14485 - Astrometry of 2014MU69

Cycle: 23, Proposal Category: GO/DD

(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) 2014MU69	WFC3/UVIS	1	02-Mar-2016 21:08:01.0	yes
02	(1) 2014MU69	WFC3/UVIS	1	02-Mar-2016 21:08:03.0	yes

2 Total Orbits Used

ABSTRACT

We propose two orbits of time to make high-precision astrometric measurments of the New Horizons extended mission target, 2014MU69. These observations are in direct support of the navigation of New Horizons leading up to its encounter in Jan 2019. These two visits are specifically in support of a trajectory correction maneuver planned for July 2016. This astrometry is a key element leading up to a close investigation of a Cold-Classical Kuiper Belt Object, one of the most primitive members of our solar system.

OBSERVING DESCRIPTION

These observations will use the full field of WFC3/UVIS due to its improved broadband PSF and detector sensitivity compared to ACS. This was the HST instrument used to successfully to detect 2014MU69 and our other potential KBO targets in our 2014 search campaign. We are using the F350LP filter for its sensitivity and image quality as well as consistency with the prior observations. Our observing strategy is based on the successful strategy developed for our 2014 and 2015 HST KBO search and followup campaigns. For each HST orbit we will use WFC3 with the F350LP filter to obtain five 370 second exposures. We will track on the known motion of 2014MU69, which results in trailing of stars, but does not prevent their removal to provide robust detections in single orbits as shown. The formal uncertainty of the position on 15 March 2016, based on 2014 and 2015 astrometry, is 15 mas. Thus, the target can easily be placed near the center of WFC3/UVIS2, and very bright stars can be avoided by adjusting the timing of the observations as necessary. Once preliminary observing windows are available we need to examine the background star field for contamination and final scheduling to avoid field stars. We require acquisition of the full WFC3 field for precise astrometric solutions. The first visit needs to schedule in the 7-day window starting on March 15 and the second in a 7-day window startin on May 15. The one week period is chosen to provide ample scheduling flexibility and could be shifted by another day or two if needed. The timing of these weeks is controlled by avoiding the time around quadrature when the sky-plane velocity is below 1 arcsec/hour and the need to get both visit spread out in time and executed in time to support the July trajectory correction maneuver (TCM). The TCM development schedule requires that we complete the second visit by late May.

Proposal 14485 - Visit 01 - Astrometry of 2014MU69

Visit

Proposal 14485, Visit 01, implementation Thu Mar 03 02:08:04 GMT 2016

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/UVIS

Special Requirements: SCHED 100%; BETWEEN 15-MAR-2016:00:00:00 AND 22-MAR-2016:11:00:00

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=LINE	Coordinate Frame=CELESTIAL		(1)
	Purpose=OTHER	Pattern Orientation=0		
	Number Of Points=5	Angle Between Sides=		
	Point Spacing=.030	Center Pattern=true		
	Line Spacing=			

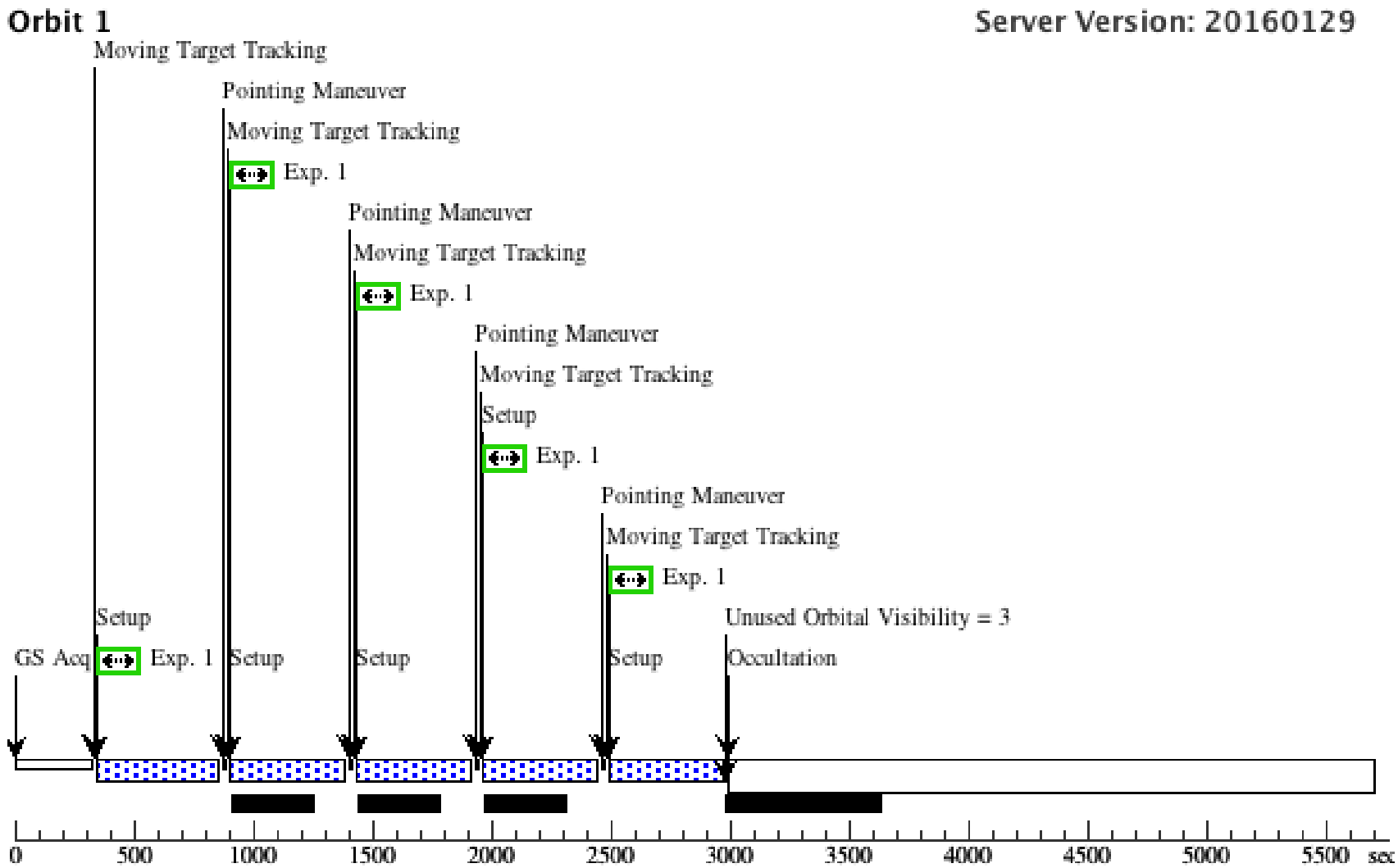
Solar System Targets

#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
(1)	2014MU69	TYPE=ASTEROID,A=44.2324082551 09,E=0.035776003052 ,I=2.453085134109 ,O=158.938296047929 ,W=181.783023901528 ,M=305.281257673465 ,EQUINOX=J2000,EPOCH=15-MAR-2016:00:00:00,EpochTimeScale=UTC				EARTH

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) 2014MU69	WFC3/UVIS, ACCUM, UVIS2	F350LP			Sequence 1-1 Non-In t in Visit 01 Pattern 1, Exps 1-1 i n Sequence 1-1 Non-Int in Visit 01 (1)	367.0 Secs (1835 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]* *[==>(Pattern 5)]*	***[1]***

Orbit Structure



Proposal 14485 - Visit 02 - Astrometry of 2014MU69

Visit

Proposal 14485, Visit 02, implementation Thu Mar 03 02:08:04 GMT 2016

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/UVIS

Special Requirements: SCHED 100%; BETWEEN 15-MAY-2016:00:00:00 AND 22-MAY-2016:11:00:00

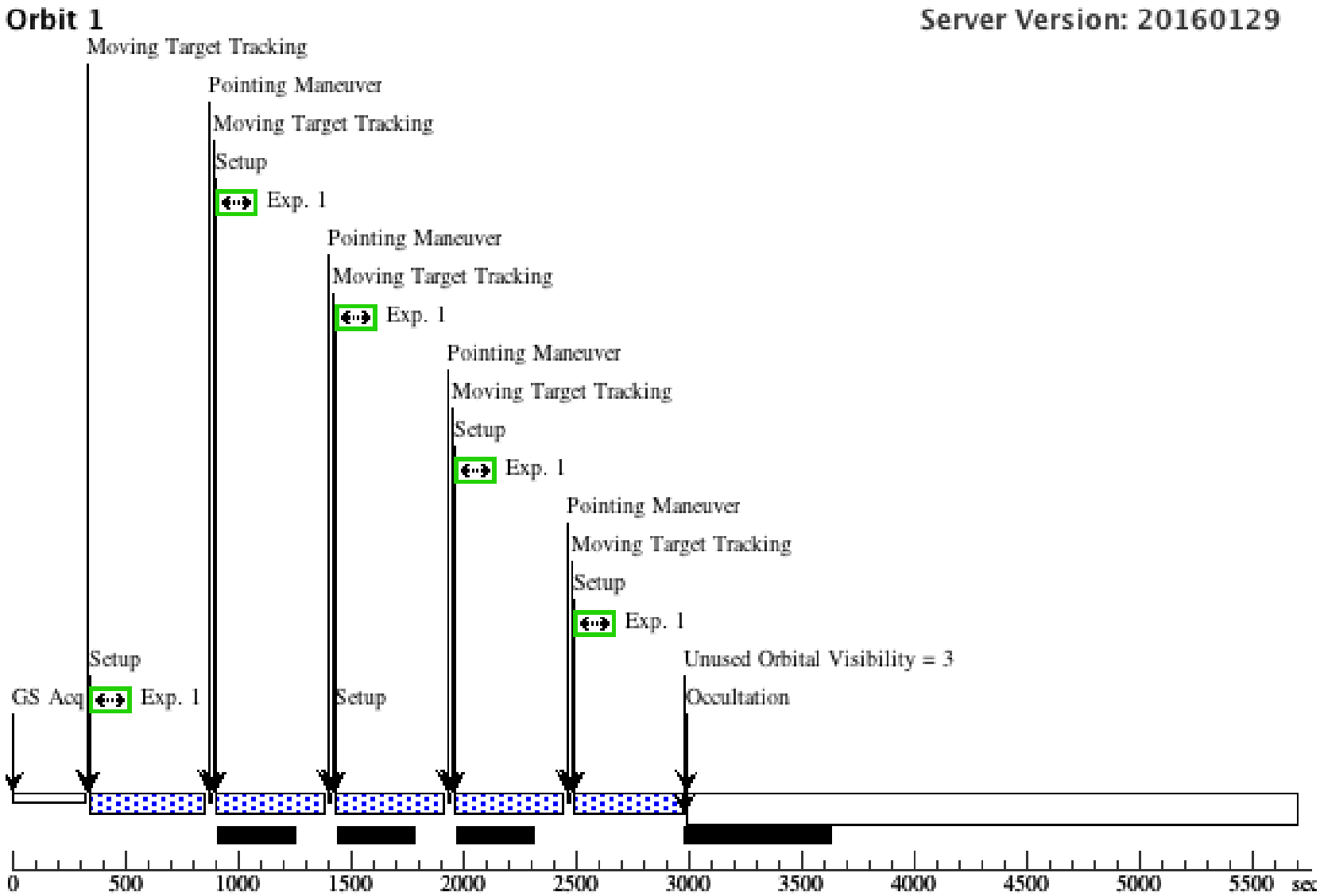
Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=LINE	Coordinate Frame=CELESTIAL		(1)
	Purpose=OTHER	Pattern Orientation=0		
	Number Of Points=5	Angle Between Sides=		
	Point Spacing=.030	Center Pattern=true		
	Line Spacing=			

Solar System Targets

#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
(1)	2014MU69	TYPE=ASTEROID,A=44.232408255109,E=0.035776003052,I=2.453085134109,O=158.938296047929,W=181.783023901528,M=305.281257673465,EQUINOX=J2000,EPOCH=15-MAR-2016:00:00:00,EpochTimeScale=UTC				EARTH

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) 2014MU69	WFC3/UVIS, ACCUM, UVIS2	F350LP			Sequence 1-1 Non-Int in Visit 02 Pattern 1, Exps 1-1 in Sequence 1-1 Non-Int in Visit 02 (1)	367.0 Secs (1835 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]* *[==>(Pattern 5)]*	***[1]***

Orbit Structure