13388 - Fundamental properties of novae outburst: Coordinated HST and XMM ToO observations

Cycle: 21, Proposal Category: GO

(UV Initiative)

(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) NOVADEL2013	STIS/CCD STIS/FUV-MAMA STIS/NUV-MAMA	1	22-Sep-2014 21:00:31.0	yes

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
02	(1) NOVADEL2013	STIS/CCD STIS/FUV-MAMA STIS/NUV-MAMA	1	22-Sep-2014 21:00:33.0	yes
03	(1) NOVADEL2013	STIS/CCD STIS/FUV-MAMA STIS/NUV-MAMA	1	22-Sep-2014 21:00:34.0	yes
04	(3) NOVACEN2013	STIS/CCD STIS/FUV-MAMA STIS/NUV-MAMA	1	22-Sep-2014 21:00:36.0	yes
05	(3) NOVACEN2013	STIS/CCD STIS/FUV-MAMA STIS/NUV-MAMA	1	22-Sep-2014 21:00:37.0	yes
06	(1) NOVADEL2013	STIS/CCD STIS/FUV-MAMA STIS/NUV-MAMA	1	22-Sep-2014 21:00:39.0	yes

6 Total Orbits Used

ABSTRACT

We propose non-disruptive ToO observations of two optically bright Galactic novae in outburst to observe their temporal UV evolution using the HST/STIS echelle. One ToO will target a Carbon-Oxygen type nova, which are not in the Galactic archive, and the other ToO will be reserved for the next high energy gamma-ray detected nova. The Fermi/LAT detection of high energy gamma-rays is a recent and unexpected discovery whose mechanism in classical novae is not currently understood. In both cases, UV spectroscopy is essential for determining the physical properties of the ejecta which carry the imprint of the thermonuclear runaway: elemental abundances, mass, dynamics, and structure. The UV provides the only opportunity to observe important nucleosynthetic ions, especially carbon, and the full velocity and density structure of the ejecta along with direct measurement of ions along the interstellar line of sight. STIS is currently the only instrument that provides the necessary resolution (R = 30,000 - 45,000) in the UV (1100-3100 Angstroms). Each nova target would also be observed with a single, high resolution XMM/RGS exposure (E/DeltaE ~ 500) obtained while X-ray luminous (as determined by our Swift X-ray monitoring). The XMM observations provide critical information about the conditions of the hot, luminous white dwarf that powers the radiative outburst and cannot be obtained from the low spectral resolution Swift X-ray

imaging. We will combine this UV and X-ray dataset with our existing ground based optical, infrared, and radio plus Swift X-ray/UV nova ToO programs to obtain fully pan-chromatic observations of two novae in outburst.

OBSERVING DESCRIPTION

The objective of the project is to obtain multiple high resolution UV spectra of two nova ToOs during their outburst and supplement the UV data set with a single XMM exposure for each source. All HST orbits will use multiple STIS medium echelle settings to obtain wavelength coverage from 1100-3100 Angstroms. We were awarded 3 HST orbits and 25 ks for each ToO. Once a candidate nova is identified, the first HST orbit will be obtained as soon as a non-disruptive ToO can be scheduled, e.g. 2-3 weeks, so that we obtain the early optically thick phase. A second HST orbit would be scheduled once our Swift monitoring program has indicated that the source is transitioning to a Super Soft Source (SSS) phase in X-rays. The last HST orbit would be scheduled while the source was a SSS and would be complimented, but not necessarily coordinated with, the XMM exposure.

--------- Additional Comments ----------

We requested and were granted long term status to extended the observations into cycle 22 if necessary.

Visit

Proposal 13388, ToO1a (01), completed Tue Sep 23 01:00:40 GMT 2014

Diagnostic Status: Warning

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

Special Requirements: AFTER 30-AUG-2013:00:00:00

Comments: Revised first visit to account for the bright Nova Del 2013.

Diagnostics

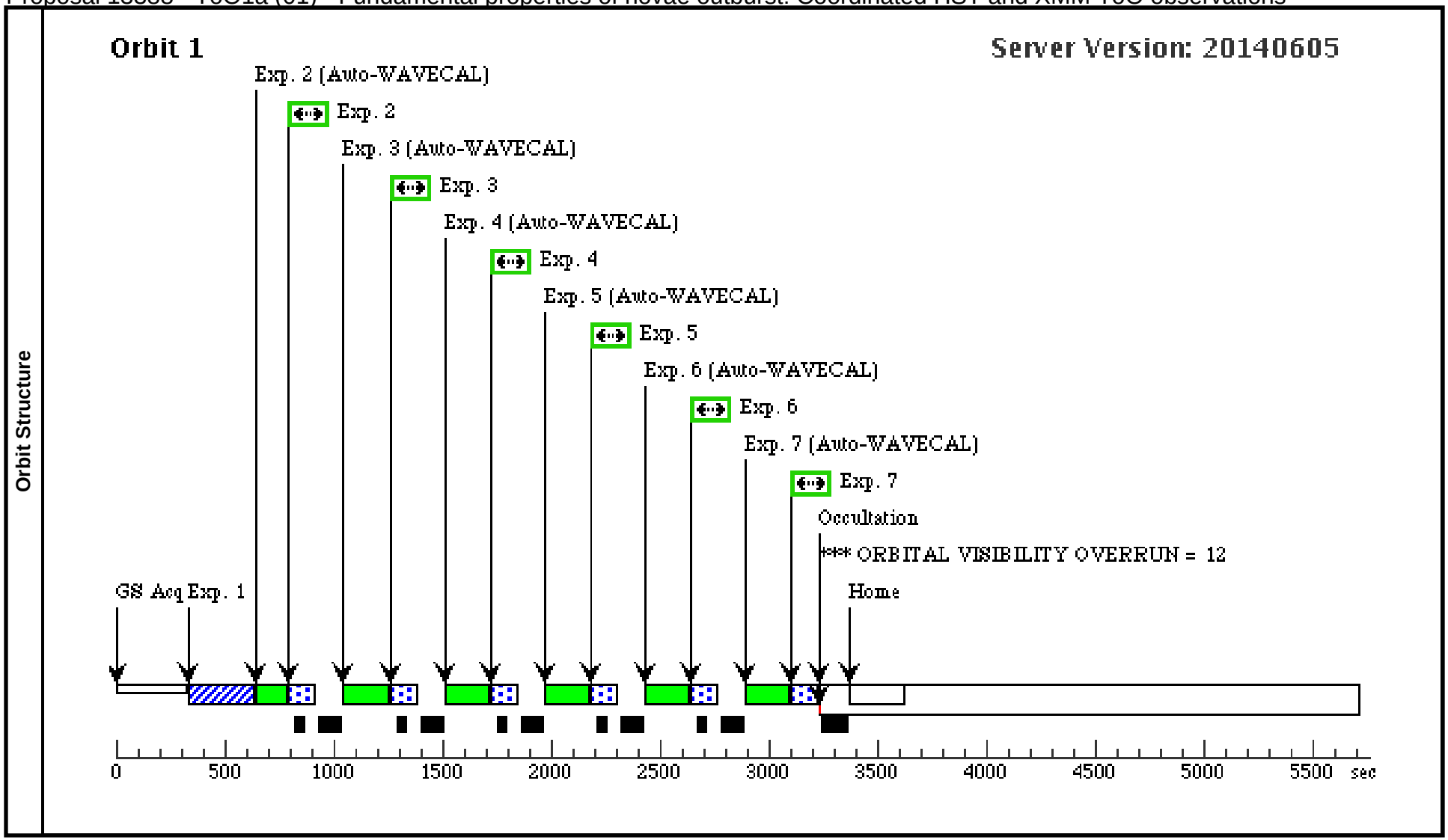
(ToO1a (01)) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	NOVADEL2013	RA: 20 23 30.7300 (305.8780417d) Dec: +20 46 4.10 (20.76781d) Equinox: J2000	Epoch of Position: 2000	V=8.5+/-1	Reference Frame: ICRS

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	ToO1a (STIS.ta.529266)	(1) NOVADEL2013	STIS/CCD, ACQ, F25ND3	MIRROR				1 Secs (1 Secs) *[==>]*	*[1]*
2	ToO1a (STIS.sp.529943)	(1) NOVADEL2013	STIS/FUV-MAMA, ACCUM, 0.2X0.2	E140M 1425 A				10 Secs (108 Secs) *[==>108.0 Secs]*	*[1]*
3	ToO1a (STIS.sp.529944)	(1) NOVADEL2013	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230H 1763 A				10 Secs (105 Secs) *[==>105.0 Secs]*	*[1]*
4	ToO1a (STIS.sp.529947)	(1) NOVADEL2013	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230H 2013 A				10 Secs (105 Secs) *[==>105.0 Secs]*	*[1]*
5	ToO1a (STIS.sp.529948)	(1) NOVADEL2013	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230H 2263 A				10 Secs (105 Secs) *[==>105.0 Secs]*	*[1]*
6	ToO1a (STIS.sp.529949)	(1) NOVADEL2013	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230H 2513 A				10 Secs (105 Secs) *[==>105.0 Secs]*	*[1]*
7	ToO1a (STIS.sp.529950)	(1) NOVADEL2013	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230H 2762 A				10 Secs (105 Secs) *[==>105.0 Secs]*	*[1]*


Orbit Structure
Orbit 1
Server Version: 20140605
Exp. 2 (Auto-WAVECAL)
Exp. 2
Exp. 3 (Auto-WAVECAL)
Exp. 3
Exp. 4 (Auto-WAVECAL)
Exp. 4
Exp. 5 (Auto-WAVECAL)
Exp. 5
Exp. 6 (Auto-WAVECAL)
Exp. 6
Exp. 7 (Auto-WAVECAL)
Exp. 7
Occultation
*** ORBITAL VISIBILITY OVERRUN = 12
GS Acq Exp. 1
Home
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 13388, ToO1b (02), completed Tue Sep 23 01:00:41 GMT 2014

Diagnostic Status: No Diagnostics

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

Special Requirements: AFTER 01 BY 60.0 D TO 365.0 D

Comments: Second visit of ToO1

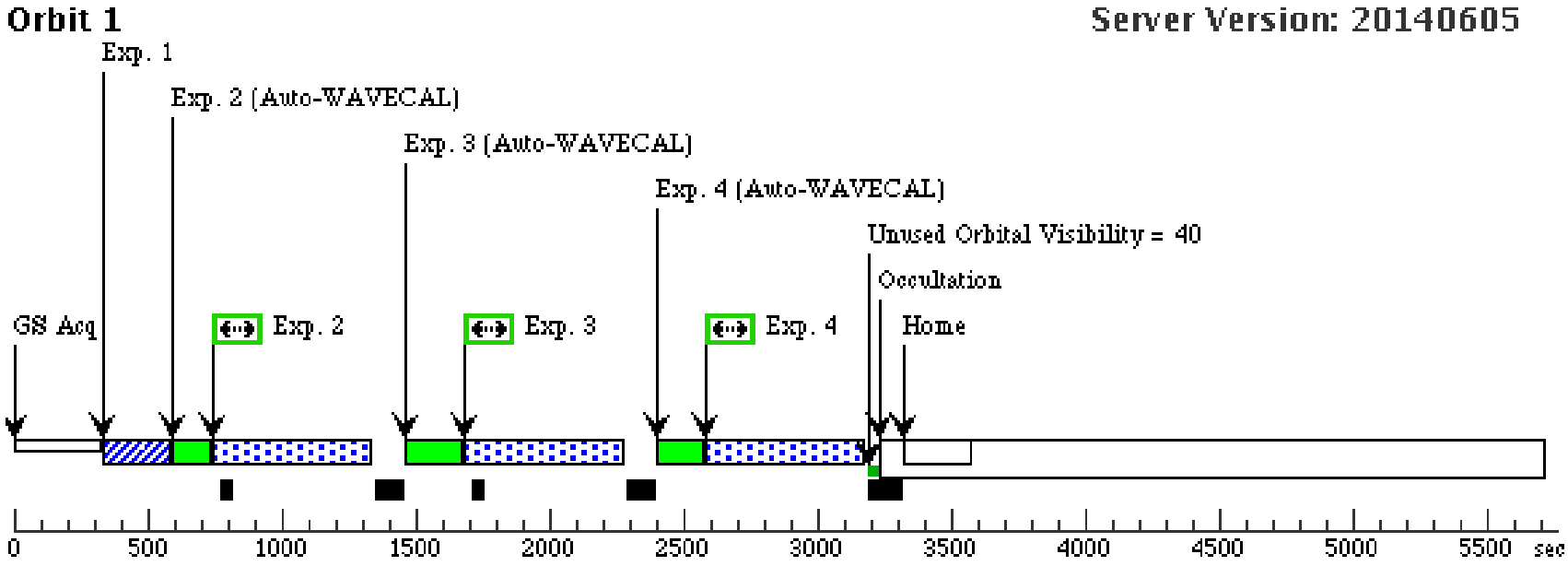
Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	NOVADEL2013	RA: 20 23 30.7300 (305.8780417d) Dec: +20 46 4.10 (20.76781d) Equinox: J2000	Epoch of Position: 2000	V=8.5+/-1	Reference Frame: ICRS

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	ToO1b (STIS.ta.540708)	(1) NOVADEL2013	STIS/CCD, ACQ, 50CCD	MIRROR				1 Secs (1 Secs) *[==>]*	*[1]*
2	ToO1b (STIS.sp.540702)	(1) NOVADEL2013	STIS/FUV-MAMA, ACCUM, 0.2X0.2	E140M 1425 A				575 Secs (575 Secs) *[==>]*	*[1]*
3	ToO1b (STIS.sp.540700)	(1) NOVADEL2013	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 1978 A				575 Secs (575 Secs) *[==>]*	*[1]*
4	ToO1b (STIS.sp.540701)	(1) NOVADEL2013	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A				575 Secs (575 Secs) *[==>]*	*[1]*

Orbit Structure



Visit

Proposal 13388, ToO1c (03), completed Tue Sep 23 01:00:41 GMT 2014

Diagnostic Status: No Diagnostics

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

Special Requirements: AFTER 02 BY 60.0 D TO 365.0 D

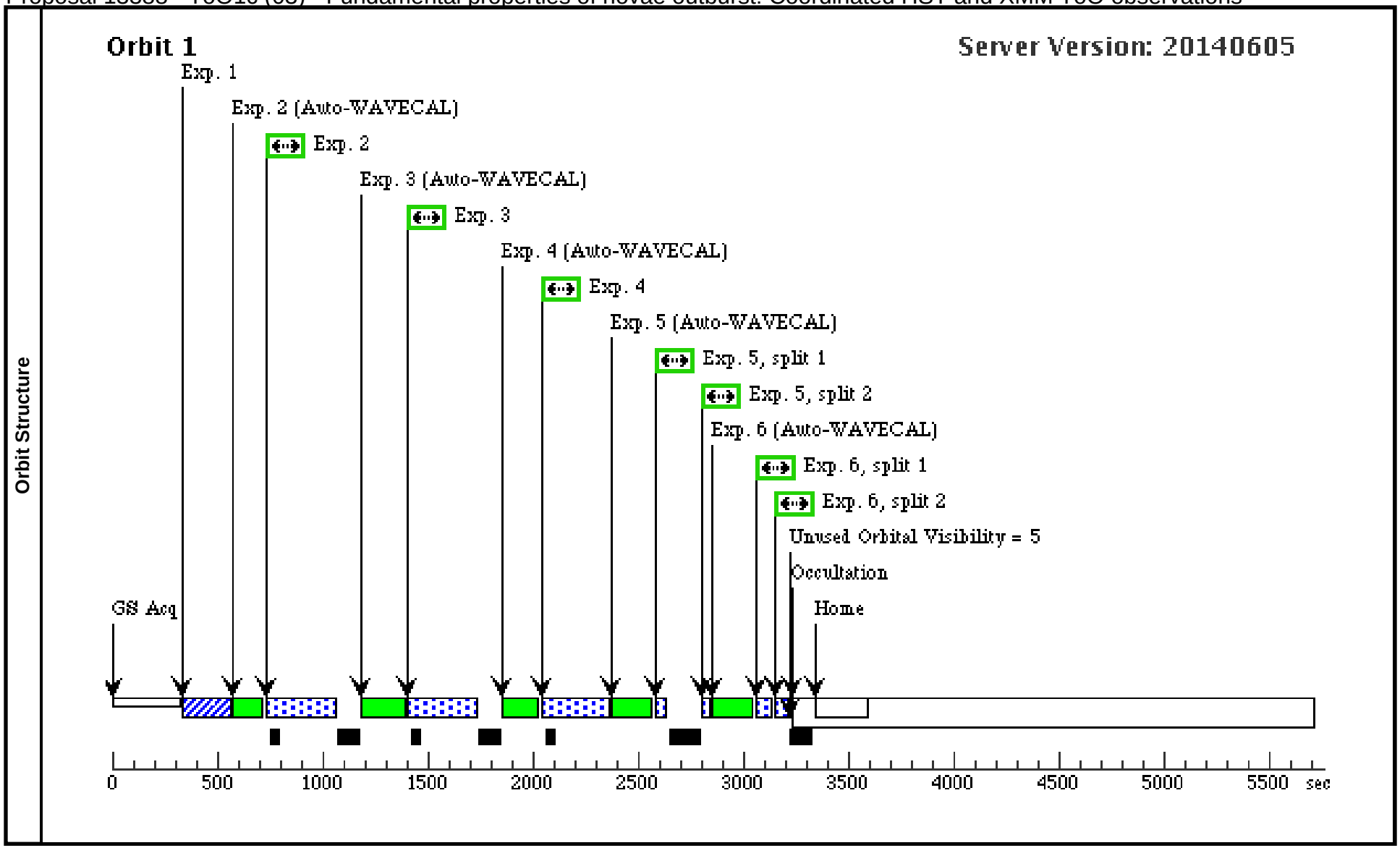
Comments: Third visit of ToO1

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	NOVADEL2013	RA: 20 23 30.7300 (305.8780417d) Dec: +20 46 4.10 (20.76781d) Equinox: J2000	Epoch of Position: 2000	V=8.5+/-1	Reference Frame: ICRS

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	ToO1c (STIS.ta.571078)	(1) NOVADEL2013	STIS/CCD, ACQ, F28X50LP	MIRROR				1 Secs (1 Secs) *[==>]*	 ***[1]***
2	ToO1c (STIS.sp.571030)	(1) NOVADEL2013	STIS/FUV-MAMA, ACCUM, 0.2X0.2	E140M 1425 A				300 Secs (310 Secs) *[==>310.0 Secs]*	 ***[1]***
3	ToO1c (STIS.sp.571031)	(1) NOVADEL2013	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 1978 A				300 Secs (310 Secs) *[==>310.0 Secs]*	 ***[1]***
4	ToO1c (STIS.sp.571032)	(1) NOVADEL2013	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A				300 Secs (307 Secs) *[==>307.0 Secs]*	 ***[1]***
5	ToO1c (STIS.sp.571023)	(1) NOVADEL2013	STIS/CCD, ACCUM, 0.2X0.2	G430L 4300 A	GAIN=4			5 Secs (10 Secs) *[==>5.0 Secs (Split 1)]* *[==>5.0 Secs (Split 2)]*	 ***[1]***
6	ToO1c (STIS.sp.571027)	(1) NOVADEL2013	STIS/CCD, ACCUM, 0.2X0.2	G430M 3423 A				50 Secs (50 Secs) *[==>25 Secs (Split 1)]* *[==>25 Secs (Split 2)]*	 ***[1]***


Orbit 1
Server Version: 20140605
Orbit Structure
Exp. 1
Exp. 2 (Auto-WAVECAL)
Exp. 2
Exp. 3 (Auto-WAVECAL)
Exp. 3
Exp. 4 (Auto-WAVECAL)
Exp. 4
Exp. 5 (Auto-WAVECAL)
Exp. 5, split 1
Exp. 5, split 2
Exp. 6 (Auto-WAVECAL)
Exp. 6, split 1
Exp. 6, split 2
Unused Orbital Visibility = 5
Occultation
Home
GS Acq
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 13388, ToO2a (04), completed Tue Sep 23 01:00:41 GMT 2014

Diagnostic Status: No Diagnostics

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

Special Requirements: (none)

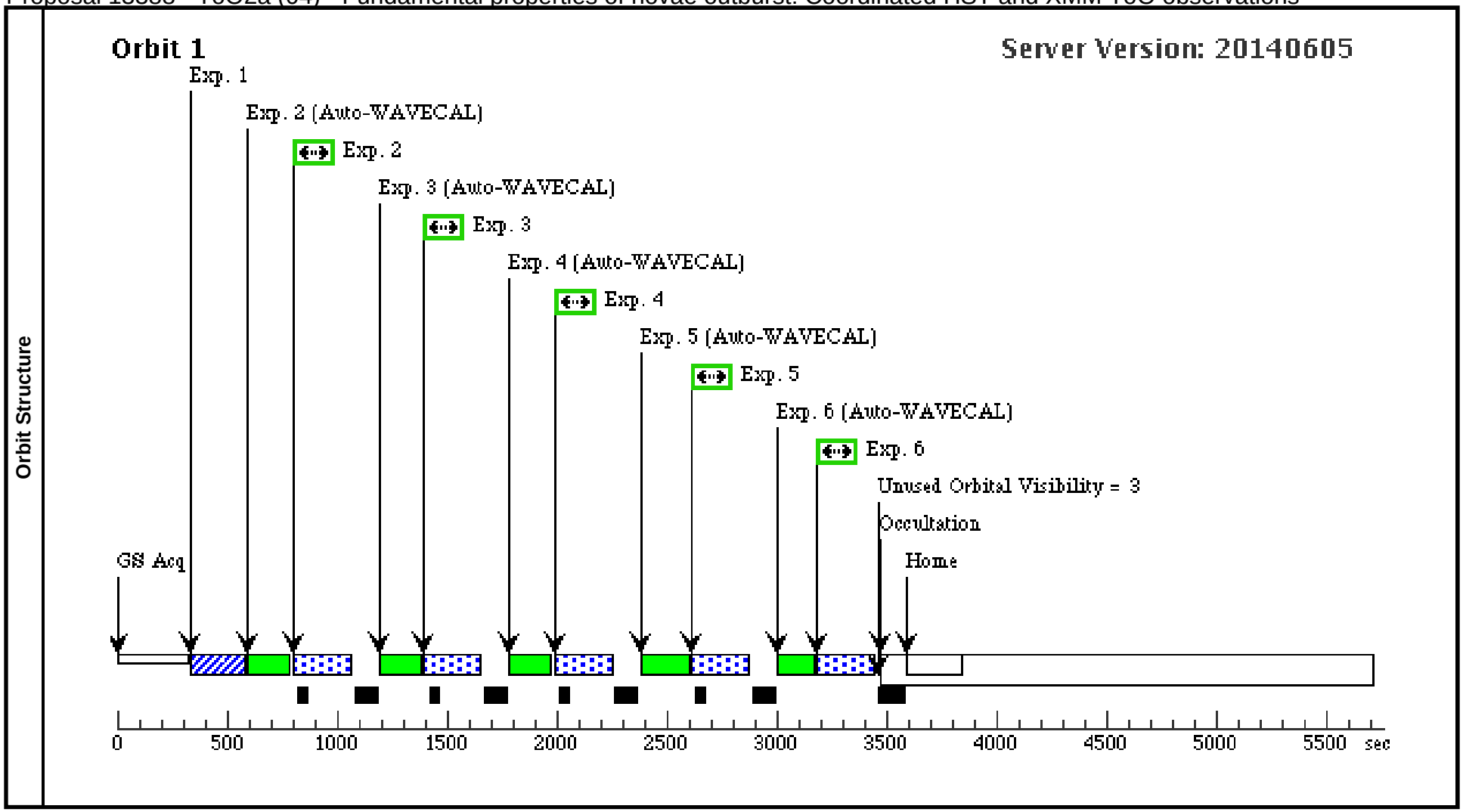
Comments: First visit of V1369 Cen

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(3)	NOVACEN2013 Alt Name1: V1369CEN	RA: 13 54 45.2200 (208.6884167d) Dec: -59 09 4.50 (-59.15125d) Equinox: J2000	Epoch of Position: 2000	V=8	Reference Frame: ICRS

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	ToO2a	(3) NOVACEN2013	STIS/CCD, ACQ, 50CCD	MIRROR				1 Secs (1 Secs) *[==>]*	 ***[1]***
2	ToO2a (STIS.sp.62 5085)	(3) NOVACEN2013	STIS/FUV-MAMA, ACCUM, 0.2X0.2	E140H 1234 A				300 Secs (249 Secs) *[==>249.0 Secs]*	 ***[1]***
3	ToO2a (STIS.sp.62 5086)	(3) NOVACEN2013	STIS/FUV-MAMA, ACCUM, 0.2X0.2	E140H 1416 A				300 Secs (249 Secs) *[==>249.0 Secs]*	 ***[1]***
4	ToO2a (STIS.sp.62 5083)	(3) NOVACEN2013	STIS/FUV-MAMA, ACCUM, 0.2X0.2	E140H 1598 A				300 Secs (249 Secs) *[==>249.0 Secs]*	 ***[1]***
5	ToO2a (STIS.sp.62 1731)	(3) NOVACEN2013	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 1978 A				300 Secs (249 Secs) *[==>249.0 Secs]*	 ***[1]***
6	ToO2a (STIS.sp.62 1739)	(3) NOVACEN2013	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A				300 Secs (249 Secs) *[==>249.0 Secs]*	 ***[1]***


Orbit Structure
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Server Version: 20140605
Exp. 1
Exp. 2 (Auto-WAVECAL)
Exp. 2
Exp. 3 (Auto-WAVECAL)
Exp. 3
Exp. 4 (Auto-WAVECAL)
Exp. 4
Exp. 5 (Auto-WAVECAL)
Exp. 5
Exp. 6 (Auto-WAVECAL)
Exp. 6
Unused Orbital Visibility = 3
Occultation
GS Acq
Home
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 13388, ToO2b (05), scheduled Tue Sep 23 01:00:41 GMT 2014

Diagnostic Status: No Diagnostics

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

Special Requirements: BETWEEN 27-SEP-2014:00:00:00 AND 11-OCT-2014:00:00:00

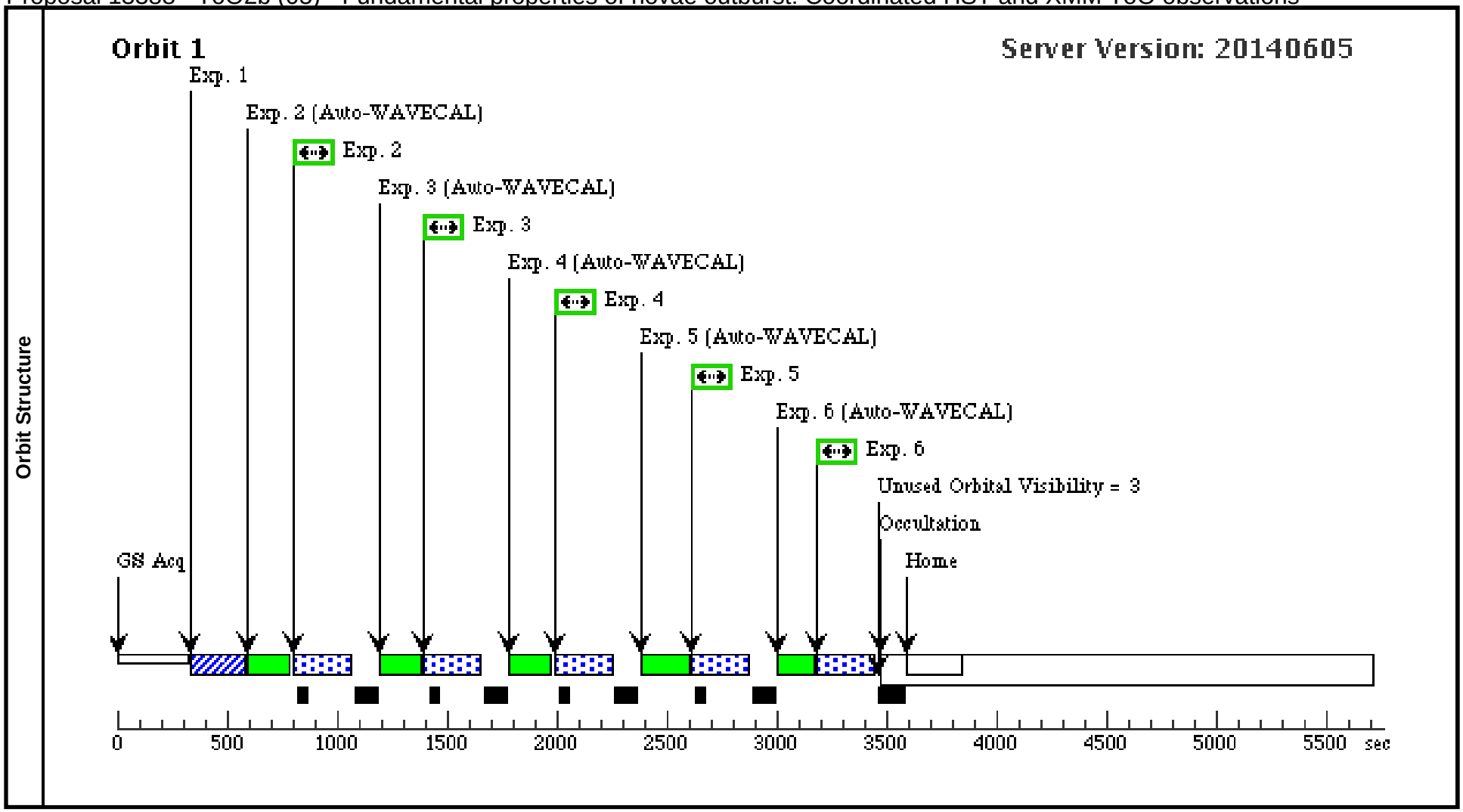
Comments: Second visit of V1369 Cen

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(3)	NOVACEN2013 Alt Name1: V1369CEN	RA: 13 54 45.2200 (208.6884167d) Dec: -59 09 4.50 (-59.15125d) Equinox: J2000	Epoch of Position: 2000	V=8	Reference Frame: ICRS

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	ToO2a	(3) NOVACEN2013	STIS/CCD, ACQ, 50CCD	MIRROR				1 Secs (1 Secs) *[==>]*	 ***[1]***
2	ToO2a (STIS.sp.62 5085)	(3) NOVACEN2013	STIS/FUV-MAMA, ACCUM, 0.2X0.2	E140H 1234 A				300 Secs (249 Secs) *[==>249.0 Secs]*	 ***[1]***
3	ToO2a (STIS.sp.62 5086)	(3) NOVACEN2013	STIS/FUV-MAMA, ACCUM, 0.2X0.2	E140H 1416 A				300 Secs (249 Secs) *[==>249.0 Secs]*	 ***[1]***
4	ToO2a (STIS.sp.62 5083)	(3) NOVACEN2013	STIS/FUV-MAMA, ACCUM, 0.2X0.2	E140H 1598 A				300 Secs (249 Secs) *[==>249.0 Secs]*	 ***[1]***
5	ToO2a (STIS.sp.62 1731)	(3) NOVACEN2013	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 1978 A				300 Secs (249 Secs) *[==>249.0 Secs]*	 ***[1]***
6	ToO2a (STIS.sp.62 1739)	(3) NOVACEN2013	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A				300 Secs (249 Secs) *[==>249.0 Secs]*	 ***[1]***


Orbit Structure
Orbit 1
Server Version: 20140605
Exp. 1
Exp. 2 (Auto-WAVECAL)
Exp. 2
Exp. 3 (Auto-WAVECAL)
Exp. 3
Exp. 4 (Auto-WAVECAL)
Exp. 4
Exp. 5 (Auto-WAVECAL)
Exp. 5
Exp. 6 (Auto-WAVECAL)
Exp. 6
Unused Orbital Visibility = 3
Occultation
GS Acq
Home
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 13388, ToO1d (06), implementation Tue Sep 23 01:00:41 GMT 2014

Diagnostic Status: Warning

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

Special Requirements: BETWEEN 11-OCT-2014:00:00:00 AND 31-OCT-2014:00:00:00; ON HOLD ; TOO RESPONSE TIME 21.0D

Comments: Last visit of V339 Del

On Hold Comments: On hold until the first ToO target is a bright X-ray source as determined by Swift monitoring.

Diagnostics

(ToO1d (06.002)) Warning (Form): Sensitive exposures should have an ETC run number provided.

(ToO1d (06.003)) Warning (Form): Sensitive exposures should have an ETC run number provided.

(ToO1d (06.004)) Warning (Form): Sensitive exposures should have an ETC run number provided.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	NOVADEL2013	RA: 20 23 30.7300 (305.8780417d) Dec: +20 46 4.10 (20.76781d) Equinox: J2000	Epoch of Position: 2000	V=8.5+/-1	Reference Frame: ICRS

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	ToO1d	(1) NOVADEL2013	STIS/CCD, ACQ, F28X50LP	MIRROR				1 Secs (1 Secs)	
								[==>]	***[1]***
2	ToO1d	(1) NOVADEL2013	STIS/FUV-MAMA, ACCUM, 0.2X0.2	E140M 1425 A				300 Secs (587 Secs)	
								[==>587.0 Secs]	***[1]***
3	ToO1d	(1) NOVADEL2013	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 1978 A				300 Secs (587 Secs)	
								[==>587.0 Secs]	***[1]***
4	ToO1d	(1) NOVADEL2013	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A				300 Secs (587 Secs)	
								[==>587.0 Secs]	***[1]***

Orbit Structure