



## 17315 - Beating Weywot in the game of hide-and-seek

Cycle: 30, Proposal Category: GO/DD

(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) QUAOAR	WFC3/UVIS	1	03-Jul-2023 12:00:16.0	yes

1 Total Orbits Used

### ABSTRACT

Weywot is the satellite of the trans-Neptunian dwarf planet candidate Quaoar. Obtaining its physical properties, such as size and density, is pivotal in order to understand its formation scenario and to better understand the formation of binary systems in the trans-Neptunian region. Weywot was thought to be a captured satellite due to its estimated size through thermal modeling and its eccentric orbit (which should circularize in a few million years if the satellite formed via collision). However, recent fortuitous detections through stellar occultation indicate that the size could be double. This opens the debate about Weywot's formation. A stellar occultation is predicted to happen on June 22nd that would cross the continental US, providing the opportunity to prepare a good observational campaign to distribute telescopes to maximize the coverage of Weywot's limb (and

surroundings). However, our resources are limited and the uncertainty of the current prediction is of around 1000 km north and south the current path. We are therefore asking for a single HST orbit to locate Weywot with respect to Quaoar so that we can reduce the uncertainty to 300 km, thus being able to obtain a highly sampled stellar occultation and decipher the mystery of Weywot's formation.

## **OBSERVING DESCRIPTION**

A single orbit is required to image the Quaoar/Weywot TNO binary system with the WFC3/UVIS instrument and the F606W filter.

The WFC3-UVIS-BOX-DITHER pattern will be used, which is composed of 4 exposures. Each exposure will be 432 seconds long in order to optimize the efficiency of the orbit (resulting in only 3 seconds of unused time). This individual exposure time is longer than the 348-second limit under which a serial buffer dump is required and APT does not provide a warning message about adding a post-flash.

The "UVIS2" aperture was specified to ensure optimal placement within the UVIS2 detector, which has better characteristics than UVIS1.

A BEFORE special requirement is specified to ensure the observations occur before June 19th. There is an occultation by Weywot predicted on June 22nd and obtaining the data by June 19th will allow enough time to process the data, extract astrometry, and update the prediction. This timing requirement was included in the DDT proposal.

Proposal 17315 - Observation 1 (01) - Beating Weywot in the game of hide-and-seek

<b>Visit</b>	<b>Proposal 17315, Observation 1 (01), completed</b> <span style="float: right;">Mon Jul 03 16:00:17 GMT 2023</span> <b>Diagnostic Status: Informational</b> Scientific Instruments: WFC3/UVIS Special Requirements: BEFORE 19-JUN-2023:00:00:00									
	(Observation 1 (01)) Informational (Form): The Visit Planner and Spike may produce different schedulability results.									
<b>Diagnosics</b>										
<b>Patterns</b>	<b>#</b>	<b>Primary Pattern</b>			<b>Secondary Pattern</b>		<b>Exposures</b>			
	(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)			
<b>Solar System Targets</b>	<b>#</b>	<b>Name</b>	<b>Level 1</b>	<b>Level 2</b>	<b>Level 3</b>	<b>Window</b>	<b>Ephem Center</b>			
	(1)	QUAOAR	TYPE=ASTEROID,A=43.3561418003 1197,E=0.0399368787562926,I=7.991 290702148744 ,O=189.0991840859715,W=158.60900 73041173,M=293.8088571674838,EQ UINOX=J2000,EPOCH=25-MAY- 2023:00:00:00,EpochTimeScale=TDB				EARTH			
Comments: Description=Trans-Neptunian object (TNO) Extended=NO										
<b>Exposures</b>	<b>#</b>	<b>Label</b>	<b>Target</b>	<b>Config,Mode,Aperture</b>	<b>Spectral Els.</b>	<b>Opt. Params.</b>	<b>Special Reqs.</b>	<b>Groups</b>	<b>Exp. Time (Total)/[Actual Dur.]</b>	<b>Orbit</b>
	1	Quaoar/Weywot	(1) QUAOAR	WFC3/UVIS, ACCUM, UVIS2	F606W			Sequence 1-1 Non-Int in Observation 1 (01) Pattern 1, Exps 1-1 in Sequence 1-1 Non-Int in Observation 1 (01) (1)	432 Secs (1728 Secs) [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]

