13038 - Westerlund 2, top to bottom: how massive star clusters form.

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	(1) ESO-127-18	ACS/WFC	2	28-Sep-2012 21:46:30.0	yes
08	(1) ESO-127-18	WFC3/IR	1	28-Sep-2012 21:46:47.0	yes
09	(1) ESO-127-18	WFC3/IR	1	28-Sep-2012 21:46:59.0	yes
10	(1) ESO-127-18	WFC3/IR	1	28-Sep-2012 21:47:12.0	yes
11	(1) ESO-127-18	WFC3/IR	1	28-Sep-2012 21:47:24.0	yes

6 Total Orbits Used

ABSTRACT

Massive stellar clusters are the main indicators of star formation activity in the distant universe, still their origin and evolution is only partially understood.

We have demonstrated that combining deep high resolution optical and IR photometry is a powerful method to investigate the initial phases of massive stellar clusters. We are now proposing to obtain deep, high resolution ACS and WFC3 observations designed to individually resolve and measure stars in Westerlund 2 (Wd2), one of the youngest and most massive clusters in the Milky Way, from the upper mass cut-off down to the hydrogen-burning limit.

Wd2 is quite unique, because it is close (8kpc), young (<2Myr), massive (>10^4 Mo) and not well studied. Yet, it is perfectly suitable to investigate how it formed, since neither stellar evolution nor cluster dynamics have had enough time to significantly affect its initial conditions. We propose to determine its mass function, which will well approximate its IMF, establish whether primordial mass segregation is present, characterise the population of pre-Main Sequence stars that have been found by Spitzer, and - as a added bonus - take a high resolution view of the surroundings of WR20a, a very massive eclipsing WR binary that might have been ejected from the cluster center. Second epoch observations in two years will allow us to accurately identify the Wd2 cluster members, and will establish the presence of additional walkaway stars, in addition possibly to WR20a. Because high resolution, high dynamic range, and PSF stability - necessary for the astrometric part - are absolute requirements to complete this project, this study can only be done with HST.

OBSERVING DESCRIPTION

Observations are organized in two visits, the first visit consists of 2 orbits, for a total of 12 ACS/WFC exposures in the optical filters F555W, F814W and F658N. Dithering is perfomed via the POS TARG keyword and is designed to fill the gap between the 2 ACS detectors and avoid multiple hits of the same bad column and bad pixels by the same source.

The second visit (called IR-mosaic) consists of a 4 poinings mosaic using the WFC3/IR camera in the filters F110W, F160W and F128N. For each tile a 4 point dithering is performed using the POS TARG keyword. The dithering has been designed to avoid multiple hits of the same source on the same bad column, or other detector imperfections.

Visit

Proposal 13038, Visit 01, implementation Sat Sep 29 01:47:33 GMT 2012

Diagnostic Status: No Diagnostics

Scientific Instruments: ACS/WFC

Special Requirements: (none)

Fixed Targets

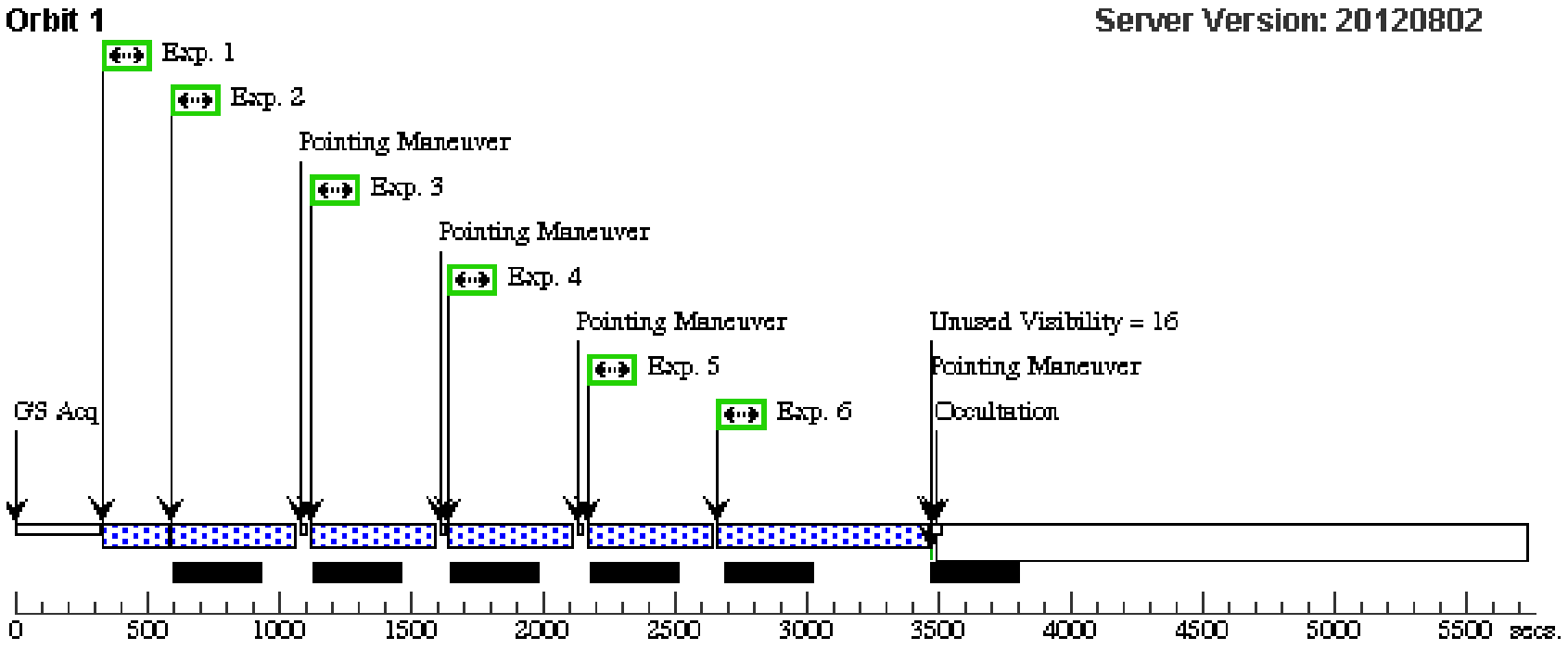
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	ESO-127-18	RA: 10 24 5.5000 (156.0229167d) Dec: -57 45 49.00 (-57.76361d) Equinox: J2000		V=10.5	Reference Frame: ICRS

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

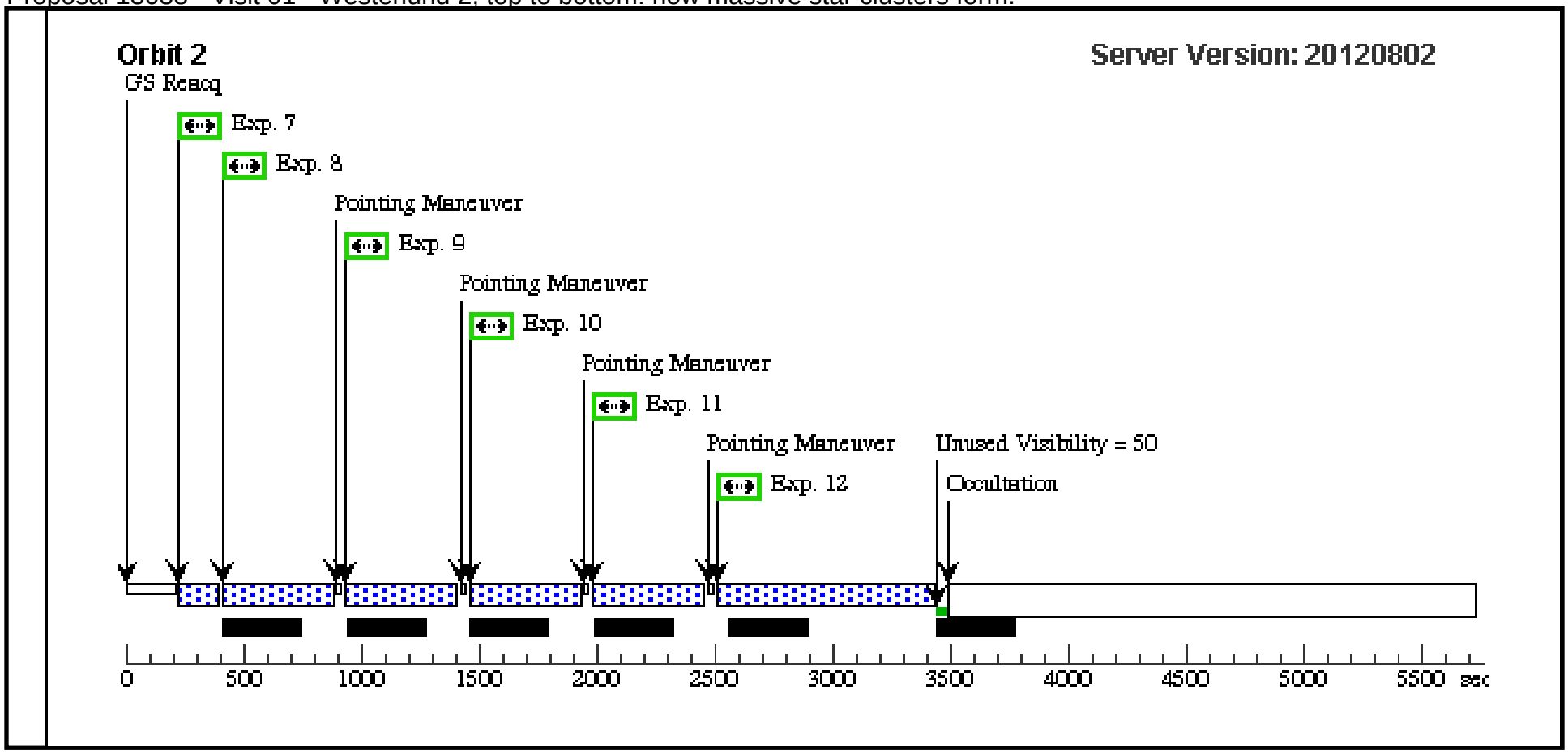
Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1		(1) ESO-127-18	ACS/WFC, ACCUM, WFC	F555W		POS TARG -30,-30		3 Secs	
								[==>]	***[1]***
2		(1) ESO-127-18	ACS/WFC, ACCUM, WFC	F555W		POS TARG -30,-30		350 Secs	
								[==>]	***[1]***
3		(1) ESO-127-18	ACS/WFC, ACCUM, WFC	F555W		POS TARG -15,-15		350 Secs	
								[==>]	***[1]***
4		(1) ESO-127-18	ACS/WFC, ACCUM, WFC	F555W				350 Secs	
								[==>]	***[1]***
5		(1) ESO-127-18	ACS/WFC, ACCUM, WFC	F555W		POS TARG 15,15		350 Secs	
								[==>]	***[1]***
6		(1) ESO-127-18	ACS/WFC, ACCUM, WFC	F658N		POS TARG 15,15		650 Secs	
								[==>]	***[1]***
7		(1) ESO-127-18	ACS/WFC, ACCUM, WFC	F814W		POS TARG -30,-30		3 Secs	
								[==>]	***[2]***
8		(1) ESO-127-18	ACS/WFC, ACCUM, WFC	F814W		POS TARG -30,-30		350 Secs	
								[==>]	***[2]***
9		(1) ESO-127-18	ACS/WFC, ACCUM, WFC	F814W		POS TARG -15,-15		350 Secs	
								[==>]	***[2]***
10		(1) ESO-127-18	ACS/WFC, ACCUM, WFC	F814W		POS TARG 0,null		350 Secs	
								[==>]	***[2]***
11		(1) ESO-127-18	ACS/WFC, ACCUM, WFC	F814W		POS TARG 15,15		350 Secs	
								[==>]	***[2]***
12		(1) ESO-127-18	ACS/WFC, ACCUM, WFC	F658N		POS TARG 0,null		750 Secs	
								[==>]	***[2]***

Orbit Structure



Proposal 13038 - Visit 01 - Westerlund 2, top to bottom: how massive star clusters form.



Visit

Proposal 13038, Tile Visit 08, implementation Sat Sep 29 01:47:36 GMT 2012

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: (none)

Fixed Targets

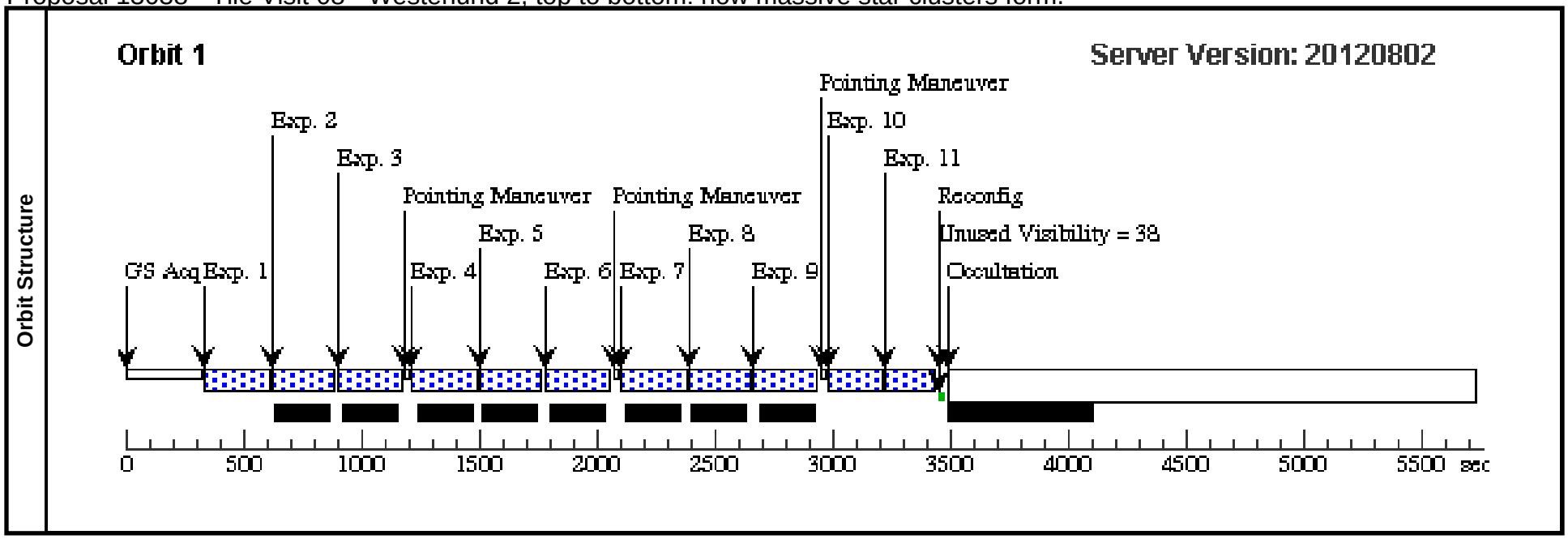
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	ESO-127-18	RA: 10 24 5.5000 (156.0229167d) Dec: -57 45 49.00 (-57.76361d) Equinox: J2000		V=10.5	Reference Frame: ICRS

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/[Actual Dur.]	Orbit
1		(1) ESO-127-18	WFC3/IR, MULTIACCUM, IR-FIX	F125W	NSAMP=10; SAMP-SEQ=STEP50	POS TARG -77.566 38000000001,-70.37 1285		*[==>]*	***[1]***
2		(1) ESO-127-18	WFC3/IR, MULTIACCUM, IR-FIX	F160W	NSAMP=10; SAMP-SEQ=STEP50	POS TARG -77.566 38000000001,-70.37 1285		*[==>]*	***[1]***
3		(1) ESO-127-18	WFC3/IR, MULTIACCUM, IR-FIX	F128N	NSAMP=10; SAMP-SEQ=STEP50	POS TARG -77.566 38000000001,-70.37 1285		*[==>]*	***[1]***
4		(1) ESO-127-18	WFC3/IR, MULTIACCUM, IR-FIX	F125W	NSAMP=10; SAMP-SEQ=STEP50	POS TARG -69.566 38000000001,-62.37 1285		*[==>]*	***[1]***
5		(1) ESO-127-18	WFC3/IR, MULTIACCUM, IR-FIX	F160W	NSAMP=10; SAMP-SEQ=STEP50	POS TARG -69.566 38000000001,-62.37 1285		*[==>]*	***[1]***
6		(1) ESO-127-18	WFC3/IR, MULTIACCUM, IR-FIX	F128N	NSAMP=10; SAMP-SEQ=STEP50	POS TARG -69.566 38000000001,-62.37 1285		*[==>]*	***[1]***
7		(1) ESO-127-18	WFC3/IR, MULTIACCUM, IR-FIX	F125W	NSAMP=10; SAMP-SEQ=STEP50	POS TARG -62.566 38000000001,-55.37 1285		*[==>]*	***[1]***
8		(1) ESO-127-18	WFC3/IR, MULTIACCUM, IR-FIX	F160W	NSAMP=10; SAMP-SEQ=STEP50	POS TARG -62.566 38000000001,-55.37 1285		*[==>]*	***[1]***
9		(1) ESO-127-18	WFC3/IR, MULTIACCUM, IR-FIX	F128N	NSAMP=10; SAMP-SEQ=STEP50	POS TARG -62.566 38000000001,-55.37 1285		*[==>]*	***[1]***
10		(1) ESO-127-18	WFC3/IR, MULTIACCUM, IR-FIX	F125W	NSAMP=9; SAMP-SEQ=STEP50	POS TARG -55.566 38000000001,-48.37 1285		*[==>]*	***[1]***
11		(1) ESO-127-18	WFC3/IR, MULTIACCUM, IR-FIX	F160W	NSAMP=9; SAMP-SEQ=STEP50	POS TARG -55.566 38000000001,-48.37 1285		*[==>]*	***[1]***

Proposal 13038 - Tile Visit 08 - Westerlund 2, top to bottom: how massive star clusters form.



Visit

Proposal 13038, Tile Visit 09, implementation Sat Sep 29 01:47:38 GMT 2012

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: SAME ORIENT AS 08

Fixed Targets

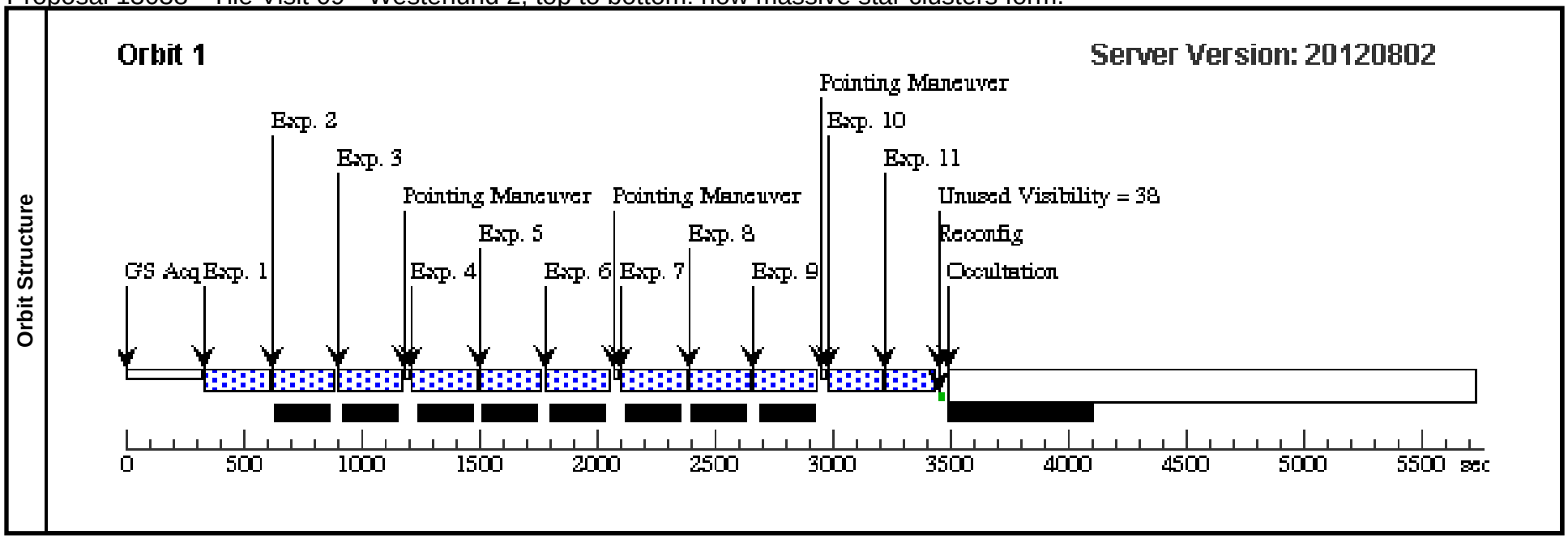
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	ESO-127-18	RA: 10 24 5.5000 (156.0229167d) Dec: -57 45 49.00 (-57.76361d) Equinox: J2000		V=10.5	Reference Frame: ICRS

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/[Actual Dur.]	Orbit
1		(1) ESO-127-18	WFC3/IR, MULTIACCUM, IR-FIX	F125W	NSAMP=10; SAMP-SEQ=STEP50	POS TARG 47.5663 8000000001,-70.371285		*[==>]*	***[1]***
2		(1) ESO-127-18	WFC3/IR, MULTIACCUM, IR-FIX	F160W	NSAMP=10; SAMP-SEQ=STEP50	POS TARG 47.5663 8000000001,-70.371285		*[==>]*	***[1]***
3		(1) ESO-127-18	WFC3/IR, MULTIACCUM, IR-FIX	F128N	NSAMP=10; SAMP-SEQ=STEP50	POS TARG 47.5663 8000000001,-70.371285		*[==>]*	***[1]***
4		(1) ESO-127-18	WFC3/IR, MULTIACCUM, IR-FIX	F125W	NSAMP=10; SAMP-SEQ=STEP50	POS TARG 55.5663 8000000001,-62.371285		*[==>]*	***[1]***
5		(1) ESO-127-18	WFC3/IR, MULTIACCUM, IR-FIX	F160W	NSAMP=10; SAMP-SEQ=STEP50	POS TARG 55.5663 8000000001,-62.371285		*[==>]*	***[1]***
6		(1) ESO-127-18	WFC3/IR, MULTIACCUM, IR-FIX	F128N	NSAMP=10; SAMP-SEQ=STEP50	POS TARG 55.5663 8000000001,-62.371285		*[==>]*	***[1]***
7		(1) ESO-127-18	WFC3/IR, MULTIACCUM, IR-FIX	F125W	NSAMP=10; SAMP-SEQ=STEP50	POS TARG 62.5663 8000000001,-55.371285		*[==>]*	***[1]***
8		(1) ESO-127-18	WFC3/IR, MULTIACCUM, IR-FIX	F160W	NSAMP=10; SAMP-SEQ=STEP50	POS TARG 62.5663 8000000001,-55.371285		*[==>]*	***[1]***
9		(1) ESO-127-18	WFC3/IR, MULTIACCUM, IR-FIX	F128N	NSAMP=10; SAMP-SEQ=STEP50	POS TARG 62.5663 8000000001,-55.371285		*[==>]*	***[1]***
10		(1) ESO-127-18	WFC3/IR, MULTIACCUM, IR-FIX	F125W	NSAMP=9; SAMP-SEQ=STEP50	POS TARG 69.5663 8000000001,-48.371285		*[==>]*	***[1]***
11		(1) ESO-127-18	WFC3/IR, MULTIACCUM, IR-FIX	F160W	NSAMP=9; SAMP-SEQ=STEP50	POS TARG 69.5663 8000000001,-48.371285		*[==>]*	***[1]***

Proposal 13038 - Tile Visit 09 - Westerlund 2, top to bottom: how massive star clusters form.



Visit

Proposal 13038, Tile Visit 10, implementation Sat Sep 29 01:47:39 GMT 2012

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: SAME ORIENT AS 08

Fixed Targets

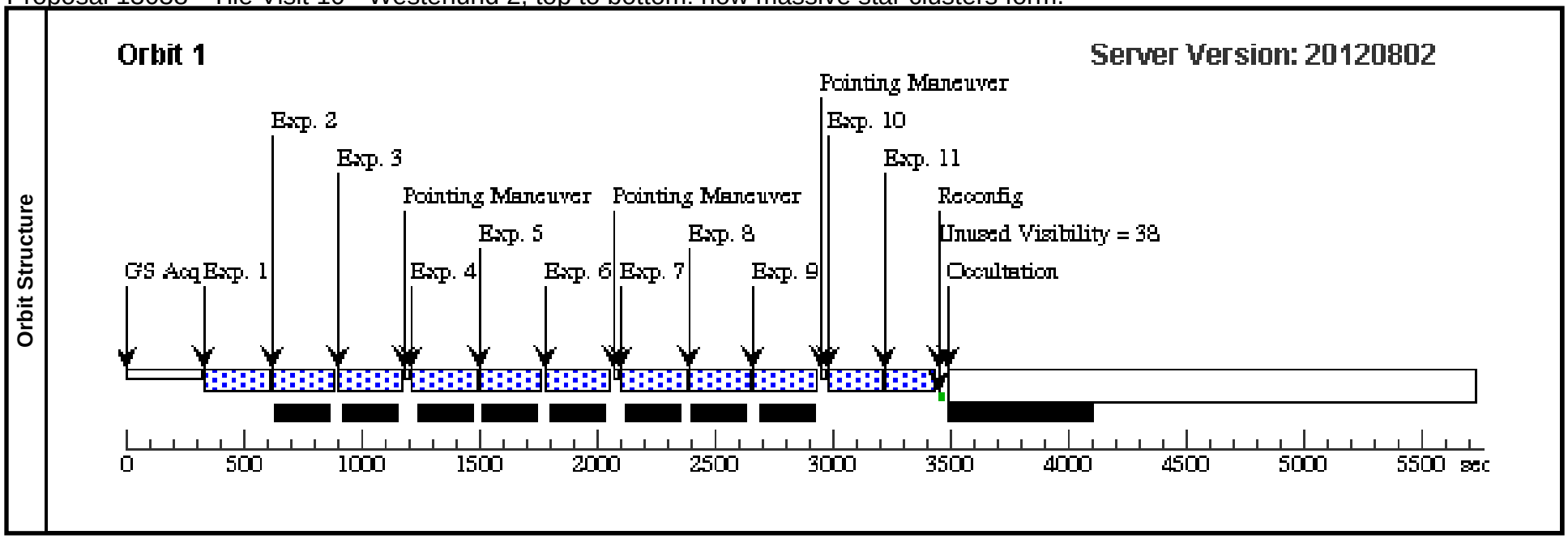
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	ESO-127-18	RA: 10 24 5.5000 (156.0229167d) Dec: -57 45 49.00 (-57.76361d) Equinox: J2000		V=10.5	Reference Frame: ICRS

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/[Actual Dur.]	Orbit
1		(1) ESO-127-18	WFC3/IR, MULTIACCUM, IR-FIX	F125W	NSAMP=10; SAMP-SEQ=STEP50	POS TARG -77.566 38000000001,40.371 28499999999		*[==>]*	***[1]***
2		(1) ESO-127-18	WFC3/IR, MULTIACCUM, IR-FIX	F160W	NSAMP=10; SAMP-SEQ=STEP50	POS TARG -77.566 38000000001,40.371 28499999999		*[==>]*	***[1]***
3		(1) ESO-127-18	WFC3/IR, MULTIACCUM, IR-FIX	F128N	NSAMP=10; SAMP-SEQ=STEP50	POS TARG -77.566 38000000001,40.371 28499999999		*[==>]*	***[1]***
4		(1) ESO-127-18	WFC3/IR, MULTIACCUM, IR-FIX	F125W	NSAMP=10; SAMP-SEQ=STEP50	POS TARG -69.566 38000000001,48.371 28499999999		*[==>]*	***[1]***
5		(1) ESO-127-18	WFC3/IR, MULTIACCUM, IR-FIX	F160W	NSAMP=10; SAMP-SEQ=STEP50	POS TARG -69.566 38000000001,48.371 28499999999		*[==>]*	***[1]***
6		(1) ESO-127-18	WFC3/IR, MULTIACCUM, IR-FIX	F128N	NSAMP=10; SAMP-SEQ=STEP50	POS TARG -69.566 38000000001,48.371 28499999999		*[==>]*	***[1]***
7		(1) ESO-127-18	WFC3/IR, MULTIACCUM, IR-FIX	F125W	NSAMP=10; SAMP-SEQ=STEP50	POS TARG -62.566 38000000001,55.371 28499999999		*[==>]*	***[1]***
8		(1) ESO-127-18	WFC3/IR, MULTIACCUM, IR-FIX	F160W	NSAMP=10; SAMP-SEQ=STEP50	POS TARG -62.566 38000000001,55.371 28499999999		*[==>]*	***[1]***
9		(1) ESO-127-18	WFC3/IR, MULTIACCUM, IR-FIX	F128N	NSAMP=10; SAMP-SEQ=STEP50	POS TARG -62.566 38000000001,55.371 28499999999		*[==>]*	***[1]***
10		(1) ESO-127-18	WFC3/IR, MULTIACCUM, IR-FIX	F125W	NSAMP=9; SAMP-SEQ=STEP50	POS TARG -55.566 38000000001,62.371 28499999999		*[==>]*	***[1]***
11		(1) ESO-127-18	WFC3/IR, MULTIACCUM, IR-FIX	F160W	NSAMP=9; SAMP-SEQ=STEP50	POS TARG -55.566 38000000001,62.371 28499999999		*[==>]*	***[1]***

Proposal 13038 - Tile Visit 10 - Westerlund 2, top to bottom: how massive star clusters form.



Visit

Proposal 13038, Tile Visit 11, implementation Sat Sep 29 01:47:40 GMT 2012

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: SAME ORIENT AS 08

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	ESO-127-18	RA: 10 24 5.5000 (156.0229167d) Dec: -57 45 49.00 (-57.76361d) Equinox: J2000		V=10.5	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/[Actual Dur.]	Orbit
1		(1) ESO-127-18	WFC3/IR, MULTIACCUM, IR-FIX	F125W	NSAMP=10; SAMP-SEQ=STEP50	POS TARG 47.5663 8000000001,40.3712 8499999999		*[==>]*	***[1]***
2		(1) ESO-127-18	WFC3/IR, MULTIACCUM, IR-FIX	F160W	NSAMP=10; SAMP-SEQ=STEP50	POS TARG 47.5663 8000000001,40.3712 8499999999		*[==>]*	***[1]***
3		(1) ESO-127-18	WFC3/IR, MULTIACCUM, IR-FIX	F128N	NSAMP=10; SAMP-SEQ=STEP50	POS TARG 47.5663 8000000001,40.3712 8499999999		*[==>]*	***[1]***
4		(1) ESO-127-18	WFC3/IR, MULTIACCUM, IR-FIX	F125W	NSAMP=10; SAMP-SEQ=STEP50	POS TARG 55.5663 8000000001,48.3712 8499999999		*[==>]*	***[1]***
5		(1) ESO-127-18	WFC3/IR, MULTIACCUM, IR-FIX	F160W	NSAMP=10; SAMP-SEQ=STEP50	POS TARG 55.5663 8000000001,48.3712 8499999999		*[==>]*	***[1]***
6		(1) ESO-127-18	WFC3/IR, MULTIACCUM, IR-FIX	F128N	NSAMP=10; SAMP-SEQ=STEP50	POS TARG 55.5663 8000000001,48.3712 8499999999		*[==>]*	***[1]***
7		(1) ESO-127-18	WFC3/IR, MULTIACCUM, IR-FIX	F125W	NSAMP=10; SAMP-SEQ=STEP50	POS TARG 62.5663 8000000001,55.3712 8499999999		*[==>]*	***[1]***
8		(1) ESO-127-18	WFC3/IR, MULTIACCUM, IR-FIX	F160W	NSAMP=10; SAMP-SEQ=STEP50	POS TARG 62.5663 8000000001,55.3712 8499999999		*[==>]*	***[1]***
9		(1) ESO-127-18	WFC3/IR, MULTIACCUM, IR-FIX	F128N	NSAMP=10; SAMP-SEQ=STEP50	POS TARG 62.5663 8000000001,55.3712 8499999999		*[==>]*	***[1]***
10		(1) ESO-127-18	WFC3/IR, MULTIACCUM, IR-FIX	F125W	NSAMP=9; SAMP-SEQ=STEP50	POS TARG 69.5663 8000000001,62.3712 8499999999		*[==>]*	***[1]***
11		(1) ESO-127-18	WFC3/IR, MULTIACCUM, IR-FIX	F160W	NSAMP=9; SAMP-SEQ=STEP50	POS TARG 69.5663 8000000001,62.3712 8499999999		*[==>]*	***[1]***

Proposal 13038 - Tile Visit 11 - Westerlund 2, top to bottom: how massive star clusters form.