12887 - Precise Orbit Determination for New Horizons Candidate KBOs

Cycle: 20, 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) VNH0034	WFC3/UVIS	1	03-Sep-2013 21:01:04.0	yes
02	(1) VNH0034	WFC3/UVIS	1	03-Sep-2013 21:01:12.0	yes

2 Total Orbits Used

ABSTRACT

The New Horizons (NH) spacecraft is on its way to study the Pluto system during a flyby after which the spacecraft will be retargeted to one or more Kuiper Belt Objects (KBOs) to learn about small KBOs and the Kuiper Belt population. We are actively carrying out dedicated ground-based observations to identify a target for NH to flyby and continue to improve our analysis algorithms. So far we have identified a few candidate objects, but none have proven to be within an accessible distance for NH, our searches will continue in 2012 and 2013. Unfortunately, NH's trajectory line of

site is within the galactic plane (Sagittarius) making stellar confusion a major problem in obtaining precise astrometry and high precision orbits for these objects from the ground. HST's sensitivity, resolution and PSF stability are crucial components for determining precise orbits for these candidates. We have been awarded 2 TOO orbits to observe a KBO candidate to be triggered in the event that a candidate object is found within the targetable region. The observations we propose will also determine if the NH candidate is binary (~30% probability per candidate) and will make a preliminary color determination to assist in target selection.

OBSERVING DESCRIPTION

We obtain 2-455 second exposures using a manual dither pattern and 2-640 second exposures in the F814W filter to obtain a color measurement (0.1 magnitude uncertainty) on the NH KBO candidate. Both TOO orbits are planned to take the same set of exposures. This project imposes no orientation constraints and uses ordinary blind target acquisition. We tracking the object under FGS control, target motion rates are very slow, at most a few arcsec per hour.

Proposal 12887 - Visit 01 - Precise Orbit Determination for New Horizons Candidate KBOs

Visit

Proposal 12887, Visit 01, implementation

Wed Sep 04 01:01:20 GMT 2013

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/UVIS

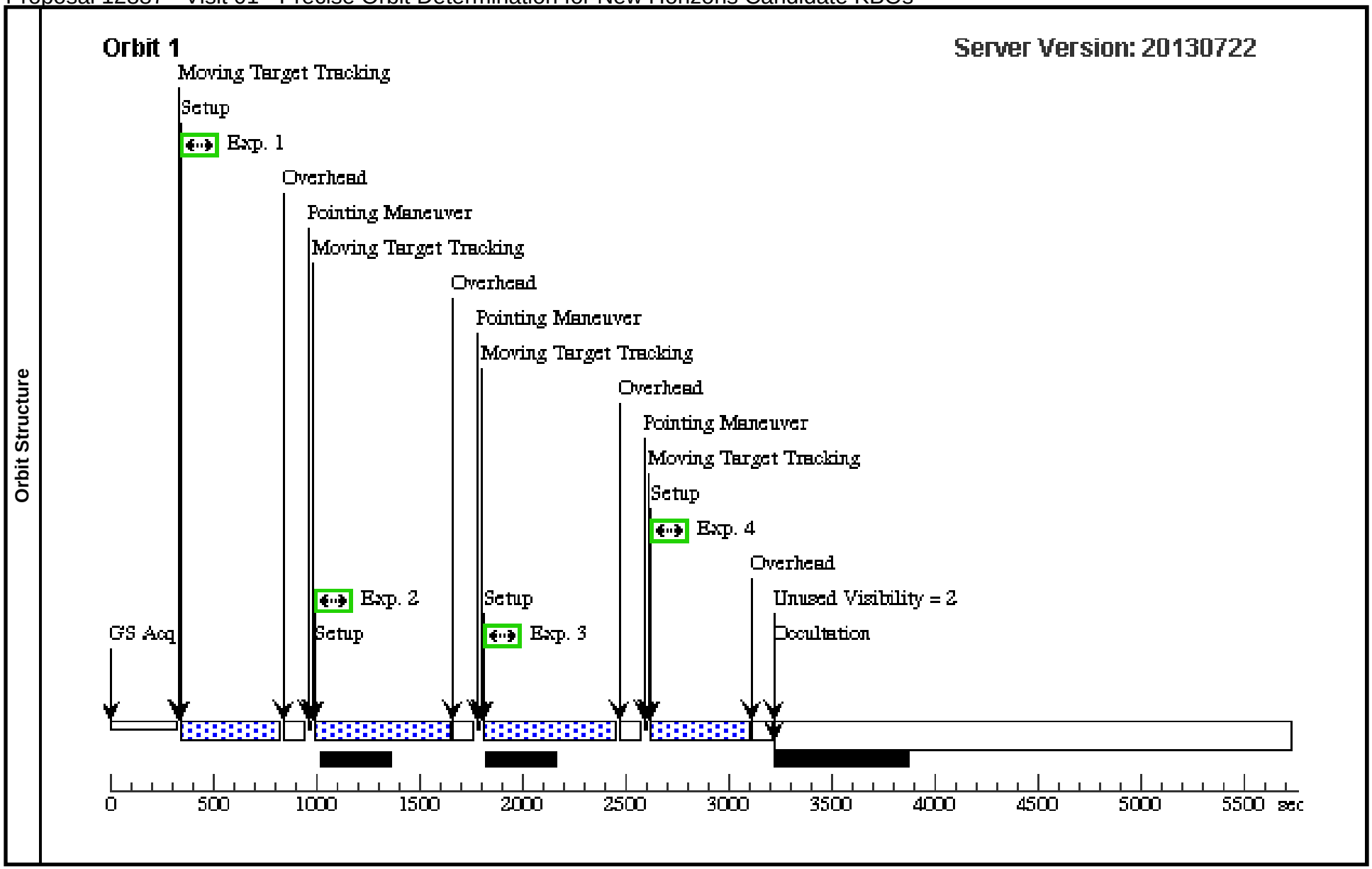
Special Requirements: PCS MODE FINE

Solar System Targets

#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
(1)	VNH0034	TYPE=ASTEROID,A=49.14322117,E=0.35008658,I=2.97806,O=157.99643,W=25.56316,M=55.18679,EQUINOX=J2000,EPOCH=28-MAY-2013:00:00:00,EpochTimeScale=UTC				EARTH

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) VNH0034	WFC3/UVIS, ACCUM, UVIS2	F606W	CR-SPLIT=NO	POS TARG 0,0		455 Secs (455 Secs)	
								[==>]	***[1]***
2		(1) VNH0034	WFC3/UVIS, ACCUM, UVIS2	F814W	CR-SPLIT=NO	POS TARG 0.099,0.106		640 Secs (640 Secs)	
								[==>]	***[1]***
3		(1) VNH0034	WFC3/UVIS, ACCUM, UVIS2	F814W	CR-SPLIT=NO	POS TARG 0,0		640 Secs (640 Secs)	
								[==>]	***[1]***
4		(1) VNH0034	WFC3/UVIS, ACCUM, UVIS2	F606W	CR-SPLIT=NO	POS TARG 0.099,0.106		455 Secs (455 Secs)	
								[==>]	***[1]***


Orbit 1
Server Version: 20130722
Orbit Structure
Moving Target Tracking
Setup
Exp. 1
Overhead
Pointing Maneuver
Moving Target Tracking
Overhead
Pointing Maneuver
Moving Target Tracking
Overhead
Pointing Maneuver
Moving Target Tracking
Setup
Exp. 4
Overhead
Unused Visibility = 2
Occultation
Exp. 2
Setup
Setup
Exp. 3
GS Acq
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 12887, Visit 02, implementation Wed Sep 04 01:01:23 GMT 2013

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/UVIS

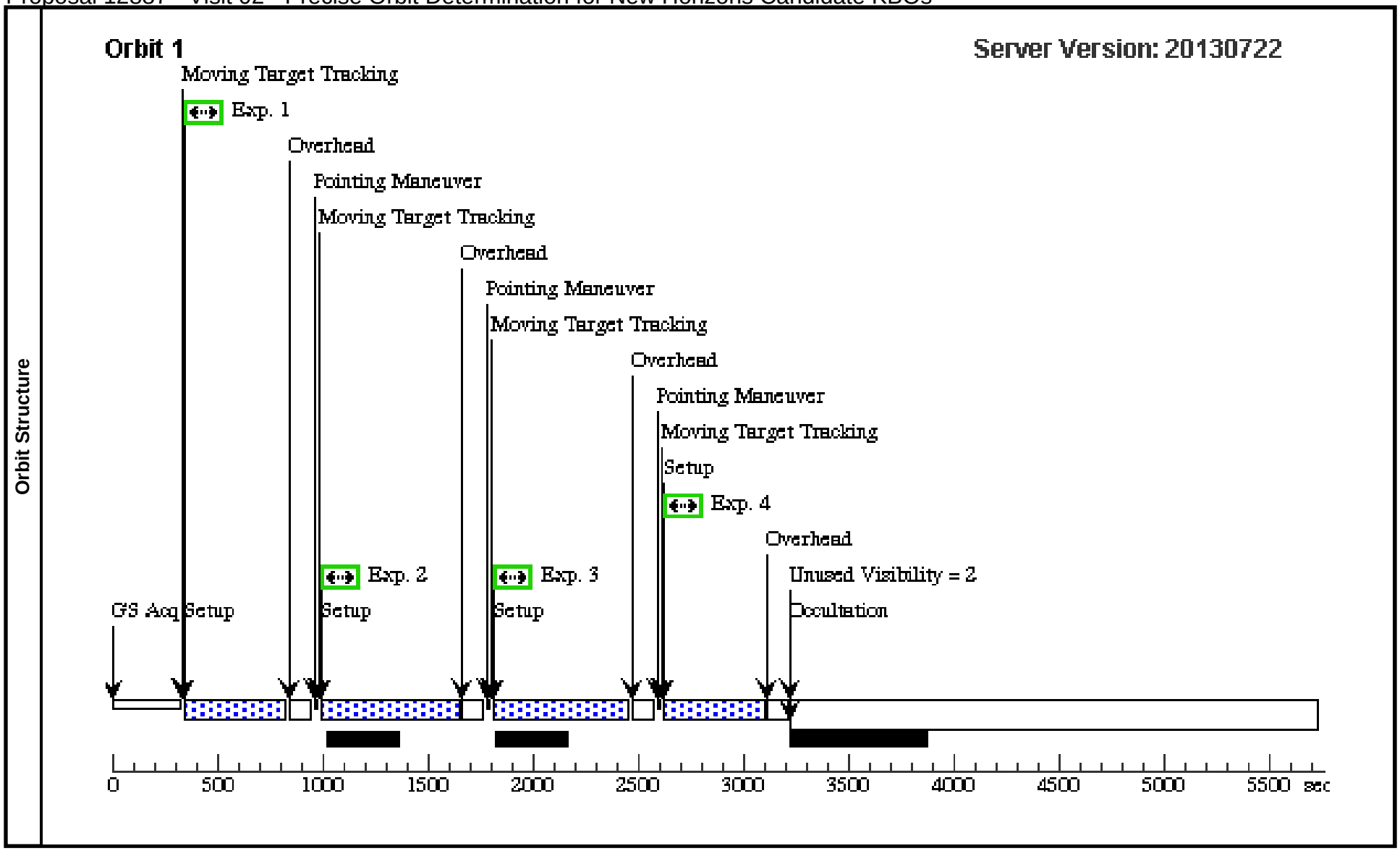
Special Requirements: PCS MODE FINE; AFTER 01 BY 10 Orbits TO 16 Orbits

Solar System Targets

#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
(1)	VNH0034	TYPE=ASTEROID,A=49.14322117,E=0.35008658,I=2.97806,O=157.99643,W=25.56316,M=55.18679,EQUINOX=J2000,EPOCH=28-MAY-2013:00:00:00,EpochTimeScale=UTC				EARTH

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) VNH0034	WFC3/UVIS, ACCUM, UVIS2	F606W	CR-SPLIT=NO	POS TARG 0,0		455 Secs (455 Secs)	
								[==>]	***[1]***
2		(1) VNH0034	WFC3/UVIS, ACCUM, UVIS2	F814W	CR-SPLIT=NO	POS TARG 0.099,0.106		640 Secs (640 Secs)	
								[==>]	***[1]***
3		(1) VNH0034	WFC3/UVIS, ACCUM, UVIS2	F814W	CR-SPLIT=NO	POS TARG 0,0		640 Secs (640 Secs)	
								[==>]	***[1]***
4		(1) VNH0034	WFC3/UVIS, ACCUM, UVIS2	F606W	CR-SPLIT=NO	POS TARG 0.099,0.106		455 Secs (455 Secs)	
								[==>]	***[1]***


Orbit 1
Server Version: 20130722
Orbit Structure
Moving Target Tracking
Exp. 1
Overhead
Pointing Maneuver
Moving Target Tracking
Overhead
Pointing Maneuver
Moving Target Tracking
Overhead
Pointing Maneuver
Moving Target Tracking
Setup
Exp. 4
Overhead
Unused Visibility = 2
Occultation
Exp. 2
Setup
Exp. 3
Setup
GS Acq Setup
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec