



14264 - A New Dual Perspective of Mutli-phase Galaxy Outflows

Cycle: 23, Proposal Category: GO

(Availability Mode: SUPPORTED)

INVESTIGATORS

<i>Name</i>	<i>Institution</i>	<i>E-Mail</i>
Dr. Glenn G. Kacprzak (PI) (Contact)	Swinburne University of Technology	gkacprzak@astro.swin.edu.au
Prof. Christopher W. Churchill (CoI) (AdminUSPI)	New Mexico State University	cwc@nmsu.edu
Prof. Jeff Cooke (CoI)	Swinburne University of Technology	jcooke@astro.swin.edu.au
Dr. Nicolas Bouche (CoI) (ESA Member)	Institut de Recherche en Astrophysique et Planetologie	nicolas.bouche@irap.omp.eu

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>
1A	(1) GALEX-J165930.3+373526-GALAXY (2) VV2000-J165931.9+373528	COS/FUV COS/NUV	5	29-Jul-2016 13:26:43.0	yes
2A	(1) GALEX-J165930.3+373526-GALAXY	COS/FUV COS/NUV	5	29-Jul-2016 13:26:45.0	yes
3A	(1) GALEX-J165930.3+373526-GALAXY	COS/FUV COS/NUV	5	29-Jul-2016 13:26:46.0	yes

15 Total Orbits Used

ABSTRACT

We propose the first multi-phase outflow study of the only system where both a galaxy ($z=0.2$) exhibits metal-line absorption back-illuminated by itself (down-the-barrel) AND transversely by a background quasar. The quasar sight-line is at a projected distance of 58 kpc along the galaxy minor axis; ideal orientation for outflows. We have already analyzed the outflow in the cool gas phase, traced by MgII absorption, in Kacprzak et al. (2014,

ApJL,792,L12). Here we request 15 orbits to obtain COS/G130M spectra of BOTH the quasar and the galaxy to study the multi-phase outflows from two perspectives: down-the-barrel of the galaxy and at 58 kpc away probed by the quasar sight-line. We will probe the physics and kinematics of HI (full Lyman series), OVI, FeII, CIII, CII, NIII, and NII absorption from the galaxy and the quasar sight-lines. We will use our established models to further interpret the observed transverse gas-galaxy kinematics, spatial relationships, and ionization conditions, metallicities, outflow mass rates, loading factors and masses. Our proposed observations will provide the first dual multi-phase outflow analysis of its kind and will provide the community with a unique view into the physical properties and processes of gaseous outflows.

OBSERVING DESCRIPTION

We planned 15 orbits to obtain COS/G130M/1222 spectra. We planned three visits. Due to the nature of target 1, which is an extended galaxy nucleus, we were approved for a hold on Visits 2 and 3 following Visit 1. We explain this below. All observations are through the PSA.

VISIT 1: 5 orbits on fixed target #2 VV2000-J165931.9+373528 (QSO)

We used three independent sources for the astrometric position of the QSO; they all agree within 0.1". For orbit 1, we acquire the target with ACQ/IMAGE/MIRROR-B for 148 sec to obtain S/N=40. We then use the remainder of orbit 1 to obtain the COS spectrum at FP-POS=3. For orbits 2-4, we continue the COS observations. For each subsequent orbit we move the FP-POS in the order 4, 1, 2. At the start of orbit 5, we slew the telescope to target #1 and obtain an 843 sec image using MIRROR A, which according to the COS image target acquisition ETC delivers S/N=40 (assuming the object fills the aperture). This image will be used to verify that the ACQ/IMAGE for Visits 2 and 3 will produce the optimal pointing on this extended and possibly clumpy target. Implementing this at the beginning of the orbit saves on OSM2 rotation (a total of 70 seconds saved). Within 30 days (and no more than 120 days) of obtaining this image, we will report back the coordinates for the pointing for target 1 and file an updated Phase II plan. Following the image, we slew the telescope back to target 2 and complete orbit 5 with a COS spectrum of target 2 using FP-POS=3.

VISIT 2: 5 orbits on fixed target #1 GALEX-J165930.3+373526-GALAXY

We used three independent sources for the astrometric position of the Galaxy; they all agree within 1". This relative error is likely due to the extended nature of the emitting region. For orbit 1, we currently are stating that we will acquire the target with ACQ/IMAGE/MIRROR-A for 843 sec to obtain S/N=40. However, since we will be using the image taken during orbit 5 of visit 1, we may modify the acquisition of the target. Once the

target is acquired, we plan to use the remainder of orbit 1 to obtain the COS spectrum at FP-POS=3. For orbits 2-5, we continue the COS observations. For each subsequent orbit we move the FP-POS in the order 4, 1, 2, and 3.

VISIT 3: 5 orbits on fixed target #1 GALEX-J165930.3+373526-GALAXY

Though we have a total of 10 orbits on target 2, we break the observations into two 5-orbit visits in order to allow avoidance of the SAA. For orbit 1, we currently state that we will acquire the target with ACQ/IMAGE/MIRROR-A for 843 sec to obtain S/N=40. However, we will adopt the method that we employ for visit 2, once we have analyzed the image obtained during orbit 5 of visit 1. We then use the remainder of orbit 1 to obtain the COS spectrum at FP-POS=3. For orbits 2-5, we continue the COS observations. For each subsequent orbit we move the FP-POS in the order 4, 1, 2, and 3.

Proposal 14264 - QSO J1659 (1A) - A New Dual Perspective of Mutli-phase Galaxy Outflows

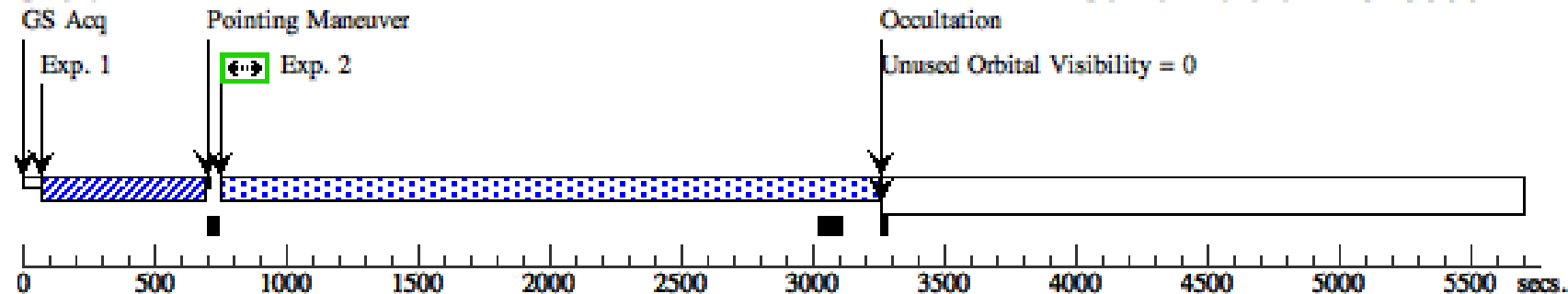
Visit	Proposal 14264, QSO J1659 (1A), completed					Fri Jul 29 17:26:47 GMT 2016
	Diagnostic Status: Warning					
	Scientific Instruments: COS/FUV, COS/NUV					
	Special Requirements: (none)					
Diagnostics	(QSO J1659 (1A)) Warning (Orbit Planner): INEFFICIENT ORDERING OF FP-POS POSITIONS					
	(QSO J1659 (1A)) Warning (Orbit Planner): REFERENCE-FRAME MUST BE ICRS OR GSC1 FOR SMALL APERTURE					
	(QSO J1659 (1A)) Warning (Orbit Planner): REFERENCE-FRAME MUST BE ICRS OR GSC1 FOR SMALL APERTURE					
	(QSO J1659 (1A)) Warning (Orbit Planner): REFERENCE-FRAME MUST BE ICRS OR GSC1 FOR SMALL APERTURE					
	(QSO J1659 (1A)) Warning (Orbit Planner): REFERENCE-FRAME MUST BE ICRS OR GSC1 FOR SMALL APERTURE					
	(QSO J1659 (1A)) Warning (Form): If the target coordinates are not known to 0.4" (or better), an ACQ/SEARCH should precede the ACQ/IMAGE.					
	(QSO J1659 (1A)) Warning (Orbit Planner): REFERENCE-FRAME MUST BE ICRS OR GSC1 FOR SMALL APERTURE					
	(QSO J1659 (1A)) Warning (Orbit Planner): REFERENCE-FRAME MUST BE ICRS OR GSC1 FOR SMALL APERTURE					
	(QSO J1659 (1A)) Warning (Orbit Planner): REFERENCE-FRAME MUST BE ICRS OR GSC1 FOR SMALL APERTURE					
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
	(1)	GALEX-J165930.3+373526-GALAXY	RA: 16 59 30.3554 (254.8764808d) Dec: +37 35 26.84 (37.59079d) Equinox: J2000		V=20.85358 GALEX fuv_flux 16.54+/-3.97 uJy, nuv_flux 30.71+/-4.48 uJy; Flam bda = 2.15e-16 erg cm^-2 s^-1 A^-1 at 1600 Ang	Reference Frame: GALEX
	Comments: This object was generated by the targetselector and retrieved from the GALEX database.					
	The half light radius of the galaxy is 1.53 arcsec.					
	Extended=YES					
	(2)	VV2000-J165931.9+373528	RA: 16 59 31.9165 (254.8829854d) Dec: +37 35 28.79 (37.59133d) Equinox: J2000		V=17.76 GALEX FUV	Reference Frame: SIMBAD
	Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.					
	Extended=NO					

Proposal 14264 - QSO J1659 (1A) - A New Dual Perspective of Mutli-phase Galaxy Outflows

Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	V1 ACQ/IM AGE (COS.sa.733 830)	(2) VV2000-J165931 .9+373528	COS/NUV, ACQ/IMAGE, PSA	MIRRORB				148 Secs (148 Secs) [==>]	[1]
	2	V1 Exp01 F P-POS-3 (COS.sp.733 002)	(2) VV2000-J165931 .9+373528	COS/FUV, TIME-TAG, PSA	G130M 1222 A	FP-POS=3; BUFFER-TIME=21 00			2310 Secs (2310 Secs) [==>]	[1]
	3	V1 Exp02 F P-POS-4 (COS.sp.733 002)	(2) VV2000-J165931 .9+373528	COS/FUV, TIME-TAG, PSA	G130M 1222 A	FP-POS=4; BUFFER-TIME=30 00			2981 Secs (2981 Secs) [==>]	[2]
	4	V1 Exp03 F P-POS-1 (COS.sp.733 002)	(2) VV2000-J165931 .9+373528	COS/FUV, TIME-TAG, PSA	G130M 1222 A	FP-POS=1; BUFFER-TIME=30 00			2981 Secs (2981 Secs) [==>]	[3]
	5	V1 Exp04 F P-POS-2 (COS.sp.733 002)	(2) VV2000-J165931 .9+373528	COS/FUV, TIME-TAG, PSA	G130M 1222 A	FP-POS=2; BUFFER-TIME=30 00			2981 Secs (2981 Secs) [==>]	[4]
	6	IMAGE_of_ GALJ1659 (COS.ta.734 276)	(1) GALEX-J165930 .3+373526-GALAX Y	COS/NUV, TIME-TAG, PSA	MIRRORA	BUFFER-TIME=74 3; FLASH=YES			843 Secs (843 Secs) [==>]	[5]
	Comments: This image will be used to verify that the ACQ/IMAGE of Visits 2 & 3 will produce the desired pointing. It's actually faster to do this first, because it saves on OSM2 rotation (70 seconds)									
	7	V1 Exp05 F P-POS-3 (COS.sp.733 002)	(2) VV2000-J165931 .9+373528	COS/FUV, TIME-TAG, PSA	G130M 1222 A	FP-POS=3; BUFFER-TIME=18 27			1927 Secs (1927 Secs) [==>]	[5]

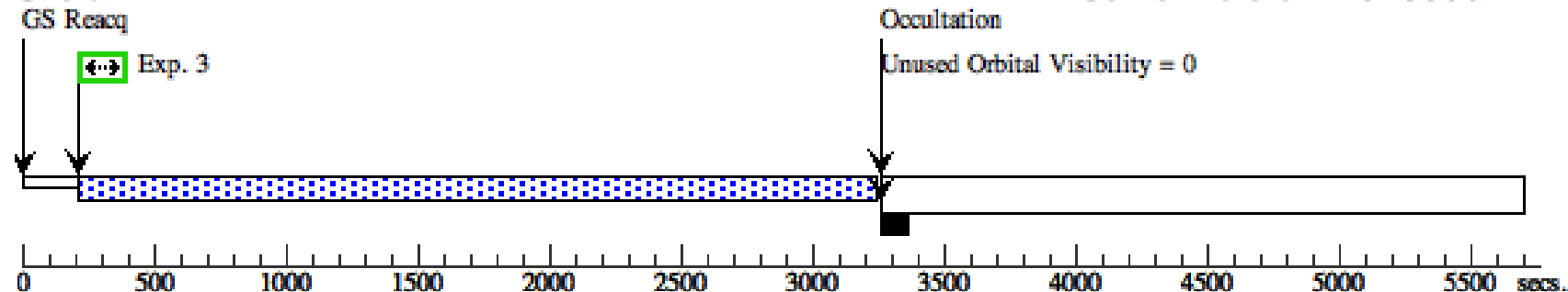
Orbit 1

Server Version: 20160601



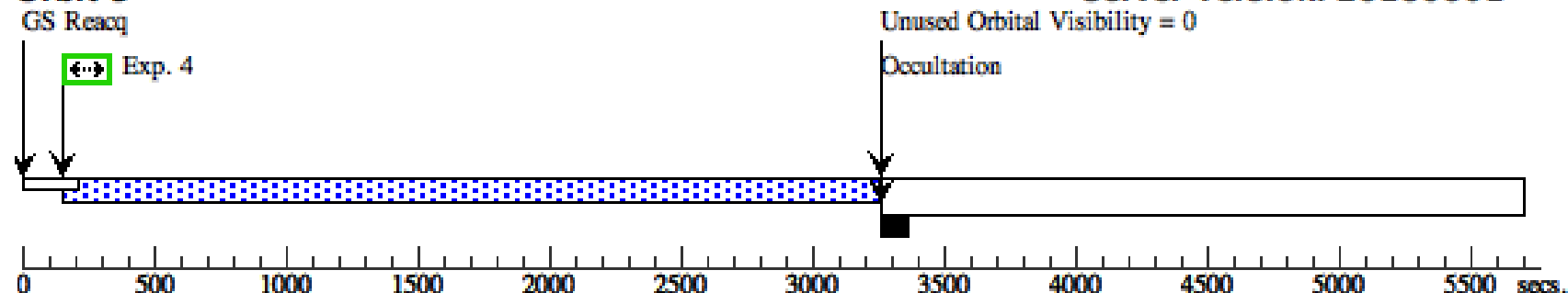
Orbit 2

Server Version: 20160601



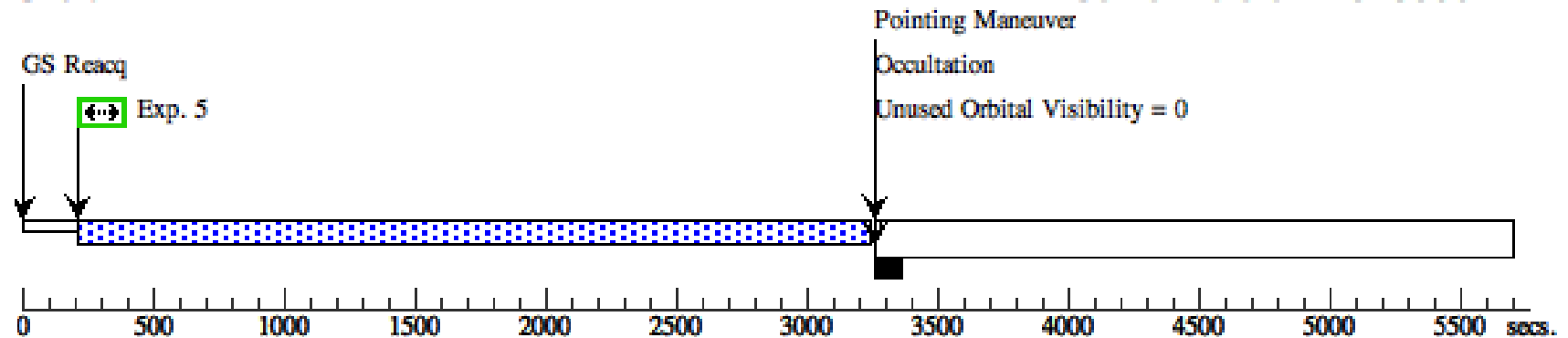
Orbit 3

Server Version: 20160601



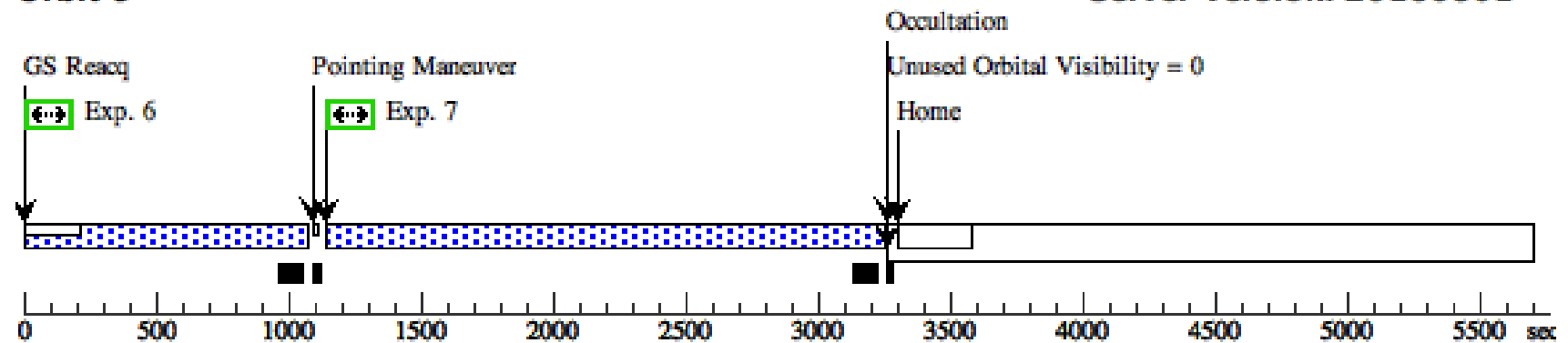
Orbit 4

Server Version: 20160601



Orbit 5

Server Version: 20160601

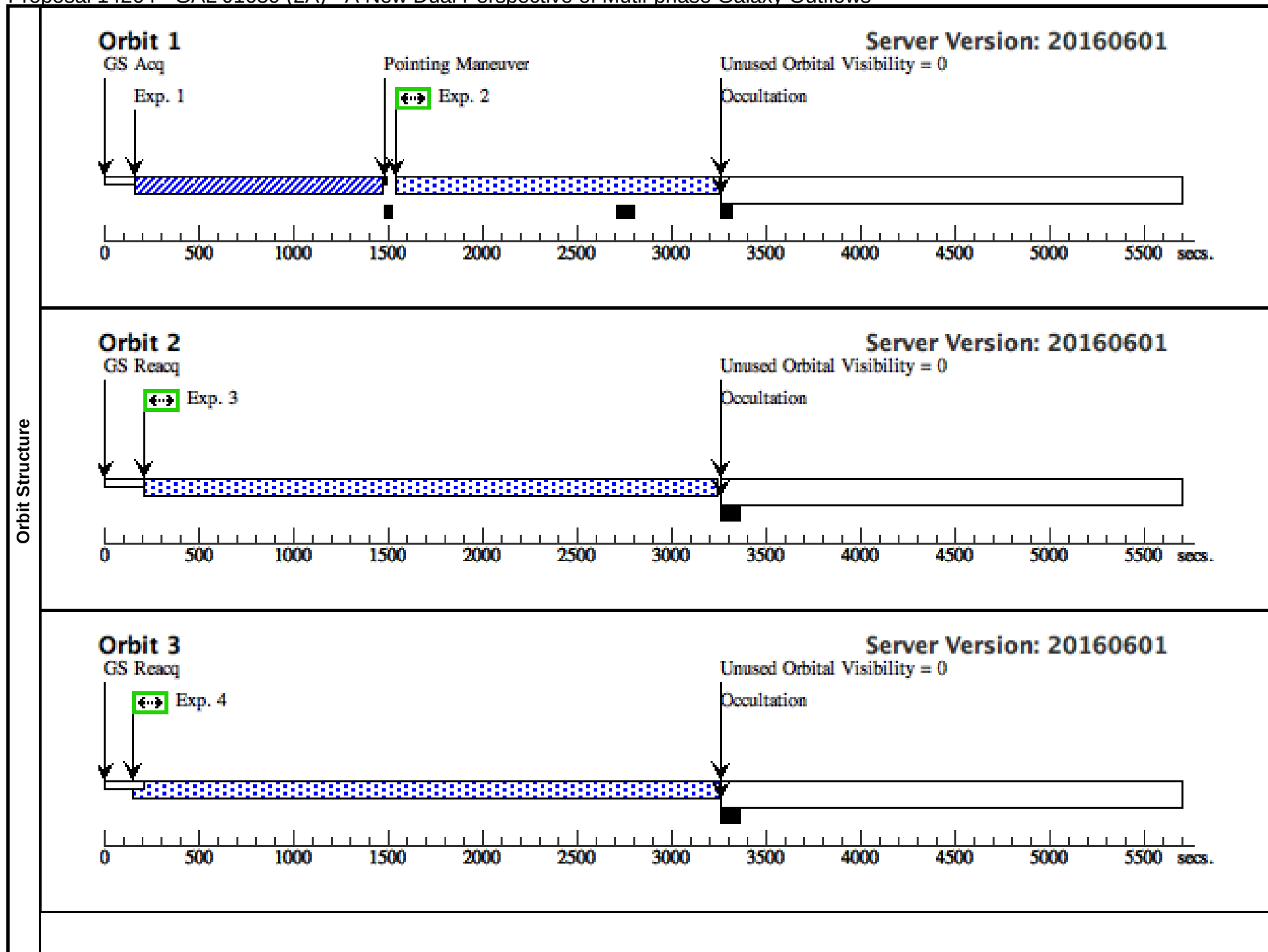


Proposal 14264 - GAL J1659 (2A) - A New Dual Perspective of Mutli-phase Galaxy Outflows

Visit	Proposal 14264, GAL J1659 (2A), implementation Fri Jul 29 17:26:47 GMT 2016															
	Diagnostic Status: Warning Scientific Instruments: COS/FUV, COS/NUV Special Requirements: AFTER 1A BY 35 D TO 120 D; ON HOLD FOR 1A <i>On Hold Comments: WE HAVE NOW REMOVED THE HOLD</i> <i>Previous Comments: We would like to take a PSA MIRROR A image at the end of Visit 1 (5 orbits) in order to optimize the target acquisitions for Visits 2 and 3. We use the GALEX FUV flux (16.54 micro Jy) corresponding to f_{λ} 1.06e-16 and ran the ETC to demonstrate that this is safe to do. The issue is that Visits 1 and 2 are for COS spectra of an extended galaxy nuclear region, for which we know the total flux, but we do not know how clumpy or the degree of flux variations across the nuclear region. In order to optimize the COS spectrum of this object, we would like to determine the optimal location on the nucleus to center the COS PSA.</i>															
Diagnostics	(GAL J1659 (2A)) Warning (Orbit Planner): REFERENCE-FRAME MUST BE ICRS OR GSC1 FOR SMALL APERTURE (GAL J1659 (2A)) Warning (Orbit Planner): REFERENCE-FRAME MUST BE ICRS OR GSC1 FOR SMALL APERTURE (GAL J1659 (2A)) Warning (Form): If the target coordinates are not known to 0.4" (or better), an ACQ/SEARCH should precede the ACQ/IMAGE. (GAL J1659 (2A)) Warning (Orbit Planner): REFERENCE-FRAME MUST BE ICRS OR GSC1 FOR SMALL APERTURE (GAL J1659 (2A)) Warning (Orbit Planner): INEFFICIENT ORDERING OF FP-POS POSITIONS (GAL J1659 (2A)) Warning (Orbit Planner): REFERENCE-FRAME MUST BE ICRS OR GSC1 FOR SMALL APERTURE (GAL J1659 (2A)) Warning (Orbit Planner): REFERENCE-FRAME MUST BE ICRS OR GSC1 FOR SMALL APERTURE (GAL J1659 (2A)) Warning (Orbit Planner): REFERENCE-FRAME MUST BE ICRS OR GSC1 FOR SMALL APERTURE (V2 Exp01 FP-POS-3 (2A.002)) Warning (Form): COS FUV PSA science exposures with extended targets have special calibration limitations. See "Errors and Warnings" for more details. (V2 Exp02 FP-POS-4 (2A.003)) Warning (Form): COS FUV PSA science exposures with extended targets have special calibration limitations. See "Errors and Warnings" for more details. (V2 Exp03 FP-POS-1 (2A.004)) Warning (Form): COS FUV PSA science exposures with extended targets have special calibration limitations. See "Errors and Warnings" for more details. (V2 Exp04 FP-POS-2 (2A.005)) Warning (Form): COS FUV PSA science exposures with extended targets have special calibration limitations. See "Errors and Warnings" for more details. (V2 Exp05 FP-POS-3 (2A.006)) Warning (Form): COS FUV PSA science exposures with extended targets have special calibration limitations. See "Errors and Warnings" for more details.															
	<table> <tr> <th>#</th><th>Name</th><th>Target Coordinates</th><th>Targ. Coord. Corrections</th><th>Fluxes</th><th>Miscellaneous</th></tr> <tr> <td>(1)</td><td>GALEX-J165930.3+373526-GALAXY</td><td>RA: 16 59 30.3554 (254.8764808d) Dec: +37 35 26.84 (37.59079d) Equinox: J2000</td><td></td><td>V=20.85358 GALEX fuv_flux 16.54+/-3.97 uJy, nuv_flux 30.71+/-4.48 uJy; Flam bda = 2.15e-16 erg cm⁻² s⁻¹ A⁻¹ at 1600 Ang</td><td>Reference Frame: GALEX</td></tr> </table>					#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous	(1)	GALEX-J165930.3+373526-GALAXY	RA: 16 59 30.3554 (254.8764808d) Dec: +37 35 26.84 (37.59079d) Equinox: J2000		V=20.85358 GALEX fuv_flux 16.54+/-3.97 uJy, nuv_flux 30.71+/-4.48 uJy; Flam bda = 2.15e-16 erg cm ⁻² s ⁻¹ A ⁻¹ at 1600 Ang
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous											
(1)	GALEX-J165930.3+373526-GALAXY	RA: 16 59 30.3554 (254.8764808d) Dec: +37 35 26.84 (37.59079d) Equinox: J2000		V=20.85358 GALEX fuv_flux 16.54+/-3.97 uJy, nuv_flux 30.71+/-4.48 uJy; Flam bda = 2.15e-16 erg cm ⁻² s ⁻¹ A ⁻¹ at 1600 Ang	Reference Frame: GALEX											
Fixed Targets	<i>Comments: This object was generated by the targetselector and retrieved from the GALEX database.</i>															
	<i>The half light radius of the galaxy is 1.53 arcsec.</i> <i>Extended=YES</i>															

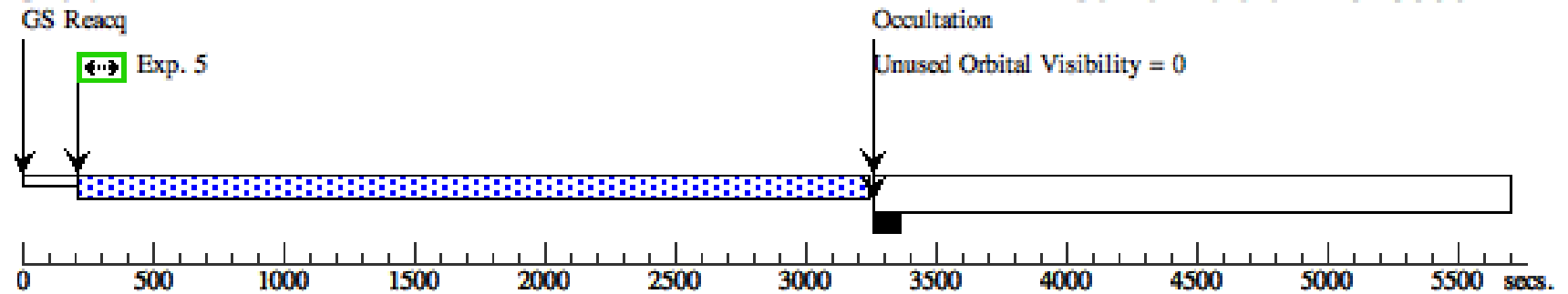
Proposal 14264 - GAL J1659 (2A) - A New Dual Perspective of Mutli-phase Galaxy Outflows

Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	V2 ACQ/IM AGE-MA (COS.ta.733 022)	(1) GALEX-J165930 .3+373526-GALAX Y	COS/NUV, ACQ/IMAGE, PSA	MIRRORA				540 Secs (540 Secs) [==>]	[1]
	2	V2 Exp01 F P-POS-3 (COS.sp.733 043)	(1) GALEX-J165930 .3+373526-GALAX Y	COS/FUV, TIME-TAG, PSA	G130M 1222 A	FP-POS=3; BUFFER-TIME=10 00			1526 Secs (1526 Secs) [==>]	[1]
	3	V2 Exp02 F P-POS-4 (COS.sp.733 043)	(1) GALEX-J165930 .3+373526-GALAX Y	COS/FUV, TIME-TAG, PSA	G130M 1222 A	FP-POS=4; BUFFER-TIME=30 00			2981 Secs (2981 Secs) [==>]	[2]
	4	V2 Exp03 F P-POS-1 (COS.sp.733 043)	(1) GALEX-J165930 .3+373526-GALAX Y	COS/FUV, TIME-TAG, PSA	G130M 1222 A	FP-POS=1; BUFFER-TIME=30 00			2981 Secs (2981 Secs) [==>]	[3]
	5	V2 Exp04 F P-POS-2 (COS.sp.733 043)	(1) GALEX-J165930 .3+373526-GALAX Y	COS/FUV, TIME-TAG, PSA	G130M 1222 A	FP-POS=2; BUFFER-TIME=30 00			2981 Secs (2981 Secs) [==>]	[4]
	6	V2 Exp05 F P-POS-3 (COS.sp.733 043)	(1) GALEX-J165930 .3+373526-GALAX Y	COS/FUV, TIME-TAG, PSA	G130M 1222 A	FP-POS=3; BUFFER-TIME=30 00			2981 Secs (2981 Secs) [==>]	[5]



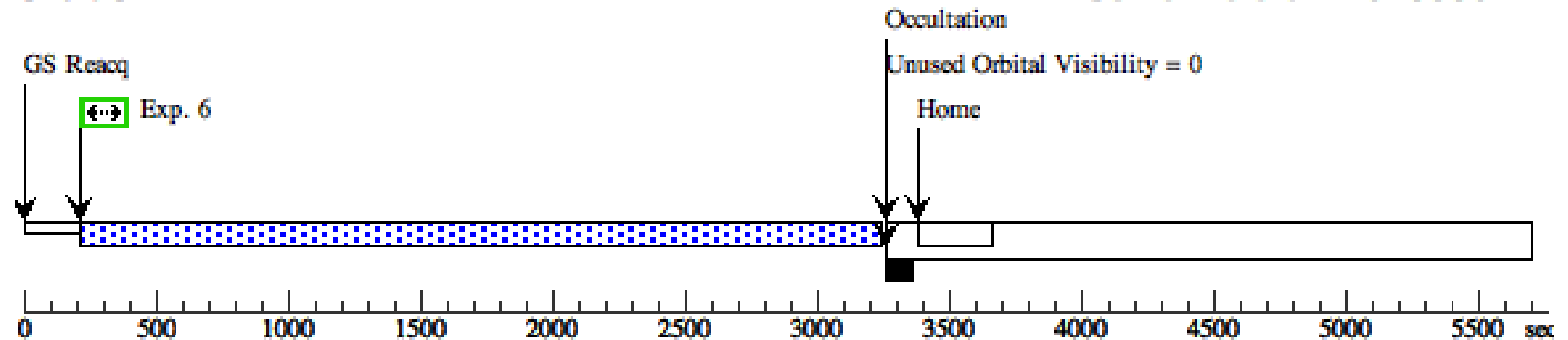
Orbit 4

Server Version: 20160601



Orbit 5

Server Version: 20160601



Proposal 14264 - GAL J1659 (3A) - A New Dual Perspective of Mutli-phase Galaxy Outflows

Visit	Proposal 14264, GAL J1659 (3A), implementation Fri Jul 29 17:26:48 GMT 2016															
	Diagnostic Status: Warning Scientific Instruments: COS/FUV, COS/NUV Special Requirements: AFTER 1A BY 35 D TO 120 D; ON HOLD FOR 1A <i>On Hold Comments: WE HAVE NOW REMOVED THE HOLD:</i> <i>Previous Comments: We would like to take a PSA MIRROR A image at the end of Visit 1 (5 orbits) in order to optimize the target acquisitions for Visits 2 and 3. We use the GALEX FUV flux (16.54 micro Jy) corresponding to f_{λ} 1.06e-16 and ran the ETC to demonstrate that this is safe to do. The issue is that Visits 1 and 2 are for COS spectra of an extended galaxy nuclear region, for which we know the total flux, but we do not know how clumpy or the degree of flux variations across the nuclear region. In order to optimize the COS spectrum of this object, we would like to determine the optimal location on the nucleus to center the COS PSA.</i>															
Diagnostics	(GAL J1659 (3A)) Warning (Orbit Planner): REFERENCE-FRAME MUST BE ICRS OR GSC1 FOR SMALL APERTURE (GAL J1659 (3A)) Warning (Orbit Planner): REFERENCE-FRAME MUST BE ICRS OR GSC1 FOR SMALL APERTURE (GAL J1659 (3A)) Warning (Orbit Planner): REFERENCE-FRAME MUST BE ICRS OR GSC1 FOR SMALL APERTURE (GAL J1659 (3A)) Warning (Orbit Planner): REFERENCE-FRAME MUST BE ICRS OR GSC1 FOR SMALL APERTURE (GAL J1659 (3A)) Warning (Orbit Planner): INEFFICIENT ORDERING OF FP-POS POSITIONS (GAL J1659 (3A)) Warning (Form): If the target coordinates are not known to 0.4" (or better), an ACQ/SEARCH should precede the ACQ/IMAGE. (GAL J1659 (3A)) Warning (Orbit Planner): REFERENCE-FRAME MUST BE ICRS OR GSC1 FOR SMALL APERTURE (GAL J1659 (3A)) Warning (Orbit Planner): REFERENCE-FRAME MUST BE ICRS OR GSC1 FOR SMALL APERTURE (V3 Exp01 FP-POS-3 (3A.002)) Warning (Form): COS FUV PSA science exposures with extended targets have special calibration limitations. See "Errors and Warnings" for more details. (V3 Exp02 FP-POS-4 (3A.003)) Warning (Form): COS FUV PSA science exposures with extended targets have special calibration limitations. See "Errors and Warnings" for more details. (V3 Exp03 FP-POS-1 (3A.004)) Warning (Form): COS FUV PSA science exposures with extended targets have special calibration limitations. See "Errors and Warnings" for more details. (V3 Exp04 FP-POS-2 (3A.005)) Warning (Form): COS FUV PSA science exposures with extended targets have special calibration limitations. See "Errors and Warnings" for more details. (V3 Exp05 FP-POS-3 (3A.006)) Warning (Form): COS FUV PSA science exposures with extended targets have special calibration limitations. See "Errors and Warnings" for more details.															
	<table> <tr> <th>#</th><th>Name</th><th>Target Coordinates</th><th>Targ. Coord. Corrections</th><th>Fluxes</th><th>Miscellaneous</th></tr> <tr> <td>(1)</td><td>GALEX-J165930.3+373526-GALAXY</td><td>RA: 16 59 30.3554 (254.8764808d) Dec: +37 35 26.84 (37.59079d) Equinox: J2000</td><td></td><td>V=20.85358 GALEX fuv_flux 16.54+/-3.97 uJy, nuv_flux 30.71+/-4.48 uJy; Flam bda = 2.15e-16 erg cm⁻² s⁻¹ A⁻¹ at 1600 Ang</td><td>Reference Frame: GALEX</td></tr> </table>					#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous	(1)	GALEX-J165930.3+373526-GALAXY	RA: 16 59 30.3554 (254.8764808d) Dec: +37 35 26.84 (37.59079d) Equinox: J2000		V=20.85358 GALEX fuv_flux 16.54+/-3.97 uJy, nuv_flux 30.71+/-4.48 uJy; Flam bda = 2.15e-16 erg cm ⁻² s ⁻¹ A ⁻¹ at 1600 Ang
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous											
(1)	GALEX-J165930.3+373526-GALAXY	RA: 16 59 30.3554 (254.8764808d) Dec: +37 35 26.84 (37.59079d) Equinox: J2000		V=20.85358 GALEX fuv_flux 16.54+/-3.97 uJy, nuv_flux 30.71+/-4.48 uJy; Flam bda = 2.15e-16 erg cm ⁻² s ⁻¹ A ⁻¹ at 1600 Ang	Reference Frame: GALEX											
Fixed Targets	<i>Comments: This object was generated by the targetselector and retrieved from the GALEX database.</i>															
	<i>The half light radius of the galaxy is 1.53 arcsec.</i> <i>Extended=YES</i>															

Proposal 14264 - GAL J1659 (3A) - A New Dual Perspective of Mutli-phase Galaxy Outflows

Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	V3 ACQ/IM AGE-MA (COS.ta.733 022)	(1) GALEX-J165930 .3+373526-GALAX Y	COS/NUV, ACQ/IMAGE, PSA	MIRRORA				540 Secs (540 Secs) [==>]	[1]
	2	V3 Exp01 F P-POS-3 (COS.sp.733 043)	(1) GALEX-J165930 .3+373526-GALAX Y	COS/FUV, TIME-TAG, PSA	G130M 1222 A	FP-POS=3; BUFFER-TIME=10 00			1526 Secs (1526 Secs) [==>]	[1]
	3	V3 Exp02 F P-POS-4 (COS.sp.733 043)	(1) GALEX-J165930 .3+373526-GALAX Y	COS/FUV, TIME-TAG, PSA	G130M 1222 A	FP-POS=4; BUFFER-TIME=30 00			2981 Secs (2981 Secs) [==>]	[2]
	4	V3 Exp03 F P-POS-1 (COS.sp.733 043)	(1) GALEX-J165930 .3+373526-GALAX Y	COS/FUV, TIME-TAG, PSA	G130M 1222 A	FP-POS=1; BUFFER-TIME=30 00			2981 Secs (2981 Secs) [==>]	[3]
	5	V3 Exp04 F P-POS-2 (COS.sp.733 043)	(1) GALEX-J165930 .3+373526-GALAX Y	COS/FUV, TIME-TAG, PSA	G130M 1222 A	FP-POS=2; BUFFER-TIME=30 00			2981 Secs (2981 Secs) [==>]	[4]
	6	V3 Exp05 F P-POS-3 (COS.sp.733 043)	(1) GALEX-J165930 .3+373526-GALAX Y	COS/FUV, TIME-TAG, PSA	G130M 1222 A	FP-POS=3; BUFFER-TIME=30 00			2981 Secs (2981 Secs) [==>]	[5]

Orbit 1

GS Acq

Exp. 1

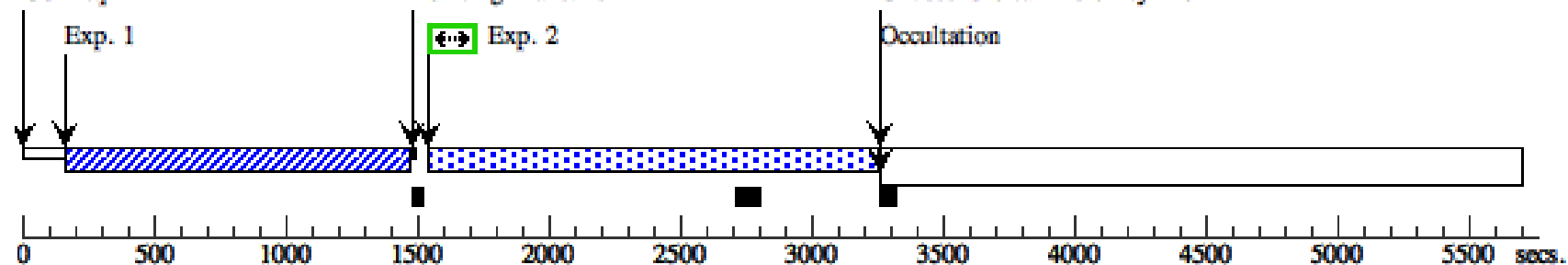
Pointing Maneuver

Exp. 2

Server Version: 20160601

Unused Orbital Visibility = 0

Occultation



Orbit 2

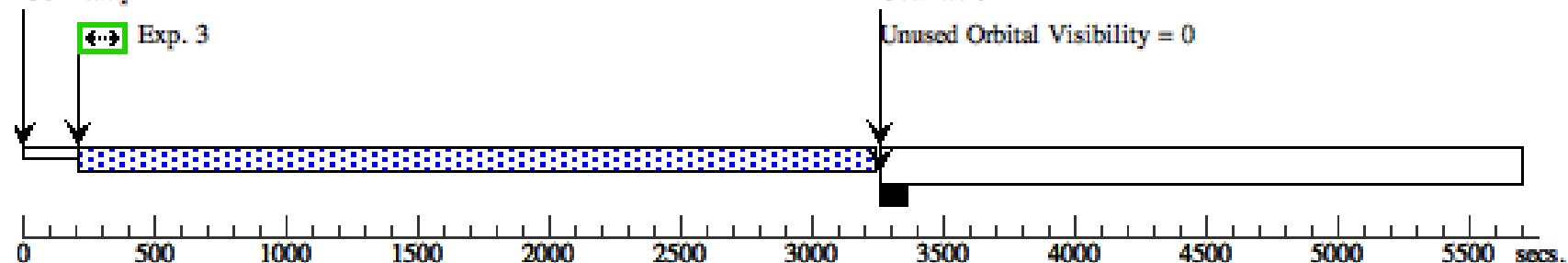
GS Reacq

Exp. 3

Server Version: 20160601

Occultation

Unused Orbital Visibility = 0



Orbit 3

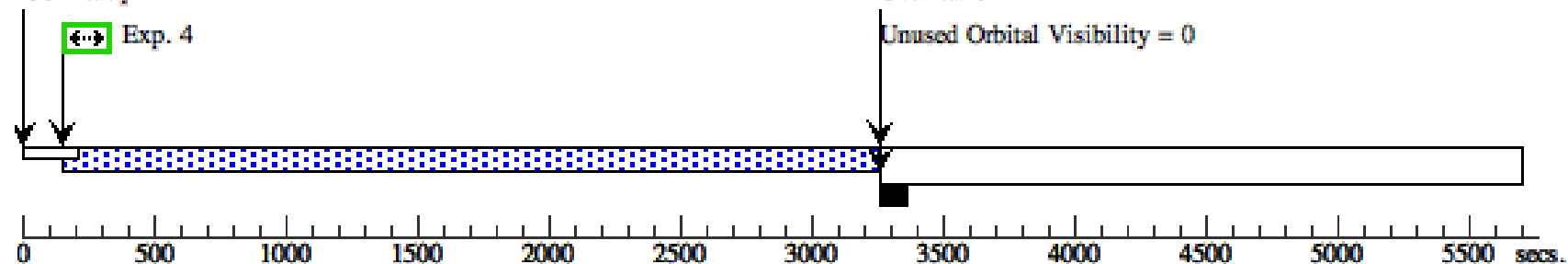
GS Reacq

Exp. 4

Server Version: 20160601

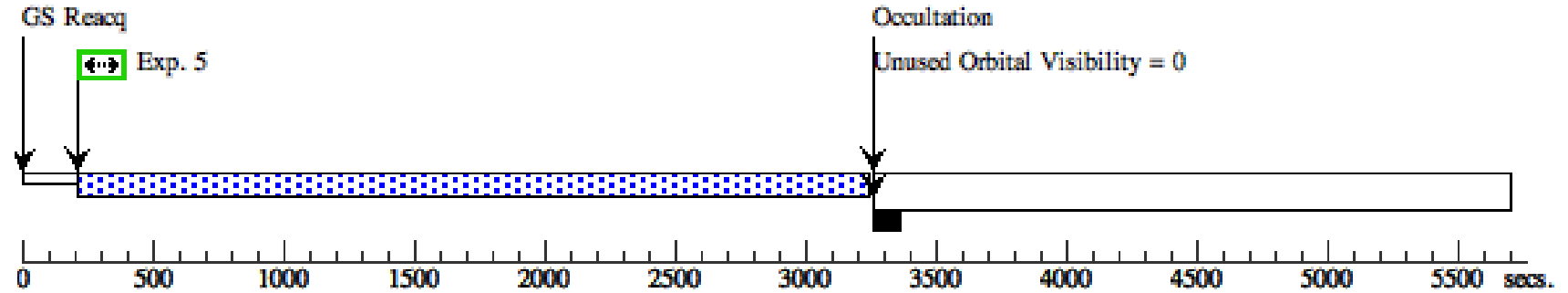
Occultation

Unused Orbital Visibility = 0



Orbit 4

Server Version: 20160601



Orbit 5

Server Version: 20160601

