15371 - Jupiter stray light background measurements for future Europa STIS observations

Cycle: 24, Proposal Category: GO/DD

(Availability Mode: AVAILABLE)

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	(2) JUPITER-OFFSET-1 (3) JUPITER-OFFSET-2 (4) JUPITER-OFFSET-3 (6) JUPITER-OFFSET-5 (8) JUPITER-OFFSET-7	STIS/CCD	2	02-Aug-2017 15:04:13.0	yes
02	(3) JUPITER-OFFSET-2 (6) JUPITER-OFFSET-5 (7) JUPITER-OFFSET-6	STIS/CCD	1	02-Aug-2017 15:04:15.0	yes

3 Total Orbits Used

ABSTRACT

This proposal characterizes the STIS/CCD background in the G230MB and G750M modes within 1 arc minutes of Jupiter. These measurements are intended to support future observations of the Jovian satellites. This is motivated by the discovery of water vapor near Europa's south pole (Roth et al., 2014) which has important implications for the search for life in our Solar System. The presence of water plumes comprises the possibility that Europa's potentially habitable subsurface ocean can be directly probed by the upcoming NASA and ESA missions. On September 26, 2017, 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. Proposal 14903 (PI: Roth) tested COS NUV and STIS visible aurora observations in eclipse to provide higher sensitivities to H2O abundances than the FUV detections of Roth et al. (2014) and found significant stray light issues.

OBSERVING DESCRIPTION

This is what we would plan to accomplish over three orbits:

1) G750M (2 orbits)

2x52 slit offset 28 arc seconds from limb of Jupiter

2x52 slit offset 38 arc seconds from the limb of Jupiter

2x2 slit offset 5, 15, 45 arc seconds from the limb of Jupiter

Orientation: PA selected such at long slit is aligned with vector toward center of Jupiter (+/- 10 deg)

Exposure times of 10, 100, 300 seconds at each location (TBD:tune to fill orbits)

2) G230MB (1 orbit)

2x2 slit placed 15 arc seconds and 30 arc seconds from limb of Jupiter

2X52 slit placed 38 arc seconds from the limb of Jupiter

(i.e. with aperture at center of long slit it extends from 10 to 62 arc seconds from limb)

Orientation: PA selected such at long slit is aligned with vector toward center of Jupiter (+/- 10 deg)

same Orient as item #1 above

Exposure times of 30, 400 seconds at each location (TBD: tune to fill orbit)

Visit

Proposal 15371, Jupiter background for STIS G750M (01), implementation Wed Aug 02 19:04:17 GMT 2017

Diagnostic Status: Warning

Scientific Instruments: STIS/CCD

Special Requirements: BEFORE 24-AUG-2017:00:00:00

Comments: 1) G750M (2 orbits)
2x52 slit offset 28 arc seconds from limb of Jupiter
2x52 slit offset 38 arc seconds from the limb of Jupiter
2x2 slit offset 5, 10, 15, 30, 45 arc seconds from the limb of Jupiter

Orientation: PA selected such at long slit is aligned with vector toward center of Jupiter (+/- 10 deg)

Exposure times of 10, 100, 300, 300 seconds at each location (TBD:tune to fill orbits)

Diagnostics

(Jupiter background for STIS G750M (01)) Warning (Form): A target acquisition should probably be performed before doing spectroscopy or coronography with STIS or COS.

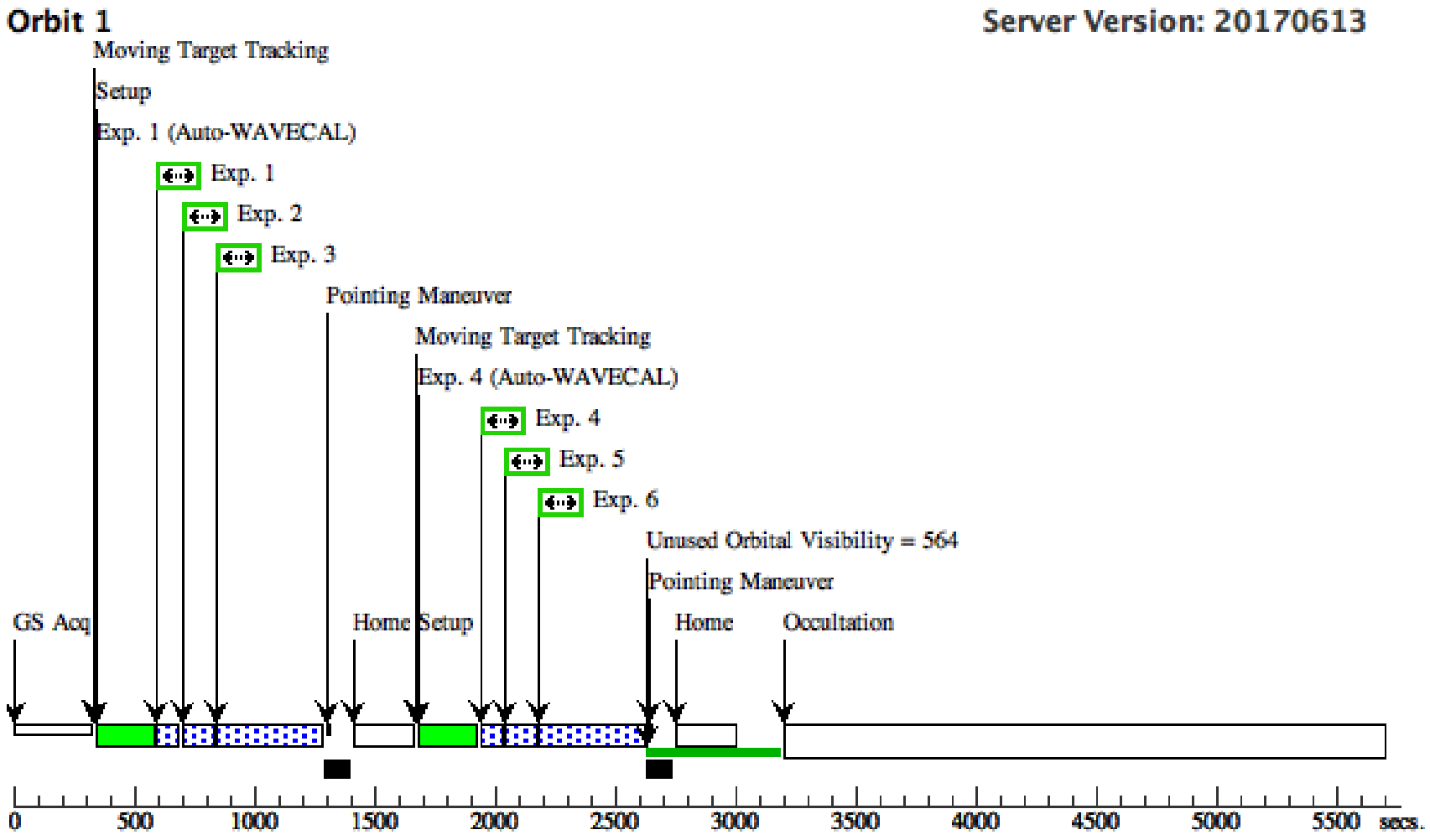
Solar System Targets

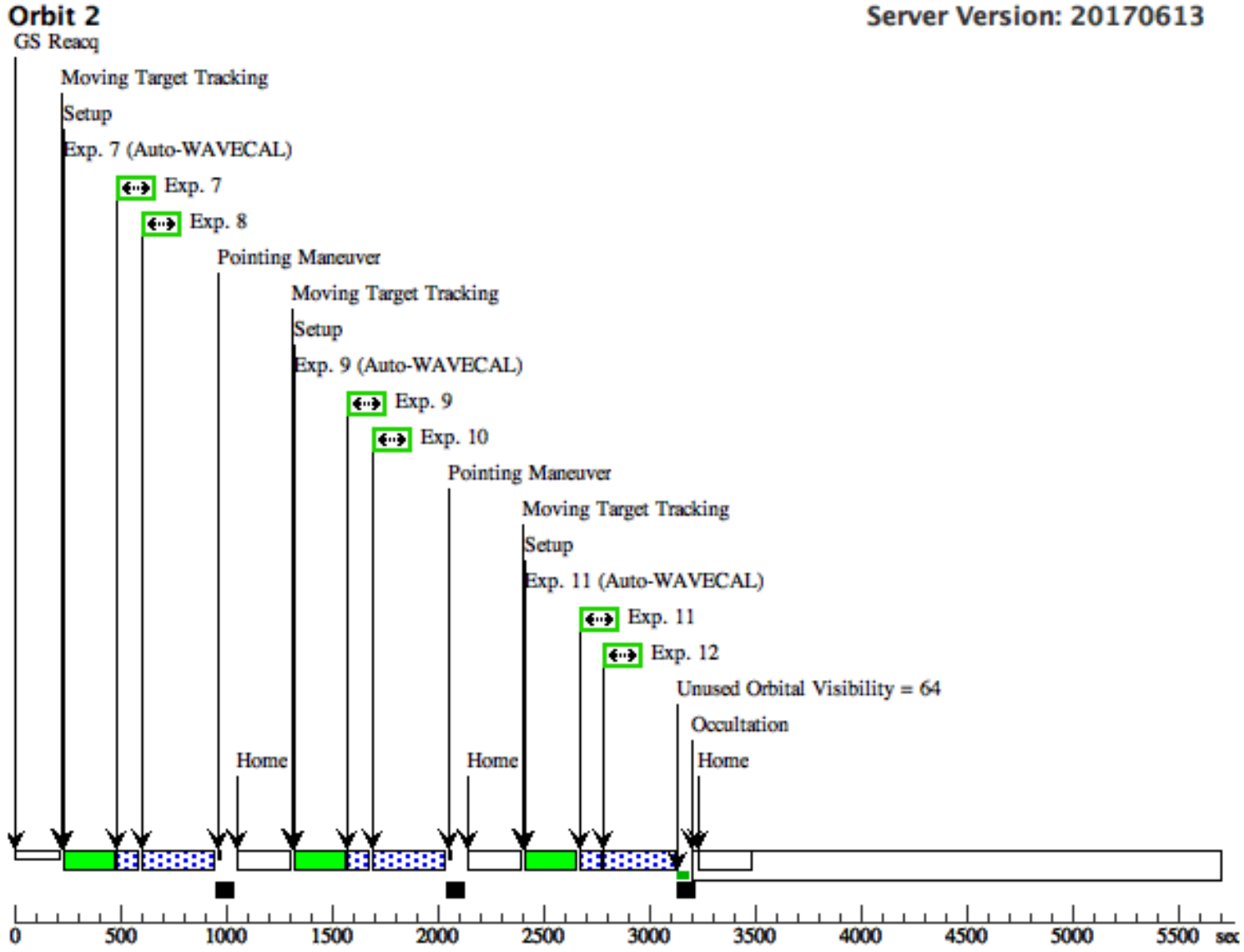
#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
(2)	JUPITER-OFFSET-1	STD=JUPITER	TYPE=POS_ANGLE,RAD=45,ANG=66.5,REF=NORTH			EARTH
Comments: Jupiter's equatorial angular radius ranges 16.30 to 16.64 arcsec on Aug 14 to 24. Round up to 17 arcsec. Offsetting the 26 arcsec slit center from the limb plus ~2 arcsec margin is RAD=45						
(3)	JUPITER-OFFSET-2	STD=JUPITER	TYPE=POS_ANGLE,RAD=55,ANG=66.5,REF=NORTH			EARTH
Comments: Jupiter's equatorial angular radius ranges 16.30 to 16.64 arcsec on Aug 14 to 24. Round up to 17 arcsec. Offsetting the 2x52 slit center 10 arcsec from previous (i.e., total 38 arcsec from limb) is RAD=55.						
(4)	JUPITER-OFFSET-3	STD=JUPITER	TYPE=POS_ANGLE,RAD=22,ANG=66.5,REF=NORTH			EARTH
Comments: Jupiter's equatorial angular radius ranges 16.30 to 16.64 arcsec on Aug 14 to 24. Round up to 17 arcsec. Offsetting the 2x2 arcsec slit center from the limb plus 5 arcsec is RAD=22.						
(6)	JUPITER-OFFSET-5	STD=JUPITER	TYPE=POS_ANGLE,RAD=32,ANG=66.5,REF=NORTH			EARTH
Comments: Jupiter's equatorial angular radius ranges 16.30 to 16.64 arcsec on Aug 14 to 24. Round up to 17 arcsec. Offsetting the 2x2 arcsec slit center from the limb plus 15 arcsec is RAD=32.						
(8)	JUPITER-OFFSET-7	STD=JUPITER	TYPE=POS_ANGLE,RAD=62,ANG=66.5,REF=NORTH			EARTH
Comments: Jupiter's equatorial angular radius ranges 16.30 to 16.64 arcsec on Aug 14 to 24. Round up to 17 arcsec. Offsetting the 2x2 arcsec slit center from the limb plus 45 arcsec is RAD=62.						

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	First orbit, 2 x52 slit	(2) JUPITER-OFFS ET-1	STIS/CCD, ACCUM, 52X2	G750M 6581 A	GAIN=4; CR-SPLIT=NO	GS ACQ SCENARIO BASE1B3		10 Secs (10 Secs) *[==>]*	*[1]*
	Comments: 15 arc seconds and 30 arc seconds from limb of Jupiter. Exposure times of 10, 100, 300, 300 seconds at each location (TBD:tune to fill orbits)								
2	First orbit, 2 x52 slit	(2) JUPITER-OFFS ET-1	STIS/CCD, ACCUM, 52X2	G750M 6581 A	GAIN=4; CR-SPLIT=NO			100 Secs (100 Secs) *[==>]*	*[1]*
	Comments: 15 arc seconds and 30 arc seconds from limb of Jupiter. Exposure times of 10, 100, 300, 300 seconds at each location (TBD:tune to fill orbits)								
3	First orbit, 2 x52 slit	(2) JUPITER-OFFS ET-1	STIS/CCD, ACCUM, 52X2	G750M 6581 A	GAIN=4; CR-SPLIT=NO			400 Secs (400 Secs) *[==>]*	*[1]*
	Comments: 15 arc seconds and 30 arc seconds from limb of Jupiter. Exposure times of 10, 100, 300, 300 seconds at each location (TBD:tune to fill orbits)								
4	First orbit, 2 x52 slit	(3) JUPITER-OFFS ET-2	STIS/CCD, ACCUM, 52X2	G750M 6581 A	GAIN=4; CR-SPLIT=NO	GS ACQ SCENARIO BASE1B3		10 Secs (10 Secs) *[==>]*	*[1]*
	Comments: 15 arc seconds and 30 arc seconds from limb of Jupiter. Exposure times of 10, 100, 300, 300 seconds at each location (TBD:tune to fill orbits)								
5	First orbit, 2 x52 slit	(3) JUPITER-OFFS ET-2	STIS/CCD, ACCUM, 52X2	G750M 6581 A	GAIN=4; CR-SPLIT=NO			100 Secs (100 Secs) *[==>]*	*[1]*
	Comments: 15 arc seconds and 30 arc seconds from limb of Jupiter. Exposure times of 10, 100, 300, 300 seconds at each location (TBD:tune to fill orbits)								
6	First orbit, 2 x52 slit	(3) JUPITER-OFFS ET-2	STIS/CCD, ACCUM, 52X2	G750M 6581 A	GAIN=4; CR-SPLIT=NO			400 Secs (400 Secs) *[==>]*	*[1]*
	Comments: 15 arc seconds and 30 arc seconds from limb of Jupiter. Exposure times of 10, 100, 300, 300 seconds at each location (TBD:tune to fill orbits)								
7	Second orbit , 2x2 slit	(4) JUPITER-OFFS ET-3	STIS/CCD, ACCUM, 2X2	G750M 6581 A	GAIN=4; CR-SPLIT=NO	GS ACQ SCENARIO BASE1B3		30 Secs (30 Secs) *[==>]*	*[2]*
	Comments: 2x2 slit offset 5, 10, 15, 30, 45 arc seconds from the limb of Jupiter. Exposure times of 10, 100, 300, 300 seconds at each location (TBD:tune to fill orbits)								
8	Second orbit , 2x2 slit	(4) JUPITER-OFFS ET-3	STIS/CCD, ACCUM, 2X2	G750M 6581 A	GAIN=4; CR-SPLIT=NO			300 Secs (300 Secs) *[==>]*	*[2]*
	Comments: 2x2 slit offset 5, 10, 15, 30, 45 arc seconds from the limb of Jupiter. Exposure times of 10, 100, 300, 300 seconds at each location (TBD:tune to fill orbits)								
9	Second orbit , 2x2 slit	(6) JUPITER-OFFS ET-5	STIS/CCD, ACCUM, 2X2	G750M 6581 A	GAIN=4; CR-SPLIT=NO	GS ACQ SCENARIO BASE1B3		30 Secs (30 Secs) *[==>]*	*[2]*
	Comments: 2x2 slit offset 5, 10, 15, 30, 45 arc seconds from the limb of Jupiter. Exposure times of 10, 100, 300, 300 seconds at each location (TBD:tune to fill orbits)								
10	Second orbit , 2x2 slit	(6) JUPITER-OFFS ET-5	STIS/CCD, ACCUM, 2X2	G750M 6581 A	GAIN=4; CR-SPLIT=NO			300 Secs (300 Secs) *[==>]*	*[2]*
	Comments: 2x2 slit offset 5, 10, 15, 30, 45 arc seconds from the limb of Jupiter. Exposure times of 10, 100, 300, 300 seconds at each location (TBD:tune to fill orbits)								
11	Second orbit , 2x2 slit	(8) JUPITER-OFFS ET-7	STIS/CCD, ACCUM, 2X2	G750M 6581 A	GAIN=4; CR-SPLIT=NO	GS ACQ SCENARIO BASE1B3		30 Secs (30 Secs) *[==>]*	*[2]*
	Comments: 2x2 slit offset 5, 10, 15, 30, 45 arc seconds from the limb of Jupiter. Exposure times of 10, 100, 300, 300 seconds at each location (TBD:tune to fill orbits)								
12	Second orbit , 2x2 slit	(8) JUPITER-OFFS ET-7	STIS/CCD, ACCUM, 2X2	G750M 6581 A	GAIN=4; CR-SPLIT=NO			300 Secs (300 Secs) *[==>]*	*[2]*
	Comments: 2x2 slit offset 5, 10, 15, 30, 45 arc seconds from the limb of Jupiter. Exposure times of 10, 100, 300, 300 seconds at each location (TBD:tune to fill orbits)								

Orbit Structure




Orbit 2
Server Version: 20170613
GS Reacq
Moving Target Tracking
Setup
Exp. 7 (Auto-WAVECAL)
Exp. 7
Exp. 8
Pointing Maneuver
Moving Target Tracking
Setup
Exp. 9 (Auto-WAVECAL)
Exp. 9
Exp. 10
Pointing Maneuver
Moving Target Tracking
Setup
Exp. 11 (Auto-WAVECAL)
Exp. 11
Exp. 12
Unused Orbital Visibility = 64
Occultation
Home
Home
Home
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 15371, Jupiter background for STIS G230MB (02), implementation Wed Aug 02 19:04:17 GMT 2017

Diagnostic Status: Warning

Scientific Instruments: STIS/CCD

Special Requirements: BEFORE 24-AUG-2017:00:00:00

Comments: G230MB (1 orbit)

2x2 slit placed 15 arc seconds and 30 arc seconds from limb of Jupiter
2X52 slit placed 38 arc seconds from the limb of Jupiter
(i.e. with aperture at center of long slit it extends from 10 to 62 arc seconds from limb)

Orientation: PA selected such at long slit is aligned with vector toward center of Jupiter (+/- 10 deg)
same Orient as item #1 above

Exposure times of 30, 400, 400 seconds at each location (TBD: tune to fill orbit)

Diagnostics

(Jupiter background for STIS G230MB (02)) Warning (Form): A target acquisition should probably be performed before doing spectroscopy or coronography with STIS or COS.

Solar System Targets

#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
(3)	JUPITER-OFFSET-2	STD=JUPITER	TYPE=POS_ANGLE,RAD=55,ANG=66.5,REF=NORTH			EARTH
Comments: Jupiter's equatorial angular radius ranges 16.30 to 16.64 arcsec on Aug 14 to 24. Round up to 17 arcsec. Offsetting the 2x52 slit center 10 arcsec from previous (i.e., total 38 arcsec from limb) is RAD=55.						
(6)	JUPITER-OFFSET-5	STD=JUPITER	TYPE=POS_ANGLE,RAD=32,ANG=66.5,REF=NORTH			EARTH
Comments: Jupiter's equatorial angular radius ranges 16.30 to 16.64 arcsec on Aug 14 to 24. Round up to 17 arcsec. Offsetting the 2x2 arcsec slit center from the limb plus 15 arcsec is RAD=32.						
(7)	JUPITER-OFFSET-6	STD=JUPITER	TYPE=POS_ANGLE,RAD=47,ANG=66.5,REF=NORTH			EARTH
Comments: Jupiter's equatorial angular radius ranges 16.30 to 16.64 arcsec on Aug 14 to 24. Round up to 17 arcsec. Offsetting the 2x2 arcsec slit center from the limb plus 30 arcsec is RAD=47.						

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	2x2 slit	(6) JUPITER-OFFSET-5	STIS/CCD, ACCUM, 2X2	G230MB 3115 A	GAIN=4; CR-SPLIT=NO	GS ACQ SCENARIO BASE1B3		20 Secs (20 Secs) *[==>]*	*[1]*
Comments: Exposure times of 30, 400, 400 seconds at each location (TBD: tune to fill orbit)									
2	2x2 slit	(6) JUPITER-OFFSET-5	STIS/CCD, ACCUM, 2X2	G230MB 3115 A	GAIN=4; CR-SPLIT=NO			300 Secs (300 Secs) *[==>]*	*[1]*
Comments: Exposure times of 30, 400, 400 seconds at each location (TBD: tune to fill orbit)									
3	2x2 slit	(7) JUPITER-OFFSET-6	STIS/CCD, ACCUM, 2X2	G230MB 3115 A	GAIN=4; CR-SPLIT=NO	GS ACQ SCENARIO BASE1B3		20 Secs (20 Secs) *[==>]*	*[1]*
Comments: Exposure times of 30, 400, 400 seconds at each location (TBD: tune to fill orbit)									
4	2x2 slit	(7) JUPITER-OFFSET-6	STIS/CCD, ACCUM, 2X2	G230MB 3115 A	GAIN=4; CR-SPLIT=NO			300 Secs (300 Secs) *[==>]*	*[1]*
Comments: Exposure times of 30, 400, 400 seconds at each location (TBD: tune to fill orbit)									
5	52x2 slit at 38 arc seconds from limb of Jupiter	(3) JUPITER-OFFSET-2	STIS/CCD, ACCUM, 52X2	G230MB 3115 A	GAIN=4; CR-SPLIT=NO	GS ACQ SCENARIO BASE1B3		20 Secs (20 Secs) *[==>]*	*[1]*
Comments: Exposure times of 30, 400, 400 seconds at each location (TBD: tune to fill orbit)									
6	52x2 slit at 38 arc seconds from limb of Jupiter	(3) JUPITER-OFFSET-2	STIS/CCD, ACCUM, 52X2	G230MB 3115 A	GAIN=4; CR-SPLIT=NO			300 Secs (300 Secs) *[==>]*	*[1]*
Comments: Exposure times of 30, 400, 400 seconds at each location (TBD: tune to fill orbit)									

Orbit Structure