

## Maneuver Acceptance Committee : Pre- Apogee Delta-V 2 Checklist

C. Reno

Last Update 6/14/11

Attendees : Chelle Reno, Dave McComas, Bret Hautamaki, Robert Lockwood, Nathan Schwadron, John Scherrer, Ryan Tyler, Debi Knapp, Jim Bobbett, Sheral Wesley, Jeff Godward, John Scherrer, Mark Tapley

Approved	By	Parameter	Info on Page	Limits	Value
	HPS/ Steve Green	ADV1 Performance Assessment (change in tank pressure & propellant consumption, observed vs predicted)	9		94.79%
	FDG	ADV1 Performance Assessment (% hot/cold) based on OD	9		91.99%
	FDG	Thrust Efficiency Scale Factor	9		0.9685
	FDG	Current OD Uncertainty	8	Within ground station FOV for post spin-up passes	16km apogee 19km perigee
	FDG	Target Orbit Period Uncertainty (Napoleon plot)	10-11, 28	No >4h eclipses	
	FDG	Orbit Period	17, 22		
	FDG	No Additional Delta-V Burn Trajectory	29	Just for comparison	
	FDG	No ADV2 Burn Trajectories	30,	Decide on backup plan	
	FDG	Helionose Progression	18, 23	Clockwise	
	FDG	Apogee Radius	19, 24	Always <= 55Re geoc.	
	FDG	Perigee Radius	20, 25	Always >= 3Re geoc.	
	FDG	Quicklook Communications Analysis - only if there is a major difference in perigee profiles	N/A	Miss 3dB link margin for >1 perigee in a row for 10 years	
	FDG	Apogee & Perigee Times	13-14, 51	N/A	
	FDG	Crossing Times	52-67	N/A	
	FDG	Viewperiods Report	68-70	Contacts Still Valid	
	MOC	SAP		Contacts Still Valid	No change in coverage
	MOC	USN Coverage for ADV2		N/A	Yes
	MOC	USN Coverage for ADV3		Available at time of MAC	Yes
	MOM	Time of ADV2 (6/16 1900 UTC)	31	In viable viewperiod	
	FDG	Duration of ADV2 Burn (600s)	31	600s - no tolerance	

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	MOM	Time of ADV3 (6/17 1100 UTC)	31	In viable viewperiod	
	FDG	Duration of ADV3 Burn (580 s)	11, 31	Up to 600s	580s
	MOC	ADV2 & ADV3 ATS		N/A	
	SYS, ACS, MOC, MOM, PM, ISOC, FDG	Approved ADV2 & ADV3 ATS (prior to MAC)		N/A	
	SYS, MOC, MOM, PM, ISOC, FDG	Approved Contact ATS (prior to MAC)		Command Limit Constraints not violated (<240 commands)	
	SYS	ACS TLM (from contact before MAC)	34,48-50	GREEN	
	SYS	HPS TLM (from contact before MAC)	35-40	GREEN	
	SYS	EPS TLM (from contact before MAC)	43-47	GREEN	
	SYS	SCB TLM (from contact before MAC)	33,41-42	GREEN	

S/C State as of pass prior to MAC:

Sun Angle Range 15.7 – 25.1    Expected Sun Angle \_\_\_\_\_ tol +/- 1 degree (quaternions) - provide running plot of sun pointing angle  
 Spin Rate 22.48 rpm    Expected Spin Rate 22    tol. +/- 1 rpm

ADV1 Maneuver Success Criteria :

Correct Polarity	<u>  Y  </u>	
Maneuver Completed at Specified Time	<u>  Y  </u>	Maneuver duration: 600 sec
End of burn pressure within limits	<u>  Y  </u>	
Cat bed heaters 5N & 22N on & off	<u>  Y  </u>	
Nutation damping pulses	<u>  N  </u>	
Spin down pulses	<u>  N  </u>	

SCB State   Housekeeping    
 CEU Mode   Off    
 FC Mode   Mission

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ACE Mode High Rate

EPS Mode Normal

Star Tracker Off

ACS Low Rate Sensor Accel

Fuel used Table : Grey boxes do not have meaningful values - leave blank \* Minimal accuracy

Immediately before/after maneuver	Tank 1 Pres (SYS) psi		Tank 1 Temp (SYS) °C		Tank 2 Pressure (SYS) psi		Tank 2 Temp (SYS) °C		Delta-V (FDG) m/s			Fuel Use (SYS, FDG, MT) kg		Fuel Remaining (SYS, FDG, MT) kg		
	Est	Obs	Est	Obs	Est	Obs	Est	Obs	Est	Recon	OD	Recon	OD*	Est	Obs	
Pre-Repointing		173.43		18.82		173.14		20.05							16.41	
Post-Repointing	173.43	172..85	18.82	18.33	173.14	172.75	20.05	19.31				0.004		16.41	16.514	
Pre-Spin Up	173.43	172..85	18.82	18.33	173.14	172.75	20.05	19.31						16.41	16.514	
Post-Spin Up MT - top <b>JG - bottom</b>	171.66	172.55 <b>172.7</b>	18.82	18.9 <b>19.07</b>	171.35	172.55 <b>172.41</b>	20.05	20.7 <b>21.29</b>				0.197		16.21	16.408 <b>16.27</b>	
Pre-ADV1 MT - top <b>JG - bottom</b>	172.18 <b>172.70</b>	<b>171.75</b>	18.585 <b>19.07</b>	<b>17.93</b>	171.88 <b>172.41</b>	<b>171.47</b>	19.696 <b>21.29</b>	<b>18.98</b>						16.403 <b>16.27</b>	<b>16.31</b>	
Post-ADV1 MT - top <b>JG - bottom</b>	<b>140.28</b>	142.21 <b>142.09</b>	<b>18.82</b>	18.47 <b>17.95</b>	142.21 <b>140.28</b>	<b>141.83</b>	<b>20.05</b>	19.25 <b>18.58</b>	97.93 <b>103.1</b>			3.975 <b>4.17</b>		12.43 <b>12.04</b>	12.43 <b>12.30</b>	
Pre-ADV2 MT - top <b>JG - bottom</b>	142.21 <b>142.09</b>		18.47 <b>17.95</b>		142.21 <b>141.83</b>		19.25 <b>18.58</b>							12.43 <b>12.30</b>		
Post-ADV2 MT	121.24		18.82		121.24		20.05		94.16			3.67		8.37		
Pre-ADV3 MT	121.24		18.82		121.24		20.05							8.37		
Post-ADV3 MT	111.0		18.82		111.0		20.05		67.62			2.52		5.85		
Pre-Spin Down	111.0		18.82		111.0		20.05							5.85		
Post-Spin Down	110.01		18.82		110.01		20.05					0.197		5.65		
Pre-Repointing	110.01		18.82		110.01		20.05							5.65		

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Post-Repointing	110.0		18.82		110.0		20.05					0.006		5.65	

Table Change History (date, person, change):

6/13, JG

Input pre-ADV1 observed pressure, temperature, fuel remaining (average over 159:19:43:05 – 159:19:59:59)

Input post-ADV1 observed pressure, temperature, fuel remaining (average over 160:05:01:24 – 160:05:59:56)

Input pre-ADV2 estimated pressure, temperature, fuel remaining

Approvals By :

Y \_\_\_ Dave McComas

John Scherrer

Y \_\_\_ Nathan Schwadron

Y \_\_\_ Chelle Reno

Y \_\_\_ Mark Tapley

Y \_\_\_ Robert Lockwood

Y \_\_\_ Ryan Tyler

Y \_\_\_ Bret Hautamaki

Y \_\_\_ Jim Bobbett

Y \_\_\_ Jeff Godward

Y \_\_\_ Tim Perry

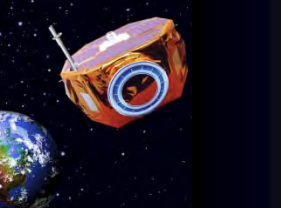
Y \_\_\_ Sheral Wesley

Y \_\_\_ John Carrico

Lisa Policastri

Ryan Lebois

Y \_\_\_ Marissa Intelisano



# IBEX Operations Pre-ADV2 Status

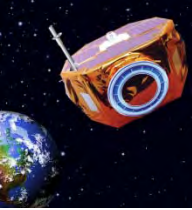
Flight Dynamics Group

*IBEX.FDG@AppliedDefense.com*

*John Carrico, Lisa Policastri, Ryan Lebois, Marissa Intelisano*

**14 Jun 2011**

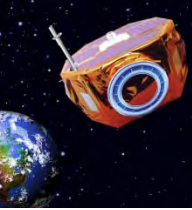
***2011 Day 165***



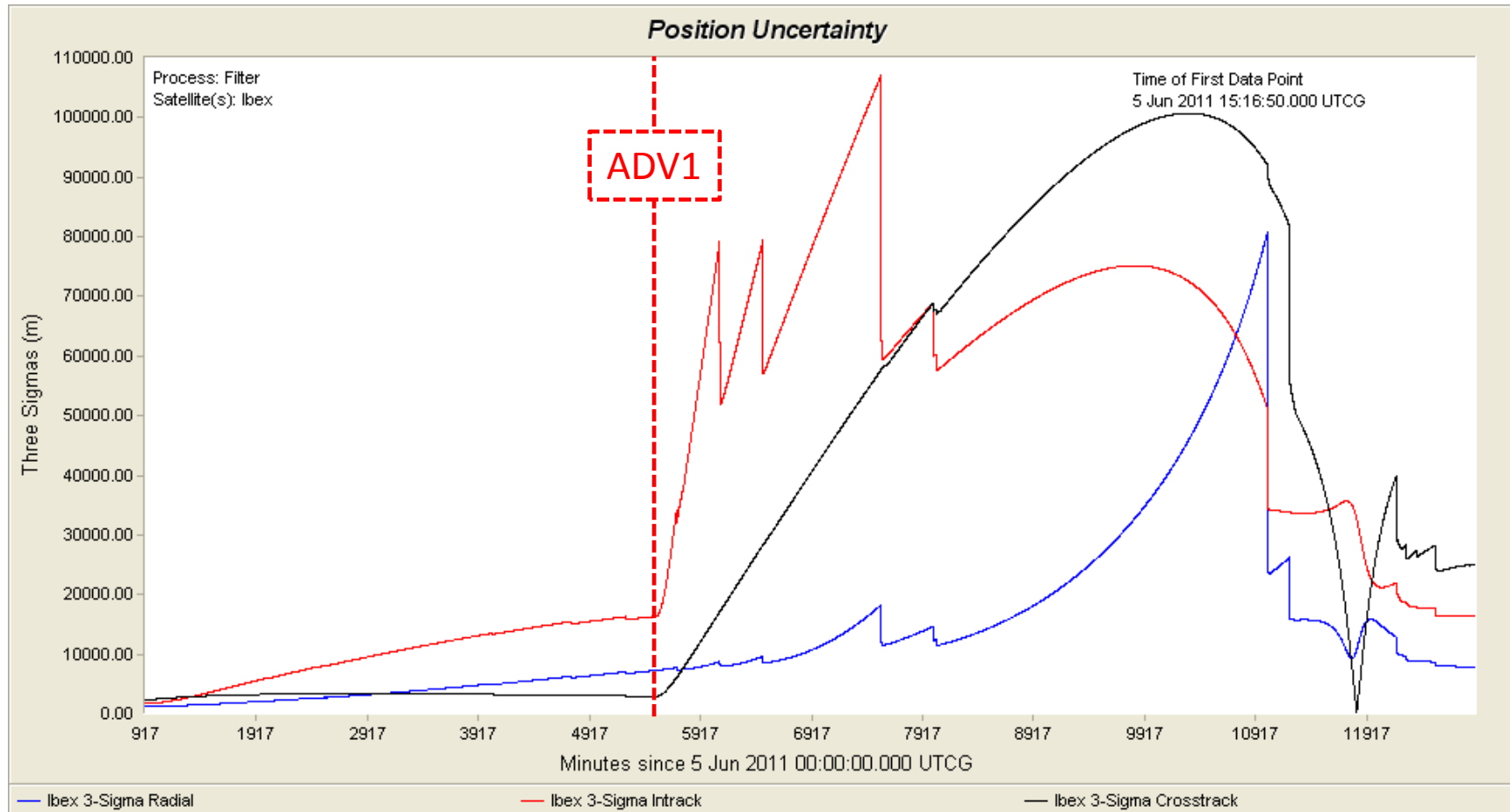
# Contents

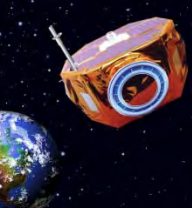


- Orbit Status
- ADV1 Performance
- Shadow Uncertainty Predictions
- Current Burn Plan
- Acquisition Check
- Fuel Estimate
- Orbit Evolution
- Hyper-Cube Check
- No Burn/No ADV3 Scenarios



# Post-ADV1 Uncertainty

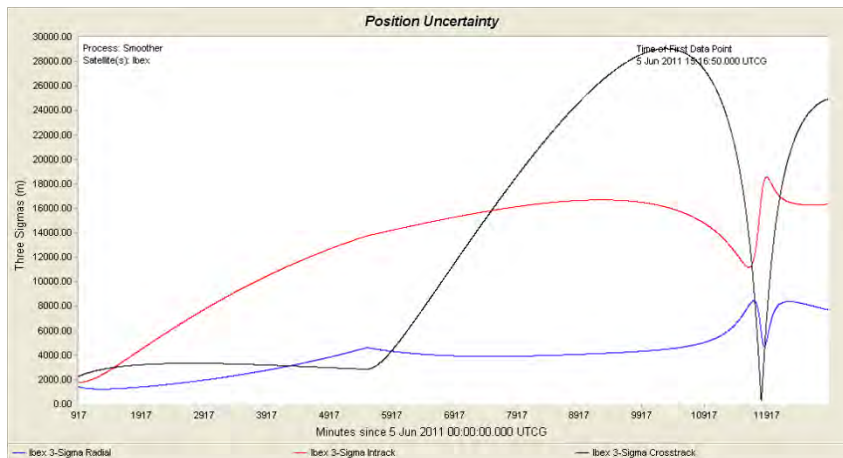




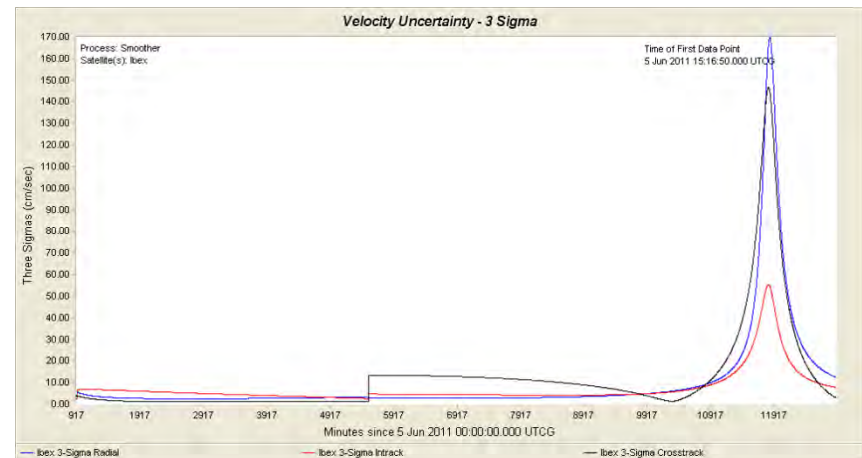
# Current Orbit Uncertainty



## 3-sigma Position Uncertainty

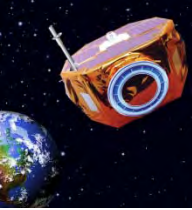


## 3-sigma Velocity Uncertainty



- The definitive 3-sigma uncertainty values are elevated but remain converged
  - In-track 3-sigma position uncertainty at apogee ~ 16 km
  - In-track 3-sigma position uncertainty at perigee ~ 19 km



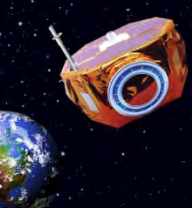


# ADV1 Performance

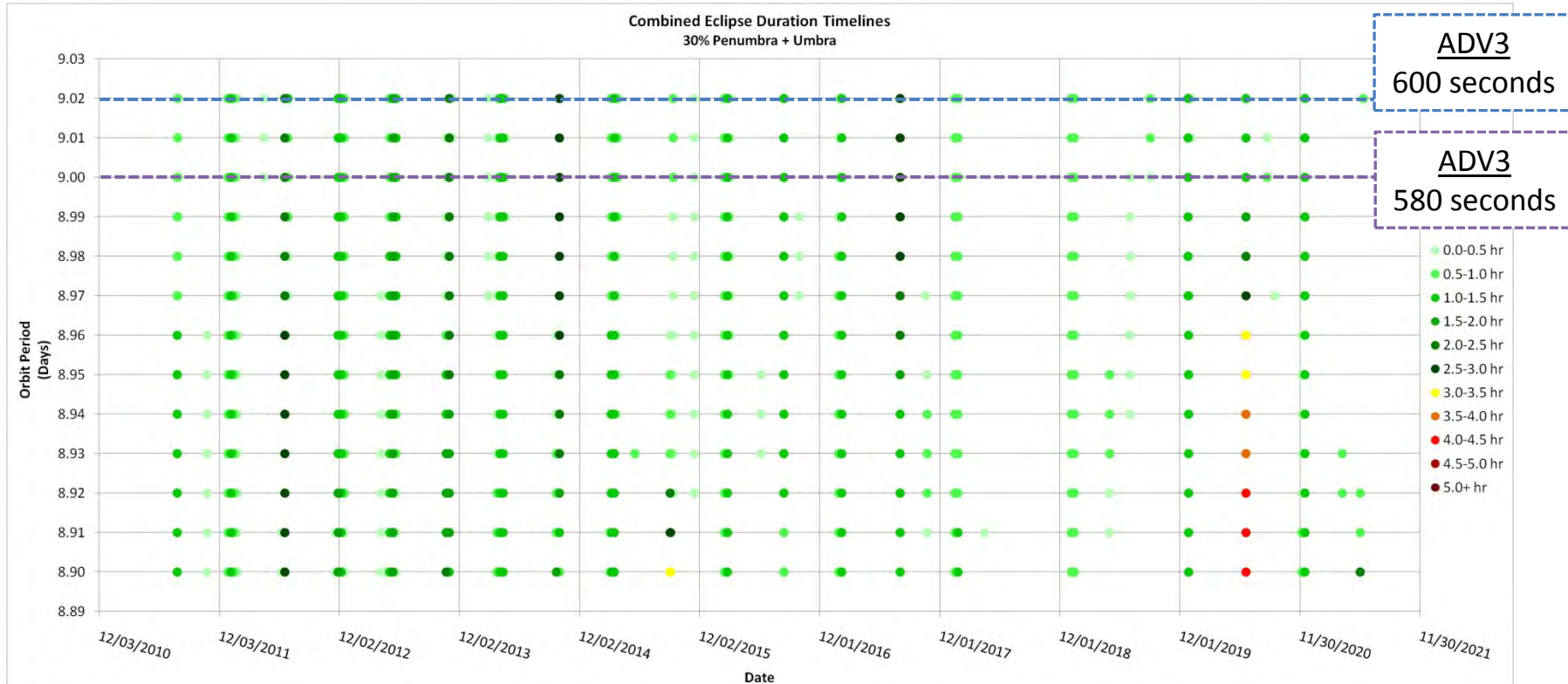


	Predicted	Observed	Difference ((O-P)/P)
Fuel Use (kg)	4.188	3.970	-5.21 %
Delta-V (m/s)	103.136	94.871	-8.01 %

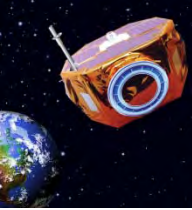
- **Updated Sinda Simulation:**
  - Scaled previous model to account for “flow restriction”
  - Aligned model with PVT estimate for fuel used
- **Calculated an Efficiency Scale Factor:**
  - Orbit Determination calculated a Thrust Efficiency Factor = 0.9685
  - Applied efficiency to new Sinda thrust tables to align model with OD estimate for delta-V



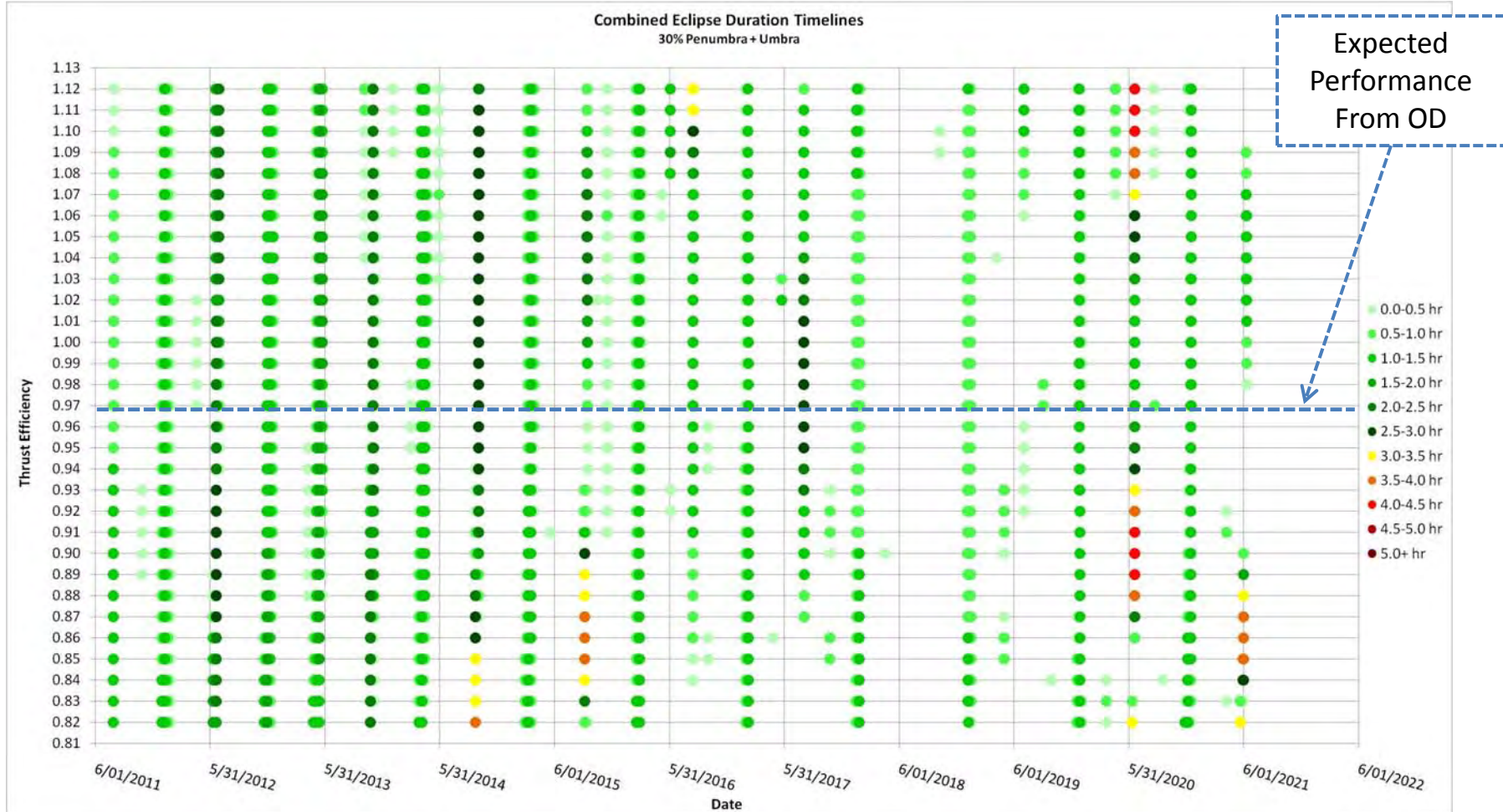
# Orbit Period Target



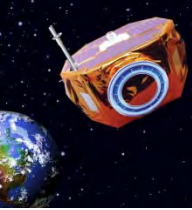
- Mass flow during ADV3  $\sim 0.005$  kg/s
  - Lowering target saves  $\sim 0.1$  kg fuel (0.5 year re-pointing)
- **ADV3 duration selected to be 580 seconds**



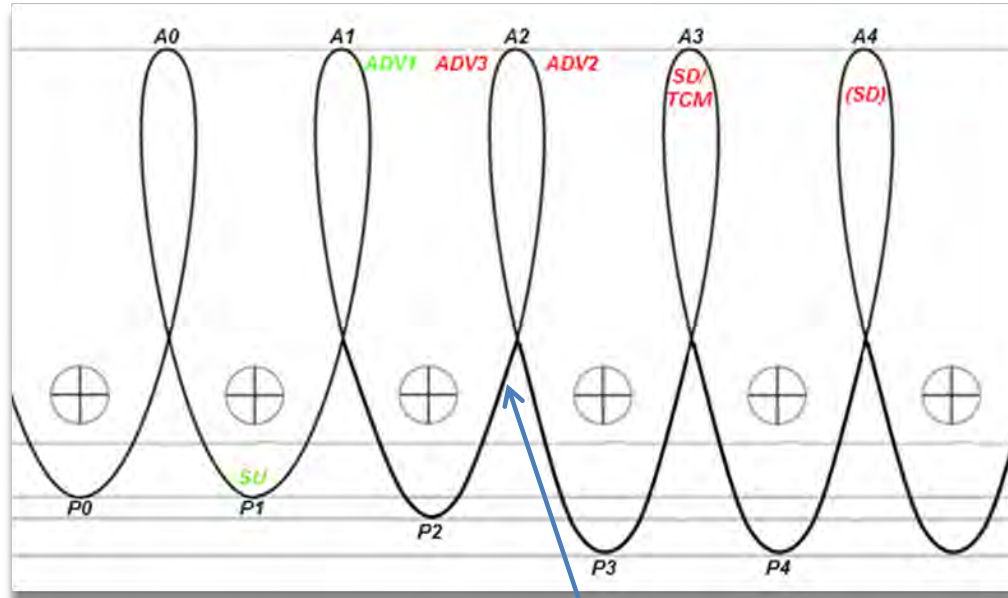
# Thrust Efficiency



- Thrust Efficiency applied to 600 second ADV2 & 580 second ADV3

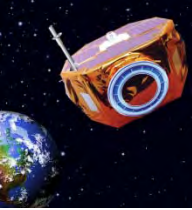


# Current Burn Plan



Current Location

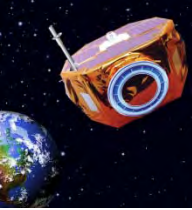
- ADV2 Ignition = 16 Jun 2011 19:00 UTCG
  - ADV3 Ignition = 17 Jun 2011 11:00 UTCG
  - Spin-down = 24 Jun 2011 09:00 UTCG
  - Re-point = 24 Jun 2011 15:30 UTCG
- } A2
- } A3



# Last Orbit



- Apogee 1 (A1)
  - A1 time: 09 Jun 2011 04:42 UTCG
  - A1 radius: 48.73 Re
- Perigee 2 (P2)
  - P2 time: 13 Jun 2011 05:11 UTCG
  - P2 radius: 4.41 Re

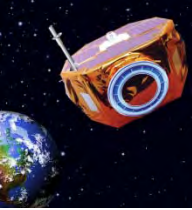


# Next Orbit



- Apogee 2 (A2)
  - A2 time: 17 Jun 2011 04:49 UTCG
  - A2 radius: 48.43 Re
- Perigee 3 (P3)
  - P3 time: 21 Jun 2011 14:43 UTCG
  - P3 radius: 8.27 Re

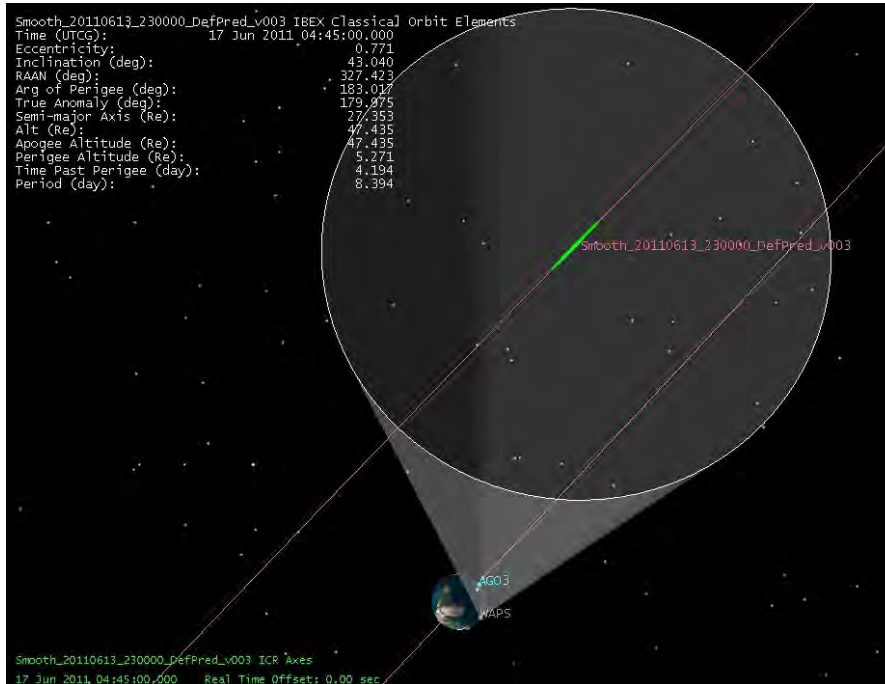




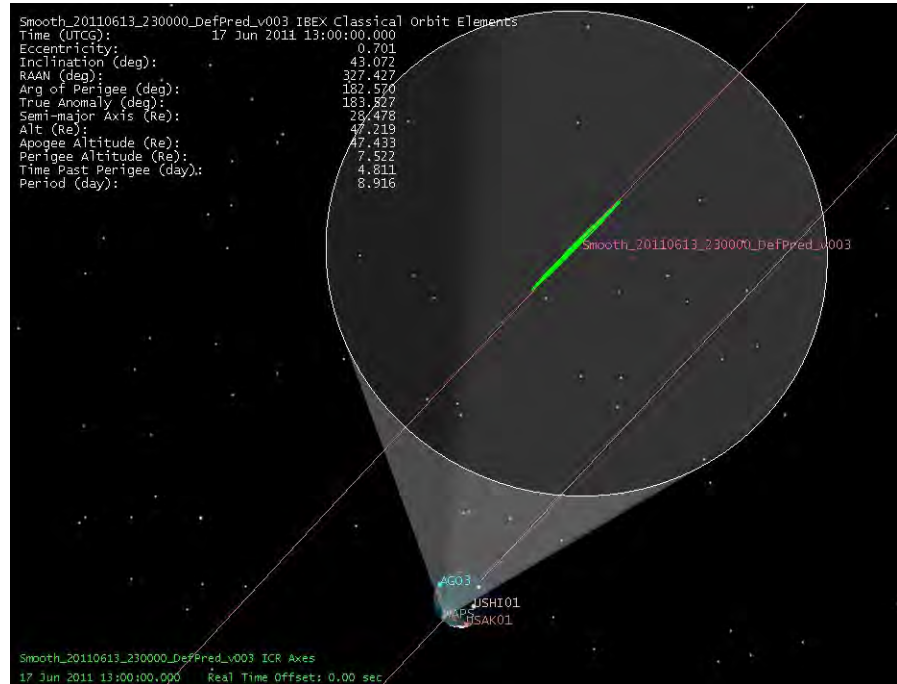
# Acquisition Check



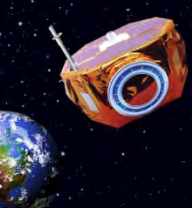
## Post-ADV2



## Post-ADV3



- Left image shown at the time of first AOS post-ADV2
  - APL – 17 Jun 2011 04:45 UTCG
- Right image shown at the time of first AOS post-ADV3
  - APL – 17 Jun 2011 13:00 UTCG
- Predicted orbit uncertainty (with 5% 1-sigma uncertainty on ADV2 & ADV3) is entirely within the station FOV for both contacts



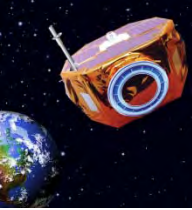
# Current Fuel Estimate



State	Fuel Mass (kg)	Wet Mass (kg)
Pre-ADV1	16.31	94.95
Pre-ADV2	12.30	90.94
Pre-ADV3	8.79	87.43
Pre-Spindown	5.71	84.35
Pre-Repaint	5.51	84.15
Final	5.33	83.97

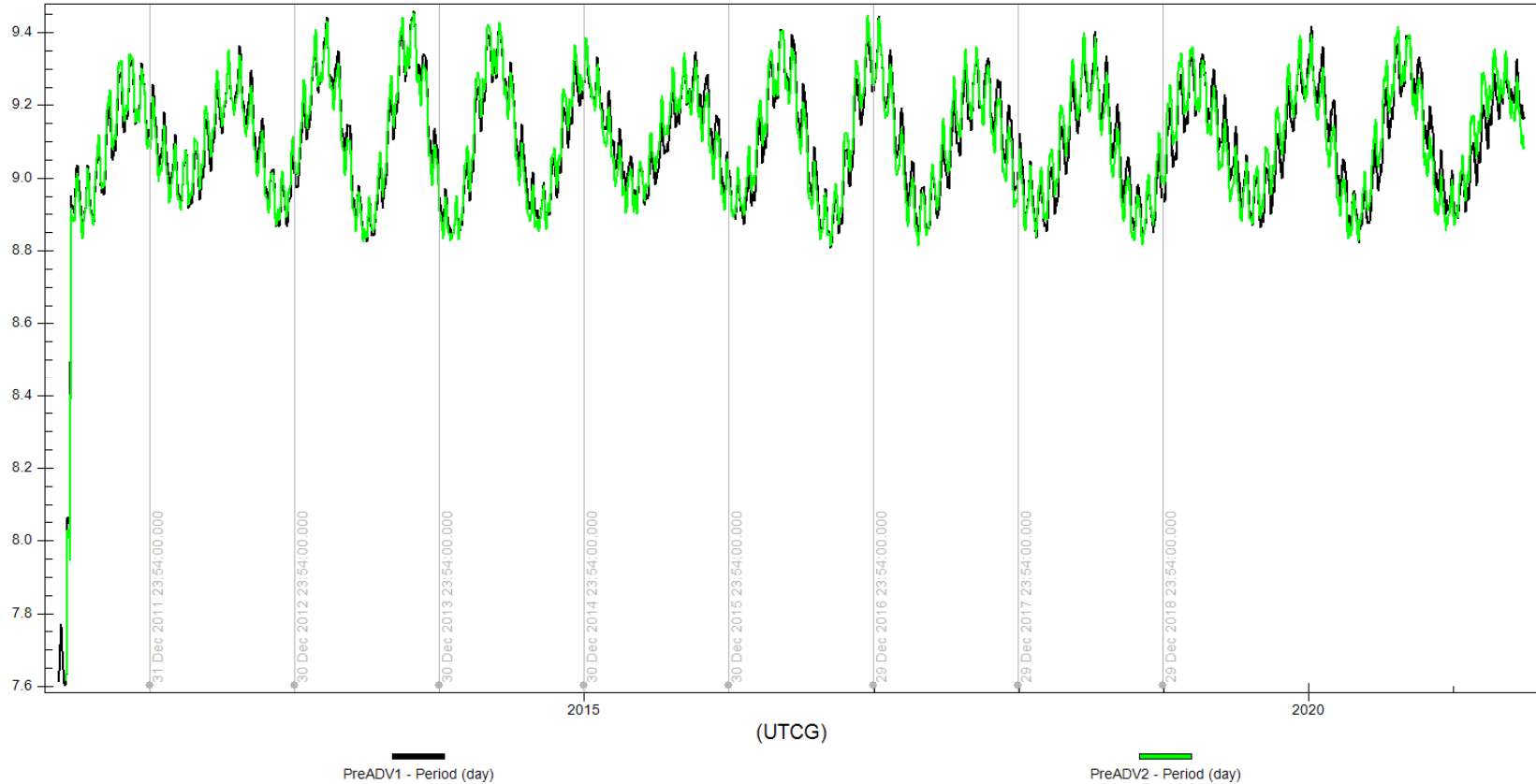
- Last Blue line indicates the current fuel estimate used for planning
  - PVT estimate from HPS
- Yellow lines indicate estimated values throughout the burn sequence
  - Sinda mass flow predictions



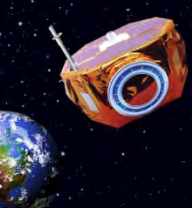


# Orbit Period Evolution

Satellite-PreADV1, PreADV2 - 14 Jun 2011 00:41:38



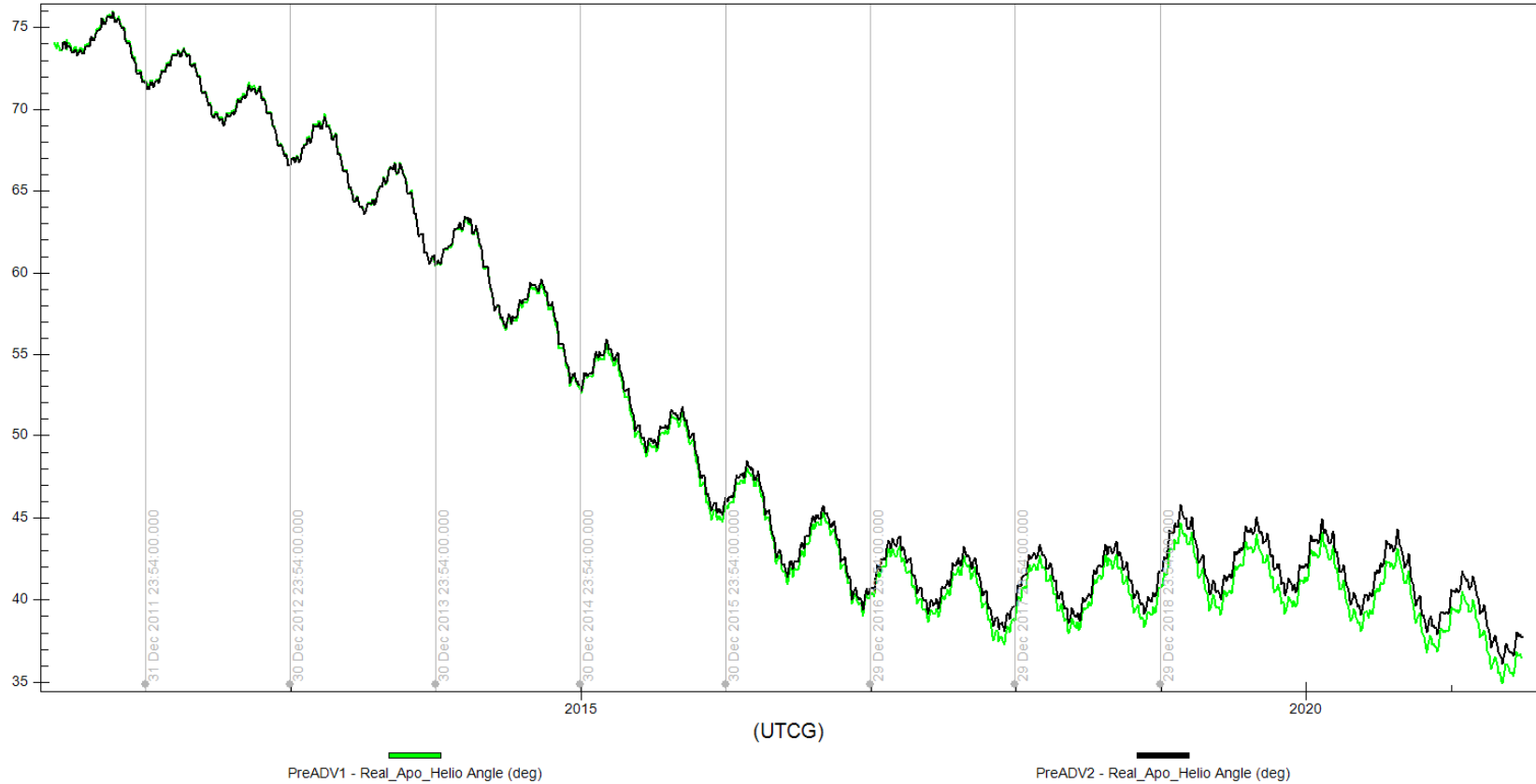
- The orbit period locks into an oscillation about 9.1 days as planned (P/3 orbit)
  - Pre-ADV1 Plan = Black
  - Pre-ADV2 Plan = Green



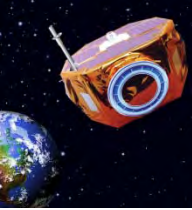
# Apogee-Helionose Evolution



Satellite-PreADV1, PreADV2 - 14 Jun 2011 00:40:52

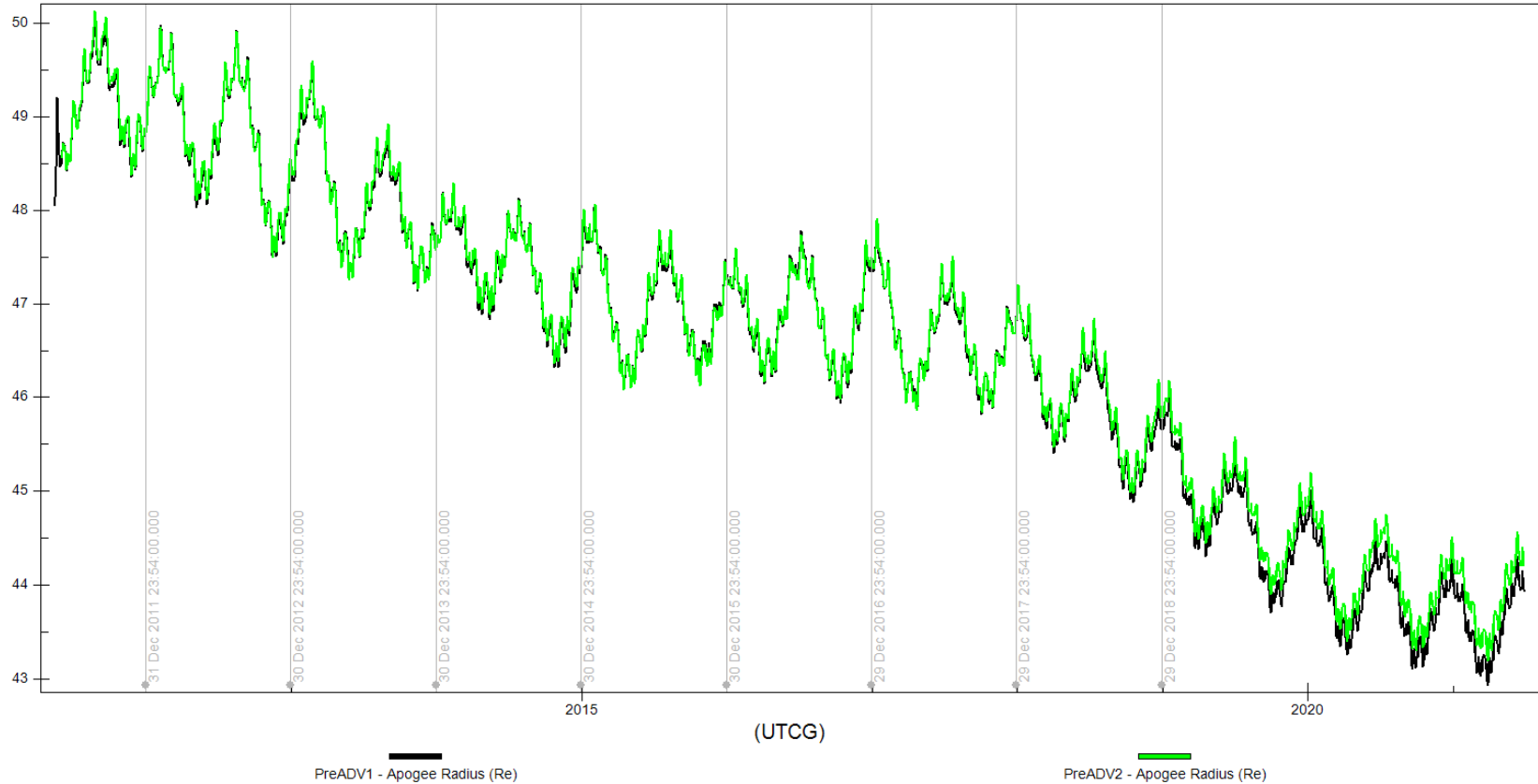


- The Apogee-to-Helionose angle evolves counter-clockwise as desired

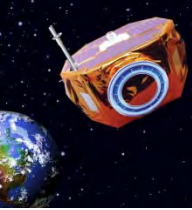


# Apogee Radius Evolution

Satellite-PreADV1, PreADV2 - 14 Jun 2011 00:39:36

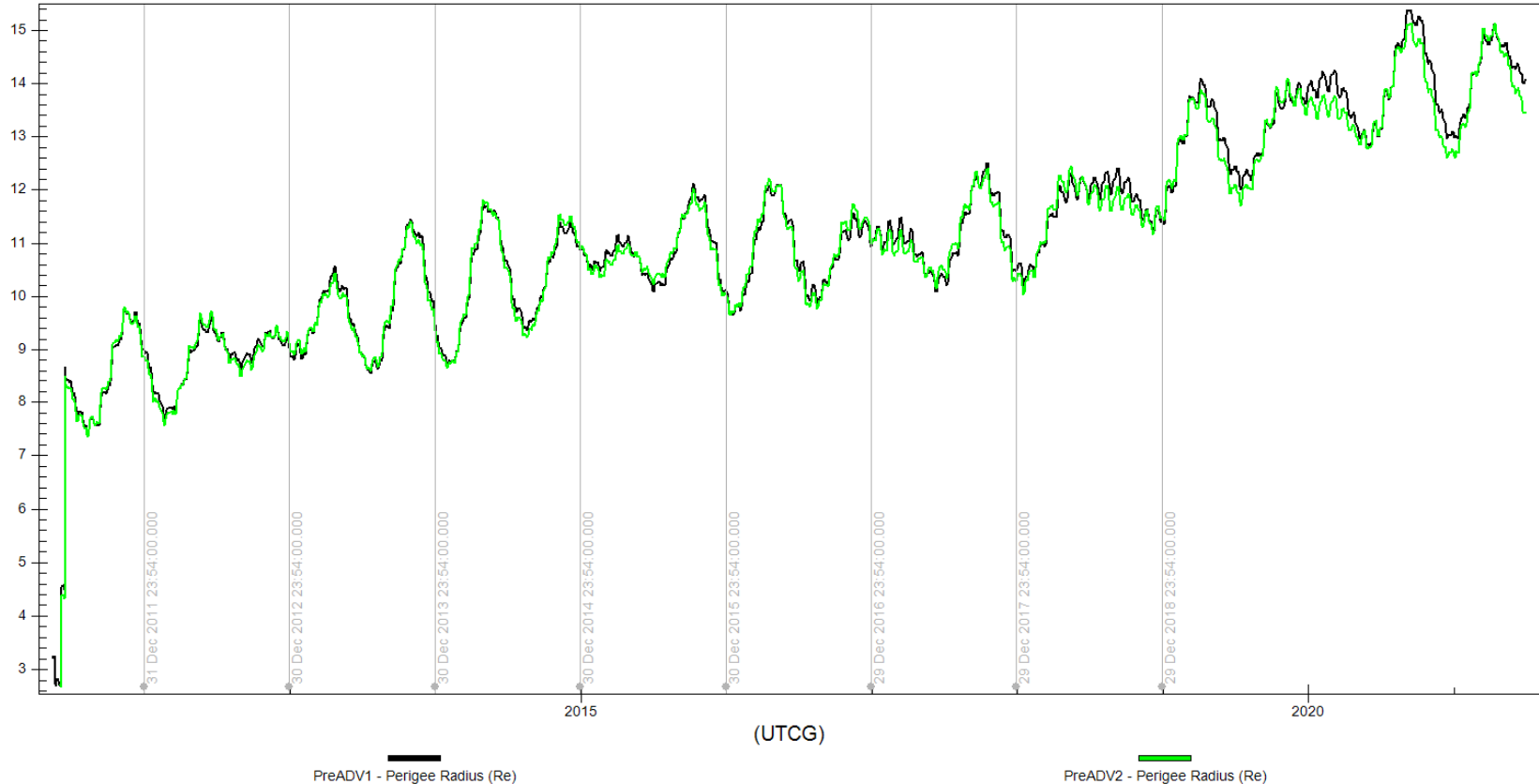


- The apogee radius does not evolve above 55 Re
  - These trajectories are within the bounds of those analyzed and approved

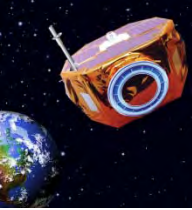


# Perigee Radius Evolution

Satellite-PreADV1, PreADV2 - 14 Jun 2011 00:42:27



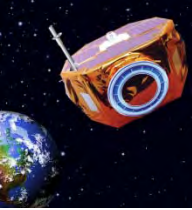
- The perigee radius does not evolve **below** 7 Re
  - Limited radiation dosing and above the Geo-Belt
- The perigee radius does not evolve **above** 16 Re
  - Upper limit of current communications analysis



# Hyper-Cube Inputs



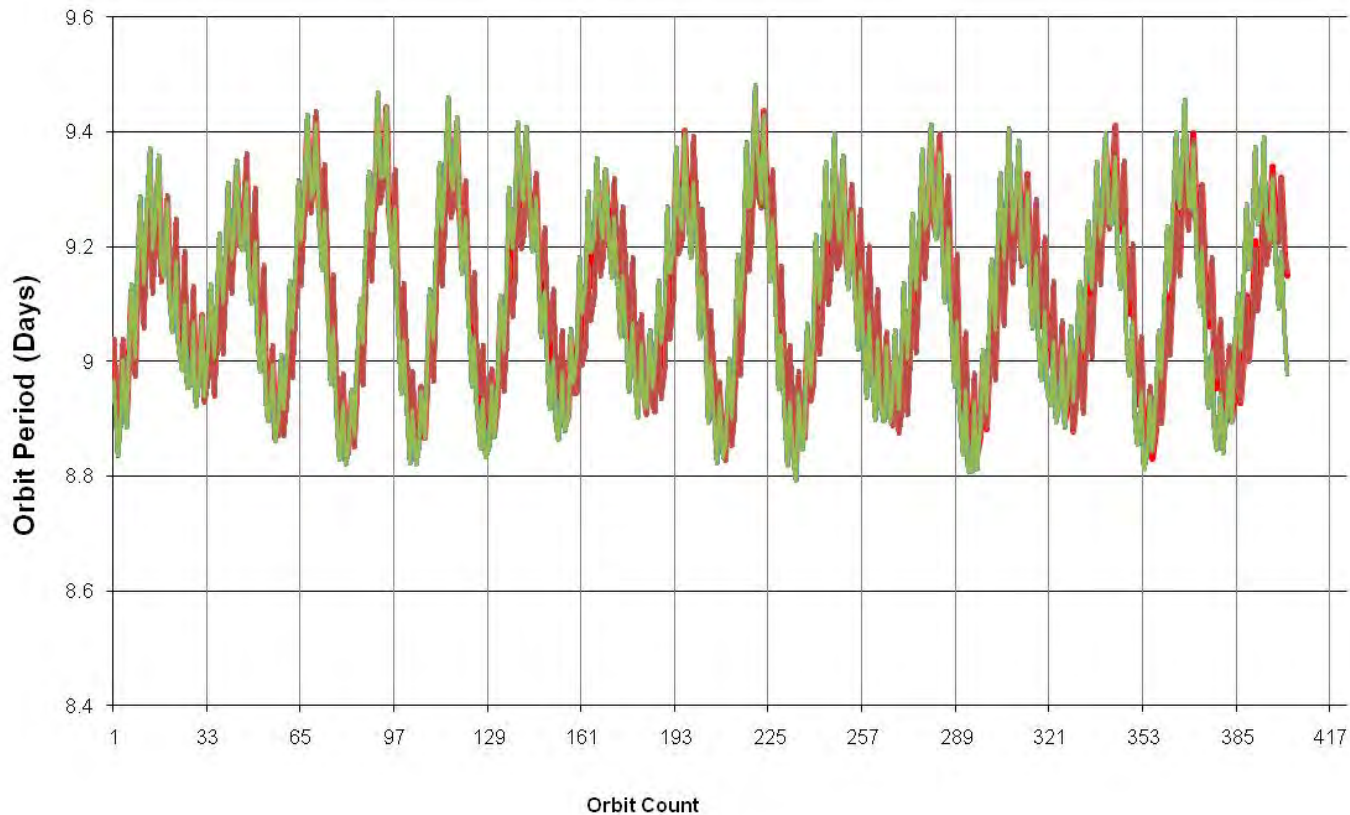
- Orbit State and Covariance from OD
- Uncertainty of ADV2 & ADV3 thrust performance (3 %)
- Uncertainty in twice-an-orbit attitude re-pointing maneuvers (2 %)

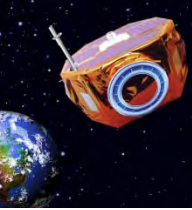


# Hyper-Cube: Orbit Period



IBEX Hyper-Cube Orbit Period History (128 Runs)

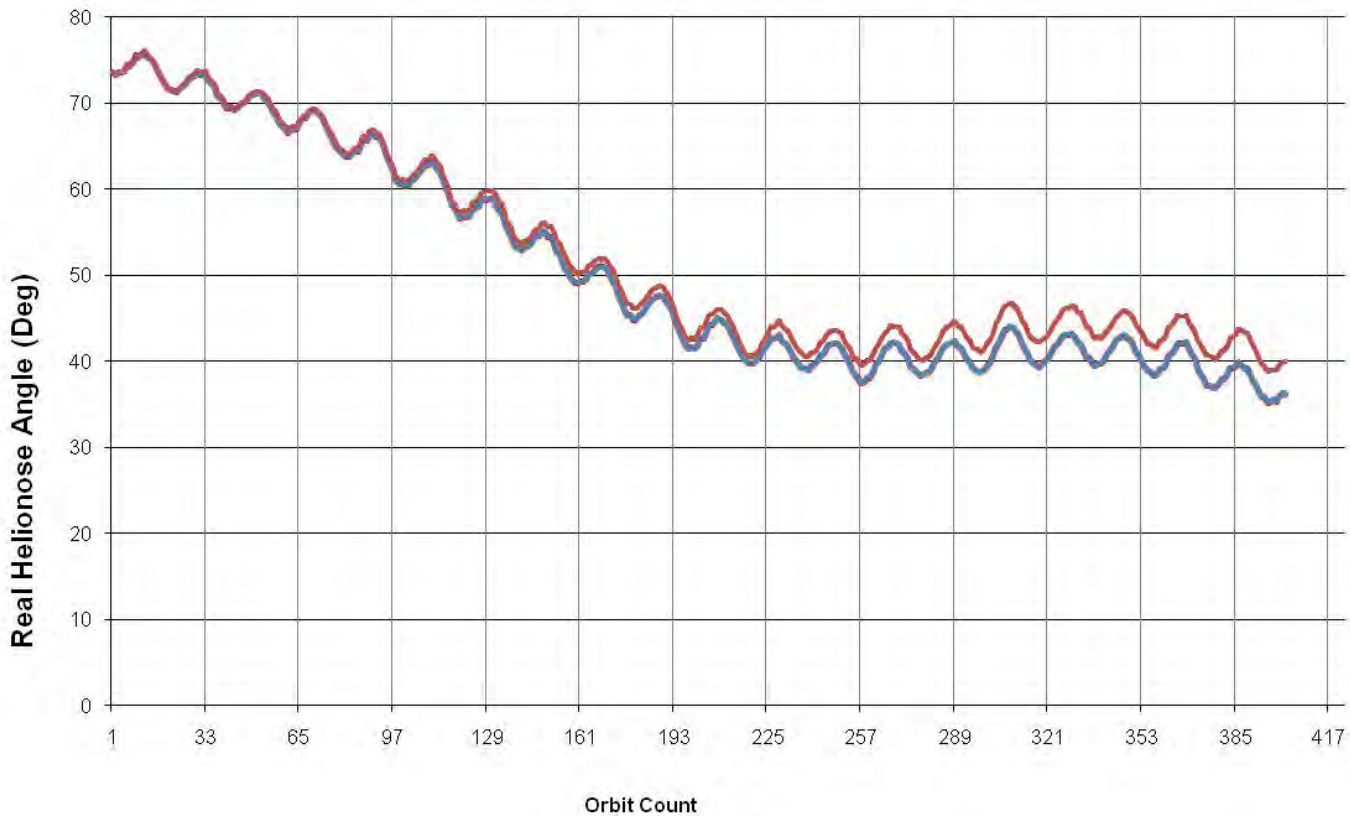


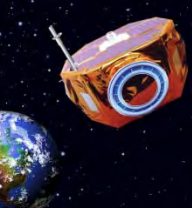


# Hyper-Cube: Helionose



IBEX Hyper-Cube Real Helionose Angle History (128 Runs)

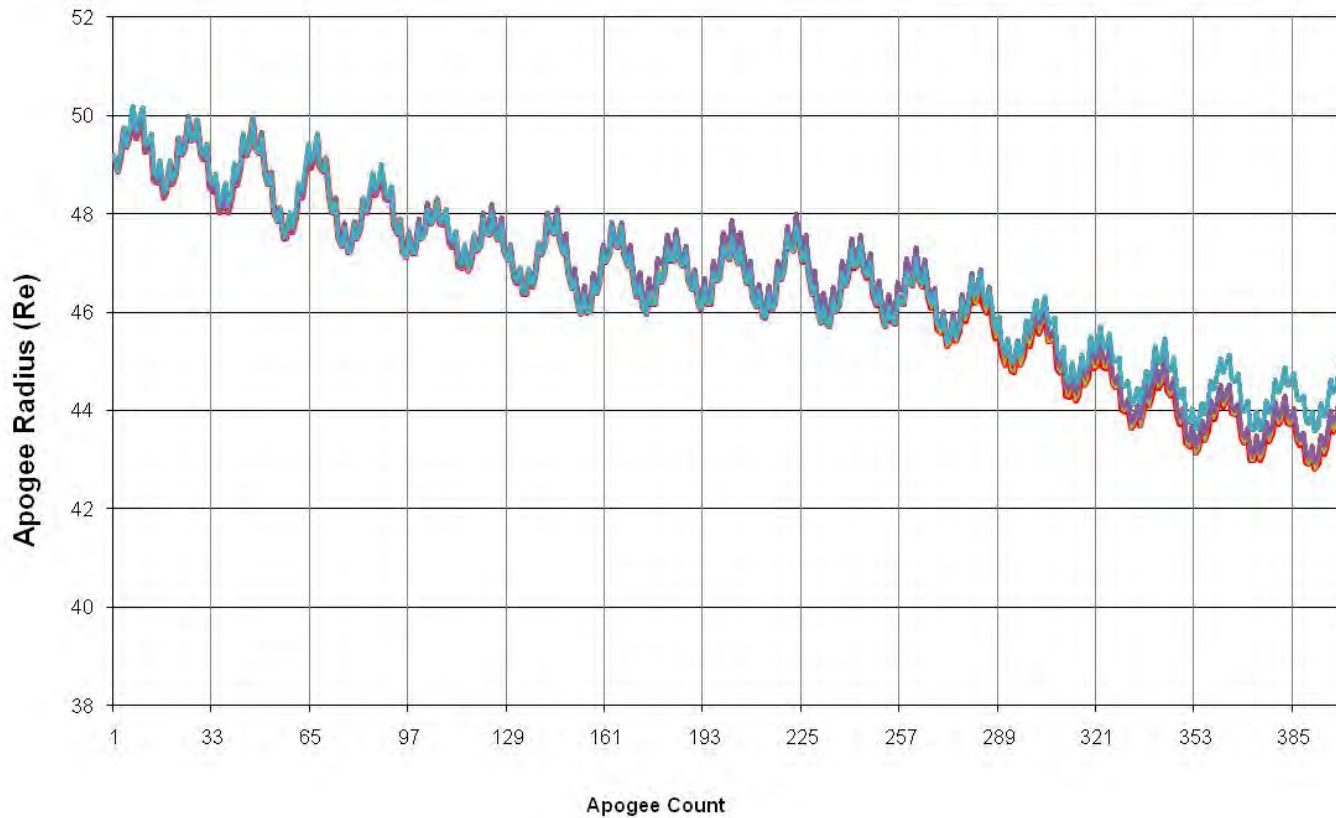




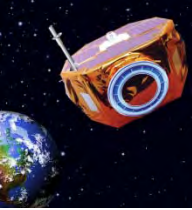
# Hyper-Cube: Apogee



IBEX Hyper-Cube Apogee History (128 Runs)



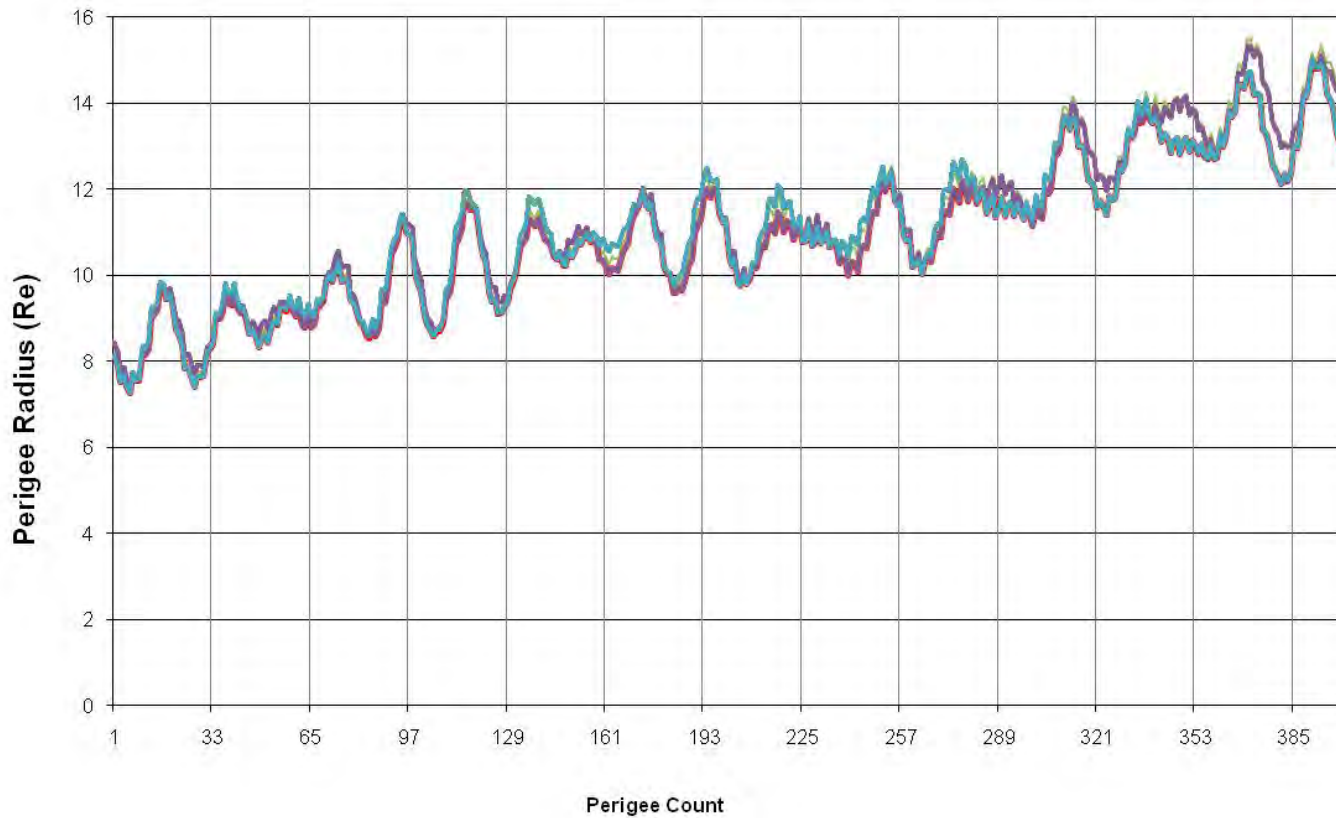


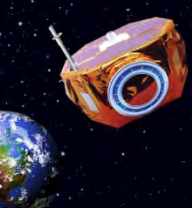


# Hyper-Cube: Perigee



IBEX Hyper-Cube Perigee History (128 Runs)

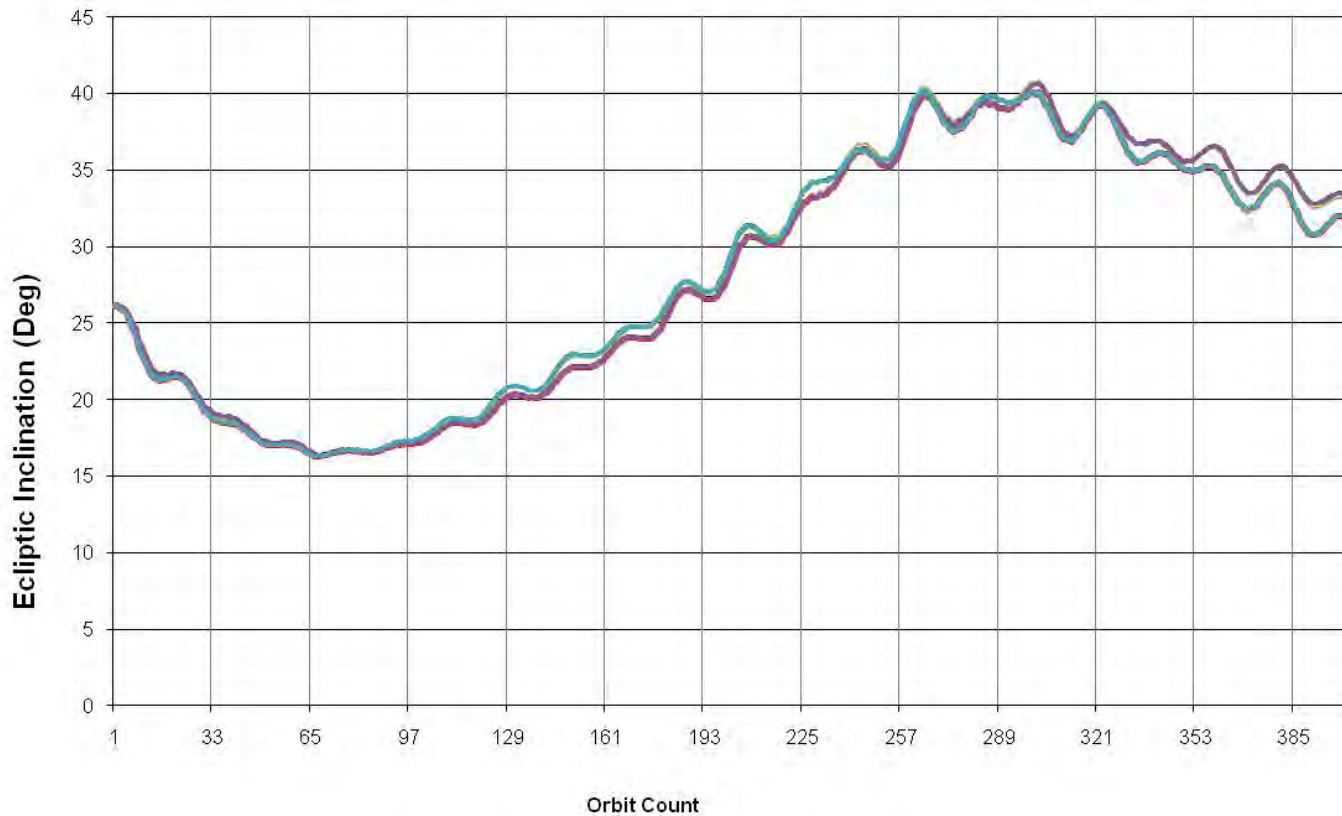


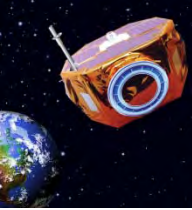


# Hyper-Cube: Ecliptic Inclination



IBEX Hyper-Cube Ecliptic Inclination History (128 Runs)

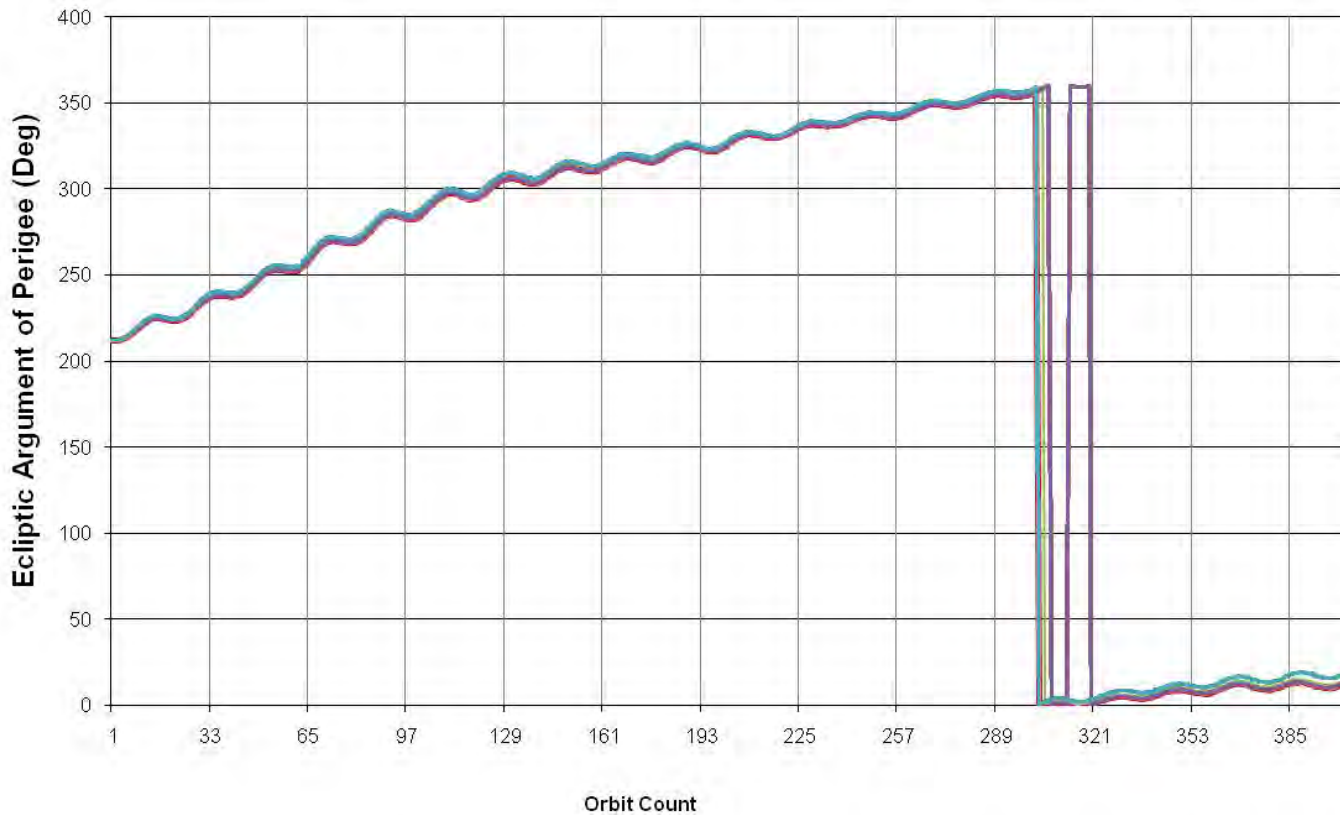


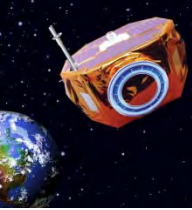


# Hyper-Cube: Argument of Perigee

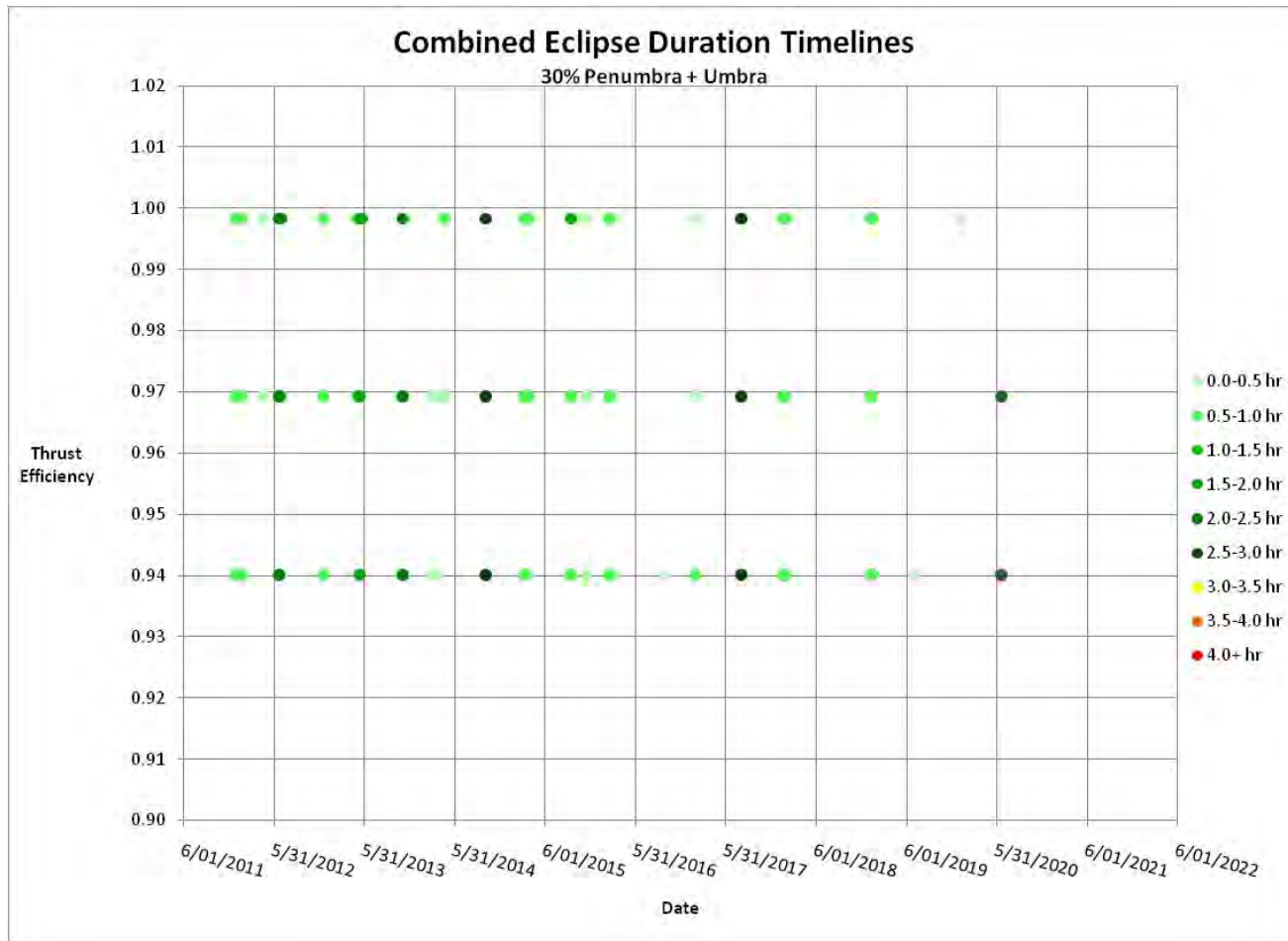


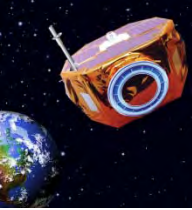
IBEX Hyper-Cube Ecliptic Argument of Perigee History (128 Runs)





# Hyper-Cube: Eclipses

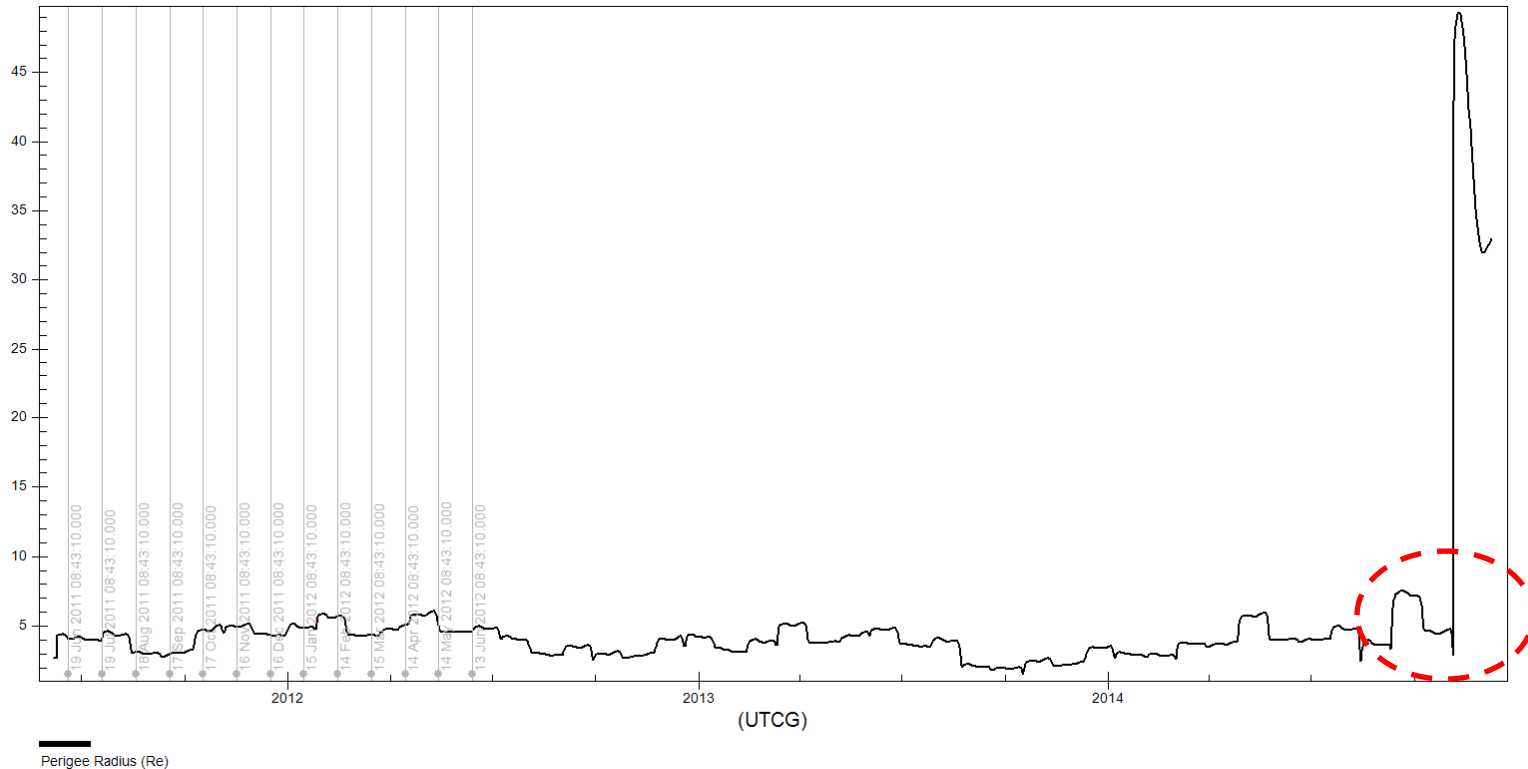




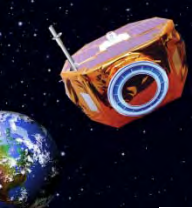
# No Burn Sequence



Satellite-PreADV2\_NoBurn - 14 Jun 2011 00:51:09

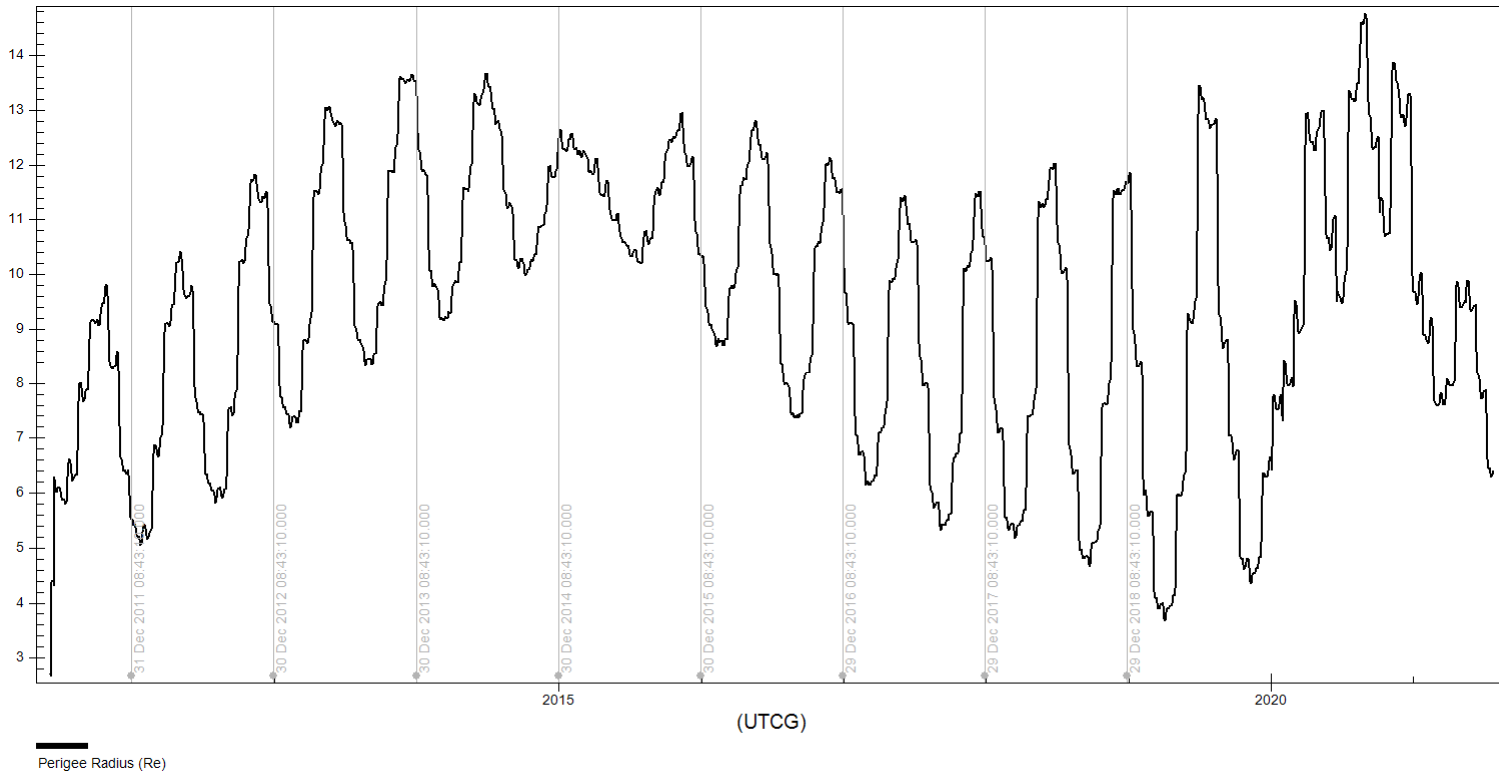


- If ADV2 and ADV3 are both waived:
  - IBEX experiences a 4.03 hour eclipse (Umbra + 30% Penumbra) in Oct 2014
  - IBEX begins to exit Earth orbit in December 2014

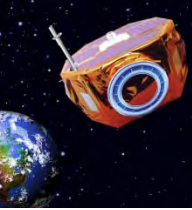


# No ADV3 Sequence

Satellite-PreADV2\_NoADV3 - 14 Jun 2011 00:52:10



- If ADV2 performs nominally, but ADV3 is waived:
  - IBEX perigee radius behaves acceptably for 10 years
  - IBEX experiences a 4.15 hour eclipse (Umbra + 30% Penumbra) in Sep 2014
  - IBEX experiences additional 4+ hour eclipses in: Sep 2018, Sep 2019, & Jan 2021

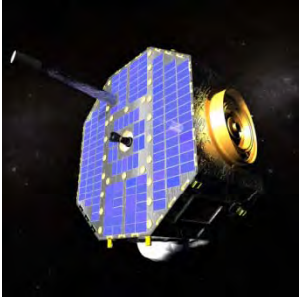


# Summary



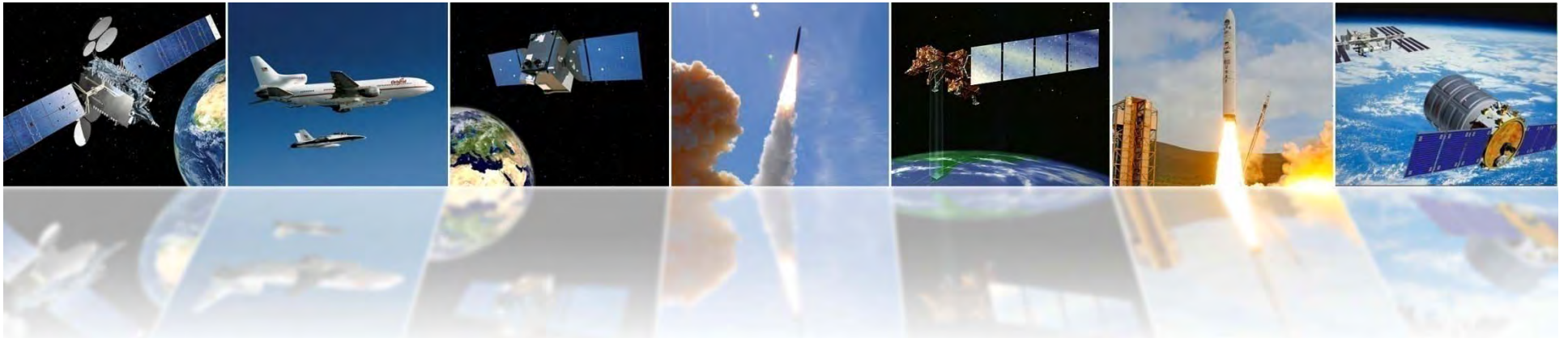
- The current orbit meets design criteria to continue as planned
- The current burn plan specifies the following:
  - **ADV2 Ignition** = 16 Jun 2011 19:00 UTCG Duration = 600 sec
  - **ADV3 Ignition** = 17 Jun 2011 11:00 UTCG Duration = 580 sec
  - Spin-down = 24 Jun 2011 09:00 UTCG
  - Re-point = 26 Jun 2011 15:30 UTCG





# IBEX Pre-ADV2 MAC Telemetry

Orbital Sciences Corporation  
Dulles, Virginia  
Tuesday, June 14, 2011





# LEOps Page

IBEX LEOps
Spacecraft Time **2011:164:14:59:24**
NOOP

HMLOGS 119 7507 1
FC BCR ACE

**Subsystem Modes**

Spacecraft State: **HOUSEKEEPING**

ACS_HIGH_RATE	ACS	5285736
NORMAL	EPS	21810037
MISSION	FC	21810009

**Up Times**

Total Cmd Count: **18374**

Timed Cmd Configured: **16**

**BCR Switches**

STX: ON ●

ACE: ON ●

FC: ON ●

MIU5V: ON ●

CEU5V: ON ●

PCM-A: ON ●

PCM-B: OFF ●

PCM-C: ON ●

MIU14V: ON ●

**MIU Switches**

CEU: OFF ●

StarTr: OFF ●

22N Thr: OFF ●

**Gyro Inhibit Status**

NOT INHIBITED

SA Curr: 4.05

SA Volt: 20.32

Ch. Reg. Out. Curr.: 4.98

**SSR Pointers**

Write: **27252**

Read: **27248**

**Power Control**

18-day Timer: **810** minutes

Long Eclipse: **FALSE**

IBEX-Hi: **OFF**

IBEX-Lo: **OFF**

**Beacon Enable**: DISABLED

**Beacon Status**: DISABLED

**BO Buffer % Full**: 3.00003

**Downlink Rate**: 2K

**Spin Rate**: 22.4834 rpm

**Sun Angle**: 25.14 deg

**Gyro Rate**: 0.0009569 rad/s

Fly By Gyro: **FALSE**

Fly By Sta: **FALSE**

**ACS FDC**

Current FDC: **8192**

0 = OK

Sumpoint Error: **TRUE**

Spin Rate Yellow: **FALSE**

Spin Rate Cont.: **FALSE**

Spin Rate Red: **FALSE**

Component Invalid: **FALSE**

Maneuver Timeout: **FALSE**

**Battery**

Curr: -0.03 Volt: 15.73

Cell 1	Cell 2	Cell 3	Cell 4
3.90	3.90	3.87	3.83

**Flags**

Deploy:

Ephemeris:

0 = Set 1 = Not set

**Latch Valves**

MX	PX
LV_OPEN	LV_OPEN

**Tank Press**

MX	PX
142.34	142.237

**Tank Temp**

MX	PX
18.7	19.19

**Thr. On-Time**

Thr.	On-Time	Valve Temp	Catbed Temp
1	3696	33.51	46.96
2	23600	36.97	52.87
3	23684	31.29	49.92
4	3760	38.45	54.84
+Z	0	40.68	79.205
-Z	62640	15	1.6087

**Temperatures**

Battery	6.84	STX	26.0296
BCR	21.29	SRX	31.064
Sol. Arr.	100.21	PCM	27.3851
Zone 1	26.72	Star Tr.	9.3187
Zone 2	23.63	Hi-1	11.516
Zone 3	19.68	Hi-2	10.2953
Zone 4	18.33	Lo-1	11.2718
		Lo-2	14.6898

**Carrier Lock**: YES

**Bit Lock**: YES

**Coherency**: ON

**RF Power**: 38.4799

**Signal Str.**: -111.318

**Loop Stress**: -14516.9

**SRX Volts**: 6.1926

**STX Volts**: 6.1987

**Thruster Enabled?**

5N	22N
FALSE	0

0=F 1=T

**Catbed Heater**: OFF

**Time/Cyc Remaining**: 0



# ACS Telemetry

IBEX\_MISSION\_OPS->acs
Reset Print Snap

**IBEX ACS** S/C Time **2011:164:22:16:47**

ACS Time **892038621**

ACE HMLGOS **1**

ADC Timeout **0**

STA INFO hex

Sensor Counts (Peg. Pkt)

**Subsystem Modes**

Spacecraft State: **HOUSEKEEPING**

- ACS\_HIGH\_RATE ACS **5312022**
- NORMAL EPS **21836316**
- MISSION FC **21836289**

**Switches**

StarTr: **OFF** Gyro Inhibit: **NOT\_ENABLED**

22N Thr: **OFF** Battery SOC: **NORMAL**

PCM-B: **OFF**

**Up Times**

ACE Up Time: **5312022**

Nutation Accel: **0**

Spin Accel: **0**

Gyro: **0**

CSS 1: **0**

CSS 2: **0**

CSS 3: **0**

CSS 4: **0**

CSS 5: **0**

CSS 6: **0**

CSS 7: **0**

CSS 8: **0**

Sun Offset 0V: **0**

Sun Div 4.3V: **0**

SAM Off 2.5V: **0**

SAM Ref 2.5V: **0**

CHI Pkt Time: **0**

CHI FDC Enable: **0**

Inr Dir Cmd X: **0**

Inr Dir Cmd Y: **0**

Inr Dir Cmd Z: **0**

**Spin Rate (Accel)** **22.4834** rpm

**Sun Angle** **24.5232** deg

**Filter Y Rate (LR)** **1.0736e-06** rad/s

**Filter Y Rate (HR)** **0.000335563** rad/s

**StarT Current** **-0.0021028**

**PCMB Current** **0.09**

**MX** **PX** **5N** **22N**

Latch Valves: **LV\_OPEN** **LV\_OPEN**

Tank Press: **143.181** **142.868**

Tank Temp: **15.19** **20.17**

Thruster Enabled?: **FALSE**

Catbed Heater: **OFF** **OFF**

Time/Cyc Remaining: **0** **0.1**

**FDC Resp hex** **2000**

ST Att Inv NoLatch: **FALSE**

Nut Ctrl Error: **FALSE**

Sun Point Err: **TRUE**

Maneuver Timeout: **FALSE**

Spin Rate Conting: **FALSE**

Spin Rate Red: **FALSE**

Spin Rate Yellow: **FALSE**

Jets Invalid: **FALSE**

Component Invalid: **FALSE**

Estimator Invalid: **FALSE**

StarT Pwr Cycle: **FALSE**

Sta Invalid: **FALSE**

CSS Invalid: **FALSE**

Gyro Invalid: **FALSE**

Accel 2 Invalid: **FALSE**

Accel 1 Invalid: **FALSE**

**FDC Trigger Totals**

AccY HW Read: **0**

AccZ HW Read: **0**

AccZ Zero: **0**

Gyro HW Read: **0**

CSS HW Read: **0**

CSS Magnitude: **0**

Sun Point Err: **527731**

Sta Invalid: **549694**

Sta No Solution: **0**

Sta No Solution 2: **399831**

Sta Stale: **23614**

Sta Stale 2: **23614**

Est Update: **121592**

Est Residual: **134**

Est Math: **0**

Jet Command: **0**

Sin Rate Yellow: **1468**

Spin Rate Red: **1395**

Spin Rate Conting: **0**

Nutation Error: **0**

Comp Invalid: **1607**

Mnvr Timeout: **0**

**Temperatures**

Star Tr: **0.07456**

Zone 1: **26.22**

Zone 2: **25.61**

Zone 3: **20.55**

Zone 4: **18.57**

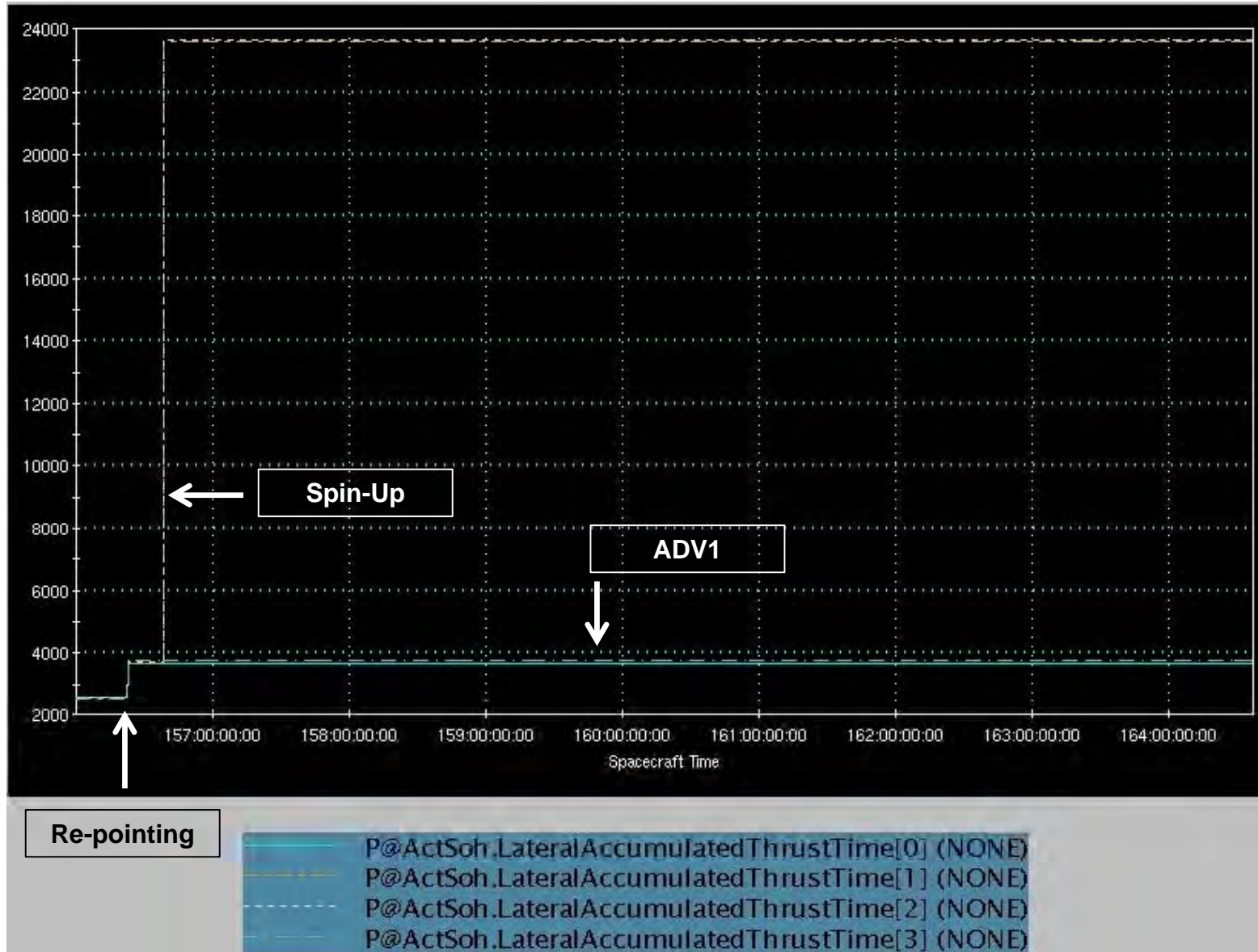
**Thr. On-Time**

1	3696	30.06	45.98
2	23600	36.23	56.81
3	23664	31.79	48.93
4	3760	38.21	52.87
+Z	0	41.17	79.205
-Z	62640	15.49	1.8007

**Valve Temp**

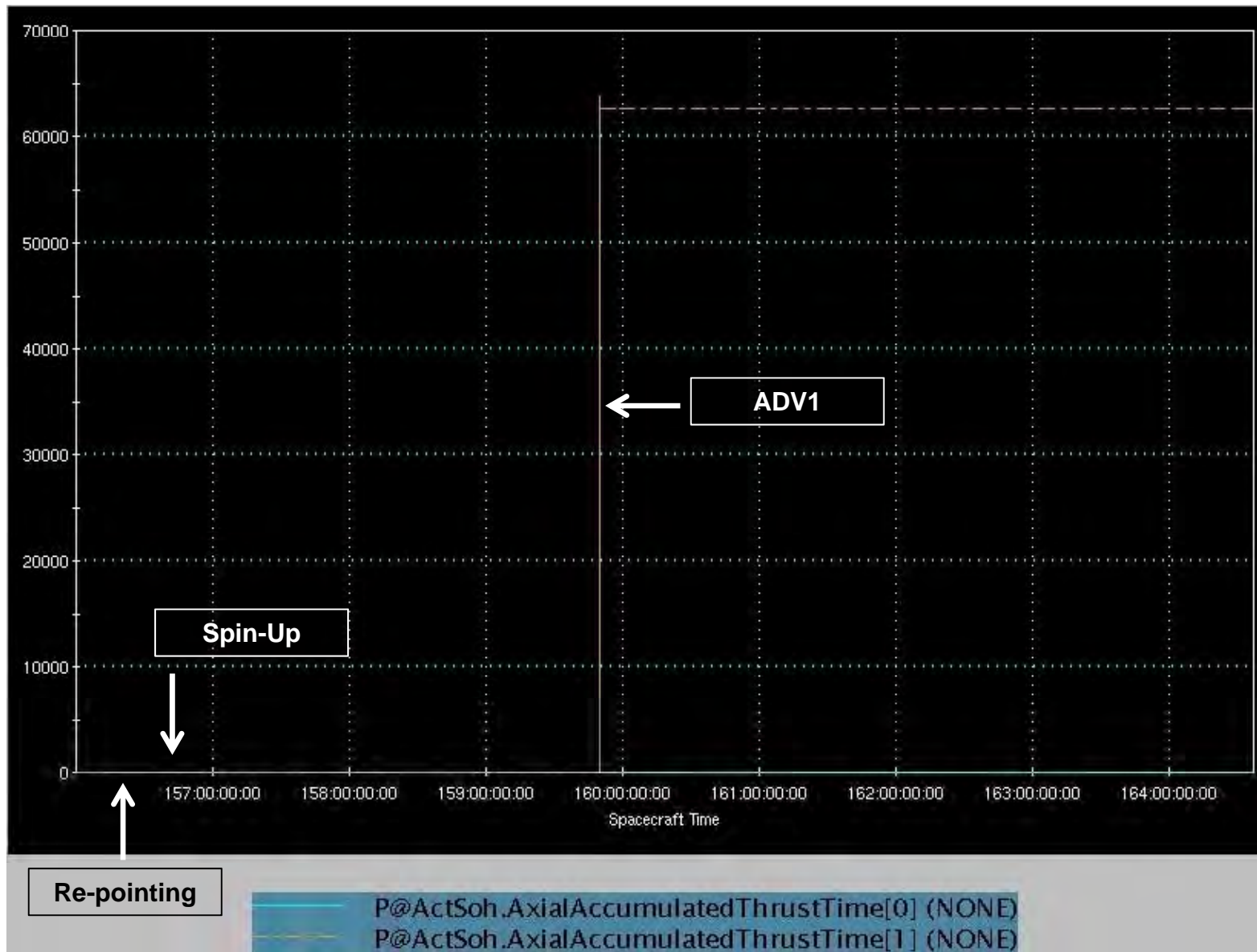
**Catbed Temp**

# Lateral Accumulated Thrust Time

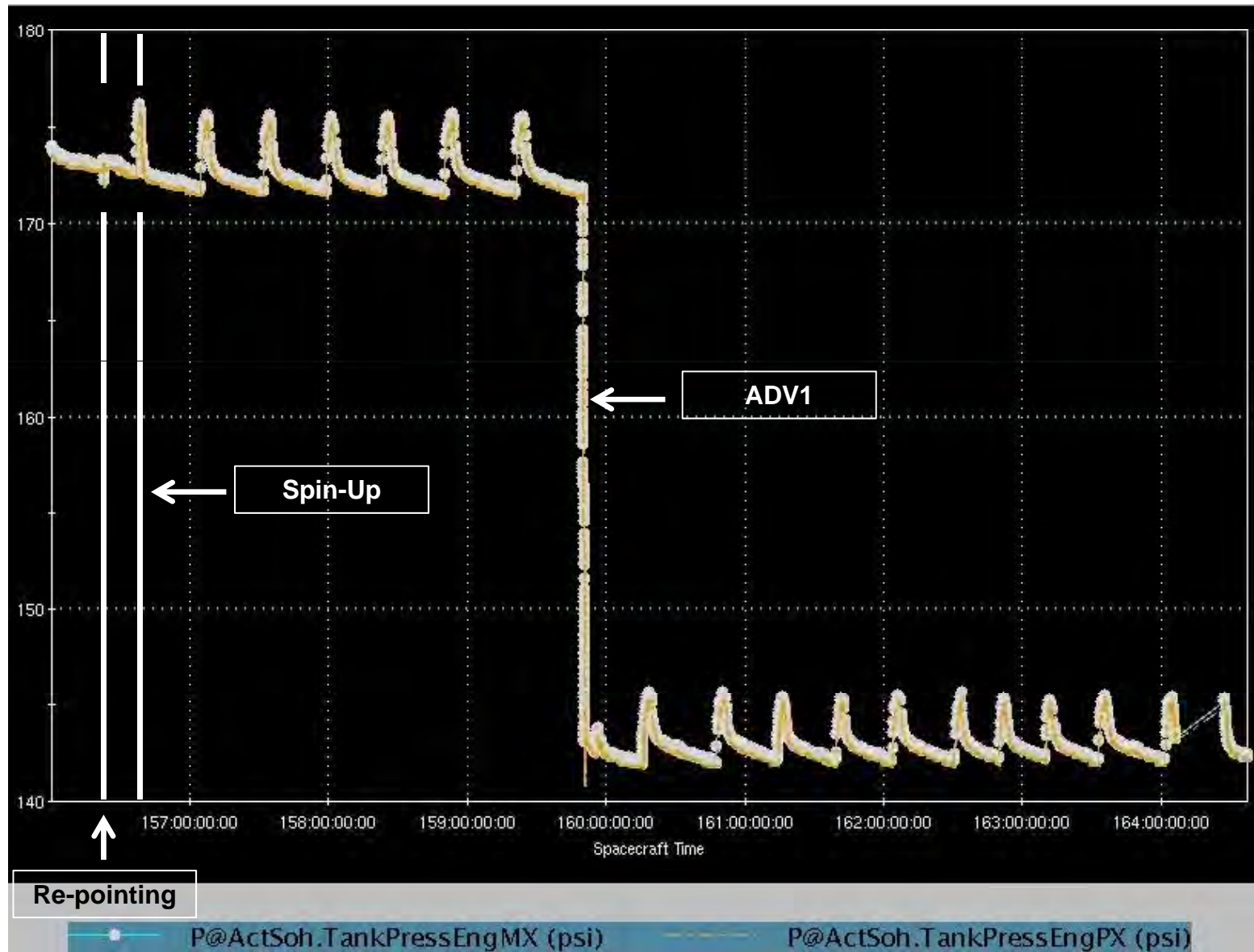




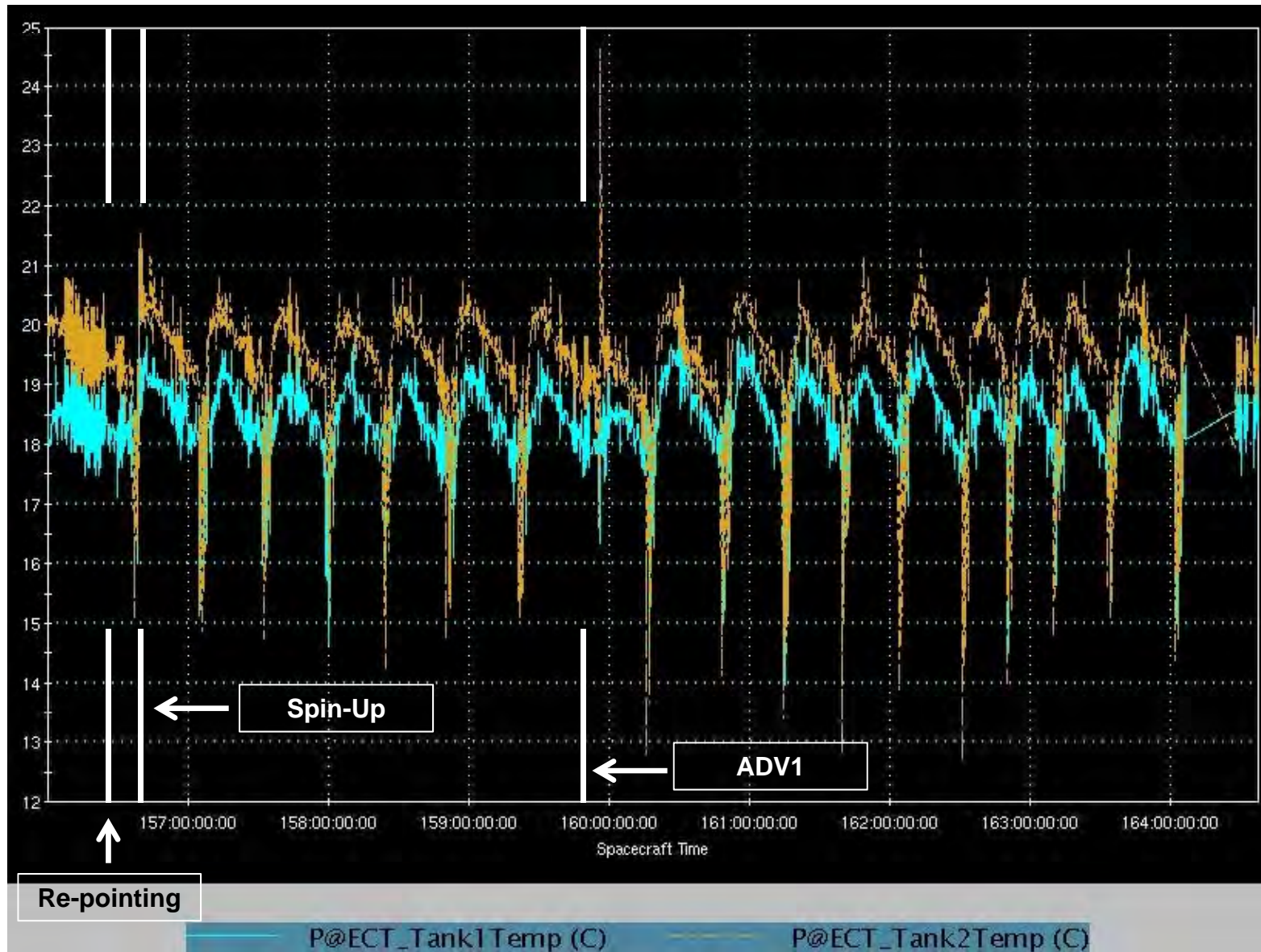
# Axial Accumulated Thrust Time



# Tank Pressure

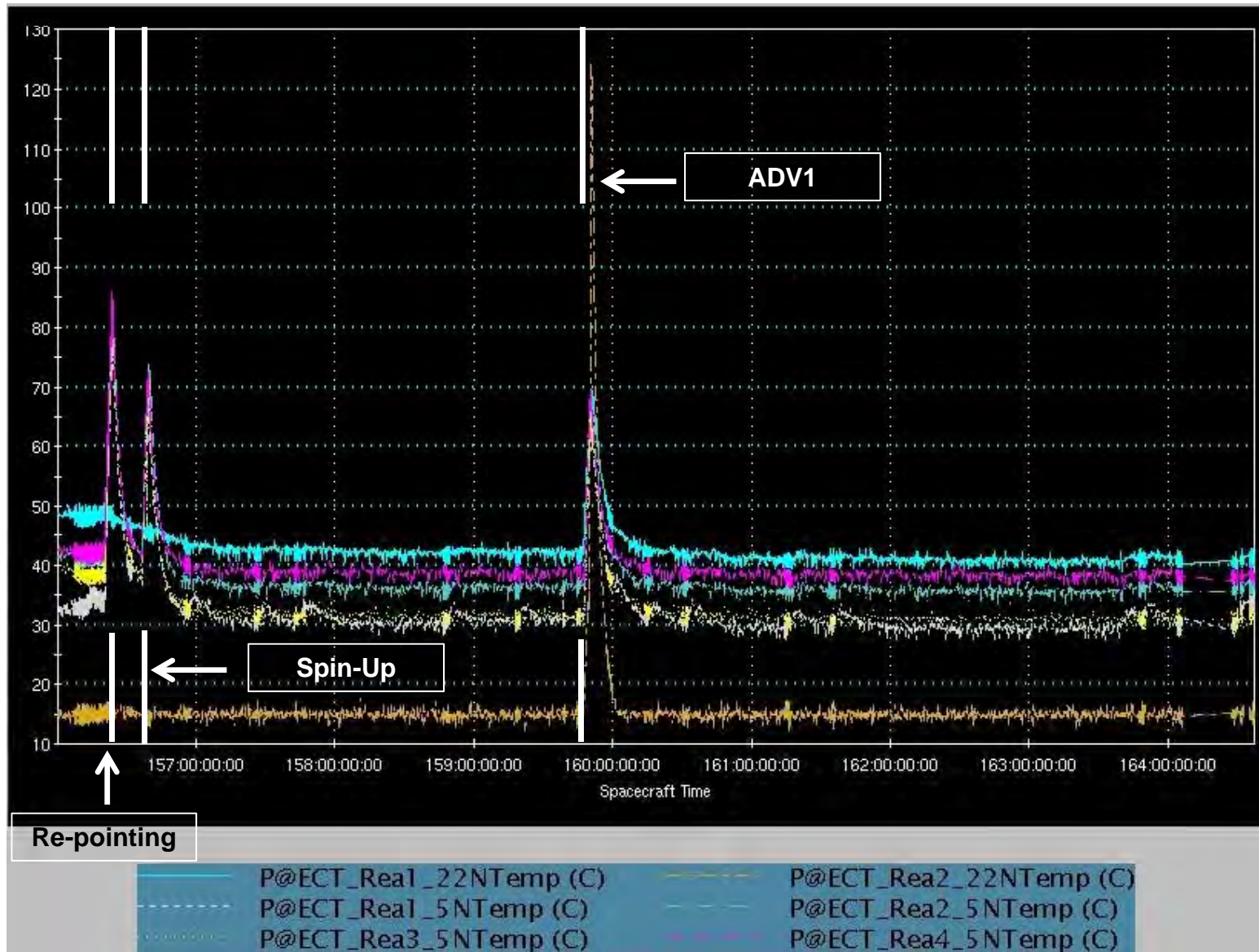


# Tank Temperature

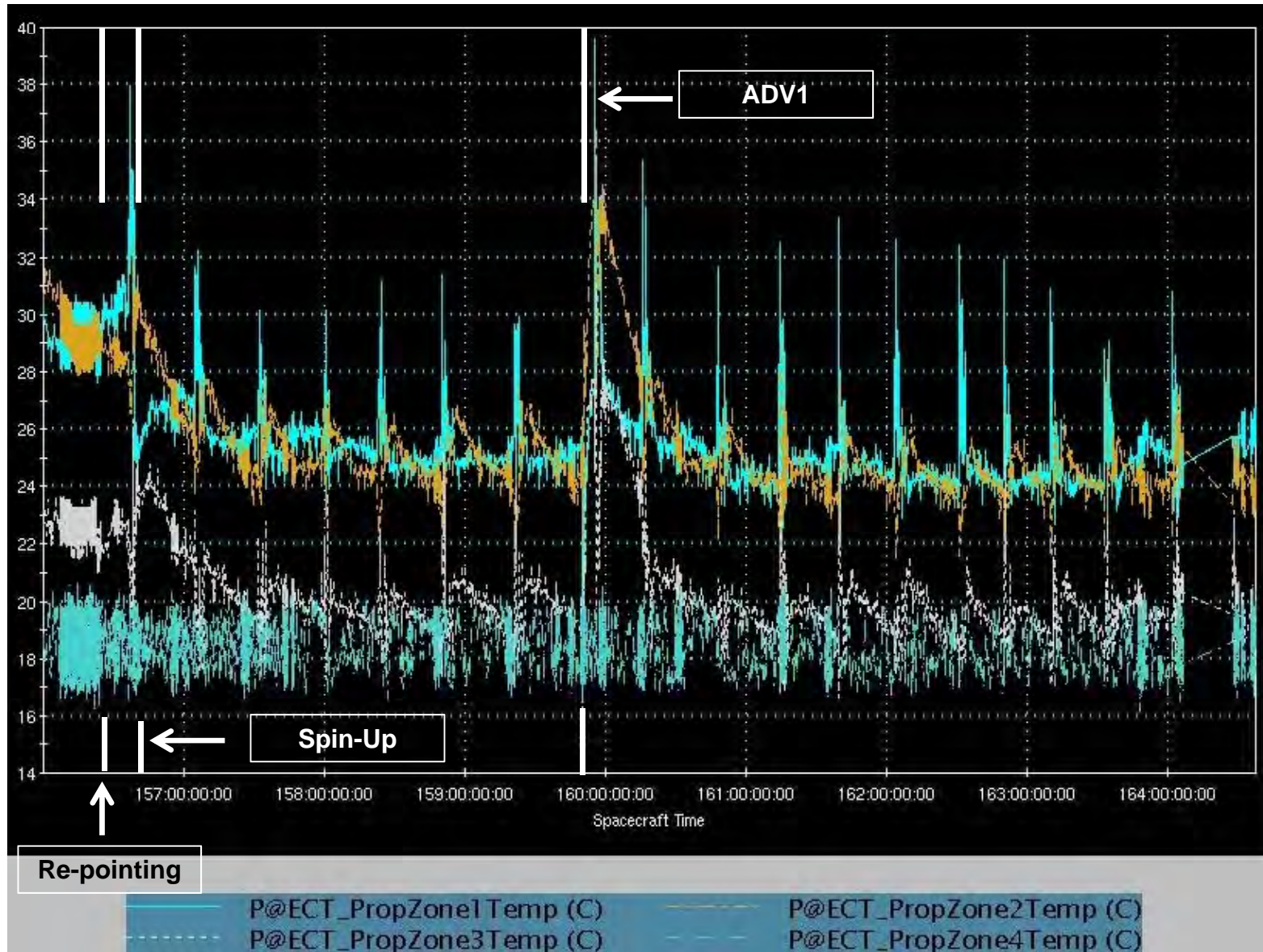




# Thruster Temperature

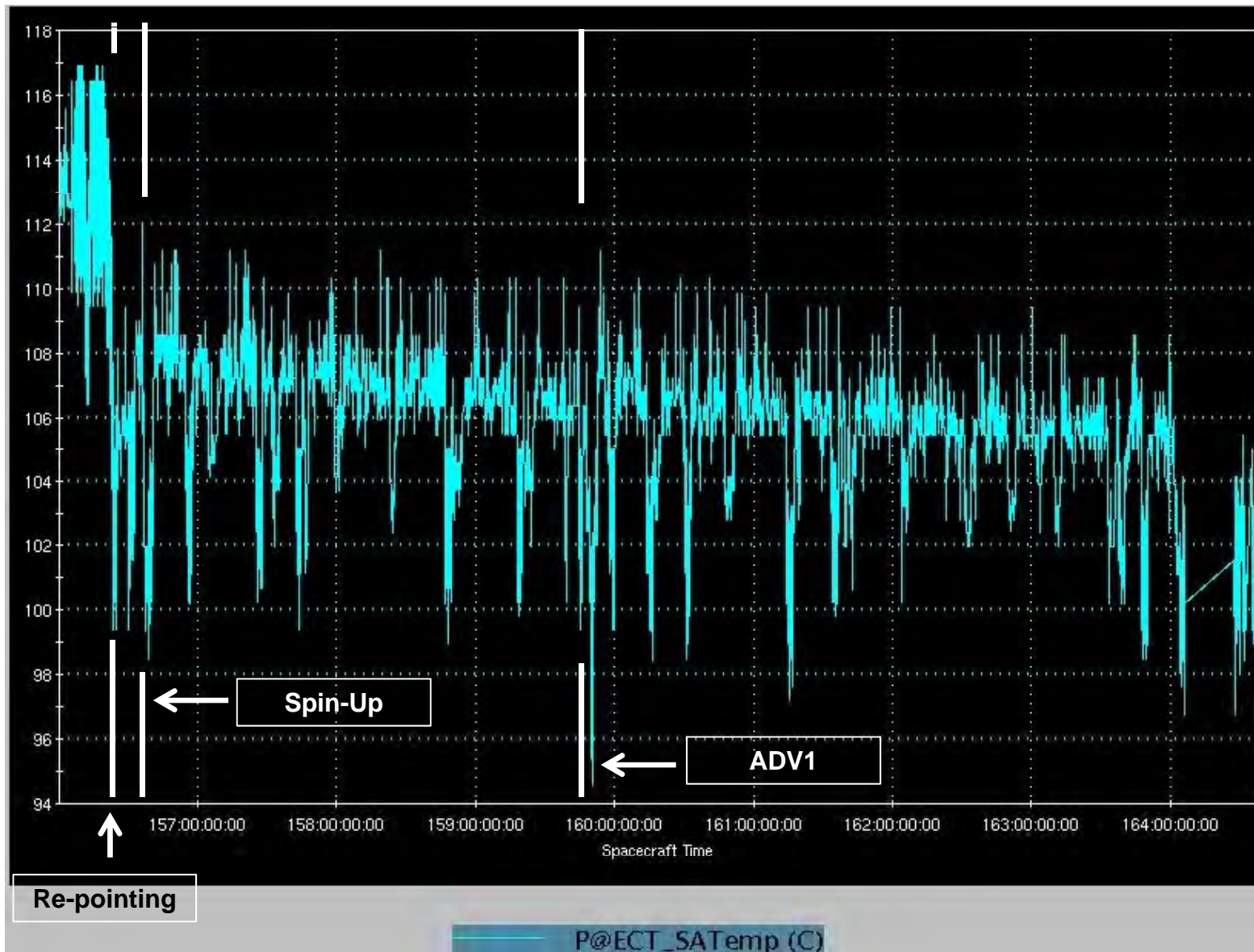


# Zone Temperatures

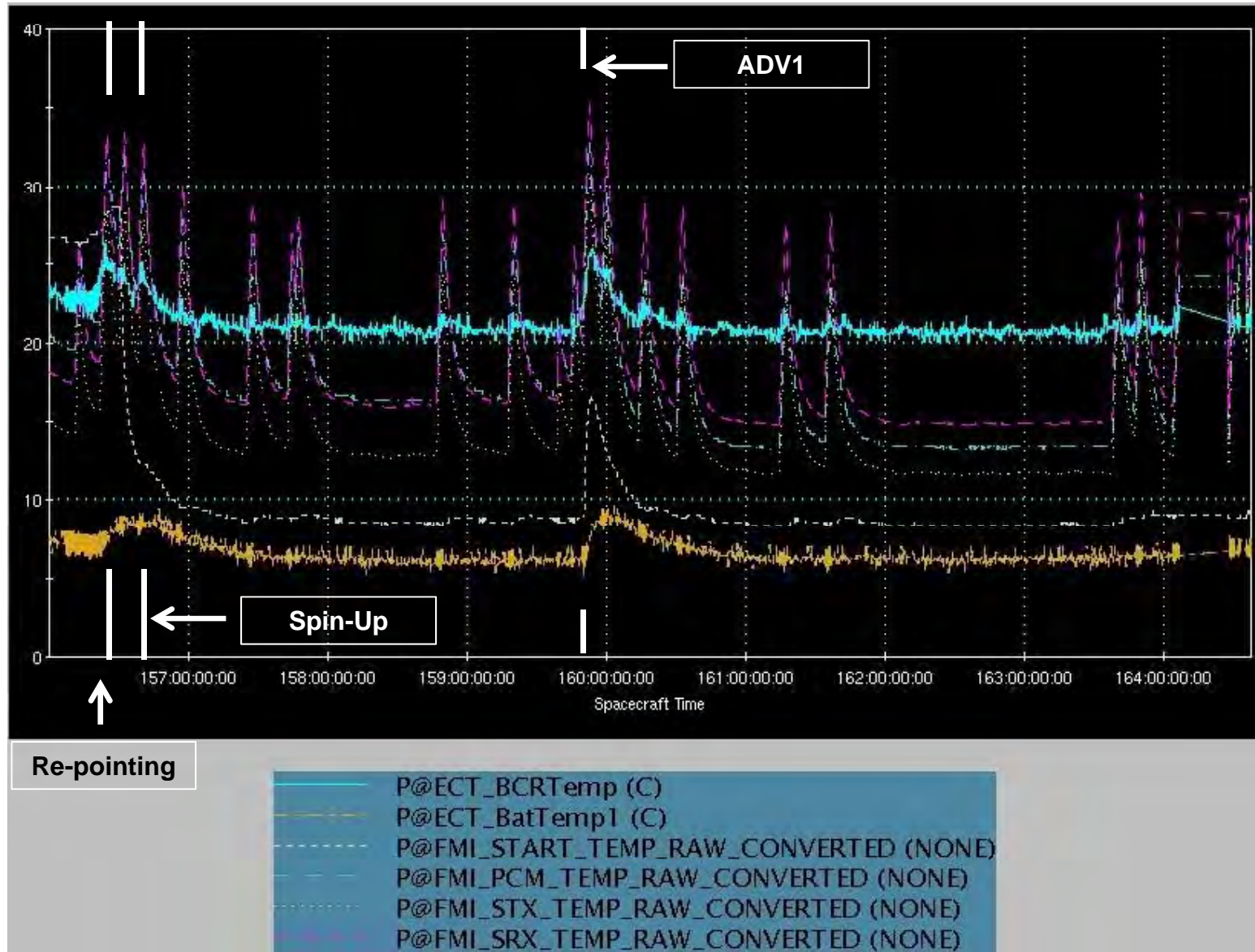




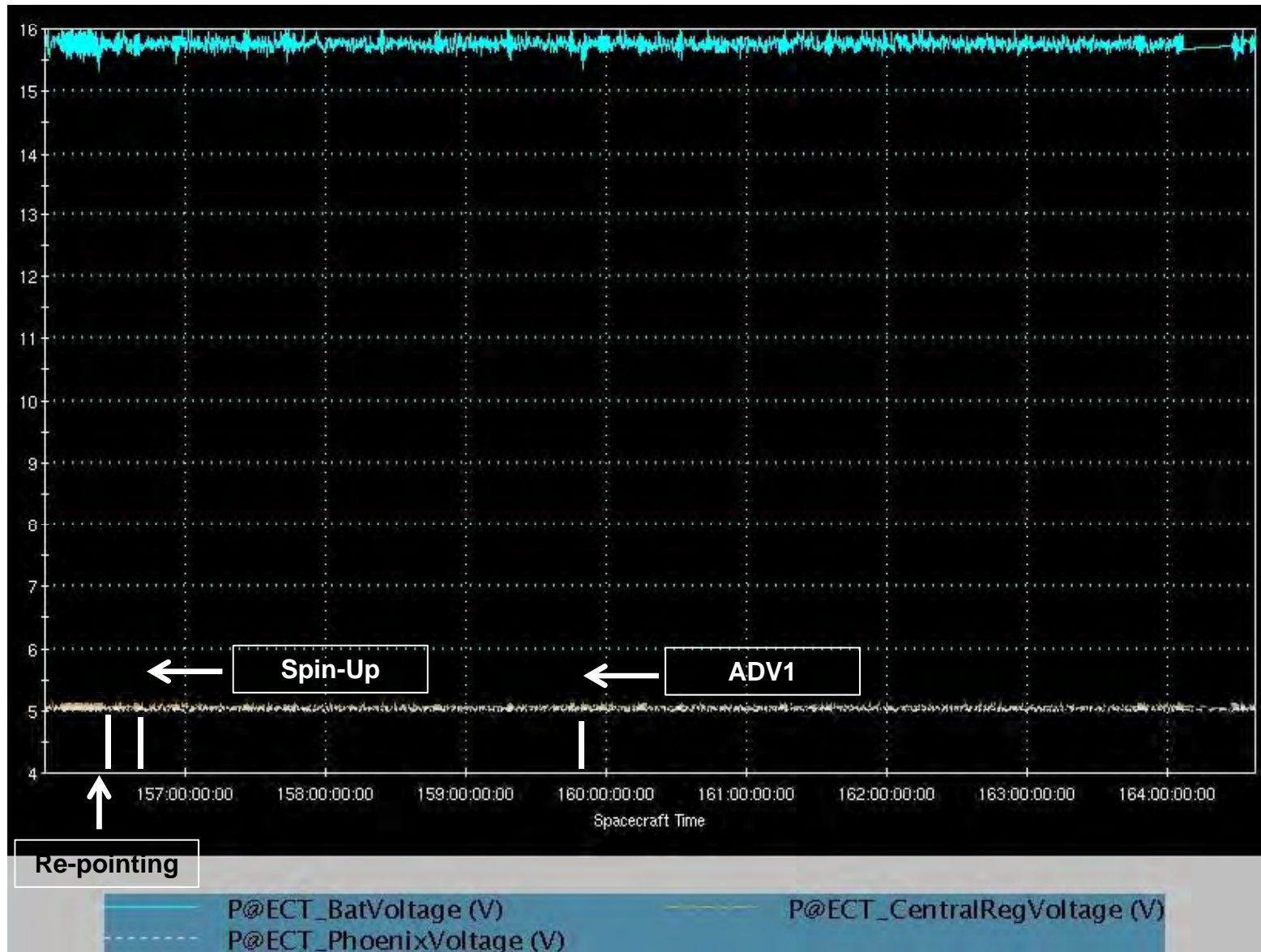
# Solar Array Temperature



# Bus Temperatures

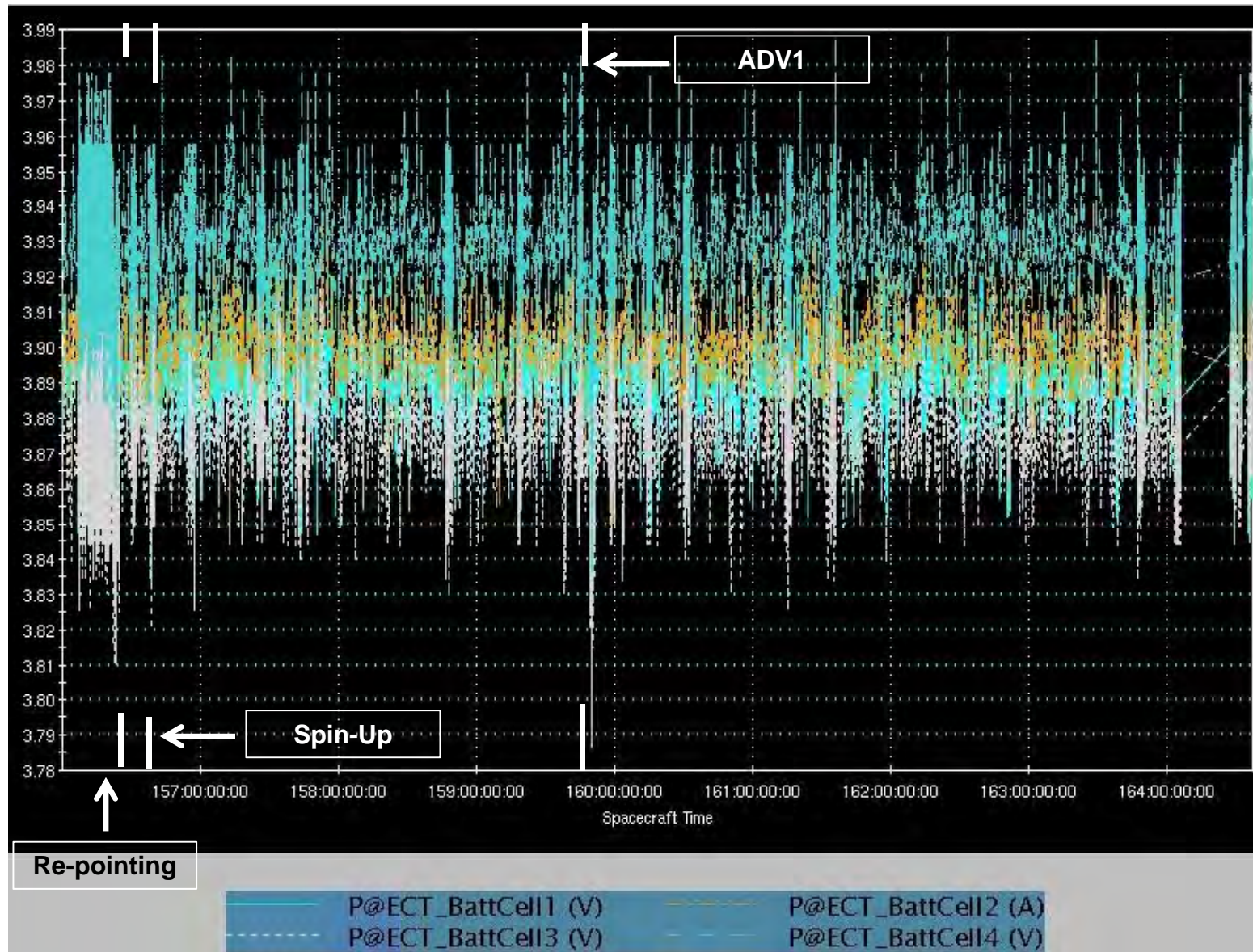


# Bus Voltage

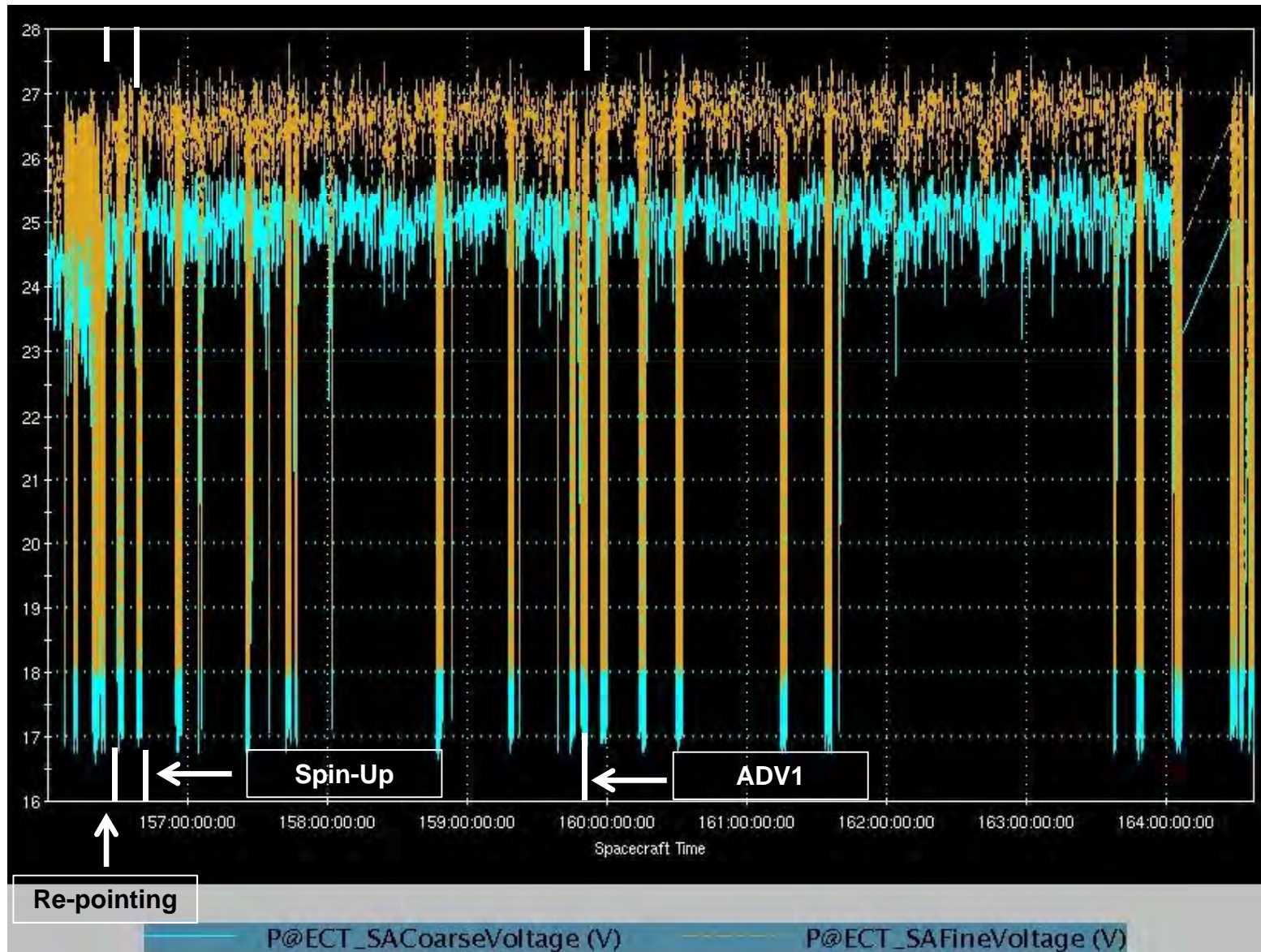




# Cell Voltage

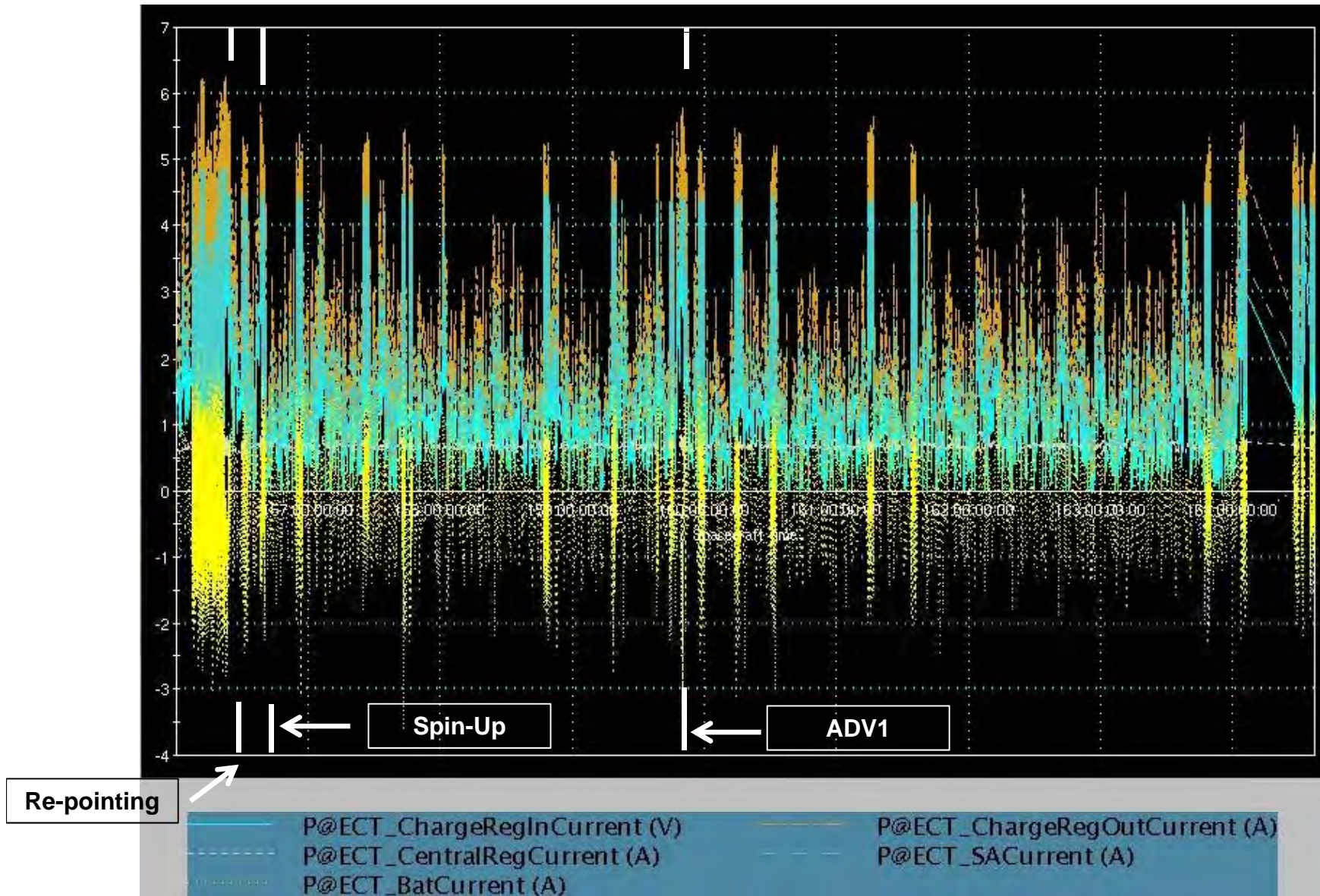


# Solar Array Voltage

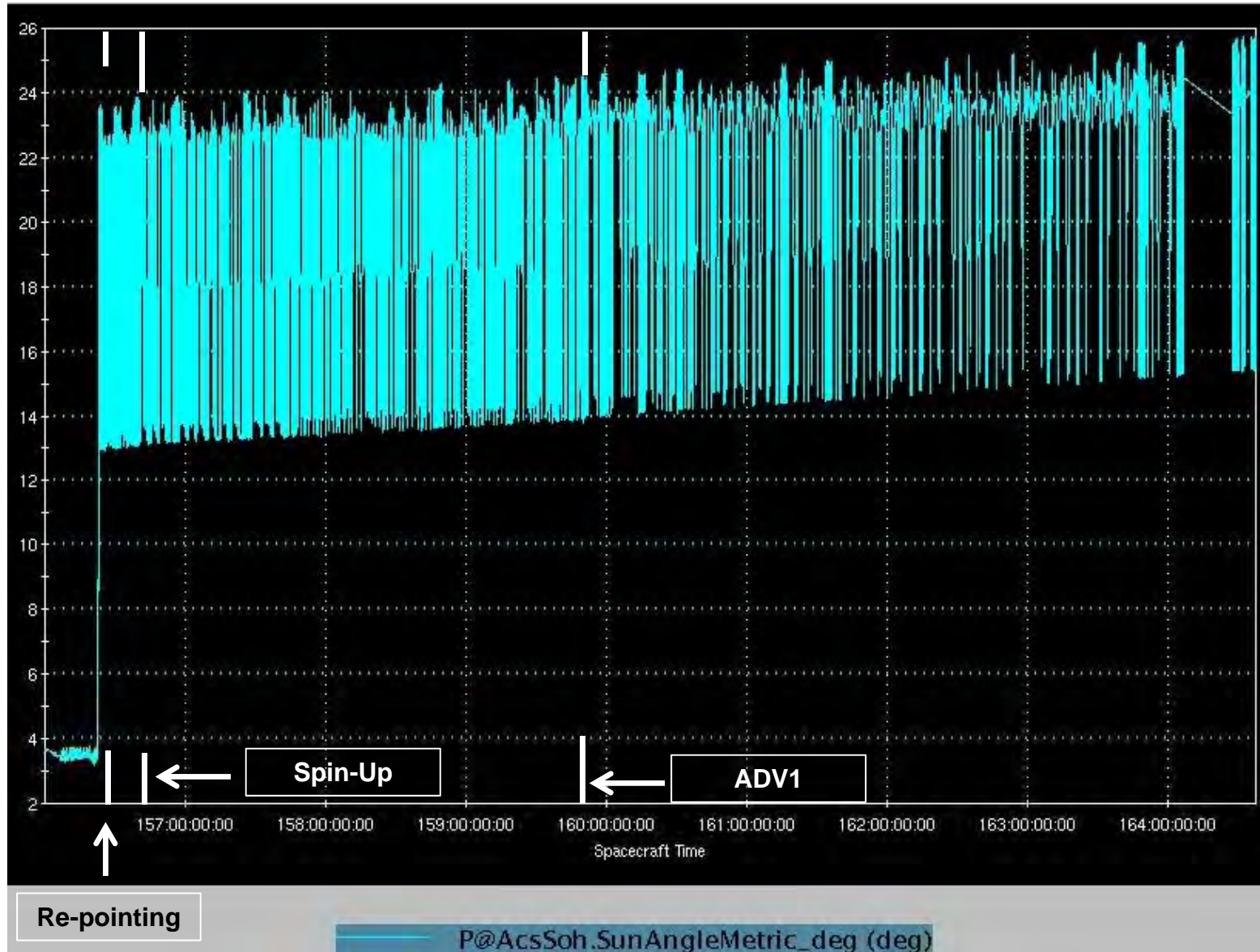




# Currents

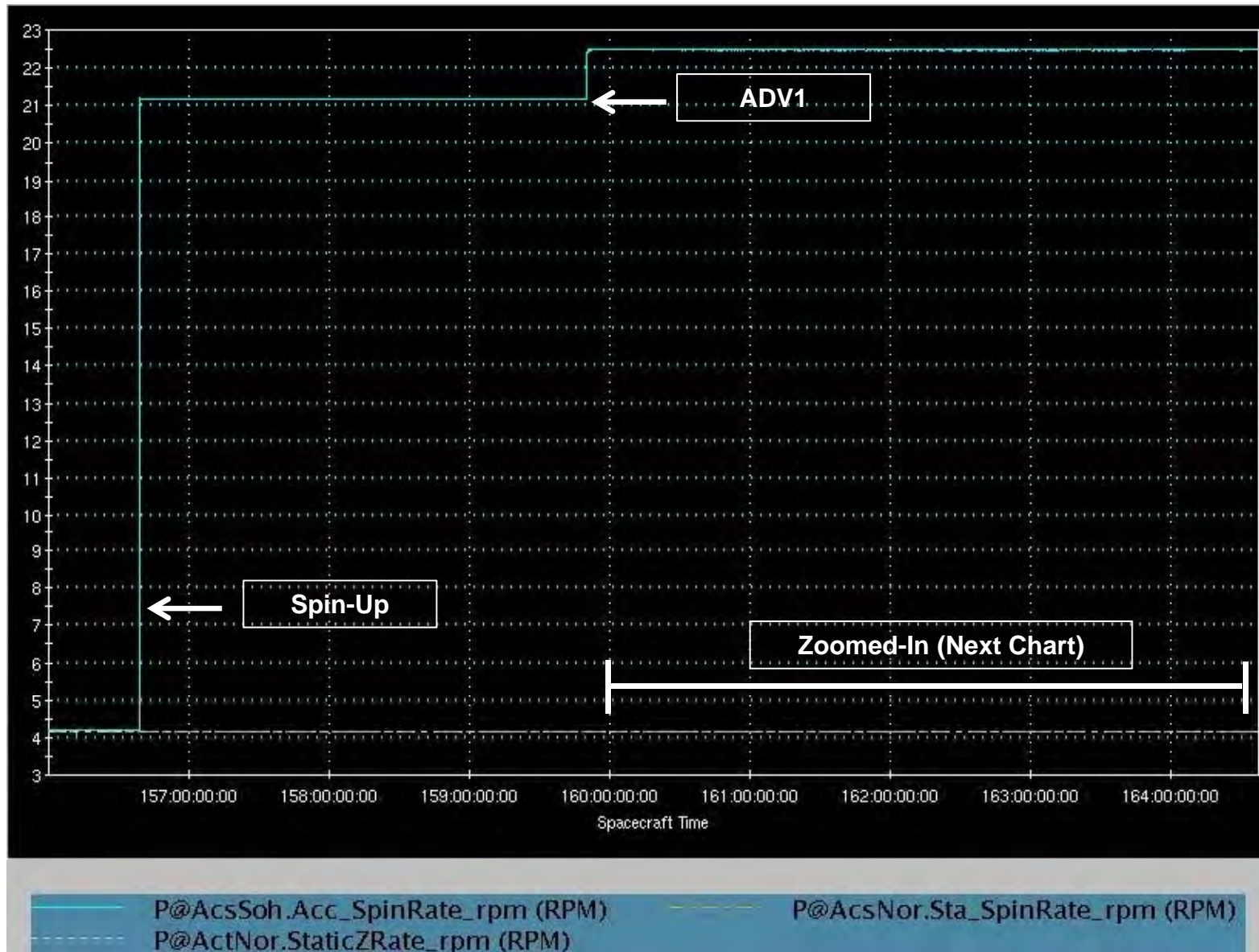


# ACS Sun Angle Metric



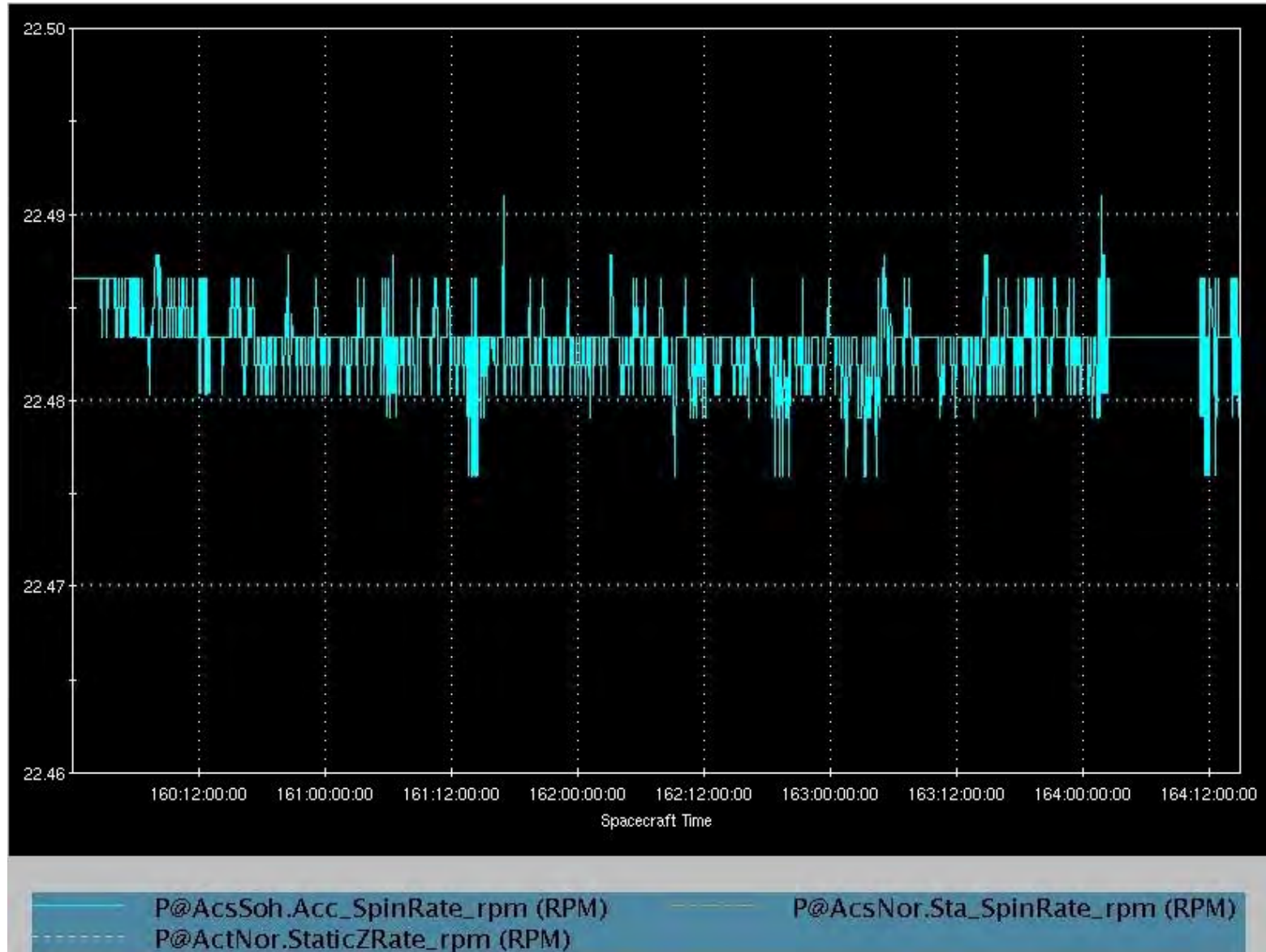


# Spin Rate

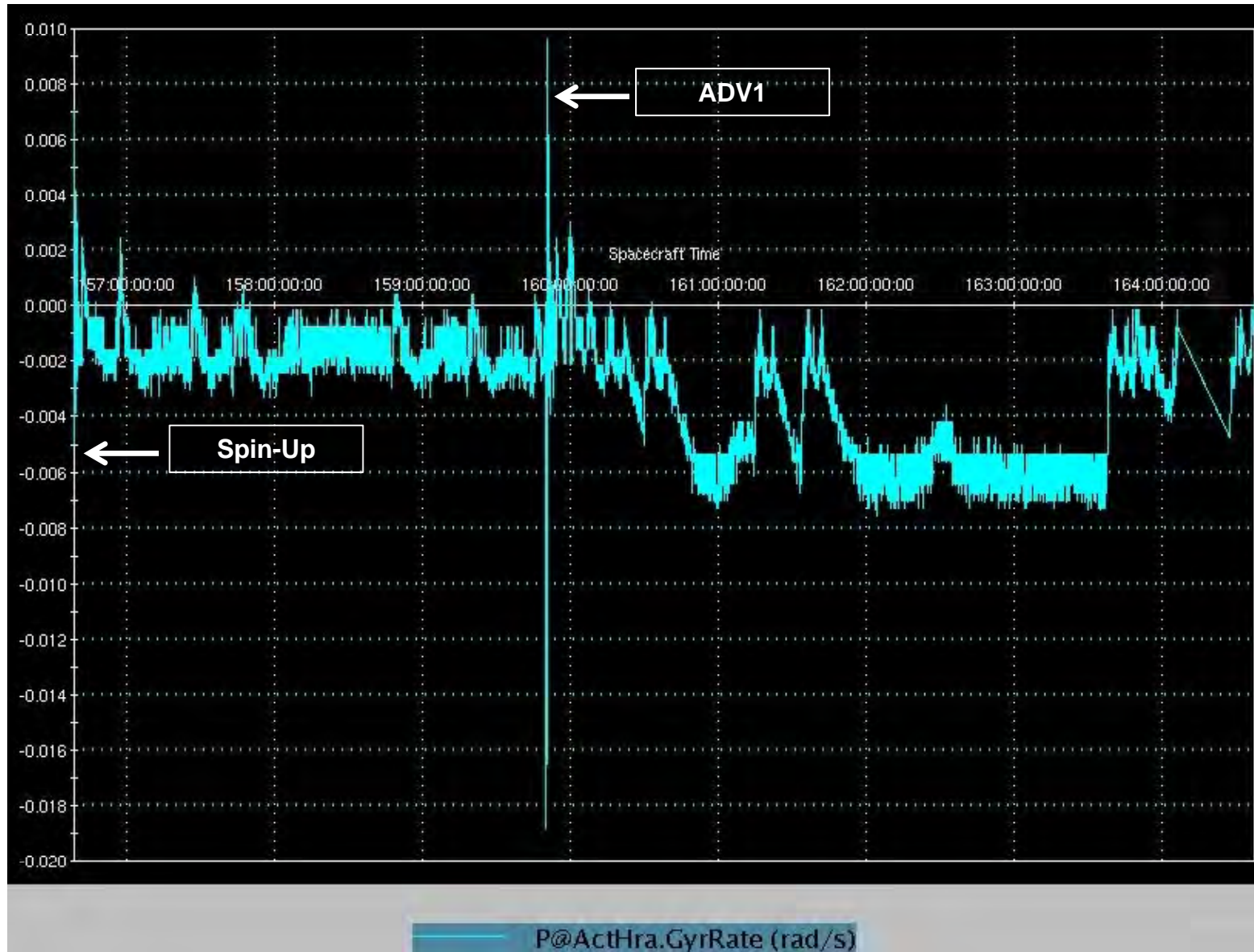




# Post ADV1 Spin Rate (Zoomed-In)



# Gyro Rate



IBEX FDG Apogee Peri gee Ti mes Report  
 Created: 14 Jun 2011 00: 21: 11 EDT

Time of Peri gee (UTCG)	Peri gee Al ti tude (Re)	Peri gee Radi us (Re)
13 Jun 2011 05: 11: 05. 441	3. 414146	4. 414142
21 Jun 2011 14: 43: 31. 533	7. 267552	8. 267548
30 Jun 2011 11: 06: 45. 594	7. 280780	8. 280778
9 Jul 2011 11: 57: 18. 215	7. 042851	8. 042847
18 Jul 2011 08: 02: 34. 538	6. 639298	7. 639295
27 Jul 2011 05: 05: 52. 864	6. 780479	7. 780476
5 Aug 2011 06: 37: 00. 096	6. 514424	7. 514418
14 Aug 2011 03: 38: 05. 016	6. 330390	7. 330384
23 Aug 2011 03: 18: 51. 249	6. 745223	7. 745216
1 Sep 2011 07: 17: 57. 782	6. 559660	7. 559648
10 Sep 2011 06: 34: 55. 278	6. 589673	7. 589660
19 Sep 2011 09: 16: 36. 665	7. 281138	8. 281124

Time of Apogee (UTCG)	Apogee Al ti tude (Re)	Apogee Radi us (Re)
9 Jun 2011 04: 41: 55. 938	47. 726445	48. 726442
17 Jun 2011 04: 48: 53. 731	47. 434904	48. 434900
26 Jun 2011 01: 00: 57. 591	47. 526232	48. 526229
4 Jul 2011 23: 50: 07. 536	48. 178821	49. 178819
13 Jul 2011 22: 24: 26. 167	47. 857933	48. 857930
22 Jul 2011 18: 34: 29. 587	48. 120557	49. 120553
31 Jul 2011 18: 09: 18. 256	48. 735291	49. 735287
9 Aug 2011 17: 19: 58. 925	48. 366296	49. 366291
18 Aug 2011 15: 12: 45. 043	48. 688912	49. 688904
27 Aug 2011 17: 27: 24. 214	49. 129757	50. 129749
5 Sep 2011 18: 54: 06. 578	48. 598248	49. 598236
14 Sep 2011 19: 21: 34. 808	48. 824828	49. 824812

IBEX\_CrossingTimes\_2011\_164\_23\_00\_v001

IBEX FDG Crossing Times Report  
 Created: 14 Jun 2011 00:19:11 EDT

13	Jun	2011	23:10:32.158	22_Re
14	Jun	2011	00:24:49.616	23_Re
14	Jun	2011	01:41:52.652	24_Re
14	Jun	2011	03:01:49.552	25_Re
14	Jun	2011	04:24:49.524	26_Re
14	Jun	2011	05:51:02.862	27_Re
14	Jun	2011	07:20:41.141	28_Re
14	Jun	2011	08:53:57.451	29_Re
14	Jun	2011	10:31:06.693	30_Re
14	Jun	2011	12:12:25.947	31_Re
14	Jun	2011	13:58:14.938	32_Re
14	Jun	2011	14:00:35.370	155_deg
14	Jun	2011	15:48:56.652	33_Re
14	Jun	2011	17:44:58.123	34_Re
14	Jun	2011	19:46:51.515	35_Re
14	Jun	2011	21:55:15.581	36_Re
15	Jun	2011	00:10:57.722	37_Re
15	Jun	2011	02:34:56.950	38_Re
15	Jun	2011	05:08:28.315	39_Re
15	Jun	2011	07:53:09.775	40_Re
15	Jun	2011	10:51:13.397	41_Re
15	Jun	2011	14:05:44.825	42_Re
15	Jun	2011	17:41:19.908	43_Re
15	Jun	2011	21:45:21.812	44_Re
16	Jun	2011	02:31:12.139	45_Re
16	Jun	2011	08:28:30.550	46_Re
16	Jun	2011	17:25:16.854	47_Re
17	Jun	2011	04:48:53.733	Apoapsis
17	Jun	2011	16:33:47.997	47_Re
18	Jun	2011	02:19:27.414	46_Re
18	Jun	2011	08:49:40.411	45_Re
18	Jun	2011	14:02:05.969	44_Re
18	Jun	2011	18:29:05.048	43_Re
18	Jun	2011	22:25:12.223	42_Re
19	Jun	2011	00:45:02.789	200_deg
19	Jun	2011	01:58:30.322	41_Re
19	Jun	2011	05:14:00.387	40_Re
19	Jun	2011	08:15:04.935	39_Re
19	Jun	2011	11:04:08.096	38_Re
19	Jun	2011	13:42:56.834	37_Re
19	Jun	2011	16:12:53.178	36_Re
19	Jun	2011	18:35:01.716	35_Re
19	Jun	2011	20:50:14.422	34_Re
19	Jun	2011	22:59:13.896	33_Re
20	Jun	2011	01:02:35.615	32_Re
20	Jun	2011	03:00:49.532	31_Re
20	Jun	2011	04:54:21.263	30_Re
20	Jun	2011	06:43:32.956	29_Re
20	Jun	2011	08:28:43.978	28_Re
20	Jun	2011	10:10:11.437	27_Re
20	Jun	2011	11:48:10.615	26_Re
20	Jun	2011	13:22:55.323	25_Re
20	Jun	2011	14:54:38.173	24_Re
20	Jun	2011	16:23:30.848	23_Re
20	Jun	2011	17:49:44.346	22_Re
20	Jun	2011	19:13:29.215	21_Re
20	Jun	2011	20:34:55.797	20_Re
20	Jun	2011	21:54:14.507	19_Re
20	Jun	2011	23:11:36.186	18_Re
21	Jun	2011	00:27:12.531	17_Re

I BEX\_CrossingTimes\_2011\_164\_23\_00\_v001

21	Jun	2011	01: 41: 16. 776	16_Re
21	Jun	2011	02: 54: 04. 614	15_Re
21	Jun	2011	04: 05: 55. 689	14_Re
21	Jun	2011	05: 07: 54. 923	270_deg
21	Jun	2011	05: 17: 16. 264	13_Re
21	Jun	2011	06: 28: 44. 088	12_Re
21	Jun	2011	07: 41: 18. 395	11_Re
21	Jun	2011	08: 56: 43. 958	10_Re
21	Jun	2011	10: 18: 42. 941	9_Re
21	Jun	2011	11: 58: 35. 090	8_Re
21	Jun	2011	14: 43: 31. 533	Periapsis
21	Jun	2011	17: 28: 27. 101	8_Re
21	Jun	2011	19: 08: 19. 791	9_Re
21	Jun	2011	20: 30: 19. 217	10_Re
21	Jun	2011	21: 45: 45. 180	11_Re
21	Jun	2011	22: 58: 19. 888	12_Re
22	Jun	2011	00: 09: 48. 044	13_Re
22	Jun	2011	01: 21: 08. 888	14_Re
22	Jun	2011	02: 33: 00. 146	15_Re
22	Jun	2011	03: 45: 48. 061	16_Re
22	Jun	2011	04: 59: 52. 269	17_Re
22	Jun	2011	05: 49: 22. 951	110_deg
22	Jun	2011	06: 15: 28. 417	18_Re
22	Jun	2011	07: 32: 49. 669	19_Re
22	Jun	2011	08: 52: 07. 714	20_Re
22	Jun	2011	10: 13: 33. 300	21_Re
22	Jun	2011	11: 37: 16. 796	22_Re
22	Jun	2011	13: 03: 28. 489	23_Re
22	Jun	2011	14: 32: 18. 864	24_Re
22	Jun	2011	16: 03: 58. 754	25_Re
22	Jun	2011	17: 38: 39. 789	26_Re
22	Jun	2011	19: 16: 34. 426	27_Re
22	Jun	2011	20: 57: 56. 303	28_Re
22	Jun	2011	22: 43: 00. 512	29_Re
23	Jun	2011	00: 32: 03. 938	30_Re
23	Jun	2011	02: 25: 25. 674	31_Re
23	Jun	2011	04: 23: 27. 536	32_Re
23	Jun	2011	06: 26: 34. 725	33_Re
23	Jun	2011	08: 35: 16. 678	34_Re
23	Jun	2011	10: 50: 08. 217	35_Re
23	Jun	2011	13: 11: 51. 094	36_Re
23	Jun	2011	15: 41: 16. 166	37_Re
23	Jun	2011	18: 19: 26. 504	38_Re
23	Jun	2011	19: 52: 52. 677	155_deg
23	Jun	2011	21: 07: 42. 024	39_Re
24	Jun	2011	00: 07: 46. 634	40_Re
24	Jun	2011	03: 21: 59. 839	41_Re
24	Jun	2011	06: 53: 36. 743	42_Re
24	Jun	2011	10: 47: 25. 379	43_Re
24	Jun	2011	15: 11: 04. 263	44_Re
24	Jun	2011	20: 18: 14. 963	45_Re
25	Jun	2011	02: 38: 25. 118	46_Re
25	Jun	2011	11: 50: 36. 676	47_Re
26	Jun	2011	01: 00: 57. 593	Apoapsis
26	Jun	2011	14: 11: 01. 002	47_Re
26	Jun	2011	23: 22: 37. 727	46_Re
27	Jun	2011	05: 42: 13. 826	45_Re
27	Jun	2011	10: 48: 51. 523	44_Re
27	Jun	2011	15: 12: 00. 513	43_Re
27	Jun	2011	19: 05: 19. 698	42_Re
27	Jun	2011	21: 26: 40. 230	200_deg
27	Jun	2011	22: 36: 27. 320	41_Re
28	Jun	2011	01: 50: 11. 824	40_Re

I BEX\_CrossingTimes\_2011\_164\_23\_00\_v001

28	Jun	2011	04: 49: 48. 436	39_Re
28	Jun	2011	07: 37: 36. 738	38_Re
28	Jun	2011	10: 15: 20. 698	37_Re
28	Jun	2011	12: 44: 20. 272	36_Re
28	Jun	2011	15: 05: 38. 565	35_Re
28	Jun	2011	17: 20: 06. 457	34_Re
28	Jun	2011	19: 28: 25. 721	33_Re
28	Jun	2011	21: 31: 11. 194	32_Re
28	Jun	2011	23: 28: 52. 321	31_Re
29	Jun	2011	01: 21: 54. 326	30_Re
29	Jun	2011	03: 10: 39. 018	29_Re
29	Jun	2011	04: 55: 25. 498	28_Re
29	Jun	2011	06: 36: 30. 649	27_Re
29	Jun	2011	08: 14: 09. 558	26_Re
29	Jun	2011	09: 48: 35. 880	25_Re
29	Jun	2011	11: 20: 02. 086	24_Re
29	Jun	2011	12: 48: 39. 745	23_Re
29	Jun	2011	14: 14: 39. 750	22_Re
29	Jun	2011	15: 38: 12. 561	21_Re
29	Jun	2011	16: 59: 28. 447	20_Re
29	Jun	2011	18: 18: 37. 759	19_Re
29	Jun	2011	19: 35: 51. 289	18_Re
29	Jun	2011	20: 51: 20. 696	17_Re
29	Jun	2011	22: 05: 19. 196	16_Re
29	Jun	2011	23: 18: 02. 486	15_Re
30	Jun	2011	00: 29: 50. 249	14_Re
30	Jun	2011	01: 29: 41. 188	270_deg
30	Jun	2011	01: 41: 08. 848	13_Re
30	Jun	2011	02: 52: 36. 238	12_Re
30	Jun	2011	04: 05: 12. 087	11_Re
30	Jun	2011	05: 20: 42. 174	10_Re
30	Jun	2011	06: 42: 51. 538	9_Re
30	Jun	2011	08: 23: 14. 181	8_Re
30	Jun	2011	11: 06: 45. 594	Periapsis
30	Jun	2011	13: 50: 16. 812	8_Re
30	Jun	2011	15: 30: 40. 684	9_Re
30	Jun	2011	16: 52: 51. 276	10_Re
30	Jun	2011	18: 08: 22. 658	11_Re
30	Jun	2011	19: 20: 59. 880	12_Re
30	Jun	2011	20: 32: 28. 625	13_Re
30	Jun	2011	21: 43: 48. 532	14_Re
30	Jun	2011	22: 55: 37. 488	15_Re
1	Jul	2011	00: 08: 21. 776	16_Re
1	Jul	2011	01: 22: 21. 001	17_Re
1	Jul	2011	02: 15: 54. 444	110_deg
1	Jul	2011	02: 37: 50. 726	18_Re
1	Jul	2011	03: 55: 03. 997	19_Re
1	Jul	2011	05: 14: 12. 346	20_Re
1	Jul	2011	06: 35: 26. 324	21_Re
1	Jul	2011	07: 58: 56. 046	22_Re
1	Jul	2011	09: 24: 51. 523	23_Re
1	Jul	2011	10: 53: 22. 897	24_Re
1	Jul	2011	12: 24: 40. 624	25_Re
1	Jul	2011	13: 58: 55. 835	26_Re
1	Jul	2011	15: 36: 20. 430	27_Re
1	Jul	2011	17: 17: 07. 368	28_Re
1	Jul	2011	19: 01: 30. 924	29_Re
1	Jul	2011	20: 49: 46. 990	30_Re
1	Jul	2011	22: 42: 13. 438	31_Re
2	Jul	2011	00: 39: 10. 580	32_Re
2	Jul	2011	02: 41: 01. 727	33_Re
2	Jul	2011	04: 48: 13. 925	34_Re
2	Jul	2011	07: 01: 18. 915	35_Re

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2	Jul	2011	09: 20: 54. 420	36_Re
2	Jul	2011	11: 47: 45. 919	37_Re
2	Jul	2011	14: 22: 49. 136	38_Re
2	Jul	2011	16: 42: 45. 418	155_deg
2	Jul	2011	17: 07: 13. 675	39_Re
2	Jul	2011	20: 02: 28. 464	40_Re
2	Jul	2011	23: 10: 30. 334	41_Re
3	Jul	2011	02: 33: 58. 184	42_Re
3	Jul	2011	06: 16: 38. 049	43_Re
3	Jul	2011	10: 24: 11. 456	44_Re
3	Jul	2011	15: 06: 00. 784	45_Re
3	Jul	2011	20: 39: 44. 743	46_Re
4	Jul	2011	03: 47: 48. 465	47_Re
4	Jul	2011	16: 00: 43. 403	48_Re
4	Jul	2011	23: 50: 07. 539	Apoapsis
5	Jul	2011	07: 39: 20. 620	48_Re
5	Jul	2011	19: 51: 06. 855	47_Re
6	Jul	2011	02: 58: 03. 139	46_Re
6	Jul	2011	08: 30: 40. 730	45_Re
6	Jul	2011	13: 11: 24. 590	44_Re
6	Jul	2011	17: 17: 53. 765	43_Re
6	Jul	2011	20: 59: 30. 235	42_Re
6	Jul	2011	22: 26: 22. 918	200_deg
7	Jul	2011	00: 21: 55. 615	41_Re
7	Jul	2011	03: 28: 55. 901	40_Re
7	Jul	2011	06: 23: 09. 954	39_Re
7	Jul	2011	09: 06: 34. 563	38_Re
7	Jul	2011	11: 40: 38. 613	37_Re
7	Jul	2011	14: 06: 31. 660	36_Re
7	Jul	2011	16: 25: 09. 381	35_Re
7	Jul	2011	18: 37: 17. 198	34_Re
7	Jul	2011	20: 43: 32. 778	33_Re
7	Jul	2011	22: 44: 27. 798	32_Re
8	Jul	2011	00: 40: 29. 228	31_Re
8	Jul	2011	02: 32: 00. 329	30_Re
8	Jul	2011	04: 19: 21. 301	29_Re
8	Jul	2011	06: 02: 49. 934	28_Re
8	Jul	2011	07: 42: 42. 008	27_Re
8	Jul	2011	09: 19: 11. 673	26_Re
8	Jul	2011	10: 52: 31. 766	25_Re
8	Jul	2011	12: 22: 54. 040	24_Re
8	Jul	2011	13: 50: 29. 399	23_Re
8	Jul	2011	15: 15: 28. 120	22_Re
8	Jul	2011	16: 38: 00. 057	21_Re
8	Jul	2011	17: 58: 14. 865	20_Re
8	Jul	2011	19: 16: 22. 243	19_Re
8	Jul	2011	20: 32: 32. 248	18_Re
8	Jul	2011	21: 46: 55. 679	17_Re
8	Jul	2011	22: 59: 44. 669	16_Re
9	Jul	2011	00: 11: 13. 500	15_Re
9	Jul	2011	01: 21: 39. 855	14_Re
9	Jul	2011	02: 31: 27. 101	13_Re
9	Jul	2011	02: 44: 01. 034	270_deg
9	Jul	2011	03: 41: 08. 321	12_Re
9	Jul	2011	04: 51: 34. 434	11_Re
9	Jul	2011	06: 04: 12. 918	10_Re
9	Jul	2011	07: 22: 00. 548	9_Re
9	Jul	2011	08: 53: 00. 630	8_Re
9	Jul	2011	11: 57: 18. 215	Periapsis
9	Jul	2011	15: 01: 34. 555	8_Re
9	Jul	2011	16: 32: 34. 630	9_Re
9	Jul	2011	17: 50: 22. 014	10_Re
9	Jul	2011	19: 03: 00. 203	11_Re

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9	Jul	2011	20: 13: 25. 989	12_Re
9	Jul	2011	21: 23: 06. 823	13_Re
9	Jul	2011	22: 32: 53. 657	14_Re
9	Jul	2011	23: 43: 19. 595	15_Re
10	Jul	2011	00: 54: 48. 036	16_Re
10	Jul	2011	02: 07: 36. 722	17_Re
10	Jul	2011	02: 30: 41. 201	110_deg
10	Jul	2011	03: 21: 59. 932	18_Re
10	Jul	2011	04: 38: 09. 872	19_Re
10	Jul	2011	05: 56: 17. 429	20_Re
10	Jul	2011	07: 16: 32. 636	21_Re
10	Jul	2011	08: 39: 05. 328	22_Re
10	Jul	2011	10: 04: 05. 259	23_Re
10	Jul	2011	11: 31: 42. 436	24_Re
10	Jul	2011	13: 02: 07. 147	25_Re
10	Jul	2011	14: 35: 30. 635	26_Re
10	Jul	2011	16: 12: 04. 586	27_Re
10	Jul	2011	17: 52: 02. 278	28_Re
10	Jul	2011	19: 35: 38. 069	29_Re
10	Jul	2011	21: 23: 08. 089	30_Re
10	Jul	2011	23: 14: 50. 548	31_Re
11	Jul	2011	01: 11: 06. 211	32_Re
11	Jul	2011	03: 12: 19. 000	33_Re
11	Jul	2011	05: 18: 56. 775	34_Re
11	Jul	2011	07: 31: 32. 366	35_Re
11	Jul	2011	09: 50: 44. 970	36_Re
11	Jul	2011	12: 17: 22. 080	37_Re
11	Jul	2011	14: 52: 22. 240	38_Re
11	Jul	2011	16: 08: 23. 755	155_deg
11	Jul	2011	17: 36: 59. 076	39_Re
11	Jul	2011	20: 32: 47. 454	40_Re
11	Jul	2011	23: 41: 53. 294	41_Re
12	Jul	2011	03: 07: 10. 125	42_Re
12	Jul	2011	06: 52: 49. 115	43_Re
12	Jul	2011	11: 05: 19. 037	44_Re
12	Jul	2011	15: 55: 43. 612	45_Re
12	Jul	2011	21: 46: 10. 694	46_Re
13	Jul	2011	05: 37: 25. 069	47_Re
13	Jul	2011	22: 24: 26. 167	Apoapsis
14	Jul	2011	15: 10: 15. 402	47_Re
14	Jul	2011	23: 00: 06. 061	46_Re
15	Jul	2011	04: 49: 10. 886	45_Re
15	Jul	2011	09: 38: 14. 461	44_Re
15	Jul	2011	13: 49: 24. 640	43_Re
15	Jul	2011	17: 33: 45. 002	42_Re
15	Jul	2011	20: 32: 14. 920	200_deg
15	Jul	2011	20: 57: 44. 234	41_Re
16	Jul	2011	00: 05: 33. 406	40_Re
16	Jul	2011	03: 00: 05. 951	39_Re
16	Jul	2011	05: 43: 27. 690	38_Re
16	Jul	2011	08: 17: 13. 390	37_Re
16	Jul	2011	10: 42: 36. 576	36_Re
16	Jul	2011	13: 00: 35. 688	35_Re
16	Jul	2011	15: 11: 58. 115	34_Re
16	Jul	2011	17: 17: 22. 942	33_Re
16	Jul	2011	19: 17: 22. 885	32_Re
16	Jul	2011	21: 12: 25. 683	31_Re
16	Jul	2011	23: 02: 55. 123	30_Re
17	Jul	2011	00: 49: 11. 846	29_Re
17	Jul	2011	02: 31: 33. 896	28_Re
17	Jul	2011	04: 10: 17. 240	27_Re
17	Jul	2011	05: 45: 36. 121	26_Re
17	Jul	2011	07: 17: 43. 377	25_Re



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17	Jul	2011	08: 46: 50. 714	24_Re
17	Jul	2011	10: 13: 08. 912	23_Re
17	Jul	2011	11: 36: 48. 043	22_Re
17	Jul	2011	12: 57: 57. 667	21_Re
17	Jul	2011	14: 16: 47. 040	20_Re
17	Jul	2011	15: 33: 25. 327	19_Re
17	Jul	2011	16: 48: 01. 870	18_Re
17	Jul	2011	18: 00: 46. 509	17_Re
17	Jul	2011	19: 11: 50. 062	16_Re
17	Jul	2011	20: 21: 24. 988	15_Re
17	Jul	2011	21: 29: 46. 304	14_Re
17	Jul	2011	22: 37: 13. 332	13_Re
17	Jul	2011	23: 29: 32. 437	270_deg
17	Jul	2011	23: 44: 12. 607	12_Re
18	Jul	2011	00: 51: 23. 553	11_Re
18	Jul	2011	01: 59: 50. 725	10_Re
18	Jul	2011	03: 11: 35. 445	9_Re
18	Jul	2011	04: 31: 23. 284	8_Re
18	Jul	2011	06: 18: 46. 344	7_Re
18	Jul	2011	08: 02: 34. 538	Periapsis
18	Jul	2011	09: 46: 21. 826	7_Re
18	Jul	2011	11: 33: 45. 411	8_Re
18	Jul	2011	12: 53: 33. 905	9_Re
18	Jul	2011	14: 05: 19. 142	10_Re
18	Jul	2011	15: 13: 46. 835	11_Re
18	Jul	2011	16: 20: 58. 210	12_Re
18	Jul	2011	17: 27: 57. 979	13_Re
18	Jul	2011	18: 35: 25. 368	14_Re
18	Jul	2011	19: 43: 46. 942	15_Re
18	Jul	2011	20: 53: 21. 989	16_Re
18	Jul	2011	21: 37: 28. 832	110_deg
18	Jul	2011	22: 04: 25. 515	17_Re
18	Jul	2011	23: 17: 09. 876	18_Re
19	Jul	2011	00: 31: 45. 842	19_Re
19	Jul	2011	01: 48: 23. 163	20_Re
19	Jul	2011	03: 07: 11. 093	21_Re
19	Jul	2011	04: 28: 18. 715	22_Re
19	Jul	2011	05: 51: 55. 160	23_Re
19	Jul	2011	07: 18: 09. 914	24_Re
19	Jul	2011	08: 47: 12. 690	25_Re
19	Jul	2011	10: 19: 14. 173	26_Re
19	Jul	2011	11: 54: 25. 842	27_Re
19	Jul	2011	13: 33: 00. 206	28_Re
19	Jul	2011	15: 15: 11. 156	29_Re
19	Jul	2011	17: 01: 14. 221	30_Re
19	Jul	2011	18: 51: 26. 930	31_Re
19	Jul	2011	20: 46: 09. 257	32_Re
19	Jul	2011	22: 45: 44. 183	33_Re
20	Jul	2011	00: 50: 38. 425	34_Re
20	Jul	2011	03: 01: 23. 392	35_Re
20	Jul	2011	05: 18: 36. 477	36_Re
20	Jul	2011	07: 43: 02. 829	37_Re
20	Jul	2011	10: 15: 37. 860	38_Re
20	Jul	2011	10: 50: 55. 693	155_deg
20	Jul	2011	12: 57: 30. 894	39_Re
20	Jul	2011	15: 50: 10. 670	40_Re
20	Jul	2011	18: 55: 34. 010	41_Re
20	Jul	2011	22: 16: 20. 211	42_Re
21	Jul	2011	01: 56: 16. 596	43_Re
21	Jul	2011	06: 01: 08. 132	44_Re
21	Jul	2011	10: 40: 26. 434	45_Re
21	Jul	2011	16: 12: 18. 713	46_Re
21	Jul	2011	23: 21: 14. 309	47_Re

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22	Jul	2011	12: 15: 14. 669	48_Re
22	Jul	2011	18: 34: 29. 586	Apoapsis
23	Jul	2011	00: 53: 43. 697	48_Re
23	Jul	2011	13: 47: 19. 763	47_Re
23	Jul	2011	20: 55: 52. 836	46_Re
24	Jul	2011	02: 27: 23. 550	45_Re
24	Jul	2011	07: 06: 21. 143	44_Re
24	Jul	2011	11: 10: 53. 281	43_Re
24	Jul	2011	14: 50: 31. 217	42_Re
24	Jul	2011	17: 03: 37. 816	200_deg
24	Jul	2011	18: 11: 00. 095	41_Re
24	Jul	2011	21: 16: 07. 279	40_Re
25	Jul	2011	00: 08: 32. 107	39_Re
25	Jul	2011	02: 50: 11. 437	38_Re
25	Jul	2011	05: 22: 34. 046	37_Re
25	Jul	2011	07: 46: 49. 291	36_Re
25	Jul	2011	10: 03: 52. 616	35_Re
25	Jul	2011	12: 14: 29. 199	34_Re
25	Jul	2011	14: 19: 16. 462	33_Re
25	Jul	2011	16: 18: 45. 842	32_Re
25	Jul	2011	18: 13: 24. 080	31_Re
25	Jul	2011	20: 03: 34. 186	30_Re
25	Jul	2011	21: 49: 36. 159	29_Re
25	Jul	2011	23: 31: 47. 557	28_Re
26	Jul	2011	01: 10: 23. 938	27_Re
26	Jul	2011	02: 45: 39. 225	26_Re
26	Jul	2011	04: 17: 46. 005	25_Re
26	Jul	2011	05: 46: 55. 784	24_Re
26	Jul	2011	07: 13: 19. 194	23_Re
26	Jul	2011	08: 37: 06. 206	22_Re
26	Jul	2011	09: 58: 26. 329	21_Re
26	Jul	2011	11: 17: 28. 818	20_Re
26	Jul	2011	12: 34: 22. 890	19_Re
26	Jul	2011	13: 49: 18. 012	18_Re
26	Jul	2011	15: 02: 24. 236	17_Re
26	Jul	2011	16: 13: 52. 714	16_Re
26	Jul	2011	17: 23: 56. 406	15_Re
26	Jul	2011	18: 32: 51. 107	14_Re
26	Jul	2011	19: 40: 57. 356	13_Re
26	Jul	2011	20: 18: 43. 850	270_deg
26	Jul	2011	20: 48: 43. 690	12_Re
26	Jul	2011	21: 56: 53. 060	11_Re
26	Jul	2011	23: 06: 36. 976	10_Re
27	Jul	2011	00: 20: 13. 066	9_Re
27	Jul	2011	01: 43: 21. 008	8_Re
27	Jul	2011	03: 43: 47. 968	7_Re
27	Jul	2011	05: 05: 52. 864	Periapsis
27	Jul	2011	06: 27: 56. 833	7_Re
27	Jul	2011	08: 28: 24. 549	8_Re
27	Jul	2011	09: 51: 33. 334	9_Re
27	Jul	2011	11: 05: 10. 309	10_Re
27	Jul	2011	12: 14: 55. 105	11_Re
27	Jul	2011	13: 23: 05. 364	12_Re
27	Jul	2011	14: 30: 52. 607	13_Re
27	Jul	2011	15: 38: 59. 707	14_Re
27	Jul	2011	16: 47: 55. 170	15_Re
27	Jul	2011	17: 57: 59. 479	16_Re
27	Jul	2011	19: 02: 24. 949	110_deg
27	Jul	2011	19: 09: 28. 363	17_Re
27	Jul	2011	20: 22: 34. 702	18_Re
27	Jul	2011	21: 37: 29. 497	19_Re
27	Jul	2011	22: 54: 22. 696	20_Re
28	Jul	2011	00: 13: 23. 561	21_Re

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28	Jul	2011	01: 34: 41. 162	22_Re
28	Jul	2011	02: 58: 24. 527	23_Re
28	Jul	2011	04: 24: 42. 953	24_Re
28	Jul	2011	05: 53: 45. 935	25_Re
28	Jul	2011	07: 25: 43. 824	26_Re
28	Jul	2011	09: 00: 47. 669	27_Re
28	Jul	2011	10: 39: 09. 477	28_Re
28	Jul	2011	12: 21: 02. 502	29_Re
28	Jul	2011	14: 06: 41. 493	30_Re
28	Jul	2011	15: 56: 23. 007	31_Re
28	Jul	2011	17: 50: 25. 816	32_Re
28	Jul	2011	19: 49: 11. 388	33_Re
28	Jul	2011	21: 53: 04. 529	34_Re
29	Jul	2011	00: 02: 34. 199	35_Re
29	Jul	2011	02: 18: 14. 604	36_Re
29	Jul	2011	04: 40: 46. 678	37_Re
29	Jul	2011	07: 11: 00. 136	38_Re
29	Jul	2011	08: 47: 03. 592	155_deg
29	Jul	2011	09: 49: 56. 418	39_Re
29	Jul	2011	12: 38: 53. 019	40_Re
29	Jul	2011	15: 39: 30. 133	41_Re
29	Jul	2011	18: 54: 01. 306	42_Re
29	Jul	2011	22: 25: 31. 560	43_Re
30	Jul	2011	02: 18: 30. 595	44_Re
30	Jul	2011	06: 40: 00. 038	45_Re
30	Jul	2011	11: 42: 10. 733	46_Re
30	Jul	2011	17: 50: 04. 324	47_Re
31	Jul	2011	02: 16: 56. 069	48_Re
31	Jul	2011	18: 09: 18. 256	Apoapsis
1	Aug	2011	10: 00: 57. 060	48_Re
1	Aug	2011	18: 26: 48. 785	47_Re
2	Aug	2011	00: 33: 43. 070	46_Re
2	Aug	2011	05: 34: 55. 076	45_Re
2	Aug	2011	09: 55: 26. 521	44_Re
2	Aug	2011	13: 47: 28. 183	43_Re
2	Aug	2011	17: 18: 01. 668	42_Re
2	Aug	2011	18: 56: 02. 517	200_deg
2	Aug	2011	20: 31: 36. 646	41_Re
2	Aug	2011	23: 31: 18. 109	40_Re
3	Aug	2011	02: 19: 19. 571	39_Re
3	Aug	2011	04: 57: 21. 191	38_Re
3	Aug	2011	07: 26: 40. 427	37_Re
3	Aug	2011	09: 48: 18. 679	36_Re
3	Aug	2011	12: 03: 05. 621	35_Re
3	Aug	2011	14: 11: 42. 138	34_Re
3	Aug	2011	16: 14: 42. 385	33_Re
3	Aug	2011	18: 12: 35. 266	32_Re
3	Aug	2011	20: 05: 45. 525	31_Re
3	Aug	2011	21: 54: 34. 563	30_Re
3	Aug	2011	23: 39: 21. 002	29_Re
4	Aug	2011	01: 20: 21. 624	28_Re
4	Aug	2011	02: 57: 50. 582	27_Re
4	Aug	2011	04: 32: 01. 370	26_Re
4	Aug	2011	06: 03: 05. 801	25_Re
4	Aug	2011	07: 31: 14. 772	24_Re
4	Aug	2011	08: 56: 38. 355	23_Re
4	Aug	2011	10: 19: 25. 994	22_Re
4	Aug	2011	11: 39: 46. 677	21_Re
4	Aug	2011	12: 57: 49. 128	20_Re
4	Aug	2011	14: 13: 41. 995	19_Re
4	Aug	2011	15: 27: 34. 104	18_Re
4	Aug	2011	16: 39: 34. 754	17_Re
4	Aug	2011	17: 49: 54. 153	16_Re

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4	Aug	2011	18: 58: 44. 047	15_Re
4	Aug	2011	20: 06: 18. 537	14_Re
4	Aug	2011	21: 12: 55. 693	13_Re
4	Aug	2011	22: 15: 51. 461	270_deg
4	Aug	2011	22: 19: 00. 182	12_Re
4	Aug	2011	23: 25: 08. 342	11_Re
5	Aug	2011	00: 32: 18. 980	10_Re
5	Aug	2011	01: 42: 20. 488	9_Re
5	Aug	2011	02: 59: 19. 332	8_Re
5	Aug	2011	04: 38: 14. 704	7_Re
5	Aug	2011	06: 37: 00. 096	Periapsis
5	Aug	2011	08: 35: 44. 025	7_Re
5	Aug	2011	10: 14: 39. 392	8_Re
5	Aug	2011	11: 31: 38. 002	9_Re
5	Aug	2011	12: 41: 39. 305	10_Re
5	Aug	2011	13: 48: 49. 655	11_Re
5	Aug	2011	14: 54: 57. 500	12_Re
5	Aug	2011	16: 01: 01. 682	13_Re
5	Aug	2011	17: 07: 38. 574	14_Re
5	Aug	2011	18: 15: 12. 884	15_Re
5	Aug	2011	19: 24: 02. 727	16_Re
5	Aug	2011	19: 54: 15. 342	110_deg
5	Aug	2011	20: 34: 22. 281	17_Re
5	Aug	2011	21: 46: 23. 301	18_Re
5	Aug	2011	23: 00: 16. 115	19_Re
6	Aug	2011	00: 16: 10. 033	20_Re
6	Aug	2011	01: 34: 13. 995	21_Re
6	Aug	2011	02: 54: 36. 767	22_Re
6	Aug	2011	04: 17: 27. 208	23_Re
6	Aug	2011	05: 42: 54. 405	24_Re
6	Aug	2011	07: 11: 08. 000	25_Re
6	Aug	2011	08: 42: 18. 250	26_Re
6	Aug	2011	10: 16: 36. 272	27_Re
6	Aug	2011	11: 54: 14. 245	28_Re
6	Aug	2011	13: 35: 25. 647	29_Re
6	Aug	2011	15: 20: 25. 532	30_Re
6	Aug	2011	17: 09: 30. 871	31_Re
6	Aug	2011	19: 03: 00. 972	32_Re
6	Aug	2011	21: 01: 18. 011	33_Re
6	Aug	2011	23: 04: 47. 709	34_Re
7	Aug	2011	01: 14: 00. 229	35_Re
7	Aug	2011	03: 29: 31. 371	36_Re
7	Aug	2011	05: 52: 04. 208	37_Re
7	Aug	2011	08: 22: 31. 379	38_Re
7	Aug	2011	08: 47: 46. 504	155_deg
7	Aug	2011	11: 01: 58. 413	39_Re
7	Aug	2011	13: 51: 48. 680	40_Re
7	Aug	2011	16: 53: 51. 110	41_Re
7	Aug	2011	20: 10: 32. 831	42_Re
7	Aug	2011	23: 45: 21. 195	43_Re
8	Aug	2011	03: 43: 25. 522	44_Re
8	Aug	2011	08: 13: 05. 670	45_Re
8	Aug	2011	13: 29: 34. 294	46_Re
8	Aug	2011	20: 07: 16. 027	47_Re
9	Aug	2011	06: 19: 17. 233	48_Re
9	Aug	2011	17: 19: 58. 922	Apoapsis
10	Aug	2011	04: 20: 23. 944	48_Re
10	Aug	2011	14: 31: 36. 865	47_Re
10	Aug	2011	21: 08: 31. 483	46_Re
11	Aug	2011	02: 24: 14. 189	45_Re
11	Aug	2011	06: 53: 09. 555	44_Re
11	Aug	2011	10: 50: 30. 180	43_Re
11	Aug	2011	14: 24: 35. 862	42_Re

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11	Aug	2011	17: 07: 53. 021	200_deg
11	Aug	2011	17: 40: 35. 859	41_Re
11	Aug	2011	20: 41: 57. 466	40_Re
11	Aug	2011	23: 31: 07. 747	39_Re
12	Aug	2011	02: 09: 55. 571	38_Re
12	Aug	2011	04: 39: 44. 247	37_Re
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13	Aug	2011	04: 41: 07. 731	24_Re
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13	Aug	2011	07: 28: 12. 613	22_Re
13	Aug	2011	08: 47: 57. 960	21_Re
13	Aug	2011	10: 05: 23. 530	20_Re
13	Aug	2011	11: 20: 37. 815	19_Re
13	Aug	2011	12: 33: 49. 415	18_Re
13	Aug	2011	13: 45: 07. 299	17_Re
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13	Aug	2011	19: 34: 55. 432	270_deg
13	Aug	2011	20: 24: 48. 572	11_Re
13	Aug	2011	21: 30: 21. 303	10_Re
13	Aug	2011	22: 38: 10. 042	9_Re
13	Aug	2011	23: 51: 35. 271	8_Re
14	Aug	2011	01: 21: 18. 503	7_Re
14	Aug	2011	03: 38: 05. 016	Periapsis
14	Aug	2011	05: 54: 50. 472	7_Re
14	Aug	2011	07: 24: 34. 314	8_Re
14	Aug	2011	08: 38: 00. 117	9_Re
14	Aug	2011	09: 45: 49. 387	10_Re
14	Aug	2011	10: 51: 22. 639	11_Re
14	Aug	2011	11: 56: 12. 489	12_Re
14	Aug	2011	13: 01: 10. 396	13_Re
14	Aug	2011	14: 06: 48. 987	14_Re
14	Aug	2011	15: 13: 30. 597	15_Re
14	Aug	2011	16: 21: 31. 836	16_Re
14	Aug	2011	16: 29: 21. 813	110_deg
14	Aug	2011	17: 31: 05. 831	17_Re
14	Aug	2011	18: 42: 23. 605	18_Re
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14	Aug	2011	21: 10: 48. 484	20_Re
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15	Aug	2011	02: 34: 56. 682	24_Re
15	Aug	2011	04: 02: 30. 871	25_Re
15	Aug	2011	05: 33: 00. 924	26_Re
15	Aug	2011	07: 06: 37. 605	27_Re
15	Aug	2011	08: 43: 32. 700	28_Re
15	Aug	2011	10: 23: 59. 238	29_Re
15	Aug	2011	12: 08: 11. 758	30_Re

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15	Aug	2011	13: 56: 26. 622	31_Re
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16	Aug	2011	00: 10: 55. 791	36_Re
16	Aug	2011	02: 31: 56. 333	37_Re
16	Aug	2011	05: 00: 36. 899	38_Re
16	Aug	2011	05: 29: 34. 704	155_deg
16	Aug	2011	07: 37: 58. 845	39_Re
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16	Aug	2011	16: 37: 13. 042	42_Re
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21	Aug	2011	10: 43: 57. 661	34_Re
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21	Aug	2011	14: 45: 00. 031	32_Re
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21	Aug	2011	18: 27: 17. 267	30_Re
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22	Aug	2011	01: 05: 45. 239	26_Re
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22	Aug	2011	13: 17: 53. 295	17_Re
22	Aug	2011	14: 28: 59. 504	16_Re
22	Aug	2011	15: 38: 41. 467	15_Re
22	Aug	2011	16: 47: 14. 595	14_Re
22	Aug	2011	17: 54: 58. 941	13_Re
22	Aug	2011	18: 34: 57. 272	270_deg
22	Aug	2011	19: 02: 22. 356	12_Re
22	Aug	2011	20: 10: 06. 695	11_Re
22	Aug	2011	21: 19: 21. 436	10_Re
22	Aug	2011	22: 32: 19. 576	9_Re
22	Aug	2011	23: 54: 25. 555	8_Re

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23	Aug	2011	12: 42: 45. 684	13_Re
23	Aug	2011	13: 50: 30. 675	14_Re
23	Aug	2011	14: 59: 04. 451	15_Re
23	Aug	2011	16: 08: 47. 049	16_Re
23	Aug	2011	17: 11: 05. 181	110_deg
23	Aug	2011	17: 19: 53. 866	17_Re
23	Aug	2011	18: 32: 37. 505	18_Re
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23	Aug	2011	22: 22: 12. 154	21_Re
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24	Aug	2011	01: 06: 16. 347	23_Re
24	Aug	2011	02: 32: 03. 493	24_Re
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24	Aug	2011	05: 31: 54. 550	26_Re
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24	Aug	2011	12: 09: 53. 137	30_Re
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25	Aug	2011	02: 34: 36. 069	37_Re
25	Aug	2011	05: 02: 38. 947	38_Re
25	Aug	2011	07: 09: 52. 781	155_deg
25	Aug	2011	07: 39: 02. 343	39_Re
25	Aug	2011	10: 24: 57. 345	40_Re
25	Aug	2011	13: 21: 54. 921	41_Re
25	Aug	2011	16: 31: 54. 783	42_Re
25	Aug	2011	19: 57: 40. 083	43_Re
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26	Aug	2011	08: 40: 07. 198	46_Re
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29	Aug	2011	02: 13: 37. 836	46_Re
29	Aug	2011	06: 59: 25. 542	45_Re
29	Aug	2011	11: 09: 58. 508	44_Re
29	Aug	2011	14: 55: 00. 030	43_Re
29	Aug	2011	18: 20: 23. 159	42_Re
29	Aug	2011	18: 55: 48. 276	200_deg
29	Aug	2011	21: 30: 00. 577	41_Re
30	Aug	2011	00: 26: 35. 431	40_Re
30	Aug	2011	03: 12: 07. 423	39_Re
30	Aug	2011	05: 48: 07. 513	38_Re
30	Aug	2011	08: 15: 46. 776	37_Re
30	Aug	2011	10: 36: 02. 036	36_Re

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30	Aug	2011	12: 49: 39. 593	35_Re
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31	Aug	2011	00: 21: 55. 569	29_Re
31	Aug	2011	02: 02: 34. 771	28_Re
31	Aug	2011	03: 39: 46. 008	27_Re
31	Aug	2011	05: 13: 42. 008	26_Re
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31	Aug	2011	08: 12: 33. 506	24_Re
31	Aug	2011	09: 37: 49. 413	23_Re
31	Aug	2011	11: 00: 31. 275	22_Re
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31	Aug	2011	16: 08: 32. 464	18_Re
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31	Aug	2011	18: 30: 57. 851	16_Re
31	Aug	2011	19: 39: 52. 681	15_Re
31	Aug	2011	20: 47: 33. 818	14_Re
31	Aug	2011	21: 54: 19. 632	13_Re
31	Aug	2011	22: 52: 16. 171	270_deg
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1	Sep	2011	03: 42: 50. 850	8_Re
1	Sep	2011	05: 24: 26. 284	7_Re
1	Sep	2011	07: 17: 57. 782	Periapsis
1	Sep	2011	09: 11: 27. 174	7_Re
1	Sep	2011	10: 53: 02. 417	8_Re
1	Sep	2011	12: 10: 53. 093	9_Re
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1	Sep	2011	18: 55: 57. 909	15_Re
1	Sep	2011	20: 04: 52. 796	16_Re
1	Sep	2011	20: 42: 12. 152	110_deg
1	Sep	2011	21: 15: 16. 007	17_Re
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1	Sep	2011	23: 41: 13. 396	19_Re
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2	Sep	2011	02: 15: 10. 095	21_Re
2	Sep	2011	03: 35: 30. 492	22_Re
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2	Sep	2011	07: 51: 46. 725	25_Re
2	Sep	2011	09: 22: 49. 009	26_Re
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2	Sep	2011	14: 15: 21. 326	29_Re
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2	Sep	2011	23: 42: 48. 865	34_Re
3	Sep	2011	01: 51: 25. 218	35_Re
3	Sep	2011	04: 06: 13. 570	36_Re
3	Sep	2011	06: 27: 55. 446	37_Re



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3	Sep	2011	08: 57: 21. 403	38_Re
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4	Sep	2011	00: 09: 47. 964	43_Re
4	Sep	2011	04: 03: 22. 446	44_Re
4	Sep	2011	08: 26: 24. 920	45_Re
4	Sep	2011	13: 32: 03. 932	46_Re
4	Sep	2011	19: 48: 13. 733	47_Re
5	Sep	2011	04: 43: 49. 765	48_Re
5	Sep	2011	18: 54: 06. 573	Apoapsis
6	Sep	2011	09: 04: 27. 169	48_Re
6	Sep	2011	18: 00: 06. 577	47_Re
7	Sep	2011	00: 16: 20. 170	46_Re
7	Sep	2011	05: 22: 03. 418	45_Re
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7	Sep	2011	13: 38: 50. 078	43_Re
7	Sep	2011	17: 10: 28. 705	42_Re
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7	Sep	2011	23: 25: 02. 483	40_Re
8	Sep	2011	02: 13: 27. 533	39_Re
8	Sep	2011	04: 51: 46. 832	38_Re
8	Sep	2011	07: 21: 19. 634	37_Re
8	Sep	2011	09: 43: 08. 566	36_Re
8	Sep	2011	11: 58: 04. 162	35_Re
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8	Sep	2011	16: 09: 54. 470	33_Re
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8	Sep	2011	21: 50: 02. 778	30_Re
8	Sep	2011	23: 34: 54. 408	29_Re
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9	Sep	2011	02: 53: 34. 555	27_Re
9	Sep	2011	04: 27: 51. 065	26_Re
9	Sep	2011	05: 59: 01. 591	25_Re
9	Sep	2011	07: 27: 17. 090	24_Re
9	Sep	2011	08: 52: 47. 701	23_Re
9	Sep	2011	10: 15: 42. 942	22_Re
9	Sep	2011	11: 36: 11. 870	21_Re
9	Sep	2011	12: 54: 23. 290	20_Re
9	Sep	2011	14: 10: 25. 959	19_Re
9	Sep	2011	15: 24: 28. 833	18_Re
9	Sep	2011	16: 36: 41. 372	17_Re
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9	Sep	2011	18: 56: 18. 756	15_Re
9	Sep	2011	20: 04: 10. 162	14_Re
9	Sep	2011	21: 11: 06. 914	13_Re
9	Sep	2011	22: 06: 28. 646	270_deg
9	Sep	2011	22: 17: 34. 667	12_Re
9	Sep	2011	23: 24: 11. 457	11_Re
10	Sep	2011	00: 31: 59. 327	10_Re
10	Sep	2011	01: 42: 54. 050	9_Re
10	Sep	2011	03: 01: 24. 288	8_Re
10	Sep	2011	04: 44: 58. 937	7_Re
10	Sep	2011	06: 34: 55. 278	Periapsis
10	Sep	2011	08: 24: 49. 688	7_Re
10	Sep	2011	10: 08: 25. 071	8_Re
10	Sep	2011	11: 26: 55. 900	9_Re
10	Sep	2011	12: 37: 51. 121	10_Re
10	Sep	2011	13: 45: 39. 482	11_Re

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10	Sep	2011	14: 52: 16. 741	12_Re
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10	Sep	2011	17: 05: 42. 140	14_Re
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10	Sep	2011	19: 22: 39. 147	16_Re
10	Sep	2011	20: 03: 56. 485	110_deg
10	Sep	2011	20: 33: 12. 199	17_Re
10	Sep	2011	21: 45: 25. 093	18_Re
10	Sep	2011	22: 59: 28. 299	19_Re
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11	Sep	2011	01: 33: 42. 715	21_Re
11	Sep	2011	02: 54: 11. 600	22_Re
11	Sep	2011	04: 17: 06. 623	23_Re
11	Sep	2011	05: 42: 36. 733	24_Re
11	Sep	2011	07: 10: 51. 413	25_Re
11	Sep	2011	08: 42: 00. 689	26_Re
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11	Sep	2011	13: 34: 49. 638	29_Re
11	Sep	2011	15: 19: 36. 721	30_Re
11	Sep	2011	17: 08: 24. 920	31_Re
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13	Sep	2011	12: 26: 37. 915	46_Re
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14	Sep	2011	02: 33: 14. 178	48_Re
14	Sep	2011	19: 21: 34. 810	Apoapsis
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15	Sep	2011	20: 19: 32. 808	47_Re
16	Sep	2011	02: 20: 36. 643	46_Re
16	Sep	2011	07: 19: 11. 510	45_Re
16	Sep	2011	11: 38: 32. 072	44_Re
16	Sep	2011	15: 30: 10. 354	43_Re
16	Sep	2011	18: 13: 52. 425	200_deg
16	Sep	2011	19: 00: 50. 182	42_Re
16	Sep	2011	22: 14: 51. 731	41_Re
17	Sep	2011	01: 15: 14. 415	40_Re
17	Sep	2011	04: 04: 08. 237	39_Re
17	Sep	2011	06: 43: 11. 029	38_Re
17	Sep	2011	09: 13: 38. 649	37_Re
17	Sep	2011	11: 36: 31. 368	36_Re
17	Sep	2011	13: 52: 38. 047	35_Re
17	Sep	2011	16: 02: 38. 983	34_Re
17	Sep	2011	18: 07: 07. 852	33_Re
17	Sep	2011	20: 06: 33. 424	32_Re
17	Sep	2011	22: 01: 20. 070	31_Re
17	Sep	2011	23: 51: 49. 129	30_Re
18	Sep	2011	01: 38: 19. 237	29_Re
18	Sep	2011	03: 21: 06. 920	28_Re
18	Sep	2011	05: 00: 26. 909	27_Re

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18	Sep	2011	06: 36: 32. 493	26_Re
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18	Sep	2011	11: 07: 19. 559	23_Re
18	Sep	2011	12: 32: 20. 431	22_Re
18	Sep	2011	13: 55: 00. 245	21_Re
18	Sep	2011	15: 15: 28. 549	20_Re
18	Sep	2011	16: 33: 55. 069	19_Re
18	Sep	2011	17: 50: 30. 037	18_Re
18	Sep	2011	19: 05: 24. 617	17_Re
18	Sep	2011	20: 18: 51. 570	16_Re
18	Sep	2011	21: 31: 06. 187	15_Re
18	Sep	2011	22: 42: 27. 770	14_Re
18	Sep	2011	23: 38: 50. 000	270_deg
18	Sep	2011	23: 53: 22. 316	13_Re
19	Sep	2011	01: 04: 27. 411	12_Re
19	Sep	2011	02: 16: 42. 318	11_Re
19	Sep	2011	03: 31: 52. 273	10_Re
19	Sep	2011	04: 53: 41. 439	9_Re
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19	Sep	2011	09: 16: 36. 665	Periapsis
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19	Sep	2011	13: 39: 30. 311	9_Re
19	Sep	2011	15: 01: 19. 915	10_Re
19	Sep	2011	16: 16: 30. 247	11_Re
19	Sep	2011	17: 28: 45. 582	12_Re
19	Sep	2011	18: 39: 51. 140	13_Re
19	Sep	2011	19: 50: 46. 229	14_Re
19	Sep	2011	21: 02: 08. 455	15_Re
19	Sep	2011	22: 14: 23. 841	16_Re
19	Sep	2011	23: 27: 51. 727	17_Re
20	Sep	2011	00: 27: 57. 561	110_deg
20	Sep	2011	00: 42: 47. 394	18_Re
20	Sep	2011	01: 59: 23. 628	19_Re
20	Sep	2011	03: 17: 51. 603	20_Re
20	Sep	2011	04: 38: 21. 521	21_Re
20	Sep	2011	06: 01: 03. 127	22_Re
20	Sep	2011	07: 26: 05. 970	23_Re
20	Sep	2011	08: 53: 39. 704	24_Re
20	Sep	2011	10: 23: 54. 138	25_Re
20	Sep	2011	11: 56: 59. 854	26_Re
20	Sep	2011	13: 33: 07. 734	27_Re
20	Sep	2011	15: 12: 30. 032	28_Re
20	Sep	2011	16: 55: 19. 853	29_Re
20	Sep	2011	18: 41: 51. 782	30_Re
20	Sep	2011	20: 32: 22. 120	31_Re
20	Sep	2011	22: 27: 09. 261	32_Re
21	Sep	2011	00: 26: 34. 162	33_Re
21	Sep	2011	02: 31: 00. 931	34_Re
21	Sep	2011	04: 40: 57. 603	35_Re
21	Sep	2011	06: 56: 57. 142	36_Re
21	Sep	2011	09: 19: 38. 809	37_Re
21	Sep	2011	11: 49: 50. 035	38_Re
21	Sep	2011	14: 28: 29. 077	39_Re
21	Sep	2011	15: 39: 50. 554	155_deg
21	Sep	2011	17: 16: 48. 890	40_Re
21	Sep	2011	20: 16: 22. 982	41_Re

I BEX FDG Stati on Vi ew Peri ods Report  
 Created: 14 Jun 2011 01:17:22 EDT

Strand Name Range (Re)	Start Time (UTCG) Stop Range (Re)	Stop Time (UTCG)	Start
AUWA01 To Forward 23. 318026	14 Jun 2011 00: 00: 00. 000 24. 526757	14 Jun 2011 01: 13: 09. 641	
APL To Forward 26. 511625	14 Jun 2011 03: 54: 18. 362 32. 161993	14 Jun 2011 12: 41: 56. 250	
USHI 01 To Forward 29. 529585	14 Jun 2011 08: 19: 15. 499 35. 388653	14 Jun 2011 18: 48: 11. 068	
USAK01 To Forward 31. 345591	14 Jun 2011 11: 16: 04. 023 33. 679108	14 Jun 2011 15: 24: 16. 750	
AUWA01 To Forward 32. 613820	14 Jun 2011 13: 27: 28. 870 38. 558247	15 Jun 2011 01: 44: 24. 772	
APL To Forward 39. 409656	15 Jun 2011 03: 54: 40. 006 42. 811015	15 Jun 2011 13: 51: 02. 852	
USHI 01 To Forward 41. 181333	15 Jun 2011 08: 41: 24. 325 44. 330590	15 Jun 2011 19: 30: 20. 505	
USAK01 To Forward 41. 559702	15 Jun 2011 09: 48: 41. 104 43. 914538	15 Jun 2011 17: 44: 06. 069	
AUWA01 To Forward 42. 960915	15 Jun 2011 14: 17: 31. 260 45. 790609	16 Jun 2011 01: 56: 00. 597	
APL To Forward 46. 144186	16 Jun 2011 03: 55: 13. 308 47. 627885	16 Jun 2011 14: 32: 39. 476	
USHI 01 To Forward 46. 965327	16 Jun 2011 08: 54: 09. 658 48. 043842	16 Jun 2011 19: 58: 38. 717	
USAK01 To Forward 47. 007066	16 Jun 2011 09: 12: 07. 344 48. 018476	16 Jun 2011 18: 59: 13. 337	
AUWA01 To Forward 47. 676587	16 Jun 2011 14: 50: 29. 822 48. 314055	17 Jun 2011 02: 03: 47. 293	
APL To Forward 48. 317706	17 Jun 2011 03: 56: 21. 505 47. 975598	17 Jun 2011 15: 15: 08. 727	
USAK01 To Forward 48. 288988	17 Jun 2011 08: 43: 09. 008 47. 587982	17 Jun 2011 20: 20: 51. 221	
USHI 01 To Forward 48. 278429	17 Jun 2011 09: 06: 34. 492 47. 534896	17 Jun 2011 20: 31: 11. 499	
AUWA01 To Forward 47. 981689	17 Jun 2011 15: 26: 38. 760 46. 919043	18 Jun 2011 02: 12: 59. 186	
APL To Forward 46. 655175	18 Jun 2011 03: 59: 55. 757 44. 432312	18 Jun 2011 16: 08: 03. 314	
USAK01 To Forward 46. 015566	18 Jun 2011 08: 11: 39. 549 43. 014388	18 Jun 2011 22: 00: 57. 105	
USHI 01 To Forward 45. 804221	18 Jun 2011 09: 24: 08. 845 43. 191013	18 Jun 2011 21: 20: 28. 570	
AUWA01 To Forward 44. 427287	18 Jun 2011 16: 14: 05. 861 42. 173857	18 Jun 2011 23: 08: 05. 863	
APL To Aft 28. 304075	20 Jun 2011 08: 22: 57. 371 21. 002338	20 Jun 2011 20: 25: 04. 324	
USAK01 To Aft 28. 277858	20 Jun 2011 09: 09: 51. 240 10. 305950	21 Jun 2011 09: 42: 11. 354	
USHI 01 To Aft 27. 532220	20 Jun 2011 10: 46: 50. 732 16. 882541	21 Jun 2011 01: 42: 00. 746	
AUWA01 To Aft 20. 773350	20 Jun 2011 20: 44: 36. 824 14. 003357	21 Jun 2011 05: 08: 41. 241	
APL To Forward 16. 867739	22 Jun 2011 03: 46: 45. 164 19. 434772	22 Jun 2011 06: 59: 45. 360	
USHI 01 To Forward 18. 953449	22 Jun 2011 06: 24: 31. 403 26. 030706	22 Jun 2011 16: 17: 17. 202	
AUWA01 To Forward 21. 785511	22 Jun 2011 10: 05: 14. 897 30. 908893	23 Jun 2011 00: 33: 38. 274	

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APL To Forward	23 Jun 2011 03:15:39.070	23 Jun 2011 11:41:06.706
32.304220	36.242158	
USHI 01 To Forward	23 Jun 2011 07:33:49.431	23 Jun 2011 17:56:10.132
34.423336	38.718171	
USAK01 To Forward	23 Jun 2011 11:41:14.919	23 Jun 2011 13:21:35.029
36.261475	36.962217	
AUWA01 To Forward	23 Jun 2011 12:30:44.026	24 Jun 2011 01:04:13.882
36.613387	41.199576	
APL To Forward	24 Jun 2011 03:17:19.895	24 Jun 2011 13:02:24.676
41.857133	44.410486	
USHI 01 To Forward	24 Jun 2011 08:00:08.189	24 Jun 2011 18:47:27.996
43.196203	45.588346	
USAK01 To Forward	24 Jun 2011 09:24:59.573	24 Jun 2011 16:47:10.833
43.559705	45.232783	
AUWA01 To Forward	24 Jun 2011 13:31:00.969	25 Jun 2011 01:18:58.087
44.538359	46.715402	
APL To Forward	25 Jun 2011 03:19:08.054	25 Jun 2011 13:57:05.357
46.975289	48.039388	
USHI 01 To Forward	25 Jun 2011 08:17:33.499	25 Jun 2011 19:25:01.977
47.579780	48.298627	
USAK01 To Forward	25 Jun 2011 08:38:30.778	25 Jun 2011 18:27:40.166
47.614617	48.299492	
AUWA01 To Forward	25 Jun 2011 14:15:00.032	26 Jun 2011 01:29:22.640
48.078504	48.429062	
APL To Forward	26 Jun 2011 03:21:29.393	26 Jun 2011 14:45:34.578
48.394280	47.837518	
USAK01 To Forward	26 Jun 2011 08:04:52.472	26 Jun 2011 19:55:30.523
48.278851	47.341370	
USHI 01 To Forward	26 Jun 2011 08:33:14.530	26 Jun 2011 20:00:04.329
48.257914	47.295962	
AUWA01 To Forward	26 Jun 2011 14:56:22.410	27 Jun 2011 01:39:01.244
47.840764	46.572963	
APL To Forward	27 Jun 2011 03:25:26.530	27 Jun 2011 15:38:56.428
46.274664	43.773747	
USAK01 To Forward	27 Jun 2011 07:33:17.655	27 Jun 2011 21:37:40.974
45.561456	42.190129	
USHI 01 To Forward	27 Jun 2011 08:51:11.480	27 Jun 2011 20:50:04.278
45.307398	42.417207	
AUWA01 To Forward	27 Jun 2011 15:44:33.837	28 Jun 2011 01:50:52.085
43.768052	40.895948	
APL To Forward	28 Jun 2011 03:33:34.207	28 Jun 2011 16:56:21.285
40.315514	35.059878	
USAK01 To Forward	28 Jun 2011 06:55:07.225	29 Jun 2011 00:48:42.591
39.160677	31.194787	
USHI 01 To Forward	28 Jun 2011 09:18:07.174	28 Jun 2011 21:54:53.570
38.269550	32.698447	
AUWA01 To Forward	28 Jun 2011 16:59:17.779	29 Jun 2011 02:12:44.452
35.053855	30.429585	
APL To Forward	29 Jun 2011 03:57:19.837	29 Jun 2011 09:07:52.484
29.434929	25.545810	
USAK01 To Forward	29 Jun 2011 05:29:39.175	29 Jun 2011 09:25:05.985
28.560384	25.837107	
AUWA01 To Aft	29 Jun 2011 21:26:03.911	30 Jun 2011 10:19:06.780
17.408150	7.845677	
USAK01 To Aft	29 Jun 2011 22:18:14.663	30 Jun 2011 07:27:39.352
16.072831	9.371235	
USHI 01 To Aft	29 Jun 2011 22:53:10.195	30 Jun 2011 02:50:18.668
15.784609	12.899447	
AUWA01 To Forward	30 Jun 2011 12:10:50.380	30 Jun 2011 20:55:32.849
7.863838	14.212355	
APL To Forward	1 Jul 2011 02:48:47.806	1 Jul 2011 07:48:35.431
19.017447	22.756363	
USHI 01 To Forward	1 Jul 2011 05:53:37.510	1 Jul 2011 15:58:55.318

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21. 386244		28. 123792			
AUWA01 To Forward	1 Jul	2011 09: 59: 33. 400		2 Jul	2011 00: 02: 45. 729
24. 298840		32. 600026			
APL To Forward	2 Jul	2011 02: 40: 01. 863		2 Jul	2011 11: 14: 37. 742
33. 877477		37. 665470			
USHI 01 To Forward	2 Jul	2011 07: 01: 14. 013		2 Jul	2011 17: 25: 31. 037
35. 905388		39. 977811			
USAK01 To Forward	2 Jul	2011 10: 33: 52. 885		2 Jul	2011 13: 23: 35. 578
37. 408302		38. 529781			
AUWA01 To Forward	2 Jul	2011 12: 01: 18. 191		3 Jul	2011 00: 29: 55. 373
37. 997539		42. 308253			
APL To Forward	3 Jul	2011 02: 41: 40. 014		3 Jul	2011 12: 30: 00. 917
42. 923404		45. 351522			
USHI 01 To Forward	3 Jul	2011 07: 25: 30. 902		3 Jul	2011 18: 13: 38. 310
44. 196660		46. 456455			
USAK01 To Forward	3 Jul	2011 08: 45: 40. 406		3 Jul	2011 16: 17: 13. 000
44. 521725		46. 135642			
AUWA01 To Forward	3 Jul	2011 12: 57: 41. 563		3 Jul	2011 23: 00: 00. 000
45. 469990		46. 895480			