



13118 - Lightcurve observations of OSIRIS-REx Sample-Return Mission target 1999 RQ36

Cycle: 19, Proposal Category: GO/DD

(Availability Mode: SUPPORTED)

INVESTIGATORS

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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>
11	(1) 1999RQ36	WFC3/UVIS	1	18-Oct-2012 21:04:17.0	yes
12	(1) 1999RQ36	WFC3/UVIS	1	18-Oct-2012 21:04:25.0	yes
13	(1) 1999RQ36	WFC3/UVIS	1	18-Oct-2012 21:04:30.0	yes
15	(1) 1999RQ36	WFC3/UVIS	1	18-Oct-2012 21:04:35.0	yes
16	(1) 1999RQ36	WFC3/UVIS	1	18-Oct-2012 21:04:40.0	yes
81	(1) 1999RQ36	WFC3/UVIS	1	18-Oct-2012 21:04:45.0	yes
82	(1) 1999RQ36	WFC3/UVIS	1	18-Oct-2012 21:04:51.0	yes
83	(1) 1999RQ36	WFC3/UVIS	1	18-Oct-2012 21:04:55.0	yes

<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>
85	(1) 1999RQ36	WFC3/UVIS	1	18-Oct-2012 21:05:00.0	yes
86	(1) 1999RQ36	WFC3/UVIS	1	18-Oct-2012 21:05:05.0	yes

10 Total Orbits Used

ABSTRACT

We propose photometric observations of near-Earth asteroid 1999 RQ36 to measure the lightcurve and determine its rotation phase in support of the OSIRIS-REx mission. The observations proposed here serve two purposes: 1) they will provide the rotational orientation that is needed to tie Spitzer observations scheduled for August 21 2012 to the shape model, and 2) they will allow measurement of the YORP effect, which needs accurate rotation phase information at several widely-spaced epochs. Currently, the observations in 1999 and 2005 cannot be directly linked in phase, leaving uncertainties of several rotations between the epochs. If we measure the lightcurve of the asteroid in 2012 and establish the phase, we will eliminate these uncertainties and link the lightcurve unambiguously to 2005 and 1999 and to the spacecraft encounter, improving our knowledge of the rotation state and allowing measurement of the YORP effect.

This is the last opportunity to make these measurements before the 2016 launch of OSIRIS-REx.

OBSERVING DESCRIPTION

We plan to obtain a lightcurve of asteroid (101955) 1999 RQ36 to determine its rotation phase for comparison with Spitzer data obtained 2012 August 25. The rotation period is 4.3 hours, so to get complete coverage we need three consecutive orbits followed by two consecutive orbits starting 15 orbits after the starting time (skipping exactly 12 orbits). Alternatively, five consecutive orbits is almost as good, and far better than delaying the experiment if it is easier to schedule. The first option is submitted as visits 11-16, the second option as visits 51-55

We will take 5-minute exposures through the F350LP filter to maximize SNR. We will take a subarray to reduce readout overhead and improve the time resolution of the images.

The target will be near the galactic plane from Sept 20.0 to Nov 10.0, so that accurate photometry will be extremely difficult. If possible, please schedule visits 11-16 or 51-55 before 2012 Sept 20

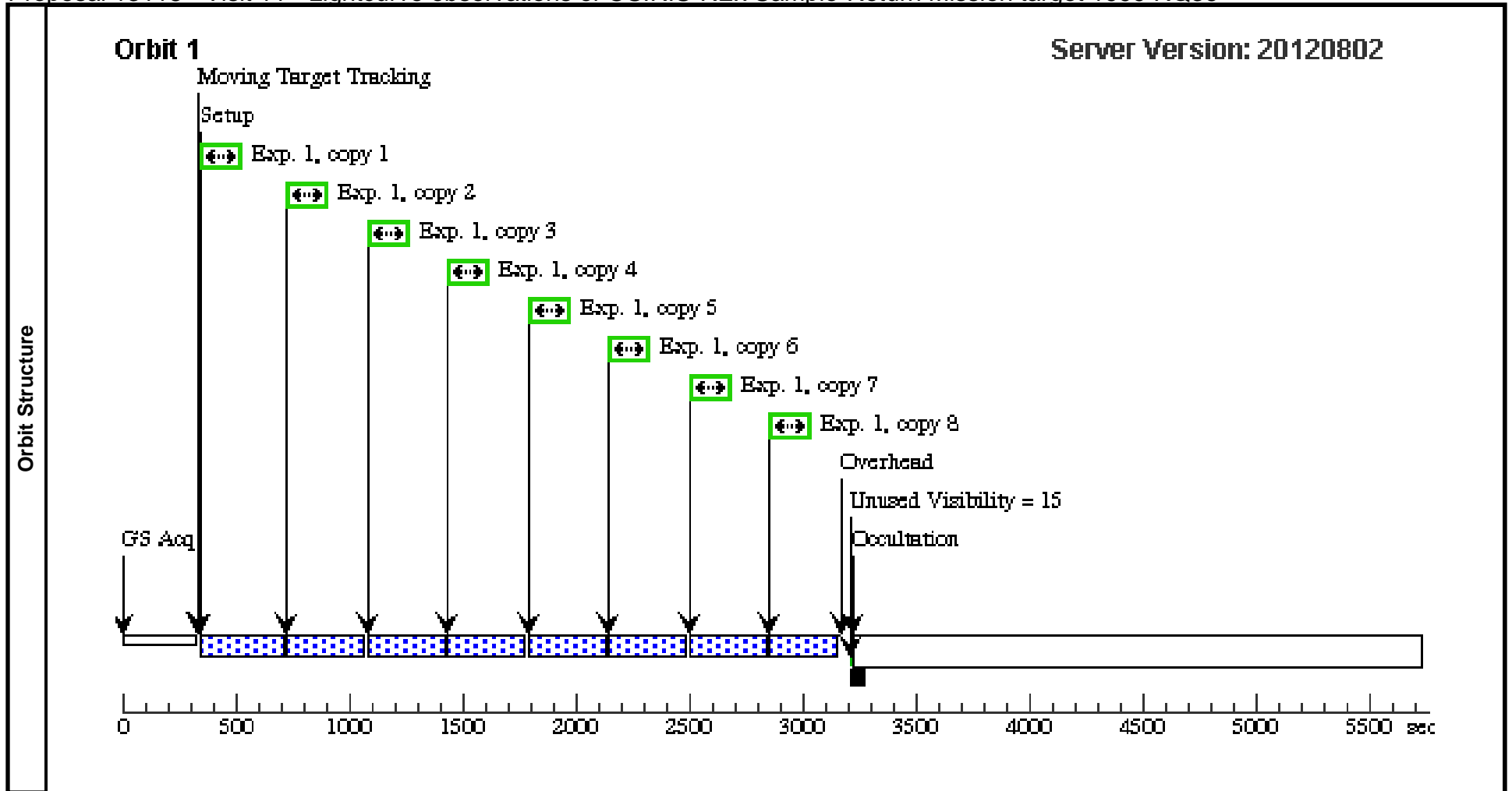
Proposal 13118 (STScI Edit Number: 0, Created: Thursday, October 18, 2012 8:05:12 PM EST) - Overview

Visits 81-86 are the same pattern to be implemented about 3 months after the first set, in order to accurately determine the rotation period. We have requested some avoidance periods to avoid bright stars and nebulae. Examination of the data from visits 11-16 suggest that we should space the orbits slightly differently (skipping 11 orbits instead of 12), assuming an HST orbit period of 95.75min

Proposal 13118 - Visit 11 - Lightcurve observations of OSIRIS-REx Sample-Return Mission target 1999 RQ36

Fri Oct 19 01:05:12 GMT 2012

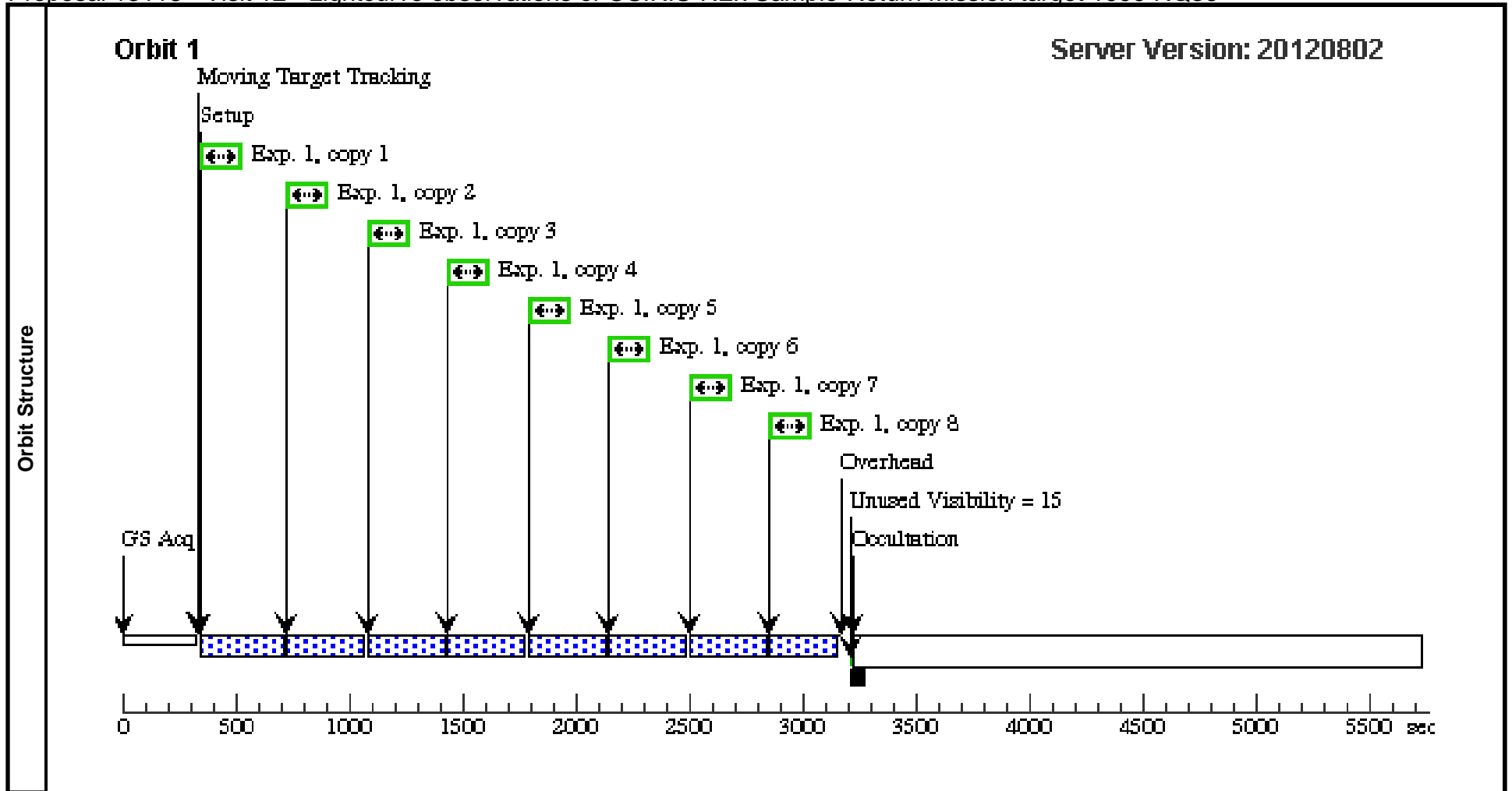
Visit	Proposal 13118, Visit 11, completed Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS Special Requirements: PCS MODE FINE <i>Comments: First three orbits in first set</i>									
	Solar System Targets		#	Name	Level 1	Level 2	Level 3	Window	Ephem Center	
	(1)	1999RQ36	TYPE=ASTEROID,A=1.12599402193 9682.E=.2037148598461005,I=6.0349 71460079773,O=2.044605768830181, W=66.27223277868985,M=268.66940 54274844,EQUINOX=J2000,EPOCH =01-OCT- 2012:00:00:00,EpochTimeScale=TDB				MOSS Planning Start: 01-SEP- 2012:00:00:00 MOSS Planning End: 01-OCT- 2013:00:00:00 MOSS Show Windows: true	EARTH		
	<i>Comments:</i> <i>Acquisition Uncertainty: 3 Arcsec</i>									
Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1	(WFC3UVI S.im.426034)	(1) 1999RQ36	WFC3/UVIS, ACCUM, UVIS2-C512C-SUB	F350LP				305 Secs X 8 [=>(Copy 1)] [=>(Copy 2)] [=>(Copy 3)] [=>(Copy 4)] [=>(Copy 5)] [=>(Copy 6)] [=>(Copy 7)] [=>(Copy 8)]	[1]



Proposal 13118 - Visit 12 - Lightcurve observations of OSIRIS-REx Sample-Return Mission target 1999 RQ36

Fri Oct 19 01:05:14 GMT 2012

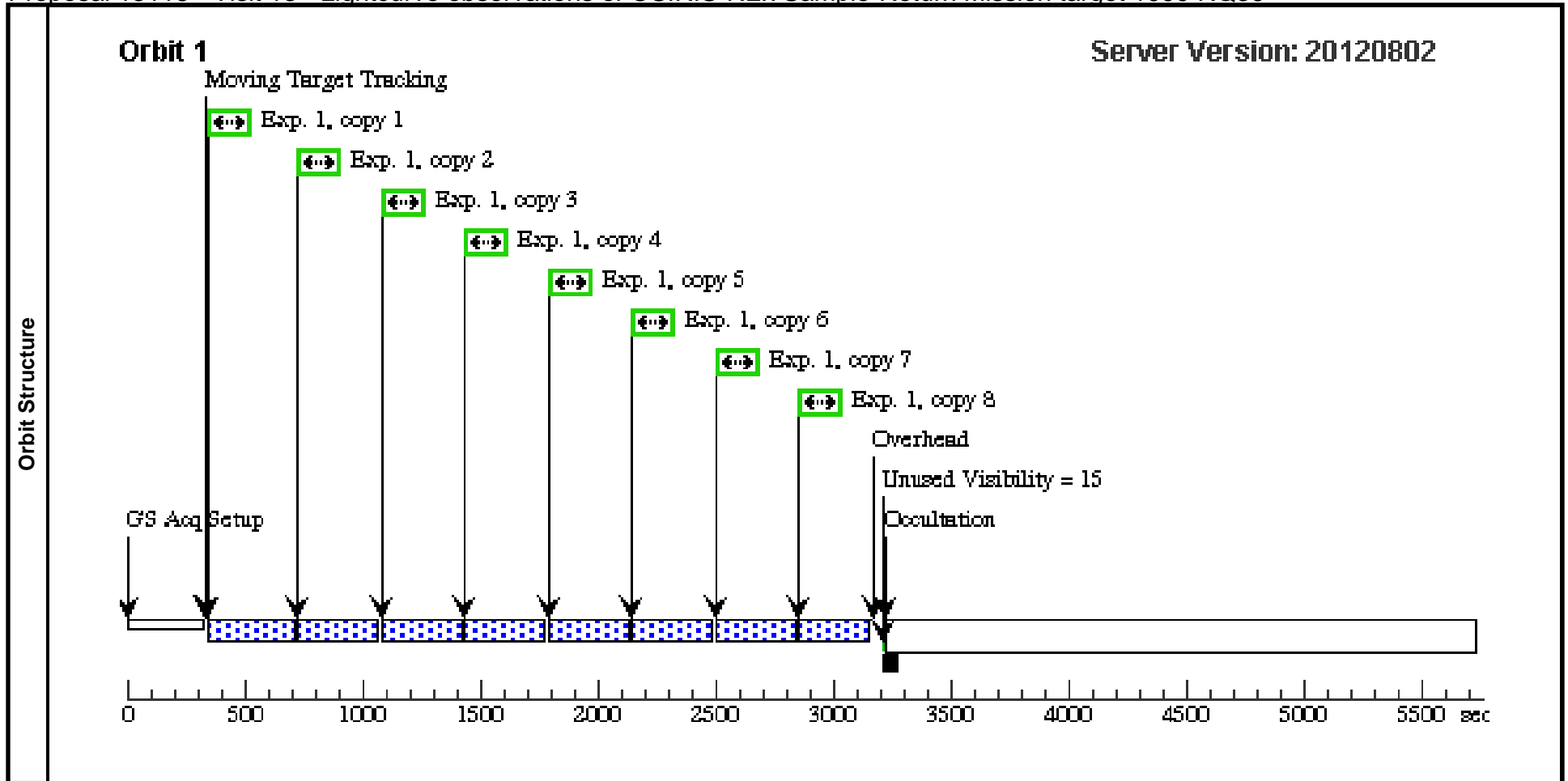
Visit	Proposal 13118, Visit 12, completed Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS Special Requirements: PCS MODE FINE; AFTER 11 BY 90 M TO 100 M <i>Comments: First three orbits in first set</i>									
Solar System Targets	#	Name	Level 1	Level 2	Level 3	Window	Ephem Center			
	(1)	1999RQ36	TYPE=ASTEROID,A=1.12599402193 9682.E=.2037148598461005,I=6.0349 71460079773,O=2.044605768830181, W=66.27223277868985,M=268.66940 54274844,EQUINOX=J2000,EPOCH =01-OCT- 2012:00:00:00,EpochTimeScale=TDB				MOSS Planning Start: 01-SEP- 2012:00:00:00 MOSS Planning End: 01-OCT- 2013:00:00:00 MOSS Show Windows: true	EARTH		
<i>Comments:</i> Acquisition Uncertainty: 3 Arcsec										
Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1	(WFC3UVI S.im.426034)	(1) 1999RQ36	WFC3/UVIS, ACCUM, UVIS2-C512C-SUB	F350LP				305 Secs X 8 [=>(Copy 1)] [=>(Copy 2)] [=>(Copy 3)] [=>(Copy 4)] [=>(Copy 5)] [=>(Copy 6)] [=>(Copy 7)] [=>(Copy 8)]	[1]



Proposal 13118 - Visit 13 - Lightcurve observations of OSIRIS-REx Sample-Return Mission target 1999 RQ36

Fri Oct 19 01:05:18 GMT 2012

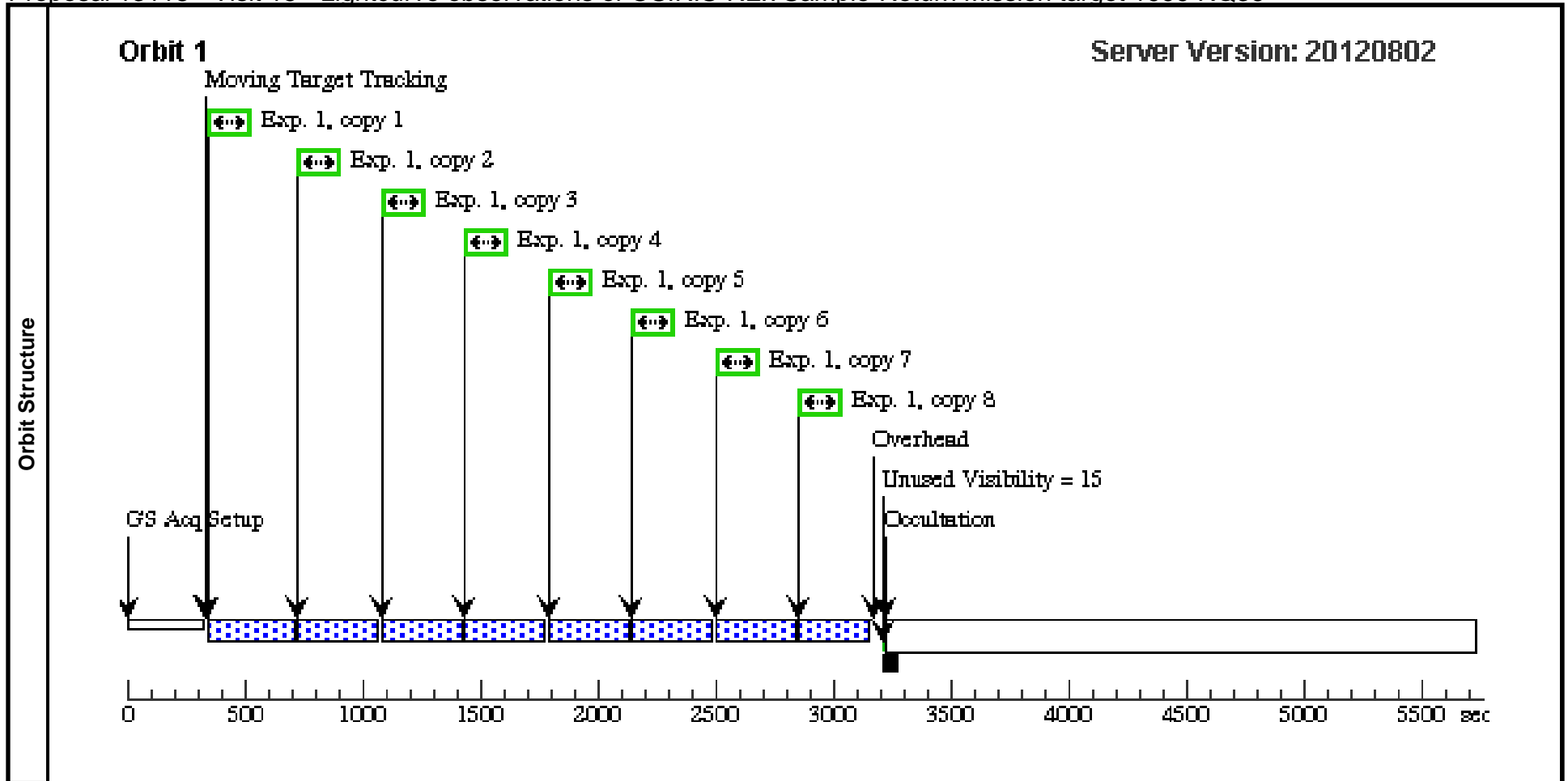
Visit	Proposal 13118, Visit 13, completed Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS Special Requirements: PCS MODE FINE; AFTER 12 BY 90 M TO 100 M <i>Comments: First three orbits in first set</i>										
Solar System Targets	#	Name	Level 1	Level 2	Level 3	Window	Ephem Center				
	(1)	1999RQ36	TYPE=ASTEROID,A=1.12599402193 9682.E=.2037148598461005,I=6.0349 71460079773,O=2.044605768830181, W=66.27223277868985,M=268.66940 54274844,EQUINOX=J2000,EPOCH =01-OCT- 2012:00:00:00,EpochTimeScale=TDB				MOSS Planning Start: 01-SEP- 2012:00:00:00 MOSS Planning End: 01-OCT- 2013:00:00:00 MOSS Show Windows: true	EARTH			
<i>Comments:</i> Acquisition Uncertainty: 3 Arcsec											
Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]		Orbit
	1	(WFC3UVI S.im.426034)	(1) 1999RQ36	WFC3/UVIS, ACCUM, UVIS2-C512C-SUB	F350LP					305 Secs X 8 [=>(Copy 1)] [=>(Copy 2)] [=>(Copy 3)] [=>(Copy 4)] [=>(Copy 5)] [=>(Copy 6)] [=>(Copy 7)] [=>(Copy 8)]	[1]



Proposal 13118 - Visit 15 - Lightcurve observations of OSIRIS-REx Sample-Return Mission target 1999 RQ36

Fri Oct 19 01:05:19 GMT 2012

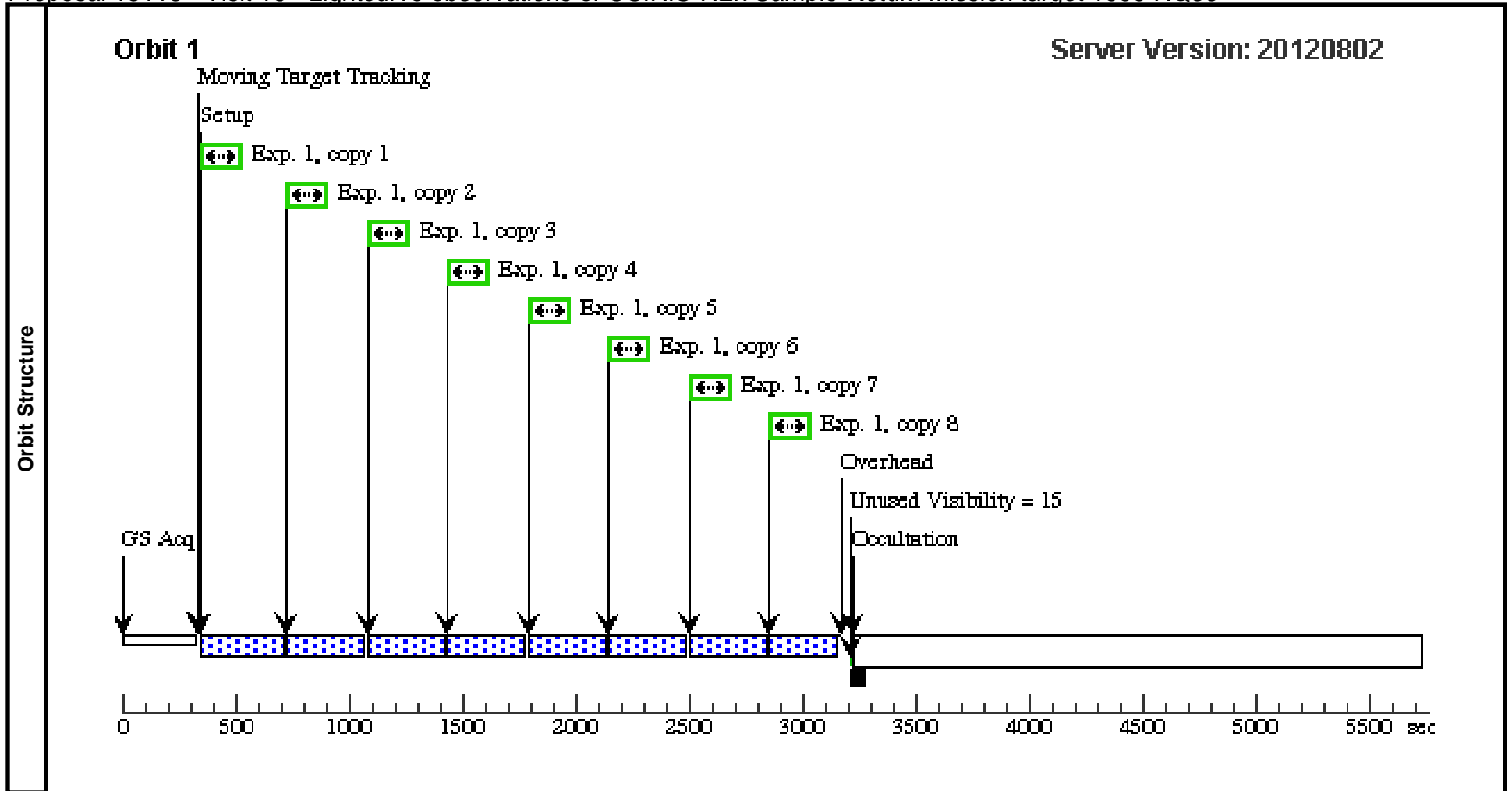
Visit	<p>Proposal 13118, Visit 15, completed</p> <p>Diagnostic Status: No Diagnostics</p> <p>Scientific Instruments: WFC3/UVIS</p> <p>Special Requirements: PCS MODE FINE; AFTER 13 BY 12.9 Orbits TO 13.1 Orbits</p> <p><i>Comments: Second set of two orbits in first set</i></p>										
	Solar System Targets	#	Name	Level 1	Level 2	Level 3	Window	Ephem Center			
(1)		1999RQ36	TYPE=ASTEROID,A=1.12599402193 9682,E=.2037148598461005,I=6.0349 71460079773,O=2.044605768830181, W=66.27223277868985,M=268.66940 54274844,EQUINOX=J2000,EPOCH =01-OCT- 2012:00:00:00,EpochTimeScale=TDB				MOSS Planning Start: 01-SEP- 2012:00:00:00 MOSS Planning End: 01-OCT- 2013:00:00:00 MOSS Show Windows: true	EARTH			
	<p><i>Comments:</i></p> <p><i>Acquisition Uncertainty: 3 Arcsec</i></p>										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]		Orbit
	1		(1) 1999RQ36	WFC3/UVIS, ACCUM, UVIS2-C512C-SUB	F350LP				305 Secs X 8		[1]
									[=>(Copy 1)]		
									[=>(Copy 2)]		
									[=>(Copy 3)]		
									[=>(Copy 4)]		
									[=>(Copy 5)]		
									[=>(Copy 6)]		
									[=>(Copy 7)]		
									[=>(Copy 8)]		



Proposal 13118 - Visit 16 - Lightcurve observations of OSIRIS-REx Sample-Return Mission target 1999 RQ36

Fri Oct 19 01:05:20 GMT 2012

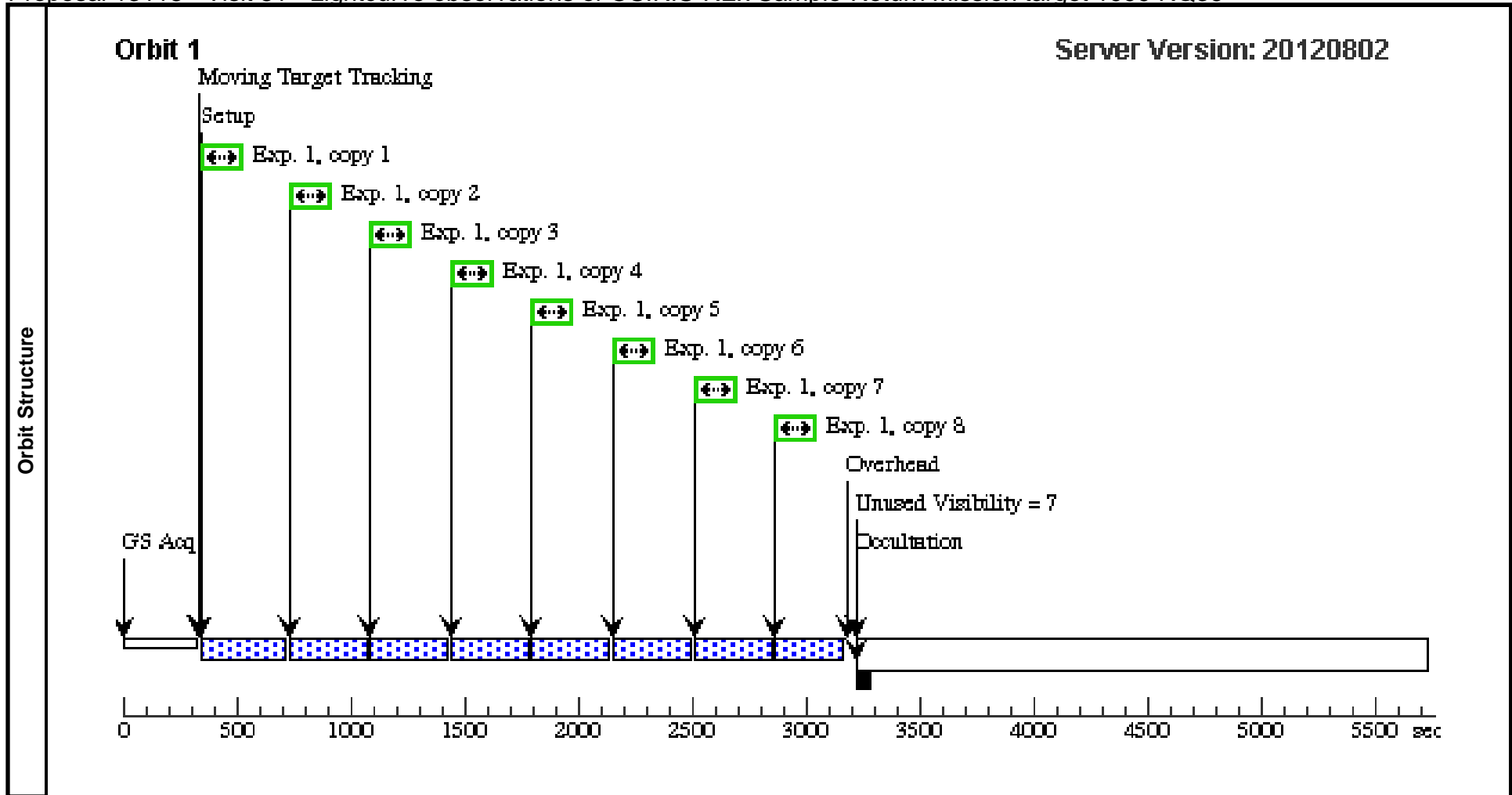
Visit	Proposal 13118, Visit 16, completed Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS Special Requirements: PCS MODE FINE; AFTER 15 BY 90 M TO 100 M <i>Comments: Second set of two orbits in first set</i>										
Solar System Targets	#	Name	Level 1	Level 2	Level 3	Window	Ephem Center				
	(1)	1999RQ36	TYPE=ASTEROID,A=1.12599402193 9682,E=.2037148598461005,I=6.0349 71460079773,O=2.044605768830181, W=66.27223277868985,M=268.66940 54274844,EQUINOX=J2000,EPOCH =01-OCT- 2012:00:00:00,EpochTimeScale=TDB				MOSS Planning Start: 01-SEP- 2012:00:00:00 MOSS Planning End: 01-OCT- 2013:00:00:00 MOSS Show Windows: true	EARTH			
<i>Comments:</i> Acquisition Uncertainty: 3 Arcsec											
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]		Orbit
	1		(1) 1999RQ36	WFC3/UVIS, ACCUM, UVIS2-C512C-SUB	F350LP				305 Secs X 8		[1]
										[=>(Copy 1)]	
										[=>(Copy 2)]	
										[=>(Copy 3)]	
										[=>(Copy 4)]	
										[=>(Copy 5)]	
										[=>(Copy 6)]	
										[=>(Copy 7)]	
										[=>(Copy 8)]	



Proposal 13118 - Visit 81 - Lightcurve observations of OSIRIS-REx Sample-Return Mission target 1999 RQ36

Fri Oct 19 01:05:21 GMT 2012

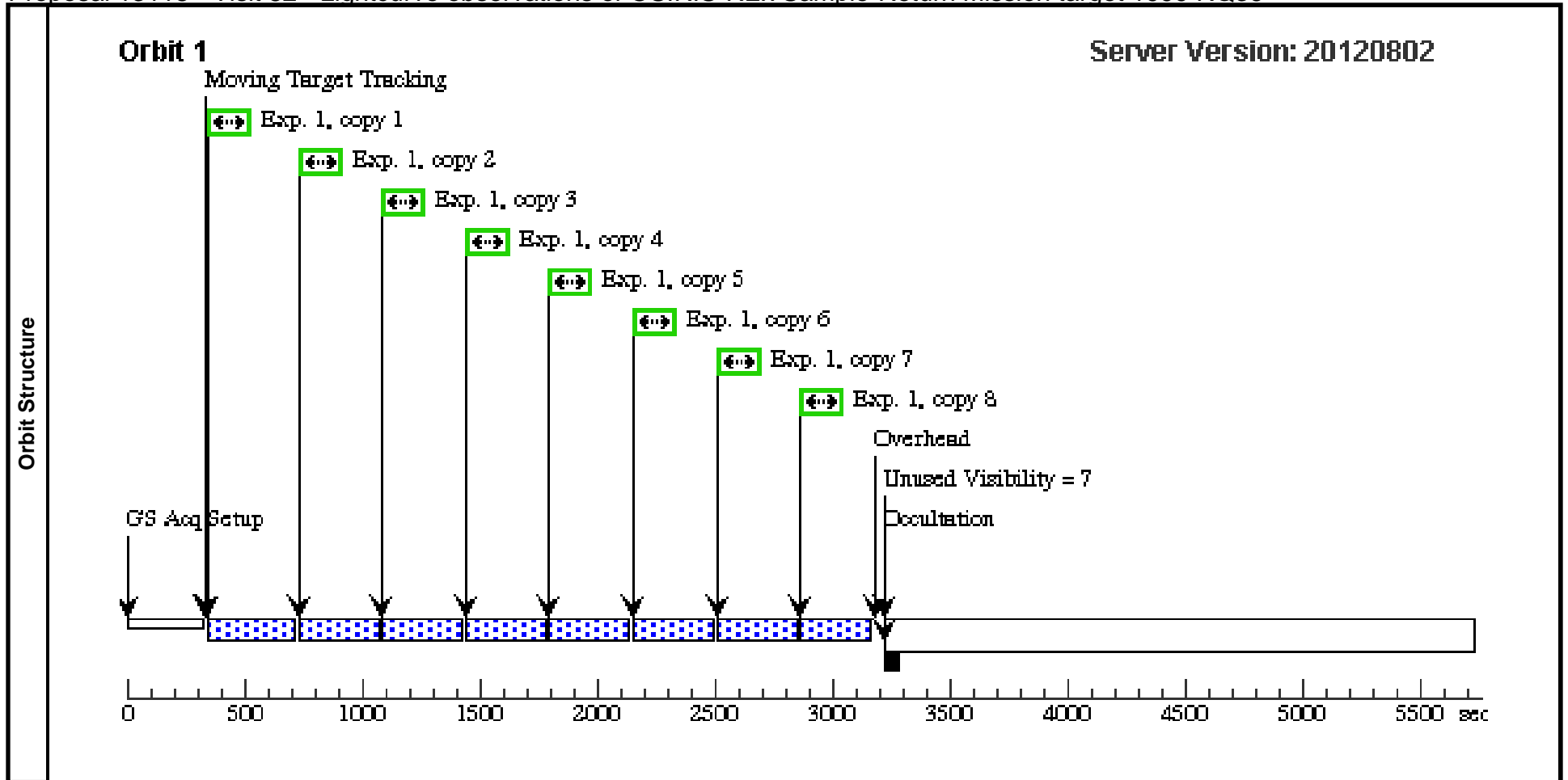
Visit	Proposal 13118, Visit 81, implementation Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS Special Requirements: PCS MODE FINE; BETWEEN 15-DEC-2012:04:00:00 AND 20-DEC-2012:05:00:00; BETWEEN 20-DEC-2012:10:00:00 AND 23-DEC-2012:14:00:00; BETWEEN 23-DEC-2012:18:00:00 AND 24-DEC-2012:13:00:00; BETWEEN 24-DEC-2012:14:00:00 AND 01-JAN-2013:00:00:00; BETWEEN 10-DEC-2012:00:00:00 AND 11-DEC-2012:14:00:00; BETWEEN 11-DEC-2012:18:00:00 AND 14-DEC-2012:22:00:00									
	Solar System Targets	#	Name	Level 1	Level 2	Level 3	Window	Ephem Center		
	(1)	1999RQ36	TYPE=ASTEROID,A=1.12599402193 9682,E=.2037148598461005,I=6.0349 71460079773,O=2.044605768830181, W=66.27223277868985,M=268.66940 54274844,EQUINOX=J2000,EPOCH =01-OCT- 2012:00:00:00,EpochTimeScale=TDB				MOSS Planning Start: 01-SEP-2012:00:00:00 MOSS Planning End: 01-OCT-2013:00:00:00 MOSS Show Windows: true	EARTH		
	<i>Comments:</i> Acquisition Uncertainty: 3 Arcsec									
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(1) 1999RQ36	WFC3/UVIS, ACCUM, UVIS2-C512C-SUB	F350LP				306 Secs X 8 [=>(Copy 1)] [=>(Copy 2)] [=>(Copy 3)] [=>(Copy 4)] [=>(Copy 5)] [=>(Copy 6)] [=>(Copy 7)] [=>(Copy 8)]	[1]



Proposal 13118 - Visit 82 - Lightcurve observations of OSIRIS-REx Sample-Return Mission target 1999 RQ36

Fri Oct 19 01:05:22 GMT 2012

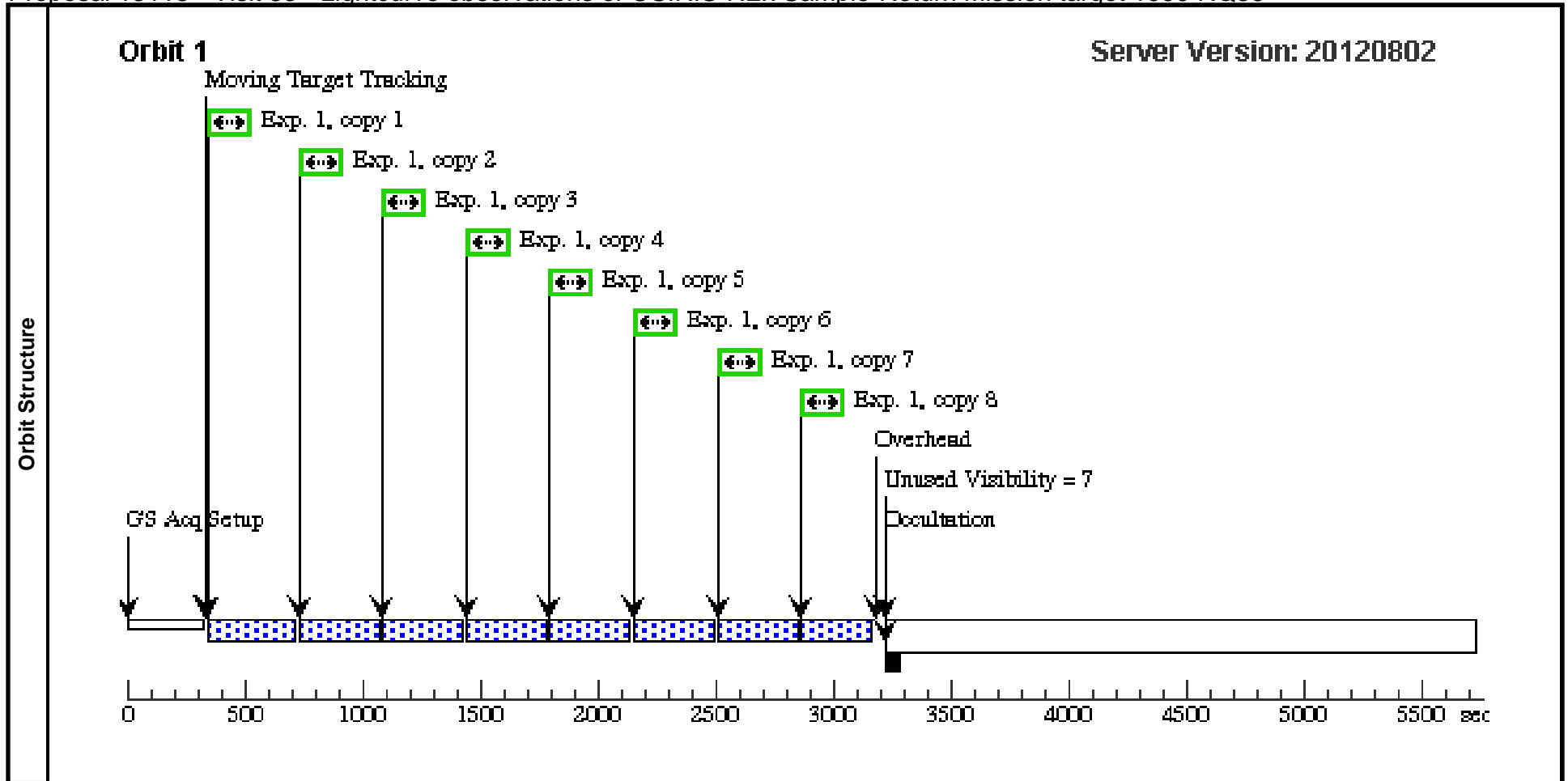
Visit	Proposal 13118, Visit 82, implementation Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS Special Requirements: PCS MODE FINE; AFTER 81 BY 0.9 Orbits TO 1.1 Orbits; BETWEEN 15-DEC-2012:04:00:00 AND 20-DEC-2012:05:00:00; BETWEEN 20-DEC-2012:10:00:00 AND 23-DEC-2012:14:00:00; BETWEEN 23-DEC-2012:18:00:00 AND 24-DEC-2012:13:00:00; BETWEEN 24-DEC-2012:14:00:00 AND 01-JAN-2013:00:00:00; BETWEEN 10-DEC-2012:00:00:00 AND 11-DEC-2012:14:00:00; BETWEEN 11-DEC-2012:18:00:00 AND 14-DEC-2012:22:00:00									
	Solar System Targets	#	Name	Level 1	Level 2	Level 3	Window	Ephem Center		
	(1)	1999RQ36	TYPE=ASTEROID,A=1.12599402193 9682,E=.2037148598461005,I=6.0349 71460079773,O=2.044605768830181, W=66.27223277868985,M=268.66940 54274844,EQUINOX=J2000,EPOCH =01-OCT- 2012:00:00:00,EpochTimeScale=TDB				MOSS Planning Start: 01-SEP-2012:00:00:00 MOSS Planning End: 01-OCT-2013:00:00:00 MOSS Show Windows: true	EARTH		
	Comments: Acquisition Uncertainty: 3 Arcsec									
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1	(1) 1999RQ36		WFC3/UVIS, ACCUM, UVIS2-C512C-SUB	F350LP				306 Secs X 8 [==>(Copy 1)] [==>(Copy 2)] [==>(Copy 3)] [==>(Copy 4)] [==>(Copy 5)] [==>(Copy 6)] [==>(Copy 7)] [==>(Copy 8)]	[1]



Proposal 13118 - Visit 83 - Lightcurve observations of OSIRIS-REx Sample-Return Mission target 1999 RQ36

Fri Oct 19 01:05:23 GMT 2012

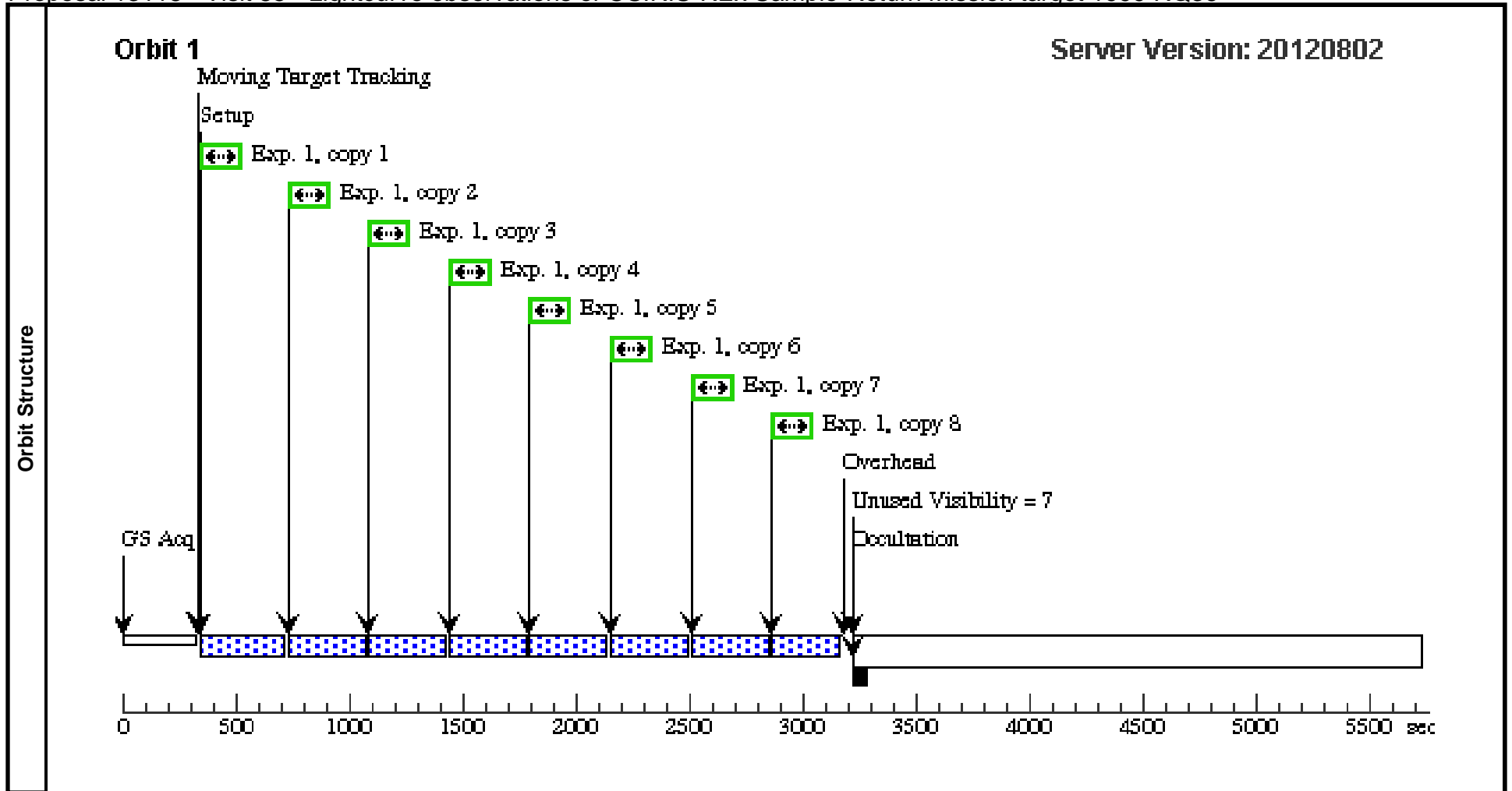
Visit	Proposal 13118, Visit 83, implementation Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS Special Requirements: PCS MODE FINE; AFTER 81 BY 1.9 Orbits TO 2.1 Orbits; BETWEEN 15-DEC-2012:04:00:00 AND 20-DEC-2012:05:00:00; BETWEEN 20-DEC-2012:10:00:00 AND 23-DEC-2012:14:00:00; BETWEEN 23-DEC-2012:18:00:00 AND 24-DEC-2012:13:00:00; BETWEEN 24-DEC-2012:14:00:00 AND 01-JAN-2013:00:00:00; BETWEEN 10-DEC-2012:00:00:00 AND 11-DEC-2012:14:00:00; BETWEEN 11-DEC-2012:18:00:00 AND 14-DEC-2012:22:00:00									
	Solar System Targets	#	Name	Level 1	Level 2	Level 3	Window	Ephem Center		
	(1)	1999RQ36	TYPE=ASTEROID,A=1.12599402193 9682,E=.2037148598461005,I=6.0349 71460079773,O=2.044605768830181, W=66.27223277868985,M=268.66940 54274844,EQUINOX=J2000,EPOCH =01-OCT- 2012:00:00:00,EpochTimeScale=TDB				MOSS Planning Start: 01-SEP-2012:00:00:00 MOSS Planning End: 01-OCT-2013:00:00:00 MOSS Show Windows: true	EARTH		
	Comments: Acquisition Uncertainty: 3 Arcsec									
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(1) 1999RQ36	WFC3/UVIS, ACCUM, UVIS2-C512C-SUB	F350LP				306 Secs X 8 [=>(Copy 1)] [=>(Copy 2)] [=>(Copy 3)] [=>(Copy 4)] [=>(Copy 5)] [=>(Copy 6)] [=>(Copy 7)] [=>(Copy 8)]	[1]



Proposal 13118 - Visit 85 - Lightcurve observations of OSIRIS-REx Sample-Return Mission target 1999 RQ36

Fri Oct 19 01:05:24 GMT 2012

Visit	Proposal 13118, Visit 85, implementation Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS Special Requirements: PCS MODE FINE; AFTER 81 BY 13.9 Orbits TO 14.1 Orbits; BETWEEN 15-DEC-2012:04:00:00 AND 20-DEC-2012:05:00:00; BETWEEN 20-DEC-2012:10:00:00 AND 23-DEC-2012:14:00:00; BETWEEN 23-DEC-2012:18:00:00 AND 24-DEC-2012:13:00:00; BETWEEN 24-DEC-2012:14:00:00 AND 01-JAN-2013:00:00:00; BETWEEN 10-DEC-2012:00:00:00 AND 11-DEC-2012:14:00:00; BETWEEN 11-DEC-2012:18:00:00 AND 14-DEC-2012:22:00:00 Comments: Skip 11 orbits between 83 and 85									
	Solar System Targets	#	Name	Level 1	Level 2	Level 3	Window	Ephem Center		
(1)		1999RQ36	TYPE=ASTEROID,A=1.12599402193 9682,E=.2037148598461005,I=6.0349 71460079773,O=2.044605768830181, W=66.27223277868985,M=268.66940 54274844,EQUINOX=J2000,EPOCH =01-OCT- 2012:00:00:00,EpochTimeScale=TDB				MOSS Planning Start: 01-SEP-2012:00:00:00 MOSS Planning End: 01-OCT-2013:00:00:00 MOSS Show Windows: true	EARTH		
	Comments: Acquisition Uncertainty: 3 Arcsec									
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1	(1) 1999RQ36	(1) 1999RQ36	WFC3/UVIS, ACCUM, UVIS2-C512C-SUB	F350LP				306 Secs X 8 [==>(Copy 1)] [==>(Copy 2)] [==>(Copy 3)] [==>(Copy 4)] [==>(Copy 5)] [==>(Copy 6)] [==>(Copy 7)] [==>(Copy 8)]	[1]



Proposal 13118 - Visit 86 - Lightcurve observations of OSIRIS-REx Sample-Return Mission target 1999 RQ36

Fri Oct 19 01:05:24 GMT 2012

Visit	Proposal 13118, Visit 86, implementation Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS Special Requirements: PCS MODE FINE; AFTER 81 BY 14.9 Orbits TO 15.1 Orbits; BETWEEN 15-DEC-2012:04:00:00 AND 20-DEC-2012:05:00:00; BETWEEN 20-DEC-2012:10:00:00 AND 23-DEC-2012:14:00:00; BETWEEN 23-DEC-2012:18:00:00 AND 24-DEC-2012:13:00:00; BETWEEN 24-DEC-2012:14:00:00 AND 01-JAN-2013:00:00:00; BETWEEN 10-DEC-2012:00:00:00 AND 11-DEC-2012:14:00:00; BETWEEN 11-DEC-2012:18:00:00 AND 14-DEC-2012:22:00:00										
	Solar System Targets										
#	Name	Level 1	Level 2	Level 3	Window	Ephem Center					
(1)	1999RQ36	TYPE=ASTEROID,A=1.12599402193 9682,E=.2037148598461005,I=6.0349 71460079773,O=2.044605768830181, W=66.27223277868985,M=268.66940 54274844,EQUINOX=J2000,EPOCH =01-OCT- 2012:00:00:00,EpochTimeScale=TDB				MOSS Planning Start: 01-SEP-2012:00:00:00 MOSS Planning End: 01-OCT-2013:00:00:00 MOSS Show Windows: true	EARTH				
<i>Comments:</i> Acquisition Uncertainty: 3 Arcsec											
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit	
	1	(1) 1999RQ36		WFC3/UVIS, ACCUM, UVIS2-C512C-SUB	F350LP				306 Secs X 8 [==>(Copy 1)] [==>(Copy 2)] [==>(Copy 3)] [==>(Copy 4)] [==>(Copy 5)] [==>(Copy 6)] [==>(Copy 7)] [==>(Copy 8)]	[1]	

