	No GPS control segment commitment will be levied on the advance leap second announcement, but the Government team will investigate current practices to determine if it is practical to suggest a probable advance notice time frame based on historical data.
5	Backwards Compatibility	The Government team will investigate the possibility of adding additional clarifications to IS-GPS-200 to address this concern. While the Government still maintains the right to employ a Data ID different than "01", the group confirmed that users of the data structure corresponding to currently defined Data ID values will still be fully functional/compatible.
6	UTC Degradation	The group acknowledged the value that this study might provide and believes that similar studies have already been conducted to estimate the GPS-UTC time conversion accuracy degradation. Any existing information would be captured in the GPS performance standard.
7	Ionospheric Correction	The group discussed the update rate of ionospheric data as it relates to UTC parameter updates. The Government team will investigate this issue further.
8	L5 Extended Operations	The group determined that extended operations is not applicable to L5. The Government will initiate an action to articulate this clarification in IS-GPS-705.
9	Group Delay	The group assessed that the section is correct as written. The Government team will investigate this issue further to clarify this section in the interface specification.
10	L5 URA _{NEDO}	The group assessed that the section is correct as written. The Government team will investigate this issue further to clarify this section in the interface specification.
11	L5 IURA _{NED}	The group assessed that the section is correct as written. The Government team will investigate this issue further to clarify this section in the interface specification.
12	Group Delay	The group discussed the text explaining the update rate of group delay correction parameters. The Government team will investigate this issue further to clarify this section in the interface specification.
13	Ionospheric Correction	The group discussed the validity of ionospheric data in the event of control segment upload failure. The Government team will investigate this issue further as it pertains to both IS-GPS-200 and IS-GPS-705.
14	Ionospheric Correction	The group discussed the validity of ionospheric data in the event of control segment upload failure. The Government team will investigate this issue further as it pertains to both IS-GPS-200 and IS-GPS-705.
15	L5 Autonav	Autonav is not currently an executable GPS mode. This issue will be investigated further to provide a comprehensive response to all questions concerning autonomous navigation.
16	Leap Second Announcement	No GPS control segment commitment will be levied on the advance leap second announcement, but the Government team will investigate current practices to



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		determine if it is practical to suggest a probable advance notice time frame based on historical data.
17	Time of Clock/Time of Ephemeris	This concern is addressed with AI 15-8.
18	Reference Times	The group reviewed the reference time descriptions in IS-GPS-200 and IS-GPS-705 and affirmed that both descriptions are necessary and correct as published.

Closing Remarks (Horejsi)

James Horejsi (GPS Chief Engineer) reviewed his top priorities for managing and advancing the technical baseline for GPS. The following is a list of topics discussed during the closing remarks:

- GPS enterprise configuration management
- Four principles of configuration management (i.e., identification, control, status accounting, and auditing)
- Ongoing GPS directorate requirements management efforts
- Development of top-level GPS enterprise requirements document
- Implementation of GPS enterprise cybersecurity
- Civil signal integrity and authentication
- Acceleration of user equipment development
- Increased modularity, responsiveness, and agility of technical baseline
- GPS transition to model-based systems engineering
- Cleaning up the GPS technical baseline documents
- Civil navigation message authentication
- Value of collaborative efforts with the civil community

Action Item Review (Anderson)

9 new action items were assigned during the public forum:

2015 PUBLIC FORUM ACTION ITEMS (10 DEC 2015)			
AI No.	Description	Originator	RE/POC
15-4	Create a new RFC to review IS-GPS-800 in the same fashion we addressed IS-200 and IS-GPS-705 for RFC-288 to define valid parameter ranges. Ensure all related appendices are included in this analysis as well.	Dan Godwin	Grossman
15-5	Add "Disposition" column showing status (i.e., Open/Closed/Defer) to comment resolution matrix template.	Dan Godwin	Bennett
15-6	If the CNAV clarifications proposed in RFC-288 for IS-GPS-705 are not approved by directorate change management boards (i.e., JCRB), then all corresponding CNAV clarifications will be removed from IS-GPS-200.	Steve Brown	Hemmerich
15-7	Create separate RFC to address data message validation parameters and clarifications for SPS.	Dave Metzger	Grossman



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15-8	Reopen Pre-RFC-520 (toe/toc) and create a change management process variant that will allow the team to take the correction through completion	Steven Brown	Nguyenhuu
15-9	Any substantial comments discussed and concurred by the Public ICWG need to be brought to the SMC/GPS Directorate change process so that these comments can be incorporated into the public document/specifications.	Ha Nguyen	Godwin
15-10	Follow up to ensure Concern #579 (SOF release) gets processed though the directorate change management process	Rebecca Ruch	Farmer/Hussain
15-11	Add an “Integrity Failure” Notice Advisory to NAVSTAR Users (NANU) type to ICD-GPS-240 & ICD-GPS-870	Karl Kovach	Bennett
15-12	Configuration Management (CM) and DOORS team to assess how to produce redline versions of PIRNs out of the DOORS database	Dan Godwin	Menjivar/Vaultz

Closing Comments:

- The 2016 public GPS meetings will be held in September 2016. Check GPS.gov and the Federal Register Announcements page for event details in July 2016.
- Next year’s public forum will include a review of the 2015 comment resolution matrix to provide a comprehensive status update on action items.
- Any questions, comments, or feedback related to the 2015 public ICWG and public forum can be sent to smcgper@us.af.mil.

Disposition as of Dec 10, 2015	CID	Comment Originator	Organization	Document	Page (of IS-GPS document)	Paragraph (of IS-GPS document)	Importance	Comment	From (WAS)	To (IS)	Rationale	PO Resolution	Resolution Rationale
Document as formal concern	1	John Lavrakas	Advanced Research Corp	ICD-GPS-240	p. 10-1	10.1	Critical	Add a definition of the term "outage".	Notice Advisory to NAVSTAR Users (NANUs) are used to notify users of scheduled and unscheduled satellite outages and general GPS information.	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 Standard.	The ICD uses the term "outage" throughout the document, but the term is not explicitly defined. This leaves the definition up to interpretation, resulting in inconsistent application by those who use the document, both those who generate the NANUs and those who interpret and use the NANUs. Such ambiguity is inappropriate for an ICD, and invites error. For example, on 17 Jun 2012 SVN59/PRN19 was broadcasting a healthy status throughout the day, yet a NANU was issued showing the satellite was "out of service" for 28 minutes. I believe a NANU should not have been issued since the satellite was broadcasting a healthy signal throughout the period. When responding to an inquiry about it, the GPSOC reported "the use of a UNUNOREF NANU was appropriate". These two conflicting interpretations result from the ambiguity on what constitutes an outage in the current ICD. Although a definition is proposed in this CRM, the wording may need adjusting; regardless, it is most important that some clear and unambiguous definition of the term "outage" be implemented in the ICD.	Accept	Will require close coordination with 50 Space Wing/2SOPS. Will create action item to develop the required changes to ICD-870.
Document as formal concern	2	John Lavrakas	Advanced Research Corp	ICD-GPS-240			Substantive	Provide to users satellite outage information in the form of a machine readable format using the satellite outage file (SOF) file implemented as part of the GPS Information Service.		Numerous (TBD)	Since 2005, the GPSOC has been producing a machine readable form for NANUs called the satellite outage file or SOF. This file would be of immense value to GPS users world wide if made available, and would do much to resolve operational issues relating to GPS performance assessment. The NANUs are suboptimal in providing satellite outage information for various reasons: (1) they are prone to occasional errors, (2) they are not easily machine readable, (3) they are not cumulative, and thus require prior information for interpreting each NANU's intent. The SOF resolves all these issues, and can be used for analyses of past performance, assessing current constellation performance, and predicted performance. This CRM comment does not include a complete list of changes to ICD-GPS-240 which would have to be made, but it is intended to present the request for the purpose of obtaining agreement to proceed. After this is done, an effort should be made to create all the changes necessary to ICD-GPS-240 to implement the feature.	Accept	Will create action item to identify specific changes required to ICD-GPS-270 and investigate possibility of providing Receiver Independent Exchange (RINEX) format exports to the civil community.
Document as formal concern	3	John Lavrakas	Advanced Research Corp	ICD-GPS-240		10.1.1	Substantive	Add text to clarify when NANU Forecast Cancellation (FCSTCANC) may be used.	Cancels a scheduled outage when a new maintenance time is not yet determined; it references the original forecast NANU message.	Cancels a scheduled outage when a new maintenance time is not yet determined; it references the original forecast NANU message. May be issued after start time of reference NANU.	Clarifies usage of FCSTCANC to include canceling NANUs prior to their start or after entering the forecast period. The current wording seems to imply that the cancellation must occur prior to the outage ("cancels a scheduled outage...") but in fact it is used to cancel outages in progress. For the record, there would no other way to cancel a NANU whose scheduled start time has	Accept	Discuss. This is a good point, and would require some coordination with 2SOPS. This would also require a corresponding change to ICD-870.
Addressed in existing RFC	38	Conner Wagenseller & Kazuma Gunning	SE&I	IS-GPS-200H	Page 57	6.3.6.2.1 Table 6-1	Substantive	Using a program to generate P code, the following errors were found under the column "first 12 chips (Octal)" for the following PRN signal numbers: PRN 66, the value "2111" should be changed to "6111" PRN 69, the value "4166" should be changed to "0166" PRN 70, the value "2251" should be changed to "6251" PRN 72, the value "4761" should be changed to "0761" PRN 73, the value "2152" should be changed to "6152" PRN 74, the value "5247" should be changed to "1247" PRN 75, the value "5736" should be changed to "1736" PRN 79, the value "3520" should be changed to "7520" PRN 81, the value "4417" should be changed to "0417" PRN 83, the value "3230" should be changed to "7230" PRN 85, the value "4575" should be changed to "0575" PRN 86, the value "2720" should be			Accept	Will need to investigate why this was not caught as part of RFC-168	
Addressed in existing RFC	39	Conner Wagenseller & Kazuma Gunning	SE&I	IS-GPS-200H	Page 58	6.3.6.2.1 Table 6-1	Substantive	For PRN signal No. 107, under the column "First 12 Chips" the value "2716" should be changed to "6716"				Accept	Will need to investigate why this was not caught as part of RFC-168
Addressed in existing RFC	40	Conner Wagenseller & Kazuma Gunning	SE&I	IS-GPS-200H	Page 59	6.3.6.2.1 Table 6-1	Substantive	For PRN signal No. 153, under the column "First 12 Chips" the value "7070" should be changed to "3070"				Reject	Further investigation needed.
Addressed in existing RFC	41	Conner Wagenseller & Kazuma Gunning	SE&I	IS-GPS-200H	Page 60	6.3.6.2.1 Table 6-1	Substantive	For PRN signal No. 181, under the column "First 12 Chips" the value "3420" should be changed to "7420"				Accept	Will need to investigate why this was not caught as part of RFC-168
Document as formal concern	46	Karl Kovach	Aerospace	IS-GPS-200H		3.2.3	Substantive	The paragraph "During the initial period of Block IIR-M SVs operation..." should have been deleted. D(t) will never be added to the L2 signal for IIR-M	During the initial period of Block IIR-M SVs operation, prior to Initial Operational Capability of L2 C signal, Block IIR-M may modulo-2 add the NAV data, D(t), to the L2 CM-code instead of 12 IS-GPS-200H 24 Sep 2013 CNAV data, DC(t). In such configuration, the data rate of D(t) may be 50 bps (i.e. without convolution encoding) or it may be 25 bps. The D(t) of 25 bps shall be convolutionally encoded resulting in 50 sps.	Blank	This mode is no longer supported by the IIR-M	Accept	Administrative error
K Kovach to investigate	49	Karl Kovach	GPE(Aero)	IS-GPS-200, IS-GPS-705	all	all	Substantive	Provide an informational briefing to let the ICWG members know what is happening with CNAV and how well it is performing.	N/A	N/A	Provides an opportunity to update industry on the progress of CNAV relative to requirements.	Accept	Provided by Mr Kovach's presentation.
K Kovach to investigate	50	Karl Kovach	GPE(Aero)	IS-GPS-200, IS-GPS-705, IS-GPS-800	all	all	Substantive	Provide an informational briefing to remind the ICWG members that PRN expansion is coming.	N/A	N/A	Ensures receiver designers understand implementation of new PRN numbers so they can adjust their designs accordingly.	Accept	Provided by Mr Kovach's presentation.
K Kovach to investigate	51	Karl Kovach	GPE(Aero)	ICD-GPS-870	all	all	Substantive	Provide an inquisitive briefing to the ICWG members to initiate a discussion on whether a RINEX interface from the Control Segment would be useful or helpful.	N/A	N/A	Need to verify with community as to whether a RINEX interface would be helpful.	Accept	Provided by Mr Kovach's presentation.

Disposition as of Dec 10, 2015	CID	Comment Originator	Organization	Document	Page (of IS-GPS document)	Paragraph (of IS-GPS document)	Importance	Comment	From (WAS)	To (IS)	Rationale	PO Resolution	Resolution Rationale
Amend to existing change proposal	52	Karl Kovach	GPE(Aero)	IS-GPS-200	183	Figure 30-16	Critical	Figure incorrectly shows 8 bits for the PRN number in two places.	PRN ID, 8 bits (two places)	Redraw figure (two places), insert a new two-bit field in place of the existing 2 MSBs and label this new field as "Reserved" (two places), and change the existing text which reads as "PRN ID, 8 bits" to instead read as "PRN ID, 6 bits" (two places).	Simple error. For Navstar satellites, the PRN ID is a six-bit number -- not an 8-bit number.	Accept	
Amend to existing change proposal	53	Karl Kovach	GPE(Aero)	IS-GPS-200	various	various	Critical	See foregoing comment about incorrectly showing 8 bits for the PRN number.	Multiple occurrences of words to the effect of "PRN ID, 8 bits"	Multiple revisions of words to now be to the effect of "PRN ID, 6 bits" with 2 bits of what used to be MSBs becoming "Reserved" as necessary.	Simple error. For Navstar satellites, the PRN ID is a six-bit number -- not an 8-bit number.	Accept	
Amend to existing change proposal	54	Karl Kovach	GPE(Aero)	IS-GPS-705	various	various	Critical	See foregoing IS-GPS-200 comment about incorrectly showing 8 bits for the PRN number.	Multiple occurrences of words to the effect of "PRN ID, 8 bits"	Multiple revisions of words to now be to the effect of "PRN ID, 6 bits" with 2 bits of what used to be MSBs becoming "Reserved" as necessary.	Simple error. For Navstar satellites, the PRN ID is a six-bit number -- not an 8-bit number.	Accept	
Amend to existing change proposal	55	Karl Kovach	GPE(Aero)	IS-GPS-800	various	various	Critical	See foregoing IS-GPS-200 comment about incorrectly showing 8 bits for the PRN number.	Multiple occurrences of words to the effect of "PRN ID, 8 bits"	Multiple revisions of words to now be to the effect of "PRN ID, 6 bits" with 2 bits of what used to be MSBs becoming "Reserved" as necessary.	Simple error. For Navstar satellites, the PRN ID is a six-bit number -- not an 8-bit number.	Accept	
Bring back/add to 705. (If urgent, look into the possibility to include this change in 288(?))	56	Tim Johnson	SE&I	IS-GPS-705			Substantive	"Pre-Operational Use" paragraph missing from IS-705 after paragraph 6.3.4, "Additional PRN Sequences" paragraph	N/A	Before any new signal or group of signals (e.g., L2C, L5, M, L1C, etcetera) is declared operational, the availability of and/or the configuration of the broadcast signal or group of signals may not comply with all requirements of the relevant IS or ICD. For example, the pre-operational broadcast of L2C signals from the IIR-M satellites did not include any NAV or CNAV data as required by IS-GPS-200. Pre-operational use of any new signal or group of signals is at the users own risk.	Disclaimer paragraph that was included in IS-200 and IS-800, but missed in IS-705.	Accept	Should have been included in RFC-188B
To be included in a change to IS-GPS-800 in a similar fashion to the parameter changes discussed for IS-GPS-200 in RFC-288.	57	Tim Johnson	SE&I	IS-GPS-800		Table 3.5-1	Substantive	Effective Range for Eccentricity value was missed in table 3.5-1	Table 3.5-1	Table 3.5-1 with Effective Range of Eccentricity set as 0.03	Effective range for eccentricity was left out during RFC-188B	Accept	Should have been included in RFC-188B
Recommend to split into two issues/comments. Frank to resubmit the issue. Separate from Pre-RFC 517	58	Frank Czopek	Microcosm	IS-GPS-200H	28	Figure 3-6	Substantive	Need to modify the figure. IS-200 P Code description is lacking. Best write up is in Kaplan 2nd ed. Need to rework the words in 200 to match how a real P coder works. Need to modify the figure		1) ADD X1B to the top clock control box 2) ADD X2A to the middle clock control box 3) ADD X2B to the bottom clock control box 3) Delete divide by 37 box		Accept	Discuss
Recommend to split into two issues/comments. Frank to resubmit the issue. Separate from Pre-RFC 517	59	Frank Czopek	Microcosm	IS-GPS-200H	22	3.3.2.2	Substantive		To accommodate this situation, the X1B shift register is held in the final state (chip 4093) of its 3749th cycle.	To accommodate this situation, the X1B clock control function holds the shift register is held in the final state (chip 4093) of its 3749th cycle		Accept	Discuss
Recommend to split into two issues/comments. Frank to resubmit the issue. Separate from Pre-RFC 517	60	Frank Czopek	Microcosm	IS-GPS-200H	27	3.3.2.2	Substantive	Need to add a description of how the X2A and X2B clock control function really works	...The X2A and X2B epochs are made to process with respect to the X1A and X1B epochs by causing the X2 period to be 37 chips longer than the X1 period. When the X2A is in the last....	...The X2A and X2B epochs are made to process with respect to the X1A and X1B epochs by causing the X2 period to be 37 chips longer than the X1 period. The 37 chip delay is done by the X2A and X2B clock control functions. The X2A will halt the X@A shift register when it detects the 3750th X2A epoch. Just like the X1B clock control function the X2B clock control function hold the X2B register upon detection of final state (chip 4093) of its 3749th cycle or When the X2A is in the last....		Accept	Discuss
Recommend to split into two issues/comments. Frank to resubmit the issue. Separate from Pre-RFC 517	61	Frank Czopek	Microcosm	IS-GPS-200H	31	3.3.2.2	Substantive	Table 3-VII is confusing	delete table	Add table contents to figures 3-2, -3, -4, -5		Accept	Discuss
Addressed in existing RFC	63	John Nielson, Tony Marquez	Rockwell Collins, GPN	IS-GPS-200H	41	3.3.4	Critical	The 90ns coordinated universal time offset error (UTC OE) quantity in IS-GPS-200 may present problems to certain receivers. During test, certain receivers (if they ever received 90ns for UTC OE) may cause failures. Either change the UTC OE value in IS-200 to something more reasonable or remove this value entirely	The NAV data contains the requisite data for relating GPS time to UTC. The accuracy of this data during the transmission interval shall be such that it relates GPS time (maintained by the MCS of the CS) to UTC (USNO) within 90 nanoseconds (one sigma). This data is generated by the CS; therefore, the accuracy of this relationship may degrade if for some reason the CS is unable to upload data to a SV. At this point, it is assumed that alternate sources of UTC are no longer available, and the relative accuracy of the GPS/UTC relationship will be sufficient for users. Range error components (e.g. SV clock and position) contribute to the GPS time transfer error, and under normal operating circumstances (two frequency time transfers from SV(s) whose navigation message indicates a URA of eight meters or less), this corresponds to a 97 nanosecond (one sigma) apparent uncertainty at the SV. Propagation delay errors and receiver equipment biases unique to the user add to this time transfer uncertainty.	The NAV data contains the requisite data for relating GPS time to UTC. This data is generated by the CS; therefore, the accuracy of this relationship may degrade if for some reason the CS is unable to upload data to a SV. Or The NAV data contains the requisite data for relating GPS time to UTC. The accuracy of this data during the transmission interval shall be such that it relates GPS time (maintained by the MCS of the CS) to UTC (USNO) within TBD (one sigma)... this corresponds to a TBD (one sigma) apparent uncertainty at the SV...	System specs should not be in the ICDs and the Performance Standards are the official documents where the Gov't provides performance information.	Accept	This value is inconsistent across the GPS Technical Baseline and does not reflect as-built performance. 12/9/15: PICWG accepted RFC-266 for changes to IS-GPS-200 with new UTC OE value of 20 ns (1 sigma) which is consistent with PPS/SPS PS performance standards.