

Maneuver Acceptance Committee : Pre-Spin Up Checklist

C. Reno
Last Update 6/1/11

By	Parameter	Info on Page	Limits	Value
FDG	Current OD Uncertainty	13	Within ground station FOV for post spin-up passes	In track 3-sigma @ apogee : 3km In track 3-sigma @ perigee : 9km
FDG	Target Orbit Period Uncertainty (Napoleon plot)	14, 23-27	- 8% delta-V, no upper limit	
FDG	No Burn Trajectory	18	Orbit progression without any more maneuvers	< 0.5 Re alt perigee Aus-Sep 2011 7h eclipse Sep 2012 Escape Jan 2014
FDG	Contingency Plans (No Burn Trajectory)	29	Define path forward for burn waive	-
FDG	Helionose Progression	15	Counter Clockwise	Counter Clockwise
FDG	Apogee Radius	16	Always <= 55Re geocentric	43 - 50 Re Radius
FDG	Perigee Radius	17	Always >= 3Re geocentric	7-15 Re Radius
FDG	Communications Analysis	19-21	Can dump all data collected	160ksps dump every perigee
FDG	Apogee & Perigee Times	30	For info	-
FDG	Crossing Times	45-61	For info	-
FDG	Star Tracker Outages	22, 31-32	No outage throughout re-pointing	No outages during Jun 5 & Jun 24 repointing maneuvers
FDG	View periods Report	39-44	Contacts Still Valid	-
MOC	SAP		Contacts Still Valid	MOC file needed
MOC	USN Coverage for Repointing		N/A	
MOC	USN Coverage for Spin Up		Available at time of MAC	
MOC	USN Coverage after Spin-Up		N/A	
FDG	Repointing Target Vector	8	N/A	Unbiased : 0.367310,0.634537,0.680034 Biased : ISOC input needed
MOC	Repointing ATS		N/A	
MOC	Spin Up ATS		N/A	
MOC	Contact ATS		240 command maximum	
SYS,	Approved Repointing ATS (prior to MAC)		N/A	

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ACS, MOC, MOM, PM, ISOC, FDG				
SYS, ACS, MOC, MOM, PM, ISOC	Approved Spin-Up 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)	38	GREEN	SYS Update needed
SYS	HPS TLM (from contact before MAC)		GREEN	SYS Update needed
SYS	EPS TLM (from contact before MAC)	33	Start June 1, running history, GREEN	SYS Update needed (unclear)
SYS	SCB TLM (from contact before MAC)	34-35	GREEN	SYS Update needed
SYS	Temperature Plots	36-37	Start June 1, running history, GREEN	SYS Update needed

S/C State as of pass prior to MAC (6/1 1045 UTC):

Sun Angle 1.942 deg Post-Maneuver Expected Sun Angle _____ tol +/- 1 degree (quaternions) SYS Update needed
 Spin Rate 4.195 rpm Post-Maneuver Expected Spin Rate _____ tol. +/- 1 rpm SYS Update needed

SCB State Science
 CEU Mode HVSci
 FC Mode Quaternion
 ACE Mode Low Rate
 EPS Mode Normal
 Star Tracker ON
 ACS Low Rate Sensor Accel

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Fuel used Table : Grey boxes do not have meaningful values - leave blank : **SYS, ISOC input needed**

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		18.82		173.14		20.05							16.41	
Pre-Spin Up	173.43		18.82		173.14		20.05							16.41	
Post-Spin Up	171.66		18.82		171.35		20.05							16.21	
Pre-ADV1															
Post-ADV1															
Pre-ADV2															
Post-ADV2															
Pre-ADV3															
Post-ADV3															
Pre-Spin Down															
Post-Spin Down															
Pre-Repointing															
Post-Repointing															

Table Change History (date, person, change) :
5/31 : RT/JG/BH – added pre-repointing observed telemetry and pre-delta-V estimates

Maneuver Acceptance Committee : Pre-Spin Up Checklist

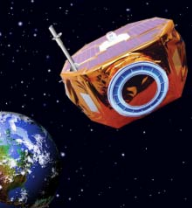
C. Reno
Last Update 6/1/11

Approvals By :

_____ Dave McComas
_____ John Scherrer
_____ Nathan Schwadron
_____ Chelle Reno
_____ Mark Tapley

_____ Robert Lockwood
_____ Ryan Tyler
_____ Bret Hautamaki
_____ Jim Bobbett
_____ Jeff Godward
_____ Tim Perry
_____ Sheral Wesley

_____ John Carrico
_____ Lisa Policastri
_____ Ryan Lebois
_____ Marissa Intelisano



IBEX Operations Pre-Spinup Status

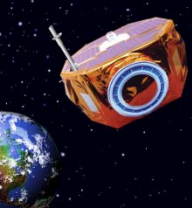
Flight Dynamics Group

IBEX.FDG@AppliedDefense.com

John Carrico, Lisa Policastri, Ryan Lebois, Marissa Intelisano

1 Jun 2011

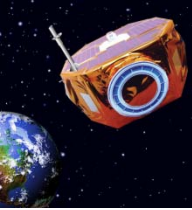
2011 Day 152



Contents

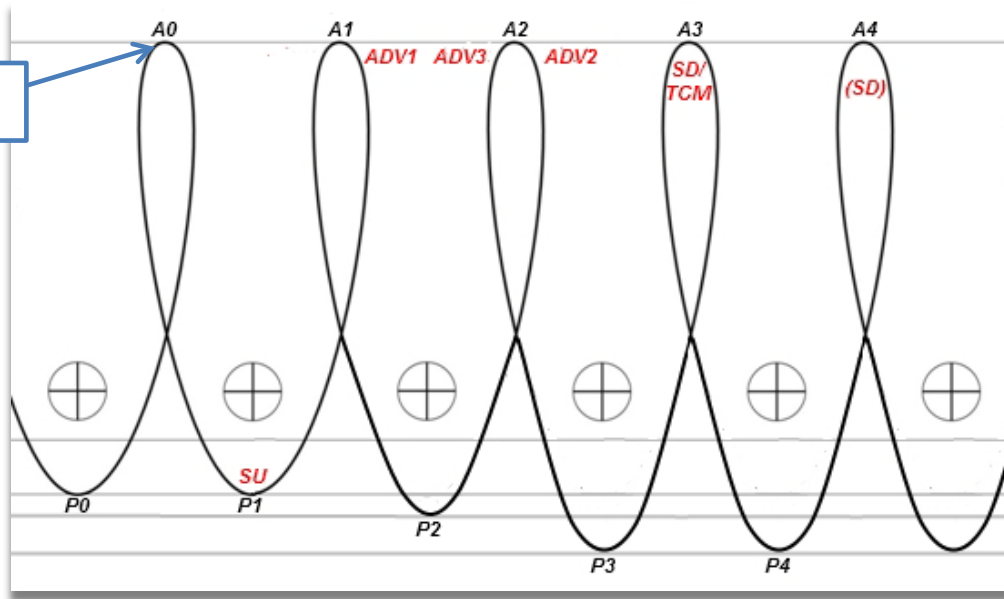


- Current Burn Plan
- Fuel Estimate
- Orbit Status
- Orbit Evolution
- Communications
- Star Tracker Outages
- Shadow Uncertainty Predictions
- Contingency Plans

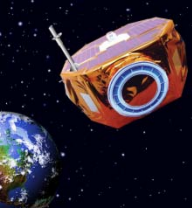


Current Burn Plan

Current Location



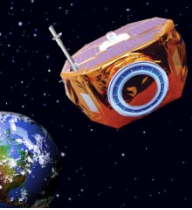
- Re-point = 05 Jun 2011 09:00 UTCG
 - Spin-up = 05 Jun 2011 15:30 UTCG
 - ADV1 Ignition = 08 Jun 2011 20:00 UTCG
 - ADV2 Ignition = 16 Jun 2011 19:00 UTCG
 - ADV3 Ignition = 17 Jun 2011 11:00 UTCG
 - Spin-down = 24 Jun 2011 09:00 UTCG
 - Re-point = 24 Jun 2011 15:30 UTCG
- } P1
 } A1
 } A2
 } A3



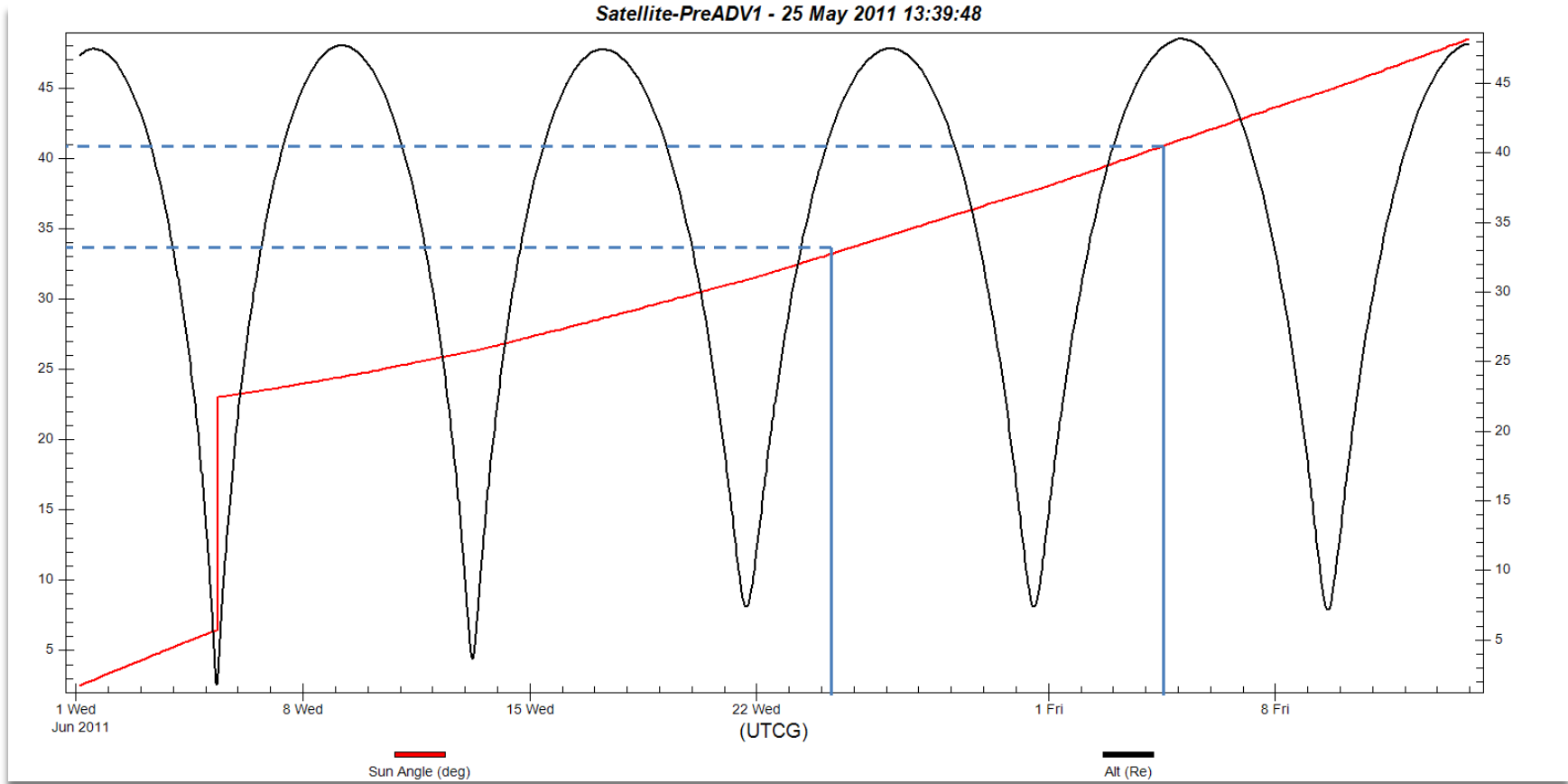
Maneuver Pointing



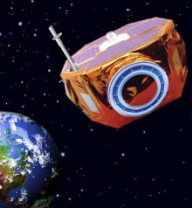
- Re-point at 05 Jun 2011 09:00 UTCG
- Align Spin Axis with J2000 vector:
 - $X = 0.367310$
 - $Y = 0.634537$
 - $Z = 0.680034$
- Body-z-to-Sun Angle ~ 23 degrees



Sun Angle



- Post-maneuver re-point: Nominal 24 Jun 2011 09:00 ~ 33.3 degrees
Backup 04 Jul 2011 09:00 ~ 40.8 degrees

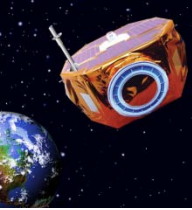


Current Fuel Estimate



State	Fuel Mass (kg)	Wet Mass (kg)
Pre-ADV1	16.257	94.897
Pre-ADV2	12.083	90.723
Pre-ADV3	8.416	87.056
Pre-Spindown	5.862	84.523
Pre-Repaint	5.622	84.326
Final	5.604	84.307

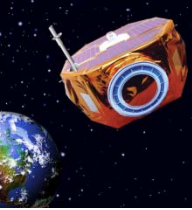
- First line indicates the current fuel estimate from HPS
 - This value was used as the initial condition for the current burn plan
- Yellow lines indicate estimated values throughout the burn sequence



Last Orbit



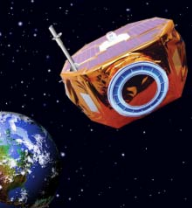
- Perigee 0 (P0)
 - P0 time: 28 May 2011 18:07 UTCG
 - P0 radius: 2.84 Re
- Apogee 0 (A0)
 - A0 time: 01 Jun 2011 13:20 UTCG
 - A0 radius: 48.46 Re



Next Orbit



- Perigee 1 (P1)
 - P1 time: 5 Jun 2011 08:22 UTCG
 - P1 radius: 2.71 Re
- Apogee 1 (A1)
 - A1 time: 9 Jun 2011 04:45 UTCG
 - A1 radius: 48.74 Re

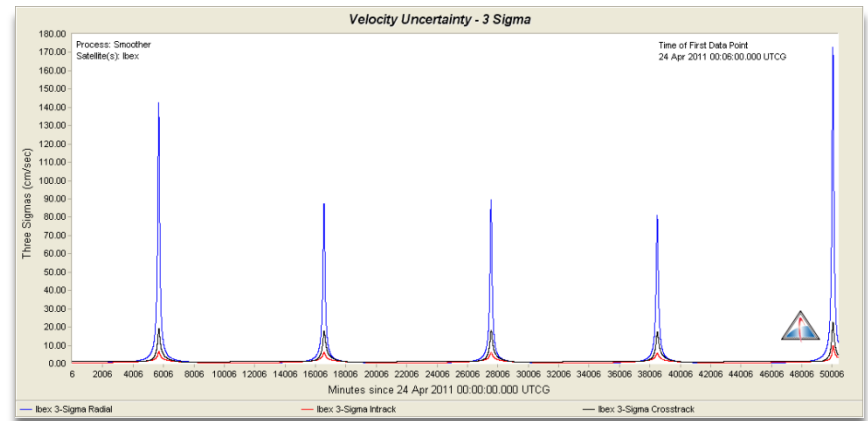
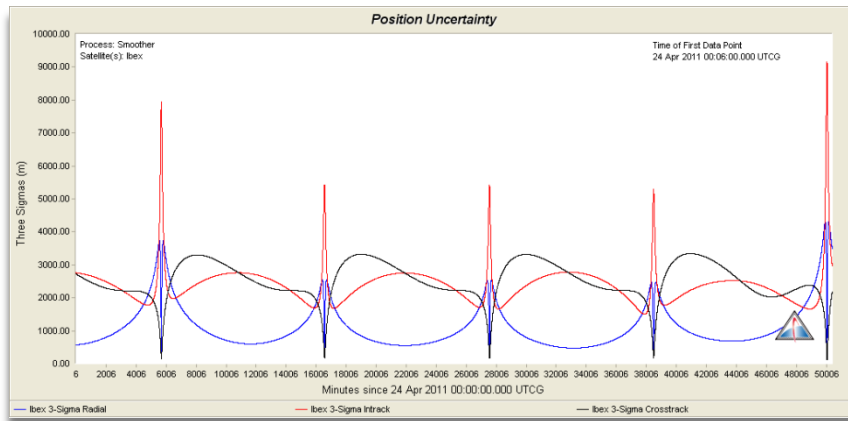


Current Orbit Uncertainty

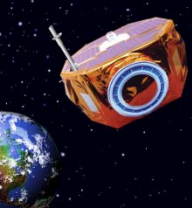


3-sigma Position Uncertainty

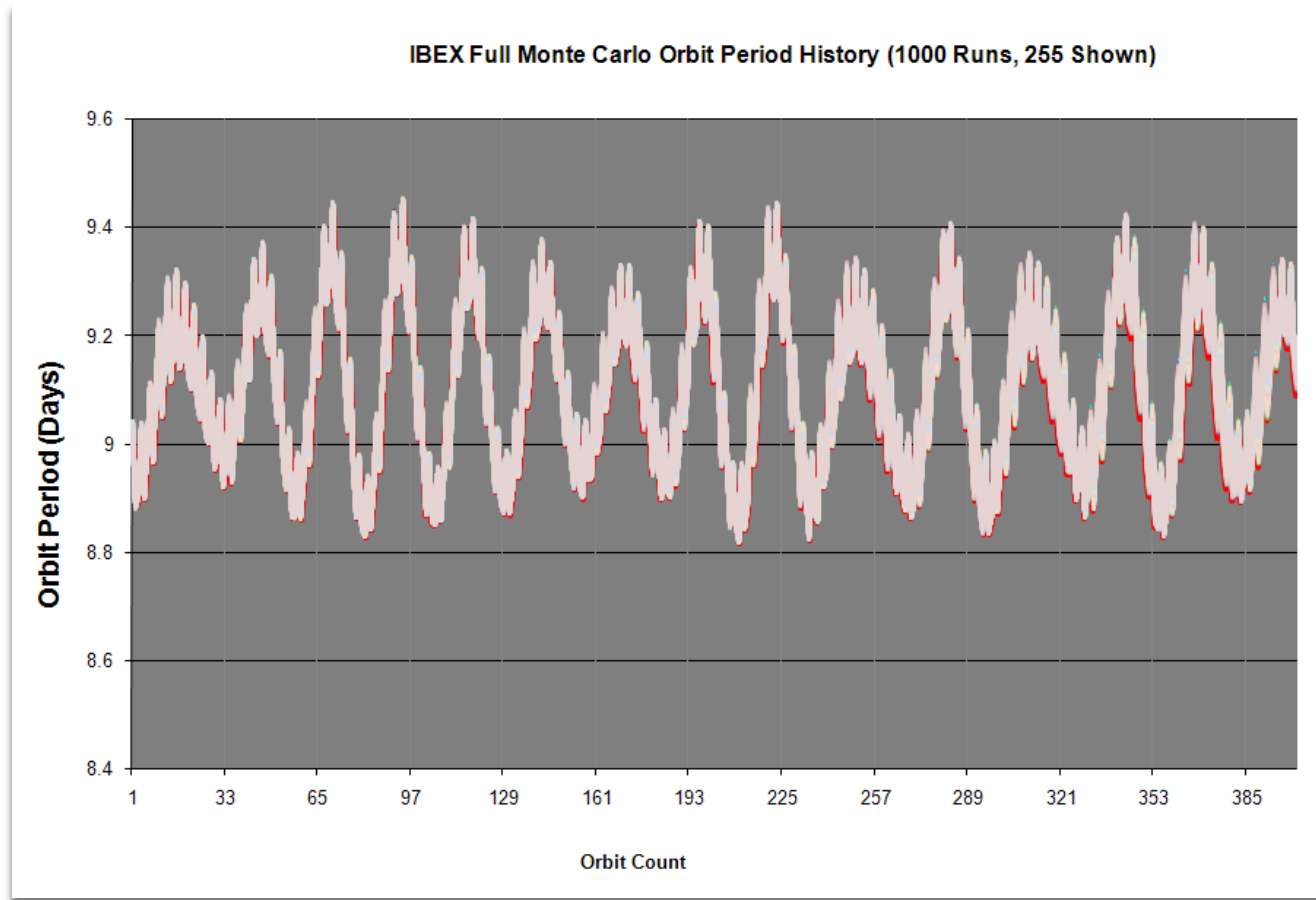
3-sigma Velocity Uncertainty



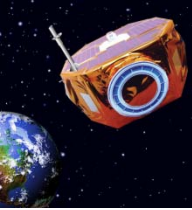
- The definitive 3-sigma uncertainty values are nominal
 - In-track 3-sigma position uncertainty at apogee $\sim 3\text{km}$
 - In-track 3-sigma position uncertainty at perigee $\sim 9\text{km}$



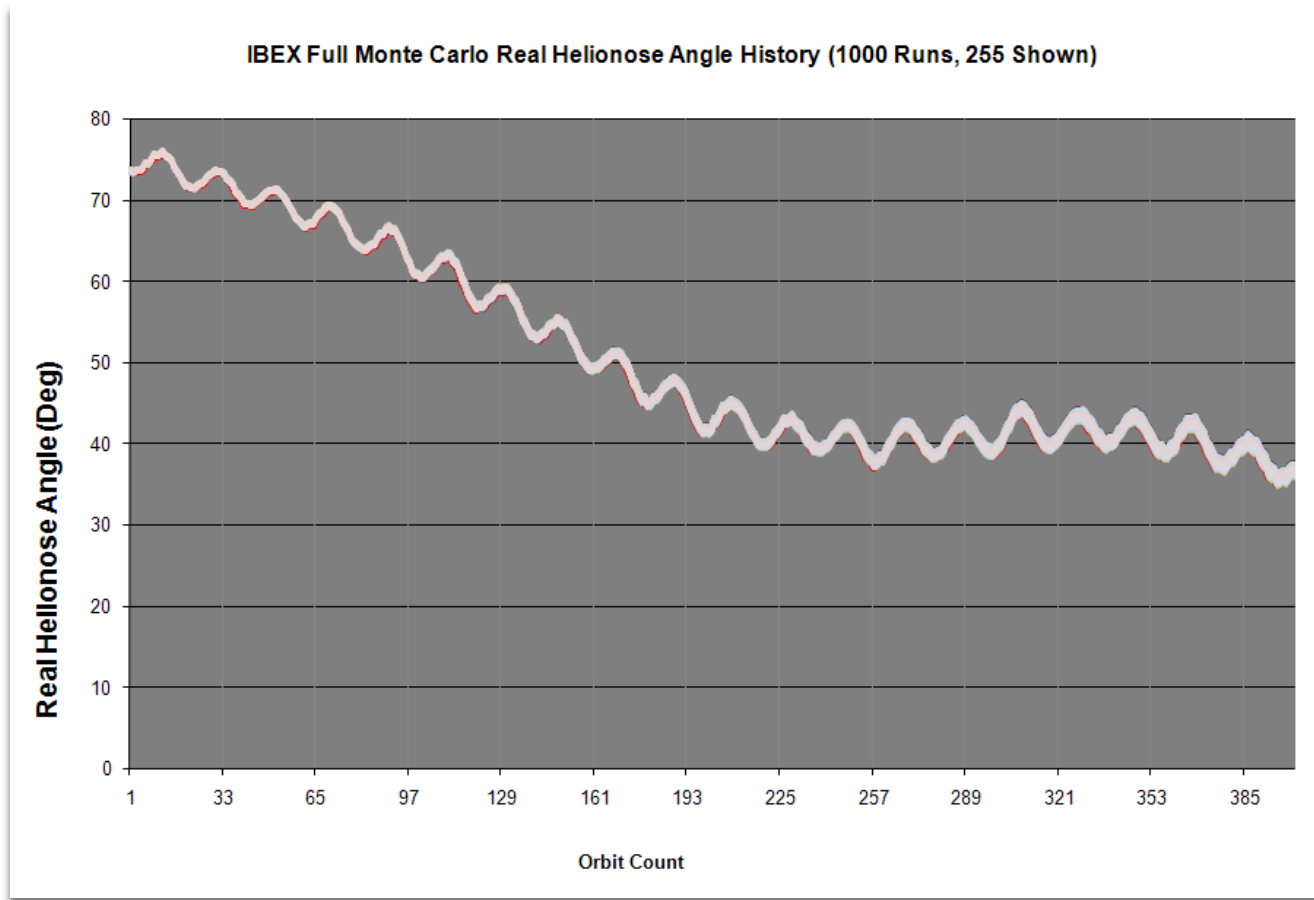
Orbit Period Evolution



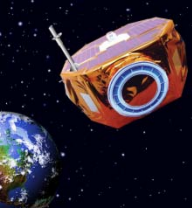
- The orbit period locks into an oscillation about 9.1 days as planned (P/3 orbit)



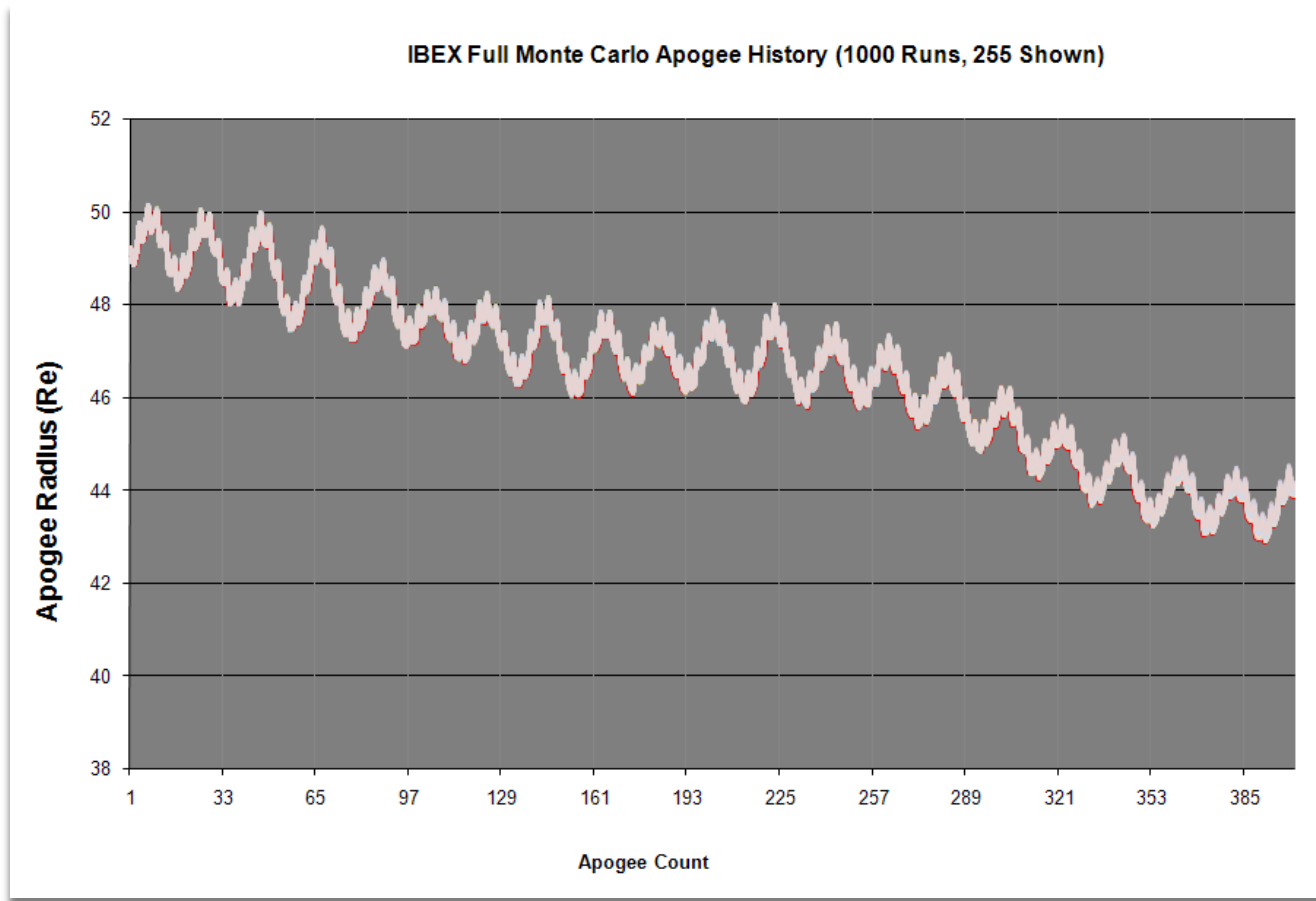
Apogee-Helionose Evolution



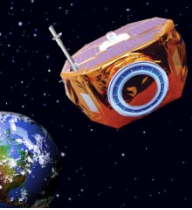
- The Apogee-to-Helionose angle evolves counter-clockwise as desired



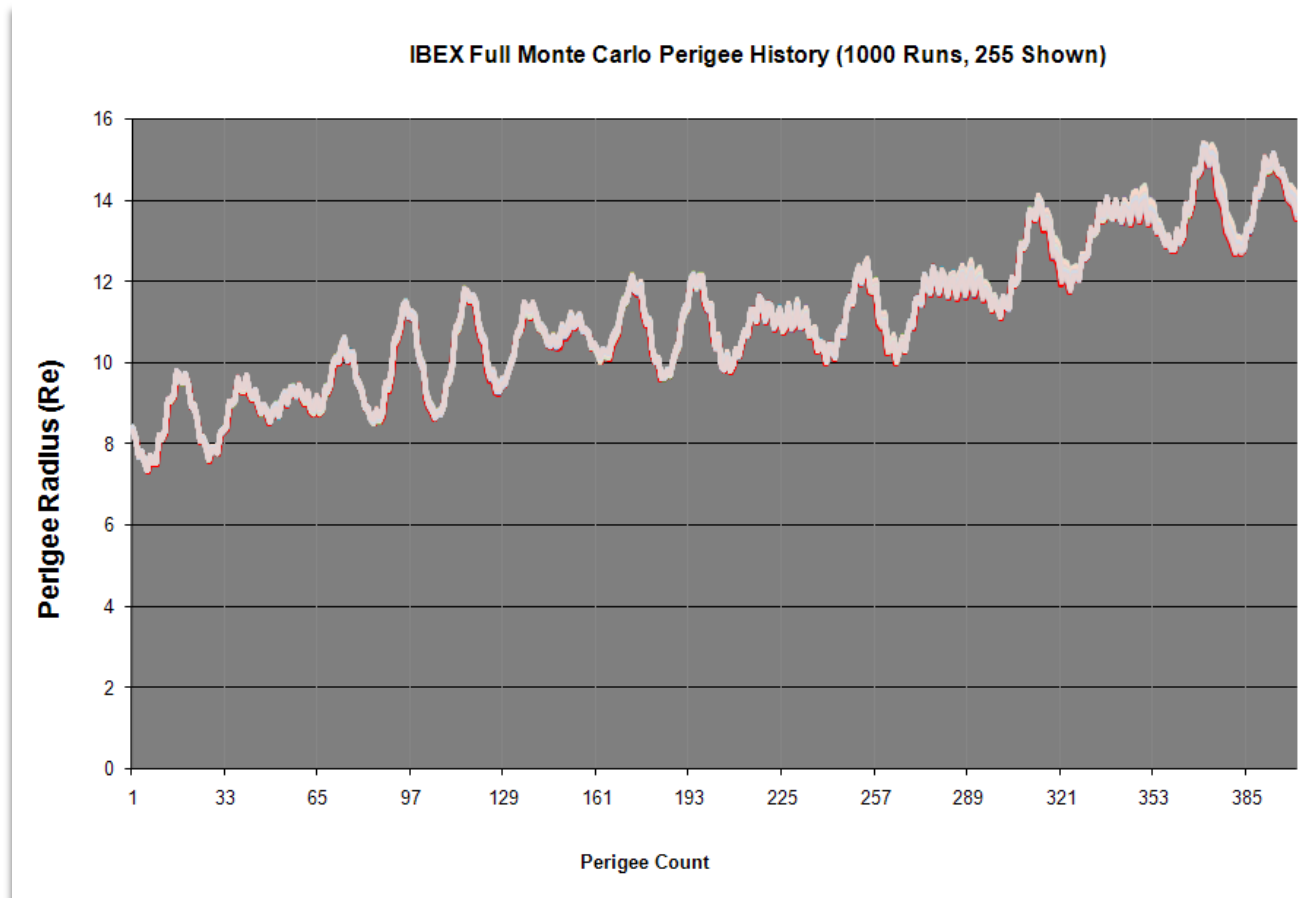
Apogee Radius Evolution



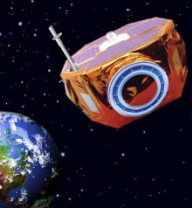
- The apogee radius does not evolve above 55 Re
 - These trajectories are within the bounds of those analyzed and approved



Perigee Radius Evolution



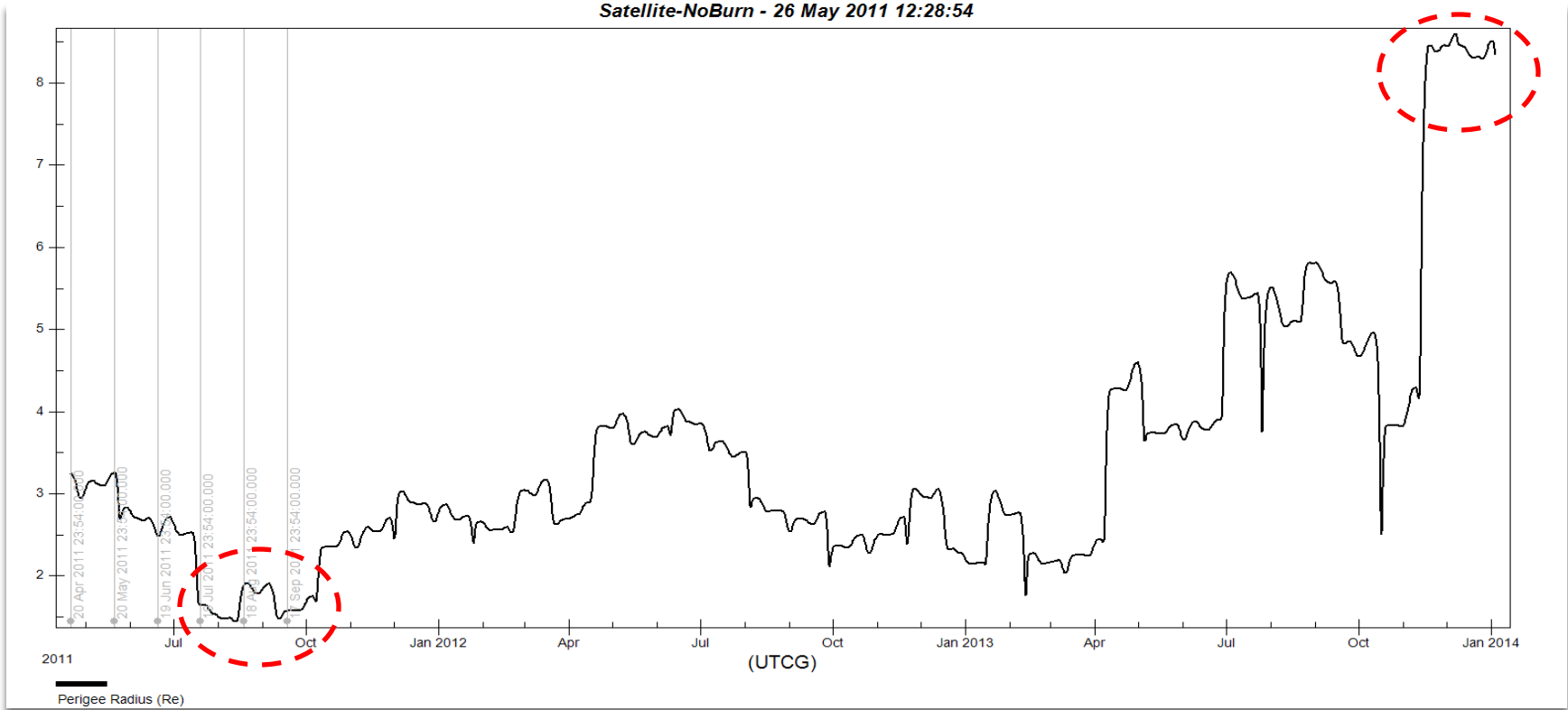
- The perigee radius does not evolve **below** 7 Re
 - Limited radiation dosing and above the Geo-Belt
- The perigee radius does not evolve **above** 16 Re
 - Upper limit of current communications analysis



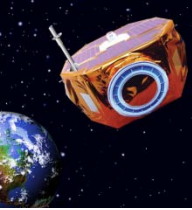
No Burn Sequence



Satellite-NoBurn - 26 May 2011 12:28:54



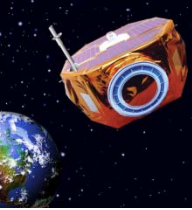
- IBEX experiences some perigees below 0.5 Re altitude in Aug – Sep 2011
- IBEX experiences a 6.98 hour eclipse (Umbra + 30% Penumbra) in Sep 2012
- IBEX begins to exit Earth orbit in January 2014



10-Year Extended Comms Analysis



- Analysis Period: 30 Jun 2011 – 30 Jun 2021
- Data Rates: 320k and 160k
- Link Margins: Only 3dB was considered
- Minimum Duration: 45 minutes at 320k and 90 minutes 160k are required to meet science data downlink requirements
- Ground Stations: Only USN Stations (USHI01, USAK, AUWA) were considered for this analysis
- No “partial dump” scenarios (320k is available for 30 minutes but not 45 minutes) were considered
- “Perigee #1” references 30 Jun 2011, first perigee after Spin-Down



10-Year Missed Perigee Summary

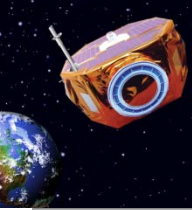


3 dB: 160k **0** of **402** perigees were missed

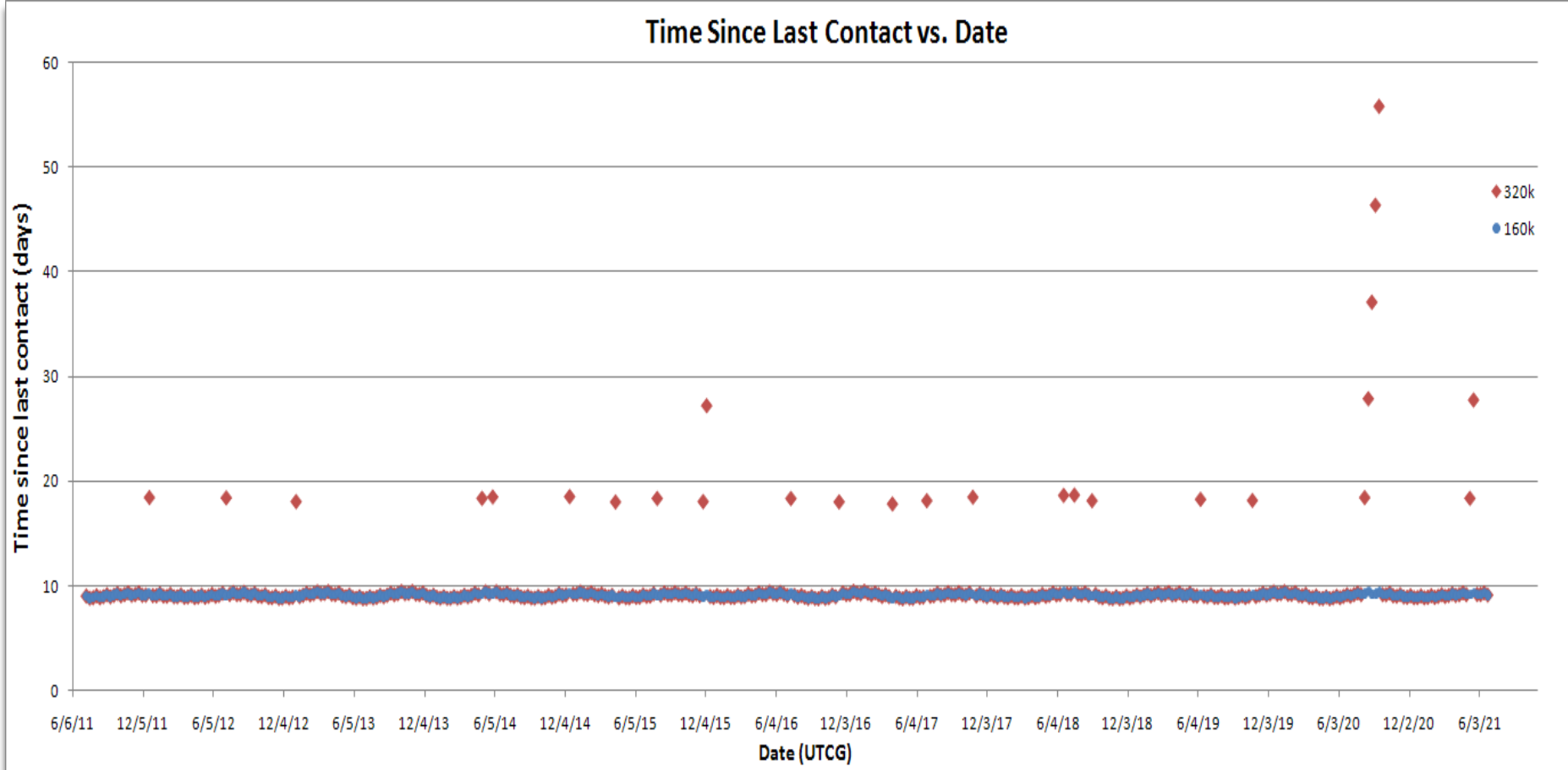
3 dB: 320k **27** of **402** perigees were missed

- 2 Consecutive Misses: Perigees #177-178
- 5 Consecutive Misses: Perigees #366-370
- 2 Consecutive Misses: Perigees #396-397

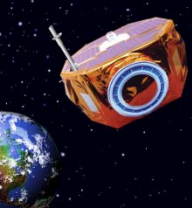
This information is shown graphically on the next slide.



10-Year Missed Perigee Summary



- Nominally, time between contacts should equal orbit period (~9.1 days)
- Red dots (320k) above 9 days represent missed perigees (i.e. 18 days = 1 missed perigee)



Star Tracker Outages - Re-Pointing



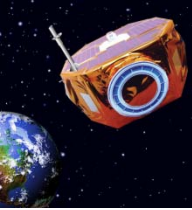
Less than 100% Valid Outage Start	Less than 100% Valid Outage End	Due to
28 May 2011 14:47:42	28 May 2011 17:26:03	Earth
05 Jun 2011 05:15:37	05 Jun 2011 07:44:19	Earth
30 Jun 2011 04:17:34	30 Jun 2011 10:59:33	Earth

- Pre-Maneuver Re-point

- Re-point: 05 Jun 09:00 UTC
- 100% Valid Outage ends: 05 Jun 07:44 UTC

- Post-Maneuver Re-point

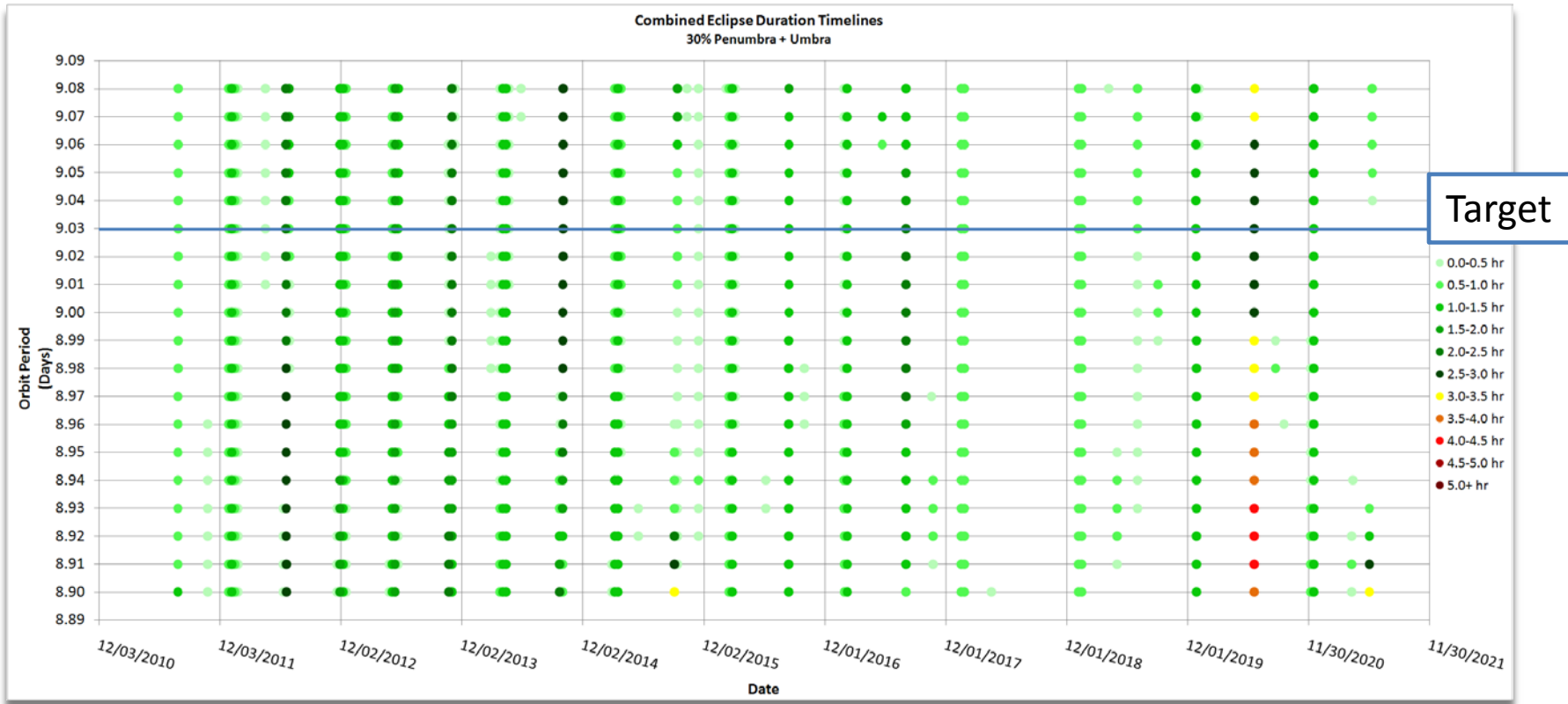
- Re-point: 24 Jun 15:30 UTC
- 100% Valid Outage starts: 30 Jun 04:17 UTC
- Based on re-pointing vector ~ 2.5 deg past sun, delivered by ISOC



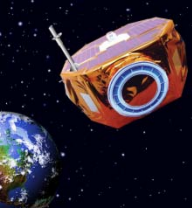
Eclipse Duration Estimate



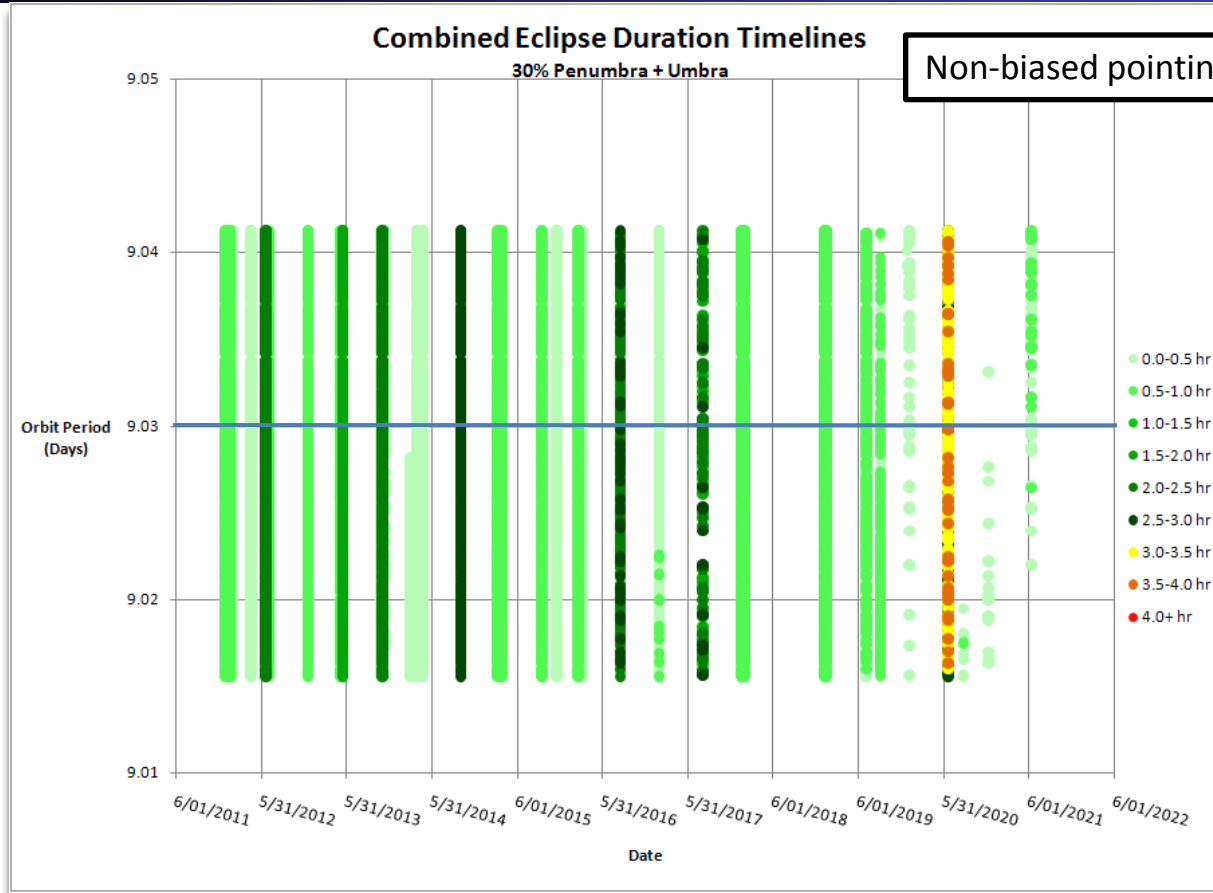
Current Estimate – Sinda Performance



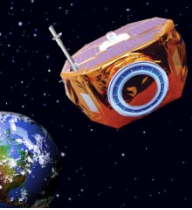
- Selected target orbit period of 9.03 days



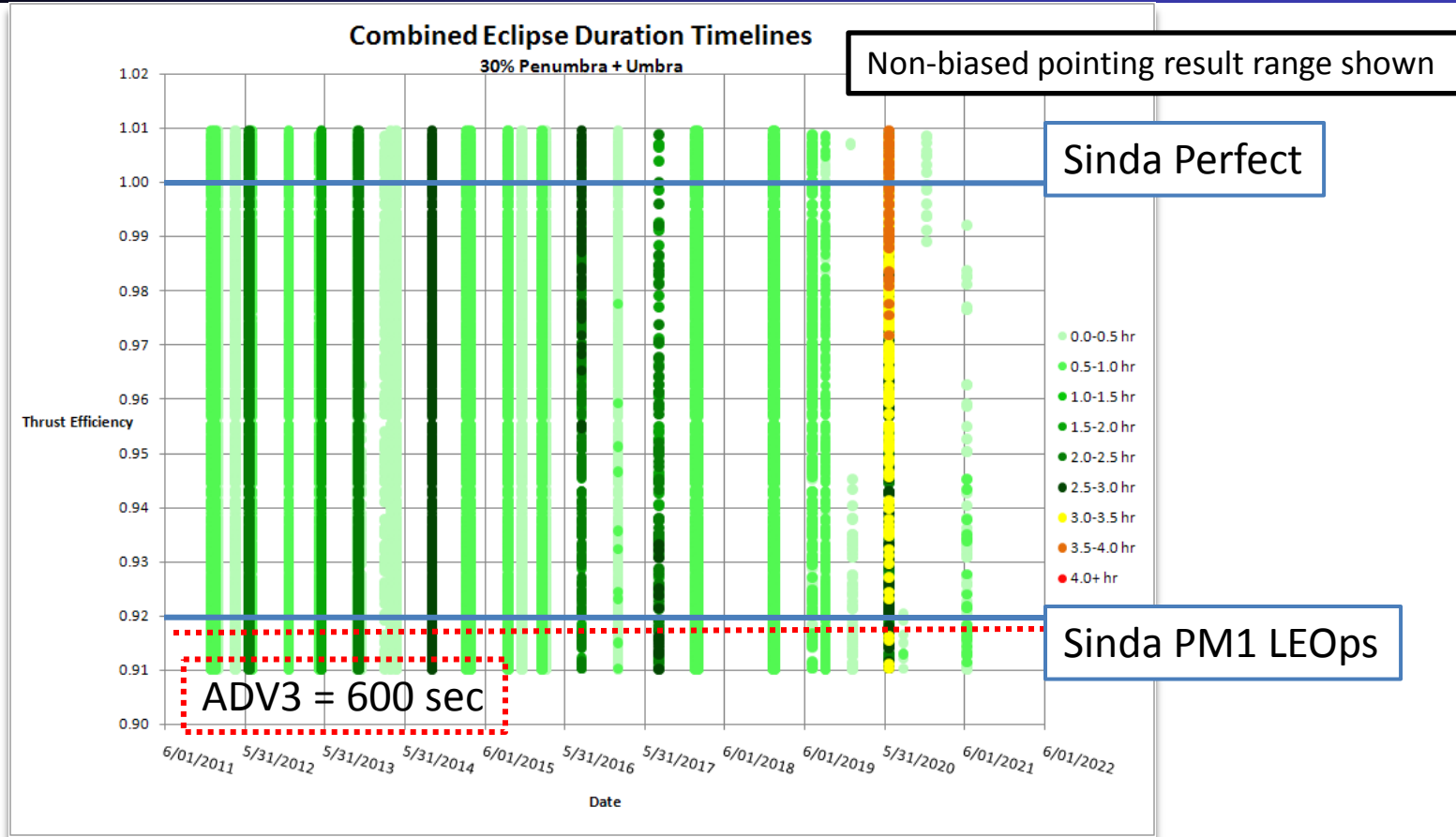
Monte Carlo – Orbit Period



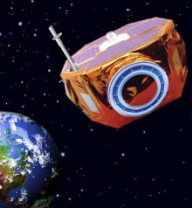
- Target orbit period range was achieved
 - Engine performance and pointing uncertainties cause shadows of 3.5-4.0 hours to appear throughout the target range



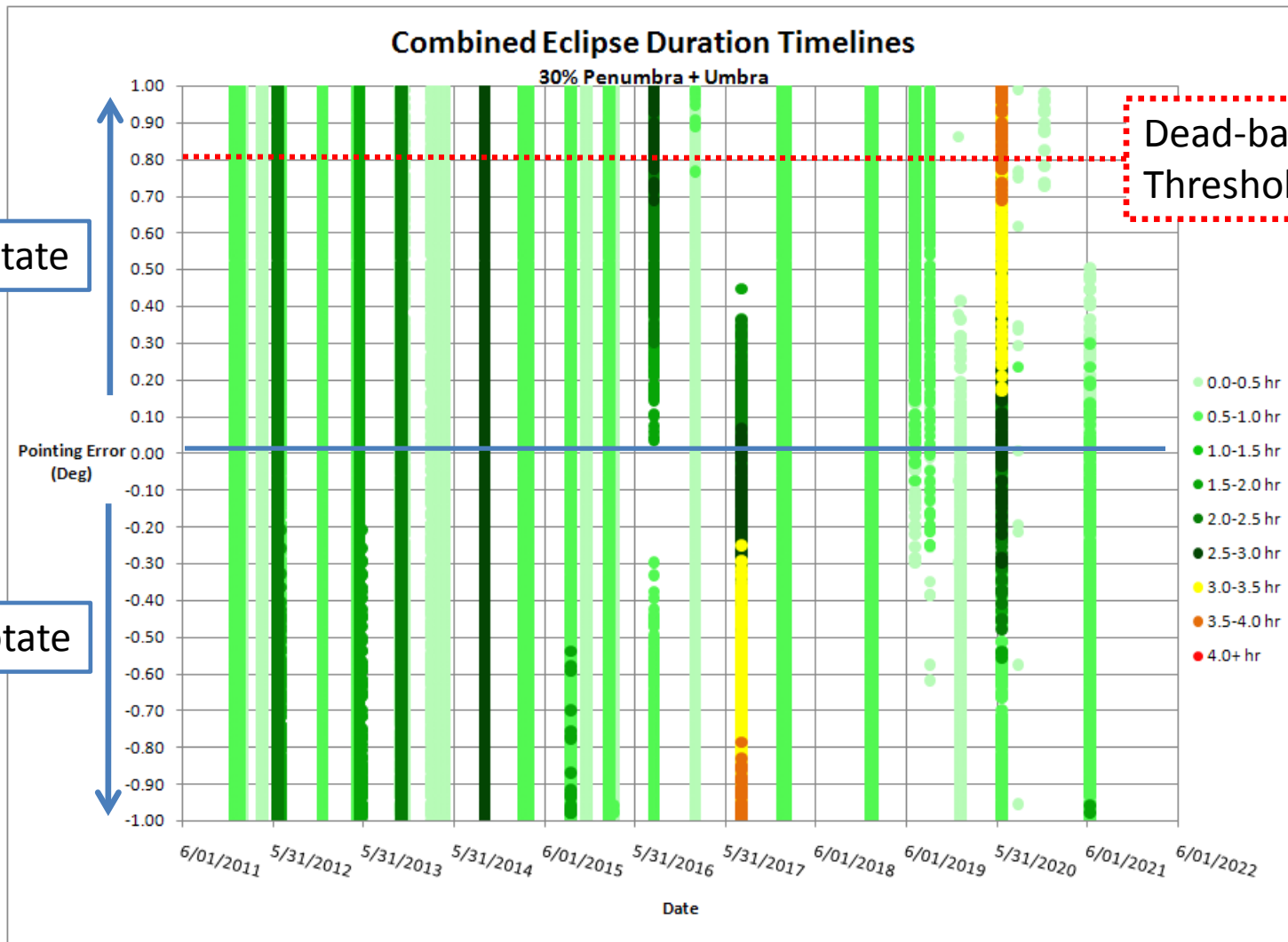
Monte Carlo - Performance

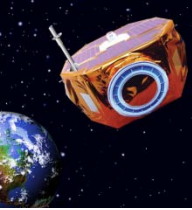


- Performance of ADV1 was varied based on two uncertainties
 - Sinda model performs ~8% more efficiently than LEOps observations
 - Tank pressure uncertainty at ignition creates 1% uncertainty in delta-V

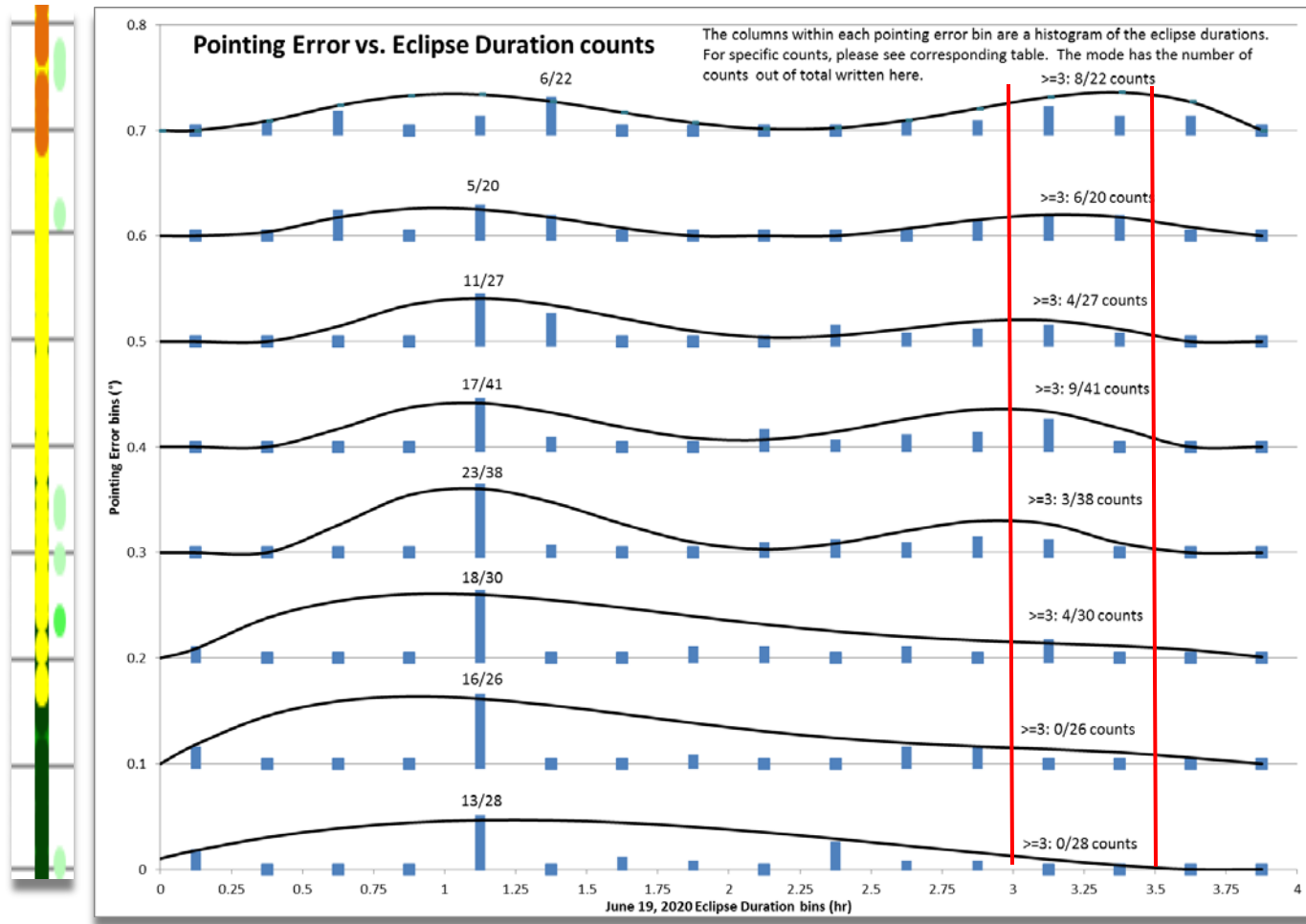


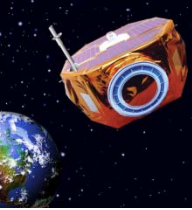
Monte Carlo - Pointing





Stacked Histograms

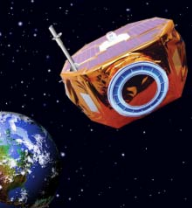




Summary



- The current orbit meets design criteria to continue as planned
- The current burn plan specifies the following:
 - Re-point = 05 Jun 2011 09:00 UTCG
 - Spin-up = 05 Jun 2011 15:30 UTCG
 - ADV1 Ignition = 08 Jun 2011 20:00 UTCG Duration = 600 sec
 - ADV2 Ignition = 16 Jun 2011 19:00 UTCG Duration = 600 sec
 - ADV3 Ignition = 17 Jun 2011 11:00 UTCG Duration = 456.359 sec
 - Spin-down = 24 Jun 2011 09:00 UTCG
 - Re-point = 24 Jun 2011 15:30 UTCG



Contingency Plans



	ADV1 (sec)	ADV2 (sec)	ADV3 (sec)	ADV4 (sec)	ADV5 (sec)
Nominal	08 Jun 2011 20:00 600	16 Jun 2011 19:00 600	17 Jun 2011 11:00 456.359		
Backup - A	Waive	16 Jun 2011 11:00 600	16 Jun 2011 19:00 600	25 Jun 2011 09:30 319.438	
Backup - B	Waive	16 Jun 2011 11:00 600	16 Jun 2011 19:00 600.000	17 Jun 2011 11:00 438.667	
Abort ADV2 - A	08 Jun 2011 20:00 600	Abort	17 Jun 2011 11:00 456.359	17 Jun 2011 13:30 600	
Abort ADV2 - B	08 Jun 2011 20:00 600	Abort	17 Jun 2011 11:00 600	25 Jun 2011 11:00 413.992	
Abort ADV2 - C	08 Jun 2011 20:00 600	Abort	Waive	24 Jun 2011 18:00 600	25 Jun 2011 11:00 420.715

- To reduce the amount of analysis during maneuver operations, several backup and contingency plans have been examined prior to spin-up
 - No cases predict shadows over 4 hours in duration
 - Some cases predict shadows over 3 hours in duration
- The maneuver times and durations are presented here
- A full analysis including orbit evolution plots, predicted fuel consumption, and predicted shadow durations for each case is documented in the IBEX Contingency Plans technical note

IBEX FDG Apogee Peri gee Ti mes Report
 Created: 29 May 2011 08: 40: 59 EDT

Time of Peri gee (UTCG)	Peri gee Al ti tude (Re)	Peri gee Radi us (Re)
Not in Pass	Not in Pass	Not in Pass
5 Jun 2011 08: 21: 54. 715	1. 705346	2. 705344
13 Jun 2011 05: 45: 27. 232	3. 588646	4. 588642
21 Jun 2011 16: 24: 08. 796	7. 382323	8. 382318
30 Jun 2011 13: 25: 11. 111	7. 379925	8. 379922
9 Jul 2011 14: 56: 02. 429	7. 149498	8. 149493
18 Jul 2011 11: 33: 55. 597	6. 704620	7. 704616
27 Jul 2011 08: 47: 27. 859	6. 810729	7. 810725
5 Aug 2011 10: 30: 36. 463	6. 557455	7. 557448
14 Aug 2011 07: 36: 04. 411	6. 336537	7. 336530
23 Aug 2011 06: 52: 06. 721	6. 701646	7. 701638
1 Sep 2011 10: 27: 01. 756	6. 528389	7. 528376
Not in Pass	Not in Pass	Not in Pass

Time of Apogee (UTCG)	Apogee Al ti tude (Re)	Apogee Radi us (Re)
Not in Pass	Not in Pass	Not in Pass
1 Jun 2011 13: 20: 20. 564	47. 464725	48. 464723
9 Jun 2011 04: 45: 06. 692	47. 743030	48. 743027
17 Jun 2011 06: 00: 41. 278	47. 451100	48. 451095
26 Jun 2011 03: 01: 16. 330	47. 534398	48. 534394
5 Jul 2011 02: 28: 31. 520	48. 194283	49. 194280
14 Jul 2011 01: 41: 25. 045	47. 871009	48. 871006
22 Jul 2011 22: 12: 38. 468	48. 105787	49. 105782
31 Jul 2011 21: 56: 27. 367	48. 733026	49. 733021
9 Aug 2011 21: 17: 25. 517	48. 357715	49. 357708
18 Aug 2011 19: 00: 38. 507	48. 640566	49. 640558
27 Aug 2011 20: 48: 05. 398	49. 096008	50. 095998
5 Sep 2011 21: 49: 47. 623	48. 559203	49. 559190

IBEX_Star_Tracker_Outages_2011_149_00_07_v001

IBEX FDG Star Tracker Outage Predictions
 Created: 05-29-2011 EDT

Less than 100% Valid

	Outage Time (UTCG)				Due To
Start	05	Jun	2011	05:15:38.032	Earth
Stop	05	Jun	2011	07:44:18.856	Earth
Start	12	Jun	2011	20:50:34.243	Earth
Stop	13	Jun	2011	03:53:28.063	Earth
Start	16	Jun	2011	20:09:02.546	Moon
Stop	19	Jun	2011	03:28:02.738	Moon
Start	20	Jun	2011	21:23:02.181	Earth
Stop	21	Jun	2011	11:09:28.594	Earth
Start	30	Jun	2011	04:17:00.493	Earth
Stop	30	Jun	2011	10:57:23.088	Earth
Start	09	Jul	2011	06:01:54.637	Earth
Stop	09	Jul	2011	12:33:08.157	Earth
Start	15	Jul	2011	15:46:06.719	Moon
Stop	17	Jul	2011	00:00:00.000	Moon

Less than 75% Valid

	Outage Time (UTCG)				Due To
Start	05	Jun	2011	05:34:57.499	Earth
Stop	05	Jun	2011	07:39:11.855	Earth
Start	12	Jun	2011	21:39:09.451	Earth
Stop	13	Jun	2011	03:43:08.585	Earth
Start	17	Jun	2011	02:57:33.110	Moon
Stop	18	Jun	2011	23:32:37.889	Moon
Start	20	Jun	2011	22:53:10.068	Earth
Stop	21	Jun	2011	10:43:27.722	Earth
Start	30	Jun	2011	04:59:06.640	Earth
Stop	30	Jun	2011	10:37:04.368	Earth
Start	09	Jul	2011	06:43:36.513	Earth
Stop	09	Jul	2011	12:13:44.279	Earth
Start	15	Jul	2011	20:49:39.445	Moon
Stop	17	Jul	2011	00:00:00.000	Moon

Less than 50% Valid

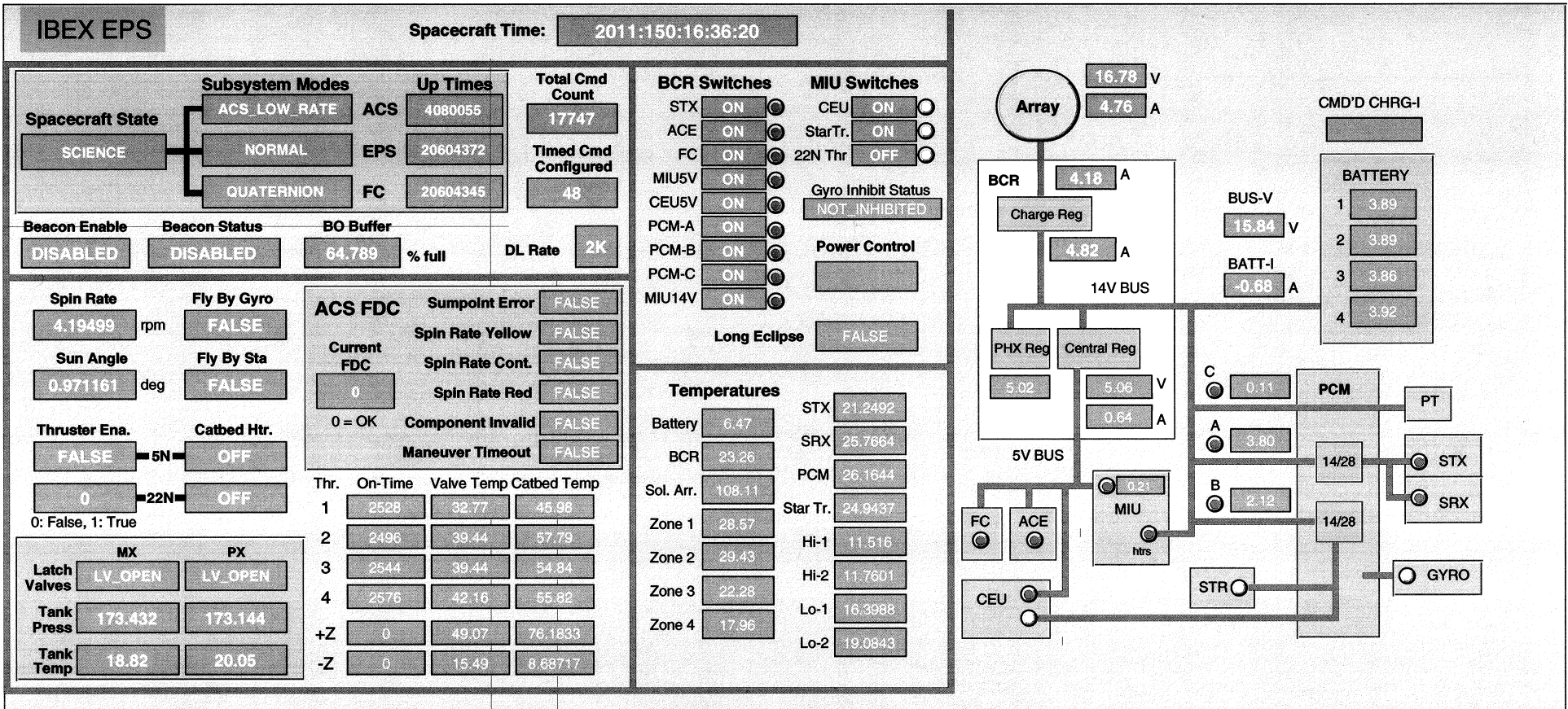
	Outage Time (UTCG)				Due To
Start	05	Jun	2011	05:42:06.515	Earth
Stop	05	Jun	2011	07:37:02.735	Earth
Start	12	Jun	2011	21:56:19.720	Earth
Stop	13	Jun	2011	03:38:56.655	Earth
Start	17	Jun	2011	04:04:54.966	Moon
Stop	18	Jun	2011	22:54:59.591	Moon
Start	20	Jun	2011	23:25:47.612	Earth
Stop	21	Jun	2011	10:32:55.951	Earth
Start	30	Jun	2011	05:14:13.185	Earth
Stop	30	Jun	2011	10:29:00.050	Earth
Start	09	Jul	2011	06:58:31.008	Earth
Stop	09	Jul	2011	12:06:02.491	Earth
Start	15	Jul	2011	21:39:52.781	Moon
Stop	16	Jul	2011	23:53:11.250	Moon

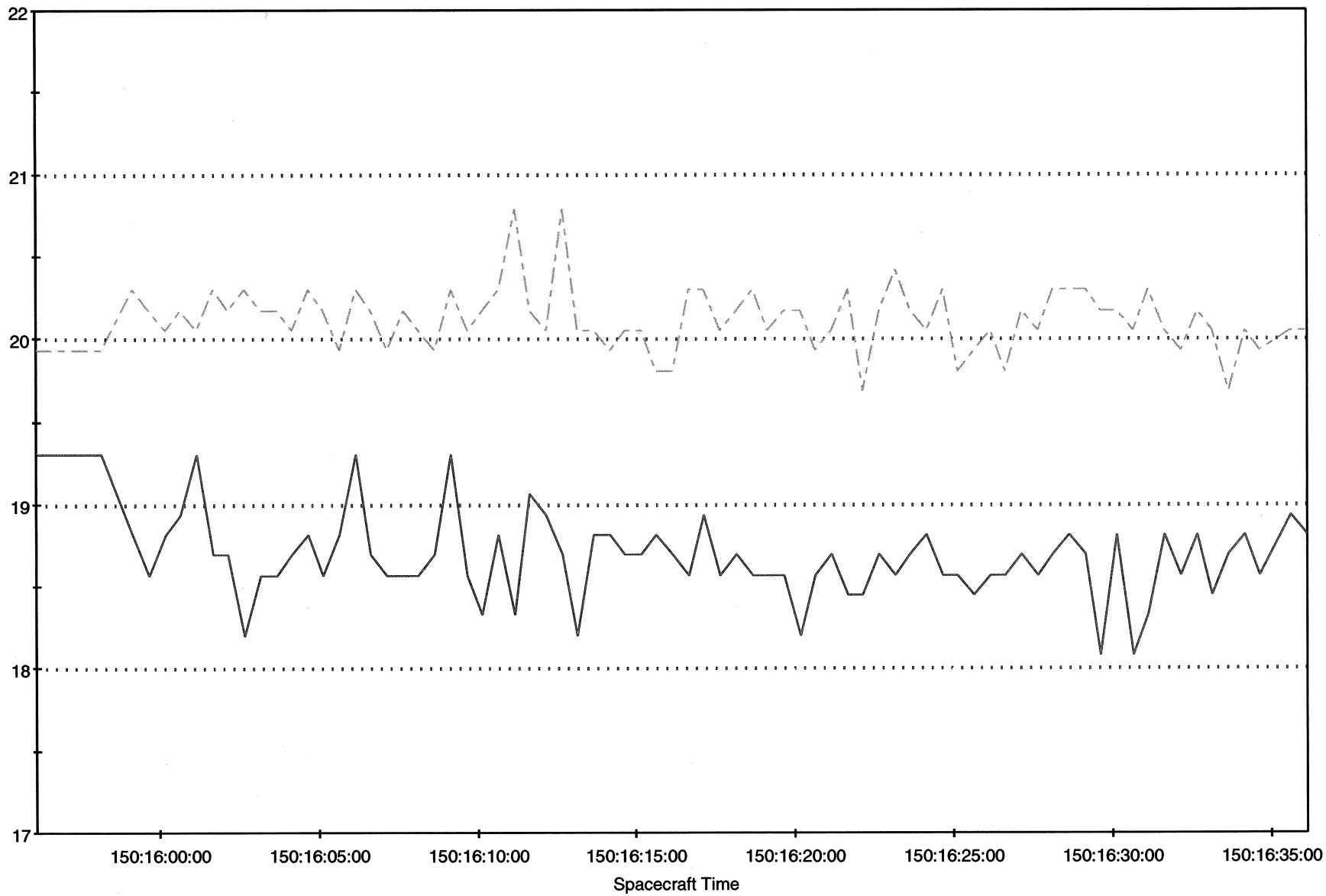
Less than 25% Valid

	Outage Time (UTCG)				Due To
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IBEX_Star_Tracker_Outages_2011_149_00_07_v001

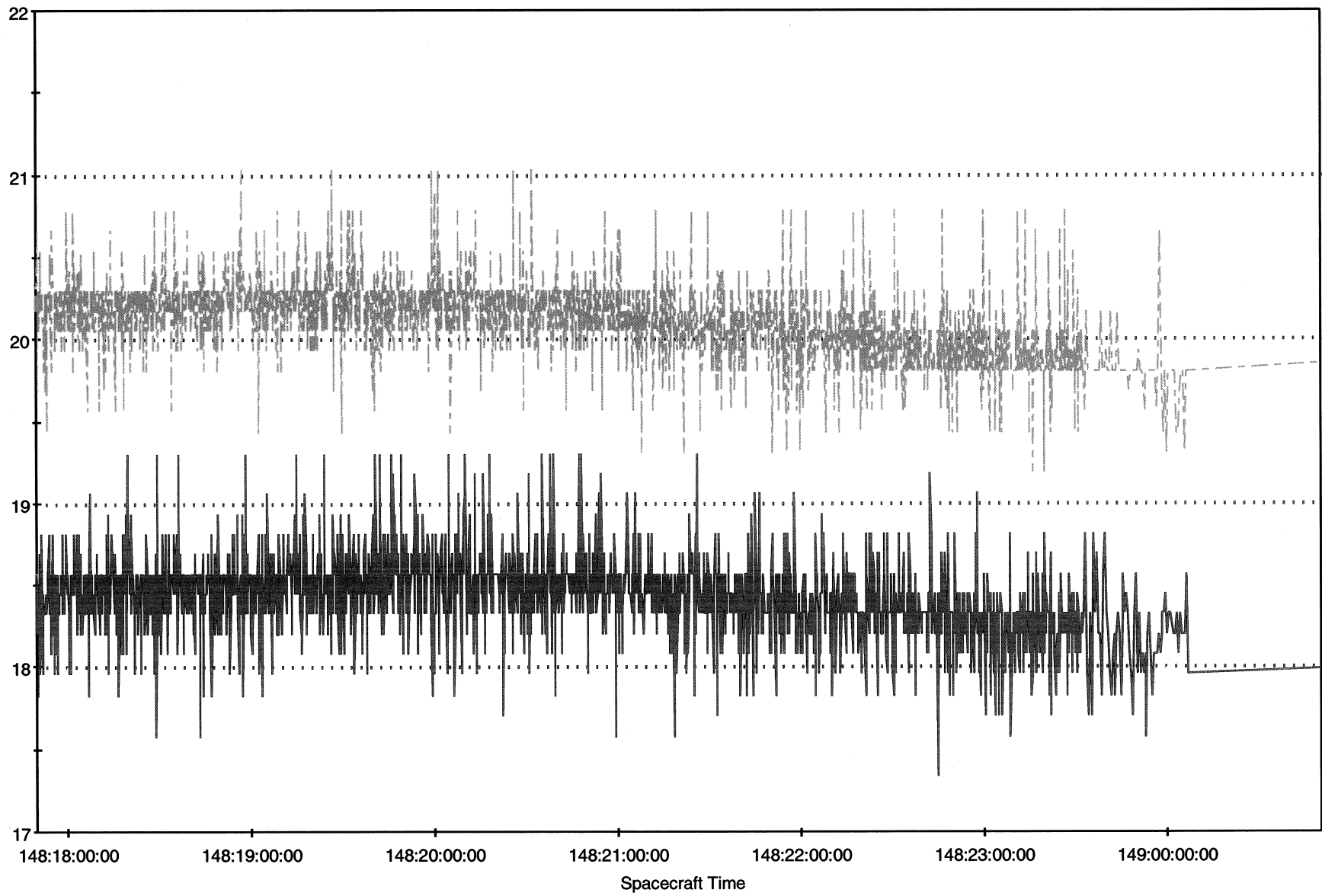
Start	05	Jun	2011	05: 45: 57. 552	Earth
Stop	05	Jun	2011	07: 35: 45. 607	Earth
Start	12	Jun	2011	22: 05: 30. 617	Earth
Stop	13	Jun	2011	03: 36: 33. 440	Earth
Start	17	Jun	2011	06: 18: 12. 982	Moon
Stop	18	Jun	2011	21: 12: 08. 615	Moon
Start	20	Jun	2011	23: 43: 18. 365	Earth
Stop	21	Jun	2011	10: 26: 57. 599	Earth
Start	30	Jun	2011	05: 23: 05. 171	Earth
Stop	30	Jun	2011	10: 24: 08. 948	Earth
Start	09	Jul	2011	07: 07: 01. 658	Earth
Stop	09	Jul	2011	12: 01: 28. 945	Earth
Start	15	Jul	2011	23: 37: 19. 607	Moon
Stop	16	Jul	2011	22: 14: 14. 198	Moon





— P@ECT_Tank1Temp (C)

- - - P@ECT_Tank2Temp (C)



———— P@ECT_Tank1Temp (C)

- - - - - P@ECT_Tank2Temp (C)

IBEX LEOps		Spacecraft Time 2011:150:16:36:20	NOOP	HMLOGS FC: 113 BCR: 7287 ACE: 1
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Spacecraft State SCIENCE	Subsystem Modes ACS LOW RATE NORMAL QUATERNION	ACS 4080055 EPS 20604372 FC 20604345	Up Times 4080055 20604372 20604345	Total Cmd Count 17747 Timed Cmd Configured 48
Beacon Enable DISABLED	Beacon Status DISABLED	BO Buffer % Full 64.789	Downlink Rate 2K	

Spin Rate 4.19499 rpm	Sun Angle 0.971161 deg	Gyro Rate .00071201 rad/s	Fly By Gyro FALSE	Fly By Sta FALSE
MX Latch Valves: LV_OPEN		PX Latch Valves: LV_OPEN		
Tank Press: 173.432		Tank Press: 173.144		
Tank Temp: 18.82		Tank Temp: 20.05		
5N Thruster Enabled?: FALSE		22N Thruster Enabled?: 0		0=F 1=T
Catbed Heater: OFF		Catbed Heater: OFF		
Time/Cyc Remaining: 0				

ACS FDC Current FDC: 0	Sumpoint Error FALSE	Spin Rate Yellow FALSE	Spin Rate Cont. FALSE	Spin Rate Red FALSE
0 = OK Component Invalid: FALSE		Maneuver Timeout: FALSE		
Thr.	On-Time	Valve Temp	Catbed Temp	
1	2528	32.77	45.98	
2	2496	39.44	57.79	
3	2544	39.44	54.84	
4	2576	42.16	55.82	
+Z	0	49.07	76.1833	
-Z	0	15.49	8.68717	

Battery Curr: -0.68 Volt: 15.84	Cell 1 3.89	Cell 2 3.89	Cell 3 3.86	Cell 4 3.92
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BCR Switches	MIU Switches
STX: ON	CEU: ON
ACE: ON	StarTr.: ON
FC: ON	22N Thr: OFF
MIU5V: ON	Gyro Inhibit Status NOT INHIBITED
CEU5V: ON	SA Curr: 4.76
PCM-A: ON	SA Volt: 16.78
PCM-B: ON	Ch. Reg. Out. Curr.: 4.82
PCM-C: ON	
MIU14V: ON	

Temperatures	STX 21.2492
Battery: 6.47	SRX: 25.7664
BCR: 23.26	PCM: 26.1644
Sol. Arr.: 108.11	Star Tr.: 24.9437
Zone 1: 28.57	Hi-1: 11.516
Zone 2: 29.43	Hi-2: 11.7601
Zone 3: 22.28	Lo-1: 16.3988
Zone 4: 17.96	Lo-2: 19.0843

SSR Pointers Write: 12574 Read: 7414	Power Control 18-day Timer: 3040 minutes
Long Eclipse FALSE	IBEX-HI: ON IBEX-Lo: ON
Flags	
Deploy 0 = Set	Ephemeris 1 = Not set

Carrier Lock YES	Bit Lock YES
Coherency ON	RF Power 38.5809
Signal Str. -113.638	Loop Stress -12326.3
SRX Volts 6.1926	STX Volts 6.1987

IBEX Sat Sum

S/C Time

2011:150:16:36:20

Allow

SC STATE

SCIENCE

ACS_LOW_RATE ACS

NORMAL EPS

QUATERNION FC

SSR Write pointer: 12574

SSR Read pointer: 7414

Remaining Blks: 0

BO-Bfr %Full 64.79

GREEN: UPPER BIT
YELLOW: LOWER BIT

18 Day Timer 3040

ACS 1 EPS 7287 FC 113

Up Times: ACT 4080055 ECT 20604372 FCT 20604345

PAYLOAD

CEU

ON

0.59 Curr

ON 5V

IBEX-HI

ON

Safed

IBEX-LO

ON

Safed

Last OP Code CEU_MACRO_EXEC

OP Mode HVSCI

Instrument State RUN_FROM_EEPROM

MACRO MACRO_31

RF

Timed Cmds Loaded

DL Rate:

48

2K

Cmd Cntr

17747

NOOP 10 cmds

STX ON STX OFF

STX Volts: 6.1987

STX Ground: -0.0477

STX Temp: 21.2492

STX On

COH ON

MZ ant ON

RECEIVE

Carrier Lock: YES

Bit Lock: YES

Sig Strength: -113.638 dBm

Loop Stress: -12326.3 hz

SRX Temp: 25.7664

Power

-0.68

15.84

3.89 C1
3.89 C2
3.86 C3
3.92 C4
6.5 DegC

1.60

FALSE

NORMAL

Load Shed 1 = 3.60v
Load Shed 2 = 3.45v
PHX Reset = 3.00v

ACS

Spin Rate: 4.19499
Nominal is 4 rpm

Gyro NOT_INHIBITED

StarT: ON

Star Curr: 0.23

FDC Flags 0

BURN

Thr_Ena: OFF

Thrusters FALSE 5N OFF

0 22N OFF

CatBedHtrs

0: False, 1: True

LATCH VALVES

MX LV_OPEN 1

PX LV_OPEN 2

HPS Plug: MATED

IBEX SPIN VECTORS

GPS Time 990809000

Tank Press MX 173.432 psi ACS Bdy0 -0.508578

Tank Press PX 173.144 psi ACS Bdy1

ACS Bdy2

ACS Bdy3 0.546498

IBEX ACS		S/C Time	2011:150:16:36:20	ACS Time	990808594	ACE HML0GS	1	ADC Timeout	0
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Spacecraft State SCIENCE	Subsystem Modes		Up Times		Switches		Gyro Inhibit	
	ACS_LOW_RATE	ACS	4080055	StarTr.	ON	NOT_INHIBITED		
	NORMAL	EPS	20604372	22N Thr	OFF	Battery SOC		
	QUATERNION	FC	20604345	PCM-B	ON	NORMAL		

Spin Rate (Accel)	Spin Rate (ST)	Fly By Sta	Fly By Gyro
4.19499 rpm	4.17216 rpm	FALSE	FALSE
Sun Angle	DirCmdBdyAngle	Point Inertial	Point at Sun
0.971161 deg	0.652821 deg	1	FALSE
Filter Y Rate (LR)	Filter Y Rate (HR)	StarT Current	PCMB Current
3.71981e-06 rad/s		0.23076	2.123

MX		PX		5N		22N	
Latch Valves	LV_OPEN	LV_OPEN	Thruster Enabled?	FALSE	0		
Tank Press	173.432	173.144	Catbed Heater	OFF	OFF		
Tank Temp	18.62	20.05	Time/Cyc Remaining	0			

Thr.	On-Time	Valve Temp	Catbed Temp
1	2528	32.77	45.98
2	2496	39.44	57.79
3	2544	39.44	54.84
4	2576	42.16	55.82
+Z	0	49.07	76.1833
-Z	0	15.49	8.68717

Temperatures	
Star Tr.	24.9437
Zone 1	28.57
Zone 2	29.43
Zone 3	22.28
Zone 4	17.96

FDC Resp hex	0
ST Att Inv NoLatch	FALSE
Nut Ctrl Error	FALSE
Sun Point Err	FALSE
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	0
Sta Invalid	513635
Sta No Solution	0
Sta No Solution 2	387933
Sta Stale	185
Sta Stale 2	185
Est Update	88194
Est Residual	85
Est Math	0
Jet Command	0
Sin Rate Yellow	0
Spin Rate Red	0
Spin Rate Conting	0
Nutation Error	0
Comp Invalid	681
Mnvr Timeout	0

STA INFO hex	27000481
Sta Valid	TRUE
Sta Time	Locked
Bright Object	FALSE
Confidence	4
# of Stars	39
Sequence	Fine_Tuning
Last Update	1103988549
Ancillary Cnt	1276133
Spin Pulse Cnt	266171
Spin Period	14.381
Spin Time	10.3714
CEU Spin Cnt	14.3808
Residual[2]	-9.33648e-05
Sta HK Pkt Time	990661323
CCD Temp	7.52692
CPU Temp	39.8186
SMPS Temp	41.9382
CCD Voltage	0.266667
DAC Gain	2096
DAC Offset	1808

Sensor Counts (Peg. Pkt)	
ACE Up Time	3932570
Nutation Accel	1971
Spin Accel	361
Gyro	2010
CSS 1	1870
CSS 2	1844
CSS 3	1852
CSS 4	1779
CSS 5	79
CSS 6	79
CSS 7	77
CSS 8	77
Sun Offset 0V	76
Sun Div 4.3V	3314
SAM Off 2.5V	77
SAM Ref 2.5V	3886
Ctl Pkt Time	990661349
Ctl FDC Enable	15
Inr Dir Cmd X	0.378914
Inr Dir Cmd Y	0.84909
Inr Dir Cmd Z	0.368084

IBEX FDG Stati on Vi ew Peri ods Report
 Created: 29 May 2011 08:59:25 EDT

Strand Name Range (Re)	Start Time (UTCG) Stop Range (Re)	Stop Time (UTCG)	Start
AUWA01 To Forward 31. 831535	30 May 2011 00: 00: 00. 000 33. 973560	30 May 2011 02: 45: 38. 936	
APL To Forward 35. 132318	30 May 2011 04: 58: 33. 219 39. 629470	30 May 2011 14: 49: 46. 124	
USHI 01 To Forward 37. 468977	30 May 2011 09: 44: 02. 537 41. 703531	30 May 2011 20: 29: 51. 785	
USAK01 To Forward 38. 015073	30 May 2011 10: 56: 19. 261 41. 086776	30 May 2011 18: 37: 50. 837	
AUWA01 To Forward 39. 841084	30 May 2011 15: 17: 59. 682 43. 730671	31 May 2011 02: 57: 41. 701	
APL To Forward 44. 242457	31 May 2011 04: 58: 21. 333 46. 507702	31 May 2011 15: 27: 21. 787	
USHI 01 To Forward 45. 456873	31 May 2011 09: 55: 11. 918 47. 299434	31 May 2011 20: 54: 29. 666	
USAK01 To Forward 45. 548074	31 May 2011 10: 20: 48. 400 47. 183925	31 May 2011 19: 45: 12. 836	
AUWA01 To Forward 46. 581836	31 May 2011 15: 46: 45. 119 47. 966665	1 Jun 2011 03: 03: 50. 967	
APL To Forward 48. 083176	1 Jun 2011 04: 58: 15. 590 48. 324498	1 Jun 2011 15: 56: 00. 821	
USAK01 To Forward 48. 325173	1 Jun 2011 09: 56: 55. 929 48. 167235	1 Jun 2011 20: 37: 05. 816	
USHI 01 To Forward 48. 328156	1 Jun 2011 10: 03: 31. 386 48. 094940	1 Jun 2011 21: 14: 22. 959	
AUWA01 To Forward 48. 338504	1 Jun 2011 16: 10: 17. 630 47. 641664	2 Jun 2011 03: 08: 21. 839	
APL To Forward 47. 414670	2 Jun 2011 04: 58: 45. 502 45. 488879	2 Jun 2011 16: 24: 20. 521	
USAK01 To Forward 46. 792336	2 Jun 2011 09: 36: 10. 946 44. 313037	2 Jun 2011 21: 29: 57. 967	
USHI 01 To Forward 46. 696749	2 Jun 2011 10: 12: 05. 641 44. 254475	2 Jun 2011 21: 35: 08. 501	
AUWA01 To Forward 45. 467664	2 Jun 2011 16: 35: 12. 952 42. 696617	3 Jun 2011 03: 13: 06. 393	
APL To Forward 42. 103391	3 Jun 2011 05: 00: 57. 379 37. 406026	3 Jun 2011 12: 00: 05. 509	
USAK01 To Forward 40. 646293	3 Jun 2011 09: 14: 31. 082 34. 596392	3 Jun 2011 12: 00: 43. 548	
USHI 01 To Forward 40. 206943	3 Jun 2011 10: 24: 07. 916 34. 891208	3 Jun 2011 12: 00: 46. 791	
USAK01 To Aft 9. 772113	5 Jun 2011 04: 02: 28. 125 3. 380154	5 Jun 2011 07: 24: 27. 151	
AUWA01 To Forward 2. 036294	5 Jun 2011 08: 25: 47. 355 23. 854379	6 Jun 2011 01: 58: 39. 990	
USHI 01 To Forward 2. 880037	5 Jun 2011 08: 59: 15. 372 15. 913329	5 Jun 2011 17: 52: 53. 353	
APL To Forward 25. 879496	6 Jun 2011 04: 30: 15. 827 32. 189351	6 Jun 2011 13: 44: 48. 684	
USHI 01 To Forward 29. 215458	6 Jun 2011 09: 03: 55. 751 35. 449788	6 Jun 2011 19: 39: 01. 986	
USAK01 To Forward 30. 592291	6 Jun 2011 11: 08: 45. 765 34. 098883	6 Jun 2011 17: 02: 13. 166	
AUWA01 To Forward 32. 594312	6 Jun 2011 14: 23: 34. 277 38. 651785	7 Jun 2011 02: 22: 24. 748	
APL To Forward 39. 511761	7 Jun 2011 04: 29: 01. 271 43. 096198	7 Jun 2011 14: 37: 10. 858	

I BEX_Vi ewPeri ods_2011_149_00_07_v002

USHI 01 To Forward	7 Jun 2011 09: 19: 39. 494	7 Jun 2011 20: 11: 00. 930
41. 371791	44. 625220	
USAK01 To Forward	7 Jun 2011 10: 09: 53. 234	7 Jun 2011 18: 38: 33. 571
41. 668337	44. 256430	
AUWA01 To Forward	7 Jun 2011 15: 01: 06. 302	8 Jun 2011 02: 30: 41. 419
43. 233249	46. 106960	
APL To Forward	8 Jun 2011 04: 28: 27. 018	8 Jun 2011 15: 08: 50. 258
46. 463520	47. 969602	
USHI 01 To Forward	8 Jun 2011 09: 28: 38. 845	8 Jun 2011 20: 32: 20. 376
47. 300422	48. 377277	
USAK01 To Forward	8 Jun 2011 09: 40: 58. 319	8 Jun 2011 19: 35: 33. 582
47. 329382	48. 355402	
AUWA01 To Forward	8 Jun 2011 15: 25: 56. 960	9 Jun 2011 02: 36: 12. 268
48. 016897	48. 631283	
APL To Forward	9 Jun 2011 04: 28: 38. 300	9 Jun 2011 15: 42: 43. 946
48. 628056	48. 211561	
USAK01 To Forward	9 Jun 2011 09: 16: 30. 720	9 Jun 2011 20: 39: 59. 819
48. 576534	47. 766311	
USHI 01 To Forward	9 Jun 2011 09: 38: 11. 876	9 Jun 2011 20: 57: 50. 900
48. 564823	47. 696401	
AUWA01 To Forward	9 Jun 2011 15: 54: 42. 178	10 Jun 2011 02: 42: 38. 655
48. 214802	46. 959873	
APL To Forward	10 Jun 2011 04: 30: 40. 220	10 Jun 2011 16: 21: 18. 124
46. 650284	44. 099900	
USAK01 To Forward	10 Jun 2011 08: 51: 47. 211	10 Jun 2011 21: 52: 48. 139
45. 859674	42. 548187	
USHI 01 To Forward	10 Jun 2011 09: 50: 41. 846	10 Jun 2011 21: 26: 57. 616
45. 642636	42. 646511	
AUWA01 To Forward	10 Jun 2011 16: 29: 22. 995	11 Jun 2011 02: 50: 28. 347
44. 084114	40. 918758	
USHI 01 To Aft	12 Jun 2011 15: 00: 29. 053	13 Jun 2011 04: 00: 43. 038
21. 095821	4. 541332	
USAK01 To Aft	12 Jun 2011 16: 10: 20. 301	13 Jun 2011 04: 00: 51. 204
19. 781801	4. 864710	
APL To Aft	12 Jun 2011 17: 00: 23. 809	12 Jun 2011 20: 26: 27. 115
19. 011327	14. 551537	
AUWA01 To Aft	12 Jun 2011 21: 21: 44. 205	13 Jun 2011 04: 00: 45. 181
13. 541447	4. 986234	
AUWA01 To Forward	13 Jun 2011 05: 30: 48. 837	14 Jun 2011 01: 09: 07. 397
4. 274074	23. 904203	
USHI 01 To Forward	13 Jun 2011 05: 30: 52. 242	13 Jun 2011 16: 18: 11. 161
4. 050240	15. 881026	
APL To Forward	14 Jun 2011 03: 53: 39. 067	14 Jun 2011 12: 34: 52. 962
25. 962205	31. 634310	
USHI 01 To Forward	14 Jun 2011 08: 16: 30. 092	14 Jun 2011 18: 43: 59. 513
29. 002812	34. 948427	
USAK01 To Forward	14 Jun 2011 11: 28: 10. 195	14 Jun 2011 15: 06: 34. 145
30. 997522	33. 085765	
AUWA01 To Forward	14 Jun 2011 13: 22: 20. 502	15 Jun 2011 01: 42: 59. 632
32. 112694	38. 191079	
APL To Forward	15 Jun 2011 03: 54: 11. 236	15 Jun 2011 13: 47: 35. 679
39. 066869	42. 517541	
USHI 01 To Forward	15 Jun 2011 08: 40: 00. 445	15 Jun 2011 19: 28: 03. 191
40. 873161	44. 083023	
USAK01 To Forward	15 Jun 2011 09: 51: 20. 121	15 Jun 2011 17: 38: 11. 823
41. 271836	43. 639167	
AUWA01 To Forward	15 Jun 2011 14: 14: 45. 357	16 Jun 2011 01: 55: 13. 255
42. 677606	45. 608577	
APL To Forward	16 Jun 2011 03: 54: 53. 150	16 Jun 2011 14: 30: 33. 354
45. 977347	47. 532472	
USHI 01 To Forward	16 Jun 2011 08: 53: 16. 769	16 Jun 2011 19: 57: 13. 014
46. 831943	47. 989271	
USAK01 To Forward	16 Jun 2011 09: 13: 26. 752	16 Jun 2011 18: 55: 50. 531

I BEX_Vi ewPeri ods_2011_149_00_07_v002

AUWA01	46. 881157 To Forward	16 Jun 2011 14: 48: 43. 897	47. 954105 48. 304342	17 Jun 2011 02: 03: 22. 124
APL To	Forward	17 Jun 2011 03: 56: 09. 602	48. 072557	17 Jun 2011 15: 14: 05. 148
USAK01	48. 322294 To Forward	17 Jun 2011 08: 43: 47. 823	47. 729491	17 Jun 2011 20: 19: 01. 163
USHI 01	48. 304920 To Forward	17 Jun 2011 09: 06: 07. 694	47. 676328	17 Jun 2011 20: 30: 26. 418
AUWA01	48. 299238 To Forward	17 Jun 2011 15: 25: 42. 191	47. 108722	18 Jun 2011 02: 12: 47. 751
APL To	Forward	18 Jun 2011 03: 59: 49. 069	44. 746319	18 Jun 2011 15: 00: 51. 009
USAK01	46. 860904 To Forward	18 Jun 2011 08: 12: 20. 010	43. 388008	18 Jun 2011 15: 00: 22. 216
USHI 01	46. 257823 To Forward	18 Jun 2011 09: 23: 44. 400	43. 552460	18 Jun 2011 15: 00: 17. 314
AUWA01	46. 060722 To Forward	18 Jun 2011 16: 12: 56. 237	42. 459906	18 Jun 2011 15: 00: 24. 801
USAK01	44. 740582 To Aft	20 Jun 2011 12: 30: 31. 354	10. 473532	21 Jun 2011 11: 13: 22. 371
USHI 01	28. 636997 To Aft	20 Jun 2011 12: 30: 49. 600	18. 574481	21 Jun 2011 01: 13: 47. 124
APL To	Aft	20 Jun 2011 12: 50: 35. 289	22. 387823	20 Jun 2011 20: 06: 34. 712
AUWA01	28. 471062 To Aft	20 Jun 2011 20: 21: 31. 581	15. 954669	21 Jun 2011 04: 28: 21. 486
APL To	Aft	21 Jun 2011 08: 43: 27. 004	9. 711681	21 Jun 2011 11: 20: 43. 801
USHI 01	12. 409302 To Forward	22 Jun 2011 06: 10: 37. 657	24. 689188	22 Jun 2011 16: 00: 06. 537
AUWA01	17. 351661 To Forward	22 Jun 2011 09: 37: 56. 257	29. 882759	23 Jun 2011 00: 28: 50. 634
APL To	Forward	23 Jun 2011 03: 14: 47. 922	35. 376426	23 Jun 2011 11: 32: 19. 306
USHI 01	31. 355796 To Forward	23 Jun 2011 07: 30: 24. 582	37. 983806	23 Jun 2011 17: 50: 56. 972
AUWA01	33. 529493 To Forward	23 Jun 2011 12: 24: 27. 422	40. 583017	24 Jun 2011 01: 02: 23. 362
APL To	Forward	24 Jun 2011 03: 16: 43. 184	43. 951360	24 Jun 2011 12: 58: 02. 603
USHI 01	41. 274731 To Forward	24 Jun 2011 07: 58: 23. 189	45. 212123	24 Jun 2011 18: 44: 31. 861
USAK01	42. 673907 To Forward	24 Jun 2011 09: 28: 29. 625	44. 813999	24 Jun 2011 16: 39: 23. 723
AUWA01	43. 091170 To Forward	24 Jun 2011 13: 27: 33. 569	46. 425726	25 Jun 2011 01: 17: 54. 208
APL To	Forward	25 Jun 2011 03: 18: 40. 477	47. 899696	25 Jun 2011 13: 54: 04. 747
USHI 01	46. 711564 To Forward	25 Jun 2011 08: 16: 20. 916	48. 226465	25 Jun 2011 19: 22: 53. 530
USAK01	47. 374182 To Forward	25 Jun 2011 08: 40: 17. 564	48. 213124	25 Jun 2011 18: 22: 36. 092
AUWA01	47. 418826 To Forward	25 Jun 2011 14: 12: 28. 122	48. 431377	26 Jun 2011 01: 28: 37. 913
APL To	Forward	26 Jun 2011 03: 21: 06. 127	48. 006912	26 Jun 2011 14: 42: 54. 941
USAK01	48. 419312 To Forward	26 Jun 2011 08: 06: 15. 689	47. 582327	26 Jun 2011 19: 50: 49. 213
USHI 01	48. 360930 To Forward	26 Jun 2011 08: 32: 12. 138	47. 533321	26 Jun 2011 19: 58: 05. 263
AUWA01	48. 347141 To Forward	26 Jun 2011 14: 54: 00. 313	46. 883212	27 Jun 2011 01: 38: 22. 798
	48. 012184			

IBEX_Vi ewPeri ods_2011_149_00_07_v002

APL To Forward	27 Jun 2011 03: 25: 01. 186	27 Jun 2011 15: 35: 42. 668
46. 608857	44. 272160	
USAK01 To Forward	27 Jun 2011 07: 34: 49. 710	27 Jun 2011 21: 31: 07. 063
45. 947291	42. 820840	
USHI 01 To Forward	27 Jun 2011 08: 49: 59. 789	27 Jun 2011 20: 47: 28. 165
45. 720199	43. 011661	
AUWA01 To Forward	27 Jun 2011 15: 41: 30. 589	28 Jun 2011 01: 50: 03. 873
44. 267805	41. 560963	
APL To Forward	28 Jun 2011 03: 32: 49. 186	28 Jun 2011 16: 50: 02. 819
41. 016562	36. 064599	
USAK01 To Forward	28 Jun 2011 06: 57: 41. 113	29 Jun 2011 00: 26: 52. 751
39. 910324	32. 522757	
USHI 01 To Forward	28 Jun 2011 09: 15: 58. 269	28 Jun 2011 21: 49: 06. 466
39. 084626	33. 821827	
AUWA01 To Forward	28 Jun 2011 16: 52: 51. 057	29 Jun 2011 02: 10: 40. 198
36. 061315	31. 636045	
APL To Forward	29 Jun 2011 03: 54: 21. 881	29 Jun 2011 06: 00: 20. 771
30. 697049	25. 319725	
AUWA01 To Aft	30 Jun 2011 01: 15: 40. 177	30 Jun 2011 05: 30: 55. 565
17. 011907	12. 614761	
USAK01 To Aft	30 Jun 2011 01: 15: 30. 451	30 Jun 2011 08: 33: 02. 066
16. 465628	10. 252257	
APL To Forward	1 Jul 2011 03: 10: 55. 189	1 Jul 2011 06: 39: 28. 631
17. 306374	20. 164338	
USHI 01 To Forward	1 Jul 2011 05: 49: 36. 932	1 Jul 2011 15: 42: 18. 951
19. 507291	26. 465900	
AUWA01 To Forward	1 Jul 2011 09: 32: 09. 255	1 Jul 2011 23: 57: 19. 755
22. 313561	31. 275653	
APL To Forward	2 Jul 2011 02: 39: 07. 200	2 Jul 2011 11: 03: 53. 247
32. 658978	36. 565202	
USHI 01 To Forward	2 Jul 2011 06: 57: 10. 911	2 Jul 2011 17: 19: 00. 595
34. 764072	39. 038453	
USAK01 To Forward	2 Jul 2011 11: 09: 12. 677	2 Jul 2011 12: 39: 18. 602
36. 621870	37. 247330	
AUWA01 To Forward	2 Jul 2011 11: 53: 33. 440	3 Jul 2011 00: 27: 39. 932
36. 942495	41. 521947	
APL To Forward	3 Jul 2011 02: 40: 58. 372	3 Jul 2011 12: 24: 15. 185
42. 184184	44. 764728	
USHI 01 To Forward	3 Jul 2011 07: 23: 17. 635	3 Jul 2011 18: 09: 43. 965
43. 529491	45. 980594	
USAK01 To Forward	3 Jul 2011 08: 50: 21. 970	3 Jul 2011 16: 06: 50. 149
43. 921932	45. 583039	
AUWA01 To Forward	3 Jul 2011 12: 53: 07. 335	4 Jul 2011 00: 42: 17. 041
44. 904321	47. 150373	
APL To Forward	4 Jul 2011 02: 42: 43. 625	4 Jul 2011 13: 18: 03. 214
47. 424885	48. 573917	
USHI 01 To Forward	4 Jul 2011 07: 40: 25. 681	4 Jul 2011 18: 46: 35. 904
48. 066352	48. 890016	
USAK01 To Forward	4 Jul 2011 08: 04: 03. 811	4 Jul 2011 17: 45: 57. 770
48. 108900	48. 877805	
AUWA01 To Forward	4 Jul 2011 13: 36: 17. 004	5 Jul 2011 00: 52: 28. 483
48. 616395	49. 091172	
APL To Forward	5 Jul 2011 02: 44: 53. 651	5 Jul 2011 14: 05: 06. 623
49. 079467	48. 687364	
USAK01 To Forward	5 Jul 2011 07: 30: 52. 045	5 Jul 2011 19: 11: 00. 177
49. 024977	48. 282956	
USHI 01 To Forward	5 Jul 2011 07: 55: 35. 184	5 Jul 2011 19: 20: 26. 065
49. 012420	48. 230923	
AUWA01 To Forward	5 Jul 2011 14: 16: 15. 353	6 Jul 2011 01: 01: 42. 949
48. 693142	47. 606033	
APL To Forward	6 Jul 2011 02: 48: 26. 133	6 Jul 2011 14: 55: 35. 538
47. 340572	45. 106408	
USAK01 To Forward	6 Jul 2011 07: 00: 15. 873	6 Jul 2011 20: 46: 26. 441

I BEX_Vi ewPeri ods_2011_149_00_07_v002

USHI 01	46. 698689 To Forward	6 Jul	43. 718614 2011 08: 12: 29. 045	6 Jul	2011 20: 07: 30. 984
AUWA01	46. 488197 To Forward	6 Jul	43. 895311 2011 15: 01: 32. 693	7 Jul	2011 01: 12: 40. 201
APL To	45. 103164 Forward	7 Jul	42. 490331 2011 02: 55: 29. 404	7 Jul	2011 16: 04: 56. 513
USAK01	41. 958974 To Forward	7 Jul	37. 233619 2011 06: 24: 48. 494	7 Jul	2011 23: 23: 44. 039
USHI 01	40. 863281 To Forward	7 Jul	33. 986827 2011 08: 36: 40. 466	7 Jul	2011 21: 04: 47. 766
AUWA01	40. 104391 To Forward	7 Jul	35. 074446 2011 16: 07: 44. 513	8 Jul	2011 01: 31: 16. 480
APL To	37. 230990 Forward	8 Jul	32. 935027 2011 03: 14: 13. 834	8 Jul	2011 07: 15: 34. 424
USAK01	32. 033925 To Forward	8 Jul	24. 775932 2011 05: 19: 12. 768	8 Jul	2011 07: 15: 17. 014
USAK01	30. 944671 To Aft	9 Jul	25. 523008 2011 03: 15: 22. 131	9 Jul	2011 09: 54: 31. 272
APL To	16. 512133 Aft	9 Jul	10. 247104 2011 07: 29: 45. 978	9 Jul	2011 13: 00: 48. 110
APL To	12. 168092 Forward	10 Jul	8. 287115 2011 03: 05: 10. 650	10 Jul	2011 04: 49: 38. 843
USHI 01	16. 113695 To Forward	10 Jul	17. 610425 2011 05: 03: 30. 571	10 Jul	2011 14: 58: 04. 923
AUWA01	17. 770056 To Forward	10 Jul	25. 142598 2011 08: 40: 53. 307	10 Jul	2011 23: 19: 30. 004
APL To	20. 672598 Forward	11 Jul	30. 255817 2011 02: 02: 59. 393	11 Jul	2011 10: 26: 08. 573
USHI 01	31. 719687 To Forward	11 Jul	35. 786718 2011 06: 20: 26. 702	11 Jul	2011 16: 42: 14. 608
USAK01	33. 913620 To Forward	11 Jul	38. 359283 2011 10: 41: 52. 735	11 Jul	2011 11: 54: 04. 740
AUWA01	35. 923136 To Forward	11 Jul	36. 437516 2011 11: 16: 34. 903	11 Jul	2011 23: 51: 18. 908
APL To	36. 172486 Forward	12 Jul	40. 956238 2011 02: 04: 50. 195	12 Jul	2011 11: 48: 14. 125
USHI 01	41. 638267 To Forward	12 Jul	44. 297924 2011 06: 47: 11. 305	12 Jul	2011 17: 33: 42. 638
USAK01	43. 038042 To Forward	12 Jul	45. 569851 2011 08: 14: 08. 446	12 Jul	2011 15: 31: 08. 992
AUWA01	43. 419132 To Forward	12 Jul	45. 181621 2011 12: 17: 12. 004	13 Jul	2011 00: 06: 07. 721
APL To	44. 432800 Forward	13 Jul	46. 777710 2011 02: 06: 36. 139	13 Jul	2011 12: 42: 14. 055
USHI 01	47. 061497 To Forward	13 Jul	48. 245171 2011 07: 04: 24. 313	13 Jul	2011 18: 10: 40. 222
USAK01	47. 722697 To Forward	13 Jul	48. 568353 2011 07: 27: 39. 546	13 Jul	2011 17: 10: 26. 663
AUWA01	47. 765833 To Forward	13 Jul	48. 555665 2011 13: 00: 28. 626	14 Jul	2011 00: 16: 19. 469
APL To	48. 288235 Forward	14 Jul	48. 769179 2011 02: 08: 45. 573	14 Jul	2011 13: 29: 14. 061
USAK01	48. 755674 To Forward	14 Jul	48. 334350 2011 06: 54: 28. 599	14 Jul	2011 18: 35: 24. 335
USHI 01	48. 693065 To Forward	14 Jul	47. 906895 2011 07: 19: 32. 652	14 Jul	2011 18: 44: 27. 465
AUWA01	48. 679373 To Forward	14 Jul	47. 854761 2011 13: 40: 24. 774	15 Jul	2011 00: 25: 29. 910
APL To	48. 339354 Forward	15 Jul	47. 195526 2011 02: 12: 16. 156	15 Jul	2011 14: 19: 46. 279
USAK01	46. 917651 To Forward	15 Jul	44. 572660 2011 06: 23: 48. 514	15 Jul	2011 20: 11: 13. 419
	46. 243827		43. 110620		

IBEX_ViewPeriods_2011_149_00_07_v002

USHI 01 To Forward	15 Jul 2011 07: 36: 25. 459	15 Jul 2011 19: 31: 57. 123
46. 021651	43. 283315	
AUWA01 To Forward	15 Jul 2011 14: 25: 49. 237	16 Jul 2011 00: 36: 21. 699
44. 565901	41. 827075	
APL To Forward	16 Jul 2011 02: 19: 19. 958	16 Jul 2011 15: 30: 16. 065
41. 259001	36. 287220	
USAK01 To Forward	16 Jul 2011 05: 47: 54. 824	16 Jul 2011 22: 54: 08. 256
40. 114728	32. 812376	
USHI 01 To Forward	16 Jul 2011 08: 00: 51. 588	16 Jul 2011 20: 30: 08. 565
39. 314350	34. 007916	
AUWA01 To Forward	16 Jul 2011 15: 33: 23. 236	17 Jul 2011 00: 00: 00. 000
36. 281109	32. 074567	

IBEX FDG Crossing Times Report
 Created: 29 May 2011 08:38:00 EDT

29	May	2011	00:26:09.062	11_Re
29	May	2011	01:11:47.009	12_Re
29	May	2011	01:59:21.632	13_Re
29	May	2011	02:48:56.045	14_Re
29	May	2011	03:40:33.134	15_Re
29	May	2011	04:34:16.128	16_Re
29	May	2011	05:30:08.453	17_Re
29	May	2011	06:28:13.838	18_Re
29	May	2011	07:28:36.378	19_Re
29	May	2011	08:31:20.624	20_Re
29	May	2011	09:36:31.460	21_Re
29	May	2011	10:44:14.543	22_Re
29	May	2011	11:54:36.008	23_Re
29	May	2011	13:07:42.739	24_Re
29	May	2011	14:23:42.436	25_Re
29	May	2011	15:42:43.736	26_Re
29	May	2011	16:36:36.009	155_deg
29	May	2011	17:04:56.367	27_Re
29	May	2011	18:30:31.326	28_Re
29	May	2011	19:59:41.103	29_Re
29	May	2011	21:32:39.963	30_Re
29	May	2011	23:09:44.300	31_Re
30	May	2011	00:51:13.081	32_Re
30	May	2011	02:37:28.438	33_Re
30	May	2011	04:28:56.429	34_Re
30	May	2011	06:26:08.075	35_Re
30	May	2011	08:29:40.762	36_Re
30	May	2011	10:40:20.223	37_Re
30	May	2011	12:59:03.379	38_Re
30	May	2011	15:27:02.586	39_Re
30	May	2011	18:05:52.209	40_Re
30	May	2011	20:57:39.329	41_Re
31	May	2011	00:05:22.285	42_Re
31	May	2011	03:33:25.472	43_Re
31	May	2011	07:28:52.223	44_Re
31	May	2011	12:04:24.028	45_Re
31	May	2011	17:47:55.104	46_Re
1	Jun	2011	02:17:49.667	47_Re
1	Jun	2011	13:20:20.564	Apoapsis
2	Jun	2011	00:22:49.464	47_Re
2	Jun	2011	08:52:38.192	46_Re
2	Jun	2011	14:36:03.089	45_Re
2	Jun	2011	19:11:28.206	44_Re
2	Jun	2011	23:06:47.920	43_Re
3	Jun	2011	02:34:43.607	42_Re
3	Jun	2011	05:42:18.646	41_Re
3	Jun	2011	08:33:57.442	40_Re
3	Jun	2011	11:12:38.345	39_Re
3	Jun	2011	13:40:28.444	38_Re
3	Jun	2011	15:59:02.112	37_Re
3	Jun	2011	18:09:31.713	36_Re
3	Jun	2011	20:12:54.179	35_Re
3	Jun	2011	22:09:55.248	34_Re
4	Jun	2011	00:01:12.316	33_Re
4	Jun	2011	01:47:16.409	32_Re
4	Jun	2011	03:15:00.669	200_deg
4	Jun	2011	03:28:33.592	31_Re
4	Jun	2011	05:05:26.001	30_Re
4	Jun	2011	06:38:12.611	29_Re
4	Jun	2011	08:07:09.816	28_Re

I BEX_CrossingTimes_2011_149_00_07_v001

4	Jun	2011	09: 32: 31. 885	27_Re
4	Jun	2011	10: 54: 31. 308	26_Re
4	Jun	2011	12: 13: 19. 083	25_Re
4	Jun	2011	13: 29: 04. 932	24_Re
4	Jun	2011	14: 41: 57. 488	23_Re
4	Jun	2011	15: 52: 04. 382	22_Re
4	Jun	2011	16: 59: 32. 629	21_Re
4	Jun	2011	18: 04: 28. 299	20_Re
4	Jun	2011	19: 06: 56. 921	19_Re
4	Jun	2011	20: 07: 03. 458	18_Re
4	Jun	2011	21: 04: 52. 392	17_Re
4	Jun	2011	22: 00: 27. 729	16_Re
4	Jun	2011	22: 53: 53. 277	15_Re
4	Jun	2011	23: 45: 12. 260	14_Re
5	Jun	2011	00: 34: 27. 791	13_Re
5	Jun	2011	01: 21: 42. 769	12_Re
5	Jun	2011	02: 06: 59. 989	11_Re
5	Jun	2011	02: 50: 22. 248	10_Re
5	Jun	2011	03: 31: 52. 725	9_Re
5	Jun	2011	04: 11: 35. 086	8_Re
5	Jun	2011	04: 49: 34. 387	7_Re
5	Jun	2011	05: 25: 58. 475	6_Re
5	Jun	2011	06: 01: 01. 312	5_Re
5	Jun	2011	06: 30: 53. 470	270_deg
5	Jun	2011	06: 35: 12. 041	4_Re
5	Jun	2011	07: 09: 48. 656	3_Re
5	Jun	2011	08: 21: 54. 715	Periapsis
5	Jun	2011	09: 34: 00. 652	3_Re
5	Jun	2011	10: 08: 37. 399	4_Re
5	Jun	2011	10: 42: 48. 212	5_Re
5	Jun	2011	11: 17: 51. 086	6_Re
5	Jun	2011	11: 31: 42. 852	110_deg
5	Jun	2011	11: 54: 15. 183	7_Re
5	Jun	2011	12: 32: 14. 436	8_Re
5	Jun	2011	13: 11: 56. 687	9_Re
5	Jun	2011	13: 53: 26. 964	10_Re
5	Jun	2011	14: 36: 49. 017	11_Re
5	Jun	2011	15: 22: 05. 824	12_Re
5	Jun	2011	16: 09: 20. 279	13_Re
5	Jun	2011	16: 58: 35. 159	14_Re
5	Jun	2011	17: 49: 53. 227	15_Re
5	Jun	2011	18: 43: 17. 579	16_Re
5	Jun	2011	19: 38: 51. 516	17_Re
5	Jun	2011	20: 36: 38. 658	18_Re
5	Jun	2011	21: 36: 42. 991	19_Re
5	Jun	2011	22: 39: 08. 965	20_Re
5	Jun	2011	23: 44: 01. 345	21_Re
6	Jun	2011	00: 51: 25. 678	22_Re
6	Jun	2011	02: 01: 27. 968	23_Re
6	Jun	2011	03: 14: 14. 955	24_Re
6	Jun	2011	04: 29: 54. 175	25_Re
6	Jun	2011	05: 48: 34. 077	26_Re
6	Jun	2011	05: 55: 15. 836	155_deg
6	Jun	2011	07: 10: 24. 166	27_Re
6	Jun	2011	08: 35: 35. 174	28_Re
6	Jun	2011	10: 04: 19. 277	29_Re
6	Jun	2011	11: 36: 50. 355	30_Re
6	Jun	2011	13: 13: 24. 331	31_Re
6	Jun	2011	14: 54: 19. 590	32_Re
6	Jun	2011	16: 39: 57. 529	33_Re
6	Jun	2011	18: 30: 43. 274	34_Re
6	Jun	2011	20: 27: 06. 635	35_Re
6	Jun	2011	22: 29: 43. 411	36_Re

I BEX_CrossingTimes_2011_149_00_07_v001

7	Jun	2011	00: 39: 17. 199	37_Re
7	Jun	2011	02: 56: 41. 984	38_Re
7	Jun	2011	05: 23: 05. 960	39_Re
7	Jun	2011	07: 59: 57. 391	40_Re
7	Jun	2011	10: 49: 14. 004	41_Re
7	Jun	2011	13: 53: 38. 970	42_Re
7	Jun	2011	17: 17: 10. 178	43_Re
7	Jun	2011	21: 05: 59. 496	44_Re
8	Jun	2011	01: 30: 51. 278	45_Re
8	Jun	2011	06: 53: 48. 711	46_Re
8	Jun	2011	14: 19: 18. 618	47_Re
9	Jun	2011	04: 45: 06. 701	Apoapsis
9	Jun	2011	19: 22: 13. 146	47_Re
10	Jun	2011	03: 04: 15. 884	46_Re
10	Jun	2011	08: 39: 44. 137	45_Re
10	Jun	2011	13: 15: 05. 370	44_Re
10	Jun	2011	17: 13: 08. 452	43_Re
10	Jun	2011	20: 45: 00. 379	42_Re
10	Jun	2011	23: 57: 06. 565	41_Re
11	Jun	2011	02: 53: 33. 620	40_Re
11	Jun	2011	05: 37: 10. 758	39_Re
11	Jun	2011	08: 10: 00. 103	38_Re
11	Jun	2011	10: 33: 33. 249	37_Re
11	Jun	2011	11: 11: 17. 157	200_deg
11	Jun	2011	12: 49: 00. 991	36_Re
11	Jun	2011	14: 57: 19. 401	35_Re
11	Jun	2011	16: 59: 13. 787	34_Re
11	Jun	2011	18: 55: 21. 384	33_Re
11	Jun	2011	20: 46: 13. 226	32_Re
11	Jun	2011	22: 32: 15. 505	31_Re
12	Jun	2011	00: 13: 50. 562	30_Re
12	Jun	2011	01: 51: 17. 628	29_Re
12	Jun	2011	03: 24: 53. 406	28_Re
12	Jun	2011	04: 54: 52. 500	27_Re
12	Jun	2011	06: 21: 27. 778	26_Re
12	Jun	2011	07: 44: 50. 582	25_Re
12	Jun	2011	09: 05: 11. 256	24_Re
12	Jun	2011	10: 22: 38. 702	23_Re
12	Jun	2011	11: 37: 21. 314	22_Re
12	Jun	2011	12: 49: 26. 480	21_Re
12	Jun	2011	13: 59: 01. 028	20_Re
12	Jun	2011	15: 06: 11. 210	19_Re
12	Jun	2011	16: 11: 03. 010	18_Re
12	Jun	2011	17: 13: 41. 947	17_Re
12	Jun	2011	18: 14: 13. 229	16_Re
12	Jun	2011	19: 12: 42. 126	15_Re
12	Jun	2011	20: 09: 13. 916	14_Re
12	Jun	2011	21: 03: 54. 155	13_Re
12	Jun	2011	21: 56: 48. 948	12_Re
12	Jun	2011	22: 48: 05. 615	11_Re
12	Jun	2011	23: 37: 53. 194	10_Re
13	Jun	2011	00: 26: 24. 095	9_Re
13	Jun	2011	01: 13: 56. 855	8_Re
13	Jun	2011	01: 42: 45. 601	270_deg
13	Jun	2011	02: 01: 02. 303	7_Re
13	Jun	2011	02: 48: 39. 278	6_Re
13	Jun	2011	03: 39: 09. 035	5_Re
13	Jun	2011	04: 42: 01. 922	4_Re
13	Jun	2011	05: 45: 27. 232	Periapsis
13	Jun	2011	06: 48: 51. 859	4_Re
13	Jun	2011	07: 51: 44. 967	5_Re
13	Jun	2011	08: 42: 14. 906	6_Re
13	Jun	2011	09: 29: 52. 032	7_Re

I BEX_CrossingTimes_2011_149_00_07_v001

13	Jun	2011	10: 16: 57. 523	8_Re
13	Jun	2011	11: 04: 30. 326	9_Re
13	Jun	2011	11: 53: 01. 245	10_Re
13	Jun	2011	12: 27: 41. 700	110_deg
13	Jun	2011	12: 42: 48. 837	11_Re
13	Jun	2011	13: 34: 05. 500	12_Re
13	Jun	2011	14: 27: 00. 379	13_Re
13	Jun	2011	15: 21: 40. 706	14_Re
13	Jun	2011	16: 18: 12. 614	15_Re
13	Jun	2011	17: 16: 41. 688	16_Re
13	Jun	2011	18: 17: 13. 243	17_Re
13	Jun	2011	19: 19: 52. 530	18_Re
13	Jun	2011	20: 24: 44. 903	19_Re
13	Jun	2011	21: 31: 55. 950	20_Re
13	Jun	2011	22: 41: 31. 582	21_Re
13	Jun	2011	23: 53: 38. 168	22_Re
14	Jun	2011	01: 08: 22. 623	23_Re
14	Jun	2011	02: 25: 52. 516	24_Re
14	Jun	2011	03: 46: 16. 198	25_Re
14	Jun	2011	05: 09: 42. 937	26_Re
14	Jun	2011	06: 36: 23. 085	27_Re
14	Jun	2011	08: 06: 28. 266	28_Re
14	Jun	2011	09: 40: 11. 623	29_Re
14	Jun	2011	11: 17: 48. 105	30_Re
14	Jun	2011	12: 59: 34. 841	31_Re
14	Jun	2011	14: 45: 51. 606	32_Re
14	Jun	2011	15: 37: 37. 430	155_deg
14	Jun	2011	16: 37: 01. 432	33_Re
14	Jun	2011	18: 33: 31. 404	34_Re
14	Jun	2011	20: 35: 53. 733	35_Re
14	Jun	2011	22: 44: 47. 221	36_Re
15	Jun	2011	01: 00: 59. 310	37_Re
15	Jun	2011	03: 25: 29. 051	38_Re
15	Jun	2011	05: 59: 31. 513	39_Re
15	Jun	2011	08: 44: 44. 637	40_Re
15	Jun	2011	11: 43: 20. 406	41_Re
15	Jun	2011	14: 58: 24. 217	42_Re
15	Jun	2011	18: 34: 31. 324	43_Re
15	Jun	2011	22: 39: 03. 371	44_Re
16	Jun	2011	03: 25: 17. 635	45_Re
16	Jun	2011	09: 22: 37. 490	46_Re
16	Jun	2011	18: 16: 46. 937	47_Re
17	Jun	2011	06: 00: 41. 281	Apoapsis
17	Jun	2011	18: 07: 44. 088	47_Re
18	Jun	2011	03: 48: 52. 215	46_Re
18	Jun	2011	10: 18: 25. 255	45_Re
18	Jun	2011	15: 30: 48. 752	44_Re
18	Jun	2011	19: 57: 58. 552	43_Re
18	Jun	2011	23: 54: 21. 965	42_Re
19	Jun	2011	01: 52: 57. 451	200_deg
19	Jun	2011	03: 27: 58. 971	41_Re
19	Jun	2011	06: 43: 49. 310	40_Re
19	Jun	2011	09: 45: 14. 842	39_Re
19	Jun	2011	12: 34: 39. 342	38_Re
19	Jun	2011	15: 13: 49. 582	37_Re
19	Jun	2011	17: 44: 07. 484	36_Re
19	Jun	2011	20: 06: 37. 581	35_Re
19	Jun	2011	22: 22: 11. 826	34_Re
20	Jun	2011	00: 31: 32. 817	33_Re
20	Jun	2011	02: 35: 16. 043	32_Re
20	Jun	2011	04: 33: 51. 443	31_Re
20	Jun	2011	06: 27: 44. 773	30_Re
20	Jun	2011	08: 17: 18. 048	29_Re

I BEX_CrossingTimes_2011_149_00_07_v001

20	Jun	2011	10: 02: 50. 895	28_Re
20	Jun	2011	11: 44: 40. 295	27_Re
20	Jun	2011	13: 23: 01. 653	26_Re
20	Jun	2011	14: 58: 08. 845	25_Re
20	Jun	2011	16: 30: 14. 560	24_Re
20	Jun	2011	17: 59: 30. 576	23_Re
20	Jun	2011	19: 26: 08. 001	22_Re
20	Jun	2011	20: 50: 17. 519	21_Re
20	Jun	2011	22: 12: 09. 634	20_Re
20	Jun	2011	23: 31: 54. 972	19_Re
21	Jun	2011	00: 49: 44. 632	18_Re
21	Jun	2011	02: 05: 50. 689	17_Re
21	Jun	2011	03: 20: 26. 829	16_Re
21	Jun	2011	04: 33: 49. 423	15_Re
21	Jun	2011	05: 46: 19. 103	14_Re
21	Jun	2011	06: 36: 50. 426	270_deg
21	Jun	2011	06: 58: 23. 671	13_Re
21	Jun	2011	08: 10: 43. 444	12_Re
21	Jun	2011	09: 24: 22. 412	11_Re
21	Jun	2011	10: 41: 15. 632	10_Re
21	Jun	2011	12: 05: 33. 891	9_Re
21	Jun	2011	13: 51: 01. 717	8_Re
21	Jun	2011	16: 24: 08. 796	Periapsis
21	Jun	2011	18: 57: 14. 863	8_Re
21	Jun	2011	20: 42: 43. 207	9_Re
21	Jun	2011	22: 07: 01. 936	10_Re
21	Jun	2011	23: 23: 55. 583	11_Re
22	Jun	2011	00: 37: 34. 978	12_Re
22	Jun	2011	01: 49: 55. 102	13_Re
22	Jun	2011	03: 01: 59. 955	14_Re
22	Jun	2011	04: 14: 29. 834	15_Re
22	Jun	2011	05: 27: 52. 518	16_Re
22	Jun	2011	06: 42: 28. 632	17_Re
22	Jun	2011	07: 47: 04. 884	110_deg
22	Jun	2011	07: 58: 34. 480	18_Re
22	Jun	2011	09: 16: 23. 755	19_Re
22	Jun	2011	10: 36: 08. 443	20_Re
22	Jun	2011	11: 57: 59. 585	21_Re
22	Jun	2011	13: 22: 07. 753	22_Re
22	Jun	2011	14: 48: 43. 403	23_Re
22	Jun	2011	16: 17: 57. 152	24_Re
22	Jun	2011	17: 49: 59. 965	25_Re
22	Jun	2011	19: 25: 03. 550	26_Re
22	Jun	2011	21: 03: 20. 453	27_Re
22	Jun	2011	22: 45: 04. 386	28_Re
23	Jun	2011	00: 30: 30. 507	29_Re
23	Jun	2011	02: 19: 55. 760	30_Re
23	Jun	2011	04: 13: 39. 292	31_Re
23	Jun	2011	06: 12: 02. 972	32_Re
23	Jun	2011	08: 15: 32. 047	33_Re
23	Jun	2011	10: 24: 36. 003	34_Re
23	Jun	2011	12: 39: 49. 702	35_Re
23	Jun	2011	15: 01: 54. 937	36_Re
23	Jun	2011	17: 31: 42. 599	37_Re
23	Jun	2011	20: 10: 15. 785	38_Re
23	Jun	2011	22: 05: 17. 524	155_deg
23	Jun	2011	22: 58: 54. 420	39_Re
24	Jun	2011	01: 59: 22. 394	40_Re
24	Jun	2011	05: 13: 59. 131	41_Re
24	Jun	2011	08: 45: 59. 535	42_Re
24	Jun	2011	12: 40: 11. 164	43_Re
24	Jun	2011	17: 04: 13. 030	44_Re
24	Jun	2011	22: 11: 43. 274	45_Re

I BEX_CrossingTimes_2011_149_00_07_v001

25	Jun	2011	04: 31: 59. 993	46_Re
25	Jun	2011	13: 42: 58. 156	47_Re
26	Jun	2011	03: 01: 16. 330	Apoapsis
26	Jun	2011	16: 19: 15. 822	47_Re
27	Jun	2011	01: 29: 37. 261	46_Re
27	Jun	2011	07: 49: 18. 058	45_Re
27	Jun	2011	12: 56: 13. 118	44_Re
27	Jun	2011	17: 19: 42. 958	43_Re
27	Jun	2011	21: 13: 23. 978	42_Re
27	Jun	2011	23: 17: 24. 764	200_deg
28	Jun	2011	00: 44: 53. 554	41_Re
28	Jun	2011	03: 58: 59. 798	40_Re
28	Jun	2011	06: 58: 57. 809	39_Re
28	Jun	2011	09: 47: 07. 139	38_Re
28	Jun	2011	12: 25: 11. 762	37_Re
28	Jun	2011	14: 54: 31. 662	36_Re
28	Jun	2011	17: 16: 09. 982	35_Re
28	Jun	2011	19: 30: 57. 643	34_Re
28	Jun	2011	21: 39: 36. 465	33_Re
28	Jun	2011	23: 42: 41. 327	32_Re
29	Jun	2011	01: 40: 41. 728	31_Re
29	Jun	2011	03: 34: 02. 924	30_Re
29	Jun	2011	05: 23: 06. 788	29_Re
29	Jun	2011	07: 08: 12. 466	28_Re
29	Jun	2011	08: 49: 36. 899	27_Re
29	Jun	2011	10: 27: 35. 240	26_Re
29	Jun	2011	12: 02: 21. 206	25_Re
29	Jun	2011	13: 34: 07. 346	24_Re
29	Jun	2011	15: 03: 05. 311	23_Re
29	Jun	2011	16: 29: 26. 099	22_Re
29	Jun	2011	17: 53: 20. 290	21_Re
29	Jun	2011	19: 14: 58. 299	20_Re
29	Jun	2011	20: 34: 30. 661	19_Re
29	Jun	2011	21: 52: 08. 403	18_Re
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30	Jun	2011	01: 35: 42. 886	15_Re
30	Jun	2011	02: 48: 04. 011	14_Re
30	Jun	2011	03: 38: 00. 736	270_deg
30	Jun	2011	04: 00: 00. 631	13_Re
30	Jun	2011	05: 12: 12. 930	12_Re
30	Jun	2011	06: 25: 44. 700	11_Re
30	Jun	2011	07: 42: 30. 646	10_Re
30	Jun	2011	09: 06: 40. 691	9_Re
30	Jun	2011	10: 51: 55. 329	8_Re
30	Jun	2011	13: 25: 11. 111	Periapsis
30	Jun	2011	15: 58: 26. 454	8_Re
30	Jun	2011	17: 43: 42. 458	9_Re
30	Jun	2011	19: 07: 53. 840	10_Re
30	Jun	2011	20: 24: 41. 184	11_Re
30	Jun	2011	21: 38: 14. 437	12_Re
30	Jun	2011	22: 50: 28. 201	13_Re
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1	Jul	2011	02: 28: 03. 107	16_Re
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1	Jul	2011	08: 57: 10. 732	21_Re
1	Jul	2011	10: 21: 01. 888	22_Re
1	Jul	2011	11: 47: 18. 170	23_Re

I BEX_CrossingTimes_2011_149_00_07_v001

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1	Jul	2011	21: 25: 54. 614	29_Re
1	Jul	2011	23: 14: 29. 490	30_Re
2	Jul	2011	01: 07: 14. 670	31_Re
2	Jul	2011	03: 04: 30. 494	32_Re
2	Jul	2011	05: 06: 40. 298	33_Re
2	Jul	2011	07: 14: 11. 144	34_Re
2	Jul	2011	09: 27: 34. 784	35_Re
2	Jul	2011	11: 47: 28. 937	36_Re
2	Jul	2011	14: 14: 39. 063	37_Re
2	Jul	2011	16: 50: 00. 848	38_Re
2	Jul	2011	19: 30: 04. 263	155_deg
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2	Jul	2011	22: 30: 16. 750	40_Re
3	Jul	2011	01: 38: 36. 250	41_Re
3	Jul	2011	05: 02: 20. 788	42_Re
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3	Jul	2011	23: 08: 27. 693	46_Re
4	Jul	2011	06: 15: 28. 196	47_Re
4	Jul	2011	18: 18: 05. 318	48_Re
5	Jul	2011	02: 28: 31. 520	Apoapsis
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6	Jul	2011	20: 06: 02. 104	43_Re
6	Jul	2011	23: 47: 53. 434	42_Re
7	Jul	2011	00: 54: 33. 182	200_deg
7	Jul	2011	03: 10: 35. 443	41_Re
7	Jul	2011	06: 17: 53. 339	40_Re
7	Jul	2011	09: 12: 25. 558	39_Re
7	Jul	2011	11: 56: 08. 647	38_Re
7	Jul	2011	14: 30: 31. 355	37_Re
7	Jul	2011	16: 56: 43. 158	36_Re
7	Jul	2011	19: 15: 39. 689	35_Re
7	Jul	2011	21: 28: 06. 354	34_Re
7	Jul	2011	23: 34: 40. 816	33_Re
8	Jul	2011	01: 35: 54. 761	32_Re
8	Jul	2011	03: 32: 15. 182	31_Re
8	Jul	2011	05: 24: 05. 343	30_Re
8	Jul	2011	07: 11: 45. 494	29_Re
8	Jul	2011	08: 55: 33. 451	28_Re
8	Jul	2011	10: 35: 45. 039	27_Re
8	Jul	2011	12: 12: 34. 462	26_Re
8	Jul	2011	13: 46: 14. 610	25_Re
8	Jul	2011	15: 16: 57. 301	24_Re
8	Jul	2011	16: 44: 53. 519	23_Re
8	Jul	2011	18: 10: 13. 633	22_Re
8	Jul	2011	19: 33: 07. 614	21_Re
8	Jul	2011	20: 53: 45. 254	20_Re
8	Jul	2011	22: 12: 16. 430	19_Re
8	Jul	2011	23: 28: 51. 425	18_Re
9	Jul	2011	00: 43: 41. 333	17_Re
9	Jul	2011	01: 56: 58. 689	16_Re
9	Jul	2011	03: 08: 58. 327	15_Re
9	Jul	2011	04: 19: 58. 744	14_Re

I BEX_CrossingTimes_2011_149_00_07_v001

9	Jul	2011	05: 30: 24. 516	13_Re
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9	Jul	2011	06: 40: 50. 870	12_Re
9	Jul	2011	07: 52: 12. 299	11_Re
9	Jul	2011	09: 06: 03. 941	10_Re
9	Jul	2011	10: 25: 42. 299	9_Re
9	Jul	2011	12: 00: 32. 242	8_Re
9	Jul	2011	14: 56: 02. 429	Periapsis
9	Jul	2011	17: 51: 31. 264	8_Re
9	Jul	2011	19: 26: 21. 128	9_Re
9	Jul	2011	20: 45: 59. 406	10_Re
9	Jul	2011	21: 59: 50. 786	11_Re
9	Jul	2011	23: 11: 11. 907	12_Re
10	Jul	2011	00: 21: 37. 842	13_Re
10	Jul	2011	01: 32: 03. 219	14_Re
10	Jul	2011	02: 43: 03. 182	15_Re
10	Jul	2011	03: 55: 02. 372	16_Re
10	Jul	2011	05: 08: 19. 339	17_Re
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10	Jul	2011	07: 39: 43. 720	19_Re
10	Jul	2011	08: 58: 14. 884	20_Re
10	Jul	2011	10: 18: 52. 717	21_Re
10	Jul	2011	11: 41: 47. 204	22_Re
10	Jul	2011	13: 07: 08. 241	23_Re
10	Jul	2011	14: 35: 05. 941	24_Re
10	Jul	2011	16: 05: 50. 732	25_Re
10	Jul	2011	17: 39: 33. 813	26_Re
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10	Jul	2011	22: 40: 38. 272	29_Re
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11	Jul	2011	10: 38: 21. 569	35_Re
11	Jul	2011	12: 57: 51. 902	36_Re
11	Jul	2011	15: 24: 46. 597	37_Re
11	Jul	2011	18: 00: 04. 149	38_Re
11	Jul	2011	19: 36: 42. 279	155_deg
11	Jul	2011	20: 44: 58. 101	39_Re
11	Jul	2011	23: 41: 03. 171	40_Re
12	Jul	2011	02: 50: 25. 026	41_Re
12	Jul	2011	06: 15: 56. 750	42_Re
12	Jul	2011	10: 01: 48. 675	43_Re
12	Jul	2011	14: 14: 27. 878	44_Re
12	Jul	2011	19: 04: 54. 142	45_Re
13	Jul	2011	00: 55: 03. 880	46_Re
13	Jul	2011	08: 44: 47. 671	47_Re
14	Jul	2011	01: 41: 25. 045	Apoapsis
14	Jul	2011	18: 36: 45. 564	47_Re
15	Jul	2011	02: 25: 01. 011	46_Re
15	Jul	2011	08: 13: 43. 809	45_Re
15	Jul	2011	13: 02: 44. 347	44_Re
15	Jul	2011	17: 13: 59. 016	43_Re
15	Jul	2011	20: 58: 27. 452	42_Re
15	Jul	2011	23: 42: 44. 905	200_deg
16	Jul	2011	00: 22: 36. 642	41_Re
16	Jul	2011	03: 30: 36. 814	40_Re
16	Jul	2011	06: 25: 20. 948	39_Re
16	Jul	2011	09: 08: 54. 607	38_Re
16	Jul	2011	11: 42: 52. 404	37_Re

I BEX_CrossingTimes_2011_149_00_07_v001

16	Jul	2011	14: 08: 27. 774	36_Re
16	Jul	2011	16: 26: 39. 103	35_Re
16	Jul	2011	18: 38: 13. 747	34_Re
16	Jul	2011	20: 43: 50. 779	33_Re
16	Jul	2011	22: 44: 02. 910	32_Re
17	Jul	2011	00: 39: 17. 881	31_Re
17	Jul	2011	02: 29: 59. 497	30_Re
17	Jul	2011	04: 16: 28. 397	29_Re
17	Jul	2011	05: 59: 02. 659	28_Re
17	Jul	2011	07: 37: 58. 268	27_Re
17	Jul	2011	09: 13: 29. 495	26_Re
17	Jul	2011	10: 45: 49. 212	25_Re
17	Jul	2011	12: 15: 09. 164	24_Re
17	Jul	2011	13: 41: 40. 173	23_Re
17	Jul	2011	15: 05: 32. 363	22_Re
17	Jul	2011	16: 26: 55. 358	21_Re
17	Jul	2011	17: 45: 58. 490	20_Re
17	Jul	2011	19: 02: 51. 018	19_Re
17	Jul	2011	20: 17: 42. 406	18_Re
17	Jul	2011	21: 30: 42. 646	17_Re
17	Jul	2011	22: 42: 02. 765	16_Re
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18	Jul	2011	01: 00: 36. 271	14_Re
18	Jul	2011	02: 08: 24. 997	13_Re
18	Jul	2011	02: 54: 27. 992	270_deg
18	Jul	2011	03: 15: 49. 165	12_Re
18	Jul	2011	04: 23: 29. 836	11_Re
18	Jul	2011	05: 32: 34. 737	10_Re
18	Jul	2011	06: 45: 12. 389	9_Re
18	Jul	2011	08: 06: 32. 351	8_Re
18	Jul	2011	09: 59: 21. 589	7_Re
18	Jul	2011	11: 33: 55. 597	Periapsis
18	Jul	2011	13: 08: 28. 459	7_Re
18	Jul	2011	15: 01: 18. 381	8_Re
18	Jul	2011	16: 22: 38. 820	9_Re
18	Jul	2011	17: 35: 17. 136	10_Re
18	Jul	2011	18: 44: 22. 561	11_Re
18	Jul	2011	19: 52: 03. 691	12_Re
18	Jul	2011	20: 59: 28. 327	13_Re
18	Jul	2011	22: 07: 17. 413	14_Re
18	Jul	2011	23: 15: 58. 441	15_Re
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19	Jul	2011	02: 50: 11. 374	18_Re
19	Jul	2011	04: 05: 02. 209	19_Re
19	Jul	2011	05: 21: 53. 813	20_Re
19	Jul	2011	06: 40: 55. 563	21_Re
19	Jul	2011	08: 02: 16. 642	22_Re
19	Jul	2011	09: 26: 06. 269	23_Re
19	Jul	2011	10: 52: 33. 997	24_Re
19	Jul	2011	12: 21: 49. 611	25_Re
19	Jul	2011	13: 54: 03. 854	26_Re
19	Jul	2011	15: 29: 28. 256	27_Re
19	Jul	2011	17: 08: 15. 385	28_Re
19	Jul	2011	18: 50: 39. 184	29_Re
19	Jul	2011	20: 36: 55. 242	30_Re
19	Jul	2011	22: 27: 21. 151	31_Re
20	Jul	2011	00: 22: 16. 954	32_Re
20	Jul	2011	02: 22: 05. 711	33_Re
20	Jul	2011	04: 27: 14. 230	34_Re
20	Jul	2011	06: 38: 14. 033	35_Re
20	Jul	2011	08: 55: 42. 649	36_Re

I BEX_CrossingTimes_2011_149_00_07_v001

20	Jul	2011	11: 20: 25. 399	37_Re
20	Jul	2011	13: 53: 17. 918	38_Re
20	Jul	2011	14: 39: 29. 943	155_deg
20	Jul	2011	16: 35: 29. 827	39_Re
20	Jul	2011	19: 28: 30. 278	40_Re
20	Jul	2011	22: 34: 16. 687	41_Re
21	Jul	2011	01: 55: 29. 250	42_Re
21	Jul	2011	05: 35: 56. 748	43_Re
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21	Jul	2011	14: 21: 35. 983	45_Re
21	Jul	2011	19: 54: 44. 483	46_Re
22	Jul	2011	03: 06: 07. 810	47_Re
22	Jul	2011	16: 17: 07. 223	48_Re
22	Jul	2011	22: 12: 38. 465	Apoapsis
23	Jul	2011	04: 08: 08. 897	48_Re
23	Jul	2011	17: 18: 40. 244	47_Re
24	Jul	2011	00: 29: 37. 184	46_Re
24	Jul	2011	06: 02: 20. 231	45_Re
24	Jul	2011	10: 42: 04. 872	44_Re
24	Jul	2011	14: 47: 11. 488	43_Re
24	Jul	2011	18: 27: 16. 539	42_Re
24	Jul	2011	20: 36: 48. 154	200_deg
24	Jul	2011	21: 48: 07. 732	41_Re
25	Jul	2011	00: 53: 33. 882	40_Re
25	Jul	2011	03: 46: 15. 220	39_Re
25	Jul	2011	06: 28: 09. 192	38_Re
25	Jul	2011	09: 00: 44. 981	37_Re
25	Jul	2011	11: 25: 12. 236	36_Re
25	Jul	2011	13: 42: 26. 619	35_Re
25	Jul	2011	15: 53: 13. 475	34_Re
25	Jul	2011	17: 58: 10. 358	33_Re
25	Jul	2011	19: 57: 48. 809	32_Re
25	Jul	2011	21: 52: 35. 659	31_Re
25	Jul	2011	23: 42: 53. 961	30_Re
26	Jul	2011	01: 29: 03. 858	29_Re
26	Jul	2011	03: 11: 22. 834	28_Re
26	Jul	2011	04: 50: 06. 670	27_Re
26	Jul	2011	06: 25: 29. 188	26_Re
26	Jul	2011	07: 57: 43. 068	25_Re
26	Jul	2011	09: 26: 59. 857	24_Re
26	Jul	2011	10: 53: 30. 227	23_Re
26	Jul	2011	12: 17: 24. 193	22_Re
26	Jul	2011	13: 38: 51. 309	21_Re
26	Jul	2011	14: 58: 00. 882	20_Re
26	Jul	2011	16: 15: 02. 184	19_Re
26	Jul	2011	17: 30: 04. 755	18_Re
26	Jul	2011	18: 43: 18. 730	17_Re
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26	Jul	2011	23: 22: 28. 759	13_Re
26	Jul	2011	23: 57: 19. 915	270_deg
27	Jul	2011	00: 30: 27. 187	12_Re
27	Jul	2011	01: 38: 51. 036	11_Re
27	Jul	2011	02: 48: 53. 456	10_Re
27	Jul	2011	04: 02: 55. 986	9_Re
27	Jul	2011	05: 26: 51. 652	8_Re
27	Jul	2011	07: 31: 00. 540	7_Re
27	Jul	2011	08: 47: 27. 859	Periapsis
27	Jul	2011	10: 03: 54. 301	7_Re
27	Jul	2011	12: 08: 03. 819	8_Re
27	Jul	2011	13: 32: 00. 427	9_Re
27	Jul	2011	14: 46: 03. 918	10_Re

I BEX_CrossingTimes_2011_149_00_07_v001

27	Jul	2011	15: 56: 07. 292	11_Re
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27	Jul	2011	18: 12: 31. 507	13_Re
27	Jul	2011	19: 20: 49. 212	14_Re
27	Jul	2011	20: 29: 54. 204	15_Re
27	Jul	2011	21: 40: 07. 265	16_Re
27	Jul	2011	22: 48: 25. 247	110_deg
27	Jul	2011	22: 51: 44. 322	17_Re
28	Jul	2011	00: 04: 58. 402	18_Re
28	Jul	2011	01: 20: 00. 603	19_Re
28	Jul	2011	02: 37: 00. 953	20_Re
28	Jul	2011	03: 56: 08. 776	21_Re
28	Jul	2011	05: 17: 33. 191	22_Re
28	Jul	2011	06: 41: 23. 269	23_Re
28	Jul	2011	08: 07: 48. 341	24_Re
28	Jul	2011	09: 36: 57. 934	25_Re
28	Jul	2011	11: 09: 02. 425	26_Re
28	Jul	2011	12: 44: 12. 892	27_Re
28	Jul	2011	14: 22: 41. 364	28_Re
28	Jul	2011	16: 04: 41. 122	29_Re
28	Jul	2011	17: 50: 26. 935	30_Re
28	Jul	2011	19: 40: 15. 391	31_Re
28	Jul	2011	21: 34: 25. 283	32_Re
28	Jul	2011	23: 33: 18. 113	33_Re
29	Jul	2011	01: 37: 18. 716	34_Re
29	Jul	2011	03: 46: 56. 090	35_Re
29	Jul	2011	06: 02: 44. 561	36_Re
29	Jul	2011	08: 25: 24. 886	37_Re
29	Jul	2011	10: 55: 47. 059	38_Re
29	Jul	2011	12: 37: 41. 452	155_deg
29	Jul	2011	13: 34: 52. 539	39_Re
29	Jul	2011	16: 23: 58. 917	40_Re
29	Jul	2011	19: 24: 46. 524	41_Re
29	Jul	2011	22: 39: 29. 099	42_Re
30	Jul	2011	02: 11: 11. 946	43_Re
30	Jul	2011	06: 04: 25. 214	44_Re
30	Jul	2011	10: 26: 11. 312	45_Re
30	Jul	2011	15: 28: 42. 645	46_Re
30	Jul	2011	21: 37: 04. 849	47_Re
31	Jul	2011	06: 04: 50. 523	48_Re
31	Jul	2011	21: 56: 27. 367	Apoapsis
1	Aug	2011	13: 47: 21. 307	48_Re
1	Aug	2011	22: 14: 07. 293	47_Re
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2	Aug	2011	09: 23: 03. 655	45_Re
2	Aug	2011	13: 43: 52. 243	44_Re
2	Aug	2011	17: 36: 08. 679	43_Re
2	Aug	2011	21: 06: 55. 349	42_Re
2	Aug	2011	22: 37: 47. 027	200_deg
3	Aug	2011	00: 20: 42. 371	41_Re
3	Aug	2011	03: 20: 35. 020	40_Re
3	Aug	2011	06: 08: 47. 003	39_Re
3	Aug	2011	08: 46: 58. 615	38_Re
3	Aug	2011	11: 16: 27. 416	37_Re
3	Aug	2011	13: 38: 14. 885	36_Re
3	Aug	2011	15: 53: 10. 758	35_Re
3	Aug	2011	18: 01: 55. 973	34_Re
3	Aug	2011	20: 05: 04. 727	33_Re
3	Aug	2011	22: 03: 05. 963	32_Re
3	Aug	2011	23: 56: 24. 456	31_Re
4	Aug	2011	01: 45: 21. 598	30_Re
4	Aug	2011	03: 30: 16. 234	29_Re
4	Aug	2011	05: 11: 24. 731	28_Re

I BEX_CrossingTimes_2011_149_00_07_v001

4	Aug	2011	06: 49: 01. 830	27_Re
4	Aug	2011	08: 23: 20. 678	26_Re
4	Aug	2011	09: 54: 33. 218	25_Re
4	Aug	2011	11: 22: 50. 375	24_Re
4	Aug	2011	12: 48: 22. 256	23_Re
4	Aug	2011	14: 11: 18. 339	22_Re
4	Aug	2011	15: 31: 47. 658	21_Re
4	Aug	2011	16: 49: 58. 985	20_Re
4	Aug	2011	18: 06: 01. 030	19_Re
4	Aug	2011	19: 20: 02. 697	18_Re
4	Aug	2011	20: 32: 13. 382	17_Re
4	Aug	2011	21: 42: 43. 422	16_Re
4	Aug	2011	22: 51: 44. 737	15_Re
4	Aug	2011	23: 59: 31. 675	14_Re
5	Aug	2011	01: 06: 22. 672	13_Re
5	Aug	2011	02: 05: 15. 587	270_deg
5	Aug	2011	02: 12: 42. 968	12_Re
5	Aug	2011	03: 19: 09. 880	11_Re
5	Aug	2011	04: 26: 44. 069	10_Re
5	Aug	2011	05: 37: 18. 148	9_Re
5	Aug	2011	06: 55: 11. 014	8_Re
5	Aug	2011	08: 36: 43. 713	7_Re
5	Aug	2011	10: 30: 36. 463	Periapsis
5	Aug	2011	12: 24: 27. 646	7_Re
5	Aug	2011	14: 06: 00. 361	8_Re
5	Aug	2011	15: 23: 53. 125	9_Re
5	Aug	2011	16: 34: 26. 980	10_Re
5	Aug	2011	17: 42: 00. 905	11_Re
5	Aug	2011	18: 48: 27. 517	12_Re
5	Aug	2011	19: 54: 47. 508	13_Re
5	Aug	2011	21: 01: 38. 229	14_Re
5	Aug	2011	22: 09: 24. 960	15_Re
5	Aug	2011	23: 18: 26. 182	16_Re
5	Aug	2011	23: 54: 05. 809	110_deg
6	Aug	2011	00: 28: 56. 324	17_Re
6	Aug	2011	01: 41: 07. 295	18_Re
6	Aug	2011	02: 55: 09. 571	19_Re
6	Aug	2011	04: 11: 12. 553	20_Re
6	Aug	2011	05: 29: 25. 255	21_Re
6	Aug	2011	06: 49: 56. 507	22_Re
6	Aug	2011	08: 12: 55. 217	23_Re
6	Aug	2011	09: 38: 30. 518	24_Re
6	Aug	2011	11: 06: 52. 087	25_Re
6	Aug	2011	12: 38: 10. 215	26_Re
6	Aug	2011	14: 12: 36. 054	27_Re
6	Aug	2011	15: 50: 21. 811	28_Re
6	Aug	2011	17: 31: 40. 995	29_Re
6	Aug	2011	19: 16: 48. 690	30_Re
6	Aug	2011	21: 06: 01. 900	31_Re
6	Aug	2011	22: 59: 39. 971	32_Re
7	Aug	2011	00: 58: 05. 115	33_Re
7	Aug	2011	03: 01: 43. 103	34_Re
7	Aug	2011	05: 11: 04. 151	35_Re
7	Aug	2011	07: 26: 44. 128	36_Re
7	Aug	2011	09: 49: 26. 190	37_Re
7	Aug	2011	12: 20: 03. 087	38_Re
7	Aug	2011	12: 52: 38. 548	155_deg
7	Aug	2011	14: 59: 40. 494	39_Re
7	Aug	2011	17: 49: 41. 982	40_Re
7	Aug	2011	20: 51: 56. 772	41_Re
8	Aug	2011	00: 08: 52. 428	42_Re
8	Aug	2011	03: 43: 57. 007	43_Re
8	Aug	2011	07: 42: 21. 055	44_Re

I BEX_CrossingTimes_2011_149_00_07_v001

8	Aug	2011	12: 12: 26. 823	45_Re
8	Aug	2011	17: 29: 32. 566	46_Re
9	Aug	2011	00: 08: 20. 943	47_Re
9	Aug	2011	10: 24: 20. 517	48_Re
9	Aug	2011	21: 17: 25. 517	Apoapsis
10	Aug	2011	08: 10: 13. 123	48_Re
10	Aug	2011	18: 25: 20. 906	47_Re
11	Aug	2011	01: 03: 18. 622	46_Re
11	Aug	2011	06: 19: 34. 862	45_Re
11	Aug	2011	10: 48: 52. 221	44_Re
11	Aug	2011	14: 46: 28. 889	43_Re
11	Aug	2011	18: 20: 47. 056	42_Re
11	Aug	2011	21: 03: 06. 666	200_deg
11	Aug	2011	21: 36: 57. 201	41_Re
12	Aug	2011	00: 38: 27. 315	40_Re
12	Aug	2011	03: 27: 44. 897	39_Re
12	Aug	2011	06: 06: 39. 100	38_Re
12	Aug	2011	08: 36: 33. 430	37_Re
12	Aug	2011	10: 58: 33. 491	36_Re
12	Aug	2011	13: 13: 31. 966	35_Re
12	Aug	2011	15: 22: 11. 940	34_Re
12	Aug	2011	17: 25: 09. 211	33_Re
12	Aug	2011	19: 22: 53. 922	32_Re
12	Aug	2011	21: 15: 51. 766	31_Re
12	Aug	2011	23: 04: 24. 877	30_Re
13	Aug	2011	00: 48: 52. 516	29_Re
13	Aug	2011	02: 29: 31. 596	28_Re
13	Aug	2011	04: 06: 37. 103	27_Re
13	Aug	2011	05: 40: 22. 437	26_Re
13	Aug	2011	07: 10: 59. 691	25_Re
13	Aug	2011	08: 38: 39. 893	24_Re
13	Aug	2011	10: 03: 33. 193	23_Re
13	Aug	2011	11: 25: 49. 060	22_Re
13	Aug	2011	12: 45: 36. 462	21_Re
13	Aug	2011	14: 03: 04. 043	20_Re
13	Aug	2011	15: 18: 20. 312	19_Re
13	Aug	2011	16: 31: 33. 885	18_Re
13	Aug	2011	17: 42: 53. 749	17_Re
13	Aug	2011	18: 52: 29. 668	16_Re
13	Aug	2011	20: 00: 32. 765	15_Re
13	Aug	2011	21: 07: 16. 220	14_Re
13	Aug	2011	22: 12: 56. 722	13_Re
13	Aug	2011	23: 17: 56. 748	12_Re
13	Aug	2011	23: 32: 19. 531	270_deg
14	Aug	2011	00: 22: 48. 927	11_Re
14	Aug	2011	01: 28: 25. 094	10_Re
14	Aug	2011	02: 36: 18. 331	9_Re
14	Aug	2011	03: 49: 50. 478	8_Re
14	Aug	2011	05: 19: 49. 881	7_Re
14	Aug	2011	07: 36: 04. 411	Periapsis
14	Aug	2011	09: 52: 17. 773	7_Re
14	Aug	2011	11: 22: 17. 795	8_Re
14	Aug	2011	12: 35: 50. 518	9_Re
14	Aug	2011	13: 43: 44. 280	10_Re
14	Aug	2011	14: 49: 20. 957	11_Re
14	Aug	2011	15: 54: 13. 650	12_Re
14	Aug	2011	16: 59: 14. 061	13_Re
14	Aug	2011	18: 04: 54. 931	14_Re
14	Aug	2011	19: 11: 38. 679	15_Re
14	Aug	2011	20: 19: 41. 968	16_Re
14	Aug	2011	20: 28: 10. 700	110_deg
14	Aug	2011	21: 29: 17. 966	17_Re
14	Aug	2011	22: 40: 37. 736	18_Re

I BEX_CrossingTimes_2011_149_00_07_v001

14	Aug	2011	23: 53: 50. 985	19_Re
15	Aug	2011	01: 09: 06. 610	20_Re
15	Aug	2011	02: 26: 33. 184	21_Re
15	Aug	2011	03: 46: 19. 142	22_Re
15	Aug	2011	05: 08: 33. 054	23_Re
15	Aug	2011	06: 33: 23. 668	24_Re
15	Aug	2011	08: 01: 00. 395	25_Re
15	Aug	2011	09: 31: 33. 175	26_Re
15	Aug	2011	11: 05: 12. 811	27_Re
15	Aug	2011	12: 42: 11. 134	28_Re
15	Aug	2011	14: 22: 41. 229	29_Re
15	Aug	2011	16: 06: 57. 698	30_Re
15	Aug	2011	17: 55: 16. 983	31_Re
15	Aug	2011	19: 47: 57. 759	32_Re
15	Aug	2011	21: 45: 21. 433	33_Re
15	Aug	2011	23: 47: 52. 779	34_Re
16	Aug	2011	01: 56: 00. 775	35_Re
16	Aug	2011	04: 10: 19. 705	36_Re
16	Aug	2011	06: 31: 30. 672	37_Re
16	Aug	2011	09: 00: 23. 696	38_Re
16	Aug	2011	09: 25: 59. 300	155_deg
16	Aug	2011	11: 38: 00. 722	39_Re
16	Aug	2011	14: 25: 40. 083	40_Re
16	Aug	2011	17: 25: 03. 345	41_Re
16	Aug	2011	20: 38: 26. 365	42_Re
17	Aug	2011	00: 08: 58. 208	43_Re
17	Aug	2011	04: 01: 16. 086	44_Re
17	Aug	2011	08: 22: 36. 951	45_Re
17	Aug	2011	13: 25: 47. 857	46_Re
17	Aug	2011	19: 37: 40. 153	47_Re
18	Aug	2011	04: 21: 28. 364	48_Re
18	Aug	2011	19: 00: 38. 508	Apoapsis
19	Aug	2011	09: 40: 02. 876	48_Re
19	Aug	2011	18: 24: 10. 872	47_Re
20	Aug	2011	00: 36: 23. 378	46_Re
20	Aug	2011	05: 39: 54. 765	45_Re
20	Aug	2011	10: 01: 36. 765	44_Re
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20	Aug	2011	17: 25: 10. 785	42_Re
20	Aug	2011	18: 39: 38. 495	200_deg
20	Aug	2011	20: 38: 57. 146	41_Re
20	Aug	2011	23: 38: 44. 657	40_Re
21	Aug	2011	02: 26: 49. 258	39_Re
21	Aug	2011	05: 04: 52. 596	38_Re
21	Aug	2011	07: 34: 13. 078	37_Re
21	Aug	2011	09: 55: 52. 727	36_Re
21	Aug	2011	12: 10: 41. 635	35_Re
21	Aug	2011	14: 19: 20. 973	34_Re
21	Aug	2011	16: 22: 25. 099	33_Re
21	Aug	2011	18: 20: 23. 057	32_Re
21	Aug	2011	20: 13: 39. 696	31_Re
21	Aug	2011	22: 02: 36. 497	30_Re
21	Aug	2011	23: 47: 32. 185	29_Re
22	Aug	2011	01: 28: 43. 372	28_Re
22	Aug	2011	03: 06: 24. 674	27_Re
22	Aug	2011	04: 40: 49. 319	26_Re
22	Aug	2011	06: 12: 09. 275	25_Re
22	Aug	2011	07: 40: 35. 495	24_Re
22	Aug	2011	09: 06: 18. 134	23_Re
22	Aug	2011	10: 29: 26. 732	22_Re
22	Aug	2011	11: 50: 10. 411	21_Re
22	Aug	2011	13: 08: 38. 044	20_Re
22	Aug	2011	14: 24: 58. 498	19_Re

I BEX_CrossingTimes_2011_149_00_07_v001

22	Aug	2011	15: 39: 20. 881	18_Re
22	Aug	2011	16: 51: 54. 866	17_Re
22	Aug	2011	18: 02: 51. 177	16_Re
22	Aug	2011	19: 12: 22. 278	15_Re
22	Aug	2011	20: 20: 43. 320	14_Re
22	Aug	2011	21: 28: 13. 962	13_Re
22	Aug	2011	22: 12: 32. 398	270_deg
22	Aug	2011	22: 35: 21. 412	12_Re
22	Aug	2011	23: 42: 46. 409	11_Re
23	Aug	2011	00: 51: 36. 241	10_Re
23	Aug	2011	02: 03: 58. 756	9_Re
23	Aug	2011	03: 25: 01. 404	8_Re
23	Aug	2011	05: 17: 18. 391	7_Re
23	Aug	2011	06: 52: 06. 721	Periapsis
23	Aug	2011	08: 26: 53. 445	7_Re
23	Aug	2011	10: 19: 11. 161	8_Re
23	Aug	2011	11: 40: 14. 417	9_Re
23	Aug	2011	12: 52: 37. 605	10_Re
23	Aug	2011	14: 01: 28. 078	11_Re
23	Aug	2011	15: 08: 53. 679	12_Re
23	Aug	2011	16: 16: 01. 853	13_Re
23	Aug	2011	17: 23: 33. 169	14_Re
23	Aug	2011	18: 31: 54. 876	15_Re
23	Aug	2011	19: 41: 26. 610	16_Re
23	Aug	2011	20: 37: 53. 625	110_deg
23	Aug	2011	20: 52: 23. 510	17_Re
23	Aug	2011	22: 04: 57. 987	18_Re
23	Aug	2011	23: 19: 20. 690	19_Re
24	Aug	2011	00: 35: 41. 213	20_Re
24	Aug	2011	01: 54: 08. 585	21_Re
24	Aug	2011	03: 14: 51. 580	22_Re
24	Aug	2011	04: 37: 58. 960	23_Re
24	Aug	2011	06: 03: 39. 673	24_Re
24	Aug	2011	07: 32: 03. 079	25_Re
24	Aug	2011	09: 03: 19. 102	26_Re
24	Aug	2011	10: 37: 38. 421	27_Re
24	Aug	2011	12: 15: 12. 660	28_Re
24	Aug	2011	13: 56: 14. 607	29_Re
24	Aug	2011	15: 40: 58. 461	30_Re
24	Aug	2011	17: 29: 40. 139	31_Re
24	Aug	2011	19: 22: 37. 633	32_Re
24	Aug	2011	21: 20: 11. 472	33_Re
24	Aug	2011	23: 22: 45. 300	34_Re
25	Aug	2011	01: 30: 46. 625	35_Re
25	Aug	2011	03: 44: 47. 808	36_Re
25	Aug	2011	06: 05: 27. 392	37_Re
25	Aug	2011	08: 33: 31. 940	38_Re
25	Aug	2011	10: 28: 55. 527	155_deg
25	Aug	2011	11: 09: 58. 623	39_Re
25	Aug	2011	13: 55: 59. 000	40_Re
25	Aug	2011	16: 53: 04. 724	41_Re
25	Aug	2011	20: 03: 16. 529	42_Re
25	Aug	2011	23: 29: 19. 187	43_Re
26	Aug	2011	03: 15: 08. 111	44_Re
26	Aug	2011	07: 26: 41. 130	45_Re
26	Aug	2011	12: 13: 52. 677	46_Re
26	Aug	2011	17: 55: 38. 207	47_Re
27	Aug	2011	01: 18: 51. 021	48_Re
27	Aug	2011	15: 01: 06. 265	49_Re
27	Aug	2011	20: 48: 05. 395	Apoapsis
28	Aug	2011	02: 35: 04. 437	49_Re
28	Aug	2011	16: 16: 59. 852	48_Re
28	Aug	2011	23: 39: 52. 500	47_Re

I BEX_CrossingTimes_2011_149_00_07_v001

29	Aug	2011	05: 21: 17. 648	46_Re
29	Aug	2011	10: 08: 08. 379	45_Re
29	Aug	2011	14: 19: 20. 783	44_Re
29	Aug	2011	18: 04: 48. 658	43_Re
29	Aug	2011	21: 30: 30. 040	42_Re
29	Aug	2011	22: 17: 01. 155	200_deg
30	Aug	2011	00: 40: 20. 337	41_Re
30	Aug	2011	03: 37: 04. 316	40_Re
30	Aug	2011	06: 22: 42. 704	39_Re
30	Aug	2011	08: 58: 47. 142	38_Re
30	Aug	2011	11: 26: 29. 179	37_Re
30	Aug	2011	13: 46: 45. 975	36_Re
30	Aug	2011	16: 00: 24. 075	35_Re
30	Aug	2011	18: 08: 02. 006	34_Re
30	Aug	2011	20: 10: 12. 108	33_Re
30	Aug	2011	22: 07: 21. 847	32_Re
30	Aug	2011	23: 59: 54. 896	31_Re
31	Aug	2011	01: 48: 11. 695	30_Re
31	Aug	2011	03: 32: 30. 215	29_Re
31	Aug	2011	05: 13: 06. 326	28_Re
31	Aug	2011	06: 50: 14. 172	27_Re
31	Aug	2011	08: 24: 06. 503	26_Re
31	Aug	2011	09: 54: 54. 872	25_Re
31	Aug	2011	11: 22: 49. 871	24_Re
31	Aug	2011	12: 48: 01. 325	23_Re
31	Aug	2011	14: 10: 38. 471	22_Re
31	Aug	2011	15: 30: 50. 116	21_Re
31	Aug	2011	16: 48: 44. 827	20_Re
31	Aug	2011	18: 04: 31. 132	19_Re
31	Aug	2011	19: 18: 17. 759	18_Re
31	Aug	2011	20: 30: 13. 924	17_Re
31	Aug	2011	21: 40: 29. 776	16_Re
31	Aug	2011	22: 49: 17. 029	15_Re
31	Aug	2011	23: 56: 49. 781	14_Re
1	Sep	2011	01: 03: 26. 145	13_Re
1	Sep	2011	02: 04: 24. 155	270_deg
1	Sep	2011	02: 09: 30. 895	12_Re
1	Sep	2011	03: 15: 40. 611	11_Re
1	Sep	2011	04: 22: 54. 606	10_Re
1	Sep	2011	05: 33: 02. 539	9_Re
1	Sep	2011	06: 50: 14. 489	8_Re
1	Sep	2011	08: 29: 54. 502	7_Re
1	Sep	2011	10: 27: 01. 756	Periapsis
1	Sep	2011	12: 24: 06. 835	7_Re
1	Sep	2011	14: 03: 46. 724	8_Re
1	Sep	2011	15: 20: 58. 420	9_Re
1	Sep	2011	16: 31: 05. 944	10_Re
1	Sep	2011	17: 38: 19. 489	11_Re
1	Sep	2011	18: 44: 28. 737	12_Re
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1	Sep	2011	20: 57: 09. 077	14_Re
1	Sep	2011	22: 04: 41. 647	15_Re
1	Sep	2011	23: 13: 28. 953	16_Re
1	Sep	2011	23: 46: 40. 494	110_deg
2	Sep	2011	00: 23: 45. 204	17_Re
2	Sep	2011	01: 35: 42. 171	18_Re
2	Sep	2011	02: 49: 30. 128	19_Re
2	Sep	2011	04: 05: 18. 383	20_Re
2	Sep	2011	05: 23: 15. 836	21_Re
2	Sep	2011	06: 43: 31. 189	22_Re
2	Sep	2011	08: 06: 13. 238	23_Re
2	Sep	2011	09: 31: 30. 946	24_Re
2	Sep	2011	10: 59: 33. 886	25_Re

I BEX_CrossingTimes_2011_149_00_07_v001

2	Sep	2011	12: 30: 32. 176	26_Re
2	Sep	2011	14: 04: 36. 784	27_Re
2	Sep	2011	15: 41: 59. 710	28_Re
2	Sep	2011	17: 22: 54. 215	29_Re
2	Sep	2011	19: 07: 35. 093	30_Re
2	Sep	2011	20: 56: 18. 999	31_Re
2	Sep	2011	22: 49: 24. 853	32_Re
3	Sep	2011	00: 47: 14. 346	33_Re
3	Sep	2011	02: 50: 12. 597	34_Re
3	Sep	2011	04: 58: 48. 996	35_Re
3	Sep	2011	07: 13: 38. 347	36_Re
3	Sep	2011	09: 35: 22. 411	37_Re
3	Sep	2011	12: 04: 52. 067	38_Re
3	Sep	2011	12: 54: 03. 384	155_deg
3	Sep	2011	14: 43: 10. 408	39_Re
3	Sep	2011	17: 31: 37. 352	40_Re
3	Sep	2011	20: 31: 56. 738	41_Re
3	Sep	2011	23: 46: 27. 839	42_Re
4	Sep	2011	03: 18: 25. 159	43_Re
4	Sep	2011	07: 12: 35. 280	44_Re
4	Sep	2011	11: 36: 33. 100	45_Re
4	Sep	2011	16: 43: 45. 957	46_Re
4	Sep	2011	23: 03: 05. 058	47_Re
5	Sep	2011	08: 09: 01. 059	48_Re
5	Sep	2011	21: 49: 47. 619	Apoapsis