INTERFACE REVISION NOTICE (IRN)

Note: This Summary Signature Page is to be used after all signatories have signed separate Signature Pages.

Affected ICD:	**IRN Number**	**Date:**
IS-GPS-800 Rev D	IRN-IS-800D-003	25-MAY-2017
Authority:	**PIRN Number**	**Date:**
RFC-00312	PIRN-IS-800D-003A	19-MAY-2017

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

Document Title: Navstar GPS Space Segment / User Segment L1C Interfaces

Reason For Change (Driver): To remove ambiguity in contractor interpretation, the definition of the parameter Time of Predict (T_op) and other timing parameters must be clarified in the GPS technical baseline documentation.

Description of Change: Process RFC via the proposed changes with the correct stakeholders and update the appropriate documentation for accurate implementation.

Prepared By: Amit Patel **Checked By: Huey Nguyenhuu**

AUTHORIZED SIGNATURES	REPRESENTING	DATE
	GPS Directorate Space & Missile Systems Center (SMC) – LAAFB	
See Section XX OR See Next Page	The Boeing Company	
See Section XX OR See Next Page	HQ Air Force Space Command (AFSPC/A5M)	
See Section XX OR See Next Page	Raytheon Company	
See Section XX OR See Next Page	Lockheed Martin Corporation (GPS III)	

Interface Control Contractor:
TASC (GPS SE&I)
An Engility Company
200 N. Sepulveda Blvd., Suite 1800
El Segundo, CA 90245

CODE IDENT 66RP1

INTERFACE REVISION NOTICE (IRN)

Note: Repeat this Signature Page for each document signatory.

Affected ICD: IS-GPS-800 Rev D	**IRN Number** IRN-IS-800D-003	**Date:** 25-MAY-2017
Authority: RFC-00312	**PIRN Number** PIRN-IS-800D-003A	**Date:** 19-MAY-2017

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

Document Title: Navstar GPS Space Segment / User Segment L1C Interfaces

Reason For Change (Driver): To remove ambiguity in contractor interpretation, the definition of the parameter Time of Predict (T_op) and other timing parameters must be clarified in the GPS technical baseline documentation.

Description of Change: Process RFC via the proposed changes with the correct stakeholders and update the appropriate documentation for accurate implementation.

APPROVED:

With Comments: Yes ☐ No ☐

With Exceptions: Yes ☐ No ☐

Name of Approving Organization	Authorized Signature	Date

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

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: TASC (GPS SE&I) An Engility Company 200 N. Sepulveda Blvd., Suite 1800 El Segundo, CA 90245
	CODE IDENT 66RP1

IS800-157 :

Section Number :
3.5.3.0-5

WAS :
Any change in the subframe 2 ephemeris and clock data shall be accomplished with a simultaneous change in the t_{oe} value. The SV shall assure that the t_{oe} value, for at least the first data set transmitted by an SV after an upload, is different from that transmitted prior to the cutover. The eight LSBs of t_{oe} for each data set shall be different from the eight LSBs of t_{oe} transmitted during the previous six hours by the SV.

Redlines :
Any change in the subframe 2 ephemeris and clock data shall be accomplished with a simultaneous change in the toe value. The SV shall assure that the toe value, for at least the first CEI data set transmitted by an SV ~~after~~from ~~an~~a ~~upload~~new CEI data sequence propagation, is different from that transmitted from the prior ~~to~~CEI ~~the~~data ~~cutover~~sequence propagation. The eight LSBs of toe- for each CEI data set shall be different from the eight LSBs of toe transmitted during the previous six hours by the SV.

IS :
Any change in the subframe 2 ephemeris and clock data shall be accomplished with a simultaneous change in the t_{oe} value. The SV shall assure that the t_{oe} value, for at least the first CEI data set transmitted by an SV from a new CEI data sequence propagation, is different from that transmitted from the prior CEI data sequence propagation. The eight LSBs of t_{oe} for each CEI data set shall be different from the eight LSBs of t_{oe} transmitted during the previous six hours by the SV.

IS800-158 :

Section Number :
3.5.3.0-6

WAS :
The general format of clock data in subframe 2 consists of data fields for SV clock correction coefficients. The clock parameters of subframe 2 describe the SV time scale during the period of validity. The parameters are applicable during the time in which they are transmitted. Beyond that time, they are still applicable, however, the most recent data set should be used since the accuracy degrades over time.

Redlines :
The general format of clock data in subframe 2 consists of data fields for SV clock correction coefficients. The clock parameters of subframe 2 describe the SV time scale during the period of validity. The parameters are applicable during the time in which they are transmitted. Beyond that time, they are still applicable, however, the most recent CEI data set should be used since the accuracy degrades over time.

IS :
The general format of clock data in subframe 2 consists of data fields for SV clock correction coefficients. The clock parameters of subframe 2 describe the SV time scale during the period of validity. The parameters are applicable during the time in which they are transmitted. Beyond that time, they are still applicable, however, the most recent CEI data set should be used since the accuracy degrades over time.

IS800-159 :

Section Number :
3.5.3.0-7

WAS :

Table 3.5-1. Subframe 2 Parameters (1 of 3)

Parameter		No. of Bits**	Scale Factor (LSB)	Effective Range***	Units
WN	Week No.	13	1		weeks
ITOW	Interval time of week	8		83	(see text)
t_{op}	Data predict time of week	11	300	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	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
$M_{0\text{-}n}$	Mean anomaly at reference time	33*	2^{-32}		semi-circles
e_n	Eccentricity	33	2^{-34}		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, effective range is the maximum range attainable with indicated bit allocation and scale factor.
**** Relative to A_{REF} = 26,559,710 meters.

Redlines :

Table 3.5-1. Subframe 2 Parameters (1 of 3)					
Parameter		No. of Bits**	Scale Factor (LSB)	Effective 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
$\dot{\Delta n_0}$	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

* 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 :

Table 3.5-1. Subframe 2 Parameters (1 of 3)				
Parameter	No. of Bits**	Scale Factor (LSB)	Effective 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-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.

IS800-161 :

Section Number :
3.5.3.0-9

WAS :

Table 3.5-1. Subframe 2 Parameters (3 of 3)

Parameter	No. of Bits**	Scale Factor (LSB)	Effective Range***	Units

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
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}	Data Predict Week Number	8	1		weeks

* 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, effective range is the maximum range attainable with indicated bit allocation and scale factor.

**** The bit string of "1000000000000" will indicate that the group delay value is not available.

Redlines :

Table 3.5-1. Subframe 2 Parameters (3 of 3)

Parameter		No. of Bits**	Scale Factor (LSB)	Effective Range***	Units
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
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

* 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, effective range is the maximum range attainable with indicated bit allocation and scale factor.

**** The bit string of "1000000000000" will indicate that the group delay value is not available.

IS :

Table 3.5-1. Subframe 2 Parameters (3 of 3)

Parameter		No. of Bits**	Scale Factor (LSB)	Effective Range***	Units
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
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

* 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, effective range is the maximum range attainable with indicated bit allocation and scale factor.

**** The bit string of "1000000000000" will indicate that the group delay value is not available.

IS800-163 :

Section Number :
3.5.3.1.0-1

WAS :
Bits 1 through 13 of subframe 2 shall contain 13 bits that are a modulo-8192 binary representation of the current GPS week number at the start of the data set transmission interval (see paragraph 6.2.2).

Redlines :
Bits 1 through 13 of subframe 2 shall contain 13 bits that are a modulo-8192 binary representation of the current GPS week number at the start of the CEI data set transmission interval (see paragraph 6.2.2).

IS :
Bits 1 through 13 of subframe 2 shall contain 13 bits that are a modulo-8192 binary representation of the current GPS week number at the start of the CEI data set transmission interval (see paragraph 6.2.2).

IS800-166 :

Section Number :
3.5.3.3

WAS :
Data Predict Time of Week

Redlines :
CEI Data ~~Predict~~Sequence Propagation Time of Week~~-~~.

IS :
CEI Data Sequence Propagation Time of Week.

IS800-167 :

Section Number :
3.5.3.3.0-1

WAS :
Bits 22 through 32 of subframe 2 shall contain the data predict time of week (t_{op}). The t_{op} term provides the epoch time of week of the state estimate utilized for the prediction of satellite quasi-Keplerian ephemeris parameters.

Redlines :
Bits 22 through 32 of subframe 2 shall contain the CEI data ~~predict~~sequence propagation time of week (top). The top term provides the epoch time of week of the state ~~estimate~~data utilized for ~~the~~satellite ~~prediction~~CEI data. Users are cautioned to avoid using this parameter to compute age of ~~satellite~~data ~~quasi-Keplerian~~for ~~ephemeris~~any ~~parameters~~SV.

IS :
Bits 22 through 32 of subframe 2 shall contain the CEI data sequence propagation time of week (t_{op}). The t_{op} term provides the epoch time of week of the state data utilized for satellite CEI data. Users are cautioned to avoid using this parameter to compute age of data for any SV.

IS800-172 :

Section Number :
3.5.3.4.0-2

WAS :
The predicted health data will be updated at the time of upload when a new data set has been built by the CS. The transmitted health data may not correspond to the actual health of the transmitting SV. In real time, if the L1C signal becomes unhealthy, the status change will normally be indicated by the broadcast of non-standard code or be indicated by the health bits as described in subframe 2.

Redlines :
The predicted health data will be updated at the time of upload when a new CEI data set has been built by the CS. The transmitted health data may not correspond to the actual health of the transmitting SV. In real time, if the L1C signal becomes unhealthy, the status change will normally be indicated by the broadcast of non-standard code or be indicated by the health bits as described in subframe 2.

IS :
The predicted health data will be updated at the time of upload when a new CEI data set has been built by the CS. The transmitted health data may not correspond to the actual health of the transmitting SV. In real time, if the L1C signal becomes unhealthy, the status change will normally be indicated by the broadcast of non-standard code or be indicated by the health bits as described in subframe 2.

IS800-179 :

Section Number :
3.5.3.6.1.0-1

WAS :
The user shall compute the ECEF coordinates of position for the SV's antenna phase center (APC) utilizing a variation of the equations shown in Table 3.5-2. The ephemeris parameters are Keplerian in appearance; however, the values of these parameters are produced by the SV via a least squares curve fit of the predicted ephemeris of the SV APC (time-position quadruples: t, x, y, z expressed in ECEF coordinates). Particulars concerning the applicable coordinate system are given in Sections 20.3.3.4.3.3 and 20.3.3.4.3.4 of IS-GPS-200.

Redlines :
The user shall compute the ECEF coordinates of position for the SV's antenna phase center (APC) utilizing a variation of the equations shown in Table 3.5-2. The ephemeris parameters are Keplerian in appearance; however, the values of these parameters are produced by the SV via a least squares curve fit of the ~~predicted~~propagated ephemeris of the SV APC (time-position quadruples: t, x, y, z expressed in ECEF coordinates). Particulars concerning the applicable coordinate system are given in Sections 20.3.3.4.3.3 and 20.3.3.4.3.4 of IS-GPS-200.

IS :
The user shall compute the ECEF coordinates of position for the SV's antenna phase center (APC) utilizing a variation of the equations shown in Table 3.5-2. The ephemeris parameters are Keplerian in appearance; however, the values of these parameters are produced by the SV via a least squares curve fit of the propagated ephemeris of the SV APC (time-position quadruples: t, x, y, z expressed in ECEF coordinates). Particulars concerning the applicable coordinate system are given in Sections 20.3.3.4.3.3 and 20.3.3.4.3.4 of IS-GPS-200.

IS800-904 :

Section Number :
3.5.3.11

WAS :
Data Predict Week Number.

Redlines :
CEI Data ~~Predict~~Sequence Propagation Week Number.

IS :
CEI Data Sequence Propagation Week Number.

IS800-905 :

Section Number :
3.5.3.11.0-1

WAS :
Bits 567-574 of Subframe 2 shall indicate the Data Predict Week Number (WN_{OP}) to which the Data Predict Time of Week (top) is referenced (see 3.5.3.3). The WN_{OP} term consists of eight bits which shall be a modulo 256 binary representation of the GPS week number to which the top is referenced.

Redlines :
Bits 567-574 of ~~Subframe~~subframe 2 shall indicate the CEI Data ~~Predict~~Sequence Propagation Week Number (~~WNOP~~WNop) to which the CEI Data ~~Predict~~Sequence Propagation Time of Week (top) is referenced (see 3.5.3.3). The ~~WNOP~~WNop term consists of eight bits which shall be a modulo 256 binary representation of the GPS week number to which the top is referenced. The combination of the epoch time of state data (top, WNop) for a valid CEI data sequence propagation will be in the past relative to the time of broadcast.

IS :
Bits 567-574 of subframe 2 shall indicate the CEI Data Sequence Propagation Week Number (WN_{op}) to which the CEI Data Sequence Propagation Time of Week (t_{op}) is referenced (see 3.5.3.3). The WN_{op} term consists of eight bits which shall be a modulo 256 binary representation of the GPS week number to which the t_{op} is referenced. The combination of the epoch time of state data (t_{op}, WN_{op}) for a valid CEI data sequence propagation will be in the past relative to the time of broadcast.

IS800-289 :

Section Number :
3.5.5.1.0-2

WAS :
Cutovers of subframe 2 data to new data sets will nominally occur on hour boundaries except for the first data set of a new upload. The first data set of newly uploaded data will cutover on 15 minute boundaries.

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 ~~upload. The first data set of newly uploaded~~CEI data ~~will cutover on 15 minute~~sequence ~~boundaries~~propagation.

IS :
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.

IS800-869 :

Section Number :
3.5.5.2

WAS :
Data Sets

Redlines :
CEI Data Sets

IS :
CEI Data Sets

IS800-871 :

Section Number :
3.5.5.2.0-1

WAS :
The t_{oe} shall be equal to the t_{oc} of the same CNAV data set. The following rules govern the transmission of t_{oe} and t_{oc} values in different data sets: (1) The transmitted t_{oc} will be different from any value transmitted by the SV during the preceding seven days; (2) The transmitted t_{oe} will be different from any value transmitted by the SV during the preceding six hours.

Cutovers to new data sets will occur only on hour boundaries except for the first data set of a new upload. The first 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.

The start of the transmission interval for each data set corresponds to the beginning of the curve fit interval for the data set. Each data set remains valid for the duration of its transmission interval, and nominally also remains valid for the duration of its curve fit interval. A data set is rendered invalid before the end of its curve fit interval when it is superseded by the SV cutting over to the first data set of a new upload.

Normal Operations. The subframe 2 data sets are transmitted by the SV for periods of two hours. The corresponding curve fit interval is three hours.

Redlines :
The ~~toe shall be equal to the toc of the same CNAV data set. The~~ following ~~rules~~rule ~~govern~~governs the transmission of toe~~ and toc values~~ in different CEI data sets:~~ (1)~~ The transmitted ~~toc~~toe will be different from any value transmitted by the SV during the preceding~~ seven days; (2) The transmitted toe will be different from any value transmitted~~six ~~by~~hours. ~~the~~top ~~SV~~does ~~during~~not ~~the~~have ~~preceding~~to ~~six~~match ~~hours~~toe.

Cutovers to new CEI data sets will occur only on hour boundaries except for the first CEI data set of a new ~~upload~~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.

The start of the transmission interval for each CEI data set corresponds to the beginning of the curve fit interval for the CEI data set. Each CEI data set remains valid for the duration of its transmission interval, and nominally also remains valid for the duration of its curve fit interval. A CEI data set is rendered invalid before the end of its curve fit interval when it is superseded by the SV cutting over to the first CEI data set of a new ~~upload~~CEI data sequence propagation.

Normal Operations. The subframe 2 CEI data sets are transmitted by the SV for periods of two hours. The corresponding curve fit interval is three hours.

IS :
The following rule governs the transmission of t_{oe} in different CEI data sets: The transmitted t_{oe} will be different from any value transmitted by the SV during the preceding six hours. t_{op} does not have to match t_{oe}.

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.

The start of the transmission interval for each CEI data set corresponds to the beginning of the curve fit interval for the CEI data set. Each CEI data set remains valid for the duration of its transmission interval, and nominally also remains valid for the duration of its curve fit interval. A CEI data set is rendered invalid before the end of its curve fit interval when it is superseded by the SV cutting over to the first CEI data set of a new CEI data sequence propagation.

Normal Operations. The subframe 2 CEI data sets are transmitted by the SV for periods of two hours. The corresponding curve fit interval is three hours.

IS800-918 :
Insertion after object IS800-871

Section Number :
3.5.5.2.1

WAS :
N/A

Redlines :
Updates to parameters in table 6.2-18 shall prompt changes in toe. Any parameter marked with NOTE1 may be changed with or without a change in toe.

IS :
Updates to parameters in table 6.2-18 shall prompt changes in t_{oe}. Any parameter marked with NOTE1 may be changed with or without a change in t_{oe}.

IS800-893 :

Section Number :
6.1.0-1

WAS :

APC	-	antenna phase center
ASCII	-	American Standard Code for Information Interchange
BCH	-	Bose, Chaudhuri, and Hocquenghem
BOC	-	Binary Offset Carrier
BPSK	-	Bi-Phase Shift Key

CCB	-	Configuration Control Board
CDC	-	clock differential correction
CNAV-2-	-	L1C Navigation Message
CRC	-	Cyclic Redundancy Check
CS	-	Control Segment
dBc	-	Power ratio of a signal to a (unmodulated) carrier signal, expressed in decibels
DC	-	differential correction
DN	-	Day Number
ECEF	-	Earth-Centered, Earth-Fixed
ECI	-	Earth-Centered, Inertial
EDC	-	ephemeris differential correction
EOE	-	Edge-of-Earth
EOL	-	End-of-Life
EOP	-	Earth Orientation Parameters
FEC	-	Forward Error Correction
GBAS	-	Ground Based Augmentation System
GGTO	-	GPS/GNSS Time Offset
GNSS	-	Global Navigation Satellite System
GPS	-	Global Positioning System
GPSW	-	GPS Wing
ICC	-	Interface Control Contractor
ICWG	-	Interface Control Working Group
IRN	-	Interface Revision Notice
IS	-	Interface Specification
ISC	-	Inter-Signal Correction
ITOW	-	Interval Time of Week
LDPC	-	Low Density Parity Check
LFSR	-	Linear Feedback Shift Register
LSB	-	Least Significant Bit

LSF	-	Leap Seconds Future
L1C	-	Common L1 Signal
MCS	-	Master Control Station
MHz	-	Megahertz
MSB	-	Most Significant Bit
NAV	-	Legacy Navigation Message, D(t)
NSCD	-	non-standard $L1C_D$
NSCP	-	non-standard $L1C_P$
PIRN	-	Proposed Interface Revision Notice
PRN	-	Pseudo-Random Noise
RF	-	Radio Frequency
RHCP	-	Right-Hand Circularly Polarized
RMS	-	Root Mean Square
SBAS	-	Satellite Based Augmentation System
sps	-	symbols per second
SS	-	Space Segment
SSV	-	Space Service Volume
SV	-	Space Vehicle
TBD	-	To Be Determined
TBR	-	To Be Resolved
TBS	-	To Be Supplied
TMBOC	-	Time-Multiplexed BOC
TOI	-	Time of Interval
TOW	-	Time of Week
UDRA	-	User Differential Range Accuracy
UE	-	User Equipment
URA	-	User Range Accuracy
US	-	User Segment
USNO	-	U.S. Naval Observatory
UTC	-	Coordinated Universal Time

WGS 84	-	World Geodetic System 1984

Redlines :

APC	-	antenna phase center
ASCII	-	American Standard Code for Information Interchange
BCH	-	Bose, Chaudhuri, and Hocquenghem
BOC	-	Binary Offset Carrier
BPSK	-	Bi-Phase Shift Key
CCB	-	Configuration Control Board
CDC	-	clock differential correction
CEI	-	Clock/Ephemeris/ Integrity
CNAV-2-	-	L1C Navigation Message
CRC	-	Cyclic Redundancy Check
CS	-	Control Segment
dBc	-	Power ratio of a signal to a (unmodulated) carrier signal, expressed in decibels
DC	-	differential correction
DN	-	Day Number
ECEF	-	Earth-Centered, Earth-Fixed
ECI	-	Earth-Centered, Inertial
EDC	-	ephemeris differential correction
EOE	-	Edge-of-Earth
EOL	-	End-of-Life
EOP	-	Earth Orientation Parameters
FEC	-	Forward Error Correction
GBAS	-	Ground Based Augmentation System
GGTO	-	GPS/GNSS Time Offset
GNSS	-	Global Navigation Satellite System
GPS	-	Global Positioning System

GPSW	-	GPS Wing
ICC	-	Interface Control Contractor
ICWG	-	Interface Control Working Group
IRN	-	Interface Revision Notice
IS	-	Interface Specification
ISC	-	Inter-Signal Correction
ITOW	-	Interval Time of Week
LDPC	-	Low Density Parity Check
LFSR	-	Linear Feedback Shift Register
LSB	-	Least Significant Bit
LSF	-	Leap Seconds Future
L1C	-	Common L1 Signal
MCS	-	Master Control Station
MHz	-	Megahertz
MSB	-	Most Significant Bit
NAV	-	Legacy Navigation Message, D(t)
NSCD	-	non-standard $L1C_D$
NSCP	-	non-standard $L1C_P$
PIRN	-	Proposed Interface Revision Notice
PRN	-	Pseudo-Random Noise
RF	-	Radio Frequency
RHCP	-	Right-Hand Circularly Polarized
RMS	-	Root Mean Square
SBAS	-	Satellite Based Augmentation System
sps	-	symbols per second
SS	-	Space Segment
SSV	-	Space Service Volume
SV	-	Space Vehicle
TBD	-	To Be Determined
TBR	-	To Be Resolved

TBS	-	To Be Supplied
TMBOC	-	Time-Multiplexed BOC
TOI	-	Time of Interval
TOW	-	Time of Week
UDRA	-	User Differential Range Accuracy
UE	-	User Equipment
URA	-	User Range Accuracy
US	-	User Segment
USNO	-	U.S. Naval Observatory
UTC	-	Coordinated Universal Time
WGS 84	-	World Geodetic System 1984

IS :

APC	-	antenna phase center
ASCII	-	American Standard Code for Information Interchange
BCH	-	Bose, Chaudhuri, and Hocquenghem
BOC	-	Binary Offset Carrier
BPSK	-	Bi-Phase Shift Key
CCB	-	Configuration Control Board
CDC	-	clock differential correction
CEI	-	Clock/Ephemeris/ Integrity
CNAV-2-	-	L1C Navigation Message
CRC	-	Cyclic Redundancy Check
CS	-	Control Segment
dBc	-	Power ratio of a signal to a (unmodulated) carrier signal, expressed in decibels
DC	-	differential correction
DN	-	Day Number
ECEF	-	Earth-Centered, Earth-Fixed

ECI	-	Earth-Centered, Inertial
EDC	-	ephemeris differential correction
EOE	-	Edge-of-Earth
EOL	-	End-of-Life
EOP	-	Earth Orientation Parameters
FEC	-	Forward Error Correction
GBAS	-	Ground Based Augmentation System
GGTO	-	GPS/GNSS Time Offset
GNSS	-	Global Navigation Satellite System
GPS	-	Global Positioning System
GPSW	-	GPS Wing
ICC	-	Interface Control Contractor
ICWG	-	Interface Control Working Group
IRN	-	Interface Revision Notice
IS	-	Interface Specification
ISC	-	Inter-Signal Correction
ITOW	-	Interval Time of Week
LDPC	-	Low Density Parity Check
LFSR	-	Linear Feedback Shift Register
LSB	-	Least Significant Bit
LSF	-	Leap Seconds Future
L1C	-	Common L1 Signal
MCS	-	Master Control Station
MHz	-	Megahertz
MSB	-	Most Significant Bit
NAV	-	Legacy Navigation Message, D(t)
NSCD	-	non-standard $L1C_D$
NSCP	-	non-standard $L1C_P$
PIRN	-	Proposed Interface Revision Notice
PRN	-	Pseudo-Random Noise

RF	-	Radio Frequency
RHCP	-	Right-Hand Circularly Polarized
RMS	-	Root Mean Square
SBAS	-	Satellite Based Augmentation System
sps	-	symbols per second
SS	-	Space Segment
SSV	-	Space Service Volume
SV	-	Space Vehicle
TBD	-	To Be Determined
TBR	-	To Be Resolved
TBS	-	To Be Supplied
TMBOC	-	Time-Multiplexed BOC
TOI	-	Time of Interval
TOW	-	Time of Week
UDRA	-	User Differential Range Accuracy
UE	-	User Equipment
URA	-	User Range Accuracy
US	-	User Segment
USNO	-	U.S. Naval Observatory
UTC	-	Coordinated Universal Time
WGS 84	-	World Geodetic System 1984

IS800-911 :
Insertion after object IS800-910

Section Number :
6.2.8

WAS :
N/A

Redlines :
Clock, Ephemeris, Integrity (CEI) Data Set.

IS :
Clock, Ephemeris, Integrity (CEI) Data Set.

IS800-912 :
Insertion below object IS800-911

Section Number :
6.2.8.1

WAS :
N/A

Redlines :
The Clock, Ephemeris, Integrity (CEI) data set is the collection of SV-specific clock correction polynomial parameters, ephemeris parameters, and related parameters (health flags, URA parameters, time tags, etc.) needed to use the SV's broadcast signal(s) in the positioning service. The parameters in the CEI data set are explicitly listed in Table 6.2-18. The entire CEI data set is needed for maximum accuracy. However, the core CEI data set (parameters without NOTE1 in Table 6.2-18) is sufficient for an initial position solution. The top term provides the epoch time of week of the state data utilized for the core CEI data set.

IS :
The Clock, Ephemeris, Integrity (CEI) data set is the collection of SV-specific clock correction polynomial parameters, ephemeris parameters, and related parameters (health flags, URA parameters, time tags, etc.) needed to use the SV's broadcast signal(s) in the positioning service. The parameters in the CEI data set are explicitly listed in Table 6.2-18. The entire CEI data set is needed for maximum accuracy. However, the core CEI data set (parameters without NOTE1 in Table 6.2-18) is sufficient for an initial position solution. The top term provides the epoch time of week of the state data utilized for the core CEI data set.

IS800-919 :
Insertion after object IS800-912

Section Number :
6.2.8.2

WAS :
N/A

Redlines :
Core CEI Data Set.

IS :
Core CEI Data Set.

IS800-920 :
Insertion below object IS800-919

Section Number :
6.2.8.2.1

WAS :
N/A

Redlines :
A Core CEI Data Set are the CEI parameters necessary for a satellite to be used for a position solution (non-almanac); broadcast to users with the shortest broadcast interval. The top term provides the epoch time of week of the state data utilized for CEI data, except for parameters marked with a Note1 in Table 6.2-18.

IS :
A Core CEI Data Set are the CEI parameters necessary for a satellite to be used for a position solution (non-almanac); broadcast to users with the shortest broadcast interval. The t_{op} term provides the epoch time of week of the state data utilized for CEI data, except for parameters marked with a Note1 in Table 6.2-18.

IS800-916 :
Insertion after object IS800-919

Section Number :
6.2.8.3

WAS :
N/A

Redlines :
Table 6.2-18. CEI Data Set Parameters

IS :
Table 6.2-18. CEI Data Set Parameters

IS800-917 :
Insertion after object IS800-916

Section Number :
6.2.8.4

WAS :
N/A

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

Symbol	Parameter Name	Subframe
$\Delta\dot{\Omega}$	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
$i_{0\text{-}n}$-DOT	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
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.		

Symbol	Parameter Name	Subframe
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 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
$i_{0\text{-}n}$-DOT	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

Symbol	Parameter Name	Subframe
L1C	Signal Health (1 bits)	2
M_0	Mean Anomaly at Reference Time	2
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}.		

IS800-913 :
Insertion after object IS800-911

Section Number :
6.2.9

WAS :
N/A

Redlines :
CEI Data Sequence Propagation.

IS :
CEI Data Sequence Propagation.

IS800-914 :
Insertion below object IS800-913

Section Number :
6.2.9.1

WAS :
N/A

Redlines :
A related time-ordered sequence of CEI data sets in which each successive CEI data set is a time propagation of the

preceding CEI data set. Special provisions apply to alert users to discontinuities separating one CEI data sequence propagation from another CEI data sequence propagation (e.g., after an upload occurs). An upload may include multiple segments of temporally continuous CEI Data sequence propagations.

IS :
A related time-ordered sequence of CEI data sets in which each successive CEI data set is a time propagation of the preceding CEI data set. Special provisions apply to alert users to discontinuities separating one CEI data sequence propagation from another CEI data sequence propagation (e.g., after an upload occurs). An upload may include multiple segments of temporally continuous CEI Data sequence propagations.
