



15159 - Wide Field Coverage for Juno (WFCJ): Jupiter's 2D Wind Field and Cloud Structure

Cycle: 25, Proposal Category: GO
(Availability Mode: AVAILABLE)

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	(3) JUPITER	WFC3/UVIS	1	18-Mar-2019 10:00:15.0	yes
03	(3) JUPITER	WFC3/UVIS	1	18-Mar-2019 10:00:16.0	yes
04	(3) JUPITER	WFC3/UVIS	1	18-Mar-2019 10:00:17.0	yes
01	(3) JUPITER	WFC3/UVIS	1	18-Mar-2019 10:00:18.0	yes
05	(3) JUPITER	S/C	1	18-Mar-2019 10:00:19.0	yes

5 Total Orbits Used

ABSTRACT

Juno will take novel measurements in the jovian system during HST Cycles 23, 24, and 25. This proposal supports Juno's neutral atmospheric investigation, which includes measurements with an IR imager/spectrometer (JIRAM) and the Microwave Radiometer (MWR). Both will achieve high spatial resolution as the orbiter swoops past Jupiter, in between the radiation belts and the cloud tops. But instrument fields of view are small compared to the planet, so HST observations would provide valuable context and complementary information.

We propose to measure Jupiter's 2D wind field, as well as UV/optical cloud colors (and their evolution). We will measure winds using sets of global maps that cover two of Juno's perijove passes, characterizing the time-varying dynamics of waves, jets, vortices, and storms. The remaining perijove passes will be covered by snapshot (1-orbit) visits, sufficient to characterize feature morphology along each Juno track at high resolution. These observations will give crucial context for MWR observations and enable more precise retrievals from MWR data.

Earth-based support is particularly important for Juno, due to its highly eccentric orbit and specialized instrumentation. WFC3/UVIS imaging can play an important role in the effort, since no other facility can obtain precise 2D wind fields and UV/optical photometry at high spatial resolution. Without the HST component of this campaign, key dynamical constraints will be missing.

OBSERVING DESCRIPTION

The name/label of each visit gives:

- * PJ (Juno perijove) number
- * SNAPshot or GLOBal map type observation
- * sequence (A-K or A-Q for global maps)
- * subarray size (1K or 2K)

Juno perijove timing information as of 21 July 2016 is used in this version of the Phase II. Observations are timed so that the longitude of each Juno perijove pass is observed by HST near disk center. If this timing doesn't work out for the same jovian rotation as the perijove pass, then observations may be taken 10 hours before or after, to catch the perijove longitude one jovian rotation before or after the perijove pass. Comments on the first visit of each PJ give some timing details for each perijove.

SNAPSHOT observations consist of a single visit, to image the perijove longitude with HST.

GLOBAL map sequences use 11 orbits (PJ6) or 17 orbits (PJ8) to measure zonal winds using multiple global maps. In each global map sequence, visits are labeled A-K or A-Q in order.

Subarrays are used to reduce buffer dumps. When Jupiter's diameter is $< 39.5''$, we use 1K subarrays. When Jupiter's apparent size is larger, we use 2K subarrays.

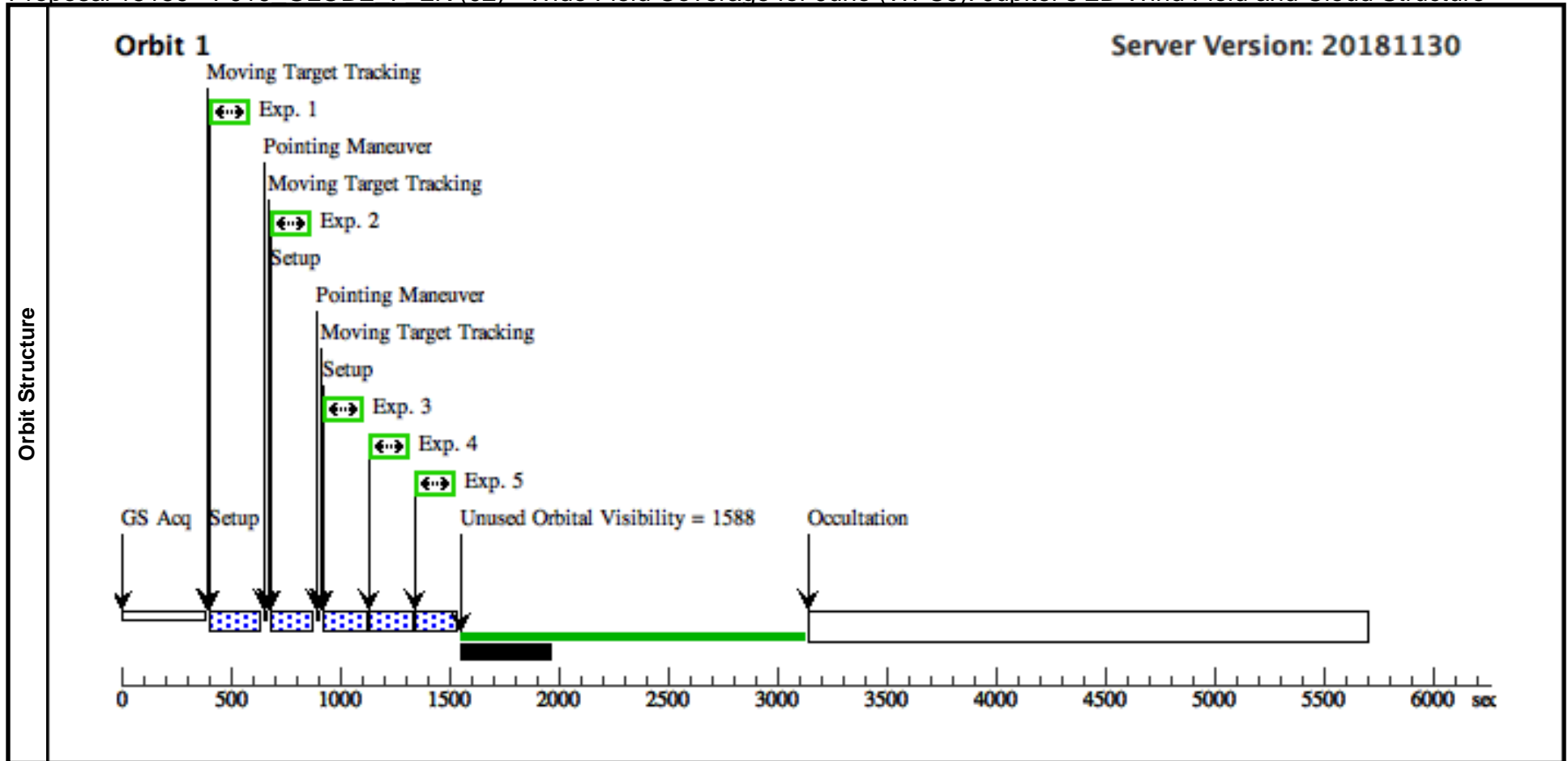
Jupiter's rotation blurs the image by about 1 pixel in a 12-sec exposure. So for filters requiring long exposure times, we try to take multiple frames to reduce rotational blurring. We do not dither frames to improve PSF sampling; instead, we let the planet's rotation dither the map data for us.

We do not use pre-flash because the target is extended and PSF wings create a halo of light around the target. This serves the same purpose as flash.

Proposal 15159 - PJ19_GLOBE_F_2K (02) - Wide Field Coverage for Juno (WFCJ): Jupiter's 2D Wind Field and Cloud Structure

Mon Mar 18 14:00:19 GMT 2019

Visit	Proposal 15159, PJ19_GLOBE_F_2K (02), implementation Diagnostic Status: Warning Scientific Instruments: WFC3/UVIS Special Requirements: BETWEEN 2019.099:20:30:00 AND 2019.099:21:25:00 <i>Comments: PJ 19, UT time and CML: 2019-04-06 12:14:00 99.7</i>																																																																					
	Diagnostics	(FQ889N_quadA (02.001)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser																																																																				
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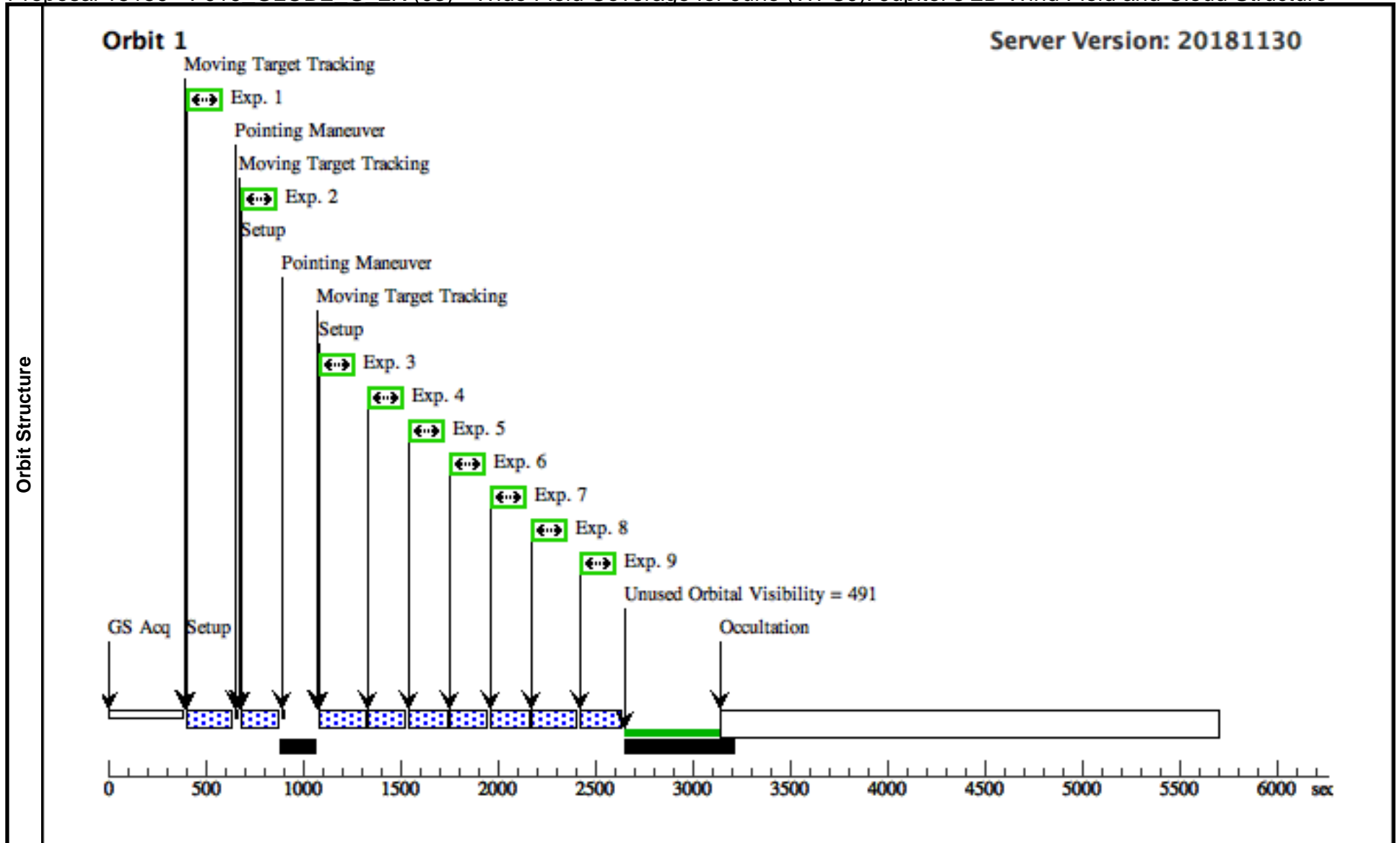
Proposal 15159 - PJ19_GLOBE_G_2K (03) - Wide Field Coverage for Juno (WFCJ): Jupiter's 2D Wind Field and Cloud Structure

Mon Mar 18 14:00:19 GMT 2019

Visit	<p>Proposal 15159, PJ19_GLOBE_G_2K (03), implementation</p> <p>Diagnostic Status: Warning</p> <p>Scientific Instruments: WFC3/UVIS</p> <p>Special Requirements: BETWEEN 2019.099:22:10:00 AND 2019.099:23:00:00</p> <p><i>Comments: PJ 19, UT time and CML: 2019-04-06 12:14:00 99.7</i></p>						
	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					
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(F275W (03.009)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser							
Solar System Targets	#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
	(3)	JUPITER	STD=JUPITER				EARTH
<p><i>Comments: Description=Jupiter atmosphere Extended=YES</i></p>							

Proposal 15159 - PJ19 GLOBE G 2K (03) - Wide Field Coverage for Juno (WFCJ): Jupiter's 2D Wind Field and Cloud Structure

Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	FQ889N_qu adA	(3) JUPITER	WFC3/UVIS, ACCUM, UVIS-QUAD-SUB	FQ889N	CR-SPLIT=NO	POS TARG +4.66,-5 .68; GS ACQ SCENARI O BASE1BE	Same Guide Stars in PJ19_GLOBE_G_2 K (03)	30 Secs (30 Secs) [==>]	[1]
	2	FQ727N_qu adD	(3) JUPITER	WFC3/UVIS, ACCUM, UVIS-QUAD-SUB	FQ727N	CR-SPLIT=NO	POS TARG -9.68,+1 0.44	Same Guide Stars in PJ19_GLOBE_G_2 K (03)	8 Secs (8 Secs) [==>]	[1]
	3	F225W	(3) JUPITER	WFC3/UVIS, ACCUM, UVIS2-2K2D-SUB	F225W	CR-SPLIT=NO	POS TARG -15,+15	Same Guide Stars in PJ19_GLOBE_G_2 K (03)	40 Secs (40 Secs) [==>]	[1]
	4	F631N	(3) JUPITER	WFC3/UVIS, ACCUM, UVIS2-2K2D-SUB	F631N	CR-SPLIT=NO; BLADE=A	POS TARG -15,+15	Same Guide Stars in PJ19_GLOBE_G_2 K (03)	4 Secs (4 Secs) [==>]	[1]
	5	F502N	(3) JUPITER	WFC3/UVIS, ACCUM, UVIS2-2K2D-SUB	F502N	CR-SPLIT=NO; BLADE=A	POS TARG -15,+15	Same Guide Stars in PJ19_GLOBE_G_2 K (03)	4 Secs (4 Secs) [==>]	[1]
	6	F395N	(3) JUPITER	WFC3/UVIS, ACCUM, UVIS2-2K2D-SUB	F395N	CR-SPLIT=NO	POS TARG -15,+15	Same Guide Stars in PJ19_GLOBE_G_2 K (03)	9 Secs (9 Secs) [==>]	[1]
	7	F343N	(3) JUPITER	WFC3/UVIS, ACCUM, UVIS2-2K2D-SUB	F343N	CR-SPLIT=NO; BLADE=A	POS TARG -15,+15	Same Guide Stars in PJ19_GLOBE_G_2 K (03)	6 Secs (6 Secs) [==>]	[1]
	8	F225W	(3) JUPITER	WFC3/UVIS, ACCUM, UVIS2-2K2D-SUB	F225W	CR-SPLIT=NO	POS TARG -15,+15	Same Guide Stars in PJ19_GLOBE_G_2 K (03)	40 Secs (40 Secs) [==>]	[1]
	9	F275W	(3) JUPITER	WFC3/UVIS, ACCUM, UVIS2-2K2D-SUB	F275W	CR-SPLIT=NO	POS TARG -15,+15	Same Guide Stars in PJ19_GLOBE_G_2 K (03)	20 Secs (20 Secs) [==>]	[1]



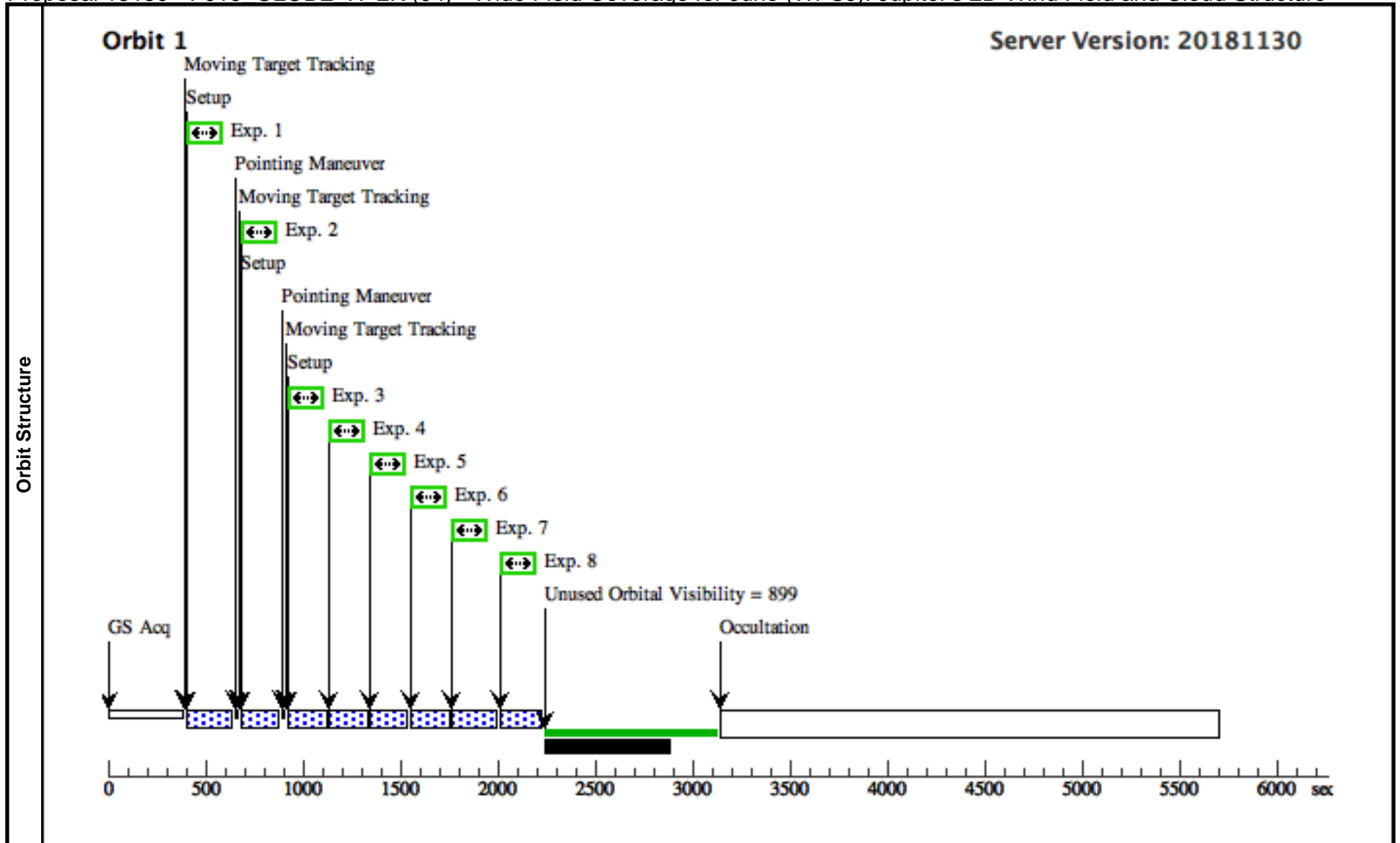
Proposal 15159 - PJ19_GLOBE_H_2K (04) - Wide Field Coverage for Juno (WFCJ): Jupiter's 2D Wind Field and Cloud Structure

Mon Mar 18 14:00:20 GMT 2019

Visit	<p>Proposal 15159, PJ19_GLOBE_H_2K (04), implementation</p> <p>Diagnostic Status: Warning</p> <p>Scientific Instruments: WFC3/UVIS</p> <p>Special Requirements: BETWEEN 2019.099:23:50:00 AND 2019.100:00:50:00</p> <p><i>Comments: PJ 19, UT time and CML: 2019-04-06 12:14:00 99.7</i></p>																				
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	#	Name	Level 1	Level 2	Level 3	Window	Ephem Center														
(3)	JUPITER	STD=JUPITER				EARTH															

Proposal 15159 - PJ19 GLOBE H 2K (04) - Wide Field Coverage for Juno (WFCJ): Jupiter's 2D Wind Field and Cloud Structure

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	1	FQ889N_qu adA	(3) JUPITER	WFC3/UVIS, ACCUM, UVIS-QUAD-SUB	FQ889N	CR-SPLIT=NO	POS TARG +4.66,-5 .68; GS ACQ SCENARI O BASE1BE	Same Guide Stars in PJ19_GLOBE_H_2 K (04)	30 Secs (30 Secs) [==>]	[1]
	2	FQ727N_qu adD	(3) JUPITER	WFC3/UVIS, ACCUM, UVIS-QUAD-SUB	FQ727N	CR-SPLIT=NO	POS TARG -9.68,+1 0.44	Same Guide Stars in PJ19_GLOBE_H_2 K (04)	8 Secs (8 Secs) [==>]	[1]
	3	F631N	(3) JUPITER	WFC3/UVIS, ACCUM, UVIS2-2K2D-SUB	F631N	CR-SPLIT=NO; BLADE=A	POS TARG -15,+15	Same Guide Stars in PJ19_GLOBE_H_2 K (04)	4 Secs (4 Secs) [==>]	[1]
	4	F502N	(3) JUPITER	WFC3/UVIS, ACCUM, UVIS2-2K2D-SUB	F502N	CR-SPLIT=NO; BLADE=A	POS TARG -15,+15	Same Guide Stars in PJ19_GLOBE_H_2 K (04)	4 Secs (4 Secs) [==>]	[1]
	5	F395N	(3) JUPITER	WFC3/UVIS, ACCUM, UVIS2-2K2D-SUB	F395N	CR-SPLIT=NO	POS TARG -15,+15	Same Guide Stars in PJ19_GLOBE_H_2 K (04)	9 Secs (9 Secs) [==>]	[1]
	6	F343N	(3) JUPITER	WFC3/UVIS, ACCUM, UVIS2-2K2D-SUB	F343N	CR-SPLIT=NO; BLADE=A	POS TARG -15,+15	Same Guide Stars in PJ19_GLOBE_H_2 K (04)	6 Secs (6 Secs) [==>]	[1]
	7	F225W	(3) JUPITER	WFC3/UVIS, ACCUM, UVIS2-2K2D-SUB	F225W	CR-SPLIT=NO	POS TARG -15,+15	Same Guide Stars in PJ19_GLOBE_H_2 K (04)	40 Secs (40 Secs) [==>]	[1]
	8	F275W	(3) JUPITER	WFC3/UVIS, ACCUM, UVIS2-2K2D-SUB	F275W	CR-SPLIT=NO	POS TARG -15,+15	Same Guide Stars in PJ19_GLOBE_H_2 K (04)	20 Secs (20 Secs) [==>]	[1]



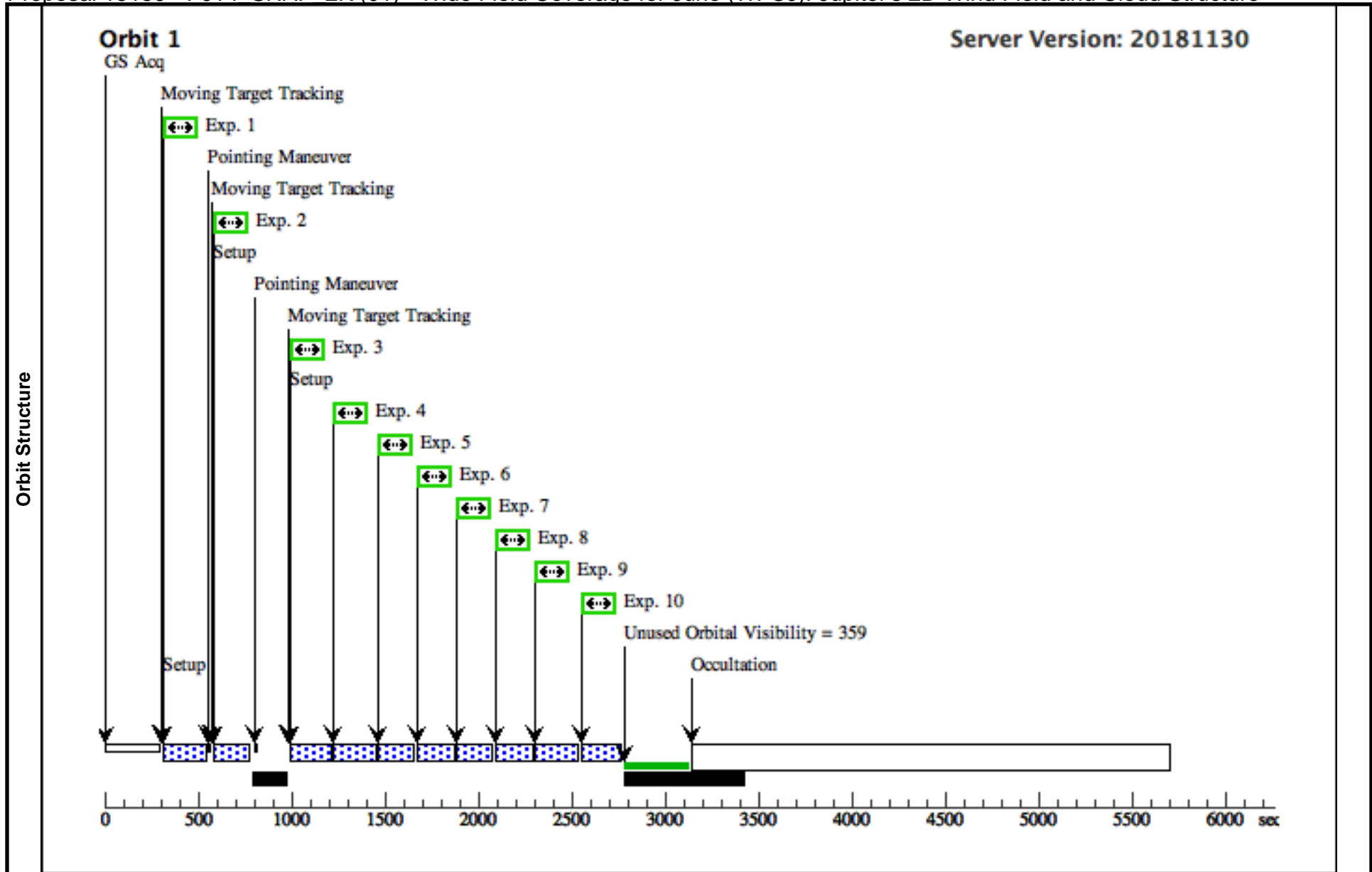
Proposal 15159 - PJ14 SNAP 2K (01) - Wide Field Coverage for Juno (WFCJ): Jupiter's 2D Wind Field and Cloud Structure

Mon Mar 18 14:00:20 GMT 2019

Visit	<p>Proposal 15159, PJ14_SNAP_2K (01), completed</p> <p>Diagnostic Status: Warning</p> <p>Scientific Instruments: WFC3/UVIS</p> <p>Special Requirements: (none)</p> <p><i>Comments: PJ 14, UT time and CML: 2018-07-16 05:18:44 74.50</i></p> <p><i>Position the Juno perijove longitude near Jupiter disk center. Secondary option is a window +/-10 hours away, to image the same location on an adjacent Jupiter rotation.</i></p> <p><i>Try for start times within an hour of these times: 2018-Jul-15 18:40 2018-Jul-16 04:35 (best one) 2018-Jul-16 14:30</i></p>																					
	Diagnostics	<p>(FQ889N_quadA (01.001)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser</p> <p>(FQ889N_quadA (01.001)) 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.</p> <p>(FQ727N_quadD (01.002)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser</p> <p>(FQ727N_quadD (01.002)) 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.</p> <p>(F275W (01.003)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser</p> <p>(F225W (01.004)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser</p> <p>(F631N (01.005)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser</p> <p>(F502N (01.006)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser</p> <p>(F395N (01.007)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser</p> <p>(F343N (01.008)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser</p> <p>(F225W (01.009)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser</p> <p>(F275W (01.010)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser</p>																				
Solar System Targets		<table border="1"> <thead> <tr> <th>#</th> <th>Name</th> <th>Level 1</th> <th>Level 2</th> <th>Level 3</th> <th>Window</th> <th>Ephem Center</th> </tr> </thead> <tbody> <tr> <td>(3)</td> <td>JUPITER</td> <td>STD=JUPITER</td> <td></td> <td></td> <td></td> <td>EARTH</td> </tr> </tbody> </table> <p><i>Comments: Description=Jupiter atmosphere Extended=YES</i></p>							#	Name	Level 1	Level 2	Level 3	Window	Ephem Center	(3)	JUPITER	STD=JUPITER				EARTH
		#	Name	Level 1	Level 2	Level 3	Window	Ephem Center														
(3)		JUPITER	STD=JUPITER				EARTH															

Proposal 15159 - PJ14 SNAP 2K (01) - Wide Field Coverage for Juno (WFCJ): Jupiter's 2D Wind Field and Cloud Structure

Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	FQ889N_quadA	(3) JUPITER	WFC3/UVIS, ACCUM, UVIS-QUAD-SUB	FQ889N	CR-SPLIT=NO	POS TARG +5.22,-6.34; GS ACQ SCENARIO SINGLE	Same Guide Stars in PJ14_SNAP_2K (01)	30 Secs (30 Secs) [==>]	[1]
	2	FQ727N_quadD	(3) JUPITER	WFC3/UVIS, ACCUM, UVIS-QUAD-SUB	FQ727N	CR-SPLIT=NO	POS TARG -10.25,+11.1	Same Guide Stars in PJ14_SNAP_2K (01)	8 Secs (8 Secs) [==>]	[1]
	3	F275W	(3) JUPITER	WFC3/UVIS, ACCUM, UVIS2-2K2D-SUB	F275W	CR-SPLIT=NO	POS TARG -15,+15	Same Guide Stars in PJ14_SNAP_2K (01)	20 Secs (20 Secs) [==>]	[1]
	4	F225W	(3) JUPITER	WFC3/UVIS, ACCUM, UVIS2-2K2D-SUB	F225W	CR-SPLIT=NO	POS TARG -15,+15	Same Guide Stars in PJ14_SNAP_2K (01)	40 Secs (40 Secs) [==>]	[1]
	5	F631N	(3) JUPITER	WFC3/UVIS, ACCUM, UVIS2-2K2D-SUB	F631N	CR-SPLIT=NO; BLADE=A	POS TARG -15,+15	Same Guide Stars in PJ14_SNAP_2K (01)	4 Secs (4 Secs) [==>]	[1]
	6	F502N	(3) JUPITER	WFC3/UVIS, ACCUM, UVIS2-2K2D-SUB	F502N	CR-SPLIT=NO; BLADE=A	POS TARG -15,+15	Same Guide Stars in PJ14_SNAP_2K (01)	4 Secs (4 Secs) [==>]	[1]
	7	F395N	(3) JUPITER	WFC3/UVIS, ACCUM, UVIS2-2K2D-SUB	F395N	CR-SPLIT=NO	POS TARG -15,+15	Same Guide Stars in PJ14_SNAP_2K (01)	9 Secs (9 Secs) [==>]	[1]
	8	F343N	(3) JUPITER	WFC3/UVIS, ACCUM, UVIS2-2K2D-SUB	F343N	CR-SPLIT=NO; BLADE=A	POS TARG -15,+15	Same Guide Stars in PJ14_SNAP_2K (01)	6 Secs (6 Secs) [==>]	[1]
	9	F225W	(3) JUPITER	WFC3/UVIS, ACCUM, UVIS2-2K2D-SUB	F225W	CR-SPLIT=NO	POS TARG -15,+15	Same Guide Stars in PJ14_SNAP_2K (01)	40 Secs (40 Secs) [==>]	[1]
10	F275W	(3) JUPITER	WFC3/UVIS, ACCUM, UVIS2-2K2D-SUB	F275W	CR-SPLIT=NO	POS TARG -15,+15	Same Guide Stars in PJ14_SNAP_2K (01)	20 Secs (20 Secs) [==>]	[1]	



Proposal 15159 - Gyro Bias Update (05) - Wide Field Coverage for Juno (WFCJ): Jupiter's 2D Wind Field and Cloud Structure

Mon Mar 18 14:00:20 GMT 2019

Visit	Proposal 15159, Gyro Bias Update (05)						
	Diagnostic Status: No Diagnostics						
	Scientific Instruments: S/C						
	Special Requirements: NOTRACK; BETWEEN 2019.099:21:05:00 AND 2019.099:21:45:00						

Comments: Gyro Bias update to be executed in the same orbit following visit 15159 02.

Solar System Targets	#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
	(3)	JUPITER	STD=JUPITER				EARTH

Comments: Description=Jupiter atmosphere
Extended=YES

Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(3) JUPITER		S/C, POINTING, V1			GS ACQ SCENARI O BASE1B3		360 Secs (360 Secs)
									[==>]	[1]

