11620 - A Quasar Light Echo in the Local Universe?

Cycle: 17, Proposal Category: GO

(Availability Mode: SUPPORTED)

INVESTIGATORS

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VISITS

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
01	(2) IC2497 CCDFLAT	STIS/CCD	2	30-Jun-2009 22:46:35.0	yes
02	(1) SDSSJ094103.80+344334.2	ACS/WFC	2	30-Jun-2009 22:46:40.0	yes
03	(1) SDSSJ094103.80+344334.2	WFC3/IR WFC3/UVIS	3	30-Jun-2009 22:46:45.0	yes

7 Total Orbits Used

ABSTRACT

The time history and duty cycle of individual AGN is an important part of their evolution and the growth history of massive black holes, but almost unconstrained on scales between galaxy-interaction timescales (hundreds of Myr) and the scales of years probed by variability measurements. We propose a detailed study of an object which seems to be a large-scale light echo from a QSO-level episode in a nearby galaxy. The Galaxy Zoo morphological survey of SDSS objects has uncovered a peculiar emission-line structure whose spectrum matches the narrow-line region of AGN, despite lying at least 20 kpc from a galaxy whose activity is currently very weak. This is best explained if the nucleus has faded dramatically on time scales of several tens of thousands of years. We propose a suite of imaging and spectroscopic observations to probe its properties, and the time history of this episode of nuclear activity, measuring time scales hitherto unavailable.

OBSERVING DESCRIPTION

We examine the nature and energy source of a newly-found cloud near the galaxy IC 2497 ("Hanny's Voorwerp") in several ways. STIS spectroscopy of the IC 2497 nucleus will seek highly-ionized AGN gas, and measure the stellar velocity dispersion. ACS ramp-filter exposures will map [O III] and H-alpha, comparison of which might show past fluctuations in the ionizing luminosity of the AGN, and include the central part of IC 2497 to seek highly ionized structures near the core. Finally, WFC3 exposures in the UV, I, and F160W bands will be used to look for star clusters in the cloud itself, to see whether it was originally a dwarf galaxy which was later disrupted.

Visit

Proposal 11620, Visit 01, implementation Wed Jul 01 02:46:49 GMT 2009

Diagnostic Status: No Diagnostics

Scientific Instruments: STIS/CCD

Special Requirements: (none)

Comments: STIS spectroscopy of the nucleus of IC 2497, seeking evidence of ongoing (even if obscured) nuclear actvity. The 0.2" slit is a compromise between rejection of the surounding starlight and throughput (plus speed of acquisition). Setups in blue and red (with fring flats) are used for one orbit each.

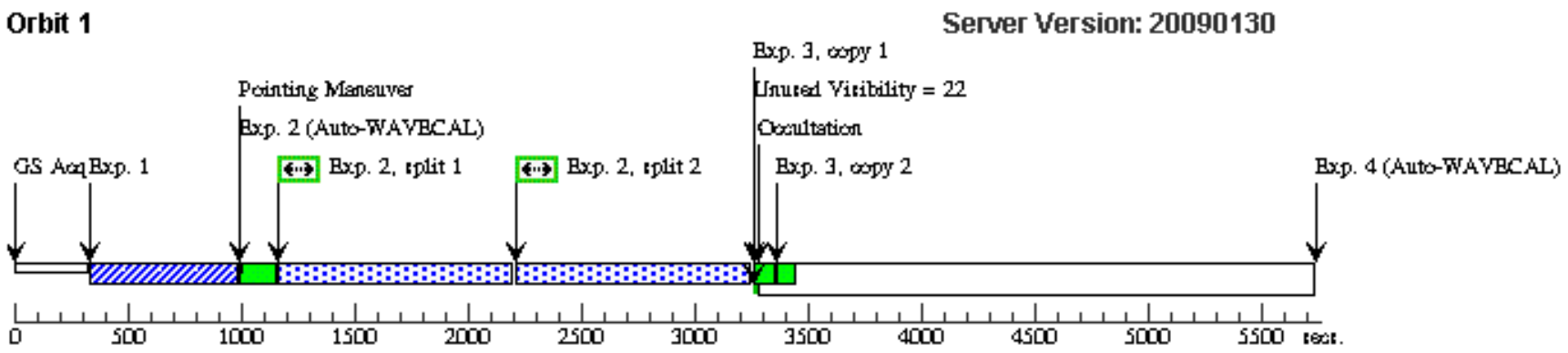
Fixed Targets

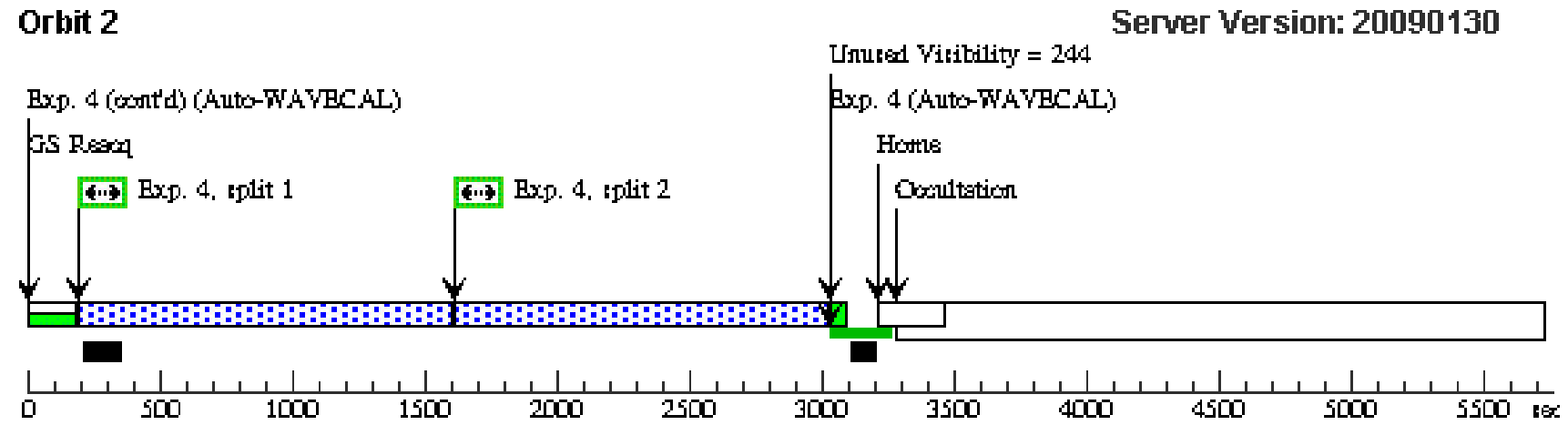
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(2)	IC2497	RA: 09 41 4.1500 (145.2672917d) Dec: +34 43 58.30 (34.73286d) Equinox: J2000		V=14 g(nucleus)=16.9	Reference Frame: ICRS

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1	IC 2497 acq	(2) IC2497	STIS/CCD, ACQ, F28X50LP	MIRROR	ACQTYPE=DIFFUSE; DIFFUSE-CENTER=FLUX-CENTROID; CHECKBOX=9			100 Secs *[==>]*	***[1]***
2	IC 2497 red spectrum	(2) IC2497	STIS/CCD, ACCUM, 52X0.2	G750L 7751 A				2000 Secs *[==>(Split 1)]* *[==>(Split 2)]*	***[1]***
3	Fringe flats	CCDFLAT	STIS/CCD, ACCUM, 52X0.2	G750L 7751 A				*[==>(Copy 1)]* *[==>(Copy 2)]*	***[1]***
4	IC 2497 STIS blue spectrum	(2) IC2497	STIS/CCD, ACCUM, 52X0.2	G430L 4300 A				2750 Secs *[==>(Split 1)]* *[==>(Split 2)]*	***[2]***

Orbit Structure





Visit

Proposal 11620, Visit 02, implementation Wed Jul 01 02:46:50 GMT 2009

Diagnostic Status: Warning

Scientific Instruments: ACS/WFC

Special Requirements: ORIENT 305D TO 335 D; ORIENT 117D TO 149 D

Comments: Narrowband images in [O III] and H-alpha at z=0.05. 2-point dither pattern, 2x2 pixels to reject hot pixels and keep the whole ramp-filter field. To keep two targets in monochromatic fields, orientation is restricted to two ranges and center point is offset from target cordinates (to maximize rangle of usable angles).

Diagnostics

(Voorwerp [O III] (02.001)) Warning (Form): POS TARG & PATTERN should be used carefully with ACS/WFPC2 ramp or WFC3 quad filters as central wavelengths & transmission efficiencies vary within the apertures.

(Voorwerp H-alpha (02.002)) Warning (Form): POS TARG & PATTERN should be used carefully with ACS/WFPC2 ramp or WFC3 quad filters as central wavelengths & transmission efficiencies vary within the apertures.

Patterns

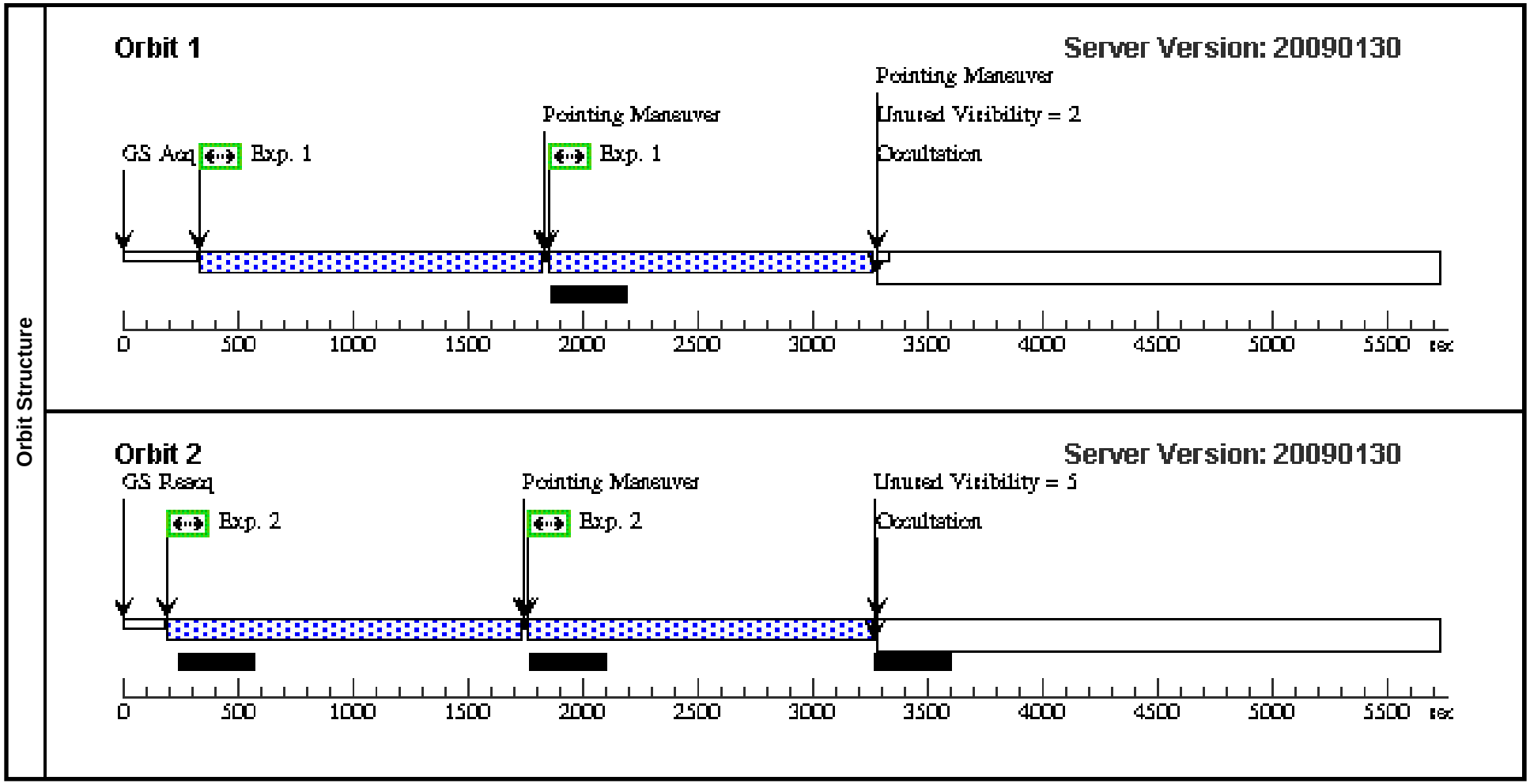
#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=LINE	Coordinate Frame=POS-TARG		(1), (2)
	Purpose=DITHER	Pattern Orientation=47.23		
	Number Of Points=2	Angle Between Sides=		
	Point Spacing=0.145	Center Pattern=false		
	Line Spacing=			

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	SDSSJ094103.80+344334.2	RA: 09 41 4.0449 (145.2668538d) Dec: +34 43 39.82 (34.72773d) Equinox: J2000		V=(?) g=18.3	Reference Frame: ICRS

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1	Voorwerp [O III]	(1) SDSSJ094103.80+344334.2	ACS/WFC, ACCUM, WFC1-MRAMP	FR505N 5240.0 A			Pattern 1, Exps 1-1 (1)	1285 Secs *[==>(Pattern 1)]* *[==>(Pattern 2)]*	***[1]***
2	Voorwerp H-alpha	(1) SDSSJ094103.80+344334.2	ACS/WFC, ACCUM, WFC1-IRAMP	FR716N 6921.0 A			Pattern 1, Exps 2-2 (1)	1375 Secs *[==>(Pattern 1)]* *[==>(Pattern 2)]*	***[2]***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Occultation
Pointing Maneuver
GS Acq
Exp. 1
Exp. 1
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2500
3000
3500
4000
4500
5000
5500
sec
Orbit 2
Server Version: 20090130
GS Reacq
Pointing Maneuver
Unused Visibility = 5
Exp. 2
Exp. 2
Occultation
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1500
2000
2500
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3500
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4500
5000
5500
sec

Visit

Proposal 11620, Visit 03, implementation Wed Jul 01 02:46:50 GMT 2009

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR, WFC3/UVIS

Special Requirements: (none)

Comments: Broadband continuum images (UVIS and IR) of the cloud known as Hanny's Voorwerp are used to seek underlying stelar populations, to tell whether it was originally a dwarf galaxy later disrupted and illuminated by IC 2497. Simple 2- and 3-pont linear dithers are used for hot-pixel rejection.

Patterns

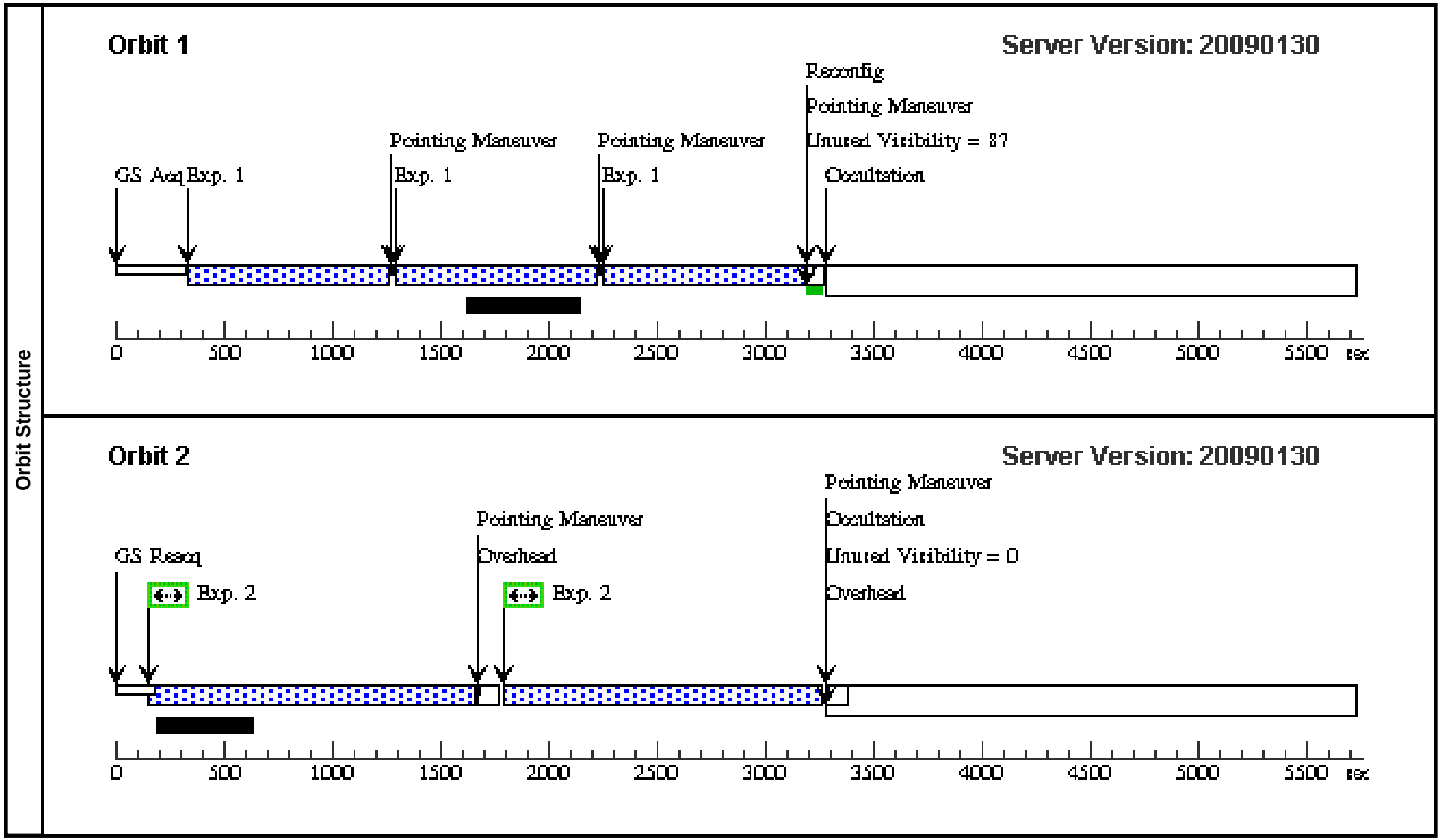
#	Primary Pattern		Secondary Pattern	Exposures
(2)	Pattern Type=WFC3-UVIS-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.145 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false		(2), (3)
(3)	Pattern Type=WFC3-IR-DITHER-LINE Purpose=DITHER Number Of Points=3 Point Spacing=0.636 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=41.788 Angle Between Sides= Center Pattern=false		(1)

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	SDSSJ094103.80+344334.2	RA: 09 41 4.0449 (145.2668538d) Dec: +34 43 39.82 (34.72773d) Equinox: J2000		V=(?) g=18.3	Reference Frame: ICRS

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1	Voorwerp IR	(1) SDSSJ094103.80+344334.2	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=STEP100; NSAMP=15		Pattern 3, Exps 1-1 (3)	*[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]*	***[1]***
2	Voorwerp UV	(1) SDSSJ094103.80+344334.2	WFC3/UVIS, ACCUM, UVIS1	F225W	CR-SPLIT=NO		Pattern 2, Exps 2-2 (2)	1200 Secs *[==>1476.0 Secs (Pattern 1)]* *[==>1476.0 Secs (Pattern 2)]*	***[2]***
3	Voorwerp I	(1) SDSSJ094103.80+344334.2	WFC3/UVIS, ACCUM, UVIS1	F814W	CR-SPLIT=NO		Pattern 2, Exps 3-3 (2)	1300 Secs *[==>1652.0 Secs (Pattern 1)]* *[==>(Pattern 2)]*	***[3]***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Pointing Maneuver
Pointing Maneuver
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Exp. 1
Exp. 1
Occultation
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Orbit 2
Server Version: 20090130
Pointing Maneuver
Pointing Maneuver
Occultation
GS Reacq
Overhead
Unused Visibility = 0
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Exp. 2
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sec

Orbit Structure (continued)