12925 - Splendid Isolation: Using DDO 210 to Benchmark Dwarf Galaxy Evolution

Cycle: 20, Proposal Category: GO

(Availability Mode: SUPPORTED)

INVESTIGATORS

Name	*Institution*	*E-Mail*
Dr. Andrew A. Cole (PI) (Contact)	**University of Tasmania**	**andrew.cole@utas.edu.au**
Dr. Evan D. Skillman (CoI) (AdminUSPI)	University of Minnesota - Twin Cities	skillman@astro.umn.edu
Dr. Daniel R. Weisz (CoI)	University of Washington	dweisz@astro.washington.edu
Dr. Alan McConnachie (CoI)	Dominion Astrophysical Observatory	alan.mcconnachie@nrc-cnrc.gc.ca
Dr. Andrew Dolphin (CoI)	Raytheon Company	adolphin@raytheon.com
Dr. Ryan Leaman (CoI)	University of Victoria	ryan.c.leaman@gmail.com
Dr. Alyson Brooks (CoI)	University of Wisconsin - Madison	abrooks@astro.wisc.edu

VISITS

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
01	(1) DDO210 ANY	ACS/WFC WFC3/UVIS	2	02-Jul-2012 21:37:02.0	yes
02	(1) DDO210 ANY	ACS/WFC WFC3/UVIS	2	02-Jul-2012 21:37:14.0	yes
03	(1) DDO210 ANY	ACS/WFC WFC3/UVIS	2	02-Jul-2012 21:37:24.0	yes
04	(1) DDO210 ANY	ACS/WFC WFC3/UVIS	2	02-Jul-2012 21:37:33.0	yes
05	(1) DDO210 ANY	ACS/WFC WFC3/UVIS	2	02-Jul-2012 21:37:42.0	yes

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
06	(1) DDO210 ANY	ACS/WFC WFC3/UVIS	2	02-Jul-2012 21:37:50.0	yes
07	(1) DDO210 ANY	ACS/WFC WFC3/UVIS	2	02-Jul-2012 21:37:59.0	yes
08	(1) DDO210 ANY	ACS/WFC WFC3/UVIS	2	02-Jul-2012 21:38:07.0	yes
09	(1) DDO210 ANY	ACS/WFC WFC3/UVIS	2	02-Jul-2012 21:38:16.0	yes
10	(1) DDO210 ANY	ACS/WFC WFC3/UVIS	2	02-Jul-2012 21:38:24.0	yes
11	(1) DDO210 ANY	ACS/WFC WFC3/UVIS	2	02-Jul-2012 21:38:33.0	yes
12	(1) DDO210 ANY	ACS/WFC WFC3/UVIS	2	02-Jul-2012 21:38:41.0	yes

24 Total Orbits Used

ABSTRACT

Dwarf galaxies are sensitive probes of galaxy formation theory because of their vulnerability to local and cosmic environmental effects. The star formation histories (SFH) of nearby galaxies can test the effects of post-reionization photoheating, supernova-driven outflows, and harassment. We are undertaking a study of the SFH, chemistry, structure, and dynamics of Local Group dwarf galaxies to inform the next generation of theory and simulations. This combines HST photometry, wide-field ground-based data, and spectra of individual stars from 8-10m class telescopes for isolated dwarf galaxies in the Local Group. Dwarf galaxies that have never interacted with either M31 or the Milky Way (MW) are a pristine environment in which to study the progress of galaxy evolution without external influences. Theory and observation suggest that star formation should be delayed in low-mass, low-metallicity galaxies that evolve in isolation; we propose to test that assertion using DDO 210. DDO 210 is the closest galaxy which can never have interacted with the MW or M31 and is thus a uniquely powerful testbed for models of dwarf galaxy evolution. We propose to photometer over 100,000 stars using ACS/WFC in order to measure its star formation rate vs. time with age resolution better than 15% over its entire lifetime. These observations will be combined with Keck/DEIMOS spectra of stars spanning the age of the galaxy to build a complete picture of its chemical and kinematic evolution. DDO 210 is the only galaxy that is both isolated and nearby enough to use as a link between deep studies of

nearby galaxies and the ANGST survey of galaxies from 1.5-4 Mpc.

OBSERVING DESCRIPTION

We propose to image DDO 210 using the F475W and F814W filters of ACS/WFC. These filters yield the optimum combination of throughput and age/metallicity resolution at the subgiant branch and main-sequence turnoffs at (B, I) ~ (29, 28). Our observations are structured to maximize sensitivity to variable stars with periods of ~0.5 day while minimizing the impact of hot pixels and cosmic rays on photometry of stars near the detection limit. We will also image a flanking field as a coordinated parallel observation with WFC3/UVIS in order to constrain the radial population gradients in DDO210. The parallel observations will achieve nearly the same photometric depth in the WFC3 F475W and F814W filters. Our limiting magnitude requirement is based on the expected magnitude and colors of the subgiant branch and main-sequence turnoff, which contain unique information about the oldest stars in the galaxy. The ACS ETC (v.20.1) suggests that exposure times of ~22 ksec in F475W and ~32 ksec in F814W are sufficient to achieve S/N ~ 10 for optimally extracted PSF photometry.

We have divided the observations into 12 visits of 2 orbits each. Each orbit contains one exposure each in F475W and F814W. The exposures are not CR-SPLIT, but we will eliminate hot pixels and CR hits in the combined images by using a dither pattern of 2-3 pixels between orbits as per the ACS instrument handbook, implemented using POS-TARG commands. In this way we minimize overheads and maximize sensitivity to faint stars, while separating exposures in each filter by the duration of an orbit in order to improve the sampling of variable star light curves. To ensure that the observations span enough of the light curve phase to identify and characterize any prospective RR Lyrae variables, we wish to group all of our visits together within a roughly 2.5-day window. This strikes a balance between a desire to sample light curves densely and the necessity to allow for ease of schedulability. In phase I we indicated the LOW-SKY visit-level constraint for our exposures because of the low ecliptic latitude of DDO 210. However, for F475W and F814W we expect that earthshine will NOT be a strong contribution to the background even at earth limb angles of 20-40 degees, so we prefer to drop the LOW-SKY constraint, thereby increasing efficiency by filling more of each orbit with science integration. In order to ensure that we maintain the low zodiacal light background (the original motivation for specifying LOW-SKY in phase I), we instead wish to use the visit-level BETWEEN constraint to enforce a sun-telescope-target angle of greater than 100 degrees. In this manner we gain a few extra minutes of integration time per orbit while preserving the low background condition, in a way that does not strongly impact schedulability. We are using WFC3 to obtain coordinated parallel observations of a field in the far outskirts of DDO210. The specific placement of this field is not important, except for a 40 degree excluded region to avoid a 9th magnitude star. Because the science goals are similar for the prime and parallel exposures, visits 2-12 are constrained to have the SAME ORIENT as visit 1 to allow for deep integration in the parallel field.

ADDITIONAL COMMENTS

DDO 210 was observed as part of a WFPC2 Snapshot program (GO-8601) with exposures of 600 sec each in F606W and F814W. The resulting CMD does not reach below I ~ 25, and so it does not strongly constrain the star formation history for ages older than 1-2 Gyr. No conclusions can be drawn about the early evolution of DDO 210 from the WFPC2 data, and the single epoch of data cannot be used to identify variable stars.

Visit

Proposal 12925, DDO210 (01) Tue Jul 03 01:38:50 GMT 2012

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/UVIS, ACS/WFC

Special Requirements: ORIENT 0.0D TO 229.9 D; ORIENT 270.0D TO 359.9 D; BETWEEN 11-MAY-2012:00:00:00 AND 20-OCT-2012:23:59:59; BETWEEN 11-MAY-2013:00:00:00 AND 20-OCT-2013:23:59:59; GROUP 01,02,03,04,05,06,07,08,09,10,11,12 WITHIN 2.5D

Comments: ORIENT range to avoid a bright star in the parallel WFC3 field (from VTT). BETWEEN constraint used to ensure sun angle greater than 100 degrees instead of LOW-SKY constraint. GROUP within 2.5D of other visits to improve variable star light curve coverage.

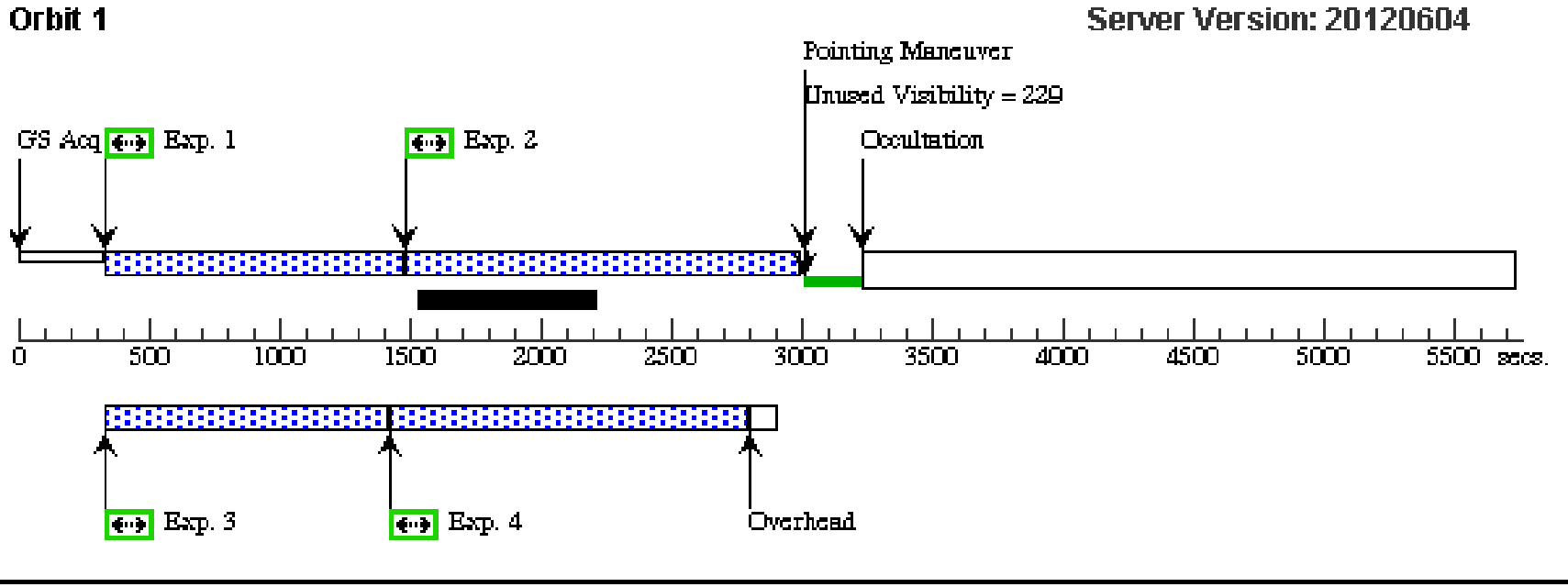
Fixed Targets

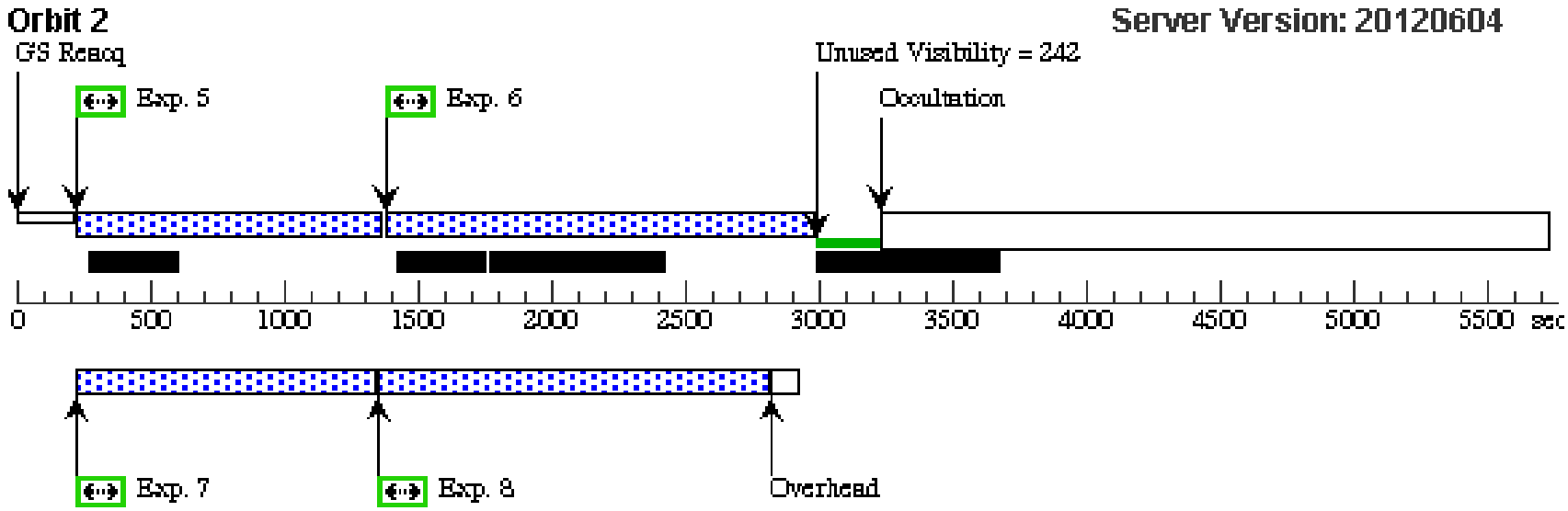
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	DDO210	RA: 20 46 51.8000 (311.7158333d) Dec: -12 50 52.50 (-12.84792d) Equinox: J2000	Radial Velocity: -141 km/sec	V=19.0+/-1.0 Most stars fainter than B=25.5, I =24; limit B=29, I=28	Reference Frame: ICRS

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1	DDO210/g	(1) DDO210	ACS/WFC, ACCUM, WFC-FIX	F475W	CR-SPLIT=NO; GAIN=2.0		Prime + Parallel Group 1-4 in DDO210 (01)	930 Secs *[==>]*	 ***[1]***
2	DDO210/I	(1) DDO210	ACS/WFC, ACCUM, WFC-FIX	F814W	CR-SPLIT=NO; GAIN=2.0		Prime + Parallel Group 1-4 in DDO210 (01)	1350 Secs *[==>]*	 ***[1]***
3	DDO210 Halo/g	ANY	WFC3/UVIS, ACCUM, UVIS-FIX	F475W			Prime + Parallel Group 1-4 in DDO210 (01)	930 Secs *[==>]*	 ***[1]***
4	DDO210 Halo/I	ANY	WFC3/UVIS, ACCUM, UVIS-FIX	F814W			Prime + Parallel Group 1-4 in DDO210 (01)	1350 Secs *[==>]*	 ***[1]***
5	DDO210/g	(1) DDO210	ACS/WFC, ACCUM, WFC-FIX	F475W	CR-SPLIT=NO; GAIN=2.0	POS TARG 0.148,0.086	Prime + Parallel Group 5-8 in DDO210 (01)	980 Secs *[==>]*	 ***[2]***
6	DDO210/I	(1) DDO210	ACS/WFC, ACCUM, WFC-FIX	F814W	CR-SPLIT=NO; GAIN=2.0	POS TARG 0.148,0.086	Prime + Parallel Group 5-8 in DDO210 (01)	1440 Secs *[==>]*	 ***[2]***
7	DDO210 Halo/g	ANY	WFC3/UVIS, ACCUM, UVIS-FIX	F475W			Prime + Parallel Group 5-8 in DDO210 (01)	980 Secs *[==>]*	 ***[2]***
8	DDO210 Halo/I	ANY	WFC3/UVIS, ACCUM, UVIS-FIX	F814W			Prime + Parallel Group 5-8 in DDO210 (01)	1440 Secs *[==>]*	 ***[2]***

Orbit Structure





Visit

Proposal 12925, DDO210 (02) Tue Jul 03 01:38:53 GMT 2012

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/UVIS, ACS/WFC

Special Requirements: SAME ORIENT AS 01; BETWEEN 11-MAY-2012:00:00:00 AND 20-OCT-2012:23:59:59; BETWEEN 11-MAY-2013:00:00:00 AND 20-OCT-2013:23:59:59; GROUP 02,01,03,04,05,06,07,08,09,10,11,12 WITHIN 2.5D

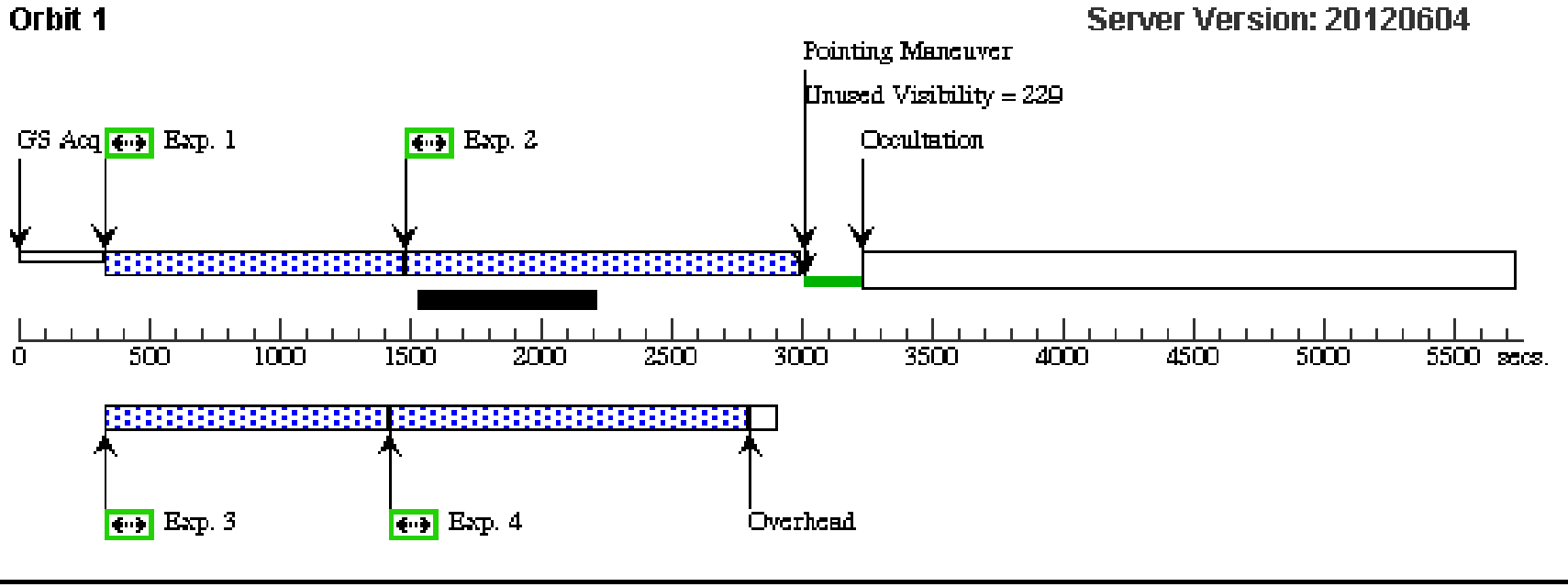
Fixed Targets

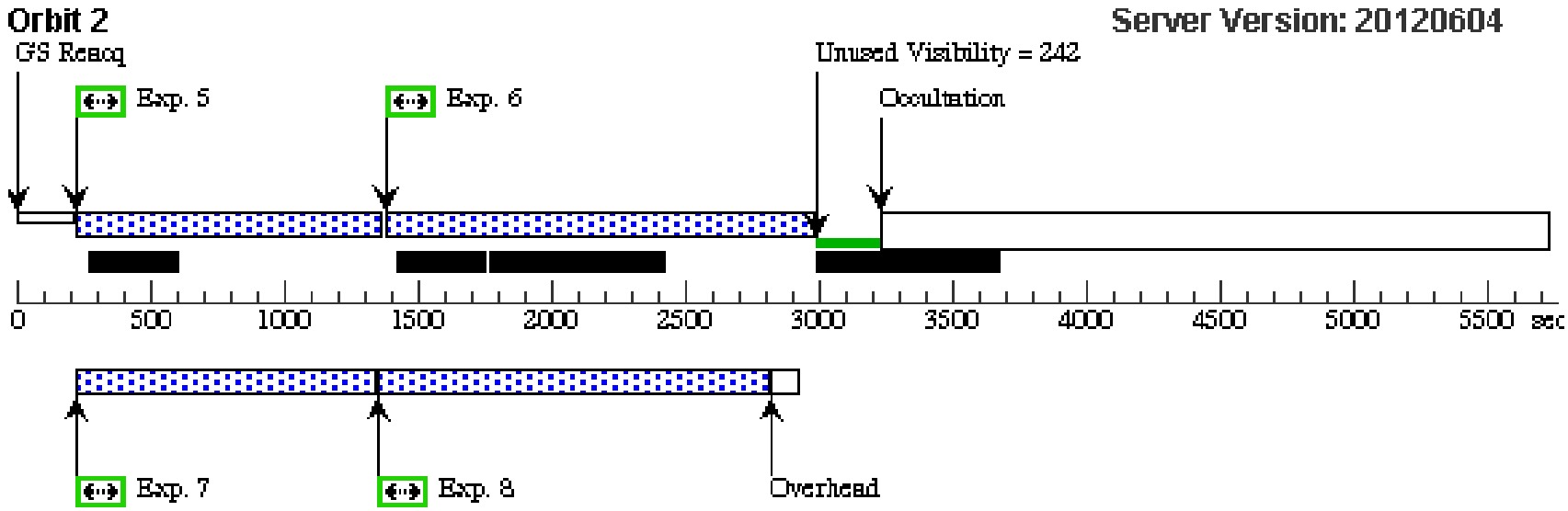
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	DDO210	RA: 20 46 51.8000 (311.7158333d) Dec: -12 50 52.50 (-12.84792d) Equinox: J2000	Radial Velocity: -141 km/sec	V=19.0+/-1.0 Most stars fainter than B=25.5, I =24; limit B=29, I=28	Reference Frame: ICRS

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1	DDO210/g	(1) DDO210	ACS/WFC, ACCUM, WFC-FIX	F475W	CR-SPLIT=NO; GAIN=2.0	POS TARG 0.222,0.240	Prime + Parallel Group 1-4 in DDO210 (02)	930 Secs *[==>]*	*[1]*
2	DDO210/I	(1) DDO210	ACS/WFC, ACCUM, WFC-FIX	F814W	CR-SPLIT=NO; GAIN=2.0	POS TARG 0.222,0.240	Prime + Parallel Group 1-4 in DDO210 (02)	1350 Secs *[==>]*	*[1]*
3	DDO210 Halo/g	ANY	WFC3/UVIS, ACCUM, UVIS-FIX	F475W			Prime + Parallel Group 1-4 in DDO210 (02)	930 Secs *[==>]*	*[1]*
4	DDO210 Halo/I	ANY	WFC3/UVIS, ACCUM, UVIS-FIX	F814W			Prime + Parallel Group 1-4 in DDO210 (02)	1350 Secs *[==>]*	*[1]*
5	DDO210/g	(1) DDO210	ACS/WFC, ACCUM, WFC-FIX	F475W	CR-SPLIT=NO; GAIN=2.0	POS TARG 0.074,0.154	Prime + Parallel Group 5-8 in DDO210 (02)	980 Secs *[==>]*	*[2]*
6	DDO210/I	(1) DDO210	ACS/WFC, ACCUM, WFC-FIX	F814W	CR-SPLIT=NO; GAIN=2.0	POS TARG 0.074,0.154	Prime + Parallel Group 5-8 in DDO210 (02)	1440 Secs *[==>]*	*[2]*
7	DDO210 Halo/g	ANY	WFC3/UVIS, ACCUM, UVIS-FIX	F475W			Prime + Parallel Group 5-8 in DDO210 (02)	980 Secs *[==>]*	*[2]*
8	DDO210 Halo/I	ANY	WFC3/UVIS, ACCUM, UVIS-FIX	F814W			Prime + Parallel Group 5-8 in DDO210 (02)	1440 Secs *[==>]*	*[2]*

Orbit Structure





Visit

Proposal 12925, DDO210 (03) Tue Jul 03 01:38:55 GMT 2012

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/UVIS, ACS/WFC

Special Requirements: SAME ORIENT AS 01; BETWEEN 11-MAY-2012:00:00:00 AND 20-OCT-2012:23:59:59; BETWEEN 11-MAY-2013:00:00:00 AND 20-OCT-2013:23:59:59; GROUP 03,01,02,04,05,06,07,08,09,10,11,12 WITHIN 2.5D

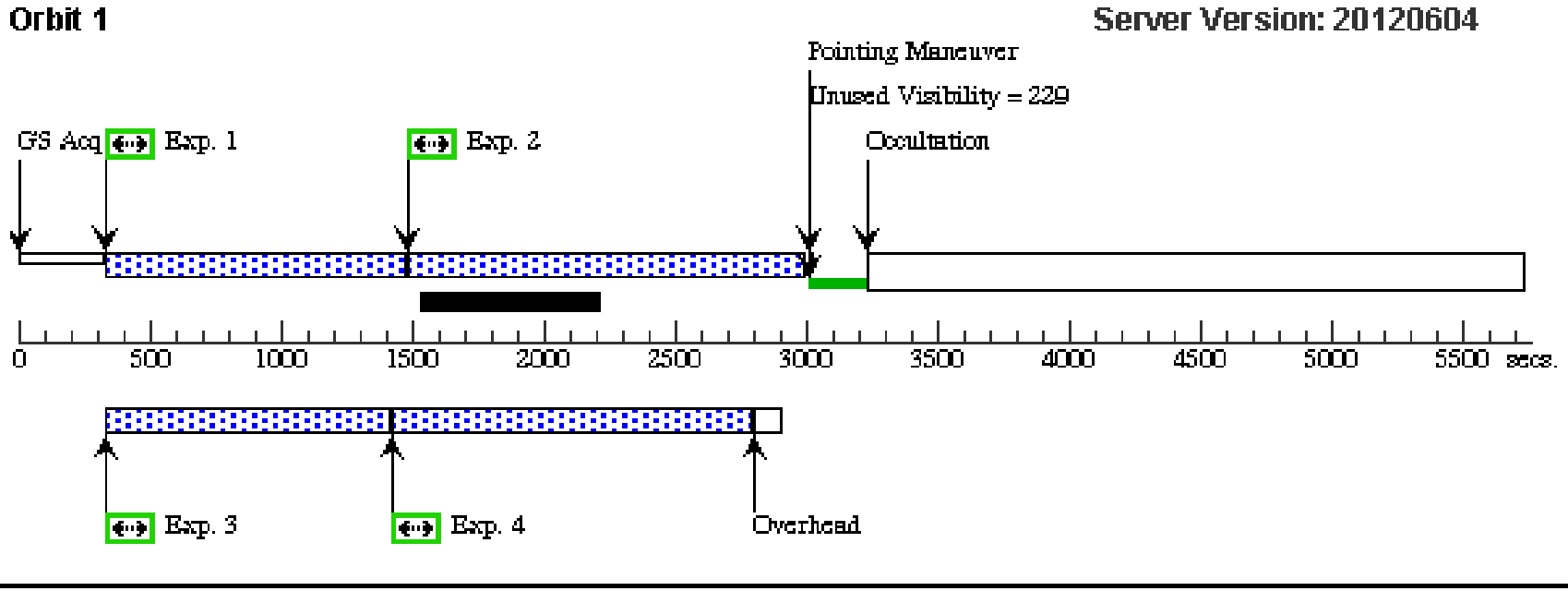
Fixed Targets

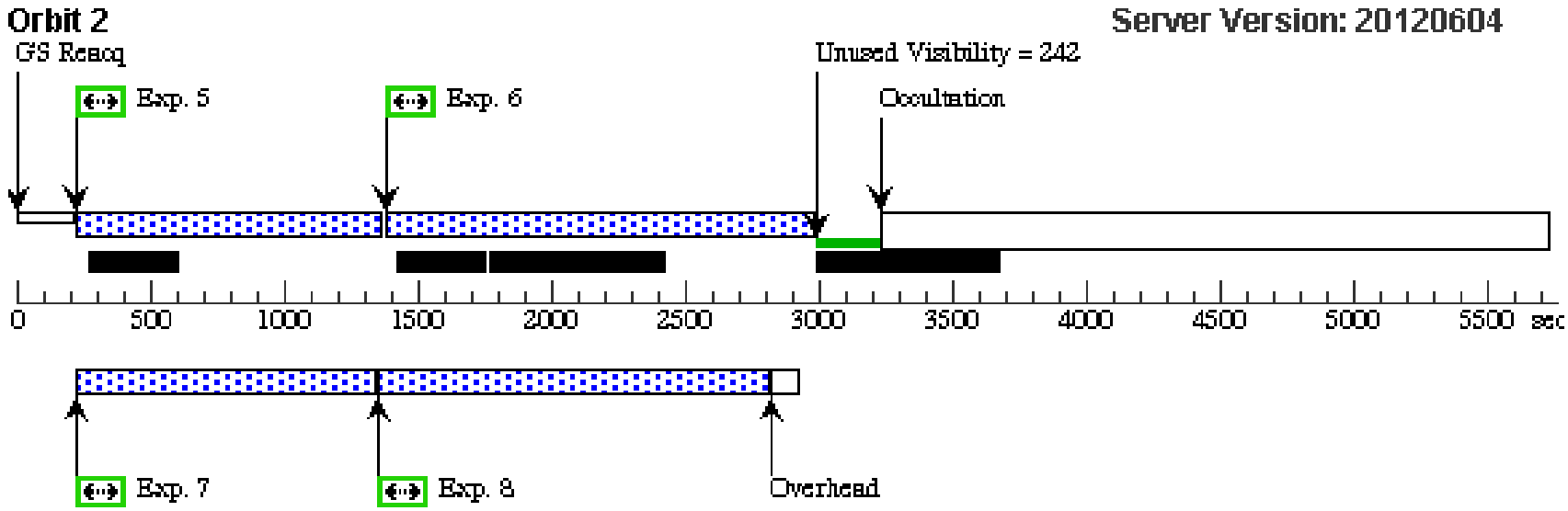
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	DDO210	RA: 20 46 51.8000 (311.7158333d) Dec: -12 50 52.50 (-12.84792d) Equinox: J2000	Radial Velocity: -141 km/sec	V=19.0+/-1.0 Most stars fainter than B=25.5, I =24; limit B=29, I=28	Reference Frame: ICRS

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1	DDO210/g	(1) DDO210	ACS/WFC, ACCUM, WFC-FIX	F475W	CR-SPLIT=NO; GAIN=2.0	POS TARG 0.085,0.105	Prime + Parallel Group 1-4 in DDO210 (03)	930 Secs *[==>]*	*[1]*
2	DDO210/I	(1) DDO210	ACS/WFC, ACCUM, WFC-FIX	F814W	CR-SPLIT=NO; GAIN=2.0	POS TARG 0.085,0.105	Prime + Parallel Group 1-4 in DDO210 (03)	1350 Secs *[==>]*	*[1]*
3	DDO210 Halo/g	ANY	WFC3/UVIS, ACCUM, UVIS-FIX	F475W			Prime + Parallel Group 1-4 in DDO210 (03)	930 Secs *[==>]*	*[1]*
4	DDO210 Halo/I	ANY	WFC3/UVIS, ACCUM, UVIS-FIX	F814W			Prime + Parallel Group 1-4 in DDO210 (03)	1350 Secs *[==>]*	*[1]*
5	DDO210/g	(1) DDO210	ACS/WFC, ACCUM, WFC-FIX	F475W	CR-SPLIT=NO; GAIN=2.0	POS TARG 0.233,0.191	Prime + Parallel Group 5-8 in DDO210 (03)	980 Secs *[==>]*	*[2]*
6	DDO210/I	(1) DDO210	ACS/WFC, ACCUM, WFC-FIX	F814W	CR-SPLIT=NO; GAIN=2.0	POS TARG 0.233,0.191	Prime + Parallel Group 5-8 in DDO210 (03)	1440 Secs *[==>]*	*[2]*
7	DDO210 Halo/g	ANY	WFC3/UVIS, ACCUM, UVIS-FIX	F475W			Prime + Parallel Group 5-8 in DDO210 (03)	980 Secs *[==>]*	*[2]*
8	DDO210 Halo/I	ANY	WFC3/UVIS, ACCUM, UVIS-FIX	F814W			Prime + Parallel Group 5-8 in DDO210 (03)	1440 Secs *[==>]*	*[2]*

Orbit Structure





Visit

Proposal 12925, DDO210 (04) Tue Jul 03 01:38:57 GMT 2012

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/UVIS, ACS/WFC

Special Requirements: SAME ORIENT AS 01; BETWEEN 11-MAY-2012:00:00:00 AND 20-OCT-2012:23:59:59; BETWEEN 11-MAY-2013:00:00:00 AND 20-OCT-2013:23:59:59; GROUP 04,01,02,03,05,06,07,08,09,10,11,12 WITHIN 2.5D

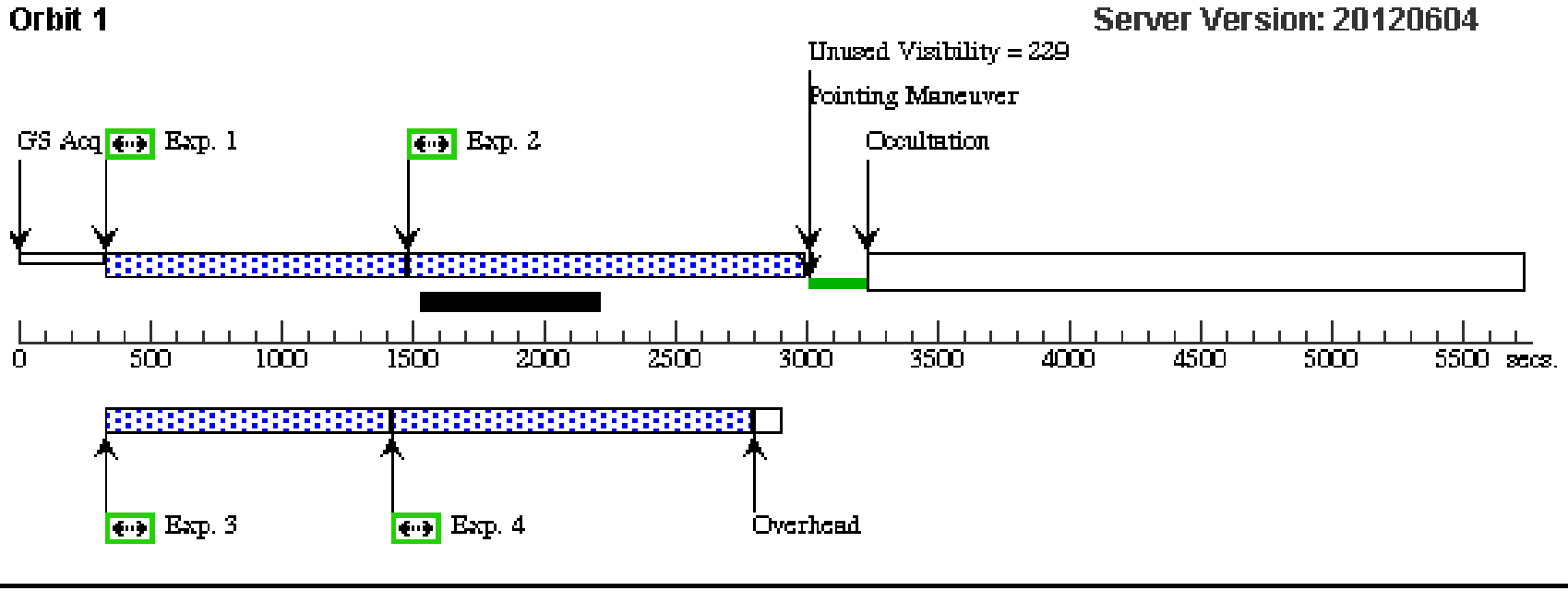
Fixed Targets

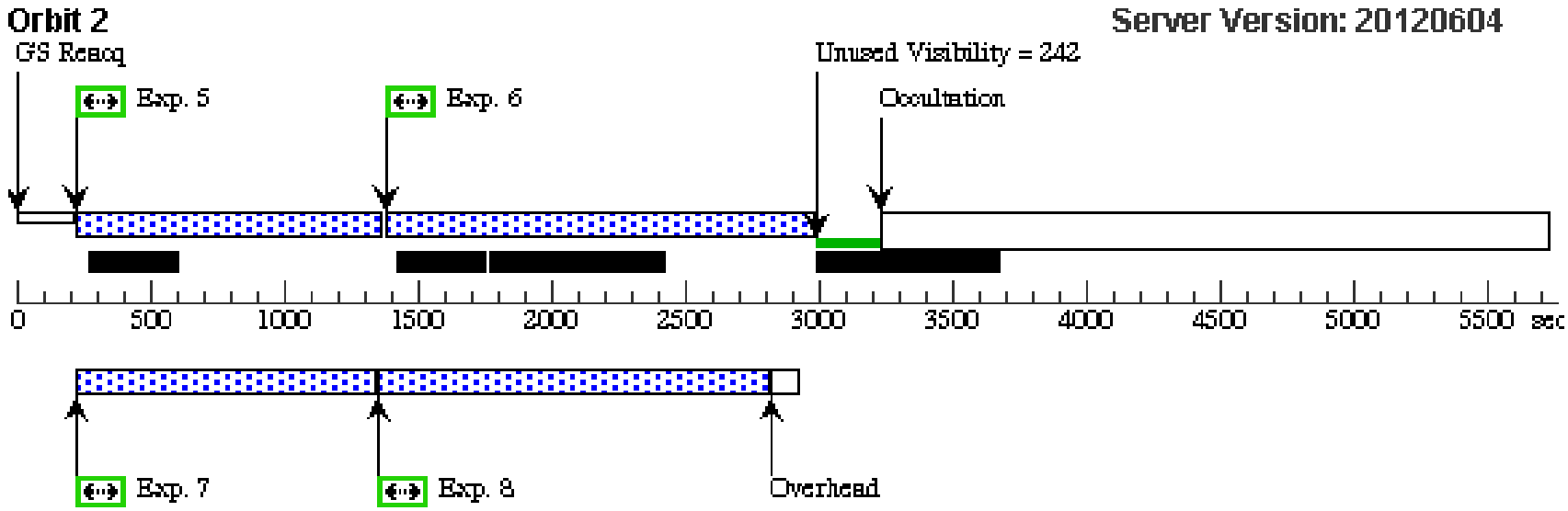
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	DDO210	RA: 20 46 51.8000 (311.7158333d) Dec: -12 50 52.50 (-12.84792d) Equinox: J2000	Radial Velocity: -141 km/sec	V=19.0+/-1.0 Most stars fainter than B=25.5, I =24; limit B=29, I=28	Reference Frame: ICRS

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1	DDO210/g	(1) DDO210	ACS/WFC, ACCUM, WFC-FIX	F475W	CR-SPLIT=NO; GAIN=2.0	POS TARG 0.307,0.345	Prime + Parallel Group 1-4 in DDO210 (04)	930 Secs *[==>]*	*[1]*
2	DDO210/I	(1) DDO210	ACS/WFC, ACCUM, WFC-FIX	F814W	CR-SPLIT=NO; GAIN=2.0	POS TARG 0.307,0.345	Prime + Parallel Group 1-4 in DDO210 (04)	1350 Secs *[==>]*	*[1]*
3	DDO210 Halo/g	ANY	WFC3/UVIS, ACCUM, UVIS-FIX	F475W			Prime + Parallel Group 1-4 in DDO210 (04)	930 Secs *[==>]*	*[1]*
4	DDO210 Halo/I	ANY	WFC3/UVIS, ACCUM, UVIS-FIX	F814W			Prime + Parallel Group 1-4 in DDO210 (04)	1350 Secs *[==>]*	*[1]*
5	DDO210/g	(1) DDO210	ACS/WFC, ACCUM, WFC-FIX	F475W	CR-SPLIT=NO; GAIN=2.0	POS TARG 0.159,0.259	Prime + Parallel Group 5-8 in DDO210 (04)	980 Secs *[==>]*	*[2]*
6	DDO210/I	(1) DDO210	ACS/WFC, ACCUM, WFC-FIX	F814W	CR-SPLIT=NO; GAIN=2.0	POS TARG 0.159,0.259	Prime + Parallel Group 5-8 in DDO210 (04)	1440 Secs *[==>]*	*[2]*
7	DDO210 Halo/g	ANY	WFC3/UVIS, ACCUM, UVIS-FIX	F475W			Prime + Parallel Group 5-8 in DDO210 (04)	980 Secs *[==>]*	*[2]*
8	DDO210 Halo/I	ANY	WFC3/UVIS, ACCUM, UVIS-FIX	F814W			Prime + Parallel Group 5-8 in DDO210 (04)	1440 Secs *[==>]*	*[2]*

Orbit Structure





Visit

Proposal 12925, DDO210 (05) Tue Jul 03 01:38:59 GMT 2012

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/UVIS, ACS/WFC

Special Requirements: SAME ORIENT AS 01; BETWEEN 11-MAY-2012:00:00:00 AND 20-OCT-2012:23:59:59; BETWEEN 11-MAY-2013:00:00:00 AND 20-OCT-2013:23:59:59; GROUP 05,01,02,03,04,06,07,08,09,10,11,12 WITHIN 2.5D

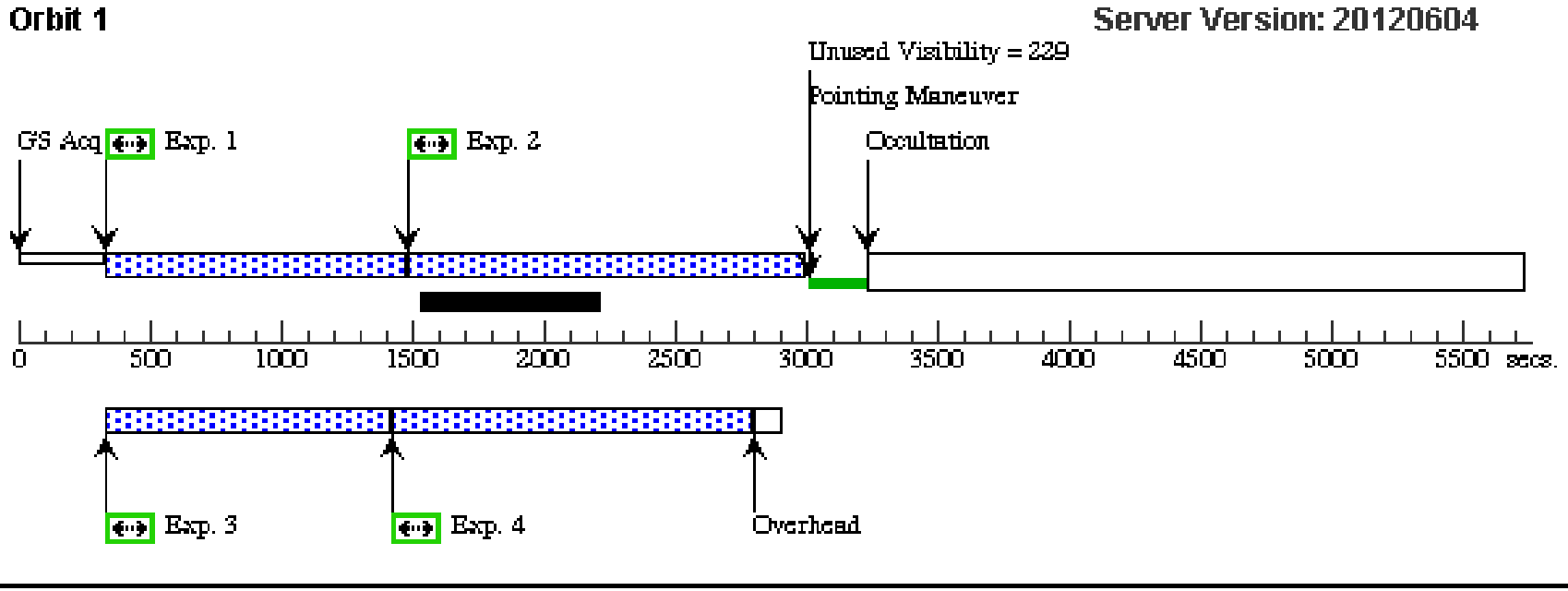
Fixed Targets

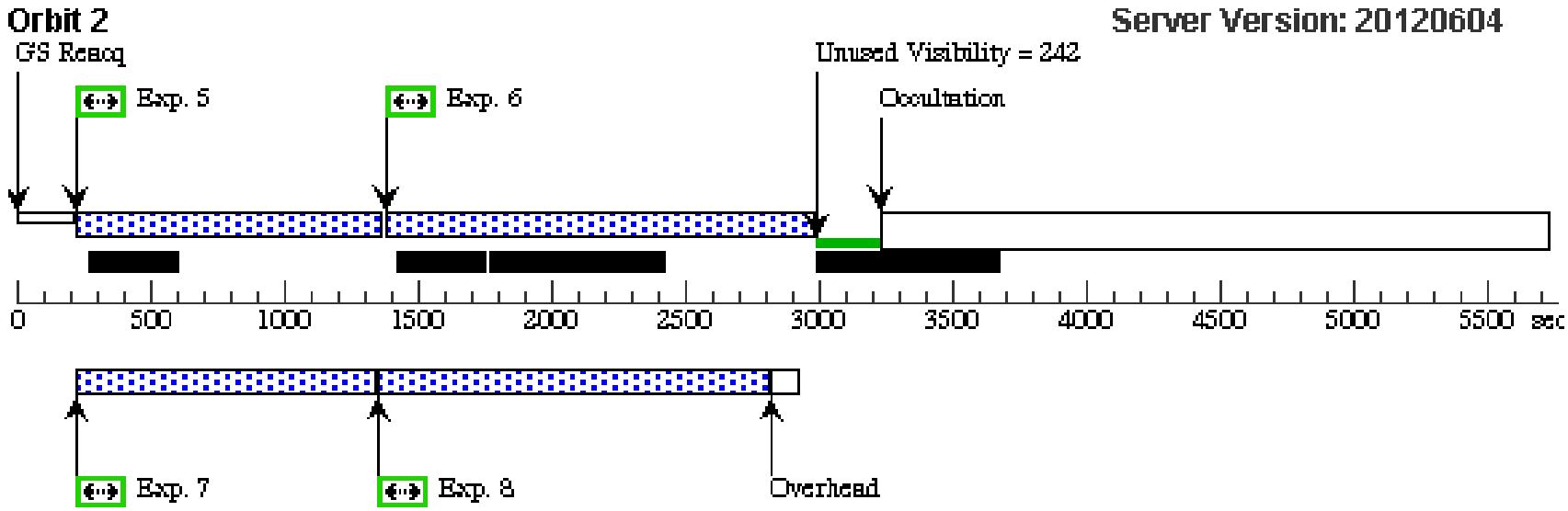
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	DDO210	RA: 20 46 51.8000 (311.7158333d) Dec: -12 50 52.50 (-12.84792d) Equinox: J2000	Radial Velocity: -141 km/sec	V=19.0+/-1.0 Most stars fainter than B=25.5, I =24; limit B=29, I=28	Reference Frame: ICRS

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1	DDO210/g	(1) DDO210	ACS/WFC, ACCUM, WFC-FIX	F475W	CR-SPLIT=NO; GAIN=2.0	POS TARG -0.115,0.070	Prime + Parallel Group 1-4 in DDO210 (05)	930 Secs *[==>]*	*[1]*
2	DDO210/I	(1) DDO210	ACS/WFC, ACCUM, WFC-FIX	F814W	CR-SPLIT=NO; GAIN=2.0	POS TARG -0.115,0.070	Prime + Parallel Group 1-4 in DDO210 (05)	1350 Secs *[==>]*	*[1]*
3	DDO210 Halo/g	ANY	WFC3/UVIS, ACCUM, UVIS-FIX	F475W			Prime + Parallel Group 1-4 in DDO210 (05)	930 Secs *[==>]*	*[1]*
4	DDO210 Halo/I	ANY	WFC3/UVIS, ACCUM, UVIS-FIX	F814W			Prime + Parallel Group 1-4 in DDO210 (05)	1350 Secs *[==>]*	*[1]*
5	DDO210/g	(1) DDO210	ACS/WFC, ACCUM, WFC-FIX	F475W	CR-SPLIT=NO; GAIN=2.0	POS TARG 0.033,0.156	Prime + Parallel Group 5-8 in DDO210 (05)	980 Secs *[==>]*	*[2]*
6	DDO210/I	(1) DDO210	ACS/WFC, ACCUM, WFC-FIX	F814W	CR-SPLIT=NO; GAIN=2.0	POS TARG 0.033,0.156	Prime + Parallel Group 5-8 in DDO210 (05)	1440 Secs *[==>]*	*[2]*
7	DDO210 Halo/g	ANY	WFC3/UVIS, ACCUM, UVIS-FIX	F475W			Prime + Parallel Group 5-8 in DDO210 (05)	980 Secs *[==>]*	*[2]*
8	DDO210 Halo/I	ANY	WFC3/UVIS, ACCUM, UVIS-FIX	F814W			Prime + Parallel Group 5-8 in DDO210 (05)	1440 Secs *[==>]*	*[2]*

Orbit Structure





Visit

Proposal 12925, DDO210 (06) Tue Jul 03 01:39:01 GMT 2012

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/UVIS, ACS/WFC

Special Requirements: SAME ORIENT AS 01; BETWEEN 11-MAY-2012:00:00:00 AND 20-OCT-2012:23:59:59; BETWEEN 11-MAY-2013:00:00:00 AND 20-OCT-2013:23:59:59; GROUP 06,01,02,03,04,05,07,08,09,10,11,12 WITHIN 2.5D

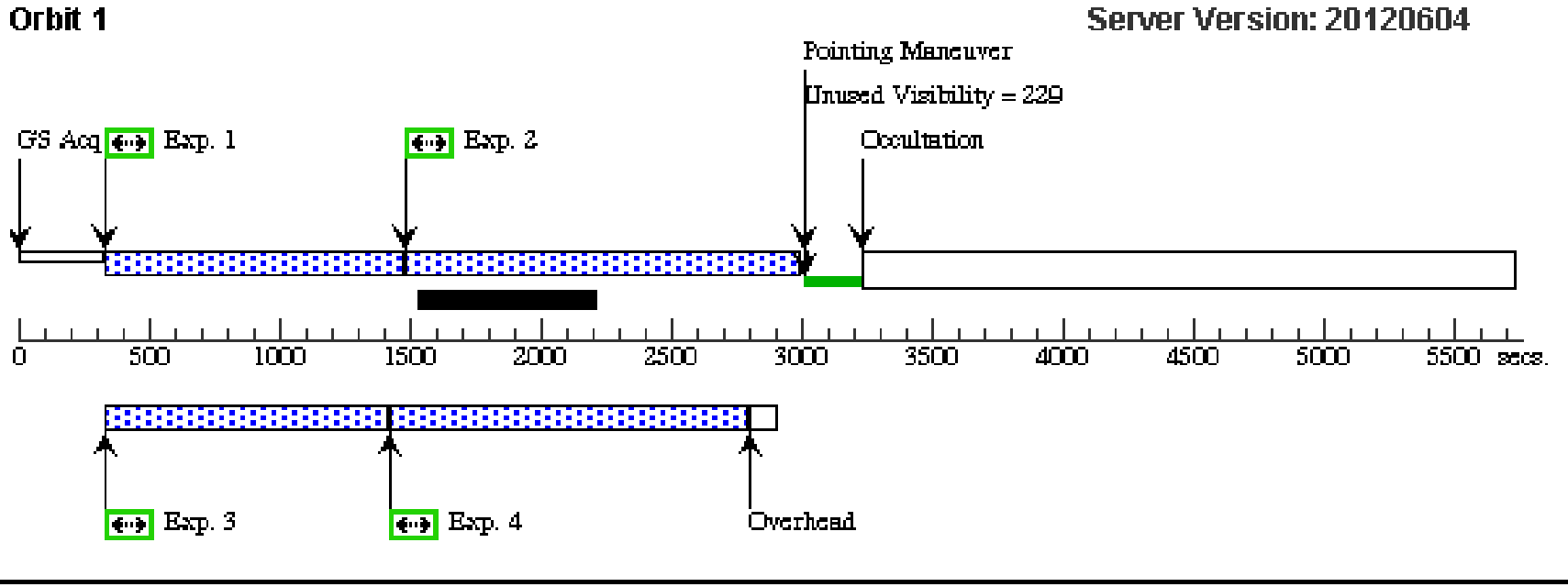
Fixed Targets

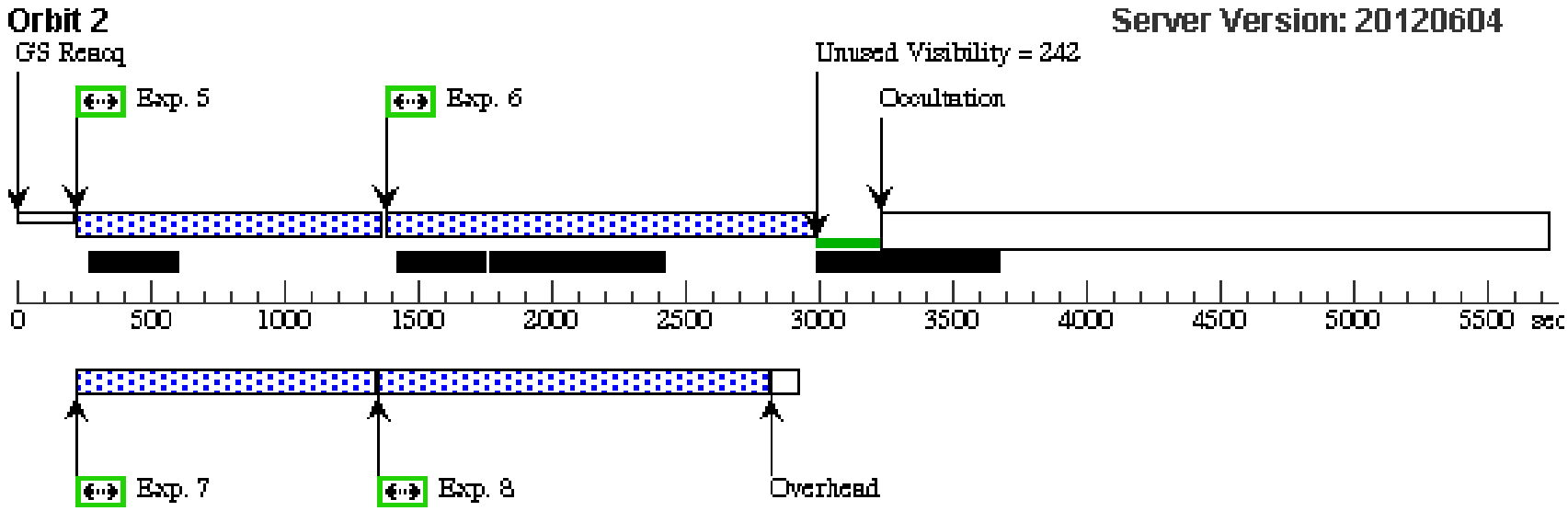
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	DDO210	RA: 20 46 51.8000 (311.7158333d) Dec: -12 50 52.50 (-12.84792d) Equinox: J2000	Radial Velocity: -141 km/sec	V=19.0+/-1.0 Most stars fainter than B=25.5, I =24; limit B=29, I=28	Reference Frame: ICRS

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1	DDO210/g	(1) DDO210	ACS/WFC, ACCUM, WFC-FIX	F475W	CR-SPLIT=NO; GAIN=2.0	POS TARG 0.107,0.310	Prime + Parallel Group 1-4 in DDO210 (06)	930 Secs *[==>]*	***[1]***
2	DDO210/I	(1) DDO210	ACS/WFC, ACCUM, WFC-FIX	F814W	CR-SPLIT=NO; GAIN=2.0	POS TARG 0.107,0.310	Prime + Parallel Group 1-4 in DDO210 (06)	1350 Secs *[==>]*	***[1]***
3	DDO210 Halo/g	ANY	WFC3/UVIS, ACCUM, UVIS-FIX	F475W			Prime + Parallel Group 1-4 in DDO210 (06)	930 Secs *[==>]*	***[1]***
4	DDO210 Halo/I	ANY	WFC3/UVIS, ACCUM, UVIS-FIX	F814W			Prime + Parallel Group 1-4 in DDO210 (06)	1350 Secs *[==>]*	***[1]***
5	DDO210/g	(1) DDO210	ACS/WFC, ACCUM, WFC-FIX	F475W	CR-SPLIT=NO; GAIN=2.0	POS TARG -0.041,0.224	Prime + Parallel Group 5-8 in DDO210 (06)	980 Secs *[==>]*	***[2]***
6	DDO210/I	(1) DDO210	ACS/WFC, ACCUM, WFC-FIX	F814W	CR-SPLIT=NO; GAIN=2.0	POS TARG -0.041,0.224	Prime + Parallel Group 5-8 in DDO210 (06)	1440 Secs *[==>]*	***[2]***
7	DDO210 Halo/g	ANY	WFC3/UVIS, ACCUM, UVIS-FIX	F475W			Prime + Parallel Group 5-8 in DDO210 (06)	980 Secs *[==>]*	***[2]***
8	DDO210 Halo/I	ANY	WFC3/UVIS, ACCUM, UVIS-FIX	F814W			Prime + Parallel Group 5-8 in DDO210 (06)	1440 Secs *[==>]*	***[2]***

Orbit Structure





Visit

Proposal 12925, DDO210 (07) Tue Jul 03 01:39:03 GMT 2012

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/UVIS, ACS/WFC

Special Requirements: SAME ORIENT AS 01; BETWEEN 11-MAY-2012:00:00:00 AND 20-OCT-2012:23:59:59; BETWEEN 11-MAY-2013:00:00:00 AND 20-OCT-2013:23:59:59; GROUP 07,01,02,03,04,05,06,08,09,10,11,12 WITHIN 2.5D

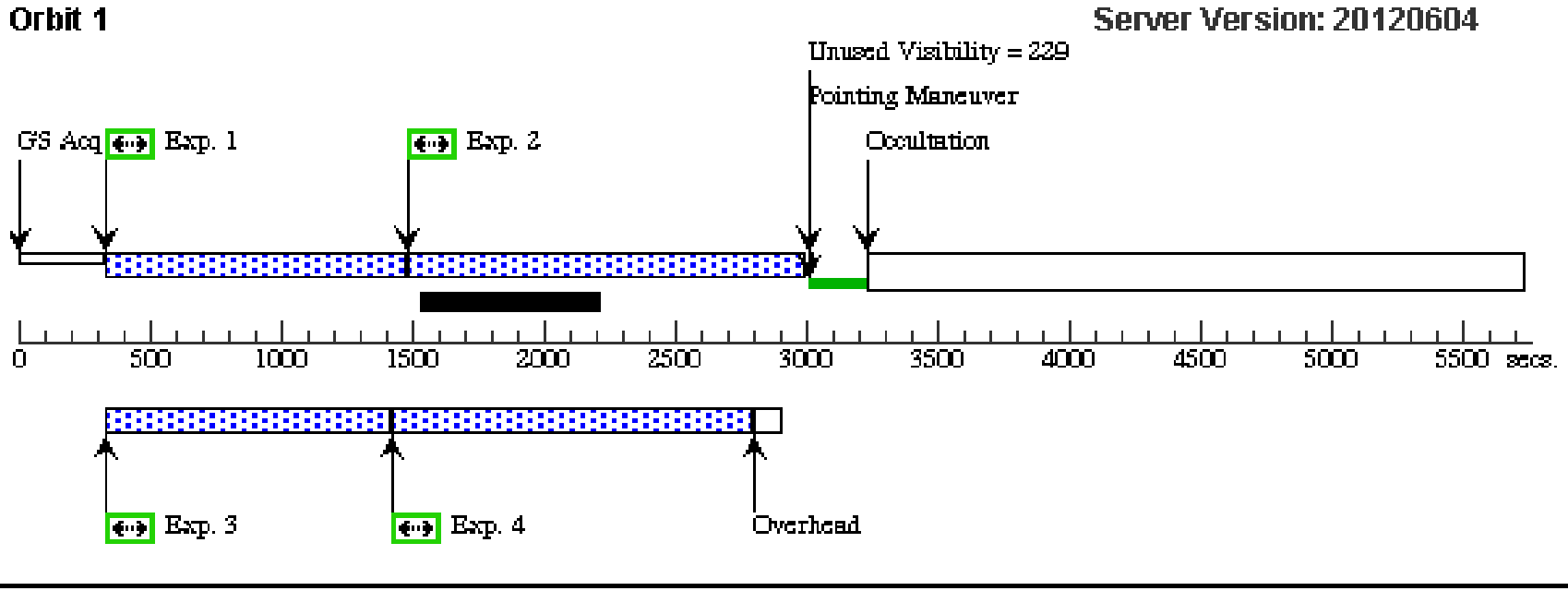
Fixed Targets

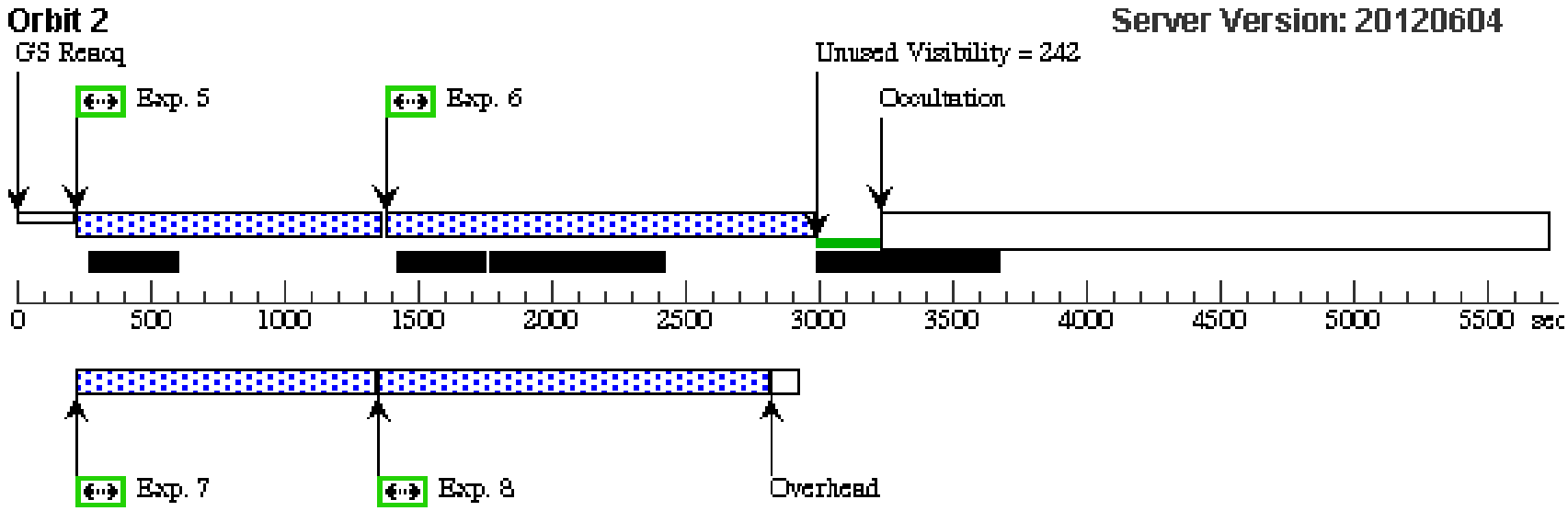
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	DDO210	RA: 20 46 51.8000 (311.7158333d) Dec: -12 50 52.50 (-12.84792d) Equinox: J2000	Radial Velocity: -141 km/sec	V=19.0+/-1.0 Most stars fainter than B=25.5, I =24; limit B=29, I=28	Reference Frame: ICRS

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1	DDO210/g	(1) DDO210	ACS/WFC, ACCUM, WFC-FIX	F475W	CR-SPLIT=NO; GAIN=2.0		Prime + Parallel Group 1-4 in DDO210 (07)	930 Secs *[==>]*	 ***[1]***
2	DDO210/I	(1) DDO210	ACS/WFC, ACCUM, WFC-FIX	F814W	CR-SPLIT=NO; GAIN=2.0		Prime + Parallel Group 1-4 in DDO210 (07)	1350 Secs *[==>]*	 ***[1]***
3	DDO210 Halo/g	ANY	WFC3/UVIS, ACCUM, UVIS-FIX	F475W			Prime + Parallel Group 1-4 in DDO210 (07)	930 Secs *[==>]*	 ***[1]***
4	DDO210 Halo/I	ANY	WFC3/UVIS, ACCUM, UVIS-FIX	F814W			Prime + Parallel Group 1-4 in DDO210 (07)	1350 Secs *[==>]*	 ***[1]***
5	DDO210/g	(1) DDO210	ACS/WFC, ACCUM, WFC-FIX	F475W	CR-SPLIT=NO; GAIN=2.0	POS TARG 0.148,0.086	Prime + Parallel Group 5-8 in DDO210 (07)	980 Secs *[==>]*	 ***[2]***
6	DDO210/I	(1) DDO210	ACS/WFC, ACCUM, WFC-FIX	F814W	CR-SPLIT=NO; GAIN=2.0	POS TARG 0.148,0.086	Prime + Parallel Group 5-8 in DDO210 (07)	1440 Secs *[==>]*	 ***[2]***
7	DDO210 Halo/g	ANY	WFC3/UVIS, ACCUM, UVIS-FIX	F475W			Prime + Parallel Group 5-8 in DDO210 (07)	980 Secs *[==>]*	 ***[2]***
8	DDO210 Halo/I	ANY	WFC3/UVIS, ACCUM, UVIS-FIX	F814W			Prime + Parallel Group 5-8 in DDO210 (07)	1440 Secs *[==>]*	 ***[2]***

Orbit Structure





Visit

Proposal 12925, DDO210 (08) Tue Jul 03 01:39:05 GMT 2012

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/UVIS, ACS/WFC

Special Requirements: SAME ORIENT AS 01; BETWEEN 11-MAY-2012:00:00:00 AND 20-OCT-2012:23:59:59; BETWEEN 11-MAY-2013:00:00:00 AND 20-OCT-2013:23:59:59; GROUP 08,01,02,03,04,05,06,07,09,10,11,12 WITHIN 2.5D

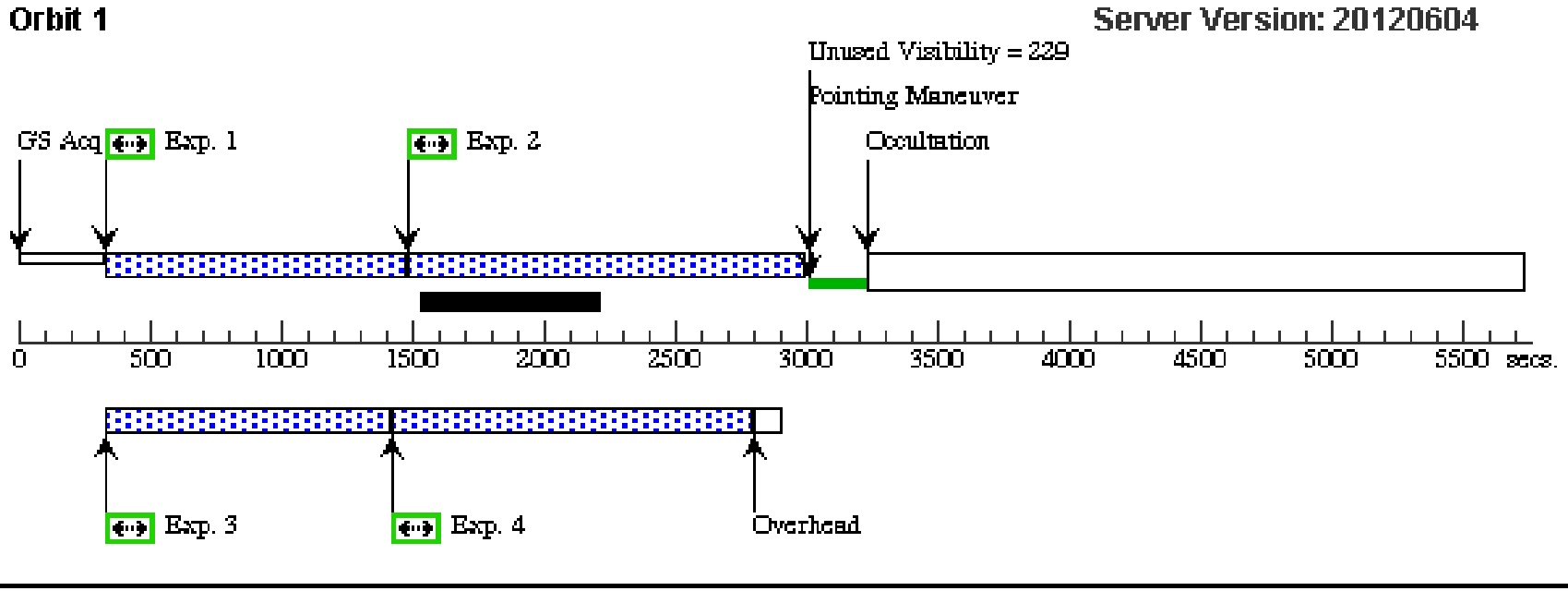
Fixed Targets

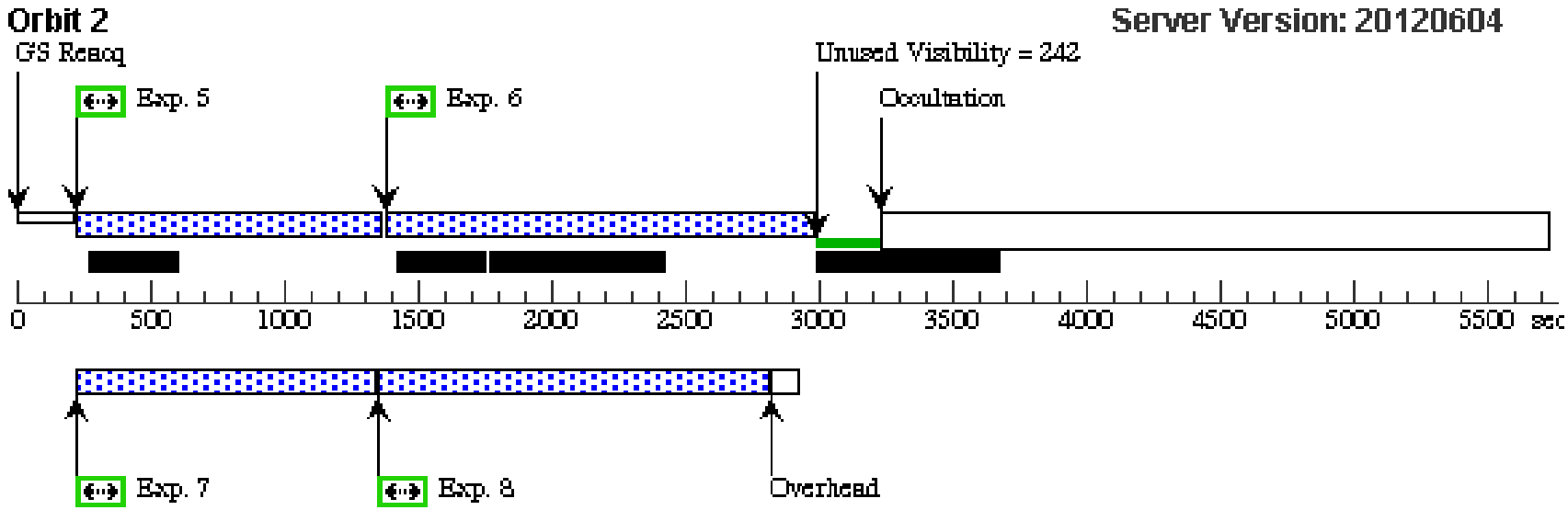
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	DDO210	RA: 20 46 51.8000 (311.7158333d) Dec: -12 50 52.50 (-12.84792d) Equinox: J2000	Radial Velocity: -141 km/sec	V=19.0+/-1.0 Most stars fainter than B=25.5, I =24; limit B=29, I=28	Reference Frame: ICRS

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1	DDO210/g	(1) DDO210	ACS/WFC, ACCUM, WFC-FIX	F475W	CR-SPLIT=NO; GAIN=2.0	POS TARG 0.222,0.240	Prime + Parallel Group 1-4 in DDO210 (08)	930 Secs *[==>]*	***[1]***
2	DDO210/I	(1) DDO210	ACS/WFC, ACCUM, WFC-FIX	F814W	CR-SPLIT=NO; GAIN=2.0	POS TARG 0.222,0.240	Prime + Parallel Group 1-4 in DDO210 (08)	1350 Secs *[==>]*	***[1]***
3	DDO210 Halo/g	ANY	WFC3/UVIS, ACCUM, UVIS-FIX	F475W			Prime + Parallel Group 1-4 in DDO210 (08)	930 Secs *[==>]*	***[1]***
4	DDO210 Halo/I	ANY	WFC3/UVIS, ACCUM, UVIS-FIX	F814W			Prime + Parallel Group 1-4 in DDO210 (08)	1350 Secs *[==>]*	***[1]***
5	DDO210/g	(1) DDO210	ACS/WFC, ACCUM, WFC-FIX	F475W	CR-SPLIT=NO; GAIN=2.0	POS TARG 0.074,0.154	Prime + Parallel Group 5-8 in DDO210 (08)	980 Secs *[==>]*	***[2]***
6	DDO210/I	(1) DDO210	ACS/WFC, ACCUM, WFC-FIX	F814W	CR-SPLIT=NO; GAIN=2.0	POS TARG 0.074,0.154	Prime + Parallel Group 5-8 in DDO210 (08)	1440 Secs *[==>]*	***[2]***
7	DDO210 Halo/g	ANY	WFC3/UVIS, ACCUM, UVIS-FIX	F475W			Prime + Parallel Group 5-8 in DDO210 (08)	980 Secs *[==>]*	***[2]***
8	DDO210 Halo/I	ANY	WFC3/UVIS, ACCUM, UVIS-FIX	F814W			Prime + Parallel Group 5-8 in DDO210 (08)	1440 Secs *[==>]*	***[2]***

Orbit Structure





Visit

Proposal 12925, DDO210 (09) Tue Jul 03 01:39:07 GMT 2012

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/UVIS, ACS/WFC

Special Requirements: SAME ORIENT AS 01; BETWEEN 11-MAY-2012:00:00:00 AND 20-OCT-2012:23:59:59; BETWEEN 11-MAY-2013:00:00:00 AND 20-OCT-2013:23:59:59; GROUP 09,01,02,03,04,05,06,07,08,10,11,12 WITHIN 2.5D

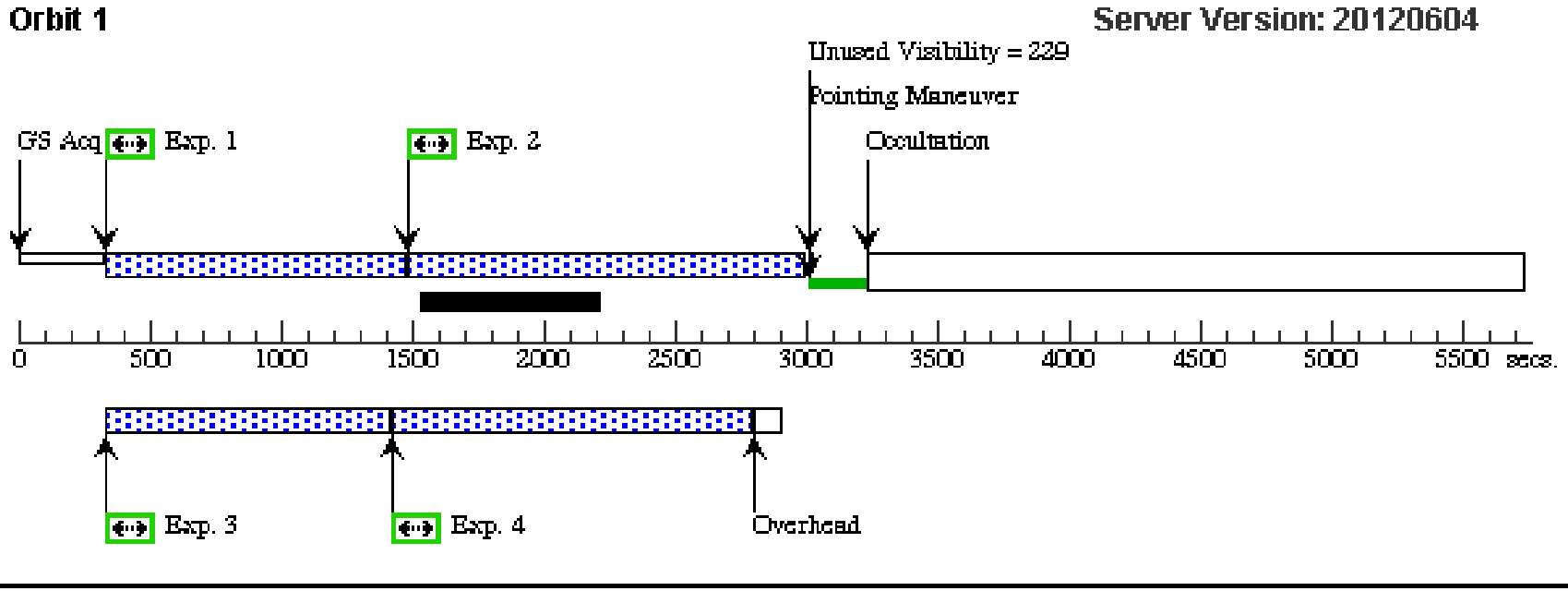
Fixed Targets

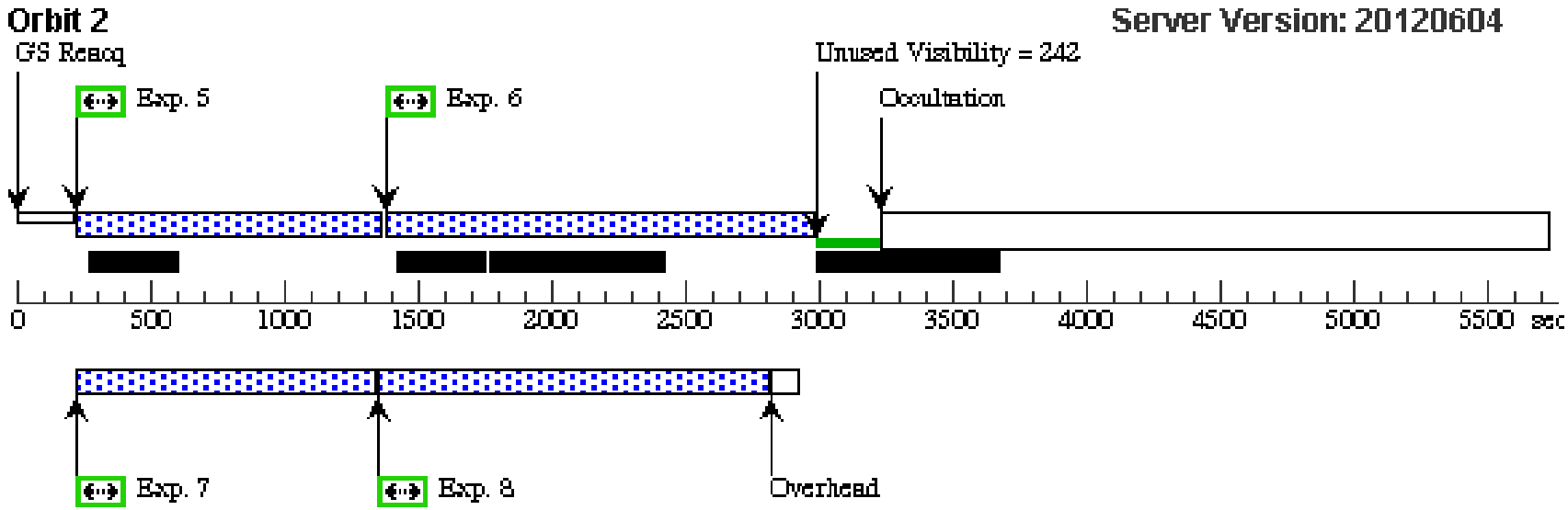
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	DDO210	RA: 20 46 51.8000 (311.7158333d) Dec: -12 50 52.50 (-12.84792d) Equinox: J2000	Radial Velocity: -141 km/sec	V=19.0+/-1.0 Most stars fainter than B=25.5, I =24; limit B=29, I=28	Reference Frame: ICRS

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1	DDO210/g	(1) DDO210	ACS/WFC, ACCUM, WFC-FIX	F475W	CR-SPLIT=NO; GAIN=2.0	POS TARG 0.085,0.105	Prime + Parallel Group 1-4 in DDO210 (09)	930 Secs *[==>]*	*[1]*
2	DDO210/I	(1) DDO210	ACS/WFC, ACCUM, WFC-FIX	F814W	CR-SPLIT=NO; GAIN=2.0	POS TARG 0.085,0.105	Prime + Parallel Group 1-4 in DDO210 (09)	1350 Secs *[==>]*	*[1]*
3	DDO210 Halo/g	ANY	WFC3/UVIS, ACCUM, UVIS-FIX	F475W			Prime + Parallel Group 1-4 in DDO210 (09)	930 Secs *[==>]*	*[1]*
4	DDO210 Halo/I	ANY	WFC3/UVIS, ACCUM, UVIS-FIX	F814W			Prime + Parallel Group 1-4 in DDO210 (09)	1350 Secs *[==>]*	*[1]*
5	DDO210/g	(1) DDO210	ACS/WFC, ACCUM, WFC-FIX	F475W	CR-SPLIT=NO; GAIN=2.0	POS TARG 0.233,0.191	Prime + Parallel Group 5-8 in DDO210 (09)	980 Secs *[==>]*	*[2]*
6	DDO210/I	(1) DDO210	ACS/WFC, ACCUM, WFC-FIX	F814W	CR-SPLIT=NO; GAIN=2.0	POS TARG 0.233,0.191	Prime + Parallel Group 5-8 in DDO210 (09)	1440 Secs *[==>]*	*[2]*
7	DDO210 Halo/g	ANY	WFC3/UVIS, ACCUM, UVIS-FIX	F475W			Prime + Parallel Group 5-8 in DDO210 (09)	980 Secs *[==>]*	*[2]*
8	DDO210 Halo/I	ANY	WFC3/UVIS, ACCUM, UVIS-FIX	F814W			Prime + Parallel Group 5-8 in DDO210 (09)	1440 Secs *[==>]*	*[2]*

Orbit Structure





Visit

Proposal 12925, DDO210 (10) Tue Jul 03 01:39:08 GMT 2012

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/UVIS, ACS/WFC

Special Requirements: SAME ORIENT AS 01; BETWEEN 11-MAY-2012:00:00:00 AND 20-OCT-2012:23:59:59; BETWEEN 11-MAY-2013:00:00:00 AND 20-OCT-2013:23:59:59; GROUP 10,01,02,03,04,05,06,07,08,09,11,12 WITHIN 2.5D

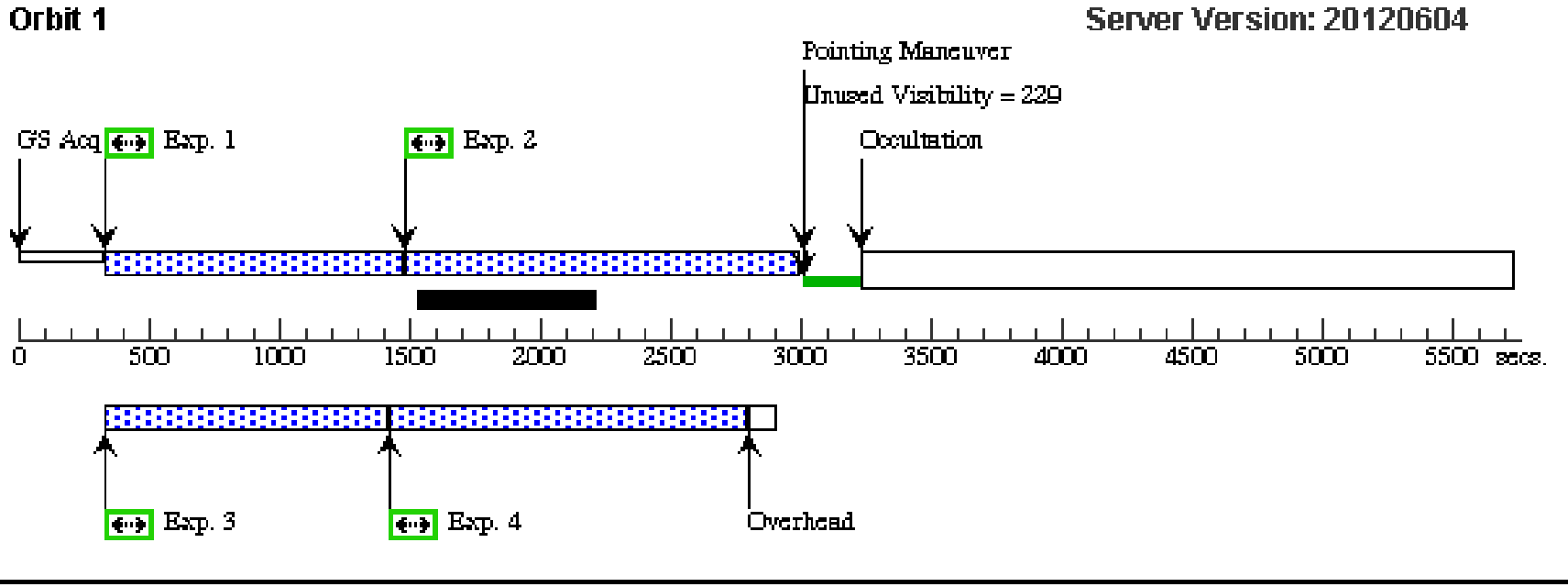
Fixed Targets

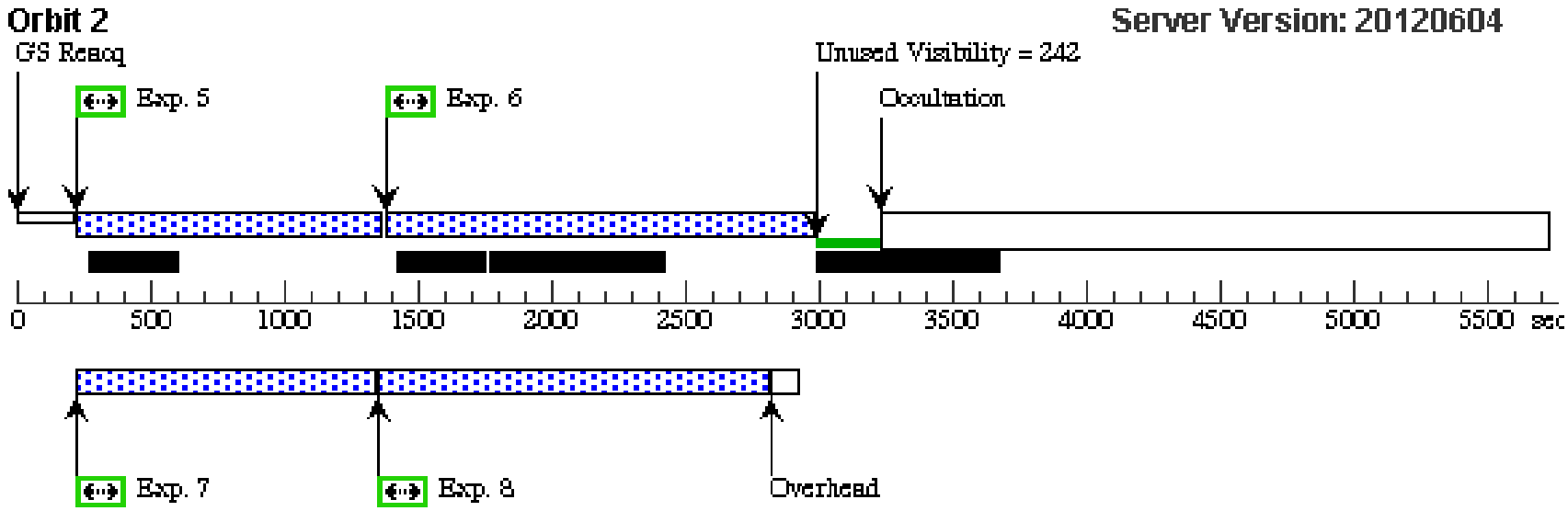
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	DDO210	RA: 20 46 51.8000 (311.7158333d) Dec: -12 50 52.50 (-12.84792d) Equinox: J2000	Radial Velocity: -141 km/sec	V=19.0+/-1.0 Most stars fainter than B=25.5, I =24; limit B=29, I=28	Reference Frame: ICRS

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1	DDO210/g	(1) DDO210	ACS/WFC, ACCUM, WFC-FIX	F475W	CR-SPLIT=NO; GAIN=2.0	POS TARG 0.307,0.345	Prime + Parallel Group 1-4 in DDO210 (10)	930 Secs *[==>]*	*[1]*
2	DDO210/I	(1) DDO210	ACS/WFC, ACCUM, WFC-FIX	F814W	CR-SPLIT=NO; GAIN=2.0	POS TARG 0.307,0.345	Prime + Parallel Group 1-4 in DDO210 (10)	1350 Secs *[==>]*	*[1]*
3	DDO210 Halo/g	ANY	WFC3/UVIS, ACCUM, UVIS-FIX	F475W			Prime + Parallel Group 1-4 in DDO210 (10)	930 Secs *[==>]*	*[1]*
4	DDO210 Halo/I	ANY	WFC3/UVIS, ACCUM, UVIS-FIX	F814W			Prime + Parallel Group 1-4 in DDO210 (10)	1350 Secs *[==>]*	*[1]*
5	DDO210/g	(1) DDO210	ACS/WFC, ACCUM, WFC-FIX	F475W	CR-SPLIT=NO; GAIN=2.0	POS TARG 0.159,0.259	Prime + Parallel Group 5-8 in DDO210 (10)	980 Secs *[==>]*	*[2]*
6	DDO210/I	(1) DDO210	ACS/WFC, ACCUM, WFC-FIX	F814W	CR-SPLIT=NO; GAIN=2.0	POS TARG 0.159,0.259	Prime + Parallel Group 5-8 in DDO210 (10)	1440 Secs *[==>]*	*[2]*
7	DDO210 Halo/g	ANY	WFC3/UVIS, ACCUM, UVIS-FIX	F475W			Prime + Parallel Group 5-8 in DDO210 (10)	980 Secs *[==>]*	*[2]*
8	DDO210 Halo/I	ANY	WFC3/UVIS, ACCUM, UVIS-FIX	F814W			Prime + Parallel Group 5-8 in DDO210 (10)	1440 Secs *[==>]*	*[2]*

Orbit Structure





Visit

Proposal 12925, DDO210 (11) Tue Jul 03 01:39:10 GMT 2012

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/UVIS, ACS/WFC

Special Requirements: SAME ORIENT AS 01; BETWEEN 11-MAY-2012:00:00:00 AND 20-OCT-2012:23:59:59; BETWEEN 11-MAY-2013:00:00:00 AND 20-OCT-2013:23:59:59; GROUP 11,01,02,03,04,05,06,07,08,09,10,12 WITHIN 2.5D

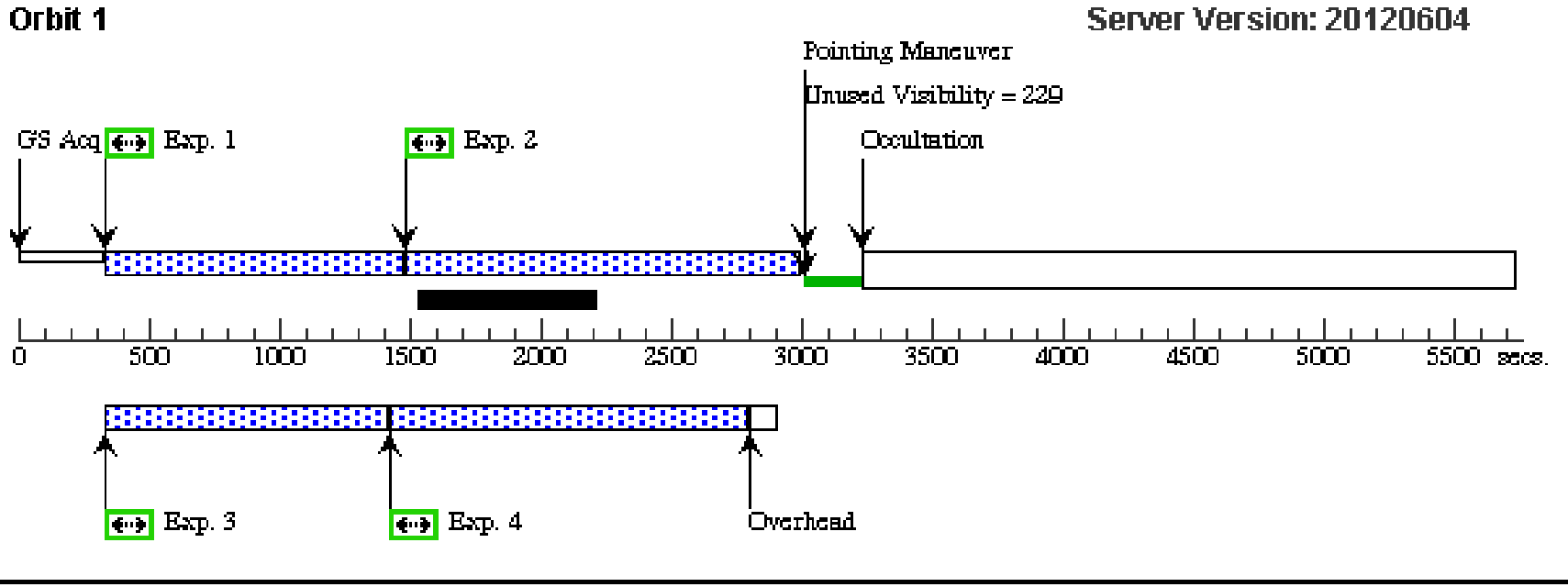
Fixed Targets

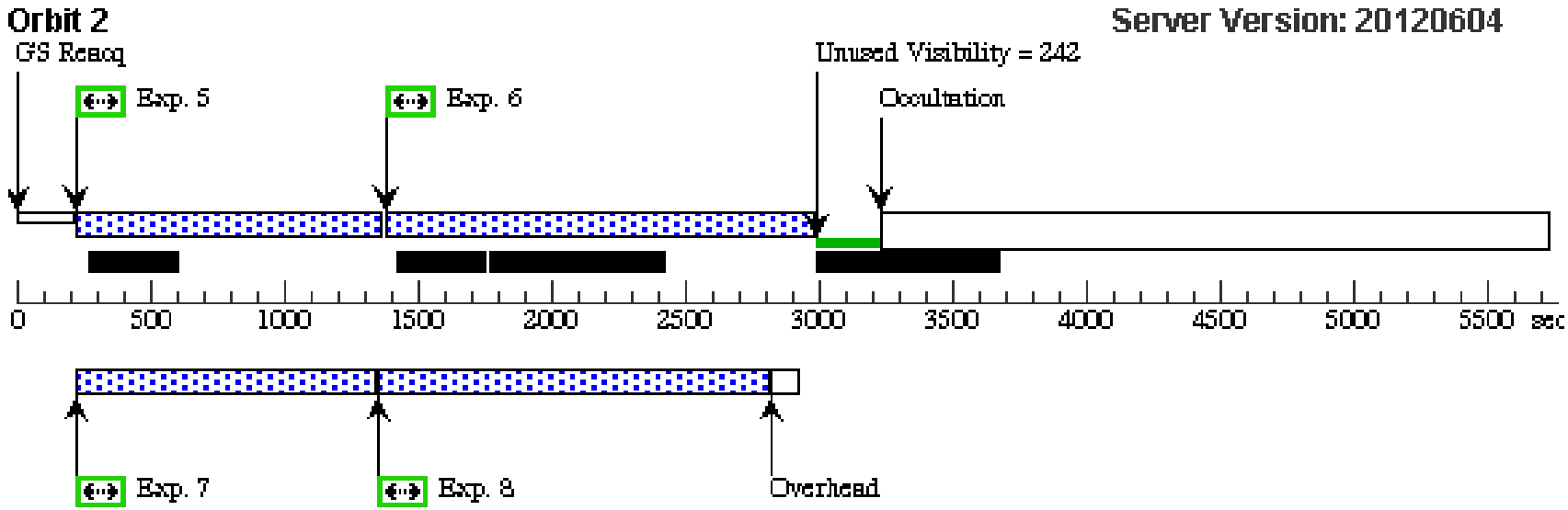
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	DDO210	RA: 20 46 51.8000 (311.7158333d) Dec: -12 50 52.50 (-12.84792d) Equinox: J2000	Radial Velocity: -141 km/sec	V=19.0+/-1.0 Most stars fainter than B=25.5, I =24; limit B=29, I=28	Reference Frame: ICRS

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1	DDO210/g	(1) DDO210	ACS/WFC, ACCUM, WFC-FIX	F475W	CR-SPLIT=NO; GAIN=2.0	POS TARG -0.115,0.070	Prime + Parallel Group 1-4 in DDO210 (11)	930 Secs *[==>]*	*[1]*
2	DDO210/I	(1) DDO210	ACS/WFC, ACCUM, WFC-FIX	F814W	CR-SPLIT=NO; GAIN=2.0	POS TARG -0.115,0.070	Prime + Parallel Group 1-4 in DDO210 (11)	1350 Secs *[==>]*	*[1]*
3	DDO210 Halo/g	ANY	WFC3/UVIS, ACCUM, UVIS-FIX	F475W			Prime + Parallel Group 1-4 in DDO210 (11)	930 Secs *[==>]*	*[1]*
4	DDO210 Halo/I	ANY	WFC3/UVIS, ACCUM, UVIS-FIX	F814W			Prime + Parallel Group 1-4 in DDO210 (11)	1350 Secs *[==>]*	*[1]*
5	DDO210/g	(1) DDO210	ACS/WFC, ACCUM, WFC-FIX	F475W	CR-SPLIT=NO; GAIN=2.0	POS TARG 0.033,0.156	Prime + Parallel Group 5-8 in DDO210 (11)	980 Secs *[==>]*	*[2]*
6	DDO210/I	(1) DDO210	ACS/WFC, ACCUM, WFC-FIX	F814W	CR-SPLIT=NO; GAIN=2.0	POS TARG 0.033,0.156	Prime + Parallel Group 5-8 in DDO210 (11)	1440 Secs *[==>]*	*[2]*
7	DDO210 Halo/g	ANY	WFC3/UVIS, ACCUM, UVIS-FIX	F475W			Prime + Parallel Group 5-8 in DDO210 (11)	980 Secs *[==>]*	*[2]*
8	DDO210 Halo/I	ANY	WFC3/UVIS, ACCUM, UVIS-FIX	F814W			Prime + Parallel Group 5-8 in DDO210 (11)	1440 Secs *[==>]*	*[2]*

Orbit Structure





Visit

Proposal 12925, DDO210 (12) Tue Jul 03 01:39:12 GMT 2012

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/UVIS, ACS/WFC

Special Requirements: SAME ORIENT AS 01; BETWEEN 11-MAY-2012:00:00:00 AND 20-OCT-2012:23:59:59; BETWEEN 11-MAY-2013:00:00:00 AND 20-OCT-2013:23:59:59; GROUP 12,01,02,03,04,05,06,07,08,09,10,11 WITHIN 2.5D

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	DDO210	RA: 20 46 51.8000 (311.7158333d) Dec: -12 50 52.50 (-12.84792d) Equinox: J2000	Radial Velocity: -141 km/sec	V=19.0+/-1.0 Most stars fainter than B=25.5, I =24; limit B=29, I=28	Reference Frame: ICRS

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1	DDO210/g	(1) DDO210	ACS/WFC, ACCUM, WFC-FIX	F475W	CR-SPLIT=NO; GAIN=2.0	POS TARG 0.107,0.310	Prime + Parallel Group 1-4 in DDO210 (12)	930 Secs *[==>]*	*[1]*
2	DDO210/I	(1) DDO210	ACS/WFC, ACCUM, WFC-FIX	F814W	CR-SPLIT=NO; GAIN=2.0	POS TARG 0.107,0.310	Prime + Parallel Group 1-4 in DDO210 (12)	1350 Secs *[==>]*	*[1]*
3	DDO210 Halo/g	ANY	WFC3/UVIS, ACCUM, UVIS-FIX	F475W			Prime + Parallel Group 1-4 in DDO210 (12)	930 Secs *[==>]*	*[1]*
4	DDO210 Halo/I	ANY	WFC3/UVIS, ACCUM, UVIS-FIX	F814W			Prime + Parallel Group 1-4 in DDO210 (12)	1350 Secs *[==>]*	*[1]*
5	DDO210/g	(1) DDO210	ACS/WFC, ACCUM, WFC-FIX	F475W	CR-SPLIT=NO; GAIN=2.0	POS TARG -0.041,0.224	Prime + Parallel Group 5-8 in DDO210 (12)	980 Secs *[==>]*	*[2]*
6	DDO210/I	(1) DDO210	ACS/WFC, ACCUM, WFC-FIX	F814W	CR-SPLIT=NO; GAIN=2.0	POS TARG -0.041,0.224	Prime + Parallel Group 5-8 in DDO210 (12)	1440 Secs *[==>]*	*[2]*
7	DDO210 Halo/g	ANY	WFC3/UVIS, ACCUM, UVIS-FIX	F475W			Prime + Parallel Group 5-8 in DDO210 (12)	980 Secs *[==>]*	*[2]*
8	DDO210 Halo/I	ANY	WFC3/UVIS, ACCUM, UVIS-FIX	F814W			Prime + Parallel Group 5-8 in DDO210 (12)	1440 Secs *[==>]*	*[2]*

Orbit Structure