14138 - Absolute Measurement of the Cosmic Near-Infrared Background Using Eclipsed Galilean Satellites as Occulters

Cycle: 23, Proposal Category: GO

(Availability Mode: SUPPORTED)

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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) EUROPA-ECLIPSE-F139M-1	WFC3/IR	1	24-Mar-2016 21:11:07.0	yes
02	(2) EUROPA-ECLIPSE-F139M-2	WFC3/IR	1	24-Mar-2016 21:11:09.0	yes
03	(3) EUROPA-ECLIPSE-F167N-1	WFC3/IR	1	24-Mar-2016 21:11:11.0	yes
04	(4) EUROPA-ECLIPSE-F167N-2	WFC3/IR	1	24-Mar-2016 21:11:12.0	yes
05	(5) GANYMEDE-ECLIPSE-F139M-1	WFC3/IR	1	24-Mar-2016 21:11:13.0	yes
06	(6) GANYMEDE-ECLIPSE-F139M-2	WFC3/IR	1	24-Mar-2016 21:11:14.0	yes
07	(7) GANYMEDE-ECLIPSE-F167N-1	WFC3/IR	1	24-Mar-2016 21:11:16.0	yes
08	(8) GANYMEDE-ECLIPSE-F167N-2	WFC3/IR	1	24-Mar-2016 21:11:17.0	yes
09	(9) CALLISTO-ECLIPSE-F139M-1	WFC3/IR	1	24-Mar-2016 21:11:18.0	yes
10	(10) CALLISTO-ECLIPSE-F139M-2	WFC3/IR	1	24-Mar-2016 21:11:19.0	yes
11	(11) CALLISTO-ECLIPSE-F167N-1	WFC3/IR	1	24-Mar-2016 21:11:21.0	yes
12	(12) CALLISTO-ECLIPSE-F167N-2	WFC3/IR	1	24-Mar-2016 21:11:22.0	yes

12 Total Orbits Used

ABSTRACT

The Cosmic Infrared Background (CIB) as an integrated history of the early universe is important for the study of unresolved star formation. However, previous CIB measurements suffer from residual contamination from strong foreground emission (e.g. the zodiacal light). We propose to observe Galilean satellites eclipsed in the shadow of Jupiter as occulting spots at near-infrared wavelengths in order to detect the absolute CIB intensity without any zodiacal light subtraction error. The zodiacal light originates inside the orbit of Jupiter; since the Galilean satellites in eclipse shield all light beyond the Jovian orbit, they should be detected as 'dark spots' if the strong CIB implied by previous observations exists. The intensity deficit of this dark spot relative to the surrounding sky directly measures the brightness of the CIB, free from any assumptions about the zodiacal light. The size of the dark spot is approximately 1 arcsec in diameter and the predicted surface brightness is 50 nW/m2/sr lower than that of surrounding sky brightness, which can be detected by WFC3 IR imaging with F167N filter for one orbit integration with S/N=10 even in the strong Jovian stray light environment.

Our previous observations revealed that deep eclipses are required to reduce the effects from forward-scatterd sunlight within the Jovian upper

atmosphere. The deepest such eclipses will occur in this Cycle 23 season, and next chance to observe such deep eclipses is six years after owing to Jupiter's orbital period. Therefore, observations in this Cycle 23 are highly required. These new observations will definitively prove if the technique can be made to work.

OBSERVING DESCRIPTION

Our observational targets are the Galilean satellites (Europa, Ganymede and Callisto), which are non-stationary targets. For example, in a Ganymede eclipse case on Dec.12th, 2015, the diameter of Ganymede is 1.4 arcsec circle, it is located at 14-51 arcsec from Jovian limb, and its relative speed to the Jupiter is 5.7*10^-3 arcsec/sec.

Our strategy is to measure the CIB brightness as a dark spot, and the foreground sky brightness can be evaluated locally around the dark spot itself. Previous direct measurements of CIB indicate that the absolute CIB brightness is ~50 nW/m2/sr at around 1.6 um. This is equivalent to a 23 Vega magnitude/arcsec2 deficit against a sky background, which can be detected by WFC3 IR imaging with F167N filter by 40 minutes (equivalent to one orbit) of integration with S/N=13. In addition, if the bright CIB reported by direct observations does not exist, the integrated light of galaxies of ~10 nW/m2/sr at around 1.6 um still should exist, which can be detected by WFC3 IR imaging with F167N filter with 40 minutes integration with S/N=3. This means that an HST observation of one orbit guarantees the detection of the dark spot of the eclipse, although we cannot observe throughout the entire eclipse (roughly two hours) because of the occultation of Jupiter by the Earth relative to HST.

The greatest difficulty in this observation results from scattered light due to the close proximity of Jupiter to the target satellites, which will reduce the estimates S/N described above. However, Jupiter is dark in our observed bands (F139M and F167N) owing to the methane absorption in the Jovian atmosphere, thus stray light from Jupiter is also reduced. Our previous observation of Europa eclipse at F139M in Cycle 20 shows that Jovian stray light at 30 arcsec from Jovian limb was almost comparable to the sky background level (the zodiacal light). Since Jupiter is darker at F167N than at F139M, we can measure the brightness of the satellites in eclipse at both F139M and F167N with the estimated S/N described above.

As a result, we propose two orbits per filter (F139M and F167N) per satellite (Europa, Ganymede and Callisto), thus twelve orbits in total. Two orbits are required to obtain sufficient signals in the case of no CIB excess scenario. In addition, we can obtain the CIB spectral shape from two different filters, which is scientifically important to investigate the origin of the CIB excess. Observations using the different satellite eclipses reduce the systematic uncertainty of scattered sunlight from Jovian upper atmosphere if the effect of the scattered sunlight is not negligible, because the effect of the sunlight depends on the distance between Jupiter and satellites in eclipse.

The greatest difficulty in this observation results from scattered light due to the close proximity of Jupiter to the target satellites. Therefore, we will keep Jupiter out of the detector field of view (FoV) during the observation to avoid stray light from Jupiter. Observations will be conducted with non-sidereal tracking on Jupiter (outside of the FoV) to fix the stray light pattern on the detector during the observation. This will minimize the systematic

error of the Jovian stray light. Since the relative speed of the target satellites to Jupiter is ~0.006 arcsec/sec, short integrations (<20 sec) are required to avoid smearing of the target satellite. Letting the eclipsed satellite move relative to the detector using Jupiter tracking has the advantage of effectively dithering the observations so that we can average out any detector issues such as scattered earthlight, structure in the darks, and the dark features called "blobs" in particular (the latter are believed to result from debris on the
pick-off optics). In addition, the spider pattern runs diagonal direction on the detector array around any bright sources (even from Jupiter located at outside of FoV). Thus we need to keep this spider pattern of Jupiter or other bright sources off of target satellites in eclipse by rolling the scope to align the target satellite in eclipse and Jupiter out of FoV to be on either the same x- or y-coordinate. This rolling adjustment was also successful in our Cycle 20 observations. We emphasize that we know the ephemeri of Galilean satellites with great precision; the size and location of the Galilean satellites will be accurately known, and therefore easily differentiated from detector effects.

Visit

Proposal 14138, Europa F139M 1 (01), completed Fri Mar 25 01:11:23 GMT 2016

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: ORIENT 298.3D TO 298.5 D

Comments: +/- 5 deg roll off nominal available, nominal is ~293.4 on scheduled date 15.321

Solar System Targets

#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
(1)	EUROPA-ECLIPSE-F139M-1	STD=JUPITER	TYPE=POS_ANGLE,RAD=90,ANG=278,REF=NORTH		ECL U FULL OF EUROPA BY JUPITER FROM EARTH, SEP OF EUROPA CALLISTO FROM EARTH GT 30", SEP OF EUROPA IO FROM EARTH GT 30", SEP OF EUROPA JUPITER FROM EARTH GT 10", SEP OF EUROPA GANYMEDE FROM EARTH GT 30"	EARTH

Comments: Target is Europa eclipsed by Jupiter. Visit will be tracking on Jupiter and using a position angle and radius to offset to Europa (but position angle offset is not set yet).

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	Europa F139M 1	(1) EUROPA-ECLIPSE-F139M-1	WFC3/IR, MULTIACCUM, IR	F139M	NSAMP=14; SAMP-SEQ=SPARS25	GS ACQ SCENARIO BASE1B3		327.938986 Secs X 8 (2623.512 Secs)	
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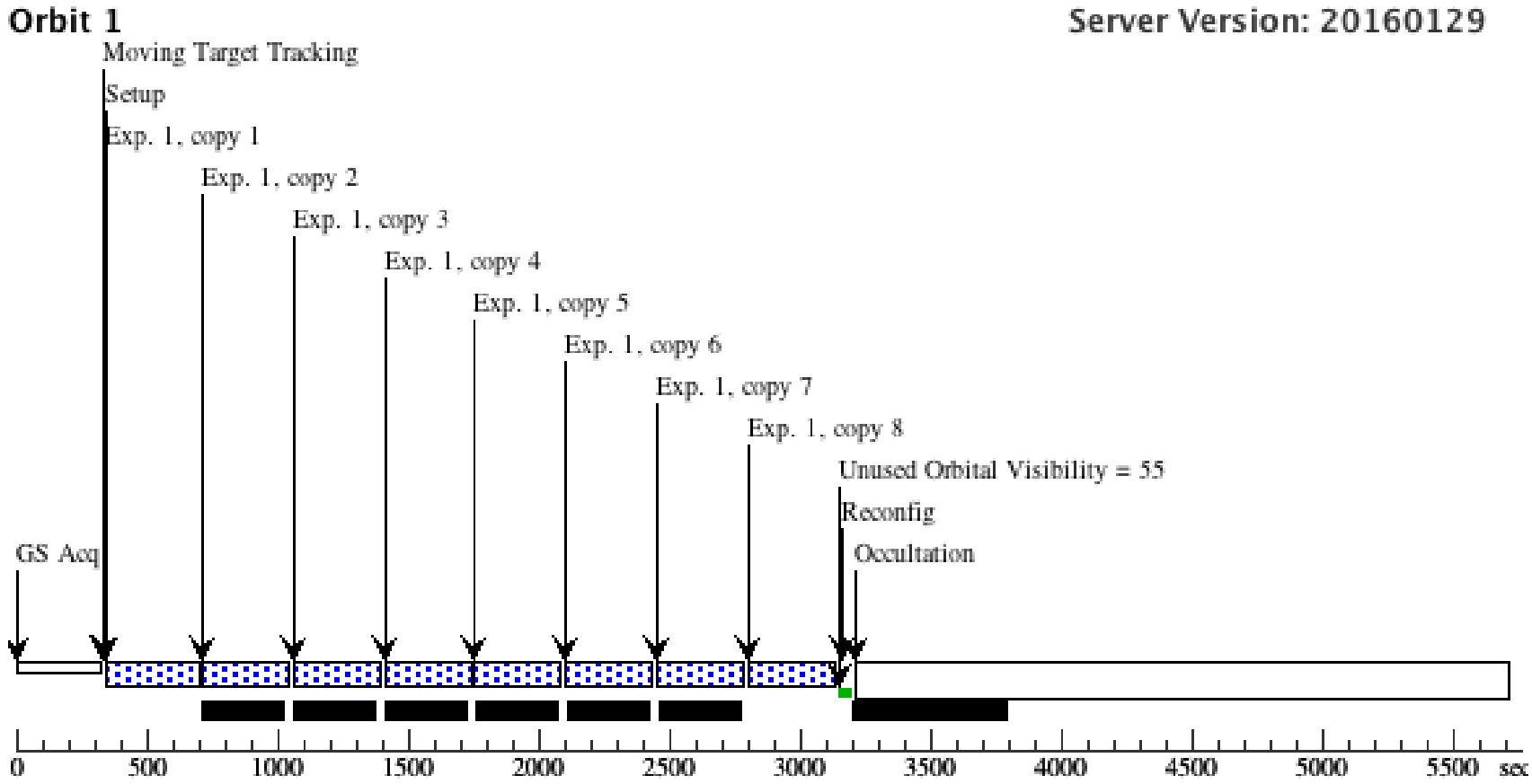
Orbit Structure



Visit

Proposal 14138, Europa F139M 2 (02), completed Fri Mar 25 01:11:24 GMT 2016

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: ORIENT 288.3D TO 288.6 D

Solar System Targets

#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
(2)	EUROPA-ECLIPSE-F139M-2	STD=JUPITER	TYPE=POS_ANGLE,RAD=108,ANG=285,REF=NORTH		ECL U FULL OF EUROPA BY JUPITER FROM EARTH, SEP OF EUROPA CALLISTO FROM EARTH GT 30", SEP OF EUROPA IO FROM EARTH GT 30", SEP OF EUROPA JUPITER FROM EARTH GT 10", SEP OF EUROPA GANYMEDE FROM EARTH GT 30"	EARTH

Comments: Target is Europa eclipsed by Jupiter. Visit will be tracking on Jupiter and using a position angle and radius to offset to Europa (but position angle offset is not set yet).

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	Europa F139M 2	(2) EUROPA-ECLIPSE-F139M-2	WFC3/IR, MULTIACCUM, IR	F139M	NSAMP=14; SAMP-SEQ=SPARS25	GS ACQ SCENARIO SINGLE		327.938986 Secs X 8 (2623.512 Secs)	
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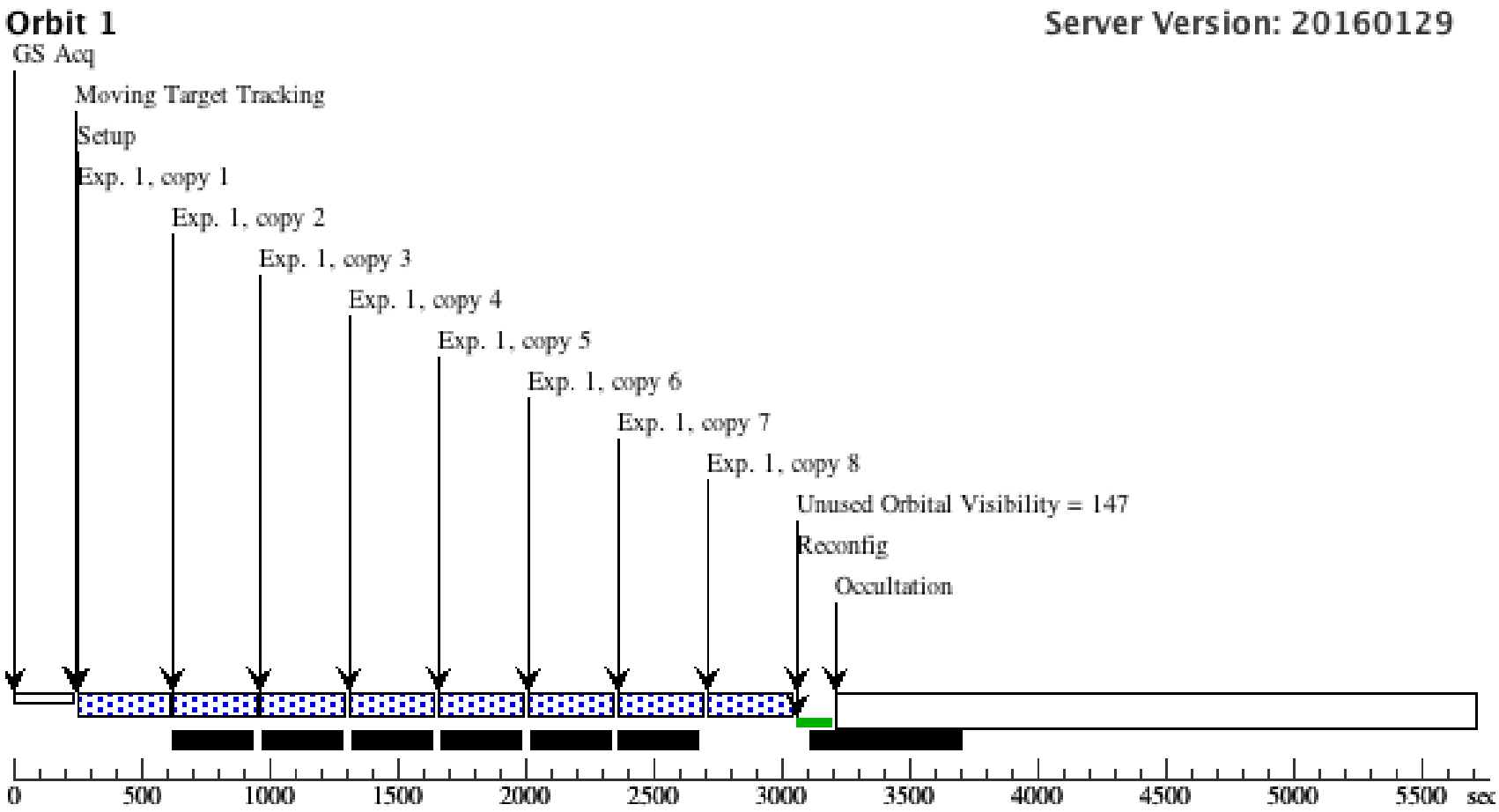
Orbit Structure



Visit

Proposal 14138, Europa F167N 1 (03), completed Fri Mar 25 01:11:24 GMT 2016

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: ORIENT 298.2D TO 298.3 D

Solar System Targets

#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
(3)	EUROPA-ECLIPSE-F167N-1	STD=JUPITER	TYPE=POS_ANGLE,RAD=84,ANG=247,REF=NORTH		ECL U FULL OF EUROPA BY JUPITER FROM EARTH, SEP OF EUROPA CALLISTO FROM EARTH GT 30", SEP OF EUROPA IO FROM EARTH GT 30", SEP OF EUROPA JUPITER FROM EARTH GT 10", SEP OF EUROPA GANYMEDE FROM EARTH GT 30"	EARTH

Comments: Target is Europa eclipsed by Jupiter. Visit will be tracking on Jupiter and using a position angle and radius to offset to Europa (but position angle offset is not set yet).

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	Europa F167N 1	(3) EUROPA-ECLIPSE-F167N-1	WFC3/IR, MULTIACCUM, IR	F167N	NSAMP=14; SAMP-SEQ=SPARS25	GS ACQ SCENARIO BASE1B3		327.938986 Secs X 8 (2623.512 Secs)	
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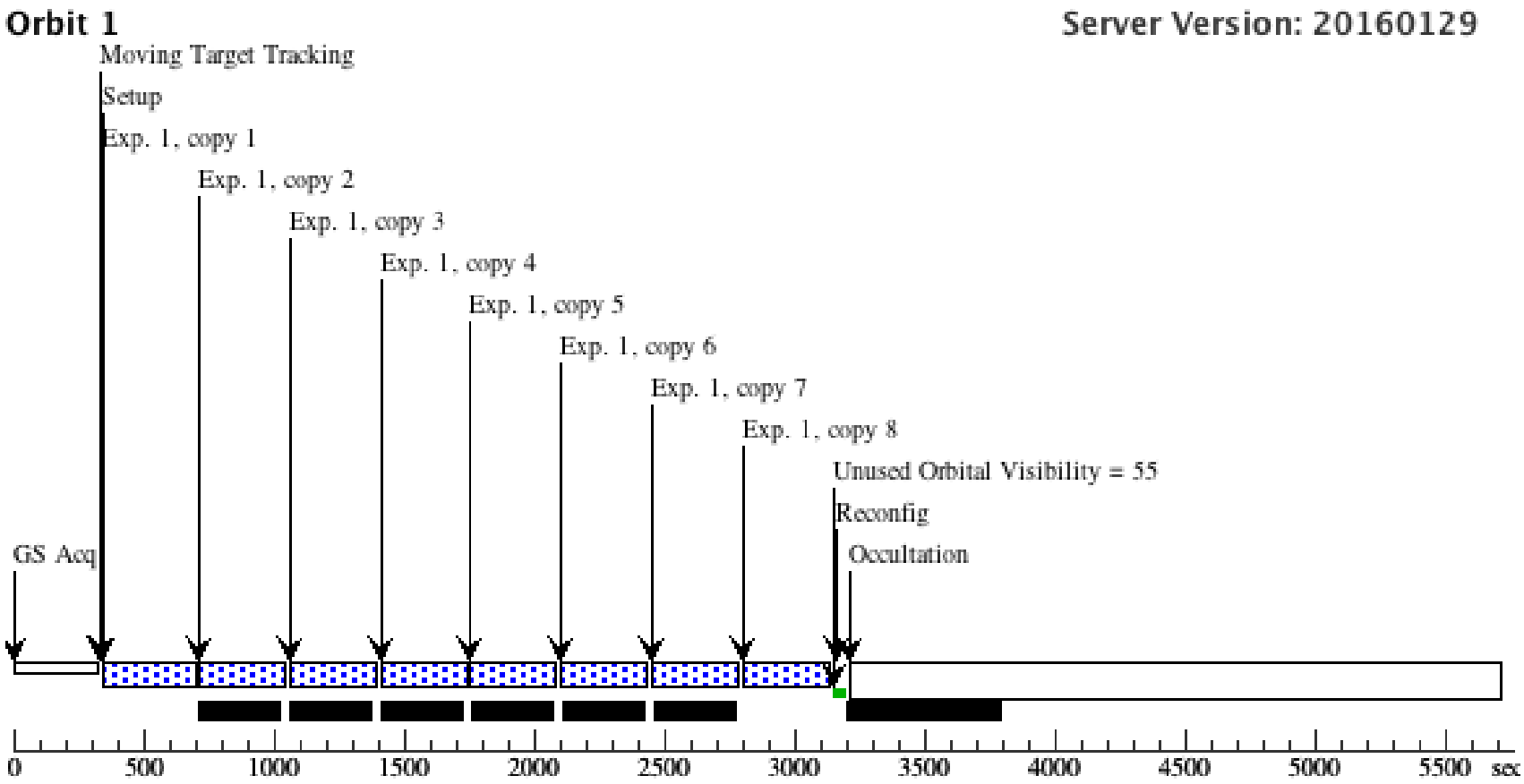
Orbit Structure



Visit

Proposal 14138, Europa F167N 2 (04), completed Fri Mar 25 01:11:24 GMT 2016

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: ORIENT 315.7D TO 315.9 D

Comments: + 22.9 deg off nominal lines up parallel to detector side

Solar System Targets

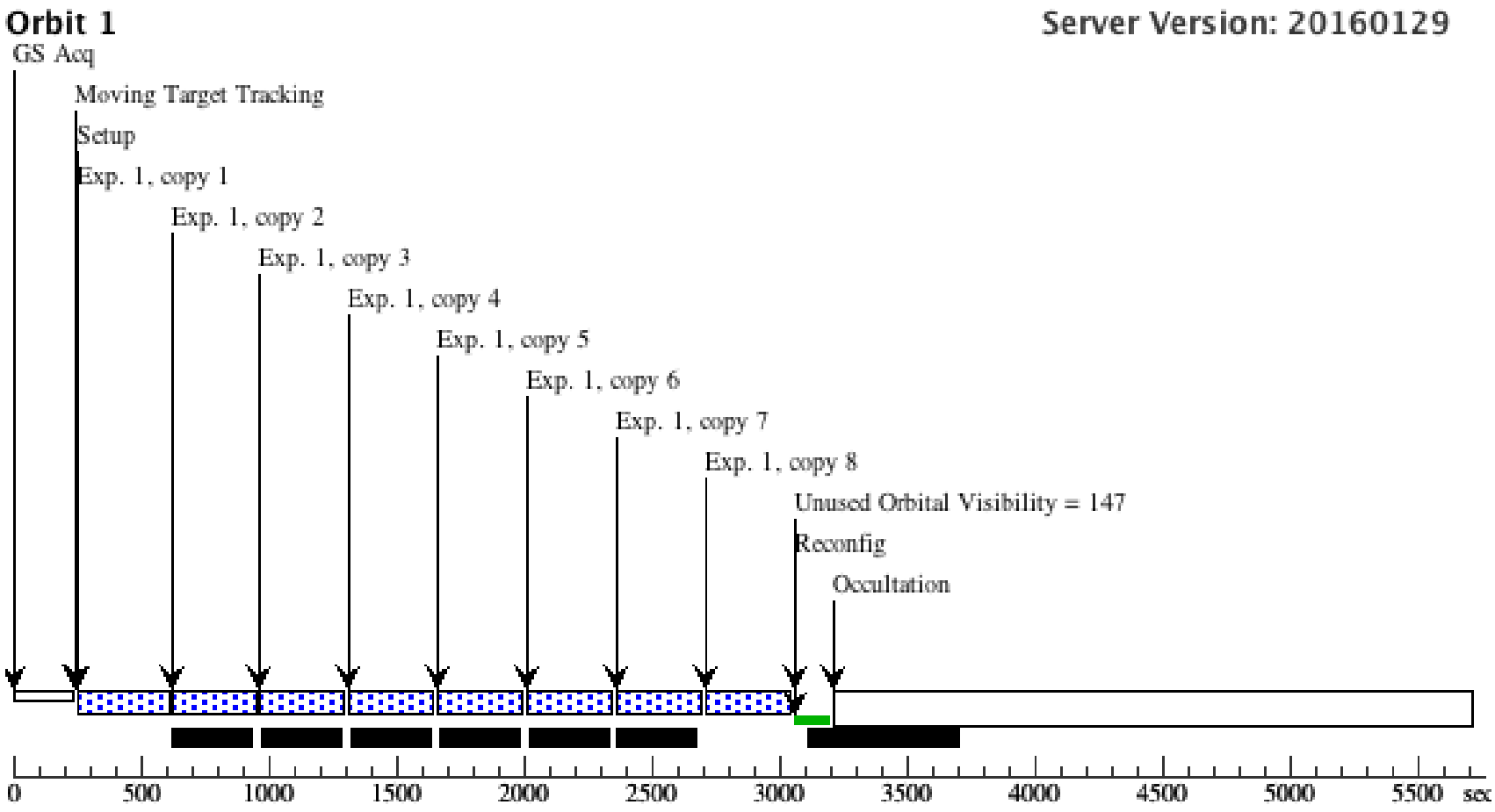
#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
(4)	EUROPA-ECLIPSE-F167N-2	STD=JUPITER	TYPE=POS_ANGLE,RAD=100,ANG=242,REF=NORTH		ECL U FULL OF EUROPA BY JUPITER FROM EARTH, SEP OF EUROPA CALLISTO FROM EARTH GT 30", SEP OF EUROPA IO FROM EARTH GT 30", SEP OF EUROPA JUPITER FROM EARTH GT 10", SEP OF EUROPA GANYMEDE FROM EARTH GT 30"	EARTH

Comments: Target is Europa eclipsed by Jupiter. Visit will be tracking on Jupiter and using a position angle and radius to offset to Europa (but position angle offset is not set yet).

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	Europa F167N 2	(4) EUROPA-ECLIPSE-F167N-2	WFC3/IR, MULTIACCUM, IR	F167N	NSAMP=14; SAMP-SEQ=SPARS25	POS TARG 2.7,43.0; GS ACQ SCENARIO SINGLE		327.938986 Secs X 8 (2623.512 Secs) *[==>(Copy 1)]* *[==>(Copy 2)]* *[==>(Copy 3)]* *[==>(Copy 4)]* *[==>(Copy 5)]* *[==>(Copy 6)]* *[==>(Copy 7)]* *[==>(Copy 8)]*	***[1]***

Orbit Structure



Visit

Proposal 14138, Ganymede F139M 1 (05), completed Fri Mar 25 01:11:24 GMT 2016

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: ORIENT 288.5D TO 288.6 D

Comments: +/- 5 deg roll off nominal available, nominal is ~293.4 on scheduled date 15.330

Solar System Targets

#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
(5)	GANYMEDE-ECLIPSE-F139M-1	STD=JUPITER	TYPE=POS_ANGLE,RAD=92,ANG=247,REF=NORTH		ECL U FULL OF GANYMEDE BY JUPITER FROM EARTH, SEP OF GANYMEDE CALLISTO FROM EARTH GT 30", SEP OF GANYMEDE IO FROM EARTH GT 30", SEP OF GANYMEDE EUROPA FROM EARTH GT 30", SEP OF GANYMEDE JUPITER FROM EARTH GT 10"	EARTH

Comments: Target is Ganymede eclipsed by Jupiter. Visit will be tracking on Jupiter and using a position angle and radius to offset to Ganymede (but position angle offset is not set yet).

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	Ganymede F139M 1	(5) GANYMEDE-ECLIPSE-F139M-1	WFC3/IR, MULTIACCUM, IR	F139M	NSAMP=14; SAMP-SEQ=SPARS25	GS ACQ SCENARIO SINGLE		327.938986 Secs X 8 (2623.512 Secs)	
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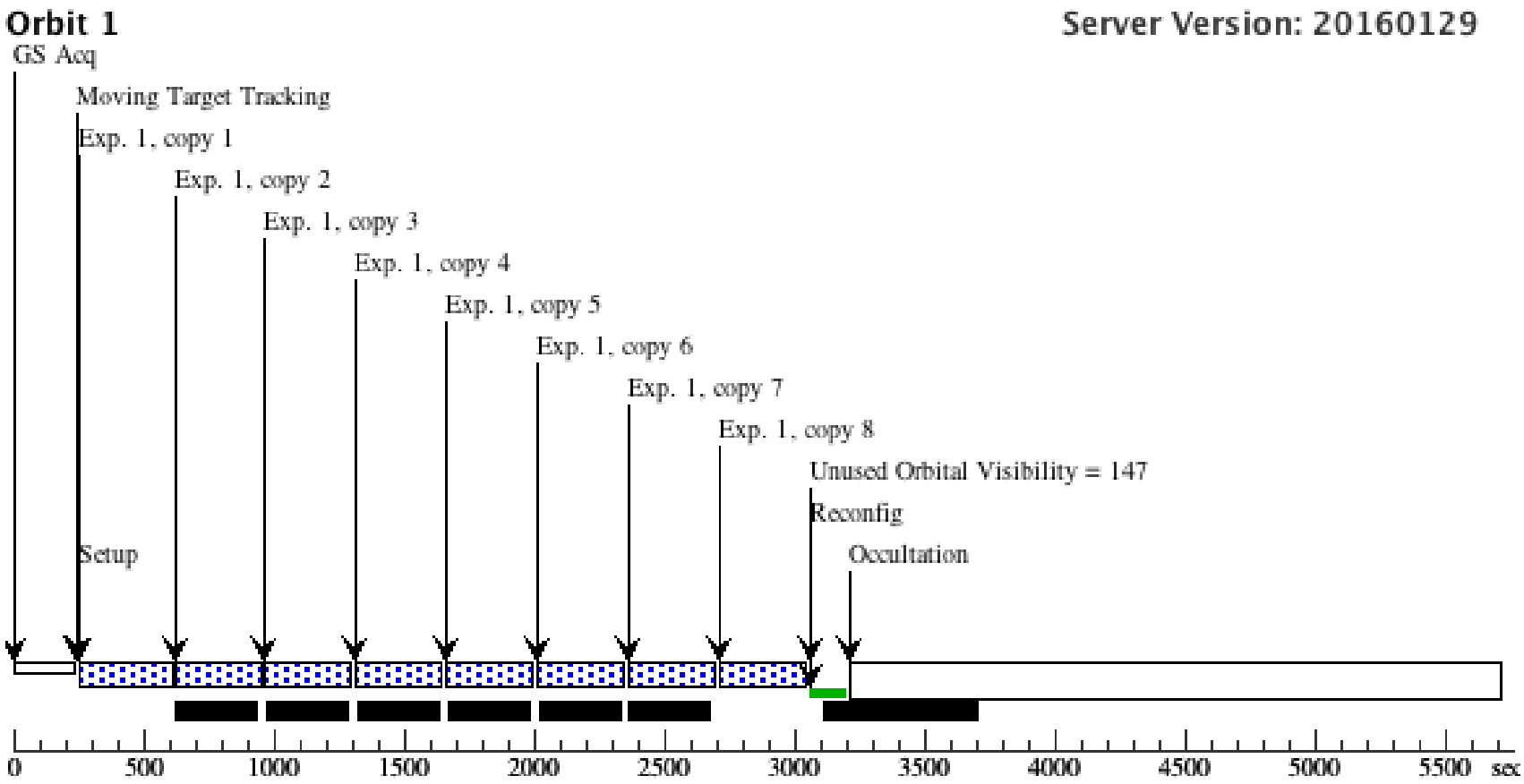
Orbit Structure



Visit

Proposal 14138, Ganymede F139M 2 (06), completed Fri Mar 25 01:11:24 GMT 2016

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: ORIENT 288.5D TO 288.6 D

Comments: +/- 5 deg roll off nominal available, nominal is ~293.4 on scheduled date 15.330

Solar System Targets

#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
(6)	GANYMEDE-ECLIPSE-F139M-2	STD=JUPITER	TYPE=POS_ANGLE,RAD=84,ANG=252,REF=NORTH		ECL U FULL OF GANYMEDE BY JUPITER FROM EARTH, SEP OF GANYMEDE CALLISTO FROM EARTH GT 30", SEP OF GANYMEDE IO FROM EARTH GT 30", SEP OF GANYMEDE EUROPA FROM EARTH GT 30", SEP OF GANYMEDE JUPITER FROM EARTH GT 10"	EARTH

Comments: Target is Ganymede eclipsed by Jupiter. Visit will be tracking on Jupiter and using a position angle and radius to offset to Ganymede (but position angle offset is not set yet).

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	Ganymede F139M 2	(6) GANYMEDE-ECLIPSE-F139M-2	WFC3/IR, MULTIACCUM, IR	F139M	NSAMP=14; SAMP-SEQ=SPARS25	GS ACQ SCENARIO SINGLE		327.938986 Secs X 8 (2623.512 Secs)	
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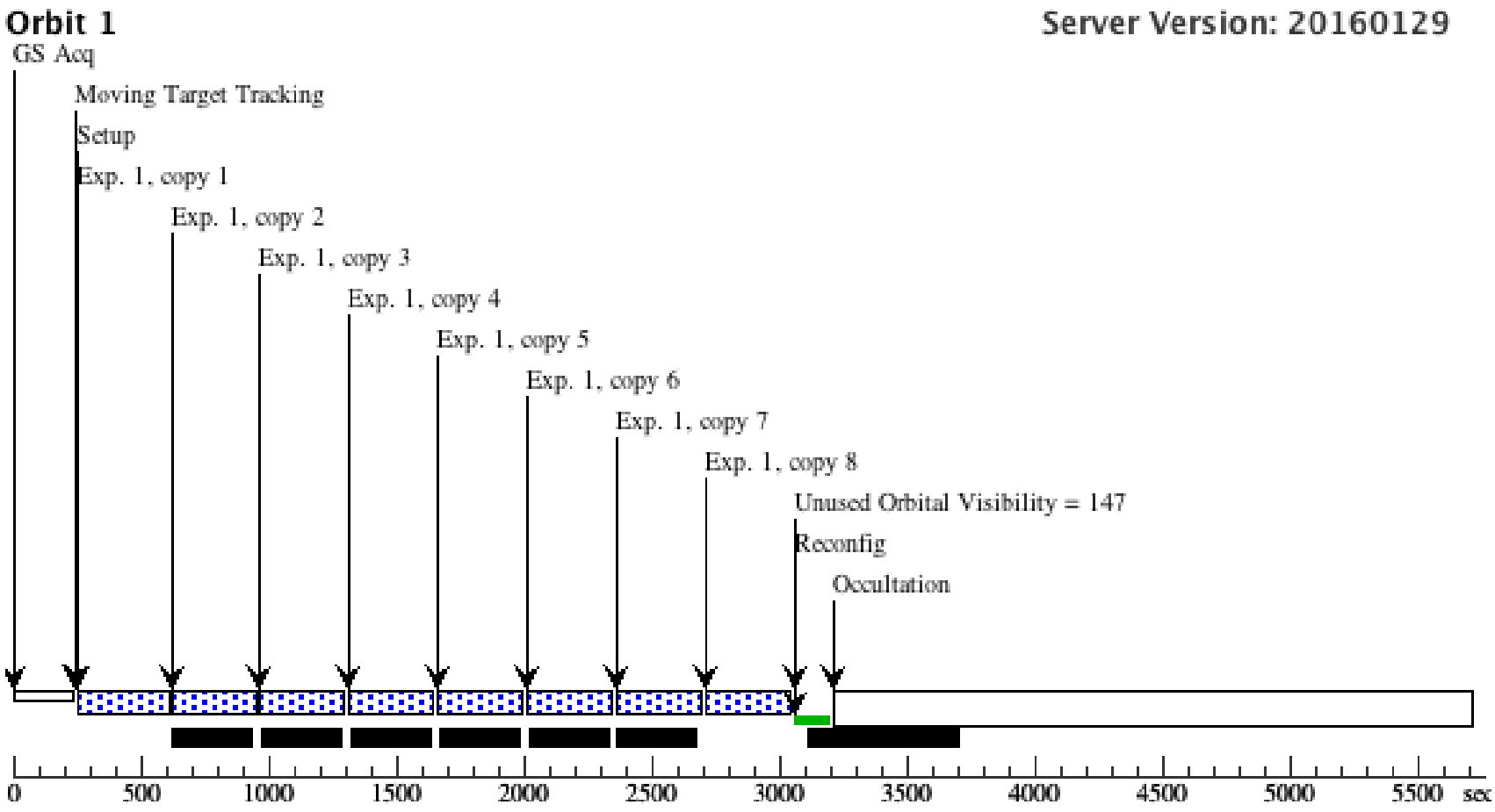
Orbit Structure



Visit

Proposal 14138, Ganymede F167N 1 (07), implementation Fri Mar 25 01:11:24 GMT 2016

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: ORIENT 93D TO 94 D

Solar System Targets

#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
(7)	GANYMEDE-ECLIPSE-F167N-1	STD=JUPITER	TYPE=POS_ANGLE,RAD=102,ANG=176,REF=NORTH		ECL U FULL OF GANYMEDE BY JUPITER FROM EARTH, SEP OF GANYMEDE CALLISTO FROM EARTH GT 30", SEP OF GANYMEDE IO FROM EARTH GT 30", SEP OF GANYMEDE EUROPA FROM EARTH GT 30", SEP OF GANYMEDE JUPITER FROM EARTH GT 10"	EARTH

Comments: Target is Ganymede eclipsed by Jupiter. Visit will be tracking on Jupiter and using a position angle and radius to offset to Ganymede (but position angle offset is not set yet).

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	Ganymede F167N 1	(7) GANYMEDE-ECLIPSE-F167N-1	WFC3/IR, MULTIACCUM, IR	F167N	NSAMP=14; SAMP-SEQ=SPARS25	GS ACQ SCENARIO BASE1B3		327.938986 Secs X 8 (2623.512 Secs)	
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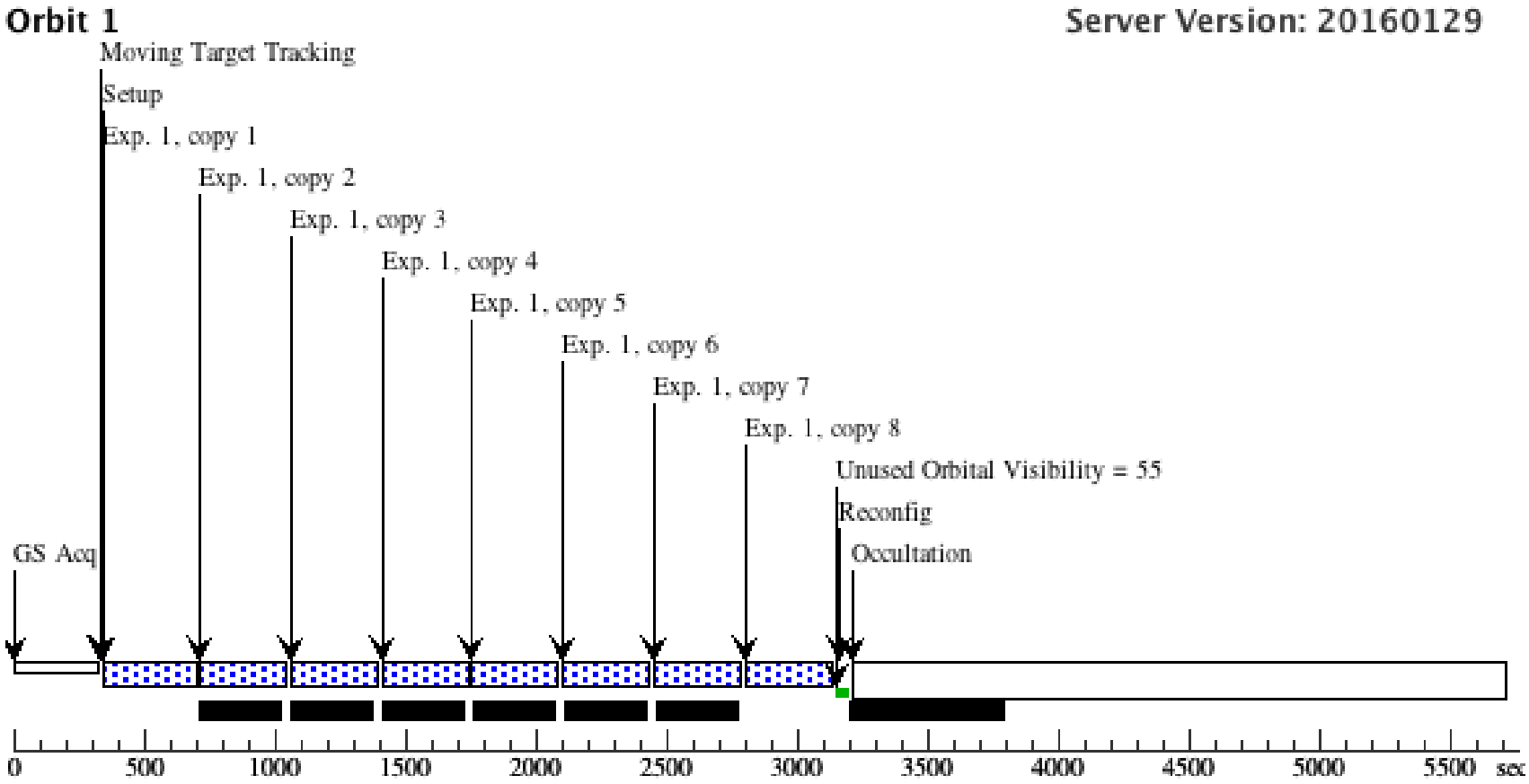
Orbit Structure



Visit

Proposal 14138, Ganymede F167N 2 (08), implementation Fri Mar 25 01:11:24 GMT 2016

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: ORIENT 94D TO 94 D; AFTER 30-JAN-2016:06:20:30

Solar System Targets

#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
(8)	GANYMEDE-ECLIPSE-F167N-2	STD=JUPITER	TYPE=POS_ANGLE,RAD=111,ANG=168,REF=NORTH		ECL U FULL OF GANYMEDE BY JUPITER FROM EARTH, SEP OF GANYMEDE CALLISTO FROM EARTH GT 30", SEP OF GANYMEDE IO FROM EARTH GT 30", SEP OF GANYMEDE EUROPA FROM EARTH GT 30", SEP OF GANYMEDE JUPITER FROM EARTH GT 10"	EARTH

Comments: Target is Ganymede eclipsed by Jupiter. Visit will be tracking on Jupiter and using a position angle and radius to offset to Ganymede (but position angle offset is not set yet).

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	Ganymede F167N 2	(8) GANYMEDE-ECLIPSE-F167N-2	WFC3/IR, MULTIACCUM, IR	F167N	NSAMP=14; SAMP-SEQ=SPARS25	GS ACQ SCENARIO BASE1B3		327.938986 Secs X 8 (2623.512 Secs)	
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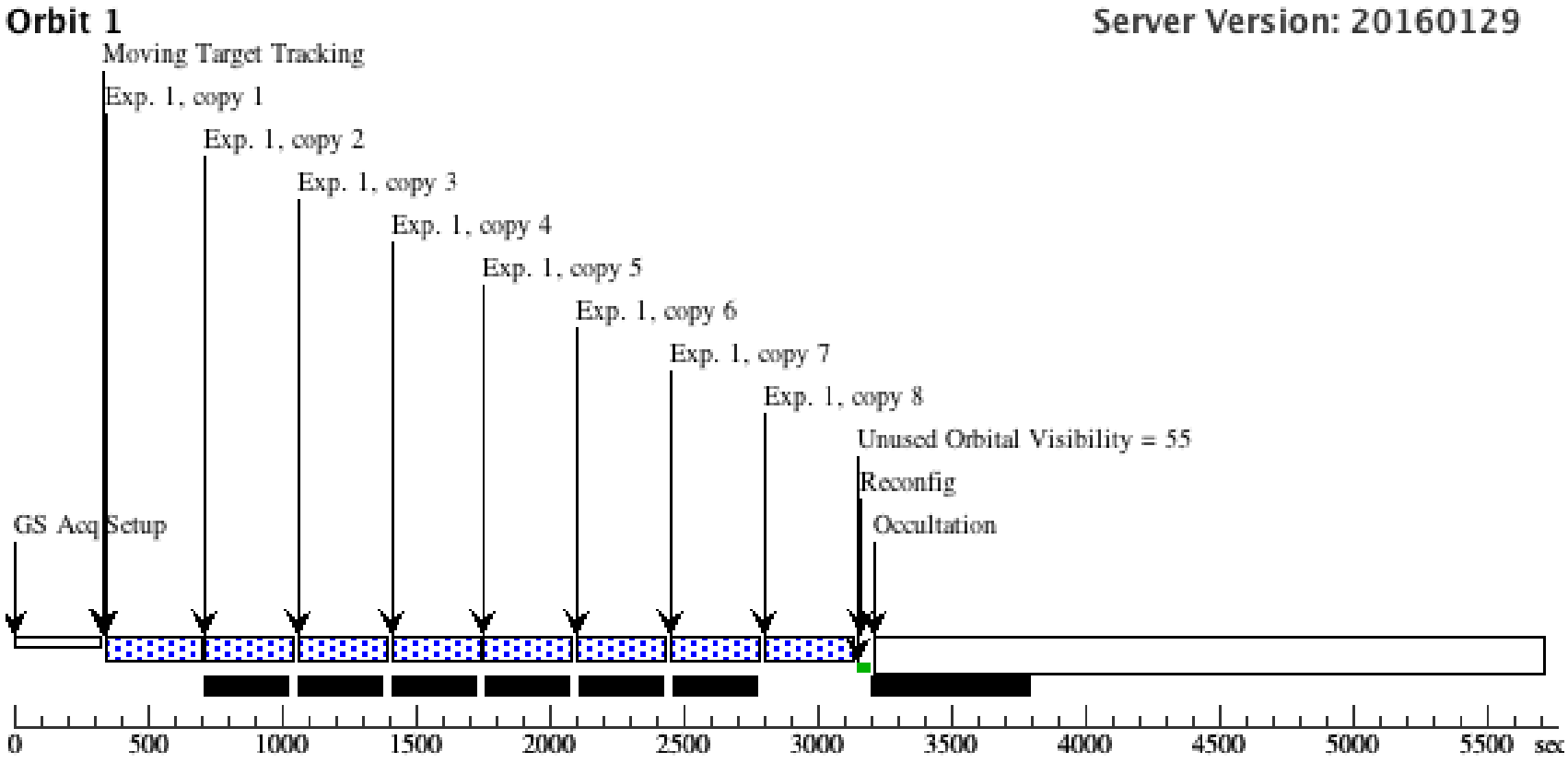
Orbit Structure



Visit

Proposal 14138, Callisto F139M 1 (09), completed Fri Mar 25 01:11:24 GMT 2016

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: ORIENT 309D TO 311 D

Solar System Targets

#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
(9)	CALLISTO-ECLIPSE-F139M-1	STD=JUPITER	TYPE=POS_ANGLE,RAD=122,ANG=280,REF=NORTH		ECL U FULL OF CALLISTO BY JUPITER FROM EARTH, SEP OF CALLISTO JUPITER FROM EARTH GT 10", SEP OF CALLISTO IO FROM EARTH GT 30", SEP OF CALLISTO EUROPA FROM EARTH GT 30", SEP OF CALLISTO GANYMEDE FROM EARTH GT 30"	EARTH

Comments: Target is Callisto eclipsed by Jupiter. Visit will be tracking on Jupiter and using a position angle and radius to offset to Callisto (but position angle offset is not set yet).

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	Callisto F139M 1	(9) CALLISTO-ECLIPSE-F139M-1	WFC3/IR, MULTIACCUM, IR	F139M	NSAMP=14; SAMP-SEQ=SPARS25	GS ACQ SCENARIO SINGLE		327.938986 Secs X 8 (2623.512 Secs)	
								[==>(Copy 1)]	***[1]***
								[==>(Copy 2)]	
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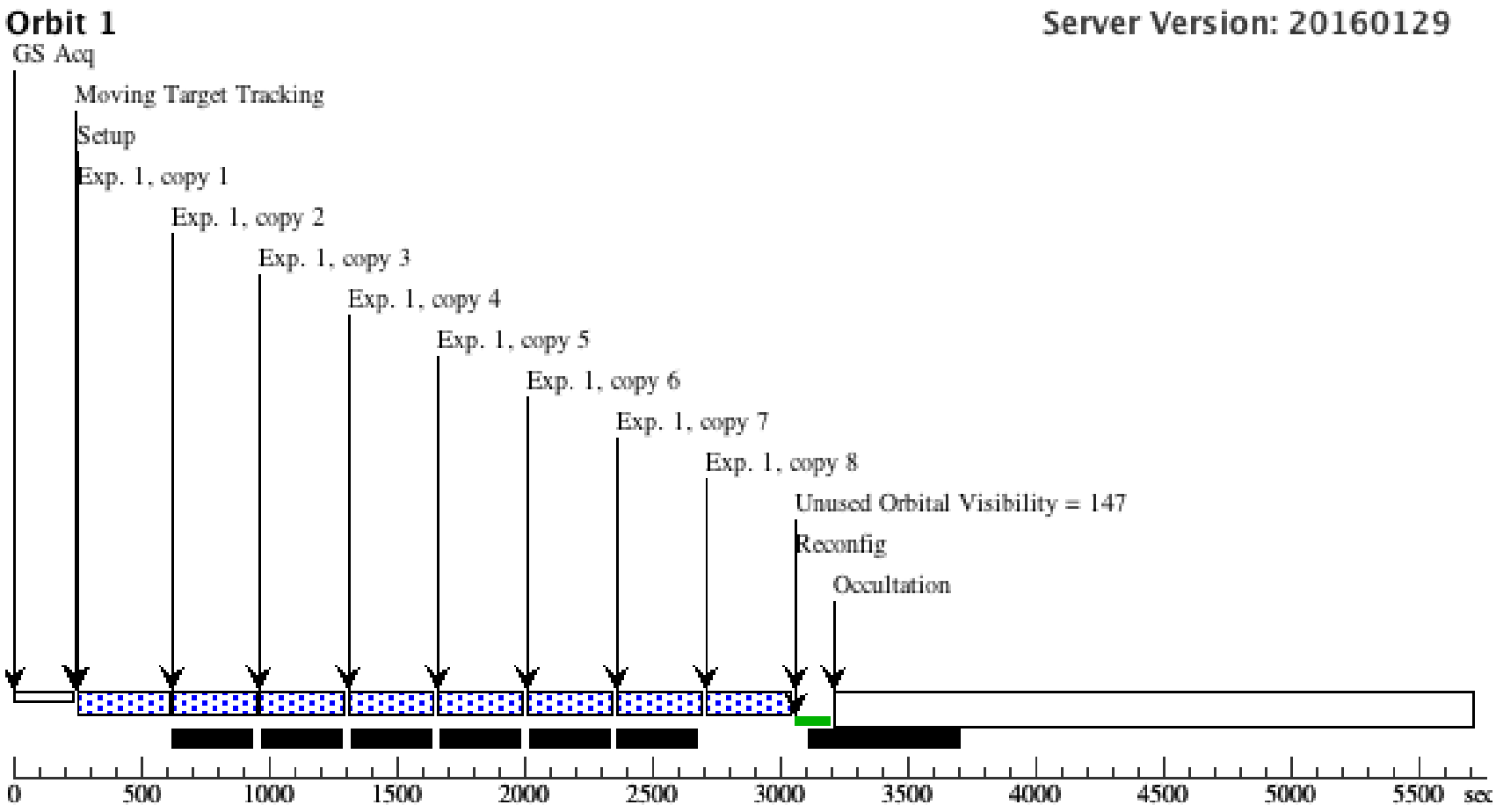
								[==>(Copy 7)]	
								[==>(Copy 8)]	

Orbit Structure



Visit

Proposal 14138, Callisto F139M 2 (10), completed Fri Mar 25 01:11:24 GMT 2016

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: ORIENT 304D TO 305 D

Solar System Targets

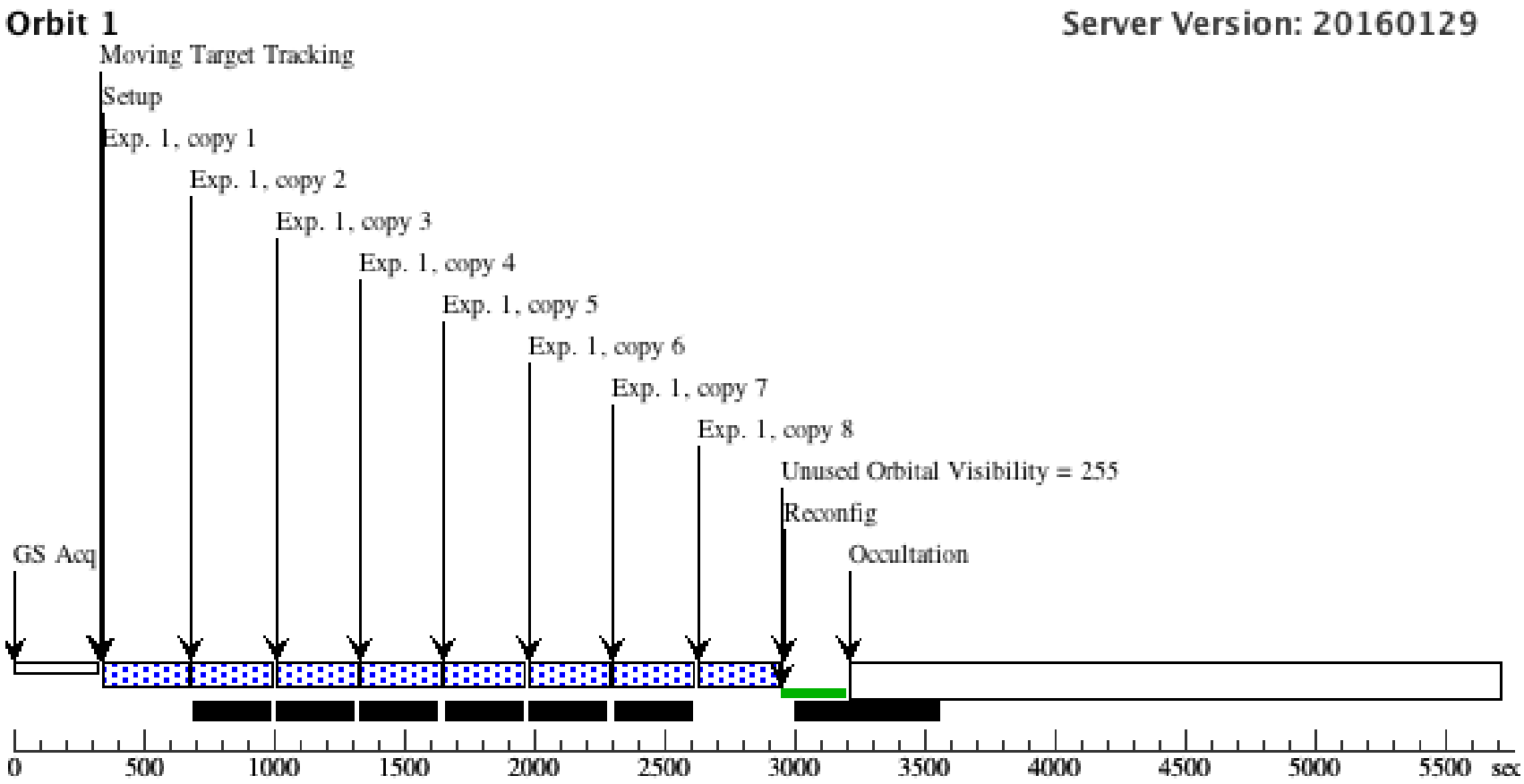
#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
(10)	CALLISTO-ECLIPSE-F139M-2	STD=JUPITER	TYPE=POS_ANGLE,RAD=93.5,ANG=248,REF=NORTH		ECL U FULL OF CALLISTO BY JUPITER FROM EARTH, SEP OF CALLISTO JUPITER FROM EARTH GT 10", SEP OF CALLISTO IO FROM EARTH GT 30", SEP OF CALLISTO EUROPA FROM EARTH GT 30", SEP OF CALLISTO GANYMEDE FROM EARTH GT 30"	EARTH

Comments: Target is Callisto eclipsed by Jupiter. Visit will be tracking on Jupiter and using a position angle and radius to offset to Callisto (but position angle offset is not set yet).

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	Callisto F139M 2	(10) CALLISTO-ECLIPSE-F139M-2	WFC3/IR, MULTIACCUM, IR	F139M	NSAMP=13; SAMP-SEQ=SPARS25	GS ACQ SCENARIO BASE1B3		302.938471 Secs X 8 (2423.508 Secs)	
								[==>(Copy 1)] *[==>(Copy 2)]* *[==>(Copy 3)]* *[==>(Copy 4)]* *[==>(Copy 5)]* *[==>(Copy 6)]* *[==>(Copy 7)]* *[==>(Copy 8)]*	***[1]***

Orbit Structure



Visit

Proposal 14138, Callisto F167N 1 (11), completed Fri Mar 25 01:11:24 GMT 2016

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: ORIENT 288.3D TO 288.6 D

Solar System Targets

#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
(11)	CALLISTO-ECLIPSE-F167N-1	STD=JUPITER	TYPE=POS_ANGLE,RAD=117,ANG=254,REF=NORTH		ECL U FULL OF CALLISTO BY JUPITER FROM EARTH, SEP OF CALLISTO JUPITER FROM EARTH GT 10", SEP OF CALLISTO IO FROM EARTH GT 30", SEP OF CALLISTO EUROPA FROM EARTH GT 25", SEP OF CALLISTO GANYMEDE FROM EARTH GT 30"	EARTH

Comments: Target is Callisto eclipsed by Jupiter. Visit will be tracking on Jupiter and using a position angle and radius to offset to Callisto (but position angle offset is not set yet).

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	Callisto F167N 1	(11) CALLISTO-ECLIPSE-F167N-1	WFC3/IR, MULTIACCUM, IR	F167N	NSAMP=14; SAMP-SEQ=SPARS25	GS ACQ SCENARIO SINGLE		327.938986 Secs X 7 (2295.573 Secs)	
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								[==>(Copy 4)]	***[1]***
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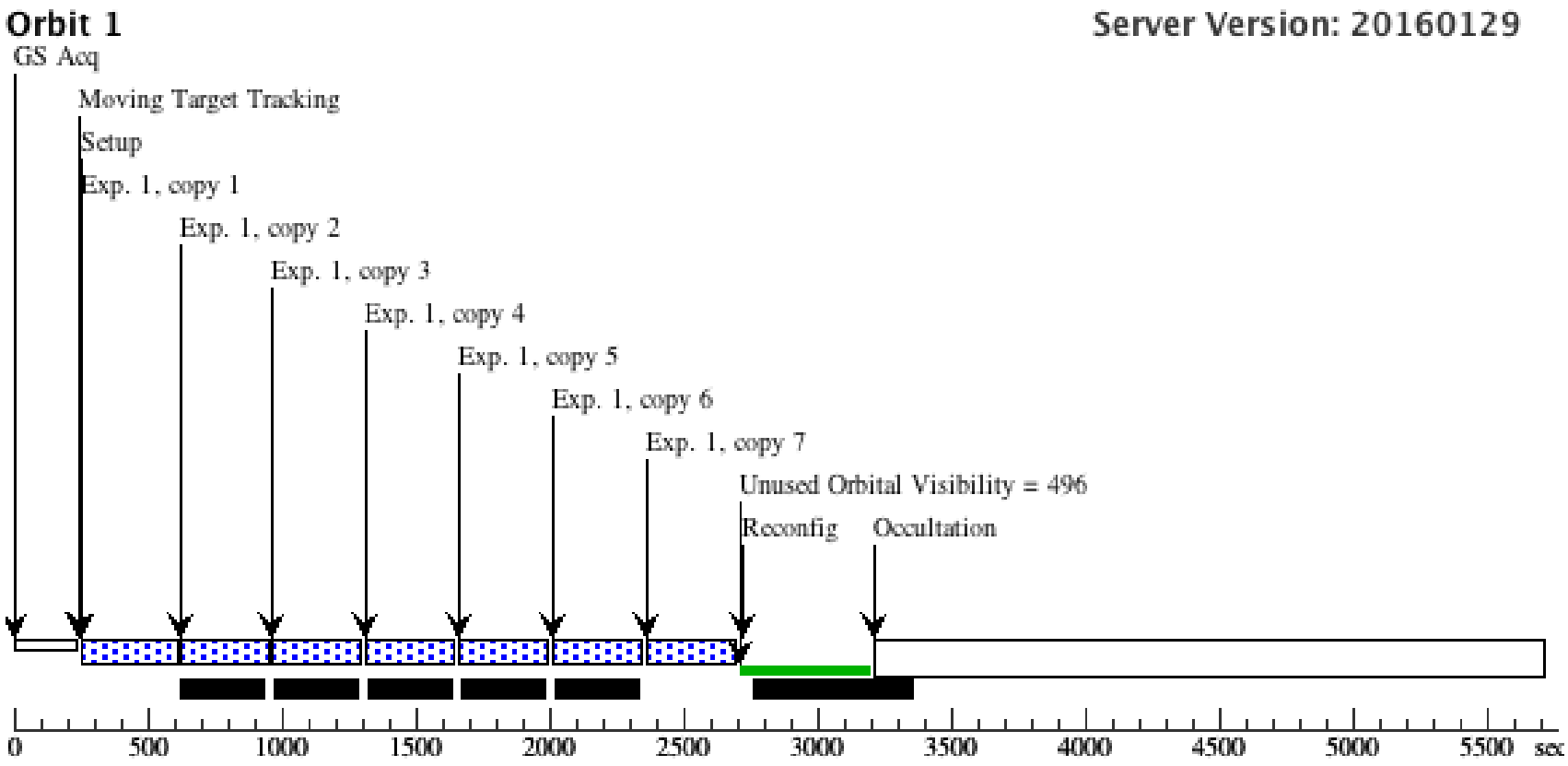
								[==>(Copy 6)]	
								[==>(Copy 7)]	

Orbit Structure



Visit

Proposal 14138, Callisto F167N 2 (12), completed Fri Mar 25 01:11:24 GMT 2016

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: ORIENT 315.4D TO 315.7 D

Comments: + 22.5 deg off nominal lines up parallel to detector side

Solar System Targets

#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
(12)	CALLISTO-ECLIPSE-F167N-2	STD=JUPITER	TYPE=POS_ANGLE,RAD=155,ANG=298,REF=NORTH		ECL U FULL OF CALLISTO BY JUPITER FROM EARTH, SEP OF CALLISTO JUPITER FROM EARTH GT 10", SEP OF CALLISTO IO FROM EARTH GT 30", SEP OF CALLISTO EUROPA FROM EARTH GT 30", SEP OF CALLISTO GANYMEDE FROM EARTH GT 30"	EARTH

Comments: Target is Callisto eclipsed by Jupiter. Visit will be tracking on Jupiter and using a position angle and radius to offset to Callisto (but position angle offset is not set yet).

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	Callisto F167N 2	(12) CALLISTO-ECLIPSE-F167N-2	WFC3/IR, MULTIACCUM, IR	F167N	NSAMP=14; SAMP-SEQ=SPARS25	GS ACQ SCENARIO SINGLE		327.938986 Secs X 8 (2623.512 Secs)	
								[==>(Copy 1)] *[==>(Copy 2)]* *[==>(Copy 3)]* *[==>(Copy 4)]* *[==>(Copy 5)]* *[==>(Copy 6)]* *[==>(Copy 7)]* *[==>(Copy 8)]*	***[1]***

Orbit Structure