



14375 - WFC3 IR Linearity Monitor

Cycle: 23, Proposal Category: CAL/WFC3

(Availability Mode: RESTRICTED)

INVESTIGATORS

<i>Name</i>	<i>Institution</i>	<i>E-Mail</i>
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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	16-Oct-2015 21:13:13.0	yes
02	DARK TUNGSTEN	WFC3/IR	1	16-Oct-2015 21:13:14.0	yes
03	DARK TUNGSTEN	WFC3/IR	1	16-Oct-2015 21:13:15.0	yes
04	DARK TUNGSTEN	WFC3/IR	1	16-Oct-2015 21:13:16.0	yes
05	DARK TUNGSTEN	WFC3/IR	1	16-Oct-2015 21:13:17.0	yes
06	DARK TUNGSTEN	WFC3/IR	1	16-Oct-2015 21:13:18.0	yes
07	DARK TUNGSTEN	WFC3/IR	1	16-Oct-2015 21:13:19.0	yes
08	DARK TUNGSTEN	WFC3/IR	1	16-Oct-2015 21:13:20.0	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	16-Oct-2015 21:13:21.0	yes
10	DARK TUNGSTEN	WFC3/IR	1	16-Oct-2015 21:13:22.0	yes

10 Total Orbits Used

ABSTRACT

To monitor the non-linearity of each pixel of WFC3's IR detector we observe Tungsten internal flat fields through the F127M filter. Accurate WFC3/IR photometry relies on a good correction for non-linearity. Any changes we measure in the non-linearity will be used to update the non-linearity calibration reference file. This program is a continuation of the Cycle 22 program 14009.

OBSERVING DESCRIPTION

Pixel-by-pixel measurements of the non-linearity across the IR detector will be obtained from internal flat fields. In order to study the non-linearity behavior at all signal levels up the ramp, we vary the sample sequence so that we have six visits with SPARS25 and four visits with SPARS10.

The visits - each composed of a dark, a warm up flat, and a final flat - are designed to minimize persistence. The dark is observed first to act as a monitor on persistence garnered from previous observations and to give the filter wheel time to rotate into place with the narrow filter F126N before the Tungsten lamp is turned on. If the lamp should be turned on while a grism or wide filter were in the beam, persistence could be triggered. The two filters (F126N and F127M) used in this program should let in too little flux to trigger persistence. Second an internal flat field is collected with F126N in place while the Tungsten lamp warms up and reaches a stable flux. Analyses from Cycle 17 shows that the lamp may only reach a stable flux after an additional 30 - 40 seconds on top of the nominal warm-up time. Thus this warm-up flat is critical for an accurate non-linearity measurement, which requires a very stable flux for the entirety of the ramp exposure. After the warm-up flat, we last observe the final flat with the medium filter F126M. This flat will be used to measure the non-linearity.

Starting this cycle we are adding a second trailing dark (using SPARS25, nsamp=15) after the final flat. The purpose is to measure the decay of any persistence that 'burps' out of the flats. Because the sample sequence and sample number is compatible, the darks can additionally be used in the IR dark program.

Calibration Justification

WFC3/IR photometry relies on an accurate non-linearity calibration. This program will monitor the detector's non-linearity behavior and provide updates for the non-linearity calibration reference file.

Additional Comments

Starting in Cycle 22 we stopped making observations of 47 Tuc, which had been used to study the point source non-linearity behavior of the detector. Archival data is now abundant enough that it can be used for this check. Also starting in Cycle 22, we removed each visit's trailing DARK in order to reduce CSM moves. This removal makes it necessary for the visits to be added to Cycle 23's Worst Actor list.

Due to an oversight in Cycle 22 we asked for only 9 visits of internal flat fields. This cycle's program is back to the nominal 10 visits.

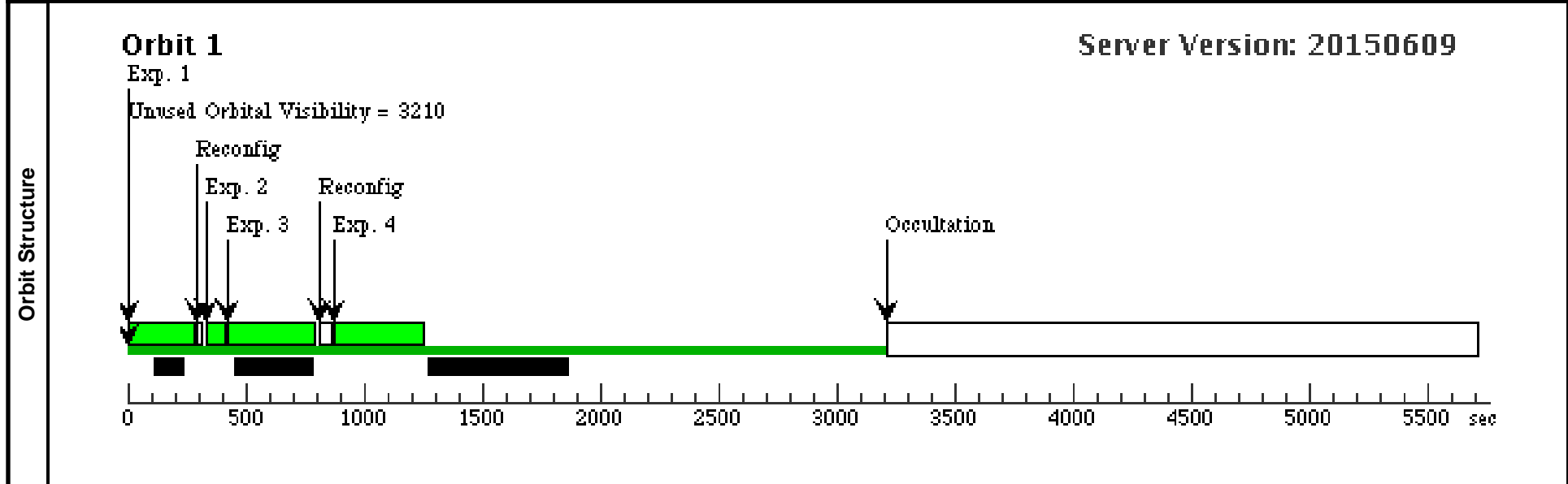
Proposal 14375 - SPARS25a (01) - WFC3 IR Linearity Monitor

Sat Oct 17 01:13:23 GMT 2015

Visit	Proposal 14375, SPARS25a (01), implementation Diagnostic Status: Warning Scientific Instruments: WFC3/IR Special Requirements: BEFORE 01-SEP-2016

Diagnostics	(SPARS25a (01)) Warning (Orbit Planner): MAXIMUM DURATION EXCEEDED FOR INTERNAL OR EARTH CALIB SU
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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]



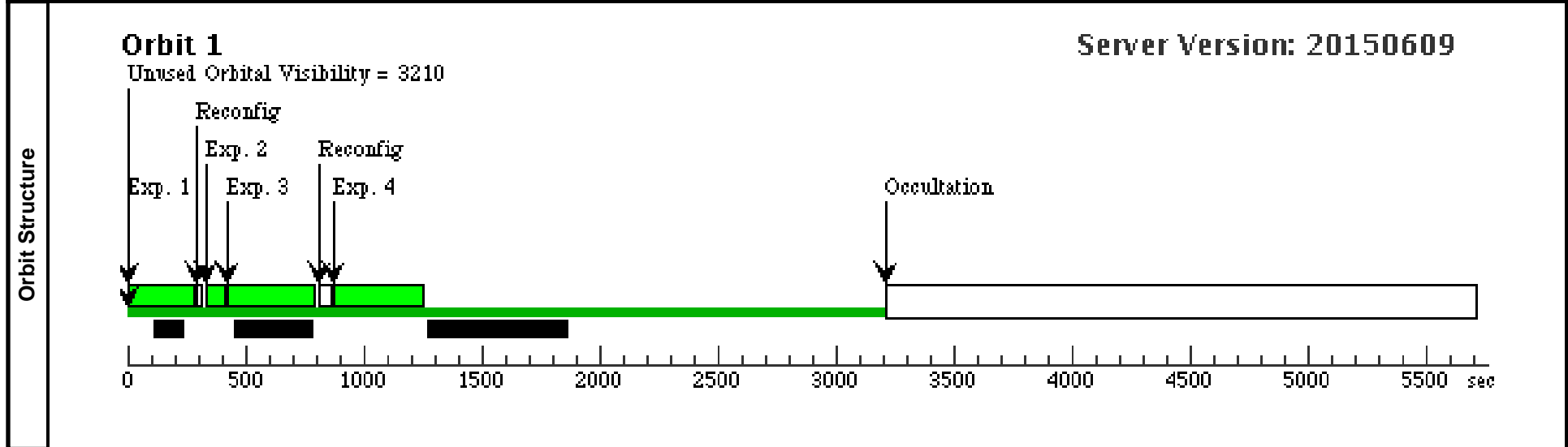
Proposal 14375 - SPARS25b (02) - WFC3 IR Linearity Monitor

Sat Oct 17 01:13:23 GMT 2015

Visit	Proposal 14375, SPARS25b (02), implementation Diagnostic Status: Warning Scientific Instruments: WFC3/IR Special Requirements: BEFORE 01-SEP-2016

Diagnostics	(SPARS25b (02)) Warning (Orbit Planner): MAXIMUM DURATION EXCEEDED FOR INTERNAL OR EARTH CALIB SU
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#	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]



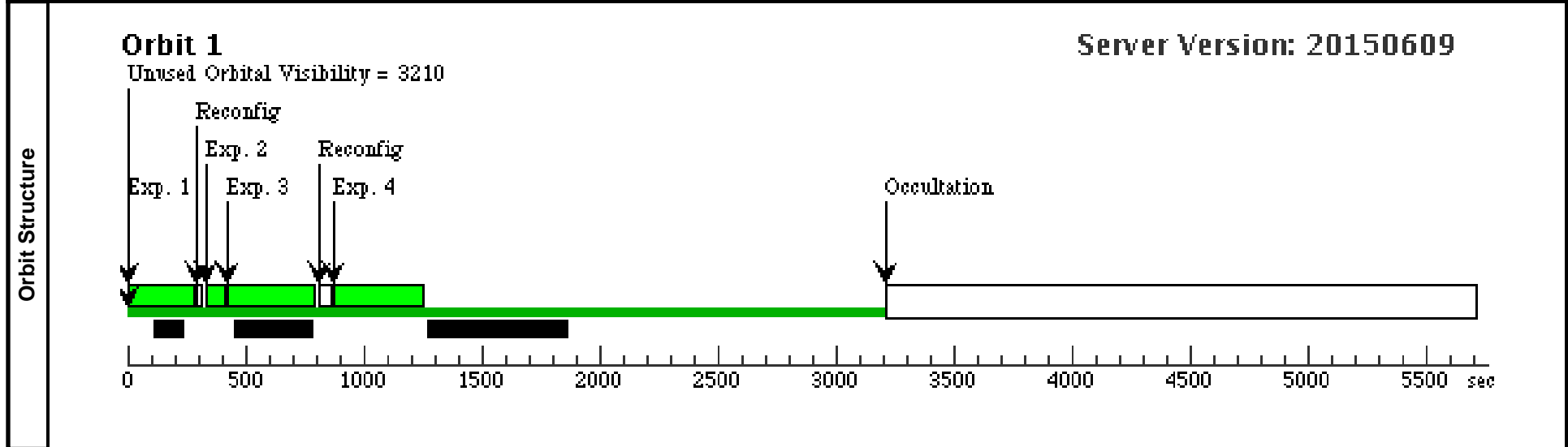
Proposal 14375 - SPARS25c (03) - WFC3 IR Linearity Monitor

Sat Oct 17 01:13:24 GMT 2015

Visit	Proposal 14375, SPARS25c (03), implementation Diagnostic Status: Warning Scientific Instruments: WFC3/IR Special Requirements: BEFORE 01-SEP-2016

Diagnostics	(SPARS25c (03)) Warning (Orbit Planner): MAXIMUM DURATION EXCEEDED FOR INTERNAL OR EARTH CALIB SU
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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]

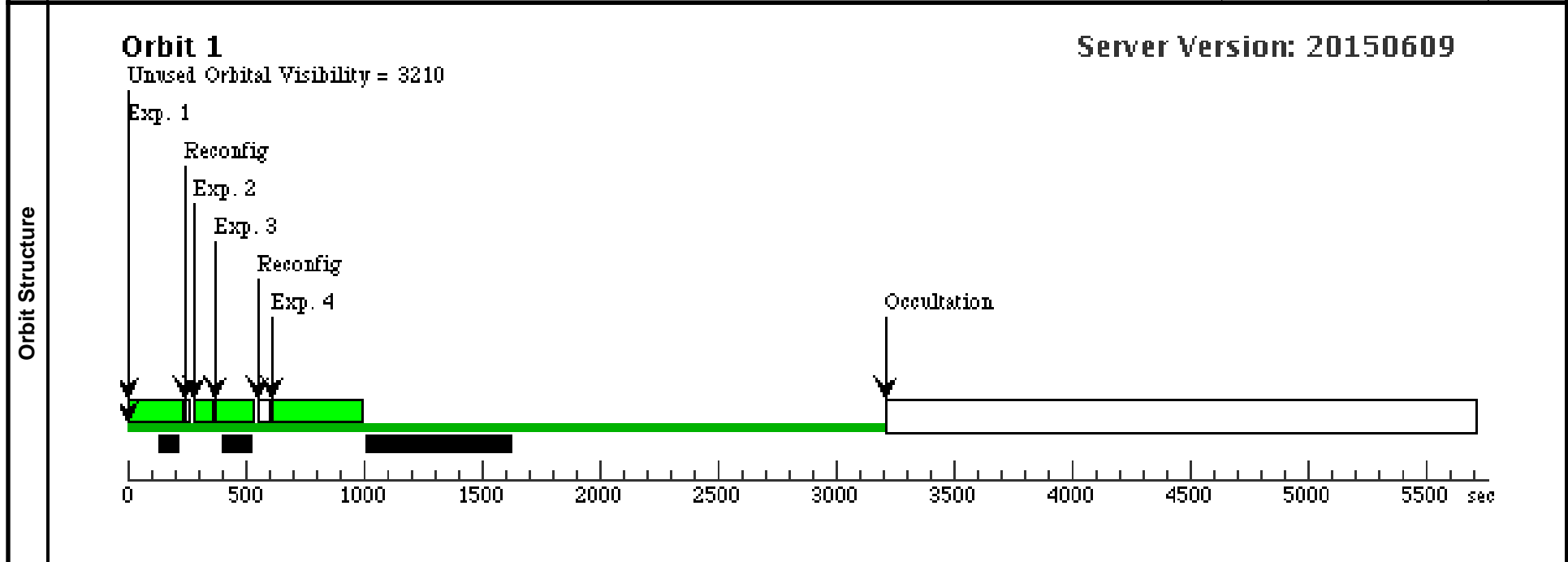


Proposal 14375 - SPARS10a (04) - WFC3 IR Linearity Monitor

Sat Oct 17 01:13:24 GMT 2015

Visit	Proposal 14375, SPARS10a (04), implementation Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/IR Special Requirements: BEFORE 01-SEP-2016									
	#	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]

Exposures	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]

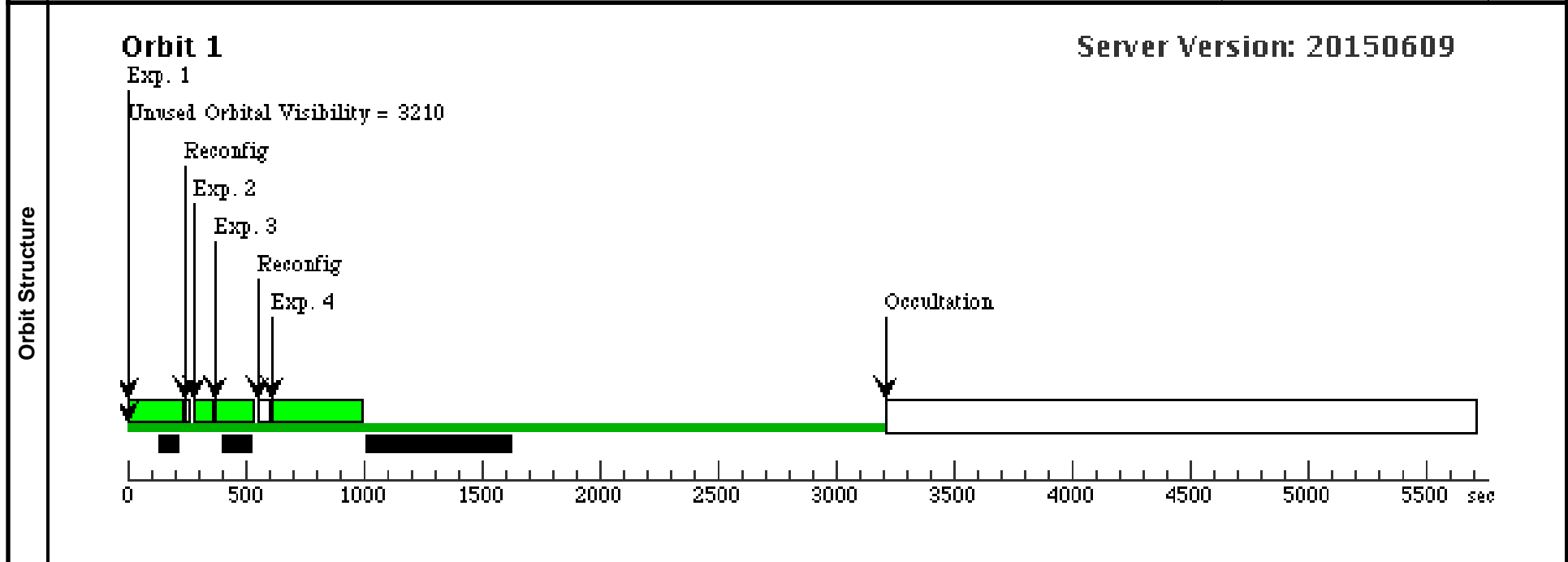


Proposal 14375 - SPARS10b (05) - WFC3 IR Linearity Monitor

Sat Oct 17 01:13:24 GMT 2015

Visit	Proposal 14375, SPARS10b (05), implementation									
	Diagnostic Status: No Diagnostics									
	Scientific Instruments: WFC3/IR									
	Special Requirements: BEFORE 01-SEP-2016									

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]	

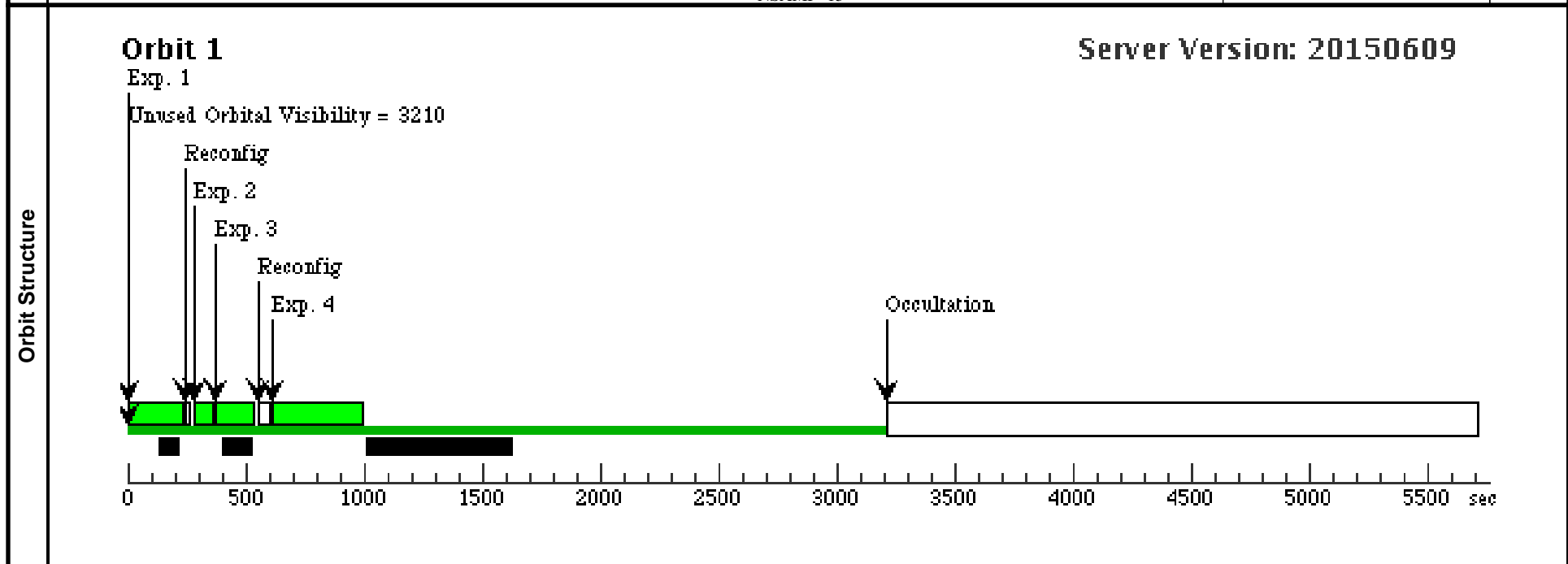


Proposal 14375 - SPARS10c (06) - WFC3 IR Linearity Monitor

Sat Oct 17 01:13:24 GMT 2015

Visit	Proposal 14375, SPARS10c (06), implementation									
	Diagnostic Status: No Diagnostics									
	Scientific Instruments: WFC3/IR									
	Special Requirements: BEFORE 01-SEP-2016									

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]	

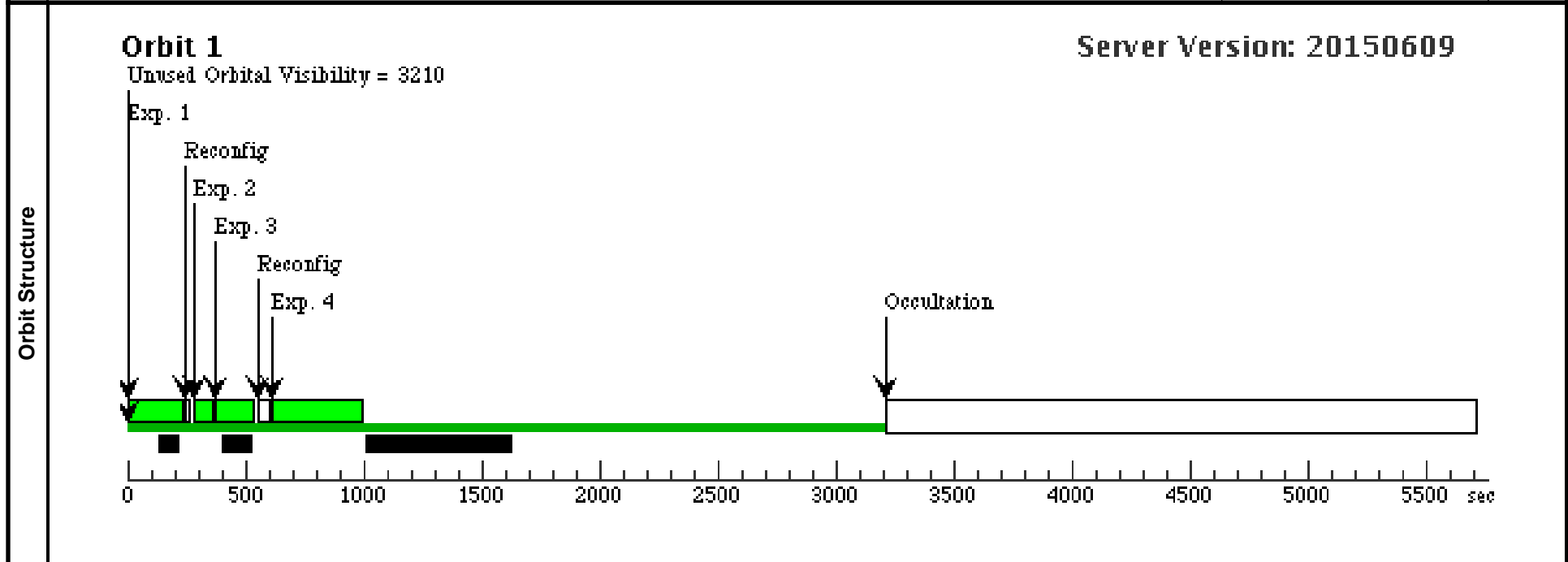


Proposal 14375 - SPARS10d (07) - WFC3 IR Linearity Monitor

Sat Oct 17 01:13:24 GMT 2015

Visit	Proposal 14375, SPARS10d (07), implementation								
	Diagnostic Status: No Diagnostics								
	Scientific Instruments: WFC3/IR								
	Special Requirements: BEFORE 01-SEP-2016								

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]	



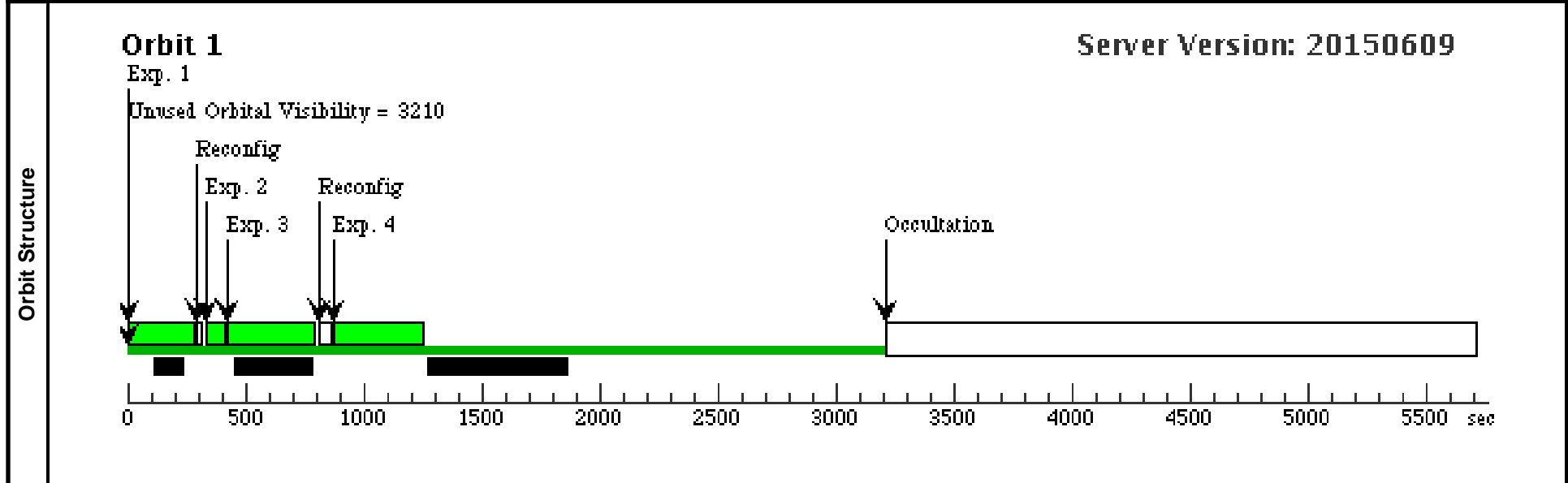
Proposal 14375 - SPARS25d (08) - WFC3 IR Linearity Monitor

Sat Oct 17 01:13:24 GMT 2015

Visit	Proposal 14375, SPARS25d (08), implementation Diagnostic Status: Warning Scientific Instruments: WFC3/IR Special Requirements: BEFORE 01-SEP-2016

Diagnostics	(SPARS25d (08)) Warning (Orbit Planner): MAXIMUM DURATION EXCEEDED FOR INTERNAL OR EARTH CALIB SU
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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]



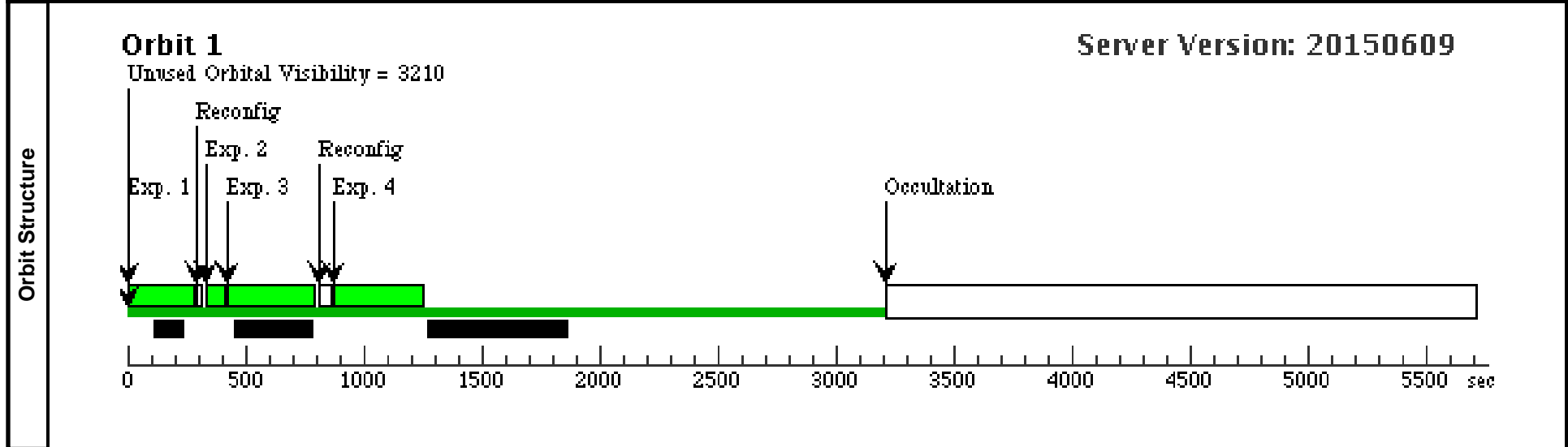
Proposal 14375 - SPARS25e (09) - WFC3 IR Linearity Monitor

Sat Oct 17 01:13:24 GMT 2015

Visit	Proposal 14375, SPARS25e (09), implementation Diagnostic Status: Warning Scientific Instruments: WFC3/IR Special Requirements: BEFORE 01-SEP-2016

Diagnostics	(SPARS25e (09)) Warning (Orbit Planner): MAXIMUM DURATION EXCEEDED FOR INTERNAL OR EARTH CALIB SU
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#	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]



Proposal 14375 - SPARS25f (10) - WFC3 IR Linearity Monitor

Sat Oct 17 01:13:24 GMT 2015

Visit	Proposal 14375, SPARS25f (10), implementation Diagnostic Status: Warning Scientific Instruments: WFC3/IR Special Requirements: BEFORE 01-SEP-2016

Diagnostics	(SPARS25f (10)) Warning (Orbit Planner): MAXIMUM DURATION EXCEEDED FOR INTERNAL OR EARTH CALIB SU
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#	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]

