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Change Topic: L1C Data Predict Week Number (WNop)

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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.

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| PROBLEM STATEMENT: |
| <p>A CNAV-2 ephemeral parameter, the Data Predict Week Number (WN_{OP}), is located in the incorrect subframe. The WN_{OP} parameter should be paired with the Time of Predict (t_{OP}) parameter in the same subframe (or message type) in order for receivers to calculate a viable PNT solution. However, for L1C, WN_{OP} and t_{OP} are located in different subframes; Subframe 3 contains WN_{OP} and Subframe 2 contains t_{OP}. Therefore, L1C receivers cannot calculate a viable PNT solution.</p> <p>In addition, the requirements should reflect the corresponding bit assignments, bit lengths, and bit definitions to reinforce the utility of the WN_{OP} parameter for receiver manufacturers planning to process the L1C signal. Also, the definition for WN_{OP} has been synchronized for L2C and L5.</p> |
| SOLUTION: (Proposed) |
| <p>Pair the L1C WN_{OP} parameter with the Time of Predict (t_{OP}) parameter in the same subframe.</p> <p>In addition, define the corresponding bit assignments, bit lengths, and bit definitions.</p> |

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| Section | IS-GPS-200 RevG (5 Sep 2012) Navstar GPS Space Segment/Navigation User Interfaces | Proposed Changes | Rationale |
|----------------|---|---|--|
| 30.3.3.2.4 | <p>The user shall calculate the NED-related URA with the equation (in meters);</p> $IAURA_{NED} = URA_{NED0} + URA_{NED1} (t - t_{op} + 604,800*(WN - WN_{op}))$ <p>for $t - t_{op} + 604,800*(WN - WN_{op}) \leq 93,600$ seconds</p> $IAURA_{NED} = URA_{NED0} + URA_{NED1}*(t - t_{op} + 604,800*(WN - WN_{op})) + URA_{NED2}*(t - t_{op} + 604,800*(WN - WN_{op}) - 93,600)^2$ <p>for $t - t_{op} + 604,800*(WN - WN_{op}) > 93,600$ seconds</p> <p>where</p> <p>t is the GPS system time</p> <p>WN_{op} -- Data Predict Week Number, identifying the GPS week to which the t_{op} term refers. See Sections 30.3.3.1.1.3 and 30.3.3.2.1.2 (Data Predict Time of Week).</p> | <p>The user shall calculate the NED-related URA with the equation (in meters);</p> $IAURA_{NED} = URA_{NED0} + URA_{NED1} (t - t_{op} + 604,800*(WN - WN_{op}))$ <p>for $t - t_{op} + 604,800*(WN - WN_{op}) \leq 93,600$ seconds</p> $IAURA_{NED} = URA_{NED0} + URA_{NED1}*(t - t_{op} + 604,800*(WN - WN_{op})) + URA_{NED2}*(t - t_{op} + 604,800*(WN - WN_{op}) - 93,600)^2$ <p>for $t - t_{op} + 604,800*(WN - WN_{op}) > 93,600$ seconds</p> <p>where</p> <p>t is the GPS system time</p> | <p>Given the new recommended language that defines WNop in IS-GPS-200, the current WNop language is redundant and should be deleted.</p> |
| 30.3.3.3.1.3 | | Data Predict Week Number. | The bitmaps define the WNOP term, but it is never provided a text definition that specifies the scale factor and application of the quantity |
| 30.3.3.3.1.3.1 | | Bits 257-264 of Message Type 30 shall indicate the Data Predict Week Number (WN _{op}) to which the Data Predict Time of Week (t _{op}) is referenced (see 30.3.3.1.1.3 and 30.3.3.2.1.2). The WN _{op} term consists of eight bits which shall be a modulo 256 binary representation of the GPS week number to which the t _{op} is referenced. The user must account for the truncated nature of WN _{op} in all calculations in which WN _{op} is used. | The bitmaps define the WN _{OP} term, but it is never provided a text definition that specifies the scale factor and application of the quantity |