CHANGE NOTICE

Affected Document: IS-GPS-800 Rev J	**IRN/SCN Number** IRN-IS-800J-003	**Date:** 27-SEP-2023
Authority: RFC-00502	**Proposed Change Notice** PCN- IS-800J_RFC502	**Date:** 31-MAY-2023

Document Title: NAVSTAR GPS Space Segment/Navigation User Segment L1C 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 (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:

Make updates to public documents IS-GPS-200, IS-GPS-705 and IS-GPS-800 as appropriate

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
DUNN.MICHAEL.J.1171235045 Digitally signed by DUNN.MICHAEL.J.1171235045 Date: 2024.01.19 11:22:56 -08'00'	PNT Technical Director, MilComm & PNT Directorate, Space Systems Command (SSC)	19-JAN-2024

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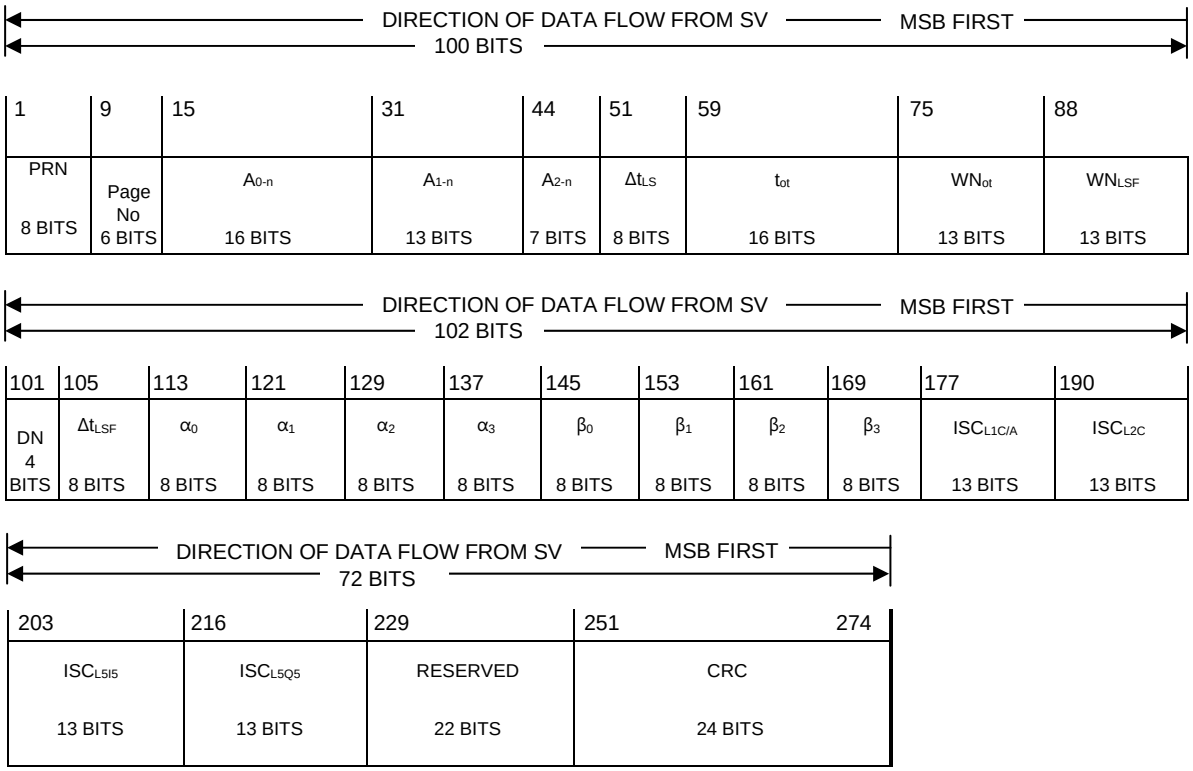
THIS DOCUMENT SPECIFIES TECHNICAL REQUIREMENTS AND NOTHING HEREIN CONTAINED SHALL BE DEEMED TO ALTER THE TERMS OF ANY CONTRACT OR PURCHASE ORDER BETWEEN ALL PARTIES AFFECTED.	Interface Control Contractor: SAIC (GPS SE&I) 200 N. Pacific Coast Highway, Suite 1800 El Segundo, CA 90245 CODE IDENT 66RP1

IS800-146:

Section Number:
3.5.2.0-5
WAS:

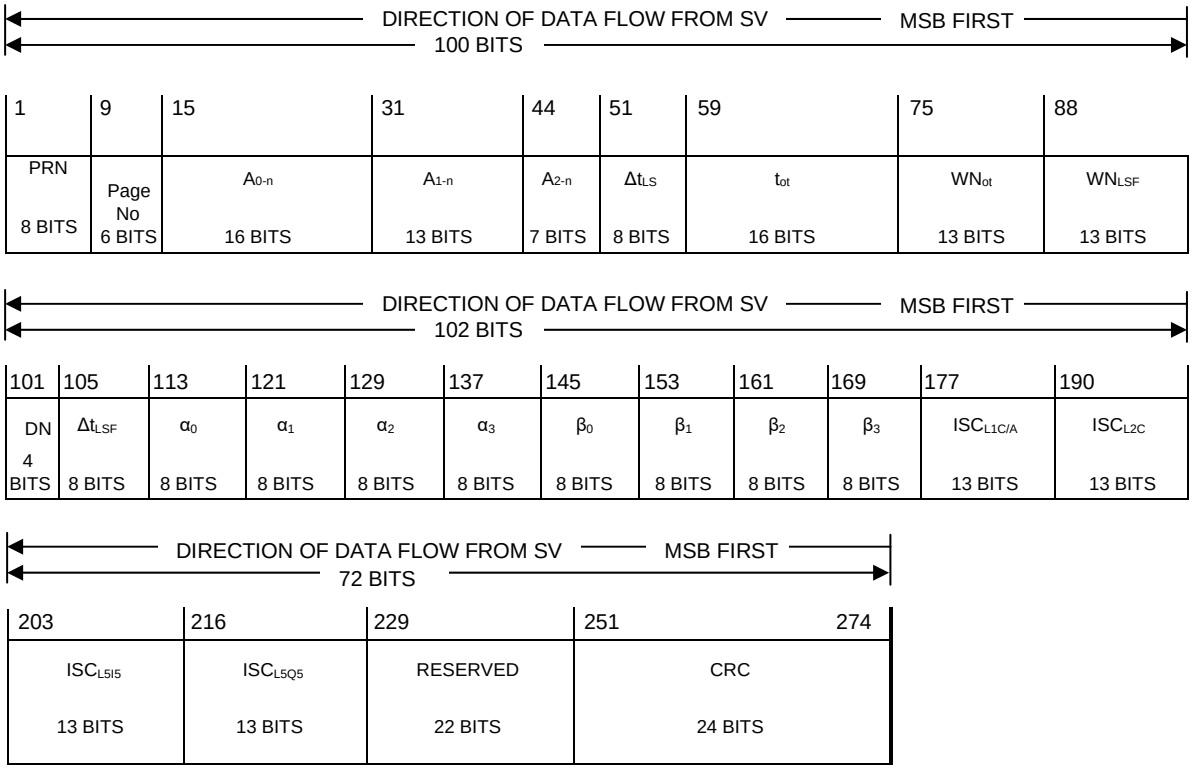


NOTE: Broadcast sequence of subframe 3 pages is a variable and, as such, users must not expect a fixed pattern of page sequence.

Redlines:

- Although the WAS/IS doesn't look different to the reader of this document, at one point all the alpha and beta characters in the IS figure appeared as question marks. In the figure below, they are restored.

IS:

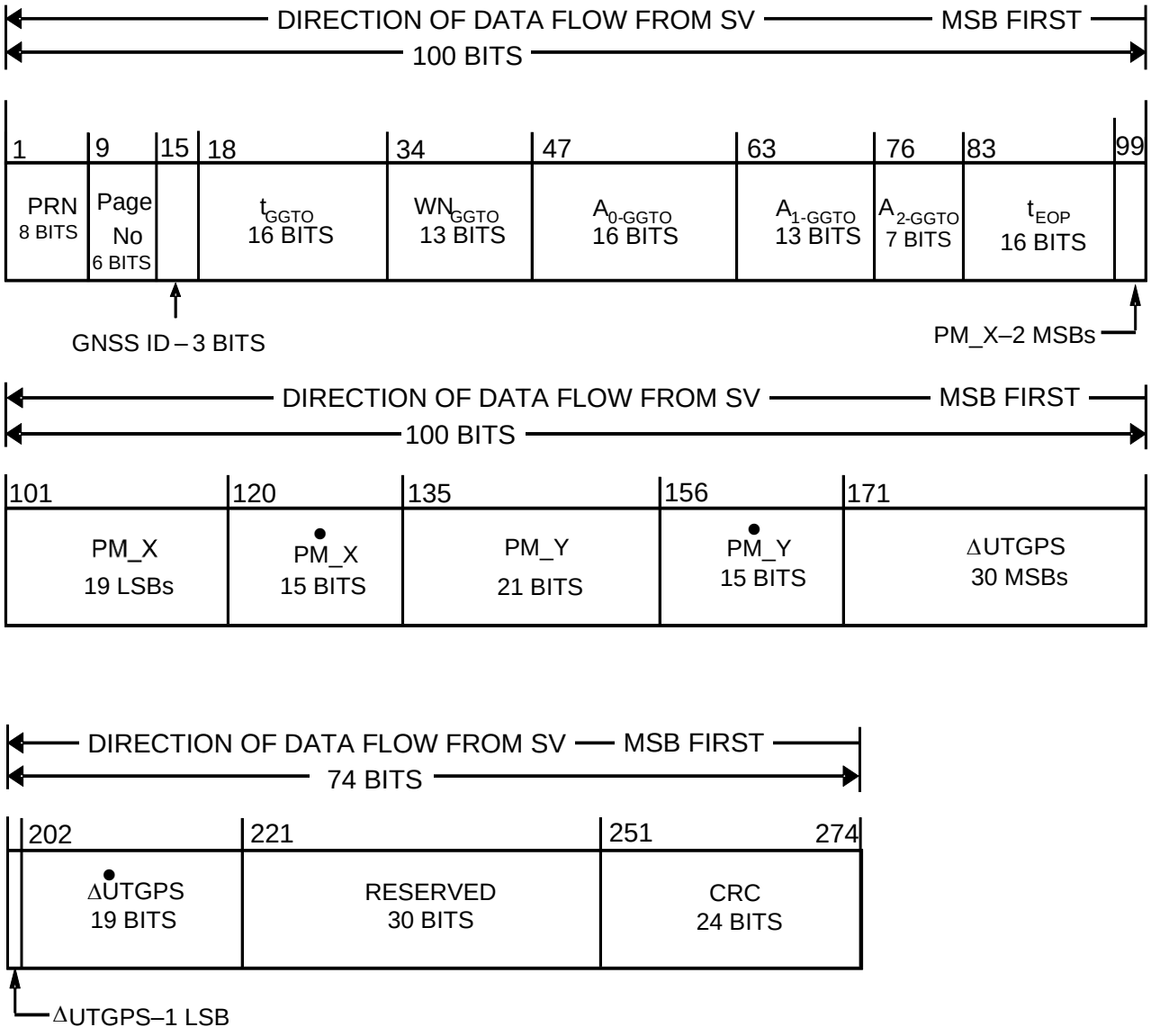


NOTE: Broadcast sequence of subframe 3 pages is a variable and, as such, users must not expect a fixed pattern of page sequence.

IS800-875:

Section Number:
3.5.2.0-7

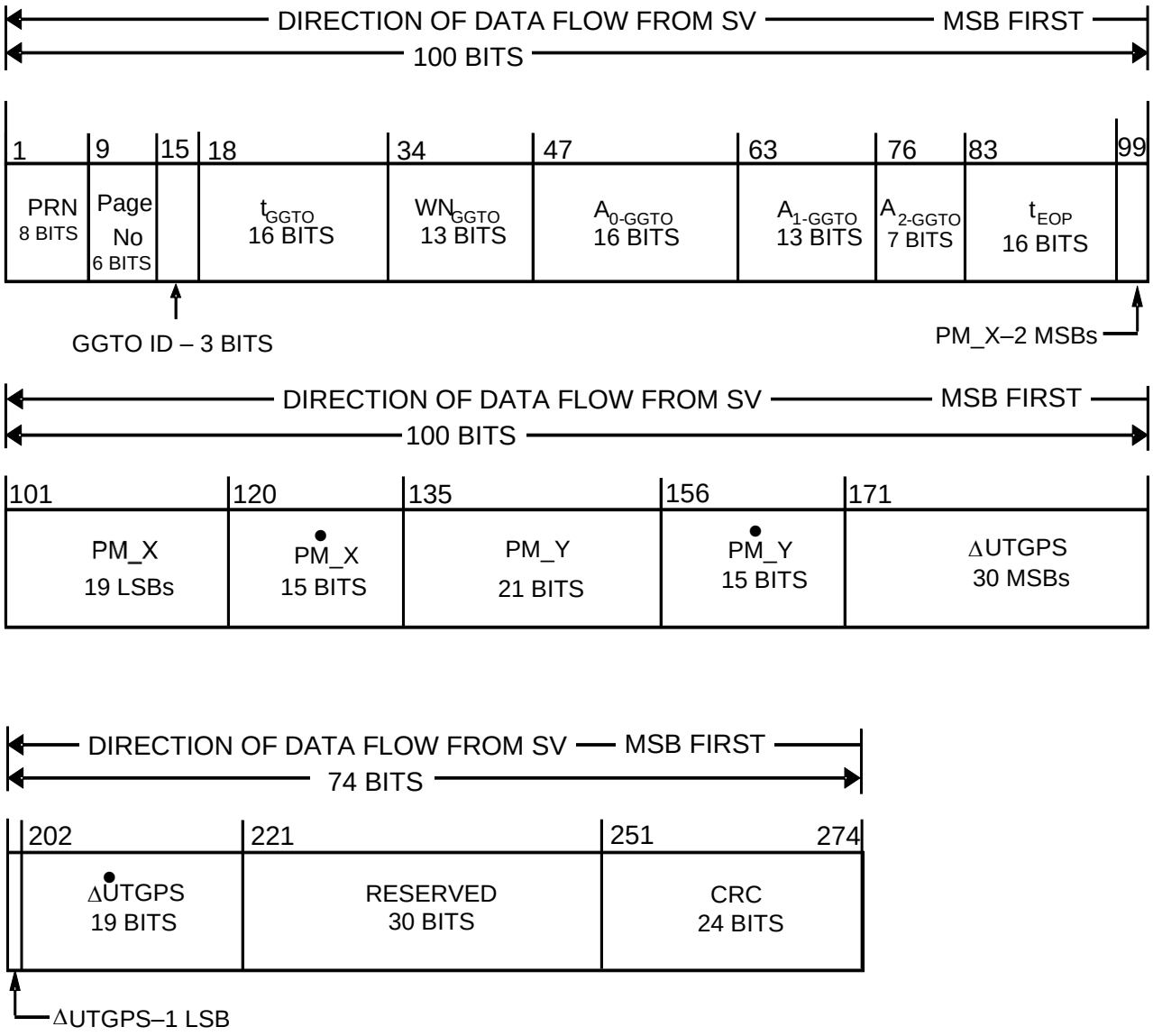
WAS:



Redlines: <not available graphically>

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

IS:


DIRECTION OF DATA FLOW FROM SV
MSB FIRST
100 BITS
1
9
15
18
34
47
63
76
83
99
PRN
8 BITS
Page
No
6 BITS
t_{GGTO}
16 BITS
WN_{GGTO}
13 BITS
$A_{0\text{-}GGTO}$
16 BITS
$A_{1\text{-}GGTO}$
13 BITS
$A_{2\text{-}GGTO}$
7 BITS
t_{EOP}
16 BITS
GGTO ID – 3 BITS
PM_X–2 MSBs
DIRECTION OF DATA FLOW FROM SV
MSB FIRST
100 BITS
101
120
135
156
171
PM_X
19 LSBs
PM_X
15 BITS
PM_Y
21 BITS
PM_Y
15 BITS
ΔUTGPS
30 MSBs

DIRECTION OF DATA FLOW FROM SV
MSB FIRST
74 BITS
202
221
251
274
ΔUTGPS
19 BITS
RESERVED
30 BITS
CRC
24 BITS
ΔUTGPS–1 LSB

IS800-159:

Section Number:
3.5.3.0-8
WAS:

Parameter		No. of Bits**	Scale Factor (LSB)	Valid Range***	Units
WN	Data Sequence Propagation Week Number	13	1		weeks
ITOW	Interval time of week	8		0 to 83	(see text)
t_{op}	CEI Data sequence propagation time of week	11	300	0 to 604,500	seconds
L1C health		1			(see text)
URA_{ED} Index	ED accuracy index	5*			(see text)
t_{oe}	Ephemeris/clock data reference time of week	11	300	0 to 604,500	seconds
ΔA ****	Semi-major axis difference at reference time	26*	2^{-9}		meters
$\dot{A}$	Change rate in semi-major axis	25*	2^{-21}		meters/sec
Δn_0	Mean Motion difference from computed value at reference time	17*	2^{-44}		semi-circles/sec
$\Delta \dot{n}_0$	Rate of mean motion difference from computed value	23*	2^{-57}		semi-circles/sec^2
$M_{0\text{-}n}$	Mean anomaly at reference time	33*	2^{-32}		semi-circles
e_n	Eccentricity	33	2^{-34}	0.0 to 0.03	dimensionless
ω_n	Argument of perigee	33*	2^{-32}		semi-circles

* Parameters so indicated are in two's complement notation;
** See Figure 3.5-1 for complete bit allocation in Subframe 2;
*** Unless otherwise indicated in this column, valid range is the maximum range attainable with indicated bit allocation and scale factor.
**** Relative to A_{REF} = 26,559,710 meters.

Redlines:

Parameter		No. of Bits**	Scale Factor (LSB)	Valid Range***	Units
WN	~~Data Sequence Propagation~~ Week Number	13	1		weeks
ITOW	Interval time of week	8		0 to 83	(see text)
t_{op}	CEI Data sequence propagation time of week	11	300	0 to 604,500	seconds
L1C health		1			(see text)
URA_{ED} Index	ED accuracy index	5*			(see text)
t_{oe}	Ephemeris/clock data reference time of week	11	300	0 to 604,500	seconds
ΔA ****	Semi-major axis difference at reference time	26*	2^{-9}		meters
$\dot{A}$	Change rate in semi-major axis	25*	2^{-21}		meters/sec
Δn_0	Mean Motion difference from computed value at reference time	17*	2^{-44}		semi-circles/sec
$\Delta \dot{n}_0$	Rate of mean motion difference from computed value	23*	2^{-57}		semi-circles/sec^2
$M_{0\text{-}n}$	Mean anomaly at reference time	33*	2^{-32}		semi-circles
e_n	Eccentricity	33	2^{-34}	0.0 to 0.03	dimensionless
ω_n	Argument of perigee	33*	2^{-32}		semi-circles

* Parameters so indicated are in two's complement notation;
** See Figure 3.5-1 for complete bit allocation in Subframe 2;
*** Unless otherwise indicated in this column, valid range is the maximum range attainable with indicated bit allocation and scale factor.
**** Relative to A_{REF} = 26,559,710 meters.

IS:

Parameter		No. of Bits**	Scale Factor (LSB)	Valid Range***	Units
WN	Week Number	13	1		weeks
ITOW	Interval time of week	8		0 to 83	(see text)
t_{op}	CEI Data sequence propagation time of week	11	300	0 to 604,500	seconds
L1C health		1			(see text)
URA_{ED} Index	ED accuracy index	5*			(see text)
t_{oe}	Ephemeris/clock data reference time of week	11	300	0 to 604,500	seconds
ΔA ****	Semi-major axis difference at reference time	26*	2^{-9}		meters
$\dot{A}$	Change rate in semi-major axis	25*	2^{-21}		meters/sec
Δn_0	Mean Motion difference from computed value at reference time	17*	2^{-44}		semi-circles/sec
$\Delta \dot{n}_0$	Rate of mean motion difference from computed value	23*	2^{-57}		semi-circles/sec^2
$M_{0\text{-}n}$	Mean anomaly at reference time	33*	2^{-32}		semi-circles
e_n	Eccentricity	33	2^{-34}	0.0 to 0.03	dimensionless
ω_n	Argument of perigee	33*	2^{-32}		semi-circles

* Parameters so indicated are in two's complement notation;
** See Figure 3.5-1 for complete bit allocation in Subframe 2;
*** Unless otherwise indicated in this column, valid range is the maximum range attainable with indicated bit allocation and scale factor.
**** Relative to A_{REF} = 26,559,710 meters.

IS800-655:

Section Number:
3.5.4.2.1.0-2
WAS:
000 = no data available,
001 = Galileo,
010 = GLONASS,
011 through 111 = Reserved in order to preserve the use of these values in a future version of this IS. Until such a revision, a developer 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:
000 = no data available,
001 = Galileo,
010 = GLONASS,
011 through 111 = Reserved in order to preserve the use of these values in a future version of this IS. Until such a revision, a developer 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~~GGTO ID applies, is presently unusable.
IS:
000 = no data available,
001 = Galileo,
010 = GLONASS,
011 through 111 = Reserved in order to preserve the use of these values in a future version of this IS. Until such a revision, a developer developing to this version of this IS should interpret these values as indicating that the GPS/GNSS Time Offset Parameter data, to which the GGTO ID applies, is presently unusable.

IS800-236:

Section Number:
3.5.4.2.1.1.0-4

WAS:

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 ID	GNSS Type ID	3			see text

* Parameters so indicated shall be in two's complement notation;

** See Figure 3.5-3 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
GGTO ~~GNSS~~ ID	GGTO ~~GNSS~~ Type ID	3			see text

* Parameters so indicated shall be in two's complement notation;

** See Figure 3.5-3 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
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
GGTO ID	GGTO Type ID	3			see text

* Parameters so indicated shall be in two's complement notation;

** See Figure 3.5-3 for complete bit allocation;

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

IS800-917:

Section Number:
6.2.8.1-2
WAS:

Symbol	Parameter Name	Subframe
$\dot{A}$	Change Rate in Semi-major Axis	2
ΔA	Semi-major Axis Difference at Reference Time	2
Δn_0	Mean Motion Difference from Computed Value at Reference Time	2
Δni_0	Rate of Mean Motion Difference from Computed Value	2
Ω_0	Longitude of Ascending Node of Orbit Plane at Weekly Epoch	2
$\Delta\dot{\Omega}$	Rate of Right Ascension Difference	2
ω	Argument of Perigee	2
a_{f0}	SV Clock Bias Correction Coefficient	2
a_{f1}	SV Clock Drift Correction Coefficient	2
a_{f2}	Drift Rate Correction Coefficient Index	2
C_{ic}	Amplitude of the Cosine Harmonic Correction Term to the Angle of Inclination	2
C_{is}	Amplitude of the Sine Harmonic Correction Term to the Angle of Inclination	2
C_{rc}	Amplitude of the Cosine Harmonic Correction Term to the Orbit Radius	2
C_{rs}	Amplitude of the Sine Correction Term to the Orbit Radius	2
C_{uc}	Amplitude of Cosine Harmonic Correction Term to the Argument of Latitude	2
C_{us}	Amplitude of Sine Harmonic Correction Term to the Argument of Latitude	2
e	Eccentricity	2
i_0	Inclination Angle at Reference Time	2
IDOT	Rate of Inclination Angle	2
ISC_{L1CP}	Inter-signal Correction	2
ISC_{L1CD}	Inter-signal Correction	2
ISC_{L1CA}	Inter-signal Correction	3
ISC_{L2C}	Inter-signal Correction	3
ISC_{L5I5}	Inter-signal Correction	3
ISC_{L5Q5}	Inter-signal Correction	3
ISF	Integrity Status Flag [NOTE1]	2
ITOW	Interval Time of Week	2
L1C	Signal Health (1 bits)	2
M_0	Mean Anomaly at Reference Time	2

Symbol	Parameter Name	Subframe
T_{GD}	Group Delay Differential	2
t_{oe}	Time of Ephemeris	2
t_{op}	CEI Data Sequence Propagation Time of Week	2
URA_{ED} Index	Elevation Dependent User Range Accuracy, URA_{ED} Index	2
URA_{NED0} Index	NED Accuracy Index	2
URA_{NED1} Index	NED Accuracy Change Index	2
URA_{NED2} Index	NED Accuracy Change Rate Index	2
WN	Data Sequence Propagation Week Number	2
NOTE1: Parameters so indicated are for CEI Refinement – not limited to curve fit. Parameters not indicated are needed for/limited to curve fit. Updates to parameters in table shall prompt changes in t_{oe}. Any parameter marked with NOTE1 may be changed with or without a change in t_{oe}.		

Redlines:

Symbol	Parameter Name	Subframe
$\dot{A}$	Change Rate in Semi-major Axis	2
ΔA	Semi-major Axis Difference at Reference Time	2
Δn_0	Mean Motion Difference from Computed Value at Reference Time	2
$\Delta \dot{n}_0$	Rate of Mean Motion Difference from Computed Value	2
Ω_0	Longitude of Ascending Node of Orbit Plane at Weekly Epoch	2
$\Delta \dot{\Omega}$	Rate of Right Ascension Difference	2
ω	Argument of Perigee	2
a_{f0}	SV Clock Bias Correction Coefficient	2
a_{f1}	SV Clock Drift Correction Coefficient	2
a_{f2}	Drift Rate Correction Coefficient ~~Index~~	2
C_{ic}	Amplitude of the Cosine Harmonic Correction Term to the Angle of Inclination	2
C_{is}	Amplitude of the Sine Harmonic Correction Term to the Angle of Inclination	2
C_{rc}	Amplitude of the Cosine Harmonic Correction Term to the Orbit Radius	2
C_{rs}	Amplitude of the Sine Correction Term to the Orbit Radius	2
C_{uc}	Amplitude of Cosine Harmonic Correction Term to the Argument of Latitude	2
C_{us}	Amplitude of Sine Harmonic Correction Term to the Argument of Latitude	2
e	Eccentricity	2
i_0	Inclination Angle at Reference Time	2
IDOT	Rate of Inclination Angle	2
ISC_{L1CP}	Inter-signal Correction	2
ISC_{L1CD}	Inter-signal Correction	2
ISC_{L1CA}	Inter-signal Correction	3
ISC_{L2C}	Inter-signal Correction	3
ISC_{L5I5}	Inter-signal Correction	3
ISC_{L5Q5}	Inter-signal Correction	3
ISF	Integrity Status Flag [NOTE1]	2
ITOW	Interval Time of Week	2
L1C	Signal Health (1 bits)	2
M_0	Mean Anomaly at Reference Time	2
T_{GD}	Group Delay Differential	2
WN_{OP}	CEI Data Sequence Propagation Week Number	2

Symbol	Parameter Name	Subframe
t_{oe}	Time of Ephemeris	2
t_{op}	CEI Data Sequence Propagation Time of Week	2
URA_{ED} Index	Elevation Dependent User Range Accuracy, URA_{ED} Index	2
URA_{NED0} Index	NED Accuracy Index	2
URA_{NED1} Index	NED Accuracy Change Index	2
URA_{NED2} Index	NED Accuracy Change Rate Index	2
WN	~~Data Sequence Propagation~~ Week Number	2
NOTE1: Parameters so indicated are for CEI Refinement – not limited to curve fit. Parameters not indicated are needed for/limited to curve fit. Updates to parameters in table shall prompt changes in t_{oe}. Any parameter marked with NOTE1 may be changed with or without a change in t_{oe}.		

IS:

Symbol	Parameter Name	Subframe
$\dot{A}$	Change Rate in Semi-major Axis	2
ΔA	Semi-major Axis Difference at Reference Time	2
Δn_0	Mean Motion Difference from Computed Value at Reference Time	2
$\Delta \dot{n_0}$	Rate of Mean Motion Difference from Computed Value	2
Ω_0	Longitude of Ascending Node of Orbit Plane at Weekly Epoch	2
$\Delta \dot{\Omega}$	Rate of Right Ascension Difference	2
ω	Argument of Perigee	2
a_{f0}	SV Clock Bias Correction Coefficient	2
a_{f1}	SV Clock Drift Correction Coefficient	2
a_{f2}	Drift Rate Correction Coefficient	2
C_{ic}	Amplitude of the Cosine Harmonic Correction Term to the Angle of Inclination	2
C_{is}	Amplitude of the Sine Harmonic Correction Term to the Angle of Inclination	2
C_{rc}	Amplitude of the Cosine Harmonic Correction Term to the Orbit Radius	2
C_{rs}	Amplitude of the Sine Correction Term to the Orbit Radius	2
C_{uc}	Amplitude of Cosine Harmonic Correction Term to the Argument of Latitude	2
C_{us}	Amplitude of Sine Harmonic Correction Term to the Argument of Latitude	2
e	Eccentricity	2
i_0	Inclination Angle at Reference Time	2
IDOT	Rate of Inclination Angle	2
ISC_{L1CP}	Inter-signal Correction	2
ISC_{L1CD}	Inter-signal Correction	2
ISC_{L1CA}	Inter-signal Correction	3
ISC_{L2C}	Inter-signal Correction	3
ISC_{L5I5}	Inter-signal Correction	3
ISC_{L5Q5}	Inter-signal Correction	3
ISF	Integrity Status Flag [NOTE1]	2
ITOW	Interval Time of Week	2
L1C	Signal Health (1 bits)	2
M_0	Mean Anomaly at Reference Time	2
T_{GD}	Group Delay Differential	2
WN_{OP}	CEI Data Sequence Propagation Week Number	2

Symbol	Parameter Name	Subframe
t_{oe}	Time of Ephemeris	2
t_{op}	CEI Data Sequence Propagation Time of Week	2
URA_{ED} Index	Elevation Dependent User Range Accuracy, URA_{ED} Index	2
URA_{NED0} Index	NED Accuracy Index	2
URA_{NED1} Index	NED Accuracy Change Index	2
URA_{NED2} Index	NED Accuracy Change Rate Index	2
WN	Week Number	2
NOTE1: Parameters so indicated are for CEI Refinement – not limited to curve fit. Parameters not indicated are needed for/limited to curve fit. Updates to parameters in table shall prompt changes in t_{oe}. Any parameter marked with NOTE1 may be changed with or without a change in t_{oe}.		