2014 Public Open Forum

Mr. Bruce Charest
SMC/GPE

Lt. John Simkus
SMC/GPE

Timothy Johnson
SMC/GPE SE&I

22 August 2014

Methods of Attendance

Online Meeting	Link	Meeting No.	Password
Defense Connect Online	https://connectcol.dco.dod.mil/gpsopenforum/	***N/A***	***N/A***
WEBEX	https://leidoswebconferencing.webex.com/leidoswebconferencing/j.php?MTID=m2341a5308e6d6d4a5779dbf911de7a4a	745 865 516	forum822

Phone	Conference Code
(855) 462-5367	***8311939***

GPS Requirements & Interfaces (R&I) Team

Organization	Title	Name
GPS Directorate	SMC/GPE: System Engineering Division	Maj. Jay Cryderman, Mr. Bruce Charest, and Lt. John Simkus
GPE Aerospace	GPS Subject Matter Expert (SME)	Karl Kovach
GPS SE&I	GPS Civil SiS Interfaces (IS-GPS-200, 705, and 800) Lead	Timothy Johnson
	GPS Requirements & Interfaces (R&I)	Kevin Pi
	GPS ICD-GPS-870 Responsible Engineer	Stephan Hillman

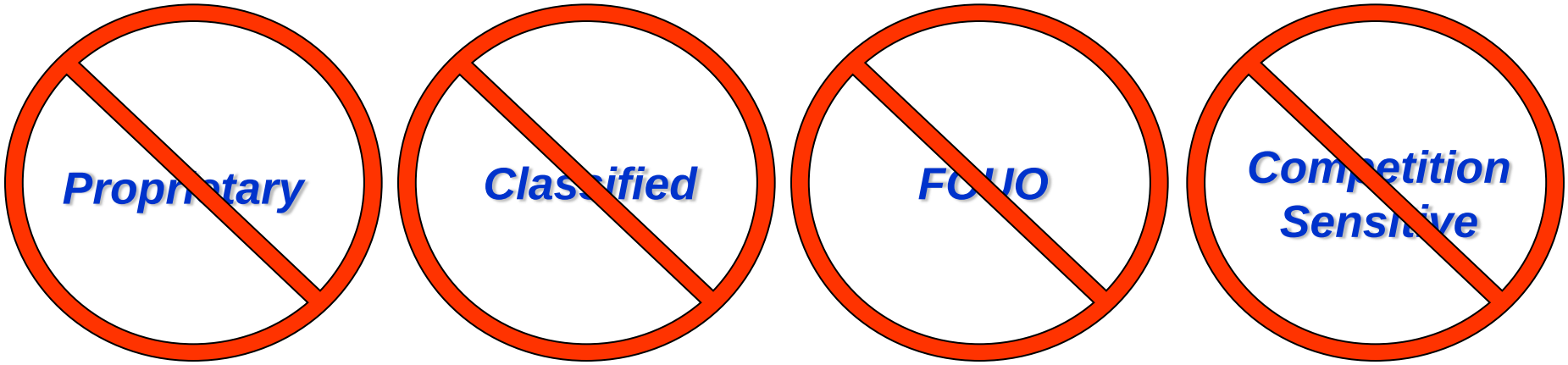
Welcome

Maj. Jay Cryderman
GPS Directorate
SMC/GPE

Roll Call

No Proprietary, Competition Sensitive, FOUO or Classified Information

UNCLASSIFIED



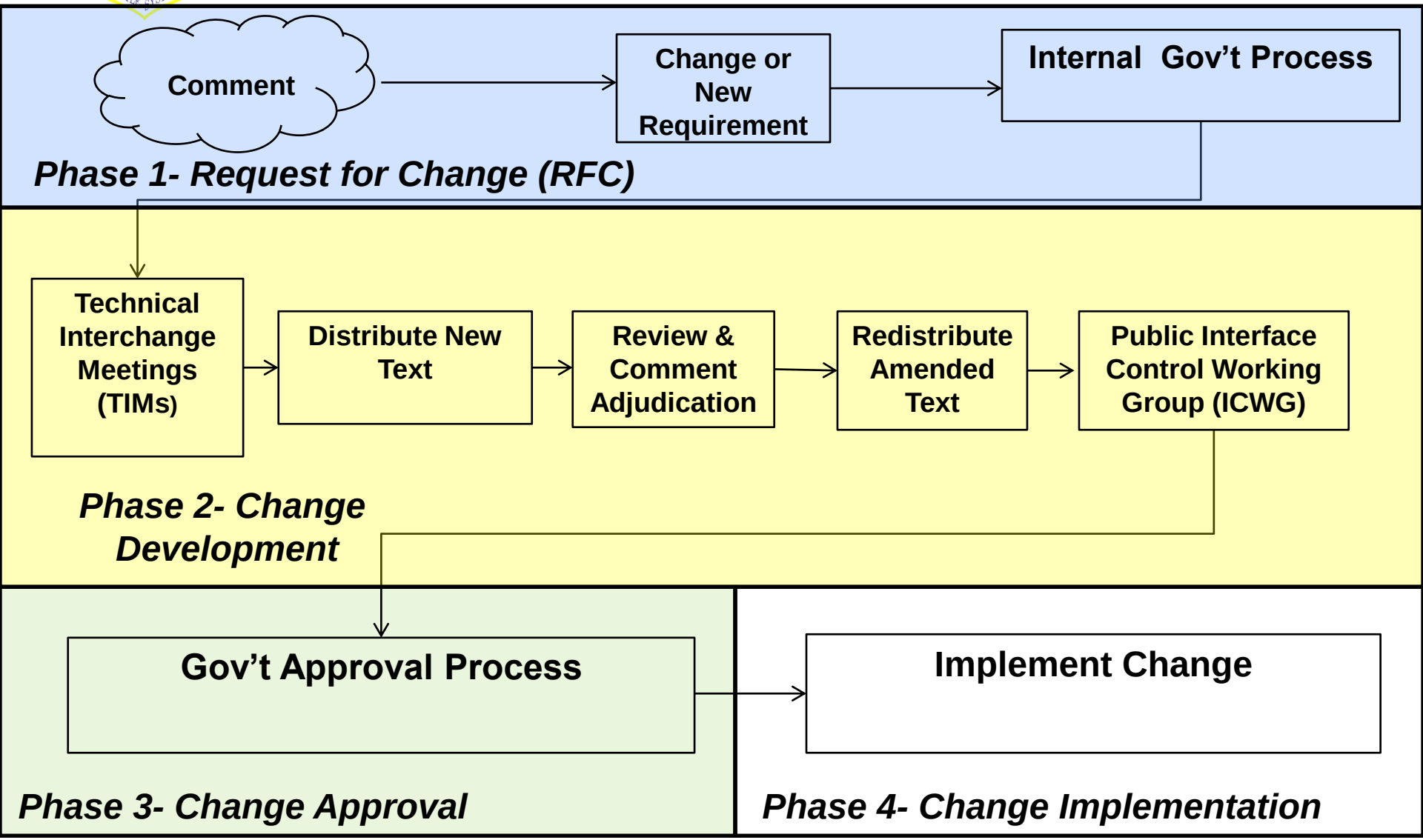
Rules of Engagement

- **Please place your phones on mute when not speaking to minimize background noise**
- **Due to time constraints, the following apply:**
  - Comments against the topics listed on the official agenda will get priority during discussion
  - Topics that warrant additional discussion may be side-barred
  - Out-of-scope issues may be side-barred
  - Only the latest revisions of documents will be discussed (IS-GPS-200H, IS-GPS-705D, IS-GPS-800D, ICD-GPS-870B, ICD-GPS-240A, and ICD-GPS-60B)

Meeting Purpose

- **Purpose of the meeting is to:**
  - Collect issues/comments for analysis and possible integration into the next GPS public document revisions
- **Comments received will be vetted per the standard Change Management Process**

Change Management High Level Process Flow



Agenda for Public Documents Forum

Session 1: 0800-1130	
Title	**Presenter**
Roll call	Tim Johnson
Welcome	Maj. Cryderman
Critical & Substantive Comments	All
Lunch 1130-1230	
Session 2: 1230-1700	
Presentation, “PRN Expansion”	Karl Kovach
Presentation, “CNAV Testing Results”	Karl Kovach
Presentation, “Civil RINEX Interface from CS”	Karl Kovach
Administrative Comments	All
Action Item Review	Tim Johnson
Closing	Tim Johnson

Open Forum Comments

Open Forum Comments CRM Status

CRM – STATUS				
Type	**Critical**	**Substantive**	**Administrative**	**Total**
Discuss	**4**	**10**	**11**	**25**

Critical Comments

Open Forum Comments

Comment Originator(s)	Karl Kovach (Aerospace)
Resolution	Discuss
Impacted Docs	IS-GPS-200, Figure 30-16

Comment	WAS	IS	GPS Directorate Response
Figure incorrectly shows 8 bits for the PRN number in two places.	PRN ID, 8 bits (two places)	Redraw figure (two places), insert a new two-bit field in place of the existing 2 MSBs and label this new field as "Reserved" (two places), and change the existing text which reads as "PRN ID, 8 bits" to instead read as "PRN ID, 6 bits" (two places).	***Discuss***

Open Forum Comments

Comment Originator(s)	Karl Kovach (Aerospace)
Resolution	Discuss
Impacted Docs	IS-GPS-200, IS-GPS-705, IS-GPS-800

Comment	WAS	IS	GPS Directorate Response
See foregoing comment about incorrectly showing 8 bits for the PRN number.	Multiple occurrences of words to the effect of "PRN ID, 8 bits"	Multiple revisions of words to now be to the effect of "PRN ID, 6 bits" with 2 bits of what used to be MSBs becoming "Reserved" as necessary.	***Discuss***

Open Forum Comments

Comment Originator(s)	John Nielson (Rockwell Collins) and Tony Marquez (GPN)
Resolution	Discuss
Impacted Docs	IS-GPS-200, Section 3.3.4

Comment	WAS	IS	GPS Directorate Response
The 90ns UTCOE quantity in IS-GPS-200 may present problems to certain receivers. During test, certain receivers (if they ever received 90ns for UTCOE) may cause failures. Either change the UTCOE value in IS-200 to something more reasonable or remove this value entirely	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.	***Discuss***

Open Forum Comments

Comment Originator(s)	John Lavrakas (Advanced Research Corporation)
Resolution	Discuss
Impacted Docs	ICD-GPS-240, Section 10.1

Comment	WAS	IS	GPS Directorate Response
Add a definition of the term "outage".	NANUs are used to notify users of scheduled and unscheduled satellite outages and general GPS information.	NANUs are used to notify users of scheduled and unscheduled satellite outages and general GPS information. An outage is defined to be a period of time that the satellite is removed from service and not available for use. This occurs when the satellite meets the conditions for "unhealthy" provided in Section 2.3.2 of the Standard Positioning Service Performance Standard.	***Discuss***

Substantive Comments

Open Forum Comments

Comment Originator(s)	Frank Czopek (Microcosm)
Resolution	Discuss
Impacted Docs	IS-GPS-200, Figure 3-6

Comment	WAS	IS	GPS Directorate Response
Need to modify the figure. IS-200 P Code description is lacking . Best write up is in Kaplan 2nd ed. Need to rework the words in 200 to match how a real P coder works. Need to modify the figure		1) ADD X1B to the top clock control box 2) ADD X2A to the middle clock control box 3) ADD X2B to the bottom clock control box 3) Delete divide by 37 box	***Discuss***

Open Forum Comments

Comment Originator(s)	Frank Czopek (Microcosm)
Resolution	Discuss
Impacted Docs	IS-GPS-200, Section 3.3.2.2

Comment	WAS	IS	GPS Directorate Response
	To accommodate this situation, the X1B shift register is held in the final state (chip 4093) of its 3749th cycle.	To accommodate this situation, the X1B clock control function holds the shift register ~~is held~~ in the final state (chip 4093) of its 3749th cycle	***Discuss***

Open Forum Comments

Comment Originator(s)	Frank Czopek (Microcosm)
Resolution	Discuss
Impacted Docs	IS-GPS-200, Section 3.3.2.2

Comment	WAS	IS	GPS Directorate Response
Need to add a description of how the X2A and X2B clock control function really works	...The X2A and X2B epochs are made to precess with respect to the X1A and X1B epochs by causing the X2 period to be 37 chips longer than the X1 period. When the X2A is in the last….	...The X2A and X2B epochs are made to precess with respect to the X1A and X1B epochs by causing the X2 period to be 37 chips longer than the X1 period. The 37 chip delay is done by the X2A and X2B clock control functions. The X2A will halt the X@A shift register when it detects the 3750th X2A epoch. Just like the X1B clock control function the X2B clock control function hold the X2B register upon detection of final state (chip 4093) of its 3749th cycle or ~~W~~when the X2A is in the last….	***Discuss***

Open Forum Comments

Comment Originator(s)	Frank Czopek
Resolution	Discuss
Impacted Docs	IS-GPS-200, Section 3.3.2.2

Comment	WAS	IS	GPS Directorate Response
Table 3-VII is confusing	delete table	add table contents to figures 3-2, -3, -4, -5	***Discuss***

Open Forum Comments

Comment Originator(s)	John Lavrakas (Advanced Research Corporation)
Resolution	Discuss
Impacted Docs	IS-GPS-240

Comment	WAS	IS	GPS Directorate Response
Provide to users satellite outage information in the form of a machine readable format using the satellite outage file (SOF) file implemented as part of the GPS Information Service.		Numerous (TBD)	***Discuss***

Open Forum Comments

Comment Originator(s)	John Lavrakas (Advanced Research Corporation)
Resolution	Discuss
Impacted Docs	IS-GPS-240, Section 10.1.1

Comment	WAS	IS	GPS Directorate Response
Add text to clarify when FCSTCANC may be used.	Cancels a scheduled outage when a new maintenance time is not yet determined; it references the original forecast NANU message.	Cancels a scheduled outage when a new maintenance time is not yet determined; it references the original forecast NANU message. May be issued after start time of reference NANU.	***Discuss***

Open Forum Comments

Comment Originator(s)	Conner Wagenseller (SE&I) and Kazuma Gunning (SE&I)
Resolution	Discuss
Impacted Docs	IS-GPS-200, Table 6-I

Comment	WAS	IS	GPS Directorate Response
Using a program to generate P code, the following errors were found under the column "first 12 chips (Octal)" for the following PRN signal numbers: PRN 66, the value "2111" should be changed to "6111" PRN 69, the value "4166" should be changed to "0166" PRN 70, the value "2251" should be changed to "6251" PRN 72, the value "4761" should be changed to "0761" PRN 73, the value "2152" should be changed to "6152" PRN 74, the value "5247" should be changed to "1247" PRN 75, the value "5736" should be changed to "1736" PRN 79, the value "3520" should be changed to "7520" PRN 81, the value "4417" should be changed to "0417" PRN 83, the value "3230" should be changed to "7230" PRN 85, the value "4575" should be changed to "0575" PRN 88, the value "3720" should be changed to "7720" PRN 91, the value "4005" should be changed to "0005“ PRN 107, the value “2716" should be changed to “6716“ PRN 153, the value “7070" should be changed to “3070“ PRN 181, the value “3420" should be changed to “7420“	Next Slide	Next Slide	***Discuss***

Open Forum Comments

Comment Originator(s)	Conner Wagenseller (SE&I) and Kazuma Gunning (SE&I)
Resolution	Discuss
Impacted Docs	IS-GPS-200, Table 6-I

WAS

Table 6-I Additional C/A-/P-Code Phase Assignments (sheet 1 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)
64	729	0254	1523	27	$P_{27}(t+24)$	5112
65	695	1602	0175	28	$P_{28}(t+24)$	0667
66	780	1160	0617	29	$P_{29}(t+24)$	2111
67	801	1114	0663	30	$P_{30}(t+24)$	5266
68	788	1342	0435	31	$P_{31}(t+24)$	4711
69	732	0025	1752	32	$P_{32}(t+24)$	4166
70	34	1523	0254	33	$P_{33}(t+24)$	2251
71	320	1046	0731	34	$P_{34}(t+24)$	5306
72	327	0404	1373	35	$P_{35}(t+24)$	4761
73	389	1445	0332	36	$P_{36}(t+24)$	2152
74	407	1054	0723	37	$P_{37}(t+24)$	5247
75	525	0072	1705	1	$P_1(t+48)$	5736
76	405	0262	1515	2	$P_2(t+48)$	2575
77	221	0077	1700	3	$P_3(t+48)$	3054
78	761	0521	1256	4	$P_4(t+48)$	3604
79	260	1400	0377	5	$P_5(t+48)$	3520
80	326	1010	0767	6	$P_6(t+48)$	5472
81	955	1441	0336	7	$P_7(t+48)$	4417
82	653	0365	1412	8	$P_8(t+48)$	2025
83	699	0270	1507	9	$P_9(t+48)$	3230
84	422	0263	1514	10	$P_{10}(t+48)$	5736
85	188	0613	1164	11	$P_{11}(t+48)$	4575
86	438	0277	1500	12	$P_{12}(t+48)$	2054
87	959	1562	0215	13	$P_{13}(t-48)$	3204
88	539	1674	0103	14	$P_{14}(t+48)$	3720
89	879	1113	0664	15	$P_{15}(t+48)$	5572
90	677	1245	0532	16	$P_{16}(t+48)$	4457
91	586	0606	1171	17	$P_{17}(t+48)$	4005
92	153	0136	1641	18	$P_{18}(t+48)$	2220
93	792	0256	1521	19	$P_{19}(t+48)$	3332
94	814	1550	0227	20	$P_{20}(t+48)$	3777
95	446	1234	0543	21	$P_{21}(t+48)$	3555

* 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.

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Table 6-I Additional C/A-/P-Code Phase Assignments (sheet 1 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)
64	729	0254	1523	27	$P_{27}(t+24)$	5112
65	695	1602	0175	28	$P_{28}(t+24)$	0667
66	780	1160	0617	29	$P_{29}(t+24)$	6111
67	801	1114	0663	30	$P_{30}(t+24)$	5266
68	788	1342	0435	31	$P_{31}(t+24)$	4711
69	732	0025	1752	32	$P_{32}(t+24)$	0166
70	34	1523	0254	33	$P_{33}(t+24)$	6251
71	320	1046	0731	34	$P_{34}(t+24)$	5306
72	327	0404	1373	35	$P_{35}(t+24)$	0761
73	389	1445	0332	36	$P_{36}(t+24)$	6152
74	407	1054	0723	37	$P_{37}(t+24)$	1247
75	525	0072	1705	1	$P_1(t+48)$	1736
76	405	0262	1515	2	$P_2(t+48)$	2575
77	221	0077	1700	3	$P_3(t+48)$	3054
78	761	0521	1256	4	$P_4(t+48)$	3604
79	260	1400	0377	5	$P_5(t+48)$	7520
80	326	1010	0767	6	$P_6(t+48)$	5472
81	955	1441	0336	7	$P_7(t+48)$	0417
82	653	0365	1412	8	$P_8(t+48)$	2025
83	699	0270	1507	9	$P_9(t+48)$	7230
84	422	0263	1514	10	$P_{10}(t+48)$	5736
85	188	0613	1164	11	$P_{11}(t+48)$	0575
86	438	0277	1500	12	$P_{12}(t+48)$	2054
87	959	1562	0215	13	$P_{13}(t-48)$	3204
88	539	1674	0103	14	$P_{14}(t+48)$	7720
89	879	1113	0664	15	$P_{15}(t+48)$	5572
90	677	1245	0532	16	$P_{16}(t+48)$	4457
91	586	0606	1171	17	$P_{17}(t+48)$	0005
92	153	0136	1641	18	$P_{18}(t+48)$	2220
93	792	0256	1521	19	$P_{19}(t+48)$	3332
94	814	1550	0227	20	$P_{20}(t+48)$	3777
95	446	1234	0543	21	$P_{21}(t+48)$	3555

* 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.

Open Forum Comments

Comment Originator(s)	Conner Wagenseller (SE&I) and Kazuma Gunning (SE&I)
Resolution	Discuss
Impacted Docs	IS-GPS-200, Table 6-I

WAS

Table 6-I Additional C/A-/P-Code Phase Assignments (sheet 2 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)
96	264	0260	1517	22	$P_{22}(t+48)$	3444
97	1015	1455	0322	23	$P_{23}(t+48)$	7400
98	278	1535	0242	24	$P_{24}(t+48)$	1422
99	536	0746	1031	25	$P_{25}(t+48)$	2433
100	819	1033	0744	26	$P_{26}(t+48)$	7037
101	156	1213	0564	27	$P_{27}(t+48)$	1635
102	957	0710	1067	28	$P_{28}(t+48)$	6534
103	159	0721	1056	29	$P_{29}(t+48)$	5074
104	712	1763	0014	30	$P_{30}(t+48)$	0614
105	885	1751	0026	31	$P_{31}(t+48)$	6124
106	461	0435	1342	32	$P_{32}(t+48)$	1270
107	248	0735	1042	33	$P_{33}(t+48)$	2716
108	713	0771	1006	34	$P_{34}(t+48)$	5165
109	126	0140	1637	35	$P_{35}(t+48)$	0650
110	807	0111	1666	36	$P_{36}(t+48)$	6106
111	279	0656	1121	37	$P_{37}(t+48)$	5261
112	122	1016	0761	1	$P_1(t+72)$	6752
113	197	0462	1315	2	$P_2(t+72)$	5147
114	693	1011	0766	3	$P_3(t+72)$	0641
115	632	0552	1225	4	$P_4(t+72)$	6102
116	771	0045	1732	5	$P_5(t+72)$	1263
117	467	1104	0673	6	$P_6(t+72)$	2713
118	647	0557	1220	7	$P_7(t+72)$	3167
119	203	0364	1413	8	$P_8(t+72)$	3651
120	145	1106	0671	9	$P_9(t+72)$	7506
121	175	1241	0536	10	$P_{10}(t+72)$	5461
122	52	0267	1510	11	$P_{11}(t+72)$	0412
123	21	0232	1545	12	$P_{12}(t+72)$	6027
124	237	1617	0160	13	$P_{13}(t+72)$	1231
125	235	1076	0701	14	$P_{14}(t+72)$	2736

* 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.

IS

Table 6-I Additional C/A-/P-Code Phase Assignments (sheet 2 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)
96	264	0260	1517	22	$P_{22}(t+48)$	3444
97	1015	1455	0322	23	$P_{23}(t+48)$	7400
98	278	1535	0242	24	$P_{24}(t+48)$	1422
99	536	0746	1031	25	$P_{25}(t+48)$	2433
100	819	1033	0744	26	$P_{26}(t+48)$	7037
101	156	1213	0564	27	$P_{27}(t+48)$	1635
102	957	0710	1067	28	$P_{28}(t+48)$	6534
103	159	0721	1056	29	$P_{29}(t+48)$	5074
104	712	1763	0014	30	$P_{30}(t+48)$	0614
105	885	1751	0026	31	$P_{31}(t+48)$	6124
106	461	0435	1342	32	$P_{32}(t+48)$	1270
107	248	0735	1042	33	$P_{33}(t+48)$	6716
108	713	0771	1006	34	$P_{34}(t+48)$	5165
109	126	0140	1637	35	$P_{35}(t+48)$	0650
110	807	0111	1666	36	$P_{36}(t+48)$	6106
111	279	0656	1121	37	$P_{37}(t+48)$	5261
112	122	1016	0761	1	$P_1(t+72)$	6752
113	197	0462	1315	2	$P_2(t+72)$	5147
114	693	1011	0766	3	$P_3(t+72)$	0641
115	632	0552	1225	4	$P_4(t+72)$	6102
116	771	0045	1732	5	$P_5(t+72)$	1263
117	467	1104	0673	6	$P_6(t+72)$	2713
118	647	0557	1220	7	$P_7(t+72)$	3167
119	203	0364	1413	8	$P_8(t+72)$	3651
120	145	1106	0671	9	$P_9(t+72)$	7506
121	175	1241	0536	10	$P_{10}(t+72)$	5461
122	52	0267	1510	11	$P_{11}(t+72)$	0412
123	21	0232	1545	12	$P_{12}(t+72)$	6027
124	237	1617	0160	13	$P_{13}(t+72)$	1231
125	235	1076	0701	14	$P_{14}(t+72)$	2736

* 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.

Open Forum Comments

Comment Originator(s)	Conner Wagenseller (SE&I) and Kazuma Gunning (SE&I)
Resolution	Discuss
Impacted Docs	IS-GPS-200, Table 6-I

WAS

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.

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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	$P_5(t+96)$	3070
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.

Open Forum Comments

Comment Originator(s)	Conner Wagenseller (SE&I) and Kazuma Gunning (SE&I)
Resolution	Discuss
Impacted Docs	IS-GPS-200, Table 6-I

WAS

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.

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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	$P_{33}(t+96)$	7420
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.

Open Forum Comments

Comment Originator(s)	Karl Kovach (Aerospace)
Resolution	Discuss
Impacted Docs	IS-GPS-200, Section 3.2.3

Comment	WAS	IS	GPS Directorate Response
The paragraph "During the initial period of Block IIR-M SVs operation…" should have been deleted. D(t) will never be added to the L2 signal for IIR-M	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, DC(t). In such configuration, the data rate of D(t) may be 50 bps (i.e. without convolution encoding) or it may be 25 bps. The D(t) of 25 bps shall be convolutionally encoded resulting in 50 sps.		***Discuss***

Open Forum Comments

Comment Originator(s)	Tim Johnson (SE&I)
Resolution	Discuss
Impacted Docs	IS-GPS-800, Table 3.5-1

Comment

Effective Range for Eccentricity value was missed in table 3.5-1 in last year's IRN.

WAS

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

Parameter		No. of Bits**	Scale Factor (LSB)	Effective Range***	Units
WN	Week No.	13	1		weeks
ITOW	Interval time of week	8		83	(see text)
t_{op}	Data predict time of week	11	300	604,500	seconds
L1C health		1			(see text)
URA_{ED} Index	ED accuracy index	5*			(see text)
t_{oe}	Ephemeris/clock data reference time of week	11	300	604,500	seconds
ΔA ****	Semi-major axis difference at reference time	26*	2^{-9}		meters
$\dot{A}$	Change rate in semi-major axis	25*	2^{-21}		meters/sec
Δn_0	Mean Motion difference from computed value at reference time	17*	2^{-44}		semi-circles/sec
$\dot{\Delta n}_0$	Rate of mean motion difference from computed value	23*	2^{-57}		semi-circles/sec^2
M_{0-n}	Mean anomaly at reference time	33*	2^{-32}		semi-circles
e_n	Eccentricity	33	2^{-34}		dimensionless
ω_n	Argument of perigee	33*	2^{-32}		semi-circles

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

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

Parameter		No. of Bits**	Scale Factor (LSB)	Effective Range***	Units
WN	Week No.	13	1		weeks
ITOW	Interval time of week	8		83	(see text)
t_{op}	Data predict time of week	11	300	604,500	seconds
L1C health		1			(see text)
URA_{ED} Index	ED accuracy index	5*			(see text)
t_{oe}	Ephemeris/clock data reference time of week	11	300	604,500	seconds
ΔA ****	Semi-major axis difference at reference time	26*	2^{-9}		meters
$\dot{A}$	Change rate in semi-major axis	25*	2^{-21}		meters/sec
Δn_0	Mean Motion difference from computed value at reference time	17*	2^{-44}		semi-circles/sec
$\dot{\Delta n}_0$	Rate of mean motion difference from computed value	23*	2^{-57}		semi-circles/sec^2
M_{0-n}	Mean anomaly at reference time	33*	2^{-32}		semi-circles
e_n	Eccentricity	33	2^{-34}	0.03	dimensionless
ω_n	Argument of perigee	33*	2^{-32}		semi-circles

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

Open Forum Comments

Comment Originator(s)	Tim Johnson (SE&I)
Resolution	Discuss
Impacted Docs	IS-GPS-705

Comment	WAS	IS	GPS Directorate Response
"Pre-Operational Use" paragraph missing from IS-705 after paragraph 6.3.4, "Additional PRN Sequences" paragraph		Before any new signal or group of signals (e.g., L2C, L5, M, L1C, etcetera) is declared operational, the availability of and/or the configuration of the broadcast signal or group of signals may not comply with all requirements of the relevant IS or ICD. For example, the pre-operational broadcast of L2C signals from the IIR-M satellites did not include any NAV or CNAV data as required by IS-GPS-200. Pre-operational use of any new signal or group of signals is at the users own risk.	***Discuss***

Lunch

Special Topics

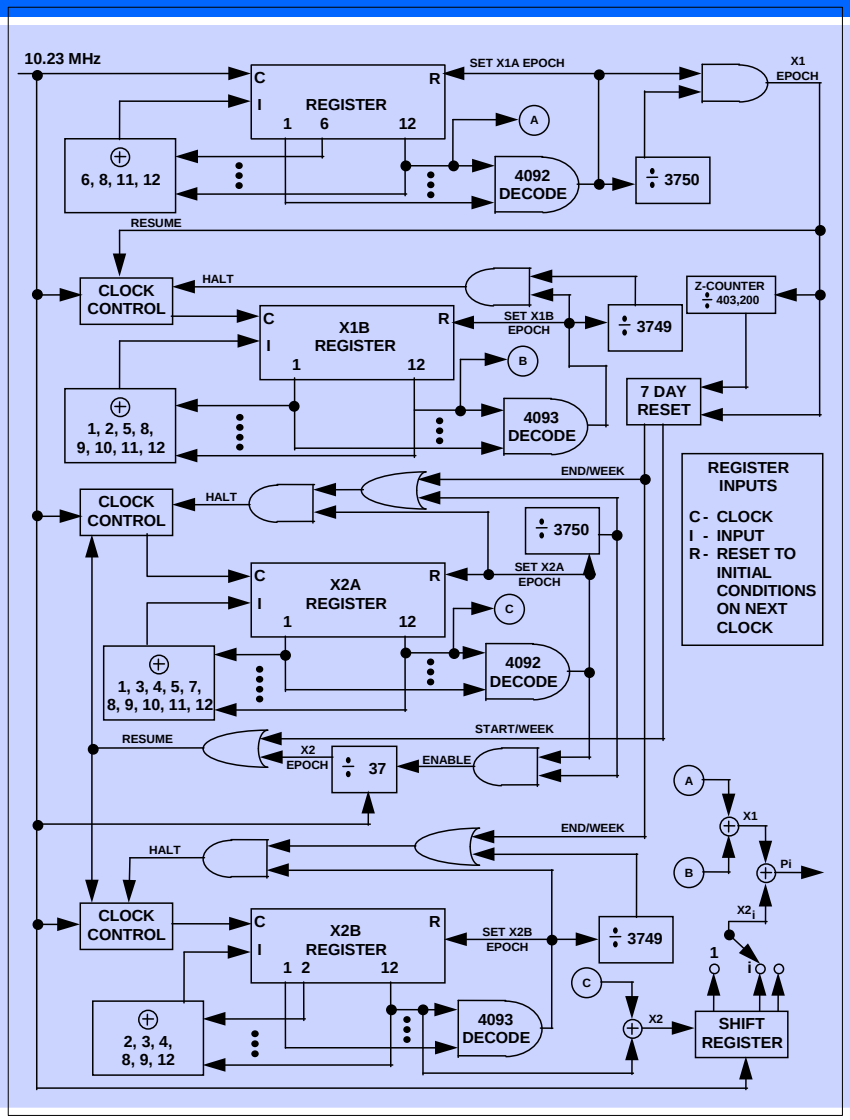
Administrative Comments

Open Forum Comments

Comment Originator(s)	Frank Czopek (Microcosm)
Resolution	Discuss
Impacted Docs	IS-GPS-200, Figure 3-6

Comment	WAS	IS	GPS Directorate Response
Figure 3-6 is and-gate and or-gate bodies are distorted, arrow heads are not placed properly	(See next slide)	Neaten the figure up	***Discuss***

IS-GPS-200H Figure 3-6

WAS	GPS Directorate Response
	*Discuss*

Open Forum Comments

Comment Originator(s)	Brent Renfro (ARL:UT)
Resolution	Discuss
Impacted Docs	IS-GPS-200, IS-GPS-705, and IS-GPS-800

Comment	WAS	IS	GPS Directorate Response
Given the definition of Group Delay in 3.3.1.7 and Group Delay Differential in 3.3.1.7.2, many group delay references should be to group delay differential.			***Discuss***

Open Forum Comments

Comment Originator(s)	Brent Renfro (ARL:UT)
Resolution	Discuss
Impacted Docs	IS-GPS-200, Section 30.3.3.3.1.1

Comment	WAS	IS	GPS Directorate Response
ISC-sub-L5I5 and ISC-sub-L5Q5 are defined in Table 30-IV and Figure 30-3 but never referenced in the text. Add a parenthetical reference to point the reader to where the terms are discussed.	"… The related algorithm is given in paragraphs 30.3.3.3.1.1.1 and 30.3.3.3.1.1.2."	"… The related algorithm is given in paragraphs 30.3.3.3.1.1.1 and 30.3.3.3.1.1.2. (ISC-sub-L5I5 and ISC-sub-L5Q5 are related to the use of the L5 signal. See IS-GPS-705 Section 20.3.3.1.2 for the related algorithms.)"	***Discuss***

Open Forum Comments

Comment Originator(s)	Brent Renfro (ARL:UT)
Resolution	Discuss
Impacted Docs	IS-GPS-800, Section 3.2.1.8.2

Comment	WAS	IS	GPS Directorate Response
Incorrect section title in reference.	"Not applicable. See Sections 3.2.1.7.1 (Signal Coherence) and 3.5.3.9.1 (Inter-Signal Group Delay Differential Correction)."	"Not applicable. See Sections 3.2.1.7.1 (Signal Coherence) and 3.5.3.9.1 (Inter-Signal Correction)."	***Discuss***

Open Forum Comments

Comment Originator(s)	Karl Kovach (Aerospace)
Resolution	Discuss
Impacted Docs	IS-GPS-200, Cover Sheet

Comment	WAS	IS	GPS Directorate Response
"Authenticated By" signature line too close to GPS Directorate Shield		Add space between directorate shield and the “Authenticated By” line	***Discuss***

Open Forum Comments

Comment Originator(s)	Karl Kovach (Aerospace)
Resolution	Discuss
Impacted Docs	IS-GPS-200, Section 30.3.3.2.4

Comment	WAS	IS	GPS Directorate Response
"intersignal" should be spelled "inter-signal"	intersignal	inter-signal	***Discuss***

Open Forum Comments

Comment Originator(s)	Karl Kovach (Aerospace)
Resolution	Discuss
Impacted Docs	IS-GPS-200, Section 20.3.3.3.3.1

Comment	WAS	IS	GPS Directorate Response
Equation for the "F" constant for the relativistic correction term is not spaced properly. Both sides of the equation should be on the same line.	$F = \frac{-2\sqrt{\mu}}{c^2} = -4.442807633\,(10)^{-10}\ \frac{\sec}{\sqrt{\text{meter}}}$	[Properly spaced equation]	***Discuss***

Open Forum Comments

Comment Originator(s)	Karl Kovach (Aerospace)
Resolution	Discuss
Impacted Docs	IS-GPS-200, Section 20.3.3.3.3.1

Comment	WAS	IS	GPS Directorate Response
Equation for the relativistic correction term, utilized by the control segment is not spaced properly. Both sides of the equation should be on the same line.	$\Delta t_r = -\frac{2\,\vec{R}\bullet\vec{V}}{c^2}$	[Properly spaced equation]	***Discuss***

Open Forum Comments

Comment Originator(s)	Kevin Pi (SE&I)
Resolution	Discuss
Impacted Docs	IS-GPS-200, Section 30.3.3.1.1

Comment	WAS	IS	GPS Directorate Response
Toe should be properly subscripted.	The timing of the toe and constraints on the t_{oc} and t_{oe} are defined in paragraph 30.3.4.4.	The timing of the t_{oe} and constraints on the t_{oc} and t_{oe} are defined in paragraph 30.3.4.4.	***Discuss***

Open Forum Comments

Comment Originator(s)	Tim Johnson (SE&I)
Resolution	Discuss
Impacted Docs	IS-GPS-800, 3.5.3.8

Comment	WAS	IS	GPS Directorate Response
Section 3.5.3 is discussing Subframe 2, not Message Type 10.	While the actual NED-related URA may vary over the satellite footprint, the IAURANED calculated using the parameters in message type 10 at each instant during the current clock/ephemeris fit interval shall bound the maximum IAURANED expected for the worst-case location within the satellite footprint at that instant.	While the actual NED-related URA may vary over the satellite footprint, the IAURANED calculated using the parameters in Subframe 2 at each instant during the current clock/ephemeris fit interval shall bound the maximum IAURANED expected for the worst-case location within the satellite footprint at that instant.	***Discuss***

Action Item Review