



## 14891 - Confirming the ice plumes of Europa

Cycle: 24, Proposal Category: GO

(UV Initiative)

(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>
02	(2) EUROPA-TRANSIT-2	STIS/FUV-MAMA	1	13-Apr-2017 21:02:42.0	yes
22	(7) EUROPA-TRANSIT-22	STIS/FUV-MAMA	1	13-Apr-2017 21:02:44.0	yes
03	(3) EUROPA-TRANSIT-3	STIS/FUV-MAMA	1	13-Apr-2017 21:02:45.0	yes
04	(4) EUROPA-TRANSIT-4	STIS/FUV-MAMA	1	13-Apr-2017 21:02:46.0	yes
05	(5) EUROPA-TRANSIT-5	STIS/FUV-MAMA	1	13-Apr-2017 21:02:46.0	yes
06	(6) EUROPA-TRANSIT-6	STIS/FUV-MAMA	1	13-Apr-2017 21:02:47.0	yes
01	(1) EUROPA-TRANSIT-1	STIS/FUV-MAMA	1	13-Apr-2017 21:02:48.0	yes

7 Total Orbits Used

## **ABSTRACT**

The presence of plumes of water ice venting from the icy surface of Europa is of tremendous interest to the scientific community, NASA and the general public, as it offers the prospect of access to material that was once in Europa's ocean without the need to drill through many miles of ice. We secured three observations, from a sample of ten, showing plume candidates, using FUV HST imaging of Europa as it transits the smooth face of Jupiter (Sparks et al., 2016). Crucially, the most accurately localized candidate, which is also the candidate of highest statistical significance, appears to repeat in recent unpublished 2016 data. We propose to acquire additional transit images in order to assess the repeatability of this event, determine a timescale for activity, and to aid in quantifying the column density and mass required. The data will provide additional opportunities to isolate new plume candidates and further characterize the persistent absorption around the southern limb of Europa. We propose a campaign to image Europa in transit against Jupiter close to the April 2017 opposition, in order to maximize spatial resolution, sensitivity, and time sampling. These measurements have the potential to profoundly influence a topic of fundamental scientific importance and of great strategic interest to NASA. If the ice plumes of Europa arise from the deep ocean, we have gained access to probably the most astrobiologically interesting location in the Solar System.

## **OBSERVING DESCRIPTION**

We will use the high resolution TIME-TAG FUV imaging mode of STIS, to obtain six images of Europa in transit against the face of Jupiter, close to opposition in order to maximize spatial resolution, sensitivity. We will use the F25SRF2 filter and drift the image of Europa across the detector using moving target specifications to Level 3. Each image is a single visit, of maximum duration permitted by the orbit. We will avoid opposition itself in order that the shadow of Europa on Jupiter does not interfere with the observation.

Proposal 14891 - Visit 02 - Confirming the ice plumes of Europa

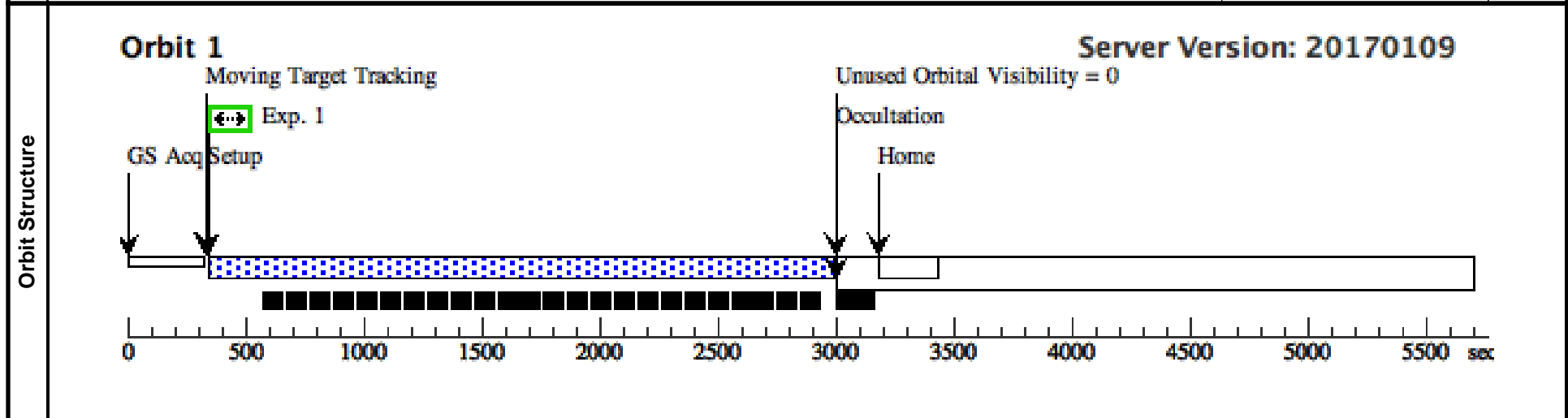
Fri Apr 14 01:02:49 GMT 2017

<b>Visit</b>	Proposal 14891, Visit 02, scheduled <b>Diagnostic Status: Warning</b> Scientific Instruments: STIS/FUV-MAMA Special Requirements: SCHED 90%; BETWEEN 07-MAR-2017:00:00:00 AND 05-APR-2017:10:00:00; BETWEEN 10-APR-2017:12:00:00 AND 07-MAY-2017:00:00:00

<b>Diagnostics</b>	(Exposure 1 (Visit 02)) Warning (Form): Sensitive exposures should have an ETC run number provided.
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<b>Solar System Targets</b>	#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
	(2)	EUROPA-TRANSIT-2	STD=JUPITER	STD=EUROPA		TRANSIT OF EUROPA ACROSS JUPITER FROM EARTH, SEP OF EUROPA JUPITER FROM EARTH LT -5" MOSS Show Windows: true	EARTH

<b>Exposures</b>	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(2) EUROPA-TRAN SIT-2	STIS/FUV-MAMA, TIME-TAG, F25SRF2	MIRROR	BUFFER-TIME=99			2700 Secs (2501 Secs) [=>2501.0 Secs ]	[1]



Proposal 14891 - Visit 22 - Confirming the ice plumes of Europa

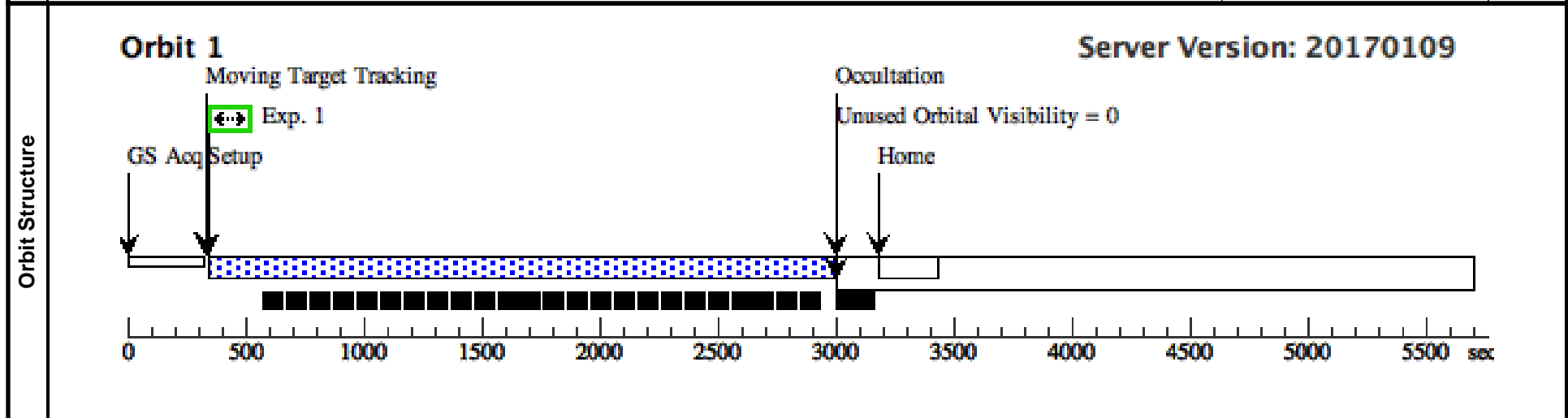
Fri Apr 14 01:02:50 GMT 2017

<b>Visit</b>	<b>Proposal 14891, Visit 22</b> <b>Diagnostic Status: Warning</b> Scientific Instruments: STIS/FUV-MAMA Special Requirements: SCHED 90%; BETWEEN 07-MAR-2017:00:00:00 AND 05-APR-2017:10:00:00; BETWEEN 10-APR-2017:12:00:00 AND 07-MAY-2017:00:00:00

<b>Diagnostics</b>	(Exposure 1 (Visit 22)) Warning (Form): Sensitive exposures should have an ETC run number provided.
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<b>Solar System Targets</b>	#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
	(7)	EUROPA-TRANSIT-22	STD=JUPITER	STD=EUROPA	TYPE=POS_ANGLE,RAD=6.5,ANG=-240.6,REF=NORTH,R_RAD=-51.0,R_ANG=0,EPOCH=17-APR-2017:02:12:20,EpochTimeScale=UTC	TRANSIT OF EUROPA ACROSS JUPITER FROM EARTH, SEP OF EUROPA JUPITER FROM EARTH LT -5" MOSS Show Windows: true	EARTH

<b>Exposures</b>	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(7) EUROPA-TRANSIT-22	STIS/FUV-MAMA, TIME-TAG, F25SRF2	MIRROR	BUFFER-TIME=99				2700 Secs (2501 Secs) [=>2501.0 Secs ]



Proposal 14891 - Visit 03 - Confirming the ice plumes of Europa

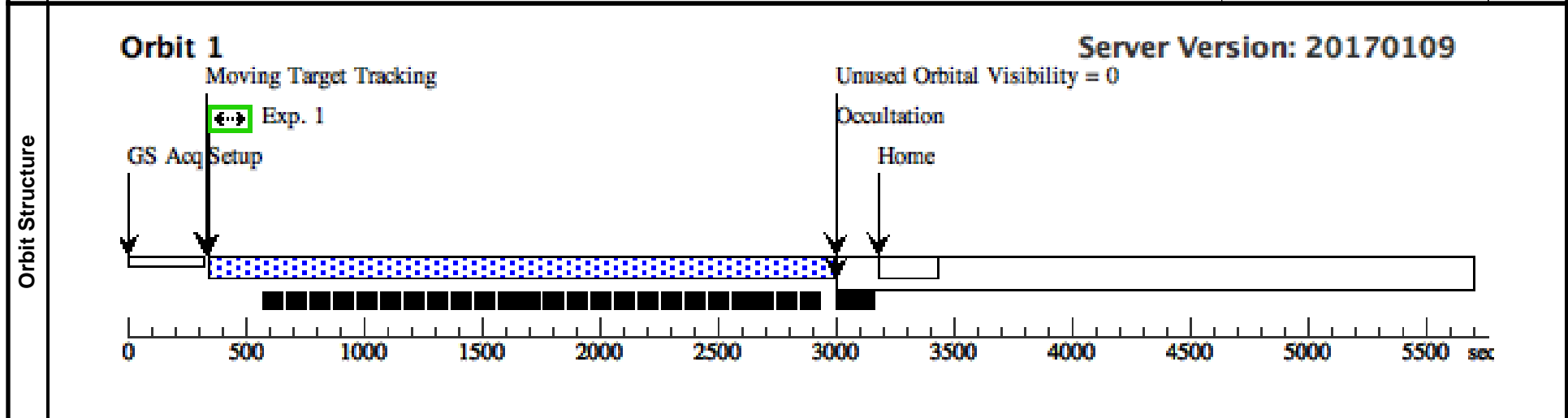
Fri Apr 14 01:02:50 GMT 2017

<b>Visit</b>	Proposal 14891, Visit 03, completed <b>Diagnostic Status: Warning</b> Scientific Instruments: STIS/FUV-MAMA Special Requirements: SCHED 90%: BETWEEN 09-APR-2017:00:00:00 AND 12-APR-2017:00:00:00
	(Exposure 1 (Visit 03)) Warning (Form): Sensitive exposures should have an ETC run number provided.

<b>Diagnostics</b>	(Exposure 1 (Visit 03)) Warning (Form): Sensitive exposures should have an ETC run number provided.
	(Exposure 1 (Visit 03)) Warning (Form): Sensitive exposures should have an ETC run number provided.

<b>Solar System Targets</b>	#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
	(3)	EUROPA-TRANSIT-3	STD=JUPITER	STD=EUROPA		TYPE=POS_ANGLE,RAD=5.5,ANG=263.7,REF=NORTH,R_RAD=-51.0,R_ANG=0.0,EPOCH=10-APR-2017:00:06:30,EpochTimeScale=UTC	TRANSIT OF EUROPA ACROSS JUPITER FROM EARTH, SEP OF EUROPA JUPITER FROM EARTH LT -5" MOSS Show Windows: true

<b>Exposures</b>	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(3) EUROPA-TRAN SIT-3		STIS/FUV-MAMA, TIME-TAG, F25SRF2	MIRROR	BUFFER-TIME=99			2700 Secs (2501 Secs) [=>2501.0 Secs ]



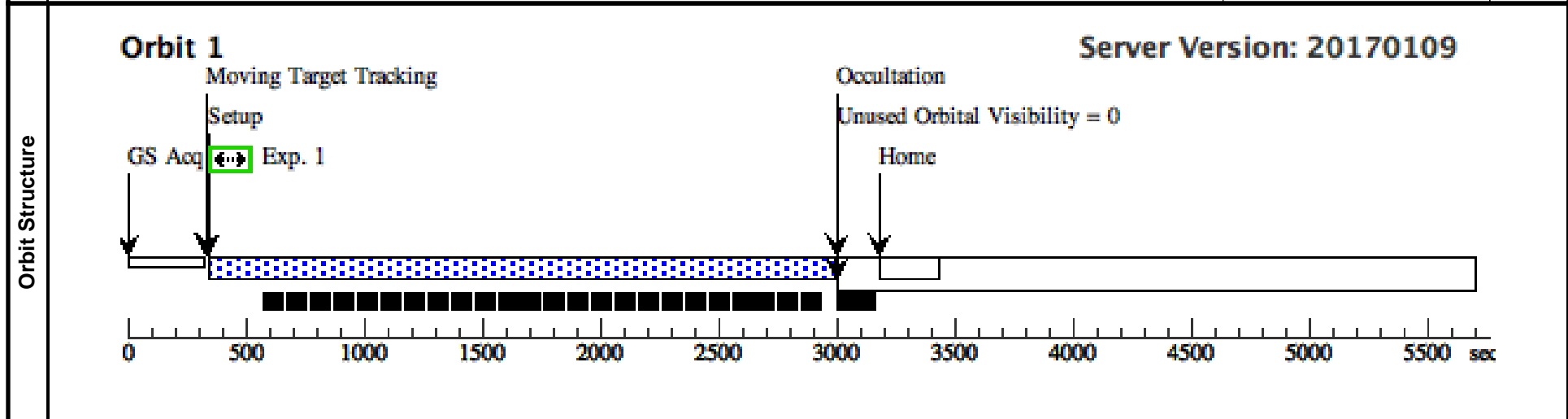
Proposal 14891 - Visit 04 - Confirming the ice plumes of Europa

Fri Apr 14 01:02:50 GMT 2017

<b>Visit</b>	Proposal 14891, Visit 04, completed <b>Diagnostic Status: Warning</b> Scientific Instruments: STIS/FUV-MAMA Special Requirements: SCHED 90%: BETWEEN 29-MAR-2017:00:00:00 AND 31-MAR-2017:00:00:00
	(Exposure 1 (Visit 04)) Warning (Form): Sensitive exposures should have an ETC run number provided.

<b>Solar System Targets</b>	#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
	(4)	EUROPA-TRANSIT-4	STD=JUPITER	STD=EUROPA	TYPE=POS_ANGLE,RAD=6.5,ANG=41.0,REF=NORTH,R_RAD=-51.0,R_ANG=0.0,EPOCH=30-MAR-2017:09:45:35,EpochTimeScale=UTC	TRANSIT OF EUROPA ACROSS JUPITER FROM EARTH, SEP OF EUROPA JUPITER FROM EARTH LT -5" MOSS Show Windows: true	EARTH

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(4) EUROPA-TRANSIT-4	STIS/FUV-MAMA, TIME-TAG, F25SRF2	MIRROR	BUFFER-TIME=99			2700 Secs (2501 Secs) [=>2501.0 Secs ]	[1]



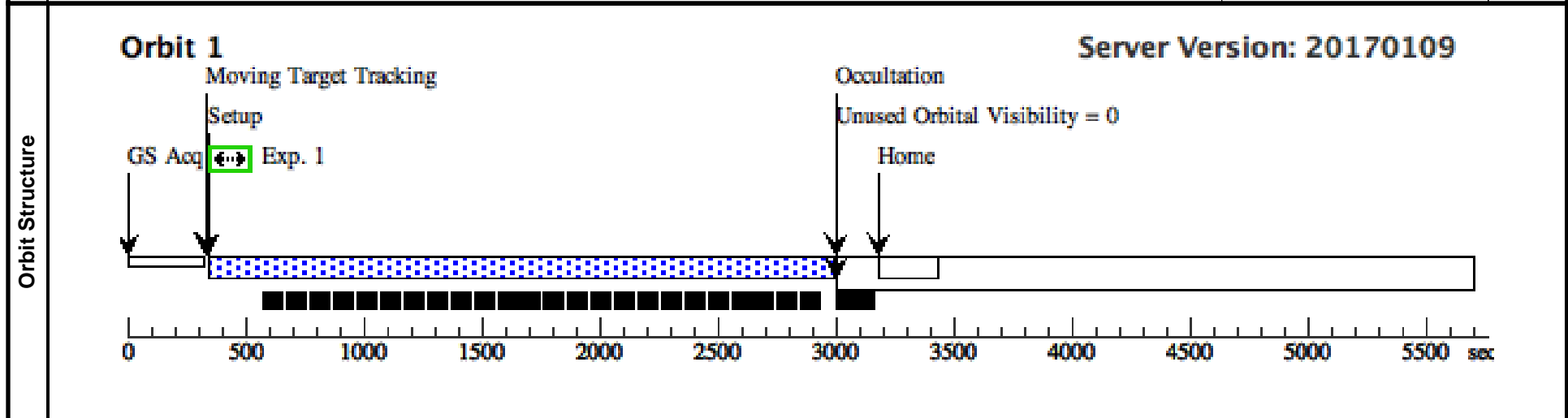
Proposal 14891 - Visit 05 - Confirming the ice plumes of Europa

Fri Apr 14 01:02:50 GMT 2017

<b>Visit</b>	Proposal 14891, Visit 05, scheduled <b>Diagnostic Status: Warning</b> Scientific Instruments: STIS/FUV-MAMA Special Requirements: SCHED 90%: BETWEEN 19-APR-2017:00:00:00 AND 21-APR-2017:00:00:00
	(Exposure 1 (Visit 05)) Warning (Form): Sensitive exposures should have an ETC run number provided.

<b>Solar System Targets</b>	#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
	(5)	EUROPA-TRANSIT-5	STD=JUPITER	STD=EUROPA	TYPE=POS_ANGLE,RAD=6.5,ANG=-235.0,REF=NORTH,R_RAD=-51.0,R_ANG=0.0,EPOCH=20-APR-2017:16:02:55,EpochTimeScale=UTC	TRANSIT OF EUROPA ACROSS JUPITER FROM EARTH, SEP OF EUROPA JUPITER FROM EARTH LT -5" MOSS Show Windows: true	EARTH

<b>Exposures</b>	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(5) EUROPA-TRAN SIT-5	STIS/FUV-MAMA, TIME-TAG, F25SRF2	MIRROR	BUFFER-TIME=99				2700 Secs (2501 Secs) [=>2501.0 Secs ]



Proposal 14891 - Visit 06 - Confirming the ice plumes of Europa

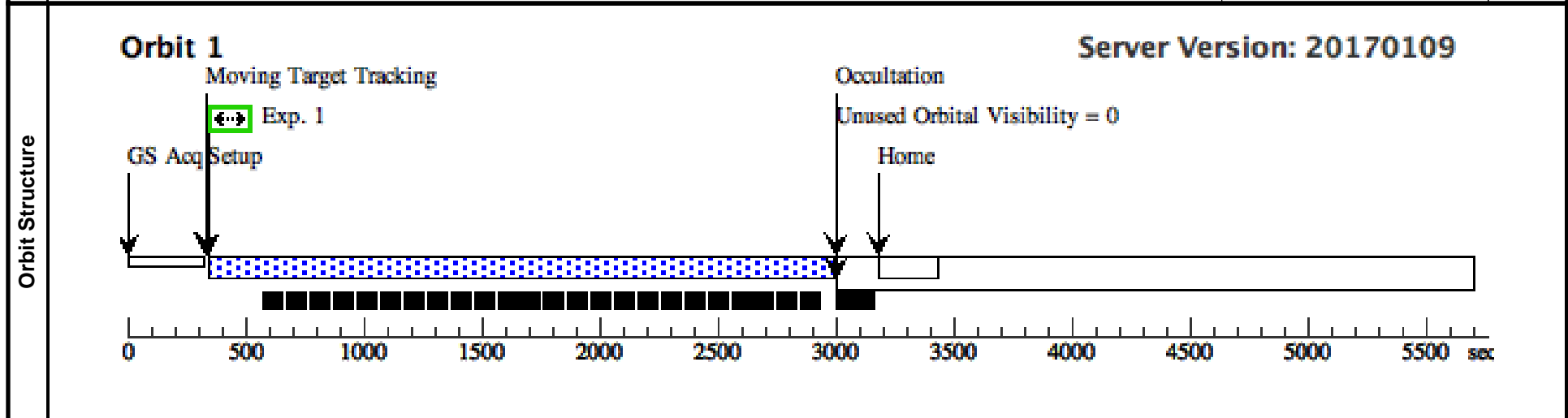
Fri Apr 14 01:02:50 GMT 2017

<b>Visit</b>	Proposal 14891, Visit 06, scheduled <b>Diagnostic Status: Warning</b> Scientific Instruments: STIS/FUV-MAMA Special Requirements: SCHED 90%: BETWEEN 26-APR-2017:00:00:00 AND 28-APR-2017:00:00:00
	(Exposure 1 (Visit 06)) Warning (Form): Sensitive exposures should have an ETC run number provided.

<b>Diagnostics</b>	(Exposure 1 (Visit 06)) Warning (Form): Sensitive exposures should have an ETC run number provided.
	(Exposure 1 (Visit 06)) Warning (Form): Sensitive exposures should have an ETC run number provided.

<b>Solar System Targets</b>	#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
	(6)	EUROPA-TRANSIT-6	STD=JUPITER	STD=EUROPA	TYPE=POS_ANGLE,RAD=6.5,ANG=-259.1,REF=NORTH,R_RAD=-51.0,R_ANG=0.0,EPOCH=27-APR-2017:18:06:20,EpochTimeScale=UTC	TRANSIT OF EUROPA ACROSS JUPITER FROM EARTH, SEP OF EUROPA JUPITER FROM EARTH LT -5"	MOSS Show Windows: true

<b>Exposures</b>	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(6) EUROPA-TRAN SIT-6	STIS/FUV-MAMA, TIME-TAG, F25SRF2	MIRROR	BUFFER-TIME=99				2700 Secs (2501 Secs) [=>2501.0 Secs ]





Proposal 14891 - Visit 01 - Confirming the ice plumes of Europa

Fri Apr 14 01:02:50 GMT 2017

<b>Visit</b>	Proposal 14891, Visit 01, completed <b>Diagnostic Status: Warning</b> Scientific Instruments: STIS/FUV-MAMA Special Requirements: BETWEEN 11-MAR-2017:00:00:00 AND 13-MAR-2017:00:00:00
	(Exposure 1 (Visit 01)) Warning (Form): Sensitive exposures should have an ETC run number provided.

<b>Diagnostics</b>	(Exposure 1 (Visit 01)) Warning (Form): Sensitive exposures should have an ETC run number provided.
	(Exposure 1 (Visit 01)) Warning (Form): Sensitive exposures should have an ETC run number provided.

<b>Solar System Targets</b>	#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
	(1)	EUROPA-TRANSIT-1	STD=JUPITER	STD=EUROPA	TYPE=POS_ANGLE,RAD=6.5,ANG=-53.0,REF=NORTH,R_RAD=-51.,R_ANG=0,EPOCH=12-MAR-2017:15:45:30,EpochTimeScale=UTC	TRANSIT OF EUROPA ACROSS JUPITER FROM EARTH, SEP OF EUROPA JUPITER FROM EARTH LT -5" MOSS Show Windows: true	EARTH

<b>Exposures</b>	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(1) EUROPA-TRAN SIT-1	STIS/FUV-MAMA, TIME-TAG, F25SRF2	MIRROR	BUFFER-TIME=99			2650 Secs (2650 Secs) [==>]	[1]

