13666 - The power of the great observatories: Investigating stellar properties out to z~10 with HST and Spitzer

Cycle: 22, Proposal Category: GO

(Availability Mode: SUPPORTED)

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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) MACSJ2214-1359	WFC3/IR	5	23-Jul-2014 21:13:21.0	yes

5 Total Orbits Used

ABSTRACT

In spite of recent progress, the role of distant galaxies in cosmic reionization has been difficult to pin down. A powerful way to make progress is to move beyond counting high redshift sources and study the stellar properties of the population instead. Accurate knowledge of the average star formation density and its recent history in the universe at this epoch is necessary to determine whether these galaxies emit enough hard photons to reionize the Universe. SURFS UP is a Spitzer Exploration Science program (PI Bradac) designed to measure stellar masses and ages of galaxies at z >~ 7 and identify the dominant sources of the bulk of ionizing photons necessary to drive reionization. The last observations were completed in March 2014. The program uses 10 galaxy clusters as cosmic telescopes to study galaxies at intrinsically lower luminosities than blank field surveys of the same exposure time. All clusters but one have both extremely deep HST and Spitzer data available. The last cluster (MACS2214) is lacking HST WFC3-IR data which are crucial to select galaxies at z >~ 7, to study their instantaneous star formation rate via rest-frame UV, and to study their evolved population via rest-frame optical. We request here 5 orbits of WFC3-IR data, which will be a crucial complement to the existing extremely deep Spitzer and HST-ACS data for MACS2214, as well as to the entire SURFS UP sample. The proposal will double the number of currently detected sub-L* galaxies at z>~7 that have been detected by Spitzer and for which we can measure stellar masses and ages. The request of 5 orbits will strongly increase the legacy value of SURFS UP and we waive any proprietary rights.

OBSERVING DESCRIPTION

HST imaging 5 orbits for MACS2214-13 to obtain images of z~7 galaxies.

WFC3/F098W 1.55 orbits, WFC3/F125W 1.55 orbits, WFC3/F160W 1.75 orbits)
We use SPAR-SAMP50 and LOW SKY requirement.
There is no ORIENT requirement (except that the entire visit is executed with the same ORIENT)

We mix 2 scaled IR-DITHER_BOX patterns, first shifted by (-1,-1) pixels to make it more central and then scaled by 9,and 11. Patterns are offset by (0.2,0.8) pixels.
To this we add central points (-0.7,0.5) and (0.7,0.5). The resulting points are

[[-11. -11.]
[33.   5.5]
[16.5 33.]
[-27.5 16.5]
[-8.8 -8.2]
[27.2   5.3]
[13.7 27.8]
[-22.3 14.3]
[-0.7   0.5]
[0.7   0.5]]

or in POSTARG coordinates:

[[-1.491 -1.332]
[4.472 0.666]
[2.236 3.996]
[-3.726 1.998]
[-1.192 -0.993]
[3.686 0.642]
[1.856 3.367]
[-3.022 1.732]
[-0.095 0.061]
[0.095 0.061]]

Visit

Proposal 13666, Visit 01, implementation

Thu Jul 24 01:13:24 GMT 2014

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: (none)

Fixed Targets

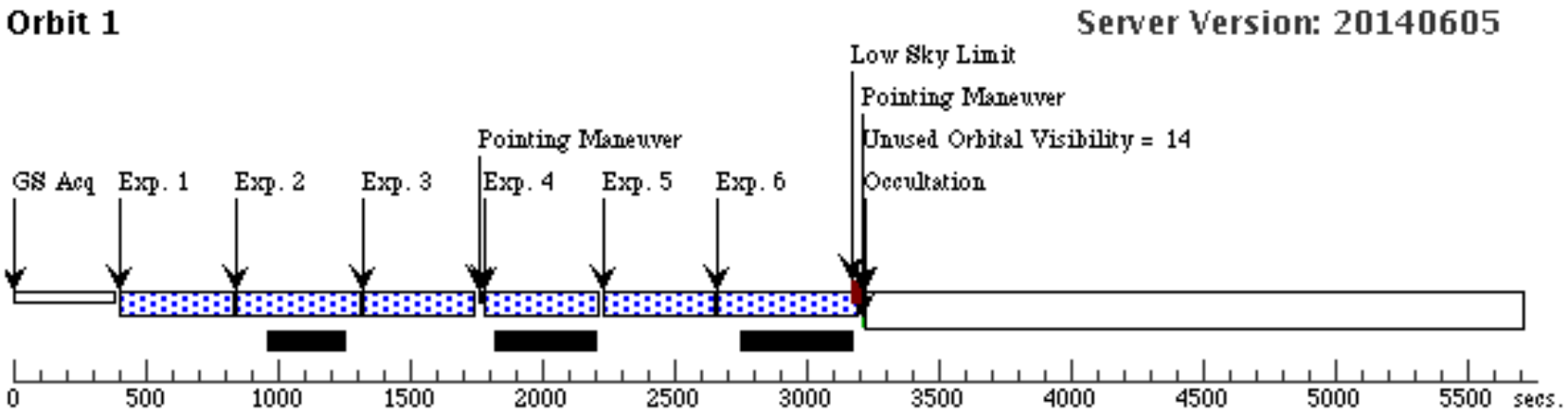
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	MACSJ2214-1359	RA: 22 14 57.3410 (333.7389208d) Dec: -14 00 12.22 (-14.00339d) Equinox: J2000		V=28	Reference Frame: ICRS

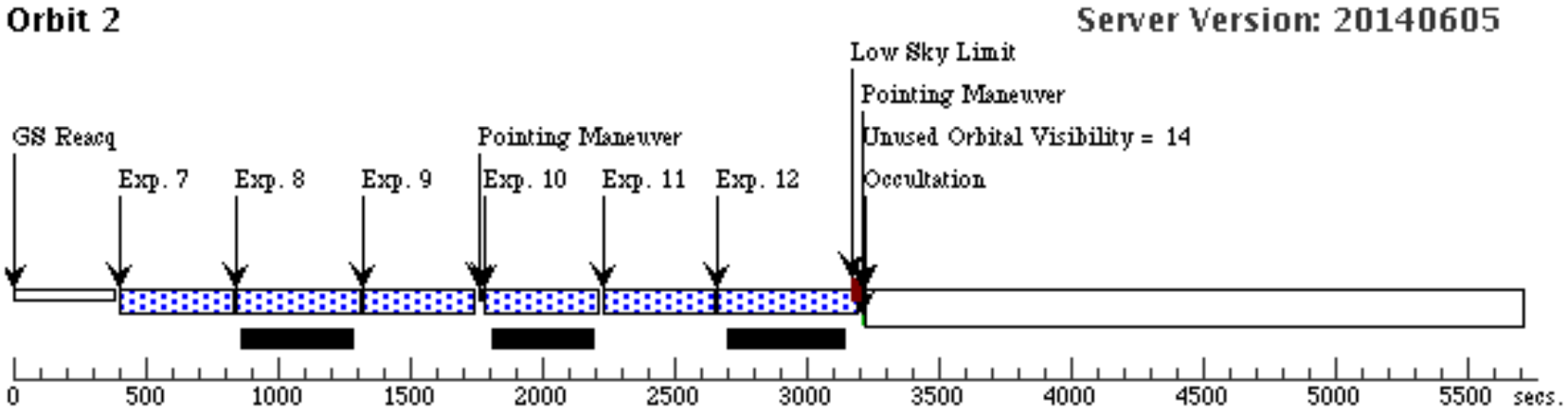
Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) MACSJ2214-1359	WFC3/IR, MULTIACCUM, IR-FIX	F125W	SAMP-SEQ=SPARS50; NSAMP=9	SAME POS AS 3; LOW-SKY		402.935899 Secs (402.936 Secs) *[==>]*	*[1]*
2		(1) MACSJ2214-1359	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=SPARS50; NSAMP=10	SAME POS AS 3; LOW-SKY		452.93635 Secs (452.936 Secs) *[==>]*	*[1]*
3		(1) MACSJ2214-1359	WFC3/IR, MULTIACCUM, IR-FIX	F105W	SAMP-SEQ=SPARS50; NSAMP=9	POS TARG -1.491,-1.332; LOW-SKY		402.935899 Secs (402.936 Secs) *[==>]*	*[1]*
4		(1) MACSJ2214-1359	WFC3/IR, MULTIACCUM, IR-FIX	F105W	SAMP-SEQ=SPARS50; NSAMP=9	POS TARG 4.472,0.666; LOW-SKY		402.935899 Secs (402.936 Secs) *[==>]*	*[1]*
5		(1) MACSJ2214-1359	WFC3/IR, MULTIACCUM, IR-FIX	F125W	SAMP-SEQ=SPARS50; NSAMP=9	SAME POS AS 4; LOW-SKY		402.935899 Secs (402.936 Secs) *[==>]*	*[1]*
6		(1) MACSJ2214-1359	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=SPARS50; NSAMP=11	SAME POS AS 4		502.936801 Secs (502.937 Secs) *[==>]*	*[1]*
7		(1) MACSJ2214-1359	WFC3/IR, MULTIACCUM, IR-FIX	F125W	SAMP-SEQ=SPARS50; NSAMP=9	SAME POS AS 9; LOW-SKY		402.935899 Secs (402.936 Secs) *[==>]*	*[2]*
8		(1) MACSJ2214-1359	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=SPARS50; NSAMP=10	SAME POS AS 9; LOW-SKY		452.93635 Secs (452.936 Secs) *[==>]*	*[2]*
9		(1) MACSJ2214-1359	WFC3/IR, MULTIACCUM, IR-FIX	F105W	SAMP-SEQ=SPARS50; NSAMP=9	POS TARG 2.236,3.996; LOW-SKY		402.935899 Secs (402.936 Secs) *[==>]*	*[2]*
10		(1) MACSJ2214-1359	WFC3/IR, MULTIACCUM, IR-FIX	F105W	SAMP-SEQ=SPARS50; NSAMP=9	POS TARG -3.726,1.998; LOW-SKY		402.935899 Secs (402.936 Secs) *[==>]*	*[2]*
11		(1) MACSJ2214-1359	WFC3/IR, MULTIACCUM, IR-FIX	F125W	SAMP-SEQ=SPARS50; NSAMP=9	SAME POS AS 10; LOW-SKY		402.935899 Secs (402.936 Secs) *[==>]*	*[2]*
12		(1) MACSJ2214-1359	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=SPARS50; NSAMP=11	SAME POS AS 10		502.936801 Secs (502.937 Secs) *[==>]*	*[2]*
13		(1) MACSJ2214-1359	WFC3/IR, MULTIACCUM, IR-FIX	F125W	SAMP-SEQ=SPARS50; NSAMP=9	SAME POS AS 15; LOW-SKY		402.935899 Secs (402.936 Secs) *[==>]*	*[3]*
14		(1) MACSJ2214-1359	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=SPARS50; NSAMP=10	SAME POS AS 15; LOW-SKY		452.93635 Secs (452.936 Secs) *[==>]*	*[3]*
15		(1) MACSJ2214-1359	WFC3/IR, MULTIACCUM, IR-FIX	F105W	SAMP-SEQ=SPARS50; NSAMP=9	POS TARG -1.192,-0.993; LOW-SKY		402.935899 Secs (402.936 Secs) *[==>]*	*[3]*
16		(1) MACSJ2214-1359	WFC3/IR, MULTIACCUM, IR-FIX	F105W	SAMP-SEQ=SPARS50; NSAMP=9	POS TARG 3.686,0.642; LOW-SKY		402.935899 Secs (402.936 Secs) *[==>]*	*[3]*

	17	(1) MACSJ2214-1359	WFC3/IR, MULTIACCUM, IR-FIX	F125W	SAMP-SEQ=SPARS50; NSAMP=9	SAME POS AS 16; LOW-SKY	402.935899 Secs (402.936 Secs) *[==>]*	***[3]***
	18	(1) MACSJ2214-1359	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=SPARS50; NSAMP=11	SAME POS AS 16	502.936801 Secs (502.937 Secs) *[==>]*	***[3]***
	19	(1) MACSJ2214-1359	WFC3/IR, MULTIACCUM, IR-FIX	F125W	SAMP-SEQ=SPARS50; NSAMP=9	SAME POS AS 21; LOW-SKY	402.935899 Secs (402.936 Secs) *[==>]*	***[4]***
	20	(1) MACSJ2214-1359	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=SPARS50; NSAMP=10	SAME POS AS 21; LOW-SKY	452.93635 Secs (452.936 Secs) *[==>]*	***[4]***
	21	(1) MACSJ2214-1359	WFC3/IR, MULTIACCUM, IR-FIX	F105W	SAMP-SEQ=SPARS50; NSAMP=9	POS TARG 1.856,3.367; LOW-SKY	402.935899 Secs (402.936 Secs) *[==>]*	***[4]***
	22	(1) MACSJ2214-1359	WFC3/IR, MULTIACCUM, IR-FIX	F105W	SAMP-SEQ=SPARS50; NSAMP=9	POS TARG -3.022,1.732; LOW-SKY	402.935899 Secs (402.936 Secs) *[==>]*	***[4]***
	23	(1) MACSJ2214-1359	WFC3/IR, MULTIACCUM, IR-FIX	F125W	SAMP-SEQ=SPARS50; NSAMP=9	SAME POS AS 22; LOW-SKY	402.935899 Secs (402.936 Secs) *[==>]*	***[4]***
	24	(1) MACSJ2214-1359	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=SPARS50; NSAMP=11	SAME POS AS 22	502.936801 Secs (502.937 Secs) *[==>]*	***[4]***
	25	(1) MACSJ2214-1359	WFC3/IR, MULTIACCUM, IR-FIX	F125W	SAMP-SEQ=SPARS50; NSAMP=9	SAME POS AS 27; LOW-SKY	402.935899 Secs (402.936 Secs) *[==>]*	***[5]***
	26	(1) MACSJ2214-1359	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=SPARS50; NSAMP=10	SAME POS AS 27; LOW-SKY	452.93635 Secs (452.936 Secs) *[==>]*	***[5]***
	27	(1) MACSJ2214-1359	WFC3/IR, MULTIACCUM, IR-FIX	F105W	SAMP-SEQ=SPARS50; NSAMP=9	POS TARG -0.095,0.061; LOW-SKY	402.935899 Secs (402.936 Secs) *[==>]*	***[5]***
	28	(1) MACSJ2214-1359	WFC3/IR, MULTIACCUM, IR-FIX	F105W	SAMP-SEQ=SPARS50; NSAMP=9	POS TARG 0.095,0.061; LOW-SKY	402.935899 Secs (402.936 Secs) *[==>]*	***[5]***
	29	(1) MACSJ2214-1359	WFC3/IR, MULTIACCUM, IR-FIX	F125W	SAMP-SEQ=SPARS50; NSAMP=9	SAME POS AS 28; LOW-SKY	402.935899 Secs (402.936 Secs) *[==>]*	***[5]***
	30	(1) MACSJ2214-1359	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=SPARS50; NSAMP=11	SAME POS AS 28	502.936801 Secs (502.937 Secs) *[==>]*	***[5]***

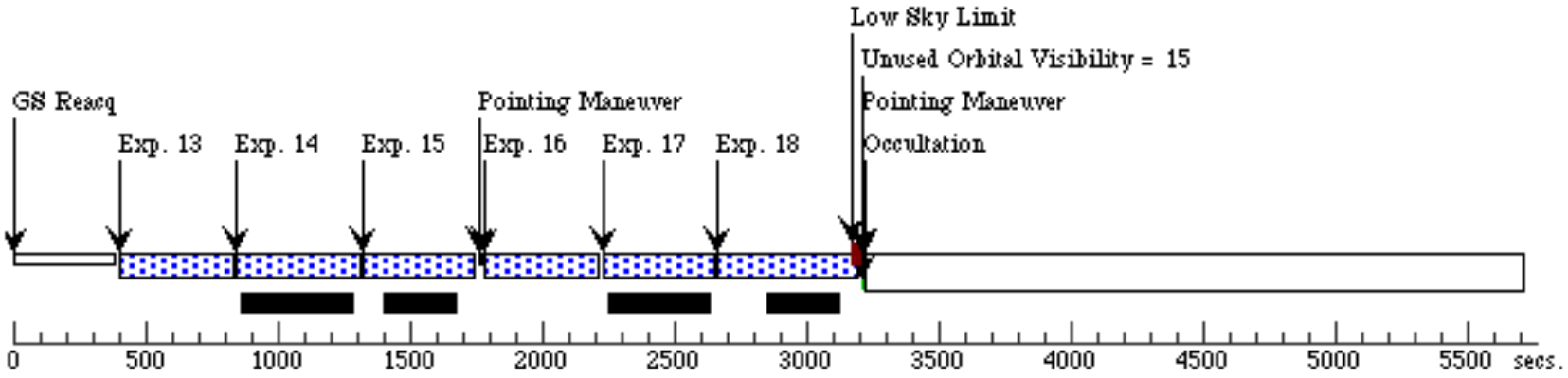
Orbit Structure





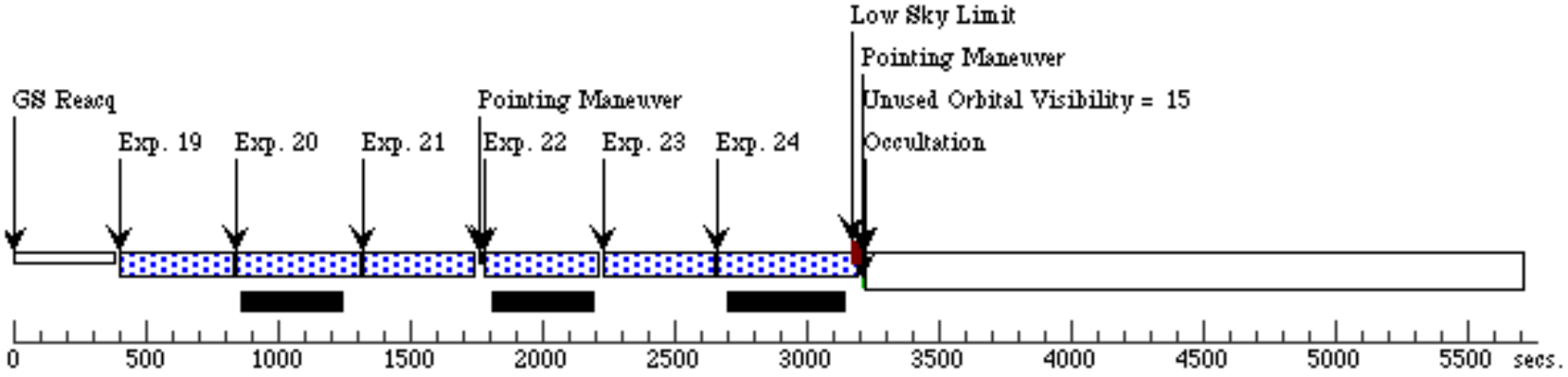
Orbit 3

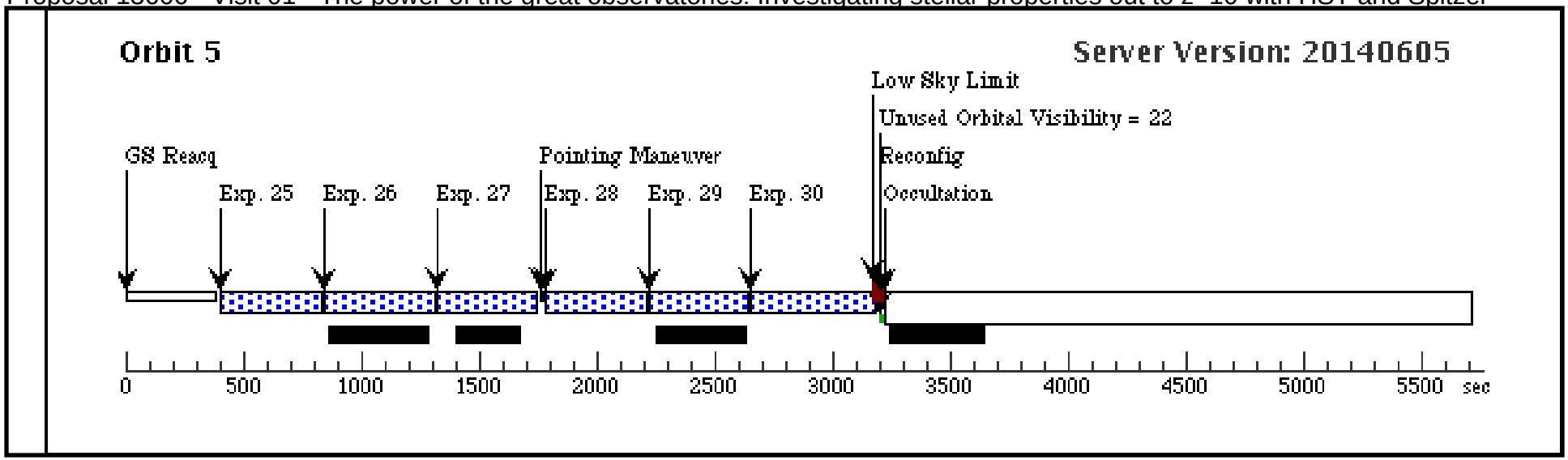
Server Version: 20140605



Orbit 4

Server Version: 20140605




Orbit 5
Server Version: 20140605
Low Sky Limit
Unused Orbital Visibility = 22
GS Reacq
Pointing Maneuver
Reconfig
Exp. 25
Exp. 26
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Exp. 28
Exp. 29
Exp. 30
Occultation
0
500
1000
1500
2000
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3000
3500
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sec