11109 - Characterization of the UV absorption feature in asteroid (1) Ceres

Cycle: 16, Proposal Category: GO

(Availability Mode: SUPPORTED)

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) CERES	ACS/SBC	3	21-May-2007 19:21:09.0	yes

3 Total Orbits Used

ABSTRACT

We propose to obtain the UV spectrum of asteroid (1) Ceres from 120 nm to 200 nm with ACS/SBC objective prism to characterize the broad and deep absorption feature within this wavelength range as reported by ACS observations of Ceres in 2003/04 (Li et al. 2006). Our scientific goals include, 1) to characterize the absorption band, 2) to determine the origin of this spectral feature and constrain the surface composition of Ceres, and

3) to understand the albedo and color features on Ceres. HST is the only observatory currently capable of obtaining spectroscopy in this wavelength range. This observation will help improve our knowledge about this largest and oldest asteroid, and support the planning of the upcoming NASA Discovery Program mission, Dawn, orbiting asteroids Vesta and Ceres.

OBSERVING DESCRIPTION

We plan to obtain the UV spectrum of Ceres from 120 nm to 200 nm during its opposition and close approach to Earth in November 2007 through ACS/SBC objective prism PR130L. This spectrum will fill in the gap in wavelength coverage in the UV spectra of Ceres that have been measured to date, and help us confirm the absorption feature that has been recently identified, and to characterize it. We will dedicate all three orbits to building up the signal-to-noise ratio for the UV spectrum. Due to the slitless nature of ACS/SBC spectrum, and the relatively large size of Ceres (0.7"), the spectrum will be processed with deconvolution techniques to restore the spectral resolution. The results will help us understand the physical nature of this deep and broad absorption feature, identify the surface compositin of Ceres, and interpret its albedo and color features reported recently from the HST/ACS images of Ceres. The program will provide important knowledge of the surface of Ceres before the Dawn spacecraft arrives this dwarf planet.

Visit

Proposal 11109, Visit 01 Mon May 21 23:21:13 GMT 2007

Diagnostic Status: No Diagnostics

Scientific Instruments: ACS/SBC

Special Requirements: BETWEEN 25-OCT-2007:00:00:00 AND 27-NOV-2007:23:59:59

Comments: The time requirement for this observation has two purposes: 1) to ensure high S/N; 2) to ensure large angular size for Ceres' disk for the purpose of spectral resolution restoration. The observation should be scheduled as close to the opposition of Ceres as possible, which occurs around Nov 13. 10% surface brightness drop allowance will relax the time requirement to between Nov 1 and Nov 20, and 20% allowance will relax it to between Oct 25 and Nov 27. The angular size window will be between Oct 17 and Dec 8 for less than 5% decrease from the maximum. Thus the best time of observation to ensure the quality of spectrum is between Oct 25 and Nov 27. According to Visit Planner, there are two periods of schedulable time. Perferably, the observation is scheduled close to the beginning of the second period, or close to the end of the first period if the first option is not available.

Solar System Targets

#	Name	Level 1	Level 2	Level 3	Window
(1)	CERES	TYPE=ASTEROID,A=2.76595642396794, E=0.07976017327383,I=10.586711607995 4,O=80.4069591479241,W=73.150734113 26651,M=215.800962246862,EQUINOX=J 2000,EPOCH=10-APR-2007:00:00:00			

Exposures

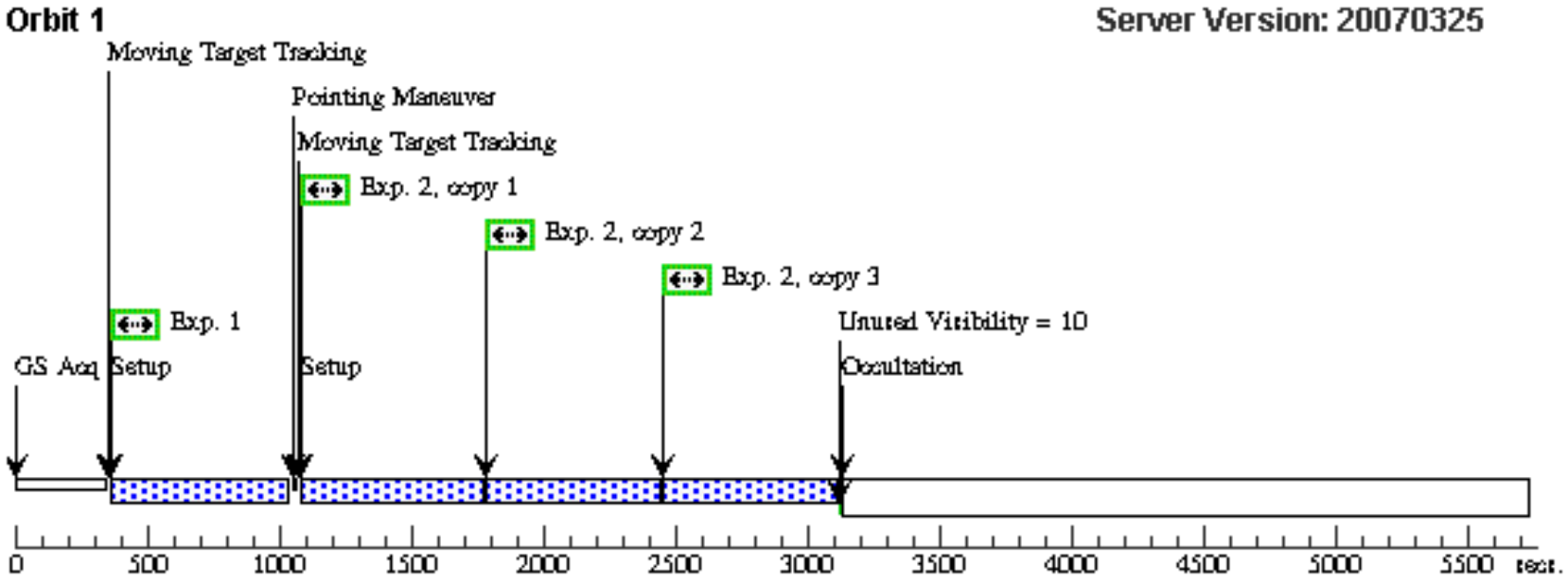
#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1		(1) CERES	ACS/SBC, ACCUM, SBC	F125LP				600.0 Secs	
								[==>]	***[1]***
Comments: We modified the filter for the image mode from F150LP as proposed in Phase I to F125LP, in order to obtain higher S/N for the image.									
2		(1) CERES	ACS/SBC, ACCUM, SBC	PR130L				630.0 Secs X 3	
								[==>(Copy 1)] *[==>(Copy 2)]* *[==>(Copy 3)]*	***[1]***
Comments: As estimated from ACS ETC, the exposure will not saturate detector at any covered wavelength for any exposure time within an orbit. Therefore the exposure time for this exposure should be adjusted to th e maximum allowed time within the usable time of an orbit once the visit is scheduled.									
3		(1) CERES	ACS/SBC, ACCUM, SBC	F125LP				600.0 Secs	
								[==>]	***[2]***
Comments: We modified the filter for the image mode from F150LP as proposed in Phase I to F125LP, in order to obtain higher S/N for the image.									
4		(1) CERES	ACS/SBC, ACCUM, SBC	PR130L				625.0 Secs X 3	
								[==>(Copy 1)] *[==>(Copy 2)]* *[==>(Copy 3)]*	***[2]***
Comments: As estimated from ACS ETC, the exposure will not saturate detector at any covered wavelength for any exposure time within an orbit. Therefore the exposure time for this exposure should be adjusted to th e maximum allowed time within the usable time of an orbit once the visit is scheduled.									
5		(1) CERES	ACS/SBC, ACCUM, SBC	F125LP				600.0 Secs	
								[==>]	***[3]***
Comments: We modified the filter for the image mode from F150LP as proposed in Phase I to F125LP, in order to obtain higher S/N for the image.									

Exposures (continued)

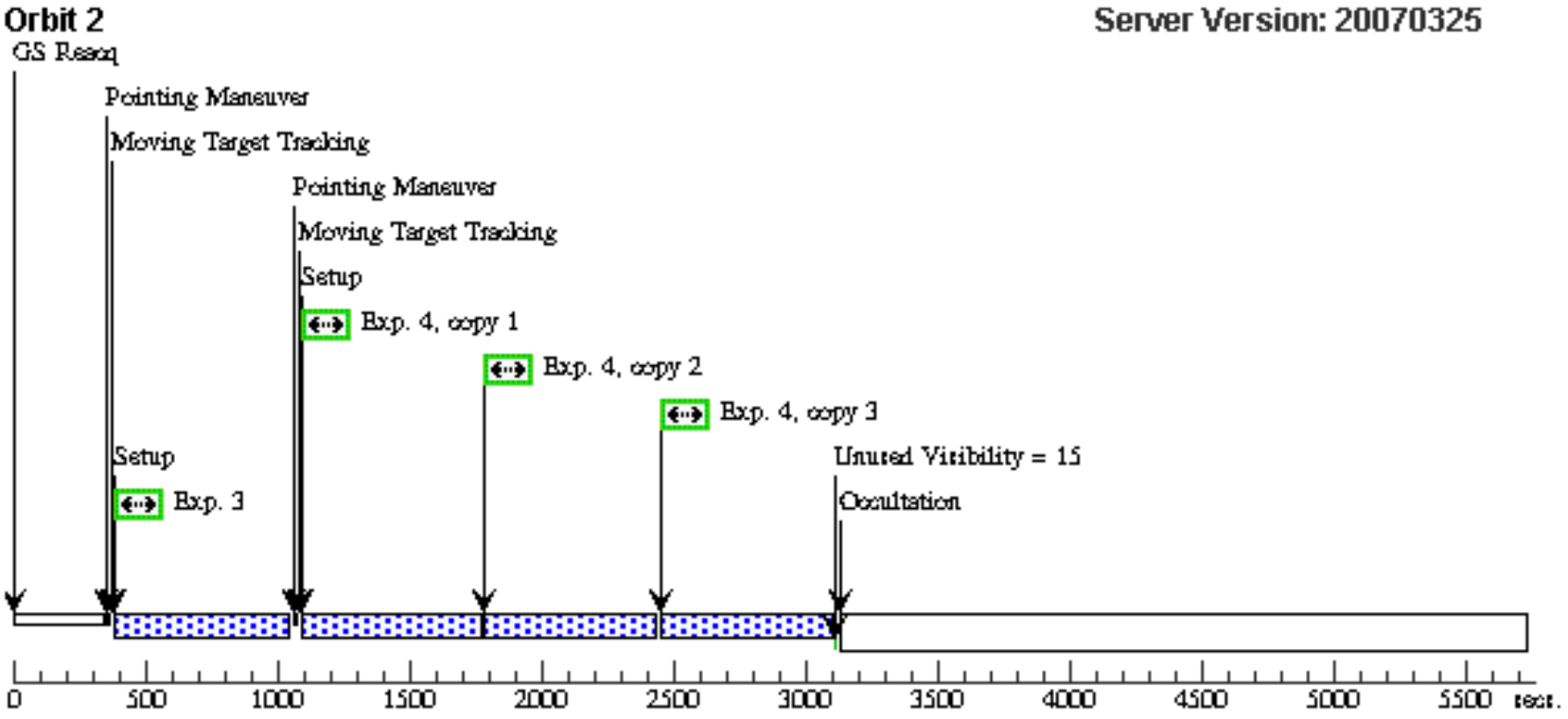
#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
6		(1) CERES	ACS/SBC, ACCUM, SBC	PR130L				625.0 Secs X 3	
								[==>(Copy 1)]	
								[==>(Copy 2)]	***[3]***
								[==>(Copy 3)]	

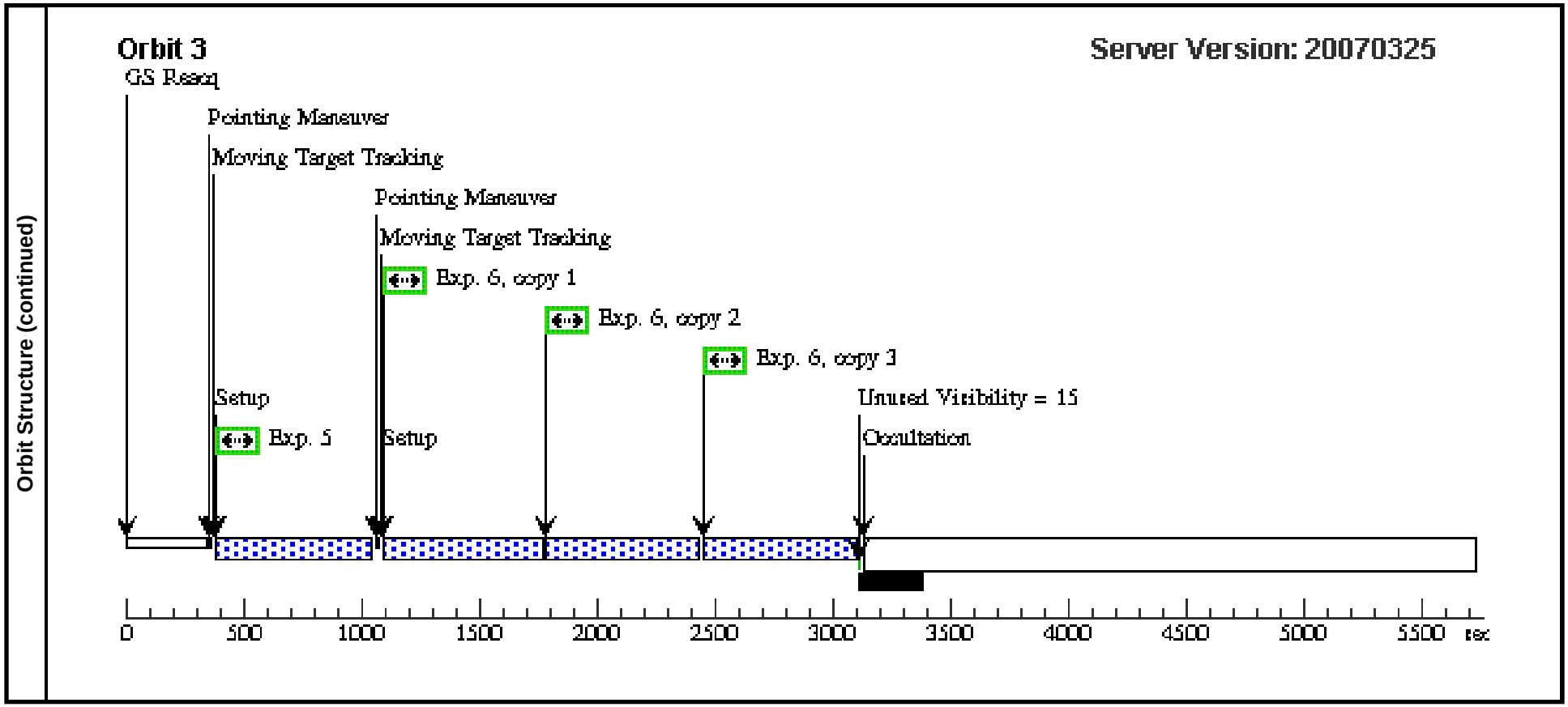
Comments: As estimated from ACS ETC, the exposure will not saturate detector at any wavelength for any exposure time within an orbit. Therefore the exposure time for this exposure should be adjusted to the maxim um allowed time within the usable time of an orbit once the visit is scheduled.

Orbit Structure



Orbit Structure (continued)




Orbit Structure (continued)
Orbit 3
Server Version: 20070325
GS Reacq
Pointing Maneuver
Moving Target Tracking
Pointing Maneuver
Moving Target Tracking
Exp. 6, copy 1
Exp. 6, copy 2
Exp. 6, copy 3
Unused Visibility = 15
Occultation
Setup
Exp. 5
Setup
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec