<u>Change Topic: User Range Accuracy (URA) Definition</u>

This change package accommodates the text changes to support the proposed solution (see table below) within the public Signals-in-Space (SiS) documents. All comments must be submitted in Comments Resolution Matrix (CRM) form.

The columns in the WAS/IS table following this page are defined below:

Section Number: This number indicates the location of the text change within the document.

(WAS) <Document Title>: Contains the baseline text of the impacted document.

Proposed Heading: Contains proposed changes to existing section titles and/or the titles to new sections

Proposed Text: Contains proposed changes to baseline text.

Rationale: Contains the supporting information to explain the reason for the proposed changes.

PROBLEM STATEMENT:
Administrative errors in the public documents are resulting in incorrect calculations and/or ambiguous definitions relative to User Range Accuracy (URA). Incorrect URA calculations would impact user equipment design and incorrect definitions would impact the interpretation of the URA data from the SV, resulting in erroneous PNT calculations.
SOLUTION: *(Proposed)*
Provide the correct URA equations and more concise definitions of the URA quantity for the users. The improvements provide the correct URA equations as well as include nomenclature that makes the equations easier to interpret for the user.

Start of WAS/IS for IS-GPS-200E Changes

Section Number	IS-GPS-200 Rev E Navstar GPS Space Segment/Navigation User Interfaces	Proposed Heading	URA Definition Proposed Text	Rationale
6.2.1	User Range Accuracy (URA) is a statistical indicator of the GPS ranging accuracy obtainable with a specific signal and SV. Whether the integrity status flag is 'off' or 'on', 4.42 times URA bounds instantaneous URE under all conditions with 1 -1e-5 per hour probability. When the integrity status flag is 'on', 5.73 times URA bounds instantaneous URE under all conditions with 1-1e-8 per hour probability. Integrity properties of the URA are specified with respect to the upper bound values of the URA index.		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 under all conditions 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 under all conditions 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 #5- There are numerous inconsistencies between ICDs and clarifications and additions that are needed for the users to compute URA. These changes resolve the inconsistencies between the ICDs so that users may properly compute URA.
6.2.1	Note #1: URA applies over the curve fit interval that is applicable to the NAV data from which the URA is read, for the worst-case location within the intersection of the satellite signal and the terrestrial service volume.		Note #1: URA applies over the transmission interval that is applicable to the NAV data from which the URA is read, for the worst-case location within the satellite footprint.	See Rationale #5
6.2.1	Note #2: The URA for a particular signal may be represented by a single parameter in the NAV data or by more than one parameter representing components of the total URA. Specific URA parameters and formulae for calculating the total URA for a signal are defined in the applicable Space Segment to Navigation User Segment ICD's.		Note #2: The URA for a particular signal may be represented by a single index in the NAV data or by a composite of more than one index representing components of the total URA. Specific URA indexes and formulae for calculating the total URA for each signal are defined in appendix 20 for the LNAV message and appendix 30 for the CNAV message.	See Rationale #5
6.2.1	N/A		Note #3: The above integrity assured probability values do not apply if: (a) an alert is issued to the users before the instantaneous URE exceeds either of the scaled URA bounds, or (b) an alert is issued to the users no more than 8.0 seconds after the instantaneous URE exceeds the 4.42 times URA bound, and (c) if the integrity status flag is 'on' and an alert is issued to the users no more than 5.2 seconds after the instantaneous URE exceeds the 5.73 times URA bound. In this context, an "alert" is defined as any indication or characteristic of the conveying signal, as specified elsewhere in this document, which signifies to users that the conveying signal may be invalid or should not be used, such as the health bits not indicating operational-healthy, broadcasting non-	See Rationale #5

Section Number	IS-GPS-200 Rev E Navstar GPS Space Segment/Navigation User Interfaces	Proposed Heading	URA Definition Proposed Text	Rationale
			standard code, parity error, etc.	
6.2.1.1	***6.2.1.1 Integrity Assured URA.***	<DELETE>		
6.2.1.1	When the integrity assurance monitoring is available, as indicated by the "integrity status flag" being set to "1", the URA value is chosen such that the probability of the "actual" URE exceeding a threshold is met (see section 3.5.3.10 for probability values). The URA value is conveyed to the user in the form of URA index values. The URA index represents a range of values; for integrity assurance applications.		<DELETE>	See Rationale #5
6.2.1.1	***6.2.1.1 User Differential Range Accuracy.***			
6.2.1.1	User Differential Range Accuracy (UDRA) is a statistical indicator of the GPS ranging accuracy obtainable with a specific signal and SV after the application of the associated differential corrections (DC parameters).		User Differential Range Accuracy (UDRA) is a statistical indicator of the GPS ranging accuracy obtainable with a specific signal and SV after the application of the associated differential corrections (DC parameters). UDRA provides a conservative RMS estimate of the differential user range errors in the navigation data for that satellite. It includes all errors for which the Space and Control Segments are responsible.	See Rationale #5
20.3.3.1	In this context, an "alert" is defined as any indication or characteristic in the conveying signal, as specified elsewhere in this document, which signifies that the conveying signal may be invalid and should not be used, such as, not Operational-Healthy, Non-Standard Code, parity error, etc.		In this context, an "alert" is defined as any indication or characteristic of the conveying signal, as specified elsewhere in this document, which signifies to users that the conveying signal may be invalid or should not be used, such as the health bits not indicating operational-healthy, broadcasting non-standard code, parity error, etc.	See Rationale #5
20.3.3.2	Bit 18 is an "alert" flag. When this flag is raised (bit 18 = "1"), it shall indicate to the standard positioning service (SPS) user (unauthorized user) that the SV URA may be worse than indicated in subframe 1 and that he shall use that SV at his own risk.		Bit 18 is an "alert" flag. When this flag is raised (bit 18 = "1"), it shall indicate to the standard positioning service (SPS) user (unauthorized user) that the signal URA may be worse than indicated in subframe 1 and that he shall use that SV at his own risk.	See Rationale #5
20.3.3.3.1	The clock parameters describe the SV time scale during the period of validity. The parameters are applicable during the time in which they are transmitted. Beyond that time, they are still applicable; however, the most recent data set should be used since the accuracy degrades over time. The timing information for subframes, pages, and data sets is covered in Section 20.3.4.		The clock parameters describe the SV time scale during the period of validity. The parameters are applicable during the time in which they are transmitted. The timing information for subframes, pages, and data sets is covered in Section 20.3.4.	See Rationale #5
20.3.3.3.1.3	Bits 13 through 16 of word three shall give the URA index of the SV (reference paragraph 6.2.1) for the standard positioning service user. Except for Block IIR/IIR-M SVs in the Autonav mode, the URA index (N) is an integer in the range of 0 through 15 and has the following relationship to the URA of the SV:		Bits 13 through 16 of word three shall give the URA index of the SV (reference paragraph 6.2.1) for the standard positioning service user. While the URA may vary over the ephemeris curve fit interval, the URA index (N) in the LNAV message shall correspond to the maximum URA expected over the entire ephemeris curve fit interval. Except for Block IIR/IIR-M SVs in the Autonav mode, the URA index (N) is an integer in the range of 0 through 15 and has the following relationship to the URA of the SV.	See Rationale #5

Section Number	IS-GPS-200 Rev E Navstar GPS Space Segment/Navigation User Interfaces	Proposed Heading	URA Definition Proposed Text	Rationale
20.3.3.3.1.3	For each URA index (N), users may compute a nominal URA value (X) as given by: • If the value of N is 6 or less, $X = 2^{(1 + N/2)}$, • If the value of N is 6 or more, but less than 15, $X = 2^{(N - 2)}$, • N = 15 shall indicate the absence of an accuracy prediction and shall advise the standard positioning service user to use that SV at his own risk. For N = 1, 3, and 5, X should be rounded to 2.8, 5.7, and 11.3 meters, respectively. For Block IIR/IIR-M SVs in the Autonav mode, the URA shall be defined to mean “no better than X meters”, with “X” as defined above for each URA index. Integrity properties of the URA are specified with respect to the upper bound values of the URA index (see 20.3.3.1). URA accounts for signal-in-space contributions to user range error that include, but are not limited to, the following: the net effect of clock parameter and code phase error in the transmitted signal for single-frequency L1C/A or single-frequency L2C users who correct the code phase as described in Section 30.3.3.3.1.1.1, as well as the net effect of clock parameter, code phase, and intersignal correction error for dual-frequency L1/L2 and L1/L5 users who correct for group delay and ionospheric effects as described in Section 30.3.3.3.1.1.2.		For each URA index (N), users may compute a nominal URA value (X) as given by: • If the value of N is 6 or less, $X = 2^{(1 + N/2)}$, • If the value of N is 6 or more, but less than 15, $X = 2^{(N - 2)}$, • N = 15 shall indicate the absence of an accuracy prediction and shall advise the standard positioning service user to use that SV at his own risk. For N = 1, 3, and 5, X should be rounded to 2.8, 5.7, and 11.3 meters, respectively. For Block IIR/IIR-M SVs in the Autonav mode, the URA shall be defined to mean “no better than X meters”, with “X” as defined above for each URA index. The nominal URA value (X) is suitable for use as a conservative prediction of the RMS signal-in-space (SIS) range errors for accuracy-related purposes in the pseudorange domain (e.g., measurement de-weighting, receiver autonomous integrity monitoring (RAIM), figure of merit (FOM) computations). 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 (see 20.3.3.1). URA accounts for SIS-contributions to user range error which include, but are not limited to, the following: LSB representation/truncation error; the net effect of clock correction polynomial error and code phase error in the transmitted signal for single-frequency L1C/A or single-frequency L2C users who correct the code phase as described in Section 30.3.3.3.1.1.1; the net effect of clock parameter, code phase, and inter-signal correction error for dual-frequency L1/L2 and L1/L5 users who correct for group delay and ionospheric effects as described in Section 30.3.3.3.1.1.2; ephemeris error; anisotropic antenna errors; and signal deformation error. URA does not account for user range error contributions due to the inaccuracy of the broadcast ionospheric data parameters used in the single-frequency ionospheric model or for other atmospheric effects.	GPS antenna errors not along the bore-sight have been discovered through JPL analysis. These changes add SV Antenna errors to list of errors that URA must cover.
20.3.4.4	The start of the transmission interval for each data set corresponds to the beginning of the curve fit interval for the data set. Each data set remains valid for the duration of its curve fit interval.		The start of the transmission interval for each data set corresponds to the beginning of the curve fit interval for the data set. Each data set remains valid for the duration of its transmission interval, and nominally also remains valid for the duration of its curve fit interval. A data set is rendered invalid before the end of its curve fit interval when it is superseded by the SV cutting over to the first data set of a new upload.	See Rationale #5
30.3.3	Each message starts with an 8-bit preamble - 10001011, followed by a 6-bit PRN number of the transmitting SV, a 6-bit message type ID with a range of 0 (000000) to 63 (111111), and the 17-bit message time of week (TOW) count. When the value of the message TOW count is multiplied by 6, it represents SV time in seconds at the start of the next 12-second message.		Each message starts with an 8-bit preamble - 10001011, followed by a 6-bit PRN number of the transmitting SV, a 6-bit message type ID with a range of 0 (000000) to 63 (111111), and the 17-bit message time of week (TOW) count. When the value of the message TOW count is multiplied by 6, it represents SV time in seconds at the start of the next 12-second message. An “alert” flag, when	See Rationale #5

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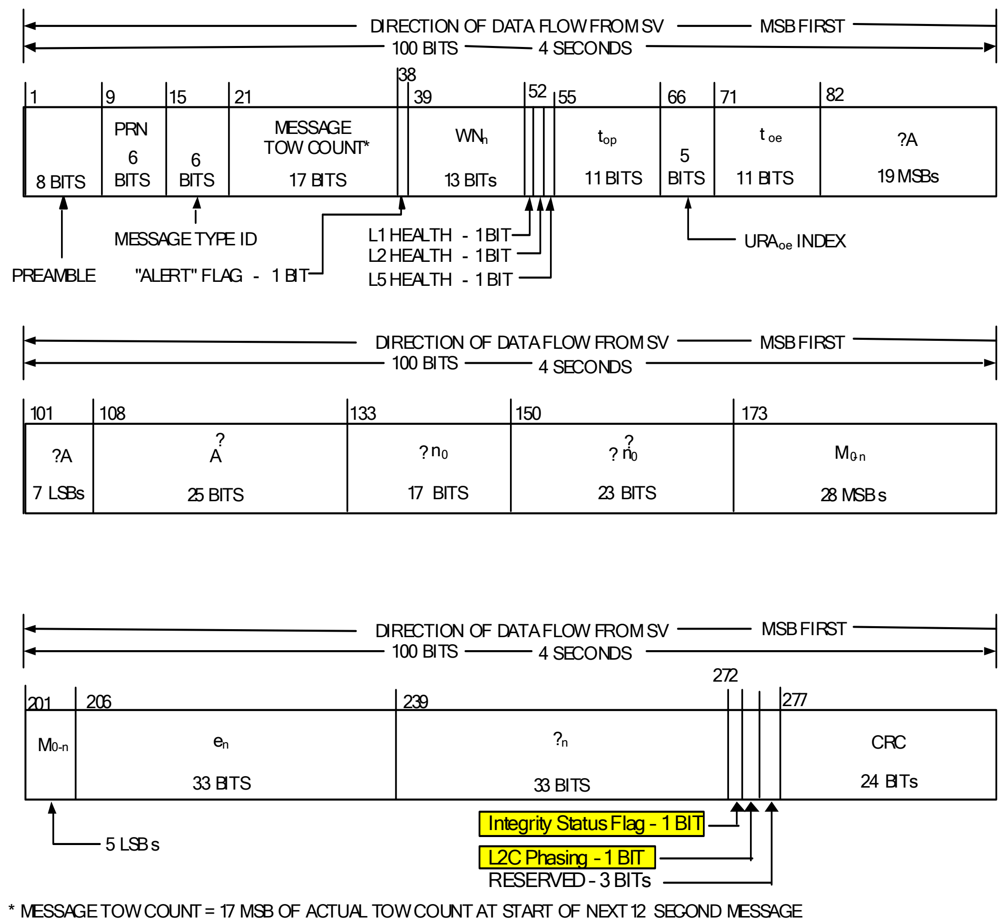
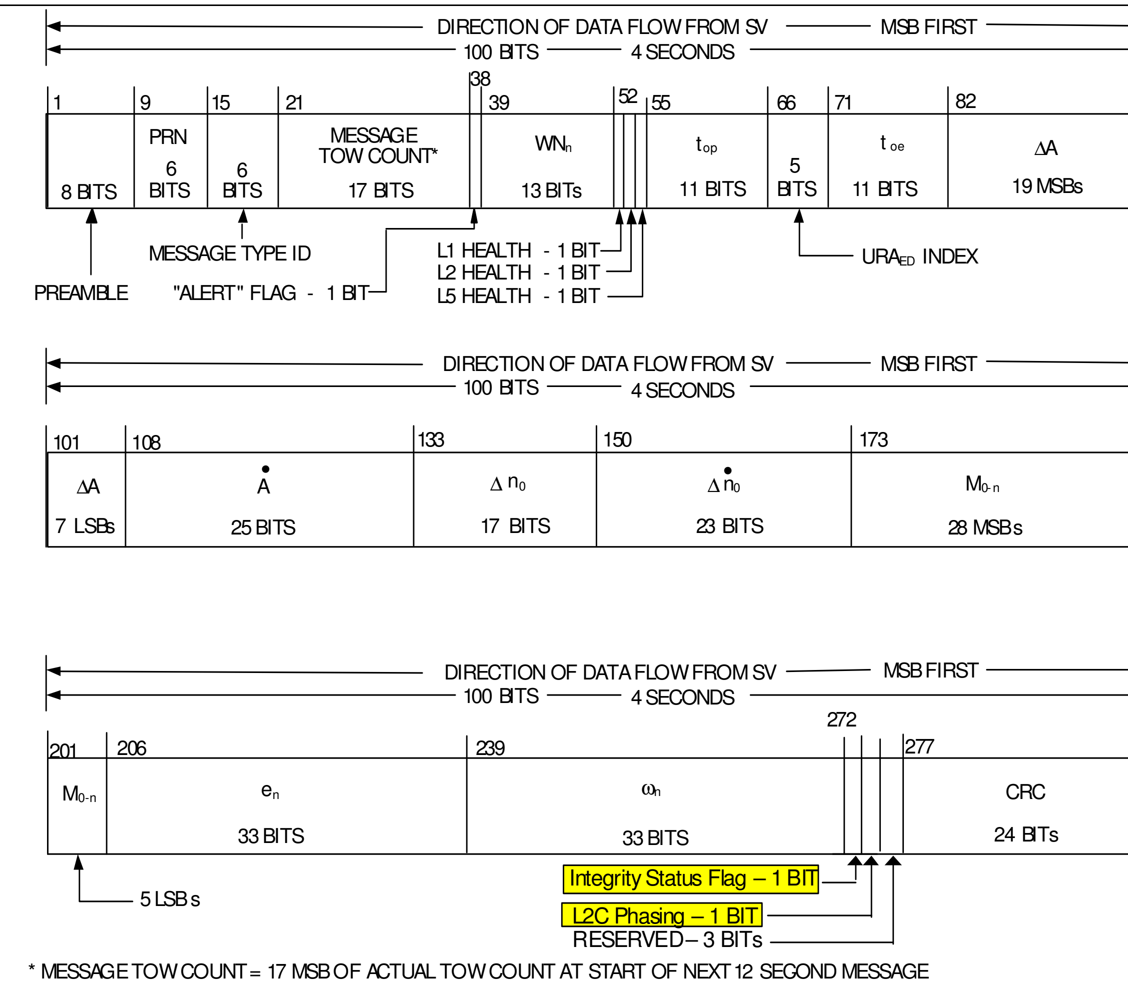
	An “alert” flag, when raised (bit 38 = “1”), indicates to the user that the SV URA and/or the SV User Differential Range Accuracy (UDRA) may be worse than indicated in the respective message types. For each default message (Message Type 0), bits 39 through 276 shall be alternating ones and zeros and the message shall contain a proper CRC parity block.		raised (bit 38 = “1”), indicates to the user that the signal URA components may be worse than indicated in the associated message types. For each default message (Message Type 0), bits 39 through 276 shall be alternating ones and zeros and the message shall contain a proper CRC parity block.	
30.3.3	 Figure 30-1. Message Type 10 - Ephemeris 1		 Figure 30-1. Message Type 10 - Ephemeris 1	Rationale #1- URA_{oc} and URA_{oe} are redefined into an elevation-dependent component (URA_{ED}) and a non-elevation-dependent component (URA_{NED}). This will enable users to de-weight the elevation-angle-dependent component with the elevation angle of the SV, resulting in a smaller composite URA, in many cases. A smaller composite URA means higher availability for applications that have

Section Number	IS-GPS-200 Rev E Navstar GPS Space Segment/Navigation User Interfaces	Proposed Heading	URA Definition Proposed Text	Rationale
				requirements for a minimum level of accuracy and/or integrity. In order to achieve a technical consensus on how to proceed forward with GPS IIIA deriving URA from the uploaded covariance, then the following changes were needed to the user ICDs.

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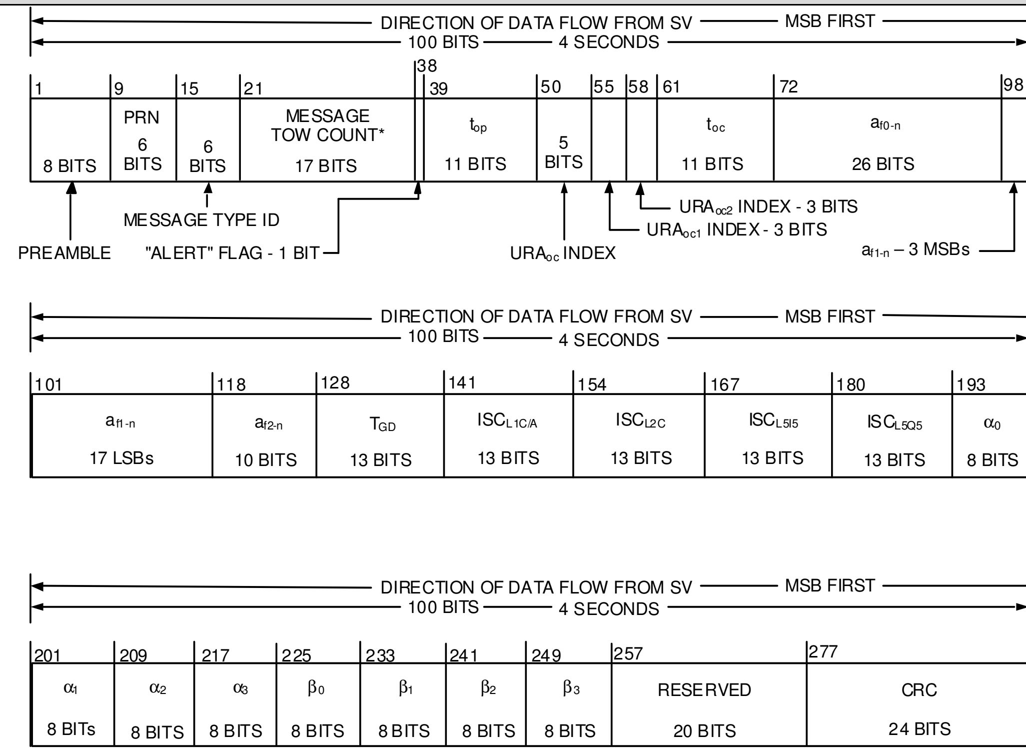
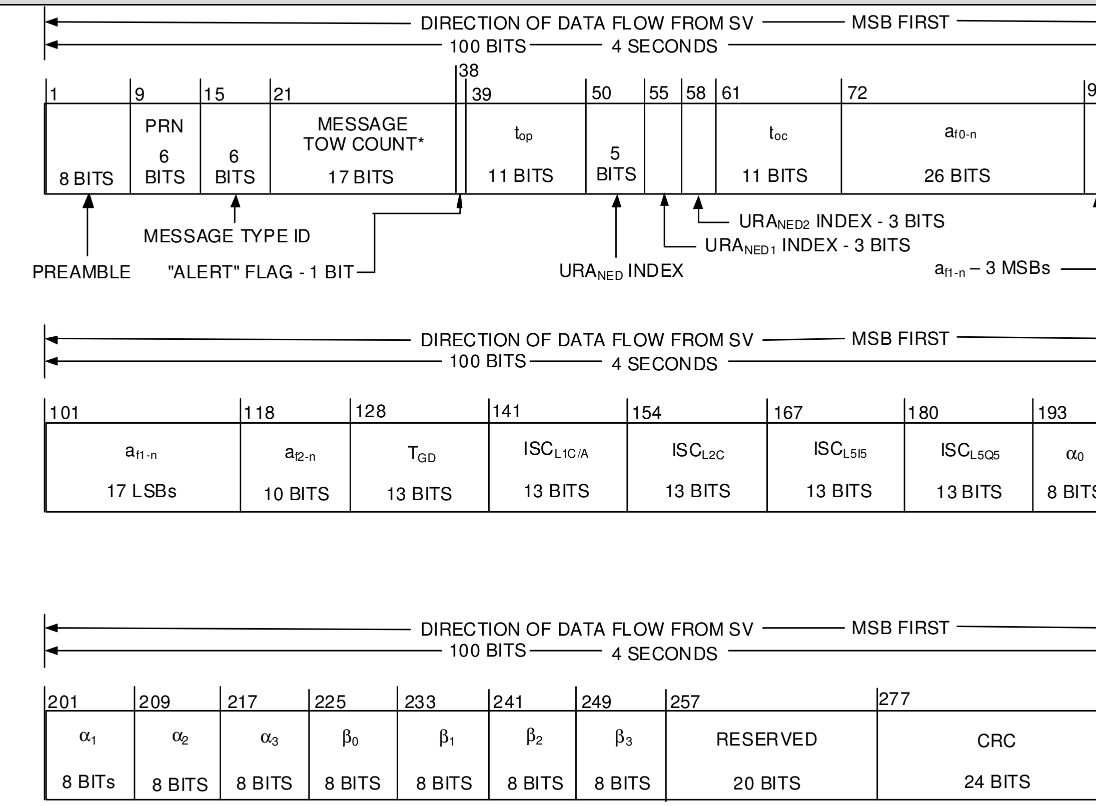
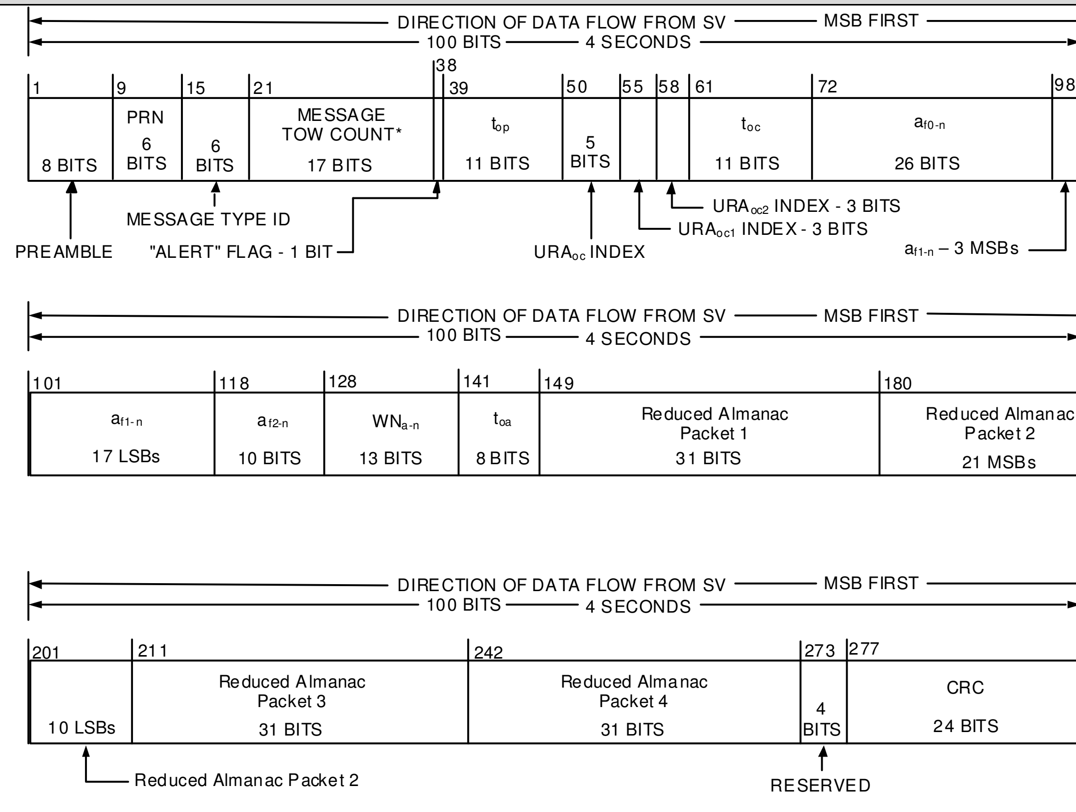
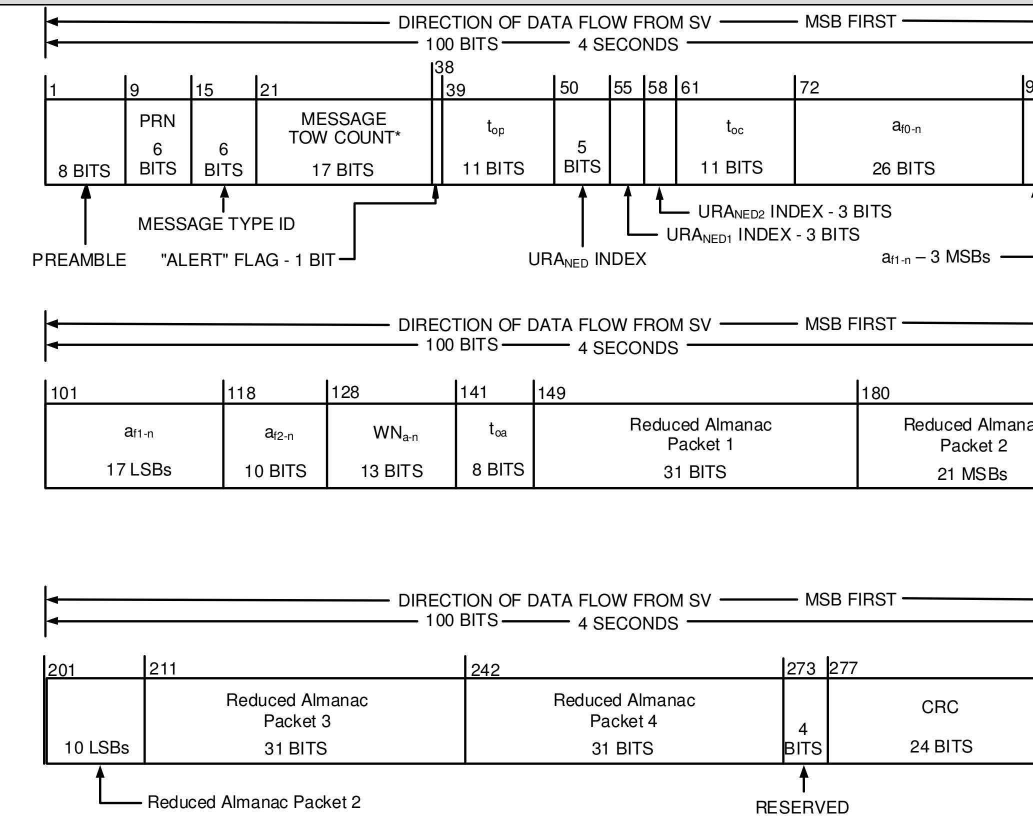
30.3.3	 * MESSAGE TOW COUNT = 17 MSB OF ACTUAL TOW COUNT AT START OF NEXT 12-SECOND MESSAGE Figure 30-3. Message Type 30 - Clock, IONO & Group Delay		 * MESSAGE TOW COUNT = 17 MSB OF ACTUAL TOW COUNT AT START OF NEXT 12-SECOND MESSAGE Figure 30-3. Message Type 30 - Clock, IONO & Group Delay	Rationale #1

<table>
<tr><th>Section Number</th><th>IS-GPS-200 Rev E Navstar GPS Space Segment/Navigation User Interfaces</th><th>Proposed Heading</th><th>URA Definition Proposed Text</th><th>Rationale</th></tr>
<tr><td>30.3.3</td><td>

* MESSAGE TOW COUNT = 17 MSB OF ACTUAL TOW COUNT AT START OF NEXT 12-SECOND MESSAGE

Figure 30-4. Message Type 31 - Clock & Reduced Almanac</td><td></td><td>

* MESSAGE TOW COUNT = 17 MSB OF ACTUAL TOW COUNT AT START OF NEXT 12-SECOND MESSAGE

Figure 30-4. Message Type 31 - Clock & Reduced Almanac</td><td>Rationale #1</td></tr>
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<tr><th>Section Number</th><th>IS-GPS-200 Rev E Navstar GPS Space Segment/Navigation User Interfaces</th><th>Proposed Heading</th><th>URA Definition Proposed Text</th><th>Rationale</th></tr>
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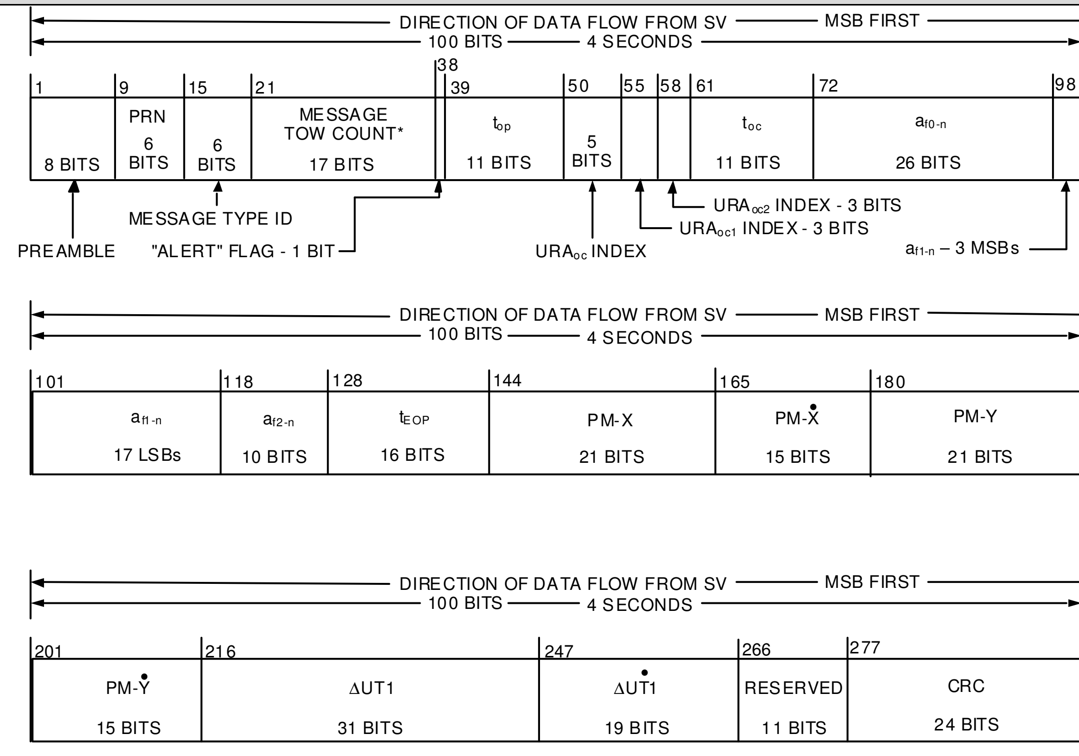
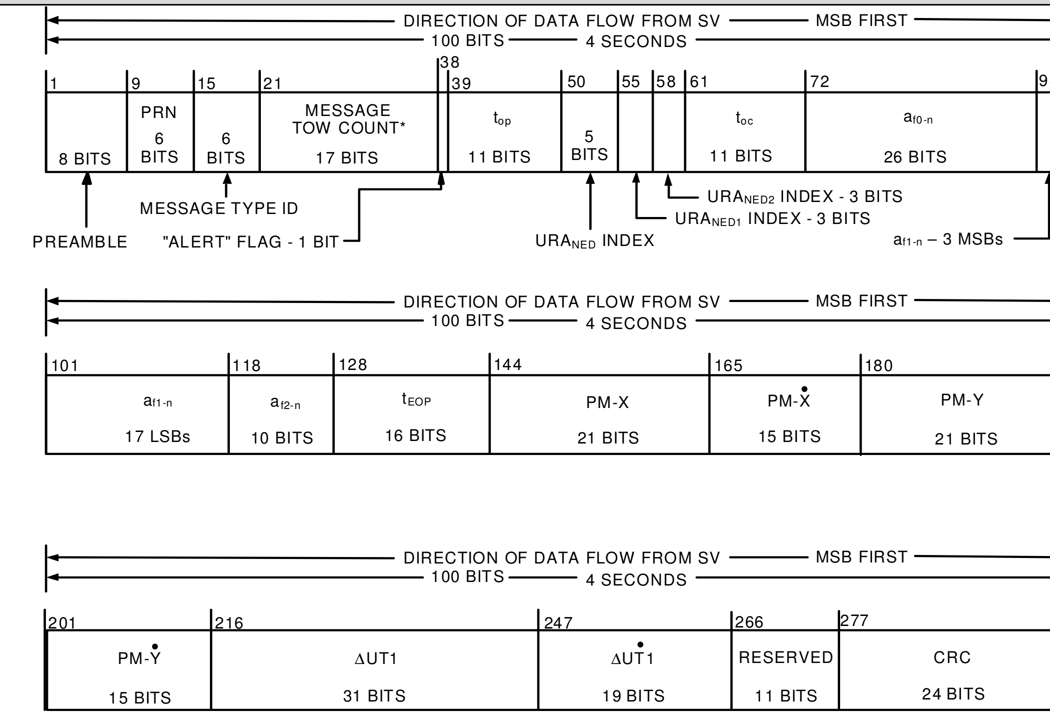


* MESSAGE TOW COUNT = 17 MSB OF ACTUAL TOW COUNT AT START OF NEXT 12-SECOND MESSAGE

Figure 30-5. Message Type 32 - Clock & EOP

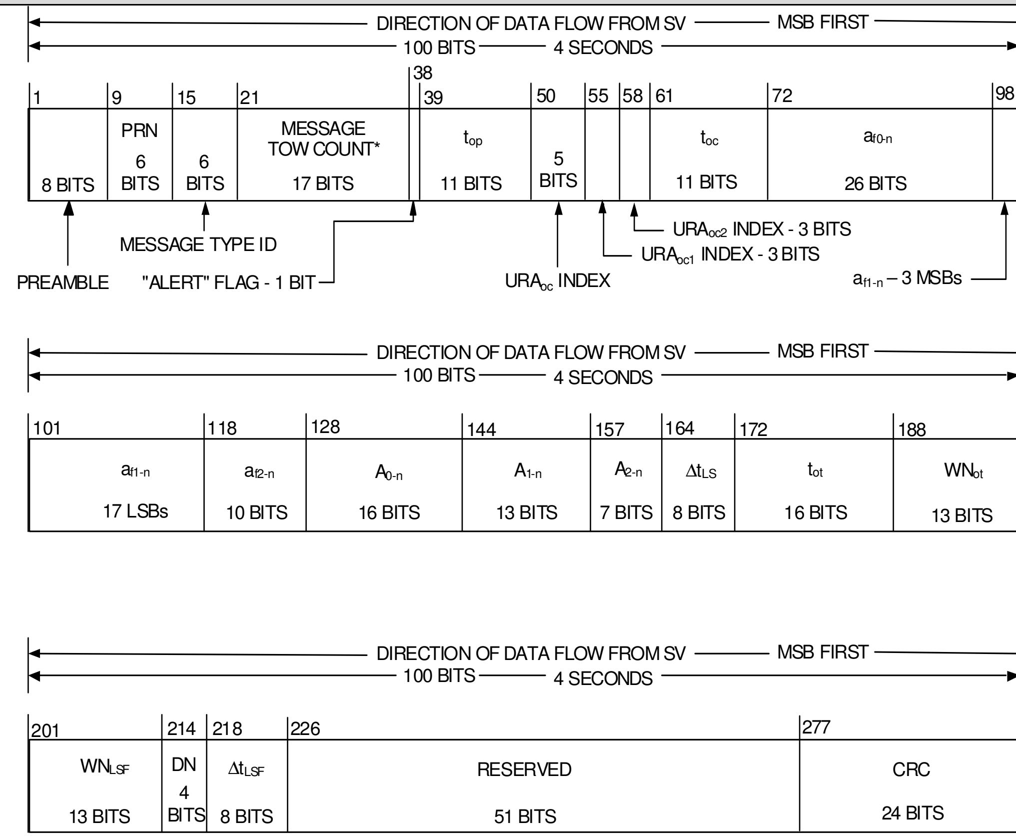
</td><td></td><td>



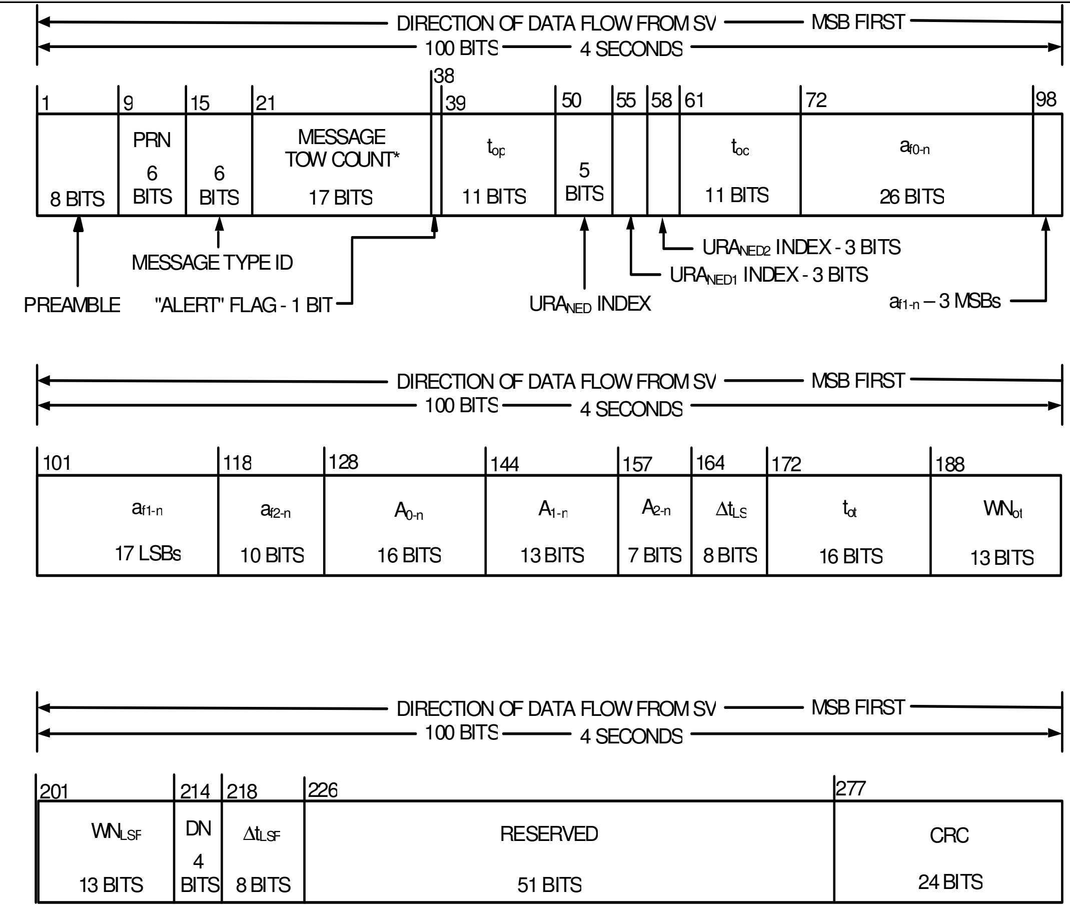
* MESSAGE TOW COUNT = 17 MSB OF ACTUAL TOW COUNT AT START OF NEXT 12-SECOND MESSAGE

Figure 30-5. Message Type 32 - Clock & EOP

</td><td>Rationale #1</td></tr>
</table>

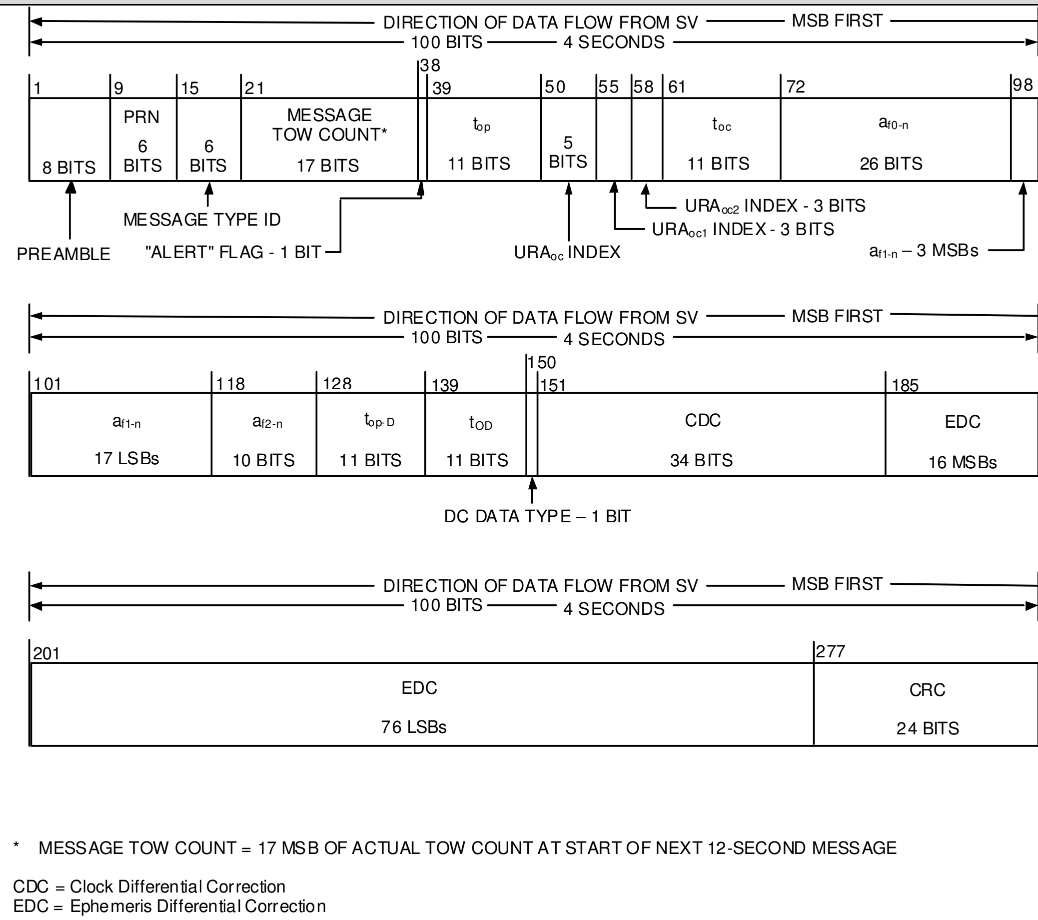
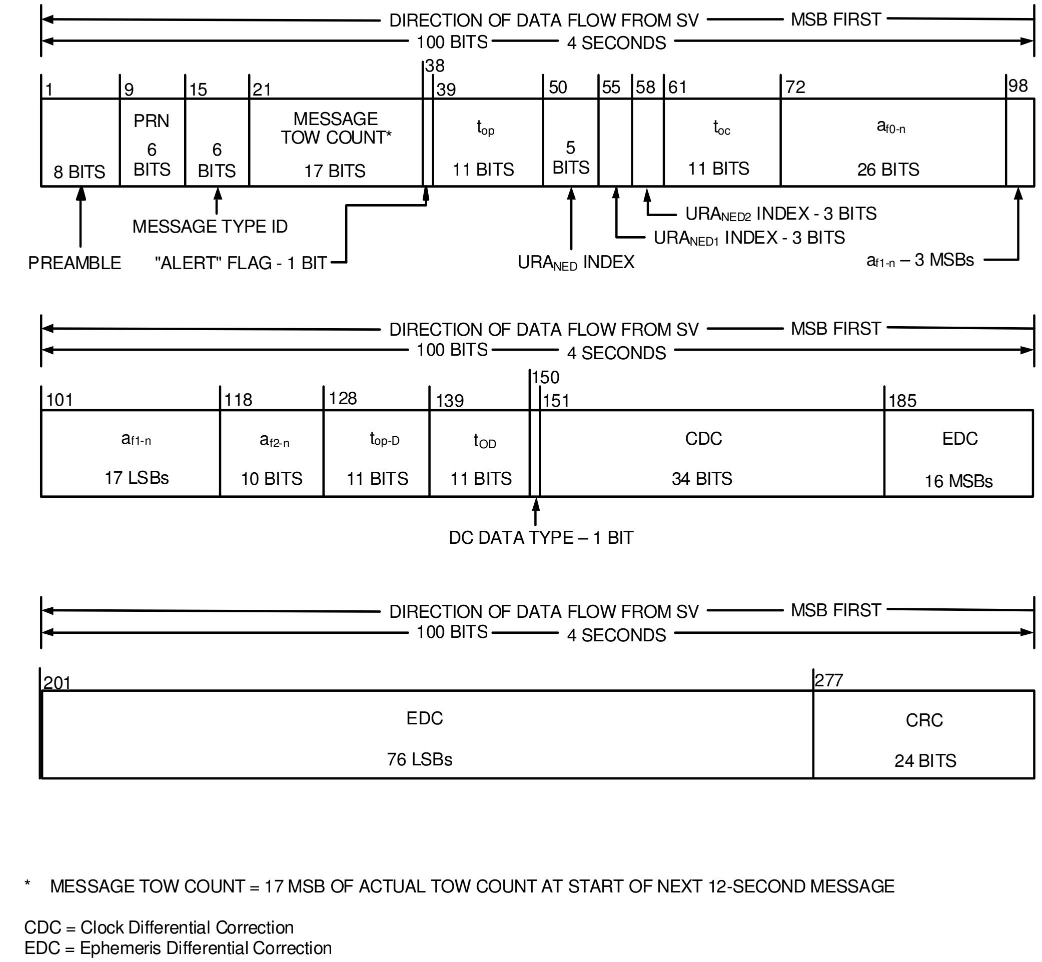
<table>
<tr><th>Section Number</th><th>IS-GPS-200 Rev E Navstar GPS Space Segment/Navigation User Interfaces</th><th>Proposed Heading</th><th>URA Definition Proposed Text</th><th>Rationale</th></tr>
<tr><td>30.3.3</td><td>

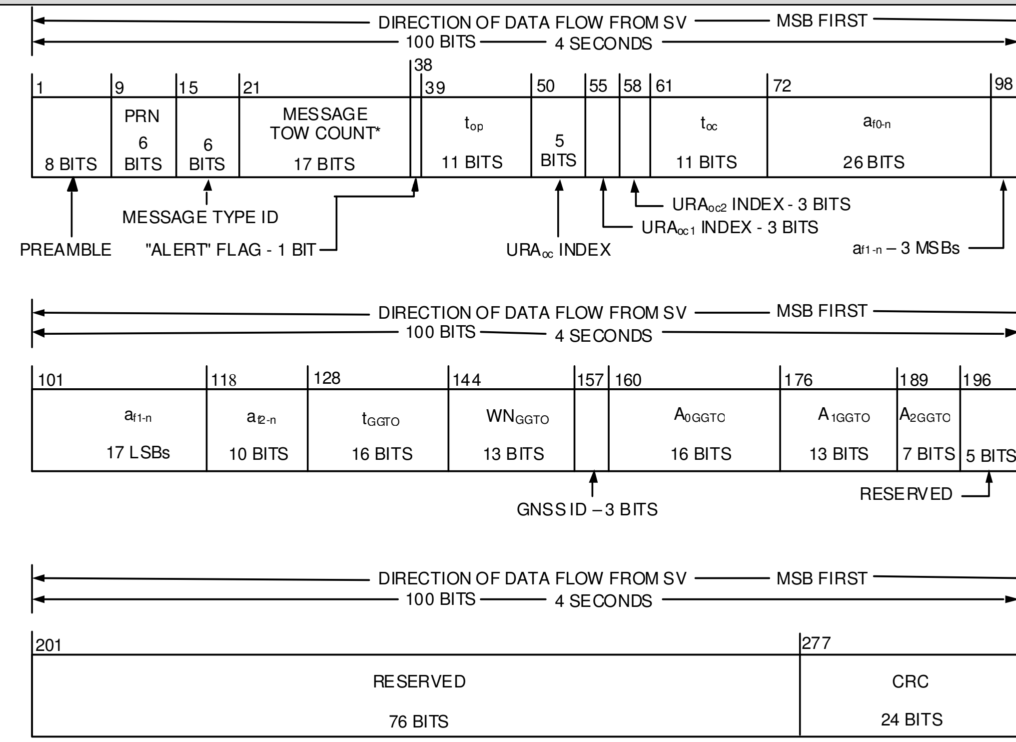
* MESSAGE TOW COUNT = 17 MSB OF ACTUAL TOW COUNT AT START OF NEXT 12-SECOND MESSAGE

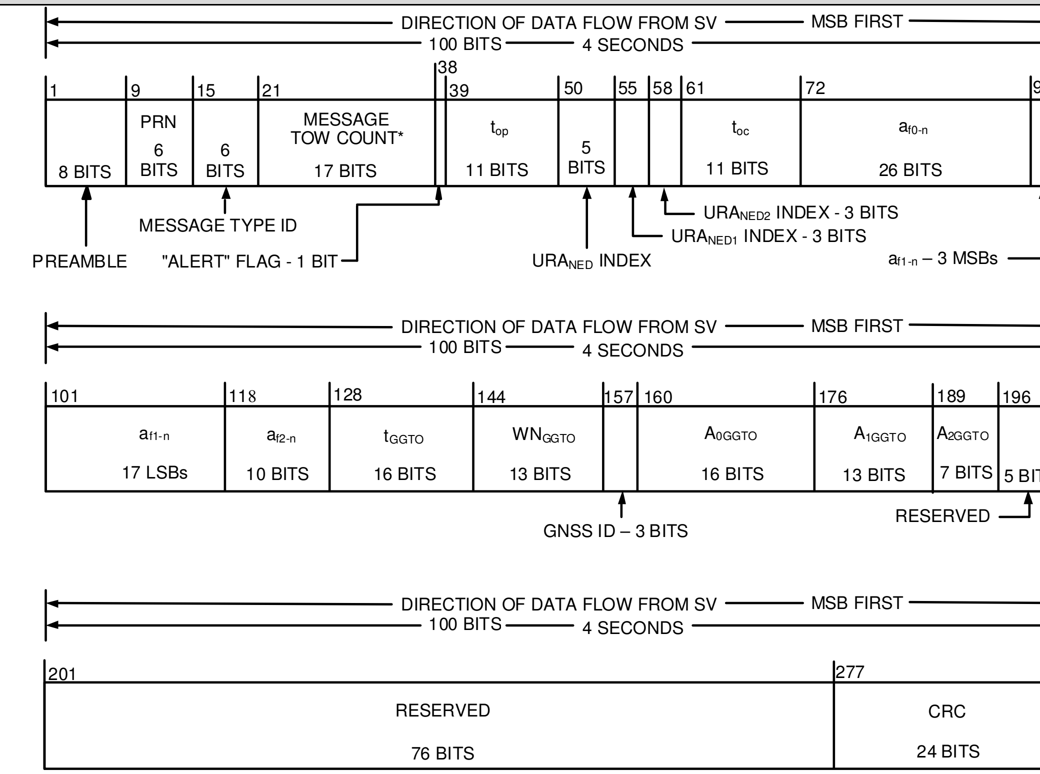
Figure 30-6. Message Type 33 - Clock & UTC</td><td></td><td>

* MESSAGE TOW COUNT = 17 MSB OF ACTUAL TOW COUNT AT START OF NEXT 12-SECOND MESSAGE

Figure 30-6. Message Type 33 - Clock & UTC</td><td>Rationale #1</td></tr>
</table>

Section Number	IS-GPS-200 Rev E Navstar GPS Space Segment/Navigation User Interfaces	Proposed Heading	URA Definition Proposed Text	Rationale
30.3.3	 Figure 30-7. Message Type 34 - Clock & Differential Correction		 Figure 30-7. Message Type 34 - Clock & Differential Correction	Rationale #1

<table>
<tr><th>Section Number</th><th>IS-GPS-200 Rev E Navstar GPS Space Segment/Navigation User Interfaces</th><th>Proposed Heading</th><th>URA Definition Proposed Text</th><th>Rationale</th></tr>
<tr><td>30.3.3</td><td>

* MESSAGE TOW COUNT = 17 MSB OF ACTUAL TOW COUNT AT START OF NEXT 12-SECOND MESSAGE
Figure 30-8. Message Type 35 - Clock & GGTO</td><td></td><td>

* MESSAGE TOW COUNT = 17 MSB OF ACTUAL TOW COUNT AT START OF NEXT 12-SECOND MESSAGE
Figure 30-8. Message Type 35 - Clock & GGTO</td><td>Rationale #1</td></tr>
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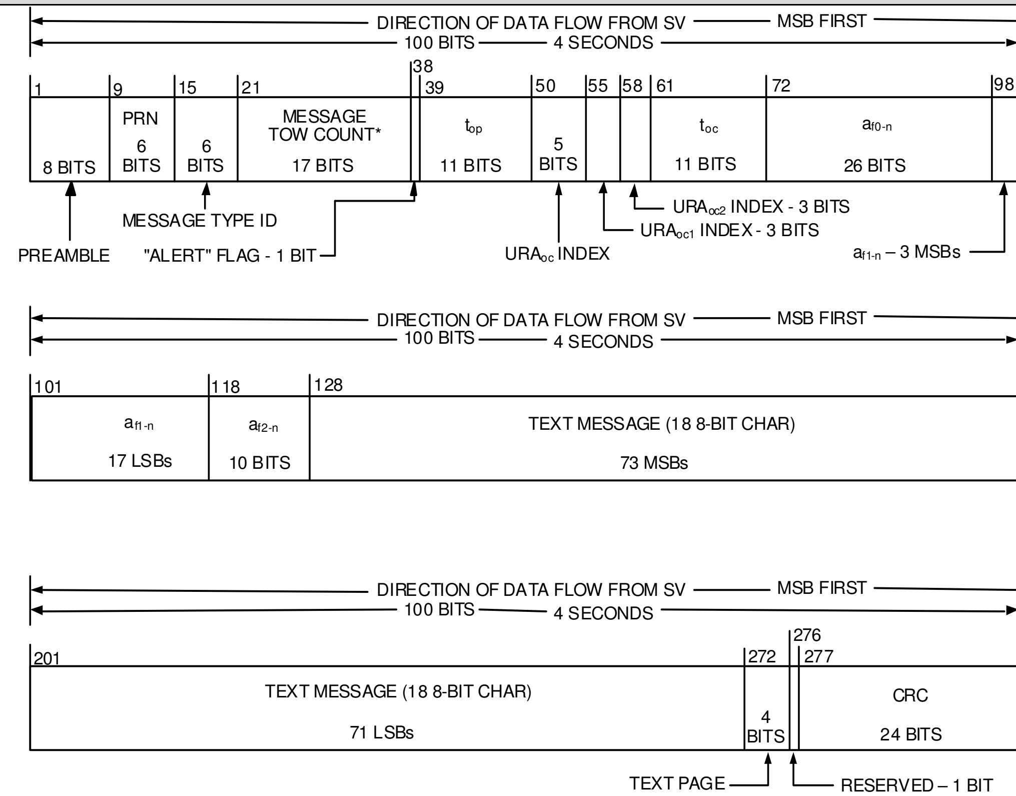
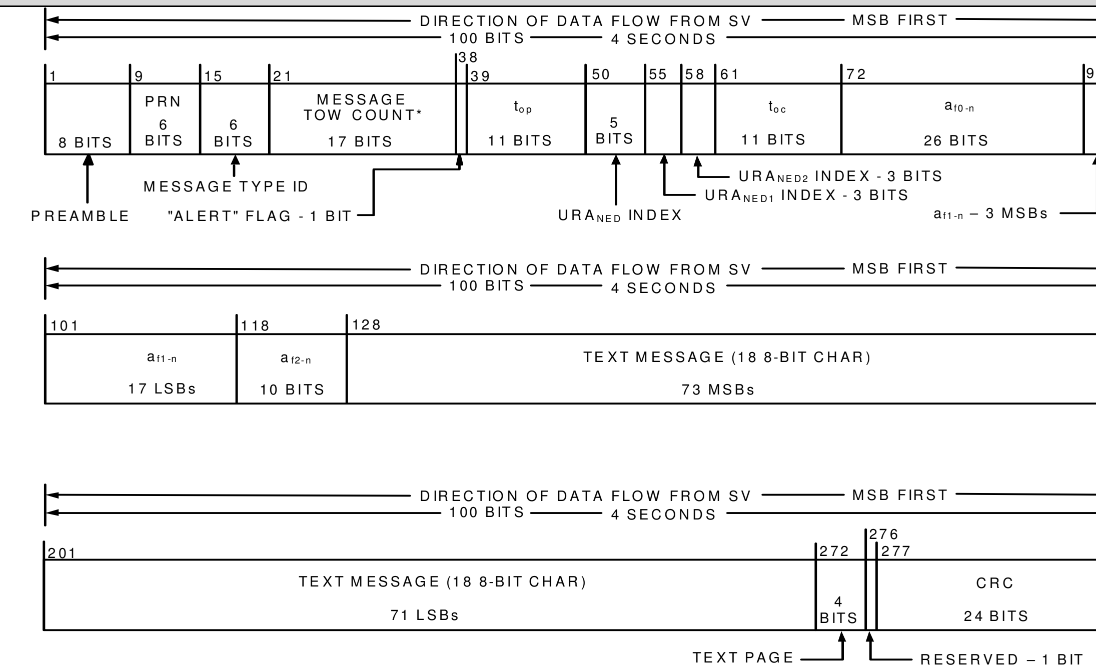
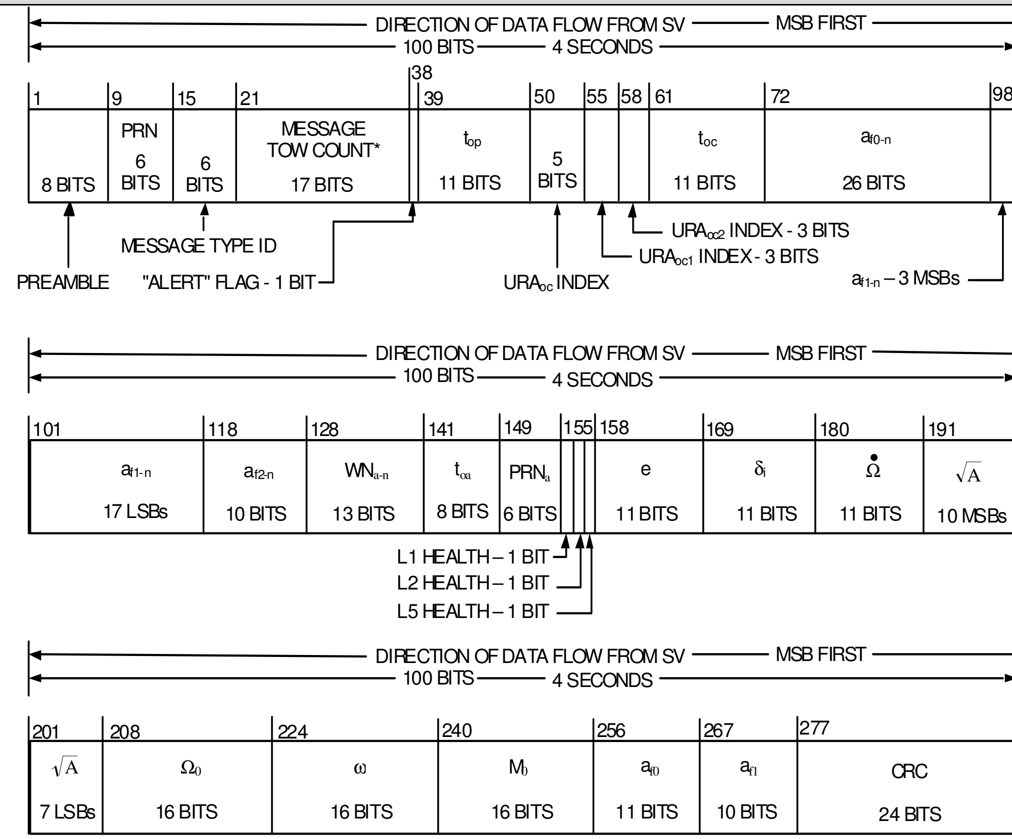
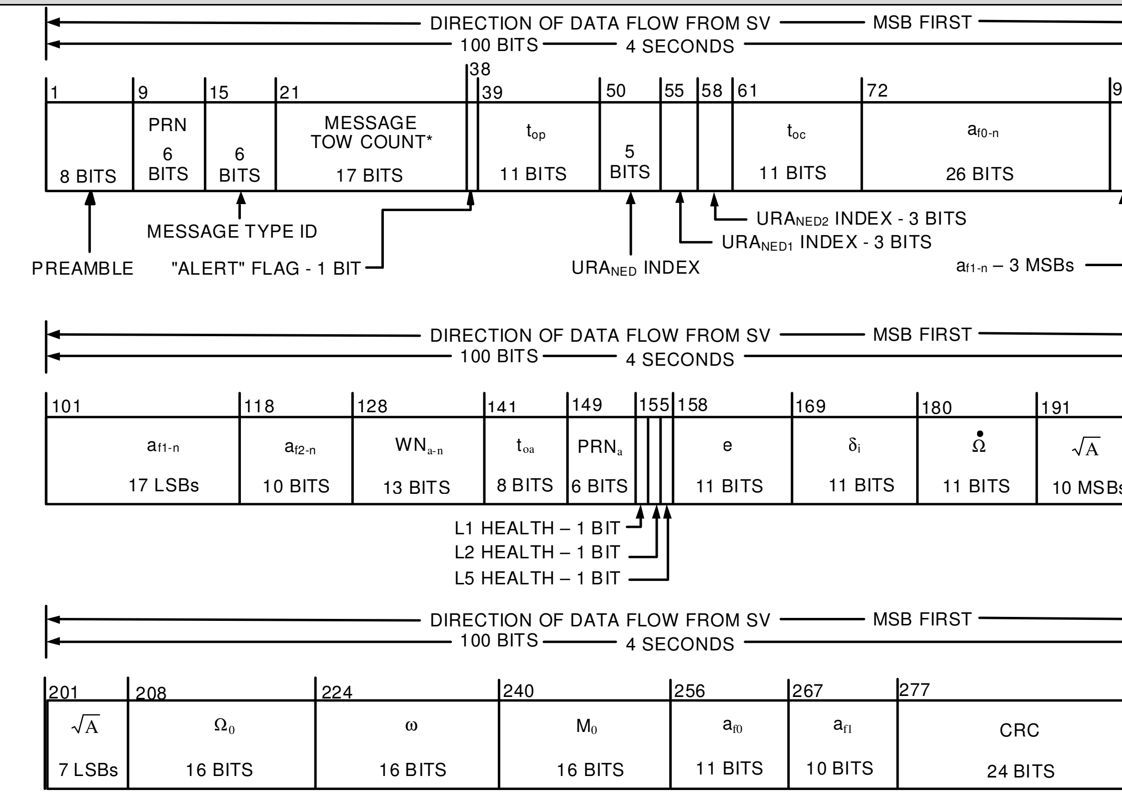
Section Number	IS-GPS-200 Rev E Navstar GPS Space Segment/Navigation User Interfaces	Proposed Heading	URA Definition Proposed Text	Rationale
30.3.3	 * MESSAGE TOW COUNT = 17 MSB OF ACTUAL TOW COUNT AT START OF NEXT 12-SECOND MESSAGE Figure 30-9. Message Type 36 - Clock & Text		 * MESSAGE TOW COUNT = 17 MSB OF ACTUAL TOW COUNT AT START OF NEXT 12-SECOND MESSAGE Figure 30-9. Message Type 36 - Clock & Text	Rationale #1

<table>
<tr><th>Section Number</th><th>IS-GPS-200 Rev E Navstar GPS Space Segment/Navigation User Interfaces</th><th>Proposed Heading</th><th>URA Definition Proposed Text</th><th>Rationale</th></tr>
<tr><td>30.3.3</td><td>

* MESSAGE TOW COUNT = 17 MSB OF ACTUAL TOW COUNT AT START OF NEXT 12-SECOND MESSAGE

Figure 30-10. Message Type 37 - Clock & Midi Almanac</td><td></td><td>

* MESSAGE TOW COUNT = 17 MSB OF ACTUAL TOW COUNT AT START OF NEXT 12-SECOND MESSAGE

Figure 30-10. Message Type 37 - Clock & Midi Almanac</td><td>Rationale #1</td></tr>
<tr><td>30.3.3.1.1</td><td>The ephemeris parameters in the message type 10 and type 11 describe the orbit of the transmitting SV during the curve fit interval of three hours. The nominal transmission interval is two hours, and shall coincide with the first two hours of the curve fit interval. The period of applicability for ephemeris data coincides with the entire three-hour curve fit interval. Table 30-I gives the definition of the orbital parameters using terminology typical of Keplerian orbital parameters; it is noted, however, that the transmitted parameter values are expressed such that they provide the best trajectory fit in Earth-Centered, Earth-Fixed (ECEF) coordinates for each specific fit interval. The user shall not interpret intermediate coordinate values as pertaining to any conventional coordinate system.</td><td></td><td>The ephemeris parameters in the message type 10 and type 11 describe the orbit of the transmitting SV during the curve fit interval of three hours. The nominal transmission interval is two hours, and shall coincide with the first two hours of the curve fit interval. The predicted period of applicability for ephemeris data coincides with the entire three-hour curve fit interval. Table 30-I gives the definition of the orbital parameters using terminology typical of Keplerian orbital parameters; it is noted, however, that the transmitted parameter values are expressed such that they provide the best trajectory fit in Earth-Centered, Earth-Fixed (ECEF) coordinates for each specific fit interval. The user shall not interpret intermediate coordinate values as pertaining to any conventional coordinate system.</td><td>Rationale #1, ,
Rationale #2</td></tr>
<tr><td>30.3.3.1.1</td><td>N/A</td><td></td><td>The t_{oe} term shall provide the user with a convenient means for detecting any change in the ephemeris representation parameters. The t_{oe} is provided in both message type 10 and 11 for the</td><td>Rationale #1,</td></tr>
</table>

Section Number	IS-GPS-200 Rev E Navstar GPS Space Segment/Navigation User Interfaces	Proposed Heading	URA Definition Proposed Text	Rationale
			purpose of comparison with the t_{oc} term in message type 30 - 37. Whenever these three terms do not match, a data set cutover has occurred and new data must be collected. The timing of the t_{oe} and constraints on the t_{oc} and t_{oe} are defined in paragraph 30.3.4.4.	Rationale #2
30.3.3.1.1	Any change in the Message Type 10 and 11 ephemeris data will be accomplished with a simultaneous change in the t_{oe} value. The CS (Block IIR-M/IIF) and SS (Block III) will assure that the t_{oe} value, for at least the first data set transmitted by an SV after an upload, is different from that transmitted prior to the cutover. See Section 20.3.4.5 for additional information regarding t_{oe}. The CNAV message will contain information that allows users to operate when integrity is assured. This is accomplished using an integrity assured URA value in conjunction with an integrity status flag. The URA value is the RSS of URAoe and URAoc; URA is integrity assured to the enhanced level only when the integrity status flag is “1” . Bit 272 of Message Type 10 is the Integrity Status Flag (ISF). A "0" in bit position 272 indicates that the conveying signal is provided with the legacy level of integrity assurance. That is, the probability that the instantaneous URE of the conveying signal exceeds 4.42 times the upper bound value of the current broadcast URA index, for more than 5.2 seconds, without an accompanying alert, is less than 1E-5 per hour. A "1" in bit-position 272 indicates that the conveying signal is provided with an enhanced level of integrity assurance. That is, the probability that the instantaneous URE of the conveying signal exceeds 5.73 times the upper bound value of the current broadcast URA index, for more than 5.2 seconds, without an accompanying alert, is less than 1E-8 per hour. The probabilities associated with the nominal and lower bound values of the current broadcast URA index are not defined. In this context, an "alert" is defined as any indication or characteristic in the conveying signal, as specified elsewhere in this document, which signifies that the conveying signal may be invalid and should not be used, such as, not Operational-Healthy, Non-Standard Code, parity error, etc. In this context, the term URA refers to the composite URA, calculated as the root-sum-squared of the individual URA components in the conveying signal. Bit 273 of Message Type 10 indicates the phase relationship between L2C and L2P(Y) as specified in section 3.3.1.5.1.		Any change in the message type 10 and 11 ephemeris data will be accomplished with a simultaneous change in the t_{oe} value. The CS will assure the t_{oe} value for Block IIR-M/IIF and SS will assure the t_{oe} value for Block III, for at least the first data set transmitted by an SV after an upload, is different from that transmitted prior to the cutover. See Section 30.3.4.5 for additional information regarding t_{oe}. The CNAV messages-contain information that allows users to take advantage of situations when integrity is assured to the enhanced level. This is accomplished using a composite integrity assured URA value in conjunction with an integrity status flag. The composite integrity assured URA (IAURA) value is the RSS of an elevation-dependent function of the upper bound value of the URA_{ED} component and the upper bound value of the URA_{NED} component. The composite IAURA value is assured to the enhanced level only when the integrity status flag is “1”; otherwise the IAURA value is assured to the legacy level. Bit 272 of Message Type 10 is the Integrity Status Flag (ISF). A "0" in bit position 272 indicates that the conveying signal is provided with the legacy level of integrity assurance. That is, the probability that the instantaneous URE of the conveying signal exceeds 4.42 times the current broadcast IAURA value, for more than 5.2 seconds, without an accompanying alert, is less than 1E-5 per hour. A "1" in bit-position 272 indicates that the conveying signal is provided with an enhanced level of integrity assurance. That is, the probability that the instantaneous URE of the conveying signal exceeds 5.73 times the current broadcast IAURA value, for more than 5.2 seconds, without an accompanying alert, is less than 1E-8 per hour. The probabilities associated with the nominal and lower bound values of the current broadcast URA_{ED} index, URA_{NED} indexes, and related URA values are not defined. In this context, an "alert" is defined as any indication or characteristic of the conveying signal, as specified elsewhere in this document, which signifies to users that the conveying signal may be invalid or-should not be used, such as the health bits not indicating operational-healthy, broadcasting non-standard code-parity error, etc.	Rationale #1, Rationale #2
30.3.3.1.1.4	*30.3.3.1.1.4 SV Accuracy.*	Elevation-Dependent (ED)		

Section Number	IS-GPS-200 Rev E Navstar GPS Space Segment/Navigation User Interfaces	Proposed Heading	URA Definition Proposed Text	Rationale
		Accuracy		
30.3.3.1.1.4	Bits 66 through 70 of message type 10 shall contain the ephemeris User Range Accuracy (URA_{oe}) index of the SV for the standard positioning service user. URA_{oe} index shall provide the ephemeris-related user range accuracy index of the SV as a function of the current ephemeris message curve fit interval. While the ephemeris-related URA may vary over the ephemeris message curve fit interval, the URA_{oe} index (N) in message type 10 shall correspond to the maximum URA_{oe} expected over the entire curve fit interval.		Bits 66 through 70 of message type 10 shall contain the elevation-dependent (ED) component User Range Accuracy (URA_{ED}) index for the standard positioning service user. The URA_{ED} index shall provide the ED-related URA-index or the current ephemeris curve fit interval. While the ED-related URA may vary over the ephemeris curve fit interval and over the satellite footprint, the URA_{ED} index (N) in message type 10 shall correspond to the maximum URA_{ED} expected over the entire ephemeris curve fit interval for the worst-case location within the SV footprint (i.e., two points at the edge of the SV footprint). At the best-case location within the SV footprint (i.e., directly below the SV along the SV nadir vector), the corresponding URA_{ED}. is zero.	Rationale #1
30.3.3.1.1.4	The URA_{oe} index is a signed, two's complement integer in the range of +15 to -16 and has the following relationship to the ephemeris URA: <u>URA_{oe} Index</u> <u>URA_{oe} (meters)</u> 15 6144.00 < URA_{oe} 14 3072.00 < URA_{oe} ≤ 6144.00 13 1536.00 < URA_{oe} ≤ 3072.00 12 768.00 < URA_{oe} ≤ 1536.00 11 384.00 < URA_{oe} ≤ 768.00 10 192.00 < URA_{oe} ≤ 384.00 9 96.00 < URA_{oe} ≤ 192.00 8 48.00 < URA_{oe} ≤ 96.00 7 24.00 < URA_{oe} ≤ 48.00 6 13.65 < URA_{oe} ≤ 24.00 5 9.65 < URA_{oe} ≤ 13.65 4 6.85 < URA_{oe} ≤ 9.65 3 4.85 < URA_{oe} ≤ 6.85 2 3.40 < URA_{oe} ≤ 4.85		The URA_{ED} index is a signed, two's complement integer in the range of +15 to -16 and has the following relationship to the ED URA: <u>URA_{ED} Index</u> <u>URA_{ED} (meters)</u> 15 6144.00 < URA_{ED} (or no accuracy prediction is available) 14 3072.00 < URA_{ED} ≤ 6144.00 13 1536.00 < URA_{ED} ≤ 3072.00 12 768.00 < URA_{ED} ≤ 1536.00 11 384.00 < URA_{ED} ≤ 768.00 10 192.00 < URA_{ED} ≤ 384.00 9 96.00 < URA_{ED} ≤ 192.00 8 48.00 < URA_{ED} ≤ 96.00 7 24.00 < URA_{ED} ≤ 48.00 6 13.65 < URA_{ED} ≤ 24.00 5 9.65 < URA_{ED} ≤ 13.65 4 6.85 < URA_{ED} ≤ 9.65 3 4.85 < URA_{ED} ≤ 6.85 2 3.40 < URA_{ED} ≤ 4.85	Rationale #1

Section Number	IS-GPS-200 Rev E Navstar GPS Space Segment/Navigation User Interfaces	Proposed Heading	URA Definition Proposed Text	Rationale
	1 2.40 < URA_{oe} ≤ 3.40 0 1.70 < URA_{oe} ≤ 2.40 -1 1.20 < URA_{oe} ≤ 1.70 -2 0.85 < URA_{oe} ≤ 1.20 -3 0.60 < URA_{oe} ≤ 0.85 -4 0.43 < URA_{oe} ≤ 0.60 -5 0.30 < URA_{oe} ≤ 0.43 -6 0.21 < URA_{oe} ≤ 0.30 -7 0.15 < URA_{oe} ≤ 0.21 -8 0.11 < URA_{oe} ≤ 0.15 -9 0.08 < URA_{oe} ≤ 0.11 -10 0.06 < URA_{oe} ≤ 0.08 -11 0.04 < URA_{oe} ≤ 0.06 -12 0.03 < URA_{oe} ≤ 0.04 -13 0.02 < URA_{oe} ≤ 0.03 -14 0.01 < URA_{oe} ≤ 0.02 -15 URA_{oe} ≤ 0.01 -16 No accuracy prediction available-use at own risk Integrity properties of the URA are specified with respect to the upper bound values of the URA index (see 20.3.3.1).		1 2.40 < URA_{ED} ≤ 3.40 0 1.70 < URA_{ED} ≤ 2.40 -1 1.20 < URA_{ED} ≤ 1.70 -2 0.85 < URA_{ED} ≤ 1.20 -3 0.60 < URA_{ED} ≤ 0.85 -4 0.43 < URA_{ED} ≤ 0.60 -5 0.30 < URA_{ED} ≤ 0.43 -6 0.21 < URA_{ED} ≤ 0.30 -7 0.15 < URA_{ED} ≤ 0.21 -8 0.11 < URA_{ED} ≤ 0.15 -9 0.08 < URA_{ED} ≤ 0.11 -10 0.06 < URA_{ED} ≤ 0.08 -11 0.04 < URA_{ED} ≤ 0.06 -12 0.03 < URA_{ED} ≤ 0.04 -13 0.02 < URA_{ED} ≤ 0.03 -14 0.01 < URA_{ED} ≤ 0.02 -15 URA_{ED} ≤ 0.01 -16 No accuracy prediction available-use at own risk For each URA_{ED} index (N), users may compute a nominal URA_{ED} value (X) as given by: • If the value of N is 6 or less, but more than -16, X = $2^{(1 + N/2)}$, • If the value of N is 6 or more, but less than 15, X = $2^{(N - 2)}$, • N = -16 or N = 15 shall indicate the absence of an accuracy prediction and shall advise the standard positioning service user to use that SV at his own risk.	

Section Number	**IS-GPS-200 Rev E Navstar GPS Space Segment/Navigation User Interfaces**	**Proposed Heading**	**URA Definition Proposed Text**	**Rationale**
			For N = 1, 3, and 5, X should be rounded to 2.8, 5.7, and 11.3 meters, respectively. The nominal URA_{ED} value (X) is suitable for use as a conservative prediction of the RMS ED range errors for accuracy-related purposes in the pseudorange domain (e.g., measurement deweighting, RAIM, FOM computations). Integrity properties of the $IAURA_{ED}$ are specified with respect to the scaled (multiplied by either 4.42 or 5.73 as appropriate) upper bound values of the broadcast URA_{ED} index (see 30.3.3.1.1). For the nominal URA_{ED} value and the $IAURA_{ED}$ value, users may compute an adjusted URA_{ED} value as a function of SV elevation angle (E) as follows: Adjusted Nominal URA_{ED} = Nominal URA_{ED} (sin(E+90 degrees) Adjusted $IAURA_{ED}$ = $IAURA_{ED}$ (sin(E+90 degrees)) URA_{ED} and $IAURA_{ED}$ account for SIS-contributions to user range error which include, but are not limited to, the following: LSB representation/truncation error, alongtrack ephemeris errors, and crosstrack ephemeris errors. URA_{ED} and $IAURA_{ED}$ do not account for user range error contributions due to the inaccuracy of the broadcast ionospheric data parameters used in the single-frequency ionospheric model or for other atmospheric effects.	

<table>
<tr><th>Section Number</th><th>IS-GPS-200 Rev E Navstar GPS Space Segment/Navigation User Interfaces</th><th>Proposed Heading</th><th>URA Definition Proposed Text</th><th>Rationale</th></tr>
<tr><td>30.3.3.1.3</td><td>
<table>
<tr><th colspan="6">Table 30-I. Message Types 10 and 11 Parameters (1 of 2)</th></tr>
<tr><th colspan="2">Parameter</th><th>No. of Bits**</th><th>Scale Factor (LSB)</th><th>Effective Range***</th><th>Units</th></tr>
<tr><td>WN</td><td>Week No.</td><td>13</td><td>1</td><td></td><td>weeks</td></tr>
<tr><td>URA_{OE} Index</td><td>SV accuracy</td><td>5*</td><td></td><td></td><td>(see text)</td></tr>
<tr><td>Signal health (L1/L2/L5)</td><td></td><td>3</td><td>1</td><td></td><td>(see text)</td></tr>
<tr><td>t_{op}</td><td>Data predict time of week</td><td>11</td><td>300</td><td>604,500</td><td>seconds</td></tr>
<tr><td>?A ****</td><td>Semi-major axis difference at reference time</td><td>26*</td><td>2^{-9}</td><td></td><td>meters</td></tr>
<tr><td>• A</td><td>Change rate in semi-major axis</td><td>25*</td><td>2^{-21}</td><td></td><td>meters/sec</td></tr>
<tr><td>?n_0</td><td>Mean Motion difference from computed value at reference time</td><td>17*</td><td>2^{-44}</td><td></td><td>semi-circles/sec</td></tr>
<tr><td>• ?n_0</td><td>Rate of mean motion difference from computed value</td><td>23*</td><td>2^{-57}</td><td></td><td>semi-circles/sec^2</td></tr>
<tr><td>M_{0-n}</td><td>Mean anomaly at reference time</td><td>33*</td><td>2^{-32}</td><td></td><td>semi-circles</td></tr>
<tr><td>e_n</td><td>Eccentricity</td><td>33</td><td>2^{-34}</td><td>0.03</td><td>dimensionless</td></tr>
<tr><td>ω_n</td><td>Argument of perigee</td><td>33*</td><td>2^{-32}</td><td></td><td>semi-circles</td></tr>
<tr><td colspan="6">* Parameters so indicated are two's complement, with the sign bit (+ or -) occupying the MSB;
** See Figure 30-1 for complete bit allocation in Message Type 10;
*** Unless otherwise indicated in this column, effective range is the maximum range attainable with indicated bit allocation and scale factor.
**** Relative to A_{REF} = 26,559,710 meters.</td></tr>
</table>
</td><td></td><td>
<table>
<tr><th colspan="6">Table 30-I. Message Types 10 and 11 Parameters (1 of 2)</th></tr>
<tr><th colspan="2">Parameter</th><th>No. of Bits**</th><th>Scale Factor (LSB)</th><th>Effective Range***</th><th>Units</th></tr>
<tr><td>WN</td><td>Week No.</td><td>13</td><td>1</td><td></td><td>weeks</td></tr>
<tr><td>URA_{ED} Index</td><td>ED Accuracy Index</td><td>5*</td><td></td><td></td><td>(see text)</td></tr>
<tr><td>Signal health (L1/L2/L5)</td><td></td><td>3</td><td>1</td><td></td><td>(see text)</td></tr>
<tr><td>t_{op}</td><td>Data predict time of week</td><td>11</td><td>300</td><td>604,500</td><td>seconds</td></tr>
<tr><td>?A ****</td><td>Semi-major axis difference at reference time</td><td>26*</td><td>2^{-9}</td><td></td><td>meters</td></tr>
<tr><td>• A</td><td>Change rate in semi-major axis</td><td>25*</td><td>2^{-21}</td><td></td><td>meters/sec</td></tr>
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**** Relative to A_{REF} = 26,559,710 meters.</td></tr>
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</td><td>Rationale #1</td></tr>
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<tr><td>30.3.3.2.3</td><td>
<table>
<tr><td colspan="6">Table 30-III. Clock Correction and Accuracy Parameters</td></tr>
<tr><th colspan="2">Parameter</th><th>No. of Bits**</th><th>Scale Factor (LSB)</th><th>Effective Range***</th><th>Units</th></tr>
<tr><td>t_{oc}</td><td>Clock Data Reference Time of Week</td><td>11</td><td>300</td><td>604,500</td><td>seconds</td></tr>
<tr><td>URA_{oc} Index</td><td>SV Clock Accuracy Index</td><td>5*</td><td></td><td></td><td>(see text)</td></tr>
<tr><td>URA_{oc1} Index</td><td>SV Clock Accuracy Change Index</td><td>3</td><td></td><td></td><td>(see text)</td></tr>
<tr><td>URA_{oc2} Index</td><td>SV Clock Accuracy Change Rate Index</td><td>3</td><td></td><td></td><td>(see text)</td></tr>
<tr><td>$a_{f2\text{-}n}$</td><td>SV Clock Drift Rate Correction Coefficient</td><td>10*</td><td>2^{-60}</td><td></td><td>sec/sec^2</td></tr>
<tr><td>$a_{f1\text{-}n}$</td><td>SV Clock Drift Correction Coefficient</td><td>20*</td><td>2^{-48}</td><td></td><td>sec/sec</td></tr>
<tr><td>$a_{f0\text{-}n}$</td><td>SV Clock Bias Correction Coefficient</td><td>26*</td><td>2^{-35}</td><td></td><td>seconds</td></tr>
<tr><td colspan="6">* Parameters so indicated are two's complement, with the sign bit (+ or -) occupying the MSB;
** See Figure 30-3 through 30-10 for complete bit allocation in Message types 30 to 37;
*** Unless otherwise indicated in this column, effective range is the maximum range attainable with indicated bit allocation and scale factor.</td></tr>
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<tr><td colspan="6">Table 30-III. Clock Correction and Accuracy Parameters</td></tr>
<tr><th colspan="2">Parameter</th><th>No. of Bits**</th><th>Scale Factor (LSB)</th><th>Effective Range***</th><th>Units</th></tr>
<tr><td>t_{oc}</td><td>Clock Data Reference Time of Week</td><td>11</td><td>300</td><td>604,500</td><td>seconds</td></tr>
<tr><td>URA_{NED} Index</td><td>NED Accuracy Index</td><td>5*</td><td></td><td></td><td>(see text)</td></tr>
<tr><td>URA_{NED1} Index</td><td>NED Accuracy Change Index</td><td>3</td><td></td><td></td><td>(see text)</td></tr>
<tr><td>URA_{NED2} Index</td><td>NED Accuracy Change Rate Index</td><td>3</td><td></td><td></td><td>(see text)</td></tr>
<tr><td>$a_{f2\text{-}n}$</td><td>SV Clock Drift Rate Correction Coefficient</td><td>10*</td><td>2^{-60}</td><td></td><td>sec/sec^2</td></tr>
<tr><td>$a_{f1\text{-}n}$</td><td>SV Clock Drift Correction Coefficient</td><td>20*</td><td>2^{-48}</td><td></td><td>sec/sec</td></tr>
<tr><td>$a_{f0\text{-}n}$</td><td>SV Clock Bias Correction Coefficient</td><td>26*</td><td>2^{-35}</td><td></td><td>seconds</td></tr>
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</table>
</td><td>Rationale #1</td></tr>
<tr><td>30.3.3.2.4</td><td>30.3.3.2.4 SV Clock Accuracy Estimates.</td><td>Non-Elevation-Dependent (NED) Accuracy Estimates.</td><td></td><td></td></tr>
<tr><td>30.3.3.2.4</td><td>Bits 50 through 54, and 55 through 57, and 58 through 60 of message types 30 through 37 shall contain the URA_{oc} Index,URA_{oc1} Index, and URA_{oc2} Index, respectively, of the SV (reference paragraph 6.2.1) for the standard positioning service user. The URA_{oc} Index together with URA_{oc1} Index and URA_{oc2} Index shall give the clock-related user range accuracy of the SV as a function of time since the prediction (t_{op}) used to generate the uploaded clock correction polynomial terms.</td><td></td><td>Bits 50 through 54, and 55 through 57, and 58 through 60 of message types 30 through 37 shall contain the non-elevation-dependent (NED) component URA_{NED0} Index,URA_{NED1} Index, and URA_{NED2} Index, respectively, of the SV (reference paragraph 6.2.1) for the standard positioning service user. The following equations together with the broadcast URA_{NED0} Index, URA_{NED1} Index, and URA_{NED2} Index shall give the clock-related user range accuracy of-$IAURA_{NED}$ over the current clock/ephemeris fit interval. While the actual NED related URA may vary over the satellite footprint, the $IAURA_{NED}$ calculated using the parameters in message type 10 at each instant during the current clock/ephemeris fit interval shall bound the maximum $IAURA_{NED}$ expected for the worst-case location within the satellite footprint at that instant.</td><td></td></tr>
</table>

Section Number	IS-GPS-200 Rev E Navstar GPS Space Segment/Navigation User Interfaces	Proposed Heading	URA Definition Proposed Text	Rationale
30.3.3.2.4	The user shall calculate the clock-related URA with the equation (in meters); $URA_{oc} = URA_{ocb} + URA_{oc1} (t - t_{op})$ for $t-t_{op} < 93,600$ seconds $URA_{oc} = URA_{ocb} + URA_{oc1} (t - t_{op}) + URA_{oc2} (t - t_{op} - 93,600)^2$ for $t-t_{op} > 93,600$ seconds where t = GPS time (must account for beginning or end of week crossovers), t_{op} = time of week of the state estimate utilized for the prediction of satellite clock correction parameters.		The user shall calculate the NED-related URA with the equation (in meters); $IAURA_{NED} = URA_{NED0} + URA_{NED1} (t - t_{op})$ for $t-t_{op} < 93,600$ seconds $IAURA_{NED} = URA_{NED0} + URA_{NED1} (t - t_{op}) + URA_{NED2} (t - t_{op} - 93,600)^2$ for $t-t_{op} > 93,600$ seconds where t = GPS time (must account for beginning or end of week crossovers), t_{op} = time of week of the state estimate utilized for the prediction of satellite clock /ephemeris parameters.	Rationale #1
30.3.3.2.4	The CS shall derive URA_{ocb} at time t_{op} which, when used together with URA_{oc1} and URA_{oc2} in the above equations, results in the minimum URA_{oc} that is greater than the predicted URA_{oc} during the entire duration up to 14 days after t_{op}.		The CS shall derive URA_{NED0}, URA_{NED1}, and URA_{NED2} indexes which, when used together in the above equations, results in the minimum $IAURA_{NED}$ that is greater than the predicted $IAURA_{NED}$ during the clock/ephemeris fit interval.	Rationale #1
30.3.3.2.4	The user shall use the broadcast URA_{oc} Index to derive URA_{ocb}. The index is a signed, two's complement integer in the range of +15 to -16 and has the following relationship to the clock-related user derived URA_{ocb}: <u>URA_{oc} Index</u> <u>URA_{ocb} (meters)</u> 15 $6144.00 < URA_{ocb}$ 14 $3072.00 < URA_{ocb} \leq 6144.00$ 13 $1536.00 < URA_{ocb} \leq 3072.00$ 12 $768.00 < URA_{ocb} \leq 1536.00$ 11 $384.00 < URA_{ocb} \leq 768.00$ 10 $192.00 < URA_{ocb} \leq 384.00$ 9 $96.00 < URA_{ocb} \leq 192.00$ 8 $48.00 < URA_{ocb} \leq 96.00$ 7 $24.00 < URA_{ocb} \leq 48.00$ 6 $13.65 < URA_{ocb} \leq 24.00$		The user shall use the broadcast URA_{NED0} index to derive the URA_{NED0} value. The URA_{NED0} index is a signed, two's complement integer in the range of +15 to -16 and has the following relationship to the URA_{NED0} value: <u>URA_{NED0} Index</u> <u>URA_{NED0} (meters)</u> 15 $6144.00 < URA_{NED0}$ (or no accuracy prediction is available) 14 $3072.00 < URA_{NED0} \leq 6144.00$ 13 $1536.00 < URA_{NED0} \leq 3072.00$ 12 $768.00 < URA_{NED0} \leq 1536.00$ 11 $384.00 < URA_{NED0} \leq 768.00$ 10 $192.00 < URA_{NED0} \leq 384.00$ 9 $96.00 < URA_{NED0} \leq 192.00$ 8 $48.00 < URA_{NED0} \leq 96.00$ 7 $24.00 < URA_{NED0} \leq 48.00$ 6 $13.65 < URA_{NED0} \leq 24.00$	Rationale #1

Section Number	IS-GPS-200 Rev E Navstar GPS Space Segment/Navigation User Interfaces	Proposed Heading	URA Definition Proposed Text	Rationale
	5 9.65 < URA_{ocb} ≤ 13.65 4 6.85 < URA_{ocb} ≤ 9.65 3 4.85 < URA_{ocb} ≤ 6.85 2 3.40 < URA_{ocb} ≤ 4.85 1 2.40 < URA_{ocb} ≤ 3.40 0 1.70 < URA_{ocb} ≤ 2.40 -1 1.20 < URA_{ocb} ≤ 1.70 -2 0.85 < URA_{ocb} ≤ 1.20 -3 0.60 < URA_{ocb} ≤ 0.85 -4 0.43 < URA_{ocb} ≤ 0.60 -5 0.30 < URA_{ocb} ≤ 0.43 -6 0.21 < URA_{ocb} ≤ 0.30 -7 0.15 < URA_{ocb} ≤ 0.21 -8 0.11 < URA_{ocb} ≤ 0.15 -9 0.08 < URA_{ocb} ≤ 0.11 -10 0.06 < URA_{ocb} ≤ 0.08 -11 0.04 < URA_{ocb} ≤ 0.06 -12 0.03 < URA_{ocb} ≤ 0.04 -13 0.02 < URA_{ocb} ≤ 0.03 -14 0.01 < URA_{ocb} ≤ 0.02 -15 URA_{ocb} ≤ 0.01 -16 No accuracy prediction available-use at own risk		5 9.65 < URA_{NED0} ≤ 13.65 4 6.85 < URA_{NED0} ≤ 9.65 3 4.85 < URA_{NED0} ≤ 6.85 2 3.40 < URA_{NED0} ≤ 4.85 1 2.40 < URA_{NED0} ≤ 3.40 0 1.70 < URA_{NED0} ≤ 2.40 -1 1.20 < URA_{NED0} ≤ 1.70 -2 0.85 < URA_{NED0} ≤ 1.20 -3 0.60 < URA_{NED0} ≤ 0.85 -4 0.43 < URA_{NED0} ≤ 0.60 -5 0.30 < URA_{NED0} ≤ 0.43 -6 0.21 < URA_{NED0} ≤ 0.30 -7 0.15 < URA_{NED0} ≤ 0.21 -8 0.11 < URA_{NED0} ≤ 0.15 -9 0.08 < URA_{NED0} ≤ 0.11 -10 0.06 < URA_{NED0} ≤ 0.08 -11 0.04 < URA_{NED0} ≤ 0.06 -12 0.03 < URA_{NED0} ≤ 0.04 -13 0.02 < URA_{NED0} ≤ 0.03 -14 0.01 < URA_{NED0} ≤ 0.02 -15 URA_{NED0} ≤ 0.01 -16 No accuracy prediction available-use at own risk	
30.3.3.2.4	The user may use the upper bound value in the URA_{ocb} range corresponding to the broadcast		For each URA_{NED0} index (N), users may compute a nominal URA_{NED0} value (X) as given by:	Rationale #3-

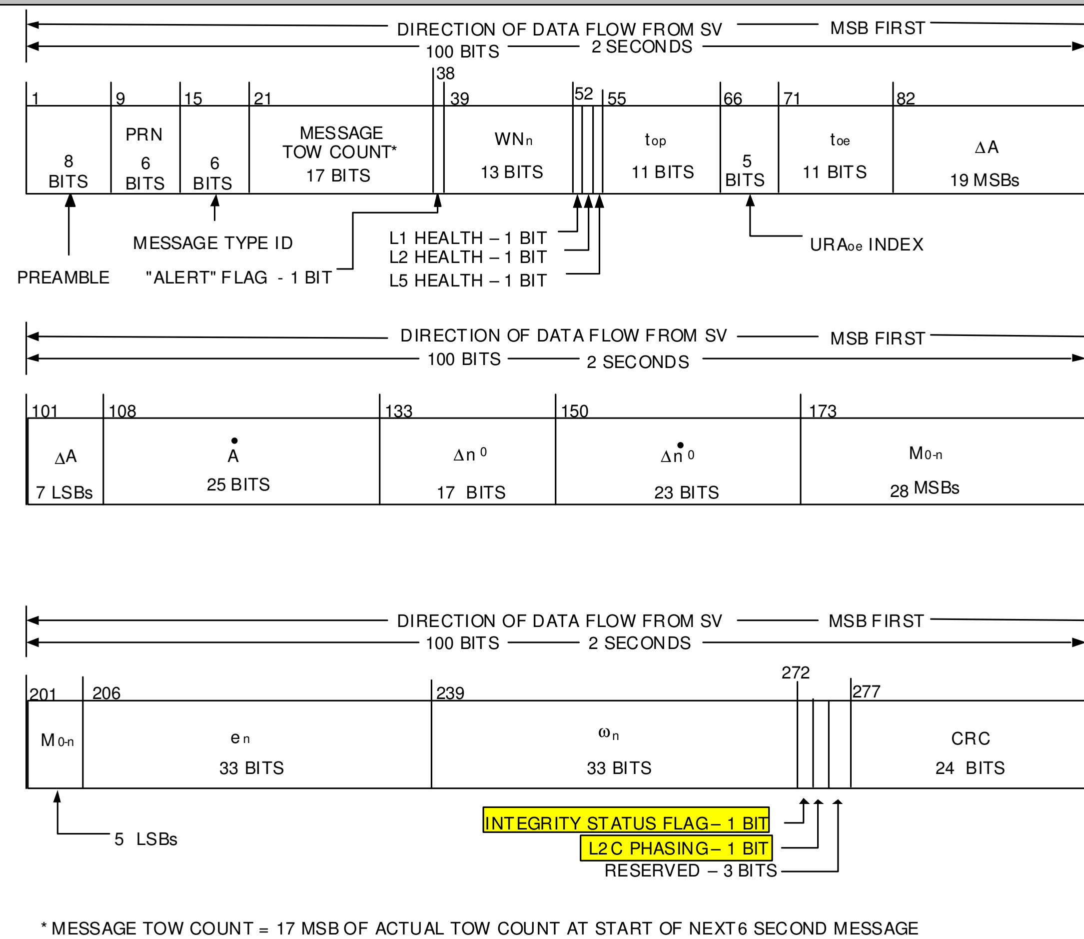
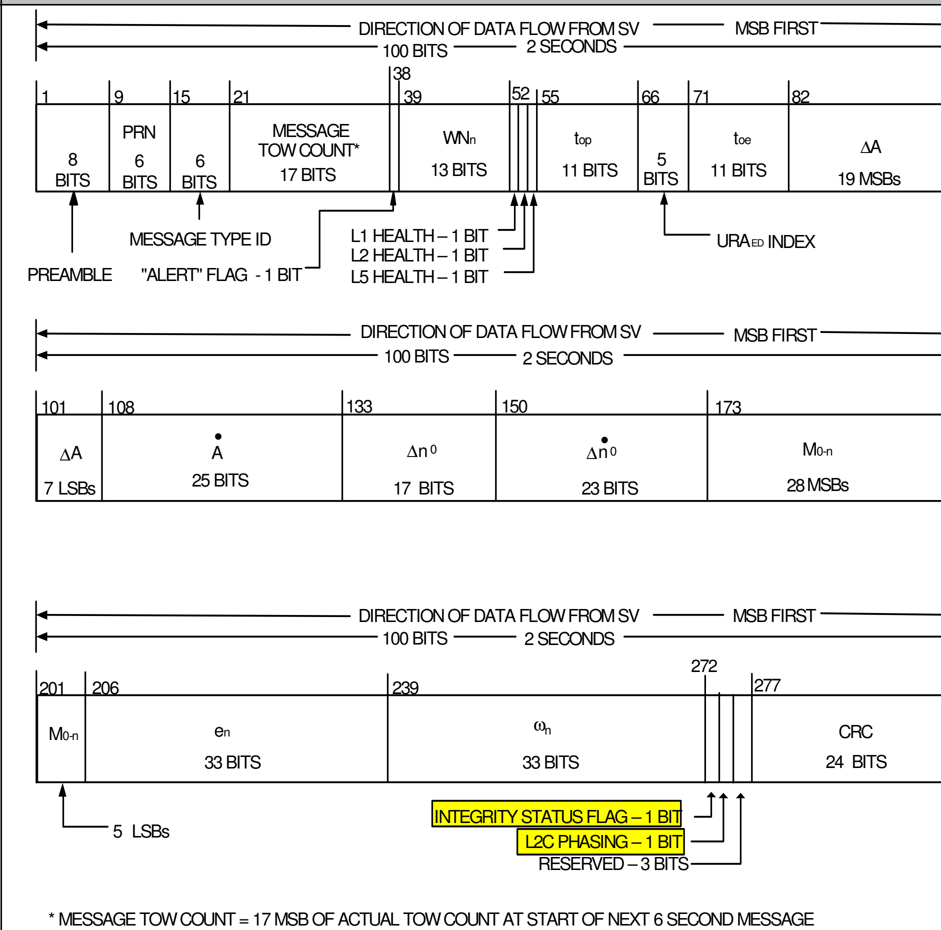
Section Number	IS-GPS-200 Rev E Navstar GPS Space Segment/Navigation User Interfaces	Proposed Heading	URA Definition Proposed Text	Rationale
	index, thereby calculating the maximum URA_{oc} that is equal to or greater than the CS predicted URA_{oc}, or the user may use the lower bound value in the range which will provide the minimum URA_{oc} that is equal to or less than the CS predicted URA_{oc}. Integrity properties of the URA are specified with respect to the upper bound values of the URA index (see 20.3.3.1). The transmitted URA_{oc1} Index is an integer value in the range 0 to 7. URA_{oc1} Index has the following relationship to the URA_{oc1}: $URA_{oc1} = \frac{1}{2^N}$ (meters/second) where N = 4 + URA_{oc1} Index. The transmitted URA_{oc2} Index is an integer value in the range 0 to 7. URA_{oc2} Index has the following relationship to the URA_{oc2}: $URA_{oc2} = \frac{1}{2^N}$ (meters/second^2) where N = 25 + URA_{oc2} Index.		• If the value of N is 6 or less, but more than -16, X = $2^{(1 + N/2)}$, • If the value of N is 6 or more, but less than 15, X = $2^{(N - 2)}$, • N = -16 or N = 15 shall indicate the absence of an accuracy prediction and shall advise the standard positioning service user to use that SV at his own risk. For N = 1, 3, and 5, X should be rounded to 2.8, 5.7, and 11.3 meters, respectively. The nominal URA_{NED0} value (X) shall be suitable for use as a conservative prediction of the RMS NED range errors for accuracy-related purposes in the pseudorange domain (e.g., measurement de-weighting RAIM, FOM computations). Integrity properties of the $IAURA_{NED}$ are specified with respect to the scaled (multiplied by either 4.42 or 5.73 as appropriate) upper bound values of the URA_{NED0} index, URA_{NED1} index, and URA_{NED2} index (see 30.3.3.1.1). URA_{NED0} accounts for zeroth order SIS-contributions to user range error which include, but are not limited to, the following: LSB representation/truncation error; the net effect of clock correction polynomial error and code phase error in the transmitted signal for single-frequency L1C/A or single-frequency L2C users who correct the code phase as described in Section 30.3.3.3.1.1.1; the net effect of clock parameter, code phase, and inter-signal correction error for dual-frequency L1/L2 and L1/L5 users who correct for group delay and ionospheric effects as described in Section 30.3.3.3.1.1.2; radial ephemeris error; anisotropic antenna errors; and signal deformation error. URA_{NED} does not account for user range contributions due to the inaccuracy of the broadcast ionospheric data parameters used in the single-frequency ionospheric model or for other atmospheric effects. The transmitted URA_{NED1} index is an integer value in the range 0 to 7. The URA_{NED1} index has the following relationship to the URA_{NED1} value: $URA_{NED1} = \frac{1}{2^N}$ (meters/second) where N = 14 + URA_{NED1} Index The transmitted URA_{NED2} index is an integer value in the range 0 to 7. URA_{NED2} index has the following relationship to the URA_{NED2}: $URA_{NED2} = \frac{1}{2^N}$ (meters/second2)	There is a typo that needs be corrected in computing URA, or all user URA values will be far too large. Using the erroneous value will result in a minimum value of URAoc1 that will prevent the Space and Control segments from meeting their specified performance requirements. Rationale #5

Section Number	IS-GPS-200 Rev E Navstar GPS Space Segment/Navigation User Interfaces	Proposed Heading	URA Definition Proposed Text	Rationale
			where N = 28 + URA_{NED2} Index.	
30.3.4.4	***30.3.4.4***	Data Sets		
30.3.4.4			The t_{oe} shall be equal to the t_{oc} of the same CNAV data set. The following rules govern the transmission of t_{oe} and t_{oc} values in different data sets: (1) The transmitted t_{oc} will be different from any value transmitted by the SV during the preceding seven days; (2) The transmitted t_{oe} will be different from any value transmitted by the SV during the preceding six hours. Cutovers to new data sets will occur only on hourly boundaries except for the first data set of a new upload. The first 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. The start of the transmission interval for each data set corresponds to the beginning of the curve fit interval for the data set. Each data set remains valid for the duration of its transmission interval, and nominally also remains valid for the duration of its curve fit interval. A data set is rendered invalid before the end of its curve fit interval when it is superseded by the SV cutting over to the first data set of a new upload. Normal Operations. The message type 10, 11, and 30-37 data sets are transmitted by the SV for periods of two hours. The corresponding curve fit interval is three hours.	Rationale #2- URA components (URA_{ED} and URA_{NED}) from different upload or fit intervals will not give a valid indication of signal accuracy or integrity. These changes provide clarification of how URA is computed by the user.
30.3.4.5	***30.3.4.5***	Reference Times		
30.3.4.5			The LNAV reference time information in paragraph 20.3.4.5 also applies to the CNAV reference times.	Rationale #5

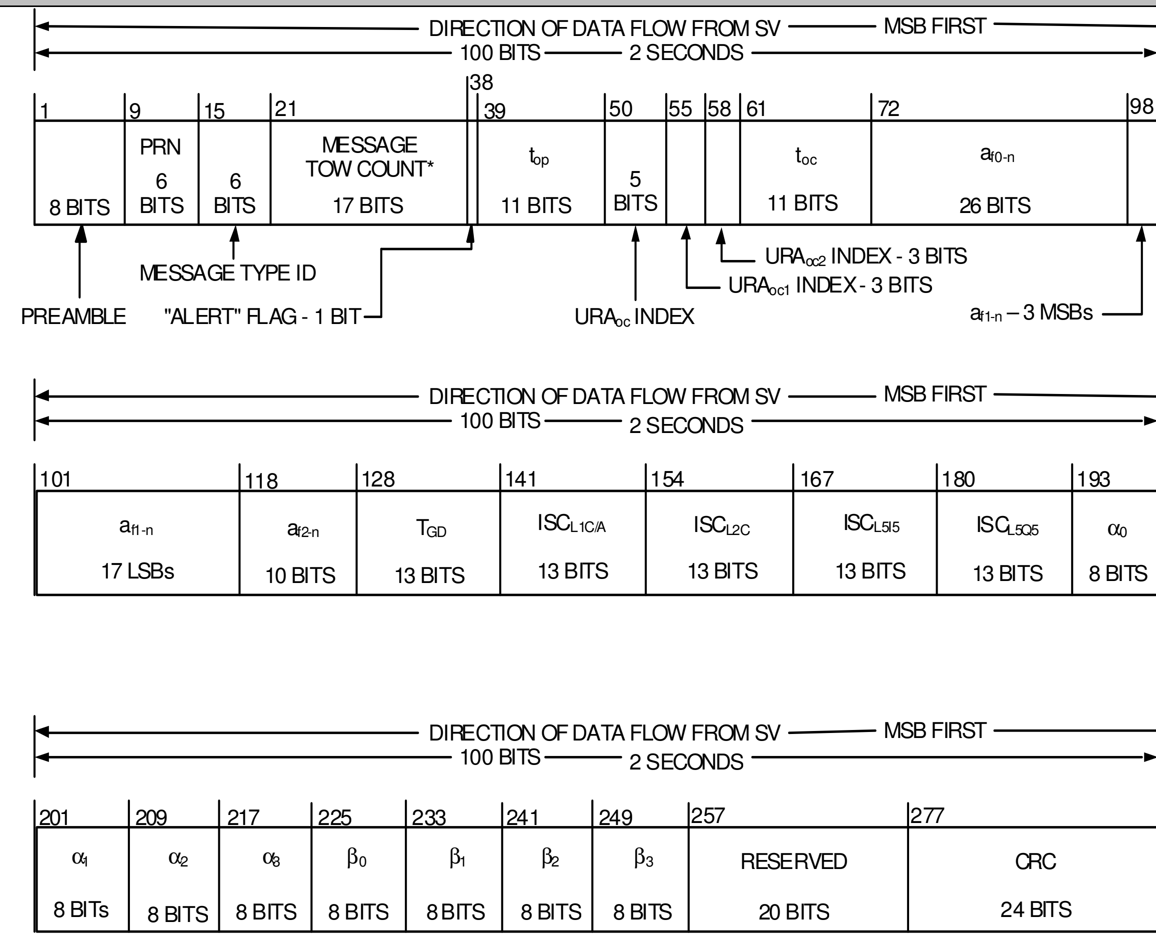
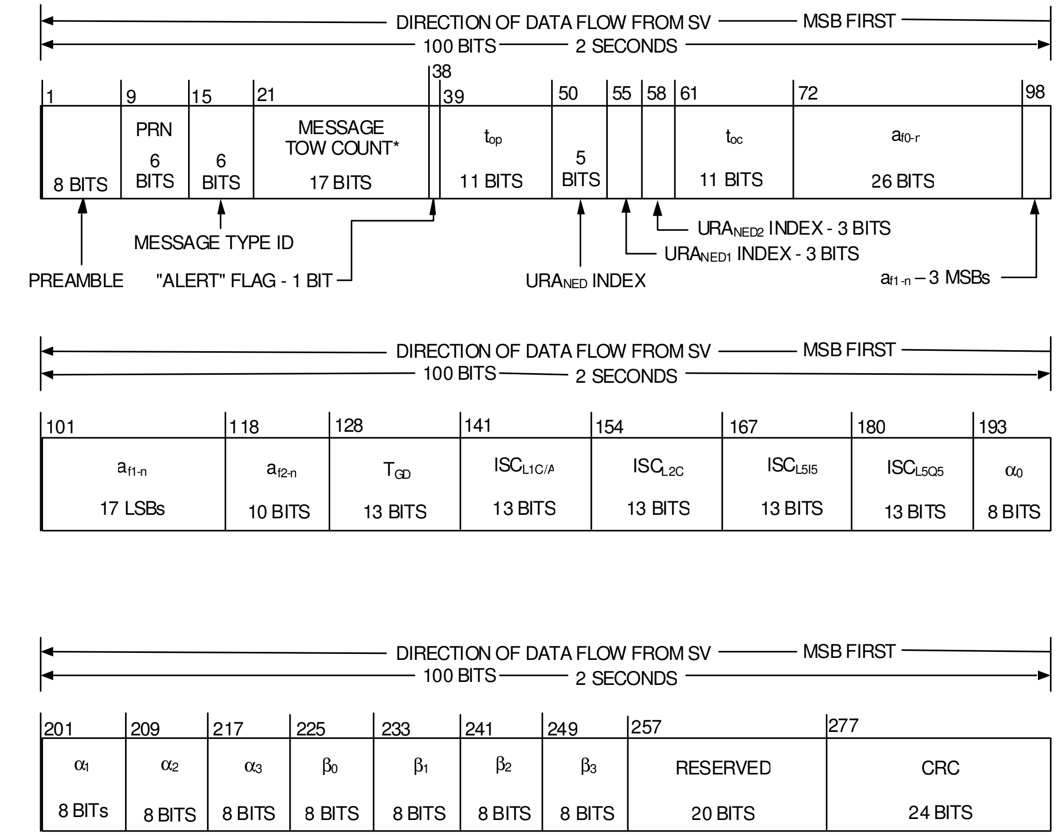
End of WAS/IS for IS-GPS-200E

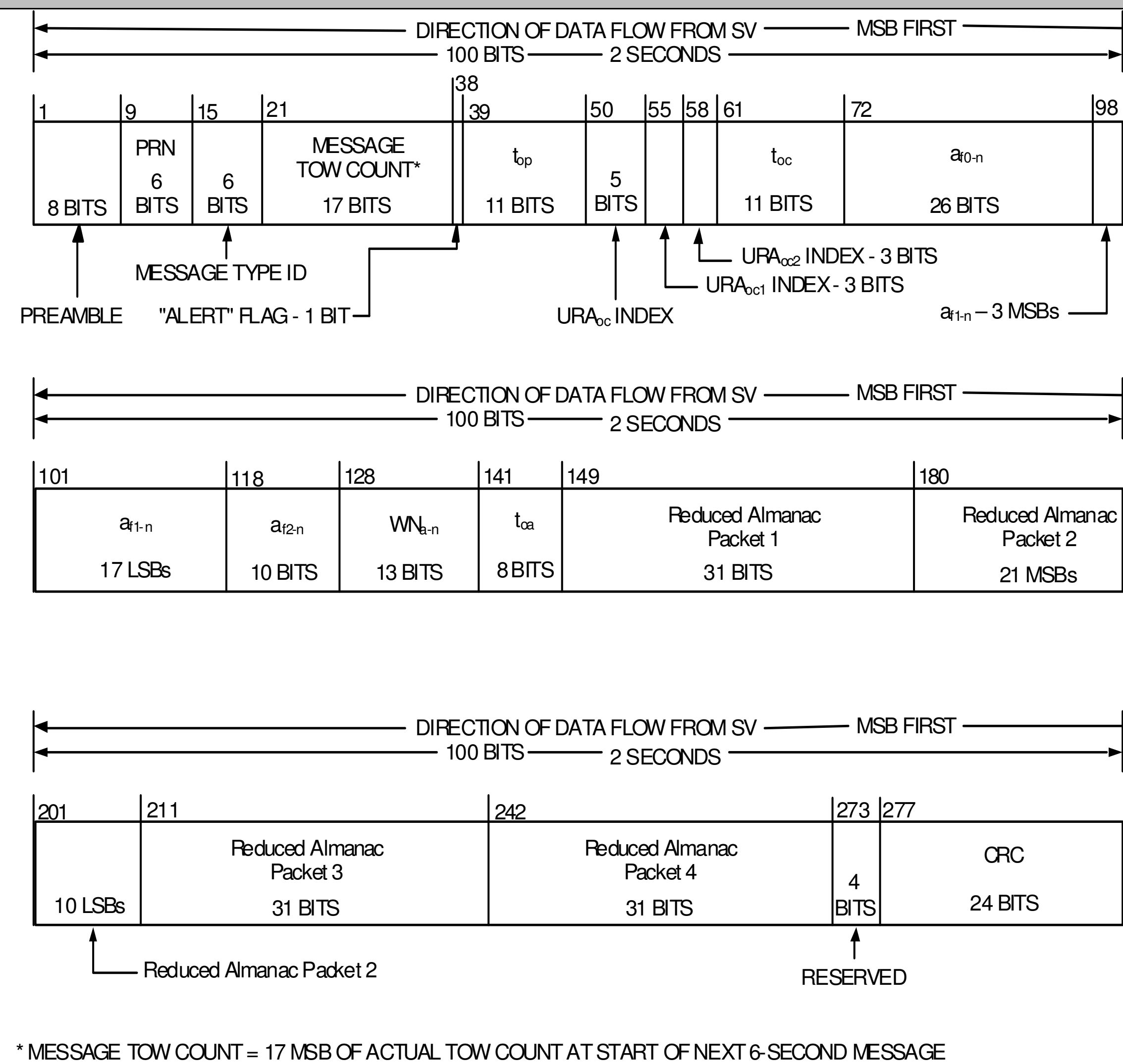
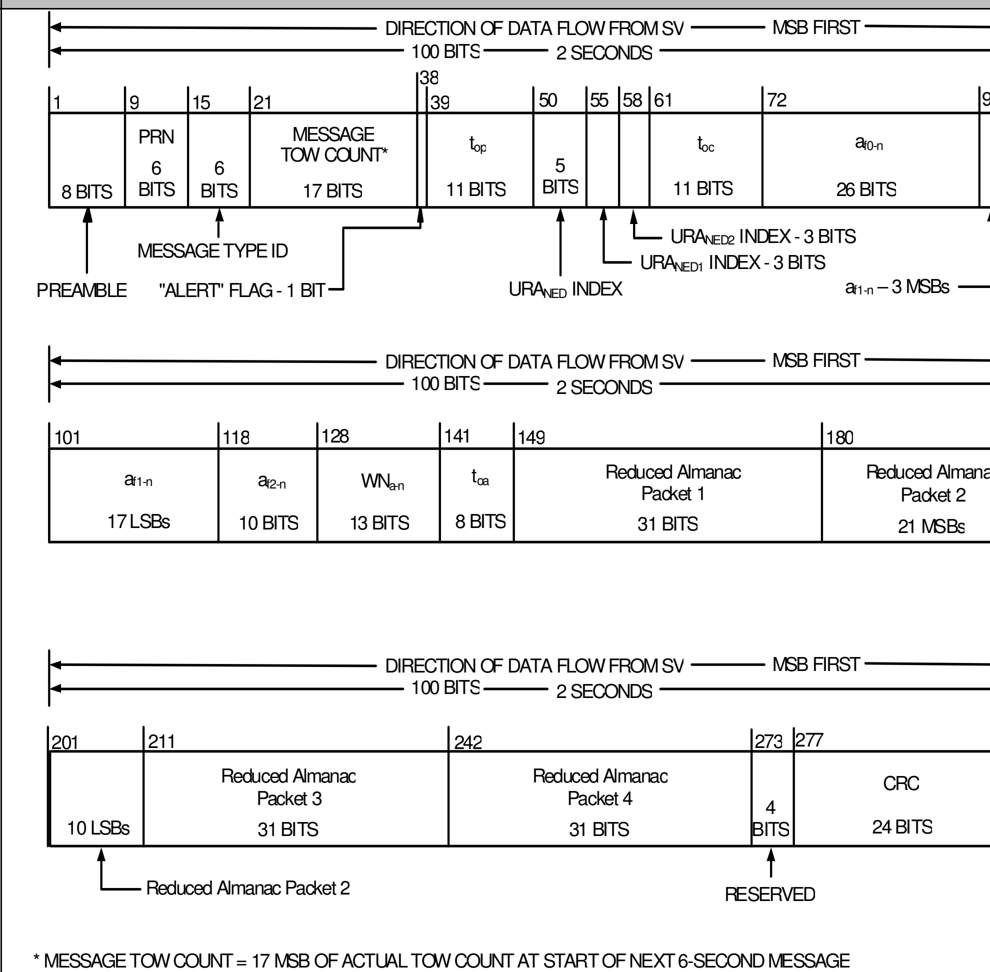
Start of WAS/IS for IS-GPS-705A Changes

Section Number	**IS-GPS-705 Rev A L5 SS and Nav User Segment Interfaces**	**Proposed Heading**	**URA Definition Proposed Text**	**Rationale**
20.3.3	Each message starts with an 8-bit preamble - 10001011, followed by a 6-bit PRN number of the transmitting SV, a 6-bit message type ID, with a range of 0 (000000) to 63 (111111), and the 17-bit message Time of Week (TOW) count. When the value of the message TOW count is multiplied by 6, it represents SV time in seconds at the start of the next 6-second message. An “alert” flag, when raised (bit 38 = “1”), indicates to the user that the SV User Range Accuracy (URA) and/or the SV User Differential Range Accuracy (UDRA) may be worse than indicated in the respective message types. For each default message (Message Type 0), bits 39 through 276 shall be alternating ones and zeros and the message shall contain a proper CRC parity block.		Each message starts with an 8-bit preamble - 10001011, followed by a 6-bit PRN number of the transmitting SV, a 6-bit message type ID with a range of 0 (000000) to 63 (111111), and the 17-bit message time of week (TOW) count. When the value of the message TOW count is multiplied by 6, it represents SV time in seconds at the start of the next 6-second message. An “alert” flag, when raised (bit 38 = “1”), indicates to the user that the signal-URA components may be worse than indicated in the associated-message types and that he shall use at his own risk. For each default message (Message Type 0), bits 39 through 276 shall be alternating ones and zeros and the message shall contain a proper CRC parity block.	Rationale #5- There are numerous inconsistencies between ICDs and clarifications and additions that are needed for the users to compute URA. These changes resolve the inconsistencies between the ICDs so that users may properly compute URA.

Section Number	IS-GPS-705 Rev A L5 SS and Nav User Segment Interfaces	Proposed Heading	URA Definition Proposed Text	Rationale
20.3.3	 Figure 20-1. Message type 10 - Ephemeris 1		 Figure 20-1. Message type 10 - Ephemeris 1	Rationale #1- URA_{oc} and URA_{oe} are redefined into an elevation-dependent component (URA_{ED}) and a non-elevation-dependent component (URA_{NED}). This will enable users to de-weight the elevation-angle-dependent component with the elevation angle of the SV, resulting in a smaller composite URA, in many cases. A smaller composite URA means higher availability for applications that have

Section Number	IS-GPS-705 Rev A L5 SS and Nav User Segment Interfaces	Proposed Heading	URA Definition Proposed Text	Rationale
				requirements for a minimum level of accuracy and/or integrity. In order to achieve a technical consensus on how to proceed forward with GPS IIIA deriving URA from the uploaded covariance, then the following changes were needed to the user ICDs.

Section Number	IS-GPS-705 Rev A L5 SS and Nav User Segment Interfaces	Proposed Heading	URA Definition Proposed Text	Rationale
20.3.3	 * MESSAGE TOW COUNT = 17 MSB OF ACTUAL TOW COUNT AT START OF NEXT 6-SECOND MESSAGE Figure 20-3. Message type 30 - Clock, IONO & Group Delay		 * MESSAGE TOW COUNT = 17 MSB OF ACTUAL TOW COUNT AT START OF NEXT 6-SECOND MESSAGE Figure 20-3. Message type 30 - Clock, IONO & Group Delay	Rationale #1

Section Number	IS-GPS-705 Rev A L5 SS and Nav User Segment Interfaces	Proposed Heading	URA Definition Proposed Text	Rationale
20.3.3	 Figure 20-4. Message type 31 - Clock & Reduced Almanac		 Figure 20-4. Message type 31 - Clock & Reduced Almanac	Rationale #1

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<tr><th>Section Number</th><th>IS-GPS-705 Rev A L5 SS and Nav User Segment Interfaces</th><th>Proposed Heading</th><th>URA Definition Proposed Text</th><th>Rationale</th></tr>
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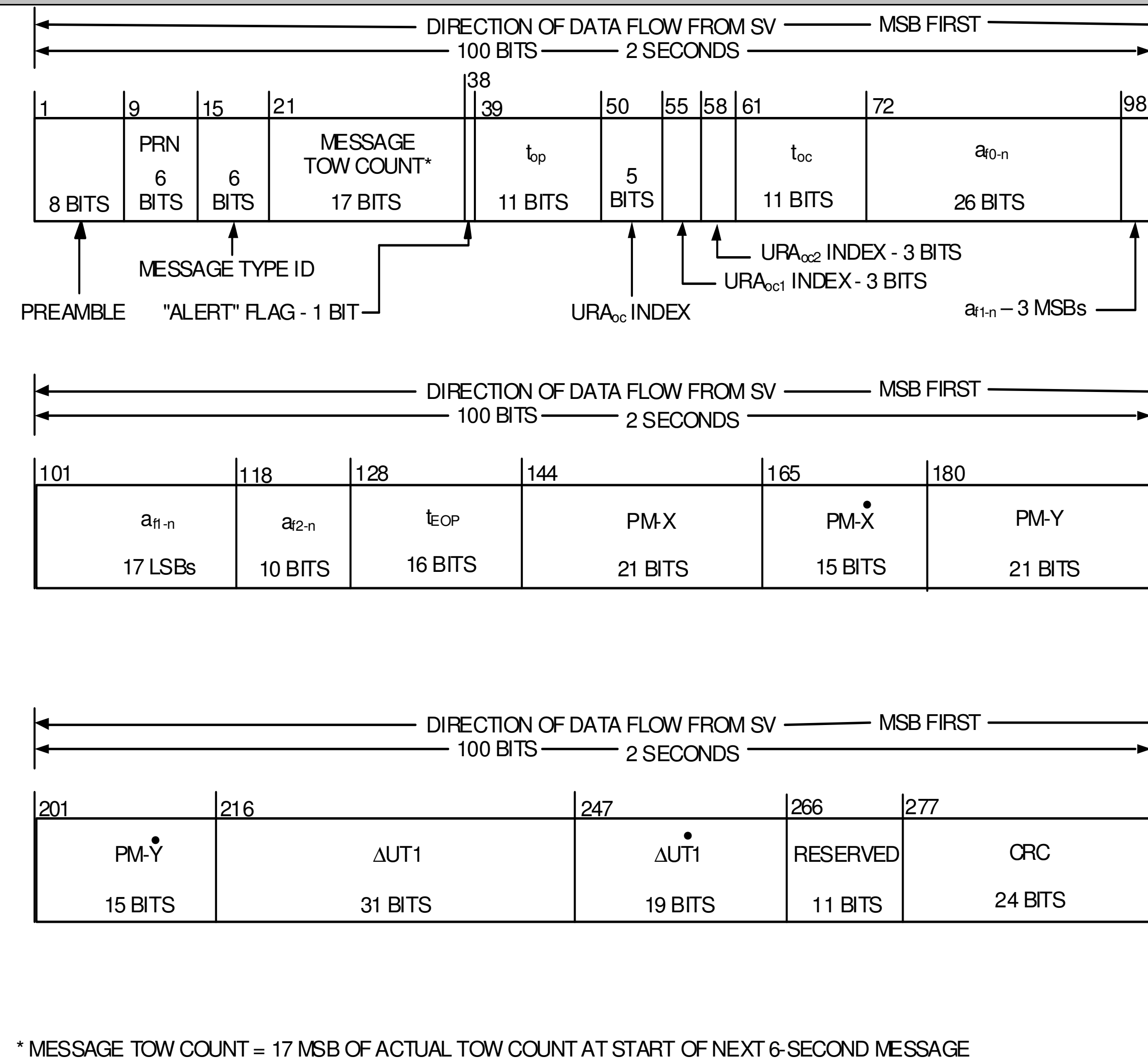


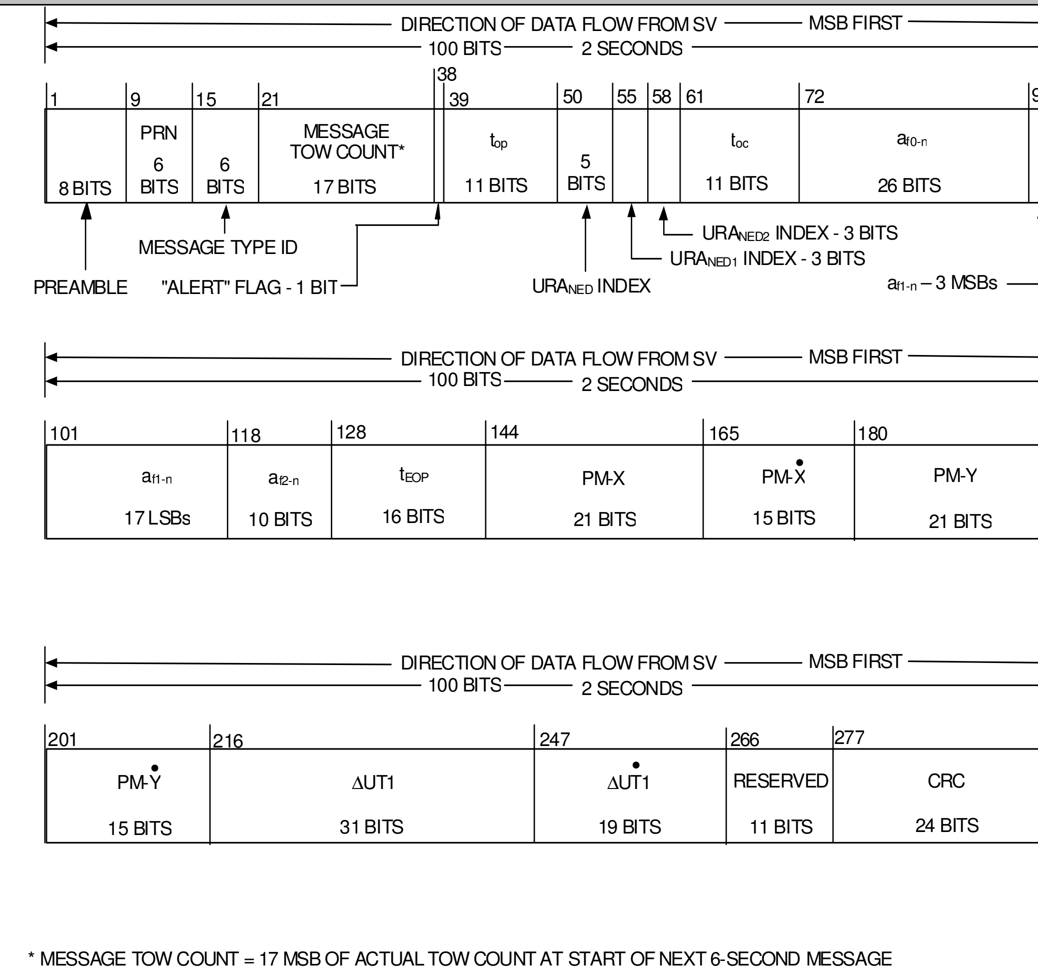
Figure 20-5. Message type 32 - Clock & EOP
</td><td></td><td>


Figure 20-5. Message type 32 - Clock & EOP
</td><td>Rationale #1</td></tr>
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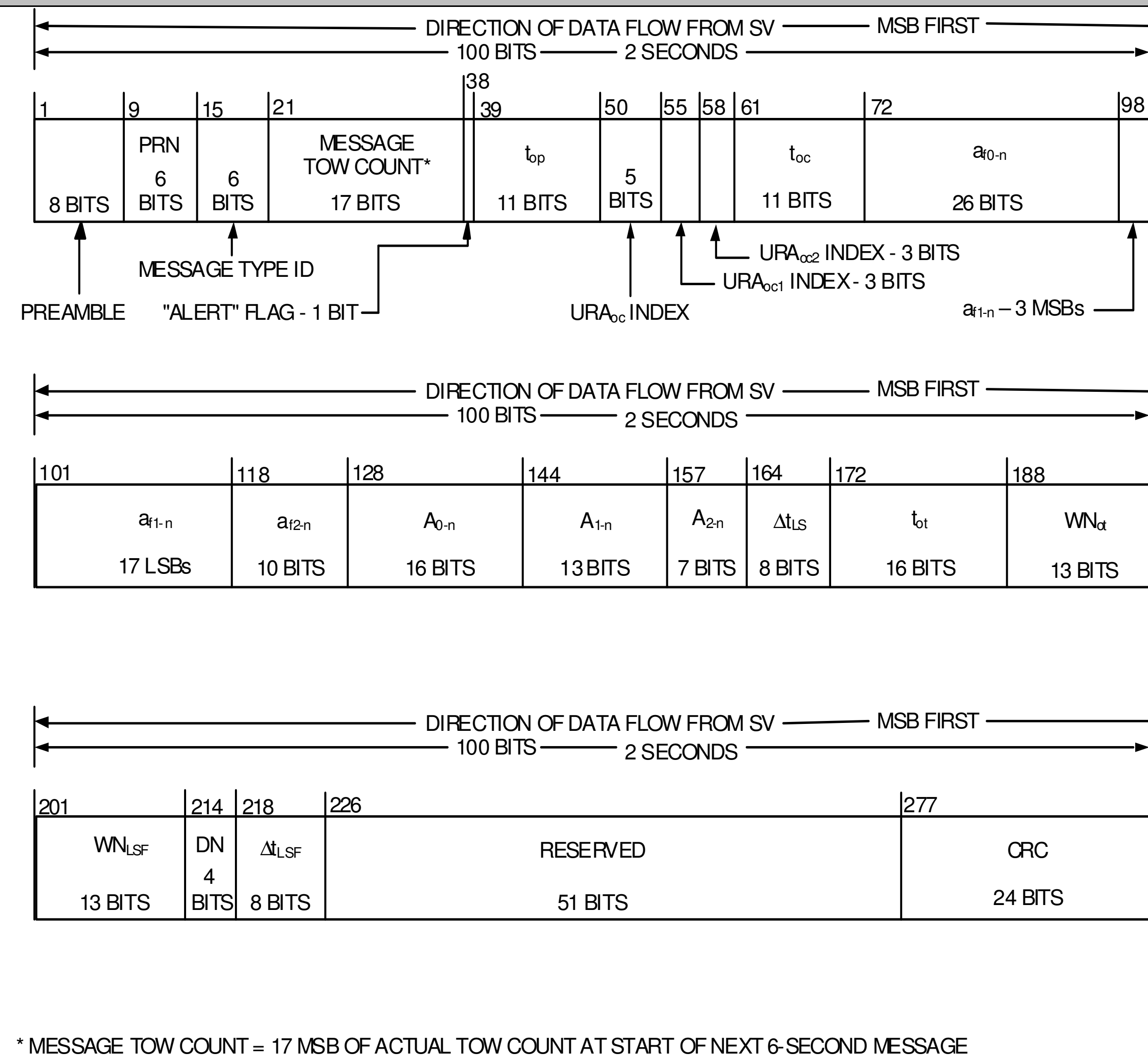


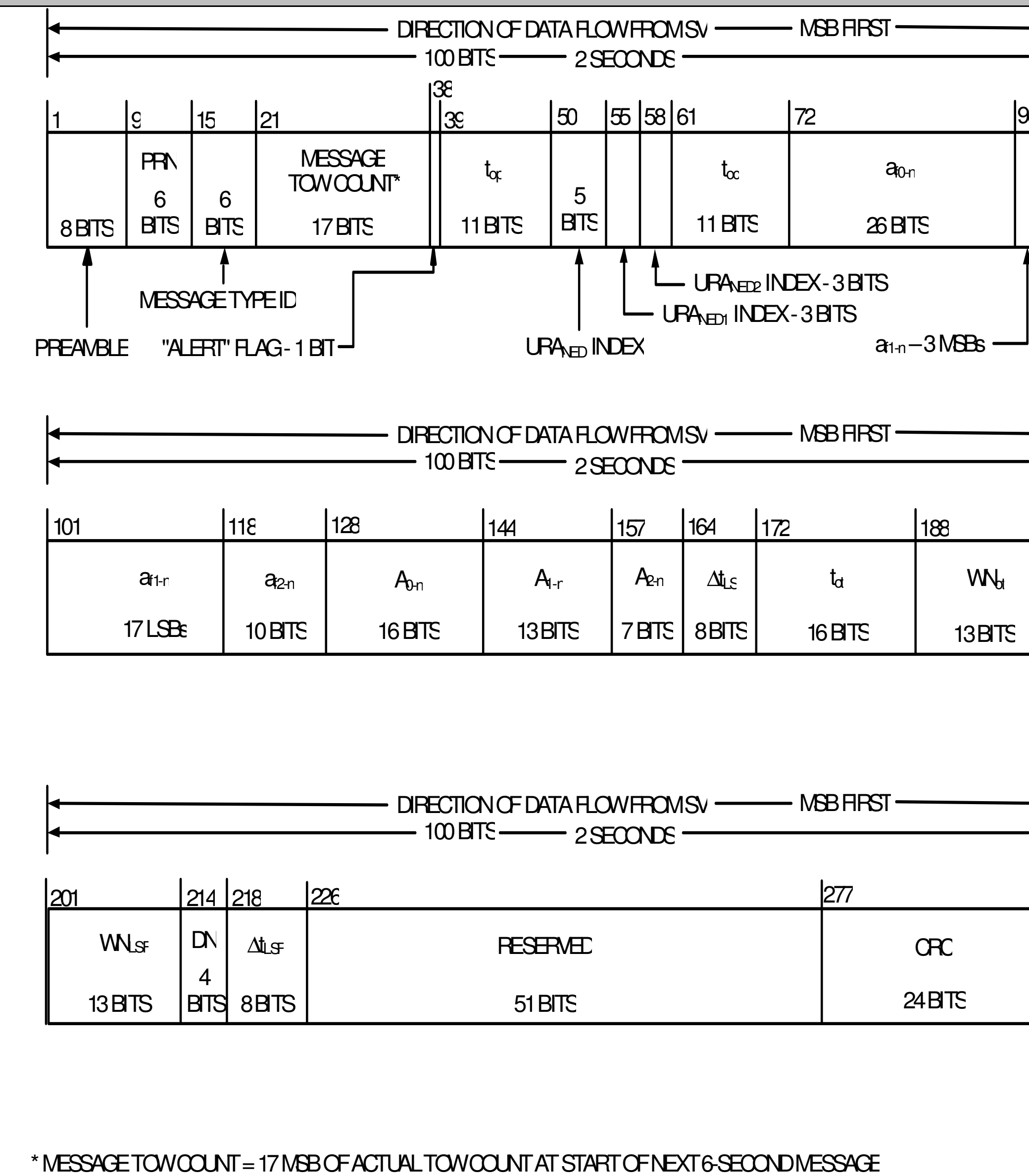
Figure 20-6. Message type 33 - Clock & UTC
</td><td></td><td>


Figure 20-6. Message type 33 - Clock & UTC
</td><td>Rationale #1</td></tr>
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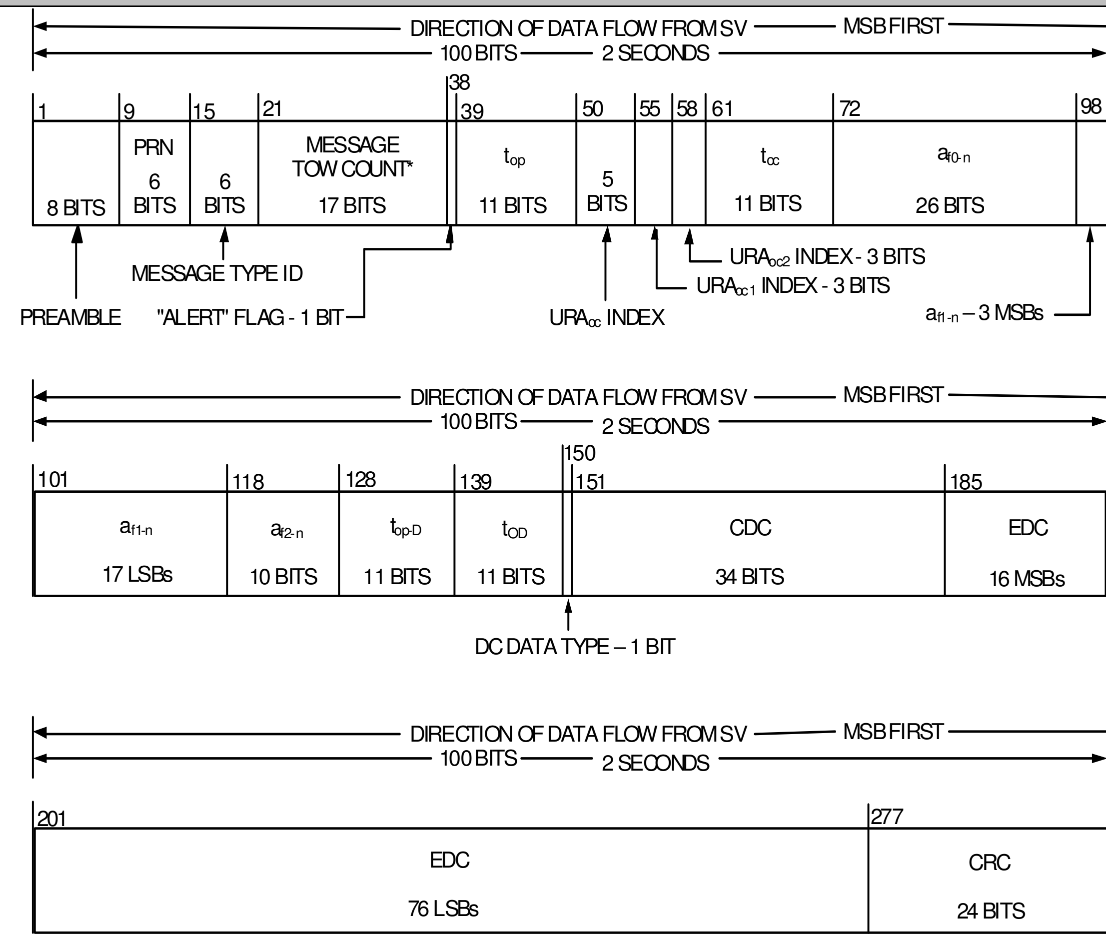
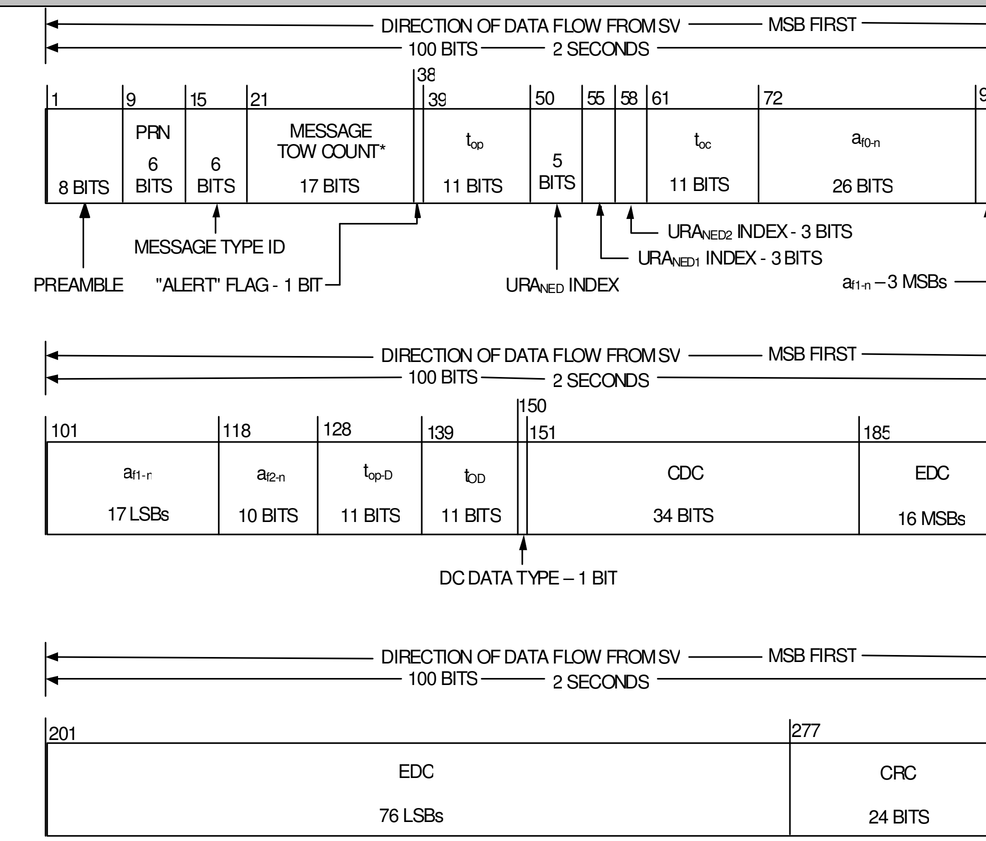
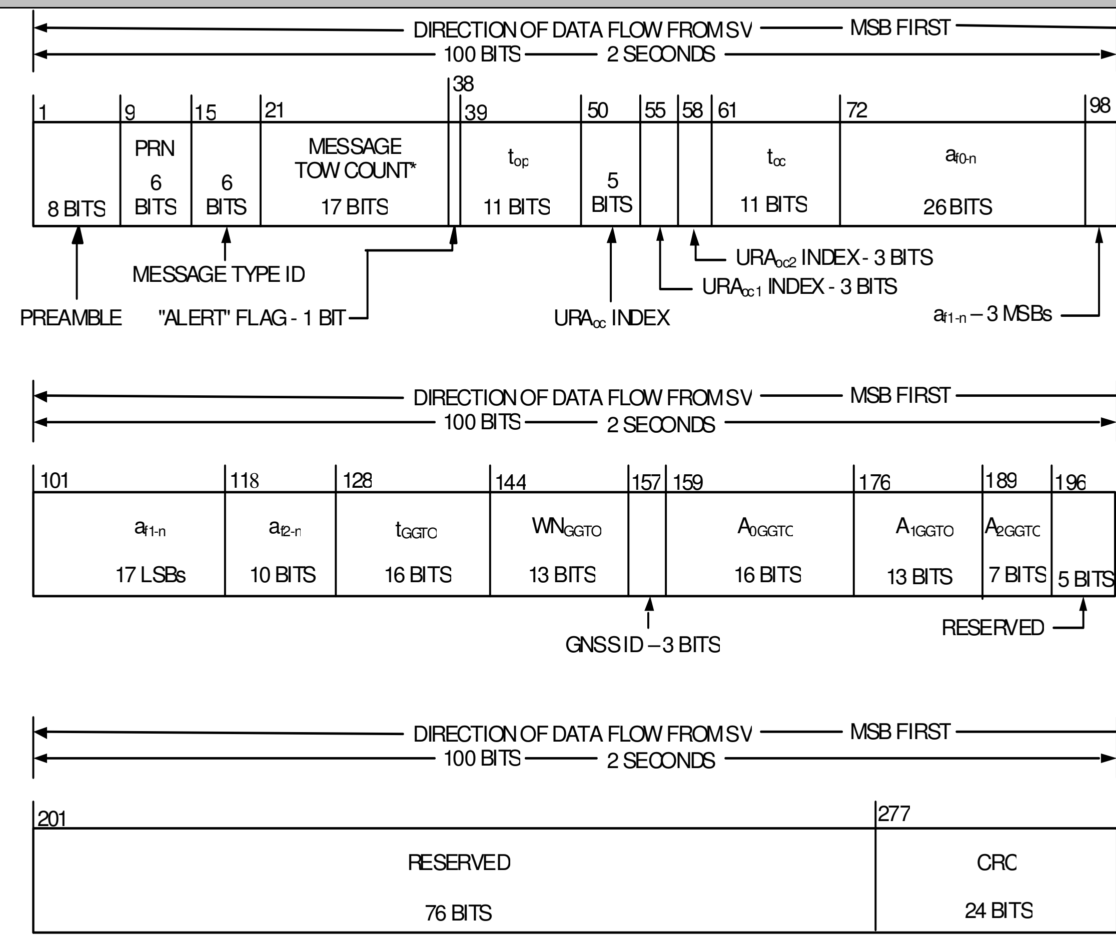
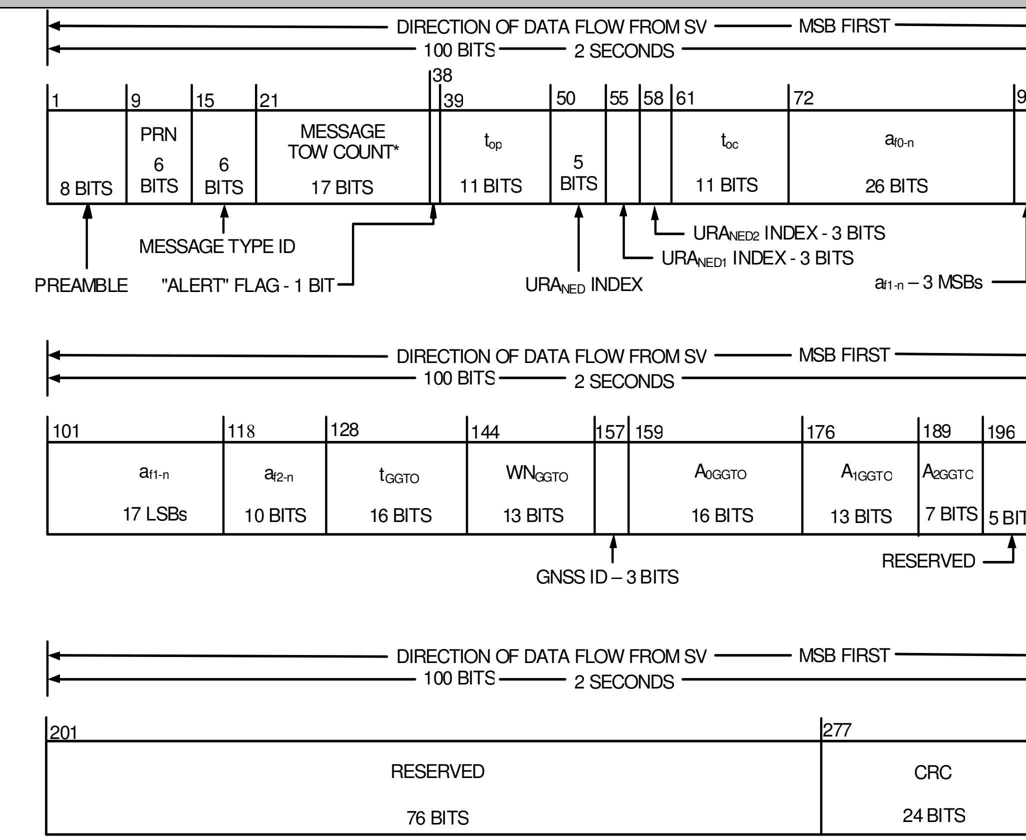
Section Number	IS-GPS-705 Rev A L5 SS and Nav User Segment Interfaces	Proposed Heading	URA Definition Proposed Text	Rationale
20.3.3	 * MESSAGE TOW COUNT = 17 MSB OF ACTUAL TOW COUNT AT START OF NEXT 6-SECOND MESSAGE CDC = Clock Differential Correction EDC = Ephemeris Differential Correction Figure 20-7. Message type 34 - Clock & Differential Correction		 * MESSAGE TOW COUNT = 17 MSB OF ACTUAL TOW COUNT AT START OF NEXT 6-SECOND MESSAGE CDC = Clock Differential Correction EDC = Ephemeris Differential Correction Figure 20-7. Message type 34 - Clock & Differential Correction	Rationale #1

Section Number	IS-GPS-705 Rev A L5 SS and Nav User Segment Interfaces	Proposed Heading	URA Definition Proposed Text	Rationale
20.3.3	 * MESSAGE TOW COUNT = 17 MSB OF ACTUAL TOW COUNT AT START OF NEXT 6-SECOND MESSAGE Figure 20-8. Message type 35 - Clock & GGTO		 * MESSAGE TOW COUNT = 17 MSB OF ACTUAL TOW COUNT AT START OF NEXT 6-SECOND MESSAGE Figure 20-8. Message type 35 - Clock & GGTO	Rationale #1

<table>
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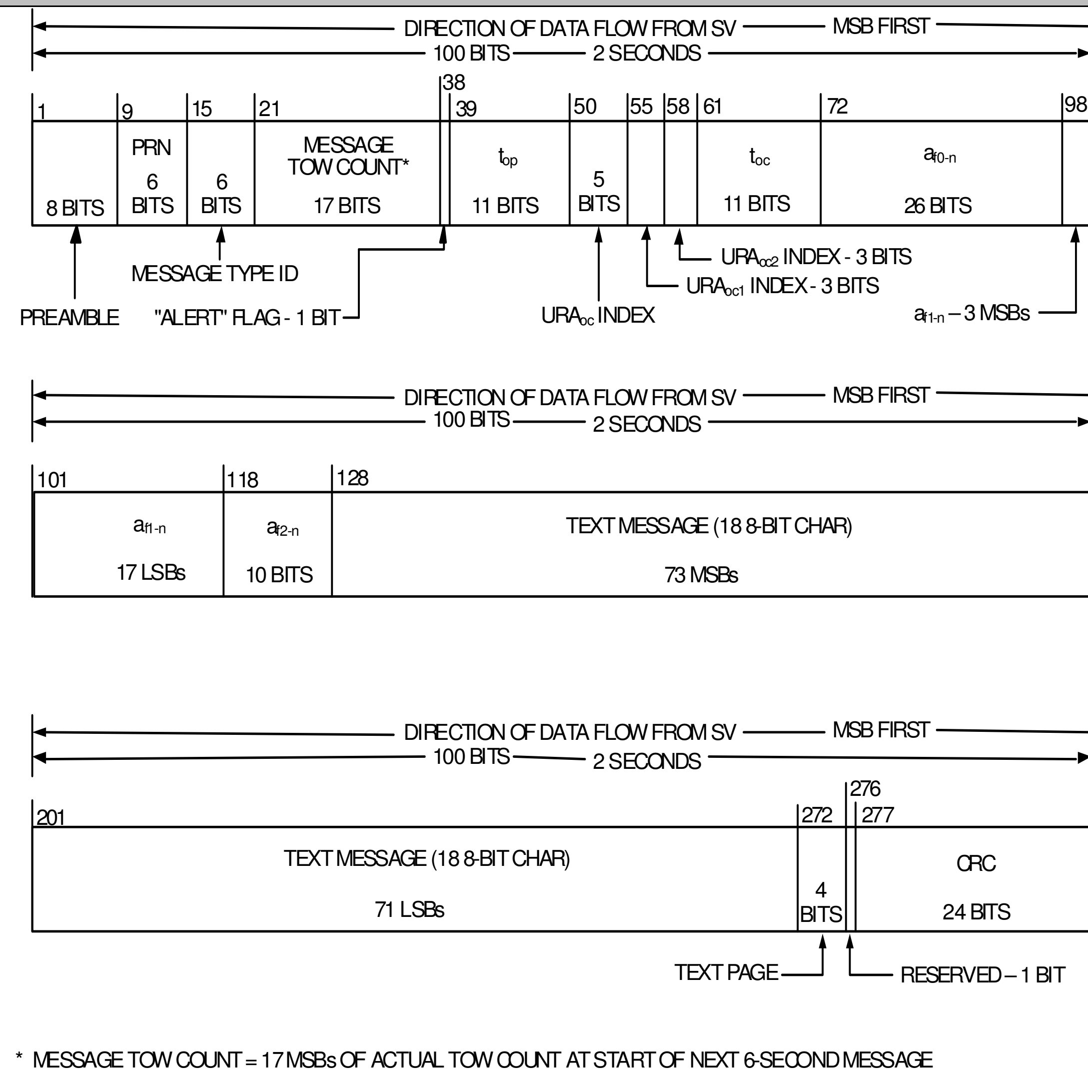


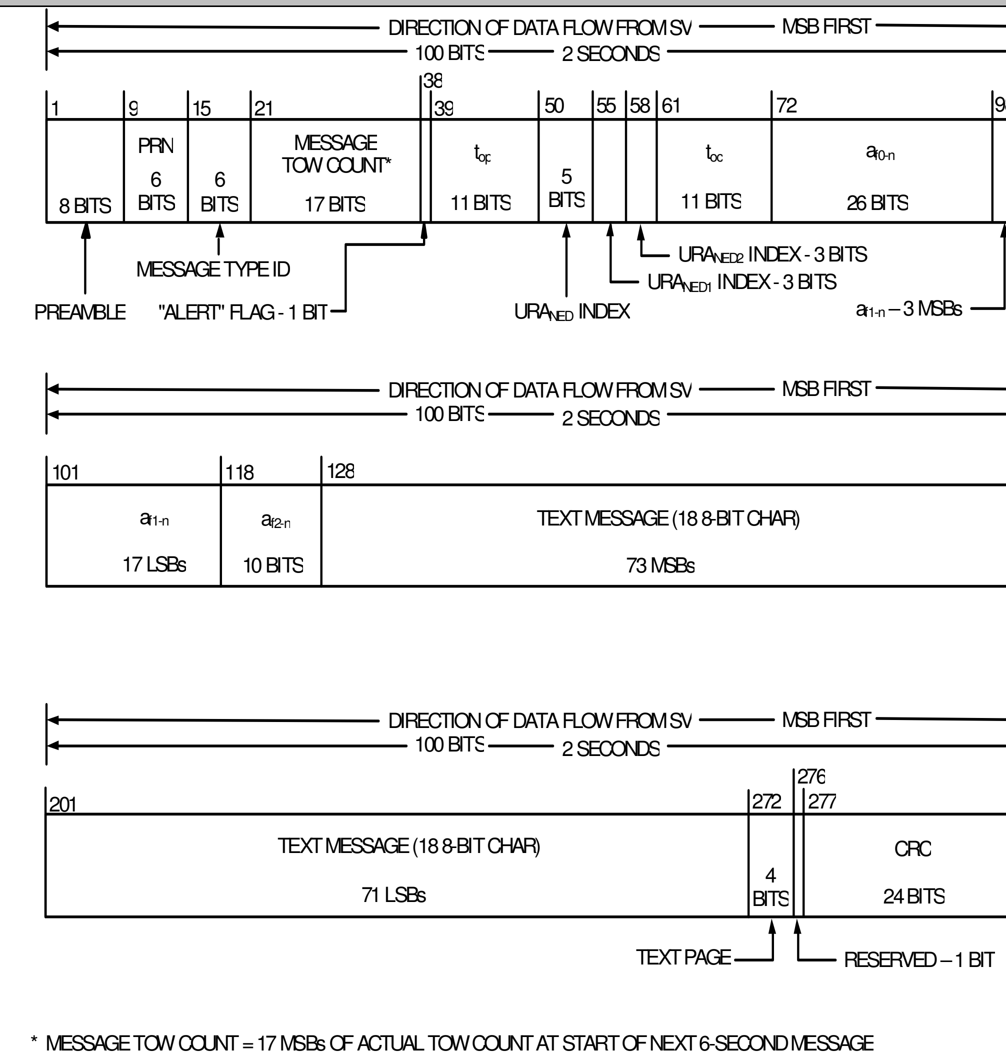
Figure 20-9. Message type 36 - Clock & Text
</td><td></td><td>


Figure 20-9. Message type 36 - Clock & Text
</td><td>Rationale #1</td></tr>
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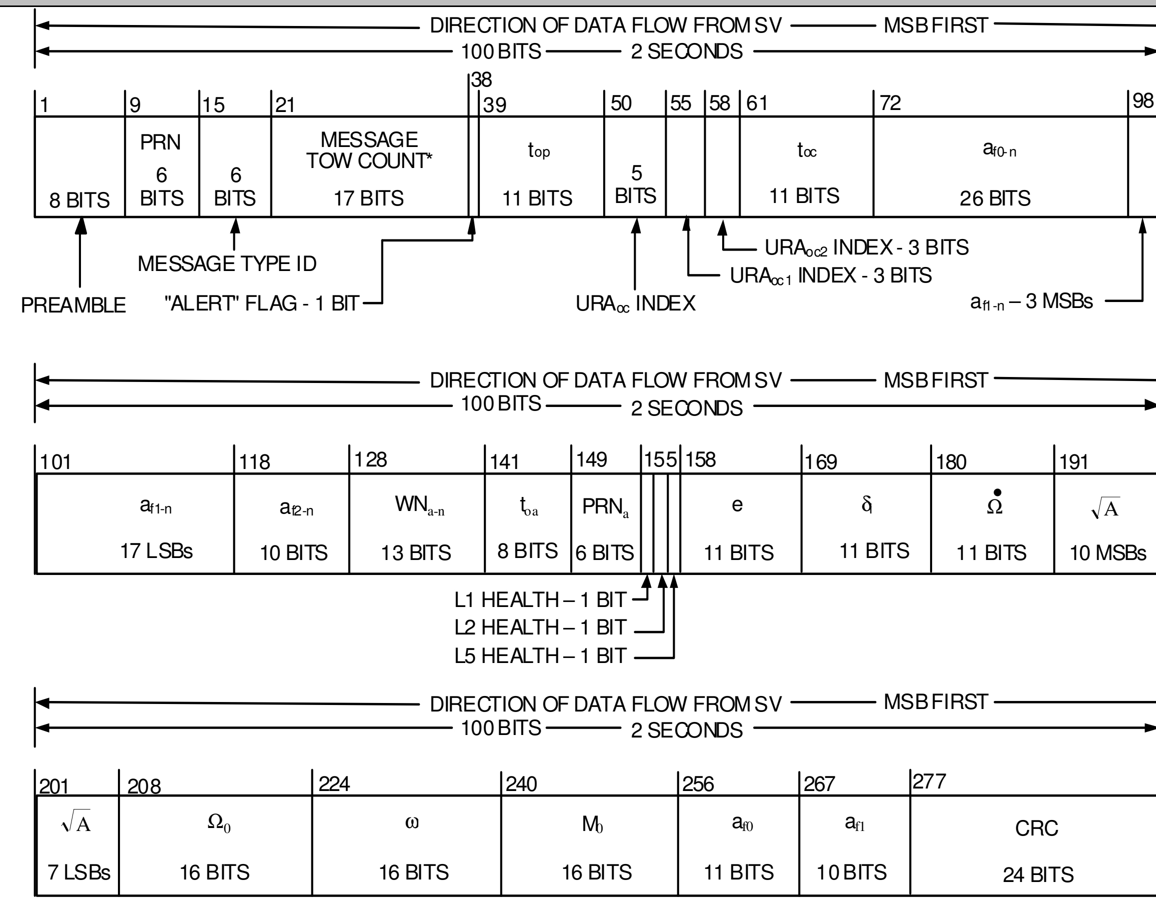
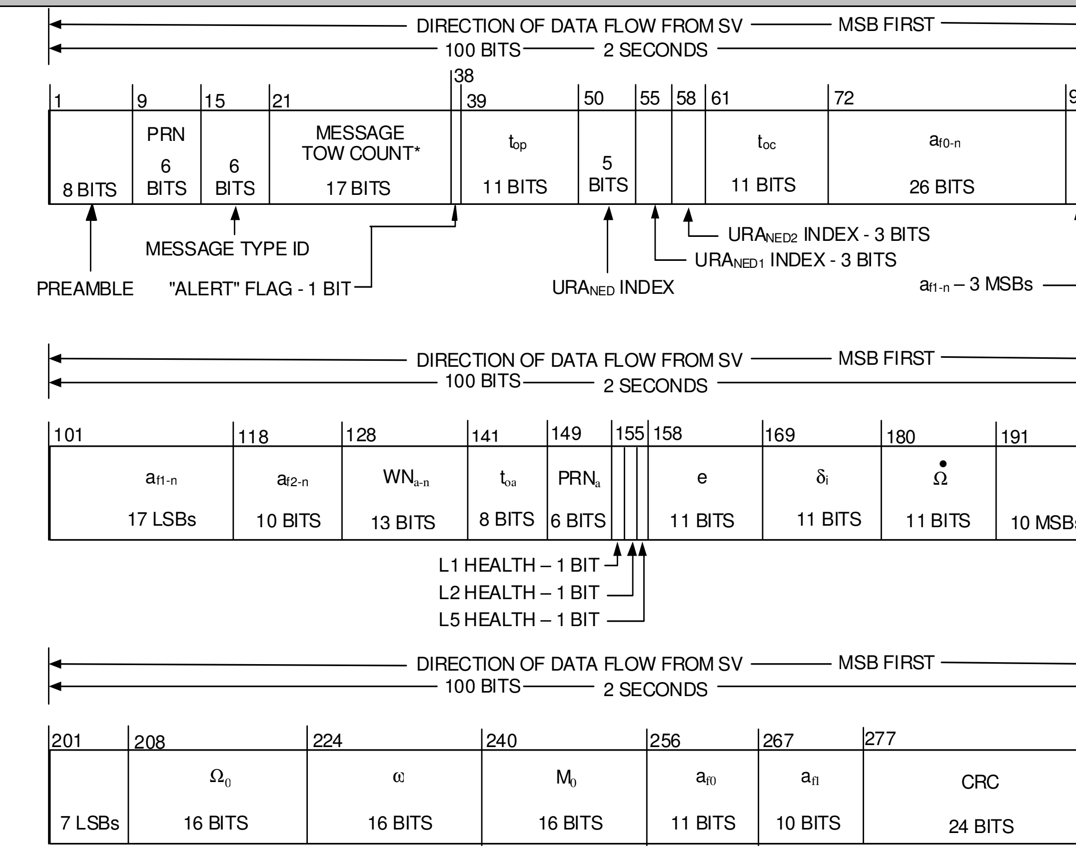
Section Number	IS-GPS-705 Rev A L5 SS and Nav User Segment Interfaces	Proposed Heading	URA Definition Proposed Text	Rationale
20.3.3	 * MESSAGE TOW COUNT = 17 MSBs OF ACTUAL TOW COUNT AT START OF NEXT 6-SECOND MESSAGE Figure 20-10. Message Type 37 - Clock & Midi Almanac		 * MESSAGE TOW COUNT = 17 MSBs OF ACTUAL TOW COUNT AT START OF NEXT 6-SECOND MESSAGE Figure 20-10. Message Type 37 - Clock & Midi Almanac	Rationale #1
20.3.3.1.1	The ephemeris parameters in the message type 10 and type 11 describe the orbit of the transmitting SV during the curve fit intervals of three hours. The nominal transmission interval is two hours, and shall coincide with the first two hours of the curve fit interval. The period of applicability for ephemeris data coincides with the entire three-hour curve fit interval. Table 20-I gives the definition of the orbital parameters using terminology typical of Keplerian orbital parameters; it is noted, however, that the transmitted parameter values are expressed such that they provide the best trajectory fit in Earth-Centered, Earth-Fixed (ECEF) coordinates for each specific fit interval. The user shall not interpret intermediate coordinate values as pertaining to any conventional coordinate		The ephemeris parameters in the message type 10 and type 11 describe the orbit of the transmitting SV during the curve fit interval of three hours. The nominal transmission interval is two hours, and shall coincide with the first two hours of the curve fit interval. The predicted period of applicability for ephemeris data coincides with the entire three-hour curve fit interval. Table 30-I gives the definition of the orbital parameters using terminology typical of Keplerian orbital parameters; it is noted, however, that the transmitted parameter values are expressed such that they provide the best trajectory fit in Earth-Centered, Earth-Fixed (ECEF) coordinates for each specific fit interval. The user shall not interpret	Rationale #1

Section Number	IS-GPS-705 Rev A L5 SS and Nav User Segment Interfaces	Proposed Heading	URA Definition Proposed Text	Rationale
	system.		intermediate coordinate values as pertaining to any conventional coordinate system. The t_{oe} term shall provide the user with a convenient means for detecting any change in the ephemeris representation parameters. The t_{oe} is provided in both message type 10 and 11 for the purpose of comparison with the t_{oc} term in message type 30 - 37. Whenever these three terms do not match, a data set cutover has occurred and new data must be collected. The timing of the t_{oe} and constraints on the t_{oc} and t_{oe} are defined in paragraph 20.3.4.4.	
20.3.3.1.1	Any change in the message type 10 and 11 ephemeris data will be accomplished with a simultaneous change in the t_{oe} value (t_{oe} =Ephemeris data reference time of week). The CS (Block IIF) or SV (Block IIIA) will ensure that the t_{oe} value, for at least the first data set transmitted by an SV after an upload, is different from that transmitted prior to the cutover. See Section 20.3.4.5 of IS-GPS-200 for additional information regarding t_{oe}.		Any change in the message type 10 and 11 ephemeris data will be accomplished with a simultaneous change in the t_{oe} value. The CS will assure the t_{oe} value for Block IIR-M/IIF and SS will assure the t_{oe} value for Block III, for at least the first data set transmitted by an SV after an upload, is different from that transmitted prior to the cutover. See Section 20.3.4.5 for additional information regarding t_{oe}.	Rationale #2- URA components (URA_{ED} and URA_{NED}) from different upload or fit intervals will not give a valid indication of signal accuracy or integrity. These changes provide clarification of how URA is computed by the user.
20.3.3.1.1	The CNAV message will contain information that allows users to operate when integrity is assured. This is accomplished using an integrity assured URA value in conjunction with an integrity status flag. The URA value is the RSS of URAoe and URAoc; URA is integrity assured to the enhanced level only when the integrity status flag is “1”.		The CNAV messages contain information that allows users to take advantage of situations when integrity is assured to the enhanced level. This is accomplished using a composite integrity assured URA value in conjunction with an integrity status flag. The composite integrity assured URA (IAURA) value is the RSS of an elevation-dependent function of the upper bound value of the URA_{ED} component and the upper bound value of the URA_{NED} component. The composite IAURA value is assured to the enhanced level only when the integrity status flag is “1”; otherwise the IAURA value is assured to the legacy level.	Rationale #1
20.3.3.1.1	Bit 272 of Message Type 10 is the Integrity Status Flag (ISF). A "0" in bit position 272 indicates that the conveying signal is provided with the legacy level of integrity assurance. That is, the probability that		Bit 272 of Message Type 10 is the Integrity Status Flag (ISF). A "0" in bit position 272 indicates that the conveying signal is provided with the legacy level of integrity assurance. That is, the	Rationale #1

Section Number	IS-GPS-705 Rev A L5 SS and Nav User Segment Interfaces	Proposed Heading	URA Definition Proposed Text	Rationale
	the instantaneous URE of the conveying signal exceeds 4.42 times the upper bound value of the current broadcast URA index, for more than 5.2 seconds, without an accompanying alert, is less than 1 x 10^{-5} per hour.		probability that the instantaneous URE of the conveying signal exceeds 4.42 times the current broadcast IAURA value, for more than 5.2 seconds, without an accompanying alert, is less than 1E-5 per hour.	
20.3.3.1.1	A "1" in bit-position 272 indicates that the conveying signal is provided with an enhanced level of integrity assurance. That is, the probability that the instantaneous URE of the conveying signal exceeds 5.73 times the upper bound value of the current broadcast URA index, for more than 5.2 seconds, without an accompanying alert, is less than 1 x 10^{-8} per hour. The probabilities associated with the nominal and lower bound values of the current broadcast URA index are not defined.		A "1" in bit-position 272 indicates that the conveying signal is provided with an enhanced level of integrity assurance. That is, the probability that the instantaneous URE of the conveying signal exceeds 5.73 times the current broadcast IAURA value, for more than 5.2 seconds, without an accompanying alert, is less than 1E-8 per hour. The probabilities associated with the nominal and lower bound values of the current broadcast URA_{ED} index, URA_{NED} indexes, and related URA values are not defined.	Rationale #1
20.3.3.1.1	In this context, an "alert" is defined as any indication or characteristic in the conveying signal, as specified elsewhere in this document, which signifies that the conveying signal may be invalid and should not be used, such as, not Operational-Healthy, Non-Standard Code, parity error, etc. In this context, the term URA refers to the composite URA, calculated as the root-sum-squared of the individual URA components in the conveying signal.		In this context, an "alert" is defined as any indication or characteristic of the conveying signal, as specified elsewhere in this document, which signifies to users that the conveying signal may be invalid or should not be used, such as the health bits not indicating operational-healthy, broadcasting non-standard code-parity error, etc.	Rationale #2
20.3.3.1.1 .4	*20.3.3.1.1.4 <u>SV Accuracy</u>.*	Elevation-Dependent (ED) Accuracy		
20.3.3.1.1 .4	Bits 66 through 70 of message type 10 shall contain the ephemeris User Range Accuracy (URA_{oe}) index of the SV for the unauthorized (non-Precise Positioning Service) user. The URA_{oe} index shall provide the ephemeris-related user range accuracy index of the SV as a function of the current ephemeris message curve fit interval. While the ephemeris-related URA may vary over the ephemeris message curve fit interval, the URA_{oe} index (N) in message type 10 shall correspond to the maximum URA_{oe} expected over the entire curve fit interval.		Bits 66 through 70 of message type 10 shall contain the elevation-dependent (ED) component User Range Accuracy (URA_{ED}) index for the standard positioning service user. The URA_{ED} index shall provide the ED-related URA index for the current ephemeris curve fit interval. While the ED-related URA may vary over the ephemeris curve fit interval and over the satellite footprint, the URA_{ED} index (N) in message type 10 shall correspond to the maximum URA_{ED} expected over the entire ephemeris curve fit interval for the worst-case location within the SV footprint (i.e., two points at the edge of the SV footprint). At the best-case location within the SV footprint (i.e., directly below the SV along the SV nadir vector), the corresponding URA_{ED}. is zero. The URA_{ED} index is a signed, two's complement integer in the range of +15 to -16 and has the following relationship to the ED URA:	Rationale #1
20.3.3.1.1 .4	The URA_{oe} index is a signed, two's complement integer in the range of +15 to -16 and has the following relationship to the ephemeris URA:		The UR_{ED} index is a signed, two's complement integer in the range of +15 to -16 and has the following relationship to the ED URA:	Rationale #1

<table>
<tr><th>Section Number</th><th>IS-GPS-705 Rev A L5 SS and Nav User Segment Interfaces</th><th>Proposed Heading</th><th>URA Definition Proposed Text</th><th>Rationale</th></tr>
<tr><td></td><td>URA_{oe} Index — URA_{oe} (meters)

15 — 6144.00 < URA_{oe}
14 — 3072.00 < URA_{oe} ≤ 6144.00
13 — 1536.00 < URA_{oe} ≤ 3072.00
12 — 768.00 < URA_{oe} ≤ 1536.00
11 — 384.00 < URA_{oe} ≤ 768.00
10 — 192.00 < URA_{oe} ≤ 384.00
9 — 96.00 < URA_{oe} ≤ 192.00
8 — 48.00 < URA_{oe} ≤ 96.00
7 — 24.00 < URA_{oe} ≤ 48.00
6 — 13.65 < URA_{oe} ≤ 24.00
5 — 9.65 < URA_{oe} ≤ 13.65
4 — 6.85 < URA_{oe} ≤ 9.65
3 — 4.85 < URA_{oe} ≤ 6.85
2 — 3.40 < URA_{oe} ≤ 4.85
1 — 2.40 < URA_{oe} ≤ 3.40
0 — 1.70 < URA_{oe} ≤ 2.40
-1 — 1.20 < URA_{oe} ≤ 1.70
-2 — 0.85 < URA_{oe} ≤ 1.20
-3 — 0.60 < URA_{oe} ≤ 0.85
-4 — 0.43 < URA_{oe} ≤ 0.60
-5 — 0.30 < URA_{oe} ≤ 0.43
-6 — 0.21 < URA_{oe} ≤ 0.30
-7 — 0.15 < URA_{oe} ≤ 0.21
-8 — 0.11 < URA_{oe} ≤ 0.15
-9 — 0.08 < URA_{oe} ≤ 0.11
-10 — 0.06 < URA_{oe} ≤ 0.08
-11 — 0.04 < URA_{oe} ≤ 0.06
-12 — 0.03 < URA_{oe} ≤ 0.04
-13 — 0.02 < URA_{oe} ≤ 0.03
-14 — 0.01 < URA_{oe} ≤ 0.02
-15 — URA_{oe} ≤ 0.01
-16 — No accuracy prediction available—use at own risk

Integrity properties of the URA are specified with respect to the upper bound values of the URA index (see 20.3.3.1.1)</td><td></td><td>URA_{ED} Index — URA_{ED} (meters)
15 — 6144.00 < URA_{ED} (or no accuracy prediction is available)
14 — 3072.00 < URA_{ED} = 6144.00
13 — 1536.00 < URA_{ED} = 3072.00
12 — 768.00 < URA_{ED} = 1536.00
11 — 384.00 < URA_{ED} = 768.00
10 — 192.00 < URA_{ED} = 384.00
9 — 96.00 < URA_{ED} = 192.00
8 — 48.00 < URA_{ED} = 96.00
7 — 24.00 < URA_{ED} = 48.00
6 — 13.65 < URA_{ED} = 24.00
5 — 9.65 < URA_{ED} = 13.65
4 — 6.85 < URA_{ED} = 9.65
3 — 4.85 < URA_{ED} = 6.85
2 — 3.40 < URA_{ED} = 4.85
1 — 2.40 < URA_{ED} = 3.40
0 — 1.70 < URA_{ED} = 2.40
-1 — 1.20 < URA_{ED} = 1.70
-2 — 0.85 < URA_{ED} = 1.20
-3 — 0.60 < URA_{ED} = 0.85
-4 — 0.43 < URA_{ED} = 0.60
-5 — 0.30 < URA_{ED} = 0.43
-6 — 0.21 < URA_{ED} = 0.30
-7 — 0.15 < URA_{ED} = 0.21
-8 — 0.11 < URA_{ED} = 0.15
-9 — 0.08 < URA_{ED} = 0.11
-10 — 0.06 < URA_{ED} = 0.08
-11 — 0.04 < URA_{ED} = 0.06
-12 — 0.03 < URA_{ED} = 0.04
-13 — 0.02 < URA_{ED} = 0.03
-14 — 0.01 < URA_{ED} = 0.02
-15 — URA_{ED} = 0.01
-16 — No accuracy prediction available—use at own risk

For each URA_{ED} index (N), users may compute a nominal URA_{ED} value (X) as given by:</td><td></td></tr>
</table>

Section Number	IS-GPS-705 Rev A L5 SS and Nav User Segment Interfaces	Proposed Heading	URA Definition Proposed Text	Rationale
			• If the value of N is 6 or less, but more than -16, X = 2(1 + N/2), • If the value of N is 6 or more, but less than 15, X = 2(N - 2), • N = -16 or N = 15 shall indicate the absence of an accuracy prediction and shall advise the standard positioning service user to use that SV at his own risk. For N = 1, 3, and 5, X should be rounded to 2.8, 5.7, and 11.3 meters, respectively. The nominal URA_{ED} value (X) is suitable for use as a conservative prediction of the RMS ED range errors for accuracy-related purposes in the pseudorange domain (e.g., measurement deweighting, RAIM, FOM computations). Integrity properties of the $IAURA_{ED}$ are specified with respect to the scaled (multiplied by either 4.42 or 5.73 as appropriate) upper bound values of the broadcast URA_{ED} index (see 230.3.3.1.1). For the nominal URA_{ED} value and the $IAURA_{ED}$ value, users may compute an adjusted URA_{ED} value as a function of SV elevation angle (E) as follows: Adjusted Nominal URA_{ED} = Nominal URA_{ED} (sin(E+90 degrees)) Adjusted $IAURA_{ED}$ = $IAURA_{ED}$ (sin(E+90 degrees)) URA_{ED} and $IAURA_{ED}$ account for SIS contributions to user range error which include, but are not limited to, the following: LSB representation/truncation error, alongtrack ephemeris errors, and crosstrack ephemeris errors. URA_{ED} and $IAURA_{ED}$ do not account for user range error contributions due to the inaccuracy of the broadcast ionospheric data parameters used in the single-frequency ionospheric model or for other atmospheric effects.	

Section Number	IS-GPS-705 Rev A L5 SS and Nav User Segment Interfaces	Proposed Heading	URA Definition Proposed Text	Rationale
20.3.3.1.3	Table 20-I. Message Types 10 and 11 Parameters (1 of 2)		Table 20-I. Message Types 10 and 11 Parameters (1 of 2)	Rationale #1

IS-GPS-705 Rev A L5 SS and Nav User Segment Interfaces:

Table 20-I. Message Types 10 and 11 Parameters (1 of 2)

Parameter Symbol	Parameter Description	No. of Bits**	Scale Factor (LSB)	Effective Range***	Units
WN	Week No.	13	1		weeks
URA_{oe} INDEX	SV accuracy	5*			(see text)
Signal health (L1/L2/L5)		3	1		(see text)
t_{op}	Data predict time of week	11	300	604,500	seconds
?A ****	Semi-major axis difference at reference time	26*	2^{-9}		meters
$\dot{A}$	Change rate in semi-major axis	25*	2^{-21}		meters/sec
? n_0	Mean Motion difference from computed value at reference time	17*	2^{-44}		semi-circles/sec
? $\dot{n}_0$	Rate of mean motion difference from computed value	23*	2^{-57}		semi-circles/sec^2
M_{0-n}	Mean anomaly at reference time	33*	2^{-32}		semi-circles
e_n	Eccentricity	33	2^{-34}	0.03	dimensionless
ω_n	Argument of perigee	33*	2^{-32}		semi-circles

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

** See Figure 20-1 for complete bit allocation in message type 10;

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

**** Relative to A_{REF} = 26,559,710 meters.

URA Definition Proposed Text:

Table 20-I. Message Types 10 and 11 Parameters (1 of 2)

Parameter Symbol	Parameter Description	No. of Bits**	Scale Factor (LSB)	Effective Range***	Units
WN	Week No.	13	1		weeks
URA_{ED} INDEX	ED accuracy	5*			(see text)
Signal health (L1/L2/L5)		3	1		(see text)
t_{op}	Data predict time of week	11	300	604,500	seconds
?A ****	Semi-major axis difference at reference time	26*	2^{-9}		meters
$\dot{A}$	Change rate in semi-major axis	25*	2^{-21}		meters/sec
? n_0	Mean Motion difference from computed value at reference time	17*	2^{-44}		semi-circles/sec
? $\dot{n}_0$	Rate of mean motion difference from computed value	23*	2^{-57}		semi-circles/sec^2
M_{0-n}	Mean anomaly at reference time	33*	2^{-32}		semi-circles
e_n	Eccentricity	33	2^{-34}	0.03	dimensionless
ω_n	Argument of perigee	33*	2^{-32}		semi-circles

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

** See Figure 20-1 for complete bit allocation in message type 10;

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

**** Relative to A_{REF} = 26,559,710 meters.

<table>
<tr><th>Section Number</th><th>IS-GPS-705 Rev A L5 SS and Nav User Segment Interfaces</th><th>Proposed Heading</th><th>URA Definition Proposed Text</th><th>Rationale</th></tr>
<tr><td>20.3.3.2.3</td><td>
<table>
<tr><th colspan="6">Table 20-III. Clock Correction and Accuracy Parameters</th></tr>
<tr><th>Parameter Symbol</th><th>Parameter Description</th><th>No. of Bits**</th><th>Scale Factor (LSB)</th><th>Effective Range***</th><th>Units</th></tr>
<tr><td>t_{oc}</td><td>Clock Data Reference Time of Week</td><td>11</td><td>300</td><td>604,500</td><td>seconds</td></tr>
<tr><td>URA_{oc} Index</td><td>SV Clock Accuracy Index</td><td>5*</td><td></td><td></td><td>(see text)</td></tr>
<tr><td>URA_{oc1} Index</td><td>SV Clock Accuracy Change Index</td><td>3</td><td></td><td></td><td>(see text)</td></tr>
<tr><td>URA_{oc2} Index</td><td>SV Clock Accuracy Change Rate Index</td><td>3</td><td></td><td></td><td>(see text)</td></tr>
<tr><td>a_{f2-n}</td><td>SV Clock Drift Rate Correction Coefficient</td><td>10*</td><td>2^{-60}</td><td></td><td>sec/sec^2</td></tr>
<tr><td>a_{f1-n}</td><td>SV Clock Drift Correction Coefficient</td><td>20*</td><td>2^{-48}</td><td></td><td>sec/sec</td></tr>
<tr><td>a_{f0-n}</td><td>SV Clock Bias Correction Coefficient</td><td>26*</td><td>2^{-35}</td><td></td><td>seconds</td></tr>
<tr><td colspan="6">* Parameters so indicated are two's complement, with the sign bit (+ or -) occupying the MSB;
** See Figures 20-3 through 20-10 for complete bit allocation in message types 30 to 37;
*** Unless otherwise indicated in this column, effective range is the maximum range attainable with indicated bit allocation and scale factor.</td></tr>
</table>
</td><td></td><td>
<table>
<tr><th colspan="6">Table 20-III. Clock Correction and Accuracy Parameters</th></tr>
<tr><th>Parameter Symbol</th><th>Parameter Description</th><th>No. of Bits**</th><th>Scale Factor (LSB)</th><th>Effective Range***</th><th>Units</th></tr>
<tr><td>t_{oc}</td><td>Clock Data Reference Time of Week</td><td>11</td><td>300</td><td>604,500</td><td>seconds</td></tr>
<tr><td>URA_{NED} Index</td><td>NED Accuracy Index</td><td>5*</td><td></td><td></td><td>(see text)</td></tr>
<tr><td>URA_{NED1} Index</td><td>NED Accuracy Change Index</td><td>3</td><td></td><td></td><td>(see text)</td></tr>
<tr><td>URA_{NED2} Index</td><td>NED Accuracy Change Rate Index</td><td>3</td><td></td><td></td><td>(see text)</td></tr>
<tr><td>a_{f2-n}</td><td>SV Clock Drift Rate Correction Coefficient</td><td>10*</td><td>2^{-60}</td><td></td><td>sec/sec^2</td></tr>
<tr><td>a_{f1-n}</td><td>SV Clock Drift Correction Coefficient</td><td>20*</td><td>2^{-48}</td><td></td><td>sec/sec</td></tr>
<tr><td>a_{f0-n}</td><td>SV Clock Bias Correction Coefficient</td><td>26*</td><td>2^{-35}</td><td></td><td>seconds</td></tr>
<tr><td colspan="6">* Parameters so indicated are two's complement, with the sign bit (+ or -) occupying the MSB;
** See Figures 20-3 through 20-10 for complete bit allocation in message types 30 to 37;
*** Unless otherwise indicated in this column, effective range is the maximum range attainable with indicated bit allocation and scale factor.</td></tr>
</table>
</td><td>Rationale #1</td></tr>
<tr><td>20.3.3.2.4</td><td>20.3.3.2.4 SV Clock Accuracy Estimates.</td><td>Non-Elevation-Dependent (NED) Accuracy Estimates</td><td></td><td></td></tr>
<tr><td>20.3.3.2.4</td><td>Bits 50 through 54, and 55 through 57, and 58 through 60 of message types 30 through 37 shall contain the URA_{oc} Index, URA_{oc1} Index, and URA_{oc2} Index, respectively, of the SV (reference paragraph 6.2.1) for the unauthorized user. The URA_{oc} Index together with URA_{oc1} Index and URA_{oc2} Index shall give the clock-related user range accuracy of the SV as a function of time since the prediction (top) used to generate the uploaded clock correction polynomial terms.</td><td></td><td>Bits 50 through 54, and 55 through 57, and 58 through 60 of message types 30 through 37 shall contain the non-elevation-dependent (NED) component URA_{NED0} Index,URA_{NED1} Index, and URA_{NED2} Index, respectively, of the SV (reference paragraph 6.2.1) for the unauthorized user. The following equations together with the broadcast URA_{NED0} Index, URA_{NED1} Index, and URA_{NED2} Index shall give the clock-related user range accuracy of-$IAURA_{NED}$ over the current clock/ephemeris fit interval. While the actual NED-related URA may vary over the satellite footprint, the $IAURA_{NED}$ calculated using the parameters in message type 10 at each instant during the current clock/ephemeris fit interval shall bound the maximum $IAURA_{NED}$ expected</td><td>Rationale #5</td></tr>
</table>

Section Number	IS-GPS-705 Rev A L5 SS and Nav User Segment Interfaces	Proposed Heading	URA Definition Proposed Text	Rationale
			for the worst-case location within the satellite footprint at that instant.	
20.3.3.2.4	The user shall calculate the clock-related URA with the equation (in meters); $URA_{oc} = URA_{ocb} + URA_{oc1}\ (t-t_{op})$ for $t-t_{op} \leq 93{,}600$ seconds $URA_{oc} = URA_{ocb} + URA_{oc1}\ (t-t_{op}) + URA_{oc2}\ (t-t_{op}-93{,}600)^2$ for $t-t_{op} > 93{,}600$ seconds where t = GPS time (must account for beginning or end of week crossovers), t_{op} = time of week of the state estimate utilized for the prediction of satellite clock correction parameters.		The user shall calculate the NED-related URA with the following equations (in meters); $IAURA_{NED} = URA_{NED0} + URA_{NED1}\ (t - t_{op})$ for $t-t_{op} < 93{,}600$ seconds $IAURA_{NED} = URA_{NED0} + URA_{NED1}\ (t - t_{op}) + URA_{NED2}\ (t - t_{op} - 93{,}600)^2$ for $t-t_{op} > 93{,}600$ seconds where t = GPS time (must account for beginning or end of week crossovers), t_{op} = time of week of the state estimate utilized for the prediction of satellite clock ephemeris parameters.	Rationale #1
20.3.3.2.4	The CS shall derive URA_{ocb} at time t_{op} which, when used together with URA_{oc1} and URA_{oc2} in the above equations, results in the minimum URA_{oc} that is greater than the predicted URA_{oc} during the entire duration up to 14 days after t_{op}.		The CS shall derive URA_{NED0}, URA_{NED1}, and URA_{NED2} indexes which, when used together in the above equations, results in the minimum $IAURA_{NED}$ that is greater than the predicted $IAURA_{NED}$ during the /ephemeris fit interval.	Rationale #1
20.3.3.2.4	The user shall use the broadcast URA_{oc} Index to derive $URA_{ocb.}$ The index is a signed, two's complement integer in the range of +15 to -16 and has the following relationship to the clock-related user derived URA_{ocb}:		The user shall use the broadcast URA_{NED0} index to derive the URA_{NED0} value. The URA_{NED0} index is a signed, two's complement integer in the range of +15 to -16 and has the following relationship to the URA_{NED0} value:	Rationale #1

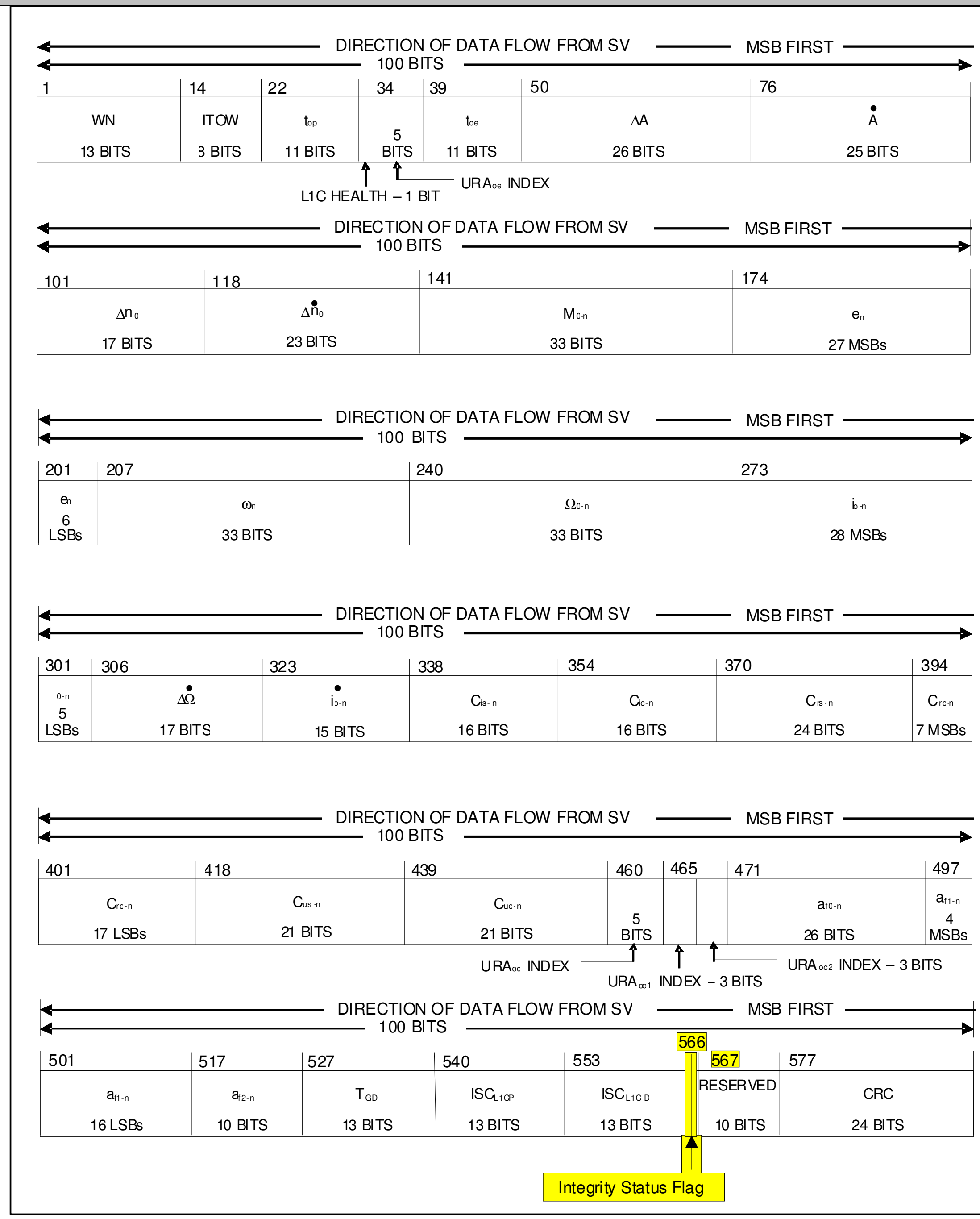
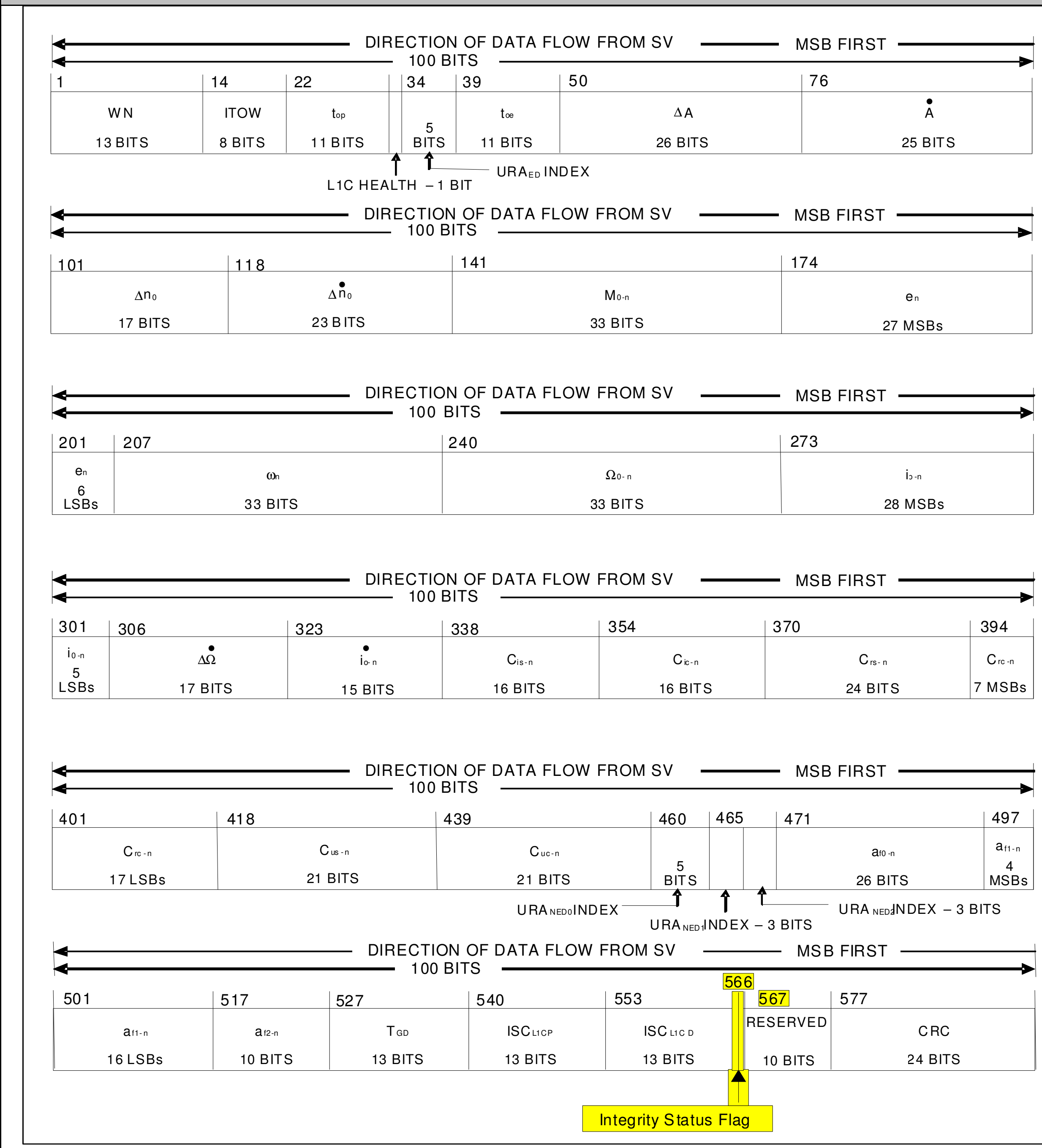
Section Number	IS-GPS-705 Rev A L5 SS and Nav User Segment Interfaces	Proposed Heading	URA Definition Proposed Text	Rationale
20.3.3.2.4	URA_{oc} Index URA_{ocb} (meters) 15 6144.00 < URA_{ocb} 14 3072.00 < URA_{ocb} ≤ 6144.00 13 1536.00 < URA_{ocb} ≤ 3072.00 12 768.00 < URA_{ocb} ≤ 1536.00 11 384.00 < URA_{ocb} ≤ 768.00 10 192.00 < URA_{ocb} ≤ 384.00 9 96.00 < URA_{ocb} ≤ 192.00 8 48.00 < URA_{ocb} ≤ 96.00 7 24.00 < URA_{ocb} ≤ 48.00 6 13.65 < URA_{ocb} ≤ 24.00 5 9.65 < URA_{ocb} ≤ 13.65 4 6.85 < URA_{ocb} ≤ 9.65 3 4.85 < URA_{ocb} ≤ 6.85 2 3.40 < URA_{ocb} ≤ 4.85 1 2.40 < URA_{ocb} ≤ 3.40 0 1.70 < URA_{ocb} ≤ 2.40 -1 1.20 < URA_{ocb} ≤ 1.70 -2 0.85 < URA_{ocb} ≤ 1.20 -3 0.60 < URA_{ocb} ≤ 0.85 -4 0.43 < URA_{ocb} ≤ 0.60 -5 0.30 < URA_{ocb} ≤ 0.43 -6 0.21 < URA_{ocb} ≤ 0.30 -7 0.15 < URA_{ocb} ≤ 0.21 -8 0.11 < URA_{ocb} ≤ 0.15 -9 0.08 < URA_{ocb} ≤ 0.11 -10 0.06 < URA_{ocb} ≤ 0.08 -11 0.04 < URA_{ocb} ≤ 0.06 -12 0.03 < URA_{ocb} ≤ 0.04 -13 0.02 < URA_{ocb} ≤ 0.03 -14 0.01 < URA_{ocb} ≤ 0.02 -15 URA_{ocb} ≤ 0.01 -16 No accuracy prediction available—use at own risk Integrity properties of the URA are specified with respect to the upper bound values of the UR 20.3.3.1.1).		URA_{NED0} Index URA_{NED0} (meters) 15 6144.00 < URA_{NED0} (or no accuracy prediction is available) 14 3072.00 < URA_{NED0} = 6144.00 13 1536.00 < URA_{NED0} = 3072.00 12 768.00 < URA_{NED0} = 1536.00 11 384.00 < URA_{NED0} = 768.00 10 192.00 < URA_{NED0} = 384.00 9 96.00 < URA_{NED0} = 192.00 8 48.00 < URA_{NED0} = 96.00 7 24.00 < URA_{NED0} = 48.00 6 13.65 < URA_{NED0} = 24.00 5 9.65 < URA_{NED0} = 13.65 4 6.85 < URA_{NED0} = 9.65 3 4.85 < URA_{NED0} = 6.85 2 3.40 < URA_{NED0} = 4.85 1 2.40 < URA_{NED0} = 3.40 0 1.70 < URA_{NED0} = 2.40 -1 1.20 < URA_{NED0} = 1.70 -2 0.85 < URA_{NED0} = 1.20 -3 0.60 < URA_{NED0} = 0.85 -4 0.43 < URA_{NED0} = 0.60 -5 0.30 < URA_{NED0} = 0.43 -6 0.21 < URA_{NED0} = 0.30 -7 0.15 < URA_{NED0} = 0.21 -8 0.11 < URA_{NED0} = 0.15 -9 0.08 < URA_{NED0} = 0.11 -10 0.06 < URA_{NED0} = 0.08 -11 0.04 < URA_{NED0} = 0.06 -12 0.03 < URA_{NED0} = 0.04 -13 0.02 < URA_{NED0} = 0.03 -14 0.01 < URA_{NED0} = 0.02 -15 URA_{NED0} = 0.01 -16 No accuracy prediction available—use at own risk Integrity properties of the URA are specified with respect to the upper bound values of the URA 20.3.3.1.1).	Rationale #1

Section Number	IS-GPS-705 Rev A L5 SS and Nav User Segment Interfaces	Proposed Heading	URA Definition Proposed Text	Rationale
20.3.3.2.4	The user may use the upper bound value in the URA_{ocb} range corresponding to the broadcast index, thereby calculating the maximum URA_{oc} that is equal to or greater than the CS predicted URA_{oc}, or the user may use the lower bound value in the range which will provide the minimum URA_{oc} that is equal to or less than the CS predicted URA_{oc}. The transmitted URA_{oc1} Index is an integer value in the range 0 to 7. URA_{oc1} Index has the following relationship to the URA_{oc1}: $URA_{oc1} = \frac{1}{2^N}$ (meters/second) where N = 4 + URA_{oc1} Index The transmitted URA_{oc2} Index is an integer value in the range 0 to 7. URA_{oc2} Index has the following relationship to the URA_{oc2}. $URA_{oc2} = \frac{1}{2^N}$ (meters/second/second) where N = 25 + URA_{oc2} Index		For each URA_{NED0} index (N), users may compute a nominal URA_{NED0} value (X) as given by: • If the value of N is 6 or less, but more than -16, X = $2^{(1 + N/2)}$, • If the value of N is 6 or more, but less than 15, X = $2^{(N - 2)}$, • N = -16 or N = 15 shall indicate the absence of an accuracy prediction and shall advise the standard positioning service user to use that SV at his own risk. For N = 1, 3, and 5, X should be rounded to 2.8, 5.7, and 11.3 meters, respectively. The nominal URA_{NED0} value (X) shall be suitable for use as a conservative prediction of the RMS NED range errors for accuracy-related purposes in the pseudorange domain (e.g., measurement de-weighting RAIM, FOM computations). Integrity properties of the $IAURA_{NED}$ are specified with respect to the scaled (multiplied by either 4.42 or 5.73 as appropriate) upper bound values of the URA_{NED0} index, URA_{NED1} index, and URA_{NED2} index (see 20.3.3.1.1). URA_{NED0} accounts for zeroth order SIS-contributions to user range error which include, but are not limited to, the following: LSB representation/truncation error; the net effect of clock correction polynomial error and code phase error in the transmitted signal for single-frequency L1C/A or single-frequency L2C users who correct the code phase as described in Section 20.3.3.3.1.1.1; the net effect of clock parameter, code phase, and inter-signal correction error for dual-frequency L1/L2 and L1/L5 users who correct for group delay and ionospheric effects as described in Section 20.3.3.3.1.1.2; radial ephemeris error; anisotropic antenna errors; and signal deformation error. URA_{NED} does not account for user range contributions due to the inaccuracy of the broadcast ionospheric data parameters used in the single-frequency ionospheric model or for other atmospheric effects. The transmitted URA_{NED1} index is an integer value in the range 0 to 7. The URA_{NED1} index has the following relationship to the URA_{NED1} value: $URA_{NED1} = \frac{1}{2^N}$ (meters/second) where N = 14 + URA_{NED1} Index. The transmitted URA_{NED2} index is an integer value in the range 0 to 7. URA_{NED2} index has the following relationship to the URA_{NED2}:	Rationale #3- There is a typo that needs be corrected in computing URA, or all user URA values will be far too large. Using the erroneous value will result in a minimum value of URA_{oc1} that will prevent the Space and Control segments from meeting their specified performance requirements.

Section Number	IS-GPS-705 Rev A L5 SS and Nav User Segment Interfaces	Proposed Heading	URA Definition Proposed Text	Rationale
			$URA_{NED2} = = \frac{1}{2^N}$ (meters/second^2) where N = 28 + URA_{NED2} Index.	
20.3.4.4	***20.3.4.4***	Data Sets		
20.3.4.4			The t_{oe} shall be equal to the t_{oc} of the same CNAV data set. The following rules govern the transmission of t_{oe} and t_{oc} values in different data sets: (1) The transmitted t_{oc} will be different from any value transmitted by the SV during the preceding seven days; (2) The transmitted toe will be different from any value transmitted by the SV during the preceding six hours. Cutovers to new data sets will occur only on hour boundaries except for the first data set of a new upload. The first data set may be cut-in (reference paragraph 30.3.4.1) at any time during the hour and therefore may be transmitted by the SV for less than one hour. The start of the transmission interval for each data set corresponds to the beginning of the curve fit interval for the data set. Each data set remains valid for the duration of its transmission interval, and nominally also remains valid for the duration of its curve fit interval. A data set is rendered invalid before the end of its curve fit interval when it is superseded by the SV cutting over to the first data set of a new upload. Normal Operations. The message type 10, 11, and 30-37 data sets are transmitted by the SV for periods of two hours. The corresponding curve fit interval is three hours.	Rationale #2
20.3.4.5	***20.3.4.5***	Reference Times		
20.3.4.5			The LNAV reference time information in paragraph 20.3.4.5 in IS-GPS-200 also applies to the CNAV reference times.	Rationale #1

End of WAS/IS for IS-GPS-705A

Start of WAS/IS for IS-GPS-800A Changes

Section Number	IS-GPS-800 Rev A Navstar GPS Space Segment/User Segment L1C Interface	Proposed Heading	URA Definition Proposed Text	Rationale
3.5.2			 Figure 3.5-1. Subframe 2 - Clock, Ephemeris, ITOW	Rationale #1- URA_{oc} and URA_{oe} are redefined into an elevation-dependent component (URA_{ED}) and a non-elevation-dependent component (URA_{NED}). This will enable users to de-weight the elevation-angle-dependent component with the elevation angle of the SV, resulting in a smaller composite URA, in many cases. A smaller composite URA means higher availability for applications that have requirements for a minimum

Section Number	IS-GPS-800 Rev A Navstar GPS Space Segment/User Segment L1C Interface	Proposed Heading	URA Definition Proposed Text	Rationale
	Figure 3.5-1. Subframe 2 - Clock, Ephemeris, ITOW			level of accuracy and/or integrity. In order to achieve a technical consensus on how to proceed forward with GPS IIIA deriving URA from the uploaded covariance, then the following changes were needed to the user ICDs.

Section Number	IS-GPS-800 Rev A Navstar GPS Space Segment/User Segment L1C Interface	Proposed Heading	URA Definition Proposed Text	Rationale
3.5.3				Rationale #1

IS-GPS-800 Rev A Navstar GPS Space Segment/User Segment L1C Interface:

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

	Parameter	No. of Bits**	Scale Factor (LSB)	Effective Range***	Units
WN	Week No.	13	1		weeks
ITOW	Interval time of week	8		83	(see text)
t_{op}	Data predict time of week	11	300	604,500	seconds
L1C health		1			(see text)
URA_{oe} Index	SV ephemeris accuracy index	5*			(see text)
t_{oe}	Ephemeris/clock data reference time of week	11	300	604,500	seconds
?A ****	Semi-major axis difference at reference time	26*	2^{-9}		meters
$\dot{A}$	Change rate in semi-major axis	25*	2^{-21}		meters/sec
? n_0	Mean Motion difference from computed value at reference time	17*	2^{-44}		semi-circles/sec
? $\dot{n}_0$	Rate of mean motion difference from computed value	23*	2^{-57}		semi-circles/sec^2
M_{0-n}	Mean anomaly at reference time	33*	2^{-32}		semi-circles
e_n	Eccentricity	33	2^{-34}		dimensionless
ω_n	Argument of perigee	33*	2^{-32}		semi-circles

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

URA Definition Proposed Text:

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

	Parameter	No. of Bits**	Scale Factor (LSB)	Effective Range***	Units
WN	Week No.	13	1		weeks
ITOW	Interval time of week	8		83	(see text)
t_{op}	Data predict time of week	11	300	604,500	seconds
L1C health		1			(see text)
URA_{ED} Index	ED accuracy index	5*			(see text)
t_{oe}	Ephemeris/clock data reference time of week	11	300	604,500	seconds
?A ****	Semi-major axis difference at reference time	26*	2^{-9}		meters
$\dot{A}$	Change rate in semi-major axis	25*	2^{-21}		meters/sec
? n_0	Mean Motion difference from computed value at reference time	17*	2^{-44}		semi-circles/sec
? $\dot{n}_0$	Rate of mean motion difference from computed value	23*	2^{-57}		semi-circles/sec^2
M_{0-n}	Mean anomaly at reference time	33*	2^{-32}		semi-circles
e_n	Eccentricity	33	2^{-34}		dimensionless
ω_n	Argument of perigee	33*	2^{-32}		semi-circles

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

<table>
<tr><th>Section Number</th><th>IS-GPS-800 Rev A Navstar GPS Space Segment/User Segment L1C Interface</th><th>Proposed Heading</th><th>URA Definition Proposed Text</th><th>Rationale</th></tr>
<tr><td>3.5.3</td><td>
<table>
<tr><th colspan="6">Table 3.5-1. Subframe 2 Parameters (3 of 3)</th></tr>
<tr><th colspan="2">Parameter</th><th>No. of Bits**</th><th>Scale Factor (LSB)</th><th>Effective Range***</th><th>Units</th></tr>
<tr><td>URA_{oc} Index</td><td>SV Clock Accuracy Index</td><td>5*</td><td></td><td></td><td>(see text)</td></tr>
<tr><td>URA_{oc1} Index</td><td>SV Clock Accuracy Change Index</td><td>3</td><td></td><td></td><td>(see text)</td></tr>
<tr><td>URA_{oc2} Index</td><td>SV Clock Accuracy Change Rate Index</td><td>3</td><td></td><td></td><td>(see text)</td></tr>
<tr><td>a_{f2-n}</td><td>SV Clock Drift Rate Correction Coefficient</td><td>10*</td><td>2^{-60}</td><td></td><td>sec/sec^2</td></tr>
<tr><td>a_{f1-n}</td><td>SV Clock Drift Correction Coefficient</td><td>20*</td><td>2^{-48}</td><td></td><td>sec/sec</td></tr>
<tr><td>a_{f0-n}</td><td>SV Clock Bias Correction Coefficient</td><td>26*</td><td>2^{-35}</td><td></td><td>seconds</td></tr>
<tr><td>T_{GD}****</td><td>Inter-Signal Correction for L1 or L2 P(Y)</td><td>13*</td><td>2^{-35}</td><td></td><td>seconds</td></tr>
<tr><td>ISC_{L1CP}****</td><td>Inter-Signal Correction for $L1C_P$</td><td>13*</td><td>2^{-35}</td><td></td><td>seconds</td></tr>
<tr><td>ISC_{L1CD}****</td><td>Inter-Signal Correction for $L1C_D$</td><td>13*</td><td>2^{-35}</td><td></td><td>seconds</td></tr>
<tr><td colspan="6">* Parameters so indicated are in two's complement notation;
** See Figure 3.5-1 for complete bit allocation in Subframe 2;
*** Unless otherwise indicated in this column, effective range is the maximum range attainable with indicated bit allocation and scale factor.
**** The bit string of "1000000000000" will indicate that the group delay value is not available.</td></tr>
</table>
</td><td></td><td>
<table>
<tr><th colspan="6">Table 3.5-1. Subframe 2 Parameters (3 of 3)</th></tr>
<tr><th colspan="2">Parameter</th><th>No. of Bits**</th><th>Scale Factor (LSB)</th><th>Effective Range***</th><th>Units</th></tr>
<tr><td>URA_{NED0} Index</td><td>NED Accuracy Index</td><td>5*</td><td></td><td></td><td>(see text)</td></tr>
<tr><td>URA_{NED1} Index</td><td>NED Accuracy Change Index</td><td>3</td><td></td><td></td><td>(see text)</td></tr>
<tr><td>URA_{NED2} Index</td><td>NED Accuracy Change Rate Index</td><td>3</td><td></td><td></td><td>(see text)</td></tr>
<tr><td>a_{f2-n}</td><td>SV Clock Drift Rate Correction Coefficient</td><td>10*</td><td>2^{-60}</td><td></td><td>sec/sec^2</td></tr>
<tr><td>a_{f1-n}</td><td>SV Clock Drift Correction Coefficient</td><td>20*</td><td>2^{-48}</td><td></td><td>sec/sec</td></tr>
<tr><td>a_{f0-n}</td><td>SV Clock Bias Correction Coefficient</td><td>26*</td><td>2^{-35}</td><td></td><td>seconds</td></tr>
<tr><td>T_{GD}****</td><td>Inter-Signal Correction for L1 or L2 P(Y)</td><td>13*</td><td>2^{-35}</td><td></td><td>seconds</td></tr>
<tr><td>ISC_{L1CP}****</td><td>Inter-Signal Correction for $L1C_P$</td><td>13*</td><td>2^{-35}</td><td></td><td>seconds</td></tr>
<tr><td>ISC_{L1CD}****</td><td>Inter-Signal Correction for $L1C_D$</td><td>13*</td><td>2^{-35}</td><td></td><td>seconds</td></tr>
<tr><td colspan="6">* Parameters so indicated are in two's complement notation;
** See Figure 3.5-1 for complete bit allocation in Subframe 2;
*** Unless otherwise indicated in this column, effective range is the maximum range attainable with indicated bit allocation and scale factor.
**** The bit string of "1000000000000" will indicate that the group delay value is not available.</td></tr>
</table>
</td><td>Rationale #1</td></tr>
<tr><td>3.5.3.5</td><td>Bits 34 through 38 of subframe 2 shall contain the ephemeris User Range Accuracy (URA_{oe}) index of the SV. URA_{oe} index shall provide the ephemeris-related user range accuracy index of the SV as a function of the current ephemeris message curve fit interval. While the ephemeris-related URA may vary over the ephemeris message curve fit interval, the URA_{oe}</td><td></td><td>Bits 34 through 38 of subframe 2 shall contain the elevation-dependent (ED) component User Range Accuracy (URA_{ED}) index for the unauthorized user. The URA_{ED} index shall provide the ED-related URA index for the current ephemeris curve fit interval. While the ED-related URA may vary over the ephemeris curve fit interval and over the satellite footprint, the URA_{ED} index (N) in subframe 2 shall</td><td>Rationale #1</td></tr>
</table>

Section Number	IS-GPS-800 Rev A Navstar GPS Space Segment/User Segment L1C Interface	Proposed Heading	URA Definition Proposed Text	Rationale
	index (N) in subframe 2 shall correspond to the maximum URA_{oe} expected over the entire curve fit interval. The URA_{oe} index is a two's complement representation of a signed integer in the range of +15 to -16 and has the following relationship to the ephemeris URA: URA_{oe} Index — URA_{oe} (meters) 15 — 6144.00 $< URA_{oe}$ 14 — 3072.00 $< URA_{oe} \leq$ 6144.00 13 — 1536.00 $< URA_{oe} \leq$ 3072.00 12 — 768.00 $< URA_{oe} \leq$ 1536.00 11 — 384.00 $< URA_{oe} \leq$ 768.00 10 — 192.00 $< URA_{oe} \leq$ 384.00 9 — 96.00 $< URA_{oe} \leq$ 192.00 8 — 48.00 $< URA_{oe} \leq$ 96.00 7 — 24.00 $< URA_{oe} \leq$ 48.00 6 — 13.65 $< URA_{oe} \leq$ 24.00 5 — 9.65 $< URA_{oe} \leq$ 13.65 4 — 6.85 $< URA_{oe} \leq$ 9.65 3 — 4.85 $< URA_{oe} \leq$ 6.85 2 — 3.40 $< URA_{oe} \leq$ 4.85 1 — 2.40 $< URA_{oe} \leq$ 3.40 0 — 1.70 $< URA_{oe} \leq$ 2.40 -1 — 1.20 $< URA_{oe} \leq$ 1.70		correspond to the maximum URA_{ED} expected over the entire ephemeris curve fit interval for the worst-case location within the SV footprint (i.e., two points at the edge of the SV footprint). At the best-case location within the SV footprint (i.e., directly below the SV along the SV nadir vector), the corresponding URA_{ED}. is zero. The URA_{ED} index is a signed, two's complement integer in the range of +15 to -16 and has the following relationship to the ED URA: URA_{ED} Index — URA_{ED} (meters) 15 — 6144.00 $< URA_{ED}$ (or no accuracy prediction is available) 14 — 3072.00 $< URA_{ED} \leq$ 6144.00 13 — 1536.00 $< URA_{ED} \leq$ 3072.00 12 — 768.00 $< URA_{ED} \leq$ 1536.00 11 — 384.00 $< URA_{ED} \leq$ 768.00 10 — 192.00 $< URA_{ED} \leq$ 384.00 9 — 96.00 $< URA_{ED} \leq$ 192.00 8 — 48.00 $< URA_{ED} \leq$ 96.00 7 — 24.00 $< URA_{ED} \leq$ 48.00 6 — 13.65 $< URA_{ED} \leq$ 24.00 5 — 9.65 $< URA_{ED} \leq$ 13.65 4 — 6.85 $< URA_{ED} \leq$ 9.65 3 — 4.85 $< URA_{ED} \leq$ 6.85 2 — 3.40 $< URA_{ED} \leq$ 4.85 1 — 2.40 $< URA_{ED} \leq$ 3.40 0 — 1.70 $< URA_{ED} \leq$ 2.40 -1 — 1.20 $< URA_{ED} \leq$ 1.70 -2 — 0.85 $< URA_{ED} \leq$ 1.20	

Section Number	IS-GPS-800 Rev A Navstar GPS Space Segment/User Segment L1C Interface	Proposed Heading	URA Definition Proposed Text	Rationale
	-2 $0.85 < URA_{oe} \leq 1.20$ -3 $0.60 < URA_{oe} \leq 0.85$ -4 $0.43 < URA_{oe} \leq 0.60$ -5 $0.30 < URA_{oe} \leq 0.43$ -6 $0.21 < URA_{oe} \leq 0.30$ -7 $0.15 < URA_{oe} \leq 0.21$ -8 $0.11 < URA_{oe} \leq 0.15$ -9 $0.08 < URA_{oe} \leq 0.11$ -10 $0.06 < URA_{oe} \leq 0.08$ -11 $0.04 < URA_{oe} \leq 0.06$ -12 $0.03 < URA_{oe} \leq 0.04$ -13 $0.02 < URA_{oe} \leq 0.03$ -14 $0.01 < URA_{oe} \leq 0.02$ -15 $URA_{oe} \leq 0.01$ -16 No accuracy prediction available-use at own risk		-3 $0.60 < URA_{ED} \leq 0.85$ -4 $0.43 < URA_{ED} \leq 0.60$ -5 $0.30 < URA_{ED} \leq 0.43$ -6 $0.21 < URA_{ED} \leq 0.30$ -7 $0.15 < URA_{ED} \leq 0.21$ -8 $0.11 < URA_{ED} \leq 0.15$ -9 $0.08 < URA_{ED} \leq 0.11$ -10 $0.06 < URA_{ED} \leq 0.08$ -11 $0.04 < URA_{ED} \leq 0.06$ -12 $0.03 < URA_{ED} \leq 0.04$ -13 $0.02 < URA_{ED} \leq 0.03$ -14 $0.01 < URA_{ED} \leq 0.02$ -15 $URA_{ED} \leq 0.01$ -16 No accuracy prediction available-use at own risk For each URA_{ED} index (N), users may compute a nominal URA_{ED} value (X) as given by: • If the value of N is 6 or less, but more than -16, $X = 2^{(1 + N/2)}$, • If the value of N is 6 or more, but less than 15, $X = 2^{(N - 2)}$, • N = -16 or N = 15 shall indicate the absence of an accuracy prediction and shall advise the standard positioning service user to use that SV at his own risk. For N = 1, 3, and 5, X should be rounded to 2.8, 5.7, and 11.3 meters, respectively. The nominal URA_{ED} value (X) is suitable for use as a conservative prediction of the RMS ED range errors for accuracy-related purposes in the pseudorange domain (e.g., measurement deweighting, RAIM, FOM computations). Integrity properties of the $IAURA_{ED}$ are specified with respect to the scaled (multiplied by either 4.42 or 5.73 as appropriate) upper bound values of the broadcast URA_{ED} index (see 30.3.3.1.1). For the nominal URA_{ED} value and the $IAURA_{ED}$ value, users may compute an adjusted URA_{ED} value as a	

Section Number	IS-GPS-800 Rev A Navstar GPS Space Segment/User Segment L1C Interface	Proposed Heading	URA Definition Proposed Text	Rationale
			function of SV elevation angle (E) as follows: Adjusted Nominal URA_{ED} = Nominal URA_{ED} (sin(E+90 degrees)) Adjusted $IAURA_{ED}$ = $IAURA_{ED}$ (sin(E+90 degrees)) URA_{ED} and $IAURA_{ED}$ account for SIS-contributions to user range error which include, but are not limited to, the following: LSB representation/truncation error, alongtrack ephemeris errors, and crosstrack ephemeris errors. URA_{ED} and $IAURA_{ED}$ do not account for user range error contributions due to the inaccuracy of the broadcast ionospheric data parameters used in the single-frequency ionospheric model or for other atmospheric effects.	
3.5.3.8	***3.5.3.8 SV Clock Accuracy Estimates***	Non-Elevation Dependent (NED) Accuracy Estimates		
3.5.3.8	Bits 460 through 470 of subframe 2 shall contain the URA_{oc} Index, URA_{oc1} Index, and URA_{oc2} Index of the SV (reference paragraph 6.2.1) for the user. The URA_{oc} Index together with URA_{oc1} Index and URA_{oc2} Index shall give the clock-related user range accuracy of the SV as a function of time since the prediction (t_{op}) used to generate the uploaded clock correction polynomial terms.		Bits 460 through 470 of subframe 2 shall contain the URA_{oc} Index, URA_{NED1} Index, and URA_{NED2} Index of the SV (reference paragraph 6.2.1) for the user. The following equations together with the broadcast URA_{NED0} Index, URA_{NED1} Index, and URA_{NED2} Index shall give the clock-related user range accuracy of $IAURA_{NED}$ over the current clock/ephemeris fit interval. While the actual NED-related URA may vary over the satellite footprint, the $IAURA_{NED}$ calculated using the parameters in message type 10 at each instant during the current clock/ephemeris fit interval shall bound the maximum $IAURA_{NED}$ expected for the worst-case location within the satellite footprint at that instant.	Rationale #1
3.5.3.8	The user shall calculate the clock-related URA with the equation (in meters): $URA_{oc} = URA_{ocb} + URA_{oc1} (t - t_{op})$ for $t-t_{op} \leq 93{,}600$ seconds $URA_{oc} = URA_{ocb} + URA_{oc1} (t - t_{op}) + URA_{oc2} (t - t_{op} - 93{,}600)^2$ for $t-t_{op} >$ 93,600 seconds where t = GPS time (must account for beginning or end of week crossovers), t_{op} = time of week of the state estimate utilized for the prediction of satellite clock correction parameters.		The user shall calculate the NED-related URA with the equation (in meters); $IAURA_{NED} = URA_{NED0} + URA_{NED1} (t - t_{op})$ for $t-t_{op} < 93{,}600$ seconds $IAURA_{NED} = URA_{NED0} + URA_{NED1} (t - t_{op}) + URA_{NED2} (t - t_{op} - 93{,}600)^2$ for $t-t_{op} > 93{,}600$ seconds where t = GPS time (must account for beginning or end of week crossovers), t_{op} = time of week of the state estimate utilized for the prediction of satellite clock /ephemeris parameters.	Rationale #1

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3.5.3.8	The CS shall derive URA_{ocb} at time t_{op} which, when used together with URA_{oc1} and URA_{oc2} in the above equations, results in the minimum URA_{oc} that is greater than the predicted URA_{oc} during the entire duration up to 14 days after t_{op}.		The CS shall derive URA_{NED0}, URA_{NED1}, and URA_{NED2} indexes which, when used together in the above equations, results in the minimum $IAURA_{NED}$ that is greater than the predicted $IAURA_{NED}$ during the clock/ephemeris fit interval.	Rationale #1
3.5.3.8	The user shall use the broadcast URA_{oc} Index to derive URA_{ocb}. The index is a two's complement representation of a signed integer in the range of +15 to -16 and has the following relationship to the clock-related user derived URA_{ocb}: URA_{oc} Index URA_{ocb} (meters) 15 6144.00 < URA_{ocb} 14 3072.00 < URA_{ocb} ≤ 6144.00 13 1536.00 < URA_{ocb} ≤ 3072.00 12 768.00 < URA_{ocb} ≤ 1536.00 11 384.00 < URA_{ocb} ≤ 768.00 10 192.00 < URA_{ocb} ≤ 384.00 9 96.00 < URA_{ocb} ≤ 192.00 8 48.00 < URA_{ocb} ≤ 96.00 7 24.00 < URA_{ocb} ≤ 48.00 6 13.65 < URA_{ocb} ≤ 24.00 5 9.65 < URA_{ocb} ≤ 13.65 4 6.85 < URA_{ocb} ≤ 9.65 3 4.85 < URA_{ocb} ≤ 6.85 2 3.40 < URA_{ocb} ≤ 4.85 1 2.40 < URA_{ocb} ≤ 3.40		The user shall use the broadcast URA_{NED0} index to derive the URA_{NED0} value. The URA_{NED0} index is a signed, two's complement integer in the range of +15 to -16 and has the following relationship to the URA_{NED0} value: URA_{NED0} Index URA_{NED0} (meters) 15 6144.00 < URA_{NED0} (or no accuracy prediction is available) 14 3072.00 < URA_{NED0} ≤ 6144.00 13 1536.00 < URA_{NED0} ≤ 3072.00 12 768.00 < URA_{NED0} ≤ 1536.00 11 384.00 < URA_{NED0} ≤ 768.00 10 192.00 < URA_{NED0} ≤ 384.00 9 96.00 < URA_{NED0} ≤ 192.00 8 48.00 < URA_{NED0} ≤ 96.00 7 24.00 < URA_{NED0} ≤ 48.00 6 13.65 < URA_{NED0} ≤ 24.00 5 9.65 < URA_{NED0} ≤ 13.65 4 6.85 < URA_{NED0} ≤ 9.65 3 4.85 < URA_{NED0} ≤ 6.85 2 3.40 < URA_{NED0} ≤ 4.85 1 2.40 < URA_{NED0} ≤ 3.40 0 1.70 < URA_{NED0} ≤ 2.40 -1 1.20 < URA_{NED0} ≤ 1.70	Rationale #1

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	0 1.70 < URA_{ocb} ≤ 2.40 -1 1.20 < URA_{ocb} ≤ 1.70 -2 0.85 < URA_{ocb} ≤ 1.20 -3 0.60 < URA_{ocb} ≤ 0.85 -4 0.43 < URA_{ocb} ≤ 0.60 -5 0.30 < URA_{ocb} ≤ 0.43 -6 0.21 < URA_{ocb} ≤ 0.30 -7 0.15 < URA_{ocb} ≤ 0.21 -8 0.11 < URA_{ocb} ≤ 0.15 -9 0.08 < URA_{ocb} ≤ 0.11 -10 0.06 < URA_{ocb} ≤ 0.08 -11 0.04 < URA_{ocb} ≤ 0.06 -12 0.03 < URA_{ocb} ≤ 0.04 -13 0.02 < URA_{ocb} ≤ 0.03 -14 0.01 < URA_{ocb} ≤ 0.02 -15 URA_{ocb} ≤ 0.01 -16 No accuracy prediction available-use at own risk		-2 0.85 < URA_{NED0} ≤ 1.20 -3 0.60 < URA_{NED0} ≤ 0.85 -4 0.43 < URA_{NED0} ≤ 0.60 -5 0.30 < URA_{NED0} ≤ 0.43 -6 0.21 < URA_{NED0} ≤ 0.30 -7 0.15 < URA_{NED0} ≤ 0.21 -8 0.11 < URA_{NED0} ≤ 0.15 -9 0.08 < URA_{NED0} ≤ 0.11 -10 0.06 < URA_{NED0} ≤ 0.08 -11 0.04 < URA_{NED0} ≤ 0.06 -12 0.03 < URA_{NED0} ≤ 0.04 -13 0.02 < URA_{NED0} ≤ 0.03 -14 0.01 < URA_{NED0} ≤ 0.02 -15 URA_{NED0} ≤ 0.01 -16 No accuracy prediction available-use at own risk For each URA_{NED0} index (N), users may compute a nominal URA_{NED0} value (X) as given by: • If the value of N is 6 or less, but more than -16, $X = 2^{(1 + N/2)}$, • If the value of N is 6 or more, but less than 15, $X = 2^{(N - 2)}$, • N = -16 or N = 15 shall indicate the absence of an accuracy prediction and shall advise the standard positioning service user to use that SV at his own risk.	
3.5.3.8	The user may use the upper bound value in the URA_{ocb} range corresponding to the broadcast index, thereby calculating the maximum URA_{oc} that is equal to or greater than the CS predicted URA_{oc}, or the user may use the lower bound value in the range which will provide the minimum URA_{oc} that is equal to or less than the CS predicted URA_{oc}.		For N = 1, 3, and 5, X should be rounded to 2.8, 5.7, and 11.3 meters, respectively. The nominal URA_{NED0} value (X) shall be suitable for use as a conservative prediction of the RMS NED range errors for accuracy-related purposes in the pseudorange domain (e.g., measurement de-weighting RAIM, FOM computations). Integrity properties of the $IAURA_{NED}$ are specified with respect to	Rationale #1

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			the scaled (multiplied by either 4.42 or 5.73 as appropriate) upper bound values of the URA_{NED0} index, URA_{NED2} index, and URA_{NED2} index (see 3.5.3.10.1). URA_{NED0} accounts for zeroth order SIS-contributions to user range error which include, but are not limited to, the following: LSB representation/truncation error; the net effect of clock correction polynomial error and code phase error in the transmitted signal for single-frequency L1C/A or single-frequency L2C users who correct the code phase as described in Section 3.5.3.9; the net effect of clock parameter, code phase, and inter-signal correction error for dual-frequency L1/L2 and L1/L5 users who correct for group delay and ionospheric effects as described in Section 3.5.3.9; radial ephemeris error; anisotropic antenna errors; and signal deformation error. URA_{NED} does not account for user range contributions due to the inaccuracy of the broadcast ionospheric data parameters used in the single-frequency ionospheric model or for other atmospheric effects.	
3.5.3.8	The transmitted URA_{oc1} Index is an integer value in the range 0 to 7. URA_{oc1} Index has the following relationship to the URA_{oc1}: $URA_{oc1} = \frac{1}{2^N}$ (meters/second) where N = 4 + URA_{oc1} Index.		The transmitted URA_{NED1} index is an integer value in the range 0 to 7. The URA_{NED1} index has the following relationship to the URA_{-NED1} value: $URA_{NED1} = \frac{1}{2^N}$ (meters/second) where N = 14 + URA_{NED1} Index.	Rationale #3- There is a typo that needs be corrected in computing URA, or all user URA values will be far too large. Using the erroneous value will result in a minimum value of URA_{oc1} that will prevent the Space and Control segments from meeting their specified performance requirements.
3.5.3.8	The transmitted URA_{oc2} Index is an integer value in the range 0 to 7. URA_{oc2} Index has the		The transmitted URA_{NED2} index is an integer value in the range 0 to 7. URA_{NED2} index has the following	Rationale #3

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	following relationship to the URA_{oc2}: $URA_{oc2} = \frac{1}{2^N}$ (meters/second^2) where N = 25 + URA_{oc2} Index.		relationship to the URA_{NED2}: $URA_{NED2} = \frac{1}{2^N}$ (meters/second^2) where N = 28 + URA_{NED2} Index.	
3.5.5.2	***3.5.5.2***	Data Sets		
3.5.5.2			The t_{oe} shall be equal to the t_{oc} of the same CNAV data set. The following rules govern the transmission of t_{oe} and t_{oc} values in different data sets: (1) The transmitted t_{oc} will be different from any value transmitted by the SV during the preceding seven days; (2) The transmitted t_{oe} will be different from any value transmitted by the SV during the preceding six hours. Cutovers to new data sets will occur only on hour boundaries except for the first data set of a new upload. The first data set may be cut-in (reference paragraph 3.5.5.1) at any time during the hour and therefore may be transmitted by the SV for less than one hour. The start of the transmission interval for each data set corresponds to the beginning of the curve fit interval for the data set. Each data set remains valid for the duration of its transmission interval, and nominally also remains valid for the duration of its curve fit interval. A data set is rendered invalid before the end of its curve fit interval when it is superseded by the SV cutting over to the first data set of a new upload. <u>Normal Operations</u>. The subframe 2 data sets are transmitted by the SV for periods of two hours. The corresponding curve fit interval is three hours.	Rationale #2- URA components (URA_{ED} and URA_{NED}) from different upload or fit intervals will not give a valid indication of signal accuracy or integrity. These changes provide clarification of how URA is computed by the user.
3.5.5.3	***3.5.5.3***	Reference Times		
3.5.5.3			The LNAV reference time information in paragraph 20.3.4.5 in IS-GPS-200 also applies to the CNAV reference times.	

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6.2.1	User Range Accuracy (URA) is a statistical indicator of the GPS ranging accuracy obtainable with a specific signal and SV. Whether the integrity status flag is 'off' or 'on', 4.42 times URA bounds instantaneous URE under all conditions with 1 -1e-5 per hour probability. When the integrity status flag is 'on', 5.73 times URA bounds instantaneous URE under all conditions with 1-1e-8 per hour probability.		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 under all conditions 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 under all conditions 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 value of the URA index or to the scaled composite of the upper bound values of all component URA indexes.	Rationale #5- There are numerous inconsistencies between ICDs and clarifications and additions that are needed for the users to compute URA. These changes resolve the inconsistencies between the ICDs so that users may properly compute URA.
6.2.1	Note #1: URA applies over the curve fit interval that is applicable to the NAV data from which the URA is read, for the worst-case location within the intersection of the satellite signal and the terrestrial service volume.		Note #1: URA applies over the transmission interval that is applicable to the NAV data from which the URA is read, for the worst-case location within the satellite footprint.	Rationale #5
6.2.1	Note #2: The URA for a particular signal may be represented by a single parameter in the NAV data or by more than one parameter representing components of the total URA. Specific URA parameters and formulae for calculating the total URA for a signal are defined in the applicable Space Segment to Navigation User Segment ICD's.		Note #2: The URA for a particular signal may be represented by a single index in the NAV data or by a composite of more than one index-representing components of the total URA. Specific URA indexes and formulae for calculating the total URA for L1C are defined in Section 3 for the CNAV message.	Rationale #5
6.2.1			Note #3: The above integrity assured probability values do not apply if: (a) an alert is issued to the users before the instantaneous URE exceeds either of the scaled URA bounds, or (b) an alert is issued to the users no more than 5.2 seconds after the instantaneous URE exceeds the 4.42 times URA bound, and (c) if the integrity status flag is 'on' and an alert is issued to the users no more than 5.2 seconds after the instantaneous URE exceeds the 5.73 times URA bound. In this context, an "alert" is defined as any indication or characteristic of the conveying signal, as specified elsewhere in this document, which signifies to users that the conveying signal may be invalid or should not be used, such as the health bits not indicating operational-healthy, broadcasting non-standard code, parity error, etc.	Rationale #5

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6.2.1.1	***6.2.1.1 Integrity Assured URA***		<DELETE>	
6.2.1.1	When the integrity assurance monitoring is available, as indicated by the "integrity status flag" being set to "1", the URA value is chosen such that the probability of the "actual" URE exceeding a threshold is met (see section 3.5.3.10 for probability values). The URA value is conveyed to the user in the form of a URA index value. The URA index represents a range of values; for integrity assurance applications, it is prudent to use the RSS of the largest URA index values in the URA index range.		<DELETE>	Rationale #5
6.2.1.1	User Differential Range Accuracy (UDRA) is a statistical indicator of the GPS ranging accuracy obtainable with a specific signal and SV after the application of the associated differential corrections (DC parameters).		User Differential Range Accuracy (UDRA) is a statistical indicator of the GPS ranging accuracy obtainable with a specific signal and SV after the application of the associated differential corrections (DC parameters). UDRA provides a conservative RMS estimate of the differential user range errors in the navigation data for that satellite. It includes all errors for which the Space and Control Segments are responsible.	Rationale #5

End of WAS/IS for IS-GPS-800A