13357 - Feeding Galaxies: Cold Accretion Through Warps

Cycle: 21, 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	(1) UGC-1281	ACS/WFC WFC3/UVIS	1	11-Sep-2013 21:01:32.0	yes
02	(2) NGC-5023	ACS/WFC WFC3/UVIS	1	11-Sep-2013 21:01:44.0	yes
03	(3) NGC-3510	ACS/WFC WFC3/UVIS	3	11-Sep-2013 21:02:05.0	yes
04	(3) NGC-3510	ACS/WFC WFC3/UVIS	2	11-Sep-2013 21:02:23.0	yes

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
05	(3) NGC-3510	ACS/WFC WFC3/UVIS	2	11-Sep-2013 21:02:38.0	yes

9 Total Orbits Used

ABSTRACT

Discovering how gas in the diffuse IGM transfers into galaxy disks has become one of the main observational challenges of the LCDM paradigm. Observations have yet to conclusively reveal this gas accretion and so cannot explain the high star-formation rates found in the local Universe. Modeling suggests that infalling gas, which is often misaligned with the angular momentum of the galaxy disk, will form a warped outer gaseous disk. However, such accretion events are not the only possible explanation of these warps. They may also form through gravitational torques, which could, for example, arise through tidal interactions or misalignments between the disk and dark-matter halo.

Fortunately, resolved stellar populations in the gas warps of nearby galaxies can discriminate between the different mechanisms for forming warps. Specifically, the models differ in their distribution and metallicity of old stars. If we do observe the predicted stellar populations due to accretion, then this will directly reveal the ongoing gas fueling of galaxy disks.

We thus propose to use ACS and WFC3 in parallel to study the resolved stellar populations in all nearby warped galaxies as selected from the largest sample of such edge-on systems. Using our previous experience with deep color-magnitude diagrams from HST, we will comprehensively explore age and metallicity distributions of stars both in and outside the warp. We will compare these distributions with simulations covering a similar mass range in order to study the underlying formation mechanisms. This unique method directly addresses the issue of sufficiently fuelling the current star formation rate observed in the local Universe.

OBSERVING DESCRIPTION

We propose to determine the stellar content of the warps of three galaxies. We will use ACS and WFC3 coordinated parallel observations in F606W and F814W to resolve stellar populations. Although F475W offers better color separation than F606W in order to distinguish ages, the sensitivity of the filter to red giant branch stars is over 0.6 mag worse (equivalent to three times the required exposure length). As our key observation is to see if the older stars follow the warp, we require F606W for its greater sensitivity in finding these redder stars.

In order to measure metallicities from RGB colors, we need to reach an optimal S/N~8 at 1 mag below the tip of the RGB, which occurs at I=-4 mag. We have used the ETC and our GHOSTS experience to calculate the required exposure times for optimal PSF fit photometry based on the best available distances. Per orbit we will typically expose 1000s and 1400s in F606W and F814W with WFC3, and 1000s and 1200s with ACS, using a dither in each exposure for removal of cosmic rays and bad pixels. However, we specify Low Sky for NGC 3510, which even with the required Increased Scheduling Flexibility option, increases the S/N despite the shorter exposure allowing us to sufficiently sample the RGB. The ACS observations will reach ~0.2 mag deeper than the WFC3 indicated limit.

By using ACS and WFC3 in parallel we double the area covered, and in all systems we are able to observe the warp on both sides of the galaxy simultaneously.

ADDITIONAL COMMENTS

POS-TARGs are used for dithering and are placed outside the aperture between the ACS and WFC3 apertures. This places the center of rotation of the primary and parallel fields between the cameras so that larger orient ranges can be used for scheduling.

Visit

Proposal 13357, UGC-1281 (01), implementation Thu Sep 12 01:02:49 GMT 2013

Diagnostic Status: Warning

Scientific Instruments: WFC3/UVIS, ACS/WFC

Special Requirements: ORIENT 167D TO 180 D; ORIENT 345D TO 358 D

Diagnostics

(UGC-1281 (01)) Warning (Orbit Planner): POS TARG OUTSIDE OF APERTURE

(UGC-1281 (01)) Warning (Orbit Planner): POS TARG OUTSIDE OF APERTURE

Fixed Targets

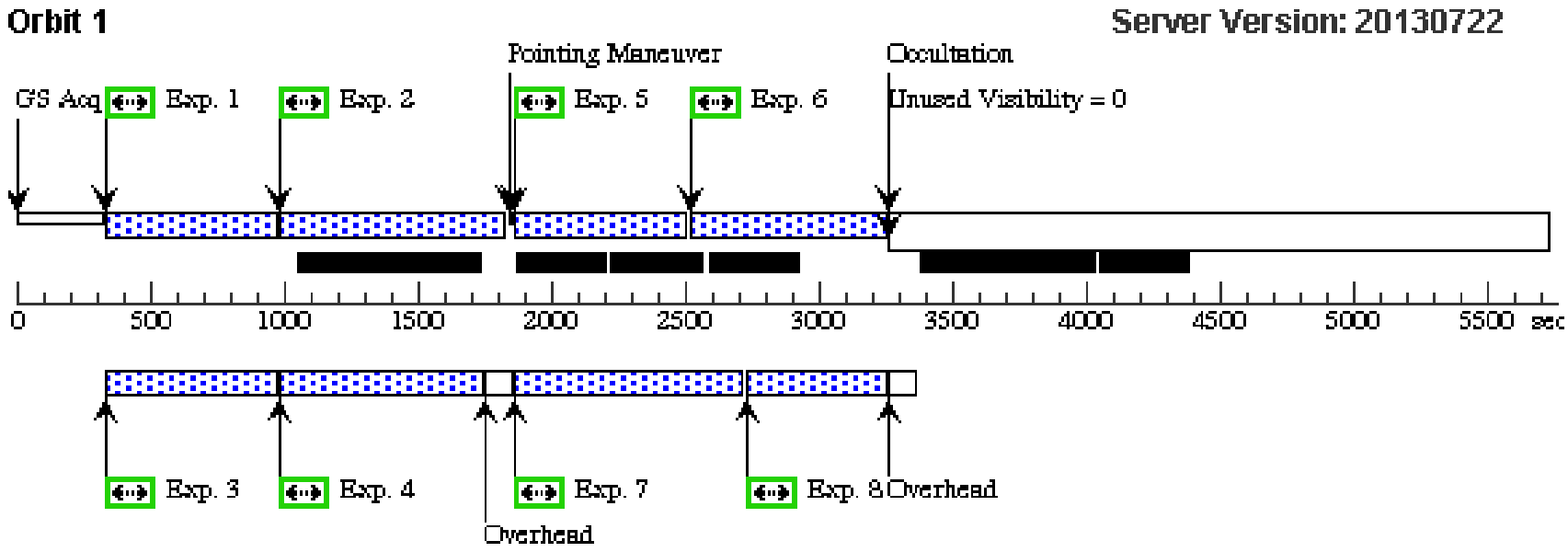
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	UGC-1281	RA: 01 49 31.7728 (27.3823867d) Dec: +32 35 17.94 (32.58832d) Equinox: J2000		V=23.5	Reference Frame: ICRS

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 (Total)/[Actual Dur.]	Orbit
1		(1) UGC-1281	ACS/WFC, ACCUM, WFCENTER	F606W	CR-SPLIT=NO	POS TARG -137,123	Prime + Parallel Group 1-4 in UGC-1281 (01)	435 Secs (435 Secs) *[==>]*	***[1]***
2		(1) UGC-1281	ACS/WFC, ACCUM, WFCENTER	F814W	CR-SPLIT=NO	SAME POS AS 1	Prime + Parallel Group 1-4 in UGC-1281 (01)	665 Secs (665 Secs) *[==>]*	***[1]***
3		(1) UGC-1281	WFC3/UVIS, ACCUM, UVIS-CENTER	F606W	CR-SPLIT=NO		Prime + Parallel Group 1-4 in UGC-1281 (01)	490 Secs (490 Secs) *[==>]*	***[1]***
4		(1) UGC-1281	WFC3/UVIS, ACCUM, UVIS-CENTER	F814W	CR-SPLIT=NO		Prime + Parallel Group 1-4 in UGC-1281 (01)	735 Secs (735 Secs) *[==>]*	***[1]***
5		(1) UGC-1281	ACS/WFC, ACCUM, WFCENTER	F814W	CR-SPLIT=NO	POS TARG -136.777,123.1338	Prime + Parallel Group 5-8 in UGC-1281 (01)	520 Secs (520 Secs) *[==>]*	***[1]***
6		(1) UGC-1281	ACS/WFC, ACCUM, WFCENTER	F606W	CR-SPLIT=NO	SAME POS AS 5	Prime + Parallel Group 5-8 in UGC-1281 (01)	547 Secs (547 Secs) *[==>]*	***[1]***
7		(1) UGC-1281	WFC3/UVIS, ACCUM, UVIS-CENTER	F814W	CR-SPLIT=NO		Prime + Parallel Group 5-8 in UGC-1281 (01)	735 Secs (735 Secs) *[==>]*	***[1]***
8		(1) UGC-1281	WFC3/UVIS, ACCUM, UVIS-CENTER	F606W	CR-SPLIT=NO		Prime + Parallel Group 5-8 in UGC-1281 (01)	500 Secs (500 Secs) *[==>]*	***[1]***

Orbit Structure



Visit

Proposal 13357, NGC-5023 (02), implementation Thu Sep 12 01:02:51 GMT 2013

Diagnostic Status: Warning

Scientific Instruments: WFC3/UVIS, ACS/WFC

Special Requirements: ORIENT 160D TO 168 D

Diagnostics

(NGC-5023 (02)) Warning (Orbit Planner): POS TARG OUTSIDE OF APERTURE

(NGC-5023 (02)) Warning (Orbit Planner): POS TARG OUTSIDE OF APERTURE

Fixed Targets

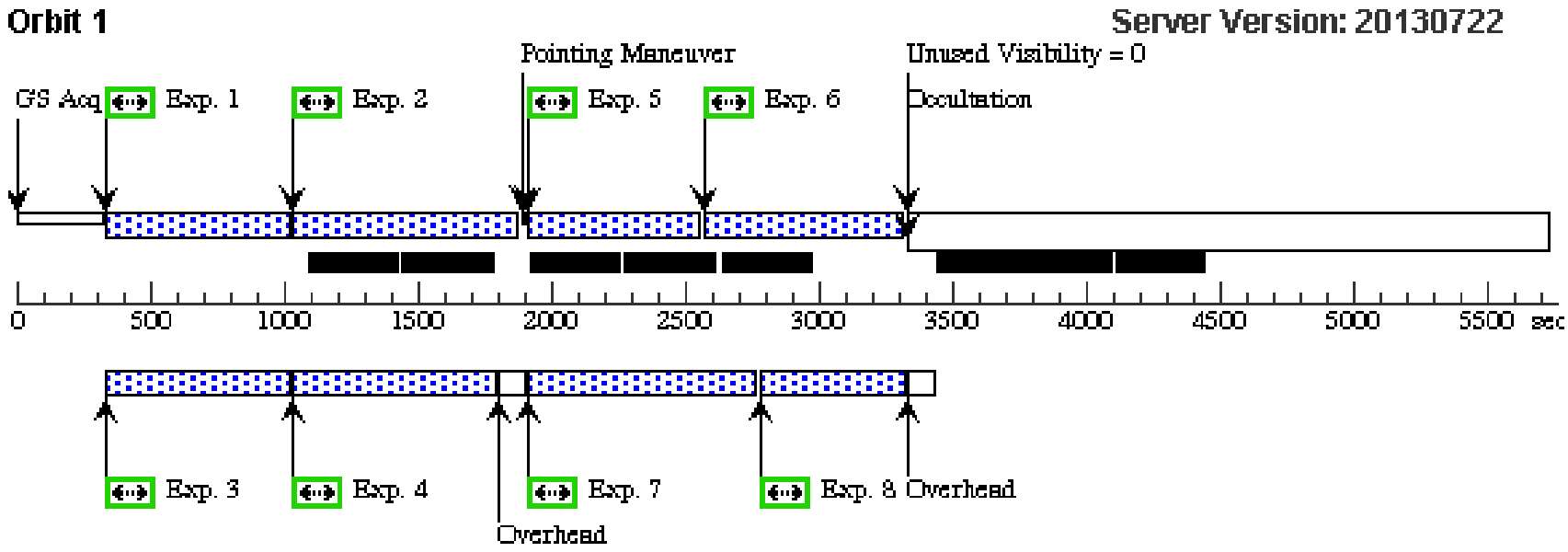
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(2)	NGC-5023	RA: 13 12 11.1503 (198.0464596d) Dec: +44 02 5.10 (44.03475d) Equinox: J2000		V=23.5	Reference Frame: ICRS

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 (Total)/[Actual Dur.]	Orbit
1		(2) NGC-5023	ACS/WFC, ACCUM, WFCENTER	F606W	CR-SPLIT=NO	POS TARG -138,127	Prime + Parallel Group 1-4 in NGC-5023 (02)	480 Secs (480 Secs) *[==>]*	 ***[1]***
2		(2) NGC-5023	ACS/WFC, ACCUM, WFCENTER	F814W	CR-SPLIT=NO	SAME POS AS 1	Prime + Parallel Group 1-4 in NGC-5023 (02)	665 Secs (665 Secs) *[==>]*	 ***[1]***
3		(2) NGC-5023	WFC3/UVIS, ACCUM, UVIS-CENTER	F606W	CR-SPLIT=NO		Prime + Parallel Group 1-4 in NGC-5023 (02)	540 Secs (540 Secs) *[==>]*	 ***[1]***
4		(2) NGC-5023	WFC3/UVIS, ACCUM, UVIS-CENTER	F814W	CR-SPLIT=NO		Prime + Parallel Group 1-4 in NGC-5023 (02)	735 Secs (735 Secs) *[==>]*	 ***[1]***
5		(2) NGC-5023	ACS/WFC, ACCUM, WFCENTER	F814W	CR-SPLIT=NO	POS TARG -137.777,127.1338	Prime + Parallel Group 5-8 in NGC-5023 (02)	520 Secs (520 Secs) *[==>]*	 ***[1]***
6		(2) NGC-5023	ACS/WFC, ACCUM, WFCENTER	F606W	CR-SPLIT=NO	SAME POS AS 5	Prime + Parallel Group 5-8 in NGC-5023 (02)	563 Secs (563 Secs) *[==>]*	 ***[1]***
7		(2) NGC-5023	WFC3/UVIS, ACCUM, UVIS-CENTER	F814W	CR-SPLIT=NO		Prime + Parallel Group 5-8 in NGC-5023 (02)	735 Secs (735 Secs) *[==>]*	 ***[1]***
8		(2) NGC-5023	WFC3/UVIS, ACCUM, UVIS-CENTER	F606W	CR-SPLIT=NO		Prime + Parallel Group 5-8 in NGC-5023 (02)	516 Secs (516 Secs) *[==>]*	 ***[1]***

Orbit Structure



Visit

Proposal 13357, NGC-3510 (03), implementation Thu Sep 12 01:02:52 GMT 2013

Diagnostic Status: Warning

Scientific Instruments: WFC3/UVIS, ACS/WFC

Special Requirements: ORIENT 306D TO 313 D

Diagnostics

(NGC-3510 (03)) Warning (Orbit Planner): POS TARG OUTSIDE OF APERTURE

(NGC-3510 (03)) Warning (Orbit Planner): POS TARG OUTSIDE OF APERTURE

(NGC-3510 (03)) Warning (Orbit Planner): POS TARG OUTSIDE OF APERTURE

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(3)	NGC-3510	RA: 11 03 44.1542 (165.9339758d) Dec: +28 52 51.11 (28.88086d) Equinox: J2000		V=25	Reference Frame: ICRS

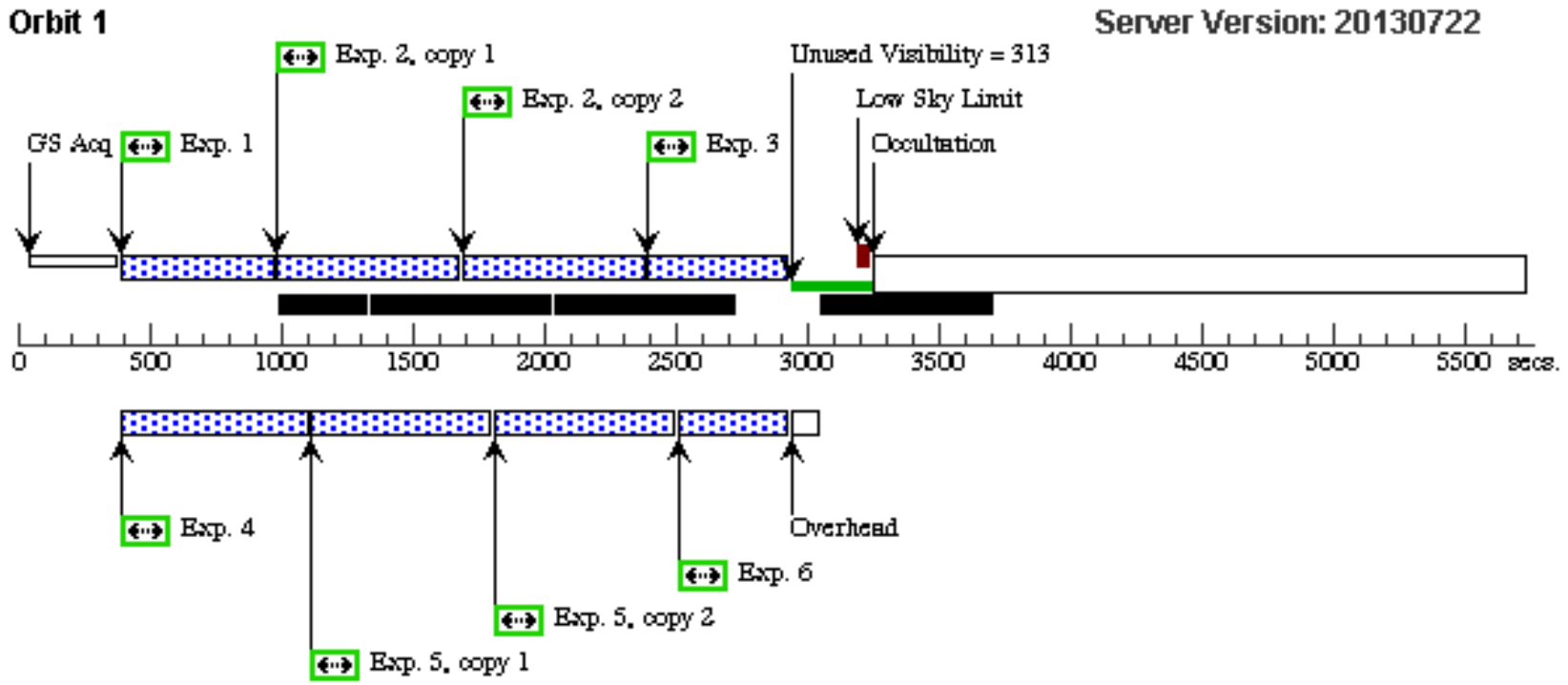
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.

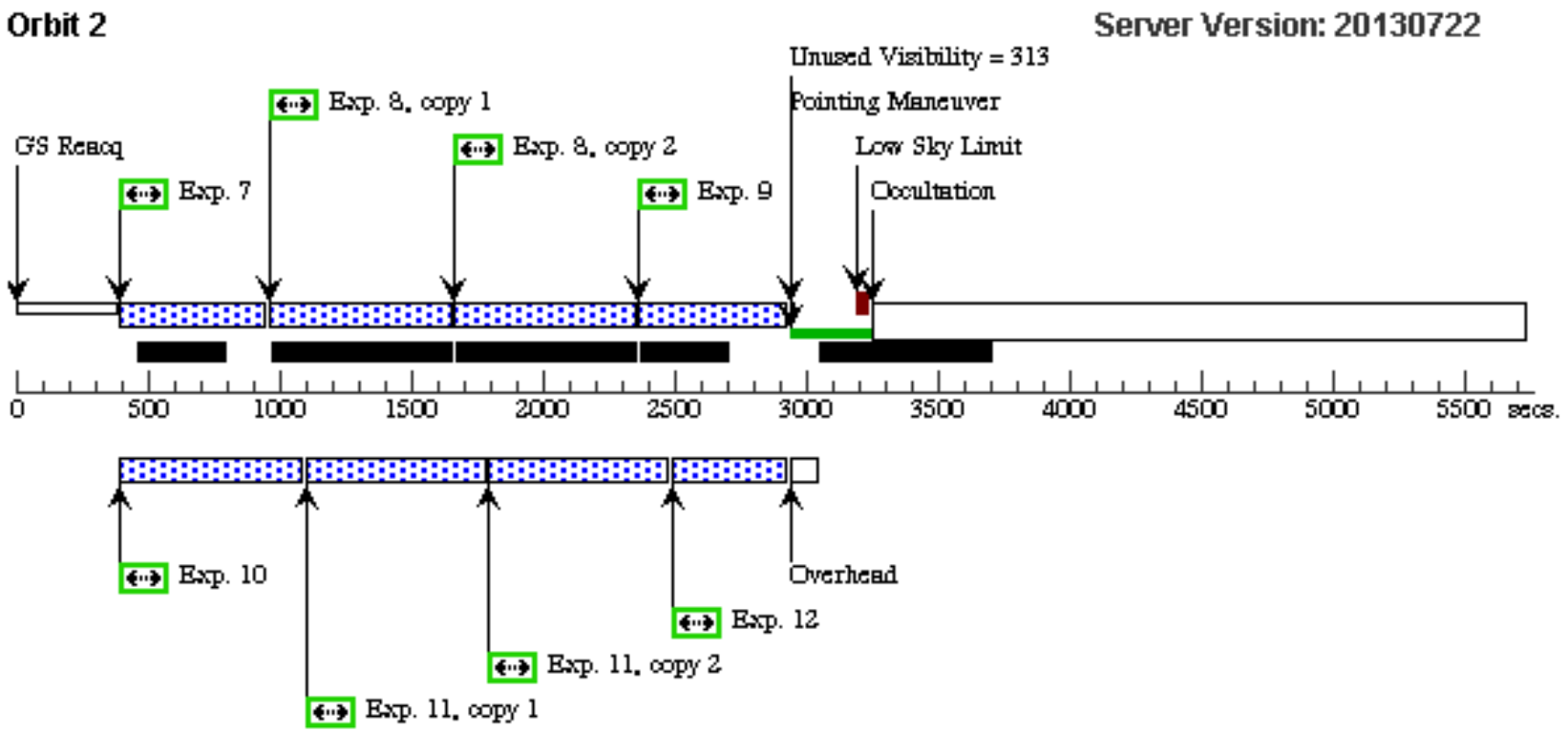
Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(3) NGC-3510	ACS/WFC, ACCUM, WFCENTER	F606W	CR-SPLIT=NO	POS TARG -132,122; LOW-SKY; GS ACQ SCENARIO SINGLE	Prime + Parallel Group 1-6 in NGC-3510 (03)	370 Secs (370 Secs) *[==>]*	***[1]***
2		(3) NGC-3510	ACS/WFC, ACCUM, WFCENTER	F606W	CR-SPLIT=NO	SAME POS AS 1; LOW-SKY	Prime + Parallel Group 1-6 in NGC-3510 (03)	563 Secs X 2 (1126 Secs) *[==>(Copy 1)]* *[==>(Copy 2)]*	***[1]***
3		(3) NGC-3510	ACS/WFC, ACCUM, WFCENTER	F606W	CR-SPLIT=NO	SAME POS AS 1; LOW-SKY	Prime + Parallel Group 1-6 in NGC-3510 (03)	411 Secs (411 Secs) *[==>]*	***[1]***
4		(3) NGC-3510	WFC3/UVIS, ACCUM, UVIS-CENTER	F606W	CR-SPLIT=NO		Prime + Parallel Group 1-6 in NGC-3510 (03)	560 Secs (560 Secs) *[==>]*	***[1]***
5		(3) NGC-3510	WFC3/UVIS, ACCUM, UVIS-CENTER	F606W	CR-SPLIT=NO		Prime + Parallel Group 1-6 in NGC-3510 (03)	570 Secs X 2 (1140 Secs) *[==>(Copy 1)]* *[==>(Copy 2)]*	***[1]***
6		(3) NGC-3510	WFC3/UVIS, ACCUM, UVIS-CENTER	F606W	CR-SPLIT=NO		Prime + Parallel Group 1-6 in NGC-3510 (03)	413 Secs (413 Secs) *[==>]*	***[1]***
7		(3) NGC-3510	ACS/WFC, ACCUM, WFCENTER	F814W	CR-SPLIT=NO	POS TARG -132,122; LOW-SKY	Prime + Parallel Group 7-12 in NGC-3510 (03)	370 Secs (370 Secs) *[==>]*	***[2]***
8		(3) NGC-3510	ACS/WFC, ACCUM, WFCENTER	F814W	CR-SPLIT=NO	SAME POS AS 7; LOW-SKY	Prime + Parallel Group 7-12 in NGC-3510 (03)	563 Secs X 2 (1126 Secs) *[==>(Copy 1)]* *[==>(Copy 2)]*	***[2]***
9		(3) NGC-3510	ACS/WFC, ACCUM, WFCENTER	F814W	CR-SPLIT=NO	SAME POS AS 7; LOW-SKY	Prime + Parallel Group 7-12 in NGC-3510 (03)	438 Secs (438 Secs) *[==>]*	***[2]***
10		(3) NGC-3510	WFC3/UVIS, ACCUM, UVIS-CENTER	F814W	CR-SPLIT=NO		Prime + Parallel Group 7-12 in NGC-3510 (03)	550 Secs (550 Secs) *[==>]*	***[2]***
11		(3) NGC-3510	WFC3/UVIS, ACCUM, UVIS-CENTER	F814W	CR-SPLIT=NO		Prime + Parallel Group 7-12 in NGC-3510 (03)	570 Secs X 2 (1140 Secs) *[==>(Copy 1)]* *[==>(Copy 2)]*	***[2]***
12		(3) NGC-3510	WFC3/UVIS, ACCUM, UVIS-CENTER	F814W	CR-SPLIT=NO		Prime + Parallel Group 7-12 in NGC-3510 (03)	432 Secs (432 Secs) *[==>]*	***[2]***
13		(3) NGC-3510	ACS/WFC, ACCUM, WFCENTER	F606W	CR-SPLIT=NO	POS TARG -131.863,121.9892; LOW-SKY	Prime + Parallel Group 13-20 in NGC-3510 (03)	348 Secs (348 Secs) *[==>]*	***[3]***
14		(3) NGC-3510	ACS/WFC, ACCUM, WFCENTER	F606W	CR-SPLIT=NO	SAME POS AS 13; LOW-SKY	Prime + Parallel Group 13-20 in NGC-3510 (03)	530 Secs (530 Secs) *[==>]*	***[3]***
15		(3) NGC-3510	ACS/WFC, ACCUM, WFCENTER	F814W	CR-SPLIT=NO	SAME POS AS 13; LOW-SKY	Prime + Parallel Group 13-20 in NGC-3510 (03)	563 Secs (563 Secs) *[==>]*	***[3]***
16		(3) NGC-3510	ACS/WFC, ACCUM, WFCENTER	F814W	CR-SPLIT=NO	SAME POS AS 13; LOW-SKY	Prime + Parallel Group 13-20 in NGC-3510 (03)	438 Secs (438 Secs) *[==>]*	***[3]***

	17	(3) NGC-3510	WFC3/UVIS, ACCUM, UVIS-CENTER	F814W	CR-SPLIT=NO	Prime + Parallel Group 13-20 in NGC-3510 (03)	567 Secs (567 Secs) *[==>]*	 ***[3]***
	18	(3) NGC-3510	WFC3/UVIS, ACCUM, UVIS-CENTER	F814W	CR-SPLIT=NO	Prime + Parallel Group 13-20 in NGC-3510 (03)	545 Secs (545 Secs) *[==>]*	 ***[3]***
	19	(3) NGC-3510	WFC3/UVIS, ACCUM, UVIS-CENTER	F606W	CR-SPLIT=NO	Prime + Parallel Group 13-20 in NGC-3510 (03)	570 Secs (570 Secs) *[==>]*	 ***[3]***
	20	(3) NGC-3510	WFC3/UVIS, ACCUM, UVIS-CENTER	F606W	CR-SPLIT=NO	Prime + Parallel Group 13-20 in NGC-3510 (03)	440 Secs (440 Secs) *[==>]*	 ***[3]***

Orbit Structure

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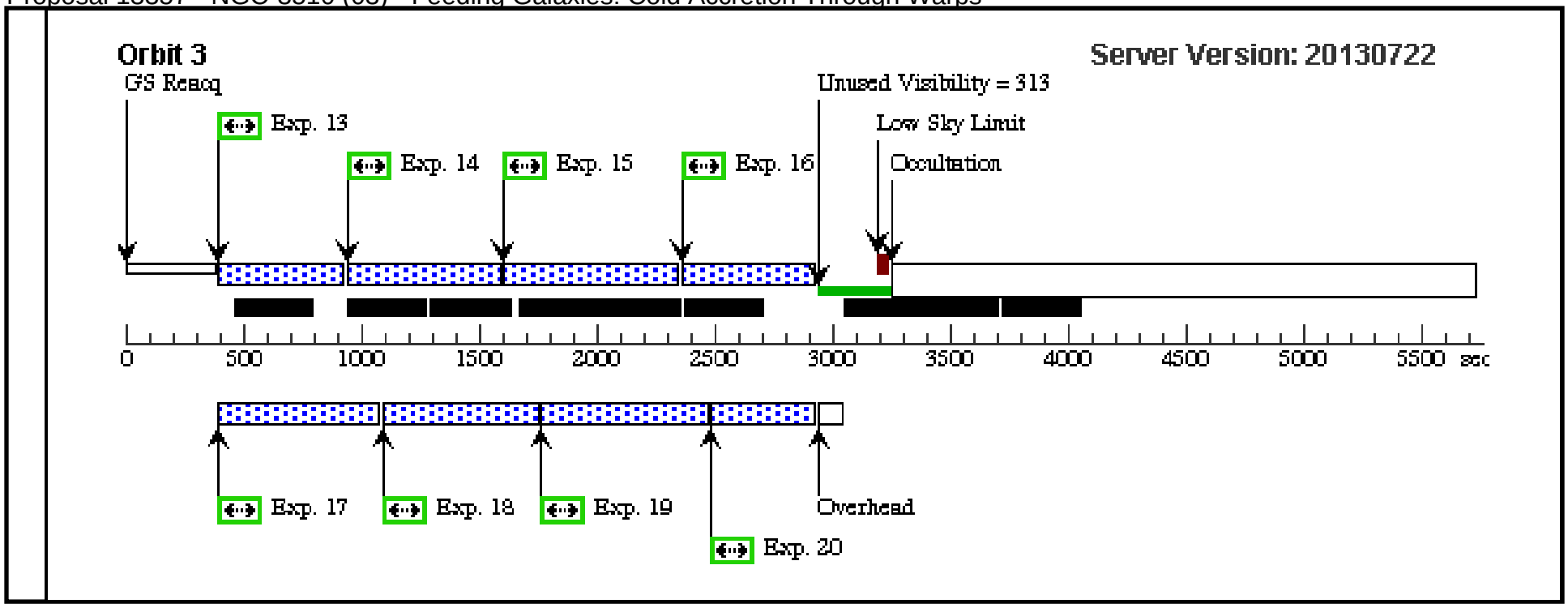
Exp. 8, copy 2
GS Reacq
Low Sky Limit
Exp. 7
Exp. 9
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
secs.
Exp. 10
Overhead
Exp. 12
Exp. 11, copy 2
Exp. 11, copy 1


Orbit 3
Server Version: 20130722
GS Reacq
Unused Visibility = 313
Exp. 13
Low Sky Limit
Exp. 14
Exp. 15
Exp. 16
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec
Exp. 17
Exp. 18
Exp. 19
Overhead
Exp. 20

Visit

Proposal 13357, NGC-3510 (04), implementation Thu Sep 12 01:02:55 GMT 2013

Diagnostic Status: Warning

Scientific Instruments: WFC3/UVIS, ACS/WFC

Special Requirements: SAME ORIENT AS 03

Diagnostics

(NGC-3510 (04)) Warning (Orbit Planner): POS TARG OUTSIDE OF APERTURE

(NGC-3510 (04)) Warning (Orbit Planner): POS TARG OUTSIDE OF APERTURE

Fixed Targets

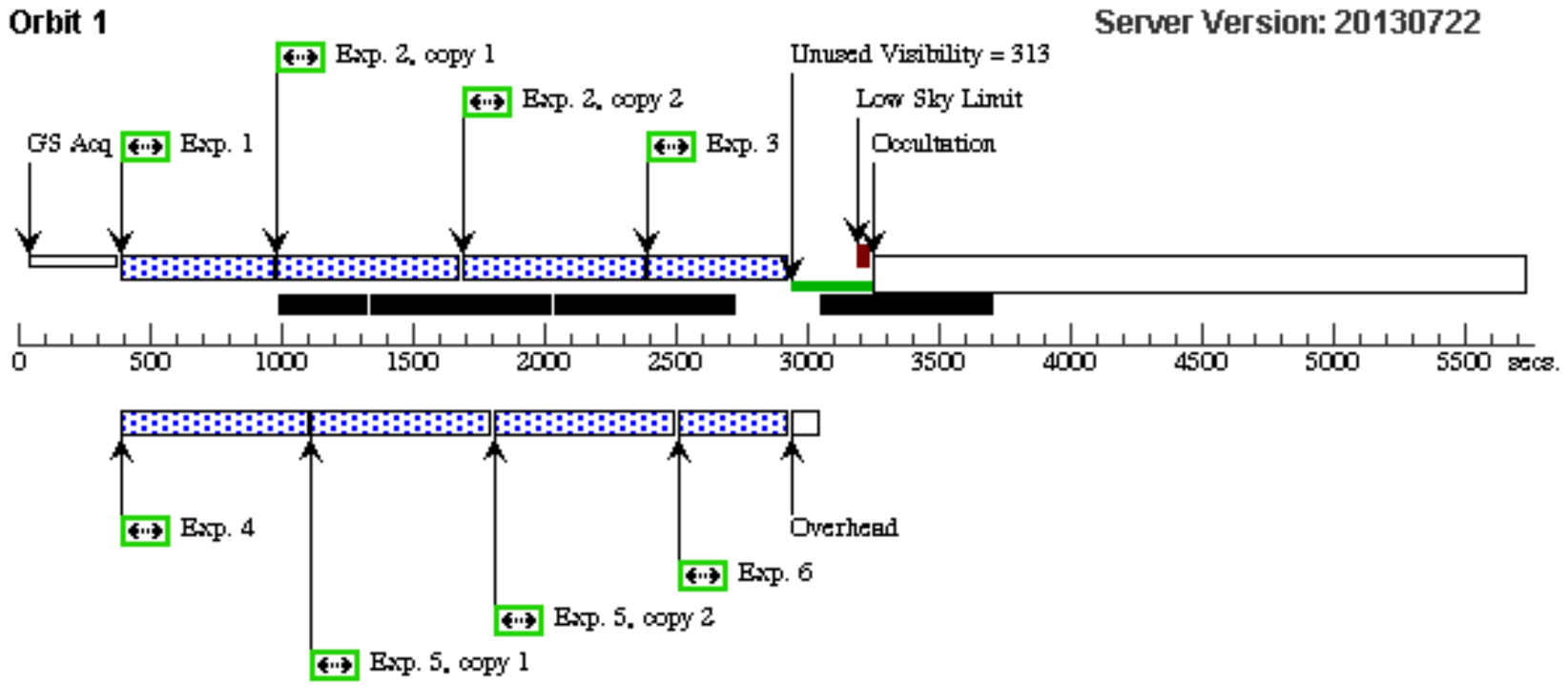
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(3)	NGC-3510	RA: 11 03 44.1542 (165.9339758d) Dec: +28 52 51.11 (28.88086d) Equinox: J2000		V=25	Reference Frame: ICRS

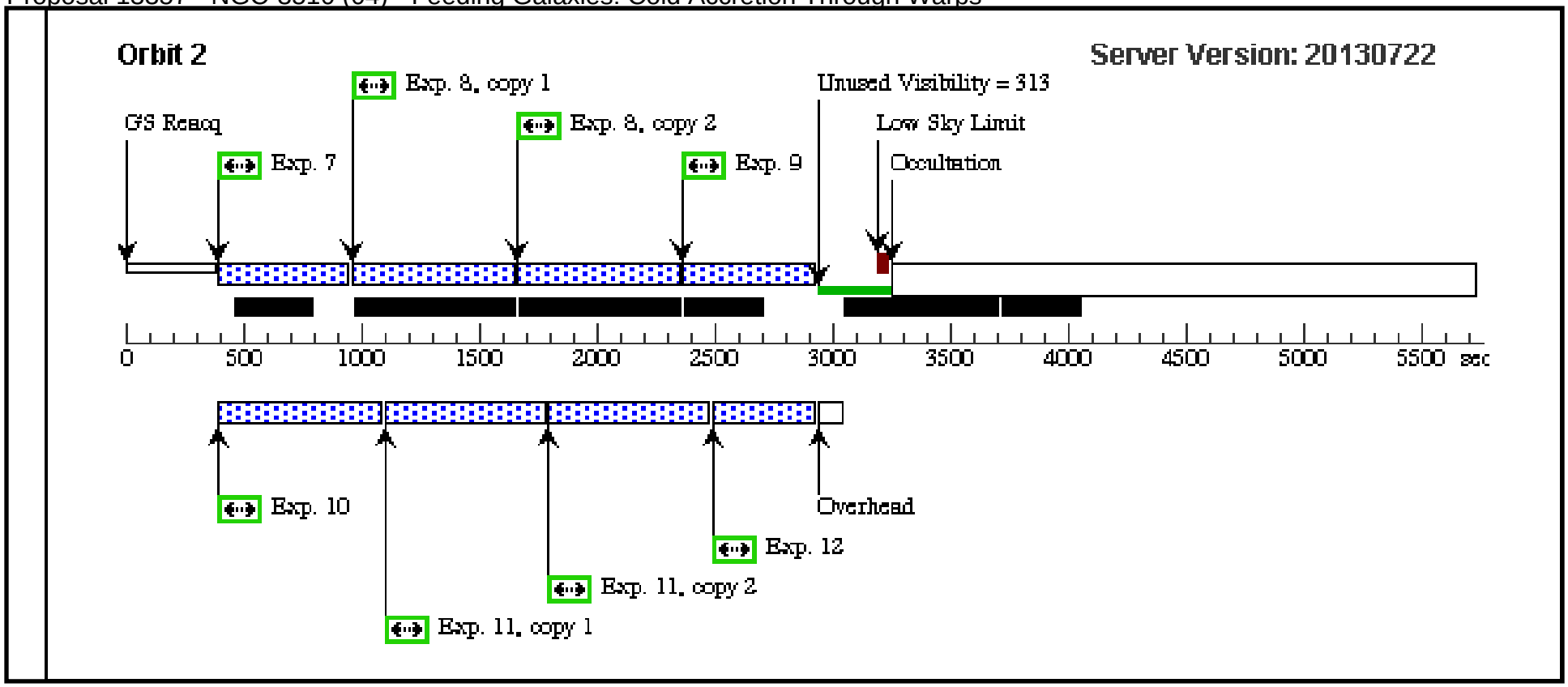
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(3) NGC-3510	ACS/WFC, ACCUM, WFCENTER	F606W	CR-SPLIT=NO	POS TARG -131.777,122.1338; LOW-SKY; GS ACQ SCENARIO SINGLE	Prime + Parallel Group 1-6 in NGC-3510 (04)	370 Secs (370 Secs) *[==>]*	***[1]***
2		(3) NGC-3510	ACS/WFC, ACCUM, WFCENTER	F606W	CR-SPLIT=NO	SAME POS AS 1; LOW-SKY	Prime + Parallel Group 1-6 in NGC-3510 (04)	563 Secs X 2 (1126 Secs) *[==>(Copy 1)]* *[==>(Copy 2)]*	***[1]***
3		(3) NGC-3510	ACS/WFC, ACCUM, WFCENTER	F606W	CR-SPLIT=NO	SAME POS AS 1; LOW-SKY	Prime + Parallel Group 1-6 in NGC-3510 (04)	411 Secs (411 Secs) *[==>]*	***[1]***
4		(3) NGC-3510	WFC3/UVIS, ACCUM, UVIS-CENTER	F606W	CR-SPLIT=NO		Prime + Parallel Group 1-6 in NGC-3510 (04)	560 Secs (560 Secs) *[==>]*	***[1]***
5		(3) NGC-3510	WFC3/UVIS, ACCUM, UVIS-CENTER	F606W	CR-SPLIT=NO		Prime + Parallel Group 1-6 in NGC-3510 (04)	570 Secs X 2 (1140 Secs) *[==>(Copy 1)]* *[==>(Copy 2)]*	***[1]***
6		(3) NGC-3510	WFC3/UVIS, ACCUM, UVIS-CENTER	F606W	CR-SPLIT=NO		Prime + Parallel Group 1-6 in NGC-3510 (04)	413 Secs (413 Secs) *[==>]*	***[1]***
7		(3) NGC-3510	ACS/WFC, ACCUM, WFCENTER	F814W	CR-SPLIT=NO	POS TARG -131.777,122.1338; LOW-SKY	Prime + Parallel Group 7-12 in NGC-3510 (04)	370 Secs (370 Secs) *[==>]*	***[2]***
8		(3) NGC-3510	ACS/WFC, ACCUM, WFCENTER	F814W	CR-SPLIT=NO	SAME POS AS 7; LOW-SKY	Prime + Parallel Group 7-12 in NGC-3510 (04)	563 Secs X 2 (1126 Secs) *[==>(Copy 1)]* *[==>(Copy 2)]*	***[2]***
9		(3) NGC-3510	ACS/WFC, ACCUM, WFCENTER	F814W	CR-SPLIT=NO	SAME POS AS 7; LOW-SKY	Prime + Parallel Group 7-12 in NGC-3510 (04)	438 Secs (438 Secs) *[==>]*	***[2]***
10		(3) NGC-3510	WFC3/UVIS, ACCUM, UVIS-CENTER	F814W	CR-SPLIT=NO		Prime + Parallel Group 7-12 in NGC-3510 (04)	550 Secs (550 Secs) *[==>]*	***[2]***
11		(3) NGC-3510	WFC3/UVIS, ACCUM, UVIS-CENTER	F814W	CR-SPLIT=NO		Prime + Parallel Group 7-12 in NGC-3510 (04)	570 Secs X 2 (1140 Secs) *[==>(Copy 1)]* *[==>(Copy 2)]*	***[2]***
12		(3) NGC-3510	WFC3/UVIS, ACCUM, UVIS-CENTER	F814W	CR-SPLIT=NO		Prime + Parallel Group 7-12 in NGC-3510 (04)	432 Secs (432 Secs) *[==>]*	***[2]***

Orbit Structure




Orbit 2
Server Version: 20130722
GS Reacq
Exp. 7
Exp. 8, copy 1
Exp. 8, copy 2
Exp. 9
Unused Visibility = 313
Low Sky Limit
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec
Exp. 10
Exp. 11, copy 1
Exp. 11, copy 2
Exp. 12
Overhead

Visit

Proposal 13357, NGC-3510 (05), implementation Thu Sep 12 01:02:57 GMT 2013

Diagnostic Status: Warning

Scientific Instruments: WFC3/UVIS, ACS/WFC

Special Requirements: SAME ORIENT AS 03

Diagnostics

(NGC-3510 (05)) Warning (Orbit Planner): POS TARG OUTSIDE OF APERTURE

Fixed Targets

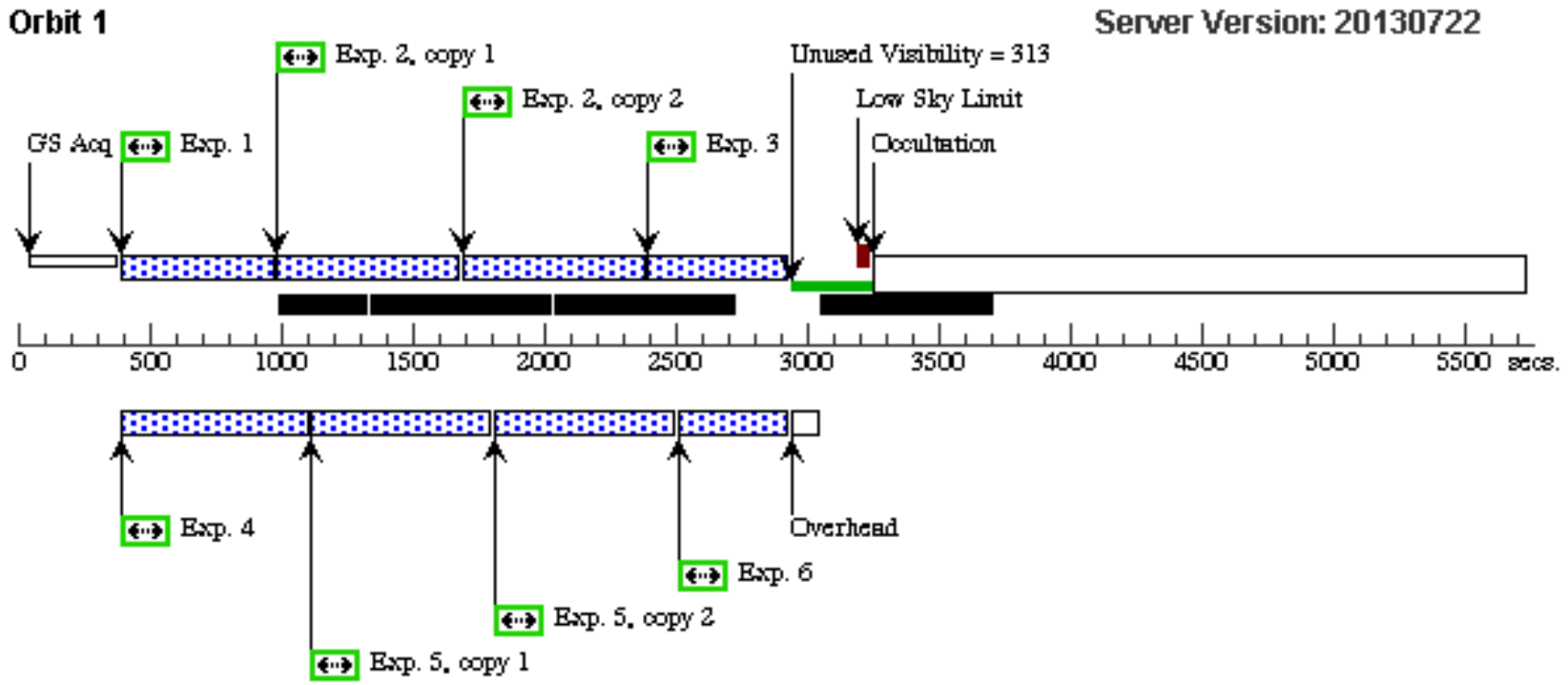
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(3)	NGC-3510	RA: 11 03 44.1542 (165.9339758d) Dec: +28 52 51.11 (28.88086d) Equinox: J2000		V=25	Reference Frame: ICRS

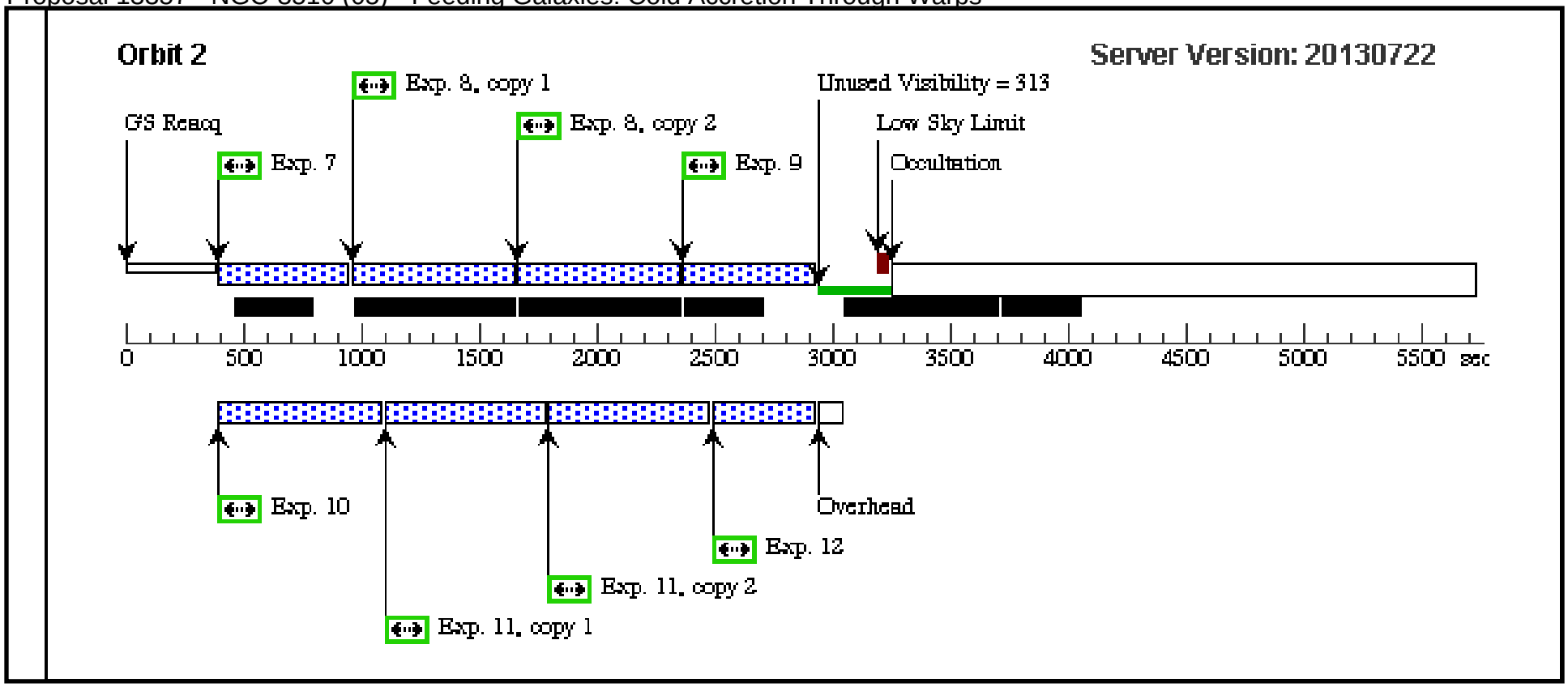
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(3) NGC-3510	ACS/WFC, ACCUM, WFCENTER	F606W	CR-SPLIT=NO	POS TARG -131.6655,122.2007; LOW-SKY; GS ACQ SCENARIO SINGLE	Prime + Parallel Group 1-6 in NGC-3510 (05)	370 Secs (370 Secs) *[==>]*	***[1]***
2		(3) NGC-3510	ACS/WFC, ACCUM, WFCENTER	F606W	CR-SPLIT=NO	SAME POS AS 1; LOW-SKY	Prime + Parallel Group 1-6 in NGC-3510 (05)	563 Secs X 2 (1126 Secs) *[==>(Copy 1)]* *[==>(Copy 2)]*	***[1]***
3		(3) NGC-3510	ACS/WFC, ACCUM, WFCENTER	F606W	CR-SPLIT=NO	SAME POS AS 1; LOW-SKY	Prime + Parallel Group 1-6 in NGC-3510 (05)	411 Secs (411 Secs) *[==>]*	***[1]***
4		(3) NGC-3510	WFC3/UVIS, ACCUM, UVIS-CENTER	F606W	CR-SPLIT=NO		Prime + Parallel Group 1-6 in NGC-3510 (05)	560 Secs (560 Secs) *[==>]*	***[1]***
5		(3) NGC-3510	WFC3/UVIS, ACCUM, UVIS-CENTER	F606W	CR-SPLIT=NO		Prime + Parallel Group 1-6 in NGC-3510 (05)	570 Secs X 2 (1140 Secs) *[==>(Copy 1)]* *[==>(Copy 2)]*	***[1]***
6		(3) NGC-3510	WFC3/UVIS, ACCUM, UVIS-CENTER	F606W	CR-SPLIT=NO		Prime + Parallel Group 1-6 in NGC-3510 (05)	413 Secs (413 Secs) *[==>]*	***[1]***
7		(3) NGC-3510	ACS/WFC, ACCUM, WFCENTER	F814W	CR-SPLIT=NO	SAME POS AS 1; LOW-SKY	Prime + Parallel Group 7-12 in NGC-3510 (05)	370 Secs (370 Secs) *[==>]*	***[2]***
8		(3) NGC-3510	ACS/WFC, ACCUM, WFCENTER	F814W	CR-SPLIT=NO	SAME POS AS 7; LOW-SKY	Prime + Parallel Group 7-12 in NGC-3510 (05)	563 Secs X 2 (1126 Secs) *[==>(Copy 1)]* *[==>(Copy 2)]*	***[2]***
9		(3) NGC-3510	ACS/WFC, ACCUM, WFCENTER	F814W	CR-SPLIT=NO	SAME POS AS 7; LOW-SKY	Prime + Parallel Group 7-12 in NGC-3510 (05)	438 Secs (438 Secs) *[==>]*	***[2]***
10		(3) NGC-3510	WFC3/UVIS, ACCUM, UVIS-CENTER	F814W	CR-SPLIT=NO		Prime + Parallel Group 7-12 in NGC-3510 (05)	550 Secs (550 Secs) *[==>]*	***[2]***
11		(3) NGC-3510	WFC3/UVIS, ACCUM, UVIS-CENTER	F814W	CR-SPLIT=NO		Prime + Parallel Group 7-12 in NGC-3510 (05)	570 Secs X 2 (1140 Secs) *[==>(Copy 1)]* *[==>(Copy 2)]*	***[2]***
12		(3) NGC-3510	WFC3/UVIS, ACCUM, UVIS-CENTER	F814W	CR-SPLIT=NO		Prime + Parallel Group 7-12 in NGC-3510 (05)	432 Secs (432 Secs) *[==>]*	***[2]***

Orbit Structure

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GS Reacq
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Exp. 8, copy 1
Exp. 8, copy 2
Exp. 9
Unused Visibility = 313
Low Sky Limit
Occultation
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500
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1500
2000
2500
3000
3500
4000
4500
5000
5500
sec
Exp. 10
Exp. 11, copy 1
Exp. 11, copy 2
Exp. 12
Overhead