



14926 - Astrometry of occultation stars for 2014MU69, New Horizons extended mission target

Cycle: 24, Proposal Category: GO/DD

(Availability Mode: AVAILABLE)

INVESTIGATORS

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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) MU20170603	WFC3/UVIS	1	11-Apr-2017 21:02:08.0	yes
02	(2) MU20170710	WFC3/UVIS	1	11-Apr-2017 21:02:10.0	yes
03	(3) MU20170717	WFC3/UVIS	1	11-Apr-2017 21:02:12.0	yes

3 Total Orbits Used

ABSTRACT

We propose observations of three stars predicted to be occulted by Classical TNO (486958) 2014MU69 in 2017. These imaging observations will be used to improve the determination of the stellar proper motions. Without these observations, the uncertainty in the ground-track prediction is dominated by the uncertainty on the proper motions. With these observations, the prediction will be limited by the uncertainty in the orbit determination for 2014MU69 and good enough to enable observational campaigns. This represents a reduction in the prediction uncertainty by

roughly a factor of 4. This improvement makes a ground-based observing campaign and a SOFIA observation possible. These observations contribute to the pre-encounter investigation of the New Horizons extended mission target whose flyby will take place on 2019 Jan 1.

OBSERVING DESCRIPTION

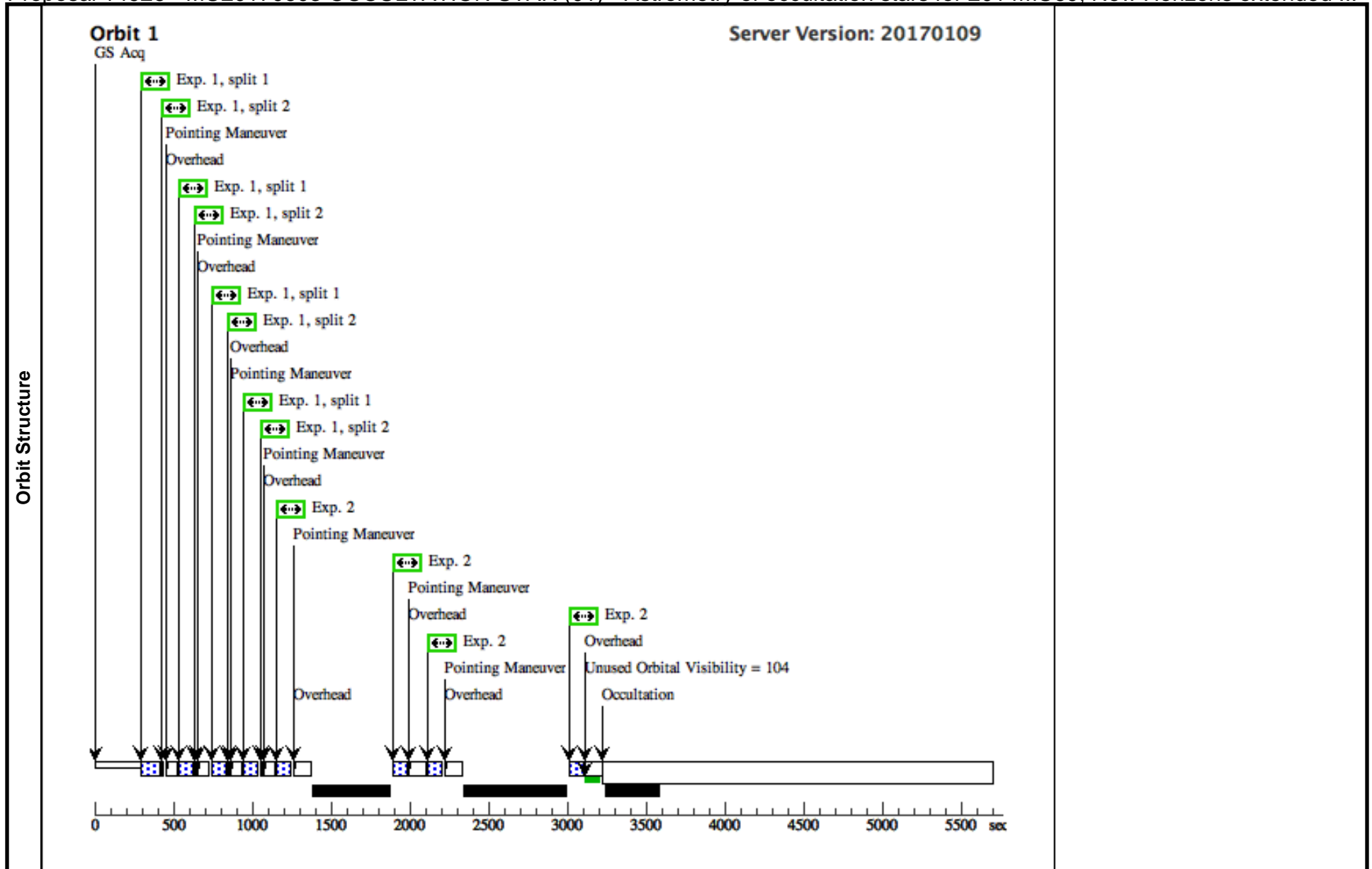
Plan A: This visit sequence is for the June 3 and July 10 stars, both at about $R=15$. The strategy combines short-exposure sub-frame images with full-field longer exposure images. The short exposures are set to expose on the target stars without saturation. Using sub-frames allows getting more images in an orbit. The full-frame images will saturate the target star but will provide much higher SNR data on fainter field stars and allow us to calibrate all stars in the sub-frame to get them onto the Gaia astrometric reference frame. There are eight short exposures, 5 seconds each, with the F350LP filter using a 1K sub-array and a 4-point box dither pattern (repeated twice). There are four long exposures, 90 seconds each, with the F350LP filter, a 4-point box dither and full frame (UVIS1+UVIS2) FOV. The pointing will be set up so that the target star does not move in absolute pixel coordinates between long and short exposures. The long exposure time is not critical and can be adjusted downward to ensure the pattern fits in a single visibility window when scheduled. The signal-to-noise ratio on the short exposures is high enough that we will be dominated by GAIA DR1 catalog errors. The choice of filter in this case is somewhat arbitrary but in using the same filter as for our 2014 MU69 astrometry we will be able to use these new images to improve our PSF modeling on those data.

Plan B: This visit sequence is for the July 17 star, at $R=12.5$. Due to the source brightness, we will use the F475W (g') filter. The basic observing pattern is same as for Plan A but the short exposure time is 1.5 seconds and the long exposure time is 27 seconds.

Proposal 14926 - MU20170603 OCCULTATION STAR (01) - Astrometry of occultation stars for 2014MU69, New Horizons extended ...

Wed Apr 12 01:02:13 GMT 2017

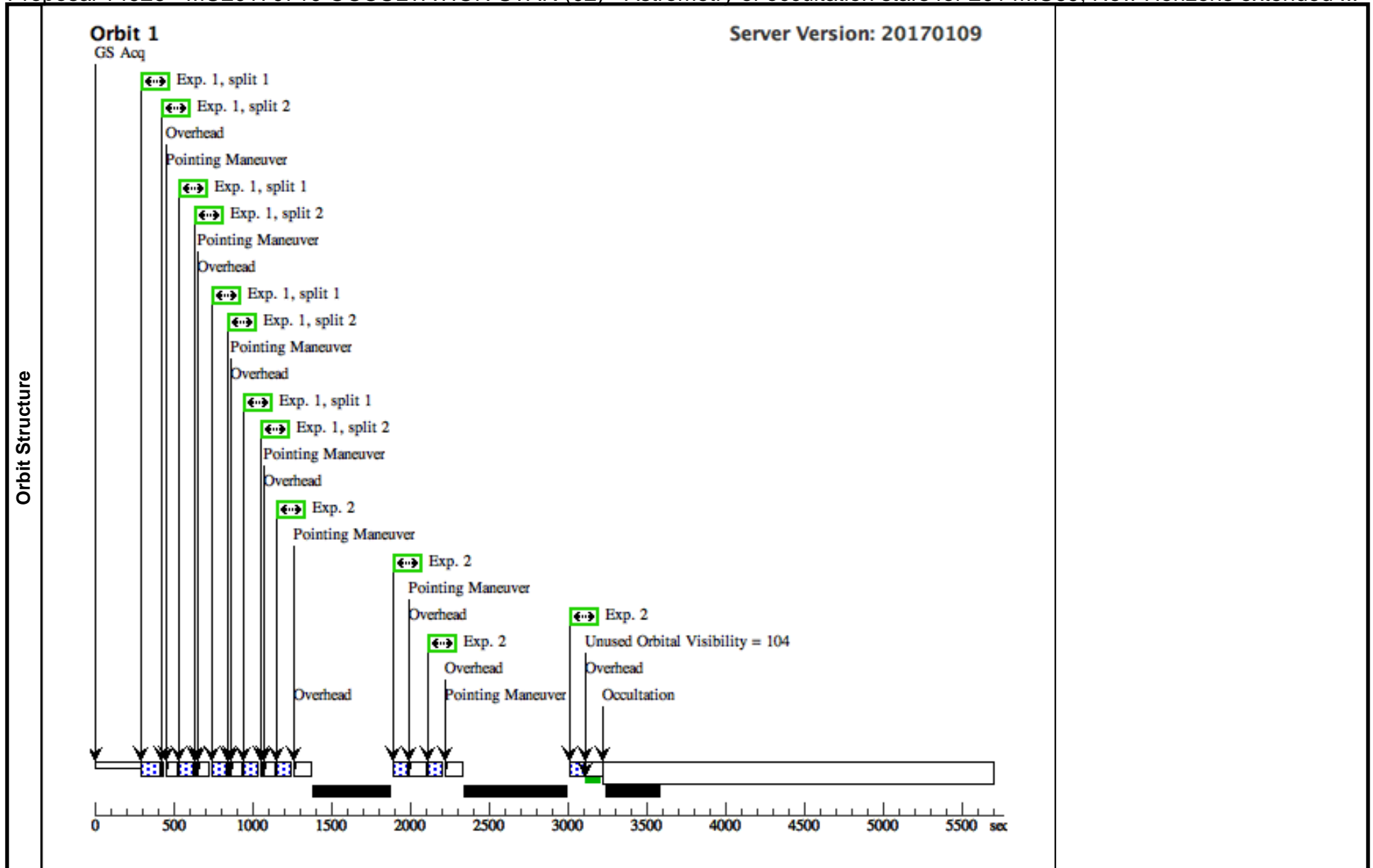
Visit	Proposal 14926, MU20170603 OCCULTATION STAR (01), implementation Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS Special Requirements: (none) <i>Comments: Observations consist of a set of exposures that just avoid saturation on the target star using a 1k sub-array and then a longer exposure set to get nearby fainter field stars and thus the target will be saturated on these. All observations should be done within a single visibility window. Observations need to be scheduled as soon as possible without being a disruptive TOO. The event is on 2017-06-03 so these observations need to schedule in early May to give sufficient time to provide prediction updates needed for deployment of ground-based assets for the occultation.</i>									
	Patterns	#	Primary Pattern				Secondary Pattern			Exposures
(2)		Pattern Type=WFC3-UVIS-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.173 Line Spacing=0.112				Coordinate Frame=POS-TARG Pattern Orientation=23.884 Angle Between Sides=81.785 Center Pattern=false			(1), (2)	
Fixed Targets	#	Name	Target Coordinates		Targ. Coord. Corrections		Fluxes	Miscellaneous		
	(1)	MU20170603	RA: 19 03 34.4926 (285.8937192d) Dec: -20 34 39.34 (-20.57759d) Equinox: J2000				V=15.4+/-0.1	Reference Frame: ICRS		
<i>Comments: g' = 15.15, G5 apparent</i>										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	SHORT EX POSURES	(1) MU20170603	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F350LP	FLASH=12; CR-SPLIT=2; BLADE=A		Pattern 2, Exps 1-1 in MU20170603 OCCULTATION STAR (01) (2)	10 Secs (40 Secs) [==>(Pattern 1, Split 1)] [==>(Pattern 1, Split 2)] [==>(Pattern 2, Split 1)] [==>(Pattern 2, Split 2)] [==>(Pattern 3, Split 1)] [==>(Pattern 3, Split 2)] [==>(Pattern 4, Split 1)] [==>(Pattern 4, Split 2)]	[1]
	2	LONG EXP OSURES	(1) MU20170603	WFC3/UVIS, ACCUM, UVIS2-C1K1C-CTE	F350LP	FLASH=6		Pattern 2, Exps 2-2 in MU20170603 OCCULTATION STAR (01) (2)	90 Secs (360 Secs) [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]
<i>Comments: The intention of this visit is to get more of the fainter field stars around the target star but across a wider field. Ignoring the edither pattern, the target star should be in the same location on the detector as the short exposure set.</i>										



Proposal 14926 - MU20170710 OCCULTATION STAR (02) - Astrometry of occultation stars for 2014MU69, New Horizons extended ...

Wed Apr 12 01:02:13 GMT 2017

Visit	Proposal 14926, MU20170710 OCCULTATION STAR (02), implementation Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS Special Requirements: (none) <i>Comments: Observations consist of a set of exposures that just avoid saturation on the target star using a 1k sub-array and then a longer exposure set to get nearby fainter field stars and thus the target will be saturated on these. All observations should be done within a single visibility window. Observations need to be scheduled as soon as possible without being a disruptive TOO. These observations should be done no later than mid-June but earlier is better.</i>									
	Patterns	#	Primary Pattern				Secondary Pattern			Exposures
(2)		Pattern Type=WFC3-UVIS-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.173 Line Spacing=0.112				Coordinate Frame=POS-TARG Pattern Orientation=23.884 Angle Between Sides=81.785 Center Pattern=false			(1), (2)	
Fixed Targets	#	Name	Target Coordinates		Targ. Coord. Corrections		Fluxes	Miscellaneous		
	(2)	MU20170710	RA: 19 00 41.6205 (285.1734187d) Dec: -20 38 44.54 (-20.64571d) Equinox: J2000				V=15.4+/-0.1	Reference Frame: ICRS		
<i>Comments: g' = 15.43, G0 apparent</i>										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	SHORT EX POSURES	(2) MU20170710	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F350LP	FLASH=12; CR-SPLIT=2; BLADE=A		Pattern 2, Exps 1-1 in MU20170710 OCCULTATION STAR (02) (2)	10 Secs (40 Secs) [==>(Pattern 1, Split 1)] [==>(Pattern 1, Split 2)] [==>(Pattern 2, Split 1)] [==>(Pattern 2, Split 2)] [==>(Pattern 3, Split 1)] [==>(Pattern 3, Split 2)] [==>(Pattern 4, Split 1)] [==>(Pattern 4, Split 2)]	[1]
	2	LONG EXP OSURES	(2) MU20170710	WFC3/UVIS, ACCUM, UVIS2-C1K1C-CTE	F350LP	FLASH=6		Pattern 2, Exps 2-2 in MU20170710 OCCULTATION STAR (02) (2)	90 Secs (360 Secs) [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]
<i>Comments: The intention of this visit is to get more of the fainter field stars around the target star but across a wider field. Ignoring the edither pattern, the target star should be in the same location on the detector as the short exposure set.</i>										



Proposal 14926 - MU20170717 OCCULTATION STAR (03) - Astrometry of occultation stars for 2014MU69, New Horizons extended ...

Wed Apr 12 01:02:13 GMT 2017

Visit	Proposal 14926, MU20170717 OCCULTATION STAR (03), implementation Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS Special Requirements: (none) <i>Comments: Observations consist of a set of exposures that just avoid saturation on the target star using a 1k sub-array and then a longer exposure set to get nearby fainter field stars and thus the target will be saturated on these. All observations should be done within a single visibility window. Observations need to be scheduled as soon as possible without being a disruptive TOO. These observations should be done no later than mid-June but earlier is better.</i>									
	Patterns	#	Primary Pattern				Secondary Pattern			Exposures
(2)		Pattern Type=WFC3-UVIS-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.173 Line Spacing=0.112				Coordinate Frame=POS-TARG Pattern Orientation=23.884 Angle Between Sides=81.785 Center Pattern=false			(1), (2)	
Fixed Targets	#	Name	Target Coordinates		Targ. Coord. Corrections		Fluxes	Miscellaneous		
	(3)	MU20170717	RA: 19 00 8.2926 (285.0345525d) Dec: -20 39 37.96 (-20.66054d) Equinox: J2000				V=12.5+/-0.1	Reference Frame: ICRS		
<i>Comments: g' = 12.60, K3 apparent</i>										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	SHORT EX POSURES	(3) MU20170717	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F438W	FLASH=12; CR-SPLIT=2; BLADE=A		Pattern 2, Exps 1-1 in MU20170717 OCCULTATION STAR (03) (2)	10 Secs (40 Secs) [==>(Pattern 1, Split 1)] [==>(Pattern 1, Split 2)] [==>(Pattern 2, Split 1)] [==>(Pattern 2, Split 2)] [==>(Pattern 3, Split 1)] [==>(Pattern 3, Split 2)] [==>(Pattern 4, Split 1)] [==>(Pattern 4, Split 2)]	[1]
	2	LONG EXP OSURES	(3) MU20170717	WFC3/UVIS, ACCUM, UVIS2-C1K1C-CTE	F438W	FLASH=12		Pattern 2, Exps 2-2 in MU20170717 OCCULTATION STAR (03) (2)	90 Secs (360 Secs) [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]
<i>Comments: The intention of this visit is to get more of the fainter field stars around the target star but across a wider field. Ignoring the edither pattern, the target star should be in the same location on the detector as the short exposure set.</i>										

