14267 - The Grand Finale : probing the origin of Saturn s aurorae with HST observations simultaneous to Cassini polar measurements

Cycle: 23, 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) SATURN	STIS/FUV-MAMA	1	11-Mar-2016 21:01:03.0	yes
02	(1) SATURN	STIS/FUV-MAMA	1	11-Mar-2016 21:01:04.0	yes
03	(1) SATURN	STIS/FUV-MAMA	1	11-Mar-2016 21:01:06.0	yes
04	(1) SATURN	STIS/FUV-MAMA	1	11-Mar-2016 21:01:07.0	yes
05	(1) SATURN	STIS/FUV-MAMA	1	11-Mar-2016 21:01:08.0	yes
06	(1) SATURN	STIS/FUV-MAMA	1	11-Mar-2016 21:01:09.0	yes

6 Total Orbits Used

ABSTRACT

With the increasing tilting of Saturn s north pole toward the Earth, HST has the opportunity to achieve unprecedented views of the entire northern aurorae at high spatial and temporal resolution. Such observations will shed light onto the auroral processes specific to the northern magnetosphere (the planet s magnetic dipole is offset toward the north) and compared to past similar observations of the southern aurorae. Furthermore, the Cassini spacecraft is about to start its last mission phase - the grand finale - with polar orbits around the planet, sampling the unexplored auroral regions at low altitude, before ultimately impacting the atmosphere. This proposal aims at taking advantage of this unique occasion to identify the acceleration processes responsible for Saturn's aurorae with HST remote observations combined with Cassini local measurements. HST images and spectra of the northern aurorae will primarily be scheduled when Cassini samples in situ the plasma conditions within the auroral regions, to assess fundamental plasma physics processes including acceleration, wave-particle interaction and energy/momentum transfer. Several HST orbits will also be coordinated with Cassini remote imaging of the southern aurorae to achieve a simultaneous view of both hemispheres and investigate magnetic (non-)conjugacy.

OBSERVING DESCRIPTION

Observations of Saturn's northern UV aurorae while Cassini observes the southern aurorae. The time windows are critical and are listed in order of preference. Visits 01-03 and 04-06 are grouped within 11h to observe auroral dynamics over a fraction of a planetary rotation.

Each visit consists of a single STIS orbit, made of a unique long exposure time-tagged FUV-MAMA image. The SrF2 filter is used to minimise geocoronal contamination. Time-tag mode is used with a buffer of 100s. Past observations show that the maximum global count rate remains <10000 cts/sec. Orient ranges are intended to avoid the repeller wire shadow and dark current across the northern polar region.

Visit

Proposal 14267, Visit 01, implementation Sat Mar 12 02:01:10 GMT 2016

Diagnostic Status: Warning

Scientific Instruments: STIS/FUV-MAMA

Special Requirements: ORIENT 168D TO 288 D; ORIENT 348D TO 360 D; ORIENT 0.1D TO 108 D; BETWEEN 04-JUN-2016:20:40:00 AND 05-JUN-2016:08:50:00; BETWEEN 05-JUN-2016:19:10:00 AND 06-JUN-2016:04:10:00; BETWEEN 29-JUN-2016:02:44:00 AND 29-JUN-2016:12:04:00; BETWEEN 22-JUL-2016:15:40:00 AND 23-JUL-2016:05:35:00; GROUP 01,02,03 WITHIN 11H

Comments: Observations of Saturn's northern UV aurorae while Cassini observes the southern aurorae.

Visits 01, 02 and 03 need to be grouped within the same observing window (within 11h of each other). Three windows matching the Cassini planning are listed by order of priority.

Each visit consists of a single orbit, made of a unique long exposure time-tagged image. Please expand the exposure time of each observation as much as possible. Orient ranges are intended to avoid the repeller wire shadow and dark current across the northern polar region.

Diagnostics

(Exposure 1 (Visit 01)) Warning (Form): Sensitive exposures should have an ETC run number provided.

Solar System Targets

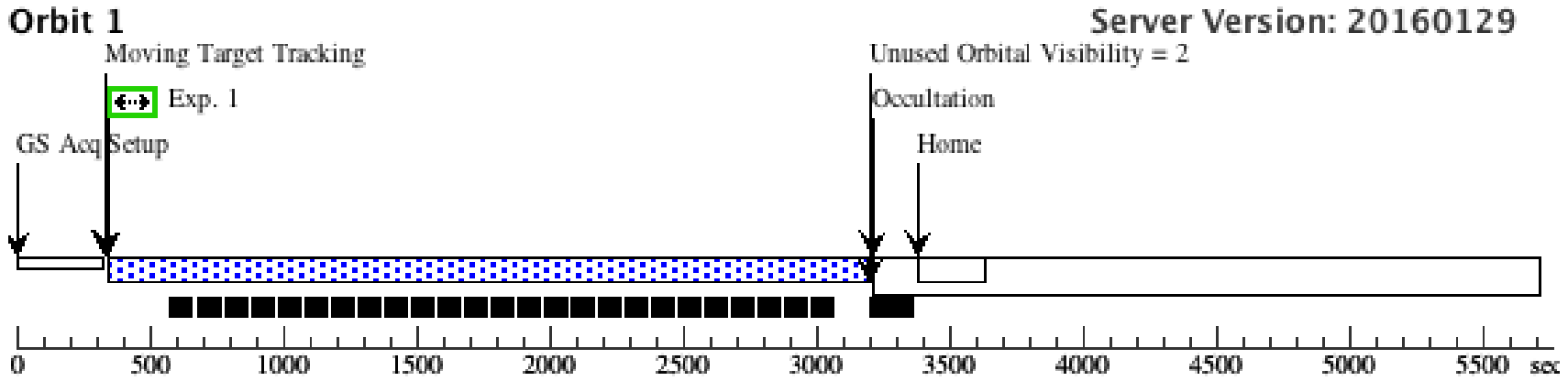
#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
(1)	SATURN	STD=SATURN				EARTH

Comments: Moving target. Point at centre of planet so that the northern polar region and the front and rear parts of A, B, C rings fit in the MAMA aperture.

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) SATURN	STIS/FUV-MAMA, TIME-TAG, F25SRF2	MIRROR	BUFFER-TIME=100			2700 Secs (2700 Secs) *[==>]*	*[1]*

Orbit Structure



Visit

Proposal 14267, Visit 02, implementation Sat Mar 12 02:01:10 GMT 2016

Diagnostic Status: Warning

Scientific Instruments: STIS/FUV-MAMA

Special Requirements: ORIENT 168D TO 288 D; ORIENT 348D TO 360 D; ORIENT 0.1D TO 108 D; BETWEEN 04-JUN-2016:20:40:00 AND 05-JUN-2016:08:50:00; BETWEEN 05-JUN-2016:19:10:00 AND 06-JUN-2016:04:10:00; BETWEEN 29-JUN-2016:02:44:00 AND 29-JUN-2016:12:04:00; BETWEEN 22-JUL-2016:15:40:00 AND 23-JUL-2016:05:35:00; GROUP 02,01,03 WITHIN 11H

Comments: Observations of Saturn's northern UV aurorae while Cassini observes the southern aurorae.

Visits 01, 02 and 03 need to be grouped within the same observing window (within 11h of each other). Three windows matching the Cassini planning are listed by order of priority.

Each visit consists of a single orbit, made of a unique long exposure time-tagged image. Please expand the exposure time of each observation as much as possible. Orient ranges are intended to avoid the repeller wire shadow and dark current across the northern polar region.

Diagnostics

(Exposure 1 (Visit 02)) Warning (Form): Sensitive exposures should have an ETC run number provided.

Solar System Targets

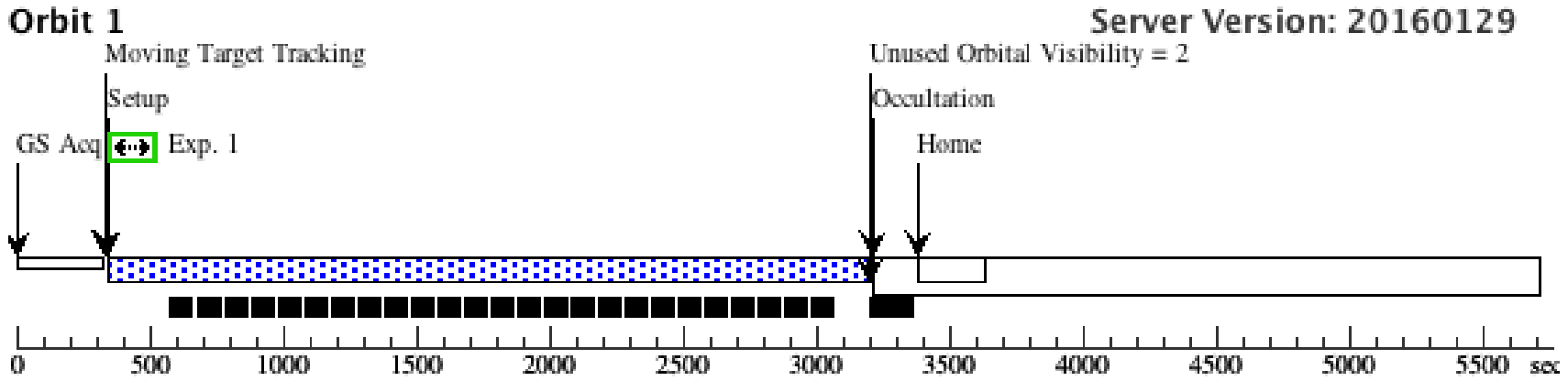
#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
(1)	SATURN	STD=SATURN				EARTH

Comments: Moving target. Point at centre of planet so that the northern polar region and the front and rear parts of A, B, C rings fit in the MAMA aperture.

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) SATURN	STIS/FUV-MAMA, TIME-TAG, F25SRF2	MIRROR	BUFFER-TIME=100			2700 Secs (2700 Secs) *[==>]*	*[1]*

Orbit Structure



Visit

Proposal 14267, Visit 03, implementation Sat Mar 12 02:01:10 GMT 2016

Diagnostic Status: Warning

Scientific Instruments: STIS/FUV-MAMA

Special Requirements: ORIENT 168D TO 288 D; ORIENT 348D TO 360 D; ORIENT 0.1D TO 108 D; BETWEEN 04-JUN-2016:20:40:00 AND 05-JUN-2016:08:50:00; BETWEEN 05-JUN-2016:19:10:00 AND 06-JUN-2016:04:10:00; BETWEEN 29-JUN-2016:02:44:00 AND 29-JUN-2016:12:04:00; BETWEEN 22-JUL-2016:15:40:00 AND 23-JUL-2016:05:35:00; GROUP 03,01,02 WITHIN 11H

Comments: Observations of Saturn's northern UV aurorae while Cassini observes the southern aurorae.

Visits 01, 02 and 03 need to be grouped within the same observing window (within 11h of each other). Three windows matching the Cassini planning are listed by order of priority.

Each visit consists of a single orbit, made of a unique long exposure time-tagged image. Please expand the exposure time of each observation as much as possible. Orient ranges are intended to avoid the repeller wire shadow and dark current across the northern polar region.

Diagnostics

(Exposure 1 (Visit 03)) Warning (Form): Sensitive exposures should have an ETC run number provided.

Solar System Targets

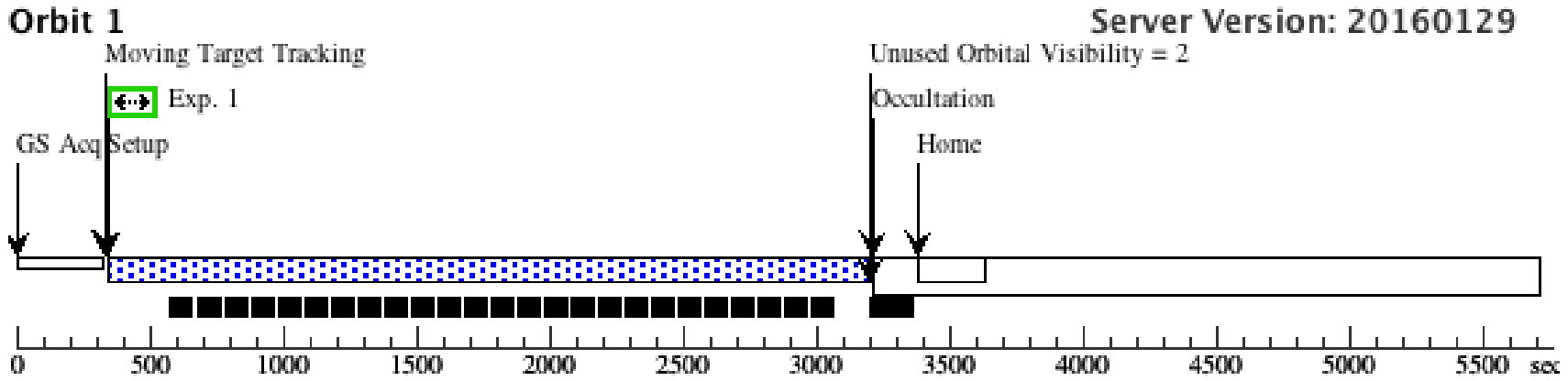
#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
(1)	SATURN	STD=SATURN				EARTH

Comments: Moving target. Point at centre of planet so that the northern polar region and the front and rear parts of A, B, C rings fit in the MAMA aperture.

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) SATURN	STIS/FUV-MAMA, TIME-TAG, F25SRF2	MIRROR	BUFFER-TIME=100			2700 Secs (2700 Secs) *[==>]*	*[1]*

Orbit Structure



Visit

Proposal 14267, Visit 04, implementation Sat Mar 12 02:01:10 GMT 2016

Diagnostic Status: Warning

Scientific Instruments: STIS/FUV-MAMA

Special Requirements: ORIENT 168D TO 288 D; ORIENT 348D TO 360 D; ORIENT 0.1D TO 108 D; BETWEEN 19-AUG-2016:10:33:00 AND 20-AUG-2016:01:33:00; BETWEEN 29-JUN-2016:05:16:00 AND 29-JUN-2016:14:36:00; BETWEEN 22-JUL-2016:15:40:00 AND 23-JUL-2016:05:35:00; GROUP 04,05,06 WITHIN 11H

Comments: Observations of Saturn's northern UV aurorae while Cassini observes the southern aurorae.

Visits 04, 05 and 06 need to be grouped within the same observing window (within 11h of each other). Three windows matching the Cassini planning are listed by order of priority.

Each visit consists of a single orbit, made of a unique long exposure time-tagged image. Please expand the exposure time of each observation as much as possible. Orient ranges are intended to avoid the repeller wire shadow and dark current across the northern polar region.

original between list:
BETWEEN 19-AUG-2016:17:00:00 AND 20-AUG-2016:04:15:00;
BETWEEN 19-AUG-2016:14:00:00 AND 19-AUG-2016:16:59:59;
BETWEEN 29-JUN-2016:05:16:00 AND 29-JUN-2016:14:36:00;
BETWEEN 22-JUL-2016:15:40:00 AND 23-JUL-2016:05:35:00

Diagnostics

(Exposure 1 (Visit 04)) Warning (Form): Sensitive exposures should have an ETC run number provided.

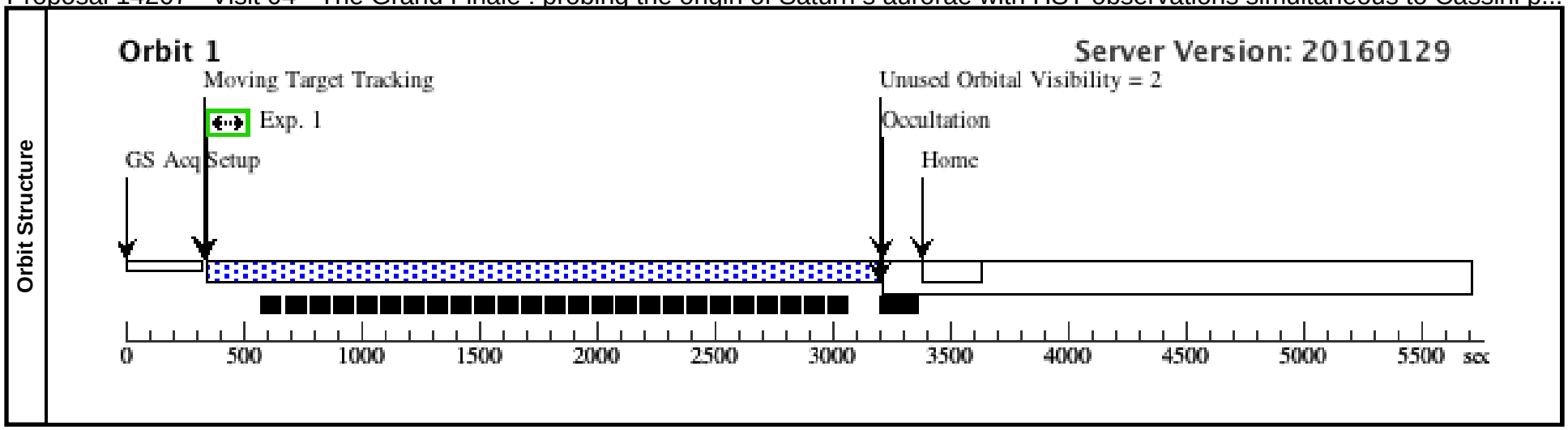
Solar System Targets

#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
(1)	SATURN	STD=SATURN				EARTH

Comments: Moving target. Point at centre of planet so that the northern polar region and the front and rear parts of A, B, C rings fit in the MAMA aperture.

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) SATURN	STIS/FUV-MAMA, TIME-TAG, F25SRF2	MIRROR	BUFFER-TIME=100			2700 Secs (2700 Secs) *[==>]*	*[1]*


Orbit Structure
Orbit 1
Server Version: 20160129
Moving Target Tracking
Exp. 1
GS Acq
Setup
Unused Orbital Visibility = 2
Occultation
Home
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 14267, Visit 05, implementation Sat Mar 12 02:01:10 GMT 2016

Diagnostic Status: Warning

Scientific Instruments: STIS/FUV-MAMA

Special Requirements: ORIENT 168D TO 288 D; ORIENT 348D TO 360 D; ORIENT 0.1D TO 108 D; BETWEEN 19-AUG-2016:10:33:00 AND 20-AUG-2016:01:33:00; BETWEEN 29-JUN-2016:05:16:00 AND 29-JUN-2016:14:36:00; BETWEEN 22-JUL-2016:15:40:00 AND 23-JUL-2016:05:35:00; GROUP 05,04,06 WITHIN 11H

Comments: Observations of Saturn's northern UV aurorae while Cassini observes the southern aurorae.

Visits 04, 05 and 06 need to be grouped within the same observing window (within 11h of each other). Three windows matching the Cassini planning are listed by order of priority.

Each visit consists of a single orbit, made of a unique long exposure time-tagged image. Please expand the exposure time of each observation as much as possible. Orient ranges are intended to avoid the repeller wire shadow and dark current across the northern polar region.

Diagnostics

(Exposure 1 (Visit 05)) Warning (Form): Sensitive exposures should have an ETC run number provided.

Solar System Targets

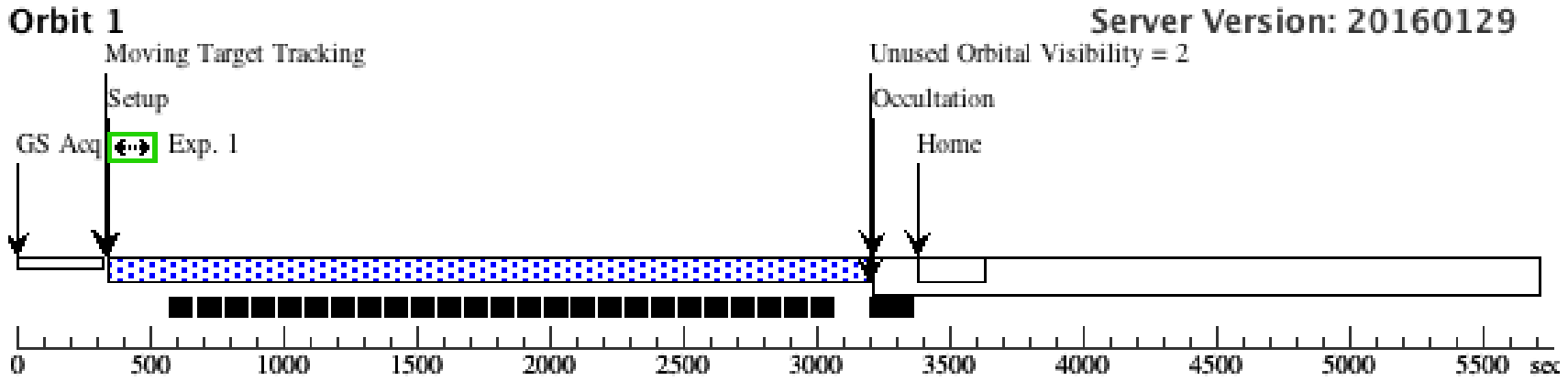
#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
(1)	SATURN	STD=SATURN				EARTH

Comments: Moving target. Point at centre of planet so that the northern polar region and the front and rear parts of A, B, C rings fit in the MAMA aperture.

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) SATURN	STIS/FUV-MAMA, TIME-TAG, F25SRF2	MIRROR	BUFFER-TIME=100			2700 Secs (2700 Secs) *[==>]*	*[1]*

Orbit Structure



Visit

Proposal 14267, Visit 06, implementation Sat Mar 12 02:01:11 GMT 2016

Diagnostic Status: Warning

Scientific Instruments: STIS/FUV-MAMA

Special Requirements: ORIENT 168D TO 288 D; ORIENT 348D TO 360 D; ORIENT 0.1D TO 108 D; BETWEEN 19-AUG-2016:10:33:00 AND 20-AUG-2016:01:33:00; BETWEEN 29-JUN-2016:05:16:00 AND 29-JUN-2016:14:36:00; BETWEEN 22-JUL-2016:15:40:00 AND 23-JUL-2016:05:35:00; GROUP 06,04,05 WITHIN 11H

Comments: Observations of Saturn's northern UV aurorae while Cassini observes the southern aurorae.

Visits 04, 05 and 06 need to be grouped within the same observing window (within 11h of each other). Three windows matching the Cassini planning are listed by order of priority.

Each visit consists of a single orbit, made of a unique long exposure time-tagged image. Please expand the exposure time of each observation as much as possible. Orient ranges are intended to avoid the repeller wire shadow and dark current across the northern polar region.

Diagnostics

(Exposure 1 (Visit 06)) 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)	SATURN	STD=SATURN				EARTH

Comments: Moving target. Point at centre of planet so that the northern polar region and the front and rear parts of A, B, C rings fit in the MAMA aperture.

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) SATURN	STIS/FUV-MAMA, TIME-TAG, F25SRF2	MIRROR	BUFFER-TIME=100			2700 Secs (2700 Secs) *[==>]*	*[1]*

Orbit Structure