12681 - Search for a photodissociated evaporating ocean on the super-Earth 55 Cancri e

Cycle: 18, Proposal Category: GO/DD

(Availability Mode: AVAILABLE)

INVESTIGATORS

Name	*Institution*	*E-Mail*
Dr. David Ehrenreich (PI) (ESA Member)	**Universite de Grenoble I**	**david.ehrenreich@obs.ujf-grenoble.fr**
Dr. Alfred Vidal-Madjar (CoI) (ESA Member)	CNRS, Institut d'Astrophysique de Paris	vidalmadjar@iap.fr
Dr. Alain Lecavelier des Etangs (CoI) (ESA Member)	CNRS, Institut d'Astrophysique de Paris	lecaveli@iap.fr
Dr. David Kent Sing (CoI) (ESA Member)	University of Exeter	sing@astro.ex.ac.uk
Dr. Guillaume Hebrard (CoI) (ESA Member)	CNRS, Institut d'Astrophysique de Paris	hebrard@iap.fr
Dr. Xavier Delfosse (CoI) (ESA Member)	Universite de Grenoble I	xavier.delfosse@obs.ujf-grenoble.fr
Dr. Stephane Udry (CoI) (ESA Member)	Observatoire de Geneve	stephane.udry@obs.unige.ch

VISITS

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
01	(1) 55CANCRI WAVE	STIS/CCD STIS/FUV-MAMA	4	22-Jul-2011 21:39:05.0	yes
02	(1) 55CANCRI WAVE	STIS/CCD STIS/FUV-MAMA	4	22-Jul-2011 21:39:18.0	yes

8 Total Orbits Used

ABSTRACT

The super-Earth exoplanet 55 Cancri e was recently detected in transit of its extremely bright (V=6) star. The different planet radii and densities measured in the visible with MOST and in the near-infrared with Spitzer suggest that this planet host at least 10% of water in mass, most likely in the form of a thick gaseous envelope. The planet features an extreme equilibrium temperature and a small Roche lobe, both in favor of an escape of atmospheric water which should be promptly dissociated beyond the Roche lobe. Because the star is exceptionnally close to Earth, the halo of atomic hydrogen resulting from the water dissociation is observable with HST at Lyman alpha. The detection of this atomic hydrogen will be the first signature of an evolved evaporating ocean on an extrasolar planet as well as the first validation of internal structure models of exoplanets in this mass regime.

OBSERVING DESCRIPTION

This program consists in 2 visits of 4 orbits. In each visit, we will observe the transit of an exoplanet in front of its parent star, which happens every 0.73 day and lasts for about 1.7h. Thus, each visit will completely cover the transit. The timing requirements are set as phase constraints on the first acquisition (ACQ) exposure of the first orbit of each visit. The given phase is specified so that the 2 first science exposures (1 science exposure is done during each orbit) can be completed before the transit, the third science exposure can occur during the transit, and the fourth science exposure can occur completely after the transit. Having the third (science part of the) orbit completed integrally during the transit is essential for the success of the program. The phase constraints given for the first orbit authorize a margin of 10 min. There is also an ACQ/PEAK exposure at the beginning of each visit: it is set with the G430L grating (the detector would get saturated with the mirror) and the 52"x0.05" slit, while the science exposures are to be done with the G140M grating and the 52"x0.1".

Visit

Proposal 12681, Visit 01 Sat Jul 23 01:39:23 GMT 2011

Diagnostic Status: No Diagnostics

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

Special Requirements: Period 0.7365400 D AND ZERO-PHASE HJD2455607.05562

Comments: First transit.

Fixed Targets

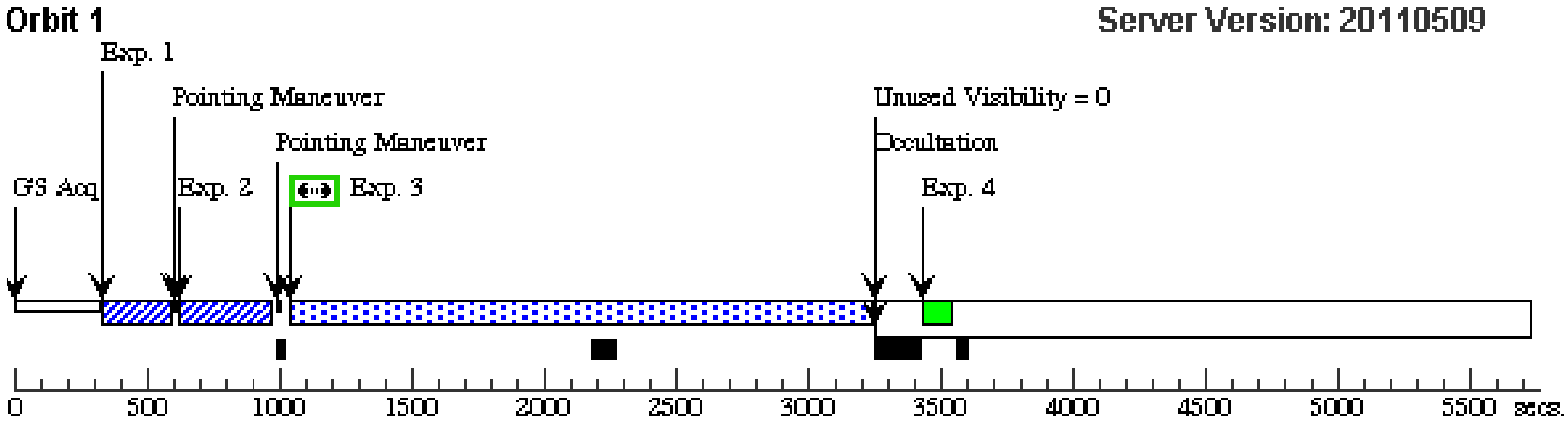
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	55CANCRI	RA: 08 52 35.8109 (133.1492121d)	Proper Motion RA: -485.80 mas/yr	V=5.95	Reference Frame: ICRS
	Alt Name1: HR3522	Dec: +28 19 50.95 (28.33082d)	Proper Motion Dec: -234.05 mas/yr	B=6.82,	
	Alt Name2: GJ324A	Equinox: J2000	Parallax: 0.08103"	R=5.4,	
			Epoch of Position: 2000	I=5.0,	
			Radial Velocity: 26.6 km/sec	J=4.768,	
				H=4.265,	
				K=4.015	

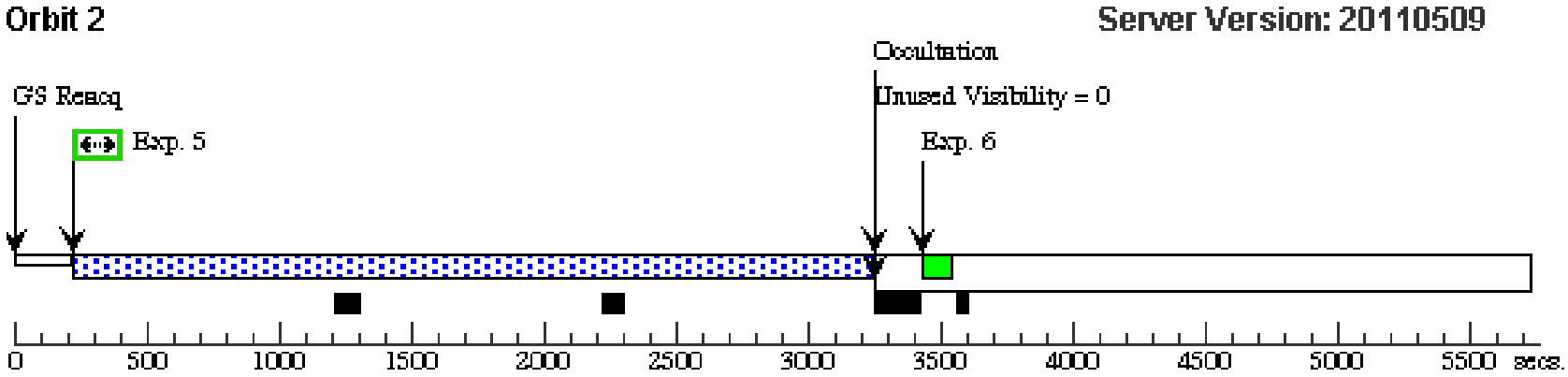
Comments: This star is in a double system (common proper motions) with 55 Cancri B (GJ 324B), a much fainter (V=13) M4 dwarf that is 1.4-arcmin away. It also 4.6-arcmin away from the similarly bright (V=6.3) star 53 Cancri (BO Cancri).

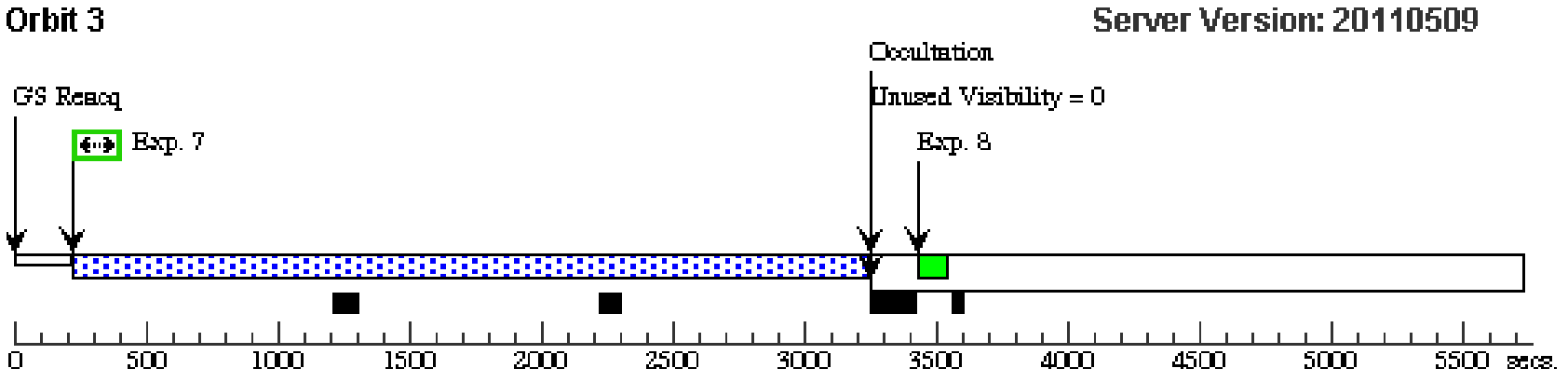
Exposures

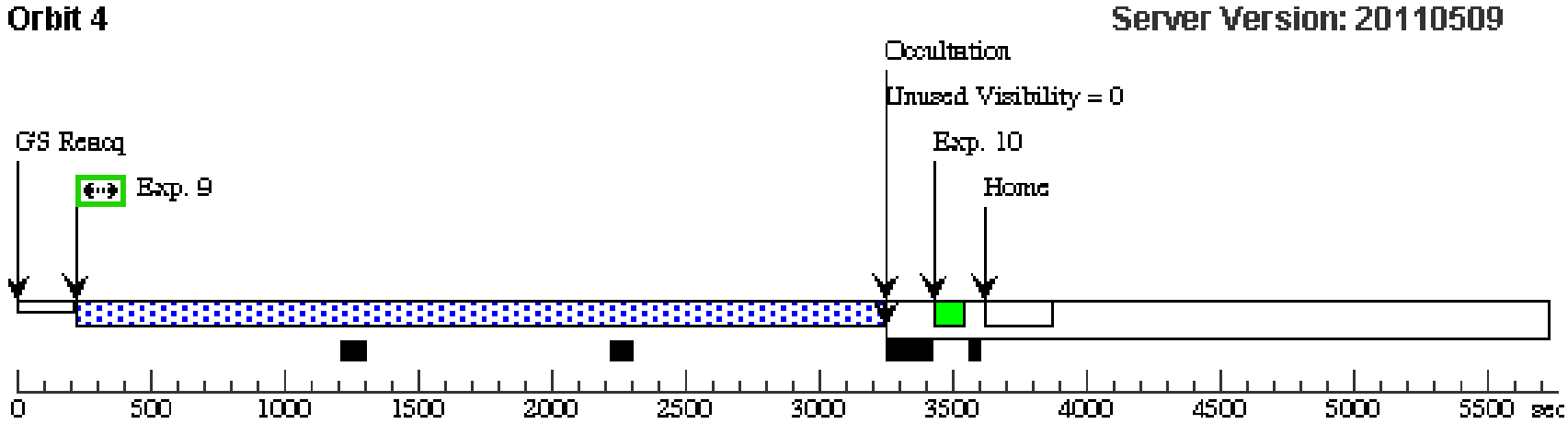
#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1	Acquisition (STIS.ta.199268)	(1) 55CANCRI	STIS/CCD, ACQ, F28X50OII	MIRROR	ACQTYPE=POINT	PHASE 0.792 TO 0.802	Sequence 1-4 Non-Int in Visit 01	1 Secs *[==>]*	 ***[1]***
2	Acquisition/Peakup (STIS.sp.201114)	(1) 55CANCRI	STIS/CCD, ACQ/PEAK, 52X0.05	G430L 4300 A			Sequence 1-4 Non-Int in Visit 01	1 Secs *[==>]*	 ***[1]***
3	Orbit 1 (STIS.sp.200340)	(1) 55CANCRI	STIS/FUV-MAMA, TIME-TAG, 52X0.1	G140M 1222 A	BUFFER-TIME=1000; WAVECAL=NO		Sequence 1-4 Non-Int in Visit 01	2126 Secs *[==>2040.0 Secs]*	 ***[1]***
4	Wavecal Orbit 1	WAVE	STIS/FUV-MAMA, ACCUM, 52X0.1	G140M 1222 A			Sequence 1-4 Non-Int in Visit 01	*[==>]*	***[1]***
5	Orbit 2 (STIS.sp.200341)	(1) 55CANCRI	STIS/FUV-MAMA, TIME-TAG, 52X0.1	G140M 1222 A	BUFFER-TIME=1000		Sequence 5-6 Non-Int in Visit 01	3005 Secs *[==>]*	 ***[2]***
6	Wavecal Orbit 2	WAVE	STIS/FUV-MAMA, ACCUM, 52X0.1	G140M 1222 A			Sequence 5-6 Non-Int in Visit 01	*[==>]*	***[2]***
7	Orbit 3 (STIS.sp.200341)	(1) 55CANCRI	STIS/FUV-MAMA, TIME-TAG, 52X0.1	G140M 1222 A	BUFFER-TIME=1000		Sequence 7-8 Non-Int in Visit 01	3005 Secs *[==>]*	 ***[3]***
8	Wavecal Orbit 3	WAVE	STIS/FUV-MAMA, ACCUM, 52X0.1	G140M 1222 A			Sequence 7-8 Non-Int in Visit 01	*[==>]*	***[3]***
9	Orbit 4 (STIS.sp.200341)	(1) 55CANCRI	STIS/FUV-MAMA, TIME-TAG, 52X0.1	G140M 1222 A	BUFFER-TIME=1000		Sequence 9-10 Non-Int in Visit 01	3005 Secs *[==>]*	 ***[4]***
10	Wavecal Orbit 4	WAVE	STIS/FUV-MAMA, ACCUM, 52X0.1	G140M 1222 A			Sequence 9-10 Non-Int in Visit 01	*[==>]*	***[4]***

Orbit Structure






Orbit 3
Server Version: 20110509
Occultation
Unused Visibility = 0
GS Reacq
Exp. 7
Exp. 8
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
secs.


Orbit 4
Server Version: 20110509
Occultation
Unused Visibility = 0
GS Reacq
Exp. 9
Exp. 10
Home
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 12681, Visit 02 Sat Jul 23 01:39:25 GMT 2011

Diagnostic Status: No Diagnostics

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

Special Requirements: Period 0.7365400 D AND ZERO-PHASE HJD2455607.05562

Comments: Second transit.

Fixed Targets

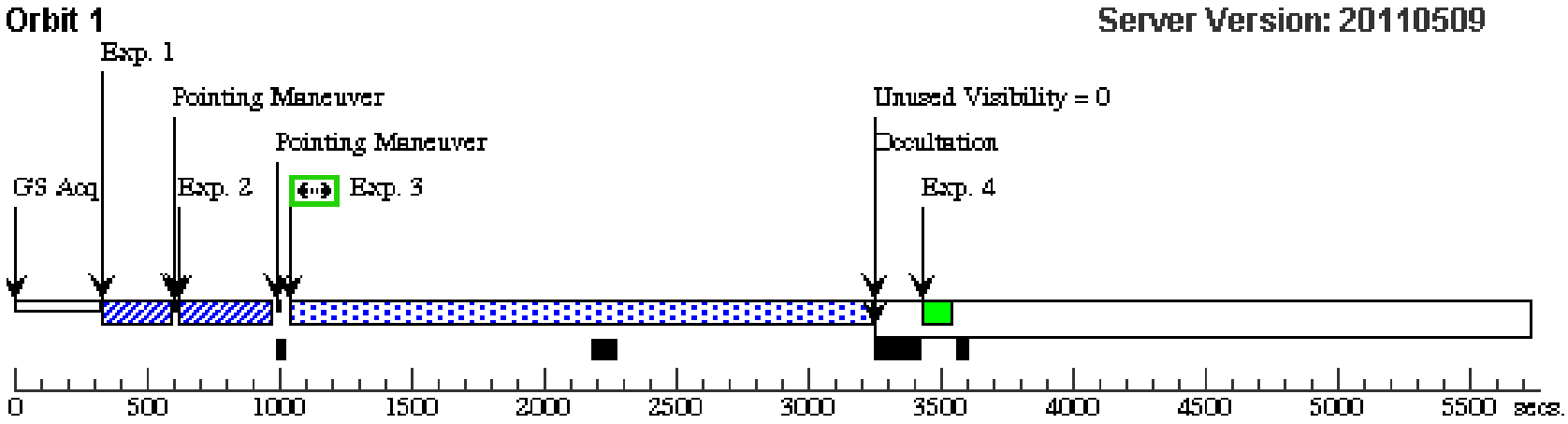
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	55CANCRI	RA: 08 52 35.8109 (133.1492121d)	Proper Motion RA: -485.80 mas/yr	V=5.95	Reference Frame: ICRS
	Alt Name1: HR3522	Dec: +28 19 50.95 (28.33082d)	Proper Motion Dec: -234.05 mas/yr	B=6.82,	
	Alt Name2: GJ324A	Equinox: J2000	Parallax: 0.08103"	R=5.4,	
			Epoch of Position: 2000	I=5.0,	
			Radial Velocity: 26.6 km/sec	J=4.768,	
				H=4.265,	
				K=4.015	

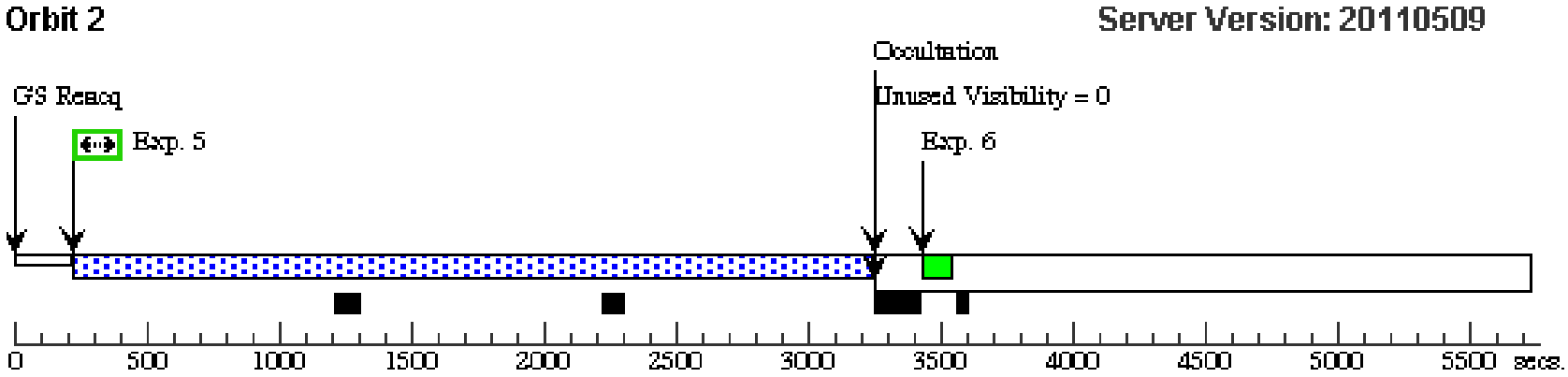
Comments: This star is in a double system (common proper motions) with 55 Cancri B (GJ 324B), a much fainter (V=13) M4 dwarf that is 1.4-arcmin away. It also 4.6-arcmin away from the similarly bright (V=6.3) star 53 Cancri (BO Cancri).

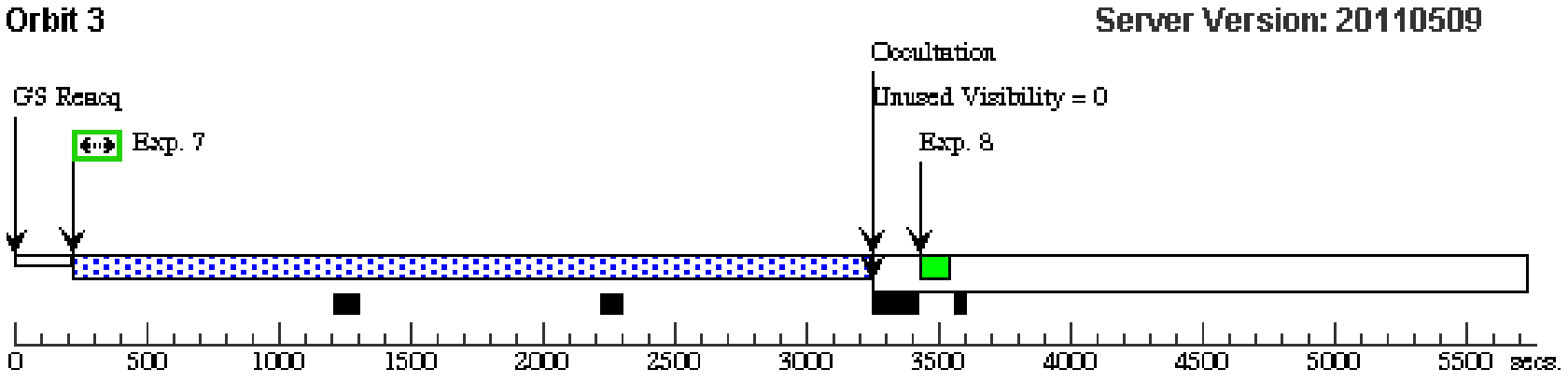
Exposures

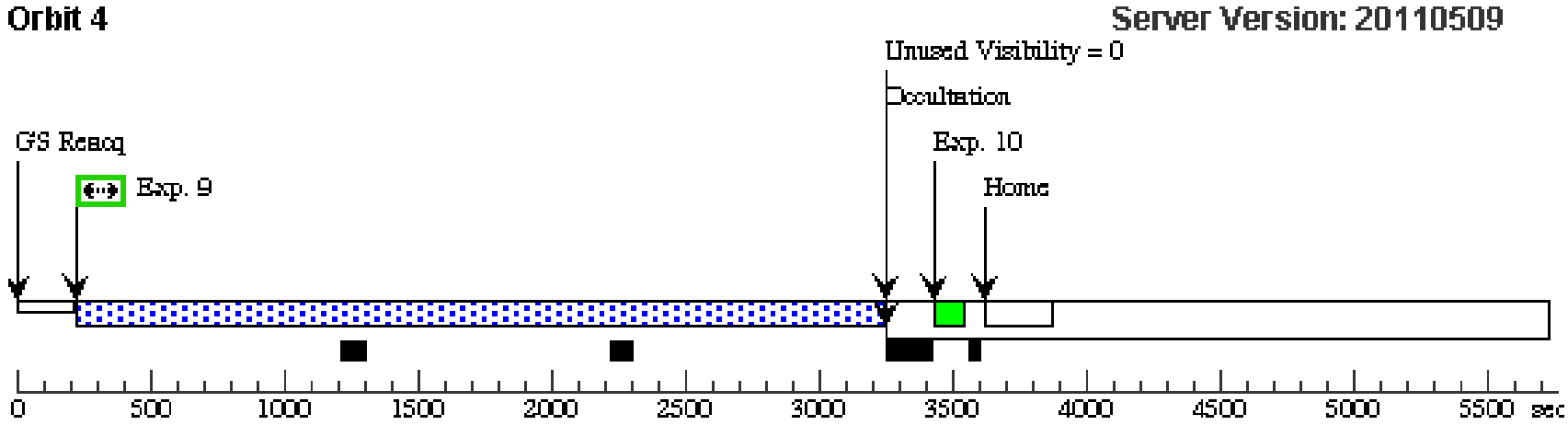
#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1	Acquisition (STIS.ta.199268)	(1) 55CANCRI	STIS/CCD, ACQ, F28X50OII	MIRROR	ACQTYPE=POINT	PHASE 0.792 TO 0.802	Sequence 1-4 Non-Int in Visit 02	1 Secs *[==>]*	 ***[1]***
2	Acquisition/Peakup (STIS.sp.201114)	(1) 55CANCRI	STIS/CCD, ACQ/PEAK, 52X0.05	G430L 4300 A			Sequence 1-4 Non-Int in Visit 02	1 Secs *[==>]*	 ***[1]***
3	Orbit 1 (STIS.sp.200340)	(1) 55CANCRI	STIS/FUV-MAMA, TIME-TAG, 52X0.1	G140M 1222 A	BUFFER-TIME=1000; WAVECAL=NO		Sequence 1-4 Non-Int in Visit 02	2126 Secs *[==>2040.0 Secs]*	 ***[1]***
4	Wavecal Orbit 1	WAVE	STIS/FUV-MAMA, ACCUM, 52X0.1	G140M 1222 A			Sequence 1-4 Non-Int in Visit 02	*[==>]*	***[1]***
5	Orbit 2 (STIS.sp.200341)	(1) 55CANCRI	STIS/FUV-MAMA, TIME-TAG, 52X0.1	G140M 1222 A	BUFFER-TIME=1000		Sequence 5-6 Non-Int in Visit 02	3005 Secs *[==>]*	 ***[2]***
6	Wavecal Orbit 2	WAVE	STIS/FUV-MAMA, ACCUM, 52X0.1	G140M 1222 A			Sequence 5-6 Non-Int in Visit 02	*[==>]*	***[2]***
7	Orbit 3 (STIS.sp.200341)	(1) 55CANCRI	STIS/FUV-MAMA, TIME-TAG, 52X0.1	G140M 1222 A	BUFFER-TIME=1000		Sequence 7-8 Non-Int in Visit 02	3005 Secs *[==>]*	 ***[3]***
8	Wavecal Orbit 3	WAVE	STIS/FUV-MAMA, ACCUM, 52X0.1	G140M 1222 A			Sequence 7-8 Non-Int in Visit 02	*[==>]*	***[3]***
9	Orbit 4 (STIS.sp.200341)	(1) 55CANCRI	STIS/FUV-MAMA, TIME-TAG, 52X0.1	G140M 1222 A	BUFFER-TIME=1000		Sequence 9-10 Non-Int in Visit 02	3005 Secs *[==>]*	 ***[4]***
10	Wavecal Orbit 4	WAVE	STIS/FUV-MAMA, ACCUM, 52X0.1	G140M 1222 A			Sequence 9-10 Non-Int in Visit 02	*[==>]*	***[4]***

Orbit Structure






Orbit 3
Server Version: 20110509
Occultation
GS Reacq
Unused Visibility = 0
Exp. 7
Exp. 8
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
secs.


Orbit 4
Server Version: 20110509
Unused Visibility = 0
Occultation
GS Reacq
Exp. 10
Exp. 9
Home
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec