# 17225 - The (Ir)Regularities of Dust Attenuation in Star Forming Galaxies

Cycle: 30, Proposal Category: GO

(UV Initiative)

(Availability Mode: SUPPORTED)

**INVESTIGATORS**



| *Name* | *Institution* |
|---|---|
| **Prof. Daniela Calzetti (PI) (Contact)** | **University of Massachusetts - Amherst** |
| Dr. Andrew J. Battisti (CoI) | Australian National University |
| Dr. Irene Shivaei (CoI) (ESA Member) | Centro de Astrobiologia (CSIC/INTA) Inst. Nac. de Tec. Aero. |
| Dr. Linda J. Smith (CoI) | Space Telescope Science Institute |
| Dr. Elena Sabbi (CoI) | NOIRLab - Gemini North (HI) |
| Dr. Sean Linden (CoI) | University of Arizona |



**VISITS**

| *Visit* | *Targets used in Visit* | *Configurations used in Visit* | *Orbits Used* | *Last Orbit Planner Run* | *OP Current with Visit?* |
|---|---|---|---|---|---|
| 01 | (1) NGC-3351 | ACS/SBC | 1 | 07-Jun-2024 14:00:17.0 | yes |
| 02 | (1) NGC-3351 | WFC3/UVIS | 1 | 07-Jun-2024 14:00:18.0 | yes |
| 52 | (1) NGC-3351 | WFC3/UVIS | 1 | 07-Jun-2024 14:00:18.0 | yes |
| 53 | (1) NGC-3351 | WFC3/UVIS | 1 | 07-Jun-2024 14:00:19.0 | yes |
| 55 | (1) NGC-3351 | WFC3/UVIS | 1 | 07-Jun-2024 14:00:19.0 | yes |
| 03 | (2) NGC-5236 | ACS/SBC | 1 | 07-Jun-2024 14:00:20.0 | yes |
| 04 | (2) NGC-5236 | WFC3/UVIS | 1 | 07-Jun-2024 14:00:20.0 | yes |
| 05 | (3) NGC-4214 | ACS/SBC | 1 | 07-Jun-2024 14:00:21.0 | yes |
| 54 | (3) NGC-4214 | ACS/SBC | 1 | 07-Jun-2024 14:00:21.0 | yes |

| *Visit* | *Targets used in Visit* | *Configurations used in Visit* | *Orbits Used* | *Last Orbit Planner Run* | *OP Current with Visit?* |
|---|---|---|---|---|---|
| 06 | (3) NGC-4214 | WFC3/UVIS | 1 | 07-Jun-2024 14:00:21.0 | yes |
| 07 | (4) NGC-5253 | WFC3/UVIS | 1 | 07-Jun-2024 14:00:22.0 | yes |
| 08 | (5) NGC-5474 | WFC3/IR | 2 | 07-Jun-2024 14:00:23.0 | yes |

13 Total Orbits Used

**ABSTRACT**

While dust constitutes a small fraction of a galaxy's interstellar medium, it has an outsized impact on its spectral energy distribution (SED) by reddening and attenuating the light from stars. The effects of dust are degenerate with those of the galaxy's star formation history, because stellar populations of different ages can be subject to different levels of attenuation in the presence of patchy dust. We propose to separate the variations of the ultraviolet-to-nearIR (UV-to-NIR) dust attenuation from those of the star formation history in star-forming galaxies, by leveraging the multi-wavelength and high resolution capabilities of HST. We will complement archival HST data with new ACS and WFC3 broad and narrow-band imaging to probe the SEDs of the stars and the hydrogen recombination lines of H-alpha and Pa-beta to model the spatially-resolved stellar populations, gas emission, and dust in five nearby galaxies hosting central starbursts. The five starbursts are selected based on their global far-infrared and UV emission properties, which deviate from those of typical starbursts in the local Universe, making them puzzling outliers. FUV (1600 Angstrom) to NIR (~1.6 micron) SEDs of individual star clusters and HII regions will provide necessary constraints to separate variations of stellar ages in patchy dust from variations of the shape and normalization of the dust attenuation curve. Our study will provide a benchmark for dust attenuation corrections directly applied to UV-to-NIR SEDs. This will remain the only viable option to derive physical parameters for the large high-redshift galaxy surveys produced by the JWST, Roman, Euclid, and ELTs.

**OBSERVING DESCRIPTION**

Target Selection:

Our targets are selected to be starbursts with IRX values 2 sigma or more below those of the IRX-beta relation marked by the SB curve and to span a range in beta, to probe the attenuation curve along the locus marked by the SMC curve. We impose a distance limit of 10 Mpc to achieve spatial resolution better than 5 pc with HST.

Observational Set--Up and  Exposure Times.

Instrument/filter combinations are chosen to complete the archival datasets and cover the full FUV-H range for each target.  Our template source is a

5000 M_sun, 4 Myr old star cluster with a conservative A_V=1.5~mag (F(1600)=2.5x10-1 ~erg/s/cm^2/AA and Sigma(Pa-beta)=2x10^-16 erg/s/cm^2/arcse$^2 at  4.5 Mpc distance).

ACS/SBC 2x2 mosaics in F150LP are planned for NGC4214 and NGC5236 to cover the UV--emitting starburst regions, while one pointing only is required for NGC3351. S/N=5 is expected to be achieved for the above template cluster in 600 s per mosaic tile in NGC4214 and NGC5236 and in 2,400 s for NGC3351 (located at twice the distance of the other two galaxies).

WFC3/UVIS observations for NGC3351 (F218W), NGC4214 and NGC5236 (F275W), and NGC5253 (F657N+F547M) will be obtained with S/N>=10 for our template cluster in 2,500 s (F218W), 2,000 s (F275W),  2,000 s (F657N). WFC3/IR observations will be obtained for NGC5474 in F110W, F128N, F160W, with S/N>=10 in 900 s, 2300 s, and 900 s, respectively. F547M and F110W are observed with S/N>20 to ensure that the subtraction of the stellar continuum from the narrow-band filter does not dominate the noise budget.

Each WFC3 exposure is divided into 3-4 dither patterns to remove CRs and fill the chip gap. The WFC3 UV/U and H-alpha exposures include 20 s post--flash. The S/N in the FUV is sufficient to discriminate between individual attenuation slopes to >5 sigma; the combination of SBC/F150LP, WFC3/F218W (or F225W) and F275W separates mean UV slopes from effects of the 2175 A bump to >10 sigma.

## Visit

**Proposal 17225, NGC-3351-SBC (01), completed** Fri Jun 07 18:00:24 GMT 2024

**Diagnostic Status: Warning**

Scientific Instruments: ACS/SBC

Special Requirements: (none)

## Diagnostics

(NGC-3351-SBC (01)) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

## Patterns

| # | Primary Pattern | | Secondary Pattern | Exposures |
|---|---|---|---|---|
| (1) | Pattern Type=ACS-SBC-DITHER-BOX<br>Purpose=DITHER<br>Number Of Points=4<br>Point Spacing=0.179<br>Line Spacing=0.116 | Coordinate Frame=POS-TARG<br>Pattern Orientation=20.02<br>Angle Between Sides=63.65<br>Center Pattern=false | | (1) |

## Fixed Targets

| # | Name | Target Coordinates | Targ. Coord. Corrections | Fluxes | Miscellaneous |
|---|---|---|---|---|---|
| (1) | NGC-3351 | RA: 10 43 57.7310 (160.9905458d)<br>Dec: +11 42 13.24 (11.70368d)<br>Equinox: J2000 | | V=11.92 | Reference Frame: NED |

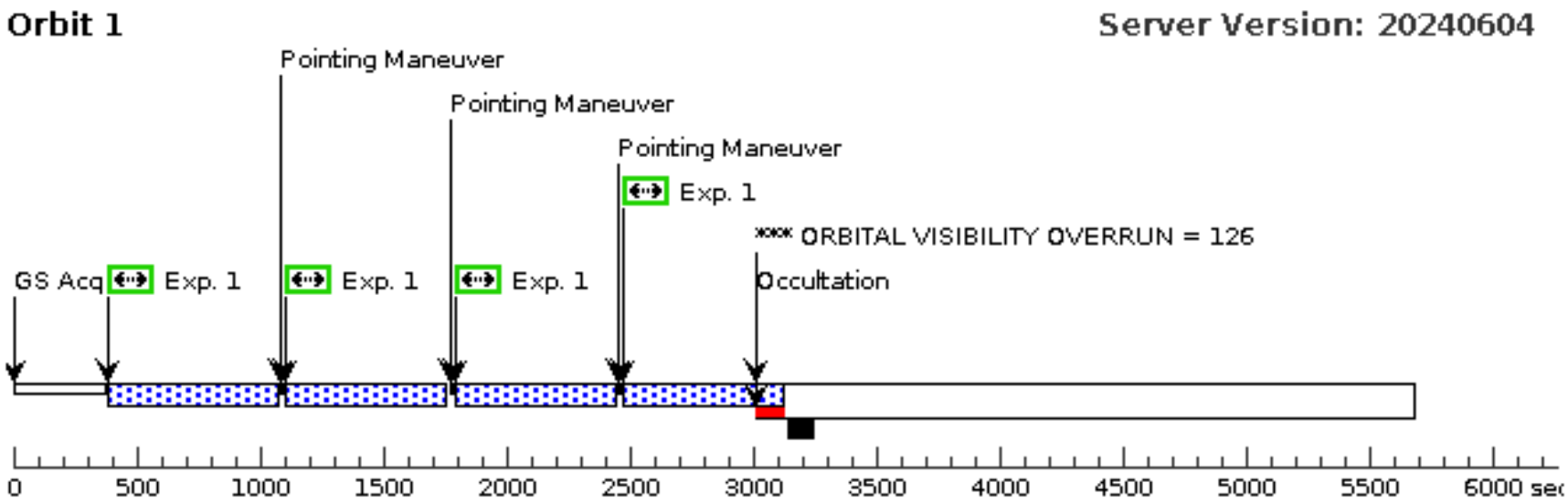
*Comments: This object was generated by the targetselector and retrieved from the NED database. Coordinates slightly (<0.5") updated using HST imaging.*
*Category=GALAXY*
*Description=[SPIRAL, STARBURST]*

## Exposures

| # | Label (ETC Run) | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time (Total)/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 1 | (ACS.im.18 12282) | (1) NGC-3351 | ACS/SBC, ACCUM, SBC-FIX | F150LP | | | Pattern 1, Exps 1-1 in NGC-3351-SBC (01) (1) | 625 Secs (2500 Secs)<br>*[==>(Pattern 1)]*<br>*[==>(Pattern 2)]*<br>*[==>(Pattern 3)]*<br>*[==>(Pattern 4)]* | ***[1]*** |

*Comments: Extrapolated from the F275W WFC3/UVIS filter, using the brightest pixel of the brightest and bluest source, which has flux 1.03E-16 erg/s/cm^2/A. Extrapolation from F275W to F150LP uses most unfavorable case that source has a Lambda^(-2) spectral shape.*

Orbit Structure



## Visit

**Proposal 17225, NGC-3351-WFC3 (02), failed** Fri Jun 07 18:00:24 GMT 2024

**Diagnostic Status: Warning**

Scientific Instruments: WFC3/UVIS

Special Requirements: (none)

## Diagnostics

(NGC-3351-WFC3 (02)) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

## Patterns

| # | Primary Pattern | | Secondary Pattern | Exposures |
|---|---|---|---|---|
| (3) | Pattern Type=WFC3-UVIS-DITHER-BOX<br>Purpose=DITHER<br>Number Of Points=4<br>Point Spacing=0.173<br>Line Spacing=2.414 | Coordinate Frame=POS-TARG<br>Pattern Orientation=23.884<br>Angle Between Sides=81.785<br>Center Pattern=false | | (1) |

## Fixed Targets

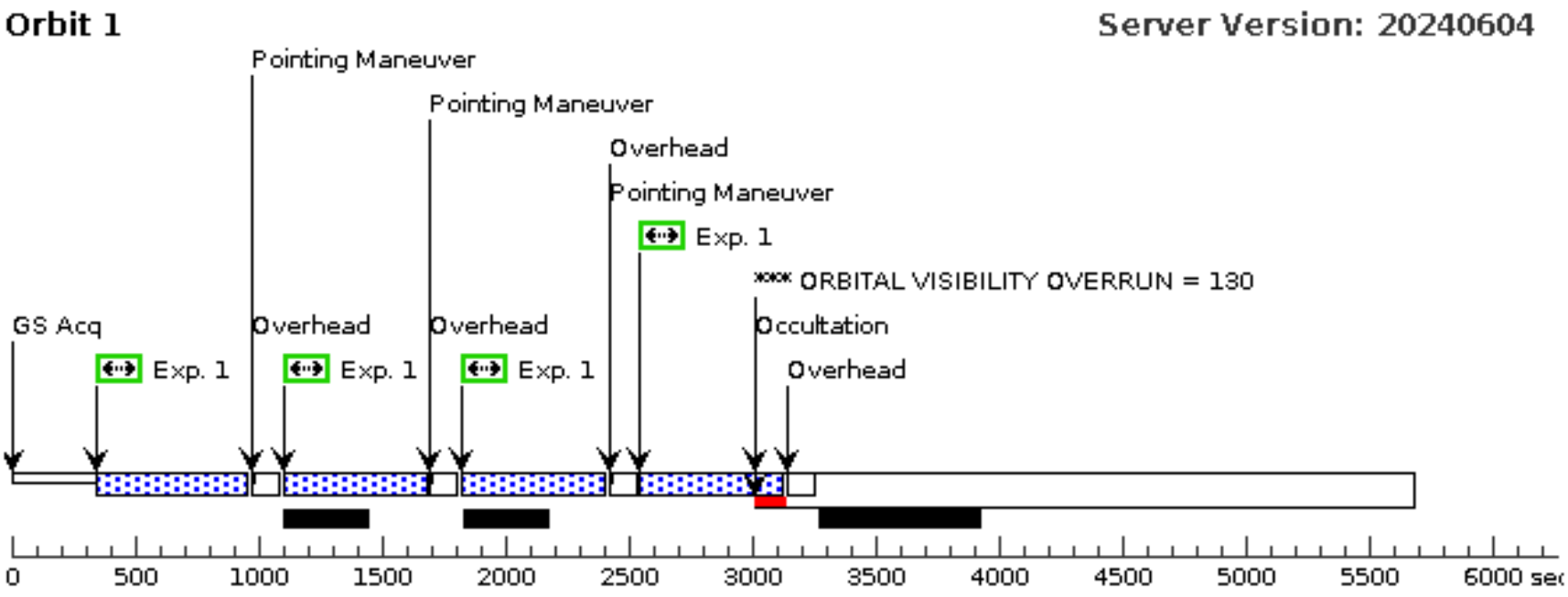
| # | Name | Target Coordinates | Targ. Coord. Corrections | Fluxes | Miscellaneous |
|---|---|---|---|---|---|
| (1) | NGC-3351 | RA: 10 43 57.7310 (160.9905458d)<br>Dec: +11 42 13.24 (11.70368d)<br>Equinox: J2000 | | V=11.92 | Reference Frame: NED |

*Comments: This object was generated by the targetselector and retrieved from the NED database. Coordinates slightly (<0.5") updated using HST imaging.*
*Category=GALAXY*
*Description=[SPIRAL, STARBURST]*

## Exposures

| # | Label | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time (Total)/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 1 | NGC3351-WFC3-218W | (1) NGC-3351 | WFC3/UVIS, ACCUM, UVIS1 | F218W | FLASH=20 | | Pattern 3, Exps 1-1 in NGC-3351-WFC3 (02) (3) | 585 Secs (2340 Secs)<br>*[==>(Pattern 1)]*<br>*[==>(Pattern 2)]*<br>*[==>(Pattern 3)]*<br>*[==>(Pattern 4)]* | ***[1]*** |

Orbit Structure



## Visit

**Proposal 17225, NGC-3351-WFC3 (52), failed** Fri Jun 07 18:00:24 GMT 2024

**Diagnostic Status: Warning**

Scientific Instruments: WFC3/UVIS

Special Requirements: (none)

*Comments: HOPR copy of visit 2*

## Diagnostics

(NGC-3351-WFC3 (52)) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

## Patterns

| # | Primary Pattern | | Secondary Pattern | Exposures |
|---|---|---|---|---|
| (3) | Pattern Type=WFC3-UVIS-DITHER-BOX<br>Purpose=DITHER<br>Number Of Points=4<br>Point Spacing=0.173<br>Line Spacing=2.414 | Coordinate Frame=POS-TARG<br>Pattern Orientation=23.884<br>Angle Between Sides=81.785<br>Center Pattern=false | | (1) |

## Fixed Targets

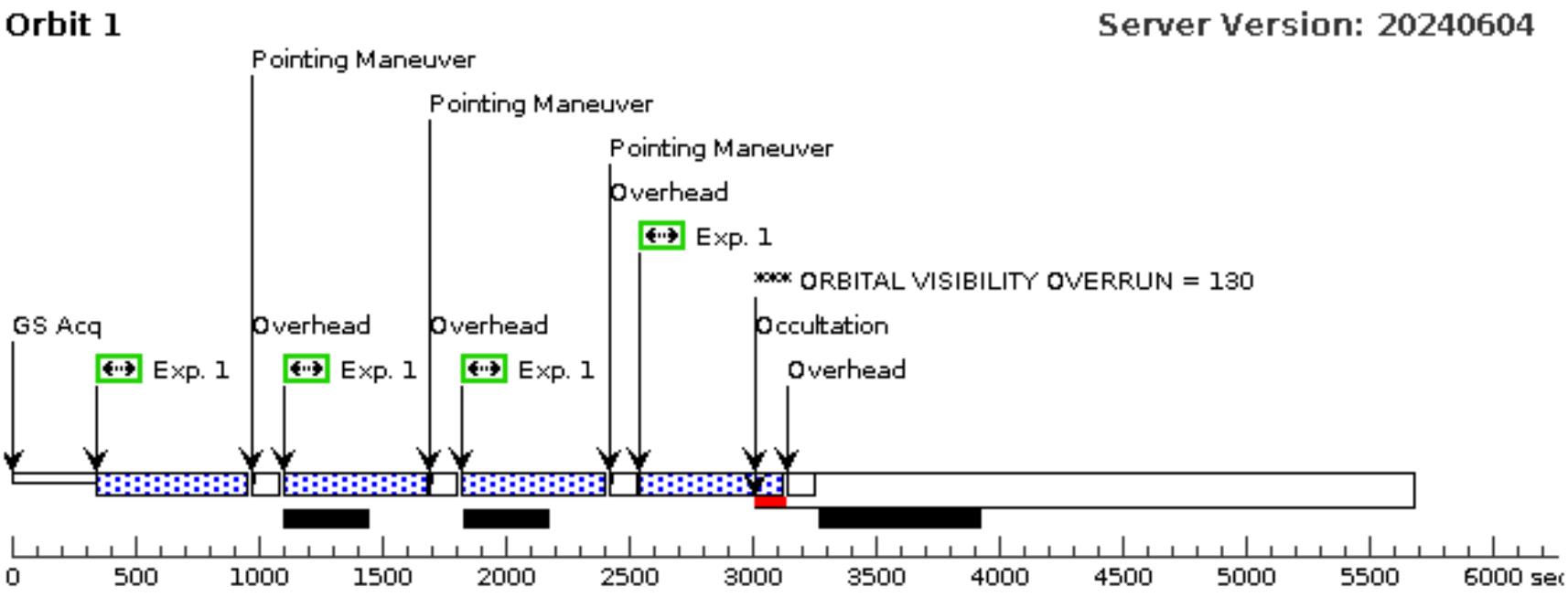
| # | Name | Target Coordinates | Targ. Coord. Corrections | Fluxes | Miscellaneous |
|---|---|---|---|---|---|
| (1) | NGC-3351 | RA: 10 43 57.7310 (160.9905458d)<br>Dec: +11 42 13.24 (11.70368d)<br>Equinox: J2000 | | V=11.92 | Reference Frame: NED |

*Comments: This object was generated by the targetselector and retrieved from the NED database. Coordinates slightly (<0.5") updated using HST imaging.*
*Category=GALAXY*
*Description=[SPIRAL, STARBURST]*

## Exposures

| # | Label | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time (Total)/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 1 | NGC3351-WFC3-218W | (1) NGC-3351 | WFC3/UVIS, ACCUM, UVIS1 | F218W | FLASH=20 | | Pattern 3, Exps 1-1 in NGC-3351-WFC3 (52) (3) | 585 Secs (2340 Secs)<br>*[==>(Pattern 1)]*<br>*[==>(Pattern 2)]*<br>*[==>(Pattern 3)]*<br>*[==>(Pattern 4)]* | ***[1]*** |

Orbit Structure



## Visit

**Proposal 17225, NGC-3351-WFC3 (53), failed** Fri Jun 07 18:00:24 GMT 2024

**Diagnostic Status: Warning**

Scientific Instruments: WFC3/UVIS

Special Requirements: (none)

*Comments: HOPR copy of visit 52*

## Diagnostics

(NGC-3351-WFC3 (53)) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

## Patterns

| # | Primary Pattern | | Secondary Pattern | Exposures |
|---|---|---|---|---|
| (3) | Pattern Type=WFC3-UVIS-DITHER-BOX<br>Purpose=DITHER<br>Number Of Points=4<br>Point Spacing=0.173<br>Line Spacing=2.414 | Coordinate Frame=POS-TARG<br>Pattern Orientation=23.884<br>Angle Between Sides=81.785<br>Center Pattern=false | | (1) |

## Fixed Targets

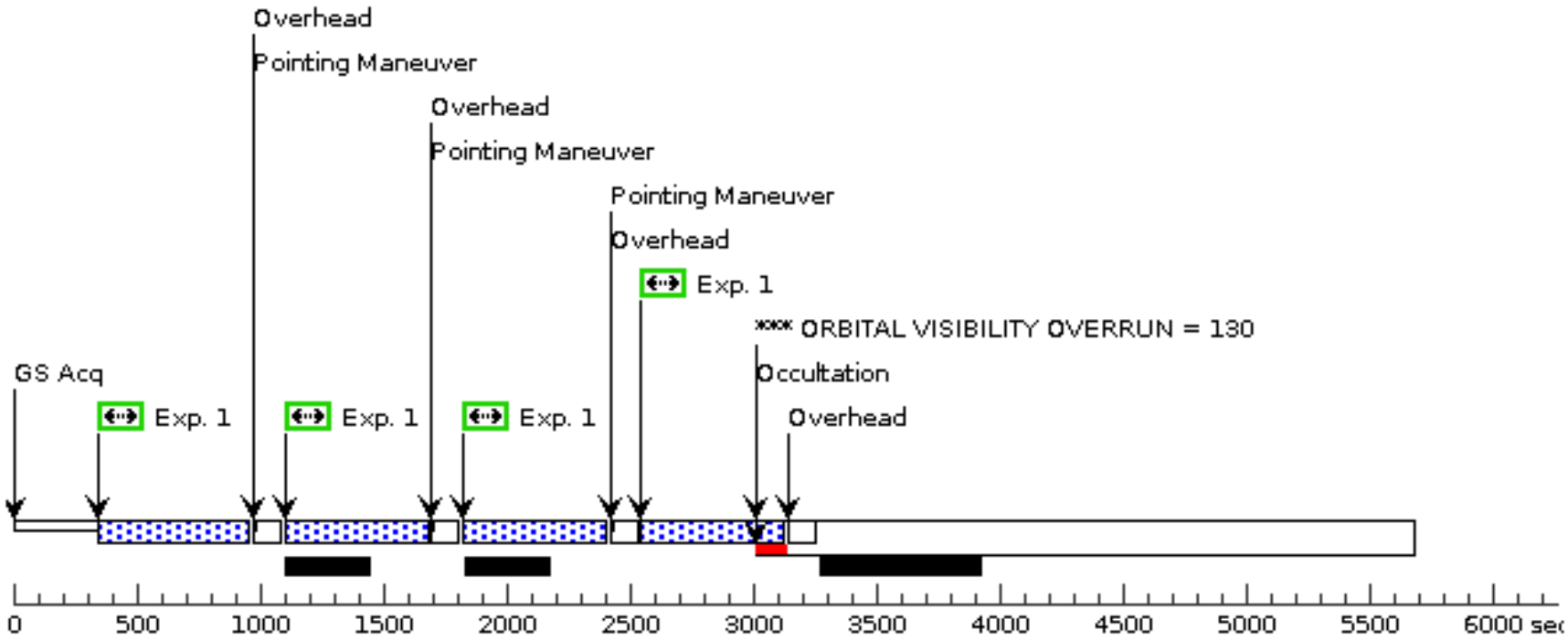
| # | Name | Target Coordinates | Targ. Coord. Corrections | Fluxes | Miscellaneous |
|---|---|---|---|---|---|
| (1) | NGC-3351 | RA: 10 43 57.7310 (160.9905458d)<br>Dec: +11 42 13.24 (11.70368d)<br>Equinox: J2000 | | V=11.92 | Reference Frame: NED |

*Comments: This object was generated by the targetselector and retrieved from the NED database. Coordinates slightly (<0.5") updated using HST imaging.*
*Category=GALAXY*
*Description=[SPIRAL, STARBURST]*

## Exposures

| # | Label | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time (Total)/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 1 | NGC3351-WFC3-218W | (1) NGC-3351 | WFC3/UVIS, ACCUM, UVIS1 | F218W | FLASH=20 | | Pattern 3, Exps 1-1 in NGC-3351-WFC3 (53) (3) | 585 Secs (2340 Secs)<br>*[==>(Pattern 1)]*<br>*[==>(Pattern 2)]*<br>*[==>(Pattern 3)]*<br>*[==>(Pattern 4)]* | ***[1]*** |

Orbit Structure



## Visit

**Proposal 17225, NGC-3351-WFC3 (55), implementation** Fri Jun 07 18:00:24 GMT 2024

**Diagnostic Status: No Diagnostics**

Scientific Instruments: WFC3/UVIS

Special Requirements: (none)

*Comments: HOPR copy of visit 53*

## Patterns

| # | Primary Pattern | | Secondary Pattern | Exposures |
|---|---|---|---|---|
| (3) | Pattern Type=WFC3-UVIS-DITHER-BOX<br>Purpose=DITHER<br>Number Of Points=4<br>Point Spacing=0.173<br>Line Spacing=2.414 | Coordinate Frame=POS-TARG<br>Pattern Orientation=23.884<br>Angle Between Sides=81.785<br>Center Pattern=false | | (1) |

## Fixed Targets

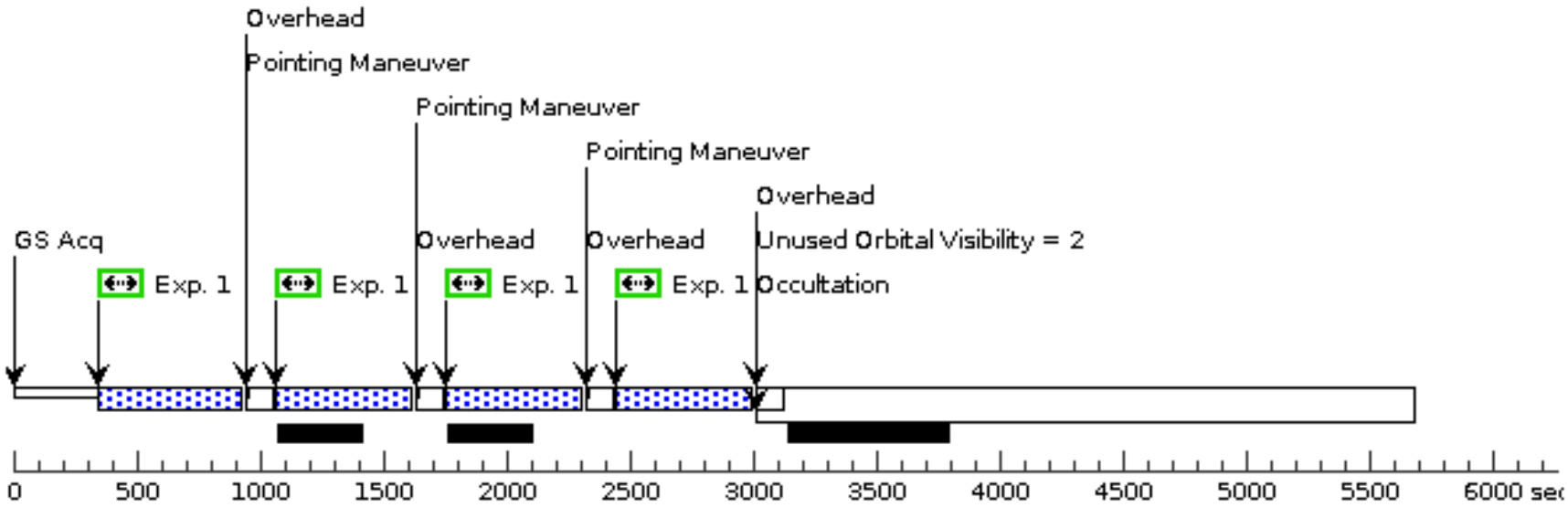
| # | Name | Target Coordinates | Targ. Coord. Corrections | Fluxes | Miscellaneous |
|---|---|---|---|---|---|
| (1) | NGC-3351 | RA: 10 43 57.7310 (160.9905458d)<br>Dec: +11 42 13.24 (11.70368d)<br>Equinox: J2000 | | V=11.92 | Reference Frame: NED |

*Comments: This object was generated by the targetselector and retrieved from the NED database. Coordinates slightly (<0.5") updated using HST imaging.*
*Category=GALAXY*
*Description=[SPIRAL, STARBURST]*

## Exposures

| # | Label | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time (Total)/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 1 | NGC3351-WFC3-218W | (1) NGC-3351 | WFC3/UVIS, ACCUM, UVIS1 | F218W | FLASH=20 | | Pattern 3, Exps 1-1 in NGC-3351-WFC3 (55) (3) | 585 Secs (2208 Secs)<br>*[==>552.0 Secs (Pattern 1)]*<br>*[==>552.0 Secs (Pattern 2)]*<br>*[==>552.0 Secs (Pattern 3)]*<br>*[==>552.0 Secs (Pattern 4)]* | ***[1]*** |

Orbit Structure



## Visit

**Proposal 17225, NGC-5236-SBC (03), completed** Fri Jun 07 18:00:24 GMT 2024

**Diagnostic Status: Warning**

Scientific Instruments: ACS/SBC

Special Requirements: ORIENT 60D TO 85 D; ORIENT 240D TO 265 D

## Diagnostics

(NGC-5236-SBC (03)) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

## Patterns

| # | Primary Pattern | | Secondary Pattern | Exposures |
|---|---|---|---|---|
| (4) | Pattern Type=ACS-SBC-MOSAIC-BOX<br>Purpose=MOSAIC<br>Number Of Points=4<br>Point Spacing=28.801<br>Line Spacing=32.957 | Coordinate Frame=POS-TARG<br>Pattern Orientation=90.0<br>Angle Between Sides=264.24<br>Center Pattern=true | | (1) |

## Fixed Targets

| # | Name | Target Coordinates | Targ. Coord. Corrections | Fluxes | Miscellaneous |
|---|---|---|---|---|---|
| (2) | NGC-5236 | RA: 13 37 0.2924 (204.2512183d)<br>Dec: -29 51 55.18 (-29.86533d)<br>Equinox: J2000 | Proper Motion RA: -3.9360555658684066E-5 sec of time/yr<br>Proper Motion Dec: 3.83E-4 arcsec/yr<br>Epoch of Position: 2015.5 | V=7.52 | Reference Frame: SIMBAD |

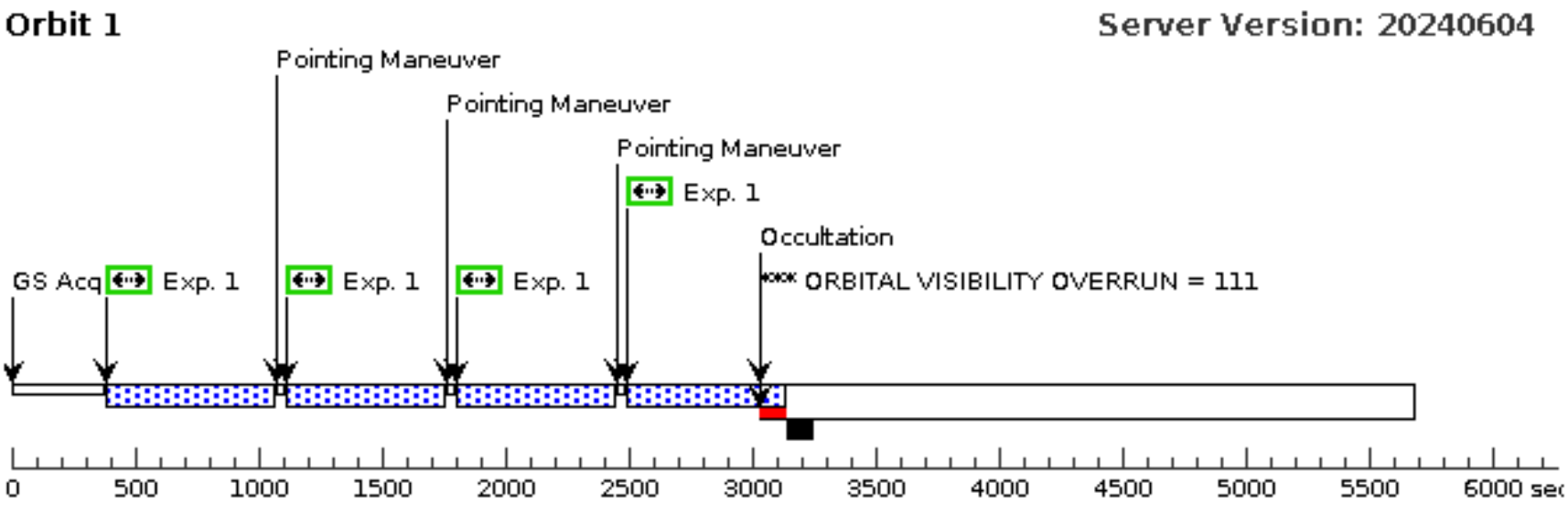
*Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.*
*Category=GALAXY*
*Description=[SPIRAL, STARBURST]*

## Exposures

| # | Label (ETC Run) | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time (Total)/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 1 | (ACS.im.18 12280) | (2) NGC-5236 | ACS/SBC, ACCUM, SBC-FIX | F150LP | | | Pattern 4, Exps 1-1 in NGC-5236-SBC (03) (4) | 610 Secs (2440 Secs)<br>*[==>(Pattern 1)]*<br>*[==>(Pattern 2)]*<br>*[==>(Pattern 3)]*<br>*[==>(Pattern 4)]* | ***[1]*** |

*Comments: The bright area in this galaxy has been already observed in SBC/F125LP (HST-GO-11579). Brightest pixel has flux: 3.615E-16 erg/s/cm^2/A.*

Orbit Structure



## Visit

**Proposal 17225, NGC-5236-WFC3 (04), completed** Fri Jun 07 18:00:24 GMT 2024

**Diagnostic Status: Warning**

Scientific Instruments: WFC3/UVIS

Special Requirements: (none)

## Diagnostics

(NGC-5236-WFC3 (04)) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

## Patterns

| # | Primary Pattern | | Secondary Pattern | Exposures |
|---|---|---|---|---|
| (3) | Pattern Type=WFC3-UVIS-DITHER-BOX<br>Purpose=DITHER<br>Number Of Points=4<br>Point Spacing=0.173<br>Line Spacing=2.414 | Coordinate Frame=POS-TARG<br>Pattern Orientation=23.884<br>Angle Between Sides=81.785<br>Center Pattern=false | | (1) |

## Fixed Targets

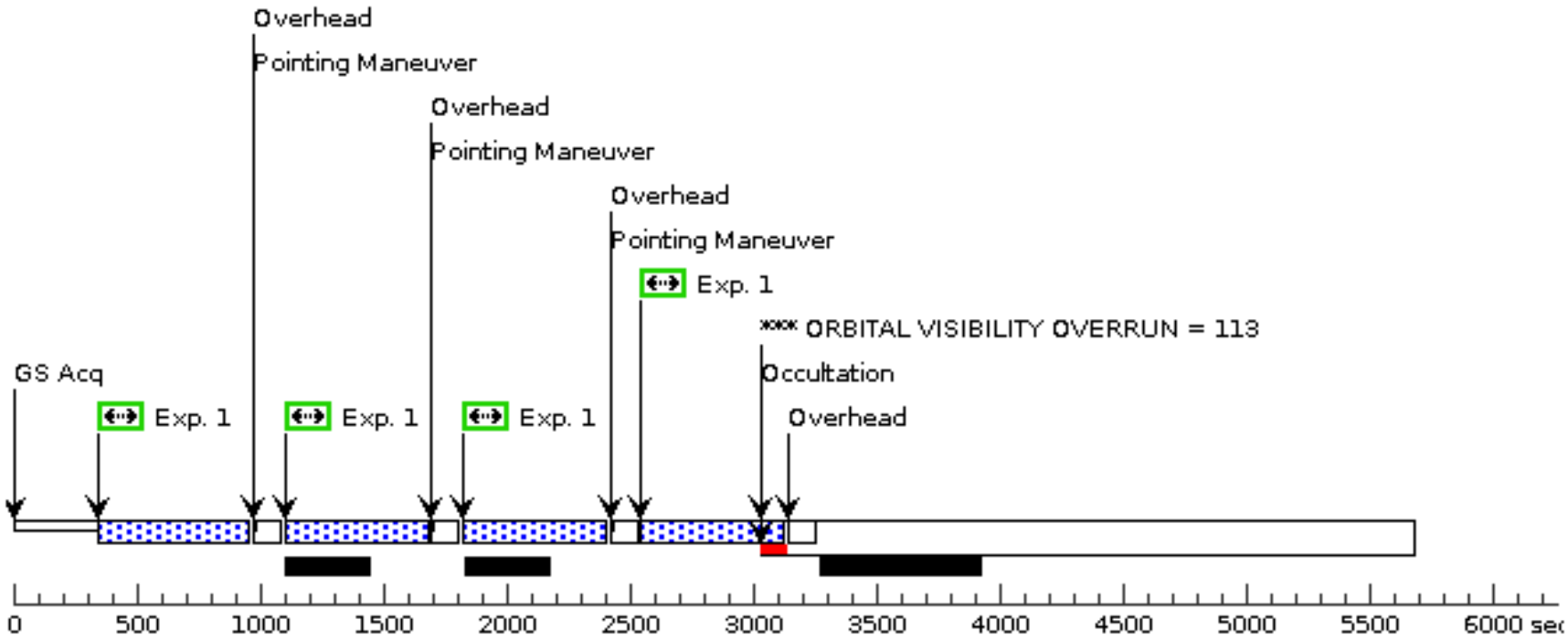
| # | Name | Target Coordinates | Targ. Coord. Corrections | Fluxes | Miscellaneous |
|---|---|---|---|---|---|
| (2) | NGC-5236 | RA: 13 37 0.2924 (204.2512183d)<br>Dec: -29 51 55.18 (-29.86533d)<br>Equinox: J2000 | Proper Motion RA: -3.9360555658684066E-5 sec of time/yr<br>Proper Motion Dec: 3.83E-4 arcsec/yr<br>Epoch of Position: 2015.5 | V=7.52 | Reference Frame: SIMBAD |

*Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.*
*Category=GALAXY*
*Description=[SPIRAL, STARBURST]*

## Exposures

| # | Label | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time (Total)/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | (2) NGC-5236 | WFC3/UVIS, ACCUM, UVIS1 | F275W | FLASH=20 | | Pattern 3, Exps 1-1 in NGC-5236-WFC3 (04) (3) | 585 Secs (2340 Secs)<br>*[==>(Pattern 1)]*<br>*[==>(Pattern 2)]*<br>*[==>(Pattern 3)]*<br>*[==>(Pattern 4)]* | ***[1]*** |

Orbit Structure



## Visit

**Proposal 17225, NGC-4214-SBC (05), failed** Fri Jun 07 18:00:24 GMT 2024

**Diagnostic Status: Warning**

Scientific Instruments: ACS/SBC

Special Requirements: ORIENT 345D TO 30 D; ORIENT 165D TO 210 D; ORIENT 70D TO 90 D; ORIENT 250D TO 270 D

## Diagnostics

(NGC-4214-SBC (05)) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

## Patterns

| # | Primary Pattern | | Secondary Pattern | Exposures |
|---|---|---|---|---|
| (4) | Pattern Type=ACS-SBC-MOSAIC-BOX<br>Purpose=MOSAIC<br>Number Of Points=4<br>Point Spacing=28.801<br>Line Spacing=32.957 | Coordinate Frame=POS-TARG<br>Pattern Orientation=90.0<br>Angle Between Sides=264.24<br>Center Pattern=true | | (1) |

## Fixed Targets

| # | Name | Target Coordinates | Targ. Coord. Corrections | Fluxes | Miscellaneous |
|---|---|---|---|---|---|
| (3) | NGC-4214 | RA: 12 15 40.4200 (183.9184167d)<br>Dec: +36 19 27.68 (36.32436d)<br>Equinox: J2000 | | V=9.41 | Reference Frame: NED |

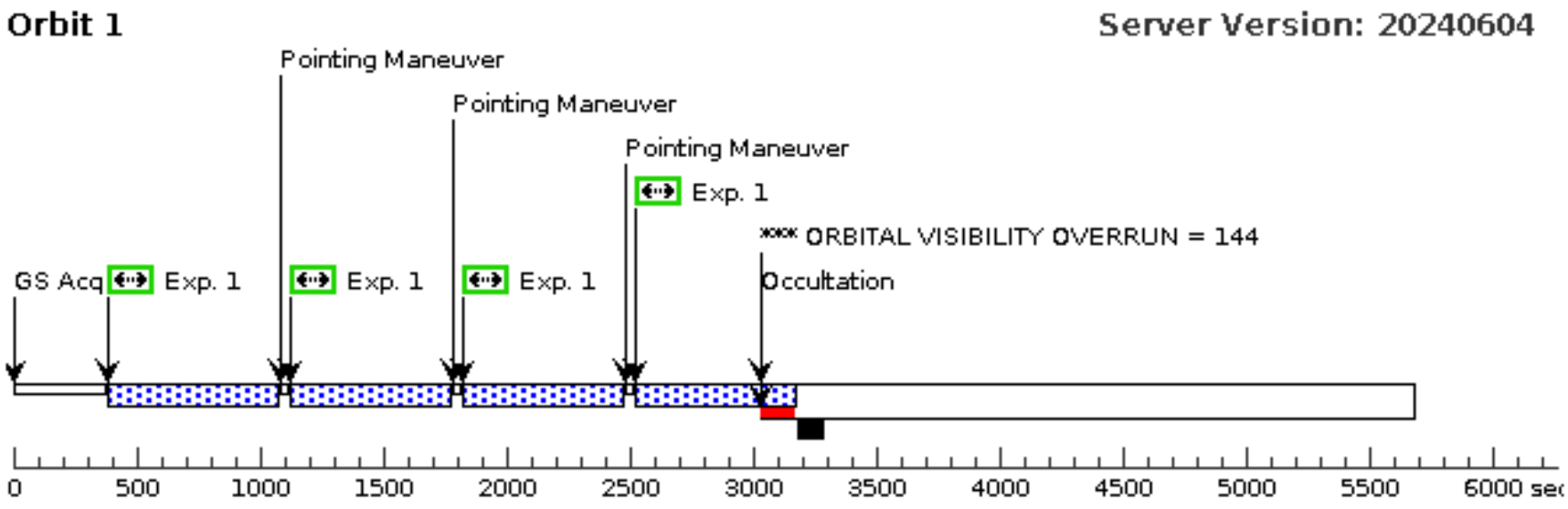
*Comments: This object was generated by the targetselector and retrieved from the NED database.*
*Category=GALAXY*
*Description=[MAGELLANIC IRREGULAR, STARBURST]*

## Exposures

| # | Label (ETC Run) | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time (Total)/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 1 | NGC-4214-SBC (ACS.im.18 12267) | (3) NGC-4214 | ACS/SBC, ACCUM, SBC-FIX | F150LP | | | Pattern 4, Exps 1-1 in NGC-4214-SBC (05) (4) | 620 Secs (2480 Secs)<br>*[==>(Pattern 1)]*<br>*[==>(Pattern 2)]*<br>*[==>(Pattern 3)]*<br>*[==>(Pattern 4)]* | ***[1]*** |

*Comments: The bright area in this galaxy has been already observed in SBC/F125LP (HST-GO-11579). Brightest pixel has flux: 8.092E-16 erg/s/cm^2/A.*

Orbit Structure



## Visit

**Proposal 17225, NGC-4214-SBC (54), completed** Fri Jun 07 18:00:24 GMT 2024

**Diagnostic Status: Warning**

Scientific Instruments: ACS/SBC

Special Requirements: ORIENT 345D TO 30 D; ORIENT 165D TO 210 D; ORIENT 70D TO 90 D; ORIENT 250D TO 270 D

*Comments: HOPR copy of visit 5*

## Diagnostics

(NGC-4214-SBC (54)) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

## Patterns

| # | Primary Pattern | | Secondary Pattern | Exposures |
|---|---|---|---|---|
| (4) | Pattern Type=ACS-SBC-MOSAIC-BOX<br>Purpose=MOSAIC<br>Number Of Points=4<br>Point Spacing=28.801<br>Line Spacing=32.957 | Coordinate Frame=POS-TARG<br>Pattern Orientation=90.0<br>Angle Between Sides=264.24<br>Center Pattern=true | | (1) |

## Fixed Targets

| # | Name | Target Coordinates | Targ. Coord. Corrections | Fluxes | Miscellaneous |
|---|---|---|---|---|---|
| (3) | NGC-4214 | RA: 12 15 40.4200 (183.9184167d)<br>Dec: +36 19 27.68 (36.32436d)<br>Equinox: J2000 | | V=9.41 | Reference Frame: NED |

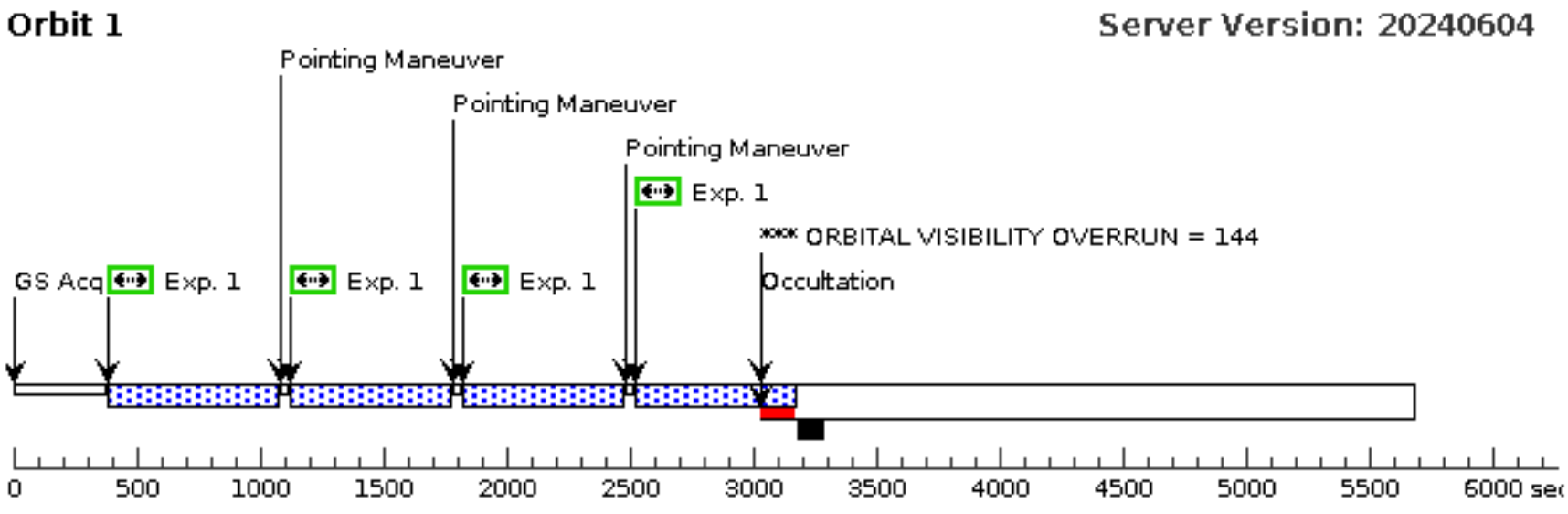
*Comments: This object was generated by the targetselector and retrieved from the NED database.*
*Category=GALAXY*
*Description=[MAGELLANIC IRREGULAR, STARBURST]*

## Exposures

| # | Label (ETC Run) | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time (Total)/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 1 | NGC-4214-SBC (ACS.im.18 12267) | (3) NGC-4214 | ACS/SBC, ACCUM, SBC-FIX | F150LP | | | Pattern 4, Exps 1-1 in NGC-4214-SBC (54) (4) | 620 Secs (2480 Secs)<br>*[==>(Pattern 1)]*<br>*[==>(Pattern 2)]*<br>*[==>(Pattern 3)]*<br>*[==>(Pattern 4)]* | ***[1]*** |

*Comments: The bright area in this galaxy has been already observed in SBC/F125LP (HST-GO-11579). Brightest pixel has flux: 8.092E-16 erg/s/cm^2/A.*

Orbit Structure



## Visit

**Proposal 17225, NGC-4214-WFC3 (06), completed** Fri Jun 07 18:00:24 GMT 2024

**Diagnostic Status: Warning**

Scientific Instruments: WFC3/UVIS

Special Requirements: (none)

## Diagnostics

(NGC-4214-WFC3 (06)) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

## Patterns

| # | Primary Pattern | | Secondary Pattern | Exposures |
|---|---|---|---|---|
| (3) | Pattern Type=WFC3-UVIS-DITHER-BOX<br>Purpose=DITHER<br>Number Of Points=4<br>Point Spacing=0.173<br>Line Spacing=2.414 | Coordinate Frame=POS-TARG<br>Pattern Orientation=23.884<br>Angle Between Sides=81.785<br>Center Pattern=false | | (1) |

## Fixed Targets

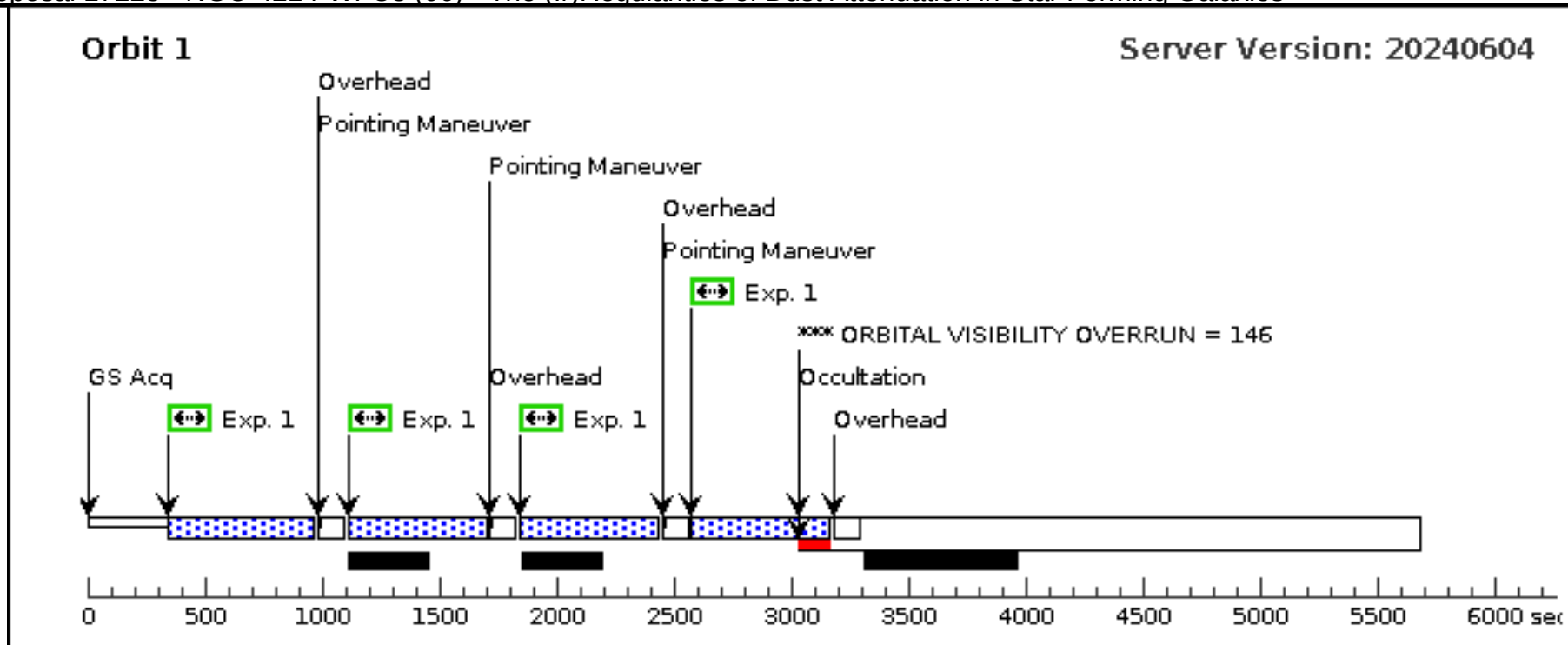
| # | Name | Target Coordinates | Targ. Coord. Corrections | Fluxes | Miscellaneous |
|---|---|---|---|---|---|
| (3) | NGC-4214 | RA: 12 15 40.4200 (183.9184167d)<br>Dec: +36 19 27.68 (36.32436d)<br>Equinox: J2000 | | V=9.41 | Reference Frame: NED |

*Comments: This object was generated by the targetselector and retrieved from the NED database.*
*Category=GALAXY*
*Description=[MAGELLANIC IRREGULAR, STARBURST]*

## Exposures

| # | Label | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time (Total)/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 1 | NGC-4214-F275W | (3) NGC-4214 | WFC3/UVIS, ACCUM, UVIS1 | F275W | FLASH=20 | | Pattern 3, Exps 1-1 in NGC-4214-WFC3 (06) (3) | 595 Secs (2380 Secs)<br>*[==>(Pattern 1)]*<br>*[==>(Pattern 2)]*<br>*[==>(Pattern 3)]*<br>*[==>(Pattern 4)]* | ***[1]*** |

Orbit Structure



## Visit

**Proposal 17225, NGC-5253-WFC3 (07), completed** Fri Jun 07 18:00:24 GMT 2024

**Diagnostic Status: Warning**

Scientific Instruments: WFC3/UVIS

Special Requirements: (none)

## Diagnostics

(NGC-5253-WFC3 (07)) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

## Fixed Targets

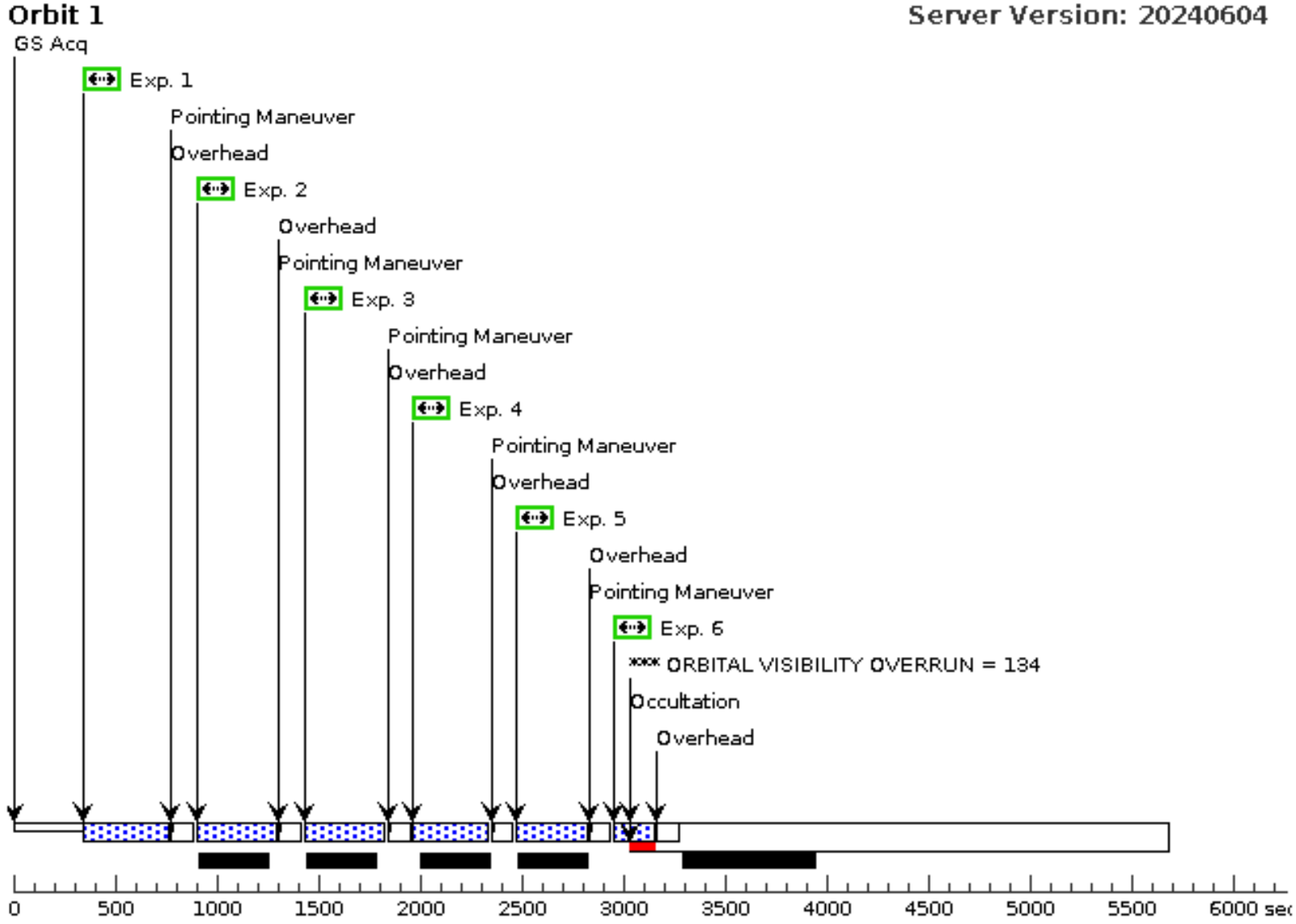
| # | Name | Target Coordinates | Targ. Coord. Corrections | Fluxes | Miscellaneous |
|---|---|---|---|---|---|
| (4) | NGC-5253 | RA: 13 39 55.9632 (204.9831800d)<br>Dec: -31 38 30.40 (-31.64178d)<br>Equinox: J2000 | | V=10.09 | Reference Frame: NED |

*Comments: This object was generated by the targetselector and retrieved from the NED database.*
*Category=GALAXY*
*Description=[AMORPHOUS IRREGULAR, STARBURST]*

## Exposures

| # | Label | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time (Total)/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 1 | NGC-5253-F657N-1 | (4) NGC-5253 | WFC3/UVIS, ACCUM, UVIS1 | F657N | FLASH=20 | POS TARG -0.089,-1.203 | | 390 Secs (390 Secs)<br>*[==>]* | <br>***[1]*** |
| 2 | NGC-5253-F657N-2 | (4) NGC-5253 | WFC3/UVIS, ACCUM, UVIS1 | F657N | FLASH=20 | POS TARG 0,0 | | 390 Secs (390 Secs)<br>*[==>]* | <br>***[1]*** |
| 3 | NGC-5253-F657N-3 | (4) NGC-5253 | WFC3/UVIS, ACCUM, UVIS1 | F657N | FLASH=20 | POS TARG 0.089,1.203 | | 395 Secs (395 Secs)<br>*[==>]* | <br>***[1]*** |
| 4 | NGC-5253-F547M-1 | (4) NGC-5253 | WFC3/UVIS, ACCUM, UVIS1 | F547M | FLASH=14 | POS TARG -0.089,-1.203 | | 350 Secs (350 Secs)<br>*[==>]* | <br>***[1]*** |
| 5 | NGC-5253-F547M-2 | (4) NGC-5253 | WFC3/UVIS, ACCUM, UVIS1 | F547M | FLASH=14 | POS TARG 0.,0. | | 350 Secs (350 Secs)<br>*[==>]* | <br>***[1]*** |
| 6 | NGC-5253-F547M-3 | (4) NGC-5253 | WFC3/UVIS, ACCUM, UVIS1 | F547M | FLASH=20 | POS TARG 0.089,1.203 | | 200 Secs (200 Secs)<br>*[==>]* | <br>***[1]*** |

Orbit Structure



## Visit

**Proposal 17225, NGC-5474-WFC3/IR (08), completed** Fri Jun 07 18:00:24 GMT 2024

**Diagnostic Status: Warning**

Scientific Instruments: WFC3/IR

Special Requirements: (none)

## Diagnostics

(NGC-5474-WFC3/IR (08)) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

(NGC-5474-WFC3/IR (08)) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

## Patterns

| # | Primary Pattern | | Secondary Pattern | Exposures |
|---|---|---|---|---|
| (5) | Pattern Type=WFC3-IR-DITHER-BOX-MIN<br>Purpose=DITHER<br>Number Of Points=4<br>Point Spacing=0.572<br>Line Spacing=0.365 | Coordinate Frame=POS-TARG<br>Pattern Orientation=18.528<br>Angle Between Sides=74.653<br>Center Pattern=false | | (1-3) |

## Fixed Targets

| # | Name | Target Coordinates | Targ. Coord. Corrections | Fluxes | Miscellaneous |
|---|---|---|---|---|---|
| (5) | NGC-5474 | RA: 14 05 0.5000 (211.2520833d)<br>Dec: +53 39 26.35 (53.65732d)<br>Equinox: J2000 | | V=11.08 | Reference Frame: NED |

*Comments: This object was generated by the targetselector and retrieved from the NED database.*
*Category=GALAXY*
*Description=[SPIRAL, STARBURST]*

## Exposures

| # | Label | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time (Total)/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 1 | NGC-5474-F128N | (5) NGC-5474 | WFC3/IR, MULTIACCUM, IR-FIX | F128N | NSAMP=13;<br>SAMP-SEQ=STEP100 | | Pattern 5, Exps 1-3 in NGC-5474-WFC3/IR (08) (5) | 699.232615 Secs (2796.93 Secs) | |
| | | | | | | | | *[==>(Pattern 1)]*<br>*[==>(Pattern 2)]* | ***[1]*** |
| | | | | | | | | *[==>(Pattern 3)]*<br>*[==>(Pattern 4)]* | ***[2]*** |
| 2 | NGC5474-F110W | (5) NGC-5474 | WFC3/IR, MULTIACCUM, IR-FIX | F110W | SAMP-SEQ=STEP50;<br>NSAMP=10 | | Pattern 5, Exps 1-3 in NGC-5474-WFC3/IR (08) (5) | 249.23203 Secs (996.928 Secs) | |
| | | | | | | | | *[==>(Pattern 1)]*<br>*[==>(Pattern 2)]* | ***[1]*** |
| | | | | | | | | *[==>(Pattern 3)]*<br>*[==>(Pattern 4)]* | ***[2]*** |
| 3 | NGC-5474-F160W | (5) NGC-5474 | WFC3/IR, MULTIACCUM, IR-FIX | F160W | SAMP-SEQ=STEP50;<br>NSAMP=13 | | Pattern 5, Exps 1-3 in NGC-5474-WFC3/IR (08) (5) | 399.233383 Secs (1596.934 Secs) | |
| | | | | | | | | *[==>(Pattern 1)]*<br>*[==>(Pattern 2)]* | ***[1]*** |
| | | | | | | | | *[==>(Pattern 3)]*<br>*[==>(Pattern 4)]* | ***[2]*** |

Orbit Structure