12042 - COS-GTO: Pluto

Cycle: 18, Proposal Category: GTO/COS

(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) PLUTO-90LONG	COS/NUV	3	18-Aug-2010 15:12:57.0	yes
02	(2) PLUTO-270LONG	COS/NUV	2	18-Aug-2010 15:12:59.0	yes

5 Total Orbits Used

ABSTRACT

We seek to measure Pluto's albedo below 2100Å, to better constrain surface composition. COS observations will provide a substantial improvement in the S/N of Pluto spectra from <1800Å to 2100Å. Accumulation of past HST/FOS spectra yields extremely low S/N below 2000Å (S/N of only 1-3 in 100Å bins; Krasnopolsky 2001). We expect to achieve S/N=5 at 1950Å with 10Å binning. In addition to spectrally broad albedo measurements, these observations could reveal line or molecular band emission, such as C I 1931Å or CO 1993Å.

OBSERVING DESCRIPTION

COS NUV spectra of Pluto from 1700 to 2100Å using G230L at 3000Å central wavelength, for a total of 5 orbits. Only one grating position (central wavelength) is required to cover the specified wavelength band.

Observations will be divided into two visits: 2 orbits at one central meridional longitude, and 3 orbits at another; in this way, the spectra can be coadded for the greatest signal-to-noise, and compared to look for longitude-specific differences in absorption spectrum. The chosen longitudes (90 and 270 degrees) correspond to greatest angular separation of Charon from Pluto, reaching 0.85"; the position angle (CCW from north) of Charon from Pluto is about 150 and 330 degrees for these cases. ORIENT is specified in order to minimize spectral confusion, by aligning Charon in the cross-dispersion direction.

ADDITIONAL COMMENTS

ORIENT calculation: U3 axis is at 135 degrees from COS +Y (spatial) direction, and at 135+180 = 315 degrees from -Y

With Pluto viewed at CML = 90, Charon is near position angle 153 degrees; Pluto-Charon vector can extend along either +Y or -Y. So we have ORIENT near 135+153 = 288 degrees or near 315 + 153 = 468 ==> 108 degrees.

With Pluto viewed at CML = 270, Charon is near position angle 333 degrees (180 degrees from above). Same calculation as above -- 135 + 333 ==> 108 degrees orient, 315 + 333 ==> 288 degrees.

We've specified the desired CML +/- 15 degrees, which provides ~12 hr obs windows; ORIENT window of +/- 5 degrees keeps 4+ months available.

Visit

Proposal 12042, Visit 01, implementation Wed Aug 18 19:13:00 GMT 2010

Diagnostic Status: Warning

Scientific Instruments: COS/NUV

Special Requirements: ORIENT 260D TO 290 D; ORIENT 90D TO 120 D; BETWEEN 20-AUG-2010:00:00:00 AND 30-SEP-2010:23:59:59

Diagnostics

(Visit 01) Warning (Orbit Planner): VISIBILITY OVERRUN

Solar System Targets

#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
(1)	PLUTO-90LONG	STD=PLUTO			CML OF PLUTO FROM EARTH BETWEEN 80 100	EARTH

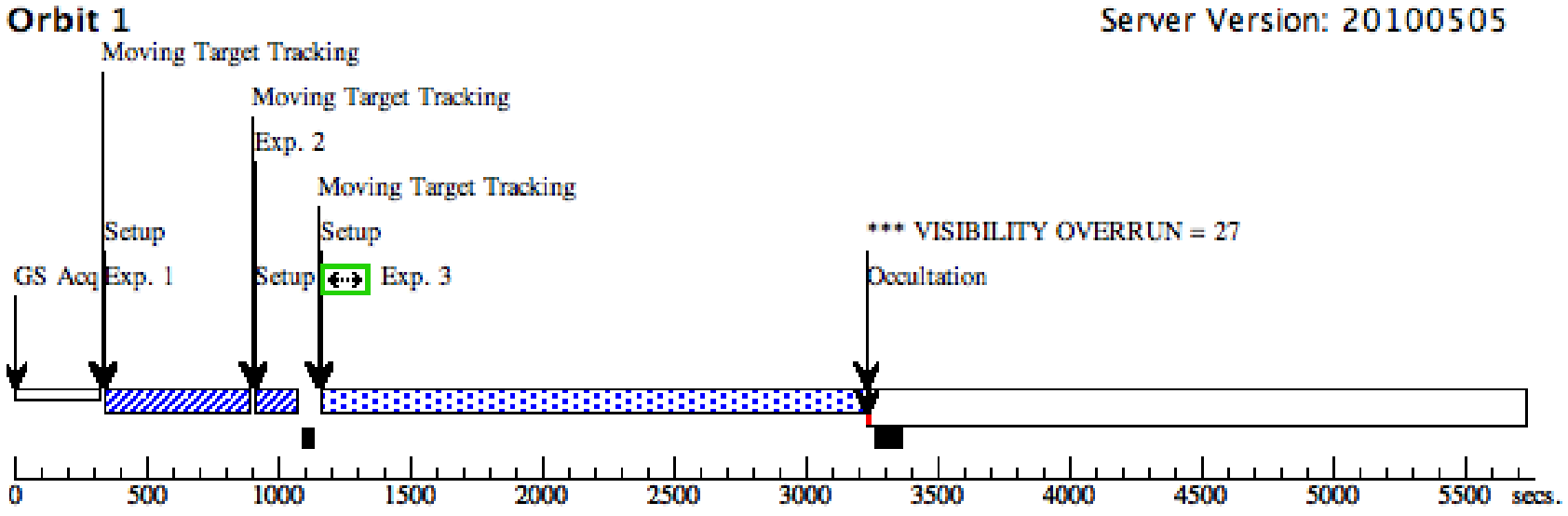
Comments: about 1 magnitude dimmer in mid-UV relative to visible, based on albedo measurements -- 0.2 - 0.25 in mid UV, instead of 0.5 - 0.66 in visible (used mV = 15 solar-type spectrum for ETC)

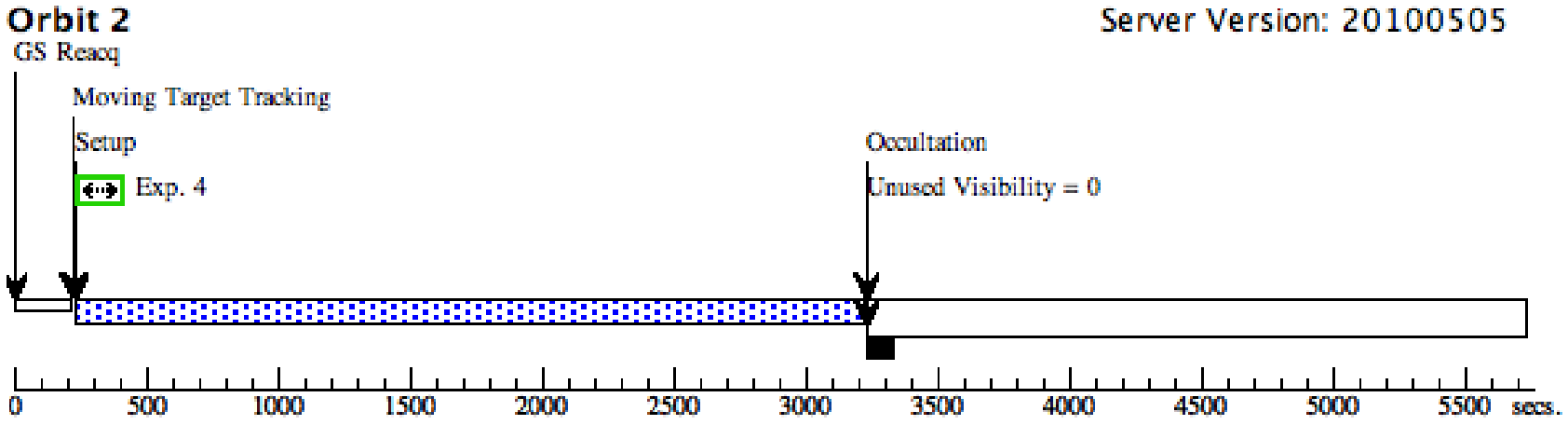
Specified window -- CML of 90+/-10 degrees -- puts Charon near largest separation from Pluto, and at position angle near 150 degrees.

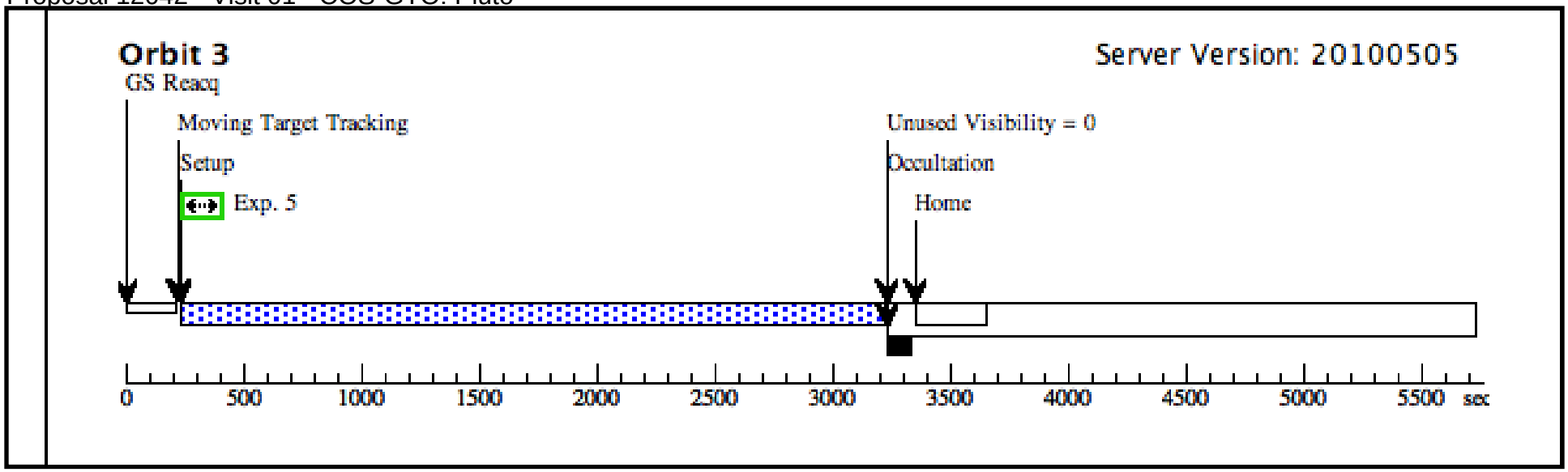
Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1		(1) PLUTO-90LONG	COS/NUV, ACQ/SEARCH, PSA	MIRRORA	SCAN-SIZE=2			25 Secs	
								[==>]	***[1]***
2		(1) PLUTO-90LONG	COS/NUV, ACQ/IMAGE, PSA	MIRRORA				25 Secs	
								[==>]	***[1]***
Comments: COS ETC: COS.A204186 for estimation of acquisition time. Assumed solar-type Kurucz spectrum with effective m_V=15.0, normal airglow. S/N = 40 in 23.5s									
3		(1) PLUTO-90LONG	COS/NUV, TIME-TAG, PSA	G230L 3000 A	BUFFER-TIME=1970; FP-POS=2			1970 Secs	
								[==>]	***[1]***
*Comments: ETC: COS.A204190 gives buffer-time of 2/3 * 26913s*									
4		(1) PLUTO-90LONG	COS/NUV, TIME-TAG, PSA	G230L 3000 A	BUFFER-TIME=2971; FP-POS=3			2971 Secs	
								[==>]	***[2]***
5		(1) PLUTO-90LONG	COS/NUV, TIME-TAG, PSA	G230L 3000 A	BUFFER-TIME=2971; FP-POS=4			2971 Secs	
								[==>]	***[3]***

Orbit Structure



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2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 12042, Visit 02, scheduling Wed Aug 18 19:13:00 GMT 2010

Diagnostic Status: Warning

Scientific Instruments: COS/NUV

Special Requirements: ORIENT 280D TO 290 D; ORIENT 100D TO 110 D; BETWEEN 20-AUG-2010:00:00:00 AND 30-SEP-2010:23:59:59

Diagnostics

(Visit 02) Warning (Orbit Planner): VISIBILITY OVERRUN

Solar System Targets

#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
(2)	PLUTO-270LONG	STD=PLUTO			CML OF PLUTO FROM EARTH BETWEEN 260 280	EARTH

Comments: Specified window -- CML of 270+/-10 degrees -- puts Charon near largest separation from Pluto, and at position angle near 330 degrees.

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1		(2) PLUTO-270LONG	COS/NUV, ACQ/SEARCH, PSA	MIRRORA	SCAN-SIZE=2			25 Secs	
								[==>]	***[1]***
2		(2) PLUTO-270LONG	COS/NUV, ACQ/IMAGE, PSA	MIRRORA				25 Secs	
								[==>]	***[1]***
3		(2) PLUTO-270LONG	COS/NUV, TIME-TAG, PSA	G230L 3000 A	BUFFER-TIME=1970; FP-POS=2			1970 Secs	
								[==>]	***[1]***
4		(2) PLUTO-270LONG	COS/NUV, TIME-TAG, PSA	G230L 3000 A	BUFFER-TIME=1335; FP-POS=3			1445 Secs	
								[==>]	***[2]***
5		(2) PLUTO-270LONG	COS/NUV, TIME-TAG, PSA	G230L 3000 A	BUFFER-TIME=1445; FP-POS=4			1445 Secs	
								[==>]	***[2]***

Orbit Structure