11806 - Coordinated Observations of LCROSS Impacts

Cycle: 17, Proposal Category: GO/DD

(Availability Mode: AVAILABLE)

INVESTIGATORS

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VISITS

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
01	(1) LUNAR-EXOSPHERE	STIS/CCD	1	02-Oct-2009 21:02:54.0	yes
02	(3) MOON-OFFSET	S/C	1	02-Oct-2009 21:03:01.0	yes
03	(2) CABEUS-A-OFFSET	WFC3/UVIS	1	02-Oct-2009 21:03:04.0	yes
04	(1) LUNAR-EXOSPHERE	STIS/CCD	3	02-Oct-2009 21:03:26.0	yes
05	(1) LUNAR-EXOSPHERE	STIS/CCD	1	02-Oct-2009 21:03:44.0	yes
11	(4) LUNAR-EXOSPHERE-2	STIS/CCD	1	02-Oct-2009 21:03:59.0	yes
12	(3) MOON-OFFSET	S/C	1	02-Oct-2009 21:04:03.0	yes

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
13	(5) CABEUS-A-OFFSET-2	WFC3/UVIS	1	02-Oct-2009 21:04:05.0	yes
14	(4) LUNAR-EXOSPHERE-2	STIS/CCD	3	02-Oct-2009 21:04:24.0	yes
15	(4) LUNAR-EXOSPHERE-2	STIS/CCD	1	02-Oct-2009 21:04:42.0	yes
21	(1) LUNAR-EXOSPHERE	STIS/CCD	1	02-Oct-2009 21:04:51.0	yes
22	(3) MOON-OFFSET	S/C	1	02-Oct-2009 21:04:54.0	yes
23	(2) CABEUS-A-OFFSET	WFC3/UVIS	1	02-Oct-2009 21:04:56.0	yes
24	(1) LUNAR-EXOSPHERE	STIS/CCD	3	02-Oct-2009 21:05:18.0	yes
25	(1) LUNAR-EXOSPHERE	STIS/CCD	1	02-Oct-2009 21:05:37.0	yes
31	(7) LUNAR-EXOSPHERE-3	STIS/CCD	1	02-Oct-2009 21:05:47.0	yes
32	(3) MOON-OFFSET	S/C	1	02-Oct-2009 21:05:51.0	yes
33	(6) CABEUS-OFFSET	WFC3/UVIS	1	02-Oct-2009 21:05:53.0	yes
34	(7) LUNAR-EXOSPHERE-3	STIS/CCD	3	02-Oct-2009 21:06:11.0	yes
35	(7) LUNAR-EXOSPHERE-3	STIS/CCD	1	02-Oct-2009 21:06:30.0	yes

28 Total Orbits Used

ABSTRACT

We propose to observe the LCROSS (Lunar Crater Observation and Sensing Satellite) impacts. This program will use STIS and WFC3 to observe the Moon in conjunction with NASA's LCROSS mission (assuming Servicing Mission 4 occurs before the LCROSS impacts). The goal is to determine whether or not water ice and/or vapor is present in the subsurface of the Moon. We will address this issue by 1) observing the sunlit ejecta plume created by the LCROSS impacts and 2) examine the Lunar exosphere for the presence of OH and other volatile species.

OBSERVING DESCRIPTION

Orbit #1 (before the impact):
STIS CCD G230LB spectroscopy, ~2100-3060?. This is a pre-impact calibration.

Orbit #2 (at the time of impact):
WFC3 F300X imaging. As many images as possible will be obtained to constrain the evolution of the impact plume with high spatial and temporal resolution. These observations will be timed such that this orbit occurs simultaneously with the LCROSS impacts. The goal of this spectral range is to observe the rapid 3085 ? OH- emission from the water vapor in the hot plasma occurring just after the impact flash.

The time lag between the impact flash from the large projectile and the impact flash from the shepherding spacecraft is planned to be about 4 minutes. Observation of the first impact position a few minutes prior to impact is desired. Observing the evolution of the second impact flash and the ejecta curtain for at least several hundred seconds is also desirable. Therefore, an observational duration of at least 20 minutes will best cover the impacts. In the tradeoff, we are willing to sacrifice some pointing accuracy for increased spatial coverage.

Orbits #3-5 (immediately following orbit 2):
STIS CCD G230LB spectroscopy, ~2100-3060 ?. The short wavelength part of the 3085 ? OH- band should be observable (for example, this line is quite wide in IUE spectra). The OH- exosphere should last for several hours after impact so 3 HST orbits after the WFC3 observations would be ideal. We would like to observe at as long a wavelength as this grating allows.

The OH band at 3085 ? is at about as short a wavelength as can be observed from the ground, and as long a wavelength as we propose to observe here, allowing normalization of the HST results with ground-based results. Monitoring the strength of this band is central to measuring the amount of water evolved in the impact, as water dissociates to OH and H very rapidly when exposed to sunlight.

The CO Cameron bands (1900-2800 ?) derive primarily from the photodissociation of CO2. We propose to monitor these bands simultaneously with OH and CS (2600 ?) to constrain the composition of the volatile fraction of the impact plume.

Orbit #6 (a day later):

A repeat of the spectroscopic observations a day after the impact will constrain long lived radicals and allow a determination of the background emission.

Visit

Proposal 11806, Visit 01, scheduling Sat Oct 03 01:06:36 GMT 2009

Diagnostic Status: Warning

Scientific Instruments: STIS/CCD

Special Requirements: PCS MODE GYRO; ON HOLD

Comments: Pre-impact calibration observation: should take place a day before the impact, to minimize the impact of the variability of the Lunar atmosphere.
Over 10m of unused visibility time is left to enhance schedulability due to time-critical nature of these observations.
Visit 01 should precede visit 02 by a day or less.

On Hold Comments: Choose visits 01-04, 11-14, 21-24, 31-34, 41-44, 51-54, or 61-64 depending on which of the candidate targets is selected for LCROSS impact.

Diagnostics

(Visit 01) Warning (Form): A target acquisition should probably be performed before doing spectroscopy or coronography with STIS or COS.

Solar System Targets

#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
(1)	LUNAR-EXOSPHERE	STD=EARTH	STD=MOON	TYPE=POS_ANGLE,RAD=1000,ANG=85,REF=SUN		HUBBLE

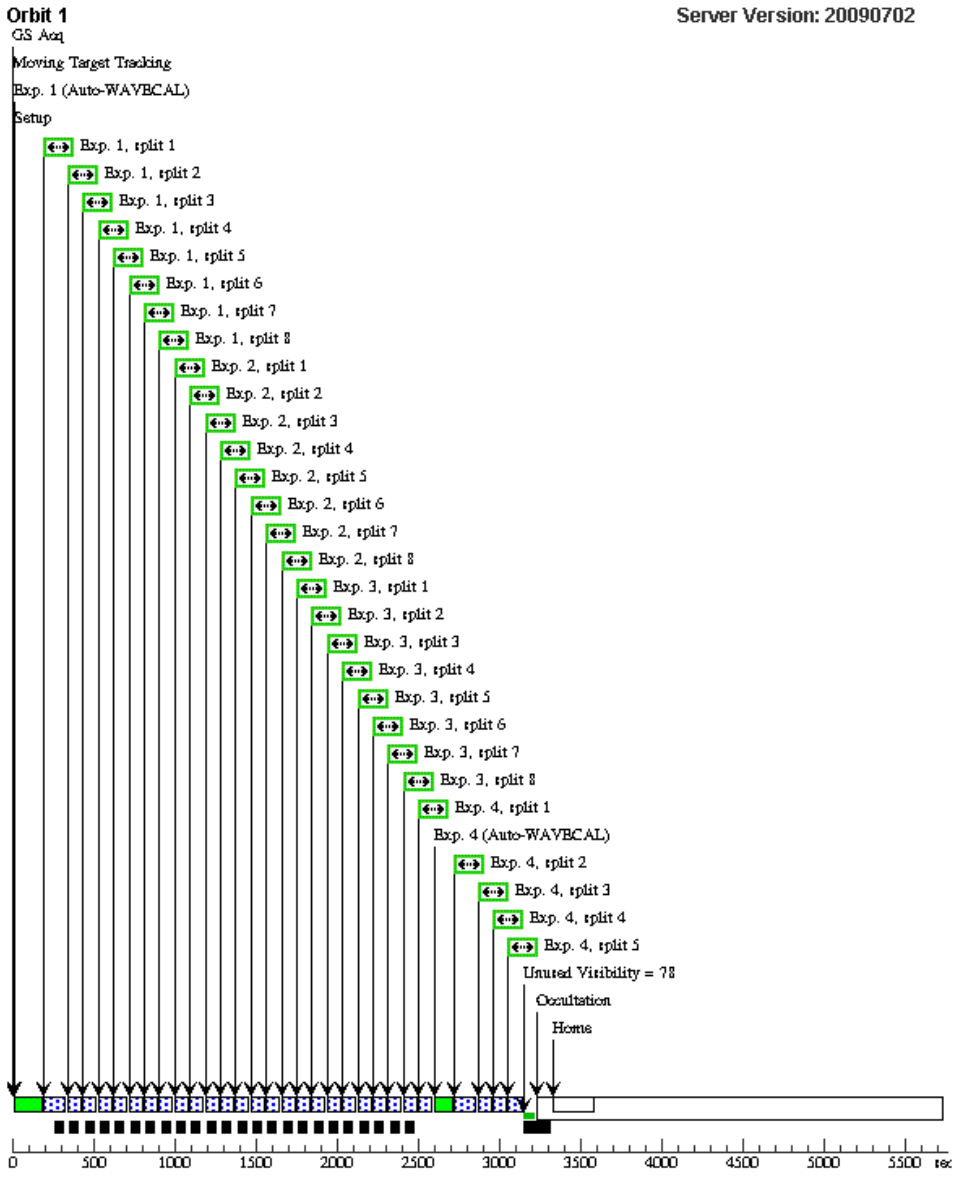
Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1	Pre-Impact Calibration	(1) LUNAR-EXOSPHERE	STIS/CCD, ACCUM, 52X0.5	G230LB 2375 A	CR-SPLIT=8			400.0 Secs	
								[==>(Split 1)]	***[1]***
								[==>(Split 2)]	
								[==>(Split 3)]	
								[==>(Split 4)]	
								[==>(Split 5)]	
								[==>(Split 6)]	
								[==>(Split 7)]	
								[==>(Split 8)]	

Exposures (continued)

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
2	Pre-Impact Calibration	(1) LUNAR-EXOSPHERE	STIS/CCD, ACCUM, 52X0.5	G230LB 2375 A	CR-SPLIT=8			400.0 Secs	
								[==>(Split 1)] *[==>(Split 2)]* *[==>(Split 3)]* *[==>(Split 4)]* *[==>(Split 5)]* *[==>(Split 6)]* *[==>(Split 7)]* *[==>(Split 8)]*	***[1]***
3	Pre-Impact Calibration	(1) LUNAR-EXOSPHERE	STIS/CCD, ACCUM, 52X0.5	G230LB 2375 A	CR-SPLIT=8			400.0 Secs	
								[==>(Split 1)] *[==>(Split 2)]* *[==>(Split 3)]* *[==>(Split 4)]* *[==>(Split 5)]* *[==>(Split 6)]* *[==>(Split 7)]* *[==>(Split 8)]*	***[1]***
4	Pre-Impact Calibration	(1) LUNAR-EXOSPHERE	STIS/CCD, ACCUM, 52X0.5	G230LB 2375 A	CR-SPLIT=5			250.0 Secs	
								[==>(Split 1)] *[==>(Split 2)]* *[==>(Split 3)]* *[==>(Split 4)]* *[==>(Split 5)]*	***[1]***

Orbit Structure



Visit

Proposal 11806, Visit 02, scheduling Sat Oct 03 01:06:37 GMT 2009

Diagnostic Status: No Diagnostics

Scientific Instruments: S/C

Special Requirements: NOTRACK; AFTER 01 BY 0 D TO 1 D

Comments: The purpose of this visit is to make sure that there is a 2-star FGS acquisition to ensure that a fresh gyro bias calculation is available before visit 03 begins.

Fixed Targets

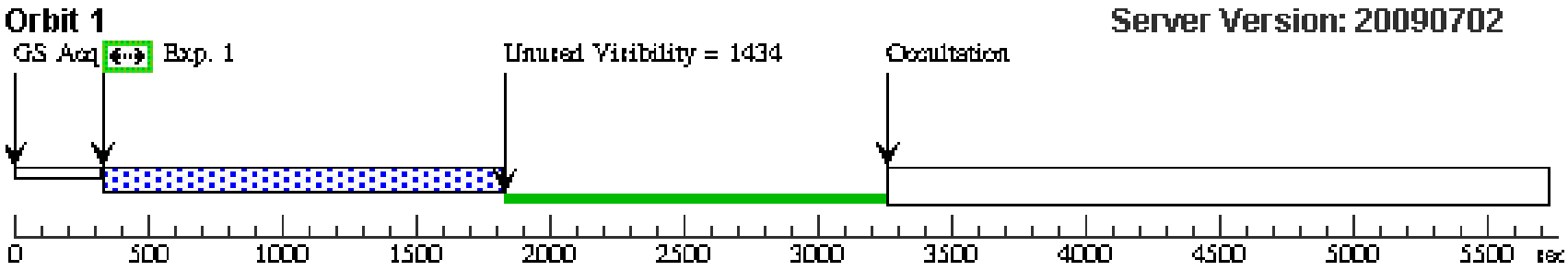
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(3)	MOON-OFFSET	RA: 06 06 58.9947 (91.7458112d) Dec: +25 31 59.98 (25.53333d) Equinox: J2000		V=20	Reference Frame: ICRS

Comments: This target is used for guide star acquisition prior to slewing to the Moon. The coordinates should be leading the Moon's limb by about 10 degrees and must be defined for a specific observing time.

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1		(3) MOON-OFFSET	S/C, POINTING, V1					1500 Secs *[==>]*	*[1]*

Orbit Structure



Visit

Proposal 11806, Visit 03, scheduling Sat Oct 03 01:06:37 GMT 2009

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/UVIS

Special Requirements: PCS MODE GYRO; AFTER 02 BY 0 Orbits TO 1.1 Orbits; BETWEEN 09-OCT-2009:11:00:00 AND 09-OCT-2009:12:00:00; ON HOLD

Comments: Impact observation. The three (CR-SPLIT) images should each be one MT track to minimize drift during the sequence.

On Hold Comments: Choose visits 01-04, 11-14, 21-24, 31-34, 41-44, 51-54, or 61-64 depending on which of the candidate targets is selected for LCROSS impact.

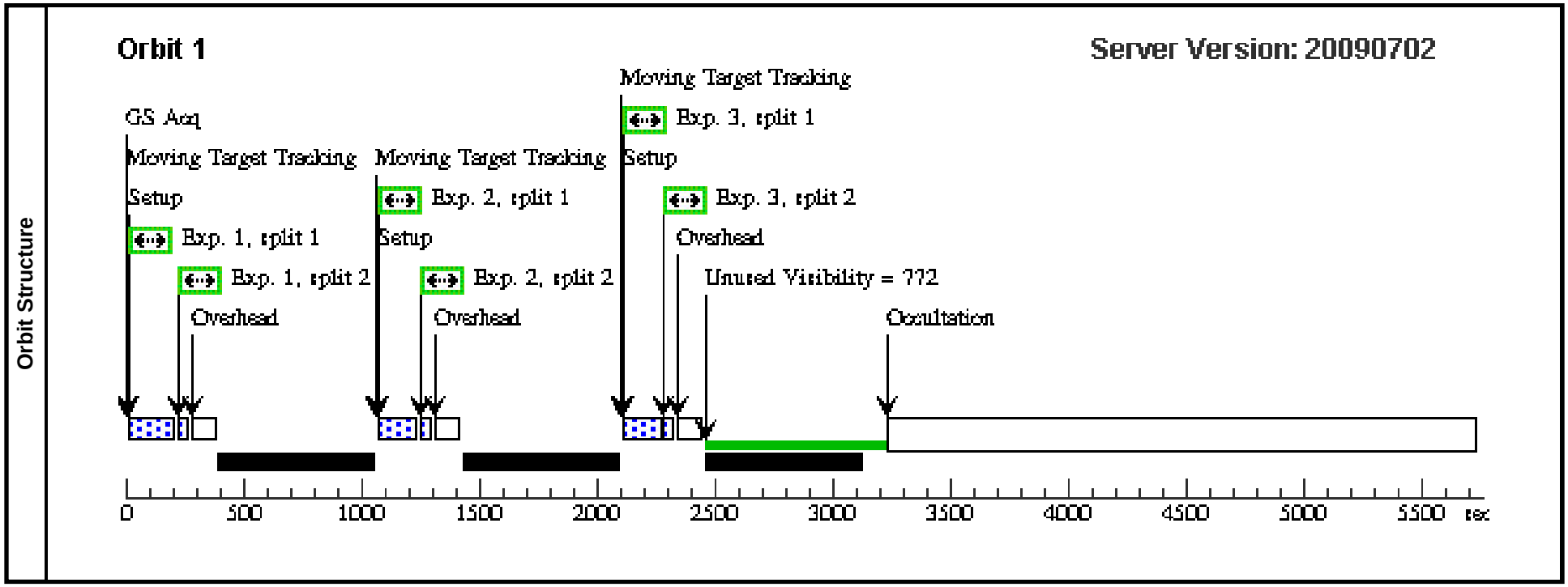
Solar System Targets

#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
(2)	CABEUS-A-OFFSET	STD=EARTH	STD=MOON	TYPE=PCENTRIC,LONG=316.90,LAT=-81.55,RAD=2008.0,R_LONG=0.0,R_LAT=0.0,R_RAD=0.0,EPOCH=01-JAN-2008:01:00:00	A_VEL CABEUS-A-OFFSET FROM HUBBLE MIN 0.3, A_VEL CABEUS-A-OFFSET FROM HUBBLE MAX 0.3	HUBBLE

Comments: The target is offset from the limb by 270 km, which is 135 arcsec at the maximum lunar distance. This will keep the limb of the Moon out of the WFC3 fov even at apogee.

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1	Impact Image	(2) CABEUS-A-OFFSET	WFC3/UVIS, ACCUM, UVIS	F300X	CR-SPLIT=2			90.0 Secs *[==>(Split 1)]* *[==>(Split 2)]*	***[1]***
2	Impact Image	(2) CABEUS-A-OFFSET	WFC3/UVIS, ACCUM, UVIS	F300X	CR-SPLIT=2	NEW ALIGNMENT		90.0 Secs *[==>(Split 1)]* *[==>(Split 2)]*	***[1]***
3	Impact Image	(2) CABEUS-A-OFFSET	WFC3/UVIS, ACCUM, UVIS	F300X	CR-SPLIT=2	NEW ALIGNMENT		90.0 Secs *[==>(Split 1)]* *[==>(Split 2)]*	***[1]***


Orbit Structure
Orbit 1
Server Version: 20090702
GS Acq
Moving Target Tracking
Setup
Exp. 1, split 1
Exp. 1, split 2
Overhead
Moving Target Tracking
Setup
Exp. 2, split 1
Exp. 2, split 2
Overhead
Moving Target Tracking
Setup
Exp. 3, split 1
Exp. 3, split 2
Overhead
Unused Visibility = 772
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 11806, Visit 04, scheduling Sat Oct 03 01:06:38 GMT 2009

Diagnostic Status: Warning

Scientific Instruments: STIS/CCD

Special Requirements: PCS MODE GYRO; AFTER 03 BY 0.9 Orbits TO 1.1 Orbits; ON HOLD

On Hold Comments: Choose visits 01-04, 11-14, 21-24, 31-34, 41-44, 51-54, or 61-64 depending on which of the candidate targets is selected for LCROSS impact.

Diagnostics

(Visit 04) Warning (Form): A target acquisition should probably be performed before doing spectroscopy or coronography with STIS or COS.

Solar System Targets

#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
(1)	LUNAR-EXOSPHERE	STD=EARTH	STD=MOON	TYPE=POS_ANGLE,RAD=1000,ANG=85,REF=SUN		HUBBLE

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1	Post-Impact Spectroscopy	(1) LUNAR-EXOSPHERE	STIS/CCD, ACCUM, 52X0.2	G230LB 2375 A	CR-SPLIT=8		Sequence 1-3 Non-Int	600.0 Secs	
								[==>(Split 1)]	***[1]***
								[==>(Split 2)]	
								[==>(Split 3)]	
								[==>(Split 4)]	
								[==>(Split 5)]	
								[==>(Split 6)]	
								[==>(Split 7)]	
								[==>(Split 8)]	

Comments: Start of Orbit #3, the orbit after the LCROSS impact.

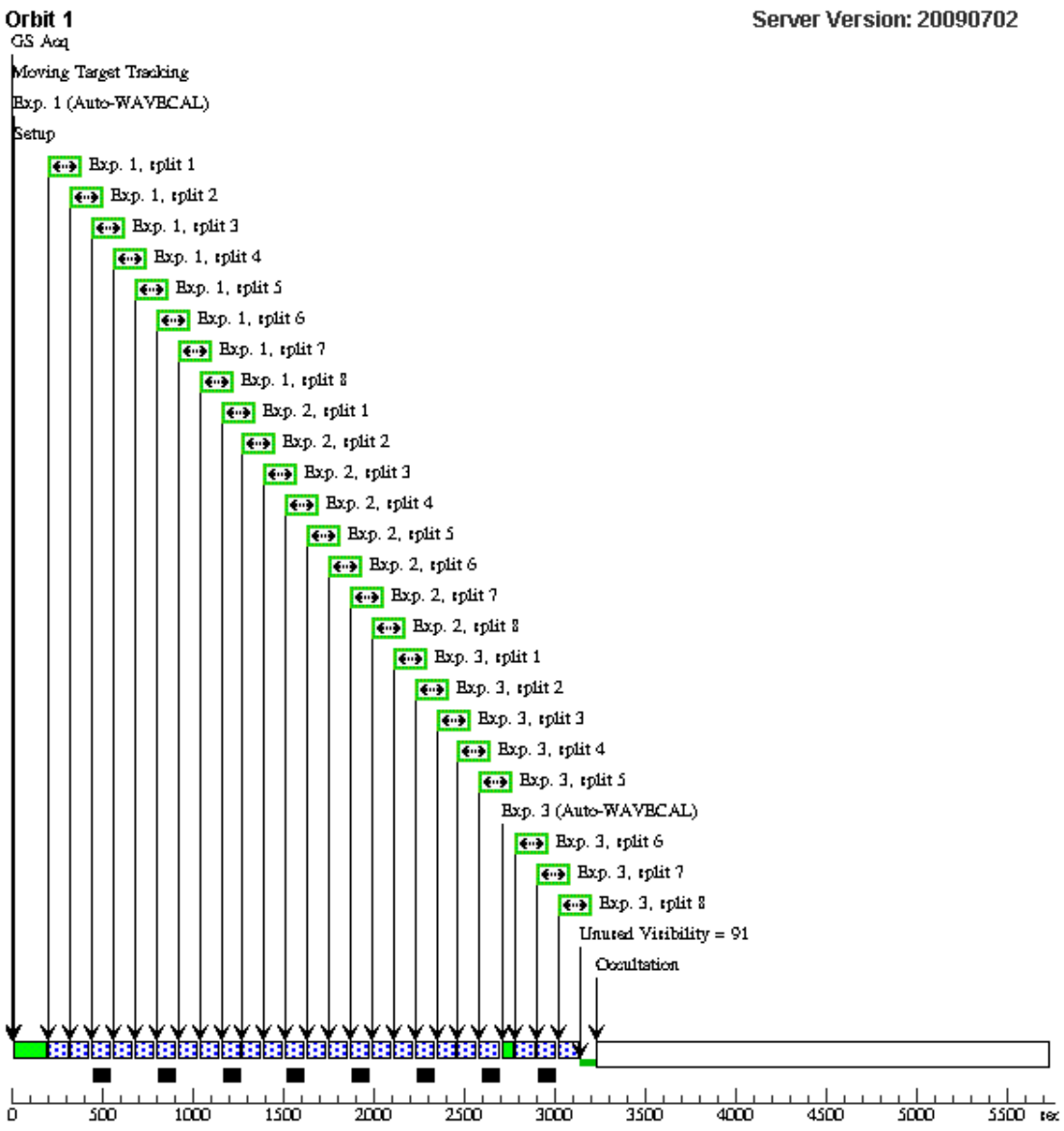
Exposures (continued)

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
2	Post-Impact Spectroscopy	(1) LUNAR-EXOSPHERE	STIS/CCD, ACCUM, 52X0.2	G230LB 2375 A	CR-SPLIT=8		Sequence 1-3 Non-Int	600.0 Secs	
								[==>(Split 1)]	***[1]***
								[==>(Split 2)]	
								[==>(Split 3)]	
								[==>(Split 4)]	
								[==>(Split 5)]	
								[==>(Split 6)]	
								[==>(Split 7)]	
								[==>(Split 8)]	
3	Post-Impact Spectroscopy	(1) LUNAR-EXOSPHERE	STIS/CCD, ACCUM, 52X0.2	G230LB 2375 A	CR-SPLIT=8		Sequence 1-3 Non-Int	600.0 Secs	
								[==>(Split 1)]	***[1]***
								[==>(Split 2)]	
								[==>(Split 3)]	
								[==>(Split 4)]	
								[==>(Split 5)]	
								[==>(Split 6)]	
								[==>(Split 7)]	
								[==>(Split 8)]	
4	Post-Impact Spectroscopy	(1) LUNAR-EXOSPHERE	STIS/CCD, ACCUM, 52X0.2	G230LB 2375 A	CR-SPLIT=8		Sequence 4-6 Non-Int	680.0 Secs	
								[==>(Split 1)]	***[2]***
								[==>(Split 2)]	
								[==>(Split 3)]	
								[==>(Split 4)]	
								[==>(Split 5)]	
								[==>(Split 6)]	
								[==>(Split 7)]	
								[==>(Split 8)]	
Comments: Start of Orbit #4, two orbits after the LCROSS impact.									
5	Post-Impact Spectroscopy	(1) LUNAR-EXOSPHERE	STIS/CCD, ACCUM, 52X0.2	G230LB 2375 A	CR-SPLIT=8		Sequence 4-6 Non-Int	680.0 Secs	
								[==>(Split 1)]	***[2]***
								[==>(Split 2)]	
								[==>(Split 3)]	
								[==>(Split 4)]	
								[==>(Split 5)]	
								[==>(Split 6)]	
								[==>(Split 7)]	
								[==>(Split 8)]	

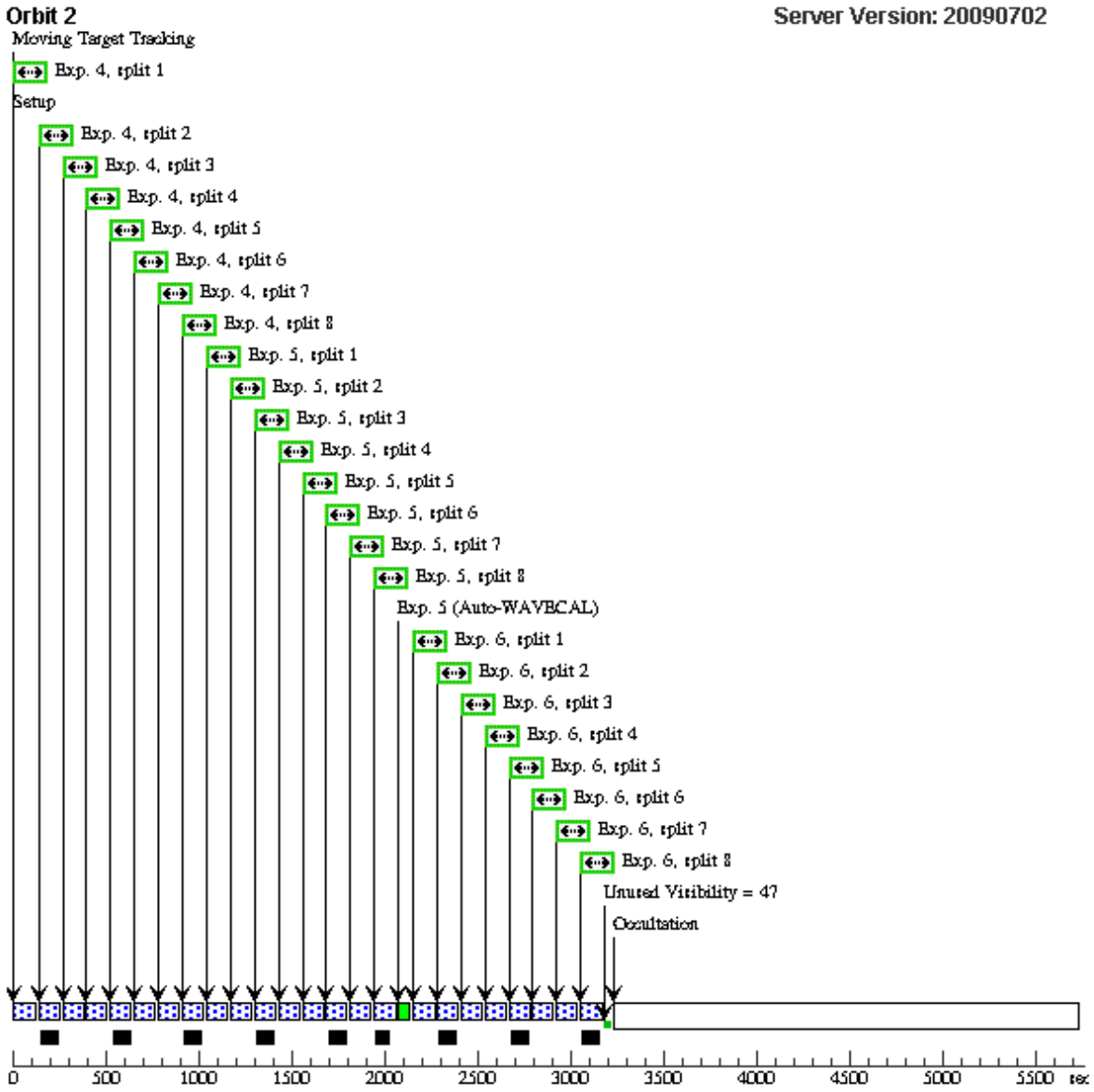
Exposures (continued)

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
6	Post-Impact Spectroscopy	(1) LUNAR-EXOSPHERE	STIS/CCD, ACCUM, 52X0.2	G230LB 2375 A	CR-SPLIT=8		Sequence 4-6 Non-Int	680.0 Secs	
								[==>(Split 1)]	***[2]***
								[==>(Split 2)]	
								[==>(Split 3)]	
								[==>(Split 4)]	
								[==>(Split 5)]	
								[==>(Split 6)]	
								[==>(Split 7)]	
								[==>(Split 8)]	
7	Post-Impact Spectroscopy	(1) LUNAR-EXOSPHERE	STIS/CCD, ACCUM, 52X0.2	G230LB 2375 A	CR-SPLIT=8		Sequence 7-9 Non-Int	680.0 Secs	
								[==>(Split 1)]	***[3]***
								[==>(Split 2)]	
								[==>(Split 3)]	
								[==>(Split 4)]	
								[==>(Split 5)]	
								[==>(Split 6)]	
								[==>(Split 7)]	
								[==>(Split 8)]	
Comments: Start of Orbit #5, three orbits after the LCROSS impact.									
8	Post-Impact Spectroscopy	(1) LUNAR-EXOSPHERE	STIS/CCD, ACCUM, 52X0.2	G230LB 2375 A	CR-SPLIT=8		Sequence 7-9 Non-Int	680.0 Secs	
								[==>(Split 1)]	***[3]***
								[==>(Split 2)]	
								[==>(Split 3)]	
								[==>(Split 4)]	
								[==>(Split 5)]	
								[==>(Split 6)]	
								[==>(Split 7)]	
								[==>(Split 8)]	
9	Post-Impact Spectroscopy	(1) LUNAR-EXOSPHERE	STIS/CCD, ACCUM, 52X0.2	G230LB 2375 A	CR-SPLIT=8		Sequence 7-9 Non-Int	680.0 Secs	
								[==>(Split 1)]	***[3]***
								[==>(Split 2)]	
								[==>(Split 3)]	
								[==>(Split 4)]	
								[==>(Split 5)]	
								[==>(Split 6)]	
								[==>(Split 7)]	
								[==>(Split 8)]	

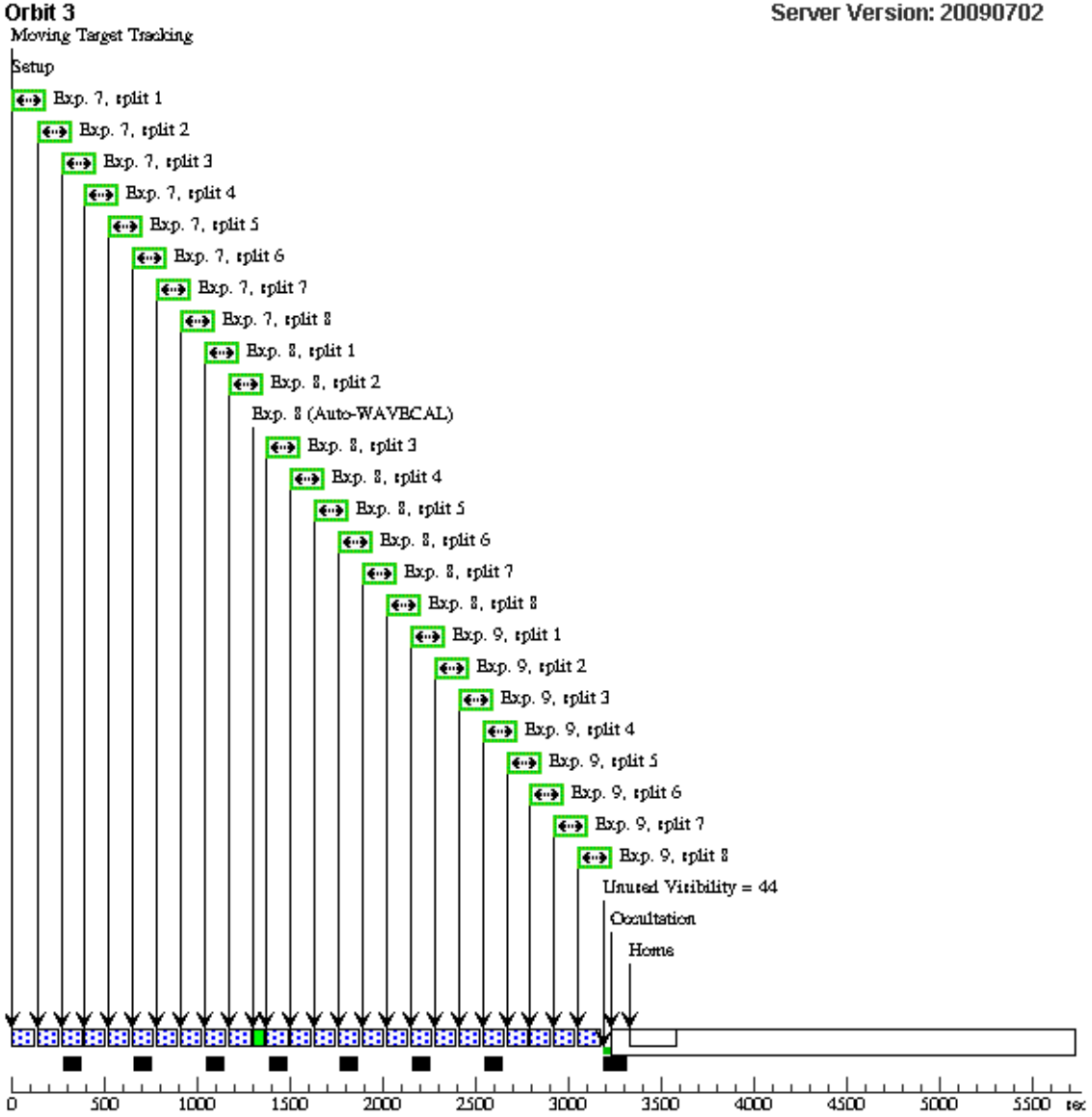
Orbit Structure



Orbit Structure (continued)



Orbit Structure (continued)



Visit

Proposal 11806, Visit 05, scheduling Sat Oct 03 01:06:39 GMT 2009

Diagnostic Status: Warning

Scientific Instruments: STIS/CCD

Special Requirements: PCS MODE GYRO; AFTER 03 BY 0.9 D TO 1.1 D; ON HOLD

On Hold Comments: Choose visits 01-04, 11-14, 21-24, 31-34, 41-44, 51-54, or 61-64 depending on which of the candidate targets is selected for LCROSS impact.

Diagnostics

(Visit 05) Warning (Form): A target acquisition should probably be performed before doing spectroscopy or coronography with STIS or COS.

Solar System Targets

#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
(1)	LUNAR-EXOSPHERE	STD=EARTH	STD=MOON	TYPE=POS_ANGLE,RAD=1000,ANG=85,REF=SUN		HUBBLE

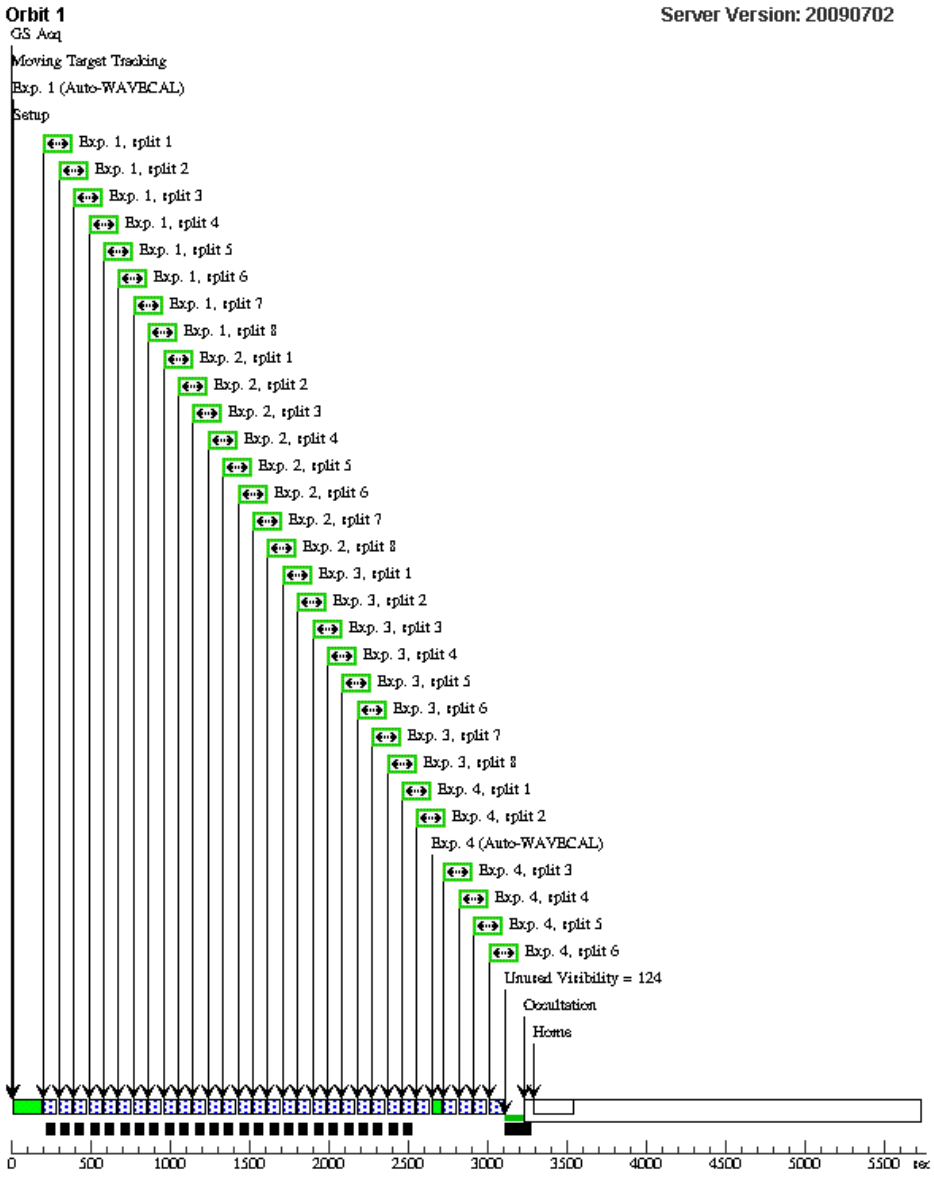
Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1	Impact +1 day	(1) LUNAR-EXOSPHERE	STIS/CCD, ACCUM, 52X0.2	G230LB 2375 A	CR-SPLIT=8		Sequence 1-4 Non-Int	400.0 Secs	
								[==>(Split 1)]	***[1]***
								[==>(Split 2)]	
								[==>(Split 3)]	
								[==>(Split 4)]	
								[==>(Split 5)]	
								[==>(Split 6)]	
								[==>(Split 7)]	
								[==>(Split 8)]	
2	Impact +1 day	(1) LUNAR-EXOSPHERE	STIS/CCD, ACCUM, 52X0.2	G230LB 2375 A	CR-SPLIT=8		Sequence 1-4 Non-Int	400.0 Secs	
								[==>(Split 1)]	***[1]***
								[==>(Split 2)]	
								[==>(Split 3)]	
								[==>(Split 4)]	
								[==>(Split 5)]	
								[==>(Split 6)]	
								[==>(Split 7)]	
								[==>(Split 8)]	

Exposures (continued)

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
3	Impact +1 day	(1) LUNAR-EXOSPHERE	STIS/CCD, ACCUM, 52X0.2	G230LB 2375 A	CR-SPLIT=8		Sequence 1-4 Non-Int	400.0 Secs	
								[==>(Split 1)]	***[1]***
								[==>(Split 2)]	
								[==>(Split 3)]	
								[==>(Split 4)]	
								[==>(Split 5)]	
								[==>(Split 6)]	
								[==>(Split 7)]	
								[==>(Split 8)]	
4	Impact +1 day	(1) LUNAR-EXOSPHERE	STIS/CCD, ACCUM, 52X0.2	G230LB 2375 A	CR-SPLIT=6		Sequence 1-4 Non-Int	300.0 Secs	
								[==>(Split 1)]	***[1]***
								[==>(Split 2)]	
								[==>(Split 3)]	
								[==>(Split 4)]	
								[==>(Split 5)]	
								[==>(Split 6)]	

Orbit Structure



Visit

Proposal 11806, Visit 11, implementation Sat Oct 03 01:06:40 GMT 2009

Diagnostic Status: Warning

Scientific Instruments: STIS/CCD

Special Requirements: PCS MODE GYRO; ON HOLD

Comments: Visits 11-15 are an alternative set to try a different ground system software processing path.

Pre-impact calibration observation: should take place a day before the impact, to minimize the impact of the variability of the Lunar atmosphere.
Over 10m of unused visibility time is left to enhance schedulability due to time-critical nature of these observations.
Visit 11 should precede visit 12 by a day or less.

On Hold Comments: Choose visits 01-04, 11-14, 21-24, 31-34, 41-44, 51-54, or 61-64 depending on which of the candidate targets is selected for LCROSS impact.

Diagnostics

(Visit 11) Warning (Form): A target acquisition should probably be performed before doing spectroscopy or coronography with STIS or COS.

Solar System Targets

#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
(4)	LUNAR-EXOSPHERE-2	STD=EARTH	STD=MOON	TYPE=POS_ANGLE,RAD=1000,ANG=85,REF=SUN		HUBBLE

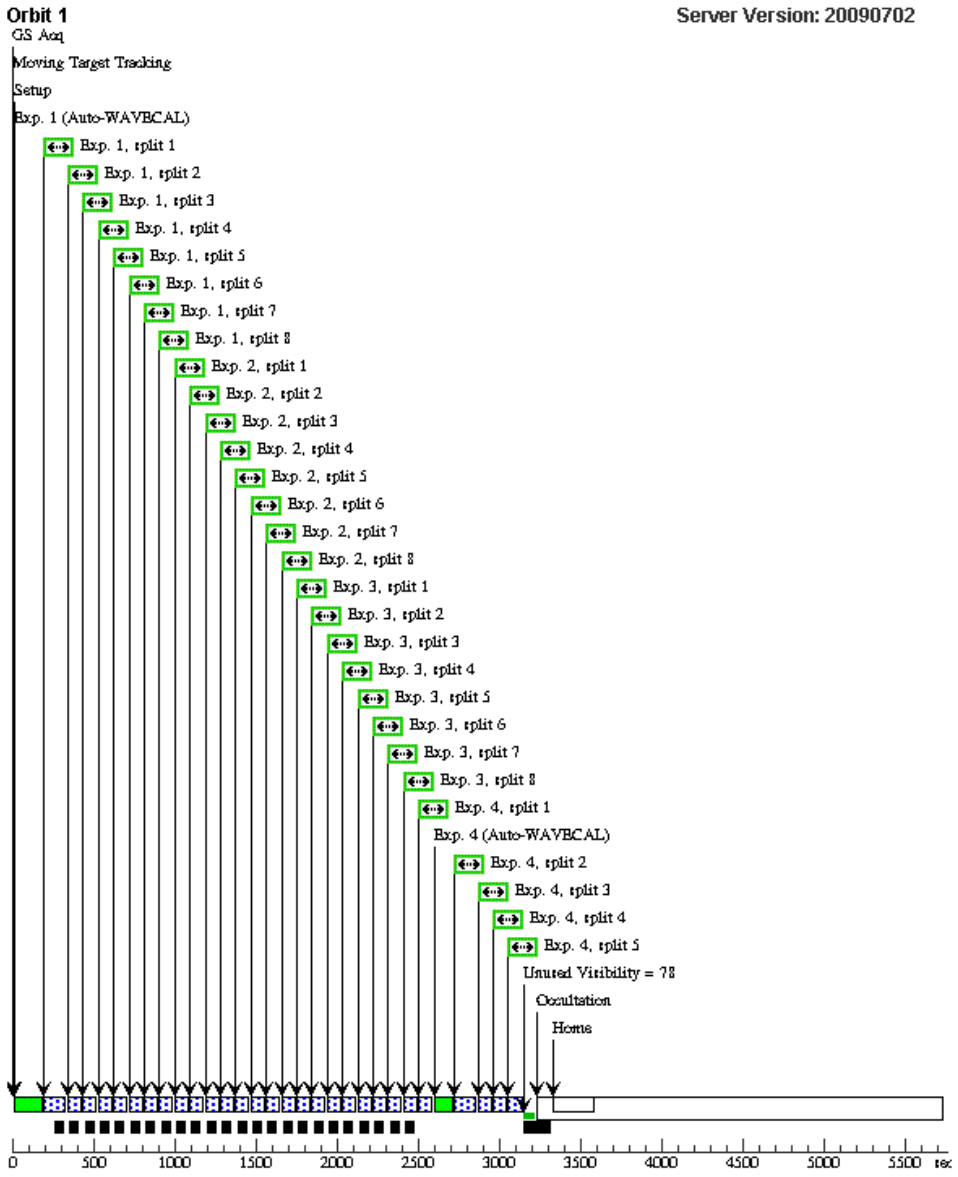
Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1	Pre-Impact Calibration	(4) LUNAR-EXOSPHERE-2	STIS/CCD, ACCUM, 52X0.5	G230LB 2375 A	CR-SPLIT=8			400.0 Secs	
								[==>(Split 1)]	*[1]*
								[==>(Split 2)]	
								[==>(Split 3)]	
								[==>(Split 4)]	
								[==>(Split 5)]	
								[==>(Split 6)]	
								[==>(Split 7)]	
								[==>(Split 8)]	

Exposures (continued)

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
2	Pre-Impact Calibration	(4) LUNAR-EXOSPHERE-2	STIS/CCD, ACCUM, 52X0.5	G230LB 2375 A	CR-SPLIT=8			400.0 Secs	
								[==>(Split 1)] *[==>(Split 2)]* *[==>(Split 3)]* *[==>(Split 4)]* *[==>(Split 5)]* *[==>(Split 6)]* *[==>(Split 7)]* *[==>(Split 8)]*	***[1]***
3	Pre-Impact Calibration	(4) LUNAR-EXOSPHERE-2	STIS/CCD, ACCUM, 52X0.5	G230LB 2375 A	CR-SPLIT=8			400.0 Secs	
								[==>(Split 1)] *[==>(Split 2)]* *[==>(Split 3)]* *[==>(Split 4)]* *[==>(Split 5)]* *[==>(Split 6)]* *[==>(Split 7)]* *[==>(Split 8)]*	***[1]***
4	Pre-Impact Calibration	(4) LUNAR-EXOSPHERE-2	STIS/CCD, ACCUM, 52X0.5	G230LB 2375 A	CR-SPLIT=5			250.0 Secs	
								[==>(Split 1)] *[==>(Split 2)]* *[==>(Split 3)]* *[==>(Split 4)]* *[==>(Split 5)]*	***[1]***

Orbit Structure



Visit

Proposal 11806, Visit 12, implementation Sat Oct 03 01:06:40 GMT 2009

Diagnostic Status: No Diagnostics

Scientific Instruments: S/C

Special Requirements: NOTRACK; AFTER 11 BY 0 D TO 1 D

Comments: The purpose of this visit is to make sure that there is a 2-star FGS acquisition to ensure that a fresh gyro bias calculation is available before visit 13 begins.

Fixed Targets

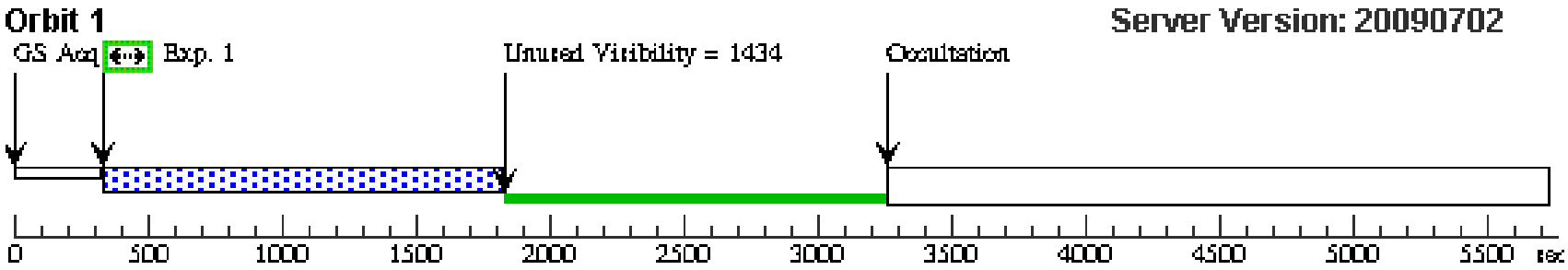
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(3)	MOON-OFFSET	RA: 06 06 58.9947 (91.7458112d) Dec: +25 31 59.98 (25.53333d) Equinox: J2000		V=20	Reference Frame: ICRS

Comments: This target is used for guide star acquisition prior to slewing to the Moon. The coordinates should be leading the Moon's limb by about 10 degrees and must be defined for a specific observing time.

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1		(3) MOON-OFFSET	S/C, POINTING, V1					1500 Secs *[==>]*	*[1]*

Orbit Structure



Visit

Proposal 11806, Visit 13, implementation Sat Oct 03 01:06:40 GMT 2009

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/UVIS

Special Requirements: PCS MODE GYRO; AFTER 12 BY 0 Orbits TO 1.1 Orbits; BETWEEN 09-OCT-2009:11:00:00 AND 09-OCT-2009:12:00:00; ON HOLD

Comments: Impact observation. The three (CR-SPLIT) images should each be one MT track to minimize drift during the sequence.

On Hold Comments: Choose visits 01-04, 11-14, 21-24, 31-34, 41-44, 51-54, or 61-64 depending on which of the candidate targets is selected for LCROSS impact.

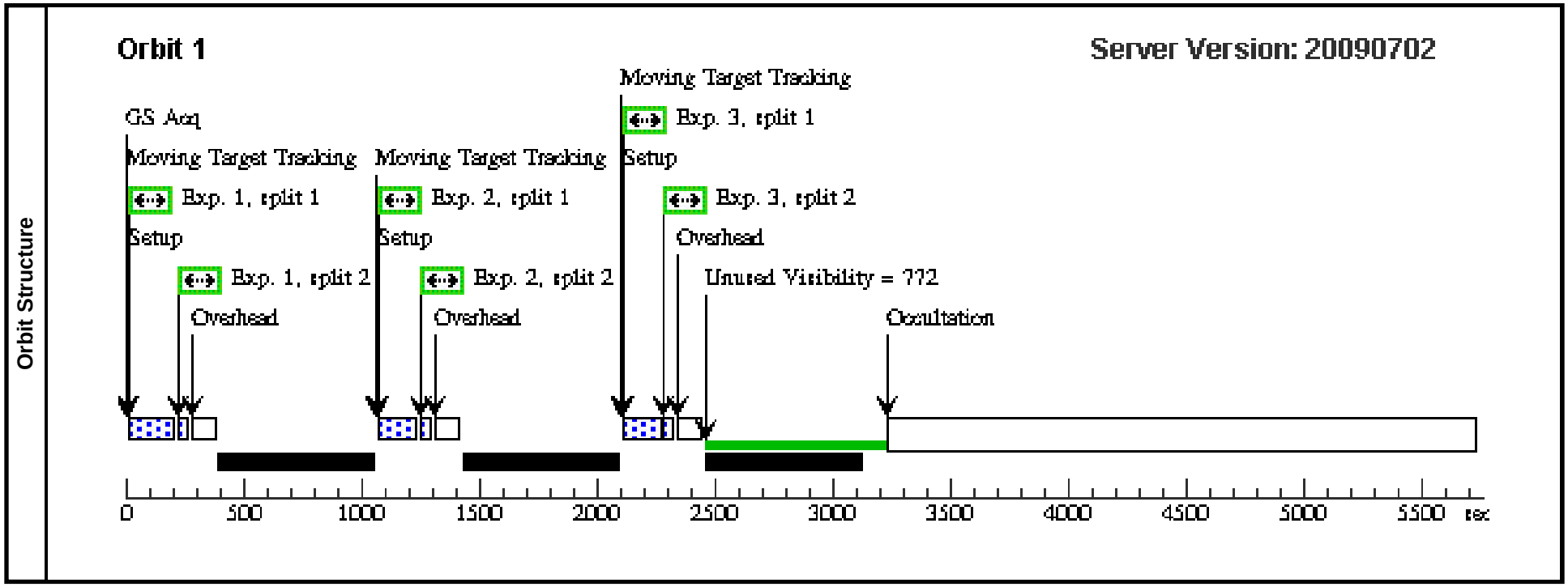
Solar System Targets

#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
(5)	CABEUS-A-OFFSET-2	STD=EARTH	STD=MOON	TYPE=PCENTRIC,LONG=316.90,LAT=-81.55,RAD=2008.0,R_LONG=0.0,R_LAT=0.0,R_RAD=0.0,EPOCH=01-JAN-2008:01:00:00	A_VEL CABEUS-A-OFFSET-2 FROM HUBBLE MIN 0.3, A_VEL CABEUS-A-OFFSET-2 FROM HUBBLE MAX 0.3	HUBBLE

Comments: The target is offset from the limb by 270 km, which is 135 arcsec at the maximum lunar distance. This will keep the limb of the Moon out of the WFC3 fov even at apogee.

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1	Impact Image	(5) CABEUS-A-OFFSET-2	WFC3/UVIS, ACCUM, UVIS	F300X	CR-SPLIT=2			90.0 Secs *[==>(Split 1)]* *[==>(Split 2)]*	***[1]***
2	Impact Image	(5) CABEUS-A-OFFSET-2	WFC3/UVIS, ACCUM, UVIS	F300X	CR-SPLIT=2	NEW ALIGNMENT		90.0 Secs *[==>(Split 1)]* *[==>(Split 2)]*	***[1]***
3	Impact Image	(5) CABEUS-A-OFFSET-2	WFC3/UVIS, ACCUM, UVIS	F300X	CR-SPLIT=2	NEW ALIGNMENT		90.0 Secs *[==>(Split 1)]* *[==>(Split 2)]*	***[1]***


Orbit Structure
Orbit 1
Server Version: 20090702
GS Acq
Moving Target Tracking
Exp. 1, split 1
Setup
Exp. 1, split 2
Overhead
Moving Target Tracking
Exp. 2, split 1
Setup
Exp. 2, split 2
Overhead
Moving Target Tracking
Exp. 3, split 1
Setup
Exp. 3, split 2
Overhead
Unused Visibility = 772
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 11806, Visit 14, implementation Sat Oct 03 01:06:41 GMT 2009

Diagnostic Status: Warning

Scientific Instruments: STIS/CCD

Special Requirements: PCS MODE GYRO; AFTER 13 BY 0.9 Orbits TO 1.1 Orbits; ON HOLD

On Hold Comments: Choose visits 01-04, 11-14, 21-24, 31-34, 41-44, 51-54, or 61-64 depending on which of the candidate targets is selected for LCROSS impact.

Diagnostics

(Visit 14) Warning (Form): A target acquisition should probably be performed before doing spectroscopy or coronography with STIS or COS.

Solar System Targets

#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
(4)	LUNAR-EXOSPHERE-2	STD=EARTH	STD=MOON	TYPE=POS_ANGLE,RAD=1000,ANG=85,REF=SUN		HUBBLE

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1	Post-Impact Spectroscopy	(4) LUNAR-EXOSPHERE-2	STIS/CCD, ACCUM, 52X0.2	G230LB 2375 A	CR-SPLIT=8		Sequence 1-3 Non-Int	600.0 Secs *[==>(Split 1)]* *[==>(Split 2)]* *[==>(Split 3)]* *[==>(Split 4)]* *[==>(Split 5)]* *[==>(Split 6)]* *[==>(Split 7)]* *[==>(Split 8)]*	 ***[1]***

Comments: Start of Orbit #3, the orbit after the LCROSS impact.

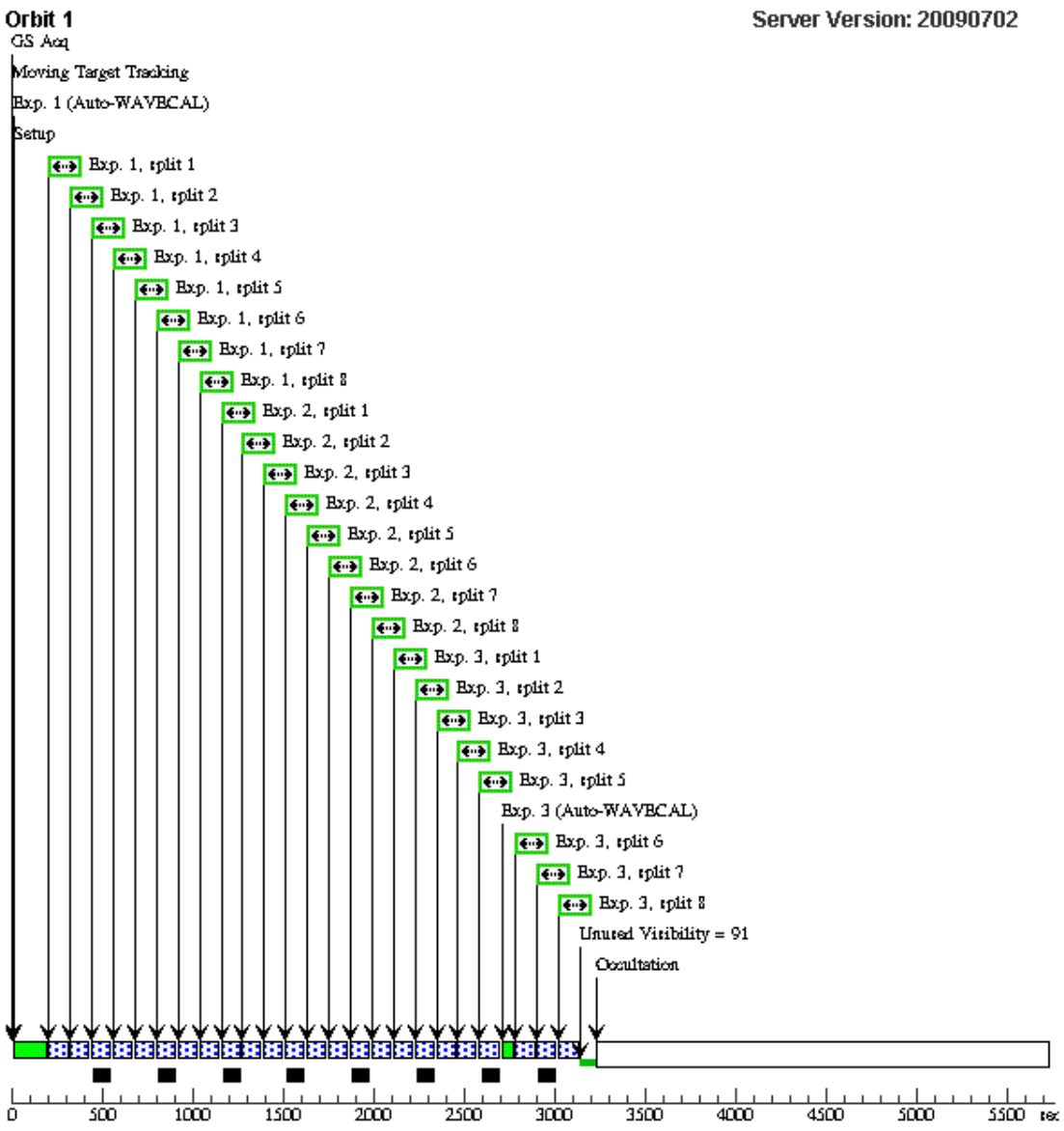
Exposures (continued)

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
2	Post-Impact Spectroscopy	(4) LUNAR-EXOSPHERE-2	STIS/CCD, ACCUM, 52X0.2	G230LB 2375 A	CR-SPLIT=8		Sequence 1-3 Non-Int	600.0 Secs	
								[==>(Split 1)]	***[1]***
								[==>(Split 2)]	
								[==>(Split 3)]	
								[==>(Split 4)]	
								[==>(Split 5)]	
								[==>(Split 6)]	
								[==>(Split 7)]	
								[==>(Split 8)]	
3	Post-Impact Spectroscopy	(4) LUNAR-EXOSPHERE-2	STIS/CCD, ACCUM, 52X0.2	G230LB 2375 A	CR-SPLIT=8		Sequence 1-3 Non-Int	600.0 Secs	
								[==>(Split 1)]	***[1]***
								[==>(Split 2)]	
								[==>(Split 3)]	
								[==>(Split 4)]	
								[==>(Split 5)]	
								[==>(Split 6)]	
								[==>(Split 7)]	
								[==>(Split 8)]	
4	Post-Impact Spectroscopy	(4) LUNAR-EXOSPHERE-2	STIS/CCD, ACCUM, 52X0.2	G230LB 2375 A	CR-SPLIT=8		Sequence 4-6 Non-Int	680.0 Secs	
								[==>(Split 1)]	***[2]***
								[==>(Split 2)]	
								[==>(Split 3)]	
								[==>(Split 4)]	
								[==>(Split 5)]	
								[==>(Split 6)]	
								[==>(Split 7)]	
								[==>(Split 8)]	
Comments: Start of Orbit #4, two orbits after the LCROSS impact.									
5	Post-Impact Spectroscopy	(4) LUNAR-EXOSPHERE-2	STIS/CCD, ACCUM, 52X0.2	G230LB 2375 A	CR-SPLIT=8		Sequence 4-6 Non-Int	680.0 Secs	
								[==>(Split 1)]	***[2]***
								[==>(Split 2)]	
								[==>(Split 3)]	
								[==>(Split 4)]	
								[==>(Split 5)]	
								[==>(Split 6)]	
								[==>(Split 7)]	
								[==>(Split 8)]	

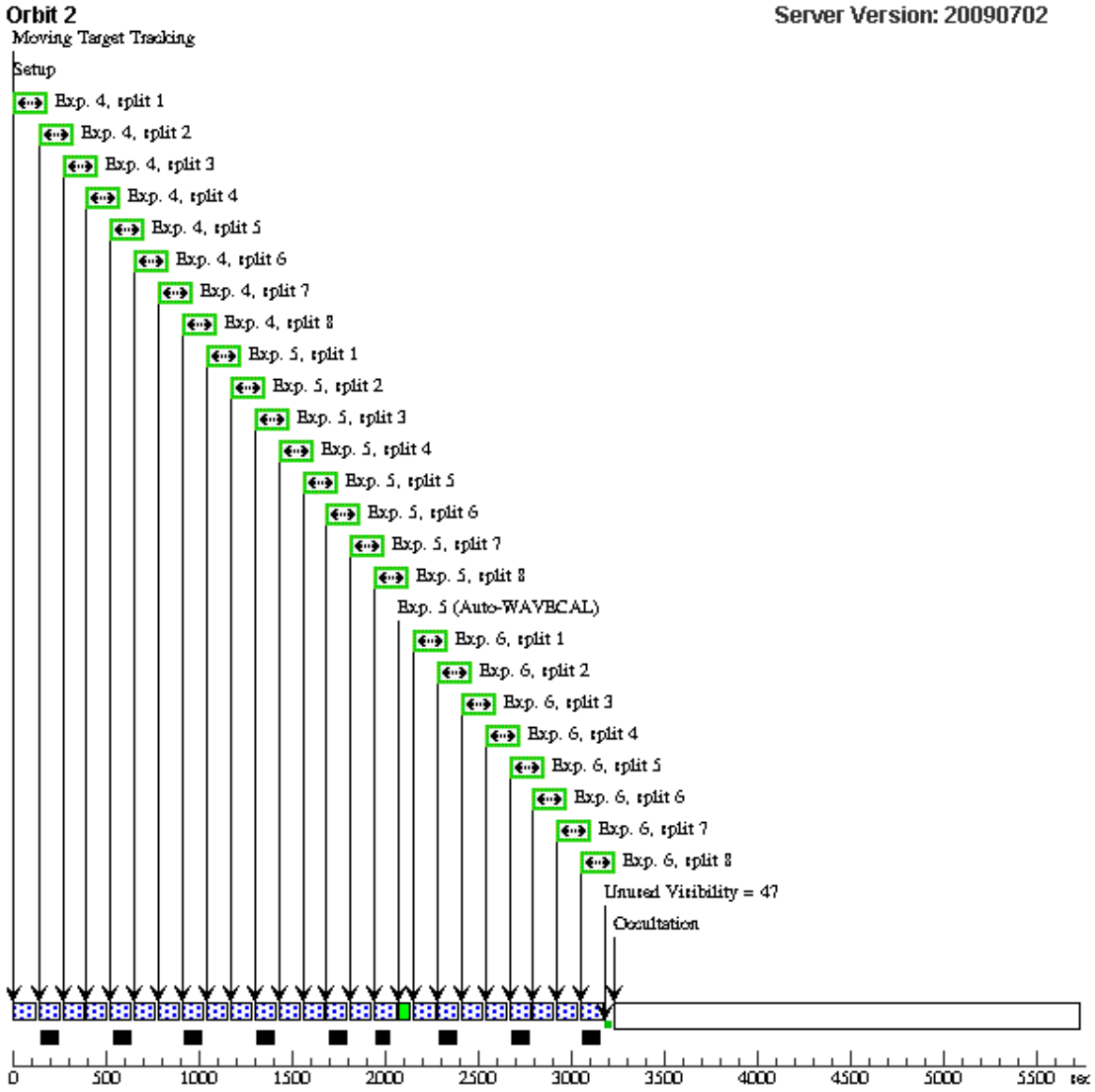
Exposures (continued)

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
6	Post-Impact Spectroscopy	(4) LUNAR-EXOSPHERE-2	STIS/CCD, ACCUM, 52X0.2	G230LB 2375 A	CR-SPLIT=8		Sequence 4-6 Non-Int	680.0 Secs	
								[==>(Split 1)] *[==>(Split 2)]* *[==>(Split 3)]* *[==>(Split 4)]* *[==>(Split 5)]* *[==>(Split 6)]* *[==>(Split 7)]* *[==>(Split 8)]*	***[2]***
7	Post-Impact Spectroscopy	(4) LUNAR-EXOSPHERE-2	STIS/CCD, ACCUM, 52X0.2	G230LB 2375 A	CR-SPLIT=8		Sequence 7-9 Non-Int	680.0 Secs	
								[==>(Split 1)] *[==>(Split 2)]* *[==>(Split 3)]* *[==>(Split 4)]* *[==>(Split 5)]* *[==>(Split 6)]* *[==>(Split 7)]* *[==>(Split 8)]*	***[3]***
Comments: Start of Orbit #5, three orbits after the LCROSS impact.									
8	Post-Impact Spectroscopy	(4) LUNAR-EXOSPHERE-2	STIS/CCD, ACCUM, 52X0.2	G230LB 2375 A	CR-SPLIT=8		Sequence 7-9 Non-Int	680.0 Secs	
								[==>(Split 1)] *[==>(Split 2)]* *[==>(Split 3)]* *[==>(Split 4)]* *[==>(Split 5)]* *[==>(Split 6)]* *[==>(Split 7)]* *[==>(Split 8)]*	***[3]***
9	Post-Impact Spectroscopy	(4) LUNAR-EXOSPHERE-2	STIS/CCD, ACCUM, 52X0.2	G230LB 2375 A	CR-SPLIT=8		Sequence 7-9 Non-Int	680.0 Secs	
								[==>(Split 1)] *[==>(Split 2)]* *[==>(Split 3)]* *[==>(Split 4)]* *[==>(Split 5)]* *[==>(Split 6)]* *[==>(Split 7)]* *[==>(Split 8)]*	***[3]***

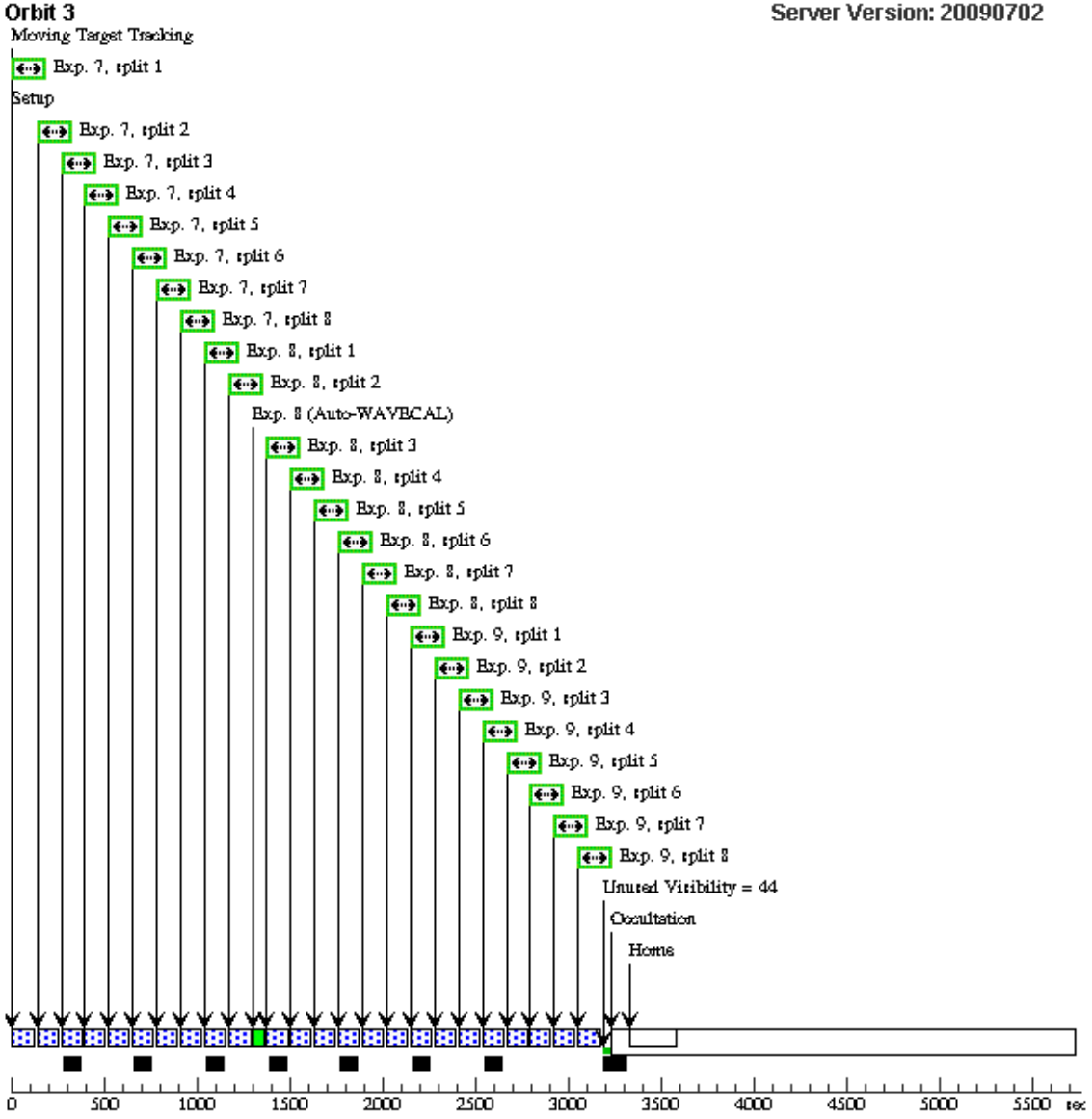
Orbit Structure



Orbit Structure (continued)



Orbit Structure (continued)



Visit

Proposal 11806, Visit 15, implementation Sat Oct 03 01:06:42 GMT 2009

Diagnostic Status: Warning

Scientific Instruments: STIS/CCD

Special Requirements: PCS MODE GYRO; AFTER 13 BY 0.9 D TO 1.1 D; ON HOLD

On Hold Comments: Choose visits 01-04, 11-14, 21-24, 31-34, 41-44, 51-54, or 61-64 depending on which of the candidate targets is selected for LCROSS impact.

Diagnostics

(Visit 15) Warning (Form): A target acquisition should probably be performed before doing spectroscopy or coronography with STIS or COS.

Solar System Targets

#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
(4)	LUNAR-EXOSPHERE-2	STD=EARTH	STD=MOON	TYPE=POS_ANGLE,RAD=1000,ANG=85,REF=SUN		HUBBLE

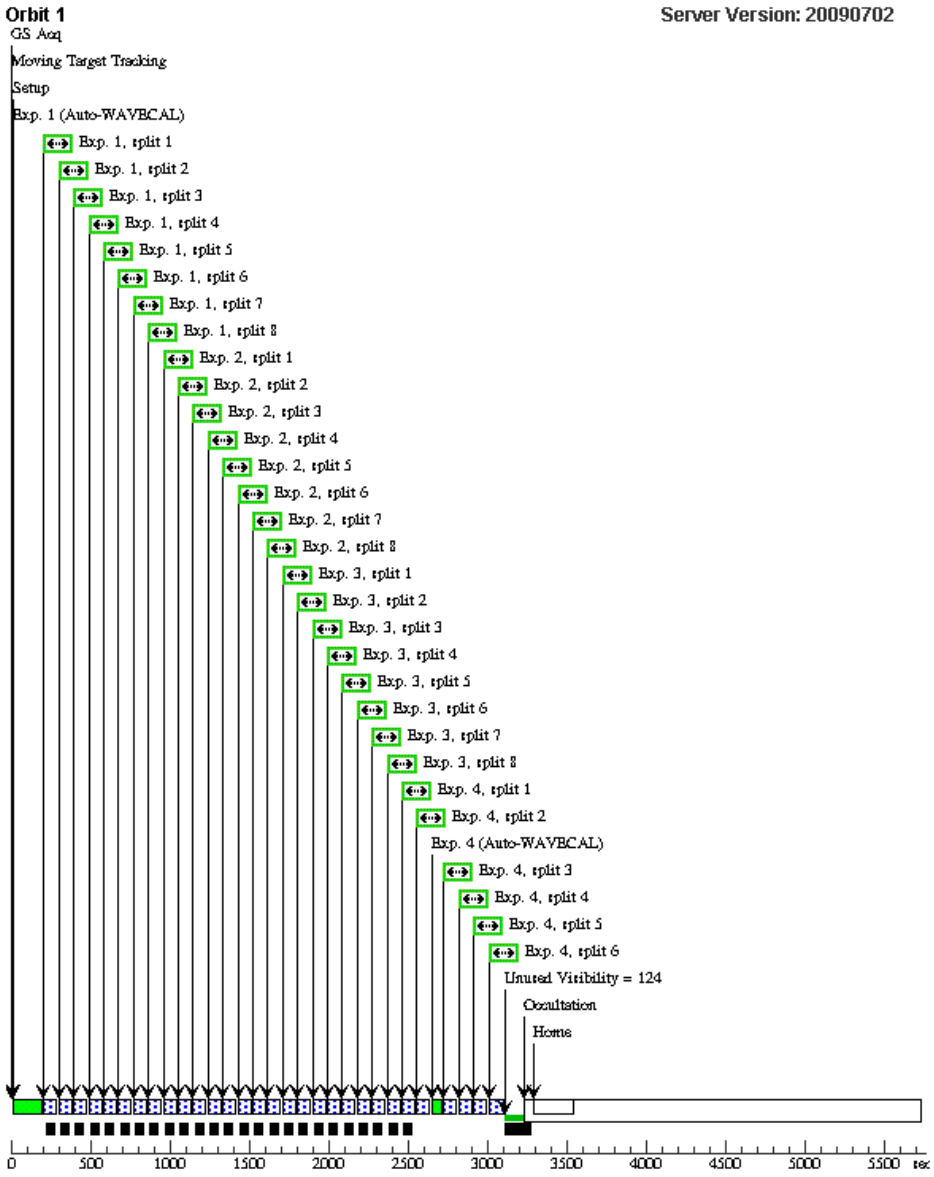
Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1	Impact +1 day	(4) LUNAR-EXOSPHERE-2	STIS/CCD, ACCUM, 52X0.2	G230LB 2375 A	CR-SPLIT=8		Sequence 1-4 Non-Int	400.0 Secs	
								[==>(Split 1)]	***[1]***
								[==>(Split 2)]	
								[==>(Split 3)]	
								[==>(Split 4)]	
								[==>(Split 5)]	
								[==>(Split 6)]	
								[==>(Split 7)]	
								[==>(Split 8)]	
2	Impact +1 day	(4) LUNAR-EXOSPHERE-2	STIS/CCD, ACCUM, 52X0.2	G230LB 2375 A	CR-SPLIT=8		Sequence 1-4 Non-Int	400.0 Secs	
								[==>(Split 1)]	***[1]***
								[==>(Split 2)]	
								[==>(Split 3)]	
								[==>(Split 4)]	
								[==>(Split 5)]	
								[==>(Split 6)]	
								[==>(Split 7)]	
								[==>(Split 8)]	

Exposures (continued)

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
3	Impact +1 day	(4) LUNAR-EXOSPHERE-2	STIS/CCD, ACCUM, 52X0.2	G230LB 2375 A	CR-SPLIT=8		Sequence 1-4 Non-Int	400.0 Secs	
								[==>(Split 1)]	***[1]***
								[==>(Split 2)]	
								[==>(Split 3)]	
								[==>(Split 4)]	
								[==>(Split 5)]	
								[==>(Split 6)]	
								[==>(Split 7)]	
								[==>(Split 8)]	
4	Impact +1 day	(4) LUNAR-EXOSPHERE-2	STIS/CCD, ACCUM, 52X0.2	G230LB 2375 A	CR-SPLIT=6		Sequence 1-4 Non-Int	300.0 Secs	
								[==>(Split 1)]	***[1]***
								[==>(Split 2)]	
								[==>(Split 3)]	
								[==>(Split 4)]	
								[==>(Split 5)]	
								[==>(Split 6)]	

Orbit Structure



Visit

Proposal 11806, Visit 21, implementation Sat Oct 03 01:06:43 GMT 2009

Diagnostic Status: Warning

Scientific Instruments: STIS/CCD

Special Requirements: PCS MODE GYRO; ON HOLD

Comments: Visits 21-25 are another set that uses smaller tracks in the STIS visits.

Pre-impact calibration observation: should take place a day before the impact, to minimize the impact of the variability of the Lunar atmosphere.
Over 10m of unused visibility time is left to enhance schedulability due to time-critical nature of these observations.
Visit 01 should precede visit 02 by a day or less.

On Hold Comments: Choose visits 01-04, 11-14, 21-24, 31-34, 41-44, 51-54, or 61-64 depending on which of the candidate targets is selected for LCROSS impact.

Diagnostics

(Visit 21) Warning (Form): A target acquisition should probably be performed before doing spectroscopy or coronography with STIS or COS.

Solar System Targets

#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
(1)	LUNAR-EXOSPHERE	STD=EARTH	STD=MOON	TYPE=POS_ANGLE,RAD=1000,ANG=85,REF=SUN		HUBBLE

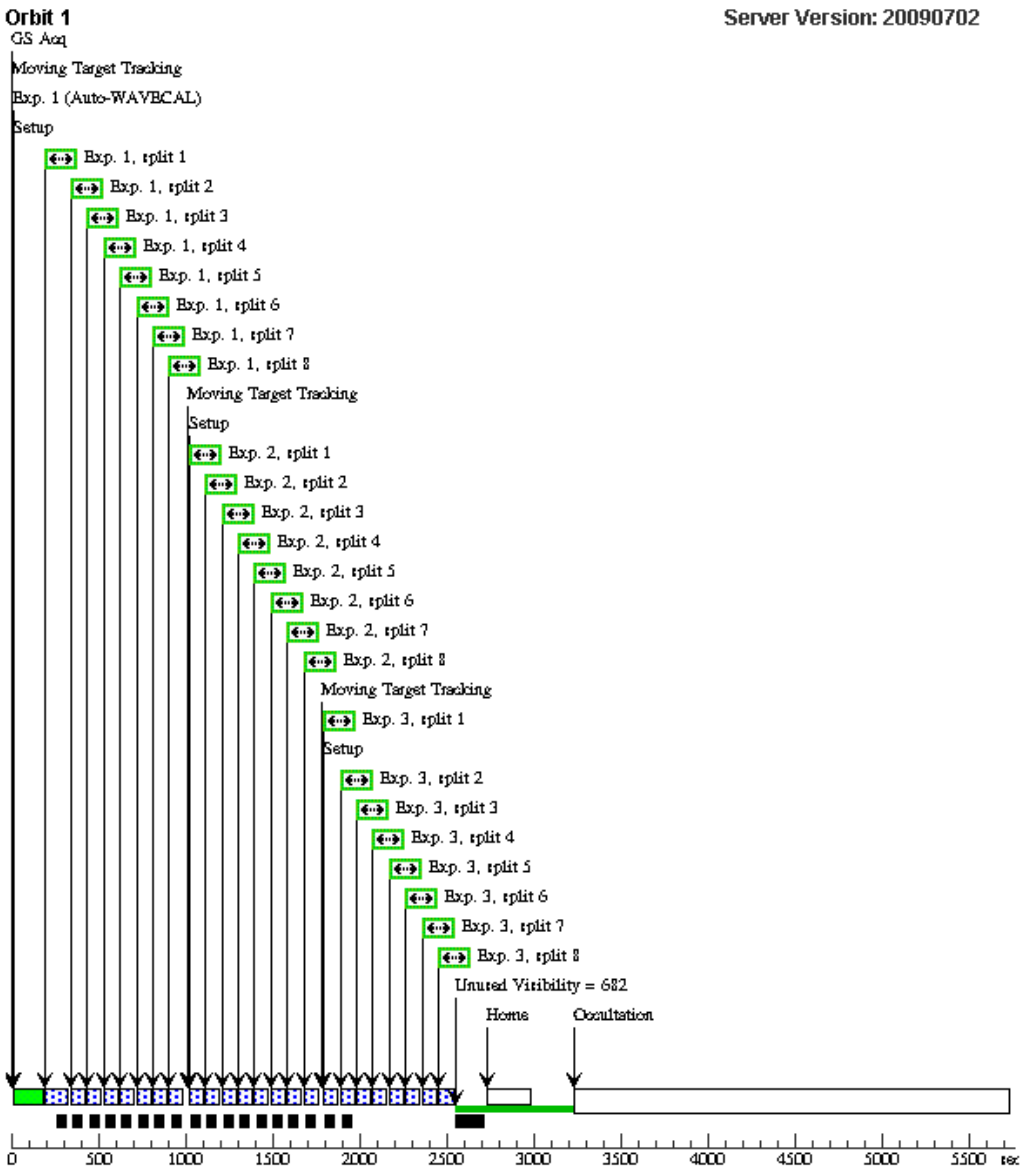
Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1	Pre-Impact Calibration	(1) LUNAR-EXOSPHERE	STIS/CCD, ACCUM, 52X0.5	G230LB 2375 A	CR-SPLIT=8			400.0 Secs	
								[==>(Split 1)]	***[1]***
								[==>(Split 2)]	
								[==>(Split 3)]	
								[==>(Split 4)]	
								[==>(Split 5)]	
								[==>(Split 6)]	
								[==>(Split 7)]	
								[==>(Split 8)]	

Exposures (continued)

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
2	Pre-Impact Calibration	(1) LUNAR-EXOSPHERE	STIS/CCD, ACCUM, 52X0.5	G230LB 2375 A	CR-SPLIT=8	NEW ALIGNMENT		400.0 Secs	
								[==>(Split 1)]	***[1]***
								[==>(Split 2)]	
								[==>(Split 3)]	
								[==>(Split 4)]	
								[==>(Split 5)]	
								[==>(Split 6)]	
								[==>(Split 7)]	
								[==>(Split 8)]	
3	Pre-Impact Calibration	(1) LUNAR-EXOSPHERE	STIS/CCD, ACCUM, 52X0.5	G230LB 2375 A	CR-SPLIT=8	NEW ALIGNMENT		400.0 Secs	
								[==>(Split 1)]	***[1]***
								[==>(Split 2)]	
								[==>(Split 3)]	
								[==>(Split 4)]	
								[==>(Split 5)]	
								[==>(Split 6)]	
								[==>(Split 7)]	
								[==>(Split 8)]	

Orbit Structure



Visit

Proposal 11806, Visit 22, implementation Sat Oct 03 01:06:43 GMT 2009

Diagnostic Status: No Diagnostics

Scientific Instruments: S/C

Special Requirements: NOTRACK; AFTER 21 BY 0 D TO 1 D

Comments: The purpose of this visit is to make sure that there is a 2-star FGS acquisition to ensure that a fresh gyro bias calculation is available before visit 03 begins.

Fixed Targets

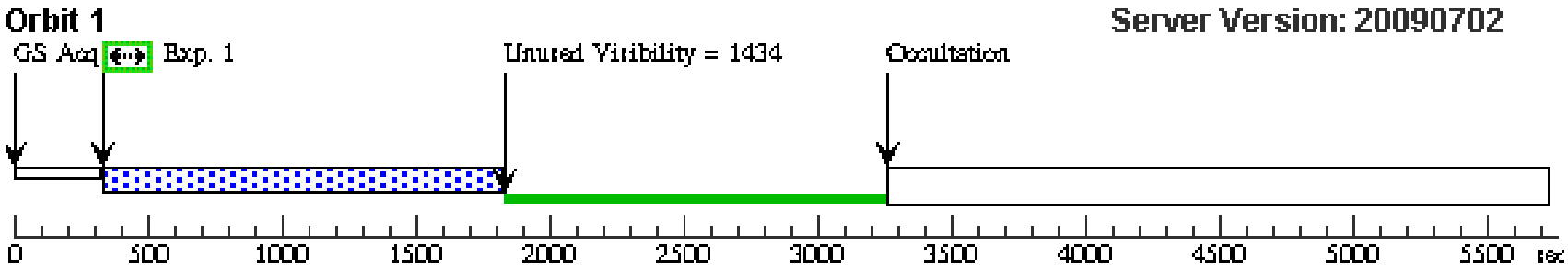
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(3)	MOON-OFFSET	RA: 06 06 58.9947 (91.7458112d) Dec: +25 31 59.98 (25.53333d) Equinox: J2000		V=20	Reference Frame: ICRS

Comments: This target is used for guide star acquisition prior to slewing to the Moon. The coordinates should be leading the Moon's limb by about 10 degrees and must be defined for a specific observing time.

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1		(3) MOON-OFFSET	S/C, POINTING, V1					1500 Secs *[==>]*	*[1]*

Orbit Structure



Visit

Proposal 11806, Visit 23, implementation Sat Oct 03 01:06:43 GMT 2009

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/UVIS

Special Requirements: PCS MODE GYRO; AFTER 22 BY 0 Orbits TO 1.1 Orbits; BETWEEN 09-OCT-2009:11:00:00 AND 09-OCT-2009:12:00:00; ON HOLD

Comments: Impact observation. The three (CR-SPLIT) images should each be one MT track to minimize drift during the sequence.

On Hold Comments: Choose visits 01-04, 11-14, 21-24, 31-34, 41-44, 51-54, or 61-64 depending on which of the candidate targets is selected for LCROSS impact.

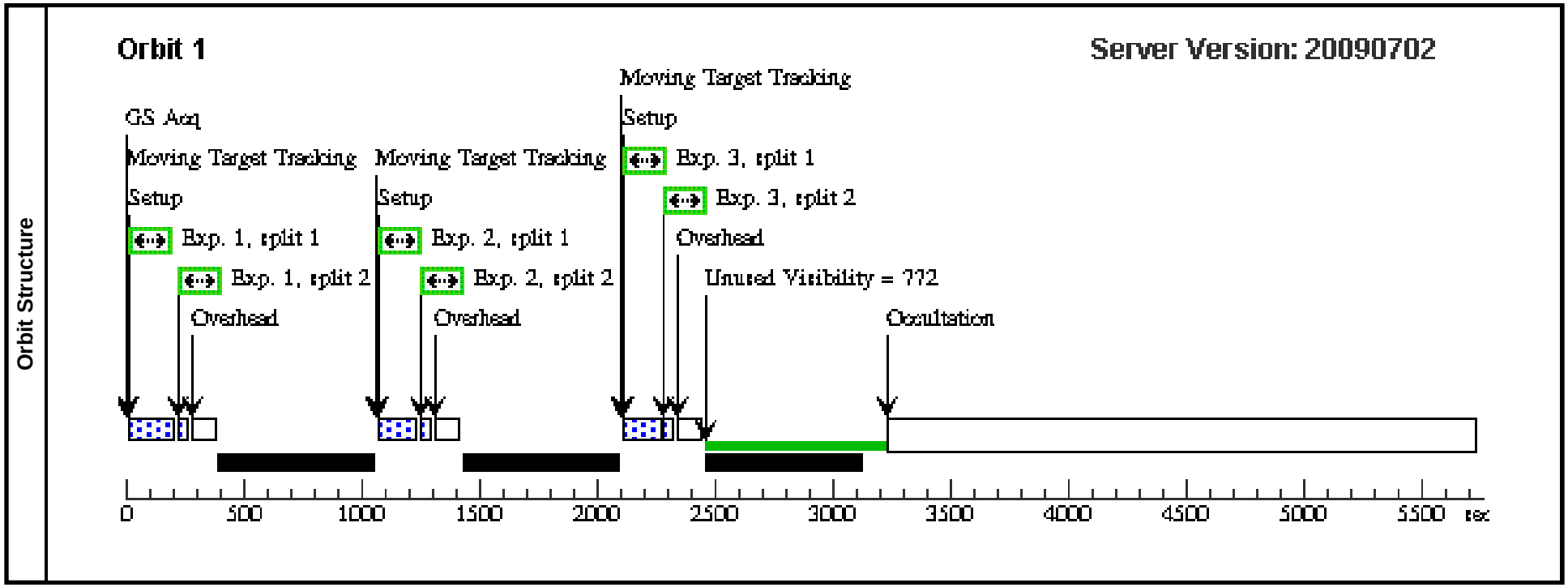
Solar System Targets

#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
(2)	CABEUS-A-OFFSET	STD=EARTH	STD=MOON	TYPE=PCENTRIC,LONG=316.90,LAT=-81.55,RAD=2008.0,R_LONG=0.0,R_LAT=0.0,R_RAD=0.0,EPOCH=01-JAN-2008:01:00:00	A_VEL CABEUS-A-OFFSET FROM HUBBLE MIN 0.3, A_VEL CABEUS-A-OFFSET FROM HUBBLE MAX 0.3	HUBBLE

Comments: The target is offset from the limb by 270 km, which is 135 arcsec at the maximum lunar distance. This will keep the limb of the Moon out of the WFC3 fov even at apogee.

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1	Impact Image	(2) CABEUS-A-OFFSET	WFC3/UVIS, ACCUM, UVIS	F300X	CR-SPLIT=2			90.0 Secs *[==>(Split 1)]* *[==>(Split 2)]*	***[1]***
2	Impact Image	(2) CABEUS-A-OFFSET	WFC3/UVIS, ACCUM, UVIS	F300X	CR-SPLIT=2	NEW ALIGNMENT		90.0 Secs *[==>(Split 1)]* *[==>(Split 2)]*	***[1]***
3	Impact Image	(2) CABEUS-A-OFFSET	WFC3/UVIS, ACCUM, UVIS	F300X	CR-SPLIT=2	NEW ALIGNMENT		90.0 Secs *[==>(Split 1)]* *[==>(Split 2)]*	***[1]***


Orbit Structure
Orbit 1
Server Version: 20090702
GS Acq
Moving Target Tracking
Setup
Exp. 1, split 1
Exp. 1, split 2
Overhead
Moving Target Tracking
Setup
Exp. 2, split 1
Exp. 2, split 2
Overhead
Moving Target Tracking
Setup
Exp. 3, split 1
Exp. 3, split 2
Overhead
Unused Visibility = 772
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 11806, Visit 24, implementation Sat Oct 03 01:06:44 GMT 2009

Diagnostic Status: Warning

Scientific Instruments: STIS/CCD

Special Requirements: PCS MODE GYRO; AFTER 23 BY 0.9 Orbits TO 1.1 Orbits; ON HOLD

On Hold Comments: Choose visits 01-04, 11-14, 21-24, 31-34, 41-44, 51-54, or 61-64 depending on which of the candidate targets is selected for LCROSS impact.

Diagnostics

(Visit 24) Warning (Form): A target acquisition should probably be performed before doing spectroscopy or coronography with STIS or COS.

Solar System Targets

#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
(1)	LUNAR-EXOSPHERE	STD=EARTH	STD=MOON	TYPE=POS_ANGLE,RAD=1000,ANG=85,REF=SUN		HUBBLE

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1	Post-Impact Spectroscopy	(1) LUNAR-EXOSPHERE	STIS/CCD, ACCUM, 52X0.2	G230LB 2375 A	CR-SPLIT=8		Sequence 1-3 Non-Int	440.0 Secs	
								[==>(Split 1)]	***[1]***
								[==>(Split 2)]	
								[==>(Split 3)]	
								[==>(Split 4)]	
								[==>(Split 5)]	
								[==>(Split 6)]	
								[==>(Split 7)]	
								[==>(Split 8)]	

Comments: Start of Orbit #3, the orbit after the LCROSS impact.

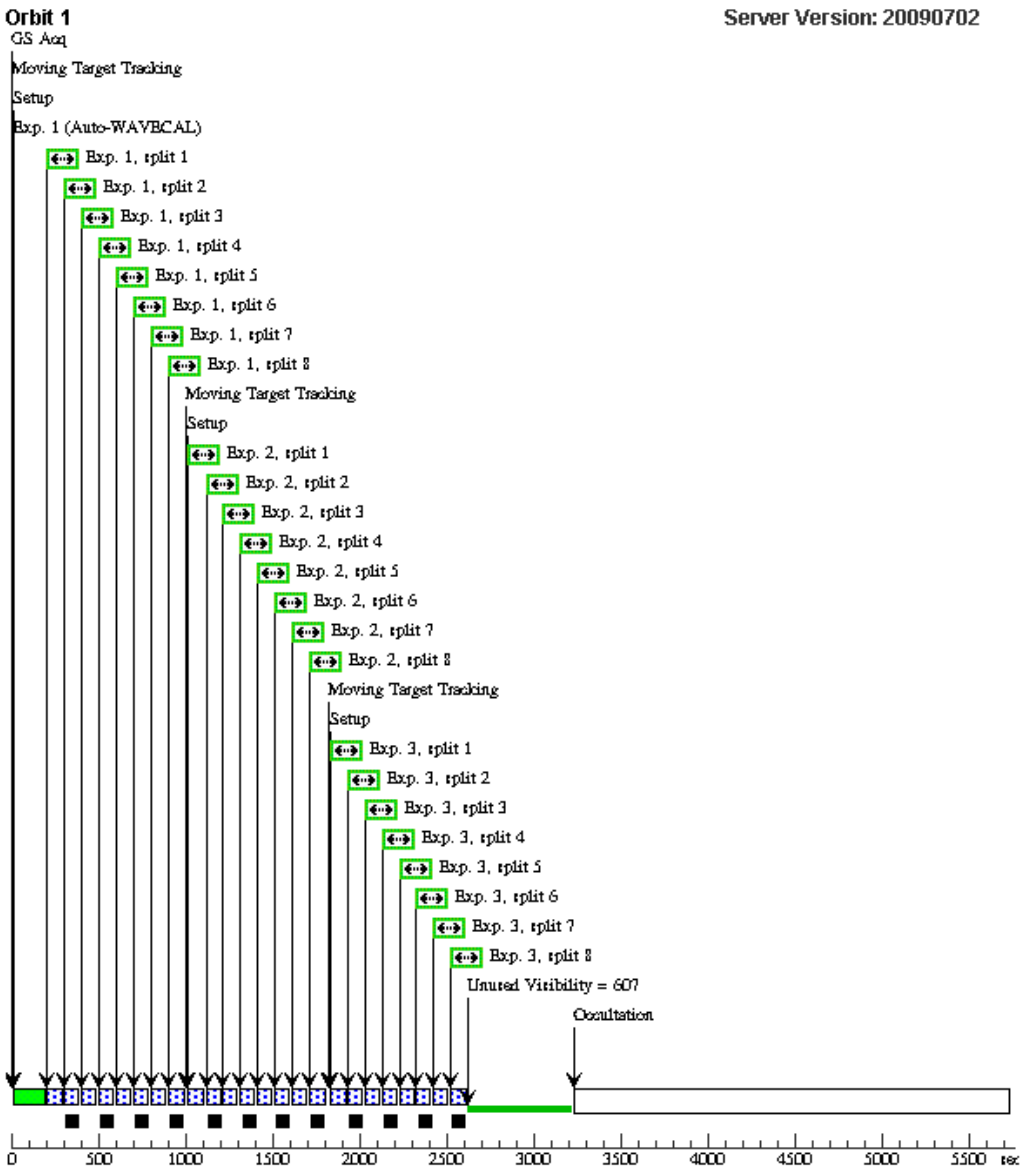
Exposures (continued)

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
2	Post-Impact Spectroscopy	(1) LUNAR-EXOSPHERE	STIS/CCD, ACCUM, 52X0.2	G230LB 2375 A	CR-SPLIT=8	NEW ALIGNMENT	Sequence 1-3 Non-Int	440.0 Secs	
								[==>(Split 1)]	***[1]***
								[==>(Split 2)]	
								[==>(Split 3)]	
								[==>(Split 4)]	
								[==>(Split 5)]	
								[==>(Split 6)]	
								[==>(Split 7)]	
								[==>(Split 8)]	
3	Post-Impact Spectroscopy	(1) LUNAR-EXOSPHERE	STIS/CCD, ACCUM, 52X0.2	G230LB 2375 A	CR-SPLIT=8	NEW ALIGNMENT	Sequence 1-3 Non-Int	440.0 Secs	
								[==>(Split 1)]	***[1]***
								[==>(Split 2)]	
								[==>(Split 3)]	
								[==>(Split 4)]	
								[==>(Split 5)]	
								[==>(Split 6)]	
								[==>(Split 7)]	
								[==>(Split 8)]	
4	Post-Impact Spectroscopy	(1) LUNAR-EXOSPHERE	STIS/CCD, ACCUM, 52X0.2	G230LB 2375 A	CR-SPLIT=8		Sequence 4-6 Non-Int	480.0 Secs	
								[==>(Split 1)]	***[2]***
								[==>(Split 2)]	
								[==>(Split 3)]	
								[==>(Split 4)]	
								[==>(Split 5)]	
								[==>(Split 6)]	
								[==>(Split 7)]	
								[==>(Split 8)]	
Comments: Start of Orbit #4, two orbits after the LCROSS impact.									
5	Post-Impact Spectroscopy	(1) LUNAR-EXOSPHERE	STIS/CCD, ACCUM, 52X0.2	G230LB 2375 A	CR-SPLIT=8	NEW ALIGNMENT	Sequence 4-6 Non-Int	480.0 Secs	
								[==>(Split 1)]	***[2]***
								[==>(Split 2)]	
								[==>(Split 3)]	
								[==>(Split 4)]	
								[==>(Split 5)]	
								[==>(Split 6)]	
								[==>(Split 7)]	
								[==>(Split 8)]	

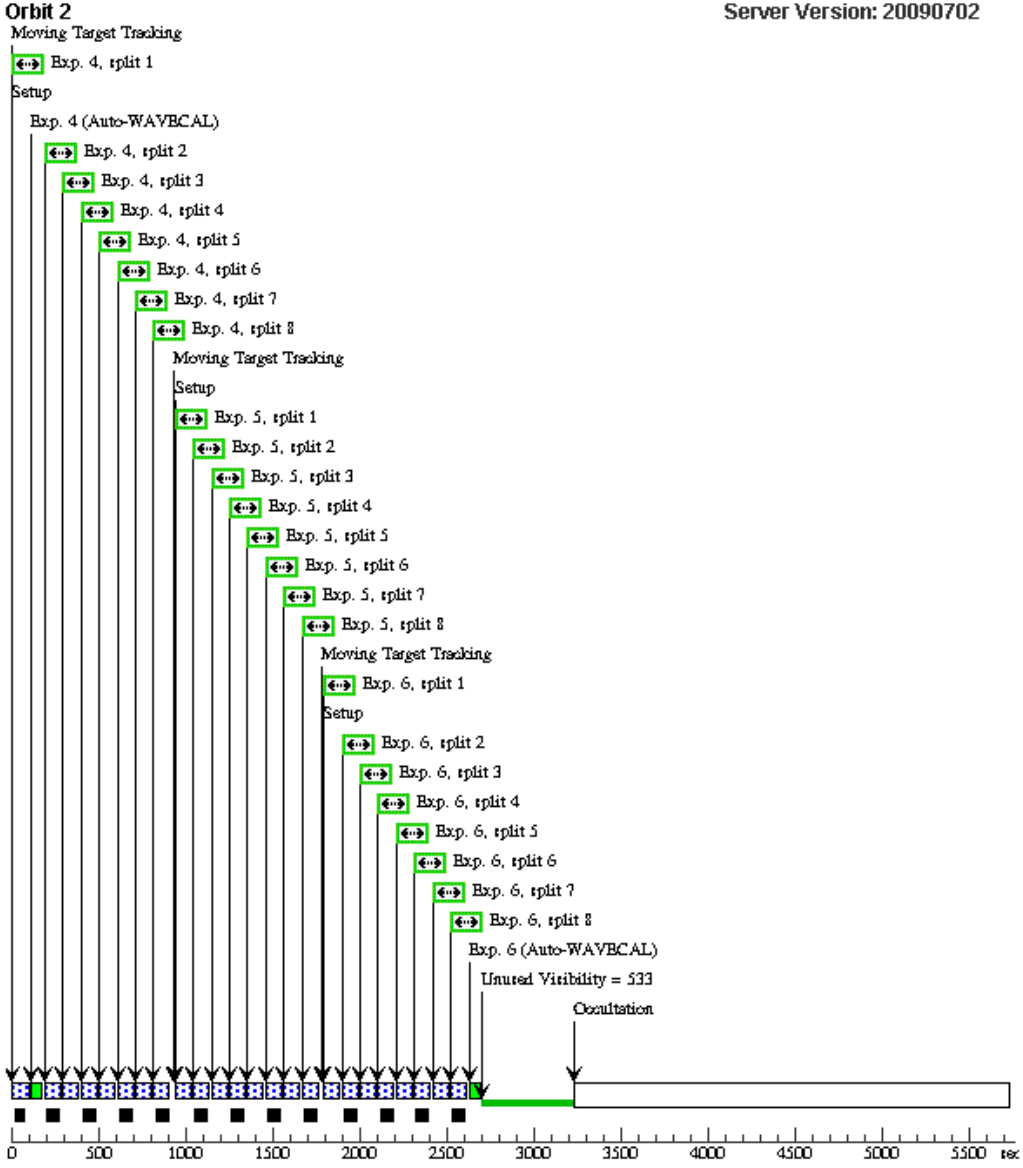
Exposures (continued)

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
6	Post-Impact Spectroscopy	(1) LUNAR-EXOSPHERE	STIS/CCD, ACCUM, 52X0.2	G230LB 2375 A	CR-SPLIT=8	NEW ALIGNMENT	Sequence 4-6 Non-Int	480.0 Secs	
								[==>(Split 1)]	***[2]***
								[==>(Split 2)]	
								[==>(Split 3)]	
								[==>(Split 4)]	
								[==>(Split 5)]	
								[==>(Split 6)]	
								[==>(Split 7)]	
								[==>(Split 8)]	
7	Post-Impact Spectroscopy	(1) LUNAR-EXOSPHERE	STIS/CCD, ACCUM, 52X0.2	G230LB 2375 A	CR-SPLIT=8		Sequence 7-9 Non-Int	480.0 Secs	
								[==>(Split 1)]	***[3]***
								[==>(Split 2)]	
								[==>(Split 3)]	
								[==>(Split 4)]	
								[==>(Split 5)]	
								[==>(Split 6)]	
								[==>(Split 7)]	
								[==>(Split 8)]	
Comments: Start of Orbit #5, three orbits after the LCROSS impact.									
8	Post-Impact Spectroscopy	(1) LUNAR-EXOSPHERE	STIS/CCD, ACCUM, 52X0.2	G230LB 2375 A	CR-SPLIT=8	NEW ALIGNMENT	Sequence 7-9 Non-Int	480.0 Secs	
								[==>(Split 1)]	***[3]***
								[==>(Split 2)]	
								[==>(Split 3)]	
								[==>(Split 4)]	
								[==>(Split 5)]	
								[==>(Split 6)]	
								[==>(Split 7)]	
								[==>(Split 8)]	
9	Post-Impact Spectroscopy	(1) LUNAR-EXOSPHERE	STIS/CCD, ACCUM, 52X0.2	G230LB 2375 A	CR-SPLIT=8	NEW ALIGNMENT	Sequence 7-9 Non-Int	480.0 Secs	
								[==>(Split 1)]	***[3]***
								[==>(Split 2)]	
								[==>(Split 3)]	
								[==>(Split 4)]	
								[==>(Split 5)]	
								[==>(Split 6)]	
								[==>(Split 7)]	
								[==>(Split 8)]	

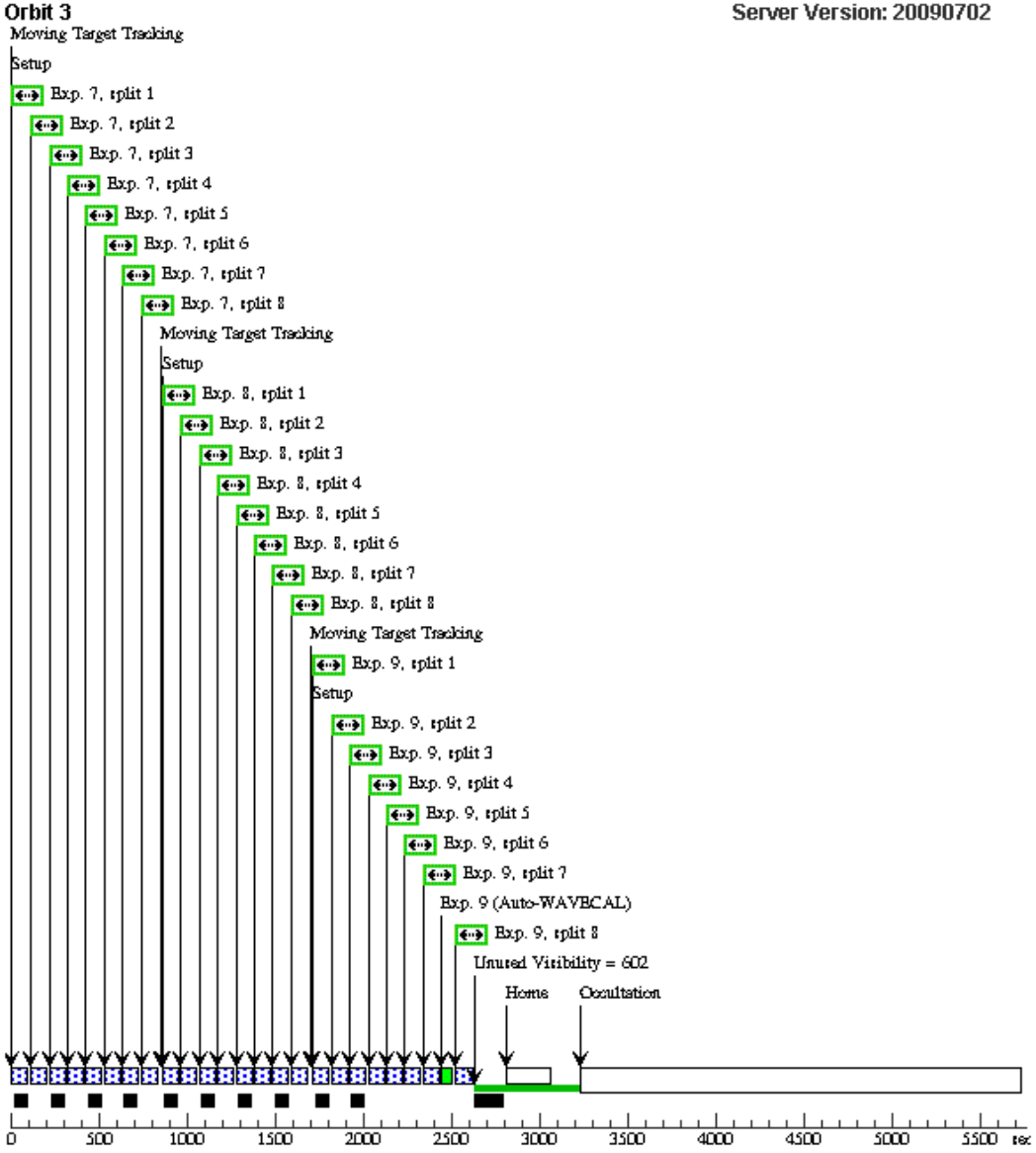
Orbit Structure



Orbit Structure (continued)



Orbit Structure (continued)



Visit

Proposal 11806, Visit 25, implementation Sat Oct 03 01:06:45 GMT 2009

Diagnostic Status: Warning

Scientific Instruments: STIS/CCD

Special Requirements: PCS MODE GYRO; AFTER 23 BY 0.9 D TO 1.1 D; ON HOLD

On Hold Comments: Choose visits 01-04, 11-14, 21-24, 31-34, 41-44, 51-54, or 61-64 depending on which of the candidate targets is selected for LCROSS impact.

Diagnostics

(Visit 25) Warning (Form): A target acquisition should probably be performed before doing spectroscopy or coronography with STIS or COS.

Solar System Targets

#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
(1)	LUNAR-EXOSPHERE	STD=EARTH	STD=MOON	TYPE=POS_ANGLE,RAD=1000,ANG=85,REF=SUN		HUBBLE

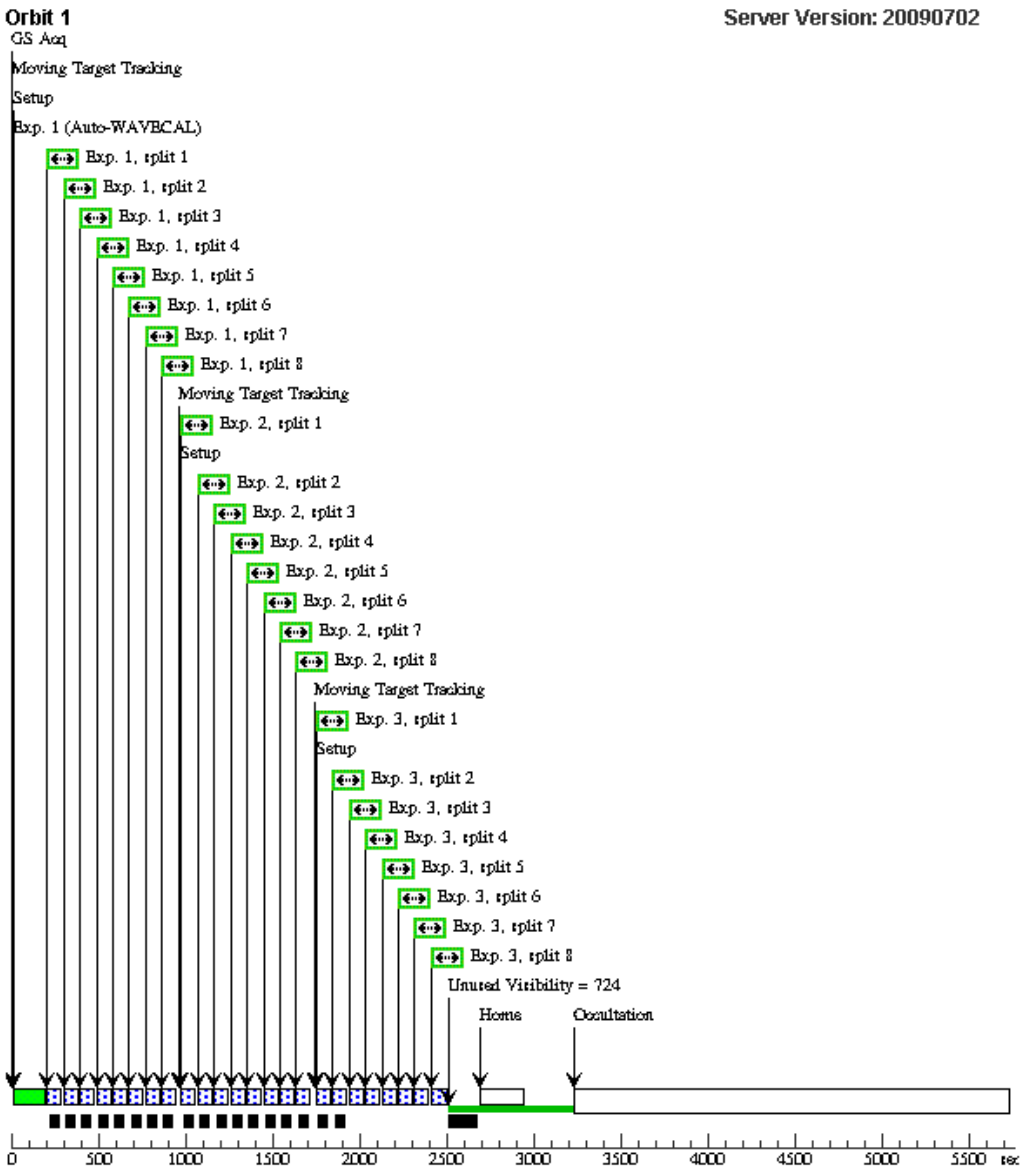
Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1	Impact +1 day	(1) LUNAR-EXOSPHERE	STIS/CCD, ACCUM, 52X0.2	G230LB 2375 A	CR-SPLIT=8		Sequence 1-3 Non-Int	400.0 Secs	
								[==>(Split 1)]	***[1]***
								[==>(Split 2)]	
								[==>(Split 3)]	
								[==>(Split 4)]	
								[==>(Split 5)]	
								[==>(Split 6)]	
								[==>(Split 7)]	
								[==>(Split 8)]	
2	Impact +1 day	(1) LUNAR-EXOSPHERE	STIS/CCD, ACCUM, 52X0.2	G230LB 2375 A	CR-SPLIT=8	NEW ALIGNMENT	Sequence 1-3 Non-Int	400.0 Secs	
								[==>(Split 1)]	***[1]***
								[==>(Split 2)]	
								[==>(Split 3)]	
								[==>(Split 4)]	
								[==>(Split 5)]	
								[==>(Split 6)]	
								[==>(Split 7)]	
								[==>(Split 8)]	

Exposures (continued)

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
3	Impact +1 day	(1) LUNAR-EXOSPHERE	STIS/CCD, ACCUM, 52X0.2	G230LB 2375 A	CR-SPLIT=8	NEW ALIGNMENT	Sequence 1-3 Non-Int	400.0 Secs	
								[==>(Split 1)]	***[1]***
								[==>(Split 2)]	
								[==>(Split 3)]	
								[==>(Split 4)]	
								[==>(Split 5)]	
								[==>(Split 6)]	
								[==>(Split 7)]	
								[==>(Split 8)]	

Orbit Structure



Visit

Proposal 11806, Visit 31, implementation Sat Oct 03 01:06:45 GMT 2009

Diagnostic Status: Warning

Scientific Instruments: STIS/CCD

Special Requirements: PCS MODE GYRO; ON HOLD

Comments: Visits 31-35 move the STIS target farther from the Moon.

Pre-impact calibration observation: should take place a day before the impact, to minimize the impact of the variability of the Lunar atmosphere.
Over 10m of unused visibility time is left to enhance schedulability due to time-critical nature of these observations.
Visit 31 should precede visit 32 by a day or less.

On Hold Comments: Choose visits 01-04, 11-14, 21-24, 31-34, 41-44, 51-54, or 61-64 depending on which of the candidate targets is selected for LCROSS impact.

Diagnostics

(Visit 31) Warning (Form): A target acquisition should probably be performed before doing spectroscopy or coronography with STIS or COS.

Solar System Targets

#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
(7)	LUNAR-EXOSPHERE-3	STD=EARTH	STD=MOON	TYPE=POS_ANGLE,RAD=1025,ANG=85,REF=SUN		HUBBLE

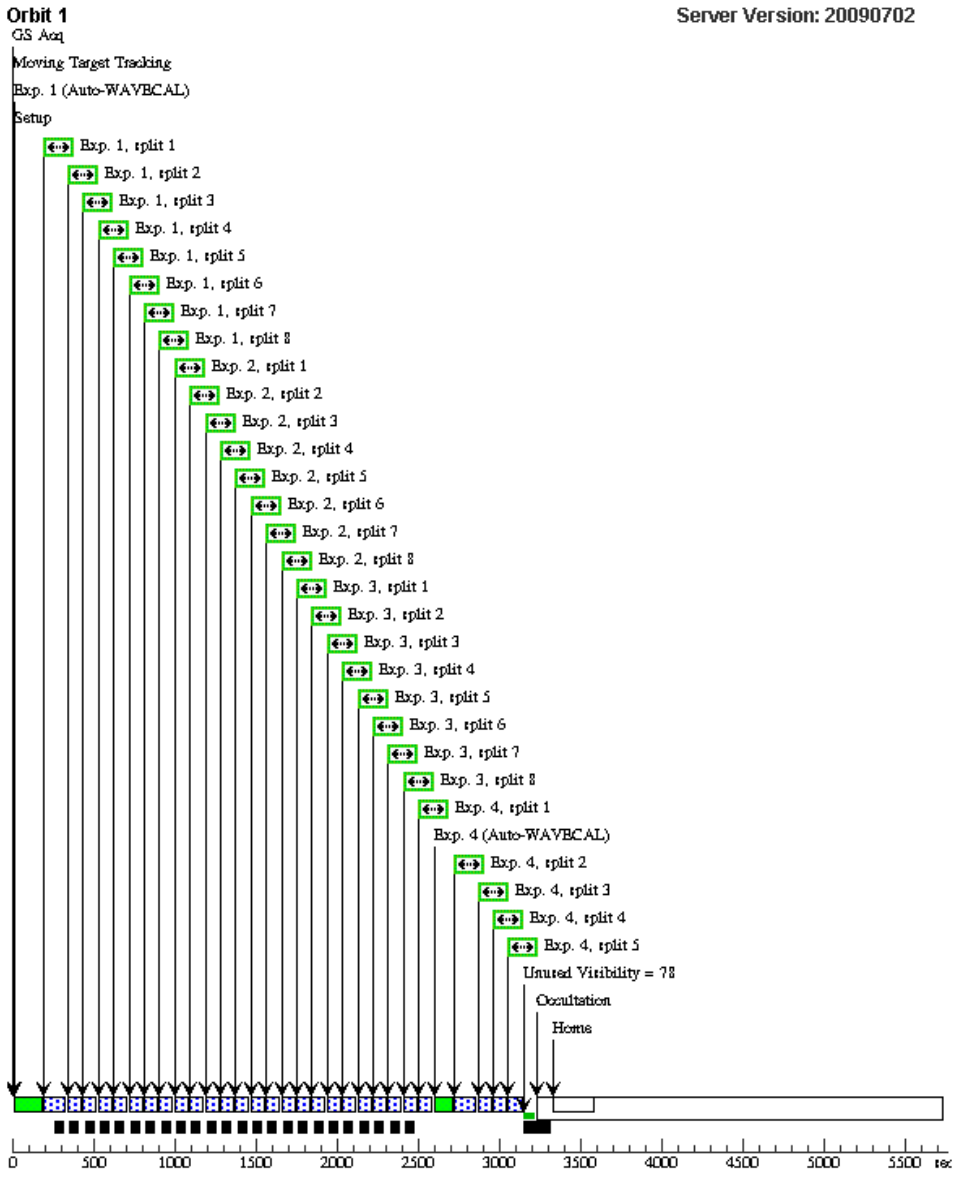
Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1	Pre-Impact Calibration	(7) LUNAR-EXOSPHERE-3	STIS/CCD, ACCUM, 52X0.5	G230LB 2375 A	CR-SPLIT=8			400.0 Secs	
								[==>(Split 1)]	***[1]***
								[==>(Split 2)]	
								[==>(Split 3)]	
								[==>(Split 4)]	
								[==>(Split 5)]	
								[==>(Split 6)]	
								[==>(Split 7)]	
								[==>(Split 8)]	

Exposures (continued)

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
2	Pre-Impact Calibration	(7) LUNAR-EXOSPHERE-3	STIS/CCD, ACCUM, 52X0.5	G230LB 2375 A	CR-SPLIT=8			400.0 Secs	
								[==>(Split 1)]	***[1]***
								[==>(Split 2)]	
								[==>(Split 3)]	
								[==>(Split 4)]	
								[==>(Split 5)]	
								[==>(Split 6)]	
								[==>(Split 7)]	
								[==>(Split 8)]	
3	Pre-Impact Calibration	(7) LUNAR-EXOSPHERE-3	STIS/CCD, ACCUM, 52X0.5	G230LB 2375 A	CR-SPLIT=8			400.0 Secs	
								[==>(Split 1)]	***[1]***
								[==>(Split 2)]	
								[==>(Split 3)]	
								[==>(Split 4)]	
								[==>(Split 5)]	
								[==>(Split 6)]	
								[==>(Split 7)]	
								[==>(Split 8)]	
4	Pre-Impact Calibration	(7) LUNAR-EXOSPHERE-3	STIS/CCD, ACCUM, 52X0.5	G230LB 2375 A	CR-SPLIT=5			250.0 Secs	
								[==>(Split 1)]	***[1]***
								[==>(Split 2)]	
								[==>(Split 3)]	
								[==>(Split 4)]	
								[==>(Split 5)]	

Orbit Structure



Visit

Proposal 11806, Visit 32, implementation Sat Oct 03 01:06:46 GMT 2009

Diagnostic Status: No Diagnostics

Scientific Instruments: S/C

Special Requirements: NOTRACK; AFTER 31 BY 0 D TO 1 D

Comments: The purpose of this visit is to make sure that there is a 2-star FGS acquisition to ensure that a fresh gyro bias calculation is available before visit 03 begins.

Fixed Targets

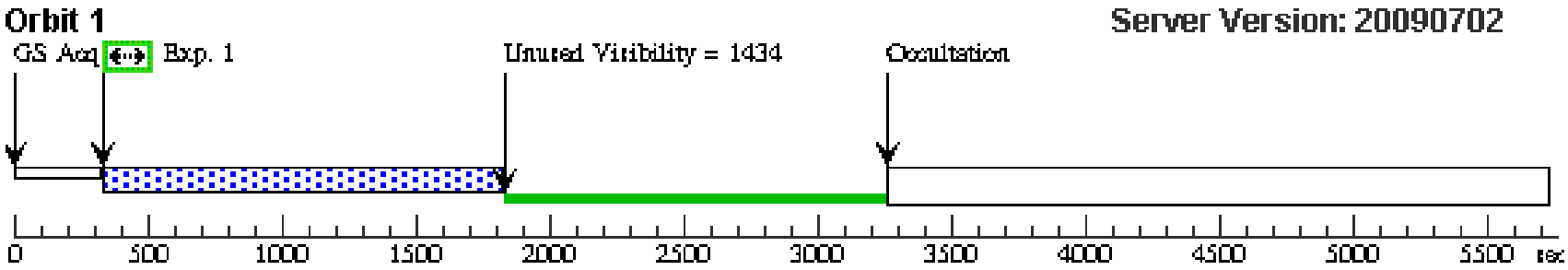
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(3)	MOON-OFFSET	RA: 06 06 58.9947 (91.7458112d) Dec: +25 31 59.98 (25.53333d) Equinox: J2000		V=20	Reference Frame: ICRS

Comments: This target is used for guide star acquisition prior to slewing to the Moon. The coordinates should be leading the Moon's limb by about 10 degrees and must be defined for a specific observing time.

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1		(3) MOON-OFFSET	S/C, POINTING, V1					1500 Secs *[==>]*	*[1]*

Orbit Structure



Visit

Proposal 11806, Visit 33, implementation Sat Oct 03 01:06:46 GMT 2009

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/UVIS

Special Requirements: PCS MODE GYRO; AFTER 32 BY 0 Orbits TO 1.1 Orbits; BETWEEN 09-OCT-2009:11:00:00 AND 09-OCT-2009:12:00:00; ON HOLD

Comments: Impact observation. The three (CR-SPLIT) images should each be one MT track to minimize drift during the sequence.

On Hold Comments: Choose visits 01-04, 11-14, 21-24, 31-34, 41-44, 51-54, or 61-64 depending on which of the candidate targets is selected for LCROSS impact.

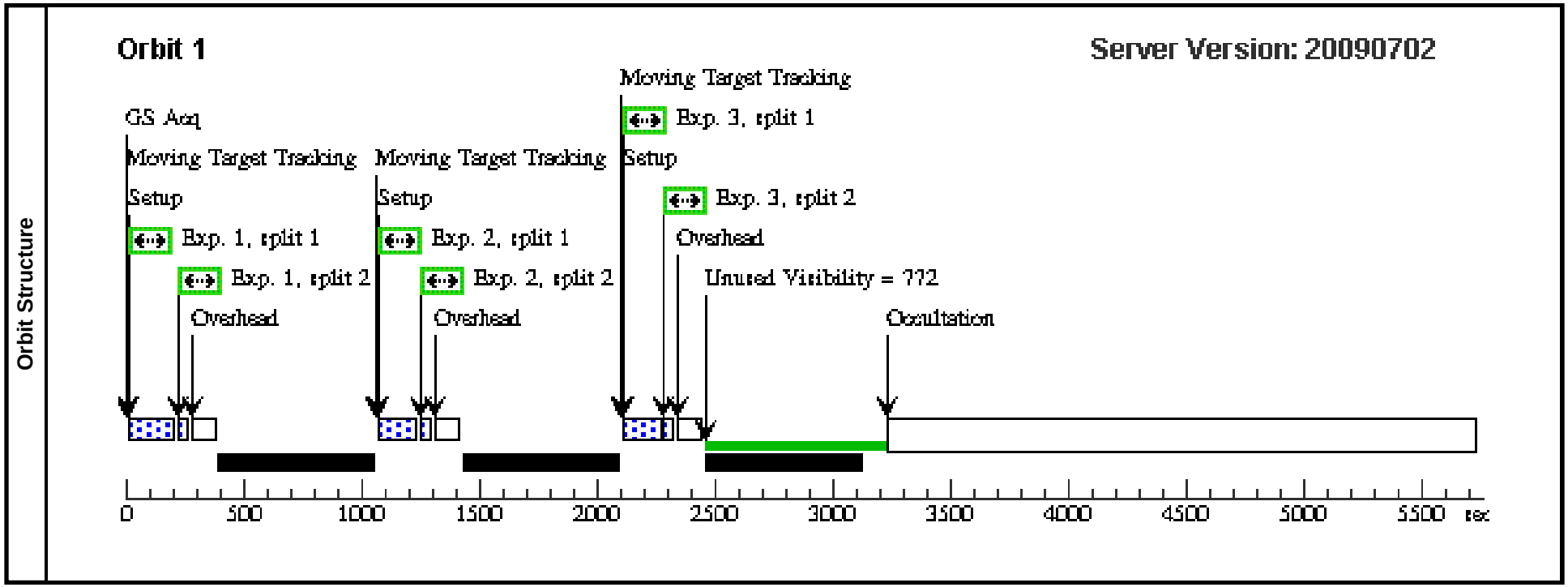
Solar System Targets

#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
(6)	CABEUS-OFFSET	STD=EARTH	STD=MOON	TYPE=PCENTRIC,LONG=310.95,LAT=-84.7,RAD=2008.0,R_LONG=0.0,R_LAT=0.0,R_RAD=0.0,EPOCH=01-JAN-2008:01:00:00	A_VEL CABEUS-OFFSET FROM HUBBLE MIN 0.3, A_VEL CABEUS-OFFSET FROM HUBBLE MAX 0.3	HUBBLE

Comments: The target is offset from the limb by 270 km, which is 135 arcsec at the maximum lunar distance. This will keep the limb of the Moon out of the WFC3 fov even at apogee.

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1	Impact Image	(6) CABEUS-OFFSET	WFC3/UVIS, ACCUM, UVIS	F300X	CR-SPLIT=2			90.0 Secs *[==>(Split 1)]* *[==>(Split 2)]*	***[1]***
2	Impact Image	(6) CABEUS-OFFSET	WFC3/UVIS, ACCUM, UVIS	F300X	CR-SPLIT=2	NEW ALIGNMENT		90.0 Secs *[==>(Split 1)]* *[==>(Split 2)]*	***[1]***
3	Impact Image	(6) CABEUS-OFFSET	WFC3/UVIS, ACCUM, UVIS	F300X	CR-SPLIT=2	NEW ALIGNMENT		90.0 Secs *[==>(Split 1)]* *[==>(Split 2)]*	***[1]***


Orbit Structure
Orbit 1
Server Version: 20090702
GS Acq
Moving Target Tracking
Setup
Exp. 1, split 1
Exp. 1, split 2
Overhead
Moving Target Tracking
Setup
Exp. 2, split 1
Exp. 2, split 2
Overhead
Moving Target Tracking
Setup
Exp. 3, split 1
Exp. 3, split 2
Overhead
Unused Visibility = 772
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 11806, Visit 34, implementation Sat Oct 03 01:06:46 GMT 2009

Diagnostic Status: Warning

Scientific Instruments: STIS/CCD

Special Requirements: PCS MODE GYRO; AFTER 33 BY 0.9 Orbits TO 1.1 Orbits; ON HOLD

On Hold Comments: Choose visits 01-04, 11-14, 21-24, 31-34, 41-44, 51-54, or 61-64 depending on which of the candidate targets is selected for LCROSS impact.

Diagnostics

(Visit 34) Warning (Form): A target acquisition should probably be performed before doing spectroscopy or coronography with STIS or COS.

Solar System Targets

#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
(7)	LUNAR-EXOSPHERE-3	STD=EARTH	STD=MOON	TYPE=POS_ANGLE,RAD=1025,ANG=85,REF=SUN		HUBBLE

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1	Post-Impact Spectroscopy	(7) LUNAR-EXOSPHERE-3	STIS/CCD, ACCUM, 52X0.2	G230LB 2375 A	CR-SPLIT=8		Sequence 1-3 Non-Int	600.0 Secs	
								[==>(Split 1)]	***[1]***
								[==>(Split 2)]	
								[==>(Split 3)]	
								[==>(Split 4)]	
								[==>(Split 5)]	
								[==>(Split 6)]	
								[==>(Split 7)]	
								[==>(Split 8)]	

Comments: Start of Orbit #3, the orbit after the LCROSS impact.

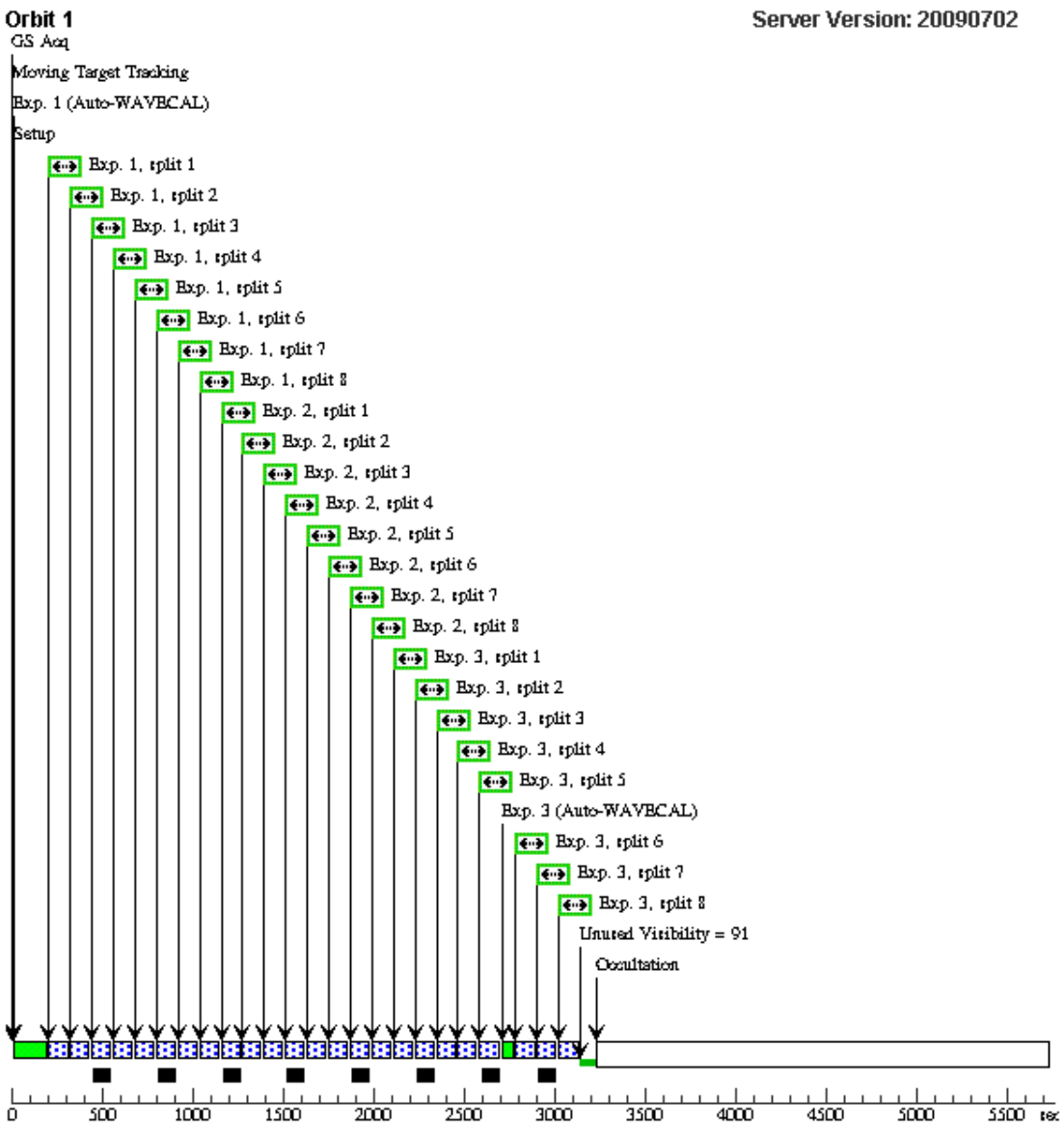
Exposures (continued)

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
2	Post-Impact Spectroscopy	(7) LUNAR-EXOSPHERE-3	STIS/CCD, ACCUM, 52X0.2	G230LB 2375 A	CR-SPLIT=8		Sequence 1-3 Non-Int	600.0 Secs	
								[==>(Split 1)]	***[1]***
								[==>(Split 2)]	
								[==>(Split 3)]	
								[==>(Split 4)]	
								[==>(Split 5)]	
								[==>(Split 6)]	
								[==>(Split 7)]	
								[==>(Split 8)]	
3	Post-Impact Spectroscopy	(7) LUNAR-EXOSPHERE-3	STIS/CCD, ACCUM, 52X0.2	G230LB 2375 A	CR-SPLIT=8		Sequence 1-3 Non-Int	600.0 Secs	
								[==>(Split 1)]	***[1]***
								[==>(Split 2)]	
								[==>(Split 3)]	
								[==>(Split 4)]	
								[==>(Split 5)]	
								[==>(Split 6)]	
								[==>(Split 7)]	
								[==>(Split 8)]	
4	Post-Impact Spectroscopy	(7) LUNAR-EXOSPHERE-3	STIS/CCD, ACCUM, 52X0.2	G230LB 2375 A	CR-SPLIT=8		Sequence 4-6 Non-Int	680.0 Secs	
								[==>(Split 1)]	***[2]***
								[==>(Split 2)]	
								[==>(Split 3)]	
								[==>(Split 4)]	
								[==>(Split 5)]	
								[==>(Split 6)]	
								[==>(Split 7)]	
								[==>(Split 8)]	
Comments: Start of Orbit #4, two orbits after the LCROSS impact.									
5	Post-Impact Spectroscopy	(7) LUNAR-EXOSPHERE-3	STIS/CCD, ACCUM, 52X0.2	G230LB 2375 A	CR-SPLIT=8		Sequence 4-6 Non-Int	680.0 Secs	
								[==>(Split 1)]	***[2]***
								[==>(Split 2)]	
								[==>(Split 3)]	
								[==>(Split 4)]	
								[==>(Split 5)]	
								[==>(Split 6)]	
								[==>(Split 7)]	
								[==>(Split 8)]	

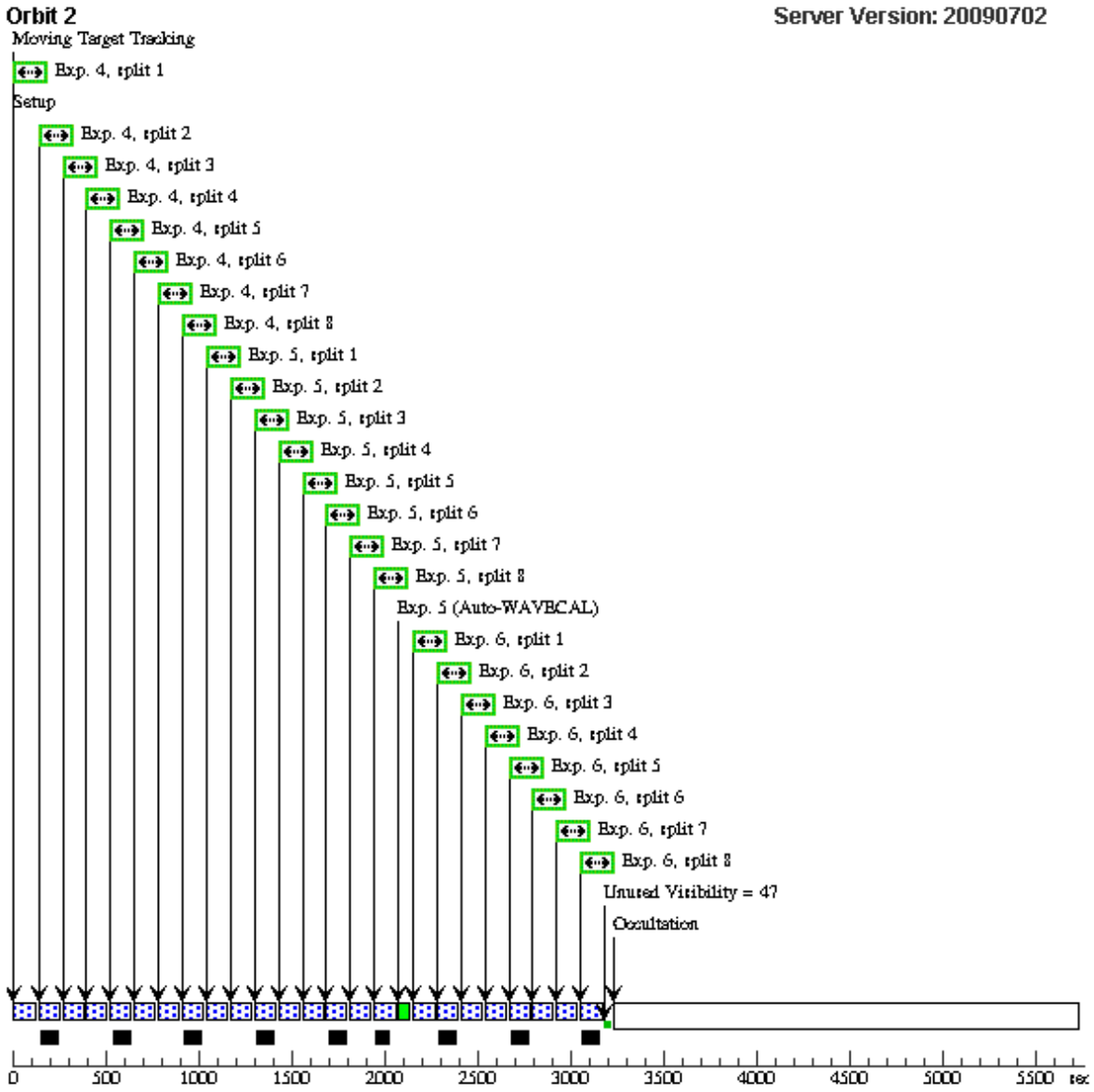
Exposures (continued)

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
6	Post-Impact Spectroscopy	(7) LUNAR-EXOSPHERE-3	STIS/CCD, ACCUM, 52X0.2	G230LB 2375 A	CR-SPLIT=8		Sequence 4-6 Non-Int	680.0 Secs	
								[==>(Split 1)] *[==>(Split 2)]* *[==>(Split 3)]* *[==>(Split 4)]* *[==>(Split 5)]* *[==>(Split 6)]* *[==>(Split 7)]* *[==>(Split 8)]*	***[2]***
7	Post-Impact Spectroscopy	(7) LUNAR-EXOSPHERE-3	STIS/CCD, ACCUM, 52X0.2	G230LB 2375 A	CR-SPLIT=8		Sequence 7-9 Non-Int	680.0 Secs	
								[==>(Split 1)] *[==>(Split 2)]* *[==>(Split 3)]* *[==>(Split 4)]* *[==>(Split 5)]* *[==>(Split 6)]* *[==>(Split 7)]* *[==>(Split 8)]*	***[3]***
Comments: Start of Orbit #5, three orbits after the LCROSS impact.									
8	Post-Impact Spectroscopy	(7) LUNAR-EXOSPHERE-3	STIS/CCD, ACCUM, 52X0.2	G230LB 2375 A	CR-SPLIT=8		Sequence 7-9 Non-Int	680.0 Secs	
								[==>(Split 1)] *[==>(Split 2)]* *[==>(Split 3)]* *[==>(Split 4)]* *[==>(Split 5)]* *[==>(Split 6)]* *[==>(Split 7)]* *[==>(Split 8)]*	***[3]***
9	Post-Impact Spectroscopy	(7) LUNAR-EXOSPHERE-3	STIS/CCD, ACCUM, 52X0.2	G230LB 2375 A	CR-SPLIT=8		Sequence 7-9 Non-Int	680.0 Secs	
								[==>(Split 1)] *[==>(Split 2)]* *[==>(Split 3)]* *[==>(Split 4)]* *[==>(Split 5)]* *[==>(Split 6)]* *[==>(Split 7)]* *[==>(Split 8)]*	***[3]***

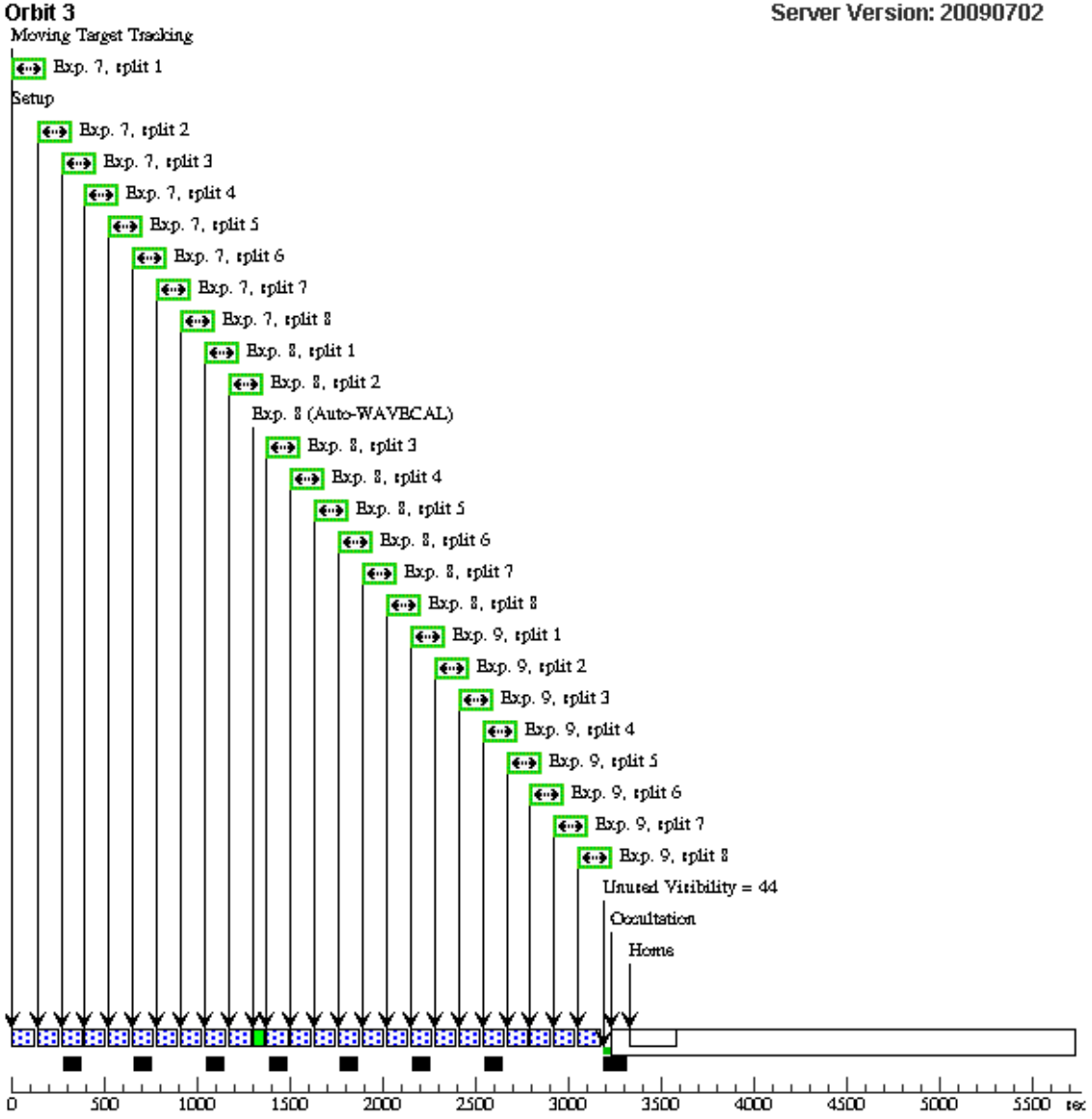
Orbit Structure



Orbit Structure (continued)



Orbit Structure (continued)



Visit

Proposal 11806, Visit 35, implementation Sat Oct 03 01:06:48 GMT 2009

Diagnostic Status: Warning

Scientific Instruments: STIS/CCD

Special Requirements: PCS MODE GYRO; AFTER 33 BY 0.9 D TO 1.1 D; ON HOLD

On Hold Comments: Choose visits 01-04, 11-14, 21-24, 31-34, 41-44, 51-54, or 61-64 depending on which of the candidate targets is selected for LCROSS impact.

Diagnostics

(Visit 35) Warning (Form): A target acquisition should probably be performed before doing spectroscopy or coronography with STIS or COS.

Solar System Targets

#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
(7)	LUNAR-EXOSPHERE-3	STD=EARTH	STD=MOON	TYPE=POS_ANGLE,RAD=1025,ANG=85,REF=SUN		HUBBLE

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1	Impact +1 day	(7) LUNAR-EXOSPHERE-3	STIS/CCD, ACCUM, 52X0.2	G230LB 2375 A	CR-SPLIT=8		Sequence 1-4 Non-Int	400.0 Secs	
								[==>(Split 1)]	***[1]***
								[==>(Split 2)]	
								[==>(Split 3)]	
								[==>(Split 4)]	
								[==>(Split 5)]	
								[==>(Split 6)]	
								[==>(Split 7)]	
								[==>(Split 8)]	
2	Impact +1 day	(7) LUNAR-EXOSPHERE-3	STIS/CCD, ACCUM, 52X0.2	G230LB 2375 A	CR-SPLIT=8		Sequence 1-4 Non-Int	400.0 Secs	
								[==>(Split 1)]	***[1]***
								[==>(Split 2)]	
								[==>(Split 3)]	
								[==>(Split 4)]	
								[==>(Split 5)]	
								[==>(Split 6)]	
								[==>(Split 7)]	
								[==>(Split 8)]	

Exposures (continued)

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
3	Impact +1 day	(7) LUNAR-EXOSPHERE-3	STIS/CCD, ACCUM, 52X0.2	G230LB 2375 A	CR-SPLIT=8		Sequence 1-4 Non-Int	400.0 Secs	
								[==>(Split 1)]	***[1]***
								[==>(Split 2)]	
								[==>(Split 3)]	
								[==>(Split 4)]	
								[==>(Split 5)]	
								[==>(Split 6)]	
								[==>(Split 7)]	
								[==>(Split 8)]	
4	Impact +1 day	(7) LUNAR-EXOSPHERE-3	STIS/CCD, ACCUM, 52X0.2	G230LB 2375 A	CR-SPLIT=6		Sequence 1-4 Non-Int	300.0 Secs	
								[==>(Split 1)]	***[1]***
								[==>(Split 2)]	
								[==>(Split 3)]	
								[==>(Split 4)]	
								[==>(Split 5)]	
								[==>(Split 6)]	

Orbit Structure