16913 - The role of stealth superstorms in a planetary-scale transition on Jupiter

Cycle: 29, Proposal Category: GO

(Availability Mode: AVAILABLE)

INVESTIGATORS

Name	*Institution*	*E-Mail*
Michael H. Wong (PI) (Contact)	**University of California - Berkeley**	**mikewong@astro.berkeley.edu**
Dr. Glenn S. Orton (CoI)	Jet Propulsion Laboratory	glenn.s.orton@jpl.nasa.gov
Dr. Amy Simon (CoI)	NASA Goddard Space Flight Center	amy.simon@nasa.gov
Dr. Leigh Fletcher (CoI) (ESA Member)	University of Leicester	leigh.fletcher@leicester.ac.uk
Dr. Shawn R Brueshaber (CoI)	Jet Propulsion Laboratory	shawn.r.brueshaber@jpl.nasa.gov

VISITS

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
02	(1) JUPITER-PJ42	WFC3/UVIS	1	09-Aug-2022 10:00:39.0	yes
04	(5) JUPITER-GRS	WFC3/UVIS	1	09-Aug-2022 10:00:40.0	yes
03	(2) JUPITER-PJ43	WFC3/UVIS	1	09-Aug-2022 10:00:41.0	yes
05	(6) JUPITER-PJ43-STORM	WFC3/UVIS	1	09-Aug-2022 10:00:42.0	yes
06	(3) JUPITER-PJ44	WFC3/UVIS	1	09-Aug-2022 10:00:43.0	yes
07	(4) JUPITER-PJ45	WFC3/UVIS	1	09-Aug-2022 10:00:44.0	yes

6 Total Orbits Used

ABSTRACT

Jupiter's North Equatorial Belt (NEB), a dark reddish/brown band just to the north of the Equatorial Zone, regularly varies in width and color. The current NEB cycle is more extreme than any previous transition since 1928, and it includes rarely seen convective eruptions at an active longitude

moving around the planet. The current convective activity is a stealth superstorm, because it shares the long-term activity of a major superstorm, but it does not reach the same high altitudes. This newly recognized transitional case between the sporadic minor convective storms common in Jupiter's belts (but never detected on Saturn), and the major convective superstorms sending plumes up to high altitudes in the atmospheres of both gas giants, probes differences in convective styles related to the deep water abundance.

HST observations of the stealth superstorm system would define 3D cloud structure by mapping deep water clouds and constraining plume heights. Observations require 200-km scale resolution (inaccessible to ground-based visible wavelength imaging) to distinguish anisotropic cloud structure in the stealth superstorm region and near the Juno spacecraft track. Juno's microwave observations have revealed that spectacular convective storms in 2016 (observed at cloud tops in the visible and infrared), are connected to changes in ammonia and temperature at great depth, both above and below the water-cloud layers. Data from Juno collected in 2021 and 2022 will test whether deep changes also accompany the current NEB cycle, with its newly recognized stealth superstorm activity.

OBSERVING DESCRIPTION

RATIONALE AND TIMING

Four orbits seeking simultaneous imaging with Juno spacecraft passes (or PJs), to provide context for atmospheric observations from Juno.

Additional two orbits to image "stealth thunderstorms" drifting around near 10 deg N in the North Equatorial Belt. The storms tend to erupt at a special longitude that drifts westward at a rate of -6.38 deg/day in the System III longitude system. For PJ 42 and 43, the storm is not close to the Juno track. Observations should be somewhat close in time to Juno, about +/- 6 days from the spacecraft encounter. This enables the storm evolution to be tied to widespread/deep atmospheric properties separately measured by Juno. For PJ 44 and 45, the storm is currently predicted to fall close to the Juno spacecraft track, so the HST orbits timed to coincide with Juno should also capture images of the storm eruptions (if still present).

Storm orbit timing (particularly the CML observing window constraints) may need to be adjusted based on updated tracking data from amateur astronomers.

POS-TARGs

POS-TARGs are used on all quad and 2K exposures, to shift the target close enough to UVIS-center so that the same guide stars can be used for the whole visit. POS-TARG amounts are optimized to maximize the shift while avoiding placement of the target on detector regions affected by quad filter edges. In some cases, the limb of the planet may actually intrude into these detector regions, either for PJ 45 where Jupiter is so large (49.9" dia), or for FQ889N exposures where an additional large (0.87") dither patter is used to mitigate some fringing artifacts. In the case of FQ889N, good photometry near disk center was prioritized over good photometry on the limb.

Visit

Proposal 16913, MAY-2022 (JUNO, 1K) (02), completed Tue Aug 09 14:00:45 GMT 2022

Diagnostic Status: Warning

Scientific Instruments: WFC3/UVIS

Special Requirements: BETWEEN 21-MAY-2022:05:20:02 AND 23-MAY-2022:01:20:02; VISIBILITY INTERVAL NO GYRO BIAS UPDATE ON MOVING TARGET

Comments: Visit should fall within +/- 2 Jupiter rotations (about 20 hours) from PJ time:
Closest approach time at spacecraft: 2022-05-23 02:35
Spacecraft to Earth 1-way light time: 44.91619224 min

Diagnostics

(F631N (02.001)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

(FQ727N_quadD (02.002)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

(FQ727N_quadD (02.002)) Warning (Form): POS TARG & PATTERN should be used carefully with WFC3 quad filters to avoid placing the target on the vignetted part of the field of view or moving it to another quadrant.

(F275W (02.003)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

(F225W (02.004)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

(F502N (02.005)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

(F658N (02.006)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

(F395N (02.007)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

(F343N (02.008)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

(F225W (02.009)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

(F275W (02.010)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

(FQ889N_quadA (02.011)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

(FQ889N_quadA (02.011)) Warning (Form): POS TARG & PATTERN should be used carefully with WFC3 quad filters to avoid placing the target on the vignetted part of the field of view or moving it to another quadrant.

(FQ750N_quadB (02.012)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

(FQ750N_quadB (02.012)) Warning (Form): POS TARG & PATTERN should be used carefully with WFC3 quad filters to avoid placing the target on the vignetted part of the field of view or moving it to another quadrant.

(FQ727N_quadD (02.013)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

(FQ727N_quadD (02.013)) Warning (Form): POS TARG & PATTERN should be used carefully with WFC3 quad filters to avoid placing the target on the vignetted part of the field of view or moving it to another quadrant.

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(2)	Pattern Type=WFC3-UVIS-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.87 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false		(11)

Solar System Targets

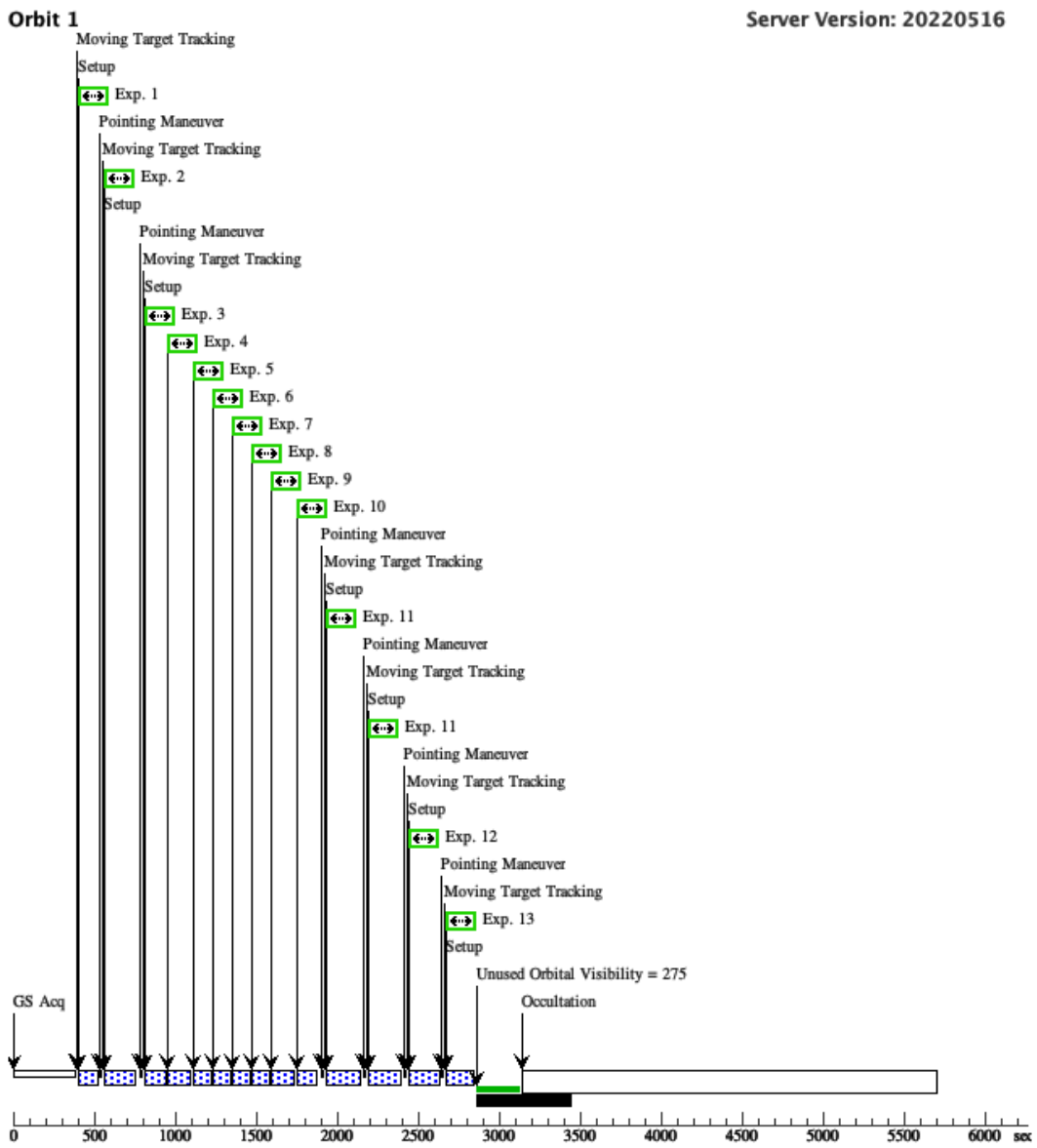
#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
(1)	JUPITER-PJ42	STD=JUPITER			CML OF JUPITER FROM EARTH BETWEEN 65 112	EARTH

Comments: PJ 42 Juno equator-crossing longitude: 91.70
Closest approach time at spacecraft: 2022-05-23 02:35
Spacecraft to Earth 1-way light time: 44.91619224 min
Description=Jupiter
Extended=YES

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	F631N	(1) JUPITER-PJ42	WFC3/UVIS, ACCUM, UVIS2-M1K1C-SUB	F631N	CR-SPLIT=NO; BLADE=A	POS TARG 0,0		4 Secs (4 Secs) *[==>]*	 ***[1]***
Comments: Request BLADE=A for this exposure only									
2	FQ727N_quadD	(1) JUPITER-PJ42	WFC3/UVIS, ACCUM, UVIS-QUAD-SUB	FQ727N	CR-SPLIT=NO	POS TARG -10,+11		8 Secs (8 Secs) *[==>]*	 ***[1]***
3	F275W	(1) JUPITER-PJ42	WFC3/UVIS, ACCUM, UVIS2-M1K1C-SUB	F275W	CR-SPLIT=NO	POS TARG 0,0		20 Secs (20 Secs) *[==>]*	 ***[1]***
4	F225W	(1) JUPITER-PJ42	WFC3/UVIS, ACCUM, UVIS2-M1K1C-SUB	F225W	CR-SPLIT=NO	POS TARG 0,0		40 Secs (40 Secs) *[==>]*	 ***[1]***
5	F502N	(1) JUPITER-PJ42	WFC3/UVIS, ACCUM, UVIS2-M1K1C-SUB	F502N	CR-SPLIT=NO	POS TARG 0,0		4 Secs (4 Secs) *[==>]*	 ***[1]***
6	F658N	(1) JUPITER-PJ42	WFC3/UVIS, ACCUM, UVIS2-M1K1C-SUB	F658N	CR-SPLIT=NO	POS TARG 0,0		8 Secs (8 Secs) *[==>]*	 ***[1]***
7	F395N	(1) JUPITER-PJ42	WFC3/UVIS, ACCUM, UVIS2-M1K1C-SUB	F395N	CR-SPLIT=NO	POS TARG 0,0		9 Secs (9 Secs) *[==>]*	 ***[1]***
8	F343N	(1) JUPITER-PJ42	WFC3/UVIS, ACCUM, UVIS2-M1K1C-SUB	F343N	CR-SPLIT=NO	POS TARG 0,0		6 Secs (6 Secs) *[==>]*	 ***[1]***
9	F225W	(1) JUPITER-PJ42	WFC3/UVIS, ACCUM, UVIS2-M1K1C-SUB	F225W	CR-SPLIT=NO	POS TARG 0,0		40 Secs (40 Secs) *[==>]*	 ***[1]***
10	F275W	(1) JUPITER-PJ42	WFC3/UVIS, ACCUM, UVIS2-M1K1C-SUB	F275W	CR-SPLIT=NO	POS TARG 0,0		20 Secs (20 Secs) *[==>]*	 ***[1]***
11	FQ889N_quadA	(1) JUPITER-PJ42	WFC3/UVIS, ACCUM, UVIS-QUAD-SUB	FQ889N	CR-SPLIT=NO	POS TARG +5,-6	Pattern 2, Exps 11-11 in MAY-2022 (JUNO, 1K) (02) (2)	30 Secs (60 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]*	 ***[1]***
12	FQ750N_quadB	(1) JUPITER-PJ42	WFC3/UVIS, ACCUM, UVIS-QUAD-SUB	FQ750N	CR-SPLIT=NO	POS TARG -12,-8		5 Secs (5 Secs) *[==>]*	 ***[1]***
13	FQ727N_quadD	(1) JUPITER-PJ42	WFC3/UVIS, ACCUM, UVIS-QUAD-SUB	FQ727N	CR-SPLIT=NO	POS TARG -10,+11		8 Secs (8 Secs) *[==>]*	 ***[1]***

Orbit Structure



Visit

Proposal 16913, JULY-AUG-2022 (JWST, 2K) (04), completed Tue Aug 09 14:00:45 GMT 2022

Diagnostic Status: Warning

Scientific Instruments: WFC3/UVIS

Special Requirements: BETWEEN 27-JUL-2022:12:00:00 AND 02-AUG-2022:12:00:00; VISIBILITY INTERVAL NO GYRO BIAS UPDATE ON MOVING TARGET

Comments: Observe Jupiter close to time of JWST ERS/GTO observations

Diagnostics

(FQ889N_quadA (04.001)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

(FQ889N_quadA (04.001)) Warning (Form): POS TARG & PATTERN should be used carefully with WFC3 quad filters to avoid placing the target on the vignetted part of the field of view or moving it to another quadrant.

(FQ727N_quadD (04.002)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

(FQ727N_quadD (04.002)) Warning (Form): POS TARG & PATTERN should be used carefully with WFC3 quad filters to avoid placing the target on the vignetted part of the field of view or moving it to another quadrant.

(F631N (04.003)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

(F275W (04.004)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

(F225W (04.005)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

(F658N (04.006)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

(F502N (04.007)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

(F395N (04.008)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

(F343N (04.009)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(2)	Pattern Type=WFC3-UVIS-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.87 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false		(1)

Solar System Targets

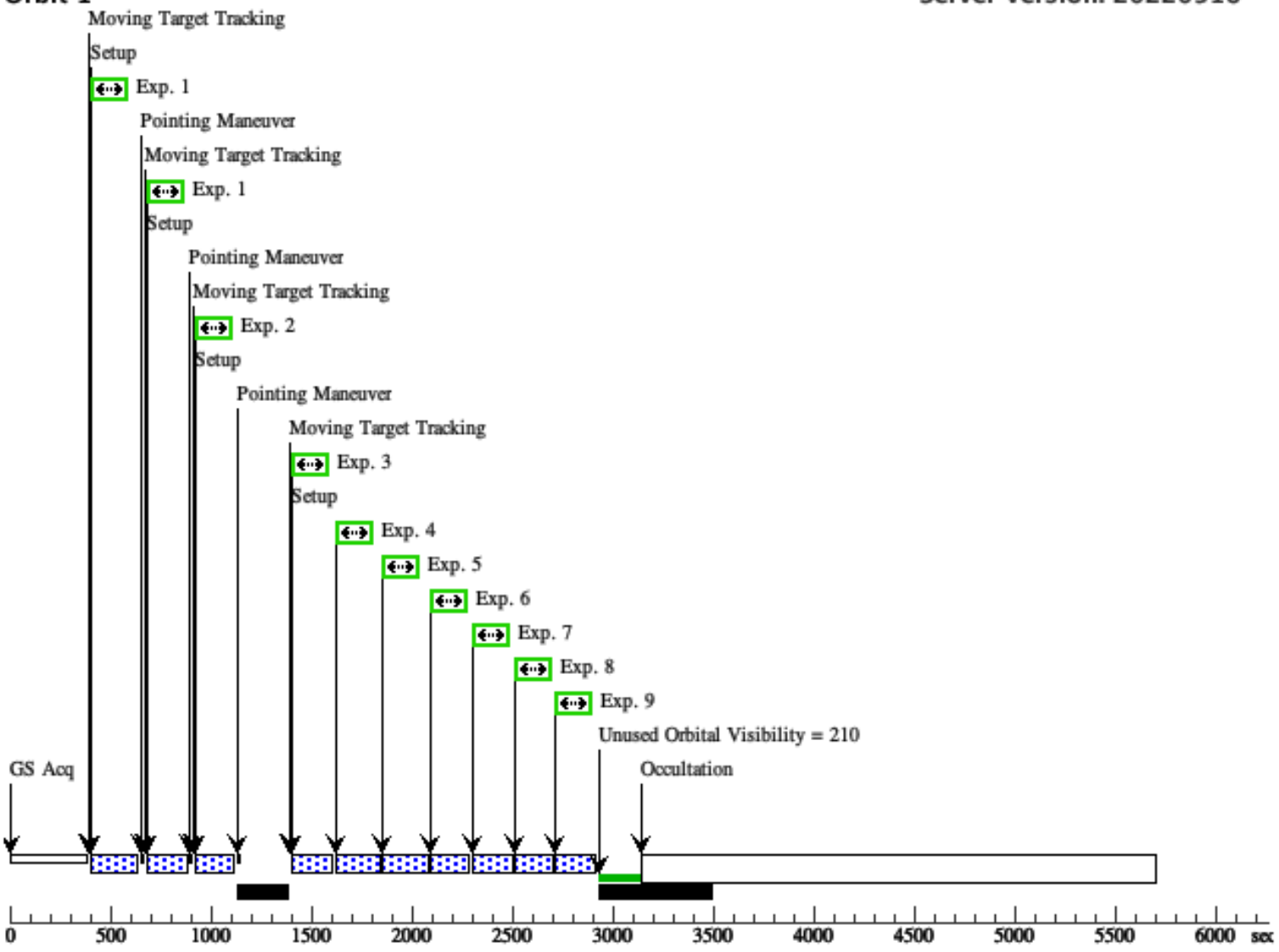
#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
(5)	JUPITER-GRS	STD=JUPITER			CML OF JUPITER FROM EARTH BETWEEN 260 330	EARTH

Comments: Use same GRS longitude rates as for JWST ERS proposal 1373: Lon 294 on July 30.
Description=Jupiter
Extended=YES

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	FQ889N_quadA	(5) JUPITER-GRS	WFC3/UVIS, ACCUM, UVIS-QUAD-SUB	FQ889N	CR-SPLIT=NO	POS TARG +1,-2	Sequence 1-9 Non-Int in JULY-AUG-2022 (JWST, 2K) (04) Pattern 2, Exps 1-1 in Sequence 1-9 Non-Int in JULY-AUG-2022 (JWST, 2K) (04) (2)	30 Secs (60 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]*	***[1]***
2	FQ727N_quadD	(5) JUPITER-GRS	WFC3/UVIS, ACCUM, UVIS-QUAD-SUB	FQ727N	CR-SPLIT=NO	POS TARG -5,+6	Sequence 1-9 Non-Int in JULY-AUG-2022 (JWST, 2K) (04)	8 Secs (8 Secs) *[==>]*	***[1]***
3	F631N	(5) JUPITER-GRS	WFC3/UVIS, ACCUM, UVIS2-2K2D-SUB	F631N	CR-SPLIT=NO; BLADE=A	POS TARG -10,+10	Sequence 1-9 Non-Int in JULY-AUG-2022 (JWST, 2K) (04)	4 Secs (4 Secs) *[==>]*	***[1]***
Comments: Request BLADE=A for this exposure only									
4	F275W	(5) JUPITER-GRS	WFC3/UVIS, ACCUM, UVIS2-2K2D-SUB	F275W	CR-SPLIT=NO	POS TARG -10,+10	Sequence 1-9 Non-Int in JULY-AUG-2022 (JWST, 2K) (04)	20 Secs (20 Secs) *[==>]*	***[1]***
5	F225W	(5) JUPITER-GRS	WFC3/UVIS, ACCUM, UVIS2-2K2D-SUB	F225W	CR-SPLIT=NO	POS TARG -10,+10	Sequence 1-9 Non-Int in JULY-AUG-2022 (JWST, 2K) (04)	40 Secs (40 Secs) *[==>]*	***[1]***
6	F658N	(5) JUPITER-GRS	WFC3/UVIS, ACCUM, UVIS2-2K2D-SUB	F658N	CR-SPLIT=NO	POS TARG -10,+10	Sequence 1-9 Non-Int in JULY-AUG-2022 (JWST, 2K) (04)	8 Secs (8 Secs) *[==>]*	***[1]***
7	F502N	(5) JUPITER-GRS	WFC3/UVIS, ACCUM, UVIS2-2K2D-SUB	F502N	CR-SPLIT=NO	POS TARG -10,+10	Sequence 1-9 Non-Int in JULY-AUG-2022 (JWST, 2K) (04)	4 Secs (4 Secs) *[==>]*	***[1]***
8	F395N	(5) JUPITER-GRS	WFC3/UVIS, ACCUM, UVIS2-2K2D-SUB	F395N	CR-SPLIT=NO	POS TARG -10,+10	Sequence 1-9 Non-Int in JULY-AUG-2022 (JWST, 2K) (04)	9 Secs (9 Secs) *[==>]*	***[1]***
9	F343N	(5) JUPITER-GRS	WFC3/UVIS, ACCUM, UVIS2-2K2D-SUB	F343N	CR-SPLIT=NO	POS TARG -10,+10	Sequence 1-9 Non-Int in JULY-AUG-2022 (JWST, 2K) (04)	6 Secs (6 Secs) *[==>]*	***[1]***

Orbit Structure



Visit

Proposal 16913, JULY-2022 (JUNO, 2K) (03), completed Tue Aug 09 14:00:45 GMT 2022

Diagnostic Status: Warning

Scientific Instruments: WFC3/UVIS

Special Requirements: BETWEEN 03-JUL-2022:15:00:00 AND 07-JUL-2022:04:00:00; VISIBILITY INTERVAL NO GYRO BIAS UPDATE ON MOVING TARGET

Comments: Visit should fall within +/- 2 Jupiter rotations (about 20 hours) from PJ time:
Closest approach time at spacecraft: 2022-07-05 09:17
Spacecraft to Earth 1-way light time: 39.58957185 min

(24 May edit: BETWEEN expanded to +/- 4 Jupiter rotations to improve scheduling options)

Diagnostics

(FQ889N_quadA (03.001)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

(FQ889N_quadA (03.001)) Warning (Form): POS TARG & PATTERN should be used carefully with WFC3 quad filters to avoid placing the target on the vignetted part of the field of view or moving it to another quadrant.

(F275W (03.002)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

(F225W (03.003)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

(F343N (03.004)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

(F658N (03.005)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

(F502N (03.006)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

(F395N (03.007)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

(F631N (03.008)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

(FQ727N_quadD (03.009)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

(FQ727N_quadD (03.009)) Warning (Form): POS TARG & PATTERN should be used carefully with WFC3 quad filters to avoid placing the target on the vignetted part of the field of view or moving it to another quadrant.

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(2)	Pattern Type=WFC3-UVIS-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.87 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false		(1)

Solar System Targets

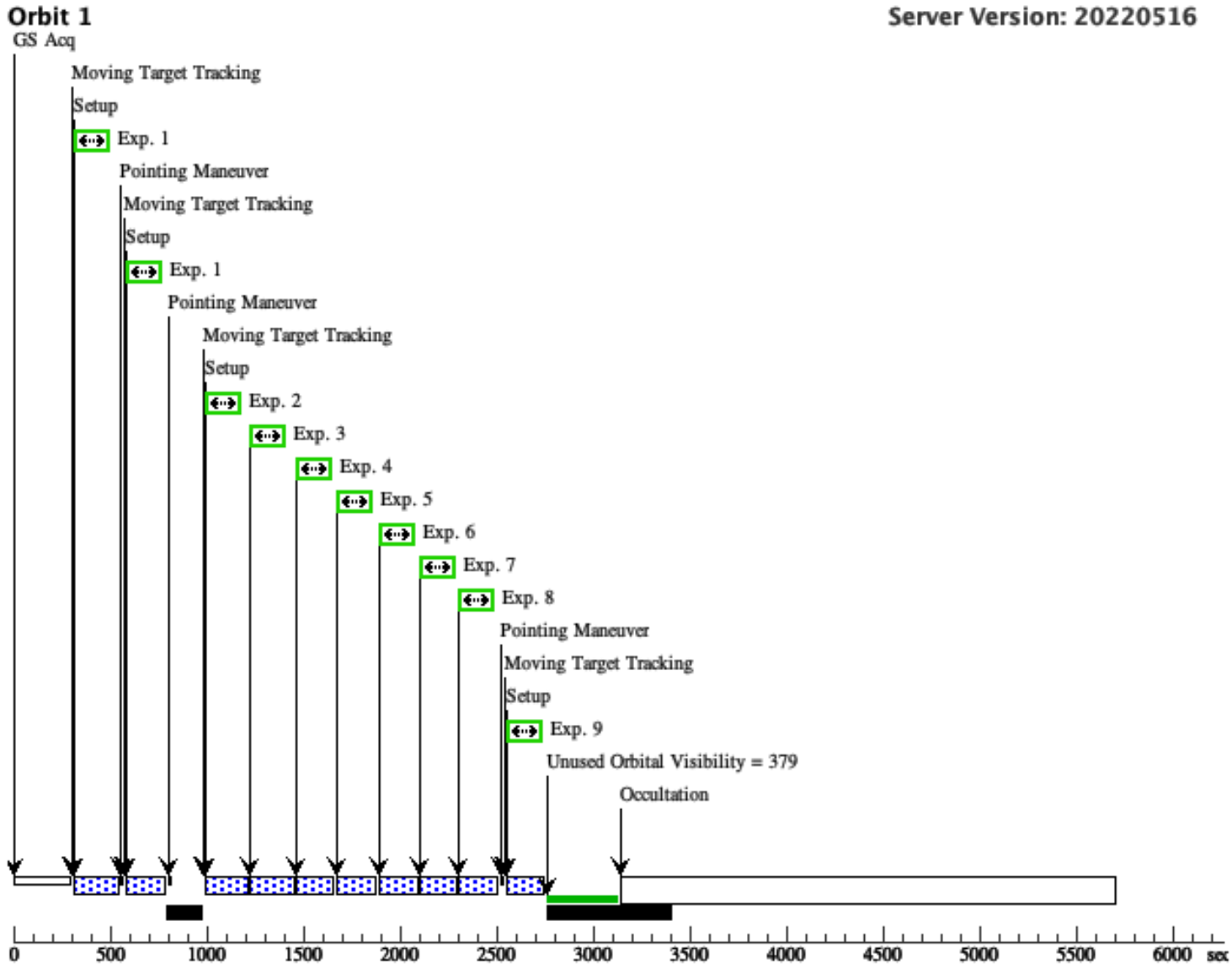
#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
(2)	JUPITER-PJ43	STD=JUPITER			CML OF JUPITER FROM EARTH BETWEEN 288 354	EARTH

Comments: PJ 43 Juno equator-crossing longitude: 327.6
PJ 43 Juno perijove longitude (at 36 N): 314.2
Closest approach time at spacecraft: 2022-07-05 09:17
Spacecraft to Earth 1-way light time: 39.58957185 min
Description=Jupiter
Extended=YES

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	FQ889N_quadA	(2) JUPITER-PJ43	WFC3/UVIS, ACCUM, UVIS-QUAD-SUB	FQ889N	CR-SPLIT=NO	POS TARG +3,-4; GS ACQ SCENARIO ONEB1BE	Pattern 2, Exps 1-1 in JULY-2022 (JUNO, 2K) (03) (2)	30 Secs (60 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]*	***[1]***
2	F275W	(2) JUPITER-PJ43	WFC3/UVIS, ACCUM, UVIS2-2K2D-SUB	F275W	CR-SPLIT=NO	POS TARG -10,+10		20 Secs (20 Secs) *[==>]*	***[1]***
3	F225W	(2) JUPITER-PJ43	WFC3/UVIS, ACCUM, UVIS2-2K2D-SUB	F225W	CR-SPLIT=NO	POS TARG -10,+10		40 Secs (40 Secs) *[==>]*	***[1]***
4	F343N	(2) JUPITER-PJ43	WFC3/UVIS, ACCUM, UVIS2-2K2D-SUB	F343N	CR-SPLIT=NO; BLADE=A	POS TARG -10,+10		6 Secs (6 Secs) *[==>]*	***[1]***
5	F658N	(2) JUPITER-PJ43	WFC3/UVIS, ACCUM, UVIS2-2K2D-SUB	F658N	CR-SPLIT=NO	POS TARG -10,+10		8 Secs (8 Secs) *[==>]*	***[1]***
6	F502N	(2) JUPITER-PJ43	WFC3/UVIS, ACCUM, UVIS2-2K2D-SUB	F502N	CR-SPLIT=NO	POS TARG -10,+10		4 Secs (4 Secs) *[==>]*	***[1]***
7	F395N	(2) JUPITER-PJ43	WFC3/UVIS, ACCUM, UVIS2-2K2D-SUB	F395N	CR-SPLIT=NO	POS TARG -10,+10		9 Secs (9 Secs) *[==>]*	***[1]***
8	F631N	(2) JUPITER-PJ43	WFC3/UVIS, ACCUM, UVIS2-2K2D-SUB	F631N	CR-SPLIT=NO	POS TARG -10,+10		4 Secs (4 Secs) *[==>]*	***[1]***
Comments: Request BLADE=A for this exposure only									
9	FQ727N_quadD	(2) JUPITER-PJ43	WFC3/UVIS, ACCUM, UVIS-QUAD-SUB	FQ727N	CR-SPLIT=NO	POS TARG -8,+9		8 Secs (8 Secs) *[==>]*	***[1]***

Orbit Structure



Visit

Proposal 16913, JULY-2022 (STORM, 2K) (05), completed Tue Aug 09 14:00:45 GMT 2022

Diagnostic Status: Warning

Scientific Instruments: WFC3/UVIS

Special Requirements: BETWEEN 29-JUN-2022:00:00:00 AND 11-JUL-2022:00:00:00; VISIBILITY INTERVAL NO GYRO BIAS UPDATE ON MOVING TARGET

Comments: Relaxed timing for observation of storm, within about +/- 6 days of Juno perijove.

Diagnostics

(FQ889N_quadA (05.001)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

(FQ889N_quadA (05.001)) Warning (Form): POS TARG & PATTERN should be used carefully with WFC3 quad filters to avoid placing the target on the vignetted part of the field of view or moving it to another quadrant.

(FQ727N_quadD (05.002)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

(FQ727N_quadD (05.002)) Warning (Form): POS TARG & PATTERN should be used carefully with WFC3 quad filters to avoid placing the target on the vignetted part of the field of view or moving it to another quadrant.

(F631N (05.003)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

(F275W (05.004)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

(F225W (05.005)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

(F658N (05.006)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

(F502N (05.007)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

(F395N (05.008)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

(F343N (05.009)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(2)	Pattern Type=WFC3-UVIS-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.87 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false		(1)

Solar System Targets

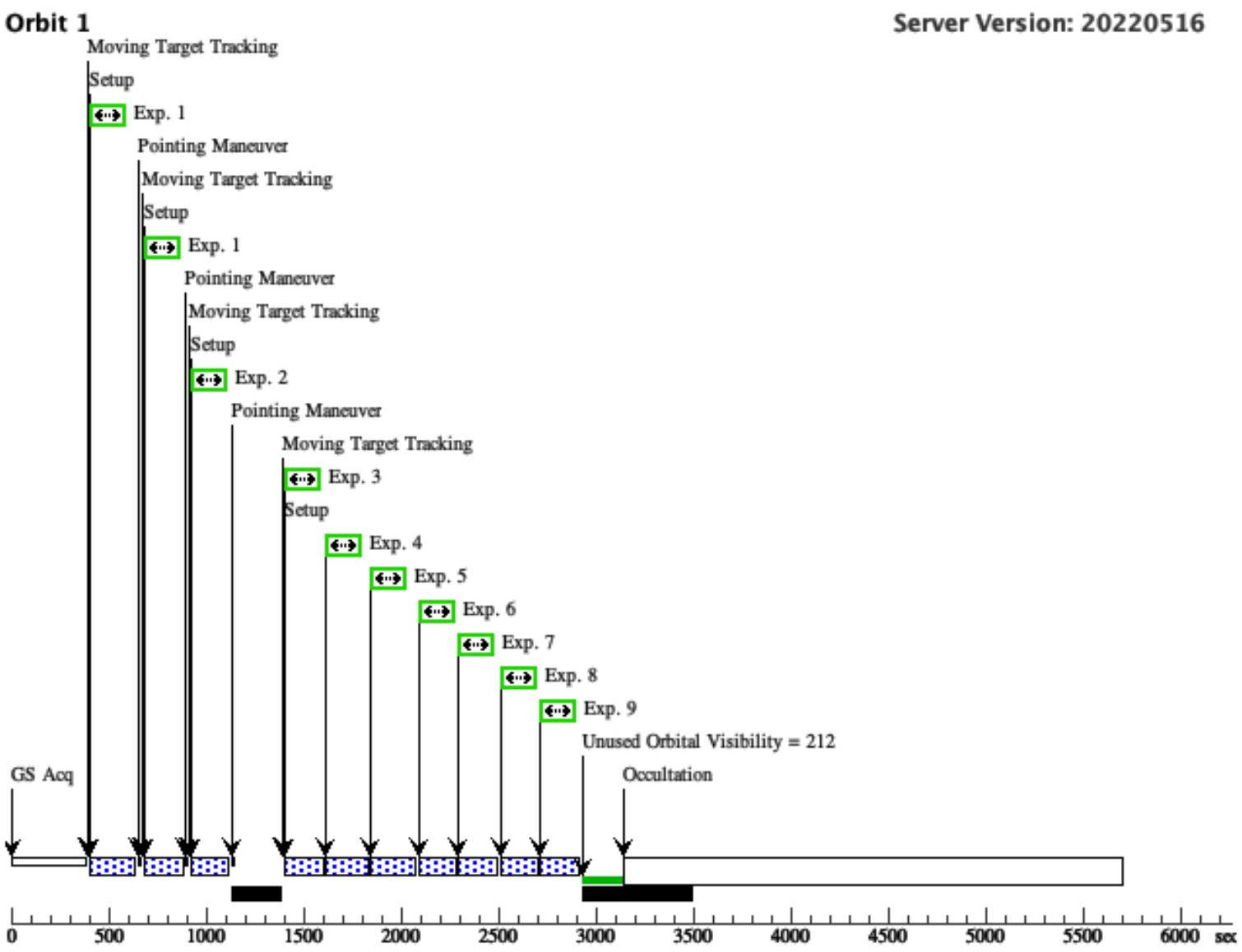
#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
(6)	JUPITER-PJ43-STORM	STD=JUPITER			CML OF JUPITER FROM EARTH BETWEEN 46 179	EARTH

Comments: Predicted superstorm longitude: 102.15 deg Sys III at 2022-07-05 09:17, with a drift rate of -6.379344658 deg/day.
CML observing window should also shift by -6.38 deg/day from this time, but there is no obvious way to do that in APT while still tracking Jupiter center in the observations.
Description=Jupiter
Extended=YES

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	FQ889N_quadA	(6) JUPITER-PJ43-STORM	WFC3/UVIS, ACCUM, UVIS-QUAD-SUB	FQ889N	CR-SPLIT=NO	POS TARG +3,-4	Pattern 2, Exps 1-1 in JULY-2022 (STORM, 2K) (05) (2)	30 Secs (60 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]*	***[1]***
2	FQ727N_quadD	(6) JUPITER-PJ43-STORM	WFC3/UVIS, ACCUM, UVIS-QUAD-SUB	FQ727N	CR-SPLIT=NO	POS TARG -8,+9		8 Secs (8 Secs) *[==>]*	***[1]***
3	F631N	(6) JUPITER-PJ43-STORM	WFC3/UVIS, ACCUM, UVIS2-2K2D-SUB	F631N	CR-SPLIT=NO	POS TARG -10,+10		4 Secs (4 Secs) *[==>]*	***[1]***
Comments: Request BLADE=A for this exposure only									
4	F275W	(6) JUPITER-PJ43-STORM	WFC3/UVIS, ACCUM, UVIS2-2K2D-SUB	F275W	CR-SPLIT=NO	POS TARG -10,+10		20 Secs (20 Secs) *[==>]*	***[1]***
5	F225W	(6) JUPITER-PJ43-STORM	WFC3/UVIS, ACCUM, UVIS2-2K2D-SUB	F225W	CR-SPLIT=NO	POS TARG -10,+10		40 Secs (40 Secs) *[==>]*	***[1]***
6	F658N	(6) JUPITER-PJ43-STORM	WFC3/UVIS, ACCUM, UVIS2-2K2D-SUB	F658N	CR-SPLIT=NO	POS TARG -10,+10		8 Secs (8 Secs) *[==>]*	***[1]***
7	F502N	(6) JUPITER-PJ43-STORM	WFC3/UVIS, ACCUM, UVIS2-2K2D-SUB	F502N	CR-SPLIT=NO	POS TARG -10,+10		4 Secs (4 Secs) *[==>]*	***[1]***
8	F395N	(6) JUPITER-PJ43-STORM	WFC3/UVIS, ACCUM, UVIS2-2K2D-SUB	F395N	CR-SPLIT=NO	POS TARG -10,+10		9 Secs (9 Secs) *[==>]*	***[1]***
9	F343N	(6) JUPITER-PJ43-STORM	WFC3/UVIS, ACCUM, UVIS2-2K2D-SUB	F343N	CR-SPLIT=NO	POS TARG -10,+10		6 Secs (6 Secs) *[==>]*	***[1]***

Orbit Structure



Visit

Proposal 16913, AUG-2022 (JUNO, 2K) (06), scheduling Tue Aug 09 14:00:45 GMT 2022

Diagnostic Status: Warning

Scientific Instruments: WFC3/UVIS

Special Requirements: BETWEEN 16-AUG-2022:17:20:18 AND 18-AUG-2022:13:20:18; VISIBILITY INTERVAL NO GYRO BIAS UPDATE ON MOVING TARGET

Comments: Visit should fall within +/- 2 Jupiter rotations (about 20 hours) from PJ time:
Closest approach time at spacecraft: 2022-08-17 14:45
Spacecraft to Earth 1-way light time: 34.71005428 min

Diagnostics

(FQ889N_quadA (06.001)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

(FQ889N_quadA (06.001)) Warning (Form): POS TARG & PATTERN should be used carefully with WFC3 quad filters to avoid placing the target on the vignetted part of the field of view or moving it to another quadrant.

(FQ727N_quadD (06.002)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

(FQ727N_quadD (06.002)) Warning (Form): POS TARG & PATTERN should be used carefully with WFC3 quad filters to avoid placing the target on the vignetted part of the field of view or moving it to another quadrant.

(F631N (06.003)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

(F275W (06.004)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

(F225W (06.005)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

(F658N (06.006)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

(F502N (06.007)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

(F395N (06.008)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

(F343N (06.009)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(2)	Pattern Type=WFC3-UVIS-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.87 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false		(1)

Solar System Targets

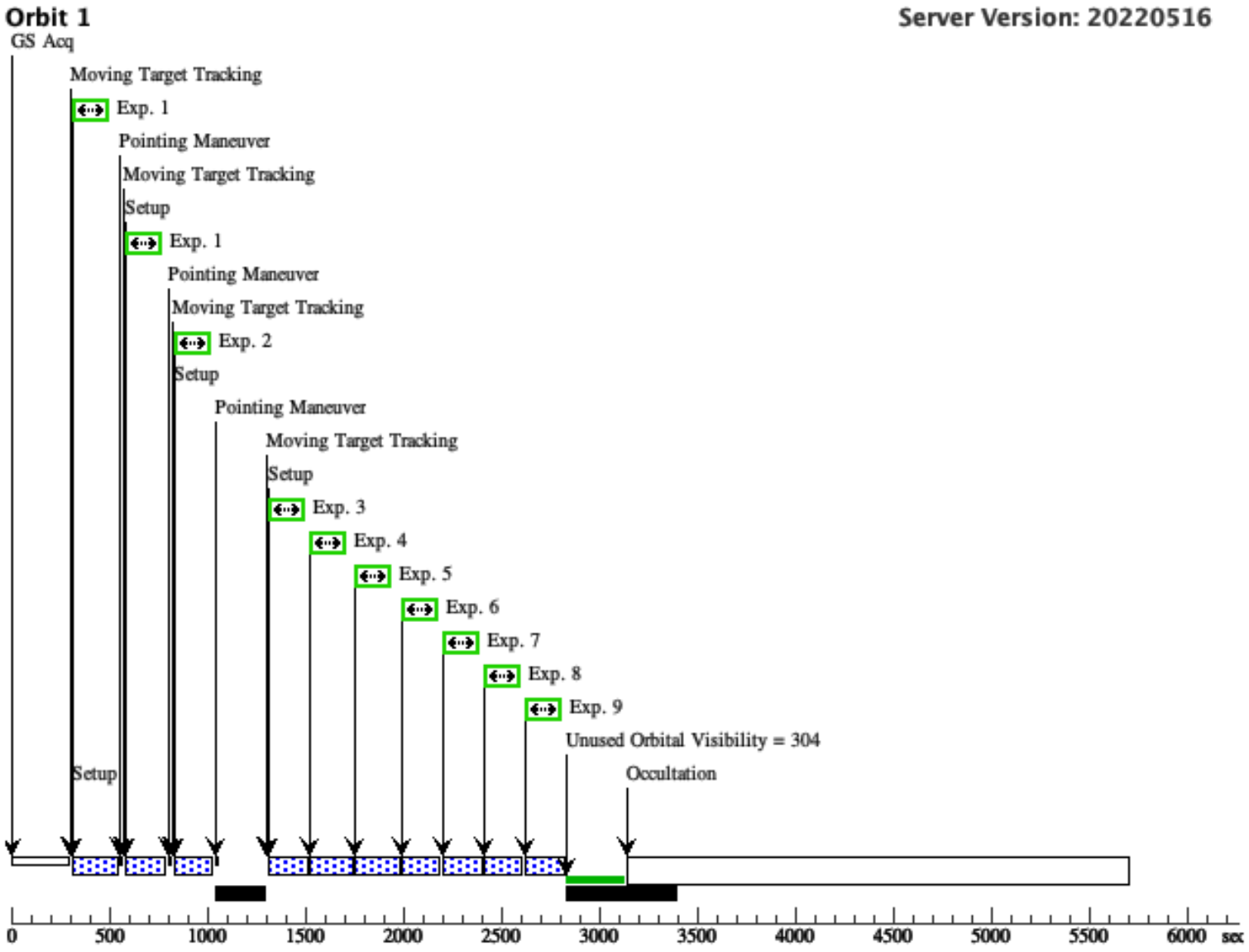
#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
(3)	JUPITER-PJ44	STD=JUPITER			CML OF JUPITER FROM EARTH BETWEEN 110 200	EARTH

Comments: PJ 44 Juno equator-crossing longitude: 158.9
Closest approach time at spacecraft: 2022-08-17 14:45
Spacecraft to Earth 1-way light time: 34.71005428 min
Description=Jupiter
Extended=YES

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	FQ889N_quadA	(3) JUPITER-PJ44	WFC3/UVIS, ACCUM, UVIS-QUAD-SUB	FQ889N	CR-SPLIT=NO	POS TARG +3,-4; GS ACQ SCENARIO ONEB1BE	Pattern 2, Exps 1-1 in AUG-2022 (JUNO, 2K) (06) (2)	30 Secs (60 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]*	***[1]***
2	FQ727N_quadD	(3) JUPITER-PJ44	WFC3/UVIS, ACCUM, UVIS-QUAD-SUB	FQ727N	CR-SPLIT=NO	POS TARG -10,+10		8 Secs (8 Secs) *[==>]*	***[1]***
3	F631N	(3) JUPITER-PJ44	WFC3/UVIS, ACCUM, UVIS2-2K2D-SUB	F631N	CR-SPLIT=NO	POS TARG -17,+23		4 Secs (4 Secs) *[==>]*	***[1]***
Comments: Request BLADE=A for this exposure only									
4	F275W	(3) JUPITER-PJ44	WFC3/UVIS, ACCUM, UVIS2-2K2D-SUB	F275W	CR-SPLIT=NO	POS TARG -17,+23		20 Secs (20 Secs) *[==>]*	***[1]***
5	F225W	(3) JUPITER-PJ44	WFC3/UVIS, ACCUM, UVIS2-2K2D-SUB	F225W	CR-SPLIT=NO	POS TARG -17,+23		40 Secs (40 Secs) *[==>]*	***[1]***
6	F658N	(3) JUPITER-PJ44	WFC3/UVIS, ACCUM, UVIS2-2K2D-SUB	F658N	CR-SPLIT=NO	POS TARG -17,+23		8 Secs (8 Secs) *[==>]*	***[1]***
7	F502N	(3) JUPITER-PJ44	WFC3/UVIS, ACCUM, UVIS2-2K2D-SUB	F502N	CR-SPLIT=NO	POS TARG -17,+23		4 Secs (4 Secs) *[==>]*	***[1]***
8	F395N	(3) JUPITER-PJ44	WFC3/UVIS, ACCUM, UVIS2-2K2D-SUB	F395N	CR-SPLIT=NO	POS TARG -17,+23		9 Secs (9 Secs) *[==>]*	***[1]***
9	F343N	(3) JUPITER-PJ44	WFC3/UVIS, ACCUM, UVIS2-2K2D-SUB	F343N	CR-SPLIT=NO	POS TARG -17,+23		6 Secs (6 Secs) *[==>]*	***[1]***

Orbit Structure



Visit

Proposal 16913, SEPT-2022 (JUNO, 2K) (07), implementation Tue Aug 09 14:00:45 GMT 2022

Diagnostic Status: Warning

Scientific Instruments: WFC3/UVIS

Special Requirements: BETWEEN 28-SEP-2022:23:30:00 AND 29-SEP-2022:00:45:00; VISIBILITY INTERVAL NO GYRO BIAS UPDATE ON MOVING TARGET

Comments: Visit should fall within +/- 2 Jupiter rotations (about 20 hours) from PJ time:
Closest approach time at spacecraft: 2022-09-29 17:11
Spacecraft to Earth 1-way light time: 32.88914252 min

Diagnostics

(FQ889N_quadA (07.001)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

(FQ889N_quadA (07.001)) Warning (Form): POS TARG & PATTERN should be used carefully with WFC3 quad filters to avoid placing the target on the vignetted part of the field of view or moving it to another quadrant.

(FQ727N_quadD (07.002)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

(FQ727N_quadD (07.002)) Warning (Form): POS TARG & PATTERN should be used carefully with WFC3 quad filters to avoid placing the target on the vignetted part of the field of view or moving it to another quadrant.

(F631N (07.003)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

(F275W (07.004)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

(F225W (07.005)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

(F658N (07.006)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

(F502N (07.007)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

(F395N (07.008)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

(F343N (07.009)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(2)	Pattern Type=WFC3-UVIS-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.87 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false		(1)

Solar System Targets

#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
(4)	JUPITER-PJ45	STD=JUPITER			CML OF JUPITER FROM EARTH BETWEEN 200 270	EARTH

Comments: PJ 45 Juno equator-crossing longitude: 240.0
Closest approach time at spacecraft: 2022-09-29 17:11
Spacecraft to Earth 1-way light time: 32.88914252 min
Description=Jupiter
Extended=YES

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	FQ889N_quadA	(4) JUPITER-PJ45	WFC3/UVIS, ACCUM, UVIS-QUAD-SUB	FQ889N	CR-SPLIT=NO	POS TARG +1,-1	Sequence 1-9 Non-Int in SEPT-2022 (JUNO, 2K) (07) Pattern 2, Exps 1-1 in Sequence 1-9 Non-Int in SEPT-2022 (JUNO, 2K) (07) (2)	30 Secs (60 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]*	***[1]***
2	FQ727N_quadD	(4) JUPITER-PJ45	WFC3/UVIS, ACCUM, UVIS-QUAD-SUB	FQ727N	CR-SPLIT=NO	POS TARG -10,+10	Sequence 1-9 Non-Int in SEPT-2022 (JUNO, 2K) (07)	8 Secs (8 Secs) *[==>]*	***[1]***
Comments: POS-TARGS are large enough that part of Jupiter on this exposure may fall into regions where quad filter edge effects affect the image. This will only render the pixels closest to detector center unusable for photometry. This sacrifice is needed to avoid a second guide-star acquisition, because Quad-A and Quad-D are so far apart.									
3	F631N	(4) JUPITER-PJ45	WFC3/UVIS, ACCUM, UVIS2-2K2D-SUB	F631N	CR-SPLIT=NO	POS TARG -10,+10	Sequence 1-9 Non-Int in SEPT-2022 (JUNO, 2K) (07)	4 Secs (4 Secs) *[==>]*	***[1]***
Comments: Request BLADE=A for this exposure only									
4	F275W	(4) JUPITER-PJ45	WFC3/UVIS, ACCUM, UVIS2-2K2D-SUB	F275W	CR-SPLIT=NO	POS TARG -10,+10	Sequence 1-9 Non-Int in SEPT-2022 (JUNO, 2K) (07)	20 Secs (20 Secs) *[==>]*	***[1]***
5	F225W	(4) JUPITER-PJ45	WFC3/UVIS, ACCUM, UVIS2-2K2D-SUB	F225W	CR-SPLIT=NO	POS TARG -10,+10	Sequence 1-9 Non-Int in SEPT-2022 (JUNO, 2K) (07)	40 Secs (40 Secs) *[==>]*	***[1]***
6	F658N	(4) JUPITER-PJ45	WFC3/UVIS, ACCUM, UVIS2-2K2D-SUB	F658N	CR-SPLIT=NO	POS TARG -10,+10	Sequence 1-9 Non-Int in SEPT-2022 (JUNO, 2K) (07)	8 Secs (8 Secs) *[==>]*	***[1]***
7	F502N	(4) JUPITER-PJ45	WFC3/UVIS, ACCUM, UVIS2-2K2D-SUB	F502N	CR-SPLIT=NO	POS TARG -10,+10	Sequence 1-9 Non-Int in SEPT-2022 (JUNO, 2K) (07)	4 Secs (4 Secs) *[==>]*	***[1]***
8	F395N	(4) JUPITER-PJ45	WFC3/UVIS, ACCUM, UVIS2-2K2D-SUB	F395N	CR-SPLIT=NO	POS TARG -10,+10	Sequence 1-9 Non-Int in SEPT-2022 (JUNO, 2K) (07)	9 Secs (9 Secs) *[==>]*	***[1]***
9	F343N	(4) JUPITER-PJ45	WFC3/UVIS, ACCUM, UVIS2-2K2D-SUB	F343N	CR-SPLIT=NO	POS TARG -10,+10	Sequence 1-9 Non-Int in SEPT-2022 (JUNO, 2K) (07)	6 Secs (6 Secs) *[==>]*	***[1]***

Orbit Structure