17142 - Europa's UV absorptions: oceanic or exogenic origins?

Cycle: 30, Proposal Category: GO

(UV Initiative)

(Availability Mode: SUPPORTED)

INVESTIGATORS

Name	*Institution*
Dr. Samantha Trumbo (PI) (Contact)	**Cornell University**
Dr. Michael E Brown (CoI)	California Institute of Technology
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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-45 WAVE	STIS/CCD STIS/NUV-MAMA	2	09-Jan-2024 12:00:20.0	yes
05	(5) EUROPA-45-2 WAVE	STIS/CCD STIS/NUV-MAMA	2	09-Jan-2024 12:00:23.0	yes
02	(2) EUROPA-135 WAVE	STIS/CCD STIS/NUV-MAMA	2	09-Jan-2024 12:00:26.0	yes
03	(3) EUROPA-225 WAVE	STIS/CCD STIS/NUV-MAMA	2	09-Jan-2024 12:00:29.0	yes
04	(4) EUROPA-315 WAVE	STIS/CCD STIS/NUV-MAMA	2	09-Jan-2024 12:00:32.0	yes

10 Total Orbits Used

ABSTRACT

Recently resurfaced terrain on Europa may contain compositional fingerprints of the internal ocean, providing a window into its chemistry and habitability. However, understanding the relationship between the surface and subsurface chemistries relies on distinguishing endogenic species from those produced via the exogenic bombardment of the surface with Jovian magnetospheric particles. Over the past 20+ years, numerous studies have sought to disentangle the two, but have been stymied by either a lack of spectral features across the wavelengths explored, a lack of sufficient spatial resolution to discern geology from background magnetospheric patterns, or both. High-spatial-resolution observations in the mid-UV would provide a singular opportunity to build our understanding of these contributions to Europa's surface, which will soon be visited by two Flagship-class spacecraft missions--NASA's Europa Clipper and ESA's JUICE. Two of Europa's fewer than ten compositionally diagnostic absorption features (other than those of water ice) lie at mid-UV wavelengths, including the only feature indicative of the plausibly endogenic SO2 and a feature newly discovered this year that could indicate endogenic salt or an exogenic radiolytic product. We propose a simple slit-scanning program with STIS in G230L to map these features at the high spatial resolution necessary to determine their origins. As neither spacecraft mission carries instrumentation spanning these wavelengths, HST provides the only opportunity to map Europa across this critical wavelength range, thereby enhancing the scientific return of the upcoming missions.

OBSERVING DESCRIPTION

Using STIS, we plan to create a uniform dataset of spatially resolved UV (G230L) spectra of the surface of Europa. We plan to replicate previously successful G430L and G750L Europa programs as closely as possible. Four separate phases of Europa will be observed to allow complete longitudinal coverage. Four observations spaced 90 degrees apart ensure that the worst resolution along the equator will be degraded by only ~40% relative to the sub-observer point. The past programs on which we base our observations used the 0.1" slit and stepped it across the surface in 0.06" increments over four Europa phases, for a total of 15 overlapping slit positions per phase. We propose to execute an analogous program in G230L to achieve the same spatial resolution and global coverage at UV wavelengths, thereby resolving any correlations of the UV absorption features with geology.

To ensure that our planned exposures will obtain the signal-to-noise ratio (SNR) necessary to achieve our science goals, we scale from the existing archival G230L observations of Europa. We set our SNR requirements based on our science goal of mapping the 230-nm feature, which is weaker than the SO2 absorption and falls in a noisier portion of the spectrum. Spectra that meet this requirement will thus be more than adequate to map the SO2 absorption. Based on the variability in the 230-nm band strength that we observe in the existing G230L data, we estimate a need to detect

absorptions with an equivalent width of 3 nm to 5 sigma in order to adequately measure the geographic distribution. As the G230L spectra provide ~275 points across the 40-nm FWHM of the absorption feature, this equates to a required SNR of ~4 per pixel. Using 800-second exposures in the 0.2" slit, the existing G230L spectra achieved a SNR of 10 per pixel across the 230-nm region. Scaling directly from this measurement, we can achieve a SNR of 5 per pixel (half that of the current observations and beyond our calculated requirement of 4 per pixel) using the 0.1" slit, at least 200-second integrations, and 2-pixel extractions (resulting in the same effective pixel scale as the past G430L observations).

We plan our program in 4 two-orbit visits (one visit per phase; two orbits to map the entire disk each time). We break up the slit-scan of the disk each visit into two separate patterns: a 7-slit pattern covering slightly less than half of the disk to be executed in the first orbit of a visit, which has less science time due to target acquisition, and a 9-slit pattern covering slightly more than half of the disk to be executed in the second orbit of a visit. In the exposure sequence corresponding to each pattern within the visits, we specify the necessary target offsets, such that the 7-slit pattern begins at the edge of the disk and the 9-slit pattern begins where the 7-slit pattern left off, thereby completing coverage of the disk over the 16 total slit positions. To maximize time dedicated to science exposures, we place the necessary wavecals at the end of each orbit, so that they are pushed into occultation.

In the event of reduced-gyro operations, the main impacts to this program are expected to be reduced schedulability, as these observations are already time-constrained, and increased overheads for target acquisition, resulting in reduced science exposure times.

Proposal 17142 - EUROPA-45 (01) - Europa's UV absorptions: oceanic or exogenic origins?

Visit

Proposal 17142, EUROPA-45 (01), failed Tue Jan 09 17:00:33 GMT 2024

Diagnostic Status: Warning

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

Special Requirements: PCS MODE FINE; BETWEEN 01-OCT-2022:00:00:00 AND 01-JAN-2023:00:00:00; BETWEEN 01-SEP-2023:00:00:00 AND 30-SEP-2023:00:00:00; VISIBILITY INTERVAL NO GYRO BIAS UPDATE ON MOVING TARGET

Comments: Timing windows are chosen such that Europa's angular size is near its maximum of ~1 arcsecond, in order to maximize spatial resolution, which is key to our science goals.

Diagnostics

(EUROPA-45 (01)) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

(EUROPA-45 (01)) Informational (Form): The Visit Planner and Spike may produce different schedulability results.

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(2)	Pattern Type=STIS-PERP-TO-SLIT	Coordinate Frame=POS-TARG		(2)
	Purpose=MOSAIC	Pattern Orientation=0.0		
	Number Of Points=7	Angle Between Sides=		
	Point Spacing=0.06	Center Pattern=false		
	Line Spacing=			
(3)	Pattern Type=STIS-PERP-TO-SLIT	Coordinate Frame=POS-TARG		(4)
	Purpose=MOSAIC	Pattern Orientation=0.0		
	Number Of Points=9	Angle Between Sides=		
	Point Spacing=0.06	Center Pattern=false		
	Line Spacing=			

Solar System Targets

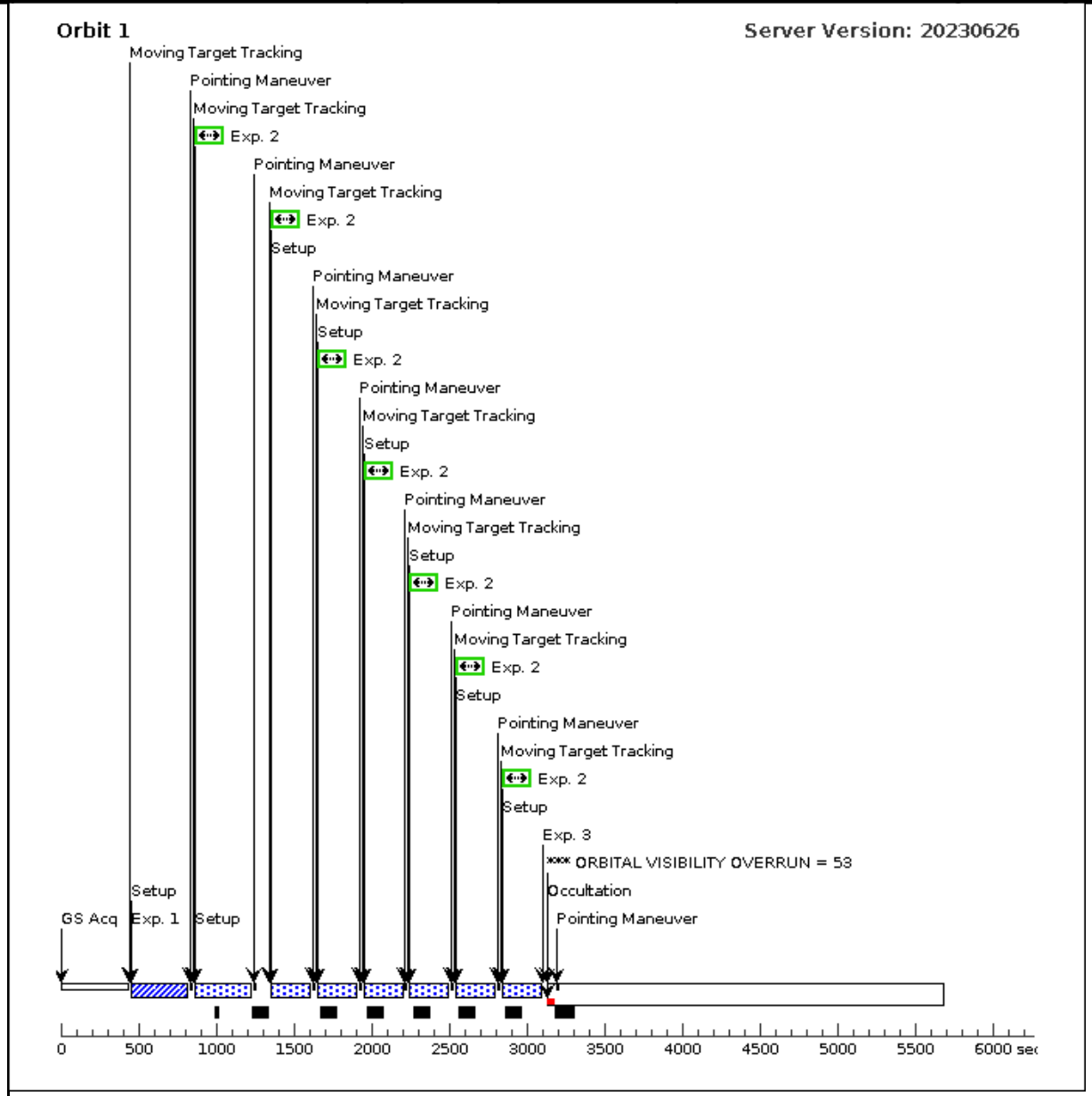
#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
(1)	EUROPA-45	STD=JUPITER	STD=EUROPA		NOT OCC OF EUROPA-45 BY JUPITER FROM EARTH, SEP OF EUROPA-45 IO FROM EARTH GT 17.5", SEP OF EUROPA-45 GANYMEDE FROM EARTH GT 10", SEP OF EUROPA-45 CALLISTO FROM EARTH GT 10", CML OF EUROPA-45 FROM EARTH BETWEEN 33 57	EARTH

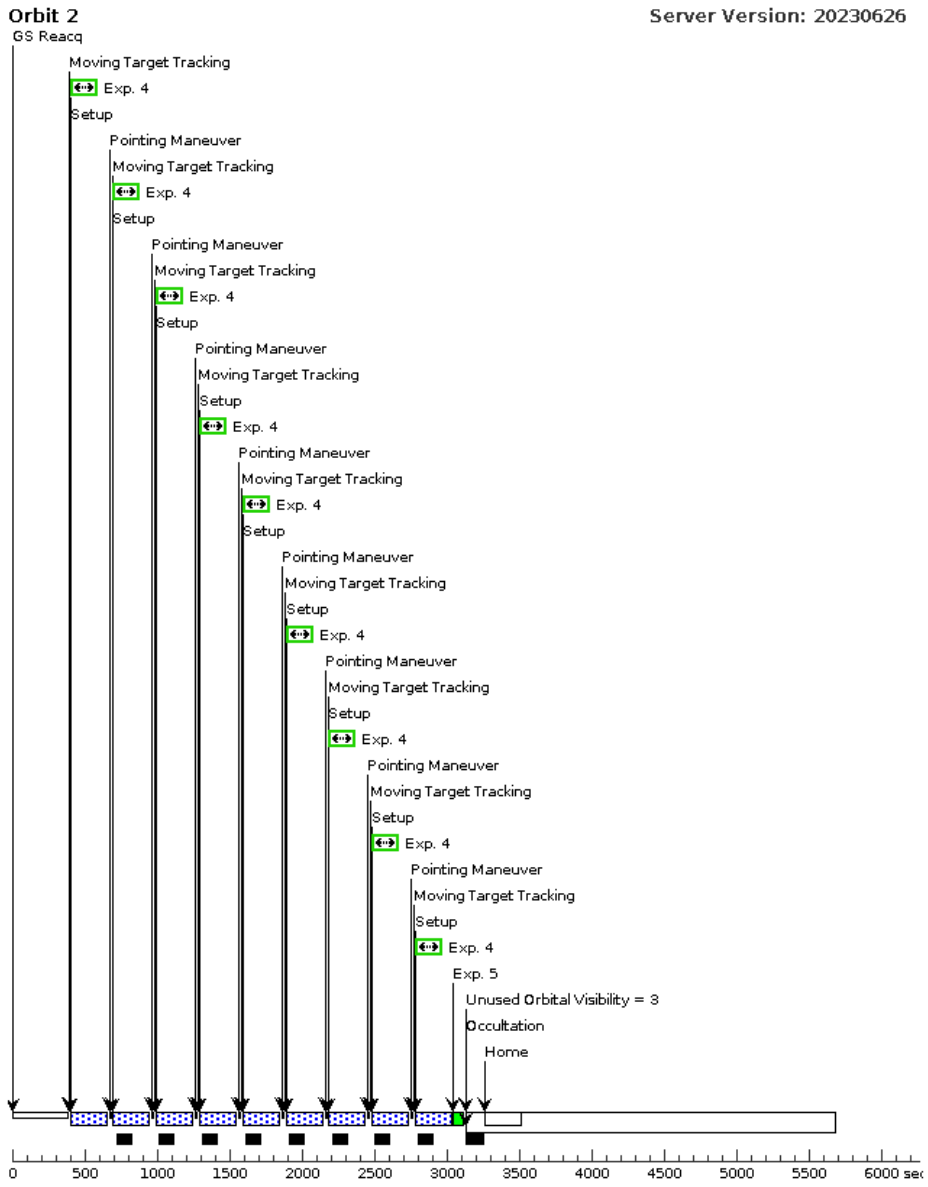
Comments: Centered near phase = 45 degrees (45 W longitude)
Description=SATELLITE EUROPA
Extended=YES

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	acq (1811106)	(1) EUROPA-45	STIS/CCD, ACQ, F28X50LP	MIRROR	ACQTYPE=DIFFUSE; CHECKBOX=21; DIFFUSE-CENTER=GEOMETRIC-CENTER		Sequence 1-2 Non-Int in EUROPA-45 (01)	0.1 Secs (0.1 Secs) *[==>]*	***[1]***
2	7 slits Europa-45 (1813446)	(1) EUROPA-45	STIS/NUV-MAMA, ACCUM, 52X0.1	G230L 2376 A	WAVECAL=NO	POS TARG -0.45,0	Sequence 1-2 Non-Int in EUROPA-45 (01) Pattern 2, Exps 2-2 in Sequence 1-2 Non-Int in EUROPA-45 (01) (2)	234 Secs (1638 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]* *[==>(Pattern 5)]* *[==>(Pattern 6)]* *[==>(Pattern 7)]*	***[1]***
3	Wavecal for G230L	WAVE	STIS/NUV-MAMA, ACCUM, 52X0.1	G230L 2376 A				*[==>]*	***[1]***
4	9 slits Europa-45 (1813446)	(1) EUROPA-45	STIS/NUV-MAMA, ACCUM, 52X0.1	G230L 2376 A	WAVECAL=NO	POS TARG -0.03,0	Sequence 4-4 Non-Int in EUROPA-45 (01) Pattern 3, Exps 4-4 in Sequence 4-4 Non-Int in EUROPA-45 (01) (3)	235 Secs (2115 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]* *[==>(Pattern 5)]* *[==>(Pattern 6)]* *[==>(Pattern 7)]* *[==>(Pattern 8)]* *[==>(Pattern 9)]*	***[2]***
5	Second Wavecal for G230L	WAVE	STIS/NUV-MAMA, ACCUM, 52X0.1	G230L 2376 A				*[==>]*	***[2]***

Orbit Structure




Orbit 2
Server Version: 20230626
GS Reacq
Moving Target Tracking
Exp. 4
Setup
Pointing Maneuver
Moving Target Tracking
Exp. 4
Setup
Pointing Maneuver
Moving Target Tracking
Exp. 4
Setup
Pointing Maneuver
Moving Target Tracking
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Exp. 4
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Setup
Exp. 4
Pointing Maneuver
Moving Target Tracking
Setup
Exp. 4
Exp. 5
Unused Orbital Visibility = 3
Occultation
Home
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000 sec

Visit

Proposal 17142, EUROPA-45 (05), implementation Tue Jan 09 17:00:33 GMT 2024

Diagnostic Status: Informational

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

Special Requirements: PCS MODE FINE; VISIBILITY INTERVAL NO GYRO BIAS UPDATE ON MOVING TARGET

Comments: Timing windows are chosen such that Europa's angular size is near its maximum of ~1 arcsecond, in order to maximize spatial resolution, which is key to our science goals.

Diagnostics

(EUROPA-45 (05)) Informational (Form): The Visit Planner and Spike may produce different schedulability results.

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(2)	Pattern Type=STIS-PERP-TO-SLIT	Coordinate Frame=POS-TARG		(2)
	Purpose=MOSAIC	Pattern Orientation=0.0		
	Number Of Points=7	Angle Between Sides=		
	Point Spacing=0.06	Center Pattern=false		
	Line Spacing=			
(3)	Pattern Type=STIS-PERP-TO-SLIT	Coordinate Frame=POS-TARG		(4)
	Purpose=MOSAIC	Pattern Orientation=0.0		
	Number Of Points=9	Angle Between Sides=		
	Point Spacing=0.06	Center Pattern=false		
	Line Spacing=			

Solar System Targets

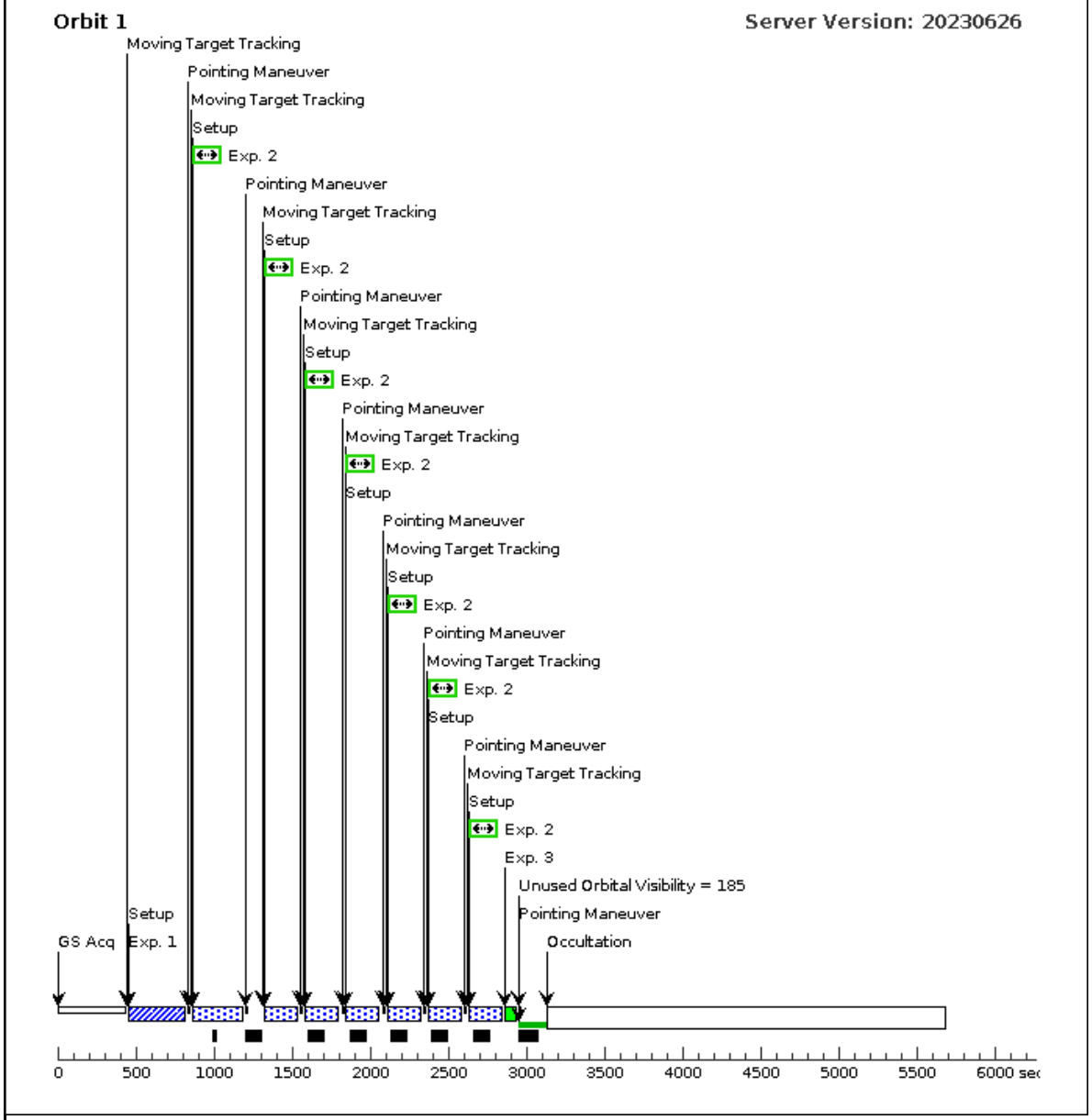
#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
(5)	EUROPA-45-2	STD=JUPITER	STD=EUROPA		NOT OCC OF EUROPA-45-2 BY JUPITER FROM EARTH, SEP OF EUROPA-45-2 IO FROM EARTH GT 17.5", SEP OF EUROPA-45-2 GANYMEDE FROM EARTH GT 10", SEP OF EUROPA-45-2 CALLISTO FROM EARTH GT 10", CML OF EUROPA-45 FROM EARTH BETWEEN 33 57	EARTH

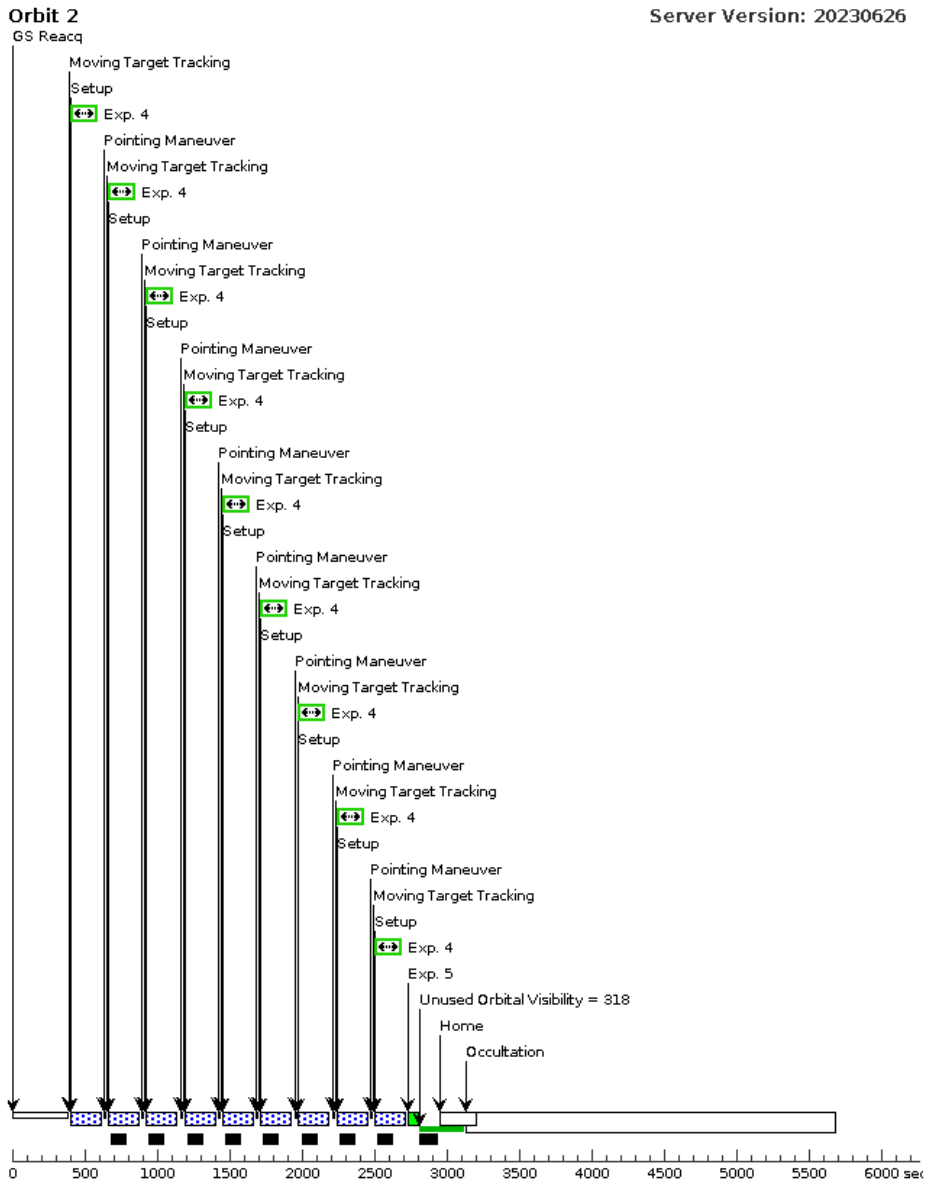
Comments: Centered near phase = 45 degrees (45 W longitude)
Description=SATELLITE EUROPA
Extended=YES

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	acq (1811106)	(5) EUROPA-45-2	STIS/CCD, ACQ, F28X50LP	MIRROR	ACQTYPE=DIFFUSE; CHECKBOX=21; DIFFUSE-CENTER=GEOMETRIC-CENTER		Sequence 1-2 Non-Int in EUROPA-45 (05)	0.1 Secs (0.1 Secs) *[==>]*	***[1]***
2	7 slits Europa-45 (1813446)	(5) EUROPA-45-2	STIS/NUV-MAMA, ACCUM, 52X0.1	G230L 2376 A	WAVECAL=NO	POS TARG -0.45,0	Sequence 1-2 Non-Int in EUROPA-45 (05) Pattern 2, Exps 2-2 in Sequence 1-2 Non-Int in EUROPA-45 (05) (2)	200 Secs (1400 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]* *[==>(Pattern 5)]* *[==>(Pattern 6)]* *[==>(Pattern 7)]*	***[1]***
3	Wavecal for G230L	WAVE	STIS/NUV-MAMA, ACCUM, 52X0.1	G230L 2376 A				*[==>]*	***[1]***
4	9 slits Europa-45 (1813446)	(5) EUROPA-45-2	STIS/NUV-MAMA, ACCUM, 52X0.1	G230L 2376 A	WAVECAL=NO	POS TARG -0.03,0	Sequence 4-4 Non-Int in EUROPA-45 (05) Pattern 3, Exps 4-4 in Sequence 4-4 Non-Int in EUROPA-45 (05) (3)	200 Secs (1800 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]* *[==>(Pattern 5)]* *[==>(Pattern 6)]* *[==>(Pattern 7)]* *[==>(Pattern 8)]* *[==>(Pattern 9)]*	***[2]***
5	Second Wavecal for G230L	WAVE	STIS/NUV-MAMA, ACCUM, 52X0.1	G230L 2376 A				*[==>]*	***[2]***

Orbit Structure




Orbit 2
Server Version: 20230626
GS Reacq
Moving Target Tracking
Setup
Exp. 4
Pointing Maneuver
Moving Target Tracking
Exp. 4
Setup
Pointing Maneuver
Moving Target Tracking
Exp. 4
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Moving Target Tracking
Exp. 4
Setup
Pointing Maneuver
Moving Target Tracking
Setup
Exp. 4
Exp. 5
Unused Orbital Visibility = 318
Home
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000 sec

Visit

Proposal 17142, EUROPA-135 (02), completed Tue Jan 09 17:00:33 GMT 2024

Diagnostic Status: Warning

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

Special Requirements: PCS MODE FINE; BETWEEN 01-OCT-2022:00:00:00 AND 30-NOV-2022:00:00:00; BETWEEN 01-SEP-2023:00:00:00 AND 30-SEP-2023:00:00:00; VISIBILITY INTERVAL NO GYRO BIAS UPDATE ON MOVING TARGET

Comments: Timing windows are chosen such that Europa's angular size is near its maximum of ~1 arcsecond, in order to maximize spatial resolution, which is key to our science goals.

Diagnostics

(EUROPA-135 (02)) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

(EUROPA-135 (02)) Informational (Form): The Visit Planner and Spike may produce different schedulability results.

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(2)	Pattern Type=STIS-PERP-TO-SLIT	Coordinate Frame=POS-TARG		(2)
	Purpose=MOSAIC	Pattern Orientation=0.0		
	Number Of Points=7	Angle Between Sides=		
	Point Spacing=0.06	Center Pattern=false		
	Line Spacing=			
(3)	Pattern Type=STIS-PERP-TO-SLIT	Coordinate Frame=POS-TARG		(4)
	Purpose=MOSAIC	Pattern Orientation=0.0		
	Number Of Points=9	Angle Between Sides=		
	Point Spacing=0.06	Center Pattern=false		
	Line Spacing=			

Solar System Targets

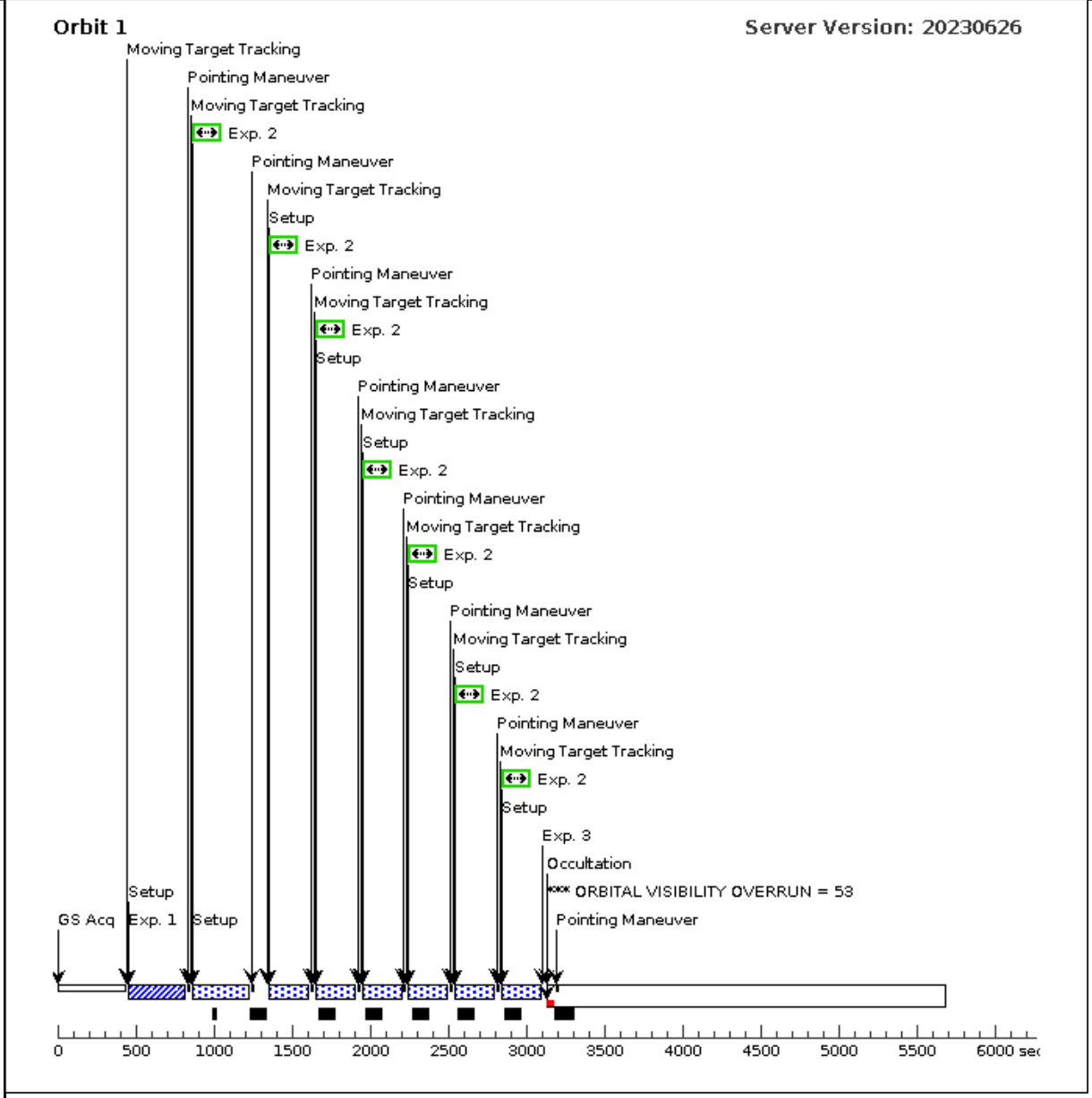
#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
(2)	EUROPA-135	STD=JUPITER	STD=EUROPA		NOT OCC OF EUROPA-135 BY JUPITER FROM EARTH, SEP OF EUROPA-135 IO FROM EARTH GT 10", SEP OF EUROPA-135 GANYMEDE FROM EARTH GT 10", SEP OF EUROPA-135 CALLISTO FROM EARTH GT 10", CML OF EUROPA-135 FROM EARTH BETWEEN 127.5 142.5	EARTH

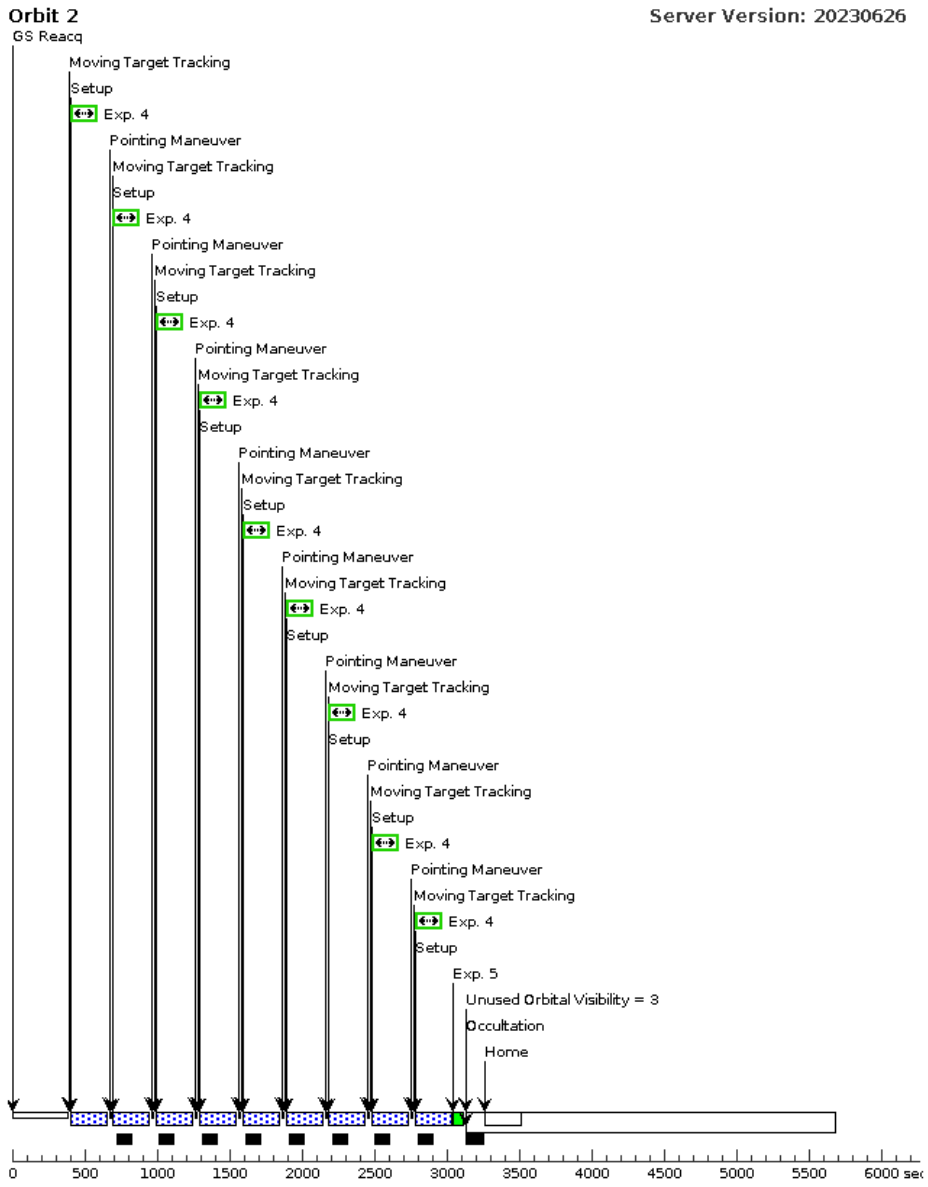
Comments: Centered near phase = 135 degrees (135 W longitude)
Description=SATELLITE EUROPA
Extended=YES

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	acq (1811106)	(2) EUROPA-135	STIS/CCD, ACQ, F28X50LP	MIRROR	ACQTYPE=DIFFUSE; CHECKBOX=21; DIFFUSE-CENTER=GEOMETRIC-CENTER		Sequence 1-2 Non-Int in EUROPA-135 (02)	0.1 Secs (0.1 Secs) *[==>]*	***[1]***
2	7 slits Europa-135 (1813446)	(2) EUROPA-135	STIS/NUV-MAMA, ACCUM, 52X0.1	G230L 2376 A	WAVECAL=NO	POS TARG -0.45,0	Sequence 1-2 Non-Int in EUROPA-135 (02) Pattern 2, Exps 2-2 in Sequence 1-2 Non-Int in EUROPA-135 (02) (2)	234 Secs (1638 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]* *[==>(Pattern 5)]* *[==>(Pattern 6)]* *[==>(Pattern 7)]*	***[1]***
3	Wavecal for G230L	WAVE	STIS/NUV-MAMA, ACCUM, 52X0.1	G230L 2376 A				*[==>]*	***[1]***
4	9 slits Europa-135 (1813446)	(2) EUROPA-135	STIS/NUV-MAMA, ACCUM, 52X0.1	G230L 2376 A	WAVECAL=NO	POS TARG -.03,0	Sequence 4-4 Non-Int in EUROPA-135 (02) Pattern 3, Exps 4-4 in Sequence 4-4 Non-Int in EUROPA-135 (02) (3)	235 Secs (2115 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]* *[==>(Pattern 5)]* *[==>(Pattern 6)]* *[==>(Pattern 7)]* *[==>(Pattern 8)]* *[==>(Pattern 9)]*	***[2]***
5	Second Wavecal for G230L	WAVE	STIS/NUV-MAMA, ACCUM, 52X0.1	G230L 2376 A				*[==>]*	***[2]***

Orbit Structure




Orbit 2
Server Version: 20230626
GS Reacq
Moving Target Tracking
Setup
Exp. 4
Pointing Maneuver
Moving Target Tracking
Setup
Exp. 4
Pointing Maneuver
Moving Target Tracking
Setup
Exp. 4
Pointing Maneuver
Moving Target Tracking
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Moving Target Tracking
Exp. 4
Setup
Pointing Maneuver
Moving Target Tracking
Setup
Exp. 4
Pointing Maneuver
Moving Target Tracking
Exp. 4
Setup
Exp. 5
Unused Orbital Visibility = 3
Occultation
Home
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000 sec

Visit

Proposal 17142, EUROPA-225 (03), completed Tue Jan 09 17:00:34 GMT 2024

Diagnostic Status: Warning

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

Special Requirements: PCS MODE FINE; BETWEEN 01-OCT-2022:00:00:00 AND 01-JAN-2023:00:00:00; BETWEEN 01-SEP-2023:00:00:00 AND 30-SEP-2023:00:00:00; VISIBILITY INTERVAL NO GYRO BIAS UPDATE ON MOVING TARGET

Comments: Timing windows are chosen such that Europa's angular size is near its maximum of ~1 arcsecond, in order to maximize spatial resolution, which is key to our science goals.

Diagnostics

(EUROPA-225 (03)) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

(EUROPA-225 (03)) Informational (Form): The Visit Planner and Spike may produce different schedulability results.

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(2)	Pattern Type=STIS-PERP-TO-SLIT	Coordinate Frame=POS-TARG		(2)
	Purpose=MOSAIC	Pattern Orientation=0.0		
	Number Of Points=7	Angle Between Sides=		
	Point Spacing=0.06	Center Pattern=false		
	Line Spacing=			
(3)	Pattern Type=STIS-PERP-TO-SLIT	Coordinate Frame=POS-TARG		(4)
	Purpose=MOSAIC	Pattern Orientation=0.0		
	Number Of Points=9	Angle Between Sides=		
	Point Spacing=0.06	Center Pattern=false		
	Line Spacing=			

Solar System Targets

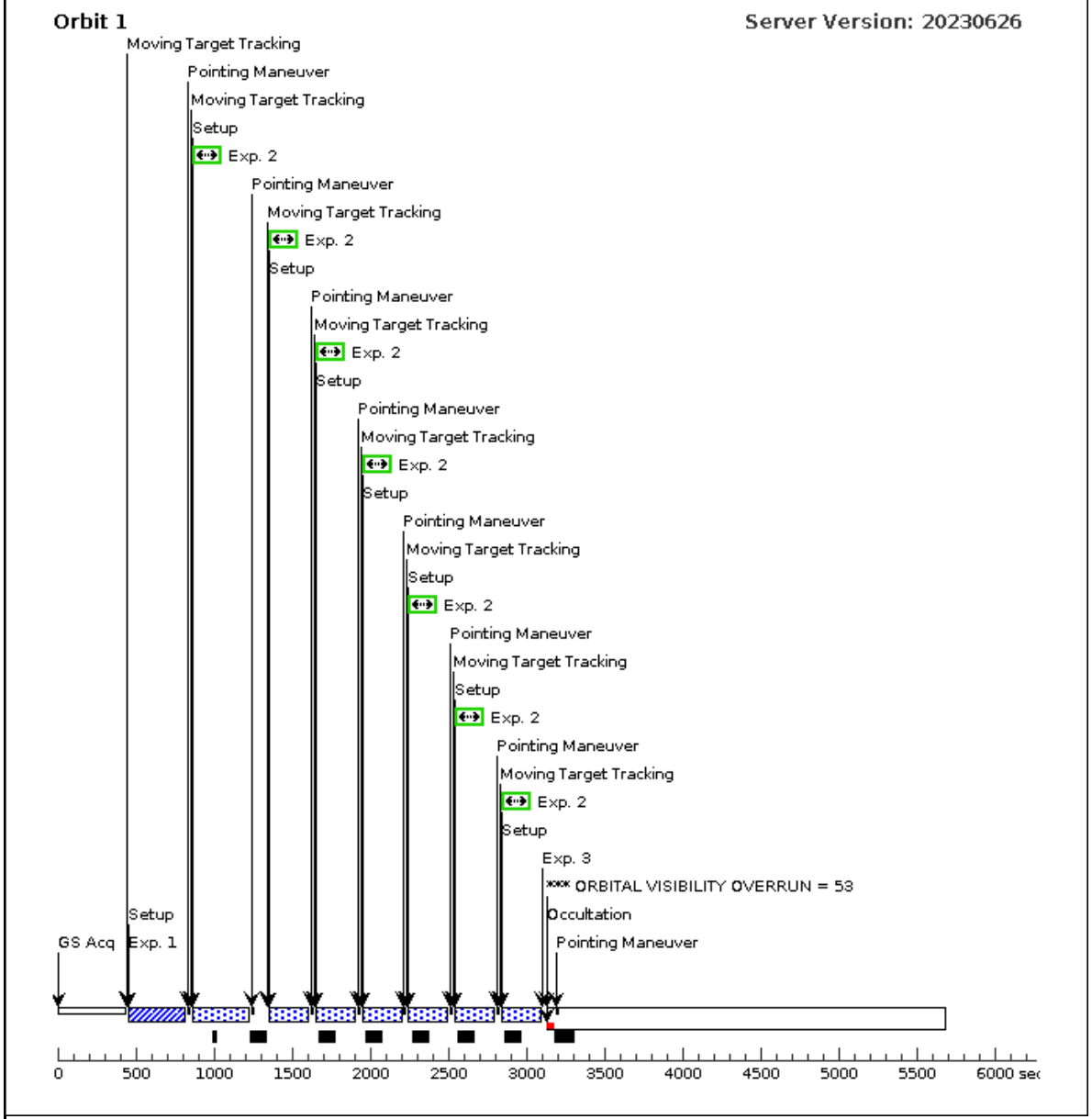
#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
(3)	EUROPA-225	STD=JUPITER	STD=EUROPA		NOT OCC OF EUROPA-225 BY JUPITER FROM EARTH, SEP OF EUROPA-225 IO FROM EARTH GT 17.5", SEP OF EUROPA-225 GANYMEDE FROM EARTH GT 10", SEP OF EUROPA-225 CALLISTO FROM EARTH GT 10", CML OF EUROPA-225 FROM EARTH BETWEEN 215 235	EARTH

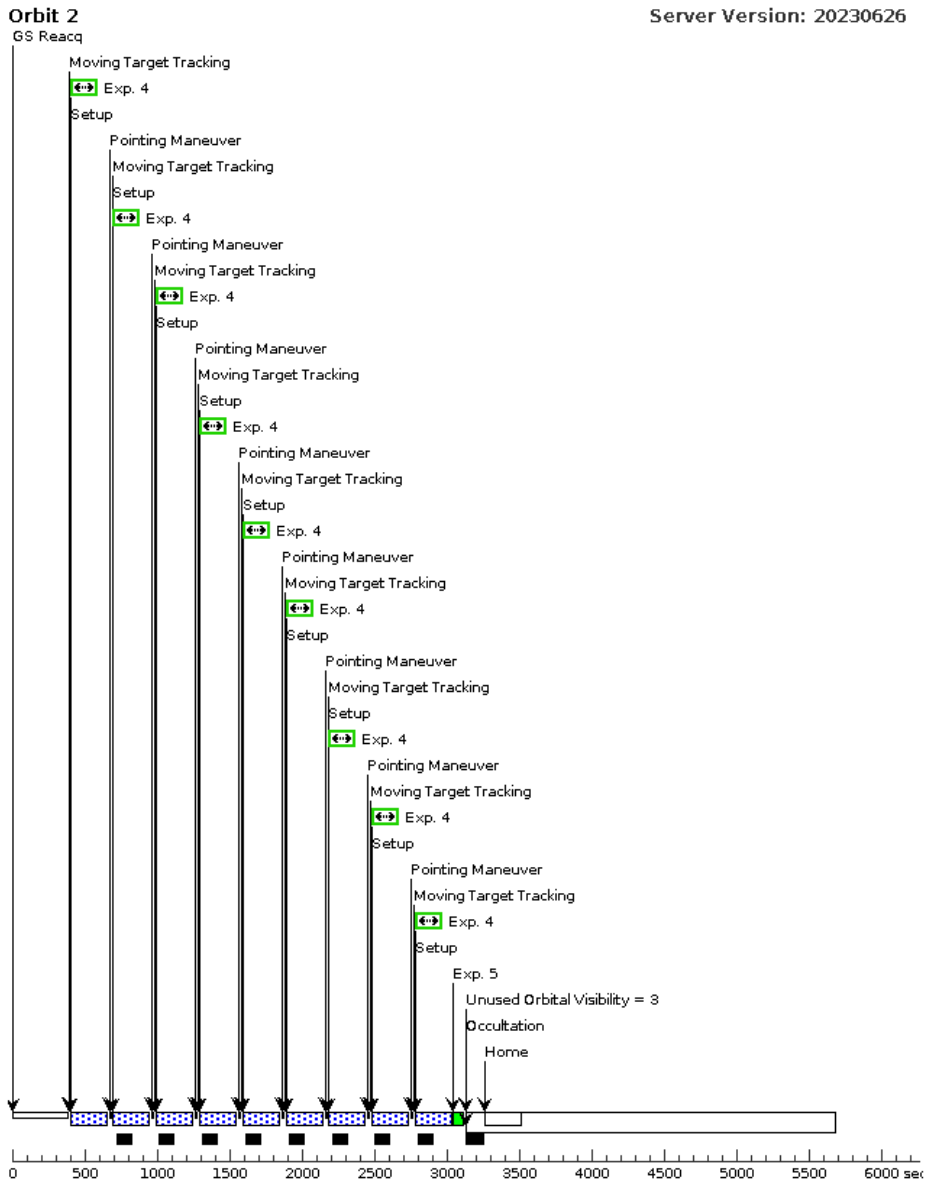
Comments: Centered near phase =225 degrees (225 W longitude)
Description=SATELLITE EUROPA
Extended=YES

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	acq (1811106)	(3) EUROPA-225	STIS/CCD, ACQ, F28X50LP	MIRROR	ACQTYPE=DIFFUSE; CHECKBOX=21; DIFFUSE-CENTER=GEOMETRIC-CENTER		Sequence 1-2 Non-Int in EUROPA-225 (03)	0.1 Secs (0.1 Secs) *[==>]*	***[1]***
2	7 slits Europa-225 (1813446)	(3) EUROPA-225	STIS/NUV-MAMA, ACCUM, 52X0.1	G230L 2376 A	WAVECAL=NO	POS TARG -0.45,0	Sequence 1-2 Non-Int in EUROPA-225 (03) Pattern 2, Exps 2-2 in Sequence 1-2 Non-Int in EUROPA-225 (03) (2)	234 Secs (1638 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]* *[==>(Pattern 5)]* *[==>(Pattern 6)]* *[==>(Pattern 7)]*	***[1]***
3	Wavecal for G230L	WAVE	STIS/NUV-MAMA, ACCUM, 52X0.1	G230L 2376 A				*[==>]*	***[1]***
4	9 slits Europa-225 (1813446)	(3) EUROPA-225	STIS/NUV-MAMA, ACCUM, 52X0.1	G230L 2376 A	WAVECAL=NO	POS TARG -.03,0	Sequence 4-4 Non-Int in EUROPA-225 (03) Pattern 3, Exps 4-4 in Sequence 4-4 Non-Int in EUROPA-225 (03) (3)	235 Secs (2115 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]* *[==>(Pattern 5)]* *[==>(Pattern 6)]* *[==>(Pattern 7)]* *[==>(Pattern 8)]* *[==>(Pattern 9)]*	***[2]***
5	Second Wavecal for G230L	WAVE	STIS/NUV-MAMA, ACCUM, 52X0.1	G230L 2376 A				*[==>]*	***[2]***

Orbit Structure




Orbit 2
Server Version: 20230626
GS Reacq
Moving Target Tracking
Exp. 4
Setup
Pointing Maneuver
Moving Target Tracking
Setup
Exp. 4
Pointing Maneuver
Moving Target Tracking
Exp. 4
Setup
Pointing Maneuver
Moving Target Tracking
Setup
Exp. 4
Pointing Maneuver
Moving Target Tracking
Setup
Exp. 4
Pointing Maneuver
Moving Target Tracking
Exp. 4
Setup
Pointing Maneuver
Moving Target Tracking
Setup
Exp. 4
Pointing Maneuver
Moving Target Tracking
Exp. 4
Setup
Pointing Maneuver
Moving Target Tracking
Exp. 4
Setup
Exp. 5
Unused Orbital Visibility = 3
Occultation
Home
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000 sec

Visit

Proposal 17142, EUROPA-315 (04), completed Tue Jan 09 17:00:34 GMT 2024

Diagnostic Status: Warning

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

Special Requirements: PCS MODE FINE; BETWEEN 01-OCT-2022:00:00:00 AND 01-JAN-2023:00:00:00; BETWEEN 01-SEP-2023:00:00:00 AND 30-SEP-2023:00:00:00; VISIBILITY INTERVAL NO GYRO BIAS UPDATE ON MOVING TARGET

Comments: Timing windows are chosen such that Europa's angular size is near its maximum of ~1 arcsecond, in order to maximize spatial resolution, which is key to our science goals.

Diagnostics

(EUROPA-315 (04)) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

(EUROPA-315 (04)) Informational (Form): The Visit Planner and Spike may produce different schedulability results.

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(2)	Pattern Type=STIS-PERP-TO-SLIT	Coordinate Frame=POS-TARG		(2)
	Purpose=MOSAIC	Pattern Orientation=0.0		
	Number Of Points=7	Angle Between Sides=		
	Point Spacing=0.06	Center Pattern=false		
	Line Spacing=			
(3)	Pattern Type=STIS-PERP-TO-SLIT	Coordinate Frame=POS-TARG		(4)
	Purpose=MOSAIC	Pattern Orientation=0.0		
	Number Of Points=9	Angle Between Sides=		
	Point Spacing=0.06	Center Pattern=false		
	Line Spacing=			

Solar System Targets

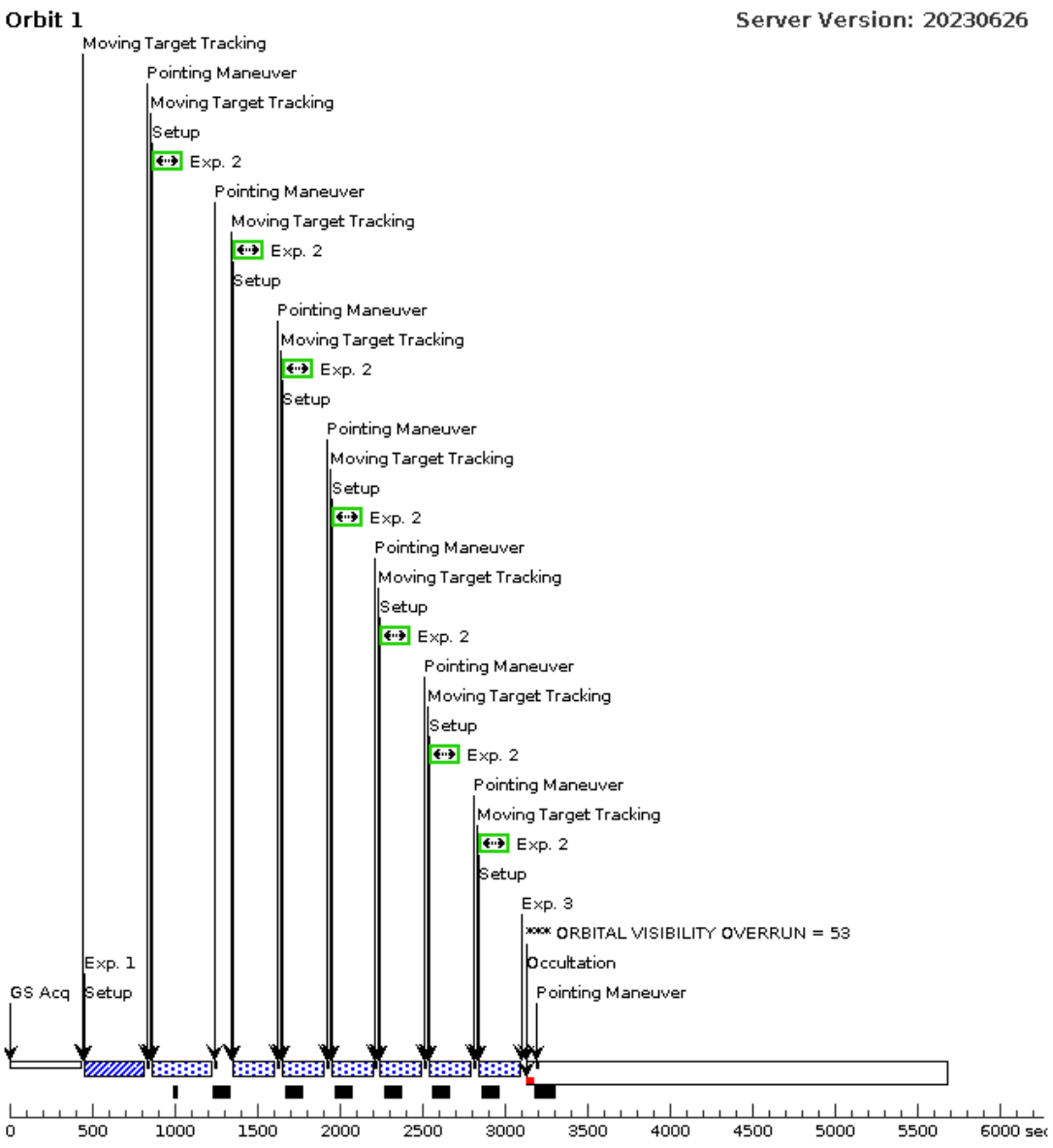
#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
(4)	EUROPA-315	STD=JUPITER	STD=EUROPA		NOT OCC OF EUROPA-315 BY JUPITER FROM EARTH, SEP OF EUROPA-315 IO FROM EARTH GT 17.5", SEP OF EUROPA-315 GANYMEDE FROM EARTH GT 10", SEP OF EUROPA-315 CALLISTO FROM EARTH GT 10", CML OF EUROPA-315 FROM EARTH BETWEEN 305 325	EARTH

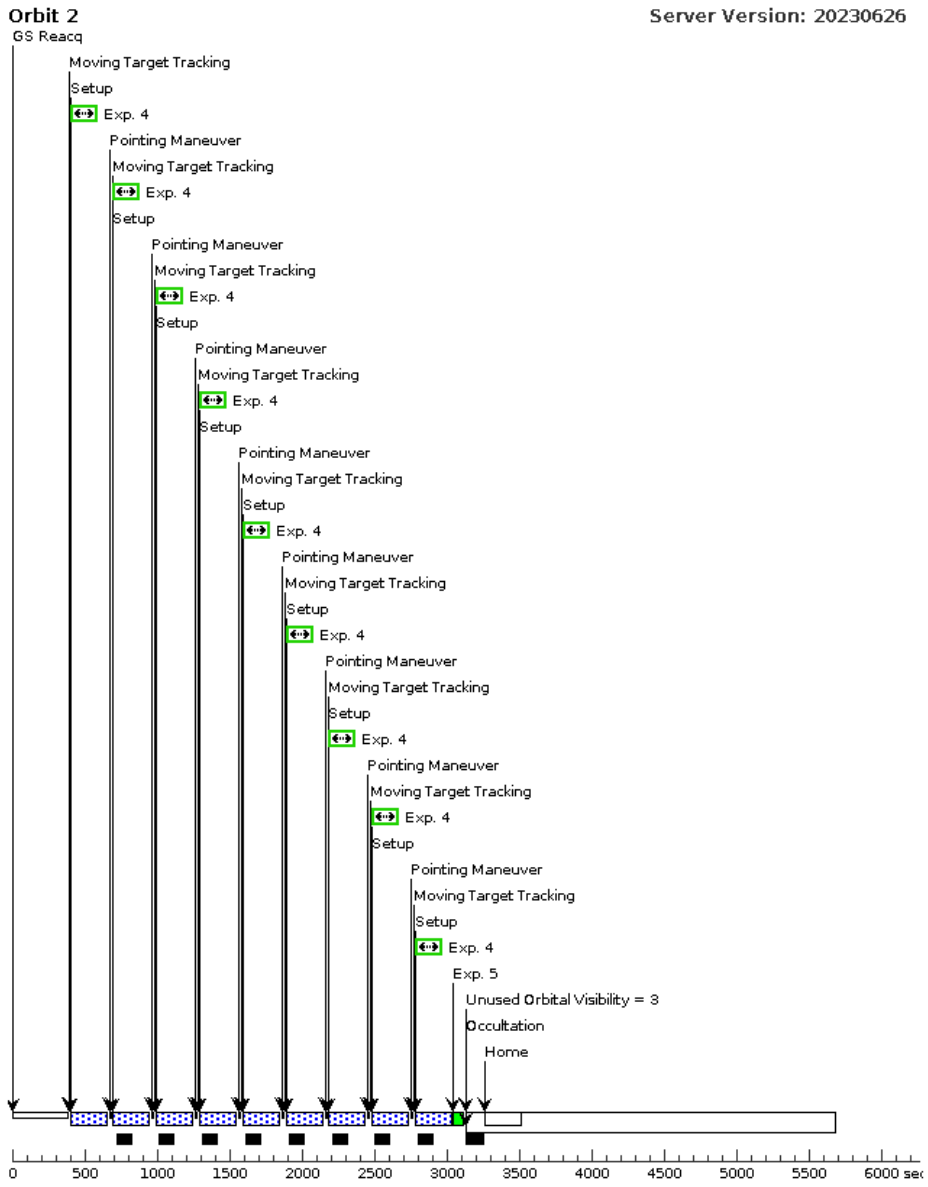
Comments: Centered near phase = 315 degrees (315 W longitude)
Description=SATELLITE EUROPA
Extended=YES

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	acq (1811106)	(4) EUROPA-315	STIS/CCD, ACQ, F28X50LP	MIRROR	ACQTYPE=DIFFUSE; CHECKBOX=21; DIFFUSE-CENTER=GEOMETRIC-CENTER		Sequence 1-2 Non-Int in EUROPA-315 (04)	0.1 Secs (0.1 Secs) *[==>]*	***[1]***
2	7 slits Europa-315 (1813446)	(4) EUROPA-315	STIS/NUV-MAMA, ACCUM, 52X0.1	G230L 2376 A	WAVECAL=NO	POS TARG -0.45,0	Sequence 1-2 Non-Int in EUROPA-315 (04) Pattern 2, Exps 2-2 in Sequence 1-2 Non-Int in EUROPA-315 (04) (2)	234 Secs (1638 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]* *[==>(Pattern 5)]* *[==>(Pattern 6)]* *[==>(Pattern 7)]*	***[1]***
3	Wavecal for G230L	WAVE	STIS/NUV-MAMA, ACCUM, 52X0.1	G230L 2376 A				*[==>]*	***[1]***
4	9 slits Europa-315 (1813446)	(4) EUROPA-315	STIS/NUV-MAMA, ACCUM, 52X0.1	G230L 2376 A	WAVECAL=NO	POS TARG -.03,0	Sequence 4-4 Non-Int in EUROPA-315 (04) Pattern 3, Exps 4-4 in Sequence 4-4 Non-Int in EUROPA-315 (04) (3)	235 Secs (2115 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]* *[==>(Pattern 5)]* *[==>(Pattern 6)]* *[==>(Pattern 7)]* *[==>(Pattern 8)]* *[==>(Pattern 9)]*	***[2]***
5	Second Wavecal for G230L	WAVE	STIS/NUV-MAMA, ACCUM, 52X0.1	G230L 2376 A				*[==>]*	***[2]***

Orbit Structure




Orbit 2
Server Version: 20230626
GS Reacq
Moving Target Tracking
Setup
Exp. 4
Pointing Maneuver
Moving Target Tracking
Exp. 4
Setup
Pointing Maneuver
Moving Target Tracking
Exp. 4
Setup
Pointing Maneuver
Moving Target Tracking
Exp. 4
Setup
Pointing Maneuver
Moving Target Tracking
Setup
Exp. 4
Pointing Maneuver
Moving Target Tracking
Setup
Exp. 4
Pointing Maneuver
Moving Target Tracking
Setup
Exp. 4
Pointing Maneuver
Moving Target Tracking
Exp. 4
Setup
Pointing Maneuver
Moving Target Tracking
Setup
Exp. 4
Exp. 5
Unused Orbital Visibility = 3
Occultation
Home
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000 sec