12920 - Testing the paradigm of X-ray driven exoplanet evaporation with XMM+HST

Cycle: 20, 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	(1) HD-189733	STIS/CCD STIS/FUV-MAMA	4	06-Sep-2013 21:29:41.0	yes
02	(1) HD-189733	STIS/CCD STIS/FUV-MAMA	3	06-Sep-2013 21:29:56.0	yes
03	(1) HD-189733	STIS/CCD STIS/FUV-MAMA	3	06-Sep-2013 21:30:09.0	yes

10 Total Orbits Used

ABSTRACT

HST observations show that two of the brightest transiting exoplanets are evaporating (HD209458b & HD189733b) and models suggest that the evolution of close-in planets may be dominated by this mass loss. It is believed that the evaporation is driven by X-ray irradiation of the planet by its parent star, but a lack of simultaneous measurements of irradiation and evaporation prevents a meaningful test of this model. We propose simultaneous XMM-Newton and HST observations of three transits of the brightest X-ray source, HD189733, in order to test the paradigm of X-ray driven evaporation and make a direct measurement of the efficiency of exoplanet evaporation.

OBSERVING DESCRIPTION

This program consists in 3 visits of 3 orbits. In each visit, we will observe the transit of an exoplanet in front of its parent star, which happens every 2.22 days and lasts for about 2h. 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 first science exposure is entirely performed before the transit, the second science exposure is done during the transit, and the last exposure entirely after the transit.

ADDITIONAL COMMENTS

These observations should be carried on together with the XMM-Newton observations. HST and XMM should observe the same transits, but they do not have the same timing requirements for a transit (XMM constraints are typically looser than for HST).

The XMM visibility is typically for 36h every two days for around 6 weeks twice per year. The next XMM windows are:
- 2012-10-05 to 2012-11-25
- 2013-04-01 to 2013-05-24

We realize that the timing constraints required for each instrument can make the observation difficult to schedule: if this is the case, we can propose to work with our program coordinator to relax some of these constraints to allow better schedulability.

Visit

Proposal 12920, Visit 01, completed Sat Sep 07 01:30:17 GMT 2013

Diagnostic Status: No Diagnostics

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

Special Requirements: BETWEEN 2013.129:22:45 AND 2013.130:05:00

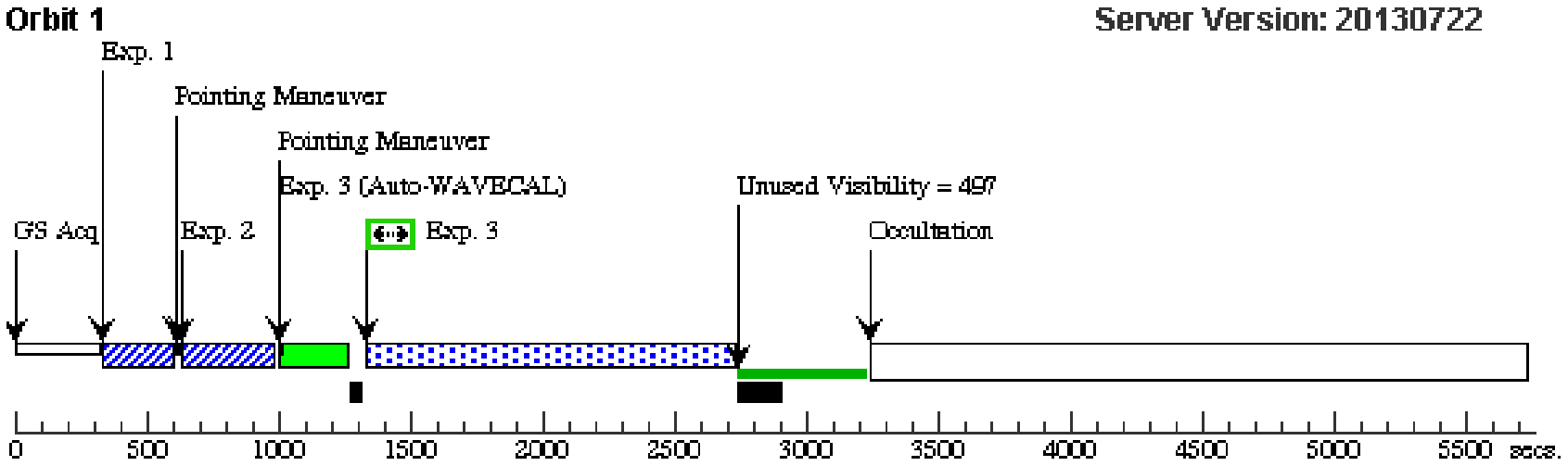
Fixed Targets

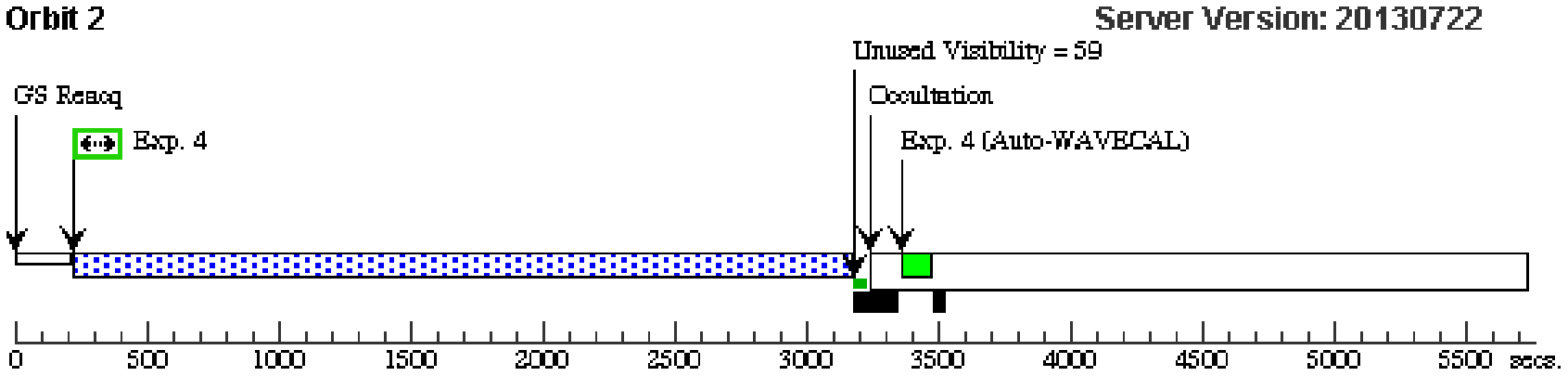
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	HD-189733	RA: 20 00 43.7100 (300.1821250d) Dec: +22 42 39.06 (22.71085d) Equinox: J2000	Proper Motion RA: -2.14 mas/yr Proper Motion Dec: -251.4 mas/yr Parallax: 0.051" Epoch of Position: 2000 Radial Velocity: -2.7 km/sec	V=7.65	Reference Frame: ICRS

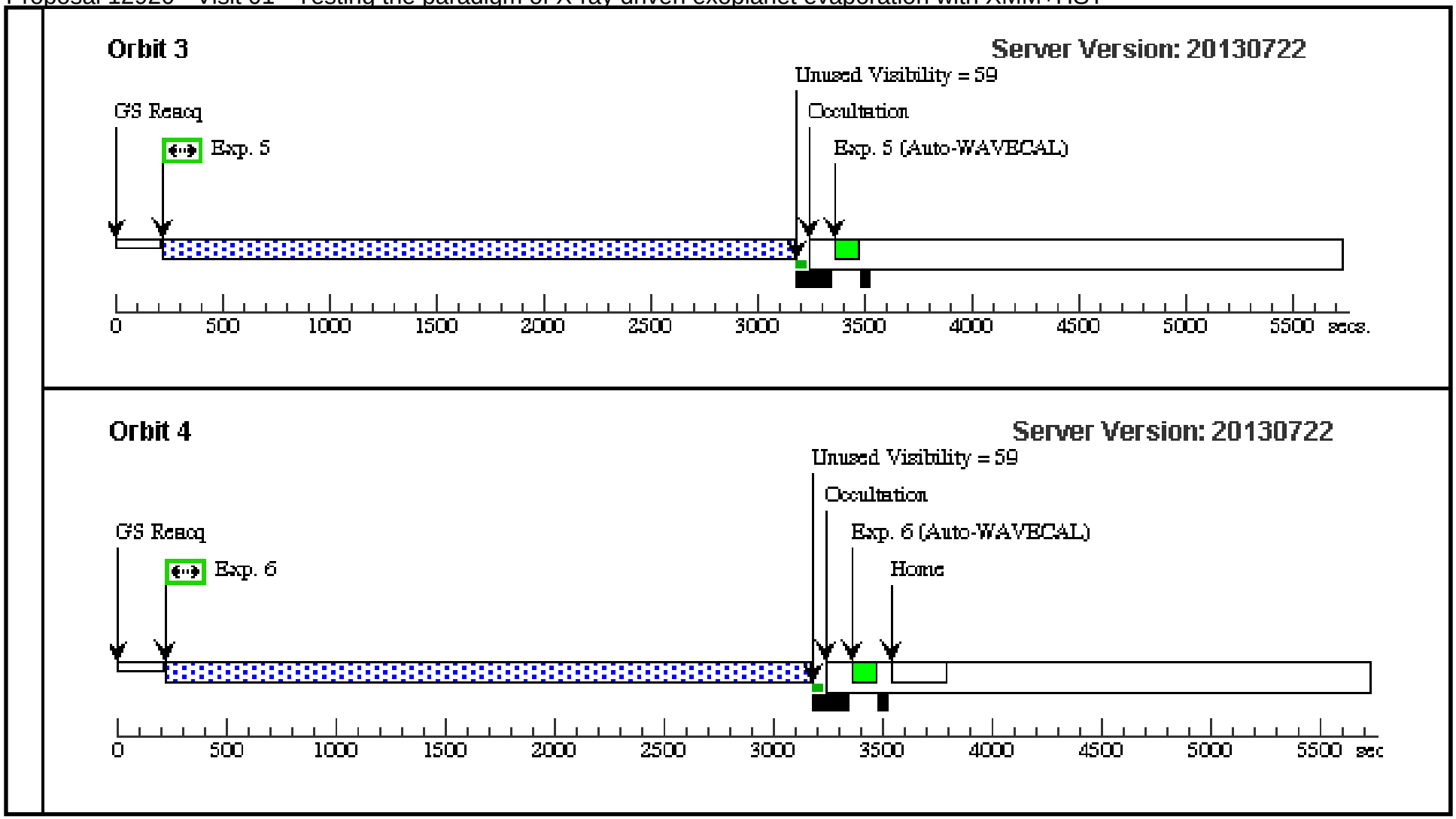
Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	ACQ	(1) HD-189733	STIS/CCD, ACQ, F28X50OII	MIRROR			Sequence 1-3 Non-Int in Visit 01	2 Secs (2 Secs) *[==>]*	 ***[1]***
2	ACQ/PEAK	(1) HD-189733	STIS/CCD, ACQ/PEAK, 52X0.05	G430L 4300 A			Sequence 1-3 Non-Int in Visit 01	1 Secs (1 Secs) *[==>]*	 ***[1]***
3	(STIS.sp.415446)	(1) HD-189733	STIS/FUV-MAMA, TIME-TAG, 52X0.1	G140M 1222 A	BUFFER-TIME=2000		Sequence 1-3 Non-Int in Visit 01	1385 Secs (1385 Secs) *[==>1385.0 Secs]*	 ***[1]***
4	(STIS.sp.415447)	(1) HD-189733	STIS/FUV-MAMA, TIME-TAG, 52X0.1	G140M 1222 A	BUFFER-TIME=2000		Sequence 4-4 Non-Int in Visit 01	2181 Secs (2933 Secs) *[==>2933.0 Secs]*	 ***[2]***
5	(STIS.sp.415447)	(1) HD-189733	STIS/FUV-MAMA, TIME-TAG, 52X0.1	G140M 1222 A	BUFFER-TIME=2000		Sequence 5-5 Non-Int in Visit 01	2181 Secs (2933 Secs) *[==>2933.0 Secs]*	 ***[3]***
6	(STIS.sp.415447)	(1) HD-189733	STIS/FUV-MAMA, TIME-TAG, 52X0.1	G140M 1222 A	BUFFER-TIME=2000		Sequence 6-6 Non-Int in Visit 01	2181 Secs (2933 Secs) *[==>2933.0 Secs]*	 ***[4]***

Orbit Structure



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Server Version: 20130722
Unused Visibility = 59
GS Reacq
Occultation
Exp. 5
Exp. 5 (Auto-WAVECAL)
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500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
secs.
Orbit 4
Server Version: 20130722
Unused Visibility = 59
Occultation
GS Reacq
Exp. 6 (Auto-WAVECAL)
Exp. 6
Home
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 12920, Visit 02, implementation Sat Sep 07 01:30:20 GMT 2013

Diagnostic Status: No Diagnostics

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

Special Requirements: Period 2.2185757 D AND ZERO-PHASE HJD2454279.43671

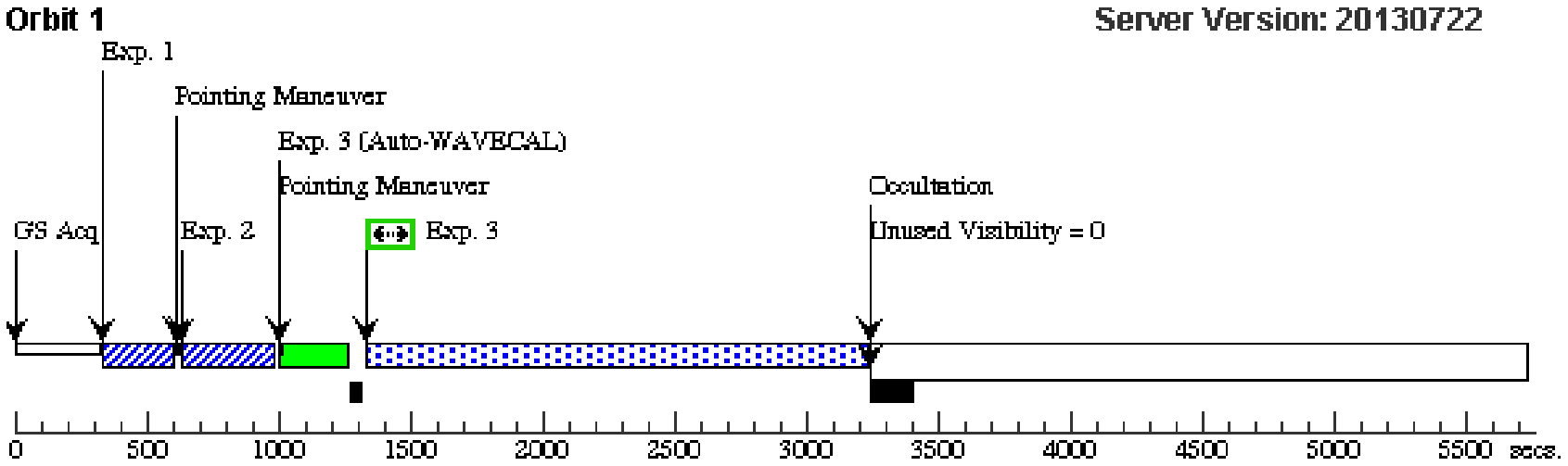
Fixed Targets

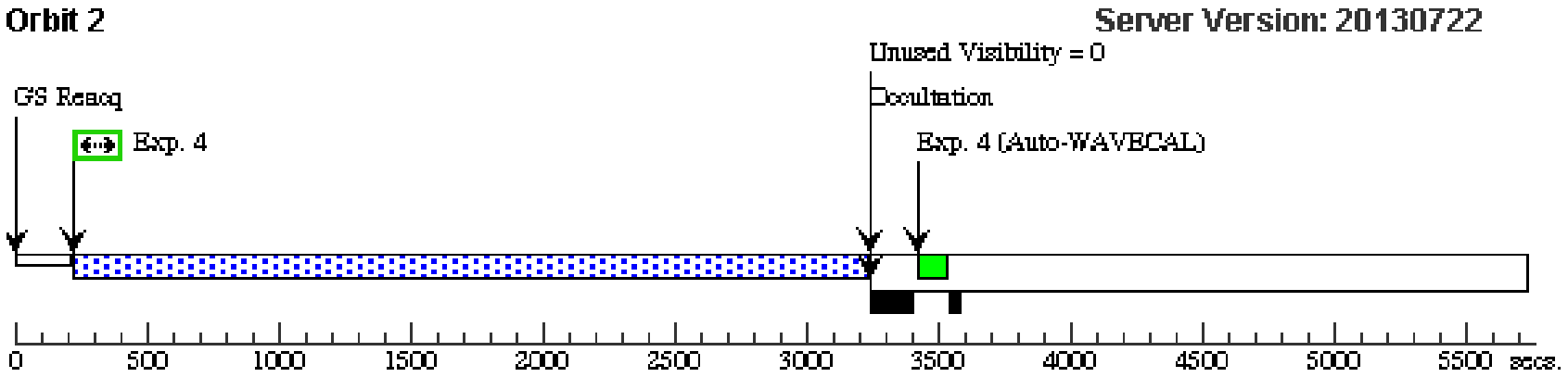
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	HD-189733	RA: 20 00 43.7100 (300.1821250d) Dec: +22 42 39.06 (22.71085d) Equinox: J2000	Proper Motion RA: -2.14 mas/yr Proper Motion Dec: -251.4 mas/yr Parallax: 0.051" Epoch of Position: 2000 Radial Velocity: -2.7 km/sec	V=7.65	Reference Frame: ICRS

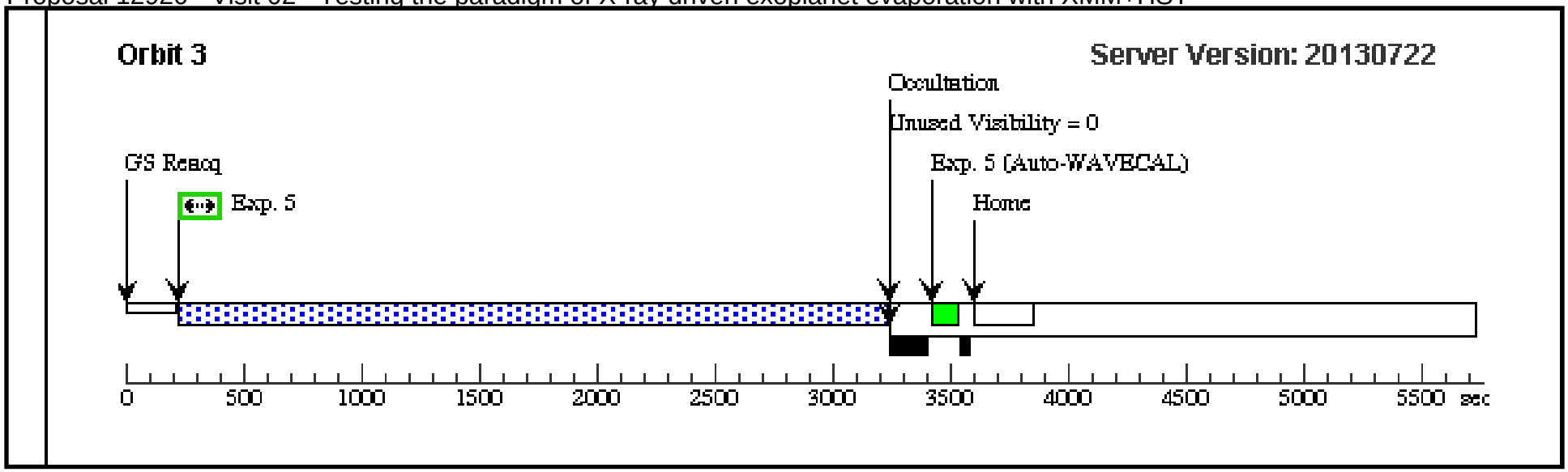
Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	ACQ	(1) HD-189733	STIS/CCD, ACQ, F28X50OII	MIRROR		PHASE 0.930 TO 0.965; GS ACQ SCENARIO BASE1B3	Sequence 1-3 Non-Int in Visit 02	2 Secs (2 Secs) *[==>]*	***[1]***
2	ACQ/PEAK	(1) HD-189733	STIS/CCD, ACQ/PEAK, 52X0.05	G430L 4300 A			Sequence 1-3 Non-Int in Visit 02	1 Secs (1 Secs) *[==>]*	***[1]***
3	(STIS.sp.415446)	(1) HD-189733	STIS/FUV-MAMA, TIME-TAG, 52X0.1	G140M 1222 A	BUFFER-TIME=2000		Sequence 1-3 Non-Int in Visit 02	1882 Secs (1882 Secs) *[==>]*	***[1]***
4	(STIS.sp.415447)	(1) HD-189733	STIS/FUV-MAMA, TIME-TAG, 52X0.1	G140M 1222 A	BUFFER-TIME=2000		Sequence 4-4 Non-Int in Visit 02	2241 Secs (2992 Secs) *[==>2992.0 Secs]*	***[2]***
5	(STIS.sp.415447)	(1) HD-189733	STIS/FUV-MAMA, TIME-TAG, 52X0.1	G140M 1222 A	BUFFER-TIME=2000		Sequence 5-5 Non-Int in Visit 02	2241 Secs (2992 Secs) *[==>2992.0 Secs]*	***[3]***

Orbit Structure






Orbit 3
Server Version: 20130722
Occultation
Unused Visibility = 0
GS Reacq
Exp. 5
Exp. 5 (Auto-WAVECAL)
Home
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 12920, Visit 03, scheduling Sat Sep 07 01:30:22 GMT 2013

Diagnostic Status: No Diagnostics

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

Special Requirements: Period 2.2185757 D AND ZERO-PHASE HJD2454279.43671

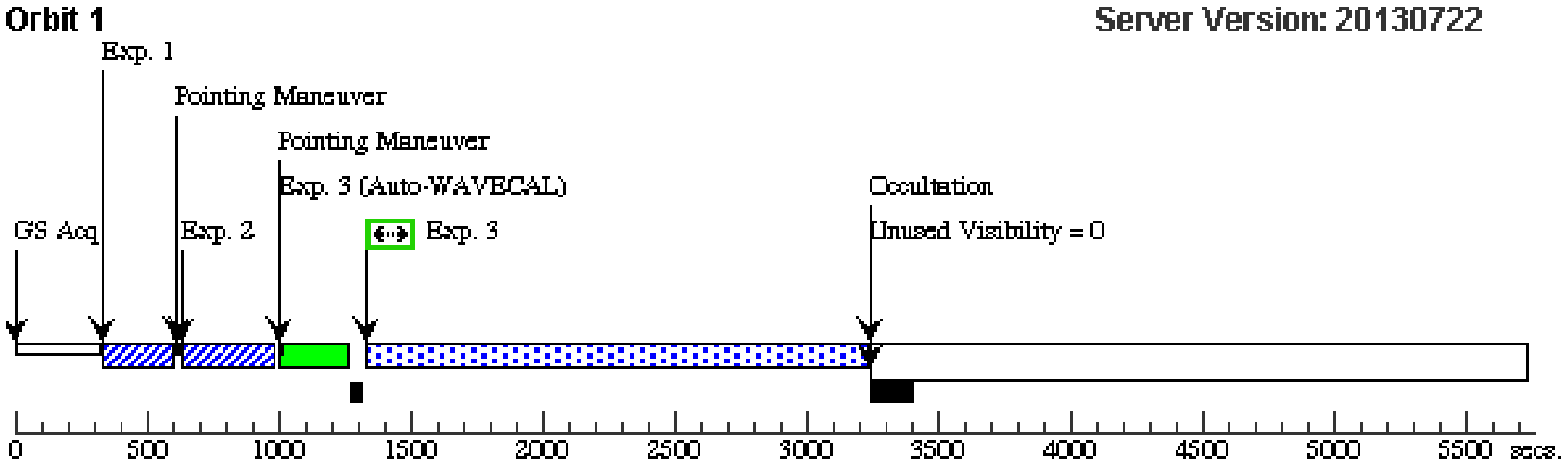
Fixed Targets

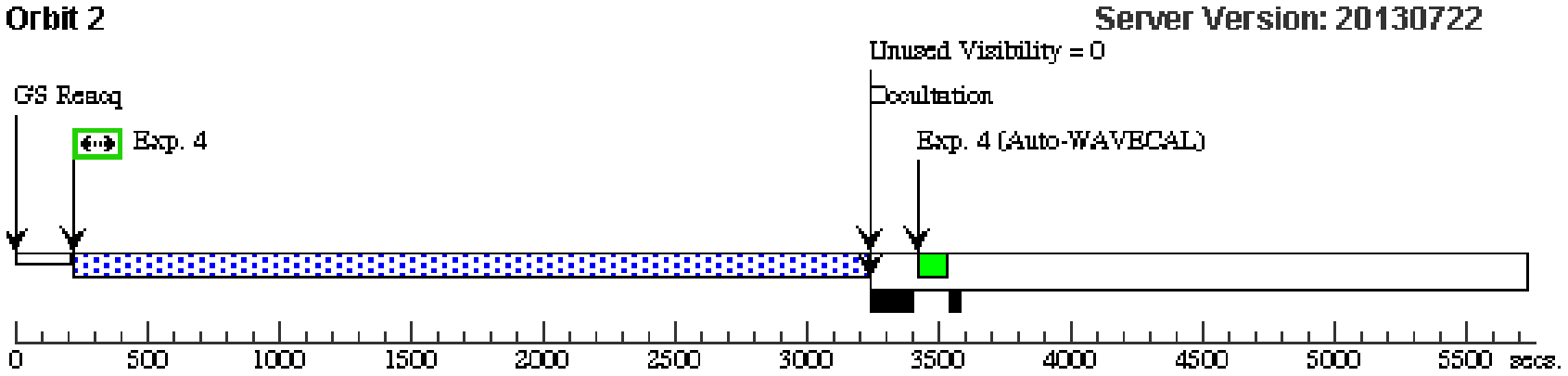
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	HD-189733	RA: 20 00 43.7100 (300.1821250d) Dec: +22 42 39.06 (22.71085d) Equinox: J2000	Proper Motion RA: -2.14 mas/yr Proper Motion Dec: -251.4 mas/yr Parallax: 0.051" Epoch of Position: 2000 Radial Velocity: -2.7 km/sec	V=7.65	Reference Frame: ICRS

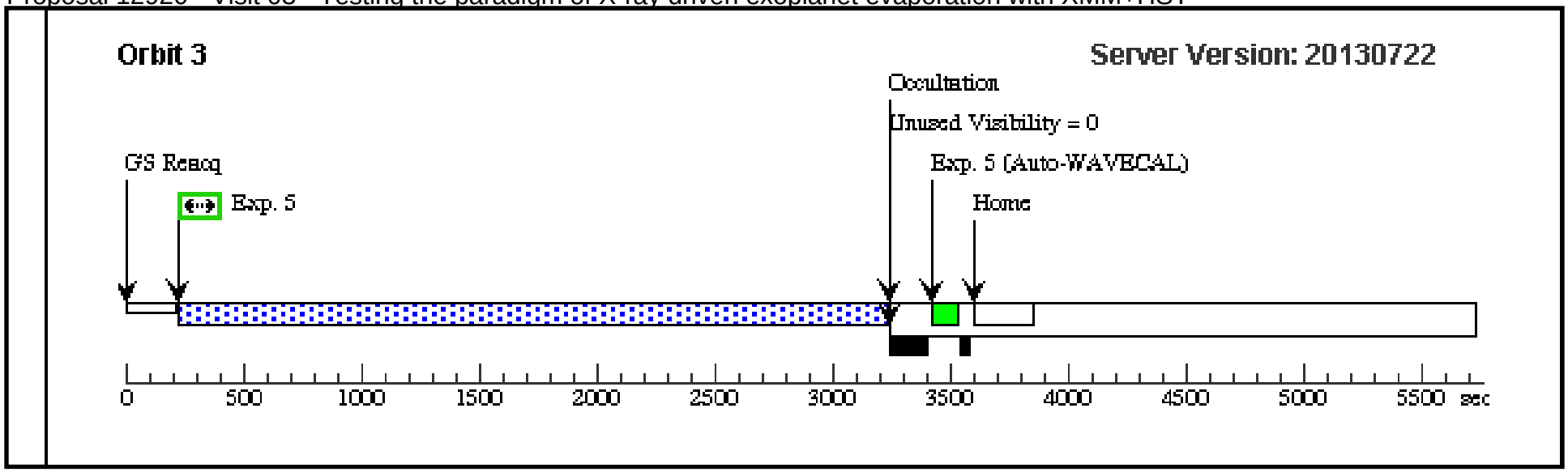
Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	ACQ	(1) HD-189733	STIS/CCD, ACQ, F28X50OII	MIRROR		PHASE 0.930 TO 0.965	Sequence 1-3 Non-Int in Visit 03	2 Secs (2 Secs) *[==>]*	 ***[1]***
2	ACQ/PEAK	(1) HD-189733	STIS/CCD, ACQ/PEAK, 52X0.05	G430L 4300 A			Sequence 1-3 Non-Int in Visit 03	1 Secs (1 Secs) *[==>]*	 ***[1]***
3	(STIS.sp.415446)	(1) HD-189733	STIS/FUV-MAMA, TIME-TAG, 52X0.1	G140M 1222 A	BUFFER-TIME=2000		Sequence 1-3 Non-Int in Visit 03	1882 Secs (1882 Secs) *[==>]*	 ***[1]***
4	(STIS.sp.415447)	(1) HD-189733	STIS/FUV-MAMA, TIME-TAG, 52X0.1	G140M 1222 A	BUFFER-TIME=2000		Sequence 4-4 Non-Int in Visit 03	2241 Secs (2992 Secs) *[==>2992.0 Secs]*	 ***[2]***
5	(STIS.sp.415447)	(1) HD-189733	STIS/FUV-MAMA, TIME-TAG, 52X0.1	G140M 1222 A	BUFFER-TIME=2000		Sequence 5-5 Non-Int in Visit 03	2241 Secs (2992 Secs) *[==>2992.0 Secs]*	 ***[3]***

Orbit Structure






Orbit 3
Server Version: 20130722
Occultation
Unused Visibility = 0
GS Reacq
Exp. 5
Exp. 5 (Auto-WAVECAL)
Home
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sec