



14903 - Detection methods for water vapor in Europa's plumes.

Cycle: 24, Proposal Category: GO/DD

(Availability Mode: SUPPORTED)

INVESTIGATORS

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VISITS

<i>Visit</i>	<i>Targets used in Visit</i>	<i>Configurations used in Visit</i>	<i>Orbits Used</i>	<i>Last Orbit Planner Run</i>	<i>OP Current with Visit?</i>
01	(1) EUROPA-ECLIPSE (2) IO-ACQ	COS/NUV	1	02-Feb-2017 21:00:49.0	yes
02	(1) EUROPA-ECLIPSE (2) IO-ACQ	STIS/CCD	1	02-Feb-2017 21:00:50.0	yes

2 Total Orbits Used

ABSTRACT

The discovery of water vapor near Europa's south pole (Roth et al., 2014) has important implications for the search for life in our Solar System. The presence of water plumes comprises the outstanding possibility that Europa's potentially habitable subsurface ocean can be directly probed by the upcoming NASA and ESA missions. On September 26, 2016, new possible sightings of plumes were reported in STIS images showing Europa in transit of Jupiter (Sparks et al. 2016). These images yield, however, no information on the plumes' composition. What is needed is a more sensitive

method of detecting the presence of water molecules, in order to draw conclusions about a connection to subsurface water. COS NUV and STIS visible aurora observations in eclipse can provide higher sensitivities to H₂O abundances than the FUV detections of Roth et al. (2014). With this 2-orbit program, we determine the instrumental performance of stray light of two COS and STIS modes for observations of Europa in Jupiter eclipse between January and March 2017. If this assessment study reveals high sensitivity for the observing modes, they can be used in future programs to characterize the water abundance and variability in Europa's plumes.

OBSERVING DESCRIPTION

Two visits with one orbit each to study the performance of COS/NUV and STIS/CCD spectral observations when Europa is eclipsed by Jupiter.

Visit 1:

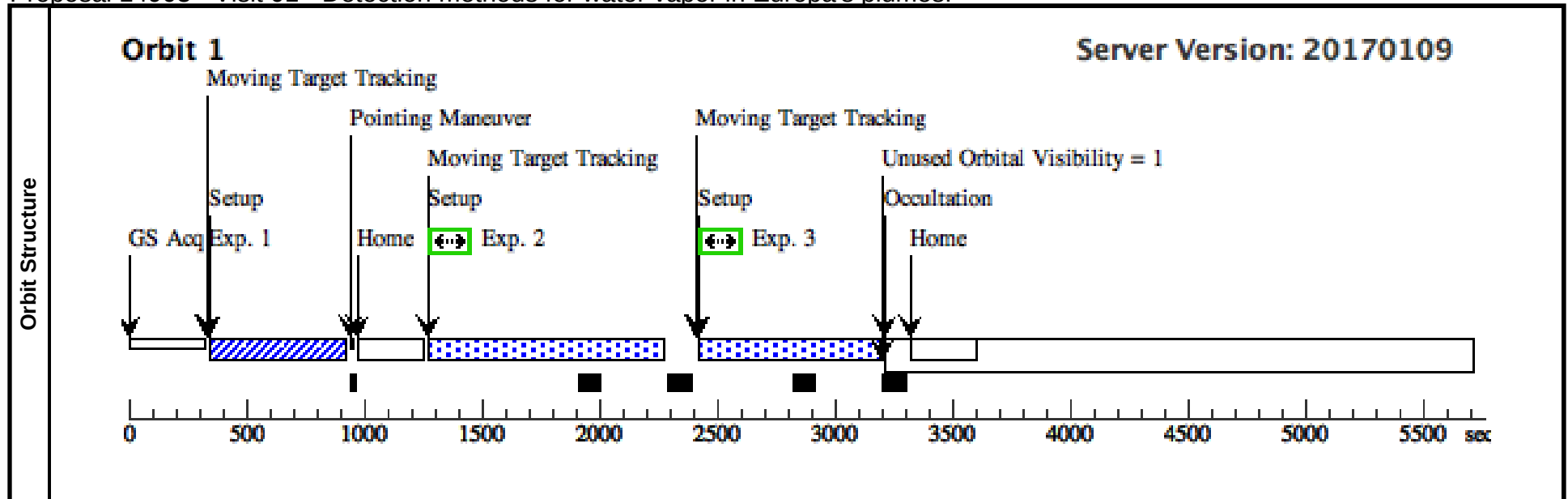
COS/NUV to observe OH band emission in eclipse. One of the other Galilean satellites is used for acquisition when Europa is in shadow.

Visit 2:

STIS/CCD to observe H-alpha and OI red line in eclipse. Again, one of the other Galilean satellites is used for acquisition when Europa is in shadow.

Proposal 14903 - Visit 01 - Detection methods for water vapor in Europa's plumes.

Visit	Proposal 14903, Visit 01, scheduling										Fri Feb 03 02:00:51 GMT 2017
	Diagnostic Status: Warning										
	Scientific Instruments: COS/NUV										
	Special Requirements: SCHED 30%										
Diagnostics	(Visit 01) Warning (Form): For the best data quality, it is strongly recommended that all four FP-POS positions be used when observing at a given COS CENWAVE setting.										
	(Exposure 2 (Sequence 1-3 Non-Int in Visit 01)) Warning (Form): Sensitive exposures should have an ETC run number provided.										
(Exposure 3 (Sequence 1-3 Non-Int in Visit 01)) Warning (Form): Sensitive exposures should have an ETC run number provided.											
Solar System Targets	#	Name	Level 1	Level 2	Level 3	Window	Ephem Center				
	(1)	EUROPA-ECLIPSE	STD=JUPITER	STD=EUROPA		SEP OF EUROPA-ECLIPSE JUPITER FROM EARTH GT 5", SEP OF EUROPA-ECLIPSE CALLISTO FROM EARTH GT 5", SEP OF EUROPA-ECLIPSE IO FROM EARTH GT 5", SEP OF EUROPA-ECLIPSE GANYMEDE FROM EARTH GT 5", ECL U FULL OF EUROPA-ECLIPSE BY JUPITER FROM EARTH	EARTH				
	Comments: Extended=YES										
	(2)	IO-ACQ	STD=JUPITER	STD=IO		SEP OF IO-ACQ JUPITER FROM EARTH GT 15", SEP OF IO-ACQ CALLISTO FROM EARTH GT 10", SEP OF IO-ACQ EUROPA FROM EARTH GT 10", SEP OF IO-ACQ GANYMEDE FROM EARTH GT 10", NOT TRANSIT OF IO ACROSS JUPITER FROM EARTH, NOT ECL U FULL OF IO BY JUPITER FROM EARTH	EARTH				
	Comments: For target acquisition for Europa in eclipse. Extended=YES										
Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit	
	1	(COS.sa.903 729)	(2) IO-ACQ	COS/NUV, ACQ/SEARCH, PSA	G285M 2617 A	SCAN-SIZE=3; CENTER=FLUX-W T-FLR		Sequence 1-3 Non-Int in Visit 01	3 Secs (3 Secs) [==>]	[1]	
	Comments: This acquisition mode has been sucessfully used in program 13803 for COS/FUV observations of Europa. The satellite for acquisition (Io now) can be changed to Ganymede or Callisto (Target GANYMED E-ACQ / CALLISTO-ACQ) if more suitable for acquisition.										
	2		(1) EUROPA-ECLIPSE	COS/NUV, TIME-TAG, PSA	G230L 3000 A	BUFFER-TIME=40 0; FP-POS=1		Sequence 1-3 Non-Int in Visit 01	759 Secs (759 Secs) [==>]	[1]	
	3		(1) EUROPA-ECLIPSE	COS/NUV, TIME-TAG, PSA	G230L 3000 A	BUFFER-TIME=40 0; FP-POS=2		Sequence 1-3 Non-Int in Visit 01	759 Secs (759 Secs) [==>]	[1]	



Proposal 14903 - Visit 02 - Detection methods for water vapor in Europa's plumes.

Visit	Proposal 14903, Visit 02, implementation							Fri Feb 03 02:00:51 GMT 2017		
	Diagnostic Status: No Diagnostics									
	Scientific Instruments: STIS/CCD									
	Special Requirements: SCHED 50%									
Solar System Targets	#	Name	Level 1	Level 2	Level 3	Window	Ephem Center			
	(1)	EUROPA-ECLIPSE	STD=JUPITER	STD=EUROPA		SEP OF EUROPA-ECLIPSE JUPITER FROM EARTH GT 5", SEP OF EUROPA-ECLIPSE CALLISTO FROM EARTH GT 5", SEP OF EUROPA-ECLIPSE IO FROM EARTH GT 5", SEP OF EUROPA-ECLIPSE GANYMEDE FROM EARTH GT 5", ECL U FULL OF EUROPA-ECLIPSE BY JUPITER FROM EARTH	EARTH			
	Comments: Extended=YES									
	(2)	IO-ACQ	STD=JUPITER	STD=IO		SEP OF IO-ACQ JUPITER FROM EARTH GT 15", SEP OF IO-ACQ CALLISTO FROM EARTH GT 10", SEP OF IO-ACQ EUROPA FROM EARTH GT 10", SEP OF IO-ACQ GANYMEDE FROM EARTH GT 10", NOT TRANSIT OF IO ACROSS JUPITER FROM EARTH, NOT ECL U FULL OF IO BY JUPITER FROM EARTH	EARTH			
Comments: For target acquisition for Europa in eclipse. Extended=YES										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(2) IO-ACQ	STIS/CCD, ACQ, F28X50LP	MIRROR	ACQTYPE=DIFFUSE; CHECKBOX=21; DIFFUSE-CENTER=GEOMETRIC-CENTER	GS ACQ SCENARIO BASE1B3	Sequence 1-3 Non-Int in Visit 02	0.1 Secs (0.1 Secs) [==>]	[1]
	Comments: Standard STIS acquisition mode, used many time for acquisition of Io, Europa and Ganymede in previous STIS/FUV programs.									
	2		(1) EUROPA-ECLIPSE	STIS/CCD, ACCUM, 52X2E1	G750M 6581 A		GS ACQ SCENARIO BASE1B3	Sequence 1-3 Non-Int in Visit 02	800 Secs (812 Secs) [==>406.0 Secs (Split 1)] [==>406.0 Secs (Split 2)]	[1]
	Comments: I have to double-check if any of the optional parameters is need/indicated.									
	3		(1) EUROPA-ECLIPSE	STIS/CCD, ACCUM, 52X2E1	G750M 6581 A			Sequence 1-3 Non-Int in Visit 02	800 Secs (812 Secs) [==>406.0 Secs (Split 1)] [==>406.0 Secs (Split 2)]	[1]

