CHANGE NOTICE

Affected Document: IS-GPS-200 Rev N	**IRN/SCN Number** XXX-XXXX-XXX	**Date:** DD-MMM-YYYY
Authority: RFC-000519	**Proposed Change Notice** PCN-IS-200N_RFC519	**Date:** 13-MAY-2025

Document Title: NAVSTAR GPS Space Segment/Navigation User Segment Interfaces

RFC Title: Civil Integrity Support Message (ISM) Formats

Reason For Change (Driver):
Complete the Civil Integrity Support Message format portion to enable the ARAIM capability in time to meet FAA's needs in support of RTCA/DO-401A and EUROCAE/ED-259B.
(Pre-RFC-1200, Pre-RFC 1269, partial Pre-RFC-1326)

Description of Change:
Expand and update current related requirements to build solid definitions for the civil ISM messages:

1. L2C and L5 CNAV MT-40 (IS-GPS-200, IS-GPS-705)
2. L1C Subframe 3 Page 8 (IS-GPS-800)

Authored By: RE: Tony Anthony **Checked By: RE:** Vincent Quan

AUTHORIZED SIGNATURES	REPRESENTING	DATE
	PNT Technical Director, MilComm & PNT Directorate, Space Systems Command (SSC)	

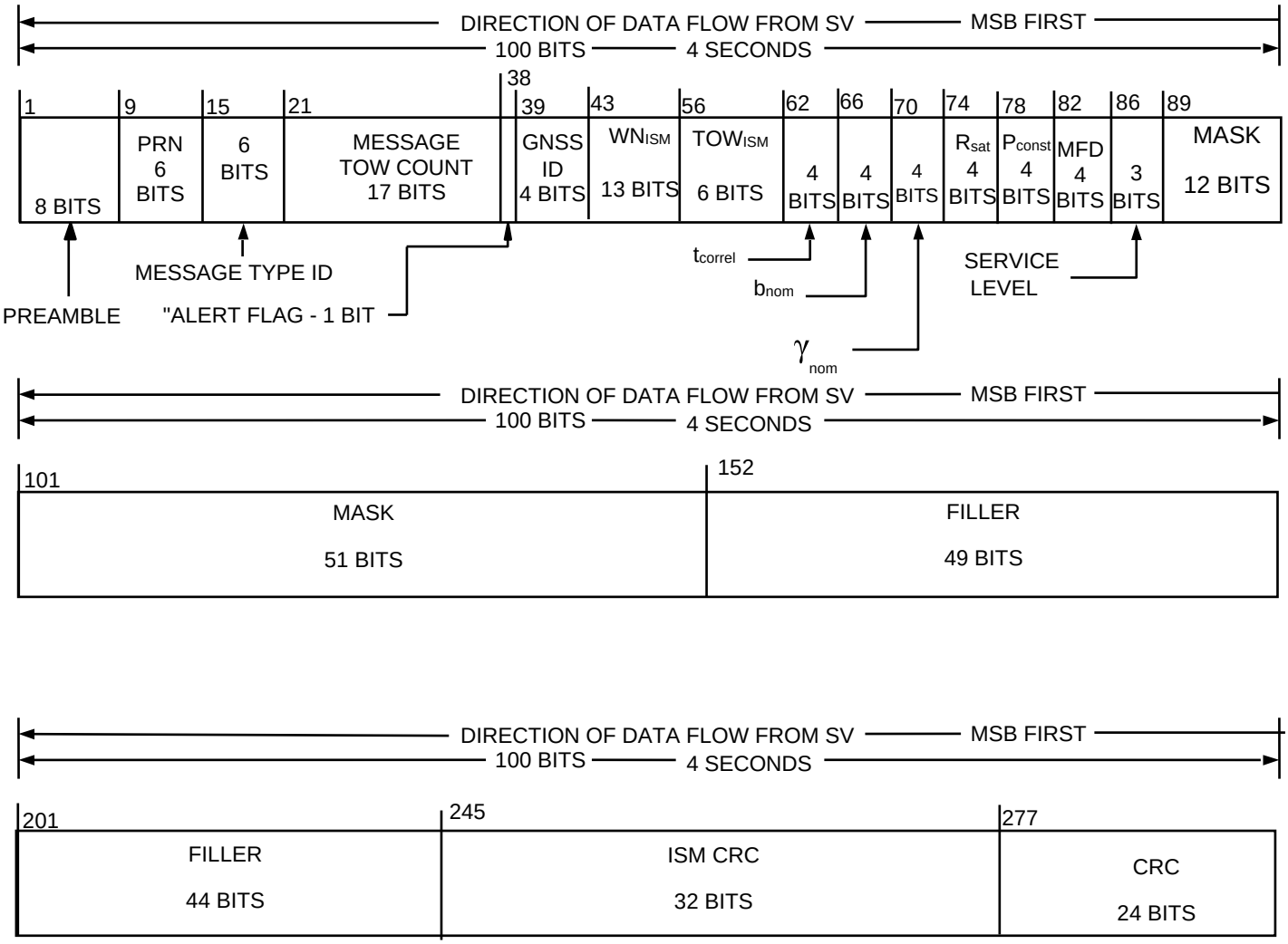
DISTRIBUTION A. Approved for public release: distribution is unlimited. SSC-PA-1370-06242025

THIS DOCUMENT SPECIFIES TECHNICAL REQUIREMENTS AND NOTHING HEREIN CONTAINED SHALL BE DEEMED TO ALTER THE TERMS OF ANY CONTRACT OR PURCHASE ORDER BETWEEN ALL PARTIES AFFECTED.	Interface Control Contractor: SAIC (GPS SE&I) 200 N. Pacific Coast Highway, Suite 1800 El Segundo, CA 90245 CODE IDENT 66RP1

IS200-1808:

Section Number:
30.3.3.0-30

WAS:

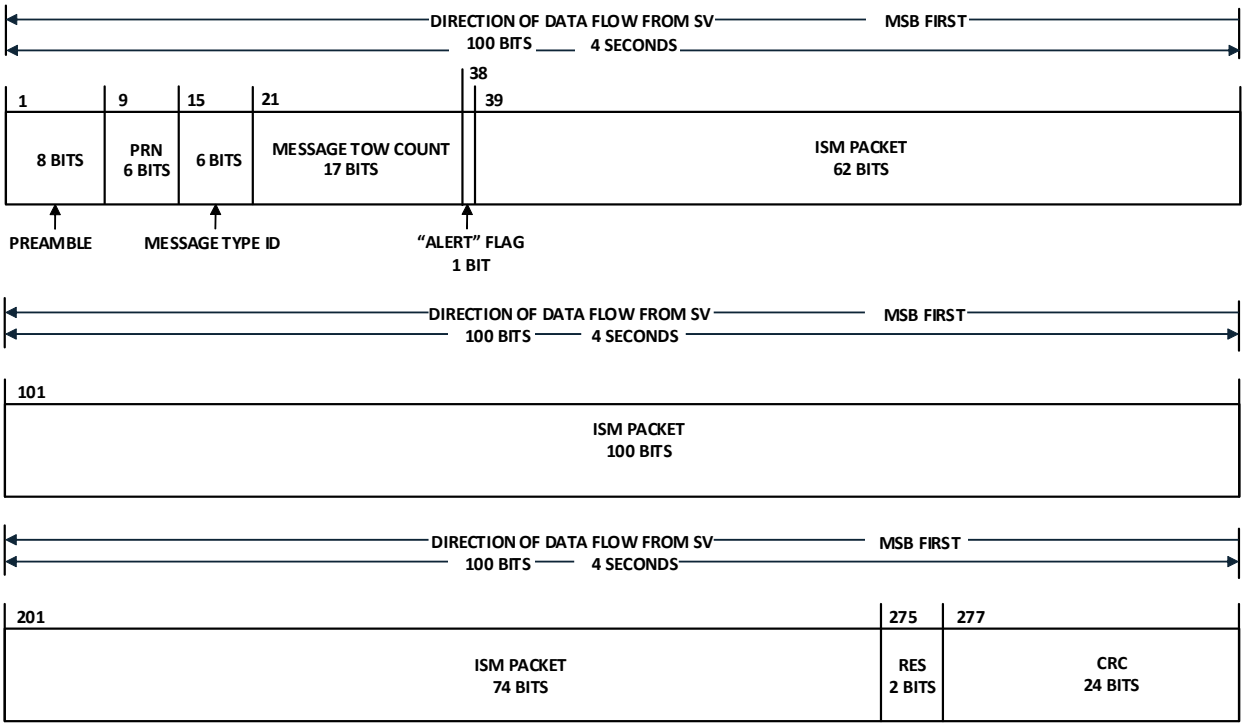


* MESSAGE TOW COUNT = 17 MSBs OF ACTUAL TOW COUNT AT START OF NEXT 12-SECOND MESSAGE

Redlines:
<graphic not available>

- Replaced the GNSS ID through ISM CRC with a 236 bit ISM Packet
- Added two Reserved bits as filler

IS:



* MESSAGE TOW COUNT = 17 MSBs OF ACTUAL TOW COUNT AT START OF NEXT 12-SECOND MESSAGE

Rationale:
10/8/2024 CRM #58 Copy paste error resulted in a mistaken 6-SECOND MESSAGE instead of the correct 12-SECOND MESSAGE (T. Anthony)
CRM #58 9/27/2024 Comment at the bottom should read "12-SECOND MESSAGE" instead of "6..." (T. Anthony)
Per the 2023 PICWG Special Topic, The two Reserved bits were added so the MT-40s and SF 3 Page 8 could have exactly the same bit pattern for the ISM Parameters. Because of this same bit pattern, at TIM #1, decided to repackage the ISM Parameters into the ISM Packet which changed out most fields in MT-40 for a single ISM Packet (T. Anthony)

IS200-2401:
Insertion after object IS200-1943

Section Number:
30.3.3.1.1.0-9

WAS:
<INSERTED OBJECT>

Redlines:
The nominal URA is a conservative estimate of the pseudorange accuracy and is the RSS of an elevation-dependent nominal value of the URA_{ED} component and the nominal value of the URA_{NED} component.
Object Type: Info-Only

IS:
The nominal URA is a conservative estimate of the pseudorange accuracy and is the RSS of an elevation-dependent nominal value of the URA_{ED} component and the nominal value of the URA_{NED} component.
Object Type: Info-Only

Rationale:
3/29/20205 CRM #111 Add definition for nominal URA (T. Anthony)

IS200-1946:

Section Number:
30.3.3.1.1.4.0-6

WAS:
For each URA_{ED} index (N), users may compute a nominal URA_{ED} value (X) as given by:

- If the value of N is 6 or less, but more than -16, $X = 2^{(1 + N/2)}$,
- If the value of N is 6 or more, but less than 15, $X = 2^{(N - 2)}$,
- N = -16 or N = 15 shall indicate the absence of an accuracy prediction and shall advise the standard positioning service user to use that SV at his own risk.

For N = 1, 3, and 5, X should be rounded to 2.8, 5.7, and 11.3 meters, respectively.

The nominal URA_{ED} value (X) is suitable for use as a conservative prediction of the RMS ED range errors for accuracy-related purposes in the pseudorange domain (e.g., measurement deweighting, RAIM, FOM computations). Integrity properties of the $IAURA_{ED}$ are specified with respect to the scaled (multiplied by either 4.42 or 5.73 as appropriate) upper bound values of the broadcast URA_{ED} index (see 30.3.3.1.1).

For the nominal URA_{ED} value and the $IAURA_{ED}$ value, users may compute an adjusted URA_{ED} value as a function of SV elevation angle (E), for $E \geq 0$, as follows:

$$\text{Adjusted Nominal } URA_{ED} = \text{Nominal } URA_{ED} (\sin(E+90 \text{ degrees}))$$
$$\text{Adjusted } IAURA_{ED} = IAURA_{ED} (\sin(E+90 \text{ degrees}))$$

URA_{ED} and $IAURA_{ED}$ account for SIS contributions to user range error which include, but are not limited to, the following: CNAV LSB representation/truncation error, CNAV alongtrack ephemeris errors, and crosstrack CNAV ephemeris errors. URA_{ED} and $IAURA_{ED}$ do not account for user range error contributions due to the inaccuracy of the broadcast ionospheric data parameters used in the single-frequency ionospheric model or for other atmospheric effects.

Redlines:

For each URA_{ED} index (N), users may compute a nominal URA_{ED} value (X) as given by:

- If the value of N is 6 or less, but more than -16, $X = 2^{(1 + N/2)}$,
- If the value of N is 6 or more, but less than 15, $X = 2^{(N - 2)}$,
- N = -16 or N = 15 shall indicate the absence of an accuracy prediction and shall advise the standard positioning service user to use that SV at his own risk.

For N = -15, 1, 3, and 5, X should be rounded to .01, 2.8, 5.7, and 11.3 meters, respectively.

The nominal URA_{ED} value (X) is suitable for use as a conservative prediction of the RMS ED range errors for accuracy-related purposes in the pseudorange domain (e.g., measurement deweighting, RAIM, FOM computations). Integrity properties of the $IAURA_{ED}$ are specified with respect to the scaled (multiplied by either 4.42 or 5.73 as appropriate) upper bound values of the broadcast URA_{ED} index (see 30.3.3.1.1).

For the nominal URA_{ED} value and the $IAURA_{ED}$ value, users may compute an adjusted URA_{ED} value as a function of SV elevation angle (E), for $E \geq 0$, as follows:

$$\text{Adjusted Nominal } URA_{ED} = \text{Nominal } URA_{ED} (\sin(E+90 \text{ degrees}))$$
$$\text{Adjusted } IAURA_{ED} = IAURA_{ED} (\sin(E+90 \text{ degrees}))$$

URA_{ED} and $IAURA_{ED}$ account for SIS contributions to user range error which include, but are not limited to, the following: CNAV LSB representation/truncation error, CNAV ~~alongtrack~~along-track ephemeris errors, and ~~crosstrack~~cross-track CNAV ephemeris errors. URA_{ED} and $IAURA_{ED}$ do not account for user range error contributions due to the inaccuracy of the broadcast ionospheric data parameters used in the single-frequency ionospheric model or for other atmospheric effects

IS:

For each URA_{ED} index (N), users may compute a nominal URA_{ED} value (X) as given by:

- If the value of N is 6 or less, but more than -16, $X = 2^{(1 + N/2)}$,
- If the value of N is 6 or more, but less than 15, $X = 2^{(N - 2)}$,
- N = -16 or N = 15 shall indicate the absence of an accuracy prediction and shall advise the standard positioning service user to use that SV at his own risk.

For N = -15, 1, 3, and 5, X should be rounded to .01, 2.8, 5.7, and 11.3 meters, respectively.

The nominal URA_{ED} value (X) is suitable for use as a conservative prediction of the RMS ED range errors for accuracy-related purposes in the pseudorange domain (e.g., measurement deweighting, RAIM, FOM computations). Integrity properties of the $IAURA_{ED}$ are specified with respect to the scaled (multiplied by either 4.42 or 5.73 as appropriate) upper bound values of the broadcast URA_{ED} index (see 30.3.3.1.1).

For the nominal URA_{ED} value and the $IAURA_{ED}$ value, users may compute an adjusted URA_{ED} value as a function of SV elevation angle (E), for $E \geq 0$, as follows:

$$\text{Adjusted Nominal } URA_{ED} = \text{Nominal } URA_{ED} (\sin(E+90 \text{ degrees}))$$
$$\text{Adjusted } IAURA_{ED} = IAURA_{ED} (\sin(E+90 \text{ degrees}))$$

URA_{ED} and $IAURA_{ED}$ account for SIS contributions to user range error which include, but are not limited to, the following: CNAV LSB representation/truncation error, CNAV along-track ephemeris errors, and cross-track CNAV ephemeris errors. URA_{ED} and $IAURA_{ED}$ do not account for user range error contributions due to the inaccuracy of the broadcast ionospheric data parameters used in the single-frequency ionospheric model or for other atmospheric effects.

Rationale:
CRM #144 5/14/2025 At PICWG the stakeholders decided the best solution was to add a note to "For N = " to add an exception for -15.
Also turned "alongtrack" and "crosstrack" into hyphenated words in keeping with general use as found in Skytionary. (T. Anthony)

IS200-572:

Section Number:
30.3.3.2.4.0-3

WAS:
The user shall calculate the NED-related URA with the equation (in meters);
$IAURA_{NED} = URA_{NED0} + URA_{NED1} (t - t_{op} + 604{,}800*(WN - WN_{op}))$

for $t - t_{op} + 604{,}800*(WN - WN_{op}) \leq 93{,}600$ seconds

$IAURA_{NED} = URA_{NED0} + URA_{NED1}*(t - t_{op} + 604{,}800*(WN - WN_{op})) + URA_{NED2}*(t - t_{op} + 604{,}800*(WN - WN_{op}) - 93{,}600)^2$

for $t - t_{op} + 604{,}800*(WN - WN_{op}) > 93{,}600$ seconds

where

t is the GPS system time

Redlines:
The user shall calculate the NED-related URA with the equation (in meters);

nominal URA_{NED} = nominal URA_{NED0}

$IAURA_{NED}$ = Upper Bound $URA_{NED0} + URA_{NED1}*(t - t_{op} + 604{,}800*(WN - WN_{op}))$

for $t - t_{op} + 604{,}800*(WN - WN_{op}) \leq 93{,}600$ seconds

$IAURA_{NED}$ = Upper Bound $URA_{NED0} + URA_{NED1}*(t - t_{op} + 604{,}800*(WN - WN_{op})) + URA_{NED2}*(t - t_{op} + 604{,}800*(WN - WN_{op}) - 93{,}600)^2$

for $t - t_{op} + 604{,}800*(WN - WN_{op}) > 93{,}600$ seconds

where

t is the GPS system time

IS:
The user shall calculate the NED-related URA with the equation (in meters);

nominal URA_{NED} = nominal URA_{NED0}

$IAURA_{NED}$ = Upper Bound URA_{NED0} + URA_{NED1}*(t - t_{op} + 604,800*(WN - WN_{op}))

for t - t_{op} + 604,800*(WN - WN_{op}) ≤ 93,600 seconds

$IAURA_{NED}$ = Upper Bound URA_{NED0} + URA_{NED1}*(t - t_{op} + 604,800*(WN - WN_{op})) + URA_{NED2}*(t - t_{op} + 604,800*(WN - WN_{op}) - 93,600)^2

for t - t_{op} + 604,800*(WN - WN_{op}) > 93,600 seconds

where

t is the GPS system time

Rationale:
5/14/2025 At PICWG CRM #158 was created to modify all formulae that don't explicitly use "*" as a multiplier symbol to use "*".(T. Anthony)
5/14/2025 CRM #143 decided at PICWG to start each formula with "Upper Bound" (T. Anthony)
3/29/2025 CRM #112 Nominal URANED added as requested, (T. Anthony)

IS200-576:

Section Number:
30.3.3.2.4.0-8

WAS:
For each URA_{NED0} index (N), users may compute a nominal URA_{NED0} value (X) as given by:

- If the value of N is 6 or less, but more than -16, $X = 2^{(1 + N/2)}$,
- If the value of N is 6 or more, but less than 15, $X = 2^{(N - 2)}$,
- N = -16 or N = 15 shall indicate the absence of an accuracy prediction and shall advise the standard positioning service user to use that SV at his own risk.

For N = 1, 3, and 5, X should be rounded to 2.8, 5.7, and 11.3 meters, respectively.

Redlines:
For each URA_{NED0} index (N), users may compute a nominal URA_{NED0} value (X) as given by:

- If the value of N is 6 or less, but more than -16, $X = 2^{(1 + N/2)}$,
- If the value of N is 6 or more, but less than 15, $X = 2^{(N - 2)}$,
- N = -16 or N = 15 shall indicate the absence of an accuracy prediction and shall advise the standard positioning service user to use that SV at his own risk.

For N = -15, 1, 3, and 5, X should be rounded to .01, 2.8, 5.7, and 11.3 meters, respectively.

IS:
For each URA_{NED0} index (N), users may compute a nominal URA_{NED0} value (X) as given by:

- If the value of N is 6 or less, but more than -16, $X = 2^{(1 + N/2)}$,
- If the value of N is 6 or more, but less than 15, $X = 2^{(N - 2)}$,
- N = -16 or N = 15 shall indicate the absence of an accuracy prediction and shall advise the standard positioning service user to use that SV at his own risk.

For N = -15, 1, 3, and 5, X should be rounded to .01, 2.8, 5.7, and 11.3 meters, respectively.

Rationale:
CRM #145 5/14/2025 At PICWG the stakeholders decided the best solution was to add a note to "For N = " to add an exception for -15.. (T. Anthony)

IS200-1952:

Section Number:
30.3.3.2.4.0-9

WAS:
The nominal URA_{NED0} value (X) shall be suitable for use as a conservative prediction of the RMS NED range errors for accuracy-related purposes in the pseudorange domain (e.g., measurement de-weighting RAIM, FOM computations). Integrity properties of the $IAURA_{NED}$ are specified with respect to the scaled (multiplied by either 4.42 or 5.73 as appropriate) upper bound values of the URA_{NED0} index, URA_{NED1} index, and URA_{NED2} index (see 30.3.3.1.1). URA_{NED0} accounts for zeroth order SIS-contributions to user range error which include, but are not limited to, the following: CNAV LSB representation/truncation error; the net effect of CNAV clock correction polynomial error and code phase error in the transmitted signal for single-frequency L2C users who correct the code phase as described in Section 30.3.3.3.1.1.1; the net effect of clock parameter, code phase, and inter-signal correction error for dual-frequency L1 C/A and L2C users who correct for group delay and ionospheric effects as described in Section 30.3.3.3.1.1.2; radial ephemeris error; anisotropic antenna errors; and signal deformation error. URA_{NED0} does not account for user range contributions due to the inaccuracy of the broadcast ionospheric data parameters used in the single-frequency ionospheric model or for other atmospheric effects.

Redlines:
The nominal URA_{NED0} value (X) shall be suitable for use as a conservative prediction of the RMS NED range errors for accuracy-related purposes in the pseudorange domain (e.g., measurement de-weighting RAIM, FOM computations). Integrity properties of the $IAURA_{NED}$ are specified with respect to the scaled (multiplied by either 4.42 or 5.73 as appropriate) upper bound values of the URA_{NED0} index, and values of the URA_{NED1} index, and URA_{NED2} index (see 30.3.3.1.1).

URA_{NED0} accounts for zeroth order SIS-contributions to user range error which include, but are not limited to, the following: CNAV LSB representation/truncation error; the net effect of CNAV clock correction polynomial error and code phase error in the transmitted signal for single-frequency L2C users who correct the code phase as described in Section 30.3.3.3.1.1.1; the net effect of clock parameter, code phase, and inter-signal correction error for dual-frequency L1 C/A and L2C users who correct for group delay and ionospheric effects as described in Section 30.3.3.3.1.1.2; radial ephemeris error; anisotropic antenna errors; and signal deformation error. URA_{NED0} does not account for user range contributions due to the inaccuracy of the broadcast ionospheric data parameters used in the single-frequency ionospheric model or for other atmospheric effects.

IS:
The nominal URA_{NED0} value (X) shall be suitable for use as a conservative prediction of the RMS NED range errors for accuracy-related purposes in the pseudorange domain (e.g., measurement de-weighting RAIM, FOM computations). Integrity properties of the $IAURA_{NED}$ are specified with respect to the scaled (multiplied by either 4.42 or 5.73 as appropriate) upper bound values of the URA_{NED0} index, and values of the URA_{NED1} index, and URA_{NED2} index (see 30.3.3.1.1).

URA_{NED0} accounts for zeroth order SIS-contributions to user range error which include, but are not limited to, the following: CNAV LSB representation/truncation error; the net effect of CNAV clock correction polynomial error and code phase error in the transmitted signal for single-frequency L2C users who correct the code phase as described in Section 30.3.3.3.1.1.1; the net effect of clock parameter, code phase, and inter-signal correction error for dual-frequency L1 C/A and L2C users who correct for group delay and ionospheric effects as described in Section 30.3.3.3.1.1.2; radial ephemeris error; anisotropic antenna errors; and signal deformation error. URA_{NED0} does not account for user range contributions due to the inaccuracy of the broadcast ionospheric data parameters used in the single-frequency ionospheric model or for other atmospheric effects.

Rationale:
5/14/2025 CRM #143: At PICWG all stakeholders concurred with a new option which added "and values of" into the end of the 2nd sentence. (T. Anthony)

IS200-1764:

Section Number:
30.3.3.10.0-1

WAS:
Figure 30-14a contains the structure of Message Type 40, Integrity Support Message (ISM). The contents of Message Type 40 are defined below, followed by material pertinent to the use of the ISM data. Users who implement Advanced Receiver Autonomous Integrity Monitoring (ARAIM) may use these parameters for the ARAIM algorithm as referenced in future TSO and MSO.
Object Type: <blank>

Redlines:
~~Figure 30-14a contains the structure of~~ Message Type 40, ~~Integrity Support Message (ISM).~~as ~~The~~depicted ~~contents~~in ~~of~~Figure ~~Message~~30-14a ~~Type~~shall ~~40~~contain ~~are~~the ~~defined~~parameters ~~below,~~related ~~followed~~to ~~by~~GNSS ~~material~~constellation ~~pertinent~~and ~~to~~satellite ~~the~~integrity ~~use~~parameters ~~of~~used ~~the~~for ~~ISM~~ARAIM ~~data~~algorithms. ~~Users who~~This ~~implement~~message ~~Advanced~~contains ~~Receiver~~a ~~Autonomous~~236-bit ~~Integrity~~ISM ~~Monitoring~~Packet (~~ARAIM) may~~see ~~use~~Figure ~~these~~30-17) ~~parameters~~common ~~for~~among ~~the~~all ~~ARAIM~~GPS ~~algorithm~~Civil ~~as~~signals ~~referenced~~that ~~in~~carry ~~future~~Integrity ~~TSO~~Support ~~and~~Data ~~MSO~~(ISD).
Object Type: ~~<blank>~~Requirement

IS:
Message Type 40, as depicted in Figure 30-14a shall contain the parameters related to GNSS constellation and satellite integrity parameters used for ARAIM algorithms. This message contains a 236-bit ISM Packet (see Figure 30-17) common among all GPS Civil signals that carry Integrity Support Data (ISD).
Object Type: Requirement

Rationale:
10/25/2024: Per Govt AWG, ISD Subpackets were removed from ISM Message terminology causing another shuffling of text and moving the 2nd paragraph to IS200-1766. (T. Anthony)
10/8/2024 CRM #13, #29, #63 Completely reworked as part of the refactoring of the ISM/ISD. (T. Anthony)
8/21/2024: At TIM, decided to repackage the ISM Parameters into the ISM Packet/ISD Subpacket which changed most bits and replaced many occurrences of MT-40 with ISM Packet or GPS ISD Subpacket (T. Anthony)
Per the 2023 PICWG Special Topic, ISM Packet and Message Type 40 content has been clarified to only applicable when the GNSS ID is equal to "0100" (GPS). (T. Anthony)

IS200-1765:

Section Number:
30.3.3.10.1

WAS:
Object Heading 30.3.3.10.1 ISM Parameter Content

Redlines:
Object Heading 30.3.3.10.1 ~~ISM~~ISD Parameter Content

IS:
Object Heading 30.3.3.10.1 ISD Parameter Content

Rationale:
10/8/2024 CRM #52 This section more correctly represent Integrity Support Data which is inside the Integrity Support Message. Ergo a change from ISM to ISD (T. Anthony)

IS200-2400:
Insertion below object IS200-1765

Section Number:
30.3.3.10.1.1

WAS:
<INSERTED OBJECT>

Redlines:
Object Heading 30.3.3.10.1.1 ISM Packet
Object Type: Header

IS:
Object Heading 30.3.3.10.1.1 ISM Packet
Object Type: Header

Rationale:
10/25/2024: Per Govt AWG, delineate the ISM Packet vs subpacket parameters more clearly. (T. Anthony)

IS200-1766:

Section Number:
30.3.3.10.1.1.0-1

WAS:
Message Type 40 shall contain the parameters related to GNSS constellation and satellite integrity parameters used for ARAIM algorithms.
Object Type: <blank>

Redlines:
~~Message~~The ~~Type~~ISM ~~40~~Packet shall contain the parameters related to GNSS constellation and satellite integrity parameters.

Users ~~used~~who implement Advanced Receiver Autonomous Integrity Monitoring (ARAIM) may use these parameters for the ARAIM ~~algorithms~~algorithm as referenced in applicable standards (e.g. TSO, MSO).
The ISM Packet contains the GNSS ID, and ISD Parameters specific to the constellation's ISD needs.
Object Type: ~~<blank>~~Requirement

IS:
The ISM Packet shall contain the parameters related to GNSS constellation and satellite integrity parameters.

Users who implement Advanced Receiver Autonomous Integrity Monitoring (ARAIM) may use these parameters for the ARAIM algorithm as referenced in applicable standards (e.g. TSO, MSO).
The ISM Packet contains the GNSS ID, and ISD Parameters specific to the constellation's ISD needs.
Object Type: Requirement

Rationale:
5/14/2025 At PICWG reworded the part about the applicable standards (T. Anthony)
3/29/2025 CRM #119 Expanded on the term "future" (T. Anthony)
3/27/2025 CRM #96 Normalized "ISD Data" across the document to "ISD Parameters" (T. Anthony)
3/19/2025 CRM #97, No comma needed after (ARAIM) because the clause is restrictive. (T. Anthony)
10/25/2024 Per the AWG, more formally splitting the description of the ISM Packet from the ISM Packet Overlays, meant that the second paragraph had to me moved from the ISM description down to this ISM Packet. (T. Anthony)
10/28/2024 CRM #31, readjusted wording to as closely match the corresponding IS-GPS-705 and IS-GPS-800 wording as practical. (T. Anthony)

10/9/2024 This is part of the refactoring of the ISM sections as agreed on 10/4/2024. Also, needs to be a requirement (T. Anthony)

IS200-1768:

Section Number:
30.3.3.10.1.1.0-2

WAS:
The CS shall upload the current ISM parameters, when necessary, to the SVs

Redlines:
~~The CS shall upload the current ISM parameters, when necessary, to the SVs~~

IS:
<DELETED OBJECT>

Rationale:
5/13/2025 PICWG Dropped this entire DOORS ID. (T. Anthony)

IS200-2387:
Insertion after object IS200-1990

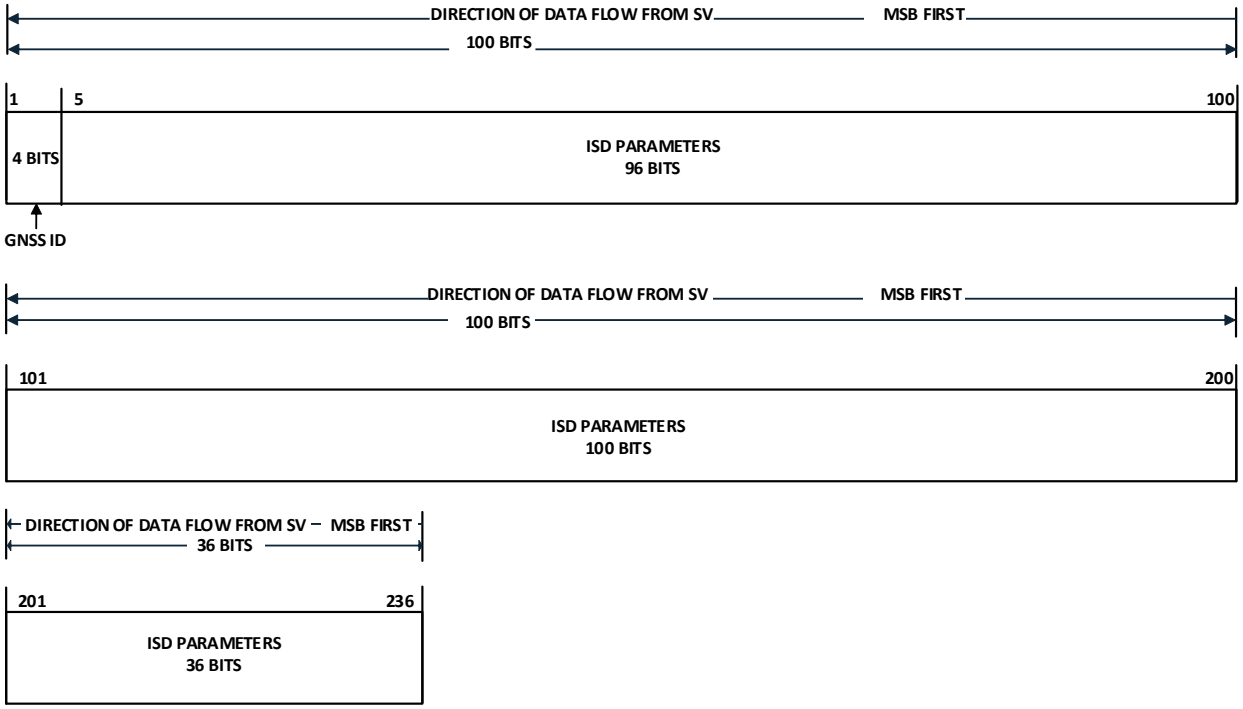
Section Number:
30.3.3.10.1.1.0-3

WAS:
<INSERTED OBJECT>

Redlines:
Object Type: Figure

(see IS: below)

IS:



Object Type: Figure

Rationale:
3/27/2025 CRM #96 Normalized "ISD Data" across the document to "ISD Parameters" (T. Anthony)
10/25/2024: Per Govt AWG, ISD Subpackets were removed from ISM Message terminology (T. Anthony)
10/9/2024 This is part of the refactoring of the ISM sections as agreed on 10/4/2024 (T. Anthony)
8/21/2024: At TIM, decided to repackage the ISM Parameters into the ISM Packet which caused this graphic to be created (T. Anthony)

IS200-2388:
Insertion after object IS200-2387

Section Number:
30.3.3.10.1.1.0-4

WAS:
<INSERTED OBJECT>

Redlines:
Figure 30-17 ISM Packet
Object Type: Figure Caption

IS:
Figure 30-17 ISM Packet
Object Type: Figure Caption

Rationale:
10/9/2024 This is part of the refactoring of the ISM sections as agreed on 10/4/2024 (T. Anthony)
8/21/2024: At TIM, decided to repackage the ISM Parameters into the ISM Packet which caused the above Figure and this Figure Caption to be created (T. Anthony)

IS200-1775:

Section Number:
30.3.3.10.1.1.1

WAS:
Object Heading 30.3.3.10.1.1.1 GNSS Constellation ID

Redlines:
Object Heading 30.3.3.10.1.1.1 GNSS ~~Constellation~~ ID

IS:
Object Heading 30.3.3.10.1.1.1 GNSS ID

Rationale:
10/25/2024: Per Govt AWG, the GNSS ID was moved forward in the document to be directly under the ISM Packet. (T. Anthony)
10/14/2024 CRM #15 Removing the word Constellation which is implied and increases uniformity for identifying this parameter. (T. Anthony)

IS200-1776:

Section Number:
30.3.3.10.1.1.1.0-1

WAS:
Bits 39 through 42 of Message Type 40 shall identify the GNSS service to which the associated ISM parameters apply.
Object Type: <blank>

Redlines:
Bits ~~39~~1 through ~~42~~4 of ~~Message~~the ~~Type~~ISM ~~40~~Packet shall identify the GNSS service to which the associated ISM parameters apply. Furthermore, the GNSS ID is used as a Packet Indicator to show which ISM Packet Overlay applies to the rest of the ISM Packet (see section 30.3.3.10.1.1).
Object Type: ~~<blank>~~Requirement

IS:
Bits 1 through 4 of the ISM Packet shall identify the GNSS service to which the associated ISM parameters apply. Furthermore, the GNSS ID is used as a Packet Indicator to show which ISM Packet Overlay applies to the rest of the ISM Packet (see section 30.3.3.10.1.1).
Object Type: Requirement

Rationale:
10/25/2024 Per the AWG, all Subpacket terminology has been removed. (T. Anthony)
9/3/2024 Finally change the bits and the enclosing object to "ISM Packet" and make this a Requirement (T. Anthony)

IS200-1777:

Section Number:
30.3.3.10.1.1.1.0-2

WAS:
The four bits are defined as follows:

0000 = No Data Available
0001 = Galileo
0010 = GLONASS
0011 = BeiDou
0100 = GPS
0101 = SBAS
0110 = QZSS
0111 = IRNSS
1000 through 1111 = Reserved for other systems
Object Type: <blank>

Redlines:
The four bits are defined as follows:

0000 = ~~No~~Test ~~Data~~Packet ~~Available~~(For Test Use Only)
0001 = ~~Galileo~~ Reserved
0010 ~~= GLONASS~~through
0011 = ~~BeiDou~~ Reserved
0100 = GPS
0101 ~~= SBAS~~
~~0110 = QZSS~~
~~0111 = IRNSS~~
~~1000~~ through 1111 = Reserved ~~for other systems~~
Object Type: ~~<blank>~~Info-Only

IS:
The four bits are defined as follows:

0000 = Test Packet (For Test Use Only)
0001 = Reserved
0010 through 0011 = Reserved
0100 = GPS
0101 through 1111 = Reserved
Object Type: Info-Only

Rationale:
5/14/2025 At PICWG changed to CRM #98 to Accept with Comments so the Reserved items are collapsed except for 0001 which may be used to represent Galileo if cross-dissemination of ISM is ever implemented. (T. Anthony)
3/28/2005 CRM #128 Rename 0000 to Test Packet (T. Anthony)
10/08/2024 CRM #69 Change RESERVED to mixed case (T. Anthony)
08/21/2024: At TIM, confirmed that only "No Data Available" and GPS are valid values for GNSS ID within the ISM Packet inside MT-40 (T. Anthony)

IS200-1814:

Section Number:
30.3.3.10.1.1.1.0-3

WAS:
If users see four bits of '0000', users will ignore the entire ISM.

Redlines:
~~If users see four bits of '0000', users will ignore the entire ISM.~~

IS:
<DELETED OBJECT>

Rationale:
10/9/20214 CRM #68 With clarification that remaining contents of ISM Packet are reserved if GNSS ID is not equal to "0100", this (poorly worded) statement is being deleted. (T. Anthony)

IS200-2389:
Insertion below object IS200-1765

Section Number:
30.3.3.10.1.2

WAS:
<INSERTED OBJECT>

Redlines:
Object Heading 30.3.3.10.1.2 ISM Packet Overlay Formats
Object Type: Header

IS:
Object Heading 30.3.3.10.1.2 ISM Packet Overlay Formats
Object Type: Header

Rationale:
10/25/2024: Per Govt AWG, ISD Subpackets were removed from ISM Message terminology. (T. Anthony)
10/9/2024 This is part of the refactoring of the ISM sections as agreed on 10/4/2024 (T. Anthony)

IS200-2392:
Insertion below object IS200-2389

Section Number:
30.3.3.10.1.2.0-1

WAS:
<INSERTED OBJECT>

Redlines:
This section describes the different constellation specific ISM Packet overlays that are currently defined to detail the ISD parameters inside bits 5 through 236 of the ISM Packet.
Object Type: Info-Only

IS:
This section describes the different constellation specific ISM Packet overlays that are currently defined to detail the ISD parameters inside bits 5 through 236 of the ISM Packet.
Object Type: Info-Only

Rationale:
3/27/2025 CRM #90, #110, #122, #132 The ISM Packet introduction should be Info-Only (T. Anthony)
10/25/2024: Per Govt AWG, ISD Subpackets were removed from ISM Message terminology. (T. Anthony)
10/9/2024 This is part of the refactoring of the ISM sections as agreed on 10/4/2024 (T. Anthony)

IS200-2390:
Insertion below object IS200-2389

Section Number:
30.3.3.10.1.2.1

WAS:
<INSERTED OBJECT>

Redlines:
Object Heading 30.3.3.10.1.2.1 Test Packet – GNSS ID = 0000
Object Type: Header

IS:
Object Heading 30.3.3.10.1.2.1 Test Packet – GNSS ID = 0000
Object Type: Header

Rationale:
10/25/2024: Per Govt AWG, ISD Subpackets were removed from ISM Message terminology. (T. Anthony)
10/9/2024 This is part of the refactoring of the ISM sections as agreed on 10/4/2024 (T. Anthony)

IS200-2393:
Insertion below object IS200-2390

Section Number:
30.3.3.10.1.2.1.0-1

WAS:
<INSERTED OBJECT>

Redlines:
The 236-bit Test Packet shall be applicable when GNSS ID = 0000 (see Figure 30-18). This packet is for test purposes and doesn't contain any data operationally useful to the ARAIM function.
Object Type: Requirement

IS:
The 236-bit Test Packet shall be applicable when GNSS ID = 0000 (see Figure 30-18). This packet is for test purposes and doesn't contain any data operationally useful to the ARAIM function.
Object Type: Requirement

Rationale:
3/27/2025 CRM #90, #110, #122, #132 The Test Packet Introduction should be a Requirement (T. Anthony)
10/25/2024: Per Govt AWG, ISD Subpackets were removed from ISM Message terminology. (T. Anthony)
10/9/2024 This is part of the refactoring of the ISM sections as agreed on 10/4/2024 (T. Anthony)

IS200-2394:
Insertion after object IS200-2393

Section Number:
30.3.3.10.1.2.1.0-2

WAS:
<INSERTED OBJECT>

Redlines:
If user equipment encounters this packet, it should be ignored.
Object Type: Info-Only

IS:
If user equipment encounters this packet, it should be ignored.
Object Type: Info-Only

Rationale:
10/25/2024: Per Govt AWG, ISD Subpackets were removed from ISM Message terminology. (T. Anthony)
10/9/2024 This is part of the refactoring of the ISM sections as agreed on 10/4/2024 (T. Anthony)

IS200-2395:
Insertion after object IS200-2394

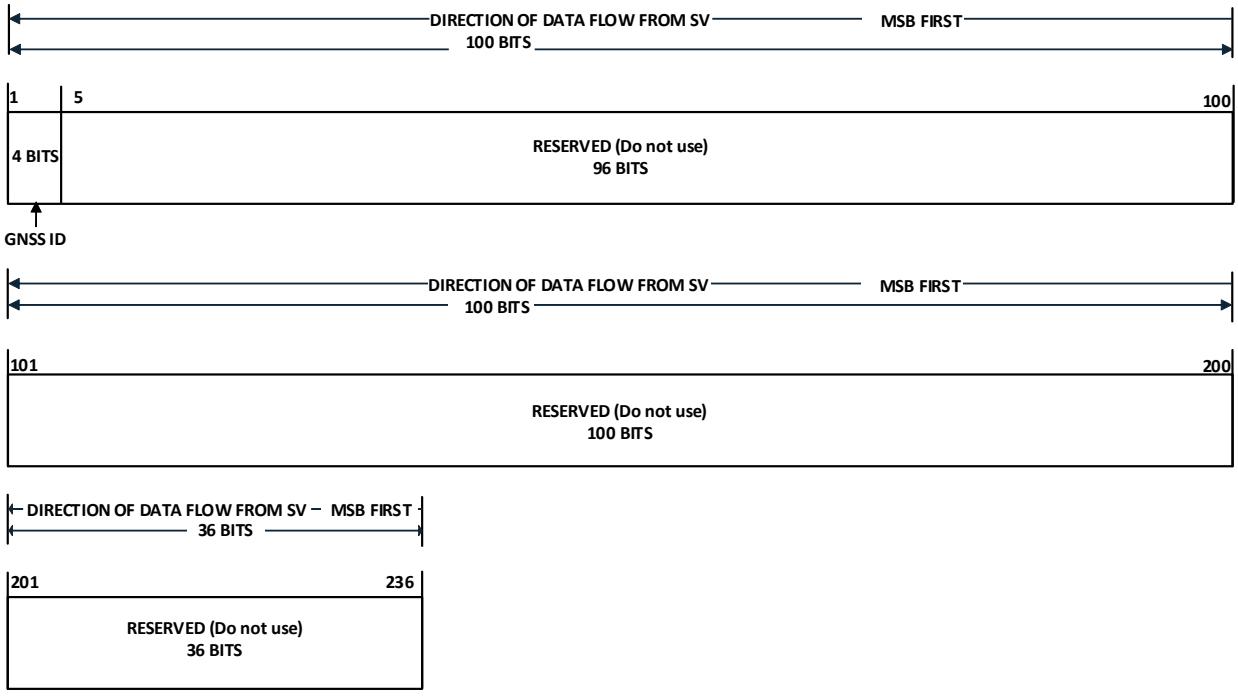
Section Number:
30.3.3.10.1.2.1.0-3

WAS:
<INSERTED OBJECT>

Redlines:
Object Type: Figure

(see IS: below)

IS:



Object Type: Figure

Rationale:
10/25/2024: Per Govt AWG, Subpackets were resized to include GNSS ID. (T. Anthony)
10/9/2024 This is part of the refactoring of the ISM sections as agreed on 10/4/2024 (T. Anthony)

IS200-2396:
Insertion after object IS200-2395

Section Number:
30.3.3.10.1.2.1.0-4

WAS:
<INSERTED OBJECT>

Redlines:
Figure 30-18 Test Packet
Object Type: Figure Caption

IS:
Figure 30-18 Test Packet
Object Type: Figure Caption

Rationale:
10/25/2024: Per Govt AWG, ISD Subpackets were removed from ISM Message terminology. (T. Anthony)
10/9/2024 This is part of the refactoring of the ISM sections as agreed on 10/4/2024 (T. Anthony)

IS200-2391:
Insertion after object IS200-2390

Section Number:
30.3.3.10.1.2.2

WAS:
<INSERTED OBJECT>

Redlines:
Object Heading 30.3.3.10.1.2.2 GPS ISM Packet – GNSS ID = 0100
Object Type: Header

IS:
Object Heading 30.3.3.10.1.2.2 GPS ISM Packet – GNSS ID = 0100
Object Type: Header

Rationale:
10/25/2024 CRM #55 While discussing the bit numbers took in comment to change the field name to GPS PRN Inclusion Mask (T. Anthony)
10/25/2024: Per Govt AWG, ISD Subpackets were removed from ISM Message terminology. (T. Anthony)
10/9/2024 This is part of the refactoring of the ISM sections as agreed on 10/4/2024 (T. Anthony)

IS200-2397:
Insertion below object IS200-2391

Section Number:
30.3.3.10.1.2.2.0-1

WAS:
<INSERTED OBJECT>

Redlines:
Each 236-bit GPS ISM Packet (see Figure 30-19) shall be applicable to a specific subset of SVs identified in the GPS PRN Inclusion Mask for the given Service Level, start time, and constellation identified by GNSS ID, which is = 0100.
Object Type: Requirement

IS:
Each 236-bit GPS ISM Packet (see Figure 30-19) shall be applicable to a specific subset of SVs identified in the GPS PRN Inclusion Mask for the given Service Level, start time, and constellation identified by GNSS ID, which is = 0100.
Object Type: Requirement

Rationale:
5/13/2025 From PICWG, reworded slightly into one sentence, by removing the 2nd sentence and add a clause to GNSS ID that its value is 0100. This resulted in everyone's concurrence (T. Anthony)
3/27/2025 CRM #91, #123, #133 In keeping with the conventions of IS-GPS-200, this is a Requirement. A "shall" is added (T. Anthony)
3/17/2025 CRM #92 Added a space betweem "Packet" and "(" to fix a typo (T. Anthony)
3/27/2025 CRM #99 Enhanced the subject of the last sentence to make the paragraph easier to understand (T. Anthony)
10/25/2024: Per Govt AWG, ISD Subpackets were removed from ISM Message terminology. (T. Anthony)
10/25/2024 CRM #55 While discussing the bit numbers took in comment to change the field name to GPS PRN Inclusion Mask. (T. Anthony)
10/9/2024 This is part of the refactoring of the ISM sections as agreed on 10/4/2024. (T. Anthony)

IS200-1767:

Section Number:
30.3.3.10.1.2.2.0-2

WAS:
The bit lengths, scale factors, ranges, and units of these parameters are given in Table 30-XIa.
Object Type: <blank>

Redlines:
The bit lengths, scale factors, ranges, and units of ~~these~~this packet's parameters are given in Table 30-XIa.
Object Type: ~~<blank>~~Info-Only

IS:
The bit lengths, scale factors, ranges, and units of this packet's parameters are given in Table 30-XIa.
Object Type: Info-Only

Rationale:
11/8/2024: At AWG finalized the naming of the owning object to GPS ISM packet, which further changed the wording for the owning object in this sentence. Also, moved this paragraph in the document to under GPS ISM Packet. (T. Anthony)
10/8/2024 CRM #14, #40, #63 Deleted because the data in this paragraph flowed better in IS200-1764. This was eventually reversed at AWG (T. Anthony)8/21/2024: At TIM, decided to repackage the ISM Parameters into the ISM Packet which caused this paragraph to explain the ISM Parameters in a different way and refer to a new graphic for the ISM Packet (T. Anthony)

IS200-2398:
Insertion after object IS200-2397

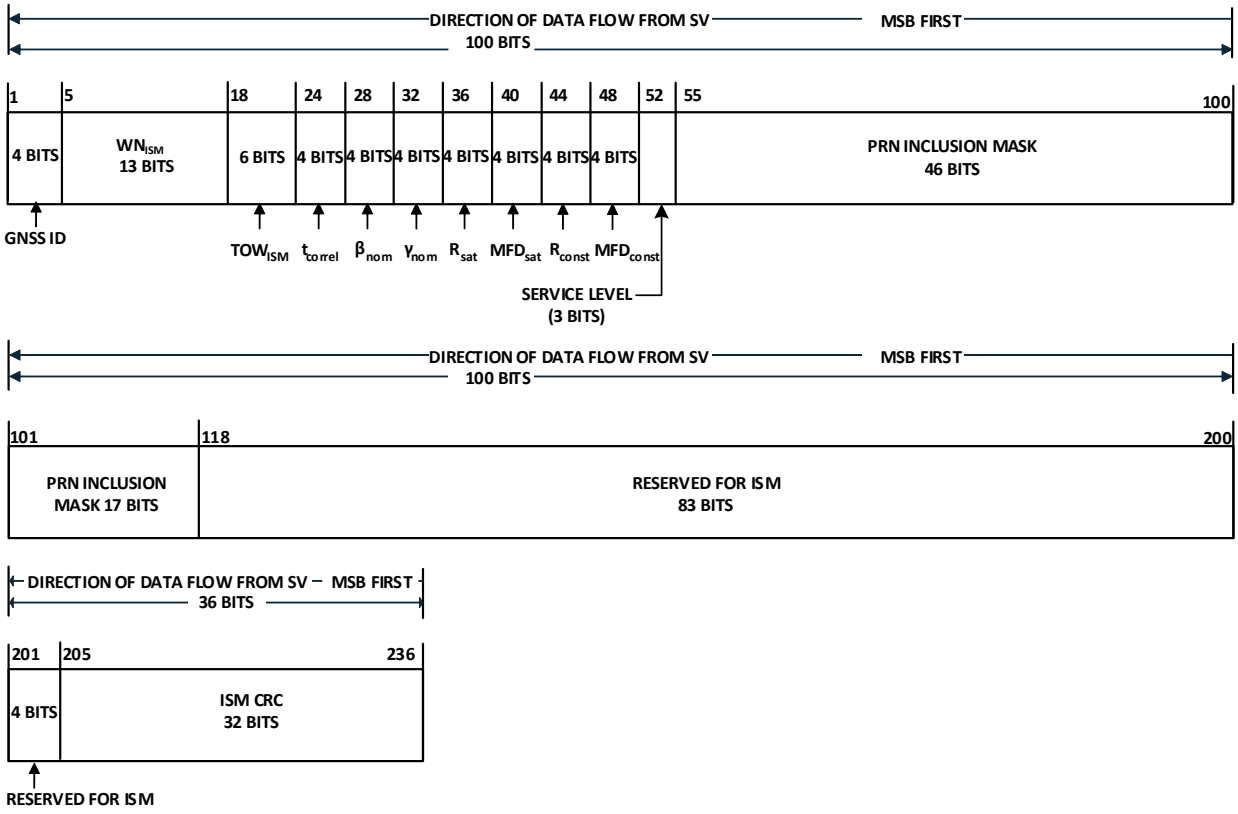
Section Number:
30.3.3.10.1.2.2.0-3

WAS:
<INSERTED OBJECT>

Redlines:
Object Type: Figure

(see IS: below)

IS:



Object Type: Figure

Rationale:
3/10/2025: CRM #153, #154, #155, #156 Redrawing the label for "SERVICE LEVEL (3 BITS)" to reduce the possibility of confusing this as "SERVICE LEVEL - 3" (T. Anthony)
10/25/2024: Per Govt AWG, Subpackets were resized to include GNSS ID. (T. Anthony)
the refactoring of the ISM sections as agreed on 10/4/2024 (T. Anthony)

IS200-2399:
Insertion after object IS200-2398

Section Number:
30.3.3.10.1.2.2.0-4

WAS:
<INSERTED OBJECT>

Redlines:
Figure 30-19 GPS ISM Packet
Object Type: Figure Caption

IS:
Figure 30-19 GPS ISM Packet
Object Type: Figure Caption

Rationale:
10/25/2024: Per Govt AWG, ISD Subpackets were removed from ISM Message terminology. (T. Anthony)
10/9/2024 This is part of the refactoring of the ISM sections as agreed on 10/4/2024 (T. Anthony)

IS200-1772:

Section Number:
30.3.3.10.1.2.2.0-5

WAS:
Table 30-XIa. ISM Parameters

Redlines:
Table 30-XIa~~.~~ – GPS ISM Packet Parameters

IS:
Table 30-XIa – GPS ISM Packet Parameters

Rationale:
10/25/2024 Per the Govt AWG, Subpacket terminology has been replaced. Also moved later to the GPS ISM Packet section. (T. Anyhony)
10/9/2024 This is part of the refactoring of the ISM sections as agreed on 10/4/2024 (T. Anthony)
8/21/2024: At TIM, decided to repackage the ISM Parameters into the ISM Packet which caused this Table title to be changed to include the word "Packet" (T. Anthony)

IS200-1770:

Section Number:
30.3.3.10.1.2.2.0-5.0-1

WAS:

Parameter	No. of Bits**	Scale Factor (LSB)	Valid Range***	Units
GNSS ID	4			
WN_{ISM}	13	1		weeks
TOW_{ISM}	6	4	0 to 164	hours
t_{correl}	4		0 to 12	hours
b_{nom}	4		0 to 2	meters
γ_{nom}	4		0 to 2	
R_{sat}	4		$1x10^{-3}$ to $3.16x10^{-10}$	/hours
P_{const}	4		$1x10^{-3}$ to $3.16\ x10^{-10}$	
MFD	4		0.25 to 24	hours
Service Level*	3			
Mask****	63			

* See Table 30-XIb for Service Level Descriptions

** See Figure 30-14a for complete bit allocation in Message Type 40

*** Unless otherwise indicated in this column, valid range is the maximum range attainable with indicated bit allocation and scale factor

**** See Table 30-XIb for Mask bit mapping

Redlines:

Parameter	No. of Bits**	Scale Factor (LSB)	Valid Range***	Units
WN_{ISM}	13	1		weeks
TOW_{ISM}	6	4	0 to 164	hours
t_{correl}	4		0 to 12 See text	hours
bβ$_{nom}$	4	0.1	0 to 2	meters
γ_{nom}	4	0.05	0 to 2	dimensionless
R_{sat}	4		$1x10^{-3}$ to $3.16x10^{-10}$ See text	/hours
MFD_{sat}	4		See text	
PR_{const}	4		See text	
MFD_{const}	4		0.25 to 24 See text	hours
Service Level***	3		See text	
GPS PRN Inclusion Mask ****	63		See text	
Reserved For ISM	87		See text	
ISM CRC	32		See text	

* See Figure 30-19 14a for complete bit allocations in the GPS ISM Packet Message Type 40

** Unless otherwise indicated in this column, valid range is the maximum range attainable with indicated bit allocation and scale factor

*** See Table 30-XIb for Service Level Descriptions

**** See Table 30-XIbc for GPS PRN Inclusion Mask bit mapping

IS:

Parameter	No. of Bits*	Scale Factor (LSB)	Valid Range**	Units
WN_{ISM}	13	1		weeks
TOW_{ISM}	6	4	0 to 164	hours
t_{correl}	4	See text		
β_{nom}	4	0.1		meters
γ_{nom}	4	0.05		dimensionless
R_{sat}	4	See text		
MFD_{sat}	4	See text		
R_{const}	4	See text		
MFD_{const}	4	See text		
Service Level***	3	See text		
GPS PRN Inclusion Mask ****	63	See text		
Reserved For ISM	87	See text		
ISM CRC	32	See text		

* See Figure 30-19 for complete bit allocations in the GPS ISM Packet

** Unless otherwise indicated in this column, valid range is the maximum range attainable with indicated bit allocation and scale factor

*** See Table 30-XIb for Service Level Descriptions

**** See Table 30-XIc for GPS PRN Inclusion Mask bit mapping

Rationale:

3/19/2025 CRM #106, #130 "Figures" in single "*" note changed to singular (T. Anthony)
10/25/2024 Per the Govt AWG, this table has been repurposed to only show GPS ISM Packet parameters (T. Anthony)
10/25/2024 Per the Govt AWG, subpacket terminology has been removed (T. Anthony)
10/25/2024 CRM #66 Will remove “unsigned” from the Valid Range (T. Anthony)
10/7/2024 CRM #66 WNISM betanom and gammanom are all full range unsigned numbers and designated as "unsigned" since this table has no indicator differentiating signed and unsigned numbers (T. Anthony)
10/7/2024 This table now shows fields in both the ISM Packet and GPS ISD Subpacket per agreement with the FAA SME and other SMEs (T. Anthony)
8/21/2024: At TIM, decided to repackage the ISM Parameters into the ISM Packet which changed most bits and added the last two parameters to this table (T. Anthony)
As part of the Pconst to Rconst Conversion, the table needs adjustment of “Pxxx” to “Rxxx” and “MFDxxx” (T. Anthony)
4/26/2022 Included "PRN Inclusion" into the **** comment so normalize terminology across the table. (T. Anthony)
5/18/2022 Restored the 2nd note to "Unless otherwise indicated in this column, valid range is the maximum range attainable with indicated bit allocation and scale factor" because the replacement note alluded to the existence of RSAM, which we decided to not document in public documents during RFC-444 (T. Anthony)
10/10/2022 Redesignated bnom as βnom. (T. Anthony)

IS200-1779:

Section Number:
30.3.3.10.1.2.2.1.0-1

WAS:
Bits 43 through 55 of Message Type 40 shall provide the ISM Week Number (WN_{ISM}) applicable to the start of the time of validity for a given ISM data issue.
Object Type: <blank>

Redlines:
Bits ~~43~~5 through ~~55~~17 of ~~Message~~the ~~Type~~GPS ~~40~~ISM Packet shall provide the ISM Week Number (WNISM) applicable to the start of the time of validity for a given ISM ~~data~~Packet ~~issue~~(see paragraph 6.2.4).
Object Type: ~~<blank>~~Requirement

IS:
Bits 5 through 17 of the GPS ISM Packet shall provide the ISM Week Number (WN_{ISM}) applicable to the start of the time of validity for a given ISM Packet (see paragraph 6.2.4).
Object Type: Requirement

Rationale:
10/25/2024 Per Govt AWG, ISD Subpackets were removed from ISM Message terminology. (T. Anthony)
10/25/2024 CRM #59 adding reference to the general week number definition. (T. Anthony)
8/21/2024 At TIM, decided to repackage the ISM Parameters into the ISM Packet which changed most bits and replaced many occurrences of MT-40 with ISM Packet (T. Anthony)

IS200-1780:

Section Number:
30.3.3.10.1.2.2.1.0-2

WAS:
This parameter describes the time stamp, in terms of weeks, for the ISM parameters.
Object Type: <blank>

Redlines:
This parameter describes the time stamp, in terms of weeks, for the ~~ISM~~ISD parameters.
Object Type: ~~<blank>~~Info-Only

IS:
This parameter describes the time stamp, in terms of weeks, for the ISD parameters.
Object Type: Info-Only

Rationale:
10/15/2024 Set the Object Type for all ISM related paragraphs with blank Object Type. Also, change occurrences of ISM parameters to ISD parameters (T. Anthony)

IS200-1782:

Section Number:
30.3.3.10.1.2.2.2.0-1

WAS:
Bits 56 through 61 of Message Type 40 shall provide the ISM Time of Week (TOW_{ISM}) applicable to the start of the time of validity for a given ISM data issue.
Object Type: <blank>

Redlines:
Bits ~~56~~18 through ~~61~~23 of ~~Message~~the ~~Type~~GPS ~~40~~ISM Packet shall provide the ISM Time of Week (TOWISM) applicable to the start of the time of validity for a given ISM~~ data issue~~Packet.
Object Type: ~~<blank>~~Requirement

IS:
Bits 18 through 23 of the GPS ISM Packet shall provide the ISM Time of Week (TOW_{ISM}) applicable to the start of the time of validity for a given ISM Packet.
Object Type: Requirement

Rationale:
10/25/2024 Per Govt AWG, ISD Subpackets were removed from ISM Message terminology. (T. Anthony)
8/21/2024 At TIM, decided to repackage the ISM Parameters into the ISM Packet which changed most bits and replaced many occurrences of MT-40 with ISM Packet (T. Anthony)

IS200-1783:

Section Number:
30.3.3.10.1.2.2.2.0-2

WAS:
This parameter describes the time stamp, in terms of hours, for the ISM parameters.
Object Type: <blank>

Redlines:
This parameter describes the time stamp, in terms of hours, for the ~~ISM~~ISD parameters.
Object Type: ~~<blank>~~Info-Only

IS:
This parameter describes the time stamp, in terms of hours, for the ISD parameters.
Object Type: Info-Only

Rationale:
10/15/2024 Set the Object Type for all ISM related paragraphs with blank Object Type. Also, change occurrences of ISM parameters to ISD parameters (T. Anthony)

IS200-1990:

Section Number:
30.3.3.10.1.2.2.2.0-3

WAS:
Users should use the ISM parameters with the most recent WN_{ISM} and TOW_{ISM} time stamp. All time stamps should be in the past.
Object Type: <blank>

Redlines:
Users should use the ISM parameters with the most recent WNISM and TOWISM time stamp. All time stamps ~~should~~shall be in the past.
Object Type: ~~<blank>~~Requirement

IS:
Users should use the ISM parameters with the most recent WN_{ISM} and TOW_{ISM} time stamp. All time stamps shall be in the past.
Object Type: Requirement

Rationale:
4/23/2025 CRM #149 Promoted this statement to a requirement, changed to "shall". This requirement will not be allocated to a segment at this time (T. Anthony)
10/9/2024 The refactored section 30.3.3.10 needs all Object Types to be non-blank. (T. Anthony)

IS200-1791:

Section Number:
30.3.3.10.1.2.2.3.0-1

WAS:
Bits 62 through 65 of Message Type 40 shall provide the assumed Correlation Time Constant (t_{correl}) value for the ARAIM at the current time for the associated GNSS constellation.
Object Type: <blank>

Redlines:
Bits ~~62~~24 through ~~65~~27 of ~~Message~~the ~~Type~~GPS ~~40~~ISM Packet shall provide the ~~assumed~~ Correlation Time Constant (tcorrel) value the ~~ARAIM~~errors ~~at~~characterized ~~the~~by ~~current~~the ~~time~~URA for use consistent with the other parameters in the associated ~~GNSS~~ISM ~~constellation~~packet.
Object Type: ~~<blank>~~Requirement

IS:
Bits 24 through 27 of the GPS ISM Packet shall provide the Correlation Time Constant (t_{correl}) value for the errors characterized by the URA for use consistent with the other parameters in the associated ISM packet.
Object Type: Requirement
Rationale:
CRM #150 5/14/2025 Added some clauses to clarify the wording (T. Anthony)
10/25/2024: Per Govt AWG, ISD Subpackets were removed from ISM Message terminology. (T. Anthony)
CRM #23 10/2/2024 Consistent applicability language has been implemented across the ISM parameter descriptions by one statement in 30.3.3.10.1.1.2 (T. Anthony)
CRM #42 10/2/2024 Drop the noise word "assumed" (T. Anthony)
9/3/2024 Finally changed the bit numbers and changed the enclosing object to ISM Packet. Also, made this a Requirement (T. Anthony)

IS200-1792:

Section Number:
30.3.3.10.1.2.2.3.0-2

WAS:
The four bits are defined as follows:
0000 = 0.25 hours
0001 = 0.33 hours
0010 = 0.50 hours
0011 = 0.67 hours
0100 = 0.83 hours
0101 = 1.00 hour
0110 = 1.17 hours
0111 = 1.33 hours
1000 = 1.50 hours
1001 = 2.10 hours
1010 = 3.00 hours
1011 = 4.20 hours
1100 = 6.00 hours
1101 = 8.50 hours
1110 = 12.00 hours
1111 = RESERVED
Object Type: <blank>

Redlines:
The four bits are defined as follows:
0000 = 0.25 hours
0001 = 0.33 hours
0010 = 0.50 hours
0011 = 0.67 hours
0100 = 0.83 hours
0101 = 1.00 hour
0110 = 1.17 hours
0111 = 1.33 hours
1000 = 1.50 hours
1001 = 2.10 hours
1010 = 3.00 hours
1011 = 4.20 hours
1100 = 6.00 hours
1101 = 8.50 hours
1110 = 12.00 hours
1111 = ~~RESERVED~~Reserved
Object Type: ~~<blank>~~Info-Only

IS:
The four bits are defined as follows:
0000 = 0.25 hours
0001 = 0.33 hours
0010 = 0.50 hours
0011 = 0.67 hours
0100 = 0.83 hours
0101 = 1.00 hour
0110 = 1.17 hours
0111 = 1.33 hours
1000 = 1.50 hours
1001 = 2.10 hours
1010 = 3.00 hours
1011 = 4.20 hours
1100 = 6.00 hours
1101 = 8.50 hours
1110 = 12.00 hours
1111 = Reserved
Object Type: Info-Only

Rationale:
10/15/2024 Set the Object Type for all ISM related paragraphs with blank Object Type. (T. Anthony)
10/08/2024 CRM #69 Change RESERVED to mixed case (T. Anthony)

IS200-1802:

Section Number:
30.3.3.10.1.2.2.4

WAS:
Object Heading 30.3.3.10.1.2.2.4 Additive Term for Nominal Pseudorange Error Bias

Redlines:
Object Heading 30.3.3.10.1.2.2.4 IAURA-Independent Additive Term for Nominal Pseudorange Error Bias

IS:
Object Heading 30.3.3.10.1.2.2.4 IAURA-Independent Additive Term for Nominal Pseudorange Error Bias

Rationale:
10/10/2022 Clarifies how what is now called βnom and γnom is related to bnom. (T. Anthony)

IS200-1803:

Section Number:
30.3.3.10.1.2.2.4.0-1

WAS:
Bits 66 through 69 of Message Type 40 shall provide the assumed Additive Term (b_{nom}) value for ARAIM at the current time for the associated GNSS constellation.
Object Type: <blank>

Redlines:
Bits ~~66~~28 through ~~69~~31 of ~~Message~~the ~~Type~~GPS ~~40~~ISM Packet shall provide the ~~assumed~~IAURA-Independent Additive Term (~~bnom~~β_{nom}) value for ~~ARAIM~~use ~~at~~consistent with the ~~current~~other ~~time~~parameters ~~for~~in the ~~associated~~ISM ~~GNSS~~packet. ~~constellation~~The βnom bounds additive biases in the instantaneous URE that do not scale with IAURA, which is defined in section 30.3.3.1.1.
Object Type: ~~<blank>~~Requirement

IS:
Bits 28 through 31 of the GPS ISM Packet shall provide the IAURA-Independent Additive Term (β_{nom}) value for use consistent with the other parameters in the ISM packet. The β_{nom} bounds additive biases in the instantaneous URE that do not scale with IAURA, which is defined in section 30.3.3.1.1.
Object Type: Requirement

Rationale:
10/25/2024: Per Govt AWG, ISD Subpackets were removed from ISM Message terminology. (T. Anthony)
CRM #23 10/2/2024 Consistent applicability language has been implemented across the ISM parameter descriptions by one statement in 30.3.3.10.1.1.2 (T. Anthony)
CRM #43 10/2/2024 Drop the noise word "assumed" (T. Anthony)
8/21/2024: At TIM, decided to repackage the ISM Parameters into the ISM Packet which changed most bits and replaced many occurrences of MT-40 with ISM Packet (T. Anthony)
10/10/2022 Clarifies how what is now called βnom and γnom is related to bnom. (T. Anthony)
10/10/2022 Redesignated bnom as βnom. (T. Anthony)

IS200-1804:

Section Number:
30.3.3.10.1.2.2.4.0-2

WAS:
The four bits are defined as follows:
0000 = 0.00 meters
0001 = 0.13 meters
0010 = 0.25 meters
0011 = 0.38 meters
0100 = 0.50 meters
0101 = 0.63 meters
0110 = 0.75 meters
0111 = 0.88 meters
1000 = 1.00 meter
1001 = 1.13 meters
1010 = 1.25 meters
1011 = 1.38 meters
1100 = 1.50 meters
1101 = 1.63 meters
1110 = 1.75 meters
1111 = 2.00 meters

Redlines:
~~The four bits are defined as follows:~~
~~0000 = 0.00 meters~~
~~0001 = 0.13 meters~~
~~0010 = 0.25 meters~~
~~0011 = 0.38 meters~~
~~0100 = 0.50 meters~~
~~0101 = 0.63 meters~~
~~0110 = 0.75 meters~~
~~0111 = 0.88 meters~~
~~1000 = 1.00 meter~~
~~1001 = 1.13 meters~~
~~1010 = 1.25 meters~~
~~1011 = 1.38 meters~~
~~1100 = 1.50 meters~~
~~1101 = 1.63 meters~~
~~1110 = 1.75 meters~~
~~1111 = 2.00 meters~~

IS:
<DELETED OBJECT>

Rationale:
8/21/2024: At TIM, decided this parameter was linear and no longer needed a list of values (T. Anthony)

IS200-1806:

Section Number:
30.3.3.10.1.2.2.5.0-1

WAS:
Bits 70 through 73 of Message Type 40 shall provide the assumed Scalar Term (γ_{nom})value for ARAIM at the current time for the associated GNSS constellation.
Object Type: <blank>

Redlines:
Bits ~~70~~32 through ~~73~~35 of ~~Message~~the ~~Type~~GPS ~~40~~ISM Packet shall provide the ~~assumed~~ Scalar Term (~~γ_{nom}~~γ_{nom}) value for ~~ARAIM~~use ~~at~~consistent with the ~~current~~other ~~time~~parameters ~~for~~in the ~~associated~~ISM ~~GNSS~~packet. ~~constellation~~The γ_{nom} bounds normalized additive biases in the instantaneous URE that scale with IAURA, which is defined in section 30.3.3.1.1.
Object Type: ~~<blank>~~Requirement

IS:
Bits 32 through 35 of the GPS ISM Packet shall provide the Scalar Term (γ_{nom}) value for use consistent with the other parameters in the ISM packet. The γ_{nom} bounds normalized additive biases in the instantaneous URE that scale with IAURA, which is defined in section 30.3.3.1.1.
Object Type: Requirement

Rationale:
10/25/2024: Per Govt AWG, ISD Subpackets were removed from ISM Message terminology. (T. Anthony)
10/9/2024 CRM #71 Scalar Term doesn't have to be used twice inside this paragraph. (T. Anthony)
CRM #23 10/2/2024 Consistent applicability language has been implemented across the ISM parameter descriptions by one statement in 30.3.3.10.1.1.2 (T. Anthony)
CRM #44 10/2/2024 Drop the noise word "assumed" (T. Anthony)
8/21/2024: At TIM, decided to repackage the ISM Parameters into the ISM Packet which changed most bits and replaced many occurrences of MT-40 with ISM Packet (T. Anthony)
10/10/2022 Clarifies how what is now called βnom and γnom is related to bnom. (T. Anthony)

IS200-1807:

Section Number:
30.3.3.10.1.2.2.5.0-2

WAS:
The four bits are defined as follows:
0000 = 0.00
0001 = 0.13
0010 = 0.25
0011 = 0.38
0100 = 0.50
0101 = 0.63
0110 = 0.75
0111 = 0.88
1000 = 1.00
1001 = 1.13
1010 = 1.25
1011 = 1.38
1100 = 1.50
1101 = 1.63
1110 = 1.75
1111 = 2.00

Redlines:
~~The four bits are defined as follows:~~
~~0000 = 0.00~~
~~0001 = 0.13~~
~~0010 = 0.25~~
~~0011 = 0.38~~
~~0100 = 0.50~~
~~0101 = 0.63~~
~~0110 = 0.75~~
~~0111 = 0.88~~
~~1000 = 1.00~~
~~1001 = 1.13~~
~~1010 = 1.25~~
~~1011 = 1.38~~
~~1100 = 1.50~~
~~1101 = 1.63~~
~~1110 = 1.75~~
~~1111 = 2.00~~

IS:
<DELETED OBJECT>

Rationale:
8/21/2024 Since this field is linear, a list of values is no longer needed (T. Anthony)

IS200-1797:

Section Number:
30.3.3.10.1.2.2.6.0-1

WAS:
Bits 74 through 77 of Message Type 40 shall provide the assumed Satellite Fault Rate (R_{sat}) value for ARAIM at the current time for the associated GNSS constellation.
Object Type: <blank>

Redlines:
Bits ~~74~~36 through ~~77~~39 of ~~Message~~the ~~Type~~GPS ~~40~~ISM Packet shall provide the ~~assumed~~ Satellite Fault Rate (Rsat) value for ~~ARAIM~~use ~~at~~consistent with the ~~current~~other ~~time~~parameters ~~for~~in the ~~associated~~ISM ~~GNSS~~packet. ~~constellation~~
Rsat is the onset rate at which the instantaneous URE of any given satellite exceeds ±4.42 times the IAURA.
Object Type: ~~<blank>~~Requirement

IS:
Bits 36 through 39 of the GPS ISM Packet shall provide the Satellite Fault Rate (R_{sat}) value for use consistent with the other parameters in the ISM packet.
R_{sat} is the onset rate at which the instantaneous URE of any given satellite exceeds ±4.42 times the IAURA.
Object Type: Requirement

Rationale:
4/22/2025 CRM #138 Added ± to match how the SPS PS defines this parameter. (T. Anthony)
10/25/2024: Per Govt AWG, ISD Subpackets were removed from ISM Message terminology. (T. Anthony)
10/9/2024 CRM #72 Add back in the Rsat definition that was added with RFC-495. (T. Anthony)
CRM #23 10/2/2024 Consistent applicability language has been implemented across the ISM parameter descriptions by one statement in 30.3.3.10.1.1.2 (T. Anthony)
CRM #45 10/2/2024 Drop the noise word "assumed" (T. Anthony)
9/6/2024 At TIM, decided to repackage the ISM Parameters into the ISM Packet which changed most bits and replaced many occurrences of MT-40 with ISM Packet (T. Anthony)

IS200-1798:

Section Number:
30.3.3.10.1.2.2.6.0-2

WAS:
The four bits are defined as follows:
0000 = 3.16 x 10^{-3} /hours
0001 = 1 x 10^{-3} /hours
0010 = 3.16 x 10^{-4} /hours
0011 = 1 x 10^{-4} /hours
0100 = 3.16 x 10^{-5} /hours
0101 = 1 x 10^{-5} /hours
0110 = 3.16 x 10^{-6} /hours
0111 = 1 x 10^{-6} /hours
1000 = 3.16 x 10^{-7} /hours
1001 = 1 x 10^{-7} /hours
1010 = 3.16 x 10^{-8} /hours
1011 = 1 x 10^{-8} /hours
1100 = 3.16 x 10^{-9} /hours
1101 = 1 x 10^{-9} /hours
1110 = 3.16 x 10^{-10} /hours
1111 = RESERVED

Object Type: <blank>

Redlines:
The four bits are defined as follows:
0000 = ~~3~~1.~~16 x 10~~00E-~~3~~8 /~~hours~~hour
0001 =~~ 1 x 10 -~~3.16E-8 /~~hours~~hour
0010 = ~~3~~1.~~16 x 10~~00E-~~4~~7 /~~hours~~hour
0011 =~~ 1 x 10~~3.16E-~~4~~7 /~~hours~~hour
0100 = ~~3~~1.~~16 x 10~~00E-~~5~~6 /~~hours~~hour
0101 =~~ 1 x 10~~3.16E-~~5~~6 /~~hours~~hour
0110 = ~~3~~1.~~16 x 10~~00E-~~6~~5 /~~hours~~hour
0111 =~~ 1 x 10~~3.16E-~~6~~5 /~~hours~~hour *
1000 = ~~3~~1.~~16 x 10~~00E-~~7~~4 /~~hours~~hour *
1001 =~~ 1 x 10 -7 /hours~~Reserved
1010 =~~ 3.16 x 10 -8 /hours~~Reserved
1011 =~~ 1 x 10 -8 /hours~~Reserved
1100 = ~~3.16~~Reserved
1101 ~~x~~= ~~10 -9~~Reserved
1110 ~~/hours~~= Reserved
~~1101~~1111 = ~~1~~Reserved

* ~~x~~Values ~~10 -9~~inconsistent ~~/hours~~
~~1110~~with =GPS ~~3.16~~performance ~~x~~commitments ~~10 -10~~are ~~/hours~~
~~1111~~included =to ~~RESERVED~~
support Service Level 4 operations
Object Type: ~~<blank>~~Info-Only

IS:
The four bits are defined as follows:
0000 = 1.00E-8 /hour
0001 = 3.16E-8 /hour
0010 = 1.00E-7 /hour
0011 = 3.16E-7 /hour
0100 = 1.00E-6 /hour
0101 = 3.16E-6 /hour
0110 = 1.00E-5 /hour
0111 = 3.16E-5 /hour *
1000 = 1.00E-4 /hour *
1001 = Reserved
1010 = Reserved
1011 = Reserved
1100 = Reserved
1101 = Reserved
1110 = Reserved
1111 = Reserved

* Values inconsistent with GPS performance commitments are included to support Service Level 4 operations
Object Type: Info-Only

Rationale:
3/27/2025 CRM #104 Change all powers of 10 to using "E" notation for paragraphs aleady being changed. (T. Anthony)
10/08/2024 CRM #73 Change RESERVED to mixed case (T. Anthony)
At the 2023 PICWG Special Topic, it was decided to support values beyond GPS performance commitments (T. Anthony)
2/27/2023: It was decided at TIM #1 that the very smallest values we would ever see would be compatible with 1 x 10-8 instead of 1 x 10-7 .
At TIM #1 it was decided the values would be better ordered with the smallest at the top instead of reversed and in the middle of the lexicon. (T. Anthony)

IS200-2126:
Insertion after object IS200-1796

Section Number:
30.3.3.10.1.2.2.7

WAS:
<INSERTED OBJECT>

Redlines:
Object Heading 30.3.3.10.1.2.2.7 Mean Duration of a Satellite Fault
Object Type: Header

IS:
Object Heading 30.3.3.10.1.2.2.7 Mean Duration of a Satellite Fault
Object Type: Header

Rationale:
As part of the Pconst to Rconst Conversion, the message format has added MFDsat. (T. Anthony)
4/26/2022 Expanded MFD to mean duration of a xxx fault. (T. Anthony)

IS200-2127:
Insertion below object IS200-2126

Section Number:
30.3.3.10.1.2.2.7.0-1

WAS:
<INSERTED OBJECT>

Redlines:
Bits 40 through 43 of the GPS ISM Packet shall provide the mean duration of a satellite fault (MFDsat) value for use consistent with the other parameters in the ISM packet.

MFD_{sat} is the mean duration the instantaneous URE of any given satellite exceeds ±4.42 times the IAURA without a timely notification issued to the user.
Object Type: Requirement

IS:
Bits 40 through 43 of the GPS ISM Packet shall provide the mean duration of a satellite fault (MFD_{sat}) value for use consistent with the other parameters in the ISM packet.

MFD_{sat} is the mean duration the instantaneous URE of any given satellite exceeds ±4.42 times the IAURA without a timely notification issued to the user.
Object Type: Requirement

Rationale:
4/22/2025 CRM #138 Added ± to match how the SPS PS defines this parameter. (T. Anthony)
10/25/2024 Per Govt AWG, ISD Subpackets were removed from ISM Message terminology. (T. Anthony)
CRM #23 10/2/2024 Consistent applicability language has been implemented across the ISM parameter descriptions by one statement in 30.3.3.10.1.1.2 (T. Anthony)
CRM #46 10/2/2024 Drop the noise word "assumed" (T. Anthony)
9/3/2024 Finally changed the bits and the enclosing object to "ISM Packet". (T. Anthony)
As part of the Pconst to Rconst Conversion, the message format MFDsat has been added. (T. Anthony)
04/26/2022 Expanded MFD to mean duration of a xxx fault. (T. Anthony)
10/10/2022 Reworded to indicate the particular GNSS constellation is identified by the GNSS ID. (T. Anthony)
10/10/2022 Added definition for MFDsat to help clarify the definition of the parameter as similar parameter clarifications had been requested. (T. Anthony)
10/31/2022 Post P-ICWG: removed the parenthetical expression about enhanced level of integrity assurance. (T. Anthony)
11/14/2022 Post P-ICWG changed MFD definition to "mean duration" instead of "mean time" to be more precise (T. Anthony)

IS200-2128:
Insertion after object IS200-2127

Section Number:
30.3.3.10.1.2.2.7.0-2

WAS:
<INSERTED OBJECT>

Redlines:
The four bits are defined as follows:
0000 = 0.25 hour
0001 = 0.5 hour
0010 = 1.0 hour
0011 = 2.0 hours *
0100 = 4.0 hours *
0101 = 6.0 hours *
0110 = 8.0 hours *
0111 = Reserved
1000 = Reserved
1001 = Reserved
1010 = Reserved
1011 = Reserved
1100 = Reserved
1101 = Reserved
1110 = Reserved
1111 = Reserved

* Values inconsistent with GPS performance commitments are included to support Service Level 4 operations.
Object Type: Info-Only

IS:
The four bits are defined as follows:
0000 = 0.25 hour
0001 = 0.5 hour
0010 = 1.0 hour
0011 = 2.0 hours *
0100 = 4.0 hours *
0101 = 6.0 hours *
0110 = 8.0 hours *
0111 = Reserved
1000 = Reserved
1001 = Reserved
1010 = Reserved
1011 = Reserved
1100 = Reserved
1101 = Reserved
1110 = Reserved
1111 = Reserved

* Values inconsistent with GPS performance commitments are included to support Service Level 4 operations.
Object Type: Info-Only

Rationale:
3/31/2025 CRM #143 Drop the oldest Rationale entries that have been specifically superseded in order to reduce reader confusion (T. Anthony)
10/08/2024 CRM #75 Change RESERVED to mixed case (T. Anthony)
At the 2023 PICWG Special Topic, it was confirmed this list of values would double until 2 hour intervals were reached (T. Anthony)
As part of the Pconst to Rconst Conversion, the message format has been modified to accommodate MFDsat. (T. Anthony)
This lexicon is influenced by three factors
1. A contingency upload will rarely be shorter than 15 minutes, and
2. Six hours is the maximum fault length permitted by the performance standards, which is reasonably well represented by 5.7 hours

---

IS200-1787:

Section Number:
30.3.3.10.1.2.2.8

WAS:
Object Heading 30.3.3.10.1.2.2.8 Constellation Fault Probability

Redlines:
Object Heading 30.3.3.10.1.2.2.8 Constellation Fault ~~Probability~~Rate

IS:
Object Heading 30.3.3.10.1.2.2.8 Constellation Fault Rate

Rationale:
As part of the Pconst to Rconst Conversion, the message probabilities have changed to rates. (T. Anthony)

IS200-1788:

Section Number:
30.3.3.10.1.2.2.8.0-1

WAS:
Bits 78 through 81 of Message Type 40 shall provide the assumed Constellation Fault Probability (P_{const}) value for ARAIM at the current time for the associated GNSS constellation.
Object Type: <blank>

Redlines:
Bits ~~78~~44 through ~~81~~47 of ~~Message~~the ~~Type~~GPS ~~40~~ISM Packet shall provide the ~~assumed~~ ~~Constellation~~constellation ~~Fault~~fault ~~Probability~~rate (~~Pconst~~Rconst) value for ~~ARAIM~~use ~~at~~consistent with the ~~current~~other ~~time~~parameters ~~for~~in the ~~associated~~ISM ~~GNSS~~packet.

R_{const} is ~~constellation~~the onset rate at which the instantaneous URE of two or more satellites exceed, due to a common cause, ±4.42 times the IAURA.
Object Type: ~~<blank>~~Requirement

IS:
Bits 44 through 47 of the GPS ISM Packet shall provide the constellation fault rate (R_{const}) value for use consistent with the other parameters in the ISM packet.

R_{const} is the onset rate at which the instantaneous URE of two or more satellites exceed, due to a common cause, ±4.42 times the IAURA.
Object Type: Requirement

Rationale:
4/22/2025 CRM #138 Added ± to match how the SPS PS defines this parameter. (T. Anthony)
10/25/2024: Per Govt AWG, ISD Subpackets were removed from ISM Message terminology. (T. Anthony)
CRM #24 10/2/2024 Consistent applicability language has been implemented across the ISM parameter descriptions by one statement in 30.3.3.10.1.1.2 (T. Anthony)
CRM #47 10/2/2024 Drop the noise word "assumed" (T. Anthony)
9/5/2024 Had forgotten to adjust the bits and change the enclosing object to ISM Packet. (T. Anthony)
As part of Pconst to Rconst Conversion, the message format has changed and probabilities have changed to rates. (T. Anthony)
10/10/2022 Added definition for Rconst to help clarify the definition of the parameter as requested. (T. Anthony)
10/31/2022 Post P-ICWG: removed the parenthetical expression about enhanced level of integrity assurance. (T. Anthony)

IS200-1789:

Section Number:
30.3.3.10.1.2.2.8.0-2

WAS:
The four bits are defined as follows:
0000 = 3.16 x 10^{-3}
0001 = 1 x 10^{-3}
0010 = 3.16 x 10^{-4}
0011 = 1 x 10^{-4}
0100 = 3.16 x 10^{-5}
0101 = 1 x 10^{-5}
0110 = 3.16 x 10^{-6}
0111 = 1 x 10^{-6}
1000 = 3.16 x 10^{-7}
1001 = 1 x 10^{-7}
1010 = 3.16 x 10^{-8}
1011 = 1 x 10^{-8}
1100 = 3.16 x 10^{-9}
1101 = 1 x 10^{-9}
1110 = 3.16 x 10^{-10}
1111 = RESERVED

Object Type: <blank>

Redlines:
The four bits are defined as follows:
0000 = 3.~~16 x 10~~16E-~~3~~10 /hour
0001 = 1~~ x 10~~.00E-~~3~~9 /hour
0010 = 3.~~16 x 10~~16E-~~4~~9 /hour
0011 = 1~~ x 10~~.00E-~~4~~8 /hour
0100 = 3.~~16 x 10~~16E-~~5~~8 /hour *
0101 = 1.00E-7 ~~x~~/hour ~~10-5~~*
0110 = 3.~~16~~16E-7 ~~x~~/hour ~~10-6~~*
0111 = 1~~ x 10~~.00E-6 /hour *
1000 = 3.~~16~~16E-6 ~~x~~/hour ~~10-7~~*
1001 =~~ 1 x 10-7~~Reserved
1010 =~~ 3.16 x 10-8~~Reserved
1011 =~~ 1 x 10-8~~Reserved
1100 =~~ 3.16 x 10-9~~Reserved
1101 =~~ 1 x 10-9~~Reserved
1110 =~~ 3.16 x 10-10~~ Reserved
1111 = ~~RESERVED~~Reserved

* Values inconsistent with GPS performance commitments are included to support Service Level 4 operations.
Object Type: ~~<blank>~~Info-Only

IS:
The four bits are defined as follows:
0000 = 3.16E-10 /hour
0001 = 1.00E-9 /hour
0010 = 3.16E-9 /hour
0011 = 1.00E-8 /hour
0100 = 3.16E-8 /hour *
0101 = 1.00E-7 /hour *
0110 = 3.16E-7 /hour *
0111 = 1.00E-6 /hour *
1000 = 3.16E-6 /hour *
1001 = Reserved
1010 = Reserved
1011 = Reserved
1100 = Reserved
1101 = Reserved
1110 = Reserved
1111 = Reserved

* Values inconsistent with GPS performance commitments are included to support Service Level 4 operations.
Object Type: Info-Only

Rationale:
3/27/2025 CRM #104 Change all powers of 10 to using "E" notation for paragraphs aleady being changed. (T. Anthony)
10/08/2024 CRM #77 Change RESERVED to mixed case (T. Anthony)
04/05/2023 Added "*" for "0100" entry because it is larger than the GPS commitment. (T. Anthony)
In January 2023 the Aerospace and FAA stakeholders agreed the very smallest values we would ever see would be compatible with 3.16 x 10-10 instead of 3.1.6 x 10-11 .
It was decided the values would be better ordered with the smallest at the top instead of reversed and in the middle of the lexicon.

IS200-1799:

Section Number:
30.3.3.10.1.2.2.9

WAS:
Object Heading 30.3.3.10.1.2.2.9 Mean Fault Duration

Redlines:
Object Heading 30.3.3.10.1.2.2.9 Mean ~~Fault~~ Duration of a Constellation Fault

IS:
Object Heading 30.3.3.10.1.2.2.9 Mean Duration of a Constellation Fault

Rationale:
As part of the Pconst to Rconst Conversion, the message format now has an MFD designated for the constellation. (T. Anthony)
4/26/2022 Expanded MFD to mean duration of a xxx fault. (T. Anthony)

IS200-1800:

Section Number:
30.3.3.10.1.2.2.9.0-1

WAS:
Bits 82 through 85 of Message Type 40 shall provide the assumed Mean Fault Duration (MFD) value for ARAIM at the current time for the associated GNSS constellation.
Object Type: <blank>

Redlines:
Bits ~~82~~48 through ~~85~~51 of ~~Message~~the ~~Type~~GPS ~~40~~ISM Packet shall provide the ~~assumed~~mean ~~Mean~~duration ~~Fault~~of ~~Duration~~a constellation fault (~~MFD~~MFDconst) value for ~~ARAIM~~use ~~at~~consistent with the ~~current~~other ~~time~~parameters ~~for~~in the ~~associated~~ISM ~~GNSS~~packet.

MFD_{const} is ~~constellation~~the mean duration the instantaneous URE of two or more satellites exceed, due to a common cause, ±4.42 times the IAURA without a timely notification issued to the user.
Object Type: ~~<blank>~~Requirement

IS:
Bits 48 through 51 of the GPS ISM Packet shall provide the mean duration of a constellation fault (MFD_{const}) value for use consistent with the other parameters in the ISM packet.

MFD_{const} is the mean duration the instantaneous URE of two or more satellites exceed, due to a common cause, ±4.42 times the IAURA without a timely notification issued to the user.
Object Type: Requirement

Rationale:
4/22/2025 CRM #138 Added ± to match how the SPS PS defines this parameter. (T. Anthony)
10/25/2024: Per Govt AWG, ISD Subpackets were removed from ISM Message terminology. (T. Anthony)
CRM #24 10/2/2024 Consistent applicability language has been implemented across the ISM parameter descriptions by one statement in 30.3.3.10.1.1.2 (T. Anthony)
CRM #48 10/2/2024 Drop the noise word "assumed" (T. Anthony)
8/21/2024: At TIM, decided to repackage the ISM Parameters into the ISM Packet which changed most bits and replaced many occurrences of MT-40 with ISM Packet (T. Anthony)
As part of the Pconst to Rconst Conversion, the message format has changed. (T. Anthony)
10/10/2022 Added definition for MFDconst to help clarify the definition of the parameter as requested (T. Anthony)
10/31/2022 Post P-ICWG: removed the parenthetical expression about enhanced level of integrity assurance. (T. Anthony)
11/14/2022 Post P-ICWG changed MFD definition to "mean duration" instead of "mean time" to be more precise (T. Anthony)

IS200-1801:

Section Number:
30.3.3.10.1.2.2.9.0-2

WAS:
The four bits are defined as follows:
0000 = 0.25 hours
0001 = 0.33 hours
0010 = 0.50 hours
0011 = 0.67 hours
0100 = 0.83 hours
0101 = 1 hour
0110 = 1.25 hours
0111 = 1.50 hours
1000 = 1.75 hours
1001 = 2 hours
1010 = 3 hours
1011 = 4 hours
1100 = 7 hours
1101 = 10 hours
1110 = 17 hours
1111 = 24 hours

Object Type: <blank>

Redlines:
The four bits are defined as follows:
0000 = 0.25 ~~hours~~hour
0001 = 0.~~33~~5 ~~hours~~hour
0010 = ~~0~~1.~~50~~0 ~~hours~~hour
0011 = ~~0~~2.~~67~~0 hours *
0100 = ~~0~~4.~~83~~0 hours *
0101 = ~~1~~6.0 ~~hour~~hours *
0110 = ~~1~~8.~~25~~0 hours *
0111 = ~~1.50 hours~~Reserved
1000 = ~~1.75 hours~~Reserved
1001 = ~~2 hours~~Reserved
1010 = ~~3 hours~~Reserved
1011 = ~~4 hours~~Reserved
1100 = ~~7 hours~~Reserved
1101 = ~~10 hours~~Reserved
1110 = ~~17 hours~~ Reserved
1111 = ~~24 hours~~Reserved

* Values inconsistent with GPS performance commitments are included to support Service Level 4 operations.
Object Type: ~~<blank>~~Info-Only

IS:
The four bits are defined as follows:
0000 = 0.25 hour
0001 = 0.5 hour
0010 = 1.0 hour
0011 = 2.0 hours *
0100 = 4.0 hours *
0101 = 6.0 hours *
0110 = 8.0 hours *
0111 = Reserved
1000 = Reserved
1001 = Reserved
1010 = Reserved
1011 = Reserved
1100 = Reserved
1101 = Reserved
1110 = Reserved
1111 = Reserved

* Values inconsistent with GPS performance commitments are included to support Service Level 4 operations.
Object Type: Info-Only

Rationale:
10/08/2024 CRM #79 Change RESERVED to mixed case (T. Anthony)
At the 2023 PICWG Special Topic, it was confirmed this list of values would double until 2 hour intervals were reached (the same as MFDsat) (T. Anthony)

IS200-1785:

Section Number:
30.3.3.10.1.2.2.10.0-1

WAS:
Bits 86 through 88 of Message Type 40 shall provide the Service Level, as described in Table 30-XIb, applicable to a given page of the ISM data issue.
Object Type: <blank>

Redlines:
Bits ~~86~~52 through ~~88~~54 of ~~Message~~the ~~Type~~GPS ~~40~~ISM Packet shall provide the Service Level, as described in Table 30-XIb, ~~applicable~~for ~~to~~use ~~a~~consistent ~~given~~with ~~page~~the ~~of~~other parameters in the ISM ~~data issue~~packet.
Object Type: ~~<blank>~~Requirement

IS:
Bits 52 through 54 of the GPS ISM Packet shall provide the Service Level, as described in Table 30-XIb, for use consistent with the other parameters in the ISM packet.
Object Type: Requirement

Rationale:
10/25/2024: Per Govt AWG, ISD Subpackets were removed from ISM Message terminology. (T. Anthony)
CRM #23 10/2/2024 Consistent applicability language has been implemented across the ISM parameter descriptions by one statement in 30.3.3.10.1.1.2 (T. Anthony)
8/21/2024: At TIM, decided to repackage the ISM Parameters into the ISM Packet which changed most bits and replaced many occurrences of MT-40 with ISM Packet (T. Anthony)
5/19/2023: Refining the end of the sentence to "applicable to a given ISM message." (T. Anthony)

IS200-1786:

Section Number:
30.3.3.10.1.2.2.10.0-2

WAS:
Three bits are allocated to the four identified service levels as follows:
000 = Level 1
001 = Level 2
010 = Level 3
011 = Level 4
100 to 111 = Reserved for future use
Object Type: <blank>

Redlines:
Three bits are allocated to the four identified service levels as follows:
000 = Level 1
001 = Level 2
010 = Level 3
011 = Level 4
100 = Level 5
101 to 111 = Reserved for future use
Object Type: ~~<blank>~~Info-Only

IS:
Three bits are allocated to the four identified service levels as follows:
000 = Level 1
001 = Level 2
010 = Level 3
011 = Level 4
100 = Level 5
101 to 111 = Reserved for future use
Object Type: Info-Only

Rationale:
10/15/2024 CRM #84 At Govt AWG, agreed add Service Level 5. (T. Anthony)

IS200-1774:

Section Number:
30.3.3.10.1.2.2.10.0-4

WAS:

Service Level	Severity	Description
Level 1	No Data Available	Service Level indicates that users may resort to the Performance Values for integrity solutions instead of this ISM. Users should not use this ISM
Level 2	Non-Safety of Life Use	Service Level indicates that users may only use these parameters for non-safety of life (i.e., uncertified ARAIM) applications.
Level 3	Safety of Life Use (Horizontal)	Service Level indicates that the user should only use these parameters for the applications requiring integrity less than or equivalent to H-ARAIM solutions.
Level 4	Safety of Life Use (Vertical)	Service Level indicates that the user should only use these parameters for the applications requiring integrity less than or equivalent to V-ARAIM solutions.

Redlines:

Service Level	Severity	Description	Notes/Applicability
Level 1	No Data Available	~~Service Level indicates that users may resort to the Performance Values for integrity solutions instead of this ISM. Users should not use this ISM~~ Broadcast ISD values are invalid. Applicable performance commitments remain valid	Any ISD parameter received for the associated GNSS ID with an effectivity time stamp earlier than the Service Level 1 effectivity time stamp (WN_{ISM} and TOW_{ISM}) is invalid. The Service Level 1 applies to ISD parameters for all other Service Levels
Level 2	Non-Safety of Life Use	~~Service Level indicates that users may only use these~~These parameters are for non-safety of life (i.e., uncertified ARAIM) applications	
Level 3	Safety of Life Use (Horizontal)	~~Service Level indicates that the user should only use these~~These parameters are for ~~the~~ applications requiring integrity risk less than or equivalent to H-ARAIM solutions	ISD parameters for GPS for Service Level 3 are valid for use with elevation angles greater than or equal to 2 degrees
Level 4	Safety of Life Use (Vertical)	~~Service Level indicates that the user should only use these~~These parameters are for ~~the~~ applications requiring integrity risk less than or equivalent to V-ARAIM solutions	ISD parameters for GPS for Service Level 4 are valid for use with elevation angles greater than or equal to 2 degrees
Level 5	Safety of Life Use (Horizontal and Vertical)	These parameters are for applications requiring integrity risk less than or equivalent to H-ARAIM and V-ARAIM solutions. These parameters apply to both Service Level 3 and Service Level 4	

IS:

Service Level	Severity	Description	Notes/Applicability
Level 1	No Data Available	Broadcast ISD parameter values are invalid. Applicable performance commitments remain valid	Any ISD parameter received for the associated GNSS ID with an effectivity time stamp earlier than the Service Level 1 effectivity time stamp (WN_{ISM} and TOW_{ISM}) is invalid. The Service Level 1 applies to ISD parameters for all other Service Levels
Level 2	Non-Safety of Life Use	These parameters are for non-safety of life (i.e., uncertified ARAIM) applications	
Level 3	Safety of Life Use (Horizontal)	These parameters are for applications requiring integrity risk less than or equivalent to H-ARAIM solutions	ISD parameters for GPS for Service Level 3 are valid for use with elevation angles greater than or equal to 2 degrees
Level 4	Safety of Life Use (Vertical)	These parameters are for applications requiring integrity risk less than or equivalent to V-ARAIM solutions	ISD parameters for GPS for Service Level 4 are valid for use with elevation angles greater than or equal to 2 degrees
Level 5	Safety of Life Use (Horizontal and Vertical)	These parameters are for applications requiring integrity risk less than or equivalent to H-ARAIM and V-ARAIM solutions. These parameters apply to both Service Level 3 and Service Level 4	

Rationale:
3/31/2025 CRM #116, #117, #118 Add "risk" after "integrity" because the real think being measured is the level of risk (T. Anthony)
10/25/2024 CRM #84 At Govt AWG, agreed to wording differences but added Service Level 5 (T. Anthony)
10/9/2024 CRM #80 Requested to change GNSS ID to GPS, but modifications went the other way to make this table applicable to any GNSS that may find it useful. Also, change references to ISM parameters to ISD parameters. (T. Anthony)
10/29/2023 Per the Public ICWG Special Topic, the Level 4 associated elevation angle was confirmed to be 2 degrees and extensive wording refinement was done which did not change engineering intent. (T. Anthony)
Added Note/Applicability column to clarify Service Level 1 and to indicate applicability for Levels 3 and 4. (T. Anthony)

IS200-1793:

Section Number:
30.3.3.10.1.2.2.11

WAS:
Object Heading 30.3.3.10.1.2.2.11 Satellite Mask

Redlines:
Object Heading 30.3.3.10.1.2.2.11 ~~Satellite~~GPS PRN Inclusion Mask

IS:
Object Heading 30.3.3.10.1.2.2.11 GPS PRN Inclusion Mask

Rationale:
10/25/2024 CRM #55 While discussing the bit numbers took in comment to change the field name to GPS PRN Inclusion Mask. (T. Anthony)
As part of the Pconst to Rconst Conversion, this field has a more descriptive name. (T. Anthony)

IS200-1794:

Section Number:
30.3.3.10.1.2.2.11.0-1

WAS:
Bits 89 through 151 of Message Type 40 shall provide the PRN inclusion mask. Refer to Table 30-XIc for complete GNSS PRN mapping.
Object Type: <blank>

Redlines:
Bits ~~89~~55 through ~~151~~117 of ~~Message~~the ~~Type~~GPS ~~40~~ISM Packet shall provide the GPS PRN ~~inclusion~~Inclusion ~~mask~~Mask. Refer to Table 30-XIc for complete ~~GNSS~~GPS PRN ~~mapping~~Inclusion Mask Mapping.
Object Type: ~~<blank>~~Requirement

IS:
Bits 55 through 117 of the GPS ISM Packet shall provide the GPS PRN Inclusion Mask. Refer to Table 30-XIc for complete GPS PRN Inclusion Mask Mapping.
Object Type: Requirement

Rationale:
10/25/2024: Per Govt AWG, ISD Subpackets were removed from ISM Message terminology. (T. Anthony)
10/25/2024 CRM #55 While discussing the bit numbers took in comment to change the field name to GPS PRN Inclusion Mask. (T. Anthony)
9/17/2024 Dropped "GNSS" From the PRN Inclusion Mask because it appears only GPS is going to be represented. (T. Anthony)
9/5/2024 Needed to update the table name and change the Object Type to Requirement (T. Anthony)
8/21/2024: At TIM, decided to repackage the ISM Parameters into the ISM Packet which changed most bits and replaced many occurrences of MT-40 with ISM Packet (T. Anthony)
4/26/2022 As part of the Conversion from Pconst to Rconst, the PRN Inclusion Mask field is shifted right 4 bits. (T. Anthony)

IS200-1795:

Section Number:
30.3.3.10.1.2.2.11.0-2

WAS:
The applicability of each PRN is indicated by:
0 = Information in the current ISM does not apply to this PRN
1 = Information in the current ISM does apply to this PRN
Object Type: <blank>

Redlines:
The applicability of each PRN ~~is~~shall be indicated by:
0 = Information in ~~the~~this ~~current~~GPS ISM Packet does not apply to this PRN
1 = Information in ~~the~~this ~~current~~GPS ISM Packet does apply to this PRN
Object Type: ~~<blank>~~Requirement

IS:
The applicability of each PRN shall be indicated by:
0 = Information in this GPS ISM Packet does not apply to this PRN
1 = Information in this GPS ISM Packet does apply to this PRN
Object Type: Requirement

Rationale:
3/27/2035 CRM #93. This DOORS ID has been changed to a requirement to match the "shall". (T. Anthony)
10/25/2024: Per Govt AWG, ISD Subpackets were removed from ISM Message terminology. (T. Anthony)
9/4/2024 Determined that the use of the GPS ISD Subpacket changes how this paragraph should be worded. (T. Anthony)

IS200-1815:

Section Number:
30.3.3.10.1.2.2.11.0-3

WAS:
Table 30-XIc. PRN Mapping

Redlines:
Table 30-XIc~~.~~ – GPS PRN Inclusion Mask Mapping

IS:
Table 30-XIc – GPS PRN Inclusion Mask Mapping

Rationale:
10/25/2024 CRM #55 While discussing the bit numbers took in comment to change the field name to GPS PRN Inclusion Mask. (T. Anthony)
04/26/2022 Reworded the Table Caption to match the reference wording in Table 30-XIa – ISM Parameters at Note **** (T. Anthony)

IS200-1816:

Section Number:
30.3.3.10.1.2.2.11.0-4

WAS:

Bits	Galileo	GLONASS	BeiDou	GPS	SBAS	QZSS	IRNSS
89	SVID 1	Freq. 1	RCN 1	PRN 1	PRN 120	PRN 183	PRN ID-1
90	SVID 2	Freq. 2	RCN 2	PRN 2	PRN 121	PRN 184	PRN ID-2
91	SVID 3	Freq. 3	RCN 3	PRN 3	PRN 122	PRN 185	PRN ID-3
92	SVID 4	Freq. 4	RCN 4	PRN 4	PRN 123	PRN 186	PRN ID-4
93	SVID 5	Freq. 5	RCN 5	PRN 5	PRN 124	PRN 187	PRN ID-5
94	SVID 6	Freq. 6	RCN 6	PRN 6	PRN 125	PRN 188	PRN ID-6
95	SVID 7	Freq. 7	RCN 7	PRN 7	PRN 126	PRN 189	PRN ID-7
96	SVID 8	Freq. 8	RCN 8	PRN 8	PRN 127	PRN 190	Reserved
97	SVID 9	Freq. 9	RCN 9	PRN 9	PRN 128	PRN 191	Reserved
98	SVID 10	Freq. 10	RCN 10	PRN 10	PRN 129	PRN 192	Reserved
99	SVID 11	Freq. 11	RCN 11	PRN 11	PRN 130	PRN 193	Reserved
100	SVID 12	Freq. 12	RCN 12	PRN 12	PRN 131	PRN 194	Reserved
101	SVID 13	Freq. 13	RCN 13	PRN 13	PRN 132	PRN 195	Reserved
102	SVID 14	Freq. 14	RCN 14	PRN 14	PRN 133	PRN 196	Reserved
103	SVID 15	Freq. 15	RCN 15	PRN 15	PRN 134	PRN 197	Reserved
104	SVID 16	Freq. 16	RCN 16	PRN 16	PRN 135	PRN 198	Reserved
105	SVID 17	Freq. 17	RCN 17	PRN 17	PRN 136	PRN 199	Reserved
106	SVID 18	Freq. 18	RCN 18	PRN 18	PRN 137	PRN 200	Reserved
107	SVID 19	Freq. 19	RCN 19	PRN 19	PRN 138	PRN 201	Reserved
108	SVID 20	Freq. 20	RCN 20	PRN 20	PRN 139	PRN 202	Reserved
109	SVID 21	Freq. 21	RCN 21	PRN 21	PRN 140	Reserved	Reserved
110	SVID 22	Freq. 22	RCN 22	PRN 22	PRN 141	Reserved	Reserved
111	SVID 23	Freq. 23	RCN 23	PRN 23	PRN 142	Reserved	Reserved
112	SVID 24	Freq. 24	RCN 24	PRN 24	PRN 143	Reserved	Reserved
113	SVID 25	Freq. 25	RCN 25	PRN 25	PRN 144	Reserved	Reserved
114	SVID 26	Freq. 26	RCN 26	PRN 26	PRN 145	Reserved	Reserved
115	SVID 27	Freq. 27	RCN 27	PRN 27	PRN 146	Reserved	Reserved
116	SVID 28	Freq. 28	RCN 28	PRN 28	PRN 147	Reserved	Reserved
117	SVID 29	Freq. 29	RCN 29	PRN 29	PRN 148	Reserved	Reserved
118	SVID 30	Freq. 30	RCN 30	PRN 30	PRN 149	Reserved	Reserved
119	SVID 31	Freq. 31	RCN 31	PRN 31	PRN 150	Reserved	Reserved
120	SVID 32	Freq. 32	RCN 32	PRN 32	PRN 151	Reserved	Reserved
121	SVID 33	Reserved	RCN 33	PRN 33	PRN 152	Reserved	Reserved
122	SVID 34	Reserved	RCN 34	PRN 34	PRN 153	Reserved	Reserved
123	SVID 35	Reserved	RCN 35	PRN 35	PRN 154	Reserved	Reserved
124	SVID 36	Reserved	RCN 36	PRN 36	PRN 155	Reserved	Reserved
125	Reserved	Reserved	RCN 37	PRN 37	PRN 156	Reserved	Reserved
126	Reserved	Reserved	Reserved	PRN 38	PRN 157	Reserved	Reserved
127	Reserved	Reserved	Reserved	PRN 39	PRN 158	Reserved	Reserved
128	Reserved	Reserved	Reserved	PRN 40	Reserved	Reserved	Reserved
129	Reserved	Reserved	Reserved	PRN 41	Reserved	Reserved	Reserved
130	Reserved	Reserved	Reserved	PRN 42	Reserved	Reserved	Reserved
131	Reserved	Reserved	Reserved	PRN 43	Reserved	Reserved	Reserved
132	Reserved	Reserved	Reserved	PRN 44	Reserved	Reserved	Reserved
133	Reserved	Reserved	Reserved	PRN 45	Reserved	Reserved	Reserved
134	Reserved	Reserved	Reserved	PRN 46	Reserved	Reserved	Reserved
135	Reserved	Reserved	Reserved	PRN 47	Reserved	Reserved	Reserved

136	Reserved	Reserved	Reserved	PRN 48	Reserved	Reserved	Reserved
137	Reserved	Reserved	Reserved	PRN 49	Reserved	Reserved	Reserved
138	Reserved	Reserved	Reserved	PRN 50	Reserved	Reserved	Reserved
139	Reserved	Reserved	Reserved	PRN 51	Reserved	Reserved	Reserved
140	Reserved	Reserved	Reserved	PRN 52	Reserved	Reserved	Reserved
141	Reserved	Reserved	Reserved	PRN 53	Reserved	Reserved	Reserved
142	Reserved	Reserved	Reserved	PRN 54	Reserved	Reserved	Reserved
143	Reserved	Reserved	Reserved	PRN 55	Reserved	Reserved	Reserved
144	Reserved	Reserved	Reserved	PRN 56	Reserved	Reserved	Reserved
145	Reserved	Reserved	Reserved	PRN 57	Reserved	Reserved	Reserved
146	Reserved	Reserved	Reserved	PRN 58	Reserved	Reserved	Reserved
147	Reserved	Reserved	Reserved	PRN 59	Reserved	Reserved	Reserved
148	Reserved	Reserved	Reserved	PRN 60	Reserved	Reserved	Reserved
149	Reserved	Reserved	Reserved	PRN 61	Reserved	Reserved	Reserved
150	Reserved	Reserved	Reserved	PRN 62	Reserved	Reserved	Reserved
151	Reserved	Reserved	Reserved	PRN 63	Reserved	Reserved	Reserved

SVID = Space Vehicle ID
Freq. = Carrier Frequency Number
RCN = Ranging Code Number
PRN = Pseudorandom Noise Number

Redlines:

Bits	Galileo	GLONASS	BeiDou	GPS PRN	SBAS	QZSS	IRNSS
8955	SVID 1	Freq. 1	RCN 1	PRN 1	PRN 120	PRN 183	PRN ID 1
9056	SVID 2	Freq. 2	RCN 2	PRN 2	PRN 121	PRN 184	PRN ID 2
9157	SVID 3	Freq. 3	RCN 3	PRN 3	PRN 122	PRN 185	PRN ID 3
9258	SVID 4	Freq. 4	RCN 4	PRN 4	PRN 123	PRN 186	PRN ID 4
9359	SVID 5	Freq. 5	RCN 5	PRN 5	PRN 124	PRN 187	PRN ID 5
9460	SVID 6	Freq. 6	RCN 6	PRN 6	PRN 125	PRN 188	PRN ID 6
9561	SVID 7	Freq. 7	RCN 7	PRN 7	PRN 126	PRN 189	PRN ID 7
9662	SVID 8	Freq. 8	RCN 8	PRN 8	PRN 127	PRN 190	Reserved
9763	SVID 9	Freq. 9	RCN 9	PRN 9	PRN 128	PRN 191	Reserved
9864	SVID 10	Freq. 10	RCN 10	PRN 10	PRN 129	PRN 192	Reserved
9965	SVID 11	Freq. 11	RCN 11	PRN 11	PRN 130	PRN 193	Reserved
10066	SVID 12	Freq. 12	RCN 12	PRN 12	PRN 131	PRN 194	Reserved
10167	SVID 13	Freq. 13	RCN 13	PRN 13	PRN 132	PRN 195	Reserved
10268	SVID 14	Freq. 14	RCN 14	PRN 14	PRN 133	PRN 196	Reserved
10369	SVID 15	Freq. 15	RCN 15	PRN 15	PRN 134	PRN 197	Reserved
10470	SVID 16	Freq. 16	RCN 16	PRN 16	PRN 135	PRN 198	Reserved
10571	SVID 17	Freq. 17	RCN 17	PRN 17	PRN 136	PRN 199	Reserved
10672	SVID 18	Freq. 18	RCN 18	PRN 18	PRN 137	PRN 200	Reserved
10773	SVID 19	Freq. 19	RCN 19	PRN 19	PRN 138	PRN 201	Reserved
10874	SVID 20	Freq. 20	RCN 20	PRN 20	PRN 139	PRN 202	Reserved
10975	SVID 21	Freq. 21	RCN 21	PRN 21	PRN 140	Reserved	Reserved
11076	SVID 22	Freq. 22	RCN 22	PRN 22	PRN 141	Reserved	Reserved
11177	SVID 23	Freq. 23	RCN 23	PRN 23	PRN 142	Reserved	Reserved
11278	SVID 24	Freq. 24	RCN 24	PRN 24	PRN 143	Reserved	Reserved
11379	SVID 25	Freq. 25	RCN 25	PRN 25	PRN 144	Reserved	Reserved
11480	SVID 26	Freq. 26	RCN 26	PRN 26	PRN 145	Reserved	Reserved
11581	SVID 27	Freq. 27	RCN 27	PRN 27	PRN 146	Reserved	Reserved
11682	SVID 28	Freq. 28	RCN 28	PRN 28	PRN 147	Reserved	Reserved
11783	SVID 29	Freq. 29	RCN 29	PRN 29	PRN 148	Reserved	Reserved
11884	SVID 30	Freq. 30	RCN 30	PRN 30	PRN 149	Reserved	Reserved
11985	SVID 31	Freq. 31	RCN 31	PRN 31	PRN 150	Reserved	Reserved
12086	SVID 32	Freq. 32	RCN 32	PRN 32	PRN 151	Reserved	Reserved
12187	SVID 33	Reserved	RCN 33	PRN 33	PRN 152	Reserved	Reserved
12288	SVID 34	Reserved	RCN 34	PRN 34	PRN 153	Reserved	Reserved
12389	SVID 35	Reserved	RCN 35	PRN 35	PRN 154	Reserved	Reserved
12490	SVID 36	Reserved	RCN 36	PRN 36	PRN 155	Reserved	Reserved
12591	Reserved	Reserved	RCN 37	PRN 37	PRN 156	Reserved	Reserved
12692	Reserved	Reserved	Reserved	PRN 38	PRN 157	Reserved	Reserved
12793	Reserved	Reserved	Reserved	PRN 39	PRN 158	Reserved	Reserved
12894	Reserved	Reserved	Reserved	PRN 40	Reserved	Reserved	Reserved
12995	Reserved	Reserved	Reserved	PRN 41	Reserved	Reserved	Reserved
13096	Reserved	Reserved	Reserved	PRN 42	Reserved	Reserved	Reserved
13195	Reserved	Reserved	Reserved	PRN 43	Reserved	Reserved	Reserved
13298	Reserved	Reserved	Reserved	PRN 44	Reserved	Reserved	Reserved
13399	Reserved	Reserved	Reserved	PRN 45	Reserved	Reserved	Reserved
134100	Reserved	Reserved	Reserved	PRN 46	Reserved	Reserved	Reserved
135101	Reserved	Reserved	Reserved	PRN 47	Reserved	Reserved	Reserved
136102	Reserved	Reserved	Reserved	PRN 48	Reserved	Reserved	Reserved
137103	Reserved	Reserved	Reserved	PRN 49	Reserved	Reserved	Reserved
138104	Reserved	Reserved	Reserved	PRN 50	Reserved	Reserved	Reserved
139105	Reserved	Reserved	Reserved	PRN 51	Reserved	Reserved	Reserved
140106	Reserved	Reserved	Reserved	PRN 52	Reserved	Reserved	Reserved
141107	Reserved	Reserved	Reserved	PRN 53	Reserved	Reserved	Reserved
142108	Reserved	Reserved	Reserved	PRN 54	Reserved	Reserved	Reserved
143109	Reserved	Reserved	Reserved	PRN 55	Reserved	Reserved	Reserved
144110	Reserved	Reserved	Reserved	PRN 56	Reserved	Reserved	Reserved
145111	Reserved	Reserved	Reserved	PRN 57	Reserved	Reserved	Reserved
146112	Reserved	Reserved	Reserved	PRN 58	Reserved	Reserved	Reserved

Bits	Galileo	GLONASS	BeiDou	GPS PRN	SBAS	QZSS	IRNSS
147113	Reserved	Reserved	Reserved	PRN 59	Reserved	Reserved	Reserved
148114	Reserved	Reserved	Reserved	PRN 60	Reserved	Reserved	Reserved
149115	Reserved	Reserved	Reserved	PRN 61	Reserved	Reserved	Reserved
150116	Reserved	Reserved	Reserved	PRN 62	Reserved	Reserved	Reserved
151117	Reserved	Reserved	Reserved	PRN 63	Reserved	Reserved	Reserved

SVID = Space Vehicle ID
Freq. = Carrier Frequency Number
RCN = Ranging Code Number
PRN = Pseudorandom Noise Number

IS:

Bit	GPS PRN
55	PRN 1
56	PRN 2
57	PRN 3
58	PRN 4
59	PRN 5
60	PRN 6
61	PRN 7
62	PRN 8
63	PRN 9
64	PRN 10
65	PRN 11
66	PRN 12
67	PRN 13
68	PRN 14
69	PRN 15
70	PRN 16
71	PRN 17
72	PRN 18
73	PRN 19
74	PRN 20
75	PRN 21
76	PRN 22
77	PRN 23
78	PRN 24
79	PRN 25
80	PRN 26
81	PRN 27
82	PRN 28
83	PRN 29
84	PRN 30
85	PRN 31
86	PRN 32
87	PRN 33
88	PRN 34
89	PRN 35
90	PRN 36
91	PRN 37
92	PRN 38

Bit	GPS PRN
93	PRN 39
94	PRN 40
95	PRN 41
96	PRN 42
97	PRN 43
98	PRN 44
99	PRN 45
100	PRN 46
101	PRN 47
102	PRN 48
103	PRN 49
104	PRN 50
105	PRN 51
106	PRN 52
107	PRN 53
108	PRN 54
109	PRN 55
110	PRN 56
111	PRN 57
112	PRN 58
113	PRN 59
114	PRN 60
115	PRN 61
116	PRN 62
117	PRN 63
PRN = Pseudorandom Noise Number	

Rationale:
3/17/2025: CRM #100 Finally implemented the "Bits" to "Bit" conversion (T. Anthony)
10/25/2024 CRM #55 While discussing the bit numbers took in comment to change the 2nd column title to GPS PRN (T. Anthony)
10/4/2024 Update the bit numbers for the PRN Inclusion Mask to support the new GPS ISD data starting point (T. Anthony)
04/26/2022 Update the Mask pattern since the message has shifted right 4 bits to bits 89 through 151 becomes 93 through 155 (T. Anthony)
11/22/2022 A commenter suggested removing all bits from the PRN Masks except for GPS. SMEs considered all foreign GNSS systems should be removed from the PRN Masks but finally decided that a special not justifying the SBAS mapping could not be agreed up and SBAS was removed – leaving only the GPS.SV mapping. (T. Anthony)

IS200-2129:
Insertion after object IS200-1793

Section Number:
30.3.3.10.1.2.2.12

WAS:
<INSERTED OBJECT>

Redlines:
Object Heading 30.3.3.10.1.2.2.12 Reserved for ISM
Object Type: Header

IS:
Object Heading 30.3.3.10.1.2.2.12 Reserved for ISM
Object Type: Header

Rationale:
As part of the Pconst to Rconst Conversion, the message format has changed to have bits reserved for ISM use. (T. Anthony)

IS200-2130:
Insertion below object IS200-2129

Section Number:
30.3.3.10.1.2.2.12.0-1

WAS:
<INSERTED OBJECT>

Redlines:
Bits 118 through 204 of the GPS ISM Packet are Reserved for ISM use.
Object Type: Info-Only

IS:
Bits 118 through 204 of the GPS ISM Packet are Reserved for ISM use.
Object Type: Info-Only

Rationale:
3/27/2025 CRM 108 Decided to go with "Reserved for ISM" across the board for this spare field (T. Anthony)
10/25/2024: Per Govt AWG, ISD Subpackets were removed from ISM Message terminology. (T. Anthony)
10/9/2024 the refactoring agreement reached on 10/4/2024 places the ISM CRC in the GPS ISD Subpacket, but the CRC itself covers the entire ISM Packet, including the GNSS ID. (T. Anthony)
CRM #56 9/27/24 Fixed capitalization of "The" in the middle of the sentence. (T. Anthony)
08/21/2024 At TIM, decided to repackage the ISM Parameters into the ISM Packet which changed most bits and replaced many occurrences of MT-40 with ISM Packet (T. Anthony)
As part of the Pconst to Rconst Conversion, the message format has bits reserved for ISM use. (T. Anthony)

IS200-1818:

Section Number:
30.3.3.10.1.2.2.13.0-1

WAS:
Bits 245 through 276 of MT-40 are a 32-bit Cyclic Redundancy Check (CRC) specific to the ISM parameters. The ISM CRC will cover only the ISM parameters in Message Type 40, (Bits 39 to 244). Refer to DO-246E-Change 1 document for more details on the ISM CRC.
Object Type: <blank>

Redlines:
Bits ~~245~~205 through ~~276~~236 of ~~MT-40~~the ~~are~~GPS ISM Packet is a 32-bit Cyclic Redundancy Check (CRC) specific to the ~~ISM~~ISD ~~parameters.~~in ~~The~~the ISM ~~CRC~~Packet. ~~will~~This ~~cover~~CRC ~~only~~covers the ~~ISM~~ ~~parameters~~data in ~~Message Type 40, (Bits 39 to 244). Refer to DO-246E-Change~~bits 1 ~~document for~~ ~~more~~through ~~details~~204 ~~on~~in the GPS ISM ~~CRC~~Packet.
Object Type: ~~<blank>~~Info-Only

IS:
Bits 205 through 236 of the GPS ISM Packet is a 32-bit Cyclic Redundancy Check (CRC) specific to the ISD in the ISM Packet. This CRC covers the data in bits 1 through 204 in the GPS ISM Packet.
Object Type: Info-Only

Rationale:
10/25/2024: Per Govt AWG, ISD Subpackets were removed from ISM Message terminology. (T. Anthony)
10/15/2024 Set the Object Type for all ISM related paragraphs with blank Object Type. (T. Anthony)
8/21/2024 At TIM, decided to repackage the ISM Parameters into an ISM Packet which changes bit numbers and some references from MT-40 to ISM Packet (T. Anthony)
4/25/2022 Bit range was confusing using "nn to nn" form so converted to "nn through nn" to include the upper bound as always intended (T. Anthony)
As of 6/6/2022, removed the comma just before the “(bits nn through nn)” and converted the "Bits" to lower case (T. Anthony)

IS200-2402:
Insertion after object IS200-1818

Section Number:
30.3.3.10.1.2.2.13.0-2

WAS:
<INSERTED OBJECT>

Redlines:
This sequence of bits and the ISM CRC are represented as polynomials of a bit position operator X (the powers of which denote the distance of the bit from the end of the applicable bit sequence) with coefficients from the Galois field of two elements, or GF(2). GF(2) is the finite field constructed on the set {0,1} and the operations of modulo-2 addition and modulo-2 multiplication.
Object Type: Info-Only

IS:
This sequence of bits and the ISM CRC are represented as polynomials of a bit position operator X (the powers of which denote the distance of the bit from the end of the applicable bit sequence) with coefficients from the Galois field of two elements, or GF(2). GF(2) is the finite field constructed on the set {0,1} and the operations of modulo-2 addition and modulo-2 multiplication.
Object Type: Info-Only

Rationale:
5/14/2025 At PICWG stakeholders wanted to split up IS200-2136 into three parts. This is Part 1. The PICWG also wanted "may be" replaced with "are" (T. Anthony)

IS200-2136:
Insertion after object IS200-1818

Section Number:
30.3.3.10.1.2.2.13.0-3

WAS:
<INSERTED OBJECT>

Redlines:
In this representation, the ISM CRC shall be the remainder polynomial r(X) left over from the polynomial division of the ISM Packet bits 1 through 204 (right-padded with 32 zeros and represented as $m(X) \cdot X^{32}$) by a generator polynomial g(X). The generator polynomial, g(X), which does not depend on the specific ISM Packet data, IS:
Object Type: Requirement

IS:
In this representation, the ISM CRC shall be the remainder polynomial r(X) left over from the polynomial division of the ISM Packet bits 1 through 204 (right-padded with 32 zeros and represented as $m(X) \cdot X^{32}$) by a generator polynomial g(X). The generator polynomial, g(X), which does not depend on the specific ISM Packet data, IS:
Object Type: Requirement

Rationale:
5/14/2025 At PICWG stakeholders wanted to split up IS200-2136 into three parts. This is the Part 2 (T. Anthony)
3/31/2025 CRM #124, #135 Made the second sentence a requirement and clarified that the CRC was the ISM CRC (T. Anthony)
10/25/2024: Per Govt AWG, ISD Subpackets were removed from ISM Message terminology. (T. Anthony)
10/9/2024: The agreement reached on 10/4, caused some wording to be changed regarding what is the ISM Packet versus the GPS ISD Subpacket. Any bit range involving 1 through 4 automatically means we have to be referring to the ISM Packet, whereas discussion of bits 205 through 236 which contain the ISM CRC are mostly referred to GPS ISD Subpacket, although ISM CRC's bit pattern is defined in the requirement in the preceding paragraph. (T. Anthony)
10/7/2024 CRM #57 Removing "the entire" from the description of the ISM Packet which is both a noise word and a grammar mistake (T. Anthony)
8/21/2024 Encasing the ISM Parameters in the ISM Packet caused the bit numbers in the CRC formulas to be changed - dropping most superscripts, subscripts and bit numbers by 38 and re-explaining the CRC is within the ISM Packet and the CRC is on only ISM Packet contents. (T. Anthony)
11/14/2022 Final agreement at Public ICWG was to insert the CRC algorithm into the interface specifications. (T. Anthony)

IS200-2403:
Insertion after object IS200-2136

Section Number:
30.3.3.10.1.2.2.13.0-4

WAS:
<INSERTED OBJECT>

Redlines:
$g(X) = X^{32} + X^{31} + X^{24} + X^{22} + X^{16} + X^{14} + X^{8} + X^{7} + X^{5} + X^{3} + X + 1$

If the terms b_1 through b_{204} signify bits 1 through 204 of the GPS ISM Packet, the information field, m(X), IS:

$m(X) = b_1X^{203} + b_2X^{202} + b_3X^{201} + ... + b_{203}X + b_{204}$

If the terms b_{205} through b_{236} signify bits 205 through 236 of the GPS ISM Packet, the remainder polynomial, r(X), IS:

$r(X) = b_{205}X^{31} + b_{206}X^{30} + b_{207}X^{29} + ... + b_{235}X + b_{236}$

The ISD in the GPS ISM Packet is valid when the ISM CRC matches r(X) in the following equation:

$r(X) = m(X) \cdot X^{32} \bmod g(X)$
Object Type: Info-Only

IS:
$g(X) = X^{32} + X^{31} + X^{24} + X^{22} + X^{16} + X^{14} + X^{8} + X^{7} + X^{5} + X^{3} + X + 1$

If the terms b_1 through b_{204} signify bits 1 through 204 of the GPS ISM Packet, the information field, m(X), IS:

$m(X) = b_1X^{203} + b_2X^{202} + b_3X^{201} + ... + b_{203}X + b_{204}$

If the terms b_{205} through b_{236} signify bits 205 through 236 of the GPS ISM Packet, the remainder polynomial, r(X), IS:

$r(X) = b_{205}X^{31} + b_{206}X^{30} + b_{207}X^{29} + ... + b_{235}X + b_{236}$

The ISD in the GPS ISM Packet is valid when the ISM CRC matches r(X) in the following equation:

$r(X) = m(X) \cdot X^{32} \bmod g(X)$
Object Type: Info-Only

Rationale:
5/14/2025 At PICWG stakeholders wanted to split up IS200-2136 into three parts. This is Part 3 (T. Anthony)

IS200-2132:
Insertion after object IS200-1765

Section Number:
30.3.3.10.2

WAS:
<INSERTED OBJECT>

Redlines:
Object Heading 30.3.3.10.2 Use of GPS ISM Data
Object Type: Header

IS:
Object Heading 30.3.3.10.2 Use of GPS ISM Data
Object Type: Header

Rationale:
10/28/2024 Per the AWG, added GPS to indicate the following formula is only relevant to GPS signals. (T. Anthony)
10/10/2022 Create “Use of ISM Data” section to define the formula for bnom. (T. Anthony)

IS200-2133:
Insertion below object IS200-2132

Section Number:
30.3.3.10.2.0-1

WAS:
<INSERTED OBJECT>

Redlines:
To calculate the nominal pseudorange error bias (b_{nom}), the following equation shall be used:
Object Type: Requirement

IS:
To calculate the nominal pseudorange error bias (b_{nom}), the following equation shall be used:
Object Type: Requirement

Rationale:
3/31/2025 CRM #125, #134, #157 All references to the bnom formula need to have requirements language (i.e., "shall") (T. Anthony)
10/9/2024 Using this formula should be a Requirement (T. Anthony)
08/21/2024 It's actually bnom that is being defined and not βnom (T. Anthony)
10/10/2022 Create “Use of ISM Data” section to define the formula for bnom. (T. Anthony)

IS200-2134:
Insertion after object IS200-2133

Section Number:
30.3.3.10.2.0-2

WAS:
<INSERTED OBJECT>

Redlines:
$b_{nom} = \beta_{nom} + \gamma_{nom}$ IAURA
Object Type: Info-Only

IS:
$b_{nom} = \beta_{nom} + \gamma_{nom}$ IAURA
Object Type: Info-Only

Rationale:
10/10/2022 Create "Use of ISM Data" section to define the formula for bnom. (T. Anthony)

IS200-2135:
Insertion after object IS200-2134

Section Number:
30.3.3.10.2.0-3

WAS:
<INSERTED OBJECT>

Redlines:
Where IAURA is defined in section 30.3.3.1.1.
Object Type: Info-Only

IS:
Where IAURA is defined in section 30.3.3.1.1.
Object Type: Info-Only

Rationale:
10/28/24 Per the AWG, made this sentence more closely match the corresponding sentences in IS-GPS-705 and IS-GPS-800. (T. Anthony)
10/10/2022 Create "Use of ISM Data" section to define the formula for bnom. (T. Anthony)

 # CP Status = 'In Review': 72

# of inserted requirements: 5
# of modified requirements: 16
# of deleted requirements: 0
# of TBDs: 0
# of TBRs: 0
of (added/modified) effectivities: 0
of VCRM additions: 5
# of VCRM modifications: 0
# of VCRM deletions: 0
# of descriptive texts: 31
of (added/modified) tables: 3
of (added/modified) figures: 4
