



11656 - A Comprehensive Survey of Neptune's Small Moons and Faint Rings

Cycle: 17, Proposal Category: GO

(Availability Mode: AVAILABLE)

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) NEPTUNE	WFC3/UVIS	3	02-Jul-2009 21:47:59.0	yes
02	(1) NEPTUNE	WFC3/UVIS	2	02-Jul-2009 21:48:07.0	yes

5 Total Orbits Used

ABSTRACT

We will use a subarray of the WFC3/UVIS to study the inner rings, arcs and moons of Neptune with a sensitivity that exceeds that achieved by any previous observations, including Voyager 2 during its 1989 flyby. Our study will reveal any inner moons down to V magnitude 25, corresponding to a radius ~ 20 km (assuming 9% albedo), to address a peculiar, apparent truncation in the size distribution of inner moons and to look for the "shepherds" and source bodies for Neptune's dusty rings. (For comparison, the radius of Neptune's smallest known regular moon, Naiad, is ~ 33 km.) Monitoring of the arcs at fine resolution and sensitivity will reveal their ongoing evolution more clearly and will enable us to assess the role of Galatea, whose resonant perturbations are widely believed to confine the arcs. Our study will also reveal any broad, faint rings with optical depth ~

10^{-6} , comparable to those now known to encircle all of the other giant planets.

OBSERVING DESCRIPTION

Each of our five orbits contains eight exposures of 275 seconds duration through the F606W filter. The long exposures will provide the finest possible sensitivity to small moons and faint rings, and the sequence will yield "movies" that can be animated to search effectively for small moving targets. The planet will be vastly over-exposed in these frames, but its saturated pixels will bloom along the y-axis and so will not interfere with features oriented close to the x-axis. However, our orientation constraint is only available for a few days around Neptune's opposition.

Additional, brief exposures through filters F475W, F625W and F775W will be used for color measurements of the moons and for cross-calibration of the F606W filter.

We will use five consecutive orbits targeted at Neptune to obtain the most complete possible coverage in time, because moons and arcs are most detectable if imaged near their maximum elongation from the planet. These five orbits are organized in a set of two consecutive visits, with slightly different ORIENT constraints. By positioning the rings and moons 15-20 degrees off the x-axis, but in opposite directions, we will obtain a better model for the scattered light from the planet and will be able to separate it from any faint, outer rings that might be present.

Dithering is accomplished shifting Neptune up and down along the y-axis between (not during) orbits. The rotational change between visits will also allow for a clearer identification of hot pixels and any other reproducible imperfections in the CCD.

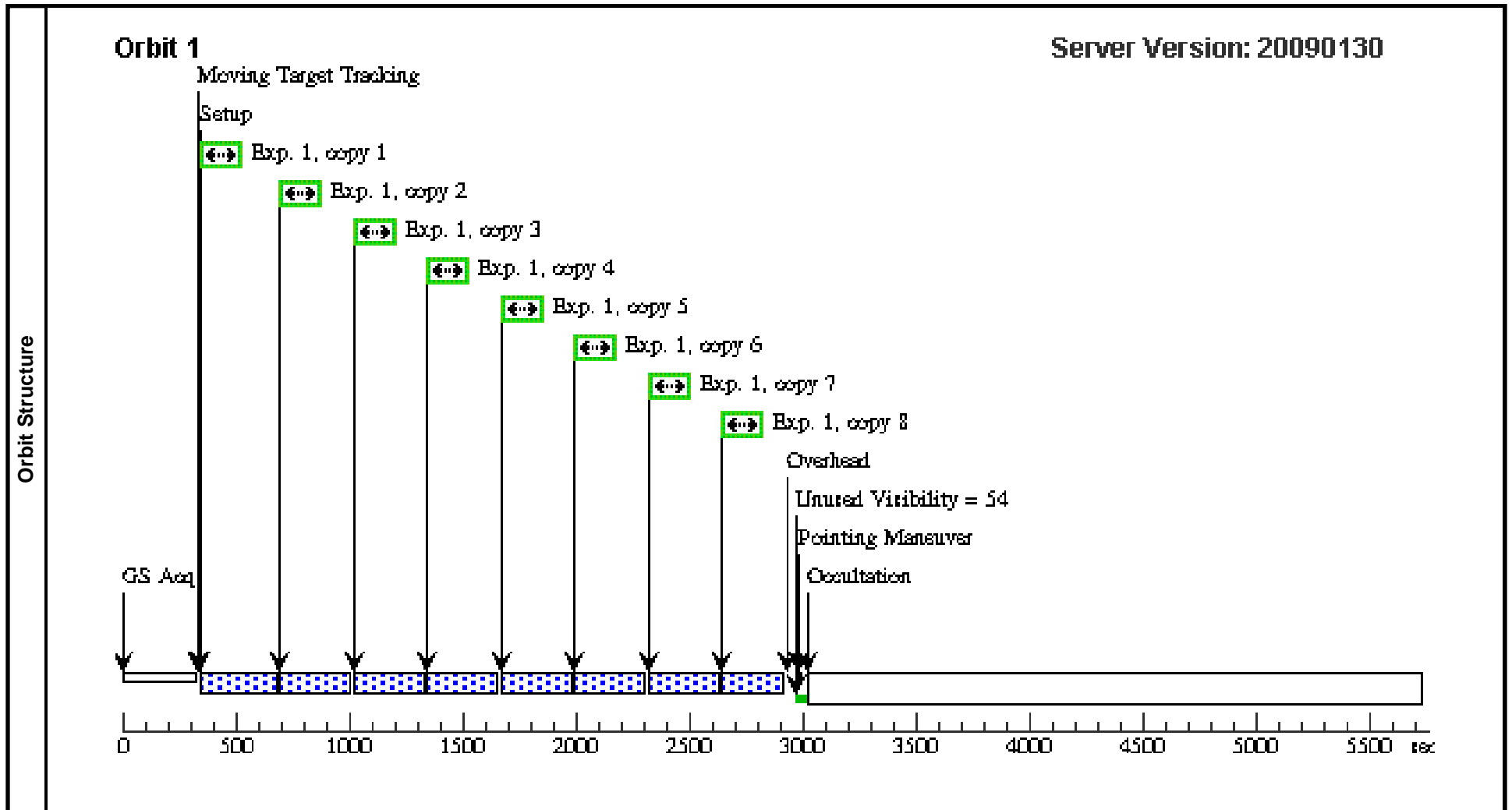
Proposal 11656 - Visit 01 - A Comprehensive Survey of Neptune's Small Moons and Faint Rings

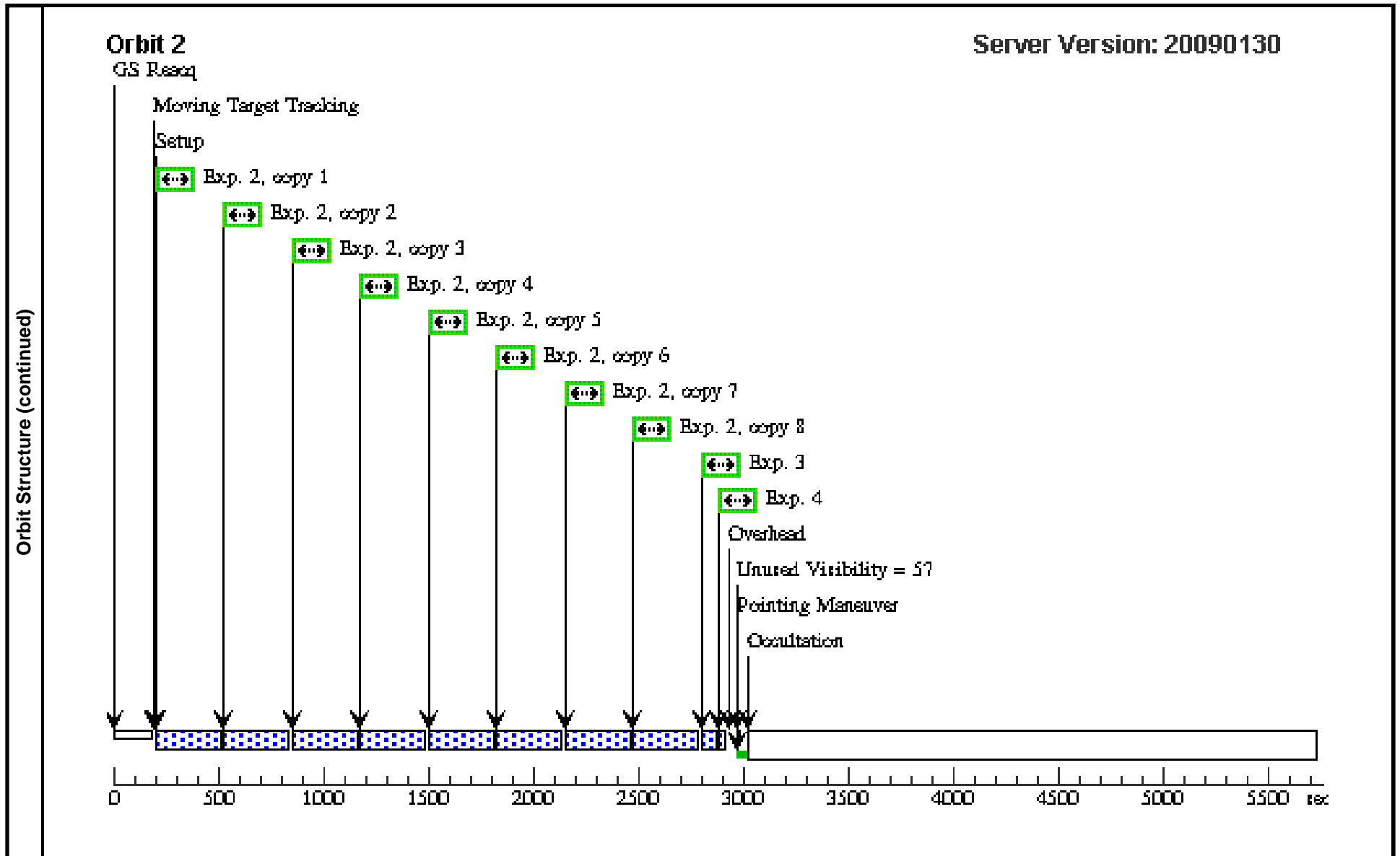
Fri Jul 03 01:48:11 GMT 2009

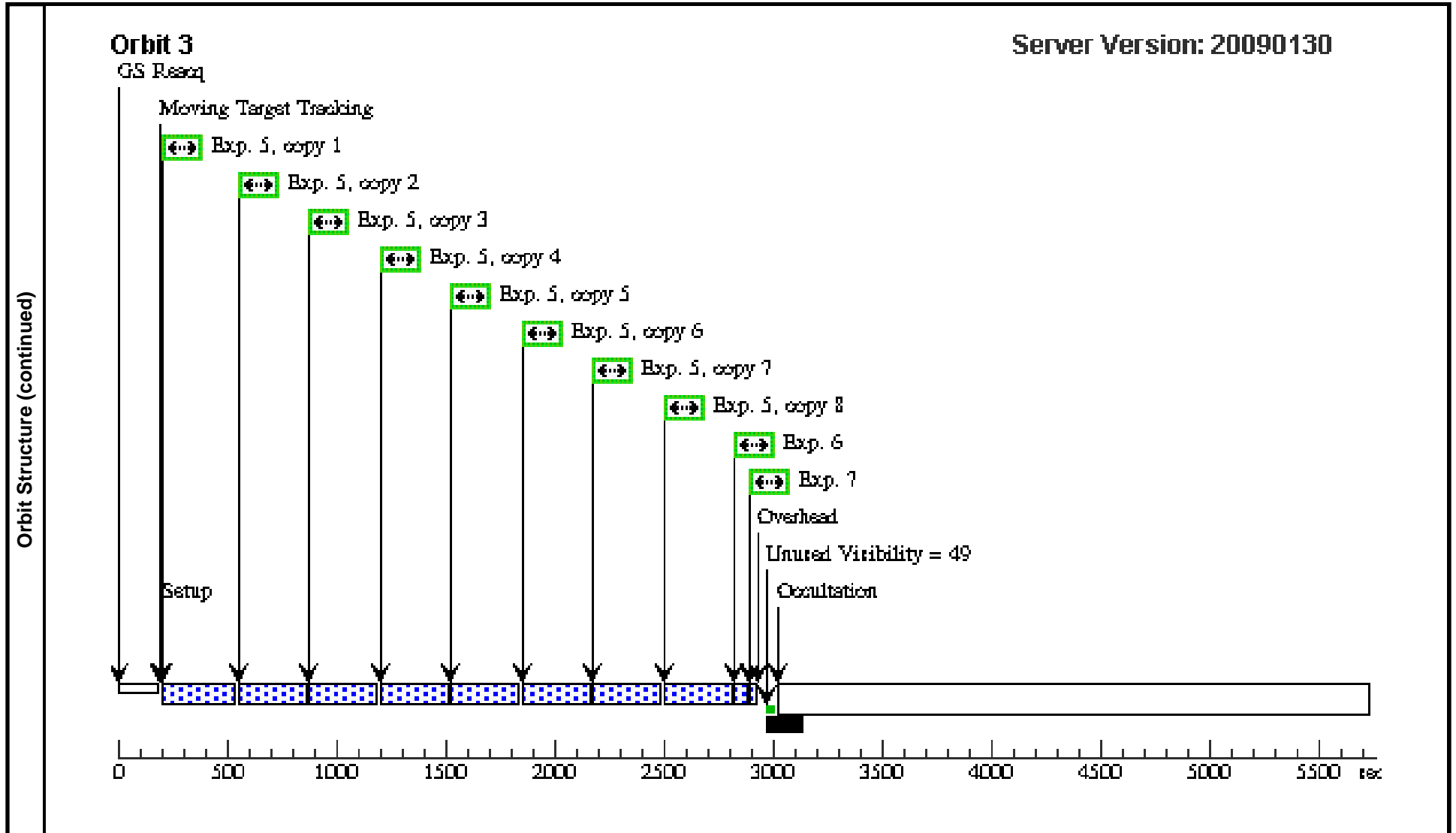
Visit	Proposal 11656, Visit 01, implementation Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS Special Requirements: SCHED 100%; ORIENT 309D TO 314 D <i>Comments: Neptune's pole is aligned with the columns of the CCD for ORIENT = 114 or 294. For this visit, we rotate the rings 15-20 degrees clockwise. We shift the target upward by 0.2 arcsec (5 pixels) for the second of the three orbits to get the benefits of dithering while retaining stable pointing during each orbit.</i>									
	Solar System Targets	#	Name	Level 1	Level 2	Level 3	Window	Ephem Center		
	(1)	NEPTUNE	STD=NEPTUNE					EARTH		
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1	F606W, 275 s x 8	(1) NEPTUNE	WFC3/UVIS, ACCUM, UVIS1-C512B-SUB	F606W	CR-SPLIT=NO	POS TARG 0,0	Sequence 1-1 Non-Int	275 Secs X 8 [==>(Copy 1)] [==>(Copy 2)] [==>(Copy 3)] [==>(Copy 4)] [==>(Copy 5)] [==>(Copy 6)] [==>(Copy 7)] [==>(Copy 8)]	[1]
	2	F606W, 275 s x 8	(1) NEPTUNE	WFC3/UVIS, ACCUM, UVIS1-C512B-SUB	F606W	CR-SPLIT=NO	POS TARG 0,0.2	Sequence 2-4 Non-Int	275 Secs X 8 [==>(Copy 1)] [==>(Copy 2)] [==>(Copy 3)] [==>(Copy 4)] [==>(Copy 5)] [==>(Copy 6)] [==>(Copy 7)] [==>(Copy 8)]	[2]
	3	F606W, 3 s	(1) NEPTUNE	WFC3/UVIS, ACCUM, UVIS1-C512B-SUB	F625W	CR-SPLIT=NO	SAME POS AS 2	Sequence 2-4 Non-Int	3 Secs [==>]	[2]
	4	F775W, 8 s	(1) NEPTUNE	WFC3/UVIS, ACCUM, UVIS1-C512B-SUB	F775W	CR-SPLIT=NO	SAME POS AS 2	Sequence 2-4 Non-Int	10 Secs [==>]	[2]

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Exposures (continued)	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	5	F606W, 275 s x 8	(1) NEPTUNE	WFC3/UVIS, ACCUM, UVIS1-C512B-SUB	F606W	CR-SPLIT=NO	POS TARG 0,0	Sequence 5-7 Non-Int	275 Secs X 8 [==>(Copy 1)] [==>(Copy 2)] [==>(Copy 3)] [==>(Copy 4)] [==>(Copy 5)] [==>(Copy 6)] [==>(Copy 7)] [==>(Copy 8)]	[3]
	6	F475W, 8 s	(1) NEPTUNE	WFC3/UVIS, ACCUM, UVIS1-C512B-SUB	F475W	CR-SPLIT=NO	SAME POS AS 5	Sequence 5-7 Non-Int	8 Secs [==>]	[3]
	7	F775W, 8 s	(1) NEPTUNE	WFC3/UVIS, ACCUM, UVIS1-C512B-SUB	F775W	CR-SPLIT=NO	SAME POS AS 5	Sequence 5-7 Non-Int	8 Secs [==>]	[3]







Proposal 11656 - Visit 02 - A Comprehensive Survey of Neptune's Small Moons and Faint Rings

Fri Jul 03 01:48:13 GMT 2009

Visit	Proposal 11656, Visit 02, implementation Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS Special Requirements: SCHED 100%; ORIENT 274D TO 279 D; AFTER 01 BY 270 M TO 300 M <i>Comments: Neptune's pole is aligned with the columns of the CCD for ORIENT = 114 or 294. For this visit, we rotate the rings 15-20 degrees counter-clockwise. We shift the target upward by 0.2 arcsec (5 pixels) for the first of the two orbits to get the benefits of dithering while retaining stable pointing during each orbit. This visit is timed to begin on the orbit immediately after Visit 01 finishes.</i>									
	Solar System Targets	#	Name	Level 1	Level 2	Level 3	Window	Ephem Center		
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1	F606W, 275 s x 8	(1) NEPTUNE	WFC3/UVIS, ACCUM, UVIS1-C512B-SUB	F606W	CR-SPLIT=NO	POS TARG 0,0.2	Sequence 1-1 Non-Int	275 Secs X 8 [==>(Copy 1)] [==>(Copy 2)] [==>(Copy 3)] [==>(Copy 4)] [==>(Copy 5)] [==>(Copy 6)] [==>(Copy 7)] [==>(Copy 8)]	[1]
	2	F606W, 275 s x 8	(1) NEPTUNE	WFC3/UVIS, ACCUM, UVIS1-C512B-SUB	F606W	CR-SPLIT=NO	POS TARG 0,0	Sequence 2-4 Non-Int	275 Secs X 8 [==>(Copy 1)] [==>(Copy 2)] [==>(Copy 3)] [==>(Copy 4)] [==>(Copy 5)] [==>(Copy 6)] [==>(Copy 7)] [==>(Copy 8)]	[2]
	3	F475W, 8 s	(1) NEPTUNE	WFC3/UVIS, ACCUM, UVIS1-C512B-SUB	F475W	CR-SPLIT=NO	SAME POS AS 2	Sequence 2-4 Non-Int	8 Secs [==>]	[2]
	4	F775W, 8 s	(1) NEPTUNE	WFC3/UVIS, ACCUM, UVIS1-C512B-SUB	F775W	CR-SPLIT=NO	SAME POS AS 2	Sequence 2-4 Non-Int	8 Secs [==>]	[2]

