# 17162 - The HST/JWST synergy: A deep dive into the NUV with WASP-39b to answer key formation questions

Cycle: 30, Proposal Category: GO

(UV Initiative)

(Availability Mode: AVAILABLE)

**INVESTIGATORS**


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|---|---|---|
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**VISITS**

| *Visit* | *Targets used in Visit* | *Configurations used in Visit* | *Orbits Used* | *Last Orbit Planner Run* | *OP Current with Visit?* |
|---|---|---|---|---|---|
| 01 | (1) WASP-39B | WFC3/UVIS | 4 | 13-Jul-2022 15:03:02.0 | yes |
| 02 | (1) WASP-39B | WFC3/UVIS | 4 | 13-Jul-2022 15:03:05.0 | yes |
| 03 | (1) WASP-39B | WFC3/UVIS | 4 | 13-Jul-2022 15:03:07.0 | yes |
| 04 | (1) WASP-39B | WFC3/UVIS | 4 | 13-Jul-2022 15:03:09.0 | yes |
| 05 | (1) WASP-39B | WFC3/UVIS | 4 | 13-Jul-2022 15:03:11.0 | yes |
| 06 | (1) WASP-39B | WFC3/UVIS | 4 | 13-Jul-2022 15:03:13.0 | yes |

24 Total Orbits Used

**ABSTRACT**

JWST is poised to transform our understanding of exoplanet atmospheres, as exquisite near-IR spectra will soon be obtained providing a detailed look at molecules such as H2O, CO, CH4 and CO2. Because JWST can only observe past 0.6 um, HST will be required to observe at shorter wavelengths into the NUV. Working together, these two powerful observatories can probe a planet's atmosphere all the way from the far UV to the mid-IR. The transit exoplanet community's very first look at JWST data will come from the Early Release Science (ERS) program which is targeting the Saturn-mass planet WASP-39b. This will be the only exoplanet where ALL of JWST's near-infrared instruments will be used on the same target in a manner that enables detailed instrument comparisons, resulting in a legacy high-quality spectrum. WASP-39b is an important gas giant planet as it is still the only one known to show evidence of a very-high metallicity, indicating a differing formation mechanism than other planets. However, there is a startling controversy in the literature regarding the true metallicity, as the current HST/STIS data suffers from calibration offsets and a highly uncertain NUV spectrum. By combining six HST/UVIS transits of WASP-39b, a precision NUV to optical spectrum can be obtained with Hubble that will be comparable in quality to those obtained with JWST. With a new high precision HST and JWST ultra-broadband transmission spectrum, the metallicity controversy can be resolved enabling an accurate insight into its formation history. WASP-39b offers a unique chance to fully probe the synergy between HST and JWST, exploring the true limits of atmospheric characterization.

**OBSERVING DESCRIPTION**

To construct a broadband transmission spectrum, we need to observe our target with the WFC3 UVIS/G280. That wavelength coverage provides maximum leverage to quantify the Rayleigh scattering slope, as the extinction and transit depths are expected to be very strong. The wavelength coverage provided by the instrument will be 0.2-0.8 um. This grism is necessary to cover cloud scattering at short wavelengths plus Na and K.

The observing strategy for transiting exoplanets consists of taking repeated exposures for the duration of each transit, plus time before and after the transits to establish the out-of-transit baseline flux. We note that the use of WFC3/UVIS for this purpose have proven to be successful for recent HST programs (e.g. GO-15288 and 16086).

## Visit

**Proposal 17162, WASP-39 UVIS Visit 1 (01)** Wed Jul 13 19:03:14 GMT 2022

**Diagnostic Status: Warning**

Scientific Instruments: WFC3/UVIS

Special Requirements: ORIENT 0D TO 30 D; ORIENT 50D TO 105 D; ORIENT 128D TO 150 D; ORIENT 180D TO 210 D; ORIENT 230D TO 285 D; ORIENT 308D TO 330 D; Period 4.0552941 D AND ZERO-PHASE HJD2455342.96913

## Diagnostics

(G280 image, chip2 (01.002)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

(G280 image, chip2 (01.003)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

(G280 image, chip2 (01.004)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

(G280 image, chip2 (01.005)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

## Fixed Targets

| # | Name | Target Coordinates | Targ. Coord. Corrections | Fluxes | Miscellaneous |
|---|---|---|---|---|---|
| (1) | WASP-39B | RA: 14 29 18.4152 (217.3267300d) | Proper Motion RA: -19.041 mas/yr | V=12.09 | Reference Frame: ICRS |
| | | Dec: -03 26 40.20 (-3.44450d) | Proper Motion Dec: 0.437 mas/yr | J=10.663; H=10.307 | |
| | | Equinox: J2000 | Epoch of Position: 2015.5 | | |

*Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.*
*Category=EXT-STAR*
*Description=[EXTRA-SOLAR PLANETARY SYSTEM, G V-IV]*

**Exposures**

| # | Label (ETC Run) | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time (Total)/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 1 | G280 reference image ( F300X) subarray on chip 2, phase constrained (WFC3UVIS.im.1813170) | (1) WASP-39B | WFC3/UVIS, ACCUM, G280-REF | F300X | SIZEAXIS1=1500; SIZEAXIS2=500; CENTERAXIS1=2148; CENTERAXIS2=1200; FLASH=20 | POS TARG 0.0,-50.0; PHASE 0.9673777515402427 TO 0.9750837944834926 | Sequence 1-2 Non-Int in WASP-39 UVIS Visit 1 (01) | 10 Secs (10 Secs)<br>*[==>]* | ***[1]*** |

*Comments: The nominal "UVIS" aperture is ~10" above the chip gap on chip 1; a Y-postarg of about -50" places the target near the center of subarray on chip 2, at an approximate XY position of (2048,1024).*

*SIZEAXIS1=1500 and SIZEAXIS2=500 are used to minimize data volume, while CENTERAXIS1 and CENTERAXIS2 are used to center the subarray readout on the target spectrum, which will be displaced from the direct image of the target. The zeroth order is expected to be about 175 pixels above the target in Y, and about 100 pixels to the right of the target in X. Therefore we set CENTERAXIS1 = 2048+100 = 2148 and CENTERAXIS2 = 1024 + 176 = 1200.*

| # | Label (ETC Run) | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time (Total)/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 2 | G280 image, chip2 (WFC3UVIS.sp.1812400) | (1) WASP-39B | WFC3/UVIS, ACCUM, UVIS | G280 | SIZEAXIS2=500; CENTERAXIS2=1200; SIZEAXIS1=1500; CENTERAXIS1=2148 | POS TARG 0.0,-50.0 | Sequence 1-2 Non-Int in WASP-39 UVIS Visit 1 (01) | 222 Secs X 9 (1998 Secs)<br>*[==>(Copy 1)]*<br>*[==>(Copy 2)]*<br>*[==>(Copy 3)]*<br>*[==>(Copy 4)]*<br>*[==>(Copy 5)]*<br>*[==>(Copy 6)]*<br>*[==>(Copy 7)]*<br>*[==>(Copy 8)]*<br>*[==>(Copy 9)]* | ***[1]*** |

*Comments: Nominal "UVIS" aperture is ~10" above the chip gap on chip 1; a Y-postarg of about -50" places the target near the center of subarray on chip 2.*

*SIZEAXIS1=2100 and SIZEAXIS2=800 are used to minimize data volume, while CENTERAXIS2 is used to center the subarray readout on the target location. The latter is set to 1026, to place the vertical center of the subarray on chip 2 where the target is positioned at (2048,1026) -50" in y below the nominal aperture (assuming each pixel = 0.04"). \These parameters are based upon similar observations obtained successfully in proposal 13574.*

| # | Label (ETC Run) | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time (Total)/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 3 | G280 image, chip2 (WFC3UVIS.sp.1812400) | (1) WASP-39B | WFC3/UVIS, ACCUM, UVIS | G280 | SIZEAXIS2=500; CENTERAXIS2=1200; SIZEAXIS1=1500; CENTERAXIS1=2148 | POS TARG 0.0,-50.0 | Sequence 3-3 Non-Int in WASP-39 UVIS Visit 1 (01) | 222 Secs X 10 (2220 Secs)<br>*[==>(Copy 1)]*<br>*[==>(Copy 2)]*<br>*[==>(Copy 3)]*<br>*[==>(Copy 4)]*<br>*[==>(Copy 5)]*<br>*[==>(Copy 6)]*<br>*[==>(Copy 7)]*<br>*[==>(Copy 8)]*<br>*[==>(Copy 9)]*<br>*[==>(Copy 10)]* | ***[2]*** |

*Comments: Nominal "UVIS" aperture is ~10" above the chip gap on chip 1; a Y-postarg of about -50" places the target near the center of subarray on chip 2.*

*SIZEAXIS1=2100 and SIZEAXIS2=800 are used to minimize data volume, while CENTERAXIS2 is used to center the subarray readout on the target location. The latter is set to 1026, to place the vertical center of the subarray on chip 2 where the target is positioned at (2048,1026) -50" in y below the nominal aperture (assuming each pixel = 0.04"). \These parameters are based upon similar observations obtained successfully in proposal 13574.*

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 4 | G280 image, (1) WASP-39B chip2 (WFC3UVIS.sp.1812400) | WFC3/UVIS, ACCUM, UVIS | G280 | SIZEAXIS2=500; CENTERAXIS2=1200; SIZEAXIS1=1500; CENTERAXIS1=2148 | POS TARG 0.0,-50.0 | Sequence 4-4 Non-Int in WASP-39 UVIS Visit 1 (01) | 222 Secs X 10 (2220 Secs)<br>*[==>(Copy 1)]*<br>*[==>(Copy 2)]*<br>*[==>(Copy 3)]*<br>*[==>(Copy 4)]*<br>*[==>(Copy 5)]*<br>*[==>(Copy 6)]*<br>*[==>(Copy 7)]*<br>*[==>(Copy 8)]*<br>*[==>(Copy 9)]*<br>*[==>(Copy 10)]* | ***[3]*** |

*Comments: Nominal "UVIS" aperture is ~10" above the chip gap on chip 1; a Y-postarg of about -50" places the target near the center of subarray on chip 2.*

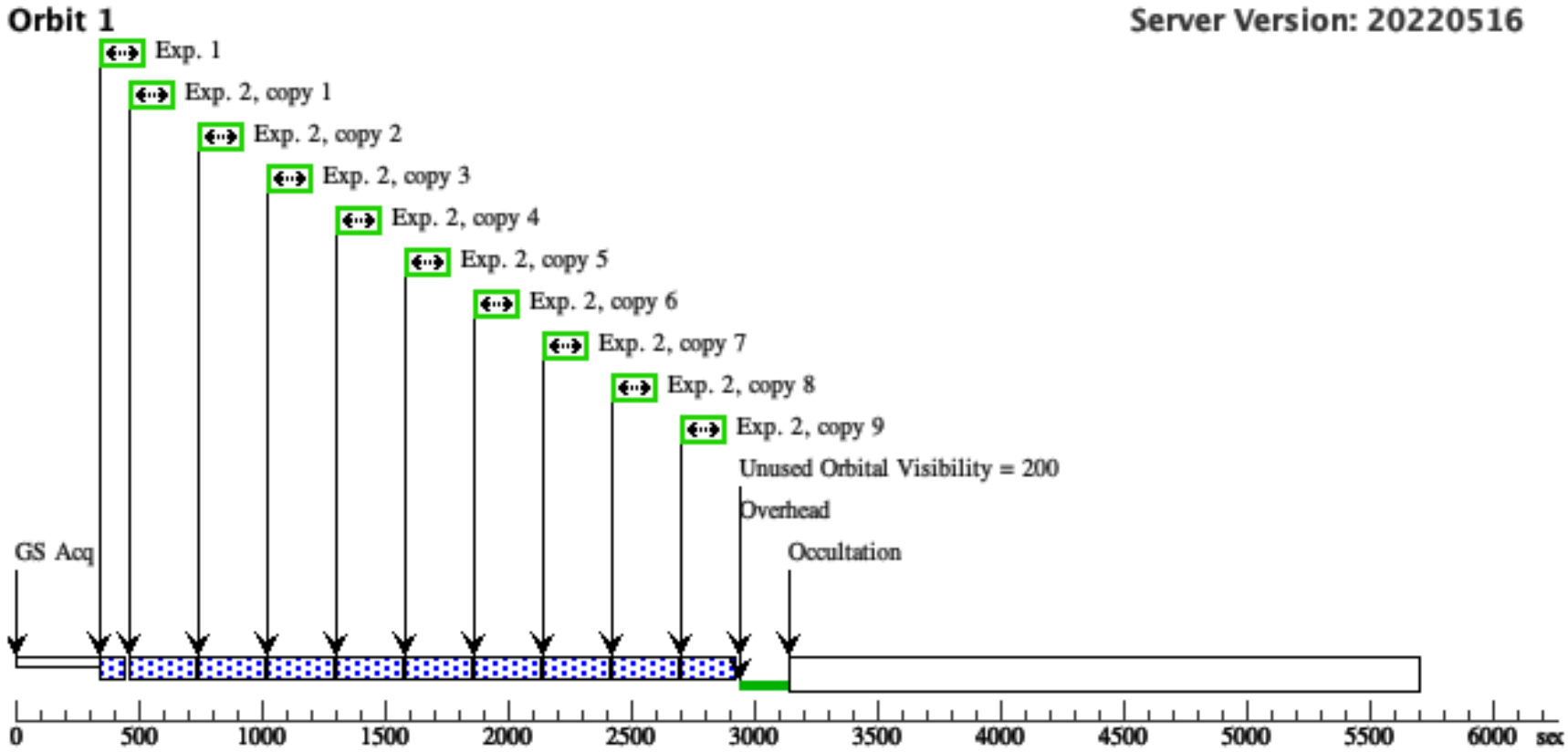
*SIZEAXIS1=2100 and SIZEAXIS2=800 are used to minimize data volume, while CENTERAXIS2 is used to center the subarray readout on the target location. The latter is set to 1026, to place the vertical center of the subarray on chip 2 where the target is positioned at (2048,1026) -50" in y below the nominal aperture (assuming each pixel = 0.04"). \These parameters are based upon similar observations obtained successfully in proposal 13574.*

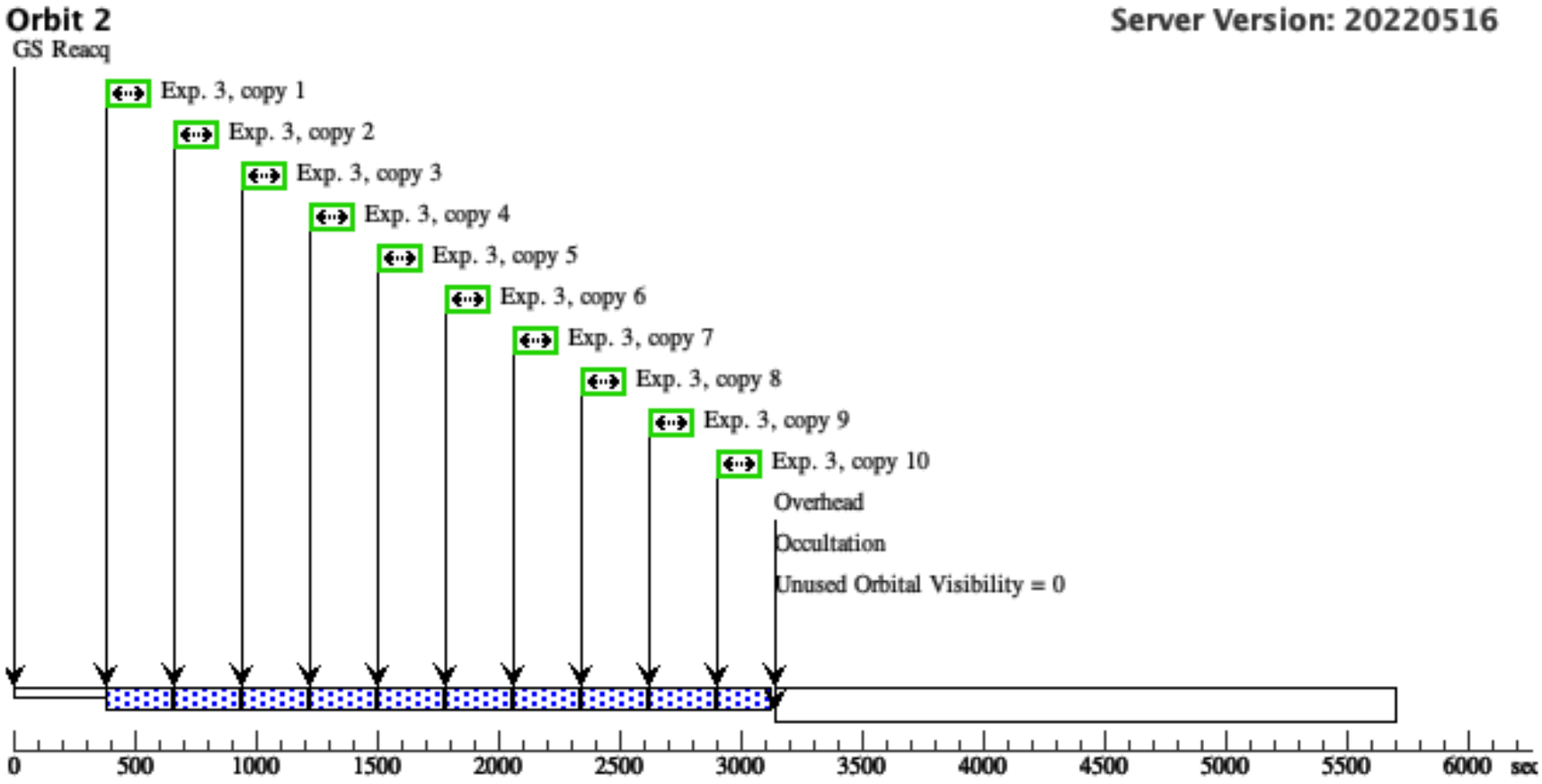
| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 5 | G280 image, (1) WASP-39B chip2 (WFC3UVIS.sp.1812400) | WFC3/UVIS, ACCUM, UVIS | G280 | SIZEAXIS2=500; CENTERAXIS2=1200; SIZEAXIS1=1500; CENTERAXIS1=2148 | POS TARG 0.0,-50.0 | Sequence 5-5 Non-Int in WASP-39 UVIS Visit 1 (01) | 222 Secs X 10 (2220 Secs)<br>*[==>(Copy 1)]*<br>*[==>(Copy 2)]*<br>*[==>(Copy 3)]*<br>*[==>(Copy 4)]*<br>*[==>(Copy 5)]*<br>*[==>(Copy 6)]*<br>*[==>(Copy 7)]*<br>*[==>(Copy 8)]*<br>*[==>(Copy 9)]*<br>*[==>(Copy 10)]* | ***[4]*** |

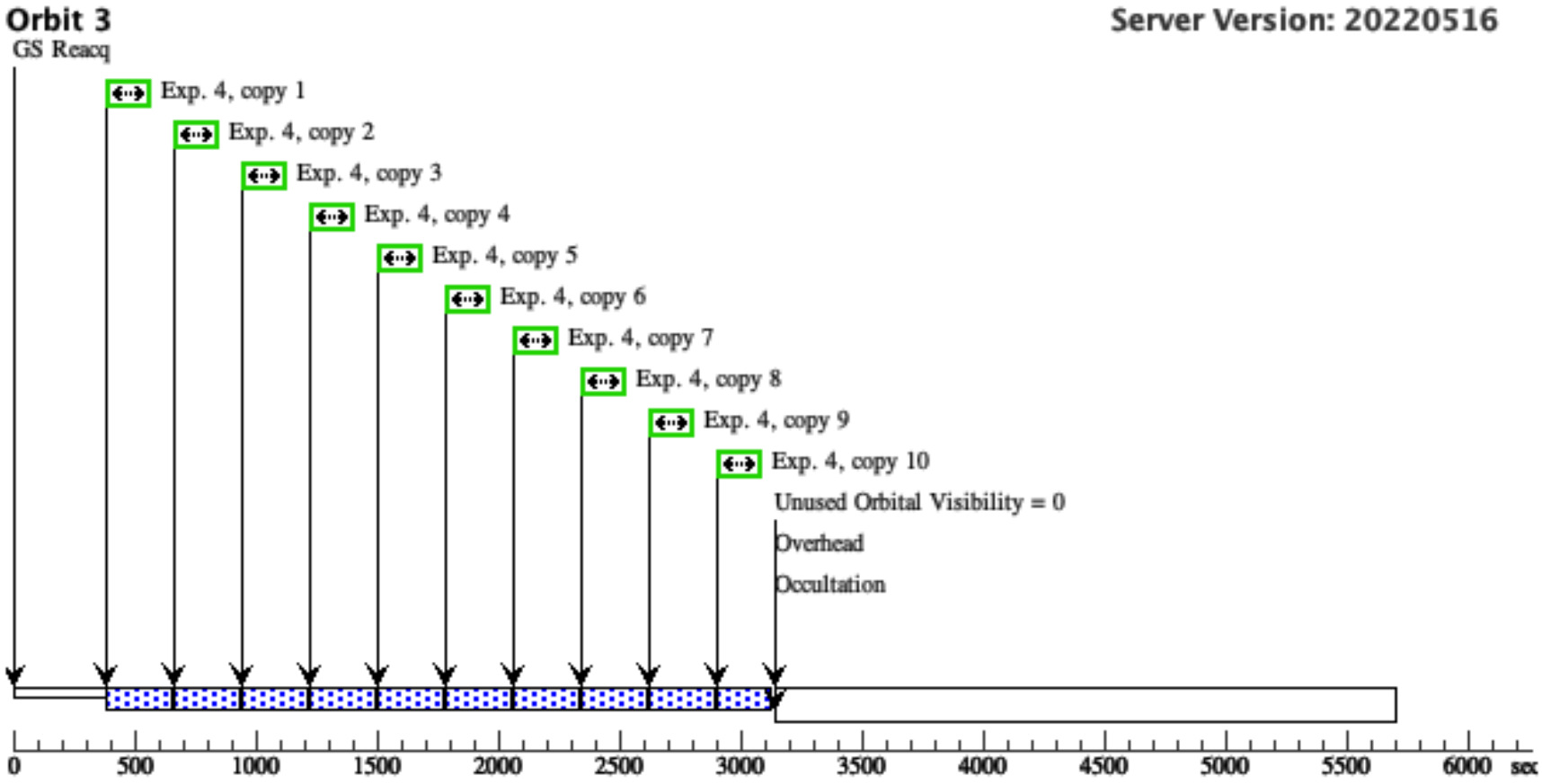
*Comments: Nominal "UVIS" aperture is ~10" above the chip gap on chip 1; a Y-postarg of about -50" places the target near the center of subarray on chip 2.*

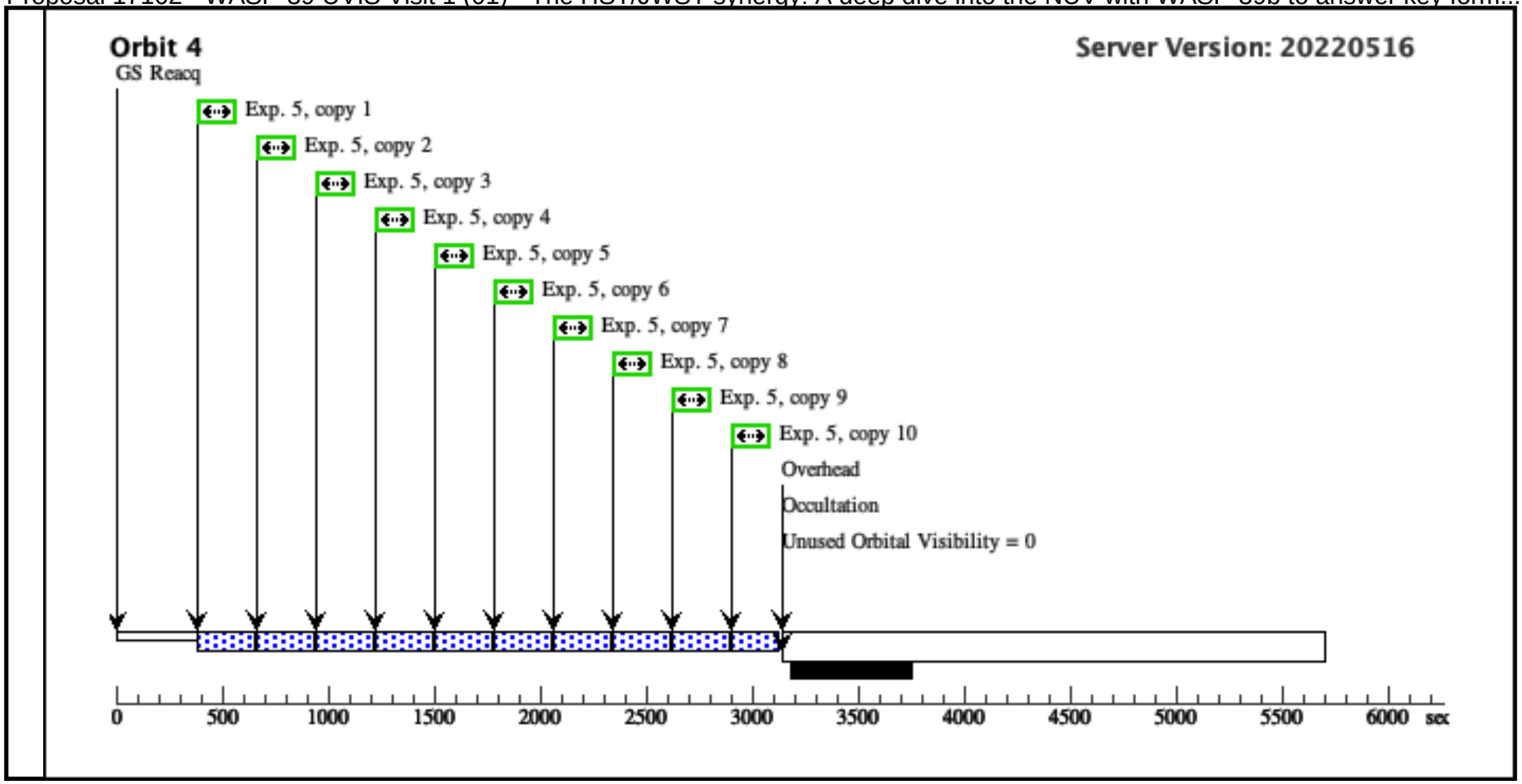
*SIZEAXIS1=2100 and SIZEAXIS2=800 are used to minimize data volume, while CENTERAXIS2 is used to center the subarray readout on the target location. The latter is set to 1026, to place the vertical center of the subarray on chip 2 where the target is positioned at (2048,1026) -50" in y below the nominal aperture (assuming each pixel = 0.04"). \These parameters are based upon similar observations obtained successfully in proposal 13574.*

**Orbit Structure**




Orbit 2
Server Version: 20220516
GS Reacq
Exp. 3, copy 1
Exp. 3, copy 2
Exp. 3, copy 3
Exp. 3, copy 4
Exp. 3, copy 5
Exp. 3, copy 6
Exp. 3, copy 7
Exp. 3, copy 8
Exp. 3, copy 9
Exp. 3, copy 10
Overhead
Occultation
Unused Orbital Visibility = 0
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000
sec


Orbit 3
Server Version: 20220516
GS Reacq
Exp. 4, copy 1
Exp. 4, copy 2
Exp. 4, copy 3
Exp. 4, copy 4
Exp. 4, copy 5
Exp. 4, copy 6
Exp. 4, copy 7
Exp. 4, copy 8
Exp. 4, copy 9
Exp. 4, copy 10
Unused Orbital Visibility = 0
Overhead
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000
sec


Orbit 4
Server Version: 20220516
GS Reacq
Exp. 5, copy 1
Exp. 5, copy 2
Exp. 5, copy 3
Exp. 5, copy 4
Exp. 5, copy 5
Exp. 5, copy 6
Exp. 5, copy 7
Exp. 5, copy 8
Exp. 5, copy 9
Exp. 5, copy 10
Overhead
Occultation
Unused Orbital Visibility = 0
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000
sec

## Visit

**Proposal 17162, WASP-39 UVIS Visit 2 (02)** Wed Jul 13 19:03:14 GMT 2022

**Diagnostic Status: Warning**

Scientific Instruments: WFC3/UVIS

Special Requirements: ORIENT 0D TO 30 D; ORIENT 50D TO 105 D; ORIENT 128D TO 150 D; ORIENT 180D TO 210 D; ORIENT 230D TO 285 D; ORIENT 308D TO 330 D; Period 4.0552941 D AND ZERO-PHASE HJD2455342.96913

## Diagnostics

(G280 image, chip2 (02.002)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

(G280 image, chip2 (02.003)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

(G280 image, chip2 (02.004)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

(G280 image, chip2 (02.005)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

## Fixed Targets

| # | Name | Target Coordinates | Targ. Coord. Corrections | Fluxes | Miscellaneous |
|---|---|---|---|---|---|
| (1) | WASP-39B | RA: 14 29 18.4152 (217.3267300d) | Proper Motion RA: -19.041 mas/yr | V=12.09 | Reference Frame: ICRS |
| | | Dec: -03 26 40.20 (-3.44450d) | Proper Motion Dec: 0.437 mas/yr | J=10.663; H=10.307 | |
| | | Equinox: J2000 | Epoch of Position: 2015.5 | | |

*Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.*
*Category=EXT-STAR*
*Description=[EXTRA-SOLAR PLANETARY SYSTEM, G V-IV]*

**Exposures**

| # | Label (ETC Run) | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time (Total)/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 1 | G280 reference image ( F300X) subarray on chip 2, phase constrained (WFC3UVIS.im.1812387) | (1) WASP-39B | WFC3/UVIS, ACCUM, G280-REF | F300X | SIZEAXIS1=1500; SIZEAXIS2=500; CENTERAXIS1=2148; CENTERAXIS2=1200; FLASH=20 | POS TARG 0.0,-50.0; PHASE 0.967377751540242 7 TO 0.975083794469448 34926 | Sequence 1-2 Non-Int in WASP-39 UVIS Visit 2 (02) | 10 Secs (10 Secs)<br>*[==>]* | ***[1]*** |

*Comments: The nominal "UVIS" aperture is ~10" above the chip gap on chip 1; a Y-postarg of about -50" places the target near the center of subarray on chip 2, at an approximate XY position of (2048,1024).*

*SIZEAXIS1=1500 and SIZEAXIS2=500 are used to minimize data volume, while CENTERAXIS1 and CENTERAXIS2 are used to center the subarray readout on the target spectrum, which will be displaced from the direct image of the target. The zeroth order is expected to be about 175 pixels above the target in Y, and about 100 pixels to the right of the target in X. Therefore we set CENTERAXIS1 = 2048+100 = 2148 and CENTERAXIS2 = 1024 + 176 = 1200.*

*We use FLASH=12 to meet the nominal count level. These parameters are based upon similar observations obtained successfully in proposal 13574.*

| # | Label (ETC Run) | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time (Total)/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 2 | G280 image, chip2 (WFC3UVIS.sp.1812400) | (1) WASP-39B | WFC3/UVIS, ACCUM, UVIS | G280 | SIZEAXIS2=500; CENTERAXIS2=1200; SIZEAXIS1=1500; CENTERAXIS1=2148 | POS TARG 0.0,-50.0 | Sequence 1-2 Non-Int in WASP-39 UVIS Visit 2 (02) | 222 Secs X 9 (1998 Secs)<br>*[==>(Copy 1)]*<br>*[==>(Copy 2)]*<br>*[==>(Copy 3)]*<br>*[==>(Copy 4)]*<br>*[==>(Copy 5)]*<br>*[==>(Copy 6)]*<br>*[==>(Copy 7)]*<br>*[==>(Copy 8)]*<br>*[==>(Copy 9)]* | ***[1]*** |

*Comments: Nominal "UVIS" aperture is ~10" above the chip gap on chip 1; a Y-postarg of about -50" places the target near the center of subarray on chip 2.*

*SIZEAXIS1=2100 and SIZEAXIS2=800 are used to minimize data volume, while CENTERAXIS2 is used to center the subarray readout on the target location. The latter is set to 1026, to place the vertical center of the subarray on chip 2 where the target is positioned at (2048,1026) -50" in y below the nominal aperture (assuming each pixel = 0.04"). \These parameters are based upon similar observations obtained successfully in proposal 13574.*

| # | Label (ETC Run) | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time (Total)/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 3 | G280 image, chip2 (WFC3UVIS.sp.1812400) | (1) WASP-39B | WFC3/UVIS, ACCUM, UVIS | G280 | SIZEAXIS2=500; CENTERAXIS2=1200; SIZEAXIS1=1500; CENTERAXIS1=2148 | POS TARG 0.0,-50.0 | Sequence 3-3 Non-Int in WASP-39 UVIS Visit 2 (02) | 222 Secs X 10 (2220 Secs)<br>*[==>(Copy 1)]*<br>*[==>(Copy 2)]*<br>*[==>(Copy 3)]*<br>*[==>(Copy 4)]*<br>*[==>(Copy 5)]*<br>*[==>(Copy 6)]*<br>*[==>(Copy 7)]*<br>*[==>(Copy 8)]*<br>*[==>(Copy 9)]*<br>*[==>(Copy 10)]* | ***[2]*** |

*Comments: Nominal "UVIS" aperture is ~10" above the chip gap on chip 1; a Y-postarg of about -50" places the target near the center of subarray on chip 2.*

*SIZEAXIS1=2100 and SIZEAXIS2=800 are used to minimize data volume, while CENTERAXIS2 is used to center the subarray readout on the target location. The latter is set to 1026, to place the vertical center of the subarray on chip 2 where the target is positioned at (2048,1026) -50" in y below the nominal aperture (assuming each pixel = 0.04"). \These parameters are based upon similar observations obtained successfully in proposal 13574.*

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 4 | G280 image, (1) WASP-39B chip2 (WFC3UVIS.sp.1812400) | WFC3/UVIS, ACCUM, UVIS | G280 | SIZEAXIS2=500; CENTERAXIS2=1200; SIZEAXIS1=1500; CENTERAXIS1=2148 | POS TARG 0.0,-50.0 | Sequence 4-4 Non-Int in WASP-39 UVIS Visit 2 (02) | 222 Secs X 10 (2220 Secs)<br>*[==>(Copy 1)]*<br>*[==>(Copy 2)]*<br>*[==>(Copy 3)]*<br>*[==>(Copy 4)]*<br>*[==>(Copy 5)]*<br>*[==>(Copy 6)]*<br>*[==>(Copy 7)]*<br>*[==>(Copy 8)]*<br>*[==>(Copy 9)]*<br>*[==>(Copy 10)]* | ***[3]*** |

*Comments: Nominal "UVIS" aperture is ~10" above the chip gap on chip 1; a Y-postarg of about -50" places the target near the center of subarray on chip 2.*

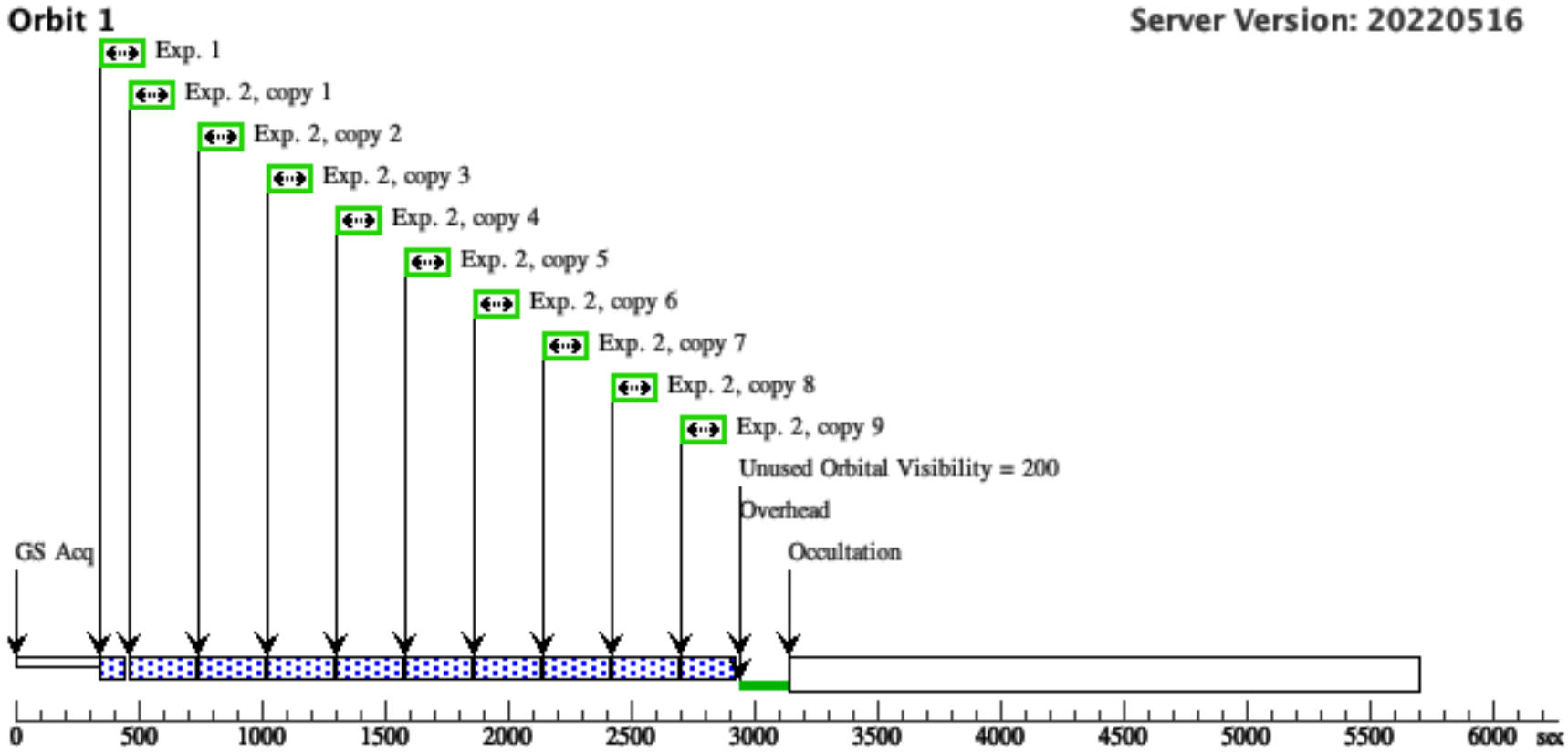
*SIZEAXIS1=2100 and SIZEAXIS2=800 are used to minimize data volume, while CENTERAXIS2 is used to center the subarray readout on the target location. The latter is set to 1026, to place the vertical center of the subarray on chip 2 where the target is positioned at (2048,1026) -50" in y below the nominal aperture (assuming each pixel = 0.04"). \These parameters are based upon similar observations obtained successfully in proposal 13574.*

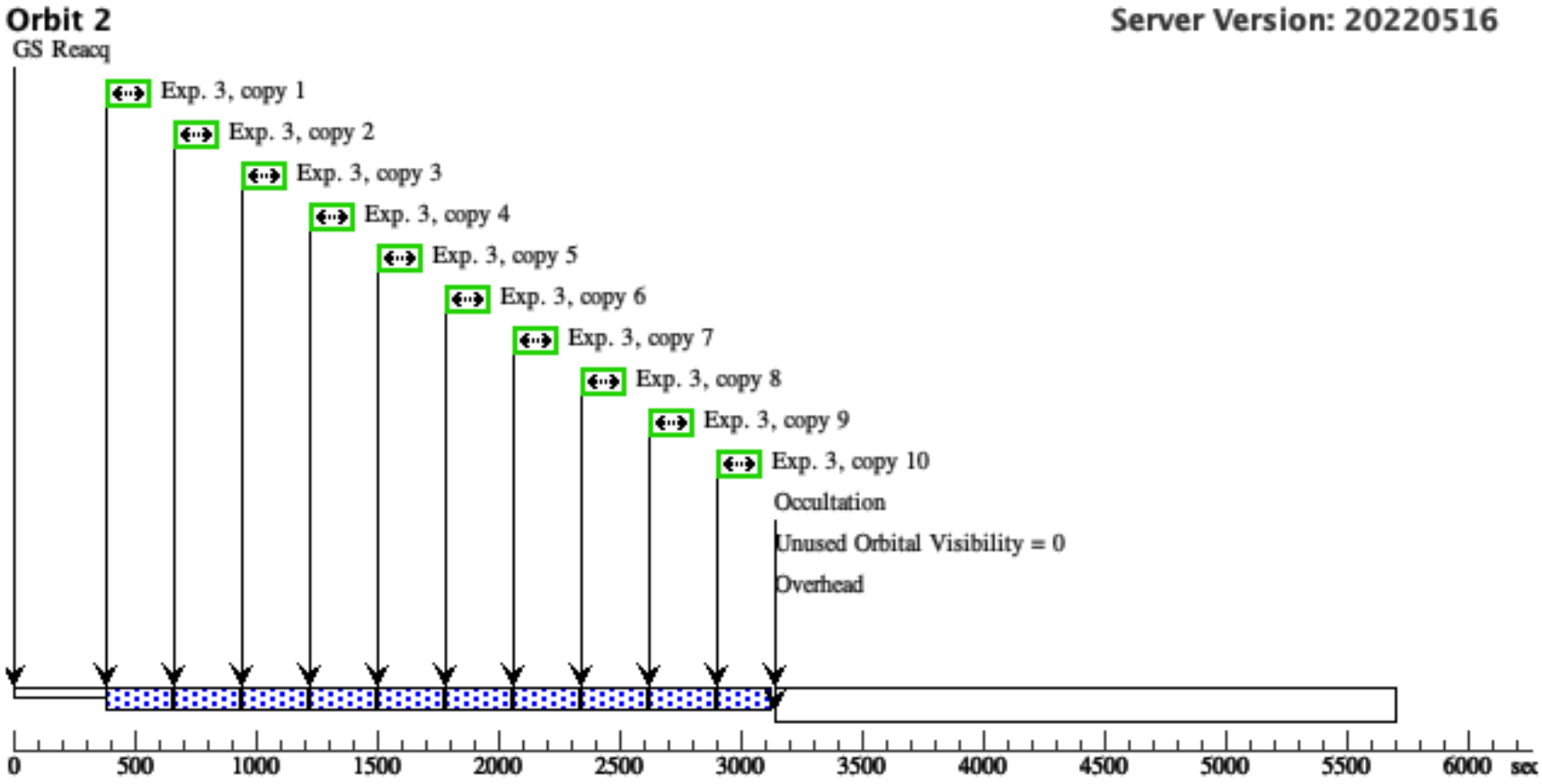
| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 5 | G280 image, (1) WASP-39B chip2 (WFC3UVIS.sp.1812400) | WFC3/UVIS, ACCUM, UVIS | G280 | SIZEAXIS2=500; CENTERAXIS2=1200; SIZEAXIS1=1500; CENTERAXIS1=2148 | POS TARG 0.0,-50.0 | Sequence 5-5 Non-Int in WASP-39 UVIS Visit 2 (02) | 222 Secs X 10 (2220 Secs)<br>*[==>(Copy 1)]*<br>*[==>(Copy 2)]*<br>*[==>(Copy 3)]*<br>*[==>(Copy 4)]*<br>*[==>(Copy 5)]*<br>*[==>(Copy 6)]*<br>*[==>(Copy 7)]*<br>*[==>(Copy 8)]*<br>*[==>(Copy 9)]*<br>*[==>(Copy 10)]* | ***[4]*** |

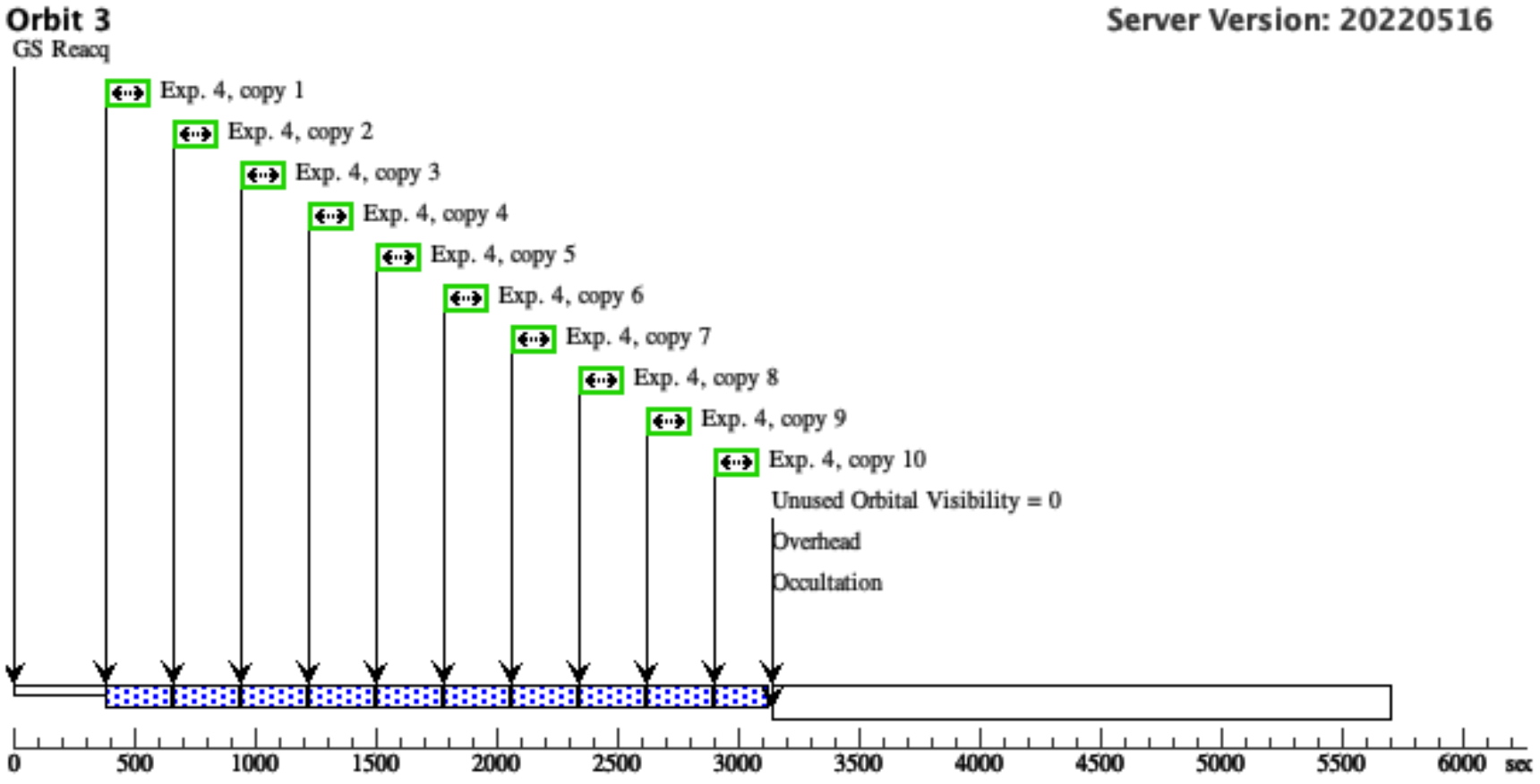
*Comments: Nominal "UVIS" aperture is ~10" above the chip gap on chip 1; a Y-postarg of about -50" places the target near the center of subarray on chip 2.*

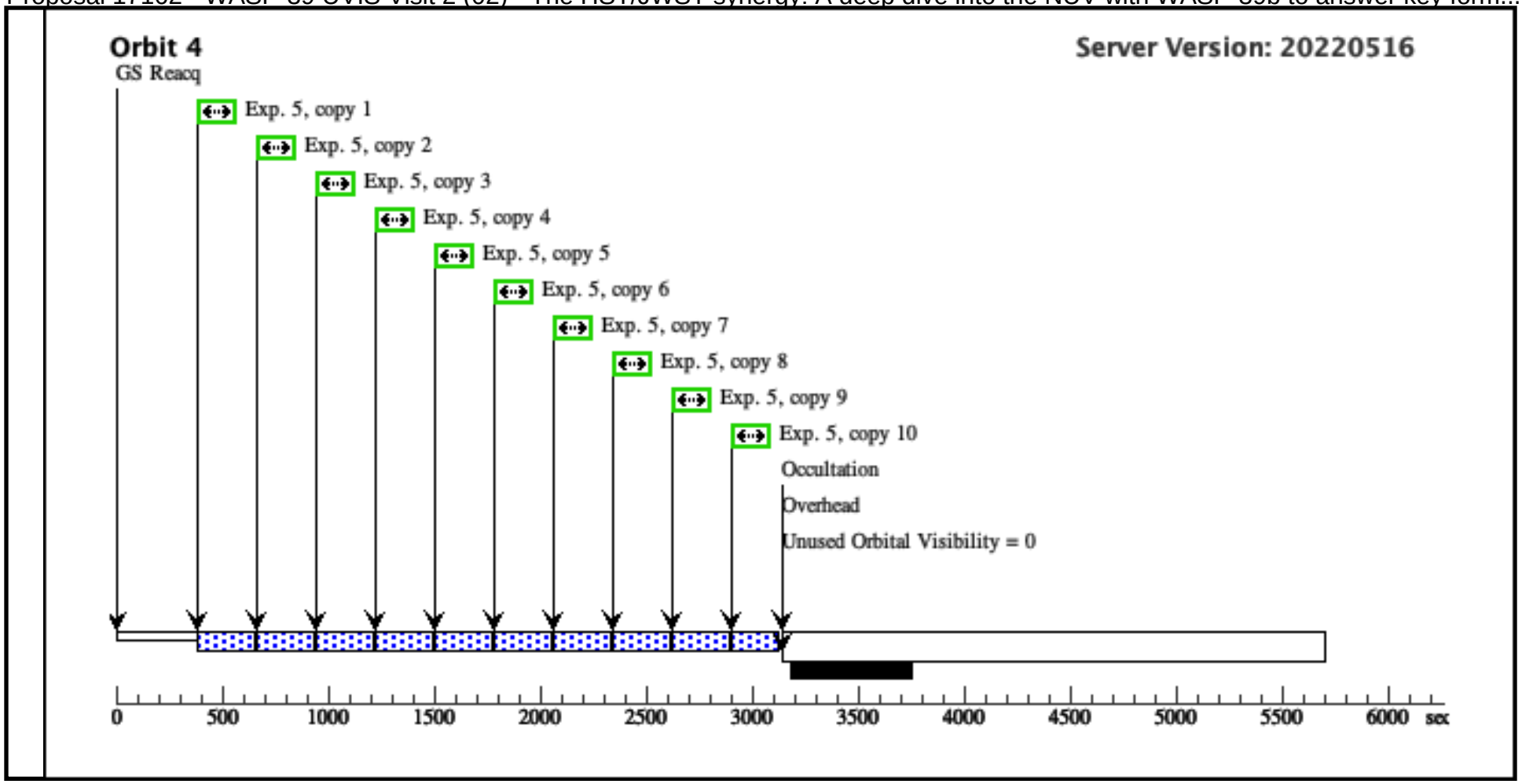
*SIZEAXIS1=2100 and SIZEAXIS2=800 are used to minimize data volume, while CENTERAXIS2 is used to center the subarray readout on the target location. The latter is set to 1026, to place the vertical center of the subarray on chip 2 where the target is positioned at (2048,1026) -50" in y below the nominal aperture (assuming each pixel = 0.04"). \These parameters are based upon similar observations obtained successfully in proposal 13574.*

**Orbit Structure**




Orbit 2
Server Version: 20220516
GS Reacq
Exp. 3, copy 1
Exp. 3, copy 2
Exp. 3, copy 3
Exp. 3, copy 4
Exp. 3, copy 5
Exp. 3, copy 6
Exp. 3, copy 7
Exp. 3, copy 8
Exp. 3, copy 9
Exp. 3, copy 10
Occultation
Unused Orbital Visibility = 0
Overhead
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000
sec


Orbit 3
Server Version: 20220516
GS Reacq
Exp. 4, copy 1
Exp. 4, copy 2
Exp. 4, copy 3
Exp. 4, copy 4
Exp. 4, copy 5
Exp. 4, copy 6
Exp. 4, copy 7
Exp. 4, copy 8
Exp. 4, copy 9
Exp. 4, copy 10
Unused Orbital Visibility = 0
Overhead
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000
sec


Orbit 4
Server Version: 20220516
GS Reacq
Exp. 5, copy 1
Exp. 5, copy 2
Exp. 5, copy 3
Exp. 5, copy 4
Exp. 5, copy 5
Exp. 5, copy 6
Exp. 5, copy 7
Exp. 5, copy 8
Exp. 5, copy 9
Exp. 5, copy 10
Occultation
Overhead
Unused Orbital Visibility = 0
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000
sec

## Visit

**Proposal 17162, WASP-39 UVIS Visit 3 (03)** Wed Jul 13 19:03:14 GMT 2022

**Diagnostic Status: Warning**

Scientific Instruments: WFC3/UVIS

Special Requirements: ORIENT 0D TO 30 D; ORIENT 50D TO 105 D; ORIENT 128D TO 150 D; ORIENT 180D TO 210 D; ORIENT 238D TO 285 D; ORIENT 300D TO 330 D; Period 4.0552941 D AND ZERO-PHASE HJD2455342.96913

## Diagnostics

(G280 image, chip2 (03.002)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

(G280 image, chip2 (03.003)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

(G280 image, chip2 (03.004)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

(G280 image, chip2 (03.005)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

## Fixed Targets

| # | Name | Target Coordinates | Targ. Coord. Corrections | Fluxes | Miscellaneous |
|---|---|---|---|---|---|
| (1) | WASP-39B | RA: 14 29 18.4152 (217.3267300d) | Proper Motion RA: -19.041 mas/yr | V=12.09 | Reference Frame: ICRS |
| | | Dec: -03 26 40.20 (-3.44450d) | Proper Motion Dec: 0.437 mas/yr | J=10.663; H=10.307 | |
| | | Equinox: J2000 | Epoch of Position: 2015.5 | | |

*Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.*
*Category=EXT-STAR*
*Description=[EXTRA-SOLAR PLANETARY SYSTEM, G V-IV]*

**Exposures**

| # | Label (ETC Run) | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time (Total)/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 1 | G280 reference image ( F300X) subarray on chip 2, phase constrained (WFC3UVIS.im.1812387) | (1) WASP-39B | WFC3/UVIS, ACCUM, G280-REF | F300X | SIZEAXIS1=1500; SIZEAXIS2=500; CENTERAXIS1=2148; CENTERAXIS2=1200; FLASH=20 | POS TARG 0.0,-50.0; PHASE 0.9673777515402427 TO 0.9750837944834926 | Sequence 1-2 Non-Int in WASP-39 UVIS Visit 3 (03) | 10 Secs (10 Secs)<br>*[==>]* | ***[1]*** |

*Comments: The nominal "UVIS" aperture is ~10" above the chip gap on chip 1; a Y-postarg of about -50" places the target near the center of subarray on chip 2, at an approximate XY position of (2048,1024).*

*SIZEAXIS1=1500 and SIZEAXIS2=500 are used to minimize data volume, while CENTERAXIS1 and CENTERAXIS2 are used to center the subarray readout on the target spectrum, which will be displaced from the direct image of the target. The zeroth order is expected to be about 175 pixels above the target in Y, and about 100 pixels to the right of the target in X. Therefore we set CENTERAXIS1 = 2048+100 = 2148 and CENTERAXIS2 = 1024 + 176 = 1200.*

*We use FLASH=12 to meet the nominal count level. These parameters are based upon similar observations obtained successfully in proposal 13574.*

| # | Label (ETC Run) | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time (Total)/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 2 | G280 image, chip2 (WFC3UVIS.sp.1812400) | (1) WASP-39B | WFC3/UVIS, ACCUM, UVIS | G280 | SIZEAXIS2=500; CENTERAXIS2=1200; SIZEAXIS1=1500; CENTERAXIS1=2148 | POS TARG 0.0,-50.0 | Sequence 1-2 Non-Int in WASP-39 UVIS Visit 3 (03) | 222 Secs X 9 (1998 Secs)<br>*[==>(Copy 1)]*<br>*[==>(Copy 2)]*<br>*[==>(Copy 3)]*<br>*[==>(Copy 4)]*<br>*[==>(Copy 5)]*<br>*[==>(Copy 6)]*<br>*[==>(Copy 7)]*<br>*[==>(Copy 8)]*<br>*[==>(Copy 9)]* | ***[1]*** |

*Comments: Nominal "UVIS" aperture is ~10" above the chip gap on chip 1; a Y-postarg of about -50" places the target near the center of subarray on chip 2.*

*SIZEAXIS1=2100 and SIZEAXIS2=800 are used to minimize data volume, while CENTERAXIS2 is used to center the subarray readout on the target location. The latter is set to 1026, to place the vertical center of the subarray on chip 2 where the target is positioned at (2048,1026) -50" in y below the nominal aperture (assuming each pixel = 0.04"). \These parameters are based upon similar observations obtained successfully in proposal 13574.*

| # | Label (ETC Run) | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time (Total)/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 3 | G280 image, chip2 (WFC3UVIS.sp.1812400) | (1) WASP-39B | WFC3/UVIS, ACCUM, UVIS | G280 | SIZEAXIS2=500; CENTERAXIS2=1200; SIZEAXIS1=1500; CENTERAXIS1=2148 | POS TARG 0.0,-50.0 | Sequence 3-3 Non-Int in WASP-39 UVIS Visit 3 (03) | 222 Secs X 10 (2220 Secs)<br>*[==>(Copy 1)]*<br>*[==>(Copy 2)]*<br>*[==>(Copy 3)]*<br>*[==>(Copy 4)]*<br>*[==>(Copy 5)]*<br>*[==>(Copy 6)]*<br>*[==>(Copy 7)]*<br>*[==>(Copy 8)]*<br>*[==>(Copy 9)]*<br>*[==>(Copy 10)]* | ***[2]*** |

*Comments: Nominal "UVIS" aperture is ~10" above the chip gap on chip 1; a Y-postarg of about -50" places the target near the center of subarray on chip 2.*

*SIZEAXIS1=2100 and SIZEAXIS2=800 are used to minimize data volume, while CENTERAXIS2 is used to center the subarray readout on the target location. The latter is set to 1026, to place the vertical center of the subarray on chip 2 where the target is positioned at (2048,1026) -50" in y below the nominal aperture (assuming each pixel = 0.04"). \These parameters are based upon similar observations obtained successfully in proposal 13574.*

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 4 | G280 image, (1) WASP-39B chip2 (WFC3UVIS.sp.1812400) | WFC3/UVIS, ACCUM, UVIS | G280 | SIZEAXIS2=500; CENTERAXIS2=1200; SIZEAXIS1=1500; CENTERAXIS1=2148 | POS TARG 0.0,-50.0 | Sequence 4-4 Non-Int in WASP-39 UVIS Visit 3 (03) | 222 Secs X 10 (2220 Secs)<br>*[==>(Copy 1)]*<br>*[==>(Copy 2)]*<br>*[==>(Copy 3)]*<br>*[==>(Copy 4)]*<br>*[==>(Copy 5)]*<br>*[==>(Copy 6)]*<br>*[==>(Copy 7)]*<br>*[==>(Copy 8)]*<br>*[==>(Copy 9)]*<br>*[==>(Copy 10)]* | ***[3]*** |

*Comments: Nominal "UVIS" aperture is ~10" above the chip gap on chip 1; a Y-postarg of about -50" places the target near the center of subarray on chip 2.*

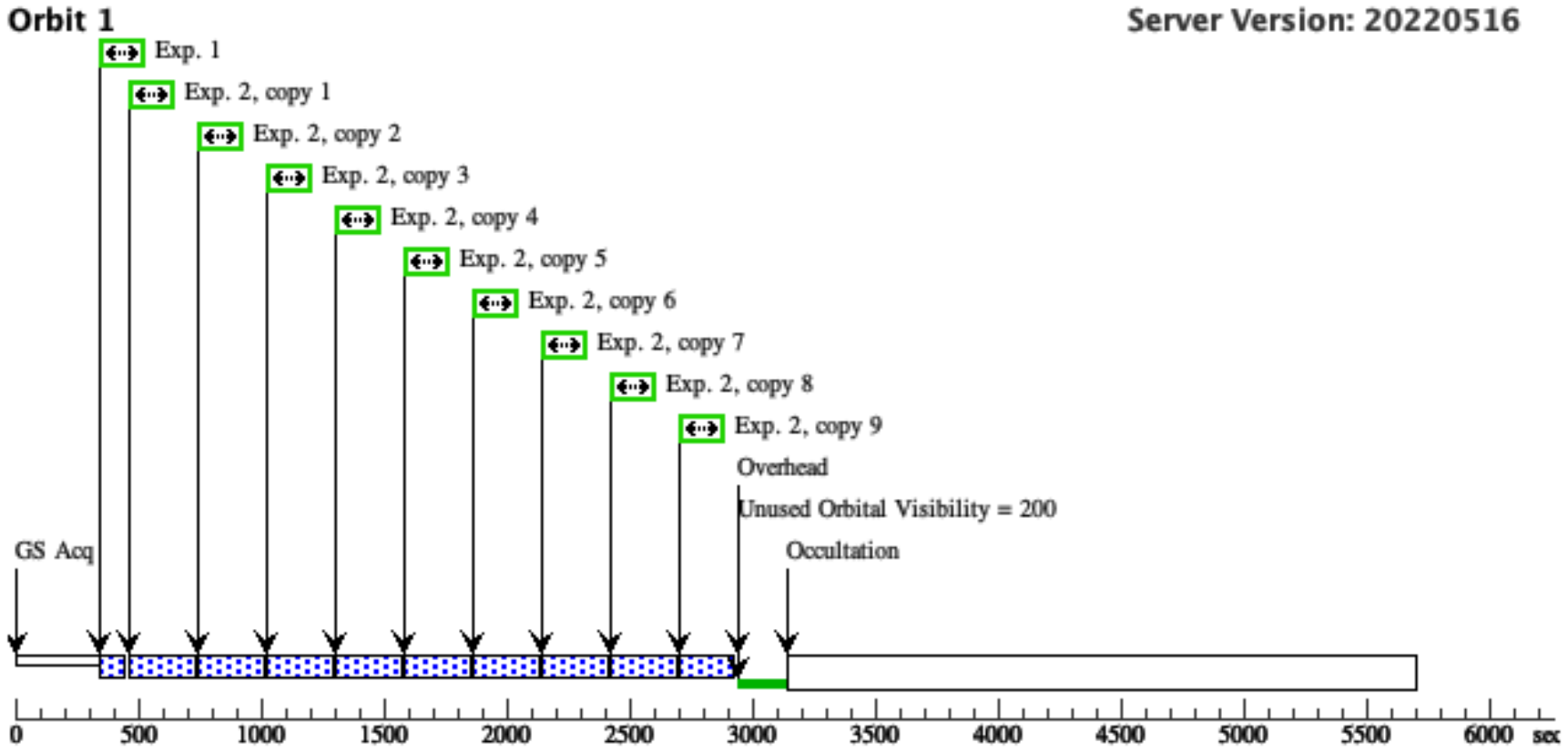
*SIZEAXIS1=2100 and SIZEAXIS2=800 are used to minimize data volume, while CENTERAXIS2 is used to center the subarray readout on the target location. The latter is set to 1026, to place the vertical center of the subarray on chip 2 where the target is positioned at (2048,1026) -50" in y below the nominal aperture (assuming each pixel = 0.04"). \These parameters are based upon similar observations obtained successfully in proposal 13574.*

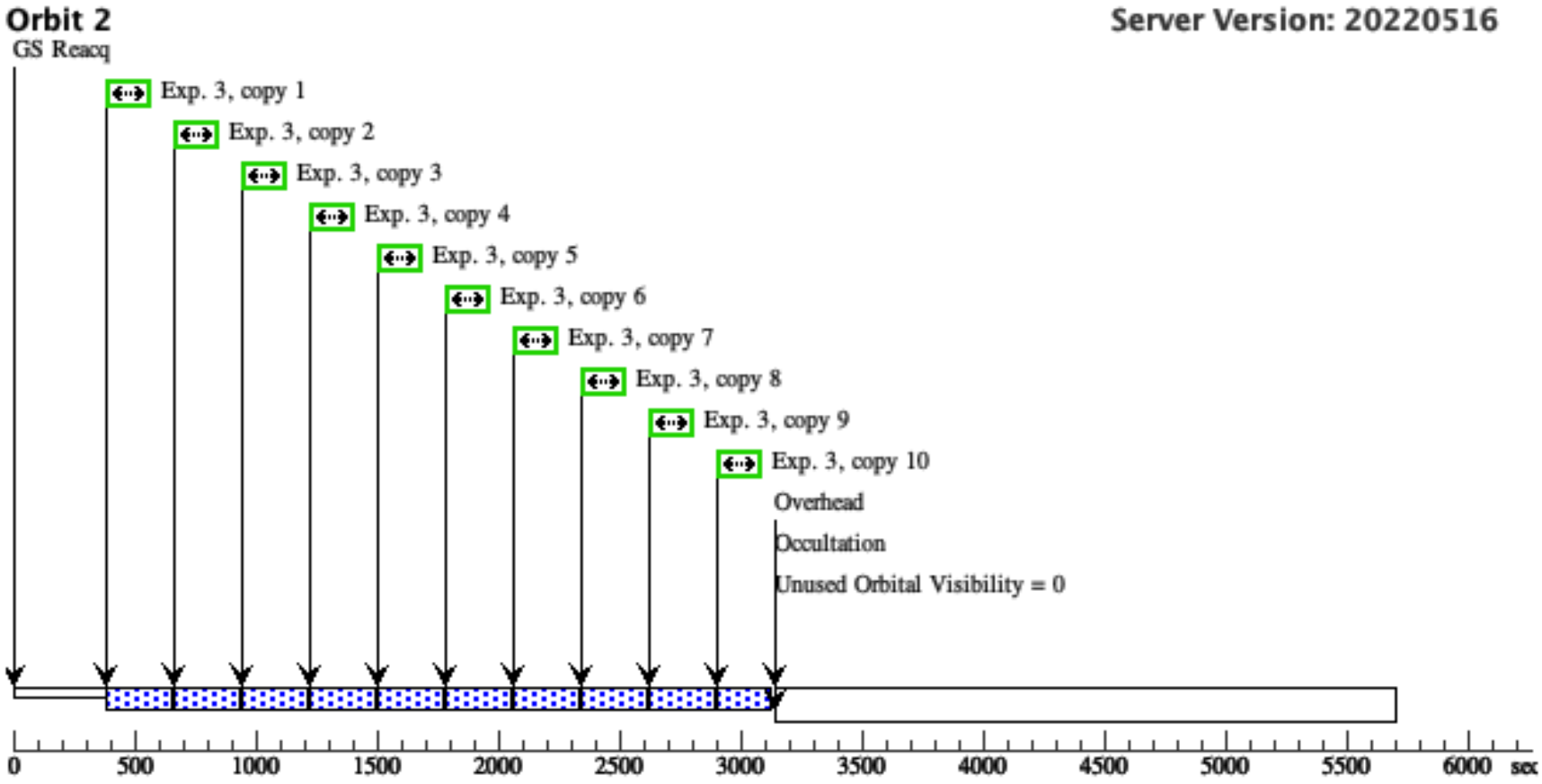
| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 5 | G280 image, (1) WASP-39B chip2 (WFC3UVIS.sp.1812400) | WFC3/UVIS, ACCUM, UVIS | G280 | SIZEAXIS2=500; CENTERAXIS2=1200; SIZEAXIS1=1500; CENTERAXIS1=2148 | POS TARG 0.0,-50.0 | Sequence 5-5 Non-Int in WASP-39 UVIS Visit 3 (03) | 222 Secs X 10 (2220 Secs)<br>*[==>(Copy 1)]*<br>*[==>(Copy 2)]*<br>*[==>(Copy 3)]*<br>*[==>(Copy 4)]*<br>*[==>(Copy 5)]*<br>*[==>(Copy 6)]*<br>*[==>(Copy 7)]*<br>*[==>(Copy 8)]*<br>*[==>(Copy 9)]*<br>*[==>(Copy 10)]* | ***[4]*** |

*Comments: Nominal "UVIS" aperture is ~10" above the chip gap on chip 1; a Y-postarg of about -50" places the target near the center of subarray on chip 2.*

*SIZEAXIS1=2100 and SIZEAXIS2=800 are used to minimize data volume, while CENTERAXIS2 is used to center the subarray readout on the target location. The latter is set to 1026, to place the vertical center of the subarray on chip 2 where the target is positioned at (2048,1026) -50" in y below the nominal aperture (assuming each pixel = 0.04"). \These parameters are based upon similar observations obtained successfully in proposal 13574.*

Orbit Structure




Orbit 2
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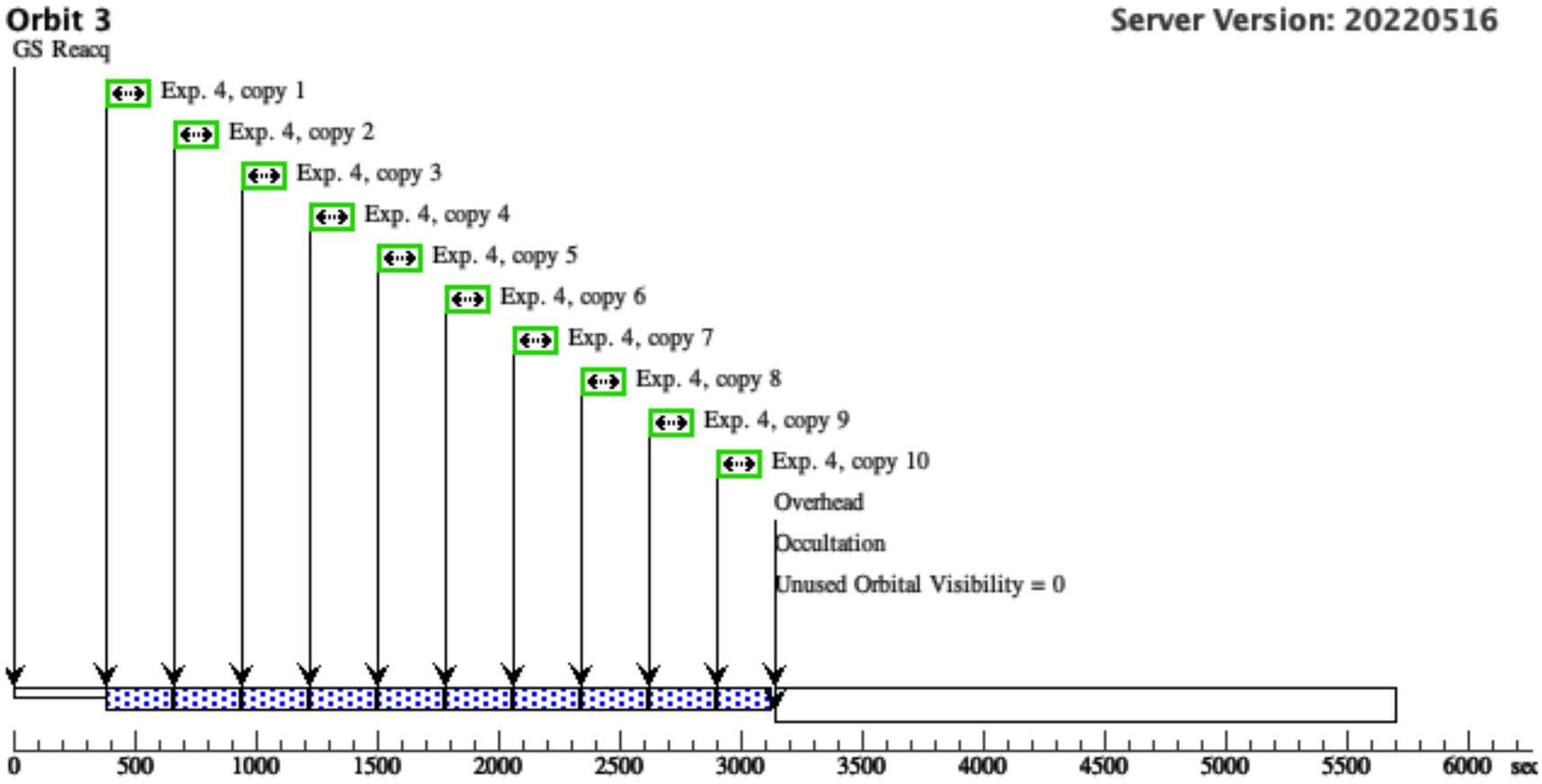
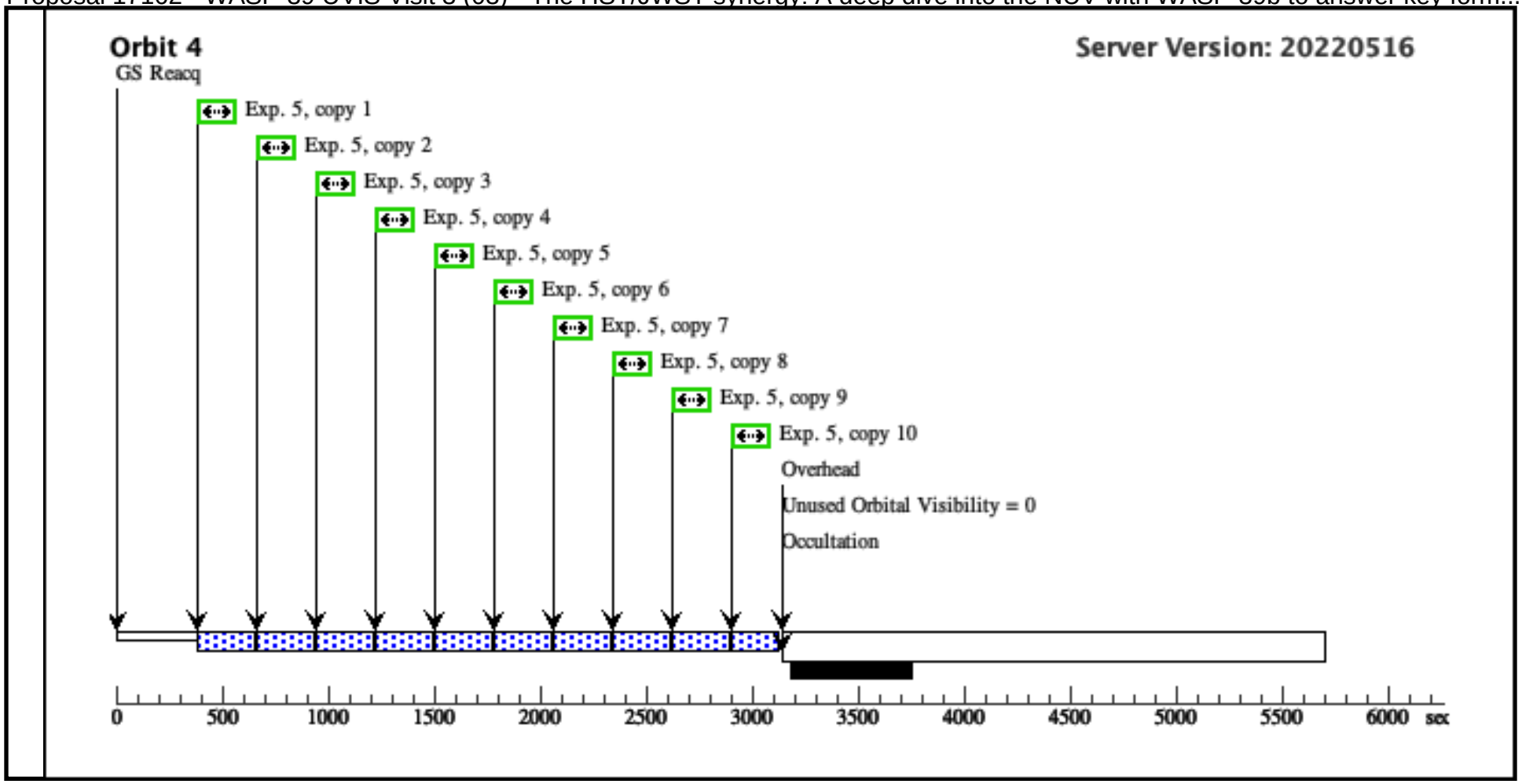
GS Reacq
Exp. 3, copy 1
Exp. 3, copy 2
Exp. 3, copy 3
Exp. 3, copy 4
Exp. 3, copy 5
Exp. 3, copy 6
Exp. 3, copy 7
Exp. 3, copy 8
Exp. 3, copy 9
Exp. 3, copy 10
Overhead
Occultation
Unused Orbital Visibility = 0
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000
sec


Orbit 3
Server Version: 20220516
GS Reacq
Exp. 4, copy 1
Exp. 4, copy 2
Exp. 4, copy 3
Exp. 4, copy 4
Exp. 4, copy 5
Exp. 4, copy 6
Exp. 4, copy 7
Exp. 4, copy 8
Exp. 4, copy 9
Exp. 4, copy 10
Overhead
Occultation
Unused Orbital Visibility = 0
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000
sec


Orbit 4
Server Version: 20220516
GS Reacq
Exp. 5, copy 1
Exp. 5, copy 2
Exp. 5, copy 3
Exp. 5, copy 4
Exp. 5, copy 5
Exp. 5, copy 6
Exp. 5, copy 7
Exp. 5, copy 8
Exp. 5, copy 9
Exp. 5, copy 10
Overhead
Unused Orbital Visibility = 0
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000
sec

## Visit

**Proposal 17162, WASP-39 UVIS Visit 4 (04)** Wed Jul 13 19:03:15 GMT 2022

**Diagnostic Status: Warning**

Scientific Instruments: WFC3/UVIS

Special Requirements: ORIENT 0D TO 30 D; ORIENT 50D TO 105 D; ORIENT 128D TO 150 D; ORIENT 180D TO 210 D; ORIENT 230D TO 285 D; ORIENT 308D TO 330 D; Period 4.0552941 D AND ZERO-PHASE HJD2455342.96913

## Diagnostics

(G280 image, chip2 (04.002)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

(G280 image, chip2 (04.003)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

(G280 image, chip2 (04.004)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

(G280 image, chip2 (04.005)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

## Fixed Targets

| # | Name | Target Coordinates | Targ. Coord. Corrections | Fluxes | Miscellaneous |
|---|---|---|---|---|---|
| (1) | WASP-39B | RA: 14 29 18.4152 (217.3267300d) | Proper Motion RA: -19.041 mas/yr | V=12.09 | Reference Frame: ICRS |
| | | Dec: -03 26 40.20 (-3.44450d) | Proper Motion Dec: 0.437 mas/yr | J=10.663; H=10.307 | |
| | | Equinox: J2000 | Epoch of Position: 2015.5 | | |

*Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.*
*Category=EXT-STAR*
*Description=[EXTRA-SOLAR PLANETARY SYSTEM, G V-IV]*

**Exposures**

| # | Label (ETC Run) | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time (Total)/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 1 | G280 reference image ( F300X) subarray on chip 2, phase constrained (WFC3UVIS.im.1812387) | (1) WASP-39B | WFC3/UVIS, ACCUM, G280-REF | F300X | SIZEAXIS1=1500; SIZEAXIS2=500; CENTERAXIS1=2148; CENTERAXIS2=1200; FLASH=20 | POS TARG 0.0,-50.0; PHASE 0.967377751540242 7 TO 0.975083794469448 34926 | Sequence 1-2 Non-Int in WASP-39 UVIS Visit 4 (04) | 10 Secs (10 Secs)<br>*[==>]* | ***[1]*** |

*Comments: The nominal "UVIS" aperture is ~10" above the chip gap on chip 1; a Y-postarg of about -50" places the target near the center of subarray on chip 2, at an approximate XY position of (2048,1024).*

*SIZEAXIS1=1500 and SIZEAXIS2=500 are used to minimize data volume, while CENTERAXIS1 and CENTERAXIS2 are used to center the subarray readout on the target spectrum, which will be displaced from the direct image of the target. The zeroth order is expected to be about 175 pixels above the target in Y, and about 100 pixels to the right of the target in X. Therefore we set CENTERAXIS1 = 2048+100 = 2148 and CENTERAXIS2 = 1024 + 176 = 1200.*

*We use FLASH=12 to meet the nominal count level. These parameters are based upon similar observations obtained successfully in proposal 13574.*

| # | Label (ETC Run) | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time (Total)/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 2 | G280 image, chip2 (WFC3UVIS.sp.1812400) | (1) WASP-39B | WFC3/UVIS, ACCUM, UVIS | G280 | SIZEAXIS2=500; CENTERAXIS2=1200; SIZEAXIS1=1500; CENTERAXIS1=2148 | POS TARG 0.0,-50.0 | Sequence 1-2 Non-Int in WASP-39 UVIS Visit 4 (04) | 222 Secs X 9 (1998 Secs)<br>*[==>(Copy 1)]*<br>*[==>(Copy 2)]*<br>*[==>(Copy 3)]*<br>*[==>(Copy 4)]*<br>*[==>(Copy 5)]*<br>*[==>(Copy 6)]*<br>*[==>(Copy 7)]*<br>*[==>(Copy 8)]*<br>*[==>(Copy 9)]* | ***[1]*** |

*Comments: Nominal "UVIS" aperture is ~10" above the chip gap on chip 1; a Y-postarg of about -50" places the target near the center of subarray on chip 2.*

*SIZEAXIS1=2100 and SIZEAXIS2=800 are used to minimize data volume, while CENTERAXIS2 is used to center the subarray readout on the target location. The latter is set to 1026, to place the vertical center of the subarray on chip 2 where the target is positioned at (2048,1026) -50" in y below the nominal aperture (assuming each pixel = 0.04"). \These parameters are based upon similar observations obtained successfully in proposal 13574.*

| # | Label (ETC Run) | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time (Total)/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 3 | G280 image, chip2 (WFC3UVIS.sp.1812400) | (1) WASP-39B | WFC3/UVIS, ACCUM, UVIS | G280 | SIZEAXIS2=500; CENTERAXIS2=1200; SIZEAXIS1=1500; CENTERAXIS1=2148 | POS TARG 0.0,-50.0 | Sequence 3-3 Non-Int in WASP-39 UVIS Visit 4 (04) | 222 Secs X 10 (2220 Secs)<br>*[==>(Copy 1)]*<br>*[==>(Copy 2)]*<br>*[==>(Copy 3)]*<br>*[==>(Copy 4)]*<br>*[==>(Copy 5)]*<br>*[==>(Copy 6)]*<br>*[==>(Copy 7)]*<br>*[==>(Copy 8)]*<br>*[==>(Copy 9)]*<br>*[==>(Copy 10)]* | ***[2]*** |

*Comments: Nominal "UVIS" aperture is ~10" above the chip gap on chip 1; a Y-postarg of about -50" places the target near the center of subarray on chip 2.*

*SIZEAXIS1=2100 and SIZEAXIS2=800 are used to minimize data volume, while CENTERAXIS2 is used to center the subarray readout on the target location. The latter is set to 1026, to place the vertical center of the subarray on chip 2 where the target is positioned at (2048,1026) -50" in y below the nominal aperture (assuming each pixel = 0.04"). \These parameters are based upon similar observations obtained successfully in proposal 13574.*

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 4 | G280 image, (1) WASP-39B chip2 (WFC3UVIS.sp.1812400) | WFC3/UVIS, ACCUM, UVIS | G280 | SIZEAXIS2=500; CENTERAXIS2=1200; SIZEAXIS1=1500; CENTERAXIS1=2148 | POS TARG 0.0,-50.0 | Sequence 4-4 Non-Int in WASP-39 UVIS Visit 4 (04) | 222 Secs X 10 (2220 Secs)<br>*[==>(Copy 1)]*<br>*[==>(Copy 2)]*<br>*[==>(Copy 3)]*<br>*[==>(Copy 4)]*<br>*[==>(Copy 5)]*<br>*[==>(Copy 6)]*<br>*[==>(Copy 7)]*<br>*[==>(Copy 8)]*<br>*[==>(Copy 9)]*<br>*[==>(Copy 10)]* | ***[3]*** |

*Comments: Nominal "UVIS" aperture is ~10" above the chip gap on chip 1; a Y-postarg of about -50" places the target near the center of subarray on chip 2.*

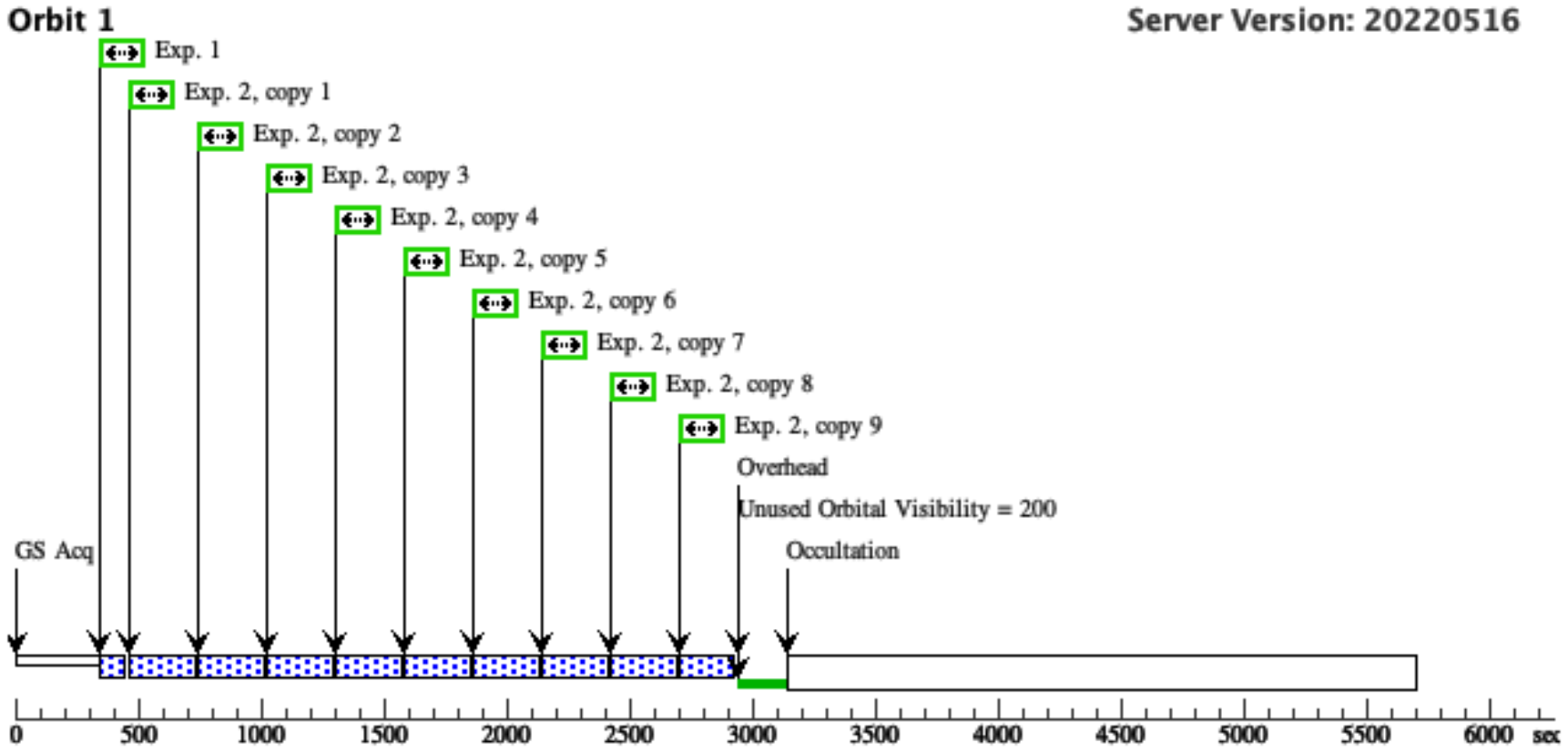
*SIZEAXIS1=2100 and SIZEAXIS2=800 are used to minimize data volume, while CENTERAXIS2 is used to center the subarray readout on the target location. The latter is set to 1026, to place the vertical center of the subarray on chip 2 where the target is positioned at (2048,1026) -50" in y below the nominal aperture (assuming each pixel = 0.04"). \These parameters are based upon similar observations obtained successfully in proposal 13574.*

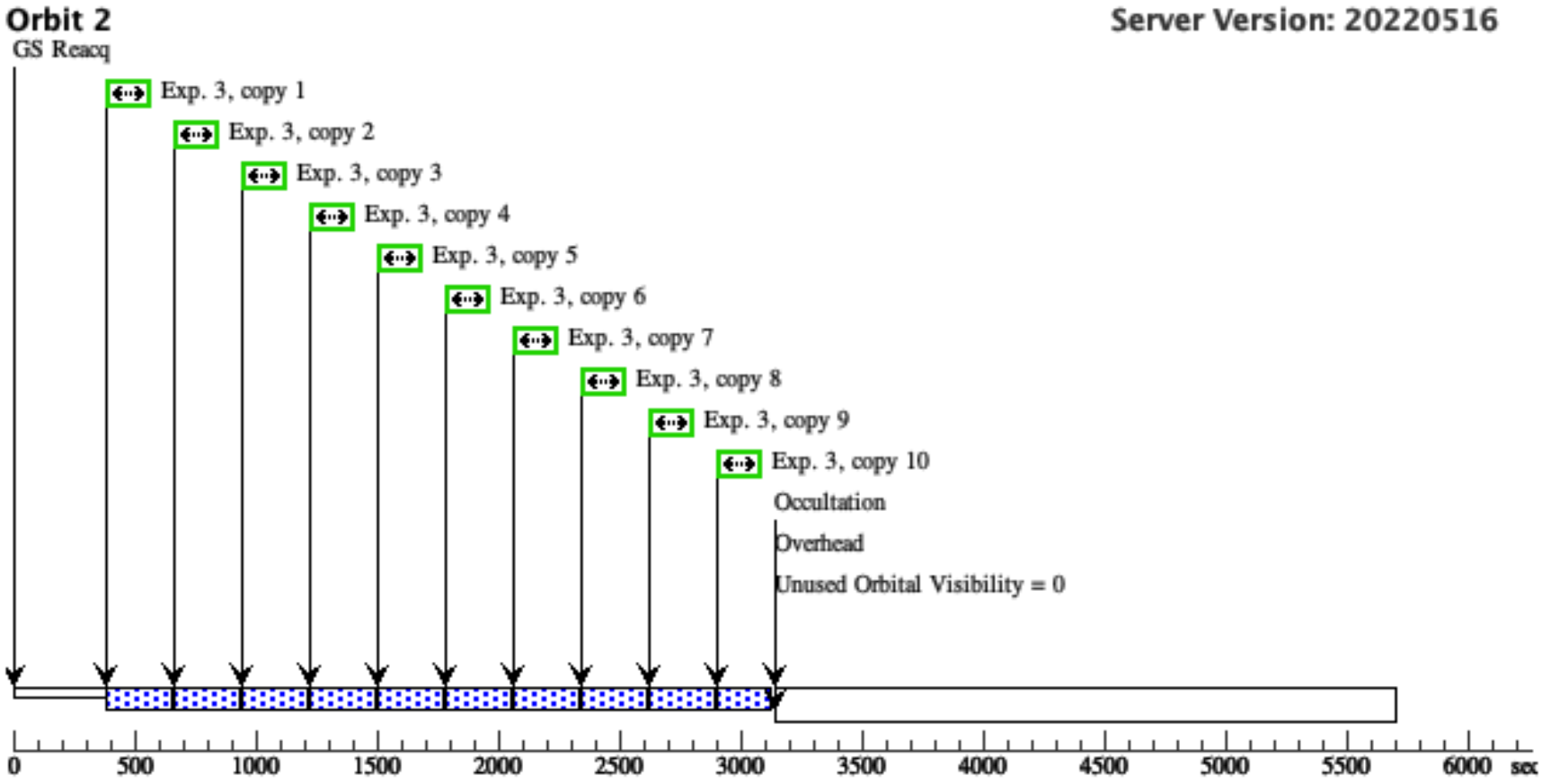
| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 5 | G280 image, (1) WASP-39B chip2 (WFC3UVIS.sp.1812400) | WFC3/UVIS, ACCUM, UVIS | G280 | SIZEAXIS2=500; CENTERAXIS2=1200; SIZEAXIS1=1500; CENTERAXIS1=2148 | POS TARG 0.0,-50.0 | Sequence 5-5 Non-Int in WASP-39 UVIS Visit 4 (04) | 222 Secs X 10 (2220 Secs)<br>*[==>(Copy 1)]*<br>*[==>(Copy 2)]*<br>*[==>(Copy 3)]*<br>*[==>(Copy 4)]*<br>*[==>(Copy 5)]*<br>*[==>(Copy 6)]*<br>*[==>(Copy 7)]*<br>*[==>(Copy 8)]*<br>*[==>(Copy 9)]*<br>*[==>(Copy 10)]* | ***[4]*** |

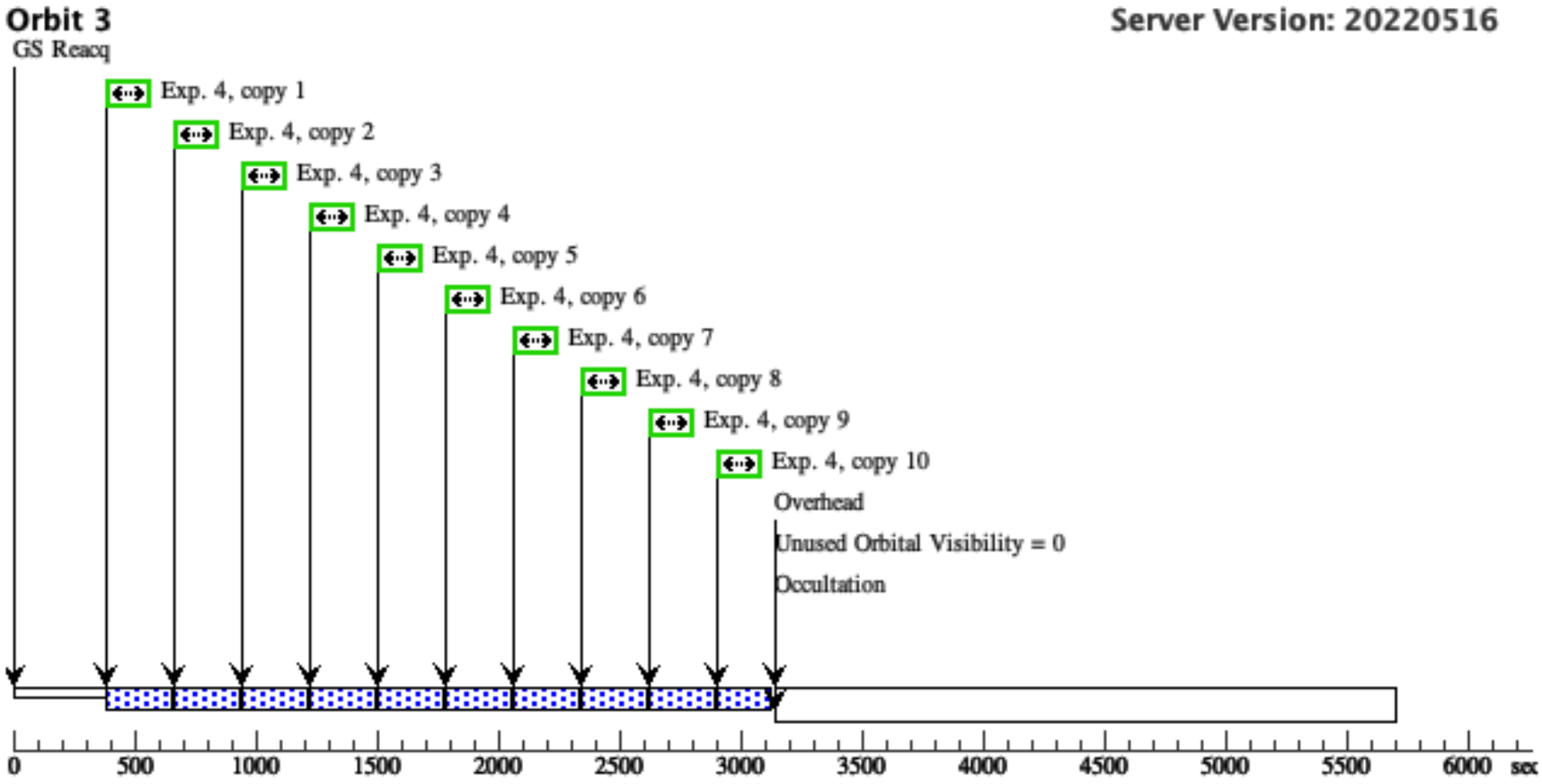
*Comments: Nominal "UVIS" aperture is ~10" above the chip gap on chip 1; a Y-postarg of about -50" places the target near the center of subarray on chip 2.*

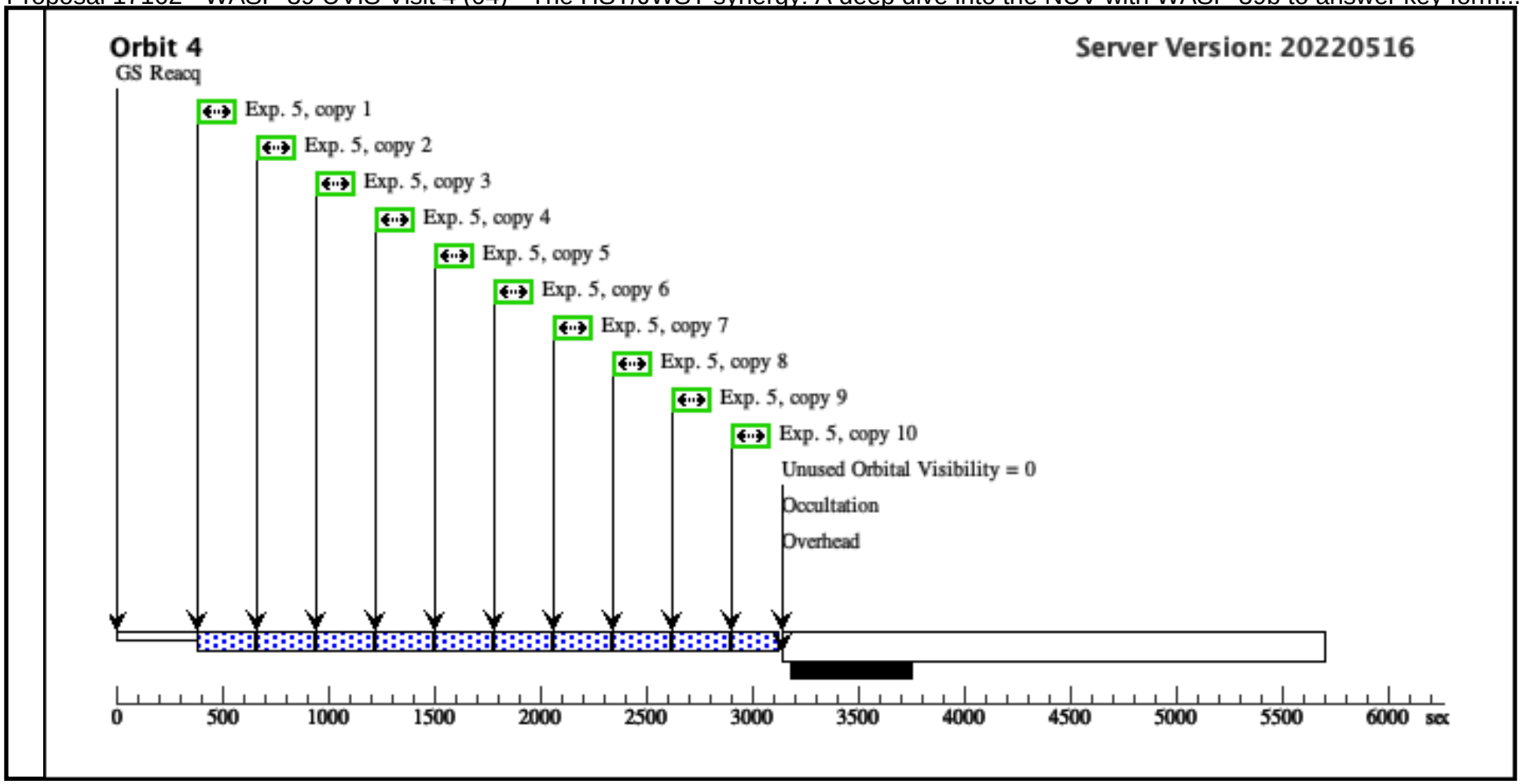
*SIZEAXIS1=2100 and SIZEAXIS2=800 are used to minimize data volume, while CENTERAXIS2 is used to center the subarray readout on the target location. The latter is set to 1026, to place the vertical center of the subarray on chip 2 where the target is positioned at (2048,1026) -50" in y below the nominal aperture (assuming each pixel = 0.04"). \These parameters are based upon similar observations obtained successfully in proposal 13574.*

Orbit Structure




Orbit 2
Server Version: 20220516
GS Reacq
Exp. 3, copy 1
Exp. 3, copy 2
Exp. 3, copy 3
Exp. 3, copy 4
Exp. 3, copy 5
Exp. 3, copy 6
Exp. 3, copy 7
Exp. 3, copy 8
Exp. 3, copy 9
Exp. 3, copy 10
Occultation
Overhead
Unused Orbital Visibility = 0
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000
sec


Orbit 3
Server Version: 20220516
GS Reacq
Exp. 4, copy 1
Exp. 4, copy 2
Exp. 4, copy 3
Exp. 4, copy 4
Exp. 4, copy 5
Exp. 4, copy 6
Exp. 4, copy 7
Exp. 4, copy 8
Exp. 4, copy 9
Exp. 4, copy 10
Overhead
Unused Orbital Visibility = 0
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000
sec


Orbit 4
Server Version: 20220516
GS Reacq
Exp. 5, copy 1
Exp. 5, copy 2
Exp. 5, copy 3
Exp. 5, copy 4
Exp. 5, copy 5
Exp. 5, copy 6
Exp. 5, copy 7
Exp. 5, copy 8
Exp. 5, copy 9
Exp. 5, copy 10
Unused Orbital Visibility = 0
Occultation
Overhead
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000
sec

## Visit

**Proposal 17162, WASP-39 UVIS Visit 5 (05)** Wed Jul 13 19:03:15 GMT 2022

**Diagnostic Status: Warning**

Scientific Instruments: WFC3/UVIS

Special Requirements: ORIENT 0D TO 30 D; ORIENT 50D TO 105 D; ORIENT 128D TO 150 D; ORIENT 180D TO 210 D; ORIENT 230D TO 285 D; ORIENT 308D TO 330 D; Period 4.0552941 D AND ZERO-PHASE HJD2455342.96913

## Diagnostics

(G280 image, chip2 (05.002)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

(G280 image, chip2 (05.003)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

(G280 image, chip2 (05.004)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

(G280 image, chip2 (05.005)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

## Fixed Targets

| # | Name | Target Coordinates | Targ. Coord. Corrections | Fluxes | Miscellaneous |
|---|---|---|---|---|---|
| (1) | WASP-39B | RA: 14 29 18.4152 (217.3267300d) | Proper Motion RA: -19.041 mas/yr | V=12.09 | Reference Frame: ICRS |
| | | Dec: -03 26 40.20 (-3.44450d) | Proper Motion Dec: 0.437 mas/yr | J=10.663; H=10.307 | |
| | | Equinox: J2000 | Epoch of Position: 2015.5 | | |

*Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.*
*Category=EXT-STAR*
*Description=[EXTRA-SOLAR PLANETARY SYSTEM, G V-IV]*

**Exposures**

| # | Label (ETC Run) | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time (Total)/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 1 | G280 reference image ( F300X) subarray on chip 2, phase constrained (WFC3UVIS.im.1812387) | (1) WASP-39B | WFC3/UVIS, ACCUM, G280-REF | F300X | SIZEAXIS1=1500; SIZEAXIS2=500; CENTERAXIS1=2148; CENTERAXIS2=1200; FLASH=20 | POS TARG 0.0,-50.0; PHASE 0.967377751540242 7 TO 0.975083794469448 34926 | Sequence 1-2 Non-Int in WASP-39 UVIS Visit 5 (05) | 10 Secs (10 Secs)<br>*[==>]* | ***[1]*** |

*Comments: The nominal "UVIS" aperture is ~10" above the chip gap on chip 1; a Y-postarg of about -50" places the target near the center of subarray on chip 2, at an approximate XY position of (2048,1024).*

*SIZEAXIS1=1500 and SIZEAXIS2=500 are used to minimize data volume, while CENTERAXIS1 and CENTERAXIS2 are used to center the subarray readout on the target spectrum, which will be displaced from the direct image of the target. The zeroth order is expected to be about 175 pixels above the target in Y, and about 100 pixels to the right of the target in X. Therefore we set CENTERAXIS1 = 2048+100 = 2148 and CENTERAXIS2 = 1024 + 176 = 1200.*

*We use FLASH=12 to meet the nominal count level. These parameters are based upon similar observations obtained successfully in proposal 13574.*

| # | Label (ETC Run) | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time (Total)/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 2 | G280 image, chip2 (WFC3UVIS.sp.1812400) | (1) WASP-39B | WFC3/UVIS, ACCUM, UVIS | G280 | SIZEAXIS2=500; CENTERAXIS2=1200; SIZEAXIS1=1500; CENTERAXIS1=2148 | POS TARG 0.0,-50.0 | Sequence 1-2 Non-Int in WASP-39 UVIS Visit 5 (05) | 222 Secs X 9 (1998 Secs)<br>*[==>(Copy 1)]*<br>*[==>(Copy 2)]*<br>*[==>(Copy 3)]*<br>*[==>(Copy 4)]*<br>*[==>(Copy 5)]*<br>*[==>(Copy 6)]*<br>*[==>(Copy 7)]*<br>*[==>(Copy 8)]*<br>*[==>(Copy 9)]* | ***[1]*** |

*Comments: Nominal "UVIS" aperture is ~10" above the chip gap on chip 1; a Y-postarg of about -50" places the target near the center of subarray on chip 2.*

*SIZEAXIS1=2100 and SIZEAXIS2=800 are used to minimize data volume, while CENTERAXIS2 is used to center the subarray readout on the target location. The latter is set to 1026, to place the vertical center of the subarray on chip 2 where the target is positioned at (2048,1026) -50" in y below the nominal aperture (assuming each pixel = 0.04"). \These parameters are based upon similar observations obtained successfully in proposal 13574.*

| # | Label (ETC Run) | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time (Total)/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 3 | G280 image, chip2 (WFC3UVIS.sp.1812400) | (1) WASP-39B | WFC3/UVIS, ACCUM, UVIS | G280 | SIZEAXIS2=500; CENTERAXIS2=1200; SIZEAXIS1=1500; CENTERAXIS1=2148 | POS TARG 0.0,-50.0 | Sequence 3-3 Non-Int in WASP-39 UVIS Visit 5 (05) | 222 Secs X 10 (2220 Secs)<br>*[==>(Copy 1)]*<br>*[==>(Copy 2)]*<br>*[==>(Copy 3)]*<br>*[==>(Copy 4)]*<br>*[==>(Copy 5)]*<br>*[==>(Copy 6)]*<br>*[==>(Copy 7)]*<br>*[==>(Copy 8)]*<br>*[==>(Copy 9)]*<br>*[==>(Copy 10)]* | ***[2]*** |

*Comments: Nominal "UVIS" aperture is ~10" above the chip gap on chip 1; a Y-postarg of about -50" places the target near the center of subarray on chip 2.*

*SIZEAXIS1=2100 and SIZEAXIS2=800 are used to minimize data volume, while CENTERAXIS2 is used to center the subarray readout on the target location. The latter is set to 1026, to place the vertical center of the subarray on chip 2 where the target is positioned at (2048,1026) -50" in y below the nominal aperture (assuming each pixel = 0.04"). \These parameters are based upon similar observations obtained successfully in proposal 13574.*

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 4 | G280 image, (1) WASP-39B chip2 (WFC3UVIS.sp.1812400) | WFC3/UVIS, ACCUM, UVIS | G280 | SIZEAXIS2=500; CENTERAXIS2=1200; SIZEAXIS1=1500; CENTERAXIS1=2148 | POS TARG 0.0,-50.0 | Sequence 4-4 Non-Int in WASP-39 UVIS Visit 5 (05) | 222 Secs X 10 (2220 Secs)<br>*[==>(Copy 1)]*<br>*[==>(Copy 2)]*<br>*[==>(Copy 3)]*<br>*[==>(Copy 4)]*<br>*[==>(Copy 5)]*<br>*[==>(Copy 6)]*<br>*[==>(Copy 7)]*<br>*[==>(Copy 8)]*<br>*[==>(Copy 9)]*<br>*[==>(Copy 10)]* | ***[3]*** |

*Comments: Nominal "UVIS" aperture is ~10" above the chip gap on chip 1; a Y-postarg of about -50" places the target near the center of subarray on chip 2.*

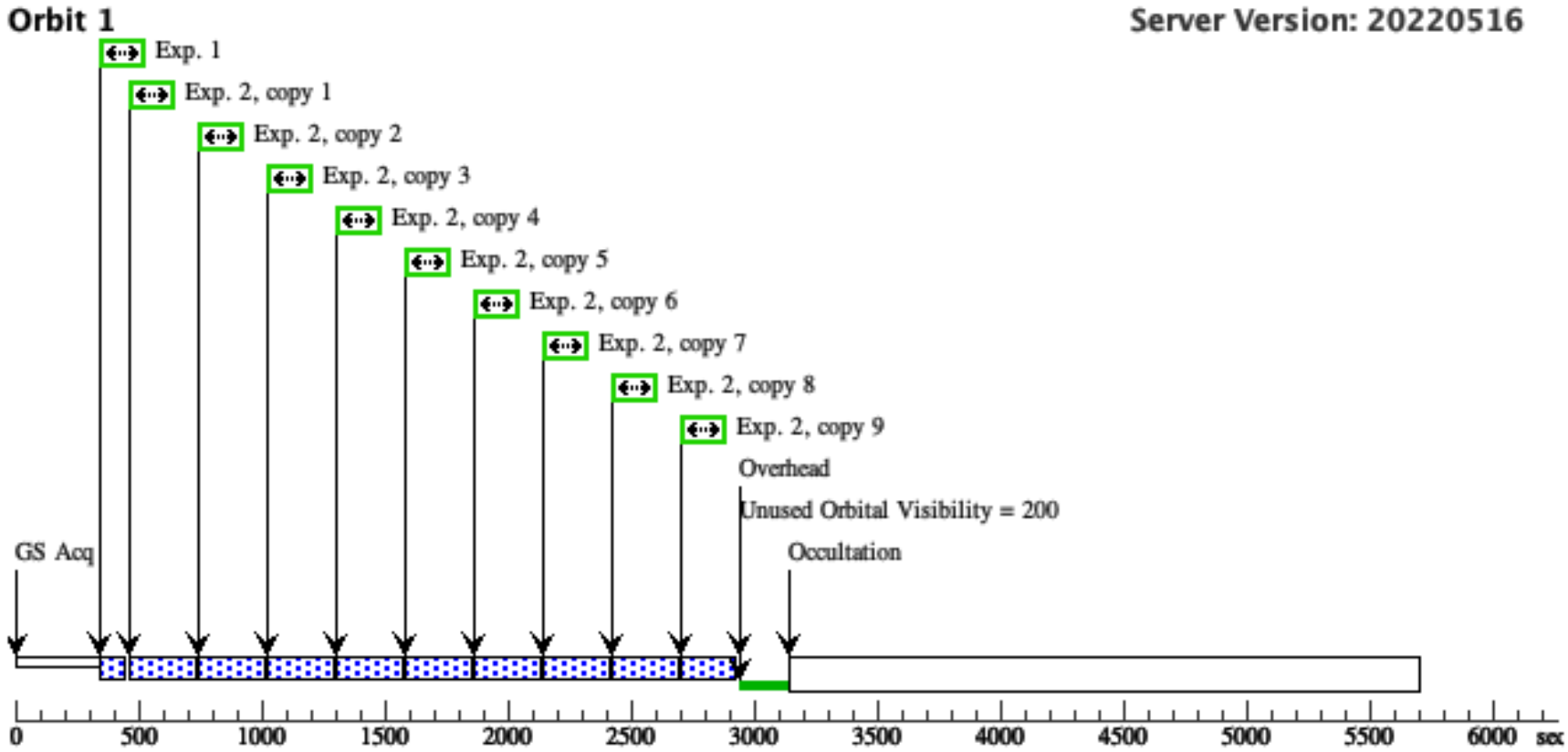
*SIZEAXIS1=2100 and SIZEAXIS2=800 are used to minimize data volume, while CENTERAXIS2 is used to center the subarray readout on the target location. The latter is set to 1026, to place the vertical center of the subarray on chip 2 where the target is positioned at (2048,1026) -50" in y below the nominal aperture (assuming each pixel = 0.04"). \These parameters are based upon similar observations obtained successfully in proposal 13574.*

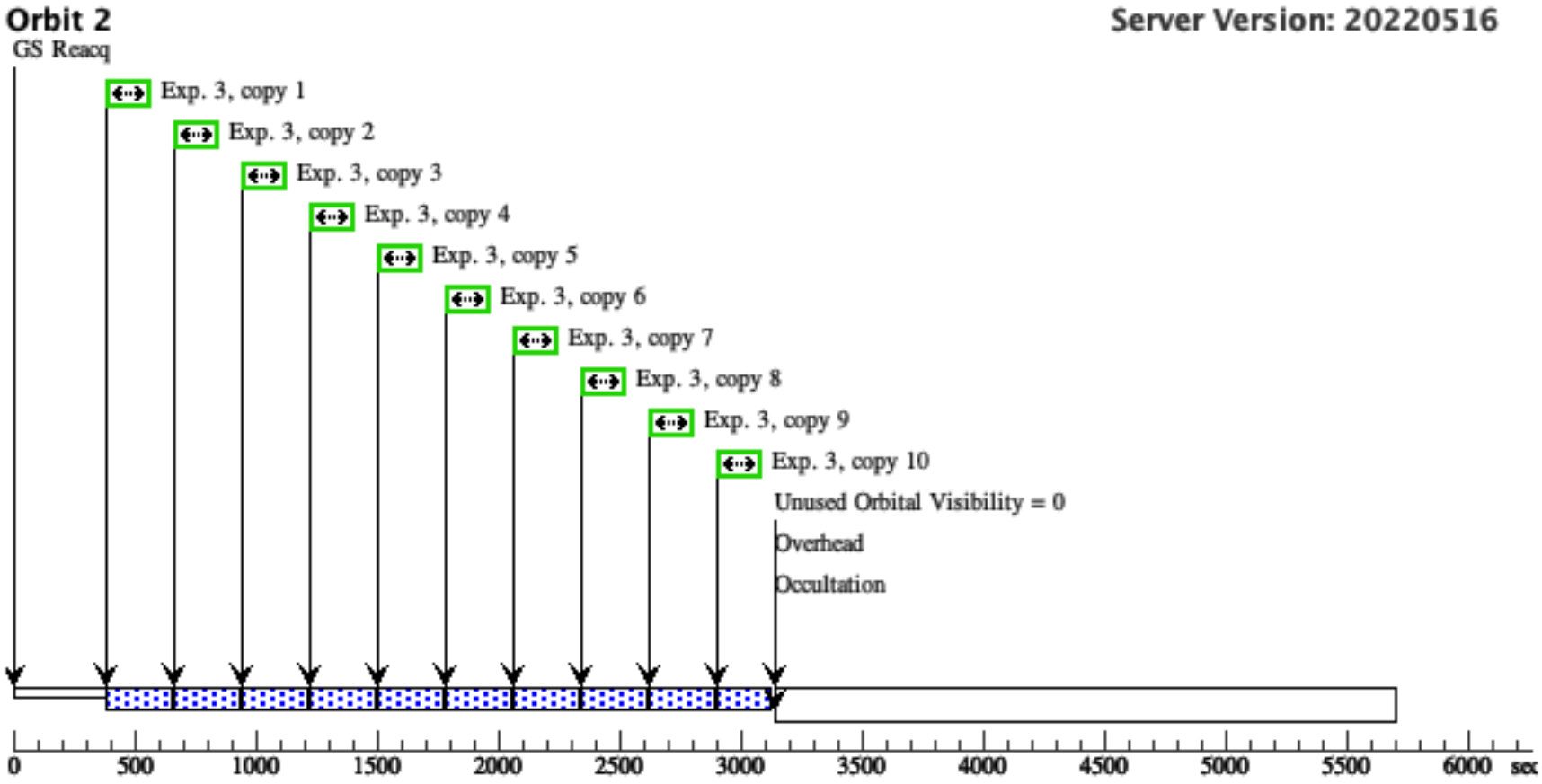
| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 5 | G280 image, (1) WASP-39B chip2 (WFC3UVIS.sp.1812400) | WFC3/UVIS, ACCUM, UVIS | G280 | SIZEAXIS2=500; CENTERAXIS2=1200; SIZEAXIS1=1500; CENTERAXIS1=2148 | POS TARG 0.0,-50.0 | Sequence 5-5 Non-Int in WASP-39 UVIS Visit 5 (05) | 222 Secs X 10 (2220 Secs)<br>*[==>(Copy 1)]*<br>*[==>(Copy 2)]*<br>*[==>(Copy 3)]*<br>*[==>(Copy 4)]*<br>*[==>(Copy 5)]*<br>*[==>(Copy 6)]*<br>*[==>(Copy 7)]*<br>*[==>(Copy 8)]*<br>*[==>(Copy 9)]*<br>*[==>(Copy 10)]* | ***[4]*** |

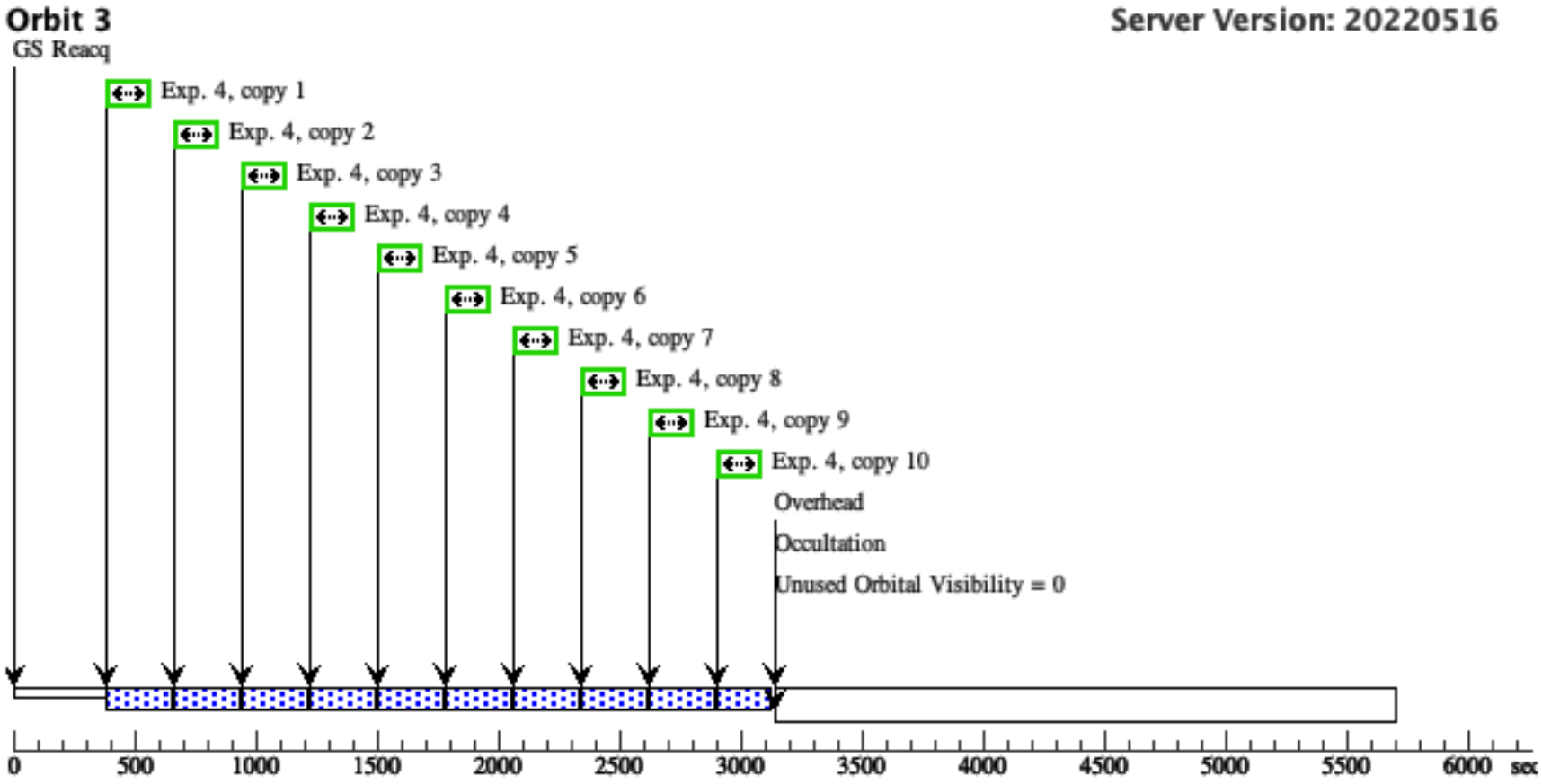
*Comments: Nominal "UVIS" aperture is ~10" above the chip gap on chip 1; a Y-postarg of about -50" places the target near the center of subarray on chip 2.*

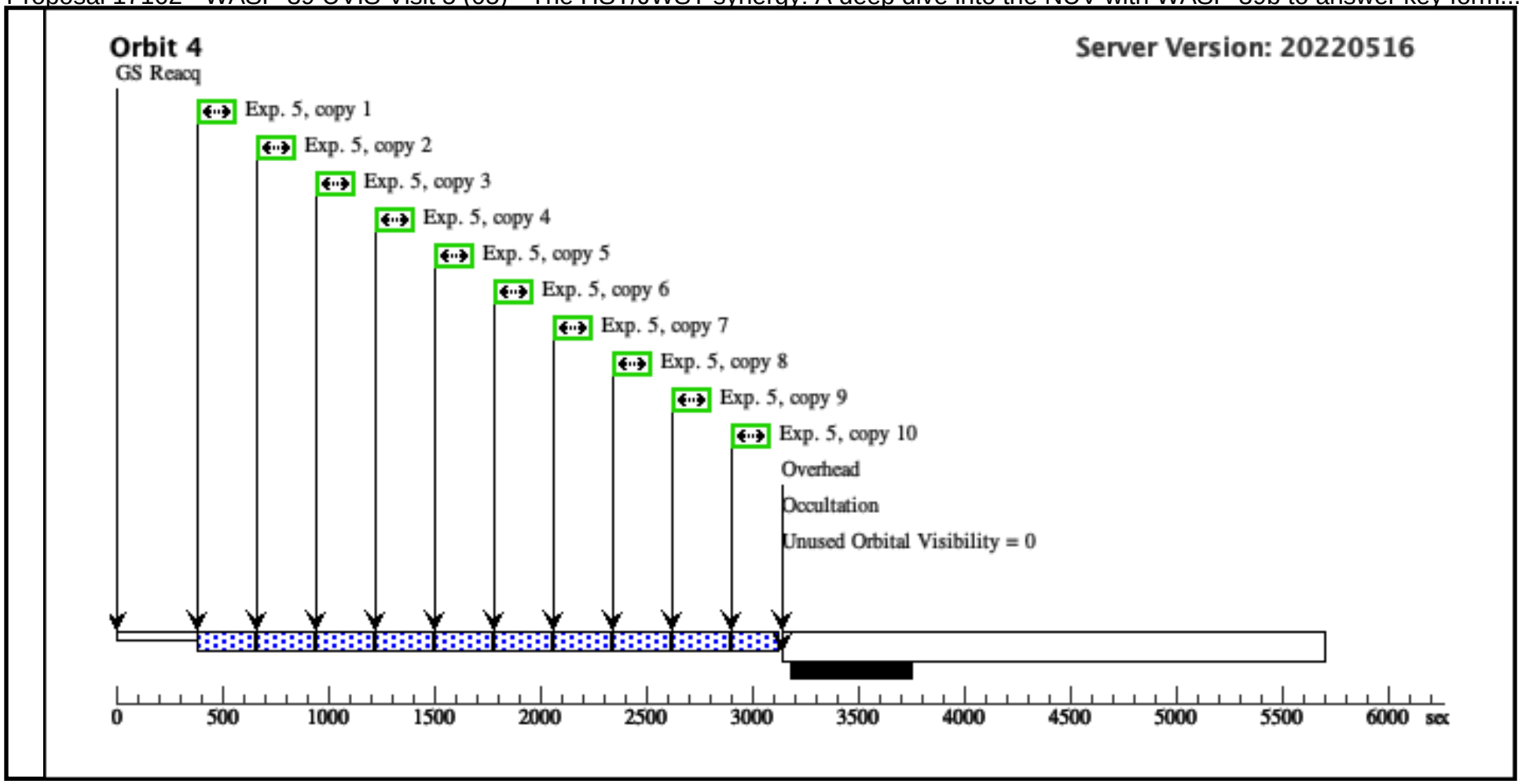
*SIZEAXIS1=2100 and SIZEAXIS2=800 are used to minimize data volume, while CENTERAXIS2 is used to center the subarray readout on the target location. The latter is set to 1026, to place the vertical center of the subarray on chip 2 where the target is positioned at (2048,1026) -50" in y below the nominal aperture (assuming each pixel = 0.04"). \These parameters are based upon similar observations obtained successfully in proposal 13574.*

Orbit Structure




Orbit 2
Server Version: 20220516
GS Reacq
Exp. 3, copy 1
Exp. 3, copy 2
Exp. 3, copy 3
Exp. 3, copy 4
Exp. 3, copy 5
Exp. 3, copy 6
Exp. 3, copy 7
Exp. 3, copy 8
Exp. 3, copy 9
Exp. 3, copy 10
Unused Orbital Visibility = 0
Overhead
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000
sec


Orbit 3
Server Version: 20220516
GS Reacq
Exp. 4, copy 1
Exp. 4, copy 2
Exp. 4, copy 3
Exp. 4, copy 4
Exp. 4, copy 5
Exp. 4, copy 6
Exp. 4, copy 7
Exp. 4, copy 8
Exp. 4, copy 9
Exp. 4, copy 10
Overhead
Occultation
Unused Orbital Visibility = 0
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000
sec


Orbit 4
Server Version: 20220516
GS Reacq
Exp. 5, copy 1
Exp. 5, copy 2
Exp. 5, copy 3
Exp. 5, copy 4
Exp. 5, copy 5
Exp. 5, copy 6
Exp. 5, copy 7
Exp. 5, copy 8
Exp. 5, copy 9
Exp. 5, copy 10
Overhead
Occultation
Unused Orbital Visibility = 0
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000
sec

## Visit

**Proposal 17162, WASP-39 UVIS Visit 6 (06)** Wed Jul 13 19:03:15 GMT 2022

**Diagnostic Status: Warning**

Scientific Instruments: WFC3/UVIS

Special Requirements: ORIENT 0D TO 30 D; ORIENT 50D TO 105 D; ORIENT 128D TO 150 D; ORIENT 180D TO 210 D; ORIENT 230D TO 285 D; ORIENT 308D TO 330 D; Period 4.0552941 D AND ZERO-PHASE HJD2455342.96913

## Diagnostics

(G280 image, chip2 (06.002)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

(G280 image, chip2 (06.003)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

(G280 image, chip2 (06.004)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

(G280 image, chip2 (06.005)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser

## Fixed Targets

| # | Name | Target Coordinates | Targ. Coord. Corrections | Fluxes | Miscellaneous |
|---|---|---|---|---|---|
| (1) | WASP-39B | RA: 14 29 18.4152 (217.3267300d) | Proper Motion RA: -19.041 mas/yr | V=12.09 | Reference Frame: ICRS |
| | | Dec: -03 26 40.20 (-3.44450d) | Proper Motion Dec: 0.437 mas/yr | J=10.663; H=10.307 | |
| | | Equinox: J2000 | Epoch of Position: 2015.5 | | |

*Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.*
*Category=EXT-STAR*
*Description=[EXTRA-SOLAR PLANETARY SYSTEM, G V-IV]*

**Exposures**

| # | Label (ETC Run) | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time (Total)/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 1 | G280 reference image ( F300X) subarray on chip 2, phase constrained (WFC3UVIS.im.1812387) | (1) WASP-39B | WFC3/UVIS, ACCUM, G280-REF | F300X | SIZEAXIS1=1500; SIZEAXIS2=500; CENTERAXIS1=2148; CENTERAXIS2=1200; FLASH=20 | POS TARG 0.0,-50.0; PHASE 0.967377751540242 7 TO 0.975083794469348 34 | Sequence 1-2 Non-Int in WASP-39 UVIS Visit 6 (06) | 10 Secs (10 Secs)<br>*[==>]* | ***[1]*** |

*Comments: The nominal "UVIS" aperture is ~10" above the chip gap on chip 1; a Y-postarg of about -50" places the target near the center of subarray on chip 2, at an approximate XY position of (2048,1024).*

*SIZEAXIS1=1500 and SIZEAXIS2=500 are used to minimize data volume, while CENTERAXIS1 and CENTERAXIS2 are used to center the subarray readout on the target spectrum, which will be displaced from the direct image of the target. The zeroth order is expected to be about 175 pixels above the target in Y, and about 100 pixels to the right of the target in X. Therefore we set CENTERAXIS1 = 2048+100 = 2148 and CENTERAXIS2 = 1024 + 176 = 1200.*

*We use FLASH=12 to meet the nominal count level. These parameters are based upon similar observations obtained successfully in proposal 13574.*

| # | Label (ETC Run) | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time (Total)/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 2 | G280 image, chip2 (WFC3UVIS.sp.1812400) | (1) WASP-39B | WFC3/UVIS, ACCUM, UVIS | G280 | SIZEAXIS2=500; CENTERAXIS2=1200; SIZEAXIS1=1500; CENTERAXIS1=2148 | POS TARG 0.0,-50.0 | Sequence 1-2 Non-Int in WASP-39 UVIS Visit 6 (06) | 222 Secs X 9 (1998 Secs)<br>*[==>(Copy 1)]*<br>*[==>(Copy 2)]*<br>*[==>(Copy 3)]*<br>*[==>(Copy 4)]*<br>*[==>(Copy 5)]*<br>*[==>(Copy 6)]*<br>*[==>(Copy 7)]*<br>*[==>(Copy 8)]*<br>*[==>(Copy 9)]* | ***[1]*** |

*Comments: Nominal "UVIS" aperture is ~10" above the chip gap on chip 1; a Y-postarg of about -50" places the target near the center of subarray on chip 2.*

*SIZEAXIS1=2100 and SIZEAXIS2=800 are used to minimize data volume, while CENTERAXIS2 is used to center the subarray readout on the target location. The latter is set to 1026, to place the vertical center of the subarray on chip 2 where the target is positioned at (2048,1026) -50" in y below the nominal aperture (assuming each pixel = 0.04"). \These parameters are based upon similar observations obtained successfully in proposal 13574.*

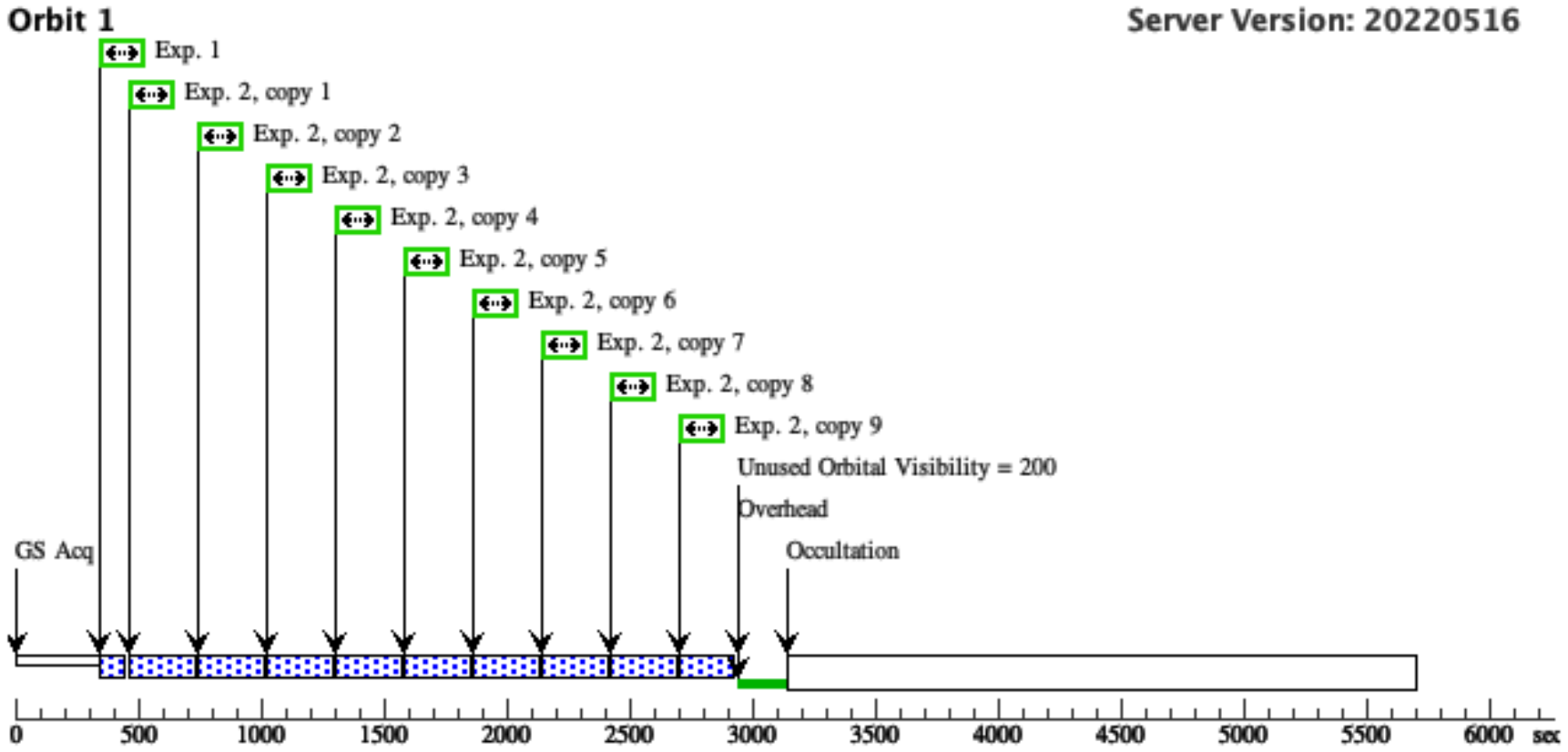
| # | Label (ETC Run) | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time (Total)/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 3 | G280 image, chip2 (WFC3UVIS.sp.1812400) | (1) WASP-39B | WFC3/UVIS, ACCUM, UVIS | G280 | SIZEAXIS2=500; CENTERAXIS2=1200; SIZEAXIS1=1500; CENTERAXIS1=2148 | POS TARG 0.0,-50.0 | Sequence 3-3 Non-Int in WASP-39 UVIS Visit 6 (06) | 222 Secs X 10 (2220 Secs)<br>*[==>(Copy 1)]*<br>*[==>(Copy 2)]*<br>*[==>(Copy 3)]*<br>*[==>(Copy 4)]*<br>*[==>(Copy 5)]*<br>*[==>(Copy 6)]*<br>*[==>(Copy 7)]*<br>*[==>(Copy 8)]*<br>*[==>(Copy 9)]*<br>*[==>(Copy 10)]* | ***[2]*** |

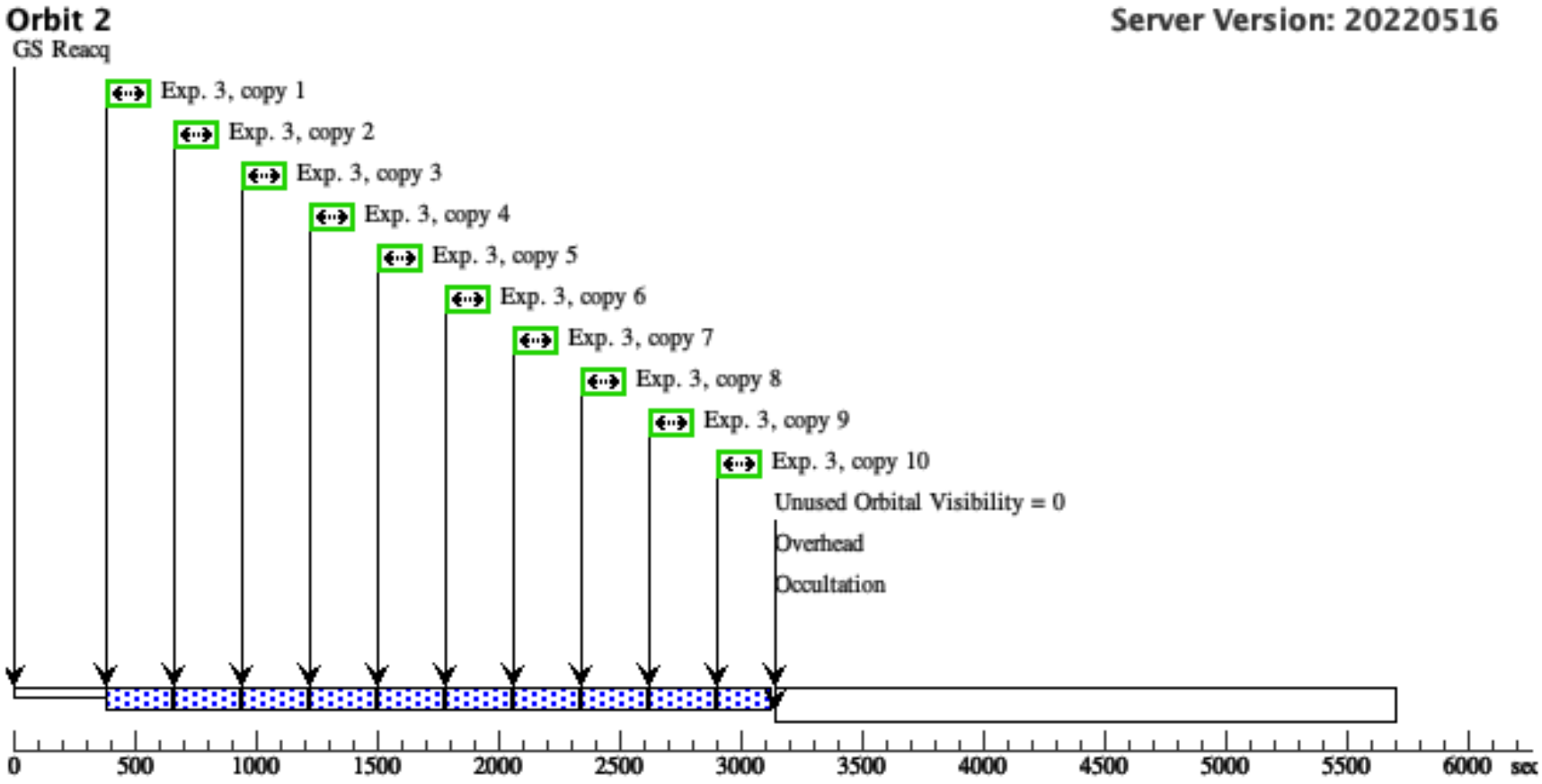
*Comments: Nominal "UVIS" aperture is ~10" above the chip gap on chip 1; a Y-postarg of about -50" places the target near the center of subarray on chip 2.*

*SIZEAXIS1=2100 and SIZEAXIS2=800 are used to minimize data volume, while CENTERAXIS2 is used to center the subarray readout on the target location. The latter is set to 1026, to place the vertical center of the subarray on chip 2 where the target is positioned at (2048,1026) -50" in y below the nominal aperture (assuming each pixel = 0.04"). \These parameters are based upon similar observations obtained successfully in proposal 13574.*

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 4 | G280 image, (1) WASP-39B chip2 (WFC3UVIS.sp.1812400) | WFC3/UVIS, ACCUM, UVIS | G280 | SIZEAXIS2=500; CENTERAXIS2=1200; SIZEAXIS1=1500; CENTERAXIS1=2148 | POS TARG 0.0,-50.0 | Sequence 4-4 Non-Int in WASP-39 UVIS Visit 6 (06) | 222 Secs X 10 (2220 Secs)<br>*[==>(Copy 1)]*<br>*[==>(Copy 2)]*<br>*[==>(Copy 3)]*<br>*[==>(Copy 4)]*<br>*[==>(Copy 5)]*<br>*[==>(Copy 6)]*<br>*[==>(Copy 7)]*<br>*[==>(Copy 8)]*<br>*[==>(Copy 9)]*<br>*[==>(Copy 10)]* | ***[3]*** |
| | | *Comments: Nominal "UVIS" aperture is ~10" above the chip gap on chip 1; a Y-postarg of about -50" places the target near the center of subarray on chip 2.*<br><br>*SIZEAXIS1=2100 and SIZEAXIS2=800 are used to minimize data volume, while CENTERAXIS2 is used to center the subarray readout on the target location. The latter is set to 1026, to place the vertical center of the subarray on chip 2 where the target is positioned at (2048,1026) -50" in y below the nominal aperture (assuming each pixel = 0.04"). \These parameters are based upon similar observations obtained successfully in proposal 13574.* | | | | | | | | |
| | 5 | G280 image, (1) WASP-39B chip2 (WFC3UVIS.sp.1812400) | WFC3/UVIS, ACCUM, UVIS | G280 | SIZEAXIS2=500; CENTERAXIS2=1200; SIZEAXIS1=1500; CENTERAXIS1=2148 | POS TARG 0.0,-50.0 | Sequence 5-5 Non-Int in WASP-39 UVIS Visit 6 (06) | 222 Secs X 10 (2220 Secs)<br>*[==>(Copy 1)]*<br>*[==>(Copy 2)]*<br>*[==>(Copy 3)]*<br>*[==>(Copy 4)]*<br>*[==>(Copy 5)]*<br>*[==>(Copy 6)]*<br>*[==>(Copy 7)]*<br>*[==>(Copy 8)]*<br>*[==>(Copy 9)]*<br>*[==>(Copy 10)]* | ***[4]*** |
| | | *Comments: Nominal "UVIS" aperture is ~10" above the chip gap on chip 1; a Y-postarg of about -50" places the target near the center of subarray on chip 2.*<br><br>*SIZEAXIS1=2100 and SIZEAXIS2=800 are used to minimize data volume, while CENTERAXIS2 is used to center the subarray readout on the target location. The latter is set to 1026, to place the vertical center of the subarray on chip 2 where the target is positioned at (2048,1026) -50" in y below the nominal aperture (assuming each pixel = 0.04"). \These parameters are based upon similar observations obtained successfully in proposal 13574.* | | | | | | | | |

Orbit Structure

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Server Version: 20220516
GS Reacq
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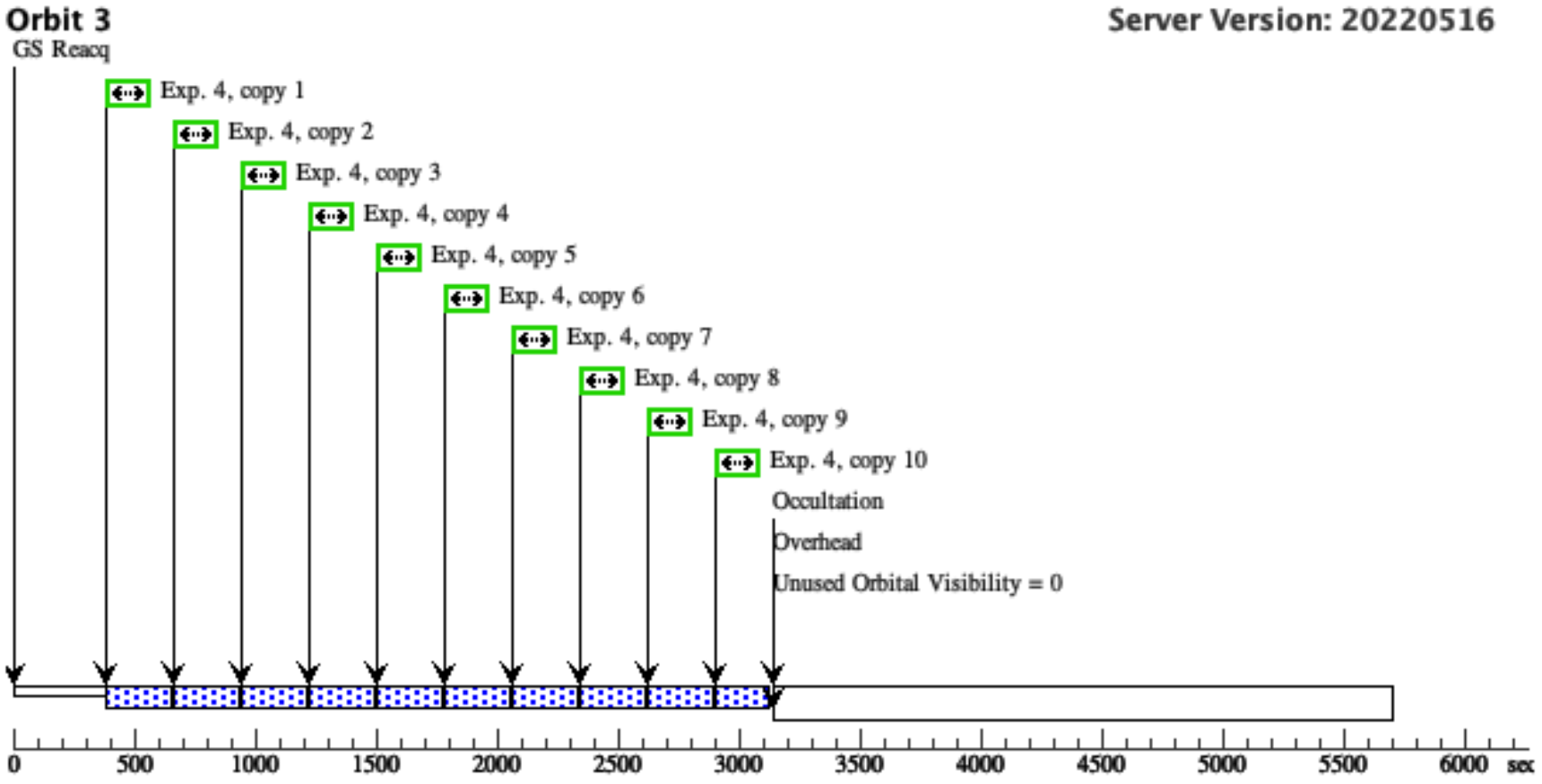
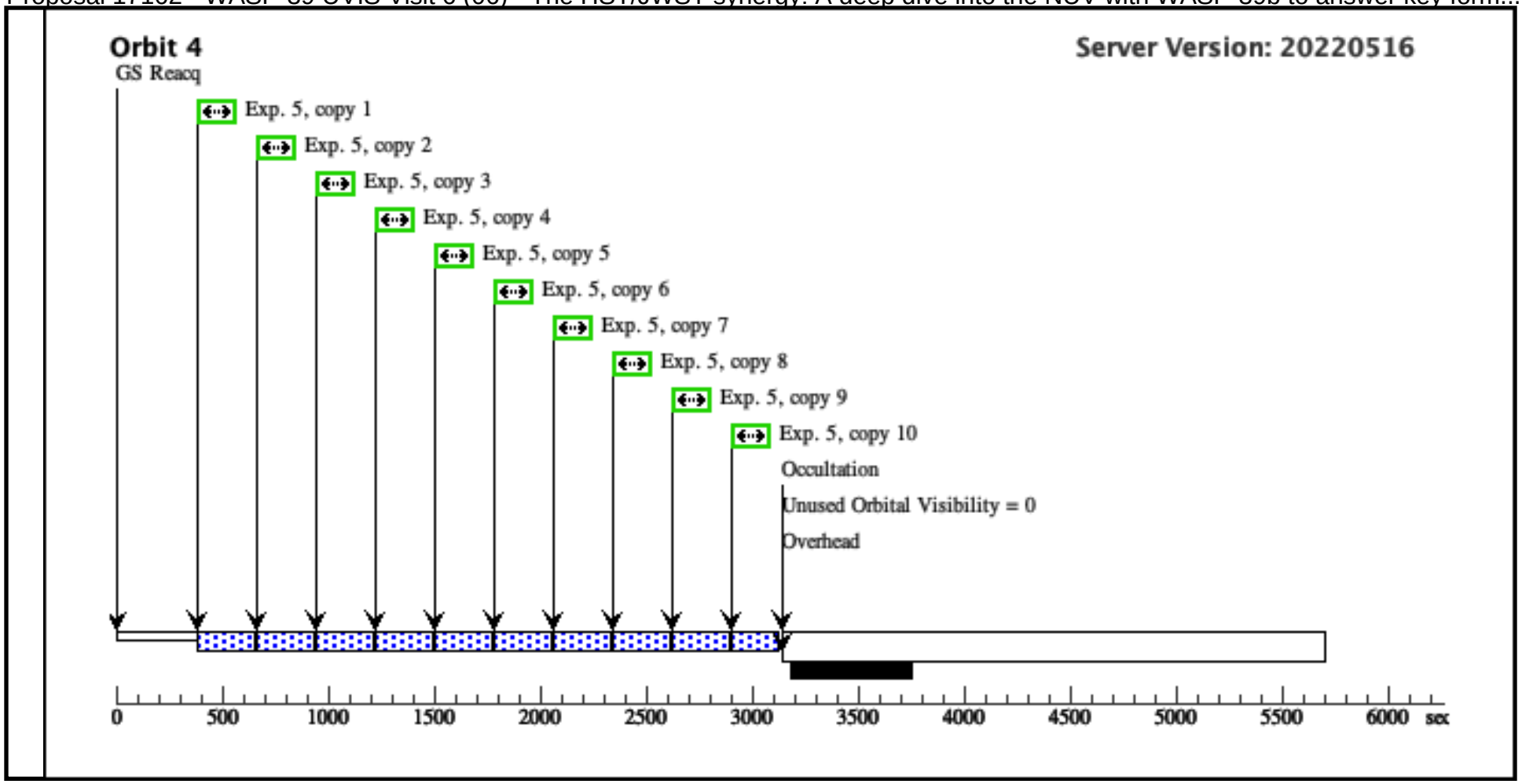
Exp. 3, copy 2
Exp. 3, copy 3
Exp. 3, copy 4
Exp. 3, copy 5
Exp. 3, copy 6
Exp. 3, copy 7
Exp. 3, copy 8
Exp. 3, copy 9
Exp. 3, copy 10
Unused Orbital Visibility = 0
Overhead
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000
sec


Orbit 3
Server Version: 20220516
GS Reacq
Exp. 4, copy 1
Exp. 4, copy 2
Exp. 4, copy 3
Exp. 4, copy 4
Exp. 4, copy 5
Exp. 4, copy 6
Exp. 4, copy 7
Exp. 4, copy 8
Exp. 4, copy 9
Exp. 4, copy 10
Occultation
Overhead
Unused Orbital Visibility = 0
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000
sec


Orbit 4
Server Version: 20220516
GS Reacq
Exp. 5, copy 1
Exp. 5, copy 2
Exp. 5, copy 3
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Exp. 5, copy 6
Exp. 5, copy 7
Exp. 5, copy 8
Exp. 5, copy 9
Exp. 5, copy 10
Occultation
Unused Orbital Visibility = 0
Overhead
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000
sec