



12607 - Using Hubble to Measure Volatile Abundances and the D/H Ratio in a Bright ToO Comet

Cycle: 19, Proposal Category: GO
(Availability Mode: SUPPORTED)

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	(1) C-2009P1-GARRADD	STIS/CCD STIS/NUV-MAMA	1	14-Jan-2012 21:01:16.0	yes
02	(1) C-2009P1-GARRADD	STIS/CCD STIS/FUV-MAMA	1	14-Jan-2012 21:01:22.0	yes
03	(1) C-2009P1-GARRADD	STIS/CCD STIS/FUV-MAMA	1	14-Jan-2012 21:01:26.0	yes
04	(1) C-2009P1-GARRADD	COS/FUV COS/NUV	1	14-Jan-2012 21:01:30.0	yes

Proposal 12607 (STScI Edit Number: 3, Created: Saturday, January 14, 2012 9:02:37 PM EST) - Overview

<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>
05	(1) C-2009P1-GARRADD	STIS/CCD STIS/NUV-MAMA	1	14-Jan-2012 21:01:35.0	yes
06	(1) C-2009P1-GARRADD	STIS/CCD STIS/FUV-MAMA	1	14-Jan-2012 21:01:40.0	yes
07	(1) C-2009P1-GARRADD	STIS/CCD STIS/FUV-MAMA	1	14-Jan-2012 21:01:43.0	yes
08	(1) C-2009P1-GARRADD	STIS/CCD STIS/FUV-MAMA	1	14-Jan-2012 21:01:47.0	yes
09	(1) C-2009P1-GARRADD	STIS/CCD STIS/NUV-MAMA	1	14-Jan-2012 21:01:51.0	yes
10	(1) C-2009P1-GARRADD (2) GARRADD-OFFSET	STIS/CCD STIS/FUV-MAMA	1	14-Jan-2012 21:01:55.0	yes
11	(3) C-2009P1-GARRADD-NEW	STIS/CCD STIS/NUV-MAMA	1	14-Jan-2012 21:01:59.0	yes
12	(3) C-2009P1-GARRADD-NEW	STIS/CCD STIS/FUV-MAMA	1	14-Jan-2012 21:02:03.0	yes
13	(3) C-2009P1-GARRADD-NEW	STIS/CCD STIS/FUV-MAMA	1	14-Jan-2012 21:02:06.0	yes
14	(3) C-2009P1-GARRADD-NEW	COS/FUV COS/NUV	1	14-Jan-2012 21:02:10.0	yes
15	(3) C-2009P1-GARRADD-NEW	STIS/CCD STIS/NUV-MAMA	1	14-Jan-2012 21:02:14.0	yes
16	(3) C-2009P1-GARRADD-NEW	STIS/CCD STIS/FUV-MAMA	1	14-Jan-2012 21:02:19.0	yes
17	(3) C-2009P1-GARRADD-NEW	STIS/CCD STIS/FUV-MAMA	1	14-Jan-2012 21:02:22.0	yes
18	(3) C-2009P1-GARRADD-NEW	STIS/CCD STIS/FUV-MAMA	1	14-Jan-2012 21:02:25.0	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>
19	(3) C-2009P1-GARRADD-NEW	STIS/CCD STIS/NUV-MAMA	1	14-Jan-2012 21:02:29.0	yes
20	(3) C-2009P1-GARRADD-NEW (4) C-2009P1-GARRADD-NEW-OFFSET	STIS/CCD STIS/FUV-MAMA	1	14-Jan-2012 21:02:32.0	yes

20 Total Orbits Used

ABSTRACT

We propose a 10-orbit program to observe any newly discovered bright comet as a non-disruptive Target of Opportunity during cycle 19.

For a comet whose water production rate meets our basic ToO selection criterion, Hubble observations can be used to measure abundances of three highly volatile species (CO, CO₂, and S₂), providing critical information on the origin and evolution of the comet's nucleus. If the comet additionally has geocentric and heliocentric radial velocities in a favorable range, our Hubble observations will measure atomic deuterium emission, from which we can derive the D/H ratio for comparison to the values measured in other comets and Earth's water. The D/H ratio in cometary water is a key indicator of the role played by comets in the delivery of volatiles to the terrestrial planets. It has been 7 years since a bright comet has been available for Hubble observations, and the statistics suggest we are overdue for another opportunity.

OBSERVING DESCRIPTION

We use our considerable experience observing comets with HST over two decades to define the optimal spectroscopic configurations for our program. We request 2 orbits using STIS/G140L and the 0.2" slit to measure CO 4PG emissions with a spectral resolution of ~5 Å. This will allow us to probe the CO abundance to ~0.3% (SNR=3) for the minimal

comet. If the abundance is higher, or the comet has a larger production rate, the long slit allows a determination of the source of the CO (nucleus vs extended) from the spatial profile. We request 1 additional orbit using COS/G160M, reaching down to an abundance of $\sim 0.1\%$ for the minimal ToO but with no spatial information on the emission, to measure the CO 4PG emissions with a spectral resolution of 0.5 \AA to determine the rotational excitation of the CO. If the comet is more active than the minimal ToO, or if the CO abundance is relatively high, the 3 orbits will provide information on any temporal variation in $Q(\text{CO})$, which provides a test of chemical heterogeneity within the nucleus.

We request 3 orbits using STIS/G230L with the $0.2''$ slit to measure CO Cameron, CS, S2, and OH emissions at $\sim 13 \text{ \AA}$ resolution. Although the CO Cameron bands should be detectable with SNR6 in 1 orbit for our minimal comet and a nominal CO₂ abundance ($\sim 5\%$), 3 orbits would permit a more robust detection (SNR10; Fig 3 shows an example of a 3-orbit sum for 153P/I-Z, which exceeded the ToO criterion by $\sim 3.2\times$). Furthermore, if the comet is bright enough, measurements of CO Cameron emission in multiple orbits will determine whether the CO₂ abundance varies with time, as it did rather dramatically (by a factor of ~ 2) during the EPOXI flyby of 103P/Hartley.

For the observations of D (assuming the comet satisfies the requirements discussed in the next section), we will use STIS/E140H with the $0.2'' \times 6''$ slit. This slit was used successfully to detect D in C/NEAT and provides a five-fold improvement in sensitivity compared to the standard $0.2'' \times 0.2''$ slit. We request 3 orbits to obtain a secure D/H detection, even for our minimal comet (see Fig 4; C/NEAT exceeded our ToO selection criterion by $1.9\times$).

Finally, we request a 1 orbit observation using E140H offset by a large distance from the nucleus, so that we can measure the H Ly- emission in a region of the coma where it is optically thin. From these data we can derive a highly reliable H production rate, which is needed for the D/H ratio. We can also compare $Q(\text{H}_2\text{O})$ derived from this offset measurement to the values derived from the other orbits using OH emission.

In summary, we request a total of 10 orbits to accomplish all the objectives of our program. The *desired* cadence is to have 10 consecutive orbits, if possible, in the following order:

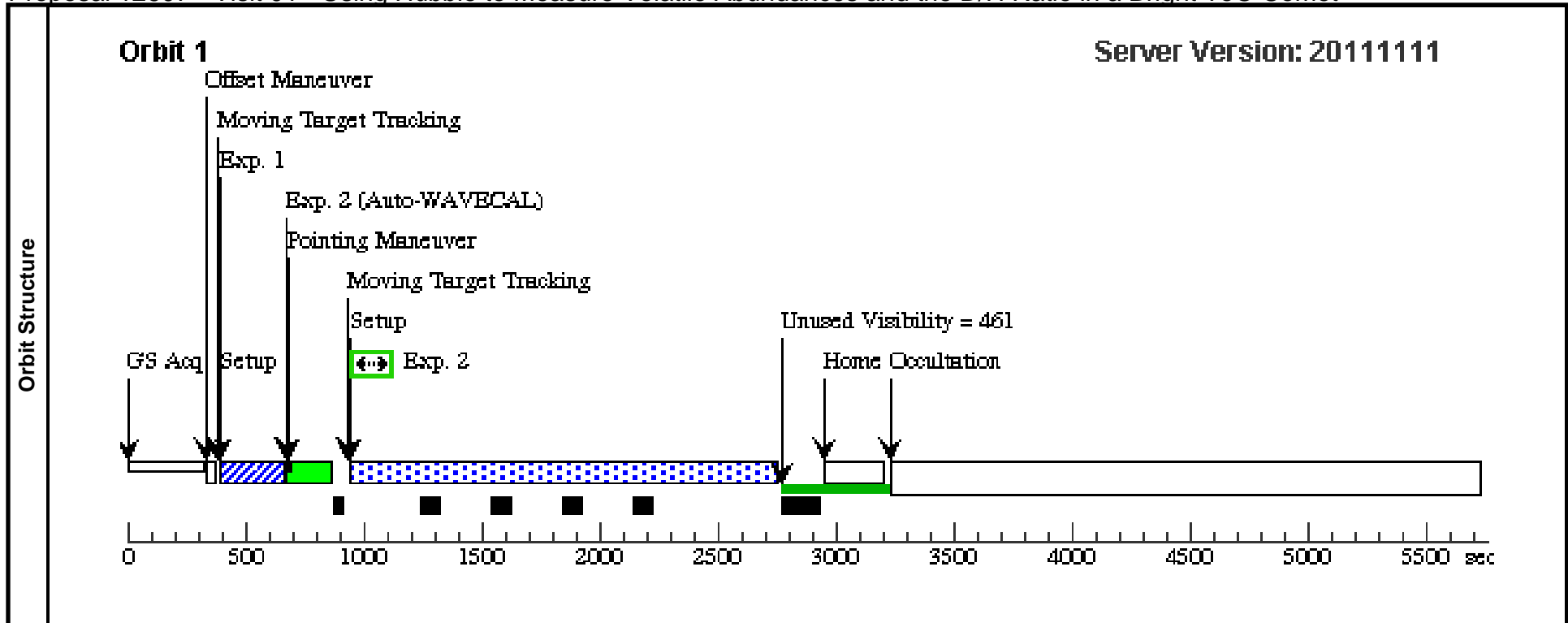
V01 (G230L), V02 (E140H), V03 (G140L), V04 (COS/G160M), V05 (G230L), V06 (E140H), V07 (G140L), V08 (E140H), V09 (G230L), V10 (E140H-OFFSET).

If 10 consecutive orbits aren't available, we'll make do with what we can get.

Proposal 12607 - Visit 01 - Using Hubble to Measure Volatile Abundances and the D/H Ratio in a Bright ToO Comet

Sun Jan 15 02:02:38 GMT 2012

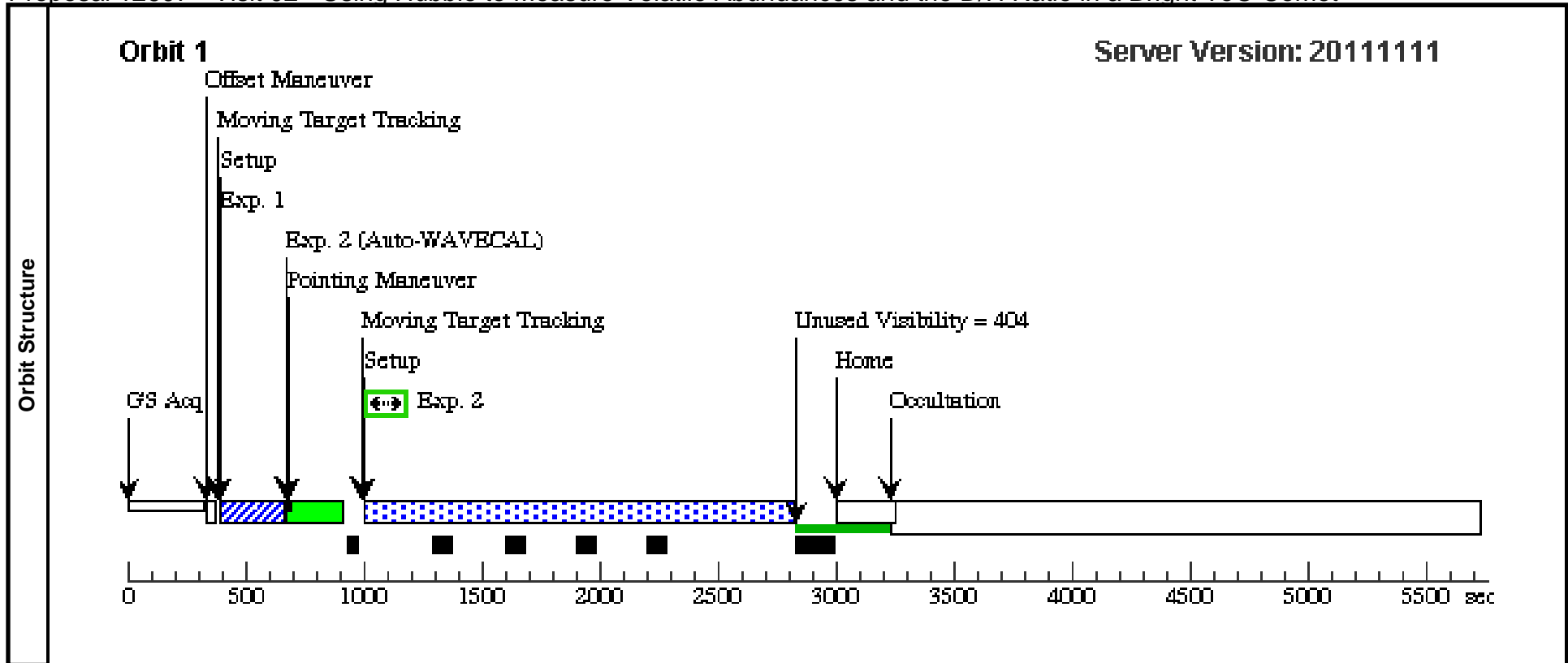
Visit	<p>Proposal 12607, Visit 01, scheduled</p> <p>Diagnostic Status: Warning</p> <p>Scientific Instruments: STIS/CCD, STIS/NUV-MAMA</p> <p>Special Requirements: SEQ 01,02,03,04,05,06,07,08,09,10 WITHIN 2 D</p> <p><i>Comments: G230L orbit</i></p>									
	<p>(Exposure 2 (Visit 01)) Warning (Form): Sensitive exposures should have an ETC run number provided.</p>									
Diagnostics										
Solar System Targets	#	Name	Level 1	Level 2	Level 3	Window	Ephem Center			
	(1)	C-2009P1-GARRADD	TYPE=COMET,Q=1.5505388231217 93,E=1.001060180395493,I=106.1774 779466713,O=325.9980001854605,W =90.74781959207823,T=23-DEC- 2011:04:15:39,TimeScale=TDB,EQ UINOX=J2000,EPOCH=15-JAN- 2012,EpochTimeScale=TDB					EARTH		
<p><i>Comments:</i></p> <p><i>Acquisition Uncertainty: 10 Arcsec</i></p> <p><i>Ephemeris Uncertainty: 3700 Kilometers</i></p>										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(1) C-2009P1-GARRADD	STIS/CCD, ACQ, F28X50LP	MIRROR		REQ EPHEM CORR COMV01		1 Secs [==>]	[1]
2		(1) C-2009P1-GARRADD	STIS/NUV-MAMA, TIME-TAG, 52X0.2	G230L 2376 A		BUFFER-TIME=30 0	REQ EPHEM CORR COMV01	1800 Secs [==>]	[1]	



Proposal 12607 - Visit 02 - Using Hubble to Measure Volatile Abundances and the D/H Ratio in a Bright ToO Comet

Sun Jan 15 02:02:39 GMT 2012

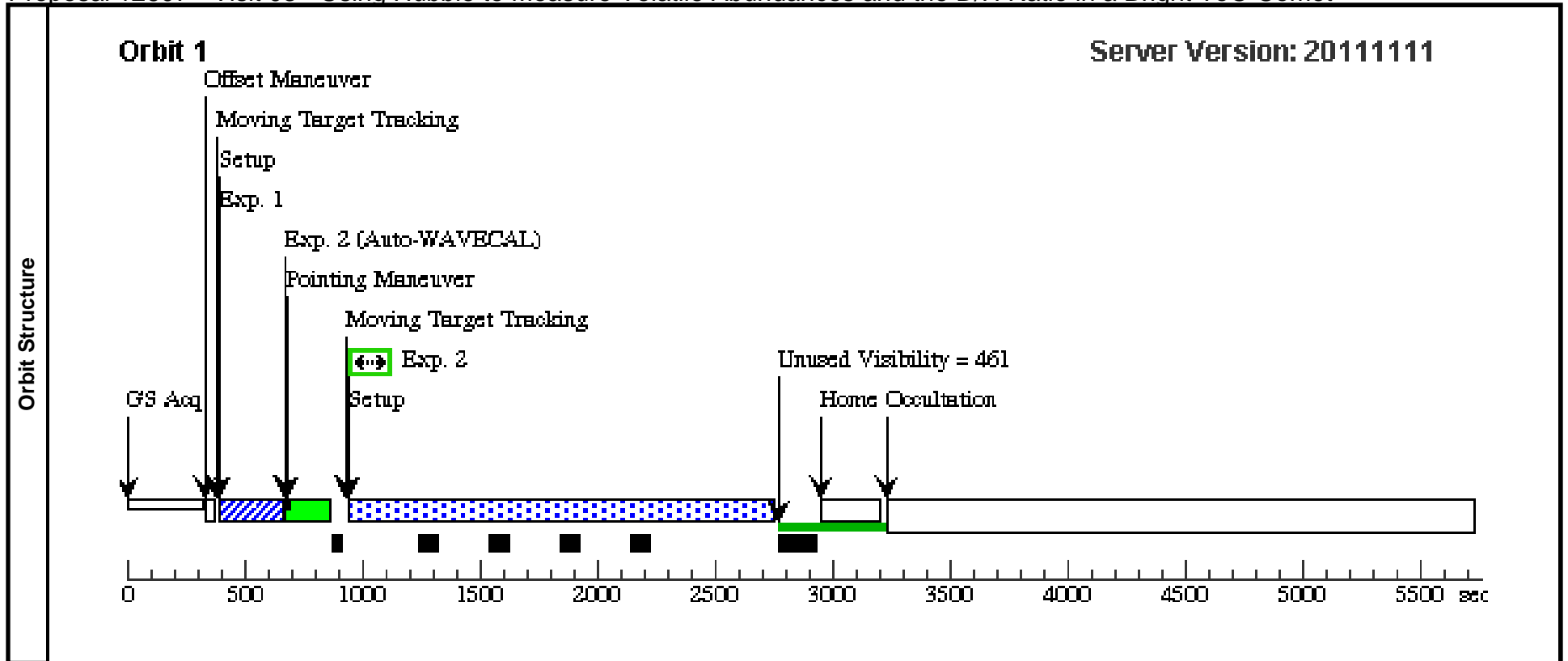
Visit	Proposal 12607, Visit 02, scheduled Diagnostic Status: Warning Scientific Instruments: STIS/CCD, STIS/FUV-MAMA Special Requirements: (none)									
	(Exposure 2 (Visit 02)) Warning (Form): Sensitive exposures should have an ETC run number provided.									
Diagnosics										
Solar System Targets	#	Name	Level 1	Level 2	Level 3	Window	Ephem Center			
	(1)	C-2009P1-GARRADD	TYPE=COMET,Q=1.5505388231217 93,E=1.001060180395493,I=106.1774 779466713,O=325.9980001854605,W =90.74781959207823,T=23-DEC- 2011:04:15:39,TTimeScale=TDB,EQ UINOX=J2000,EPOCH=15-JAN- 2012,EpochTimeScale=TDB					EARTH		
Comments: Acquisition Uncertainty: 10 Arcsec Ephemeris Uncertainty: 3700 Kilometers										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(1) C-2009P1-GARR ADD	STIS/CCD, ACQ, F28X50LP	MIRROR		REQ EPHEM CORR COMV02		1 Secs [==>]	[1]
2		(1) C-2009P1-GARR ADD	STIS/FUV-MAMA, TIME-TAG, 6X0.2	E140H 1234 A		BUFFER-TIME=30 0	REQ EPHEM CORR COMV02	1800 Secs [==>]	[1]	



Proposal 12607 - Visit 03 - Using Hubble to Measure Volatile Abundances and the D/H Ratio in a Bright ToO Comet

Sun Jan 15 02:02:40 GMT 2012

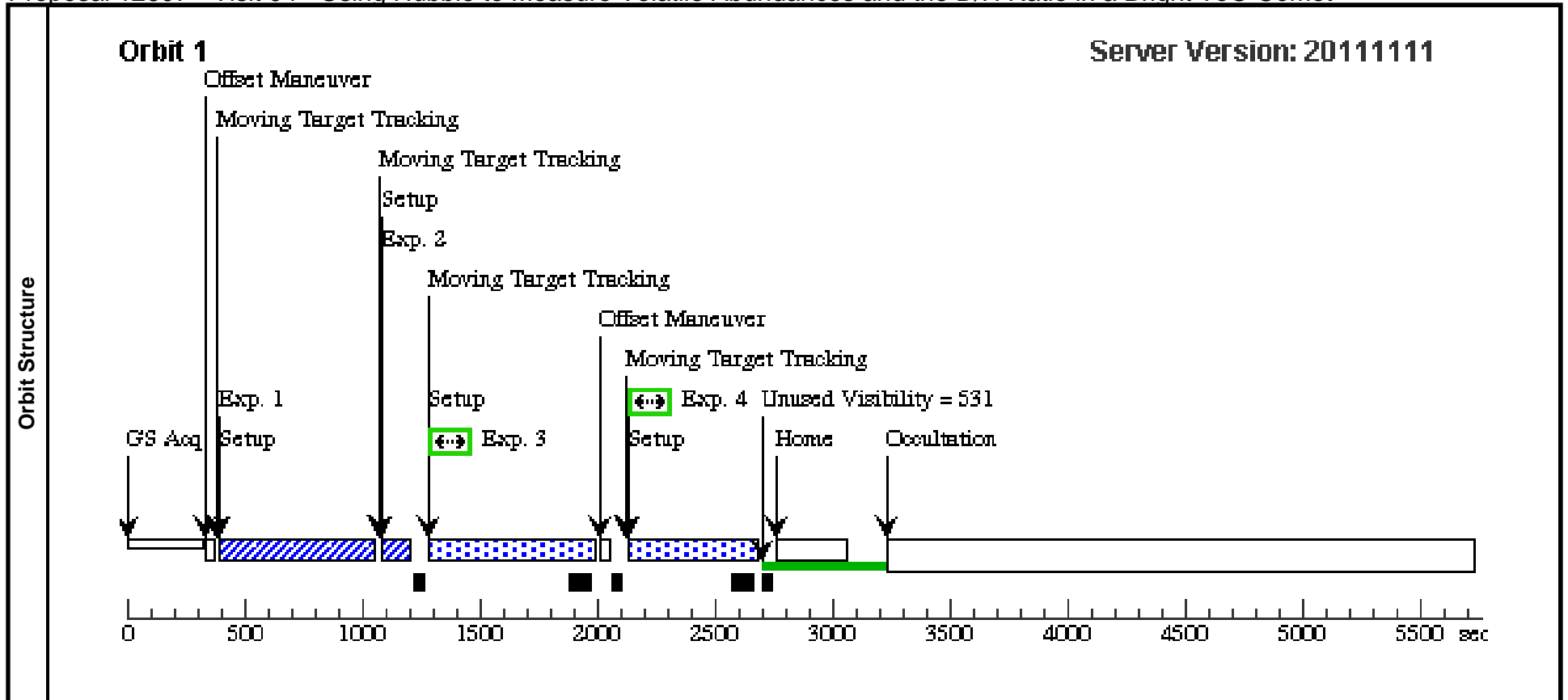
Visit	Proposal 12607, Visit 03, scheduled Diagnostic Status: Warning Scientific Instruments: STIS/CCD, STIS/FUV-MAMA Special Requirements: (none)									
	(Exposure 2 (Visit 03)) Warning (Form): Sensitive exposures should have an ETC run number provided.									
Diagnostics										
Solar System Targets	#	Name	Level 1	Level 2	Level 3	Window	Ephem Center			
	(1)	C-2009P1-GARRADD	TYPE=COMET,Q=1.5505388231217 93,E=1.001060180395493,I=106.1774 779466713,O=325.9980001854605,W =90.74781959207823,T=23-DEC- 2011:04:15:39,TTimeScale=TDB,EQ UINOX=J2000,EPOCH=15-JAN- 2012,EpochTimeScale=TDB					EARTH		
Comments: Acquisition Uncertainty: 10 Arcsec Ephemeris Uncertainty: 3700 Kilometers										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(1) C-2009P1-GARRADD	STIS/CCD, ACQ, F28X50LP	MIRROR		REQ EPHEM CORR COMV03		1 Secs [==>]	[1]
2		(1) C-2009P1-GARRADD	STIS/FUV-MAMA, TIME-TAG, 52X0.2	G140L 1425 A		BUFFER-TIME=30 0	REQ EPHEM CORR COMV03	1800 Secs [==>]	[1]	



Proposal 12607 - Visit 04 - Using Hubble to Measure Volatile Abundances and the D/H Ratio in a Bright ToO Comet

Sun Jan 15 02:02:40 GMT 2012

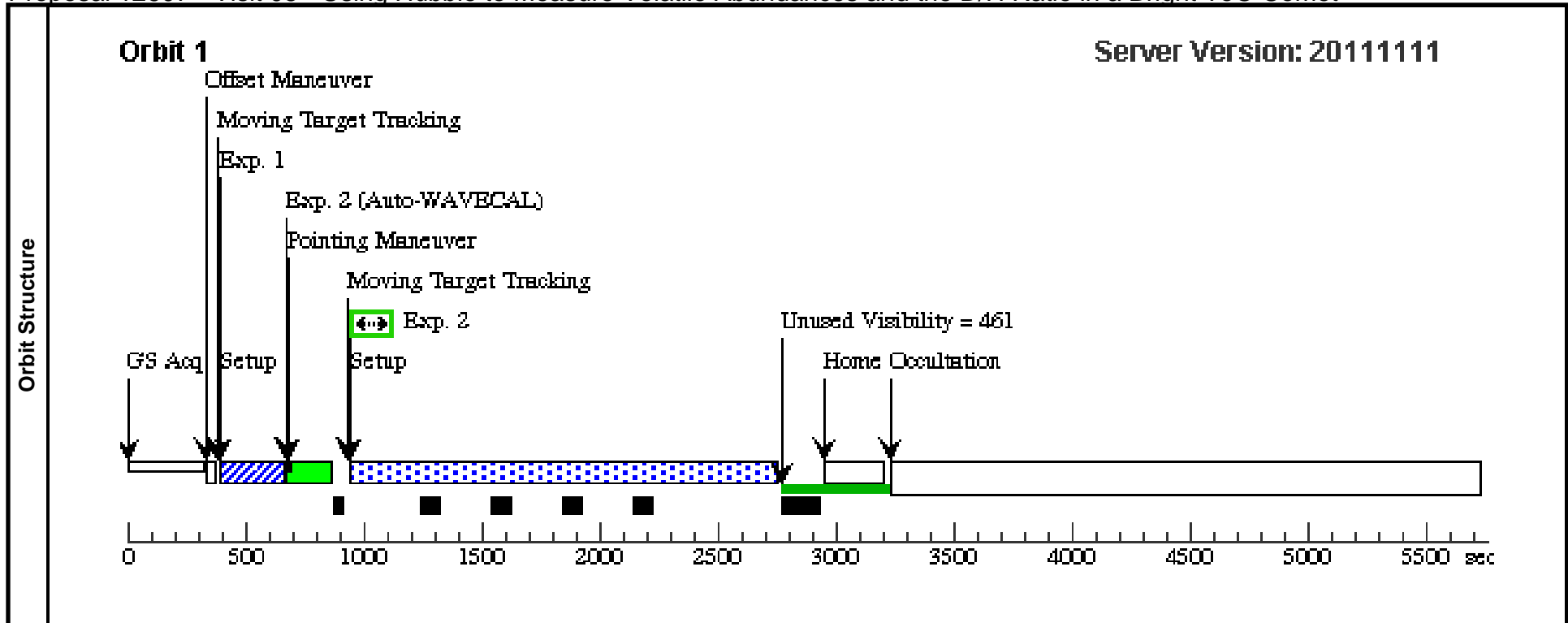
Visit	Proposal 12607, Visit 04, scheduled Diagnostic Status: Warning Scientific Instruments: COS/NUV, COS/FUV Special Requirements: (none)									
	(Visit 04) Warning (Form): For the best data quality, it is strongly recommended that all four FP-POS positions be used when observing at a given COS CENWAVE setting. (Exposure 1 (Visit 04)) Warning (Form): Sensitive exposures should have an ETC run number provided. (Exposure 2 (Visit 04)) Warning (Form): Sensitive exposures should have an ETC run number provided. (Exposure 3 (Visit 04)) Warning (Form): Sensitive exposures should have an ETC run number provided. (Exposure 4 (Visit 04)) Warning (Form): Sensitive exposures should have an ETC run number provided.									
Diagnostics										
Solar System Targets	#	Name	Level 1	Level 2	Level 3	Window	Ephem Center			
	(1)	C-2009P1-GARRADD	TYPE=COMET,Q=1.5505388231217 93,E=1.001060180395493,I=106.1774 779466713,O=325.9980001854605,W =90.74781959207823,T=23-DEC- 2011:04:15:39,TimeScale=TDB,EQ UINOX=J2000,EPOCH=15-JAN- 2012,EpochTimeScale=TDB					EARTH		
Comments: Acquisition Uncertainty: 10 Arcsec Ephemeris Uncertainty: 3700 Kilometers										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(1) C-2009P1-GARR ADD	COS/NUV, ACQ/SEARCH, PSA	MIRRORA	SCAN-SIZE=3	REQ EPHEM CORR COMV04		10 Secs [==>]	[1]
	2		(1) C-2009P1-GARR ADD	COS/NUV, ACQ/IMAGE, PSA	MIRRORA		REQ EPHEM CORR COMV04		10 Secs [==>]	[1]
	3		(1) C-2009P1-GARR ADD	COS/FUV, TIME-TAG, PSA	G160M 1589 A	FP-POS=2; BUFFER-TIME=40 0; EXTENDED=YES	REQ EPHEM CORR COMV04		500 Secs [==>]	[1]
	4		(1) C-2009P1-GARR ADD	COS/FUV, TIME-TAG, PSA	G160M 1589 A	FP-POS=3; BUFFER-TIME=40 0; EXTENDED=YES			500 Secs [==>]	[1]



Proposal 12607 - Visit 05 - Using Hubble to Measure Volatile Abundances and the D/H Ratio in a Bright ToO Comet

Sun Jan 15 02:02:40 GMT 2012

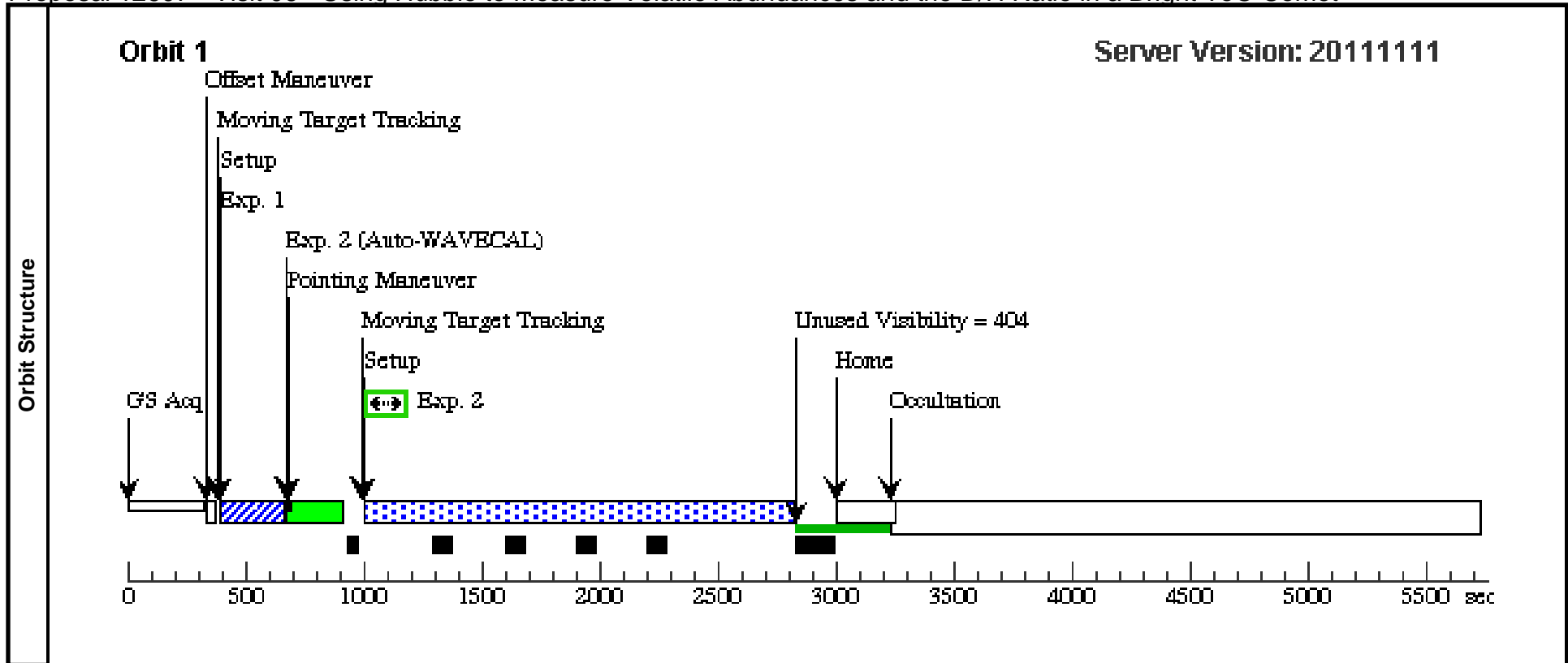
Visit	<p>Proposal 12607, Visit 05, scheduled</p> <p>Diagnostic Status: Warning</p> <p>Scientific Instruments: STIS/CCD, STIS/NUV-MAMA</p> <p>Special Requirements: (none)</p> <p><i>Comments: G230L orbit</i></p>										
	<p>(Exposure 2 (Visit 05)) Warning (Form): Sensitive exposures should have an ETC run number provided.</p>										
Diagnostics											
Solar System Targets	#	Name	Level 1	Level 2	Level 3	Window	Ephem Center				
	(1)	C-2009P1-GARRADD	TYPE=COMET,Q=1.5505388231217 93,E=1.001060180395493,I=106.1774 779466713,O=325.9980001854605,W =90.74781959207823,T=23-DEC- 2011:04:15:39,TimeScale=TDB,EQ UINOX=J2000,EPOCH=15-JAN- 2012,EpochTimeScale=TDB					EARTH			
<p><i>Comments:</i></p> <p><i>Acquisition Uncertainty: 10 Arcsec</i></p> <p><i>Ephemeris Uncertainty: 3700 Kilometers</i></p>											
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]		Orbit
	1		(1) C-2009P1-GARRADD	STIS/CCD, ACQ, F28X50LP	MIRROR		REQ EPHEM CORR COMV05		1 Secs [==>]	[1]	
2		(1) C-2009P1-GARRADD	STIS/NUV-MAMA, TIME-TAG, 52X0.2	G230L 2376 A		BUFFER-TIME=30 0	REQ EPHEM CORR COMV05	1800 Secs [==>]	[1]		



Proposal 12607 - Visit 06 - Using Hubble to Measure Volatile Abundances and the D/H Ratio in a Bright ToO Comet

Sun Jan 15 02:02:41 GMT 2012

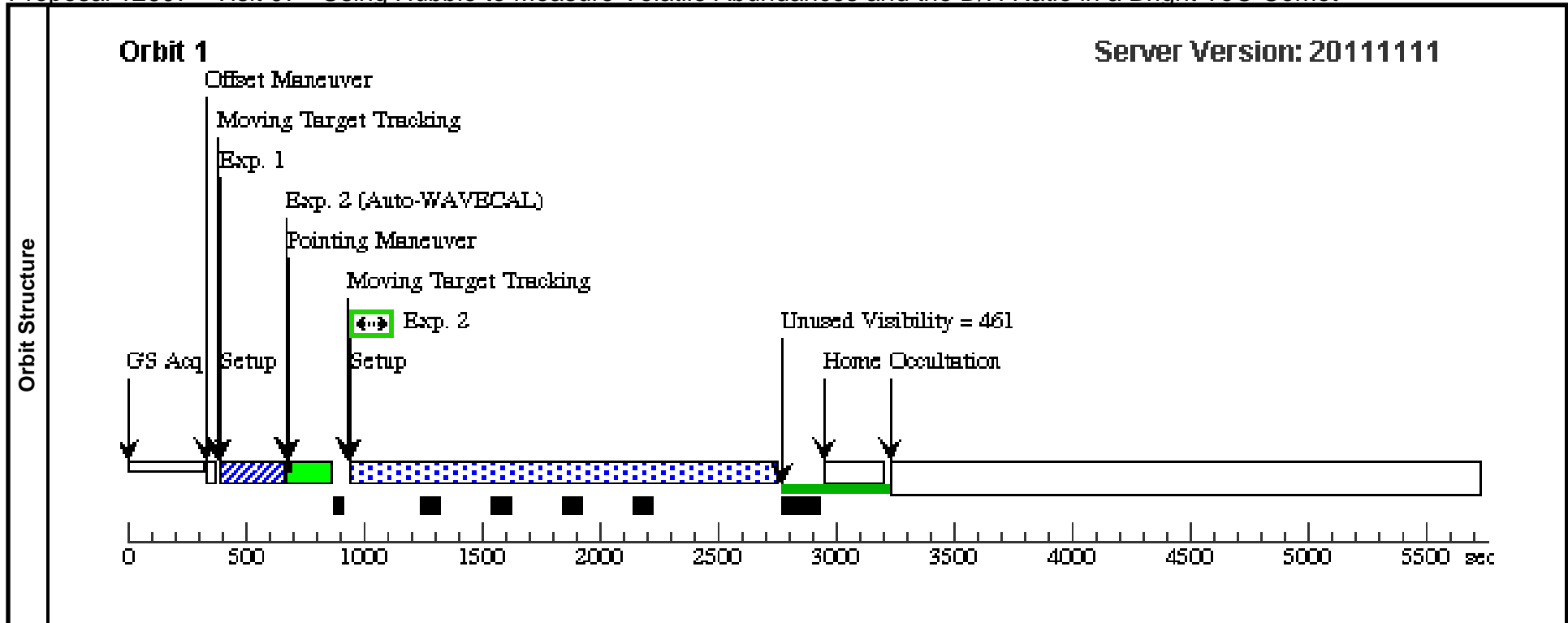
Visit	Proposal 12607, Visit 06, scheduled Diagnostic Status: Warning Scientific Instruments: STIS/CCD, STIS/FUV-MAMA Special Requirements: (none)									
	(Exposure 2 (Visit 06)) Warning (Form): Sensitive exposures should have an ETC run number provided.									
Diagnosics										
Solar System Targets	#	Name	Level 1	Level 2	Level 3	Window	Ephem Center			
	(1)	C-2009P1-GARRADD	TYPE=COMET,Q=1.5505388231217 93,E=1.001060180395493,I=106.1774 779466713,O=325.9980001854605,W =90.74781959207823,T=23-DEC- 2011:04:15:39,TTimeScale=TDB,EQ UINOX=J2000,EPOCH=15-JAN- 2012,EpochTimeScale=TDB					EARTH		
Comments: Acquisition Uncertainty: 10 Arcsec Ephemeris Uncertainty: 3700 Kilometers										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1	(1) C-2009P1-GARRADD	STIS/CCD, ACQ, F28X50LP	MIRROR			REQ EPHEM CORR COMV06		1 Secs [==>]	[1]
2	(1) C-2009P1-GARRADD	STIS/FUV-MAMA, TIME-TAG, 6X0.2	E140H 1234 A		BUFFER-TIME=30 0	REQ EPHEM CORR COMV06		1800 Secs [==>]	[1]	



Proposal 12607 - Visit 07 - Using Hubble to Measure Volatile Abundances and the D/H Ratio in a Bright ToO Comet

Sun Jan 15 02:02:41 GMT 2012

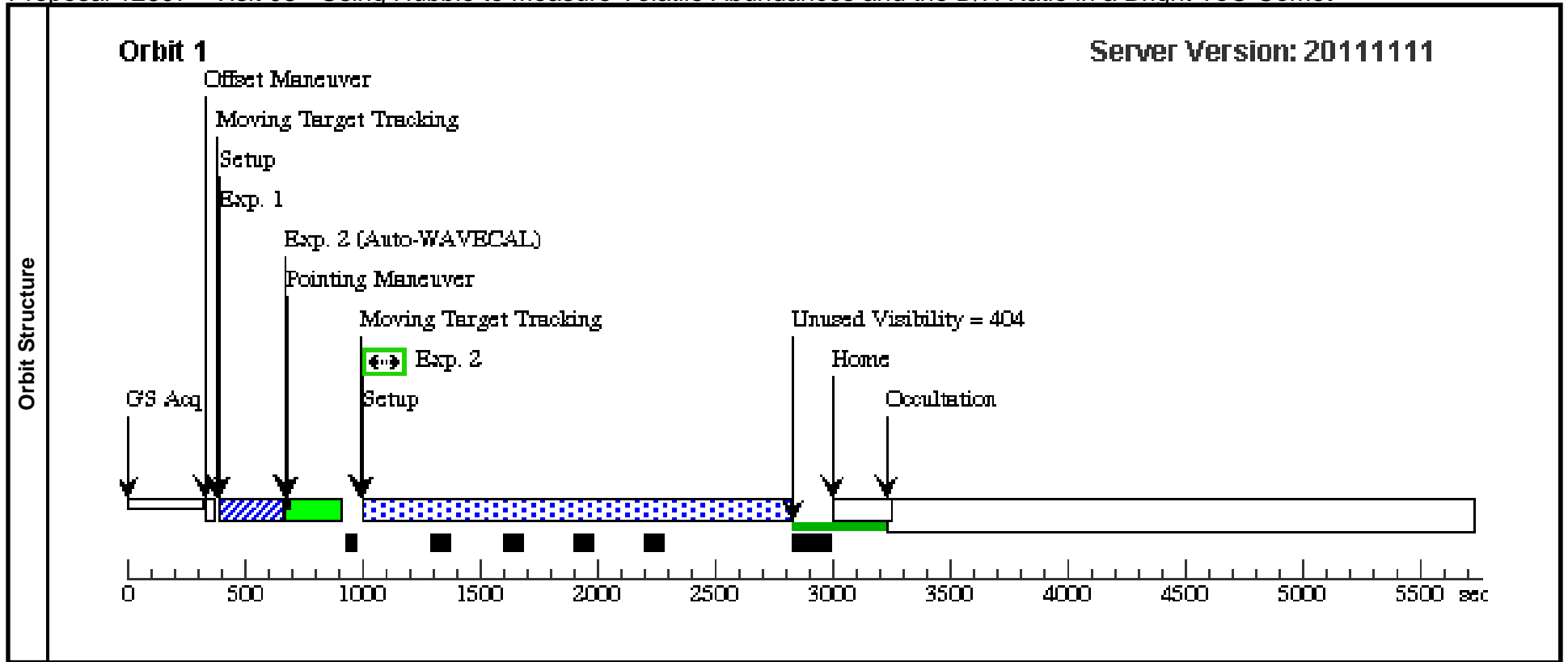
Visit	Proposal 12607, Visit 07, scheduled Diagnostic Status: Warning Scientific Instruments: STIS/CCD, STIS/FUV-MAMA Special Requirements: (none)									
	(Exposure 2 (Visit 07)) Warning (Form): Sensitive exposures should have an ETC run number provided.									
Diagnostics										
Solar System Targets	#	Name	Level 1	Level 2	Level 3	Window	Ephem Center			
	(1)	C-2009P1-GARRADD	TYPE=COMET,Q=1.5505388231217 93,E=1.001060180395493,I=106.1774 779466713,O=325.9980001854605,W =90.74781959207823,T=23-DEC- 2011:04:15:39,TTimeScale=TDB,EQ UINOX=J2000,EPOCH=15-JAN- 2012,EpochTimeScale=TDB					EARTH		
Comments: Acquisition Uncertainty: 10 Arcsec Ephemeris Uncertainty: 3700 Kilometers										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(1) C-2009P1-GARRADD	STIS/CCD, ACQ, F28X50LP	MIRROR		REQ EPHEM CORR COMV07		1 Secs [==>]	[1]
2		(1) C-2009P1-GARRADD	STIS/FUV-MAMA, TIME-TAG, 52X0.2	G140L 1425 A		BUFFER-TIME=30 0	REQ EPHEM CORR COMV07	1800 Secs [==>]	[1]	



Proposal 12607 - Visit 08 - Using Hubble to Measure Volatile Abundances and the D/H Ratio in a Bright ToO Comet

Sun Jan 15 02:02:42 GMT 2012

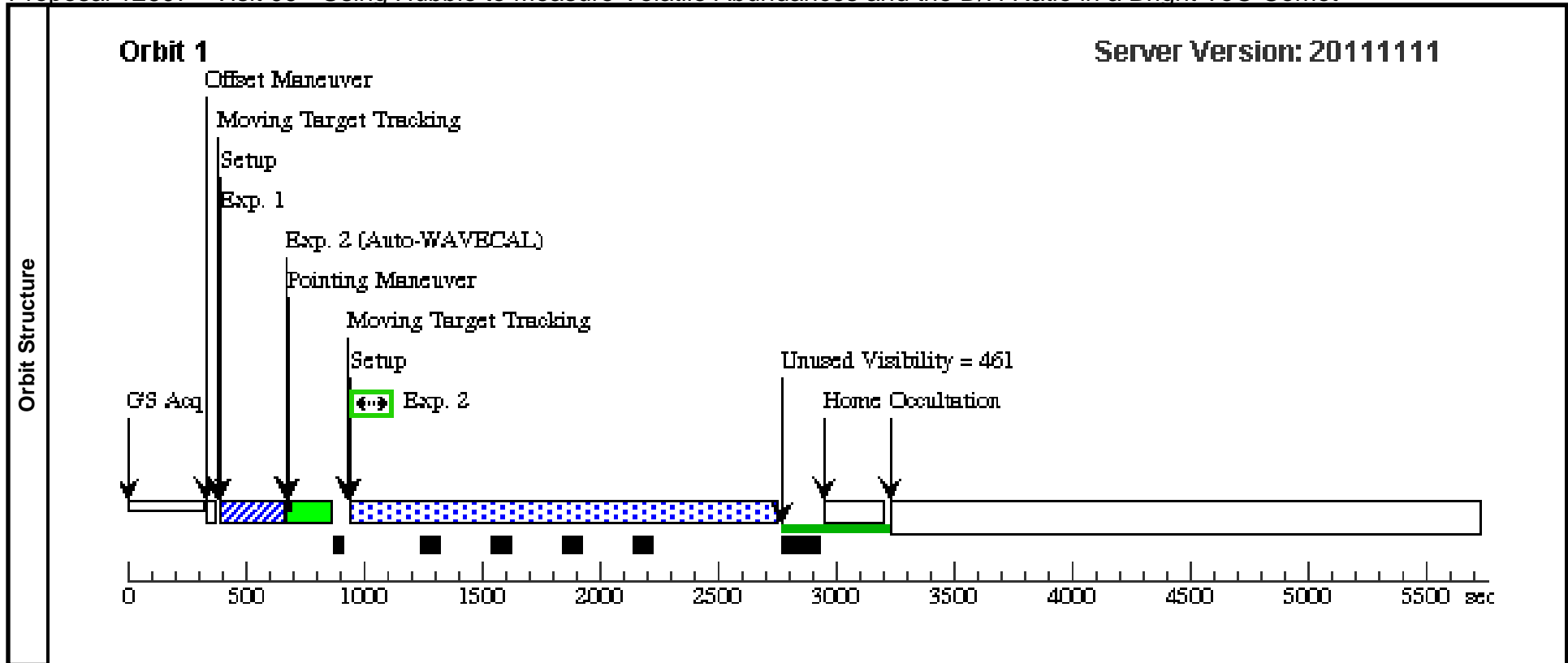
Visit	Proposal 12607, Visit 08, scheduled Diagnostic Status: Warning Scientific Instruments: STIS/CCD, STIS/FUV-MAMA Special Requirements: (none)									
	(Exposure 2 (Visit 08)) Warning (Form): Sensitive exposures should have an ETC run number provided.									
Diagnosics										
Solar System Targets	#	Name	Level 1	Level 2	Level 3	Window	Ephem Center			
	(1)	C-2009P1-GARRADD	TYPE=COMET,Q=1.5505388231217 93,E=1.001060180395493,I=106.1774 779466713,O=325.9980001854605,W =90.74781959207823,T=23-DEC- 2011:04:15:39,TTimeScale=TDB,EQ UINOX=J2000,EPOCH=15-JAN- 2012,EpochTimeScale=TDB					EARTH		
Comments: Acquisition Uncertainty: 10 Arcsec Ephemeris Uncertainty: 3700 Kilometers										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(1) C-2009P1-GARR ADD	STIS/CCD, ACQ, F28X50LP	MIRROR		REQ EPHEM CORR COMV08		1 Secs [==>]	[1]
2		(1) C-2009P1-GARR ADD	STIS/FUV-MAMA, TIME-TAG, 6X0.2	E140H 1234 A		BUFFER-TIME=30 0	REQ EPHEM CORR COMV08	1800 Secs [==>]	[1]	



Proposal 12607 - Visit 09 - Using Hubble to Measure Volatile Abundances and the D/H Ratio in a Bright ToO Comet

Sun Jan 15 02:02:42 GMT 2012

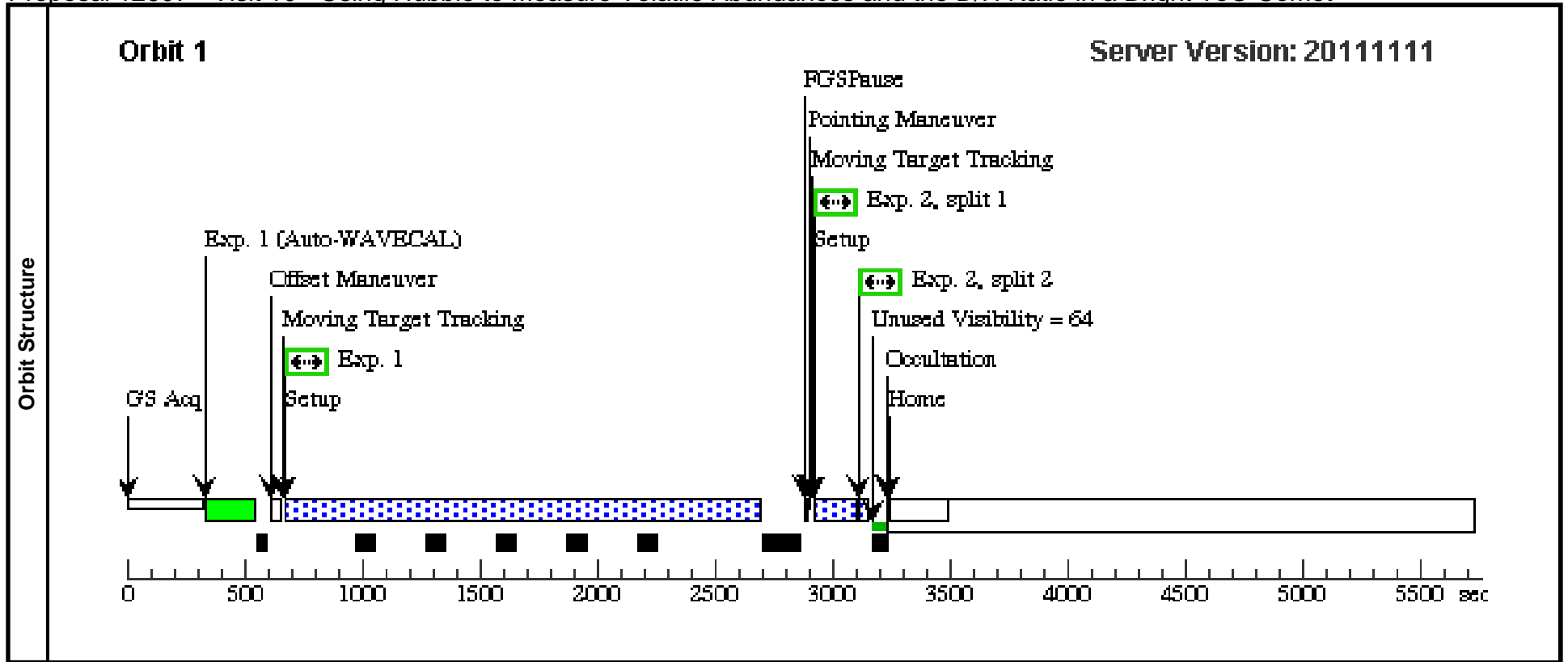
Visit	Proposal 12607, Visit 09, scheduled Diagnostic Status: Warning Scientific Instruments: STIS/CCD, STIS/NUV-MAMA Special Requirements: (none) <i>Comments: G230L orbit</i>									
	(Exposure 2 (Visit 09)) Warning (Form): Sensitive exposures should have an ETC run number provided.									
Diagnostics										
Solar System Targets	#	Name	Level 1	Level 2	Level 3	Window	Ephem Center			
	(1)	C-2009P1-GARRADD	TYPE=COMET,Q=1.5505388231217 93,E=1.001060180395493,I=106.1774 779466713,O=325.9980001854605,W =90.74781959207823,T=23-DEC- 2011:04:15:39,TimeScale=TDB,EQ UINOX=J2000,EPOCH=15-JAN- 2012,EpochTimeScale=TDB					EARTH		
<i>Comments:</i> Acquisition Uncertainty: 10 Arcsec Ephemeris Uncertainty: 3700 Kilometers										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(1) C-2009P1-GARR ADD	STIS/CCD, ACQ, F28X50LP	MIRROR		REQ EPHEM CORR COMV09		1 Secs [==>]	[1]
	2		(1) C-2009P1-GARR ADD	STIS/NUV-MAMA, TIME-TAG, 52X0.2	G230L 2376 A	BUFFER-TIME=30 0	REQ EPHEM CORR COMV09		1800 Secs [==>]	[1]



Proposal 12607 - Visit 10 - Using Hubble to Measure Volatile Abundances and the D/H Ratio in a Bright ToO Comet

Sun Jan 15 02:02:42 GMT 2012

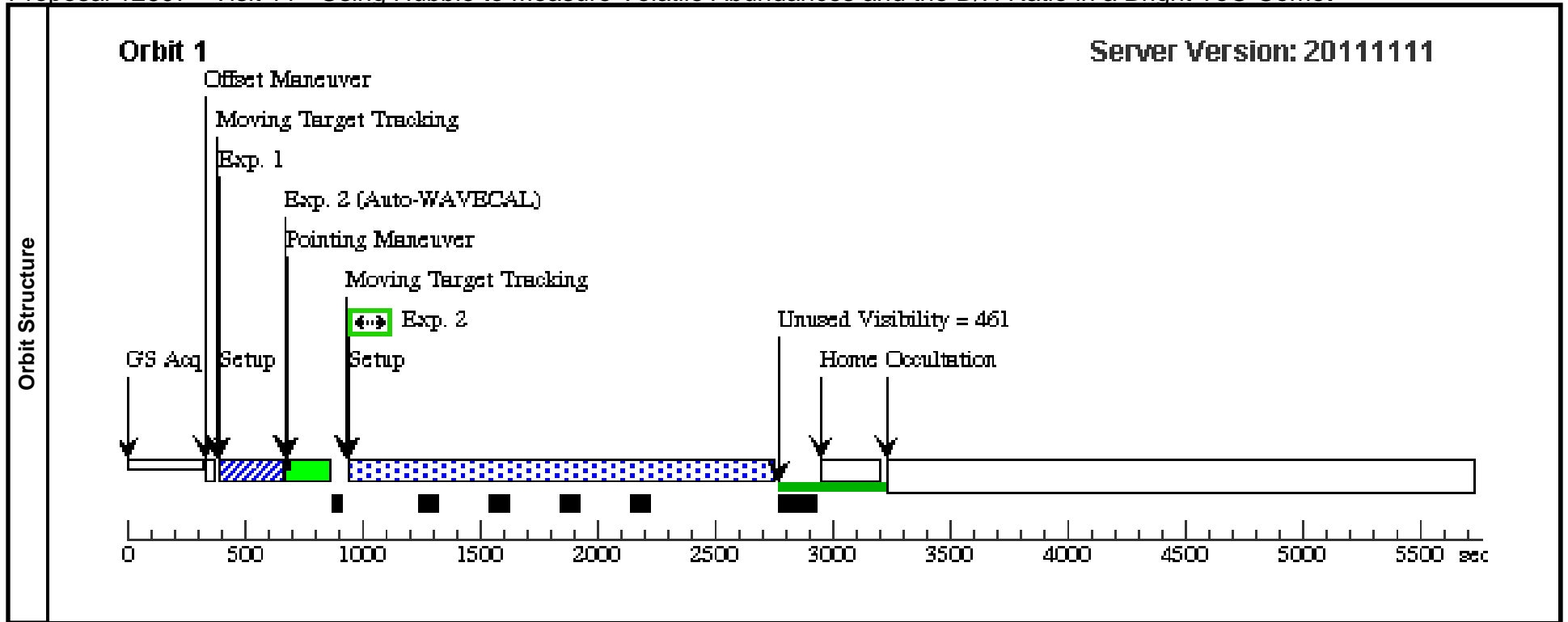
Visit	Proposal 12607, Visit 10, scheduled Diagnostic Status: Warning Scientific Instruments: STIS/CCD, STIS/FUV-MAMA Special Requirements: (none)									
	Diagnosics (Visit 10) Warning (Orbit Planner): MERGING RULE VIOLATED DURING AUTOMATIC MERGING (Visit 10) Warning (Form): A target acquisition should probably be performed before doing spectroscopy or coronagraphy with STIS or COS. (Exposure 1 (Same Obset in Visit 10)) Warning (Form): Sensitive exposures should have an ETC run number provided.									
Solar System Targets	#	Name	Level 1	Level 2	Level 3	Window	Ephem Center			
	(1)	C-2009P1-GARRADD	TYPE=COMET,Q=1.5505388231217 93,E=1.001060180395493,I=106.1774 779466713,O=325.9980001854605,W =90.74781959207823,T=23-DEC-2011:04:15:39,TTIMEscale=TDB,EQ UINOX=J2000,EPOCH=15-JAN-2012,EpochTimeScale=TDB				EARTH			
	Comments: Acquisition Uncertainty: 10 Arcsec Ephemeris Uncertainty: 3700 Kilometers									
(2)	GARRADD-OFFSET	TYPE=COMET,Q=1.5505388231217 93,E=1.001060180395493,I=106.1774 779466713,O=325.9980001854605,W =90.74781959207823,T=23-DEC-2011:04:15:39,TTIMEscale=TDB,EQ UINOX=J2000,EPOCH=15-JAN-2012,EpochTimeScale=TDB	TYPE=POS_ANGLE,RAD=1500,AN G=0,REF=SUN				EARTH			
Comments: Acquisition Uncertainty: 10 Arcsec Ephemeris Uncertainty: 3700 Kilometers										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(2) GARRADD-OFFSET	STIS/FUV-MAMA, TIME-TAG, 6X0.2	E140H 1234 A	BUFFER-TIME=30 0	REQ EPHEM CORR COMV10	Same Obset in Visit 10	2000 Secs [==>]	[1]
	2		(1) C-2009P1-GARRADD	STIS/CCD, ACCUM, F28X50LP	MIRROR	CR-SPLIT=2; GAIN=4	REQ EPHEM CORR COMV10; EXP PCS MODE G YRO	Same Obset in Visit 10	10 Secs [==>(Split 1)] [==>(Split 2)]	[1]



Proposal 12607 - Visit 11 - Using Hubble to Measure Volatile Abundances and the D/H Ratio in a Bright ToO Comet

Sun Jan 15 02:02:43 GMT 2012

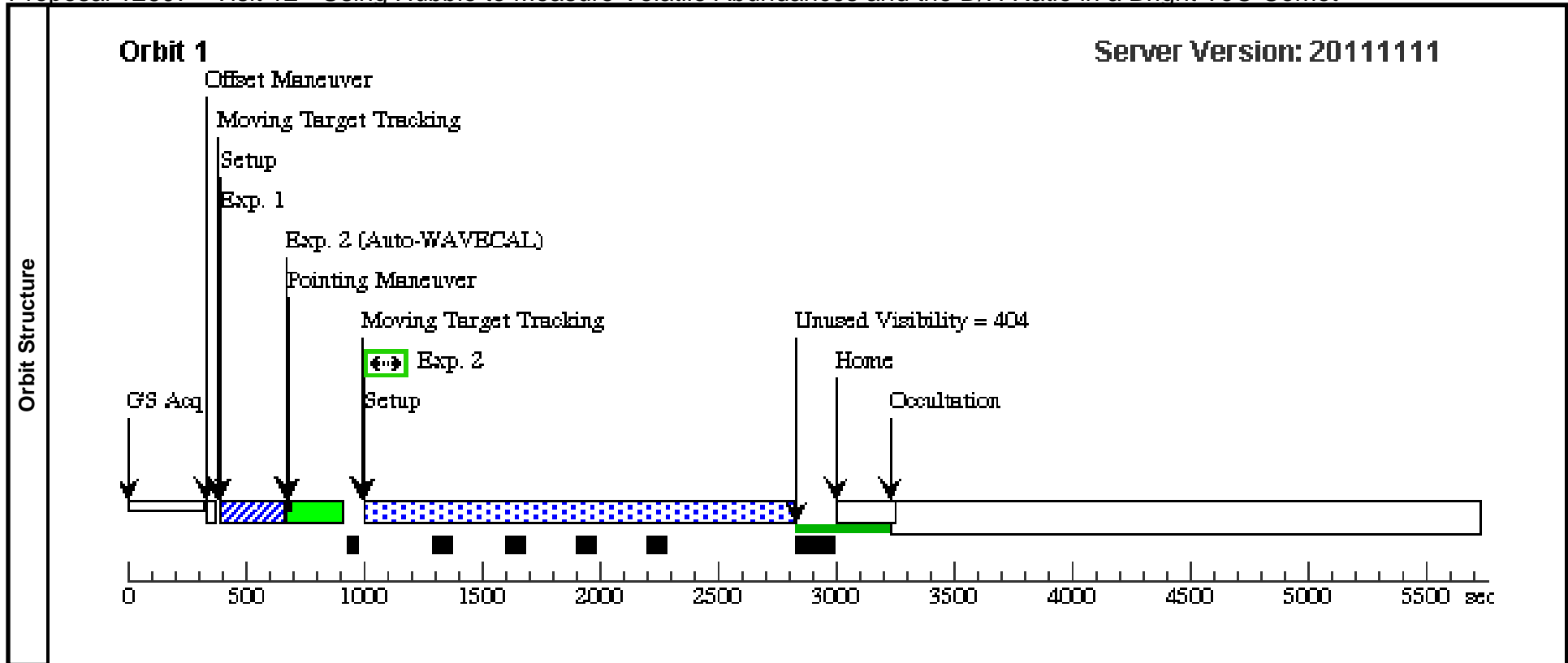
Visit	Proposal 12607, Visit 11, implementation Diagnostic Status: Warning Scientific Instruments: STIS/CCD, STIS/NUV-MAMA Special Requirements: SEQ 11,12,13,14,15,16,17,18,19,20 WITHIN 2 D <i>Comments: G230L orbit</i>										
	(Exposure 2 (Visit 11)) Warning (Form): Sensitive exposures should have an ETC run number provided.										
Diagnostics											
Solar System Targets	#	Name	Level 1	Level 2	Level 3	Window	Ephem Center				
	(3)	C-2009P1-GARRADD-NEW	TYPE=COMET,Q=1.5505372,E=1.00 10494,I=106.17749,O=325.99769,W=90.74772,T=23-DEC-2011:16:15:53,TimeScale=TDB,EQ UINOX=J2000,EPOCH=25-DEC-2011,EpochTimeScale=TDB					EARTH			
<i>Comments:</i> Acquisition Uncertainty: 10 Arcsec Ephemeris Uncertainty: 3700 Kilometers											
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]		Orbit
	1		(3) C-2009P1-GARR ADD-NEW	STIS/CCD, ACQ, F28X50LP	MIRROR		REQ EPHEM CORR COMV11		1 Secs	[==>]	[1]
	2		(3) C-2009P1-GARR ADD-NEW	STIS/NUV-MAMA, TIME-TAG, 52X0.2	G230L 2376 A	BUFFER-TIME=30 0	REQ EPHEM CORR COMV11		1800 Secs	[==>]	[1]



Proposal 12607 - Visit 12 - Using Hubble to Measure Volatile Abundances and the D/H Ratio in a Bright ToO Comet

Sun Jan 15 02:02:43 GMT 2012

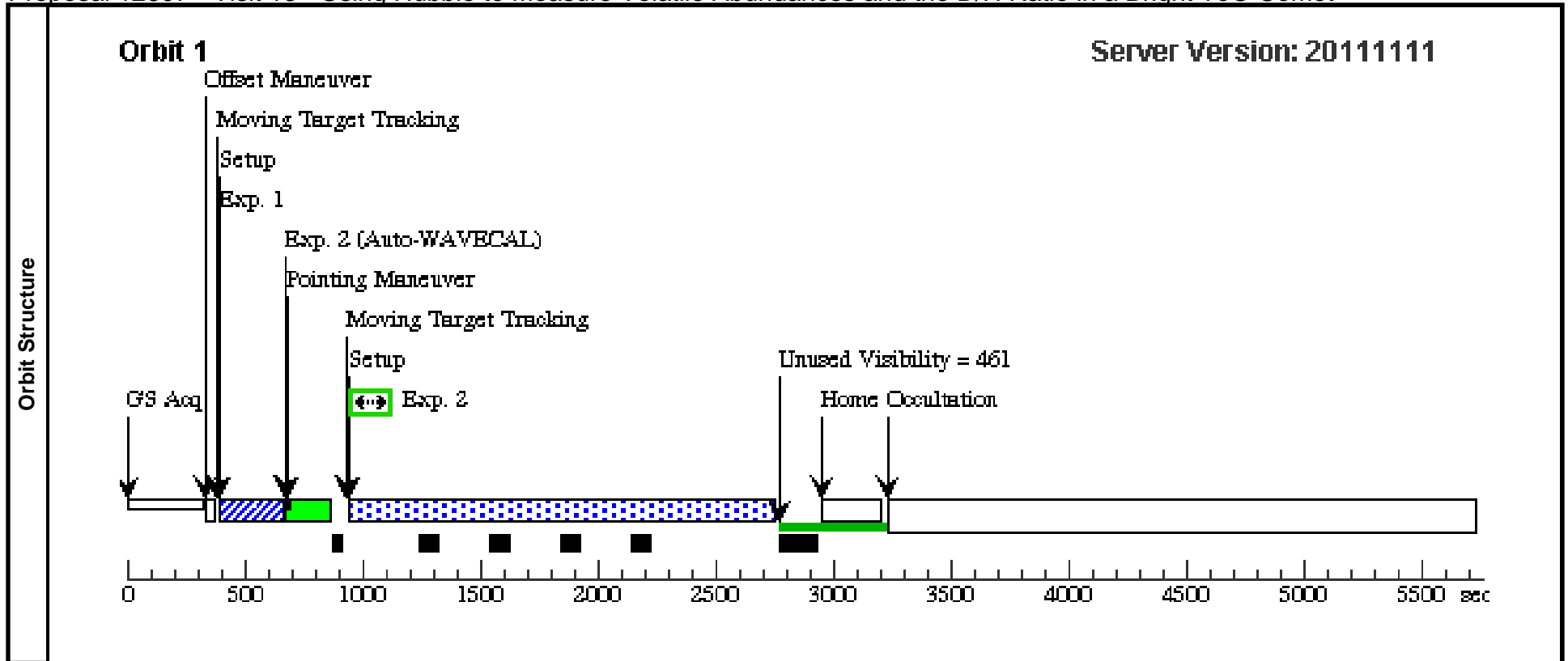
Visit	Proposal 12607, Visit 12, implementation Diagnostic Status: Warning Scientific Instruments: STIS/CCD, STIS/FUV-MAMA Special Requirements: (none)										
	(Exposure 2 (Visit 12)) Warning (Form): Sensitive exposures should have an ETC run number provided.										
Diagnostics											
Solar System Targets	#	Name	Level 1	Level 2	Level 3	Window	Ephem Center				
	(3)	C-2009P1-GARRADD-NEW	TYPE=COMET,Q=1.5505372,E=1.00 10494,I=106.17749,O=325.99769,W=90.74772,T=23-DEC-2011:16:15:53,TTTimeScale=TDB,EQ UINOX=J2000,EPOCH=25-DEC-2011,EpochTimeScale=TDB					EARTH			
Comments: Acquisition Uncertainty: 10 Arcsec Ephemeris Uncertainty: 3700 Kilometers											
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]		Orbit
	1	(3) C-2009P1-GARRADD-NEW	STIS/CCD, ACQ, F28X50LP	MIRROR			REQ EPHEM CORR COMV12		1 Secs [==>]	[1]	
2	(3) C-2009P1-GARRADD-NEW	STIS/FUV-MAMA, TIME-TAG, 6X0.2	E140H 1234 A		BUFFER-TIME=30 0	REQ EPHEM CORR COMV12		1800 Secs [==>]	[1]		



Proposal 12607 - Visit 13 - Using Hubble to Measure Volatile Abundances and the D/H Ratio in a Bright ToO Comet

Sun Jan 15 02:02:43 GMT 2012

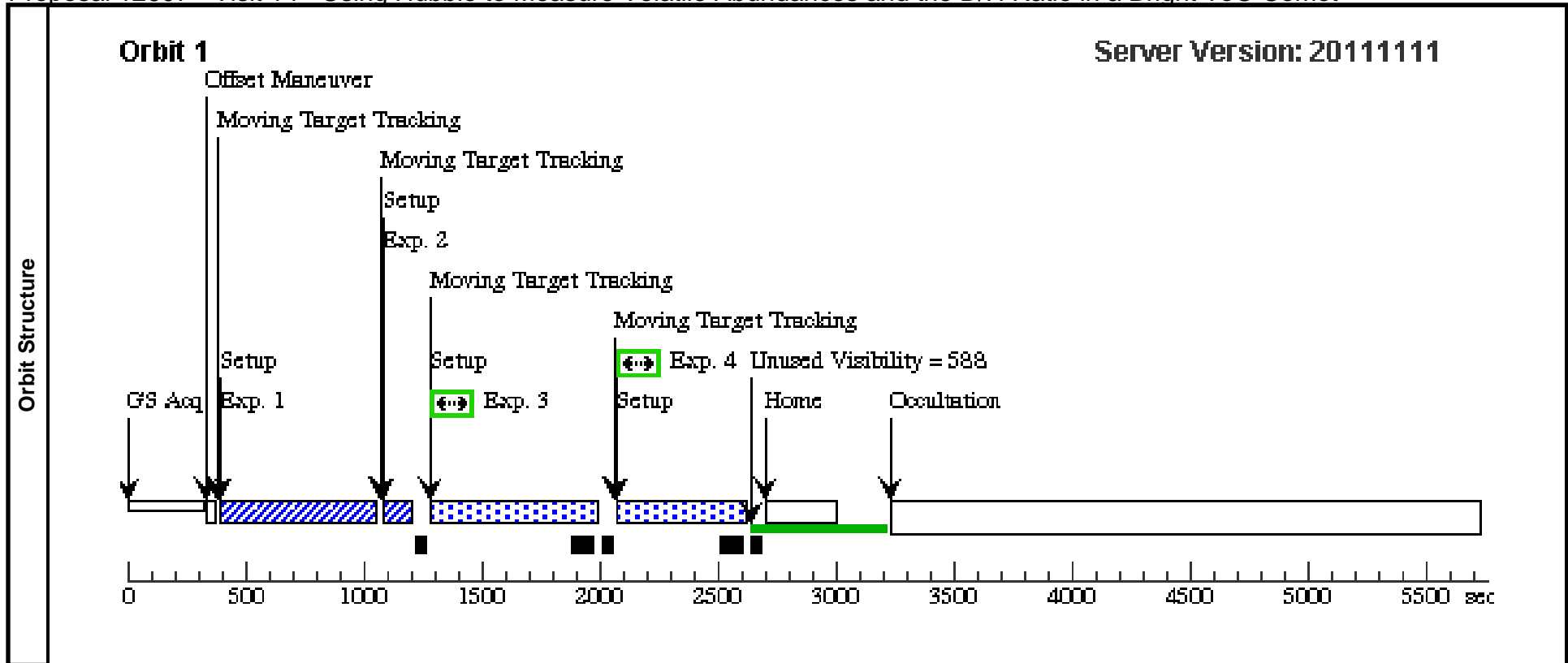
Visit	Proposal 12607, Visit 13, implementation Diagnostic Status: Warning Scientific Instruments: STIS/CCD, STIS/FUV-MAMA Special Requirements: (none)										
	(Exposure 2 (Visit 13)) Warning (Form): Sensitive exposures should have an ETC run number provided.										
Diagnostics											
Solar System Targets	#	Name	Level 1	Level 2	Level 3	Window	Ephem Center				
	(3)	C-2009P1-GARRADD-NEW	TYPE=COMET,Q=1.5505372,E=1.00 10494,I=106.17749,O=325.99769,W=90.74772,T=23-DEC-2011:16:15:53,TTTimeScale=TDB,EQ UINOX=J2000,EPOCH=25-DEC-2011,EpochTimeScale=TDB					EARTH			
Comments: Acquisition Uncertainty: 10 Arcsec Ephemeris Uncertainty: 3700 Kilometers											
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]		Orbit
	1	(3) C-2009P1-GARRADD-NEW	STIS/CCD, ACQ, F28X50LP	MIRROR			REQ EPHEM CORR COMV13		1 Secs [==>]	[1]	
2	(3) C-2009P1-GARRADD-NEW	STIS/FUV-MAMA, TIME-TAG, 52X0.2	G140L 1425 A		BUFFER-TIME=30 0	REQ EPHEM CORR COMV13		1800 Secs [==>]	[1]		



Proposal 12607 - Visit 14 - Using Hubble to Measure Volatile Abundances and the D/H Ratio in a Bright ToO Comet

Sun Jan 15 02:02:44 GMT 2012

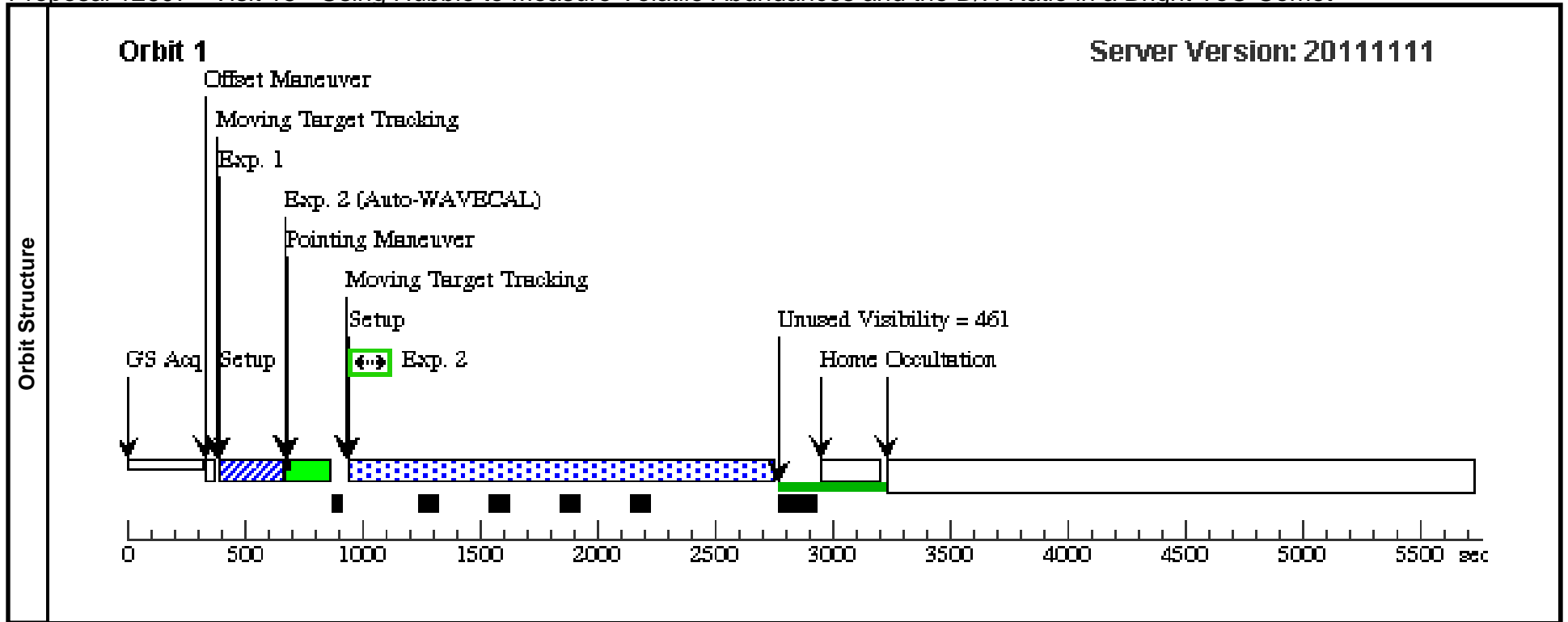
Visit	Proposal 12607, Visit 14, implementation Diagnostic Status: Warning Scientific Instruments: COS/NUV, COS/FUV Special Requirements: (none)									
	(Visit 14) Warning (Form): For the best data quality, it is strongly recommended that all four FP-POS positions be used when observing at a given COS CENWAVE setting. (Exposure 1 (Visit 14)) Warning (Form): Sensitive exposures should have an ETC run number provided. (Exposure 2 (Visit 14)) Warning (Form): Sensitive exposures should have an ETC run number provided. (Exposure 3 (Visit 14)) Warning (Form): Sensitive exposures should have an ETC run number provided. (Exposure 4 (Visit 14)) Warning (Form): Sensitive exposures should have an ETC run number provided.									
Diagnostics										
Solar System Targets	#	Name	Level 1	Level 2	Level 3	Window	Ephem Center			
	(3)	C-2009P1-GARRADD-NEW	TYPE=COMET,Q=1.5505372,E=1.00 10494,I=106.17749,O=325.99769,W=90.74772,T=23-DEC-2011:16:15:53,TTTimeScale=TDB,EQ UINOX=J2000,EPOCH=25-DEC-2011,EpochTimeScale=TDB					EARTH		
Comments: Acquisition Uncertainty: 10 Arcsec Ephemeris Uncertainty: 3700 Kilometers										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1	(3) C-2009P1-GARRADD-NEW	COS/NUV, ACQ/SEARCH, PSA	MIRRORA	SCAN-SIZE=3	REQ EPHEM CORR COMV14			10 Secs [==>]	[1]
	2	(3) C-2009P1-GARRADD-NEW	COS/NUV, ACQ/IMAGE, PSA	MIRRORA		REQ EPHEM CORR COMV14			10 Secs [==>]	[1]
	3	(3) C-2009P1-GARRADD-NEW	COS/FUV, TIME-TAG, PSA	G160M 1589 A	FP-POS=2; BUFFER-TIME=40 0; EXTENDED=YES	REQ EPHEM CORR COMV14			500 Secs [==>]	[1]
	4	(3) C-2009P1-GARRADD-NEW	COS/FUV, TIME-TAG, PSA	G160M 1589 A	FP-POS=3; BUFFER-TIME=40 0; EXTENDED=YES	REQ EPHEM CORR COMV14			500 Secs [==>]	[1]



Proposal 12607 - Visit 15 - Using Hubble to Measure Volatile Abundances and the D/H Ratio in a Bright ToO Comet

Sun Jan 15 02:02:45 GMT 2012

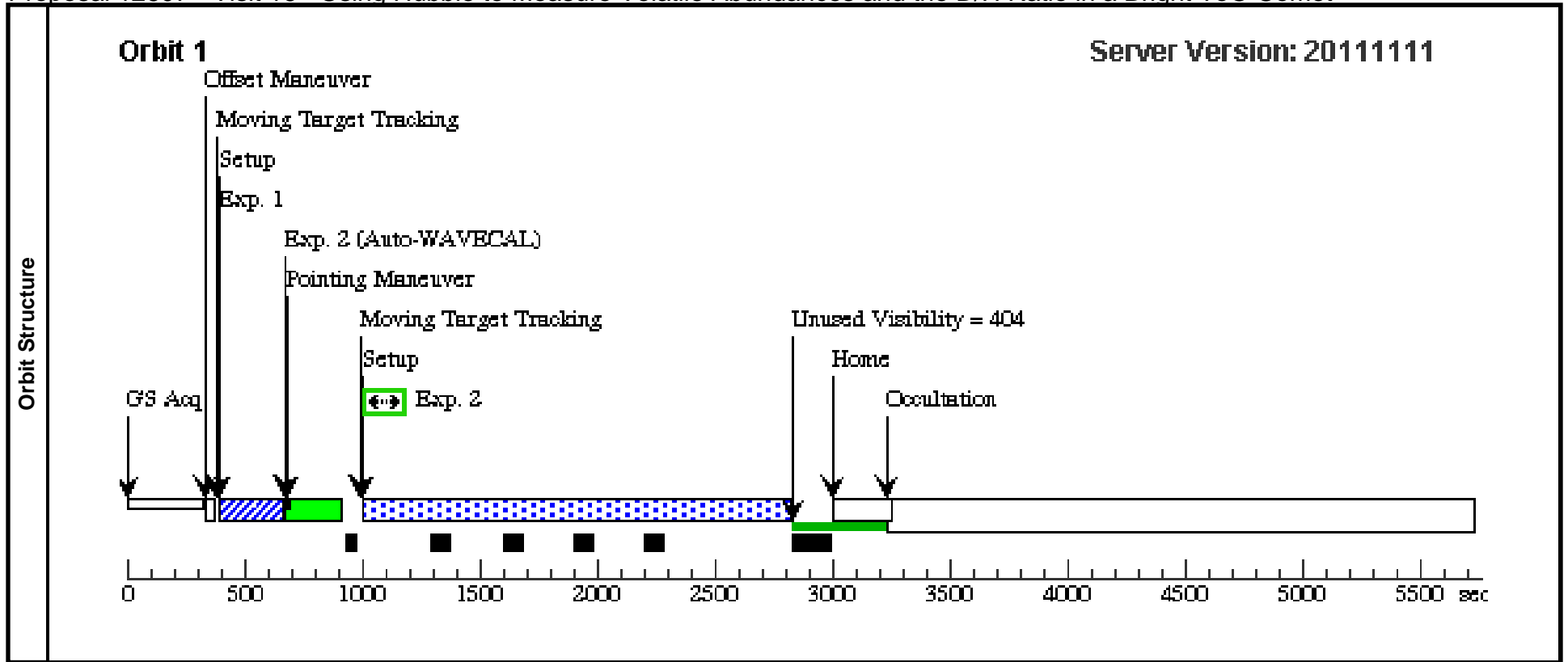
Visit	Proposal 12607, Visit 15, implementation Diagnostic Status: Warning Scientific Instruments: STIS/CCD, STIS/NUV-MAMA Special Requirements: (none) <i>Comments: G230L orbit</i>									
	(Exposure 2 (Visit 15)) Warning (Form): Sensitive exposures should have an ETC run number provided.									
Diagnostics										
Solar System Targets	#	Name	Level 1	Level 2	Level 3	Window	Ephem Center			
	(3)	C-2009P1-GARRADD-NEW	TYPE=COMET,Q=1.5505372,E=1.00 10494,I=106.17749,O=325.99769,W=90.74772,T=23-DEC-2011:16:15:53,TTIMEscale=TDB,EQ UINOX=J2000,EPOCH=25-DEC-2011,EpochTimeScale=TDB					EARTH		
<i>Comments:</i> Acquisition Uncertainty: 10 Arcsec Ephemeris Uncertainty: 3700 Kilometers										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1	(3) C-2009P1-GARRADD-NEW	STIS/CCD, ACQ, F28X50LP	MIRROR			REQ EPHEM CORR COMV15		1 Secs [==>]	[1]
	2	(3) C-2009P1-GARRADD-NEW	STIS/NUV-MAMA, TIME-TAG, 52X0.2	G230L 2376 A		BUFFER-TIME=30 0	REQ EPHEM CORR COMV15		1800 Secs [==>]	[1]



Proposal 12607 - Visit 16 - Using Hubble to Measure Volatile Abundances and the D/H Ratio in a Bright ToO Comet

Sun Jan 15 02:02:45 GMT 2012

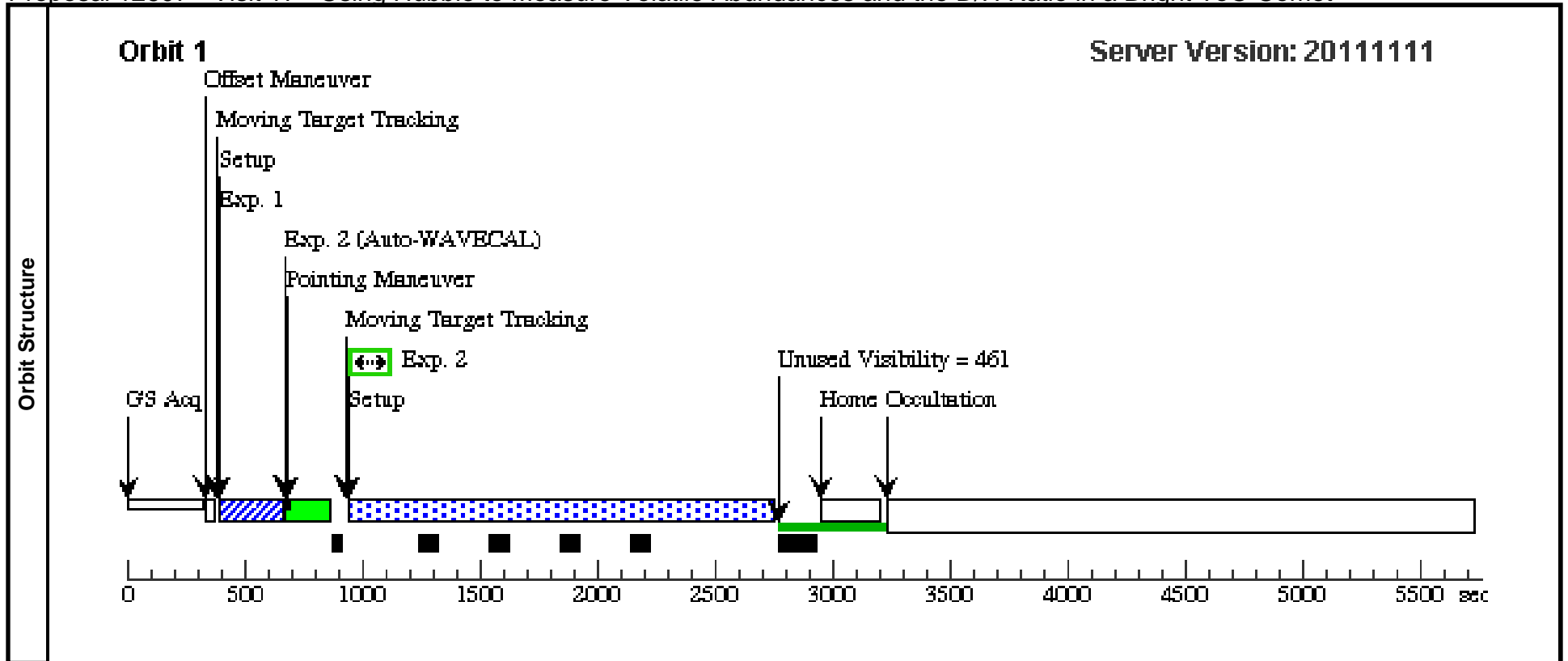
Visit	Proposal 12607, Visit 16, implementation Diagnostic Status: Warning Scientific Instruments: STIS/CCD, STIS/FUV-MAMA Special Requirements: (none)									
	(Exposure 2 (Visit 16)) Warning (Form): Sensitive exposures should have an ETC run number provided.									
Diagnostics										
Solar System Targets	#	Name	Level 1	Level 2	Level 3	Window	Ephem Center			
	(3)	C-2009P1-GARRADD-NEW	TYPE=COMET,Q=1.5505372,E=1.00 10494,I=106.17749,O=325.99769,W=90.74772,T=23-DEC-2011:16:15:53,TTTimeScale=TDB,EQ UINOX=J2000,EPOCH=25-DEC-2011,EpochTimeScale=TDB					EARTH		
Comments: Acquisition Uncertainty: 10 Arcsec Ephemeris Uncertainty: 3700 Kilometers										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1	(3) C-2009P1-GARRADD-NEW	STIS/CCD, ACQ, F28X50LP	MIRROR			REQ EPHEM CORR COMV16		1 Secs [==>]	[1]
2	(3) C-2009P1-GARRADD-NEW	STIS/FUV-MAMA, TIME-TAG, 6X0.2	E140H 1234 A		BUFFER-TIME=30 0	REQ EPHEM CORR COMV16		1800 Secs [==>]	[1]	



Proposal 12607 - Visit 17 - Using Hubble to Measure Volatile Abundances and the D/H Ratio in a Bright ToO Comet

Sun Jan 15 02:02:45 GMT 2012

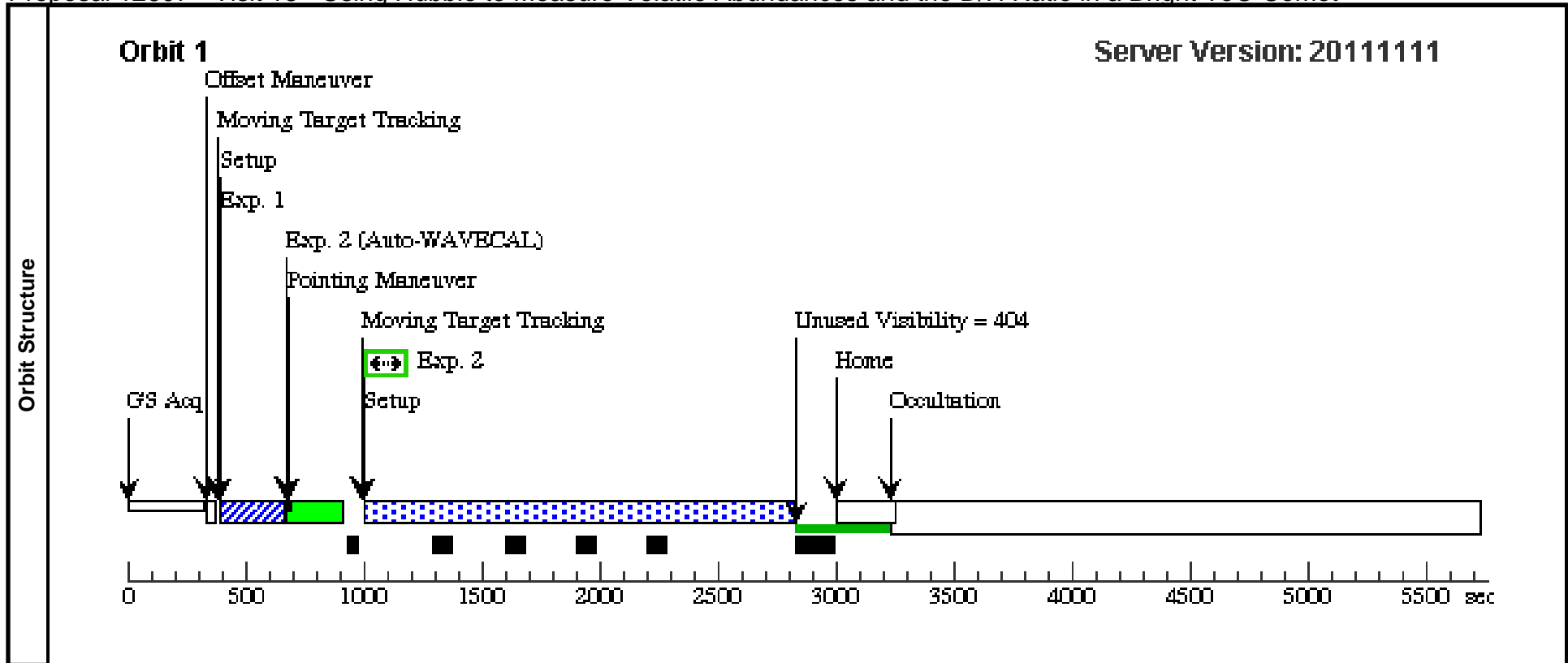
Visit	Proposal 12607, Visit 17, implementation Diagnostic Status: Warning Scientific Instruments: STIS/CCD, STIS/FUV-MAMA Special Requirements: (none)										
	(Exposure 2 (Visit 17)) Warning (Form): Sensitive exposures should have an ETC run number provided.										
Diagnostics											
Solar System Targets	#	Name	Level 1	Level 2	Level 3	Window	Ephem Center				
	(3)	C-2009P1-GARRADD-NEW	TYPE=COMET,Q=1.5505372,E=1.00 10494,I=106.17749,O=325.99769,W=90.74772,T=23-DEC-2011:16:15:53,TTTimeScale=TDB,EQ UINOX=J2000,EPOCH=25-DEC-2011,EpochTimeScale=TDB					EARTH			
Comments: Acquisition Uncertainty: 10 Arcsec Ephemeris Uncertainty: 3700 Kilometers											
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]		Orbit
	1	(3) C-2009P1-GARRADD-NEW	STIS/CCD, ACQ, F28X50LP	MIRROR			REQ EPHEM CORR COMV17		1 Secs [==>]	[1]	
2	(3) C-2009P1-GARRADD-NEW	STIS/FUV-MAMA, TIME-TAG, 52X0.2	G140L 1425 A		BUFFER-TIME=30 0	REQ EPHEM CORR COMV17		1800 Secs [==>]	[1]		



Proposal 12607 - Visit 18 - Using Hubble to Measure Volatile Abundances and the D/H Ratio in a Bright ToO Comet

Sun Jan 15 02:02:45 GMT 2012

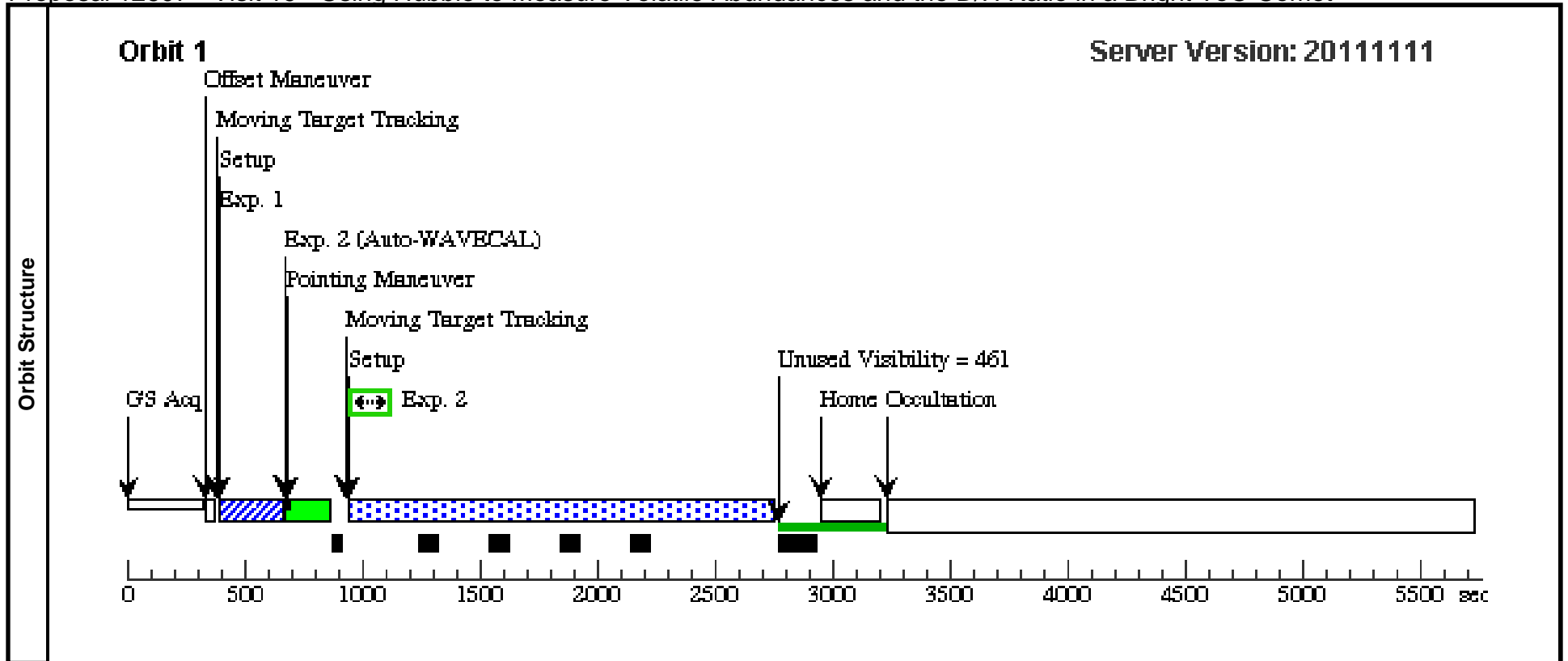
Visit	Proposal 12607, Visit 18, implementation Diagnostic Status: Warning Scientific Instruments: STIS/CCD, STIS/FUV-MAMA Special Requirements: (none)									
	(Exposure 2 (Visit 18)) Warning (Form): Sensitive exposures should have an ETC run number provided.									
Diagnosics										
Solar System Targets	#	Name	Level 1	Level 2	Level 3	Window	Ephem Center			
	(3)	C-2009P1-GARRADD-NEW	TYPE=COMET,Q=1.5505372,E=1.00 10494,I=106.17749,O=325.99769,W=90.74772,T=23-DEC-2011:16:15:53,TTTimeScale=TDB,EQ UINOX=J2000,EPOCH=25-DEC-2011,EpochTimeScale=TDB					EARTH		
Comments: Acquisition Uncertainty: 10 Arcsec Ephemeris Uncertainty: 3700 Kilometers										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1	(3) C-2009P1-GARRADD-NEW	STIS/CCD, ACQ, F28X50LP	MIRROR			REQ EPHEM CORR COMV18		1 Secs [==>]	[1]
2	(3) C-2009P1-GARRADD-NEW	STIS/FUV-MAMA, TIME-TAG, 6X0.2	E140H 1234 A		BUFFER-TIME=30 0	REQ EPHEM CORR COMV18		1800 Secs [==>]	[1]	



Proposal 12607 - Visit 19 - Using Hubble to Measure Volatile Abundances and the D/H Ratio in a Bright ToO Comet

Sun Jan 15 02:02:46 GMT 2012

Visit	Proposal 12607, Visit 19, implementation Diagnostic Status: Warning Scientific Instruments: STIS/CCD, STIS/NUV-MAMA Special Requirements: (none) <i>Comments: G230L orbit</i>										
	(Exposure 2 (Visit 19)) Warning (Form): Sensitive exposures should have an ETC run number provided.										
Diagnostics											
Solar System Targets	#	Name	Level 1	Level 2	Level 3	Window	Ephem Center				
	(3)	C-2009P1-GARRADD-NEW	TYPE=COMET,Q=1.5505372,E=1.00 10494,I=106.17749,O=325.99769,W=90.74772,T=23-DEC-2011:16:15:53,TTIMEscale=TDB,EQ UINOX=J2000,EPOCH=25-DEC-2011,EpochTimeScale=TDB					EARTH			
<i>Comments:</i> Acquisition Uncertainty: 10 Arcsec Ephemeris Uncertainty: 3700 Kilometers											
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]		Orbit
	1	(3) C-2009P1-GARRADD-NEW	STIS/CCD, ACQ, F28X50LP	MIRROR			REQ EPHEM CORR COMV19		1 Secs [==>]	[1]	
	2	(3) C-2009P1-GARRADD-NEW	STIS/NUV-MAMA, TIME-TAG, 52X0.2	G230L 2376 A		BUFFER-TIME=30 0	REQ EPHEM CORR COMV19		1800 Secs [==>]	[1]	



Proposal 12607 - Visit 20 - Using Hubble to Measure Volatile Abundances and the D/H Ratio in a Bright ToO Comet

Sun Jan 15 02:02:46 GMT 2012

Visit	Proposal 12607, Visit 20, implementation Diagnostic Status: Warning Scientific Instruments: STIS/CCD, STIS/FUV-MAMA Special Requirements: (none)									
	(Visit 20) Warning (Form): A target acquisition should probably be performed before doing spectroscopy or coronagraphy with STIS or COS. (Visit 20) Warning (Orbit Planner): MERGING RULE VIOLATED DURING AUTOMATIC MERGING (Exposure 1 (Same Obset in Visit 20)) Warning (Form): Sensitive exposures should have an ETC run number provided.									
Diagnostics										
Solar System Targets	#	Name	Level 1	Level 2	Level 3	Window	Ephem Center			
	(3)	C-2009P1-GARRADD-NEW	TYPE=COMET,Q=1.5505372,E=1.00 10494,I=106.17749,O=325.99769,W=90.74772,T=23-DEC-2011:16:15:53,TTimeScale=TDB,EQ UINOX=J2000,EPOCH=25-DEC-2011,EpochTimeScale=TDB				EARTH			
	Comments: Acquisition Uncertainty: 10 Arcsec Ephemeris Uncertainty: 3700 Kilometers									
	(4)	C-2009P1-GARRADD-NEW-OFFSET	TYPE=COMET,Q=1.5505372,E=1.00 10494,I=106.17749,O=325.99769,W=90.74772,T=23-DEC-2011:16:15:53,TTimeScale=TDB,EQ UINOX=J2000,EPOCH=25-DEC-2011,EpochTimeScale=TDB	TYPE=POS_ANGLE,RAD=1500,AN G=0,REF=SUN				EARTH		
Comments: Acquisition Uncertainty: 10 Arcsec Ephemeris Uncertainty: 3700 Kilometers										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1	(4) C-2009P1-GARRADD-NEW-OFFSET		STIS/FUV-MAMA, TIME-TAG, 6X0.2	E140H 1234 A	BUFFER-TIME=30 0	REQ EPHEM CORR COMV20	Same Obset in Visit 20	2000 Secs [==>]	[1]
	2	(3) C-2009P1-GARRADD-NEW		STIS/CCD, ACCUM, F28X50LP	MIRROR	CR-SPLIT=2; GAIN=4	REQ EPHEM CORR COMV20; EXP PCS MODE G YRO	Same Obset in Visit 20	10 Secs [==>(Split 1)] [==>(Split 2)]	[1]

