## Change Topic: Public Signals-in-Space (SiS) Updates

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.

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

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

Proposed Object Text: Contains proposed changes to baseline text.

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

| ***PROBLEM STATEMENT:*** |
|---|
| There are eight areas of obsolete/ambiguous language in the Signals-in-Space (SiS) specifications (mean anomaly equation, convolutional encoding, LNAV special messages reference, Universal Coordinated Time Offset Error (UTCOE), User Range Accuracy (URA) Note #3, Right Ascension Angle Language, and the signal health versus navigation data terminology, publication errors). If this language were interpreted incorrectly it could result in UE developers designing receivers that don't work. |
| ***SOLUTION:*** *(Proposed)* |
| Resolve the obsolete/ambiguous language in the areas above to avoid the potential for misinterpretation. |
| Note: For the changes with respect to IS-GPS-200F, IRN-001 there are ***eight*** areas that are being amended:<br>i. Convolutional encoding, (2 proposed changes)<br>ii. Coordinated Universal Coordinated Time Offset Error (UTCOE), (1 proposed change)<br>iii. User Range Accuracy (URA) Note #3, (1 proposed change)<br>iv. LNAV special messages reference, (2 proposed changes)<br>v. Right Ascension Angle Language, (1 proposed change)<br>vi. Signal health versus navigation data terminology, (1 proposed change)<br>vii. Mean Anomaly Equation, (1 proposed change) |

viii. Publication Errors (69 proposed changes)

Start of WAS/IS for IS-GPS-200F, IRN-001 Changes

| Section Number | IS-GPS-200 RevF IRN001 (17 Apr 2012) Navstar GPS Space Segment/Navigation User Interfaces | Proposed Object Heading | Proposed Public Signals-in-Space (SiS) Updates Object Text | Proposed Rationale |
|---|---|---|---|---|
| 3.2.1 | Users shall only use non-dummy satellites as defined via current broadcast almanac. See Section 20.3.3.5.1.2.2 and/or Section 30.3.3.4 and/or Section 40.3.3.5.1.2.2 for the definition of information about the almanac. | | Users shall only use non-dummy satellites as defined via current broadcast almanac. See Section 20.3.3.5.1.2 and/or Section 40.3.3.5.1.2 for the definition of information about dummy satellites in the almanac. | Corrected section number references from 20.3.3.5.1.2.2 to 20.3.3.5.1.2 and from 40.3.3.5.1.2.2 to 40.3.3.5.1.2 and removed reference to section 30.3.3.4, and also added the clarification "definition of information about dummy satellites in the almanac". |
| 3.2.1.1 | The PRN P-code for SV ID number i, for i = 1 to 37, is a ranging code, $P_i(t)$, of 7 days in length at a chipping rate of 10.23 Mbps. The 7 day sequence is the modulo-2 sum of two sub-sequences referred to as X1 and $X2_i$; their lengths are 15,345,000 chips and 15,345,037 chips, respectively. The $X2_i$ sequence is an X2 sequence selectively delayed by 1 to 37 chips thereby allowing the basic code generation technique to produce a set of 37 mutually exclusive P-code sequences of 7 days in length. Assignment of these code phase segments by SV ID number is given in Table 3-Ia. (NOTE: previous versions of this document reserved PRNs 33 through 37 for other uses. Due to increased system capability, PRNs 33 through 37 are being redesignated to allow for use by SVs.)<br>An initial almanac collected from P(Y)-code in the upper PRNs must be obtained from PRNs 35 or 36. | | The PRN P-code for SV ID number i, for i = 1 to 37, is a ranging code, $P_i(t)$, of 7 days in length at a chipping rate of 10.23 Mbps. The 7 day sequence is the modulo-2 sum of two sub-sequences referred to as X1 and $X2_i$; their lengths are 15,345,000 chips and 15,345,037 chips, respectively. The $X2_i$ sequence is an X2 sequence selectively delayed by 1 to 37 chips thereby allowing the basic code generation technique to produce a set of 37 mutually exclusive P-code sequences of 7 days in length. Assignment of these code phase segments by SV ID number is given in Table 3-Ia. (NOTE: previous versions of this document reserved PRNs 33 through 37 for other uses. Due to increased system capability, PRNs 33 through 37 are being redesignated to allow for use by SVs.)<br>An initial almanac collected from P(Y)-code in the upper PRNs must be obtained from PRNs 35, 36, or 38 through 63. | Receiver manufacturers may interpret that obtaining the initial almanacs for the upper PRNs for P(Y) code can only be done from PRNs 35 and 36. This is not true-almanacs for LNAV-U (LNAV-Upper) |

| Section Number | IS-GPS-200 RevF IRN001 (17 Apr 2012) Navstar GPS Space Segment/Navigation User Interfaces | Proposed Object Heading | Proposed Public Signals-in-Space (SiS) Updates Object Text | Proposed Rationale |
|---|---|---|---|---|
| | | | | may be obtained from PRNs 35, 36, or 38 through 63. |
| 3.2.1.1.1 | An expanded set of 26 P-code PRN sequences are generated by circularly shifting 26 of the original 37 sequences (over one week) by an amount corresponding to 1 day. These expanded sequences are therefore time shifted (i.e. offset) versions of 26 of the original sequences. Assignment of these expanded code phase segments by SV ID number is given in Table 3-Ib. Additional PRN P-code sequences with assigned PRN numbers are provided in Section 6.3.7, Table 6-I. | | An expanded set of 26 P-code PRN sequences are generated by circularly shifting 26 of the original 37 sequences (over one week) by an amount corresponding to 1 day. These expanded sequences are therefore time shifted (i.e. offset) versions of 26 of the original sequences. Assignment of these expanded code phase segments by SV ID number is given in Table 3-Ib. Additional PRN P-code sequences with assigned PRN numbers are provided in Section 6.3.6, Table 6-I. | Due to the renumbering of the Section in IS-200 to stay consistent with IS-200, Rev E, the additional PRN P-Code sequences (Table 6-I) can now be found in Section 6.3.6, not 6.3.7. |
| 3.2.1.3 | The PRN C/A-Code for SV ID number i is a Gold code, $G_i(t)$, of 1 millisecond in length at a chipping rate of 1023 Kbps. The $G_i(t)$ sequence is a linear pattern generated by the modulo-2 addition of two sub-sequences, G1 and $G2_i$, each of which is a 1023 chip long linear pattern. The epochs of the Gold code are synchronized with the X1 epochs of the P-code. As shown in Table 3-Ia, the $G2_i$ sequence is a G2 sequence selectively delayed by pre-assigned number of chips, thereby generating a set of different C/A-codes. Assignment of these by GPS PRN signal number are given in Table 3-Ia and Table 3-Ib.<br>An initial almanac collected from C/A Code in the upper PRNs must be obtained from PRNs 35, 36, or 38 through 63.<br>CS will prevent the simultaneous transmission of PRNs 34 and 37 of C/A code. | | The PRN C/A-Code for SV ID number i is a Gold code, $G_i(t)$, of 1 millisecond in length at a chipping rate of 1023 Kbps. The $G_i(t)$ sequence is a linear pattern generated by the modulo-2 addition of two sub-sequences, G1 and $G2_i$, each of which is a 1023 chip long linear pattern. The epochs of the Gold code are synchronized with the X1 epochs of the P-code. As shown in Table 3-Ia, the $G2_i$ sequence is a G2 sequence selectively delayed by pre-assigned number of chips, thereby generating a set of different C/A-codes. Assignment of these by GPS PRN signal number are given in Table 3-Ia and Table 3-Ib.<br>An initial almanac collected from C/A Code in the upper PRNs must be obtained from PRNs 35, 36, or 38 through 63.<br>CS *will prevent* the simultaneous transmission of PRNs 34 and 37 of C/A code. | Fixed italics emphasis on "will prevent". The italics place an emphasis on the CS preventing the simultaneous transmission of PRNs 34 and 37. |
| 3.2.1.3.1 | An expanded set of 26 C/A-code PRN sequences are identified in Table 3-Ib using "G2 Delay" and "Initial G2 Setting" which is not the same as the method used in Table 3-Ia. The two-tap coder implementation method referenced and used in Table 3-Ia is not used in Table 3-Ib due to its limitation in generating C/A-code sequences. The "G2 Delay" specified in Table 3-Ib may be accomplished by using the "Initial G2 Setting" as the initialization vector for the G2 shift register of Figure 3-9. Assignment of these expanded code phase segments by SV ID number is given in Table 3-Ib. Additional PRN C/A-code sequences with | | An expanded set of 26 C/A-code PRN sequences are identified in Table 3-Ib using "G2 Delay" and "Initial G2 Setting" which is not the same as the method used in Table 3-Ia. The two-tap coder implementation method referenced and used in Table 3-Ia is not used in Table 3-Ib due to its limitation in generating C/A-code sequences. The "G2 Delay" specified in Table 3-Ib may be accomplished by using the "Initial G2 Setting" as the initialization vector for the G2 shift register of Figure 3-9. Assignment of these expanded code phase segments by SV ID number is given in Table 3-Ib. Additional PRN C/A-code sequences with assigned PRN numbers are provided in Section 6.3.6.1, | Due to the renumbering of the Section in IS-200 to stay consistent with IS-200, Rev E, the additional |

| Section Number | IS-GPS-200 RevF IRN001 (17 Apr 2012) Navstar GPS Space Segment/Navigation User Interfaces | Proposed Object Heading | Proposed Public Signals-in-Space (SiS) Updates Object Text | Proposed Rationale |
|---|---|---|---|---|
| | assigned PRN numbers are provided in Section 6.3.7.1, Table 6-I. | | Table 6-I. | PRN P-Code sequences (Table 6-I) can now be found in Section 6.3.6.1, not 6.3.7.1.<br>Section 6.3.7.1 has been changed to 6.3.6.1. |
| 3.2.1.4.1 | Expanded L2 CM Code (GPS III) | **Expanded L2 CM Code (GPS III and subsequent blocks)** | | The header appeared as 'Expanded L2 CM Code (GPS III and subsequent blocks)' in IS-GPS-200, Rev E and should appear as such in IS-GPS-200F, IRN-001. However, this change should be made to (GPS III) since '(GPS III and subsequent blocks)' implies that this will be the design for any SV beyond GPS III. |
| 3.2.1.4.1 | An expanded set of 26 L2 CM-Code PRN sequences are identified with assignment of initial states by SV ID number in Table 3-IIb. Additional PRN L2 CM-code sequence pairs are | | An expanded set of 26 L2 CM-Code PRN sequences are identified with assignment of initial states by SV ID number in Table 3-IIb. Additional PRN L2 CM-code sequence pairs are provided in Section | Due to the renumbering of |

| Section Number | IS-GPS-200 RevF IRN001 (17 Apr 2012) Navstar GPS Space Segment/Navigation User Interfaces | Proposed Object Heading | Proposed Public Signals-in-Space (SiS) Updates Object Text | Proposed Rationale |
|---|---|---|---|---|
| | provided in Section 6.3.7.3, Table 6-II. | | 6.3.6.3, Table 6-II. | the Section in IS-200 to stay consistent with IS-200, Rev E, the additional PRN L2 CM-code sequences (Table 6-II) can now be found in Section 6.3.6.3, not 6.3.7.3.<br>Section 6.3.7.3 has been changed to 6.3.6.3. |
| 3.2.1.5.1 | Expanded L2 CL-Code (GPS III). | Expanded L2 CL-Code (GPS III and subsequent blocks) | | The header appeared as 'Expanded L2 CL Code (GPS III and subsequent blocks)' in IS-GPS-200, Rev E and should appear as such in IS-GPS-200F, IRN-001. However, this change should be made to (GPS III) since '(GPS III and subsequent blocks)' implies |

| Section Number | IS-GPS-200 RevF IRN001 (17 Apr 2012) Navstar GPS Space Segment/Navigation User Interfaces | Proposed Object Heading | Proposed Public Signals-in-Space (SiS) Updates Object Text | Proposed Rationale |
|---|---|---|---|---|
| | | | | that this will be the design for any SV beyond GPS III. |
| 3.2.1.5.1 | An expanded set of 26 L2 CL-Code PRN sequences are identified with assignment of initial states by SV ID number in Table 3-IIb. Additional PRN L2 CL-code sequence pairs are provided in Section 6.3.7.3, Table 6-I<br>I. | | An expanded set of 26 L2 CL-Code PRN sequences are identified with assignment of initial states by SV ID number in Table 3-IIb. Additional PRN L2 CL-code sequence pairs are provided in Section 6.3.6.3, Table 6-II. | Due to the renumbering of the Section in IS-200 to stay consistent with IS-200, Rev E, the additional PRN L2 CM-code sequences (Table 6-II) can now be found in Section 6.3.6.3, not 6.3.7.3.<br>Section 6.3.7.3 has been changed to 6.3.6.3. |

<table>
<tr><th>Section Number</th><th>IS-GPS-200 RevF IRN001 (17 Apr 2012) Navstar GPS Space Segment/Navigation User Interfaces</th><th>Proposed Object Heading</th><th>Proposed Public Signals-in-Space (SiS) Updates Object Text</th><th>Proposed Rationale</th></tr>
<tr><td>3.2.1.5.1</td><td>
<table>
<tr><th colspan="8">Table 3-Ia. Code Phase Assignments (sheet 1 of 2)</th></tr>
<tr><th rowspan="2">SV ID No.</th><th rowspan="2">GPS PRN Signal No.</th><th colspan="2">Code Phase Selection</th><th colspan="2">Code Delay Chips</th><th rowspan="2">First 10 Chips Octal* C/A</th><th rowspan="2">First 12 Chips Octal P</th></tr>
<tr><th>C/A($G2_i$)***</th><th>($X2_i$)</th><th>C/A</th><th>P</th></tr>
<tr><td>1</td><td>1</td><td>2 ⊕ 6</td><td>1</td><td>5</td><td>1</td><td>1440</td><td>4444</td></tr>
<tr><td>2</td><td>2</td><td>3 ⊕ 7</td><td>2</td><td>6</td><td>2</td><td>1620</td><td>4000</td></tr>
<tr><td>3</td><td>3</td><td>4 ⊕ 8</td><td>3</td><td>7</td><td>3</td><td>1710</td><td>4222</td></tr>
<tr><td>4</td><td>4</td><td>5 ⊕ 9</td><td>4</td><td>8</td><td>4</td><td>1744</td><td>4333</td></tr>
<tr><td>5</td><td>5</td><td>1 ⊕ 9</td><td>5</td><td>17</td><td>5</td><td>1133</td><td>4377</td></tr>
<tr><td>6</td><td>6</td><td>2 ⊕ 10</td><td>6</td><td>18</td><td>6</td><td>1455</td><td>4355</td></tr>
<tr><td>7</td><td>7</td><td>1 ⊕ 8</td><td>7</td><td>139</td><td>7</td><td>1131</td><td>4344</td></tr>
<tr><td>8</td><td>8</td><td>2 ⊕ 9</td><td>8</td><td>140</td><td>8</td><td>1454</td><td>4340</td></tr>
<tr><td>9</td><td>9</td><td>3 ⊕ 10</td><td>9</td><td>141</td><td>9</td><td>1626</td><td>4342</td></tr>
<tr><td>10</td><td>10</td><td>2 ⊕ 3</td><td>10</td><td>251</td><td>10</td><td>1504</td><td>4343</td></tr>
<tr><td>11</td><td>11</td><td>3 ⊕ 4</td><td>11</td><td>252</td><td>11</td><td>1642</td><td>|</td></tr>
<tr><td>12</td><td>12</td><td>5 ⊕ 6</td><td>12</td><td>254</td><td>12</td><td>1750</td><td>|</td></tr>
<tr><td>13</td><td>13</td><td>6 ⊕ 7</td><td>13</td><td>255</td><td>13</td><td>1764</td><td>|</td></tr>
<tr><td>14</td><td>14</td><td>7 ⊕ 8</td><td>14</td><td>256</td><td>14</td><td>1772</td><td>|</td></tr>
<tr><td>15</td><td>15</td><td>8 ⊕ 9</td><td>15</td><td>257</td><td>15</td><td>1775</td><td>|</td></tr>
<tr><td>16</td><td>16</td><td>9 ⊕ 10</td><td>16</td><td>258</td><td>16</td><td>1776</td><td>|</td></tr>
<tr><td>17</td><td>17</td><td>1 ⊕ 4</td><td>17</td><td>469</td><td>17</td><td>1156</td><td>|</td></tr>
<tr><td>18</td><td>18</td><td>2 ⊕ 5</td><td>18</td><td>470</td><td>18</td><td>1467</td><td>|</td></tr>
<tr><td>19</td><td>19</td><td>3 ⊕ 6</td><td>19</td><td>471</td><td>19</td><td>1633</td><td>4343</td></tr>
<tr><td colspan="8">* In the octal notation for the first 10 chips of the C/A code as shown in this column, the first digit (1) represents a "1" for the first chip and the last three digits are the conventional octal representation of the remaining 9 chips. (For example, the first 10 chips of the C/A code for PRN Signal Assembly No. 1 are: 1100100000).<br>** C/A Codes for 34 and 37 are identical.<br>*** The two-tap coder utilized here is only an example implementation that generates a limited set of valid C/A codes.<br>⊕ = "exclusive or"⊕ = "exclusive or"</td></tr>
<tr><td colspan="8">NOTE #1: The code phase assignments constitute inseparable pairs, each consisting of a specific C/A and a specific P code phase, as shown above.</td></tr>
</table>
</td><td></td><td>
<table>
<tr><th colspan="8">Table 3-Ia. Code Phase Assignments (sheet 1 of 2)</th></tr>
<tr><th rowspan="2">SV ID No.</th><th rowspan="2">GPS PRN Signal No.</th><th colspan="2">Code Phase Selection</th><th colspan="2">Code Delay Chips</th><th rowspan="2">First 10 Chips Octal* C/A</th><th rowspan="2">First 12 Chips Octal P</th></tr>
<tr><th>C/A($G2_i$)***</th><th>($X2_i$)</th><th>C/A</th><th>P</th></tr>
<tr><td>1</td><td>1</td><td>2 ⊕ 6</td><td>1</td><td>5</td><td>1</td><td>1440</td><td>4444</td></tr>
<tr><td>2</td><td>2</td><td>3 ⊕ 7</td><td>2</td><td>6</td><td>2</td><td>1620</td><td>4000</td></tr>
<tr><td>3</td><td>3</td><td>4 ⊕ 8</td><td>3</td><td>7</td><td>3</td><td>1710</td><td>4222</td></tr>
<tr><td>4</td><td>4</td><td>5 ⊕ 9</td><td>4</td><td>8</td><td>4</td><td>1744</td><td>4333</td></tr>
<tr><td>5</td><td>5</td><td>1 ⊕ 9</td><td>5</td><td>17</td><td>5</td><td>1133</td><td>4377</td></tr>
<tr><td>6</td><td>6</td><td>2 ⊕ 10</td><td>6</td><td>18</td><td>6</td><td>1455</td><td>4355</td></tr>
<tr><td>7</td><td>7</td><td>1 ⊕ 8</td><td>7</td><td>139</td><td>7</td><td>1131</td><td>4344</td></tr>
<tr><td>8</td><td>8</td><td>2 ⊕ 9</td><td>8</td><td>140</td><td>8</td><td>1454</td><td>4340</td></tr>
<tr><td>9</td><td>9</td><td>3 ⊕ 10</td><td>9</td><td>141</td><td>9</td><td>1626</td><td>4342</td></tr>
<tr><td>10</td><td>10</td><td>2 ⊕ 3</td><td>10</td><td>251</td><td>10</td><td>1504</td><td>4343</td></tr>
<tr><td>11</td><td>11</td><td>3 ⊕ 4</td><td>11</td><td>252</td><td>11</td><td>1642</td><td>|</td></tr>
<tr><td>12</td><td>12</td><td>5 ⊕ 6</td><td>12</td><td>254</td><td>12</td><td>1750</td><td>|</td></tr>
<tr><td>13</td><td>13</td><td>6 ⊕ 7</td><td>13</td><td>255</td><td>13</td><td>1764</td><td>|</td></tr>
<tr><td>14</td><td>14</td><td>7 ⊕ 8</td><td>14</td><td>256</td><td>14</td><td>1772</td><td>|</td></tr>
<tr><td>15</td><td>15</td><td>8 ⊕ 9</td><td>15</td><td>257</td><td>15</td><td>1775</td><td>|</td></tr>
<tr><td>16</td><td>16</td><td>9 ⊕ 10</td><td>16</td><td>258</td><td>16</td><td>1776</td><td>|</td></tr>
<tr><td>17</td><td>17</td><td>1 ⊕ 4</td><td>17</td><td>469</td><td>17</td><td>1156</td><td>|</td></tr>
<tr><td>18</td><td>18</td><td>2 ⊕ 5</td><td>18</td><td>470</td><td>18</td><td>1467</td><td>|</td></tr>
<tr><td>19</td><td>19</td><td>3 ⊕ 6</td><td>19</td><td>471</td><td>19</td><td>1633</td><td>4343</td></tr>
<tr><td colspan="8">* In the octal notation for the first 10 chips of the C/A code as shown in this column, the first digit (1) represents a "1" for the first chip and the last three digits are the conventional octal representation of the remaining 9 chips. (For example, the first 10 chips of the C/A code for PRN Signal Assembly No. 1 are: 1100100000).<br>** C/A Codes for 34 and 37 are identical.<br>*** The two-tap coder utilized here is only an example implementation that generates a limited set of valid C/A codes.<br>⊕ = "exclusive or"</td></tr>
<tr><td colspan="8">NOTE #1: The code phase assignments constitute inseparable pairs, each consisting of a specific C/A and a specific P code phase, as shown above.</td></tr>
</table>
</td><td>The "exclusive or" in the notes section of Table 3-Ia is listed twice and only needs to be listed once.</td></tr>
<tr><td>3.2.2</td><td>During the initial period of Block IIR-M SVs operation, prior to Initial Operational Capability of L2 C signal, Block IIR-M may modulo-2 add the NAV data, D(t), to the L2 CM-code instead of CNAV data, $D_C(t)$. Moreover, the NAV data, D(t), can be used in one of two different data rates which are selectable by ground command. D(t) with a data rate of 50 bps can be commanded to be modulo-2 added to the L2 CM-code, or D(t) with a symbol rate of 50 symbols per second (sps) (rate ½ convolutional encoding of 25 bps NAV data) can be commanded to be modulo-2 added to the L2 CM-code. The resultant bit-train is combined</td><td></td><td><DELETE></td><td>This mode no longer reflects the accurate operation of GPS IIR-M and should be deleted.</td></tr>
</table>

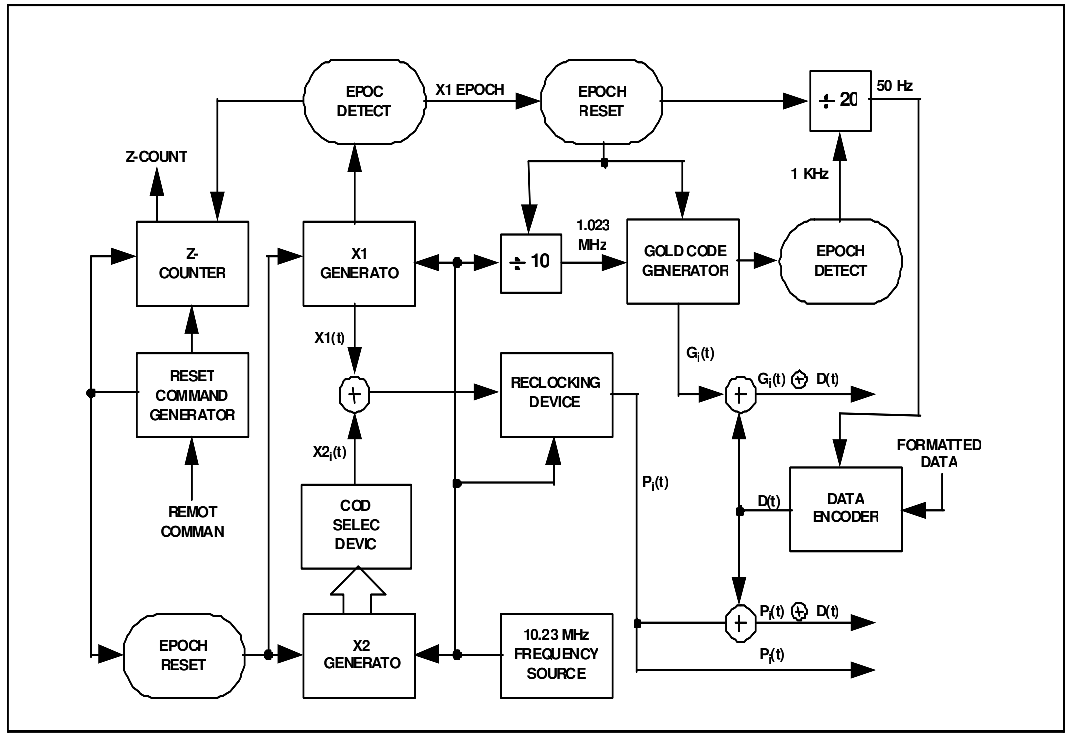
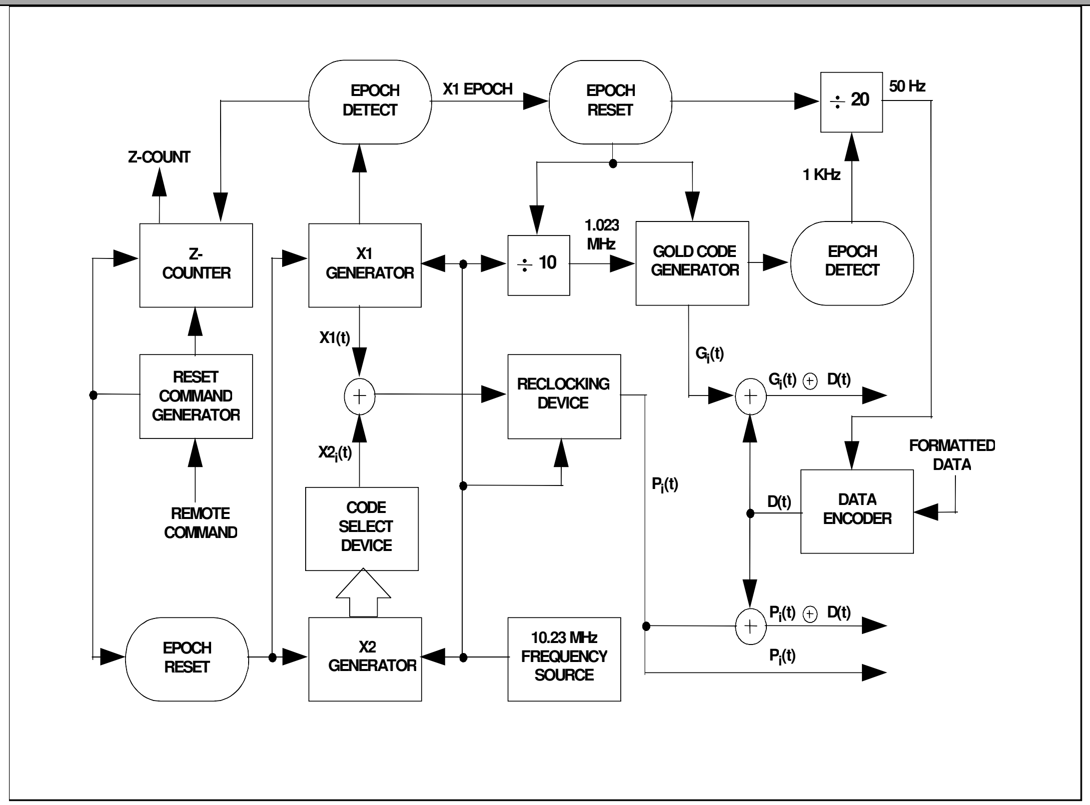
<table>
<tr><th>Section Number</th><th>IS-GPS-200 RevF IRN001 (17 Apr 2012) Navstar GPS Space Segment/Navigation User Interfaces</th><th>Proposed Object Heading</th><th>Proposed Public Signals-in-Space (SiS) Updates Object Text</th><th>Proposed Rationale</th></tr>
<tr><td></td><td>with L2 CL-code using chip by chip time-division multiplexing method (i.e. alternating between L2 CM ⊕ data and L2 CL chips). This multiplexed bit-train is used to modulate the L2 carrier.</td><td></td><td></td><td></td></tr>
<tr><td>3.2.3</td><td>
<table>
<tr><th colspan="5">Table 3-III. Signal Configuration</th></tr>
<tr><th rowspan="2">SV Blocks</th><th colspan="2">L1</th><th colspan="2">L2**</th></tr>
<tr><th>In-Phase*</th><th>Quadrature-Phase*</th><th>In-Phase*</th><th>Quadrature-Phase*</th></tr>
<tr><td>Block II/IIA/IIR</td><td>P(Y) ⊕ D(t)</td><td>C/A ⊕ D(t)</td><td>P(Y) ⊕ D(t)<br>or<br>P(Y)<br>or<br>C/A ⊕ D(t)</td><td>Not Applicable</td></tr>
<tr><td>Block IIR-M***</td><td>P(Y) ⊕ D(t)</td><td>C/A ⊕ D(t)</td><td>P(Y) ⊕ D(t)<br>or<br>P(Y)</td><td>L2 CM ⊕ D(t) with L2 CL<br>or<br>L2 CM ⊕ D′(t) with L2 CL<br>or<br>C/A ⊕ D(t)<br>or<br>C/A</td></tr>
<tr><td>Block IIR-M/IIF/ and GPS III</td><td>P(Y) ⊕ D(t)</td><td>C/A ⊕ D(t)</td><td>P(Y) ⊕ D(t)<br>or<br>P(Y)</td><td>L2 CM ⊕ $D_C(t)$ with L2 CL<br>or<br>C/A ⊕ D(t)<br>or<br>C/A</td></tr>
<tr><td colspan="5">Notes: 1) The configuration identified in this table reflects only the content of Section 3.2.3 and does not show all available codes/signals on L1/L2.<br>2) It should be noted that there are no flags or bits in the navigation message to directly indicate which signal option is broadcast for L2 Civil (L2 C) signal.<br>⊕ = “exclusive-or” (modulo-2 addition)<br>D(t) = NAV data at 50 bps<br>D′(t) = NAV data at 25 bps with FEC encoding resulting in 50 sps<br>$D_C(t)$ = CNAV data at 25 bps with FEC encoding resulting in 50 sps<br>* Terminology of “in-phase” and “quadrature-phase” is used only to identify the relative phase quadrature relationship of the carrier components (i.e. 90 degrees offset of each other).<br>** The two carrier components on L2 may not have the phase quadrature relationship. They may be broadcast on same phase (ref. Section 3.3.1.5).<br>*** Possible signal configuration for Block IIR-M only during the initial period of Block IIR-M SVs operation, prior to Initial Operational Capability of L2 C signal. See paragraph 3.2.2.</td></tr>
</table>
</td><td></td><td>
<table>
<tr><th colspan="5">Table 3-III. Signal Configuration</th></tr>
<tr><th rowspan="2">SV Blocks</th><th colspan="2">L1</th><th colspan="2">L2**</th></tr>
<tr><th>In-Phase*</th><th>Quadrature-Phase*</th><th>In-Phase*</th><th>Quadrature-Phase*</th></tr>
<tr><td>Block II/IIA/IIR</td><td>P(Y) ⊕ D(t)</td><td>C/A ⊕ D(t)</td><td>P(Y) ⊕ D(t)<br>or<br>P(Y)<br>or<br>C/A ⊕ D(t)</td><td>Not Applicable</td></tr>
<tr><td>Block IIR-M/IIF/ and GPS III</td><td>P(Y) ⊕ D(t)</td><td>C/A ⊕ D(t)</td><td>P(Y) ⊕ D(t)<br>or<br>P(Y)</td><td>L2 CM ⊕ $D_C(t)$ with L2 CL<br>or<br>C/A ⊕ D(t)<br>or<br>C/A</td></tr>
<tr><td colspan="5">Notes: 1) The configuration identified in this table reflects only the content of Section 3.2.3 and does not show all available codes/signals on L1/L2.<br>2) It should be noted that there are no flags or bits in the navigation message to directly indicate which signal option is broadcast for L2 Civil (L2 C) signal.<br>⊕ = “exclusive-or” (modulo-2 addition)<br>D(t) = NAV data at 50 bps<br>$D_C(t)$ = CNAV data at 25 bps with FEC encoding resulting in 50 sps<br>* Terminology of “in-phase” and “quadrature-phase” is used only to identify the relative phase quadrature relationship of the carrier components (i.e. 90 degrees offset of each other).<br>** The two carrier components on L2 may not have the phase quadrature relationship. They may be broadcast on same phase (ref. Section 3.3.1.5).</td></tr>
</table>
</td><td>The deletion of the "L2CM ⊕ D'(t) with L2 CL" signal is no longer a valid 'separate' mode and is deleted.<br>Block IIR-M also does not perform "L2CM ⊕ D(t) with L2 CL" thus leaving the only valid IIR-M operation in the second row as "C/A ⊕ D(t)" and C/A for L2. Both of these operations are listed in Row 3-titled "Block IIR-M-IIF/ and GPS III. Row #2 can be deleted.<br>In the Notes section, the "D'(t) = NAV Data at 25 bps with FEC encoding resulting in 50</td></tr>
</table>

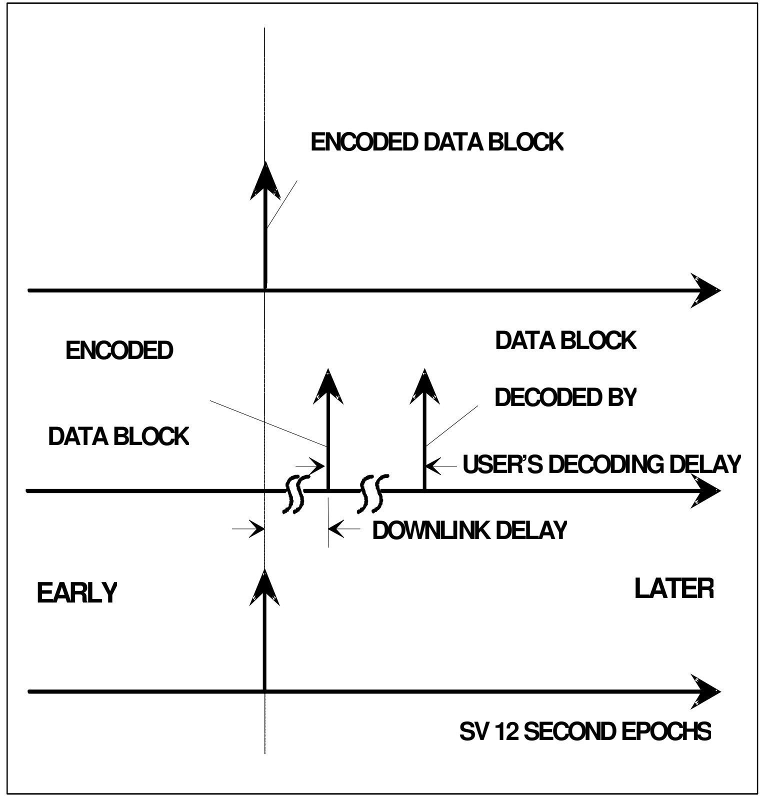
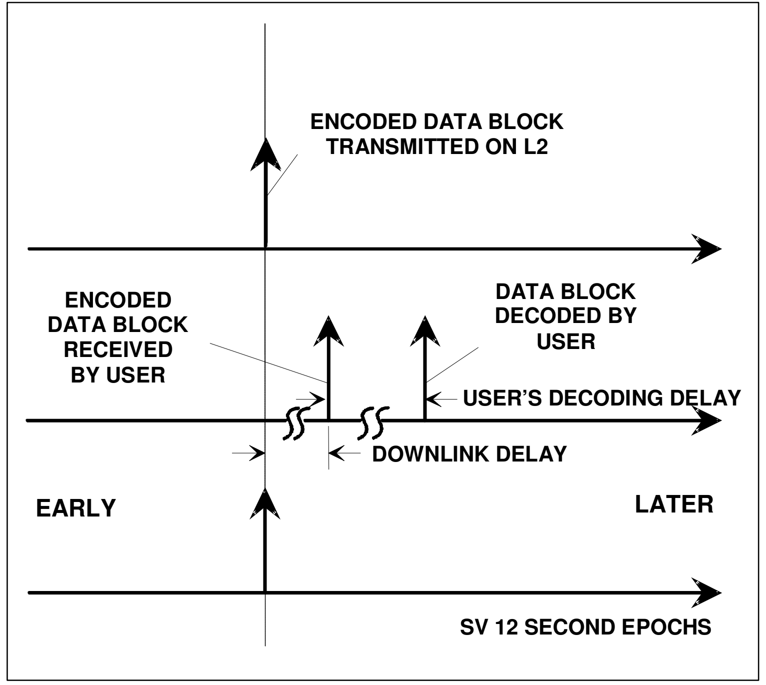
| Section Number | IS-GPS-200 RevF IRN001 (17 Apr 2012) Navstar GPS Space Segment/Navigation User Interfaces | Proposed Object Heading | Proposed Public Signals-in-Space (SiS) Updates Object Text | Proposed Rationale |
|---|---|---|---|---|
| | | | | sps is also deleted since D'(t) is no longer a separate convolutional encoded signal." is also deleted since D'(t) is no longer a valid signal.<br>In the Notes section, the verbiage "*** Possible signal configuration for Block IIR-M only during the initial period of Block IIR-M SVs operation, prior to Initial Operational Capability of L2C signal. See paragraph 3.2.2" is deleted since "L2CM ⊕ D'(t) with L2 CL" is no longer a valid configuration. |
| 3.3.1.5.1 | For Block IIR-M, IIF, and subsequent blocks of SVs, the two L2 carrier components shall be either in phase quadrature or in the same phase (within ±100 milliradians) - see paragraph | | For Block IIR-M, IIF, and subsequent blocks of SVs, the two L2 carrier components shall be either in phase quadrature or in the same phase (within ±100 milliradians) - see paragraph 3.3.1.5.3 for | The term L2P(Y) was |

| Section Number | IS-GPS-200 RevF IRN001 (17 Apr 2012) Navstar GPS Space Segment/Navigation User Interfaces | Proposed Object Heading | Proposed Public Signals-in-Space (SiS) Updates Object Text | Proposed Rationale |
|---|---|---|---|---|
| | 3.3.1.5.3 for additional information. The civil signal carrier component is modulated by any one of three (IIF) or four (IIR-M) different bit trains as described in paragraph 3.2.3. The resultant composite transmitted signal phases will vary as a function of the binary state of the modulating signals as well as the signal power ratio and phase quadrature relationship. Beyond these considerations, additional carrier components in Block IIR-M, IIF, and subsequent blocks of SVs will result in composite transmitted signal phase relationships other than the nominal special case of Table 3-IV. The current phase relationship of the two L2 carrier components (L2C and L2 P(Y)) shall be indicated by means of bit 273 of the CNAV Type 10 Message (See section 30.3.3), where zero indicates phase quadrature, with the L2C lagging the L2 P(Y) by 90 degrees, and one indicates that L2C and L2 P(Y) are in-phase. If the CNAV message is not available, then the L2C and L2 P(Y) shall be fixed in phase quadrature. | | additional information. The civil signal carrier component is modulated by any one of three (IIF) or four (IIR-M) different bit trains as described in paragraph 3.2.3. The resultant composite transmitted signal phases will vary as a function of the binary state of the modulating signals as well as the signal power ratio and phase quadrature relationship. Beyond these considerations, additional carrier components in Block IIR-M, IIF, and subsequent blocks of SVs will result in composite transmitted signal phase relationships other than the nominal special case of Table 3-IV. The current phase relationship of the two L2 carrier components (L2C and L2P(Y)) shall be indicated by means of bit 273 of the CNAV Type 10 Message (See section 30.3.3), where zero indicates phase quadrature, with the L2C lagging the L2P(Y) by 90 degrees, and one indicates that L2C and L2P(Y) are in-phase. If the CNAV message is not available, then the L2C and L2P(Y) shall be fixed in phase quadrature. | inadvertently changed to L2 P(Y) (L2 space P(Y)) in 4 instances in RevF. The term has been changed back to L2P(Y). |
| 3.3.1.8 | All transmitted signals for a particular SV shall be coherently derived from the same on-board frequency standard. On the L1 carrier, the chip transitions of the modulating signals, C/A and L1 P(Y), and on the L2 carrier the chip transitions of L2 P(Y) and L2C, shall be such that the average time difference between the chips on the same carrier do not exceed 10 nanoseconds. The variable time difference shall not exceed 1 nanosecond (95% probability), when including consideration of the temperature and antenna effect changes during a vehicle orbital revolution. Corrections for the bias components of the time difference are provided to the US in the CNAV message using parameters designated as ISCs (reference paragraph 30.3.3.3.1.1). | | All transmitted signals for a particular SV shall be coherently derived from the same on-board frequency standard. On the L1 carrier, the chip transitions of the modulating signals, C/A and L1P(Y), and on the L2 carrier the chip transitions of L2P(Y) and L2C, shall be such that the average time difference between the chips on the same carrier do not exceed 10 nanoseconds. The variable time difference shall not exceed 1 nanosecond (95% probability), when including consideration of the temperature and antenna effect changes during a vehicle orbital revolution. Corrections for the bias components of the time difference are provided to the US in the CNAV message using parameters designated as ISCs (reference paragraph 30.3.3.3.1.1). | The terms L1P(Y) and L2P(Y) was inadvertently changed to L1 P(Y) and L2 P(Y) (L1 space P(Y) and L2 space P(Y)) in RevF.<br>The terms have been changed back to L1P(Y) and L2P(Y) |
| 3.3.2.1 | For PRN codes 1 through 37, the $P_i(t)$ pattern (P-code) is generated by the modulo-2 summation of two PRN codes, X1(t) and X2(t - iT), where T is the period of one P-code chip and equals $(1.023E7)^{-1}$ seconds, while i is an integer from 1 through 37. This allows the generation of 37 unique P(t) code phases (identified in Table 3-Ia) using the same basic code generator.<br>Expanded P-code PRN sequences, $P_i(t)$ where $38 \le i \le 63$, are described as follows:<br>$P_i(t) = P_{i-37}(t - T)$ where T will equal 24 hours)<br>therefore, the equation is | | For PRN codes 1 through 37, the $P_i(t)$ pattern (P-code) is generated by the modulo-2 summation of two PRN codes, X1(t) and X2(t - iT), where T is the period of one P-code chip and equals $(1.023E7)^{-1}$ seconds, while i is an integer from 1 through 37. This allows the generation of 37 unique P(t) code phases (identified in Table 3-Ia) using the same basic code generator.<br>Expanded P-code PRN sequences, $P_i(t)$ where $38 \le i \le 63$, are described as follows:<br>$P_i(t) = P_{i-37}(t - T)$ where T will equal 24 hours)<br>therefore, the equation is | Fixed section reference number in the sentence "Section 6.3.7.1 provides a selected subset of additional P-, L2 CM-, L2 CL-, and the C/A-code |

| Section Number | IS-GPS-200 RevF IRN001 (17 Apr 2012) Navstar GPS Space Segment/Navigation User Interfaces | Proposed Object Heading | Proposed Public Signals-in-Space (SiS) Updates Object Text | Proposed Rationale |
|---|---|---|---|---|
| | $P_i(t) = P_{i-37x}(t + i * 24 \text{ hours})$,<br>where i is an integer from 64 to 210, x is an integer portion of (i-1)/37.<br>As an example, the P-code sequence for PRN 38 is the same sequence as PRN 1 shifted 24 hours into a week (i.e. 1st chip of PRN 38 at beginning of week is the same chip for PRN 1 at 24 hours after beginning of week). The list of expanded P-code PRN assignments is identified in Table 3-Ib.<br>The linear $G_i(t)$ pattern (C/A-code) is the modulo-2 sum of two 1023-bit linear patterns, G1 and $G2_i$. The latter sequence is selectively delayed by an integer number of chips to produce many different G(t) patterns (defined in Tables 3-Ia and 3-Ib).<br>The $C_{M,i}(t)$ pattern (L2 CM-code) is a linear pattern which is reset with a specified initial state every code count of 10230 chips. Different initial states are used to generate different $C_{M,i}(t)$ patterns (defined in Tables 3-IIa and 3-IIb).<br>The $C_{L,i}(t)$ pattern (L2 CL-code) is also a linear pattern but with a longer reset period of 767250 chips. Different initial states are used to generate different $C_{L,i}(t)$ patterns (defined in Tables 3-IIa and 3-IIb).<br>For a given SV ID, two different initial states are used to generate different $C_{L,i}(t)$ and $C_{M,i}(t)$ patterns.<br>Section 6.3.7.1 provides a selected subset of additional P-, L2 CM-, L2 CL-, and the C/A-code sequences with assigned PRN numbers. | | $P_i(t) = P_{i-37x}(t + i * 24 \text{ hours})$,<br>where i is an integer from 64 to 210, x is an integer portion of (i-1)/37.<br>As an example, the P-code sequence for PRN 38 is the same sequence as PRN 1 shifted 24 hours into a week (i.e. 1st chip of PRN 38 at beginning of week is the same chip for PRN 1 at 24 hours after beginning of week). The list of expanded P-code PRN assignments is identified in Table 3-Ib.<br>The linear $G_i(t)$ pattern (C/A-code) is the modulo-2 sum of two 1023-bit linear patterns, G1 and $G2_i$. The latter sequence is selectively delayed by an integer number of chips to produce many different G(t) patterns (defined in Tables 3-Ia and 3-Ib).<br>The $C_{M,i}(t)$ pattern (L2 CM-code) is a linear pattern which is reset with a specified initial state every code count of 10230 chips. Different initial states are used to generate different $C_{M,i}(t)$ patterns (defined in Tables 3-IIa and 3-IIb).<br>The $C_{L,i}(t)$ pattern (L2 CL-code) is also a linear pattern but with a longer reset period of 767250 chips. Different initial states are used to generate different $C_{L,i}(t)$ patterns (defined in Tables 3-IIa and 3-IIb).<br>For a given SV ID, two different initial states are used to generate different $C_{L,i}(t)$ and $C_{M,i}(t)$ patterns.<br>Section 6.3.6 provides a selected subset of additional P-, L2 CM-, L2 CL-, and the C/A-code sequences with assigned PRN numbers. | sequences with assigned PRN numbers" to "Section 6.3.6 provides a selected subset of additional P-, L2 CM-, L2 CL-, and the C/A-code sequences with assigned PRN numbers." |
| 3.3.2.1 | The linear $G_i(t)$ pattern (C/A-code) is the modulo-2 sum of two 1023-bit linear patterns, G1 and $G2_i$. The latter sequence is selectively delayed by an integer number of chips to produce many different G(t) patterns (defined in Table 3-I). | | <DELETE> | Text has been repeated as a result of a publication error and is unnecessary. |
| 3.3.2.1 | The $C_{M,i}(t)$ pattern (L2 CM-code) is a linear pattern which is reset with a specified initial state every code count of 10230 chips. Different initial states are used to generate different $C_{M,i}(t)$ patterns (defined in Table 3-II). | | <DELETE> | Text has been repeated as a result of a publication error and is |

| Section Number | IS-GPS-200 RevF IRN001 (17 Apr 2012) Navstar GPS Space Segment/Navigation User Interfaces | Proposed Object Heading | Proposed Public Signals-in-Space (SiS) Updates Object Text | Proposed Rationale |
|---|---|---|---|---|
| | | | | unnecessary. |
| 3.3.2.1 | The $C_{L,i}(t)$ pattern (L2 CL-code) is also a linear pattern but with a longer reset period of 767250 chips. Different initial states are used to generate different $C_{L,i}(t)$ patterns (defined in Table 3-II). | | <DELETE> | Text has been repeated as a result of a publication error and is unnecessary. |
| 3.3.2.1 | For a given SV ID, two different initial states are used to generate different $C_{L,i}(t)$ and $C_{M,i}(t)$ patterns. | | <DELETE> | Text has been repeated as a result of a publication error and is unnecessary. |
| 3.3.2.1 | Section 6.3.7.1 provides a selected subset of additional P-, L2 CM-, L2 CL-, and the C/A-code sequences with assigned PRN numbers. | | <DELETE> | Text has been repeated as a result of a publication error and is unnecessary. |

| Section Number | IS-GPS-200 RevF IRN001 (17 Apr 2012) Navstar GPS Space Segment/Navigation User Interfaces | Proposed Object Heading | Proposed Public Signals-in-Space (SiS) Updates Object Text | Proposed Rationale |
|---|---|---|---|---|
| 3.3.2.1 |  <br>Figure 3-1. Generation of P-, C/A-Codes and Modulating Signals | |  <br>Figure 3-1. Generation of P-, C/A-Codes and Modulating Signals | Fixed figure for clarity. The terms "X1 Generator," "Code Select Device," and "Remote Command" have been repaired. |
| 3.3.3.1 | For Block IIR-M, Block IIF, and subsequent blocks of SVs, the CNAV bit train, $D_C(t)$, is rate ½ encoded and, thus, clocked at 50 sps. The resultant symbol sequence is then modulo-2 added to the L2 CM-code. During the initial period of Block IIR-M SVs operation, prior to Initial Operational Capability of L2 C signal, and upon ground command, the NAV bit train, D(t), at one of two data rates, may be modulo-2 added to the L2 CM-code instead of CNAV data, $D_C(t)$, as further described in Section 3.2.2. | | For Block IIR-M, Block IIF, and subsequent blocks of SVs, the CNAV bit train, $D_C(t)$, is rate ½ encoded and, thus, clocked at 50 sps. The resultant symbol sequence is then modulo-2 added to the L2 CM-code. | This mode no longer reflects the accurate operation of GPS IIR-M and should be deleted. |

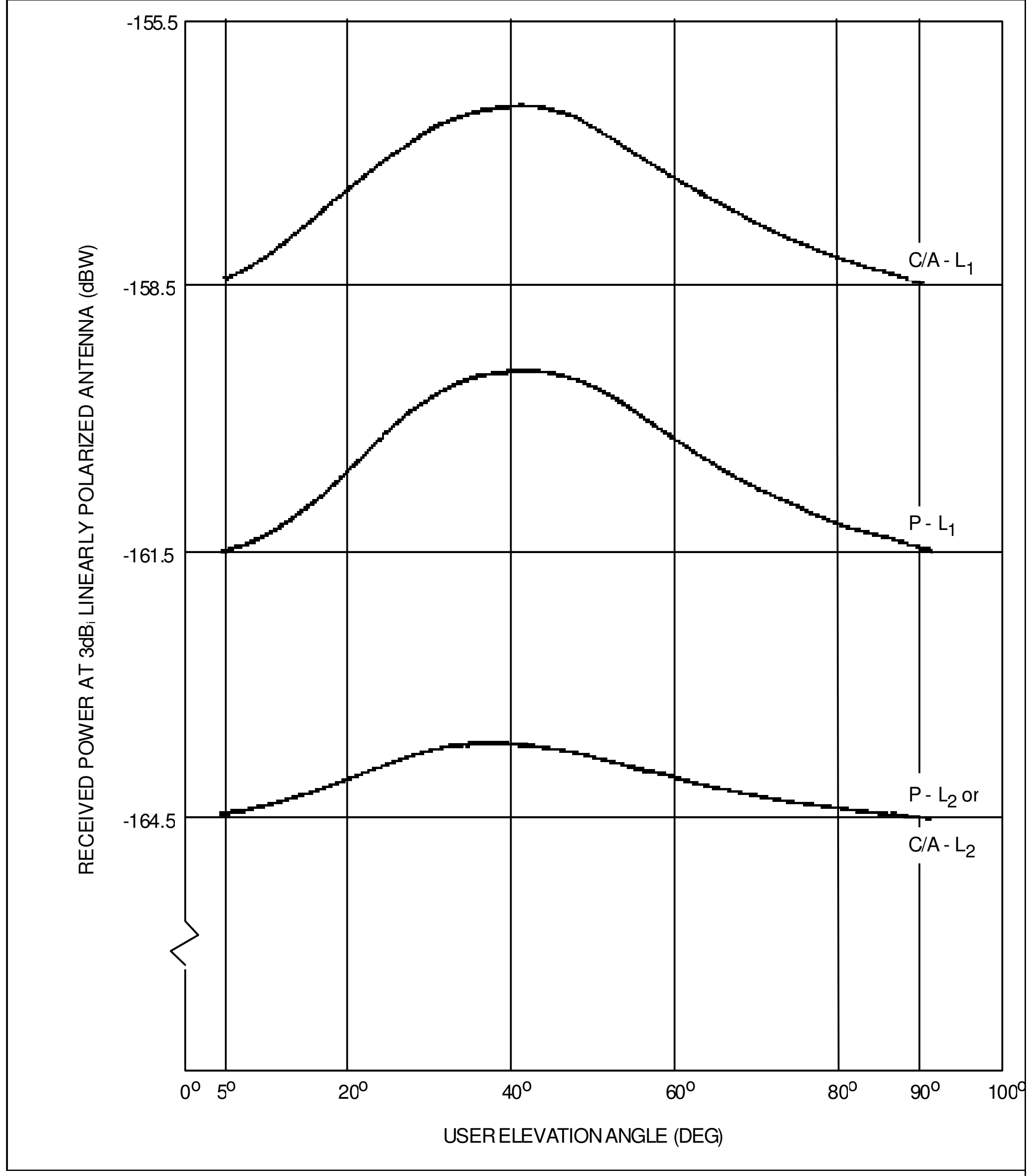
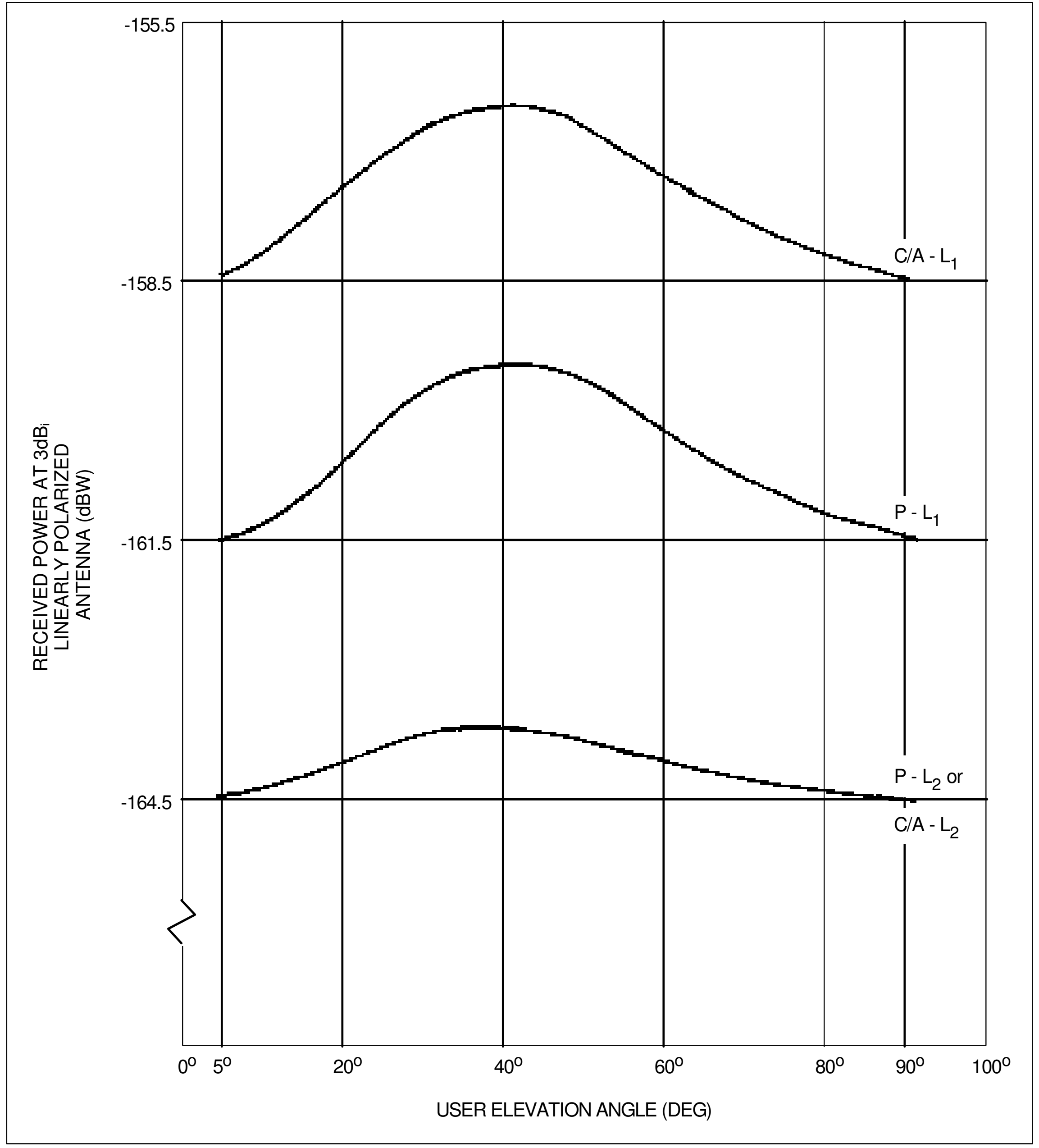
| Section Number | IS-GPS-200 RevF IRN001 (17 Apr 2012) Navstar GPS Space Segment/Navigation User Interfaces | Proposed Object Heading | Proposed Public Signals-in-Space (SiS) Updates Object Text | Proposed Rationale |
|---|---|---|---|---|
| 3.3.3.1.1 |  <br>Figure 3-15. Convolutional transmit/Decoding Timing Relationships | |  <br>Figure 3-15. Convolutional transmit/Decoding Timing Relationships | Publication error during Word export.<br>Figure is now correct in Word/PDF.<br>The terms "Encoded Data Block Received by User," "Data Block Decoded by User," and Encoded Data Block Transmitted on L2," have been repaired. |
| 3.3.4 | The NAV data contains the requisite data for relating GPS time to UTC. The accuracy of this data during the transmission interval shall be such that it relates GPS time (maintained by the MCS of the CS) to UTC (USNO) within 90 nanoseconds (one sigma). This data is generated by the CS; therefore, the accuracy of this relationship may degrade if for some reason the CS is unable to upload data to a SV. At this point, it is assumed that alternate sources of UTC are no longer available, and the relative accuracy of the GPS/UTC relationship will be sufficient for users. Range error components (e.g. SV clock and position) contribute to the GPS time transfer error, and under normal operating circumstances (two frequency time transfers from SV(s) whose navigation message indicates a URA of eight meters or less), this corresponds to a 97 nanosecond (one sigma) apparent uncertainty at the SV. Propagation delay errors and receiver equipment biases unique to the user add to this time transfer uncertainty. | | The NAV data contains the requisite data for relating GPS time to UTC. This data is generated by the CS; therefore, the accuracy of this relationship may degrade if for some reason the CS is unable to upload data to a SV. | The text "The accuracy of this data during the transmission interval shall be such that it relates GPS time (maintained by the MCS of the CS) to UTC (USNO) within 90 nanoseconds (one sigma)" |

| Section Number | IS-GPS-200 RevF IRN001 (17 Apr 2012) Navstar GPS Space Segment/Navigation User Interfaces | Proposed Object Heading | Proposed Public Signals-in-Space (SiS) Updates Object Text | Proposed Rationale |
|---|---|---|---|---|
| | | | | has been deleted. The rationale is that the time accuracy stated (90ns- one sigma) is not aligned to the PPS PS and the SPS PS (40ns).<br>Also removing text starting from "At this point..." as it can be misleading to the reader. |

| Section Number | IS-GPS-200 RevF IRN001 (17 Apr 2012) Navstar GPS Space Segment/Navigation User Interfaces | | | Proposed Object Heading | Proposed Public Signals-in-Space (SiS) Updates Object Text | | | Proposed Rationale |
|---|---|---|---|---|---|---|---|---|
| 6.1 | AI | - | Availability Indicator | | AI | - | Availability Indicator | The dBc term was inadvertently changed to DB in RevF. Modifying the term back to dBc. |
| | AODO | - | Age of Data Offset | | AODO | - | Age of Data Offset | |
| | A-S | - | Anti-Spoofing | | A-S | - | Anti-Spoofing | |
| | Autonav | - | Autonomous Navigation | | Autonav | - | Autonomous Navigation | |
| | BPSK | - | Bi-Phase Shift Key | | BPSK | - | Bi-Phase Shift Key | |
| | CDC | - | Clock Differential Correction | | CDC | - | Clock Differential Correction | |
| | CNAV | - | Civil Navigation | | CNAV | - | Civil Navigation | |
| | cps | - | cycles per second | | cps | - | cycles per second | |
| | CRC | - | Cyclic Redundancy Check | | CRC | - | Cyclic Redundancy Check | |
| | CS | - | Control Segment | | CS | - | Control Segment | |
| | DC | - | Differential Correction | | DC | - | Differential Correction | |
| | Db | - | Power ratio of a signal to a (unmodulated) carrier signal, expressed in decibels | | dBc | - | Power ratio of a signal to a (unmodulated) carrier signal, expressed in decibels | |
| | dBi | - | Decibel with respect to isotropic antenna | | dBi | - | Decibel with respect to isotropic antenna | |
| | dBW | - | Decibel with respect to 1 W | | dBW | - | Decibel with respect to 1 W | |
| | DN | - | Day Number | | DN | - | Day Number | |
| | EAROM | - | Electrically Alterable Read-Only Memory | | EAROM | - | Electrically Alterable Read-Only Memory | |
| | ECEF | - | Earth-Centered, Earth-Fixed | | ECEF | - | Earth-Centered, Earth-Fixed | |
| | ECI | - | Earth-Centered, Inertial | | ECI | - | Earth-Centered, Inertial | |
| | EDC | - | Ephemeris Differential Correction | | EDC | - | Ephemeris Differential Correction | |
| | EOE | - | Edge-of-Earth | | EOE | - | Edge-of-Earth | |
| | EOL | - | End of Life | | EOL | - | End of Life | |
| | ERD | - | Estimated Range Deviation | | ERD | - | Estimated Range Deviation | |
| | FEC | - | Forward Error Correction | | FEC | - | Forward Error Correction | |
| | GGTO | - | GPS/GNSS Time Offset | | GGTO | - | GPS/GNSS Time Offset | |
| | GNSS | - | Global Navigation Satellite System | | GNSS | - | Global Navigation Satellite System | |
| | GPS | - | Global Positioning System | | GPS | - | Global Positioning System | |

| Section Number | IS-GPS-200 RevF IRN001 (17 Apr 2012) Navstar GPS Space Segment/Navigation User Interfaces | Proposed Object Heading | Proposed Public Signals-in-Space (SiS) Updates Object Text | Proposed Rationale |
|---|---|---|---|---|
| | | | | |
| 6.2.1 | 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. | | User Range Accuracy (URA) is a statistical indicator of the GPS ranging accuracy obtainable with a specific signal and SV. URA provides a conservative RMS estimate of the user range error (URE) in the associated navigation data for the transmitting SV. It includes all errors for which the Space and Control Segments are responsible. Whether the integrity status flag is 'off' or 'on', 4.42 times URA bounds the instantaneous URE with 1-(1e-5) per hour probability (‘legacy’ level of integrity assurance). When the integrity status flag is 'on', 5.73 times URA bounds the instantaneous URE with 1-(1e-8) per hour probability (‘enhanced’ level of integrity assurance). Integrity properties of the URA are specified with respect to the scaled (multiplied by either 4.42 or 5.73 as appropriate) upper bound values of the URA index or to the scaled composite of the upper bound values of all component URA indexes. | Removing "under all conditions" in two instances.<br>The text URA applies "under all conditions" contradicts the text found in Note #3 of Section 6.2.1 which details conditions under which URA does not apply. |
| 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 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-standard code, parity error, etc. | | 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) if the integrity status flag is 'off' an alert is issued to the users no more than 8.0 seconds after the instantaneous URE exceeds the 4.42 times URA bound; or (c) if the integrity status flag is 'on' an alert is issued to the users no more than 8.0 seconds after the instantaneous URE exceeds the 4.42 times URA bound; or (d) if the integrity status flag is 'on' an alert is issued to 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. | The (b) and (c) conditions of this requirement have been rewritten since condition (b) and (c) must happen together for the conditions to apply. However, condition (b) states the integrity status flag must be 'on' and condition 'c' |

| Section Number | IS-GPS-200 RevF IRN001 (17 Apr 2012) Navstar GPS Space Segment/Navigation User Interfaces | Proposed Object Heading | Proposed Public Signals-in-Space (SiS) Updates Object Text | Proposed Rationale |
|---|---|---|---|---|
| | | | | states the integrity status flag must be 'off' at the same time for the conditions to apply. The text has been rewritten to reflect the conditions are separate.<br>These 3 conditions have now been decomposed into 4 conditions to decrease ambiguity. |

| Section Number | IS-GPS-200 RevF IRN001 (17 Apr 2012) Navstar GPS Space Segment/Navigation User Interfaces | Proposed Object Heading | Proposed Public Signals-in-Space (SiS) Updates Object Text | Proposed Rationale |
|---|---|---|---|---|
| 6.3.1 |  <br>Figure 6-1. User Received Minimum Signal Level Variations (Example, Block II/IIA/IIR) |  |  <br>Figure 6-1. User Received Minimum Signal Level Variations (Example, Block II/IIA/IIR) | The Y-axis header is now divided into three lines. |
| 6.3.3 | **Block IIA Mode (Block IIR/IIR-M)** | Block IIA Mode (Block |  | Renaming Section 6.3.3 to encompass |

| Section Number | IS-GPS-200 RevF IRN001 (17 Apr 2012) Navstar GPS Space Segment/Navigation User Interfaces | Proposed Object Heading | Proposed Public Signals-in-Space (SiS) Updates Object Text | Proposed Rationale |
|---|---|---|---|---|
| | | IIR/IIR-M) and Extended Navigation Mode (Block II-F). | | both 6.3.3.1 (Block IIA Mode (Block IIR/IIR-M) and 6.3.3.2, "Extended Navigation Mode (Block II-F). This reverts to the numbering found in IS-200, Rev E. |
| 6.3.3.1 | | Block IIA Mode (Block IIR/IIR-M). | | Moved Block IIA mode (Section 6.3.3) to Section 6.3.3.1 to list Block IIA Mode (Block IIR/IIR-M) and Extended Navigation Mode (Block II-F) in chronological order.<br>All associated text with Section 6.3.3 has also moved to Section 6.3.3.1. |
| 6.3.3.2 | | Extended Navigation Mode (Block II- | | Moved Extended Navigation Mode (Block II- |

| Section Number | IS-GPS-200 RevF IRN001 (17 Apr 2012) Navstar GPS Space Segment/Navigation User Interfaces | Proposed Object Heading | Proposed Public Signals-in-Space (SiS) Updates Object Text | Proposed Rationale |
|---|---|---|---|---|
| | | F). | | F) from 6.3.4 to Section 6.3.3.2 to list Block IIA Mode (Block IIR/IIR-M) and Extended Navigation Mode (Block II-F) in chronological order.<br>All associated text with Section 6.3.4 has also moved to Section 6.3.3.2. |
| 6.3.4 | **Extended Navigation Mode (Block II-F).** | Extended Navigation Mode (GPS III). | | Moving Section 6.3.5 "Extended Navigation Mode (GPS III)" to 6.3.4, which honors the RevE numbering.<br>All associated text with Section 6.3.5 has also moved to Section 6.3.4. |
| 6.3.5 | **Extended Navigation Mode (GPS III).** | Autonomous Navigatio | | Moving Section 6.3.6 "Autonomous |

| Section Number | IS-GPS-200 RevF IRN001 (17 Apr 2012) Navstar GPS Space Segment/Navigation User Interfaces | Proposed Object Heading | Proposed Public Signals-in-Space (SiS) Updates Object Text | Proposed Rationale |
|---|---|---|---|---|
| | | n Mode. | | Navigation Mode" to 6.3.5, which honors the RevE numbering.<br>All associated text with Section 6.3.6 has also moved to Section 6.3.5. |
| 6.3.6 | **Autonomous Navigation Mode.** | Additional PRN Code Sequences | | Moving Section 6.3.7 "Additional PRN Code Sequences" to 6.3.6, which honors the RevE numbering.<br>All associated text with Section 6.3.6 has also moved to Section 6.3.7. |
| 6.3.6.1 | | Additional C/A-code PRN sequences. | | Due to the renumbering of Sections 6.3.7 to 6.3.6, all associated sections from 6.3.7 have been moved to be part of |

| Section Number | IS-GPS-200 RevF IRN001 (17 Apr 2012) Navstar GPS Space Segment/Navigation User Interfaces | Proposed Object Heading | Proposed Public Signals-in-Space (SiS) Updates Object Text | Proposed Rationale |
|---|---|---|---|---|
| | | | | 6.3.6.<br>All associated text with Section 6.3.7.1 has also moved to Section 6.3.6.1 |
| 6.3.6.2 | | Additional P-Code PRN sequences. | | Due to the renumbering of Sections 6.3.7 to 6.3.6, all associated sections from 6.3.7 have been moved to be part of 6.3.6.<br>All associated text with Section 6.3.7.2 has also moved to Section 6.3.6.2 |
| 6.3.6.2.1 | | Additional P-code Generation. | | Due to the renumbering of Sections 6.3.7 to 6.3.6, all associated sections from 6.3.7 have been moved to be part of 6.3.6.<br>All associated |

| Section Number | IS-GPS-200 RevF IRN001 (17 Apr 2012) Navstar GPS Space Segment/Navigation User Interfaces | Proposed Object Heading | Proposed Public Signals-in-Space (SiS) Updates Object Text | Proposed Rationale |
|---|---|---|---|---|
| | | | | text with Section 6.3.7.2.1 has also moved to Section 6.3.6.2.1. |

<table>
<tr><th>Section Number</th><th>IS-GPS-200 RevF IRN001 (17 Apr 2012) Navstar GPS Space Segment/Navigation User Interfaces</th><th>Proposed Object Heading</th><th>Proposed Public Signals-in-Space (SiS) Updates Object Text</th><th>Proposed Rationale</th></tr>
<tr><td>6.3.6.2.1</td><td>
<table>
<tr><th colspan="7">Table 6-I Additional C/A-/P-Code Phase Assignments (sheet 1 of 5)</th></tr>
<tr><th rowspan="2">PRN Signal No.</th><th colspan="3">C/A</th><th colspan="3">P</th></tr>
<tr><th>G2 Delay (Chips)</th><th>Initial G2 Setting (Octal)*</th><th>First 10 Chips (Octal)**</th><th>X2 Delay (Chips)</th><th>P-code Relative Advance (Hours) **</th><th>First 12 Chips (Octal)</th></tr>
<tr><td>64</td><td>729</td><td>0254</td><td>1523</td><td>27</td><td>$P_{27}(t+24)$</td><td>5112</td></tr>
<tr><td>65</td><td>695</td><td>1602</td><td>0175</td><td>28</td><td>$P_{28}(t+24)$</td><td>0667</td></tr>
<tr><td>66</td><td>780</td><td>1160</td><td>0617</td><td>29</td><td>$P_{29}(t+24)$</td><td>2111</td></tr>
<tr><td>67</td><td>801</td><td>1114</td><td>0663</td><td>30</td><td>$P_{30}(t+24)$</td><td>5266</td></tr>
<tr><td>68</td><td>788</td><td>1342</td><td>0435</td><td>31</td><td>$P_{31}(t+24)$</td><td>4711</td></tr>
<tr><td>69</td><td>732</td><td>0025</td><td>1752</td><td>32</td><td>$P_{32}(t+24)$</td><td>4166</td></tr>
<tr><td>70</td><td>34</td><td>1523</td><td>0254</td><td>33</td><td>$P_{33}(t+24)$</td><td>2251</td></tr>
<tr><td>71</td><td>320</td><td>1046</td><td>0731</td><td>34</td><td>$P_{34}(t+24)$</td><td>5306</td></tr>
<tr><td>72</td><td>327</td><td>0404</td><td>1373</td><td>35</td><td>$P_{35}(t+24)$</td><td>4761</td></tr>
<tr><td>73</td><td>389</td><td>1445</td><td>0332</td><td>36</td><td>$P_{36}(t+24)$</td><td>2152</td></tr>
<tr><td>74</td><td>407</td><td>1054</td><td>0723</td><td>37</td><td>$P_{37}(t+24)$</td><td>5247</td></tr>
<tr><td>75</td><td>525</td><td>0072</td><td>1705</td><td>1</td><td>$P_{1}(t+48)$</td><td>5736</td></tr>
<tr><td>76</td><td>405</td><td>0262</td><td>1515</td><td>2</td><td>$P_{2}(t+48)$</td><td>2575</td></tr>
<tr><td>77</td><td>221</td><td>0077</td><td>1700</td><td>3</td><td>$P_{3}(t+48)$</td><td>3054</td></tr>
<tr><td>78</td><td>761</td><td>0521</td><td>1256</td><td>4</td><td>$P_{4}(t+48)$</td><td>3604</td></tr>
<tr><td>79</td><td>260</td><td>1400</td><td>0377</td><td>5</td><td>$P_{5}(t+48)$</td><td>3520</td></tr>
<tr><td>80</td><td>326</td><td>1010</td><td>0767</td><td>6</td><td>$P_{6}(t+48)$</td><td>5472</td></tr>
<tr><td>81</td><td>955</td><td>1441</td><td>0336</td><td>7</td><td>$P_{7}(t+48)$</td><td>4417</td></tr>
<tr><td>82</td><td>653</td><td>0365</td><td>1412</td><td>8</td><td>$P_{8}(t+48)$</td><td>2025</td></tr>
<tr><td>83</td><td>699</td><td>0270</td><td>1507</td><td>9</td><td>$P_{9}(t+48)$</td><td>3230</td></tr>
<tr><td>84</td><td>422</td><td>0263</td><td>1514</td><td>10</td><td>$P_{10}(t+48)$</td><td>5736</td></tr>
<tr><td>85</td><td>188</td><td>0613</td><td>1164</td><td>11</td><td>$P_{11}(t+48)$</td><td>4575</td></tr>
<tr><td>86</td><td>438</td><td>0277</td><td>1500</td><td>12</td><td>$P_{12}(t+48)$</td><td>2054</td></tr>
<tr><td>87</td><td>959</td><td>1562</td><td>0215</td><td>13</td><td>$P_{13}(t-48)$</td><td>3204</td></tr>
<tr><td>88</td><td>539</td><td>1674</td><td>0103</td><td>14</td><td>$P_{14}(t+48)$</td><td>3720</td></tr>
<tr><td>89</td><td>879</td><td>1113</td><td>0664</td><td>15</td><td>$P_{15}(t+48)$</td><td>5572</td></tr>
<tr><td>90</td><td>677</td><td>1245</td><td>0532</td><td>16</td><td>$P_{16}(t+48)$</td><td>4457</td></tr>
<tr><td>91</td><td>586</td><td>0606</td><td>1171</td><td>17</td><td>$P_{17}(t+48)$</td><td>4005</td></tr>
<tr><td>92</td><td>153</td><td>0136</td><td>1641</td><td>18</td><td>$P_{18}(t+48)$</td><td>2220</td></tr>
<tr><td>93</td><td>792</td><td>0256</td><td>1521</td><td>19</td><td>$P_{19}(t+48)$</td><td>3332</td></tr>
<tr><td>94</td><td>814</td><td>1550</td><td>0227</td><td>20</td><td>$P_{20}(t+48)$</td><td>3777</td></tr>
<tr><td>95</td><td>446</td><td>1234</td><td>0543</td><td>21</td><td>$P_{21}(t+48)$</td><td>3555</td></tr>
<tr><td colspan="7">* In the octal notation for the first 10 chips of the C/A-code or the initial settings as shown in this table, the first digit (1/0) represents a "1" or “0”, respectively, for the first chip and the last three digits are the conventional octal representation of the remaining 9 chips. (For example, the first 10 chips of the C/A code for PRN Signal Assembly No. 64 are: 1101010011).<br>** $P_i(t+N)$: P-code sequence of PRN number i shifted by N hours. See Section 6.3.7.2.1.</td></tr>
<tr><td colspan="7">NOTE: The code phase assignments constitute inseparable pairs, each consisting of a specific C/A and a specific P code phase, as shown above.</td></tr>
</table>
</td><td></td><td>
<table>
<tr><th colspan="7">Table 6-I Additional C/A-/P-Code Phase Assignments (sheet 1 of 5)</th></tr>
<tr><th rowspan="2">PRN Signal No.</th><th colspan="3">C/A</th><th colspan="3">P</th></tr>
<tr><th>G2 Delay (Chips)</th><th>Initial G2 Setting (Octal)*</th><th>First 10 Chips (Octal)**</th><th>X2 Delay (Chips)</th><th>P-code Relative Advance (Hours) **</th><th>First 12 Chips (Octal)</th></tr>
<tr><td>64</td><td>729</td><td>0254</td><td>1523</td><td>27</td><td>$P_{27}(t+24)$</td><td>5112</td></tr>
<tr><td>65</td><td>695</td><td>1602</td><td>0175</td><td>28</td><td>$P_{28}(t+24)$</td><td>0667</td></tr>
<tr><td>66</td><td>780</td><td>1160</td><td>0617</td><td>29</td><td>$P_{29}(t+24)$</td><td>2111</td></tr>
<tr><td>67</td><td>801</td><td>1114</td><td>0663</td><td>30</td><td>$P_{30}(t+24)$</td><td>5266</td></tr>
<tr><td>68</td><td>788</td><td>1342</td><td>0435</td><td>31</td><td>$P_{31}(t+24)$</td><td>4711</td></tr>
<tr><td>69</td><td>732</td><td>0025</td><td>1752</td><td>32</td><td>$P_{32}(t+24)$</td><td>4166</td></tr>
<tr><td>70</td><td>34</td><td>1523</td><td>0254</td><td>33</td><td>$P_{33}(t+24)$</td><td>2251</td></tr>
<tr><td>71</td><td>320</td><td>1046</td><td>0731</td><td>34</td><td>$P_{34}(t+24)$</td><td>5306</td></tr>
<tr><td>72</td><td>327</td><td>0404</td><td>1373</td><td>35</td><td>$P_{35}(t+24)$</td><td>4761</td></tr>
<tr><td>73</td><td>389</td><td>1445</td><td>0332</td><td>36</td><td>$P_{36}(t+24)$</td><td>2152</td></tr>
<tr><td>74</td><td>407</td><td>1054</td><td>0723</td><td>37</td><td>$P_{37}(t+24)$</td><td>5247</td></tr>
<tr><td>75</td><td>525</td><td>0072</td><td>1705</td><td>1</td><td>$P_{1}(t+48)$</td><td>5736</td></tr>
<tr><td>76</td><td>405</td><td>0262</td><td>1515</td><td>2</td><td>$P_{2}(t+48)$</td><td>2575</td></tr>
<tr><td>77</td><td>221</td><td>0077</td><td>1700</td><td>3</td><td>$P_{3}(t+48)$</td><td>3054</td></tr>
<tr><td>78</td><td>761</td><td>0521</td><td>1256</td><td>4</td><td>$P_{4}(t+48)$</td><td>3604</td></tr>
<tr><td>79</td><td>260</td><td>1400</td><td>0377</td><td>5</td><td>$P_{5}(t+48)$</td><td>3520</td></tr>
<tr><td>80</td><td>326</td><td>1010</td><td>0767</td><td>6</td><td>$P_{6}(t+48)$</td><td>5472</td></tr>
<tr><td>81</td><td>955</td><td>1441</td><td>0336</td><td>7</td><td>$P_{7}(t+48)$</td><td>4417</td></tr>
<tr><td>82</td><td>653</td><td>0365</td><td>1412</td><td>8</td><td>$P_{8}(t+48)$</td><td>2025</td></tr>
<tr><td>83</td><td>699</td><td>0270</td><td>1507</td><td>9</td><td>$P_{9}(t+48)$</td><td>3230</td></tr>
<tr><td>84</td><td>422</td><td>0263</td><td>1514</td><td>10</td><td>$P_{10}(t+48)$</td><td>5736</td></tr>
<tr><td>85</td><td>188</td><td>0613</td><td>1164</td><td>11</td><td>$P_{11}(t+48)$</td><td>4575</td></tr>
<tr><td>86</td><td>438</td><td>0277</td><td>1500</td><td>12</td><td>$P_{12}(t+48)$</td><td>2054</td></tr>
<tr><td>87</td><td>959</td><td>1562</td><td>0215</td><td>13</td><td>$P_{13}(t-48)$</td><td>3204</td></tr>
<tr><td>88</td><td>539</td><td>1674</td><td>0103</td><td>14</td><td>$P_{14}(t+48)$</td><td>3720</td></tr>
<tr><td>89</td><td>879</td><td>1113</td><td>0664</td><td>15</td><td>$P_{15}(t+48)$</td><td>5572</td></tr>
<tr><td>90</td><td>677</td><td>1245</td><td>0532</td><td>16</td><td>$P_{16}(t+48)$</td><td>4457</td></tr>
<tr><td>91</td><td>586</td><td>0606</td><td>1171</td><td>17</td><td>$P_{17}(t+48)$</td><td>4005</td></tr>
<tr><td>92</td><td>153</td><td>0136</td><td>1641</td><td>18</td><td>$P_{18}(t+48)$</td><td>2220</td></tr>
<tr><td>93</td><td>792</td><td>0256</td><td>1521</td><td>19</td><td>$P_{19}(t+48)$</td><td>3332</td></tr>
<tr><td>94</td><td>814</td><td>1550</td><td>0227</td><td>20</td><td>$P_{20}(t+48)$</td><td>3777</td></tr>
<tr><td>95</td><td>446</td><td>1234</td><td>0543</td><td>21</td><td>$P_{21}(t+48)$</td><td>3555</td></tr>
<tr><td colspan="7">* In the octal notation for the first 10 chips of the C/A-code or the initial settings as shown in this table, the first digit (1/0) represents a "1" or “0”, respectively, for the first chip and the last three digits are the conventional octal representation of the remaining 9 chips. (For example, the first 10 chips of the C/A code for PRN Signal Assembly No. 64 are: 1101010011).<br>** $P_i(t+N)$: P-code sequence of PRN number i shifted by N hours. See Section 6.3.6.2.1.</td></tr>
<tr><td colspan="7">NOTE: The code phase assignments constitute inseparable pairs, each consisting of a specific C/A and a specific P code phase, as shown above.</td></tr>
</table>
</td><td>References in Table have changed from 6.3.7.2.1 to Section 6.3.6.2.1.</td></tr>
</table>

<table>
<tr><th>Section Number</th><th>IS-GPS-200 RevF IRN001 (17 Apr 2012) Navstar GPS Space Segment/Navigation User Interfaces</th><th>Proposed Object Heading</th><th>Proposed Public Signals-in-Space (SiS) Updates Object Text</th><th>Proposed Rationale</th></tr>
<tr><td>6.3.6.2.1</td><td>
<table>
<tr><th colspan="7">Table 6-I Additional C/A-/P-Code Phase Assignments (sheet 2 of 5)</th></tr>
<tr><th rowspan="2">PRN Signal No.</th><th colspan="3">C/A</th><th colspan="3">P</th></tr>
<tr><th>G2 Delay (Chips)</th><th>Initial G2 Setting (Octal)*</th><th>First 10 Chips (Octal)*</th><th>X2 Delay (Chips)</th><th>P-code Relative Advance (Hours) **</th><th>First 12 Chips (Octal)</th></tr>
<tr><td>96</td><td>264</td><td>0260</td><td>1517</td><td>22</td><td>$P_{22}(t+48)$</td><td>3444</td></tr>
<tr><td>97</td><td>1015</td><td>1455</td><td>0322</td><td>23</td><td>$P_{23}(t+48)$</td><td>7400</td></tr>
<tr><td>98</td><td>278</td><td>1535</td><td>0242</td><td>24</td><td>$P_{24}(t+48)$</td><td>1422</td></tr>
<tr><td>99</td><td>536</td><td>0746</td><td>1031</td><td>25</td><td>$P_{25}(t+48)$</td><td>2433</td></tr>
<tr><td>100</td><td>819</td><td>1033</td><td>0744</td><td>26</td><td>$P_{26}(t+48)$</td><td>7037</td></tr>
<tr><td>101</td><td>156</td><td>1213</td><td>0564</td><td>27</td><td>$P_{27}(t+48)$</td><td>1635</td></tr>
<tr><td>102</td><td>957</td><td>0710</td><td>1067</td><td>28</td><td>$P_{28}(t+48)$</td><td>6534</td></tr>
<tr><td>103</td><td>159</td><td>0721</td><td>1056</td><td>29</td><td>$P_{29}(t+48)$</td><td>5074</td></tr>
<tr><td>104</td><td>712</td><td>1763</td><td>0014</td><td>30</td><td>$P_{30}(t+48)$</td><td>0614</td></tr>
<tr><td>105</td><td>885</td><td>1751</td><td>0026</td><td>31</td><td>$P_{31}(t+48)$</td><td>6124</td></tr>
<tr><td>106</td><td>461</td><td>0435</td><td>1342</td><td>32</td><td>$P_{32}(t+48)$</td><td>1270</td></tr>
<tr><td>107</td><td>248</td><td>0735</td><td>1042</td><td>33</td><td>$P_{33}(t+48)$</td><td>2716</td></tr>
<tr><td>108</td><td>713</td><td>0771</td><td>1006</td><td>34</td><td>$P_{34}(t+48)$</td><td>5165</td></tr>
<tr><td>109</td><td>126</td><td>0140</td><td>1637</td><td>35</td><td>$P_{35}(t+48)$</td><td>0650</td></tr>
<tr><td>110</td><td>807</td><td>0111</td><td>1666</td><td>36</td><td>$P_{36}(t+48)$</td><td>6106</td></tr>
<tr><td>111</td><td>279</td><td>0656</td><td>1121</td><td>37</td><td>$P_{37}(t+48)$</td><td>5261</td></tr>
<tr><td>112</td><td>122</td><td>1016</td><td>0761</td><td>1</td><td>$P_{1}(t+72)$</td><td>6752</td></tr>
<tr><td>113</td><td>197</td><td>0462</td><td>1315</td><td>2</td><td>$P_{2}(t+72)$</td><td>5147</td></tr>
<tr><td>114</td><td>693</td><td>1011</td><td>0766</td><td>3</td><td>$P_{3}(t+72)$</td><td>0641</td></tr>
<tr><td>115</td><td>632</td><td>0552</td><td>1225</td><td>4</td><td>$P_{4}(t+72)$</td><td>6102</td></tr>
<tr><td>116</td><td>771</td><td>0045</td><td>1732</td><td>5</td><td>$P_{5}(t+72)$</td><td>1263</td></tr>
<tr><td>117</td><td>467</td><td>1104</td><td>0673</td><td>6</td><td>$P_{6}(t+72)$</td><td>2713</td></tr>
<tr><td>118</td><td>647</td><td>0557</td><td>1220</td><td>7</td><td>$P_{7}(t+72)$</td><td>3167</td></tr>
<tr><td>119</td><td>203</td><td>0364</td><td>1413</td><td>8</td><td>$P_{8}(t+72)$</td><td>3651</td></tr>
<tr><td>120</td><td>145</td><td>1106</td><td>0671</td><td>9</td><td>$P_{9}(t+72)$</td><td>7506</td></tr>
<tr><td>121</td><td>175</td><td>1241</td><td>0536</td><td>10</td><td>$P_{10}(t+72)$</td><td>5461</td></tr>
<tr><td>122</td><td>52</td><td>0267</td><td>1510</td><td>11</td><td>$P_{11}(t+72)$</td><td>0412</td></tr>
<tr><td>123</td><td>21</td><td>0232</td><td>1545</td><td>12</td><td>$P_{12}(t+72)$</td><td>6027</td></tr>
<tr><td>124</td><td>237</td><td>1617</td><td>0160</td><td>13</td><td>$P_{13}(t+72)$</td><td>1231</td></tr>
<tr><td>125</td><td>235</td><td>1076</td><td>0701</td><td>14</td><td>$P_{14}(t+72)$</td><td>2736</td></tr>
<tr><td colspan="7">* In the octal notation for the first 10 chips of the C/A-code or the initial settings as shown in this table, the first digit (1/0) represents a "1" or “0”, respectively, for the first chip and the last three digits are the conventional octal representation of the remaining 9 chips. (For example, the first 10 chips of the C/A code for PRN Signal Assembly No. 64 are: 1101010011).<br>** $P_i$(t+N): P-code sequence of PRN number i shifted by N hours. See Section 6.3.7.2.1.</td></tr>
<tr><td colspan="7">NOTE: The code phase assignments constitute inseparable pairs, each consisting of a specific C/A and a specific P code phase, as shown above.</td></tr>
</table>
</td><td></td><td>
<table>
<tr><th colspan="7">Table 6-I Additional C/A-/P-Code Phase Assignments (sheet 2 of 5)</th></tr>
<tr><th rowspan="2">PRN Signal No.</th><th colspan="3">C/A</th><th colspan="3">P</th></tr>
<tr><th>G2 Delay (Chips)</th><th>Initial G2 Setting (Octal)*</th><th>First 10 Chips (Octal)*</th><th>X2 Delay (Chips)</th><th>P-code Relative Advance (Hours) **</th><th>First 12 Chips (Octal)</th></tr>
<tr><td>96</td><td>264</td><td>0260</td><td>1517</td><td>22</td><td>$P_{22}(t+48)$</td><td>3444</td></tr>
<tr><td>97</td><td>1015</td><td>1455</td><td>0322</td><td>23</td><td>$P_{23}(t+48)$</td><td>7400</td></tr>
<tr><td>98</td><td>278</td><td>1535</td><td>0242</td><td>24</td><td>$P_{24}(t+48)$</td><td>1422</td></tr>
<tr><td>99</td><td>536</td><td>0746</td><td>1031</td><td>25</td><td>$P_{25}(t+48)$</td><td>2433</td></tr>
<tr><td>100</td><td>819</td><td>1033</td><td>0744</td><td>26</td><td>$P_{26}(t+48)$</td><td>7037</td></tr>
<tr><td>101</td><td>156</td><td>1213</td><td>0564</td><td>27</td><td>$P_{27}(t+48)$</td><td>1635</td></tr>
<tr><td>102</td><td>957</td><td>0710</td><td>1067</td><td>28</td><td>$P_{28}(t+48)$</td><td>6534</td></tr>
<tr><td>103</td><td>159</td><td>0721</td><td>1056</td><td>29</td><td>$P_{29}(t+48)$</td><td>5074</td></tr>
<tr><td>104</td><td>712</td><td>1763</td><td>0014</td><td>30</td><td>$P_{30}(t+48)$</td><td>0614</td></tr>
<tr><td>105</td><td>885</td><td>1751</td><td>0026</td><td>31</td><td>$P_{31}(t+48)$</td><td>6124</td></tr>
<tr><td>106</td><td>461</td><td>0435</td><td>1342</td><td>32</td><td>$P_{32}(t+48)$</td><td>1270</td></tr>
<tr><td>107</td><td>248</td><td>0735</td><td>1042</td><td>33</td><td>$P_{33}(t+48)$</td><td>2716</td></tr>
<tr><td>108</td><td>713</td><td>0771</td><td>1006</td><td>34</td><td>$P_{34}(t+48)$</td><td>5165</td></tr>
<tr><td>109</td><td>126</td><td>0140</td><td>1637</td><td>35</td><td>$P_{35}(t+48)$</td><td>0650</td></tr>
<tr><td>110</td><td>807</td><td>0111</td><td>1666</td><td>36</td><td>$P_{36}(t+48)$</td><td>6106</td></tr>
<tr><td>111</td><td>279</td><td>0656</td><td>1121</td><td>37</td><td>$P_{37}(t+48)$</td><td>5261</td></tr>
<tr><td>112</td><td>122</td><td>1016</td><td>0761</td><td>1</td><td>$P_{1}(t+72)$</td><td>6752</td></tr>
<tr><td>113</td><td>197</td><td>0462</td><td>1315</td><td>2</td><td>$P_{2}(t+72)$</td><td>5147</td></tr>
<tr><td>114</td><td>693</td><td>1011</td><td>0766</td><td>3</td><td>$P_{3}(t+72)$</td><td>0641</td></tr>
<tr><td>115</td><td>632</td><td>0552</td><td>1225</td><td>4</td><td>$P_{4}(t+72)$</td><td>6102</td></tr>
<tr><td>116</td><td>771</td><td>0045</td><td>1732</td><td>5</td><td>$P_{5}(t+72)$</td><td>1263</td></tr>
<tr><td>117</td><td>467</td><td>1104</td><td>0673</td><td>6</td><td>$P_{6}(t+72)$</td><td>2713</td></tr>
<tr><td>118</td><td>647</td><td>0557</td><td>1220</td><td>7</td><td>$P_{7}(t+72)$</td><td>3167</td></tr>
<tr><td>119</td><td>203</td><td>0364</td><td>1413</td><td>8</td><td>$P_{8}(t+72)$</td><td>3651</td></tr>
<tr><td>120</td><td>145</td><td>1106</td><td>0671</td><td>9</td><td>$P_{9}(t+72)$</td><td>7506</td></tr>
<tr><td>121</td><td>175</td><td>1241</td><td>0536</td><td>10</td><td>$P_{10}(t+72)$</td><td>5461</td></tr>
<tr><td>122</td><td>52</td><td>0267</td><td>1510</td><td>11</td><td>$P_{11}(t+72)$</td><td>0412</td></tr>
<tr><td>123</td><td>21</td><td>0232</td><td>1545</td><td>12</td><td>$P_{12}(t+72)$</td><td>6027</td></tr>
<tr><td>124</td><td>237</td><td>1617</td><td>0160</td><td>13</td><td>$P_{13}(t+72)$</td><td>1231</td></tr>
<tr><td>125</td><td>235</td><td>1076</td><td>0701</td><td>14</td><td>$P_{14}(t+72)$</td><td>2736</td></tr>
<tr><td colspan="7">* In the octal notation for the first 10 chips of the C/A-code or the initial settings as shown in this table, the first digit (1/0) represents a "1" or “0”, respectively, for the first chip and the last three digits are the conventional octal representation of the remaining 9 chips. (For example, the first 10 chips of the C/A code for PRN Signal Assembly No. 64 are: 1101010011).<br>** $P_i$(t+N): P-code sequence of PRN number i shifted by N hours. See Section 6.3.6.2.1.</td></tr>
<tr><td colspan="7">NOTE: The code phase assignments constitute inseparable pairs, each consisting of a specific C/A and a specific P code phase, as shown above.</td></tr>
</table>
</td><td>References in Table have changed from 6.3.7.2.1 to Section 6.3.6.2.1.</td></tr>
</table>

| Section Number | IS-GPS-200 RevF IRN001 (17 Apr 2012) Navstar GPS Space Segment/Navigation User Interfaces | Proposed Object Heading | Proposed Public Signals-in-Space (SiS) Updates Object Text | Proposed Rationale |
|---|---|---|---|---|
| 6.3.6.2.1 | | | | References in Table have changed from 6.3.7.2.1 to Section 6.3.6.2.1. |

Table 6-I Additional C/A-/P-Code Phase Assignments (sheet 3 of 5)

| PRN Signal No. | C/A | | | P | | |
|---|---|---|---|---|---|---|
| | G2 Delay (Chips) | Initial G2 Setting (Octal)* | First 10 Chips (Octal)* | X2 Delay (Chips) | P-code Relative Advance (Hours) ** | First 12 Chips (Octal) |
| 126 | 886 | 1764 | 0013 | 15 | $P_{15}(t+72)$ | 7175 |
| 127 | 657 | 0717 | 1060 | 16 | $P_{16}(t+72)$ | 1654 |
| 128 | 634 | 1532 | 0245 | 17 | $P_{17}(t+72)$ | 6504 |
| 129 | 762 | 1250 | 0527 | 18 | $P_{18}(t+72)$ | 1060 |
| 130 | 355 | 0341 | 1436 | 19 | $P_{19}(t+72)$ | 2612 |
| 131 | 1012 | 0551 | 1226 | 20 | $P_{20}(t+72)$ | 7127 |
| 132 | 176 | 0520 | 1257 | 21 | $P_{21}(t+72)$ | 5671 |
| 133 | 603 | 1731 | 0046 | 22 | $P_{22}(t+72)$ | 4516 |
| 134 | 130 | 0706 | 1071 | 23 | $P_{23}(t+72)$ | 4065 |
| 135 | 359 | 1216 | 0561 | 24 | $P_{24}(t+72)$ | 4210 |
| 136 | 595 | 0740 | 1037 | 25 | $P_{25}(t+72)$ | 4326 |
| 137 | 68 | 1007 | 0770 | 26 | $P_{26}(t+72)$ | 0371 |
| 138 | 386 | 0450 | 1327 | 27 | $P_{27}(t+72)$ | 6356 |
| 139 | 797 | 0305 | 1472 | 28 | $P_{28}(t+72)$ | 5345 |
| 140 | 456 | 1653 | 0124 | 29 | $P_{29}(t+72)$ | 0740 |
| 141 | 499 | 1411 | 0366 | 30 | $P_{30}(t+72)$ | 6142 |
| 142 | 883 | 1644 | 0133 | 31 | $P_{31}(t+72)$ | 1243 |
| 143 | 307 | 1312 | 0465 | 32 | $P_{32}(t+72)$ | 6703 |
| 144 | 127 | 1060 | 0717 | 33 | $P_{33}(t+72)$ | 5163 |
| 145 | 211 | 1560 | 0217 | 34 | $P_{34}(t+72)$ | 4653 |
| 146 | 121 | 0035 | 1742 | 35 | $P_{35}(t+72)$ | 4107 |
| 147 | 118 | 0355 | 1422 | 36 | $P_{36}(t+72)$ | 4261 |
| 148 | 163 | 0335 | 1442 | 37 | $P_{37}(t+72)$ | 0312 |
| 149 | 628 | 1254 | 0523 | 1 | $P_{1}(t+96)$ | 2525 |
| 150 | 853 | 1041 | 0736 | 2 | $P_{2}(t+96)$ | 7070 |
| 151 | 484 | 0142 | 1635 | 3 | $P_{3}(t+96)$ | 1616 |
| 152 | 289 | 1641 | 0136 | 4 | $P_{4}(t+96)$ | 2525 |
| 153 | 811 | 1504 | 0273 | 5 | $P_{5}(t+96)$ | 7070 |
| 154 | 202 | 0751 | 1026 | 6 | $P_{6}(t+96)$ | 3616 |
| 155 | 1021 | 1774 | 0003 | 7 | $P_{7}(t+96)$ | 7525 |

* In the octal notation for the first 10 chips of the C/A-code or the initial settings as shown in this table, the first digit (1/0) represents a "1" or "0", respectively, for the first chip and the last three digits are the conventional octal representation of the remaining 9 chips. (For example, the first 10 chips of the C/A code for PRN Signal Assembly No. 64 are: 1101010011).

** $P_i(t+N)$: P-code sequence of PRN number i shifted by N hours. See Section 6.3.7.2.1.

NOTE: The code phase assignments constitute inseparable pairs, each consisting of a specific C/A and a specific P code phase, as shown above.

Table 6-I Additional C/A-/P-Code Phase Assignments (sheet 3 of 5)

| PRN Signal No. | C/A | | | P | | |
|---|---|---|---|---|---|---|
| | G2 Delay (Chips) | Initial G2 Setting (Octal)* | First 10 Chips (Octal)* | X2 Delay (Chips) | P-code Relative Advance (Hours) ** | First 12 Chips (Octal) |
| 126 | 886 | 1764 | 0013 | 15 | $P_{15}(t+72)$ | 7175 |
| 127 | 657 | 0717 | 1060 | 16 | $P_{16}(t+72)$ | 1654 |
| 128 | 634 | 1532 | 0245 | 17 | $P_{17}(t+72)$ | 6504 |
| 129 | 762 | 1250 | 0527 | 18 | $P_{18}(t+72)$ | 1060 |
| 130 | 355 | 0341 | 1436 | 19 | $P_{19}(t+72)$ | 2612 |
| 131 | 1012 | 0551 | 1226 | 20 | $P_{20}(t+72)$ | 7127 |
| 132 | 176 | 0520 | 1257 | 21 | $P_{21}(t+72)$ | 5671 |
| 133 | 603 | 1731 | 0046 | 22 | $P_{22}(t+72)$ | 4516 |
| 134 | 130 | 0706 | 1071 | 23 | $P_{23}(t+72)$ | 4065 |
| 135 | 359 | 1216 | 0561 | 24 | $P_{24}(t+72)$ | 4210 |
| 136 | 595 | 0740 | 1037 | 25 | $P_{25}(t+72)$ | 4326 |
| 137 | 68 | 1007 | 0770 | 26 | $P_{26}(t+72)$ | 0371 |
| 138 | 386 | 0450 | 1327 | 27 | $P_{27}(t+72)$ | 6356 |
| 139 | 797 | 0305 | 1472 | 28 | $P_{28}(t+72)$ | 5345 |
| 140 | 456 | 1653 | 0124 | 29 | $P_{29}(t+72)$ | 0740 |
| 141 | 499 | 1411 | 0366 | 30 | $P_{30}(t+72)$ | 6142 |
| 142 | 883 | 1644 | 0133 | 31 | $P_{31}(t+72)$ | 1243 |
| 143 | 307 | 1312 | 0465 | 32 | $P_{32}(t+72)$ | 6703 |
| 144 | 127 | 1060 | 0717 | 33 | $P_{33}(t+72)$ | 5163 |
| 145 | 211 | 1560 | 0217 | 34 | $P_{34}(t+72)$ | 4653 |
| 146 | 121 | 0035 | 1742 | 35 | $P_{35}(t+72)$ | 4107 |
| 147 | 118 | 0355 | 1422 | 36 | $P_{36}(t+72)$ | 4261 |
| 148 | 163 | 0335 | 1442 | 37 | $P_{37}(t+72)$ | 0312 |
| 149 | 628 | 1254 | 0523 | 1 | $P_{1}(t+96)$ | 2525 |
| 150 | 853 | 1041 | 0736 | 2 | $P_{2}(t+96)$ | 7070 |
| 151 | 484 | 0142 | 1635 | 3 | $P_{3}(t+96)$ | 1616 |
| 152 | 289 | 1641 | 0136 | 4 | $P_{4}(t+96)$ | 2525 |
| 153 | 811 | 1504 | 0273 | 5 | $P_{5}(t+96)$ | 7070 |
| 154 | 202 | 0751 | 1026 | 6 | $P_{6}(t+96)$ | 3616 |
| 155 | 1021 | 1774 | 0003 | 7 | $P_{7}(t+96)$ | 7525 |

* In the octal notation for the first 10 chips of the C/A-code or the initial settings as shown in this table, the first digit (1/0) represents a "1" or "0", respectively, for the first chip and the last three digits are the conventional octal representation of the remaining 9 chips. (For example, the first 10 chips of the C/A code for PRN Signal Assembly No. 64 are: 1101010011).

** $P_i(t+N)$: P-code sequence of PRN number i shifted by N hours. See Section 6.3.6.2.1.

NOTE: The code phase assignments constitute inseparable pairs, each consisting of a specific C/A and a specific P code phase, as shown above.

| Section Number | IS-GPS-200 RevF IRN001 (17 Apr 2012) Navstar GPS Space Segment/Navigation User Interfaces | Proposed Object Heading | Proposed Public Signals-in-Space (SiS) Updates Object Text | Proposed Rationale |
|---|---|---|---|---|
| 6.3.6.2.1 | | | | References in Table have changed from 6.3.7.2.1 to Section 6.3.6.2.1. |

Table 6-I Additional C/A-/P-Code Phase Assignments (sheet 4 of 5)

| PRN Signal No. | C/A | | | P | | |
|---|---|---|---|---|---|---|
| | G2 Delay (Chips) | Initial G2 Setting (Octal)* | First 10 Chips (Octal)* | X2 Delay (Chips) | P-code Relative Advance (Hours) ** | First 12 Chips (Octal) |
| 156 | 463 | 0107 | 1670 | 8 | $P_{8}(t+96)$ | 5470 |
| 157 | 568 | 1153 | 0624 | 9 | $P_{9}(t+96)$ | 4416 |
| 158 | 904 | 1542 | 0235 | 10 | $P_{10}(t+96)$ | 4025 |
| 159 | 670 | 1223 | 0554 | 11 | $P_{11}(t+96)$ | 4230 |
| 160 | 230 | 1702 | 0075 | 12 | $P_{12}(t+96)$ | 0336 |
| 161 | 911 | 0436 | 1341 | 13 | $P_{13}(t+96)$ | 6375 |
| 162 | 684 | 1735 | 0042 | 14 | $P_{14}(t+96)$ | 1354 |
| 163 | 309 | 1662 | 0115 | 15 | $P_{15}(t+96)$ | 6744 |
| 164 | 644 | 1570 | 0207 | 16 | $P_{16}(t+96)$ | 5140 |
| 165 | 932 | 1573 | 0204 | 17 | $P_{17}(t+96)$ | 4642 |
| 166 | 12 | 0201 | 1576 | 18 | $P_{18}(t+96)$ | 0103 |
| 167 | 314 | 0635 | 1142 | 19 | $P_{19}(t+96)$ | 6263 |
| 168 | 891 | 1737 | 0040 | 20 | $P_{20}(t+96)$ | 1313 |
| 169 | 212 | 1670 | 0107 | 21 | $P_{21}(t+96)$ | 6767 |
| 170 | 185 | 0134 | 1643 | 22 | $P_{22}(t+96)$ | 1151 |
| 171 | 675 | 1224 | 0553 | 23 | $P_{23}(t+96)$ | 2646 |
| 172 | 503 | 1460 | 0317 | 24 | $P_{24}(t+96)$ | 7101 |
| 173 | 150 | 1362 | 0415 | 25 | $P_{25}(t+96)$ | 5662 |
| 174 | 395 | 1654 | 0123 | 26 | $P_{26}(t+96)$ | 0513 |
| 175 | 345 | 0510 | 1267 | 27 | $P_{27}(t+96)$ | 2067 |
| 176 | 846 | 0242 | 1535 | 28 | $P_{28}(t+96)$ | 3211 |
| 177 | 798 | 1142 | 0635 | 29 | $P_{29}(t+96)$ | 3726 |
| 178 | 992 | 1017 | 0760 | 30 | $P_{30}(t+96)$ | 3571 |
| 179 | 357 | 1070 | 0707 | 31 | $P_{31}(t+96)$ | 3456 |
| 180 | 995 | 0501 | 1276 | 32 | $P_{32}(t+96)$ | 3405 |
| 181 | 877 | 0455 | 1322 | 33 | $P_{33}(t+96)$ | 3420 |
| 182 | 112 | 1566 | 0211 | 34 | $P_{34}(t+96)$ | 5432 |
| 183 | 144 | 0215 | 1562 | 35 | $P_{35}(t+96)$ | 0437 |
| 184 | 476 | 1003 | 0774 | 36 | $P_{36}(t+96)$ | 6035 |
| 185 | 193 | 1454 | 0323 | 37 | $P_{37}(t+96)$ | 1234 |

* In the octal notation for the first 10 chips of the C/A-code or the initial settings as shown in this table, the first digit (1/0) represents a "1" or "0", respectively, for the first chip and the last three digits are the conventional octal representation of the remaining 9 chips. (For example, the first 10 chips of the C/A code for PRN Signal Assembly No. 64 are: 1101010011).

** $P_i(t+N)$: P-code sequence of PRN number i shifted by N hours. See Section 6.3.7.2.1.

NOTE: The code phase assignments constitute inseparable pairs, each consisting of a specific C/A and a specific P code phase, as shown above.

Table 6-I Additional C/A-/P-Code Phase Assignments (sheet 4 of 5)

| PRN Signal No. | C/A | | | P | | |
|---|---|---|---|---|---|---|
| | G2 Delay (Chips) | Initial G2 Setting (Octal)* | First 10 Chips (Octal)* | X2 Delay (Chips) | P-code Relative Advance (Hours) ** | First 12 Chips (Octal) |
| 156 | 463 | 0107 | 1670 | 8 | $P_{8}(t+96)$ | 5470 |
| 157 | 568 | 1153 | 0624 | 9 | $P_{9}(t+96)$ | 4416 |
| 158 | 904 | 1542 | 0235 | 10 | $P_{10}(t+96)$ | 4025 |
| 159 | 670 | 1223 | 0554 | 11 | $P_{11}(t+96)$ | 4230 |
| 160 | 230 | 1702 | 0075 | 12 | $P_{12}(t+96)$ | 0336 |
| 161 | 911 | 0436 | 1341 | 13 | $P_{13}(t+96)$ | 6375 |
| 162 | 684 | 1735 | 0042 | 14 | $P_{14}(t+96)$ | 1354 |
| 163 | 309 | 1662 | 0115 | 15 | $P_{15}(t+96)$ | 6744 |
| 164 | 644 | 1570 | 0207 | 16 | $P_{16}(t+96)$ | 5140 |
| 165 | 932 | 1573 | 0204 | 17 | $P_{17}(t+96)$ | 4642 |
| 166 | 12 | 0201 | 1576 | 18 | $P_{18}(t+96)$ | 0103 |
| 167 | 314 | 0635 | 1142 | 19 | $P_{19}(t+96)$ | 6263 |
| 168 | 891 | 1737 | 0040 | 20 | $P_{20}(t+96)$ | 1313 |
| 169 | 212 | 1670 | 0107 | 21 | $P_{21}(t+96)$ | 6767 |
| 170 | 185 | 0134 | 1643 | 22 | $P_{22}(t+96)$ | 1151 |
| 171 | 675 | 1224 | 0553 | 23 | $P_{23}(t+96)$ | 2646 |
| 172 | 503 | 1460 | 0317 | 24 | $P_{24}(t+96)$ | 7101 |
| 173 | 150 | 1362 | 0415 | 25 | $P_{25}(t+96)$ | 5662 |
| 174 | 395 | 1654 | 0123 | 26 | $P_{26}(t+96)$ | 0513 |
| 175 | 345 | 0510 | 1267 | 27 | $P_{27}(t+96)$ | 2067 |
| 176 | 846 | 0242 | 1535 | 28 | $P_{28}(t+96)$ | 3211 |
| 177 | 798 | 1142 | 0635 | 29 | $P_{29}(t+96)$ | 3726 |
| 178 | 992 | 1017 | 0760 | 30 | $P_{30}(t+96)$ | 3571 |
| 179 | 357 | 1070 | 0707 | 31 | $P_{31}(t+96)$ | 3456 |
| 180 | 995 | 0501 | 1276 | 32 | $P_{32}(t+96)$ | 3405 |
| 181 | 877 | 0455 | 1322 | 33 | $P_{33}(t+96)$ | 3420 |
| 182 | 112 | 1566 | 0211 | 34 | $P_{34}(t+96)$ | 5432 |
| 183 | 144 | 0215 | 1562 | 35 | $P_{35}(t+96)$ | 0437 |
| 184 | 476 | 1003 | 0774 | 36 | $P_{36}(t+96)$ | 6035 |
| 185 | 193 | 1454 | 0323 | 37 | $P_{37}(t+96)$ | 1234 |

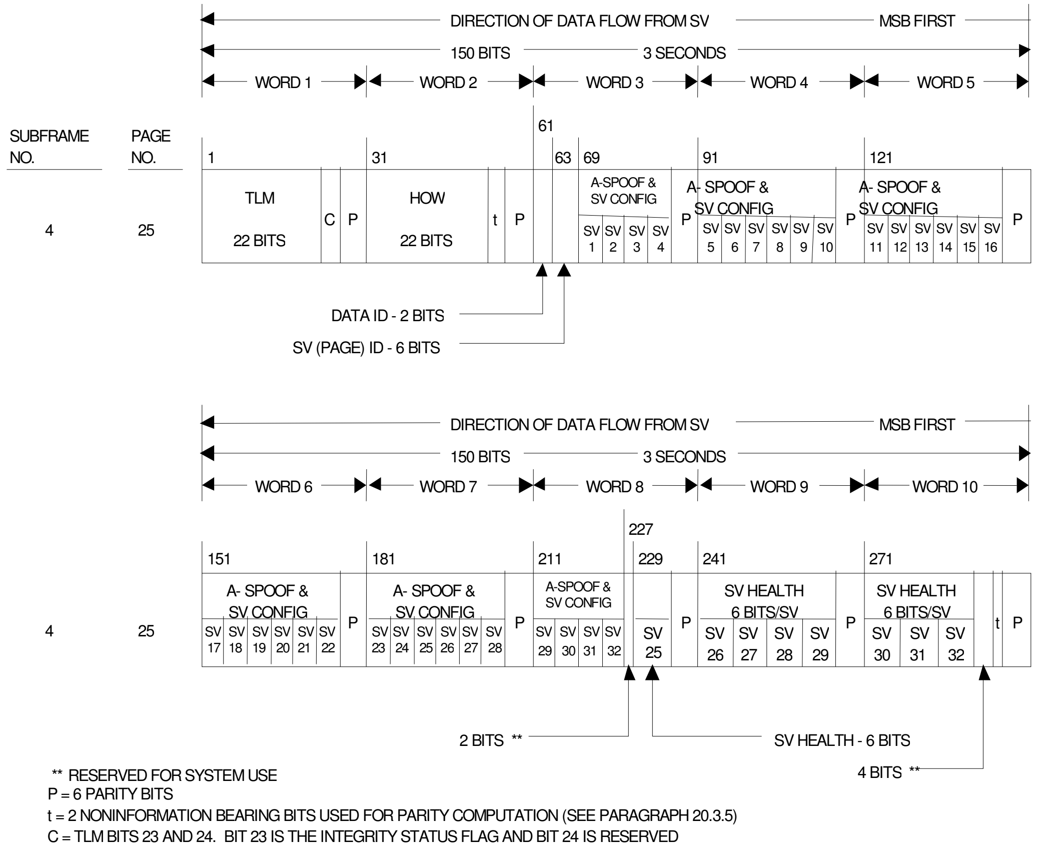
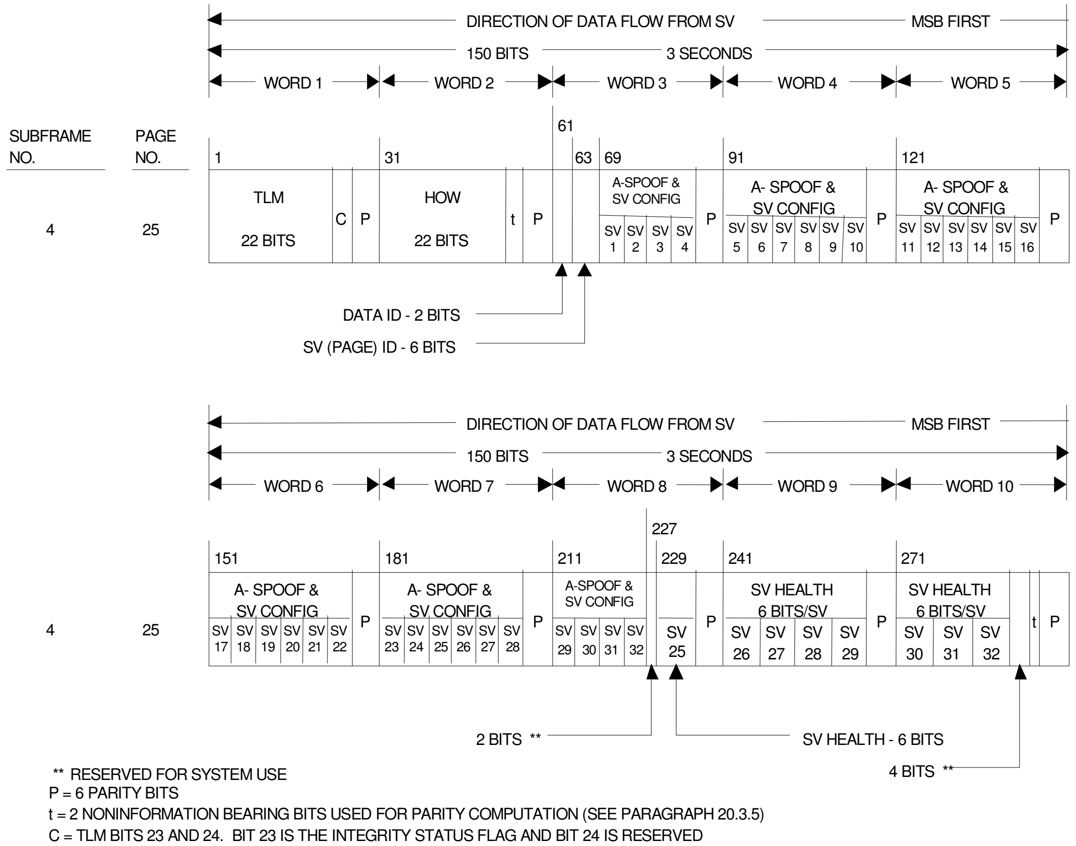
* In the octal notation for the first 10 chips of the C/A-code or the initial settings as shown in this table, the first digit (1/0) represents a "1" or "0", respectively, for the first chip and the last three digits are the conventional octal representation of the remaining 9 chips. (For example, the first 10 chips of the C/A code for PRN Signal Assembly No. 64 are: 1101010011).

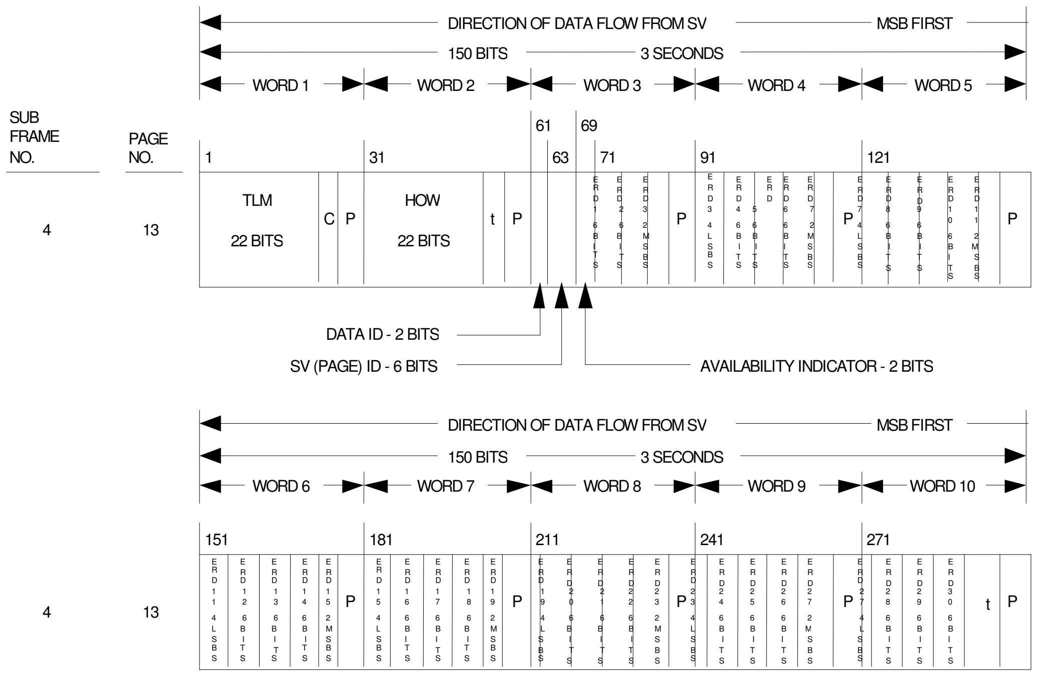
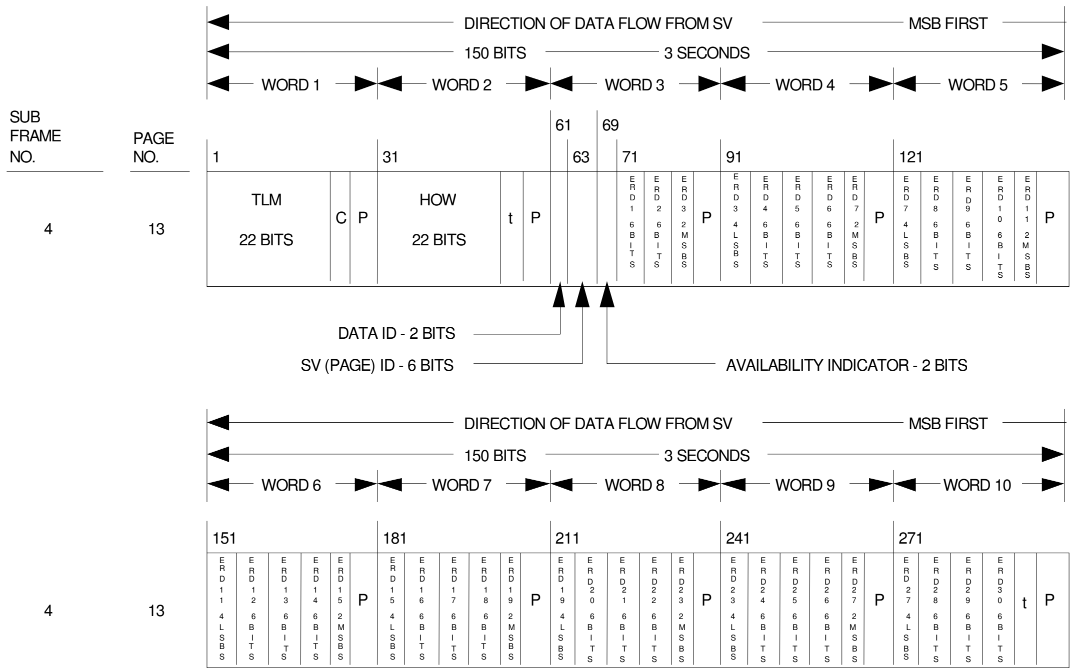
** $P_i(t+N)$: P-code sequence of PRN number i shifted by N hours. See Section 6.3.6.2.1.

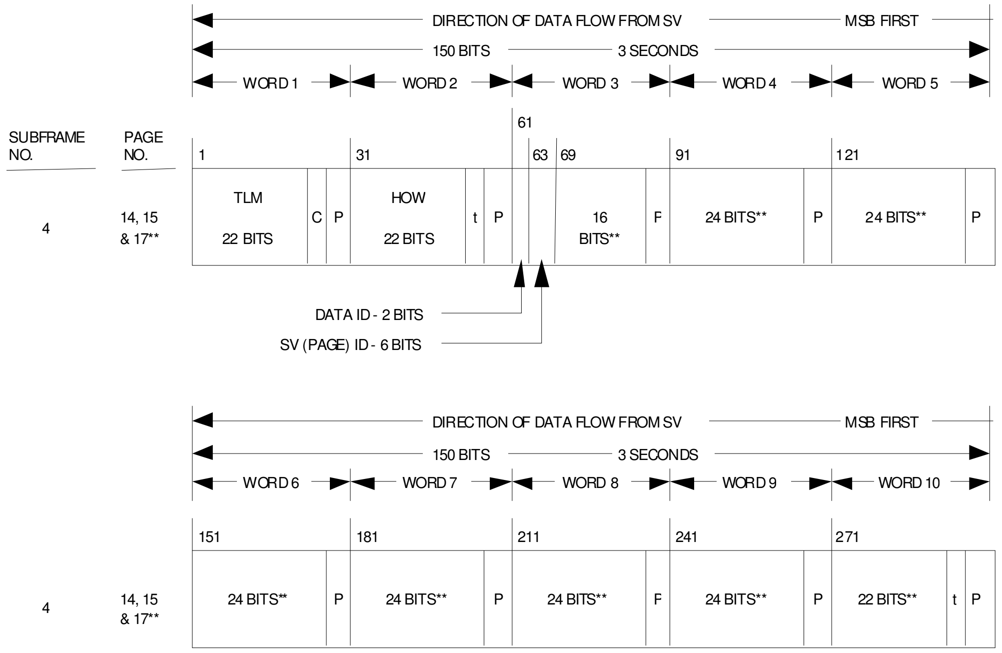
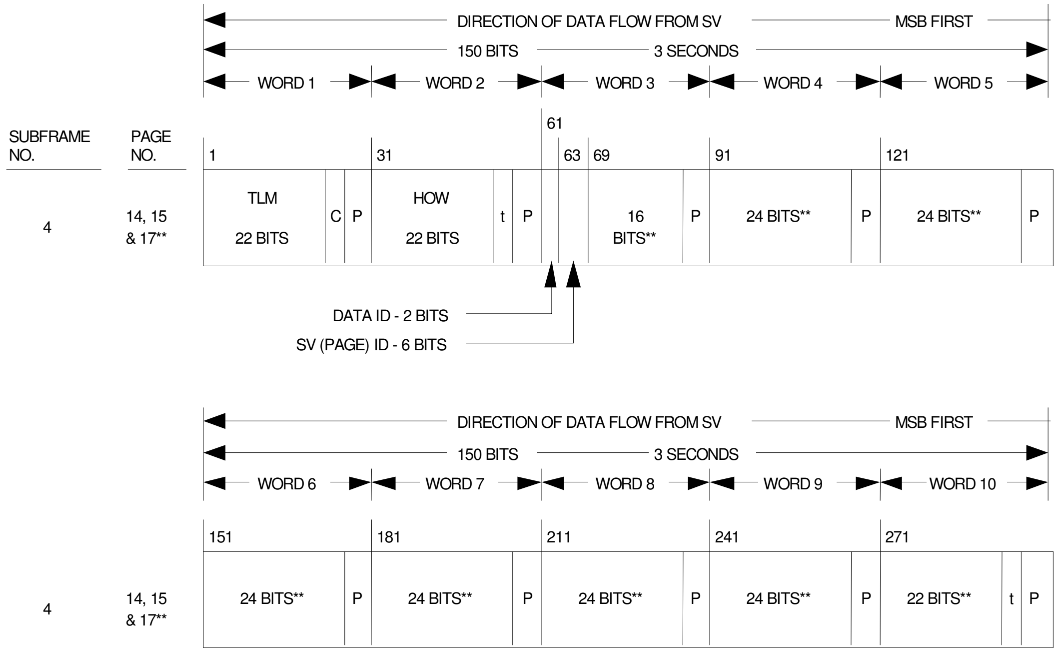
NOTE: The code phase assignments constitute inseparable pairs, each consisting of a specific C/A and a specific P code phase, as shown above.

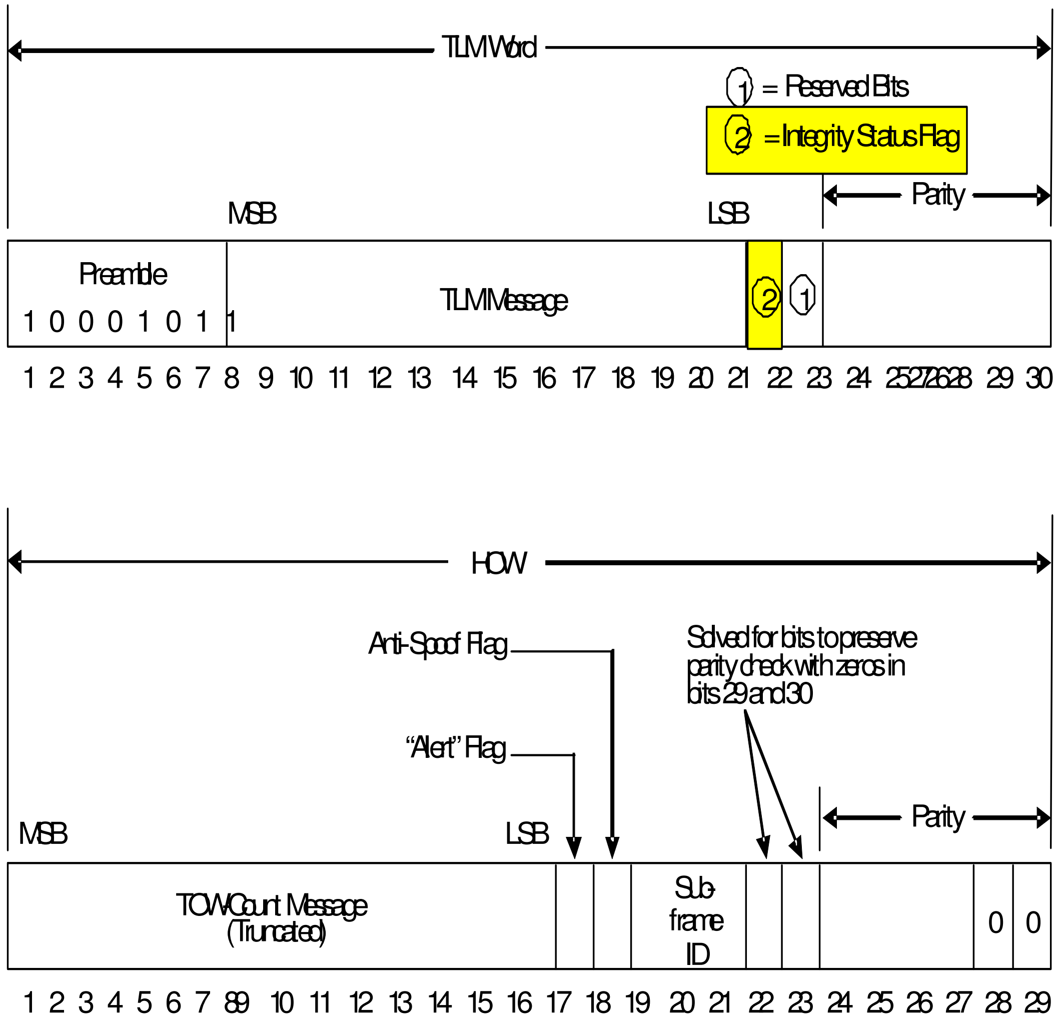
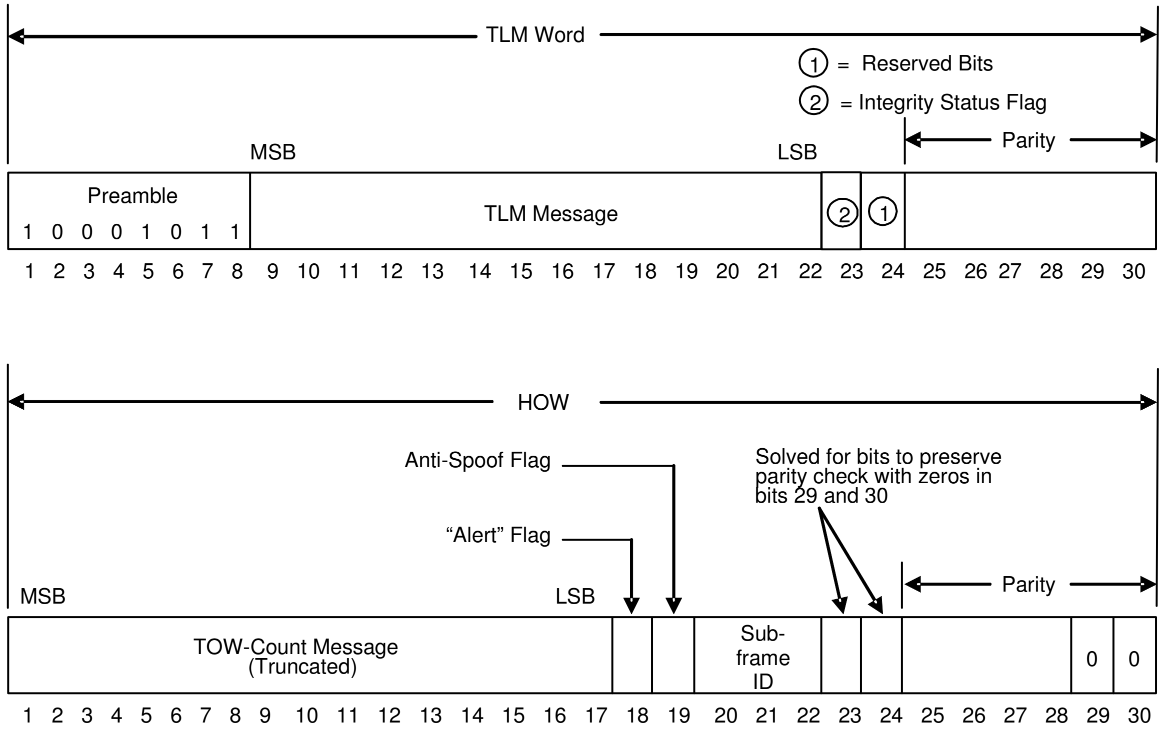
<table>
<tr><th>Section Number</th><th>IS-GPS-200 RevF IRN001 (17 Apr 2012) Navstar GPS Space Segment/Navigation User Interfaces</th><th>Proposed Object Heading</th><th>Proposed Public Signals-in-Space (SiS) Updates Object Text</th><th>Proposed Rationale</th></tr>
<tr><td>6.3.6.2.1</td><td>
<table>
<tr><th colspan="7">Table 6-I. Additional C/A-/P-Code Phase Assignments (sheet 5 of 5)</th></tr>
<tr><th rowspan="2">PRN Signal No.</th><th colspan="3">C/A</th><th colspan="3">P</th></tr>
<tr><th>G2 Delay (Chips)</th><th>Initial G2 Setting (Octal)*</th><th>First 10 Chips (Octal)*</th><th>X2 Delay (Chips)</th><th>P-code Relative Advance (Hours) **</th><th>First 12 Chips (Octal)</th></tr>
<tr><td>186</td><td>109</td><td>1665</td><td>0112</td><td>1</td><td>$P_{1}(t+120)$</td><td>1067</td></tr>
<tr><td>187</td><td>445</td><td>0471</td><td>1306</td><td>2</td><td>$P_{2}(t+120)$</td><td>6611</td></tr>
<tr><td>188</td><td>291</td><td>1750</td><td>0027</td><td>3</td><td>$P_{3}(t+120)$</td><td>5126</td></tr>
<tr><td>189</td><td>87</td><td>0307</td><td>1470</td><td>4</td><td>$P_{4}(t+120)$</td><td>4671</td></tr>
<tr><td>190</td><td>399</td><td>0272</td><td>1505</td><td>5</td><td>$P_{5}(t+120)$</td><td>0116</td></tr>
<tr><td>191</td><td>292</td><td>0764</td><td>1013</td><td>6</td><td>$P_{6}(t+120)$</td><td>6265</td></tr>
<tr><td>192</td><td>901</td><td>1422</td><td>0355</td><td>7</td><td>$P_{7}(t+120)$</td><td>1310</td></tr>
<tr><td>193</td><td>339</td><td>1050</td><td>0727</td><td>8</td><td>$P_{8}(t+120)$</td><td>6766</td></tr>
<tr><td>194</td><td>208</td><td>1607</td><td>0170</td><td>9</td><td>$P_{9}(t+120)$</td><td>1151</td></tr>
<tr><td>195</td><td>711</td><td>1747</td><td>0030</td><td>10</td><td>$P_{10}(t+120)$</td><td>2646</td></tr>
<tr><td>196</td><td>189</td><td>1305</td><td>0472</td><td>11</td><td>$P_{11}(t+120)$</td><td>3101</td></tr>
<tr><td>197</td><td>263</td><td>0540</td><td>1237</td><td>12</td><td>$P_{12}(t+120)$</td><td>7662</td></tr>
<tr><td>198</td><td>537</td><td>1363</td><td>0414</td><td>13</td><td>$P_{13}(t+120)$</td><td>5513</td></tr>
<tr><td>199</td><td>663</td><td>0727</td><td>1050</td><td>14</td><td>$P_{14}(t+120)$</td><td>4467</td></tr>
<tr><td>200</td><td>942</td><td>0147</td><td>1630</td><td>15</td><td>$P_{15}(t+120)$</td><td>4011</td></tr>
<tr><td>201</td><td>173</td><td>1206</td><td>0571</td><td>16</td><td>$P_{16}(t+120)$</td><td>4226</td></tr>
<tr><td>202</td><td>900</td><td>1045</td><td>0732</td><td>17</td><td>$P_{17}(t+120)$</td><td>4331</td></tr>
<tr><td>203</td><td>30</td><td>0476</td><td>1301</td><td>18</td><td>$P_{18}(t+120)$</td><td>0376</td></tr>
<tr><td>204</td><td>500</td><td>0604</td><td>1173</td><td>19</td><td>$P_{19}(t+120)$</td><td>6355</td></tr>
<tr><td>205</td><td>935</td><td>1757</td><td>0020</td><td>20</td><td>$P_{20}(t+120)$</td><td>5344</td></tr>
<tr><td>206</td><td>556</td><td>1330</td><td>0447</td><td>21</td><td>$P_{21}(t+120)$</td><td>0740</td></tr>
<tr><td>207</td><td>373</td><td>0663</td><td>1114</td><td>22</td><td>$P_{22}(t+120)$</td><td>6142</td></tr>
<tr><td>208</td><td>85</td><td>1436</td><td>0341</td><td>23</td><td>$P_{23}(t+120)$</td><td>1243</td></tr>
<tr><td>209</td><td>652</td><td>0753</td><td>1024</td><td>24</td><td>$P_{24}(t+120)$</td><td>6703</td></tr>
<tr><td>210</td><td>310</td><td>0731</td><td>1046</td><td>25</td><td>$P_{25}(t+120)$</td><td>1163</td></tr>
<tr><td colspan="7">* In the octal notation for the first 10 chips of the C/A-code or the initial settings as shown in this table, the first digit (1/0) represents a "1" or "0", respectively, for the first chip and the last three digits are the conventional octal representation of the remaining 9 chips. (For example, the first 10 chips of the C/A code for PRN Signal Assembly No. 64 are: 1101010011).<br>** $P_i(t+N)$: P-code sequence of PRN number i shifted by N hours. See Section 6.3.7.2.1.</td></tr>
<tr><td colspan="7">NOTE: The code phase assignments constitute inseparable pairs, each consisting of a specific C/A and a specific P code phase, as shown above.</td></tr>
</table>
</td><td></td><td>
<table>
<tr><th colspan="7">Table 6-I. Additional C/A-/P-Code Phase Assignments (sheet 5 of 5)</th></tr>
<tr><th rowspan="2">PRN Signal No.</th><th colspan="3">C/A</th><th colspan="3">P</th></tr>
<tr><th>G2 Delay (Chips)</th><th>Initial G2 Setting (Octal)*</th><th>First 10 Chips (Octal)*</th><th>X2 Delay (Chips)</th><th>P-code Relative Advance (Hours) **</th><th>First 12 Chips (Octal)</th></tr>
<tr><td>186</td><td>109</td><td>1665</td><td>0112</td><td>1</td><td>$P_{1}(t+120)$</td><td>1067</td></tr>
<tr><td>187</td><td>445</td><td>0471</td><td>1306</td><td>2</td><td>$P_{2}(t+120)$</td><td>6611</td></tr>
<tr><td>188</td><td>291</td><td>1750</td><td>0027</td><td>3</td><td>$P_{3}(t+120)$</td><td>5126</td></tr>
<tr><td>189</td><td>87</td><td>0307</td><td>1470</td><td>4</td><td>$P_{4}(t+120)$</td><td>4671</td></tr>
<tr><td>190</td><td>399</td><td>0272</td><td>1505</td><td>5</td><td>$P_{5}(t+120)$</td><td>0116</td></tr>
<tr><td>191</td><td>292</td><td>0764</td><td>1013</td><td>6</td><td>$P_{6}(t+120)$</td><td>6265</td></tr>
<tr><td>192</td><td>901</td><td>1422</td><td>0355</td><td>7</td><td>$P_{7}(t+120)$</td><td>1310</td></tr>
<tr><td>193</td><td>339</td><td>1050</td><td>0727</td><td>8</td><td>$P_{8}(t+120)$</td><td>6766</td></tr>
<tr><td>194</td><td>208</td><td>1607</td><td>0170</td><td>9</td><td>$P_{9}(t+120)$</td><td>1151</td></tr>
<tr><td>195</td><td>711</td><td>1747</td><td>0030</td><td>10</td><td>$P_{10}(t+120)$</td><td>2646</td></tr>
<tr><td>196</td><td>189</td><td>1305</td><td>0472</td><td>11</td><td>$P_{11}(t+120)$</td><td>3101</td></tr>
<tr><td>197</td><td>263</td><td>0540</td><td>1237</td><td>12</td><td>$P_{12}(t+120)$</td><td>7662</td></tr>
<tr><td>198</td><td>537</td><td>1363</td><td>0414</td><td>13</td><td>$P_{13}(t+120)$</td><td>5513</td></tr>
<tr><td>199</td><td>663</td><td>0727</td><td>1050</td><td>14</td><td>$P_{14}(t+120)$</td><td>4467</td></tr>
<tr><td>200</td><td>942</td><td>0147</td><td>1630</td><td>15</td><td>$P_{15}(t+120)$</td><td>4011</td></tr>
<tr><td>201</td><td>173</td><td>1206</td><td>0571</td><td>16</td><td>$P_{16}(t+120)$</td><td>4226</td></tr>
<tr><td>202</td><td>900</td><td>1045</td><td>0732</td><td>17</td><td>$P_{17}(t+120)$</td><td>4331</td></tr>
<tr><td>203</td><td>30</td><td>0476</td><td>1301</td><td>18</td><td>$P_{18}(t+120)$</td><td>0376</td></tr>
<tr><td>204</td><td>500</td><td>0604</td><td>1173</td><td>19</td><td>$P_{19}(t+120)$</td><td>6355</td></tr>
<tr><td>205</td><td>935</td><td>1757</td><td>0020</td><td>20</td><td>$P_{20}(t+120)$</td><td>5344</td></tr>
<tr><td>206</td><td>556</td><td>1330</td><td>0447</td><td>21</td><td>$P_{21}(t+120)$</td><td>0740</td></tr>
<tr><td>207</td><td>373</td><td>0663</td><td>1114</td><td>22</td><td>$P_{22}(t+120)$</td><td>6142</td></tr>
<tr><td>208</td><td>85</td><td>1436</td><td>0341</td><td>23</td><td>$P_{23}(t+120)$</td><td>1243</td></tr>
<tr><td>209</td><td>652</td><td>0753</td><td>1024</td><td>24</td><td>$P_{24}(t+120)$</td><td>6703</td></tr>
<tr><td>210</td><td>310</td><td>0731</td><td>1046</td><td>25</td><td>$P_{25}(t+120)$</td><td>1163</td></tr>
<tr><td colspan="7">* In the octal notation for the first 10 chips of the C/A-code or the initial settings as shown in this table, the first digit (1/0) represents a "1" or "0", respectively, for the first chip and the last three digits are the conventional octal representation of the remaining 9 chips. (For example, the first 10 chips of the C/A code for PRN Signal Assembly No. 64 are: 1101010011).<br>** $P_i(t+N)$: P-code sequence of PRN number i shifted by N hours. See Section 6.3.6.2.1.</td></tr>
<tr><td colspan="7">NOTE: The code phase assignments constitute inseparable pairs, each consisting of a specific C/A and a specific P code phase, as shown above.</td></tr>
</table>
</td><td>References in Table have changed from 6.3.7.2.1 to Section 6.3.6.2.1.</td></tr>
<tr><td>6.3.6.3</td><td></td><td>Additional L2 CM-/L2 CL-</td><td></td><td>Due to the renumbering of Sections 6.3.7</td></tr>
</table>

| Section Number | IS-GPS-200 RevF IRN001 (17 Apr 2012) Navstar GPS Space Segment/Navigation User Interfaces | Proposed Object Heading | Proposed Public Signals-in-Space (SiS) Updates Object Text | Proposed Rationale |
|---|---|---|---|---|
| | | Code PRN sequences. | | to 6.3.6, all associated sections from 6.3.7.3 have been moved to be part of 6.3.6.3.<br>All associated text and tables with Section 6.3.7.3 has also moved to Section 6.3.6.3. |
| 6.3.7 | **Additional PRN Code Sequences.** | Pre-Operational Use. | | Moving Section 6.3.8 "Pre-Operational Use" to 6.3.7, which honors the RevE numbering.<br>All associated text with Section 6.3.8 has also moved to Section 6.3.7.<br>Section 6.3.8 has been deleted. |
| 6.3.8 | **Pre-Operational Use** | <DELETE> | | Moving Section 6.3.8 "Pre-Operational Use" to 6.3.7, which honors |

| **Section Number** | **IS-GPS-200 RevF IRN001 (17 Apr 2012) Navstar GPS Space Segment/Navigation User Interfaces** | **Proposed Object Heading** | **Proposed Public Signals-in-Space (SiS) Updates Object Text** | **Proposed Rationale** |
|---|---|---|---|---|
| | | | | the RevE numbering.<br>All associated text with Section 6.3.8 has also moved to Section 6.3.7. |
| 20.3.2 |  <br>** RESERVED FOR SYSTEM USE<br>P = 6 PARITY BITS<br>t = 2 NONINFORMATION BEARING BITS USED FOR PARITY COMPUTATION (SEE PARAGRAPH 20.3.5)<br>C = TLM BITS 23 AND 24. BIT 23 IS THE INTEGRITY STATUS FLAG AND BIT 24 IS RESERVED<br>Figure 20-1. Data Format (sheet 9 of 11) | |  <br>** RESERVED FOR SYSTEM USE<br>P = 6 PARITY BITS<br>t = 2 NONINFORMATION BEARING BITS USED FOR PARITY COMPUTATION (SEE PARAGRAPH 20.3.5)<br>C = TLM BITS 23 AND 24. BIT 23 IS THE INTEGRITY STATUS FLAG AND BIT 24 IS RESERVED<br>Figure 20-1. Data Format (sheet 9 of 11) | Publication error during Word export.<br>Figure is now correct in Word/PDF.<br>The "A-SPOOF & SV CONFIG" (bits 69 to 121) fields were misaligned and have now been repaired. |

| **Section Number** | **IS-GPS-200 RevF IRN001 (17 Apr 2012) Navstar GPS Space Segment/Navigation User Interfaces** | **Proposed Object Heading** | **Proposed Public Signals-in-Space (SiS) Updates Object Text** | **Proposed Rationale** |
|---|---|---|---|---|
| 20.3.2 |  <br>P = 6 PARITY BITS<br>t = 2 NONINFORMATION BEARING BITS USED FOR PARITY COMPUTATION (SEE PARAGRAPH 20.3.5)<br>C = TLM BITS 23 AND 24. BIT 23 IS THE INTEGRITY STATUS FLAG AND BIT 24 IS RESERVED<br>Figure 20-1. Data Format (sheet 10 of 11) |  |  <br>P = 6 PARITY BITS<br>t = 2 NONINFORMATION BEARING BITS USED FOR PARITY COMPUTATION (SEE PARAGRAPH 20.3.5)<br>C = TLM BITS 23 AND 24. BIT 23 IS THE INTEGRITY STATUS FLAG AND BIT 24 IS RESERVED<br>Figure 20-1. Data Format (sheet 10 of 11) | Publication error during Word export.<br>Figure is now correct in Word/PDF.<br>The bits 71 to 121 fields were misaligned and have now been repaired. |

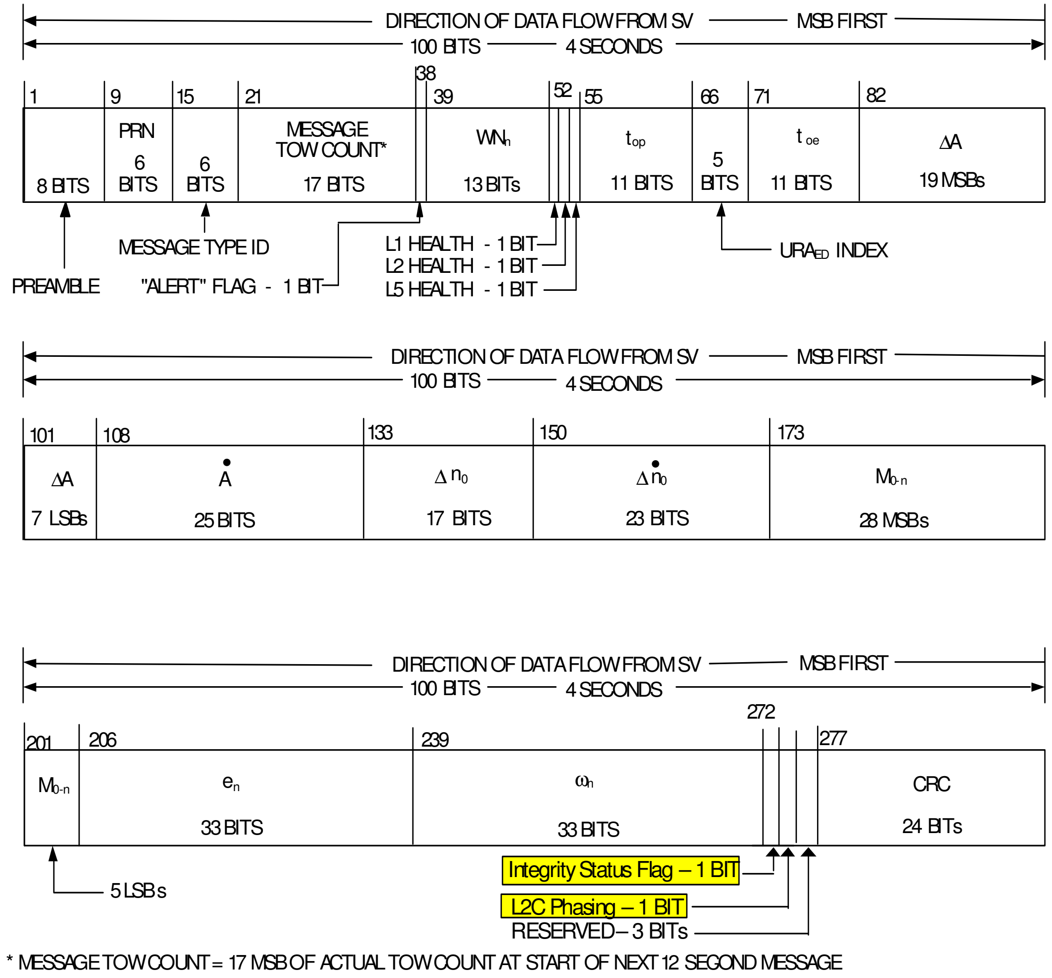
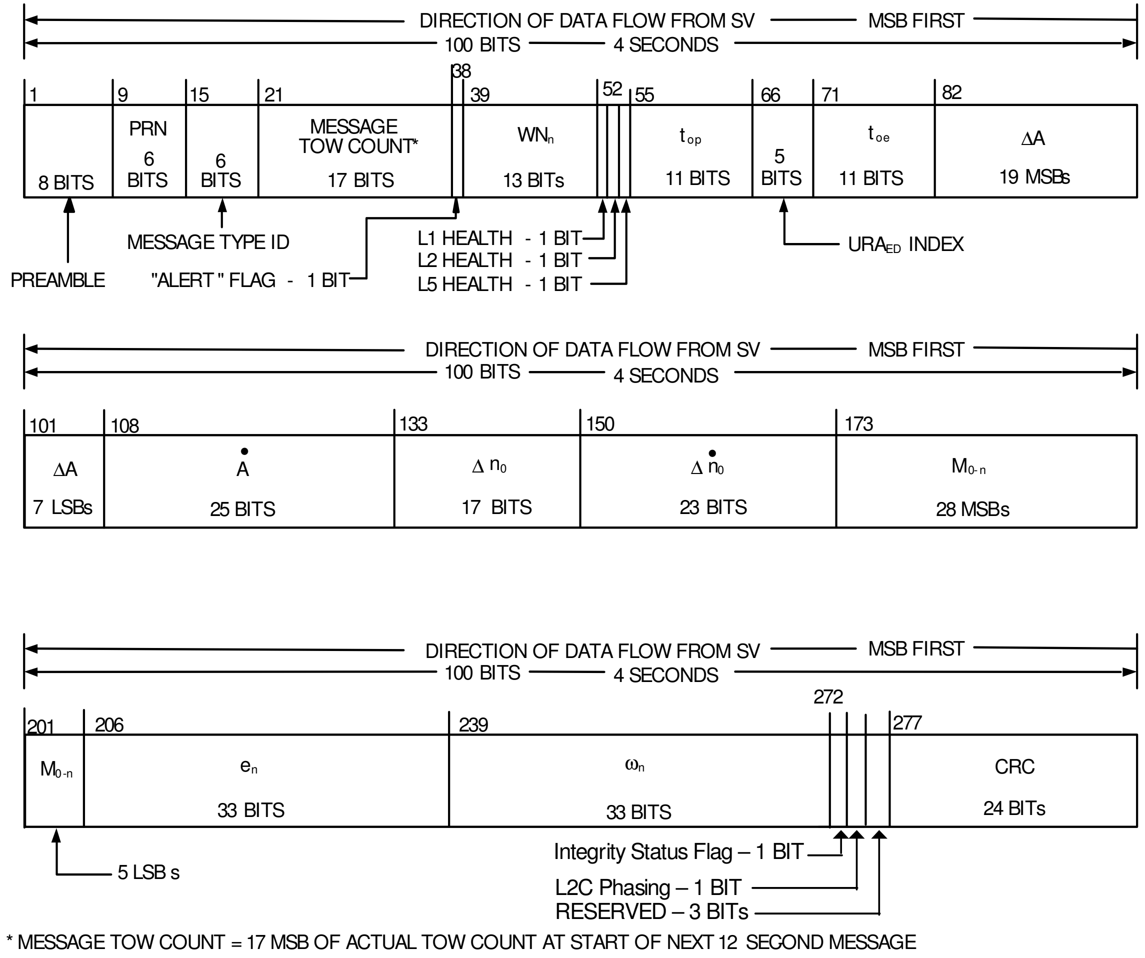
| Section Number | IS-GPS-200 RevF IRN001 (17 Apr 2012) Navstar GPS Space Segment/Navigation User Interfaces | Proposed Object Heading | Proposed Public Signals-in-Space (SiS) Updates Object Text | Proposed Rationale |
|---|---|---|---|---|
| 20.3.2 |  <br>** THE INDICATED PORTIONS OF WORDS 3 THROUGH 10 OF PAGES 14 AND 15 ARE RESERVED FOR SYSTEM USE, WHILE THOSE OF PAGE 17 ARE RESERVED FOR SPECIAL MESSAGES PER PARAGRAPH 20.3.3.5.1.10<br>P = 6 PARITY BITS<br>t = 2 NONINFORMATION BEARING BITS USED FOR PARITY COMPUTATION (SEE PARAGRAPH 20.3.5)<br>C = TLM BITS 23 AND 24. BIT 23 IS THE INTEGRITY STATUS FLAG AND BIT 24 IS RESERVED<br>Figure 20-1. Data Format (sheet 11 of 11) | |  <br>** THE INDICATED PORTIONS OF WORDS 3 THROUGH 10 OF PAGES 14 AND 15 ARE RESERVED FOR SYSTEM USE, WHILE THOSE OF PAGE 17 ARE RESERVED FOR SPECIAL MESSAGES PER PARAGRAPH 20.3.3.5.1.8<br>P = 6 PARITY BITS<br>t = 2 NONINFORMATION BEARING BITS USED FOR PARITY COMPUTATION (SEE PARAGRAPH 20.3.5)<br>C = TLM BITS 23 AND 24. BIT 23 IS THE INTEGRITY STATUS FLAG AND BIT 24 IS RESERVED<br>Figure 20-1. Data Format (sheet 11 of 11) | The dual asterisked (**) section reference 20.3.3.5.1.10 is an incorrect section reference for Special Messages. The section reference should be 20.3.3.5.1.8. |

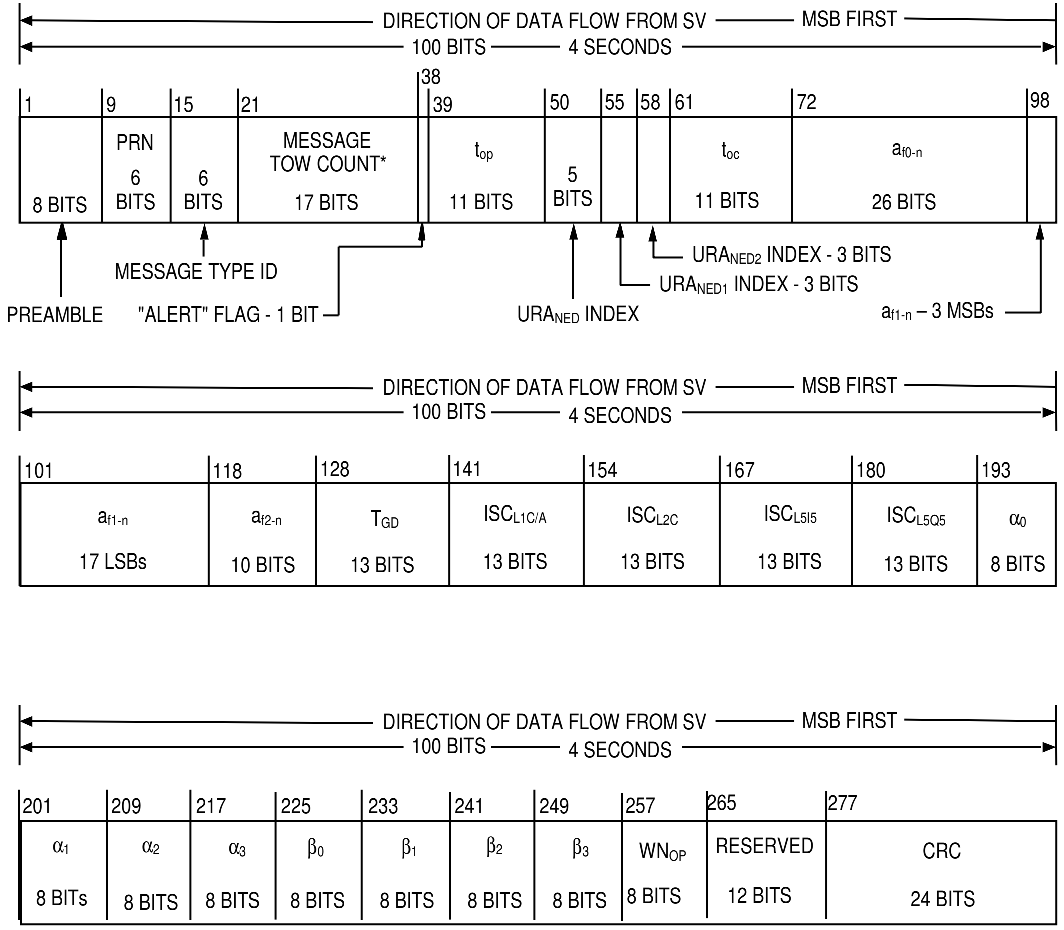
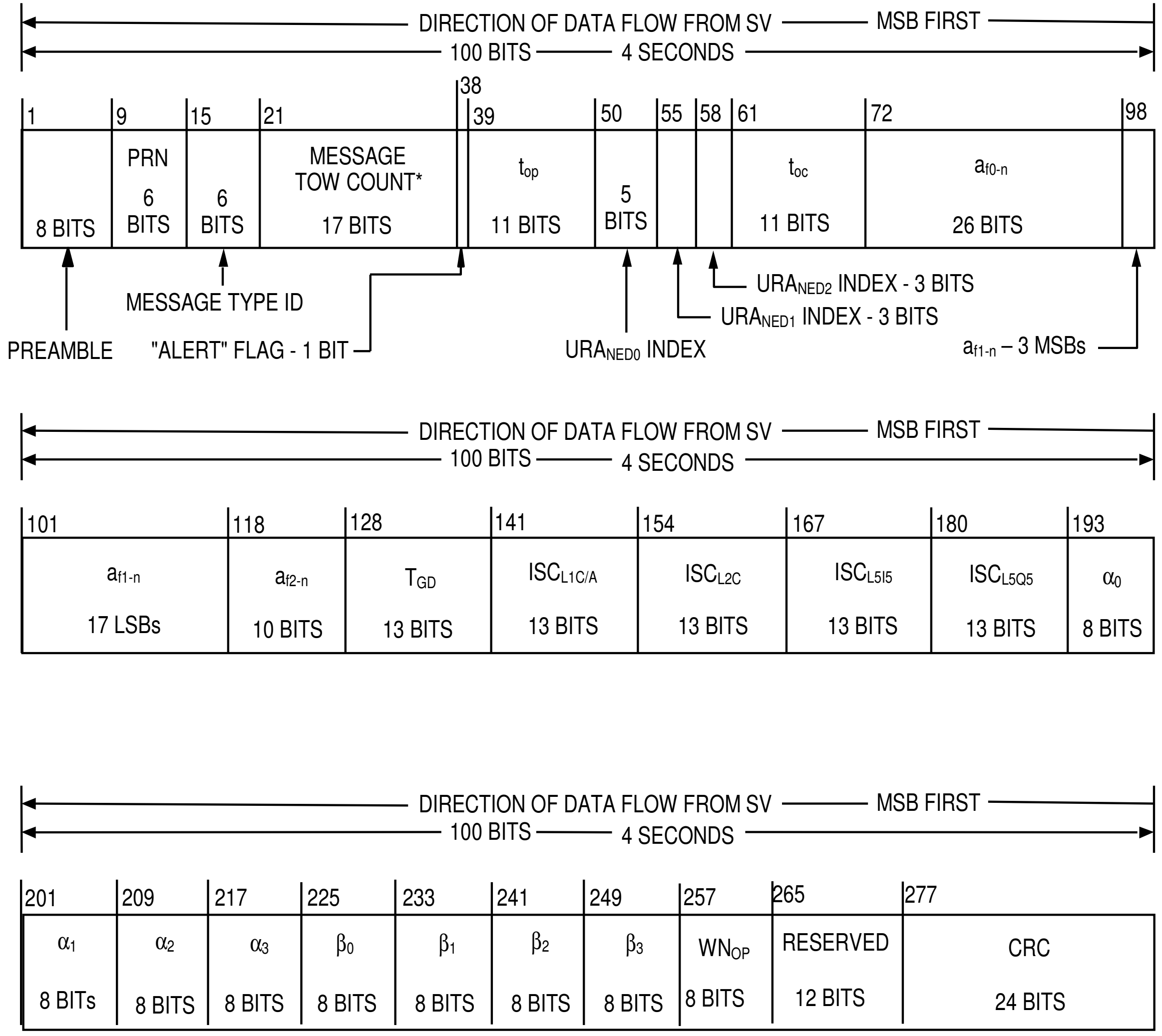
| Section Number | IS-GPS-200 RevF IRN001 (17 Apr 2012) Navstar GPS Space Segment/Navigation User Interfaces | Proposed Object Heading | Proposed Public Signals-in-Space (SiS) Updates Object Text | Proposed Rationale |
|---|---|---|---|---|
| 20.3.3.2 |  <br>Figure 20-2. TLM and HOW Formats |  |  <br>Figure 20-2. TLM and HOW Formats | Removing yellow highlighting from Figure 20-2.<br>The highlighted bits were only differentiated for discussion purposes and removing the highlights have no technical impact. |
| 20.3.3.4.3.3.2 | In an ECI coordinate system, GPS signals propagate in straight lines at the constant speed c* (reference paragraph 20.3.4.3). A stable ECI coordinate system of convenience may be defined as being coincident with the ECEF coordinate system at a given time $t_0$. The x, y, z coordinates in the ECEF coordinate system at some other time t can be transformed to the x′, y′, z′ coordinates in the selected ECI coordinate system of convenience by the simple** rotation: |  | In an ECI coordinate system, GPS signals propagate in straight lines at the constant speed c* (reference paragraph 20.3.4.3). A stable ECI coordinate system of convenience may be defined as being coincident with the ECEF coordinate system at a given time $t_0$. The x, y, z coordinates in the ECEF coordinate system at some other time t can be transformed to the x′, y′, z′ coordinates in the selected ECI coordinate system of convenience by the simple** rotation: | Corrected subscript of Omega sub-c to Omega sub-e. |

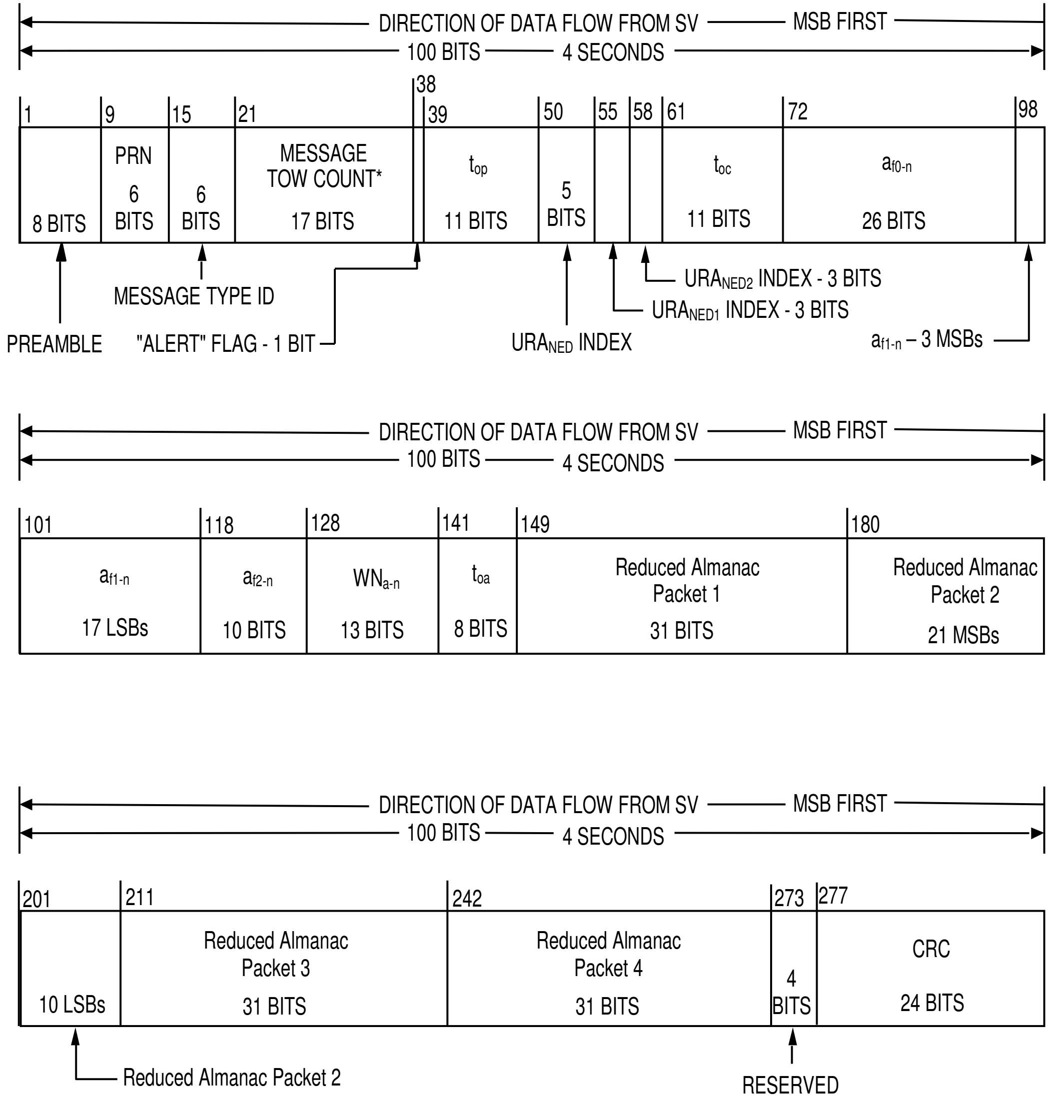
| Section Number | IS-GPS-200 RevF IRN001 (17 Apr 2012) Navstar GPS Space Segment/Navigation User Interfaces | Proposed Object Heading | Proposed Public Signals-in-Space (SiS) Updates Object Text | Proposed Rationale |
|---|---|---|---|---|
| | $x' = x \cos(\theta) - y \sin(\theta)$<br>$y' = x \sin(\theta) + y \cos(\theta)$<br>$z' = z$<br>where<br>$\theta = \dot{\Omega}_c (t - t_0)$<br>* The propagation speed c is constant only in a vacuum. The gravitational potential also has a small effect on the propagation speed, but may be neglected by most users.<br>** Neglecting effects due to polar motion, nutation, and precession which may be neglected by most users for small values of $(t - t_0)$. | | $x' = x \cos(\theta) - y \sin(\theta)$<br>$y' = x \sin(\theta) + y \cos(\theta)$<br>$z' = z$<br>where<br>$\theta = \dot{\Omega}_e (t - t_0)$<br>* The propagation speed c is constant only in a vacuum. The gravitational potential also has a small effect on the propagation speed, but may be neglected by most users.<br>** Neglecting effects due to polar motion, nutation, and precession which may be neglected by most users for small values of $(t - t_0)$. | |
| 20.3.3.5.1 | Contents of Subframes 4 and 5. | **Content of Subframes 4 and 5.** | | "Content" was inadvertently changed to "Contents" in RevF. Changing title back to "Content". |

<table>
<tr><th>Section Number</th><th>IS-GPS-200 RevF IRN001 (17 Apr 2012) Navstar GPS Space Segment/Navigation User Interfaces</th><th>Proposed Object Heading</th><th>Proposed Public Signals-in-Space (SiS) Updates Object Text</th><th>Proposed Rationale</th></tr>
<tr><td>20.3.3.5.1.7</td><td>
<table>
<tr><th colspan="5">Table 20-IX. UTC Parameters</th></tr>
<tr><th>Parameter</th><th>No. of Bits**</th><th>Scale Factor (LSB)</th><th>Effective Range***</th><th>Units</th></tr>
<tr><td>$A_0$</td><td>32*</td><td>$2^{-30}$</td><td></td><td>seconds</td></tr>
<tr><td>$A_1$</td><td>24*</td><td>$2^{-50}$</td><td></td><td>sec/sec</td></tr>
<tr><td>$t_{LS}$</td><td>8*</td><td>1</td><td></td><td>seconds</td></tr>
<tr><td>$t_{ot}$</td><td>8</td><td>$2^{12}$</td><td>602,112</td><td>seconds</td></tr>
<tr><td>$WN_t$</td><td>8</td><td>1</td><td></td><td>weeks</td></tr>
<tr><td>$WN_{LSF}$</td><td>8</td><td>1</td><td></td><td>weeks</td></tr>
<tr><td>DN</td><td>8****</td><td>1</td><td>7</td><td>days</td></tr>
<tr><td>$t_{LSF}$</td><td>8*</td><td>1</td><td></td><td>seconds</td></tr>
<tr><td colspan="5">* Parameters so indicated shall be two's complement with the sign bit (+ or -) occupying the MSB;<br>** See Figure 20-1 for complete bit allocation in subframe;<br>*** Unless otherwise indicated in this column, effective range is the maximum range attainable with indicated bit allocation and scale factor;<br>**** Right justified.</td></tr>
</table>
</td><td></td><td>
<table>
<tr><th colspan="5">Table 20-IX. UTC Parameters</th></tr>
<tr><th>Parameter</th><th>No. of Bits**</th><th>Scale Factor (LSB)</th><th>Effective Range***</th><th>Units</th></tr>
<tr><td>$A_0$</td><td>32*</td><td>$2^{-30}$</td><td></td><td>seconds</td></tr>
<tr><td>$A_1$</td><td>24*</td><td>$2^{-50}$</td><td></td><td>sec/sec</td></tr>
<tr><td>$\Delta t_{LS}$</td><td>8*</td><td>1</td><td></td><td>seconds</td></tr>
<tr><td>$t_{ot}$</td><td>8</td><td>$2^{12}$</td><td>602,112</td><td>seconds</td></tr>
<tr><td>$WN_t$</td><td>8</td><td>1</td><td></td><td>weeks</td></tr>
<tr><td>$WN_{LSF}$</td><td>8</td><td>1</td><td></td><td>weeks</td></tr>
<tr><td>DN</td><td>8****</td><td>1</td><td>7</td><td>days</td></tr>
<tr><td>$\Delta t_{LSF}$</td><td>8*</td><td>1</td><td></td><td>seconds</td></tr>
<tr><td colspan="5">* Parameters so indicated shall be two's complement with the sign bit (+ or -) occupying the MSB;<br>** See Figure 20-1 for complete bit allocation in subframe;<br>*** Unless otherwise indicated in this column, effective range is the maximum range attainable with indicated bit allocation and scale factor;<br>**** Right justified.</td></tr>
</table>
</td><td>Publication error during Word export.<br>Table is now correct in Word/PDF.<br>The deltas for the terms "$t_{LS}$" and $t_{LSF}$" have been repaired and reinserted.</td></tr>
<tr><td>20.3.3.5.1.8</td><td>Page 17 of subframe 4 shall be reserved for special messages with the specific contents at the discretion of the Operating Command. It shall accommodate the transmission of 22 eight-bit ASCII characters. The requisite 176 bits shall occupy bits 9 through 24 of word three, the 24 MSBs of words four through nine, plus the 16 MSBs of word ten. The eight MSBs of word three shall contain the data ID and SV ID, while bits 17 through 22 of word ten shall be reserved for system use. The remaining 50 bits of words three through ten are used for parity (six bits/word) and parity computation (two bits in word ten). The eight-bit</td><td></td><td>Page 17 of subframe 4 shall be reserved for special messages with the specific contents at the discretion of the Operating Command. It shall accommodate the transmission of 22 eight-bit ASCII characters. The requisite 176 bits shall occupy bits 9 through 24 of word three, the 24 MSBs of words four through nine, plus the 16 MSBs of word ten. The eight MSBs of word three shall contain the data ID and SV ID, while bits 17 through 22 of word ten shall be reserved for system use. The remaining 50 bits of words three through ten are used for parity (six bits/word) and parity computation (two bits in word ten). The eight-bit ASCII characters shall be limited to the following set:</td><td>Removed borders from table.</td></tr>
</table>

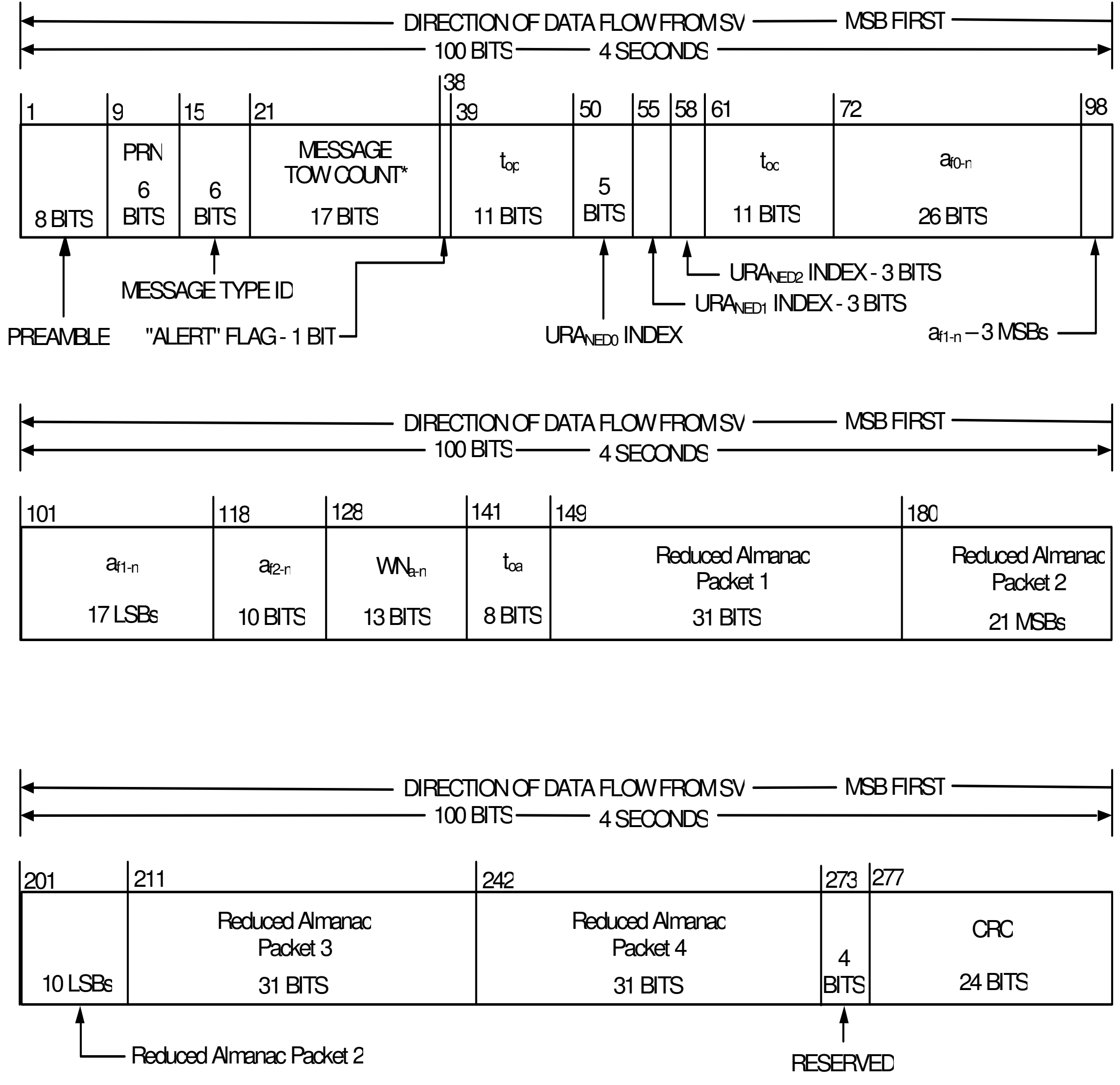
<table>
<tr><th>Section Number</th><th>IS-GPS-200 RevF IRN001 (17 Apr 2012) Navstar GPS Space Segment/Navigation User Interfaces</th><th>Proposed Object Heading</th><th>Proposed Public Signals-in-Space (SiS) Updates Object Text</th><th>Proposed Rationale</th></tr>
<tr><td></td><td>ASCII characters shall be limited to the following set:
<table>
<tr><td>Alphanumeric Character</td><td>ASCII Character</td><td>Code (Octal)</td></tr>
<tr><td>A - Z</td><td>A - Z</td><td>101 - 132</td></tr>
<tr><td>0 - 9</td><td>0 - 9</td><td>060 - 071</td></tr>
<tr><td>+</td><td>+</td><td>053</td></tr>
<tr><td>-</td><td>-</td><td>055</td></tr>
<tr><td>. (Decimal point)</td><td>.</td><td>056</td></tr>
<tr><td>' (Minute mark)</td><td>'</td><td>047</td></tr>
<tr><td>° (Degree sign)</td><td>°</td><td>370</td></tr>
<tr><td>/</td><td>/</td><td>057</td></tr>
<tr><td>Blank</td><td>Space</td><td>040</td></tr>
<tr><td>:</td><td>:</td><td>072</td></tr>
<tr><td>" (Second mark)</td><td>"</td><td>042</td></tr>
</table></td><td></td><td><table>
<tr><td>Alphanumeric Character</td><td>ASCII Character</td><td>Code (Octal)</td></tr>
<tr><td>A - Z</td><td>A - Z</td><td>101 - 132</td></tr>
<tr><td>0 - 9</td><td>0 - 9</td><td>060 - 071</td></tr>
<tr><td>+</td><td>+</td><td>053</td></tr>
<tr><td>-</td><td>-</td><td>055</td></tr>
<tr><td>. (Decimal point)</td><td>.</td><td>056</td></tr>
<tr><td>' (Minute mark)</td><td>'</td><td>047</td></tr>
<tr><td>° (Degree sign)</td><td>°</td><td>370</td></tr>
<tr><td>/</td><td>/</td><td>057</td></tr>
<tr><td>Blank</td><td>Space</td><td>040</td></tr>
<tr><td>:</td><td>:</td><td>072</td></tr>
<tr><td>" (Second mark)</td><td>"</td><td>042</td></tr>
</table></td><td></td></tr>
<tr><td>20.3.5.1</td><td><b><i>User Frame Parity.</i></b></td><td><b>SV/CS Parity Algorithm.</b></td><td></td><td>"SV/CS Parity Algorithm" was inadvertently changed to "User Frame Parity" in RevF. Changing title back to "SV/CS Parity Algorithm".</td></tr>
</table>

| Section Number | IS-GPS-200 RevF IRN001 (17 Apr 2012) Navstar GPS Space Segment/Navigation User Interfaces | Proposed Object Heading | Proposed Public Signals-in-Space (SiS) Updates Object Text | Proposed Rationale |
|---|---|---|---|---|
| 30.3.3 |  Figure 30-1. Message Type 10 - Ephemeris 1 |  |  Figure 30-1. Message Type 10 - Ephemeris 1 | Removing yellow highlighting from Figure 30-1.<br>The highlighted bits were only differentiated for discussion purposes and removing the highlights have no technical impact. |

| Section Number | IS-GPS-200 RevF IRN001 (17 Apr 2012) Navstar GPS Space Segment/Navigation User Interfaces | Proposed Object Heading | Proposed Public Signals-in-Space (SiS) Updates Object Text | Proposed Rationale |
|---|---|---|---|---|
| 30.3.3 |  <br>* MESSAGE TOW COUNT = 17 MSB OF ACTUAL TOW COUNT AT START OF NEXT 12-SECOND MESSAGE<br>Figure 30-3. Message Type 30 - Clock, IONO & Group Delay | |  <br>* MESSAGE TOW COUNT = 17 MSB OF ACTUAL TOW COUNT AT START OF NEXT 12-SECOND MESSAGE<br>Figure 30-3. Message Type 30 - Clock, IONO & Group Delay | The 5 bit field starting with Bit 50 should be designated URA$_{NED0}$, not URA$_{NED}$. |

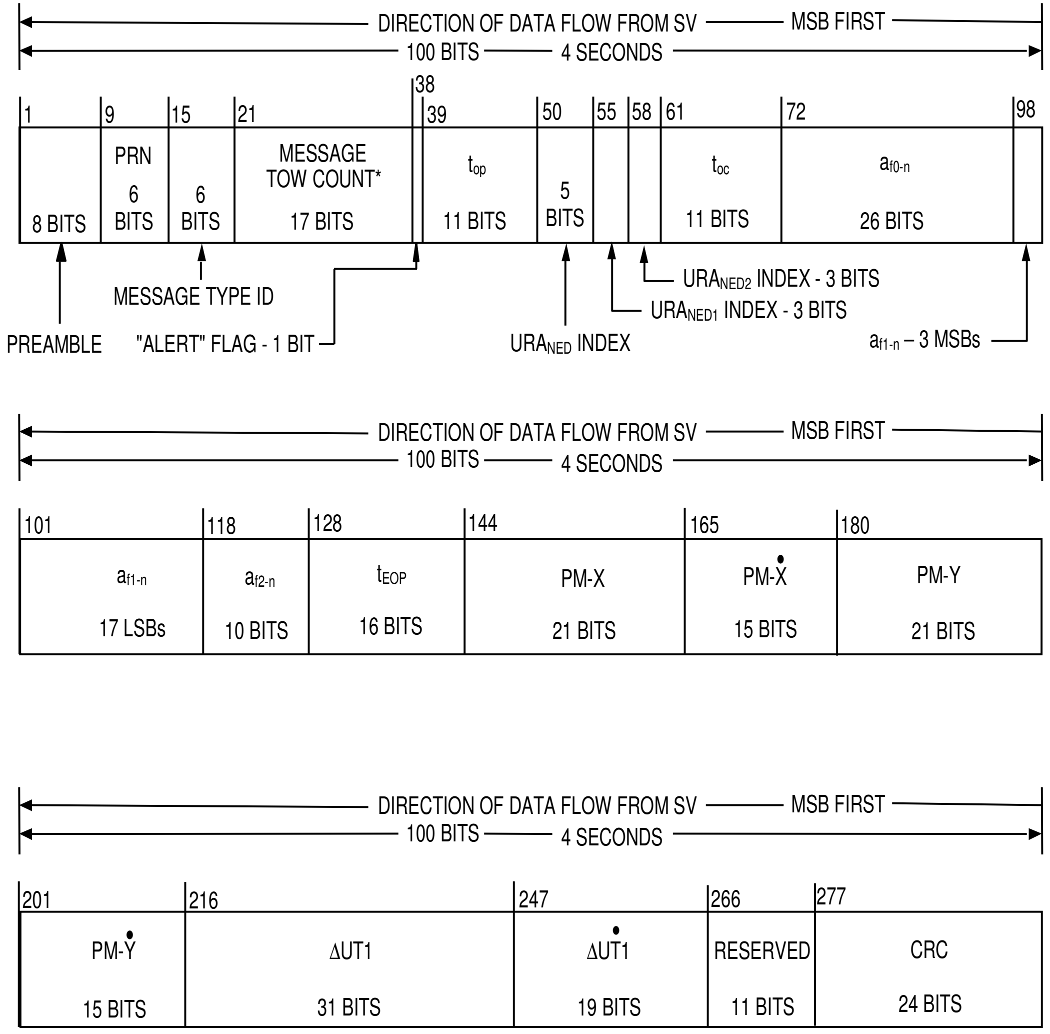
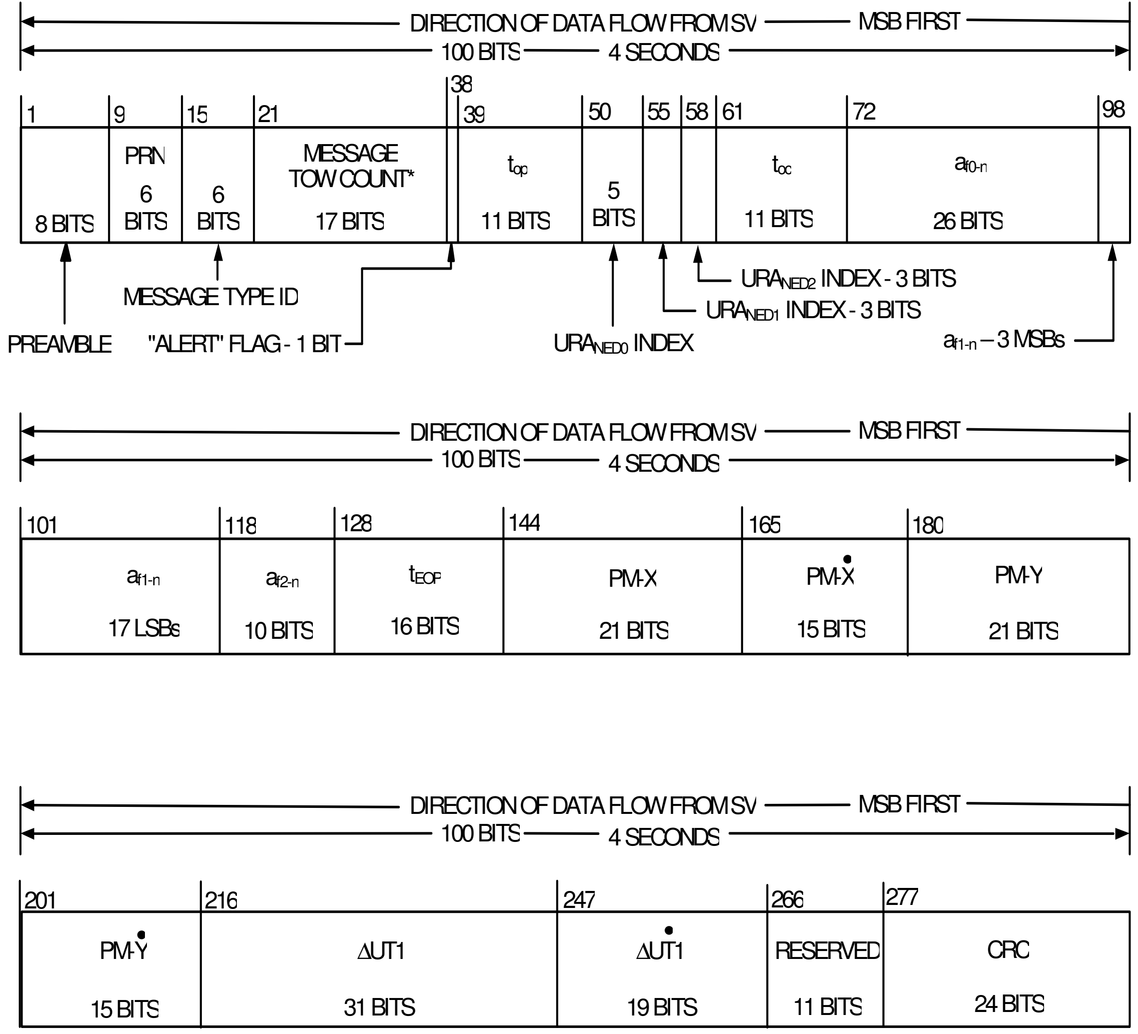
<table>
<tr><th>Section Number</th><th>IS-GPS-200 RevF IRN001 (17 Apr 2012) Navstar GPS Space Segment/Navigation User Interfaces</th><th>Proposed Object Heading</th><th>Proposed Public Signals-in-Space (SiS) Updates Object Text</th><th>Proposed Rationale</th></tr>
<tr><td>30.3.3</td><td>

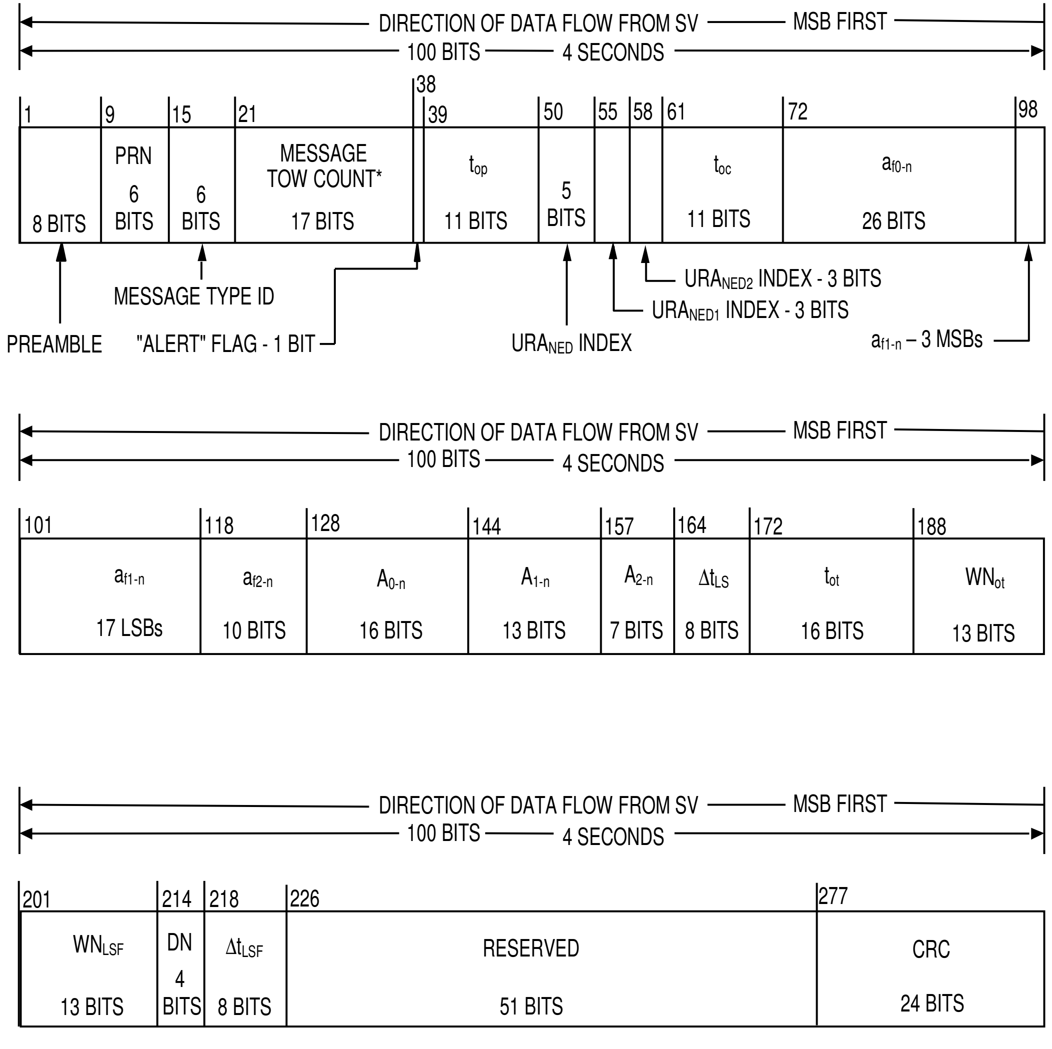
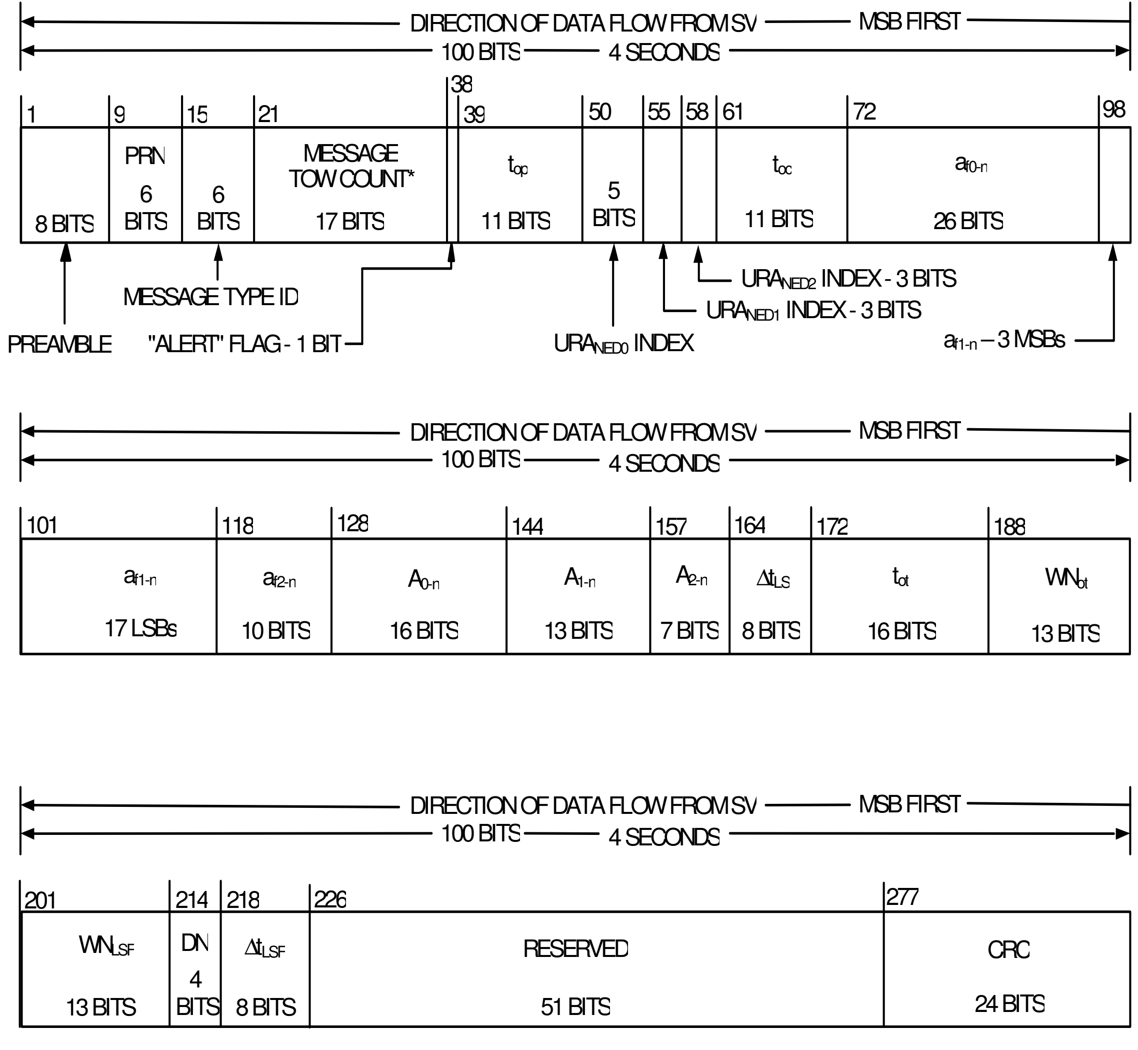
* MESSAGE TOW COUNT = 17 MSB OF ACTUAL TOW COUNT AT START OF NEXT 12-SECOND MESSAGE

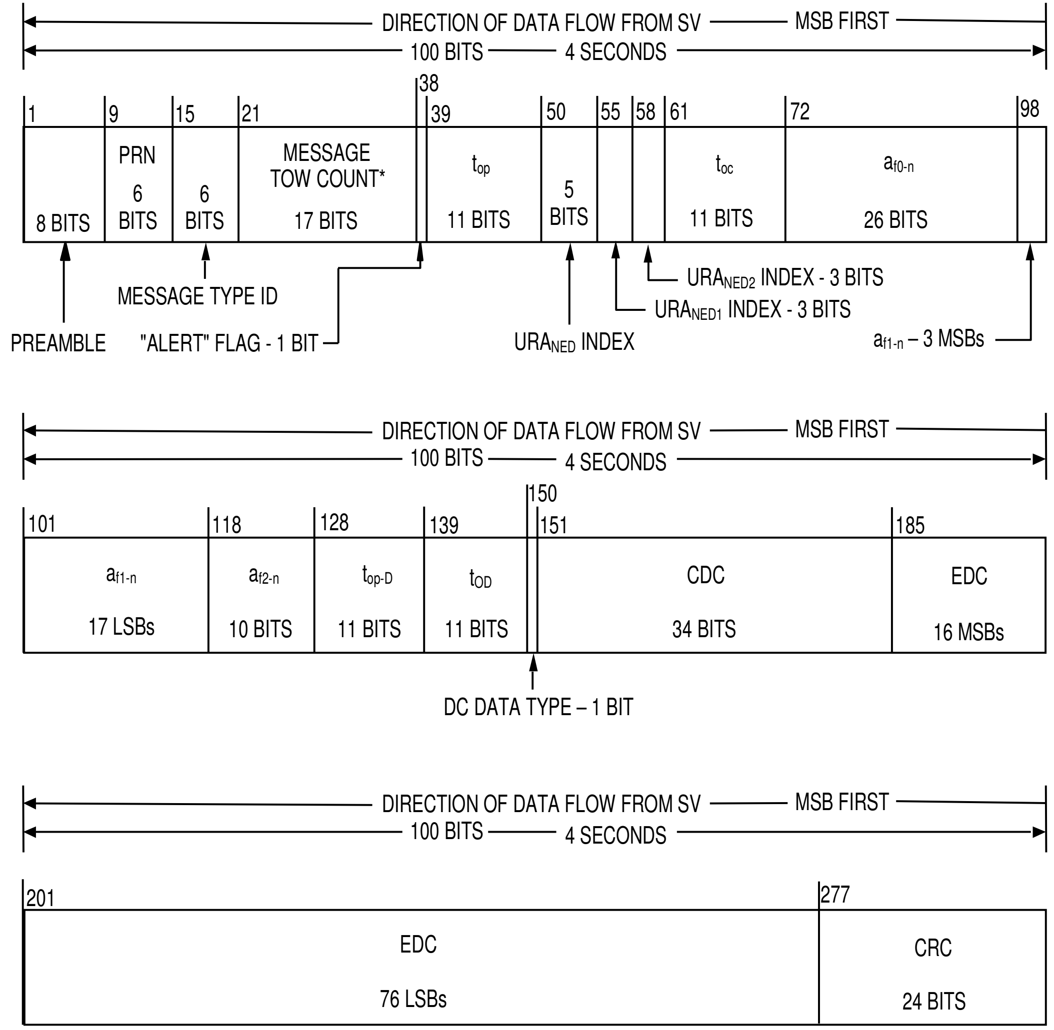
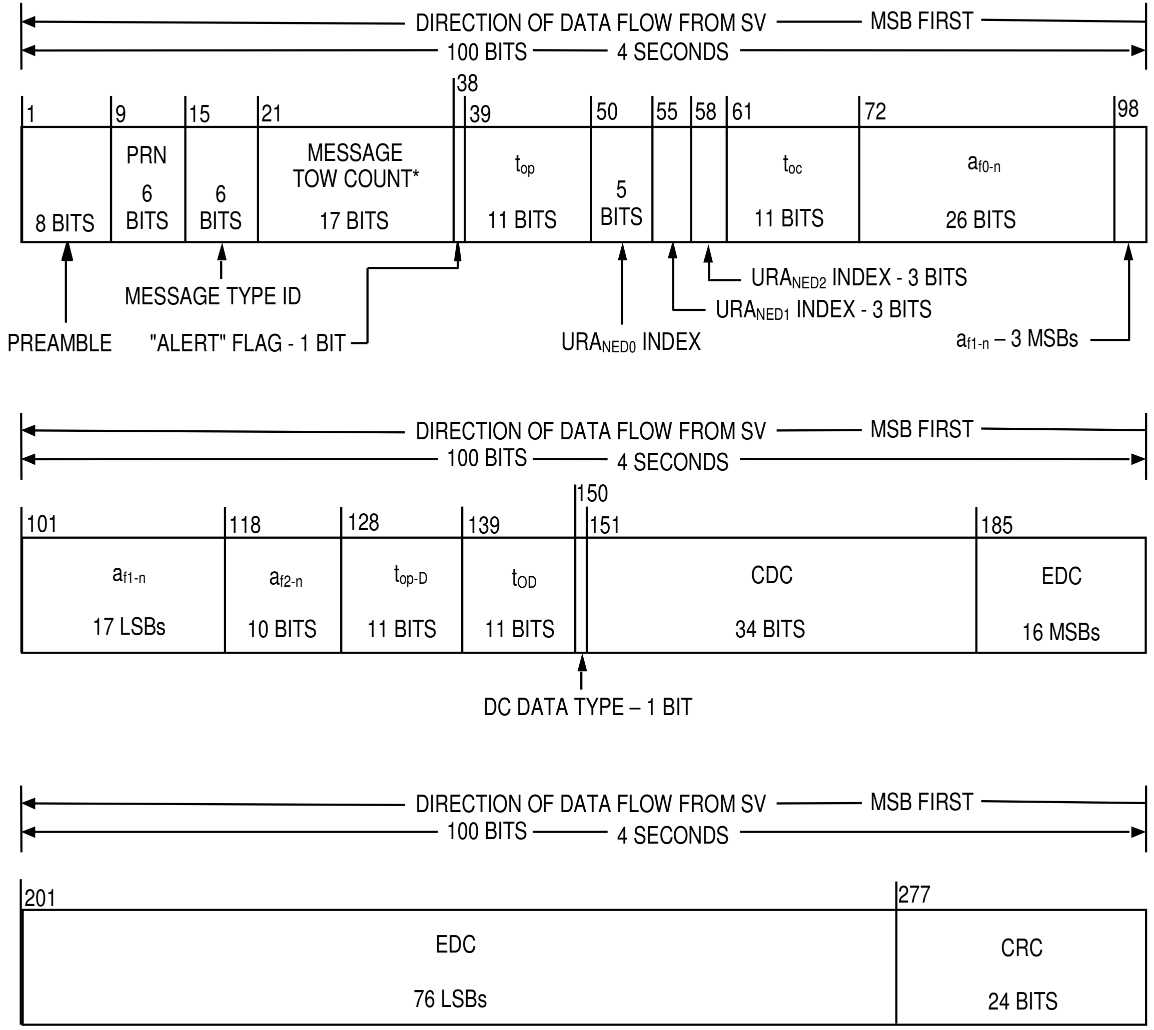
Figure 30-4. Message Type 31 - Clock & Reduced Almanac</td><td></td><td>

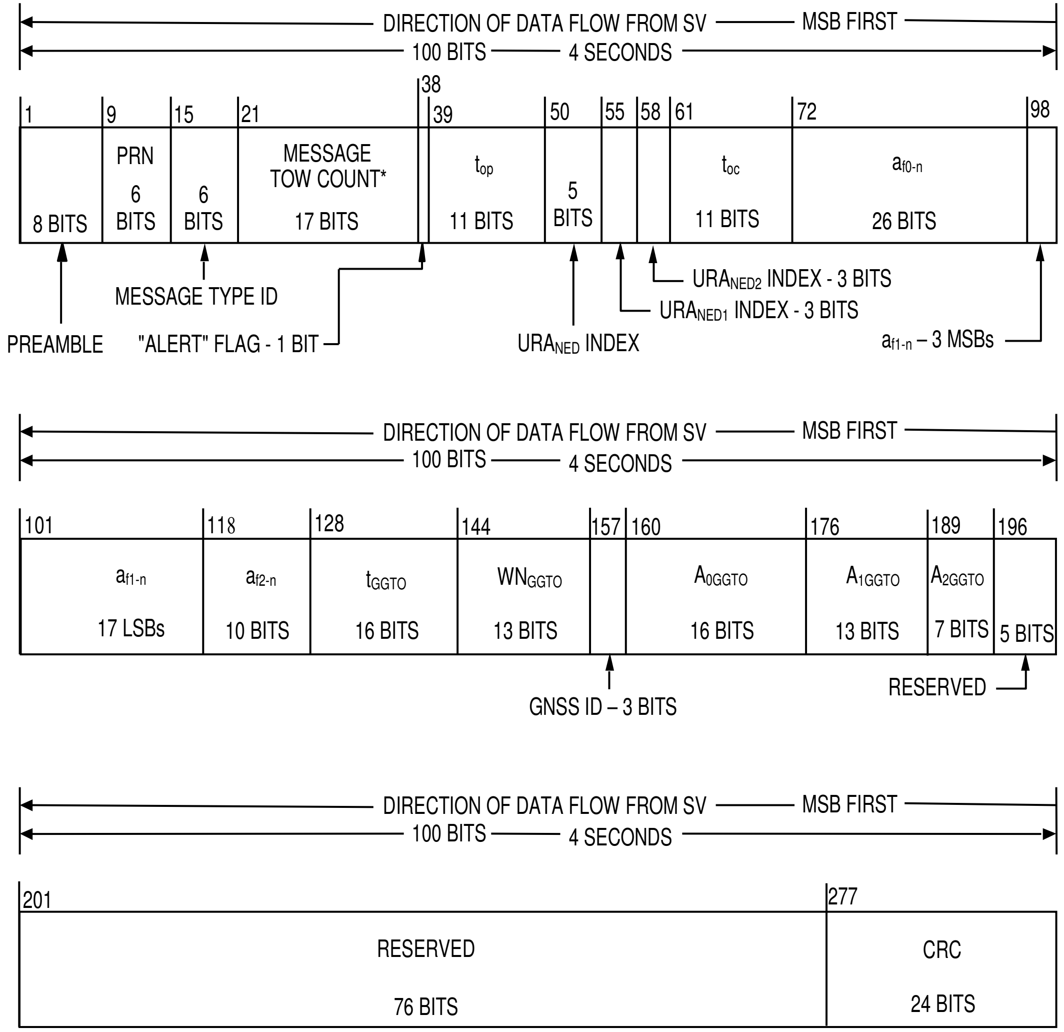
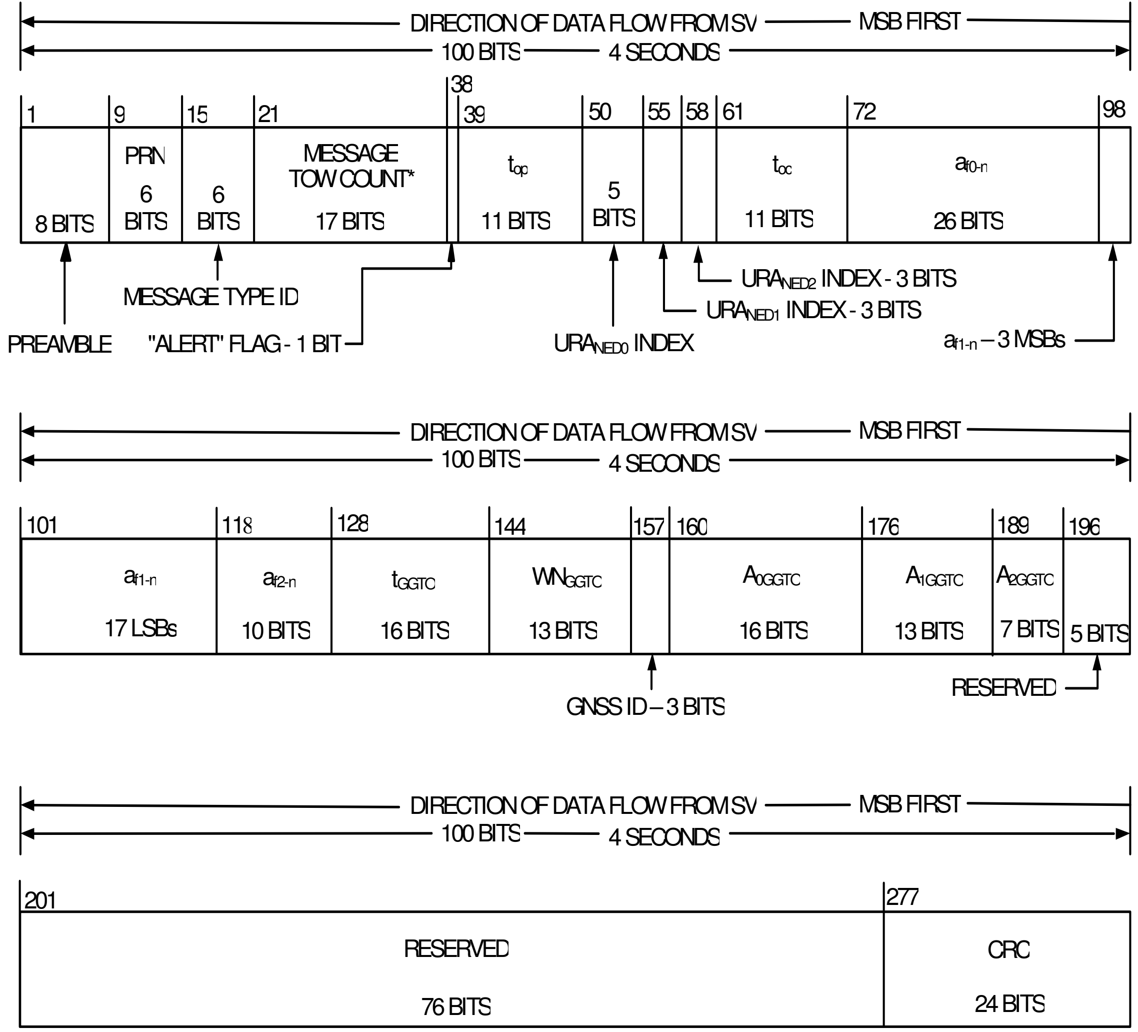
* MESSAGE TOW COUNT = 17 MSB OF ACTUAL TOW COUNT AT START OF NEXT 12-SECOND MESSAGE

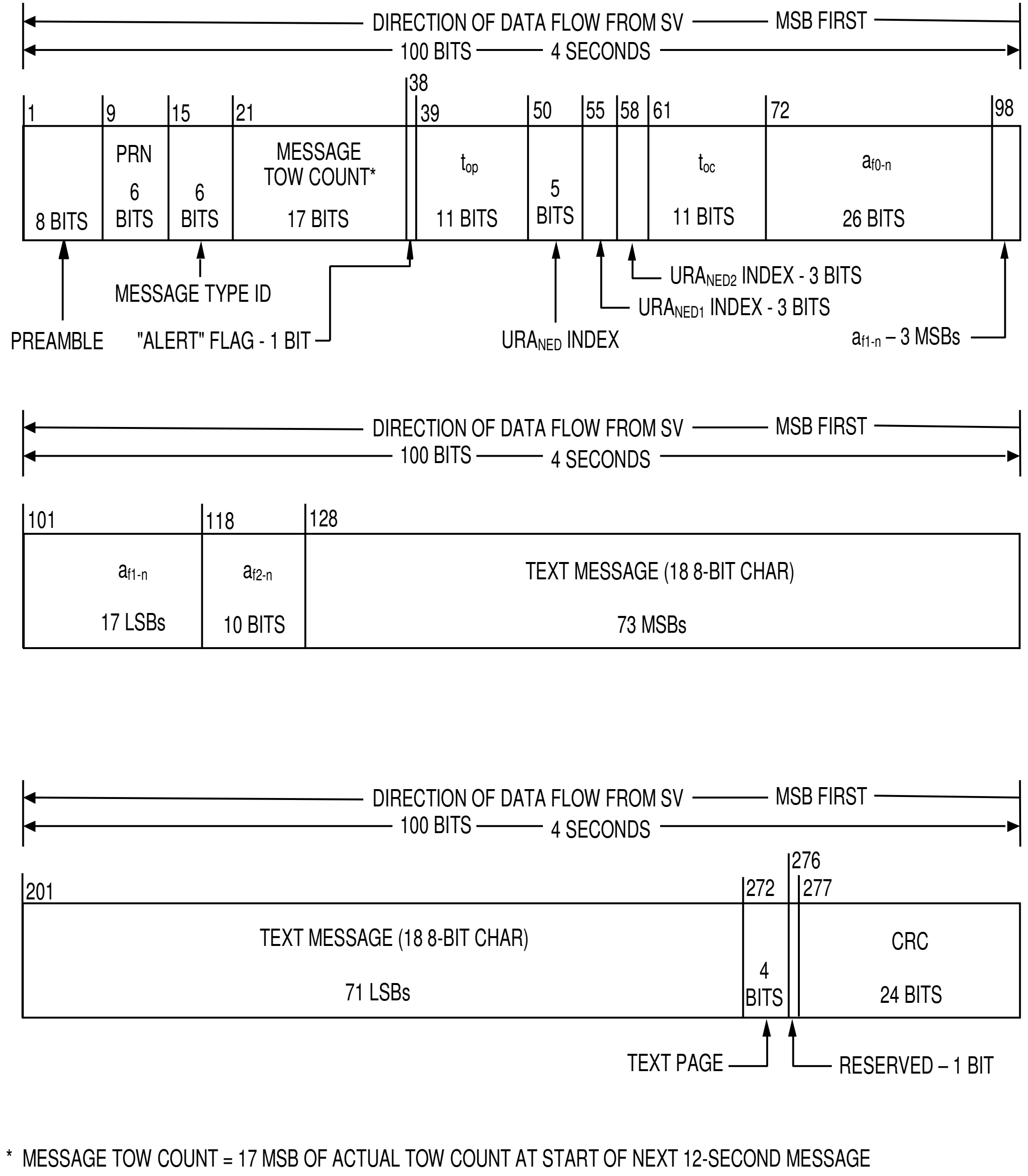
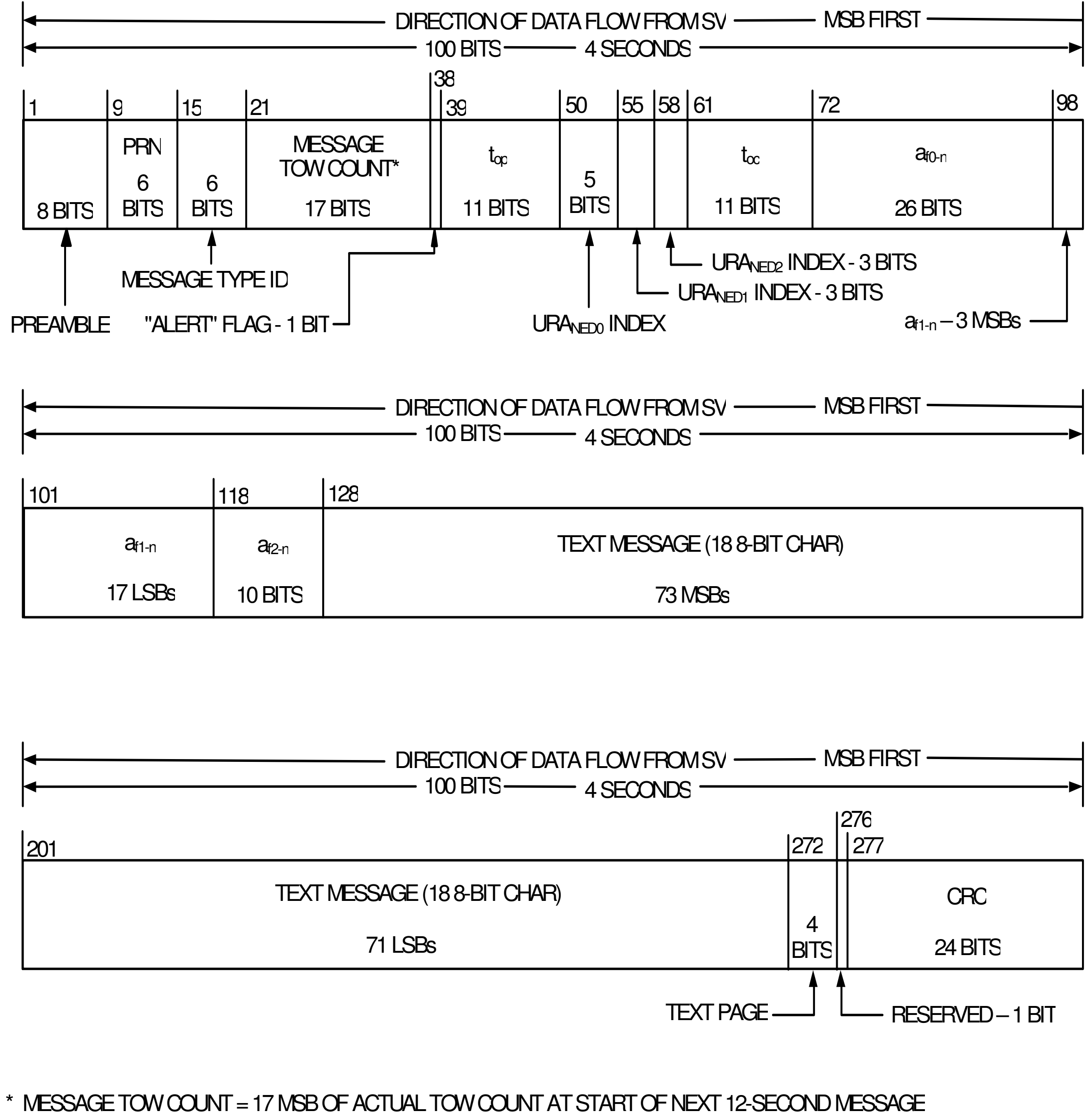
Figure 30-4. Message Type 31 - Clock & Reduced Almanac</td><td>The 5 bit field starting with Bit 50 should be designated $URA_{NED0}$, not $URA_{NED}$.</td></tr>
</table>

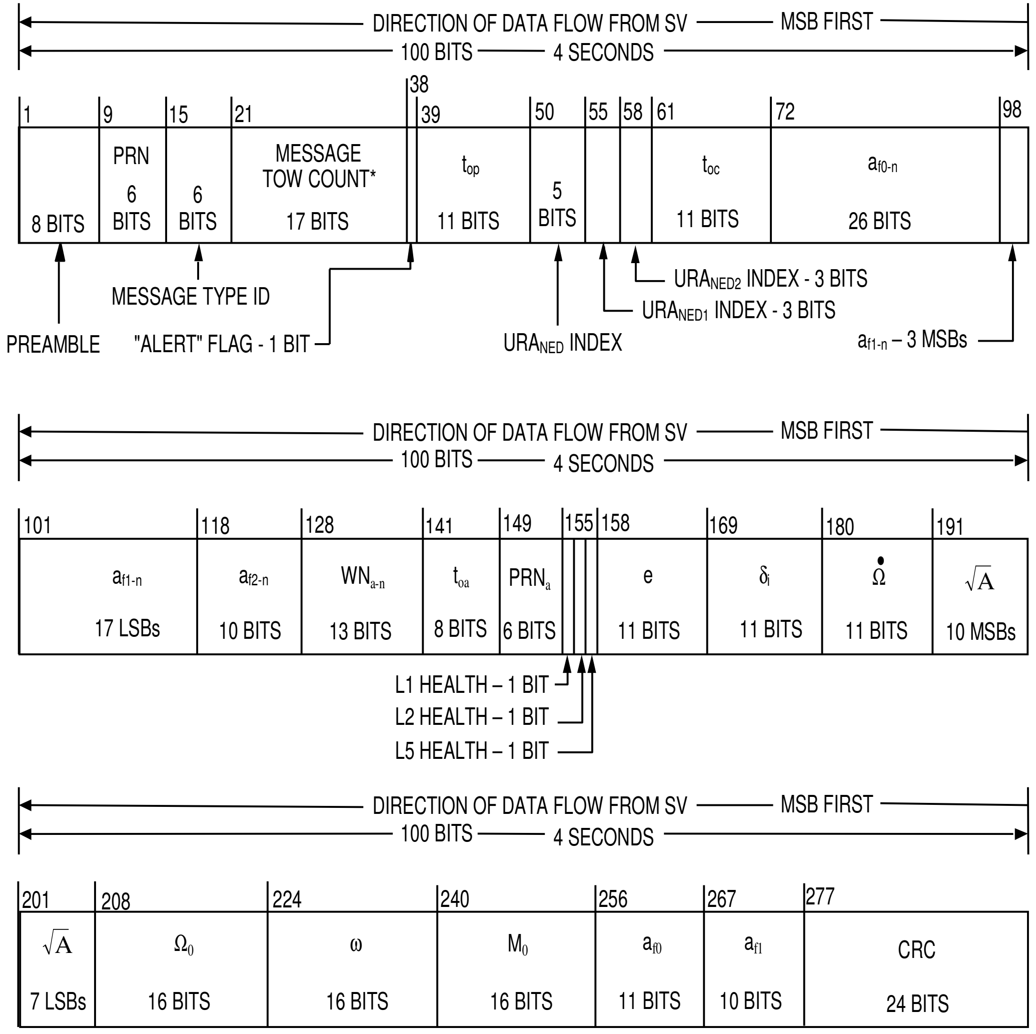
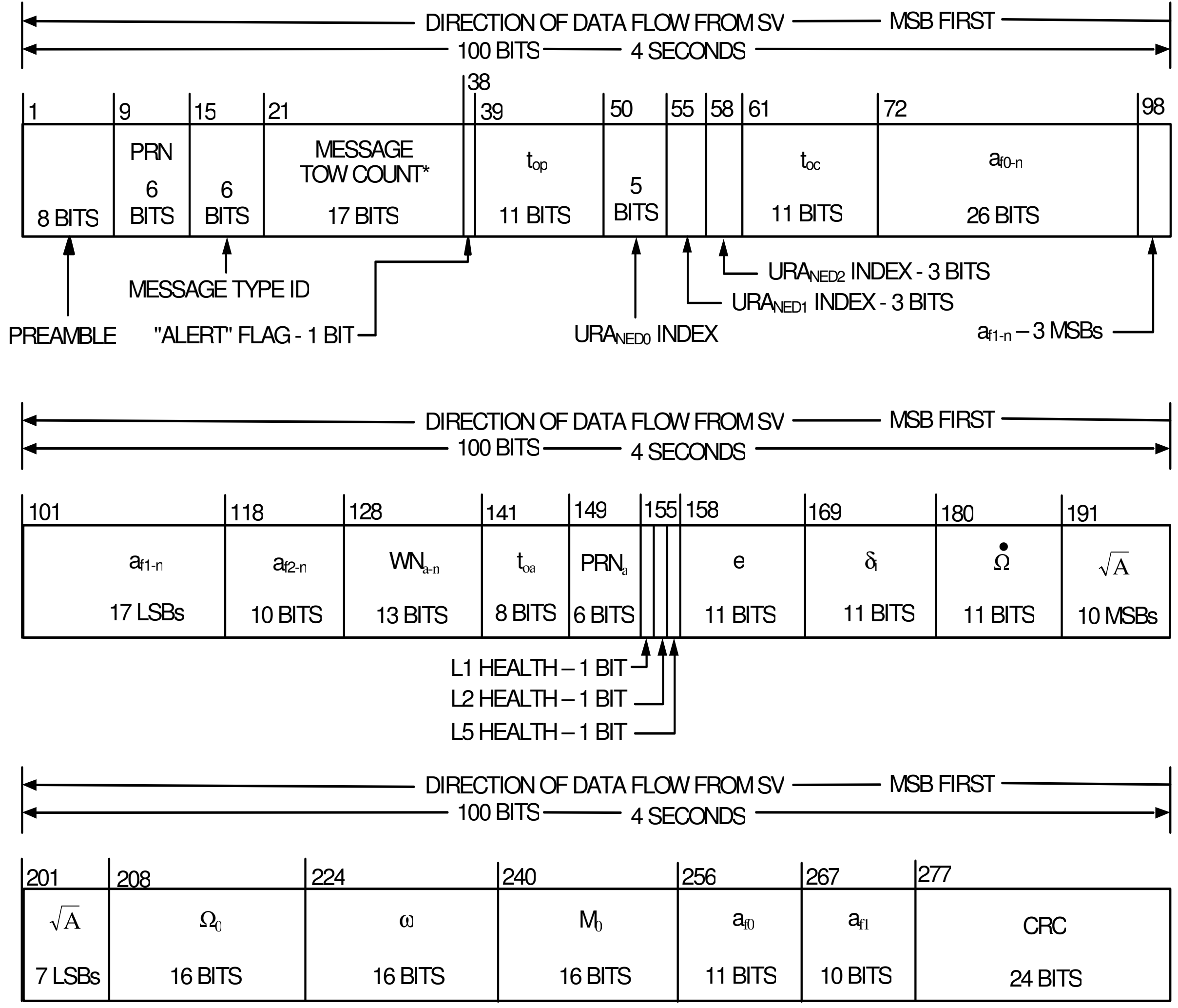
| Section Number | IS-GPS-200 RevF IRN001 (17 Apr 2012) Navstar GPS Space Segment/Navigation User Interfaces | Proposed Object Heading | Proposed Public Signals-in-Space (SiS) Updates Object Text | Proposed Rationale |
|---|---|---|---|---|
| 30.3.3 |  <br>* MESSAGE TOW COUNT = 17 MSB OF ACTUAL TOW COUNT AT START OF NEXT 12-SECOND MESSAGE<br>Figure 30-5. Message Type 32 - Clock & EOP |  |  <br>* MESSAGE TOW COUNT = 17 MSB OF ACTUAL TOW COUNT AT START OF NEXT 12-SECOND MESSAGE<br>Figure 30-5. Message Type 32 - Clock & EOP | The 5 bit field starting with Bit 50 should be designated URA$_{NED0}$, not URA$_{NED}$. |

| Section Number | IS-GPS-200 RevF IRN001 (17 Apr 2012) Navstar GPS Space Segment/Navigation User Interfaces | Proposed Object Heading | Proposed Public Signals-in-Space (SiS) Updates Object Text | Proposed Rationale |
|---|---|---|---|---|
| 30.3.3 |  <br>* MESSAGE TOW COUNT = 17 MSB OF ACTUAL TOW COUNT AT START OF NEXT 12-SECOND MESSAGE<br>Figure 30-6. Message Type 33 - Clock & UTC |  |  <br>* MESSAGE TOW COUNT = 17 MSB OF ACTUAL TOW COUNT AT START OF NEXT 12-SECOND MESSAGE<br>Figure 30-6. Message Type 33 - Clock & UTC | The 5 bit field starting with Bit 50 should be designated URA$_{NED0}$, not URA$_{NED}$. |

| Section Number | IS-GPS-200 RevF IRN001 (17 Apr 2012) Navstar GPS Space Segment/Navigation User Interfaces | Proposed Object Heading | Proposed Public Signals-in-Space (SiS) Updates Object Text | Proposed Rationale |
|---|---|---|---|---|
| 30.3.3 |  <br>* MESSAGE TOW COUNT = 17 MSB OF ACTUAL TOW COUNT AT START OF NEXT 12-SECOND MESSAGE<br>CDC = Clock Differential Correction<br>EDC = Ephemeris Differential Correction<br>Figure 30-7. Message Type 34 - Clock & Differential Correction |  |  <br>* MESSAGE TOW COUNT = 17 MSB OF ACTUAL TOW COUNT AT START OF NEXT 12-SECOND MESSAGE<br>CDC = Clock Differential Correction<br>EDC = Ephemeris Differential Correction<br>Figure 30-7. Message Type 34 - Clock & Differential Correction | The 5 bit field starting with Bit 50 should be designated $URA_{NED0}$, not $URA_{NED}$. |

| Section Number | IS-GPS-200 RevF IRN001 (17 Apr 2012) Navstar GPS Space Segment/Navigation User Interfaces | Proposed Object Heading | Proposed Public Signals-in-Space (SiS) Updates Object Text | Proposed Rationale |
|---|---|---|---|---|
| 30.3.3 |  <br>* MESSAGE TOW COUNT = 17 MSB OF ACTUAL TOW COUNT AT START OF NEXT 12-SECOND MESSAGE<br>Figure 30-8. Message Type 35 - Clock & GGTO |  |  <br>* MESSAGE TOW COUNT = 17 MSB OF ACTUAL TOW COUNT AT START OF NEXT 12-SECOND MESSAGE<br>Figure 30-8. Message Type 35 - Clock & GGTO | The 5 bit field starting with Bit 50 should be designated $URA_{NED0}$, not $URA_{NED}$. |

| Section Number | IS-GPS-200 RevF IRN001 (17 Apr 2012) Navstar GPS Space Segment/Navigation User Interfaces | Proposed Object Heading | Proposed Public Signals-in-Space (SiS) Updates Object Text | Proposed Rationale |
|---|---|---|---|---|
| 30.3.3 |  <br>Figure 30-9. Message Type 36 - Clock & Text |  |  <br>Figure 30-9. Message Type 36 - Clock & Text | The 5 bit field starting with Bit 50 should be designated URA$_{NED0}$, not URA$_{NED}$. |

| Section Number | IS-GPS-200 RevF IRN001 (17 Apr 2012) Navstar GPS Space Segment/Navigation User Interfaces | Proposed Object Heading | Proposed Public Signals-in-Space (SiS) Updates Object Text | Proposed Rationale |
|---|---|---|---|---|
| 30.3.3 |  <br>* MESSAGE TOW COUNT = 17 MSB OF ACTUAL TOW COUNT AT START OF NEXT 12-SECOND MESSAGE<br>Figure 30-10. Message Type 37 - Clock & Midi Almanac | |  <br>* MESSAGE TOW COUNT = 17 MSB OF ACTUAL TOW COUNT AT START OF NEXT 12-SECOND MESSAGE<br>Figure 30-10. Message Type 37 - Clock & Midi Almanac | The 5 bit field starting with Bit 50 should be designated $URA_{NED0}$, not $URA_{NED}$. |

<table>
<tr><th>Section Number</th><th>IS-GPS-200 RevF IRN001 (17 Apr 2012) Navstar GPS Space Segment/Navigation User Interfaces</th><th>Proposed Object Heading</th><th>Proposed Public Signals-in-Space (SiS) Updates Object Text</th><th>Proposed 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 (2 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>$t_{oe}$</td><td>Ephemeris data reference time of week</td><td>11</td><td>300</td><td>604,500</td><td>seconds</td></tr>
<tr><td>$\Omega_{0\text{-}n}$****</td><td>Reference right ascension angle</td><td>33*</td><td>$2^{-32}$</td><td></td><td>semi-circles</td></tr>
<tr><td>$\Delta\dot{\Omega}$ *****</td><td>Rate of right ascension difference</td><td>17*</td><td>$2^{-44}$</td><td></td><td>semi-circles/sec</td></tr>
<tr><td>$i_{0\text{-}n}$</td><td>Inclination angle at reference time</td><td>33*</td><td>$2^{-32}$</td><td></td><td>semi-circles</td></tr>
<tr><td>$i_{0\text{-}n}$ –DOT</td><td>Rate of inclination angle</td><td>15*</td><td>$2^{-44}$</td><td></td><td>semi-circles/sec</td></tr>
<tr><td>$C_{is\text{-}n}$</td><td>Amplitude of the sine harmonic correction term to the angle of inclination</td><td>16*</td><td>$2^{-30}$</td><td></td><td>radians</td></tr>
<tr><td>$C_{ic\text{-}n}$</td><td>Amplitude of the cosine harmonic correction term to the angle of inclination</td><td>16*</td><td>$2^{-30}$</td><td></td><td>radians</td></tr>
<tr><td>$C_{rs\text{-}n}$</td><td>Amplitude of the sine correction term to the orbit radius</td><td>24*</td><td>$2^{-8}$</td><td></td><td>meters</td></tr>
<tr><td>$C_{rc\text{-}n}$</td><td>Amplitude of the cosine correction term to the orbit radius</td><td>24*</td><td>$2^{-8}$</td><td></td><td>meters</td></tr>
<tr><td>$C_{us\text{-}n}$</td><td>Amplitude of the sine harmonic correction term to the argument of latitude</td><td>21*</td><td>$2^{-30}$</td><td></td><td>radians</td></tr>
<tr><td>$C_{uc\text{-}n}$</td><td>Amplitude of the cosine harmonic correction term to the argument of latitude</td><td>21*</td><td>$2^{-30}$</td><td></td><td>radians</td></tr>
<tr><td colspan="6">* Parameters so indicated are two's complement, with the sign bit (+ or -) occupying the MSB;<br>** See Figure 30-1 and Figure 30-2 for complete bit allocation in Message Types 10 and 11;<br>*** Unless otherwise indicated in this column, effective range is the maximum range attainable with indicated bit allocation and scale factor.<br>**** $\Omega_{0\text{-}n}$ is the right ascension angle at the weekly epoch ($\Omega_{0\text{-}w}$) propagated to the reference time at the rate of right ascension {$\dot{\Omega}_{REF}$ Table 30-II }.<br>***** Relative to $\dot{\Omega}_{REF}$ = -2.6 x $10^{-9}$ semi-circles/second.</td></tr>
</table>
</td>
<td></td>
<td>
<table>
<tr><th colspan="6">Table 30-I. Message Types 10 and 11 Parameters (2 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>$t_{oe}$</td><td>Ephemeris data reference time of week</td><td>11</td><td>300</td><td>604,500</td><td>seconds</td></tr>
<tr><td>$\Omega_{0\text{-}n}$</td><td>Longitude of Ascending Node of Orbit Plane at Weekly Epoch</td><td>33*</td><td>$2^{-32}$</td><td></td><td>semi-circles</td></tr>
<tr><td>$\Delta\dot{\Omega}$****</td><td>Rate of right ascension difference</td><td>17*</td><td>$2^{-44}$</td><td></td><td>semi-circles/sec</td></tr>
<tr><td>$i_{0\text{-}n}$</td><td>Inclination angle at reference time</td><td>33*</td><td>$2^{-32}$</td><td></td><td>semi-circles</td></tr>
<tr><td>$i_{0\text{-}n}$ –DOT</td><td>Rate of inclination angle</td><td>15*</td><td>$2^{-44}$</td><td></td><td>semi-circles/sec</td></tr>
<tr><td>$C_{is\text{-}n}$</td><td>Amplitude of the sine harmonic correction term to the angle of inclination</td><td>16*</td><td>$2^{-30}$</td><td></td><td>radians</td></tr>
<tr><td>$C_{ic\text{-}n}$</td><td>Amplitude of the cosine harmonic correction term to the angle of inclination</td><td>16*</td><td>$2^{-30}$</td><td></td><td>radians</td></tr>
<tr><td>$C_{rs\text{-}n}$</td><td>Amplitude of the sine correction term to the orbit radius</td><td>24*</td><td>$2^{-8}$</td><td></td><td>meters</td></tr>
<tr><td>$C_{rc\text{-}n}$</td><td>Amplitude of the cosine correction term to the orbit radius</td><td>24*</td><td>$2^{-8}$</td><td></td><td>meters</td></tr>
<tr><td>$C_{us\text{-}n}$</td><td>Amplitude of the sine harmonic correction term to the argument of latitude</td><td>21*</td><td>$2^{-30}$</td><td></td><td>radians</td></tr>
<tr><td>$C_{uc\text{-}n}$</td><td>Amplitude of the cosine harmonic correction term to the argument of latitude</td><td>21*</td><td>$2^{-30}$</td><td></td><td>radians</td></tr>
<tr><td colspan="6">* Parameters so indicated are two's complement, with the sign bit (+ or -) occupying the MSB;<br>** See Figure 30-1 and Figure 30-2 for complete bit allocation in Message Types 10 and 11;<br>*** Unless otherwise indicated in this column, effective range is the maximum range attainable with indicated bit allocation and scale factor.<br>**** Relative to $\dot{\Omega}_{REF}$ = -2.6 x $10^{-9}$ semi-circles/second.</td></tr>
</table>
</td>
<td>The orbit parameter "Reference right ascension angle $\Omega_{O\text{–}N}$ **** in Table 30-I, is defined as $\Omega_{O\text{–}N}$ is the right ascension angle at the weekly epoch ($\Omega_{O\text{–}w}$) propagated to the reference time at the rate of right ascension." This definition is consistent with the term used in Table 20-II, but the name of the term is inconsistent- "Reference right ascension angle" in Table 30-I and "Longitude of Ascending Node of Orbit Plane at Weekly Epoch" in Table 20-II. Recommend that the</td>
</tr>
</table>

| Section Number | IS-GPS-200 RevF IRN001 (17 Apr 2012) Navstar GPS Space Segment/Navigation User Interfaces | Proposed Object Heading | Proposed Public Signals-in-Space (SiS) Updates Object Text | Proposed Rationale |
|---|---|---|---|---|
| | | | | identical terms be used since they are have identical definitions.<br>Also recommending deleting the 4-star note, and thus renumbering the old 5-star note to a 4-star note. |

<table>
<tr><th>Section Number</th><th>IS-GPS-200 RevF IRN001 (17 Apr 2012) Navstar GPS Space Segment/Navigation User Interfaces</th><th>Proposed Object Heading</th><th>Proposed Public Signals-in-Space (SiS) Updates Object Text</th><th>Proposed Rationale</th></tr>
<tr>
<td>30.3.3.1.3</td>
<td>
<table>
<tr><th colspan="2">Table 30-II. Elements of Coordinate System (part 2 of 2)</th></tr>
<tr><th>Element/Equation *</th><th>Description</th></tr>
<tr><td>$\Phi_k = \nu_k + \omega_n$</td><td>Argument of Latitude</td></tr>
<tr><td>$\delta u_k = C_{us\text{-}n}\sin 2\Phi_k + C_{uc\text{-}n}\cos 2\Phi_k$</td><td>Argument of Latitude Correction</td></tr>
<tr><td>$\delta r_k = C_{rs\text{-}n}\sin 2\Phi_k + C_{rc\text{-}n}\cos 2\Phi_k$</td><td>Radial Correction</td></tr>
<tr><td>$\delta i_k = C_{is\text{-}n}\sin 2\Phi_k + C_{ic\text{-}n}\cos 2\Phi_k$</td><td>Inclination Correction</td></tr>
<tr><td>$u_k = \Phi_k + \delta u_k$</td><td>Corrected Argument of Latitude</td></tr>
<tr><td>$r_k = A_k(1 - e_n \cos E_k) + \delta r_k$</td><td>Corrected Radius</td></tr>
<tr><td>$i_k = i_{o\text{-}n} + (i_{o\text{-}n}\text{-DOT})t_k + \delta i_k$</td><td>Corrected Inclination</td></tr>
<tr><td>$x_k' = r_k \cos u_k$<br>$y_k' = r_k \sin u_k$</td><td>Positions in orbital plane</td></tr>
<tr><td>$\dot{\Omega} = \dot{\Omega}_{REF} + ?\dot{\Omega}$ ***</td><td>Rate of Right Ascension</td></tr>
<tr><td>$\Omega_k = \Omega_{0\text{-}n} + (\dot{\Omega} - \dot{\Omega}_e)\, t_k - \dot{\Omega}_e\, t_{oe}$</td><td>Corrected Longitude of Ascending Node</td></tr>
<tr><td>$x_k = x_k' \cos \Omega_k - y_k' \cos i_k \sin \Omega_k$<br>$y_k = x_k' \sin \Omega_k + y_k' \cos i_k \cos \Omega_k$<br>$z_k = y_k' \sin i_k$</td><td>Earth-fixed coordinates of SV antenna phase center</td></tr>
<tr><td colspan="2">*** $\dot{\Omega}_{REF} = -2.6 \text{ x } 10^{-9}$ semi-circles/second.</td></tr>
</table>
</td>
<td></td>
<td>
<table>
<tr><th colspan="2">Table 30-II. Elements of Coordinate System (part 2 of 2)</th></tr>
<tr><th>Element/Equation *</th><th>Description</th></tr>
<tr><td>$\Phi_k = \nu_k + \omega_n$</td><td>Argument of Latitude</td></tr>
<tr><td>$\delta u_k = C_{us\text{-}n}\sin 2\Phi_k + C_{uc\text{-}n}\cos 2\Phi_k$<br>$\delta r_k = C_{rs\text{-}n}\sin 2\Phi_k + C_{rc\text{-}n}\cos 2\Phi_k$<br>$\delta i_k = C_{is\text{-}n}\sin 2\Phi_k + C_{ic\text{-}n}\cos 2\Phi_k$</td><td>$\left.\begin{array}{l}\text{Argument of Latitude Correction}\\ \text{Radial Correction}\\ \text{Inclination Correction}\end{array}\right\}$ Second Harmonic Perturbations</td></tr>
<tr><td>$u_k = \Phi_k + \delta u_k$</td><td>Corrected Argument of Latitude</td></tr>
<tr><td>$r_k = A_k(1 - e_n \cos E_k) + \delta r_k$</td><td>Corrected Radius</td></tr>
<tr><td>$i_k = i_{o\text{-}n} + (i_{o\text{-}n}\text{-DOT})t_k + \delta i_k$</td><td>Corrected Inclination</td></tr>
<tr><td>$\left.\begin{array}{l} x_k' = r_k \cos u_k \\ y_k' = r_k \sin u_k \end{array}\right\}$</td><td>Positions in orbital plane</td></tr>
<tr><td>$\dot{\Omega} = \dot{\Omega}_{REF} + ?\dot{\Omega}$ ***</td><td>Rate of Right Ascension</td></tr>
<tr><td>$\Omega_k = \Omega_{0\text{-}n} + (\dot{\Omega} - \dot{\Omega}_e)\, t_k - \dot{\Omega}_e\, t_{oe}$</td><td>Corrected Longitude of Ascending Node</td></tr>
<tr><td>$\left.\begin{array}{l} x_k = x_k' \cos \Omega_k - y_k' \cos i_k \sin \Omega_k \\ y_k = x_k' \sin \Omega_k + y_k' \cos i_k \cos \Omega_k \\ z_k = y_k' \sin i_k \end{array}\right\}$</td><td>Earth-fixed coordinates of SV antenna phase center</td></tr>
<tr><td colspan="2">*** $\dot{\Omega}_{REF} = -2.6 \text{ x } 10^{-9}$ semi-circles/second.</td></tr>
</table>
</td>
<td>Publication error during Word export.<br>Table is now correct in Word/PDF.<br>The brackets from the "Second Harmonic Perturbations," "Positions in Orbital Plane," and Earth Fixed coordinates of SV antenna phase center," have been repaired and reinserted.</td>
</tr>
</table>

<table>
<tr><th>Section Number</th><th>IS-GPS-200 RevF IRN001 (17 Apr 2012) Navstar GPS Space Segment/Navigation User Interfaces</th><th>Proposed Object Heading</th><th>Proposed Public Signals-in-Space (SiS) Updates Object Text</th><th>Proposed Rationale</th></tr>
<tr><td>30.3.3.2.3</td><td>
<table>
<tr><th colspan="6">Table 30-III. Clock Correction and Accuracy Parameters</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>$t_{oc}$</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;<br>** See Figure 30-3 through 30-10 for complete bit allocation in Message types 30 to 37;<br>*** 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 30-III. Clock Correction and Accuracy Parameters</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>$t_{oc}$</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>$URA_{NED0}$ 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 colspan="6">* Parameters so indicated are two's complement, with the sign bit (+ or -) occupying the MSB;<br>** See Figure 30-3 through 30-10 for complete bit allocation in Message types 30 to 37;<br>*** 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>Replaced $URA_{NED}$ with $URA_{NED0}$. $URA_{NED}$ is not the correct term.</td></tr>
<tr><td>30.3.3.2.4</td><td>For each $URA_{NED0}$ index (N), users may compute a nominal $URA_{NED0}$ value (X) as given by:<br>• If the value of N is 6 or less, but more than -16, X = $2^{(1 + N/2)}$,<br>• If the value of N is 6 or more, but less than 15, X = $2^{(N - 2)}$,<br>• 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.<br>For N = 1, 3, and 5, X should be rounded to 2.8, 5.7, and 11.3 meters, respectively.<br>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.,</td><td></td><td>For each $URA_{NED0}$ index (N), users may compute a nominal $URA_{NED0}$ value (X) as given by:<br>• If the value of N is 6 or less, but more than -16, X = $2^{(1 + N/2)}$,<br>• If the value of N is 6 or more, but less than 15, X = $2^{(N - 2)}$,<br>• 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.<br>For N = 1, 3, and 5, X should be rounded to 2.8, 5.7, and 11.3 meters, respectively.<br>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-</td><td>The variable $URA_{NED}$ has in the sentence "$URA_{NED}$ does not account for user range contributions…" has been corrected to $URA_{NED0}$. The sentence now reads "$URA_{NED0}$</td></tr>
</table>

| Section Number | IS-GPS-200 RevF IRN001 (17 Apr 2012) Navstar GPS Space Segment/Navigation User Interfaces | Proposed Object Heading | Proposed Public Signals-in-Space (SiS) Updates Object Text | Proposed Rationale |
|---|---|---|---|---|
|  | measurement de-weighting RAIM, FOM computations). Integrity properties of the IAURA$_{\text{NED}}$ are specified with respect to the scaled (multiplied by either 4.42 or 5.73 as appropriate) upper bound values of the URA$_{\text{NED0}}$ index, URA$_{\text{NED1}}$ index, and URA$_{\text{NED2}}$ index (see 30.3.3.1.1).<br>URA$_{\text{NED0}}$ 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$_{\text{NED}}$ 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.<br>The transmitted URA$_{\text{NED1}}$ index is an integer value in the range 0 to 7. The URA$_{\text{NED1}}$ index has the following relationship to the URA$_{\text{NED1}}$ value:<br>URA$_{\text{NED1}}$ = $\frac{1}{2^{N}}$ (meters/second)<br>where<br>N = 14 + URA$_{\text{NED1}}$ Index<br>The transmitted URA$_{\text{NED2}}$ index is an integer value in the range 0 to 7. URA$_{\text{NED2}}$ index has the following relationship to the URA$_{\text{NED2}}$:<br>URA$_{\text{NED2}}$ = $\frac{1}{2^{N}}$ (meters/second2)<br>where<br>N = 28 + URA$_{\text{NED2}}$ Index. |  | weighting RAIM, FOM computations). Integrity properties of the IAURA$_{\text{NED}}$ are specified with respect to the scaled (multiplied by either 4.42 or 5.73 as appropriate) upper bound values of the URA$_{\text{NED0}}$ index, URA$_{\text{NED1}}$ index, and URA$_{\text{NED2}}$ index (see 30.3.3.1.1).<br>URA$_{\text{NED0}}$ 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$_{\text{NED0}}$ 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.<br>The transmitted URA$_{\text{NED1}}$ index is an integer value in the range 0 to 7. The URA$_{\text{NED1}}$ index has the following relationship to the URA$_{\text{NED1}}$ value:<br>URA$_{\text{NED1}}$ = $\frac{1}{2^{N}}$ (meters/second)<br>where<br>N = 14 + URA$_{\text{NED1}}$ Index<br>The transmitted URA$_{\text{NED2}}$ index is an integer value in the range 0 to 7. URA$_{\text{NED2}}$ index has the following relationship to the URA$_{\text{NED2}}$:<br>URA$_{\text{NED2}}$ = $\frac{1}{2^{N}}$ (meters/second$^{2}$)<br>where<br>N = 28 + URA$_{\text{NED2}}$ Index. | does not account for user range contributions… ”<br>In the equation URA$_{\text{NED2}}$ = 1/2$^{N}$ (meters/second2), the second2 should be second$^{2}$ (seconds squared) |

| Section Number | IS-GPS-200 RevF IRN001 (17 Apr 2012) Navstar GPS Space Segment/Navigation User Interfaces | Proposed Object Heading | Proposed Public Signals-in-Space (SiS) Updates Object Text | Proposed Rationale |
|---|---|---|---|---|
| | | | | |
| 30.3.3.4 | Message Types 31, 12, and 37 Almanac Types. | Message Types 31, 12, and 37 Almanac Parameters. | | Section title has been changed back to "Almanac Parameters". |
| 30.3.3.4.4 | The three, one-bit, health indication in bits 155, 156, and 157 of message type 37 and bits 29,30 and 31 of each packet of reduced almanac refers to the L1, L2, and L5 signals of the SV whose PRN number is specified in the message or in the packet. For each health indicator, a "0" signifies that all navigation data are okay and "1" signifies that some or all navigation data are bad. The predicted health data will be updated at the time of upload when a new reduced almanac has been built by the CS. The transmitted health data may not correspond to the actual health of the transmitting SV or other SVs in the constellation. | | The three, one-bit, health indication in bits 155, 156, and 157 of message type 37 and bits 29,30 and 31 of each packet of reduced almanac refers to the L1, L2, and L5 signals of the SV whose PRN number is specified in the message or in the packet. For each health indicator, a "0" signifies that all signals on the associated frequency are okay and "1" signifies that some or all signals on the associated frequency are bad. The predicted health data will be updated at the time of upload when a new reduced almanac has been built by the CS. The transmitted health data may not correspond to the actual health of the transmitting SV or other SVs in the constellation. | The current language states that "For each health indicator, a "0" signifies that all navigation data are okay and "1" signifies that some or all navigation data are bad." This language is misleading in that it implies that one bit designated with a "1" means that all navigation data (L1, L2, and L5) are bad, which may not be true.<br>Recommended text clarifies that a "1" signifies that |

| Section Number | IS-GPS-200 RevF IRN001 (17 Apr 2012) Navstar GPS Space Segment/Navigation User Interfaces | Proposed Object Heading | Proposed Public Signals-in-Space (SiS) Updates Object Text | Proposed Rationale |
|---|---|---|---|---|
| | | | | some or all signals on the associated frequency are bad. |
| 30.3.3.4.6.1 | | | A 6-bit value of “000000” in the $PRN_a$ field shall indicate that no further Status Words are contained in the remainder of the data block. In this event, all subsequent bits in the data block field shall be filler bits, i.e., alternating ones and zeros beginning with one. | This language is being supplied so that users now know how to interpret dummy SVs for the CNAV signal. |
| 30.3.3.4.6.2.1 | | Reduced Almanac. | | Publication error during Word export.<br>Section heading is now correct in Word/PDF. |

<table>
<tr><th>Section Number</th><th>IS-GPS-200 RevF IRN001 (17 Apr 2012) Navstar GPS Space Segment/Navigation User Interfaces</th><th>Proposed Object Heading</th><th>Proposed Public Signals-in-Space (SiS) Updates Object Text</th><th>Proposed Rationale</th></tr>
<tr>
<td>30.3.3.4.6.2.1</td>
<td>
<table>
<tr><th colspan="5">Table 30-VI. Reduced Almanac Parameters *****</th></tr>
<tr><th>Parameter</th><th>No. of Bits</th><th>Scale Factor (LSB)</th><th>Effective Range **</th><th>Units</th></tr>
<tr><td>$\delta_A$ ***</td><td>8 *</td><td>$2^{+9}$</td><td>**</td><td>meters</td></tr>
<tr><td>$\Omega_0$</td><td>7 *</td><td>$2^{-6}$</td><td>**</td><td>semi-circles</td></tr>
<tr><td>$\Phi_0$ ****</td><td>7 *</td><td>$2^{-6}$</td><td>**</td><td>semi-circles</td></tr>
<tr><td colspan="5">* Parameters so indicated shall be two's complement with the sign bit (+ or -) occupying the MSB;<br>** Effective range is the maximum range attainable with indicated bit allocation and scale factor;<br>*** Relative to $A_{ref}$ = 26,559,710 meters;<br>**** $\Phi_0$ = Argument of Latitude at Reference Time = $M_0 + \omega$;<br>***** Relative to following reference values:<br>e = 0<br>$\delta_i$ = +0.0056 semi-circles (i = 55 degrees)<br>$\Omega = -2.6 \times 10^{-9}$ semi-circles/second.</td></tr>
</table>
</td>
<td></td>
<td>
<table>
<tr><th colspan="5">Table 30-VI. Reduced Almanac Parameters *****</th></tr>
<tr><th>Parameter</th><th>No. of Bits</th><th>Scale Factor (LSB)</th><th>Effective Range **</th><th>Units</th></tr>
<tr><td>$\delta_A$ ***</td><td>8 *</td><td>$2^{+9}$</td><td>**</td><td>meters</td></tr>
<tr><td>$\Omega_0$</td><td>7 *</td><td>$2^{-6}$</td><td>**</td><td>semi-circles</td></tr>
<tr><td>$\Phi_0$ ****</td><td>7 *</td><td>$2^{-6}$</td><td>**</td><td>semi-circles</td></tr>
<tr><td colspan="5">* Parameters so indicated shall be two's complement with the sign bit (+ or -) occupying the MSB;<br>** Effective range is the maximum range attainable with indicated bit allocation and scale factor;<br>*** Relative to $A_{ref}$ = 26,559,710 meters;<br>**** $\Phi_0$ = Argument of Latitude at Reference Time = $M_0 + \omega$;<br>***** Relative to following reference values:<br>e = 0<br>$\delta_i$ = +0.0056 semi-circles (i = 55 degrees)<br>$\dot{\Omega} = -2.6 \times 10^{-9}$ semi-circles/second.</td></tr>
</table>
</td>
<td>Publication error during Word export.<br>Table is now correct in Word/PDF.<br>The DOT term over the OMEGA term has been replaced.</td>
</tr>
</table>

<table>
<tr><th>Section Number</th><th>IS-GPS-200 RevF IRN001 (17 Apr 2012) Navstar GPS Space Segment/Navigation User Interfaces</th><th>Proposed Object Heading</th><th>Proposed Public Signals-in-Space (SiS) Updates Object Text</th><th>Proposed Rationale</th></tr>
<tr><td>30.3.3.6.2</td><td>
<table>
<tr><th colspan="6">Table 30-IX. UTC Parameters</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>$A_{0-n}$</td><td>Bias coefficient of GPS time scale relative to UTC time scale</td><td>16*</td><td>$2^{-35}$</td><td></td><td>Seconds</td></tr>
<tr><td>$A_{1-n}$</td><td>Drift coefficient of GPS time scale relative to UTC time scale</td><td>13*</td><td>$2^{-51}$</td><td></td><td>sec/sec</td></tr>
<tr><td>$A_{2-n}$</td><td>Drift rate correction coefficient of GPS time scale relative to UTC time scale</td><td>7*</td><td>$2^{-68}$</td><td></td><td>sec/sec$^2$</td></tr>
<tr><td></td><td>Current or past leap second count</td><td></td><td></td><td></td><td></td></tr>
<tr><td>$t_{LS}$</td><td></td><td>8*</td><td>1</td><td></td><td>seconds</td></tr>
<tr><td></td><td>Time data reference Time of Week</td><td></td><td></td><td></td><td></td></tr>
<tr><td>$t_{ot}$</td><td></td><td>16</td><td>$2^4$</td><td>604,784</td><td>seconds</td></tr>
<tr><td></td><td>Time data reference Week Number</td><td></td><td></td><td></td><td></td></tr>
<tr><td>$WN_{ot}$</td><td></td><td>13</td><td>1</td><td></td><td>weeks</td></tr>
<tr><td></td><td>Leap second reference Week Number</td><td></td><td></td><td></td><td></td></tr>
<tr><td>$WN_{LSF}$</td><td></td><td>8</td><td>1</td><td></td><td>weeks</td></tr>
<tr><td></td><td>Leap second reference Day Number</td><td></td><td></td><td></td><td></td></tr>
<tr><td>DN</td><td></td><td>4***</td><td>1</td><td></td><td>days</td></tr>
<tr><td></td><td>Current or future leap second count</td><td></td><td></td><td></td><td></td></tr>
<tr><td>$t_{LSF}$</td><td></td><td>8*</td><td>1</td><td></td><td>seconds</td></tr>
<tr><td colspan="6">* Parameters so indicated shall be two's complement with the sign bit (+ or -) occupying the MSB;<br>** See Figure 30-6 for complete bit allocation;<br>*** Unless otherwise indicated in this column, effective range is the maximum range attainable with indicated bit allocation and scale factor;<br>**** Right justified.</td></tr>
</table>
</td><td></td><td>
<table>
<tr><th colspan="6">Table 30-IX. UTC Parameters</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>$A_{0-n}$</td><td>Bias coefficient of GPS time scale relative to UTC time scale</td><td>16*</td><td>$2^{-35}$</td><td></td><td>Seconds</td></tr>
<tr><td>$A_{1-n}$</td><td>Drift coefficient of GPS time scale relative to UTC time scale</td><td>13*</td><td>$2^{-51}$</td><td></td><td>sec/sec</td></tr>
<tr><td>$A_{2-n}$</td><td>Drift rate correction coefficient of GPS time scale relative to UTC time scale</td><td>7*</td><td>$2^{-68}$</td><td></td><td>sec/sec$^2$</td></tr>
<tr><td>$\Delta t_{LS}$</td><td>Current or past leap second count</td><td>8*</td><td>1</td><td></td><td>seconds</td></tr>
<tr><td>$t_{ot}$</td><td>Time data reference Time of Week</td><td>16</td><td>$2^4$</td><td>604,784</td><td>seconds</td></tr>
<tr><td>$WN_{ot}$</td><td>Time data reference Week Number</td><td>13</td><td>1</td><td></td><td>weeks</td></tr>
<tr><td>$WN_{LSF}$</td><td>Leap second reference Week Number</td><td>8</td><td>1</td><td></td><td>weeks</td></tr>
<tr><td></td><td></td><td>4***</td><td>1</td><td></td><td>days</td></tr>
<tr><td>DN</td><td>Leap second reference Day Number</td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td>8*</td><td>1</td><td></td><td>seconds</td></tr>
<tr><td>$\Delta t_{LSF}$</td><td>Current or future leap second count</td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="6">* Parameters so indicated shall be two's complement with the sign bit (+ or -) occupying the MSB;<br>** See Figure 30-6 for complete bit allocation;<br>*** Unless otherwise indicated in this column, effective range is the maximum range attainable with indicated bit allocation and scale factor;<br>**** Right justified.</td></tr>
</table>
</td><td>Fixed alignment of table rows.<br>The deltas have also been replaced in the terms "$t_{LS}$" and "$t_{LSF}$."</td></tr>
<tr><td>30.3.3.7.2</td><td>Each DC data packet contains:  corrections to SV clock polynomial coefficients provided in any one of the message types 30 to 37 of the corresponding SV;  corrections to quasi-Keplerian elements referenced to $t_{OD}$ of the corresponding SV;  and User Differential Range Accuracy (UDRA) and UDRA indices that enable users to estimate the accuracy obtained after corrections are applied.  Each DC packet is made up of two different segments.  The first segment contains 34 bits for the CDC parameters and the second segment contains 92 bits of EDC parameters totaling 126 bits.  The CDC and EDC parameters form an indivisible pair and users must utilize CDC and EDC as a pair.  Users must utilize CDC and EDC data pair of same $t_{op-D}$ and of same $t_{OD}$.</td><td></td><td>Each DC data packet contains:  corrections to SV clock polynomial coefficients provided in any one of the message types 30 to 37 of the corresponding SV;  corrections to quasi-Keplerian elements referenced to $t_{OD}$ of the corresponding SV;  and User Differential Range Accuracy (UDRA) and $\dot{UDRA}$ indices that enable users to estimate the accuracy obtained after corrections are applied.  Each DC packet is made up of two different segments.  The first segment contains 34 bits for the CDC parameters and the second segment contains 92 bits of EDC parameters totaling 126 bits.  The CDC and EDC parameters form an indivisible pair and users must utilize CDC and EDC as a pair.  Users must utilize CDC and EDC data pair of same $t_{op-D}$ and of same $t_{OD}$.</td><td>Incorporated DOT over proper UDRA term.</td></tr>
</table>

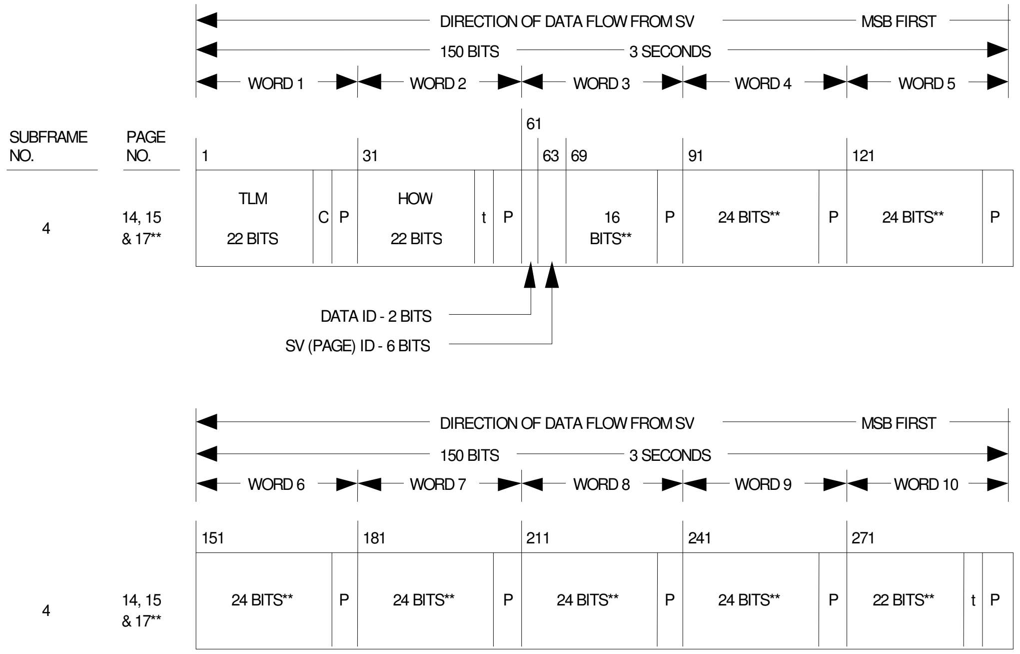
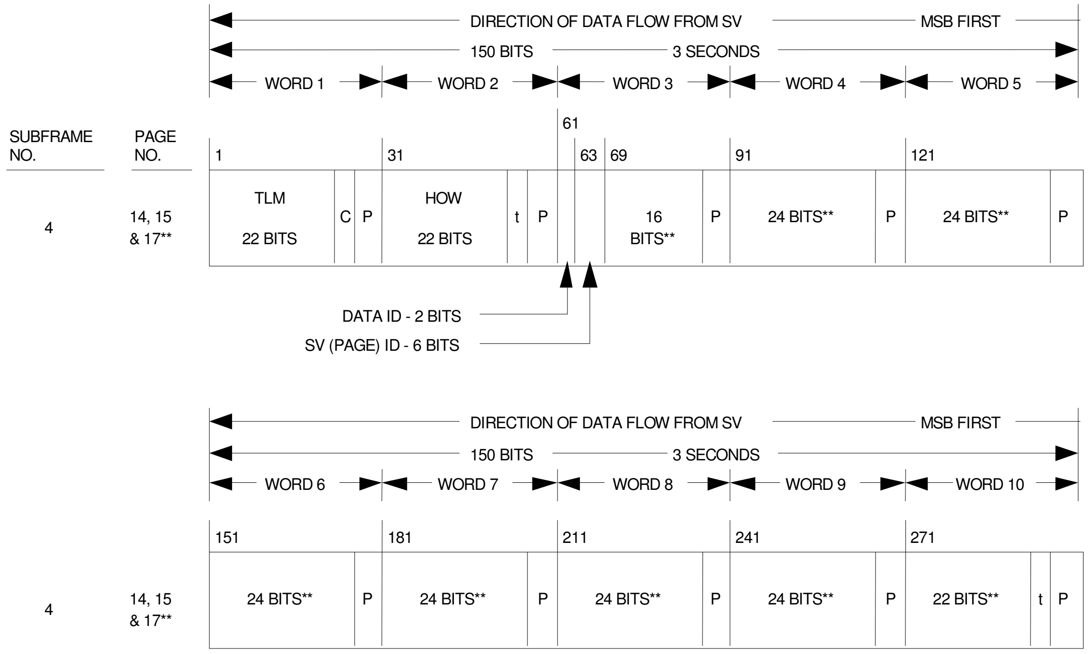
| Section Number | IS-GPS-200 RevF IRN001 (17 Apr 2012) Navstar GPS Space Segment/Navigation User Interfaces | Proposed Object Heading | Proposed Public Signals-in-Space (SiS) Updates Object Text | Proposed Rationale |
|---|---|---|---|---|
| 30.3.3.7.2.1 | Differential Correction Data Predict Time of the Week. | Differential Correction Data Predict Time of Week. | | Publication error during Word export.<br>Section heading is now correct in Word/PDF. |
| 30.3.3.7.3 | Application of Clock Related DC Data. | Application of Clock-Related DC Data. | | Publication error during Word export.<br>Section heading is now correct in Word/PDF. |
| 30.3.3.7.4 | The user will construct a set of initial (uncorrected) elements by:<br>$A_i = A_0$<br>$e_i = e_n$<br>$i_i = i_{0-n}$<br>$\Omega_i = \Omega_{0-n}$<br>$\alpha_i = e_n \cos(\omega_n)$<br>$\beta_i = e_n \sin(\omega_n)$<br>$\gamma_i = M_{0-n} + \omega_n$<br>where $A_0$, $e_n$, $i_{0-n}$, $\Omega_{0-n}$, $\omega_n$ and $M_{0-n}$ are obtained from the applicable SV's message types 10 and 11 data. The terms $\alpha_i$, $\beta_i$, and $\gamma_i$ form a subset of stabilized ephemeris elements which are subsequently corrected by $\Delta\alpha$, $\Delta\beta$ and $\Delta\gamma$—the values of which are supplied in the message types 34 or 14 - as follows:<br>$\alpha_c = \alpha_i + \Delta\alpha$<br>$\beta_c = \beta_i + \Delta\beta$<br>$\gamma_c = \gamma_i + \Delta\gamma$ | | The user will construct a set of initial (uncorrected) elements by:<br>$A_i = A_0$<br>$e_i = e_n$<br>$i_i = i_{0-n}$<br>$\Omega_i = \Omega_{0-n}$<br>$\alpha_i = e_n \cos(\omega_n)$<br>$\beta_i = e_n \sin(\omega_n)$<br>$\gamma_i = M_{0-n} + \omega_n$<br>where $A_0$, $e_n$, $i_{0-n}$, $\Omega_{0-n}$, $\omega_n$ and $M_{0-n}$ are obtained from the applicable SV's message types 10 and 11 data. The terms $\alpha_i$, $\beta_i$, and $\gamma_i$ form a subset of stabilized ephemeris elements which are subsequently corrected by $\Delta\alpha$, $\Delta\beta$ and $\Delta\gamma$—the values of which are supplied in the message types 34 or 14 - as follows:<br>$\alpha_c = \alpha_i + \Delta\alpha$<br>$\beta_c = \beta_i + \Delta\beta$<br>$\gamma_c = \gamma_i + \Delta\gamma$ | The current mean anomaly equation, $\Delta M_0$, yields a velocity component and is incorrect. The mean anomaly equation should yield 'radians.' |

| Section Number | IS-GPS-200 RevF IRN001 (17 Apr 2012) Navstar GPS Space Segment/Navigation User Interfaces | Proposed Object Heading | Proposed Public Signals-in-Space (SiS) Updates Object Text | Proposed Rationale |
|---|---|---|---|---|
| | The quasi-Keplerian elements are then corrected by<br>$A_c = A_i + \Delta A$<br>$e_c = (\alpha_c{}^2 + \beta_c{}^2)^{1/2}$<br>$i_c = i_i + \Delta i$<br>$\Omega_c = \Omega_i + \Delta\Omega$<br>$\omega_c = \tan^{-1} (\beta_c/\alpha_c)$<br>$M_{0\text{-}c} = \gamma_c - \omega_c + \Delta M_0$<br>where ΔA, Δi and ΔΩ are provided in the EDC data packet of the message type 34 or 14 and $\Delta M_0$ is obtained from<br>$\Delta M_0 = -3 \frac{\sqrt{\mu}}{A_c{}^2} [(t_{oe}) - (t_{OD})].$<br>The corrected quasi-Keplerian elements above are applied to the user algorithm for determination of antenna phase center position in Section 30.3.3.1.3, Table 30-II. | | The quasi-Keplerian elements are then corrected by<br>$A_c = A_i + \Delta A$<br>$e_c = (\alpha_c{}^2 + \beta_c{}^2)^{1/2}$<br>$i_c = i_i + \Delta i$<br>$\Omega_c = \Omega_i + \Delta\Omega$<br>$\omega_c = \tan^{-1} (\beta_c/\alpha_c)$<br>$M_{0\text{-}c} = \gamma_c - \omega_c + \Delta M_0$<br>where ΔA, Δi and ΔΩ are provided in the EDC data packet of the message type 34 or 14 and $\Delta M_0$ is obtained from<br>$\Delta M_0 = \frac{-3}{2}\left(\frac{\mu}{A_0{}^3}\right)^{\frac{1}{2}}\left(\frac{\Delta A_0}{A_0}\right)[(t_{oe} + WN_{oe} * 604{,}800) - (t_{OD} + WN * 604{,}800)]$<br>The corrected quasi-Keplerian elements above are applied to the user algorithm for determination of antenna phase center position in Section 30.3.3.1.3, Table 30-II. | |
| 30.3.3.7.5 | The $UDRA_{op\text{-}D}$ and UDRA shall give the differential user range accuracy for the SV. It must be noted that the two parameters provide estimated accuracy after both clock and ephemeris DC are applied. The $UDRA_{op\text{-}D}$ and UDRA indices are signed, two's complement integers in the range of +15 to -16 and has the following relationship: | | The $UDRA_{op\text{-}D}$ and $\dot{UDRA}$ shall give the differential user range accuracy for the SV. It must be noted that the two parameters provide estimated accuracy after both clock and ephemeris DC are applied.<br>The $UDRA_{op\text{-}D}$ and $\dot{UDRA}$ indices are signed, two's complement integers in the range of +15 to -16 and has the following relationship: | Incorporated DOT over proper UDRA term. |

<table>
<tr><th>Section Number</th><th>IS-GPS-200 RevF IRN001 (17 Apr 2012) Navstar GPS Space Segment/Navigation User Interfaces</th><th>Proposed Object Heading</th><th>Proposed Public Signals-in-Space (SiS) Updates Object Text</th><th>Proposed Rationale</th></tr>
<tr><td></td><td>
<table>
<tr><th>Index Value</th><th>$UDRA_{op-D}$ (meters)</th><th>UDRA ($10^{-6}$ m/sec)</th></tr>
<tr><td>15</td><td>$6144.00 < UDRA_{op-D}$ 6144.00</td><td></td></tr>
<tr><td>14</td><td>$3072.00 < UDRA_{op-D} \le 6144.00$</td><td>3072.00</td></tr>
<tr><td>13</td><td>$1536.00 < UDRA_{op-D} \le 3072.00$</td><td>1536.00</td></tr>
<tr><td>12</td><td>$768.00 < UDRA_{op-D} \le 1536.00$</td><td>768.00</td></tr>
<tr><td>11</td><td>$384.00 < UDRA_{op-D} \le 768.00$</td><td>384.00</td></tr>
<tr><td>10</td><td>$192.00 < UDRA_{op-D} \le 384.00$</td><td>192.00</td></tr>
<tr><td>9</td><td>$96.00 < UDRA_{op-D} \le 192.00$</td><td>96.00</td></tr>
<tr><td>8</td><td>$48.00 < UDRA_{op-D} \le 96.00$</td><td>48.00</td></tr>
<tr><td>7</td><td>$24.00 < UDRA_{op-D} \le 48.00$</td><td>24.00</td></tr>
<tr><td>6</td><td>$13.65 < UDRA_{op-D} \le 24.00$</td><td>13.65</td></tr>
<tr><td>5</td><td>$9.65 < UDRA_{op-D} \le 13.65$</td><td>9.65</td></tr>
<tr><td>4</td><td>$6.85 < UDRA_{op-D} \le 9.65$</td><td>6.85</td></tr>
<tr><td>3</td><td>$4.85 < UDRA_{op-D} \le 6.85$</td><td>4.85</td></tr>
<tr><td>2</td><td>$3.40 < UDRA_{op-D} \le 4.85$</td><td>3.40</td></tr>
<tr><td>1</td><td>$2.40 < UDRA_{op-D} \le 3.40$</td><td>2.40</td></tr>
<tr><td>0</td><td>$1.70 < UDRA_{op-D} \le 2.40$</td><td>1.70</td></tr>
<tr><td>-1</td><td>$1.20 < UDRA_{op-D} \le 1.70$</td><td>1.20</td></tr>
<tr><td>-2</td><td>$0.85 < UDRA_{op-D} \le 1.20$</td><td>0.85</td></tr>
<tr><td>-3</td><td>$0.60 < UDRA_{op-D} \le 0.85$</td><td>0.60</td></tr>
<tr><td>-4</td><td>$0.43 < UDRA_{op-D} \le 0.60$</td><td>0.43</td></tr>
<tr><td>-5</td><td>$0.30 < UDRA_{op-D} \le 0.43$</td><td>0.30</td></tr>
<tr><td>-6</td><td>$0.21 < UDRA_{op-D} \le 0.30$</td><td>0.21</td></tr>
<tr><td>-7</td><td>$0.15 < UDRA_{op-D} \le 0.21$</td><td>0.15</td></tr>
<tr><td>-8</td><td>$0.11 < UDRA_{op-D} \le 0.15$</td><td>0.11</td></tr>
<tr><td>-9</td><td>$0.08 < UDRA_{op-D} \le 0.11$</td><td>0.08</td></tr>
<tr><td>-10</td><td>$0.06 < UDRA_{op-D} \le 0.08$</td><td>0.06</td></tr>
<tr><td>-11</td><td>$0.04 < UDRA_{op-D} \le 0.06$</td><td>0.04</td></tr>
<tr><td>-12</td><td>$0.03 < UDRA_{op-D} \le 0.04$</td><td>0.03</td></tr>
<tr><td>-13</td><td>$0.02 < UDRA_{op-D} \le 0.03$</td><td>0.02</td></tr>
<tr><td>-14</td><td>$0.01 < UDRA_{op-D} \le 0.02$</td><td>0.01</td></tr>
<tr><td>-15</td><td>$UDRA_{op-D} \le 0.01$</td><td>0.005</td></tr>
<tr><td>-16</td><td>No accuracy prediction available—use at own risk</td><td></td></tr>
</table>
For any time, $t_k$, other than $t_{op-D}$, UDRA is found by,<br>
$UDRA = UDRA_{op-D} + UDRA\ (t_k - t_{op-D})$
</td><td></td><td>
<table>
<tr><th>Index Value</th><th>$UDRA_{op-D}$ (meters)</th><th>$\dot{UDRA}$ ($10^{-6}$ m/sec)</th></tr>
<tr><td>15</td><td>$6144.00 < UDRA_{op-D}$ 6144.00</td><td></td></tr>
<tr><td>14</td><td>$3072.00 < UDRA_{op-D} \le 6144.00$</td><td>3072.00</td></tr>
<tr><td>13</td><td>$1536.00 < UDRA_{op-D} \le 3072.00$</td><td>1536.00</td></tr>
<tr><td>12</td><td>$768.00 < UDRA_{op-D} \le 1536.00$</td><td>768.00</td></tr>
<tr><td>11</td><td>$384.00 < UDRA_{op-D} \le 768.00$</td><td>384.00</td></tr>
<tr><td>10</td><td>$192.00 < UDRA_{op-D} \le 384.00$</td><td>192.00</td></tr>
<tr><td>9</td><td>$96.00 < UDRA_{op-D} \le 192.00$</td><td>96.00</td></tr>
<tr><td>8</td><td>$48.00 < UDRA_{op-D} \le 96.00$</td><td>48.00</td></tr>
<tr><td>7</td><td>$24.00 < UDRA_{op-D} \le 48.00$</td><td>24.00</td></tr>
<tr><td>6</td><td>$13.65 < UDRA_{op-D} \le 24.00$</td><td>13.65</td></tr>
<tr><td>5</td><td>$9.65 < UDRA_{op-D} \le 13.65$</td><td>9.65</td></tr>
<tr><td>4</td><td>$6.85 < UDRA_{op-D} \le 9.65$</td><td>6.85</td></tr>
<tr><td>3</td><td>$4.85 < UDRA_{op-D} \le 6.85$</td><td>4.85</td></tr>
<tr><td>2</td><td>$3.40 < UDRA_{op-D} \le 4.85$</td><td>3.40</td></tr>
<tr><td>1</td><td>$2.40 < UDRA_{op-D} \le 3.40$</td><td>2.40</td></tr>
<tr><td>0</td><td>$1.70 < UDRA_{op-D} \le 2.40$</td><td>1.70</td></tr>
<tr><td>-1</td><td>$1.20 < UDRA_{op-D} \le 1.70$</td><td>1.20</td></tr>
<tr><td>-2</td><td>$0.85 < UDRA_{op-D} \le 1.20$</td><td>0.85</td></tr>
<tr><td>-3</td><td>$0.60 < UDRA_{op-D} \le 0.85$</td><td>0.60</td></tr>
<tr><td>-4</td><td>$0.43 < UDRA_{op-D} \le 0.60$</td><td>0.43</td></tr>
<tr><td>-5</td><td>$0.30 < UDRA_{op-D} \le 0.43$</td><td>0.30</td></tr>
<tr><td>-6</td><td>$0.21 < UDRA_{op-D} \le 0.30$</td><td>0.21</td></tr>
<tr><td>-7</td><td>$0.15 < UDRA_{op-D} \le 0.21$</td><td>0.15</td></tr>
<tr><td>-8</td><td>$0.11 < UDRA_{op-D} \le 0.15$</td><td>0.11</td></tr>
<tr><td>-9</td><td>$0.08 < UDRA_{op-D} \le 0.11$</td><td>0.08</td></tr>
<tr><td>-10</td><td>$0.06 < UDRA_{op-D} \le 0.08$</td><td>0.06</td></tr>
<tr><td>-11</td><td>$0.04 < UDRA_{op-D} \le 0.06$</td><td>0.04</td></tr>
<tr><td>-12</td><td>$0.03 < UDRA_{op-D} \le 0.04$</td><td>0.03</td></tr>
<tr><td>-13</td><td>$0.02 < UDRA_{op-D} \le 0.03$</td><td>0.02</td></tr>
<tr><td>-14</td><td>$0.01 < UDRA_{op-D} \le 0.02$</td><td>0.01</td></tr>
<tr><td>-15</td><td>$UDRA_{op-D} \le 0.01$</td><td>0.005</td></tr>
<tr><td>-16</td><td>No accuracy prediction available—use at own risk</td><td></td></tr>
</table>
For any time, $t_k$, other than $t_{op-D}$, UDRA is found by,<br>
$UDRA = UDRA_{op-D} + \dot{UDRA}\ (t_k - t_{op-D})$
</td><td></td></tr>
<tr><td>30.3.3.8.1</td><td>GPS/GNSS Tiem Offset Parameter Content.</td><td>GPS/GNSS Time</td><td></td><td>Correct the spelling of the</td></tr>
</table>

| Section Number | IS-GPS-200 RevF IRN001 (17 Apr 2012) Navstar GPS Space Segment/Navigation User Interfaces | Proposed Object Heading | Proposed Public Signals-in-Space (SiS) Updates Object Text | Proposed Rationale |
|---|---|---|---|---|
| | | Offset Parameter Content. | | word "Time" in the header. |
| 30.3.5.1 | Twenty-four bits of CRC parity will provide protection against burst as well as random errors with a probability of undetected error ≤ $2^{-24} = 5.96 \times 10^{-8}$ for all channel bit error probabilities ≤ 0.5. The CRC word is calculated in the forward direction on a given message using a seed of 0. The sequence of 24 bits ($p_1, p_2, \ldots, p_{24}$) is generated from the sequence of information bits ($m_1, m_2, \ldots, m_{276}$) in a given message. This is done by means of a code that is generated by the polynomial<br>$g(X) = \sum_{i=0}^{24} g_i X^i$<br>where<br>$g_i = 1$ for $i = 0,1,3,4,5,6,7,10,11,14,17,18,23,24$<br>$= 0$ otherwise<br>This code is called CRC-24Q. The generator polynomial of this code is in the following form (using binary polynomial algebra):<br>$g(X) = (1 + X)p(X)$<br>where p(X) is the primitive and irreducible polynomial<br>$p(X) = X^{23} + X^{17} + X^{13} + X^{12} + X^{11} + X^9 + X^8 + X^7 + X^5 + X^3 + 1$<br>When, by the application of binary polynomial algebra, the above g(x) is divided into $m(x)x^{24}$, where the information sequence m(x) is expressed as | | Twenty-four bits of CRC parity will provide protection against burst as well as random errors with a probability of undetected error ≤ $2^{-24} = 5.96 \times 10^{-8}$ for all channel bit error probabilities ≤ 0.5. The CRC word is calculated in the forward direction on a given message using a seed of 0. The sequence of 24 bits ($p_1, p_2, \ldots, p_{24}$) is generated from the sequence of information bits ($m_1, m_2, \ldots, m_{276}$) in a given message. This is done by means of a code that is generated by the polynomial<br>$g(X) = \sum_{i=0}^{24} g_i X^i$<br>where<br>$g_i = 1$ for $i = 0,1,3,4,5,6,7,10,11,14,17,18,23,24$<br>$= 0$ otherwise<br>This code is called CRC-24Q. The generator polynomial of this code is in the following form (using binary polynomial algebra):<br>$g(X) = (1 + X)p(X)$<br>where p(X) is the primitive and irreducible polynomial<br>$p(X) = X^{23} + X^{17} + X^{13} + X^{12} + X^{11} + X^9 + X^8 + X^7 + X^5 + X^3 + 1$<br>When, by the application of binary polynomial algebra, the above g(X) is divided into $m(X)X^{24}$, where the information sequence m(X) is expressed as | Fixed lowercase "x"s to uppercase "X"s in g(X) and m(X) terms. |

| Section Number | IS-GPS-200 RevF IRN001 (17 Apr 2012) Navstar GPS Space Segment/Navigation User Interfaces | Proposed Object Heading | Proposed Public Signals-in-Space (SiS) Updates Object Text | Proposed Rationale |
|---|---|---|---|---|
| | $m(X) = m_k + m_{k-1}X + m_{k-2}X^2 + \cdots + m_1X^{k-1}$ | | $m(X) = m_k + m_{k-1}X + m_{k-2}X^2 + \cdots + m_1X^{k-1}$ | |
| 30.3.5.1 | The result is a quotient and a remainder R(x) of degree < 24. The bit sequence formed by this remainder represents the parity check sequence. Parity bit $p_i$, for any i from 1 to 24, is the coefficient of $x^{24-i}$ in R(x).<br>This code has the following characteristics:<br>1) It detects all single bit errors per code word.<br>2) It detects all double bit error combinations in a codeword because the generator polynomial g(X) has a factor of at least three terms.<br>3) It detects any odd number of errors because g(X) contains a factor 1+X.<br>4) It detects any burst error for which the length of the burst is ≤ 24 bits.<br>5) It detects most large error bursts with length greater than the parity length r = 24 bits. The fraction of error bursts of length b > 24 that are undetected is:<br>a) $2^{-24} = 5.96 \times 10^{-8}$, if b > 25 bits.<br>b) $2^{-23} = 1.19 \times 10^{-7}$, if b = 25 bits. | | The result is a quotient and a remainder R(X) of degree < 24. The bit sequence formed by this remainder represents the parity check sequence. Parity bit $p_i$, for any i from 1 to 24, is the coefficient of $X^{24-i}$ in R(X).<br>This code has the following characteristics:<br>1) It detects all single bit errors per code word.<br>2) It detects all double bit error combinations in a codeword because the generator polynomial g(X) has a factor of at least three terms.<br>3) It detects any odd number of errors because g(X) contains a factor 1+X.<br>4) It detects any burst error for which the length of the burst is ≤ 24 bits.<br>5) It detects most large error bursts with length greater than the parity length r = 24 bits. The fraction of error bursts of length b > 24 that are undetected is:<br>a) $2^{-24} = 5.96 \times 10^{-8}$, if b > 25 bits.<br>b) $2^{-23} = 1.19 \times 10^{-7}$, if b = 25 bits. | Corrected the term "R(x)" to "R(X)". |

| Section Number | IS-GPS-200 RevF IRN001 (17 Apr 2012) Navstar GPS Space Segment/Navigation User Interfaces | Proposed Object Heading | Proposed Public Signals-in-Space (SiS) Updates Object Text | Proposed Rationale |
|---|---|---|---|---|
| 40.3.2 |  <br>** THE INDICATED PORTIONS OF WORDS 3 THROUGH 10 OF PAGES 14 AND 15 ARE RESERVED FOR SYSTEM USE, WHILE THOSE OF PAGE 17 ARE RESERVED FOR SPECIAL MESSAGES PER PARAGRAPH 20.3.3.5.1.10<br>P = 6 PARITY BITS<br>t = 2 NONINFORMATION BEARING BITS USED FOR PARITY COMPUTATION (SEE PARAGRAPH 20.3.5)<br>C = TLM BITS 23 AND 24. BIT 23 IS THE INTEGRITY STATUS FLAG AND BIT 24 IS RESERVED<br>Figure 40-1. Data Format (sheet 11 of 11) | |  <br>** THE INDICATED PORTIONS OF WORDS 3 THROUGH 10 OF PAGES 14 AND 15 ARE RESERVED FOR SYSTEM USE, WHILE THOSE OF PAGE 17 ARE RESERVED FOR SPECIAL MESSAGES PER PARAGRAPH 20.3.3.5.1.8<br>P = 6 PARITY BITS<br>t = 2 NONINFORMATION BEARING BITS USED FOR PARITY COMPUTATION (SEE PARAGRAPH 20.3.5)<br>C = TLM BITS 23 AND 24. BIT 23 IS THE INTEGRITY STATUS FLAG AND BIT 24 IS RESERVED<br>Figure 40-1. Data Format (sheet 11 of 11) | The dual asterisked (**) section reference 20.3.3.5.1.10 is an incorrect section reference for Special Messages. The section reference should be 20.3.3.5.1.8. |
| 40.3.3.5.1 | Words three through ten of each page contain six parity bits as their LSBs; in addition, two non-information bearing bits are provided as bits 23 and 24 of word ten in each page for parity computation purposes. The data contained in the remaining bits of words three through ten of the various pages in subframes 4 and 5 are described in the following subparagraphs.<br>A brief summary of the various data contained in each page of subframes 4 and 5 is as follows:<br>a. Subframe 4:<br>· Pages 1, 6, 11, 16 and 21: (reserved);<br>· Pages 2, 3, 4, 5, 7, 8, and 9: almanac data for SV ID 89 through 95 (PRN 57 | | Words three through ten of each page contain six parity bits as their LSBs; in addition, two non-information bearing bits are provided as bits 23 and 24 of word ten in each page for parity computation purposes. The data contained in the remaining bits of words three through ten of the various pages in subframes 4 and 5 are described in the following subparagraphs.<br>A brief summary of the various data contained in each page of subframes 4 and 5 is as follows: | Reformatting table to make it consistent with similar table in Section 20.3.3.5.1 |

<table>
<tr><th>Section Number</th><th>IS-GPS-200 RevF IRN001 (17 Apr 2012) Navstar GPS Space Segment/Navigation User Interfaces</th><th>Proposed Object Heading</th><th>Proposed Public Signals-in-Space (SiS) Updates Object Text</th><th>Proposed Rationale</th></tr>
<tr><td></td><td>through 63) respectively;<br>· Page 10: (reserved);<br>· Pages 12, 19, 20, 22, 23 and 24: (reserved);<br>· Page 13: NMCT;<br>· Pages 14 and 15: reserved for system use;<br>· Page 17: special messages;<br>· Page 18: ionospheric and UTC data;<br>· Page 25: A-S flags/SV configurations for 31 SVs, plus SV health for SV ID 89 through 95 (PRN 57 through 63).<br>b. Subframe 5:<br>· Pages 1 through 24: almanac data for SV ID 65 through 88 (PRN 33 through 56);<br>· Page 25: SV health data for SV ID 65 through 88 (PRN 33 through 56), the almanac reference time, the almanac reference week number.</td><td></td><td><table>
<tr><th>Subframe</th><th>Page(s)</th><th>Data</th></tr>
<tr><td>4</td><td>1, 6, 11, 16 and 21</td><td>Reserved</td></tr>
<tr><td></td><td>2, 3, 4, 5, 7, 8, and 9</td><td>Almanac data for SV ID 89 through 95 (PRN 57 through 63) respectively</td></tr>
<tr><td></td><td>10</td><td>Reserved</td></tr>
<tr><td></td><td>12, 19, 20, 22, 23 and 24</td><td>Reserved</td></tr>
<tr><td></td><td>13</td><td>NMCT</td></tr>
<tr><td></td><td>14 and 15</td><td>Reserved for system use</td></tr>
<tr><td></td><td>17</td><td>Special messages</td></tr>
<tr><td></td><td>18</td><td>Ionospheric and UTC data</td></tr>
<tr><td></td><td>25</td><td>A-S flags/SV configurations for 31 SVs, plus SV health for SV ID 89 through 95 (PRN 57 through 63)</td></tr>
<tr><td>5</td><td>1 through 24</td><td>Almanac data for SV ID 65 through 88 (PRN 33 through 56)</td></tr>
<tr><td></td><td>25</td><td>SV health data for SV ID 65 through 88 (PRN 33 through 56), the almanac reference time, the almanac reference week number</td></tr>
</table></td><td></td></tr>
</table>

End of WAS/IS for IS-GPS-200F, IRN-001 Changes