12750 - Monitoring Dynamical Mass Loss from Eta Car with the HETG and STIS: The Rise to Maximum

Cycle: 19, 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	(1) ETA-CAR CCDFLAT WAVE	STIS/CCD	3	02-Sep-2011 21:48:20.0	yes

3 Total Orbits Used

ABSTRACT

Eta Car is the nearest highly unstable extremely massive star and a key object for understanding how a star heads towards hypernova. Periodic minima in X-rays show it as an extremely eccentric binary with a massive companion. A surprising change in the X-ray emission during the January 2009 X-ray minimum might indicate a large-scale variation in the LBV primary's mass loss rate. We propose to obtain an HETGS observation of the system during AO13, at beginning of the X-ray increase which proceeds the minimum. We also request STIS mapping along with the HETGS observations to constrain the 3-D shape of the wind-wind interaction regions on scales of 1--1700AU from the star so as to test variable mass loss models.

OBSERVING DESCRIPTION

These observations are planned to observe the extended winds of Eta Carinae at critical times to test current and developing 3D hydrodynamic models that eventually will incorporate radiative transfer. Each visit will map over a 2.1"X2.1" region centered on Eta Carinae that encompasses the extended winds as seen in forbidden emission lines of high and low ionization species (> and <13.6 eV) including Fe++, Ar++, N+, Fe+ and Ni+. CVZ is requested to obtain complete mappings in each of these lines using one G430M grating setting (4706A) and two G750M grating settings (7354 abd 5734). The mapping is accomplished with a 52"X0.1" aperture at arbitrary position angles, sampled at 0.05" spacing.
The observations under this program will occur in the Fall of 2012 (orbital phase~0.7) in close coordination with CHANDRA observations. Similar observations, through HST program 12508, are scheduled in Fall, 2011 and summer 2013 that are complimentary to these observations. Given known variability with phase and the potential long term variability of the primary wind, closely scheduled (within two months) are required. Indeed the STIS observations associated with this proposal will greatly enhance our knowledge about variability of the wind structure just past apastron and long term changes of the primary wind.

ADDITIONAL COMMENTS

Two CVZ opportunities are within the planning window of October through December for CHANDRA.

Visit

Proposal 12750, Visit 01 Sat Sep 03 01:49:34 GMT 2011

Diagnostic Status: No Diagnostics

Scientific Instruments: STIS/CCD

Special Requirements: PCS MODE FINE; GYRO MODE 3GOBAD; CVZ; BETWEEN 30-SEP-2012:00:00:00 AND 31-DEC-2012:00:00:00

Comments: Schedule around phase 12.7 Oct - Dec, 2012

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=STIS-PERP-TO-SLIT	Coordinate Frame=POS-TARG		(5), (8), (11)
	Purpose=MOSAIC	Pattern Orientation=0.0		
	Number Of Points=7	Angle Between Sides=		
	Point Spacing=0.05	Center Pattern=true		
	Line Spacing=			
(2)	Pattern Type=STIS-PERP-TO-SLIT	Coordinate Frame=POS-TARG		(3), (6), (9)
	Purpose=MOSAIC	Pattern Orientation=0.0		
	Number Of Points=41	Angle Between Sides=		
	Point Spacing=.05	Center Pattern=true		
	Line Spacing=			

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	ETA-CAR	RA: 10 45 3.5910 (161.2649625d)		V=4.5+/-0.2	Reference Frame: GSC1
		Dec: -59 41 4.26 (-59.68452d)			
		Equinox: J2000			
		Plate Id: ZZZQ			

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1	Acquisition exposure	(1) ETA-CAR	STIS/CCD, ACQ, F25ND3	MIRROR				0.5 Secs *[==>]*	 ***[1]***
Comments: Peak=9290 e-, Total=15480 e-, S/N=123									
2	ACQ/Peak	(1) ETA-CAR	STIS/CCD, ACQ/PEAK, 52X0.1	G750M 7795 A				0.5 Secs *[==>]*	 ***[1]***

	3	Mapping [Fe III], [Fe II], Fe II	(1) ETA-CAR	STIS/CCD, ACCUM, 52X0.1	G430M 4706 A	CR-SPLIT=2; GAIN=4; SIZEAXIS2=128; WAVECAL=NO	Pattern 2, Exps 3-3 in Visit 01 (2)	26 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)]* *[==>(Pattern 5, Split 1)]* *[==>(Pattern 5, Split 2)]* *[==>(Pattern 6, Split 1)]* *[==>(Pattern 6, Split 2)]* *[==>(Pattern 7, Split 1)]* *[==>(Pattern 7, Split 2)]* *[==>(Pattern 8, Split 1)]* *[==>(Pattern 8, Split 2)]* *[==>(Pattern 9, Split 1)]* *[==>(Pattern 9, Split 2)]* *[==>(Pattern 10, Split 1)]* *[==>(Pattern 10, Split 2)]* *[==>(Pattern 11, Split 1)]* *[==>(Pattern 11, Split 2)]* *[==>(Pattern 12, Split 1)]* *[==>(Pattern 12, Split 2)]* *[==>(Pattern 13, Split 1)]* *[==>(Pattern 13, Split 2)]* *[==>(Pattern 14, Split 1)]* *[==>(Pattern 14, Split 2)]* *[==>(Pattern 15, Split 1)]* *[==>(Pattern 15, Split 2)]* *[==>(Pattern 16, Split 1)]* *[==>(Pattern 16, Split 2)]* *[==>(Pattern 17, Split 1)]* *[==>(Pattern 17, Split 2)]* *[==>(Pattern 18, Split 1)]* *[==>(Pattern 18, Split 2)]* *[==>(Pattern 19, Split 1)]* *[==>(Pattern 19, Split 2)]* *[==>(Pattern 20, Split 1)]* *[==>(Pattern 20, Split 2)]* *[==>(Pattern 21, Split 1)]* *[==>(Pattern 21, Split 2)]* *[==>(Pattern 22, Split 1)]* *[==>(Pattern 22, Split 2)]* *[==>(Pattern 23, Split 1)]*	***[1]***

						[==>(Pattern 23, Split 2)] *[==>(Pattern 24, Split 1)]* *[==>(Pattern 24, Split 2)]* *[==>(Pattern 25, Split 1)]* *[==>(Pattern 25, Split 2)]* *[==>(Pattern 26, Split 1)]* *[==>(Pattern 26, Split 2)]* *[==>(Pattern 27, Split 1)]* *[==>(Pattern 27, Split 2)]* *[==>(Pattern 28, Split 1)]* *[==>(Pattern 28, Split 2)]* *[==>(Pattern 29, Split 1)]* *[==>(Pattern 29, Split 2)]* *[==>(Pattern 30, Split 1)]* *[==>(Pattern 30, Split 2)]* *[==>(Pattern 31, Split 1)]* *[==>(Pattern 31, Split 2)]* *[==>(Pattern 32, Split 1)]* *[==>(Pattern 32, Split 2)]* *[==>(Pattern 33, Split 1)]* *[==>(Pattern 33, Split 2)]* *[==>(Pattern 34, Split 1)]* *[==>(Pattern 34, Split 2)]* *[==>(Pattern 35, Split 1)]* *[==>(Pattern 35, Split 2)]* *[==>(Pattern 36, Split 1)]* *[==>(Pattern 36, Split 2)]* *[==>(Pattern 37, Split 1)]* *[==>(Pattern 37, Split 2)]* *[==>(Pattern 38, Split 1)]* *[==>(Pattern 38, Split 2)]* *[==>(Pattern 39, Split 1)]* *[==>(Pattern 39, Split 2)]* *[==>(Pattern 40, Split 1)]* *[==>(Pattern 40, Split 2)]* *[==>(Pattern 41, Split 1)]* *[==>(Pattern 41, Split 2)]*	
Comments: two [Fe III] and one [Fe II] line within this grating coverage.							
4	4706 WAV ECAL	WAVE	STIS/CCD, ACCUM, 52X0.1	G430M 4706 A		*[==>]*	***[1]***
Comments: Placed in earth occultation							

5	Submapping [Fe III], [Fe II]	(1) ETA-CAR	STIS/CCD, ACCUM, 52X0.1	G430M 4706 A	CR-SPLIT=2; GAIN=4; SIZEAXIS2=64	Pattern 1, Exps 5-5 in Visit 01 (1)	5.0 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)]* *[==>(Pattern 5, Split 1)]* *[==>(Pattern 5, Split 2)]* *[==>(Pattern 6, Split 1)]* *[==>(Pattern 6, Split 2)]*	***[1]***
							[==>(Pattern 7, Split 1)] *[==>(Pattern 7, Split 2)]*	***[2]***

Comments: Submapping on bright stellar positions.

	6	Submapping [N II]	(1) ETA-CAR	STIS/CCD, ACCUM, 52X0.1	G750M 5734 A	CR-SPLIT=2; GAIN=4; SIZEAXIS2=128	Pattern 2, Exps 6-6 in Visit 01 (2)	35.0 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)]* *[==>(Pattern 5, Split 1)]* *[==>(Pattern 5, Split 2)]* *[==>(Pattern 6, Split 1)]* *[==>(Pattern 6, Split 2)]* *[==>(Pattern 7, Split 1)]* *[==>(Pattern 7, Split 2)]* *[==>(Pattern 8, Split 1)]* *[==>(Pattern 8, Split 2)]* *[==>(Pattern 9, Split 1)]* *[==>(Pattern 9, Split 2)]* *[==>(Pattern 10, Split 1)]* *[==>(Pattern 10, Split 2)]* *[==>(Pattern 11, Split 1)]* *[==>(Pattern 11, Split 2)]* *[==>(Pattern 12, Split 1)]* *[==>(Pattern 12, Split 2)]* *[==>(Pattern 13, Split 1)]* *[==>(Pattern 13, Split 2)]* *[==>(Pattern 14, Split 1)]* *[==>(Pattern 14, Split 2)]* *[==>(Pattern 15, Split 1)]* *[==>(Pattern 15, Split 2)]* *[==>(Pattern 16, Split 1)]* *[==>(Pattern 16, Split 2)]* *[==>(Pattern 17, Split 1)]* *[==>(Pattern 17, Split 2)]* *[==>(Pattern 18, Split 1)]* *[==>(Pattern 18, Split 2)]* *[==>(Pattern 19, Split 1)]* *[==>(Pattern 19, Split 2)]* *[==>(Pattern 20, Split 1)]* *[==>(Pattern 20, Split 2)]* *[==>(Pattern 21, Split 1)]* *[==>(Pattern 21, Split 2)]* *[==>(Pattern 22, Split 1)]* *[==>(Pattern 22, Split 2)]* *[==>(Pattern 23, Split 1)]*	***[2]***

						[==>(Pattern 23, Split 2)] *[==>(Pattern 24, Split 1)]* *[==>(Pattern 24, Split 2)]* *[==>(Pattern 25, Split 1)]* *[==>(Pattern 25, Split 2)]* *[==>(Pattern 26, Split 1)]* *[==>(Pattern 26, Split 2)]* *[==>(Pattern 27, Split 1)]* *[==>(Pattern 27, Split 2)]* *[==>(Pattern 28, Split 1)]* *[==>(Pattern 28, Split 2)]* *[==>(Pattern 29, Split 1)]* *[==>(Pattern 29, Split 2)]* *[==>(Pattern 30, Split 1)]* *[==>(Pattern 30, Split 2)]* *[==>(Pattern 31, Split 1)]* *[==>(Pattern 31, Split 2)]* *[==>(Pattern 32, Split 1)]* *[==>(Pattern 32, Split 2)]* *[==>(Pattern 33, Split 1)]* *[==>(Pattern 33, Split 2)]* *[==>(Pattern 34, Split 1)]* *[==>(Pattern 34, Split 2)]* *[==>(Pattern 35, Split 1)]* *[==>(Pattern 35, Split 2)]* *[==>(Pattern 36, Split 1)]* *[==>(Pattern 36, Split 2)]* *[==>(Pattern 37, Split 1)]* *[==>(Pattern 37, Split 2)]* *[==>(Pattern 38, Split 1)]* *[==>(Pattern 38, Split 2)]* *[==>(Pattern 39, Split 1)]* *[==>(Pattern 39, Split 2)]* *[==>(Pattern 40, Split 1)]* *[==>(Pattern 40, Split 2)]* *[==>(Pattern 41, Split 1)]* *[==>(Pattern 41, Split 2)]*	
Comments: Mapping [N II] 5755							
7	5734 WAV ECAL	WAVE	STIS/CCD, ACCUM, 52X0.1	G750M 5734 A		*[==>]*	***[2]***
Comments: WAVECAL inserted in earth occultation or after exposure 7-7 completed							

8	Mapping [N II], He I	(1) ETA-CAR	STIS/CCD, ACCUM, 52X0.1	G750M 5734 A	CR-SPLIT=2; GAIN=4; SIZEAXIS2=64	Pattern 1, Exps 8-8 in Visit 01 (1)	5 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)]* *[==>(Pattern 5, Split 1)]* *[==>(Pattern 5, Split 2)]* *[==>(Pattern 6, Split 1)]* *[==>(Pattern 6, Split 2)]* *[==>(Pattern 7, Split 1)]* *[==>(Pattern 7, Split 2)]*	***[2]***

Comments: Bright stellar core mapping

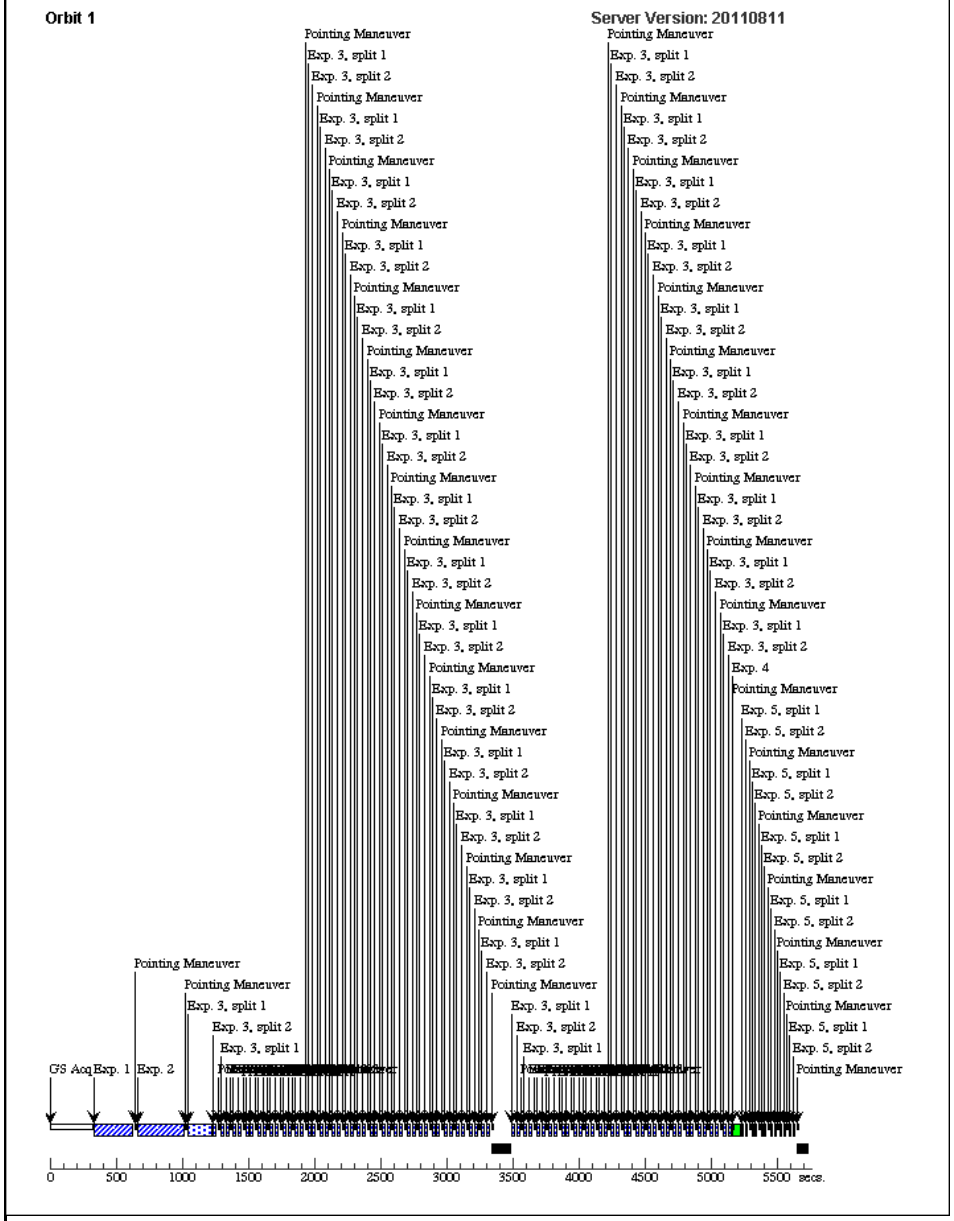
	9	Mapping [Ar III], [Fe II], [Ni II]	(1) ETA-CAR	STIS/CCD, ACCUM, 52X0.1	G750M 7283 A	CR-SPLIT=2; GAIN=4; SIZEAXIS2=128	Pattern 2, Exps 9-9 in Visit 01 (2)	34 Secs *[==>(Pattern 1, Split 1)]* *[==>(Pattern 1, Split 2)]* *[==>(Pattern 2, Split 1)]* *[==>(Pattern 2, Split 2)]* *[==>(Pattern 3, Split 1)]* *[==>(Pattern 3, Split 2)]*	***[2]***

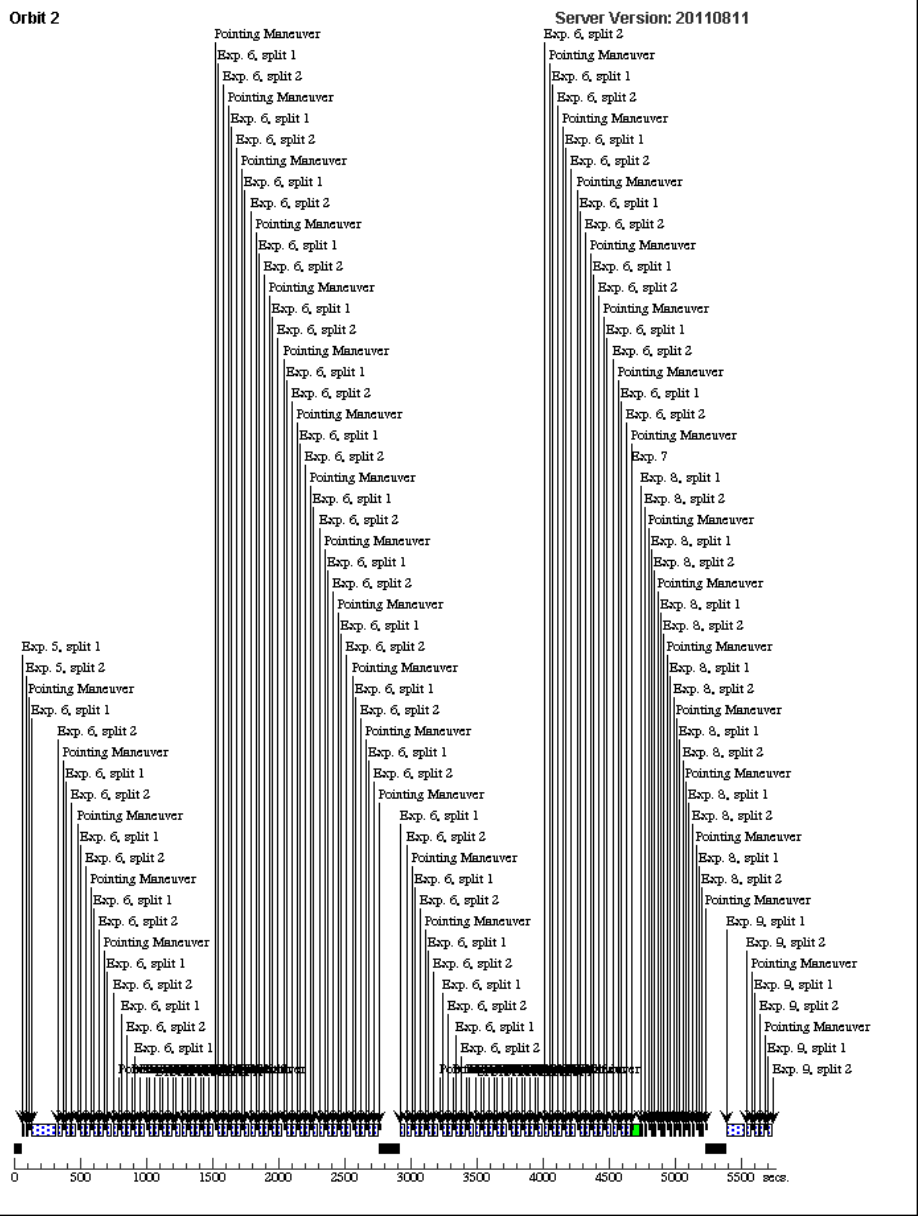
		[==>(Pattern 4, Split 1)] *[==>(Pattern 4, Split 2)]* *[==>(Pattern 5, Split 1)]* *[==>(Pattern 5, Split 2)]* *[==>(Pattern 6, Split 1)]* *[==>(Pattern 6, Split 2)]* *[==>(Pattern 7, Split 1)]* *[==>(Pattern 7, Split 2)]* *[==>(Pattern 8, Split 1)]* *[==>(Pattern 8, Split 2)]* *[==>(Pattern 9, Split 1)]* *[==>(Pattern 9, Split 2)]* *[==>(Pattern 10, Split 1)]* *[==>(Pattern 10, Split 2)]* *[==>(Pattern 11, Split 1)]* *[==>(Pattern 11, Split 2)]* *[==>(Pattern 12, Split 1)]* *[==>(Pattern 12, Split 2)]* *[==>(Pattern 13, Split 1)]* *[==>(Pattern 13, Split 2)]* *[==>(Pattern 14, Split 1)]* *[==>(Pattern 14, Split 2)]* *[==>(Pattern 15, Split 1)]* *[==>(Pattern 15, Split 2)]* *[==>(Pattern 16, Split 1)]* *[==>(Pattern 16, Split 2)]* *[==>(Pattern 17, Split 1)]* *[==>(Pattern 17, Split 2)]* *[==>(Pattern 18, Split 1)]* *[==>(Pattern 18, Split 2)]* *[==>(Pattern 19, Split 1)]* *[==>(Pattern 19, Split 2)]* *[==>(Pattern 20, Split 1)]* *[==>(Pattern 20, Split 2)]* *[==>(Pattern 21, Split 1)]* *[==>(Pattern 21, Split 2)]* *[==>(Pattern 22, Split 1)]* *[==>(Pattern 22, Split 2)]* *[==>(Pattern 23, Split 1)]* *[==>(Pattern 23, Split 2)]* *[==>(Pattern 24, Split 1)]* *[==>(Pattern 24, Split 2)]* *[==>(Pattern 25, Split 1)]* *[==>(Pattern 25, Split 2)]* *[==>(Pattern 26, Split 1)]*	***[3]***

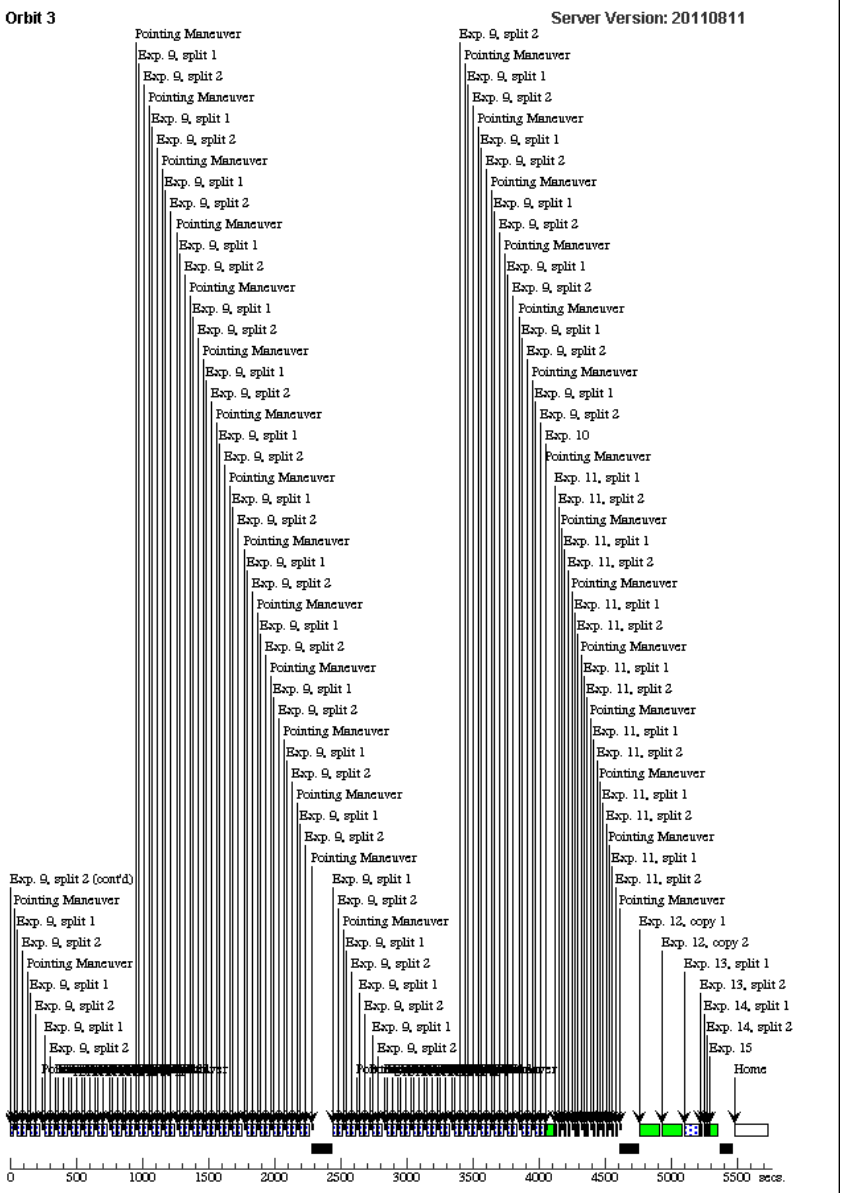
					[==>(Pattern 26, Split 2)] *[==>(Pattern 27, Split 1)]* *[==>(Pattern 27, Split 2)]* *[==>(Pattern 28, Split 1)]* *[==>(Pattern 28, Split 2)]* *[==>(Pattern 29, Split 1)]* *[==>(Pattern 29, Split 2)]* *[==>(Pattern 30, Split 1)]* *[==>(Pattern 30, Split 2)]* *[==>(Pattern 31, Split 1)]* *[==>(Pattern 31, Split 2)]* *[==>(Pattern 32, Split 1)]* *[==>(Pattern 32, Split 2)]* *[==>(Pattern 33, Split 1)]* *[==>(Pattern 33, Split 2)]* *[==>(Pattern 34, Split 1)]* *[==>(Pattern 34, Split 2)]* *[==>(Pattern 35, Split 1)]* *[==>(Pattern 35, Split 2)]* *[==>(Pattern 36, Split 1)]* *[==>(Pattern 36, Split 2)]* *[==>(Pattern 37, Split 1)]* *[==>(Pattern 37, Split 2)]* *[==>(Pattern 38, Split 1)]* *[==>(Pattern 38, Split 2)]* *[==>(Pattern 39, Split 1)]* *[==>(Pattern 39, Split 2)]* *[==>(Pattern 40, Split 1)]* *[==>(Pattern 40, Split 2)]* *[==>(Pattern 41, Split 1)]* *[==>(Pattern 41, Split 2)]*	
	10	7283 Wavecal	WAVE	STIS/CCD, ACCUM, 52X0.1	G750M 7283 A	*[==>]*	***[3]***

11	Sub-mapping [Ar III], [Fe II], [Ni II]	(1) ETA-CAR	STIS/CCD, ACCUM, 52X0.1	G750M 7283 A	CR-SPLIT=2; GAIN=4; SIZEAXIS2=64	Pattern 1, Exps 11-11 in Visit 01 (1)	6 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)]* *[==>(Pattern 5, Split 1)]* *[==>(Pattern 5, Split 2)]* *[==>(Pattern 6, Split 1)]* *[==>(Pattern 6, Split 2)]* *[==>(Pattern 7, Split 1)]* *[==>(Pattern 7, Split 2)]*	***[3]***
Comments: Bright stellar core mapping								
12	7283 Flat	CCDFLAT	STIS/CCD, ACCUM, 52X0.1	G750M 7283 A			*[==>(Copy 1)]* *[==>(Copy 2)]*	***[3]***
13	H alpha short	(1) ETA-CAR	STIS/CCD, ACCUM, 52X0.1	G750M 6768 A	CR-SPLIT=2; GAIN=4; SIZEAXIS2=128		0.2 Secs *[==>(Split 1)]* *[==>(Split 2)]*	***[3]***
14	H alpha long	(1) ETA-CAR	STIS/CCD, ACCUM, 52X0.1	G750M 6768 A	SIZEAXIS2=128; GAIN=4; CR-SPLIT=2		1 Secs *[==>(Split 1)]* *[==>(Split 2)]*	***[3]***
15	6768 WAV ECAL	WAVE	STIS/CCD, ACCUM, 52X0.1	G750M 6768 A			*[==>]*	***[3]***

Orbit Structure




Orbit 2
Server Version: 20110811
Pointing Maneuver
Exp. 6, split 1
Exp. 6, split 2
Exp. 5, split 1
Exp. 5, split 2
Exp. 7
Exp. 8, split 1
Exp. 8, split 2
Exp. 9, split 1
Exp. 9, split 2
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
secs.


Orbit 3
Server Version: 20110811
Pointing Maneuver
Exp. 9, split 1
Exp. 9, split 2
Exp. 9, split 2 (cont'd)
Exp. 10
Exp. 11, split 1
Exp. 11, split 2
Exp. 12, copy 1
Exp. 12, copy 2
Exp. 13, split 1
Exp. 13, split 2
Exp. 14, split 1
Exp. 14, split 2
Exp. 15
Home
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
secs.