12933 - COSMIC-LAB: unveling the true nature of Terzan 5, a pristine fragment of the Galactic bulge

Cycle: 20, 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	(2) TERZAN5-ACS ANY	ACS/WFC WFC3/IR	2	16-Jul-2012 21:56:06.0	yes
02	(1) TERZAN5-POS1 ANY	ACS/WFC WFC3/IR	4	16-Jul-2012 21:56:57.0	yes

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
03	(1) TERZAN5-POS1 ANY	ACS/WFC WFC3/IR	4	16-Jul-2012 21:57:58.0	yes

10 Total Orbits Used

ABSTRACT

We have discovered that Terzan5, a stellar system in the Galactic bulge, harbors two stellar populations with different iron content (Delta[Fe/H]~0.5 dex) and possibly different ages (Ferraro et al. 2009, Nature 462, 483). Moreover, the observed chemical patterns (Origlia et al. 2011, ApJ 726, L20) significantly differ from those observed in any known genuine GC. These evidences demonstrate that, similarly to omega Centauri in the halo, Terzan5 is NOT a genuine globular cluster (GC), but a stellar system that was able to retain the gas ejected by violent supernova (SN) explosions. Indeed the striking chemical similarity with the bulge stars suggests that Terzan5 and the Galactic bulge shared the same star formation and chemical enrichment processes, driven by an exceptional amount of SNeII explosions (this is also the key to understand the origin of the extraordinary population of millisecond pulsars in Terzan5). A quite intriguing scenario is emerging from these observations: Terzan5 could be the relic of one of the massive clumps that contributed (through strong dynamical interactions with other pre-formed and internally-evolved sub-structures) to the formation of the Galactic bulge.

Here we propose to use the WFC3 to accurately measure the age of the two populations directly from the main sequence turn-off luminosities. Precisely dating the first and second burst of star formation is a crucial step for the correct reconstruction of the evolutionary history of Terzan5, with a significant impact on our comprehension of the formation processes of the Milky Way bulge and, more in general, of galactic spheroids.

OBSERVING DESCRIPTION

The observations are organized in three visits:

VISIT 1- Second epoch ACS optical observations for proper motion measures: 2 orbits.

In order to exactly duplicate the observations secured in Prop GO9799 - PI Rich, we adopted the WFC1 aperture and the same ORIENNation as in those images. In each orbit we require one short exposure (50sec in F606W and 10 sec in F814W) and 5 long exposures (t=365sec each). We adopted an ACS-DITHER-BOX pattern. In each orbit a parallel WFC3-IR (in F110W and F160W) image with exposure time of t=300sec is also required.

VISIT 2 and VISIT 3- Deep WFC3-IR observations (4 orbits for each visit) with same ORIENTation.

We required 4 orbits in each of the two selected filters (F110W and F160W). In each orbit we require 8 exposures performed with SAMP-SEQ=STEP50 and NSAMP=11. We adopted a dither pattern already succesfully tested in previous observations. For each orbit we placed a parallel

ACS-WFC exposure (alternatively in F606W and F814W).

Visit

Proposal 12933, ACS_VI (01) Tue Jul 17 01:58:17 GMT 2012

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR, ACS/WFC

Special Requirements: ORIENT 91.075287D TO 91.075287 D

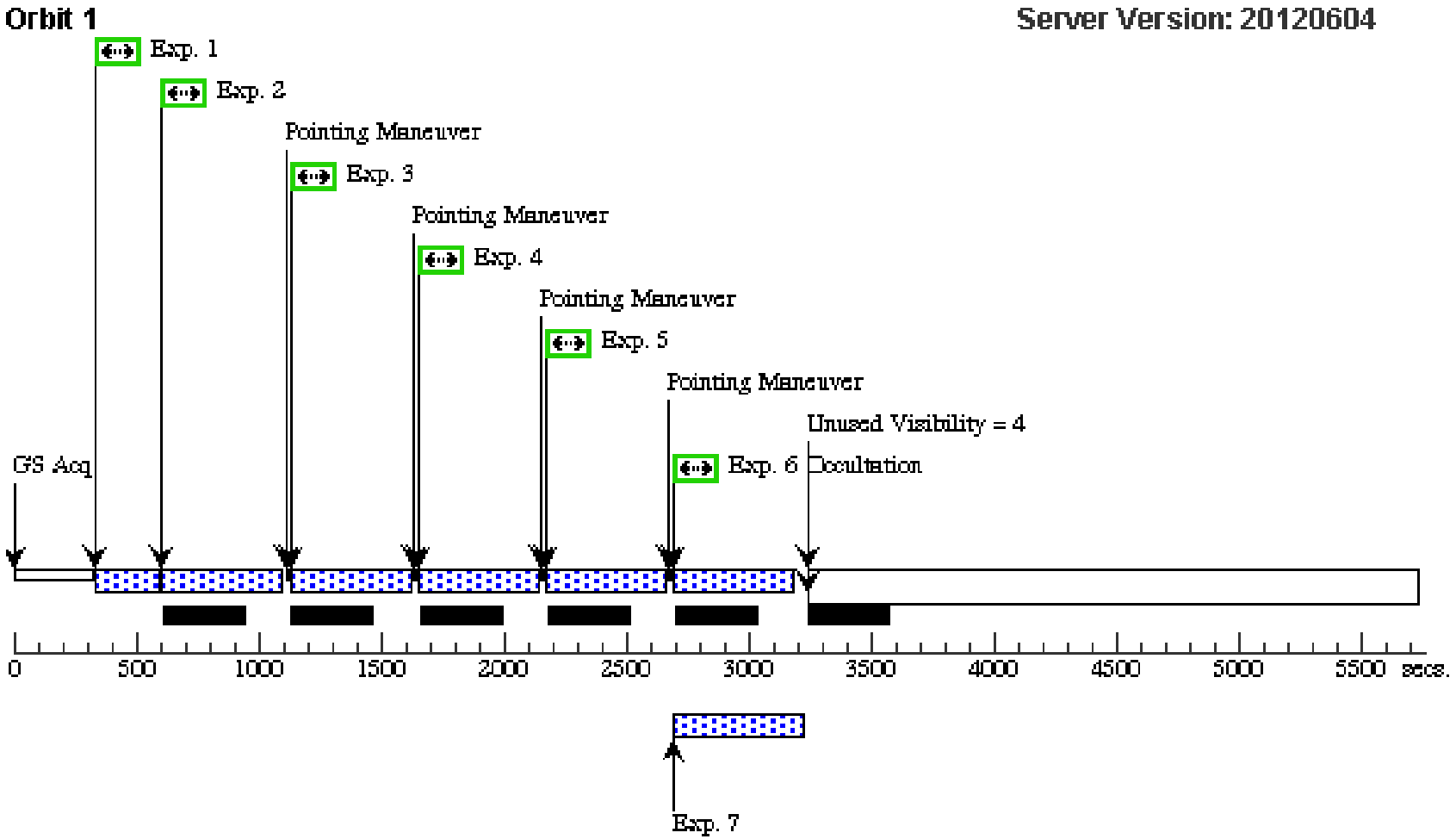
Fixed Targets

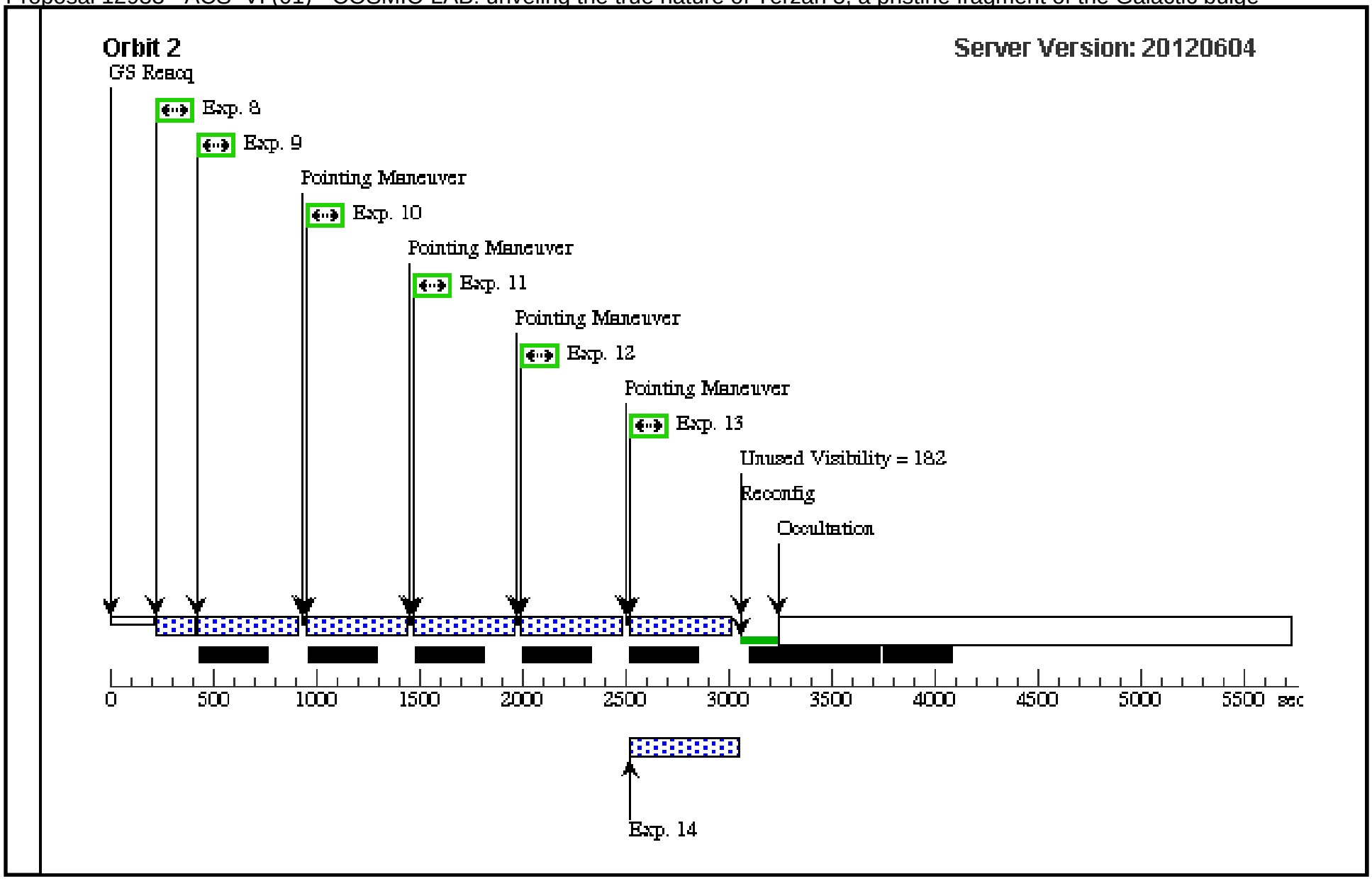
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(2)	TERZAN5-ACS	RA: 17 48 4.8500 (267.0202083d) Dec: -24 46 44.60 (-24.77906d) Equinox: J2000		V=13.8	Reference Frame: ICRS

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1	ACS_Vs	(2) TERZAN5-ACS	ACS/WFC, ACCUM, WFC1	F606W		POS TARG 0.0,0.0		50 Secs	
								[==>]	***[1]***
2	ACS_V1	(2) TERZAN5-ACS	ACS/WFC, ACCUM, WFC1	F606W		POS TARG 0.0,0.0		365 Secs	
								[==>]	***[1]***
3	ACS_V2	(2) TERZAN5-ACS	ACS/WFC, ACCUM, WFC1	F606W		POS TARG 0.247,0.094		365 Secs	
								[==>]	***[1]***
4	ACS_V3	(2) TERZAN5-ACS	ACS/WFC, ACCUM, WFC1	F606W		POS TARG 0.124,0.232		365 Secs	
								[==>]	***[1]***
5	ACS_V4	(2) TERZAN5-ACS	ACS/WFC, ACCUM, WFC1	F606W		POS TARG -0.124,0.138		365 Secs	
								[==>]	***[1]***
6	ACS_V5	(2) TERZAN5-ACS	ACS/WFC, ACCUM, WFC1	F606W		POS TARG 0.0,0.0	Prime + Parallel Group 6-7 in ACS_VI (01)	365 Secs	
								[==>]	***[1]***
7	WFC3_IR J	ANY	WFC3/IR, MULTIACCUM, IR	F110W	NSAMP=15; SAMP-SEQ=STEP50		Prime + Parallel Group 6-7 in ACS_VI (01)	*[==>]*	***[1]***
8	ACS_Is	(2) TERZAN5-ACS	ACS/WFC, ACCUM, WFC1	F814W				10 Secs	
								[==>]	***[2]***
9	ACS_I1	(2) TERZAN5-ACS	ACS/WFC, ACCUM, WFC1	F814W		POS TARG 0.0,0.0		365 Secs	
								[==>]	***[2]***
10	ACS_I2	(2) TERZAN5-ACS	ACS/WFC, ACCUM, WFC1	F814W		POS TARG 0.247,0.094		365 Secs	
								[==>]	***[2]***
11	ACS_I3	(2) TERZAN5-ACS	ACS/WFC, ACCUM, WFC1	F814W		POS TARG 0.124,0.232		365 Secs	
								[==>]	***[2]***
12	ACS_I4	(2) TERZAN5-ACS	ACS/WFC, ACCUM, WFC1	F814W		POS TARG -0.124,0.138		365 Secs	
								[==>]	***[2]***
13	ACS_I5	(2) TERZAN5-ACS	ACS/WFC, ACCUM, WFC1	F814W		POS TARG 0.0,0.0	Prime + Parallel Group 13-14 in ACS_VI (01)	365 Secs	
								[==>]	***[2]***
14	WFC3_IR H	ANY	WFC3/IR, MULTIACCUM, IR	F160W	SAMP-SEQ=STEP50; NSAMP=15		Prime + Parallel Group 13-14 in ACS_VI (01)	*[==>]*	***[2]***

Orbit Structure




Orbit 2
Server Version: 20120604
GS Reacq
Exp. 8
Exp. 9
Pointing Maneuver
Exp. 10
Pointing Maneuver
Exp. 11
Pointing Maneuver
Exp. 12
Pointing Maneuver
Exp. 13
Unused Visibility = 182
Reconfig
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec
Exp. 14

Visit

Proposal 12933, WFC3_JH1 (02) Tue Jul 17 01:58:20 GMT 2012

Diagnostic Status: Warning

Scientific Instruments: WFC3/IR, ACS/WFC

Special Requirements: (none)

Diagnostics

(WFC3_JH1 (02)) Warning (Orbit Planner): PARALLELS SIGNIFICANTLY EXTEND ALIGNMENT TIME

(WFC3_JH1 (02)) Warning (Orbit Planner): PARALLELS SIGNIFICANTLY EXTEND ALIGNMENT TIME

(WFC3_JH1 (02)) Warning (Orbit Planner): PARALLELS SIGNIFICANTLY EXTEND ALIGNMENT TIME

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	TERZAN5-POS1	RA: 17 47 58.9000 (266.9954167d) Dec: -24 46 44.00 (-24.77889d) Equinox: J2000		V=13.8	Reference Frame: ICRS

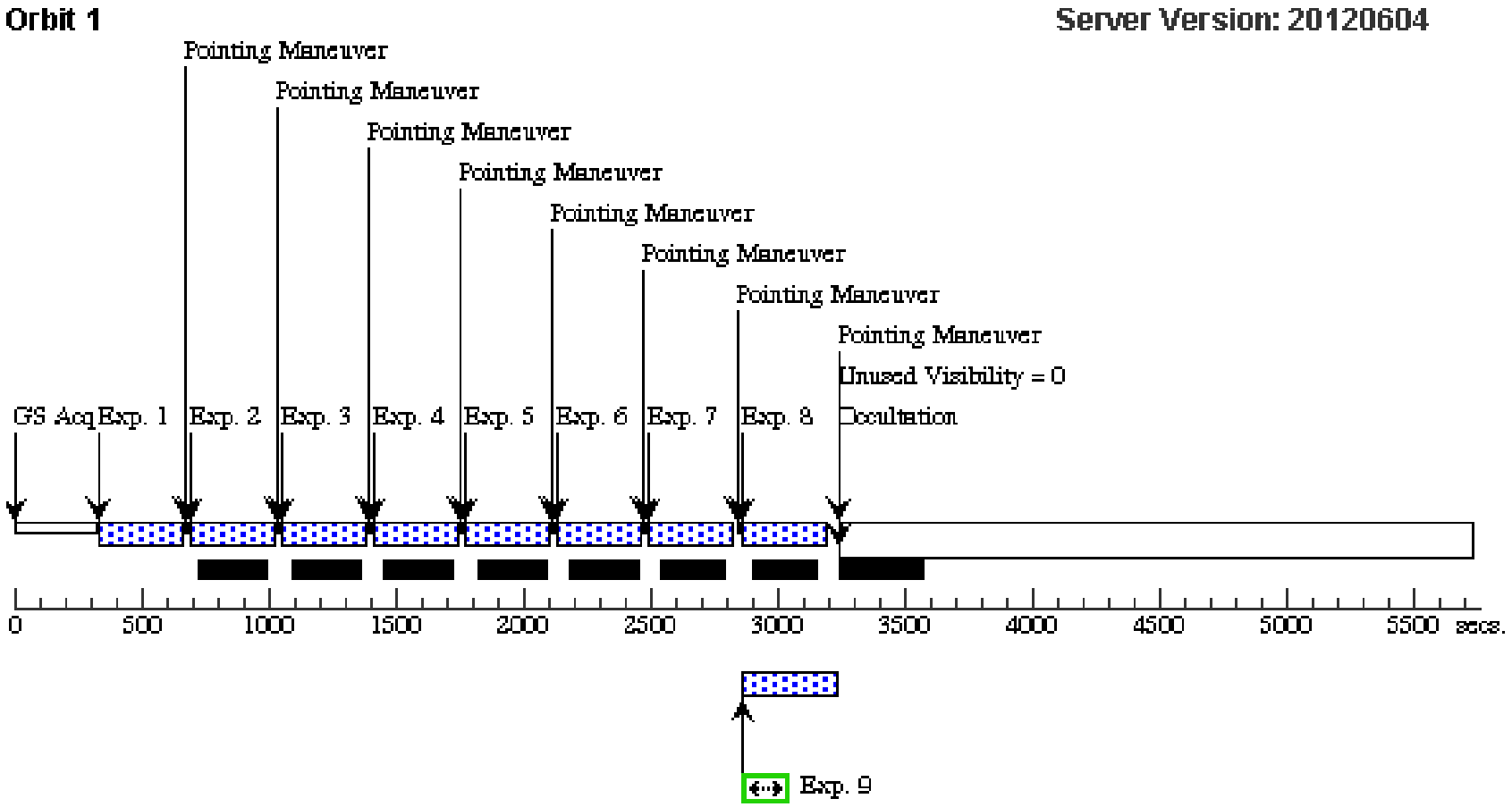
Exposures

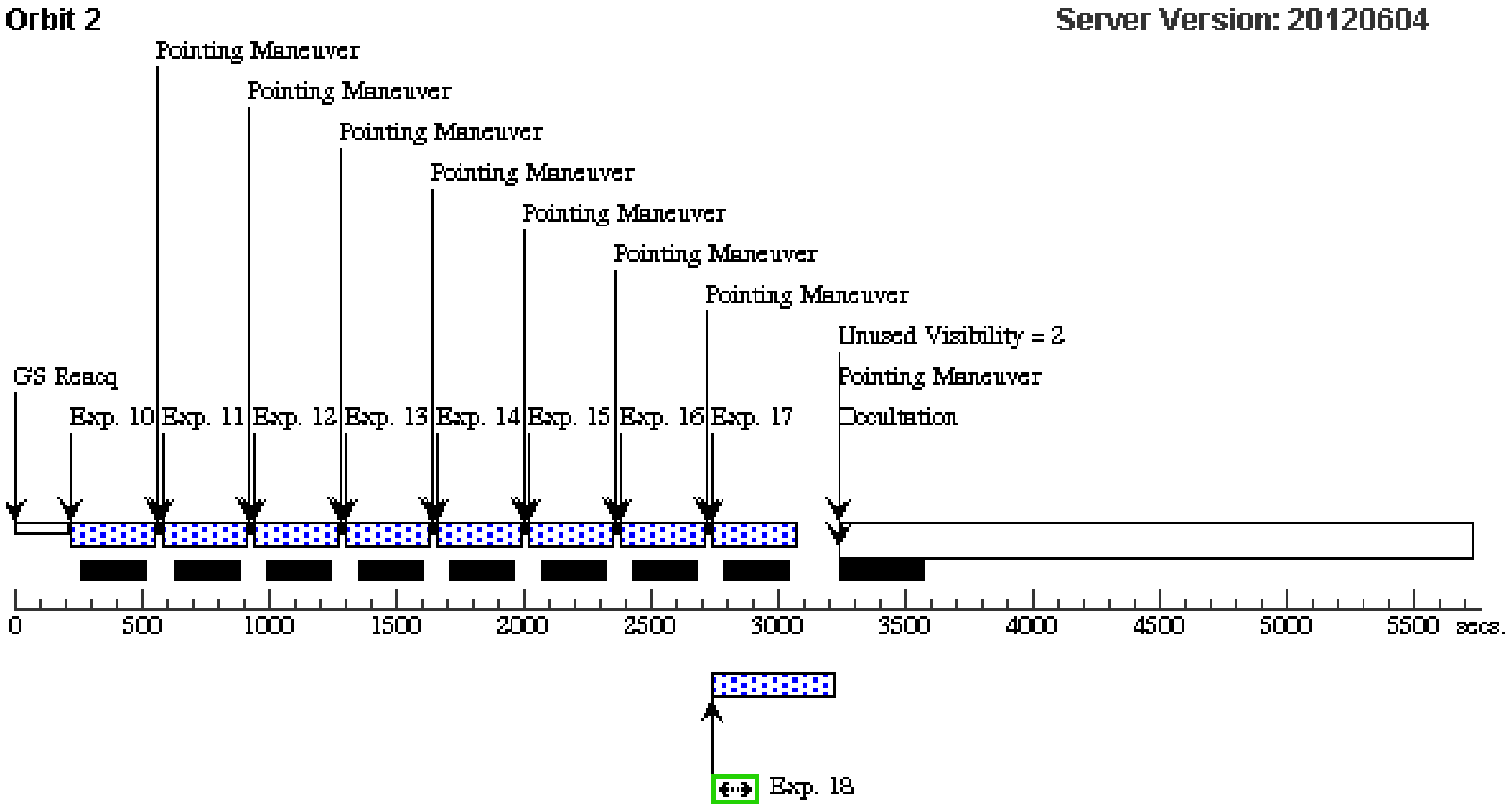
#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1	J1	(1) TERZAN5-POS1	WFC3/IR, MULTIACCUM, IR-FIX	F110W	SAMP-SEQ=STEP50; NSAMP=11	POS TARG 0.0,0.0		*[==>]*	*[1]*
2	J2	(1) TERZAN5-POS1	WFC3/IR, MULTIACCUM, IR-FIX	F110W	SAMP-SEQ=STEP50; NSAMP=11	POS TARG -0.339,-0.484		*[==>]*	*[1]*
3	J3	(1) TERZAN5-POS1	WFC3/IR, MULTIACCUM, IR-FIX	F110W	SAMP-SEQ=STEP50; NSAMP=11	POS TARG 0.203,-0.303		*[==>]*	*[1]*
4	J4	(1) TERZAN5-POS1	WFC3/IR, MULTIACCUM, IR-FIX	F110W	SAMP-SEQ=STEP50; NSAMP=11	POS TARG 0.745,-0.121		*[==>]*	*[1]*
5	J5	(1) TERZAN5-POS1	WFC3/IR, MULTIACCUM, IR-FIX	F110W	SAMP-SEQ=STEP50; NSAMP=11	POS TARG 0.542,0.182		*[==>]*	*[1]*
6	J6	(1) TERZAN5-POS1	WFC3/IR, MULTIACCUM, IR-FIX	F110W	SAMP-SEQ=STEP50; NSAMP=11	POS TARG 0.339,0.484		*[==>]*	*[1]*
7	J7	(1) TERZAN5-POS1	WFC3/IR, MULTIACCUM, IR-FIX	F110W	SAMP-SEQ=STEP50; NSAMP=11	POS TARG -0.203,0.303		*[==>]*	*[1]*
8	J8	(1) TERZAN5-POS1	WFC3/IR, MULTIACCUM, IR-FIX	F110W	SAMP-SEQ=STEP50; NSAMP=11	POS TARG -0.745,0.121	Prime + Parallel Group 8-9 in WFC3_JH 1 (02)	*[==>]*	*[1]*
9	ACS_WFC V1	ANY	ACS/WFC, ACCUM, WFC1	F606W			Prime + Parallel Group 8-9 in WFC3_JH 1 (02)	160 Secs *[==>]*	*[1]*
10	J9	(1) TERZAN5-POS1	WFC3/IR, MULTIACCUM, IR-FIX	F110W	SAMP-SEQ=STEP50; NSAMP=11	POS TARG -0.542,-0.182		*[==>]*	*[2]*
11	J10	(1) TERZAN5-POS1	WFC3/IR, MULTIACCUM, IR-FIX	F110W	SAMP-SEQ=STEP50; NSAMP=11	POS TARG -0.542,-0.303		*[==>]*	*[2]*
12	J11	(1) TERZAN5-POS1	WFC3/IR, MULTIACCUM, IR-FIX	F110W	SAMP-SEQ=STEP50; NSAMP=11	POS TARG -0.339,0.182		*[==>]*	*[2]*
13	J12	(1) TERZAN5-POS1	WFC3/IR, MULTIACCUM, IR-FIX	F110W	SAMP-SEQ=STEP50; NSAMP=11	POS TARG -0.136,0.666		*[==>]*	*[2]*
14	J13	(1) TERZAN5-POS1	WFC3/IR, MULTIACCUM, IR-FIX	F110W	SAMP-SEQ=STEP50; NSAMP=11	POS TARG 0.203,0.484		*[==>]*	*[2]*
15	J14	(1) TERZAN5-POS1	WFC3/IR, MULTIACCUM, IR-FIX	F110W	SAMP-SEQ=STEP50; NSAMP=11	POS TARG 0.542,0.303		*[==>]*	*[2]*
16	J15	(1) TERZAN5-POS1	WFC3/IR, MULTIACCUM, IR-FIX	F110W	SAMP-SEQ=STEP50; NSAMP=11	POS TARG 0.339,-0.182		*[==>]*	*[2]*

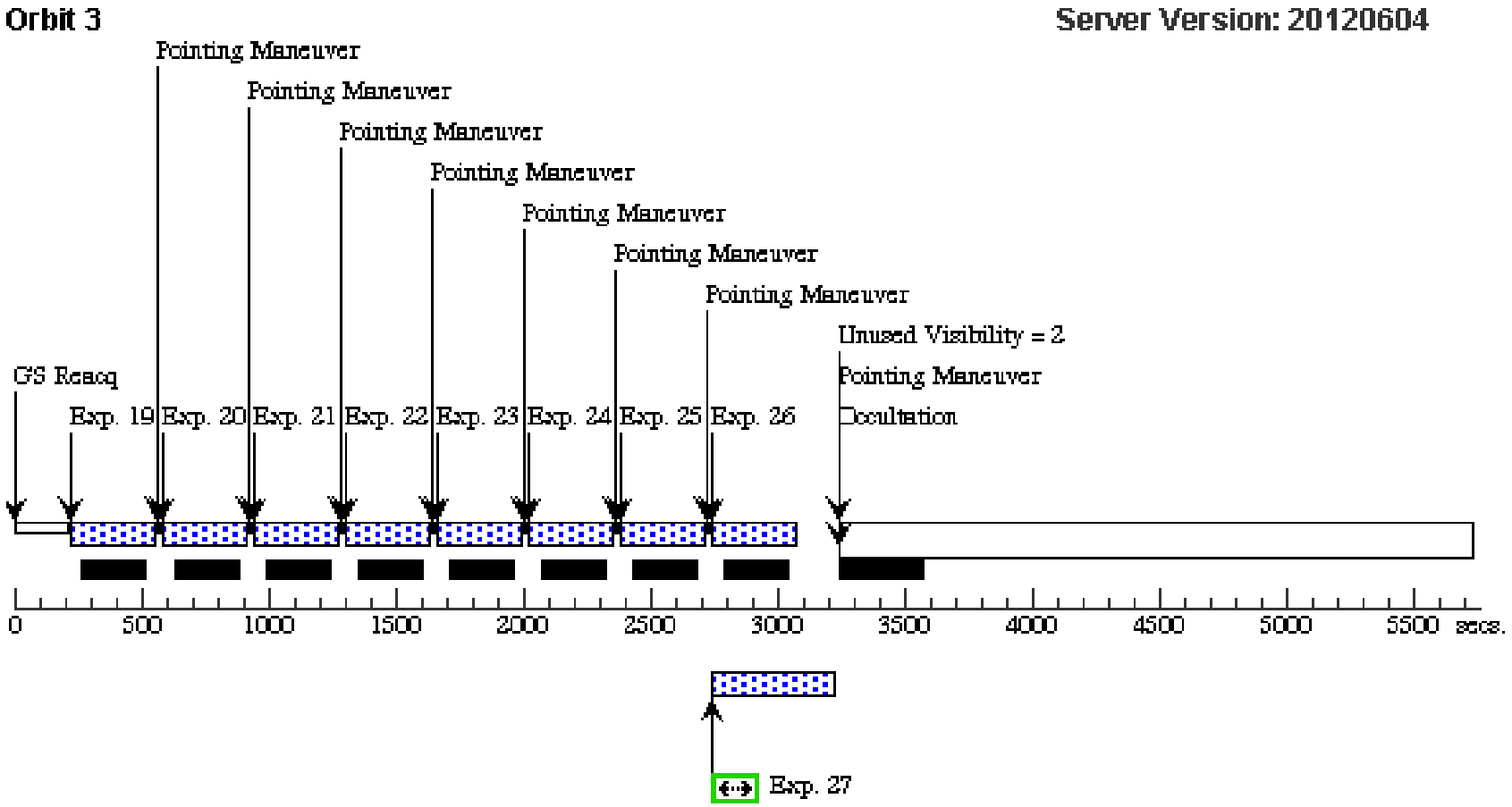
17	J16	(1) TERZAN5-POS1	WFC3/IR, MULTIACCUM, IR-FIX	F110W	SAMP-SEQ=STEP50; NSAMP=11	POS TARG 0.136,-0.666	Prime + Parallel Group 17-18 in WFC3_JH1 (02)	*[==>]*	***[2]***
18	ACS_WFC I1	ANY	ACS/WFC, ACCUM, WFC1	F814W			Prime + Parallel Group 17-18 in WFC3_JH1 (02)	300 Secs *[==>]*	***[2]***
19	H1	(1) TERZAN5-POS1	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=STEP50; NSAMP=11	POS TARG 0.0,0.0		*[==>]*	***[3]***
20	H2	(1) TERZAN5-POS1	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=STEP50; NSAMP=11	POS TARG -0.339,-0.484		*[==>]*	***[3]***
21	H3	(1) TERZAN5-POS1	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=STEP50; NSAMP=11	POS TARG 0.203,-0.303		*[==>]*	***[3]***
22	H4	(1) TERZAN5-POS1	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=STEP50; NSAMP=11	POS TARG 0.745,-0.121		*[==>]*	***[3]***
23	H5	(1) TERZAN5-POS1	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=STEP50; NSAMP=11	POS TARG 0.542,0.182		*[==>]*	***[3]***
24	H6	(1) TERZAN5-POS1	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=STEP50; NSAMP=11	POS TARG 0.339,0.484		*[==>]*	***[3]***
25	H7	(1) TERZAN5-POS1	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=STEP50; NSAMP=11	POS TARG -0.203,0.303		*[==>]*	***[3]***
26	H8	(1) TERZAN5-POS1	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=STEP50; NSAMP=11	POS TARG -0.745,0.121	Prime + Parallel Group 26-27 in WFC3_JH1 (02)	*[==>]*	***[3]***
27	ACS_WFC V2	ANY	ACS/WFC, ACCUM, WFC1	F606W			Prime + Parallel Group 26-27 in WFC3_JH1 (02)	300 Secs *[==>]*	***[3]***
28	H9	(1) TERZAN5-POS1	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=STEP50; NSAMP=11	POS TARG -0.542,-0.182		*[==>]*	***[4]***
29	H10	(1) TERZAN5-POS1	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=STEP50; NSAMP=11	POS TARG -0.542,-0.303		*[==>]*	***[4]***
30	H11	(1) TERZAN5-POS1	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=STEP50; NSAMP=11	POS TARG -0.339,0.182		*[==>]*	***[4]***
31	H12	(1) TERZAN5-POS1	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=STEP50; NSAMP=11	POS TARG -0.136,0.666		*[==>]*	***[4]***
32	H13	(1) TERZAN5-POS1	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=STEP50; NSAMP=11	POS TARG 0.203,0.484		*[==>]*	***[4]***
33	H14	(1) TERZAN5-POS1	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=STEP50; NSAMP=11	POS TARG 0.542,0.303		*[==>]*	***[4]***

	34	H15	(1) TERZAN5-POS1	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=STEP50; NSAMP=11	POS TARG 0.339,-0.182			*[==>]*	***[4]***
	35	H16	(1) TERZAN5-POS1	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=STEP50; NSAMP=11	POS TARG 0.136,-0.666	Prime + Parallel Group 35-36 in WFC3_JH1 (02)		*[==>]*	***[4]***
	36	ACS_WFC I 2	ANY	ACS/WFC, ACCUM, WFC1	F814W			Prime + Parallel Group 35-36 in WFC3_JH1 (02)		300 Secs *[==>]*	***[4]***

Orbit Structure




Orbit 2
Server Version: 20120604
Pointing Maneuver
Pointing Maneuver
Pointing Maneuver
Pointing Maneuver
Pointing Maneuver
Pointing Maneuver
Pointing Maneuver
Unused Visibility = 2
Pointing Maneuver
GS Reacq
Exp. 10
Exp. 11
Exp. 12
Exp. 13
Exp. 14
Exp. 15
Exp. 16
Exp. 17
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
secs.
Exp. 18


Orbit 3
Server Version: 20120604
Pointing Maneuver
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Pointing Maneuver
Unused Visibility = 2
Pointing Maneuver
GS Reacq
Occultation
Exp. 19
Exp. 20
Exp. 21
Exp. 22
Exp. 23
Exp. 24
Exp. 25
Exp. 26
0
500
1000
1500
2000
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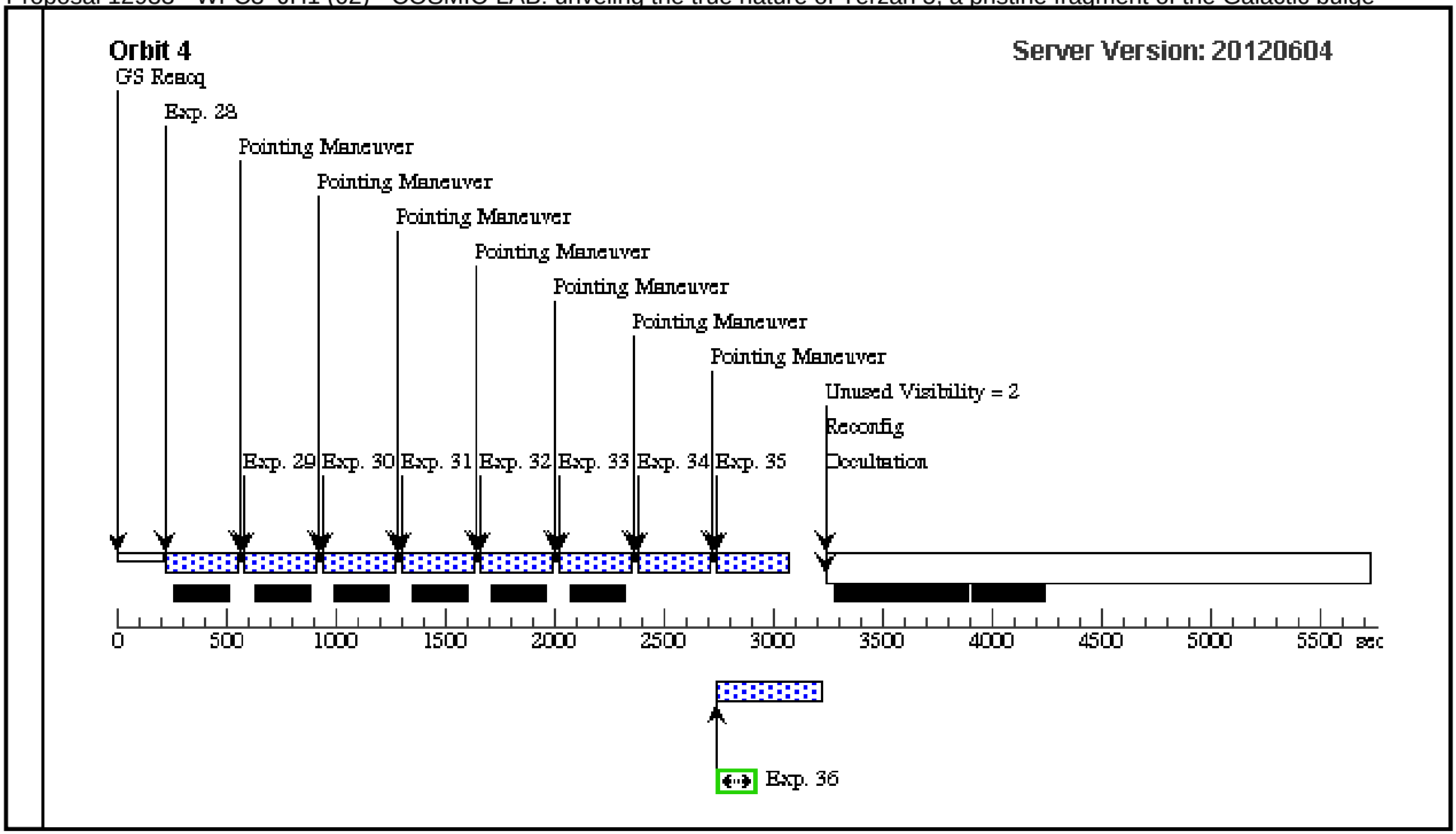
5500
secs.
Exp. 27


Orbit 4
Server Version: 20120604
GS Reacq
Exp. 28
Pointing Maneuver
Pointing Maneuver
Pointing Maneuver
Pointing Maneuver
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Pointing Maneuver
Pointing Maneuver
Unused Visibility = 2
Reconfig
Occultation
Exp. 29
Exp. 30
Exp. 31
Exp. 32
Exp. 33
Exp. 34
Exp. 35
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec
Exp. 36

Visit

Proposal 12933, WFC3_JH2 (03) Tue Jul 17 01:58:25 GMT 2012

Diagnostic Status: Warning

Scientific Instruments: WFC3/IR, ACS/WFC

Special Requirements: SAME ORIENT AS 02

Diagnostics

(WFC3_JH2 (03)) Warning (Orbit Planner): PARALLELS SIGNIFICANTLY EXTEND ALIGNMENT TIME

(WFC3_JH2 (03)) Warning (Orbit Planner): PARALLELS SIGNIFICANTLY EXTEND ALIGNMENT TIME

(WFC3_JH2 (03)) Warning (Orbit Planner): PARALLELS SIGNIFICANTLY EXTEND ALIGNMENT TIME

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	TERZAN5-POS1	RA: 17 47 58.9000 (266.9954167d) Dec: -24 46 44.00 (-24.77889d) Equinox: J2000		V=13.8	Reference Frame: ICRS

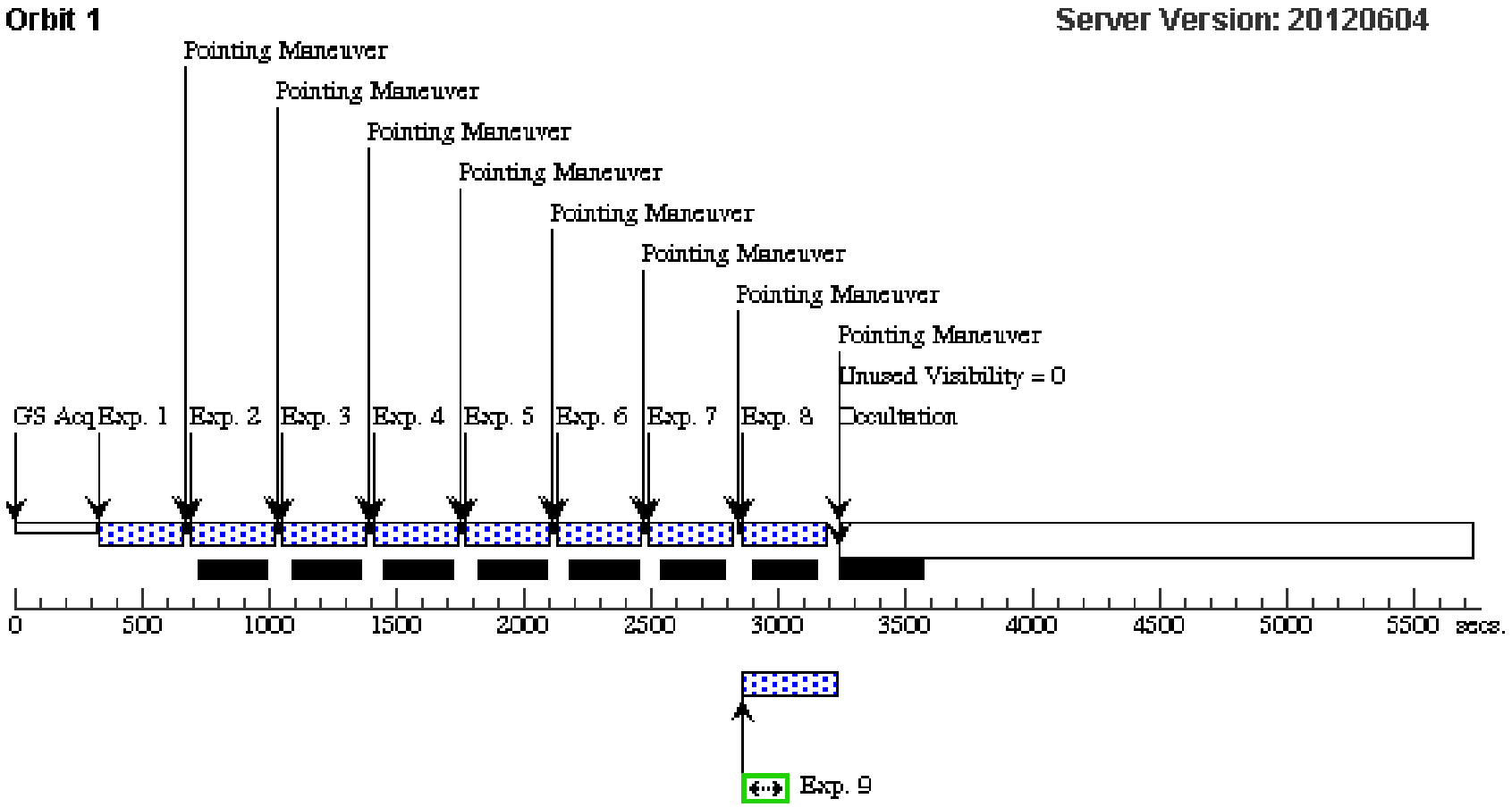
Exposures

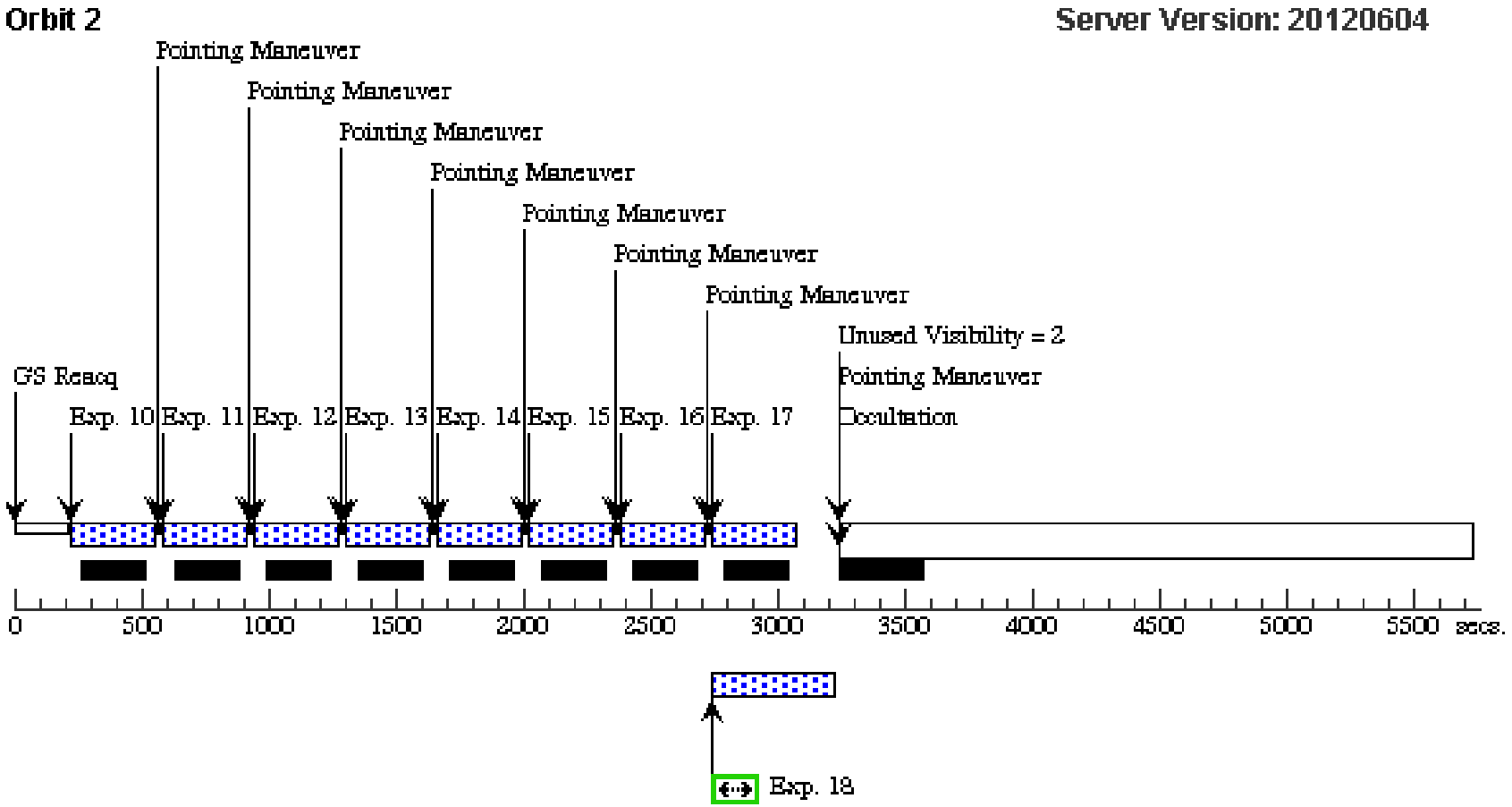
#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1	J17	(1) TERZAN5-POS1	WFC3/IR, MULTIACCUM, IR-FIX	F110W	SAMP-SEQ=STEP50; NSAMP=11	POS TARG -0.203,-0.484		*[==>]*	*[1]*
2	J18	(1) TERZAN5-POS1	WFC3/IR, MULTIACCUM, IR-FIX	F110W	SAMP-SEQ=STEP50; NSAMP=11	POS TARG 0.542,0.484		*[==>]*	*[1]*
3	J19	(1) TERZAN5-POS1	WFC3/IR, MULTIACCUM, IR-FIX	F110W	SAMP-SEQ=STEP50; NSAMP=11	POS TARG 0.203,0.0		*[==>]*	*[1]*
4	J20	(1) TERZAN5-POS1	WFC3/IR, MULTIACCUM, IR-FIX	F110W	SAMP-SEQ=STEP50; NSAMP=11	POS TARG 0.745,0.182		*[==>]*	*[1]*
5	J21	(1) TERZAN5-POS1	WFC3/IR, MULTIACCUM, IR-FIX	F110W	SAMP-SEQ=STEP50; NSAMP=11	POS TARG 1.287,0.363		*[==>]*	*[1]*
6	J22	(1) TERZAN5-POS1	WFC3/IR, MULTIACCUM, IR-FIX	F110W	SAMP-SEQ=STEP50; NSAMP=11	POS TARG 1.084,0.666		*[==>]*	*[1]*
7	J23	(1) TERZAN5-POS1	WFC3/IR, MULTIACCUM, IR-FIX	F110W	SAMP-SEQ=STEP50; NSAMP=11	POS TARG 0.881,0.969		*[==>]*	*[1]*
8	J24	(1) TERZAN5-POS1	WFC3/IR, MULTIACCUM, IR-FIX	F110W	SAMP-SEQ=STEP50; NSAMP=11	POS TARG 0.339,0.787	Prime + Parallel Group 8-9 in WFC3_JH 2 (03)	*[==>]*	*[1]*
9	ACS_WFC V3	ANY	ACS/WFC, ACCUM, WFC1	F606W			Prime + Parallel Group 8-9 in WFC3_JH 2 (03)	160 Secs *[==>]*	*[1]*
10	J25	(1) TERZAN5-POS1	WFC3/IR, MULTIACCUM, IR-FIX	F110W	SAMP-SEQ=STEP50; NSAMP=11	POS TARG -0.203,0.606		*[==>]*	*[2]*
11	J26	(1) TERZAN5-POS1	WFC3/IR, MULTIACCUM, IR-FIX	F110W	SAMP-SEQ=STEP50; NSAMP=11	POS TARG 0.0,0.303		*[==>]*	*[2]*
12	J27	(1) TERZAN5-POS1	WFC3/IR, MULTIACCUM, IR-FIX	F110W	SAMP-SEQ=STEP50; NSAMP=11	POS TARG 0.0,0.182		*[==>]*	*[2]*
13	J28	(1) TERZAN5-POS1	WFC3/IR, MULTIACCUM, IR-FIX	F110W	SAMP-SEQ=STEP50; NSAMP=11	POS TARG 0.0,0.0		*[==>]*	*[2]*
14	J29	(1) TERZAN5-POS1	WFC3/IR, MULTIACCUM, IR-FIX	F110W	SAMP-SEQ=STEP50; NSAMP=11	POS TARG -0.339,-0.484		*[==>]*	*[2]*
15	J30	(1) TERZAN5-POS1	WFC3/IR, MULTIACCUM, IR-FIX	F110W	SAMP-SEQ=STEP50; NSAMP=11	POS TARG 0.203,-0.303		*[==>]*	*[2]*
16	J31	(1) TERZAN5-POS1	WFC3/IR, MULTIACCUM, IR-FIX	F110W	SAMP-SEQ=STEP50; NSAMP=11	POS TARG 0.745,-0.121		*[==>]*	*[2]*

17	J32	(1) TERZAN5-POS1	WFC3/IR, MULTIACCUM, IR-FIX	F110W	SAMP-SEQ=STEP50; NSAMP=11	POS TARG 0.542,0.182	Prime + Parallel Group 17-18 in WFC3_JH2 (03)	*[==>]*	***[2]***
18	ACS_WFC I3	ANY	ACS/WFC, ACCUM, WFC1	F814W			Prime + Parallel Group 17-18 in WFC3_JH2 (03)	300 Secs *[==>]*	***[2]***
19	H17	(1) TERZAN5-POS1	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=STEP50; NSAMP=11	POS TARG -0.203,-0.484		*[==>]*	***[3]***
20	H18	(1) TERZAN5-POS1	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=STEP50; NSAMP=11	POS TARG 0.542,0.484		*[==>]*	***[3]***
21	H19	(1) TERZAN5-POS1	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=STEP50; NSAMP=11	POS TARG 0.203,0.0		*[==>]*	***[3]***
22	H20	(1) TERZAN5-POS1	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=STEP50; NSAMP=11	POS TARG 0.745,0.182		*[==>]*	***[3]***
23	H21	(1) TERZAN5-POS1	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=STEP50; NSAMP=11	POS TARG 1.287,0.363		*[==>]*	***[3]***
24	H22	(1) TERZAN5-POS1	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=STEP50; NSAMP=11	POS TARG 1.084,0.666		*[==>]*	***[3]***
25	H23	(1) TERZAN5-POS1	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=STEP50; NSAMP=11	POS TARG 0.881,0.969		*[==>]*	***[3]***
26	H24	(1) TERZAN5-POS1	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=STEP50; NSAMP=11	POS TARG 0.339,0.787	Prime + Parallel Group 26-27 in WFC3_JH2 (03)	*[==>]*	***[3]***
27	ACS_WFC V4	ANY	ACS/WFC, ACCUM, WFC1	F606W			Prime + Parallel Group 26-27 in WFC3_JH2 (03)	300 Secs *[==>]*	***[3]***
28	H25	(1) TERZAN5-POS1	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=STEP50; NSAMP=11	POS TARG -0.203,0.606		*[==>]*	***[4]***
29	H26	(1) TERZAN5-POS1	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=STEP50; NSAMP=11	POS TARG 0.0,0.303		*[==>]*	***[4]***
30	H27	(1) TERZAN5-POS1	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=STEP50; NSAMP=11	POS TARG 0.0,0.182		*[==>]*	***[4]***
31	H28	(1) TERZAN5-POS1	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=STEP50; NSAMP=11	POS TARG 0.0,0.0		*[==>]*	***[4]***
32	H29	(1) TERZAN5-POS1	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=STEP50; NSAMP=11	POS TARG -0.339,-0.484		*[==>]*	***[4]***
33	H30	(1) TERZAN5-POS1	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=STEP50; NSAMP=11	POS TARG 0.203,-0.303		*[==>]*	***[4]***

	34	H31	(1) TERZAN5-POS1	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=STEP50; NSAMP=11	POS TARG 0.745,-0.121			*[==>]*	***[4]***
	35	H32	(1) TERZAN5-POS1	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=STEP50; NSAMP=11	POS TARG 0.542,0.182	Prime + Parallel Group 35-36 in WFC3_JH2 (03)		*[==>]*	***[4]***
	36	ACS_WFC I 4	ANY	ACS/WFC, ACCUM, WFC1	F814W			Prime + Parallel Group 35-36 in WFC3_JH2 (03)		300 Secs *[==>]*	***[4]***

Orbit Structure

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Pointing Maneuver
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Unused Visibility = 2
Pointing Maneuver
GS Reacq
Exp. 10
Exp. 11
Exp. 12
Exp. 13
Exp. 14
Exp. 15
Exp. 16
Exp. 17
Occultation
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1000
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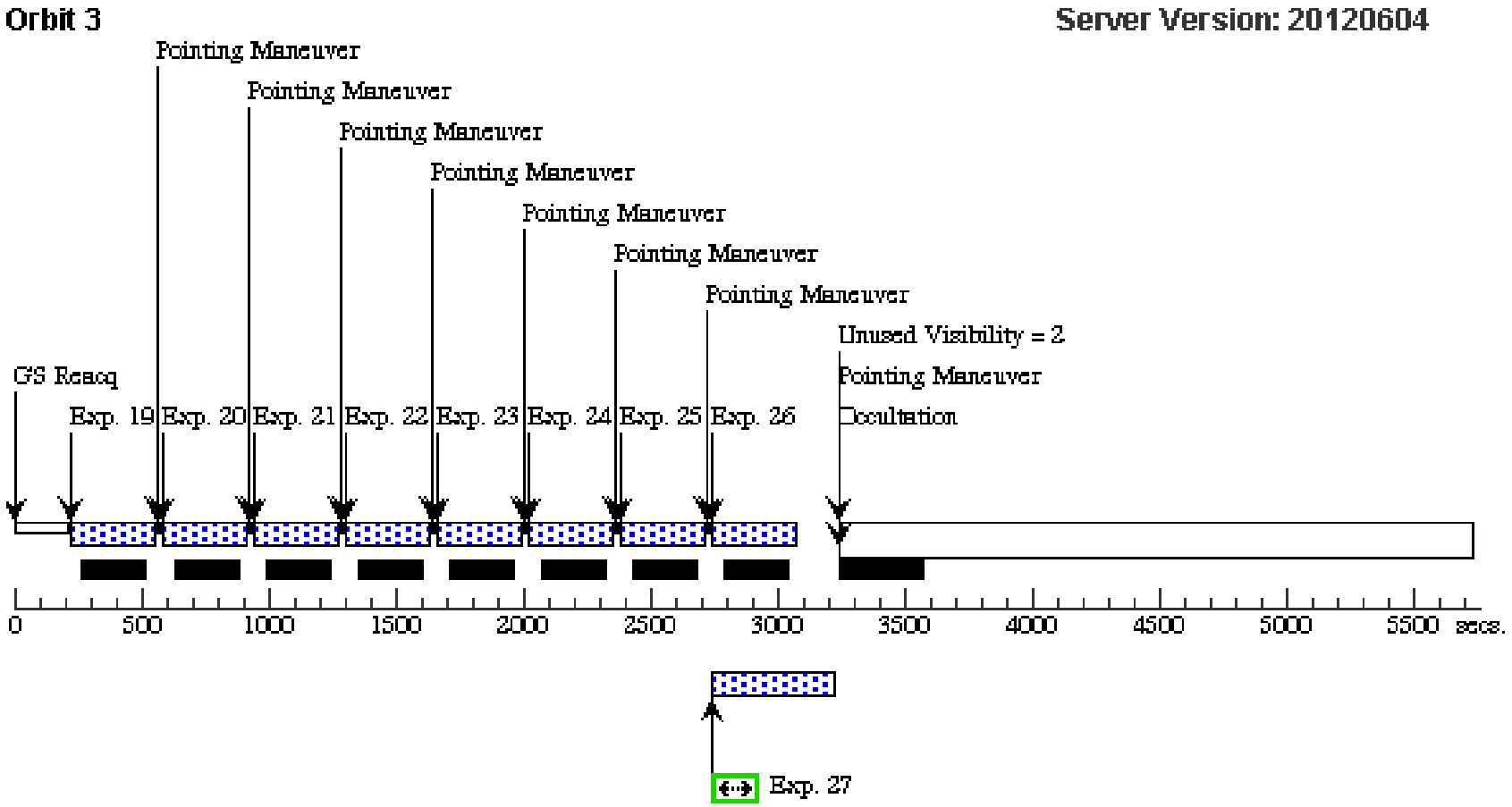
secs.
Exp. 18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Unused Visibility = 2
Pointing Maneuver
GS Reacq
Occultation
Exp. 19
Exp. 20
Exp. 21
Exp. 22
Exp. 23
Exp. 24
Exp. 25
Exp. 26
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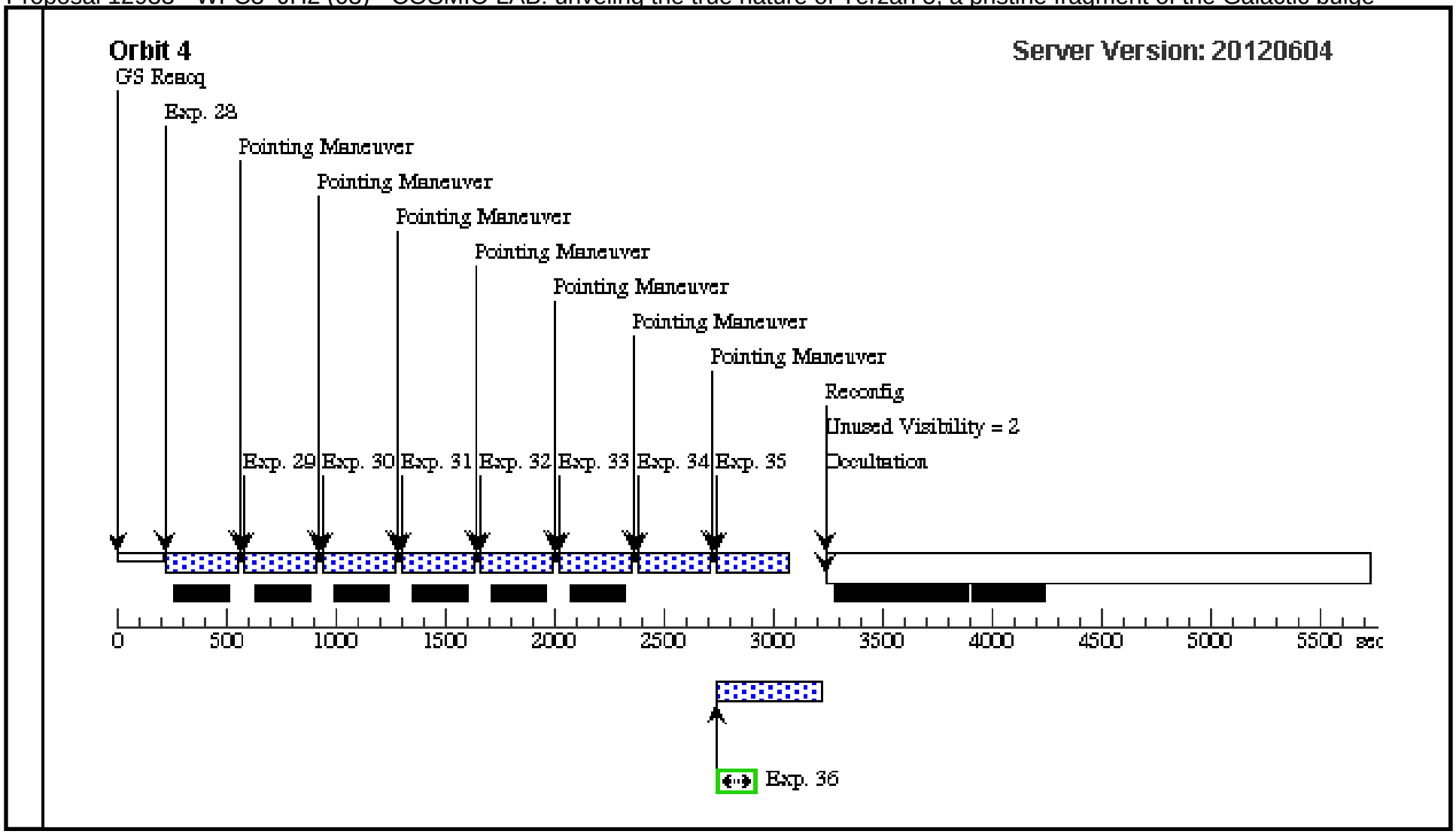
secs.
Exp. 27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Exp. 28
Pointing Maneuver
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Occultation
Exp. 29
Exp. 30
Exp. 31
Exp. 32
Exp. 33
Exp. 34
Exp. 35
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Exp. 36