11690 - EG And: Providing the Missing Link Required for Modelling Red Giant Mass-loss

Cycle: 17, 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	(2) HD148349	STIS/CCD STIS/FUV-MAMA STIS/NUV-MAMA	1	22-Sep-2009 21:37:10.0	yes
02	(3) HD1013	STIS/CCD STIS/FUV-MAMA STIS/NUV-MAMA	1	22-Sep-2009 21:37:16.0	yes

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
03	(1) HD4174	STIS/CCD STIS/FUV-MAMA STIS/NUV-MAMA	3	22-Sep-2009 21:37:22.0	yes
04	(1) HD4174	STIS/CCD STIS/FUV-MAMA STIS/NUV-MAMA	2	22-Sep-2009 21:37:30.0	yes
05	(1) HD4174	STIS/CCD STIS/FUV-MAMA	1	22-Sep-2009 21:37:33.0	yes
06	(1) HD4174	STIS/CCD STIS/FUV-MAMA STIS/NUV-MAMA	1	22-Sep-2009 21:37:36.0	yes

9 Total Orbits Used

ABSTRACT

For the majority of red giant stars the basic mass-loss processes at work are unknown. Indeed, for stars of spectral types between K0 III and M5-M6 III, much remains unknown about the regions above the visible photosphere and the transportation of the processed material outwards to the ISM. Eclipsing symbiotic binary systems, consisting of an evolved giant in orbit with a white dwarf, provide an opportunity to take advantage of the finite size of the hot component to probe different levels of the chromosphere and wind acceleration region in absorption. This provides spatially resolved thermal, ionisation and dynamic information on the wind which can then be compared against predictions of hydrodynamical stellar atmosphere codes. The symbiotic binary EG And can be considered as a rosetta stone for understanding the winds of these objects. The system is ideal on a number of counts for utilising the ultraviolet eclipse of the white dwarf (WD) component to probe, layer-by-layer, the thermal and dynamic conditions at the very base of the wind and chromosphere of the RG. This information is vital for constraining, testing and calibrating the new generation of cool giant wind+chromosphere models and is not possible to obtain for isolated RGs. This team has studied the UV eclipses of this system in depth and detail, however in order to definitively constrain the wind acceleration profile and identify the location of the temperature rise

just above the photosphere we require 4 STIS E140M observations of EG And at specific orbital phases. We are also requesting a E230M observation of an isolated spectral standard, corresponding to the RG in
the binary, which will help place the EG And results into the context of the general RG population from analysis of the MgII wind diagnostic lines.

OBSERVING DESCRIPTION

Observations are for 3 targets: 2 stars (HD1013 and HD148349) are spectral analogues for the red giant under study in the symbiotic binary HD4174 (EG And). HD148349 was in the original proposal, but the radial velocity of this star may preclude observation of the wind structure in MgII, so HD1013 has been added as a backup. MgII details are the main requirement, but the addition of the G140L observations will permit detection or the setting of upper limits on additional chromospheric features. In addition, a G430L observation has been inserted so that a calibration of the G430L data taken for all ACQ/PEAK observations of EG And (including historical data in the archive) through the 0.2x0.06 aperture can be obtained. EG And will be observed at a number of phases to record the absorptipon features as the impact parameter of our sightline to the white dwarf secondary changes as it orbits the red giant primary.

Visit

Proposal 11690, Visit 01, completed Wed Sep 23 01:37:40 GMT 2009

Diagnostic Status: No Diagnostics

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

Special Requirements: (none)

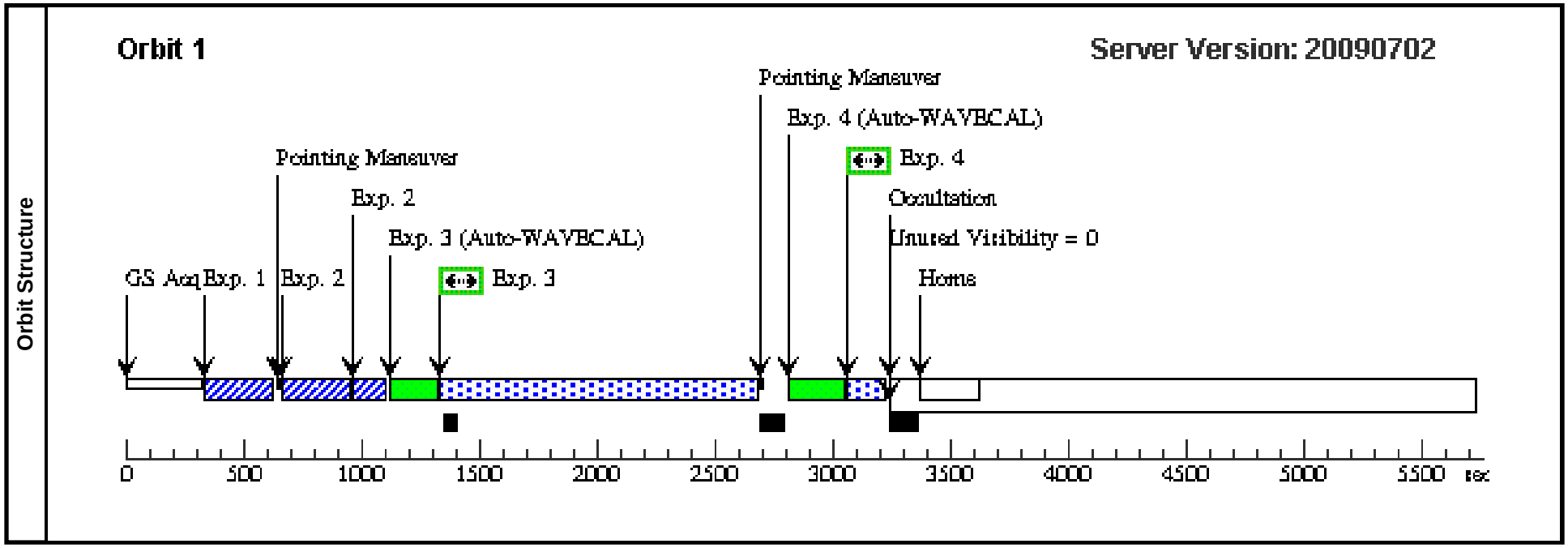
Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(2)	HD148349 Alt Name1: V2106-OPH Alt Name2: GSC05626-00124	RA: 16 27 43.4564 (246.9310683d) Dec: -07 35 52.55 (-7.59793d) Equinox: J2000	Proper Motion RA: -0.00095s/yr Proper Motion Dec: -0.15341"/yr Parallax: 0.00643" Epoch of Position: 2000.0 Radial Velocity: +99 km/sec	V=5.27 f(3200)=1.5e-13;f(1450)=7.5e-16(est)	Reference Frame: ICRS

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	HD148349 ACQ	(2) HD148349	STIS/CCD, ACQ, F25ND3	MIRROR			Sequence 1-4 Non-Int	0.1 Secs *[==>]*	 ***[1]***
Comments: STIS80038 Bruzual M3III model with E(B-V)=0.05 and V=5.3 has S/N=341.19 (time to saturation 0.76s)									
2	HD148349 ACQ/PEAK	(2) HD148349	STIS/CCD, ACQ/PEAK, 0.2X0.06	G430L 4300 A			Sequence 1-4 Non-Int	1.5 Secs *[==>]*	 ***[1]***
Comments: ETC STIS79982 S/N=110 at 4451A brightest pixel 7,200 CCDGAIN=4, CR-SPLIT=1, 52x0.05 Bruzual M3III E(B-V)=0.05 for V=5.3									
3	HD148349 E230M	(2) HD148349	STIS/NUV-MAMA, ACCUM, 0.2X0.06	E230M 2707 A			Sequence 1-4 Non-Int	1332 Secs *[==>]*	 ***[1]***
Comments: ETC run STIS79975 with M3 III Bruzual model normalized to 1.5e-13 at 3200A after E(B-V)=0.05 gives S/N=16 at 2790A									
4	HD148349 G140L	(2) HD148349	STIS/FUV-MAMA, ACCUM, 52X0.2D1	G140L 1425 A			Sequence 1-4 Non-Int	150.0 Secs *[==>]*	 ***[1]***
Comments: ETC run STIS79976 S/N=6 in 150s at 1450A for 7.5e-16 flat continuum									


Orbit Structure
Orbit 1
Server Version: 20090702
Pointing Maneuver
Exp. 4 (Auto-WAVECAL)
Exp. 4
Occultation
Unused Visibility = 0
Pointing Maneuver
Exp. 2
Exp. 3 (Auto-WAVECAL)
GS Acq
Exp. 1
Exp. 2
Exp. 3
Home
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 11690, Visit 02, scheduling Wed Sep 23 01:37:41 GMT 2009

Diagnostic Status: No Diagnostics

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

Special Requirements: (none)

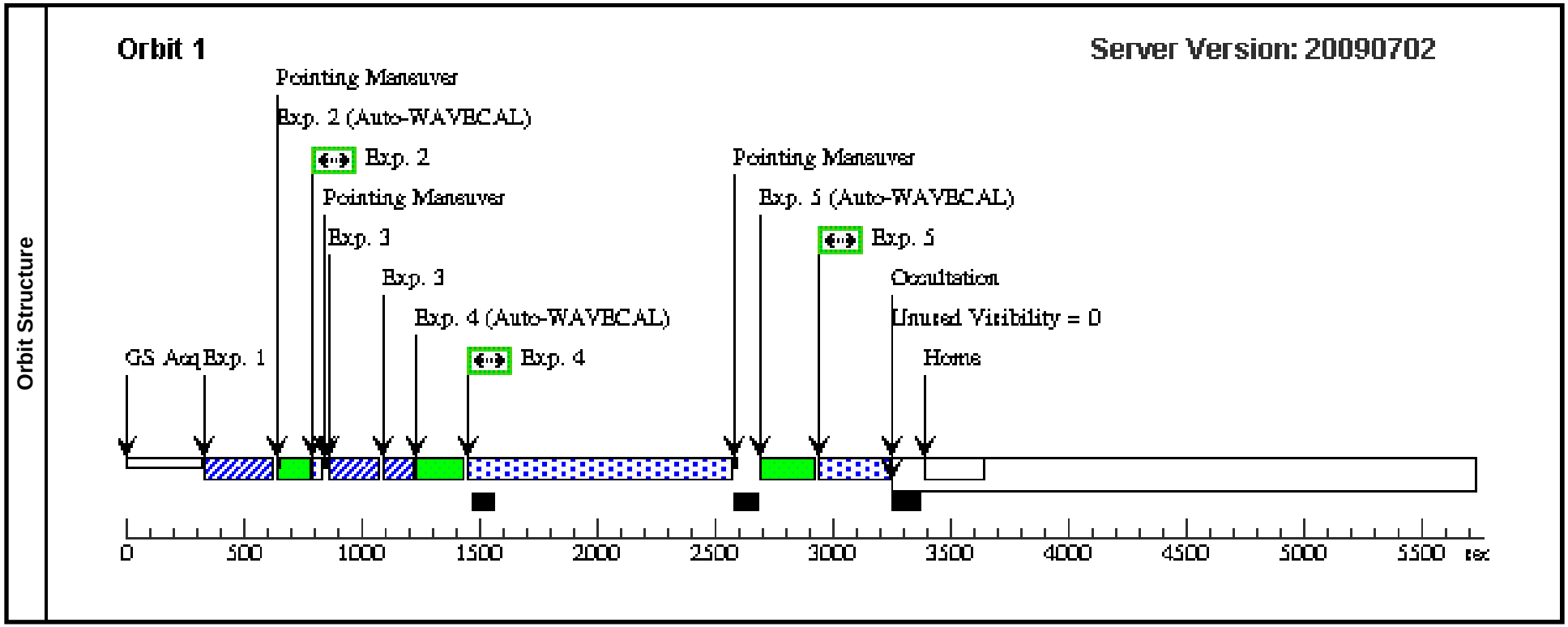
Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(3)	HD1013 Alt Name1: CHI-PEG Alt Name2: GSC01185-02319	RA: 00 14 36.1645 (3.6506854d) Dec: +20 12 24.13 (20.20670d) Equinox: J2000	Proper Motion RA: +0.09066s/yr Proper Motion Dec: +0.0188"/yr Parallax: 0.01001" Epoch of Position: 2000.0 Radial Velocity: -46 km/sec	V=4.82 f(3200)=3.5e-13;f(1450)=.7e-15 (est)	Reference Frame: ICRS

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	HD1013 ACQ	(3) HD1013	STIS/CCD, ACQ, F25ND3	MIRROR			Sequence 1-5 Non-Int	0.1 Secs *[==>]*	*[1]*
Comments: ETC STIS79978 S/N=305 at 4300A with E(B-V)=0.05 and V=4.8									
2	HD1013 G430L calibration	(3) HD1013	STIS/CCD, ACCUM, 52X0.2	G430L 4300 A	CR-SPLIT=NO		Sequence 1-5 Non-Int	0.5 Secs *[==>]*	*[1]*
Comments: ETCID 79716 / ETC STIS79981 S/N=140/resn element at 4451A brightest pixel 11,000 E(B-V)=0.05 Bruzual M3III V=4.8 52x0.05 aperture, CCDGAIN=4, CR-SPLIT=1 texp=0.5									
3	HD1013 ACQ/PEAK	(3) HD1013	STIS/CCD, ACQ/PEAK, 0.2X0.06	G430L 4300 A			Sequence 1-5 Non-Int	0.1 Secs *[==>]*	*[1]*
Comments: ETC STIS79985 S/N=46.7 in 0.1s Bruzual M3III V=4.8, E(B-V)=0.05; CCDGAIN=1, CR-SPLIT=NO									
4	HD1013 E230M	(3) HD1013	STIS/NUV-MAMA, ACCUM, 0.2X0.06	E230M 2707 A			Sequence 1-5 Non-Int	1100 Secs *[==>]*	*[1]*
Comments: ETC run with M3 III Bruzual model normalized to 3e-14 at 3200A gives S/N=10 @ 2810A									
5	HD1013 G140L	(3) HD1013	STIS/FUV-MAMA, ACCUM, 52X2D1	G140L 1425 A			Sequence 1-5 Non-Int	248 Secs *[==>]*	*[1]*
Comments: STISID80097 S/N=4 per resolution element for 250s with flat continuum of 1.7e-15									


Orbit Structure
Orbit 1
Server Version: 20090702
Pointing Maneuver
Exp. 2 (Auto-WAVECAL)
Exp. 2
Pointing Maneuver
Exp. 3
Exp. 3
Exp. 4 (Auto-WAVECAL)
Exp. 4
GS Acq
Exp. 1
Pointing Maneuver
Exp. 5 (Auto-WAVECAL)
Exp. 5
Occultation
Unused Visibility = 0
Home
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 11690, Visit 03, completed Wed Sep 23 01:37:41 GMT 2009

Diagnostic Status: Warning

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

Special Requirements: BETWEEN 15-AUG-2009:00:00:01 AND 18-AUG-2009:23:59:59

Diagnostics

(Visit 03) Warning (Orbit Planner): VISIBILITY OVERRUN

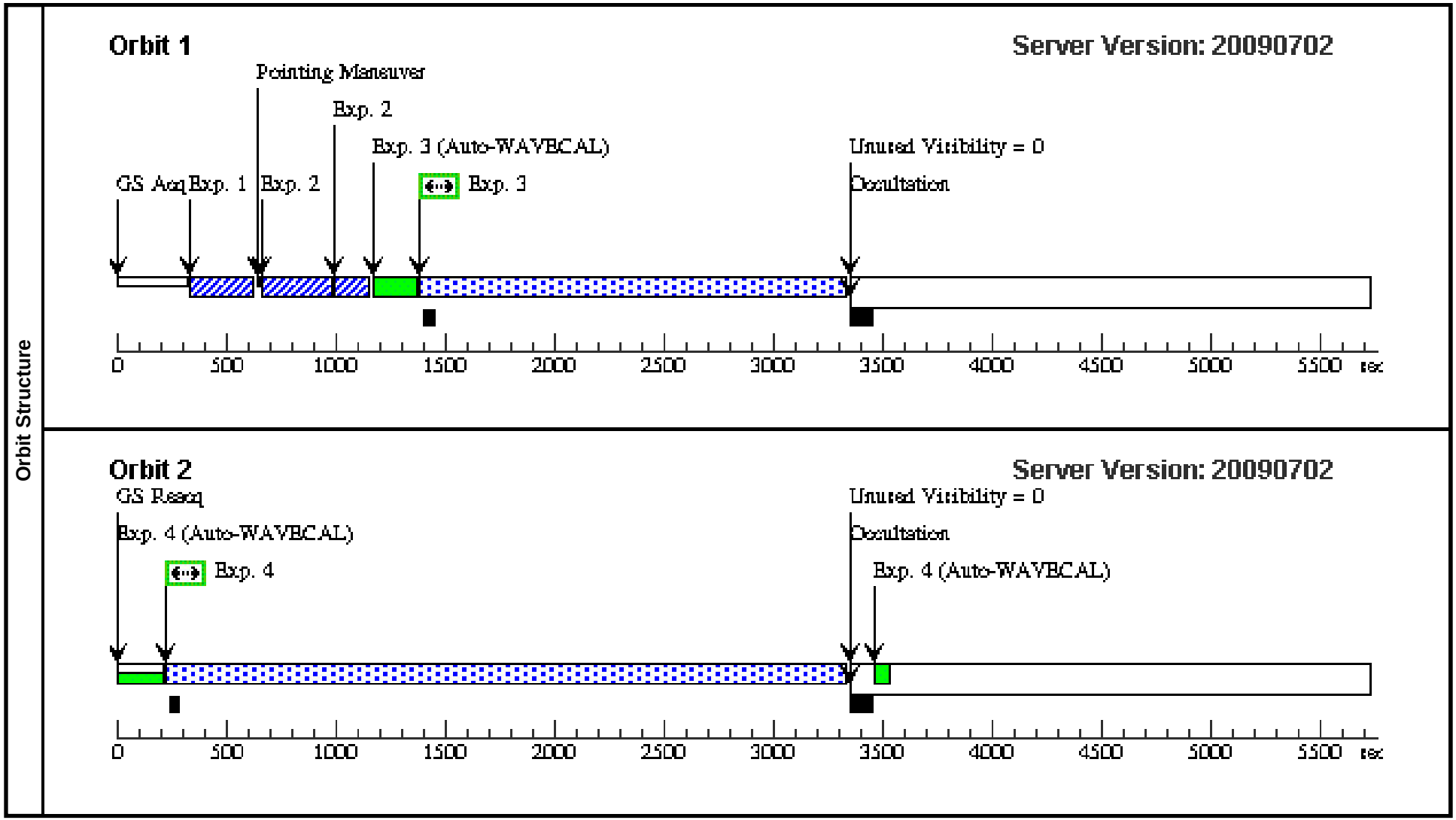
Fixed Targets

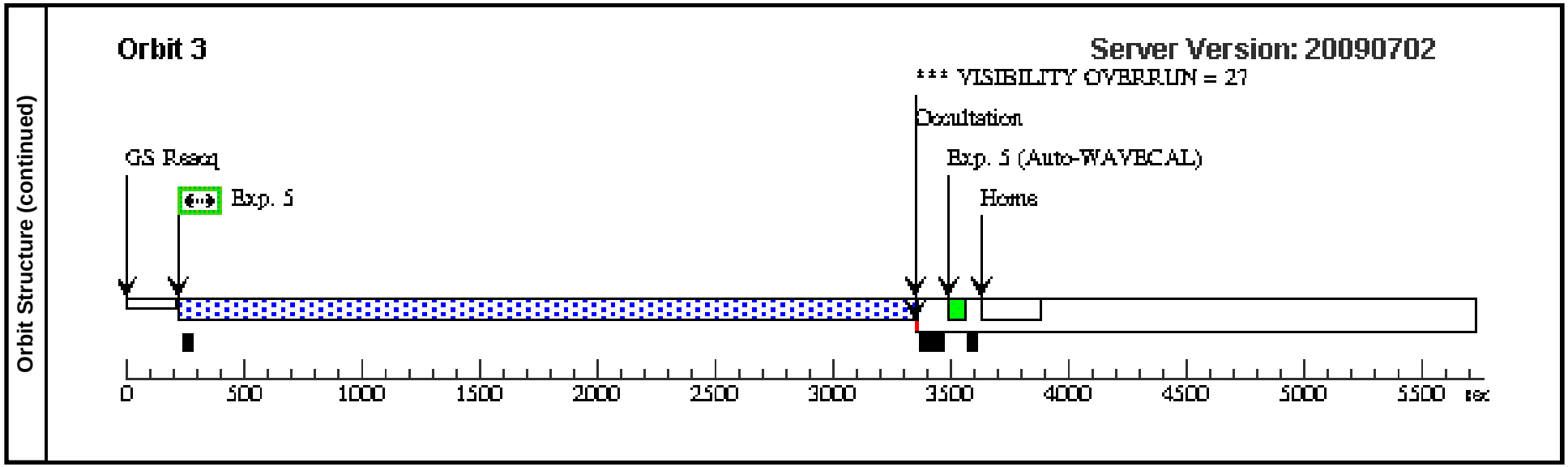
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	HD4174 Alt Name1: EG-AND Alt Name2: GSC02801-01704	RA: 00 44 37.1869 (11.1549454d) Dec: +40 40 45.71 (40.67936d) Equinox: J2000	Proper Motion RA: 0.00912s/yr Proper Motion Dec: 0.01505"/yr Parallax: 0.00148" Epoch of Position: 2000.0 Radial Velocity: -95 km/sec	V=7.23+/-0.25 f(3200)=7.0e-14;f(1380 Ang) ~ 3e-13 outside eclipse	Reference Frame: ICRS

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	EG And ACQ Phi=0.058	(1) HD4174	STIS/CCD, ACQ, F25ND3	MIRROR				0.1 Secs *[==>]*	***[1]***
Comments: STIS80038 Bruzual M3III model with E(B-V)=0.05 and V=7.3 has S/N=94.05 (time to saturation 4.8s)									
2	EG And ACQ/PEAK Phi =0.058	(1) HD4174	STIS/CCD, ACQ/PEAK, 0.2X0.06	G430L 4300 A				4 Secs *[==>]*	***[1]***
Comments: STIS80099 S/N=125 per resolution element in 4s for Bruzual M3III model, E(B-V)=0.05 and V=7.3									
3	EG And E230M Phi=0.0 58	(1) HD4174	STIS/NUV-MAMA, ACCUM, 0.2X0.06	E230M 2707 A				1938 Secs *[==>]*	***[1]***
Comments: Exposure based on previous Cycle 11 data									
4	EG And E140M Phi=0.0 58	(1) HD4174	STIS/FUV-MAMA, ACCUM, 0.2X0.06	E140M 1425 A				3099 Secs *[==>]*	***[2]***
Comments: Exposure based on previous Cycle 11 data									
5	EG And E140M Phi=0.0 58	(1) HD4174	STIS/FUV-MAMA, ACCUM, 0.2X0.06	E140M 1425 A				3126 Secs *[==>]*	***[3]***
Comments: ETC STIS79986 S/N=1.6/resn element at 1425A E140M 0.2x0.06 Texp=3100s									


Orbit Structure
Orbit 1
Server Version: 20090702
Pointing Maneuver
Exp. 2
Exp. 3 (Auto-WAVECAL)
Unused Visibility = 0
GS Acq
Exp. 1
Exp. 2
Exp. 3
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec
Orbit 2
Server Version: 20090702
GS Resaq
Unused Visibility = 0
Exp. 4 (Auto-WAVECAL)
Occultation
Exp. 4
Exp. 4 (Auto-WAVECAL)
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec


Orbit Structure (continued)
Orbit 3
Server Version: 20090702
*** VISIBILITY OVERRUN = 27
Occultation
GS Reacq
Exp. 5
Exp. 5 (Auto-WAVECAL)
Home
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 11690, Visit 04, completed Wed Sep 23 01:37:42 GMT 2009

Diagnostic Status: Warning

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

Special Requirements: AFTER 03 BY 84 H TO 7 D

Diagnostics

(Visit 04) Warning (Orbit Planner): VISIBILITY OVERRUN

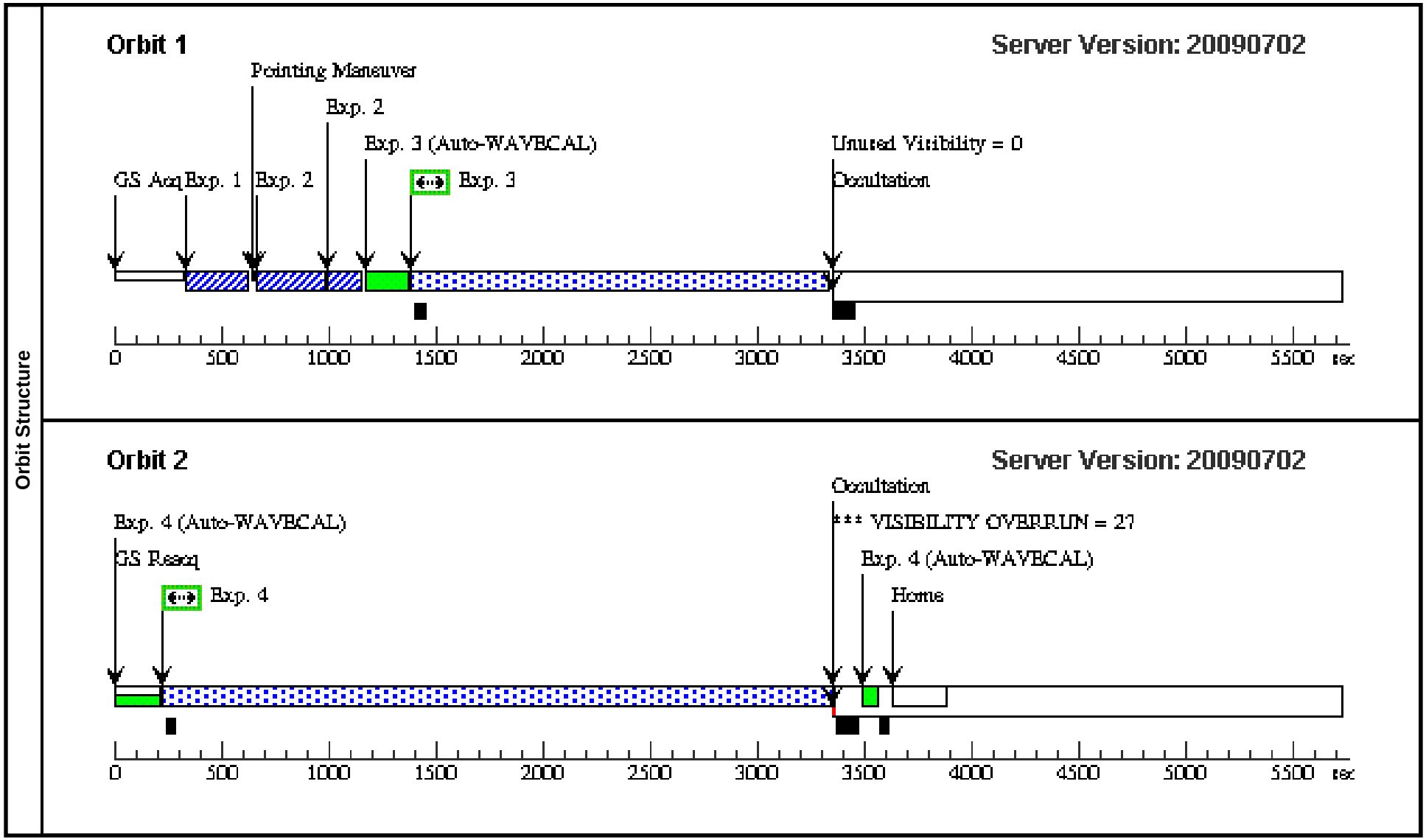
Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	HD4174 Alt Name1: EG-AND Alt Name2: GSC02801-01704	RA: 00 44 37.1869 (11.1549454d) Dec: +40 40 45.71 (40.67936d) Equinox: J2000	Proper Motion RA: 0.00912s/yr Proper Motion Dec: 0.01505"/yr Parallax: 0.00148" Epoch of Position: 2000.0 Radial Velocity: -95 km/sec	V=7.23+/-0.25 f(3200)=7.0e-14;f(1380 Ang) ~ 3e-13 outside eclipse	Reference Frame: ICRS

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	EG And ACQ Phi=0.066	(1) HD4174	STIS/CCD, ACQ, F25ND3	MIRROR				0.1 Secs *[==>]*	 ***[1]***
Comments: STIS80038 Bruzual M3III model with E(B-V)=0.05 and V=7.3 has S/N=94.05 (time to saturation 4.8s)									
2	EG And ACQ/PEAK Phi =0.066	(1) HD4174	STIS/CCD, ACQ/PEAK, 0.2X0.06	G430L 4300 A				4 Secs *[==>]*	 ***[1]***
Comments: STIS80099 S/N=125 per resolution element in 4s for Bruzual M3III model, E(B-V)=0.05 and V=7.3									
3	EG And E230M Phi=0.066	(1) HD4174	STIS/NUV-MAMA, ACCUM, 0.2X0.06	E230M 2707 A				1938 Secs *[==>]*	 ***[1]***
Comments: Exposure based on previous Cycle 11 data									
4	EG And E140M Phi=0.066	(1) HD4174	STIS/FUV-MAMA, ACCUM, 0.2X0.06	E140M 1425 A				3126 Secs *[==>]*	 ***[2]***
Comments: Exposure based on previous Cycle 11 data									


Orbit Structure
Orbit 1
Server Version: 20090702
Pointing Maneuver
Exp. 2
Exp. 3 (Auto-WAVECAL)
Unused Visibility = 0
GS Acq
Exp. 1
Exp. 2
Exp. 3
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec
Orbit 2
Server Version: 20090702
Occultation
Exp. 4 (Auto-WAVECAL)
*** VISIBILITY OVERRUN = 27
GS Reacq
Exp. 4 (Auto-WAVECAL)
Exp. 4
Home
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 11690, Visit 05, scheduling Wed Sep 23 01:37:43 GMT 2009

Diagnostic Status: No Diagnostics

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

Special Requirements: BETWEEN 01-OCT-2009:00:00:01 AND 05-OCT-2009:23:59:59

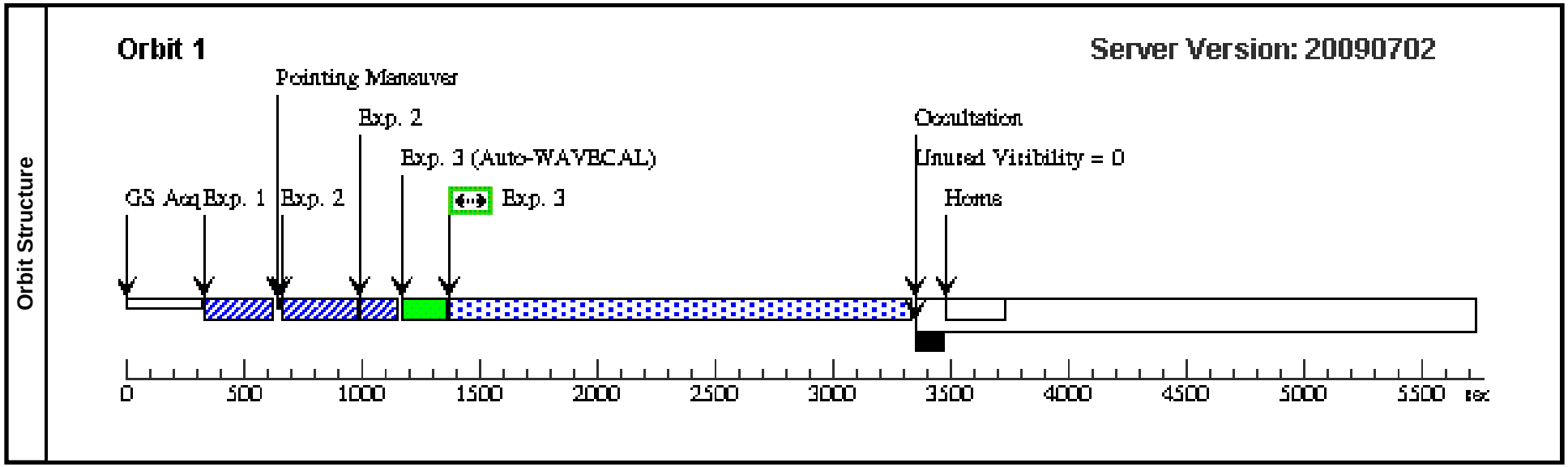
Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	HD4174 Alt Name1: EG-AND Alt Name2: GSC02801-01704	RA: 00 44 37.1869 (11.1549454d) Dec: +40 40 45.71 (40.67936d) Equinox: J2000	Proper Motion RA: 0.00912s/yr Proper Motion Dec: 0.01505"/yr Parallax: 0.00148" Epoch of Position: 2000.0 Radial Velocity: -95 km/sec	V=7.23+/-0.25 f(3200)=7.0e-14;f(1380 Ang) ~ 3e-13 outside eclipse	Reference Frame: ICRS

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	EG And ACQ Phi=0.157	(1) HD4174	STIS/CCD, ACQ, F25ND3	MIRROR			Sequence 1-3 Non-Int	0.1 Secs *[==>]*	 ***[1]***
Comments: STIS80038 Bruzual M3III model has S/N=94.05 (time to saturation 4.8s)									
2	EG And ACQ/PEAK Phi =0.157	(1) HD4174	STIS/CCD, ACQ/PEAK, 0.2X0.06	G430L 4300 A			Sequence 1-3 Non-Int	4 Secs *[==>]*	 ***[1]***
Comments: STIS80099 S/N=125 per resolution element in 4s for Bruzual M3III model, E(B-V)=0.05 and V=7.3									
3	EG And E140M Phi=0.157	(1) HD4174	STIS/FUV-MAMA, ACCUM, 0.2X0.06	E140M 1425 A			Sequence 1-3 Non-Int	1948 Secs *[==>]*	 ***[1]***
Comments: STIS ETC79989 S/N=8 at 1425 flat spectrum f_lambda = 2e-13									


Orbit Structure
Orbit 1
Server Version: 20090702
Pointing Maneuver
Exp. 2
Exp. 3 (Auto-WAVECAL)
Occultation
Unused Visibility = 0
GS Acq
Exp. 1
Exp. 2
Exp. 3
Home
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 11690, Visit 06, scheduling Wed Sep 23 01:37:43 GMT 2009

Diagnostic Status: No Diagnostics

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

Special Requirements: AFTER 05 BY 2 D TO 6 D

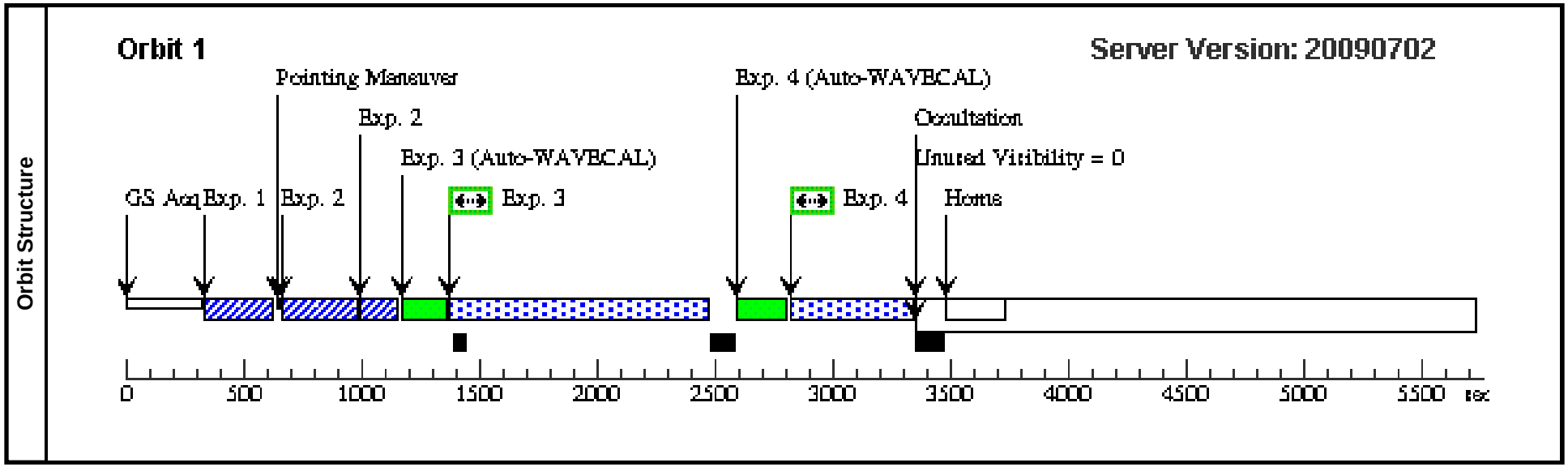
Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	HD4174 Alt Name1: EG-AND Alt Name2: GSC02801-01704	RA: 00 44 37.1869 (11.1549454d) Dec: +40 40 45.71 (40.67936d) Equinox: J2000	Proper Motion RA: 0.00912s/yr Proper Motion Dec: 0.01505"/yr Parallax: 0.00148" Epoch of Position: 2000.0 Radial Velocity: -95 km/sec	V=7.23+/-0.25 f(3200)=7.0e-14;f(1380 Ang) ~ 3e-13 outside eclipse	Reference Frame: ICRS

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	EG And ACQ Phi=0.17	(1) HD4174	STIS/CCD, ACQ, F25ND3	MIRROR			Sequence 1-4 Non-Int	0.1 Secs *[==>]*	 ***[1]***
Comments: STIS80038 Bruzual M3III model with E(B-V)=0.05 and V=7.3 has S/N=94.05 (time to saturation 4.8s)									
2	EG And ACQ/PEAK Phi =0.17	(1) HD4174	STIS/CCD, ACQ/PEAK, 0.2X0.06	G430L 4300 A			Sequence 1-4 Non-Int	4 Secs *[==>]*	 ***[1]***
Comments: STIS80099 S/N=125 per resolution element in 4s for Bruzual M3III model, E(B-V)=0.05 and V=7.3									
3	EG And E140M Phi=0.17	(1) HD4174	STIS/FUV-MAMA, ACCUM, 0.2X0.06	E140M 1425 A			Sequence 1-4 Non-Int	1081 Secs *[==>]*	 ***[1]***
Comments: Exposure based on previous Cycle 11 data									
4	EG And E230M Phi=0.17	(1) HD4174	STIS/NUV-MAMA, ACCUM, 0.2X0.06	E230M 2707 A			Sequence 1-4 Non-Int	500 Secs *[==>]*	 ***[1]***
Comments: Exposure based on previous Cycle 11 data									


Orbit Structure
Orbit 1
Server Version: 20090702
Pointing Maneuver
Exp. 2
Exp. 3 (Auto-WAVECAL)
Exp. 4 (Auto-WAVECAL)
Occultation
Unused Visibility = 0
GS Acq
Exp. 1
Exp. 2
Exp. 3
Exp. 4
Home
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec