11098 - Pinning down the redshift of the J-band dropout JD0910+46

Cycle: 15, Proposal Category: GO/DD

(Availability Mode: SUPPORTED)

INVESTIGATORS

Name	*Institution*	*E-Mail*
Dr. Andrew J. Levan (PI) (ESA Member)	**The University of Warwick**	**a.j.levan@warwick.ac.uk**
Prof. Nial R. Tanvir (CoI) (ESA Member)	University of Leicester	nrt3@star.le.ac.uk
Dr. Andrew S. Fruchter (CoI) (AdminUSPI)	Space Telescope Science Institute	fruchter@stsci.edu
Dr. James Rhoads (CoI)	Arizona State University	james.rhoads@asu.edu
Dr. Malcolm Bremer (CoI) (ESA Member)	University of Bristol	m.bremer@bristol.ac.uk
Dr. Robert S. Priddey (CoI) (ESA Member)	University of Hertfordshire	priddey@star.herts.ac.uk
Dr. Pall Jakobsson (CoI) (ESA Member)	University of Hertfordshire	p.jakobsson@herts.ac.uk
Dr. Evert Rol (CoI) (ESA Member)	University of Leicester	er45@star.le.ac.uk
Dr. Jens Hjorth (CoI) (ESA Member)	University of Copenhagen, Niels Bohr Institute	jens@astro.ku.dk
Dr. Melissa C. Nysewander (CoI)	Space Telescope Science Institute	mnysewan@physics.unc.edu

VISITS

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
01	(1) JD910+46	NIC3	4	01-Mar-2007 21:34:10.0	yes
02	(1) JD910+46	NIC3	4	01-Mar-2007 21:34:22.0	yes

8 Total Orbits Used

ABSTRACT

The earliest galaxies in the Universe should have formed at very high redshifts, based both on models of hierarchical structure formation, and on observations of the microwave background polarization by WMAP that require significant ionization of the intergalactic medium before z=10. However, direct observation of sources at z>7 remains highly challenging due to their scarcity and faintness. We recently identified a spatially extended J-band dropout, JD0910+46, that is a promising candidate for a z>10 galaxy. Its spectral energy distribution is more extreme than any previously reported: It is undetected in our 2-orbit J-band observation, with a very red J-H color, yet is bluer in H-K than plausible lower redshift (z~3) model SEDs. These colors are, however, natural for a very high redshift star-burst galaxy in which the Lyman-alpha break has moved mostly or entirely through the F110W band. Here we propose deeper F110W and F187W observations to better map the spectral energy distribution of JD910+46, these have the potential to convincingly reject all low redshift solutions for the origin of the observed colours. We believe the importance of such a discovery adds urgency to the followup, and motivates this DD request. Even in the event that JD0910+46 lies at lower redshift understanding the nature of the object will be of great importance since it may lie in a significant overdensity of galaxies at z~4, and will be an important tool for identifying possible interlopers in samples of ultra high-z galaxies.

OBSERVING DESCRIPTION

We wish to observe JD0910+46 using NICMOS. The purpose of these observations is to secure a deep limit (or detection) of JD0910+46 in the F110W band. We will perform a total of eight orbits over two visits with an 8 point dither pattern in each of them. This will allow us to reach 2-sigma limiting magnitudes of F110W(AB)~27.5. We will perform two, four orbit visits, with two exposures per orbit to aid the SAA correction. Each visit will perform a 8-point dither pattern to allow some reconstruction of the PSF via drizzle, while we perform a constant POSTARG offset of 4" between the first and second visit to aid the production of a "master" sky flat.

Visit

Proposal 11098, Visit 01, implementation Fri Mar 02 02:34:28 GMT 2007

Diagnostic Status: No Diagnostics

Scientific Instruments: NIC3

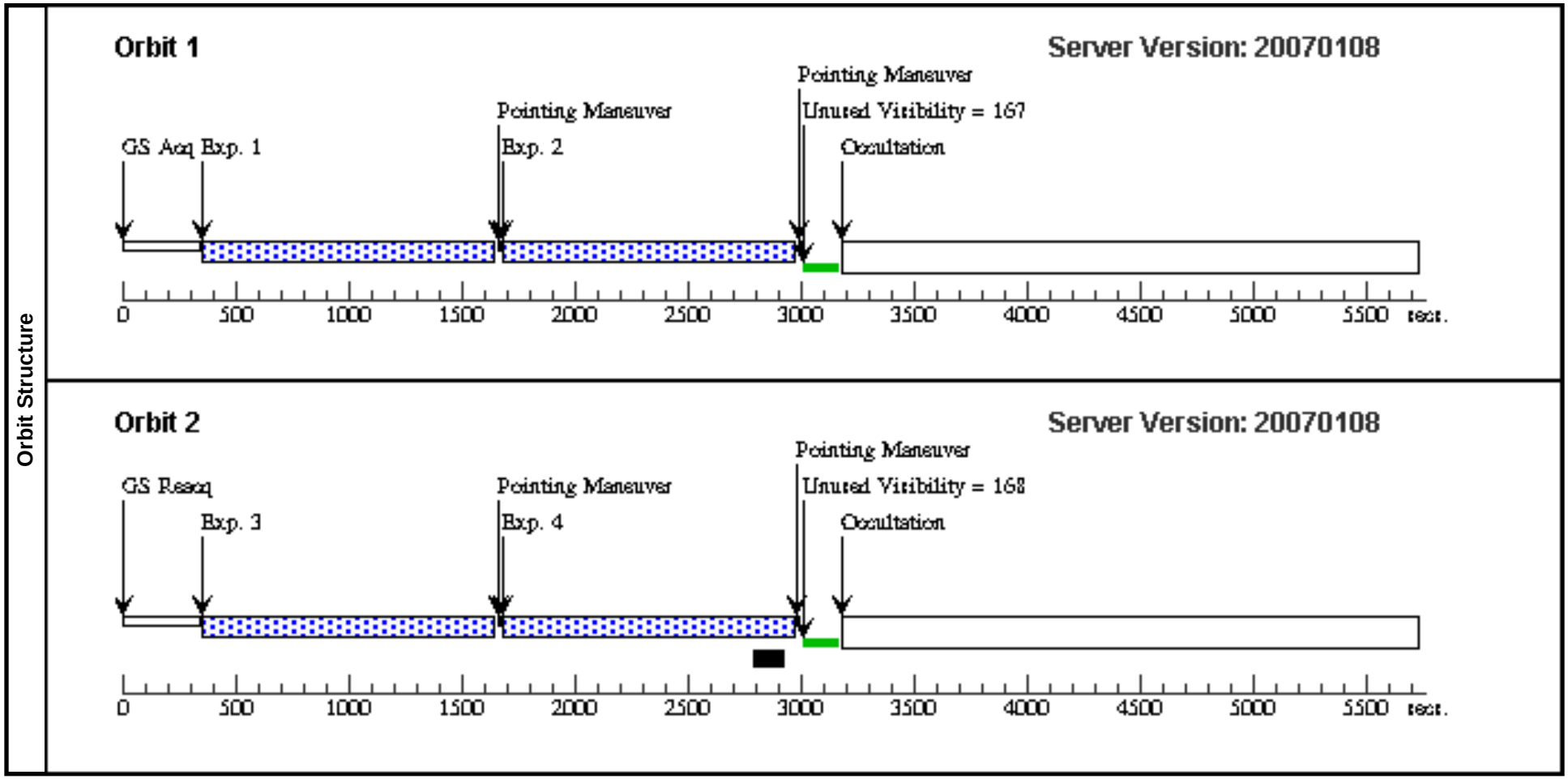
Special Requirements: (none)

Fixed Targets

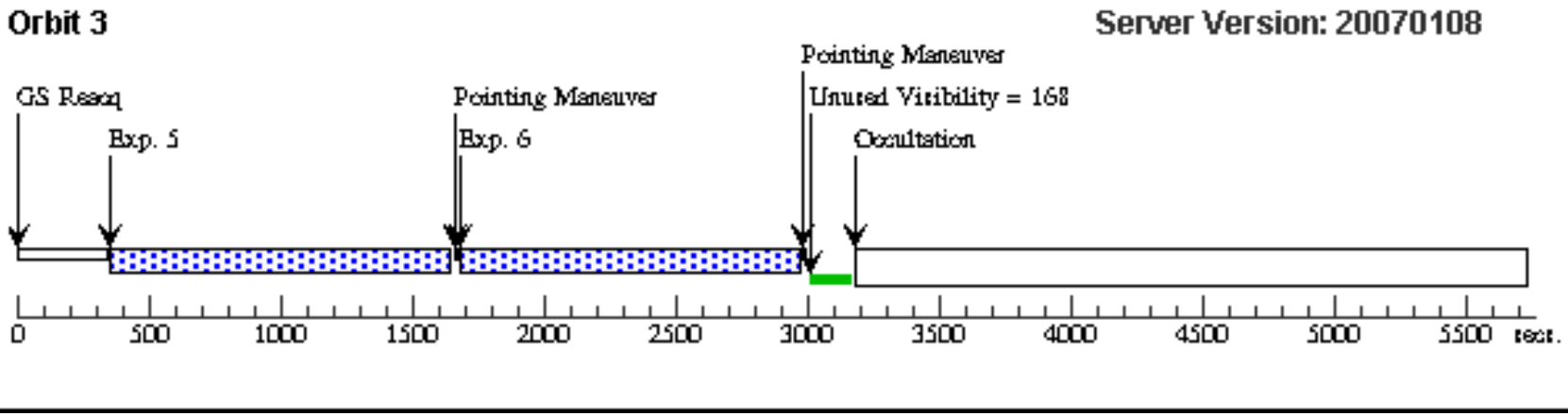
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	JD910+46	RA: 09 09 52.1300 (137.4672083d) Dec: +45 39 44.90 (45.66247d) Equinox: J2000 Plate Id: (?)		V=29.0+/-1.0 H(AB)=23.8, K(AB)=23.2	Reference Frame: GSC1

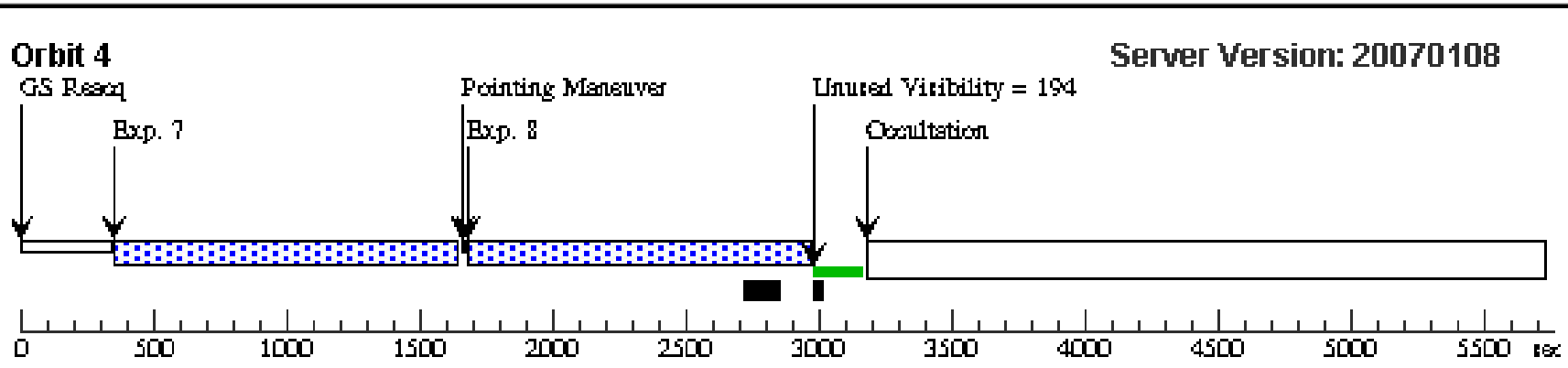
Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1		(1) JD910+46	NIC3, MULTIACCUM, NIC3	F110W	NSAMP=22; SAMP-SEQ=SPARS64	POS TARG -1.426,-1.421		*[==>]*	***[1]***
2		(1) JD910+46	NIC3, MULTIACCUM, NIC3	F110W	NSAMP=22; SAMP-SEQ=SPARS64	POS TARG -1.426,1.523		*[==>]*	***[1]***
3		(1) JD910+46	NIC3, MULTIACCUM, NIC3	F110W	NSAMP=22; SAMP-SEQ=SPARS64	POS TARG 1.528,-1.421		*[==>]*	***[2]***
4		(1) JD910+46	NIC3, MULTIACCUM, NIC3	F110W	NSAMP=22; SAMP-SEQ=SPARS64	POS TARG 1.528,1.523		*[==>]*	***[2]***
5		(1) JD910+46	NIC3, MULTIACCUM, NIC3	F110W	NSAMP=22; SAMP-SEQ=SPARS64	POS TARG -1.681,-1.675		*[==>]*	***[3]***
6		(1) JD910+46	NIC3, MULTIACCUM, NIC3	F110W	NSAMP=22; SAMP-SEQ=SPARS64	POS TARG -1.681,1.675		*[==>]*	***[3]***
7		(1) JD910+46	NIC3, MULTIACCUM, NIC3	F110W	NSAMP=22; SAMP-SEQ=SPARS64	POS TARG 1.681,-1.675		*[==>]*	***[4]***
8		(1) JD910+46	NIC3, MULTIACCUM, NIC3	F110W	NSAMP=22; SAMP-SEQ=SPARS64	POS TARG 1.681,1.675		*[==>]*	***[4]***


Orbit Structure
Orbit 1
Server Version: 20070108
GS Acq
Exp. 1
Pointing Maneuver
Exp. 2
Pointing Maneuver
Unused Visibility = 167
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec.
Orbit 2
Server Version: 20070108
GS Reacq
Exp. 3
Pointing Maneuver
Exp. 4
Pointing Maneuver
Unused Visibility = 168
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec.

Orbit Structure (continued)





Visit

Proposal 11098, Visit 02, implementation Fri Mar 02 02:34:30 GMT 2007

Diagnostic Status: No Diagnostics

Scientific Instruments: NIC3

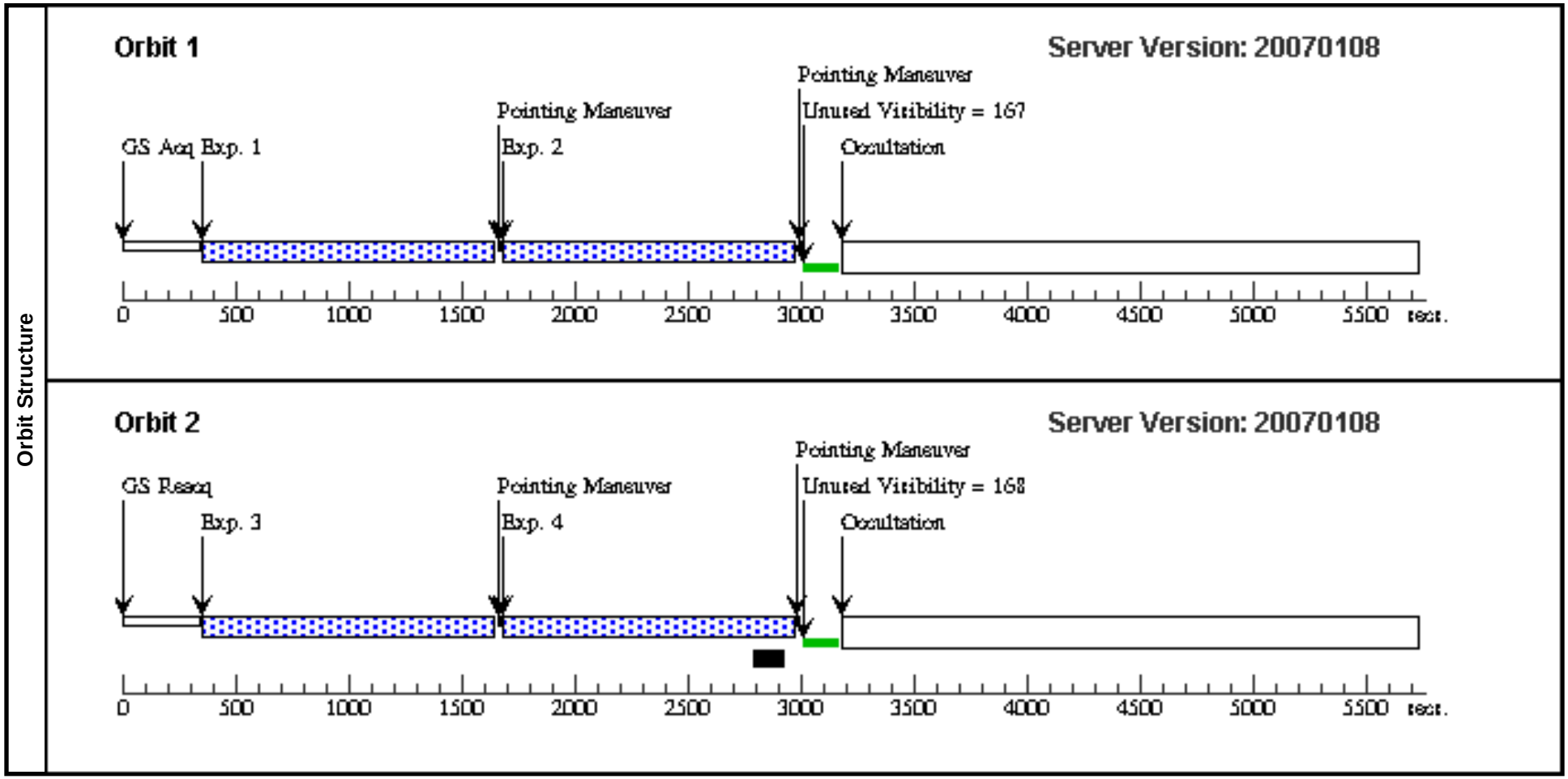
Special Requirements: (none)

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	JD910+46	RA: 09 09 52.1300 (137.4672083d) Dec: +45 39 44.90 (45.66247d) Equinox: J2000 Plate Id: (?)		V=29.0+/-1.0 H(AB)=23.8, K(AB)=23.2	Reference Frame: GSC1

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1		(1) JD910+46	NIC3, MULTIACCUM, NIC3	F110W	NSAMP=22; SAMP-SEQ=SPARS64	POS TARG 2.574,2.579		*[==>]*	***[1]***
2		(1) JD910+46	NIC3, MULTIACCUM, NIC3	F110W	NSAMP=22; SAMP-SEQ=SPARS64	POS TARG 2.574,5.523		*[==>]*	***[1]***
3		(1) JD910+46	NIC3, MULTIACCUM, NIC3	F110W	NSAMP=22; SAMP-SEQ=SPARS64	POS TARG 5.528,2.579		*[==>]*	***[2]***
4		(1) JD910+46	NIC3, MULTIACCUM, NIC3	F110W	NSAMP=22; SAMP-SEQ=SPARS64	POS TARG 5.528,5.523		*[==>]*	***[2]***
5		(1) JD910+46	NIC3, MULTIACCUM, NIC3	F110W	NSAMP=22; SAMP-SEQ=SPARS64	POS TARG 2.319,2.325		*[==>]*	***[3]***
6		(1) JD910+46	NIC3, MULTIACCUM, NIC3	F110W	NSAMP=22; SAMP-SEQ=SPARS64	POS TARG 2.319,5.675		*[==>]*	***[3]***
7		(1) JD910+46	NIC3, MULTIACCUM, NIC3	F110W	NSAMP=22; SAMP-SEQ=SPARS64	POS TARG 5.681,2.325		*[==>]*	***[4]***
8		(1) JD910+46	NIC3, MULTIACCUM, NIC3	F110W	NSAMP=22; SAMP-SEQ=SPARS64	POS TARG 5.681,5.675		*[==>]*	***[4]***


Orbit Structure
Orbit 1
Server Version: 20070108
Pointing Maneuver
Pointing Maneuver
Unused Visibility = 167
GS Acq Exp. 1
Exp. 2
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec.
Orbit 2
Server Version: 20070108
Pointing Maneuver
GS Reacq
Pointing Maneuver
Unused Visibility = 168
Exp. 3
Exp. 4
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec.

Orbit Structure (continued)