

INTERFACE REVISION NOTICE (IRN)

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Affected ICD: IS-GPS-705 Rev D	IRN Number IRN-IS-705D-002	Date: 09-DEC-2015
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CLASSIFIED BY: NA
DECLASSIFY ON: NA

Document Title: NAVSTAR GPS Space Segment/User Segment L5 Interfaces

Reason For Change (Driver): The GPS technical baseline includes requirements for military receivers to recognize, reject, and report invalid data messages from the signal in space. However, GPS interface documents do not consistently define the acceptable data ranges for all data messages and are unclear about how to handle certain data fields. As a result, GPS developers may generate incorrect assumptions on what constitutes a valid or an invalid message, leading to degraded or inconsistent GPS performance.

Description of Change: Perform an engineering analysis on all GPS messages used by military GPS receivers. Assess and prioritize candidate messages where clarification of valid data fields is necessary. Update documentation to define validity ranges for applicable data fields and to clarify how receivers should handle certain data fields.

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AUTHORIZED SIGNATURES	REPRESENTING	DATE
	GPS Directorate Space & Missile Systems Center (SMC) – LAAFB	

DISTRIBUTION STATEMENT A: Approved For Public Release; Distribution Is Unlimited

6.2.5 :

Insertion after object IS705-132

WAS :

N/A

IS :

Reserved Data

6.2.5 :

Insertion below object IS705-1508

WAS :

N/A

IS :

See paragraph 6.2.6 of IS-GPS-200

6.2.6 :

Insertion after object IS705-1508

WAS :

N/A

IS :

Valid Range

6.2.6 :

Insertion below object IS705-1510

WAS :

N/A

IS :

See paragraph 6.2.7 of IS-GPS-200

6.2.7 :

Insertion after object IS705-1510

WAS :

N/A

IS :

Invalid Range

6.2.7 :

Insertion below object IS705-1512

WAS :

N/A

IS :

See paragraph 6.2.8 of IS-GPS-200

Table 20-I (part 1):

WAS :

Table 20-I. Message Types 10 and 11 Parameters (1 of 2)					
Parameter Symbol	Parameter Description	No. of Bits**	Scale Factor (LSB)	Effective Range***	Units
WN	Week No.	13	1		weeks
URA _{ED} INDEX	ED accuracy	5*			(see text)
Signal health (L1/L2/L5)		3	1		(see text)
t_{op}	Data predict time of week	11	300	604,500	seconds
?A ****	Semi-major axis difference at reference time	26*	2^{-9}		meters
\dot{A}	Change rate in semi-major axis	25*	2^{-21}		meters/sec
? n_0	Mean Motion difference from computed value at reference time	17*	2^{-44}		semi-circles/sec
? \dot{n}_0	Rate of mean motion difference from computed value	23*	2^{-57}		semi-circles/sec ²
M_{0-n}	Eccentricity	33*	2^{-32}		semi-circles
e_n	Argument of perigee	33	2^{-34}	0.03	dimensionless
ω_n		33*	2^{-32}		semi-circles
<p>* Parameters so indicated are two's complement, with the sign bit (+ or -) occupying the MSB;</p> <p>** See Figure 20-1 for complete bit allocation in message type 10;</p> <p>*** Unless otherwise indicated in this column, effective range is the maximum range attainable with indicated bit allocation and scale factor.</p> <p>**** Relative to $A_{REF} = 26,559,710$ meters.</p>					

IS :

Table 20-I. Message Types 10 and 11 Parameters (1 of 2)					
Parameter Symbol	Parameter Description	No. of Bits**	Scale Factor (LSB)	Valid Range***	Units

WN	Week No.	13	1		weeks
URA _{ED} INDEX	ED accuracy	5*			(see text)
Signal health (L1/L2/L5)		3	1		(see text)
t _{op}	Data predict 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
$\dot{\Delta n}_0$	Rate of mean motion difference from computed value	23*	2 ⁻⁵⁷		semi-circles/sec ²
M _{0-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
<p>* Parameters so indicated are two's complement, with the sign bit (+ or -) occupying the MSB;</p> <p>** See Figure 20-1 for complete bit allocation in message type 10;</p> <p>*** Unless otherwise indicated in this column, valid range is the maximum range attainable with indicated bit allocation and scale factor.</p> <p>**** Relative to A_{REF} = 26,559,710 meters.</p>					

Table 20-I (part 2):

WAS :

Table 20-I. Message Types 10 and 11 Parameters (2 of 2)

Parameter Symbol	Parameter Description	No. of Bits**	Scale Factor (LSB)	Effective Range***	Units
t_{oe}	Ephemeris data reference time of week	11	300	604,500	seconds
Ω_{0-n}	Longitude of Ascending Node of Orbit Plane at Weekly Epoch	33*	2^{-32}		semi-circles
$\Delta \dot{\Omega}$ ****	Rate of right ascension difference	17*	2^{-44}		semi-circles/sec
i_{0-n}	Inclination angle at reference time	33*	2^{-32}		semi-circles
\dot{i}_{0-n}	Rate of inclination angle	15*	2^{-44}		semi-circles/sec
C_{is-n}	Amplitude of the sine harmonic correction term to the angle of inclination	16*	2^{-30}		radians
C_{ic-n}	Amplitude of the cosine harmonic correction term to the angle of inclination	16*	2^{-30}		radians
C_{rs-n}	Amplitude of the sine correction term to the orbit radius	24*	2^{-8}		meters
C_{rc-n}	Amplitude of the cosine correction term to the orbit radius	24*	2^{-8}		meters
C_{us-n}	Amplitude of the sine harmonic correction term to the argument of latitude	21*	2^{-30}		radians
C_{uc-n}	Amplitude of the cosine harmonic correction term to the argument of latitude	21*	2^{-30}		radians

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

** See Figure 20-1 and Figure 20-2 for complete bit allocation in message types 10 and 11;

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

**** Relative to $\dot{\Omega}_{REF} = -2.6 \times 10^{-9}$ semi-circles/second.

IS :

Table 20-I. Message Types 10 and 11 Parameters (2 of 2)

Parameter Symbol	Parameter Description	No. of Bits**	Scale Factor (LSB)	Valid Range***	Units
t_{oe}	Ephemeris data reference time of week	11	300	0 to 604,500	seconds
Ω_{0-n}	Longitude of Ascending Node of Orbit Plane at Weekly Epoch	33*	2^{-32}		semi-circles
$\dot{\Delta \Omega}$ ****	Rate of right ascension difference	17*	2^{-44}		semi-circles/sec
i_{0-n}	Inclination angle at reference time	33*	2^{-32}		semi-circles
\dot{i}_{0-n}	Rate of inclination angle	15*	2^{-44}		semi-circles/sec
C_{is-n}	Amplitude of the sine harmonic correction term to the angle of inclination	16*	2^{-30}		radians
C_{ic-n}	Amplitude of the cosine harmonic correction term to the angle of inclination	16*	2^{-30}		radians
C_{rs-n}	Amplitude of the sine correction term to the orbit radius	24*	2^{-8}		meters
C_{rc-n}	Amplitude of the cosine correction term to the orbit radius	24*	2^{-8}		meters
C_{us-n}	Amplitude of the sine harmonic correction term to the argument of latitude	21*	2^{-30}		radians
C_{uc-n}	Amplitude of the cosine harmonic correction term to the argument of latitude	21*	2^{-30}		radians
<p>* Parameters so indicated are two's complement, with the sign bit (+ or -) occupying the MSB;</p> <p>** See Figure 20-1 and Figure 20-2 for complete bit allocation in message types 10 and 11;</p> <p>*** Unless otherwise indicated in this column, valid range is the maximum range attainable with indicated bit allocation and scale factor.</p> <p>**** Relative to $\dot{\Omega}_{REF} = -2.6 \times 10^{-9}$ semi-circles/second.</p>					

Table 20-III :

WAS :

Table 20-III. Clock Correction and Accuracy Parameters

Parameter Symbol	Parameter Description	No. of Bits**	Scale Factor (LSB)	Effective Range***	Units
t_{oc}	Clock Data Reference Time of Week	11	300	604,500	seconds
URA_{NED0} Index	NED Accuracy Index	5*			(see text)
URA_{NED1} Index	NED Accuracy Change Index	3			(see text)
URA_{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

* Parameters so indicated are two's complement, with the sign bit (+ or -) occupying the MSB;
 ** See Figures 20-3 through 20-10 for complete bit allocation in message types 30 to 37;
 *** Unless otherwise indicated in this column, effective range is the maximum range attainable with indicated bit allocation and scale factor.

IS :

Table 20-III. Clock Correction and Accuracy Parameters					
Parameter		No. of Bits**	Scale Factor (LSB)	Valid Range***	Units
t_{op}	Data Predict Time of Week	11	300	0 to 604,500	seconds
t_{oc}	Clock Data Reference Time of Week	11	300	0 to 604,500	seconds
URA_{NED0} Index	NED Accuracy Index	5*			(see text)
URA_{NED1} Index	NED Accuracy Change Index	3			(see text)
URA_{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
<p>* Parameters so indicated are two's complement, with the sign bit (+ or -) occupying the MSB;</p> <p>** See Figure 20-3 through 20-10 for complete bit allocation in Message types 30 to 37;</p> <p>*** Unless otherwise indicated in this column, valid range is the maximum range attainable with indicated bit allocation and scale factor.</p>					

Table 20-IV :

WAS :

Table 20-IV. Group Delay Differential Parameters ****				
Parameter	No. of Bits**	Scale Factor (LSB)	Effective Range***	Units
T _{GD}	13*	2 ⁻³⁵		seconds
ISC _{L1C/A}	13*	2 ⁻³⁵		seconds
ISC _{L2C}	13*	2 ⁻³⁵		seconds
ISC _{L515}	13*	2 ⁻³⁵		seconds
ISC _{L5Q5}	13*	2 ⁻³⁵		seconds

* Parameters so indicated are two's complement with the sign bit (+ or -) occupying the MSB;
 ** See Figure 20-3 for complete bit allocation in message type 30;
 *** Effective range is the maximum range attainable with indicated bit allocation and scale factor;
 **** The bit string of "100000000000" will indicate that the group delay value is not available.

IS :

Table 20-IV. Group Delay Differential Parameters ****				
Parameter	No. of Bits**	Scale Factor (LSB)	Valid Range***	Units
T _{GD}	13*	2 ⁻³⁵		seconds
ISC _{L1C/A}	13*	2 ⁻³⁵		seconds
ISC _{L2C}	13*	2 ⁻³⁵		seconds
ISC _{L515}	13*	2 ⁻³⁵		seconds
ISC _{L5Q5}	13*	2 ⁻³⁵		seconds

* Parameters so indicated are two's complement with the sign bit (+ or -) occupying the MSB;
 ** See Figure 20-3 for complete bit allocation in message type 30;
 *** Valid range is the maximum range attainable with indicated bit allocation and scale factor;
 **** The bit string of "100000000000" will indicate that the group delay value is not available.

Table 20-V :

WAS :

Table 20-V. Midi Almanac Parameters				
Parameter	No. of Bits**	Scale Factor (LSB)	Effective Range***	Units
t_{oa}	8	2^{12}	602,112	seconds
e	11	2^{-16}		dimensionless
δ_1****	11*	2^{-14}		semi-circles
$\dot{\Omega}$	11*	2^{-33}		semi-circles/sec
\sqrt{A}	17	2^{-4}		$\sqrt{\text{meters}}$
Ω_0	16*	2^{-15}		semi-circles
ω	16*	2^{-15}		semi-circles
M_0	16*	2^{-15}		semi-circles
a_{f0}	11*	2^{-20}		seconds
a_{f1}	10*	2^{-37}		sec/sec

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

** See Figure 20-10 for complete bit allocation in message type 37;

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

**** Relative to $i_0 = 0.30$ semi-circles.

IS :

Table 20-V. Midi Almanac Parameters				
Parameter	No. of Bits**	Scale Factor (LSB)	Valid Range***	Units
t_{oa}	8	2^{12}	0 to 602,112	seconds
e	11	2^{-16}	0.0 to 0.03	dimensionless
δ_i^{****}	11*	2^{-14}		semi-circles
$\dot{\Omega}$	11*	2^{-33}	-6.33E-07 to 0	semi-circles/sec
\sqrt{A}	17	2^{-4}	2530 to 8192	$\sqrt{\text{meters}}$
Ω_0	16*	2^{-15}		semi-circles
ω	16*	2^{-15}		semi-circles
M_0	16*	2^{-15}		semi-circles
a_{f0}	11*	2^{-20}		seconds
a_{f1}	10*	2^{-37}		sec/sec

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

** See Figure 20-10 for complete bit allocation in message type 37;

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

**** Relative to $i_0 = 0.30$ semi-circles.

Table 20-VI :

WAS :

Table 20-VI. Reduced Almanac Parameters				
Parameter*****	No. of Bits	Scale Factor (LSB)	Effective Range **	Units
δ_A ***	8 *	2^{+9}	**	meters
Ω_0	7 *	2^{-6}	**	semi-circles
Φ_0 *****	7 *	2^{-6}	**	semi-circles

* Parameters so indicated shall be two's complement with the sign bit (+ or -) occupying the MSB;
 ** Effective range is the maximum range attainable with indicated bit allocation and scale factor;
 *** Relative to $A_{ref} = 26,559,710$ meters;
 ***** $\Phi_0 =$ Argument of Latitude at Reference Time = $M_0 + \omega$;
 ***** Relative to following reference values:
 $e = 0$
 $\delta_i = +0.0056$ semi-circles ($i = 55$ degrees)
 $\dot{\Omega} = -2.6 \times 10^{-9}$ semi-circles/second

IS :

Table 20-VI. Reduced Almanac Parameters				
Parameter*****	No. of Bits	Scale Factor (LSB)	Valid Range **	Units
δ_A ***	8 *	2^{+9}	**	meters
Ω_0	7 *	2^{-6}	**	semi-circles
Φ_0 *****	7 *	2^{-6}	**	semi-circles

* Parameters so indicated shall be two's complement with the sign bit (+ or -) occupying the MSB;
 ** Valid range is the maximum range attainable with indicated bit allocation and scale factor;
 *** Relative to $A_{ref} = 26,559,710$ meters;
 ***** $\Phi_0 =$ Argument of Latitude at Reference Time = $M_0 + \omega$;
 ***** Relative to following reference values:
 $e = 0$
 $\delta_i = +0.0056$ semi-circles ($i = 55$ degrees)
 $\dot{\Omega} = -2.6 \times 10^{-9}$ semi-circles/second

Table 20-VII :

WAS :

Table 20-VII. Earth Orientation Parameters

Parameter Symbol	Parameter Description	No. of Bits**	Scale Factor (LSB)	Effective Range***	Units
t_{EOP}	EOP Data Reference Time	16	2^4	604,784	seconds
PM_X^\dagger	X-Axis Polar Motion Value at Reference Time.	21*	2^{-20}	1	arc-seconds
\dot{PM}_X	X-Axis Polar Motion Drift at Reference Time.	15*	2^{-21}	7.8125×10^{-3}	arc-seconds/day
PM_Y^{\ddagger}	Y-Axis Polar Motion Value at Reference Time.	21*	2^{-20}	1	arc-seconds
\dot{PM}_Y	Y-Axis Polar Motion Drift at Reference Time.	15*	2^{-21}	7.8125×10^{-3}	arc-seconds/day
$\Delta UT1^{\ddagger\ddagger}$	UT1-UTC Difference at Reference Time.	31*	2^{-24}	64	seconds
$\dot{\Delta UT1}^{\ddagger\ddagger}$	Rate of UT1-UTC Difference at Reference Time	19*	2^{-25}	7.8125×10^{-3}	seconds/day

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

** See Figure 20-5 for complete bit allocation in message type 32;

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

† Represents the predicted angular displacement of instantaneous Celestial Ephemeris Pole with respect to semi-minor axis of the reference ellipsoid along Greenwich meridian.

‡ Represents the predicted angular displacement of instantaneous Celestial Ephemeris Pole with respect to semi-minor axis of the reference ellipsoid on a line directed 90° west of Greenwich meridian.

‡‡ With zonal tides restored.

IS :

Table 20-VII. Earth Orientation Parameters					
Parameter Symbol	Parameter Description	No. of Bits**	Scale Factor (LSB)	Valid Range***	Units
t_{EOP}	EOP Data Reference Time	16	2^4	0 to 604,784	seconds
PM_X^\dagger	X-Axis Polar Motion Value at Reference Time.	21*	2^{-20}		arc-seconds
\dot{PM}_X	X-Axis Polar Motion Drift at Reference Time.	15*	2^{-21}		arc-seconds/day
$PM_Y^{\dagger\dagger}$	Y-Axis Polar Motion Value at Reference Time.	21*	2^{-20}		arc-seconds
\dot{PM}_Y	Y-Axis Polar Motion Drift at Reference Time.	15*	2^{-21}		arc-seconds/day
$\Delta UT1^{\dagger\dagger\dagger}$	UT1-UTC Difference at Reference Time.	31*	2^{-24}		seconds
$\dot{\Delta UT1}^{\dagger\dagger\dagger}$	Rate of UT1-UTC Difference at Reference Time	19*	2^{-25}		seconds/day

* Parameters so indicated are two's complement, with the sign bit (+ or -) occupying the MSB;
 ** See Figure 20-5 for complete bit allocation in message type 32;
 *** Unless otherwise indicated in this column, valid range is the maximum range attainable with indicated bit allocation and scale factor.
 † Represents the predicted angular displacement of instantaneous Celestial Ephemeris Pole with respect to semi-minor axis of the reference ellipsoid along Greenwich meridian.
 †† Represents the predicted angular displacement of instantaneous Celestial Ephemeris Pole with respect to semi-minor axis of the reference ellipsoid on a line directed 90° west of Greenwich meridian.
 ††† With zonal tides restored.

Table 20-IX :

WAS :

Table 20-IX. UTC Parameters

Parameter Symbol	Parameter Description	No. of Bits**	Scale Factor (LSB)	Effective Range***	Units
A _{0-n}	Bias coefficient of GPS time scale relative to UTC time scale	16*	2 ⁻³⁵		Seconds
A _{1-n}	Drift coefficient of GPS time scale relative to UTC time scale	13*	2 ⁻⁵¹		sec/sec
A _{2-n}	Drift rate correction coefficient of GPS time scale relative of UTC time scale	7*	2 ⁻⁶⁸		sec/sec ²
Δt _{LS}	Current or past leap second count	8*	1		seconds
t _{ot}	Time data reference Time of Week	16	2 ⁴	604,784	seconds
WN _{ot}	Time data reference Week Number	13	1		weeks
WN _{LSF}	Leap second reference Week Number	8	1		weeks
DN	Leap second reference Day Number	4****	1		days
Δt _{LSF}	Current or future leap second count	8*	1		seconds

* Parameters so indicated shall be two's complement with the sign bit (+ or -) occupying the MSB;
 ** See Figure 20-6 for complete bit allocation
 *** Unless otherwise indicated in this column, effective range is the maximum range attainable with indicated bit allocation and scale factor;
 **** Right justified.

IS :

Table 20-IX. UTC Parameters					
Parameter Symbol	Parameter Description	No. of Bits**	Scale Factor (LSB)	Valid Range***	Units
A _{0-n}	Bias coefficient of GPS time scale relative to UTC time scale	16*	2 ⁻³⁵		Seconds
A _{1-n}	Drift coefficient of GPS time scale relative to UTC time scale	13*	2 ⁻⁵¹		sec/sec
A _{2-n}	Drift rate correction coefficient of GPS time scale relative of UTC time scale	7*	2 ⁻⁶⁸		sec/sec ²
Δt _{LS}	Current or past leap second count	8*	1		seconds
t _{ot}	Time data reference Time of Week	16	2 ⁴	0 to 604,784	seconds
WN _{ot}	Time data reference Week Number	13	1		weeks
WN _{LSF}	Leap second reference Week Number	8	1		weeks
DN	Leap second reference Day Number	4	1	1 to 7	days
Δt _{LSF}	Current or future leap second count	8*	1		seconds
<p>* Parameters so indicated shall be two's complement with the sign bit (+ or -) occupying the MSB; ** See Figure 20-6 for complete bit allocation *** Unless otherwise indicated in this column, valid range is the maximum range attainable with indicated bit allocation and scale factor.</p>					

Table 20-X :

WAS :

Table 20-X. Differential Correction Parameters

Parameter Symbol	Parameter Description	No. of Bits**	Scale Factor (LSB)	Effective Range***	Units
PRN ID		8			see text
δa_{f0}	SV Clock Bias Correction	13*	2^{-35}		seconds
δa_{f1}	SV Clock Drift Correction	8*	2^{-51}		seconds/second
UDRA	User Differential Range Accuracy Index.	5*			see text
$\Delta\alpha$	Alpha Correction to Ephemeris Parameters	14*	2^{-34}		dimensionless
$\Delta\beta$	Beta Correction to Ephemeris Parameters	14*	2^{-34}		dimensionless
$\Delta\gamma$	Gamma Correction to Ephemeris Parameters	15*	2^{-32}		semi-circles
Δi	Angle of Inclination Correction	12*	2^{-32}		semi-circles
$\Delta\Omega$	Angle of Right Ascension Correction	12*	2^{-32}		semi-circles
ΔA	Semi-Major Correction	12*	2^{-9}		meters
$\dot{\text{UDRA}}$	Change Rate of User Differential Range Accuracy Index	5*			see text

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

** See Figures 20-7, 11 and 12 for complete bit allocation in message types 34, 13 and 14.

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

IS :

Table 20-X. Differential Correction Parameters					
Parameter		No. of Bits**	Scale Factor (LSB)	Valid Range***	Units
PRN ID		8			see text
t_{op-D}	DC data predict time of week	11	300	0 to 604,500	seconds
t_{OD}	time of DC data	11	300	0 to 604,500	seconds
δa_{f0}	SV Clock Bias Correction	13*	2^{-35}		seconds
δa_{f1}	SV Clock Drift Correction	8*	2^{-51}		seconds/second
UDRA	User Differential Range Accuracy Index	5*			see text
$\Delta\alpha$	Alpha Correction to Ephemeris Parameters	14*	2^{-34}		dimensionless
$\Delta\beta$	Beta Correction to Ephemeris Parameters	14*	2^{-34}		dimensionless
$\Delta\gamma$	Gamma Correction to Ephemeris Parameters	15*	2^{-32}		semi-circles
Δi	Angle of Inclination Correction	12*	2^{-32}		semi-circles
$\Delta\Omega$	Angle of Right Ascension Correction	12*	2^{-32}		semi-circles
ΔA	Semi-Major Correction	12*	2^{-9}		meters
$\dot{\bullet}$ UDRA	Change Rate of User Differential Range Accuracy Index.	5*			see text

* Parameters so indicated are two's complement, with the sign bit (+ or -) occupying the MSB;
 ** See Figure 20-7 , 11 and 12 for complete bit allocation in Message types 34, 13 and 14;
 *** Unless otherwise indicated in this column, valid range is the maximum range attainable with indicated bit allocation and scale factor.

IS705-361 :

20.3.3.8.1:

Message Type 35 provides SV clock correction parameters (ref. Section 20.3.3.2) and also, shall contain the parameters related to correlating GPS time with other GNSS time. 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 for other systems.

The number of bits, the scales factor (LSB), the ranges, and the units of the GGTO parameters are given in Table 20-XI. See Figure 20-8 for complete bit allocation in message type 35.

IS :

Message Type 35 provides SV clock correction parameters (ref. Section 20.3.3.2) and also, shall contain the parameters related to correlating GPS time with other GNSS time. 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.

The number of bits, the scales factor (LSB), the ranges, and the units of the GGTO parameters are given in Table 20-XI. See Figure 20-8 for complete bit allocation in message type 35.

Table 20-XI :

WAS :

Table 20-XI. GPS/GNSS Time Offset Parameters					
Parameter Symbol	Parameter Description	No. of Bits**	Scale Factor (LSB)	Effective 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	604,784	seconds
WN _{GGTO}	Time data reference Week Number	13	2 ⁰		weeks
GNSS ID	GNSS Type ID	3			see text
<p>* Parameters so indicated shall be two's complement with the sign bit (+ or -) occupying the MSB;</p> <p>** See Figure 20-8 for complete bit allocation;</p> <p>*** Unless otherwise indicated in this column, effective range is the maximum range attainable with indicated bit allocation and scale factor.</p>					

IS :

Table 20-XI. GPS/GNSS Time Offset Parameters					
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	16	2 ⁴	0 to 604,784	seconds
W _{NGGTO}	Time data reference Week Number	13	2 ⁰		weeks
GNSS ID	GNSS Type ID	3			see text
<p>* Parameters so indicated shall be two's complement with the sign bit (+ or -) occupying the MSB;</p> <p>** See Figure 20-8 for complete bit allocation;</p> <p>*** Unless otherwise indicated in this column, valid range is the maximum range attainable with indicated bit allocation and scale factor.</p>					