



12087 - WFC3 IR subarray anomaly

Cycle: 17, 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	S/C WFC3/IR	1	01-Mar-2010 21:20:46.0	yes
02	DARK	S/C WFC3/IR	1	01-Mar-2010 21:20:50.0	yes
11	DARK	S/C WFC3/IR	1	01-Mar-2010 21:20:53.0	yes
12	DARK	S/C WFC3/IR	1	01-Mar-2010 21:20:56.0	yes
21	DARK	S/C WFC3/IR	1	01-Mar-2010 21:20:59.0	yes
22	DARK	S/C WFC3/IR	1	01-Mar-2010 21:21:01.0	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>
31	DARK	S/C WFC3/IR	1	01-Mar-2010 21:21:04.0	yes
32	DARK	S/C WFC3/IR	1	01-Mar-2010 21:21:06.0	yes

8 Total Orbits Used

ABSTRACT

Certain combinations of WFC3 IR subarray size and sample sequence yield images that show a sharp change in background level that exactly bisects each detector amplifier quadrant. The change in level has an amplitude of a few DN per pixel. The cause of this anomaly and its apparent correlation with subarray size and sample sequence is not understood. Given the 4 available subarray sizes and 11 available readout sample sequences, there are a total of 44 possible subarray mode readout combinations. To date, 14 of those combinations have been used on-orbit in either calibration and GO programs. Of those, 3 combinations show the anomaly. This program will obtain IR dark exposures in the remaining 30 readout combinations that have not yet been explored. This will add to our knowledge of which combinations show the anomaly and will therefore help us to understand its origin.

OBSERVING DESCRIPTION

All of the WFC3/IR dark exposures can be obtained as pure parallels with other instruments. The number of samples obtained in each exposure is kept low enough to minimize total exposure time (and hence the number of orbits required), while also being large enough to obtain sufficient dark signal and at least 2 evenly spaced sample times for the STEP sequences. This keeps the exposure durations short enough to allow two or more exposures to fit within the nominal ~30 window allowed for internals during the occultation portion of orbits. The exposures are packed as efficiently as possible within the 30 minute windows. Obtaining one exposure for each of the 30 readout combinations requires a total of 8 internal-only orbits.

CALIBRATION JUSTIFICATION

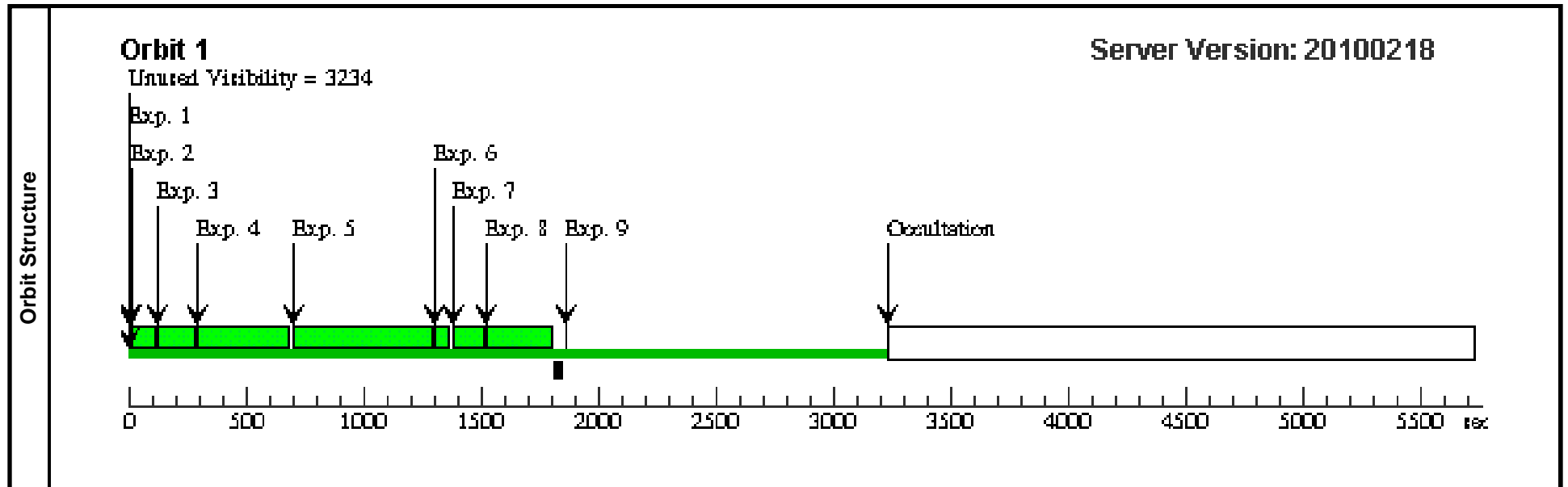
Signal jumps in the background of science images taken in the affected subarray modes will lead to errors in photometry of sources within the field. This anomaly therefore needs to be understood so that a potential fix can be determined. It is likely to be an error in the detector readout timing patterns for at least some of the subarray modes. Knowing which combinations of subarray size and sample sequence are affected will help to determine the underlying source of the anomaly.

Proposal 12087 - Visit 01 - WFC3 IR subarray anomaly

Visit	<p>Proposal 12087, Visit 01 Diagnostic Status: Warning Scientific Instruments: WFC3/IR, S/C Special Requirements: PARALLEL <i>Comments: SO64 with SPARS and STEP.</i></p>	<p>Tue Mar 02 02:21:09 GMT 2010</p>
Diagnostics	<p>(Visit 01) Warning (Orbit Planner): MAXIMUM DURATION EXCEEDED FOR INTERNAL OR EARTH CALIB SU</p>	

Proposal 12087 - Visit 01 - WFC3 IR subarray anomaly

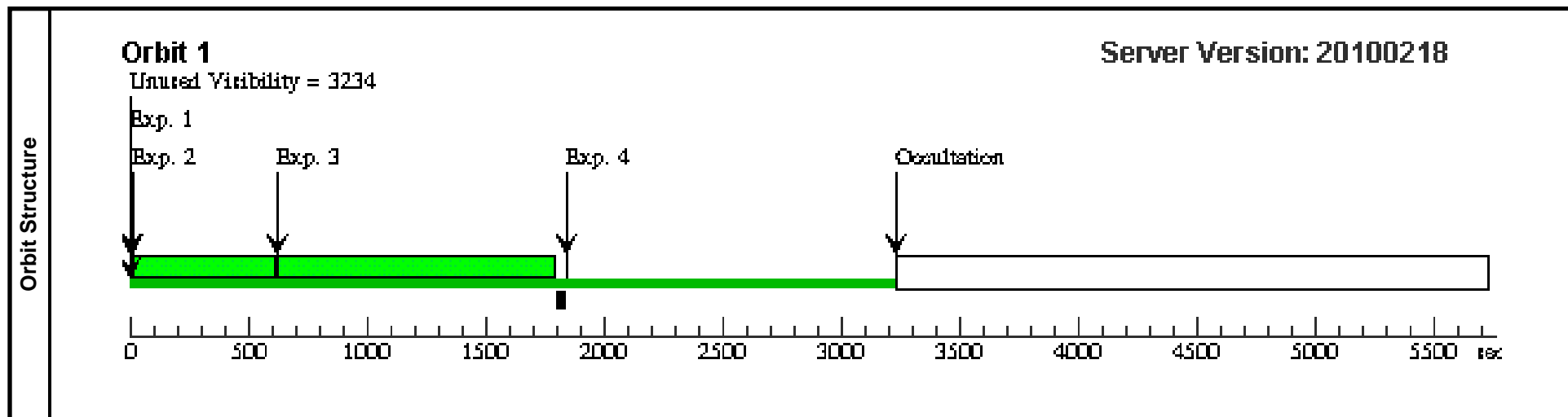
#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
Exposures	1	S/C-IROCC DARK	S/C, DATA, NONE			SPEC COM INSTR RIHDTUOD; QASISTATES WFC 3 SI OBSERVE OBSERVE; QASISTATES WFC 3 DET HOLD IROCC	Sequence 1-9 Non-Int	10 Secs [==>]	[1]
	2	SQ64: SPA RS10 DARK	WFC3/IR, MULTIACCUM, IRSUB64-FIX	BLANK	SAMP-SEQ=SPARS 10; NSAMP=11		Sequence 1-9 Non-Int	[==>]	[1]
	3	SQ64: SPA RS25 DARK	WFC3/IR, MULTIACCUM, IRSUB64-FIX	BLANK	SAMP-SEQ=SPARS 25; NSAMP=8		Sequence 1-9 Non-Int	[==>]	[1]
	4	SQ64: SPA RS100 DARK	WFC3/IR, MULTIACCUM, IRSUB64-FIX	BLANK	SAMP-SEQ=SPARS 100; NSAMP=5		Sequence 1-9 Non-Int	[==>]	[1]
	5	SQ64: SPA RS200 DARK	WFC3/IR, MULTIACCUM, IRSUB64-FIX	BLANK	SAMP-SEQ=SPARS 200; NSAMP=4		Sequence 1-9 Non-Int	[==>]	[1]
	6	SQ64: STEP 25 DARK	WFC3/IR, MULTIACCUM, IRSUB64-FIX	BLANK	SAMP-SEQ=STEP2 5; NSAMP=7		Sequence 1-9 Non-Int	[==>]	[1]
	7	SQ64: STEP 50 DARK	WFC3/IR, MULTIACCUM, IRSUB64-FIX	BLANK	SAMP-SEQ=STEP5 0; NSAMP=8		Sequence 1-9 Non-Int	[==>]	[1]
	8	SQ64: STEP 100 DARK	WFC3/IR, MULTIACCUM, IRSUB64-FIX	BLANK	SAMP-SEQ=STEP1 00; NSAMP=9		Sequence 1-9 Non-Int	[==>]	[1]
	9	S/C-HOLD DARK	S/C, DATA, NONE			SPEC COM INSTR RIUOTHDD; NEW ALIGNMENT ; QASISTATES WFC 3 SI OBSERVE OBSERVE; QASISTATES WFC 3 DET IROCC HOLD	Sequence 1-9 Non-Int	10 Secs [==>]	[1]



Proposal 12087 - Visit 02 - WFC3 IR subarray anomaly

Tue Mar 02 02:21:10 GMT 2010

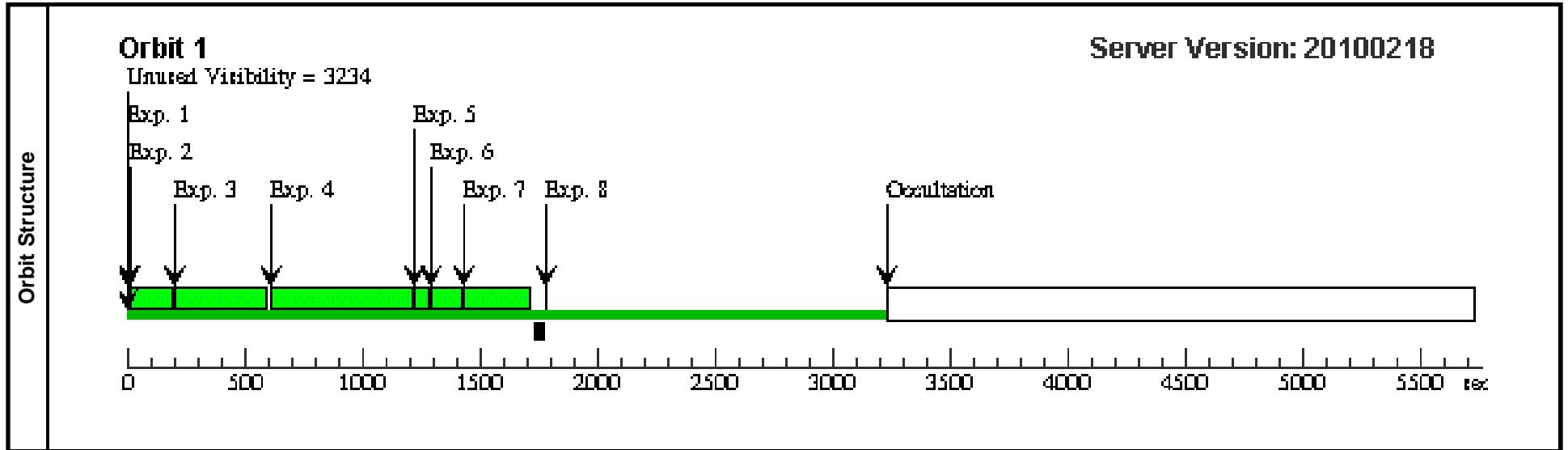
Visit	Proposal 12087, Visit 02 Diagnostic Status: Warning Scientific Instruments: WFC3/IR, S/C Special Requirements: PARALLEL <i>Comments: SQ64 with STEP200 and STEP400.</i>										
	Diagnostics	(Visit 02) Warning (Orbit Planner): MAXIMUM DURATION EXCEEDED FOR INTERNAL OR EARTH CALIB SU									
Exposures		#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1	S/C-IROCC	DARK	S/C, DATA, NONE				SPEC COM INSTR RIHDTUOD; QASISTATES WFC 3 SI OBSERVE OBSERVE; QASISTATES WFC 3 DET HOLD IROCC	Sequence 1-4 Non-Int	10 Secs [==>]	[1]
	2	SQ64: STEP 200	DARK	WFC3/IR, MULTIACCUM, IRSUB64-FIX	BLANK	SAMP-SEQ=STEP200; NSAMP=10			Sequence 1-4 Non-Int	[==>]	[1]
	3	SQ64: STEP 400	DARK	WFC3/IR, MULTIACCUM, IRSUB64-FIX	BLANK	SAMP-SEQ=STEP400; NSAMP=11			Sequence 1-4 Non-Int	[==>]	[1]
	4	S/C-HOLD	DARK	S/C, DATA, NONE				SPEC COM INSTR RIUOTHDD; NEW ALIGNMENT ; QASISTATES WFC 3 SI OBSERVE OBSERVE; QASISTATES WFC 3 DET IROCC HOLD	Sequence 1-4 Non-Int	10 Secs [==>]	[1]



Proposal 12087 - Visit 11 - WFC3 IR subarray anomaly

Tue Mar 02 02:21:11 GMT 2010

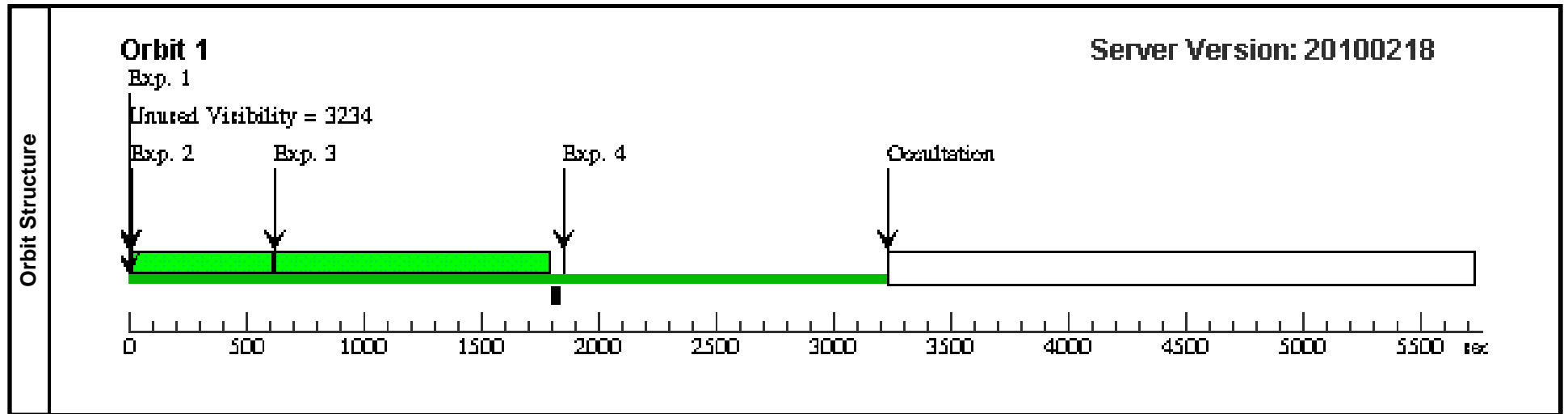
Visit	Proposal 12087, Visit 11										
	Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/IR, S/C Special Requirements: PARALLEL Comments: SQ128 with SPARS and STEP.										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit	
	1	S/C-IROCC	DARK	S/C, DATA, NONE				SPEC COM INSTR RIHDTUOD; QASISTATES WFC 3 SI OBSERVE OBSERVE; QASISTATES WFC 3 DET HOLD IROCC	Sequence 1-8 Non-Int	10 Secs [==>]	[1]
	2	SQ128: SPA RS25	DARK	WFC3/IR, MULTIACCUM, IRSUB128-FIX	BLANK	SAMP-SEQ=SPARS 25; NSAMP=8			Sequence 1-8 Non-Int	[==>]	[1]
	3	SQ128: SPA RS100	DARK	WFC3/IR, MULTIACCUM, IRSUB128-FIX	BLANK	SAMP-SEQ=SPARS 100; NSAMP=5			Sequence 1-8 Non-Int	[==>]	[1]
	4	SQ128: SPA RS200	DARK	WFC3/IR, MULTIACCUM, IRSUB128-FIX	BLANK	SAMP-SEQ=SPARS 200; NSAMP=4			Sequence 1-8 Non-Int	[==>]	[1]
	5	SQ128: STE P25	DARK	WFC3/IR, MULTIACCUM, IRSUB128-FIX	BLANK	SAMP-SEQ=STEP2 5; NSAMP=7			Sequence 1-8 Non-Int	[==>]	[1]
	6	SQ128: STE P50	DARK	WFC3/IR, MULTIACCUM, IRSUB128-FIX	BLANK	SAMP-SEQ=STEP5 0; NSAMP=8			Sequence 1-8 Non-Int	[==>]	[1]
	7	SQ128: STE P100	DARK	WFC3/IR, MULTIACCUM, IRSUB128-FIX	BLANK	SAMP-SEQ=STEP1 00; NSAMP=9			Sequence 1-8 Non-Int	[==>]	[1]
	8	S/C-HOLD	DARK	S/C, DATA, NONE				SPEC COM INSTR RIUOTHDD; NEW ALIGNMENT ; QASISTATES WFC 3 SI OBSERVE OBSERVE; QASISTATES WFC 3 DET IROCC HOLD	Sequence 1-8 Non-Int	10 Secs [==>]	[1]



Proposal 12087 - Visit 12 - WFC3 IR subarray anomaly

Tue Mar 02 02:21:11 GMT 2010

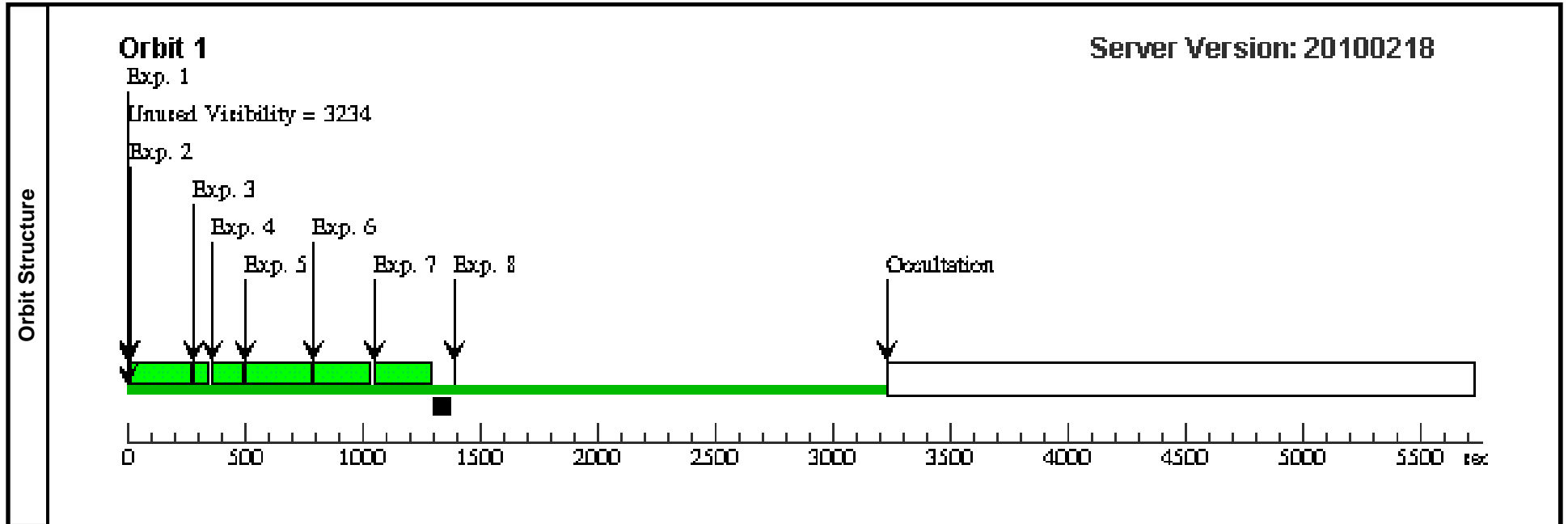
Visit	Proposal 12087, Visit 12 Diagnostic Status: Warning Scientific Instruments: WFC3/IR, S/C Special Requirements: PARALLEL <i>Comments: SQ128 with STEP200 and STEP400.</i>										
	Diagnostics	(Visit 12) Warning (Orbit Planner): MAXIMUM DURATION EXCEEDED FOR INTERNAL OR EARTH CALIB SU									
Exposures		#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1	S/C-IROCC	DARK	S/C, DATA, NONE				SPEC COM INSTR RIHDTUOD; QASISTATES WFC 3 SI OBSERVE OBSERVE; QASISTATES WFC 3 DET HOLD IROCC	Sequence 1-4 Non-Int	10 Secs [==>]	[1]
	2	SQ128: STE P200	DARK	WFC3/IR, MULTIACCUM, IRSUB128-FIX	BLANK	SAMP-SEQ=STEP200; NSAMP=10			Sequence 1-4 Non-Int	[==>]	[1]
	3	SQ128: STE P400	DARK	WFC3/IR, MULTIACCUM, IRSUB128-FIX	BLANK	SAMP-SEQ=STEP400; NSAMP=11			Sequence 1-4 Non-Int	[==>]	[1]
	4	S/C-HOLD	DARK	S/C, DATA, NONE				SPEC COM INSTR RIUOTHDD; NEW ALIGNMENT ; QASISTATES WFC 3 SI OBSERVE OBSERVE; QASISTATES WFC 3 DET IROCC HOLD	Sequence 1-4 Non-Int	10 Secs [==>]	[1]



Proposal 12087 - Visit 21 - WFC3 IR subarray anomaly

Tue Mar 02 02:21:12 GMT 2010

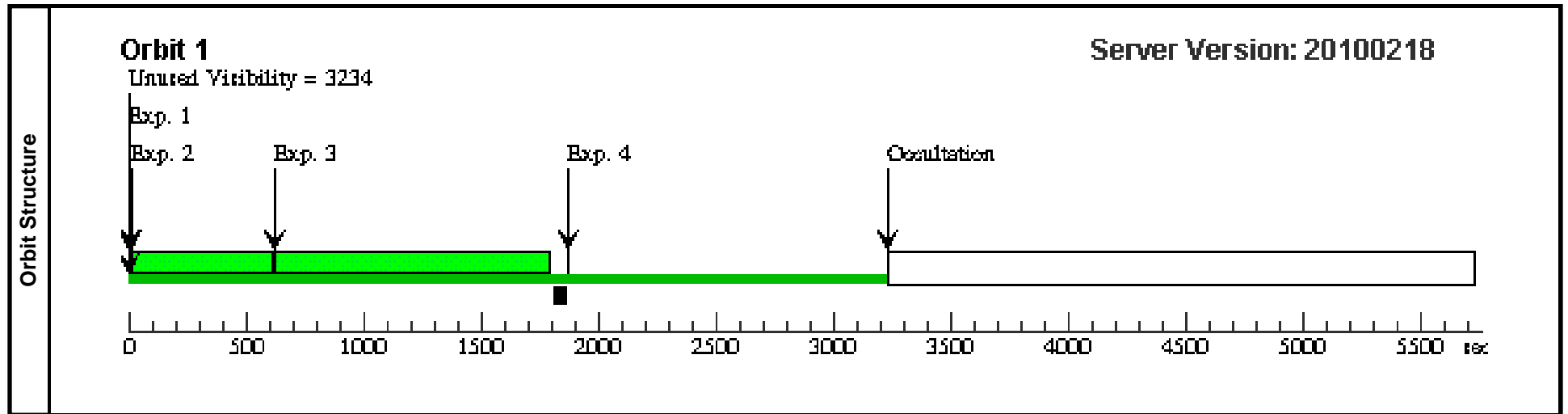
Visit	Proposal 12087, Visit 21										
	Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/IR, S/C Special Requirements: PARALLEL Comments: SQ256 with SPARS and STEP.										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit	
	1	S/C-IROCC	DARK	S/C, DATA, NONE				SPEC COM INSTR RIHDTUOD; QASISTATES WFC 3 SI OBSERVE OBSERVE; QASISTATES WFC 3 DET HOLD IROCC	Sequence 1-8 Non-Int	10 Secs [==>]	[1]
	2	SQ256: SPA RS50	DARK	WFC3/IR, MULTIACCUM, IRSUB256-FIX	BLANK	SAMP-SEQ=SPARS50; NSAMP=6			Sequence 1-8 Non-Int	[==>]	[1]
	3	SQ256: STE P25	DARK	WFC3/IR, MULTIACCUM, IRSUB256-FIX	BLANK	SAMP-SEQ=STEP25; NSAMP=7			Sequence 1-8 Non-Int	[==>]	[1]
	4	SQ256: STE P50	DARK	WFC3/IR, MULTIACCUM, IRSUB256-FIX	BLANK	SAMP-SEQ=STEP50; NSAMP=8			Sequence 1-8 Non-Int	[==>]	[1]
	5	SQ256: STE P100	DARK	WFC3/IR, MULTIACCUM, IRSUB256-FIX	BLANK	SAMP-SEQ=STEP100; NSAMP=9			Sequence 1-8 Non-Int	[==>]	[1]
	6	SQ128: SPA RS50	DARK	WFC3/IR, MULTIACCUM, IRSUB128-FIX	BLANK	SAMP-SEQ=SPARS50; NSAMP=6			Sequence 1-8 Non-Int	[==>]	[1]
	7	SQ64: SPA RS50	DARK	WFC3/IR, MULTIACCUM, IRSUB64-FIX	BLANK	SAMP-SEQ=SPARS50; NSAMP=6			Sequence 1-8 Non-Int	[==>]	[1]
	8	S/C-HOLD	DARK	S/C, DATA, NONE				SPEC COM INSTR RIUOTHDD; NEW ALIGNMENT ; QASISTATES WFC 3 SI OBSERVE OBSERVE; QASISTATES WFC 3 DET IROCC HOLD	Sequence 1-8 Non-Int	10 Secs [==>]	[1]



Proposal 12087 - Visit 22 - WFC3 IR subarray anomaly

Tue Mar 02 02:21:12 GMT 2010

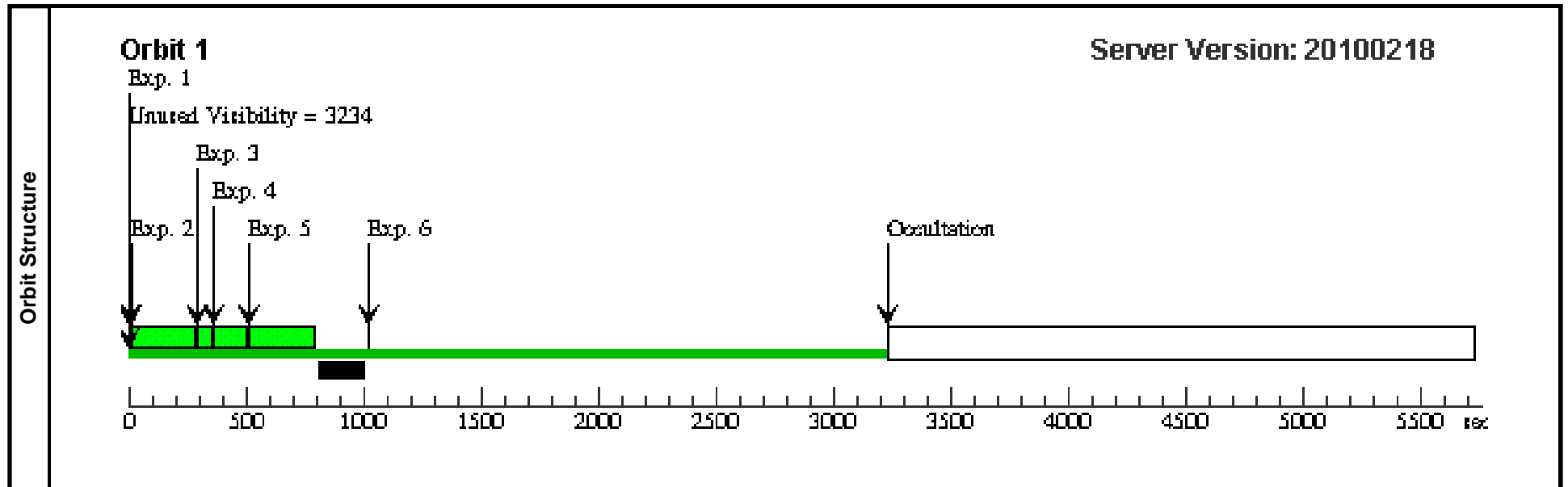
Visit	Proposal 12087, Visit 22 Diagnostic Status: Warning Scientific Instruments: WFC3/IR, S/C Special Requirements: PARALLEL <i>Comments: SQ256 with STEP200 and STEP400.</i>										
	Diagnostics	(Visit 22) Warning (Orbit Planner): MAXIMUM DURATION EXCEEDED FOR INTERNAL OR EARTH CALIB SU									
Exposures		#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1	S/C-IROCC	DARK		S/C, DATA, NONE			SPEC COM INSTR RIHDTUOD; QASISTATES WFC 3 SI OBSERVE OBSERVE; QASISTATES WFC 3 DET HOLD IROCC	Sequence 1-4 Non-Int	10 Secs [==>]	[1]
	2	SQ256: STE P200	DARK		WFC3/IR, MULTIACCUM, IRSUB256-FIX	BLANK	SAMP-SEQ=STEP200; NSAMP=10		Sequence 1-4 Non-Int	[==>]	[1]
	3	SQ256: STE P400	DARK		WFC3/IR, MULTIACCUM, IRSUB256-FIX	BLANK	SAMP-SEQ=STEP400; NSAMP=11		Sequence 1-4 Non-Int	[==>]	[1]
	4	S/C-HOLD	DARK		S/C, DATA, NONE			SPEC COM INSTR RIUOTHDD; NEW ALIGNMENT ; QASISTATES WFC 3 SI OBSERVE OBSERVE; QASISTATES WFC 3 DET IROCC HOLD	Sequence 1-4 Non-Int	10 Secs [==>]	[1]



Proposal 12087 - Visit 31 - WFC3 IR subarray anomaly

Tue Mar 02 02:21:12 GMT 2010

Visit		Proposal 12087, Visit 31 Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/IR, S/C Special Requirements: PARALLEL Comments: SQ512 with SPARS and STEP.									
Exposures		#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
Exposures		1	S/C-IROCC	DARK	S/C, DATA, NONE			SPEC COM INSTR RIHDTUOD; QASISTATES WFC 3 SI OBSERVE OBSERVE; QASISTATES WFC 3 DET HOLD IROCC	Sequence 1-6 Non-Int	10 Secs [==>]	[1]
		2	SQ512: SPA RS50	DARK	WFC3/IR, MULTIACCUM, IRSUB512-FIX	BLANK	SAMP-SEQ=SPARS50; NSAMP=6		Sequence 1-6 Non-Int	[==>]	[1]
		3	SQ512: STE P25	DARK	WFC3/IR, MULTIACCUM, IRSUB512-FIX	BLANK	SAMP-SEQ=STEP25; NSAMP=7		Sequence 1-6 Non-Int	[==>]	[1]
		4	SQ512: STE P50	DARK	WFC3/IR, MULTIACCUM, IRSUB512-FIX	BLANK	SAMP-SEQ=STEP50; NSAMP=8		Sequence 1-6 Non-Int	[==>]	[1]
		5	SQ512: STE P100	DARK	WFC3/IR, MULTIACCUM, IRSUB512-FIX	BLANK	SAMP-SEQ=STEP100; NSAMP=9		Sequence 1-6 Non-Int	[==>]	[1]
		6	S/C-HOLD	DARK	S/C, DATA, NONE			SPEC COM INSTR RIUOTHDD; NEW ALIGNMENT ; QASISTATES WFC 3 SI OBSERVE OBSERVE; QASISTATES WFC 3 DET IROCC HOLD	Sequence 1-6 Non-Int	10 Secs [==>]	[1]



Proposal 12087 - Visit 32 - WFC3 IR subarray anomaly

Tue Mar 02 02:21:13 GMT 2010

Visit	Proposal 12087, Visit 32 Diagnostic Status: Warning Scientific Instruments: WFC3/IR, S/C Special Requirements: PARALLEL <i>Comments: SQ512 with STEP200 and STEP400.</i>										
	Diagnostics	(Visit 32) 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/[Actual Dur.]	Orbit
	1	S/C-IROCC	DARK	S/C, DATA, NONE				SPEC COM INSTR RIHDTUOD; QASISTATES WFC 3 SI OBSERVE OBSERVE; QASISTATES WFC 3 DET HOLD IROCC	Sequence 1-4 Non-Int	10 Secs [==>]	[1]
	2	SQ512: STE P200	DARK	WFC3/IR, MULTIACCUM, IRSUB512-FIX	BLANK	SAMP-SEQ=STEP200; NSAMP=10			Sequence 1-4 Non-Int	[==>]	[1]
	3	SQ512: STE P400	DARK	WFC3/IR, MULTIACCUM, IRSUB512-FIX	BLANK	SAMP-SEQ=STEP400; NSAMP=11			Sequence 1-4 Non-Int	[==>]	[1]
	4	S/C-HOLD	DARK	S/C, DATA, NONE				SPEC COM INSTR RIUOTHDD; NEW ALIGNMENT ; QASISTATES WFC 3 SI OBSERVE OBSERVE; QASISTATES WFC 3 DET IROCC HOLD	Sequence 1-4 Non-Int	10 Secs [==>]	[1]

