11622 - A Search for Water and Methane on a Neptune-Mass Transiting Planet

Cycle: 17, Proposal Category: GO

(Availability Mode: AVAILABLE)

INVESTIGATORS

Name	*Institution*	*E-Mail*
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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) GJ-436	WFC3/IR	4	27-Sep-2012 21:04:41.0	yes
02	(1) GJ-436	WFC3/IR	4	27-Sep-2012 21:09:02.0	yes
03	(1) GJ-436	WFC3/IR	4	27-Sep-2012 21:13:09.0	yes
04	(1) GJ-436	WFC3/IR	4	27-Sep-2012 21:17:26.0	yes
51	(1) GJ-436	WFC3/IR	4	27-Sep-2012 21:21:36.0	yes

20 Total Orbits Used

ABSTRACT

GJ 436b is the only known Neptune-mass transiting exoplanet. Like Neptune, more than 80% of the mass is ice and rock, surrounded by a thin H/He envelope of only 1-3 earth masses. The similarities end there, however, as GJ 436b orbits a mere 0.03 A.U. from its M dwarf primary and has a toasty 700 K atmosphere. Although it is much warmer than the gas giant planets in the solar system, GJ 436b is the coolest transiting planet discovered to date. As a result, we expect most of the carbon in GJ 436b's atmosphere to exist in the form of methane instead of the carbon monoxide found in the atmospheres of the hotter, more massive transiting planets. We propose to test this prediction by searching for the signature

of water and methane absorption in this unusual planet's atmosphere as seen in the wavelength dependence of the transit depth from 1.4-2.5 micron. This wavelength range includes strong absorption bands from both water and methane, and will also allow us to place limits on the presence of clouds and atmospheric hazes if present. Using the technique of transit timing, these observations (which span four transits) will also allow us to search for additional planetary companions with masses as small as that of Mars. A second planet would provide a natural explanation for GJ 436b's ability to maintain a significant orbital eccentricity, despite the fact that the circularization time scale for this system is significantly shorter than its current age.

OBSERVING DESCRIPTION

Four transits of GJ 436b will be observing using the G141 grating on WFC3. Each visit will consist of four HST orbits, where the first orbit is discarded due to instrument settling, the second and fourth orbits establish an out-of-transit baseline, and the third orbit is roughly centered on the transit itself.

In the first orbit we will obtain an image in F139M for wavelength specification, then switch to G141 for the remainder of the observations.

ADDITIONAL COMMENTS

We observe our target in drift scan mode, oriented to increase in the y (vertical) direction.

Visit

Proposal 11622, Visit 01, failed Fri Sep 28 01:22:04 GMT 2012

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: ORIENT 20.0D TO 170.0 D; ORIENT 200.0D TO 350.0 D; Period 2.6438979 D AND ZERO-PHASE HJD2454865.083208

Comments: First of four visits with WFC3. It is essential for the four orbits in each visit to be scheduled in a contiguous block. These orbits should be free of the SAA. The total allowed window for the start of each visit is 0.003 in planet orbital phase, corresponding to a 15 minute interval. In order to ensure complete coverage of the phase curve, the visits have been scheduled with two different offsets corresponding to either the first or second 7.5 minutes of this 15 minute window. However, if this poses a significant barrier to scheduling the requirements for individual visits may be relaxed to the full 15 minute range (0.9418-0.9458 in orbital phase).
We also include orientation restrictions intended to avoid overlapping spectra with a H=13.1 star located at a distance of 64" (6"S, 63"W) from GJ 436 (H=6.3). We find that we should avoid rotation angles between -10 to +20 degrees and 170 to 200 degrees in order to preserve a minimum separation of 12" in the Y (vertical) direction between the two spectra. We use 2MASS J2000 coordinates for both objects, and take into account GJ 436b's high proper motion of [896.1, -813.5] mas/yr to calculate the J2012 coordinates and corresponding rotation angle constraints.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	GJ-436	RA: 11 42 11.0941 (175.5462254d)	Proper Motion RA: 0.059756 sec of time/yr	V=10.68	Reference Frame: ICRS
		Dec: +26 42 23.65 (26.70657d)	Proper Motion Dec: -0.8137 arcsec/yr	B-V=1.52,	
		Equinox: J2000	Parallax: 0.09773"	H=6.32,	
			Epoch of Position: 2000	K=6.07	

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1		(1) GJ-436	WFC3/IR, MULTIACCUM, IRSUB256	F139M	SAMP-SEQ=RAPID ; NSAMP=6	POS TARG 0.0,5.3; PHASE 0.9418 TO 0 .9438; GS ACQ SCENARI O BASE1B3		*[==>]*	***[1]***

	2	(1) GJ-436	WFC3/IR, MULTIACCUM, GRISM256	G141	SAMP-SEQ=SPARS10; NSAMP=2	POS TARG 0.0,1.5; SPATIAL SCAN 0.99,90.0 Degrees,Forward	*[==>(Copy 1)]* *[==>(Copy 2)]* *[==>(Copy 3)]* *[==>(Copy 4)]* *[==>(Copy 5)]* *[==>(Copy 6)]* *[==>(Copy 7)]* *[==>(Copy 8)]* *[==>(Copy 9)]* *[==>(Copy 10)]* *[==>(Copy 11)]* *[==>(Copy 12)]* *[==>(Copy 13)]* *[==>(Copy 14)]* *[==>(Copy 15)]* *[==>(Copy 16)]* *[==>(Copy 17)]* *[==>(Copy 18)]* *[==>(Copy 19)]* *[==>(Copy 20)]* *[==>(Copy 21)]* *[==>(Copy 22)]* *[==>(Copy 23)]* *[==>(Copy 24)]* *[==>(Copy 25)]* *[==>(Copy 26)]* *[==>(Copy 27)]* *[==>(Copy 28)]*	***[1]***

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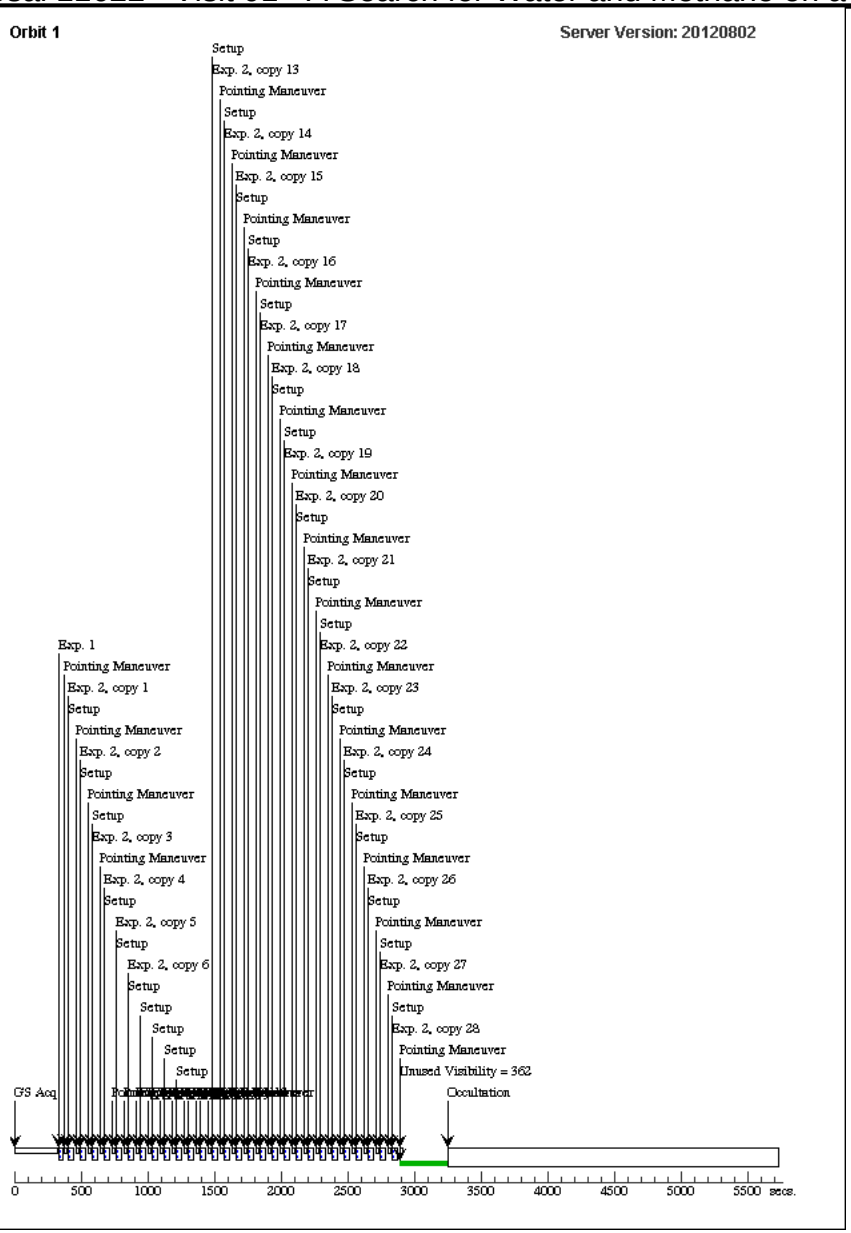
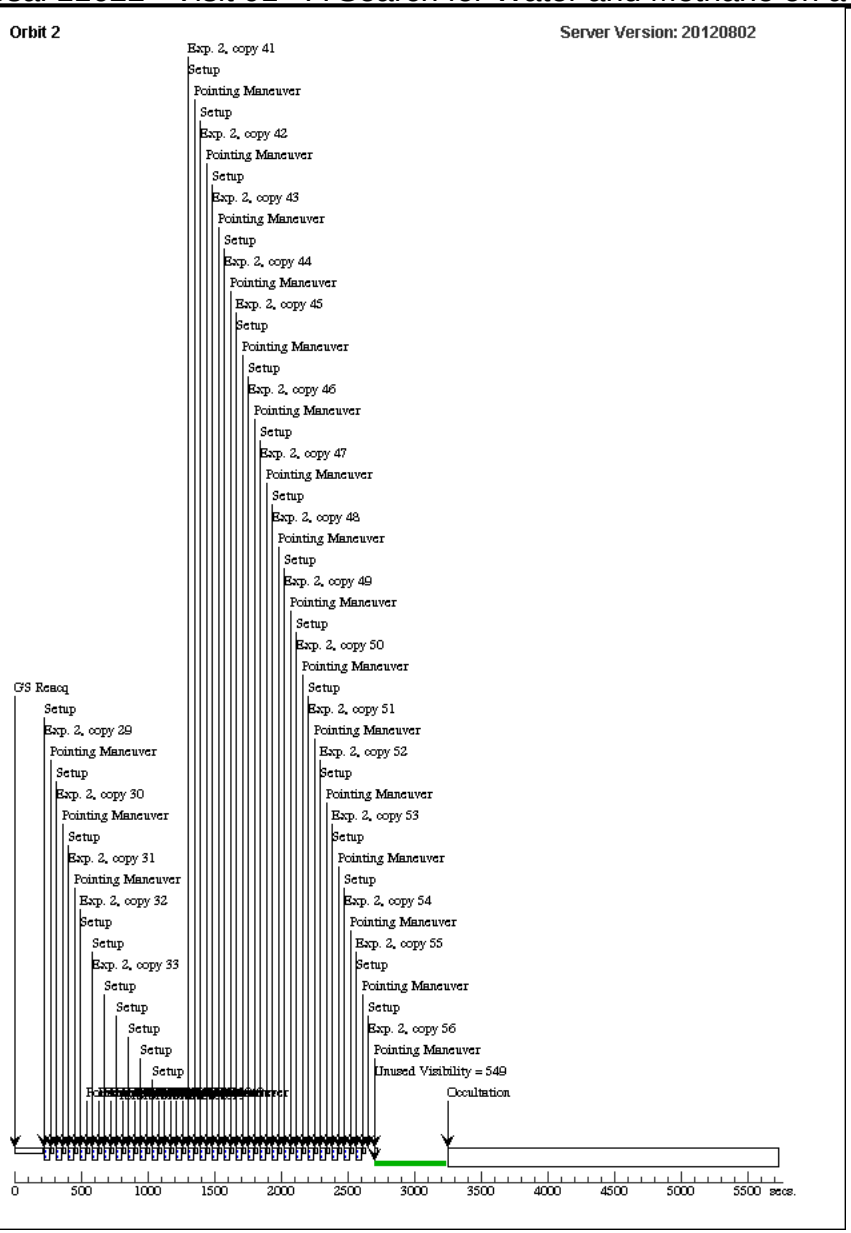
Orbit Structure

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GS Reacq
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Exp. 2, copy 54
Pointing Maneuver
Exp. 2, copy 55
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Pointing Maneuver
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Exp. 2, copy 56
Pointing Maneuver
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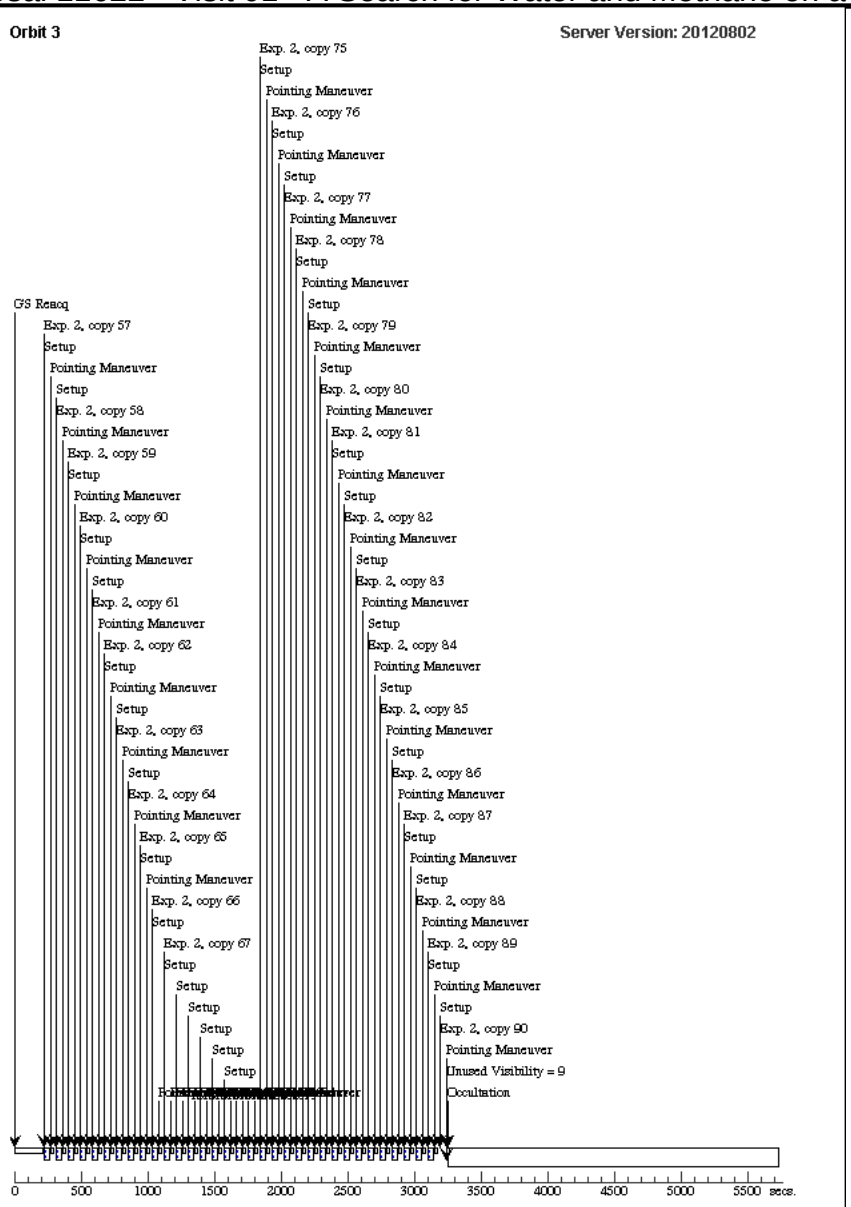
secs.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Exp. 2, copy 89
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Setup
Exp. 2, copy 90
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Occultation
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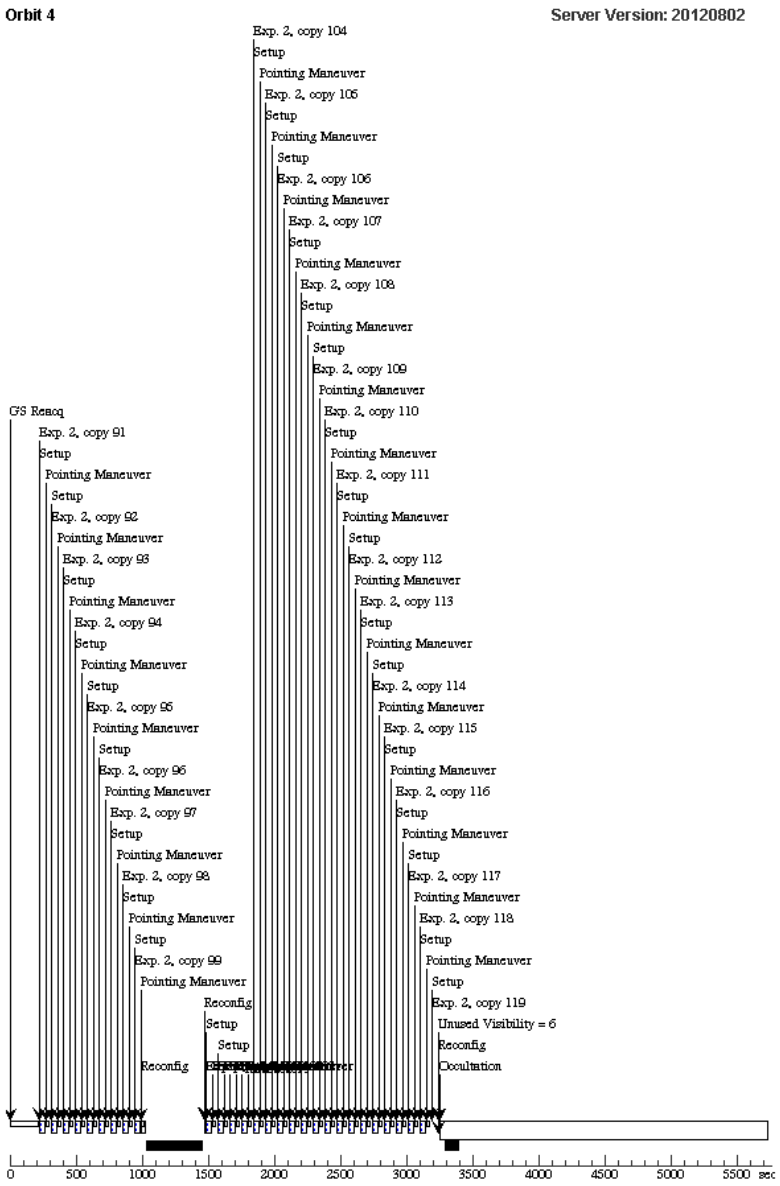
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Exp. 2, copy 119
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Visit

Proposal 11622, Visit 02, scheduling Fri Sep 28 01:22:14 GMT 2012

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: ORIENT 20.0D TO 170.0 D; ORIENT 200.0D TO 350.0 D; Period 2.6438979 D AND ZERO-PHASE HJD2454865.083208

Comments: Second of four visits with WFC3. It is essential for the four orbits in each visit to be scheduled in a contiguous block. These orbits should be free of the SAA. The total allowed window for the start of each visit is 0.003 in planet orbital phase, corresponding to a 15 minute interval. In order to ensure complete coverage of the phase curve, the visits have been scheduled with two different offsets corresponding to either the first or second 7.5 minutes of this 15 minute window. However, if this poses a significant barrier to scheduling the requirements for individual visits may be relaxed to the full 15 minute range (0.9418-0.9458 in orbital phase).

We also include orientation restrictions intended to avoid overlapping spectra with a H=13.1 star located at a distance of 64" (6"S, 63"W) from GJ 436 (H=6.3). We find that we should avoid rotation angles between -10 to +20 degrees and 170 to 200 degrees in order to preserve a minimum separation of 12" in the Y (vertical) direction between the two spectra. We use 2MASS J2000 coordinates for both objects, and take into account GJ 436b's high proper motion of [896.1, -813.5] mas/yr to calculate the J2012 coordinates and corresponding rotation angle constraints.

Lastly, we include an additional downward offset of -6.5 arcsec in Y position for the second exposure to accound for the additional 6.5 second delay observed in the start of each exposure for Visit 1. This corresponds to a new Y offset of 1.5 - 6.5 = 5.0 arcsec.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	GJ-436	RA: 11 42 11.0941 (175.5462254d)	Proper Motion RA: 0.059756 sec of time/yr	V=10.68	Reference Frame: ICRS
		Dec: +26 42 23.65 (26.70657d)	Proper Motion Dec: -0.8137 arcsec/yr	B-V=1.52,	
		Equinox: J2000	Parallax: 0.09773"	H=6.32,	
			Epoch of Position: 2000	K=6.07	

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1		(1) GJ-436	WFC3/IR, MULTIACCUM, IRSUB256	F139M	SAMP-SEQ=RAPID ; NSAMP=6	POS TARG 0.0,5.3; PHASE 0.9438 TO 0 .9458; GS ACQ SCENARI O BASE1B3		*[==>]*	***[1]***

	2	(1) GJ-436	WFC3/IR, MULTIACCUM, GRISM256	G141	SAMP-SEQ=SPARS10; NSAMP=2	POS TARG 0.0,-2.09; SPATIAL SCAN 0.99,90.0 Degrees,Forward	*[==>(Copy 1)]* *[==>(Copy 2)]* *[==>(Copy 3)]* *[==>(Copy 4)]* *[==>(Copy 5)]* *[==>(Copy 6)]* *[==>(Copy 7)]* *[==>(Copy 8)]* *[==>(Copy 9)]* *[==>(Copy 10)]* *[==>(Copy 11)]* *[==>(Copy 12)]* *[==>(Copy 13)]* *[==>(Copy 14)]* *[==>(Copy 15)]* *[==>(Copy 16)]* *[==>(Copy 17)]* *[==>(Copy 18)]* *[==>(Copy 19)]* *[==>(Copy 20)]* *[==>(Copy 21)]* *[==>(Copy 22)]* *[==>(Copy 23)]* *[==>(Copy 24)]* *[==>(Copy 25)]* *[==>(Copy 26)]* *[==>(Copy 27)]* *[==>(Copy 28)]*	***[1]***

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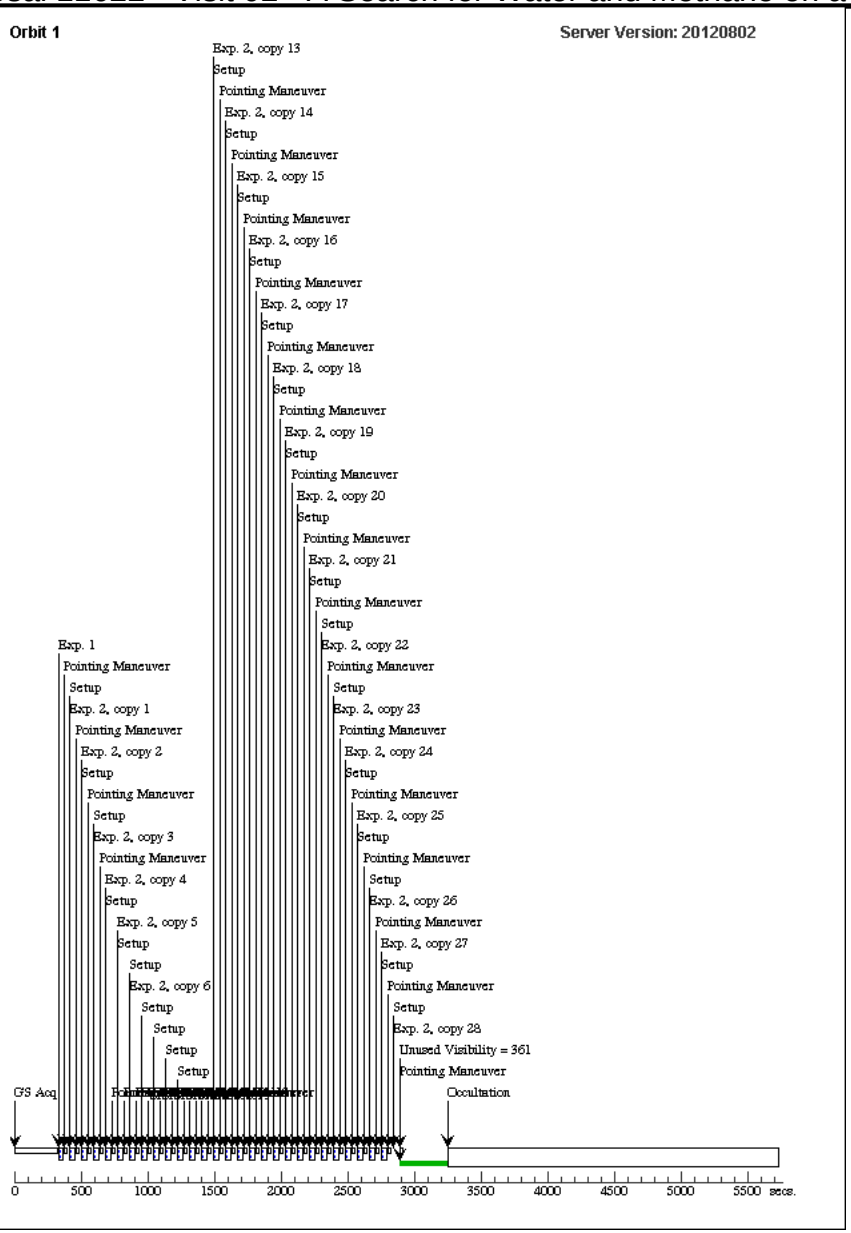
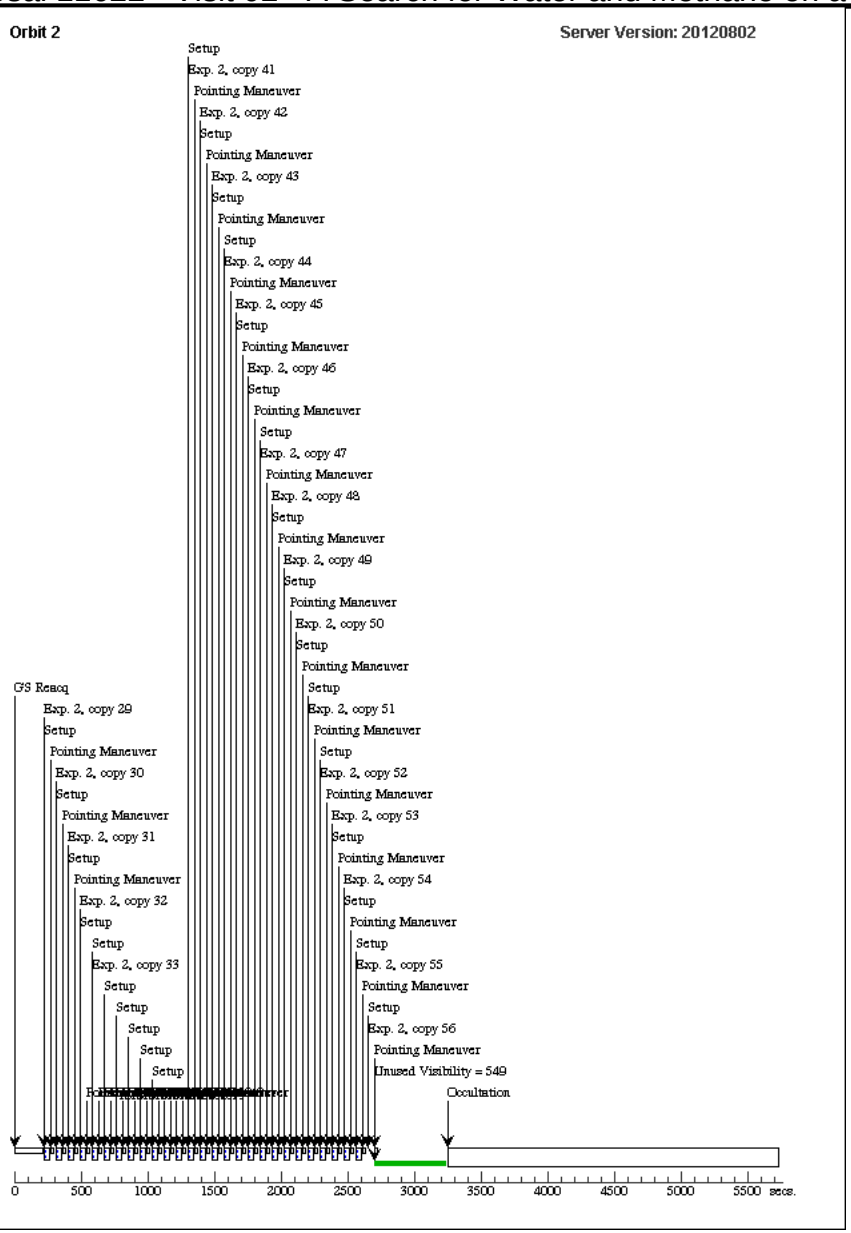
Orbit Structure

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Exp. 2, copy 56
Pointing Maneuver
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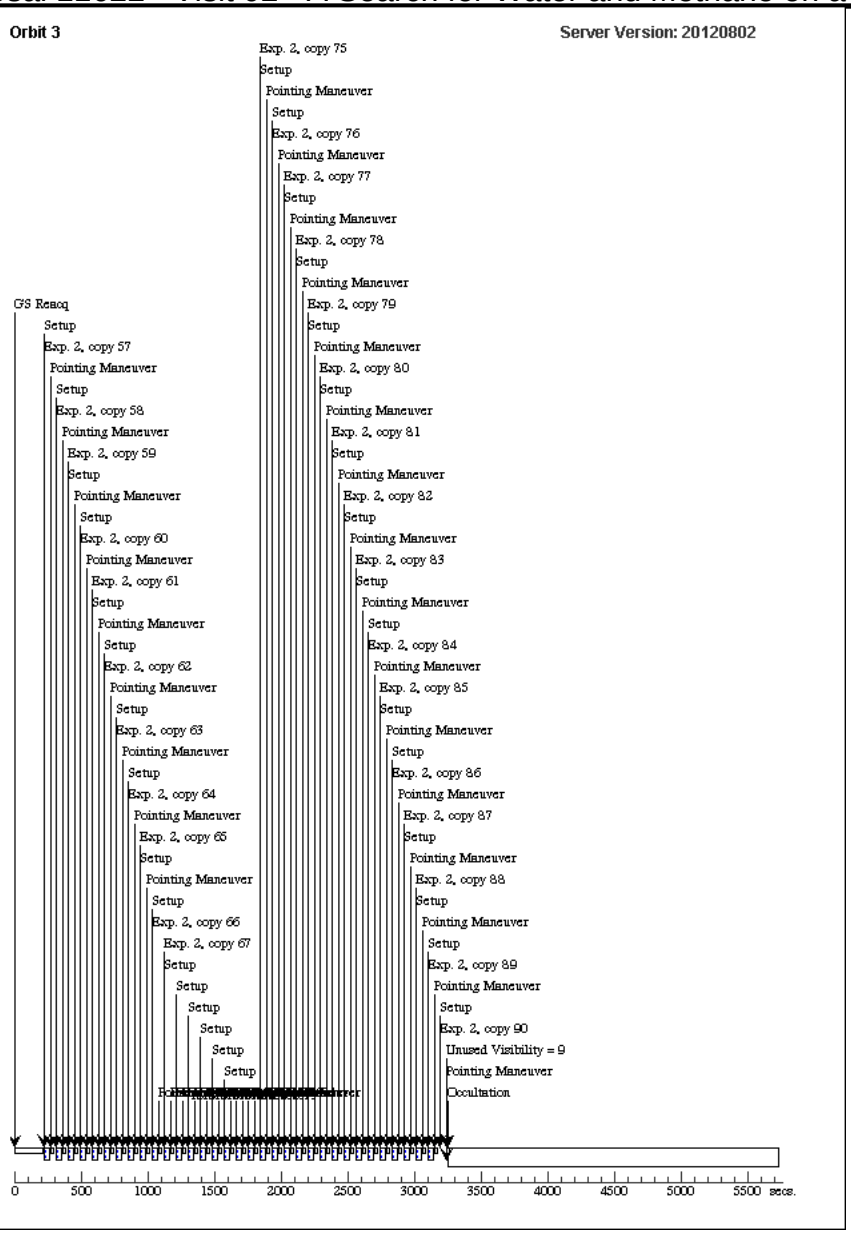
Orbit 3
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Exp. 2, copy 90
Unused Visibility = 9
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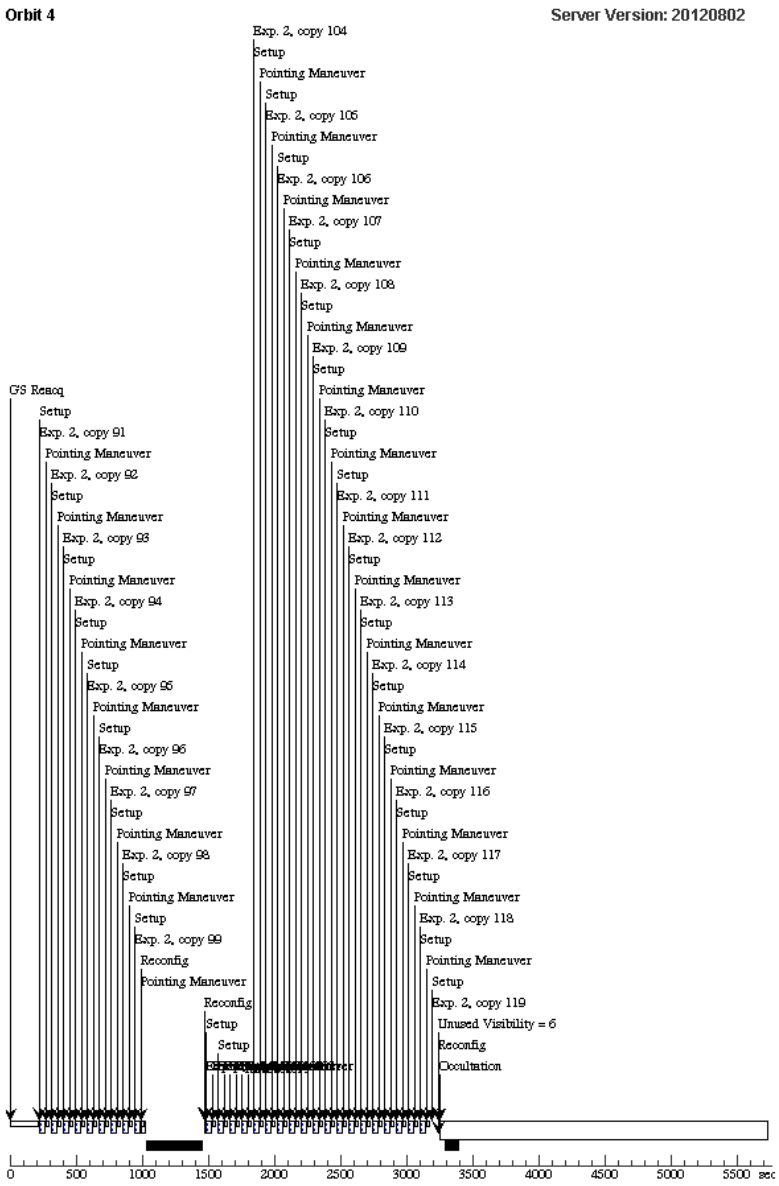
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Pointing Maneuver
Setup
Exp. 2, copy 106
Pointing Maneuver
Exp. 2, copy 107
Setup
Pointing Maneuver
Exp. 2, copy 108
Setup
Pointing Maneuver
Exp. 2, copy 109
Setup
Pointing Maneuver
Exp. 2, copy 110
Setup
Pointing Maneuver
Setup
Exp. 2, copy 111
Pointing Maneuver
Exp. 2, copy 112
Setup
Pointing Maneuver
Exp. 2, copy 113
Setup
Pointing Maneuver
Exp. 2, copy 114
Setup
Pointing Maneuver
Exp. 2, copy 115
Setup
Pointing Maneuver
Exp. 2, copy 116
Setup
Pointing Maneuver
Exp. 2, copy 117
Setup
Pointing Maneuver
Exp. 2, copy 118
Setup
Pointing Maneuver
Setup
Exp. 2, copy 119
Unused Visibility = 6
Reconfig
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 11622, Visit 03, implementation Fri Sep 28 01:22:25 GMT 2012

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: ORIENT 20.0D TO 170.0 D; ORIENT 200.0D TO 350.0 D; Period 2.6438979 D AND ZERO-PHASE HJD2454865.083208

Comments: Third of four visits with WFC3. It is essential for the four orbits in each visit to be scheduled in a contiguous block. These orbits should be free of the SAA. The total allowed window for the start of each visit is 0.003 in planet orbital phase, corresponding to a 15 minute interval. In order to ensure complete coverage of the phase curve, the visits have been scheduled with two different offsets corresponding to either the first or second 7.5 minutes of this 15 minute window. However, if this poses a significant barrier to scheduling the requirements for individual visits may be relaxed to the full 15 minute range (0.9418-0.9458 in orbital phase).

We also include orientation restrictions intended to avoid overlapping spectra with a H=13.1 star located at a distance of 64" (6"S, 63"W) from GJ 436 (H=6.3). We find that we should avoid rotation angles between -10 to +20 degrees and 170 to 200 degrees in order to preserve a minimum separation of 12" in the Y (vertical) direction between the two spectra. We use 2MASS J2000 coordinates for both objects, and take into account GJ 436b's high proper motion of [896.1, -813.5] mas/yr to calculate the J2012 coordinates and corresponding rotation angle constraints.

Lastly, we include an additional downward offset of -6.5 arcsec in Y position for the second exposure to accound for the additional 6.5 second delay observed in the start of each exposure for Visit 1. This corresponds to a new Y offset of 1.5 - 6.5 = 5.0 arcsec.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	GJ-436	RA: 11 42 11.0941 (175.5462254d)	Proper Motion RA: 0.059756 sec of time/yr	V=10.68	Reference Frame: ICRS
		Dec: +26 42 23.65 (26.70657d)	Proper Motion Dec: -0.8137 arcsec/yr	B-V=1.52,	
		Equinox: J2000	Parallax: 0.09773"	H=6.32,	
			Epoch of Position: 2000	K=6.07	

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1		(1) GJ-436	WFC3/IR, MULTIACCUM, IRSUB256	F139M	SAMP-SEQ=RAPID ; NSAMP=6	POS TARG 0.0,5.3; PHASE 0.9416 TO 0 .9438; GS ACQ SCENARI O BASE1B3		*[==>]*	***[1]***

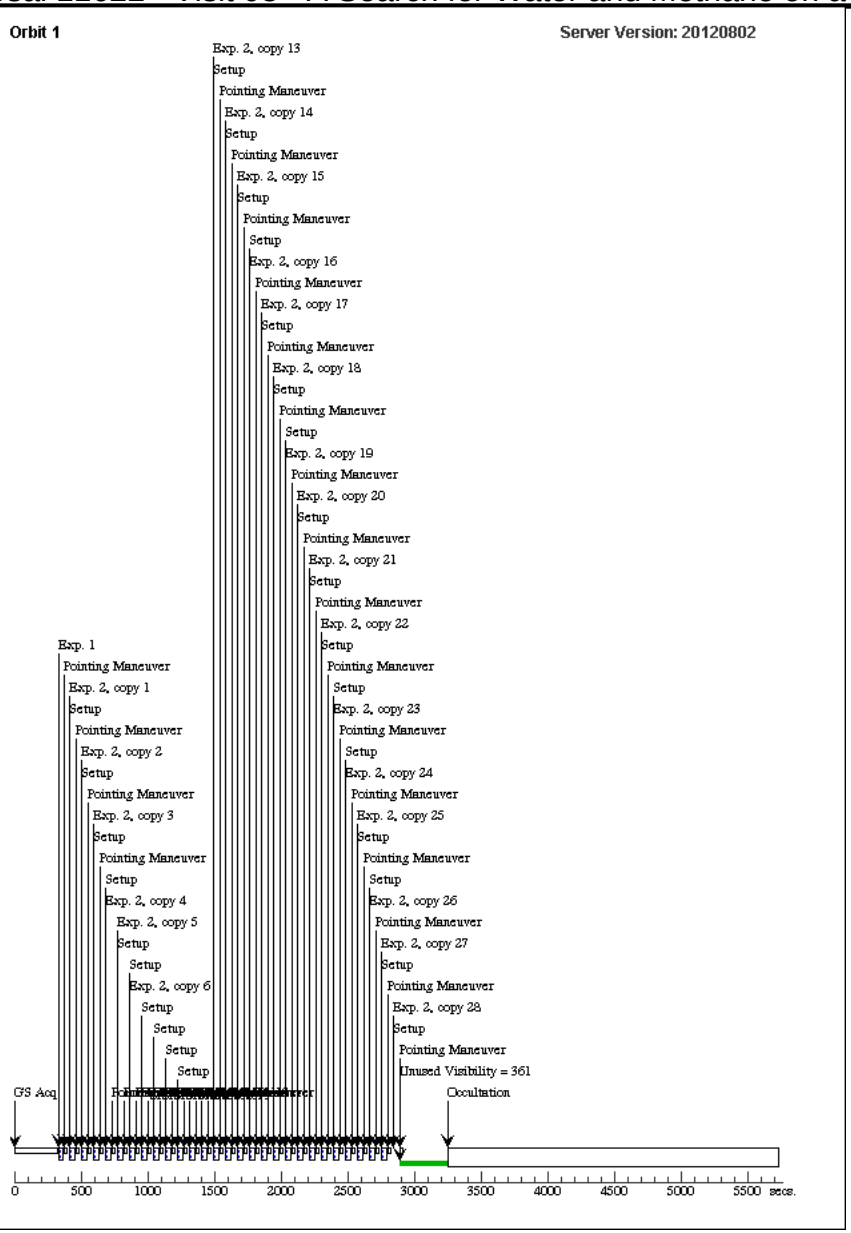
	2	(1) GJ-436	WFC3/IR, MULTIACCUM, GRISM256	G141	SAMP-SEQ=SPARS10; NSAMP=2	POS TARG 0.0,-2.09; SPATIAL SCAN 0.99,90.0 Degrees,Forward	*[==>(Copy 1)]* *[==>(Copy 2)]* *[==>(Copy 3)]* *[==>(Copy 4)]* *[==>(Copy 5)]* *[==>(Copy 6)]* *[==>(Copy 7)]* *[==>(Copy 8)]* *[==>(Copy 9)]* *[==>(Copy 10)]* *[==>(Copy 11)]* *[==>(Copy 12)]* *[==>(Copy 13)]* *[==>(Copy 14)]* *[==>(Copy 15)]* *[==>(Copy 16)]* *[==>(Copy 17)]* *[==>(Copy 18)]* *[==>(Copy 19)]* *[==>(Copy 20)]* *[==>(Copy 21)]* *[==>(Copy 22)]* *[==>(Copy 23)]* *[==>(Copy 24)]* *[==>(Copy 25)]* *[==>(Copy 26)]* *[==>(Copy 27)]* *[==>(Copy 28)]*	***[1]***

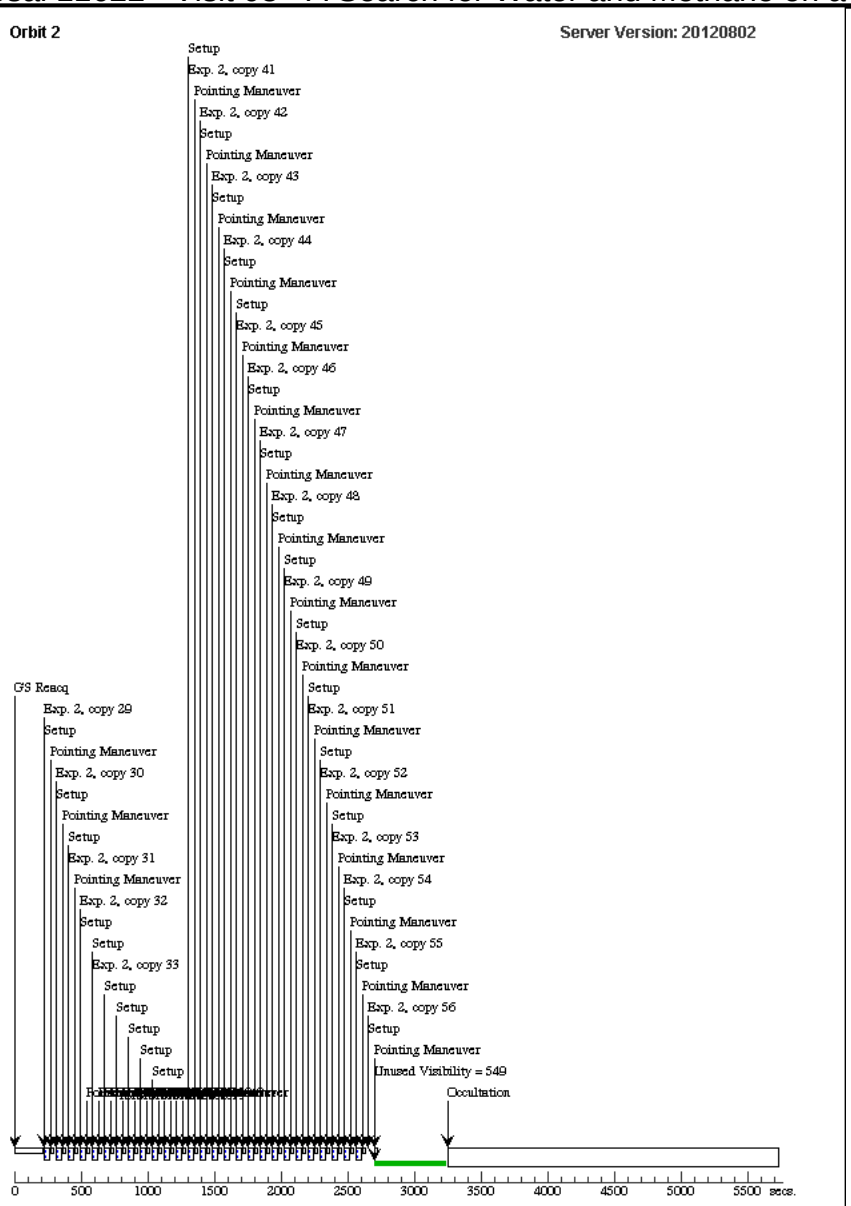
		[==>(Copy 29)] *[==>(Copy 30)]* *[==>(Copy 31)]* *[==>(Copy 32)]* *[==>(Copy 33)]* *[==>(Copy 34)]* *[==>(Copy 35)]* *[==>(Copy 36)]* *[==>(Copy 37)]* *[==>(Copy 38)]* *[==>(Copy 39)]* *[==>(Copy 40)]* *[==>(Copy 41)]* *[==>(Copy 42)]* *[==>(Copy 43)]* *[==>(Copy 44)]* *[==>(Copy 45)]* *[==>(Copy 46)]* *[==>(Copy 47)]* *[==>(Copy 48)]* *[==>(Copy 49)]* *[==>(Copy 50)]* *[==>(Copy 51)]* *[==>(Copy 52)]* *[==>(Copy 53)]* *[==>(Copy 54)]* *[==>(Copy 55)]* *[==>(Copy 56)]*	***[2]***

		[==>(Copy 57)] *[==>(Copy 58)]* *[==>(Copy 59)]* *[==>(Copy 60)]* *[==>(Copy 61)]* *[==>(Copy 62)]* *[==>(Copy 63)]* *[==>(Copy 64)]* *[==>(Copy 65)]* *[==>(Copy 66)]* *[==>(Copy 67)]* *[==>(Copy 68)]* *[==>(Copy 69)]* *[==>(Copy 70)]* *[==>(Copy 71)]* *[==>(Copy 72)]* *[==>(Copy 73)]* *[==>(Copy 74)]* *[==>(Copy 75)]* *[==>(Copy 76)]* *[==>(Copy 77)]* *[==>(Copy 78)]* *[==>(Copy 79)]* *[==>(Copy 80)]* *[==>(Copy 81)]* *[==>(Copy 82)]* *[==>(Copy 83)]* *[==>(Copy 84)]* *[==>(Copy 85)]* *[==>(Copy 86)]* *[==>(Copy 87)]* *[==>(Copy 88)]* *[==>(Copy 89)]* *[==>(Copy 90)]*	***[3]***

		[==>(Copy 91)] *[==>(Copy 92)]* *[==>(Copy 93)]* *[==>(Copy 94)]* *[==>(Copy 95)]* *[==>(Copy 96)]* *[==>(Copy 97)]* *[==>(Copy 98)]* *[==>(Copy 99)]* *[==>(Copy 100)]* *[==>(Copy 101)]* *[==>(Copy 102)]* *[==>(Copy 103)]* *[==>(Copy 104)]* *[==>(Copy 105)]* *[==>(Copy 106)]* *[==>(Copy 107)]* *[==>(Copy 108)]* *[==>(Copy 109)]* *[==>(Copy 110)]* *[==>(Copy 111)]* *[==>(Copy 112)]* *[==>(Copy 113)]* *[==>(Copy 114)]* *[==>(Copy 115)]* *[==>(Copy 116)]* *[==>(Copy 117)]* *[==>(Copy 118)]* *[==>(Copy 119)]*	***[4]***

Orbit Structure

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Exp. 2, copy 41
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Exp. 2, copy 42
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Pointing Maneuver
Exp. 2, copy 43
Setup
Pointing Maneuver
Exp. 2, copy 44
Setup
Pointing Maneuver
Setup
Exp. 2, copy 45
Pointing Maneuver
Exp. 2, copy 46
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Pointing Maneuver
Exp. 2, copy 47
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Pointing Maneuver
Exp. 2, copy 48
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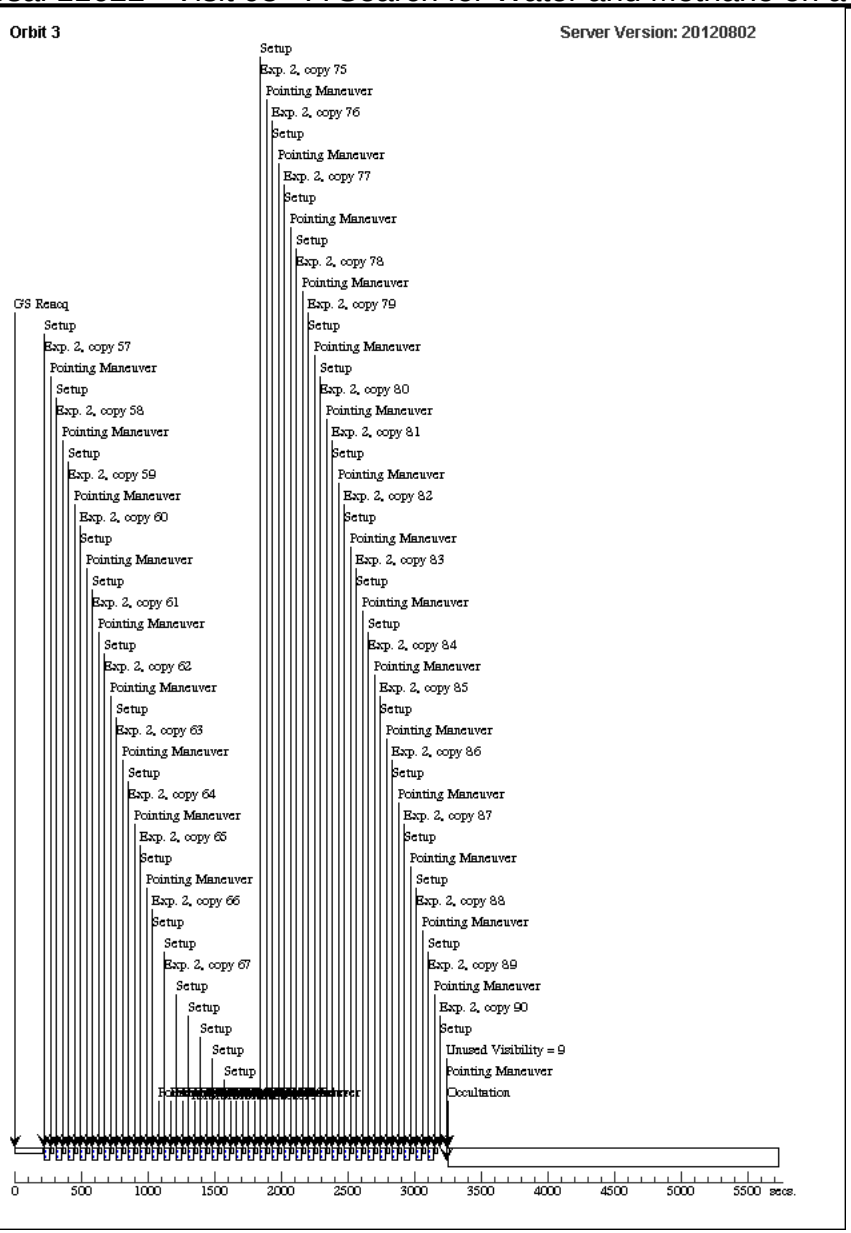
Pointing Maneuver
Setup
Exp. 2, copy 49
Pointing Maneuver
Setup
Exp. 2, copy 50
Pointing Maneuver
GS Reacq
Setup
Exp. 2, copy 51
Exp. 2, copy 29
Setup
Pointing Maneuver
Pointing Maneuver
Setup
Exp. 2, copy 30
Exp. 2, copy 52
Setup
Pointing Maneuver
Pointing Maneuver
Setup
Setup
Exp. 2, copy 53
Exp. 2, copy 31
Pointing Maneuver
Pointing Maneuver
Exp. 2, copy 54
Exp. 2, copy 32
Setup
Setup
Pointing Maneuver
Setup
Exp. 2, copy 55
Exp. 2, copy 33
Setup
Pointing Maneuver
Setup
Exp. 2, copy 56
Setup
Setup
Pointing Maneuver
Setup
Unused Visibility = 549
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
secs.


Orbit 3
Server Version: 20120802
GS Reacq
Setup
Exp. 2, copy 57
Pointing Maneuver
Setup
Exp. 2, copy 58
Pointing Maneuver
Setup
Exp. 2, copy 59
Pointing Maneuver
Exp. 2, copy 60
Setup
Pointing Maneuver
Setup
Exp. 2, copy 61
Pointing Maneuver
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Pointing Maneuver
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Exp. 2, copy 64
Pointing Maneuver
Exp. 2, copy 65
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Pointing Maneuver
Exp. 2, copy 66
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Exp. 2, copy 67
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Exp. 2, copy 75
Pointing Maneuver
Exp. 2, copy 76
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Exp. 2, copy 78
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Exp. 2, copy 85
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Exp. 2, copy 86
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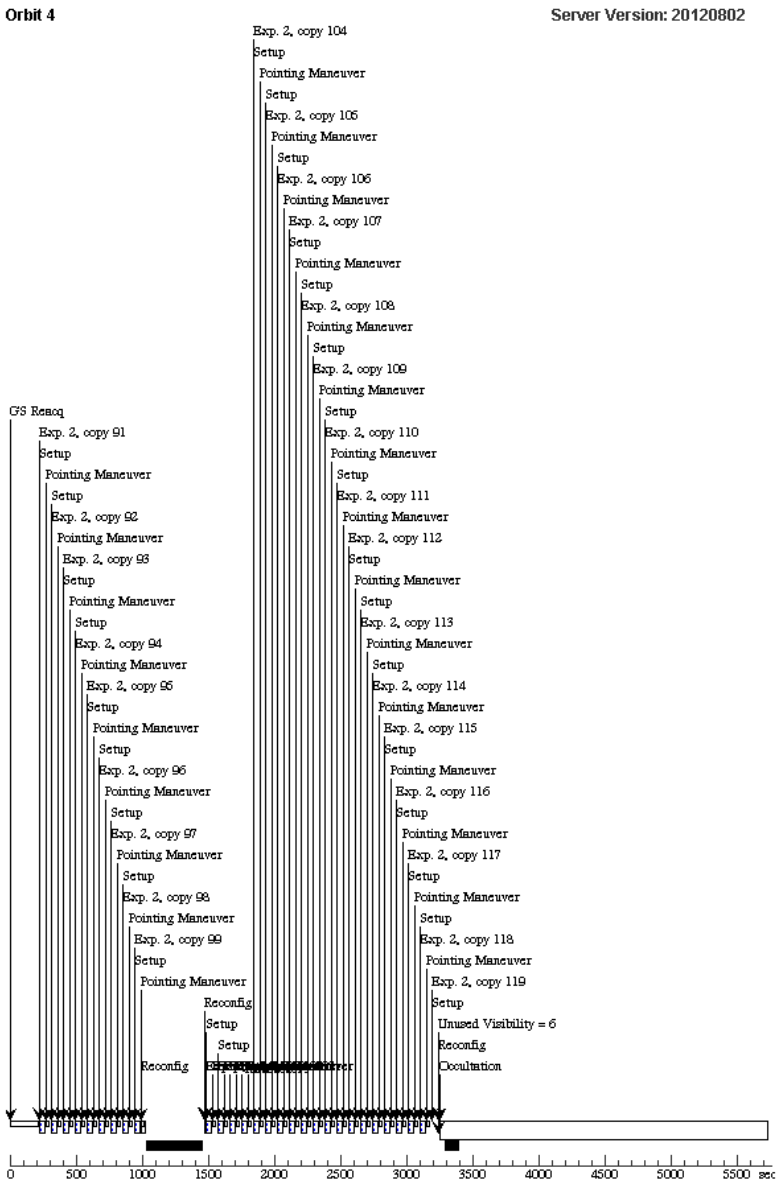
Exp. 2, copy 87
Setup
Pointing Maneuver
Setup
Exp. 2, copy 88
Pointing Maneuver
Setup
Exp. 2, copy 89
Pointing Maneuver
Exp. 2, copy 90
Setup
Unused Visibility = 9
Pointing Maneuver
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
secs.


Orbit 4
Server Version: 20120802
GS Reacq
Exp. 2, copy 91
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Pointing Maneuver
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Exp. 2, copy 92
Pointing Maneuver
Exp. 2, copy 93
Setup
Pointing Maneuver
Setup
Exp. 2, copy 94
Pointing Maneuver
Exp. 2, copy 95
Setup
Pointing Maneuver
Setup
Exp. 2, copy 96
Pointing Maneuver
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Exp. 2, copy 97
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Exp. 2, copy 98
Pointing Maneuver
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Setup
Pointing Maneuver
Reconfig
Exp. 2, copy 104
Setup
Pointing Maneuver
Setup
Exp. 2, copy 105
Pointing Maneuver
Setup
Exp. 2, copy 106
Pointing Maneuver
Exp. 2, copy 107
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Exp. 2, copy 108
Pointing Maneuver
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Exp. 2, copy 111
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Exp. 2, copy 115
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Exp. 2, copy 116
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Pointing Maneuver
Exp. 2, copy 117
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Pointing Maneuver
Setup
Exp. 2, copy 118
Pointing Maneuver
Exp. 2, copy 119
Setup
Unused Visibility = 6
Reconfig
Occultation
Reconfig
Setup
Setup
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 11622, Visit 04, implementation Fri Sep 28 01:22:33 GMT 2012

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: ORIENT 20.0D TO 170.0 D; ORIENT 200.0D TO 350.0 D; Period 2.6438979 D AND ZERO-PHASE HJD2454865.083208

Comments: Fourth of four visits with WFC3. It is essential for the four orbits in each visit to be scheduled in a contiguous block. These orbits should be free of the SAA. The total allowed window for the start of each visit is 0.003 in planet orbital phase, corresponding to a 15 minute interval. In order to ensure complete coverage of the phase curve, the visits have been scheduled with two different offsets corresponding to either the first or second 7.5 minutes of this 15 minute window. However, if this poses a significant barrier to scheduling the requirements for individual visits may be relaxed to the full 15 minute range (0.9418-0.9458 in orbital phase).

We also include orientation restrictions intended to avoid overlapping spectra with a H=13.1 star located at a distance of 64" (6"S, 63"W) from GJ 436 (H=6.3). We find that we should avoid rotation angles between -10 to +20 degrees and 170 to 200 degrees in order to preserve a minimum separation of 12" in the Y (vertical) direction between the two spectra. We use 2MASS J2000 coordinates for both objects, and take into account GJ 436b's high proper motion of [896.1, -813.5] mas/yr to calculate the J2012 coordinates and corresponding rotation angle constraints.

Lastly, we include an additional downward offset of -6.5 arcsec in Y position for the second exposure to accound for the additional 6.5 second delay observed in the start of each exposure for Visit 1. This corresponds to a new Y offset of 1.5 - 6.5 = 5.0 arcsec.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	GJ-436	RA: 11 42 11.0941 (175.5462254d)	Proper Motion RA: 0.059756 sec of time/yr	V=10.68	Reference Frame: ICRS
		Dec: +26 42 23.65 (26.70657d)	Proper Motion Dec: -0.8137 arcsec/yr	B-V=1.52,	
		Equinox: J2000	Parallax: 0.09773"	H=6.32,	
			Epoch of Position: 2000	K=6.07	

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1		(1) GJ-436	WFC3/IR, MULTIACCUM, IRSUB256	F139M	SAMP-SEQ=RAPID ; NSAMP=6	POS TARG 0.0,5.3; PHASE 0.9432 TO 0 .9458; GS ACQ SCENARI O BASE1B3		*[==>]*	***[1]***

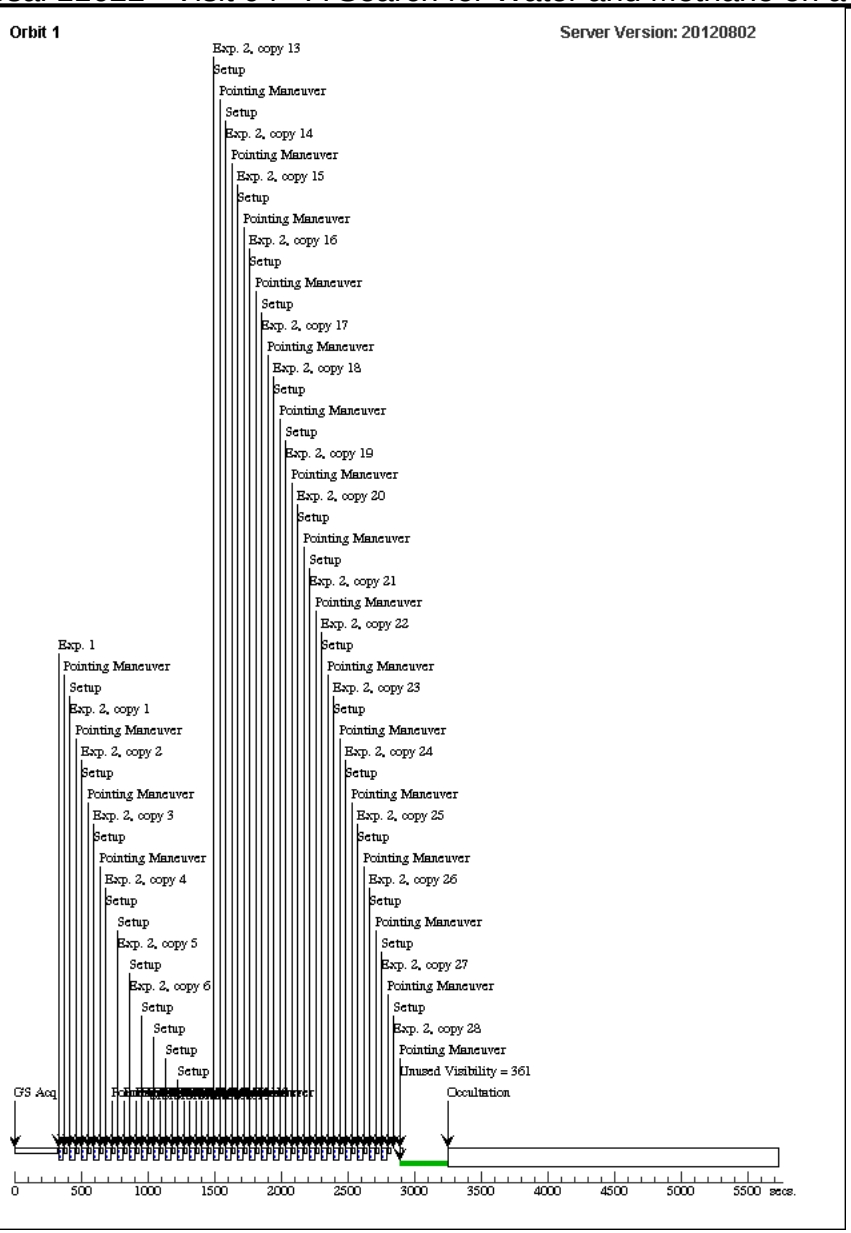
	2	(1) GJ-436	WFC3/IR, MULTIACCUM, GRISM256	G141	SAMP-SEQ=SPARS10; NSAMP=2	POS TARG 0.0,-2.09; SPATIAL SCAN 0.99,90.0 Degrees,Forward	*[==>(Copy 1)]* *[==>(Copy 2)]* *[==>(Copy 3)]* *[==>(Copy 4)]* *[==>(Copy 5)]* *[==>(Copy 6)]* *[==>(Copy 7)]* *[==>(Copy 8)]* *[==>(Copy 9)]* *[==>(Copy 10)]* *[==>(Copy 11)]* *[==>(Copy 12)]* *[==>(Copy 13)]* *[==>(Copy 14)]* *[==>(Copy 15)]* *[==>(Copy 16)]* *[==>(Copy 17)]* *[==>(Copy 18)]* *[==>(Copy 19)]* *[==>(Copy 20)]* *[==>(Copy 21)]* *[==>(Copy 22)]* *[==>(Copy 23)]* *[==>(Copy 24)]* *[==>(Copy 25)]* *[==>(Copy 26)]* *[==>(Copy 27)]* *[==>(Copy 28)]*	***[1]***

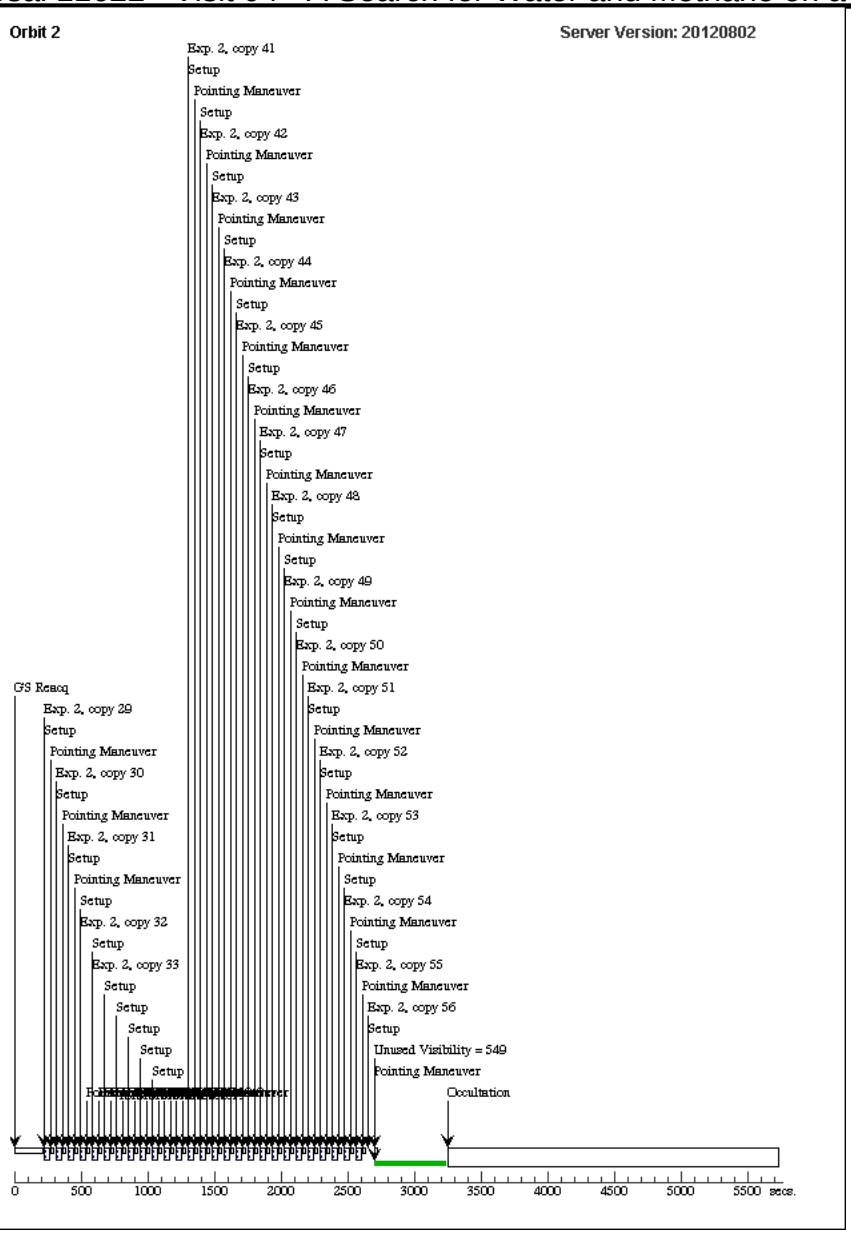
		[==>(Copy 29)] *[==>(Copy 30)]* *[==>(Copy 31)]* *[==>(Copy 32)]* *[==>(Copy 33)]* *[==>(Copy 34)]* *[==>(Copy 35)]* *[==>(Copy 36)]* *[==>(Copy 37)]* *[==>(Copy 38)]* *[==>(Copy 39)]* *[==>(Copy 40)]* *[==>(Copy 41)]* *[==>(Copy 42)]* *[==>(Copy 43)]* *[==>(Copy 44)]* *[==>(Copy 45)]* *[==>(Copy 46)]* *[==>(Copy 47)]* *[==>(Copy 48)]* *[==>(Copy 49)]* *[==>(Copy 50)]* *[==>(Copy 51)]* *[==>(Copy 52)]* *[==>(Copy 53)]* *[==>(Copy 54)]* *[==>(Copy 55)]* *[==>(Copy 56)]*	***[2]***

		[==>(Copy 57)] *[==>(Copy 58)]* *[==>(Copy 59)]* *[==>(Copy 60)]* *[==>(Copy 61)]* *[==>(Copy 62)]* *[==>(Copy 63)]* *[==>(Copy 64)]* *[==>(Copy 65)]* *[==>(Copy 66)]* *[==>(Copy 67)]* *[==>(Copy 68)]* *[==>(Copy 69)]* *[==>(Copy 70)]* *[==>(Copy 71)]* *[==>(Copy 72)]* *[==>(Copy 73)]* *[==>(Copy 74)]* *[==>(Copy 75)]* *[==>(Copy 76)]* *[==>(Copy 77)]* *[==>(Copy 78)]* *[==>(Copy 79)]* *[==>(Copy 80)]* *[==>(Copy 81)]* *[==>(Copy 82)]* *[==>(Copy 83)]* *[==>(Copy 84)]* *[==>(Copy 85)]* *[==>(Copy 86)]* *[==>(Copy 87)]* *[==>(Copy 88)]* *[==>(Copy 89)]* *[==>(Copy 90)]*	***[3]***

		[==>(Copy 91)] *[==>(Copy 92)]* *[==>(Copy 93)]* *[==>(Copy 94)]* *[==>(Copy 95)]* *[==>(Copy 96)]* *[==>(Copy 97)]* *[==>(Copy 98)]* *[==>(Copy 99)]* *[==>(Copy 100)]* *[==>(Copy 101)]* *[==>(Copy 102)]* *[==>(Copy 103)]* *[==>(Copy 104)]* *[==>(Copy 105)]* *[==>(Copy 106)]* *[==>(Copy 107)]* *[==>(Copy 108)]* *[==>(Copy 109)]* *[==>(Copy 110)]* *[==>(Copy 111)]* *[==>(Copy 112)]* *[==>(Copy 113)]* *[==>(Copy 114)]* *[==>(Copy 115)]* *[==>(Copy 116)]* *[==>(Copy 117)]* *[==>(Copy 118)]* *[==>(Copy 119)]*	***[4]***

Orbit Structure




Orbit 2
Server Version: 20120802
Exp. 2, copy 41
Setup
Pointing Maneuver
Setup
Exp. 2, copy 42
Pointing Maneuver
Setup
Exp. 2, copy 43
Pointing Maneuver
Setup
Exp. 2, copy 44
Pointing Maneuver
Setup
Exp. 2, copy 45
Pointing Maneuver
Setup
Exp. 2, copy 46
Pointing Maneuver
Exp. 2, copy 47
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Pointing Maneuver
Exp. 2, copy 48
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Pointing Maneuver
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Exp. 2, copy 49
Pointing Maneuver
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Exp. 2, copy 50
Pointing Maneuver
Exp. 2, copy 51
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Pointing Maneuver
Exp. 2, copy 52
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Pointing Maneuver
Exp. 2, copy 53
Setup
Pointing Maneuver
Setup
Exp. 2, copy 54
Pointing Maneuver
Setup
Exp. 2, copy 55
Pointing Maneuver
Exp. 2, copy 56
Setup
Unused Visibility = 549
Pointing Maneuver
Occultation
GS Reacq
Exp. 2, copy 29
Setup
Pointing Maneuver
Exp. 2, copy 30
Setup
Pointing Maneuver
Exp. 2, copy 31
Setup
Pointing Maneuver
Setup
Exp. 2, copy 32
Setup
Exp. 2, copy 33
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Setup
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1500
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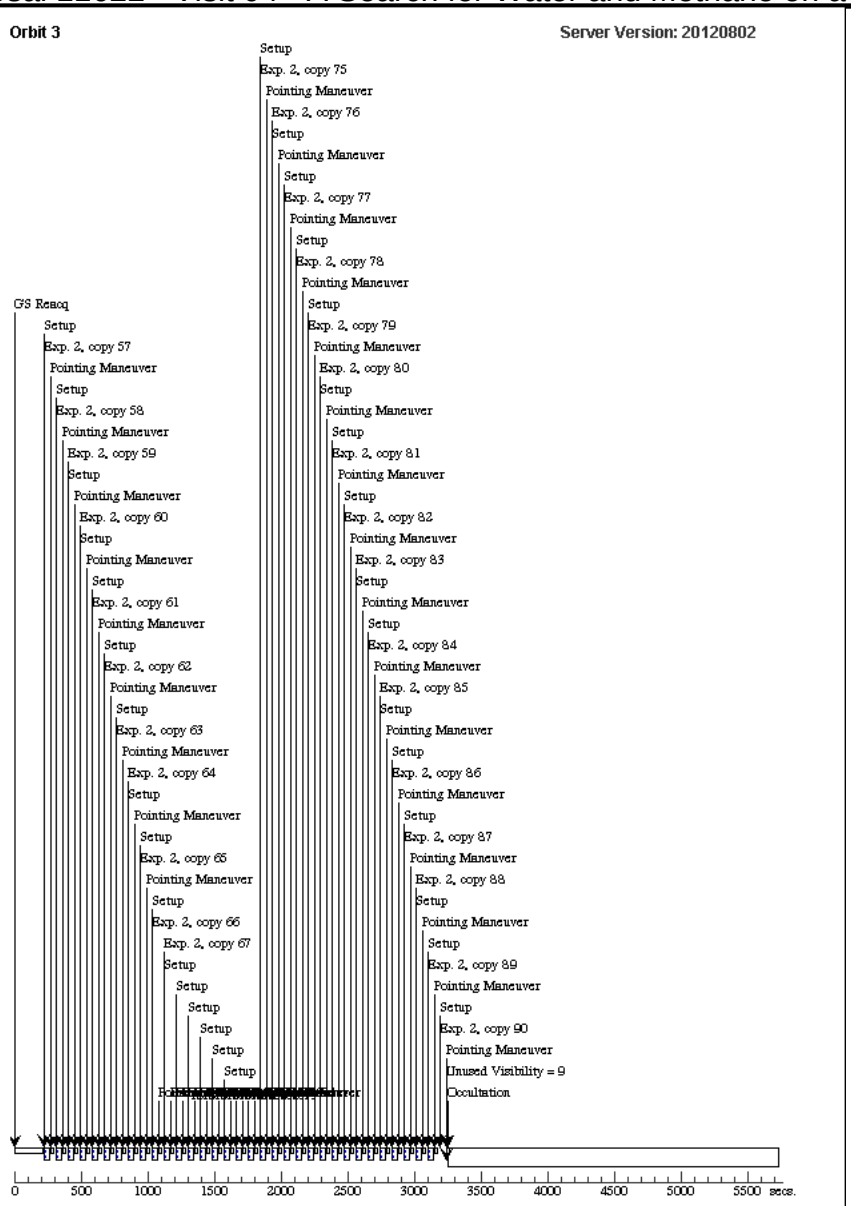
secs.


Orbit 3
Server Version: 20120802
GS Reacq
Setup
Exp. 2, copy 57
Pointing Maneuver
Setup
Exp. 2, copy 58
Pointing Maneuver
Exp. 2, copy 59
Setup
Pointing Maneuver
Exp. 2, copy 60
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Pointing Maneuver
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Exp. 2, copy 61
Pointing Maneuver
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Exp. 2, copy 62
Pointing Maneuver
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Exp. 2, copy 63
Pointing Maneuver
Exp. 2, copy 64
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Pointing Maneuver
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Exp. 2, copy 65
Pointing Maneuver
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Exp. 2, copy 66
Exp. 2, copy 67
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Exp. 2, copy 75
Pointing Maneuver
Exp. 2, copy 76
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Exp. 2, copy 78
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Exp. 2, copy 81
Pointing Maneuver
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Exp. 2, copy 82
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Exp. 2, copy 83
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Pointing Maneuver
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Exp. 2, copy 84
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Exp. 2, copy 85
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Exp. 2, copy 86
Pointing Maneuver
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Exp. 2, copy 87
Pointing Maneuver
Exp. 2, copy 88
Setup
Pointing Maneuver
Setup
Exp. 2, copy 89
Pointing Maneuver
Setup
Exp. 2, copy 90
Pointing Maneuver
Unused Visibility = 9
Occultation
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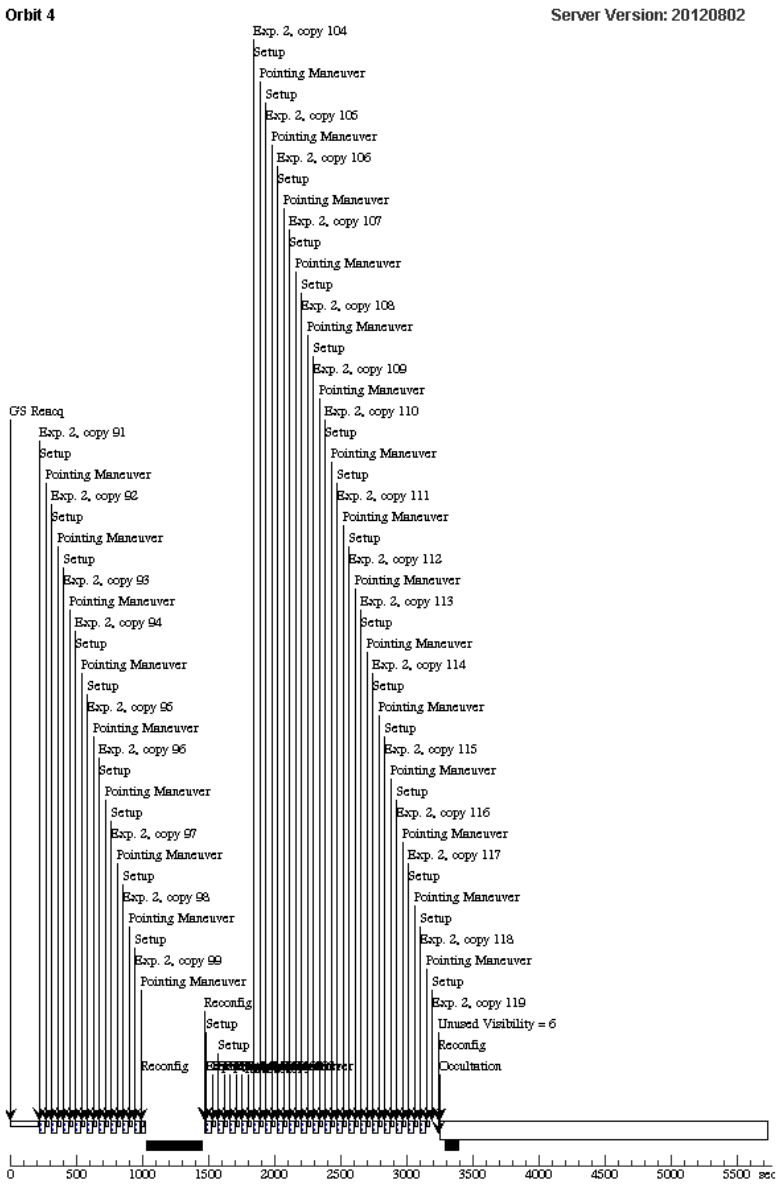
3500
4000
4500
5000
5500
secs.


Orbit 4
Server Version: 20120802
Exp. 2, copy 104
Setup
Pointing Maneuver
Setup
Exp. 2, copy 105
Pointing Maneuver
Exp. 2, copy 106
Setup
Pointing Maneuver
Exp. 2, copy 107
Setup
Pointing Maneuver
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Exp. 2, copy 108
Pointing Maneuver
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Exp. 2, copy 109
Pointing Maneuver
Exp. 2, copy 110
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Exp. 2, copy 111
Pointing Maneuver
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Exp. 2, copy 114
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Exp. 2, copy 115
Pointing Maneuver
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Exp. 2, copy 116
Pointing Maneuver
Exp. 2, copy 117
Setup
Pointing Maneuver
Setup
Exp. 2, copy 118
Pointing Maneuver
Setup
Exp. 2, copy 119
Unused Visibility = 6
Reconfig
Occultation
GS Reacq
Exp. 2, copy 91
Setup
Pointing Maneuver
Exp. 2, copy 92
Setup
Pointing Maneuver
Setup
Exp. 2, copy 93
Pointing Maneuver
Exp. 2, copy 94
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Pointing Maneuver
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Exp. 2, copy 95
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Exp. 2, copy 96
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Pointing Maneuver
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Exp. 2, copy 97
Pointing Maneuver
Setup
Exp. 2, copy 98
Pointing Maneuver
Setup
Exp. 2, copy 99
Pointing Maneuver
Reconfig
Setup
Setup
Reconfig
0
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1500
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3000
3500
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4500
5000
5500
sec

Visit

Proposal 11622, Visit 51 Fri Sep 28 01:22:41 GMT 2012

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: ORIENT 20.0D TO 170.0 D; ORIENT 200.0D TO 350.0 D; Period 2.6438979 D AND ZERO-PHASE HJD2454865.083208

Comments: First of four visits with WFC3. It is essential for the four orbits in each visit to be scheduled in a contiguous block. These orbits should be free of the SAA. The total allowed window for the start of each visit is 0.003 in planet orbital phase, corresponding to a 15 minute interval. In order to ensure complete coverage of the phase curve, the visits have been scheduled with two different offsets corresponding to either the first or second 7.5 minutes of this 15 minute window. However, if this poses a significant barrier to scheduling the requirements for individual visits may be relaxed to the full 15 minute range (0.9418-0.9458 in orbital phase).
We also include orientation restrictions intended to avoid overlapping spectra with a H=13.1 star located at a distance of 64" (6"S, 63"W) from GJ 436 (H=6.3). We find that we should avoid rotation angles between -10 to +20 degrees and 170 to 200 degrees in order to preserve a minimum separation of 12" in the Y (vertical) direction between the two spectra. We use 2MASS J2000 coordinates for both objects, and take into account GJ 436b's high proper motion of [896.1, -813.5] mas/yr to calculate the J2012 coordinates and corresponding rotation angle constraints.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	GJ-436	RA: 11 42 11.0941 (175.5462254d)	Proper Motion RA: 0.059756 sec of time/yr	V=10.68	Reference Frame: ICRS
		Dec: +26 42 23.65 (26.70657d)	Proper Motion Dec: -0.8137 arcsec/yr	B-V=1.52,	
		Equinox: J2000	Parallax: 0.09773"	H=6.32,	
			Epoch of Position: 2000	K=6.07	

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1		(1) GJ-436	WFC3/IR, MULTIACCUM, IRSUB256	F139M	SAMP-SEQ=RAPID ; NSAMP=6	POS TARG 0.0,5.3; PHASE 0.9418 TO 0 .9438; GS ACQ SCENARI O BASE1B3		*[==>]*	***[1]***

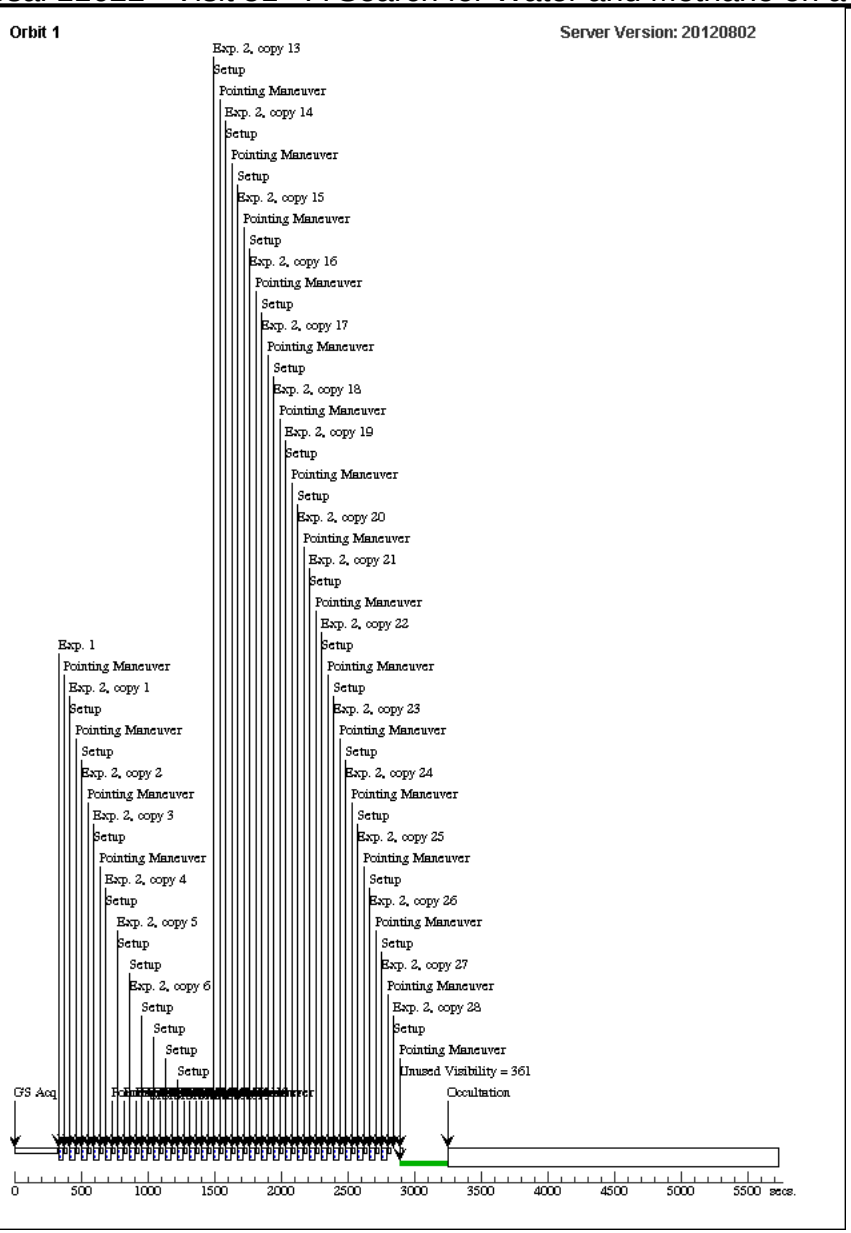
	2	(1) GJ-436	WFC3/IR, MULTIACCUM, GRISM256	G141	SAMP-SEQ=SPARS10; NSAMP=2	POS TARG 0.0,-2.09; SPATIAL SCAN 0.99,90.0 Degrees,Forward	*[==>(Copy 1)]* *[==>(Copy 2)]* *[==>(Copy 3)]* *[==>(Copy 4)]* *[==>(Copy 5)]* *[==>(Copy 6)]* *[==>(Copy 7)]* *[==>(Copy 8)]* *[==>(Copy 9)]* *[==>(Copy 10)]* *[==>(Copy 11)]* *[==>(Copy 12)]* *[==>(Copy 13)]* *[==>(Copy 14)]* *[==>(Copy 15)]* *[==>(Copy 16)]* *[==>(Copy 17)]* *[==>(Copy 18)]* *[==>(Copy 19)]* *[==>(Copy 20)]* *[==>(Copy 21)]* *[==>(Copy 22)]* *[==>(Copy 23)]* *[==>(Copy 24)]* *[==>(Copy 25)]* *[==>(Copy 26)]* *[==>(Copy 27)]* *[==>(Copy 28)]*	***[1]***

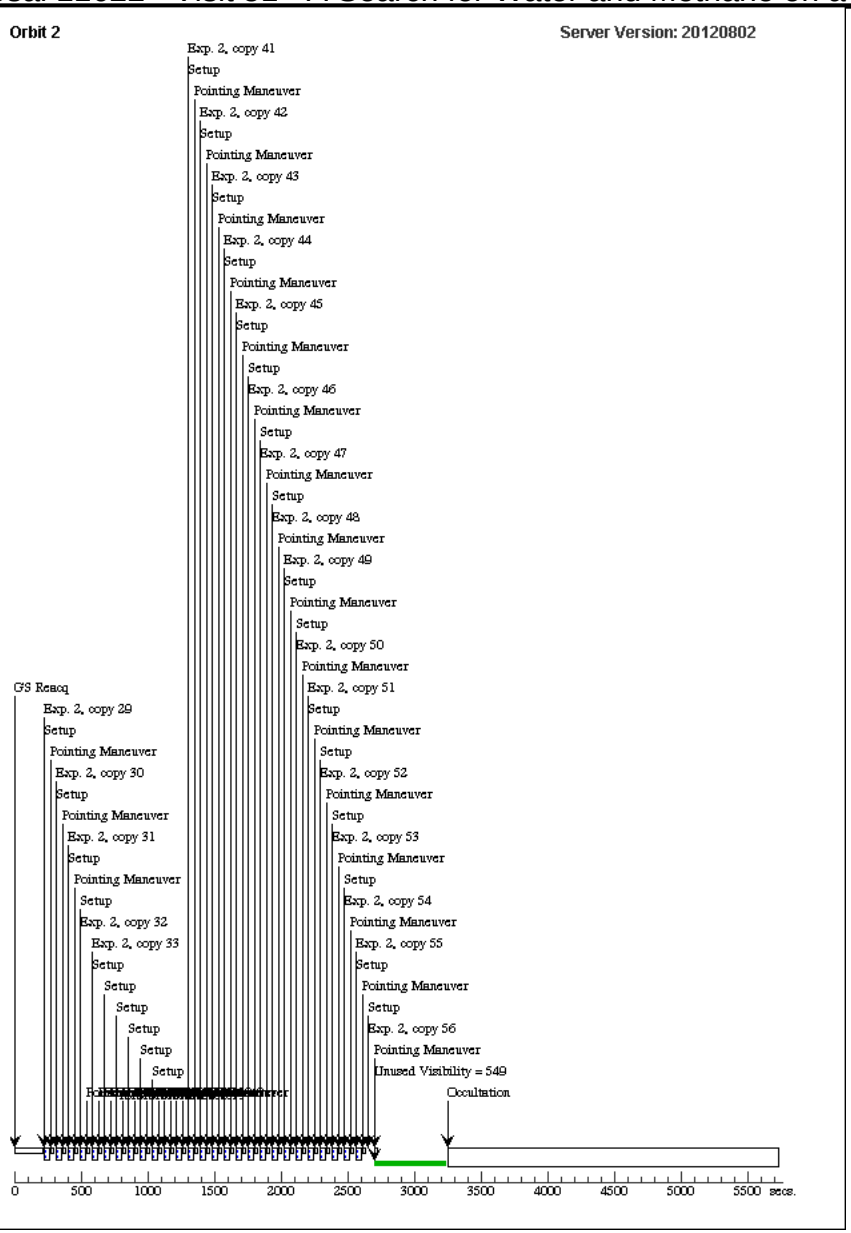
		[==>(Copy 29)] *[==>(Copy 30)]* *[==>(Copy 31)]* *[==>(Copy 32)]* *[==>(Copy 33)]* *[==>(Copy 34)]* *[==>(Copy 35)]* *[==>(Copy 36)]* *[==>(Copy 37)]* *[==>(Copy 38)]* *[==>(Copy 39)]* *[==>(Copy 40)]* *[==>(Copy 41)]* *[==>(Copy 42)]* *[==>(Copy 43)]* *[==>(Copy 44)]* *[==>(Copy 45)]* *[==>(Copy 46)]* *[==>(Copy 47)]* *[==>(Copy 48)]* *[==>(Copy 49)]* *[==>(Copy 50)]* *[==>(Copy 51)]* *[==>(Copy 52)]* *[==>(Copy 53)]* *[==>(Copy 54)]* *[==>(Copy 55)]* *[==>(Copy 56)]*	***[2]***

		[==>(Copy 57)] *[==>(Copy 58)]* *[==>(Copy 59)]* *[==>(Copy 60)]* *[==>(Copy 61)]* *[==>(Copy 62)]* *[==>(Copy 63)]* *[==>(Copy 64)]* *[==>(Copy 65)]* *[==>(Copy 66)]* *[==>(Copy 67)]* *[==>(Copy 68)]* *[==>(Copy 69)]* *[==>(Copy 70)]* *[==>(Copy 71)]* *[==>(Copy 72)]* *[==>(Copy 73)]* *[==>(Copy 74)]* *[==>(Copy 75)]* *[==>(Copy 76)]* *[==>(Copy 77)]* *[==>(Copy 78)]* *[==>(Copy 79)]* *[==>(Copy 80)]* *[==>(Copy 81)]* *[==>(Copy 82)]* *[==>(Copy 83)]* *[==>(Copy 84)]* *[==>(Copy 85)]* *[==>(Copy 86)]* *[==>(Copy 87)]* *[==>(Copy 88)]* *[==>(Copy 89)]* *[==>(Copy 90)]*	***[3]***

		[==>(Copy 91)] *[==>(Copy 92)]* *[==>(Copy 93)]* *[==>(Copy 94)]* *[==>(Copy 95)]* *[==>(Copy 96)]* *[==>(Copy 97)]* *[==>(Copy 98)]* *[==>(Copy 99)]* *[==>(Copy 100)]* *[==>(Copy 101)]* *[==>(Copy 102)]* *[==>(Copy 103)]* *[==>(Copy 104)]* *[==>(Copy 105)]* *[==>(Copy 106)]* *[==>(Copy 107)]* *[==>(Copy 108)]* *[==>(Copy 109)]* *[==>(Copy 110)]* *[==>(Copy 111)]* *[==>(Copy 112)]* *[==>(Copy 113)]* *[==>(Copy 114)]* *[==>(Copy 115)]* *[==>(Copy 116)]* *[==>(Copy 117)]* *[==>(Copy 118)]* *[==>(Copy 119)]*	***[4]***

Orbit Structure

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Exp. 2, copy 56
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Occultation
GS Reacq
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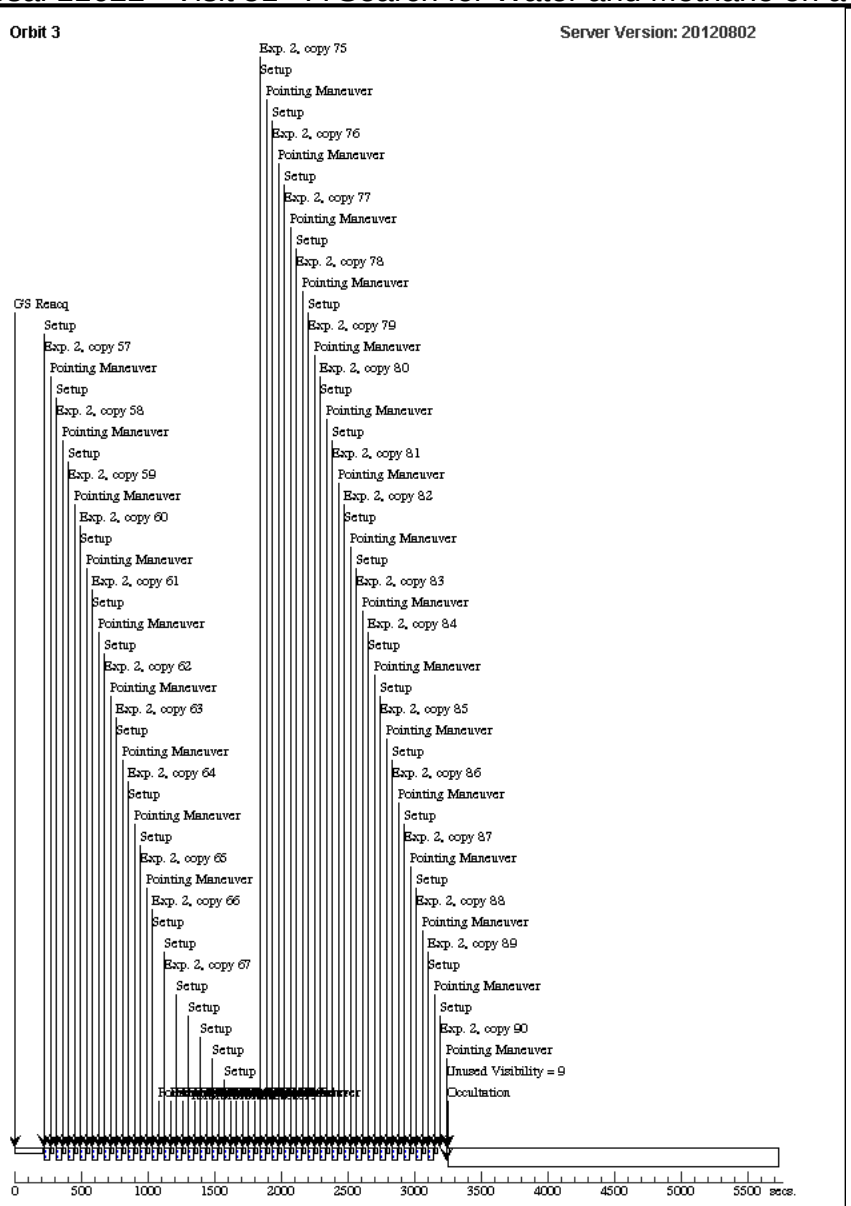
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Exp. 2, copy 90
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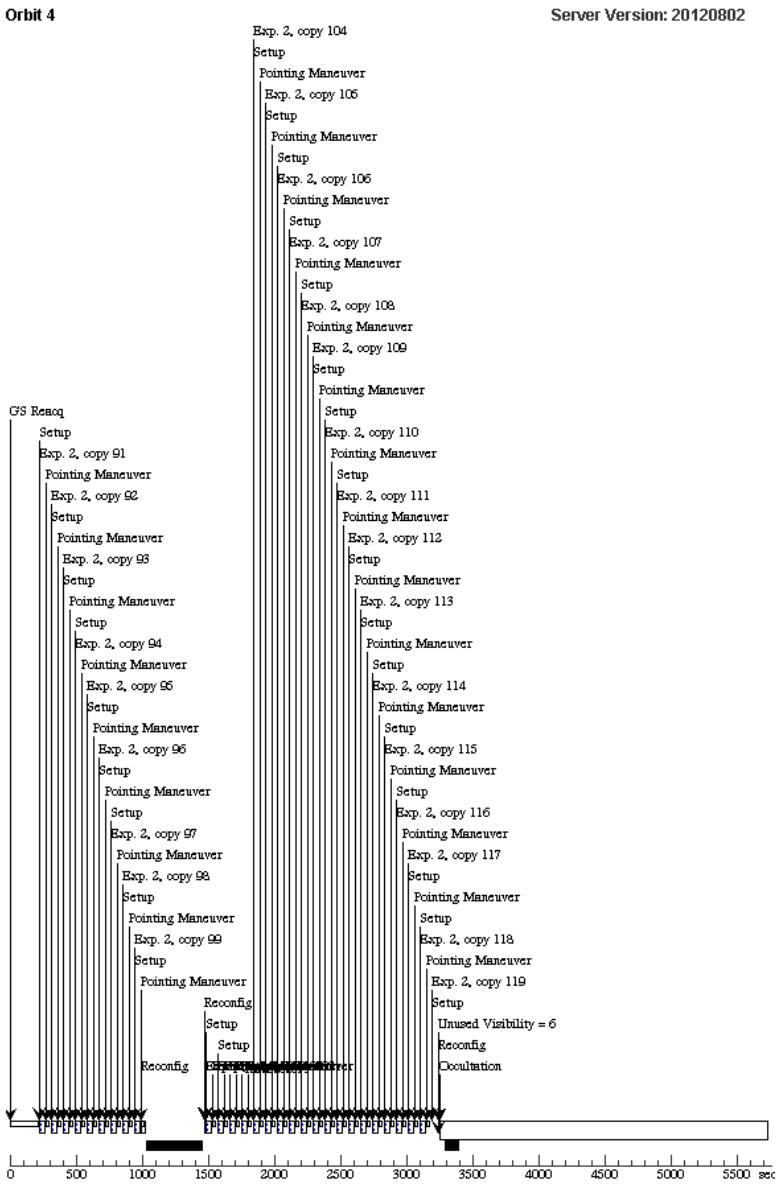
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