# 17446 - Extending Precision Cosmology to Early Hosts of Type Ia Supernovae via Surface Brightness Fluctuation (SBF) Distances

Cycle: 31, Proposal Category: GO

(Availability Mode: SUPPORTED)

**INVESTIGATORS**

| *Name* | *Institution* |
|---|---|
| **Dr. Peter Milne (PI) (Contact)** | **University of Arizona** |
| Dr. Joseph Jensen (CoI) | Utah Valley University |
| Dr. Charlotte M. Wood (CoI) | Iowa State University |
| Dr. John P. Blakeslee (CoI) | NOIRLab - (AZ) |
| Dr. Peter M. Garnavich (CoI) | University of Notre Dame |
| Dr. Peter J. Brown (CoI) | Texas A & M University |

**VISITS**

| *Visit* | *Targets used in Visit* | *Configurations used in Visit* | *Orbits Used* | *Last Orbit Planner Run* | *OP Current with Visit?* |
|---|---|---|---|---|---|
| 01 | (1) CGCG-005-038 | WFC3/IR | 1 | 16-Jul-2024 15:00:33.0 | yes |
| 02 | (2) CGCG-031-049 | WFC3/IR | 1 | 16-Jul-2024 15:00:35.0 | yes |
| 03 | (3) CGCG-285-013 | WFC3/IR | 1 | 16-Jul-2024 15:00:36.0 | yes |
| 04 | (4) ESO-352-G057 | WFC3/IR | 1 | 16-Jul-2024 15:00:37.0 | yes |
| 05 | (5) ESO-442-G015 | WFC3/IR | 1 | 16-Jul-2024 15:00:37.0 | yes |
| 06 | (6) ESO-479-G007 | WFC3/IR | 1 | 16-Jul-2024 15:00:38.0 | yes |
| 30 | (6) ESO-479-G007 | WFC3/IR | 1 | 16-Jul-2024 15:00:39.0 | yes |
| 07 | (7) IC-0511 | WFC3/IR | 1 | 16-Jul-2024 15:00:40.0 | yes |

| *Visit* | *Targets used in Visit* | *Configurations used in Visit* | *Orbits Used* | *Last Orbit Planner Run* | *OP Current with Visit?* |
|---|---|---|---|---|---|
| 08 | (8) MCG-02-33-017 | WFC3/IR | 1 | 16-Jul-2024 15:00:41.0 | yes |
| 09 | (9) CGCG-097-050 | WFC3/IR | 1 | 16-Jul-2024 15:00:42.0 | yes |
| 10 | (10) MCG+08-07-008 | WFC3/IR | 1 | 16-Jul-2024 15:00:43.0 | yes |
| 11 | (11) UGC-00402 | WFC3/IR | 1 | 16-Jul-2024 15:00:44.0 | yes |
| 12 | (12) NGC-0083 | WFC3/IR | 1 | 16-Jul-2024 15:00:45.0 | yes |
| 13 | (13) NGC-1209 | WFC3/IR | 1 | 16-Jul-2024 15:00:46.0 | yes |
| 14 | (14) NGC-3332 | WFC3/IR | 1 | 16-Jul-2024 15:00:47.0 | yes |
| 15 | (15) NGC-3643 | WFC3/IR | 1 | 16-Jul-2024 15:00:48.0 | yes |
| 16 | (16) NGC-3941 | WFC3/IR | 1 | 16-Jul-2024 15:00:48.0 | yes |
| 17 | (17) NGC-4125 | WFC3/IR | 1 | 16-Jul-2024 15:00:49.0 | yes |
| 18 | (18) NGC-4169 | WFC3/IR | 1 | 16-Jul-2024 15:00:49.0 | yes |
| 19 | (19) NGC-4415 | WFC3/IR | 1 | 16-Jul-2024 15:00:50.0 | yes |
| 20 | (20) NGC-4636 | WFC3/IR | 1 | 16-Jul-2024 15:00:50.0 | yes |
| 21 | (21) NGC-4767 | WFC3/IR | 1 | 16-Jul-2024 15:00:51.0 | yes |
| 22 | (22) NGC-5018 | WFC3/IR | 1 | 16-Jul-2024 15:00:51.0 | yes |
| 23 | (23) NGC-5222 | WFC3/IR | 2 | 16-Jul-2024 15:00:52.0 | yes |
| 24 | (24) NGC-5304 | WFC3/IR | 1 | 16-Jul-2024 15:00:52.0 | yes |
| 25 | (25) NGC-5419 | WFC3/IR | 1 | 16-Jul-2024 15:00:53.0 | yes |
| 26 | (26) NGC-5631 | WFC3/IR | 1 | 16-Jul-2024 15:00:53.0 | yes |
| 27 | (27) NGC-7187 | WFC3/IR | 1 | 16-Jul-2024 15:00:53.0 | yes |
| 28 | (28) LEDA-1693718 | WFC3/IR | 1 | 16-Jul-2024 15:00:54.0 | yes |
| 29 | (29) UGC-02829 | WFC3/IR | 2 | 16-Jul-2024 15:00:55.0 | yes |

32 Total Orbits Used

**ABSTRACT**

We propose to measure Surface Brightness Fluctuation (SBF) distances to the early-type host galaxies of 30 nearby Type Ia supernovae (SNe Ia) using WFC3/IR imaging. Combined with the existing HST-SBF distances, these new measurements provide a complete sample of 62 SBF-calibrated, SALT2-fitted SNe Ia reaching out to 100 Mpc. This compares with 42 SNe calibrated with Cepheid variables and 18 calibrated through the TRGB method. However, the cost per calibrator using SBF is significantly less than for the other methods. The SBF technique is currently tied to Cepheids, but a recently-approved JWST program will allow anchoring to the TRGB distances of early hosts, providing a precise estimate of the Hubble constant that is independent of Cepheids. Comparisons between the two zero-point anchors will isolate variations in SN luminosities and determine if there are systematic differences between the SN Ia distances to early- and late-type galaxies. Since SN Ia properties have been shown to depend upon the host galaxy type, it is essential that SNe Ia from all galaxy types be included in the calibration as a check on systematic population shifts impacting the Hubble constant, the Hubble tension and conclusions about the accelerating universe. The TRGB+SBF method is a good complement to the Cepheid+SN technique: it has comparable statistical uncertainties, requires many fewer orbits to achieve the distance measurements, and reaches well into the Hubble flow. This Cycle 31 proposal will roughly double the number of SNe Ia with SBF distances and will particularly improve the sampling of narrow-peaked SNe Ia.

**OBSERVING DESCRIPTION**

We will collect WFC3/IR F110W imaging observations of 29 early-type elliptical and lenticular galaxies that hosted normal SNe Ia to measure their SBF distances. The new distances will be combined with existing archival and published SBF measurements of 27 normal SNe Ia in 25 host galaxies. The host galaxies for these SNe Ia were selected to be near enough (<100 Mpc) that observations can be completed in 1 or 2 orbits following the SBF guidelines developed for WFC3 (Jensen et al. 2015, 2021), and are therefore expected to have measurement uncertainties <5%. All the galaxies in the proposed sample have (J-H) > 0.2 or (g-z) > 1.2 (AB mags) as required by Jensen et al. (2015). The requested exposure times are calculated to adequately sample the globular cluster luminosity function, as that is the primary limitation to measuring SBF in the most distant galaxies. The exposure times and distance limit of 100 Mpc were chosen to achieve a point-source sensitivity that reaches to within 0.5 mag of the peak of the globular cluster (GC) luminosity function, which is sufficient for the contribution from undetected GCs and galaxies to be less than 10% of the fluctuation signal, and therefore not dominate the final uncertainty in the distance measurement (Jensen et al. 2021).

We believe the most efficient use of the allocated time is to collect four dithered exposures per orbit with SPARS50 and NSAMP=13 to get a total of 2412 sec per target (or twice that for the two targets for which 2 orbits were allocated). This requires setting the schedulability to 60-80% for the majority of the targets. From the visit planning tool output, this restriction has minimal impact on the potential observing windows. If we need to go

to 100% scheduability, the exposure time per target would have to be reduced from 2412 to 2212 sec (with NSAMP=12).

There are no other special requirements for these observations. They are just straight-forward imaging at F110W with 4 small dithers to allow for correction of image defects.

## Visit

**Proposal 17446, CGCG-005-038 (01), completed** Tue Jul 16 19:00:55 GMT 2024

**Diagnostic Status: No Diagnostics**

Scientific Instruments: WFC3/IR

Special Requirements: SCHED 60%

## Patterns

| # | Primary Pattern | | Secondary Pattern | Exposures |
|---|---|---|---|---|
| (1) | Pattern Type=WFC3-IR-DITHER-BOX-MIN<br>Purpose=DITHER<br>Number Of Points=4<br>Point Spacing=1.144<br>Line Spacing=0.73 | Coordinate Frame=POS-TARG<br>Pattern Orientation=18.528<br>Angle Between Sides=74.653<br>Center Pattern=false | | (1) |

## Fixed Targets

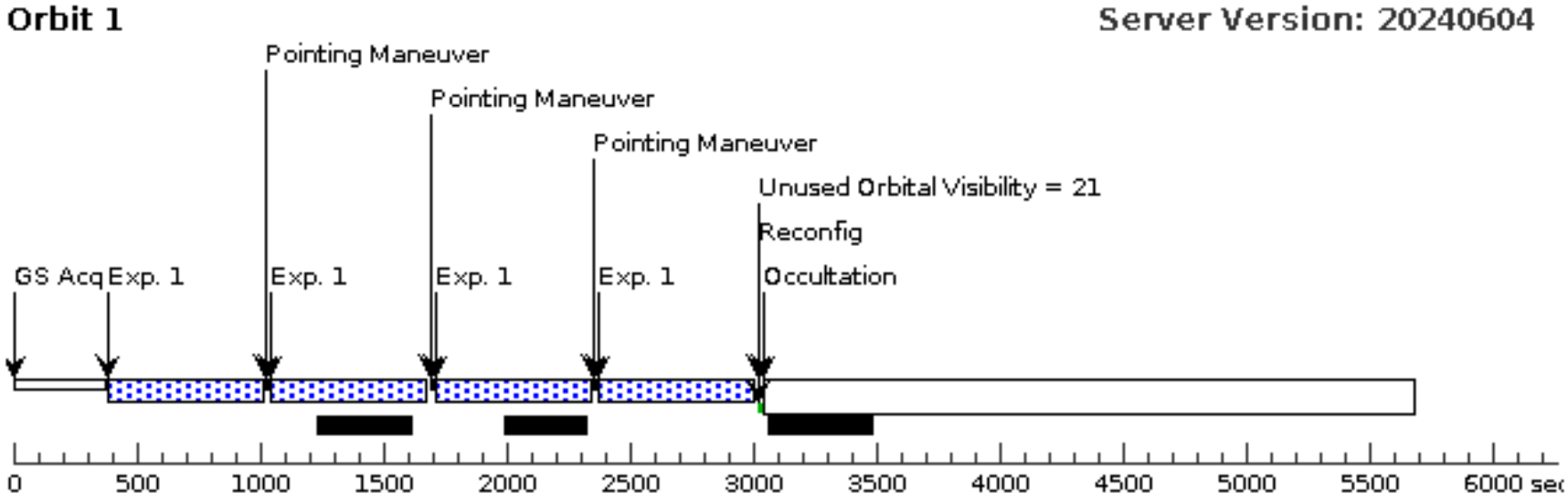
| # | Name | Target Coordinates | Targ. Coord. Corrections | Fluxes | Miscellaneous |
|---|---|---|---|---|---|
| (1) | CGCG-005-038 | RA: 08 56 18.7248 (134.0780200d)<br>Dec: -00 26 29.40 (-.44150d)<br>Equinox: J2000 | Radial Velocity: 4113 km/sec | V=(?)<br>g =15.03 AB | Reference Frame: NED |

*Comments: This object was generated by the targetselector and retrieved from the NED database.*
*Category=GALAXY*
*Description=[LENTICULAR]*
*Extended=YES*

## Exposures

| # | Label | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time (Total)/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | (1) CGCG-005-038 | WFC3/IR, MULTIACCUM, IR | F110W | SAMP-SEQ=SPARS50;<br>NSAMP=13 | | Pattern 1, Exps 1-1 in CGCG-005-038 (01) (1) | 602.937703 Secs (2411.751 Secs)<br>*[==>(Pattern 1)]*<br>*[==>(Pattern 2)]*<br>*[==>(Pattern 3)]*<br>*[==>(Pattern 4)]* | ***[1]*** |

## Orbit Structure



## Visit

**Proposal 17446, CGCG-031-049 (02), completed** Tue Jul 16 19:00:55 GMT 2024

**Diagnostic Status: No Diagnostics**

Scientific Instruments: WFC3/IR

Special Requirements: SCHED 60%

## Patterns

| # | Primary Pattern | | Secondary Pattern | Exposures |
|---|---|---|---|---|
| (1) | Pattern Type=WFC3-IR-DITHER-BOX-MIN<br>Purpose=DITHER<br>Number Of Points=4<br>Point Spacing=1.144<br>Line Spacing=0.73 | Coordinate Frame=POS-TARG<br>Pattern Orientation=18.528<br>Angle Between Sides=74.653<br>Center Pattern=false | | (1) |

## Fixed Targets

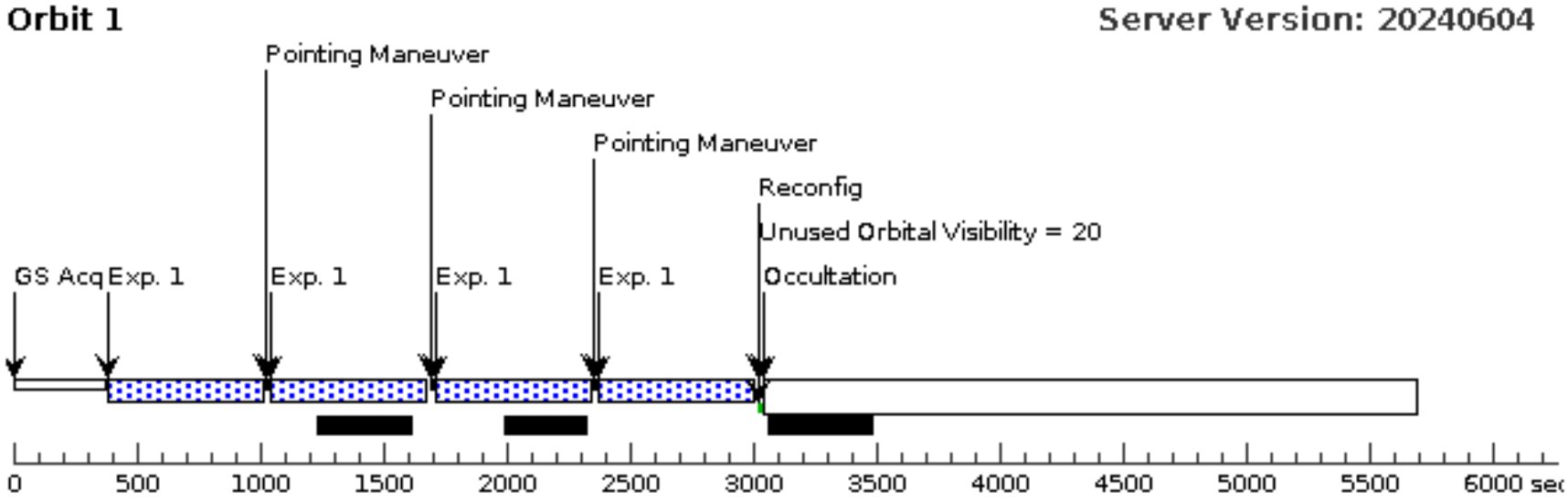
| # | Name | Target Coordinates | Targ. Coord. Corrections | Fluxes | Miscellaneous |
|---|---|---|---|---|---|
| (2) | CGCG-031-049 | RA: 08 07 13.5024 (121.8062600d)<br>Dec: +05 40 56.53 (5.68237d)<br>Equinox: J2000 | Radial Velocity: 7722 km/sec | V=(?)<br>g = 15.26 | Reference Frame: NED |

*Comments: This object was generated by the targetselector and retrieved from the NED database.*
*Category=GALAXY*
*Description=[ELLIPTICAL]*
*Extended=YES*

## Exposures

| # | Label | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time (Total)/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | (2) CGCG-031-049 | WFC3/IR, MULTIACCUM, IR | F110W | SAMP-SEQ=SPARS50;<br>NSAMP=13 | | Pattern 1, Exps 1-1 in CGCG-031-049 (02) (1) | 602.937703 Secs (2411.751 Secs)<br>*[==>(Pattern 1)]*<br>*[==>(Pattern 2)]*<br>*[==>(Pattern 3)]*<br>*[==>(Pattern 4)]* | ***[1]*** |

## Orbit Structure



## Visit

**Proposal 17446, CGCG-285-013 (03), completed** Tue Jul 16 19:00:55 GMT 2024

**Diagnostic Status: No Diagnostics**

Scientific Instruments: WFC3/IR

Special Requirements: SCHED 80%

## Patterns

| # | Primary Pattern | | Secondary Pattern | Exposures |
|---|---|---|---|---|
| (1) | Pattern Type=WFC3-IR-DITHER-BOX-MIN<br>Purpose=DITHER<br>Number Of Points=4<br>Point Spacing=1.144<br>Line Spacing=0.73 | Coordinate Frame=POS-TARG<br>Pattern Orientation=18.528<br>Angle Between Sides=74.653<br>Center Pattern=false | | (1) |

## Fixed Targets

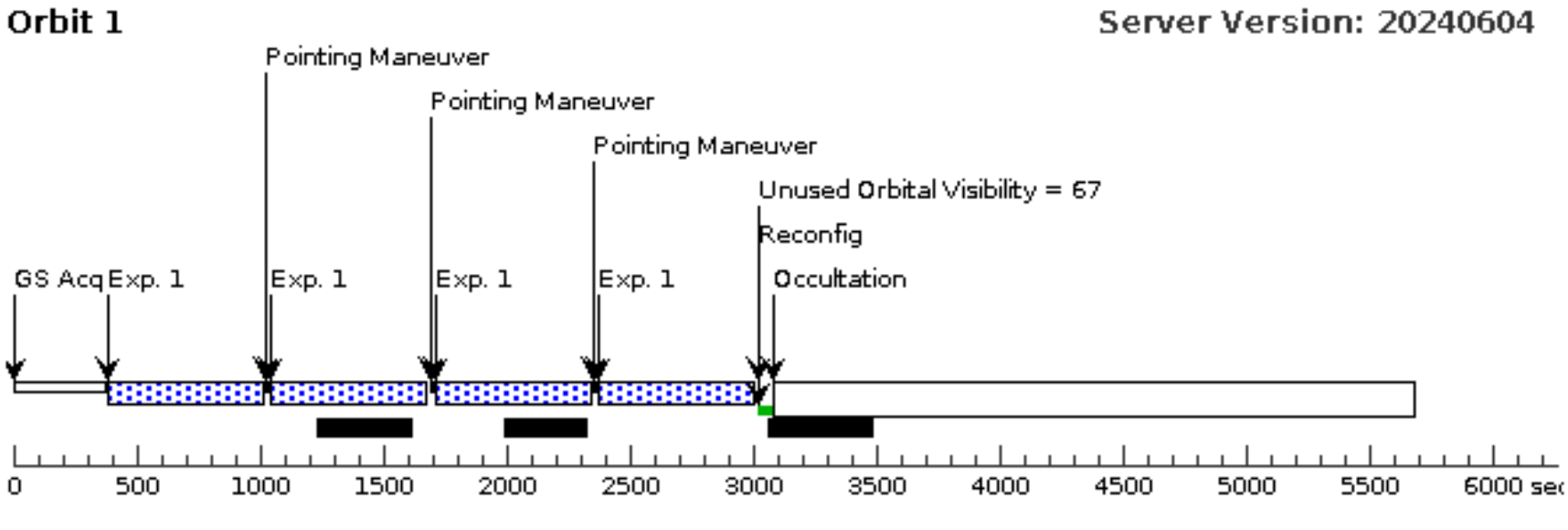
| # | Name | Target Coordinates | Targ. Coord. Corrections | Fluxes | Miscellaneous |
|---|---|---|---|---|---|
| (3) | CGCG-285-013 | RA: 07 02 54.7008 (105.7279200d)<br>Dec: +62 46 10.99 (62.76972d)<br>Equinox: J2000 | Radial Velocity: 4586 km/sec | V=(?)<br>B = 14.42 | Reference Frame: NED |

*Comments: This object was generated by the targetselector and retrieved from the NED database.*
*Category=GALAXY*
*Description=[BAR, LENTICULAR]*
*Extended=YES*

## Exposures

| # | Label | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time (Total)/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | (3) CGCG-285-013 | WFC3/IR, MULTIACCUM, IR | F110W | SAMP-SEQ=SPARS50;<br>NSAMP=13 | | Pattern 1, Exps 1-1 in CGCG-285-013 (03) (1) | 602.937703 Secs (2411.751 Secs)<br>*[==>(Pattern 1)]*<br>*[==>(Pattern 2)]*<br>*[==>(Pattern 3)]*<br>*[==>(Pattern 4)]* | *[1]* |

## Orbit Structure



## Visit

**Proposal 17446, ESO-352-G057 (04), scheduling**

Tue Jul 16 19:00:55 GMT 2024

**Diagnostic Status: No Diagnostics**

Scientific Instruments: WFC3/IR

Special Requirements: SCHED 70%

## Patterns

| # | Primary Pattern | | Secondary Pattern | Exposures |
|---|---|---|---|---|
| (1) | Pattern Type=WFC3-IR-DITHER-BOX-MIN<br>Purpose=DITHER<br>Number Of Points=4<br>Point Spacing=1.144<br>Line Spacing=0.73 | Coordinate Frame=POS-TARG<br>Pattern Orientation=18.528<br>Angle Between Sides=74.653<br>Center Pattern=false | | (1) |

## Fixed Targets

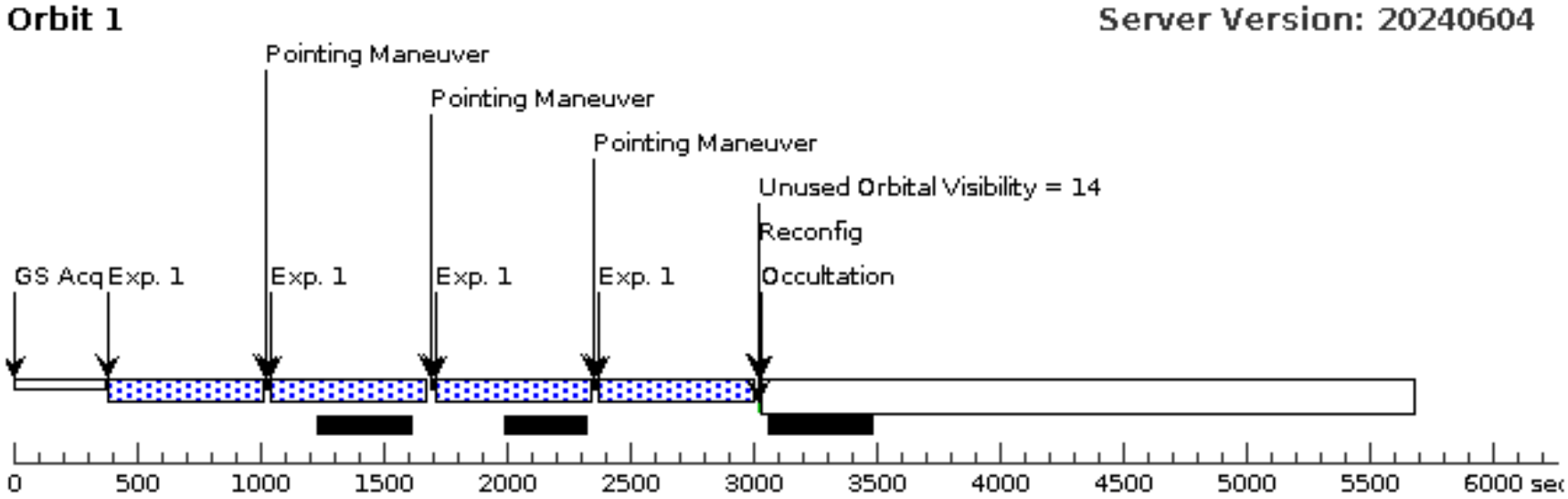
| # | Name | Target Coordinates | Targ. Coord. Corrections | Fluxes | Miscellaneous |
|---|---|---|---|---|---|
| (4) | ESO-352-G057 | RA: 01 22 2.3941 (20.5099754d)<br>Dec: -34 11 48.19 (-34.19672d)<br>Equinox: J2000 | Radial Velocity: 5453 km/sec | V=(?)<br>R = 13.39 | Reference Frame: NED |

*Comments:*
*Category=GALAXY*
*Description=[LENTICULAR]*
*Extended=YES*

## Exposures

| # | Label | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time (Total)/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | (4) ESO-352-G057 | WFC3/IR, MULTIACCUM, IR | F110W | SAMP-SEQ=SPARS50;<br>NSAMP=13 | | Pattern 1, Exps 1-1 in ESO-352-G057 (04) (1) | 602.937703 Secs (2411.751 Secs)<br>*[==>(Pattern 1)]*<br>*[==>(Pattern 2)]*<br>*[==>(Pattern 3)]*<br>*[==>(Pattern 4)]* | ***[1]*** |

## Orbit Structure



## Visit

**Proposal 17446, ESO-442-G015 (05), completed**

Tue Jul 16 19:00:55 GMT 2024

**Diagnostic Status: No Diagnostics**

Scientific Instruments: WFC3/IR

Special Requirements: SCHED 70%

## Patterns

| # | Primary Pattern | | Secondary Pattern | Exposures |
|---|---|---|---|---|
| (1) | Pattern Type=WFC3-IR-DITHER-BOX-MIN<br>Purpose=DITHER<br>Number Of Points=4<br>Point Spacing=1.144<br>Line Spacing=0.73 | Coordinate Frame=POS-TARG<br>Pattern Orientation=18.528<br>Angle Between Sides=74.653<br>Center Pattern=false | | (1) |

## Fixed Targets

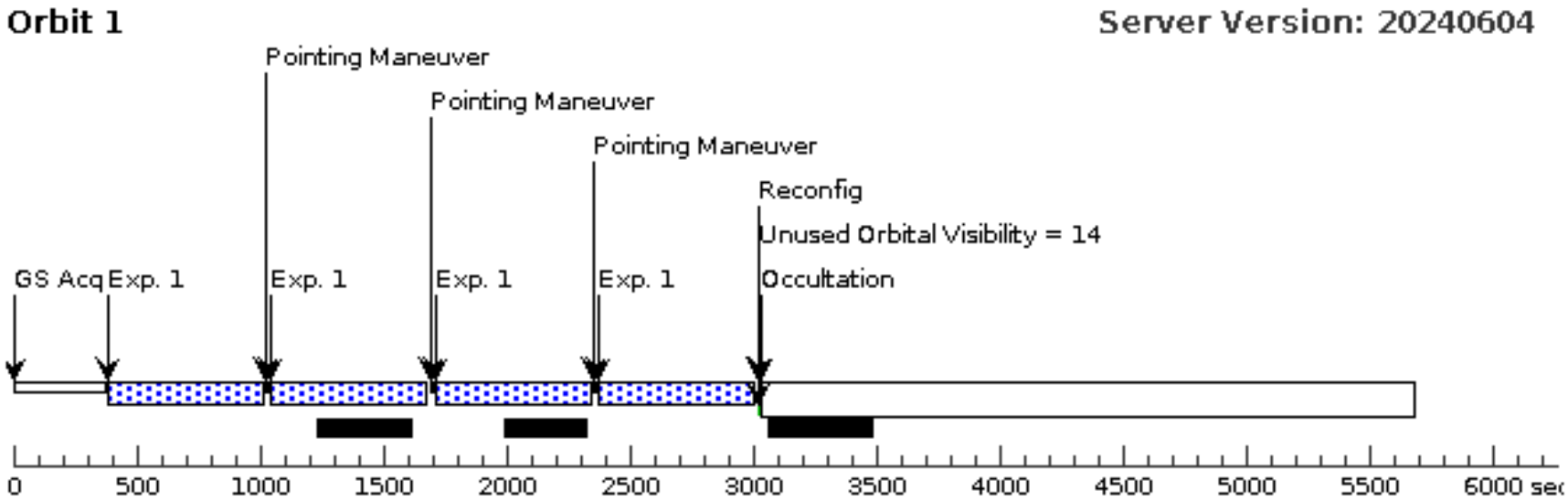
| # | Name | Target Coordinates | Targ. Coord. Corrections | Fluxes | Miscellaneous |
|---|---|---|---|---|---|
| (5) | ESO-442-G015 | RA: 12 42 50.7832 (190.7115967d)<br>Dec: -30 24 34.59 (-30.40961d)<br>Equinox: J2000 | Radial Velocity: 4619 km/sec | V=(?)<br>R = 12.71 | Reference Frame: NED |

*Comments:*
*Category=GALAXY*
*Description=[LENTICULAR]*
*Extended=YES*

## Exposures

| # | Label | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time (Total)/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | (5) ESO-442-G015 | WFC3/IR, MULTIACCUM, IR | F110W | SAMP-SEQ=SPARS50;<br>NSAMP=13 | | Pattern 1, Exps 1-1 in ESO-442-G015 (05) (1) | 602.937703 Secs (2411.751 Secs)<br>*[==>(Pattern 1)]*<br>*[==>(Pattern 2)]*<br>*[==>(Pattern 3)]*<br>*[==>(Pattern 4)]* | ***[1]*** |

## Orbit Structure



## Visit

**Proposal 17446, ESO-479-G007 (06), failed**

Tue Jul 16 19:00:55 GMT 2024

**Diagnostic Status: No Diagnostics**

Scientific Instruments: WFC3/IR

Special Requirements: SCHED 70%

## Patterns

| # | Primary Pattern | | Secondary Pattern | Exposures |
|---|---|---|---|---|
| (1) | Pattern Type=WFC3-IR-DITHER-BOX-MIN<br>Purpose=DITHER<br>Number Of Points=4<br>Point Spacing=1.144<br>Line Spacing=0.73 | Coordinate Frame=POS-TARG<br>Pattern Orientation=18.528<br>Angle Between Sides=74.653<br>Center Pattern=false | | (1) |

## Fixed Targets

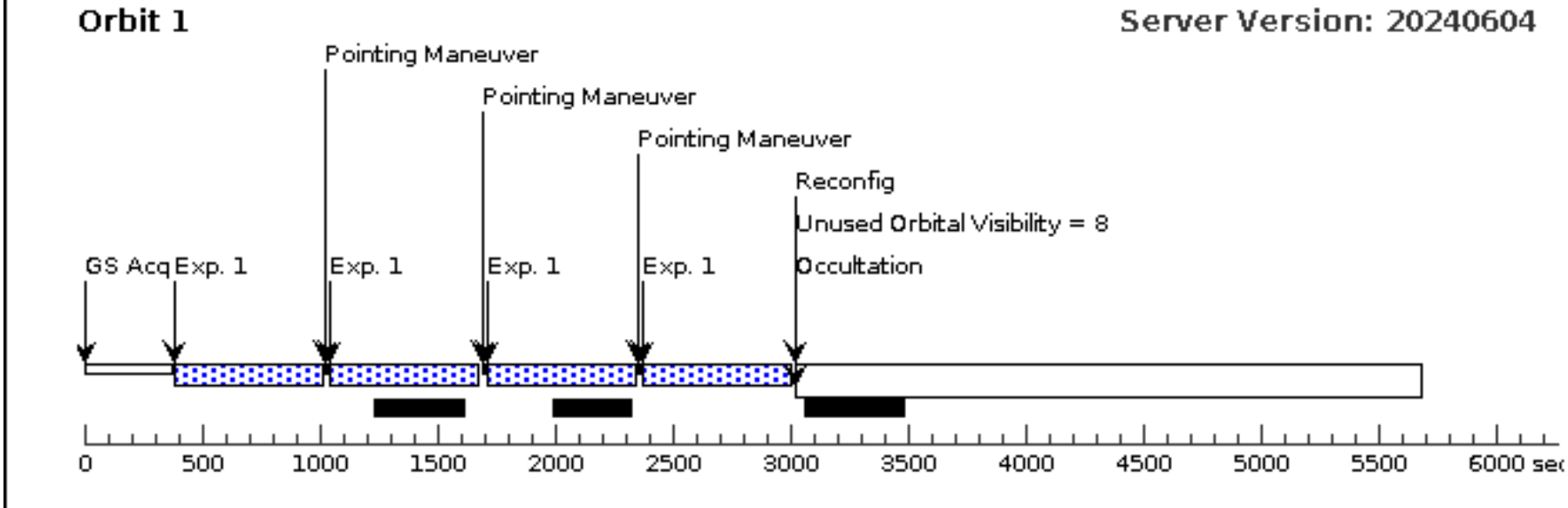
| # | Name | Target Coordinates | Targ. Coord. Corrections | Fluxes | Miscellaneous |
|---|---|---|---|---|---|
| (6) | ESO-479-G007 | RA: 02 27 21.8226 (36.8409275d)<br>Dec: -23 55 43.65 (-23.92879d)<br>Equinox: J2000 | Radial Velocity: 4896 km/sec | V=(?)<br>R = 14.15 | Reference Frame: NED |

*Comments:*
*Category=GALAXY*
*Description=[LENTICULAR]*
*Extended=YES*

## Exposures

| # | Label | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time (Total)/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | (6) ESO-479-G007 | WFC3/IR, MULTIACCUM, IR | F110W | SAMP-SEQ=SPARS50;<br>NSAMP=13 | | Pattern 1, Exps 1-1 in ESO-479-G007 (06) (1) | 602.937703 Secs (2411.751 Secs)<br>*[==>(Pattern 1)]*<br>*[==>(Pattern 2)]*<br>*[==>(Pattern 3)]*<br>*[==>(Pattern 4)]* | ***[1]*** |

## Orbit Structure



## Visit

**Proposal 17446, ESO-479-G007 (30)** Tue Jul 16 19:00:55 GMT 2024

**Diagnostic Status: No Diagnostics**

Scientific Instruments: WFC3/IR

Special Requirements: SCHED 70%

*Comments: This is an approved replacement for visit 06, for which guiding failed for 50% of the exposures.*

## Patterns

| # | Primary Pattern | | Secondary Pattern | Exposures |
|---|---|---|---|---|
| (1) | Pattern Type=WFC3-IR-DITHER-BOX-MIN<br>Purpose=DITHER<br>Number Of Points=4<br>Point Spacing=1.144<br>Line Spacing=0.73 | Coordinate Frame=POS-TARG<br>Pattern Orientation=18.528<br>Angle Between Sides=74.653<br>Center Pattern=false | | (1) |

## Fixed Targets

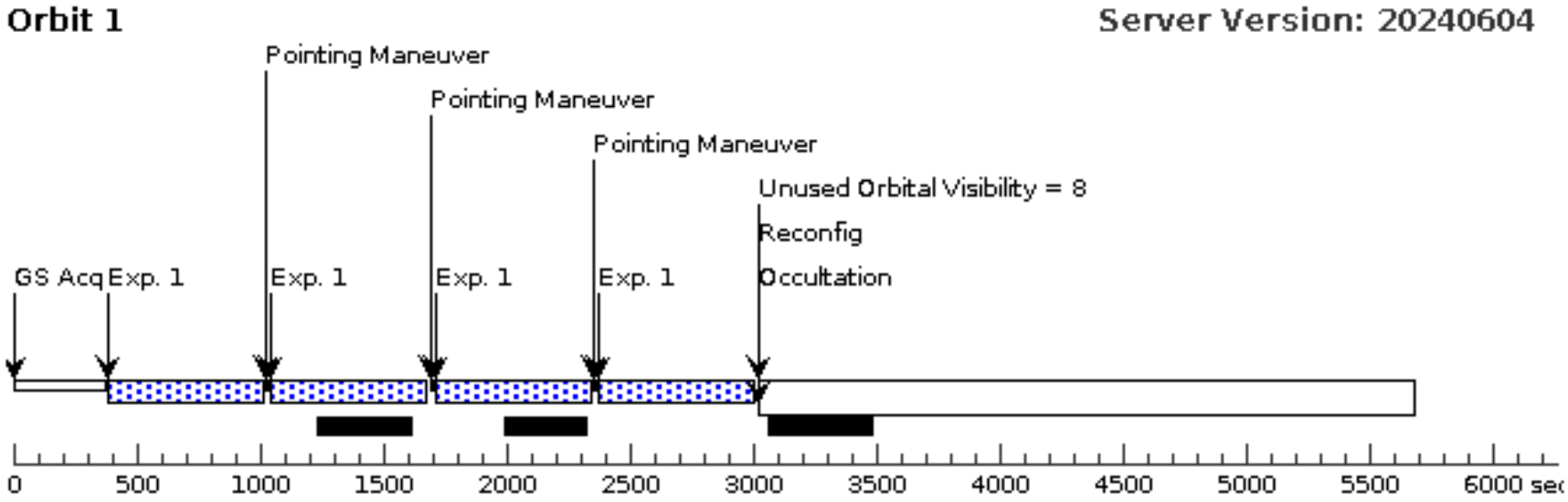
| # | Name | Target Coordinates | Targ. Coord. Corrections | Fluxes | Miscellaneous |
|---|---|---|---|---|---|
| (6) | ESO-479-G007 | RA: 02 27 21.8226 (36.8409275d)<br>Dec: -23 55 43.65 (-23.92879d)<br>Equinox: J2000 | Radial Velocity: 4896 km/sec | V=(?)<br>R = 14.15 | Reference Frame: NED |

*Comments:*
*Category=GALAXY*
*Description=[LENTICULAR]*
*Extended=YES*

## Exposures

| # | Label | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time (Total)/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | (6) ESO-479-G007 | WFC3/IR, MULTIACCUM, IR | F110W | SAMP-SEQ=SPARS50;<br>NSAMP=13 | | Pattern 1, Exps 1-1 in ESO-479-G007 (30) (1) | 602.937703 Secs (2411.751 Secs)<br>*[==>(Pattern 1)]*<br>*[==>(Pattern 2)]*<br>*[==>(Pattern 3)]*<br>*[==>(Pattern 4)]* | *[1]* |

## Orbit Structure



## Visit

**Proposal 17446, IC-0511 (07), completed** Tue Jul 16 19:00:55 GMT 2024

**Diagnostic Status: No Diagnostics**

Scientific Instruments: WFC3/IR

Special Requirements: SCHED 90%

## Patterns

| # | Primary Pattern | | Secondary Pattern | Exposures |
|---|---|---|---|---|
| (1) | Pattern Type=WFC3-IR-DITHER-BOX-MIN<br>Purpose=DITHER<br>Number Of Points=4<br>Point Spacing=1.144<br>Line Spacing=0.73 | Coordinate Frame=POS-TARG<br>Pattern Orientation=18.528<br>Angle Between Sides=74.653<br>Center Pattern=false | | (1) |

## Fixed Targets

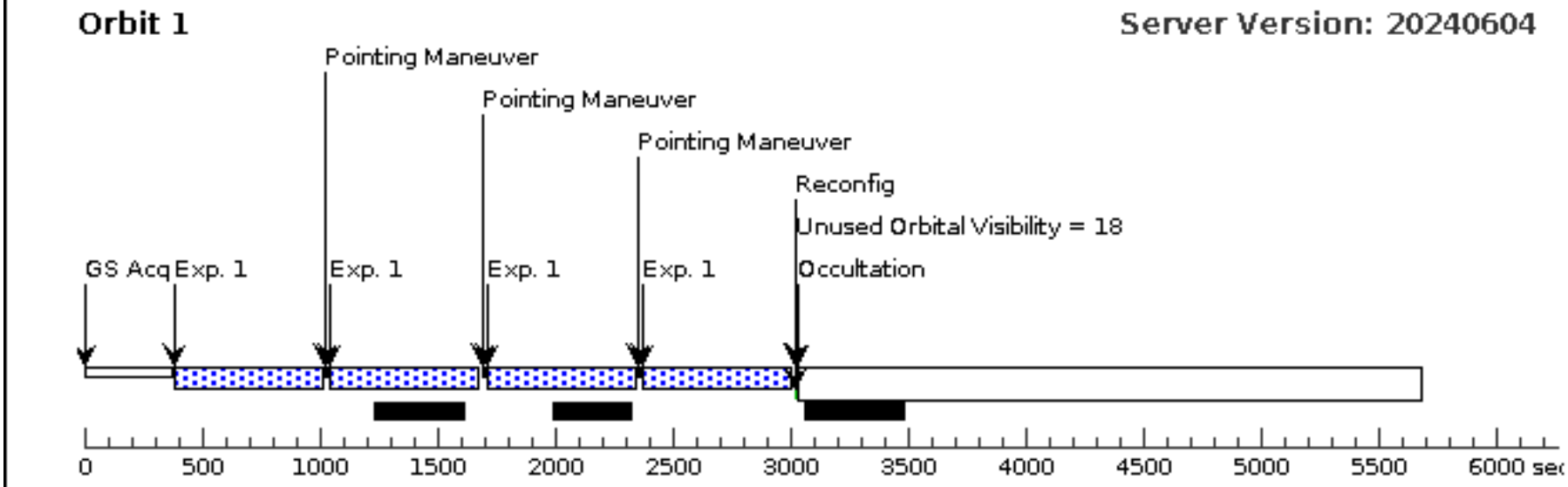
| # | Name | Target Coordinates | Targ. Coord. Corrections | Fluxes | Miscellaneous |
|---|---|---|---|---|---|
| (7) | IC-0511 | RA: 08 40 50.4504 (130.2102100d)<br>Dec: +73 29 12.01 (73.48667d)<br>Equinox: J2000 | Radial Velocity: 3662 km/sec | V=(?)<br>J = 11.19 | Reference Frame: NED |

*Comments: This object was generated by the targetselector and retrieved from the NED database.*
*Category=GALAXY*
*Description=[LENTICULAR]*
*Extended=YES*

## Exposures

| # | Label | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time (Total)/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | (7) IC-0511 | WFC3/IR, MULTIACCUM, IR | F110W | SAMP-SEQ=SPARS50;<br>NSAMP=13 | | Pattern 1, Exps 1-1 in IC-0511 (07) (1) | 602.937703 Secs (2411.751 Secs)<br>*[==>(Pattern 1)]*<br>*[==>(Pattern 2)]*<br>*[==>(Pattern 3)]*<br>*[==>(Pattern 4)]* | ***[1]*** |

## Orbit Structure



## Visit

**Proposal 17446, MCG-02-33-107 (08), completed**

Tue Jul 16 19:00:55 GMT 2024

**Diagnostic Status: No Diagnostics**

Scientific Instruments: WFC3/IR

Special Requirements: SCHED 60%

## Patterns

| # | Primary Pattern | | Secondary Pattern | Exposures |
|---|---|---|---|---|
| (1) | Pattern Type=WFC3-IR-DITHER-BOX-MIN<br>Purpose=DITHER<br>Number Of Points=4<br>Point Spacing=1.144<br>Line Spacing=0.73 | Coordinate Frame=POS-TARG<br>Pattern Orientation=18.528<br>Angle Between Sides=74.653<br>Center Pattern=false | | (1) |

## Fixed Targets

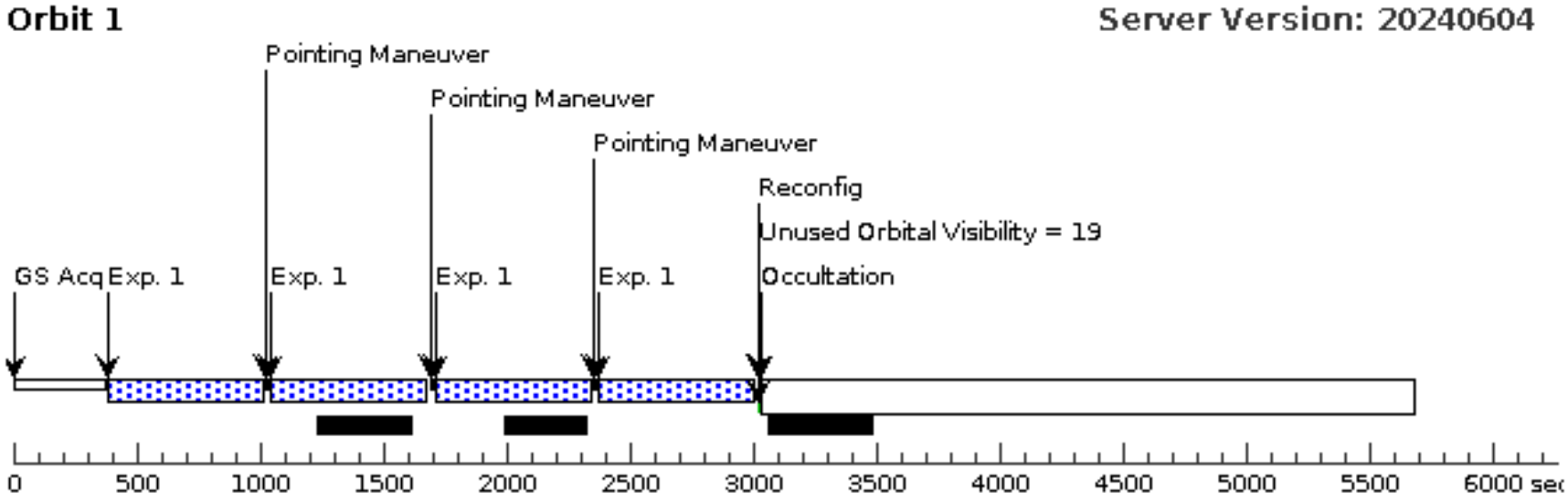
| # | Name | Target Coordinates | Targ. Coord. Corrections | Fluxes | Miscellaneous |
|---|---|---|---|---|---|
| (8) | MCG-02-33-017 | RA: 12 50 4.6910 (192.5195458d)<br>Dec: -14 44 0.56 (-14.73349d)<br>Equinox: J2000 | Radial Velocity: 4251 km/sec | V=12.51 | Reference Frame: SIMBAD |

*Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.*
*Category=GALAXY*
*Description=[LENTICULAR]*
*Extended=YES*

## Exposures

| # | Label | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time (Total)/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | (8) MCG-02-33-017 | WFC3/IR, MULTIACCUM, IR | F110W | SAMP-SEQ=SPARS50;<br>NSAMP=13 | | Pattern 1, Exps 1-1 in MCG-02-33-107 (08) (1) | 602.937703 Secs (2411.751 Secs)<br>*[==>(Pattern 1)]*<br>*[==>(Pattern 2)]*<br>*[==>(Pattern 3)]*<br>*[==>(Pattern 4)]* | *[1]* |

## Orbit Structure



## Visit

**Proposal 17446, CGCG-097-050 (09), completed** Tue Jul 16 19:00:55 GMT 2024

**Diagnostic Status: No Diagnostics**

Scientific Instruments: WFC3/IR

Special Requirements: SCHED 70%

## Patterns

| # | Primary Pattern | | Secondary Pattern | Exposures |
|---|---|---|---|---|
| (1) | Pattern Type=WFC3-IR-DITHER-BOX-MIN<br>Purpose=DITHER<br>Number Of Points=4<br>Point Spacing=1.144<br>Line Spacing=0.73 | Coordinate Frame=POS-TARG<br>Pattern Orientation=18.528<br>Angle Between Sides=74.653<br>Center Pattern=false | | (1) |

## Fixed Targets

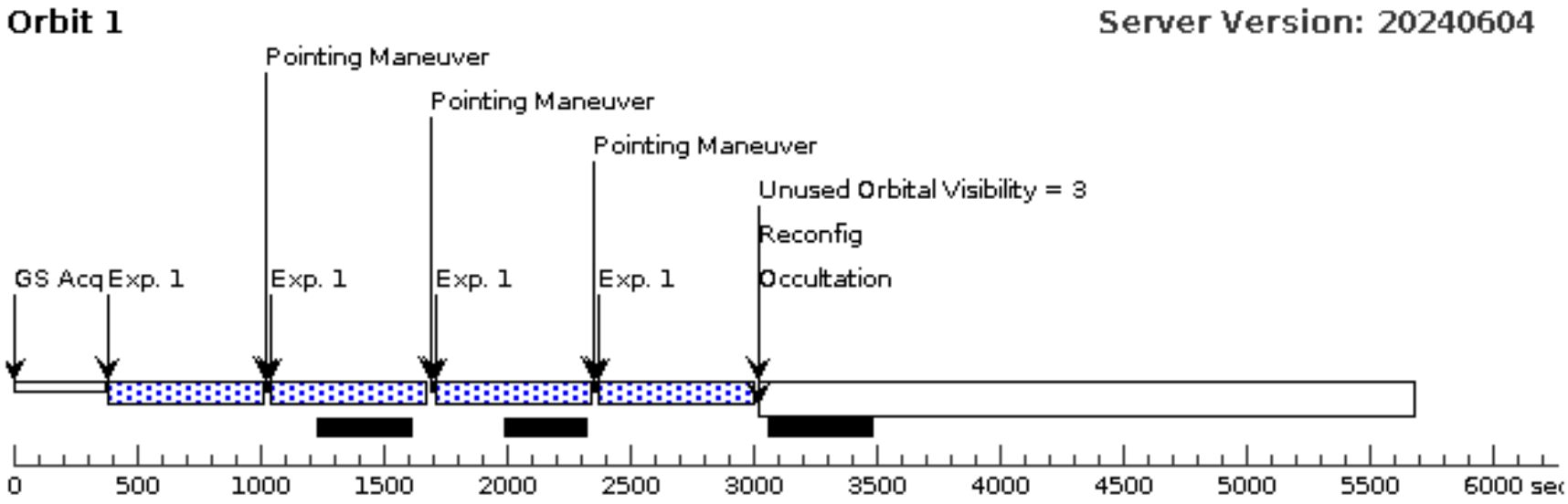
| # | Name | Target Coordinates | Targ. Coord. Corrections | Fluxes | Miscellaneous |
|---|---|---|---|---|---|
| (9) | CGCG-097-050 | RA: 11 40 16.0941 (175.0670588d)<br>Dec: +17 27 26.11 (17.45725d)<br>Equinox: J2000 | Radial Velocity: 3468 km/sec | V=(?)<br>g = 14.22 | Reference Frame: SIMBAD |

*Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.*
*Category=GALAXY*
*Description=[ELLIPTICAL]*
*Extended=YES*

## Exposures

| # | Label | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time (Total)/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | (9) CGCG-097-050 | WFC3/IR, MULTIACCUM, IR | F110W | SAMP-SEQ=SPARS50;<br>NSAMP=13 | | Pattern 1, Exps 1-1 in CGCG-097-050 (09) (1) | 602.937703 Secs (2411.751 Secs)<br>*[==>(Pattern 1)]*<br>*[==>(Pattern 2)]*<br>*[==>(Pattern 3)]*<br>*[==>(Pattern 4)]* | ***[1]*** |

## Orbit Structure



## Visit

**Proposal 17446, MCG+08-07-008 (10), completed**

Tue Jul 16 19:00:55 GMT 2024

**Diagnostic Status: No Diagnostics**

Scientific Instruments: WFC3/IR

Special Requirements: SCHED 80%

## Patterns

| # | Primary Pattern | | Secondary Pattern | Exposures |
|---|---|---|---|---|
| (1) | Pattern Type=WFC3-IR-DITHER-BOX-MIN<br>Purpose=DITHER<br>Number Of Points=4<br>Point Spacing=1.144<br>Line Spacing=0.73 | Coordinate Frame=POS-TARG<br>Pattern Orientation=18.528<br>Angle Between Sides=74.653<br>Center Pattern=false | | (1) |

## Fixed Targets

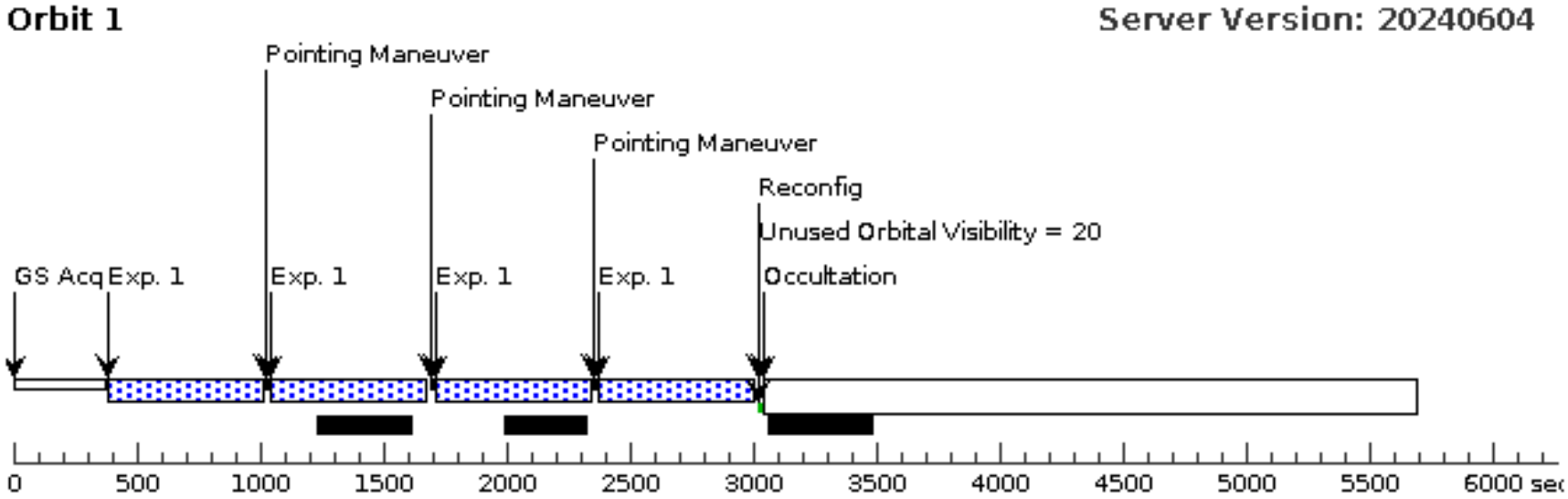
| # | Name | Target Coordinates | Targ. Coord. Corrections | Fluxes | Miscellaneous |
|---|---|---|---|---|---|
| (10) | MCG+08-07-008 | RA: 03 43 39.0504 (55.9127100d)<br>Dec: +46 09 19.69 (46.15547d)<br>Equinox: J2000 | Radial Velocity: 4894 km/sec | V=(?)<br>J = 11.57 | Reference Frame: NED |

*Comments:*
*Category=GALAXY*
*Description=[ELLIPTICAL]*
*Extended=YES*

## Exposures

| # | Label | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time (Total)/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | (10) MCG+08-07-008 | WFC3/IR, MULTIACCUM, IR | F110W | SAMP-SEQ=SPARS50;<br>NSAMP=13 | | Pattern 1, Exps 1-1 in MCG+08-07-008 (10) (1) | 602.937703 Secs (2411.751 Secs)<br>*[==>(Pattern 1)]*<br>*[==>(Pattern 2)]*<br>*[==>(Pattern 3)]*<br>*[==>(Pattern 4)]* | ***[1]*** |

## Orbit Structure



## Visit

**Proposal 17446, UGC-00402 (11), completed** Tue Jul 16 19:00:55 GMT 2024

**Diagnostic Status: Warning**

Scientific Instruments: WFC3/IR

Special Requirements: SCHED 60%

## Diagnostics

(UGC-00402 (11)) Warning (Orbit Planner): GS ACQ SCENARIO REQUESTED INCONSISTENT WITH VISIT GYRO MODE

(Exposure 1 (Pattern 1, Exps 1-1 in UGC-00402 (11)) special requirements) Warning (Form): The specified GS Acq Scenario is not in the current list of valid scenarios.

## Patterns

| # | Primary Pattern | | Secondary Pattern | Exposures |
|---|---|---|---|---|
| (1) | Pattern Type=WFC3-IR-DITHER-BOX-MIN<br>Purpose=DITHER<br>Number Of Points=4<br>Point Spacing=1.144<br>Line Spacing=0.73 | Coordinate Frame=POS-TARG<br>Pattern Orientation=18.528<br>Angle Between Sides=74.653<br>Center Pattern=false | | (1) |

## Fixed Targets

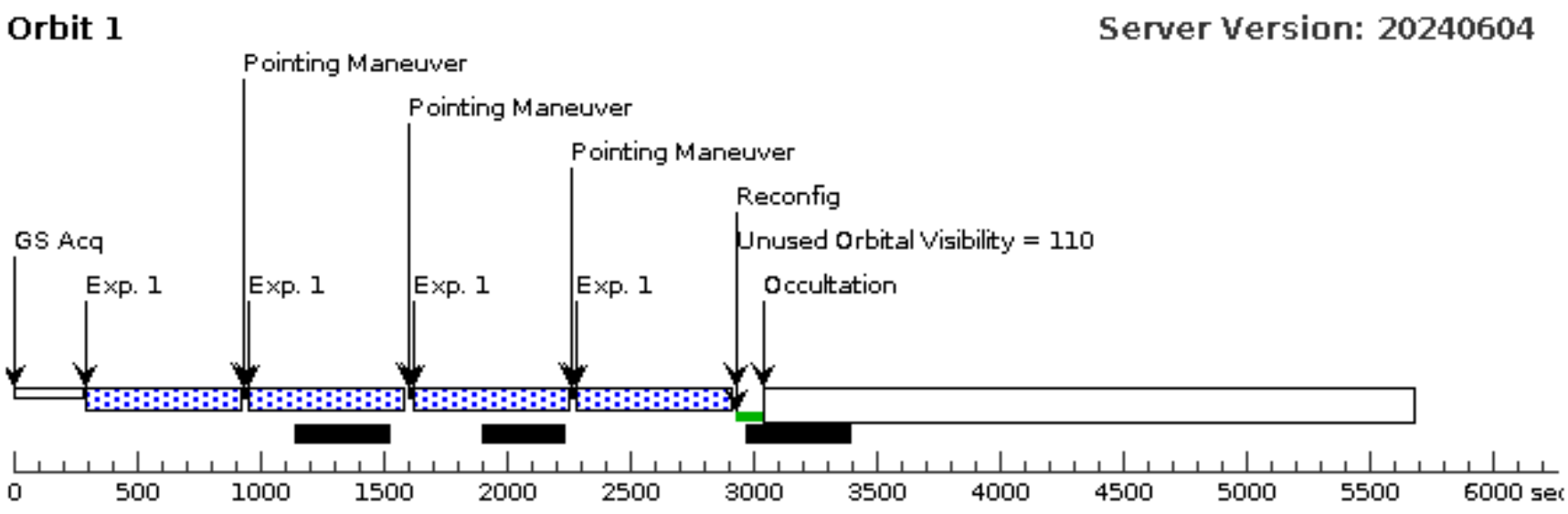
| # | Name | Target Coordinates | Targ. Coord. Corrections | Fluxes | Miscellaneous |
|---|---|---|---|---|---|
| (11) | UGC-00402 | RA: 00 39 18.6384 (9.8276600d)<br>Dec: +03 57 10.37 (3.95288d)<br>Equinox: J2000 | Radial Velocity: 4952 km/sec | V=(?)<br>J = 11.97 | Reference Frame: NED |

*Comments: This object was generated by the targetselector and retrieved from the NED database.*
*Category=GALAXY*
*Description=[LENTICULAR]*
*Extended=YES*

## Exposures

| # | Label | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time (Total)/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | (11) UGC-00402 | WFC3/IR, MULTIACCUM, IR | F110W | SAMP-SEQ=SPARS50;<br>NSAMP=13 | GS ACQ SCENARIO ONEB1B3 | Pattern 1, Exps 1-1 in UGC-00402 (11) (1) | 602.937703 Secs (2411.751 Secs)<br>*[==>(Pattern 1)]*<br>*[==>(Pattern 2)]*<br>*[==>(Pattern 3)]*<br>*[==>(Pattern 4)]* | ***[1]*** |

Orbit Structure



## Visit

**Proposal 17446, NGC-0083 (12), completed** Tue Jul 16 19:00:56 GMT 2024

**Diagnostic Status: No Diagnostics**

Scientific Instruments: WFC3/IR

Special Requirements: SCHED 70%

## Patterns

| # | Primary Pattern | | Secondary Pattern | Exposures |
|---|---|---|---|---|
| (1) | Pattern Type=WFC3-IR-DITHER-BOX-MIN<br>Purpose=DITHER<br>Number Of Points=4<br>Point Spacing=1.144<br>Line Spacing=0.73 | Coordinate Frame=POS-TARG<br>Pattern Orientation=18.528<br>Angle Between Sides=74.653<br>Center Pattern=false | | (1) |

## Fixed Targets

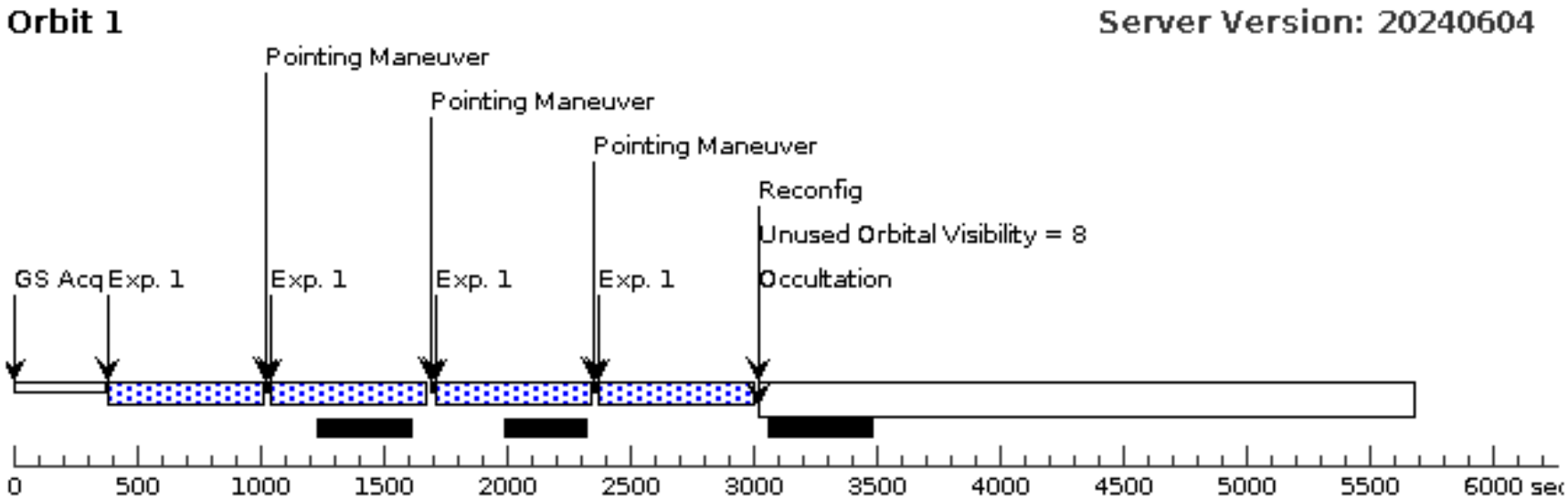
| # | Name | Target Coordinates | Targ. Coord. Corrections | Fluxes | Miscellaneous |
|---|---|---|---|---|---|
| (12) | NGC-0083 | RA: 00 21 22.3992 (5.3433300d)<br>Dec: +22 26 1.00 (22.43361d)<br>Equinox: J2000 | Radial Velocity: 5808 km/sec | V=12.51 | Reference Frame: NED |

*Comments: This object was generated by the targetselector and retrieved from the NED database.*
*Category=GALAXY*
*Description=[ELLIPTICAL]*
*Extended=YES*

## Exposures

| # | Label | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time (Total)/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | (12) NGC-0083 | WFC3/IR, MULTIACCUM, IR | F110W | SAMP-SEQ=SPARS50;<br>NSAMP=13 | | Pattern 1, Exps 1-1 in NGC-0083 (12) (1) | 602.937703 Secs (2411.751 Secs)<br>*[==>(Pattern 1)]*<br>*[==>(Pattern 2)]*<br>*[==>(Pattern 3)]*<br>*[==>(Pattern 4)]* | ***[1]*** |

## Orbit Structure



## Visit

**Proposal 17446, NGC-1209 (13), completed** Tue Jul 16 19:00:56 GMT 2024

**Diagnostic Status: No Diagnostics**

Scientific Instruments: WFC3/IR

Special Requirements: SCHED 70%

## Patterns

| # | Primary Pattern | | Secondary Pattern | Exposures |
|---|---|---|---|---|
| (1) | Pattern Type=WFC3-IR-DITHER-BOX-MIN<br>Purpose=DITHER<br>Number Of Points=4<br>Point Spacing=1.144<br>Line Spacing=0.73 | Coordinate Frame=POS-TARG<br>Pattern Orientation=18.528<br>Angle Between Sides=74.653<br>Center Pattern=false | | (1) |

## Fixed Targets

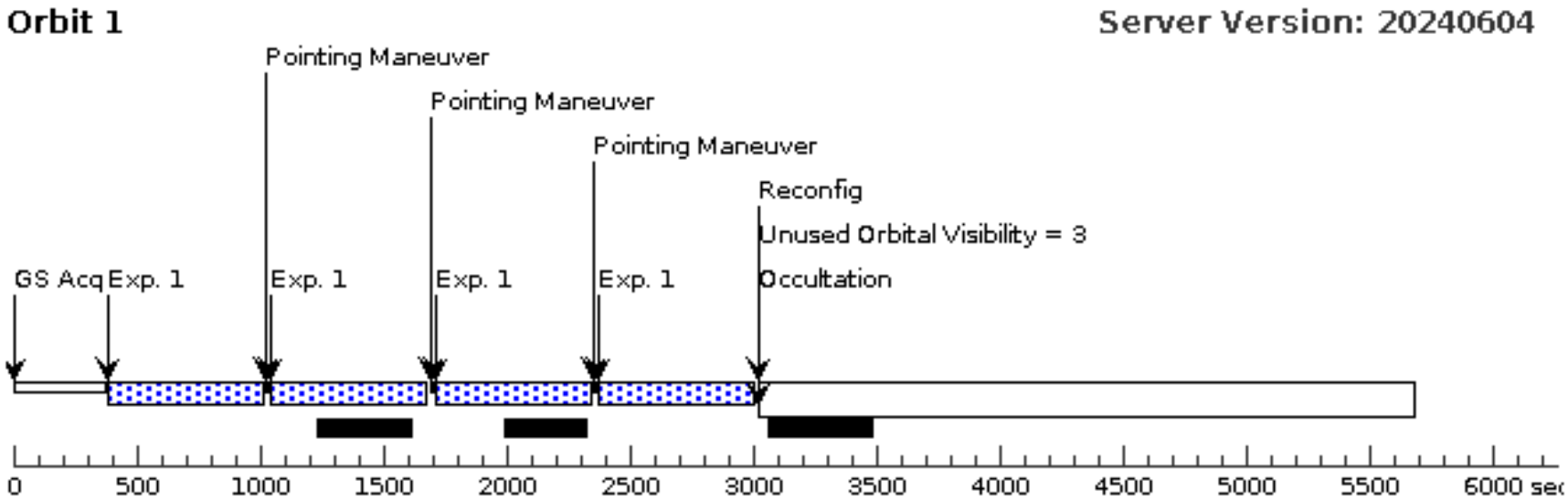
| # | Name | Target Coordinates | Targ. Coord. Corrections | Fluxes | Miscellaneous |
|---|---|---|---|---|---|
| (13) | NGC-1209 | RA: 03 06 3.0200 (46.5125833d)<br>Dec: -15 36 40.58 (-15.61127d)<br>Equinox: J2000 | Radial Velocity: 2427 km/sec | V=11.35 | Reference Frame: SIMBAD |

*Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.*
*Category=GALAXY*
*Description=[ELLIPTICAL]*
*Extended=YES*

## Exposures

| # | Label | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time (Total)/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | (13) NGC-1209 | WFC3/IR, MULTIACCUM, IR | F110W | SAMP-SEQ=SPARS50;<br>NSAMP=13 | GS ACQ SCENARIO BASE1O3 | Pattern 1, Exps 1-1 in NGC-1209 (13) (1) | 602.937703 Secs (2411.751 Secs)<br>*[==>(Pattern 1)]*<br>*[==>(Pattern 2)]*<br>*[==>(Pattern 3)]*<br>*[==>(Pattern 4)]* | ***[1]*** |

## Orbit Structure



## Visit

**Proposal 17446, NGC-3332 (14), completed** Tue Jul 16 19:00:56 GMT 2024

**Diagnostic Status: No Diagnostics**

Scientific Instruments: WFC3/IR

Special Requirements: SCHED 60%

## Patterns

| # | Primary Pattern | | Secondary Pattern | Exposures |
|---|---|---|---|---|
| (1) | Pattern Type=WFC3-IR-DITHER-BOX-MIN<br>Purpose=DITHER<br>Number Of Points=4<br>Point Spacing=1.144<br>Line Spacing=0.73 | Coordinate Frame=POS-TARG<br>Pattern Orientation=18.528<br>Angle Between Sides=74.653<br>Center Pattern=false | | (1) |

## Fixed Targets

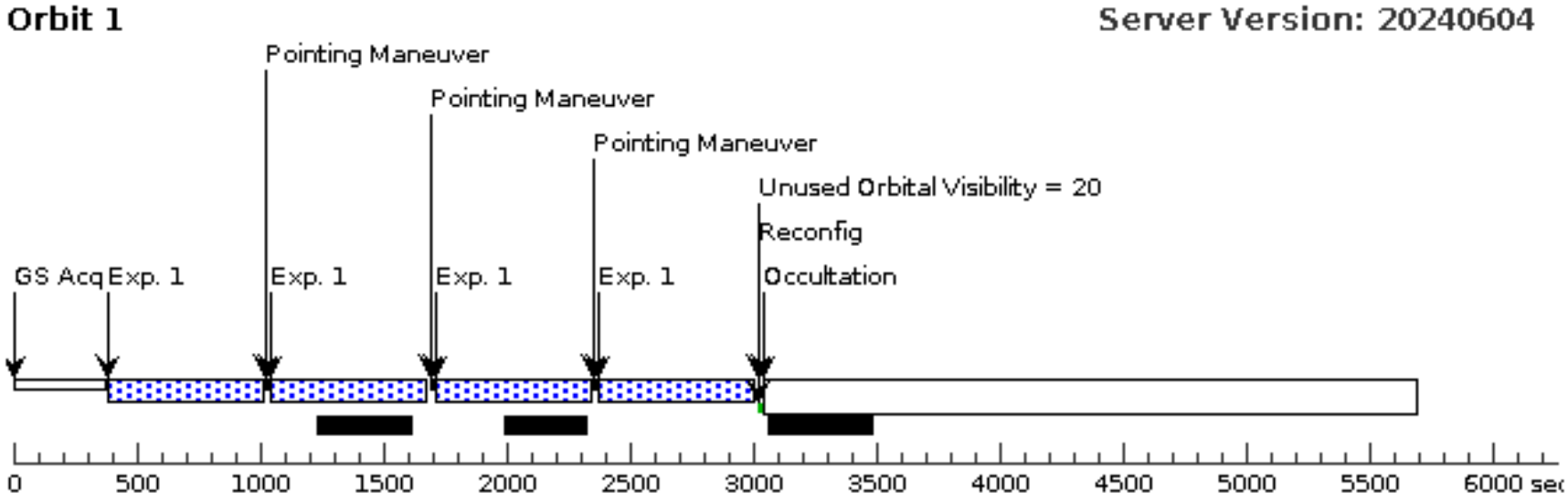
| # | Name | Target Coordinates | Targ. Coord. Corrections | Fluxes | Miscellaneous |
|---|---|---|---|---|---|
| (14) | NGC-3332 | RA: 10 40 28.3728 (160.1182200d)<br>Dec: +09 10 57.18 (9.18255d)<br>Equinox: J2000 | Radial Velocity: 6186 km/sec | V=(?)<br>g = 13.37 | Reference Frame: NED |

*Comments: This object was generated by the targetselector and retrieved from the NED database.*
*Category=GALAXY*
*Description=[ELLIPTICAL]*
*Extended=YES*

## Exposures

| # | Label | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time (Total)/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | (14) NGC-3332 | WFC3/IR, MULTIACCUM, IR | F110W | SAMP-SEQ=SPARS50;<br>NSAMP=13 | | Pattern 1, Exps 1-1 in NGC-3332 (14) (1) | 602.937703 Secs (2411.751 Secs)<br>*[==>(Pattern 1)]*<br>*[==>(Pattern 2)]*<br>*[==>(Pattern 3)]*<br>*[==>(Pattern 4)]* | ***[1]*** |

## Orbit Structure



## Visit

**Proposal 17446, NGC-3643 (15), completed** Tue Jul 16 19:00:56 GMT 2024

**Diagnostic Status: No Diagnostics**

Scientific Instruments: WFC3/IR

Special Requirements: SCHED 60%

## Patterns

| # | Primary Pattern | | Secondary Pattern | Exposures |
|---|---|---|---|---|
| (1) | Pattern Type=WFC3-IR-DITHER-BOX-MIN<br>Purpose=DITHER<br>Number Of Points=4<br>Point Spacing=1.144<br>Line Spacing=0.73 | Coordinate Frame=POS-TARG<br>Pattern Orientation=18.528<br>Angle Between Sides=74.653<br>Center Pattern=false | | (1) |

## Fixed Targets

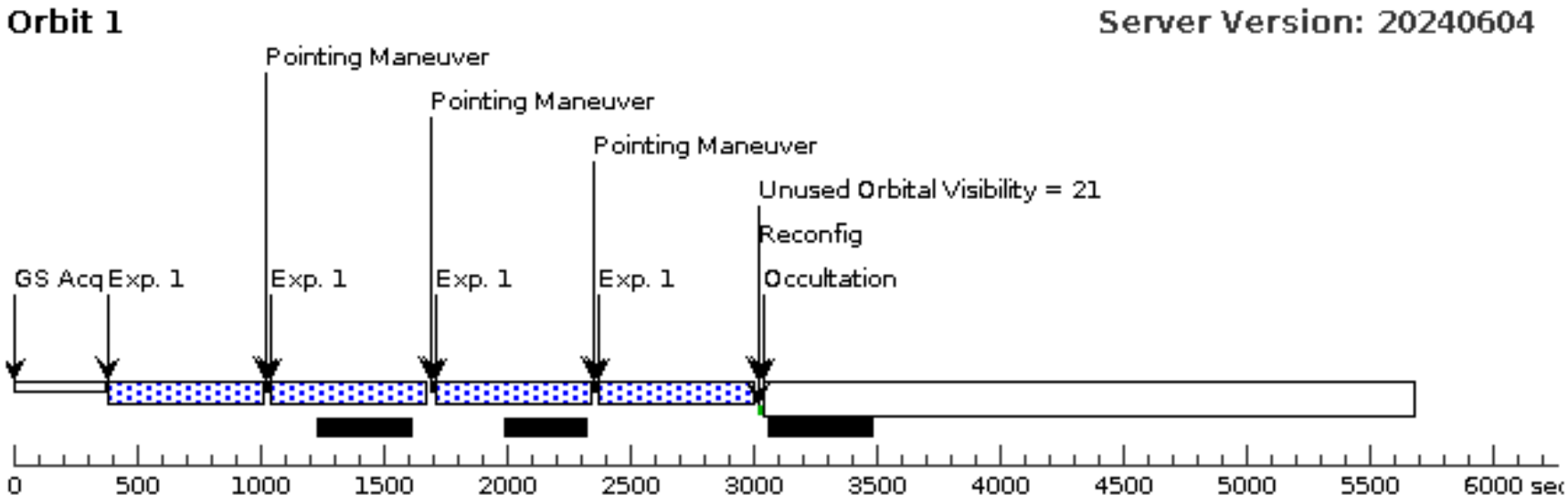
| # | Name | Target Coordinates | Targ. Coord. Corrections | Fluxes | Miscellaneous |
|---|---|---|---|---|---|
| (15) | NGC-3643 | RA: 11 21 24.9880 (170.3541167d)<br>Dec: +03 00 50.19 (3.01394d)<br>Equinox: J2000 | Radial Velocity: 2107 km/sec | V=(?)<br>g = 14.32 | Reference Frame: SIMBAD |

*Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.*
*Category=GALAXY*
*Description=[LENTICULAR]*
*Extended=YES*

## Exposures

| # | Label | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time (Total)/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | (15) NGC-3643 | WFC3/IR, MULTIACCUM, IR | F110W | SAMP-SEQ=SPARS50;<br>NSAMP=13 | | Pattern 1, Exps 1-1 in NGC-3643 (15) (1) | 602.937703 Secs (2411.751 Secs)<br>*[==>(Pattern 1)]*<br>*[==>(Pattern 2)]*<br>*[==>(Pattern 3)]*<br>*[==>(Pattern 4)]* | ***[1]*** |

## Orbit Structure



## Visit

**Proposal 17446, NGC-3941 (16), completed** Tue Jul 16 19:00:56 GMT 2024

**Diagnostic Status: Warning**

Scientific Instruments: WFC3/IR

Special Requirements: SCHED 70%

## Diagnostics

(NGC-3941 (16)) Warning (Orbit Planner): GS ACQ SCENARIO REQUESTED INCONSISTENT WITH VISIT GYRO MODE

(Exposure 1 (Pattern 1, Exps 1-1 in NGC-3941 (16)) special requirements) Warning (Form): The specified GS Acq Scenario is not in the current list of valid scenarios.

## Patterns

| # | Primary Pattern | | Secondary Pattern | Exposures |
|---|---|---|---|---|
| (1) | Pattern Type=WFC3-IR-DITHER-BOX-MIN<br>Purpose=DITHER<br>Number Of Points=4<br>Point Spacing=1.144<br>Line Spacing=0.73 | Coordinate Frame=POS-TARG<br>Pattern Orientation=18.528<br>Angle Between Sides=74.653<br>Center Pattern=false | | (1) |

## Fixed Targets

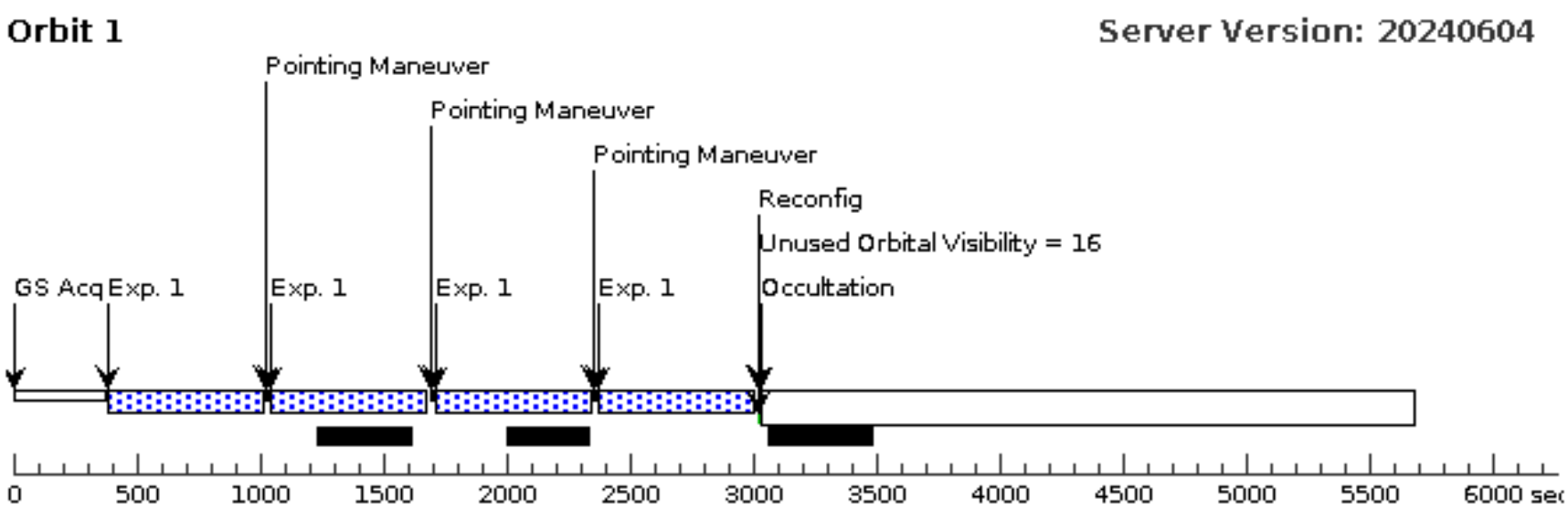
| # | Name | Target Coordinates | Targ. Coord. Corrections | Fluxes | Miscellaneous |
|---|---|---|---|---|---|
| (16) | NGC-3941 | RA: 11 52 55.3591 (178.2306629d)<br>Dec: +36 59 10.72 (36.98631d)<br>Equinox: J2000 | Radial Velocity: 1184 km/sec | V=10.35<br>g = 11.44 | Reference Frame: SIMBAD |

*Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.*
*Category=GALAXY*
*Description=[LENTICULAR]*
*Extended=YES*

## Exposures

| # | Label | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time (Total)/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | (16) NGC-3941 | WFC3/IR, MULTIACCUM, IR | F110W | SAMP-SEQ=SPARS50;<br>NSAMP=13 | GS ACQ SCENARIO BASE1B3 | Pattern 1, Exps 1-1 in NGC-3941 (16) (1) | 602.937703 Secs (2411.751 Secs)<br>*[==>(Pattern 1)]*<br>*[==>(Pattern 2)]*<br>*[==>(Pattern 3)]*<br>*[==>(Pattern 4)]* | ***[1]*** |

Orbit Structure



## Visit

**Proposal 17446, NGC-4125 (17), completed** Tue Jul 16 19:00:56 GMT 2024

**Diagnostic Status: No Diagnostics**

Scientific Instruments: WFC3/IR

Special Requirements: SCHED 80%

## Patterns

| # | Primary Pattern | | Secondary Pattern | Exposures |
|---|---|---|---|---|
| (1) | Pattern Type=WFC3-IR-DITHER-BOX-MIN<br>Purpose=DITHER<br>Number Of Points=4<br>Point Spacing=1.144<br>Line Spacing=0.73 | Coordinate Frame=POS-TARG<br>Pattern Orientation=18.528<br>Angle Between Sides=74.653<br>Center Pattern=false | | (1) |

## Fixed Targets

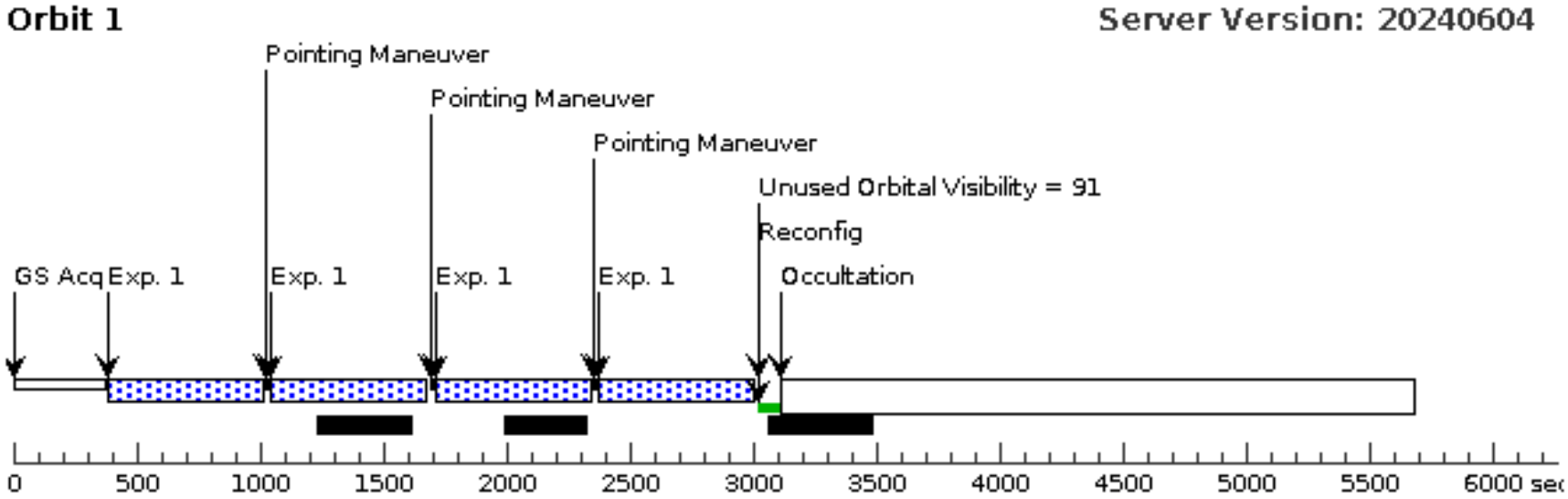
| # | Name | Target Coordinates | Targ. Coord. Corrections | Fluxes | Miscellaneous |
|---|---|---|---|---|---|
| (17) | NGC-4125 | RA: 12 08 6.0170 (182.0250708d)<br>Dec: +65 10 26.88 (65.17413d)<br>Equinox: J2000 | Radial Velocity: 1390 km/sec | V=9.72 | Reference Frame: SIMBAD |

*Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.*
*Category=GALAXY*
*Description=[ELLIPTICAL]*
*Extended=YES*

## Exposures

| # | Label | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time (Total)/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | (17) NGC-4125 | WFC3/IR, MULTIACCUM, IR | F110W | SAMP-SEQ=SPARS50;<br>NSAMP=13 | | Pattern 1, Exps 1-1 in NGC-4125 (17) (1) | 602.937703 Secs (2411.751 Secs)<br>*[==>(Pattern 1)]*<br>*[==>(Pattern 2)]*<br>*[==>(Pattern 3)]*<br>*[==>(Pattern 4)]* | ***[1]*** |

## Orbit Structure



## Visit

**Proposal 17446, NGC-4169 (18), completed** Tue Jul 16 19:00:56 GMT 2024

**Diagnostic Status: No Diagnostics**

Scientific Instruments: WFC3/IR

Special Requirements: SCHED 70%

## Patterns

| # | Primary Pattern | | Secondary Pattern | Exposures |
|---|---|---|---|---|
| (1) | Pattern Type=WFC3-IR-DITHER-BOX-MIN<br>Purpose=DITHER<br>Number Of Points=4<br>Point Spacing=1.144<br>Line Spacing=0.73 | Coordinate Frame=POS-TARG<br>Pattern Orientation=18.528<br>Angle Between Sides=74.653<br>Center Pattern=false | | (1) |

## Fixed Targets

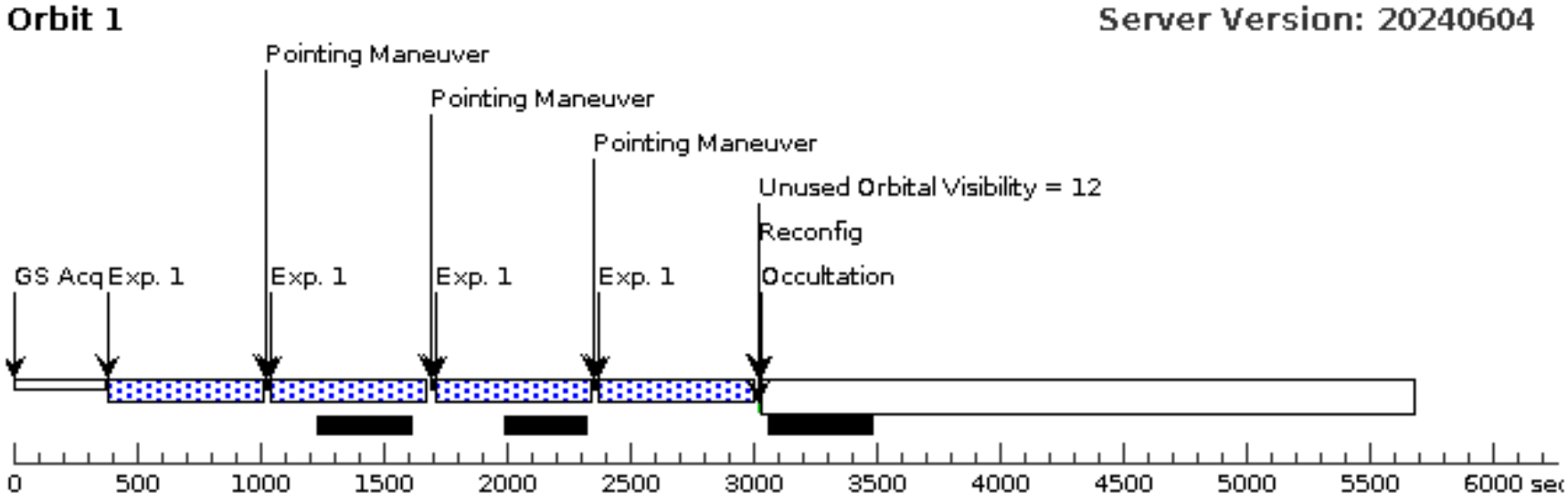
| # | Name | Target Coordinates | Targ. Coord. Corrections | Fluxes | Miscellaneous |
|---|---|---|---|---|---|
| (18) | NGC-4169 | RA: 12 12 18.7702 (183.0782092d)<br>Dec: +29 10 45.85 (29.17940d)<br>Equinox: J2000 | Radial Velocity: 4099 km/sec | V=12.34 | Reference Frame: SIMBAD |

*Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.*
*Category=GALAXY*
*Description=[LENTICULAR]*
*Extended=YES*

## Exposures

| # | Label | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time (Total)/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | (18) NGC-4169 | WFC3/IR, MULTIACCUM, IR | F110W | SAMP-SEQ=SPARS50;<br>NSAMP=13 | | Pattern 1, Exps 1-1 in NGC-4169 (18) (1) | 602.937703 Secs (2411.751 Secs)<br>*[==>(Pattern 1)]*<br>*[==>(Pattern 2)]*<br>*[==>(Pattern 3)]*<br>*[==>(Pattern 4)]* | ***[1]*** |

## Orbit Structure



## Visit

**Proposal 17446, NGC-4415 (19), completed** Tue Jul 16 19:00:56 GMT 2024

**Diagnostic Status: No Diagnostics**

Scientific Instruments: WFC3/IR

Special Requirements: SCHED 60%

## Patterns

| # | Primary Pattern | | Secondary Pattern | Exposures |
|---|---|---|---|---|
| (1) | Pattern Type=WFC3-IR-DITHER-BOX-MIN<br>Purpose=DITHER<br>Number Of Points=4<br>Point Spacing=1.144<br>Line Spacing=0.73 | Coordinate Frame=POS-TARG<br>Pattern Orientation=18.528<br>Angle Between Sides=74.653<br>Center Pattern=false | | (1) |

## Fixed Targets

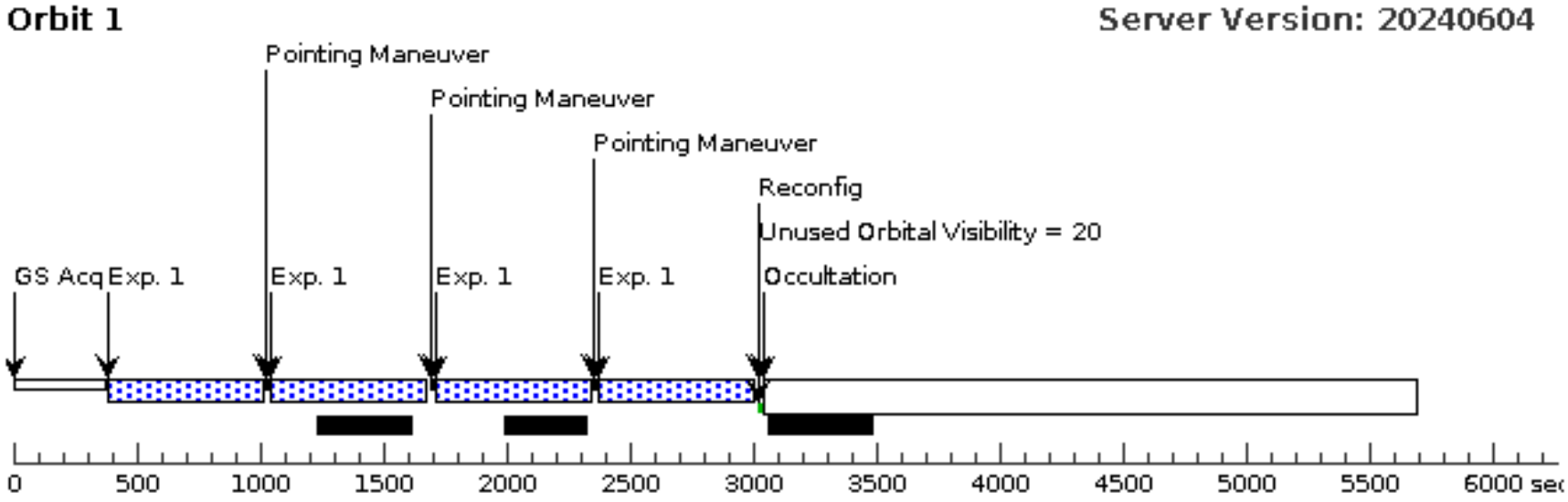
| # | Name | Target Coordinates | Targ. Coord. Corrections | Fluxes | Miscellaneous |
|---|---|---|---|---|---|
| (19) | NGC-4415 | RA: 12 26 40.4851 (186.6686879d)<br>Dec: +08 26 8.58 (8.43572d)<br>Equinox: J2000 | Radial Velocity: 1241 km/sec | V=(?)<br>g = 13.76 | Reference Frame: SIMBAD |

*Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.*
*Category=GALAXY*
*Description=[LENTICULAR]*
*Extended=YES*

## Exposures

| # | Label | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time (Total)/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | (19) NGC-4415 | WFC3/IR, MULTIACCUM, IR | F110W | SAMP-SEQ=SPARS50;<br>NSAMP=13 | | Pattern 1, Exps 1-1 in NGC-4415 (19) (1) | 602.937703 Secs (2411.751 Secs)<br>*[==>(Pattern 1)]*<br>*[==>(Pattern 2)]*<br>*[==>(Pattern 3)]*<br>*[==>(Pattern 4)]* | ***[1]*** |

## Orbit Structure



## Visit

**Proposal 17446, NGC-4636 (20), completed** Tue Jul 16 19:00:56 GMT 2024

**Diagnostic Status: No Diagnostics**

Scientific Instruments: WFC3/IR

Special Requirements: SCHED 60%

## Patterns

| # | Primary Pattern | | Secondary Pattern | Exposures |
|---|---|---|---|---|
| (1) | Pattern Type=WFC3-IR-DITHER-BOX-MIN<br>Purpose=DITHER<br>Number Of Points=4<br>Point Spacing=1.144<br>Line Spacing=0.73 | Coordinate Frame=POS-TARG<br>Pattern Orientation=18.528<br>Angle Between Sides=74.653<br>Center Pattern=false | | (1) |

## Fixed Targets

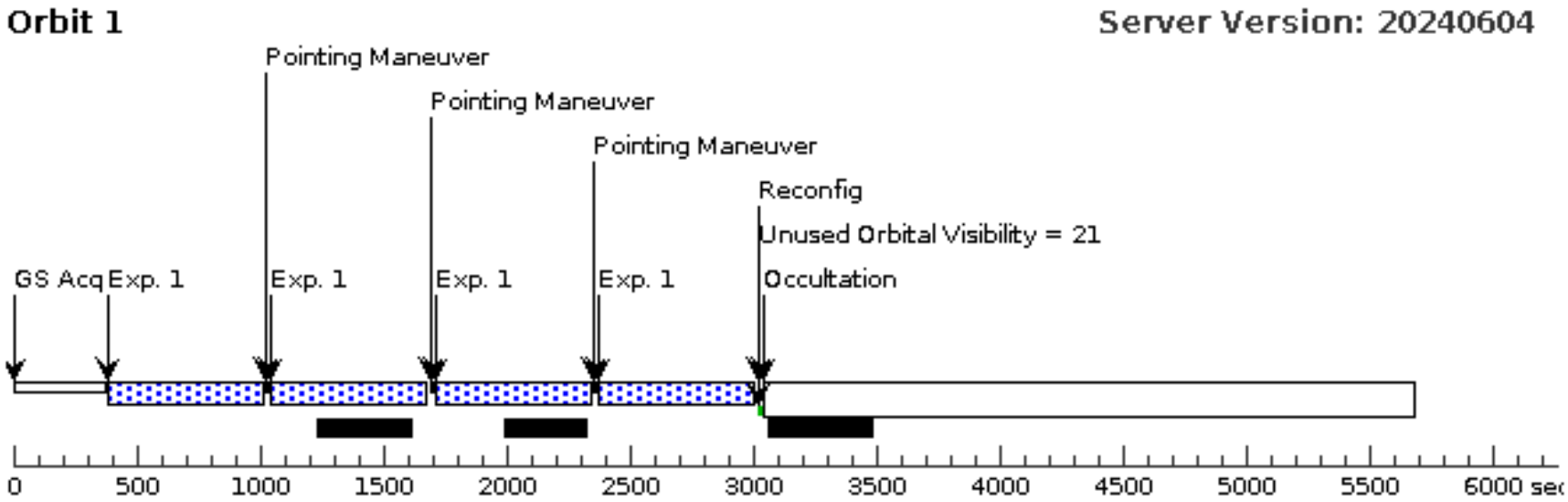
| # | Name | Target Coordinates | Targ. Coord. Corrections | Fluxes | Miscellaneous |
|---|---|---|---|---|---|
| (20) | NGC-4636 | RA: 12 42 49.8333 (190.7076388d)<br>Dec: +02 41 15.95 (2.68776d)<br>Equinox: J2000 | Radial Velocity: 1275 km/sec | V=9.51 | Reference Frame: SIMBAD |

*Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.*
*Category=GALAXY*
*Description=[ELLIPTICAL]*
*Extended=YES*

## Exposures

| # | Label | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time (Total)/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | (20) NGC-4636 | WFC3/IR, MULTIACCUM, IR | F110W | SAMP-SEQ=SPARS50;<br>NSAMP=13 | | Pattern 1, Exps 1-1 in NGC-4636 (20) (1) | 602.937703 Secs (2411.751 Secs)<br>*[==>(Pattern 1)]*<br>*[==>(Pattern 2)]*<br>*[==>(Pattern 3)]*<br>*[==>(Pattern 4)]* | ***[1]*** |

## Orbit Structure



## Visit

**Proposal 17446, NGC-4767 (21), completed**

Tue Jul 16 19:00:56 GMT 2024

**Diagnostic Status: No Diagnostics**

Scientific Instruments: WFC3/IR

Special Requirements: SCHED 70%

## Patterns

| # | Primary Pattern | | Secondary Pattern | Exposures |
|---|---|---|---|---|
| (1) | Pattern Type=WFC3-IR-DITHER-BOX-MIN<br>Purpose=DITHER<br>Number Of Points=4<br>Point Spacing=1.144<br>Line Spacing=0.73 | Coordinate Frame=POS-TARG<br>Pattern Orientation=18.528<br>Angle Between Sides=74.653<br>Center Pattern=false | | (1) |

## Fixed Targets

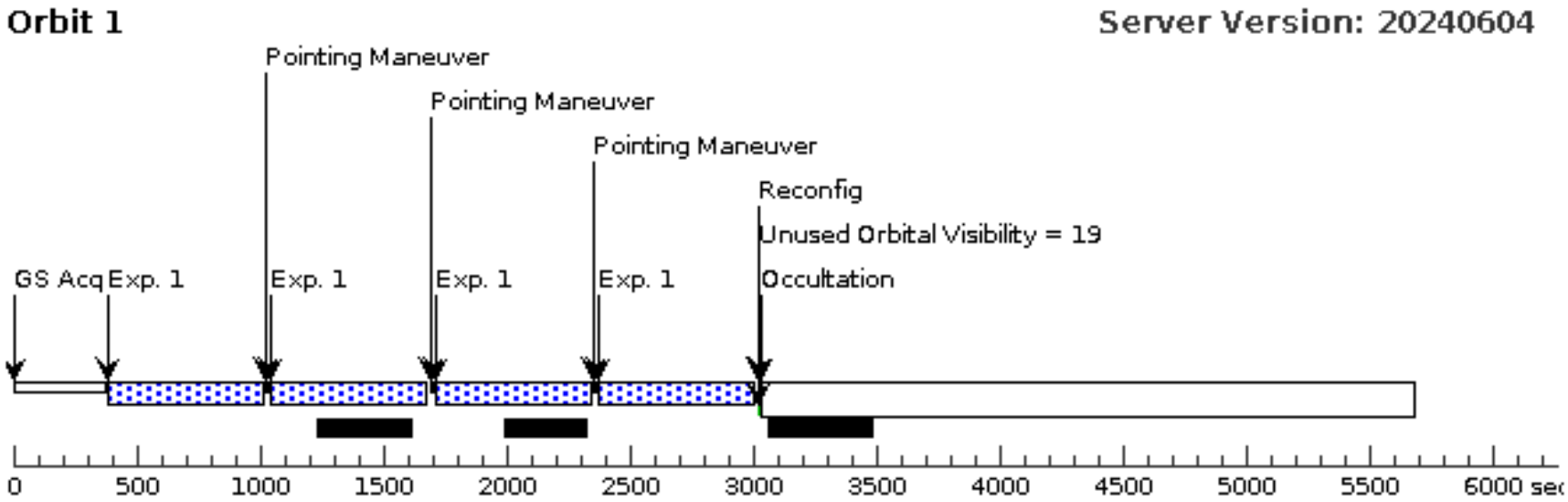
| # | Name | Target Coordinates | Targ. Coord. Corrections | Fluxes | Miscellaneous |
|---|---|---|---|---|---|
| (21) | NGC-4767 | RA: 12 53 52.9482 (193.4706175d)<br>Dec: -39 42 51.43 (-39.71429d)<br>Equinox: J2000 | Radial Velocity: 3662 km/sec | V=11.53<br>J = 11.19 | Reference Frame: SIMBAD |

*Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.*
*Category=GALAXY*
*Description=[ELLIPTICAL]*
*Extended=YES*

## Exposures

| # | Label | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time (Total)/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | (21) NGC-4767 | WFC3/IR, MULTIACCUM, IR | F110W | SAMP-SEQ=SPARS50;<br>NSAMP=13 | | Pattern 1, Exps 1-1 in NGC-4767 (21) (1) | 602.937703 Secs (2411.751 Secs)<br>*[==>(Pattern 1)]*<br>*[==>(Pattern 2)]*<br>*[==>(Pattern 3)]*<br>*[==>(Pattern 4)]* | ***[1]*** |

## Orbit Structure



## Visit

**Proposal 17446, NGC-5018 (22), completed**

Tue Jul 16 19:00:56 GMT 2024

**Diagnostic Status: No Diagnostics**

Scientific Instruments: WFC3/IR

Special Requirements: SCHED 70%

## Patterns

| # | Primary Pattern | | Secondary Pattern | Exposures |
|---|---|---|---|---|
| (1) | Pattern Type=WFC3-IR-DITHER-BOX-MIN<br>Purpose=DITHER<br>Number Of Points=4<br>Point Spacing=1.144<br>Line Spacing=0.73 | Coordinate Frame=POS-TARG<br>Pattern Orientation=18.528<br>Angle Between Sides=74.653<br>Center Pattern=false | | (1) |

## Fixed Targets

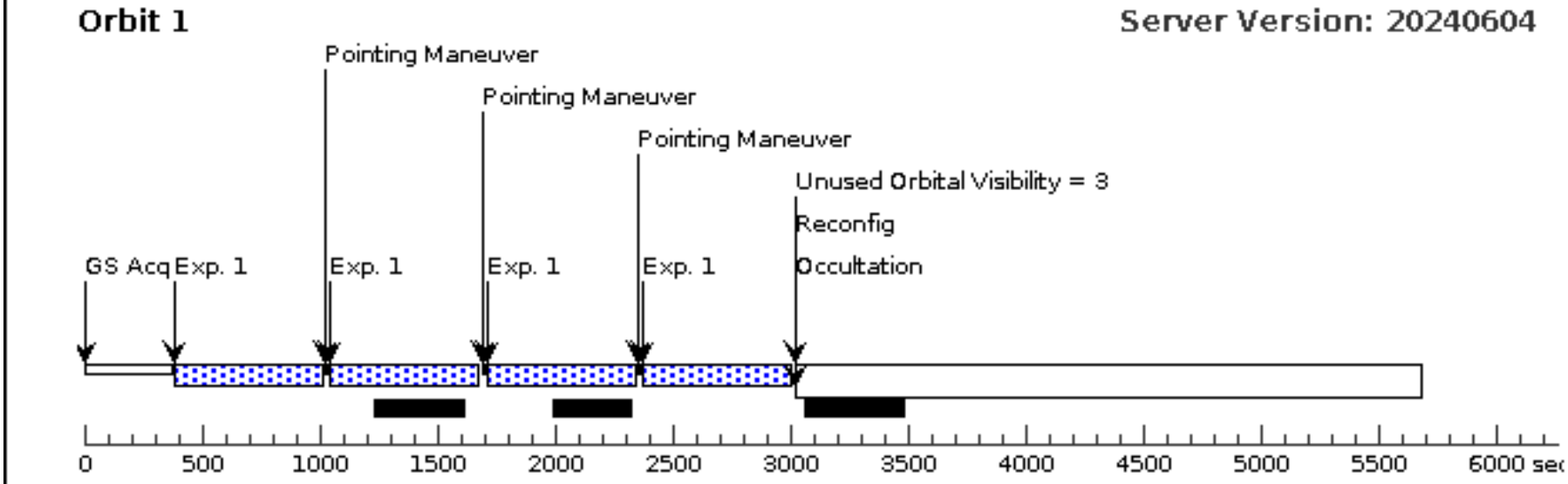
| # | Name | Target Coordinates | Targ. Coord. Corrections | Fluxes | Miscellaneous |
|---|---|---|---|---|---|
| (22) | NGC-5018 | RA: 13 13 1.0453 (198.2543554d)<br>Dec: -19 31 5.65 (-19.51824d)<br>Equinox: J2000 | Radial Velocity: 3131 km/sec | V=10.55 | Reference Frame: SIMBAD |

*Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.*
*Category=GALAXY*
*Description=[ELLIPTICAL]*
*Extended=YES*

## Exposures

| # | Label | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time (Total)/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | (22) NGC-5018 | WFC3/IR, MULTIACCUM, IR | F110W | SAMP-SEQ=SPARS50;<br>NSAMP=13 | | Pattern 1, Exps 1-1 in NGC-5018 (22) (1) | 602.937703 Secs (2411.751 Secs)<br>*[==>(Pattern 1)]*<br>*[==>(Pattern 2)]*<br>*[==>(Pattern 3)]*<br>*[==>(Pattern 4)]* | ***[1]*** |

## Orbit Structure



## Visit

**Proposal 17446, NGC-5222 (23), scheduling** Tue Jul 16 19:00:56 GMT 2024

**Diagnostic Status: No Diagnostics**

Scientific Instruments: WFC3/IR

Special Requirements: SCHED 80%

## Patterns

| # | Primary Pattern | | Secondary Pattern | Exposures |
|---|---|---|---|---|
| (1) | Pattern Type=WFC3-IR-DITHER-BOX-MIN<br>Purpose=DITHER<br>Number Of Points=4<br>Point Spacing=1.144<br>Line Spacing=0.73 | Coordinate Frame=POS-TARG<br>Pattern Orientation=18.528<br>Angle Between Sides=74.653<br>Center Pattern=false | | (1) |

## Fixed Targets

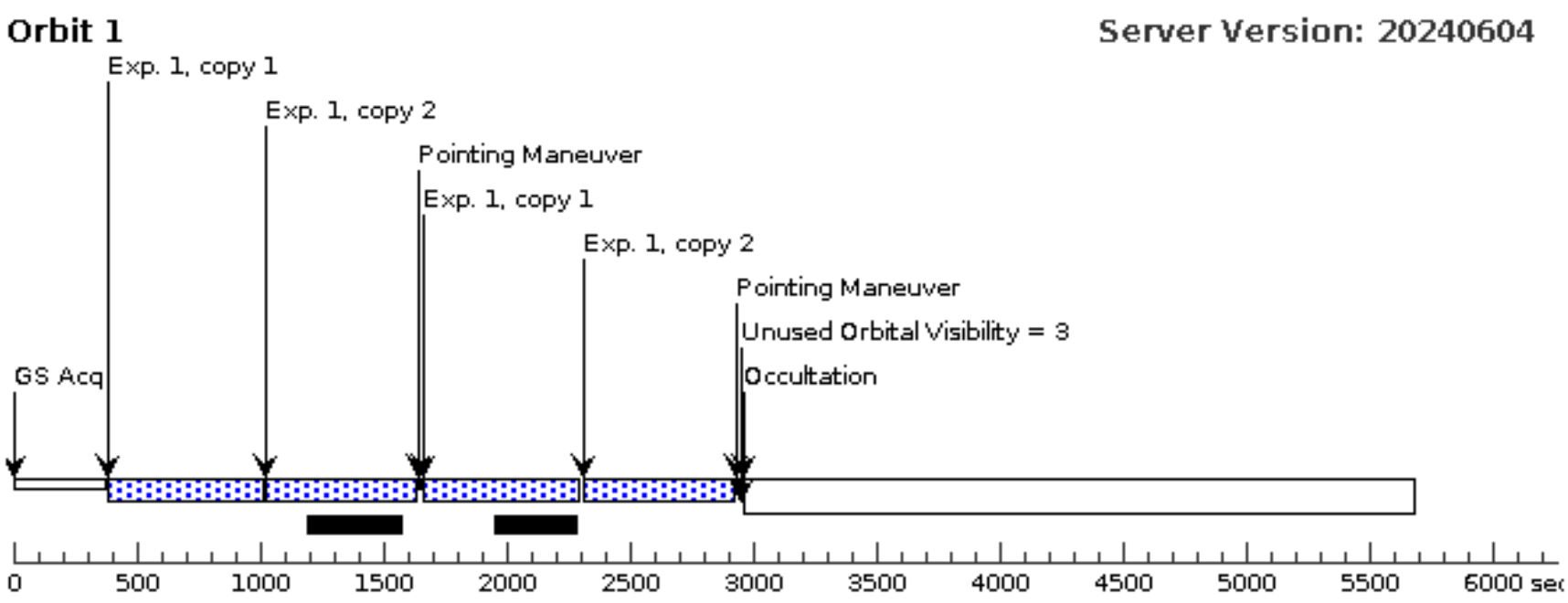
| # | Name | Target Coordinates | Targ. Coord. Corrections | Fluxes | Miscellaneous |
|---|---|---|---|---|---|
| (23) | NGC-5222 | RA: 13 34 55.9448 (203.7331033d)<br>Dec: +13 44 31.80 (13.74217d)<br>Equinox: J2000 | Radial Velocity: 7088 km/sec | V=(?)<br>m_p = 14.1 | Reference Frame: SIMBAD |

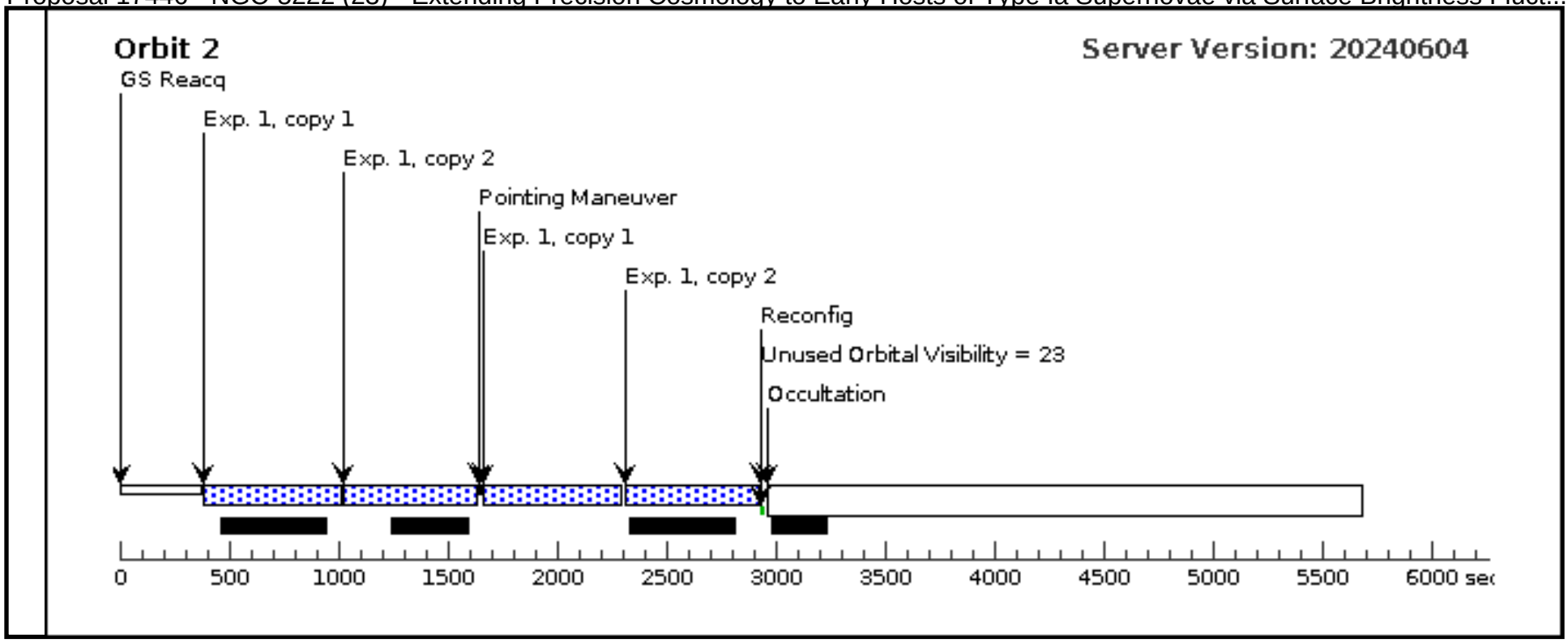
*Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.*
*Category=GALAXY*
*Description=[ELLIPTICAL]*
*Extended=YES*

## Exposures

| # | Label | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time (Total)/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | (23) NGC-5222 | WFC3/IR, MULTIACCUM, IR | F110W | SAMP-SEQ=SPARS50;<br>NSAMP=13 | | Pattern 1, Exps 1-1 in NGC-5222 (23) (1) | 602.937703 Secs X 2 (4823.502 Secs) | |
| | | | | | | | | *[==>(Pattern 1, Copy 1)]*<br>*[==>(Pattern 1, Copy 2)]*<br>*[==>(Pattern 2, Copy 1)]*<br>*[==>(Pattern 2, Copy 2)]* | ***[1]*** |
| | | | | | | | | *[==>(Pattern 3, Copy 1)]*<br>*[==>(Pattern 3, Copy 2)]*<br>*[==>(Pattern 4, Copy 1)]*<br>*[==>(Pattern 4, Copy 2)]* | ***[2]*** |

**Orbit Structure**




Orbit 2
Server Version: 20240604
GS Reacq
Exp. 1, copy 1
Exp. 1, copy 2
Pointing Maneuver
Exp. 1, copy 1
Exp. 1, copy 2
Reconfig
Unused Orbital Visibility = 23
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000 sec

## Visit

**Proposal 17446, NGC-5304 (24), completed** Tue Jul 16 19:00:56 GMT 2024

**Diagnostic Status: No Diagnostics**

Scientific Instruments: WFC3/IR

Special Requirements: SCHED 70%

## Patterns

| # | Primary Pattern | | Secondary Pattern | Exposures |
|---|---|---|---|---|
| (1) | Pattern Type=WFC3-IR-DITHER-BOX-MIN<br>Purpose=DITHER<br>Number Of Points=4<br>Point Spacing=1.144<br>Line Spacing=0.73 | Coordinate Frame=POS-TARG<br>Pattern Orientation=18.528<br>Angle Between Sides=74.653<br>Center Pattern=false | | (1) |

## Fixed Targets

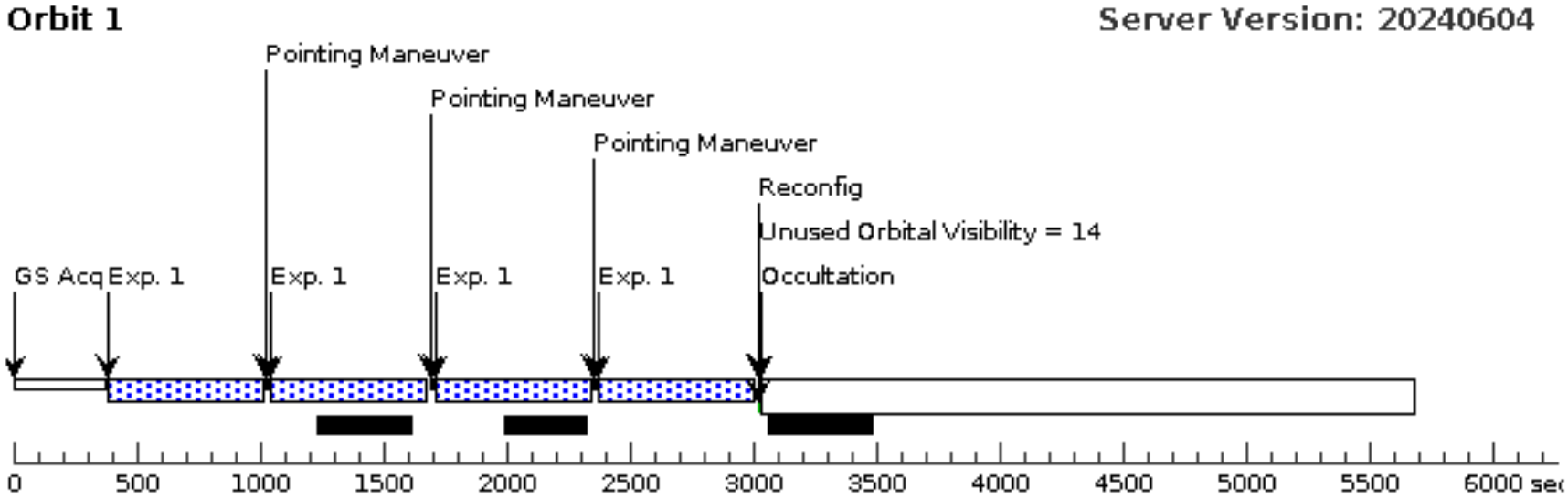
| # | Name | Target Coordinates | Targ. Coord. Corrections | Fluxes | Miscellaneous |
|---|---|---|---|---|---|
| (24) | NGC-5304 | RA: 13 50 1.5020 (207.5062583d)<br>Dec: -30 34 42.25 (-30.57840d)<br>Equinox: J2000 | Radial Velocity: 3986 km/sec | V=13.56 | Reference Frame: SIMBAD |

*Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.*
*Category=GALAXY*
*Description=[ELLIPTICAL]*
*Extended=YES*

## Exposures

| # | Label | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time (Total)/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | (24) NGC-5304 | WFC3/IR, MULTIACCUM, IR | F110W | SAMP-SEQ=SPARS50;<br>NSAMP=13 | | Pattern 1, Exps 1-1 in NGC-5304 (24) (1) | 602.937703 Secs (2411.751 Secs)<br>*[==>(Pattern 1)]*<br>*[==>(Pattern 2)]*<br>*[==>(Pattern 3)]*<br>*[==>(Pattern 4)]* | ***[1]*** |

## Orbit Structure



## Visit

**Proposal 17446, NGC-5419 (25), completed** Tue Jul 16 19:00:56 GMT 2024

**Diagnostic Status: No Diagnostics**

Scientific Instruments: WFC3/IR

Special Requirements: SCHED 70%

## Patterns

| # | Primary Pattern | | Secondary Pattern | Exposures |
|---|---|---|---|---|
| (1) | Pattern Type=WFC3-IR-DITHER-BOX-MIN<br>Purpose=DITHER<br>Number Of Points=4<br>Point Spacing=1.144<br>Line Spacing=0.73 | Coordinate Frame=POS-TARG<br>Pattern Orientation=18.528<br>Angle Between Sides=74.653<br>Center Pattern=false | | (1) |

## Fixed Targets

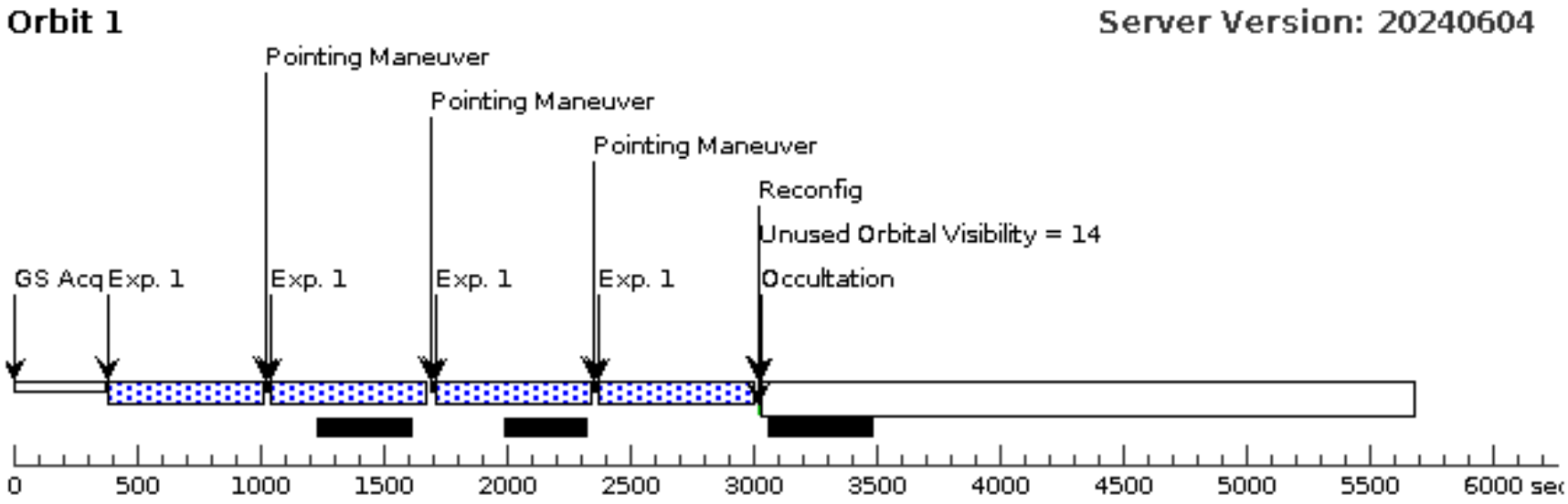
| # | Name | Target Coordinates | Targ. Coord. Corrections | Fluxes | Miscellaneous |
|---|---|---|---|---|---|
| (25) | NGC-5419 | RA: 14 03 38.7225 (210.9113438d)<br>Dec: -33 58 41.88 (-33.97830d)<br>Equinox: J2000 | Radial Velocity: 4375 km/sec | V=10.49 | Reference Frame: NED |

*Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.*
*Category=GALAXY*
*Description=[ELLIPTICAL]*
*Extended=YES*

## Exposures

| # | Label | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time (Total)/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | (25) NGC-5419 | WFC3/IR, MULTIACCUM, IR | F110W | SAMP-SEQ=SPARS50;<br>NSAMP=13 | | Pattern 1, Exps 1-1 in NGC-5419 (25) (1) | 602.937703 Secs (2411.751 Secs)<br>*[==>(Pattern 1)]*<br>*[==>(Pattern 2)]*<br>*[==>(Pattern 3)]*<br>*[==>(Pattern 4)]* | ***[1]*** |

## Orbit Structure



## Visit

**Proposal 17446, NGC-5631 (26), completed** Tue Jul 16 19:00:56 GMT 2024

**Diagnostic Status: No Diagnostics**

Scientific Instruments: WFC3/IR

Special Requirements: SCHED 80%

## Patterns

| # | Primary Pattern | | Secondary Pattern | Exposures |
|---|---|---|---|---|
| (1) | Pattern Type=WFC3-IR-DITHER-BOX-MIN<br>Purpose=DITHER<br>Number Of Points=4<br>Point Spacing=1.144<br>Line Spacing=0.73 | Coordinate Frame=POS-TARG<br>Pattern Orientation=18.528<br>Angle Between Sides=74.653<br>Center Pattern=false | | (1) |

## Fixed Targets

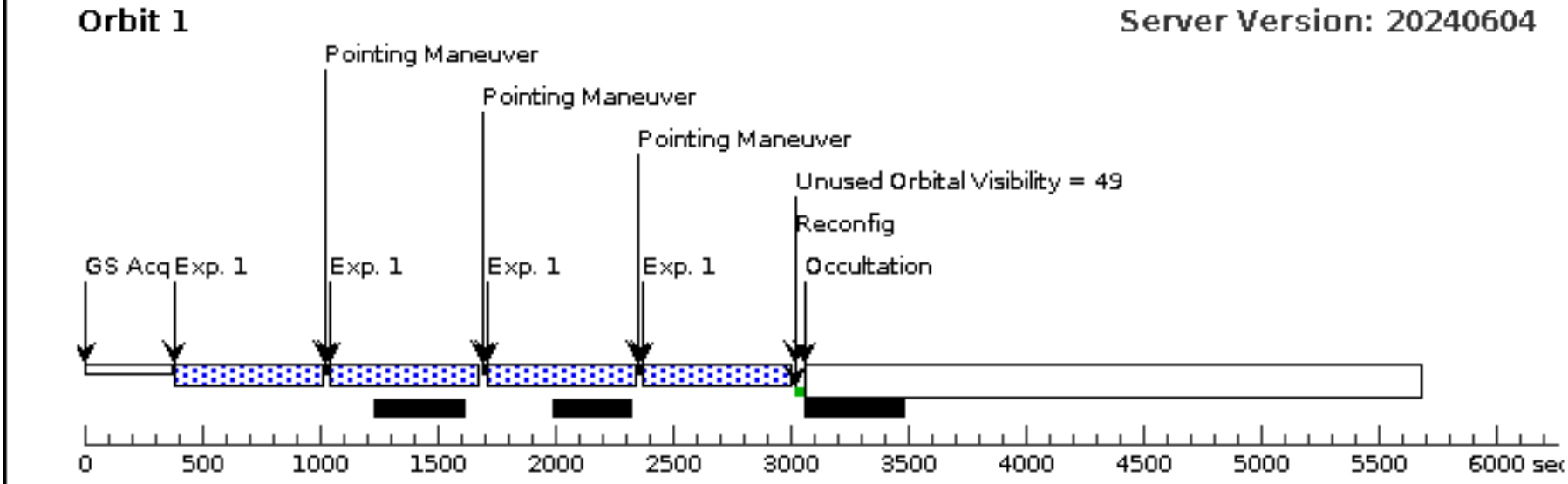
| # | Name | Target Coordinates | Targ. Coord. Corrections | Fluxes | Miscellaneous |
|---|---|---|---|---|---|
| (26) | NGC-5631 | RA: 14 26 33.2901 (216.6387088d)<br>Dec: +56 34 57.43 (56.58262d)<br>Equinox: J2000 | Radial Velocity: 2040 km/sec | V=11.45 | Reference Frame: NED |

*Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.*
*Category=GALAXY*
*Description=[ELLIPTICAL]*
*Extended=YES*

## Exposures

| # | Label | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time (Total)/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | (26) NGC-5631 | WFC3/IR, MULTIACCUM, IR | F110W | SAMP-SEQ=SPARS50;<br>NSAMP=13 | | Pattern 1, Exps 1-1 in NGC-5631 (26) (1) | 602.937703 Secs (2411.751 Secs)<br>*[==>(Pattern 1)]*<br>*[==>(Pattern 2)]*<br>*[==>(Pattern 3)]*<br>*[==>(Pattern 4)]* | ***[1]*** |

## Orbit Structure



## Visit

**Proposal 17446, NGC-7187 (27), scheduled**

Tue Jul 16 19:00:56 GMT 2024

**Diagnostic Status: No Diagnostics**

Scientific Instruments: WFC3/IR

Special Requirements: SCHED 70%

## Patterns

| # | Primary Pattern | | Secondary Pattern | Exposures |
|---|---|---|---|---|
| (1) | Pattern Type=WFC3-IR-DITHER-BOX-MIN<br>Purpose=DITHER<br>Number Of Points=4<br>Point Spacing=1.144<br>Line Spacing=0.73 | Coordinate Frame=POS-TARG<br>Pattern Orientation=18.528<br>Angle Between Sides=74.653<br>Center Pattern=false | | (1) |

## Fixed Targets

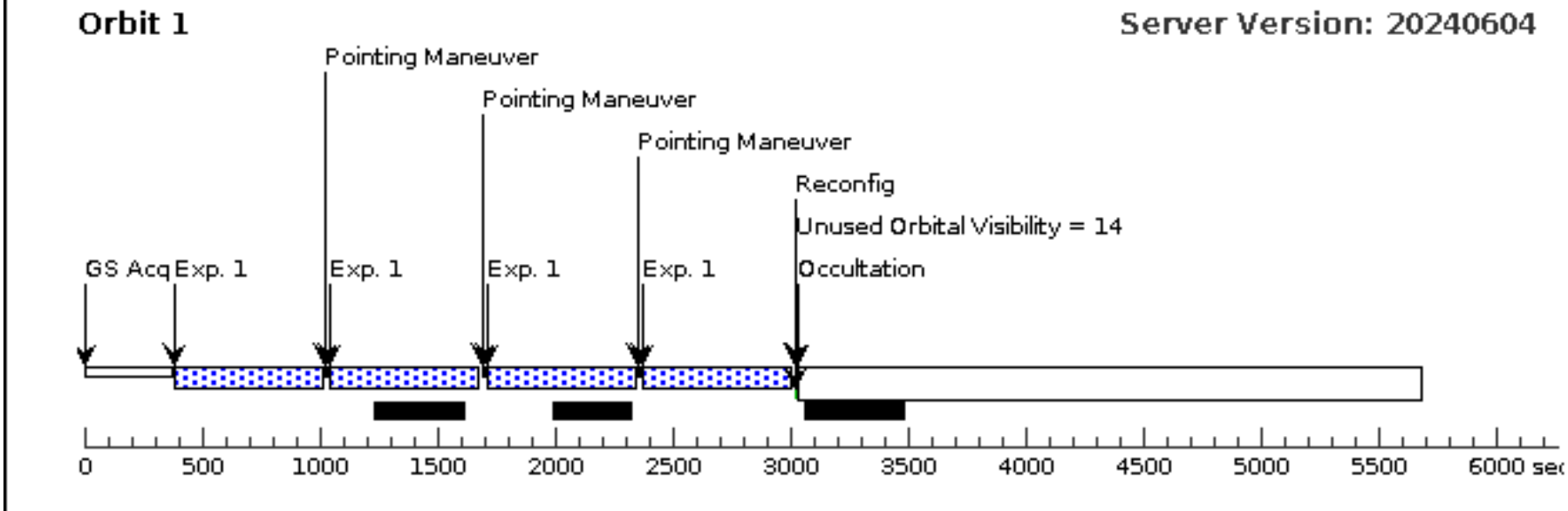
| # | Name | Target Coordinates | Targ. Coord. Corrections | Fluxes | Miscellaneous |
|---|---|---|---|---|---|
| (27) | NGC-7187 | RA: 22 02 44.4963 (330.6854013d)<br>Dec: -32 48 11.44 (-32.80318d)<br>Equinox: J2000 | Radial Velocity: 1958 km/sec | V=12.11 | Reference Frame: SIMBAD |

*Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.*
*Category=GALAXY*
*Description=[DISK]*
*Extended=YES*

## Exposures

| # | Label | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time (Total)/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | (27) NGC-7187 | WFC3/IR, MULTIACCUM, IR | F110W | SAMP-SEQ=SPARS50;<br>NSAMP=13 | | Pattern 1, Exps 1-1 in NGC-7187 (27) (1) | 602.937703 Secs (2411.751 Secs)<br>*[==>(Pattern 1)]*<br>*[==>(Pattern 2)]*<br>*[==>(Pattern 3)]*<br>*[==>(Pattern 4)]* | ***[1]*** |

## Orbit Structure



## Visit

**Proposal 17446, LEDA-1693718 (28), completed**

Tue Jul 16 19:00:56 GMT 2024

**Diagnostic Status: No Diagnostics**

Scientific Instruments: WFC3/IR

Special Requirements: SCHED 70%

## Patterns

| # | Primary Pattern | | Secondary Pattern | Exposures |
|---|---|---|---|---|
| (1) | Pattern Type=WFC3-IR-DITHER-BOX-MIN<br>Purpose=DITHER<br>Number Of Points=4<br>Point Spacing=1.144<br>Line Spacing=0.73 | Coordinate Frame=POS-TARG<br>Pattern Orientation=18.528<br>Angle Between Sides=74.653<br>Center Pattern=false | | (1) |

## Fixed Targets

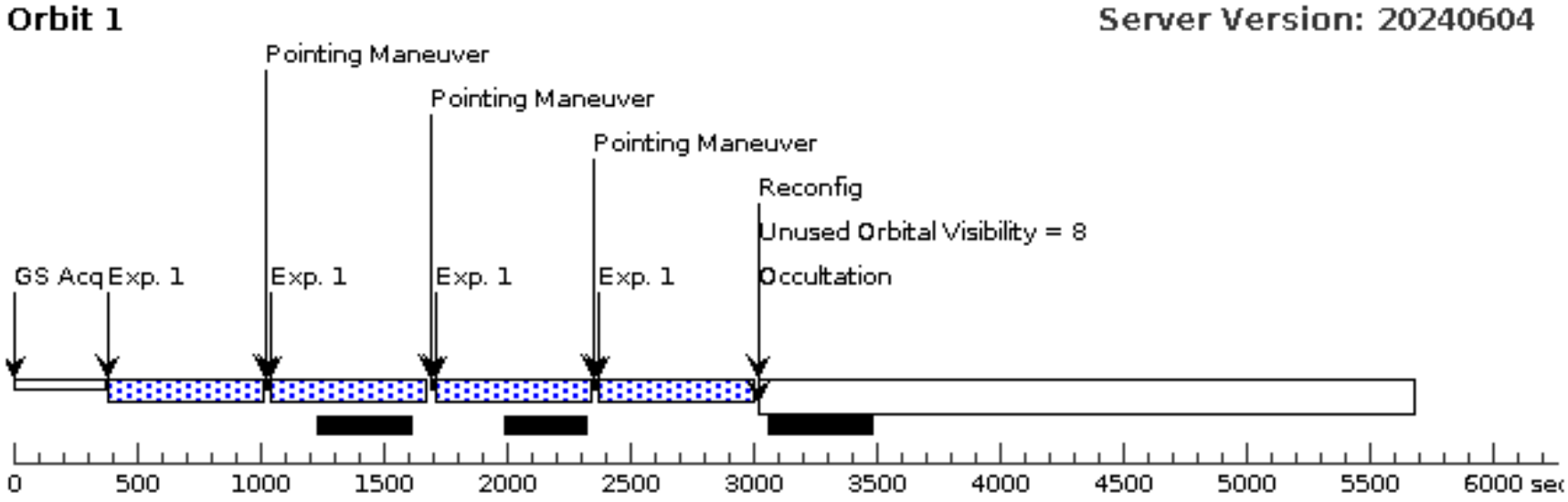
| # | Name | Target Coordinates | Targ. Coord. Corrections | Fluxes | Miscellaneous |
|---|---|---|---|---|---|
| (28) | LEDA-1693718<br>Alt Name1: WISEA-J181935.67+234714.0 | RA: 18 19 35.6688 (274.8986200d)<br>Dec: +23 47 13.81 (23.78717d)<br>Equinox: J2000 | Radial Velocity: 9789 km/sec | V=(?)<br>J = 13.14 | Reference Frame: NED |

*Comments:*
*Category=GALAXY*
*Description=[ELLIPTICAL]*
*Extended=YES*

## Exposures

| # | Label | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time (Total)/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | (28) LEDA-1693718 | WFC3/IR, MULTIACCUM, IR | F110W | SAMP-SEQ=SPARS50;<br>NSAMP=13 | | Pattern 1, Exps 1-1 in LEDA-1693718 (28) (1) | 602.937703 Secs (2411.751 Secs)<br>*[==>(Pattern 1)]*<br>*[==>(Pattern 2)]*<br>*[==>(Pattern 3)]*<br>*[==>(Pattern 4)]* | ***[1]*** |

## Orbit Structure



## Visit

**Proposal 17446, UGC-02829 (29), completed**

Tue Jul 16 19:00:56 GMT 2024

**Diagnostic Status: No Diagnostics**

Scientific Instruments: WFC3/IR

Special Requirements: SCHED 80%

## Patterns

| # | Primary Pattern | | Secondary Pattern | Exposures |
|---|---|---|---|---|
| (1) | Pattern Type=WFC3-IR-DITHER-BOX-MIN<br>Purpose=DITHER<br>Number Of Points=4<br>Point Spacing=1.144<br>Line Spacing=0.73 | Coordinate Frame=POS-TARG<br>Pattern Orientation=18.528<br>Angle Between Sides=74.653<br>Center Pattern=false | | (1) |

## Fixed Targets

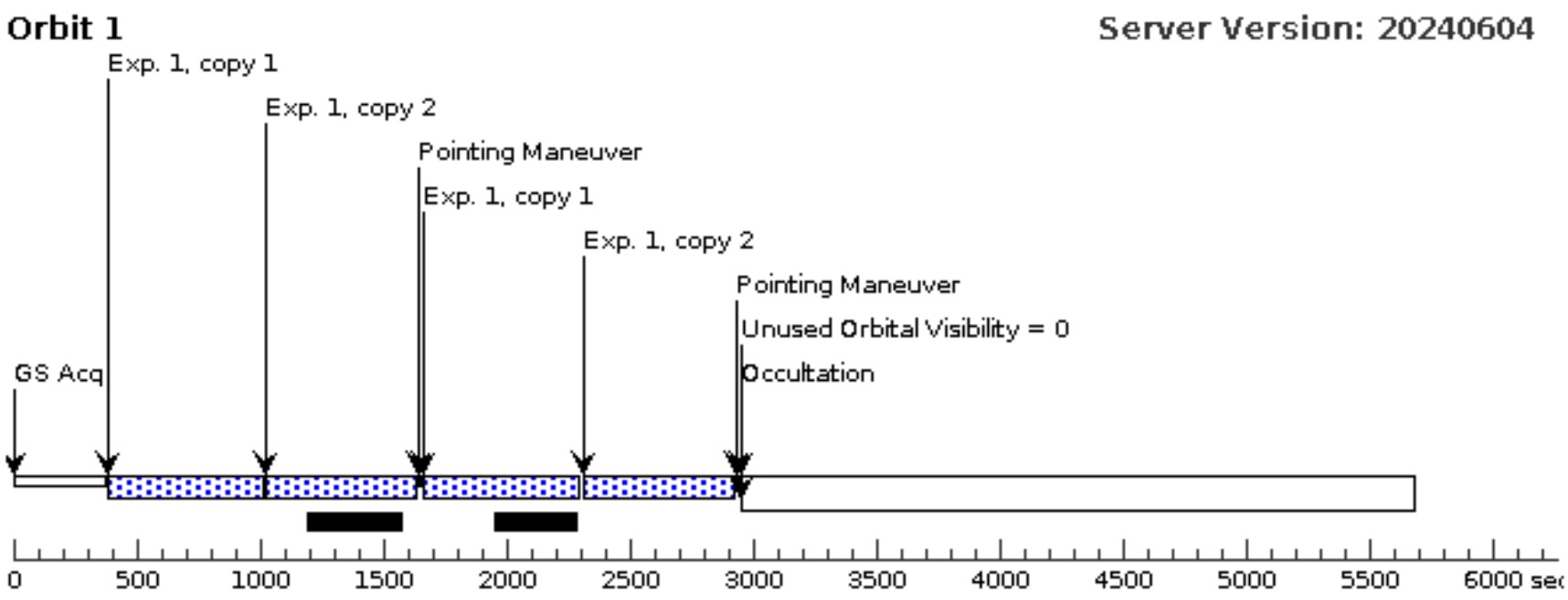
| # | Name | Target Coordinates | Targ. Coord. Corrections | Fluxes | Miscellaneous |
|---|---|---|---|---|---|
| (29) | UGC-02829 | RA: 03 41 50.8600 (55.4619167d)<br>Dec: +08 09 35.36 (8.15982d)<br>Equinox: J2000 | Radial Velocity: 5861 km/sec | V=(?)<br>B = 14.88,<br>J = 11.1 | Reference Frame: SIMBAD |

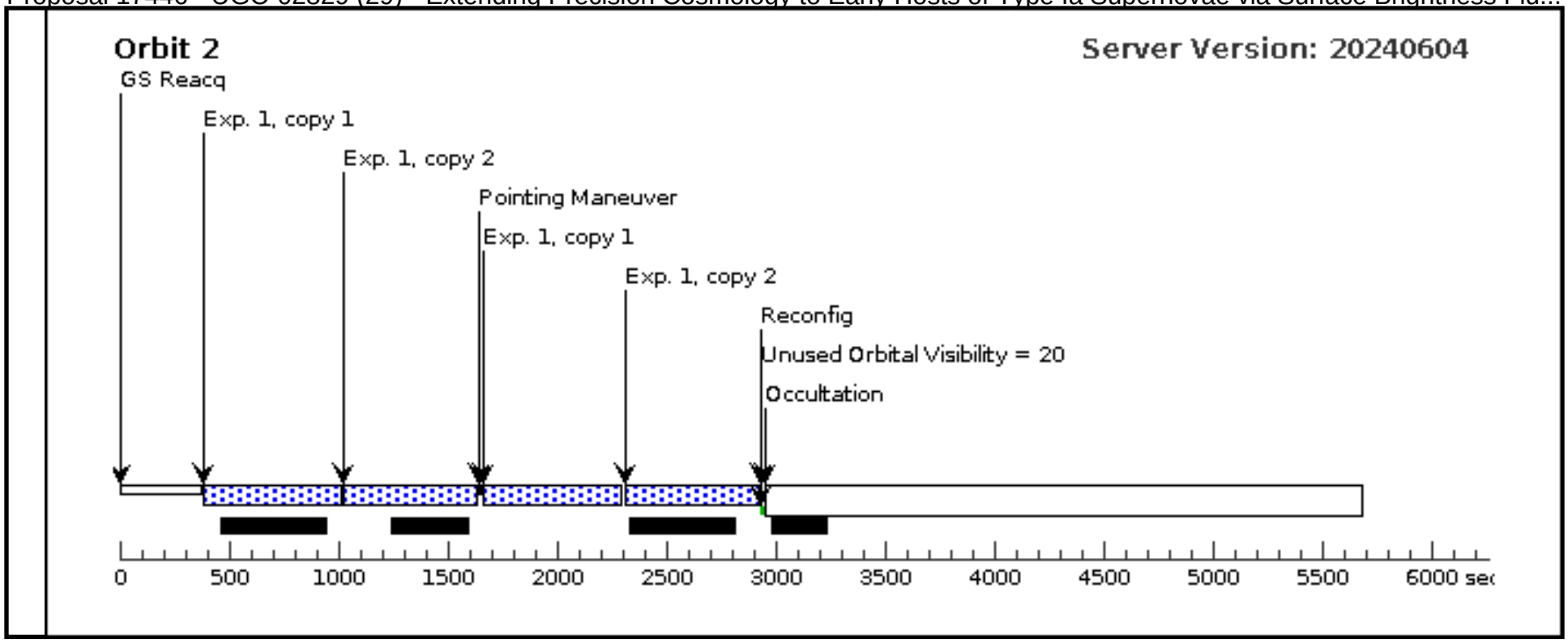
*Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.*
*Category=GALAXY*
*Description=[LENTICULAR]*
*Extended=YES*

## Exposures

| # | Label | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time (Total)/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | (29) UGC-02829 | WFC3/IR, MULTIACCUM, IR | F110W | SAMP-SEQ=SPARS50;<br>NSAMP=13 | | Pattern 1, Exps 1-1 in UGC-02829 (29) (1) | 602.937703 Secs X 2 (4823.502 Secs) | |
| | | | | | | | | *[==>(Pattern 1, Copy 1)]*<br>*[==>(Pattern 1, Copy 2)]*<br>*[==>(Pattern 2, Copy 1)]*<br>*[==>(Pattern 2, Copy 2)]* | ***[1]*** |
| | | | | | | | | *[==>(Pattern 3, Copy 1)]*<br>*[==>(Pattern 3, Copy 2)]*<br>*[==>(Pattern 4, Copy 1)]*<br>*[==>(Pattern 4, Copy 2)]* | ***[2]*** |

**Orbit Structure**




Orbit 2
Server Version: 20240604
GS Reacq
Exp. 1, copy 1
Exp. 1, copy 2
Pointing Maneuver
Exp. 1, copy 1
Exp. 1, copy 2
Reconfig
Unused Orbital Visibility = 20
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000 sec