10774 - Confirming the Discovery of Two New Satellites of Pluto

Cycle: 14, Proposal Category: GO/DD

(Availability Mode: SUPPORTED)

INVESTIGATORS

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Dr. William J. Merline (CoI)	Southwest Research Institute	merline@boulder.swri.edu

VISITS

Visit	*Targets*	*Configurations*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
01	(1) PLUTO	ACS/HRC	1	30-Jan-2006 21:00:51.0	yes
02	(1) PLUTO	ACS/HRC	1	30-Jan-2006 21:01:00.0	yes

2 Total Orbits Used

ABSTRACT

We detected two new objects ~2 arcsec from Pluto during our recent deep search for companions using the ACS / WFC mode (HST GO program 10427). Either these objects are newly discovered satellites of Pluto, or they are previously undiscovered Plutino KBOs that happened to be located along the line-of-sight to Pluto. The ramifications are enormous for our understanding of the origin and evolution of the Pluto-Charon system, and for our understanding of KBO satellite formation in general, if these new objects are satellites of Pluto. Thus, we request two orbits of HST observing time as soon as possible, to confirm that these newly discovered objects are truly satellites of Pluto.

OBSERVING DESCRIPTION

These observations will be very similar to our ACS / WFC observations of Pluto (HST GO program 10427), where we first discovered the new satellites S/2005 P 1 and S/2005 P 2. However, since these objects were detected within a few arcseconds of Pluto-Charon, we will now utilize the ACS / HRC instead. The HRC field-of-view (~29x26 arcseconds) is much smaller than the WFC, but still easily large enough to image the entire system, and at higher resolution. Although the orbits of P1 and P2 are not definitively determined yet, we believe they are Charon-like and essentially circular, so they should never be more than a few arcseconds from Pluto. We employ a sub-pixel dither box pattern, both to avoid bad detector pixels and to improve the spatial sampling as much as possible. At each dither point we take one long exposure, where Pluto-Charon will be saturated (with some bleeding along the CCD columns), and where we expect to detect P1 and P2. We also take at least one short (1 second) exposure at each dither point, where P1 and P2 will not be detected, but Pluto and Charon will be unsaturated and provide additional positional information which will aid in the registration of the images. The short exposures would also reveal (and allow us to correct for) any drift in the moving target tracking, which we otherwise expect to be accurate to within a fraction of a pixel (i.e. good enough to faithfully execute a sub-pixel dither pattern). Then we repeat these observations in an identical visit, about 15 days days later (which is roughly half of the orbital period of both satellites), to confirm the orbital motion of the objects. We expect these observations to confirm the status of P1 and P2 as satellites of Pluto, and further constrain their orbital elements.

ADDITIONAL COMMENTS

We would like the first epoch (orbit) of this program to execute as soon as possible after Pluto becomes observable again by HST (in 2 gyro mode) around 15 February 2006.

Visit

Proposal 10774, Visit 01 Tue Jan 31 02:01:03 GMT 2006

Diagnostic Status: No Diagnostics

Scientific Instruments: ACS/HRC

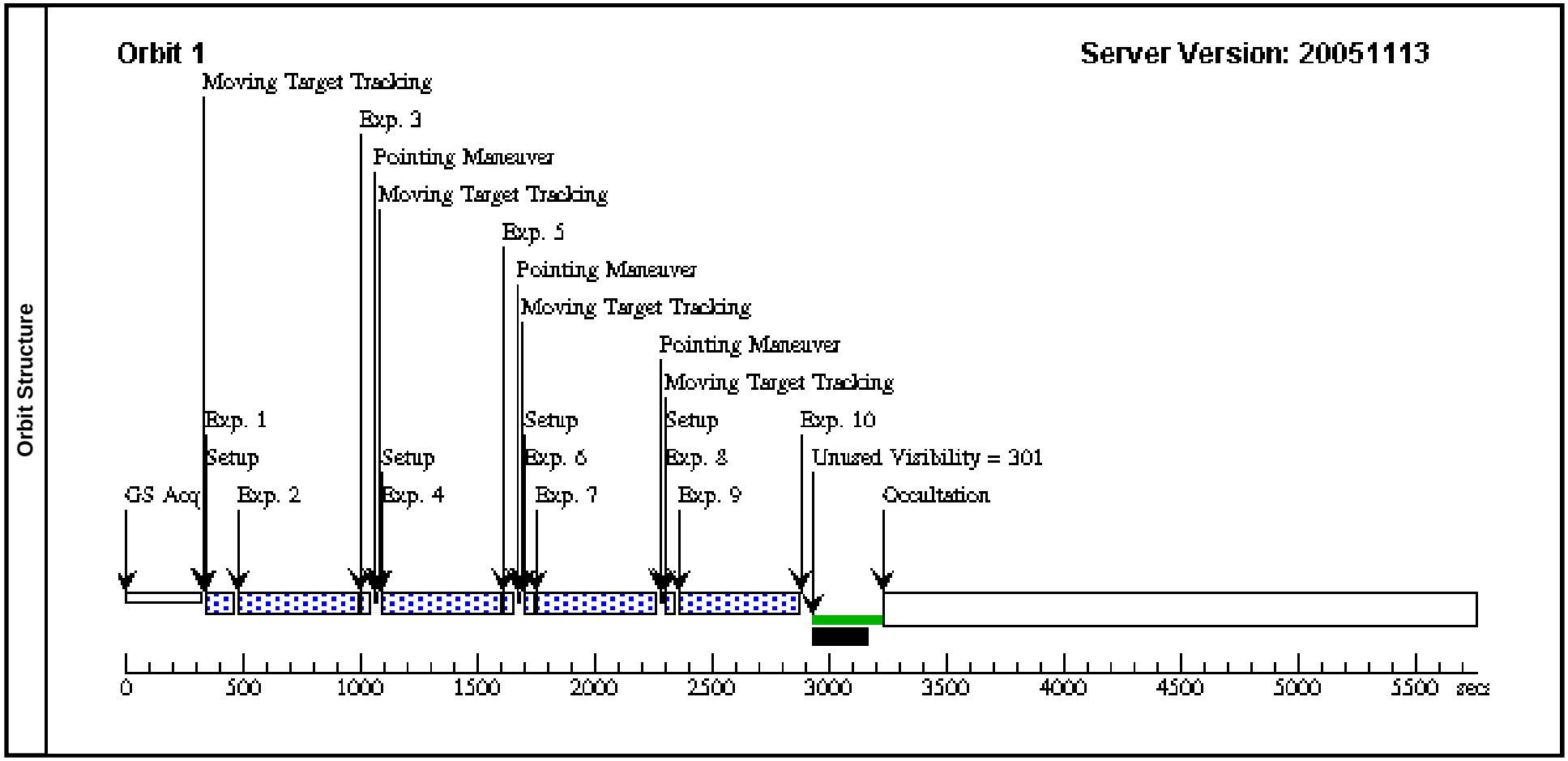
Special Requirements: BETWEEN 13-FEB-2006:00:00:00 AND 20-FEB-2006:00:00:00

Solar System Targets

#	Name	Level 1	Level 2	Level 3	Window
(1)	PLUTO	STD=PLUTO			

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1		(1) PLUTO	ACS/HRC, ACCUM, HRC-FIX	F606W	CR-SPLIT=NO		Sequence 1-5 Non-Int	1.0 Secs	
								[==>]	***[1]***
2		(1) PLUTO	ACS/HRC, ACCUM, HRC-FIX	F606W	CR-SPLIT=NO		Sequence 1-5 Non-Int	475.0 Secs	
								[==>]	***[1]***
3		(1) PLUTO	ACS/HRC, ACCUM, HRC-FIX	F606W	CR-SPLIT=NO		Sequence 1-5 Non-Int	1.0 Secs	
								[==>]	***[1]***
4		(1) PLUTO	ACS/HRC, ACCUM, HRC-FIX	F606W	CR-SPLIT=NO	POS TARG 0.142,0.052	Sequence 1-5 Non-Int	475.0 Secs	
								[==>]	***[1]***
5		(1) PLUTO	ACS/HRC, ACCUM, HRC-FIX	F606W	CR-SPLIT=NO	POS TARG 0.142,0.052	Sequence 1-5 Non-Int	1.0 Secs	
								[==>]	***[1]***
6		(1) PLUTO	ACS/HRC, ACCUM, HRC-FIX	F606W	CR-SPLIT=NO	POS TARG 0.071,0.119	Sequence 6-10 Non-Int	1.0 Secs	
								[==>]	***[1]***
7		(1) PLUTO	ACS/HRC, ACCUM, HRC-FIX	F606W	CR-SPLIT=NO	POS TARG 0.071,0.119	Sequence 6-10 Non-Int	475.0 Secs	
								[==>]	***[1]***
8		(1) PLUTO	ACS/HRC, ACCUM, HRC-FIX	F606W	CR-SPLIT=NO	POS TARG -0.071,0.067	Sequence 6-10 Non-Int	1.0 Secs	
								[==>]	***[1]***
9		(1) PLUTO	ACS/HRC, ACCUM, HRC-FIX	F606W	CR-SPLIT=NO	POS TARG -0.071,0.067	Sequence 6-10 Non-Int	475.0 Secs	
								[==>]	***[1]***
10		(1) PLUTO	ACS/HRC, ACCUM, HRC-FIX	F606W	CR-SPLIT=NO	POS TARG -0.071,0.067	Sequence 6-10 Non-Int	1.0 Secs	
								[==>]	***[1]***


Orbit Structure
Orbit 1
Server Version: 20051113
Moving Target Tracking
Exp. 3
Pointing Maneuver
Moving Target Tracking
Exp. 5
Pointing Maneuver
Moving Target Tracking
Pointing Maneuver
Moving Target Tracking
Exp. 1
Setup
Setup
Setup
Setup
Exp. 10
GS Acq
Exp. 2
Exp. 4
Exp. 6
Exp. 7
Exp. 8
Exp. 9
Unused Visibility = 301
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
secs

Visit

Proposal 10774, Visit 02 Tue Jan 31 02:01:04 GMT 2006

Diagnostic Status: No Diagnostics

Scientific Instruments: ACS/HRC

Special Requirements: SAME ORIENT AS 01; AFTER 01 BY 15 D TO 15.4 D; BETWEEN 27-FEB-2006:00:00:00 AND 06-MAR-2006:00:00:00

Solar System Targets

#	Name	Level 1	Level 2	Level 3	Window
(1)	PLUTO	STD=PLUTO			

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
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								[==>]	***[1]***
2		(1) PLUTO	ACS/HRC, ACCUM, HRC-FIX	F606W	CR-SPLIT=NO		Sequence 1-5 Non-Int	475.0 Secs	
								[==>]	***[1]***
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								[==>]	***[1]***
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								[==>]	***[1]***
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								[==>]	***[1]***
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								[==>]	***[1]***
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								[==>]	***[1]***
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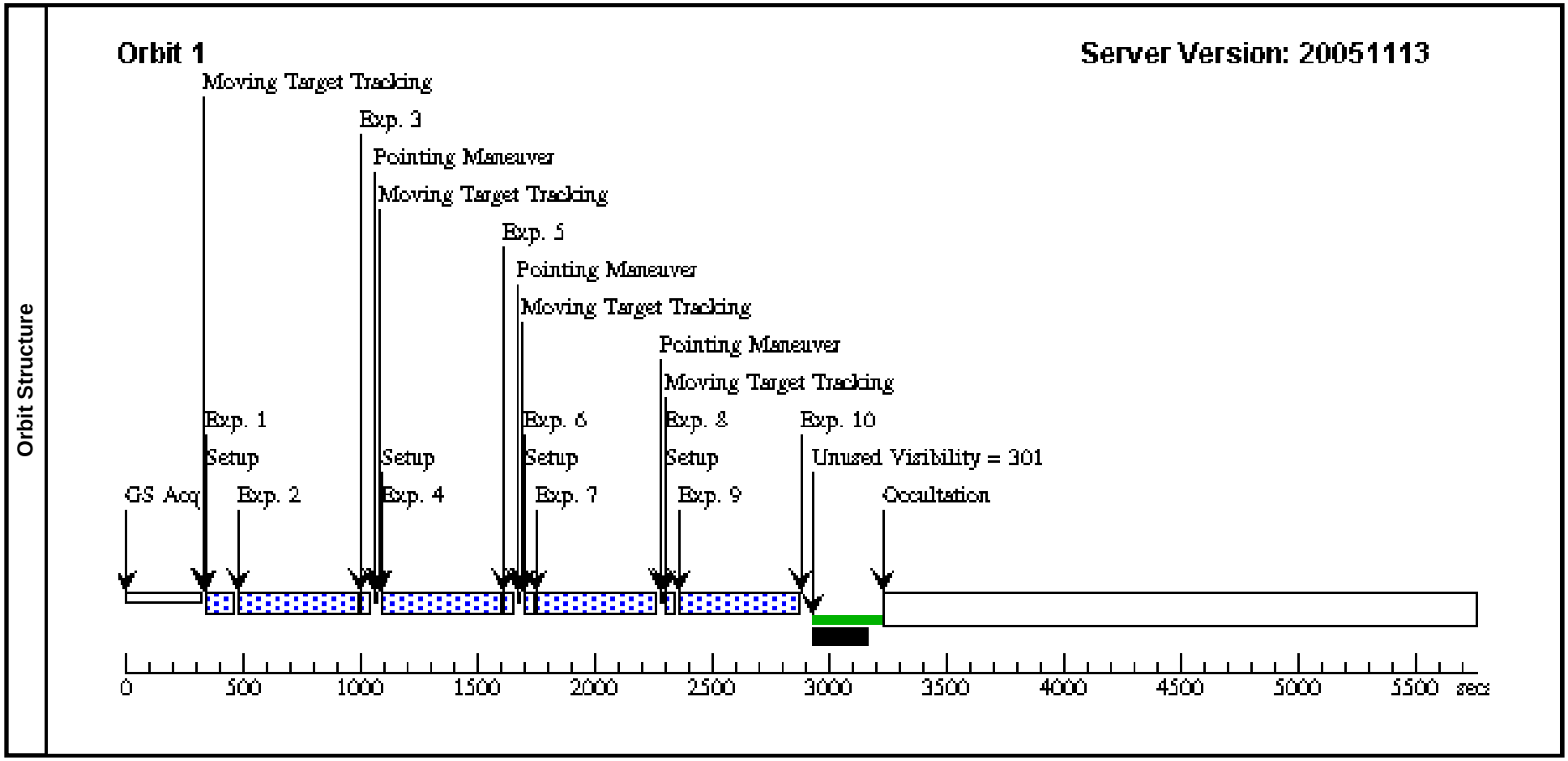
								[==>]	***[1]***
10		(1) PLUTO	ACS/HRC, ACCUM, HRC-FIX	F606W	CR-SPLIT=NO	POS TARG -0.071,0.067	Sequence 6-10 Non-Int	1.0 Secs	
								[==>]	***[1]***


Orbit Structure
Orbit 1
Server Version: 20051113
Moving Target Tracking
Exp. 3
Pointing Maneuver
Moving Target Tracking
Exp. 5
Pointing Maneuver
Moving Target Tracking
Pointing Maneuver
Moving Target Tracking
Exp. 1
Setup
Setup
Exp. 6
Setup
Exp. 8
Setup
Exp. 10
Unused Visibility = 301
GS Acq
Exp. 2
Exp. 4
Exp. 7
Exp. 9
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
secs