

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.

<b>PROBLEM STATEMENT:</b>
<p>A CNAV-2 ephemeral parameter, the Data Predict Week Number (<math>WN_{OP}</math>), is located in the incorrect subframe. The <math>WN_{OP}</math> parameter should be paired with the Time of Predict (<math>t_{OP}</math>) parameter in the same subframe (or message type) in order for receivers to calculate a viable PNT solution. However, for L1C, <math>WN_{OP}</math> and <math>t_{OP}</math> are located in different subframes; Subframe 3 contains <math>WN_{OP}</math> and Subframe 2 contains <math>t_{OP}</math>. 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 <math>WN_{OP}</math> parameter for receiver manufacturers planning to process the L1C signal. Also, the definition for <math>WN_{OP}</math> has been synchronized for L2C and L5.</p>
<b>SOLUTION: (Proposed)</b>
<p>Pair the L1C <math>WN_{OP}</math> parameter with the Time of Predict (<math>t_{OP}</math>) parameter in the same subframe.</p> <p>In addition, define the corresponding bit assignments, bit lengths, and bit definitions.</p>

**UNCLASSIFIED**  
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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 <math>t - t_{op} + 604,800*(WN - WN_{op}) \leq 93,600</math> 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 <math>t - t_{op} + 604,800*(WN - WN_{op}) &gt; 93,600</math> seconds</p> <p>where</p> <p>t is the GPS system time</p> <p>WN<sub>op</sub> -- Data Predict Week Number, identifying the GPS week to which the t<sub>op</sub> 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 <math>t - t_{op} + 604,800*(WN - WN_{op}) \leq 93,600</math> 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 <math>t - t_{op} + 604,800*(WN - WN_{op}) &gt; 93,600</math> 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		<b>Data Predict Week Number.</b>	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 <sub>op</sub> ) to which the Data Predict Time of Week (t <sub>op</sub> ) is referenced (see 30.3.3.1.1.3 and 30.3.3.2.1.2). The WN <sub>op</sub> term consists of eight bits which shall be a modulo 256 binary representation of the GPS week number to which the t <sub>op</sub> is referenced. The user must account for the truncated nature of WN <sub>op</sub> in all calculations in which WN <sub>op</sub> is used.	The bitmaps define the WN <sub>OP</sub> term, but it is never provided a text definition that specifies the scale factor and application of the quantity