16499 - Providing Context for Juno's only Close Ganymede Flyby

Cycle: 28, Proposal Category: GO

(UV Initiative)

(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) GANYMEDE-PJ34 WAVE	STIS/CCD STIS/FUV-MAMA	3	13-May-2021 09:01:00.0	yes
02	(1) GANYMEDE-PJ34 WAVE	STIS/CCD STIS/FUV-MAMA	1	13-May-2021 09:01:02.0	yes
2A	(1) GANYMEDE-PJ34	STIS/CCD STIS/FUV-MAMA	2	13-May-2021 09:01:03.0	yes
03	(1) GANYMEDE-PJ34	STIS/CCD STIS/FUV-MAMA	2	13-May-2021 09:01:04.0	yes
04	(1) GANYMEDE-PJ34	STIS/CCD STIS/FUV-MAMA	1	13-May-2021 09:01:04.0	yes
05	(1) GANYMEDE-PJ34	STIS/CCD STIS/FUV-MAMA	1	13-May-2021 09:01:05.0	yes
06	(1) GANYMEDE-PJ34	STIS/CCD STIS/FUV-MAMA	2	13-May-2021 09:01:06.0	yes

12 Total Orbits Used

ABSTRACT

Jupiter's planet-sized satellite Ganymede is the only known moon with a mini-magnetosphere and two auroral ovals. In its only close flyby of Ganymede, NASA's Juno spacecraft is scheduled to pass through the satellite's magnetotail on June 7, 2021. The magnetotail is the region where magnetic reconnection and energization is expected to be strongest. Juno's flyby provides a unique opportunity to make significant progress about the poorly understood processes which energize Ganymede's magnetosphere and power its auroral emissions. The flyby occurs over a short time-span of only approximately 30 minutes. We propose 6 HST orbits to observe Ganymede's aurora which will provide important context and assist with the interpretation of the Juno observations. We request three HST orbits before the Juno flyby to establish the state of the aurora prior to the flyby and three additional orbits after the Juno flyby to monitor the changes in Ganymede's aurora after the flyby. The moon's aurora is known to vary on timescales of Juno's flyby and the proposed HST observations. The collection of HST observations over these timescales will enable an investigation of how conditions and events observed by Juno are related to changes in Ganymede's aurora observed by HST. The Juno flyby provides a very important and unique opportunity for HST to complement investigations of NASA's solar system exploration program and improve our understanding of the only magnetosphere in the solar system without a bow shock.

OBSERVING DESCRIPTION

We plan 2 visits of 3 orbits each with STIS to observe Ganymede at western elongation in coordination with the Juno flyby on June 7, 2021. We will use STIS with grating G140L at central wavelength 1425 A and a slit of 2.0 arcsec width. The size of Ganymede is slightly less than 2.0 arcsec and thus Ganymede's aurora can be completely observed. We will observe in TIMETAG mode to resolve temporal variability and to remove any parts of the orbits highly contaminated by geocoronal noise.

The scheduling is dictated by the timing of the Juno flyby. We ask for three HST orbits before the Juno flyby and three orbits after the Juno flyby. Depending on the availabilty of the Hydro Mode for HST's guiding modes, the three orbits of each visit will be executed consecutively or will be split up into one visit with two consecutive orbits and one visit with only one orbit. If the Hydro Mode is available, we chose for the visit after the Juno flyby three orbits (#4,5,6) the ones immediately available after closest approach. The orbits before the Juno flyby (#1,2,3) we chose to be close, but at the same time symmetric with respect to Ganymede's position in the plasma sheet similar to the orbits #4,5,6. Therefore we plan not to observe during the last available HST orbit just before HST enters the phase impaired by the SAA. Depending on the results of the final timing and the availabilities of orbits in the time leading up the Ganymede flyby, we might choose different combinations for the orbits #1,2,3. We will weigh between proximity to the time of the flyby and symmetry with orbits #4,5,6.

Visit

Proposal 16499, Consec: Before JUNO C/A (01), implementation Thu May 13 13:01:06 GMT 2021

Diagnostic Status: No Diagnostics

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

Special Requirements: SCHED 100%; BETWEEN 07-JUN-2021:00:00:00 AND 07-JUN-2021:00:30:00; VISIBILITY INTERVAL 46 M

Solar System Targets

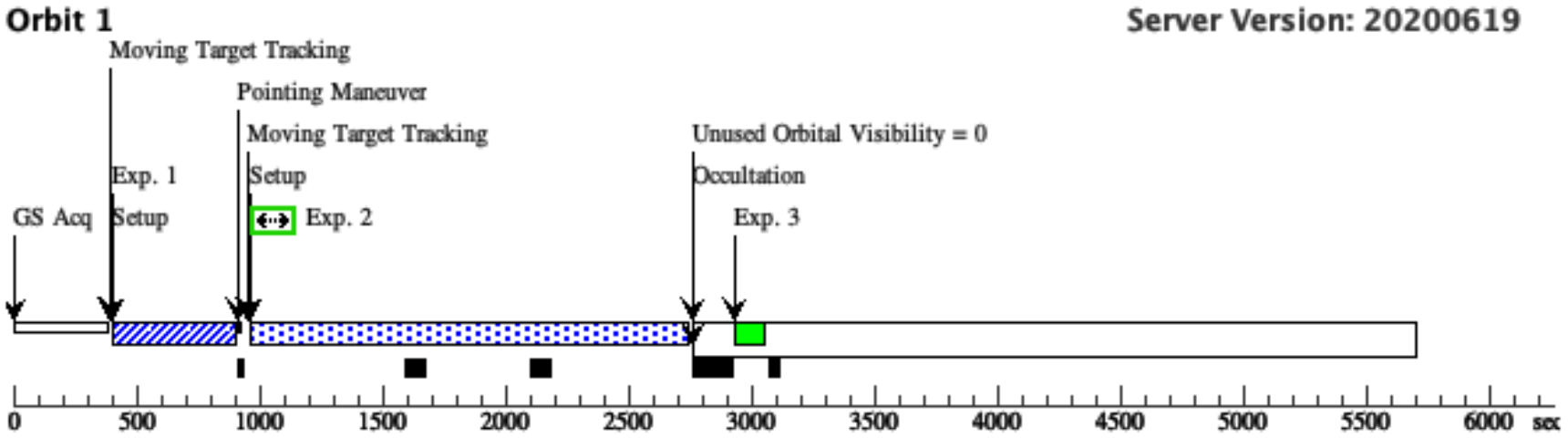
#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
(1)	GANYMEDE-PJ34	STD=JUPITER	STD=GANYMEDE		NOT OCC OF GANYMEDE-PJ34 BY JUPITER FROM EARTH, SEP OF GANYMEDE-PJ34 IO FROM EARTH GT 10", SEP OF GANYMEDE-PJ34 EUROPA FROM EARTH GT 10", SEP OF GANYMEDE-PJ34 CALLISTO FROM EARTH GT 10"	EARTH

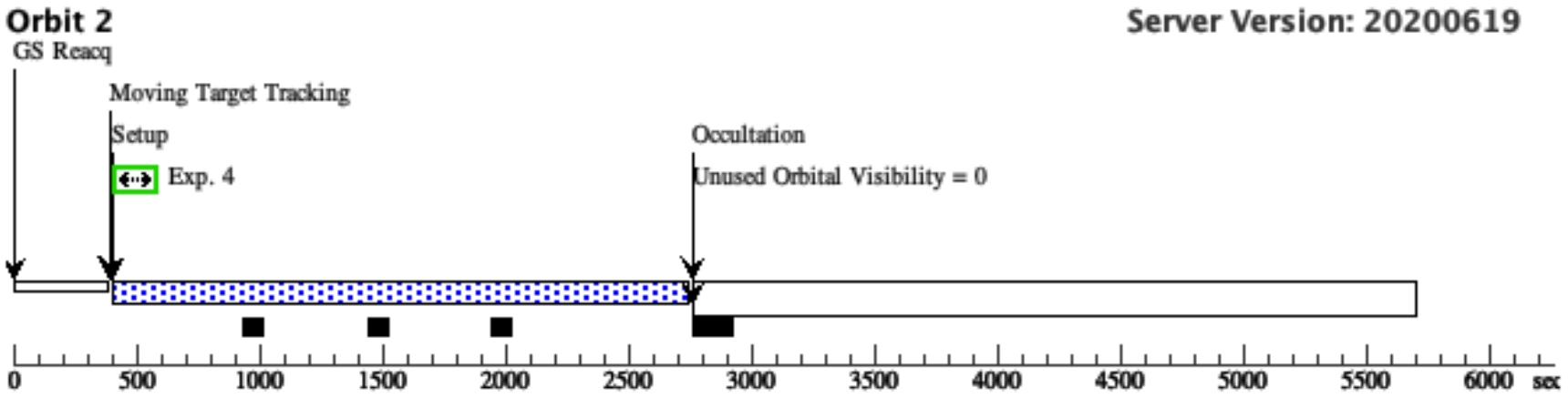
Comments: Description=Satellite Ganymede

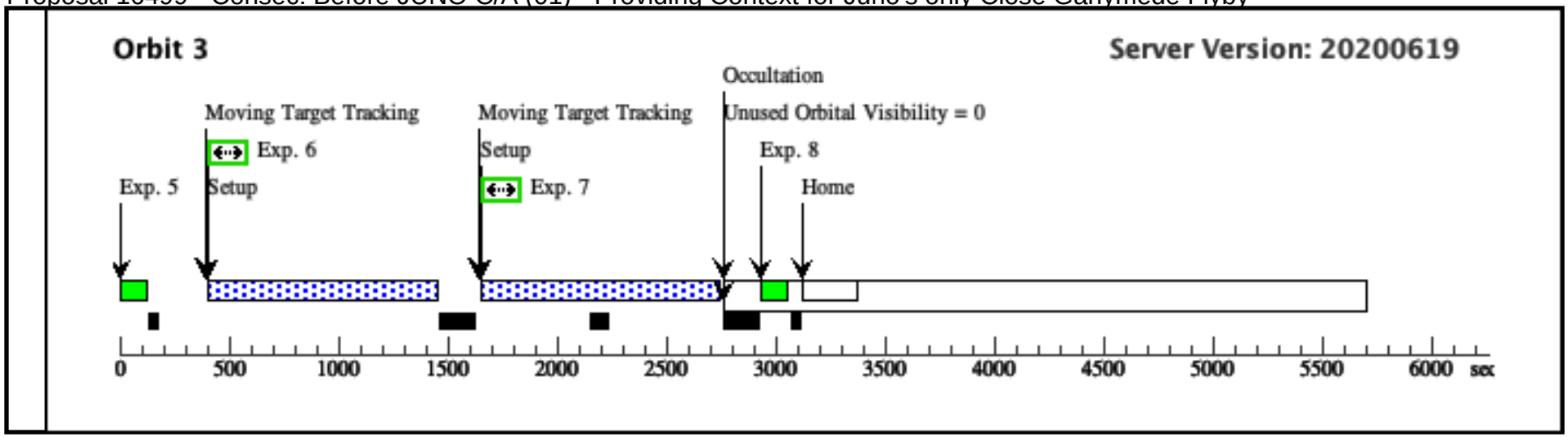
Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	ACQ Before (STIS.ta.1515522)	(1) GANYMEDE-PJ34	STIS/CCD, ACQ, F28X50LP	MIRROR	ACQTYPE=DIFFUSE; DIFFUSE-CENTER=GEOMETRIC-CENTER; CHECKBOX=33			0.1 Secs (0.1 Secs) *[==>]*	***[1]***
2	Science Before C/A (STIS.sp.1515647)	(1) GANYMEDE-PJ34	STIS/FUV-MAMA, TIME-TAG, 52X2D1	G140L 1425 A	BUFFER-TIME=500			1631 Secs (1631 Secs) *[==>]*	***[1]***
3	Wavecal	WAVE	STIS/FUV-MAMA, ACCUM, 52X0.05	G140L 1425 A				*[==>]*	***[1]***
4	Science Before C/A (STIS.sp.1515647)	(1) GANYMEDE-PJ34	STIS/FUV-MAMA, TIME-TAG, 52X2D1	G140L 1425 A	BUFFER-TIME=500			2291 Secs (2291 Secs) *[==>]*	***[2]***
5		WAVE	STIS/FUV-MAMA, ACCUM, 52X0.05	G140L 1425 A				*[==>]*	***[3]***
6	Science Before C/A (STIS.sp.1515647)	(1) GANYMEDE-PJ34	STIS/FUV-MAMA, TIME-TAG, 52X2D1	G140L 1425 A	BUFFER-TIME=500; WAVECAL=NO		Sequence 6-8 Non-Int in Consec: Before JUNO C/A (01)	1000 Secs (1000 Secs) *[==>]*	***[3]***
7	Science Before C/A (STIS.sp.1515647)	(1) GANYMEDE-PJ34	STIS/FUV-MAMA, TIME-TAG, 52X2D1	G140L 1425 A	BUFFER-TIME=500; WAVECAL=NO		Sequence 6-8 Non-Int in Consec: Before JUNO C/A (01)	1076 Secs (1076 Secs) *[==>]*	***[3]***
8		WAVE	STIS/FUV-MAMA, ACCUM, 52X0.05	G140L 1425 A			Sequence 6-8 Non-Int in Consec: Before JUNO C/A (01)	*[==>]*	***[3]***

Orbit Structure



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Occultation
Moving Target Tracking
Moving Target Tracking
Unused Orbital Visibility = 0
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Setup
Exp. 8
Exp. 5
Setup
Exp. 7
Home
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000
sec

Proposal 16499 - Consec: After JUNO C/A (02) - Providing Context for Juno's only Close Ganymede Flyby

Visit

Proposal 16499, Consec: After JUNO C/A (02), implementation Thu May 13 13:01:07 GMT 2021

Diagnostic Status: No Diagnostics

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

Special Requirements: SCHED 100%; BETWEEN 07-JUN-2021:19:00:00 AND 07-JUN-2021:19:30:00

Solar System Targets

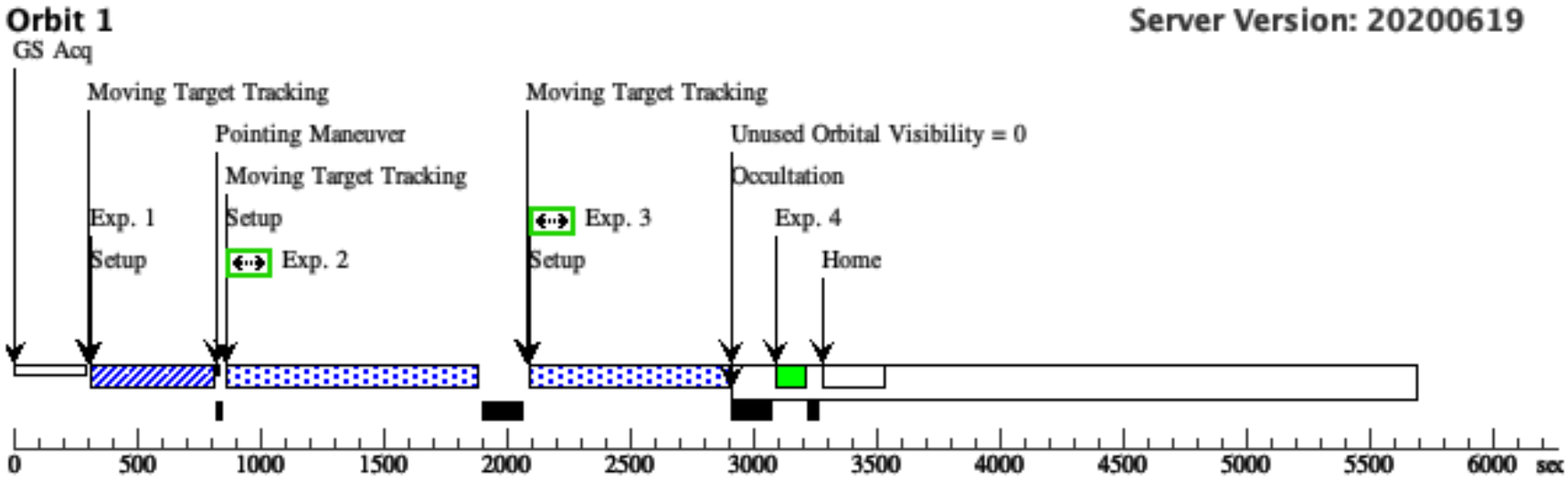
#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
(1)	GANYMEDE-PJ34	STD=JUPITER	STD=GANYMEDE		NOT OCC OF GANYMEDE-PJ34 BY JUPITER FROM EARTH, SEP OF GANYMEDE-PJ34 IO FROM EARTH GT 10", SEP OF GANYMEDE-PJ34 EUROPA FROM EARTH GT 10", SEP OF GANYMEDE-PJ34 CALLISTO FROM EARTH GT 10"	EARTH

Comments: Description=Satellite Ganymede

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	ACQ After (STIS.ta.1515522)	(1) GANYMEDE-PJ34	STIS/CCD, ACQ, F28X50LP	MIRROR	ACQTYPE=DIFFUSE; DIFFUSE-CENTER=GEOMETRIC-CENTER; CHECKBOX=33	GS ACQ SCENARIO SINGLE	Sequence 1-4 Non-Int in Consec: After JUNO C/A (02)	0.1 Secs (0.1 Secs) *[==>]*	***[1]***
2	Science After C/A (STIS.sp.1515647)	(1) GANYMEDE-PJ34	STIS/FUV-MAMA, TIME-TAG, 52X2D1	G140L 1425 A	BUFFER-TIME=500; WAVECAL=NO		Sequence 1-4 Non-Int in Consec: After JUNO C/A (02)	866 Secs (866 Secs) *[==>]*	***[1]***
3	Science After C/A (STIS.sp.1515647)	(1) GANYMEDE-PJ34	STIS/FUV-MAMA, TIME-TAG, 52X2D1	G140L 1425 A	BUFFER-TIME=500; WAVECAL=NO		Sequence 1-4 Non-Int in Consec: After JUNO C/A (02)	800 Secs (800 Secs) *[==>]*	***[1]***
4		WAVE	STIS/FUV-MAMA, ACCUM, 52X0.05	G140L 1425 A			Sequence 1-4 Non-Int in Consec: After JUNO C/A (02)	*[==>]*	***[1]***

Orbit Structure



Visit

Proposal 16499, Consec: After JUNO C/A (2A), implementation Thu May 13 13:01:07 GMT 2021

Diagnostic Status: No Diagnostics

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

Special Requirements: SCHED 100%; AFTER 02 BY 0.9 Orbits TO 1.1 Orbits; VISIBILITY INTERVAL 46 M

Solar System Targets

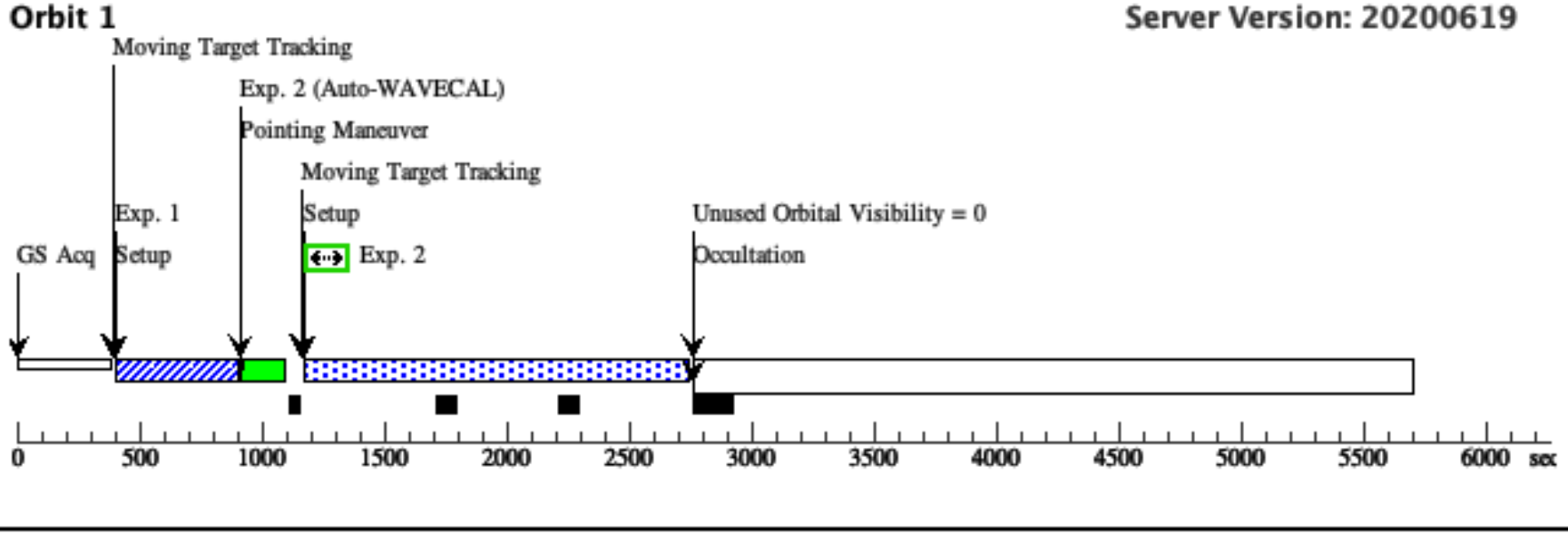
#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
(1)	GANYMEDE-PJ34	STD=JUPITER	STD=GANYMEDE		NOT OCC OF GANYMEDE-PJ34 BY JUPITER FROM EARTH, SEP OF GANYMEDE-PJ34 IO FROM EARTH GT 10", SEP OF GANYMEDE-PJ34 EUROPA FROM EARTH GT 10", SEP OF GANYMEDE-PJ34 CALLISTO FROM EARTH GT 10"	EARTH

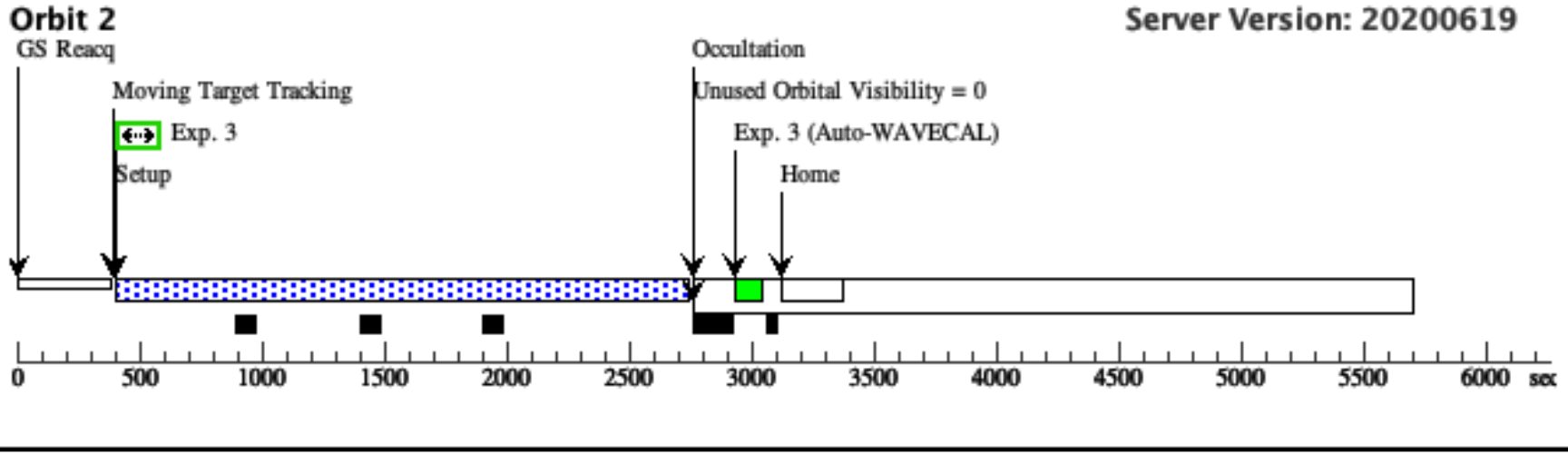
Comments: Description=Satellite Ganymede

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	ACQ After (STIS.ta.1515522)	(1) GANYMEDE-PJ34	STIS/CCD, ACQ, F28X50LP	MIRROR	ACQTYPE=DIFFUSE; DIFFUSE-CENTER=GEOMETRIC-CENTER; CHECKBOX=33			0.1 Secs (0.1 Secs) *[==>]*	***[1]***
2	Science After C/A (STIS.sp.1515647)	(1) GANYMEDE-PJ34	STIS/FUV-MAMA, TIME-TAG, 52X2D1	G140L 1425 A	BUFFER-TIME=500			1514 Secs (1514 Secs) *[==>]*	***[1]***
3	Science After C/A (STIS.sp.1515647)	(1) GANYMEDE-PJ34	STIS/FUV-MAMA, TIME-TAG, 52X2D1	G140L 1425 A	BUFFER-TIME=500			2331 Secs (2331 Secs) *[==>]*	***[2]***

Orbit Structure





Visit

Proposal 16499, Non-consec: Before JUNO C/A (03), implementation Thu May 13 13:01:07 GMT 2021

Diagnostic Status: No Diagnostics

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

Special Requirements: SCHED 100%; BETWEEN 07-JUN-2021:00:00:00 AND 07-JUN-2021:00:30:00; ON HOLD

On Hold Comments: In case Hybrid Mode is not available, i.e. 3 consecutive orbits cannot be executed, we split visit 'Consec: Before JUNO C/A' into 2 visits with 1 and 2 orbits each. They are labeled 'Non-consec: Before Juno C/A'. This visit contains two orbits.

Solar System Targets

#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
(1)	GANYMEDE-PJ34	STD=JUPITER	STD=GANYMEDE		NOT OCC OF GANYMEDE-PJ34 BY JUPITER FROM EARTH, SEP OF GANYMEDE-PJ34 IO FROM EARTH GT 10", SEP OF GANYMEDE-PJ34 EUROPA FROM EARTH GT 10", SEP OF GANYMEDE-PJ34 CALLISTO FROM EARTH GT 10"	EARTH

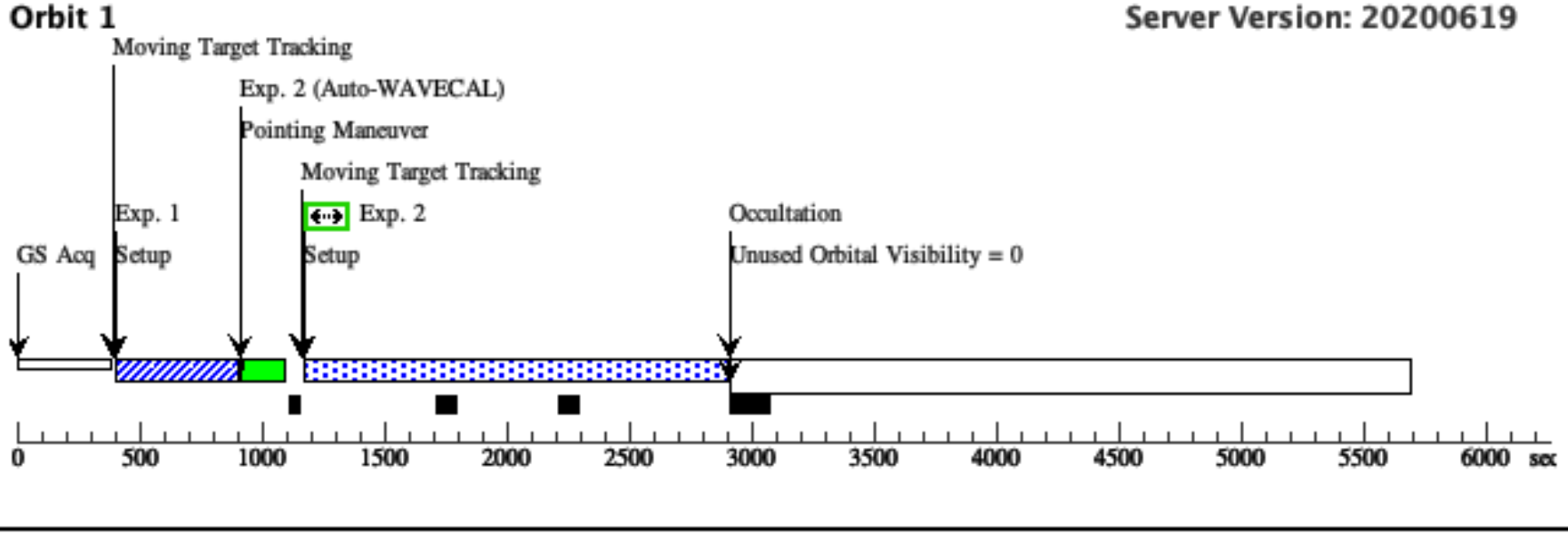
Comments: Description=Satellite Ganymede

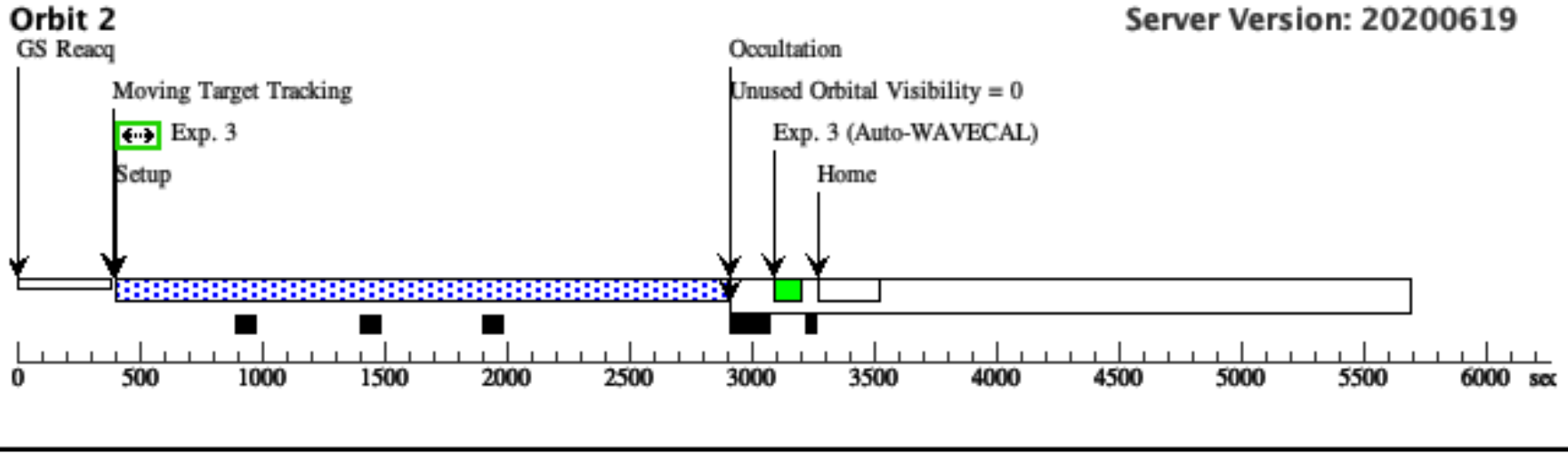
Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	ACQ (STIS.ta.1515522)	(1) GANYMEDE-PJ34	STIS/CCD, ACQ, F28X50LP	MIRROR	ACQTYPE=DIFFUSE; DIFFUSE-CENTER=GEOMETRIC-CENTER; CHECKBOX=33			0.1 Secs (0.1 Secs) *[==>]*	 ***[1]***
2	Science Before C/A (STIS.sp.1515647)	(1) GANYMEDE-PJ34	STIS/FUV-MAMA, TIME-TAG, 52X2D1	G140L 1425 A	BUFFER-TIME=500			1672 Secs (1672 Secs) *[==>]*	 ***[1]***
3	Science Before C/A (STIS.sp.1515647)	(1) GANYMEDE-PJ34	STIS/FUV-MAMA, TIME-TAG, 52X2D1	G140L 1425 A	BUFFER-TIME=500			2489 Secs (2489 Secs) *[==>]*	 ***[2]***

Comments: I

Orbit Structure





Visit

Proposal 16499, Non-consec: Before JUNO C/A (04), implementation Thu May 13 13:01:07 GMT 2021

Diagnostic Status: No Diagnostics

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

Special Requirements: SCHED 100%; BETWEEN 07-JUN-2021:04:40:00 AND 07-JUN-2021:05:10:00; ON HOLD

On Hold Comments: In case Hybrid Mode is not available, i.e., 3 consequtive orbits cannot be executed, we split visit 1 into two plus one visit labeled Non-conseq: Before Juno C/A'. This visit contains one orbit.

Solar System Targets

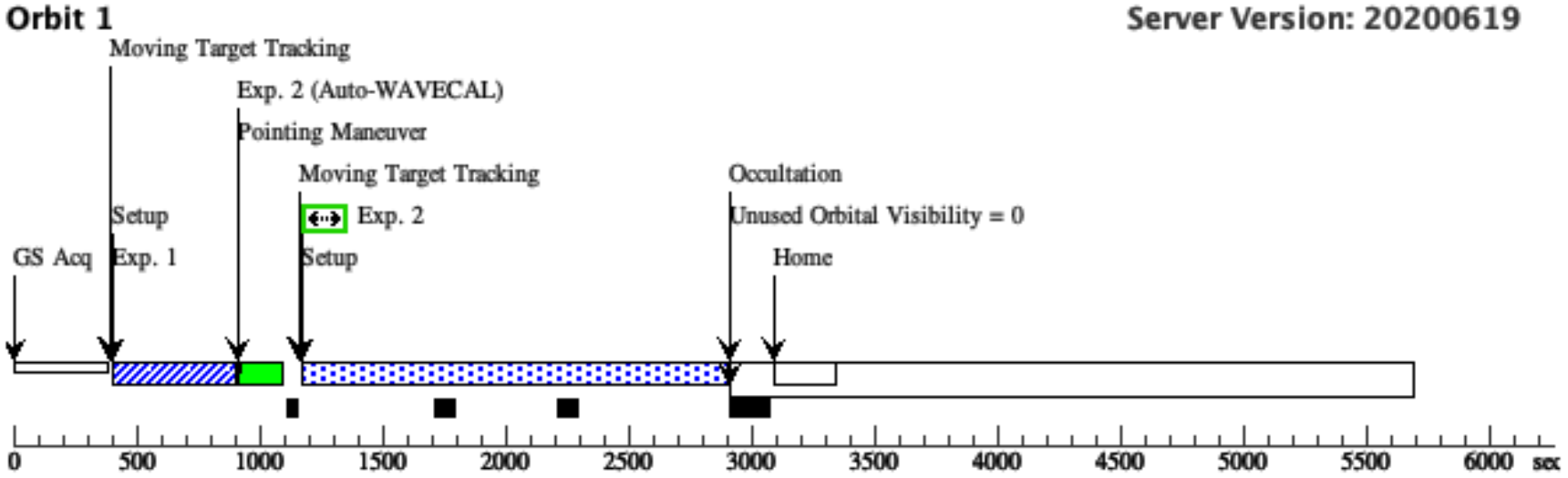
#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
(1)	GANYMEDE-PJ34	STD=JUPITER	STD=GANYMEDE		NOT OCC OF GANYMEDE-PJ34 BY JUPITER FROM EARTH, SEP OF GANYMEDE-PJ34 IO FROM EARTH GT 10", SEP OF GANYMEDE-PJ34 EUROPA FROM EARTH GT 10", SEP OF GANYMEDE-PJ34 CALLISTO FROM EARTH GT 10"	EARTH

Comments: Description=Satellite Ganymede

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	ACQ (STIS.ta.1515522)	(1) GANYMEDE-PJ34	STIS/CCD, ACQ, F28X50LP	MIRROR	ACQTYPE=DIFFUSE; DIFFUSE-CENTER=GEOMETRIC-CENTER; CHECKBOX=33		Sequence 1-2 Non-Int in Non-consec: Before JUNO C/A (04)	0.1 Secs (0.1 Secs) *[==>]*	*[1]*
2	Science Before C/A (STIS.sp.1515647)	(1) GANYMEDE-PJ34	STIS/FUV-MAMA, TIME-TAG, 52X2D1	G140L 1425 A	BUFFER-TIME=500		Sequence 1-2 Non-Int in Non-consec: Before JUNO C/A (04)	1672 Secs (1672 Secs) *[==>]*	*[1]*

Orbit Structure



Visit

Proposal 16499, Non-consec: After JUNO C/A (05), implementation Thu May 13 13:01:07 GMT 2021

Diagnostic Status: No Diagnostics

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

Special Requirements: SCHED 100%; BETWEEN 07-JUN-2021:19:00:00 AND 07-JUN-2021:19:30:00; ON HOLD

On Hold Comments: In case Hybrid Mode is not available, i.e., 3 consequtive orbits cannot be executed, we split visit 2 into two plus one visit labeled 'Non-conseq: After Juno C/A'. This visit contains only one orbit.

Solar System Targets

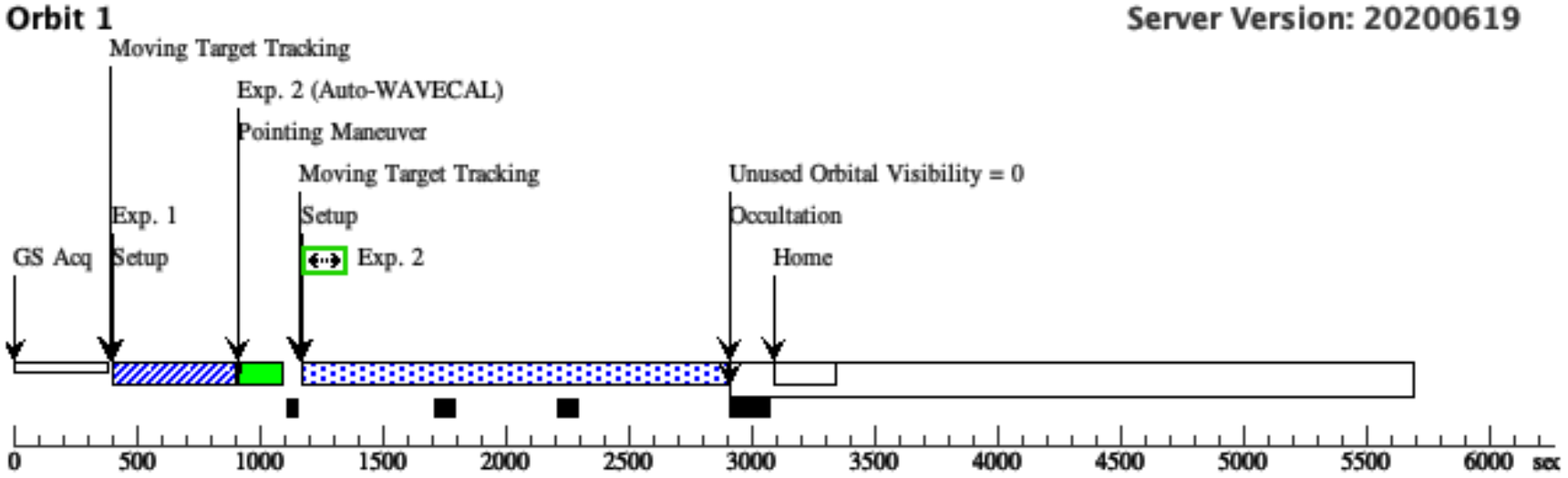
#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
(1)	GANYMEDE-PJ34	STD=JUPITER	STD=GANYMEDE		NOT OCC OF GANYMEDE-PJ34 BY JUPITER FROM EARTH, SEP OF GANYMEDE-PJ34 IO FROM EARTH GT 10", SEP OF GANYMEDE-PJ34 EUROPA FROM EARTH GT 10", SEP OF GANYMEDE-PJ34 CALLISTO FROM EARTH GT 10"	EARTH

Comments: Description=Satellite Ganymede

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	ACQ After C/A (STIS.ta.1515522)	(1) GANYMEDE-PJ34	STIS/CCD, ACQ, F28X50LP	MIRROR	ACQTYPE=DIFFUSE; DIFFUSE-CENTER=GEOMETRIC-CENTER; CHECKBOX=33		Sequence 1-2 Non-Int in Non-consec: After JUNO C/A (05)	0.1 Secs (0.1 Secs) *[==>]*	*[1]*
2	Science After C/A (STIS.sp.1515647)	(1) GANYMEDE-PJ34	STIS/FUV-MAMA, TIME-TAG, 52X2D1	G140L 1425 A	BUFFER-TIME=500		Sequence 1-2 Non-Int in Non-consec: After JUNO C/A (05)	1672 Secs (1672 Secs) *[==>]*	*[1]*

Orbit Structure



Visit

Proposal 16499, Non-consec: After JUNO C/A (06), implementation Thu May 13 13:01:07 GMT 2021

Diagnostic Status: No Diagnostics

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

Special Requirements: SCHED 100%; BETWEEN 07-JUN-2021:22:10:00 AND 07-JUN-2021:22:40:00; ON HOLD

On Hold Comments: In case Hybrid Mode is not available, i.e., 3 consequtive orbits cannot be executed, we split visit 2 into two plus one visit labeled Non-conseq: After Juno C/A'. This visit contains two orbits in a row.

Solar System Targets

#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
(1)	GANYMEDE-PJ34	STD=JUPITER	STD=GANYMEDE		NOT OCC OF GANYMEDE-PJ34 BY JUPITER FROM EARTH, SEP OF GANYMEDE-PJ34 IO FROM EARTH GT 10", SEP OF GANYMEDE-PJ34 EUROPA FROM EARTH GT 10", SEP OF GANYMEDE-PJ34 CALLISTO FROM EARTH GT 10"	EARTH

Comments: Description=Satellite Ganymede

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	ACQ After (STIS.ta.1515522)	(1) GANYMEDE-PJ34	STIS/CCD, ACQ, F28X50LP	MIRROR	ACQTYPE=DIFFUSE; DIFFUSE-CENTER=GEOMETRIC-CENTER; CHECKBOX=33			0.1 Secs (0.1 Secs) *[==>]*	 ***[1]***
2	Science After C/A (STIS.sp.1515647)	(1) GANYMEDE-PJ34	STIS/FUV-MAMA, TIME-TAG, 52X2D1	G140L 1425 A	BUFFER-TIME=500			1672 Secs (1672 Secs) *[==>]*	 ***[1]***
3	Science After C/A (STIS.sp.1515647)	(1) GANYMEDE-PJ34	STIS/FUV-MAMA, TIME-TAG, 52X2D1	G140L 1425 A	BUFFER-TIME=500			2489 Secs (2489 Secs) *[==>]*	 ***[2]***

Orbit Structure