



16043 - Characterization of the second interstellar object

Cycle: 27, Proposal Category: GO

(Availability Mode: SUPPORTED)

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) I2-BOROSOV	WFC3/UVIS	1	04-Dec-2019 13:01:32.0	yes
02	(1) I2-BOROSOV	WFC3/UVIS	1	04-Dec-2019 13:01:33.0	yes
03	(1) I2-BOROSOV	WFC3/UVIS	1	04-Dec-2019 13:01:34.0	yes
04	(1) I2-BOROSOV	WFC3/UVIS	1	04-Dec-2019 13:01:34.0	yes
05	(1) I2-BOROSOV	WFC3/UVIS	1	04-Dec-2019 13:01:35.0	yes
06	(1) I2-BOROSOV	WFC3/UVIS	1	04-Dec-2019 13:01:36.0	yes

<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>
07	(1) I2-BOROSOV	WFC3/UVIS	1	04-Dec-2019 13:01:37.0	yes
08	(1) I2-BOROSOV	WFC3/UVIS	1	04-Dec-2019 13:01:37.0	yes
09	(1) I2-BOROSOV	WFC3/UVIS	1	04-Dec-2019 13:01:38.0	yes
10	(1) I2-BOROSOV	WFC3/UVIS	1	04-Dec-2019 13:01:39.0	yes
11	(1) I2-BOROSOV	WFC3/UVIS	1	04-Dec-2019 13:01:40.0	yes
12	(1) I2-BOROSOV	WFC3/UVIS	1	04-Dec-2019 13:01:40.0	yes
13	(1) I2-BOROSOV	WFC3/UVIS	1	04-Dec-2019 13:01:41.0	yes
14	(1) I2-BOROSOV	WFC3/UVIS	1	04-Dec-2019 13:01:42.0	yes

14 Total Orbits Used

ABSTRACT

We request HST WFC3/UVIS observations of I2/Borosov, a recently discovered comet that is on a hyperbolic orbit, originating from outside the Solar System. This is only the second interstellar object to be discovered, and is arguably a more exciting object because it allows us to explore the diversity of these left-over relicts of extrasolar planetary system formation. One of the most intriguing aspects of the first interstellar object, 1I/2017 U1 `Oumuamua, was its highly elongated shape. The wealth of ideas published in numerous papers showed that this aspect had the potential to provide information about processing in the ISM, affects on planetesimals during the process of ejection from their home system either at the time of formation or as the home star was evolving off the main sequence. It will be particularly exciting to ascertain the shape of the second interstellar object. I2/Borosov is quite active at its current distance of 2.8 au. Because the flux from the nucleus is now swamped by the dust coma until the comet is outbound and getting very faint, this observation requires HST. With HST's unparalleled resolution this will enable us to remove the coma and observe the nucleus light curve.

OBSERVING DESCRIPTION

There are two goals for this observing program and both benefit from iteration during scheduling to optimize the outcome based on observing window options. The first goal is to measure or constrain the rotation state of the object. So far, the bright coma has been masking the potential modulation due to the rotation of the nucleus. The overall scheduling window is chosen to give us the best SNR for the nucleus lightcurve constraint. In general, after perihelion the coma will decline due to reduced activity. This consideration pushes us to later observing epochs. At the same time,

Proposal 16043 (STScI Edit Number: 0, Created: Wednesday, December 4, 2019 at 1:01:42 PM Eastern Standard Time) - Overview
the heliocentric and geocentric distance will be increasing and the nuclear brightness will also decrease. Based on initial models, the ideal window is Dec 2019 to Feb 2020 and this is the initial window but this could change with updated information about the object.

Each orbit is intended to be its own visit. Due to the readout overheads on WFC3, we cannot use the time savings for reusing a guide star from one orbit to the next. By having independent guide stars we also preserve the option for customized POSTARG values if needed for optimizing reference star placement on the image.

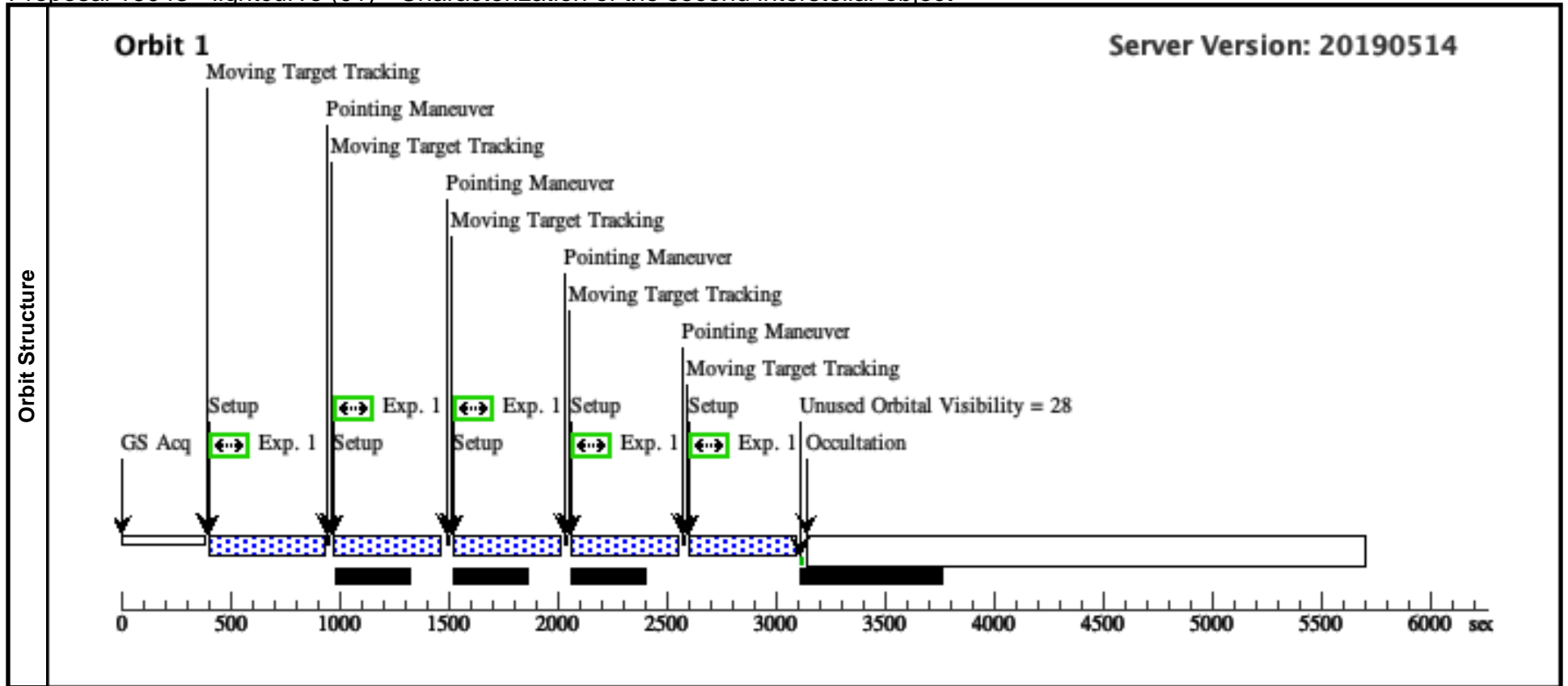
The most important part of the timing of the visits is to minimize gaps between visits and minimize the time from first visit to the last. These considerations come from wanting to maximize the range of rotation periods we will be sensitive to.

The second goal of these data are to extract high-precision astrometry from the images. We will need to check the proposed observation windows for suitable reference stars as well as avoiding having the target overlap with objects in the field. We have tools already developed for this that were used in prior observations with `Oumuamua. Due to the general level of background stars expected, scheduling earlier in our 3 month window is likely to be best but this will be evaluated once there are candidate scheduling options.

Proposal 16043 - lightcurve (01) - Characterization of the second interstellar object

Wed Dec 04 18:01:42 GMT 2019

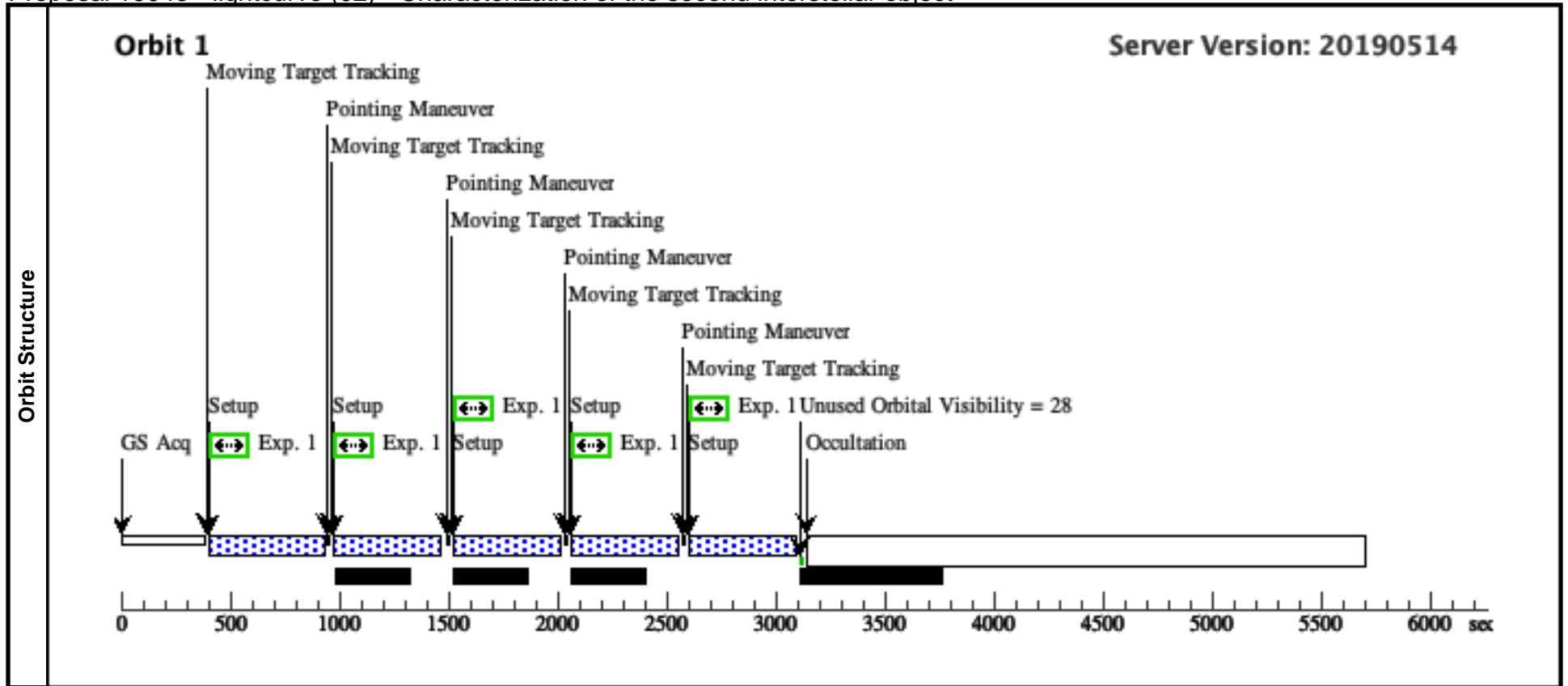
Visit	Proposal 16043, lightcurve (01), implementation Diagnostic Status: Warning Scientific Instruments: WFC3/UVIS Special Requirements: ORIENT 291.85D TO 291.85 D; BETWEEN 01-DEC-2019:00:00:00 AND 01-MAR-2020:00:00:00; GROUP 01,02,03,04,05,06,07,08,09,10,11,12,13,14 WITHIN 3D <i>Comments: All visits have the same structure with 5 long, dithered exposures that fill the orbit. The only variable is how the visits are scheduled.</i>									
	(Exposure 1 (Pattern 1, Exps 1-1 in Sequence 1-1 Non-Int in lightcurve (01)) special requirements) Warning (Form): Be very careful mixing POS TARG and Center_Pattern = Yes									
Diagnosics										
Patterns	#	Primary Pattern			Secondary Pattern		Exposures			
	(1)	Pattern Type=LINE Purpose=OTHER Number Of Points=5 Point Spacing=0.03 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)	I2-BOROSOV	TYPE=COMET,Q=2.0066316719435 I2,E=3.357186641306118,I=44.05177 560961525 ,O=308.1489574182682,W=209.12373 39804854,T=08-DEC- 2019:13:15:25,TTimeScale=TDB,EQ UINOX=J2000,EPOCH=20-DEC- 2019:00:00:00,EpochTimeScale=TDB				EARTH			
<i>Comments: Description=Comet I2/Borisov Extended=YES</i>										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(1) I2-BOROSOV	WFC3/UVIS, ACCUM, UVIS2	F350LP		POS TARG -16,0	Sequence 1-1 Non-Int in lightcurve (01) Pattern 1, Exps 1-1 in Sequence 1-1 Non-Int in lightcurve (01) (1)	380 Secs (1900 Secs) [=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)] [=>(Pattern 4)] [=>(Pattern 5)]	[1]



Proposal 16043 - lightcurve (02) - Characterization of the second interstellar object

Wed Dec 04 18:01:43 GMT 2019

Visit	Proposal 16043, lightcurve (02), implementation Diagnostic Status: Warning Scientific Instruments: WFC3/UVIS Special Requirements: ORIENT 291.87D TO 291.87 D <i>Comments: All visits have the same structure with 5 long, dithered exposures that fill the orbit. The only variable is how the visits are scheduled.</i>									
	(Exposure 1 (Pattern 1, Exps 1-1 in Sequence 1-1 Non-Int in lightcurve (02)) special requirements) Warning (Form): Be very careful mixing POS TARG and Center_Pattern = Yes									
Diagnosics										
Patterns	#	Primary Pattern		Secondary Pattern		Exposures				
	(1)	Pattern Type=LINE Purpose=OTHER Number Of Points=5 Point Spacing=0.03 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)	I2-BOROSOV	TYPE=COMET,Q=2.0066316719435 I2,E=3.357186641306118,I=44.05177 560961525 ,O=308.1489574182682,W=209.12373 39804854,T=08-DEC- 2019:13:15:25,TTimeScale=TDB,EQ UINOX=J2000,EPOCH=20-DEC- 2019:00:00:00,EpochTimeScale=TDB				EARTH			
<i>Comments: Description=Comet I2/Borisov Extended=YES</i>										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(1) I2-BOROSOV	WFC3/UVIS, ACCUM, UVIS2	F350LP		POS TARG -24,8	Sequence 1-1 Non-Int in lightcurve (02) Pattern 1, Exps 1-1 in Sequence 1-1 Non-Int in lightcurve (02) (1)	380 Secs (1900 Secs) [=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)] [=>(Pattern 4)] [=>(Pattern 5)]	[1]



Proposal 16043 - lightcurve (03) - Characterization of the second interstellar object

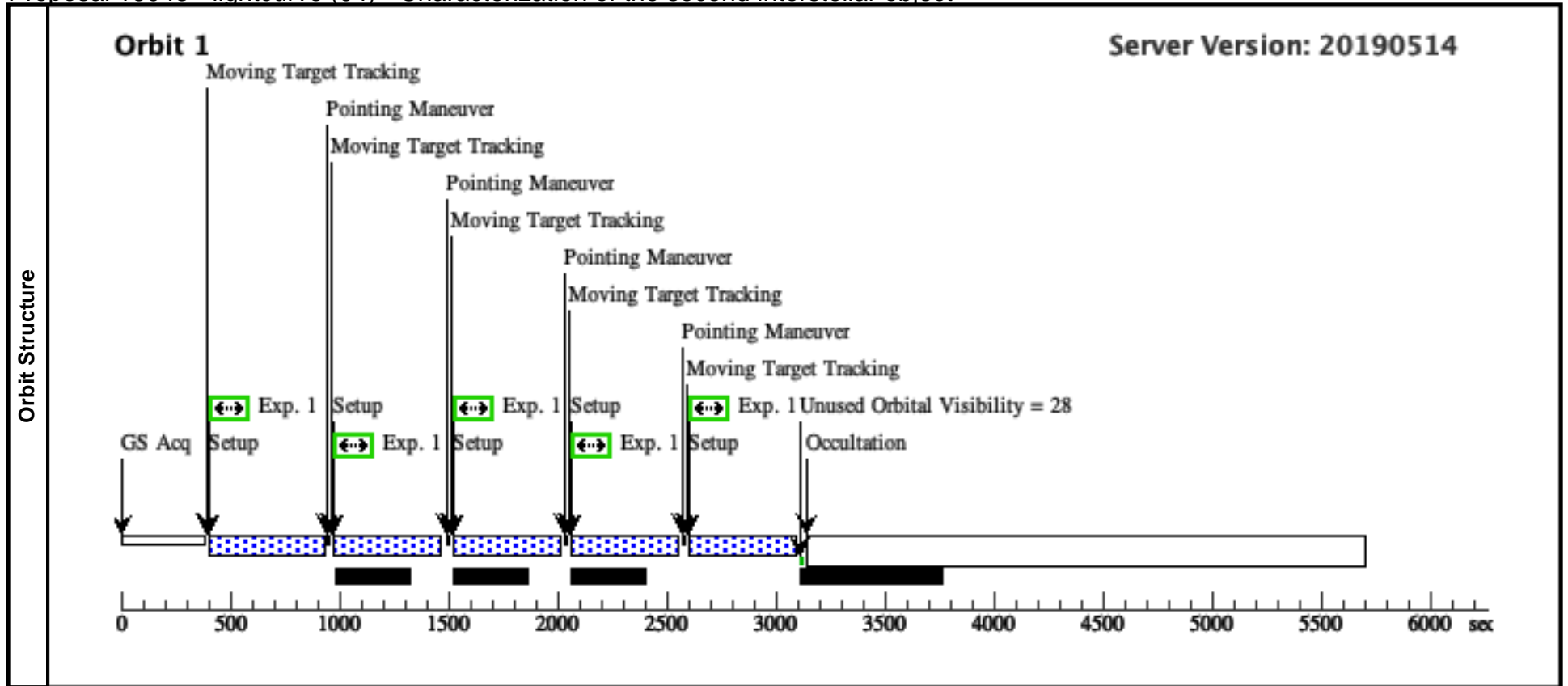
Wed Dec 04 18:01:43 GMT 2019

Visit	Proposal 16043, lightcurve (03), implementation Diagnostic Status: Warning Scientific Instruments: WFC3/UVIS Special Requirements: ORIENT 296.72D TO 296.72 D <i>Comments: All visits have the same structure with 5 long, dithered exposures that fill the orbit. The only variable is how the visits are scheduled.</i>									
	(Exposure 1 (Pattern 1, Exps 1-1 in Sequence 1-1 Non-Int in lightcurve (03)) special requirements) Warning (Form): Be very careful mixing POS TARG and Center_Pattern = Yes									
Diagnosics										
Patterns	#	Primary Pattern		Secondary Pattern		Exposures				
	(1)	Pattern Type=LINE Purpose=OTHER Number Of Points=5 Point Spacing=0.03 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)	I2-BOROSOV	TYPE=COMET,Q=2.0066316719435 I2,E=3.357186641306118,I=44.05177 560961525 ,O=308.1489574182682,W=209.12373 39804854,T=08-DEC- 2019:13:15:25,TTimeScale=TDB,EQ UINOX=J2000,EPOCH=20-DEC- 2019:00:00:00,EpochTimeScale=TDB				EARTH			
<i>Comments: Description=Comet I2/Borisov Extended=YES</i>										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(1) I2-BOROSOV	WFC3/UVIS, ACCUM, UVIS2	F350LP		POS TARG 0,0	Sequence 1-1 Non-Int in lightcurve (03) Pattern 1, Exps 1-1 in Sequence 1-1 Non-Int in lightcurve (03) (1)	380 Secs (1900 Secs) [=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)] [=>(Pattern 4)] [=>(Pattern 5)]	[1]

Proposal 16043 - lightcurve (04) - Characterization of the second interstellar object

Wed Dec 04 18:01:43 GMT 2019

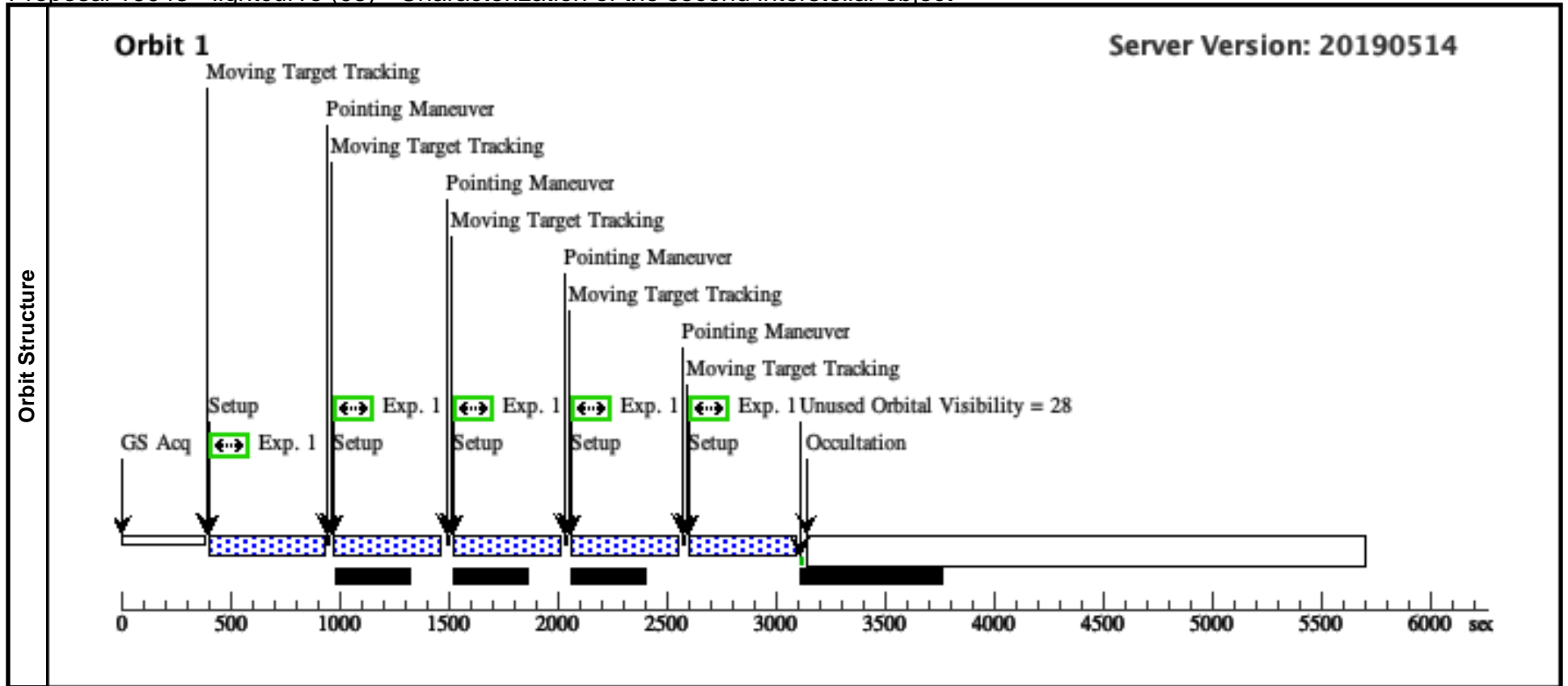
Visit	Proposal 16043, lightcurve (04), implementation Diagnostic Status: Warning Scientific Instruments: WFC3/UVIS Special Requirements: ORIENT 292.60D TO 292.60 D <i>Comments: All visits have the same structure with 5 long, dithered exposures that fill the orbit. The only variable is how the visits are scheduled.</i>									
	(Exposure 1 (Pattern 1, Exps 1-1 in Sequence 1-1 Non-Int in lightcurve (04)) special requirements) Warning (Form): Be very careful mixing POS TARG and Center_Pattern = Yes									
Diagnosics										
Patterns	#	Primary Pattern		Secondary Pattern		Exposures				
	(1)	Pattern Type=LINE Purpose=OTHER Number Of Points=5 Point Spacing=0.03 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)	I2-BOROSOV	TYPE=COMET,Q=2.0066316719435 I2,E=3.357186641306118,I=44.05177 560961525 ,O=308.1489574182682,W=209.12373 39804854,T=08-DEC- 2019:13:15:25,TimeScale=TDB,EQ UINOX=J2000,EPOCH=20-DEC- 2019:00:00:00,EpochTimeScale=TDB				EARTH			
<i>Comments: Description=Comet I2/Borisov Extended=YES</i>										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(1) I2-BOROSOV	WFC3/UVIS, ACCUM, UVIS2	F350LP		POS TARG 0,0	Sequence 1-1 Non-Int in lightcurve (04) Pattern 1, Exps 1-1 in Sequence 1-1 Non-Int in lightcurve (04) (1)	380 Secs (1900 Secs) [=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)] [=>(Pattern 4)] [=>(Pattern 5)]	[1]



Proposal 16043 - lightcurve (05) - Characterization of the second interstellar object

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Visit	Proposal 16043, lightcurve (05), implementation Diagnostic Status: Warning Scientific Instruments: WFC3/UVIS Special Requirements: ORIENT 292.67D TO 292.67 D <i>Comments: All visits have the same structure with 5 long, dithered exposures that fill the orbit. The only variable is how the visits are scheduled.</i>									
	(Exposure 1 (Pattern 1, Exps 1-1 in Sequence 1-1 Non-Int in lightcurve (05)) special requirements) Warning (Form): Be very careful mixing POS TARG and Center_Pattern = Yes									
Diagnosics										
Patterns	#	Primary Pattern		Secondary Pattern		Exposures				
	(1)	Pattern Type=LINE Purpose=OTHER Number Of Points=5 Point Spacing=0.03 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)	I2-BOROSOV	TYPE=COMET,Q=2.0066316719435 I2,E=3.357186641306118,I=44.05177 560961525 ,O=308.1489574182682,W=209.12373 39804854,T=08-DEC- 2019:13:15:25,TimeScale=TDB,EQ UINOX=J2000,EPOCH=20-DEC- 2019:00:00:00,EpochTimeScale=TDB				EARTH			
<i>Comments: Description=Comet I2/Borisov Extended=YES</i>										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(1) I2-BOROSOV	WFC3/UVIS, ACCUM, UVIS2	F350LP		POS TARG 0,0	Sequence 1-1 Non-Int in lightcurve (05) Pattern 1, Exps 1-1 in Sequence 1-1 Non-Int in lightcurve (05) (1)	380 Secs (1900 Secs) [=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)] [=>(Pattern 4)] [=>(Pattern 5)]	[1]



Proposal 16043 - lightcurve (06) - Characterization of the second interstellar object

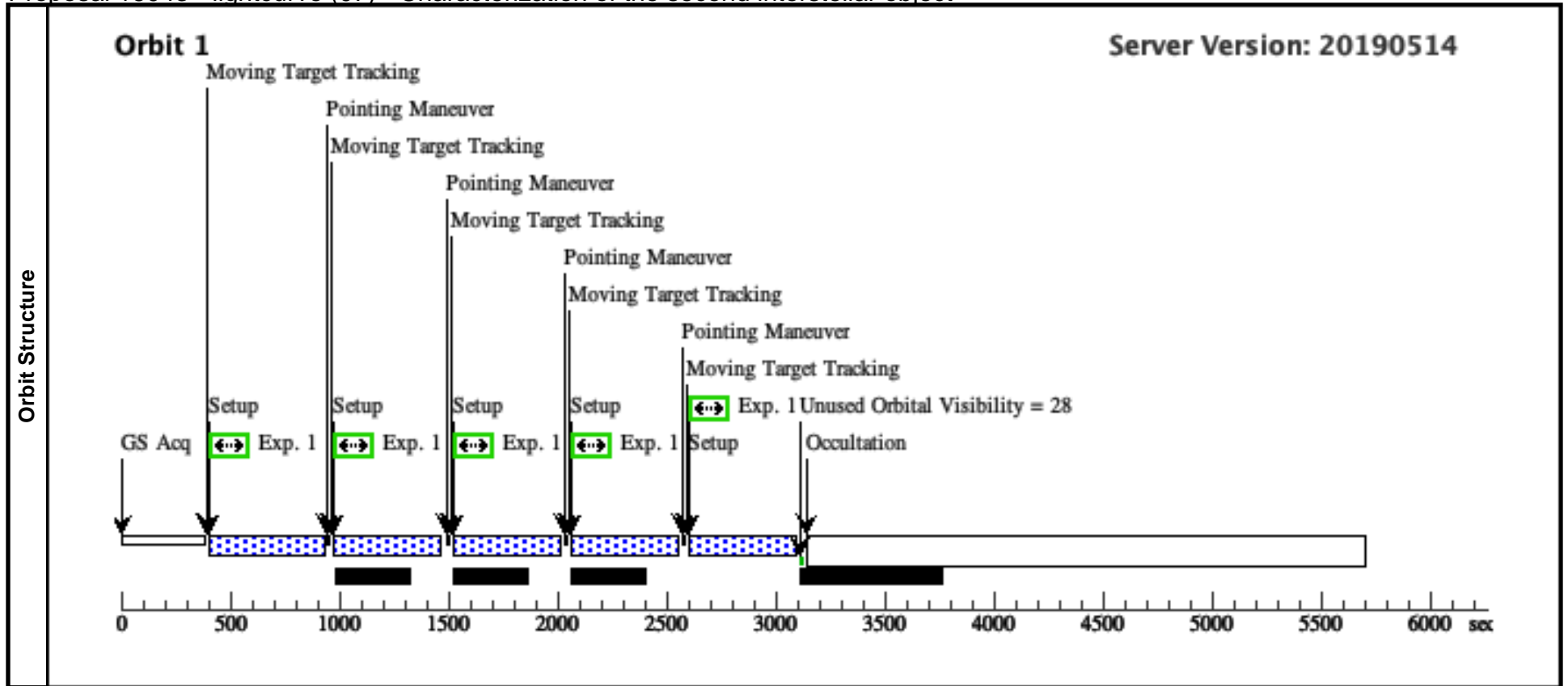
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Visit	Proposal 16043, lightcurve (06), implementation Diagnostic Status: Warning Scientific Instruments: WFC3/UVIS Special Requirements: ORIENT 291.7D TO 291.75 D <i>Comments: All visits have the same structure with 5 long, dithered exposures that fill the orbit. The only variable is how the visits are scheduled.</i>									
	(Exposure 1 (Pattern 1, Exps 1-1 in Sequence 1-1 Non-Int in lightcurve (06)) special requirements) Warning (Form): Be very careful mixing POS TARG and Center_Pattern = Yes									
Diagnosics										
Patterns	#	Primary Pattern		Secondary Pattern		Exposures				
	(1)	Pattern Type=LINE Purpose=OTHER Number Of Points=5 Point Spacing=0.03 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)	I2-BOROSOV	TYPE=COMET,Q=2.0066316719435 I2,E=3.357186641306118,I=44.05177 560961525 ,O=308.1489574182682,W=209.12373 39804854,T=08-DEC- 2019:13:15:25,TTimeScale=TDB,EQ UINOX=J2000,EPOCH=20-DEC- 2019:00:00:00,EpochTimeScale=TDB				EARTH			
<i>Comments: Description=Comet I2/Borisov Extended=YES</i>										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(1) I2-BOROSOV	WFC3/UVIS, ACCUM, UVIS2	F350LP		POS TARG 40,0	Sequence 1-1 Non-Int in lightcurve (06) Pattern 1, Exps 1-1 in Sequence 1-1 Non-Int in lightcurve (06) (1)	380 Secs (1900 Secs) [=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)] [=>(Pattern 4)] [=>(Pattern 5)]	[1]

Proposal 16043 - lightcurve (07) - Characterization of the second interstellar object

Wed Dec 04 18:01:43 GMT 2019

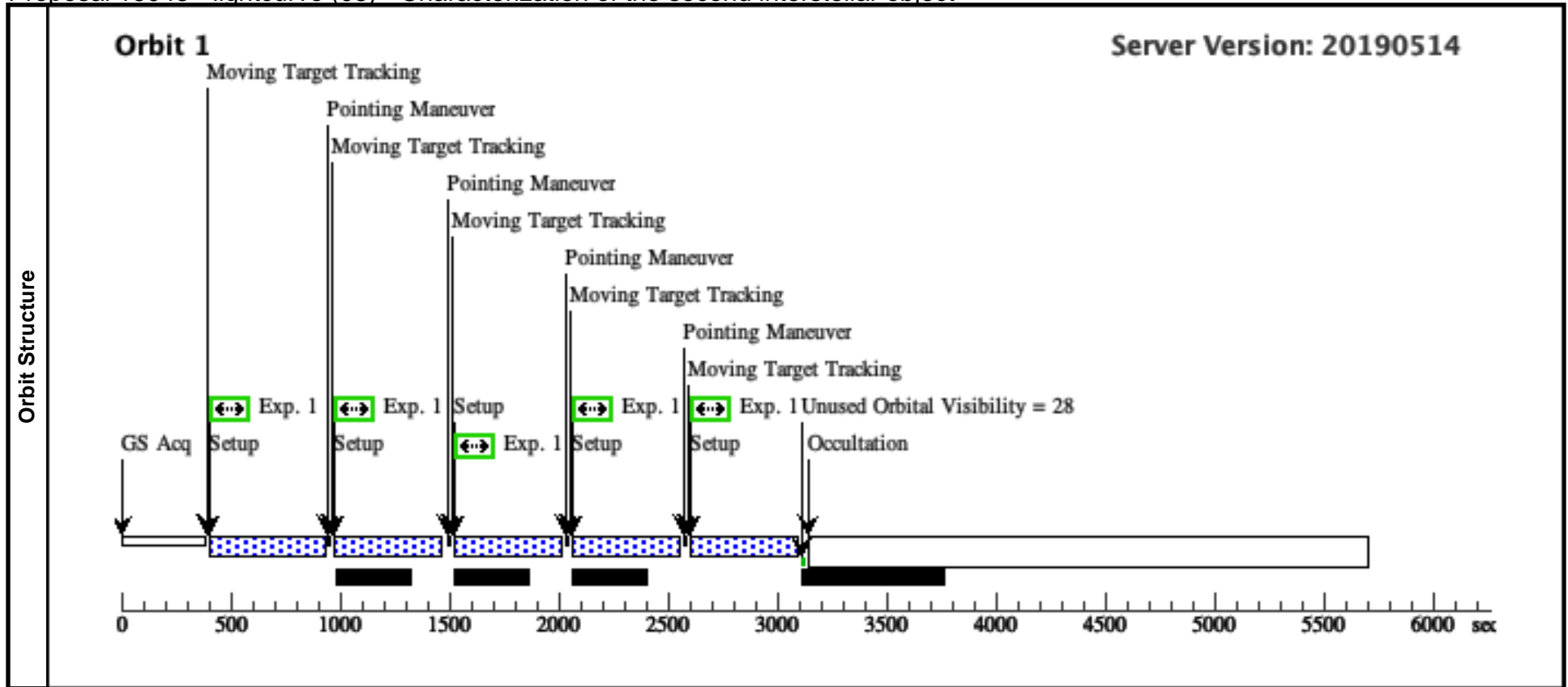
Visit	Proposal 16043, lightcurve (07), implementation Diagnostic Status: Warning Scientific Instruments: WFC3/UVIS Special Requirements: ORIENT 292.04D TO 292.04 D <i>Comments: All visits have the same structure with 5 long, dithered exposures that fill the orbit. The only variable is how the visits are scheduled.</i>									
	(Exposure 1 (Pattern 1, Exps 1-1 in Sequence 1-1 Non-Int in lightcurve (07)) special requirements) Warning (Form): Be very careful mixing POS TARG and Center_Pattern = Yes									
Diagnosics										
Patterns	#	Primary Pattern		Secondary Pattern		Exposures				
	(1)	Pattern Type=LINE Purpose=OTHER Number Of Points=5 Point Spacing=0.03 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)	I2-BOROSOV	TYPE=COMET,Q=2.0066316719435 I2,E=3.357186641306118,I=44.05177 560961525 ,O=308.1489574182682,W=209.12373 39804854,T=08-DEC- 2019:13:15:25,TTimeScale=TDB,EQ UINOX=J2000,EPOCH=20-DEC- 2019:00:00:00,EpochTimeScale=TDB				EARTH			
<i>Comments: Description=Comet I2/Borisov Extended=YES</i>										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(1) I2-BOROSOV	WFC3/UVIS, ACCUM, UVIS2	F350LP		POS TARG 48,0	Sequence 1-1 Non-Int in lightcurve (07) Pattern 1, Exps 1-1 in Sequence 1-1 Non-Int in lightcurve (07) (1)	380 Secs (1900 Secs) [=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)] [=>(Pattern 4)] [=>(Pattern 5)]	[1]



Proposal 16043 - lightcurve (08) - Characterization of the second interstellar object

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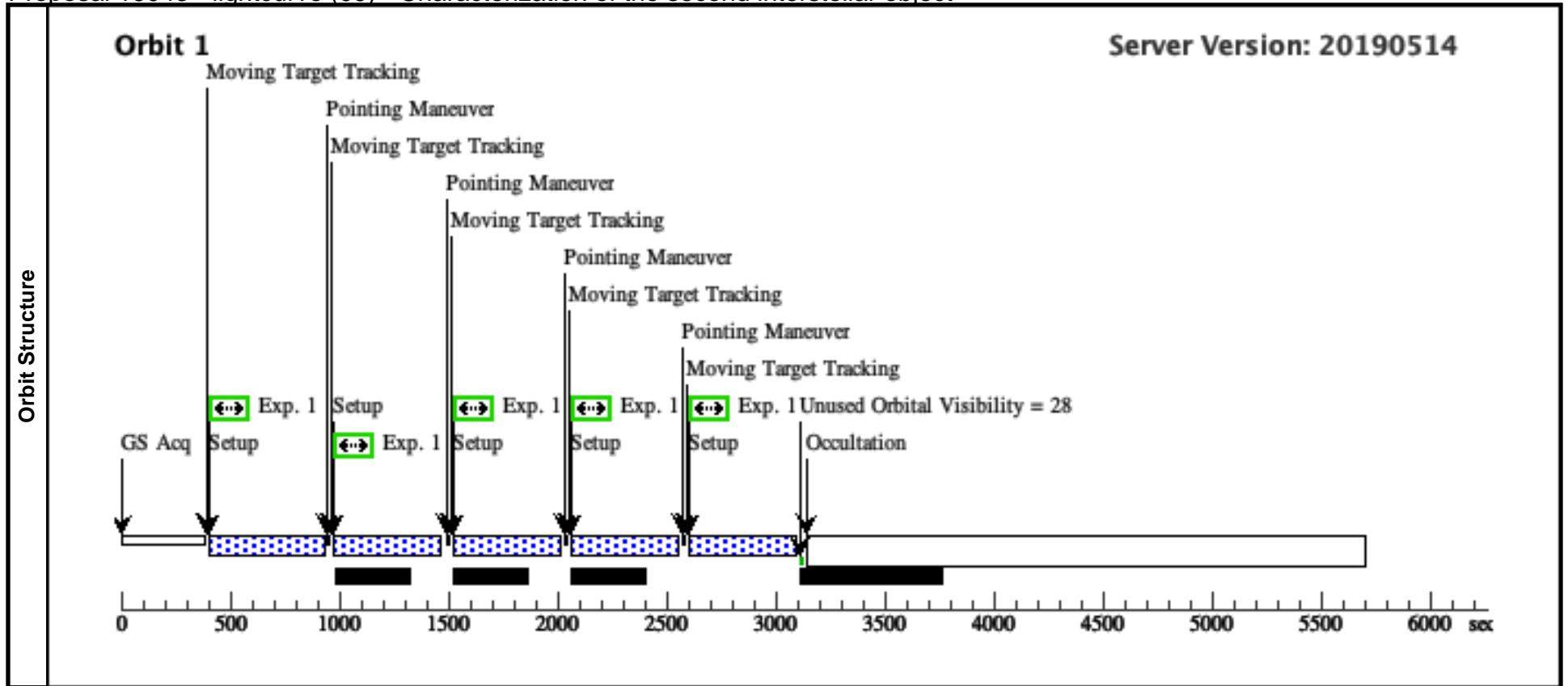
Visit	Proposal 16043, lightcurve (08), implementation Diagnostic Status: Warning Scientific Instruments: WFC3/UVIS Special Requirements: ORIENT 292.05D TO 292.05 D <i>Comments: All visits have the same structure with 5 long, dithered exposures that fill the orbit. The only variable is how the visits are scheduled.</i>									
	(Exposure 1 (Pattern 1, Exps 1-1 in Sequence 1-1 Non-Int in lightcurve (08)) special requirements) Warning (Form): Be very careful mixing POS TARG and Center_Pattern = Yes									
Diagnosics										
Patterns	#	Primary Pattern		Secondary Pattern		Exposures				
	(1)	Pattern Type=LINE Purpose=OTHER Number Of Points=5 Point Spacing=0.03 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)	I2-BOROSOV	TYPE=COMET,Q=2.0066316719435 I2,E=3.357186641306118,I=44.05177 560961525 ,O=308.1489574182682,W=209.12373 39804854,T=08-DEC- 2019:13:15:25,TTimeScale=TDB,EQ UINOX=J2000,EPOCH=20-DEC- 2019:00:00:00,EpochTimeScale=TDB				EARTH			
<i>Comments: Description=Comet I2/Borisov Extended=YES</i>										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(1) I2-BOROSOV	WFC3/UVIS, ACCUM, UVIS2	F350LP		POS TARG 0,0	Sequence 1-1 Non-Int in lightcurve (08) Pattern 1, Exps 1-1 in Sequence 1-1 Non-Int in lightcurve (08) (1)	380 Secs (1900 Secs) [=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)] [=>(Pattern 4)] [=>(Pattern 5)]	[1]



Proposal 16043 - lightcurve (09) - Characterization of the second interstellar object

Wed Dec 04 18:01:43 GMT 2019

Visit	Proposal 16043, lightcurve (09), implementation Diagnostic Status: Warning Scientific Instruments: WFC3/UVIS Special Requirements: ORIENT 292.11D TO 292.11 D <i>Comments: All visits have the same structure with 5 long, dithered exposures that fill the orbit. The only variable is how the visits are scheduled.</i>									
	(Exposure 1 (Pattern 1, Exps 1-1 in Sequence 1-1 Non-Int in lightcurve (09)) special requirements) Warning (Form): Be very careful mixing POS TARG and Center_Pattern = Yes									
Diagnosics										
Patterns	#	Primary Pattern		Secondary Pattern		Exposures				
	(1)	Pattern Type=LINE Purpose=OTHER Number Of Points=5 Point Spacing=0.03 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)	I2-BOROSOV	TYPE=COMET,Q=2.0066316719435 I2,E=3.357186641306118,I=44.05177 560961525 ,O=308.1489574182682,W=209.12373 39804854,T=08-DEC- 2019:13:15:25,TTimeScale=TDB,EQ UINOX=J2000,EPOCH=20-DEC- 2019:00:00:00,EpochTimeScale=TDB				EARTH			
<i>Comments: Description=Comet I2/Borisov Extended=YES</i>										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(1) I2-BOROSOV	WFC3/UVIS, ACCUM, UVIS2	F350LP		POS TARG -8,0	Sequence 1-1 Non-Int in lightcurve (09) Pattern 1, Exps 1-1 in Sequence 1-1 Non-Int in lightcurve (09) (1)	380 Secs (1900 Secs) [=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)] [=>(Pattern 4)] [=>(Pattern 5)]	[1]



Proposal 16043 - lightcurve (10) - Characterization of the second interstellar object

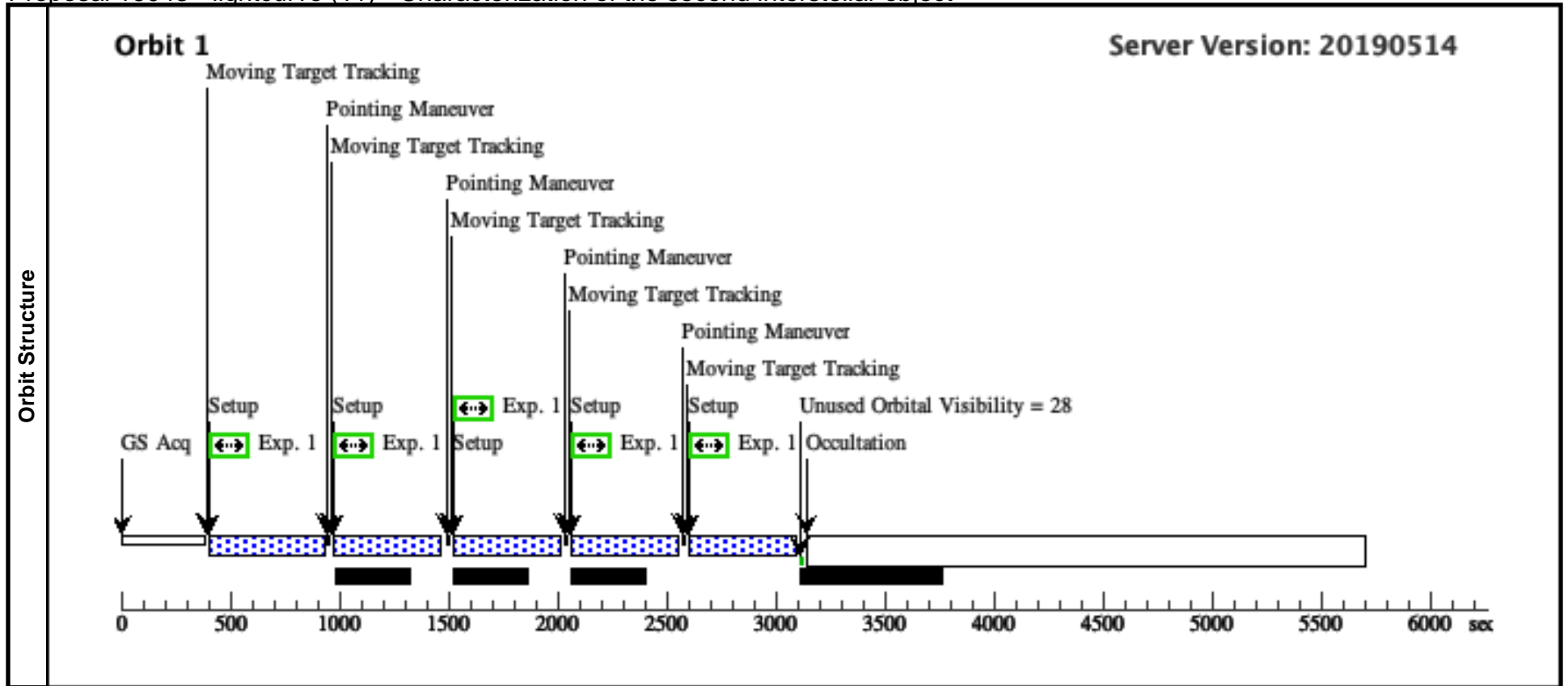
Wed Dec 04 18:01:43 GMT 2019

Visit	Proposal 16043, lightcurve (10), implementation Diagnostic Status: Warning Scientific Instruments: WFC3/UVIS Special Requirements: ORIENT 292.12D TO 292.12 D <i>Comments: All visits have the same structure with 5 long, dithered exposures that fill the orbit. The only variable is how the visits are scheduled.</i>									
	(Exposure 1 (Pattern 1, Exps 1-1 in Sequence 1-1 Non-Int in lightcurve (10)) special requirements) Warning (Form): Be very careful mixing POS TARG and Center_Pattern = Yes									
Diagnosics										
Patterns	#	Primary Pattern		Secondary Pattern		Exposures				
	(1)	Pattern Type=LINE Purpose=OTHER Number Of Points=5 Point Spacing=0.03 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)	I2-BOROSOV	TYPE=COMET,Q=2.0066316719435 I2,E=3.357186641306118,I=44.05177 560961525 ,O=308.1489574182682,W=209.12373 39804854,T=08-DEC- 2019:13:15:25,TTimeScale=TDB,EQ UINOX=J2000,EPOCH=20-DEC- 2019:00:00:00,EpochTimeScale=TDB				EARTH			
<i>Comments: Description=Comet I2/Borisov Extended=YES</i>										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(1) I2-BOROSOV	WFC3/UVIS, ACCUM, UVIS2	F350LP		POS TARG -28,0	Sequence 1-1 Non-Int in lightcurve (10) Pattern 1, Exps 1-1 in Sequence 1-1 Non-Int in lightcurve (10) (1)	380 Secs (1900 Secs) [=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)] [=>(Pattern 4)] [=>(Pattern 5)]	[1]

Proposal 16043 - lightcurve (11) - Characterization of the second interstellar object

Wed Dec 04 18:01:43 GMT 2019

Visit	Proposal 16043, lightcurve (11), implementation Diagnostic Status: Warning Scientific Instruments: WFC3/UVIS Special Requirements: ORIENT 292.80D TO 292.80 D <i>Comments: All visits have the same structure with 5 long, dithered exposures that fill the orbit. The only variable is how the visits are scheduled.</i>									
	(Exposure 1 (Pattern 1, Exps 1-1 in Sequence 1-1 Non-Int in lightcurve (11)) special requirements) Warning (Form): Be very careful mixing POS TARG and Center_Pattern = Yes									
Diagnosics										
Patterns	#	Primary Pattern		Secondary Pattern		Exposures				
	(1)	Pattern Type=LINE Purpose=OTHER Number Of Points=5 Point Spacing=0.03 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)	I2-BOROSOV	TYPE=COMET,Q=2.0066316719435 I2,E=3.357186641306118,I=44.05177 560961525 ,O=308.1489574182682,W=209.12373 39804854,T=08-DEC- 2019:13:15:25,TTimeScale=TDB,EQ UINOX=J2000,EPOCH=20-DEC- 2019:00:00:00,EpochTimeScale=TDB				EARTH			
<i>Comments: Description=Comet I2/Borisov Extended=YES</i>										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(1) I2-BOROSOV	WFC3/UVIS, ACCUM, UVIS2	F350LP		POS TARG 0,0	Sequence 1-1 Non-Int in lightcurve (11) Pattern 1, Exps 1-1 in Sequence 1-1 Non-Int in lightcurve (11) (1)	380 Secs (1900 Secs) [=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)] [=>(Pattern 4)] [=>(Pattern 5)]	[1]



Proposal 16043 - lightcurve (12) - Characterization of the second interstellar object

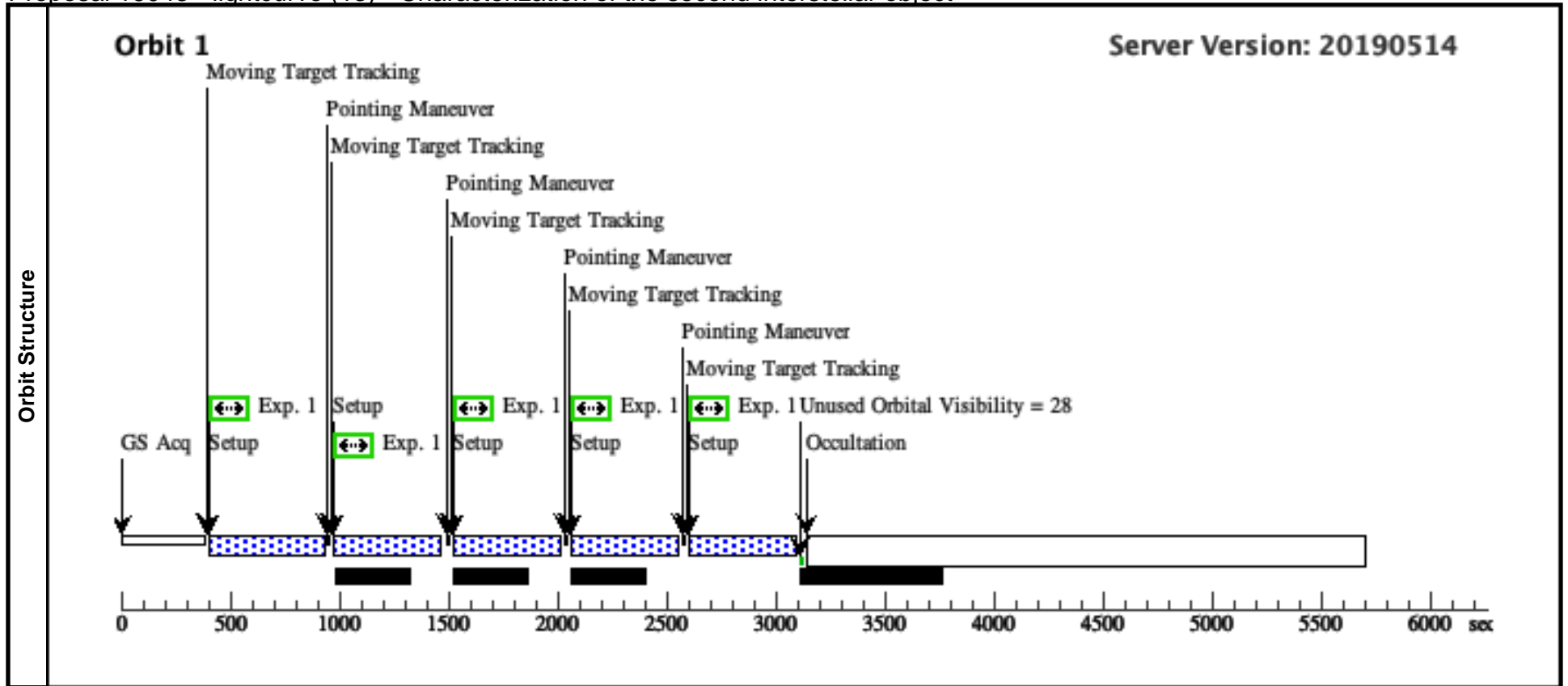
Wed Dec 04 18:01:43 GMT 2019

Visit	Proposal 16043, lightcurve (12), implementation Diagnostic Status: Warning Scientific Instruments: WFC3/UVIS Special Requirements: (none) <i>Comments: All visits have the same structure with 5 long, dithered exposures that fill the orbit. The only variable is how the visits are scheduled.</i>									
	(Exposure 1 (Pattern 1, Exps 1-1 in Sequence 1-1 Non-Int in lightcurve (12)) special requirements) Warning (Form): Be very careful mixing POS TARG and Center_Pattern = Yes									
Diagnosics										
Patterns	#	Primary Pattern		Secondary Pattern		Exposures				
	(1)	Pattern Type=LINE Purpose=OTHER Number Of Points=5 Point Spacing=0.03 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)	I2-BOROSOV	TYPE=COMET,Q=2.0066316719435 12,E=3.357186641306118,I=44.05177 560961525 ,O=308.1489574182682,W=209.12373 39804854,T=08-DEC- 2019:13:15:25,TTimeScale=TDB,EQ UINOX=J2000,EPOCH=20-DEC- 2019:00:00:00,EpochTimeScale=TDB				EARTH			
<i>Comments: Description=Comet I2/Borisov Extended=YES</i>										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(1) I2-BOROSOV	WFC3/UVIS, ACCUM, UVIS2	F350LP		POS TARG 0,0	Sequence 1-1 Non-Int in lightcurve (12) Pattern 1, Exps 1-1 in Sequence 1-1 Non-Int in lightcurve (12) (1)	380 Secs (1900 Secs) [=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)] [=>(Pattern 4)] [=>(Pattern 5)]	[1]

Proposal 16043 - lightcurve (13) - Characterization of the second interstellar object

Wed Dec 04 18:01:43 GMT 2019

Visit	Proposal 16043, lightcurve (13), implementation Diagnostic Status: Warning Scientific Instruments: WFC3/UVIS Special Requirements: ORIENT 292.80D TO 292.80 D <i>Comments: All visits have the same structure with 5 long, dithered exposures that fill the orbit. The only variable is how the visits are scheduled.</i>									
	(Exposure 1 (Pattern 1, Exps 1-1 in Sequence 1-1 Non-Int in lightcurve (13)) special requirements) Warning (Form): Be very careful mixing POS TARG and Center_Pattern = Yes									
Diagnosics										
Patterns	#	Primary Pattern		Secondary Pattern		Exposures				
	(1)	Pattern Type=LINE Purpose=OTHER Number Of Points=5 Point Spacing=0.03 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)	I2-BOROSOV	TYPE=COMET,Q=2.0066316719435 I2,E=3.357186641306118,I=44.05177 560961525 ,O=308.1489574182682,W=209.12373 39804854,T=08-DEC- 2019:13:15:25,TTimeScale=TDB,EQ UINOX=J2000,EPOCH=20-DEC- 2019:00:00:00,EpochTimeScale=TDB				EARTH			
<i>Comments: Description=Comet I2/Borisov Extended=YES</i>										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(1) I2-BOROSOV	WFC3/UVIS, ACCUM, UVIS2	F350LP		POS TARG 0,0	Sequence 1-1 Non-Int in lightcurve (13) Pattern 1, Exps 1-1 in Sequence 1-1 Non-Int in lightcurve (13) (1)	380 Secs (1900 Secs) [=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)] [=>(Pattern 4)] [=>(Pattern 5)]	[1]



Proposal 16043 - lightcurve (14) - Characterization of the second interstellar object

Wed Dec 04 18:01:43 GMT 2019

Visit	Proposal 16043, lightcurve (14), implementation Diagnostic Status: Warning Scientific Instruments: WFC3/UVIS Special Requirements: ORIENT 295.65D TO 295.65 D <i>Comments: All visits have the same structure with 5 long, dithered exposures that fill the orbit. The only variable is how the visits are scheduled.</i>									
	(Exposure 1 (Pattern 1, Exps 1-1 in Sequence 1-1 Non-Int in lightcurve (14)) special requirements) Warning (Form): Be very careful mixing POS TARG and Center_Pattern = Yes									
Diagnosics										
Patterns	#	Primary Pattern		Secondary Pattern		Exposures				
	(1)	Pattern Type=LINE Purpose=OTHER Number Of Points=5 Point Spacing=0.03 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)	I2-BOROSOV	TYPE=COMET,Q=2.0066316719435 I2,E=3.357186641306118,I=44.05177 560961525 ,O=308.1489574182682,W=209.12373 39804854,T=08-DEC- 2019:13:15:25,TimeScale=TDB,EQ UINOX=J2000,EPOCH=20-DEC- 2019:00:00:00,EpochTimeScale=TDB				EARTH			
<i>Comments: Description=Comet I2/Borisov Extended=YES</i>										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(1) I2-BOROSOV	WFC3/UVIS, ACCUM, UVIS2	F350LP		POS TARG 12,0	Sequence 1-1 Non-Int in lightcurve (14) Pattern 1, Exps 1-1 in Sequence 1-1 Non-Int in lightcurve (14) (1)	380 Secs (1900 Secs) [=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)] [=>(Pattern 4)] [=>(Pattern 5)]	[1]

