17254 - Determining the Driver of Activity in a Newly Discovered Main Belt Comet

Cycle: 30, Proposal Category: GO/DD

(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) P21XDAC	WFC3/UVIS	1	19-Oct-2022 10:00:13.0	yes
02	(2) P21XDAC2	WFC3/UVIS	1	19-Oct-2022 10:00:14.0	yes

2 Total Orbits Used

ABSTRACT

On 2022 September 8, Pan-STARRS detected a dust tail / trail associated with a new main-belt asteroid candidate. Confirming follow-up observations with the 3.6m Canada-France-Hawaii Telescope on September 22 show a tail corresponding to at least 25,000 km length in space. A search of the Pan-STARRS image archive shows no matching object in pre-discovery images, nor could the recent astrometry be linked to any existing asteroid, or isolated tracklets, implying that this is a new discovery that was not previously visible. Something happened recently to trigger significant activity, resulting in an increase in brightness by at least 2 orders of magnitude.

We propose a DD programme of WFC3 imaging over two orbits. Only HST will allow us to study the changing morphology of the dust structures and thus differentiate between continuous mass-loss and an impulsive event.

OBSERVING DESCRIPTION

Optical imaging observations to explore the dust surrounding an active asteroid. We request a total time baseline for observations of approximately two months, with visits spaced roughly equally, to enable robust measurements of the evolution of the dust structure and of the velocity of any detected fragments. While we would like to observe the asteroid as soon as possible, disruptive scheduling is not warranted.

Our basic observing strategy is to take multiple long exposures using WFC3 and the F350LP wide bandpass filter.

Visit

Proposal 17254, Visit 01, scheduled Wed Oct 19 14:00:14 GMT 2022

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/UVIS

Special Requirements: BETWEEN 17-OCT-2022:00:00:00 AND 18-OCT-2022:03:00:00; BETWEEN 18-OCT-2022:13:00:00 AND 24-OCT-2022:00:00:00; VISIBILITY INTERVAL NO GYRO BIAS UPDATE ON MOVING TARGET

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFC3-UVIS-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.145 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false		(1)

Solar System Targets

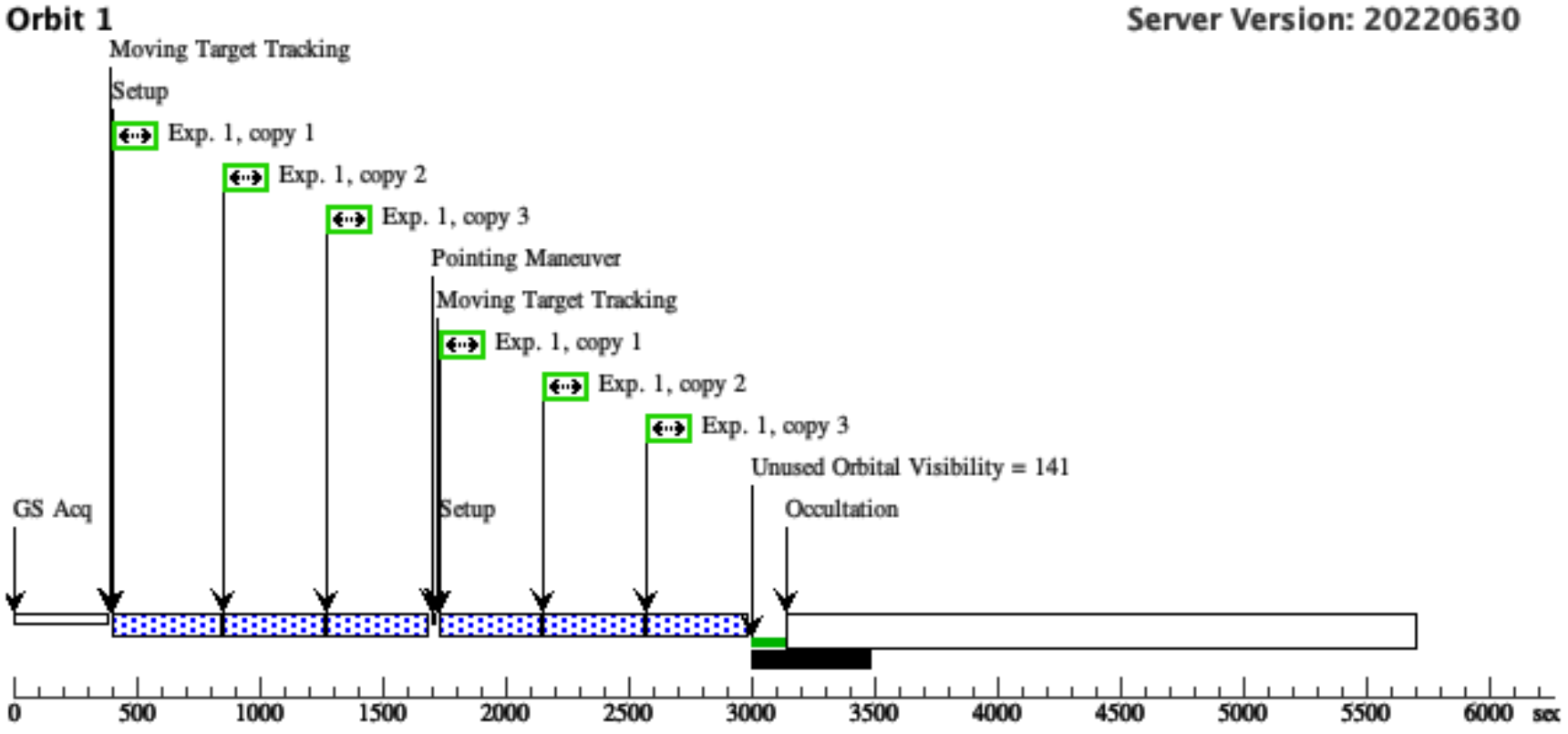
#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
(1)	P21XDAC	TYPE=ASTEROID,A=3.0705665,E=0.1956716,I=15.29185,O=115.06373,W=240.71338,M=23.81960201,EQUINOX=J2000,EPOCH=05-OCT-2022:00:00:00,EpochTimeScale=UTC				EARTH

Comments: Description=Active asteroid in the main asteroid belt.
Extended=NO

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) P21XDAC	WFC3/UVIS, ACCUM, UVIS2-2K2C-SUB	F350LP	CR-SPLIT=NO		Sequence 1-1 Non-Int in Visit 01 Pattern 1, Exps 1-1 in Sequence 1-1 Non-Int in Visit 01 (1)	245 Secs X 3 (1470 Secs) *[==>(Pattern 1, Copy 1)]* *[==>(Pattern 1, Copy 2)]* *[==>(Pattern 1, Copy 3)]* *[==>(Pattern 2, Copy 1)]* *[==>(Pattern 2, Copy 2)]* *[==>(Pattern 2, Copy 3)]*	***[1]***

Orbit Structure



Visit

Proposal 17254, Visit 02, implementation Wed Oct 19 14:00:14 GMT 2022

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/UVIS

Special Requirements: AFTER 01 BY 21 D TO 45 D; BETWEEN 12-NOV-2022:00:00:00 AND 12-NOV-2022:00:30:00; BETWEEN 12-NOV-2022:02:30:00 AND 12-NOV-2022:06:30:00; BETWEEN 12-NOV-2022:11:00:00 AND 12-NOV-2022:13:45:00; BETWEEN 12-NOV-2022:17:00:00 AND 13-NOV-2022:00:30:00; BETWEEN 13-NOV-2022:02:30:00 AND 13-NOV-2022:04:00:00; BETWEEN 13-NOV-2022:05:30:00 AND 13-NOV-2022:07:00:00; BETWEEN 13-NOV-2022:11:00:00 AND 13-NOV-2022:16:00:00; BETWEEN 13-NOV-2022:23:00:00 AND 14-NOV-2022:21:30:00; VISIBILITY INTERVAL NO GYRO BIAS UPDATE ON MOVING TARGET

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFC3-UVIS-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.145 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false		(1)

Solar System Targets

#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
(2)	P21XDAC2	TYPE=ASTEROID,A=3.070266776415772,E=0.1955671799352209,I=15.29187909037629,O=115.062336313636,W=240.7237704225099,M=21.80331790047074,EQUINOX=J2000,EPOCH=24-SEP-2022:00:00:00,EpochTimeScale=TDB				EARTH

Comments: Description=asteroid

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(2) P21XDAC2	WFC3/UVIS, ACCUM, UVIS2-2K2C-SUB	F350LP	CR-SPLIT=NO		Sequence 1-1 Non-Int in Visit 02 Pattern 1, Exps 1-1 in Sequence 1-1 Non-Int in Visit 02 (1)	245 Secs X 3 (1470 Secs) *[==>(Pattern 1, Copy 1)]* *[==>(Pattern 1, Copy 2)]* *[==>(Pattern 1, Copy 3)]* *[==>(Pattern 2, Copy 1)]* *[==>(Pattern 2, Copy 2)]* *[==>(Pattern 2, Copy 3)]*	***[1]***

Orbit Structure