12597 - Hubble Imaging of a Newly Discovered Main Belt Comet

Cycle: 19, 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) MBC-300163	WFC3/UVIS	1	21-Nov-2011 21:17:31.0	yes
02	(1) MBC-300163	WFC3/UVIS	1	21-Nov-2011 21:17:36.0	yes

2 Total Orbits Used

ABSTRACT

We seek two orbits of Target of Opportunity (ToO) time to secure exploratory observations of a main-belt comet (MBC), should one be discovered in the upcoming proposal cycle. The observations will be used to determine the early-time morphology and to assess its rate of change by comparison of data from two epochs. The ToO data are needed

to determine the optimum strategy for subsequent observations, intended to characterize the MBC at the highest resolution and so to determine the driver of the cometary activity. Our previous Hubble observations of MBCs P/2010 A2 and (596) Scheila were obtained in emergency mode through Director's Discretionary Time requests. The Director's office has suggested that we propose to follow up future MBC discoveries as a ToO, so that HST observations could begin sooner.

OBSERVING DESCRIPTION

Our observing strategy will be dictated by the specific target discovered. For an MBC having a relatively faint nucleus (e.g., P/2010 A2), we expect to take 5 or 6 images with long exposure times (400-500 s) in a broadband filter (F606W) to provide a deep search for debris. But if the MBC has a relatively bright nucleus, we will take both short and long exposures, and possibly use a narrow band filter for the short exposures. For example, for asteroid (596) Scheila with its ultra-bright nucleus (V=13.7), we used an exposure time of 0.5 sec (the shortest available) and the F621M filter to avoid saturation while still obtaining S/N=200 on the nucleus itself in search of structure at 100 km scales. In all cases, we will obtain approximately half the images at one location on the CCD and then repeat that sequence of images at a dithered location. Dithered, multiple images provide protection from bad pixels and cosmic ray strikes that otherwise might compromise the photometry. Previous HST observations show that the timescale for substantial change is from several weeks (Scheila) to several months (P/2010 A2). Therefore, while the first observation should be scheduled as soon as possible after the target is discovered, the science does not require that the first visit be secured within the first two weeks.

The first visit will set the scene, by establishing the high-resolution morphology of the object (at ~60 km/pixel at 2 AU geocentric distance). The second visit, ideally separated from the first by ~10 days, will reveal the changes. The two visits together will allow us to

make a rational decision about the need for further observations with HST.

ADDITIONAL COMMENTS

This is a Target of Opportunity program that will be activated upon the discovery of a new Main Belt Comet. Please note that the orbital elements must be updated with those of the newly discovered object *before* doing any detailed planning of the observations.

Visit

Proposal 12597, Visit 01, implementation Tue Nov 22 02:17:40 GMT 2011

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/UVIS

Special Requirements: (none)

Solar System Targets

#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
(1)	MBC-300163	TYPE=COMET,Q=2.4378652,E=0.2011255,I=3.23918,O=83.20655,W=281.88617,T=18-JUL-2011:13:00:05,TTimeScale=TDB,EQUINOX=J2000,EPOCH=27-AUG-2011:00:00:00,EpochTimeScale=TDB				EARTH

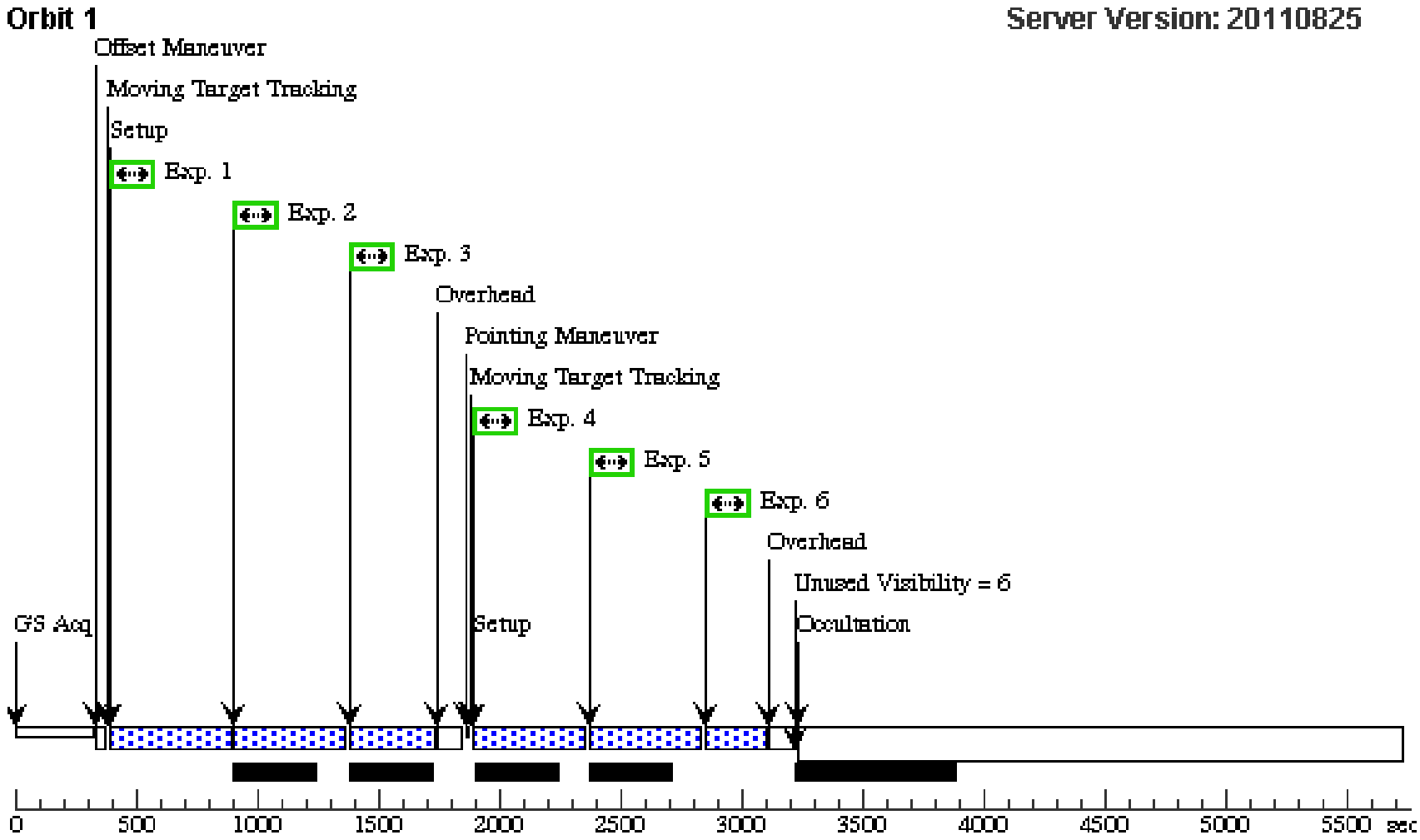
Comments: Main belt asteroid 300163 (2006 VW139) has recently been identified as a Main Belt Comet (MBC).

Acquisition Uncertainty: 10 Arcsec
Ephemeris Uncertainty: 14500 Kilometers

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1		(1) MBC-300163	WFC3/UVIS, ACCUM, UVIS1	F606W	CR-SPLIT=NO	REQ EPHEM CORR MBCV01		350 Secs	
								[==>]	***[1]***
2		(1) MBC-300163	WFC3/UVIS, ACCUM, UVIS1	F606W	CR-SPLIT=NO	REQ EPHEM CORR MBCV01		350 Secs	
								[==>]	***[1]***
3		(1) MBC-300163	WFC3/UVIS, ACCUM, UVIS1	F606W	CR-SPLIT=NO	REQ EPHEM CORR MBCV01		350 Secs	
								[==>]	***[1]***
4		(1) MBC-300163	WFC3/UVIS, ACCUM, UVIS1	F606W	CR-SPLIT=NO	POS TARG 0.2,2.41; REQ EPHEM CORR MBCV01		350 Secs	
								[==>]	***[1]***
5		(1) MBC-300163	WFC3/UVIS, ACCUM, UVIS1	F606W	CR-SPLIT=NO	POS TARG 0.2,2.41; REQ EPHEM CORR MBCV01		350 Secs	
								[==>]	***[1]***
6		(1) MBC-300163	WFC3/UVIS, ACCUM, UVIS1	F606W	CR-SPLIT=NO	POS TARG 0.2,2.41; REQ EPHEM CORR MBCV01		250 Secs	
								[==>]	***[1]***

Orbit Structure



Visit

Proposal 12597, Visit 02, implementation Tue Nov 22 02:17:41 GMT 2011

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/UVIS

Special Requirements: AFTER_01 BY 8 D TO 12 D

Solar System Targets

#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
(1)	MBC-300163	TYPE=COMET,Q=2.4378652,E=0.20 11255,I=3.23918,O=83.20655,W=281. 88617,T=18-JUL-2011:13:00:05,TTimeScale=TDB,EQ UINOX=J2000,EPOCH=27-AUG-2011:00:00:00,EpochTimeScale=TDB				EARTH

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Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1		(1) MBC-300163	WFC3/UVIS, ACCUM, UVIS1	F606W	CR-SPLIT=NO	REQ EPHEM CORR MBCV02		350 Secs	
								[==>]	***[1]***
2		(1) MBC-300163	WFC3/UVIS, ACCUM, UVIS1	F606W	CR-SPLIT=NO	REQ EPHEM CORR MBCV02		350 Secs	
								[==>]	***[1]***
3		(1) MBC-300163	WFC3/UVIS, ACCUM, UVIS1	F606W	CR-SPLIT=NO	REQ EPHEM CORR MBCV02		350 Secs	
								[==>]	***[1]***
4		(1) MBC-300163	WFC3/UVIS, ACCUM, UVIS1	F606W	CR-SPLIT=NO	POS TARG 0.2,2.41; REQ EPHEM CORR MBCV02		350 Secs	
								[==>]	***[1]***
5		(1) MBC-300163	WFC3/UVIS, ACCUM, UVIS1	F606W	CR-SPLIT=NO	POS TARG 0.2,2.41; REQ EPHEM CORR MBCV02		350 Secs	
								[==>]	***[1]***
6		(1) MBC-300163	WFC3/UVIS, ACCUM, UVIS1	F606W	CR-SPLIT=NO	POS TARG 0.2,2.41; REQ EPHEM CORR MBCV02		250 Secs	
								[==>]	***[1]***

Orbit Structure