



14053 - Astrometric Follow-Up of Kuiper Belt Objects for the New Horizons

Mission

Cycle: 22, Proposal Category: GO/DD

(Availability Mode: SUPPORTED)

INVESTIGATORS

<i>Name</i>	<i>Institution</i>	<i>E-Mail</i>
Dr. John R. Spencer (PI) (Contact)	Southwest Research Institute	spencer@boulder.swri.edu
Dr. Harold A. Weaver (CoI) (Contact)	The Johns Hopkins University Applied Physics Laboratory	hal.weaver@jhuapl.edu
Dr. Marc W. Buie (CoI)	Southwest Research Institute	buie@boulder.swri.edu
Dr. S. Alan Stern (CoI)	Southwest Research Institute	astern@swri.edu
Dr. Alex Parker (CoI)	Southwest Research Institute	alexharrisonparker@gmail.com
Dr. Simon Porter (CoI)	Southwest Research Institute	porter@lowell.edu
Dr. Amanda M. Zangari (CoI)	Southwest Research Institute	azangari@boulder.swri.edu
Dr. Anne J. Verbiscer (CoI)	The University of Virginia	verbiscer@virginia.edu
Dr. Susan D. Benecchi (CoI)	Planetary Science Institute	susank@psi.edu
Dr. David Tholen (CoI)	University of Hawaii	tholen@ifa.hawaii.edu

VISITS

<i>Visit</i>	<i>Targets used in Visit</i>	<i>Configurations used in Visit</i>	<i>Orbits Used</i>	<i>Last Orbit Planner Run</i>	<i>OP Current with Visit?</i>
01	(1) 2014MU69	WFC3/UVIS	1	17-Jun-2015 08:52:02.0	yes
02	(2) 2014PN70	WFC3/UVIS	1	17-Jun-2015 08:52:04.0	yes
03	(1) 2014MU69	WFC3/UVIS	1	17-Jun-2015 08:52:06.0	yes

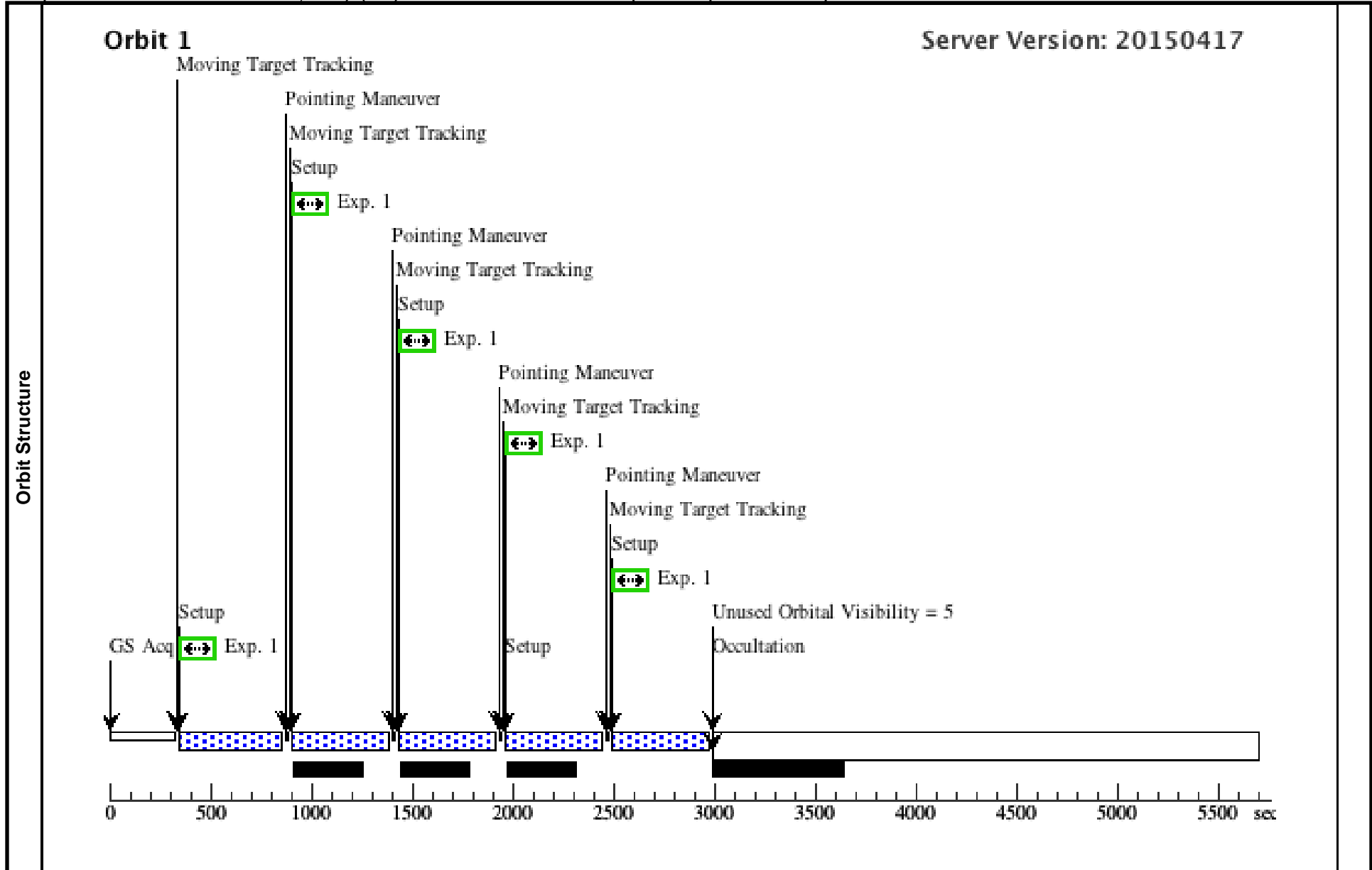
3 Total Orbits Used

ABSTRACT

We propose five orbits of HST time for time-critical 2015 astrometry of the two Kuiper Belt Objects (KBOs) targetable by the New Horizons (NH) spacecraft during an extended mission to be proposed to NASA. These KBOs were discovered in our 2014 HST search campaign (GO 13633). A close flyby by NH of a typical KBO beyond Pluto will revolutionize our understanding of this major component of the solar system, and was recommended as a key part of the Pluto mission by the 2002 Planetary Decadal Survey. In August 2015, the New Horizons project and NASA must choose one of these objects as the flyby target for a potential extended mission, and make a course correction in late 2015 towards the chosen target. The 2015 astrometry proposed here supports that decision point by substantially improving our knowledge of the orbits of the two flyby candidates, providing essential information for the choice between the two. It will also enable an accurate burn towards the chosen target, and will greatly improve our knowledge of the KBO's location at the time of the encounter. Because we need several well-spaced observations well in advance of the August decision date, these observations must be made during HST Cycle 22; they cannot wait until HST Cycle 23 decisions are made. The faintness of these objects ($R > 26.5$) has to date made them impossible to detect from the ground, and certainly precludes 2015 astrometry of the necessary precision from ground-based telescopes.

Proposal 14053 - 2014MU69, May (01) - Astrometric Follow-Up of Kuiper Belt Objects for the New Horizons Mission

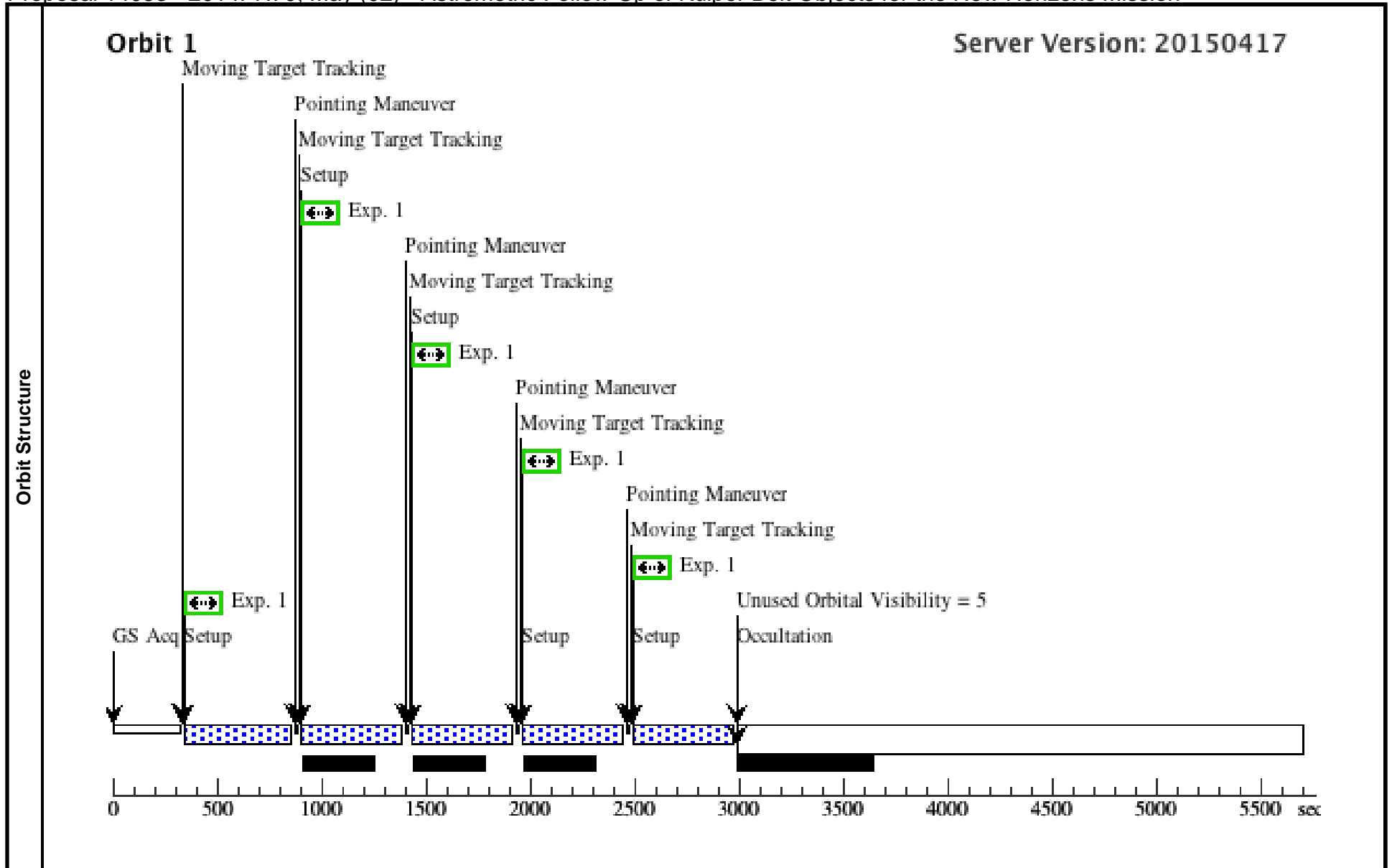
Visit	Proposal 14053, 2014MU69, May (01), completed Wed Jun 17 12:52:09 GMT 2015 Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS Special Requirements: SCHED 100%; BETWEEN 04-MAY-2015:00:00:00 AND 05-MAY-2015:11:00:00; BETWEEN 06-MAY-2015:03 AND 06-MAY-2015:16									
	Patterns	#	Primary Pattern	Secondary Pattern	Exposures					
	(1)	Pattern Type=LINE Purpose=OTHER Number Of Points=5 Point Spacing=0.75 Line Spacing=	Coordinate Frame=CELESTIAL Pattern Orientation=0 Angle Between Sides= Center Pattern=true		(1)					
Solar System Targets	#	Name	Level 1	Level 2	Level 3	Window	Ephem Center			
	(1)	2014MU69	TYPE=ASTEROID,A=44.1391072755 2167,E=0.0449706694222827,I=2.450 303934722035,O=159.0420382227352 ,W=192.1577572255627,M=294.2232 035908972,EQUINOX=J2000,EPOCH =01-SEP- 2014:00:00:00,EpochTimeScale=TDB <i>Comments: Using JPL #01 orbital elements.</i>				EARTH			
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	2014MU69, May	(1) 2014MU69	WFC3/UVIS, ACCUM, UVIS2	F350LP			Sequence 1-1 Non-Int in 2014MU69, May (01) Pattern 1, Exps 1-1 in Sequence 1-1 Non-Int in 2014MU69, May (01) (1)	368.0 Secs (1840 Secs) [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)] [==>(Pattern 5)]	[1]



Proposal 14053 - 2014PN70, May (02) - Astrometric Follow-Up of Kuiper Belt Objects for the New Horizons Mission

Wed Jun 17 12:52:10 GMT 2015

Visit	Proposal 14053, 2014PN70, May (02), completed Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS Special Requirements: SCHED 100%; BETWEEN 04-MAY-2015:00:00:00 AND 06-MAY-2015:16:00:00									
Patterns	#	Primary Pattern		Secondary Pattern		Exposures				
	(1)	Pattern Type=LINE Purpose=OTHER Number Of Points=5 Point Spacing=0.75 Line Spacing=	Coordinate Frame=CELESTIAL Pattern Orientation=0 Angle Between Sides= Center Pattern=true			(1)				
Solar System Targets	#	Name	Level 1	Level 2	Level 3	Window	Ephem Center			
	(2)	2014PN70	TYPE=ASTEROID,A=44.0426891294 4715,E=0.05170378391162126,I=4.12 1313140884151,O=136.259260422729 6,W=239.4547871029322,M=270.751 8427973431,EQUINOX=J2000,EPOC H=14-SEP- 2014:00:00,EpochTimeScale=TDB <i>Comments: Using JPL #01 orbital elements.</i>				EARTH			
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	2014PN70, May	(2) 2014PN70	WFC3/UVIS, ACCUM, UVIS2	F350LP			Sequence 1-1 Non-Int in 2014PN70, May (02) Pattern 1, Exps 1-1 in Sequence 1-1 Non-Int in 2014PN70, May (02) (1)	368.0 Secs (1840 Secs) [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)] [==>(Pattern 5)]	[1]



Proposal 14053 - 2014MU69, July (03) - Astrometric Follow-Up of Kuiper Belt Objects for the New Horizons Mission

Wed Jun 17 12:52:10 GMT 2015

Visit	Proposal 14053, 2014MU69, July (03), scheduling Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS Special Requirements: SCHED 100%; ORIENT 127D TO 137 D; BETWEEN 04-JUL-2015:14:00:00 AND 04-JUL-2015:15:00:00									
	Patterns	#	Primary Pattern	Secondary Pattern	Exposures					
		(2)	Pattern Type=LINE Purpose=OTHER Number Of Points=5 Point Spacing=1.5 Line Spacing=	Coordinate Frame=CELESTIAL Pattern Orientation=0 Angle Between Sides= Center Pattern=false		(1)				
Solar System Targets	#	Name	Level 1	Level 2	Level 3	Window	Ephem Center			
	(1)	2014MU69	TYPE=ASTEROID,A=44.1391072755 2167,E=0.0449706694222827,I=2.450 303934722035,O=159.0420382227352 ,W=192.1577572255627,M=294.2232 035908972,EQUINOX=J2000,EPOCH =01-SEP- 2014:00:00:00,EpochTimeScale=TDB <i>Comments: Using JPL #01 orbital elements.</i>				EARTH			
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	2014MU69, July	(1) 2014MU69	WFC3/UVIS, ACCUM, UVIS2	F350LP		POS TARG 0,5; GS ACQ SCENARI O BASE1B3	Sequence 1-1 Non-Int in 2014MU69, July (03) Pattern 2, Exps 1-1 in Sequence 1-1 Non-Int in 2014MU69, July (03) (2)	368.0 Secs (1840 Secs) [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)] [==>(Pattern 5)]	[1]

