11618 - WFC3 Observations of VeLLOs and the Youngest Star Forming Environments

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	(1) L1014-CENTER	WFC3/IR	2	09-Oct-2009 21:01:02.0	yes
02	(2) CB130-3-CENTER	WFC3/IR	2	09-Oct-2009 21:01:09.0	yes
03	(3) L328-CENTER	WFC3/IR	2	09-Oct-2009 21:01:16.0	yes
04	(4) L673-7-CENTER	WFC3/IR	2	09-Oct-2009 21:01:24.0	yes

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
05	(5) IRAM04191+1522-CENTER	WFC3/IR	2	09-Oct-2009 21:01:30.0	yes
06	(6) DC2742-04-CENTER	WFC3/IR	2	09-Oct-2009 21:01:36.0	yes
07	(7) L694-2-CENTER	WFC3/IR	2	09-Oct-2009 21:01:42.0	yes
08	(8) B335-CENTER	WFC3/IR	2	09-Oct-2009 21:01:47.0	yes

16 Total Orbits Used

ABSTRACT

The Cores-to-Disks Spitzer Legacy team has discovered a number of extremely low luminosity sources embedded deep within nearby (< 300 pc) cores previously thought to be starless. With substellar masses, these low luminosity sources represent either the youngest low-mass protostars yet detected or the first embedded brown dwarfs. In either case, they represent a new observed class of sources referred to as VeLLOs (Very Low Luminosity Objects). We propose WFC3 F160W observations of a small sample of these sources, to be combined with deep ground-based observations at Ks, to address a broad set of issues concerning VeLLOs and the environments within which they are forming. First, the morphology of their outflow cavities will be traced, yielding estimates of the inclinations and opening angles of the cavities and the evolutionary stages of the VeLLOs. Second, our observations will reveal background stars seen through the densest regions of cores harboring these VeLLOs. The color-excesses of the background stars will yield the highest angular resolution extinction maps necessary to directly probe the inner density structure of these cores, found very soon after the onset of collapse, which would constrain the initial conditions of collapse within these isolated environments. In addition, we will construct similar maps of the dense pre-protostellar core L694-2 and the protostellar core B335. These maps will provide a snapshot of the evolution of the inner density structure of a core prior to low-mass star formation and soon thereafter, for comparison with the inner density structure of cores that have formed VeLLOs. Finally, these extinction maps will enable us to determine the core "centers", or positions of peak column densities. Comparison of these centers with the positions of the VeLLOs may yield insight regarding potential differences between the formation of low-mass stars and brown dwarfs.

OBSERVING DESCRIPTION

To achieve the goals of this project, we propose to use WFC3 to obtain deep F160W observations of fields toward a sample of VeLLOs and their harboring cores to provide reliable photometry of background stars as well as trace the morphology of the cavities. For each source, the target coordinates were chosen to provide coverage of the VeLLO, follow the orientation of the cavity, and cover the core regions opaque to ground-based H observations, independent of the rotation angle of the WFC3 field of view.

The completeness limit of our IRAC 3.6 um observations from the Spitzer GO-2 Program 20386 (P. Myers) is ~17.3 mag. Previously, we had obtained shallower Spitzer observations of these cores as part of the Cores-to-Disks Spitzer legacy program (N. Evans), with a completeness limit of ~16.3 mag. The shallower observations do not reveal a sufficient number of background stars toward the densest regions of these cores, while the deeper Spitzer observations do. This proposed WFC3 study then critically depends on detecting the near-IR (F160W) counterparts to most of the mid-IR sources seen in the deeper Spitzer observations, and deriving reliable fluxes, especially within the central regions of the core. The dense cores we propose to observe have typical central extinctions of at least AV ~ 60. For purposes of estimating exposure times, we make use of the reddening law, AV ~ 8.2 E(H - [3.6]) (Indebetouw et al. 2005; Cardelli et al. 1989). Thus, most of the mid-IR sources, for which we need to detect and derive reliable photometry at F160W, have H magnitudes of H < 24.6. According to the WFC3 IR Imaging Exposure Time Calculator, we find a total exposure time of at least 5057 seconds, without overheads, is necessary to obtain SNR > 8 photometry with WFC3+F160W on sources with H = 24.6. Such sensitive observations spanning a relatively large field to cover both the core center and entire nebula are ideally suited for WFC3, especially considering this study requires observations of at least a small survey to characterize VeLLOs and their environments.

We propose to obtain a total of four dither positions during two orbits for each source. Using the pre-defined pattern type "WFC3-IR-DITHER-LINE", we will obtain in the first orbit two dither positions, separated by an integral number of pixels (80) along the x- and y-axes of the detectors and centered on the target position. During the second orbit, which will have a similar roll angle as the first, we will obtain two more dither positions with half the separation and oriented with position angle reflected about the y-axis relative to the first orbit dither pattern. The net result will be four dither positions that will fill gaps in coverage caused by the 35-pixel spacing between the WFC3 detectors; regions lying within a gap in one dither position will be observed in all other three dither positions.

We plan to use the STEP100 MULTIACCUM sample sequence for each dither pointing. For all our sources, except L1014 and DC2742-04, the first

orbit is filled with exposure sequences of NSAMP=15, NSAMP=10, and NSAMP=6 at each of the two dither positions. The second orbit is filled with sequences of NSAMP=15, NSAMP=11, and NSAMP=5. For L1014, which has a somewhat greater visibility than most of our sources, the first orbit is filled with sequences of NSAMP=15, NSAMP=11, and NSAMP=5, while the second orbit is filled with sequences of NSAMP=15 and NSAMP=12. For DC2742-04, which has the greatest visibility of all our sources, the first orbit is filled with NSAMP=15, NSAMP=11, and NSAMP=6, while the second orbit is filled with sequences of NSAMP=15, NSAMP=12, and NSAMP=5. Even after ignoring the first two images in a sequence (since these are not photometrically reliable), we will obtain sufficient numbers of short-exposure images with which to calibrate our photometry using 2MASS sources. The long-exposure images (100 seconds) saturate on sources with H < 15.8, and may be calibrated by "bootstrapping", i.e., making use of faint sources (not detected by 2MASS) detected in the 2MASS-calibrated short-exposure images as the standard stars in the long-exposure images. Our observing plan provides sufficient total exposure time, while obtaining enough short exposures to provide robust calibration with brighter 2MASS sources.

REAL TIME JUSTIFICATION

N/A

CALIBRATION JUSTIFICATION

N/A

Visit

Proposal 11618, Visit 01, completed Sat Oct 10 01:01:51 GMT 2009

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: (none)

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFC3-IR-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=14.503 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=41.788 Angle Between Sides= Center Pattern=true		(1-3)
(2)	Pattern Type=WFC3-IR-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=7.252 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=138.212 Angle Between Sides= Center Pattern=true		(4-5)

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	L1014-CENTER Alt Name1: L1014-2	RA: 21 24 6.7000 (321.0279167d) Dec: +49 59 5.00 (49.98472d) Equinox: J2000		V=(?) F(F160W, BRIGHTEST) = 4.8 +/- 0.1 E-15 ; F(F160W, VeLLO) = 5.6 +/- 0.3 E-17; F(F 160W, FAINTEST) = 1.6 E-20	Reference Frame: ICRS

Comments: Expected F160W fluxes are listed for the following: the brightest H-band source in the WFC3 field, the VeLLO (assuming a foreground extinction of AV=30), and the faintest source for which we need to obtain SNR>8 photometry. The foreground extinction toward the VeLLO may be greater, yielding a smaller F160W flux by an order of magnitude. Depth of observation is determined not by VeLLO flux, but by that of faint background stars seen through extinctions of AV~60.

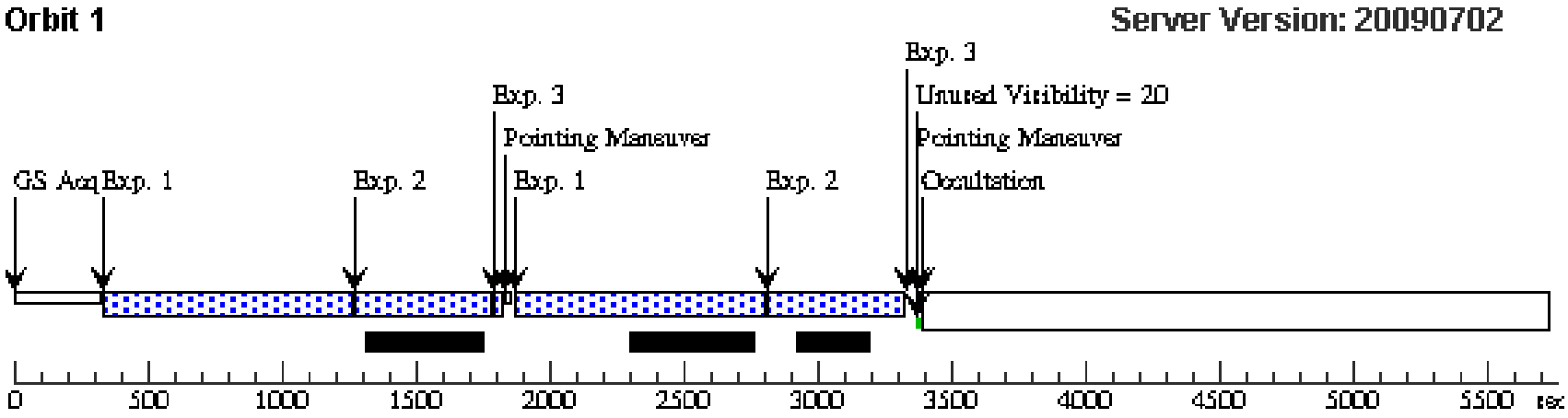
Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1	L1014/1	(1) L1014-CENTER	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=STEP100; NSAMP=15		Pattern 1, Exps 1-3 (1)	*[==>(Pattern 1)]* *[==>(Pattern 2)]*	***[1]***
2	L1014/2	(1) L1014-CENTER	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=STEP100; NSAMP=11		Pattern 1, Exps 1-3 (1)	*[==>(Pattern 1)]* *[==>(Pattern 2)]*	***[1]***
3	L1014/3	(1) L1014-CENTER	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=STEP100; NSAMP=5		Pattern 1, Exps 1-3 (1)	*[==>(Pattern 1)]* *[==>(Pattern 2)]*	***[1]***
4	L1014/4	(1) L1014-CENTER	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=STEP100; NSAMP=15		Pattern 2, Exps 4-5 (2)	*[==>(Pattern 1)]* *[==>(Pattern 2)]*	***[2]***

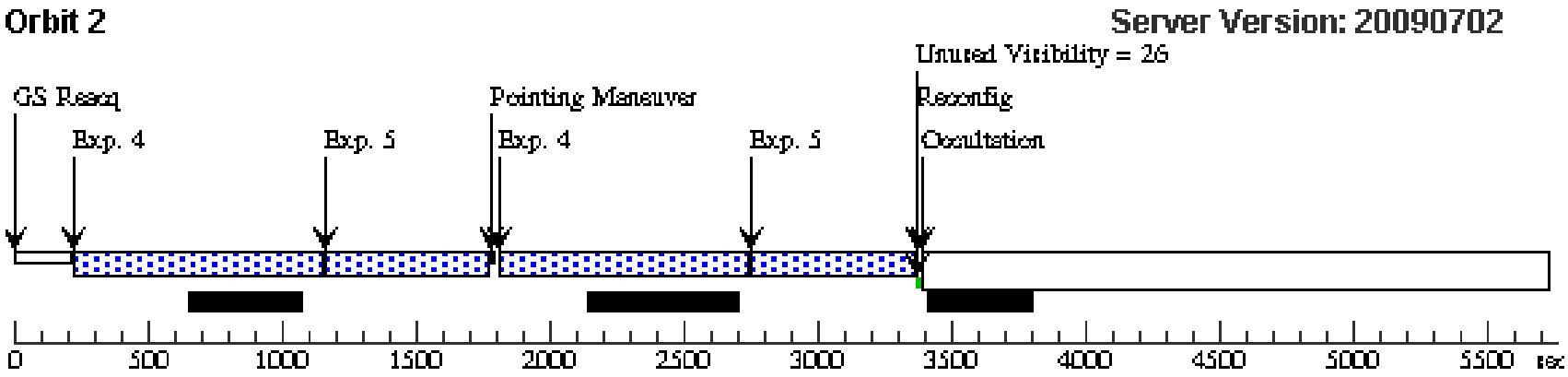
Exposures (continued)

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
5	L1014/5	(1) L1014-CENTER	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=STEP100; NSAMP=12		Pattern 2, Exps 4-5 (2)	*[==>(Pattern 1)]* *[==>(Pattern 2)]*	*[2]*

Orbit Structure



Orbit Structure (continued)



Visit

Proposal 11618, Visit 02, scheduling Sat Oct 10 01:01:52 GMT 2009

Diagnostic Status: Warning

Scientific Instruments: WFC3/IR

Special Requirements: (none)

Diagnostics

(Visit 02) Warning (Orbit Planner): VISIBILITY OVERRUN

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFC3-IR-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=14.503 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=41.788 Angle Between Sides= Center Pattern=true		(1-3)
(2)	Pattern Type=WFC3-IR-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=7.252 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=138.212 Angle Between Sides= Center Pattern=true		(4-6)

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(2)	CB130-3-CENTER Alt Name1: L507-3	RA: 18 16 16.3000 (274.0679167d) Dec: -02 32 38.00 (-2.54389d) Equinox: J2000		V=(?) F(F160W, BRIGHTEST) = 9.3 +/- 0.3 E-16 ; F(F160W, VeLLO) = 2.0 +/- 0.1 E-17; F(F160W, FAINTEST) = 1.6 E-20	Reference Frame: ICRS

Comments: Expected F160W fluxes are listed for the following: the brightest H-band source in the WFC3 field, the VeLLO (assuming a foreground extinction of AV=30), and the faintest source for which we need to obtain SNR>8 photometry. The foreground extinction toward the VeLLO may be greater, yielding a smaller F160W flux by an order of magnitude. Depth of observation is determined not by VeLLO flux, but by that of faint background stars seen through extinctions of AV~60.

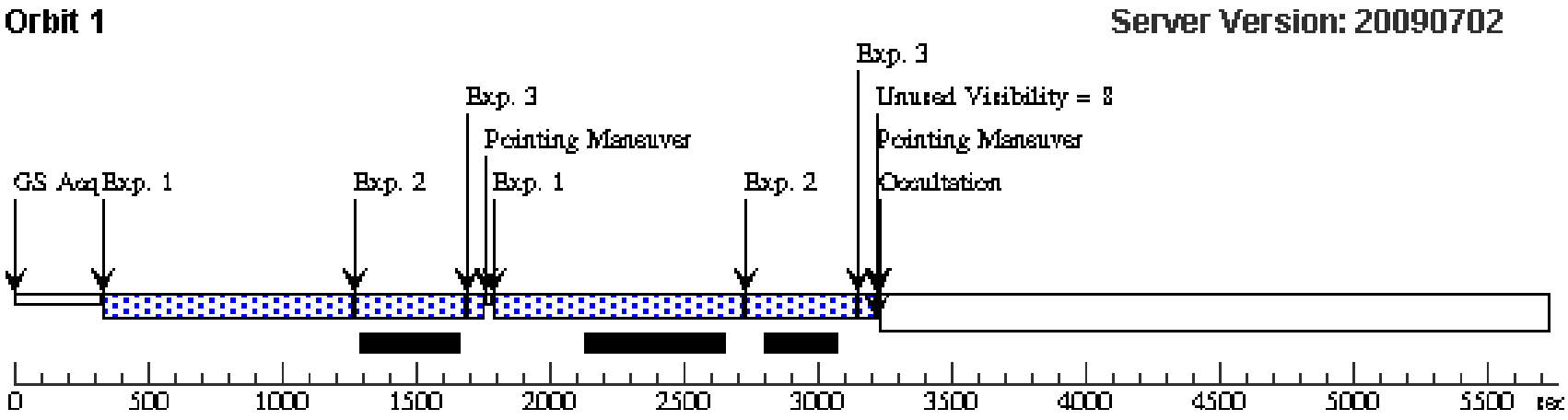
Exposures

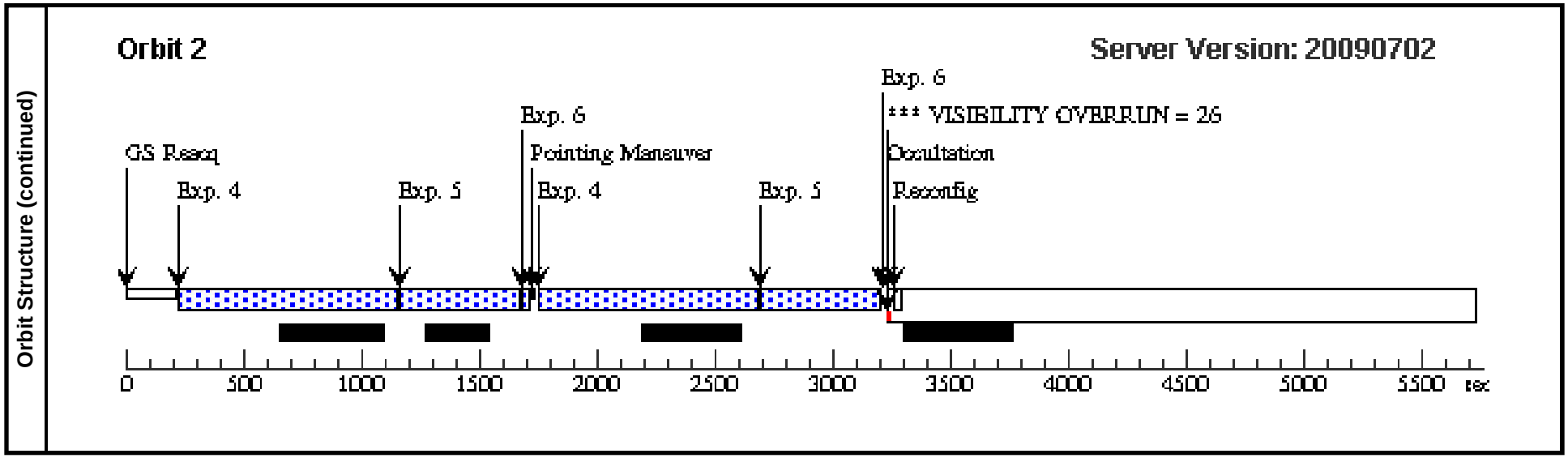
#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1	CB130-3/1	(2) CB130-3-CENTER	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=STEP100; NSAMP=15		Pattern 1, Exps 1-3 (1)	*[==>(Pattern 1)]* *[==>(Pattern 2)]*	***[1]***
2	CB130-3/2	(2) CB130-3-CENTER	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=STEP100; NSAMP=10		Pattern 1, Exps 1-3 (1)	*[==>(Pattern 1)]* *[==>(Pattern 2)]*	***[1]***

Exposures (continued)

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
3	CB130-3/3	(2) CB130-3-CENTER	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=STEP100; NSAMP=6		Pattern 1, Exps 1-3 (1)	*[==>(Pattern 1)]* *[==>(Pattern 2)]*	***[1]***
4	CB130-3/4	(2) CB130-3-CENTER	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=STEP100; NSAMP=15		Pattern 2, Exps 4-6 (2)	*[==>(Pattern 1)]* *[==>(Pattern 2)]*	***[2]***
5	CB130-3/5	(2) CB130-3-CENTER	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=STEP100; NSAMP=11		Pattern 2, Exps 4-6 (2)	*[==>(Pattern 1)]* *[==>(Pattern 2)]*	***[2]***
6	CB130-3/6	(2) CB130-3-CENTER	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=STEP100; NSAMP=5		Pattern 2, Exps 4-6 (2)	*[==>(Pattern 1)]* *[==>(Pattern 2)]*	***[2]***

Orbit Structure

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Server Version: 20090702
GS Reacq
Exp. 4
Exp. 5
Exp. 6
Pointing Maneuver
Exp. 4
Exp. 5
Exp. 6
*** VISIBILITY OVERRUN = 26
Occultation
Reconfig
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500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 11618, Visit 03, scheduling Sat Oct 10 01:01:53 GMT 2009

Diagnostic Status: Warning

Scientific Instruments: WFC3/IR

Special Requirements: (none)

Diagnostics

(Visit 03) Warning (Orbit Planner): VISIBILITY OVERRUN

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFC3-IR-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=14.503 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=41.788 Angle Between Sides= Center Pattern=true		(1-3)
(2)	Pattern Type=WFC3-IR-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=7.252 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=138.212 Angle Between Sides= Center Pattern=true		(4-6)

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(3)	L328-CENTER	RA: 18 17 0.4000 (274.2516667d) Dec: -18 02 14.00 (-18.03722d) Equinox: J2000		V=(?) F(F160W, BRIGHTEST) = 4.0 +/- 0.2 E-14 ; F(F160W, VeLLO) = 2.1 +/- 0.1 E-17; F(F 160W, FAINTEST) = 1.6 E-20	Reference Frame: ICRS

Comments: Expected F160W fluxes are listed for the following: the brightest H-band source in the WFC3 field, the VeLLO (assuming a foreground extinction of AV=30), and the faintest source for which we need to obtain SNR>8 photometry. The foreground extinction toward the VeLLO may be greater, yielding a smaller F160W flux by an order of magnitude. Depth of observation is determined not by VeLLO flux, but by that of faint background stars seen through extinctions of AV~60.

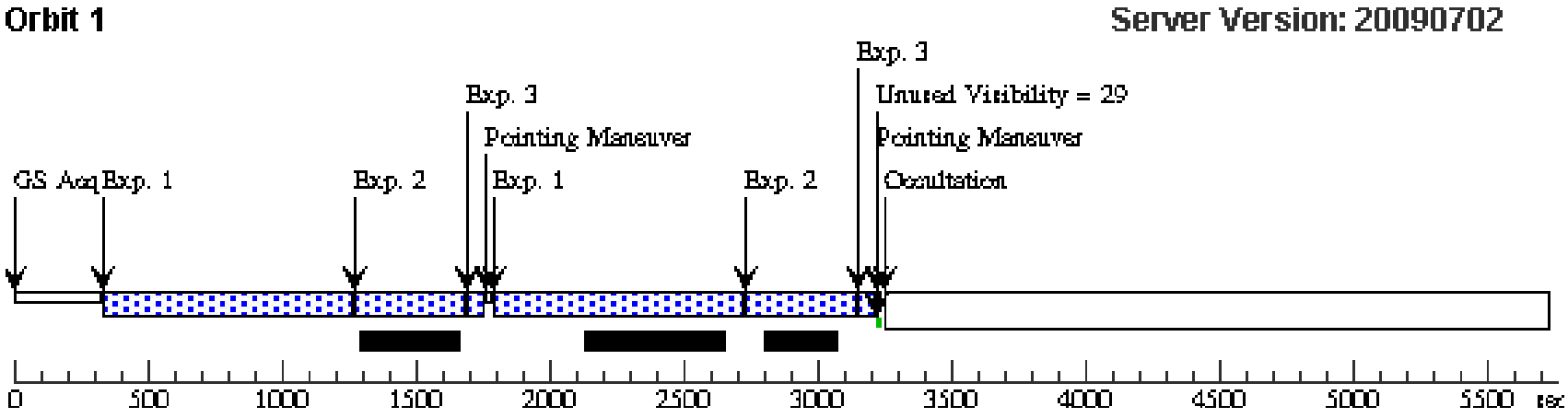
Exposures

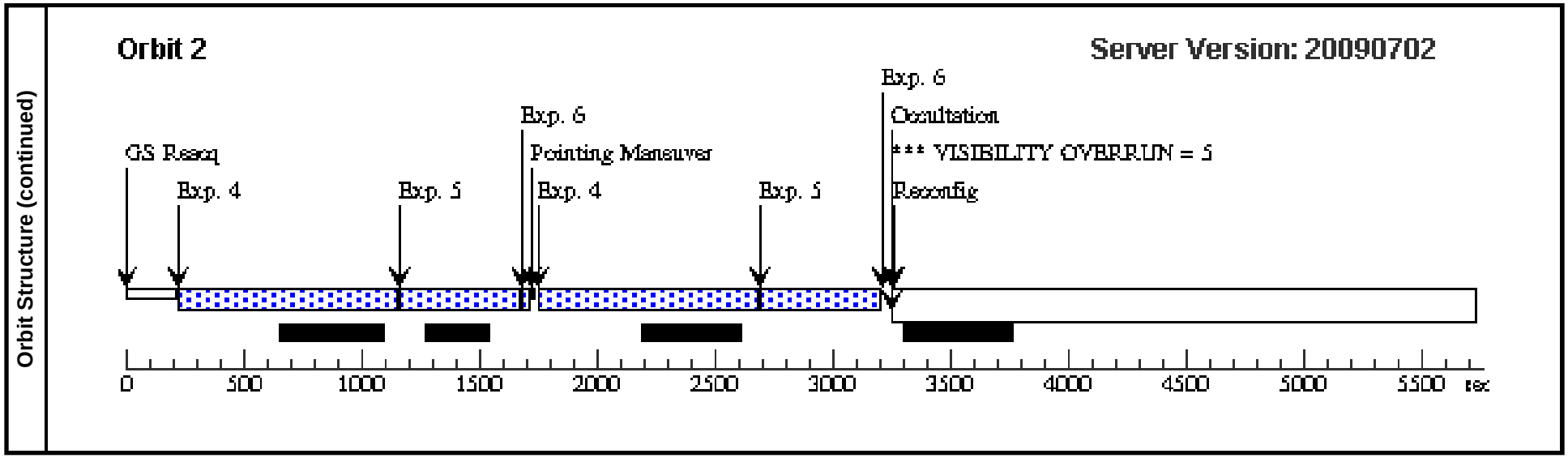
#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1	L328/1	(3) L328-CENTER	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=STEP100; NSAMP=15		Pattern 1, Exps 1-3 (1)	*[==>(Pattern 1)]* *[==>(Pattern 2)]*	***[1]***
2	L328/2	(3) L328-CENTER	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=STEP100; NSAMP=10		Pattern 1, Exps 1-3 (1)	*[==>(Pattern 1)]* *[==>(Pattern 2)]*	***[1]***

Exposures (continued)

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
3	L328/3	(3) L328-CENTER	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=STEP100; NSAMP=6		Pattern 1, Exps 1-3 (1)	*[==>(Pattern 1)]* *[==>(Pattern 2)]*	***[1]***
4	L328/4	(3) L328-CENTER	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=STEP100; NSAMP=15		Pattern 2, Exps 4-6 (2)	*[==>(Pattern 1)]* *[==>(Pattern 2)]*	***[2]***
5	L328/5	(3) L328-CENTER	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=STEP100; NSAMP=11		Pattern 2, Exps 4-6 (2)	*[==>(Pattern 1)]* *[==>(Pattern 2)]*	***[2]***
6	L328/6	(3) L328-CENTER	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=STEP100; NSAMP=5		Pattern 2, Exps 4-6 (2)	*[==>(Pattern 1)]* *[==>(Pattern 2)]*	***[2]***

Orbit Structure




Orbit Structure (continued)
Orbit 2
Server Version: 20090702
GS Reacq
Exp. 4
Exp. 5
Exp. 6
Pointing Maneuver
Exp. 4
Exp. 5
Exp. 6
Occultation
*** VISIBILITY OVERRUN = 5
Reconfig
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 11618, Visit 04, scheduling Sat Oct 10 01:01:54 GMT 2009

Diagnostic Status: Warning

Scientific Instruments: WFC3/IR

Special Requirements: (none)

Diagnostics

(Visit 04) Warning (Orbit Planner): VISIBILITY OVERRUN

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFC3-IR-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=14.503 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=41.788 Angle Between Sides= Center Pattern=true		(1-3)
(2)	Pattern Type=WFC3-IR-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=7.252 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=138.212 Angle Between Sides= Center Pattern=true		(4-6)

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(4)	L673-7-CENTER	RA: 19 21 35.7000 (290.3987500d) Dec: +11 21 24.00 (11.35667d) Equinox: J2000		V=(?) F(F160W, BRIGHTEST) = 9.0 +/- 0.2 E-15 ; F(F160W, VeLLO) < 2.8 E-19; F(F160W, FAINTEST) = 1.6 E-20	Reference Frame: ICRS

Comments: Expected F160W fluxes are listed for the following: the brightest H-band source in the WFC3 field, the VeLLO (assuming a foreground extinction of AV=30), and the faintest source for which we need to obtain SNR>8 photometry. The foreground extinction toward the VeLLO may be greater, yielding a smaller F160W flux by an order of magnitude. Depth of observation is determined not by VeLLO flux, but by that of faint background stars seen through extinctions of AV~60.

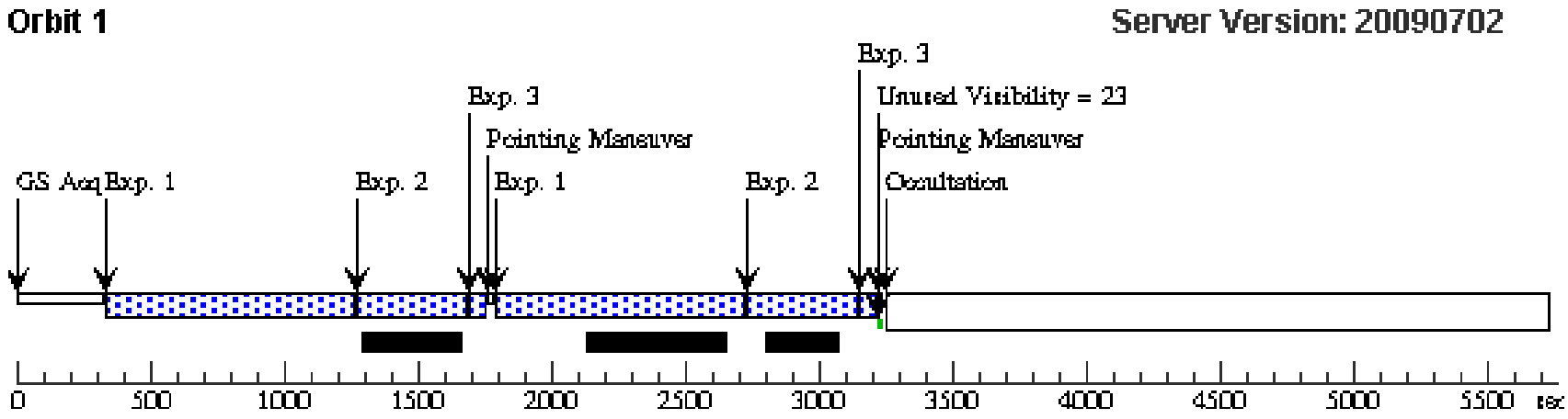
Exposures

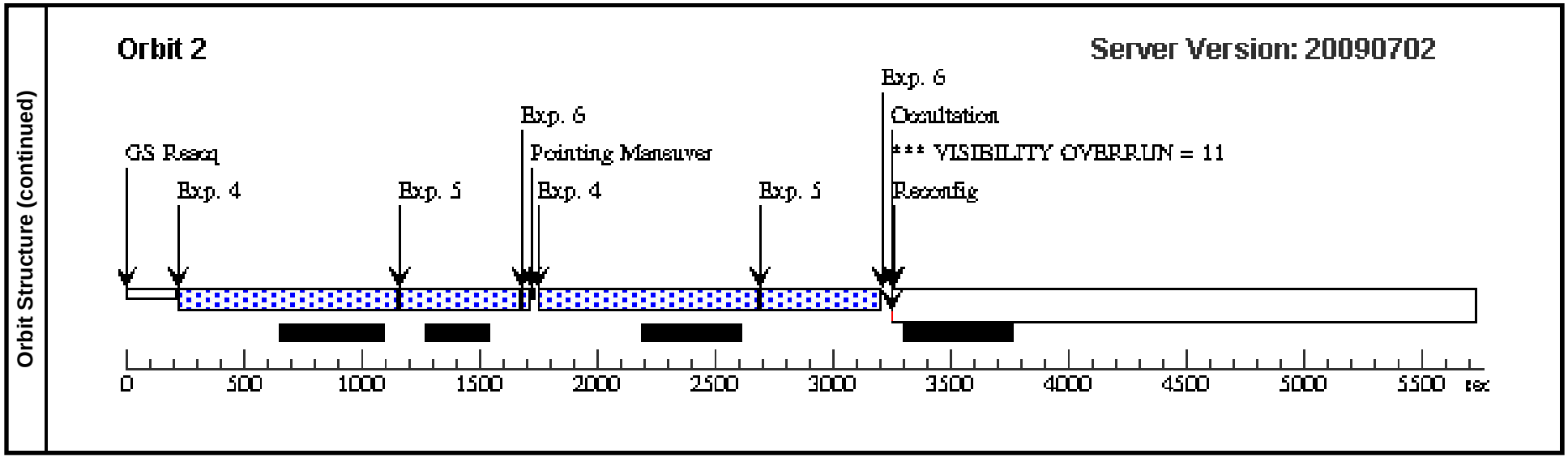
#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1	L673-7/1	(4) L673-7-CENTER	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=STEP100; NSAMP=15		Pattern 1, Exps 1-3 (1)	*[==>(Pattern 1)]* *[==>(Pattern 2)]*	***[1]***
2	L673-7/2	(4) L673-7-CENTER	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=STEP100; NSAMP=10		Pattern 1, Exps 1-3 (1)	*[==>(Pattern 1)]* *[==>(Pattern 2)]*	***[1]***

Exposures (continued)

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
3	L673-7/3	(4) L673-7-CENTER	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=STEP100; NSAMP=6		Pattern 1, Exps 1-3 (1)	*[==>(Pattern 1)]* *[==>(Pattern 2)]*	*[1]*
4	L673-7/4	(4) L673-7-CENTER	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=STEP100; NSAMP=15		Pattern 2, Exps 4-6 (2)	*[==>(Pattern 1)]* *[==>(Pattern 2)]*	*[2]*
5	L673-7/5	(4) L673-7-CENTER	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=STEP100; NSAMP=11		Pattern 2, Exps 4-6 (2)	*[==>(Pattern 1)]* *[==>(Pattern 2)]*	*[2]*
6	L673-7/6	(4) L673-7-CENTER	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=STEP100; NSAMP=5		Pattern 2, Exps 4-6 (2)	*[==>(Pattern 1)]* *[==>(Pattern 2)]*	*[2]*

Orbit Structure




Orbit Structure (continued)
Orbit 2
Server Version: 20090702
GS Reacq
Exp. 4
Exp. 5
Exp. 6
Pointing Maneuver
Exp. 4
Exp. 5
Exp. 6
Occultation
*** VISIBILITY OVERRUN = 11
Reconfig
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 11618, Visit 05, scheduling Sat Oct 10 01:01:54 GMT 2009

Diagnostic Status: Warning

Scientific Instruments: WFC3/IR

Special Requirements: (none)

Diagnostics

(Visit 05) Warning (Orbit Planner): VISIBILITY OVERRUN

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFC3-IR-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=14.503 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=41.788 Angle Between Sides= Center Pattern=true		(1-3)
(2)	Pattern Type=WFC3-IR-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=7.252 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=138.212 Angle Between Sides= Center Pattern=true		(4-6)

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(5)	IRAM04191+1522-CENTER	RA: 04 21 56.2000 (65.4841667d) Dec: +15 29 47.00 (15.49639d) Equinox: J2000		V=(?) F(F160W, BRIGHTEST) = 5.3 +/- 0.1 E-16 ; F(F160W, VeLLO) = 3.1 +/- 0.2 E-18; F(F 160W, FAINTEST) = 1.6 E-20	Reference Frame: ICRS

Comments: Expected F160W fluxes are listed for the following: the brightest H-band source in the WFC3 field, the VeLLO (assuming a foreground extinction of AV=30), and the faintest source for which we need to obtain SNR>8 photometry. The foreground extinction toward the VeLLO may be greater, yielding a smaller F160W flux by an order of magnitude. Depth of observation is determined not by VeLLO flux, but by that of faint background stars seen through extinctions of AV~60.

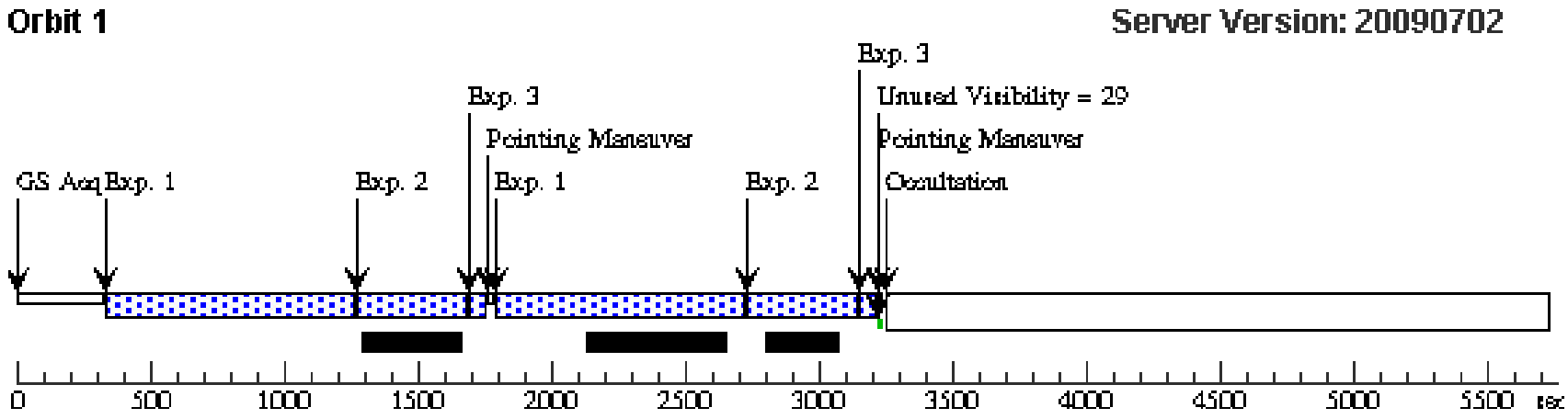
Exposures

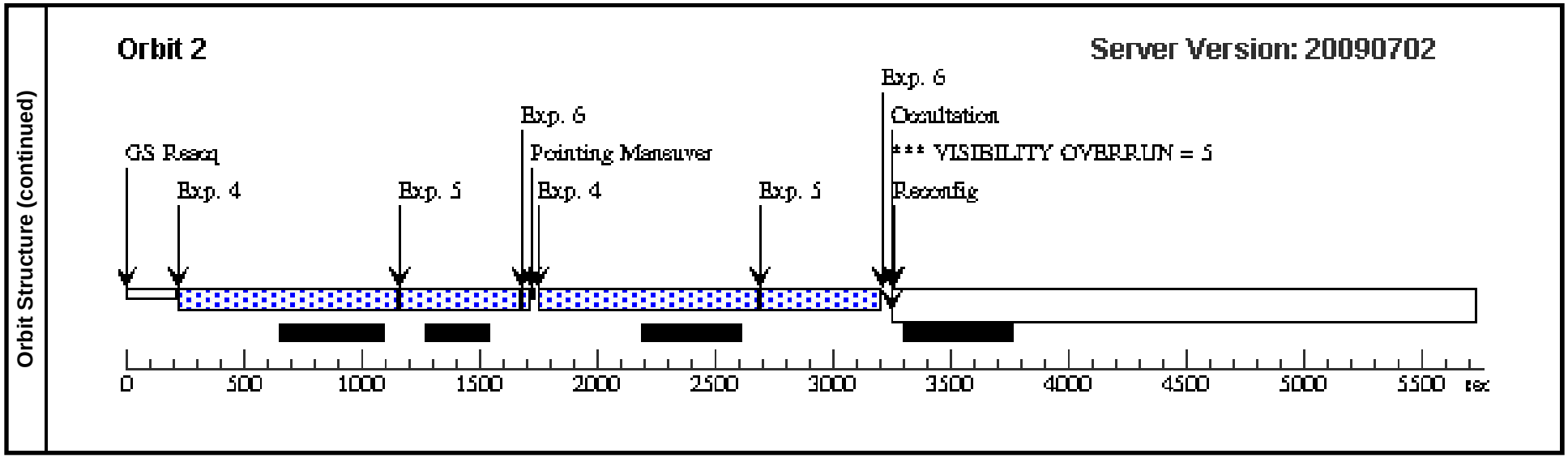
#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1	IRAM04191+1522/1	(5) IRAM04191+1522-CENTER	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=STEP100; NSAMP=15		Pattern 1, Exps 1-3 (1)	*[==>(Pattern 1)]* *[==>(Pattern 2)]*	***[1]***
2	IRAM04191+1522/2	(5) IRAM04191+1522-CENTER	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=STEP100; NSAMP=10		Pattern 1, Exps 1-3 (1)	*[==>(Pattern 1)]* *[==>(Pattern 2)]*	***[1]***

Exposures (continued)

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
3	IRAM04191+1522/3	(5) IRAM04191+1522-CENTER	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=STEP100; NSAMP=6		Pattern 1, Exps 1-3 (1)	*[==>(Pattern 1)]* *[==>(Pattern 2)]*	***[1]***
4	IRAM04191+1522/4	(5) IRAM04191+1522-CENTER	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=STEP100; NSAMP=15		Pattern 2, Exps 4-6 (2)	*[==>(Pattern 1)]* *[==>(Pattern 2)]*	***[2]***
5	IRAM04191+1522/5	(5) IRAM04191+1522-CENTER	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=STEP100; NSAMP=11		Pattern 2, Exps 4-6 (2)	*[==>(Pattern 1)]* *[==>(Pattern 2)]*	***[2]***
6	IRAM04191+1522/6	(5) IRAM04191+1522-CENTER	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=STEP100; NSAMP=5		Pattern 2, Exps 4-6 (2)	*[==>(Pattern 1)]* *[==>(Pattern 2)]*	***[2]***

Orbit Structure




Orbit Structure (continued)
Orbit 2
Server Version: 20090702
GS Reacq
Exp. 4
Exp. 5
Exp. 6
Pointing Maneuver
Exp. 4
Exp. 5
Exp. 6
Occultation
*** VISIBILITY OVERRUN = 5
Reconfig
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 11618, Visit 06, scheduling Sat Oct 10 01:01:55 GMT 2009

Diagnostic Status: Warning

Scientific Instruments: WFC3/IR

Special Requirements: (none)

Diagnostics

(Visit 06) Warning (Orbit Planner): VISIBILITY OVERRUN

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFC3-IR-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=14.503 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=41.788 Angle Between Sides= Center Pattern=true		(1-3)
(2)	Pattern Type=WFC3-IR-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=7.252 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=138.212 Angle Between Sides= Center Pattern=true		(4-6)

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(6)	DC2742-04-CENTER Alt Name1: BHR53	RA: 09 28 49.3000 (142.2054167d) Dec: -51 36 3.00 (-51.60083d) Equinox: J2000		V=(?) F(F160W, BRIGHTEST) = 3.6 +/- 0.2 E-14 ; F(F160W, VeLLO) = 1.9 +/- 0.1 E-18; F(F160W, FAINTEST) = 1.6 E-20	Reference Frame: ICRS

Comments: Expected F160W fluxes are listed for the following: the brightest H-band source in the WFC3 field, the VeLLO (assuming a foreground extinction of AV=30), and the faintest source for which we need to obtain SNR>8 photometry. The foreground extinction toward the VeLLO may be greater, yielding a smaller F160W flux by an order of magnitude. Depth of observation is determined not by VeLLO flux, but by that of faint background stars seen through extinctions of AV~60.

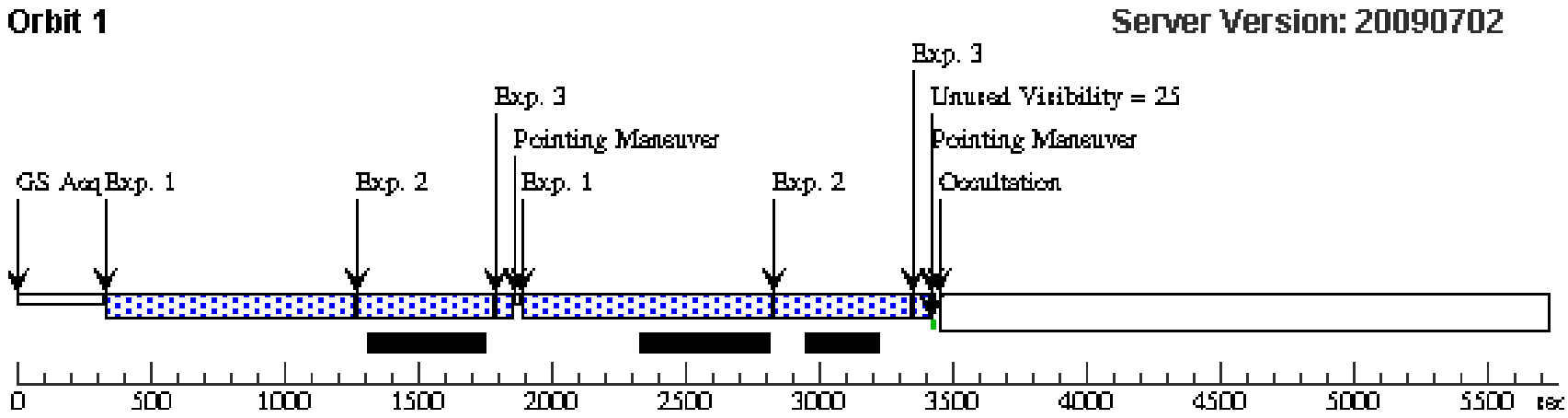
Exposures

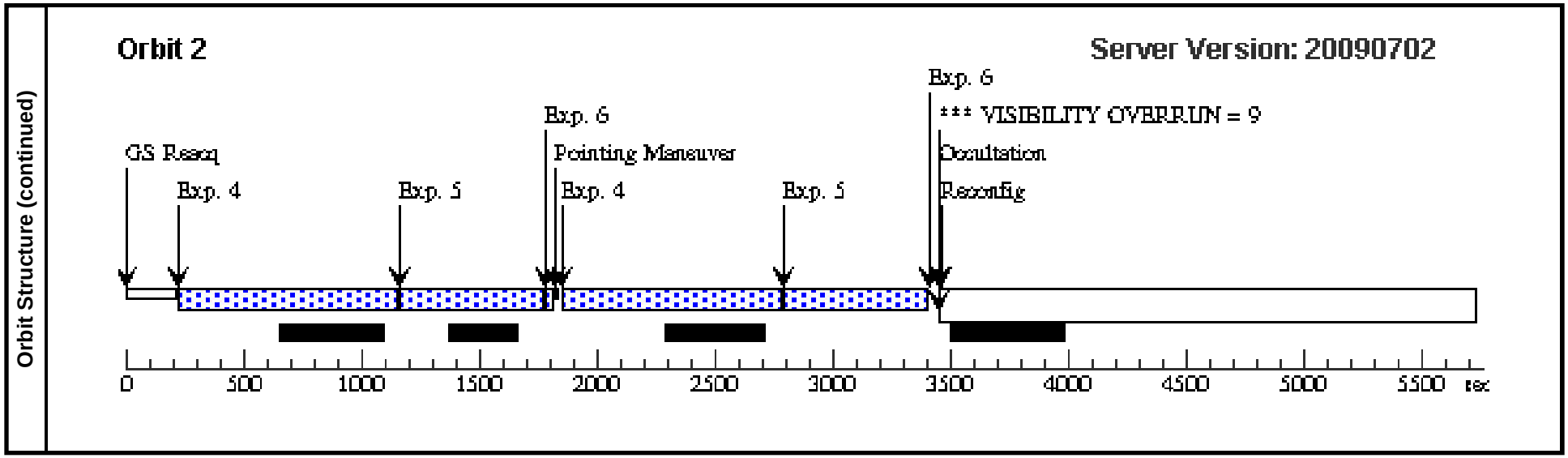
#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1	DC2742-04/1	(6) DC2742-04-CENTER	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=STEP100; NSAMP=15		Pattern 1, Exps 1-3 (1)	*[==>(Pattern 1)]* *[==>(Pattern 2)]*	***[1]***
2	DC2742-04/2	(6) DC2742-04-CENTER	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=STEP100; NSAMP=11		Pattern 1, Exps 1-3 (1)	*[==>(Pattern 1)]* *[==>(Pattern 2)]*	***[1]***

Exposures (continued)

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
3	DC2742-04/3	(6) DC2742-04-CENTER	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=STEP100; NSAMP=6		Pattern 1, Exps 1-3 (1)	*[==>(Pattern 1)]* *[==>(Pattern 2)]*	*[1]*
4	DC2742-04/4	(6) DC2742-04-CENTER	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=STEP100; NSAMP=15		Pattern 2, Exps 4-6 (2)	*[==>(Pattern 1)]* *[==>(Pattern 2)]*	*[2]*
5	DC2742-04/5	(6) DC2742-04-CENTER	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=STEP100; NSAMP=12		Pattern 2, Exps 4-6 (2)	*[==>(Pattern 1)]* *[==>(Pattern 2)]*	*[2]*
6	DC2742-04/6	(6) DC2742-04-CENTER	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=STEP100; NSAMP=5		Pattern 2, Exps 4-6 (2)	*[==>(Pattern 1)]* *[==>(Pattern 2)]*	*[2]*

Orbit Structure




Orbit Structure (continued)
Orbit 2
Server Version: 20090702
GS Reacq
Exp. 4
Exp. 5
Exp. 6
Pointing Maneuver
Exp. 4
Exp. 5
Exp. 6
*** VISIBILITY OVERRUN = 9
Occultation
Reconfig
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 11618, Visit 07, scheduling Sat Oct 10 01:01:56 GMT 2009

Diagnostic Status: Warning

Scientific Instruments: WFC3/IR

Special Requirements: (none)

Diagnostics

(Visit 07) Warning (Orbit Planner): VISIBILITY OVERRUN

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFC3-IR-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=14.503 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=41.788 Angle Between Sides= Center Pattern=true		(1-3)
(2)	Pattern Type=WFC3-IR-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=7.252 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=138.212 Angle Between Sides= Center Pattern=true		(4-6)

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(7)	L694-2-CENTER Alt Name1: B143 Alt Name2: CB200	RA: 19 41 4.5000 (295.2687500d) Dec: +10 57 8.00 (10.95222d) Equinox: J2000		V=(?) F(F160W, BRIGHTEST) = 4.0 +/- 0.2 E-15 ; F(F160W, FAINTEST) = 1.6 E-20	Reference Frame: ICRS

Comments: There is no VeLLO or protostar in this field. Expected F160W fluxes are listed for the following: the brightest H-band source in the WFC3 field, and the faintest source for which we need to obtain SNR>8 photometry. Depth of observation is determined by the fluxes of faint background stars seen through extinctions of AV~60.

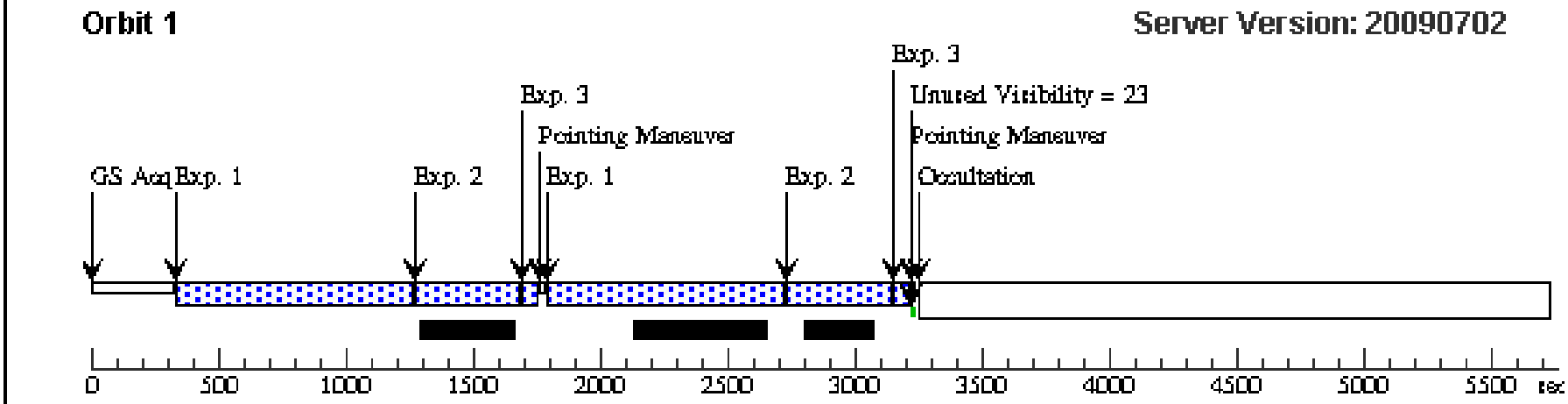
Exposures

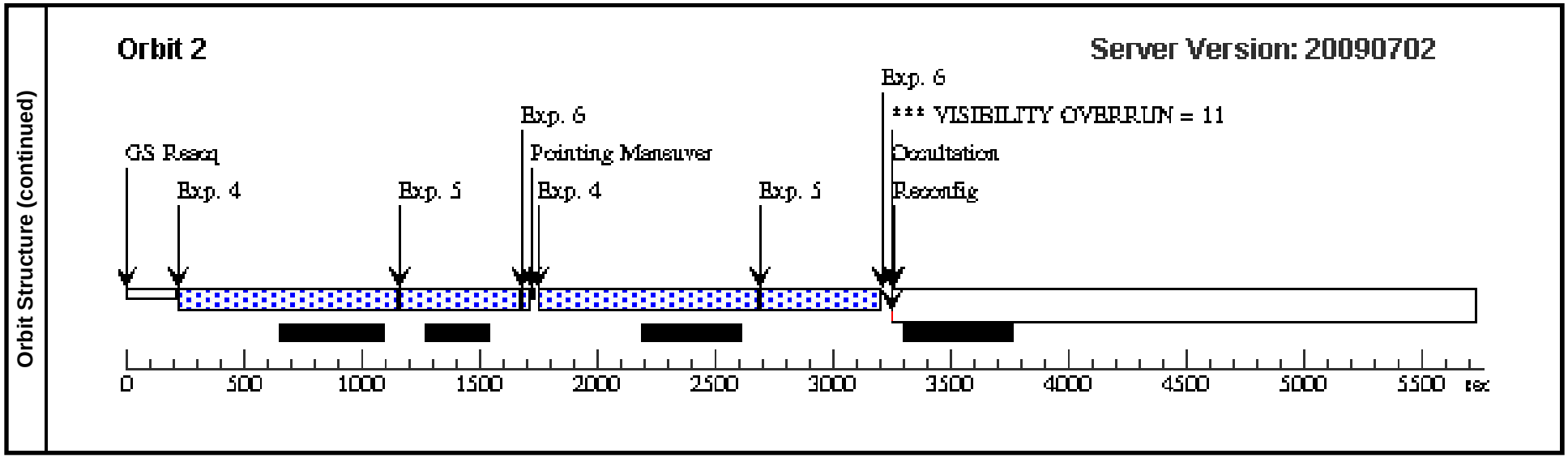
#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1	L694-2/1	(7) L694-2-CENTER	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=STEP100; NSAMP=15		Pattern 1, Exps 1-3 (1)	*[==>(Pattern 1)]* *[==>(Pattern 2)]*	***[1]***
2	L694-2/2	(7) L694-2-CENTER	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=STEP100; NSAMP=10		Pattern 1, Exps 1-3 (1)	*[==>(Pattern 1)]* *[==>(Pattern 2)]*	***[1]***
3	L694-2/3	(7) L694-2-CENTER	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=STEP100; NSAMP=6		Pattern 1, Exps 1-3 (1)	*[==>(Pattern 1)]* *[==>(Pattern 2)]*	***[1]***

Exposures (continued)

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
4	L694-2/4	(7) L694-2-CENTER	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=STEP100; NSAMP=15		Pattern 2, Exps 4-6 (2)	*[==>(Pattern 1)]* *[==>(Pattern 2)]*	*[2]*
5	L694-2/5	(7) L694-2-CENTER	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=STEP100; NSAMP=11		Pattern 2, Exps 4-6 (2)	*[==>(Pattern 1)]* *[==>(Pattern 2)]*	*[2]*
6	L694-2/6	(7) L694-2-CENTER	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=STEP100; NSAMP=5		Pattern 2, Exps 4-6 (2)	*[==>(Pattern 1)]* *[==>(Pattern 2)]*	*[2]*

Orbit Structure




Orbit Structure (continued)
Orbit 2
Server Version: 20090702
GS Reacq
Exp. 4
Exp. 5
Exp. 6
Pointing Maneuver
Exp. 4
Exp. 5
Exp. 6
*** VISIBILITY OVERRUN = 11
Occultation
Reconfig
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 11618, Visit 08, scheduling Sat Oct 10 01:01:57 GMT 2009

Diagnostic Status: Warning

Scientific Instruments: WFC3/IR

Special Requirements: (none)

Diagnostics

(Visit 08) Warning (Orbit Planner): VISIBILITY OVERRUN

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFC3-IR-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=14.503 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=41.788 Angle Between Sides= Center Pattern=true		(1-3)
(2)	Pattern Type=WFC3-IR-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=7.252 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=138.212 Angle Between Sides= Center Pattern=true		(4-6)

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(8)	B335-CENTER	RA: 19 37 0.7000 (294.2529167d) Dec: +07 34 8.00 (7.56889d) Equinox: J2000		V=(?) F(F160W, BRIGHTEST) = 2.7 +/- 0.1 E-14 ; F(F160W, PROTOSTAR) = 6.1 +/- 0.3 E-18; F(F160W, FAINTEST) = 1.6 E-20	Reference Frame: ICRS

Comments: Expected F160W fluxes are listed for the following: the brightest H-band source in the WFC3 field, the protostar (assuming a foreground extinction of AV=30), and the faintest source for which we need to obtain SNR>8 photometry. The foreground extinction toward the protostar may be greater, yielding a smaller F160W flux by an order of magnitude. Depth of observation is determined not by protostellar flux, but by that of faint background stars seen through extinctions of AV~60.

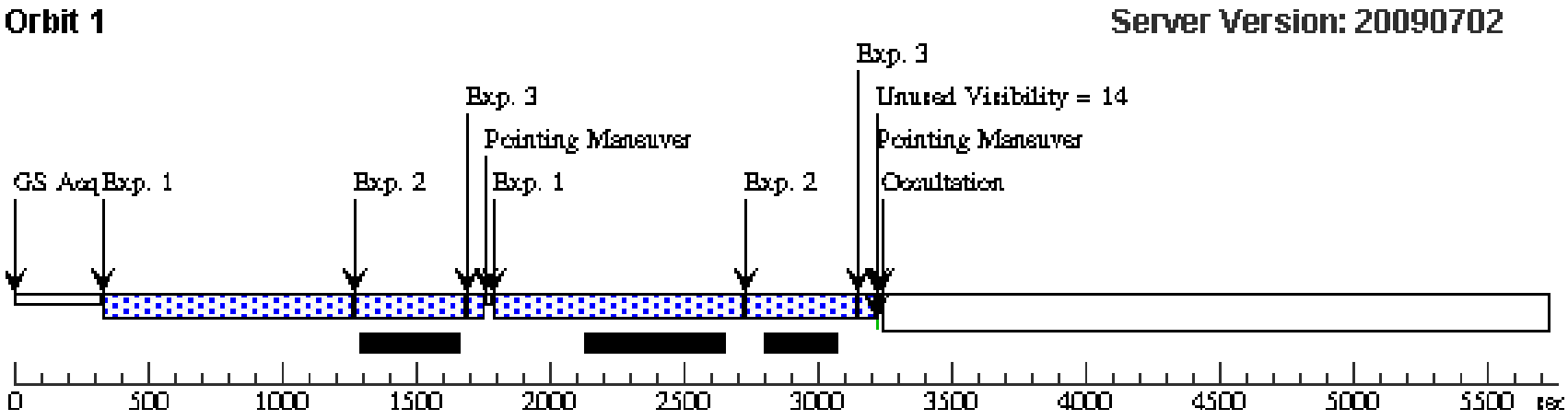
Exposures

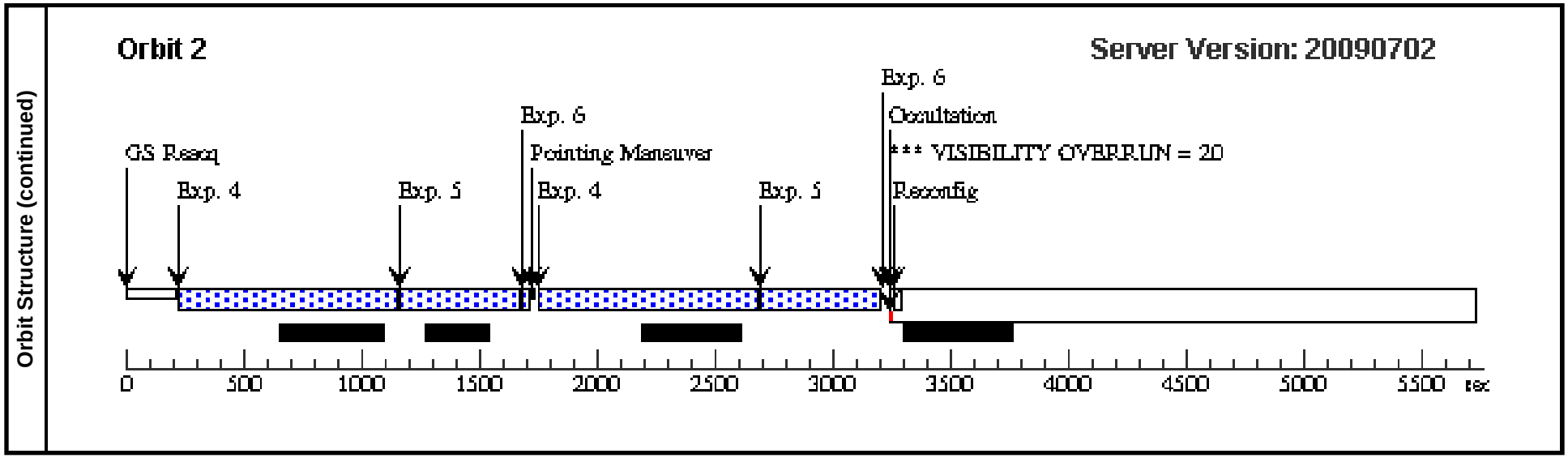
#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1	B335/1	(8) B335-CENTER	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=STEP100; NSAMP=15		Pattern 1, Exps 1-3 (1)	*[==>(Pattern 1)]* *[==>(Pattern 2)]*	***[1]***
2	B335/2	(8) B335-CENTER	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=STEP100; NSAMP=10		Pattern 1, Exps 1-3 (1)	*[==>(Pattern 1)]* *[==>(Pattern 2)]*	***[1]***

Exposures (continued)

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
3	B335/3	(8) B335-CENTER	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=STEP100; NSAMP=6		Pattern 1, Exps 1-3 (1)	*[==>(Pattern 1)]* *[==>(Pattern 2)]*	***[1]***
4	B335/4	(8) B335-CENTER	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=STEP100; NSAMP=15		Pattern 2, Exps 4-6 (2)	*[==>(Pattern 1)]* *[==>(Pattern 2)]*	***[2]***
5	B335/5	(8) B335-CENTER	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=STEP100; NSAMP=11		Pattern 2, Exps 4-6 (2)	*[==>(Pattern 1)]* *[==>(Pattern 2)]*	***[2]***
6	B335/6	(8) B335-CENTER	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=STEP100; NSAMP=5		Pattern 2, Exps 4-6 (2)	*[==>(Pattern 1)]* *[==>(Pattern 2)]*	***[2]***

Orbit Structure




Orbit Structure (continued)
Orbit 2
Server Version: 20090702
GS Reacq
Exp. 4
Exp. 5
Exp. 6
Pointing Maneuver
Exp. 4
Exp. 5
Exp. 6
Occultation
*** VISIBILITY OVERRUN = 20
Reconfig
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec