15380 - Hunting the successive auroral response of Uranus and Neptune to unexpected powerful heliospheric disturbances

Cycle: 25, 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) URANUS	STIS/FUV-MAMA	1	09-Oct-2017 15:00:57.0	yes
02	(1) URANUS	STIS/FUV-MAMA	1	09-Oct-2017 15:00:59.0	yes
03	(1) URANUS	STIS/FUV-MAMA	1	09-Oct-2017 15:01:00.0	yes
04	(1) URANUS	STIS/FUV-MAMA	1	09-Oct-2017 15:01:01.0	yes
05	(2) NEPTUNE	STIS/FUV-MAMA	1	09-Oct-2017 15:01:02.0	yes

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
06	(2) NEPTUNE	STIS/FUV-MAMA	1	09-Oct-2017 15:01:03.0	yes
07	(2) NEPTUNE	STIS/FUV-MAMA	1	09-Oct-2017 15:01:04.0	yes
08	(2) NEPTUNE	STIS/FUV-MAMA	1	09-Oct-2017 15:01:05.0	yes

8 Total Orbits Used

ABSTRACT

An exceptional coronal mass ejection (CME) associated with a X9.3 class solar flare - the most intense one for the past 12 years - departed from the Sun on 6 Sept. 2017, leading a series of powerful CMEs ejected from the same solar active region in the following days. These wide and fast propagating interplanetary shocks were directed toward the Earth, Uranus and Neptune which currently orbit at comparable solar longitudes. The first CME reached Earth on Sept. 7 and triggered a severe geomagnetic storm and intense aurora (Kp index = 8) for a couple of days. Previous successful HST observations revealed that the Uranian aurorae observed near equinox respond to powerful solar wind conditions, while Neptune's aurorae (never observed yet with HST) are expected to respond at least similarly, if not (much) more. By numerically propagating near-Earth solar wind measurements with MHD models, we predict the arrival of the first shock at Uranus around 1st Oct. and at Neptune around 1st Nov, with unusually large pressure amplitudes (0.025 and 0.015 nPa resp.) never sampled yet. These extreme active solar wind conditions and ideal solar system configuration brings a unique chance to HST to both catch Uranus aurorae under an intriguing equinox-to-solstice magnetospheric geometry and detect those of Neptune in a frame of comparative planetology.

OBSERVING DESCRIPTION

Uranus will be observed through a sequence of 7 HST orbits distributed along approximately a week sampling the arrival at Uranus of an interplanetary shock, so far predicted to reach the planet on 31 Oct. 2014. The arrival time of the interplanetary shock will be checked (and further refined) by iterative runs of robust MHD propagation codes.

The proposed observations will consist of 6 STIS orbits, with TIME-TAG imaging using the clear and SRF2 filters, and 1 COS orbit, with TIME-TAG spectroscopy using the FUV G140L gratings. STIS will track the reflected solar emission, airglow and auroral emissions. COS will additionally attempts to detect atmospheric absorption or emission by hydrocarbons.

We request the COS orbit to imediatly follow or preceed one STIS orbit, to help the analysis of COS spectra with STIS images.

Visit

Proposal 15380, URANUS (01), completed Mon Oct 09 19:01:06 GMT 2017

Diagnostic Status: No Diagnostics

Scientific Instruments: STIS/FUV-MAMA

Special Requirements: BETWEEN 20-SEP-2017:00:00:00 AND 01-NOV-2017:00:00:00; VISIBILITY INTERVAL 51 M

Comments: The filter and integration times are similar to those used in proposal 14036.

Please expand exposure time if possible.

Solar System Targets

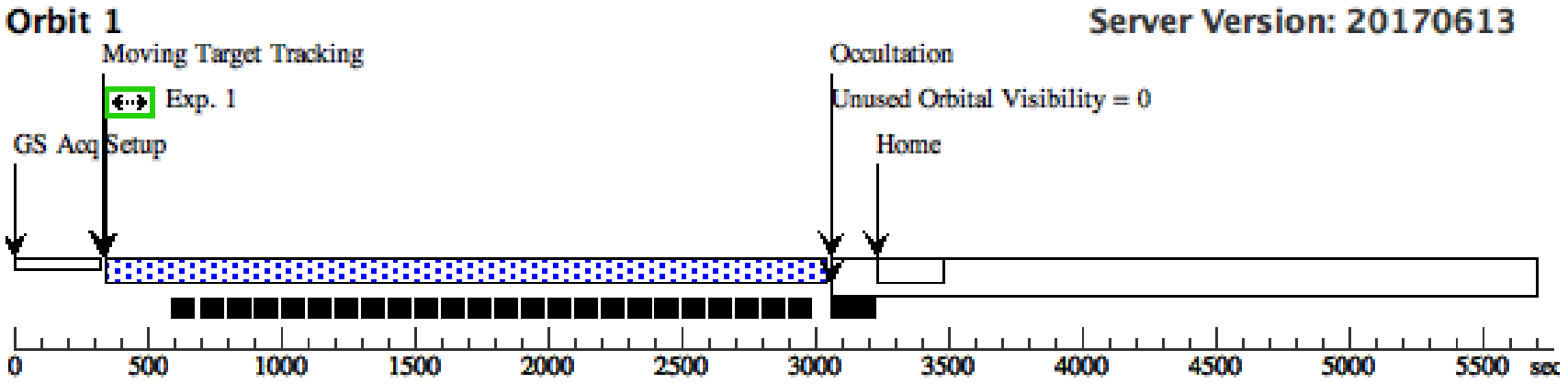
#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
(1)	URANUS	STD=URANUS				EARTH

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	Clear image (189449)	(1) URANUS	STIS/FUV-MAMA, TIME-TAG, 25MAMA	MIRROR	BUFFER-TIME=100	POS TARG null,-3		2670 Secs (2533 Secs) *[==>2533.0 Secs]*	 ***[1]***

Comments: A POS TARG of -3arcsec in AXIS2 will move Uranus' signal away from the repeller wire shadow.

Orbit Structure



Visit

Proposal 15380, URANUS (02), completed Mon Oct 09 19:01:06 GMT 2017

Diagnostic Status: No Diagnostics

Scientific Instruments: STIS/FUV-MAMA

Special Requirements: BETWEEN 22-SEP-2017:00:00:00 AND 01-NOV-2017:00:00:00; VISIBILITY INTERVAL 51 M

Comments: The filter and integration times are similar to those used in proposal 14036.

Please expand exposure time if possible.

Solar System Targets

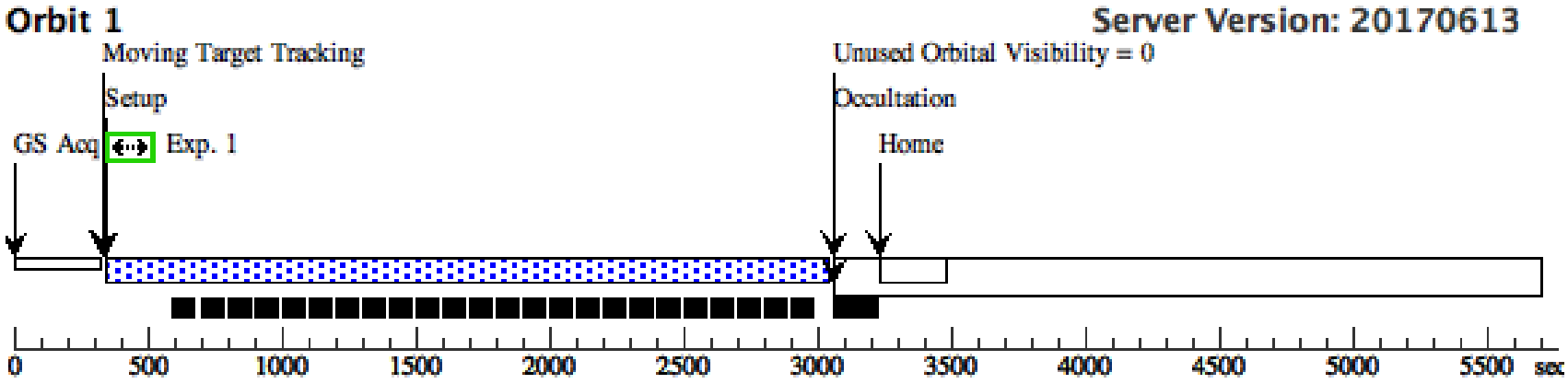
#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
(1)	URANUS	STD=URANUS				EARTH

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	Clear image (189449)	(1) URANUS	STIS/FUV-MAMA, TIME-TAG, 25MAMA	MIRROR	BUFFER-TIME=100	POS TARG null,-3		2670 Secs (2533 Secs) *[==>2533.0 Secs]*	 ***[1]***

Comments: A POS TARG of -3arcsec in AXIS2 will move Uranus' signal away from the repeller wire shadow.

Orbit Structure



Visit

Proposal 15380, URANUS (03), scheduled Mon Oct 09 19:01:06 GMT 2017

Diagnostic Status: No Diagnostics

Scientific Instruments: STIS/FUV-MAMA

Special Requirements: BETWEEN 22-SEP-2017:00:00:00 AND 01-NOV-2017:00:00:00; VISIBILITY INTERVAL 51 M

Comments: The filter and integration times are similar to those used in proposal 14036.

Please expand exposure time if possible.

Solar System Targets

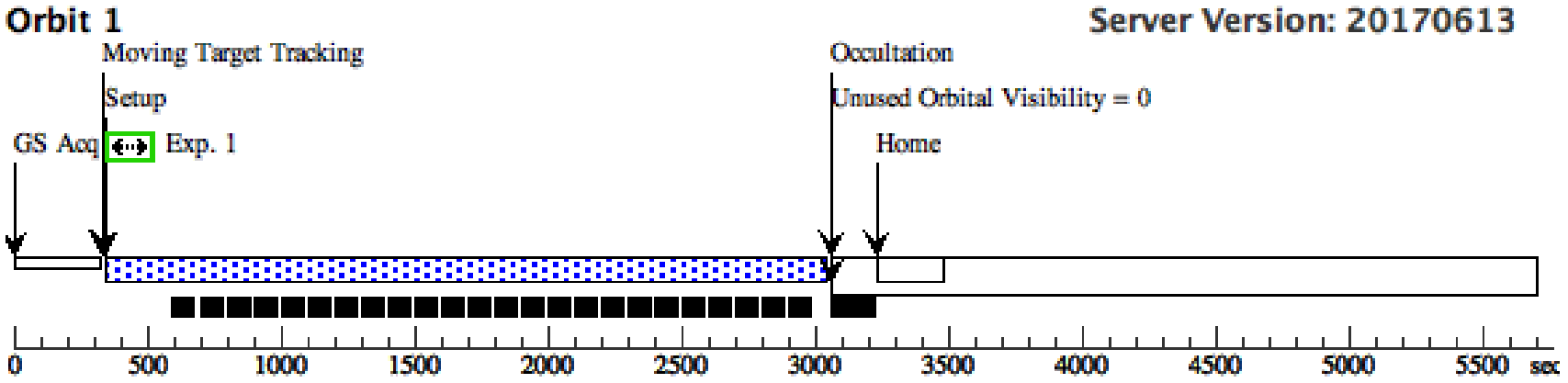
#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
(1)	URANUS	STD=URANUS				EARTH

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	Clear image (189449)	(1) URANUS	STIS/FUV-MAMA, TIME-TAG, 25MAMA	MIRROR	BUFFER-TIME=100	POS TARG null,-3		2670 Secs (2533 Secs) *[==>2533.0 Secs]*	 ***[1]***

Comments: A POS TARG of -3arcsec in AXIS2 will move Uranus' signal away from the repeller wire shadow.

Orbit Structure



Visit

Proposal 15380, URANUS (04), scheduling Mon Oct 09 19:01:06 GMT 2017

Diagnostic Status: No Diagnostics

Scientific Instruments: STIS/FUV-MAMA

Special Requirements: BETWEEN 22-SEP-2017:00:00:00 AND 13-NOV-2017:00:00:00; VISIBILITY INTERVAL 51.5 M

Comments: The filter and integration times are similar to those used in proposal 14036.

Please expand exposure time if possible.

Solar System Targets

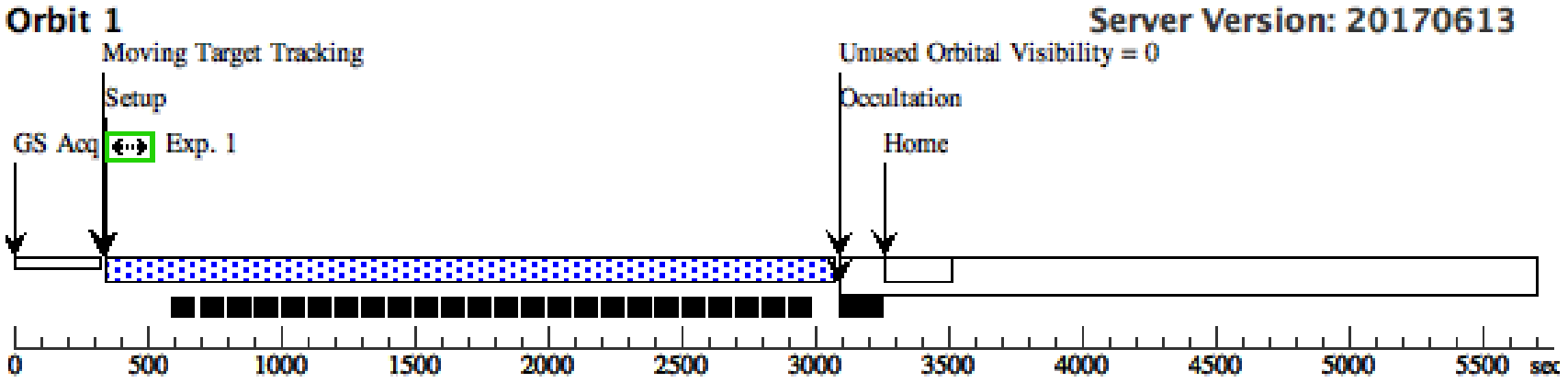
#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
(1)	URANUS	STD=URANUS				EARTH

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	Clear image (189449)	(1) URANUS	STIS/FUV-MAMA, TIME-TAG, 25MAMA	MIRROR	BUFFER-TIME=100	POS TARG null,-3		2670 Secs (2563 Secs) *[==>2563.0 Secs]*	 ***[1]***

Comments: A POS TARG of -3arcsec in AXIS2 will move Uranus' signal away from the repeller wire shadow.

Orbit Structure



Visit

Proposal 15380, NEPTUNE (05), implementation Mon Oct 09 19:01:06 GMT 2017

Diagnostic Status: No Diagnostics

Scientific Instruments: STIS/FUV-MAMA

Special Requirements: BETWEEN 20-OCT-2017:00:00:00 AND 20-NOV-2017:00:00:00

Comments: The filter and integration times are similar to those used in proposal 14036.

Please expand exposure time if possible.

Solar System Targets

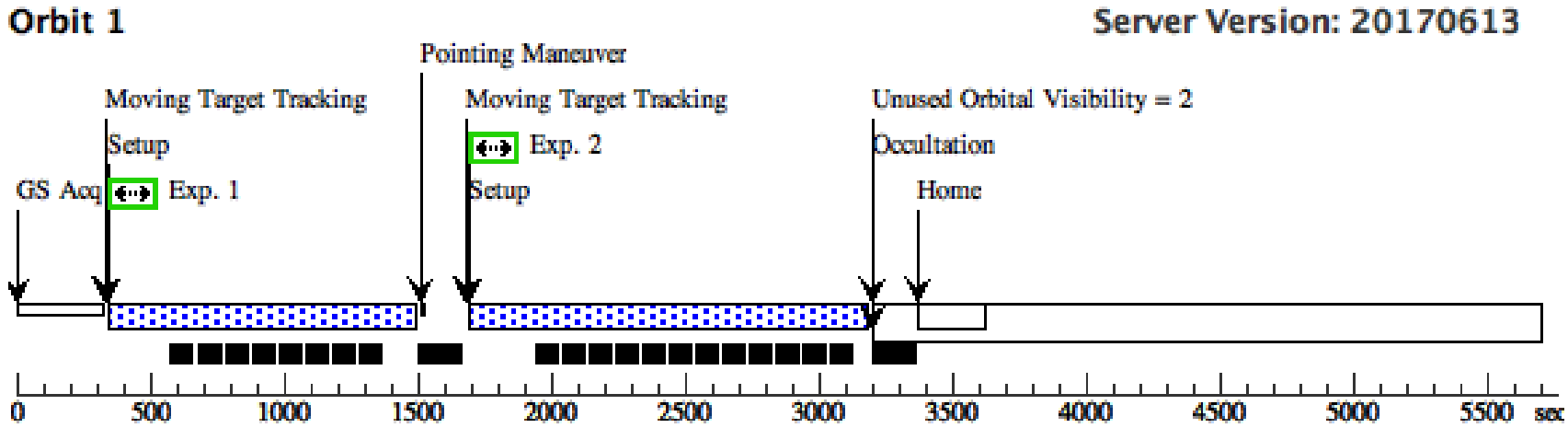
#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
(2)	NEPTUNE	STD=NEPTUNE			NOT ECL P PARTIAL OF NEPTUNE BY TRITON FROM EARTH	EARTH

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	Filtered image (189449)	(2) NEPTUNE	STIS/FUV-MAMA, TIME-TAG, F25SRF2	MIRROR	BUFFER-TIME=100	POS TARG null,-3		900 Secs (1000 Secs) *[==>1000.0 Secs]*	 ***[1]***
2	Clear image (189449)	(2) NEPTUNE	STIS/FUV-MAMA, TIME-TAG, 25MAMA	MIRROR	BUFFER-TIME=100	POS TARG null,-3		1325 Secs (1325 Secs) *[==>]*	 ***[1]***

Comments: A POS TARG of -3arcsec in AXIS2 will move Uranus' signal away from the repeller wire shadow.

Orbit Structure



Visit

Proposal 15380, NEPTUNE (06), implementation Mon Oct 09 19:01:06 GMT 2017

Diagnostic Status: No Diagnostics

Scientific Instruments: STIS/FUV-MAMA

Special Requirements: BETWEEN 20-OCT-2017:00:00:00 AND 20-NOV-2017:00:00:00

Comments: The filter and integration times are similar to those used in proposal 14036.

Please expand exposure time if possible.

Solar System Targets

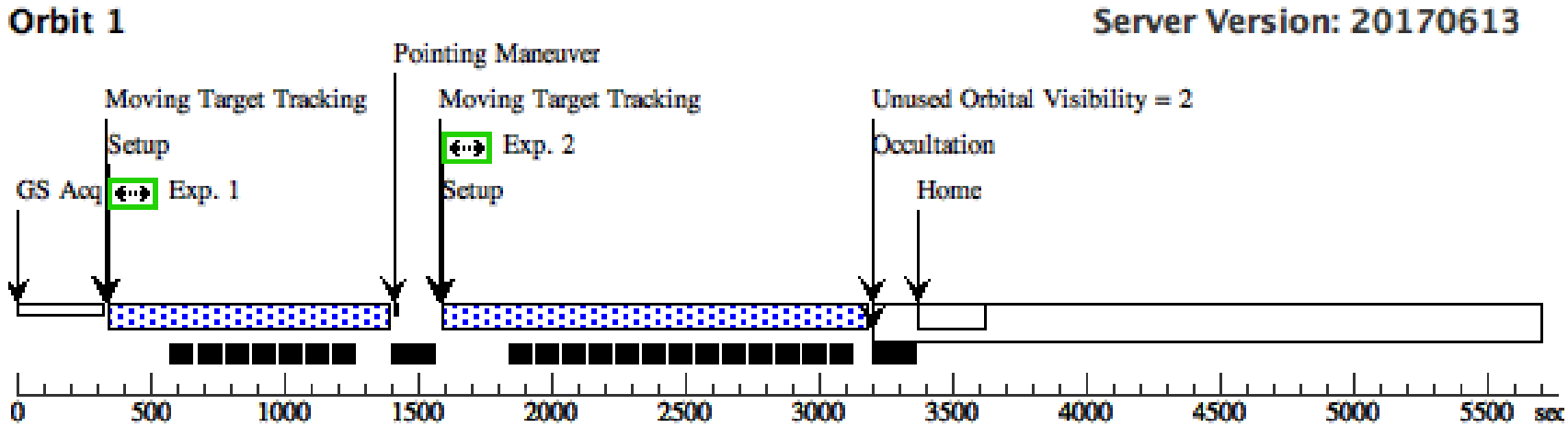
#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
(2)	NEPTUNE	STD=NEPTUNE			NOT ECL P PARTIAL OF NEPTUNE BY TRITON FROM EARTH	EARTH

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	Filtered image (189449)	(2) NEPTUNE	STIS/FUV-MAMA, TIME-TAG, F25SRF2	MIRROR	BUFFER-TIME=100	POS TARG null,-3		900 Secs (900 Secs) *[==>]*	 ***[1]***
2	Clear image (189449)	(2) NEPTUNE	STIS/FUV-MAMA, TIME-TAG, 25MAMA	MIRROR	BUFFER-TIME=100	POS TARG null,-3		1425 Secs (1425 Secs) *[==>]*	 ***[1]***

Comments: A POS TARG of -3arcsec in AXIS2 will move Uranus' signal away from the repeller wire shadow.

Orbit Structure



Visit

Proposal 15380, NEPTUNE (07), implementation Mon Oct 09 19:01:07 GMT 2017

Diagnostic Status: No Diagnostics

Scientific Instruments: STIS/FUV-MAMA

Special Requirements: BETWEEN 20-OCT-2017:00:00:00 AND 20-NOV-2017:00:00:00

Comments: The filter and integration times are similar to those used in proposal 14036.

Please expand exposure time if possible.

Solar System Targets

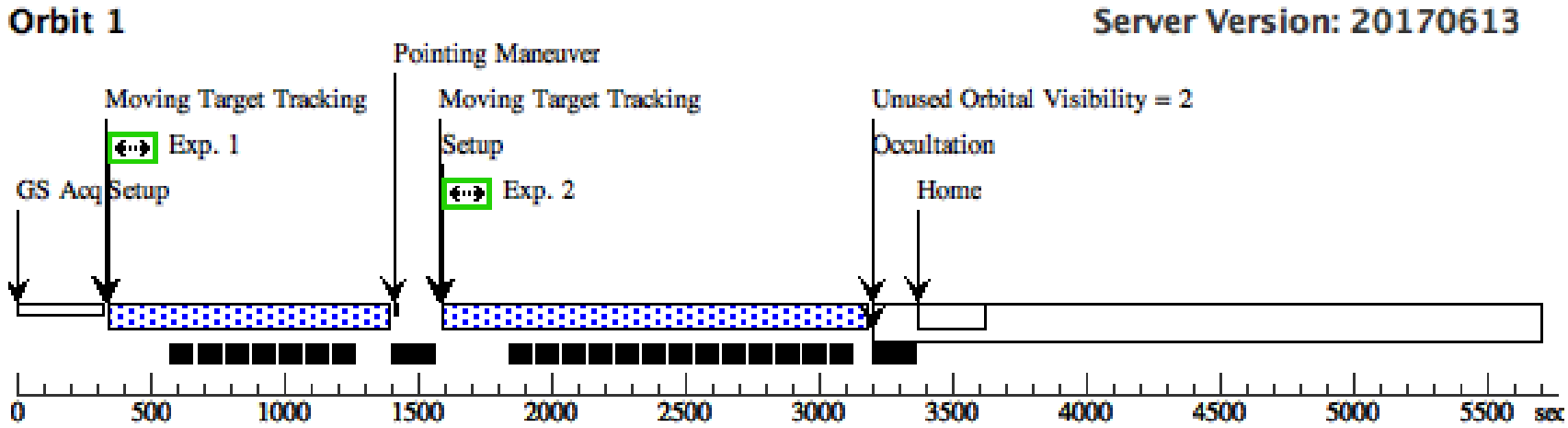
#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
(2)	NEPTUNE	STD=NEPTUNE			NOT ECL P PARTIAL OF NEPTUNE BY TRITON FROM EARTH	EARTH

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	Filtered image (189449)	(2) NEPTUNE	STIS/FUV-MAMA, TIME-TAG, F25SRF2	MIRROR	BUFFER-TIME=100	POS TARG null,-3		900 Secs (900 Secs) *[==>]*	 ***[1]***
2	Clear image (189449)	(2) NEPTUNE	STIS/FUV-MAMA, TIME-TAG, 25MAMA	MIRROR	BUFFER-TIME=100	POS TARG null,-3		1425 Secs (1425 Secs) *[==>]*	 ***[1]***

Comments: A POS TARG of -3arcsec in AXIS2 will move Uranus' signal away from the repeller wire shadow.

Orbit Structure



Visit

Proposal 15380, NEPTUNE (08), implementation Mon Oct 09 19:01:07 GMT 2017

Diagnostic Status: No Diagnostics

Scientific Instruments: STIS/FUV-MAMA

Special Requirements: BETWEEN 20-OCT-2017:00:00:00 AND 20-NOV-2017:00:00:00

Comments: The filter and integration times are similar to those used in proposal 14036.

Please expand exposure time if possible.

Solar System Targets

#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
(2)	NEPTUNE	STD=NEPTUNE			NOT ECL P PARTIAL OF NEPTUNE BY TRITON FROM EARTH	EARTH

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	Filtered image (189449)	(2) NEPTUNE	STIS/FUV-MAMA, TIME-TAG, F25SRF2	MIRROR	BUFFER-TIME=100	POS TARG null,-3		900 Secs (900 Secs) *[==>]*	 ***[1]***
2	Clear image (189449)	(2) NEPTUNE	STIS/FUV-MAMA, TIME-TAG, 25MAMA	MIRROR	BUFFER-TIME=100	POS TARG null,-3		1425 Secs (1425 Secs) *[==>]*	 ***[1]***

Comments: A POS TARG of -3arcsec in AXIS2 will move Uranus' signal away from the repeller wire shadow.

Orbit Structure