



GPS Operations CGSIC Brief

21 September 09

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This briefing is UNCLASSIFIED



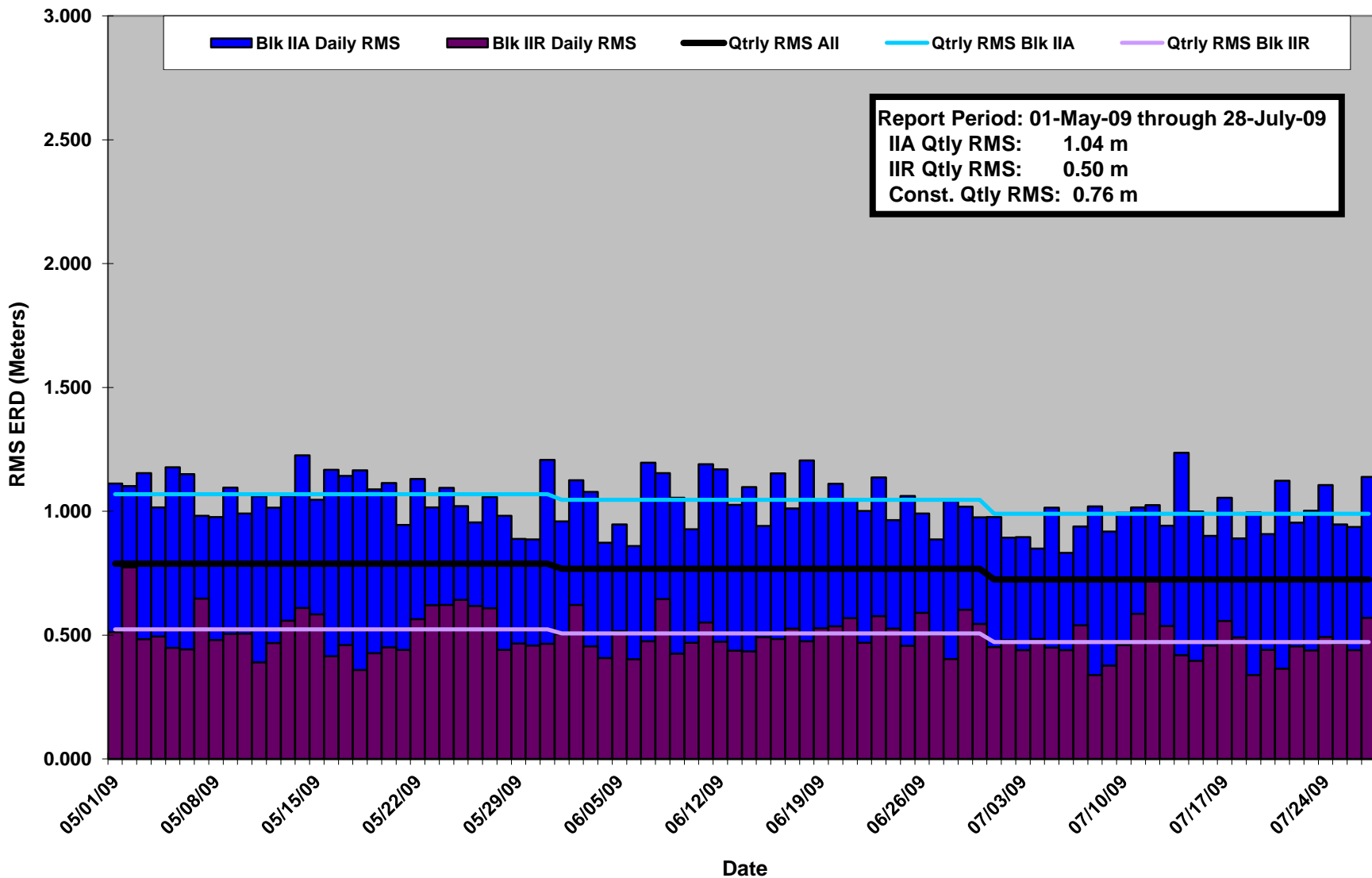
Overview



- Navigation and Timing Performance
 - Navigation Performance
 - Time Transfer Performance
- Constellation Status



GPS Constellation RMS ERD Performance -- 01-May-09 through 28-July-09

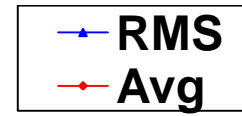


Report Period: 01-May-09 through 28-July-09
IIA Qtrly RMS: 1.04 m
IIR Qtrly RMS: 0.50 m
Const. Qtrly RMS: 0.76 m

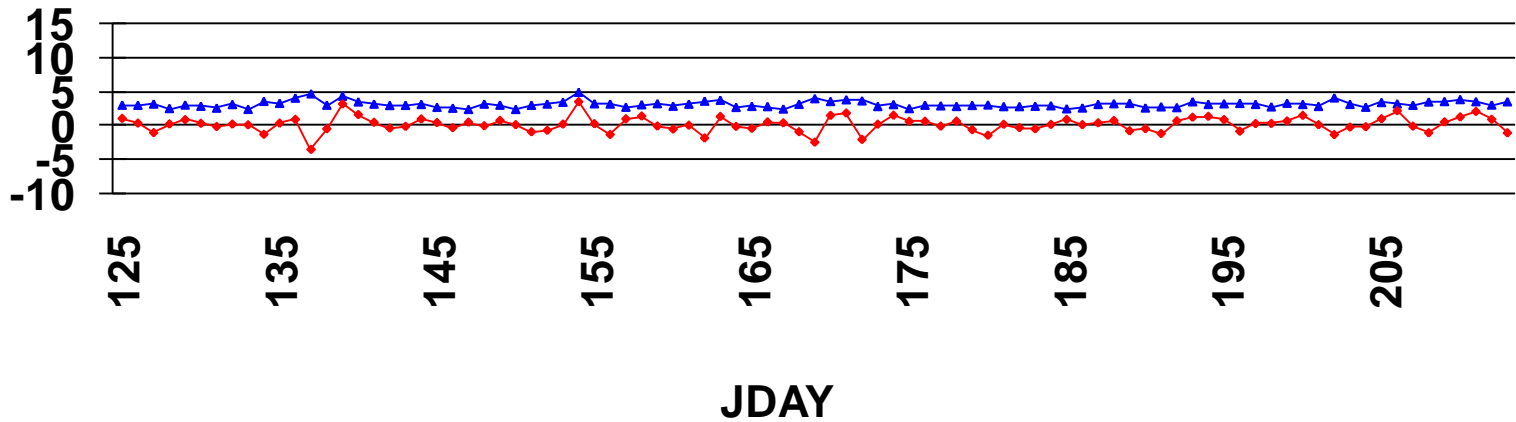


UTC TIME TRANSFER

Specification 28ns



NANOSECONDS

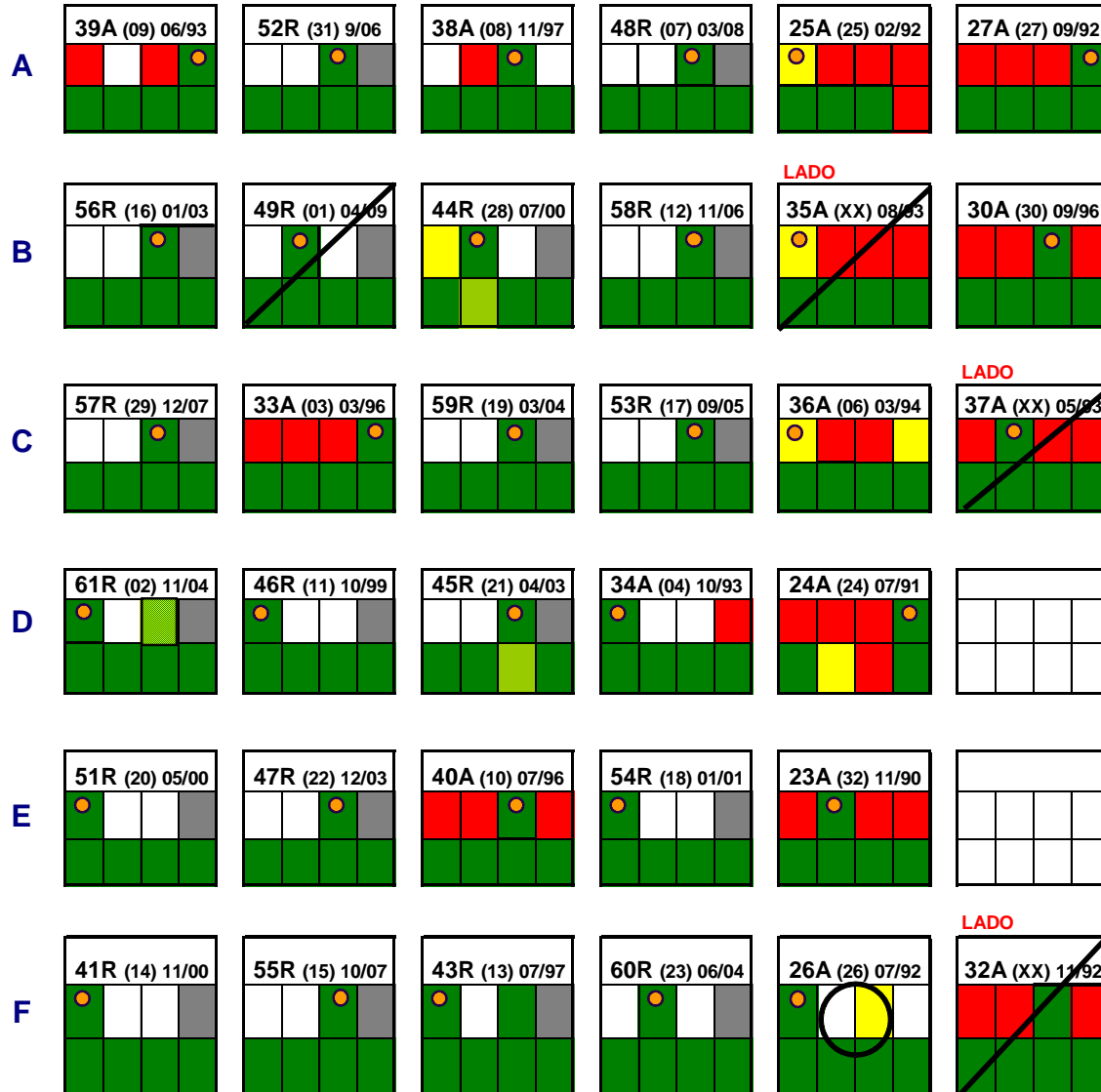




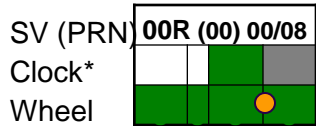
GPS Space Status – 03 Aug 2009

Slot

1 Nav/Bus / 2 Clock/Reactive 3 Wheel Performance 4 5 6



KEY



* II/IIA = Rb, Rb, Cs, Cs
IIR = Rb, Rb, Rb

Bus/Nav Key



Clock/Wheel Key





Constellation Status Summary



Total SVs in Category

Changes Since Last Update

- 21 (+1) SVs past design life (including residual SVs)
- 18 (+0) Operational SVs past design life
- 15 (+0) SVs past pre-launch mean life estimate (MLE) (including residual SVs)
- 12 (+0) Operation SVs past pre-launch mean life estimate (MLE)
- 19 (+0) SVs one component away from Nav mission failure (including residual SVs)
- 16 (+0) Operation SVs one component away from Nav mission failure
- 8 (+0) SVs one component away from bus failure (including residual SVs)
- 6 (+0) Operational SVs one component away from bus failure



IIA Vehicles On Last Clock

SVN	Slot	1st Clock	Last Clock	Storage time for current clock (Years)	Clock operating time (Years)	Operational Clock	Clocks Remaining	Current Age of Vehicle (Years)
23		5-Dec-90	1-Jan-04	13.1	5.7	Rb #2	None	18.8
24		13-Jul-91	7-Sep-00	9.2	9.0	Cs #4	None	18.2
25		15-Mar-92	25-Dec-05	13.8	3.7	Rb #1	None	17.5
27	A4	24-Sep-92	20-May-05	12.7	4.3	Cs #4	None	17.0
30	B2	27-Sep-96	2-Jun-06	9.7	3.3	Cs #3	None	13.0
32		5-Dec-92	19-Aug-96	3.7	13.1	Cs #3	None	16.8
33	C2	3-Apr-96	1-Jan-07	10.8	2.7	Cs#4	None	13.5
36		18-Mar-94	19-Mar-04	10.0	5.5	Rb #1	None	15.5
37		20-May-93	21-Aug-07	14.3	2.1	Rb #2	None	16.3
40	E3	1-Aug-96	25-Mar-08	11.7	1.5	Cs #3	None	13.1

- **SVN 36:** has a higher likelihood of failing due to its Rb clock being turned on with over 8 years of on-orbit storage
- **SVN-37:** being stored as on-orbit spare in LADO
- **SVN-32:** being stored as on-orbit spare in LADO
- **SVN-35:** being stored as on-orbit spare in LADO

Bottom Line: 11 of 15 IIAs left are on their last clock



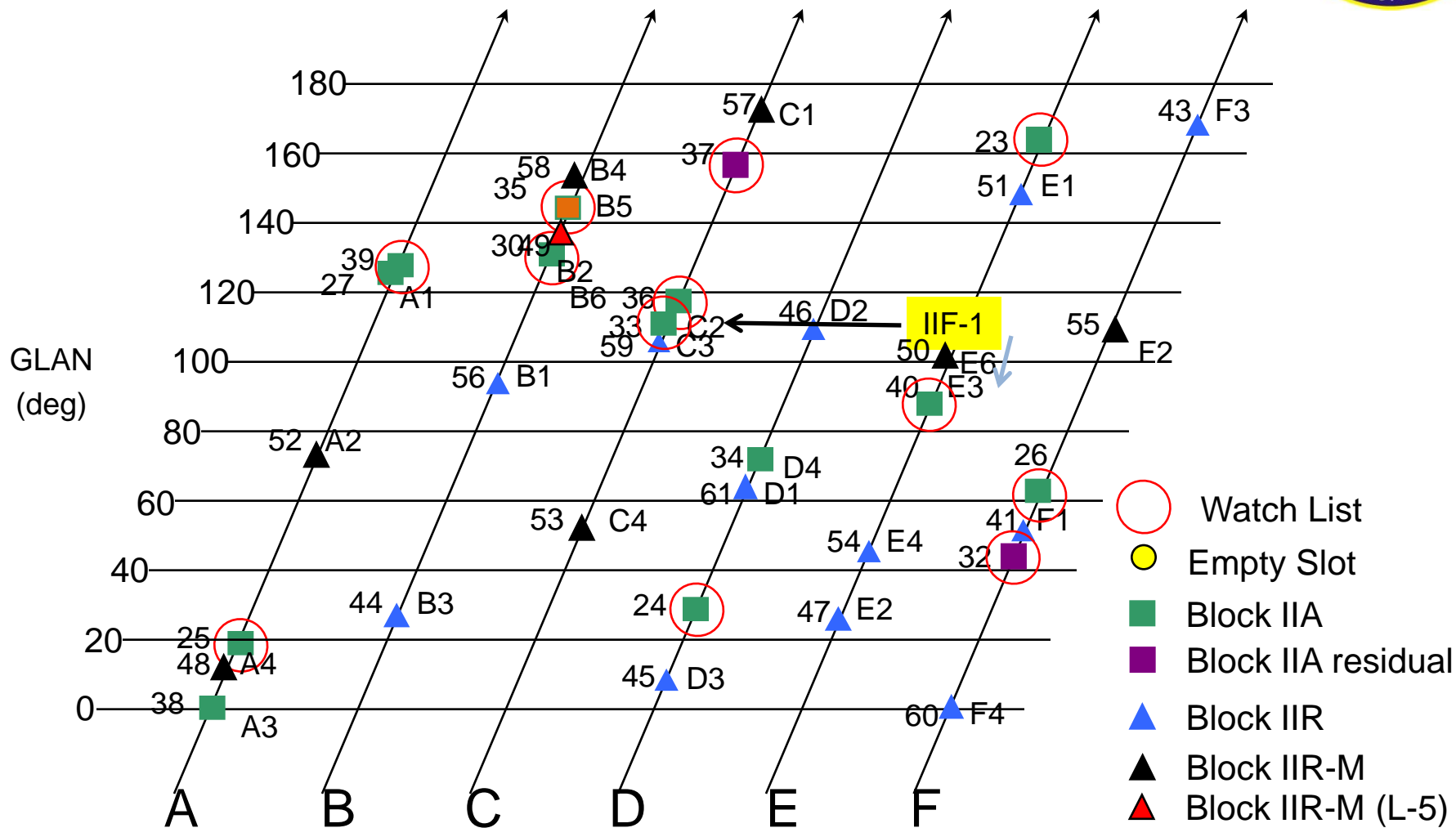
IIR/IIR(M) Clock Status

- No IIR/IIR(M) clock failures to date
- SVN 43:
 - First IIR launch, AFS 3 on for test purposes only
- SVN 44:
 - AFS 1 had a baseplate heater failure
 - Clock is assessed as viable
 - Performance could be slightly degraded during eclipse season
- SVN 61:
 - AFS 3 clock failure
 - Switched to AFS 1

SVN	Clock	Status	Date Active	Total Years in Use
41	AFS 1	On	15-Nov-00	8.84
43	AFS 1	On	13-Aug-97	12.10
	AFS 3	Off	7-Jul-98	0.87
44	AFS 1	Off	10-Aug-00	0.06
	AFS 2	On	14-Aug-00	9.09
45	AFS 3	On	4-Apr-03	6.45
46	AFS 1	On	21-Dec-99	9.74
47	AFS 3	On	24-Dec-03	5.73
48	AFS 3	On	19-Mar-08	1.49
49	AFS 2	On	28-Mar-09	0.47
51	AFS 1	On	17-May-00	9.34
52	AFS 3	On	29-Sep-06	2.96
53	AFS 3	On	29-Sep-05	3.96
54	AFS 1	On	7-Feb-01	8.61
55	AFS 3	On	22-Oct-07	1.90
56	AFS 3	On	6-Feb-03	6.61
57	AFS 3	On	23-Dec-07	1.73
58	AFS 3	On	21-Nov-06	2.82
59	AFS 3	On	24-Mar-04	5.48
60	AFS 2	On	28-Jun-04	5.22
61	AFS 1	On	27-Apr-08	1.39
	AFS 3	Off	10-Nov-04	3.47



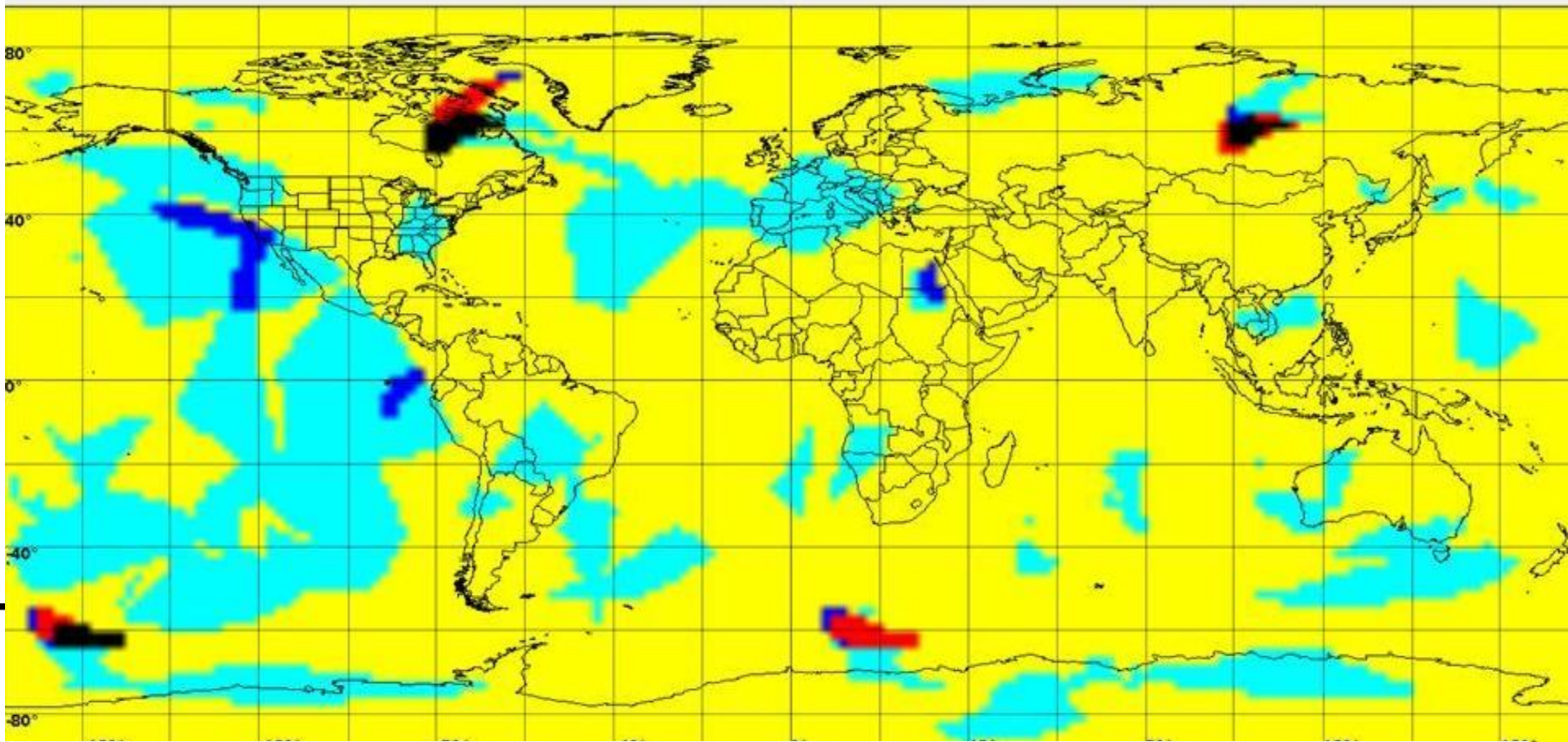
GPS Locations



SVN-26 Rephase Complete: Sept '09



World (Best 4) Max Position Error (m)



Contour Legend		Number of Channels: 4 Mask Angle: 5°	> 20.0 m
Metric: Position Error Max(m)	Start Time: 08 Sep 2008 00:00:00Z		16.0 - 20.0
Production Date: 09/09/2008 05:00:56	End Time: 08 Sep 2008 23:59:00Z	12.0 - 16.0	
Almanac File: SEM week 472	Altitude: 0 ft HAE	8.0 - 12.0	
SOF File: 2008_249_220548_v02	Latitude Increment: 02° 00' 00"	4.0 - 8.0	
PAF File: 2008_252_v03	Longitude Increment: 002° 00' 00"		
PRN: 5 Outage: 05 Aug 2008 23:38:00 to Until Further Notice PRN: 25 Outage: 26 Aug 2008 22:19:00 to Until Further Notice			



Summary



- Navigation and Timing Performance
 - Navigation Performance
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- Constellation Status
- Questions...