



## 17259 - WFC3 UVIS CTE Internal Monitor

Cycle: 30, Proposal Category: CAL/WFC3

(Availability Mode: RESTRICTED)

### INVESTIGATORS

<i>Name</i>	<i>Institution</i>	<i>E-Mail</i>
<b>Dr. Jay Anderson (PI) (Contact)</b>	<b>Space Telescope Science Institute</b>	<b>jayander@stsci.edu</b>
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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	WFC3/UVIS	1	31-Oct-2022 15:00:11.0	yes
02	DARK	WFC3/UVIS	1	31-Oct-2022 15:00:12.0	yes
03	DARK	WFC3/UVIS	1	31-Oct-2022 15:00:12.0	yes
04	DARK	WFC3/UVIS	1	31-Oct-2022 15:00:13.0	yes
05	DARK	WFC3/UVIS	1	31-Oct-2022 15:00:13.0	yes
06	DARK	WFC3/UVIS	1	31-Oct-2022 15:00:13.0	yes
07	DARK	WFC3/UVIS	1	31-Oct-2022 15:00:13.0	yes
08	DARK	WFC3/UVIS	1	31-Oct-2022 15:00:14.0	yes
09	DARK	WFC3/UVIS	1	31-Oct-2022 15:00:14.0	yes
10	DARK	WFC3/UVIS	1	31-Oct-2022 15:00:14.0	yes
11	DARK	WFC3/UVIS	1	31-Oct-2022 15:00:15.0	yes
12	DARK	WFC3/UVIS	1	31-Oct-2022 15:00:15.0	yes
13	DARK	WFC3/UVIS	1	31-Oct-2022 15:00:15.0	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>
14	DARK	WFC3/UVIS	1	31-Oct-2022 15:00:16.0	yes
15	DARK	WFC3/UVIS	1	31-Oct-2022 15:00:16.0	yes

15 Total Orbits Used

## **ABSTRACT**

The goal of his program is to demonstrate a new way to pin the pixel-based CTE model.

We will take a set of ~500s dark exposures with a variety of post-flash levels, from 0e to 30,000e (the maximum possible). Each exposure by design should have the same WPs (warm pixels) before readout, but the various backgrounds will result in different CTE losses for each WP in each exposure. By studying the survival of the electrons in each WP, we can compare the pixel-based model's predictions for losses-vs-WP intensity-vs-background against the results seen in the actual detector. Previous programs have taken sets of short darks and long darks, but there were not always enough WPs in the short darks to make those exposures useful. This was particularly the case at higher background levels where fainter WPs cannot be reliably measured on account of the noise in the background itself. The longer darks employed for all exposure levels here should alleviate these concerns. The current plan is to take a program like this in our routine yearly cal suite.

## **OBSERVING DESCRIPTION**

We take a uniform set of darks with a range of post-flash levels. The goal is to have each dark exposure be ~500s. In practice, the actual achieved darktime will probably be ~503s on account of overheads, but the important thing is that the time be the same for all exposures.

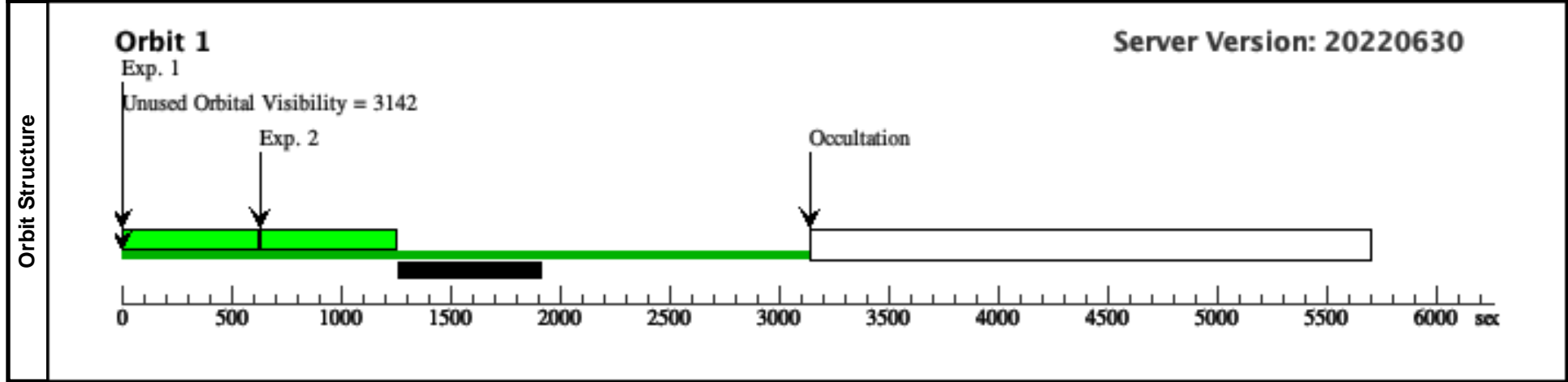
This program involves 15 internal orbits. In each orbit we can take two 500s darks with different background levels via postflash within the 1800s range (readout extends longer). The levels we will probe are: 0e, 1e, 2e, 4e, 7e, 10e, 15e, 20e, 25e, 30e, 40e, 50e, 65e, 80e, 100e, 120e, 150e, 200e, 300e, 500e, 750e, 1000e, 1500e, 2500e, 4000e, 7500e, 10000e, 15000e, 20000e, and, 30000e. The first 22 PF levels can be explored with the standard FLASH requirement, which imparts about 2.5e per second of post-flash, up to a maximum background of 1000e. The remaining 8 PF levels have to be explored with MED current, which imparts 75e per second and can achieve a background of 30,000.

<b>Visit</b>	<b>Proposal 17259, Visit 01</b> <b>Diagnostic Status: Warning</b> Scientific Instruments: WFC3/UVIS Special Requirements: BETWEEN 02-DEC-2022:00:00:00 AND 13-DEC-2022:00:00:00; BETWEEN 28-DEC-2022:00:00:00 AND 10-JAN-2023:00:00:00; BETWEEN 27-JAN-2023:00:00:00 AND 07-FEB-2023:00:00:00; BETWEEN 23-FEB-2023:00:00:00 AND 07-MAR-2023:00:00:00									
	(Visit 01) Warning (Orbit Planner): MAXIMUM DURATION EXCEEDED FOR INTERNAL OR EARTH CALIB SU									
<b>Exposures</b>	<b>#</b>	<b>Label</b>	<b>Target</b>	<b>Config,Mode,Aperture</b>	<b>Spectral Els.</b>	<b>Opt. Params.</b>	<b>Special Reqs.</b>	<b>Groups</b>	<b>Exp. Time (Total)/[Actual Dur.]</b>	<b>Orbit</b>
	1	0e (use 0.1s current to equalize dark times)	DARK	WFC3/UVIS, ACCUM, UVIS-FIX	DEF	FLASHCUR=LOW; FLASHEXP=0.1			499.9 Secs (499.9 Secs) [==>]	[1]
	2	1e = 0.4s L OW	DARK	WFC3/UVIS, ACCUM, UVIS-FIX	DEF	FLASHCUR=LOW; FLASHEXP=0.4			499.6 Secs (499.6 Secs) [==>]	[1]
<b>Orbit Structure</b>	<p><b>Orbit 1</b> Unused Orbital Visibility = 3142</p> <p style="text-align: right;"><b>Server Version: 20220630</b></p>									
	<p>Exp. 1      Exp. 2      Occultation</p> <p>0      500      1000      1500      2000      2500      3000      3500      4000      4500      5000      5500      6000 sec</p>									

<b>Visit</b>	<b>Proposal 17259, Visit 02</b> <b>Diagnostic Status: Warning</b> Scientific Instruments: WFC3/UVIS Special Requirements: AFTER 01 BY 0 D TO 5 D
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<b>Diagnostics</b>	(Visit 02) Warning (Orbit Planner): MAXIMUM DURATION EXCEEDED FOR INTERNAL OR EARTH CALIB SU
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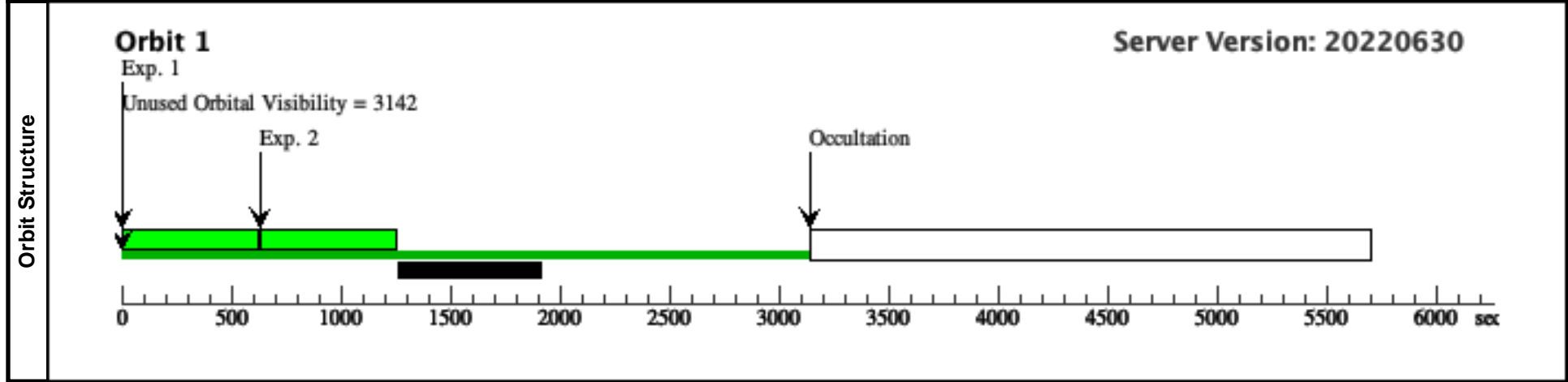
<b>Exposures</b>	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	2e = 0.8s L OW	DARK	WFC3/UVIS, ACCUM, UVIS-FIX	DEF	FLASHCUR=LOW; FLASHEXP=0.8			499.2 Secs (499.2 Secs)	[1]
									[==>]	
	2	4e = 1.6s L OW	DARK	WFC3/UVIS, ACCUM, UVIS-FIX	DEF	FLASHCUR=LOW; FLASHEXP=1.6			498.4 Secs (498.4 Secs)	[1]
									[==>]	



<b>Visit</b>	<b>Proposal 17259, Visit 03</b> <b>Diagnostic Status: Warning</b> Scientific Instruments: WFC3/UVIS Special Requirements: AFTER 01 BY 0 D TO 5 D
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<b>Diagnostics</b>	(Visit 03) Warning (Orbit Planner): MAXIMUM DURATION EXCEEDED FOR INTERNAL OR EARTH CALIB SU
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<b>Exposures</b>	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	7e = 2.8s L OW	DARK	WFC3/UVIS, ACCUM, UVIS-FIX	DEF	FLASHCUR=LOW; FLASHEXP=2.8			497.2 Secs (497.2 Secs) [==>]	[1]
	2	10e = 4s LO W	DARK	WFC3/UVIS, ACCUM, UVIS-FIX	DEF	FLASHCUR=LOW; FLASHEXP=4.0			496.0 Secs (496 Secs) [==>]	[1]



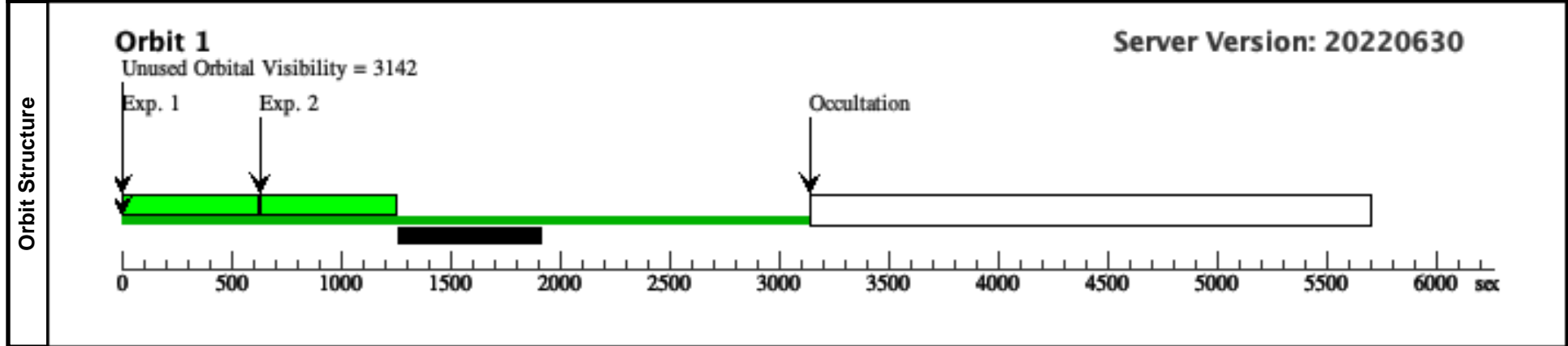
Proposal 17259 - Visit 04 - WFC3 UVIS CTE Internal Monitor

Mon Oct 31 19:00:16 GMT 2022

<b>Visit</b>	<b>Proposal 17259, Visit 04</b> <b>Diagnostic Status: Warning</b> Scientific Instruments: WFC3/UVIS Special Requirements: AFTER 01 BY 0 D TO 5 D
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<b>Diagnostics</b>	(Visit 04) Warning (Orbit Planner): MAXIMUM DURATION EXCEEDED FOR INTERNAL OR EARTH CALIB SU
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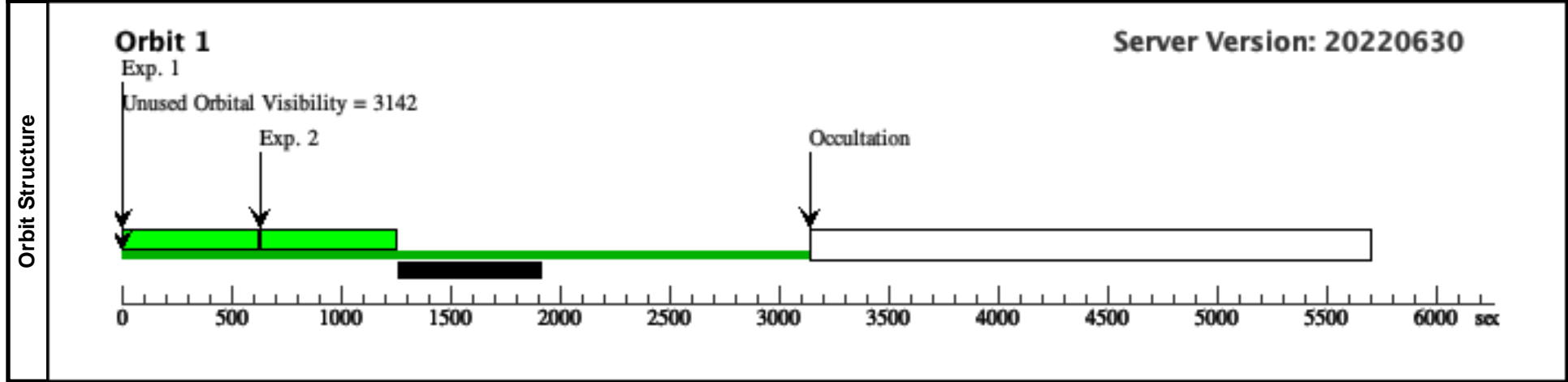
<b>Exposures</b>	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	15e = 6s LO W	DARK	WFC3/UVIS, ACCUM, UVIS-FIX	DEF	FLASHCUR=LOW; FLASHEXP=6.0			494.0 Secs (494 Secs)	
									[=>]	[1]
	2	20e = 8s LO W	DARK	WFC3/UVIS, ACCUM, UVIS-FIX	DEF	FLASHCUR=LOW; FLASHEXP=8.0			492.0 Secs (492 Secs)	
									[=>]	[1]



<b>Visit</b>	<b>Proposal 17259, Visit 05</b> <b>Diagnostic Status: Warning</b> Scientific Instruments: WFC3/UVIS Special Requirements: AFTER 01 BY 0 D TO 5 D
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<b>Diagnostics</b>	(Visit 05) Warning (Orbit Planner): MAXIMUM DURATION EXCEEDED FOR INTERNAL OR EARTH CALIB SU
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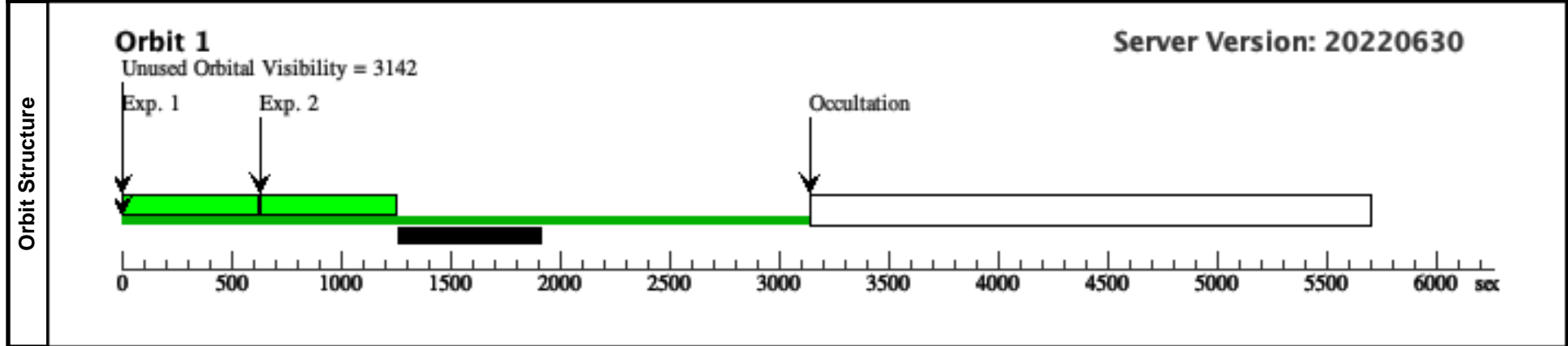
<b>Exposures</b>	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	25e = 10.0s LOW	DARK	WFC3/UVIS, ACCUM, UVIS-FIX	DEF	FLASHCUR=LOW; FLASHEXP=10.0			490.0 Secs (490 Secs)	[1]
									[==>]	
	2	30e = 12s L OW	DARK	WFC3/UVIS, ACCUM, UVIS-FIX	DEF	FLASHCUR=LOW; FLASHEXP=12.0			488.0 Secs (488 Secs)	[1]
									[==>]	



<b>Visit</b>	<b>Proposal 17259, Visit 06</b> <b>Diagnostic Status: Warning</b> Scientific Instruments: WFC3/UVIS Special Requirements: AFTER 01 BY 0 D TO 5 D
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<b>Diagnostics</b>	(Visit 06) Warning (Orbit Planner): MAXIMUM DURATION EXCEEDED FOR INTERNAL OR EARTH CALIB SU
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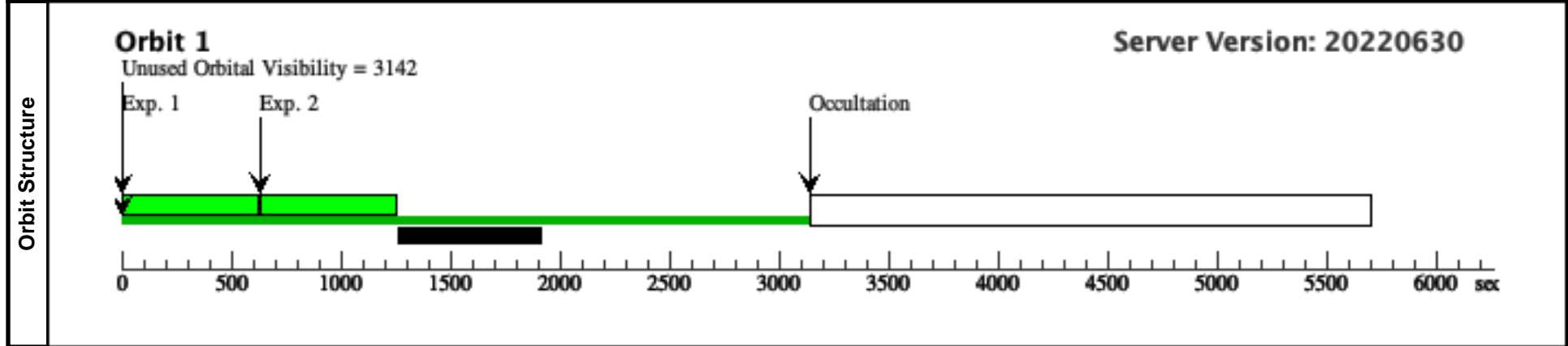
<b>Exposures</b>	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	40e = 16s L OW	DARK	WFC3/UVIS, ACCUM, UVIS-FIX	DEF	FLASHCUR=LOW; FLASHEXP=16.0			484.0 Secs (484 Secs)	[1]
									[==>]	
	2	50e = 20s L OW	DARK	WFC3/UVIS, ACCUM, UVIS-FIX	DEF	FLASHCUR=LOW; FLASHEXP=20.0			480.0 Secs (480 Secs)	[1]
									[==>]	



<b>Visit</b>	<b>Proposal 17259, Visit 07</b> <b>Diagnostic Status: Warning</b> Scientific Instruments: WFC3/UVIS Special Requirements: AFTER 01 BY 0 D TO 5 D
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<b>Diagnostics</b>	(Visit 07) Warning (Orbit Planner): MAXIMUM DURATION EXCEEDED FOR INTERNAL OR EARTH CALIB SU
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<b>Exposures</b>	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	65e = 26s L OW	DARK	WFC3/UVIS, ACCUM, UVIS-FIX	DEF	FLASHCUR=LOW; FLASHEXP=26.0			474.0 Secs (474 Secs)	[1]
									[=>]	
	2	80e = 32s L OW	DARK	WFC3/UVIS, ACCUM, UVIS-FIX	DEF	FLASHCUR=LOW; FLASHEXP=32.0			468.0 Secs (468 Secs)	[1]
									[=>]	

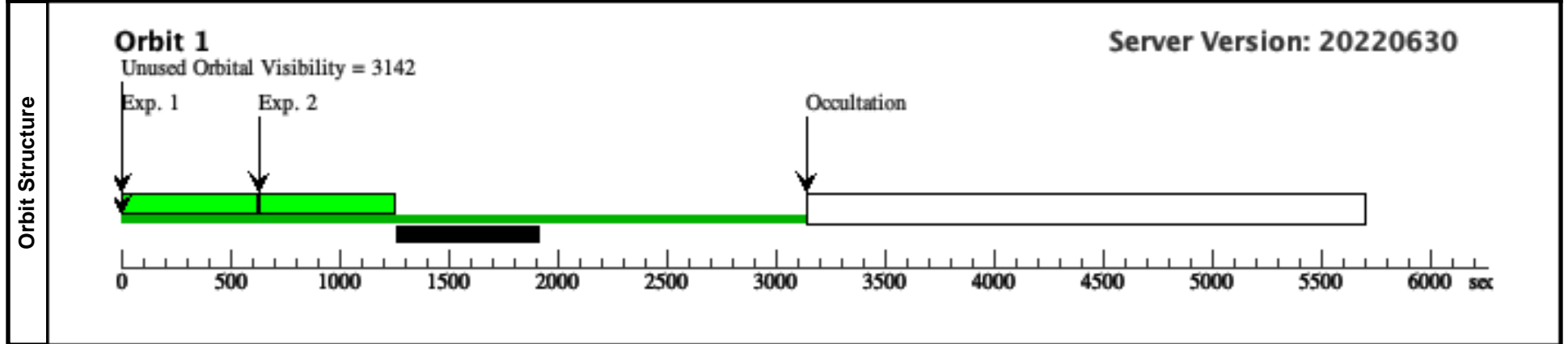


<b>Visit</b>	Proposal 17259, Visit 08 Diagnostic Status: Warning Scientific Instruments: WFC3/UVIS Special Requirements: AFTER 01 BY 0 D TO 5 D									
	(Visit 08) Warning (Orbit Planner): MAXIMUM DURATION EXCEEDED FOR INTERNAL OR EARTH CALIB SU									
<b>Exposures</b>	<b>#</b>	<b>Label</b>	<b>Target</b>	<b>Config,Mode,Aperture</b>	<b>Spectral Els.</b>	<b>Opt. Params.</b>	<b>Special Reqs.</b>	<b>Groups</b>	<b>Exp. Time (Total)/[Actual Dur.]</b>	<b>Orbit</b>
	1	100e = 40s LOW	DARK	WFC3/UVIS, ACCUM, UVIS-FIX	DEF	FLASHCUR=LOW; FLASHEXP=40.0			460.0 Secs (460 Secs)	
									[==>]	[1]
	2	120e = 48s LOW	DARK	WFC3/UVIS, ACCUM, UVIS-FIX	DEF	FLASHCUR=LOW; FLASHEXP=48.0			452.0 Secs (452 Secs)	
								[==>]	[1]	
<b>Orbit Structure</b>	<p><b>Orbit 1</b> <span style="float: right;"><b>Server Version: 20220630</b></span></p> <p>Exp. 1</p> <p>Unused Orbital Visibility = 3142</p> <p>Exp. 2</p> <p>Occultation</p> <p>0 500 1000 1500 2000 2500 3000 3500 4000 4500 5000 5500 6000 sec</p>									
	Detailed description of the Orbit Structure timeline <p>The timeline shows two exposure periods (green bars) starting at 0 seconds. The first exposure (Exp. 1) ends at approximately 1200 seconds. The second exposure (Exp. 2) starts at approximately 600 seconds and ends at approximately 1200 seconds. A black bar below the green bars indicates a period of 'Unused Orbital Visibility' from approximately 1200 to 1900 seconds. An 'Occultation' period (white bar) begins at approximately 3100 seconds and ends at approximately 5700 seconds.</p>									

<b>Visit</b>	<b>Proposal 17259, Visit 09</b> <b>Diagnostic Status: Warning</b> Scientific Instruments: WFC3/UVIS Special Requirements: AFTER 01 BY 0 D TO 5 D
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<b>Diagnostics</b>	(Visit 09) Warning (Orbit Planner): MAXIMUM DURATION EXCEEDED FOR INTERNAL OR EARTH CALIB SU
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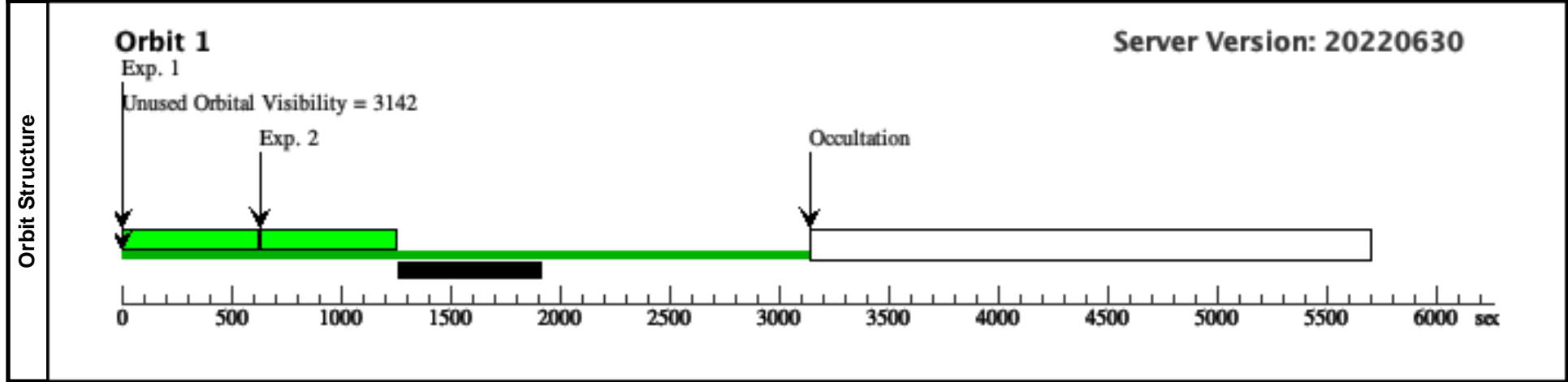
<b>Exposures</b>	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	150e = 60s LOW	DARK	WFC3/UVIS, ACCUM, UVIS-FIX	DEF	FLASHCUR=LOW; FLASHEXP=60.0			440.0 Secs (440 Secs)	[1]
									[=>]	
	2	200e = 80s LOW	DARK	WFC3/UVIS, ACCUM, UVIS-FIX	DEF	FLASHCUR=LOW; FLASHEXP=80.0			420.0 Secs (420 Secs)	[1]
									[=>]	



<b>Visit</b>	<b>Proposal 17259, Visit 10</b> <b>Diagnostic Status: Warning</b> Scientific Instruments: WFC3/UVIS Special Requirements: AFTER 01 BY 0 D TO 5 D
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<b>Diagnostics</b>	(Visit 10) Warning (Orbit Planner): MAXIMUM DURATION EXCEEDED FOR INTERNAL OR EARTH CALIB SU
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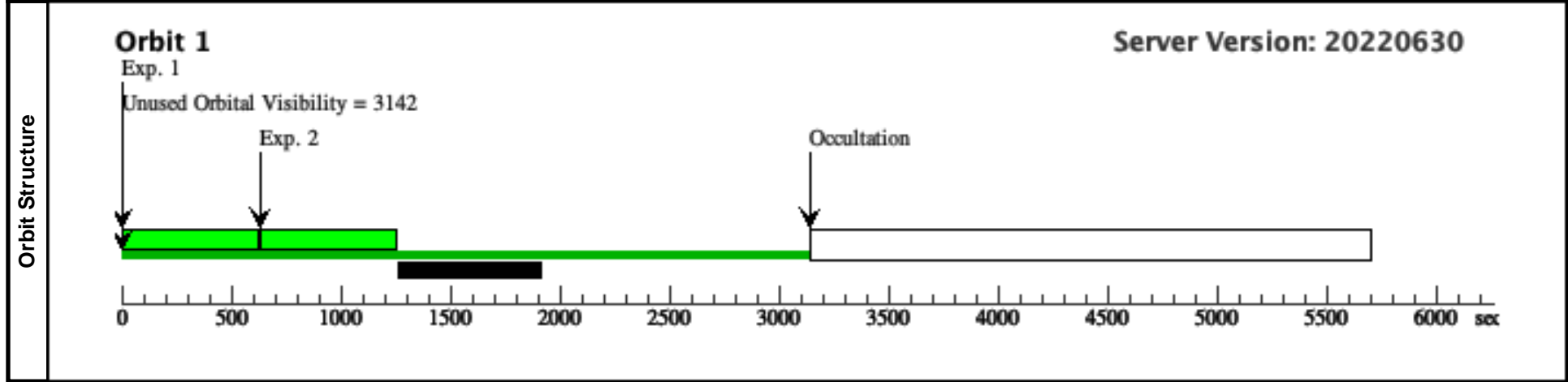
<b>Exposures</b>	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	300e = 120s LOW	DARK	WFC3/UVIS, ACCUM, UVIS-FIX	DEF	FLASHCUR=LOW; FLASHEXP=120.0			380.0 Secs (380 Secs) [==>]	[1]
	2	500e = 200s LOW	DARK	WFC3/UVIS, ACCUM, UVIS-FIX	DEF	FLASHCUR=LOW; FLASHEXP=200.0			300.0 Secs (300 Secs) [==>]	[1]



<b>Visit</b>	Proposal 17259, Visit 11 <b>Diagnostic Status: Warning</b> Scientific Instruments: WFC3/UVIS Special Requirements: AFTER 01 BY 0 D TO 5 D
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<b>Diagnostics</b>	(Visit 11) 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	750e = 300s LOW	DARK	WFC3/UVIS, ACCUM, UVIS-FIX	DEF	FLASHCUR=LOW; FLASHEXP=300.0			200.0 Secs (200 Secs) [==>]	[1]
2	1000e = 400s LOW	DARK	WFC3/UVIS, ACCUM, UVIS-FIX	DEF	FLASHCUR=LOW; FLASHEXP=400.0			100.0 Secs (100 Secs) [==>]	[1]



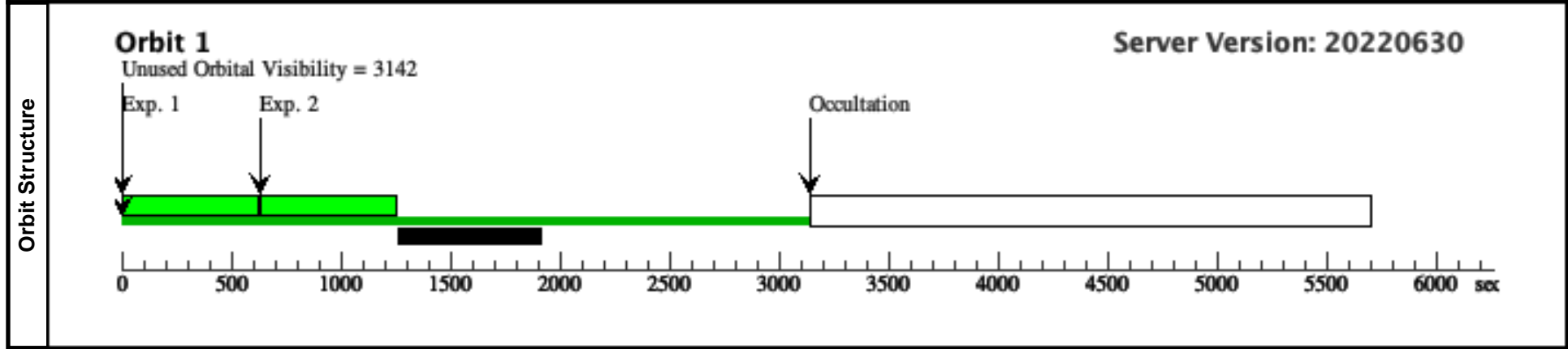
<b>Visit</b>	Proposal 17259, Visit 12 <b>Diagnostic Status: Warning</b> Scientific Instruments: WFC3/UVIS Special Requirements: AFTER 01 BY 0 D TO 5 D									
	(Visit 12) Warning (Orbit Planner): MAXIMUM DURATION EXCEEDED FOR INTERNAL OR EARTH CALIB SU									
<b>Exposures</b>	<b>#</b>	<b>Label</b>	<b>Target</b>	<b>Config,Mode,Aperture</b>	<b>Spectral Els.</b>	<b>Opt. Params.</b>	<b>Special Reqs.</b>	<b>Groups</b>	<b>Exp. Time (Total)/[Actual Dur.]</b>	<b>Orbit</b>
	1	1500e = 20s MED	DARK	WFC3/UVIS, ACCUM, UVIS-FIX	DEF	FLASHCUR=MEDI UM;			480.0 Secs (480 Secs)	
						FLASHEXP=20.0			[==>]	[1]
	2	2500e = 33. 3s MED	DARK	WFC3/UVIS, ACCUM, UVIS-FIX	DEF	FLASHCUR=MEDI UM;			466.7 Secs (466.7 Secs)	
					FLASHEXP=33.3			[==>]	[1]	
<b>Orbit Structure</b>	<b>Orbit 1</b> Exp. 1 Unused Orbital Visibility = 3142 Exp. 2 Occultation Server Version: 20220630									

<b>Visit</b>	Proposal 17259, Visit 13 <b>Diagnostic Status: Warning</b> Scientific Instruments: WFC3/UVIS Special Requirements: AFTER 01 BY 0 D TO 5 D										
	(Visit 13) Warning (Orbit Planner): MAXIMUM DURATION EXCEEDED FOR INTERNAL OR EARTH CALIB SU										
<b>Exposures</b>	<b>#</b>	<b>Label</b>	<b>Target</b>	<b>Config,Mode,Aperture</b>	<b>Spectral Els.</b>	<b>Opt. Params.</b>	<b>Special Reqs.</b>	<b>Groups</b>	<b>Exp. Time (Total)/[Actual Dur.]</b>		<b>Orbit</b>
	1	4000e = 53. 3s MED	DARK	WFC3/UVIS, ACCUM, UVIS-FIX	DEF	FLASHCUR=MEDI UM;			446.7 Secs (446.7 Secs)		
						FLASHEXP=53.3			[==>]		[1]
	2	7500e = 100 .0s MED	DARK	WFC3/UVIS, ACCUM, UVIS-FIX	DEF	FLASHCUR=MEDI UM;			400.0 Secs (400 Secs)		
					FLASHEXP=100.0				[==>]		[1]
<b>Orbit Structure</b>	<p><b>Orbit 1</b> <span style="float: right;"><b>Server Version: 20220630</b></span></p> <p>Exp. 1 Unused Orbital Visibility = 3142</p> <p>Exp. 2</p> <p>Occultation</p> <p>The diagram shows a timeline from 0 to 6000 seconds. A green bar represents the total exposure duration, starting at 0 and ending at approximately 3142 seconds. A black bar represents the occultation period, starting at approximately 1250 seconds and ending at approximately 1900 seconds. Arrows point to the start of 'Exp. 1' at 0s, 'Exp. 2' at approximately 600s, and 'Occultation' at approximately 3142s.</p>										
	<p>0 500 1000 1500 2000 2500 3000 3500 4000 4500 5000 5500 6000 sec</p>										

<b>Visit</b>	Proposal 17259, Visit 14 <b>Diagnostic Status: Warning</b> Scientific Instruments: WFC3/UVIS Special Requirements: AFTER 01 BY 0 D TO 5 D
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<b>Diagnostics</b>	(Visit 14) 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	10,000e = 1 33.3s MED	DARK	WFC3/UVIS, ACCUM, UVIS-FIX	DEF	FLASHCUR=MEDI UM; FLASHEXP=133.3			366.7 Secs (366.7 Secs) [==>]	[1]
2	15,000e = 2 00s MED	DARK	WFC3/UVIS, ACCUM, UVIS-FIX	DEF	FLASHCUR=MEDI UM; FLASHEXP=200.0			300.0 Secs (300 Secs) [==>]	[1]



<b>Visit</b>	Proposal 17259, Visit 15 Diagnostic Status: Warning Scientific Instruments: WFC3/UVIS Special Requirements: AFTER 01 BY 0 D TO 5 D									
	(Visit 15) Warning (Orbit Planner): MAXIMUM DURATION EXCEEDED FOR INTERNAL OR EARTH CALIB SU									
<b>Exposures</b>	<b>#</b>	<b>Label</b>	<b>Target</b>	<b>Config,Mode,Aperture</b>	<b>Spectral Els.</b>	<b>Opt. Params.</b>	<b>Special Reqs.</b>	<b>Groups</b>	<b>Exp. Time (Total)/[Actual Dur.]</b>	<b>Orbit</b>
	1	20,000e = 2 66.7s MED	DARK	WFC3/UVIS, ACCUM, UVIS-FIX	DEF	FLASHCUR=MEDI UM; FLASHEXP=266.7			233.3 Secs (233.3 Secs) [==>]	[1]
2	30,000e = 4 00s MED	DARK	WFC3/UVIS, ACCUM, UVIS-FIX	DEF	FLASHCUR=MEDI UM; FLASHEXP=400.0			100.0 Secs (100 Secs) [==>]	[1]	
<b>Orbit Structure</b>	<p><b>Orbit 1</b> Unused Orbital Visibility = 3142</p> <p>The diagram shows a timeline for Orbit 1 from 0 to 6000 seconds. Two exposure periods are highlighted in green: Exp. 1 from 0 to approximately 1200 seconds, and Exp. 2 from approximately 600 to 1200 seconds. A black bar representing occultation occurs from approximately 1800 to 2000 seconds. A white bar representing the rest of the orbit extends from approximately 3100 to 5700 seconds. The text 'Occultation' is placed above the black bar.</p>									
	<p style="text-align: right;"><b>Server Version: 20220630</b></p>									