



14156 - An Ionizing Photon Rate Map of NGC 6946

Cycle: 23, Proposal Category: GO

(Availability Mode: SUPPORTED)

INVESTIGATORS

<i>Name</i>	<i>Institution</i>	<i>E-Mail</i>
Dr. Adam Leroy (PI) (Contact)	The Ohio State University	leroy.42@osu.edu
Dr. Croxall, Kevin (CoI)	The Ohio State University	croxall.5@osu.edu
Kathryn Kreckel (CoI) (ESA Member)	Max-Planck-Institut fur Astronomie, Heidelberg	kreckel@mpia.de
Dr. Eric J. Murphy (CoI)	Jet Propulsion Laboratory	emurphy@ipac.caltech.edu
Dr. Richard W. Pogge (CoI)	The Ohio State University	pogge.1@osu.edu
Dr. Eva Schinnerer (CoI) (ESA Member)	Max-Planck-Institut fur Astronomie, Heidelberg	schinner@mpia.de

VISITS

<i>Visit</i>	<i>Targets used in Visit</i>	<i>Configurations used in Visit</i>	<i>Orbits Used</i>	<i>Last Orbit Planner Run</i>	<i>OP Current with Visit?</i>
02	(1) NGC-6946-CENTER	WFC3/IR	8	06-Nov-2015 21:18:23.0	yes

8 Total Orbits Used

ABSTRACT

Significant progress in our understanding of star formation and galaxy evolution depends on ability to obtain precise measurements of the star formation rate on scales from individual regions to large samples of galaxies. In order to do so we need to benchmark star formation rate estimators available for large samples and over wide areas (e.g., H α +IR,

UV+IR) against high quality, spatially resolved "ground-truth" measurements. This has been done in groundbreaking studies for individual regions, but has yet to be done carefully using maps covering whole area of nearby galaxies.

The Paschen beta line is ideal for this purpose: it tracks star formation by tracing ionizing photons that can be cleanly associated with young stars and it is 3x less affected by extinction than the commonly used H α line. Most important WFC3 has the demonstrated ability to map Paschen beta at

high resolution and excellent sensitivity over the whole area of nearby galaxies. We propose to use this capability to map the active area of active star formation in NGC6946, making only the second deeply sensitive map of Paschen beta across a whole nearby star-forming galaxy. We will use this to (1) inter-compare proposed ground-truth tracers (free-free, optical Balmer decrement, Paschen beta + Halpha) and (2) to improve the calibration of empirical star formation rate estimators by measuring them for individual regions, across large parts of galaxies, and comparing galaxies. Only HST can provide this new and important measurement of an extinction robust tracer of ionizing photon rates at high sensitivity and resolution across a whole galaxy.

OBSERVING DESCRIPTION

We aim for a 3 x 3 mosaic in the 128N (Paschen Beta) and 110W (broad band off) filters.

The orientation is allowed to be anything as long as it is fixed - that is, we are happy with a circle being our guaranteed coverage and then the square can be pointed any direction around this.

Proposal 14156 - NGC 6946 110W 128N Mosaic Offsets (02) - An Ionizing Photon Rate Map of NGC 6946

Sat Nov 07 02:18:28 GMT 2015

Visit	Proposal 14156, NGC 6946 110W 128N Mosaic Offsets (02), implementation Diagnostic Status: Warning Scientific Instruments: WFC3/IR Special Requirements: (none)				
	Diagnostics	(NGC 6946 110W 128N Mosaic Offsets (02)) Warning (Orbit Planner): PATTERN POSITION OUTSIDE APERTURE (NGC 6946 110W 128N Mosaic Offsets (02)) Warning (Orbit Planner): PATTERN POSITION OUTSIDE APERTURE (NGC 6946 110W 128N Mosaic Offsets (02)) Warning (Orbit Planner): PATTERN POSITION OUTSIDE APERTURE (NGC 6946 110W 128N Mosaic Offsets (02)) Warning (Orbit Planner): PATTERN POSITION OUTSIDE APERTURE (NGC 6946 110W 128N Mosaic Offsets (02)) Warning (Orbit Planner): PATTERN POSITION OUTSIDE APERTURE (NGC 6946 110W 128N Mosaic Offsets (02)) Warning (Orbit Planner): PATTERN POSITION OUTSIDE APERTURE (NGC 6946 110W 128N Mosaic Offsets (02)) Warning (Orbit Planner): PATTERN POSITION OUTSIDE APERTURE (NGC 6946 110W 128N Mosaic Offsets (02)) Warning (Orbit Planner): PATTERN POSITION OUTSIDE APERTURE (NGC 6946 110W 128N Mosaic Offsets (02)) Warning (Orbit Planner): PATTERN POSITION OUTSIDE APERTURE (NGC 6946 110W 128N Mosaic Offsets (02)) Warning (Orbit Planner): PATTERN POSITION OUTSIDE APERTURE (NGC 6946 110W 128N Mosaic Offsets (02)) Warning (Orbit Planner): PATTERN POSITION OUTSIDE APERTURE (NGC 6946 110W 128N Mosaic Offsets (02)) Warning (Orbit Planner): PATTERN POSITION OUTSIDE APERTURE (NGC 6946 110W 128N Mosaic Offsets (02)) Warning (Orbit Planner): PATTERN POSITION OUTSIDE APERTURE (NGC 6946 110W 128N Mosaic Offsets (02)) Warning (Orbit Planner): PATTERN POSITION OUTSIDE APERTURE (NGC 6946 110W 128N Mosaic Offsets (02)) Warning (Orbit Planner): PATTERN POSITION OUTSIDE APERTURE (NGC 6946 110W 128N Mosaic Offsets (02)) Warning (Orbit Planner): PATTERN POSITION OUTSIDE APERTURE (Exposure 1 (Pattern 2, Exps 1-1 in NGC 6946 110W 128N Mosaic Offsets (02)) special requirements) Warning (Form): Be very careful mixing POS TARG and Center_Pattern = Yes (Exposure 3 (Pattern 2, Exps 3-3 in NGC 6946 110W 128N Mosaic Offsets (02)) special requirements) Warning (Form): Be very careful mixing POS TARG and Center_Pattern = Yes (Exposure 5 (Pattern 2, Exps 5-5 in NGC 6946 110W 128N Mosaic Offsets (02)) special requirements) Warning (Form): Be very careful mixing POS TARG and Center_Pattern = Yes (Exposure 7 (Pattern 2, Exps 7-7 in NGC 6946 110W 128N Mosaic Offsets (02)) special requirements) Warning (Form): Be very careful mixing POS TARG and Center_Pattern = Yes (Exposure 9 (Pattern 2, Exps 9-9 in NGC 6946 110W 128N Mosaic Offsets (02)) special requirements) Warning (Form): Be very careful mixing POS TARG and Center_Pattern = Yes (Exposure 11 (Pattern 2, Exps 11-11 in NGC 6946 110W 128N Mosaic Offsets (02)) special requirements) Warning (Form): Be very careful mixing POS TARG and Center_Pattern = Yes (Exposure 13 (Pattern 2, Exps 13-13 in NGC 6946 110W 128N Mosaic Offsets (02)) special requirements) Warning (Form): Be very careful mixing POS TARG and Center_Pattern = Yes (Exposure 15 (Pattern 2, Exps 15-15 in NGC 6946 110W 128N Mosaic Offsets (02)) special requirements) Warning (Form): Be very careful mixing POS TARG and Center_Pattern = Yes (Exposure 17 (Pattern 2, Exps 17-17 in NGC 6946 110W 128N Mosaic Offsets (02)) special requirements) Warning (Form): Be very careful mixing POS TARG and Center_Pattern = Yes			
Patterns		#	Primary Pattern	Secondary Pattern	Exposures
		(1)	Pattern Type=WFC3-IR-DITHER-BLOB Purpose=DITHER Number Of Points=2 Point Spacing=5.183 Line Spacing= Coordinate Frame=POS-TARG Pattern Orientation=41.859 Angle Between Sides= Center Pattern=false		(2), (4), (6), (8), (10), (12), (14), (16), (18)
(2)		Pattern Type=WFC3-IR-DITHER-BLOB Purpose=DITHER Number Of Points=2 Point Spacing=5.183 Line Spacing= Coordinate Frame=POS-TARG Pattern Orientation=41.859 Angle Between Sides= Center Pattern=true	Pattern Type=WFC3-IR-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.636 Line Spacing= Coordinate Frame=POS-TARG Pattern Orientation=41.788 Angle Between Sides= Center Pattern=false		(1), (3), (5), (7), (9), (11), (13), (15), (17)

Proposal 14156 - NGC 6946 110W 128N Mosaic Offsets (02) - An Ionizing Photon Rate Map of NGC 6946

Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
	(1)	NGC-6946-CENTER	RA: 20 34 52.3200 (308.7180000d) Dec: +60 09 14.04 (60.15390d) Equinox: J2000		V=8.57	Reference Frame: NED
	<i>Comments: This object was generated by the targetselector and retrieved from the NED database.</i>					
	<i>This is the central position in the galaxy.</i>					
	<i>The flux is the total V (Johnson) magnitude from NED.</i>					
	<i>Extended=YES</i>					

Proposal 14156 - NGC 6946 110W 128N Mosaic Offsets (02) - An Ionizing Photon Rate Map of NGC 6946

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
Exposures	1	(1) NGC-6946-CEN TER	WFC3/IR, MULTIACCUM, IR-FIX	F128N	NSAMP=8; SAMP-SEQ=SPAR S50	POS TARG -125.13 276000000002,-110. 74257000000001	Pattern 2, Exps 1-1 i n NGC 6946 110W 1 28N Mosaic Offsets (02) (2)	352.935448 Secs (1411.742 Secs) [==>(Pattern 1,1)] [==>(Pattern 1,2)] [==>(Pattern 2,1)] [==>(Pattern 2,2)]	[1]
	2	(1) NGC-6946-CEN TER	WFC3/IR, MULTIACCUM, IR-FIX	F110W	NSAMP=10; SAMP-SEQ=SPAR S25	POS TARG -125.13 276000000002,-110. 74257000000001	Pattern 1, Exps 2-2 i n NGC 6946 110W 1 28N Mosaic Offsets (02) (1)	227.936926 Secs (455.874 Secs) [==>(Pattern 1)] [==>(Pattern 2)]	[1]
	3	(1) NGC-6946-CEN TER	WFC3/IR, MULTIACCUM, IR-FIX	F128N	NSAMP=8; SAMP-SEQ=SPAR S50	POS TARG 0,-110.7 4257000000001	Pattern 2, Exps 3-3 i n NGC 6946 110W 1 28N Mosaic Offsets (02) (2)	352.935448 Secs (1411.742 Secs) [==>(Pattern 1,1)] [==>(Pattern 1,2)] [==>(Pattern 2,1)] [==>(Pattern 2,2)]	[1] [2]
	4	(1) NGC-6946-CEN TER	WFC3/IR, MULTIACCUM, IR-FIX	F110W	NSAMP=10; SAMP-SEQ=SPAR S25	POS TARG 0,-110.7 4257000000001	Pattern 1, Exps 4-4 i n NGC 6946 110W 1 28N Mosaic Offsets (02) (1)	227.936926 Secs (455.874 Secs) [==>(Pattern 1)] [==>(Pattern 2)]	[2]
	5	(1) NGC-6946-CEN TER	WFC3/IR, MULTIACCUM, IR-FIX	F128N	NSAMP=8; SAMP-SEQ=SPAR S50	POS TARG 125.132 760000000002,-110.7 4257000000001	Pattern 2, Exps 5-5 i n NGC 6946 110W 1 28N Mosaic Offsets (02) (2)	352.935448 Secs (1411.742 Secs) [==>(Pattern 1,1)] [==>(Pattern 1,2)] [==>(Pattern 2,1)] [==>(Pattern 2,2)]	[2] [3]
	6	(1) NGC-6946-CEN TER	WFC3/IR, MULTIACCUM, IR-FIX	F110W	NSAMP=10; SAMP-SEQ=SPAR S25	POS TARG 125.132 760000000002,-110.7 4257000000001	Pattern 1, Exps 6-6 i n NGC 6946 110W 1 28N Mosaic Offsets (02) (1)	227.936926 Secs (455.874 Secs) [==>(Pattern 1)] [==>(Pattern 2)]	[3]
	7	(1) NGC-6946-CEN TER	WFC3/IR, MULTIACCUM, IR-FIX	F128N	NSAMP=8; SAMP-SEQ=SPAR S50	POS TARG 125.132 760000000002,0	Pattern 2, Exps 7-7 i n NGC 6946 110W 1 28N Mosaic Offsets (02) (2)	352.935448 Secs (1411.742 Secs) [==>(Pattern 1,1)] [==>(Pattern 1,2)] [==>(Pattern 2,1)] [==>(Pattern 2,2)]	[3] [4]
	8	(1) NGC-6946-CEN TER	WFC3/IR, MULTIACCUM, IR-FIX	F110W	NSAMP=10; SAMP-SEQ=SPAR S25	POS TARG 125.132 760000000002,0	Pattern 1, Exps 8-8 i n NGC 6946 110W 1 28N Mosaic Offsets (02) (1)	227.936926 Secs (455.874 Secs) [==>(Pattern 1)] [==>(Pattern 2)]	[4]
	9	(1) NGC-6946-CEN TER	WFC3/IR, MULTIACCUM, IR-FIX	F128N	NSAMP=8; SAMP-SEQ=SPAR S50	POS TARG 0,0	Pattern 2, Exps 9-9 i n NGC 6946 110W 1 28N Mosaic Offsets (02) (2)	352.935448 Secs (1411.742 Secs) [==>(Pattern 1,1)] [==>(Pattern 1,2)] [==>(Pattern 2,1)] [==>(Pattern 2,2)]	[4]
	10	(1) NGC-6946-CEN TER	WFC3/IR, MULTIACCUM, IR-FIX	F110W	NSAMP=10; SAMP-SEQ=SPAR S25	POS TARG 0,0	Pattern 1, Exps 10-1 0 in NGC 6946 110 W 128N Mosaic Off sets (02) (1)	227.936926 Secs (455.874 Secs) [==>(Pattern 1)] [==>(Pattern 2)]	[5]

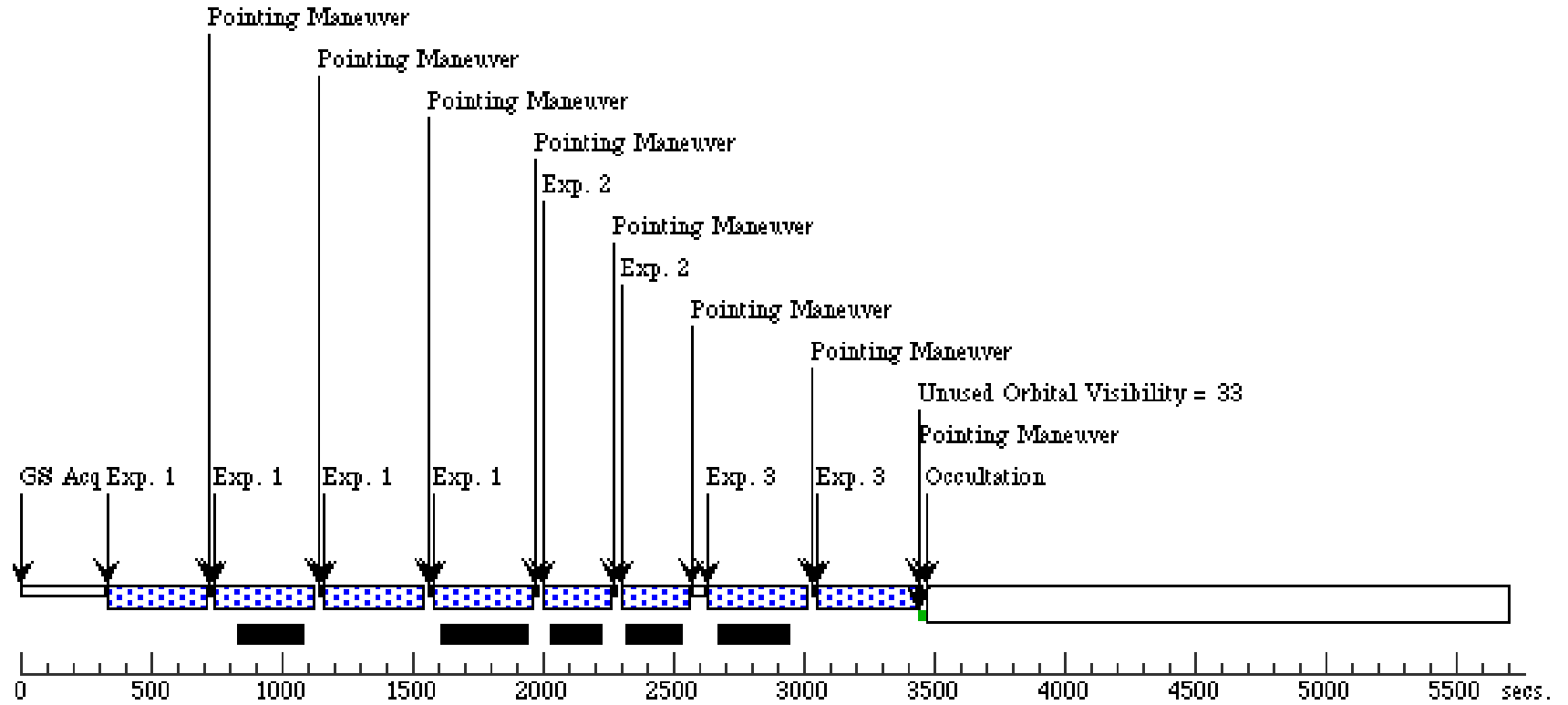
Proposal 14156 - NGC 6946 110W 128N Mosaic Offsets (02) - An Ionizing Photon Rate Map of NGC 6946

11	(1) NGC-6946-CEN TER	WFC3/IR, MULTIACCUM, IR-FIX F128N	NSAMP=8; SAMP-SEQ=SPAR S50	POS TARG -125.13 276000000002,0	Pattern 2, Exps 11-1 1 in NGC 6946 110 W 128N Mosaic Off sets (02) (2)	352.935448 Secs (1411.742 Secs) [==>(Pattern 1,1)] [==>(Pattern 1,2)] [==>(Pattern 2,1)] [==>(Pattern 2,2)]	[5]
12	(1) NGC-6946-CEN TER	WFC3/IR, MULTIACCUM, IR-FIX F110W	NSAMP=10; SAMP-SEQ=SPAR S25	POS TARG -125.13 276000000002,0	Pattern 1, Exps 12-1 2 in NGC 6946 110 W 128N Mosaic Off sets (02) (1)	227.936926 Secs (455.874 Secs) [==>(Pattern 1)] [==>(Pattern 2)]	[5] [6]
13	(1) NGC-6946-CEN TER	WFC3/IR, MULTIACCUM, IR-FIX F128N	NSAMP=8; SAMP-SEQ=SPAR S50	POS TARG -125.13 276000000002,110.7 4256999999999	Pattern 2, Exps 13-1 3 in NGC 6946 110 W 128N Mosaic Off sets (02) (2)	352.935448 Secs (1411.742 Secs) [==>(Pattern 1,1)] [==>(Pattern 1,2)] [==>(Pattern 2,1)] [==>(Pattern 2,2)]	[6]
14	(1) NGC-6946-CEN TER	WFC3/IR, MULTIACCUM, IR-FIX F110W	NSAMP=10; SAMP-SEQ=SPAR S25	POS TARG -125.13 276000000002,110.7 4256999999999	Pattern 1, Exps 14-1 4 in NGC 6946 110 W 128N Mosaic Off sets (02) (1)	227.936926 Secs (455.874 Secs) [==>(Pattern 1)] [==>(Pattern 2)]	[6]
15	(1) NGC-6946-CEN TER	WFC3/IR, MULTIACCUM, IR-FIX F128N	NSAMP=8; SAMP-SEQ=SPAR S50	POS TARG 0,110.74 2569999999999	Pattern 2, Exps 15-1 5 in NGC 6946 110 W 128N Mosaic Off sets (02) (2)	352.935448 Secs (1411.742 Secs) [==>(Pattern 1,1)] [==>(Pattern 1,2)] [==>(Pattern 2,1)] [==>(Pattern 2,2)]	[7]
16	(1) NGC-6946-CEN TER	WFC3/IR, MULTIACCUM, IR-FIX F110W	NSAMP=10; SAMP-SEQ=SPAR S25	POS TARG 0,110.74 2569999999999	Pattern 1, Exps 16-1 6 in NGC 6946 110 W 128N Mosaic Off sets (02) (1)	227.936926 Secs (455.874 Secs) [==>(Pattern 1)] [==>(Pattern 2)]	[7]
17	(1) NGC-6946-CEN TER	WFC3/IR, MULTIACCUM, IR-FIX F128N	NSAMP=8; SAMP-SEQ=SPAR S50	POS TARG 125.132 760000000002,110.74 2569999999999	Pattern 2, Exps 17-1 7 in NGC 6946 110 W 128N Mosaic Off sets (02) (2)	352.935448 Secs (1411.742 Secs) [==>(Pattern 1,1)] [==>(Pattern 1,2)] [==>(Pattern 2,1)] [==>(Pattern 2,2)]	[7] [8]
18	(1) NGC-6946-CEN TER	WFC3/IR, MULTIACCUM, IR-FIX F110W	NSAMP=10; SAMP-SEQ=SPAR S25	POS TARG 125.132 760000000002,110.74 2569999999999	Pattern 1, Exps 18-1 8 in NGC 6946 110 W 128N Mosaic Off sets (02) (1)	227.936926 Secs (455.874 Secs) [==>(Pattern 1)] [==>(Pattern 2)]	[8]

Orbit 1

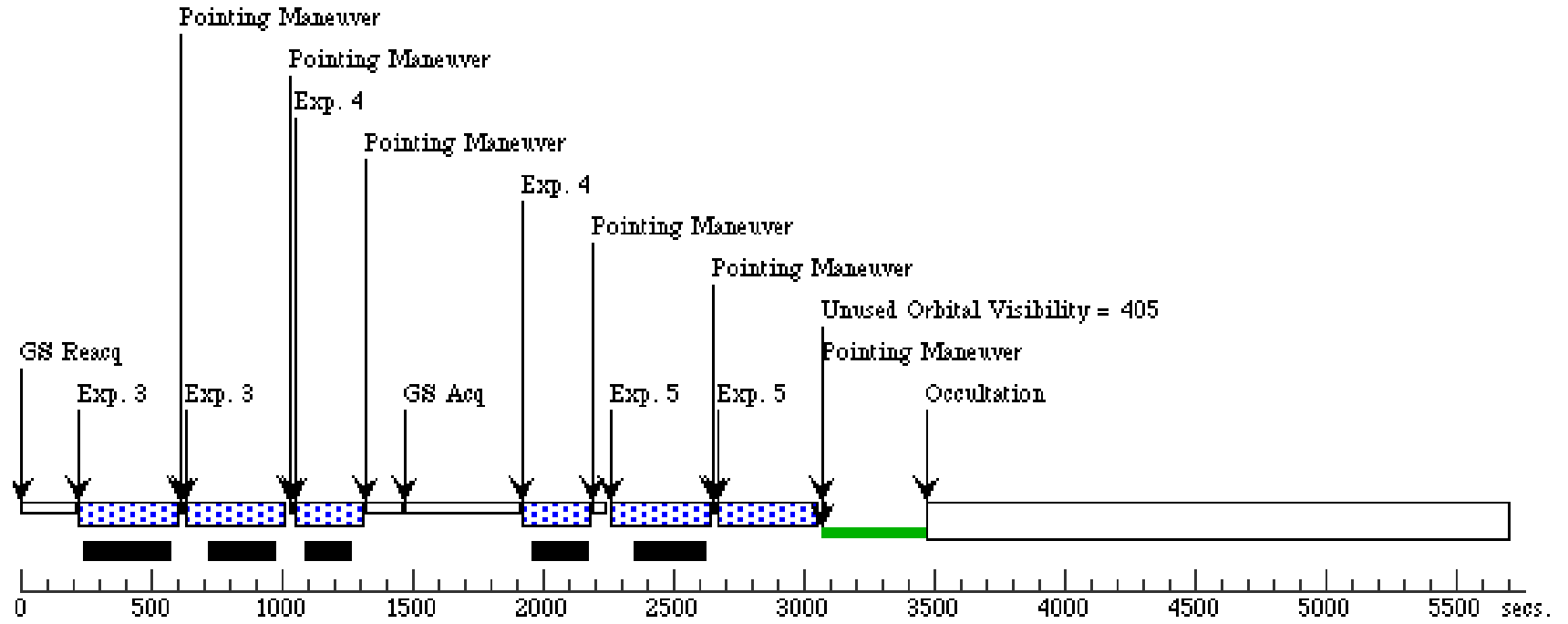
Server Version: 20150609

Orbit Structure



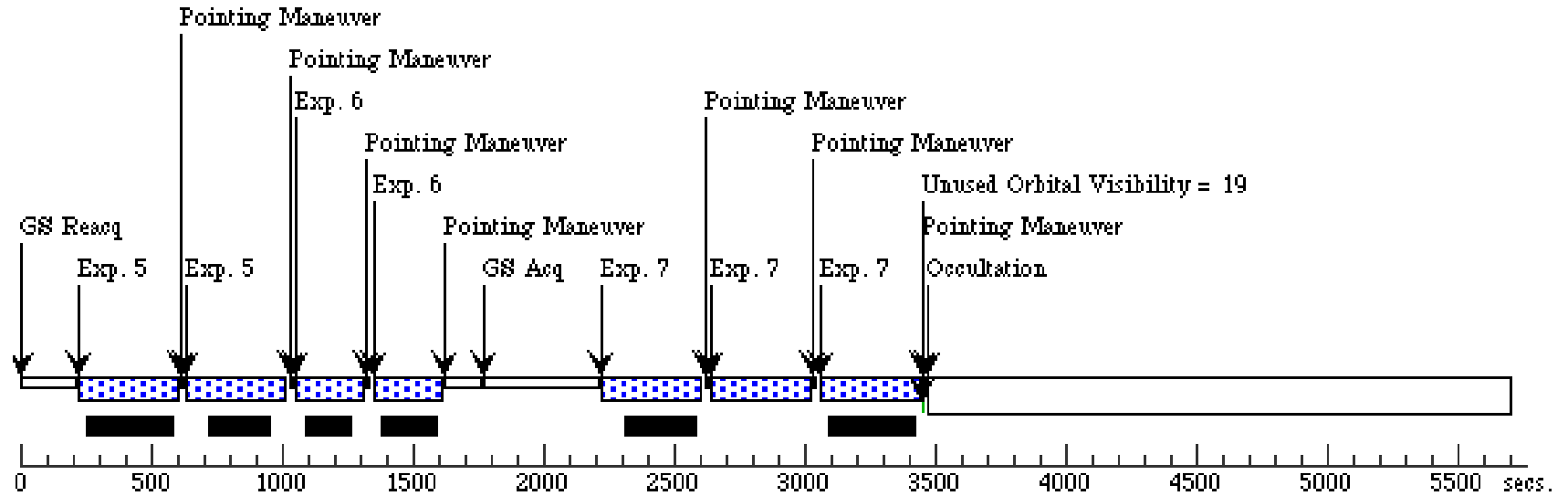
Orbit 2

Server Version: 20150609



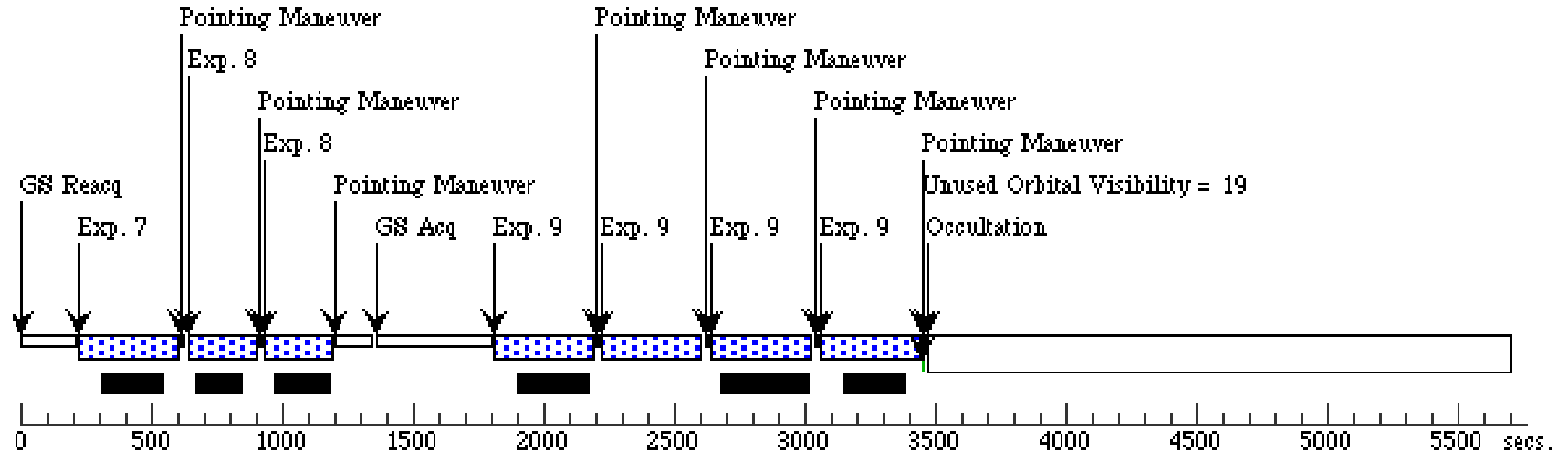
Orbit 3

Server Version: 20150609



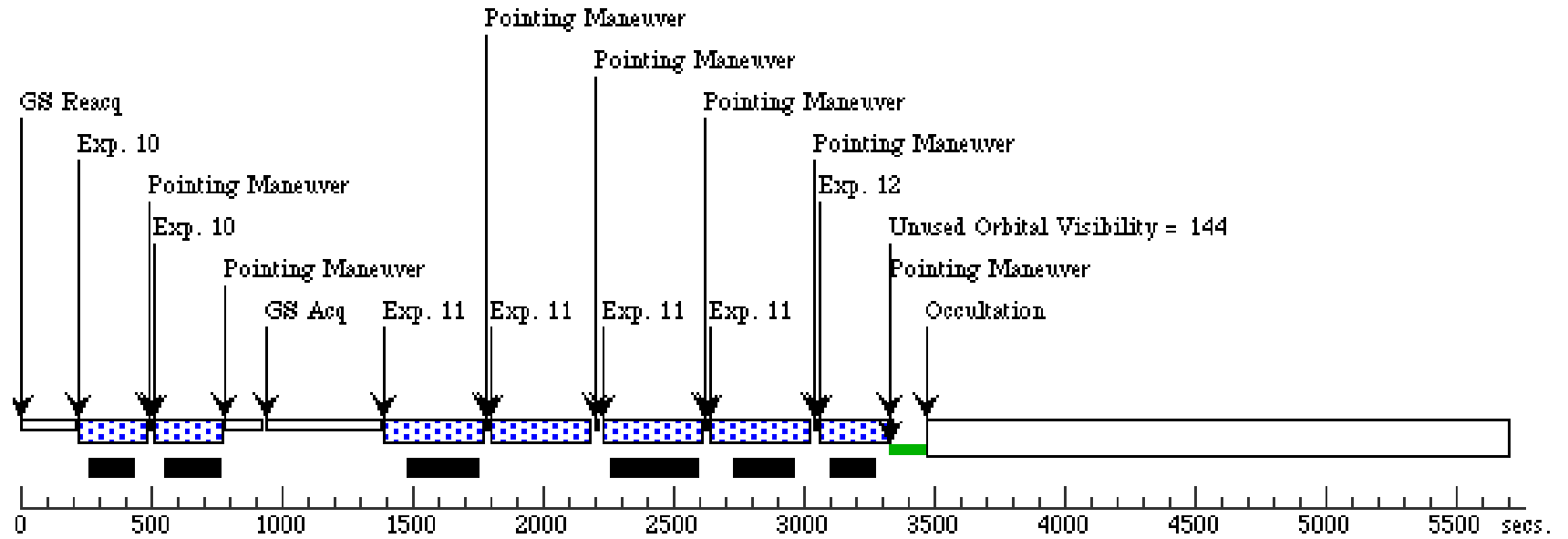
Orbit 4

Server Version: 20150609



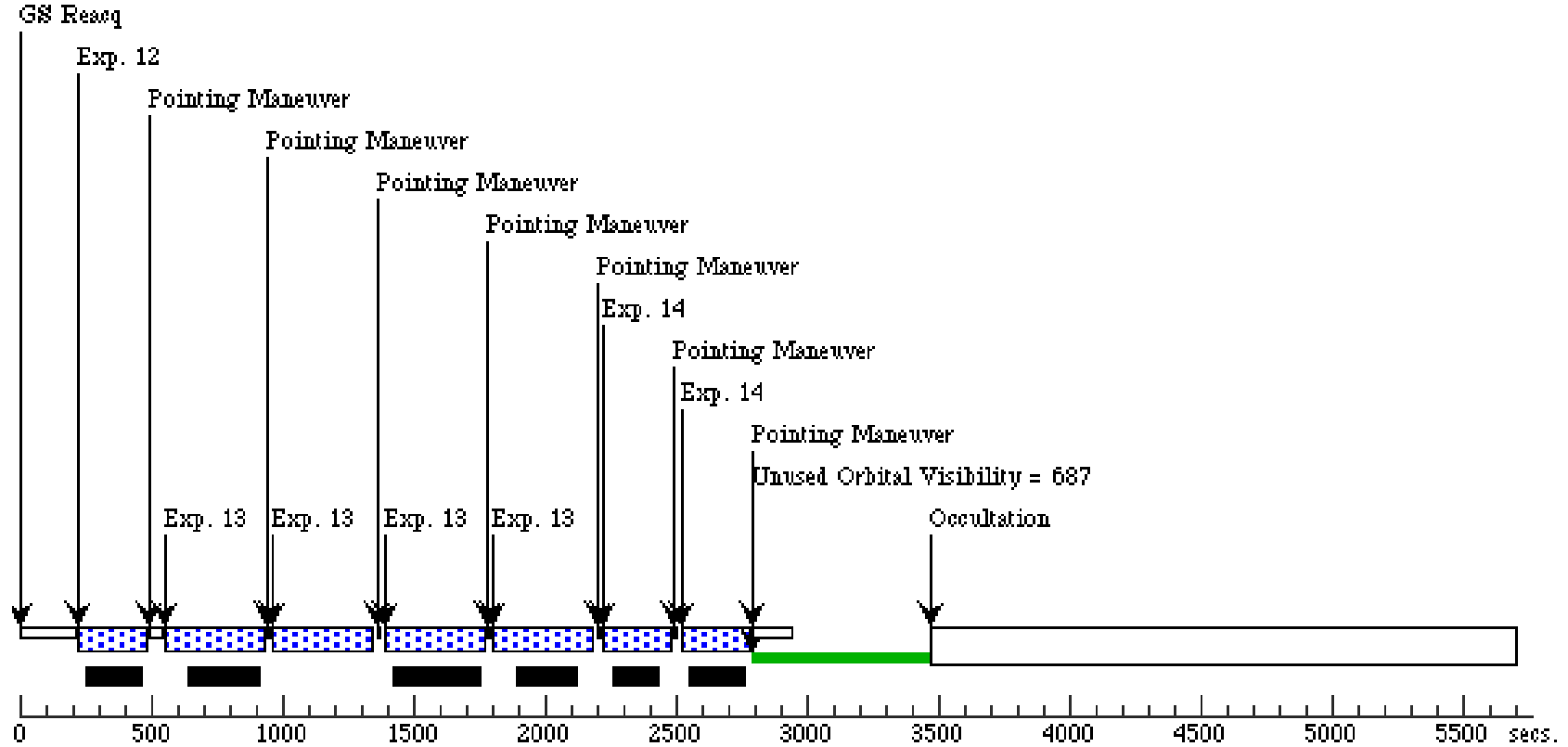
Orbit 5

Server Version: 20150609



Orbit 6

Server Version: 20150609



Orbit 7

Server Version: 20150609

