



14491 - Trojan Binary Candidate: A Slow-Rotating Mission Target

Cycle: 23, 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) TROJAN11351	WFC3/UVIS	1	03-May-2016 21:15:39.0	yes

1 Total Orbits Used

ABSTRACT

A mission to the unexplored Jupiter Trojans is explicitly called for in the Planetary Decadal and HST observations in early 2016 can influence mission plans for both Discovery and New Frontiers. We propose to observe a Trojan that will be targeted by the step-1 Discovery mission, Lucy. (11351) 1997 TS25 is a Trojan that is notable for having one of the longest known rotation periods of any small body, $T=514$ h. A possible cause for this long period would be the existence of a tidally locked binary similar to the already-known long-period binary Trojan, (617) Patroclus. If so, the components will be separated by ~ 0.18 arcsec at lightcurve maximum, resolvable by WFC3. We will coordinate with groundbased observations to schedule near a maximum and thus require only a single orbit to confidently test whether (11351) 1997 TS25 is binary.

Binary Trojans offer scientific benefits beyond the impact to any specific mission. Orbit-derived mass and density can be used to constrain planetary

migration models. Low density is characteristic of bodies found in the dynamically cold Kuiper Belt, a remnant of the solar system's protoplanetary disk. Only one undisputed density has been measured in the Trojans, that of the binary (617) Patroclus, which has a low density of 0.8 g/cm^3 , similar to the low densities found in the Kuiper Belt. Evidence for or against a possible common origin linking Trojans and KBOs is a key constraint for planetesimal formation and planetary migration models relevant to the solar system and to planetary systems in general.

OBSERVING DESCRIPTION

Single orbit visit to Trojan (11351) Leucus (temp id 1997 TS25). Standard WFC3 imaging. The timing is tied to ground-based lightcurve analysis being completed by co-I Buie. One full phase completed, waiting for second repeating phase to take visit off hold. Preliminary guess to phase included in initial phase 2 submission.

Proposal 14491 - Visit 01 - Trojan Binary Candidate: A Slow-Rotating Mission Target

Wed May 04 01:15:41 GMT 2016

Visit	Proposal 14491, Visit 01, implementation Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS Special Requirements: BETWEEN 08-JUN-2016:12:36 AND 10-JUN-2016:16:12; BETWEEN 17-JUN-2016:15:48 AND 19-JUN-2016:19:25; BETWEEN 27-JUN-2016:03:01 AND 28-JUN-2016:22:37; BETWEEN 06-JUL-2016:06:14 AND 08-JUL-2016:00:49									
	Patterns	#	Primary Pattern	Secondary Pattern	Exposures					
	(1)	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		(1-4)					
Solar System Targets	#	Name	Level 1	Level 2	Level 3	Window	Ephem Center			
	(1)	TROJAN11351	TYPE=ASTEROID,A=5.25988656914 4591,E=.06547811318672574,I=11.57 174016291844,O=251.1003040760594 ,W=159.1547220321686,M=13.33041 690556806,EQUINOX=J2000,EPOCH =08-DEC- 2009:00:00:00,EpochTimeScale=TDB				EARTH			
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	(1) TROJAN11351	WFC3/UVIS, ACCUM, UVIS2-C512C-SUB	F555W	FLASH=12	GS ACQ SCENARI O BASE1B3	Pattern 1, Exps 1-4 in Visit 01 (1)	20 Secs (80 Secs) [=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)] [=>(Pattern 4)]	[1]	
	2	(1) TROJAN11351	WFC3/UVIS, ACCUM, UVIS2-C512C-SUB	F438W	FLASH=12		Pattern 1, Exps 1-4 in Visit 01 (1)	60 Secs (240 Secs) [=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)] [=>(Pattern 4)]	[1]	
	3	(1) TROJAN11351	WFC3/UVIS, ACCUM, UVIS2-C512C-SUB	F814W	FLASH=12		Pattern 1, Exps 1-4 in Visit 01 (1)	30 Secs (120 Secs) [=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)] [=>(Pattern 4)]	[1]	
	4	(1) TROJAN11351	WFC3/UVIS, ACCUM, UVIS2-C512C-SUB	F336W	FLASH=12		Pattern 1, Exps 1-4 in Visit 01 (1)	120 Secs (480 Secs) [=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)] [=>(Pattern 4)]	[1]	
	5	(1) TROJAN11351	WFC3/UVIS, ACCUM, UVIS2-C512C-SUB	F555W	FLASH=11			100 Secs X 2 (200 Secs) [=>(Copy 1)] [=>(Copy 2)]	[1]	

