



# 12116 - A Panchromatic Hubble Andromeda and Triangulum Survey - Globular Cluster Sequence Calibrations

Cycle: 18, Proposal Category: GO

(Large Program)

(Availability Mode: SUPPORTED)

## INVESTIGATORS

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| <i>Name</i>                            | <i>Institution</i>                             | <i>E-Mail</i>                    |
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**VISITS**

| <i>Visit</i> | <i>Targets used in Visit</i> | <i>Configurations used in Visit</i> | <i>Orbits Used</i> | <i>Last Orbit Planner Run</i> | <i>OP Current with Visit?</i> |
|--------------|------------------------------|-------------------------------------|--------------------|-------------------------------|-------------------------------|
| 01           | (1) NGC1818<br>ANY           | ACS/WFC<br>WFC3/UVIS                | 1                  | 04-May-2012 16:16:38.0        | yes                           |
| 02           | (2) NGC5927                  | ACS/WFC                             | 1                  | 04-May-2012 16:16:40.0        | yes                           |
| 03           | (3) NGC0104                  | ACS/WFC                             | 1                  | 04-May-2012 16:16:42.0        | yes                           |
| 04           | (4) NGC6752                  | ACS/WFC                             | 1                  | 04-May-2012 16:16:43.0        | yes                           |
| 05           | (5) NGC6341                  | ACS/WFC                             | 1                  | 04-May-2012 16:16:45.0        | yes                           |
| 06           | (6) NGC6791                  | ACS/WFC                             | 1                  | 04-May-2012 16:16:46.0        | yes                           |

6 Total Orbits Used

**ABSTRACT**

We propose to image the north east quadrant of M31 to deep limits in the UV, optical, and near-IR. HST imaging should resolve the galaxy into more than 100 million stars, all with common distances and foreground extinctions. UV through NIR stellar photometry (F275W, F336W with WFC3/UVIS, F475W and F814W with ACS/WFC, and F110W and F160W with WFC3/NIR) will provide effective temperatures for O through M spectral types, while simultaneously mapping M31's extinction. Our central science drivers are to: understand high-mass variations in the stellar IMF

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as a function of SFR intensity and metallicity; capture the spatially-resolved star formation history of M31; study a vast sample of stellar clusters with a range of ages and metallicities. These are central to understanding stellar evolution and clustered star formation; constraining ISM energetics; and understanding the counterparts and environments of transient objects (novae, SNe, variable stars, x-ray sources, etc.). As its legacy, this survey adds M31 to the Milky Way and Magellanic Clouds as a fundamental calibrator of stellar evolution and star-formation processes for understanding the stellar populations of distant galaxies. Effective exposure times are 400s in F275W, 1800s in F336W, 2800s in F475W, 2880s in F814W, 600s in F110W, and 1600s in F160W, including short exposures to avoid saturation of bright sources. These depths will produce photon-limited images in the UV. Images will be crowding-limited in the optical and NIR, but will reach below the red clump at all radii. The images will reach the Nyquist sampling limit in F160W, F475W, and F814W.

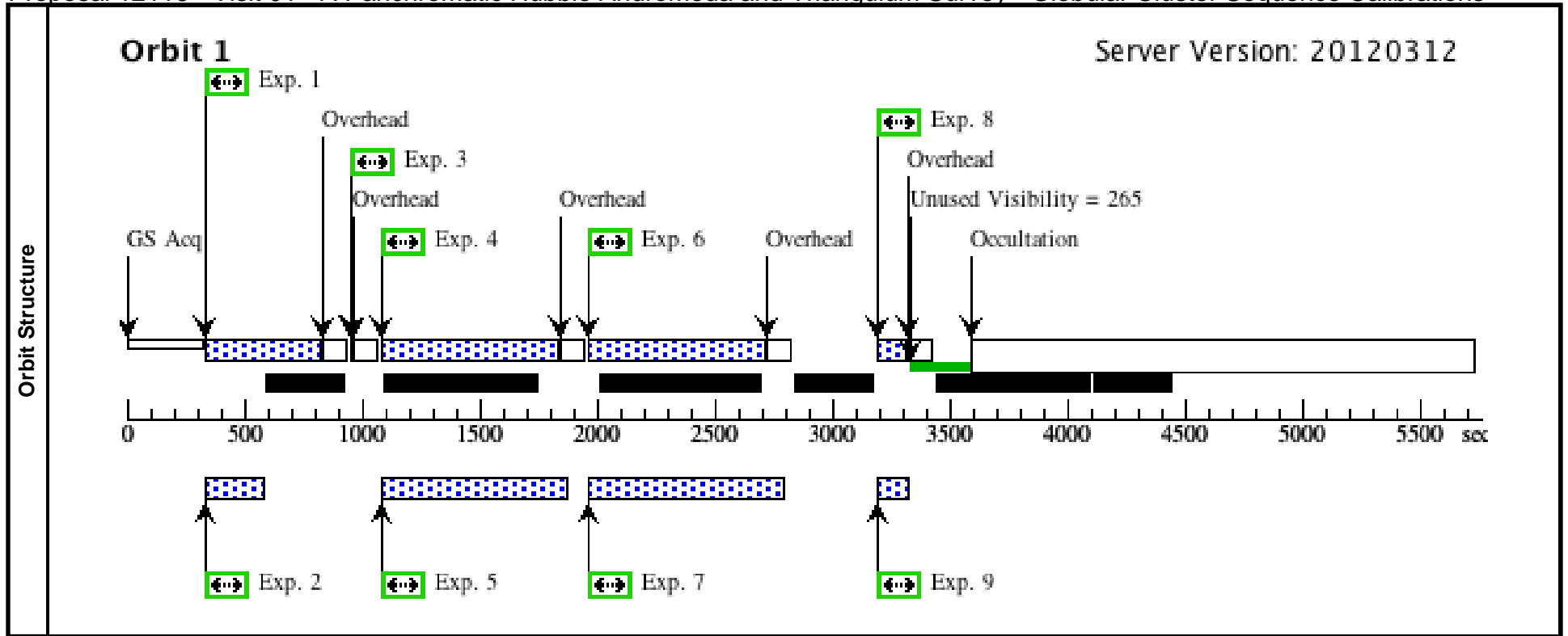
### **OBSERVING DESCRIPTION**

TBD

Proposal 12116 - Visit 01 - A Panchromatic Hubble Andromeda and Triangulum Survey - Globular Cluster Sequence Calibrations

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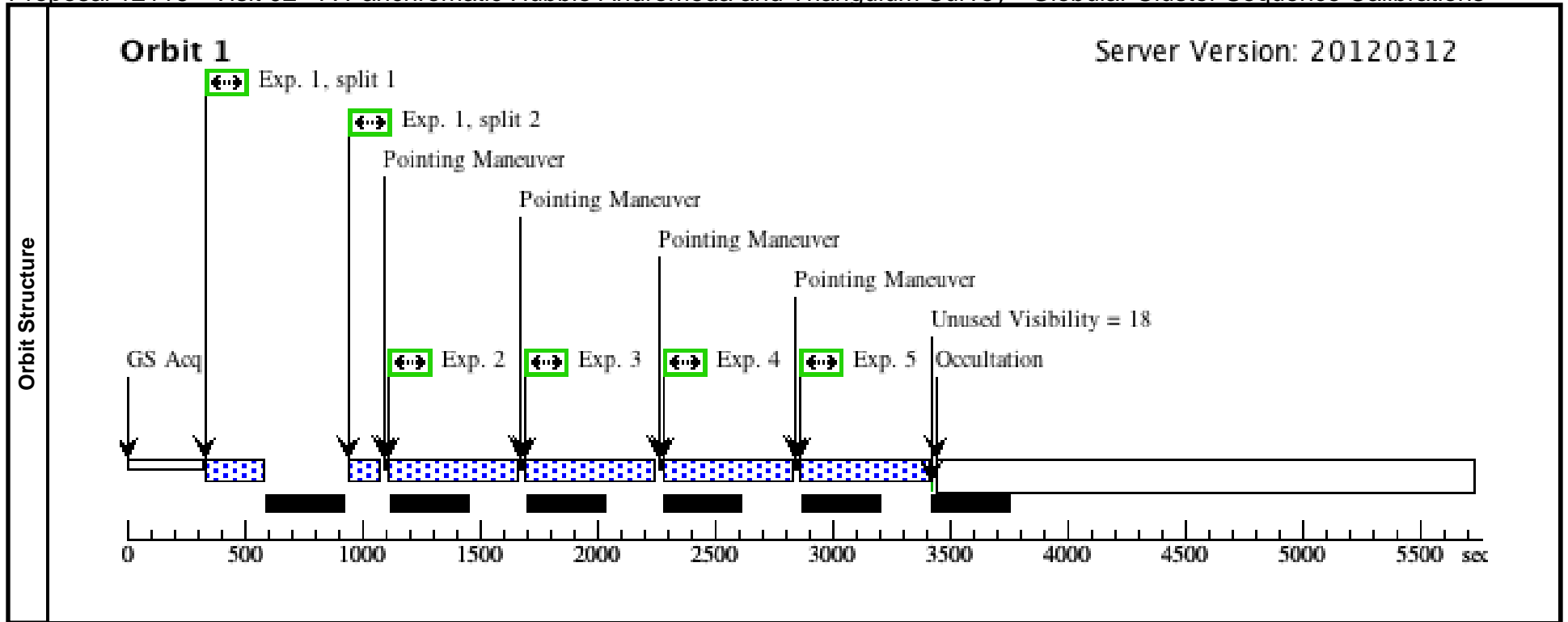
| Fixed Targets | Visit |  |  |                                  |               |                       |               |  |                         |       |
|---------------|-------|--|--|----------------------------------|---------------|-----------------------|---------------|--|-------------------------|-------|
|               | #     | Name   | Target Coordinates   | Targ. Coord. Corrections         | Fluxes        | Miscellaneous         |               |  |                         |       |
|               | (1)   | NGC1818                                      | RA: 05 04 14.7600 (76.0615000d)<br>Dec: -66 26 4.16 (-66.43449d)<br>Equinox: J2000 |                                  | V=20          | Reference Frame: ICRS |               |  |                         |       |
| Exposures     | #     | Label  | Target   | Config,Mode,Aperture             | Spectral Els. | Opt. Params.          | Special Reqs. | Groups                                 | Exp. Time/[Actual Dur.] | Orbit |
|               | 1     | NGC1818-U<br>VIS-F275W                       | (1) NGC1818  | WFC3/UVIS, ACCUM,<br>UVIS-CENTER | F275W         | CR-SPLIT=NO           |               | Prime + Parallel Group 1-2 in Visit 01 | 460 Secs<br>[==>]       | [1]   |
|               | 2     | NGC1818-A<br>CS-PARAL<br>LEL-F475W<br>-GUARD | ANY  | ACS/WFC, ACCUM, WFC              | F475W         |                       |               | Prime + Parallel Group 1-2 in Visit 01 | 1 Secs<br>[==>]         | [1]   |
|               | 3     | NGC1818-U<br>VIS-F275W<br>-GUARD             | (1) NGC1818  | WFC3/UVIS, ACCUM,<br>UVIS-CENTER | F275W         | CR-SPLIT=NO           |               |  | 2 Secs<br>[==>]         | [1]   |
|               | 4     | NGC1818-U<br>VIS-F275W                       | (1) NGC1818  | WFC3/UVIS, ACCUM,<br>UVIS-CENTER | F275W         |                       |               | Prime + Parallel Group 4-5 in Visit 01 | 750 Secs<br>[==>]       | [1]   |
|               | 5     | NGC1818-A<br>CS_PARAL<br>LEL-F475W           | ANY  | ACS/WFC, ACCUM, WFC              | F475W         |                       |               | Prime + Parallel Group 4-5 in Visit 01 | 670 Secs<br>[==>]       | [1]   |
|               | 6     | NGC1818-U<br>VIS-F275W                       | (1) NGC1818  | WFC3/UVIS, ACCUM,<br>UVIS-CENTER | F275W         | CR-SPLIT=NO           |               | Prime + Parallel Group 6-7 in Visit 01 | 750 Secs<br>[==>]       | [1]   |
|               | 7     | NGC1818-A<br>CS-PARAL<br>LEL-F814W           | ANY  | ACS/WFC, ACCUM, WFC              | F814W         |                       |               | Prime + Parallel Group 6-7 in Visit 01 | 670 Secs<br>[==>]       | [1]   |
|               | 8     | NGC1818-U<br>VIS-F475W                       | (1) NGC1818  | WFC3/UVIS, ACCUM,<br>UVIS-CENTER | F475W         | CR-SPLIT=NO           |               | Prime + Parallel Group 8-9 in Visit 01 | 100 Secs<br>[==>]       | [1]   |
|               | 9     | NGC1818-A<br>CS-PARAL<br>LEL-F814W<br>-GUARD | ANY  | ACS/WFC, ACCUM, WFC              | F814W         |                       |               | Prime + Parallel Group 8-9 in Visit 01 | 2 Secs<br>[==>]         | [1]   |



Proposal 12116 - Visit 02 - A Panchromatic Hubble Andromeda and Triangulum Survey - Globular Cluster Sequence Calibrations

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| Visit     | <b>Proposal 12116, Visit 02, implementation</b><br><b>Diagnostic Status: No Diagnostics</b><br>Scientific Instruments: ACS/WFC<br>Special Requirements: ORIENT 96.287D TO 96.287 D |                                 |   |                      |                          |                       |                       |        |   |       |
|-----------|--|---------------------------------|---|----------------------|--------------------------|-----------------------|-----------------------|--------|---|-------|
|           | Fixed Targets  | #                               | Name  | Target Coordinates   | Targ. Coord. Corrections | Fluxes                | Miscellaneous         |        |   |       |
|           | (2)  | NGC5927                         | RA: 15 28 1.7400 (232.0072500d)<br>Dec: -50 40 44.30 (-50.67897d)<br>Equinox: J2000 |                      | V=20                     | Reference Frame: ICRS |                       |        |   |       |
| Exposures | #  | Label                           | Target  | Config,Mode,Aperture | Spectral Els.            | Opt. Params.          | Special Reqs.         | Groups | Exp. Time/[Actual Dur.]                     | Orbit |
|           | 1  | NGC5927-A<br>CS-F475W-<br>GUARD | (2) NGC5927   | ACS/WFC, ACCUM, WFC  | F475W                    | CR-SPLIT=2            |                       |        | 14 Secs<br>[==>(Split 1)]<br>[==>(Split 2)] | [1]   |
|           | 2  | NGC5927-A<br>CS-F475W           | (2) NGC5927   | ACS/WFC, ACCUM, WFC  | F475W                    |                       | POS TARG 0.265,0.121  |        | 425 Secs<br>[==>]                           | [1]   |
|           | 3  | NGC5927-A<br>CS-F475W           | (2) NGC5927   | ACS/WFC, ACCUM, WFC  | F475W                    |                       | POS TARG 0.292,0.242  |        | 425 Secs<br>[==>]                           | [1]   |
|           | 4  | NGC5927-A<br>CS-F475W           | (2) NGC5927   | ACS/WFC, ACCUM, WFC  | F475W                    |                       | POS TARG 0.372,0.266  |        | 425 Secs<br>[==>]                           | [1]   |
|           | 5  | NGC5927-A<br>CS-F475W           | (2) NGC5927   | ACS/WFC, ACCUM, WFC  | F475W                    |                       | POS TARG 0.288,-0.002 |        | 425 Secs<br>[==>]                           | [1]   |



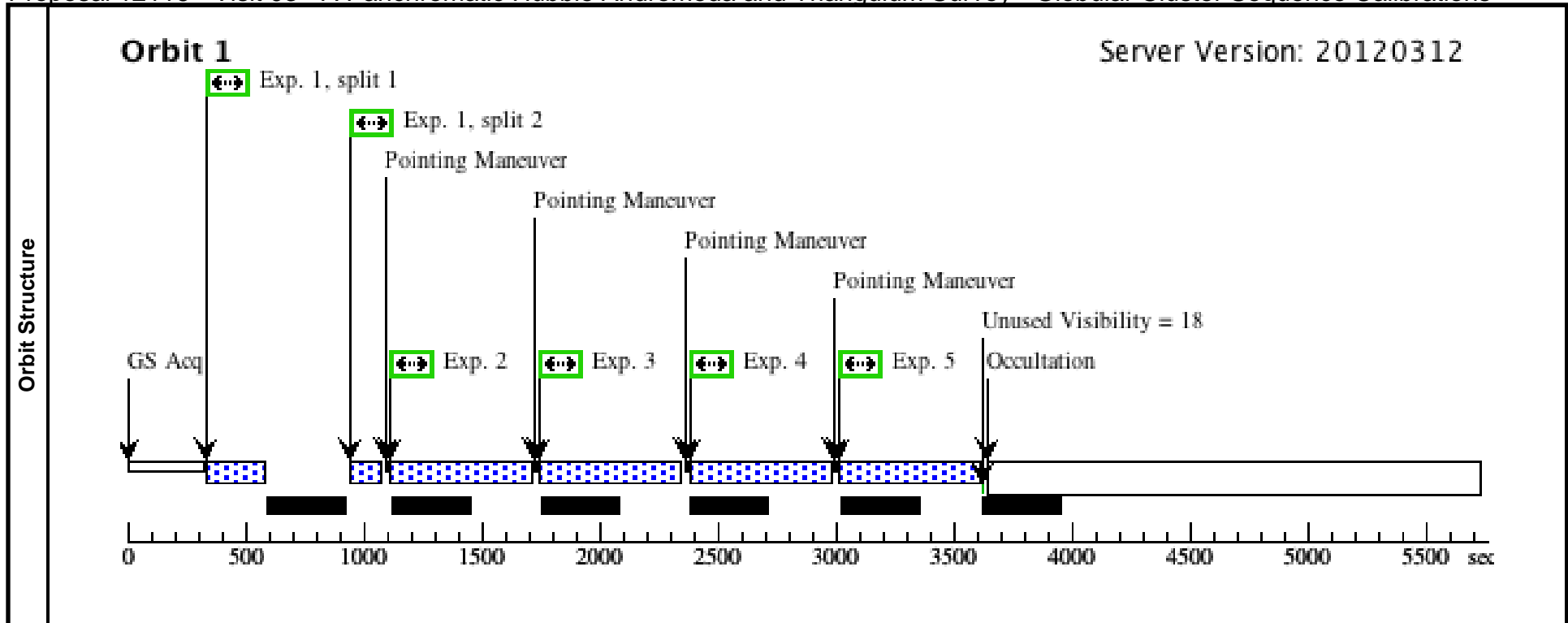
Proposal 12116 - Visit 03 - A Panchromatic Hubble Andromeda and Triangulum Survey - Globular Cluster Sequence Calibrations

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| Fixed Targets | # |     | Name | Target Coordinates | Targ. Coord. Corrections   | Fluxes | Miscellaneous |                       |  |
|---------------|---|-----|------|--------------------|--|--------|---------------|-----------------------|--|
|               |   | (3) |      | NGC0104            | RA: 00 24 15.2600 (6.0635833d)<br>Dec: -72 05 47.93 (-72.09665d)<br>Equinox: J2000 |        | V=20          | Reference Frame: ICRS |  |

| Exposures | # | Label                           | Target      | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs.              | Groups | Exp. Time/[Actual Dur.]                     | Orbit |
|-----------|---|---------------------------------|-------------|----------------------|---------------|--------------|----------------------------|--------|---|-------|
|           | 1 | NGC0104-A<br>CS-F475W-<br>GUARD | (3) NGC0104 | ACS/WFC, ACCUM, WFC  | F475W         | CR-SPLIT=2   |                            |        | 14 Secs<br>[==>(Split 1)]<br>[==>(Split 2)] | [1]   |
|           | 2 | NGC0104-A<br>CS-F475W           | (3) NGC0104 | ACS/WFC, ACCUM, WFC  | F475W         |              | POS TARG 0.265,0.<br>121   |        | 475 Secs<br>[==>]                           | [1]   |
|           | 3 | NGC0104-A<br>CS-F475W           | (3) NGC0104 | ACS/WFC, ACCUM, WFC  | F475W         |              | POS TARG 0.292,0.<br>242   |        | 475 Secs<br>[==>]                           | [1]   |
|           | 4 | NGC0104-A<br>CS-F475W           | (3) NGC0104 | ACS/WFC, ACCUM, WFC  | F475W         |              | POS TARG 0.372,0.<br>266   |        | 475 Secs<br>[==>]                           | [1]   |
|           | 5 | NGC0104-A<br>CS-F475W           | (3) NGC0104 | ACS/WFC, ACCUM, WFC  | F475W         |              | POS TARG 0.288,-0.<br>.002 |        | 475 Secs<br>[==>]                           | [1]   |



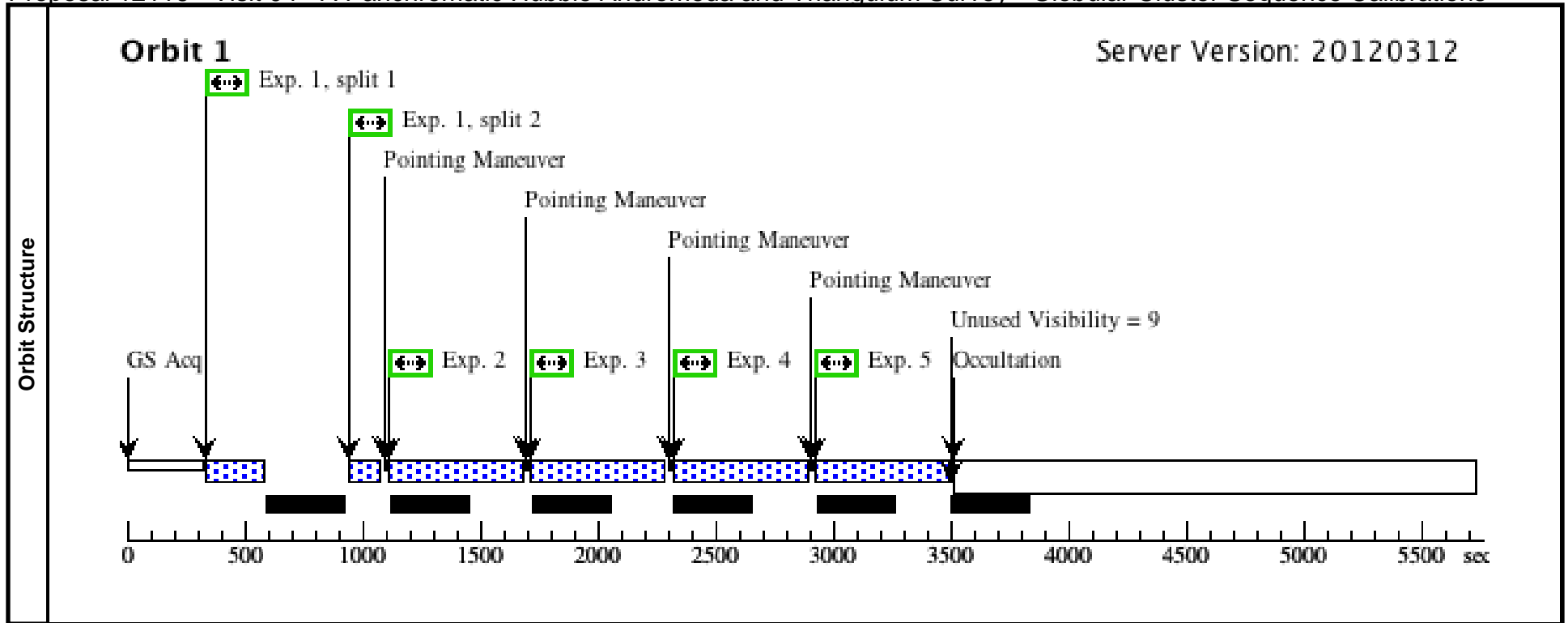
Proposal 12116 - Visit 04 - A Panchromatic Hubble Andromeda and Triangulum Survey - Globular Cluster Sequence Calibrations

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| Fixed Targets | # |     | Name    | Target Coordinates  | Targ. Coord. Corrections | Fluxes | Miscellaneous         |
|---------------|---|-----|---------|---|--------------------------|--------|-----------------------|
|               |   | (4) | NGC6752 | RA: 19 11 2.8000 (287.7616667d)<br>Dec: -60 00 51.70 (-60.01436d)<br>Equinox: J2000 |                          | V=20   | Reference Frame: ICRS |

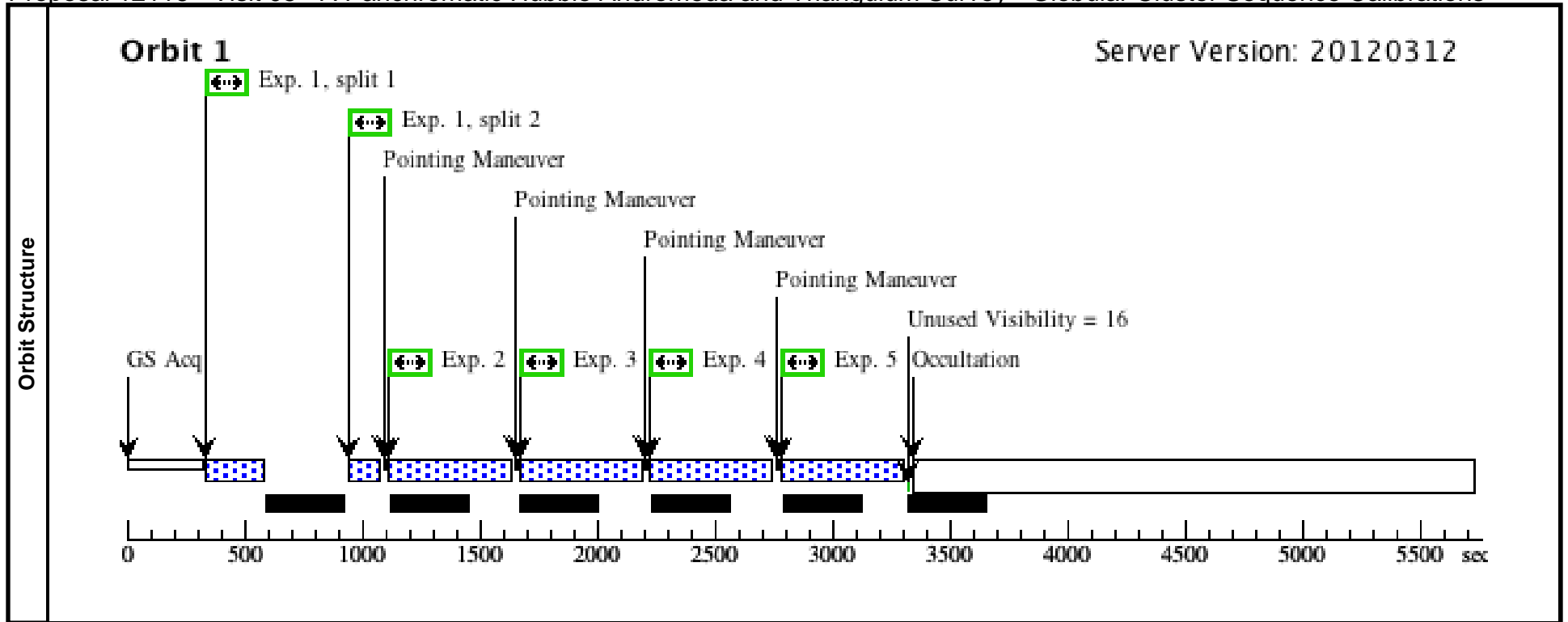
| Exposures | # | Label                           | Target      | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs.         | Groups | Exp. Time/[Actual Dur.]                     | Orbit |
|-----------|---|---------------------------------|-------------|----------------------|---------------|--------------|-----------------------|--------|---|-------|
|           | 1 | NGC6752-A<br>CS-F475W-<br>GUARD | (4) NGC6752 | ACS/WFC, ACCUM, WFC  | F475W         | CR-SPLIT=2   |                       |        | 14 Secs<br>[==>(Split 1)]<br>[==>(Split 2)] | [1]   |
|           | 2 | NGC6752-A<br>CS-F475W           | (4) NGC6752 | ACS/WFC, ACCUM, WFC  | F475W         |              | POS TARG 0.265,0.121  |        | 445 Secs<br>[==>]                           | [1]   |
|           | 3 | NGC6752-A<br>CS-F475W           | (4) NGC6752 | ACS/WFC, ACCUM, WFC  | F475W         |              | POS TARG 0.292,0.242  |        | 445 Secs<br>[==>]                           | [1]   |
|           | 4 | NGC6752-A<br>CS-F475W           | (4) NGC6752 | ACS/WFC, ACCUM, WFC  | F475W         |              | POS TARG 0.372,0.266  |        | 445 Secs<br>[==>]                           | [1]   |
|           | 5 | NGC6752-A<br>CS-F475W           | (4) NGC6752 | ACS/WFC, ACCUM, WFC  | F475W         |              | POS TARG 0.288,-0.002 |        | 445 Secs<br>[==>]                           | [1]   |



Proposal 12116 - Visit 05 - A Panchromatic Hubble Andromeda and Triangulum Survey - Globular Cluster Sequence Calibrations

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| Visit     | <b>Proposal 12116, Visit 05, implementation</b><br><b>Diagnostic Status: No Diagnostics</b><br>Scientific Instruments: ACS/WFC<br>Special Requirements: ORIENT 106.598D TO 106.598 D |                                 |  |                      |                          |                       |                       |        |   |       |
|-----------|--|---------------------------------|--|----------------------|--------------------------|-----------------------|-----------------------|--------|---|-------|
|           | Fixed Targets  | #                               | Name   | Target Coordinates   | Targ. Coord. Corrections | Fluxes                | Miscellaneous         |        |   |       |
|           | (5)  | NGC6341                         | RA: 17 17 7.0500 (259.2793750d)<br>Dec: +43 07 58.20 (43.13283d)<br>Equinox: J2000 |                      | V=20                     | Reference Frame: ICRS |                       |        |   |       |
| Exposures | #  | Label                           | Target   | Config,Mode,Aperture | Spectral Els.            | Opt. Params.          | Special Reqs.         | Groups | Exp. Time/[Actual Dur.]                     | Orbit |
|           | 1  | NGC6341-A<br>CS-F475W-<br>GUARD | (5) NGC6341  | ACS/WFC, ACCUM, WFC  | F475W                    | CR-SPLIT=2            |                       |        | 10 Secs<br>[==>(Split 1)]<br>[==>(Split 2)] | [1]   |
|           | 2  | NGC6341-A<br>CS-F475W           | (5) NGC6341  | ACS/WFC, ACCUM, WFC  | F475W                    |                       | POS TARG 0.265,0.121  |        | 400 Secs<br>[==>]                           | [1]   |
|           | 3  | NGC6341-A<br>CS-F475W           | (5) NGC6341  | ACS/WFC, ACCUM, WFC  | F475W                    |                       | POS TARG 0.292,0.242  |        | 400 Secs<br>[==>]                           | [1]   |
|           | 4  | NGC6341-A<br>CS-F475W           | (5) NGC6341  | ACS/WFC, ACCUM, WFC  | F475W                    |                       | POS TARG 0.372,0.266  |        | 400 Secs<br>[==>]                           | [1]   |
|           | 5  | NGC6341-A<br>CS-F475W           | (5) NGC6341  | ACS/WFC, ACCUM, WFC  | F475W                    |                       | POS TARG 0.288,-0.002 |        | 400 Secs<br>[==>]                           | [1]   |



Proposal 12116 - Visit 06 - A Panchromatic Hubble Andromeda and Triangulum Survey - Globular Cluster Sequence Calibrations

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| Visit     | <b>Proposal 12116, Visit 06, implementation</b><br><b>Diagnostic Status: No Diagnostics</b><br>Scientific Instruments: ACS/WFC<br>Special Requirements: ORIENT 96.287D TO 96.287 D |                                 |   |                      |                          |                       |                       |        |   |       |
|-----------|--|---------------------------------|---|----------------------|--------------------------|-----------------------|-----------------------|--------|---|-------|
|           | Fixed Targets  | #                               | Name  | Target Coordinates   | Targ. Coord. Corrections | Fluxes                | Miscellaneous         |        |   |       |
|           | (6)  | NGC6791                         | RA: 19 20 53.0000 (290.2208333d)<br>Dec: +37 46 30.00 (37.77500d)<br>Equinox: J2000 |                      | V=20                     | Reference Frame: ICRS |                       |        |   |       |
| Exposures | #  | Label                           | Target  | Config,Mode,Aperture | Spectral Els.            | Opt. Params.          | Special Reqs.         | Groups | Exp. Time/[Actual Dur.]                     | Orbit |
|           | 1  | NGC6791-A<br>CS-F475W-<br>GUARD | (6) NGC6791   | ACS/WFC, ACCUM, WFC  | F475W                    | CR-SPLIT=2            |                       |        | 14 Secs<br>[==>(Split 1)]<br>[==>(Split 2)] | [1]   |
|           | 2  | NGC6791-A<br>CS-F475W           | (6) NGC6791   | ACS/WFC, ACCUM, WFC  | F475W                    |                       | POS TARG 0.265,0.121  |        | 390 Secs<br>[==>]                           | [1]   |
|           | 3  | NGC6791-A<br>CS-F475W           | (6) NGC6791   | ACS/WFC, ACCUM, WFC  | F475W                    |                       | POS TARG 0.292,0.242  |        | 390 Secs<br>[==>]                           | [1]   |
|           | 4  | NGC6791-A<br>CS-F475W           | (6) NGC6791   | ACS/WFC, ACCUM, WFC  | F475W                    |                       | POS TARG 0.372,0.266  |        | 390 Secs<br>[==>]                           | [1]   |
|           | 5  | NGC6791-A<br>CS-F475W           | (6) NGC6791   | ACS/WFC, ACCUM, WFC  | F475W                    |                       | POS TARG 0.288,-0.002 |        | 390 Secs<br>[==>]                           | [1]   |

