15338 - NUV Transit Spectroscopy of HD189733b: Measuring the Mass-loss and Ionization State of a Prototypical Escaping Atmosphere

Cycle: 25, Proposal Category: GO

(UV Initiative)

(Availability Mode: SUPPORTED)

INVESTIGATORS

Name	*Institution*	*E-Mail*
Dr. Luca Fossati (PI) (ESA Member) (Contact)	**Space Research Institute, Austrian Academy of Sciences**	**fossati1511@gmail.com**
Dr. Kevin France (CoI) (AdminUSPI)	University of Colorado at Boulder	kevin.france@colorado.edu
Dr. Tommi Koskinen (CoI)	University of Arizona	tommi@lpl.arizona.edu

VISITS

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
01	(1) HD-189733 WAVE	STIS/CCD STIS/NUV-MAMA	5	07-Dec-2018 09:00:17.0	yes
02	(1) HD-189733 WAVE	STIS/CCD STIS/NUV-MAMA	5	07-Dec-2018 09:00:22.0	yes
03	(1) HD-189733 WAVE	STIS/CCD STIS/NUV-MAMA	5	07-Dec-2018 09:00:28.0	yes

15 Total Orbits Used

ABSTRACT

The benchmark hot Jupiters HD209458b and HD189733b have provided the foundations of comparative planetology for giant exoplanets, making them of paramount importance for atmospheric studies of short-period planets. HD189733b is the closest transiting hot Jupiter to Earth and transit observations have been obtained and studied across the electromagnetic spectrum, with the surprising exception of the near-ultraviolet: a unique window for atmospheric mass-loss studies owing to the strong resonance lines and large photospheric flux in this band. In order to make a quantitative assessment of the metallicity, ionization state, and outflow rate of this important system, and to complete the panchromatic archive of transit spectroscopy of this archetypal object, we request 15 HST orbits to obtain three STIS near-ultraviolet transit light curves of HD189733b. These observations will allow us to study the physical properties of the planet's upper atmosphere, constrain the composition of the haze layer characterising the optical transmission spectrum, and provide a reference spectrum for NASA's recently funded Colorado Ultraviolet Transit Experiment (CUTE) exoplanet mission, which will carry out a 1-year science mission to observe multiple near-ultraviolet transits of the brightest and most nearby short-period transiting planets to study the physics of atmospheric escape.

OBSERVING DESCRIPTION

We will observe HD189733 for 3 visits timed with the planet's primary transit. Each visit will be composed of 5 consecutive HST orbits.
The transit happens every 2.219 days and lasts for about 1.8 hours. The observations aim at completely covering the planet transit with the first 3 science observations placed before the transit, the 4th in transit, and the 5th after the transit.
The timing constrain is set on the beginning of the target acquisition and it gives a freedom of about 29 minutes on the starting time.
The conditions driving the phase constrain are 1) the last science exposure sequence (5th orbit) falls integrally after the transit and 2) the 4th science exposure sequence (4th orbit) starts before the mid-transit.
For the ETC runs, we used a G2V stellar type, although the target has a K2V spectral type. This was suggested by the STIS team in order to account for the chemospheric emission.
In phase 1 we requested to use the TIME-TAG mode, but in phase 2 this reavealed to be too expensive for the buffer. For this reason, we modified our observing mode to ACCUM and therefore split the science exposure along each orbit in several consecutive short exposures.
This part of the sky is not covered by GALEX, but observations of this target have already been done in the past with STIS and COS in the FUV without any problem.

Visit

Proposal 15338, Visit1 (01), completed Fri Dec 07 14:00:30 GMT 2018

Diagnostic Status: Warning

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

Special Requirements: Period 2.218575200 D AND ZERO-PHASE HJD2453955.5255511

Comments: Observation of the first planet transit consisting of 5 consecutive orbits.

Diagnostics

(Visit1 (01)) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

(Visit1 (01)) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

(Visit1 (01)) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

(Visit1 (01)) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

(Visit1 (01)) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	HD-189733	RA: 20 00 43.7135 (300.1821396d)	Proper Motion RA: -2.14 mas/yr	V=7.648	Reference Frame: ICRS
		Dec: +22 42 39.06 (22.71085d)	Proper Motion Dec: -251.40 mas/yr	Johnson U: 9.241 mag	
		Equinox: J2000	Parallax: 0.05141"		
			Epoch of Position: 2000		

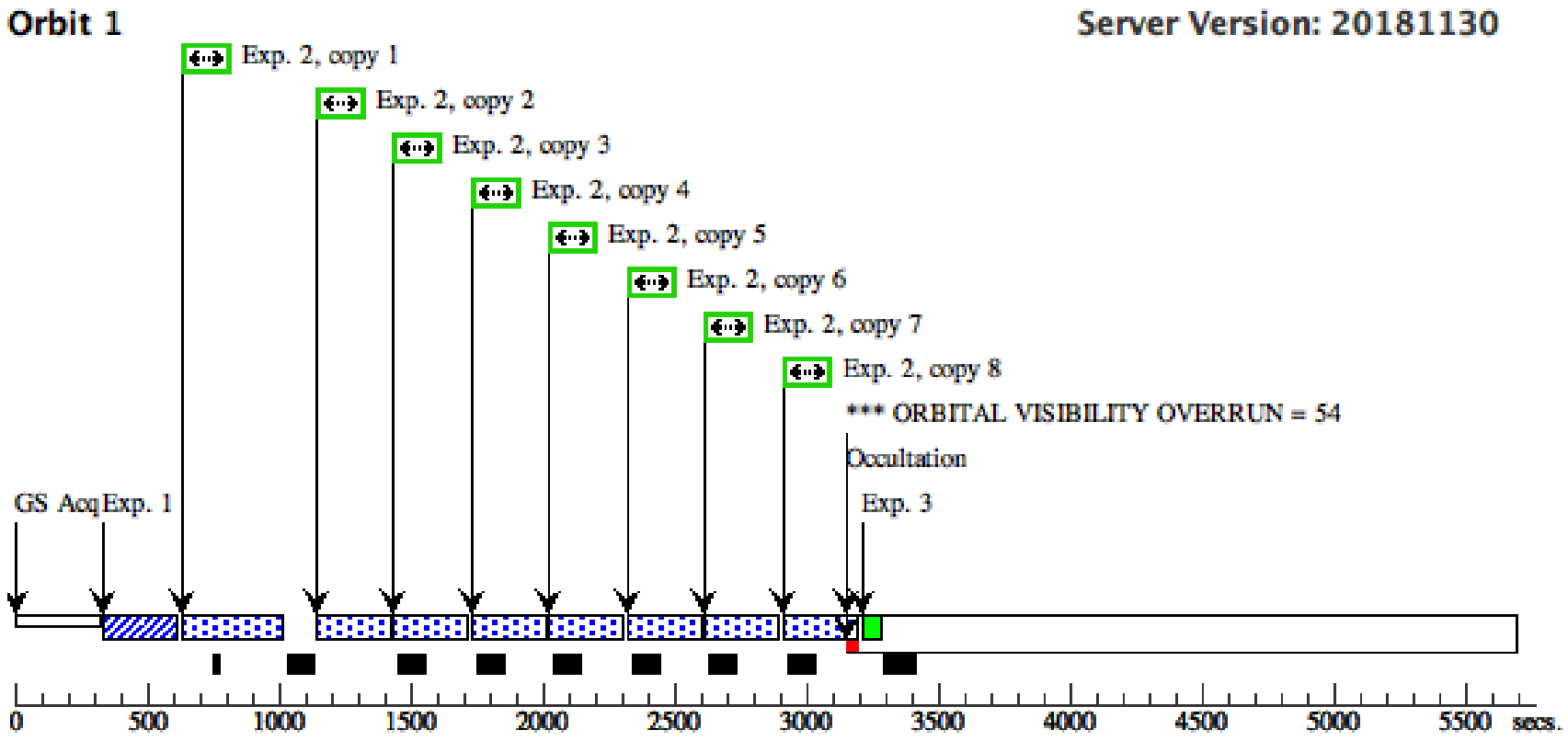
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
No Galex or TD1 UV fluxes available.
Towards the ultraviolet, we were able to find just a Johnson U-band magnitude, given above.
Category=STAR
Description=[EXTRA-SOLAR PLANET, K V-IV]
Extended=NO

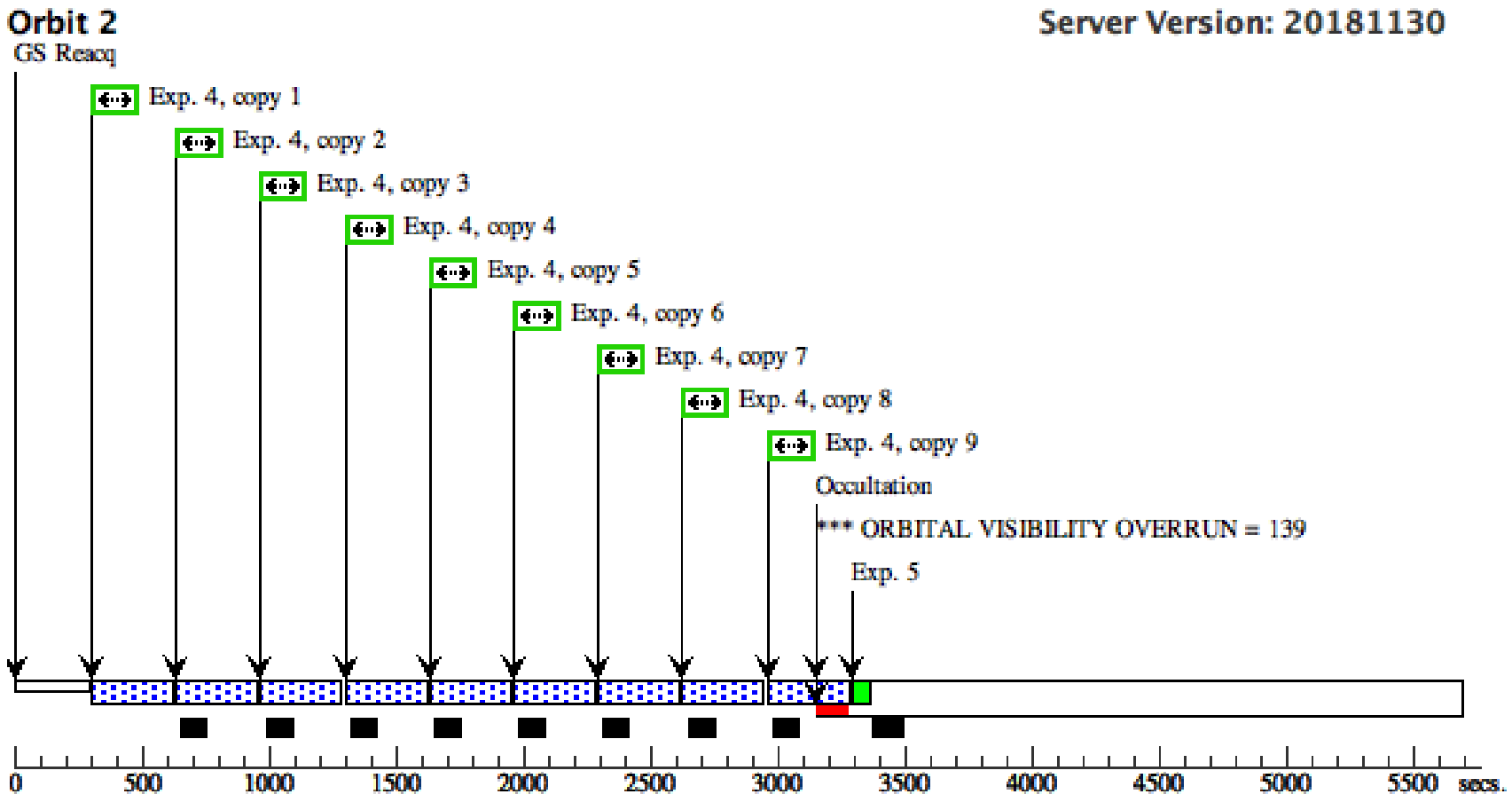
Exposures

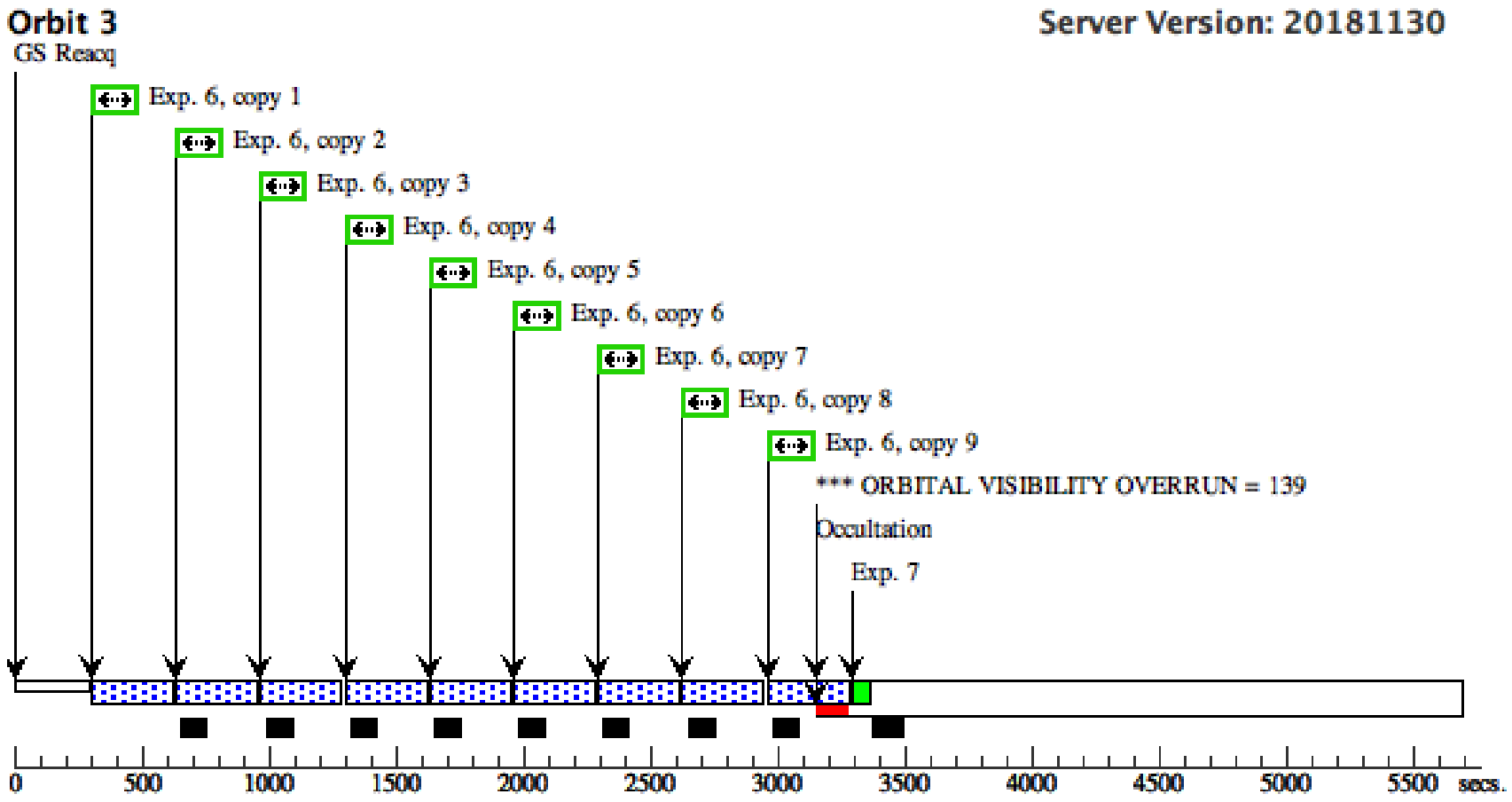
#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	CCD acquisition 1 (STIS.ta.1004163)	(1) HD-189733	STIS/CCD, ACQ, F28X50OIII	MIRROR	ACQTYPE=POINT	PHASE 0.901 TO 0.91	Sequence 1-3 Non-Int in Visit1 (01)	3 Secs (3 Secs) *[==>]*	***[1]***
2	Science 1 (STIS.sp.1004819)	(1) HD-189733	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A	BINAXIS1=DEF; BINAXIS2=DEF; WAVECAL=NO		Sequence 1-3 Non-Int in Visit1 (01)	270 Secs X 8 (2168 Secs) *[==>271.0 Secs (Copy 1)]* *[==>271.0 Secs (Copy 2)]* *[==>271.0 Secs (Copy 3)]* *[==>271.0 Secs (Copy 4)]* *[==>271.0 Secs (Copy 5)]* *[==>271.0 Secs (Copy 6)]* *[==>271.0 Secs (Copy 7)]* *[==>271.0 Secs (Copy 8)]*	***[1]***
3	Wavecal 1	WAVE	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A			Sequence 1-3 Non-Int in Visit1 (01)	*[==>]*	***[1]***
4	Science 2 (STIS.sp.1004820)	(1) HD-189733	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A	BINAXIS1=DEF; BINAXIS2=DEF		Sequence 4-5 Non-Int in Visit1 (01)	305 Secs X 9 (2772 Secs) *[==>308.0 Secs (Copy 1)]* *[==>308.0 Secs (Copy 2)]* *[==>308.0 Secs (Copy 3)]* *[==>308.0 Secs (Copy 4)]* *[==>308.0 Secs (Copy 5)]* *[==>308.0 Secs (Copy 6)]* *[==>308.0 Secs (Copy 7)]* *[==>308.0 Secs (Copy 8)]* *[==>308.0 Secs (Copy 9)]*	***[2]***
5	Wavecal 2	WAVE	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A			Sequence 4-5 Non-Int in Visit1 (01)	*[==>]*	***[2]***
6	Science 3 (STIS.sp.1004820)	(1) HD-189733	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A	BINAXIS1=DEF; BINAXIS2=DEF		Sequence 6-7 Non-Int in Visit1 (01)	305 Secs X 9 (2772 Secs) *[==>308.0 Secs (Copy 1)]* *[==>308.0 Secs (Copy 2)]* *[==>308.0 Secs (Copy 3)]* *[==>308.0 Secs (Copy 4)]* *[==>308.0 Secs (Copy 5)]* *[==>308.0 Secs (Copy 6)]* *[==>308.0 Secs (Copy 7)]* *[==>308.0 Secs (Copy 8)]* *[==>308.0 Secs (Copy 9)]*	***[3]***
7	Wavecal 3	WAVE	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A			Sequence 6-7 Non-Int in Visit1 (01)	*[==>]*	***[3]***

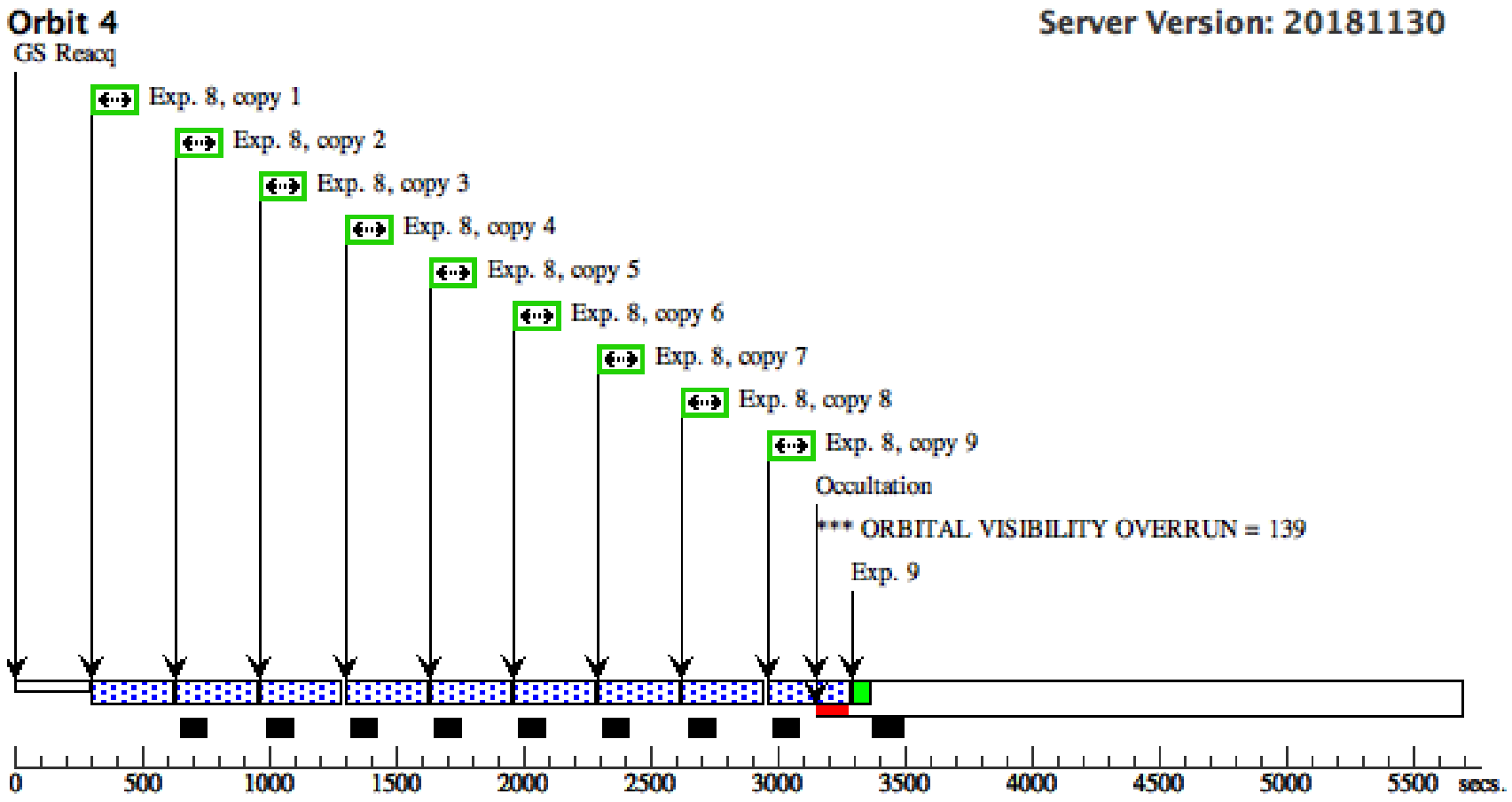
	8	Science 4 (STIS.sp.10 04820)	(1) HD-189733	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A	BINAXIS1=DEF; BINAXIS2=DEF	Sequence 8-9 Non-In t in Visit1 (01)	305 Secs X 9 (2772 Secs) *[==>308.0 Secs (Copy 1)]* *[==>308.0 Secs (Copy 2)]* *[==>308.0 Secs (Copy 3)]* *[==>308.0 Secs (Copy 4)]* *[==>308.0 Secs (Copy 5)]* *[==>308.0 Secs (Copy 6)]* *[==>308.0 Secs (Copy 7)]* *[==>308.0 Secs (Copy 8)]* *[==>308.0 Secs (Copy 9)]*	***[4]***
	9	Wavecal 4	WAVE	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A		Sequence 8-9 Non-In t in Visit1 (01)	*[==>]*	***[4]***
	10	Science 5 (STIS.sp.10 04820)	(1) HD-189733	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A	BINAXIS1=DEF; BINAXIS2=DEF	Sequence 10-11 Non -Int in Visit1 (01)	305 Secs X 9 (2772 Secs) *[==>308.0 Secs (Copy 1)]* *[==>308.0 Secs (Copy 2)]* *[==>308.0 Secs (Copy 3)]* *[==>308.0 Secs (Copy 4)]* *[==>308.0 Secs (Copy 5)]* *[==>308.0 Secs (Copy 6)]* *[==>308.0 Secs (Copy 7)]* *[==>308.0 Secs (Copy 8)]* *[==>308.0 Secs (Copy 9)]*	***[5]***
	11	Wavecal 5	WAVE	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A		Sequence 10-11 Non -Int in Visit1 (01)	*[==>]*	***[5]***

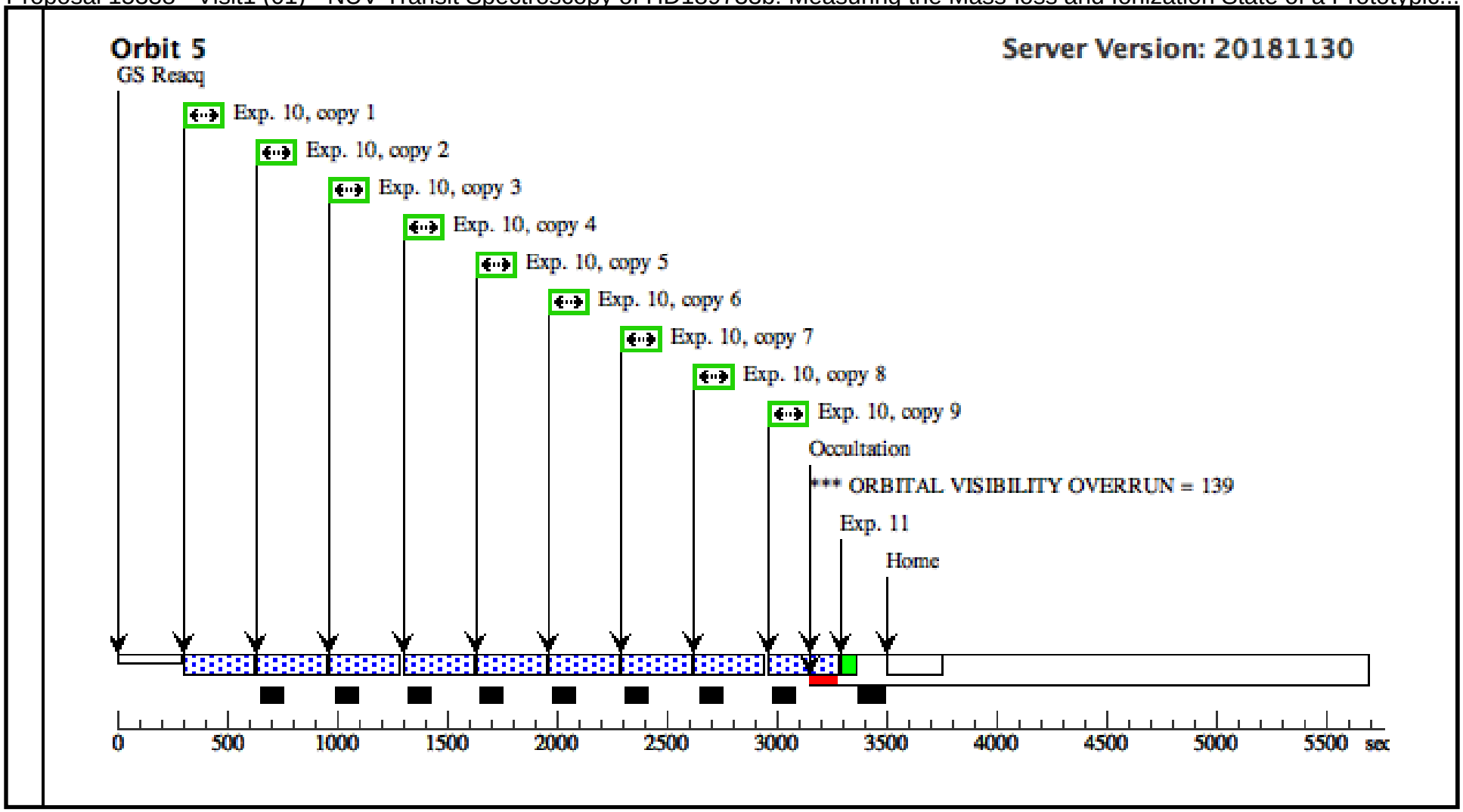
Orbit Structure




Orbit 2
Server Version: 20181130
GS Reacq
Exp. 4, copy 1
Exp. 4, copy 2
Exp. 4, copy 3
Exp. 4, copy 4
Exp. 4, copy 5
Exp. 4, copy 6
Exp. 4, copy 7
Exp. 4, copy 8
Exp. 4, copy 9
Occultation
*** ORBITAL VISIBILITY OVERRUN = 139
Exp. 5
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
secs.


Orbit 3
Server Version: 20181130
GS Reacq
Exp. 6, copy 1
Exp. 6, copy 2
Exp. 6, copy 3
Exp. 6, copy 4
Exp. 6, copy 5
Exp. 6, copy 6
Exp. 6, copy 7
Exp. 6, copy 8
Exp. 6, copy 9
*** ORBITAL VISIBILITY OVERRUN = 139
Occultation
Exp. 7
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
secs.


Orbit 4
Server Version: 20181130
GS Reacq
Exp. 8, copy 1
Exp. 8, copy 2
Exp. 8, copy 3
Exp. 8, copy 4
Exp. 8, copy 5
Exp. 8, copy 6
Exp. 8, copy 7
Exp. 8, copy 8
Exp. 8, copy 9
Occultation
*** ORBITAL VISIBILITY OVERRUN = 139
Exp. 9
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
secs.


Orbit 5
Server Version: 20181130
GS Reacq
Exp. 10, copy 1
Exp. 10, copy 2
Exp. 10, copy 3
Exp. 10, copy 4
Exp. 10, copy 5
Exp. 10, copy 6
Exp. 10, copy 7
Exp. 10, copy 8
Exp. 10, copy 9
Occultation
*** ORBITAL VISIBILITY OVERRUN = 139
Exp. 11
Home
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 15338, Visit2 (02), completed Fri Dec 07 14:00:30 GMT 2018

Diagnostic Status: Warning

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

Special Requirements: Period 2.218575200 D AND ZERO-PHASE HJD2453955.5255511

Comments: Observation of the second planet transit consisting of 5 consecutive orbits.

Diagnostics

(Visit2 (02)) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

(Visit2 (02)) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

(Visit2 (02)) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

(Visit2 (02)) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

(Visit2 (02)) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	HD-189733	RA: 20 00 43.7135 (300.1821396d)	Proper Motion RA: -2.14 mas/yr	V=7.648	Reference Frame: ICRS
		Dec: +22 42 39.06 (22.71085d)	Proper Motion Dec: -251.40 mas/yr	Johnson U: 9.241 mag	
		Equinox: J2000	Parallax: 0.05141"		
			Epoch of Position: 2000		

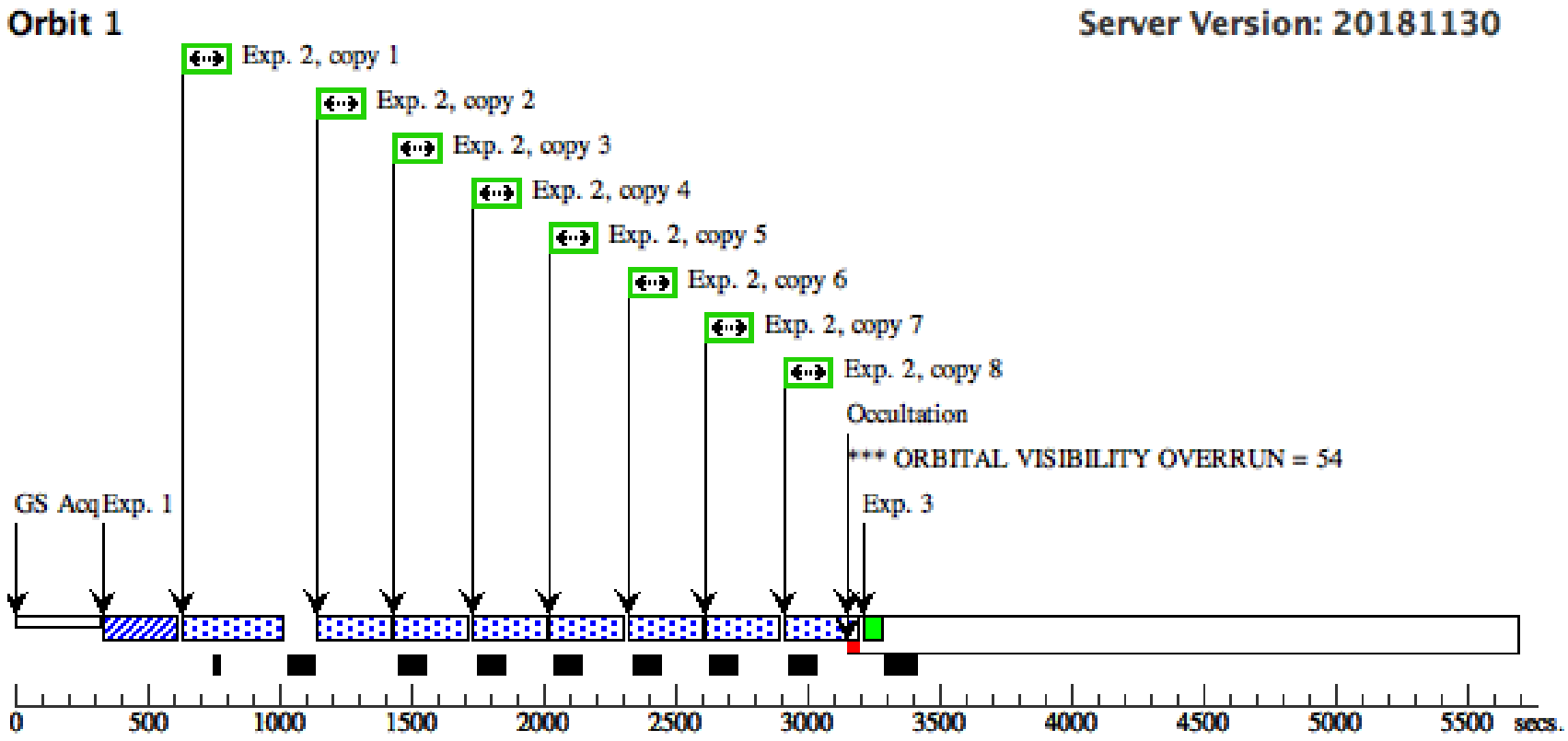
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
No Galex or TD1 UV fluxes available.
Towards the ultraviolet, we were able to find just a Johnson U-band magnitude, given above.
Category=STAR
Description=[EXTRA-SOLAR PLANET, K V-IV]
Extended=NO

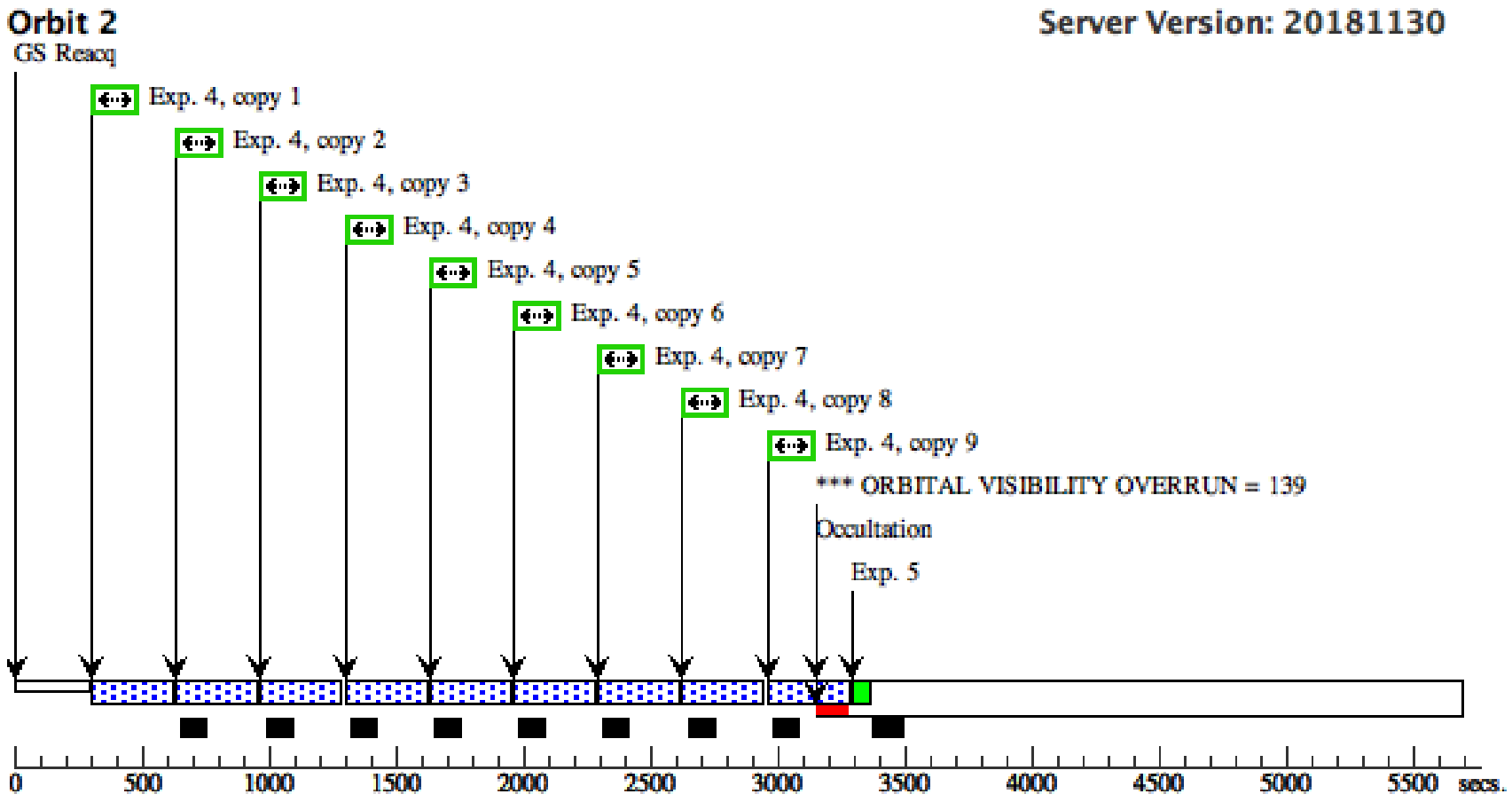
Exposures

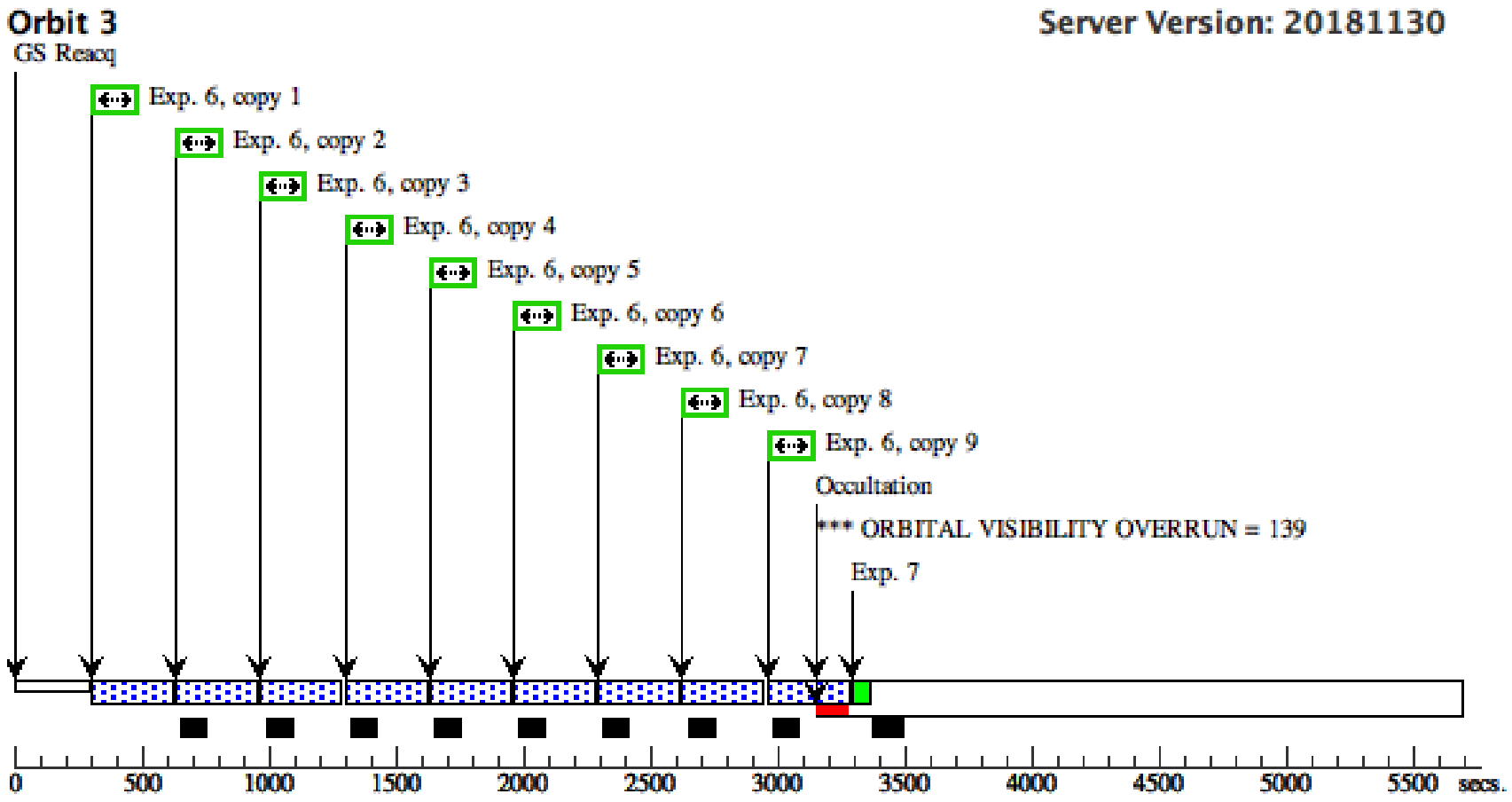
#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	CCD acquisition 1 (STIS.ta.1004163)	(1) HD-189733	STIS/CCD, ACQ, F28X50OIII	MIRROR	ACQTYPE=POINT	PHASE 0.901 TO 0.91	Sequence 1-3 Non-Int in Visit2 (02)	3 Secs (3 Secs) *[==>]*	***[1]***
2	Science 1 (STIS.sp.1004819)	(1) HD-189733	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A	BINAXIS1=DEF; BINAXIS2=DEF; WAVECAL=NO		Sequence 1-3 Non-Int in Visit2 (02)	270 Secs X 8 (2168 Secs) *[==>271.0 Secs (Copy 1)]* *[==>271.0 Secs (Copy 2)]* *[==>271.0 Secs (Copy 3)]* *[==>271.0 Secs (Copy 4)]* *[==>271.0 Secs (Copy 5)]* *[==>271.0 Secs (Copy 6)]* *[==>271.0 Secs (Copy 7)]* *[==>271.0 Secs (Copy 8)]*	***[1]***
3	Wavecal 1	WAVE	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A			Sequence 1-3 Non-Int in Visit2 (02)	*[==>]*	***[1]***
4	Science 2 (STIS.sp.1004820)	(1) HD-189733	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A	BINAXIS1=DEF; BINAXIS2=DEF		Sequence 4-5 Non-Int in Visit2 (02)	305 Secs X 9 (2772 Secs) *[==>308.0 Secs (Copy 1)]* *[==>308.0 Secs (Copy 2)]* *[==>308.0 Secs (Copy 3)]* *[==>308.0 Secs (Copy 4)]* *[==>308.0 Secs (Copy 5)]* *[==>308.0 Secs (Copy 6)]* *[==>308.0 Secs (Copy 7)]* *[==>308.0 Secs (Copy 8)]* *[==>308.0 Secs (Copy 9)]*	***[2]***
5	Wavecal 2	WAVE	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A			Sequence 4-5 Non-Int in Visit2 (02)	*[==>]*	***[2]***
6	Science 3 (STIS.sp.1004820)	(1) HD-189733	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A	BINAXIS1=DEF; BINAXIS2=DEF		Sequence 6-7 Non-Int in Visit2 (02)	305 Secs X 9 (2772 Secs) *[==>308.0 Secs (Copy 1)]* *[==>308.0 Secs (Copy 2)]* *[==>308.0 Secs (Copy 3)]* *[==>308.0 Secs (Copy 4)]* *[==>308.0 Secs (Copy 5)]* *[==>308.0 Secs (Copy 6)]* *[==>308.0 Secs (Copy 7)]* *[==>308.0 Secs (Copy 8)]* *[==>308.0 Secs (Copy 9)]*	***[3]***
7	Wavecal 3	WAVE	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A			Sequence 6-7 Non-Int in Visit2 (02)	*[==>]*	***[3]***

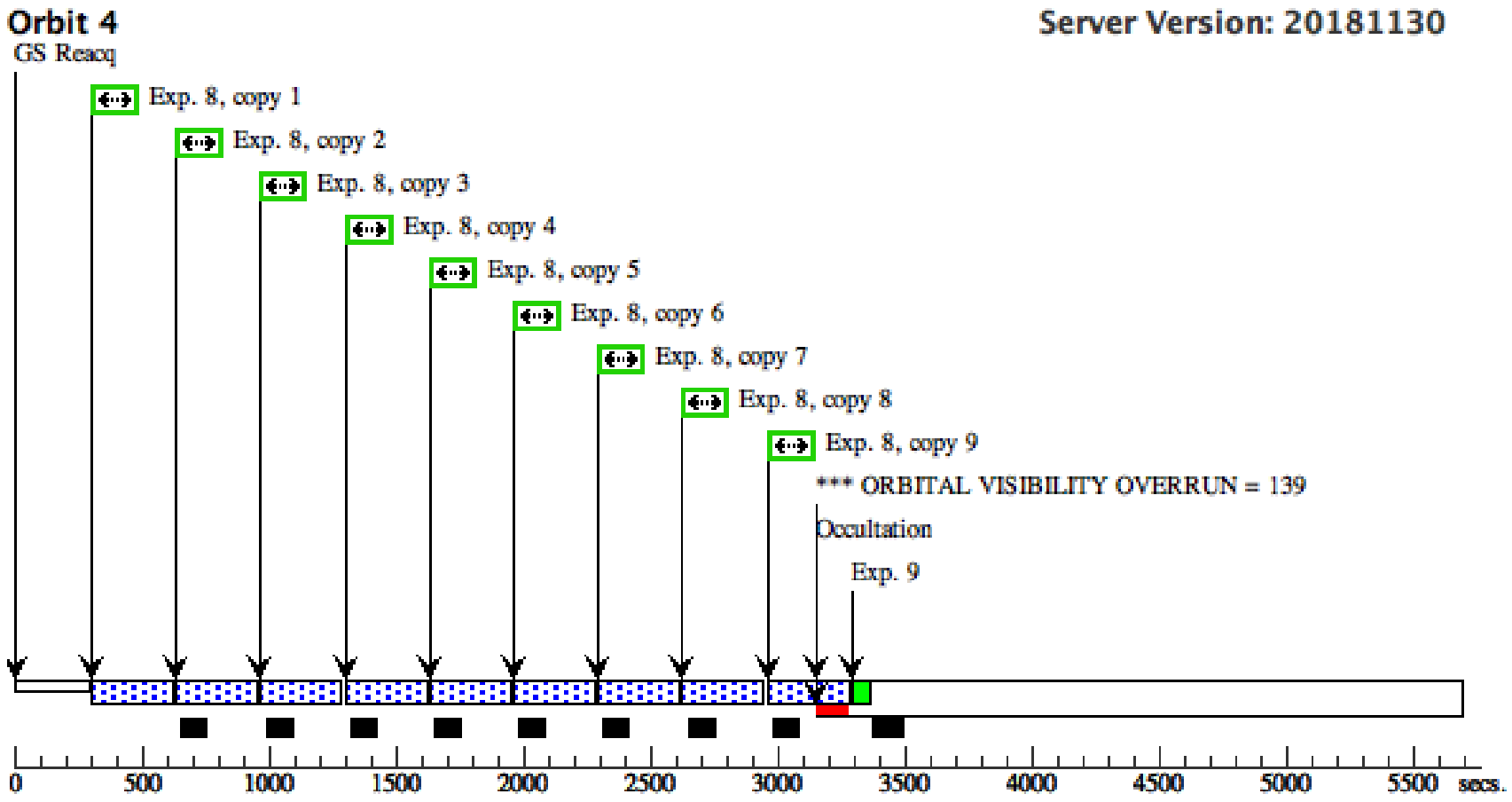
	8	Science 4 (STIS.sp.10 04820)	(1) HD-189733	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A	BINAXIS1=DEF; BINAXIS2=DEF	Sequence 8-9 Non-In t in Visit2 (02)	305 Secs X 9 (2772 Secs) *[==>308.0 Secs (Copy 1)]* *[==>308.0 Secs (Copy 2)]* *[==>308.0 Secs (Copy 3)]* *[==>308.0 Secs (Copy 4)]* *[==>308.0 Secs (Copy 5)]* *[==>308.0 Secs (Copy 6)]* *[==>308.0 Secs (Copy 7)]* *[==>308.0 Secs (Copy 8)]* *[==>308.0 Secs (Copy 9)]*	***[4]***
	9	Wavecal 4	WAVE	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A		Sequence 8-9 Non-In t in Visit2 (02)	*[==>]*	***[4]***
	10	Science 5 (STIS.sp.10 04820)	(1) HD-189733	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A	BINAXIS1=DEF; BINAXIS2=DEF	Sequence 10-11 Non -Int in Visit2 (02)	305 Secs X 9 (2772 Secs) *[==>308.0 Secs (Copy 1)]* *[==>308.0 Secs (Copy 2)]* *[==>308.0 Secs (Copy 3)]* *[==>308.0 Secs (Copy 4)]* *[==>308.0 Secs (Copy 5)]* *[==>308.0 Secs (Copy 6)]* *[==>308.0 Secs (Copy 7)]* *[==>308.0 Secs (Copy 8)]* *[==>308.0 Secs (Copy 9)]*	***[5]***
	11	Wavecal 5	WAVE	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A		Sequence 10-11 Non -Int in Visit2 (02)	*[==>]*	***[5]***

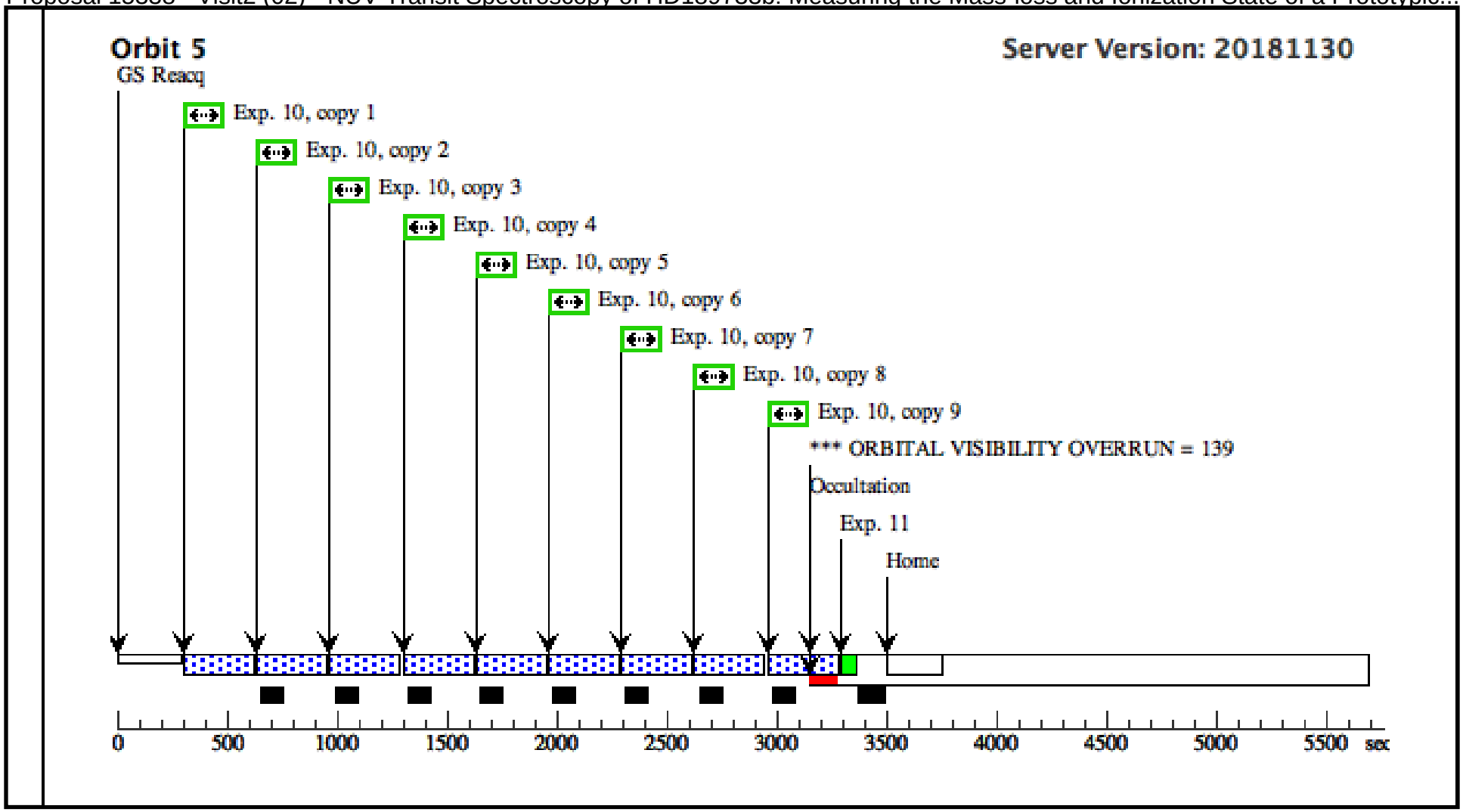
Orbit Structure




Orbit 2
GS Reacq
Server Version: 20181130
Exp. 4, copy 1
Exp. 4, copy 2
Exp. 4, copy 3
Exp. 4, copy 4
Exp. 4, copy 5
Exp. 4, copy 6
Exp. 4, copy 7
Exp. 4, copy 8
Exp. 4, copy 9
*** ORBITAL VISIBILITY OVERRUN = 139
Occultation
Exp. 5
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
secs.


Orbit 3
Server Version: 20181130
GS Reacq
Exp. 6, copy 1
Exp. 6, copy 2
Exp. 6, copy 3
Exp. 6, copy 4
Exp. 6, copy 5
Exp. 6, copy 6
Exp. 6, copy 7
Exp. 6, copy 8
Exp. 6, copy 9
Occultation
*** ORBITAL VISIBILITY OVERRUN = 139
Exp. 7
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
secs.


Orbit 4
GS Reacq
Server Version: 20181130
Exp. 8, copy 1
Exp. 8, copy 2
Exp. 8, copy 3
Exp. 8, copy 4
Exp. 8, copy 5
Exp. 8, copy 6
Exp. 8, copy 7
Exp. 8, copy 8
Exp. 8, copy 9
*** ORBITAL VISIBILITY OVERRUN = 139
Occultation
Exp. 9
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
secs.


Orbit 5
Server Version: 20181130
GS Reacq
Exp. 10, copy 1
Exp. 10, copy 2
Exp. 10, copy 3
Exp. 10, copy 4
Exp. 10, copy 5
Exp. 10, copy 6
Exp. 10, copy 7
Exp. 10, copy 8
Exp. 10, copy 9
*** ORBITAL VISIBILITY OVERRUN = 139
Occultation
Exp. 11
Home
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 15338, Visit3 (03), implementation Fri Dec 07 14:00:31 GMT 2018

Diagnostic Status: No Diagnostics

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

Special Requirements: Period 2.218575200 D AND ZERO-PHASE HJD2453955.5255511

Comments: Observation of the third planet transit consisting of 5 consecutive orbits.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	HD-189733	RA: 20 00 43.7135 (300.1821396d)	Proper Motion RA: -2.14 mas/yr	V=7.648	Reference Frame: ICRS
		Dec: +22 42 39.06 (22.71085d)	Proper Motion Dec: -251.40 mas/yr	Johnson U: 9.241 mag	
		Equinox: J2000	Parallax: 0.05141"		
			Epoch of Position: 2000		

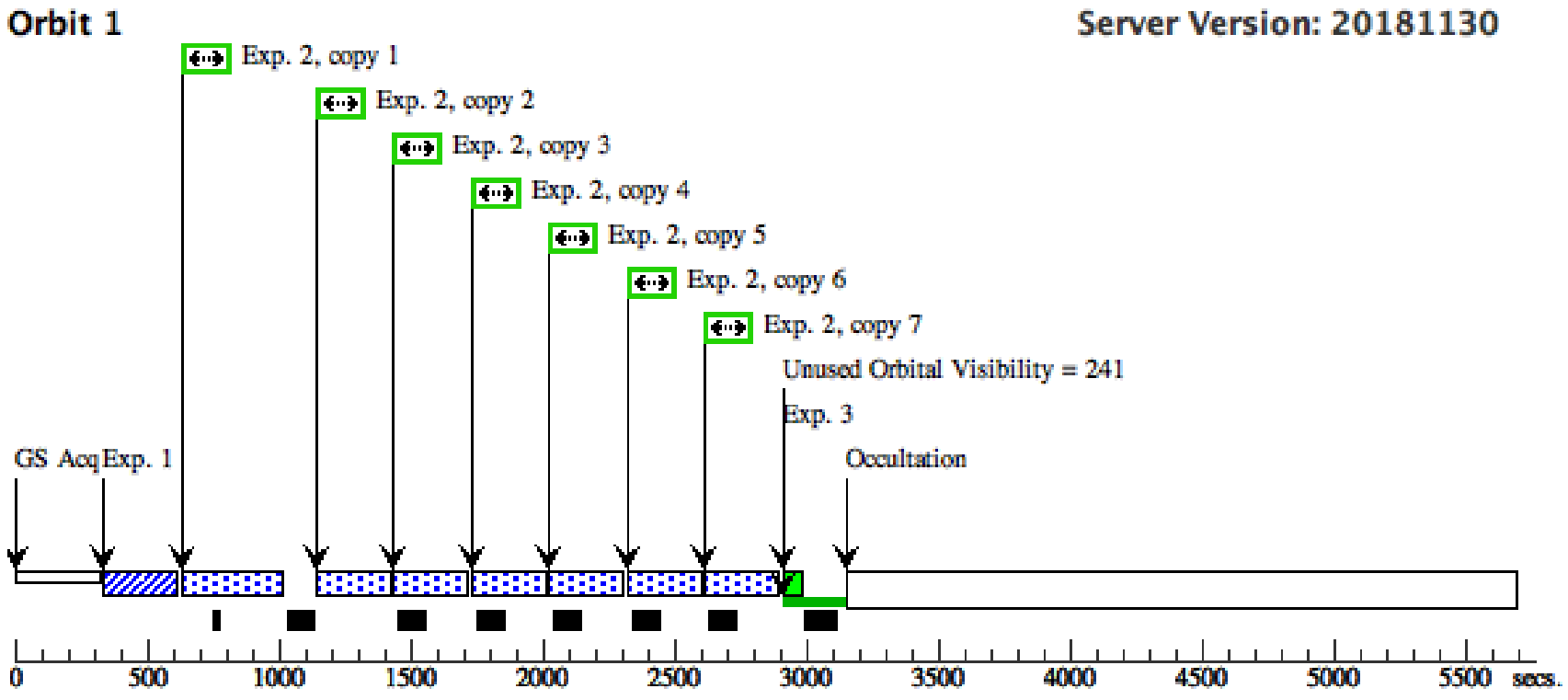
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
No Galex or TD1 UV fluxes available.
Towards the ultraviolet, we were able to find just a Johnson U-band magnitude, given above.
Category=STAR
Description=[EXTRA-SOLAR PLANET, K V-IV]
Extended=NO

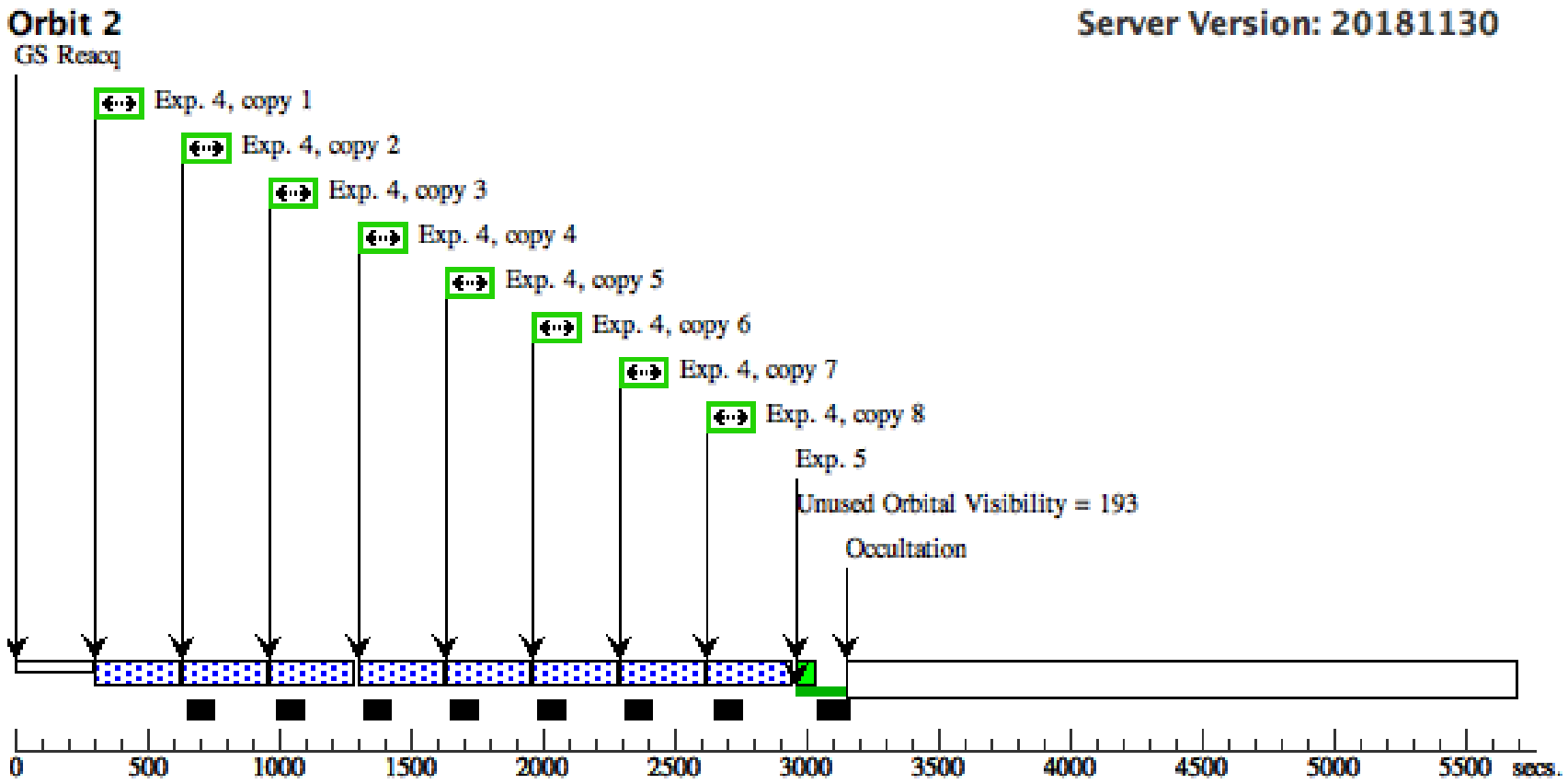
Exposures

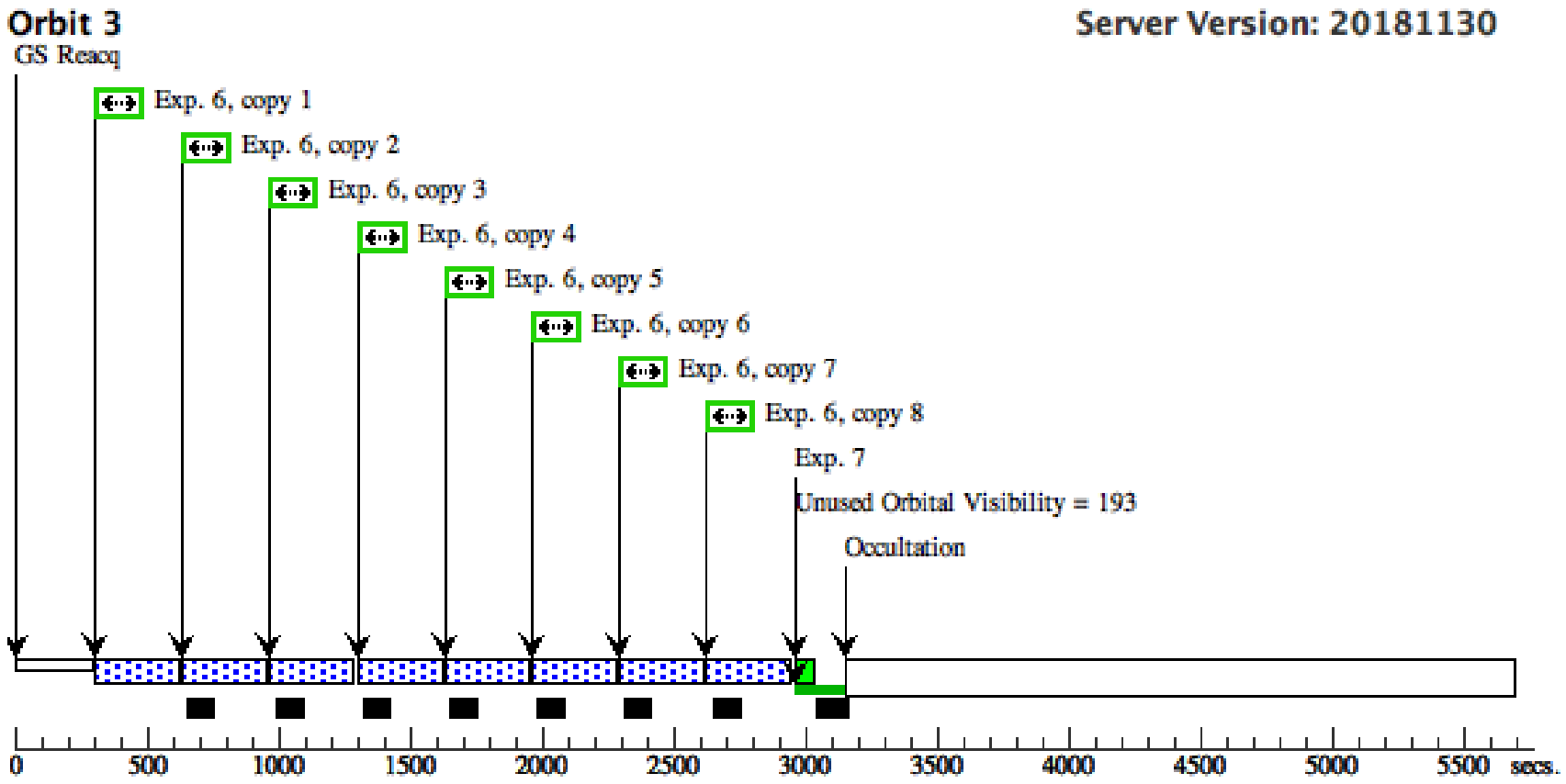
#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	CCD acquisition 1 (STIS.ta.1004163)	(1) HD-189733	STIS/CCD, ACQ, F28X50OIII	MIRROR	ACQTYPE=POINT	PHASE 0.901 TO 0.91	Sequence 1-3 Non-Int in Visit3 (03)	3 Secs (3 Secs) *[==>]*	***[1]***
2	Science 1 (STIS.sp.1004819)	(1) HD-189733	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A	BINAXIS1=DEF; BINAXIS2=DEF; WAVECAL=NO		Sequence 1-3 Non-Int in Visit3 (03)	270 Secs X 7 (1897 Secs) *[==>271.0 Secs (Copy 1)]* *[==>271.0 Secs (Copy 2)]* *[==>271.0 Secs (Copy 3)]* *[==>271.0 Secs (Copy 4)]* *[==>271.0 Secs (Copy 5)]* *[==>271.0 Secs (Copy 6)]* *[==>271.0 Secs (Copy 7)]*	***[1]***
3	Wavecal 1	WAVE	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A			Sequence 1-3 Non-Int in Visit3 (03)	*[==>]*	***[1]***
4	Science 2 (STIS.sp.1004820)	(1) HD-189733	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A	BINAXIS1=DEF; BINAXIS2=DEF		Sequence 4-5 Non-Int in Visit3 (03)	305 Secs X 8 (2464 Secs) *[==>308.0 Secs (Copy 1)]* *[==>308.0 Secs (Copy 2)]* *[==>308.0 Secs (Copy 3)]* *[==>308.0 Secs (Copy 4)]* *[==>308.0 Secs (Copy 5)]* *[==>308.0 Secs (Copy 6)]* *[==>308.0 Secs (Copy 7)]* *[==>308.0 Secs (Copy 8)]*	***[2]***
5	Wavecal 2	WAVE	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A			Sequence 4-5 Non-Int in Visit3 (03)	*[==>]*	***[2]***
6	Science 3 (STIS.sp.1004820)	(1) HD-189733	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A	BINAXIS1=DEF; BINAXIS2=DEF		Sequence 6-7 Non-Int in Visit3 (03)	305 Secs X 8 (2464 Secs) *[==>308.0 Secs (Copy 1)]* *[==>308.0 Secs (Copy 2)]* *[==>308.0 Secs (Copy 3)]* *[==>308.0 Secs (Copy 4)]* *[==>308.0 Secs (Copy 5)]* *[==>308.0 Secs (Copy 6)]* *[==>308.0 Secs (Copy 7)]* *[==>308.0 Secs (Copy 8)]*	***[3]***
7	Wavecal 3	WAVE	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A			Sequence 6-7 Non-Int in Visit3 (03)	*[==>]*	***[3]***

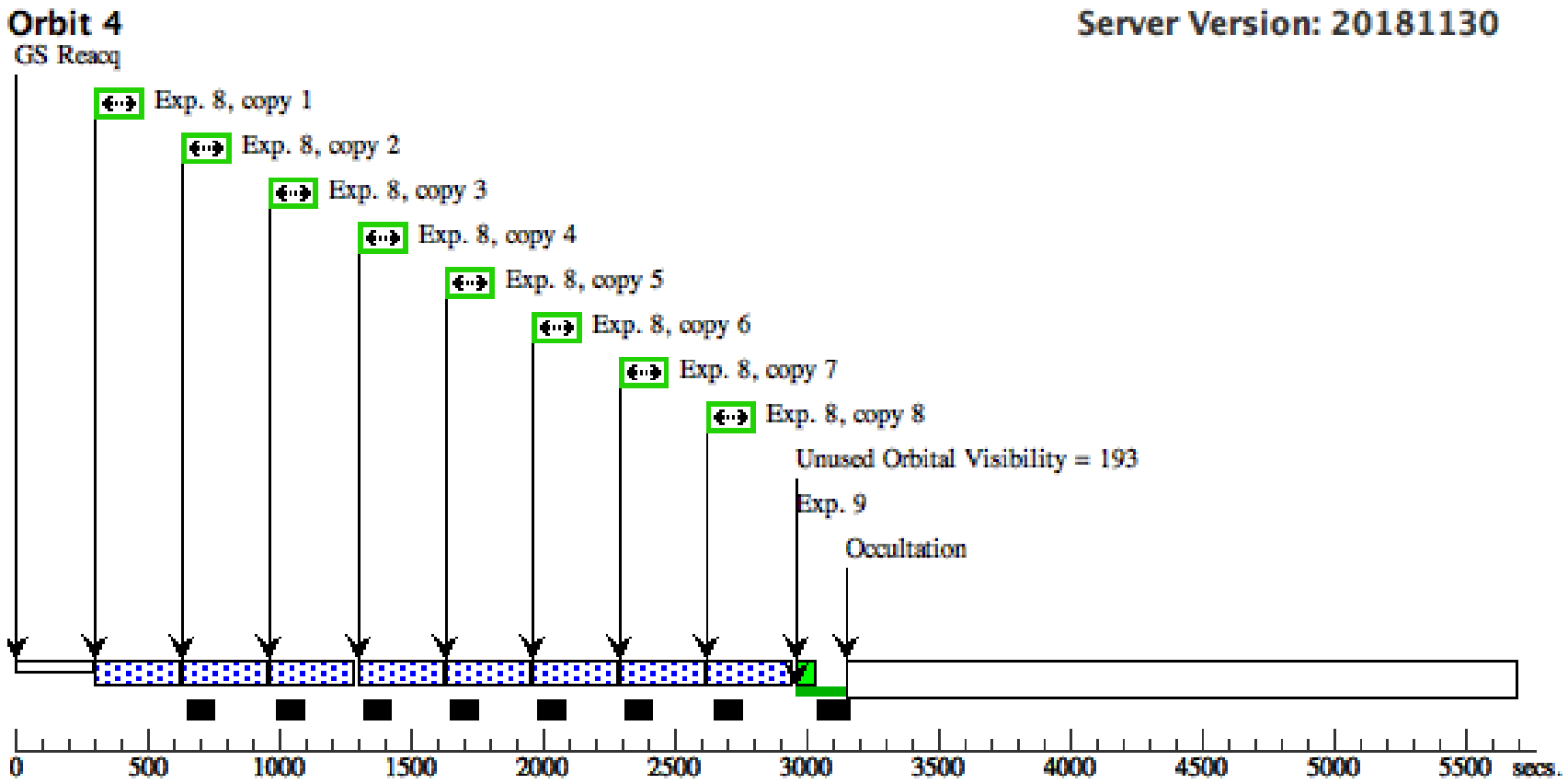
	8	Science 4 (STIS.sp.10 04820)	(1) HD-189733	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A	BINAXIS1=DEF; BINAXIS2=DEF	Sequence 8-9 Non-In t in Visit3 (03)	305 Secs X 8 (2464 Secs) *[==>308.0 Secs (Copy 1)]* *[==>308.0 Secs (Copy 2)]* *[==>308.0 Secs (Copy 3)]* *[==>308.0 Secs (Copy 4)]* *[==>308.0 Secs (Copy 5)]* *[==>308.0 Secs (Copy 6)]* *[==>308.0 Secs (Copy 7)]* *[==>308.0 Secs (Copy 8)]*	***[4]***
	9	Wavecal 4	WAVE	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A		Sequence 8-9 Non-In t in Visit3 (03)	*[==>]*	***[4]***
	10	Science 5 (STIS.sp.10 04820)	(1) HD-189733	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A	BINAXIS1=DEF; BINAXIS2=DEF	Sequence 10-11 Non -Int in Visit3 (03)	305 Secs X 8 (2464 Secs) *[==>308.0 Secs (Copy 1)]* *[==>308.0 Secs (Copy 2)]* *[==>308.0 Secs (Copy 3)]* *[==>308.0 Secs (Copy 4)]* *[==>308.0 Secs (Copy 5)]* *[==>308.0 Secs (Copy 6)]* *[==>308.0 Secs (Copy 7)]* *[==>308.0 Secs (Copy 8)]*	***[5]***
	11	Wavecal 5	WAVE	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A		Sequence 10-11 Non -Int in Visit3 (03)	*[==>]*	***[5]***

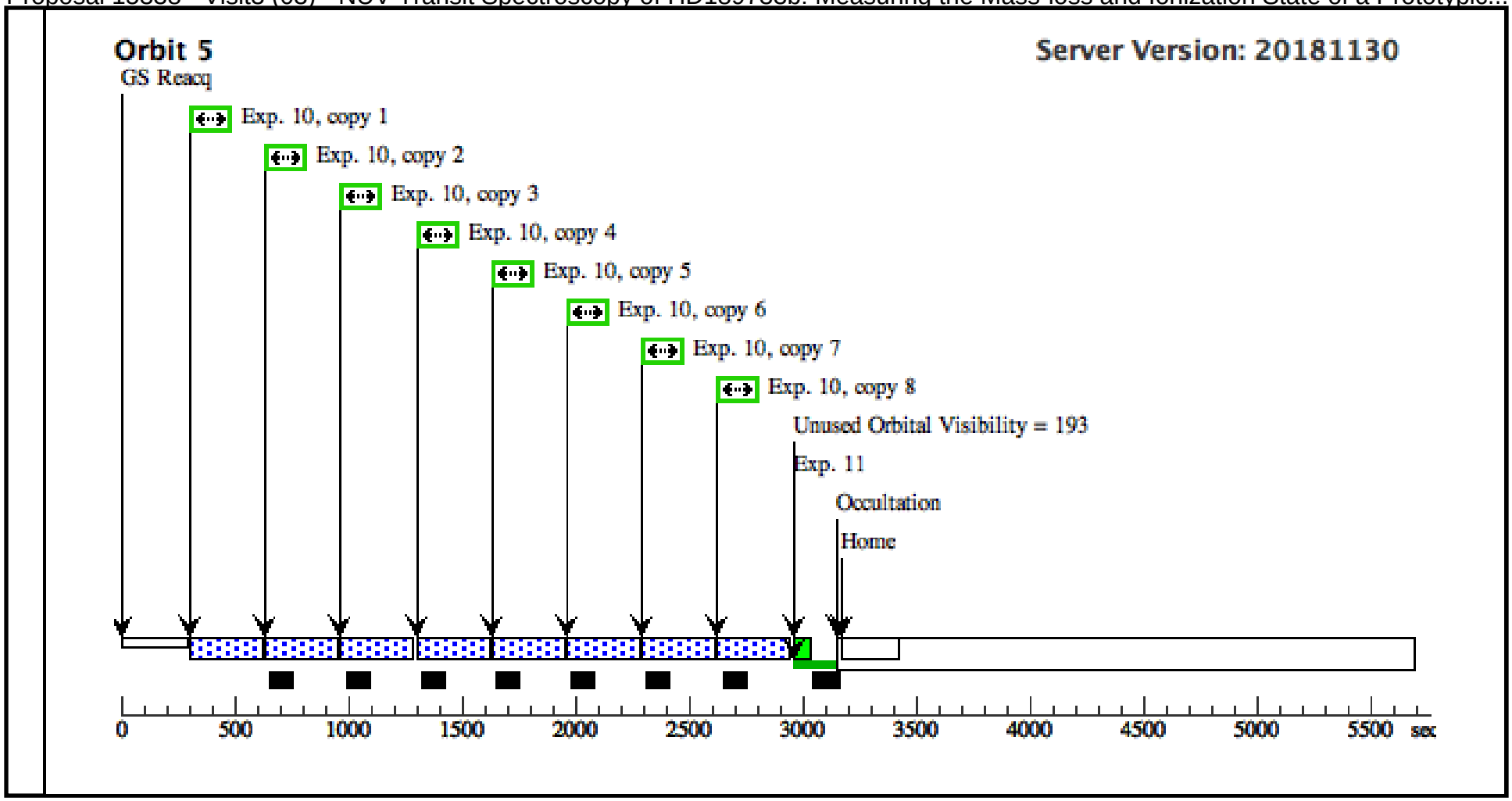
Orbit Structure




Orbit 2
Server Version: 20181130
GS Reacq
Exp. 4, copy 1
Exp. 4, copy 2
Exp. 4, copy 3
Exp. 4, copy 4
Exp. 4, copy 5
Exp. 4, copy 6
Exp. 4, copy 7
Exp. 4, copy 8
Exp. 5
Unused Orbital Visibility = 193
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
secs.


Orbit 3
Server Version: 20181130
GS Reacq
Exp. 6, copy 1
Exp. 6, copy 2
Exp. 6, copy 3
Exp. 6, copy 4
Exp. 6, copy 5
Exp. 6, copy 6
Exp. 6, copy 7
Exp. 6, copy 8
Exp. 7
Unused Orbital Visibility = 193
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
secs.


Orbit 4
GS Reacq
Server Version: 20181130
Exp. 8, copy 1
Exp. 8, copy 2
Exp. 8, copy 3
Exp. 8, copy 4
Exp. 8, copy 5
Exp. 8, copy 6
Exp. 8, copy 7
Exp. 8, copy 8
Unused Orbital Visibility = 193
Exp. 9
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
secs.


Orbit 5
Server Version: 20181130
GS Reacq
Exp. 10, copy 1
Exp. 10, copy 2
Exp. 10, copy 3
Exp. 10, copy 4
Exp. 10, copy 5
Exp. 10, copy 6
Exp. 10, copy 7
Exp. 10, copy 8
Unused Orbital Visibility = 193
Exp. 11
Occultation
Home
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec