

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

2025 Public ICWG Meeting Minutes

Meeting Details:

Tuesday, May 13, 2025
08:30 – 17:00 PDT

Primary Meeting Information (via MS Teams)
Meeting ID: 992 414 074 763
Passcode: YM2gn9Qm
Dial-in: +1 571-544-7242,,607943486#

Agenda

Public ICWG	Presenter	Times
GPS Public ICWG and Public Forum Meeting Overview	Dan Stevenson	08:30 08:45
Opening Remarks / GPS Overview	Dan Stevenson	08:45 09:05
2023 Public ICWG RFC Discussion		
•RFC-519 (Civil ISM Format)	Tony Anthony	09:05 11:00
Break		11:00 11:10
•ARAIM Background In Support of ISM	Dr. Hansen	11:10 11:40
Action Item Review		11:40 11:55
Lunch Break (1 hour)		11:55 13:00
•AODO/WAGE Change	John Taylor	13:00 13:30
•Deferred Work from RFC-495 & RFC-502	Tony Anthony	13:30 14:00
•Correction to CNAV Velocity Calculations	David Allen	14:00 14:20
Break		14:20 14:30
Walk-on Topics, Open Discussion	--	14:30 14:40
Action Item Review		14:40 14:55
PRAT - Public Req. Accountability Tool	Tony Anthony	14:55 15:15
Action Item Review		15:15 15:30
Closing Remarks	Dan Stevenson	15:30 15:35

Minutes Ground Rules

1. These meeting minutes have had the slides renumbered to accommodate slide changes requested during the meeting and new PRAT items added during the meeting. This includes slide additions and removals. The slide numbers in these meeting minutes track to the relevant slides as contained in the “post Meeting” slide set only and not to the slide set presented on May 13th.
2. A few actions that came out of the Public ICWG happened after the meeting and have been mentioned in these meeting minutes. These actions are clearly explained as being accomplished or decided after the Public ICWG.
3. Across the board, all CRM comments were concurred with by the originator before the PICWG was over. Concurrences that were obtained during the PICWG are not shown in the meeting minutes for brevity.
4. Acronyms are at the end of this document.

Meeting Minutes

Time	Item	Who
8:30-8:45	GPS Public ICWG and Public Forum Meeting Overview	Dan Stevenson

No Comments

8:45-9:05	Opening Remarks/GPS Overview	Dan Stevenson
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No Comments

2025 PICWG RFC Discussion

9:05-10:30	RFC-519 -Civil Integrity Support Message Formats	Tony Anthony
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Slide 43 - CRM #91, #92, #99, #123, #133

- Gained full concurrence from all stakeholders by shortening the paragraph to one sentence by adding a clause to the 1st sentence that the value of GNSS ID is = 0100 and making GNSS ID the last item in the list of applicable criteria for what the ISM Packet Overlay means.

Slides 56 through 59 - CRM #119, #120, #121

- To obtain universal stakeholder concurrence, reworded the part about applicable standards to “as referenced in applicable standards (e.g. TSO, MSO)”

Slide 60 and 61 - CRM #98, #128

- Because it is very possible Galileo ISM data will be cross-disseminated on GPS signals, the value for “0001 =” is going to remain separate to ease future editing. This decision was concurred by everyone at the PICWG.

Slide 72 and 75 - CRM #111, #113, #115

- The Disposition was changed from Accept With Comments to a plain Accept, along with a shortening of the Government Disposition. This should have been changed before the PICWG.
- Specific to CRM #115 on Slide 75, the FAA recommended that the first sentence of IS800-211 be normalized to the equivalent text in IS-GPS-200 and IS-GPS-705. This had concurrence from all stakeholders.

Slide 76 through 78 - CRM #112, #114, #158

- FAA noticed that the new formula for nominal URA_{NED} also needed “nominal” to be added to the right-hand-side of that formula.
- CRM #158 was added during the PICWG to correct formulae that had multiplication implied with that formula but did not use an explicit multiply operator. To match the rest of the SiS documents, the multiply operator we are using is the asterisk (“*”).
- Along with this CRM, we modified the white space in IS800-190 so it matches the equivalent IS-GPS-200 and IS-GPS-705 DOORS IDs bit-for-bit.

Slide 84 through 86 - CRM #124, #135, #159

- During the PICWG, stakeholders wanted to split up this long DOORS ID. It is common practice to have a text based DOORS ID that is a requirement referring to a different Info Only DOORS ID that contains the related formulae. In this case, we developed CRM #159 to divide the DOORS ID into three parts and replaced “may be represented” with “are represented” in the lead-in sentence. All PICWG stakeholders concurred.

Slide 89 and 90 - CRM #131, #160

- The PICWG started off accepting Raytheon's suggestion to change this requirement into something more exact, but by the time the discussion was done, all PICWG stakeholders agreed this requirement wasn't allocatable to an existing segment and should be deleted. This change far enough from the original comment, that a new CRM comment #160 was created to delete the DOORS ID.

Slide 91 and 92 - CRM # 138, #139, #140, #141

- During the PICWG, discussion changed the Disposition from Reject to Accept.
- Karl Kovach was assigned an Action to confirm that the corresponding formulae in the SPS PS also show the use of " \pm ".

Slide 95 and 98 - CRM #143

- Going into the PICWG, the Disposition for this CRM was TBD with two different alternative possible changes on the next two slides. During the meeting the stakeholders developed a third alternative (i.e. Alternative C) shown on Slide 98 as a variant on Alternative A (see Slide 96). In this case the "IAURANED0" were replaced with "Upper Bound URANED0" and the word "nominal" was dropped for the added clause in IS200-1952.

Slide 99 through 101 - CRM #144, #145

- During the PICWG the Disposition was changed from Reject to Accept With Comments and the corresponding sentences in the successor DOORS IDs starting with "For N =" had a special case for -15 added to indicate the nominal URAXX should be ".01"

Slide 106 and 107 - CRM #150

- This CRM generated a lot of controversy, but the comment originator reluctantly accepted keeping t_{correl} in the ISM based on FAA's insistence that this parameter has value in an area outside aviation.

11:10-11:40	ARAIM Background In Support of ISM	Dr. Andrew Hansen
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Slide 116-119. This special topic was not able to be presented; however, the slides are included in the Post PICWG Presentation.

13:00-13:30	Age of Data Offset (AODO) and Navigation Message Correction Table (NMCT)	John Taylor
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Slides 124-126. John Taylor of SE&I presented his material. The main point here is that 2NWS on LNAV wants to broadcast valid AODO while eliminating WAGE data. This would eventually result in a Public RFC to modify IS-GPS-200.

13:30-14:00	Deferred Work from RFC-495 & RFC-502	Tony Anthony
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Slides 128-132. Tony Anthony of SE&I presented his material. The main point of this presentation is that a Public RFC could be executed that would incorporate all the unprocessed changes from these two RFCs that involve corrections to explanations about the Signal-in-Space that is already being broadcast. This RFC would not require extra cost modifying the Control or Space Segments and Military User Equipment programs. We could decide if we want to incorporate the changes or not in sustainment. The main beneficiaries of this RFC would be civil user equipment makers.

An important side point is that RFC-495B Text Messages has been placed in the Watch Item Catalog (WIC) controlled by 31 STS. Bert Hayden suggested that we shouldn't ever bring RFC-495B back and should instead develop other new specifically binary messages.

14:00-14:20	Corrections to the Calculation of Satellite Velocity for Modernized Navigation Messages	David Allen
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Slide 134. David Allen of Aerospace presented his subject of errors in the CNAV formulae regarding velocities without presentation materials. The main point he was getting across is that the CNAV formulae in the public Signal-in-Space documents are copied directly from LNAV work, but are incorrect for CNAV.

Various options for removing or mitigating this problem were discussed with an eye toward having these mitigations in place before CNAV IOC.

1. Publish an Aerospace Technical Note, akin to an errata sheet to GPS.GOV warning of the problem and providing corrected formulae.
2. Incorporate the fixes into the RFC discussed in the **Deferred Work from RFC-495 & RFC-502** presentation (above).
3. Incorporating this change into RFC-519. That would slow down the completion of that RFC because the scope of the RFC would be expanded and more Public Affairs reviews would be required.
4. Combining 1 and 2 above.

At the PICWG, consensus formed around Option 4; however, the 5/20/2025 CSOC seemed to want to go with Option 3. At the time of publishing these meeting minutes, no change is being made to RFC-519. Post meeting discussion disqualifies Option 3 as unworkable.

14:30-14:40	Walk-on Topics, Open Discussion	N/A
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Question: Regarding the distributions resulting from the approval of RFC-519.

Answer: The result of the approval of this RFC will include new Up Revs for the public Signal-in-Space documents. Leaving the results of RFC-519 as only IRNs would be unfair to the reader because of the complexity and extent of the changes being made. Based on typical version letter advancement rules, we can expect the new version letters will most likely result in the following document revisions:

- IS-GPS-200P
- IS-GPS-705K
- IS-GPS-800K

Bert Hayden PSA: Regarding CNAV message broadcast schedules, the two existing schedules are still in effect, but if anyone has suggestions for any updates, contact him at bert.h.hayden@aero.org .

Public Requirement Accountability Tool (PRAT)

Current PRAT Items

14:55-15:15	PRAT - Public Req. Accountability Tool	Tony Anthony
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The existing PRAT items were all presented. The following PRAT items were able to be closed either through completion or cancellation.

ID	Description	Status
PRAT 2018-01	Update GPS products in ICD-GPS-870, Table 3-I.	Complete
PRAT 2021-05	Data ID Issue	Complete
PRAT 2022-01	Reassess the relevance of the ISF 5.73 factor to the definition of MSF	Cancelled
PRAT 2022-03	Investigate CNAV Schedules Technical Baseline changes for future Public Documents Updates	Complete
PRAT 2023-03	Investigate all Changes that have been Deferred from RFC-502	Complete
PRAT 2023-04	Status RFC-495B Text Message Changes for Completion	Cancelled
PRAT 2023-05	Investigate Impact of PRN 34 and 37 Rule (ref. 3.2.1.3 C/A-Code)	Complete

PRAT 2022-01's Note was slightly corrected in that the "4.22" factor was changed to "4.42". This did not change the overall status of the PRAT Item.

The following PRAT items are still open.

ID	Description	Status
PRAT 2020-03	Normalize Power of 10 Notation	In Progress
PRAT 2021-02	Almanac Ephemeris URE	In Progress
PRAT 2021-03	Remove Inter Signal Corrections from Core CEI	Deferred
PRAT 2023-01	Drive ISM Message Formats to Final State	In Progress
PRAT 2023-02	Investigate CNAV-2 Schedules Technical Baseline changes for future Public Documents Updates	In Progress

The Note for PRAT 2021-02 Investigate the Almanac Ephemeris URE Table in IS-GPS-200 20.3.3.5.2.1 (Slide 158) was changed because the Special Topic that was planned for this Public ICWG was not presented.

New PRAT Items

PRAT 2025-01 Investigate more effective mechanisms to handle and discharge PRAT items and public document oriented Concerns.

Originator: Rhonda Slattery

POC: Emily Hendrickson

Notes: 14-May-2025: SSC/CGEP has fewer resources to effect change to the requirements baseline than in the past. This applies both PRAT items and pre-RFCs and Actions against the public documents, which are stacking up without getting implemented or acted on for years..

PRAT 2025-02 Implement the CNAV velocity formula corrections in the public Signal-in-Space documents.

Originator: TBD

POC: Tony Anthony / David Allen (Aerospace)

Notes: 14-May-2025: Per David Allen's Special Topic on mistakes in several CNAV velocity formulae, these formulae need to be corrected in all places in the public Signal-in-Space documents well before CNAV IOC is declared.

15:15-15:35	Action Item Review	
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See Action Item List

15:35-15:40	Closing Remarks	Dan Stevenson
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Action Items

Actionee	Description	Status
Anthony, Tony	Implement all changes agreed to regarding RFC-519 and the PRAT Items as agreed to in the meeting. Produce products for: <ol style="list-style-type: none"> 1. Changes in DOORS as agreed 2. The Meeting Minutes 3. A Post Meeting PowerPoint 	Complete 5/27/2025
Kovach, Karl	Regarding CRM #138, confirm that the corresponding formulae in the SPS PS also show the use of " \pm ".	TBD

Attendee Organizations

Organization	Method
SSC/CGEV	In Person
SE&I	In Person
Aerospace	In Person
FAA	In Person
SSC/CGJ	On-Line
SSC/CGL	On-Line
SSC/CGLP	On-Line
SSC/CGPX	On-Line
SSC/MD 31	On-Line
SSC/Navy	On-Line
SSC/PNT Delta	On-Line
USN NAVSURFWARCEN	On-Line
USSF SpOC/S35P	On-Line
2 NWS/DOOA	On-Line
2 SOPS/EA	On-Line

Organization	Method
517th	On-Line
AFMC 517 SWES/MXDPC	On-Line
SNL	On-Line
SDB-II	On-Line
PNT PO	On-Line
NASA	On-Line
NAVCEN	On-Line
NGA	On-Line
NNSA	On-Line
PMW/A 170	On-Line
MITRE	On-Line
ARL UT	On-Line
BAE	On-Line
BAH	On-Line
Boeing	On-Line
Canyon	On-Line
EuroControl	On-Line
L3 Harris	On-Line
LMCO	On-Line
ManTech	On-Line
Raytheon	On-Line
System Enginuity	On-Line
TetraTech	On-Line
Thales	On-Line

Acronyms

Acronym	Meaning
AODO	Age of Data Offset
CNAV	Civil Navigation
GNSS	Global Navigation Satellite System
ICWG	Interface Control Working Group
IOC	Initial Operational Capability
ISM	Integrity Support Message
PICWG	Public Interface Control Working Group
PNT	Positioning, Navigation, and Timing
PRAT	Public Requirements Accountability Tool
PRN	Pseudo-Random Noise
RFC	Request for Change
RTCA	Technical Commission for Aeronautics
SE&I	System Engineering and Integration
SIS	Signal in Space
SPS	System Performance Spec
URA	User Range Accuracy
URE	User Range Error
USAF	United States Air Force
USMC	United States Marine Corps
USN	United States Navy
WAGE	Wide Area GPS Enhancement
WIC	Watch Item Catalog