14748 - A close-up view of the star formation history of a young ultracompact dwarf

Cycle: 24, 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) NGC-247-UCD1	WFC3/UVIS	3	07-Sep-2016 18:21:41.0	yes
02	(1) NGC-247-UCD1	WFC3/UVIS	3	07-Sep-2016 18:21:43.0	yes

6 Total Orbits Used

ABSTRACT

We have recently discovered a young ultracompact dwarf (UCD) in the dwarf spiral galaxy NGC 247. This is by far the nearest known UCD (3.6 Mpc), providing a unique opportunity to study the stellar populations of a UCD in detail. There are indications that this object originated as the nucleus of a smaller dwarf, stripped in a recent merger, and that it harbors multiple stellar populations. We propose to use WFC3-UVIS imaging to map out the internal color gradient of the UCD and to construct a color-magnitude diagram of its stars. We will be able to detect age spreads down to 100 Myr, which would provide an important point of reference for the mystery of multiple stellar populations in star clusters.

OBSERVING DESCRIPTION

The technical goals of the observations are:

(1) to obtain high spatial resolution imaging of the UCD integrated light, to measure a radial color profile on scales of ~0.05-0.4 arcsec;
(2) to construct a color-magnitude diagram (CMD) of individual stars (magnitude range ~24.5-28.5) at the periphery of the UCD, at radii of ~0.4-3.5 arcsec (trying in particular to measure magnitude spreads of post-main-sequence blue loop stars);
(3) to construct a CMD of surrounding stream stars, out to radii of ~20 arcsec.

We will observe the UCD with three orbits for each of two filters (WFC3/UVIS F475W and F606W, similar to g and V). The same orientation is used for both filters.
We will use a three-point subpixel dither pattern (one point per orbit) with a two-point line sub-pattern (each orbit split into two exposures), equivalent to the pattern WFC3-UVIS-MOS-DITH-LINE.
We will place the target close to a read-out amplifier (~30 arcsec) in order to reduce CTE loss, using the UVIS2-C1K1C-CTE aperture.

Our total exposure times per filter are 2 hours, split into 6 exposures each. The CMD photometry will be done on individual rather than combined frames.
Additional short exposures (1-5 min) are obtained in 6 filters (F225W, F275W, F390W, F475W, F606W, F814W) for increased wavelength coverage on the UCD imaging.

Visit

Proposal 14748, F475W visit (01) Wed Sep 07 22:21:44 GMT 2016

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/UVIS

Special Requirements: (none)

Comments: Long exposures in F475W + short exposures in F475W, F225W, F275W.

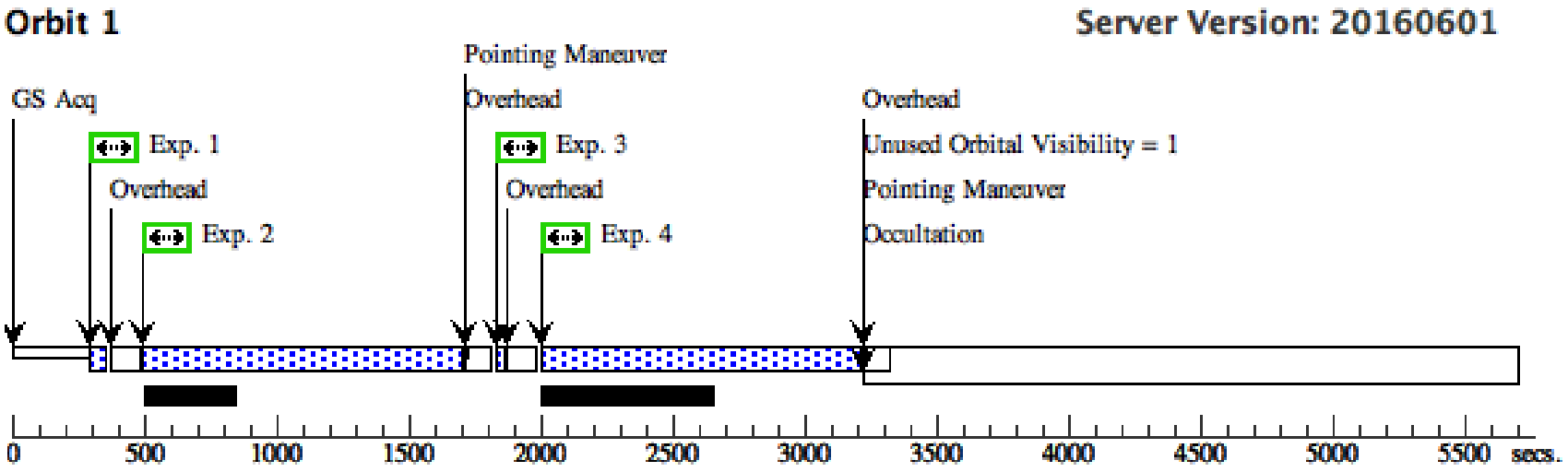
Fixed Targets

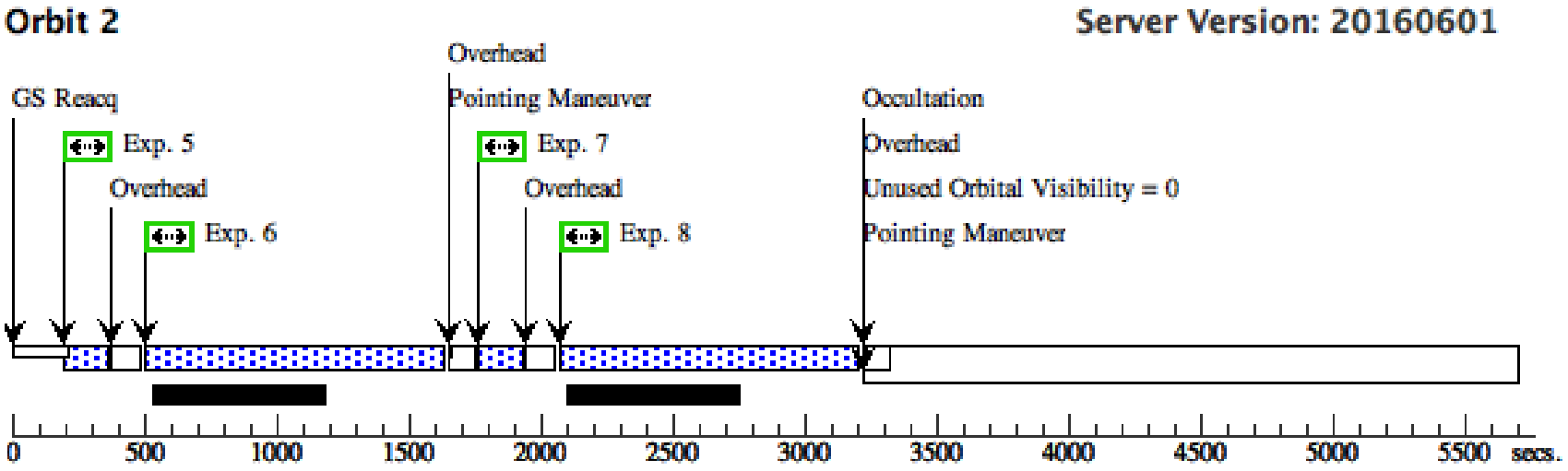
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	NGC-247-UCD1	RA: 00 46 50.7198 (11.7113325d) Dec: -20 39 4.97 (-20.65138d) Equinox: J2000	Redshift: 0.0005	V=18.5+/-0.1	Reference Frame: ICRS

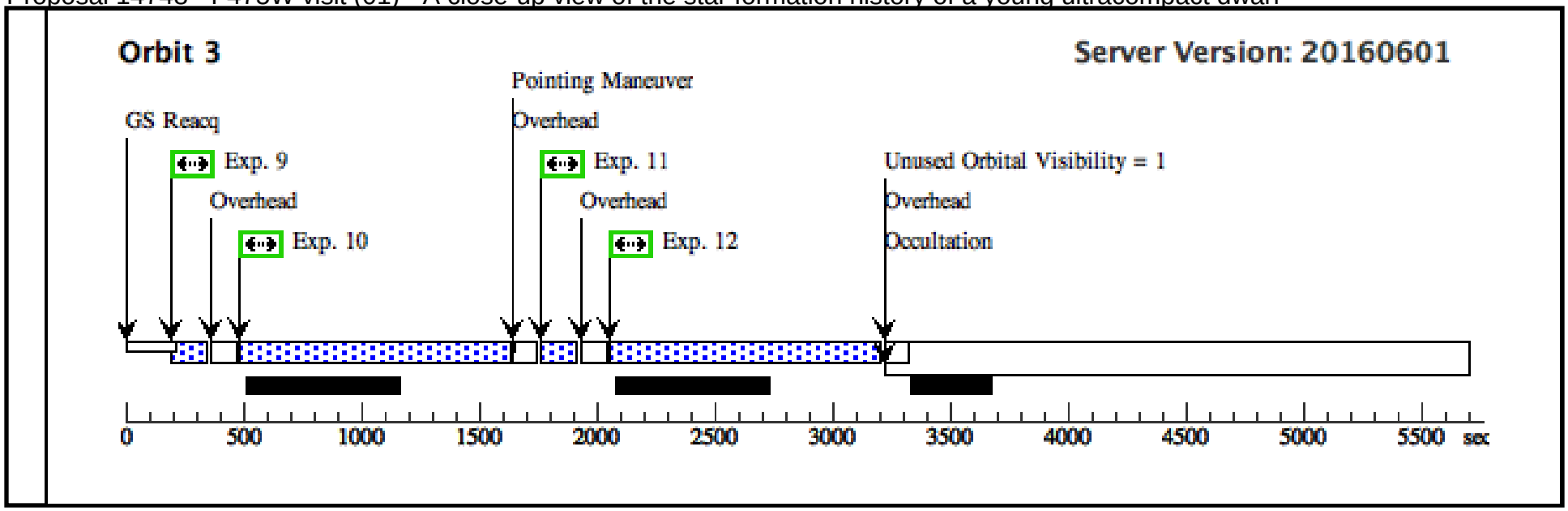
Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	F475W short exposure # 1	(1) NGC-247-UCD1	WFC3/UVIS, ACCUM, UVIS2-C1K1C-CTE	F475W	FLASH=12	POS TARG -0.178,-2.393		30 Secs (30 Secs) *[==>]*	***[1]***
2	F475W long exposure #1	(1) NGC-247-UCD1	WFC3/UVIS, ACCUM, UVIS2-C1K1C-CTE	F475W		POS TARG -0.178,-2.393		1208 Secs (1208 Secs) *[==>]*	***[1]***
3	F475W short exposure # 2	(1) NGC-247-UCD1	WFC3/UVIS, ACCUM, UVIS2-C1K1C-CTE	F475W	FLASH=12	POS TARG -0.079,-2.328		30 Secs (30 Secs) *[==>]*	***[1]***
4	F475W long exposure #2	(1) NGC-247-UCD1	WFC3/UVIS, ACCUM, UVIS2-C1K1C-CTE	F475W		POS TARG -0.079,-2.328		1208 Secs (1208 Secs) *[==>]*	***[1]***
5	F225W short exposure # 1	(1) NGC-247-UCD1	WFC3/UVIS, ACCUM, UVIS2-C1K1C-CTE	F225W	FLASH=12	POS TARG 0.000,0.000		147 Secs (147 Secs) *[==>]*	***[2]***
6	F475W long exposure #3	(1) NGC-247-UCD1	WFC3/UVIS, ACCUM, UVIS2-C1K1C-CTE	F475W		POS TARG 0.000,0.000		1111 Secs (1111 Secs) *[==>]*	***[2]***
7	F225W short exposure # 2	(1) NGC-247-UCD1	WFC3/UVIS, ACCUM, UVIS2-C1K1C-CTE	F225W	FLASH=12	POS TARG 0.099,0.066		147 Secs (147 Secs) *[==>]*	***[2]***
8	F475W long exposure #4	(1) NGC-247-UCD1	WFC3/UVIS, ACCUM, UVIS2-C1K1C-CTE	F475W		POS TARG 0.099,0.066		1111 Secs (1111 Secs) *[==>]*	***[2]***
9	F275W short exposure # 1	(1) NGC-247-UCD1	WFC3/UVIS, ACCUM, UVIS2-C1K1C-CTE	F275W	FLASH=12	POS TARG 0.178,2.393		130 Secs (130 Secs) *[==>]*	***[3]***
10	F475W long exposure #5	(1) NGC-247-UCD1	WFC3/UVIS, ACCUM, UVIS2-C1K1C-CTE	F475W		POS TARG 0.178,2.393		1129 Secs (1129 Secs) *[==>]*	***[3]***
11	F275W short exposure # 2	(1) NGC-247-UCD1	WFC3/UVIS, ACCUM, UVIS2-C1K1C-CTE	F275W	FLASH=12	POS TARG 0.277,2.459		130 Secs (130 Secs) *[==>]*	***[3]***
12	F475W long exposure #6	(1) NGC-247-UCD1	WFC3/UVIS, ACCUM, UVIS2-C1K1C-CTE	F475W		POS TARG 0.277,2.459		1129 Secs (1129 Secs) *[==>]*	***[3]***

Orbit Structure



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Overhead
Occultation
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3500
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5000
5500
sec

Visit

Proposal 14748, F606W visit (02) Wed Sep 07 22:21:45 GMT 2016

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/UVIS

Special Requirements: SAME ORIENT AS 01

Comments: Long exposures in F606W + short exposures in F606W, F390W, F814W, using the same Orient as the F475W visit.

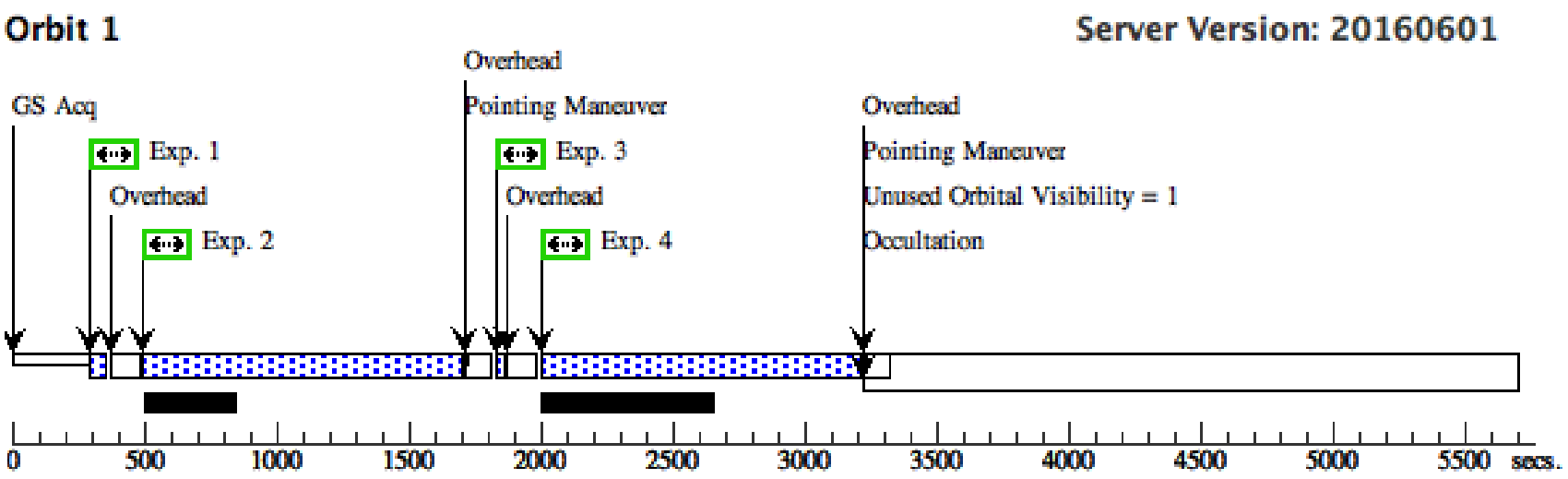
Fixed Targets

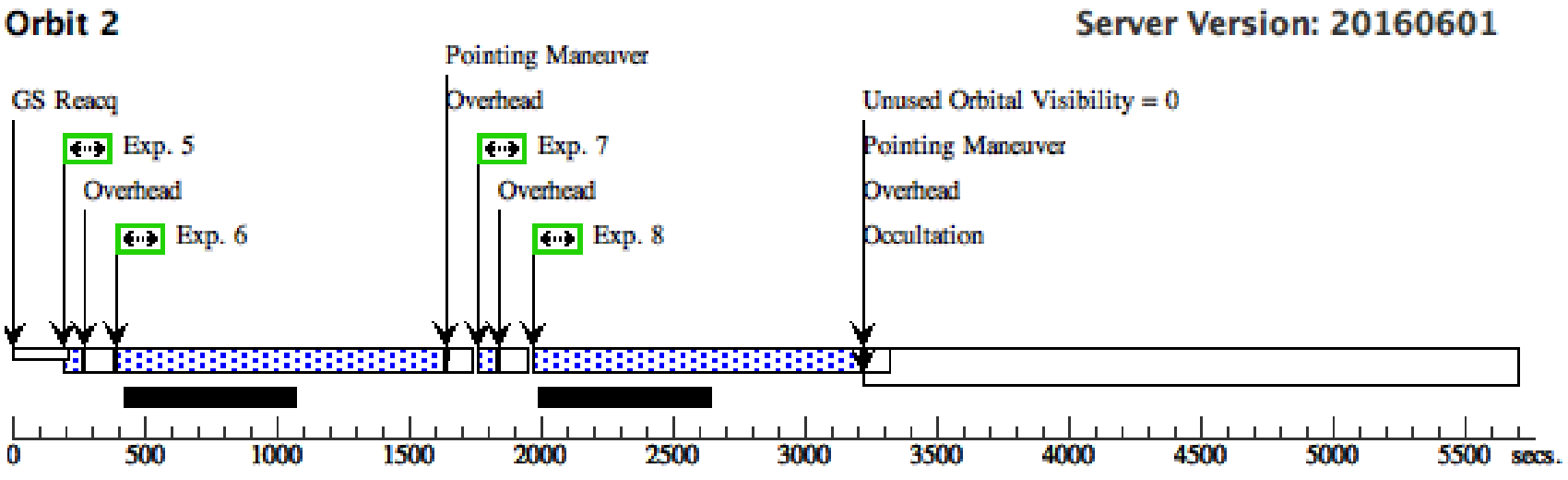
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	NGC-247-UCD1	RA: 00 46 50.7198 (11.7113325d) Dec: -20 39 4.97 (-20.65138d) Equinox: J2000	Redshift: 0.0005	V=18.5+/-0.1	Reference Frame: ICRS

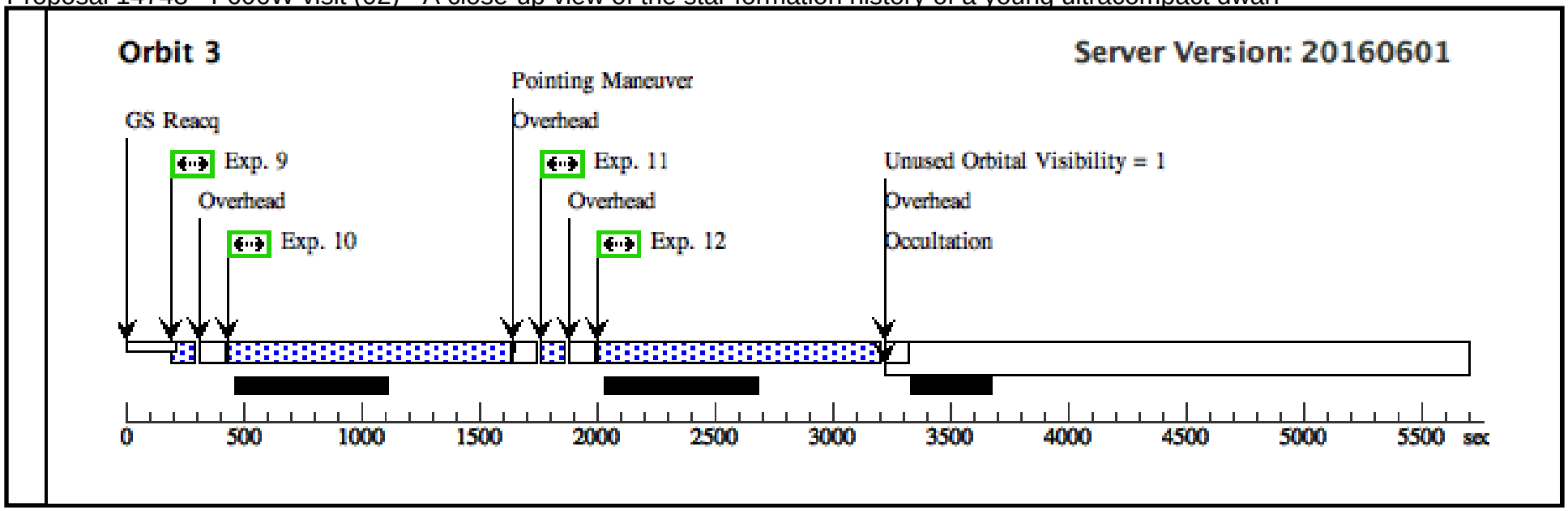
Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	F606W short exposure # 1	(1) NGC-247-UCD1	WFC3/UVIS, ACCUM, UVIS2-C1K1C-CTE	F606W	FLASH=12	POS TARG -0.178,-2.393		30 Secs (30 Secs) *[==>]*	***[1]***
2	F606W long exposure #1	(1) NGC-247-UCD1	WFC3/UVIS, ACCUM, UVIS2-C1K1C-CTE	F606W		POS TARG -0.178,-2.393		1208 Secs (1208 Secs) *[==>]*	***[1]***
3	F606W short exposure # 2	(1) NGC-247-UCD1	WFC3/UVIS, ACCUM, UVIS2-C1K1C-CTE	F606W	FLASH=12	POS TARG -0.079,-2.328		30 Secs (30 Secs) *[==>]*	***[1]***
4	F606W long exposure #2	(1) NGC-247-UCD1	WFC3/UVIS, ACCUM, UVIS2-C1K1C-CTE	F606W		POS TARG -0.079,-2.328		1208 Secs (1208 Secs) *[==>]*	***[1]***
5	F390W short exposure # 1	(1) NGC-247-UCD1	WFC3/UVIS, ACCUM, UVIS2-C1K1C-CTE	F390W	FLASH=12	POS TARG 0.000,0.000		41 Secs (41 Secs) *[==>]*	***[2]***
6	F606W long exposure #3	(1) NGC-247-UCD1	WFC3/UVIS, ACCUM, UVIS2-C1K1C-CTE	F606W		POS TARG 0.000,0.000		1220 Secs (1220 Secs) *[==>]*	***[2]***
7	F390W short exposure # 2	(1) NGC-247-UCD1	WFC3/UVIS, ACCUM, UVIS2-C1K1C-CTE	F390W	FLASH=12	POS TARG 0.099,0.066		41 Secs (41 Secs) *[==>]*	***[2]***
8	F606W long exposure #4	(1) NGC-247-UCD1	WFC3/UVIS, ACCUM, UVIS2-C1K1C-CTE	F606W		POS TARG 0.099,0.066		1220 Secs (1220 Secs) *[==>]*	***[2]***
9	F814W short exposure # 1	(1) NGC-247-UCD1	WFC3/UVIS, ACCUM, UVIS2-C1K1C-CTE	F814W	FLASH=12	POS TARG 0.178,2.393		80 Secs (80 Secs) *[==>]*	***[3]***
10	F606W long exposure #5	(1) NGC-247-UCD1	WFC3/UVIS, ACCUM, UVIS2-C1K1C-CTE	F606W		POS TARG 0.178,2.393		1179 Secs (1179 Secs) *[==>]*	***[3]***
11	F814W short exposure # 2	(1) NGC-247-UCD1	WFC3/UVIS, ACCUM, UVIS2-C1K1C-CTE	F814W	FLASH=12	POS TARG 0.277,2.459		80 Secs (80 Secs) *[==>]*	***[3]***
12	F606W long exposure #6	(1) NGC-247-UCD1	WFC3/UVIS, ACCUM, UVIS2-C1K1C-CTE	F606W		POS TARG 0.277,2.459		1179 Secs (1179 Secs) *[==>]*	***[3]***

Orbit Structure



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GS Reacq
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Overhead
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Pointing Maneuver
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Exp. 12
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Overhead
Occultation
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sec