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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.

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.</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-800 RevC (5 Sep 2012) Navstar GPS Space Segment/User Segment L1C Interface	Proposed Changes	Rationale
3.5.2			<p>The Data Predict Week Number, WN_{OP}, has moved from Subframe 3, Page 2 to Subframe 2 to occupy bits 567 to 574. This change is made so that the time of predict, top, and the Data Predict Week Number, WN_{OP}, occur in the same message. Without these parameters in the same message may hinder L1C receivers usability and Time to First Fix (TTFF) for L1C.</p> <p>Remove outline around Integrity Status Flag parameter.</p>

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	<p>Figure 3.5-1. Subframe 2 - Clock, Ephemeris, ITOW</p>	<p>Figure 3.5-1. Subframe 2 - Clock, Ephemeris, ITOW</p>	<p>Add number of bits. Consistent use of capitalization.</p> <p>Remove outline around "Reserved", add bit count. Consistent use of capitalization.</p> <p>Consistency with how L1C Health is handled at top of figure. All other fields are labeled with BOTH start bit and number of bits.</p>

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Section	IS-GPS-800 RevC (5 Sep 2012) Navstar GPS Space Segment/User Segment L1C Interface	Proposed Changes	Rationale
3.5.2	<p>Figure 3.5-3 Subframe 3, Page 2</p>	<p>Figure 3.5-3 Subframe 3, Page 2</p>	<p>Data Predict Week Number, $WNOp$, has moved from Subframe 3, Page 2 (bits 221-228) to Subframe 2. The bits 221-228 which were previously defined $WNOp$ are now included into the Reserved bits.</p>

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Section	IS-GPS-800 RevC (5 Sep 2012) Navstar GPS Space Segment/User Segment L1C Interface	Proposed Changes					Rationale																																																																																																			
3.5.3	Table 3.5-1. Subframe 2 Parameters (3 of 3)					Table 3.5-1. Subframe 2 Parameters (3 of 3)					Data Predict Week Number, WN _{OP} , has been moved from Subframe 3, Page 2 to Subframe 2. Table 3.5-1 now accurately reflects the parameters listed in Subframe 2 to include WN _{OP} .																																																																																															
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<p>* Parameters so indicated are in two's complement notation;</p> <p>** See Figure 3.5-1 for complete bit allocation in Subframe 2;</p> <p>*** Unless otherwise indicated in this column, effective range is the maximum range attainable with indicated bit allocation and scale factor.</p> <p>**** The bit string of "100000000000" will indicate that the group delay value is not available.</p>					<p>* Parameters so indicated are in two's complement notation;</p> <p>** See Figure 3.5-1 for complete bit allocation in Subframe 2;</p> <p>*** Unless otherwise indicated in this column, effective range is the maximum range attainable with indicated bit allocation and scale factor.</p> <p>**** The bit string of "100000000000" will indicate that the group delay value is not available.</p>																																																																																																					

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		r	
3.5.3.8 r	<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>WNop -- Data Predict Week Number, identifying the GPS week to which the t_{op} term refers. See Section 3.5.3.3.</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-800, the current WNop language is redundant and should be deleted.</p>
3.5.3.1 1		Data Predict Week Number.	<p>The bitmaps define the WNop term, but it is never provided a text definition that specifies the scale factor and application of</p>

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			the quantity
3.5.3.1 1		Bits 567-574 of Subframe 2, Page 2 shall indicate the Data Predict Week Number (WN _{OP}) to which the Data Predict Time of Week (top) is referenced (see 3.5.3.3). The WN _{OP} term consists of eight bits which shall be a modulo 256 binary representation of the GPS week number to which the top is referenced.	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