

CHANGE NOTICE

Affected Document: IS-GPS-800 Rev G	IRN/SCN Number XXX-XXX-XXXX-XXX	Date: XX-XXX-XXX
Authority: RFC-00467	Proposed Change Notice PCN-IS-800G_RFC467	Date: 26-APR-2021

CLASSIFIED BY: N/A
DECLASSIFY ON: N/A

Document Title: NAVSTAR GPS Space Segment / User Segment L1C Interface

RFC Title: 2021 Proposed Changes to the Public Documents

Reason For Change (Driver):

1. Reserved/spare bits in the CNAV/CNAV-2 in IS-GPS-200 are assumed to be a static bit pattern. With the current proposed implementation to fill those bits with a pseudorandom bit pattern, users are at risk of incorrectly using those bits for integrity checks.
2. The GPS IIF SV Configuration Code '101' confirms that the "alert" in HOW is still applicable. As such, one of the public stakeholder was requesting clarification to confirm if the "alert" in the HOW will also be applicable in the future undefined configuration codes. This is not sufficient for safety-of-life equipment that would need to have the confirmation because the alert is part of the "marginal" conditions leading to the selection/deselection of a satellite in a RAIM or ARAIM integrity context.
3. Current Issue of Data and Clock (IODC) requirement in IS-GPS-200 states that the IODC will be different from any value transmitted by the SV during the preceding 7-days. In certain occasions, current operations have shown not to follow that requirement.
4. The descriptions of how the navigation message changes with time (for example, transitions between data sets, or behavior under extended navigation) do not capture all the implementation differences between earlier SVs and GPS III/IIF.
5. All documents need clarification and clean-up, as identified in past Public ICWGs and as newly-identified changes of administrative nature.

Description of Change:

1. Clarify language in IS-GPS-200, IS-GPS-705, ICD-GPS-240, ICD-GPS-870, and IS-GPS-800 to tell users to not utilize the spare/reserved bits.
2. Add clarification to the SV Configuration Code section for the undefined SV codes.
3. Modify or delete the IODC requirement.
4. Update the timing-related information to reflect the current implementation, including aspects specific to GPS III/IIF.
5. Provide clarity and clean up identified administrative changes in all affected documents.

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Checked By: RE:

AUTHORIZED SIGNATURES	REPRESENTING	DATE
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IS800-5:

Section Number:

1.2.0-1

WAS:

Utilizing the L1 open link defined in this document, GPS space vehicles (SVs), except Block II/IIA, IIR/IIR-M, and IIF SVs, shall transmit continuous earth coverage L1C signal that provides the ranging codes and the system data needed to accomplish the navigation mission to all users having RF visibility to SVs and suitable receivers.

Redlines:

Utilizing the L1 open link defined in this document, GPS space vehicles (SVs), except Block ~~II/IIA~~, IIR/IIR-M, and IIF SVs, shall transmit continuous earth coverage L1C signal that provides the ranging codes and the system data needed to accomplish the navigation mission to all users having RF visibility to SVs and suitable receivers.

IS:

Utilizing the L1 open link defined in this document, GPS space vehicles (SVs), except Block IIR/IIR-M, and IIF SVs, shall transmit continuous earth coverage L1C signal that provides the ranging codes and the system data needed to accomplish the navigation mission to all users having RF visibility to SVs and suitable receivers.

Rationale:

Delete II/IIA references

IS800-140:

Section Number:

3.5.1.0-3

WAS:

Subframe 3 provides other navigation data which is commutated over multiple pages. Each page of subframe 3 provides different data as shown in Figures 3.5-2 through 3.5-8a. Additional subframe 3 pages may be defined in the future. It shall be noted that the broadcast sequence of subframe 3 pages is variable and, as such, users must not expect a fixed pattern of page sequence. Subframe 3 provides an 8-bit PRN number of the transmitting SV with a range of 0 (00000000) to 255 (11111111).

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Subframe 3 provides other navigation data which is commutated over multiple pages. ~~Each page of subframe 3 provides different data as shown in Figures 3.5-2 through 3.5-8a. Additional subframe 3 pages may be defined in the future. It shall be noted that the broadcast sequence of subframe 3 pages is variable and, as such, users must not expect a fixed pattern of page sequence. Subframe 3 provides an 8-bit PRN number of the transmitting SV with a range of 0 (00000000) to 255 (11111111).~~ ~~Each page of subframe 3 provides different data as shown in Figures 3.5-2 through 3.5-8a. Additional subframe 3 pages may be defined in the future. It shall be noted that the broadcast sequence of subframe 3 pages is variable and, as such, users must not expect a fixed pattern of page sequence. Subframe 3 provides an 8-bit PRN number of the transmitting SV with a range of 0 (00000000) to 255 (11111111).~~ Each page of subframe 3 provides different data as shown in Figures 3.5-2 through 3.5-8a. Additional subframe 3 pages may be defined in the future. It shall be noted that the broadcast sequence of subframe 3 pages is variable and, as such, users must not expect a fixed pattern of page sequence. Subframe 3 provides an 8-bit PRN number of the transmitting SV with a range of 0 (00000000) to 255 (11111111). ~~Each page of subframe 3 provides different data as shown in Figures 3.5-2 through 3.5-8a. Additional subframe 3 pages may be defined in the future. It shall be noted that the broadcast sequence of subframe 3 pages is variable and, as such, users must not expect a fixed pattern of page sequence. Subframe 3 provides an 8-bit PRN number of the transmitting SV with a range of 0 (00000000) to 255 (11111111).~~ The such, maximum users repetition must rates not and expect broadcast a periods fixed are pattern given of in page Table sequence 3.5-9 in paragraph 3.5.4.

IS:

Subframe 3 provides other navigation data which is commutated over multiple pages. Each page of subframe 3 provides different data as shown in Figures 3.5-2 through 3.5-8. Additional subframe 3 pages may be defined in the future. It shall be noted that the broadcast sequence of subframe 3 pages is variable. The maximum repetition rates and broadcast periods are given in Table 3.5-9 in paragraph 3.5.4. Subframe 3 provides an 8-bit PRN number of the transmitting SV with a range of 0 (00000000) to 255 (11111111).

Rationale:

Adding broadcast intervals periods for IS800 similar to IS200 and IS705.

IS800-161:

Section Number:

3.5.3.0-12

WAS:

Parameter		No. of Bits**	Scale Factor (LSB)	Valid Range***	Units
URANED0 Index	NED Accuracy Index	5*			(see text)
URANED1 Index	NED Accuracy Change Index	3			(see text)
URANED2 Index	NED Accuracy Change Rate Index	3			(see text)
a _{f2-n}	SV Clock Drift Rate Correction Coefficient	10*	2 ⁻⁶⁰		sec/sec ²
a _{f1-n}	SV Clock Drift Correction Coefficient	20*	2 ⁻⁴⁸		sec/sec
a _{f0-n}	SV Clock Bias Correction Coefficient	26*	2 ⁻³⁵		seconds
T _{GD} ****	Inter-Signal Correction for L1 or L2 P(Y)	13*	2 ⁻³⁵		seconds
ISC _{L1CP} ****	Inter-Signal Correction for L1C _P	13*	2 ⁻³⁵		seconds
ISC _{L1CD} ****	Inter-Signal Correction for L1C _D	13*	2 ⁻³⁵		seconds
WN _{op}	CEI Data Sequence Propagation Week Number	8	1		weeks
<p>* Parameters so indicated are in two's complement notation;</p> <p>** See Figure 3.5-1 for complete bit allocation in Subframe 2;</p> <p>*** Unless otherwise indicated in this column, valid range is the maximum range attainable with indicated bit allocation and scale factor.</p>					

Redlines:

Parameter		No. of Bits**	Scale Factor (LSB)	Valid Range***	Units
URANED0 Index	NED Accuracy Index	5*			(see text)
URANED1 Index	NED Accuracy Change Index	3			(see text)
URANED2 Index	NED Accuracy Change Rate Index	3			(see text)
a _{f2-n}	SV Clock Drift Rate Correction Coefficient	10*	2 ⁻⁶⁰		sec/sec ²
a _{f1-n}	SV Clock Drift Correction Coefficient	20*	2 ⁻⁴⁸		sec/sec
a _{f0-n}	SV Clock Bias Correction Coefficient	26*	2 ⁻³⁵		seconds
T _{GD} ***	Inter-Signal Correction for L1 or L2 P(Y)	13*	2 ⁻³⁵		seconds
ISC _{L1CP} ***	Inter-Signal Correction for L1C _P	13*	2 ⁻³⁵		seconds
ISC _{L1CD} ***	Inter-Signal Correction for L1C _D	13*	2 ⁻³⁵		seconds
WN _{op}	CEI Data Sequence Propagation Week Number	8	1		weeks
<p>* Parameters so indicated are in two's complement notation;</p> <p>** See Figure 3.5-1 for complete bit allocation in Subframe 2;</p> <p>*** Unless otherwise indicated in this column, valid range is the maximum range attainable with indicated bit allocation and scale factor.</p>					

IS:

Parameter		No. of Bits**	Scale Factor (LSB)	Valid Range***	Units
UR _{NED0} Index	NED Accuracy Index	5*			(see text)
UR _{NED1} Index	NED Accuracy Change Index	3			(see text)
UR _{NED2} Index	NED Accuracy Change Rate Index	3			(see text)
a _{f2-n}	SV Clock Drift Rate Correction Coefficient	10*	2 ⁻⁶⁰		sec/sec ²
a _{f1-n}	SV Clock Drift Correction Coefficient	20*	2 ⁻⁴⁸		sec/sec
a _{f0-n}	SV Clock Bias Correction Coefficient	26*	2 ⁻³⁵		seconds
T _{GD}	Inter-Signal Correction for L1 or L2 P(Y)	13*	2 ⁻³⁵		seconds
ISC _{L1CP}	Inter-Signal Correction for L1C _P	13*	2 ⁻³⁵		seconds
ISC _{L1CD}	Inter-Signal Correction for L1C _D	13*	2 ⁻³⁵		seconds
WN _{op}	CEI Data Sequence Propagation Week Number	8	1		weeks
<p>* Parameters so indicated are in two's complement notation;</p> <p>** See Figure 3.5-1 for complete bit allocation in Subframe 2;</p> <p>*** Unless otherwise indicated in this column, valid range is the maximum range attainable with indicated bit allocation and scale factor.</p>					

Rationale:

Table legend updates from RFC-442

IS800-1174:

Insertion after object IS800-1109

Section Number:

3.5.4.0-3

WAS:

<INSERTED OBJECT>

Redlines:

[Table 3.5-9 Maximum Repetition Rates and Maximum Broadcast Periods](#)

Object Type : [Table Caption](#)

IS:

Table 3.5-9 Maximum Repetition Rates and Maximum Broadcast Periods

Object Type : Table Caption

Rationale:

Adding broadcast intervals periods for IS800 similar to IS200 and IS705

IS800-1175:

Insertion after object IS800-1174

Section Number:

3.5.4.0-4

WAS:

<INSERTED OBJECT>

Redlines:

IS:

Page Data	Page Number	Maximum Broadcast Intervals †
UTC, IONO and ISC	1	144 sec
GGTO and EOP	2	144 sec ***
Reduced Almanac	3	10 min *,***
Midi Almanac	4	60 min *
Differential Corrections	5	15 min **,***
Text Message	6	As Needed
SV Configuration	7	12.5 min
Integrity Support Message	8	144 sec

* Complete set of SVs in the constellation.
** When Differential Corrections are available.
*** Optional (interval applies if/when broadcast).
† The intervals specified are maximum. As such, the broadcast intervals may be shorter than the specified value.

Rationale:

Adding broadcast intervals periods for IS800 similar to IS200 and IS705

IS800-1173:

Insertion after object IS800-262

Section Number:

3.5.4.3.6.0-2

WAS:

<INSERTED OBJECT>

Redlines:

[The Midi almanac parameters shall be updated by the CS at least once every 3 days while the CS is able to upload the SVs. If the CS is unable to upload the SVs, the accuracy of the Midi almanac parameters transmitted by the SVs will degrade over time.](#)

IS:

The Midi almanac parameters shall be updated by the CS at least once every 3 days while the CS is able to upload the

SVs. If the CS is unable to upload the SVs, the accuracy of the Midi almanac parameters transmitted by the SVs will degrade over time.

Rationale:

The Midi almanac description is missing the CS update requirement, which is 3 days for modernized almanac formats, same as for the Reduced almanac in IS-GPS-800 3.5.4.3.5.

IS800-289:

Section Number:

3.5.5.1.0-2

WAS:

Cutovers of subframe 2 data to new CEI data sets will nominally occur on hour boundaries except for the first CEI data set of a new CEI data sequence propagation.

Redlines:

~~Cutovers of subframe 2 data to new CEI data sets will nominally occur on hour boundaries except for the first CEI data set of a new CEI data sequence propagation.~~

IS:

<DELETED OBJECT>

Rationale:

Deleted duplicate information also present in 3.5.5.2.

IS800-1158:

Section Number:

3.5.5.2.0-2

WAS:

Cutovers to new CEI data sets will occur only on hour boundaries except for the first CEI data set of a new CEI data sequence propagation. The first CEI data set may be cut-in (reference paragraph 3.5.5.1) at any time during the hour and therefore may be transmitted by the SV for less than one hour.

Redlines:

Cutovers to new CEI data sets will occur only on two-hour boundaries except for the first CEI data set of a new CEI data sequence propagation.- The first CEI data set may be cut-in (reference paragraph 3.5.5.1) at any time during the ~~hour~~two hours and therefore may be transmitted by the SV for less than ~~one~~two hour~~hours~~.

IS:

Cutovers to new CEI data sets will occur only on two-hour boundaries except for the first CEI data set of a new CEI data sequence propagation. The first CEI data set may be cut-in (reference paragraph 3.5.5.1) at any time during the two hours and therefore may be transmitted by the SV for less than two hours.

Rationale:

All modernized CEI data set cutovers nominally occur on "even" hour boundaries.

IS800-1172:

Insertion after object IS800-1159

Section Number:

3.5.5.2.0-4

WAS:

<INSERTED OBJECT>

Redlines:

The start time of the curve fit interval of the first CEI data set of a new CEI data sequence propagation may be later than the start time of the curve fit interval of the preceding CEI data set that was transmitted prior to the cutover. The beginning of the curve fit interval of the first CEI data set of a new CEI data sequence propagation will be a multiple of 300 seconds (5 minutes) relative to the start of week.

IS:

The start time of the curve fit interval of the first CEI data set of a new CEI data sequence propagation may be later than the start time of the curve fit interval of the preceding CEI data set that was transmitted prior to the cutover. The beginning of the curve fit interval of the first CEI data set of a new CEI data sequence propagation will be a multiple of 300 seconds (5 minutes) relative to the start of week.

Rationale:

New information (using wording that accommodates the differences in CEI data set implementation for IIR/IIR-M/IIF and GPS III/IIF) to explain the constraints on selection of the new curve fit interval, for the first CEI data set of a new CEI data sequence propagation.