CHANGE NOTICE

Affected Document: IS-GPS-705 Rev J	**IRN/SCN Number** XXX-XXXX-XXX	**Date:** DD-MMM-YYYY
Authority: RFC-00502	**Proposed Change Notice** PCN-IS-705J_RFC502	**Date:** 31-MAY-2023

Document Title: NAVSTAR GPS Space Segment/Navigation User Interfaces

RFC Title: 2023 Proposed Changes to the Public Documents

Reason For Change (Driver):

1. Finalize the CNAV Schedules Technical Baseline changes
2. Resolve the Data ID Issue in IS-GPS-200 (a commercial vendor did not want Data IDs other than 2)
3. Add the maximum power for GPS III/IIIF SVs to IS-GPS-200
4. Accommodate all administrative fixes possible from Boeing's list of fixes

Description of Change:

1. Update the CNAV message schedule information
2. Publish the resolution for the Data ID Issue to IS-GPS-200
3. Add the maximum power for GPS III/IIIF SVs to IS-GPS-200
4. Fix the three figures that have the most readability problems

Authored By: RE: Tony Anthony **Checked By:** RE: Emily Hendrickson

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

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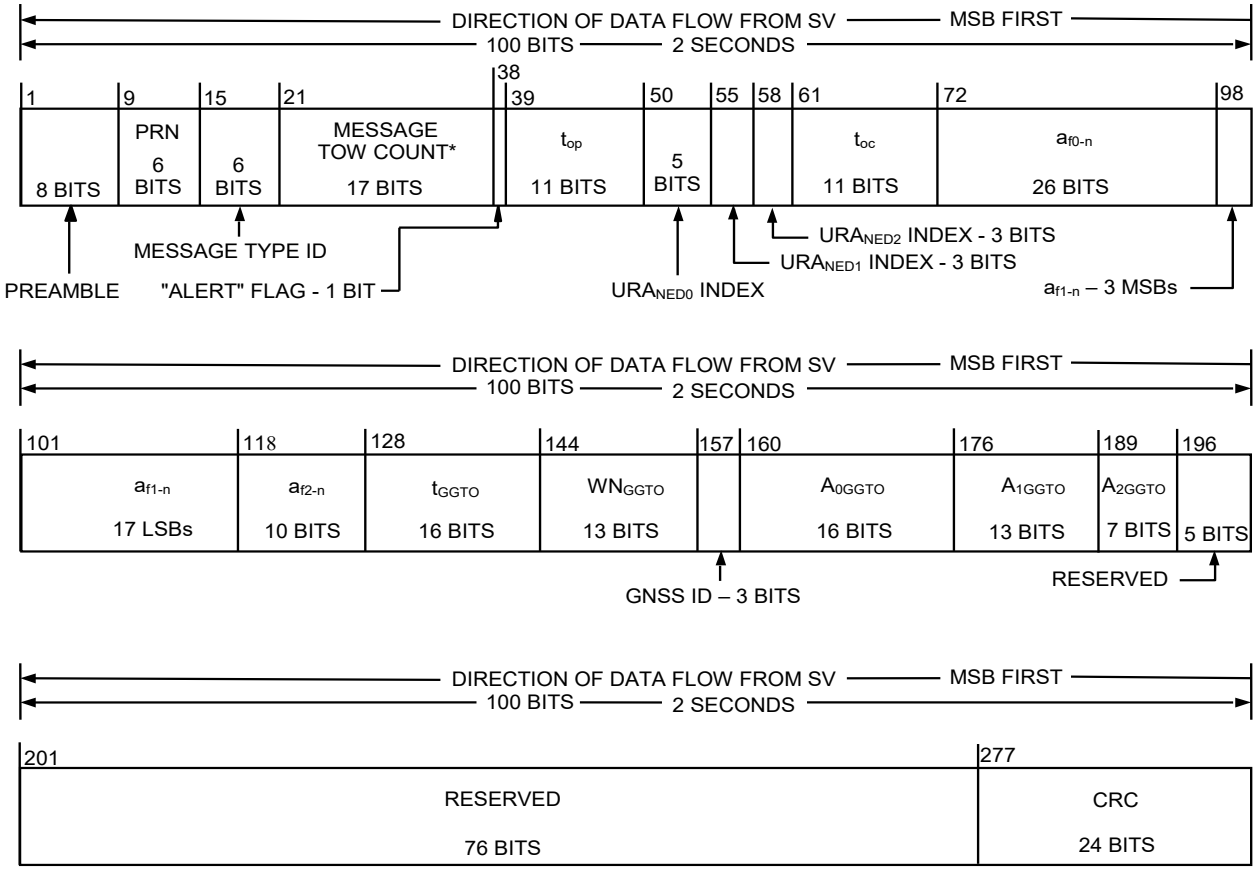
THIS DOCUMENT SPECIFIES TECHNICAL REQUIREMENTS AND NOTHING HEREIN CONTAINED SHALL BE DEEMED TO ALTER THE TERMS OF ANY CONTRACT OR PURCHASE ORDER BETWEEN ALL PARTIES AFFECTED.	Interface Control Contractor: SAIC (GPS SE&I) 200 N. Pacific Coast Highway, Suite 1800 El Segundo, CA 90245 CODE IDENT 66RP1

IS705-205:

Section Number:
20.3.3.0-16

WAS:

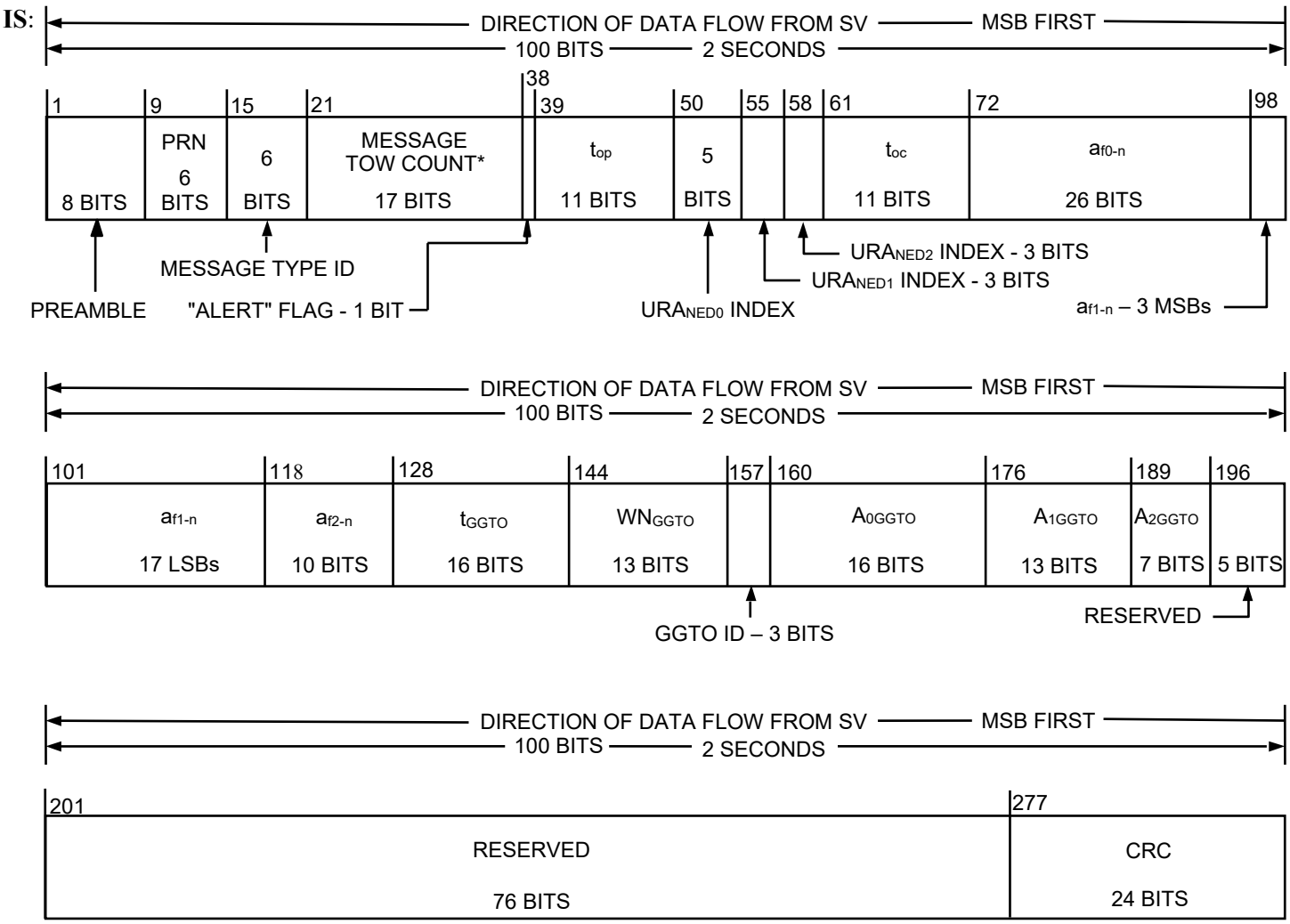


* MESSAGE TOW COUNT = 17 MSB OF ACTUAL TOW COUNT AT START OF NEXT 6-SECOND MESSAGE

Redlines: <not available graphically>

- The GNSS ID field was renamed GGTO ID near the middle of the figure.

IS:



* MESSAGE TOW COUNT = 17 MSB OF ACTUAL TOW COUNT AT START OF NEXT 6-SECOND MESSAGE

Rationale:
5/19/2023: CRM #142 Renamed GNSS ID parameter associated with MT 35 to GGTO ID to eliminate overloading the GNSS ID definition. (T. Anthony)

IS705-1723:

Section Number:
20.3.3.8.1.0-2

WAS:
Bits 157 through 159 of message type 35 shall identify the other GPS-like navigation system to which the offset data applies. The three bits are defined as follows;

000 = no data available,
001 = Galileo,
010 = GLONASS,
011 through 111 = Reserved in order to preserve use of these values in a future revision of this IS. Until such a revision, the user segment developing to this version of this IS should interpret these values as indicating that the GPS/GNSS Time Offset Parameter data, to which the GNSS Type ID applies, is presently unusable.

Redlines:
Bits 157 through 159 of message type 35 shall identify the other GPS-like navigation system to which the offset data applies. The three bits are defined as follows~~;~~:

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Rationale:
5/19/2023: CRM #142 Renamed GNSS ID parameter associated with MT 35 to GGTO ID to eliminate overloading the GNSS ID definition. (T. Anthony)

IS705-364:

Section Number:
20.3.3.8.2.0-3

WAS:

Parameter Symbol	Parameter Description	No. of Bits**	Scale Factor (LSB)	Valid Range***	Units
A_{0GGTO}	Bias coefficient of GPS time scale relative to GNSS time scale	16*	2^{-35}		seconds
A_{1GGTO}	Drift coefficient of GPS time scale relative to GNSS time scale	13*	2^{-51}		sec/sec
A_{2GGTO}	Drift rate correction coefficient of GPS time scale relative to GNSS time scale	7*	2^{-68}		sec/sec^2
t_{GGTO}	Time data reference Time of Week Time data reference Week Number	16	2^4	0 to 604,784	seconds
WN_{GGTO}	GNSS Type ID	13	2^0		weeks
GNSS ID		3			see text

* Parameters so indicated shall be two's complement with the sign bit (+ or -) occupying the MSB;

** See Figure 20-8 for complete bit allocation;

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

Redlines:

Parameter		No. of Bits**	Scale Factor (LSB)	Valid Range***	Units
A_{0GGTO}	Bias coefficient of GPS time scale relative to GNSS time scale	16*	2^{-35}		seconds
A_{1GGTO}	Drift coefficient of GPS time scale relative to GNSS time scale	13*	2^{-51}		sec/sec
A_{2GGTO}	Drift rate correction coefficient of GPS time scale relative to GNSS time scale	7*	2^{-68}		sec/sec^2
t_{GGTO}	Time data reference Time of Week	16	2^{4}	0 to 604,784	seconds
WN_{GGTO}	Time data reference Week Number	13	2^{0}		weeks
~~GNSS~~GGTO ID	GNSS Type ID	3			see text

* Parameters so indicated shall be two's complement with the sign bit (+ or -) occupying the MSB~~;~~

** See Figure 20-8 for complete bit allocation~~;~~

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

IS:

Parameter		No. of Bits**	Scale Factor (LSB)	Valid Range***	Units
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t_{GGTO}	Time data reference Time of Week	16	2^{4}	0 to 604,784	seconds
WN_{GGTO}	Time data reference Week Number	13	2^{0}		weeks
GGTO ID	GNSS Type ID	3			see text

* Parameters so indicated shall be two's complement with the sign bit (+ or -) occupying the MSB

** See Figure 20-8 for complete bit allocation

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

Rationale:
5/19/2023: CRM #142 Renamed GNSS ID parameter associated with MT 35 to GGTO ID to eliminate overloading the GNSS ID definition. (T. Anthony)

IS705-370:

Section Number:
20.3.4.1.0-1

WAS:
Broadcast system of messages is completely arbitrary, but sequenced to provide optimum user performance. Message types 10 and 11 shall be broadcast at least once every 24 seconds.

Redlines:
~~Broadcast~~The ~~system~~broadcast schedule of ~~messages~~CNAV message types is completely arbitrary~~,~~ but sequenced to provide optimum user performance.~~-~~ Message types 10, 11, and ~~11~~a clock message shall be broadcast at least once every 30 seconds (with a nominal rate of 24 seconds) to provide system users the clock, ephemeris and integrity (CEI) data needed to access GPS. Among the broadcast clock messages, an MT 30 message will be broadcast once every 150 seconds. Other message types may not be broadcast, but when they are scheduled for broadcast, they will be broadcast in between these CEI messages. If a message type is scheduled for broadcast on L5I from a satellite, that satellite will broadcast that message type on L5I at least every 10 minutes, unless a message generation failure results in its replacement with a Message Type 0. Message types with constellation data (like almanac and differential corrections) will cycle through any allotted broadcast slots in these 10-minute intervals, and therefore, will take longer than 10 minutes to complete the broadcast of the entire data set. CNAV message broadcast schedules may differ between satellites, and between L2C and L5I on the same satellite.

IS:
The broadcast schedule of CNAV message types is completely arbitrary but sequenced to provide optimum user performance. Message types 10, 11, and a clock message shall be broadcast at least once every 30 seconds (with a nominal rate of 24 seconds) to provide system users the clock, ephemeris and integrity (CEI) data needed to access GPS. Among the broadcast clock messages, an MT 30 message will be broadcast once every 150 seconds. Other message types may not be broadcast, but when they are scheduled for broadcast, they will be broadcast in between these CEI messages. If a message type is scheduled for broadcast on L5I from a satellite, that satellite will broadcast that message type on L5I at least every 10 minutes, unless a message generation failure results in its replacement with a Message Type 0. Message types with constellation data (like almanac and differential corrections) will cycle through any allotted broadcast slots in these 10-minute intervals, and therefore, will take longer than 10 minutes to complete the broadcast of the entire data set. CNAV message broadcast schedules may differ between satellites, and between L2C and L5I on the same satellite.

Rationale:
5/17/2023 Per AWG 1A, changed "in-between" to "in between" and "10 minute intervals" to "10-minute intervals" (T. Anthony)5/16/2023 CRM #78 replaced "therefore may take longer" with "therefore will take longer" and replaced "within 10 minutes" with "at least every 10 minutes" (T. Anthony)

5/3/2023: CRM #102 Use present tense "broadcast" (T. Anthony)

3/14/2023: Added note about the exception for how long the interval will be between successive messages being broadcast and extended the possible interval for MT 10, 11 and 30. (T. Anthony)

2/28/2023: Overall plan is to reduce the number of messages that have a specific Maximum Broadcast Interval per TIM #1. Specifically, Message Type 30 Maximum Broadcast Interval is added to this paragraph along with Message Types 10 and 11. Then Table 20-XII isn't needed. (T. Anthony)

IS705-1731:

Section Number:
20.3.4.1.0-2

WAS:
All other messages shall be broadcast in-between, not exceeding the maximum broadcast interval in Table 20-XII. Message type 15 will be broadcast as needed, but will not reduce the maximum broadcast interval of the other messages. Type 15 messages that are longer than one page will not necessarily be broadcast consecutively.

Redlines:
~~All other messages shall be broadcast in-between, not exceeding the maximum broadcast interval in Table 20-XII.~~
Message ~~type~~Type 15~~ will be broadcast as needed, but will not reduce the maximum broadcast interval of the other messages.~~ ~~Type~~and ~~15~~36 messages that are longer than one text page will not necessarily be broadcast consecutively.

IS:
Message Type 15 and 36 messages that are longer than one text page will not necessarily be broadcast consecutively.

Rationale:
5/19/2023: CRM #79 per the AWG added "and 36" , inserted "text" before "page" and removed the parenthetical expression that associated page with TEXT_PAGE. (T. Anthony)

5/3/2023: CRM #79 Retained Message Type 15 relevant sentences while deleting the reference to Table 20-XII. Also define how one identifies pages (T. Anthony)

2/28/2023: This change adds the Maximum Broadcast Interval for Message Type 30 series clock messages to 20.3.4.1 and drops Table 20-XII entirely per TIM #1 (T. Anthony)

IS705-1551:

Section Number:
20.3.4.1.0-3

WAS:
Table 20-XII. Message Broadcast Intervals

Redlines:
Table 20-XII. ~~Message Broadcast Intervals~~RESERVED

IS:
Table 20-XII. RESERVED

Rationale:
5/3/2023: CRM #124 Suggested making the Table Caption RESERVED instead of deleting it. (T. Anthony)

2/28/2023: This change adds the Maximum Broadcast Interval for Message Type 30 series clock messages to 20.3.4.1 and drops Table 20-XII entirely per TIM #1 (T. Anthony)

IS705-371:

Section Number:
20.3.4.1.0-4

WAS:

Message Data	Message Type Number	Maximum Broadcast Intervals †
Ephemeris	10 & 11	24 sec
Clock	Type 30's	24 sec
ISC, IONO	30*	144 sec
Reduced Almanac	31* or 12	10 min**,****
Midi Almanac	37*	60 min**
EOP	32*	15 min****
UTC	33*	144 sec
Diff Correction	34* or 13 & 14	15 min***,****
GGTO	35*	144 sec****
Text	36* or 15	As needed****
Integrity Support Message +	40	144 sec****

* Also contains SV clock correction parameters.

** Complete set of SVs in the constellation.

*** When Differential Corrections are available.

**** Optional (interval applies if/when broadcast).

\+ One ISM per maximum broadcast interval; However, users are not required but can accept multiple ISMs from any SVs. Users can refer to the future TSO and MSO for further details.

† The intervals specified are maximum. As such, the broadcast intervals may be shorter than the specified value.

Redlines:

~~Message Data~~	~~Message Type Number~~	~~Maximum Broadcast Intervals ‡~~
~~Ephemeris~~	~~10 & 11~~	~~24 sec~~
~~Clock~~	~~Type 30's~~	~~24 sec~~
~~ISC, IONO~~	~~30*~~	~~144 sec~~
~~Reduced Almanac~~	~~31* or 12~~	~~10 min**;****~~
~~Midi Almanac~~	~~37*~~	~~60 min**~~
~~EOP~~	~~32*~~	~~15 min****~~
~~UTC~~	~~33*~~	~~144 sec~~
~~Diff Correction~~	~~34* or 13 & 14~~	~~15 min***;****~~
~~GGTO~~	~~35*~~	~~144 sec****~~
~~Text~~	~~36* or 15~~	~~As needed****~~
~~Integrity Support Message +~~	~~40~~	~~144 sec****~~

~~* Also contains SV clock correction parameters.~~

~~** Complete set of SVs in the constellation.~~

~~*** When Differential Corrections are available.~~

~~**** Optional (interval applies if/when broadcast).~~

~~+ One ISM per maximum broadcast interval; However, users are not required but can accept multiple ISMs from any SVs. Users can refer to the future TSO and MSO for further details.~~

~~‡ The intervals specified are maximum. As such, the broadcast intervals may be shorter than the specified value.~~

IS:
<DELETED OBJECT>

Rationale:
2/28/2023: This change adds the Maximum Broadcast Interval for Message Type 30 series clock messages to 20.3.4.1 and drops Table 20-XII entirely per TIM #1 (T. Anthony)