



12185 - The Hosts of Megamaser Disk Galaxies

Cycle: 18, Proposal Category: GO

(Availability Mode: SUPPORTED)

INVESTIGATORS

<i>Name</i>	<i>Institution</i>	<i>E-Mail</i>
Dr. Jenny E. Greene (PI)	Princeton University	jgreene@astro.princeton.edu
Dr. Chien Y. Peng (CoI)	Dominion Astrophysical Observatory	cyp@nrc-cnrc.gc.ca
Dr. Minjin Kim (CoI)	Associated Universities, Inc.	mkim@nrao.edu
Dr. Anil C. Seth (CoI)	Smithsonian Institution Astrophysical Observatory	aseth@cfa.harvard.edu
Dr. James A. Braatz (CoI)	Associated Universities, Inc.	jbraatz@nrao.edu
Mr. Cheng-Yu Kuo (CoI)	The University of Virginia	ck2v@virginia.edu
Dr. C. M. Viollette Impellizzeri (CoI)	Associated Universities, Inc.	vimpelli@nrao.edu
Dr. Fred K. Y. Lo (CoI)	Associated Universities, Inc.	flo@nrao.edu
Dr. James J. Condon (CoI)	Associated Universities, Inc.	jcondon@nrao.edu

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) NGC-1194	WFC3/IR WFC3/UVIS	2	13-Jul-2010 21:06:12.0	yes
02	(2) NGC-2273	WFC3/IR WFC3/UVIS	2	13-Jul-2010 21:06:27.0	yes
03	(3) MCG+10-11-021	WFC3/IR WFC3/UVIS	2	13-Jul-2010 21:06:39.0	yes
04	(4) NGC-2960	WFC3/IR WFC3/UVIS	2	13-Jul-2010 21:06:51.0	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>
05	(5) IC-2560	WFC3/IR WFC3/UVIS	2	13-Jul-2010 21:07:03.0	yes
06	(6) NGC-3393	WFC3/IR WFC3/UVIS	2	13-Jul-2010 21:07:14.0	yes
07	(7) NGC-4388	WFC3/IR WFC3/UVIS	2	13-Jul-2010 21:07:24.0	yes
08	(8) NGC-6264	WFC3/IR WFC3/UVIS	2	13-Jul-2010 21:07:34.0	yes
09	(9) NGC-6323	WFC3/IR WFC3/UVIS	2	13-Jul-2010 21:07:45.0	yes

18 Total Orbits Used

ABSTRACT

We propose to obtain multi-wavelength imaging of a new sample of exquisite megamaser disk galaxies. Much like in NGC 4258, the megamasers in our sample trace sub-pc, circumnuclear gas in Keplerian rotation around the central supermassive black holes (BHs). We are thus able to derive remarkably precise BH masses in these systems. As the megamasers are found in spiral galaxies with BH masses $\sim 10^7 M_{\odot}$, they offer a unique opportunity to study BH-bulge scaling relations in later-type galaxies. Existing ground-based imaging is inadequate to disentangle the many structural components (star clusters, bars, spirals, and dust lanes) found in the nuclei of these galaxies. Thus, we propose F336W, F438W, F814W, F110W, and F160W observations of these galaxies with WFC3 to simultaneously model the stellar populations and structures of their inner regions. With these data we will constrain BH-bulge scaling relations at low mass, study the relation between nuclear star clusters and supermassive BHs, and look for evidence of coincident star formation and accretion. The mass-to-light ratio profiles will provide important inputs to complementary stellar- and gas-dynamical modeling of the BH masses. The high-precision masses afforded by this sample of new megamaser galaxies provides a tremendous resource for our community that can only be adequately exploited with complementary HST imaging.

OBSERVING DESCRIPTION

We take as our sample the nine galaxies with megamaser disks and VLBI observations in hand. With distances of 18-150 Mpc, the galaxies have apparent B-band magnitudes of 15.4-12.5 mag and apparent sizes ranging from 1-4 arcmin (~ 15 kpc at 50 Mpc).

Choice of Filters and Camera:

In order to disentangle, both spectrally and spatially, variations in stellar populations, dust absorption, and dust emission from the AGN, we require multiple filters. In the UV we take F336W (broad U), which allows us to probe the near UV part of the spectrum with reasonable throughput, while in the blue we choose F438W to avoid contamination from H β emission. In the red we take F814W (broad I) because of its high throughput and to avoid contamination from emission lines such as [O III] 5007. In the near-infrared, we anticipate some contamination from dust heated by the active galaxy continuum in the F160W filter, while we expect galaxy light to dominate the F110W filter. We thus request both F110W and F160W to ensure that we have an AGN-free filter in the red to constrain the nuclear cluster mass. WFC3 is the camera of choice, as it will allow us to cover the entire wavelength range with the highest sensitivity and finest pixel scale.

Observational Plan:

Our exposure times are driven by a number of considerations. Firstly, to model the nuclear star cluster masses accurately, we require $\sim 3\%$ accuracy in our color measurements, requiring $S/N > 50$ for the faintest expected cluster ($V = 21.8$ mag). Secondly, we must be sensitive to classical bulges with $\mu V \sim 22$ mag/ sq. arcsec at ~ 5 arcsec, which is typically a factor of a few below the total surface brightness at these scales (Fig. 3). Finally, because we are interested in decoupling various non-axisymmetric components, such as bars, and to facilitate combining with ground-based data, we require $S/N > 5$ at ~ 20 arcsec scales (as faint as $\mu V \sim 24.5$ mag/ sq arcsec; Fig. 3) in our deepest filters (IH). These goals can be accomplished in two ~ 51 min orbits per galaxy.

In the UVIS, we will use a three-point dither pattern to facilitate cosmic-ray removal. In the IR, we will use the WFC3-IR-DITHER-BOX in order to properly sample the PSF. For filters with short exposures (F438W, F110W, F160W) we will use subarrays ($2k \times 2k$ and IRSUB512 respectively) to avoid buffer dumps.

In summary, the exposure times for each filter are as follows:

F336W: for nuclear cluster and bulge stellar populations, require $S/N > 50$ for all nuclear clusters; 3 x 400 sec.

F438W: the same as F336W; 3 x 130 sec.

F814W: for galaxy structural measurements, requires $S/N > 5$ at $\mu V = 24.5$ mag/sq arcsec; 3 x 640 sec.

Proposal 12185 (STScI Edit Number: 1, Created: Tuesday, July 13, 2010 8:07:50 PM EST) - Overview

F110W: for stellar populations, dust, and structural measurements, requires $S/N > 5$ at $\mu V = 24.5$ mag/sq arcsec; 4 x 30 sec.

F160W: combination of AGN and nuclear star cluster at the center, also our deep near-infrared structural image; requires 4 x 100 sec.

We divide the exposures as follows. Orbit 1 will proceed as F110W (4 x 30 sec)-F438W (1 x 130 sec)-F336W (3 x 400 sec)-F438 (2 x 130 sec). Since the first two filters use subarrays, we incur no buffer dumps, but spend 22 min on overheads (6 for guide-star acquisition, 12.4 min for readout, 2.5 min for dithering, and 1 min to change from IR to UVIS). Orbit 2 will be the remaining filters: F160W (4 x 100 sec)-F814W (3 x 690 sec). The long exposures in F814W allow us to read out the full array with no buffer dumps. It is worth noting that we are in danger of saturating in F814W, F110W, and F160W. In the former case we thus include a fourth 5 sec exposure. For the NIR filters, we use the cluster luminosity of NGC 4388 ($F160W = 14.8$) as a guide. In order to avoid saturation of this cluster, we take SPARS10, NSAMP=5 for F110W and SPARS25, NSAMP=8 for F160W. Using fewer samples increases the readnoise slightly, but this will not impact our bright targets. Finally, we note that there is some danger for a low-level jump in the background level for the F110W and F160W observations, which will hopefully be removed in software, but should not significantly impact our observations.

We request a total of 18 orbits to image the entire sample.

Proposal 12185 (STScI Edit Number: 1, Created: Tuesday, July 13, 2010 8:07:50 PM EST) - Overview

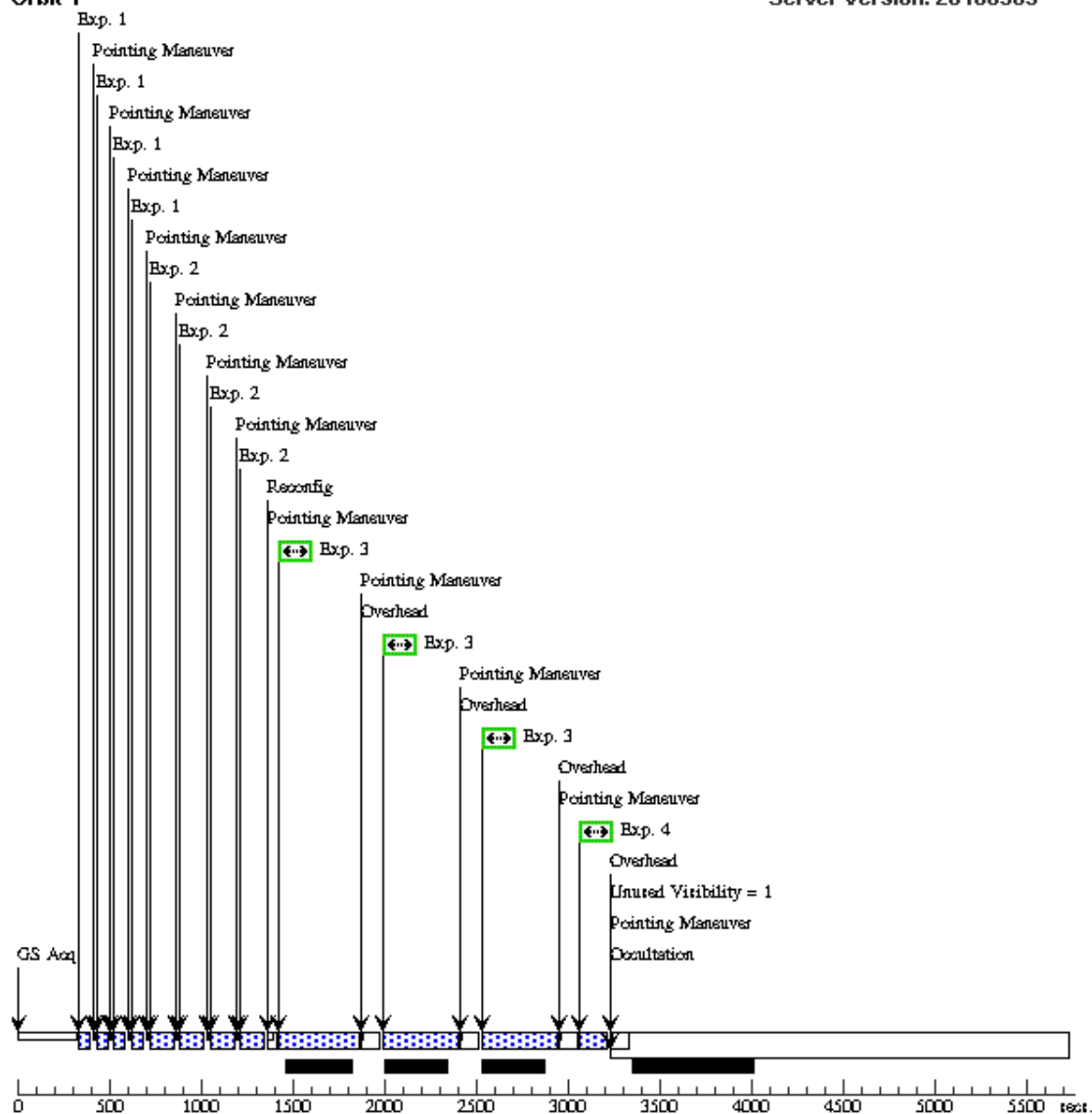
Visit	Proposal 12185, Visit 01, implementation Wed Jul 14 01:07:51 GMT 2010				
	Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/IR, WFC3/UVIS Special Requirements: (none)				
Patterns	#	Primary Pattern		Secondary Pattern	Exposures
	(1)	Pattern Type=WFC3-IR-DITHER-BOX-MIN Purpose=DITHER Number Of Points=4 Point Spacing=0.572 Line Spacing=0.365	Coordinate Frame=POS-TARG Pattern Orientation=18.528 Angle Between Sides=74.653 Center Pattern=false		(1), (2)
	(2)	Pattern Type=WFC3-UVIS-DITHER-LINE-3PT Purpose=DITHER Number Of Points=3 Point Spacing=0.135 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false		(3)
	(4)	Pattern Type=WFC3-UVIS-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.173 Line Spacing=0.112	Coordinate Frame=POS-TARG Pattern Orientation=23.884 Angle Between Sides=81.785 Center Pattern=false		(6)
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes
	(1)	NGC-1194	RA: 03 03 49.1400 (45.9547500d) Dec: -01 06 13.00 (-1.10361d) Equinox: J2000		V=13.8
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.					
Miscellaneous Reference Frame: ICRS					

Proposal 12185 (STScI Edit Number: 1, Created: Tuesday, July 13, 2010 8:07:50 PM EST) - Overview

Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(1) NGC-1194	WFC3/IR, MULTIACCUM, IRSUB512	F110W	NSAMP=6; SAMP-SEQ=STEP2 5		Pattern 1, Exps 1-1 (1)	[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]
	2		(1) NGC-1194	WFC3/IR, MULTIACCUM, IRSUB512	F160W	NSAMP=9; SAMP-SEQ=STEP2 5		Pattern 1, Exps 2-2 (1)	[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]
	3		(1) NGC-1194	WFC3/UVIS, ACCUM, UVIS2	F336W		POS TARG 0.1848,0 .1969	Pattern 2, Exps 3-3 (2)	400 Secs [==>408.0 Secs (Pattern 1)] [==>408.0 Secs (Pattern 2)] [==>408.0 Secs (Pattern 3)]	[1]
	4		(1) NGC-1194	WFC3/UVIS, ACCUM, UVIS2	F438W		POS TARG 0.1848,0 .1969		130 Secs [==>]	[1]
	5		(1) NGC-1194	WFC3/UVIS, ACCUM, UVIS2	F438W		POS TARG 0.0,0.0		130 Secs [==>197.0 Secs]	[2]
	6		(1) NGC-1194	WFC3/UVIS, ACCUM, UVIS2	F814W			Pattern 4, Exps 6-6 (4)	480 Secs [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[2]
	7		(1) NGC-1194	WFC3/UVIS, ACCUM, UVIS2	F438W		POS TARG 0.0924,0 .0985		130 Secs [==>197.0 Secs]	[2]

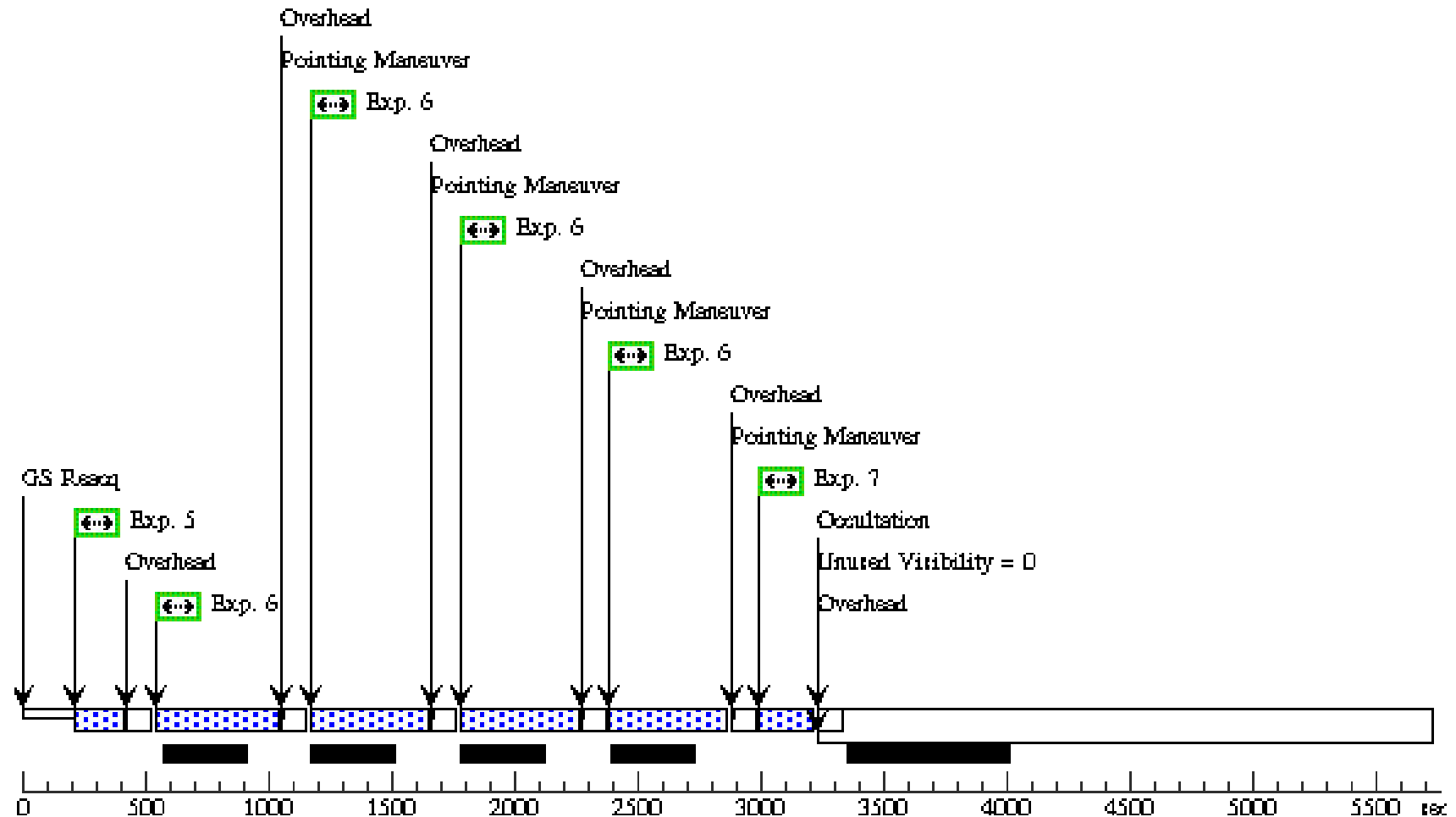
Orbit 1

Server Version: 20100505



Orbit 2

Server Version: 20100505



Proposal 12185 - Visit 01 - The Hosts of Megamaser Disk Galaxies

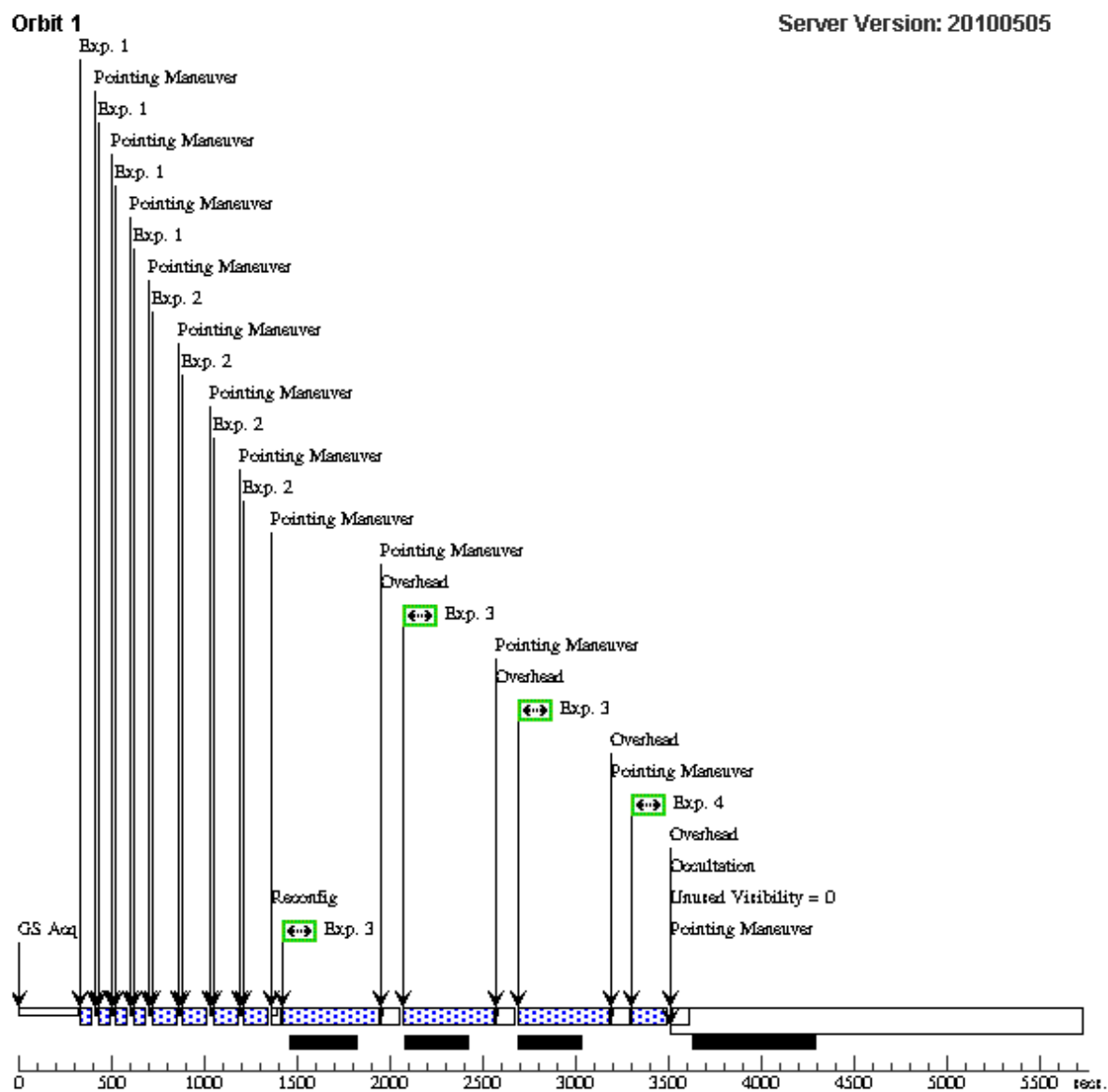
Visit	Proposal 12185, Visit 02, implementation Wed Jul 14 01:07:53 GMT 2010				
	Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/IR, WFC3/UVIS Special Requirements: (none)				
Patterns	#	Primary Pattern		Secondary Pattern	Exposures
	(1)	Pattern Type=WFC3-IR-DITHER-BOX-MIN Purpose=DITHER Number Of Points=4 Point Spacing=0.572 Line Spacing=0.365	Coordinate Frame=POS-TARG Pattern Orientation=18.528 Angle Between Sides=74.653 Center Pattern=false		(1), (2)
	(2)	Pattern Type=WFC3-UVIS-DITHER-LINE-3PT Purpose=DITHER Number Of Points=3 Point Spacing=0.135 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false		(3)
	(4)	Pattern Type=WFC3-UVIS-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.173 Line Spacing=0.112	Coordinate Frame=POS-TARG Pattern Orientation=23.884 Angle Between Sides=81.785 Center Pattern=false		(7)
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes
	(2)	NGC-2273	RA: 06 50 8.6500 (102.5360417d) Dec: +60 50 44.10 (60.84558d) Equinox: J2000		V=12.6
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.					
Miscellaneous Reference Frame: ICRS					

Proposal 12185 - Visit 01 - The Hosts of Megamaser Disk Galaxies

Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(2) NGC-2273	WFC3/IR, MULTIACCUM, IRSUB512	F110W	NSAMP=6; SAMP-SEQ=STEP2 5		Pattern 1, Exps 1-1 (1)	[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]
	2		(2) NGC-2273	WFC3/IR, MULTIACCUM, IRSUB512	F160W	NSAMP=9; SAMP-SEQ=STEP2 5		Pattern 1, Exps 2-2 (1)	[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]
	3		(2) NGC-2273	WFC3/UVIS, ACCUM, UVIS2	F336W		POS TARG 0.1848,0 .1969	Pattern 2, Exps 3-3 (2)	489 Secs [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)]	[1]
	4		(2) NGC-2273	WFC3/UVIS, ACCUM, UVIS2	F438W		POS TARG 0.1848,0 .1969		170 Secs [==>]	[1]
	5		(2) NGC-2273	WFC3/UVIS, ACCUM, UVIS2	F438W		POS TARG 0.0,0.0		170 Secs [==>]	[2]
	6		(2) NGC-2273	WFC3/UVIS, ACCUM, UVIS2-M1K1C-SUB	F814W				5 Secs [==>]	[2]
	7		(2) NGC-2273	WFC3/UVIS, ACCUM, UVIS2	F814W			Pattern 4, Exps 7-7 (4)	539 Secs [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[2]
	8		(2) NGC-2273	WFC3/UVIS, ACCUM, UVIS2	F438W		POS TARG 0.0924,0 .0985		170 Secs [==>]	[2]

Server Version: 20100505

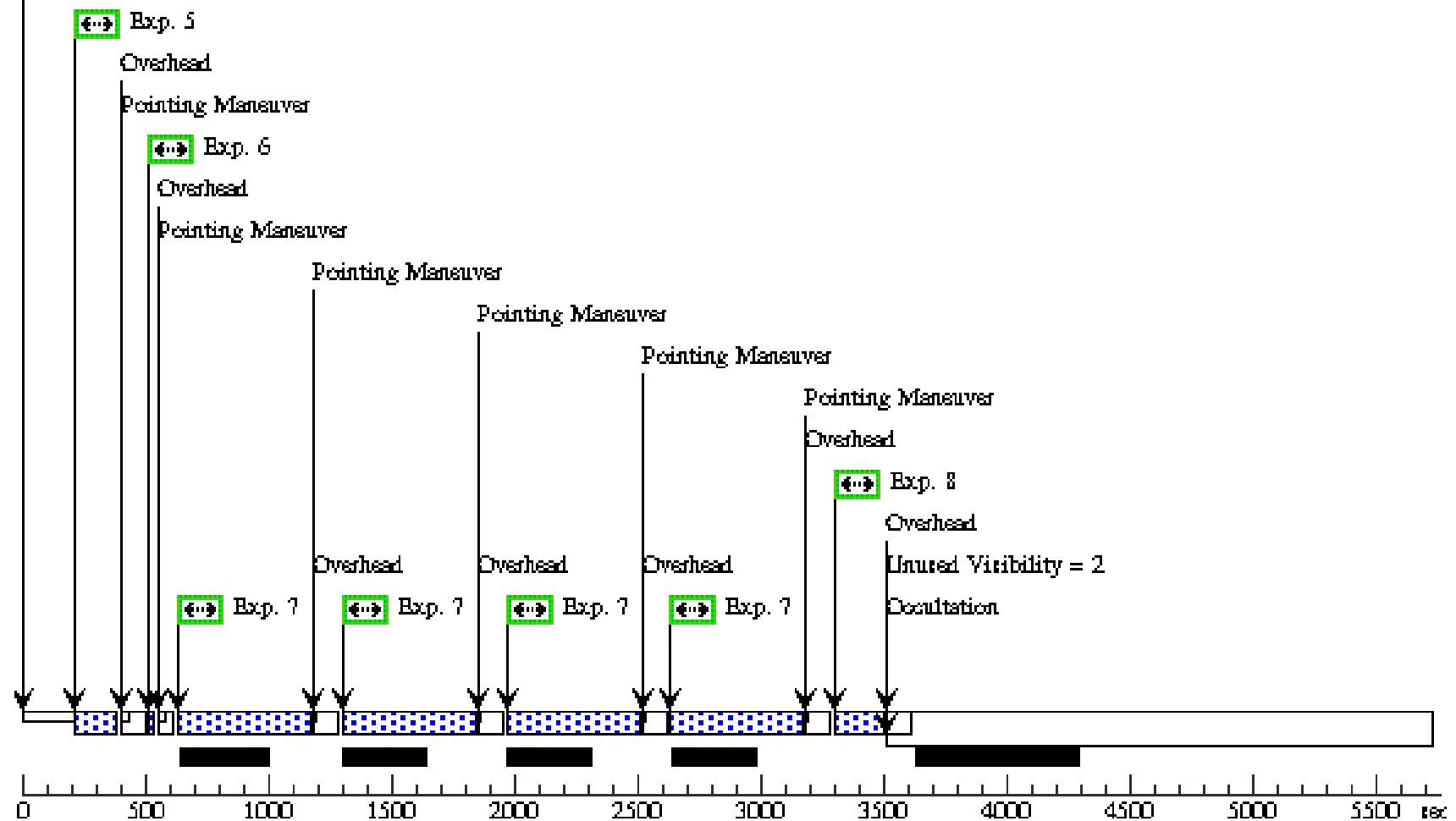
Orbit Structure



Server Version: 20100505

Orbit 2

GS Req

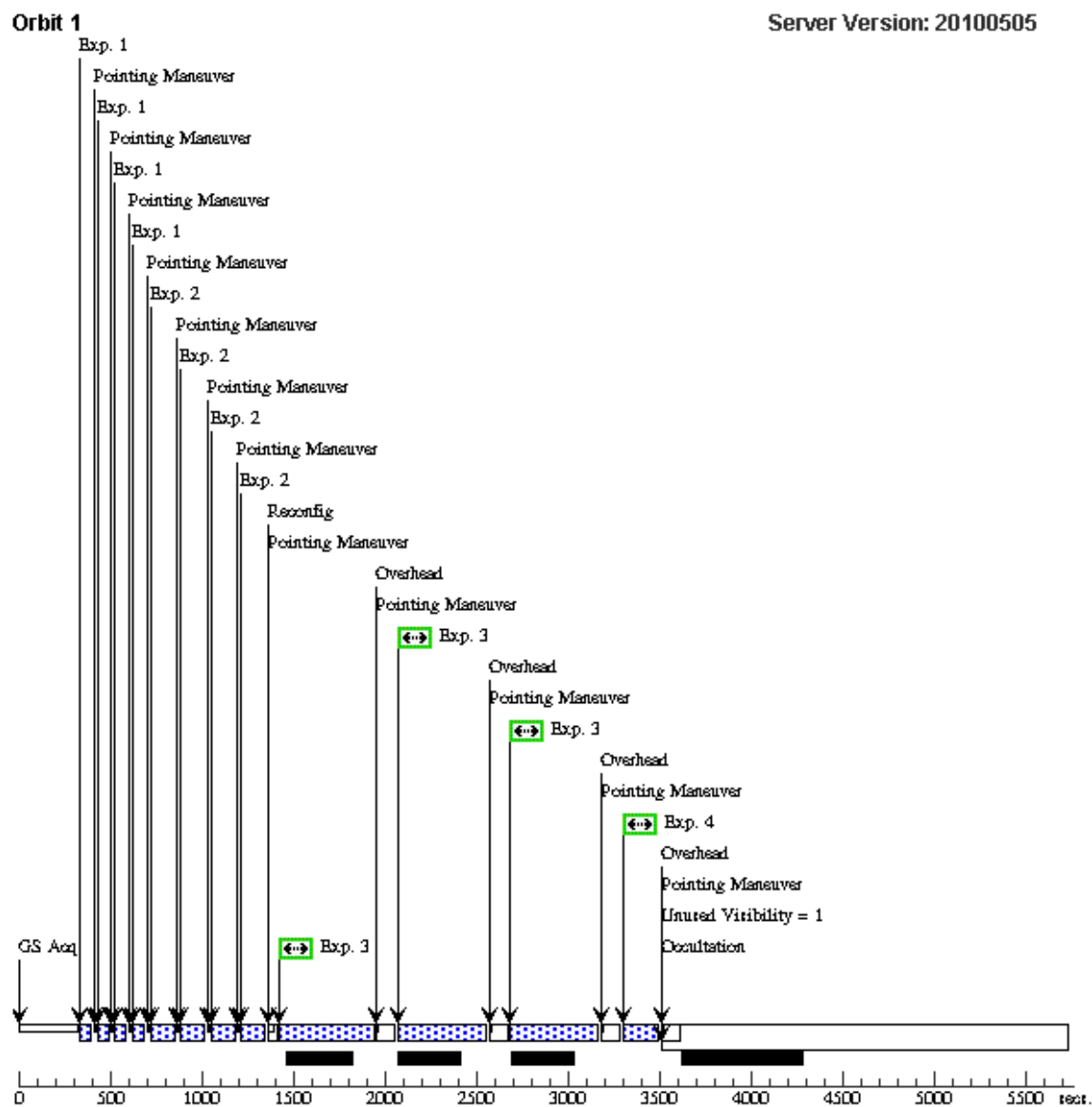


Proposal 12185 - Visit 02 - The Hosts of Megamaser Disk Galaxies

Visit	Proposal 12185, Visit 03, implementation Wed Jul 14 01:07:54 GMT 2010				
	Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/IR, WFC3/UVIS Special Requirements: (none)				
Patterns	#	Primary Pattern		Secondary Pattern	Exposures
	(1)	Pattern Type=WFC3-IR-DITHER-BOX-MIN Purpose=DITHER Number Of Points=4 Point Spacing=0.572 Line Spacing=0.365	Coordinate Frame=POS-TARG Pattern Orientation=18.528 Angle Between Sides=74.653 Center Pattern=false		(1), (2)
	(2)	Pattern Type=WFC3-UVIS-DITHER-LINE-3PT Purpose=DITHER Number Of Points=3 Point Spacing=0.135 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false		(3)
	(4)	Pattern Type=WFC3-UVIS-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.173 Line Spacing=0.112	Coordinate Frame=POS-TARG Pattern Orientation=23.884 Angle Between Sides=81.785 Center Pattern=false		(6)
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes
	(3)	MCG+10-11-021	RA: 07 19 31.0200 (109.8792500d) Dec: +59 21 17.90 (59.35497d) Equinox: J2000		V=13.3
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.					
Miscellaneous Reference Frame: ICRS					

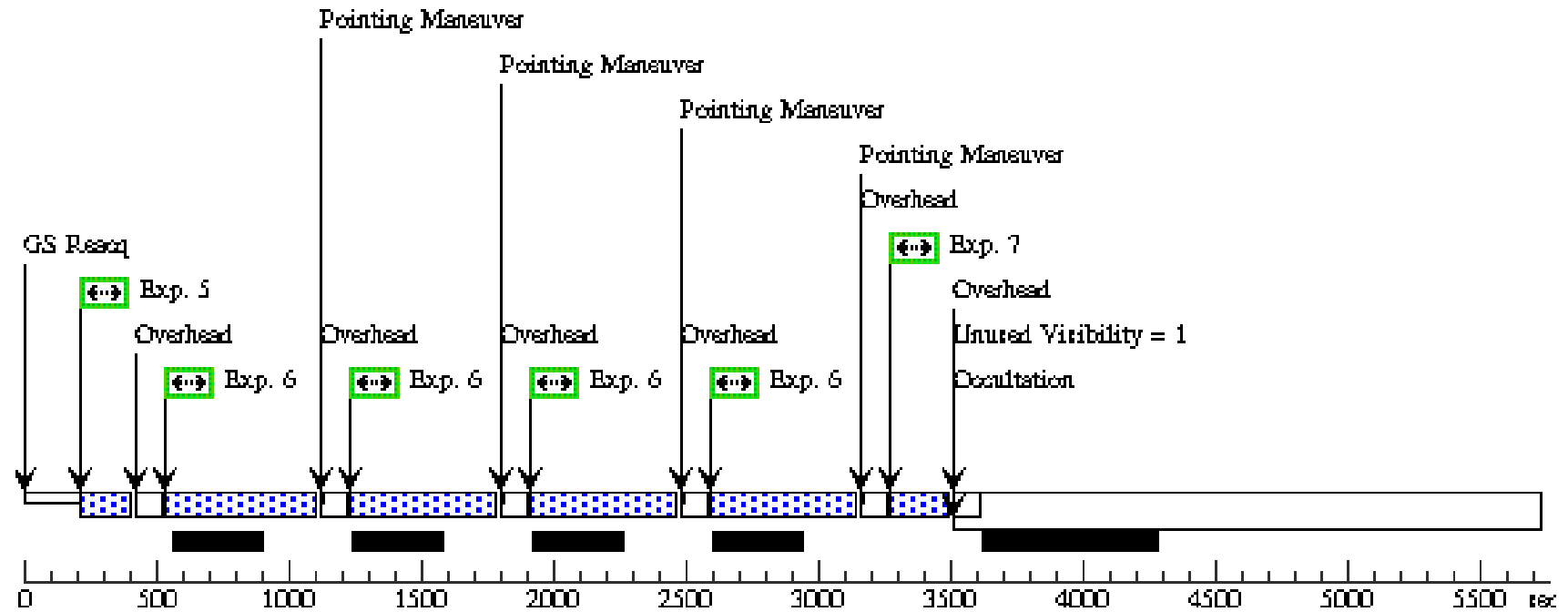
Proposal 12185 - Visit 02 - The Hosts of Megamaser Disk Galaxies

Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(3) MCG+10-11-021	WFC3/IR, MULTIACCUM, IRSUB512	F110W	NSAMP=6; SAMP-SEQ=STEP2 5		Pattern 1, Exps 1-1 (1)	[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]
	2		(3) MCG+10-11-021	WFC3/IR, MULTIACCUM, IRSUB512	F160W	NSAMP=9; SAMP-SEQ=STEP2 5		Pattern 1, Exps 2-2 (1)	[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]
	3		(3) MCG+10-11-021	WFC3/UVIS, ACCUM, UVIS2	F336W		POS TARG 0.1848,0 .1969	Pattern 2, Exps 3-3 (2)	487 Secs [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)]	[1]
	4		(3) MCG+10-11-021	WFC3/UVIS, ACCUM, UVIS2	F438W		POS TARG 0.1848,0 .1969		170 Secs [==>]	[1]
	5		(3) MCG+10-11-021	WFC3/UVIS, ACCUM, UVIS2	F438W		POS TARG 0.0,0.0		191 Secs [==>]	[2]
	6		(3) MCG+10-11-021	WFC3/UVIS, ACCUM, UVIS2	F814W			Pattern 4, Exps 6-6 (4)	552 Secs [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[2]
	7		(3) MCG+10-11-021	WFC3/UVIS, ACCUM, UVIS2	F438W		POS TARG 0.0924,0 .0985		191 Secs [==>]	[2]



Orbit 2

Server Version: 20100505

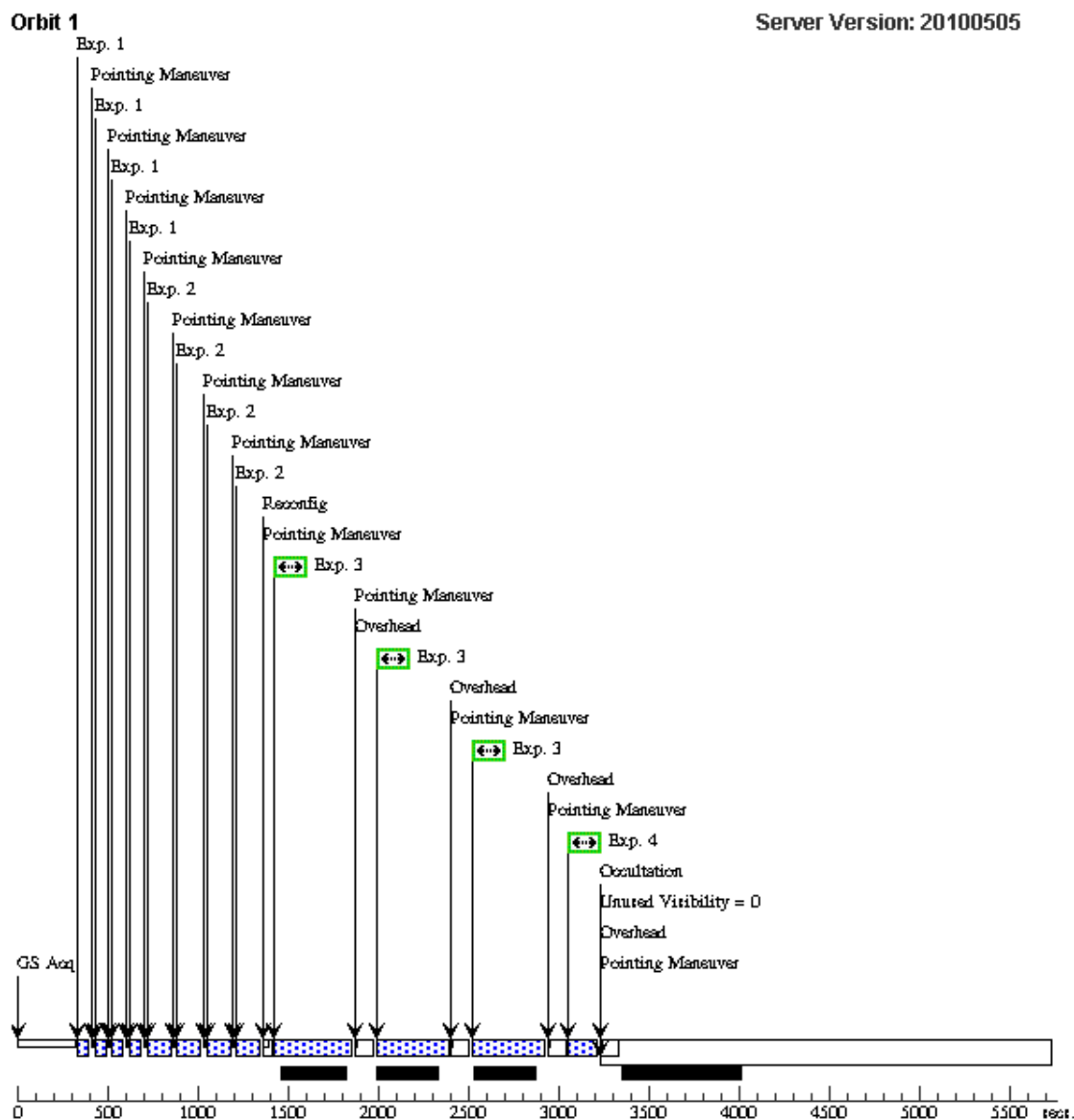


Proposal 12185 - Visit 03 - The Hosts of Megamaser Disk Galaxies

Visit	Proposal 12185, Visit 04, implementation Wed Jul 14 01:07:55 GMT 2010				
	Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/IR, WFC3/UVIS Special Requirements: (none)				
Patterns	#	Primary Pattern		Secondary Pattern	Exposures
	(1)	Pattern Type=WFC3-IR-DITHER-BOX-MIN Purpose=DITHER Number Of Points=4 Point Spacing=0.572 Line Spacing=0.365	Coordinate Frame=POS-TARG Pattern Orientation=18.528 Angle Between Sides=74.653 Center Pattern=false		(1), (2)
	(2)	Pattern Type=WFC3-UVIS-DITHER-LINE-3PT Purpose=DITHER Number Of Points=3 Point Spacing=0.135 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false		(3)
	(4)	Pattern Type=WFC3-UVIS-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.173 Line Spacing=0.112	Coordinate Frame=POS-TARG Pattern Orientation=23.884 Angle Between Sides=81.785 Center Pattern=false		(6)
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes
	(4)	NGC-2960	RA: 09 40 36.4600 (145.1519167d) Dec: +03 34 36.60 (3.57683d) Equinox: J2000		V=13.3
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.					
Miscellaneous Reference Frame: ICRS					

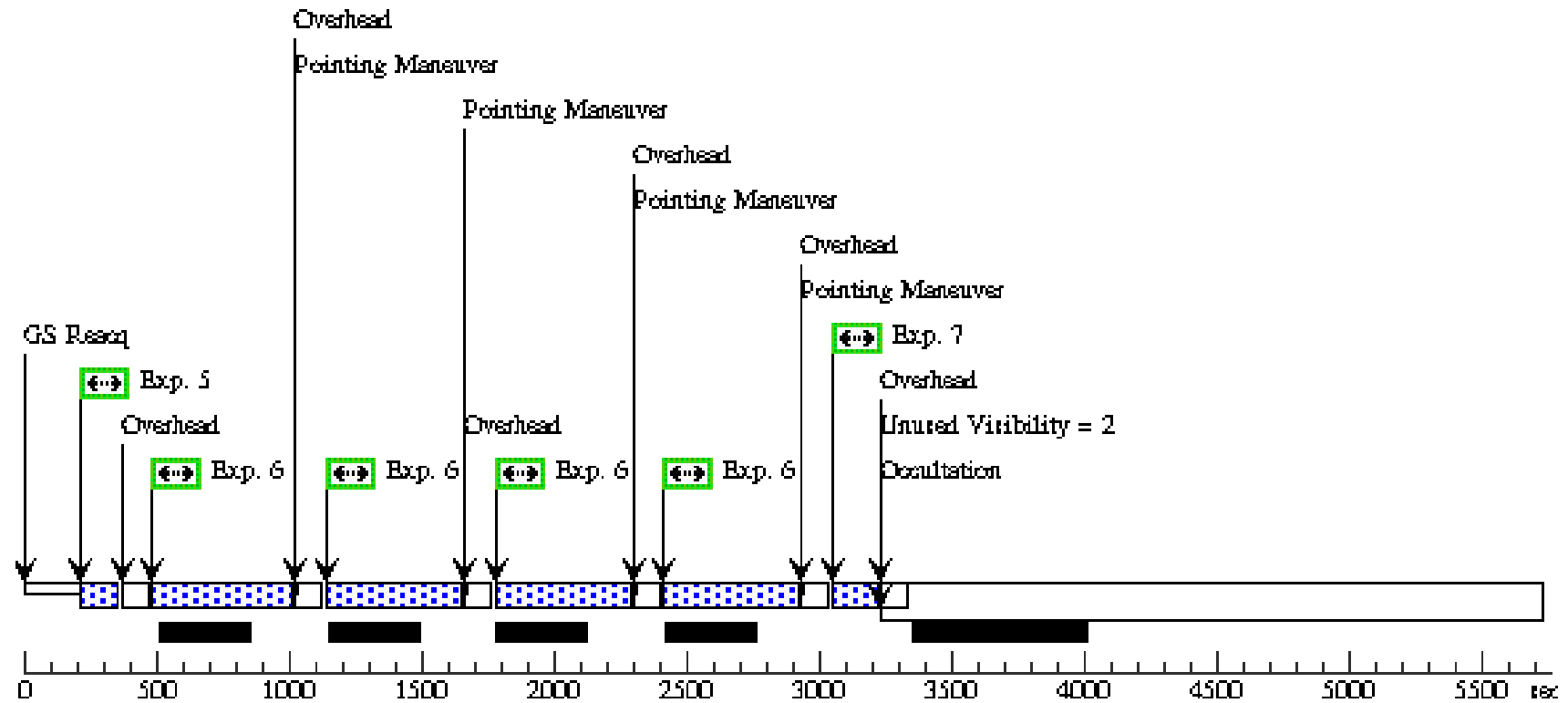
Proposal 12185 - Visit 03 - The Hosts of Megamaser Disk Galaxies

Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(4) NGC-2960	WFC3/IR, MULTIACCUM, IRSUB512	F110W	NSAMP=6; SAMP-SEQ=STEP2 5		Pattern 1, Exps 1-1 (1)	[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]
	2		(4) NGC-2960	WFC3/IR, MULTIACCUM, IRSUB512	F160W	NSAMP=9; SAMP-SEQ=STEP2 5		Pattern 1, Exps 2-2 (1)	[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]
	3		(4) NGC-2960	WFC3/UVIS, ACCUM, UVIS2	F336W		POS TARG 0.1848,0 .1969	Pattern 2, Exps 3-3 (2)	405 Secs [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)]	[1]
	4		(4) NGC-2960	WFC3/UVIS, ACCUM, UVIS2	F438W		POS TARG 0.1848,0 .1969		140 Secs [==>]	[1]
	5		(4) NGC-2960	WFC3/UVIS, ACCUM, UVIS2	F438W		POS TARG 0.0,0.0		140 Secs [==>]	[2]
	6		(4) NGC-2960	WFC3/UVIS, ACCUM, UVIS2	F814W			Pattern 4, Exps 6-6 (4)	508 Secs [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[2]
	7		(4) NGC-2960	WFC3/UVIS, ACCUM, UVIS2	F438W		POS TARG 0.0924,0 .0985		140 Secs [==>]	[2]



Orbit 2

Server Version: 20100505



Proposal 12185 - Visit 04 - The Hosts of Megamaser Disk Galaxies

Visit	Proposal 12185, Visit 05, implementation Wed Jul 14 01:07:55 GMT 2010				
	Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/IR, WFC3/UVIS Special Requirements: (none)				
Patterns	#	Primary Pattern		Secondary Pattern	Exposures
	(1)	Pattern Type=WFC3-IR-DITHER-BOX-MIN Purpose=DITHER Number Of Points=4 Point Spacing=0.572 Line Spacing=0.365	Coordinate Frame=POS-TARG Pattern Orientation=18.528 Angle Between Sides=74.653 Center Pattern=false		(1), (2)
	(2)	Pattern Type=WFC3-UVIS-DITHER-LINE-3PT Purpose=DITHER Number Of Points=3 Point Spacing=0.135 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false		(3)
	(4)	Pattern Type=WFC3-UVIS-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.173 Line Spacing=0.112	Coordinate Frame=POS-TARG Pattern Orientation=23.884 Angle Between Sides=81.785 Center Pattern=false		(6)
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes
	(5)	IC-2560	RA: 10 16 18.7000 (154.0779167d) Dec: -33 33 50.00 (-33.56389d) Equinox: J2000		V=12.5
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.					
Miscellaneous Reference Frame: ICRS					

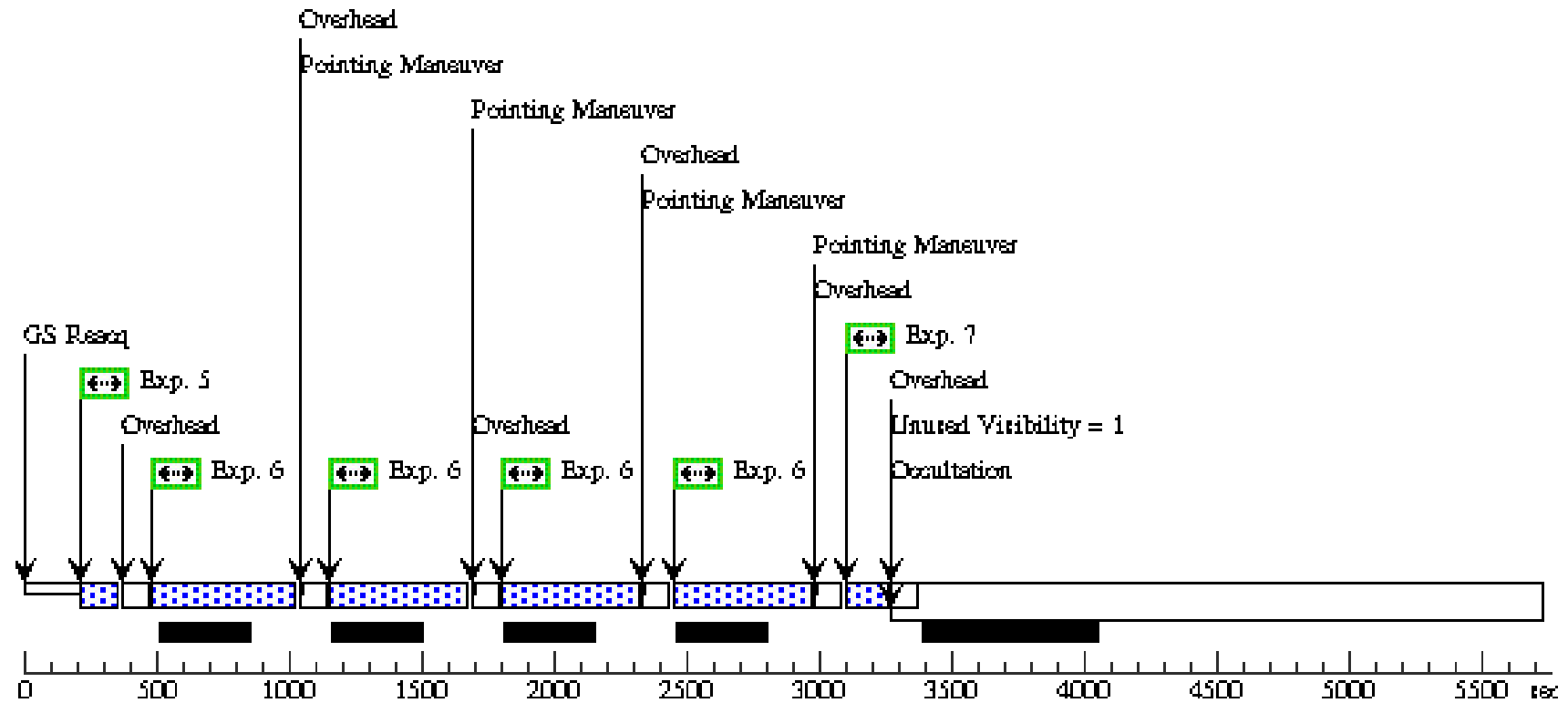
Proposal 12185 - Visit 04 - The Hosts of Megamaser Disk Galaxies

Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(5) IC-2560	WFC3/IR, MULTIACCUM, IRSUB512	F110W	NSAMP=6; SAMP-SEQ=STEP2 5		Pattern 1, Exps 1-1 (1)	[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]
	2		(5) IC-2560	WFC3/IR, MULTIACCUM, IRSUB512	F160W	NSAMP=9; SAMP-SEQ=STEP2 5		Pattern 1, Exps 2-2 (1)	[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]
	3		(5) IC-2560	WFC3/UVIS, ACCUM, UVIS2	F336W		POS TARG 0.1848,0 .1969	Pattern 2, Exps 3-3 (2)	418 Secs [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)]	[1]
	4		(5) IC-2560	WFC3/UVIS, ACCUM, UVIS2	F438W		POS TARG 0.1848,0 .1969		140 Secs [==>]	[1]
	5		(5) IC-2560	WFC3/UVIS, ACCUM, UVIS2	F438W		POS TARG 0.0,0.0		140 Secs [==>]	[2]
	6		(5) IC-2560	WFC3/UVIS, ACCUM, UVIS2	F814W			Pattern 4, Exps 6-6 (4)	521 Secs [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[2]
	7		(5) IC-2560	WFC3/UVIS, ACCUM, UVIS2	F438W		POS TARG 0.0924,0 .0985		130 Secs [==>]	[2]



Orbit 2

Server Version: 20100505



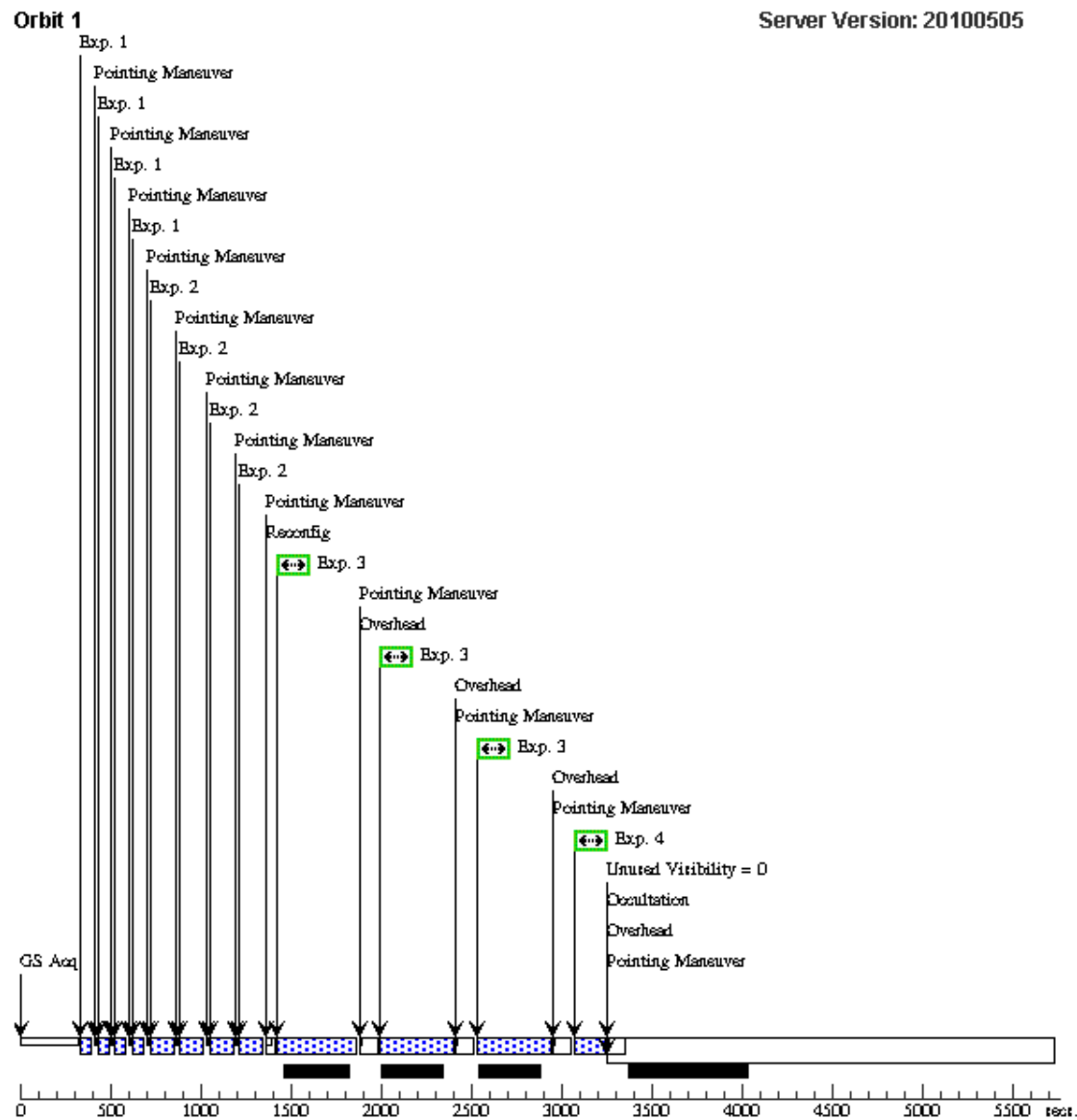
Proposal 12185 - Visit 05 - The Hosts of Megamaser Disk Galaxies

Visit	Proposal 12185, Visit 06, implementation Wed Jul 14 01:07:56 GMT 2010				
	Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/IR, WFC3/UVIS Special Requirements: (none)				
Patterns	#	Primary Pattern		Secondary Pattern	Exposures
	(1)	Pattern Type=WFC3-IR-DITHER-BOX-MIN Purpose=DITHER Number Of Points=4 Point Spacing=0.572 Line Spacing=0.365	Coordinate Frame=POS-TARG Pattern Orientation=18.528 Angle Between Sides=74.653 Center Pattern=false		(1), (2)
	(2)	Pattern Type=WFC3-UVIS-DITHER-LINE-3PT Purpose=DITHER Number Of Points=3 Point Spacing=0.135 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false		(3)
	(4)	Pattern Type=WFC3-UVIS-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.173 Line Spacing=0.112	Coordinate Frame=POS-TARG Pattern Orientation=23.884 Angle Between Sides=81.785 Center Pattern=false		(6)
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes
	(6)	NGC-3393	RA: 10 48 23.4000 (162.0975000d) Dec: -25 09 43.00 (-25.16194d) Equinox: J2000		V=14.0
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.					
Miscellaneous Reference Frame: ICRS					

Proposal 12185 - Visit 05 - The Hosts of Megamaser Disk Galaxies

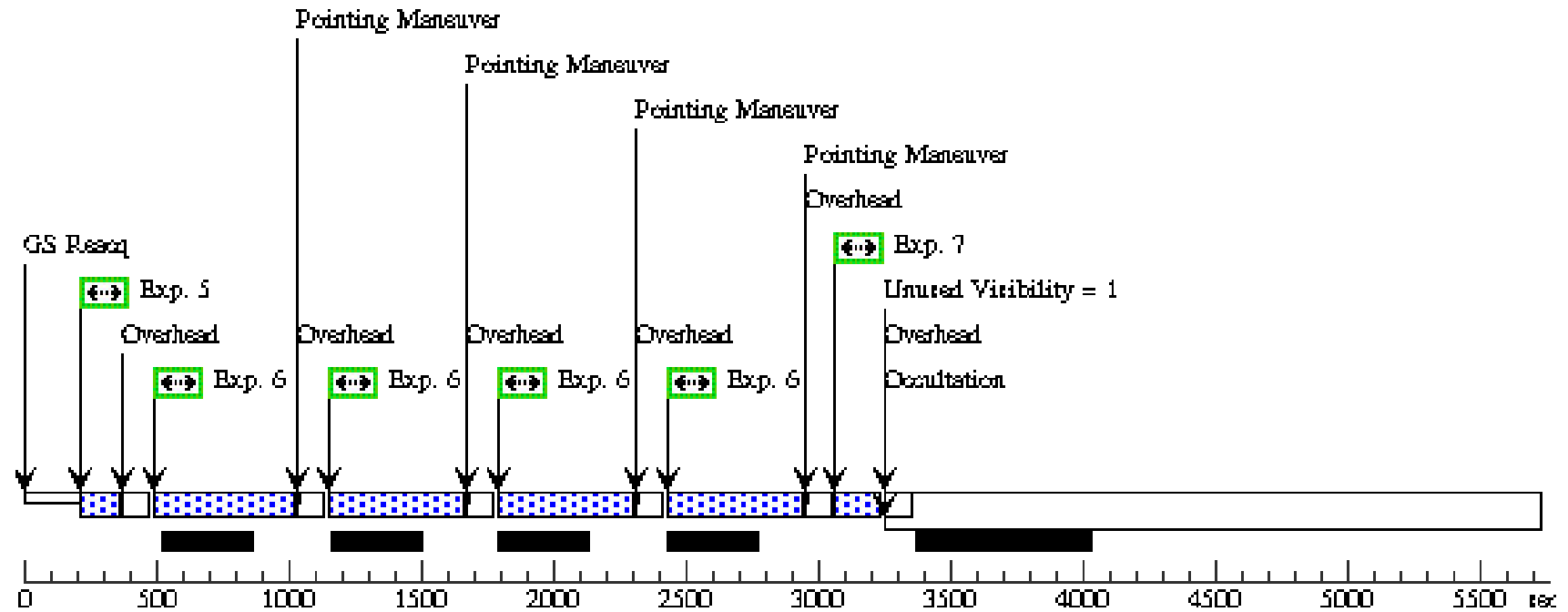
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(6) NGC-3393	WFC3/IR, MULTIACCUM, IRSUB512	F110W	NSAMP=6; SAMP-SEQ=STEP2 5		Pattern 1, Exps 1-1 (1)	[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]
	2		(6) NGC-3393	WFC3/IR, MULTIACCUM, IRSUB512	F160W	NSAMP=9; SAMP-SEQ=STEP2 5		Pattern 1, Exps 2-2 (1)	[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]
	3		(6) NGC-3393	WFC3/UVIS, ACCUM, UVIS2	F336W		POS TARG 0.1848,0 .1969	Pattern 2, Exps 3-3 (2)	410 Secs [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)]	[1]
	4		(6) NGC-3393	WFC3/UVIS, ACCUM, UVIS2	F438W		POS TARG 0.1848,0 .1969		148 Secs [==>]	[1]
	5		(6) NGC-3393	WFC3/UVIS, ACCUM, UVIS2	F438W		POS TARG 0.0,0.0		148 Secs [==>]	[2]
	6		(6) NGC-3393	WFC3/UVIS, ACCUM, UVIS2	F814W			Pattern 4, Exps 6-6 (4)	510 Secs [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[2]
	7		(6) NGC-3393	WFC3/UVIS, ACCUM, UVIS2	F438W		POS TARG 0.0924,0 .0985		148 Secs [==>]	[2]

Server Version: 20100505



Orbit 2

Server Version: 20100505



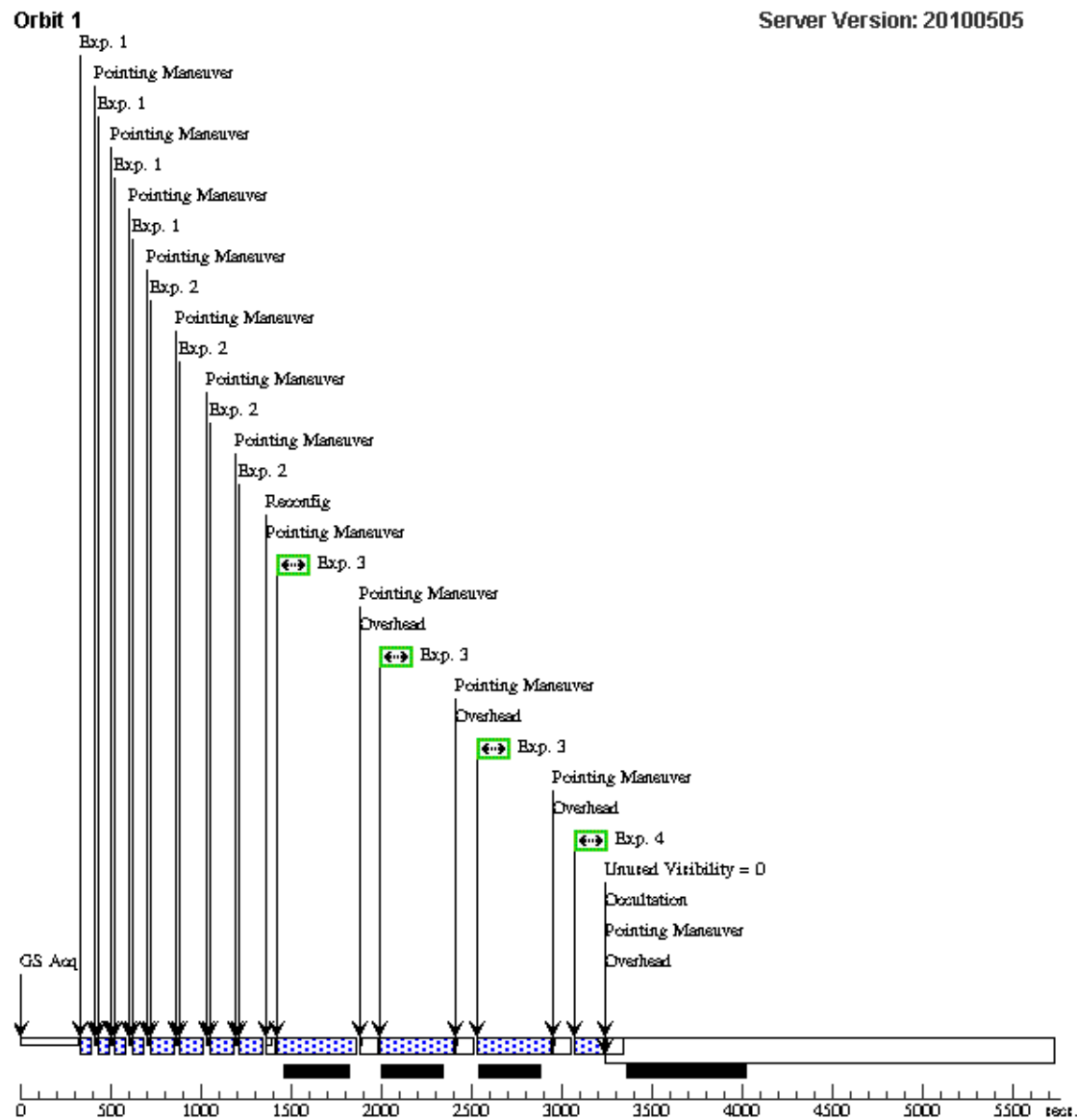
Proposal 12185 - Visit 06 - The Hosts of Megamaser Disk Galaxies

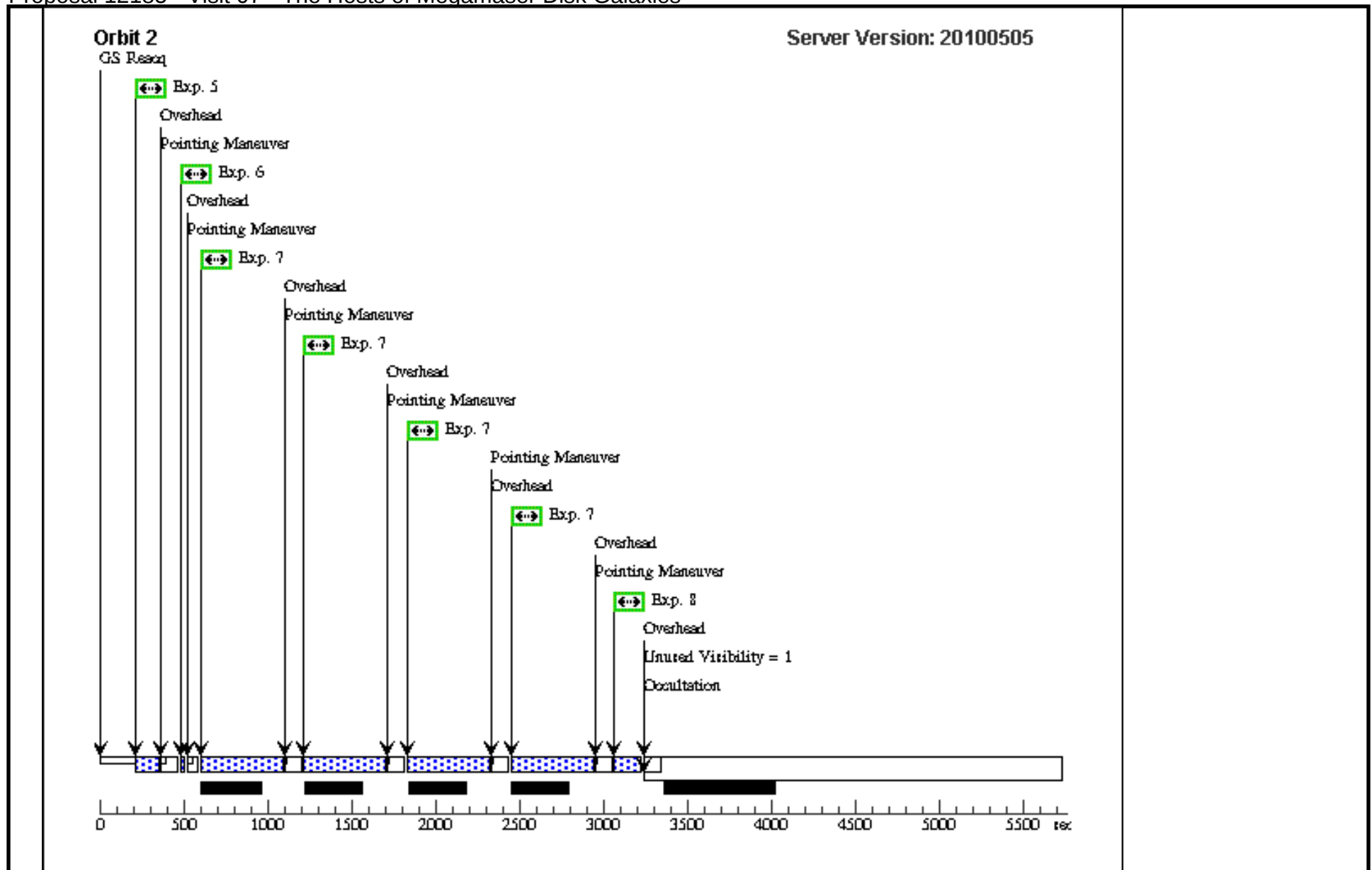
Visit	Proposal 12185, Visit 07, implementation Wed Jul 14 01:07:57 GMT 2010				
	Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/IR, WFC3/UVIS Special Requirements: ORIENT 105.D TO 145. D; ORIENT 285.D TO 325. D				
Patterns	#	Primary Pattern	Secondary Pattern	Exposures	
	(1)	Pattern Type=WFC3-IR-DITHER-BOX-MIN Purpose=DITHER Number Of Points=4 Point Spacing=0.572 Line Spacing=0.365	Coordinate Frame=POS-TARG Pattern Orientation=18.528 Angle Between Sides=74.653 Center Pattern=false	(1), (2)	
	(2)	Pattern Type=WFC3-UVIS-DITHER-LINE-3PT Purpose=DITHER Number Of Points=3 Point Spacing=0.135 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false	(3)	
	(4)	Pattern Type=WFC3-UVIS-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.173 Line Spacing=0.112	Coordinate Frame=POS-TARG Pattern Orientation=23.884 Angle Between Sides=81.785 Center Pattern=false	(7)	
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
	(7)	NGC-4388	RA: 12 25 46.9300 (186.4455417d) Dec: +12 39 43.30 (12.66203d) Equinox: J2000	V=11.0	Reference Frame: ICRS
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.					

Proposal 12185 - Visit 06 - The Hosts of Megamaser Disk Galaxies

Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(7) NGC-4388	WFC3/IR, MULTIACCUM, IRSUB512	F110W	NSAMP=6; SAMP-SEQ=STEP2 5	GS ACQ SCENARI O BASE1B3	Pattern 1, Exps 1-1 (1)	[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]
	2		(7) NGC-4388	WFC3/IR, MULTIACCUM, IRSUB512	F160W	NSAMP=9; SAMP-SEQ=STEP2 5		Pattern 1, Exps 2-2 (1)	[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]
	3		(7) NGC-4388	WFC3/UVIS, ACCUM, UVIS2	F336W		POS TARG 0.1848,0 .1969	Pattern 2, Exps 3-3 (2)	410 Secs [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)]	[1]
	4		(7) NGC-4388	WFC3/UVIS, ACCUM, UVIS2	F438W		POS TARG 0.1848,0 .1969		136 Secs [==>]	[1]
	5		(7) NGC-4388	WFC3/UVIS, ACCUM, UVIS2	F438W		POS TARG 0.0,0.0		137 Secs [==>]	[2]
	6		(7) NGC-4388	WFC3/UVIS, ACCUM, UVIS2-M1K1C-SUB	F814W				5 Secs [==>]	[2]
	7		(7) NGC-4388	WFC3/UVIS, ACCUM, UVIS2	F814W			Pattern 4, Exps 7-7 (4)	488 Secs [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[2]
	8		(7) NGC-4388	WFC3/UVIS, ACCUM, UVIS2	F438W		POS TARG 0.0924,0 .0985		137 Secs [==>]	[2]

Server Version: 20100505



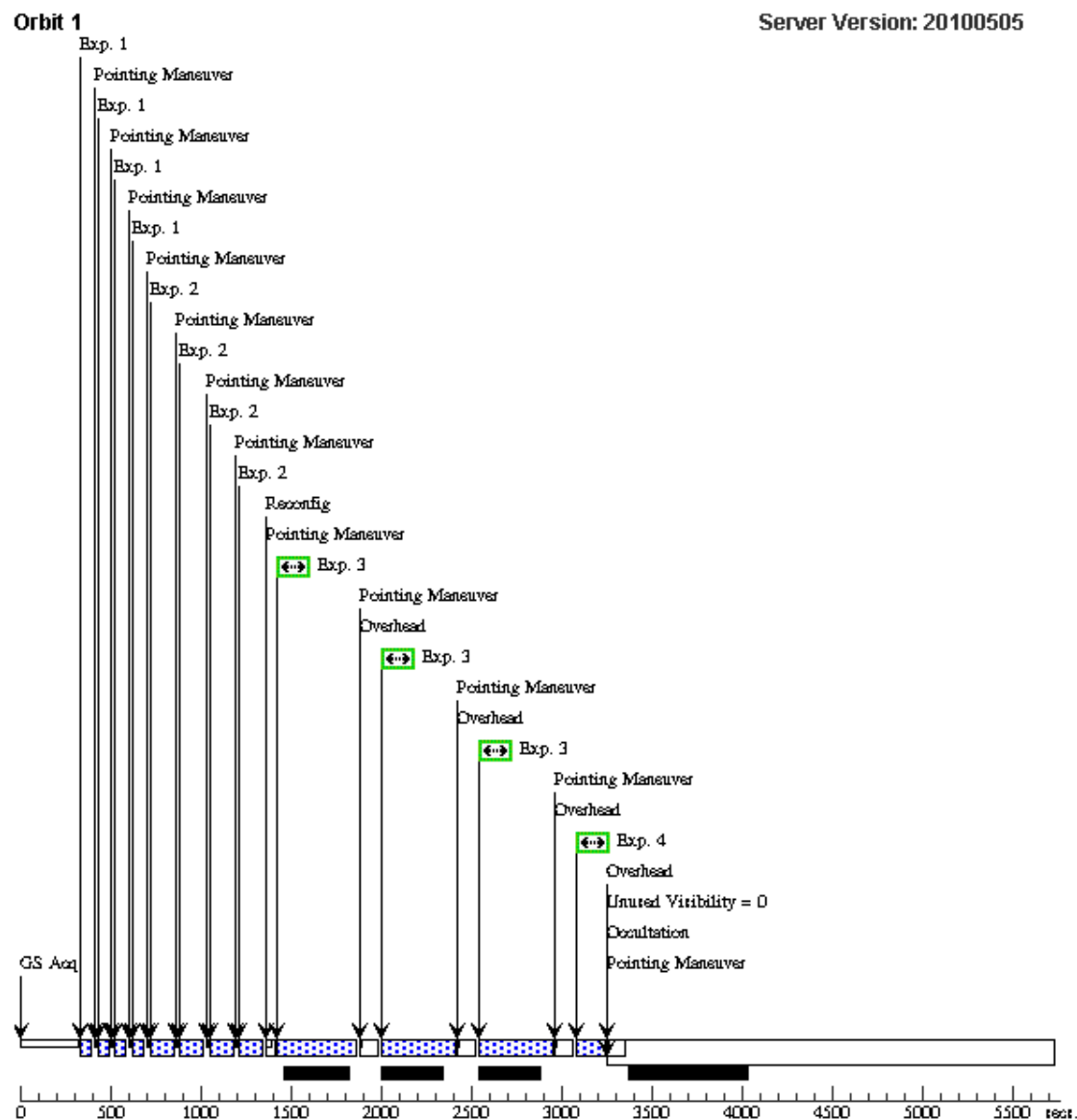


Proposal 12185 - Visit 07 - The Hosts of Megamaser Disk Galaxies

Visit	Proposal 12185, Visit 08, implementation Wed Jul 14 01:07:58 GMT 2010				
	Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/IR, WFC3/UVIS Special Requirements: (none)				
Patterns	#	Primary Pattern		Secondary Pattern	Exposures
	(1)	Pattern Type=WFC3-IR-DITHER-BOX-MIN Purpose=DITHER Number Of Points=4 Point Spacing=0.572 Line Spacing=0.365	Coordinate Frame=POS-TARG Pattern Orientation=18.528 Angle Between Sides=74.653 Center Pattern=false		(1), (2)
	(2)	Pattern Type=WFC3-UVIS-DITHER-LINE-3PT Purpose=DITHER Number Of Points=3 Point Spacing=0.135 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false		(3)
	(4)	Pattern Type=WFC3-UVIS-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.173 Line Spacing=0.112	Coordinate Frame=POS-TARG Pattern Orientation=23.884 Angle Between Sides=81.785 Center Pattern=false		(6)
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes
	(8)	NGC-6264	RA: 16 57 16.0800 (254.3170000d) Dec: +27 50 58.90 (27.84969d) Equinox: J2000		V=15.4
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.					
Miscellaneous Reference Frame: ICRS					

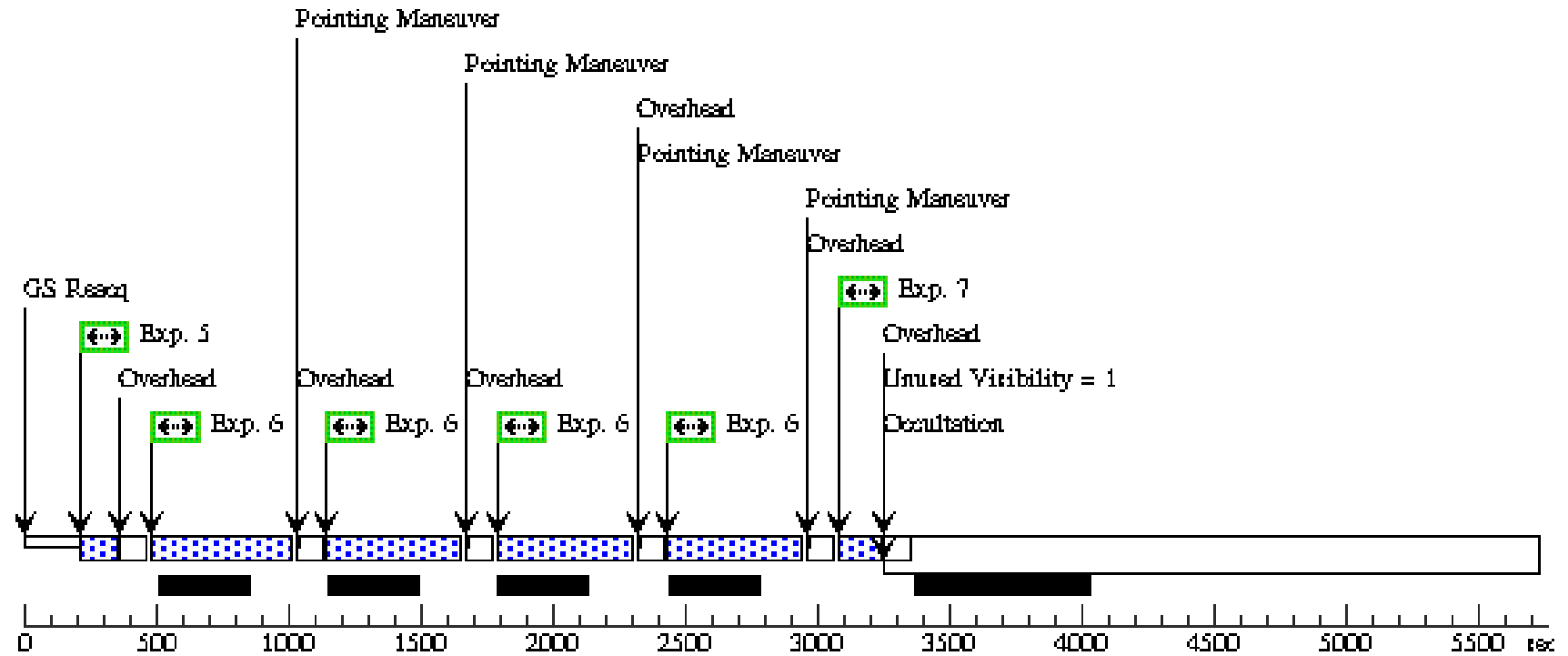
Proposal 12185 - Visit 07 - The Hosts of Megamaser Disk Galaxies

Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(8) NGC-6264	WFC3/IR, MULTIACCUM, IRSUB512	F110W	NSAMP=6; SAMP-SEQ=STEP2 5		Pattern 1, Exps 1-1 (1)	[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]
	2		(8) NGC-6264	WFC3/IR, MULTIACCUM, IRSUB512	F160W	NSAMP=9; SAMP-SEQ=STEP2 5		Pattern 1, Exps 2-2 (1)	[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]
	3		(8) NGC-6264	WFC3/UVIS, ACCUM, UVIS2	F336W		POS TARG 0.1848,0 .1969	Pattern 2, Exps 3-3 (2)	414 Secs [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)]	[1]
	4		(8) NGC-6264	WFC3/UVIS, ACCUM, UVIS2	F438W		POS TARG 0.1848,0 .1969		136 Secs [==>]	[1]
	5		(8) NGC-6264	WFC3/UVIS, ACCUM, UVIS2	F438W		POS TARG 0.0,0.0		136 Secs [==>]	[2]
	6		(8) NGC-6264	WFC3/UVIS, ACCUM, UVIS2	F814W			Pattern 4, Exps 6-6 (4)	516 Secs [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[2]
	7		(8) NGC-6264	WFC3/UVIS, ACCUM, UVIS2	F438W		POS TARG 0.0924,0 .0985		136 Secs [==>]	[2]



Orbit 2

Server Version: 20100505



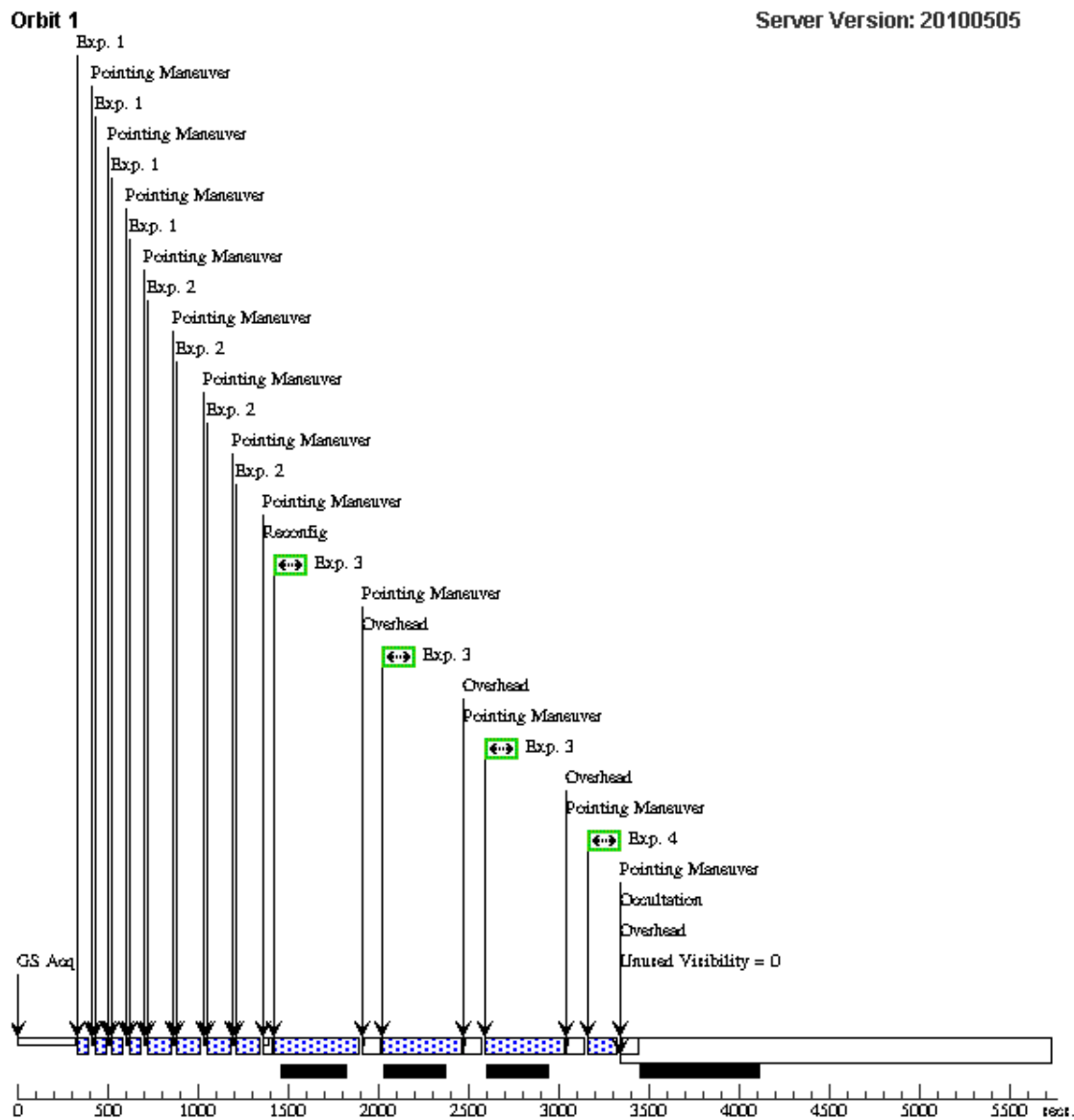
Proposal 12185 - Visit 08 - The Hosts of Megamaser Disk Galaxies

Visit	Proposal 12185, Visit 09, implementation Wed Jul 14 01:07:59 GMT 2010				
	Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/IR, WFC3/UVIS Special Requirements: (none)				
Patterns	#	Primary Pattern		Secondary Pattern	Exposures
	(1)	Pattern Type=WFC3-IR-DITHER-BOX-MIN Purpose=DITHER Number Of Points=4 Point Spacing=0.572 Line Spacing=0.365	Coordinate Frame=POS-TARG Pattern Orientation=18.528 Angle Between Sides=74.653 Center Pattern=false		(1), (2)
	(2)	Pattern Type=WFC3-UVIS-DITHER-LINE-3PT Purpose=DITHER Number Of Points=3 Point Spacing=0.135 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false		(3)
	(4)	Pattern Type=WFC3-UVIS-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.173 Line Spacing=0.112	Coordinate Frame=POS-TARG Pattern Orientation=23.884 Angle Between Sides=81.785 Center Pattern=false		(6)
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes
	(9)	NGC-6323	RA: 17 13 18.0300 (258.3251250d) Dec: +43 46 57.20 (43.78256d) Equinox: J2000		V=14.9
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.					
Miscellaneous Reference Frame: ICRS					

Proposal 12185 - Visit 08 - The Hosts of Megamaser Disk Galaxies

Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(9) NGC-6323	WFC3/IR, MULTIACCUM, IRSUB512	F110W	NSAMP=6; SAMP-SEQ=STEP2 5		Pattern 1, Exps 1-1 (1)	[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]
	2		(9) NGC-6323	WFC3/IR, MULTIACCUM, IRSUB512	F160W	NSAMP=9; SAMP-SEQ=STEP2 5		Pattern 1, Exps 2-2 (1)	[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]
	3		(9) NGC-6323	WFC3/UVIS, ACCUM, UVIS2	F336W		POS TARG 0.1848,0 .1969	Pattern 2, Exps 3-3 (2)	440 Secs [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)]	[1]
	4		(9) NGC-6323	WFC3/UVIS, ACCUM, UVIS2	F438W		POS TARG 0.1848,0 .1969		142 Secs [==>]	[1]
	5		(9) NGC-6323	WFC3/UVIS, ACCUM, UVIS2	F438W		POS TARG 0.0,0.0		142 Secs [==>]	[2]
	6		(9) NGC-6323	WFC3/UVIS, ACCUM, UVIS2	F814W			Pattern 4, Exps 6-6 (4)	534 Secs [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[2]
	7		(9) NGC-6323	WFC3/UVIS, ACCUM, UVIS2	F438W		POS TARG 0.0924,0 .0985		142 Secs [==>]	[2]

Server Version: 20100505



Orbit 2

Server Version: 20100505

