CHANGE NOTICE

Affected Document:	IRN/SCN Number	Date:
IS-GPS-200 Rev L	XXX-XXX-XXXX-XXX	XX-XXX-XXXX
Authority:	**Proposed Change Notice**	**Date:**
RFC-00467	PCN-IS-200L_RFC467	26-APR-2021

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

Document Title: NAVSTAR GPS Space Segment / Navigation User Interfaces

RFC Title: 2021 Proposed Changes to the Public Documents

Reason For Change (Driver):

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

Description of Change:

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

Authored By: RE: Chirag Patel **Checked By: RE:**

AUTHORIZED SIGNATURES	REPRESENTING	DATE
	PNT Capability Area Integration, Portfolio Architect, Space and Missile Systems Center - LAAFB	

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CODE IDENT 66RP1

IS200-1402:

Section Number:
3.2.1.1.1
WAS:
Object Heading : Expanded P-Code (GPS III)
Redlines:
Object Heading : Expanded P-Code (GPS III and GPS IIIF)
IS:
Object Heading : Expanded P-Code (GPS III and GPS IIIF)
Rationale:
Adding GPS IIIF reference since information is applicable to IIIF.

IS200-1315:

Section Number:
3.2.1.3.1
WAS:
Object Heading : Expanded C/A Code (GPS III)
Redlines:
Object Heading : Expanded C/A Code (GPS III and GPS IIIF)
IS:
Object Heading : Expanded C/A Code (GPS III and GPS IIIF)
Rationale:
Adding GPS IIIF reference since information is applicable to IIIF.

IS200-46:

Section Number:
3.2.3.0-1
WAS:
The L1 consists of two carrier components which are in phase quadrature with each other. Each carrier component is bi-phase shift key (BPSK) modulated by a separate bit train. One bit train is the modulo-2 sum of the P(Y)-code and LNAV data, D(t), while the other is the modulo-2 sum of the C/A-code and the LNAV data, D(t). For Block II/IIA and IIR, the L2 is BPSK modulated by only one of those two bit trains; the bit train to be used for L2 modulation is selected by ground command. A third modulation mode is also selectable on the L2 channel by ground command: it utilizes the P(Y)-code without the LNAV data as the modulating signal. For a particular SV, all transmitted signal elements (carriers, codes and data) are coherently derived from the same on-board frequency source.
Redlines:
The L1 consists of two carrier components which are in phase quadrature with each other. Each carrier component is bi-phase shift key (BPSK) modulated by a separate bit train. One bit train is the modulo-2 sum of the P(Y)-code and LNAV data, D(t), while the other is the modulo-2 sum of the C/A-code and the LNAV data, D(t). For Block ~~II/IIA and~~ IIR, the L2 is BPSK modulated by only one of those two bit trains; the bit train to be used for L2 modulation is selected by ground command. A third modulation mode is also selectable on the L2 channel by ground command: it utilizes the P(Y)-code without the LNAV data as the modulating signal. For a particular SV, all transmitted signal elements (carriers, codes and data) are coherently derived from the same on-board frequency source.
IS:
The L1 consists of two carrier components which are in phase quadrature with each other. Each carrier component is bi-phase shift key (BPSK) modulated by a separate bit train. One bit train is the modulo-2 sum of the P(Y)-code and LNAV data, D(t), while the other is the modulo-2 sum of the C/A-code and the LNAV data, D(t). For Block IIR, the L2 is BPSK modulated by only one of those two bit trains; the bit train to be used for L2 modulation is selected by ground command. A third modulation mode is also selectable on the L2 channel by ground command: it utilizes the P(Y)-code

without the LNAV data as the modulating signal. For a particular SV, all transmitted signal elements (carriers, codes and data) are coherently derived from the same on-board frequency source.
Rationale:
During the RFC discussions, it was determined that certain appropriate terms are outdated, such as Block IIA. As a result, this RFC plans to remove those outdated terms.

IS200-50:

Section Number:
3.2.3.0-5
WAS:

Table 3-III. Signal Configuration

SV Blocks	L1		L2**	
	In-Phase*	Quadrature-Phase*	In-Phase*	Quadrature-Phase*
Block II/IIA/IIR	P(Y) ⊕ D(t)	C/A ⊕ D(t)	P(Y) ⊕ D(t) or P(Y) or C/A ⊕ D(t)	Not Applicable
Block IIR-M/IIF/ and GPS III/ IIIF	P(Y) ⊕ D(t)	C/A ⊕ D(t)	P(Y) ⊕ D(t) or P(Y)	L2 CM ⊕ D_C(t) with L2 CL or C/A ⊕ D(t) or C/A

Notes: 1) The configuration identified in this table reflects only the content of Section 3.2.3 and does not show all available codes/signals on L1/L2.

⊕ = "exclusive-or" (modulo-2 addition)
D(t) = LNAV data at 50 bps
D_C(t) = CNAV data at 25 bps with FEC encoding resulting in 50 sps

* Terminology of "in-phase" and "quadrature-phase" is used only to identify the relative phase quadrature relationship of the carrier components (i.e. 90 degrees offset of each other).

** The two carrier components on L2 may not have the phase quadrature relationship. They may be broadcast on same phase (ref. Section 3.3.1.5).

Redlines:

Table 3-III. Signal Configuration

SV Blocks	L1		L2**	
	In-Phase*	Quadrature-Phase*	In-Phase*	Quadrature-Phase*
Block ~~II/IIA/~~IIR	P(Y) ⊕ D(t)	C/A ⊕ D(t)	P(Y) ⊕ D(t) or P(Y) or C/A ⊕ D(t)	Not Applicable
Block IIR-M/IIF/ and GPS III/ IIIF	P(Y) ⊕ D(t)	C/A ⊕ D(t)	P(Y) ⊕ D(t) or P(Y)	L2 CM ⊕ $D_C(t)$ with L2 CL or C/A ⊕ D(t) or C/A

Notes: 1) The configuration identified in this table reflects only the content of Section 3.2.3 and does not show all available codes/signals on L1/L2.

⊕ = "exclusive-or" (modulo-2 addition)
D(t) = LNAV data at 50 bps
$D_C(t)$ = CNAV data at 25 bps with FEC encoding resulting in 50 sps

* Terminology of "in-phase" and "quadrature-phase" is used only to identify the relative phase quadrature relationship of the carrier components (i.e. 90 degrees offset of each other).

** The two carrier components on L2 may not have the phase quadrature relationship. They may be broadcast on same phase (ref. Section 3.3.1.5).

IS:

Table 3-III. Signal Configuration

SV Blocks	L1		L2**	
	In-Phase*	Quadrature-Phase*	In-Phase*	Quadrature-Phase*
Block IIR	P(Y) ⊕ D(t)	C/A ⊕ D(t)	P(Y) ⊕ D(t) or P(Y) or C/A ⊕ D(t)	Not Applicable
Block IIR-M/IIF/ and GPS III/ IIIF	P(Y) ⊕ D(t)	C/A ⊕ D(t)	P(Y) ⊕ D(t) or P(Y)	L2 CM ⊕ D_C(t) with L2 CL or C/A ⊕ D(t) or C/A

Notes: 1) The configuration identified in this table reflects only the content of Section 3.2.3 and does not show all available codes/signals on L1/L2.

⊕ = "exclusive-or" (modulo-2 addition)
D(t) = LNAV data at 50 bps
D_C(t) = CNAV data at 25 bps with FEC encoding resulting in 50 sps

* Terminology of "in-phase" and "quadrature-phase" is used only to identify the relative phase quadrature relationship of the carrier components (i.e. 90 degrees offset of each other).

** The two carrier components on L2 may not have the phase quadrature relationship. They may be broadcast on same phase (ref. Section 3.3.1.5).

Rationale:
During the RFC discussions, it was determined that certain appropriate terms are outdated, such as Block IIA. As a result, this RFC plans to remove those outdated terms.

IS200-56:

Section Number:
3.3.1.1.0-1
WAS:
For Block IIA, IIR, IIR-M, and IIF satellites, the requirements specified in this IS shall pertain to the signal contained within two 20.46 MHz bands; one centered about the L1 nominal frequency and the other centered about the L2 nominal frequency (see Table 3-Vb). For GPS III, GPS IIIF, and subsequent satellites, the requirements specified in this IS shall pertain to the signal contained within two 30.69 MHz bands; one centered about the L1 nominal frequency and the other centered about the L2 nominal frequency (see Table 3-Vc).
Redlines:
For Block ~~IIA,~~ IIR, IIR-M, and IIF satellites, the requirements specified in this IS shall pertain to the signal contained within two 20.46 MHz bands; one centered about the L1 nominal frequency and the other centered about the L2 nominal frequency (see Table 3-Vb). For GPS III, GPS IIIF, and subsequent satellites, the requirements specified in this IS shall pertain to the signal contained within two 30.69 MHz bands; one centered about the L1 nominal frequency and the other centered about the L2 nominal frequency (see Table 3-Vc).
IS:
For Block IIR, IIR-M, and IIF satellites, the requirements specified in this IS shall pertain to the signal contained within two 20.46 MHz bands; one centered about the L1 nominal frequency and the other centered about the L2 nominal frequency (see Table 3-Vb). For GPS III, GPS IIIF, and subsequent satellites, the requirements specified in this IS shall pertain to the signal contained within two 30.69 MHz bands; one centered about the L1 nominal frequency and the other centered about the L2 nominal frequency (see Table 3-Vc).

Rationale:
During the RFC discussions, it was determined that certain appropriate terms are outdated, such as Block IIA. As a result, this RFC plans to remove those outdated terms if it does not impact other parts of the document.

IS200-1523:

Section Number:
3.3.1.6.0-11
WAS:
Table 3-IV. Composite L1 Transmitted Signal Phase ** (Block II/IIA and IIR SVs Only)
Redlines:
Table 3-IV. Composite L1 Transmitted Signal Phase ** (Block ~~II/IIA and~~ IIR SVs Only)
IS:
Table 3-IV. Composite L1 Transmitted Signal Phase ** (Block IIR SVs Only)
Rationale:
During the RFC discussions, it was determined that certain appropriate terms are outdated, such as Block IIA. As a result, this RFC plans to remove those outdated terms.

IS200-1524:

Section Number:
3.3.1.6.0-13
WAS:
Table 3-Va. Received Minimum RF Signal Strength for Block IIA, IIR, IIR-M, IIF, GPS III, and GPS IIIF Satellites
(20.46 MHz Bandwidth)
Redlines:
Table 3-Va. Received Minimum RF Signal Strength for Block ~~IIA,~~ IIR, IIR-M, IIF, GPS III, and GPS IIIF Satellites

(20.46 MHz Bandwidth)
IS:
Table 3-Va. Received Minimum RF Signal Strength for Block IIR, IIR-M, IIF, GPS III, and GPS IIIF Satellites

(20.46 MHz Bandwidth)
Rationale:
During the RFC discussions, it was determined that certain appropriate terms are outdated, such as Block IIA. As a result, this RFC plans to remove those outdated terms.

IS200-77:

Section Number:
3.3.1.6.0-14

WAS:

Table 3-Va. Received Minimum RF Signal Strength for Block IIA, IIR, IIR-M, IIF, GPS III, and GPS IIIF Satellites (20.46MHz Bandwidth)

SV Blocks	Channel	Signal	
		P(Y)	C/A or L2C
IIA/IIR	L1	-161.5 dBW	-158.5 dBW
	L2	-164.5 dBW	-164.5 dBW
IIR-M/IIF	L1	-161.5 dBW	-158.5 dBW
	L2	-161.5 dBW	-160.0 dBW
GPS III/ IIIF	L1	-161.5 dBW	-158.5 dBW
	L2	-161.5 dBW	-158.5 dBW

Redlines:

Table 3-Va. Received Minimum RF Signal Strength for Block IIA, IIR, IIR-M, IIF, GPS III, and GPS IIIF Satellites (20.46 MHz Bandwidth)

SV Blocks	Channel	Signal	
		P(Y)	C/A or L2C
~~IIA~~IIR	L1	-161.5 dBW	-158.5 dBW
	L2	-164.5 dBW	-164.5 dBW
IIR-M/IIF	L1	-161.5 dBW	-158.5 dBW
	L2	-161.5 dBW	-160.0 dBW
GPS III/ IIIF	L1	-161.5 dBW	-158.5 dBW
	L2	-161.5 dBW	-158.5 dBW

IS:

Table 3-Va. Received Minimum RF Signal Strength for Block IIA, IIR, IIR-M, IIF, GPS III, and GPS IIIF Satellites (20.46MHz Bandwidth)

SV Blocks	Channel	Signal	
		P(Y)	C/A or L2C
IIR	L1	-161.5 dBW	-158.5 dBW
	L2	-164.5 dBW	-164.5 dBW
IIR-M/IIF	L1	-161.5 dBW	-158.5 dBW
	L2	-161.5 dBW	-160.0 dBW
GPS III/ IIIF	L1	-161.5 dBW	-158.5 dBW
	L2	-161.5 dBW	-158.5 dBW

Rationale:
During the RFC discussions, it was determined that certain appropriate terms are outdated, such as Block IIA. As a result, this RFC plans to remove those outdated terms.

IS200-2046:

Section Number:
3.3.1.9.0-2
WAS:
For the angular range of ±13.8 degrees from nadir, L1 ellipticity shall be no worse than 1.2 dB for Block IIA
Redlines:
~~For the angular range of ±13.8 degrees from nadir, L1 ellipticity shall be no worse than 1.2 dB for Block IIA~~
IS:
<DELETED OBJECT>
Rationale:
During the RFC discussions, it was determined that certain appropriate terms are outdated, such as Block IIA. As a result, this RFC plans to remove those outdated terms.

IS200-2047:

Section Number:
3.3.1.9.0-3
WAS:
and shall be no worse than 1.8 dB for Block IIR/IIR-M/IIF/III/IIIF SVs.
Redlines:
~~and~~The transmitted signal shall be right-hand circularly polarized (RHCP). For the angular range of ±13.8 degrees from nadir, L1 ellipticity shall be no worse than 1.8 dB for Block IIR/IIR-M/IIF/III/IIIF SVs. L2 ellipticity shall be no worse than 2.2 dB for Block IIR/IIR-M/IIF and GPS III/IIIF SVs over the angular range of ±13.8 degrees from nadir.
IS:
The transmitted signal shall be right-hand circularly polarized (RHCP). For the angular range of ±13.8 degrees from nadir, L1 ellipticity shall be no worse than 1.8 dB for Block IIR/IIR-M/IIF/III/IIIF SVs. L2 ellipticity shall be no worse than 2.2 dB for Block IIR/IIR-M/IIF and GPS III/IIIF SVs over the angular range of ±13.8 degrees from nadir.

Rationale:
Previous section deleted, New wording added for completeness

IS200-2048:

Section Number:
3.3.1.9.0-4
WAS:
L2 ellipticity shall be no worse than 3.2 dB for Block II/IIA SVs
Redlines:
~~L2 ellipticity shall be no worse than 3.2 dB for Block II/IIA SVs~~
IS:
<DELETED OBJECT>
Rationale:
During the RFC discussions, it was determined that certain appropriate terms are outdated, such as Block IIA. As a result, this RFC plans to remove those outdated terms.

IS200-2049:

Section Number:
3.3.1.9.0-5
WAS:
and shall be no worse than 2.2 dB for Block IIR/IIR-M/IIF and GPS III/IIIF SVs over the angular range of ±13.8 degrees from nadir.
Redlines:
~~and~~The transmitted signal shall be right-hand circularly polarized (RHCP). For the angular range of ±13.8 degrees from nadir, L1 ellipticity shall be no worse than 1.8 dB for Block IIR/IIR-M/IIF/III/IIIF SVs. L2 ellipticity shall be no worse than 2.2 dB for Block IIR/IIR-M/IIF and GPS III/IIIF SVs over the angular range of ±13.8 degrees from nadir.
IS:
The transmitted signal shall be right-hand circularly polarized (RHCP). For the angular range of ±13.8 degrees from nadir, L1 ellipticity shall be no worse than 1.8 dB for Block IIR/IIR-M/IIF/III/IIIF SVs. L2 ellipticity shall be no worse than 2.2 dB for Block IIR/IIR-M/IIF and GPS III/IIIF SVs over the angular range of ±13.8 degrees from nadir.
Rationale:
Previous section deleted, added wording for completeness

IS200-157:

Section Number:
6.2.1.0-1
WAS:
User Range Accuracy (URA) is a statistical indicator of the GPS ranging accuracy obtainable with a specific signal and SV. URA provides a conservative RMS estimate of the user range error (URE) in the associated navigation data for the transmitting SV. It includes all errors for which the Space and Control Segments are responsible. Whether the integrity status flag is 'off' or 'on', 4.42 times URA bounds the instantaneous URE with 1-(1e-5) per hour probability ('legacy' level of integrity assurance). When the integrity status flag is 'on', 5.73 times URA bounds the instantaneous URE with 1-(1e-8) per hour probability ('enhanced' level of integrity assurance). Integrity properties of the URA are specified with respect to the scaled (multiplied by either 4.42 or 5.73 as appropriate) upper bound values of the URA index or to the scaled composite of the upper bound values of all component URA indexes.
Redlines:
User Range Accuracy (URA) is a statistical indicator of the GPS ranging accuracy obtainable with a specific signal and SV. URA provides a conservative RMS estimate of the user range error (URE) in the associated navigation data for the transmitting SV. It includes all errors for which the Space and Control Segments are responsible. Whether the integrity

status flag is ~~'off'~~"0" or ~~'on'~~"1", 4.42 times URA bounds the instantaneous URE with 1-(1e-5) per hour probability ('legacy' level of integrity assurance). When the integrity status flag is ~~'on'~~set to "1", 5.73 times URA bounds the instantaneous URE with 1-(1e-8) per hour probability ('enhanced' level of integrity assurance). Integrity properties of the URA are specified with respect to the scaled (multiplied by either 4.42 or 5.73 as appropriate) upper bound values of the URA index or to the scaled composite of the upper bound values of all component URA indexes.
IS:
User Range Accuracy (URA) is a statistical indicator of the GPS ranging accuracy obtainable with a specific signal and SV. URA provides a conservative RMS estimate of the user range error (URE) in the associated navigation data for the transmitting SV. It includes all errors for which the Space and Control Segments are responsible. Whether the integrity status flag is "0" or "1", 4.42 times URA bounds the instantaneous URE with 1-(1e-5) per hour probability ('legacy' level of integrity assurance). When the integrity status flag is set to "1", 5.73 times URA bounds the instantaneous URE with 1-(1e-8) per hour probability ('enhanced' level of integrity assurance). Integrity properties of the URA are specified with respect to the scaled (multiplied by either 4.42 or 5.73 as appropriate) upper bound values of the URA index or to the scaled composite of the upper bound values of all component URA indexes.
Rationale:
Clean up

IS200-169:

Section Number:
6.2.2.2.0-1
WAS:
The operational satellites are designated Block II, Block IIA, Block IIR, Block IIR-M, Block IIF, GPS III, and GPS IIIF SVs. Characteristics of these SVs are provided below. Modes of operation for these SVs and accuracy of positioning services provided are described in paragraphs 6.3.2 through 6.3.4. These SVs transmit configuration codes as specified in paragraph 20.3.3.5.1.4. The navigation signal provides no direct indication of the type of the transmitting SV.
Redlines:
The operational satellites are designated Block ~~II, Block IIA, Block~~ IIR, Block IIR-M, Block IIF, GPS III, and GPS IIIF SVs. Characteristics of these SVs are provided below. Modes of operation for these SVs and accuracy of positioning services provided are described in paragraphs 6.3.2 through 6.3.4. These SVs transmit configuration codes as specified in paragraph 20.3.3.5.1.4. The navigation signal provides no direct indication of the type of the transmitting SV.
IS:
The operational satellites are designated Block IIR, Block IIR-M, Block IIF, GPS III, and GPS IIIF SVs. Characteristics of these SVs are provided below. Modes of operation for these SVs and accuracy of positioning services provided are described in paragraphs 6.3.2 through 6.3.4. These SVs transmit configuration codes as specified in paragraph 20.3.3.5.1.4. The navigation signal provides no direct indication of the type of the transmitting SV.
Rationale:
During the RFC discussions, it was determined that certain appropriate terms are outdated, such as Block IIA. As a result, this RFC plans to remove those outdated terms if it does not impact other parts of the document.

IS200-170:

Section Number:
6.2.2.2.1
WAS:
Object Heading : Block II SVs.
Redlines:
Object Heading : Block II SVs~~.~~ (Decommissioned)
IS:
Object Heading : Block II SVs (Decommissioned)

Rationale:
During the RFC discussions, it was determined that certain appropriate terms are outdated, such as Block IIA. As a result, this RFC plans to remove those outdated terms.

IS200-171:

Section Number:
6.2.2.2.1.0-1
WAS:
The first block of full scale operational SVs developed by Rockwell International are designated as SVNs 13-21 and are termed "Block II" SVs. These SVs were designed to provide 14 days of positioning service without contact from the CS.
Redlines:
The first block of full scale operational SVs ~~developed by Rockwell International~~ are designated as SVNs 13-21 and are termed "Block II" SVs.~~-~~ These SVs were designed to provide 14 days of positioning service without contact from the CS. These SVs transmitted a configuration code of 001 (reference paragraph 20.3.3.5.1.4). There are no longer any active Block II SVs in the GPS constellation.

IS:
The first block of full scale operational SVs are designated as SVNs 13-21 and are termed "Block II" SVs. These SVs were designed to provide 14 days of positioning service without contact from the CS. These SVs transmitted a configuration code of 001 (reference paragraph 20.3.3.5.1.4). There are no longer any active Block II SVs in the GPS constellation.

Rationale:
During the RFC discussions, it was determined that certain appropriate terms are outdated, such as Block IIA. As a result, this RFC plans to remove those outdated terms.

IS200-172:

Section Number:
6.2.2.2.2
WAS:
Object Heading : Block IIA SVs.
Object Type : Header
Redlines:
Object Heading : Block IIA SVs~~.~~ (Decommissioned)
Object Type : Header
IS:
Object Heading : Block IIA SVs (Decommissioned)
Object Type : Header
Rationale:
During the RFC discussions, it was determined that certain appropriate terms are outdated, such as Block IIA. As a result, this RFC plans to remove those outdated terms.

IS200-173:

Section Number:
6.2.2.2.2.0-1
WAS:
The second block of full scale operational SVs developed by Rockwell International are designated as SVNs 22-40 and are termed "Block IIA" SVs. These SVs are capable of providing 60 days of positioning service without contact from the CS.

Redlines:
The second block of full scale operational SVs developed by Rockwell International are designated as SVNs 22-40 and are termed "Block IIA" SVs. -These SVs ~~are~~were capable of providing 60 days of positioning service without contact from the CS. These SVs transmitted a configuration code of 001 (reference paragraph 20.3.3.5.1.4). There are no longer any active Block IIA SVs in the GPS constellation.
IS:
The second block of full scale operational SVs developed by Rockwell International are designated as SVNs 22-40 and are termed "Block IIA" SVs. These SVs were capable of providing 60 days of positioning service without contact from the CS. These SVs transmitted a configuration code of 001 (reference paragraph 20.3.3.5.1.4). There are no longer any active Block IIA SVs in the GPS constellation.
Rationale:
During the RFC discussions, it was determined that certain appropriate terms are outdated, such as Block IIA. As a result, this RFC plans to remove those outdated terms.

IS200-175:

Section Number:
6.2.2.2.3.0-1
WAS:
The block of operational replenishment SVs developed by Lockheed Martin are designated as SVNs 41-61 and are termed "Block IIR" SVs. These SVs have the capability of storing at least 60 days of navigation data with current memory margins, while operating in a IIA mode, to provide positioning service without contact from the CS for that period. (Contractual requirements for these SVs specify transmission of correct data for only 14 days to support short-term extended operations while in IIA mode.)
Redlines:
The block of operational replenishment SVs ~~developed by Lockheed Martin~~ are designated as SVNs 41-61 and are termed "Block IIR" SVs. These SVs have the capability of storing at least 60 days of navigation data with current memory margins~~, while operating in a IIA mode,~~ to provide positioning service without contact from the CS for that period. (Contractual requirements for these SVs specify transmission of correct data for only 14 days to support short-term extended operations ~~while in IIA mode~~.)
IS:
The block of operational replenishment SVs are designated as SVNs 41-61 and are termed "Block IIR" SVs. These SVs have the capability of storing at least 60 days of navigation data with current memory margins to provide positioning service without contact from the CS for that period. (Contractual requirements for these SVs specify transmission of correct data for only 14 days to support short-term extended operations.)
Rationale:
Wording change is awkward ("...in a mode...") and incomplete (reference to "IIA mode" remains in last sentence).

IS200-177:

Section Number:
6.2.2.2.4.0-1
WAS:
The subset of operational replenishment SVs developed by Lockheed Martin which are “Modernized” configuration of “Block IIR” SVs are termed “Block IIR-M”.
Redlines:
The subset of operational replenishment SVs ~~developed by Lockheed Martin~~ which are “Modernized” configuration of “Block IIR” SVs are termed “Block IIR-M”.

IS:
The subset of operational replenishment SVs which are “Modernized” configuration of “Block IIR” SVs are termed “Block IIR-M”.

Rationale:
Removal of contractor name

IS200-1404:

Section Number:
6.2.2.2.6
WAS:
Object Heading : GPS III SVs
Redlines:
Object Heading : GPS III and GPS IIIF SVs
IS:
Object Heading : GPS III and GPS IIIF SVs
Rationale:
Adding GPS IIIF reference since information is applicable to IIIF

IS200-1405:

Section Number:
6.2.2.2.6.0-1
WAS:
The block of operational replenishment SVs are designated as SVNs 74-105. This is the first block of operational SVs that transmit the L1C signal. These SVs will provide at least 60 days of positioning service without contact from the CS.

Redlines:
The block of operational replenishment SVs are designated as SVNs 74-105. -This is the first block of operational SVs that transmit the L1C signal.– These SVs will provide at least 60 days of positioning service without contact from the CS.

The subset of operational replenishment SVs which are the "Follow-On" configuration of "GPS III" SVs are termed "GPS IIIF".
IS:
The block of operational replenishment SVs are designated as SVNs 74-105. This is the first block of operational SVs that transmit the L1C signal. These SVs will provide at least 60 days of positioning service without contact from the CS.
The subset of operational replenishment SVs which are the "Follow-On" configuration of "GPS III" SVs are termed "GPS IIIF".
Rationale:
Clean up

IS200-183:

Section Number:
6.2.3.0-1
WAS:
The following three operational intervals have been defined. These labels will be used to refer to differences in the interface definition as time progresses from SV acceptance of the last navigation data upload.
Redlines:
The following three operational intervals have been defined. -These labels will be used to refer to differences in the LNAV interface definition as time progresses from SV acceptance of the last navigation data upload. For CNAV data, the

interface definition does not change with time from upload and only the "normal operations" label is applicable, irrespective of the SV's current LNAV operational interval.
IS:
The following three operational intervals have been defined. These labels will be used to refer to differences in the LNAV interface definition as time progresses from SV acceptance of the last navigation data upload. For CNAV data, the interface definition does not change with time from upload and only the "normal operations" label is applicable, irrespective of the SV's current LNAV operational interval.
Rationale:
Clean up

IS200-192:

Section Number:
6.2.5
WAS:
Object Heading : L5 Civil Signal.
Redlines:
Object Heading : L5 ~~Civil~~and ~~Signal.~~L1C Civil Signals.
IS:
Object Heading : L5 and L1C Civil Signals.
Rationale:
Since the purpose of this section is to provide basic and reference information about civil signals other than L1 C/A and L2C, it makes sense to include the L1C civil signal as well as the L5 civil signal.

IS200-193:

Section Number:
6.2.5.0-1
WAS:
L5 is the GPS downlink signal at a nominal carrier frequency of 1176.45 MHz. The L5 signal is only available on Block IIF and subsequent blocks of SVs and the signal is specified/described in interface specification IS-GPS-705.
Redlines:
L5 is the GPS downlink signal at a nominal carrier frequency of 1176.45 MHz. The L5 signal is only available on Block IIF and subsequent blocks of SVs and the signal is specified/described in interface specification IS-GPS-705.
An additional signal on the L1 carrier denoted L1 Civil (L1C) is only available on GPS III and subsequent blocks of SVs and the signal is specified/described in interface specification IS-GPS-800.
IS:
L5 is the GPS downlink signal at a nominal carrier frequency of 1176.45 MHz. The L5 signal is only available on Block IIF and subsequent blocks of SVs and the signal is specified/described in interface specification IS-GPS-705.
An additional signal on the L1 carrier denoted L1 Civil (L1C) is only available on GPS III and subsequent blocks of SVs and the signal is specified/described in interface specification IS-GPS-800.
Rationale:
Since the purpose of this section is to provide basic and reference information about civil signals other than L1 C/A and L2C, it makes sense to include the L1C civil signal as well as the L5 civil signal.

IS200-1506:

Section Number:
6.2.6.0-1
WAS:
Reserved bits (or a single reserved value within a defined bit) are intended for future or other use and their values may change throughout the life of the system. In order to preserve future use of a reserved value within a defined bit, the User Segment should handle those values as described for each applicable field.

Redlines:
Reserved bits (or a single reserved value within a defined bit) are intended for future or other use and their values may change throughout the life of the system. The reserved fields within the navigation messages that are not defined should be treated as "don't care" bits by the user equipment. "Don't care" bits in the system are bits in a bit field that may or may not have an assigned meaning. User equipment is not required to do anything with these bits. In order to preserve future use of a reserved value within a defined bit, the User Segment should handle those values as described for each applicable field.
IS:
Reserved bits (or a single reserved value within a defined bit) are intended for future or other use and their values may change throughout the life of the system. The reserved fields within the navigation messages that are not defined should be treated as "don't care" bits by the user equipment. "Don't care" bits in the system are bits in a bit field that may or may not have an assigned meaning. User equipment is not required to do anything with these bits. In order to preserve future use of a reserved value within a defined bit, the User Segment should handle those values as described for each applicable field.

Rationale:
Adding a statement to clarify that the CNAV reserved bits should remain untouched.

IS200-1639:

Section Number:
6.2.9.1-2

WAS:

Table 6-I-1. CEI Data Set Parameters

Symbol	Parameter Name	Subframe	Message
SV Health	SV Health (6 bits)	1	N/A
IODC	Issue of Data, Clock	1	N/A
URA	URA Index	1	N/A
WN	Data Sequence Propagation Week Number	1	10
T_{GD}	Group Delay Differential	1	30
a_{f0}	SV Clock Bias Correction Coefficient	1	30-37
a_{f1}	SV Clock Drift Correction Coefficient	1	30-37
a_{f2}	Drift Rate Correction Coefficient	1	30-37
t_{oc}	Time of Clock	1	30-37
$\sqrt{A}$	Square Root of the Semi-Major Axis	2	N/A
Δn	Mean Motion Difference from Computed Value	2	N/A
Fit Interval Flag	Fit Interval Flag	2	N/A
e	Eccentricity	2	10
M_0	Mean Anomaly at Reference Time	2	10
t_{oe}	Time of Ephemeris	2	10, 11
C_{rs}	Amplitude of the Sine Correction Term to the Orbit Radius	2	11
C_{uc}	Amplitude of Cosine Harmonic Correction Term to the Argument of Latitude	2	11
C_{us}	Amplitude of Sine Harmonic Correction Term to the Argument of Latitude	2	11
IODE	Issue of Data, Ephemeris	2, 3	N/A
ISF	Integrity Status Flag NOTE1	All	10
ω	Argument of Perigee	3	10
$\dot{\Omega}$	Rate of Right Ascension	3	11
Ω_0	Longitude of Ascending Node of Orbit Plane at Weekly Epoch	3	11
i_0	Inclination Angle at Reference Time	3	11
IDOT, $i_{0\text{-}n}$-DOT	Rate of Inclination Angle	3	11
C_{ic}	Amplitude of the Cosine Harmonic Correction Term to the Angle of Inclination	3	11
C_{is}	Amplitude of the Sine Harmonic Correction Term to the Angle of Inclination	3	11
C_{rc}	Amplitude of the Cosine Harmonic Correction Term to the Orbit Radius	3	11
ΔA	Semi-major Axis Difference at Reference Time	N/A	10

Redlines:

Table 6-I-1. CEI Data Set Parameters

Symbol	Parameter Name	Subframe	Message
SV Health	SV Health (6 bits)	1	N/A
IODC	Issue of Data, Clock	1	N/A
URA	URA Index	1	N/A
WN	Data Sequence Propagation Week Number	1	10
T_{GD}	Group Delay Differential	1	30
a_{f0}	SV Clock Bias Correction Coefficient	1	30-37
a_{f1}	SV Clock Drift Correction Coefficient	1	30-37
a_{f2}	Drift Rate Correction Coefficient	1	30-37
t_{oc}	Time of Clock	1	30-37
$\sqrt{A}$	Square Root of the Semi-Major Axis	2	N/A
Δn	Mean Motion Difference from Computed Value	2	N/A
Fit Interval Flag	Fit Interval Flag	2	N/A
e	Eccentricity	2	10
M_0	Mean Anomaly at Reference Time	2	10
t_{oe}	Time of Ephemeris	2	10, 11
C_{rs}	Amplitude of the Sine Correction Term to the Orbit Radius	2	11
C_{uc}	Amplitude of Cosine Harmonic Correction Term to the Argument of Latitude	2	11
C_{us}	Amplitude of Sine Harmonic Correction Term to the Argument of Latitude	2	11
IODE	Issue of Data, Ephemeris	2, 3	N/A
ISF	Integrity Status Flag [NOTE1]	All	10
ω	Argument of Perigee	3	10
$\dot{\Omega}$	Rate of Right Ascension	3	N/A
$\Delta\dot{\Omega}$	Rate of Right Ascension Difference	N/A	11
Ω_0	Longitude of Ascending Node of Orbit Plane at Weekly Epoch	3	11
i_0	Inclination Angle at Reference Time	3	11
IDOT, $i_{0\text{-}n}$-DOT	Rate of Inclination Angle	3	11
C_{ic}	Amplitude of the Cosine Harmonic Correction Term to the Angle of Inclination	3	11
C_{is}	Amplitude of the Sine Harmonic Correction Term to the Angle of Inclination	3	11

IS:

Table 6-I-1. CEI Data Set Parameters

Symbol	Parameter Name	Subframe	Message
SV Health	SV Health (6 bits)	1	N/A
IODC	Issue of Data, Clock	1	N/A
URA	URA Index	1	N/A
WN	Data Sequence Propagation Week Number	1	10
T_{GD}	Group Delay Differential	1	30
a_{f0}	SV Clock Bias Correction Coefficient	1	30-37
a_{f1}	SV Clock Drift Correction Coefficient	1	30-37
a_{f2}	Drift Rate Correction Coefficient	1	30-37
t_{oc}	Time of Clock	1	30-37
$\sqrt{A}$	Square Root of the Semi-Major Axis	2	N/A
Δn	Mean Motion Difference from Computed Value	2	N/A
Fit Interval Flag	Fit Interval Flag	2	N/A
e	Eccentricity	2	10
M_0	Mean Anomaly at Reference Time	2	10
t_{oe}	Time of Ephemeris	2	10, 11
C_{rs}	Amplitude of the Sine Correction Term to the Orbit Radius	2	11
C_{uc}	Amplitude of Cosine Harmonic Correction Term to the Argument of Latitude	2	11
C_{us}	Amplitude of Sine Harmonic Correction Term to the Argument of Latitude	2	11
IODE	Issue of Data, Ephemeris	2, 3	N/A
ISF	Integrity Status Flag [NOTE1]	All	10
ω	Argument of Perigee	3	10
$\dot{\Omega}$	Rate of Right Ascension	3	N/A
$\Delta\dot{\Omega}$	Rate of Right Ascension Difference	N/A	11
Ω_0	Longitude of Ascending Node of Orbit Plane at Weekly Epoch	3	11
i_0	Inclination Angle at Reference Time	3	11
IDOT, $i_{0\text{-}n}$-DOT	Rate of Inclination Angle	3	11
C_{ic}	Amplitude of the Cosine Harmonic Correction Term to the Angle of Inclination	3	11
C_{is}	Amplitude of the Sine Harmonic Correction Term to the Angle of Inclination	3	11

Rationale:
Table correctness; Rate of right ascension difference added

IS200-196:

Section Number:
6.3.1.0-1
WAS:
The guaranteed minimum user-received signal levels are defined in paragraph 3.3.1.6. As additional supporting material, Figure 6-1 illustrates an example variation in the minimum received power of the near-ground user-received L1 and L2 signals from Block II/IIA/IIR SVs as a function of SV elevation angle.
Redlines:
The guaranteed minimum user-received signal levels are defined in paragraph 3.3.1.6. As additional supporting material, Figure 6-1 illustrates an example variation in the minimum received power of the near-ground user-received L1 and L2 signals from Block ~~II/IIA/~~IIR SVs as a function of SV elevation angle.
IS:
The guaranteed minimum user-received signal levels are defined in paragraph 3.3.1.6. As additional supporting material, Figure 6-1 illustrates an example variation in the minimum received power of the near-ground user-received L1 and L2 signals from Block IIR SVs as a function of SV elevation angle.
Rationale:
During the RFC discussions, it was determined that certain appropriate terms are outdated, such as Block IIA. As a result, this RFC plans to remove those outdated terms if it does not impact other parts of the document.

IS200-2052:

Section Number:
6.3.1.0-3
WAS:
For Block II/IIA and IIR SVs, the maximum received signal levels as a result of these factors is not expected to exceed -155.5 dBW and -153.0 dBW, respectively, for the P(Y) and C/A components of the L1 channel, nor -158.0 dBW for either signal on the L2 channel.
Redlines:
For Block ~~II/IIA and~~ IIR SVs, the maximum received signal levels as a result of these factors is not expected to exceed -155.5 dBW and -153.0 dBW, respectively, for the P(Y) and C/A components of the L1 channel, nor -158.0 dBW for either signal on the L2 channel.
IS:
For Block IIR SVs, the maximum received signal levels as a result of these factors is not expected to exceed -155.5 dBW and -153.0 dBW, respectively, for the P(Y) and C/A components of the L1 channel, nor -158.0 dBW for either signal on the L2 channel.
Rationale:
During the RFC discussions, it was determined that certain appropriate terms are outdated, such as Block IIA. As a result, this RFC plans to remove those outdated terms.

IS200-1545:

Section Number:
6.3.1.0-6
WAS:
Figure 6-1. User Received Minimum Signal Level Variations (Example, Block II/IIA/IIR)
Redlines:
Figure 6-1. User Received Minimum Signal Level Variations (Example, Block ~~II/IIA/~~IIR)
IS:
Figure 6-1. User Received Minimum Signal Level Variations (Example, Block IIR)
Rationale:
Consistency

IS200-199:

Section Number:
6.3.2
WAS:
Object Heading : Extended Navigation Mode (Block II/IIA).
Redlines:
Object Heading : Extended Navigation Mode ~~(Block II/IIA).~~
IS:
Object Heading : Extended Navigation Mode
Rationale:
Maintain generic section heading for object IS200-201 and IS200-202.

IS200-200:

Section Number:
6.3.2.0-1
WAS:
The Block II and IIA SVs are capable of being uploaded by the CS with a minimum of 60 days of navigation data to support a 60 day positioning service. Due to memory retention limitations, the Block II SVs may not transmit correct data for the entire 60 days but are guaranteed to transmit correct data for at least 14 days to support short-term extended operations. Under normal conditions the CS will provide daily uploads to each SV, which will allow the SV to maintain normal operations as defined in paragraph 6.2.3.1 and described within this IS. During normal operations, the SVs will have a user range error that is at or below a level required to support a positioning accuracy of 16 meters spherical error probable (SEP). In addition, the almanac data, UTC parameters and ionospheric data will be maintained current to meet the accuracy specified in this IS.
Redlines:
~~The Block II and IIA SVs are capable of being uploaded by the CS with a minimum of 60 days of navigation data to support a 60 day positioning service. Due to memory retention limitations, the Block II SVs may not transmit correct data for the entire 60 days but are guaranteed to transmit correct data for at least 14 days to support short-term extended operations.~~ Under normal conditions the CS will provide daily uploads to each SV, which will allow the SV to maintain normal operations as defined in paragraph 6.2.3.1 and described within this IS~~. During normal operations, the SVs will have a user range error that is at or below a level required to support a positioning accuracy of 16 meters spherical error probable (SEP)~~. In addition, the almanac data, UTC parameters and ionospheric data will be maintained current to meet the accuracy specified in this IS.
IS:
Under normal conditions the CS will provide daily uploads to each SV, which will allow the SV to maintain normal operations as defined in paragraph 6.2.3.1 and described within this IS. In addition, the almanac data, UTC parameters and ionospheric data will be maintained current to meet the accuracy specified in this IS.
Rationale:
Object is relevant to a generic description of Extended Navigation mode.

IS200-201:

Section Number:
6.3.2.0-2
WAS:
If the CS is unable to upload the SVs (the CS is unavailable or the SV is unable to accept and process the upload), each SV

will individually transition to short-term extended operations and eventually to long-term extended operations (based on time from each SV's last upload) as defined in paragraphs 6.2.3.2 and 6.2.3.3, and as further described throughout this IS. As time from upload continues through these three operational intervals, the user range error of the SV will increase, causing a positioning service accuracy degradation. The rate of accuracy degradation is slow over the short-term extended operations interval, such that at the end of this interval (approximately 14 days after upload) the US will be able to achieve a positioning accuracy of 425 meters SEP. The rate of accuracy degradation increases in the long-term extended interval, such that by the 180th day after the last upload, the positioning errors will have grown to 10 kilometers SEP. During these intervals the URA will continue to provide the proper estimate of the user range errors.
IS:
<DELETED OBJECT>
Rationale:
Clean up

IS200-1490:

Section Number:
6.3.3
WAS:
Object Heading : Block IIA Mode (Block IIR/IIR-M) and Extended Navigation Mode (Block II-F).
Redlines:
Object Heading : ~~Block~~Extended ~~IIA~~Navigation Mode (Block IIR/IIR-M~~) and Extended Navigation Mode (Block II-F~~/IIF).
IS:
Object Heading : Extended Navigation Mode (Block IIR/IIR-M/IIF).

Rationale:
During the RFC discussions, it was determined that certain appropriate terms are outdated, such as Block IIA. As a result, this RFC plans to remove those outdated terms.

IS200-206:

Section Number:
6.3.3.1
WAS:
Object Heading : Block IIA Mode (Block IIR/IIR-M).
Redlines:
Object Heading : ~~Block~~Extended ~~IIA~~Navigation Mode (Block IIR/IIR-M)~~.~~
IS:
Object Heading : Extended Navigation Mode (Block IIR/IIR-M)
Rationale:
Simpler header

IS200-207:

Section Number:
6.3.3.1.0-1
WAS:
The Block IIR/IIR-M SVs, when operating in the Block IIA mode, will perform similarly to the Block IIA SVs and have the capability of storing at least 60 days of navigation data, with current memory margins, to provide positioning service without contact from the CS for that period (through short-term and long-term extended operations). (Contractual requirements for these SVs specify transmission of correct data for only 14 days to support short-term extended

operations while in IIA mode.) Under normal conditions, the CS will provide daily uploads to each SV, which will allow the SV to maintain normal operations as defined in paragraph 6.2.3.1 and described within this IS.
Redlines:
The Block IIR/IIR-M SVs~~, when operating in the Block IIA mode, will perform similarly to the Block IIA SVs and~~ have the capability of storing at least 60 days of navigation data, with current memory margins, to provide positioning service without contact from the CS for that period (through short-term and long-term extended operations). (Contractual requirements for these SVs specify transmission of correct data for only 14 days to support short-term extended operations~~ while in IIA mode~~.) Under normal conditions, the CS will provide daily uploads to each SV, which will allow the SV to maintain normal operations as defined in paragraph 6.2.3.1 and described within this IS.
IS:
The Block IIR/IIR-M SVs have the capability of storing at least 60 days of navigation data, with current memory margins, to provide positioning service without contact from the CS for that period (through short-term and long-term extended operations). (Contractual requirements for these SVs specify transmission of correct data for only 14 days to support short-term extended operations.) Under normal conditions, the CS will provide daily uploads to each SV, which will allow the SV to maintain normal operations as defined in paragraph 6.2.3.1 and described within this IS.
Rationale:
Clarity and completeness.

IS200-1760:

Section Number:
6.4.6.2.2.0-1
WAS:
The following alarm indications are specific to the code signals listed below.
C/A-Code or P(Y)-Code Signal
(a) The failure of parity on 5 successive words of LNAV data (3 seconds) (see paragraphs 20.3.5 and 40.3.5).
(b) The broadcast IODE does not match the 8 LSBs of the broadcast IODC (excluding normal data set cutovers, see paragraph 20.3.3.4.1).
(c) The transmitted bits in words 3-10 in subframe 1, 2, or 3 are all set to 0's or all set to 1's.
(d) Default LNAV data is being transmitted in subframes 1, 2, or 3 (see paragraph 20.3.2).
(e) The 8-bit preamble does not equal 10001011_2, decimal 139, or hexadecimal 8B (see paragraph 20.3.3).

CM-Code Signal
(a) The failure of the cyclic redundancy check (CRC) on 5 successive CNAV messages (60 seconds) (see paragraph 30.3.5).
(b) The broadcast time of ephemeris (t_{oe}) is not current (i.e. not within the current curve-fit) or does not match the broadcast time of clock (t_{oc}) (excluding normal data set cutovers, see paragraphs 30.3.3.1.1 and 30.3.4.4).
(c) The broadcast t_{op} is not consistent across the Message Types 10, 11 and Type 30's messages which comprise the current (i.e. not within the current curve-fit) CEI data set (excluding normal data set cutovers, see paragraph 30.3.4.4).
(d) The transmitted bits (bits 39-276) in Message Types 10, 11 and Type 30's are all set to 0's or all set to 1's.
(e) The 8-bit preamble does not equal 10001011_2, decimal 139, or hexadecimal 8B (see paragraph 30.3.3).

Notes:
1. *A SIS alarm indication exists when the satellite is not trackable because it is not transmitting the standard PRN code modulation on the L-band carrier signal. These SIS alarm indications are specifically called out above because of their relatively high probability of occurrence.*
2. *The SIS alarm indications related to the LNAV and CNAV message data are considered "weak" indications since receivers do not necessarily continuously read each satellite's LNAV or CNAV message data either by design or by circumstance (e.g., radio-frequency interference [RFI] can prevent reading LNAV or CNAV message data). These weak SIS alarm indications are assumed to have a five-minute lag time before receivers take notice of them for alerting purposes.*

3. *The SIS alarm indications related to the LNAV or CNAV message data are indicative of a problem onboard the satellite. GPS receivers may perceive similar indications caused by local effects that are unrelated to the broadcast SIS.*
4. *In addition to SIS alarm indications, other conditions may also cause GPS signals to become temporarily untrackable, such as ionospheric signal fades, local signal masking, or local interference.*

Redlines:

The following alarm indications are specific to the code signals listed below.

C/A-Code or P(Y)-Code Signal

(a) The failure of parity on 5 successive words of LNAV data in subframe 1, 2, or 3 (3 seconds) (see paragraphs 20.3.5 and 40.3.5).

(b) The broadcast IODE does not match the 8 LSBs of the broadcast IODC (excluding normal data set cutovers, see paragraph 20.3.3.4.1).

(c) The transmitted bits in words 3-10 in subframe 1, 2, or 3 are all set to 0's or all set to 1's.

(d) Default LNAV data is being transmitted in subframes 1, 2, or 3 (see paragraph 20.3.2).

(e) The 8-bit preamble does not equal 100010112, decimal 139, or hexadecimal 8B (see paragraph 20.3.3).

CM-Code Signal

(a) The failure of the cyclic redundancy check (CRC) on 5 successive CNAV messages (60 seconds) (see paragraph 30.3.5).

(b) The broadcast time of ephemeris (t_{oe}) is not current (i.e. not within the current curve-fit) or does not match the broadcast time of clock (toc) (excluding normal data set cutovers, see paragraphs 30.3.3.1.1 and 30.3.4.4).

(c) The broadcast top is not consistent across the Message Types 10, 11 and Type 30's messages which comprise the current (i.e. not within the current curve-fit)- CEI data set (excluding normal data set cutovers, see paragraph 30.3.4.4).

(d) The transmitted bits (bits 39-276) in Message Types 10, 11 and Type 30's are all set to 0's or all set to 1's.

(e) The 8-bit preamble does not equal 100010112, decimal 139, or hexadecimal 8B (see paragraph 30.3.3).

Notes:

A SIS alarm indication exists when the satellite is not trackable because it is not transmitting the standard PRN code modulation on the L-band carrier signal. These SIS alarm indications are specifically called out above because of their relatively high probability of occurrence.

The SIS alarm indications related to the LNAV and CNAV message data are considered "weak" indications since receivers do not necessarily continuously read each satellite's LNAV or CNAV message data either by design or by circumstance (e.g., radio-frequency interference [RFI] can prevent reading LNAV or CNAV message data). These weak SIS alarm indications are assumed to have a five-minute lag time before receivers take notice of them for alerting purposes.

The SIS alarm indications related to the LNAV or CNAV message data are indicative of a problem onboard the satellite. GPS receivers may perceive similar indications caused by local effects that are unrelated to the broadcast SIS.

In addition to SIS alarm indications, other conditions may also cause GPS signals to become temporarily untrackable, such as ionospheric signal fades, local signal masking, or local interference.

IS:

The following alarm indications are specific to the code signals listed below.

C/A-Code or P(Y)-Code Signal

(a) The failure of parity on 5 successive words of LNAV data in subframe 1, 2, or 3 (3 seconds) (see paragraphs 20.3.5 and 40.3.5).

(b) The broadcast IODE does not match the 8 LSBs of the broadcast IODC (excluding normal data set cutovers, see paragraph 20.3.3.4.1).

(c) The transmitted bits in words 3-10 in subframe 1, 2, or 3 are all set to 0's or all set to 1's.

(d) Default LNAV data is being transmitted in subframes 1, 2, or 3 (see paragraph 20.3.2).

(e) The 8-bit preamble does not equal 10001011_2, decimal 139, or hexadecimal 8B (see paragraph 20.3.3).

CM-Code Signal

(a) The failure of the cyclic redundancy check (CRC) on 5 successive CNAV messages (60 seconds) (see paragraph 30.3.5).
(b) The broadcast time of ephemeris (t_{oe}) is not current (i.e. not within the current curve-fit) or does not match the broadcast time of clock (toc) (excluding normal data set cutovers, see paragraphs 30.3.3.1.1 and 30.3.4.4).
(c) The broadcast top is not consistent across the Message Types 10, 11 and Type 30's messages which comprise the current (i.e. not within the current curve-fit) CEI data set (excluding normal data set cutovers, see paragraph 30.3.4.4).
(d) The transmitted bits (bits 39-276) in Message Types 10, 11 and Type 30's are all set to 0's or all set to 1's.
(e) The 8-bit preamble does not equal 10001011_2, decimal 139, or hexadecimal 8B (see paragraph 30.3.3).

Notes:

1. *A SIS alarm indication exists when the satellite is not trackable because it is not transmitting the standard PRN code modulation on the L-band carrier signal. These SIS alarm indications are specifically called out above because of their relatively high probability of occurrence.*
2. *The SIS alarm indications related to the LNAV and CNAV message data are considered "weak" indications since receivers do not necessarily continuously read each satellite's LNAV or CNAV message data either by design or by circumstance (e.g., radio-frequency interference [RFI] can prevent reading LNAV or CNAV message data). These weak SIS alarm indications are assumed to have a five-minute lag time before receivers take notice of them for alerting purposes.*
3. *The SIS alarm indications related to the LNAV or CNAV message data are indicative of a problem onboard the satellite. GPS receivers may perceive similar indications caused by local effects that are unrelated to the broadcast SIS.*
4. *In addition to SIS alarm indications, other conditions may also cause GPS signals to become temporarily untrackable, such as ionospheric signal fades, local signal masking, or local interference.*

Rationale:
Added subframes

IS200-281:

Section Number:
20.3.2.0-9
WAS:
Block II and IIA SVs are designed with sufficient memory capacity for storing at least 60 days of uploaded LNAV data. However, the memory retention of these SVs will determine the duration of data transmission. The memory retentivity is guaranteed for at least 60 days for SVs subsequent to Block IIA. GPS III and GPS IIIF SVs have the capability to support operation for at least 60 days without contact from the CS. Alternating ones and zeros will be transmitted in words 3 through 10 in place of the normal LNAV data whenever the SV cannot locate the requisite valid control or data element in its on-board computer memory. The following specifics apply to this default action: (a) the parity of the affected words will be invalid, (b) the two trailing bits of word 10 will be zeros (to allow the parity of subsequent subframes to be valid -- reference paragraph 20.3.5), (c) if the problem is the lack of a data element, only the directly related subframe(s) will be treated in this manner, (d) if a control element cannot be located, this default action will be applied to all subframes and all subframes will indicate ID = 1 (Block II/IIA only) (i.e., an ID-code of 001) in the HOW (reference paragraph 20.3.3.2) (Block IIR/IIR-M, IIF, and GPS III/IIIF SVs indicate the proper subframe ID for all subframes). Certain failures of control elements which may occur in the SV memory or during an upload will cause the SV to transmit in non-standard codes (NSC and NSY) which would preclude normal use by the US. Normal LNAV data transmission will be resumed by the SV whenever a valid set of elements becomes available.
Redlines:
~~Block II and IIA SVs are designed with sufficient memory capacity for storing at least 60 days of uploaded LNAV data. However, the memory retention of these SVs will determine the duration of data transmission. The memory retentivity is guaranteed for at least 60 days for SVs subsequent to Block IIA. GPS III and GPS IIIF~~All SVs have the capability to support operation for at least 60 days without contact from the CS.~~-~~ Alternating ones and zeros will be transmitted in words 3 through 10 in place of the normal LNAV data whenever the SV cannot locate the requisite valid control or data

element in its on-board computer memory. The following specifics apply to this default action: (a) the parity of the affected words will be invalid, (b) the two trailing bits of word 10 will be zeros (to allow the parity of subsequent subframes to be valid -- reference paragraph 20.3.5), (c) if the problem is the lack of a data element, only the directly related subframe(s) will be treated in this manner~~, (d) if a control element cannot be located, this default action will be applied to all subframes and all subframes will indicate ID = 1 (Block II/IIA only) (i.e., an ID-code of 001) in the HOW (reference paragraph 20.3.3.2) (Block IIR/IIR-M, IIF, and GPS III/IIIF SVs indicate the proper subframe ID for all subframes)~~. Certain failures of control elements which may occur in the SV memory or during an upload will cause the SV to transmit in non-standard codes (NSC and NSY) which would preclude normal use by the US. Normal LNAV data transmission will be resumed by the SV whenever a valid set of elements becomes available.
IS:
All SVs have the capability to support operation for at least 60 days without contact from the CS. Alternating ones and zeros will be transmitted in words 3 through 10 in place of the normal LNAV data whenever the SV cannot locate the requisite valid control or data element in its on-board computer memory. The following specifics apply to this default action: (a) the parity of the affected words will be invalid, (b) the two trailing bits of word 10 will be zeros (to allow the parity of subsequent subframes to be valid -- reference paragraph 20.3.5), (c) if the problem is the lack of a data element, only the directly related subframe(s) will be treated in this manner. Certain failures of control elements which may occur in the SV memory or during an upload will cause the SV to transmit in non-standard codes (NSC and NSY) which would preclude normal use by the US. Normal LNAV data transmission will be resumed by the SV whenever a valid set of elements becomes available.
Rationale:
During the RFC discussions, it was determined that certain appropriate terms are outdated, such as Block IIA. As a result, this RFC plans to remove those outdated terms.

IS200-282:

Section Number:
20.3.2.0-10
WAS:
Block II/IIA SVs are uploaded with a minimum of 60 days of LNAV data. However, the EAROM retentivity for Block II SVs is designed and guaranteed for only 14 days. Therefore, Block II SV memory is most likely to fail sometime during long-term extended operations after repeated write operations. In the case of memory failure, the SV will transmit alternating ones and zeros in word 3-10 as specified in the above paragraph. The EAROM retentivity for Block IIA SVs is designed and guaranteed for at least 60 days.
Redlines:
~~Block II/IIA SVs are uploaded with a minimum of 60 days of LNAV data. However, the EAROM retentivity for Block II SVs is designed and guaranteed for only 14 days. Therefore, Block II SV memory is most likely to fail sometime during long-term extended operations after repeated write operations. In the case of memory failure, the SV will transmit alternating ones and zeros in word 3-10 as specified in the above paragraph. The EAROM retentivity for Block IIA SVs is designed and guaranteed for at least 60 days.~~
IS:
<DELETED OBJECT>
Rationale:
During the RFC discussions, it was determined that certain appropriate terms are outdated, such as Block IIA. As a result, this RFC plans to remove those outdated terms.

IS200-2024:

Section Number:
20.3.3.3.1.1.0-3
WAS:
For Block II SVs in long-term extended operations, beginning approximately 28 days after upload, the transmission week number may not correspond to the actual GPS week number due to curve fit intervals that cross week boundaries.

Redlines:
~~For Block II SVs in long-term extended operations, beginning approximately 28 days after upload, the transmission week number may not correspond to the actual GPS week number due to curve fit intervals that cross week boundaries.~~
IS:
<DELETED OBJECT>
Rationale:
Text is specific to Block II SVs and should be removed for completeness.

IS200-355:

Section Number:
20.3.3.4.1.0-7
WAS:
Any change in the subframe 2 and 3 core CEI data will be accomplished with a simultaneous change in both IODE words. The CS (Block II/Block IIA/IIR/IIR-M/IIF) and SS (GPS III/IIIF) 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 for the prior CEI data sequence propagation (reference paragraph 20.3.4.5).
Redlines:
Any change in the subframe 2 and 3 core CEI data will be accomplished with a simultaneous change in both IODE words. The CS (Block ~~II/Block IIA/~~IIR/IIR-M/IIF) and SS (GPS III/IIIF) 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 for the prior CEI data sequence propagation (reference paragraph 20.3.4.5).
IS:
Any change in the subframe 2 and 3 core CEI data will be accomplished with a simultaneous change in both IODE words. The CS (Block IIR/IIR-M/IIF) and SS (GPS III/IIIF) 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 for the prior CEI data sequence propagation (reference paragraph 20.3.4.5).
Rationale:
Removal of block II/IIA

IS200-363:

Section Number:
20.3.3.4.3.0-1
WAS:
The user shall compute the ECEF coordinates of position for the phase center of the SVs' antennas utilizing a variation of the equations shown in Table 20-IV. Subframes 2 and 3 parameters are Keplerian in appearance; the values of these parameters, however, are produced by the CS (Block II/Block IIA/IIR/IIR-M/IIF) and SS (GPS III/IIIF) via a least squares curve fit of the propagated ephemeris of the phase center of the SVs' antennas (time-position quadruples; t, x, y, z expressed in ECEF coordinates). Particulars concerning the periods of the curve fit, the resultant accuracy, and the applicable coordinate system are given in the following subparagraphs.
Redlines:
The user shall compute the ECEF coordinates of position for the phase center of the SVs' antennas utilizing a variation of the equations shown in Table 20-IV. Subframes 2 and 3 parameters are Keplerian in appearance; the values of these parameters, however, are produced by the CS (~~Block II/~~Block ~~IIA/~~IIR/IIR-M/IIF) and SS (GPS III/IIIF) via a least squares curve fit of the propagated ephemeris of the phase center of the SVs' antennas (time-position quadruples; t, x, y, z expressed in ECEF coordinates). Particulars concerning the periods of the curve fit, the resultant accuracy, and the applicable coordinate system are given in the following subparagraphs.
IS:
The user shall compute the ECEF coordinates of position for the phase center of the SVs' antennas utilizing a variation of the equations shown in Table 20-IV. Subframes 2 and 3 parameters are Keplerian in appearance; the values of these

parameters, however, are produced by the CS (Block IIR/IIR-M/IIF) and SS (GPS III/IIIF) via a least squares curve fit of the propagated ephemeris of the phase center of the SVs' antennas (time-position quadruples; t, x, y, z expressed in ECEF coordinates). Particulars concerning the periods of the curve fit, the resultant accuracy, and the applicable coordinate system are given in the following subparagraphs.
Rationale:
During the RFC discussions, it was determined that certain appropriate terms are outdated, such as Block IIA. As a result, this RFC plans to remove those outdated terms.

IS200-365:

Section Number:
20.3.3.4.3.1.0-1
WAS:
Bit 17 in word 10 of subframe 2 is a "fit interval" flag which indicates the curve-fit interval used by the CS (Block II/Block IIA/IIR/IIR-M/IIF) and SS (GPS III and GPS IIIF) in determining the ephemeris parameters, as follows:

0 = 4 hours,
1 = greater than 4 hours.

Redlines:
Bit 17 in word 10 of subframe 2 is a "fit interval" flag which indicates the curve-fit interval used by the CS (~~Block II/~~Block ~~IIA/~~IIR/IIR-M/IIF) and SS (GPS III and GPS IIIF) in determining the ephemeris parameters, as follows:

0 = 4 hours,
1 = greater than 4 hours.

IS:
Bit 17 in word 10 of subframe 2 is a "fit interval" flag which indicates the curve-fit interval used by the CS (Block IIR/IIR-M/IIF) and SS (GPS III and GPS IIIF) in determining the ephemeris parameters, as follows:

0 = 4 hours,
1 = greater than 4 hours.

Rationale:
During the RFC discussions, it was determined that certain appropriate terms are outdated, such as Block IIA. As a result, this RFC plans to remove those outdated terms.

IS200-380:

Section Number:
20.3.3.4.4.0-6
WAS:
It should be noted that the NMCT information shall be supported by the Block IIR SV.
Redlines:
~~It should be noted that the NMCT information shall be supported by the Block IIR SV.~~
IS:
<DELETED OBJECT>
Rationale:
The final paragraph originally described an exclusion for Block IIR SVs in Autonav mode, and was incompletely deleted by RFC-395 when the Autonav information was removed. Since all current SVs support NMCT, the information specific to Block IIR is not necessary.

IS200-391:

Section Number:
20.3.3.5.1.1.0-6

WAS:

Table 20-V. Data IDs and SV IDs in Subframes 4 and 5

Page	Subframe 4		Subframe 5	
	Data ID	SV ID*	Data ID	SV ID*
1	Note(2)	57	Note(1)	1
2	Note(1)	25	Note(1)	2
3	Note(1)	26	Note(1)	3
4	Note(1)	27	Note(1)	4
5	Note(1)	28	Note(1)	5
6	Note(2)	57	Note(1)	6
7	Note(1)	29	Note(1)	7
8	Note(1)	30	Note(1)	8
9	Note(1)	31	Note(1)	9
10	Note(1)	32	Note(1)	10
11	Note(2)	57	Note(1)	11
12	Note(2)	62	Note(1)	12
13	Note(2)	52	Note(1)	13
14	Note(2)	53	Note(1)	14
15	Note(2)	54	Note(1)	15
16	Note(2)	57	Note(1)	16
17	Note(2)	55	Note(1)	17
18	Note(2)	56	Note(1)	18
19	Note(2)	58 Note(3)	Note(1)	19
20	Note(2)	59 Note(3)	Note(1)	20
21	Note(2)	57	Note(1)	21
22	Note(2)	60 Note(3)	Note(1)	22
23	Note(2)	61 Note(3)	Note(1)	23
24	Note(2)	62	Note(1)	24
25	Note(2)	63	Note(2)	51

* Use "0" to indicate "dummy" SV. When using "0" to indicate dummy SV, use the data ID of the transmitting SV.

Note 1: Data ID of that SV whose SV ID appears in that page.
Note 2: Data ID of transmitting SV.
Note 3: SV ID may vary (except for IIR/IIR-M/IIF/GPS III/ GPS IIIF SVs).

Redlines:

Table 20-V. Data IDs and SV IDs in Subframes 4 and 5

Page	Subframe 4		Subframe 5	
	Data ID	SV ID*	Data ID	SV ID*
1	Note(2)	57	Note(1)	1
2	Note(1)	25	Note(1)	2
3	Note(1)	26	Note(1)	3
4	Note(1)	27	Note(1)	4
5	Note(1)	28	Note(1)	5
6	Note(2)	57	Note(1)	6
7	Note(1)	29	Note(1)	7
8	Note(1)	30	Note(1)	8
9	Note(1)	31	Note(1)	9
10	Note(1)	32	Note(1)	10
11	Note(2)	57	Note(1)	11
12	Note(2)	62	Note(1)	12
13	Note(2)	52	Note(1)	13
14	Note(2)	53	Note(1)	14
15	Note(2)	54	Note(1)	15
16	Note(2)	57	Note(1)	16
17	Note(2)	55	Note(1)	17
18	Note(2)	56	Note(1)	18
19	Note(2)	58 ~~Note(3)~~	Note(1)	19
20	Note(2)	59 ~~Note(3)~~	Note(1)	20
21	Note(2)	57	Note(1)	21
22	Note(2)	60 ~~Note(3)~~	Note(1)	22
23	Note(2)	61 ~~Note(3)~~	Note(1)	23
24	Note(2)	62	Note(1)	24
25	Note(2)	63	Note(2)	51

* Use "0" to indicate "dummy" SV. When using "0" to indicate dummy SV, use the data ID of the transmitting SV.

Note 1: Data ID of that SV whose SV ID appears in that page.
Note 2: Data ID of transmitting SV.
~~Note 3: SV ID may vary (except for IIR/IIR-M/IIF/GPS III/ GPS IIIF SVs).~~

IS:

Table 20-V. Data IDs and SV IDs in Subframes 4 and 5

Page	Subframe 4		Subframe 5	
	Data ID	SV ID*	Data ID	SV ID*
1	Note(2)	57	Note(1)	1
2	Note(1)	25	Note(1)	2
3	Note(1)	26	Note(1)	3
4	Note(1)	27	Note(1)	4
5	Note(1)	28	Note(1)	5
6	Note(2)	57	Note(1)	6
7	Note(1)	29	Note(1)	7
8	Note(1)	30	Note(1)	8
9	Note(1)	31	Note(1)	9
10	Note(1)	32	Note(1)	10
11	Note(2)	57	Note(1)	11
12	Note(2)	62	Note(1)	12
13	Note(2)	52	Note(1)	13
14	Note(2)	53	Note(1)	14
15	Note(2)	54	Note(1)	15
16	Note(2)	57	Note(1)	16
17	Note(2)	55	Note(1)	17
18	Note(2)	56	Note(1)	18
19	Note(2)	58	Note(1)	19
20	Note(2)	59	Note(1)	20
21	Note(2)	57	Note(1)	21
22	Note(2)	60	Note(1)	22
23	Note(2)	61	Note(1)	23
24	Note(2)	62	Note(1)	24
25	Note(2)	63	Note(2)	51

* Use "0" to indicate "dummy" SV. When using "0" to indicate dummy SV, use the data ID of the transmitting SV.

Note 1: Data ID of that SV whose SV ID appears in that page.
Note 2: Data ID of transmitting SV.

Rationale:
During the RFC discussions, it was determined that certain appropriate terms are outdated, such as Block IIA. As a result, this RFC plans to remove those outdated terms if it does not impact other parts of the document.

IS200-394:

Section Number:
20.3.3.5.1.2.0-2
WAS:
The almanac message for any dummy SVs shall contain alternating ones and zeros with valid parity.
Redlines:
The almanac message (174 almanac data bits and 8 SV health bits) for any dummy SVs shall contain alternating ones and zeros with valid parity.

IS:
The almanac message (174 almanac data bits and 8 SV health bits) for any dummy SVs shall contain alternating ones and zeros with valid parity.
Rationale:
The term "almanac message" is not defined anywhere in IS-GPS-200, and the immediately preceding paragraph specifically excludes the 8 "SV health" bits in word 5 from the description of "almanac data". It would be better to explicitly state which data bits are to be filled with alternating 1/0 for a dummy SV.

IS200-396:

Section Number :
20.3.3.5.1.2.0-5
WAS :
For Block II and IIA SVs, three sets of almanac shall be used to span at least 60 days. The first and second sets will be transmitted for up to six days each; the third set is intended to be transmitted for the remainder of the 60 days minimum, but the actual duration of transmission will depend on the individual SV's capability to retain data in memory. All three sets are based on six-day curve fits that correspond to the first six days of the transmission interval.
Redlines :
~~For Block II and IIA SVs, three sets of almanac shall be used to span at least 60 days. The first and second sets will be transmitted for up to six days each; the third set is intended to be transmitted for the remainder of the 60 days minimum, but the actual duration of transmission will depend on the individual SV's capability to retain data in memory. All three sets are based on six-day curve fits that correspond to the first six days of the transmission interval.~~
IS :
<DELETED OBJECT>
Rationale :
During the RFC discussions, it was determined that certain appropriate terms are outdated, such as Block IIA. As a result, this RFC plans to remove those outdated terms if it does not impact other parts of the document.

IS200-1418:

Section Number:
20.3.3.5.1.2.0-6
WAS:
For Block IIR/IIR-M, IIF, GPS III, and GPS IIIF SVs, five sets of almanac shall be used to span at least 60 days. The first, second, and third sets will be transmitted for up to six days each; the fourth and fifth sets will be transmitted for up to 32 days; the fifth set is intended to be transmitted for the remainder of the 60 days minimum, but the actual duration of transmission will depend on the individual SV's capability to retain data in memory.
The first, second, and third sets are based on six day curve fits. The fourth and fifth sets are based on 32 day curve fits.
Redlines:
For Block IIR/IIR-M, IIF, GPS III, and GPS IIIF SVs, a minimum of five sets of almanac shall be used to span at least 60 days. The first, second, and third sets will be transmitted for up to six days each; the fourth and ~~fifth~~subsequent sets will be transmitted for up to 32 days each; with the ~~fifth~~final set ~~is intended to be~~ transmitted for the remainder of the 60 days minimum~~, but the actual duration of transmission will~~. ~~depend on~~
During the ~~individual SV's capability to retain data in memory.~~ first
~~The~~18 ~~first,~~days ~~second,~~after ~~and~~upload ~~third~~the sets are based on six day curve fits. ~~The fourth and fifth~~Subsequent sets are based on 32 day curve fits.
IS:
For Block IIR/IIR-M, IIF, GPS III, and GPS IIIF SVs, a minimum of five sets of almanac shall be used to span at least 60 days. The first, second, and third sets will be transmitted for up to six days each; the fourth and subsequent sets will be transmitted for up to 32 days each; with the final set transmitted for the remainder of the 60 days minimum.
During the first 18 days after upload the sets are based on six day curve fits. Subsequent sets are based on 32 day curve fits.

Rationale:
The number of broadcast almanac sets over 60 days may be greater than five due to propagation by some SVs of the uploaded almanac data. The updated description of the broadcast almanac behavior is valid for all of the applicable SV blocks.

IS200-2073:

Section Number:
20.3.3.5.1.4.0-3
WAS:
Code SV Configuration

000 No Information is available
001 A-S capability, plus flags for A-S and "alert" in HOW; memory capacity as described in paragraph 20.3.2 (e.g. Block II/Block IIA/IIR SV).
010 A-S capability, plus flags for A-S and "alert" in HOW; memory capacity as described in paragraph 20.3.2, M-code signal capability, L2C signal capability (e.g., Block IIR-M SV).
011 A-S capability, plus flags for A-S and "alert" in HOW; memory capacity as described in paragraph 20.3.2, M-code capability, L2C signal capability, L5 signal capability (e.g., Block IIF SV).
100 A-S capability, plus flags for A-S and "alert" in HOW; memory capacity as described in paragraph 20.3.2, M-code capability, L1C signal capability, L2C signal capability, L5 signal capability, no SA capability (e.g., GPS III SVs).
101 A-S capability, plus flags for A-S and “alert” in HOW; memory capacity as described in paragraph 20.3.2, M-code capability, Regional Military Protection capability, L1C signal capability, L2C signal capability, L5 signal capability, no SA capability (e.g., GPS IIIF SVs).
110, 111 Reserved in order to preserve future 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 no information in this data field is presently usable as a means to identify the actual SV configuration.
Redlines:
Code SV Configuration

000 No Information is available
001 ~~A-S capability, plus flags for A-S and "alert" in HOW; memory~~ Memory capacity as described in paragraph 20.3.2 (e.g. Block II/Block IIA/IIR SV).
010 ~~A-S capability, plus flags for A-S and "alert" in HOW; memory~~ Memory capacity as described in paragraph 20.3.2, M-code signal capability, L2C signal capability (e.g., Block IIR-M SV).
011 ~~A-S capability, plus flags for A-S and "alert" in HOW; memory~~ Memory capacity as described in paragraph 20.3.2, M-code capability, L2C signal capability, L5 signal capability (e.g., Block IIF SV).
100 ~~A-S capability, plus flags for A-S and "alert" in HOW; memory~~ Memory capacity as described in paragraph 20.3.2, M-code capability, L1C signal capability, L2C signal capability, L5 signal capability, no SA capability (e.g., GPS III SVs).
101 ~~A-S capability, plus flags for A-S and “alert” in HOW; memory~~Memory capacity as described in paragraph 20.3.2, M-code capability, Regional Military Protection capability, L1C signal capability, L2C signal capability, L5 signal capability, no SA capability (e.g., GPS IIIF SVs).
110, 111 Reserved in order to preserve future 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 no information in this data field is presently usable as a means to identify the actual SV configuration.

To comply with system backward compatibility requirements, all present and future satellites that transmit the C/A and P(Y) ranging codes will have A-S capability, and A-S and “alert” in HOW.

IS:
Code SV Configuration

000 No Information is available
001 Memory capacity as described in paragraph 20.3.2 (e.g. Block II/Block IIA/IIR SV).
010 Memory capacity as described in paragraph 20.3.2, M-code signal capability, L2C signal capability (e.g., Block IIR-M SV).
011 Memory capacity as described in paragraph 20.3.2, M-code capability, L2C signal capability, L5 signal capability (e.g., Block IIF SV).
100 Memory capacity as described in paragraph 20.3.2, M-code capability, L1C signal capability, L2C signal capability, L5 signal capability, no SA capability (e.g., GPS III SVs).
101 Memory capacity as described in paragraph 20.3.2, M-code capability, Regional Military Protection capability, L1C signal capability, L2C signal capability, L5 signal capability, no SA capability (e.g., GPS IIIF SVs).
110, 111 Reserved in order to preserve future 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 no information in this data field is presently usable as a means to identify the actual SV configuration.

To comply with system backward compatibility requirements, all present and future satellites that transmit the C/A and P(Y) ranging codes will have A-S capability, and A-S and "alert" in HOW.

Rationale:
Removing the capability since it is configured to appear in all SVs.

IS200-431:

Section Number:
20.3.3.5.2.1.0-2
WAS:
The user is cautioned that the sensitivity to small perturbations in the parameters is even greater for the almanac than for the ephemeris, with the sensitivity of the angular rate terms over the interval of applicability on the order of 10^{14} meters/(semicircle/second). An indication of the URE provided by a given almanac during each of the operational intervals is as follows:

Redlines:
The user is cautioned that the sensitivity to small perturbations in the parameters is even greater for the almanac than for the ephemeris, with the sensitivity of the angular rate terms over the interval of applicability on the order of 1014 meters/(semicircle/second). An indication of the URE provided by a given almanac during each of the operational intervals on Block IIR/IIR-M/IIF SVs is as follows:

IS:
The user is cautioned that the sensitivity to small perturbations in the parameters is even greater for the almanac than for the ephemeris, with the sensitivity of the angular rate terms over the interval of applicability on the order of 10^{14} meters/(semicircle/second). An indication of the URE provided by a given almanac during each of the operational intervals on Block IIR/IIR-M/IIF SVs is as follows:

Rationale:
Since GPS III/IIIF SVs may not transition to short- or long-term extended operations, but the URE will still increase with time since last upload, the URE estimates for each operational interval in the table in 20.3.3.5.2.1 may not be applicable to GPS III/IIIF.

IS200-433:

Section Number:
20.3.3.5.2.2.0-2
WAS:
In addition, the Block IIR/IIR-M SVs will also ensure that, based on a valid CS upload, all t_{oa} values in subframes 4 and 5 will be the same for a given almanac data set and will differ for successive data sets which contain changes in almanac parameters.
Redlines:
In addition, the Block IIR/IIR-M and GPS III/IIIF SVs will also ensure that, based on a valid CS upload, all toa values in subframes 4 and 5 will be the same for a given almanac data set and will differ for successive data sets which contain changes in almanac parameters.
IS:
In addition, the Block IIR/IIR-M and GPS III/IIIF SVs will also ensure that, based on a valid CS upload, all t_{oa} values in subframes 4 and 5 will be the same for a given almanac data set and will differ for successive data sets which contain changes in almanac parameters.
Rationale:
The statement about Block IIR/IIR-M SVs ensuring identical toa values for a given almanac set is also applicable to GPS III/IIIF, since all these SV blocks have the ability to perform on-board generation of a new set of almanac parameters by propagating a previously uploaded set.

IS200-439:

Section Number:
20.3.3.5.2.3.0-4
WAS:
During extended operations (short-term and long-term) the almanac time parameter may not provide the specified time accuracy or URE component.
Redlines:
During extended operations (short-term and long-term), or if the CS is otherwise unable to upload the SVs, the almanac time parameter may not provide the specified time accuracy or URE component.

IS:
During extended operations (short-term and long-term), or if the CS is otherwise unable to upload the SVs, the almanac time parameter may not provide the specified time accuracy or URE component.

Rationale:
GPS III/IIIF may not enter short- or long-term extended operations, but the almanac time and URE will still degrade if the SV cannot be uploaded.

IS200-443:

Section Number:
20.3.3.5.2.4.0-5
WAS:
The estimated GPS time (t_E) shall be in seconds relative to end/start of week. During the normal and short-term extended operations, the reference time for UTC data, t_{ot}, is some multiple of 2^{12} seconds occurring approximately 70 hours after the first valid transmission time for this UTC data set (reference 20.3.4.5).

Redlines:
The estimated GPS time (tE) shall be in seconds relative to end/start of week. ~~During the normal and short-term extended operations, the~~The reference time for UTC data, tot, is some multiple of 212 seconds occurring approximately 70 hours after the first valid transmission time for this UTC data set (reference 20.3.4.5).
IS:
The estimated GPS time (t_E) shall be in seconds relative to end/start of week. The reference time for UTC data, t_{ot}, is some multiple of 2^{12} seconds occurring approximately 70 hours after the first valid transmission time for this UTC data set (reference 20.3.4.5).
Rationale:
The description of the “approximately 70 hours” relationship (between tot and the first valid transmission time for that UTC data set) is valid irrespective of the time since last upload, so it does not need to be limited to normal and short-term extended operations.

IS200-447:

Section Number:
20.3.3.5.2.5.0-1
WAS:
The "dual-frequency" (L1 and L2) user shall correct the time received from the SV for ionospheric effect by utilizing the time delay differential between L1 and L2 (reference paragraph 20.3.3.3.3.3). The "single-frequency" user, however, may use the model given in Figure 20-4 to make this correction. It is estimated that the use of this model will provide at least a 50 percent reduction in the single - frequency user's RMS error due to ionospheric propagation effects. During extended operations, the use of this model will yield unpredictable results.
Redlines:
The "dual-frequency" (L1 and L2) user shall correct the time received from the SV for ionospheric effect by utilizing the time delay differential between L1 and L2 (reference paragraph 20.3.3.3.3.3).- The "single-frequency" user, however, may use the model given in Figure 20-4 to make this correction.- It is estimated that the use of this model will provide at least a 50 percent reduction in the single - frequency user's RMS error due to ionospheric propagation effects.- During extended operations, or if the CS is otherwise unable to upload the SVs, the use of this model will yield unpredictable results.

IS:
The "dual-frequency" (L1 and L2) user shall correct the time received from the SV for ionospheric effect by utilizing the time delay differential between L1 and L2 (reference paragraph 20.3.3.3.3.3). The "single-frequency" user, however, may use the model given in Figure 20-4 to make this correction. It is estimated that the use of this model will provide at least a 50 percent reduction in the single - frequency user's RMS error due to ionospheric propagation effects. During extended operations, or if the CS is otherwise unable to upload the SVs, the use of this model will yield unpredictable results.

Rationale:
GPS III/IIIF may not enter short- or long-term extended operations, but the iono model will still degrade if the SV cannot be uploaded.

IS200-462:

Section Number:
20.3.4.4.0-1
WAS:
The IODE is an 8 bit number equal to the 8 LSBs of the 10 bit IODC of the same CEI data set. The following rules govern the transmission of IODC and IODE values in different CEI data sets: (1) The transmitted IODC will be different from any

value transmitted by the SV during the preceding seven days; (2) The transmitted IODE will be different from any value transmitted by the SV during the preceding six hours. The range of IODC will be as given in Table 20-XI for Block II/IIA SVs and Table 20-XII for Block IIR/IIR-M/IIF and GPS III/IIIF SVs.
Redlines:
The IODE is an 8 bit number equal to the 8 LSBs of the 10 bit IODC of the same CEI data set. ~~-~~The following ~~rules~~rule ~~govern~~governs the transmission of IODC and IODE values in different CEI data sets:~~-~~ (1~~) The transmitted IODC will be different from any value transmitted by the SV during the preceding seven days; (2~~) The transmitted IODE will be different from any value transmitted by the SV during the preceding six hours.~~-~~ The range of IODC will be as given in ~~Table 20-XI for Block II/IIA SVs and~~ Table 20-XII for Block IIR/IIR-M/IIF and GPS III/IIIF SVs.
IS:
The IODE is an 8 bit number equal to the 8 LSBs of the 10 bit IODC of the same CEI data set. The following rule governs the transmission of IODC and IODE values in different CEI data sets: (1) The transmitted IODE will be different from any value transmitted by the SV during the preceding six hours. The range of IODC will be as given in Table 20-XII for Block IIR/IIR-M/IIF and GPS III/IIIF SVs.

Rationale:
Following operations that have shown to violate the first rule, it was proposed to remove the first rule that an IODC will be different from any value during seven days.

IS200-463:

Section Number:
20.3.4.4.0-2
WAS:
Cutovers to new CEI data sets will occur only on hour boundaries except for the first CEI data set of a new CEI data sequence propagation. The first CEI data set may be cut-in (reference paragraph 20.3.4.1) at any time during the hour and therefore may be transmitted by the SV for less than one hour. During short-term operations, cutover to 4-hour sets and subsequent cutovers to succeeding 4-hour CEI data sets will always occur modulo 4 hours relative to end/start of week. Cutover from 4-hour CEI data sets to 6-hour CEI data sets shall occur modulo 12 hours relative to end/start of week.
Redlines:
Cutovers to new CEI data sets will occur only on two-hour boundaries except for the first CEI data set of a new CEI data sequence propagation.~~-~~ The first CEI data set may be cut-in (reference paragraph 20.3.4.1) at any time during the ~~hour~~two hours and therefore may be transmitted by the SV for less than ~~one~~two ~~hour~~hours. Upon ~~During~~transition to short-term operations, cutover ~~to 4-hour sets and subsequent cutovers~~ ~~to~~from ~~succeeding~~these ~~4~~2-hour CEI data sets ~~will always occur modulo 4 hours relative~~ to ~~end/start of week. Cutover from~~ 4-hour ~~CEI~~sets ~~data~~and ~~sets~~subsequent cutovers to ~~6~~succeeding 4-hour CEI data sets shall occur modulo ~~12~~4 hours relative to end/start of week.

IS:
Cutovers to new CEI data sets will occur only on two-hour boundaries except for the first CEI data set of a new CEI data sequence propagation. The first CEI data set may be cut-in (reference paragraph 20.3.4.1) at any time during the two hours and therefore may be transmitted by the SV for less than two hours. Upon transition to short-term operations, cutover from these 2-hour CEI data sets to 4-hour sets and subsequent cutovers to succeeding 4-hour CEI data sets shall occur modulo 4 hours relative to end/start of week.

Rationale:
All legacy CEI data set cutovers nominally occur on “even” hour boundaries, following RFC-395’s deletion of Autonav.

IS200-2091:

Section Number:
20.3.4.4.0-3
WAS:
Cutover from 12-hour CEI data sets to 24-hour CEI data sets shall occur modulo 24 hours relative to end/start of week. Cutover from a CEI data set transmitted 24 hours or more occurs on a modulo 24-hour boundary relative to end/start of week.
Redlines:
Upon transition to long-term operations, cutover from 4-hour CEI data sets to 6-hour CEI data sets shall occur modulo 12 hours relative to end/start of week. Subsequent cutovers to succeeding 6-hour CEI data sets shall occur modulo 6 hours relative to end/start of week. Cutover from 6-hour CEI data sets to 12-hour CEI data sets and subsequent cutovers to succeeding 12-hour CEI data sets shall occur modulo 12 hours relative to end/start of week. Cutover from 12-hour CEI data sets to 24-hour CEI data sets shall occur modulo 24 hours relative to end/start of week.- Cutover from a CEI data set transmitted 24 hours or more occurs on a modulo 24-hour boundary relative to end/start of week.

IS:
Upon transition to long-term operations, cutover from 4-hour CEI data sets to 6-hour CEI data sets shall occur modulo 12 hours relative to end/start of week. Subsequent cutovers to succeeding 6-hour CEI data sets shall occur modulo 6 hours relative to end/start of week. Cutover from 6-hour CEI data sets to 12-hour CEI data sets and subsequent cutovers to succeeding 12-hour CEI data sets shall occur modulo 12 hours relative to end/start of week. Cutover from 12-hour CEI data sets to 24-hour CEI data sets shall occur modulo 24 hours relative to end/start of week. Cutover from a CEI data set transmitted 24 hours or more occurs on a modulo 24-hour boundary relative to end/start of week.

Rationale:
For IIR/IIR-M/IIF/III/IIF there are no CEI data sets under long-term operations that have a transmission interval greater than 24 hours (see Table 20-XII).

IS200-464:

Section Number:
20.3.4.4.0-4
WAS:
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 nominally remains valid for the duration of its curve fit interval. A CEI data set may be rendered obsolete before the end of its curve fit interval when it is superseded by the SV cutting over to new data.

Redlines:
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 ~~may be~~is rendered obsolete 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.
IS:
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 obsolete 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.

Rationale:
Wording made consistent between IS-GPS-200, IS-GPS-705 and IS-GPS-800.

IS200-2121:
Insertion after object IS200-464

Section Number:
20.3.4.4.0-5
WAS:
<INSERTED OBJECT>
Redlines:
The start time of the curve fit interval of the first CEI data set of a new CEI data sequence propagation may be later than the start time of the curve fit interval of the preceding CEI data set that was transmitted prior to the cutover. The beginning of the curve fit interval of the first CEI data set of a new CEI data sequence propagation will be a multiple of 300 seconds (5 minutes) relative to the start of week.

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

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

IS200-687:

Section Number:
20.3.4.4.0-11
WAS:
The transmission intervals and curve fit intervals with the applicable IODC ranges are given in Tables 20-XI and 20-XII.
Redlines:
The transmission intervals and curve fit intervals with the applicable IODC ranges are given in ~~Tables 20-XI and~~Table 20-XII.
IS:
The transmission intervals and curve fit intervals with the applicable IODC ranges are given in Table 20-XII.

Rationale:
During the RFC discussions, it was determined that certain appropriate terms are outdated, such as Block IIA. As a result, this RFC plans to remove those outdated terms.

IS200-1588:

Section Number:
20.3.4.4.0-12
WAS:
Table 20-XI. IODC Values and Data Set Lengths (Block II/IIA)
Redlines:
Table 20-XI. ~~IODC Values and Data Set Lengths (Block~~RESERVED ~~II/IIA)~~
IS:
Table 20-XI. RESERVED

Rationale:
During the RFC discussions, it was determined that certain appropriate terms are outdated, such as Block IIA. As a result, this RFC plans to remove those outdated terms.

IS200-467:

Section Number:
20.3.4.4.0-13
WAS:

Days Spanned	Transmission Interval (hours) (Note 4)	Curve Fit Interval (hours)	IODC Range (Note 1)
1	2	4	(Note 2)
2-14	4	6	(Note 2)
15-16	6	8	240-247
17-20	12	14	248-255, 496 (Note 3)
21-27	24	26	497-503
28-41	48	50	504-510
42-59	72	74	511, 752-756
60-63	96	98	757

Note 1: For transmission intervals of 6 hours or greater, the IODC values shown will be transmitted in increasing order.

Note 2: IODC values for blocks with 2- or 4-hour transmission intervals (at least the first 14 days after a new CEI data sequence propagation) shall be any number in the range 0 to 1023 excluding those values of IODC that correspond to IODE values in the range 240-255, subject to the constraints on re-transmission given in paragraph 20.3.4.4.

Note 3: The ninth 12-hour data set may not be transmitted.

Note 4: The first CEI data set of a new CEI data sequence propagation may be cut-in at any time and therefore the transmission interval may be less than the specified value.

Redlines:

IS:
<DELETED OBJECT>
Rationale:
During the RFC discussions, it was determined that certain appropriate terms are outdated, such as Block IIA. As a result, this RFC plans to remove those outdated terms.

IS200-468:

Section Number:
20.3.4.4.0-15

WAS:

Table 20-XII. IODC Values and Data Set Lengths (Block IIR/IIR-M/IIF & GPS III/ IIIF)

Days Spanned	Transmission Interval (hours) (Note 5)	Curve Fit Interval (hours)	IODC Range
1	2	4	(Note 2)
2-14	4	6	(Note 2)
15-16	6	8	240-247 (Note 1)
17-20	12	14	248-255, 496 (Note 1) (Note 3)
21-62	24	26	497-503, 1021-1023

Note 1: For transmission intervals of 6 and 12 hours, the IODC values shown will be transmitted in increasing order.

Note 2: IODC values for blocks with 1-, 2- or 4-hour transmission intervals (at least the first 14 days after a new CEI data sequence propagation) shall be any number in the range 0 to 1023 excluding those values of IODC that correspond to IODE values in the range 240-255, subject to the constraints on re-transmission given in paragraph 20.3.4.4. The CS can define the GPS III and GPS IIIF SV time of transition from the 4 hour curve fits into extended navigation (beyond 4 hour curve fits). Following the transition time, the SV will follow the timeframes defined in the table, including appropriately setting IODC values.

Note 3: The ninth 12-hour data set may not be transmitted.

Note 4: Reserved

Note 5: The first CEI data set of a new CEI data sequence propagation may be cut-in at any time and therefore the transmission interval may be less than the specified value.

Redlines:

Table 20-XII. IODC Values and Data Set Lengths (Block IIR/IIR-M/IIF & GPS III/ IIIF)

Days Spanned	Transmission Interval (hours) (Note 5)	Curve Fit Interval (hours)	IODC Range
1	2	4	(Note 2)
2-14	4	6	(Note 2)
15-16	6	8	240-247 (Note 1)
17-20	12	14	248-255, 496 (Note 1) (Note 3)
21-62	24	26	497-503, 1021-1023

Note 1: For transmission intervals of 6 and 12 hours, the IODC values shown will be transmitted in increasing order.

Note 2: IODC values for blocks with ~~1,~~ 2- or 4-hour transmission intervals (at least the first 14 days after a new CEI data sequence propagation) shall be any number in the range 0 to 1023 excluding those values of IODC that correspond to IODE values in the range 240-255, subject to the constraints on re-transmission given in paragraph 20.3.4.4. The CS can define the GPS III and GPS IIIF SV time of transition from the 4 hour curve fits into extended navigation (beyond 4 hour curve fits). Following the transition time, the SV will follow the timeframes defined in the table, including appropriately setting IODC values.

Note 3: The ninth 12-hour data set may not be transmitted.

Note 4: Reserved

Note 5: The first CEI data set of a new CEI data sequence propagation may be cut-in at any time and therefore the transmission interval may be less than the specified value.

Note 6: IODC values in the ranges 504-511, 752-767 and 1008-1020 are reserved.

IS:

Table 20-XII. IODC Values and Data Set Lengths (Block IIR/IIR-M/IIF & GPS III/ IIIF)

Days Spanned	Transmission Interval (hours) (Note 5)	Curve Fit Interval (hours)	IODC Range
1	2	4	(Note 2)
2-14	4	6	(Note 2)
15-16	6	8	240-247 (Note 1)
17-20	12	14	248-255, 496 (Note 1) (Note 3)
21-62	24	26	497-503, 1021-1023

Note 1: For transmission intervals of 6 and 12 hours, the IODC values shown will be transmitted in increasing order.

Note 2: IODC values for blocks with 2- or 4-hour transmission intervals (at least the first 14 days after a new CEI data sequence propagation) shall be any number in the range 0 to 1023 excluding those values of IODC that correspond to IODE values in the range 240-255, subject to the constraints on re-transmission given in paragraph 20.3.4.4. The CS can define the GPS III and GPS IIIF SV time of transition from the 4 hour curve fits into extended navigation (beyond 4 hour curve fits). Following the transition time, the SV will follow the timeframes defined in the table, including appropriately setting IODC values.

Note 3: The ninth 12-hour data set may not be transmitted.

Note 4: Reserved

Note 5: The first CEI data set of a new CEI data sequence propagation may be cut-in at any time and therefore the transmission interval may be less than the specified value.

Note 6: IODC values in the ranges 504-511, 752-767 and 1008-1020 are reserved.

Rationale:
Table changes and clarification

IS200-2092:

Section Number:
20.3.4.5.0-4
WAS:
Epoch Application Algorithm Reference

t_{oc} 20.3.3.3.3.1

t_{oe} 20.3.3.4.3

t_{oa} 20.3.3.5.2.2 and 20.3.3.5.2.3

t_{ot} 20.3.3.5.2.4
Redlines:
Epoch Week Application Algorithm Reference

t_{oc} 20.3.3.3.3.1

t_{oe} 20.3.3.4.3

t_{oa} W_{Na} 20.3.3.5.2.2 and 20.3.3.5.2.3

t_{ot} W_{Nt} 20.3.3.5.2.4

IS:

Epoch	Week	Application Algorithm Reference
t_{oc}		20.3.3.3.3.1
t_{oe}		20.3.3.4.3
t_{oa}	W_{Na}	20.3.3.5.2.2 and 20.3.3.5.2.3
t_{ot}	W_{Nt}	20.3.3.5.2.4

IS200-472:

Section Number:
20.3.4.5.0-5
WAS:
Table 20-XIII describes the nominal selection which will be expressed modulo 604,800 seconds in the Navigation Message.
Redlines:
For each parameter, Table 20-XIII ~~describes~~specifies the fit interval, the nominal transmission interval, and the nominal selection of the fit point (which will be expressed as an epoch time modulo 604,800 seconds in the Navigation Message). Where applicable, the week number associated with the epoch time is also provided in the Navigation Message.
IS:
For each parameter, Table 20-XIII specifies the fit interval, the nominal transmission interval, and the nominal selection of the fit point (which will be expressed as an epoch time modulo 604,800 seconds in the Navigation Message). Where applicable, the week number associated with the epoch time is also provided in the Navigation Message.
Rationale:
This comment is submitted in response to RFC-444 comment #242, where it was recommended that the week number should be listed in addition to the reference time epoch for each of the time-dependent MNAV parameters. For consistency, a similar change should be made to the LNAV "reference times" section in IS-GPS-200.

IS200-2122:
Insertion after object IS200-472
Section Number:
20.3.4.5.0-6
WAS:
<INSERTED OBJECT>
Redlines:
The nominal transmission interval in Table 20-XIII represents the maximum time period during which a particular data set will be valid for broadcast in the Navigation Message. The actual broadcast duration may be shorter than the specified transmission interval if the SV cuts over to a new data set.

IS:
The nominal transmission interval in Table 20-XIII represents the maximum time period during which a particular data

set will be valid for broadcast in the Navigation Message. The actual broadcast duration may be shorter than the specified transmission interval if the SV cuts over to a new data set.

Rationale:
The original language is entirely unclear, and the proposed additions provide an actual explanation for the table. As for the addition of the week numbers to the reference times, the complete specification of certain reference times requires the relevant week number as well as a time given as seconds of the week.

IS200-474:

Section Number:
20.3.4.5.0-8
WAS:
The CS (Block II/IIA/IIR/IIR M/IIF) and SS (GPS III and GPS IIIF) 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 (see paragraph 20.3.4.4).
Redlines:
The CS (Block ~~II/IIA/~~IIR/IIR~~-~~-M/IIF) and SS (GPS III and GPS IIIF) 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 (see paragraph 20.3.4.4).
IS:
The CS (Block IIR/IIR-M/IIF) and SS (GPS III and GPS IIIF) 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 (see paragraph 20.3.4.4).
Rationale:
Deleted Block II/IIA information.

IS200-2093:

Section Number:
20.3.4.5.0-9
WAS:
As such, when a new CEI data sequence propagation is cutover for transmission, the CS (Block IIA/IIR/IIR-M/IIF) and SS (GPS III and GPS IIIF) shall introduce a small deviation in the t_{oe} resulting in the t_{oe} value that is offset from the hour boundaries (see Table 20 XIII). This offset t_{oe} will be transmitted by an SV in the first CEI data set of the new CEI data sequence propagation and the second CEI data set, following the first CEI data set, may also continue to reflect the same offset in the t_{oe}.
Redlines:
As such, when a new CEI data sequence propagation is cutover for transmission, the CS (Block ~~IIA/~~IIR/IIR-M/IIF) and SS (GPS III and GPS IIIF) shall introduce a small negative deviation in the t_{oe} relative to the midpoint of the curve fit interval, resulting in ~~the~~a t_{oe} value that is offset from the nominal location on an hour ~~boundaries~~boundary (see Table 20~~-~~-XIII). This offset t_{oe} will be transmitted by an SV in the first CEI data set of the new CEI data sequence propagation and the second CEI data set, following the first CEI data set, may also continue to reflect ~~the same~~an offset in the t_{oe} relative to the nominal location on an hour boundary.
IS:
As such, when a new CEI data sequence propagation is cutover for transmission, the CS (Block IIR/IIR-M/IIF) and SS (GPS III and GPS IIIF) shall introduce a small negative deviation in the t_{oe} relative to the midpoint of the curve fit interval, resulting in a t_{oe} value that is offset from the nominal location on an hour boundary (see Table 20-XIII). This offset t_{oe} will be transmitted by an SV in the first CEI data set of the new CEI data sequence propagation and the second CEI data set, following the first CEI data set, may also continue to reflect an offset in the t_{oe} relative to the nominal location on an hour boundary.

Rationale:
Deleted Block II/IIA information. Wording made consistent between App II and App III. To accommodate the CEI data set implementation on GPS III/IIF, removed the constraint that the t_{oe} offset must be the same in the first and second sets.

IS200-475:

Section Number:
20.3.4.5.0-10
WAS:
When the t_{oe}, immediately prior to a new CEI data sequence propagation cutover, already reflects a small deviation (i.e. a new CEI data sequence propagation cutover has occurred in the recent past), then the CS (Block II/IIA/IIR/IIR-M/IIF) and SS (GPS III and GPS IIIF) shall introduce an additional deviation to the t_{oe} when a new CEI data sequence propagation is cutover for transmission.
Redlines:
When the t_{oe}, immediately prior to a new CEI data sequence propagation cutover, already reflects a small deviation (i.e. a new CEI data sequence propagation cutover has occurred in the recent past), then the CS (Block ~~II/IIA/~~IIR/IIR-M/IIF) and SS (GPS III and GPS IIIF) shall introduce an additional deviation to the t_{oe} when a new CEI data sequence propagation is cutover for transmission.
IS:
When the t_{oe}, immediately prior to a new CEI data sequence propagation cutover, already reflects a small deviation (i.e. a new CEI data sequence propagation cutover has occurred in the recent past), then the CS (Block IIR/IIR-M/IIF) and SS (GPS III and GPS IIIF) shall introduce an additional deviation to the t_{oe} when a new CEI data sequence propagation is cutover for transmission.

Rationale:
During the RFC discussions, it was determined that certain appropriate terms are outdated, such as Block IIA. As a result, this RFC plans to remove those outdated terms.

IS200-476:

Section Number:
20.3.4.5.0-11
WAS:
A change from the broadcast reference time immediately prior to cutover is used to indicate a change of values in the CEI data set. The user may use the following example algorithm to detect the occurrence of a new CEI data sequence propagation cutover:

DEV = t_{oe} [modulo 3600]

If DEV ≠ 0, then a new CEI data sequence propagation cutover has occurred within past 4 hours.
Redlines:
A change from the broadcast reference time immediately prior to cutover is used to indicate a change of values in the CEI data set.- The user may use the following example algorithm to detect the occurrence of a new CEI data sequence propagation cutover:

~~———~~ ———DEV = t_{oe} [modulo 3600]

~~———~~ ———If DEV ≠ 0, then a new CEI data sequence propagation cutover has occurred within past 4 hours.

When DEV = 0, the broadcast t_{oe} and toc correspond to the midpoint of the curve fit interval for that CEI data set (Table 20-XIII). When DEV ≠ 0, the broadcast t_{oe} and toc are offset values representing a time that is a minimum of 16 seconds

prior to the midpoint of the curve fit interval for that CEI data set. These offsets are accounted for in the generation of the time-dependent coefficients in the CEI data set, such that the user may directly apply the broadcast t_{oe} and toc in the algorithms of paragraphs 20.3.3.4.3 and 20.3.3.3.3.1.

IS:
A change from the broadcast reference time immediately prior to cutover is used to indicate a change of values in the CEI data set. The user may use the following example algorithm to detect the occurrence of a new CEI data sequence propagation cutover:

DEV = t_{oe} [modulo 3600]
If DEV ≠ 0, then a new CEI data sequence propagation cutover has occurred within past 4 hours.

When DEV = 0, the broadcast t_{oe} and toc correspond to the midpoint of the curve fit interval for that CEI data set (Table 20-XIII). When DEV ≠ 0, the broadcast t_{oe} and t_{oc} are offset values representing a time that is a minimum of 16 seconds prior to the midpoint of the curve fit interval for that CEI data set. These offsets are accounted for in the generation of the time-dependent coefficients in the CEI data set, such that the user may directly apply the broadcast t_{oe} and t_{oc} in the algorithms of paragraphs 20.3.3.4.3 and 20.3.3.3.3.1.

Rationale:
New information to explain the relationship of the offset t_{oe}/t_{oc} to the curve fit interval.

IS200-477:

Section Number:
20.3.4.5.0-13
WAS:

Table 20-XIII. Reference Times

Fit Interval (hours)	Transmission Interval (hours)	Hours After First Valid Transmission Time			
		t_{oc} (clock)	t_{oe} (ephemeris)	t_{oa} (almanac)	t_{ot} (UTC)
4	2*	2	2		
6	4	3	3		
8	6	4	4		
14	12	7	7		
26	24	13	13		
50	48	25	25		
74	72	37	37		
98	96	49	49		
122	120	61	61		
146	144	73	73		

146	144			70	70
144 (6 days)	144			70	70
* Some SVs will have transmission intervals of 1 hour per paragraph 20.3.4.4.					

Redlines:

Table 20-XIII. Reference Times

		Hours After First Valid Transmission Time			
Fit Interval (hours)	Transmission Interval (hours)	t_{oc} (clock)	t_{oe} (ephemeris)	t_{oa} (almanac)	t_{ot} (UTC)
4	2	2	2		
6	4	3	3		
8	6	4	4		
14	12	7	7		
26	24	13	13		
~~146~~ 144 (6 days)	144 (6 days)			70	
~~144 (6 days)~~ 768 (32 days) *	~~144~~ 768 (32 days) *			70	
~~≥ 144 (6 days)~~ N/A	~~>~~ 144 (6 days) **				70

* Applies after 18 days if the CS is unable to upload the SV

** If the CS is unable to upload the SV this interval may extend to at least 1,584 hours (66 days)

IS:

Table 20-XIII. Reference Times

		Hours After First Valid Transmission Time			
Fit Interval (hours)	Transmission Interval (hours)	t_{oc} (clock)	t_{oe} (ephemeris)	t_{oa} (almanac)	t_{ot} (UTC)
4	2	2	2		
6	4	3	3		
8	6	4	4		
14	12	7	7		
26	24	13	13		
144 (6 days)	144 (6 days)			70	
768 (32 days) *	768 (32 days) *			70	
N/A	144 (6 days) **				70

* Applies after 18 days if the CS is unable to upload the SV
** If the CS is unable to upload the SV this interval may extend to at least 1,584 hours (66 days)

Rationale:
Deleted the asterisked note that is no longer relevant due to RFC-395's deletion of Autonav. Deleted the rows for clock/ephemeris fit intervals of 50, 74, 98, 122 and 146 hours that are not applicable to IIR/IIR-M/IIF/III/IIF (see Table 20-XII). Updated the two almanac rows to be consistent with the information in 20.3.3.5.1.2 and 40.3.3.5.1.2. Created a new row for the UTC information consistent with 20.3.3.5.2.4.

IS200-540:

Section Number:
30.3.3.1.1.2.0-2
WAS:
The health bit indication shall be given relative to the capabilities of each SV as designated by the configuration code in the LNAV message (see paragraph 20.3.3.5.1.4). Accordingly, the health bit for any SV which does not have a certain capability will be indicated as "healthy" if the lack of this capability is inherent in its design or if it has been configured into a mode which is normal from a user standpoint and does not require that capability; however, the Operating Command may choose to set the health bit "unhealthy" for an SV without a certain capability. Single-frequency L2C users or users who have not recieved or choose not to use configuration code should assume that every signal is available on every SV. The predicted health data will be updated at the time of upload when a new CEI data set has been built by the CS. Therefore, the transmitted health data may not correspond to the actual health of the transmitting SV. For more information about user protocol for interpreting health indications see paragraph 6.4.6.
Redlines:
The health bit indication shall be given relative to the capabilities of each SV as designated by the configuration code in the LNAV message (see paragraph 20.3.3.5.1.4). Accordingly, the health bit for any SV which does not have a certain capability will be indicated as "healthy" if the lack of this capability is inherent in its design or if it has been configured

into a mode which is normal from a user standpoint and does not require that capability; however, the Operating Command may choose to set the health bit "unhealthy" for an SV without a certain capability. Single-frequency L2C users or users who have not ~~recieved~~received or choose not to use configuration code should assume that every signal is available on every SV. The predicted health data will be updated at the time of upload when a new CEI data set has been built by the CS. Therefore, the transmitted health data may not correspond to the actual health of the transmitting SV or other SVs in the constellation. For more information about user protocol for interpreting health indications see paragraph 6.4.~~6~~.5
IS:
The health bit indication shall be given relative to the capabilities of each SV as designated by the configuration code in the LNAV message (see paragraph 20.3.3.5.1.4). Accordingly, the health bit for any SV which does not have a certain capability will be indicated as "healthy" if the lack of this capability is inherent in its design or if it has been configured into a mode which is normal from a user standpoint and does not require that capability; however, the Operating Command may choose to set the health bit "unhealthy" for an SV without a certain capability. Single-frequency L2C users or users who have not received or choose not to use configuration code should assume that every signal is available on every SV. The predicted health data will be updated at the time of upload when a new CEI data set has been built by the CS. Therefore, the transmitted health data may not correspond to the actual health of the transmitting SV or other SVs in the constellation. For more information about user protocol for interpreting health indications see paragraph 6.4.5
Rationale:
Latest public Up Rev revision left out text that was not caught in the Revision previous to it.

IS200-2119:
Insertion after object IS200-600
Section Number:
30.3.3.4.5.0-2
WAS:
<INSERTED OBJECT>
Redlines:
The Midi almanac parameters shall be updated by the CS at least once every 3 days while the CS is able to upload the SVs. If the CS is unable to upload the SVs, the accuracy of the Midi almanac parameters transmitted by the SVs will degrade over time.
IS:
The Midi almanac parameters shall be updated by the CS at least once every 3 days while the CS is able to upload the SVs. If the CS is unable to upload the SVs, the accuracy of the Midi almanac parameters transmitted by the SVs will degrade over time.
Rationale:
The Midi almanac description is missing the CS update requirement, which is 3 days for modernized almanac formats, same as for the Reduced almanac in IS-GPS-200 30.3.3.4.6.1.

IS200-630:

Section Number:
30.3.3.6.2.0-1
WAS:
Message Type 33 includes: (1) the parameters needed to relate GPS Time to UTC (USNO), and (2) notice to the user regarding the scheduled future or recent past (relative to Nav message upload) value of the delta time due to leap seconds (Δt_{LSF}), together with the week number (WN_{LSF}) and the day number (DN) at the end of which the leap second becomes effective. Information required to use these parameters to calculate t_{UTC} is in paragraph 20.3.3.5.2.4 except the following definition of Δt_{UTC} shall be used.
Redlines:
Message ~~Type~~Type 33 includes: (1) the parameters needed to relate GPS Time to UTC (USNO), and (2) notice to the user

regarding the scheduled future or recent past (relative to Nav message upload) value of the delta time due to leap seconds (~~DtLSF~~ ΔtLSF), together with the GPS week number (WNLSF) and the GPS day number (DN) ~~at~~near the end of which ~~the leap second~~ΔtLSF becomes effective.~~-~~ Information required to use these parameters to calculate (and define) tUTC is in paragraph 20.3.3.5.2.4 except the following definition of ~~DtUTC~~ΔtUTC shall be used.
IS:
Message Type 33 includes: (1) the parameters needed to relate GPS Time to UTC(USNO), and (2) notice to the user regarding the scheduled future or recent past (relative to Nav message upload) value of the delta time due to leap seconds (Δt_{LSF}), together with the GPS week number (WN_{LSF}) and the GPS day number (DN) near the end of which ΔtLSF becomes effective. Information required to use these parameters to calculate (and define) t_{UTC} is in paragraph 20.3.3.5.2.4 except the following definition of Δt_{UTC} shall be used.
Rationale:
Continuity between IS705 and IS200

IS200-1969:

WAS:
t_{op} does not have to match t_{oe}/t_{oc}. As a redundant check, t_{op} in Message Type 10 and 11 will match with the t_{op} term in Message Type 30-37 for a valid CEI data set.
Redlines:
top does not have to match t_{oe}/toc~~. As a redundant~~but ~~check,~~the top in Message Type 10~~ and 11~~ will match ~~with~~ the top ~~term~~ in Message Type 30-37 ~~for~~from ~~a~~the ~~valid~~same CEI data set.
IS:
t_{op} does not have to match t_{oe}/t_{oc} but the t_{op} in Message Type 10 will match the t_{op} in Message Type 30-37 from the same CEI data set.
Rationale:
All modernized CEI data set cutovers nominally occur on “even” hour boundaries. MT11 does not have a top field. Wording made consistent between IS-GPS-200, IS-GPS-705 and IS-GPS-800.

Section Number:
30.3.4.4.0-3
WAS:
The following rule governs the transmission of t_{oe} and t_{oc} values in different data sets: The transmitted t_{oe}/t_{oc} will be different from any value transmitted by the SV during the preceding six hours.
Redlines:
The following rule governs the transmission of t_{oe} and toc values in different CEI data sets: The transmitted t_{oe}/toc will be different from any value transmitted by the SV during the preceding six hours.
IS:
The following rule governs the transmission of t_{oe} and t_{oc} values in different CEI data sets: The transmitted t_{oe}/t_{oc} will be different from any value transmitted by the SV during the preceding six hours.
Rationale:
All modernized CEI data set cutovers nominally occur on “even” hour boundaries. MT11 does not have a top field. Wording made consistent between IS-GPS-200, IS-GPS-705 and IS-GPS-800.

IS200-1971:

Section Number:
30.3.4.4.0-4
WAS:
Cutovers to new CEI data sets will occur only on hour boundaries except for the first data set of a new CEI data sequence propagation. The first CEI data set may be cut-in (reference paragraph 30.3.4.1) at any time during the hour and therefore may be transmitted by the SV for less than one hour.

Redlines:
Cutovers to new CEI data sets will occur only on two-hour boundaries except for the first CEI data set of a new CEI data sequence propagation. The first CEI data set may be cut-in (reference paragraph 30.3.4.1) at any time during the ~~hour~~two hours and therefore may be transmitted by the SV for less than ~~one~~two ~~hour~~hours.
IS:
Cutovers to new CEI data sets will occur only on two-hour boundaries except for the first CEI data set of a new CEI data sequence propagation. The first CEI data set may be cut-in (reference paragraph 30.3.4.1) at any time during the two hours and therefore may be transmitted by the SV for less than two hours.
Rationale:
All modernized CEI data set cutovers nominally occur on “even” hour boundaries. MT11 does not have a top field. Wording made consistent between IS-GPS-200, IS-GPS-705 and IS-GPS-800.

IS200-1972:

Section Number:
30.3.4.4.0-5
WAS:
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 obsolete 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.
Redlines:
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 obsolete 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.
The curve fit interval of the first CEI data set of a new CEI data sequence propagation may have a later start time than the curve fit interval of the preceding CEI data set that was transmitted prior to the cutover. The beginning of the curve fit interval of the first CEI data set of a new CEI data sequence propagation will be a multiple of 300 seconds (5 minutes) relative to the start of week.
IS:
The start 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 obsolete 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.
The curve fit interval of the first CEI data set of a new CEI data sequence propagation may have a later start time than the curve fit interval of the preceding CEI data set that was transmitted prior to the cutover. The beginning of the curve fit interval of the first CEI data set of a new CEI data sequence propagation will be a multiple of 300 seconds (5 minutes) relative to the start of week.

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

IS200-1492:

Section Number:
30.3.4.5.0-3
WAS:
Each of these parameters is formulated as a polynomial in time. The specific time scale of expansion can be arbitrary. Due to the short data field lengths available in the Navigation Message format, the epoch of the polynomial is chosen

near the midpoint of the expansion range so that quantization error is small. This results in time epoch values which can be different for each data set. Time epochs contained in the Navigation Message and the different algorithms which utilize them are related as follows:

Redlines:
Each of these parameters is formulated as a polynomial in time. The specific time scale of expansion can be arbitrary. Due to the short data field lengths available in the Navigation Message format, the nominal epoch of the polynomial is chosen near the midpoint of the expansion range so that quantization error is small. This results in time epoch values which can be different for each data set. Time epochs contained in the Navigation Message and the different algorithms which utilize them are related as follows:
IS:
Each of these parameters is formulated as a polynomial in time. The specific time scale of expansion can be arbitrary. Due to the short data field lengths available in the Navigation Message format, the nominal epoch of the polynomial is chosen near the midpoint of the expansion range so that quantization error is small. This results in time epoch values which can be different for each data set. Time epochs contained in the Navigation Message and the different algorithms which utilize them are related as follows:
Rationale:
Wording made consistent between App II and App III.

IS200-1493:

Section Number:
30.3.4.5.0-4
WAS:

Epoch	Application Algorithm Reference
t_{oc}	20.3.3.3.3.1
t_{oe}	20.3.3.4.3
t_{oa}	20.3.3.5.2.2 and 20.3.3.5.2.3
t_{ot}	20.3.3.5.2.4 and 30.3.3.6.2
t_{op}	30.3.3.2.4
t_{EOP}	30.3.3.5.1
t_{OD}	30.3.3.7
t_{GGTO}	30.3.3.8.2

Redlines:

Epoch	Week	Application Algorithm Reference
toc~~-~~		20.3.3.3.3.1
toe~~-~~	~~20~~	30.3.3.~~4~~1.3
toa	W_{Na-n}	20.3.3.5.2.2~~ and~~, 20.3.3.5.2.3 and 30.3.3.4.6.2
tot~~-~~	W_{Not}	20.3.3.5.2.4 and 30.3.3.6.2
top	W_{Nop}	30.3.3.2.4
tEOP	W_{Not}	30.3.3.5.1
tOD		30.3.3.7
tGGTO	W_{NGGTO}	30.3.3.8.2

IS:

Epoch	Week	Application Algorithm Reference
t_{oc}		20.3.3.3.3.1
t_{oe}		30.3.3.1.3
t_{oa}	W_{Na-n}	20.3.3.5.2.2, 20.3.3.5.2.3 and 30.3.3.4.6.2
t_{ot}	W_{Not}	20.3.3.5.2.4 and 30.3.3.6.2
t_{op}	W_{Nop}	30.3.3.2.4
t_{EOP}	W_{Not}	30.3.3.5.1
t_{OD}		30.3.3.7

t_{GGTO} W_{NGGTO} 30.3.3.8.2

Rationale:
Updated incorrect algorithm references.

IS200-1494:

Section Number:
30.3.4.5.0-5
WAS:
For those parameters for which fit interval and transmission interval are relevant, Table 30-XIII specifies the fit interval, the nominal transmission interval, and the nominal selection of the fit point (which will be expressed modulo 604,800 seconds in the Navigation Message).

Redlines:
For those parameters for which fit interval and transmission interval are relevant, Table 30-XIII specifies the fit interval, the nominal transmission interval, and the nominal selection of the fit point (which will be expressed modulo 604,800 seconds in the Navigation Message). The nominal transmission interval in Table 30-XIII represents the maximum time period during which a particular data set will be valid for broadcast in the Navigation Message. The actual broadcast duration may be shorter than the specified transmission interval if the SV cuts over to a new data set.

IS:
For those parameters for which fit interval and transmission interval are relevant, Table 30-XIII specifies the fit interval, the nominal transmission interval, and the nominal selection of the fit point (which will be expressed modulo 604,800 seconds in the Navigation Message). The nominal transmission interval in Table 30-XIII represents the maximum time period during which a particular data set will be valid for broadcast in the Navigation Message. The actual broadcast duration may be shorter than the specified transmission interval if the SV cuts over to a new data set.

Rationale:
Clarification for maximum time periods in navigation messages

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IS200-1495:

Section Number:
30.3.4.5.0-6
WAS:
The coefficients of expansion are obviously dependent upon choice of epoch, and thus the epoch time and expansion coefficients must be treated as an inseparable parameter set. Note that a user applying current navigation data will normally be working with negative values of ($t-t_{oc}$) and ($t-t_{oe}$) in evaluating the expansions.

Redlines:
The coefficients of expansion are obviously dependent upon choice of epoch, and thus the epoch time and expansion coefficients must be treated as an inseparable parameter set. Note that a user applying current navigation data during the first 1.5 hours of the transmission interval will normally be working with negative values of (t-toc) and ($t-t_{oe}$) in evaluating the expansions.
IS:
The coefficients of expansion are obviously dependent upon choice of epoch, and thus the epoch time and expansion coefficients must be treated as an inseparable parameter set. Note that a user applying current navigation data during the first 1.5 hours of the transmission interval will normally be working with negative values of (t-toc) and ($t-t_{oe}$) in evaluating the expansions.

Rationale:
A deficiency was identified in the statement that (t-toc) and ($t-t_{oe}$) normally take negative values.

IS200-1496:

Section Number:
30.3.4.5.0-7
WAS:
The CS (Block IIR-M/IIF) and SS (GPS III and GPS IIIF) shall assure that the t_{oe} value, for at least the first CEI data set transmitted by an SV after a new CEI data sequence propagation, is different from that transmitted prior to the cutover (see paragraph 30.3.4.4).
Redlines:
The CS (Block IIR-M/IIF) and SS (GPS III and GPS IIIF) shall assure that the t_{oe} value, for at least the first CEI data set transmitted by an SV ~~after~~from a new CEI data sequence propagation, is different from that transmitted from the prior ~~to~~CEI ~~the~~data ~~cutover~~sequence propagation (see paragraph 30.3.4.4).
IS:
The CS (Block IIR-M/IIF) and SS (GPS III and GPS IIIF) 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 (see paragraph 30.3.4.4).
Rationale:
Wording made consistent between App II and App III.

IS200-1975:

Section Number:
30.3.4.5.0-8
WAS:
As such, when a new CEI data sequence propagation is cutover for transmission, the CS (Block IIR-M/IIF) and SS (GPS III and GPS IIIF) shall introduce a small deviation in the t_{oe} resulting in the t_{oe} value that is offset from the nominal location of 1.5 hours into the fit interval (see Table 30-XIII). This offset t_{oe} will be transmitted by an SV in the first data set after a new CEI data sequence propagation cutover and the second CEI data set, following the first CEI data set, may also continue to reflect the same offset in the t_{oe}.
Redlines:
As such, when a new CEI data sequence propagation is cutover for transmission, the CS (Block IIR-M/IIF) and SS (GPS III and GPS IIIF) shall introduce a small negative deviation in the t_{oe} relative to the midpoint of the curve fit interval, resulting in ~~the~~a t_{oe} value that is offset from the nominal location of 1.5 hours into the fit interval (see Table 30-XIII). This offset t_{oe} will be transmitted by an SV in the first CEI data set ~~after~~of ~~a~~the new CEI data sequence propagation ~~cutover~~ and the second CEI data set, following the first CEI data set, may also continue to reflect ~~the same~~an offset in the toe relative to the nominal location of 1.5 hours into the fit interval.
IS:
As such, when a new CEI data sequence propagation is cutover for transmission, the CS (Block IIR-M/IIF) and SS (GPS III and GPS IIIF) shall introduce a small negative deviation in the t_{oe} relative to the midpoint of the curve fit interval, resulting in a t_{oe} value that is offset from the nominal location of 1.5 hours into the fit interval (see Table 30-XIII). This offset t_{oe} will be transmitted by an SV in the first CEI data set of the new CEI data sequence propagation and the second CEI data set, following the first CEI data set, may also continue to reflect an offset in the t_{oe} relative to the nominal location of 1.5 hours into the fit interval.

Rationale:
Wording made consistent between App II and App III. To accommodate the CEI data set implementation on GPS III/IIF, removed the constraint that the t_{oe} offset must be the same in the first and second sets.

IS200-1498:

Section Number:
30.3.4.5.0-10
WAS:
For CNAV data, the user may use the following example algorithm to detect the occurrence of a new CEI data sequence propagation cutover:

DEV = t_{oe} [modulo 7200]

If DEV ≠ 5400, then a new CEI data sequence propagation cutover has occurred within the past 4 hours.

Redlines:
A change from the broadcast reference time immediately prior to cutover is used to indicate a change of values in the CEI data set. For CNAV data, the user may use the following example algorithm to detect the occurrence of a new CEI data sequence propagation cutover:

DEV = t_{oe} [modulo 7200]

If DEV ≠ 5400, then a new CEI data sequence propagation cutover has occurred within the past 4 hours.

When DEV = 5400, the broadcast t_{oe} and toc correspond to the midpoint of the curve fit interval for that CEI data set (Table 20-XV). When DEV ≠ 5400, the broadcast t_{oe} and toc are offset values representing a time that is a minimum of 300 seconds prior to the midpoint of the curve fit interval for that CEI data set. These offsets are accounted for in the generation of the time-dependent coefficients in the CEI data set, such that the user may directly apply the broadcast t_{oe} and toc in the algorithms of §20.3.4.7.1 and §20.3.4.6.1.

IS:
A change from the broadcast reference time immediately prior to cutover is used to indicate a change of values in the CEI data set. For CNAV data, the user may use the following example algorithm to detect the occurrence of a new CEI data sequence propagation cutover:

DEV = t_{oe} [modulo 7200]

If DEV ≠ 5400, then a new CEI data sequence propagation cutover has occurred within the past 4 hours.

When DEV = 5400, the broadcast t_{oe} and t_{oc} correspond to the midpoint of the curve fit interval for that CEI data set (Table 20-XV). When DEV ≠ 5400, the broadcast t_{oe} and t_{oc} are offset values representing a time that is a minimum of 300 seconds prior to the midpoint of the curve fit interval for that CEI data set. These offsets are accounted for in the generation of the time-dependent coefficients in the CEI data set, such that the user may directly apply the broadcast t_{oe} and t_{oc} in the algorithms of §20.3.4.7.1 and §20.3.4.6.1.

Rationale:
Wording made consistent between App II and App III. New information to explain the relationship of the offset t_{oe}/t_{oc} to the curve fit interval.

IS200-1499:

Section Number:
30.3.4.5.0-12

WAS: Table 30-XIII. Reference Times

Fit Interval (hours)	Transmission Interval (hours)	Hours After First Valid Transmission Time			
		t_{oc} (clock)	t_{oe} (ephemeris)	t_{oa} (almanac)	t_{ot} (UTC)
3*	2*	1.5	1.5		
144 (6 days)	144			70	70
≥144 (6 days)	≥144			70	70
* Defined in Section 30.3.3.1.1					

Redlines:

Table 30-XIII. Reference Times

Fit Interval (hours)	Transmission Interval (hours)	Hours After First Valid Transmission Time			
		t_{oc} (clock)	t_{oe} (ephemeris)	t_{oa} (almanac)	t_{ot} (UTC)
3*	2*	1.5	1.5		
144 (6 days)	144 (6 days)			70	70
≥144 (6 days) 768 (32 days) **	≥ 144 768 (32 days) **			70	70
N/A	72 (3 days) ***				70
* Defined in Section 30.3.3.1.1 ** Applies after 18 days if the CS is unable to upload the SV *** If the CS is unable to upload the SV this interval may extend to at least 1,512 hours (63 days)					

IS:

Table 30-XIII. Reference Times

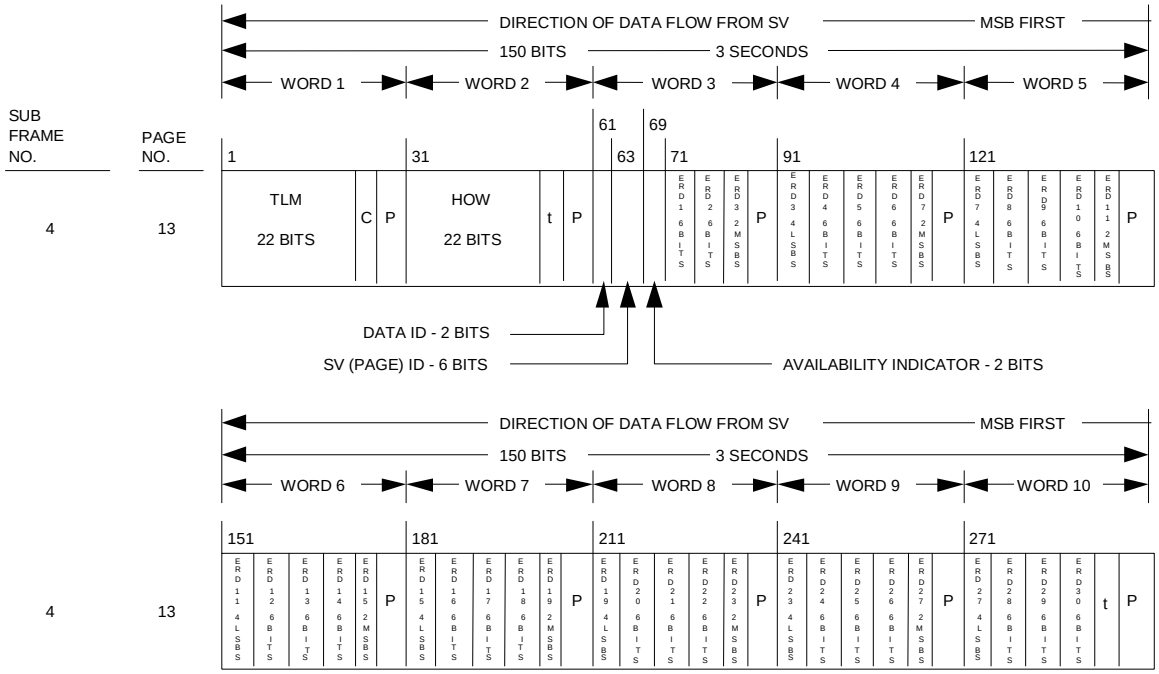
Fit Interval (hours)	Transmission Interval (hours)	Hours After First Valid Transmission Time			
		t_{oc} (clock)	t_{oe} (ephemeris)	t_{oa} (almanac)	t_{ot} (UTC)
3*	2*	1.5	1.5		
144 (6 days)	144 (6 days)			70	
768 (32 days) **	768 (32 days) **			70	
N/A	72 (3 days) ***				70
* Defined in Section 30.3.3.1.1 ** Applies after 18 days if the CS is unable to upload the SV *** If the CS is unable to upload the SV this interval may extend to at least 1,512 hours (63 days)					

Rationale:
Updated the two almanac rows and created a new row for the UTC information, consistent with Table 20-XIII.

IS200-1438:

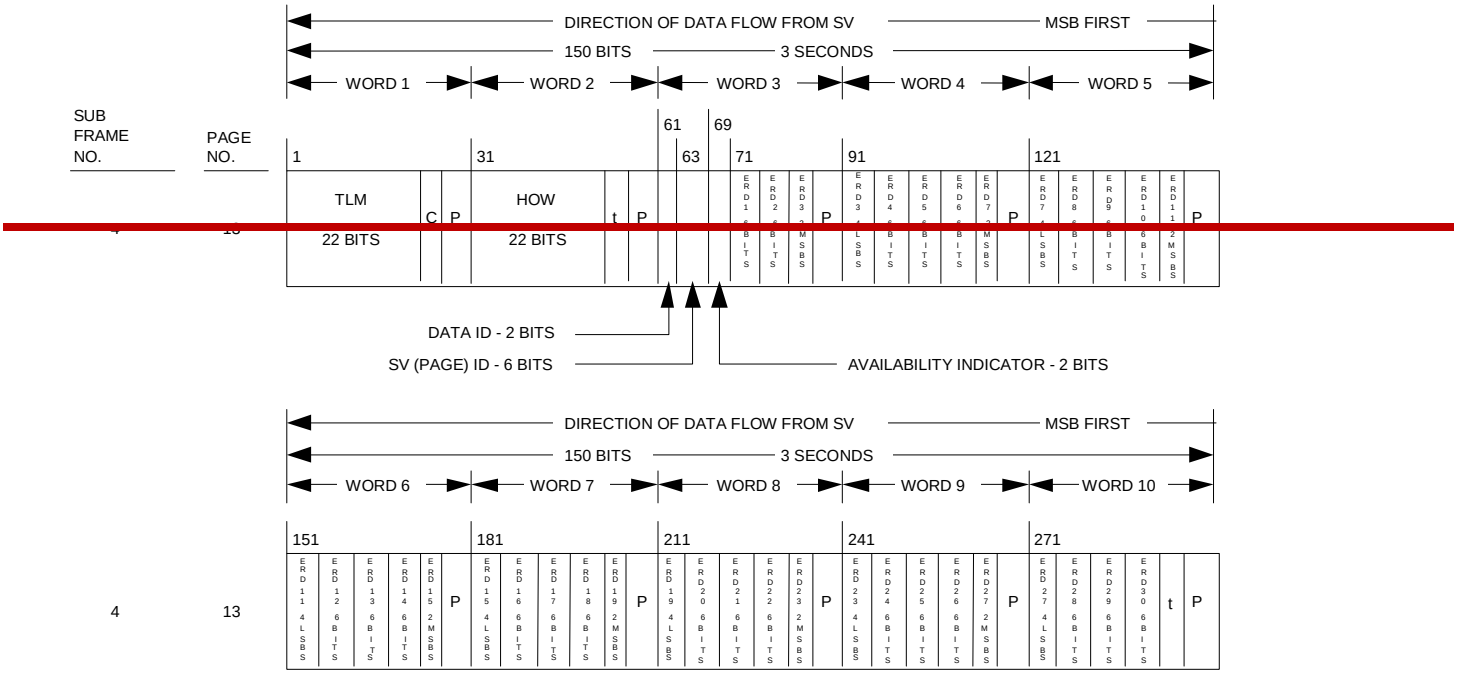
Section Number:
40.3.2.0-20

WAS:

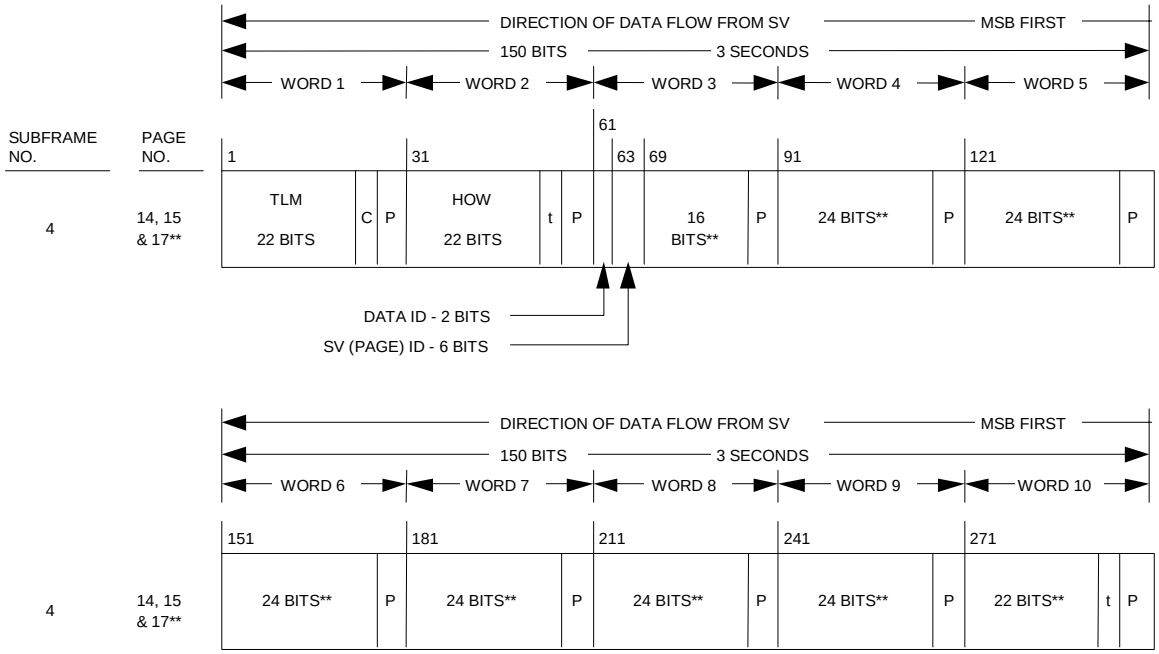


P = 6 PARITY BITS
t = 2 NONINFORMATION BEARING BITS USED FOR PARITY COMPUTATION (SEE PARAGRAPH 20.3.5)
C = TLM BITS 23 AND 24. BIT 23 IS THE INTEGRITY STATUS FLAG AND BIT 24 IS RESERVED

Redlines:



P = 6 PARITY BITS
t = 2 NONINFORMATION BEARING BITS USED FOR PARITY COMPUTATION (SEE PARAGRAPH 20.3.5)
C = TLM BITS 23 AND 24. BIT 23 IS THE INTEGRITY STATUS FLAG AND BIT 24 IS RESERVED



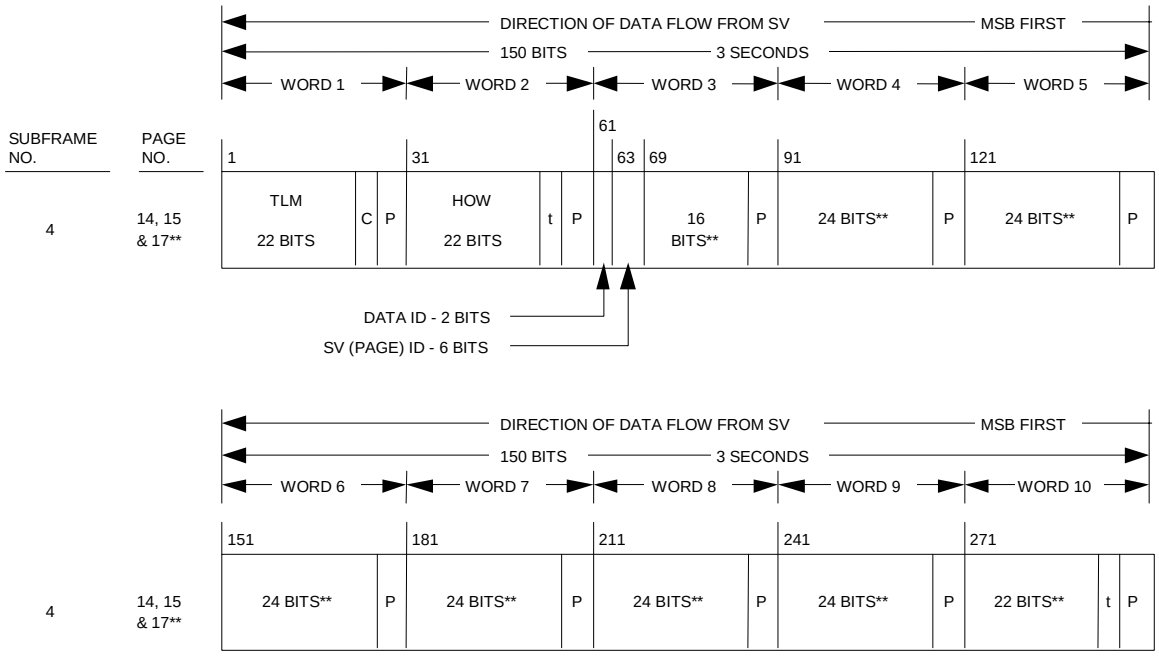
** THE INDICATED PORTIONS OF WORDS 3 THROUGH 10 OF PAGES 14 AND 15 ARE RESERVED FOR SYSTEM USE, WHILE THOSE OF PAGE 17 ARE RESERVED FOR SPECIAL MESSAGES PER PARAGRAPH 20.3.3.5.1.8

P = 6 PARITY BITS

t = 2 NONINFORMATION BEARING BITS USED FOR PARITY COMPUTATION (SEE PARAGRAPH 20.3.5)

C = TLM BITS 23 AND 24. BIT 23 IS THE INTEGRITY STATUS FLAG AND BIT 24 IS RESERVED

IS:



** THE INDICATED PORTIONS OF WORDS 3 THROUGH 10 OF PAGES 14 AND 15 ARE RESERVED FOR SYSTEM USE, WHILE THOSE OF PAGE 17 ARE RESERVED FOR SPECIAL MESSAGES PER PARAGRAPH 20.3.3.5.1.8
P = 6 PARITY BITS
t = 2 NONINFORMATION BEARING BITS USED FOR PARITY COMPUTATION (SEE PARAGRAPH 20.3.5)
C = TLM BITS 23 AND 24. BIT 23 IS THE INTEGRITY STATUS FLAG AND BIT 24 IS RESERVED

Rationale:
Data format sheet update

IS200-1372:

Section Number:
40.3.3.5.1.1-1

WAS:

Table 40-V. Data IDs and SV IDs in Subframes 4 and 5

Page	Subframe 4		Subframe 5	
	Data ID	SV ID* (Note 4)	Data ID	SV ID* (Note 4)
1	Note(2)	121	Note(1)	65
2	Note(1)	89	Note(1)	66
3	Note(1)	90	Note(1)	67
4	Note(1)	91	Note(1)	68
5	Note(1)	92	Note(1)	69
6	Note(2)	121	Note(1)	70

7	Note(1)	93	Note(1)	71
8	Note(1)	94	Note(1)	72
9	Note(1)	95	Note(1)	73
10	Note(2)	0	Note(1)	74
11	Note(2)	121	Note(1)	75
12	Note(2)	126	Note(1)	76
13	Note(2)	116	Note(1)	77
14	Note(2)	117	Note(1)	78
15	Note(2)	118	Note(1)	79
16	Note(2)	121	Note(1)	80
17	Note(2)	119	Note(1)	81
18	Note(2)	120	Note(1)	82
19	Note(2)	122 Note(3)	Note(1)	83
20	Note(2)	123 Note(3)	Note(1)	84
21	Note(2)	121	Note(1)	85
22	Note(2)	124 Note(3)	Note(1)	86
23	Note(2)	125 Note(3)	Note(1)	87
24	Note(2)	126	Note(1)	88
25	Note(2)	127	Note(2)	115

* Use "0" to indicate "dummy" SV. When using "0" to indicate dummy SV, use the data ID of the transmitting SV.
Note 1: Data ID of that SV whose SV ID appears in that page.
Note 2: Data ID of transmitting SV.
Note 3: SV ID may vary (except for IIR/IIR-M/IIF/GPS III/GPS IIIF SVs).
Note 4: For almanac data pages, the SV ID relationship to PRN ID is defined in Table 3-Ia and Table 3-Ib

Redlines:

Table 40-V. Data IDs and SV IDs in Subframes 4 and 5

Page	Subframe 4		Subframe 5	
	Data ID	SV ID* ~~(Note 4)~~	Data ID	SV ID* ~~(Note 4)~~
1	Note(2)	121	Note(1)	65
2	Note(1)	89	Note(1)	66
3	Note(1)	90	Note(1)	67
4	Note(1)	91	Note(1)	68
5	Note(1)	92	Note(1)	69
6	Note(2)	121	Note(1)	70
7	Note(1)	93	Note(1)	71
8	Note(1)	94	Note(1)	72
9	Note(1)	95	Note(1)	73
10	Note(2)	0	Note(1)	74
11	Note(2)	121	Note(1)	75
12	Note(2)	126	Note(1)	76
13	Note(2)	116	Note(1)	77
14	Note(2)	117	Note(1)	78
15	Note(2)	118	Note(1)	79
16	Note(2)	121	Note(1)	80
17	Note(2)	119	Note(1)	81
18	Note(2)	120	Note(1)	82

19	Note(2)	122 Note(3)	Note(1)	83
20	Note(2)	123 Note(3)	Note(1)	84
21	Note(2)	121	Note(1)	85
22	Note(2)	124 Note(3)	Note(1)	86
23	Note(2)	125 Note(3)	Note(1)	87
24	Note(2)	126	Note(1)	88
25	Note(2)	127	Note(2)	115

* Use "0" to indicate "dummy" SV. When using "0" to indicate dummy SV, use the data ID of the transmitting SV.

Note 1: Data ID of that SV whose SV ID appears in that page.

Note 2: Data ID of transmitting SV.

~~Note 3: SV ID may vary (except for IIR/IIR-M/IIF/GPS III/GPS IIIF SVs).~~

Note 3~~4~~: For almanac data pages, the SV ID relationship to PRN ID is defined in Table 3-Ia and Table 3-Ib

IS:

Table 40-V. Data IDs and SV IDs in Subframes 4 and 5

Page	Subframe 4		Subframe 5	
	Data ID	SV ID* (Note 3)	Data ID	SV ID* (Note 3)
1	Note(2)	121	Note(1)	65
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7	Note(1)	93	Note(1)	71
8	Note(1)	94	Note(1)	72
9	Note(1)	95	Note(1)	73
10	Note(2)	0	Note(1)	74
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13	Note(2)	116	Note(1)	77
14	Note(2)	117	Note(1)	78
15	Note(2)	118	Note(1)	79
16	Note(2)	121	Note(1)	80
17	Note(2)	119	Note(1)	81
18	Note(2)	120	Note(1)	82
19	Note(2)	122	Note(1)	83
20	Note(2)	123	Note(1)	84
21	Note(2)	121	Note(1)	85
22	Note(2)	124	Note(1)	86
23	Note(2)	125	Note(1)	87
24	Note(2)	126	Note(1)	88
25	Note(2)	127	Note(2)	115

* Use "0" to indicate "dummy" SV. When using "0" to indicate dummy SV, use the data ID of the transmitting SV.
Note 1: Data ID of that SV whose SV ID appears in that page.
Note 2: Data ID of transmitting SV.
Note 3: For almanac data pages, the SV ID relationship to PRN ID is defined in Table 3-Ia and Table 3-Ib

Rationale:
During the RFC discussions, it was determined that certain appropriate terms are outdated, such as Block IIA. As a result, this RFC plans to remove those outdated terms.

IS200-2105:

Section Number:
40.3.3.5.1.2.0-2
Redlines:
The almanac message (174 almanac data bits and 8 SV health bits) for any dummy SVs shall contain alternating ones and zeros with valid parity.

WAS:
The almanac message for any dummy SVs shall contain alternating ones and zeros with valid parity.
IS:
The almanac message (174 almanac data bits and 8 SV health bits) for any dummy SVs shall contain alternating ones and zeros with valid parity.
Rationale:
The term "almanac message" is not defined anywhere in IS-GPS-200, and the immediately preceding paragraph specifically excludes the 8 "SV health" bits in word 5 from the description of "almanac data". It would be better to explicitly state which data bits are to be filled with alternating 1/0 for a dummy SV.

IS200-2107:

Section Number:
40.3.3.5.1.2.0-4
WAS:
For Block IIA SVs, three sets of almanac shall be used to span at least 60 days. The first and second sets will be transmitted for up to six days each; the third set is intended to be transmitted for the remainder of the 60 days minimum, but the actual duration of transmission will depend on the individual SV's capability to retain data in memory. All three sets are based on six-day curve fits that correspond to the first six days of the transmission interval.
Redlines:
~~For Block IIA SVs, three sets of almanac shall be used to span at least 60 days. The first and second sets will be transmitted for up to six days each; the third set is intended to be transmitted for the remainder of the 60 days minimum, but the actual duration of transmission will depend on the individual SV's capability to retain data in memory. All three sets are based on six-day curve fits that correspond to the first six days of the transmission interval.~~
IS:
<DELETED OBJECT>
Rationale:
The description of the broadcast almanac behavior for the LNAV-U data structure was not updated when IRN-IS-200E-004 made changes to the corresponding LNAV-L wording, and includes irrelevant information on SV blocks that do not support PRN Expansion. The updated description is identical to the new LNAV-L wording for GPS III/IIIF in IS-GPS-200 20.3.3.5.1.2.

IS200-2120:
Insertion after object IS200-2106
Section Number:
40.3.3.5.1.2.0-5
WAS:
<INSERTED OBJECT>
Redlines:
For GPS III and GPS IIIF SVs, a minimum of five sets of almanac shall be used to span at least 60 days. The first, second, and third sets will be transmitted for up to six days each; the fourth and subsequent sets will be transmitted for up to 32 days each; with the final set transmitted for the remainder of the 60 days minimum. During the first 18 days after upload the sets are based on six day curve fits. Subsequent sets are based on 32 day curve fits.

IS:
For GPS III and GPS IIIF SVs, a minimum of five sets of almanac shall be used to span at least 60 days. The first, second, and third sets will be transmitted for up to six days each; the fourth and subsequent sets will be transmitted for up to 32 days each; with the final set transmitted for the remainder of the 60 days minimum. During the first 18 days after upload the sets are based on six day curve fits. Subsequent sets are based on 32 day curve fits.

Rationale:
The description of the broadcast almanac behavior for the LNAV-U data structure was not updated when IRN-IS-200E-004 made changes to the corresponding LNAV-L wording, and includes irrelevant information on SV blocks that do not support PRN Expansion. The updated description is identical to the new LNAV-L wording for GPS III/IIIF in IS-GPS-200 20.3.3.5.1.2.