16712 - Constraining the Orbit of Eurybates' Satellite, Queta

Cycle: 29, 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) EURYBATES	WFC3/UVIS	1	11-Nov-2021 11:00:42.0	yes
02	(1) EURYBATES	WFC3/UVIS	1	11-Nov-2021 11:00:43.0	yes

2 Total Orbits Used

ABSTRACT

(3548) Eurybates will be the first Trojan asteroid to be explored in situ when the Lucy spacecraft flies by it in August 2027. The possibility of close-up study of Eurybates' satellite, Queta, offers a unique opportunity to test whether Eurybates' unusual properties are tied to its collisional history and, more broadly, how collisional evolution shapes small body populations. It is critical to reduce the orbital uncertainty and improve knowledge of the relative position of Queta as soon as possible to understand if there could be an impact to Lucy's encounter concept of operations and to optimize planning for the best angular resolution and lighting conditions in the brief window when observations can be made. By establishing a tighter constraint on the current orbit, it will be possible to accelerate searches for non-Keplerian motion should there be an additional satellite or satellites interior to Queta (as are commonly found in other collisional-family satellite systems). Additionally, we will use astrometric information from trailed stars in the full UVIS aperture to improve predictions for future stellar occultations. HST is required because Queta is 8.7 magnitudes fainter than Eurybates and will be observed at a separation of 0.5 arcsec - an observational regime that is unique to Hubble.

OBSERVING DESCRIPTION

This proposal is two orbits of astrometric observations of the satellite of Eurybates. It is intended to execute the orbits at known orbital phase to maximize the improvement in orbit determination needed to validate spacecraft pointing on approach. Each one - orbit visit will be identical 5 exposure sequence using the full WFC3 UVIS FOV to enable absolute astrometry with field stars as well as relative astrometry determined by measuring the positions of Eurybates and Queta.

Proposal 16712 - Visit 01 - Constraining the Orbit of Eurybates' Satellite, Queta

Visit

Proposal 16712, Visit 01, implementation Thu Nov 11 16:00:43 GMT 2021

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/UVIS

Special Requirements: BETWEEN 16-DEC-2021:12:00:00 AND 18-DEC-2021:12:00:00; VISIBILITY INTERVAL NO GYRO BIAS UPDATE ON MOVING TARGET

Solar System Targets

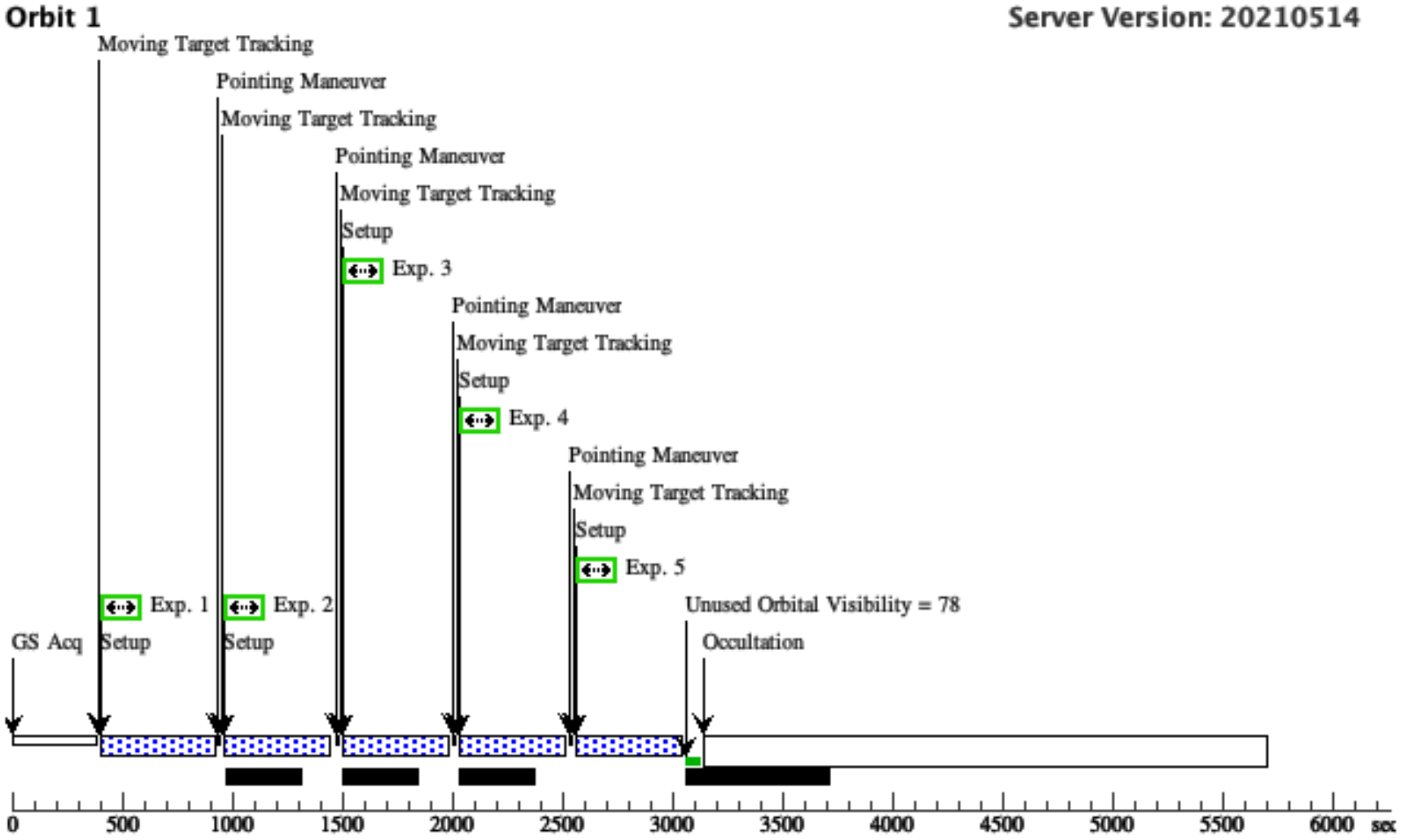
#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
(1)	EURYBATES	TYPE=ASTEROID,A=5.194825660909952,E=0.08892019463262771,I=8.05897310596958,O=43.53959194136358,W=27.42986950746389,M=279.393486820639,EQUINOX=J2000,EPOCH=05-AUG-2019:00:00:00,EpochTimeScale=TDB				EARTH

Comments: Description=Queta is a satellite of Eurybates

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) EURYBATES	WFC3/UVIS, ACCUM, UVIS2	F350LP		POS TARG 0.6544,0.6796	Sequence 1-5 Non-Int in Visit 01	370 Secs (370 Secs)	
								[==>]	***[1]***
2		(1) EURYBATES	WFC3/UVIS, ACCUM, UVIS2	F350LP		POS TARG 0.4760,0.5286	Sequence 1-5 Non-Int in Visit 01	370 Secs (370 Secs)	
								[==>]	***[1]***
3		(1) EURYBATES	WFC3/UVIS, ACCUM, UVIS2	F350LP		POS TARG 0.3437,0.3674	Sequence 1-5 Non-Int in Visit 01	370 Secs (370 Secs)	
								[==>]	***[1]***
4		(1) EURYBATES	WFC3/UVIS, ACCUM, UVIS2	F350LP		POS TARG 0.1719,0.1837	Sequence 1-5 Non-Int in Visit 01	370 Secs (370 Secs)	
								[==>]	***[1]***
5		(1) EURYBATES	WFC3/UVIS, ACCUM, UVIS2	F350LP			Sequence 1-5 Non-Int in Visit 01	370 Secs (370 Secs)	
								[==>]	***[1]***

Orbit Structure



Visit

Proposal 16712, Visit 02, scheduling Thu Nov 11 16:00:43 GMT 2021

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/UVIS

Special Requirements: BETWEEN 24-NOV-2021:12:00:00 AND 26-NOV-2021:12:00:00; VISIBILITY INTERVAL NO GYRO BIAS UPDATE ON MOVING TARGET

Solar System Targets

#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
(1)	EURYBATES	TYPE=ASTEROID,A=5.194825660909952,E=0.08892019463262771,I=8.05897310596958,O=43.53959194136358,W=27.42986950746389,M=279.393486820639,EQUINOX=J2000,EPOCH=05-AUG-2019:00:00:00,EpochTimeScale=TDB				EARTH

Comments: Description=Queta is a satellite of Eurybates

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) EURYBATES	WFC3/UVIS, ACCUM, UVIS2	F350LP			Sequence 1-5 Non-Int in Visit 02	370 Secs (370 Secs)	
								[==>]	***[1]***
2		(1) EURYBATES	WFC3/UVIS, ACCUM, UVIS2	F350LP		POS TARG 0.1719,0.1837	Sequence 1-5 Non-Int in Visit 02	370 Secs (370 Secs)	
								[==>]	***[1]***
3		(1) EURYBATES	WFC3/UVIS, ACCUM, UVIS2	F350LP		POS TARG 0.3437,0.3674	Sequence 1-5 Non-Int in Visit 02	370 Secs (370 Secs)	
								[==>]	***[1]***
4		(1) EURYBATES	WFC3/UVIS, ACCUM, UVIS2	F350LP		POS TARG 0.4760,0.5286	Sequence 1-5 Non-Int in Visit 02	370 Secs (370 Secs)	
								[==>]	***[1]***
5		(1) EURYBATES	WFC3/UVIS, ACCUM, UVIS2	F350LP		POS TARG 0.6544,0.6796	Sequence 1-5 Non-Int in Visit 02	370 Secs (370 Secs)	
								[==>]	***[1]***

Orbit Structure