14787 - Imaging the Ejecta in Classical Novae

Cycle: 24, Proposal Category: GO

(Availability Mode: AVAILABLE)

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	(2) NOVA-SGR-2015-B	WFC3/UVIS	1	26-May-2017 21:01:40.0	yes
02	(1) NOVA-DEL-2013	WFC3/UVIS	2	26-May-2017 21:01:44.0	yes
03	(1) NOVA-DEL-2013	STIS/CCD	3	26-May-2017 21:01:48.0	yes

6 Total Orbits Used

ABSTRACT

A nova outburst results when sufficient mass accretes from a companion star onto the surface of a white dwarf, triggering a thermonuclear explosion. In classical novae the bulk of the emission comes from the warm, expanding ejecta. The prevailing theories assume that the explosion occurs as a single, spherically symmetric ejection event and predict a simple relationship between the white dwarf mass, the accretion rate, and the mass loss and energetics of the explosion. However, observations with modern instruments indicate that nova eruptions are far from simple. There is now evidence for multiple ejection events, common envelopes, non-spherical geometry, and even jet-like structures in the ejecta. Our ENova collaboration combines radio, mm, optical, and X-ray observations and detailed theoretical modelling to study the most common major explosions in the universe. Among our results so far are the direct demonstration of the importance of shocks in novae, including the detection of gamma-ray producing shocks in several sources, and the realization that multiple, long-lived outflows are much more common than previously assumed. Here we propose to continue these highly successful observations with coordinated detailed VLA radio interferometry and HST optical imaging and spectroscropy of several recent novae with substantial VLA monitoring already in progress.

OBSERVING DESCRIPTION

This project is a coordinated campaign to use the highest-resolutions in both VLA interferometry and HST direct and spectral imaging to study the expanding thermal ejecta of recent classical novae. We have been awarded 37.5 hours of VLA A-configuration time for a campaign to image the expanding thermal ejecta of five recent classical novae. The high angular resolution during VLA A-configuration is essential to the interpretation of the radio light curves and learning how the nova morphologies have evolved since the previous A-configuration in 2014. We will combine these radio data with 6 orbits of contemporaneous HST observations described herein to image optically-thin line emission in the two recent Fermi-detected novae V339 Del and V5668 Sgr and also to obtain spatially-resolved optical spectroscopic data on V339 Del. These HST images and spectra will provide information about diffuse material in the ejecta that is not detectable by VLA and provide more details on the kinematics of the explosions at angular resolutions comparable to the VLA in A-configuration, tying together the extensive radio and optical data sets on these sources. The WFC3 imaging of the younger Nova V5668 Sgr will be done in a single, one-orbit visit (01), split evenly between the F502N and F657N filters. The WFC3 imaging of the older Nova V339 Del will be done in a single, two-orbit visit (02), also split evenly between the the F502N and F657N filters. The STIS spectral imaging of Nova V339 Del will be done in a single, three-orbit visit (03), using the G430L grating to probe the structure and kinematics of the newborn remnant in permitted and forbidden transitions spanning a large range of ionization states. As these HST visits are coordinated observations with the VLA A-configuration radio campaign, there are moderately strong timing constraints. The VLA will only be in its A-configuration for four months from 2016/09/23 through 2017/01/23, so the observations of V339 Del will be executed in that same general window. V5668 Sgr is fading more slowly than anticipated, so we are delaying that visit until the second half of Cycle 24.

Visit

Proposal 14787, Visit 01 new: 1 orbit of WFC3 imaging on V5668 Sgr (01), implementation Sat May 27 01:01:50 GMT 2017

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/UVIS

Special Requirements: BETWEEN 01-MAY-2017:00:00:00 AND 31-AUG-2017:00:00:00

Comments: NOTE: This orbit was re-structured in May 2017 based on updated brightnesses and line strengths from recetn AAVSO photometry and ground-based spectra.
The purpose of Visit 01 is to take WFC3 images of the expanding remnant of Nova Sgr 2015b = V5668 Sgr. This imaging visit is for one orbit, for a total of 244 seconds in F502N ([O III]) and 324 seconds in F657N (Halpha+[N II]). V5668 Sgr has faded much more slowly than expected, and hence is significantly brighter than was expected. We request that these exposures be taken late in Cycle 24, between 2017-05-01 and 2017-08-31, to allow the nova to fade below V~12.0 magnitude, but still stay within ~6 months of the VLA A-configuration radio imaging. We split the exposures in each filter into two sets, with the first set short enough to avoid saturating the brightest pixels of the central stellar point source. The second sets will most likely saturate the central point source, but we want to search for faint extended nebular shells 0.5--1.0" out from the core. Exposure times estimated from the ETC using recent AAVSO V-band photometry and SMARTS spectra of V5668 Sgr. Note that use of the "auto-expand" function to maximally pack the orbit severely restricts the scheduling windows, so the requested exposure times are about as large as we can practically make them. Flash levels set using the minimum ETC recommendation that did not trigger a warning flag.

Patterns

#	Primary Pattern		Secondary Pattern		Exposures
(3)	Pattern Type=WFC3-UVIS-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.519 Line Spacing=0.336	Coordinate Frame=POS-TARG Pattern Orientation=23.884 Angle Between Sides=81.785 Center Pattern=false			(1), (3)
(7)	Pattern Type=LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.135 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false	Pattern Type=WFC3-UVIS-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.519 Line Spacing=0.336	Coordinate Frame=POS-TARG Pattern Orientation=23.884 Angle Between Sides=81.785 Center Pattern=false	(2), (4)

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(2)	NOVA-SGR-2015-B	RA: 18 36 56.8400 (279.2368333d) Dec: -28 55 39.80 (-28.92772d) Equinox: J2000		V=10.31+/-0.2 B = 11.25 +/-0.2, R = 10.97 +/-0.2	Reference Frame: ICRS

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database, coordinates confirmed with those reported in most recent literature and in the Target Confirmation tool. Photometry reported here is taken from the most recent CCD measurements (early July 2016) in the AAVSO database. The nova is fading, although surprisingly slowly for a novae at this relatively young age. Based on the last few months of the AAVSO light curve, we predict it will fade to V ~ 12.0 and R ~ 13.6 by the June 2017.
Extended=YES

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	Exp 01: 1x4 x1.0=4.0 second F502N integration	(2) NOVA-SGR-2015-B	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F502N	FLASH=12; BLADE=A		Pattern 3, Exps 1-1 in Visit 01 new: 1 orbit of WFC3 imaging on V5668 Sgr (01) (3)	1.0 Secs (4 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	***[1]***

Comments: Post-flash = 12 e- based on ETC WFC3UVIS.im.827956
We use two iterations of the 4-point of a 3x expanded WFC3-UVIS-DITHER-BOX with 230 second subexposures: if the nova fades to V=14.5 these should not saturate the brightest few pixels of central point source in F502N; but if it does the larger dither pattern will help keep saturated and bloomed pixels/columns separated. Estimates based on the ETC and on scaling our previous images of V959 Mon and T Pyx.

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
2	Exp 02: 2x4 x30.0=240 second F502N integration	(2) NOVA-SGR-2015-B	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F502N	FLASH=12		Pattern 7, Exps 2-2 in Visit 01 new: 1 orbit of WFC3 imaging on V5668 Sgr (01) (7)	30.0 Secs (240 Secs) *[==>(Pattern 1,1)]* *[==>(Pattern 1,2)]* *[==>(Pattern 1,3)]* *[==>(Pattern 1,4)]* *[==>(Pattern 2,1)]* *[==>(Pattern 2,2)]* *[==>(Pattern 2,3)]* *[==>(Pattern 2,4)]*	***[1]***

Comments: Post-flash = 12 e- based on ETC WFC3UVIS.im.827956
We use two iterations of the 4-point of a 3x expanded WFC3-UVIS-DITHER-BOX with 230 second subexposures: if the nova fades to V=14.5 these should not saturate the brightest few pixels of central point source in F502N; but if it does the larger dither pattern will help keep saturated and bloomed pixels/columns separated. Estimates based on the ETC and on scaling our previous images of V959 Mon and T Pyx.

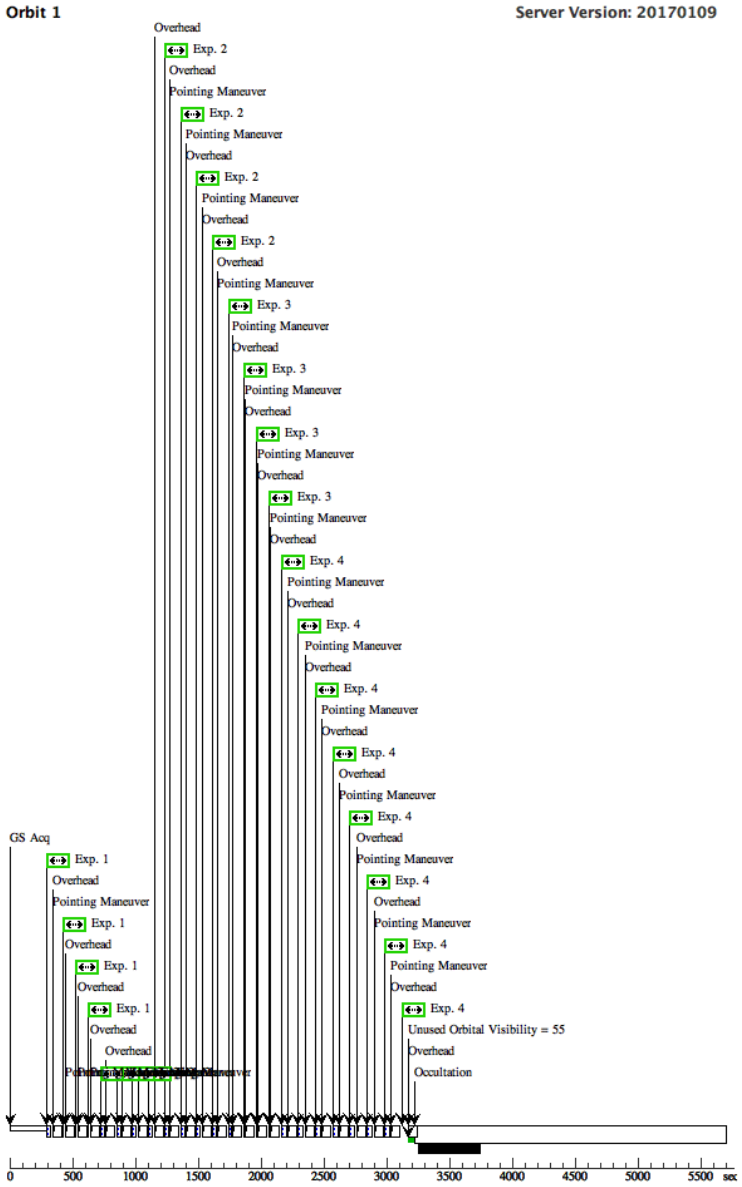
#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
3	Exp 01: 1x4 x1.0=4.0 second F657N exposure	(2) NOVA-SGR-2015-B	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F657N	FLASH=12; BLADE=A		Pattern 3, Exps 3-3 in Visit 01 new: 1 orbit of WFC3 imaging on V5668 Sgr (01) (3)	1.0 Secs (4 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	***[1]***

Comments: Post-flash = 12 e- based on WFC3UVIS.im.827980
We use three iterations at each of the 4-points of a 3x expanded WFC3-UVIS-DITHER-BOX with 150 second subexposures: if the nova fades to R=14.2 these should not saturate the brightest few pixels of the central point source in F657N; but if it does the larger dither pattern will help keep saturated and bloomed pixels/columns separated. Estimates based on the ETC and on scaling our previous images of V959 Mon and T Pyx.

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
4	Exp 04: 2x4 x40.0=320 sec F657N exposure	(2) NOVA-SGR-2015-B	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F657N	FLASH=12		Pattern 7, Exps 4-4 in Visit 01 new: 1 orbit of WFC3 imaging on V5668 Sgr (01) (7)	40.0 Secs (320 Secs) *[==>(Pattern 1,1)]* *[==>(Pattern 1,2)]* *[==>(Pattern 1,3)]* *[==>(Pattern 1,4)]* *[==>(Pattern 2,1)]* *[==>(Pattern 2,2)]* *[==>(Pattern 2,3)]* *[==>(Pattern 2,4)]*	***[1]***

Comments: Post-flash = 12 e- based on WFC3UVIS.im.827980
We use three iterations at each of the 4-points of a 3x expanded WFC3-UVIS-DITHER-BOX with 150 second subexposures: if the nova fades to R=14.2 these should not saturate the brightest few pixels of the central point source in F657N; but if it does the larger dither pattern will help keep saturated and bloomed pixels/columns separated. Estimates based on the ETC and on scaling our previous images of V959 Mon and T Pyx.

Orbit Structure



Visit

Proposal 14787, Visit 02: 2 orbits of WFC3 imaging on V339 Del (02), completed Sat May 27 01:01:50 GMT 2017

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/UVIS

Special Requirements: ORIENT 315D TO 140 D; BETWEEN 23-SEP-2016:00:00:00 AND 24-JAN-2017:00:00:00

Comments: The purpose of Visit 02 is to take deep WFC3 images of the expanding remnant of Nova Del 2013 = V339 Del, fairly contemporaneous with VLA A-configuration radio interfermetry (late September 2016 to late January 2017). This visit should be scheduled 21-90 days before the STIS spectroscopic Visit 03, in order to provide contemporaneous intensity mapping with the spectra, yet also to provide optimal slit orientation information for the STIS spectra in Visit 03 to follow shortly thereafter. This imaging visit is for two orbits, for a total of ~2200 seconds in F502N ([O III]) and ~2320 seconds in F657N (Halpha+[N II]). Exposure times estimated from the ETC and by scaling our past F502N and F657N images of Nova Mon and T Pyx up to the anticipated brightness of V339 Del in late 2016. If new ground-based photometry or spectra indicate dramatic or unexpected changes, we may request an adjustment of exposure times within this orbit. Note that use of the "auto-expand" function to maximally pack the orbit severely restricts the scheduling windows, so the requested exposure times are about as large as we can practically make them. Flash levels set using the minimum ETC recommendation that did not trigger a warning flag.

Comment added with re-submission on 9/19/16: Visit Orient Range Requirement of MinOrient=315 and MaxOrient=140 degrees added upon recommendation of S. Baggett to prevent two nearby, but off-CCD stars to SW from producing flares in the images. This appears to have no impact on schedulability.

Patterns

#	Primary Pattern		Secondary Pattern		Exposures
(3)	Pattern Type=WFC3-UVIS-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.519 Line Spacing=0.336	Coordinate Frame=POS-TARG Pattern Orientation=23.884 Angle Between Sides=81.785 Center Pattern=false			(1), (4)
(6)	Pattern Type=LINE Purpose=DITHER Number Of Points=3 Point Spacing=0.135 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false	Pattern Type=WFC3-UVIS-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.519 Line Spacing=0.336	Coordinate Frame=POS-TARG Pattern Orientation=23.884 Angle Between Sides=81.785 Center Pattern=false	(2), (3)

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	NOVA-DEL-2013	RA: 20 23 30.6800 (305.8778333d) Dec: +20 46 3.80 (20.76772d) Equinox: J2000		V=14.2+/-0.2 B = 15.2 +/-0.2; R = 14.0 +/-0.2	Reference Frame: ICRS

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database, coordinates confirmed with those reported in most recent literature and in the Target Confirmation tool. Photometry reported here is taken from the most recent CCD measurements (early July 2016) in the AAVSO database. The nova is fading, although fairly slowly at this late stage in its evolution. Based on the last few months of the AAVSO light curve, we predict it will fade to V ~ 14.5 and R ~ 14.2 by the early portion of Cycle 24 in late 2016.
Extended=YES

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	Exp 01: 1x4 x10=40 second F502N integration	(1) NOVA-DEL-2013	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F502N	FLASH=12		Pattern 3, Exps 1-1 in Visit 02: 2 orbits of WFC3 imaging on V339 Del (02) (3)	10 Secs (40 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	***[1]***

Comments: Post-flash = 12 e- based on ETC WFC3UVIS.im.827956
We use two iterations of the 4-point of a 3x expanded WFC3-UVIS-DITHER-BOX with 230 second subexposures: if the nova fades to V=14.5 these should not saturate the brightest few pixels of central point source in F502N; but if it does the larger dither pattern will help keep saturated and bloomed pixels/columns separated. Estimates based on the ETC and on scaling our previous images of V959 Mon and T Pyx.

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
2	Exp 02: 3x4 x110=1320 second F502N integration	(1) NOVA-DEL-2013	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F502N	FLASH=12		Pattern 6, Exps 2-2 in Visit 02: 2 orbits of WFC3 imaging on V339 Del (02) (6)	110 Secs (1320 Secs) *[==>(Pattern 1,1)]* *[==>(Pattern 1,2)]* *[==>(Pattern 1,3)]* *[==>(Pattern 1,4)]* *[==>(Pattern 2,1)]* *[==>(Pattern 2,2)]* *[==>(Pattern 2,3)]* *[==>(Pattern 2,4)]* *[==>(Pattern 3,1)]* *[==>(Pattern 3,2)]* *[==>(Pattern 3,3)]* *[==>(Pattern 3,4)]*	***[1]***

Comments: Post-flash = 12 e- based on ETC WFC3UVIS.im.827956
We use two iterations of the 4-point of a 3x expanded WFC3-UVIS-DITHER-BOX with 230 second subexposures: if the nova fades to V=14.5 these should not saturate the brightest few pixels of central point source in F502N; but if it does the larger dither pattern will help keep saturated and bloomed pixels/columns separated. Estimates based on the ETC and on scaling our previous images of V959 Mon and T Pyx.

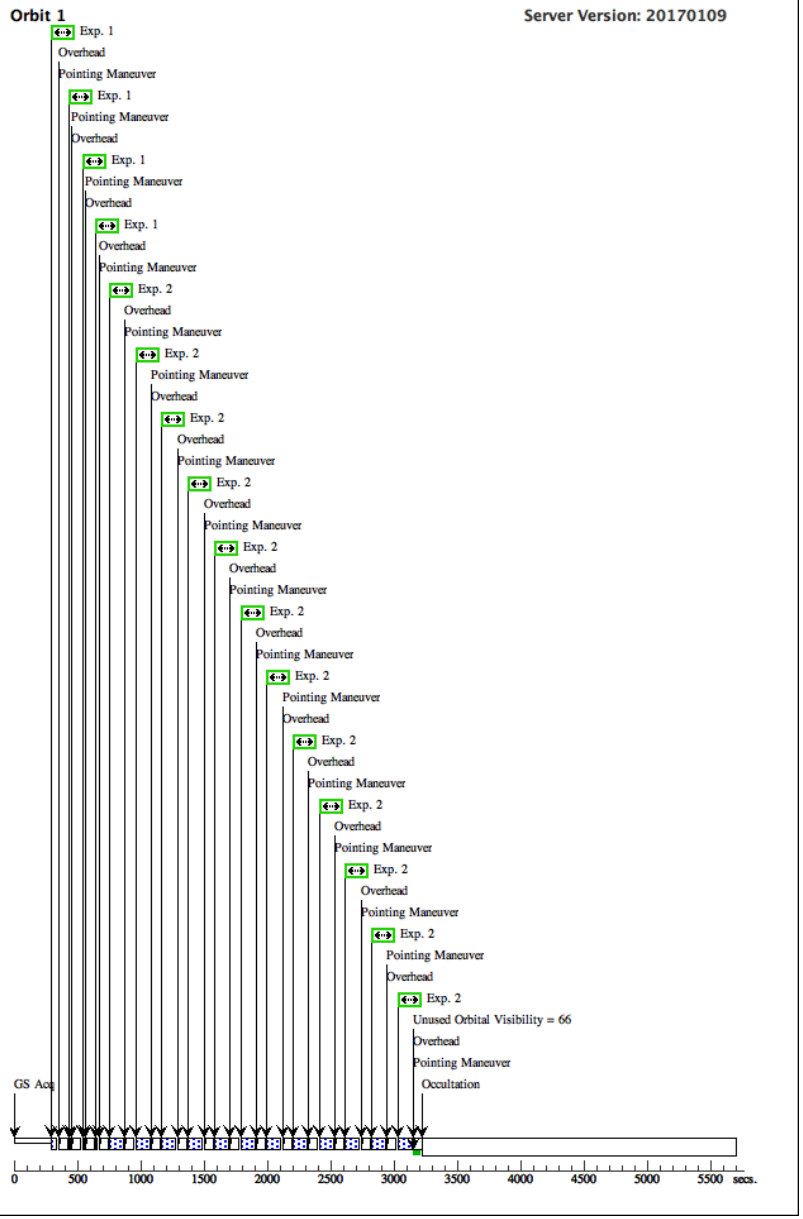
#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
3	Exp 04: 3x4 x110=1320 sec F657N exposure	(1) NOVA-DEL-2013	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F657N	FLASH=12		Pattern 6, Exps 3-3 in Visit 02: 2 orbits of WFC3 imaging on V339 Del (02) (6)	120 Secs (1440 Secs) *[==>(Pattern 1,1)]* *[==>(Pattern 1,2)]* *[==>(Pattern 1,3)]* *[==>(Pattern 1,4)]* *[==>(Pattern 2,1)]* *[==>(Pattern 2,2)]* *[==>(Pattern 2,3)]* *[==>(Pattern 2,4)]* *[==>(Pattern 3,1)]* *[==>(Pattern 3,2)]* *[==>(Pattern 3,3)]* *[==>(Pattern 3,4)]*	***[2]***

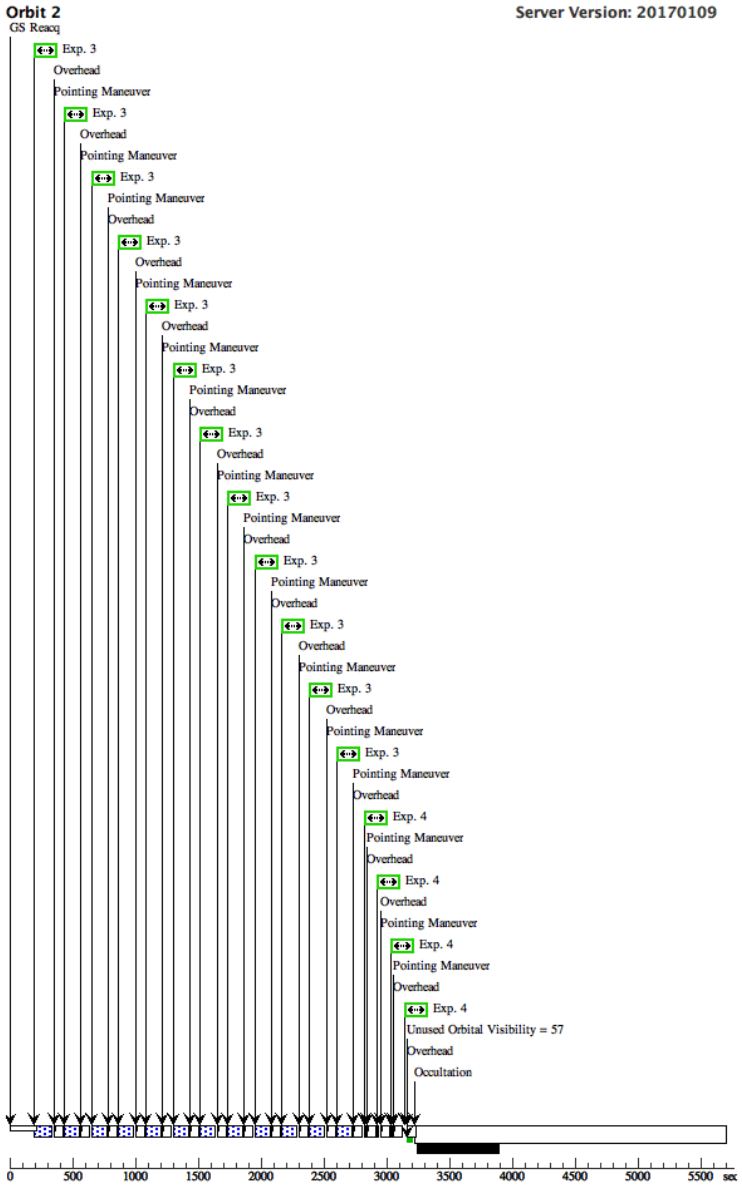
Comments: Post-flash = 12 e- based on WFC3UVIS.im.827980
We use three iterations at each of the 4-points of a 3x expanded WFC3-UVIS-DITHER-BOX with 150 second subexposures: if the nova fades to R=14.2 these should not saturate the brightest few pixels of the central point source in F657N; but if it does the larger dither pattern will help keep saturated and bloomed pixels/columns separated. Estimates based on the ETC and on scaling our previous images of V959 Mon and T Pyx.

	4	Exp 03: 1x4 x10=40 sec F657N exposure	(1) NOVA-DEL-2013	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F657N	FLASH=12	Pattern 3, Exps 4-4 in Visit 02: 2 orbits of WFC3 imaging on V 339 Del (02) (3)	10 Secs (40 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	***[2]***

Comments: Post-flash = 12 e- based on WFC3UVIS.im.827980
We use three iterations at each of the 4-points of a 3x expanded WFC3-UVIS-DITHER-BOX with 150 second subexposures: if the nova fades to R=14.2 these should not saturate the brightest few pixels of the central point source in F657N; but if it does the larger dither pattern will help keep saturated and bloomed pixels/columns separated. Estimates based on the ETC and on scaling our previous images of V959 Mon and T Pyx.

Orbit Structure




Orbit 2
Server Version: 20170109
GS Reacq
Exp. 3
Overhead
Pointing Maneuver
Exp. 4
Unused Orbital Visibility = 57
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 14787, Visit 03: 3 orbits of STIS CCD G430L spectra on V339 Del (03), completed Sat May 27 01:01:50 GMT 2017

Diagnostic Status: No Diagnostics

Scientific Instruments: STIS/CCD

Special Requirements: ORIENT 85D TO 105 D; ORIENT 265D TO 285 D

Comments: The purpose of Visit 03 is to use 3 orbits to take STIS CCD G430L spectra along either the major or minor axis of the expanding and fading remnant of Nova Del 2103 = V339 Del, after the axis orientation has been revealed by the WFC3 imaging Visit 02. Both Visits 02 and 03 are constrained to be relatively contemporaneous with VLA A-configuration observations of V339 Del (to be taken late September 2016 to late January 2017). This visit will likely require a specific narrow range in roll angle to place the STIS slit at the optimum PA to match spatial structures seen in the WFC3 imaging of Visit 02. As such, determining this exact roll angle and the subsequent scheduling window will need to wait until the Visit 02 imaging is taken and quickly analyzed. Either a major axis or minor axis should be available within 4 months after the WFC3 imaging visit, thus we request for this Visit to follow Visit 02 by at least 21 days, but not more than 120 days. Including solar and timing restrictions, Visit 03 will thus likely need to be scheduled in a few week window sometime within late October 2016 to late December 2016, or possibly March--April 2017. This spectroscopic visit is for a total of three orbits, for a total of 1580+2280+2260=6120 seconds in G430L. If new ground-based photometry or spectra indicate dramatic or unexpected changes in brightness, we may request an adjustment of exposure times within this orbit. Note that use of the "auto-expand" function to maximally pack the orbit seems to severely restrict the scheduling windows, so the requested exposure times are about as large as we can practically make them.

Comment added with re-submission on 11/01/16: A preliminary review of the WFC3 imaging from Visit 02 obtained on 10/18/16 shows that the remnant is spatially-resolved relative to a stellar PSF. [V339 Del FWHM ~ 7 pixels ~ 0.3 arcseconds; all stars have FWHM < 2 pixels ~0.08 arcseconds.] Additionally, the central core of V339 Del is resolved into an asymmetric ring-like structure ~0.2 arcsec (4--5 pixels) in diameter, with minimum and maximum pixels on opposite sides along a symmetry axis that runs from PA 50 to 230 E of N relative to the center of V339 Del overall (with the brightest pixel at PA 230). As such, following the original submitted Phase II plan, in order to gain maximum spatial resolution and minimize spatial-spectral confusion, we would want to schedule Visit 03 to place the STIS slit along this 230--50 symmetry axis. Requiring the STIS slit to match the 230 or 50 PA to within +/-10 degrees needs spacecraft ORIENT ranges of 265--285 or 85--105, respectively. We have added these specific "Orient Range" restrictions with this update of the Phase II plan. Additionally, to clear various errors and warnings, we removed the "On Hold" and "Timing Requirements" linking this visit explicitly to Visit 02, which has now been executed. The newly-added STIS orient ranges requirements (specifically the PA 230 alignment) are schedulable in March--May 2017.

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(5)	Pattern Type=STIS-ALONG-SLIT	Coordinate Frame=POS-TARG		(3), (4), (5)
	Purpose=DITHER	Pattern Orientation=90.0		
	Number Of Points=4	Angle Between Sides=		
	Point Spacing=0.5332	Center Pattern=true		
	Line Spacing=			

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	NOVA-DEL-2013	RA: 20 23 30.6800 (305.8778333d)		V=14.2+/-0.2	Reference Frame: ICRS
		Dec: +20 46 3.80 (20.76772d)		B = 15.2 +/-0.2; R = 14.0 +/-0.2	
		Equinox: J2000			

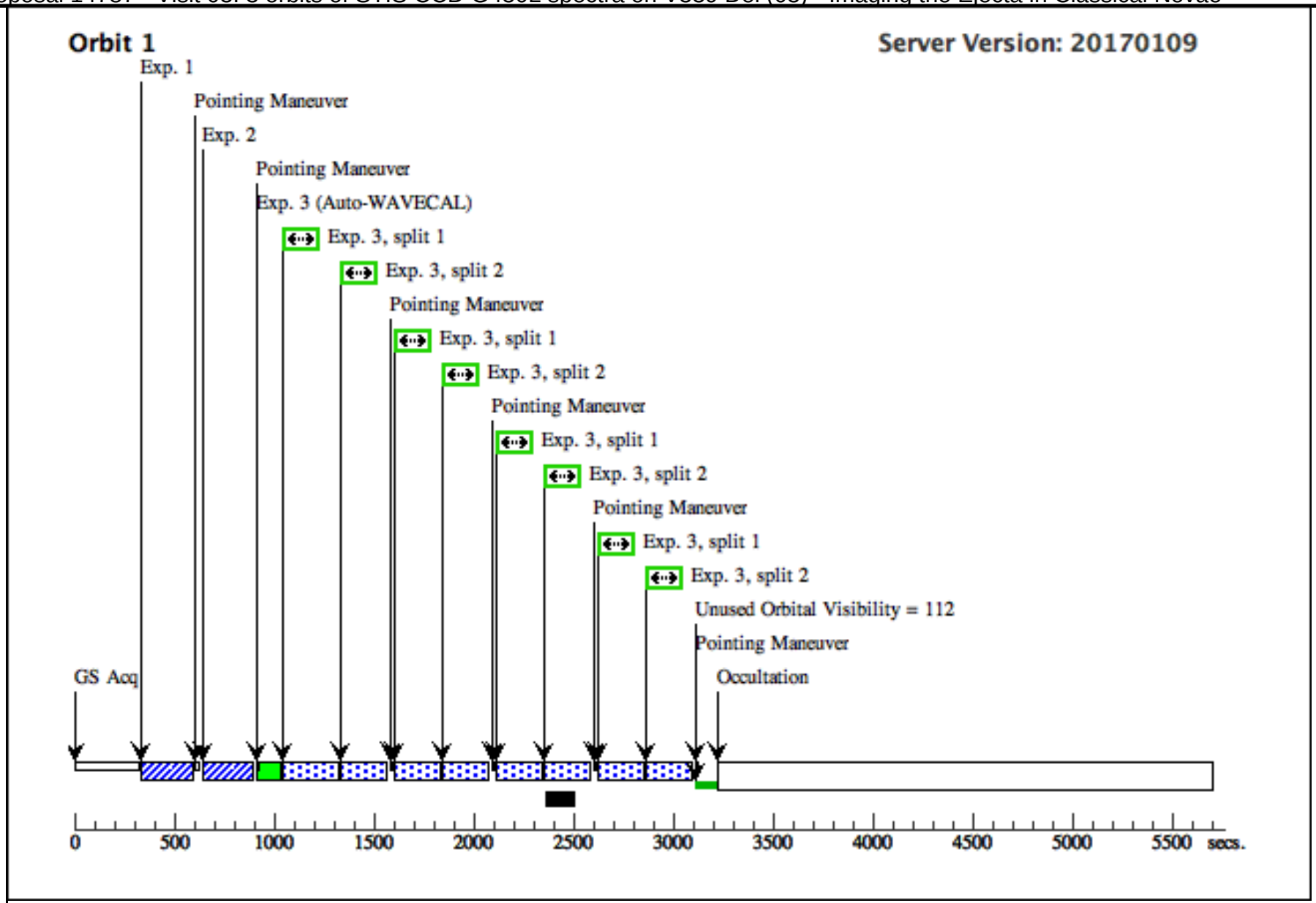
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database, coordinates confirmed with those reported in most recent literature and in the Target Confirmation tool. Photometry reported here is taken from the most recent CCD measurements (early July 2016) in the AAVSO database. The nova is fading, although fairly slowly at this late stage in its evolution. Based on the last few months of the AAVSO light curve, we predict it will fade to V ~ 14.5 and R ~ 14.2 by the early portion of Cycle 24 in late 2016.
Extended=YES

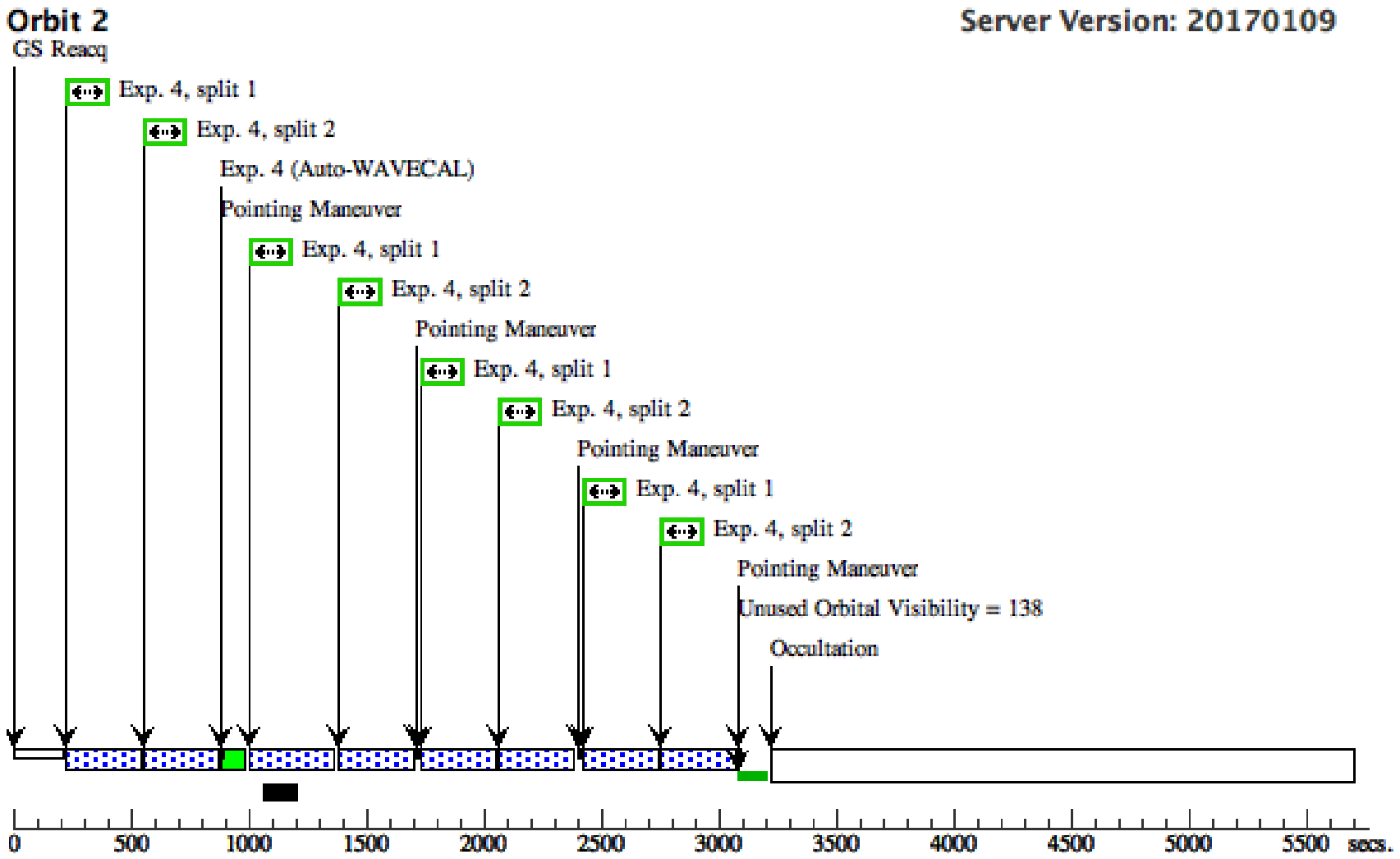
Exposures

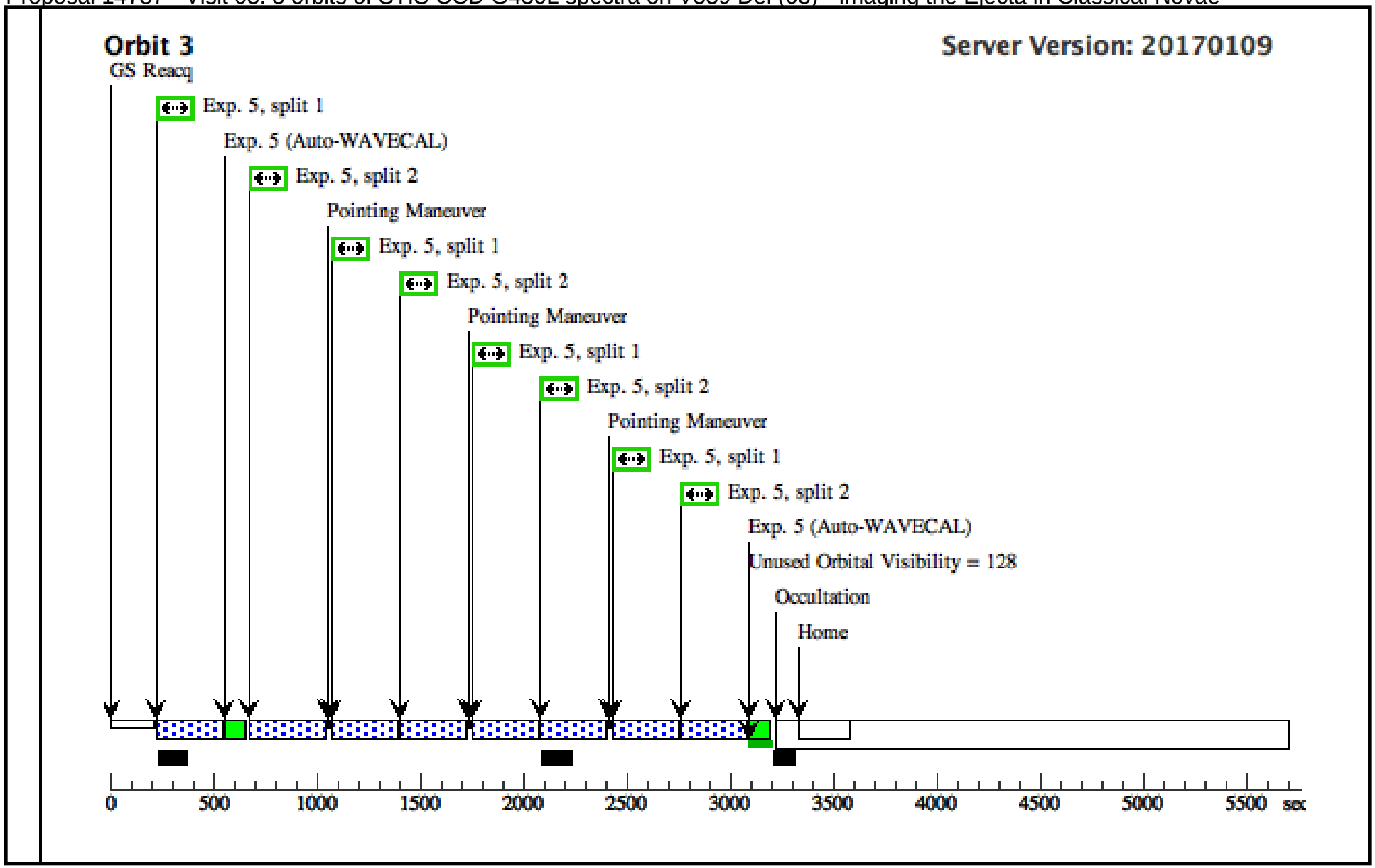
#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	V339Del-ACQ (STIS.ta.622498)	(1) NOVA-DEL-2013	STIS/CCD, ACQ, 50CCD	MIRROR	ACQTYPE=DIFFUSE; CHECKBOX=5; DIFFUSE-CENTER=FLUX-CENTROID			3 Secs (3 Secs) *[==>]*	***[1]***
	Comments: Acquistion imaging for V339 Del, which we expect to be a point source potentially surrounded by small-scale (<0.5 arcsec) nebular structures of possibly similar intensity. We will use the WFC3 imaging from Visit 02 to determine whether a ACQ-PEAK will be suitable, or if an OFFSET from a nearby star will be needed.								
2	V339Del-PEAK (STIS.ta.622499)	(1) NOVA-DEL-2013	STIS/CCD, ACQ/PEAK, 52X0.1E1	MIRROR				3 Secs (3 Secs) *[==>]*	***[1]***
	Comments: Peak-up imaging for V339 Del, which we expect to be a point source potentially surrounded by small-scale (<0.5 arcsec) nebular structures of possibly similar intensity. We will use the WFC3 imaging from Visit 02 to determine whether a ACQ-PEAK will be suitable, or if an OFFSET from a nearby star will be needed.								
3	Orbit 1 V339 Del G430L	(1) NOVA-DEL-2013	STIS/CCD, ACCUM, 52X2E1	G430L 4300 A	CR-SPLIT=2		Pattern 5, Exps 3-3 in Visit 03: 3 orbits of STIS CCD G430L spectra on V339 Del (03) (5)	395 Secs (1580 Secs) *[==>(Pattern 1, Split 1)]* *[==>(Pattern 1, Split 2)]* *[==>(Pattern 2, Split 1)]* *[==>(Pattern 2, Split 2)]* *[==>(Pattern 3, Split 1)]* *[==>(Pattern 3, Split 2)]* *[==>(Pattern 4, Split 1)]* *[==>(Pattern 4, Split 2)]*	***[1]***
	Comments: We use a CR-SPLIT=2 at each of the 4-points of a centered STIS-ALONG-SLIT dither pattern with 0.5332 arcsec = 10.5 pixel steps, here with 395 second subexposures. In combination with the multiple orbits, the half-integer pixel step size will allow us to flag and remove cosmic rays, bad pixels and potentially increase the spatial resolution. Exposure estimates based on the ETC and on scaling our previous spectra of V959 Mon and T Pyx.								
4	Orbit 2 V339 Del G430L	(1) NOVA-DEL-2013	STIS/CCD, ACCUM, 52X2E1	G430L 4300 A	CR-SPLIT=2		Pattern 5, Exps 4-4 in Visit 03: 3 orbits of STIS CCD G430L spectra on V339 Del (03) (5)	570 Secs (2280 Secs) *[==>(Pattern 1, Split 1)]* *[==>(Pattern 1, Split 2)]* *[==>(Pattern 2, Split 1)]* *[==>(Pattern 2, Split 2)]* *[==>(Pattern 3, Split 1)]* *[==>(Pattern 3, Split 2)]* *[==>(Pattern 4, Split 1)]* *[==>(Pattern 4, Split 2)]*	***[2]***
	Comments: We use a CR-SPLIT=2 at each of the 4-points of a centered STIS-ALONG-SLIT dither pattern with 0.5332 arcsec = 10.5 pixel steps, here with 570 second subexposures. In combination with the multiple orbits, the half-integer pixel step size will allow us to flag and remove cosmic rays, bad pixels and potentially increase the spatial resolution. Exposure estimates based on the ETC and on scaling our previous spectra of V959 Mon and T Pyx.								

	5	Orbit 3 V339 Del G430L	(1) NOVA-DEL-2013	STIS/CCD, ACCUM, 52X2E1	G430L 4300 A	CR-SPLIT=2	Pattern 5, Exps 5-5 in Visit 03: 3 orbits of STIS CCD G430L spectra on V339 Del (03) (5)	565 Secs (2260 Secs) *[==>(Pattern 1, Split 1)]* *[==>(Pattern 1, Split 2)]* *[==>(Pattern 2, Split 1)]* *[==>(Pattern 2, Split 2)]* *[==>(Pattern 3, Split 1)]* *[==>(Pattern 3, Split 2)]* *[==>(Pattern 4, Split 1)]* *[==>(Pattern 4, Split 2)]*	***[3]***
	Comments: We use a CR-SPLIT=2 at each of the 4-points of a centered STIS-ALONG-SLIT dither pattern with 0.5332 arcsec = 10.5 pixel steps, here with 565 second subexposures. In combination with the multiple orbits, the half-integer pixel step size will allow us to flag and remove cosmic rays, bad pixels and potentially increase the spatial resolution. Exposure estimates based on the ETC and on scaling our previous spectra of V959 Mon and T Pyx.								

Orbit Structure




Orbit 2
Server Version: 20170109
GS Reacq
Exp. 4, split 1
Exp. 4, split 2
Exp. 4 (Auto-WAVECAL)
Pointing Maneuver
Exp. 4, split 1
Exp. 4, split 2
Pointing Maneuver
Exp. 4, split 1
Exp. 4, split 2
Pointing Maneuver
Exp. 4, split 1
Exp. 4, split 2
Pointing Maneuver
Unused Orbital Visibility = 138
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
secs.


Orbit 3
Server Version: 20170109
GS Reacq
Exp. 5, split 1
Exp. 5 (Auto-WAVECAL)
Exp. 5, split 2
Pointing Maneuver
Exp. 5, split 1
Exp. 5, split 2
Pointing Maneuver
Exp. 5, split 1
Exp. 5, split 2
Pointing Maneuver
Exp. 5, split 1
Exp. 5, split 2
Exp. 5 (Auto-WAVECAL)
Unused Orbital Visibility = 128
Occultation
Home
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec