



16404 - WFC3 IR Linearity Monitor

Cycle: 28, Proposal Category: CAL/WFC3

(Availability Mode: RESTRICTED)

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>
01	DARK TUNGSTEN	WFC3/IR	1	07-Aug-2020 10:00:12.0	yes
02	DARK TUNGSTEN	WFC3/IR	1	07-Aug-2020 10:00:12.0	yes
03	DARK TUNGSTEN	WFC3/IR	1	07-Aug-2020 10:00:13.0	yes
04	DARK TUNGSTEN	WFC3/IR	1	07-Aug-2020 10:00:14.0	yes
05	DARK TUNGSTEN	WFC3/IR	1	07-Aug-2020 10:00:14.0	yes
06	DARK TUNGSTEN	WFC3/IR	1	07-Aug-2020 10:00:15.0	yes
07	DARK TUNGSTEN	WFC3/IR	1	07-Aug-2020 10:00:15.0	yes
08	DARK TUNGSTEN	WFC3/IR	1	07-Aug-2020 10:00:16.0	yes

<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>
09	DARK TUNGSTEN	WFC3/IR	1	07-Aug-2020 10:00:16.0	yes
10	DARK TUNGSTEN	WFC3/IR	1	07-Aug-2020 10:00:17.0	yes

10 Total Orbits Used

ABSTRACT

The WFC3/IR detector exhibits a non-linear response to incident flux. The data reduction pipeline provides a correction for the non-linearity, which depends on accurate characterization of the response of the detector. To monitor the non-linearity of the WFC3/IR detector, we use a dark observation followed by two internal flats using the Tungsten lamp at different sampling rates, and a trailing dark. Any changes measured in the non-linearity will be updated in the calibration reference file, crucial to providing a correction for accurate photometry. This program is a continuation of the cycle 27 (program 15724) linearity calibration program.

OBSERVING DESCRIPTION

To monitor the non-linearity of the WFC3/IR detector, we use a dark observation followed by two internal flats using the Tungsten lamp. We begin with a narrow band flat to ensure that the lamp is warm and stable, but not so bright as to cause persistence, observing the Tungsten lamp with F126N (half SPARS10 and half SPARS50). Then we take internal flats through the F127M filter at different signal levels and sampling sequence (half SPARS10 and half SPARS25). After the F127M flat, a dark is obtained to measure the persistence decay rate.

Proposal 16404 - SPARS25a (01) - WFC3 IR Linearity Monitor

Visit	Proposal 16404, SPARS25a (01) Fri Aug 07 14:00:17 GMT 2020									
	Diagnostic Status: Warning Scientific Instruments: WFC3/IR Special Requirements: BEFORE 01-FEB-2021:00:00:00									
Diagnostics	(SPARS25a (01)) Warning (Orbit Planner): MAXIMUM DURATION EXCEEDED FOR INTERNAL OR EARTH CALIB SU									
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	Dark	DARK	WFC3/IR, MULTIACCUM, IR	BLANK	SAMP-SEQ=SPARS 25; NSAMP=11			252.937441 Secs (252.937 Secs) [==>]	[1]
	2	warm up flat	TUNGSTEN	WFC3/IR, MULTIACCUM, IR	F126N	SAMP-SEQ=SPARS 10; NSAMP=6			52.937106 Secs (52.937 Secs) [==>]	[1]
	3	full flat	TUNGSTEN	WFC3/IR, MULTIACCUM, IR	F127M	SAMP-SEQ=SPARS 25; NSAMP=15			352.939501 Secs (352.94 Secs) [==>]	[1]
	4	Persistence Dark	DARK	WFC3/IR, MULTIACCUM, IR	BLANK	SAMP-SEQ=SPARS 25; NSAMP=15			352.939501 Secs (352.94 Secs) [==>]	[1]
Orbit Structure	Orbit 1 Unused Orbital Visibility = 3142 Server Version: 20200619									

Proposal 16404 - SPARS25b (02) - WFC3 IR Linearity Monitor

Visit	Proposal 16404, SPARS25b (02) Fri Aug 07 14:00:17 GMT 2020									
	Diagnostic Status: Warning Scientific Instruments: WFC3/IR Special Requirements: BEFORE 01-FEB-2021:00:00:00									
Diagnostics	(SPARS25b (02)) Warning (Orbit Planner): MAXIMUM DURATION EXCEEDED FOR INTERNAL OR EARTH CALIB SU									
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	Dark	DARK	WFC3/IR, MULTIACCUM, IR	BLANK	SAMP-SEQ=SPARS 25; NSAMP=11			252.937441 Secs (252.937 Secs) [==>]	[1]
	2	warm up flat	TUNGSTEN	WFC3/IR, MULTIACCUM, IR	F126N	SAMP-SEQ=SPARS 10; NSAMP=6			52.937106 Secs (52.937 Secs) [==>]	[1]
	3	full flat	TUNGSTEN	WFC3/IR, MULTIACCUM, IR	F127M	SAMP-SEQ=SPARS 25; NSAMP=15			352.939501 Secs (352.94 Secs) [==>]	[1]
	4	Persistence Dark	DARK	WFC3/IR, MULTIACCUM, IR	BLANK	SAMP-SEQ=SPARS 25; NSAMP=15			352.939501 Secs (352.94 Secs) [==>]	[1]
Orbit Structure	Orbit 1 Unused Orbital Visibility = 3142 Server Version: 20200619									

Proposal 16404 - SPARS25c (03) - WFC3 IR Linearity Monitor

Visit	Proposal 16404, SPARS25c (03) Diagnostic Status: Warning Scientific Instruments: WFC3/IR Special Requirements: BEFORE 01-FEB-2021:00:00:00									Fri Aug 07 14:00:18 GMT 2020
Diagnostics	(SPARS25c (03)) Warning (Orbit Planner): MAXIMUM DURATION EXCEEDED FOR INTERNAL OR EARTH CALIB SU									
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	Dark	DARK	WFC3/IR, MULTIACCUM, IR	BLANK	SAMP-SEQ=SPARS 25; NSAMP=11			252.937441 Secs (252.937 Secs) [==>]	[1]
	2	warm up flat	TUNGSTEN	WFC3/IR, MULTIACCUM, IR	F126N	SAMP-SEQ=SPARS 10; NSAMP=6			52.937106 Secs (52.937 Secs) [==>]	[1]
	3	full flat	TUNGSTEN	WFC3/IR, MULTIACCUM, IR	F127M	SAMP-SEQ=SPARS 25; NSAMP=15			352.939501 Secs (352.94 Secs) [==>]	[1]
	4	Persistence Dark	DARK	WFC3/IR, MULTIACCUM, IR	BLANK	SAMP-SEQ=SPARS 25; NSAMP=15			352.939501 Secs (352.94 Secs) [==>]	[1]
Orbit Structure	Orbit 1 Exp. 1 Unused Orbital Visibility = 3142 Reconfig Exp. 2 Reconfig Exp. 3 Reconfig Exp. 4 Occultation Server Version: 20200619									

Proposal 16404 - SPARS25d (04) - WFC3 IR Linearity Monitor

Visit	Proposal 16404, SPARS25d (04) Fri Aug 07 14:00:18 GMT 2020									
	Diagnostic Status: Warning Scientific Instruments: WFC3/IR Special Requirements: BEFORE 01-FEB-2021:00:00:00									
Diagnostics	(SPARS25d (04)) Warning (Orbit Planner): MAXIMUM DURATION EXCEEDED FOR INTERNAL OR EARTH CALIB SU									
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	Dark	DARK	WFC3/IR, MULTIACCUM, IR	BLANK	SAMP-SEQ=SPARS 25; NSAMP=11			252.937441 Secs (252.937 Secs) [==>]	[1]
	2	warm up flat	TUNGSTEN	WFC3/IR, MULTIACCUM, IR	F126N	SAMP-SEQ=SPARS 10; NSAMP=6			52.937106 Secs (52.937 Secs) [==>]	[1]
	3	full flat	TUNGSTEN	WFC3/IR, MULTIACCUM, IR	F127M	SAMP-SEQ=SPARS 25; NSAMP=15			352.939501 Secs (352.94 Secs) [==>]	[1]
	4	Persistence Dark	DARK	WFC3/IR, MULTIACCUM, IR	BLANK	SAMP-SEQ=SPARS 25; NSAMP=15			352.939501 Secs (352.94 Secs) [==>]	[1]
Orbit Structure	Orbit 1 Unused Orbital Visibility = 3142 Reconfig Exp. 2 Reconfig Exp. 3 Exp. 4 Occultation Exp. 1									
	Server Version: 20200619 The timeline shows a sequence of exposures (Exp. 1, 2, 3, 4) and reconfigurations (Reconfig) occurring within the first 3142 seconds of the orbit. An occultation event occurs at approximately 3142 seconds, lasting until the end of the orbit at 6000 seconds. The x-axis is labeled 'sec' and ranges from 0 to 6000.									

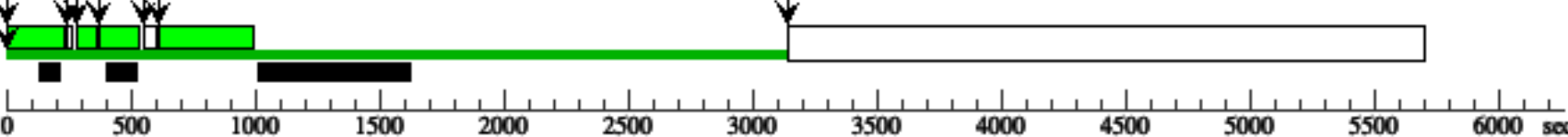
Proposal 16404 - SPARS25e (05) - WFC3 IR Linearity Monitor

Visit	Proposal 16404, SPARS25e (05) Fri Aug 07 14:00:18 GMT 2020									
	Diagnostic Status: Warning Scientific Instruments: WFC3/IR Special Requirements: BEFORE 01-FEB-2021:00:00:00									
Diagnostics	(SPARS25e (05)) Warning (Orbit Planner): MAXIMUM DURATION EXCEEDED FOR INTERNAL OR EARTH CALIB SU									
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	Dark	DARK	WFC3/IR, MULTIACCUM, IR	BLANK	SAMP-SEQ=SPARS 25; NSAMP=11			252.937441 Secs (252.937 Secs) [==>]	[1]
	2	warm up flat	TUNGSTEN	WFC3/IR, MULTIACCUM, IR	F126N	SAMP-SEQ=SPARS 10; NSAMP=6			52.937106 Secs (52.937 Secs) [==>]	[1]
	3	full flat	TUNGSTEN	WFC3/IR, MULTIACCUM, IR	F127M	SAMP-SEQ=SPARS 25; NSAMP=15			352.939501 Secs (352.94 Secs) [==>]	[1]
	4	Persistence Dark	DARK	WFC3/IR, MULTIACCUM, IR	BLANK	SAMP-SEQ=SPARS 25; NSAMP=15			352.939501 Secs (352.94 Secs) [==>]	[1]
Orbit Structure	Orbit 1 Unused Orbital Visibility = 3142 Server Version: 20200619									

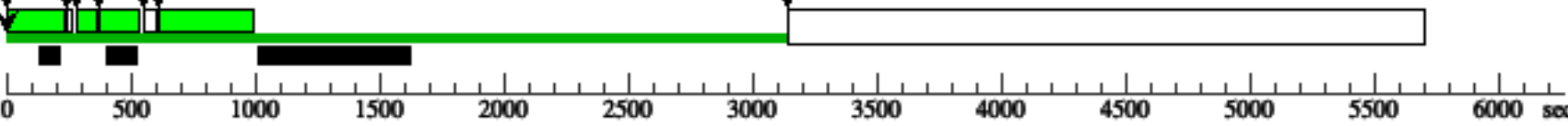
Proposal 16404 - SPARS25f (06) - WFC3 IR Linearity Monitor

Visit	Proposal 16404, SPARS25f (06) Fri Aug 07 14:00:18 GMT 2020									
	Diagnostic Status: Warning Scientific Instruments: WFC3/IR Special Requirements: BEFORE 01-FEB-2021:00:00:00									
Diagnostics	(SPARS25f (06)) Warning (Orbit Planner): MAXIMUM DURATION EXCEEDED FOR INTERNAL OR EARTH CALIB SU									
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	Dark	DARK	WFC3/IR, MULTIACCUM, IR	BLANK	SAMP-SEQ=SPARS 25; NSAMP=11			252.937441 Secs (252.937 Secs) [==>]	[1]
	2	warm up flat	TUNGSTEN	WFC3/IR, MULTIACCUM, IR	F126N	SAMP-SEQ=SPARS 10; NSAMP=6			52.937106 Secs (52.937 Secs) [==>]	[1]
	3	full flat	TUNGSTEN	WFC3/IR, MULTIACCUM, IR	F127M	SAMP-SEQ=SPARS 25; NSAMP=15			352.939501 Secs (352.94 Secs) [==>]	[1]
	4	Persistence Dark	DARK	WFC3/IR, MULTIACCUM, IR	BLANK	SAMP-SEQ=SPARS 25; NSAMP=15			352.939501 Secs (352.94 Secs) [==>]	[1]
Orbit Structure	Orbit 1 Exp. 1 Unused Orbital Visibility = 3142 Reconfig Exp. 2 Reconfig Exp. 3 Reconfig Exp. 4 Occultation Server Version: 20200619 The figure is a horizontal timeline representing the duration of Orbit 1. The x-axis is labeled 'sec' and ranges from 0 to 6000 with major tick marks every 500 seconds. The timeline shows a sequence of events: Exp. 1: A green bar starting at 0 seconds and ending at approximately 125 seconds. Reconfig: A short black bar at approximately 125 seconds. Exp. 2: A green bar starting at approximately 125 seconds and ending at approximately 250 seconds. Reconfig: A short black bar at approximately 250 seconds. Exp. 3: A green bar starting at approximately 250 seconds and ending at approximately 500 seconds. Reconfig: A short black bar at approximately 500 seconds. Exp. 4: A green bar starting at approximately 500 seconds and ending at approximately 1000 seconds. Reconfig: A short black bar at approximately 1000 seconds. Occultation: A long white bar with a black outline starting at approximately 1000 seconds and ending at approximately 5700 seconds.									

Proposal 16404 - SPARS10a (07) - WFC3 IR Linearity Monitor

Visit	Proposal 16404, SPARS10a (07)										Fri Aug 07 14:00:18 GMT 2020
	Diagnostic Status: No Diagnostics										
	Scientific Instruments: WFC3/IR										
	Special Requirements: BEFORE 01-FEB-2021:00:00:00										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]		Orbit
	1	Dark	DARK	WFC3/IR, MULTIACCUM, IR	BLANK	SAMP-SEQ=SPARS 100; NSAMP=3			202.932937 Secs (202.933 Secs) [==>]		[1]
	2	warm up flat	TUNGSTEN	WFC3/IR, MULTIACCUM, IR	F126N	SAMP-SEQ=SPARS 50; NSAMP=2			52.932742 Secs (52.933 Secs) [==>]		[1]
	3	full flat	TUNGSTEN	WFC3/IR, MULTIACCUM, IR	F127M	SAMP-SEQ=SPARS 10; NSAMP=15			142.945773 Secs (142.946 Secs) [==>]		[1]
	4	Persistence Dark	DARK	WFC3/IR, MULTIACCUM, IR	BLANK	SAMP-SEQ=SPARS 25; NSAMP=15			352.939501 Secs (352.94 Secs) [==>]		[1]
Orbit Structure	Orbit 1 Exp. 1 Unused Orbital Visibility = 3142 Reconfig Exp. 2 Exp. 3 Reconfig Exp. 4 Occultation Server Version: 20200619 										

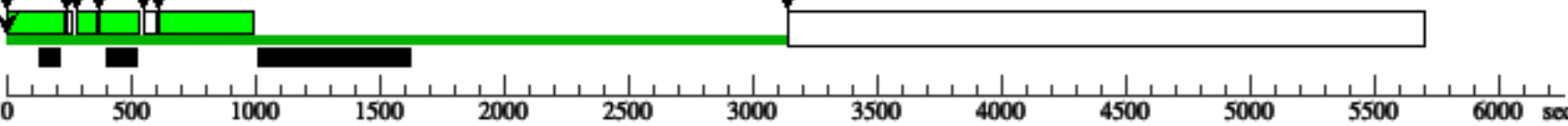
Proposal 16404 - SPARS10b (08) - WFC3 IR Linearity Monitor

Visit	Proposal 16404, SPARS10b (08)										Fri Aug 07 14:00:18 GMT 2020
	Diagnostic Status: No Diagnostics										
	Scientific Instruments: WFC3/IR										
	Special Requirements: BEFORE 01-FEB-2021:00:00:00										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]		Orbit
	1	Dark	DARK	WFC3/IR, MULTIACCUM, IR	BLANK	SAMP-SEQ=SPARS 100; NSAMP=3			202.932937 Secs (202.933 Secs) [==>]		[1]
	2	warm up flat	TUNGSTEN	WFC3/IR, MULTIACCUM, IR	F126N	SAMP-SEQ=SPARS 50; NSAMP=2			52.932742 Secs (52.933 Secs) [==>]		[1]
	3	full flat	TUNGSTEN	WFC3/IR, MULTIACCUM, IR	F127M	SAMP-SEQ=SPARS 10; NSAMP=15			142.945773 Secs (142.946 Secs) [==>]		[1]
	4	Persistence Dark	DARK	WFC3/IR, MULTIACCUM, IR	BLANK	SAMP-SEQ=SPARS 25; NSAMP=15			352.939501 Secs (352.94 Secs) [==>]		[1]
Orbit Structure	Orbit 1 Exp. 1 Unused Orbital Visibility = 3142 Reconfig Exp. 2 Exp. 3 Reconfig Exp. 4 Occultation Server Version: 20200619 										

Proposal 16404 - SPARS10c (09) - WFC3 IR Linearity Monitor

Visit	Proposal 16404, SPARS10c (09) Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/IR Special Requirements: BEFORE 01-FEB-2021:00:00:00																																													
	Fri Aug 07 14:00:18 GMT 2020																																													
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit																																				
	1	Dark	DARK	WFC3/IR, MULTIACCUM, IR	BLANK	SAMP-SEQ=SPARS 100; NSAMP=3			202.932937 Secs (202.933 Secs) [==>]	[1]																																				
	2	warm up flat	TUNGSTEN	WFC3/IR, MULTIACCUM, IR	F126N	SAMP-SEQ=SPARS 50; NSAMP=2			52.932742 Secs (52.933 Secs) [==>]	[1]																																				
	3	full flat	TUNGSTEN	WFC3/IR, MULTIACCUM, IR	F127M	SAMP-SEQ=SPARS 10; NSAMP=15			142.945773 Secs (142.946 Secs) [==>]	[1]																																				
	4	Persistence Dark	DARK	WFC3/IR, MULTIACCUM, IR	BLANK	SAMP-SEQ=SPARS 25; NSAMP=15			352.939501 Secs (352.94 Secs) [==>]	[1]																																				
Orbit Structure	Orbit 1 Unused Orbital Visibility = 3142 Server Version: 20200619 <table><thead><tr><th>Event</th><th>Start Time (sec)</th><th>End Time (sec)</th><th>Duration (sec)</th></tr></thead><tbody><tr><td>Exp. 1</td><td>0</td><td>202.933</td><td>202.933</td></tr><tr><td>Reconfig</td><td>202.933</td><td>254.933</td><td>52</td></tr><tr><td>Exp. 2</td><td>254.933</td><td>307.865</td><td>52.932</td></tr><tr><td>Reconfig</td><td>307.865</td><td>359.865</td><td>52</td></tr><tr><td>Exp. 3</td><td>359.865</td><td>502.812</td><td>142.946</td></tr><tr><td>Reconfig</td><td>502.812</td><td>554.812</td><td>52</td></tr><tr><td>Exp. 4</td><td>554.812</td><td>907.752</td><td>352.94</td></tr><tr><td>Occultation</td><td>3142</td><td>6000</td><td>2858</td></tr></tbody></table>										Event	Start Time (sec)	End Time (sec)	Duration (sec)	Exp. 1	0	202.933	202.933	Reconfig	202.933	254.933	52	Exp. 2	254.933	307.865	52.932	Reconfig	307.865	359.865	52	Exp. 3	359.865	502.812	142.946	Reconfig	502.812	554.812	52	Exp. 4	554.812	907.752	352.94	Occultation	3142	6000	2858
	Event	Start Time (sec)	End Time (sec)	Duration (sec)																																										
Exp. 1	0	202.933	202.933																																											
Reconfig	202.933	254.933	52																																											
Exp. 2	254.933	307.865	52.932																																											
Reconfig	307.865	359.865	52																																											
Exp. 3	359.865	502.812	142.946																																											
Reconfig	502.812	554.812	52																																											
Exp. 4	554.812	907.752	352.94																																											
Occultation	3142	6000	2858																																											

Proposal 16404 - SPARS10d (10) - WFC3 IR Linearity Monitor

Visit	Proposal 16404, SPARS10d (10)										Fri Aug 07 14:00:18 GMT 2020	
	Diagnostic Status: No Diagnostics											
	Scientific Instruments: WFC3/IR											
	Special Requirements: BEFORE 01-FEB-2021:00:00:00											
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]		Orbit	
	1	Dark	DARK	WFC3/IR, MULTIACCUM, IR	BLANK	SAMP-SEQ=SPARS 100; NSAMP=3			202.932937 Secs (202.933 Secs) [==>]		[1]	
	2	warm up flat	TUNGSTEN	WFC3/IR, MULTIACCUM, IR	F126N	SAMP-SEQ=SPARS 50; NSAMP=2			52.932742 Secs (52.933 Secs) [==>]		[1]	
	3	full flat	TUNGSTEN	WFC3/IR, MULTIACCUM, IR	F127M	SAMP-SEQ=SPARS 10; NSAMP=15			142.945773 Secs (142.946 Secs) [==>]		[1]	
	4	Persistence Dark	DARK	WFC3/IR, MULTIACCUM, IR	BLANK	SAMP-SEQ=SPARS 25; NSAMP=15			352.939501 Secs (352.94 Secs) [==>]		[1]	
	Orbit Structure	Orbit 1 Unused Orbital Visibility = 3142 Exp. 1 Reconfig Exp. 2 Exp. 3 Reconfig Exp. 4 Occultation  The figure is a horizontal timeline representing the duration of an orbit (0 to 6000 seconds). It shows the sequence of exposures and reconfiguration events. Exposure 1 (green bar) starts at 0s and ends at approximately 1000s. Exposure 2 (green bar) starts at approximately 1000s and ends at approximately 1500s. Exposure 3 (green bar) starts at approximately 1500s and ends at approximately 3142s. Exposure 4 (green bar) starts at approximately 3142s and ends at approximately 5700s. Reconfiguration events (black bars) are shown as short segments between the exposures. An occultation event (black bar) is shown starting at approximately 5700s and ending at approximately 5750s. The x-axis is labeled 'sec' and ranges from 0 to 6000 with major ticks every 500 seconds.										
		Server Version: 20200619										