# 17855 - Narrowband Imaging of NGC 2899

Cycle: 32, Proposal Category: GO/DD

(Availability Mode: SUPPORTED)

**INVESTIGATORS**



| *Name* | *Institution* |
|---|---|
| **Dr. Christopher Britt (PI) (Contact)** | **Space Telescope Science Institute** |
| Ryan Kunzer (CoI) | Space Telescope Science Institute |
| Max Mutchler (CoI) (CoPI) (Contact) | Space Telescope Science Institute |
| John Maple (CoI) (CoPI) | Space Telescope Science Institute |
| Varun Bajaj (CoI) (Contact) | Space Telescope Science Institute |
| Joseph DePasquale (CoI) (Contact) | Space Telescope Science Institute |
| Alyssa Pagan (CoI) (Contact) | Space Telescope Science Institute |
| Christine Pulliam (CoI) | Space Telescope Science Institute |
| Ray Villard (CoI) | Space Telescope Science Institute |
| Dr. Emma Marcucci (CoI) | Space Telescope Science Institute |



**VISITS**

| *Visit* | *Targets used in Visit* | *Configurations used in Visit* | *Orbits Used* | *Last Orbit Planner Run* | *OP Current with Visit?* |
|---|---|---|---|---|---|
| 01 | (1) NGC-2899 | WFC3/UVIS | 3 | 11-Dec-2024 17:00:24.0 | yes |

3 Total Orbits Used

**ABSTRACT**

We propose to take deep narrowband imaging of the planetary nebula NGC 2899. Deep H-alpha, [NII], and [OIII] images in F656N, F658N, and F502N will sample different density and temperature regions within the nebula.

**OBSERVING DESCRIPTION**

We will obtain high signal-to-noise imaging of NGC 2899 in narrowband filters F502N, F656N, and F658N as well as broadband filters F436W, F555W and F814W to highlight the atomic emission lines in the nebula and enable color-balancing the stars, respectively. We propose a single WFC3 pointing which will adequately cover the entire object. We expect to be able to complete observations in a single visit, such that matching position angles in the event of any guide star failures is not a concern. NGC 2899 nearly fills the WFC3 field-of-view and can be observed at any available position angle. We will also employ a dither pattern which fills the chip gaps and enables cosmic ray rejection. The dither pattern will ensure that even the outlying parts of the nebula on the long axis are covered. The nebula has a bright limb in an hourglass shape with a fainter cavity in the middle. We calculate exposure times via the WFC ETC and find that we will acquire high signal-to-noise images suitable for public outreach with a minimum of 800 s in F656N, 300 s in F658N, and 400s of [O III] spread across 3 dithers. However, in order to accommodate buffer dumps, the individual exposures for each dither position must be above 370s, except for bookend exposures. We will place the broadband filters on the bookends since they can be much shallower, and cycling through each narrowband dither position will occupy 1 orbit for each dither, such that we require 3 orbits of HST time for this target. Most of the color in the composite image will derive from the contrasting ionization thresholds and density sensitivities for [O III]. [N II], and H-alpha in the F502, F656N, and F658N filters. The broadband filters are included to get a natural color balance on stars in the image.

## Visit

**Proposal 17855, Visit 01, implementation** Wed Dec 11 22:00:24 GMT 2024

**Diagnostic Status: No Diagnostics**

Scientific Instruments: WFC3/UVIS

Special Requirements: ORIENT 273D TO 319 D; BEFORE 01-FEB-2025:00:00:00

## Fixed Targets

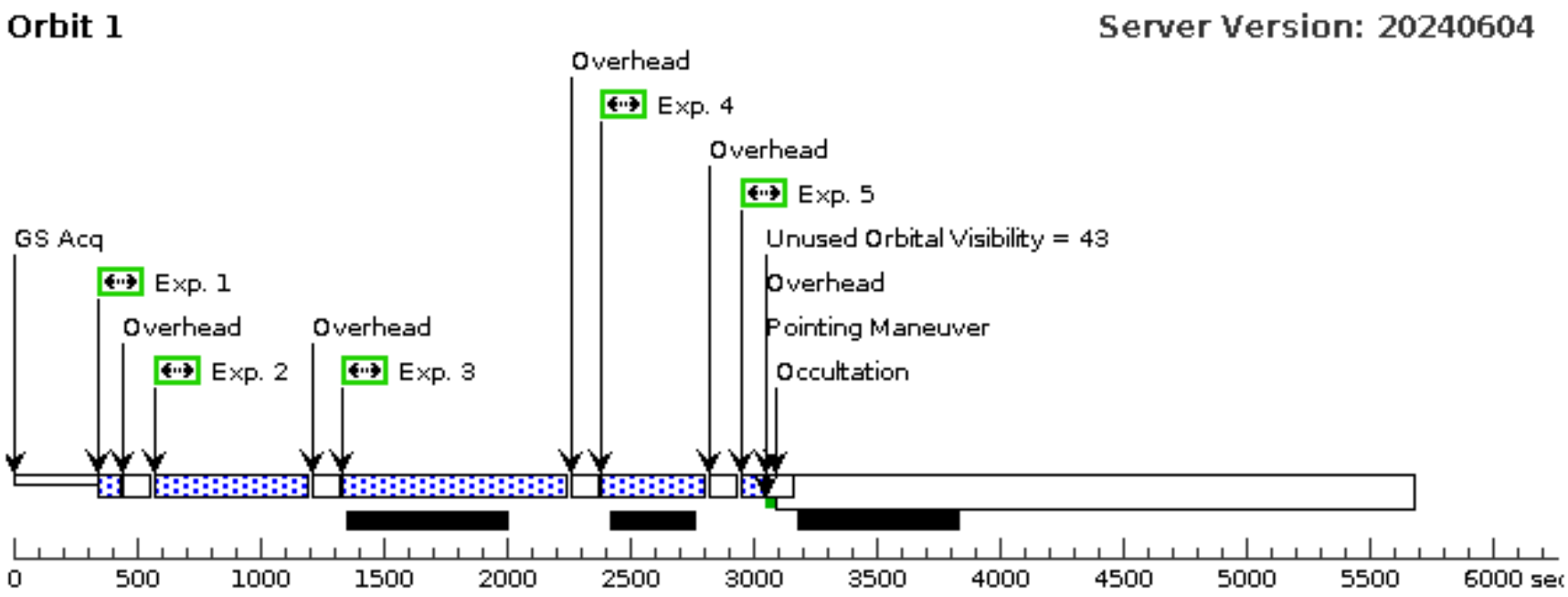
| # | Name | Target Coordinates | Targ. Coord. Corrections | Fluxes | Miscellaneous |
|---|---|---|---|---|---|
| (1) | NGC-2899 | RA: 09 27 4.2287 (141.7676196d)<br>Dec: -56 06 20.26 (-56.10563d)<br>Equinox: J2000 | Epoch of Position: 2000 | V=12.4 | Reference Frame: ICRS |

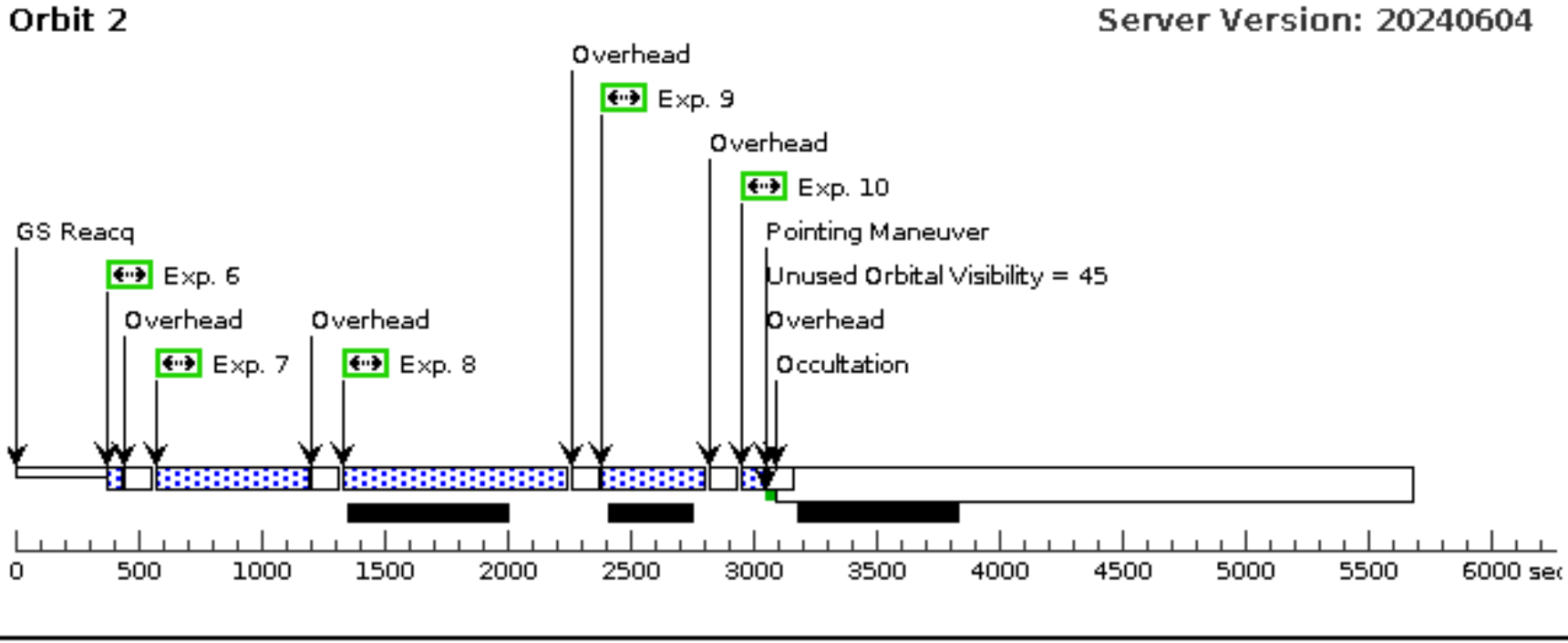
*Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.*
*Category=EXT-STAR*
*Description=[PLANETARY NEBULA CENTRAL STAR]*
*Extended=YES*

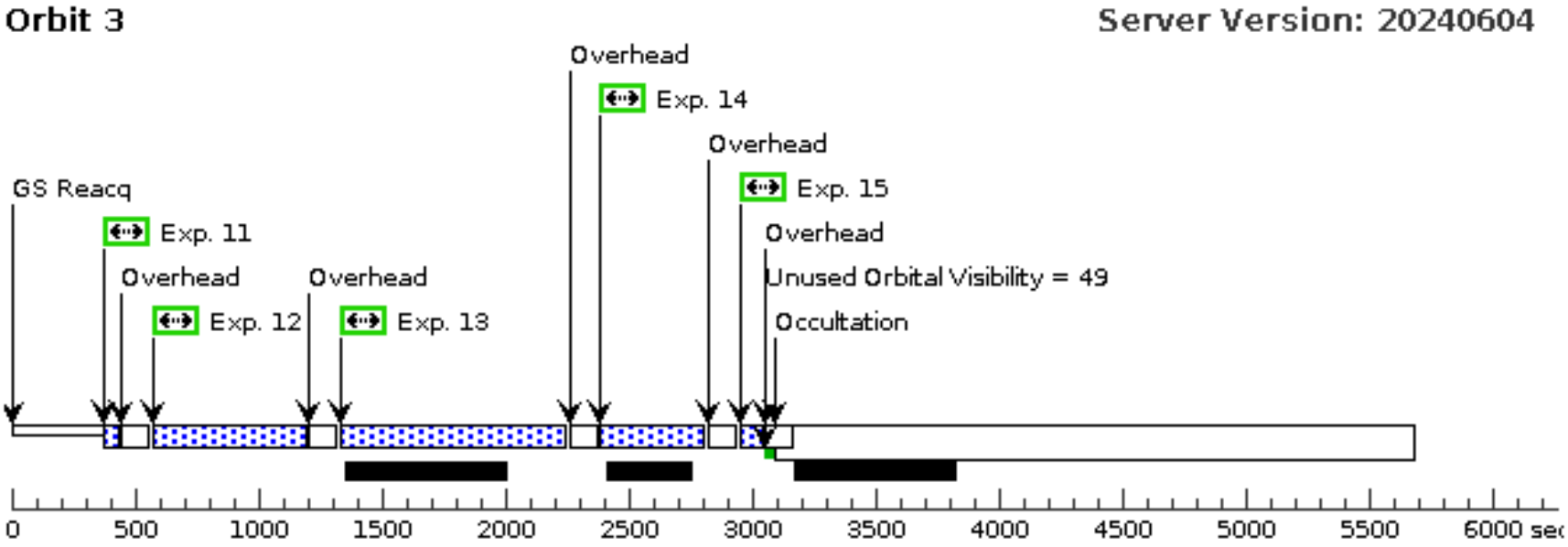
## Exposures

| # | Label | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time (Total)/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | (1) NGC-2899 | WFC3/UVIS, ACCUM, UVIS-CENTER | F814W | FLASH=15 | | | 60 Secs (60 Secs)<br>*[==>]* | *[1]* |
| 2 | | (1) NGC-2899 | WFC3/UVIS, ACCUM, UVIS-CENTER | F502N | FLASH=15 | | | 600 Secs (600 Secs)<br>*[==>]* | *[1]* |
| 3 | | (1) NGC-2899 | WFC3/UVIS, ACCUM, UVIS-CENTER | F656N | FLASH=15 | | | 900 Secs (900 Secs)<br>*[==>]* | *[1]* |
| 4 | | (1) NGC-2899 | WFC3/UVIS, ACCUM, UVIS-CENTER | F658N | FLASH=18 | | | 400 Secs (400 Secs)<br>*[==>]* | *[1]* |
| 5 | | (1) NGC-2899 | WFC3/UVIS, ACCUM, UVIS-CENTER | F438W | FLASH=18 | | | 60 Secs (60 Secs)<br>*[==>]* | *[1]* |
| 6 | | (1) NGC-2899 | WFC3/UVIS, ACCUM, UVIS-CENTER | F438W | FLASH=18 | POS TARG .932,2.5 | | 60 Secs (60 Secs)<br>*[==>]* | *[2]* |
| 7 | | (1) NGC-2899 | WFC3/UVIS, ACCUM, UVIS-CENTER | F502N | FLASH=15 | POS TARG .932,2.5 | | 600 Secs (600 Secs)<br>*[==>]* | *[2]* |
| 8 | | (1) NGC-2899 | WFC3/UVIS, ACCUM, UVIS-CENTER | F656N | FLASH=15 | POS TARG .932,2.5 | | 900 Secs (900 Secs)<br>*[==>]* | *[2]* |
| 9 | | (1) NGC-2899 | WFC3/UVIS, ACCUM, UVIS-CENTER | F658N | FLASH=18 | POS TARG .932,2.5 | | 400 Secs (400 Secs)<br>*[==>]* | *[2]* |
| 10 | | (1) NGC-2899 | WFC3/UVIS, ACCUM, UVIS-CENTER | F555W | FLASH=15 | POS TARG .932,2.5 | | 60 Secs (60 Secs)<br>*[==>]* | *[2]* |
| 11 | | (1) NGC-2899 | WFC3/UVIS, ACCUM, UVIS-CENTER | F555W | FLASH=15 | POS TARG .1864,5.01 | | 60 Secs (60 Secs)<br>*[==>]* | *[3]* |
| 12 | | (1) NGC-2899 | WFC3/UVIS, ACCUM, UVIS-CENTER | F502N | FLASH=15 | POS TARG .1864,5.01 | | 600 Secs (600 Secs)<br>*[==>]* | *[3]* |
| 13 | | (1) NGC-2899 | WFC3/UVIS, ACCUM, UVIS-CENTER | F656N | FLASH=15 | POS TARG .1864,5.01 | | 900 Secs (900 Secs)<br>*[==>]* | *[3]* |
| 14 | | (1) NGC-2899 | WFC3/UVIS, ACCUM, UVIS-CENTER | F658N | FLASH=18 | POS TARG .1864,5.01 | | 400 Secs (400 Secs)<br>*[==>]* | *[3]* |
| 15 | | (1) NGC-2899 | WFC3/UVIS, ACCUM, UVIS-CENTER | F814W | FLASH=15 | POS TARG .1864,5.01 | | 60 Secs (60 Secs)<br>*[==>]* | *[3]* |

Orbit Structure




Orbit 2
Server Version: 20240604
GS Reacq
Exp. 6
Overhead
Exp. 7
Overhead
Exp. 8
Overhead
Exp. 9
Overhead
Exp. 10
Pointing Maneuver
Unused Orbital Visibility = 45
Overhead
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000 sec


Orbit 3
Server Version: 20240604
GS Reacq
Exp. 11
Overhead
Exp. 12
Overhead
Exp. 13
Overhead
Exp. 14
Overhead
Exp. 15
Overhead
Unused Orbital Visibility = 49
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000 sec