12484 - STIS UV spectroscopy of a bright nova during its super soft X-ray phase

Cycle: 19, Proposal Category: GO

(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) NOVALMC2012	STIS/CCD STIS/FUV-MAMA STIS/NUV-MAMA	1	21-Jun-2012 21:03:03.0	yes
02	(1) NOVALMC2012	STIS/CCD STIS/FUV-MAMA STIS/NUV-MAMA	1	21-Jun-2012 21:03:14.0	yes
03	(1) NOVALMC2012 CCDFLAT	STIS/CCD STIS/FUV-MAMA	1	21-Jun-2012 21:03:23.0	yes

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
99	(1) NOVALMC2012	STIS/CCD STIS/FUV-MAMA	1	21-Jun-2012 21:03:29.0	yes

4 Total Orbits Used

ABSTRACT

We propose ToO observations of one bright nova in outburst using the STIS echelle to obtain ultraviolet spectroscopy while the source is X-ray luminous. UV spectroscopy enables determination of ejecta physical properties, including the elemental abundances, ejecta mass, and structure. This information provides insight into the role of novae in the isotopic enrichment of the Interstellar Medium, pre-solar grain abundances, details on the mass and composition of the underlying white dwarf, and constraints on hydrodynamic modeling of the outburst. UV data are key to these analyses, providing the only opportunity to observe strong carbon lines in these objects as well as direct measures of the interstellar reddening. With slit spectroscopy from ~1100-3100 Angstroms, HST is currently the only facility that can provide these data. The data will complement our existing ground based optical, infrared and radio and Swift X-ray nova ToO programs providing continous spectral information from X-ray to the radio.

OBSERVING DESCRIPTION

We will observe a bright nova during its super soft source (SSS) X-ray phase as determined by Swift XRT monitoring. The program calls for three separate one orbit visits. The initial ToO trigger occurs when the source enters the SSS phase, e.g., the majority of photons have E ~< 1 keV and a Swift X-ray count rate ~> 0.1 ct/s. The second visit is initiated after the source has reached X-ray maximum and stabilized at an approximately constant level. The last visit is scheduled after the decline in the X-ray light curve indicating that nuclear burning has ended. This will give us UV spectra of the ejecta exposed to different photoionization levels.

In order to sample the full spectral range we will use the E140M and E230M gratings. The echelle is necessary to provide high resolution data while also minimizing the flux on the MAMA detectors for this bright source. For each orbit we use the CCD and F28X50LP aperture to acquire the source. A 1 second exposure is sufficient to obtain enough S/N to acquire but if the source is too bright we will switch to the F20X50OII aperture. We will use the E140M and the E230M (lambda1978) to obtain the critical 1150-1700 Angstrom and 1600-2300 Angstrom spectra. In the first and second visits this will be supplmented with an additional E230M (lambda 2707) exposure to get the 2300-3100 Angstrom data. There will be no E230M (lambda 2707) during the third visit. The exposure times for each grating and position should be approximately equal in each visit, e.g. 360-590 seconds in visits 1 and 2 and longer 780-1050 second exposures in visit 3. The 0.2" X 0.2" slit will be used unless the nova is too bright in which

case we will use an appropriate neutral density filter. This is unlikely as such novae are relatively rare. We will use visual photometry and Swift UVOT data to estimate the UV brightness before each visit to ensure the health of the MAMA detectors.

Proposal 12484 - Visit 01 - STIS UV spectroscopy of a bright nova during its super soft X-ray phase

Visit

Proposal 12484, Visit 01, completed Fri Jun 22 01:03:36 GMT 2012

Diagnostic Status: Warning

Scientific Instruments: STIS/CCD, STIS/FUV-MAMA, STIS/NUV-MAMA

Special Requirements: BETWEEN 01-MAY-2012:00:00:00 AND 31-MAY-2012:00:00:00

Diagnostics

(Visit 01) Warning (Orbit Planner): VISIBILITY OVERRUN

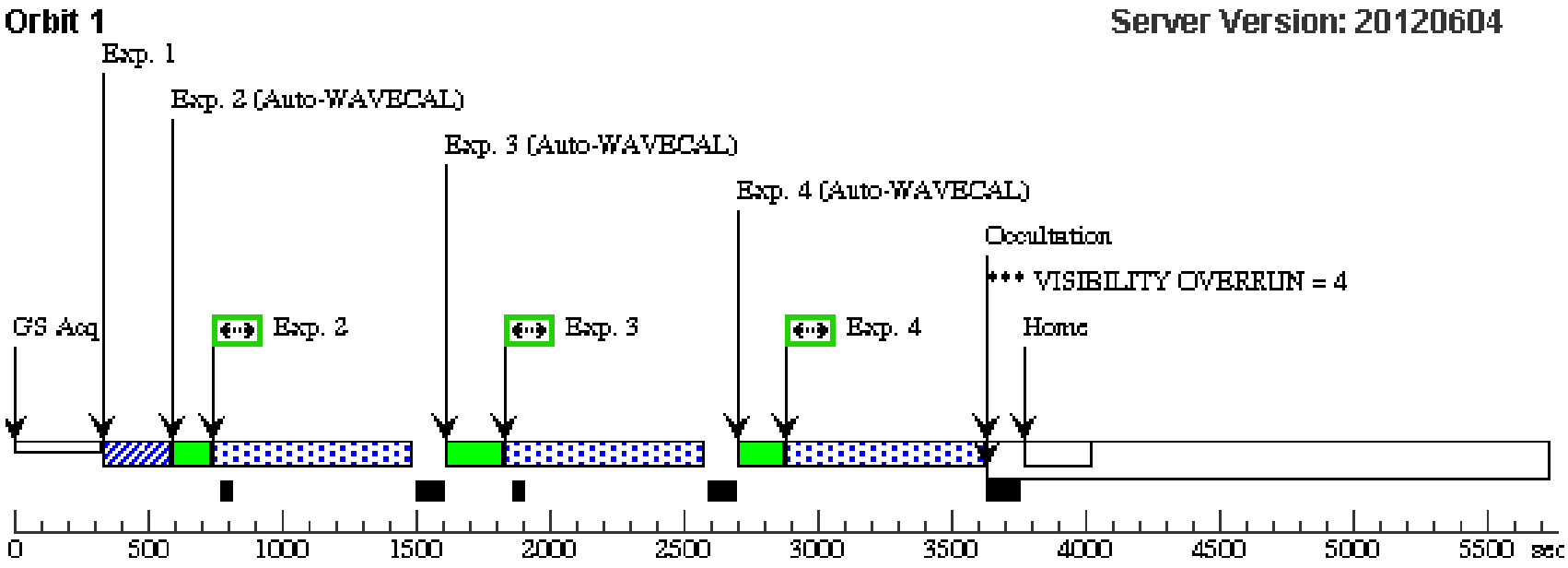
Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	NOVALMC2012	RA: 04 54 56.8200 (73.7367500d) Dec: -70 26 56.60 (-70.44906d) Equinox: J2000		V=15+/-1	Reference Frame: ICRS

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1	(STIS.ta.395990)	(1) NOVALMC2012	STIS/CCD, ACQ, 50CCD	MIRROR				1 Secs *[==>]*	***[1]***
2	(STIS.sp.395992)	(1) NOVALMC2012	STIS/FUV-MAMA, ACCUM, 0.2X0.2	E140M 1425 A				300 Secs *[==>724.0 Secs]*	***[1]***
3	(STIS.sp.395993)	(1) NOVALMC2012	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 1978 A				300 Secs *[==>724.0 Secs]*	***[1]***
4	(STIS.sp.395994)	(1) NOVALMC2012	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A				300 Secs *[==>724.0 Secs]*	***[1]***

Orbit Structure



Proposal 12484 - Visit 02 - STIS UV spectroscopy of a bright nova during its super soft X-ray phase

Visit

Proposal 12484, Visit 02, completed Fri Jun 22 01:03:38 GMT 2012

Diagnostic Status: Warning

Scientific Instruments: STIS/CCD, STIS/FUV-MAMA, STIS/NUV-MAMA

Special Requirements: AFTER_01 BY 10 D TO 20 D; BETWEEN 20-MAY-2012:00:00:00 AND 03-JUN-2012:00:00:00

Diagnostics

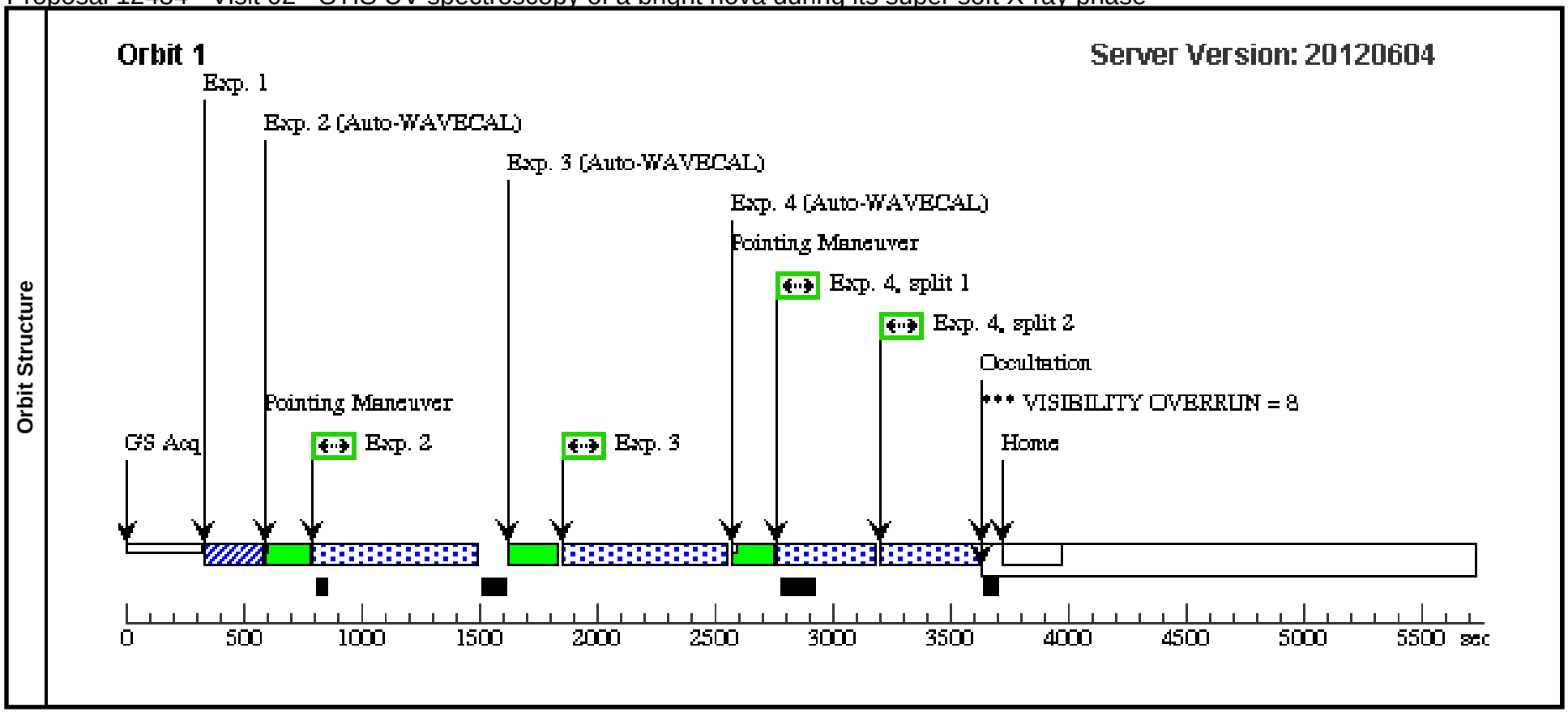
(Visit 02) Warning (Orbit Planner): VISIBILITY OVERRUN

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	NOVALMC2012	RA: 04 54 56.8200 (73.7367500d) Dec: -70 26 56.60 (-70.44906d) Equinox: J2000		V=15+/-1	Reference Frame: ICRS

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1		(1) NOVALMC2012	STIS/CCD, ACQ, 50CCD	MIRROR				1 Secs *[==>]*	*[1]*
2	(STIS.sp.395995)	(1) NOVALMC2012	STIS/FUV-MAMA, ACCUM, 52X0.2	G140L 1425 A				300 Secs *[==>690.0 Secs]*	*[1]*
3	(STIS.sp.395996)	(1) NOVALMC2012	STIS/NUV-MAMA, ACCUM, 52X0.2	G230L 2376 A				300 Secs *[==>690.0 Secs]*	*[1]*
4	(STIS.sp.395997)	(1) NOVALMC2012	STIS/CCD, ACCUM, 52X0.2E1	G430L 4300 A				600 Secs *[==>390.0 Secs (Split 1)]* *[==>390.0 Secs (Split 2)]*	*[1]*


Orbit Structure
Orbit 1
Server Version: 20120604
Exp. 1
Exp. 2 (Auto-WAVECAL)
Exp. 3 (Auto-WAVECAL)
Exp. 4 (Auto-WAVECAL)
Pointing Maneuver
Exp. 4, split 1
Exp. 4, split 2
Occultation
*** VISIBILITY OVERRUN = 8
Pointing Maneuver
GS Acq
Exp. 2
Exp. 3
Home
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 12484, Visit 03, scheduling Fri Jun 22 01:03:39 GMT 2012

Diagnostic Status: No Diagnostics

Scientific Instruments: STIS/CCD, STIS/FUV-MAMA

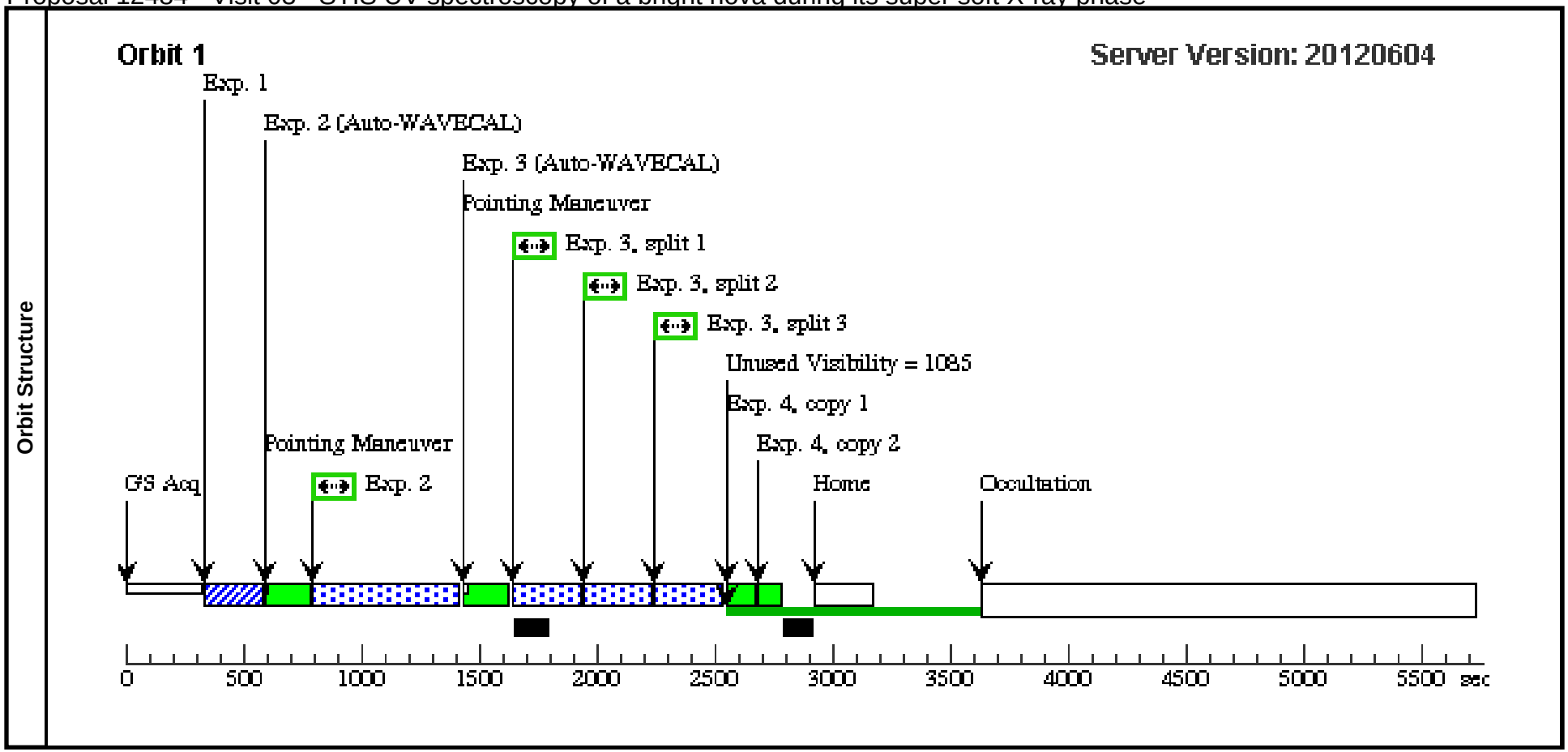
Special Requirements: BETWEEN 01-JUL-2012:00:00:00 AND 30-JUL-2012:00:00:00

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	NOVALMC2012	RA: 04 54 56.8200 (73.7367500d) Dec: -70 26 56.60 (-70.44906d) Equinox: J2000		V=15+/-1	Reference Frame: ICRS

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1		(1) NOVALMC2012	STIS/CCD, ACQ, 50CCD	MIRROR				2 Secs *[==>]*	***[1]***
2	(STIS.sp.406813)	(1) NOVALMC2012	STIS/FUV-MAMA, ACCUM, 52X0.2	G140L 1425 A				800 Secs *[==>611.0 Secs]*	***[1]***
3		(1) NOVALMC2012	STIS/CCD, ACCUM, 52X0.2E1	G750L 7751 A	CR-SPLIT=3			600 Secs *[==>256.0 Secs (Split 1)]* *[==>256.0 Secs (Split 2)]* *[==>256.0 Secs (Split 3)]*	***[1]***
4		CCDFLAT	STIS/CCD, ACCUM, 52X0.1	G750L 7751 A				*[==>(Copy 1)]* *[==>(Copy 2)]*	***[1]***


Orbit Structure
Orbit 1
Server Version: 20120604
Exp. 1
Exp. 2 (Auto-WAVECAL)
Exp. 3 (Auto-WAVECAL)
Pointing Maneuver
Exp. 3, split 1
Exp. 3, split 2
Exp. 3, split 3
Unused Visibility = 1085
Exp. 4, copy 1
Exp. 4, copy 2
Pointing Maneuver
GS Acq
Exp. 2
Home
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 12484, Visit 99 Fri Jun 22 01:03:40 GMT 2012

Diagnostic Status: Warning

Scientific Instruments: STIS/CCD, STIS/FUV-MAMA

Special Requirements: AFTER_01; BETWEEN 01-JUL-2012:00:00:00 AND 31-JUL-2012:00:00:00

Diagnostics

(Visit 99) Warning (Orbit Planner): VISIBILITY OVERRUN

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	NOVALMC2012	RA: 04 54 56.8200 (73.7367500d) Dec: -70 26 56.60 (-70.44906d) Equinox: J2000		V=15+/-1	Reference Frame: ICRS

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1	(STIS.ta.409289)	(1) NOVALMC2012	STIS/CCD, ACQ, 50CCD	MIRROR				20 Secs *[==>]*	*[1]*
2	(STIS.sp.409288)	(1) NOVALMC2012	STIS/FUV-MAMA, ACCUM, 0.2X0.2	G140L 1425 A				300 Secs *[==>2746.0 Secs]*	*[1]*

Orbit Structure