



## 13803 - Europa's Composition as Revealed by its Atmosphere

Cycle: 22, Proposal Category: GO

(Availability Mode: SUPPORTED)

### INVESTIGATORS

<i>Name</i>	<i>Institution</i>	<i>E-Mail</i>
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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-TRAILING	COS/FUV COS/NUV	5	14-Feb-2015 21:00:50.0	yes

5 Total Orbits Used

### ABSTRACT

The two main sources of Europa's tenuous atmosphere, surface sputtering and plumes, imply that Europa's surface and sub-surface composition are directly reflected by the composition of its atmosphere. Recent detection of water vapor plumes at Europa makes it more likely that the atmosphere contains important trace species that are diagnostic of the sub-surface ocean composition. We will perform a sensitive search for trace species via electron excited emissions in the far-ultraviolet with the Cosmic Origins Spectrograph, in order to constrain the composition of the ice-ocean-rock system and better understand the potential habitability of the satellite. HST spectroscopic measurement of trace species is one of the only techniques presently available to meaningfully constrain Europa's composition.

## **OBSERVING DESCRIPTION**

We will perform deep spectroscopic integrations of Europa using COS gratings G130M and G160M to search for trace species in Europa's atmosphere. To minimize contamination from Earth's geocoronal emission, we request that the observations be performed near Jupiter opposition. We are targeting the Europa trailing hemisphere, which potentially has a higher abundance of trace species contaminating the surface than the leading hemisphere. We will cycle through the four FP-POS positions with both gratings. Precise centering is not required, so we will utilize only an acq/search. The acq/search exposure time of 3 s is based on the well known trailing hemisphere albedo of Europa at 2700 Å (about 10%), and the counts obtained in the COS acq/search and acq/peakd acquisitions of Europa in program 11353.

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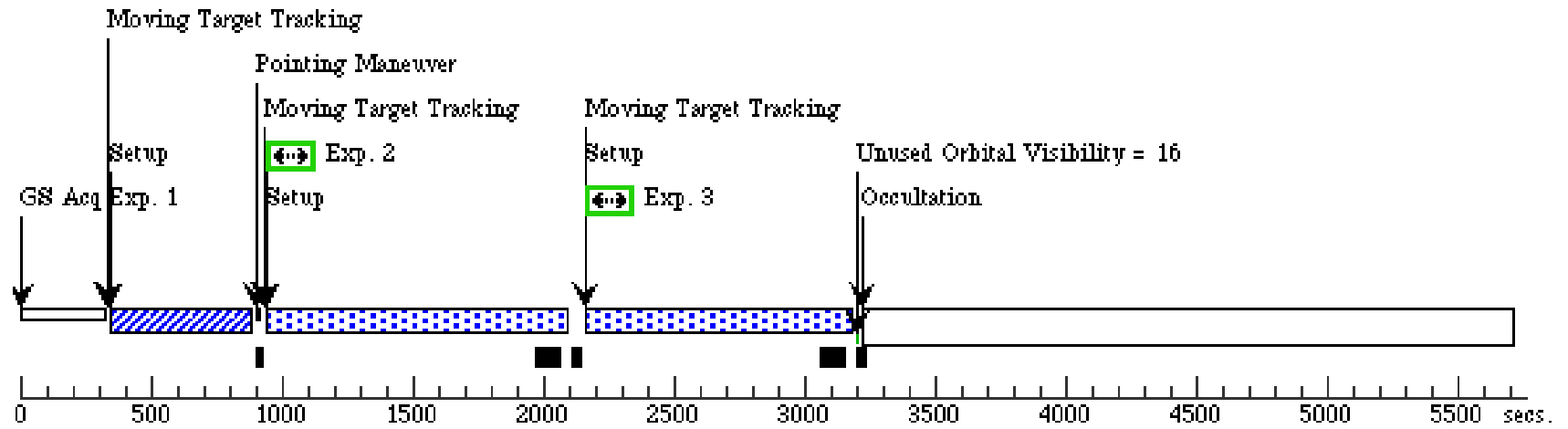
Sun Feb 15 02:00:53 GMT 2015

<b>Visit</b>	<b>Proposal 13803, Visit 01, implementation</b> <b>Diagnostic Status: Warning</b> Scientific Instruments: COS/NUV, COS/FUV Special Requirements: (none)						
	(Visit 01) Warning (Orbit Planner): INEFFICIENT ORDERING OF FP-POS POSITIONS (Visit 01) Warning (Orbit Planner): INEFFICIENT ORDERING OF FP-POS POSITIONS (Visit 01) Warning (Orbit Planner): INEFFICIENT ORDERING OF FP-POS POSITIONS (Visit 01) Warning (Orbit Planner): INEFFICIENT ORDERING OF FP-POS POSITIONS						
<b>Solar System Targets</b>	<b>#</b>	<b>Name</b>	<b>Level 1</b>	<b>Level 2</b>	<b>Level 3</b>	<b>Window</b>	<b>Ephem Center</b>
	(1)	EUROPA-TRAILING	STD=JUPITER	STD=EUROPA		SEP OF EUROPA-TRAILING JUPITER FROM EARTH GT 30", SEP OF EUROPA-TRAILING CALLISTO FROM EARTH GT 10", SEP OF EUROPA-TRAILING IO FROM EARTH GT 10", SEP OF EUROPA-TRAILING GANYMEDE FROM EARTH GT 10", OLG OF EUROPA-TRAILING BETWEEN 240 300, OLG OF JUPITER BETWEEN 330 20	EARTH

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Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	(COS.sa.626 335)	(1) EUROPA-TRAI LING	COS/NUV, ACQ/SEARCH, PSA	G285M 2617 A	SCAN-SIZE=3; CENTER=FLUX-W T-FLR	GS ACQ SCENARI O BASE1B3		3 Secs (3 Secs) [==>]	[1]
	2	(COS.sp.653 965)	(1) EUROPA-TRAI LING	COS/FUV, TIME-TAG, PSA	G130M 1327 A	BUFFER-TIME=86 0; FP-POS=1			970 Secs (970 Secs) [==>]	[1]
	3	(COS.sp.653 965)	(1) EUROPA-TRAI LING	COS/FUV, TIME-TAG, PSA	G130M 1327 A	FP-POS=2; BUFFER-TIME=86 0			970 Secs (970 Secs) [==>]	[1]
	4	(COS.sp.653 965)	(1) EUROPA-TRAI LING	COS/FUV, TIME-TAG, PSA	G130M 1327 A	BUFFER-TIME=51 0; FP-POS=ALL			620 Secs (2480 Secs) [==>(Split 1)] [==>(Split 2)] [==>(Split 3)] [==>(Split 4)]	[2]
	5	(COS.sp.653 965)	(1) EUROPA-TRAI LING	COS/FUV, TIME-TAG, PSA	G130M 1327 A	FP-POS=1; BUFFER-TIME=48 0			585 Secs (585 Secs) [==>]	[3]
	6	(COS.sp.653 965)	(1) EUROPA-TRAI LING	COS/FUV, TIME-TAG, PSA	G130M 1327 A	FP-POS=2; BUFFER-TIME=48 0			585 Secs (585 Secs) [==>]	[3]
	7	(COS.sp.654 801)	(1) EUROPA-TRAI LING	COS/FUV, TIME-TAG, PSA	G160M 1589 A	FP-POS=1; BUFFER-TIME=48 0			585 Secs (585 Secs) [==>]	[3]
	8	(COS.sp.654 801)	(1) EUROPA-TRAI LING	COS/FUV, TIME-TAG, PSA	G160M 1589 A	FP-POS=2; BUFFER-TIME=48 0			585 Secs (585 Secs) [==>]	[3]
	9	(COS.sp.654 801)	(1) EUROPA-TRAI LING	COS/FUV, TIME-TAG, PSA	G160M 1589 A	FP-POS=ALL; BUFFER-TIME=51 0			620 Secs (2480 Secs) [==>(Split 1)] [==>(Split 2)] [==>(Split 3)] [==>(Split 4)]	[4]
10	(COS.sp.654 801)	(1) EUROPA-TRAI LING	COS/FUV, TIME-TAG, PSA	G160M 1589 A	FP-POS=ALL; BUFFER-TIME=51 0			620 Secs (2480 Secs) [==>(Split 1)] [==>(Split 2)] [==>(Split 3)] [==>(Split 4)]	[5]	

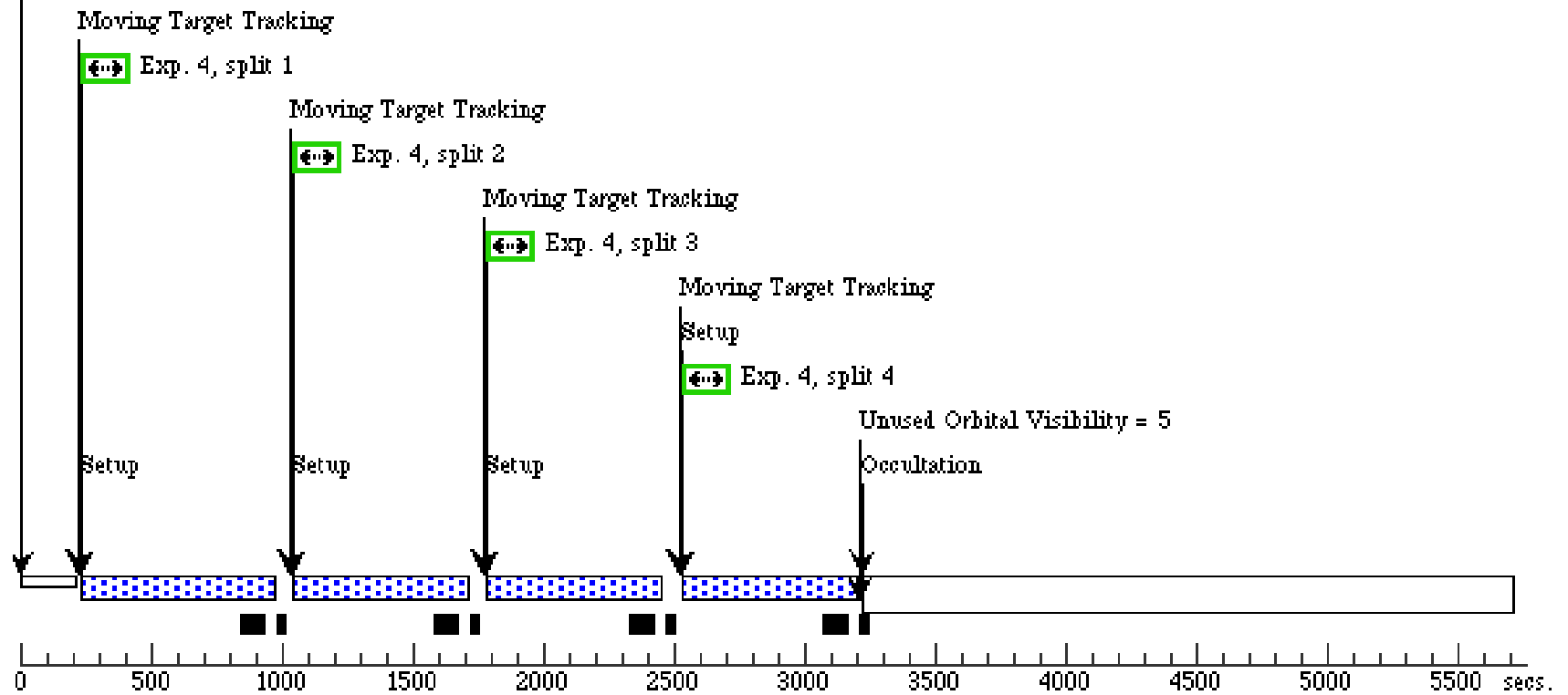
**Orbit 1**



Orbit Structure

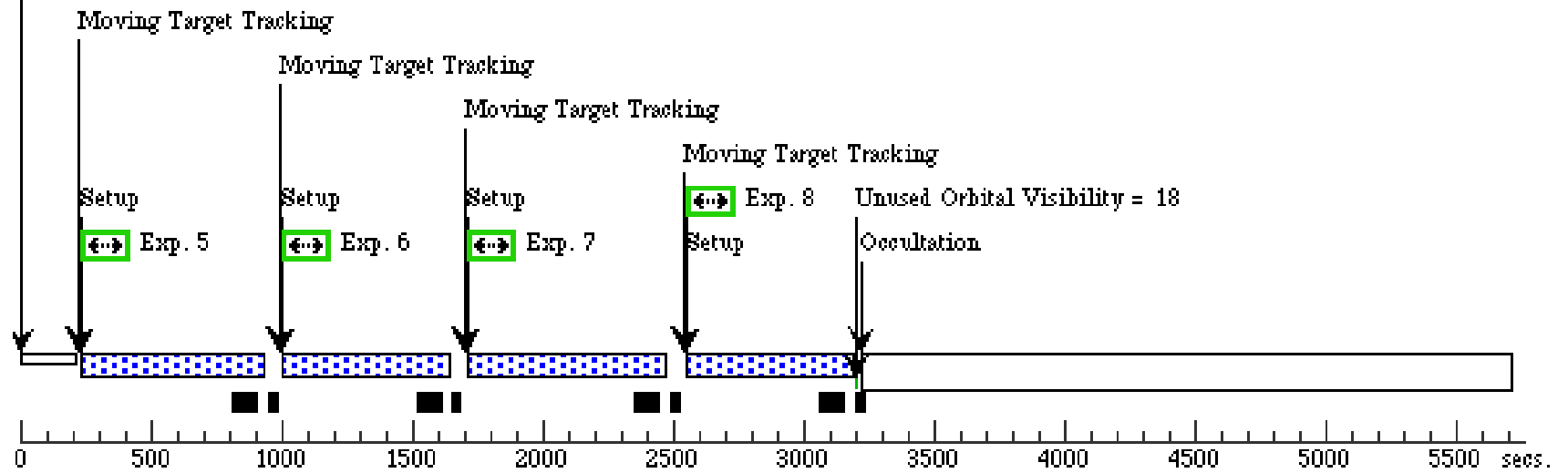
Orbit 2

GS Reacq



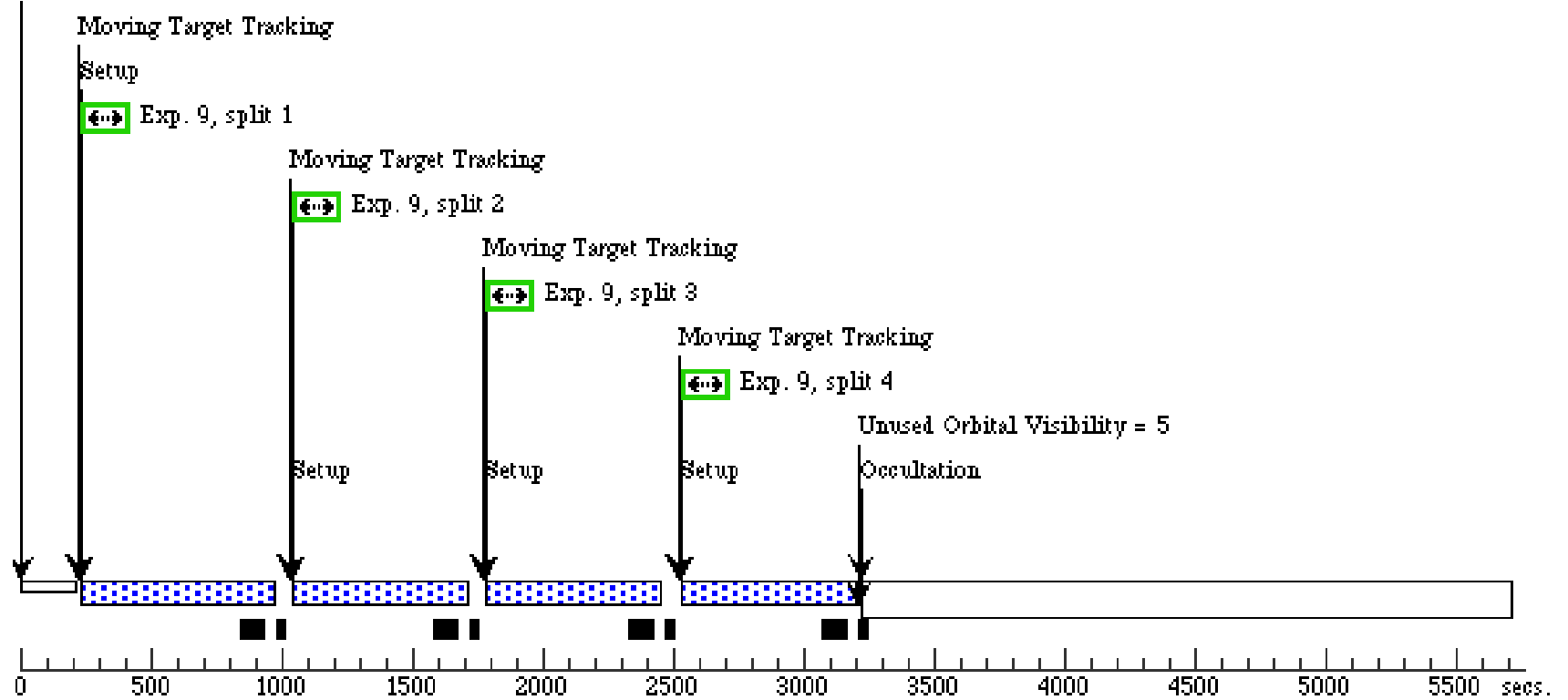
**Orbit 3**

GS Reacq



**Orbit 4**

GS Reacq



**Orbit 5**

GS Reacq

