



# 11117 - The Search for Atmospheric Water in the Transiting Planet HD189733b

Cycle: 16, Proposal Category: GO

(Availability Mode: AVAILABLE)

## INVESTIGATORS

| <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) HD189733                 | NIC1                                | 4                  | 09-Jul-2008 21:17:52.0        | yes                           |
| 02           | (1) HD189733                 | NIC1                                | 4                  | 09-Jul-2008 21:36:29.0        | yes                           |
| 05           | (1) HD189733                 | NIC1                                | 4                  | 09-Jul-2008 22:00:14.0        | yes                           |
| 03           | (1) HD189733                 | NIC1                                | 4                  | 09-Jul-2008 22:20:56.0        | yes                           |
| 53           | (1) HD189733                 | NIC1                                | 4                  | 09-Jul-2008 22:40:08.0        | yes                           |

| <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> |
|--------------|------------------------------|-------------------------------------|--------------------|-------------------------------|-------------------------------|
| 04           | (1) HD189733                 | NIC1                                | 4                  | 09-Jul-2008 22:59:58.0        | yes                           |
| 06           | (1) HD189733                 | NIC1                                | 4                  | 09-Jul-2008 23:27:50.0        | yes                           |

28 Total Orbits Used

## ABSTRACT

We propose to use the NICMOS camera to search for transit NIR signatures of atmospheric water in HD189733b. While water absorption bands exist in the optical and IR, space-based NIR signatures are uniquely positioned to offer the best chance at detection. Using narrow band photometric filters, we will be able to detect absorption signatures while the planet is in primary transit. A positive detection would be the first proof of water on an extrasolar planet. Furthermore, it would provide invaluable planetary information, constraining the entire chemistry. As a byproduct of the high SNR required for our primary science goal, we will be able to improve on the value of the planetary radius, a result independent of our primary science objective. The accurate radius estimate, together with planet structure models, will allow constraining the planet interior and its relationship with formation models and stellar metallicity.

## OBSERVING DESCRIPTION

Visits: 4 consisting of 4 HST orbits each. Two visits will be observed primary with the F187N filter while the other two will be done primary in the F166N filter. A set of observations at the beginning of the 1st orbit, the middle of the 3rd orbit, and the end of the 4th orbit, are to be done in the opposing filter. The exposure times for the two filters are 4 seconds with each orbit consisting of repeated exposures. No dithering is to be done and a small amount of defocusing is to be applied for each visit. Each exposure for all visits should be as close to identical as possible.

# Proposal 11117 - Visit 01 - The Search for Atmospheric Water in the Transiting Planet HD189733b

|                                                                                                                                                                                                                                     |                                                                                                                                                      |                         |                                                                                     |                             |               |                                                      |                     |        |                         |       |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|-------------------------------------------------------------------------------------|-----------------------------|---------------|------------------------------------------------------|---------------------|--------|-------------------------|-------|
| Visit                                                                                                                                                                                                                               | <b>Proposal 11117, Visit 01, completed</b> <span style="float: right;">Thu Jul 10 03:29:10 GMT 2008</span>                                           |                         |                                                                                     |                             |               |                                                      |                     |        |                         |       |
|                                                                                                                                                                                                                                     | <b>Diagnostic Status: No Diagnostics</b><br>Scientific Instruments: NIC1<br>Special Requirements: Period 2.218573 D AND ZERO-PHASE HJD2454037.611956 |                         |                                                                                     |                             |               |                                                      |                     |        |                         |       |
| Fixed Targets                                                                                                                                                                                                                       | #                                                                                                                                                    | Name                    | Target Coordinates                                                                  | Targ. Coord. Corrections    | Fluxes        | Miscellaneous                                        |                     |        |                         |       |
|                                                                                                                                                                                                                                     | (1)                                                                                                                                                  | HD189733                | RA: 20 00 43.7133 (300.1821388d)<br>Dec: +22 42 39.07 (22.71085d)<br>Equinox: J2000 |                             | V=7.67+/-0.01 | Reference Frame: ICRS                                |                     |        |                         |       |
| Exposures                                                                                                                                                                                                                           | #                                                                                                                                                    | Label                   | Target                                                                              | Config,Mode,Aperture        | Spectral Els. | Opt. Params.                                         | Special Reqs.       | Groups | Exp. Time/[Actual Dur.] | Orbit |
|                                                                                                                                                                                                                                     | 1                                                                                                                                                    | F166N Constraints Phase | (1) HD189733                                                                        | NIC1, MULTIACCUM, NIC1-FIXD | F166N         | NSAMP=3;<br>SAMP-SEQ=SPARS4;<br>CAMERA-FOCUS=DEFOCUS | PHASE 0.925 TO 0.94 |        | [==>]                   | [1]   |
| Comments: Phase constrained such that the transit occurs in the third orbit. The third orbit should contain the central transit depth, with the constraints set to begin or end the third orbit science observations at that point. |                                                                                                                                                      |                         |                                                                                     |                             |               |                                                      |                     |        |                         |       |

Proposal 11117 - Visit 01 - The Search for Atmospheric Water in the Transiting Planet HD189733b

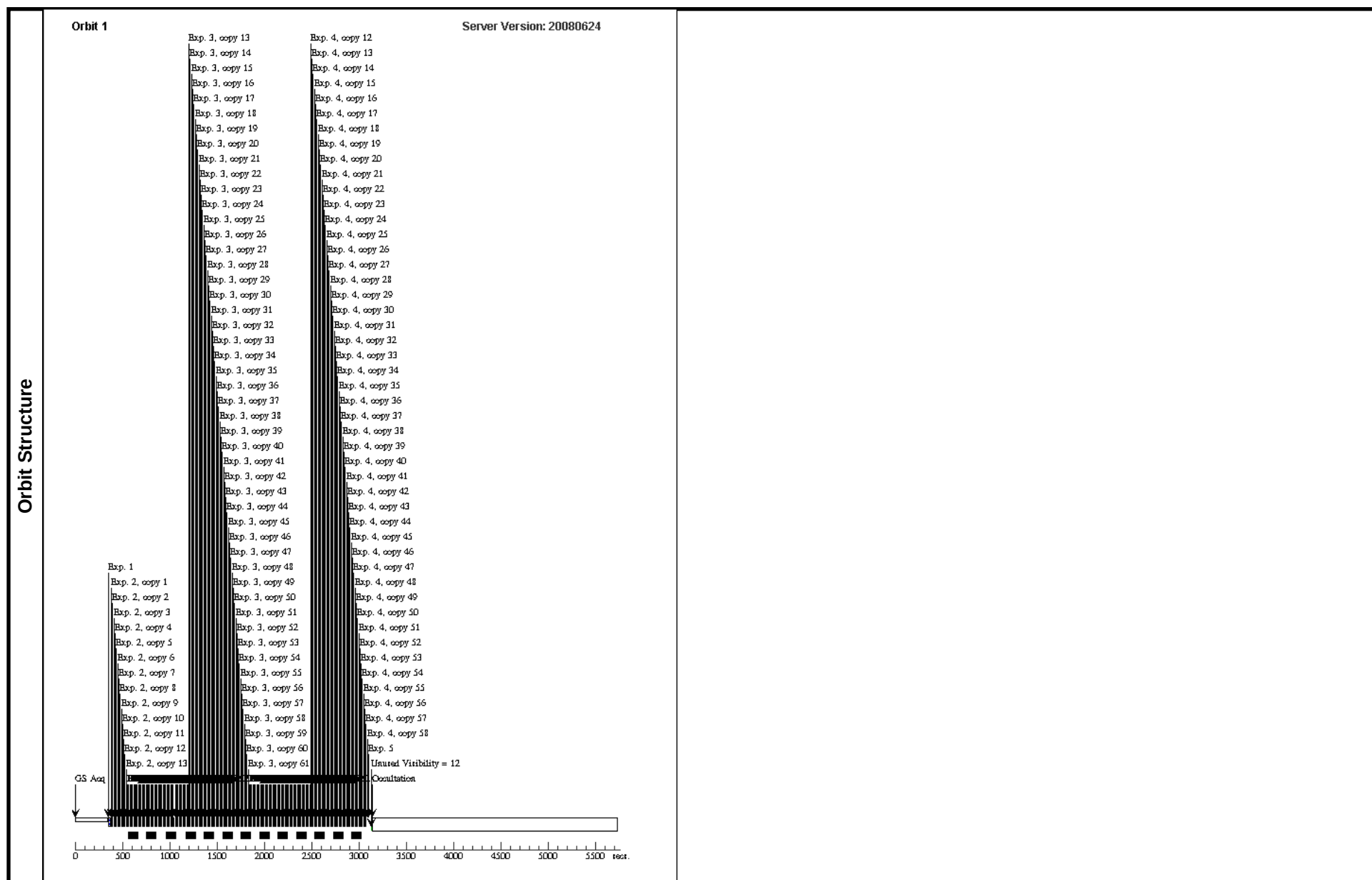
| Exposures (continued) | # | Label          | Target       | Config,Mode,Aperture        | Spectral Els. | Opt. Params.                                           | Special Req.                | Groups | Exp. Time/[Actual Dur.] | Orbit |
|-----------------------|---|----------------|--------------|-----------------------------|---------------|--------------------------------------------------------|-----------------------------|--------|-------------------------|-------|
|                       | 5 | Orbit 2 F187 N | (1) HD189733 | NIC1, MULTIACCUM, NIC1-FIXD | F187N         | NSAMP=3;<br>SAMP-SEQ=SPAR S4;<br>CAMERA-FOCUS =DEFOCUS | SAME POS AS 1;<br>NEW OBSET |        | [==>]                   | [1]   |

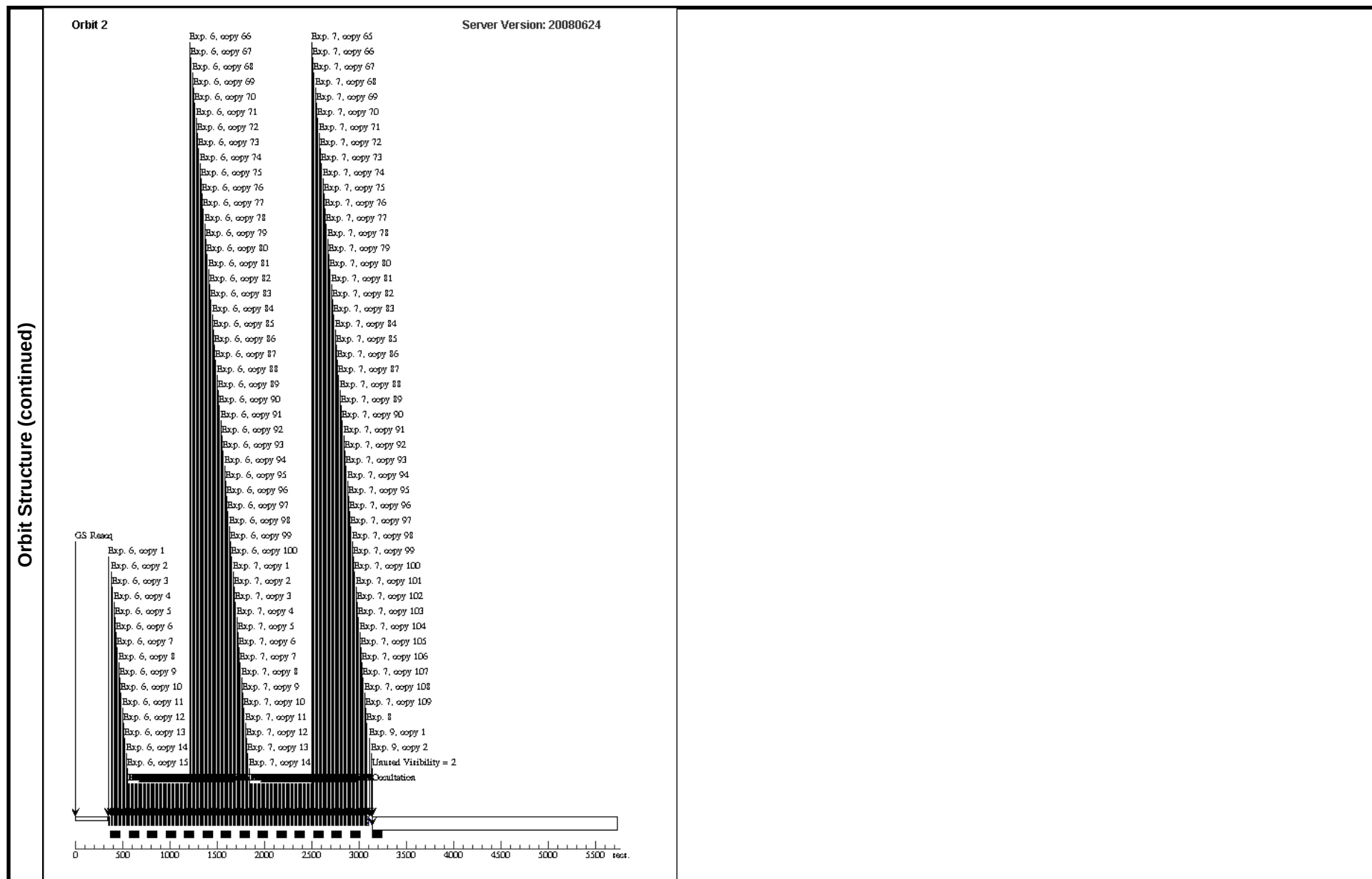
Proposal 11117 - Visit 01 - The Search for Atmospheric Water in the Transiting Planet HD189733b

| Exposures (continued) | # | Label                     | Target       | Config,Mode,Aperture        | Spectral Els. | Opt. Params.                                           | Special Req.                | Groups | Exp. Time/[Actual Dur.] | Orbit |
|-----------------------|---|---------------------------|--------------|-----------------------------|---------------|--------------------------------------------------------|-----------------------------|--------|-------------------------|-------|
|                       | 8 | Orbit 3 F187 N In Transit | (1) HD189733 | NIC1, MULTIACCUM, NIC1-FIXD | F187N         | NSAMP=3;<br>SAMP-SEQ=SPAR S4;<br>CAMERA-FOCUS =DEFOCUS | SAME POS AS 1;<br>NEW OBSET |        | [==>]                   | [2]   |

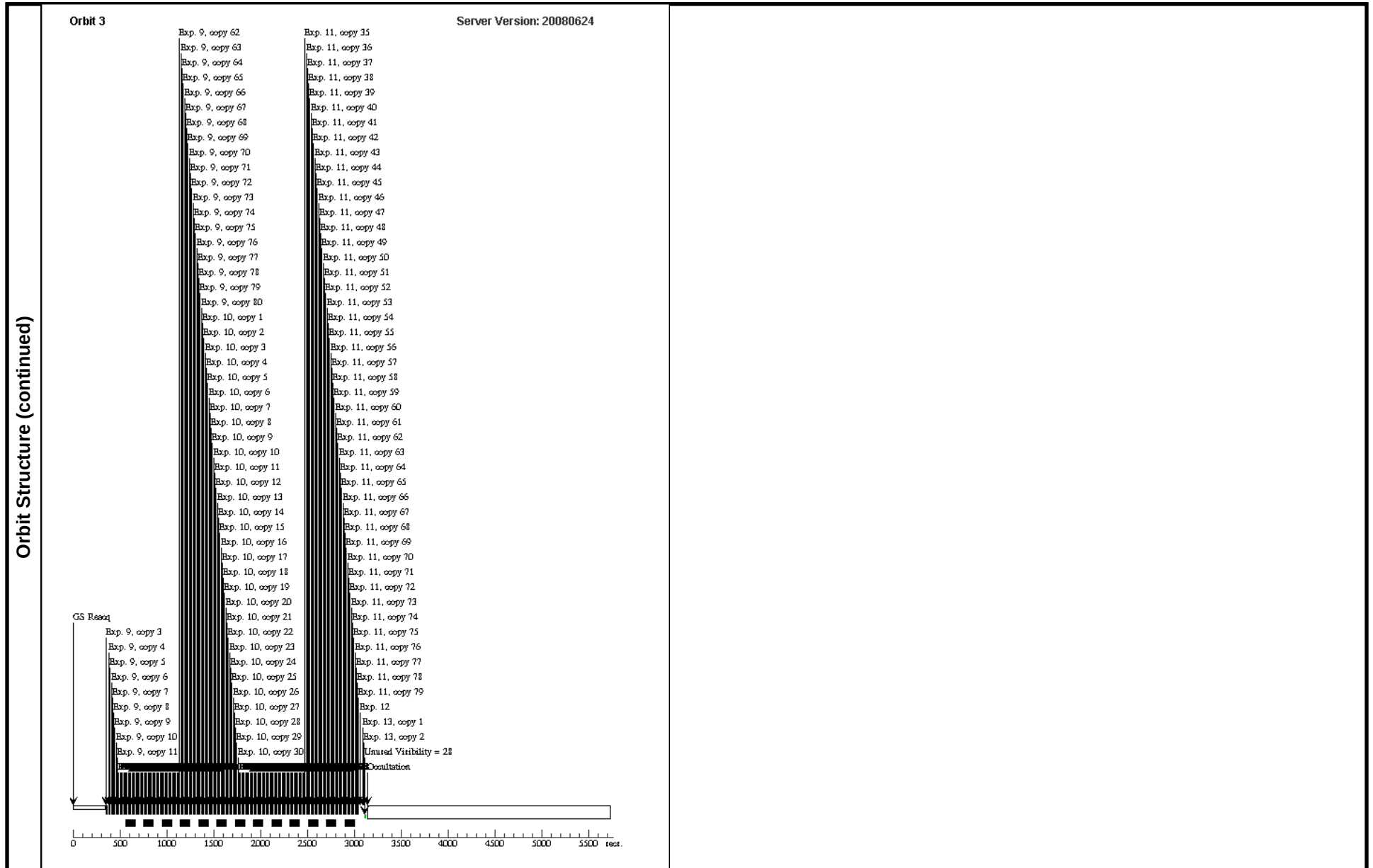
Proposal 11117 - Visit 01 - The Search for Atmospheric Water in the Transiting Planet HD189733b

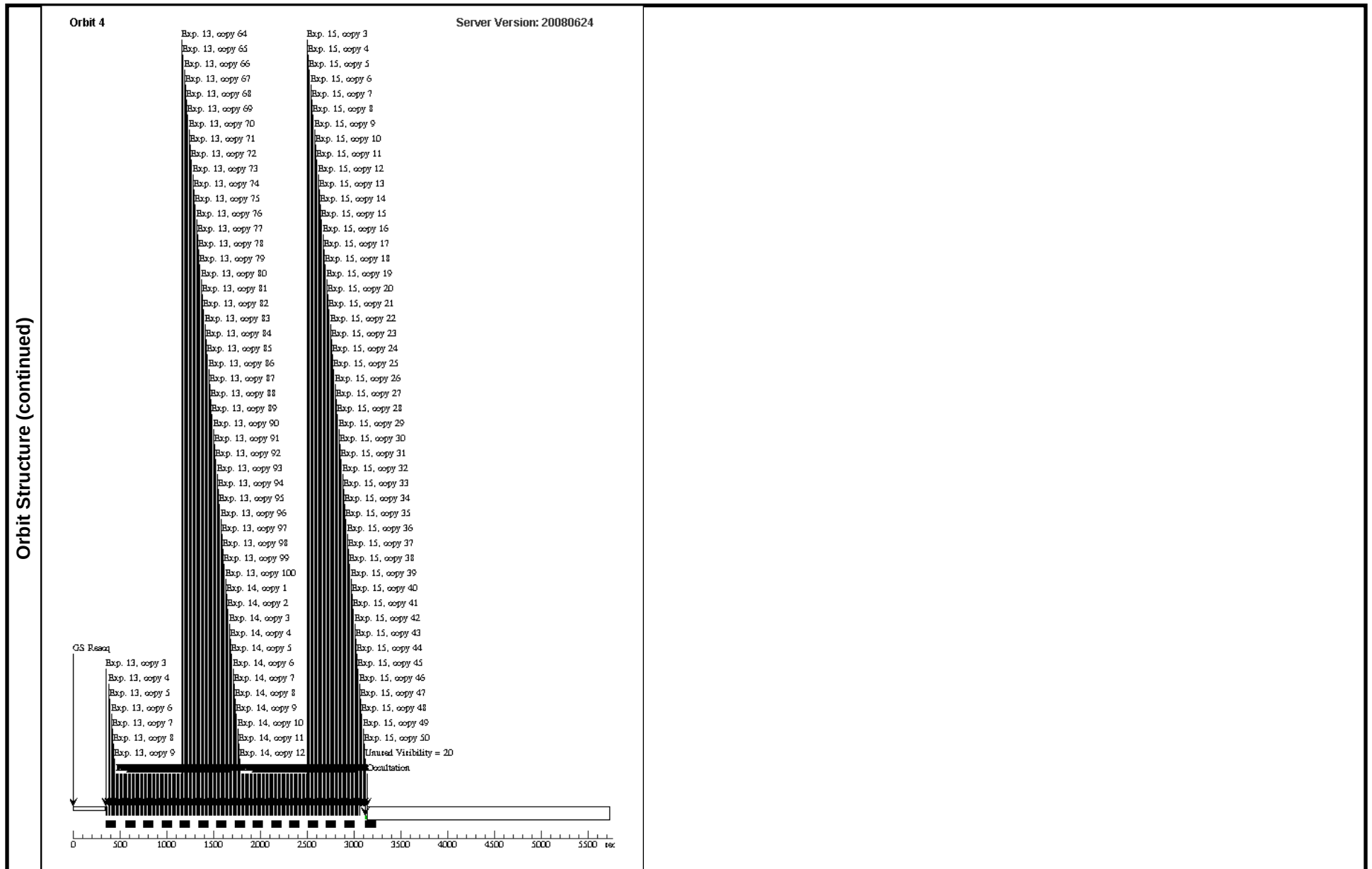
| Exposures (continued) | #  | Label          | Target       | Config,Mode,Aperture        | Spectral Els. | Opt. Params.                                           | Special Reqs.               | Groups | Exp. Time/[Actual Dur.] | Orbit |
|-----------------------|----|----------------|--------------|-----------------------------|---------------|--------------------------------------------------------|-----------------------------|--------|-------------------------|-------|
|                       | 12 | Orbit 4 F187 N | (1) HD189733 | NIC1, MULTIACCUM, NIC1-FIXD | F187N         | NSAMP=3;<br>SAMP-SEQ=SPAR S4;<br>CAMERA-FOCUS =DEFOCUS | SAME POS AS 1;<br>NEW OBSET |        | [==>]                   | [3]   |











# Proposal 11117 - Visit 02 - The Search for Atmospheric Water in the Transiting Planet HD189733b

|                                                                                                                                                                                                                                     |                                                                                                                                                      |                             |                                                                                     |                                |               |                                                      |                     |        |                         |       |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|-------------------------------------------------------------------------------------|--------------------------------|---------------|------------------------------------------------------|---------------------|--------|-------------------------|-------|
| Visit                                                                                                                                                                                                                               | <b>Proposal 11117, Visit 02, withdrawn</b> <span style="float: right;">Thu Jul 10 03:29:22 GMT 2008</span>                                           |                             |                                                                                     |                                |               |                                                      |                     |        |                         |       |
|                                                                                                                                                                                                                                     | <b>Diagnostic Status: No Diagnostics</b><br>Scientific Instruments: NIC1<br>Special Requirements: Period 2.218573 D AND ZERO-PHASE HJD2454037.611956 |                             |                                                                                     |                                |               |                                                      |                     |        |                         |       |
| Fixed Targets                                                                                                                                                                                                                       | #                                                                                                                                                    | Name                        | Target Coordinates                                                                  | Targ. Coord. Corrections       | Fluxes        | Miscellaneous                                        |                     |        |                         |       |
|                                                                                                                                                                                                                                     | (1)                                                                                                                                                  | HD189733                    | RA: 20 00 43.7133 (300.1821388d)<br>Dec: +22 42 39.07 (22.71085d)<br>Equinox: J2000 |                                | V=7.67+/-0.01 | Reference Frame: ICRS                                |                     |        |                         |       |
| Exposures                                                                                                                                                                                                                           | #                                                                                                                                                    | Label                       | Target                                                                              | Config,Mode,Aperture           | Spectral Els. | Opt. Params.                                         | Special Reqs.       | Groups | Exp. Time/[Actual Dur.] | Orbit |
|                                                                                                                                                                                                                                     | 1                                                                                                                                                    | F187N Cons<br>trained Phase | (1) HD189733                                                                        | NIC1, MULTIACCUM,<br>NIC1-FIXD | F187N         | NSAMP=3;<br>SAMP-SEQ=SPARS4;<br>CAMERA-FOCUS=DEFOCUS | PHASE 0.925 TO 0.94 |        | [==>]                   | [1]   |
| Comments: Phase constrained such that the transit occurs in the third orbit. The third orbit should contain the central transit depth, with the constraints set to begin or end the third orbit science observations at that point. |                                                                                                                                                      |                             |                                                                                     |                                |               |                                                      |                     |        |                         |       |

Proposal 11117 - Visit 02 - The Search for Atmospheric Water in the Transiting Planet HD189733b

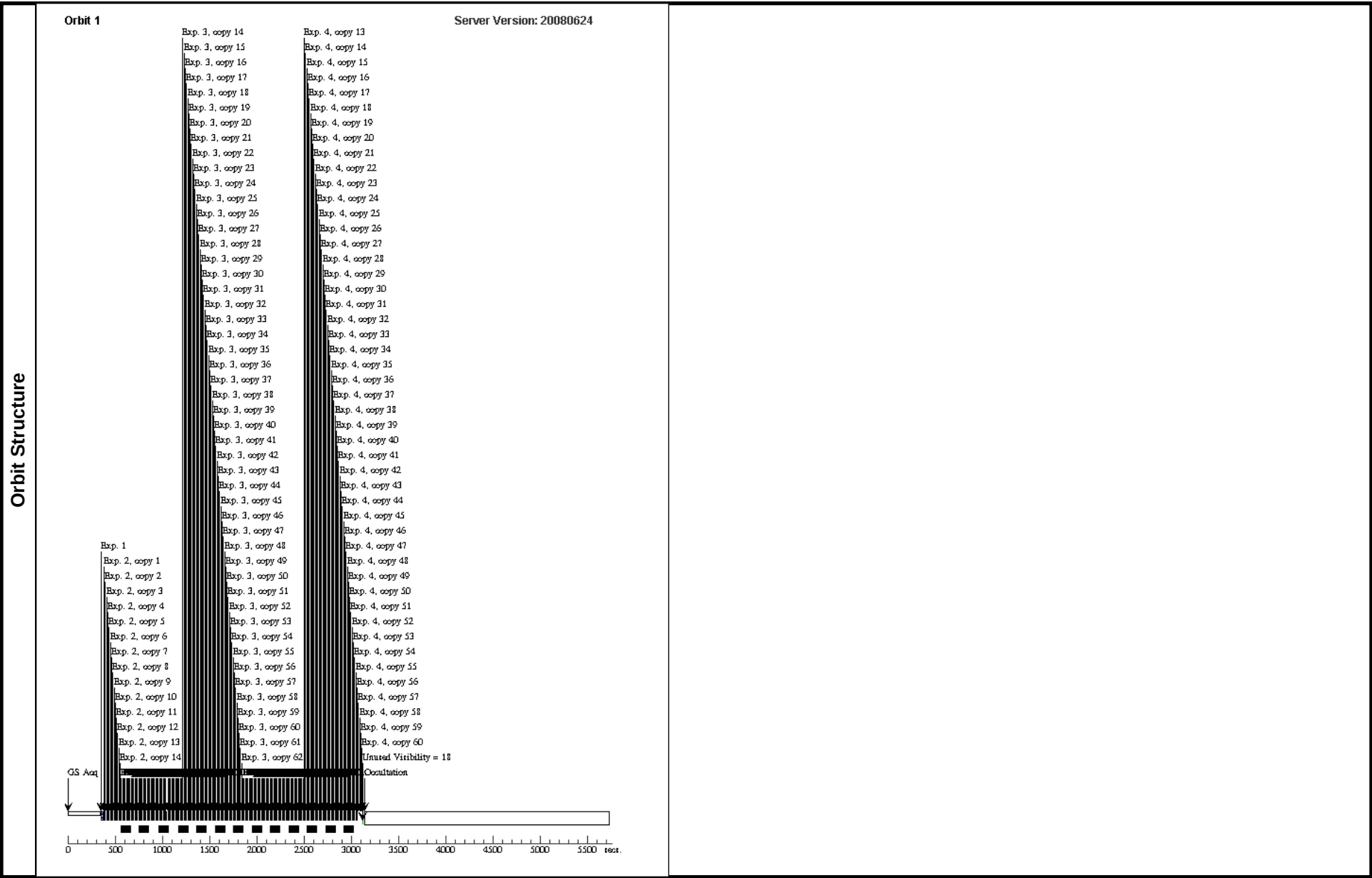
| Exposures (continued) | # | Label          | Target       | Config,Mode,Aperture        | Spectral Els. | Opt. Params.                                           | Special Req.                | Groups | Exp. Time/[Actual Dur.] | Orbit |
|-----------------------|---|----------------|--------------|-----------------------------|---------------|--------------------------------------------------------|-----------------------------|--------|-------------------------|-------|
|                       | 5 | Orbit 2 F166 N | (1) HD189733 | NIC1, MULTIACCUM, NIC1-FIXD | F166N         | NSAMP=3;<br>SAMP-SEQ=SPAR S4;<br>CAMERA-FOCUS =DEFOCUS | SAME POS AS 1;<br>NEW OBSET |        | [==>]                   | [2]   |

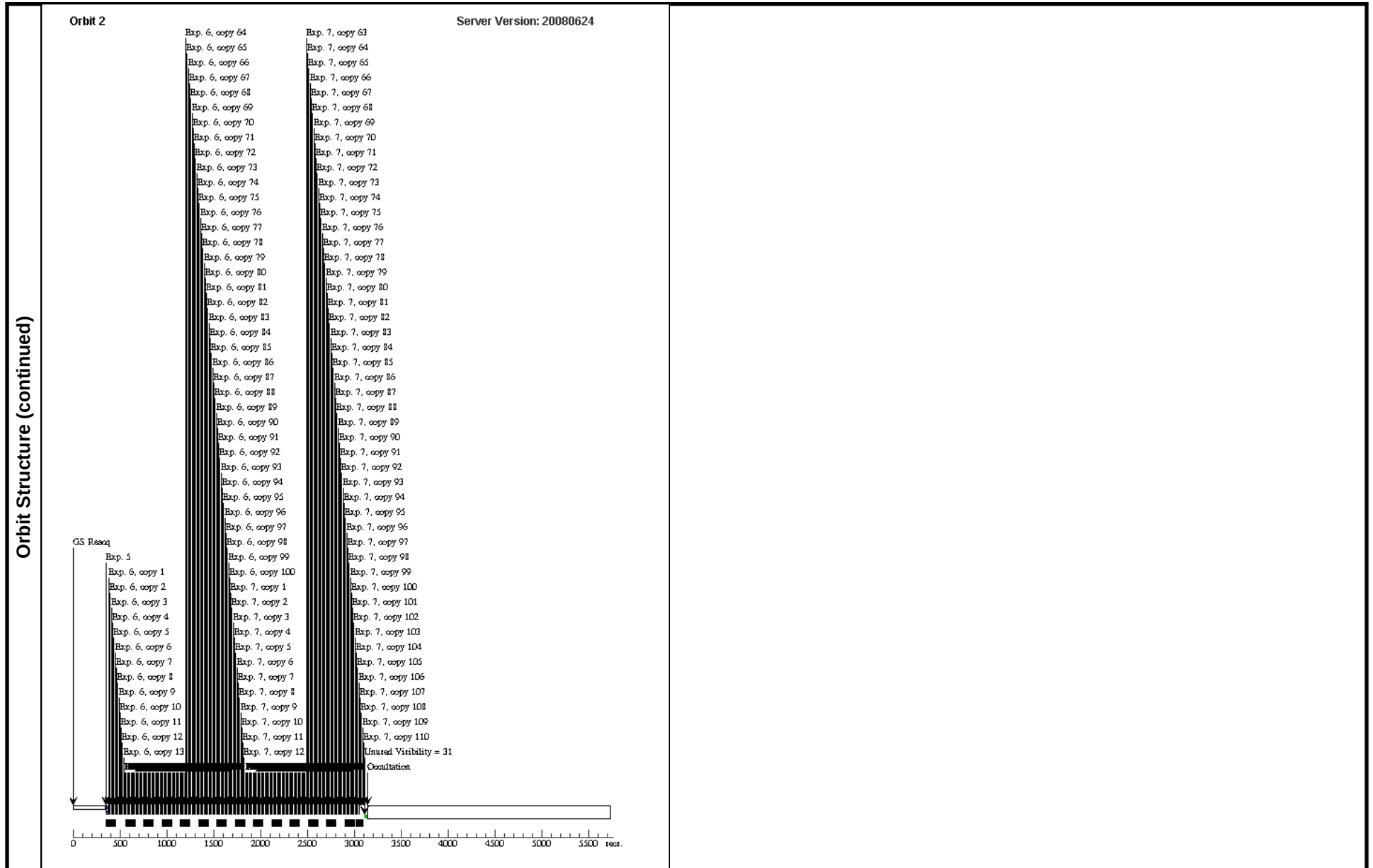
Proposal 11117 - Visit 02 - The Search for Atmospheric Water in the Transiting Planet HD189733b

| Exposures (continued) | # | Label                        | Target       | Config,Mode,Aperture           | Spectral Els. | Opt. Params.                                                 | Special Req.                | Groups | Exp. Time/[Actual Dur.] | Orbit |
|-----------------------|---|------------------------------|--------------|--------------------------------|---------------|--------------------------------------------------------------|-----------------------------|--------|-------------------------|-------|
|                       | 8 | Orbit 3 F166<br>N In Transit | (1) HD189733 | NIC1, MULTIACCUM,<br>NIC1-FIXD | F166N         | NSAMP=3;<br>SAMP-SEQ=SPAR<br>S4;<br>CAMERA-FOCUS<br>=DEFOCUS | SAME POS AS 1;<br>NEW OBSET |        | [==>]                   | [3]   |

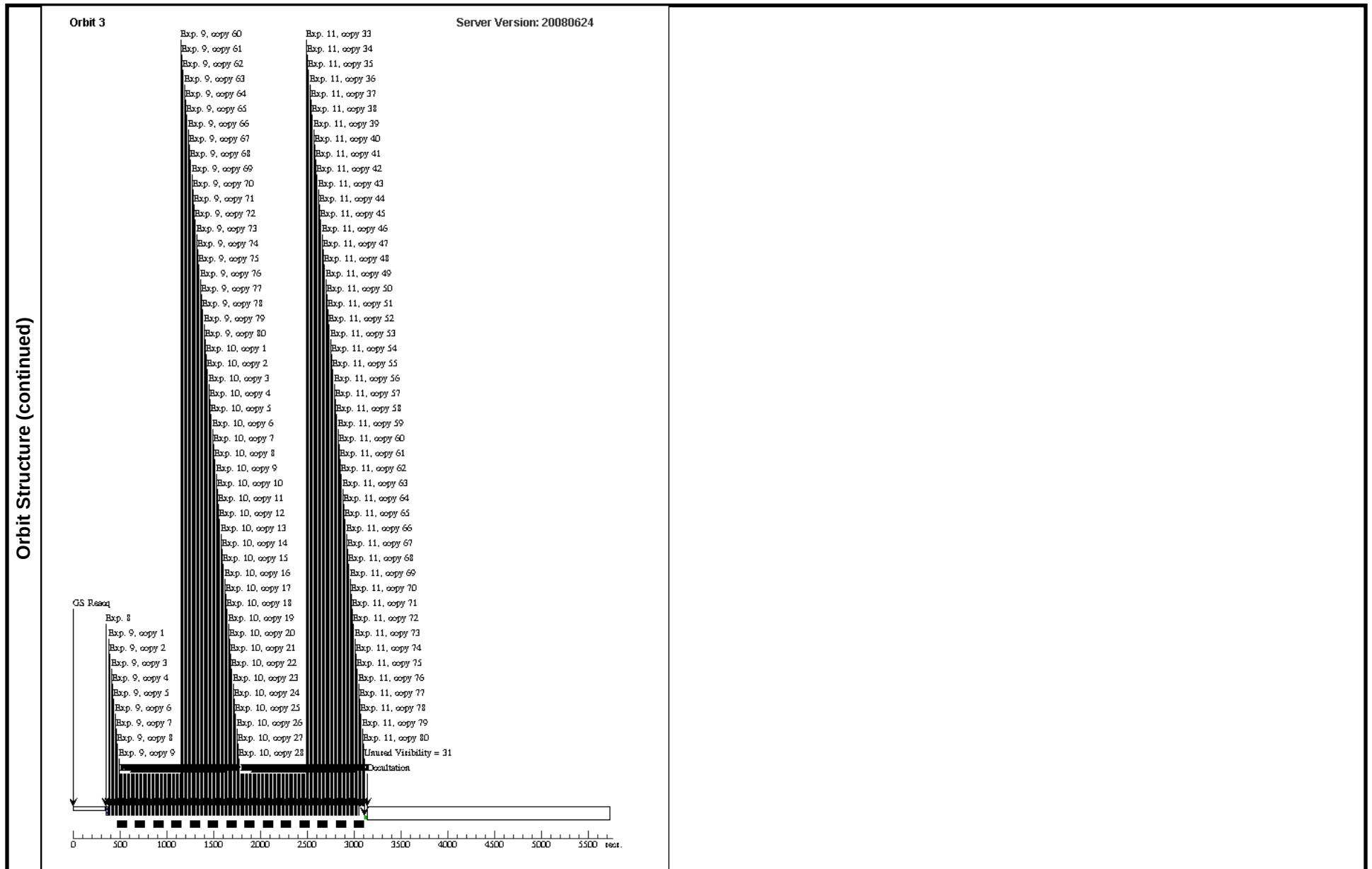
Proposal 11117 - Visit 02 - The Search for Atmospheric Water in the Transiting Planet HD189733b

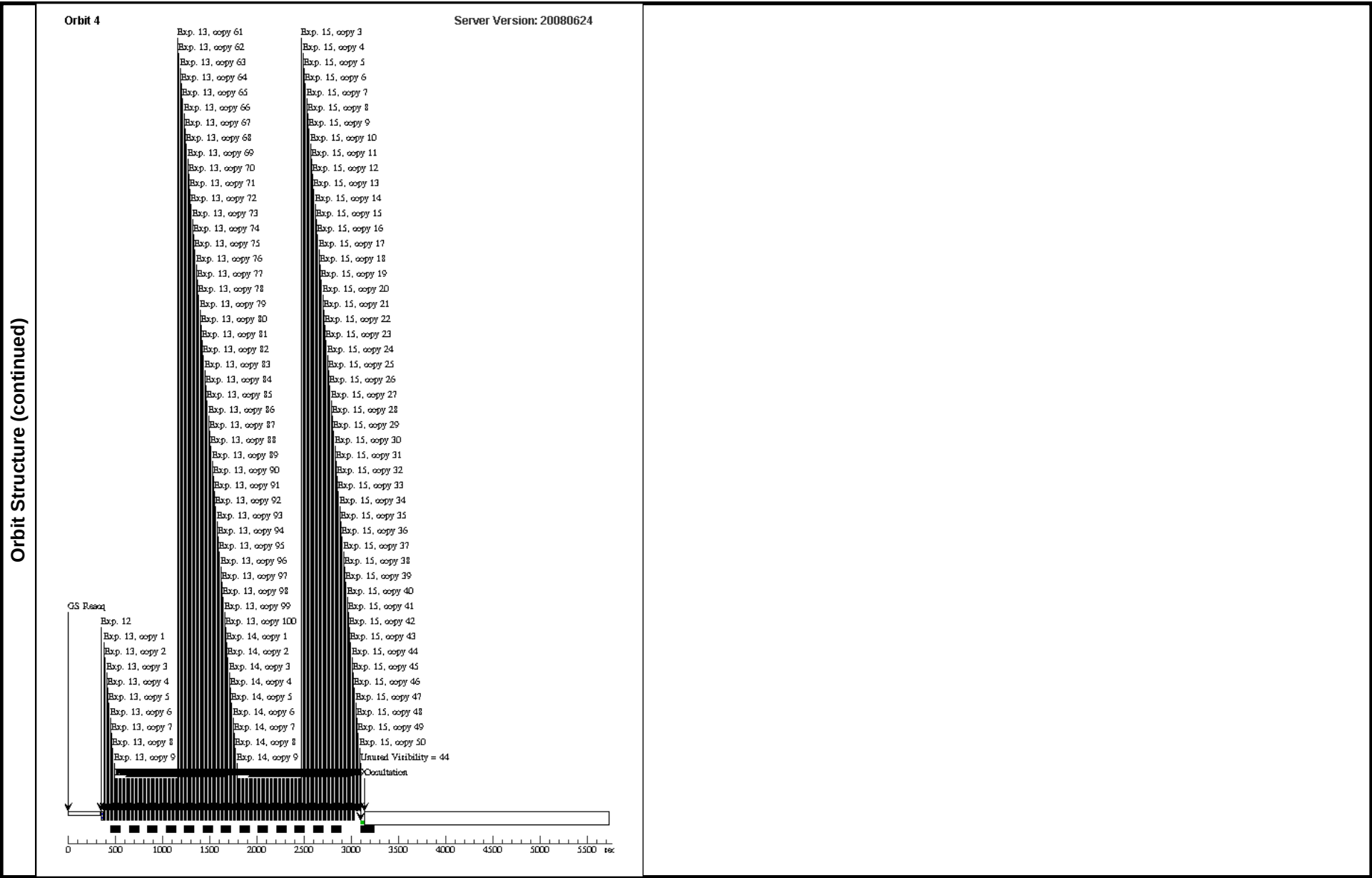
| Exposures (continued) | #  | Label          | Target       | Config,Mode,Aperture        | Spectral Els. | Opt. Params.                                           | Special Req.                | Groups | Exp. Time/[Actual Dur.] | Orbit |
|-----------------------|----|----------------|--------------|-----------------------------|---------------|--------------------------------------------------------|-----------------------------|--------|-------------------------|-------|
|                       | 12 | Orbit 4 F166 N | (1) HD189733 | NIC1, MULTIACCUM, NIC1-FIXD | F166N         | NSAMP=3;<br>SAMP-SEQ=SPAR S4;<br>CAMERA-FOCUS =DEFOCUS | SAME POS AS 1;<br>NEW OBSET |        | [==>]                   | [4]   |











# Proposal 11117 - Visit 05 - The Search for Atmospheric Water in the Transiting Planet HD189733b

|                                                                                                                                                                                                                                     |                                                                                                                                                      |                         |                                                                                     |                             |               |                                                      |                     |        |                         |       |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|-------------------------------------------------------------------------------------|-----------------------------|---------------|------------------------------------------------------|---------------------|--------|-------------------------|-------|
| Visit                                                                                                                                                                                                                               | <b>Proposal 11117, Visit 05, completed</b> <span style="float: right;">Thu Jul 10 03:29:33 GMT 2008</span>                                           |                         |                                                                                     |                             |               |                                                      |                     |        |                         |       |
|                                                                                                                                                                                                                                     | <b>Diagnostic Status: No Diagnostics</b><br>Scientific Instruments: NIC1<br>Special Requirements: Period 2.218573 D AND ZERO-PHASE HJD2454037.611956 |                         |                                                                                     |                             |               |                                                      |                     |        |                         |       |
| Fixed Targets                                                                                                                                                                                                                       | #                                                                                                                                                    | Name                    | Target Coordinates                                                                  | Targ. Coord. Corrections    | Fluxes        | Miscellaneous                                        |                     |        |                         |       |
|                                                                                                                                                                                                                                     | (1)                                                                                                                                                  | HD189733                | RA: 20 00 43.7133 (300.1821388d)<br>Dec: +22 42 39.07 (22.71085d)<br>Equinox: J2000 |                             | V=7.67+/-0.01 | Reference Frame: ICRS                                |                     |        |                         |       |
| Exposures                                                                                                                                                                                                                           | #                                                                                                                                                    | Label                   | Target                                                                              | Config,Mode,Aperture        | Spectral Els. | Opt. Params.                                         | Special Reqs.       | Groups | Exp. Time/[Actual Dur.] | Orbit |
|                                                                                                                                                                                                                                     | 1                                                                                                                                                    | F187N Constraints Phase | (1) HD189733                                                                        | NIC1, MULTIACCUM, NIC1-FIXD | F187N         | NSAMP=3;<br>SAMP-SEQ=SPARS4;<br>CAMERA-FOCUS=DEFOCUS | PHASE 0.925 TO 0.94 |        | [==>]                   | [1]   |
| Comments: Phase constrained such that the transit occurs in the third orbit. The third orbit should contain the central transit depth, with the constraints set to begin or end the third orbit science observations at that point. |                                                                                                                                                      |                         |                                                                                     |                             |               |                                                      |                     |        |                         |       |

Proposal 11117 - Visit 05 - The Search for Atmospheric Water in the Transiting Planet HD189733b

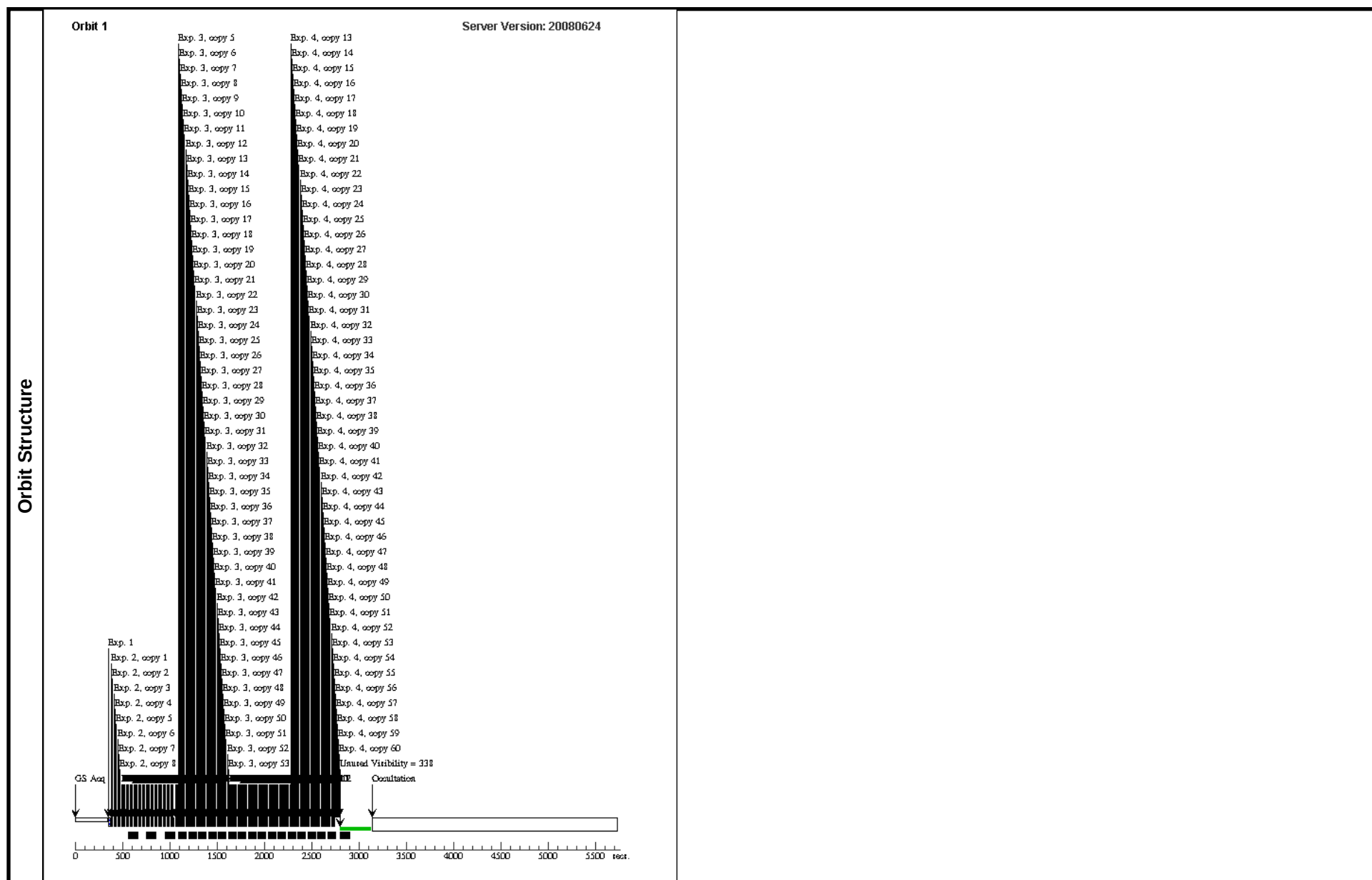
| Exposures (continued) | # | Label          | Target       | Config,Mode,Aperture        | Spectral Els. | Opt. Params.                                                | Special Req.                | Groups | Exp. Time/[Actual Dur.] | Orbit |
|-----------------------|---|----------------|--------------|-----------------------------|---------------|-------------------------------------------------------------|-----------------------------|--------|-------------------------|-------|
|                       | 5 | Orbit 2 F166 N | (1) HD189733 | NIC1, MULTIACCUM, NIC1-FIXD | F166N         | NSAMP=4;<br>SAMP-SEQ=STEP1<br>;<br>CAMERA-FOCUS<br>=DEFOCUS | SAME POS AS 1;<br>NEW OBSET |        | [==>]                   | [2]   |

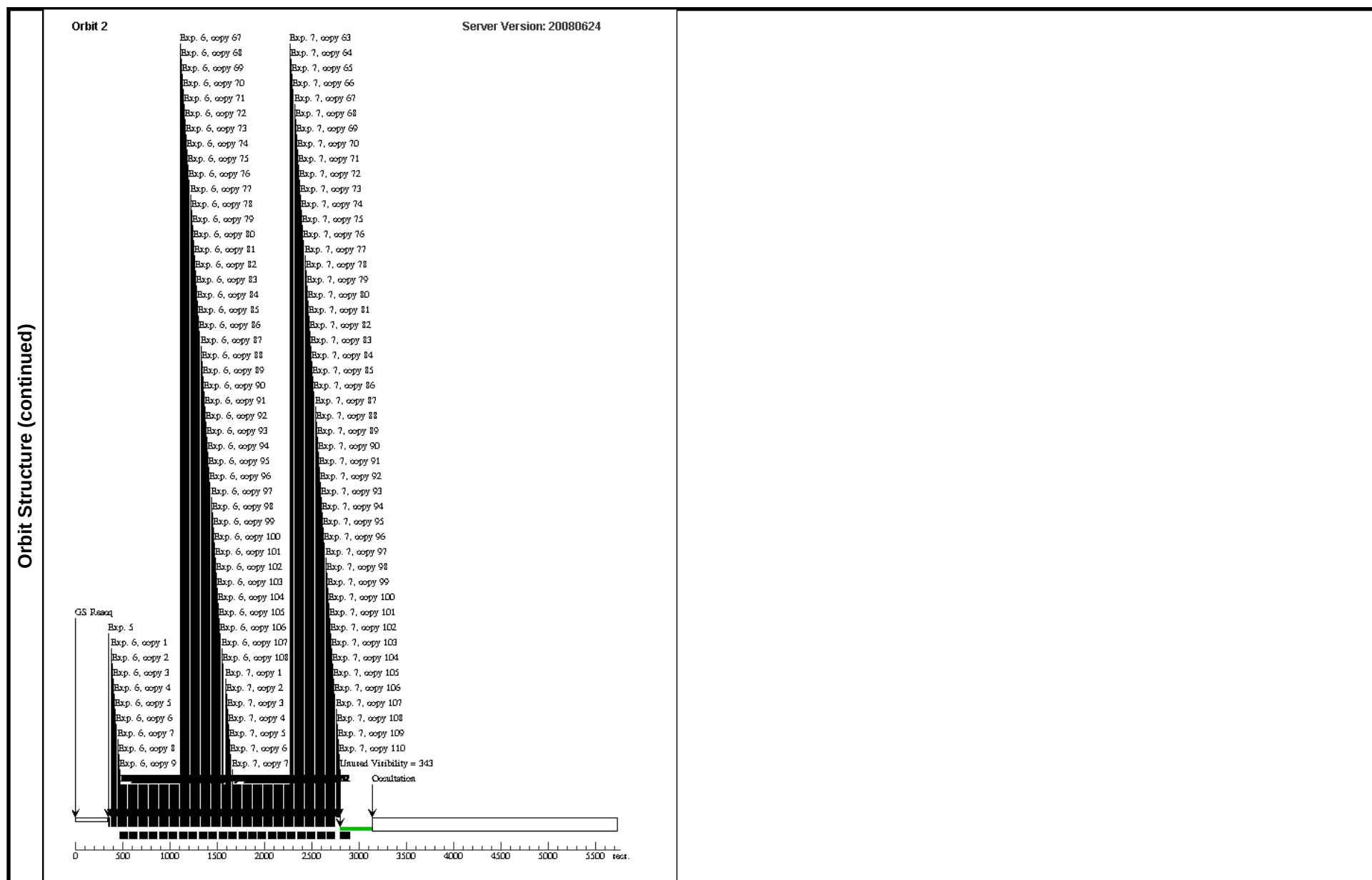
Proposal 11117 - Visit 05 - The Search for Atmospheric Water in the Transiting Planet HD189733b

| Exposures (continued) | # | Label                     | Target       | Config,Mode,Aperture        | Spectral Els. | Opt. Params.                                                | Special Req.                | Groups | Exp. Time/[Actual Dur.] | Orbit |
|-----------------------|---|---------------------------|--------------|-----------------------------|---------------|-------------------------------------------------------------|-----------------------------|--------|-------------------------|-------|
|                       | 8 | Orbit 3 F166 N In Transit | (1) HD189733 | NIC1, MULTIACCUM, NIC1-FIXD | F166N         | NSAMP=4;<br>SAMP-SEQ=STEP1<br>;<br>CAMERA-FOCUS<br>=DEFOCUS | SAME POS AS 1;<br>NEW OBSET |        | [==>]                   | [3]   |

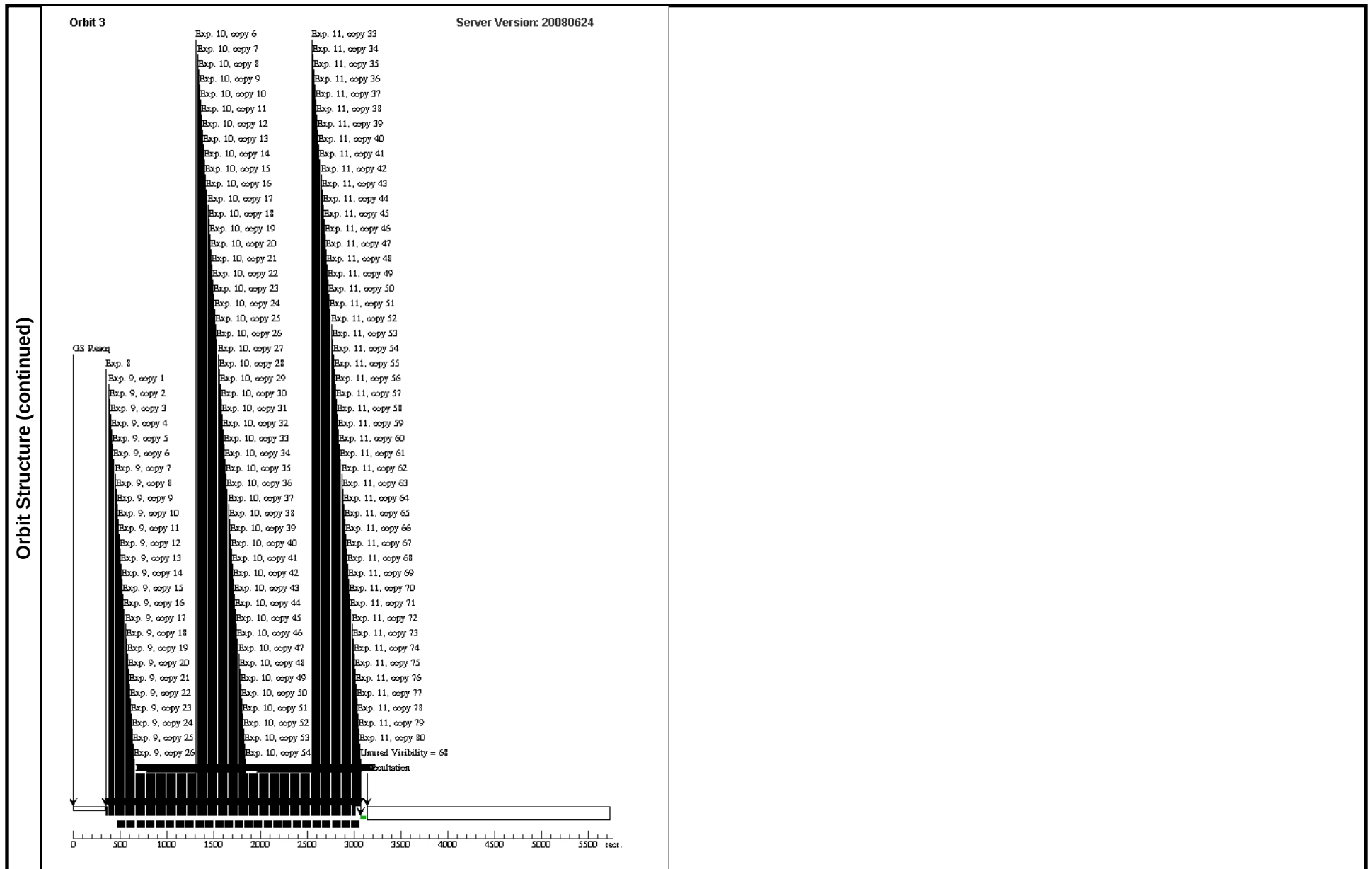
Proposal 11117 - Visit 05 - The Search for Atmospheric Water in the Transiting Planet HD189733b

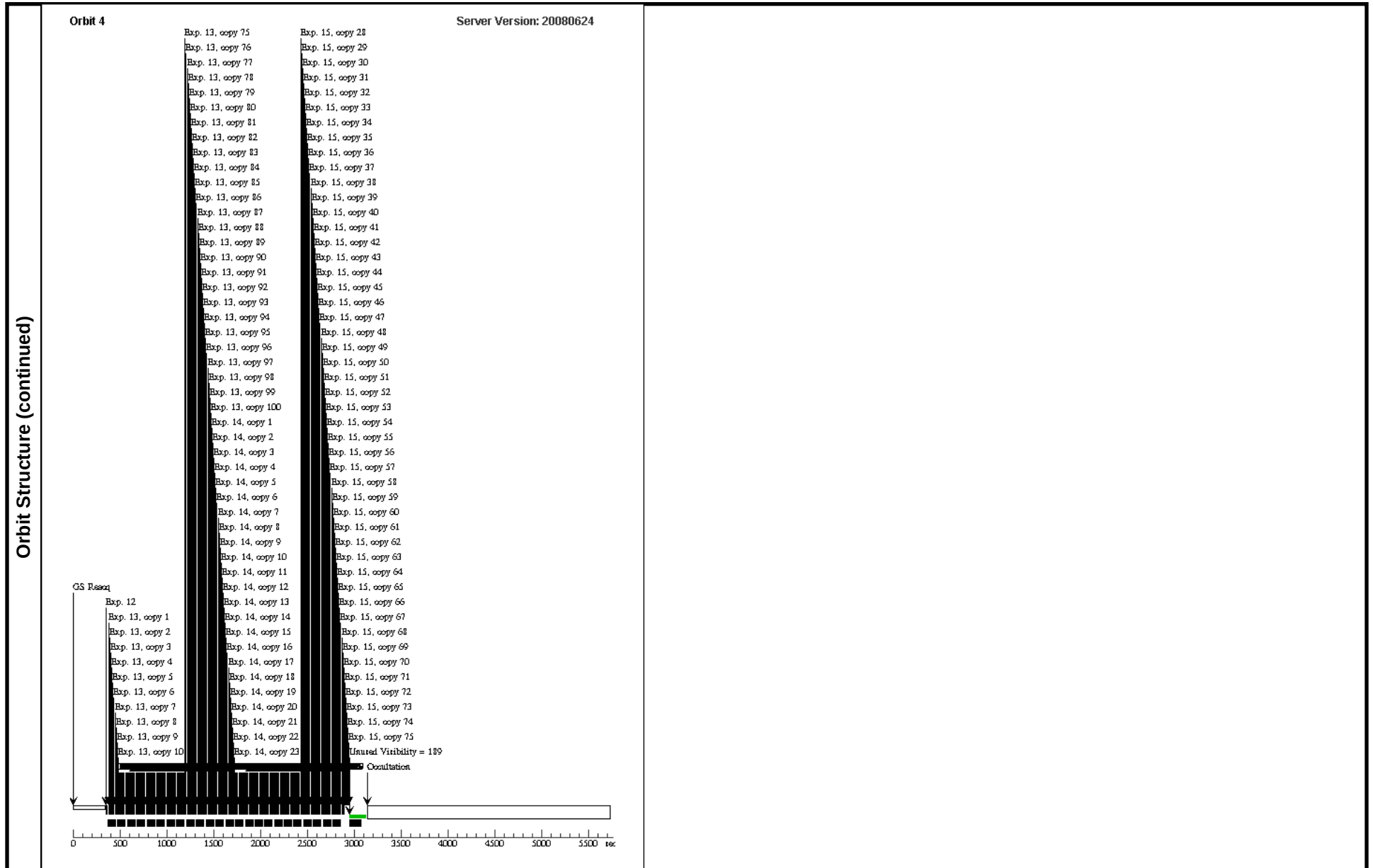
| Exposures (continued) | #  | Label          | Target       | Config,Mode,Aperture        | Spectral Els. | Opt. Params.                                                | Special Req.                | Groups | Exp. Time/[Actual Dur.] | Orbit |
|-----------------------|----|----------------|--------------|-----------------------------|---------------|-------------------------------------------------------------|-----------------------------|--------|-------------------------|-------|
|                       | 12 | Orbit 4 F166 N | (1) HD189733 | NIC1, MULTIACCUM, NIC1-FIXD | F166N         | NSAMP=4;<br>SAMP-SEQ=STEP1<br>;<br>CAMERA-FOCUS<br>=DEFOCUS | SAME POS AS 1;<br>NEW OBSET |        | [==>]                   | [4]   |











# Proposal 11117 - Visit 03 - The Search for Atmospheric Water in the Transiting Planet HD189733b

|                                                                                                                      |                                                                                                                                                      |                             |                                                                                     |                                |               |                                                              |                            |        |                         |       |
|----------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|-------------------------------------------------------------------------------------|--------------------------------|---------------|--------------------------------------------------------------|----------------------------|--------|-------------------------|-------|
| Visit                                                                                                                | <b>Proposal 11117, Visit 03, failed</b> <span style="float: right;">Thu Jul 10 03:29:43 GMT 2008</span>                                              |                             |                                                                                     |                                |               |                                                              |                            |        |                         |       |
|                                                                                                                      | <b>Diagnostic Status: No Diagnostics</b><br>Scientific Instruments: NIC1<br>Special Requirements: Period 2.218573 D AND ZERO-PHASE HJD2454037.611956 |                             |                                                                                     |                                |               |                                                              |                            |        |                         |       |
| Fixed Targets                                                                                                        | #                                                                                                                                                    | Name                        | Target Coordinates                                                                  | Targ. Coord. Corrections       | Fluxes        | Miscellaneous                                                |                            |        |                         |       |
|                                                                                                                      | (1)                                                                                                                                                  | HD189733                    | RA: 20 00 43.7133 (300.1821388d)<br>Dec: +22 42 39.07 (22.71085d)<br>Equinox: J2000 |                                | V=7.67+/-0.01 | Reference Frame: ICRS                                        |                            |        |                         |       |
| Exposures                                                                                                            | #                                                                                                                                                    | Label                       | Target                                                                              | Config,Mode,Aperture           | Spectral Els. | Opt. Params.                                                 | Special Reqs.              | Groups | Exp. Time/[Actual Dur.] | Orbit |
|                                                                                                                      | 1                                                                                                                                                    | F166N Cons<br>trained Phase | (1) HD189733                                                                        | NIC1, MULTIACCUM,<br>NIC1-FIXD | F166N         | NSAMP=3;<br>SAMP-SEQ=SPAR<br>S4;<br>CAMERA-FOCUS<br>=DEFOCUS | PHASE 0.9425 TO 0<br>.9525 |        | [==>]                   | [1]   |
| Comments: Phase constrained such that the full ingress (or full outgress) is covered by the second (or third) orbit. |                                                                                                                                                      |                             |                                                                                     |                                |               |                                                              |                            |        |                         |       |

Proposal 11117 - Visit 03 - The Search for Atmospheric Water in the Transiting Planet HD189733b

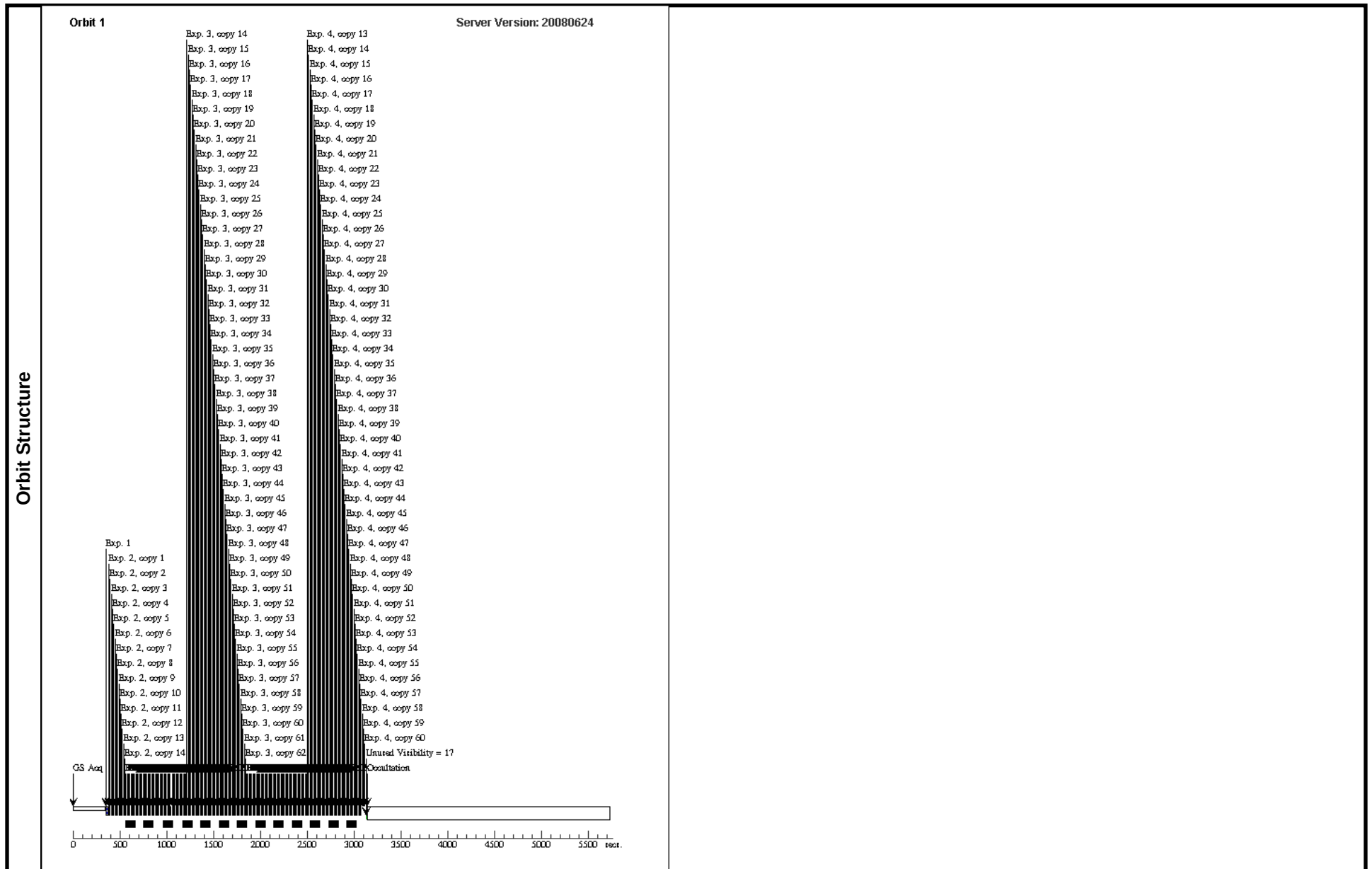
| Exposures (continued) | # | Label          | Target       | Config,Mode,Aperture        | Spectral Els. | Opt. Params.                                           | Special Req.                | Groups | Exp. Time/[Actual Dur.] | Orbit |
|-----------------------|---|----------------|--------------|-----------------------------|---------------|--------------------------------------------------------|-----------------------------|--------|-------------------------|-------|
|                       | 5 | Orbit 2 F187 N | (1) HD189733 | NIC1, MULTIACCUM, NIC1-FIXD | F187N         | NSAMP=3;<br>SAMP-SEQ=SPAR S4;<br>CAMERA-FOCUS =DEFOCUS | SAME POS AS 1;<br>NEW OBSET |        | [==>]                   | [2]   |

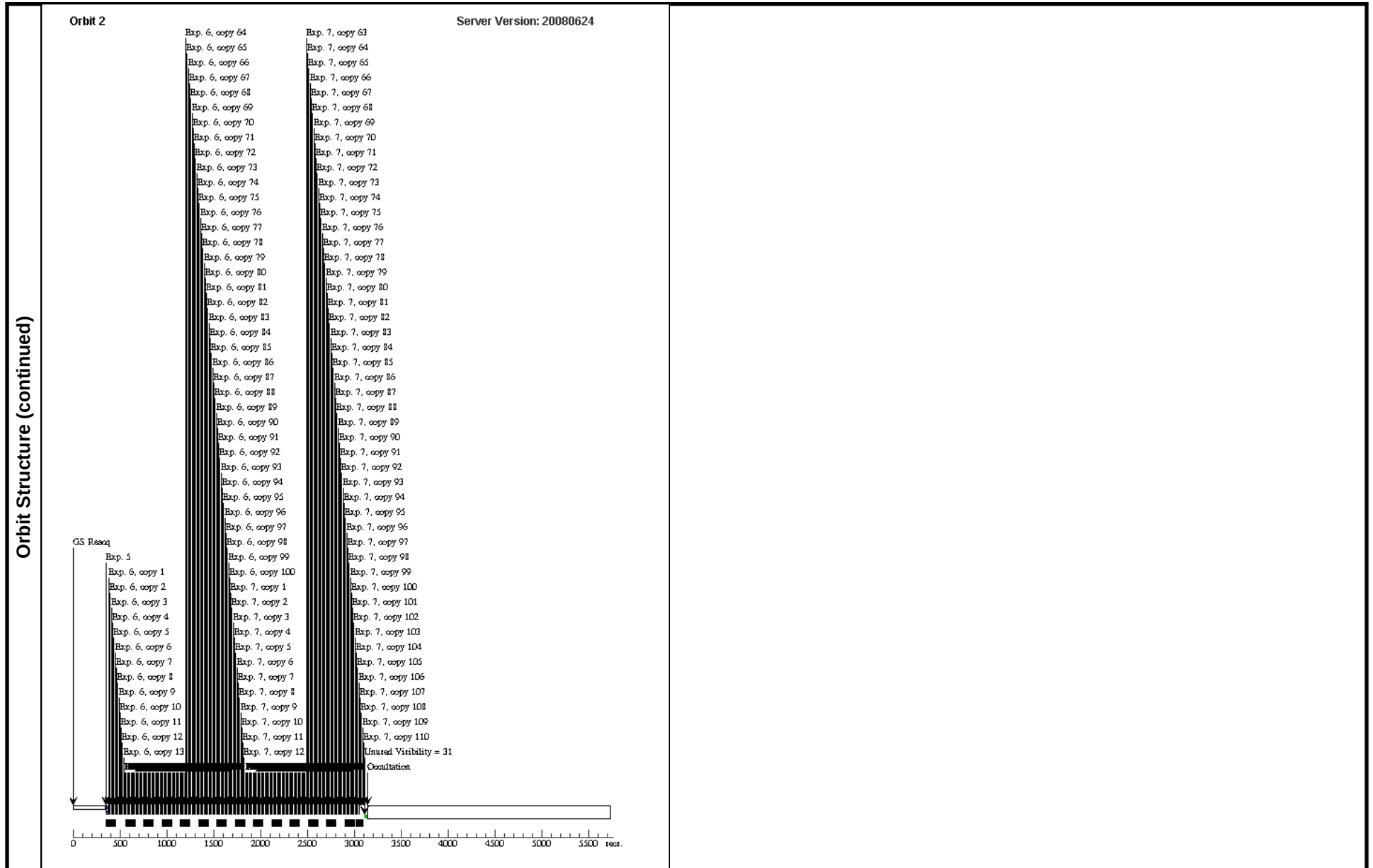
Proposal 11117 - Visit 03 - The Search for Atmospheric Water in the Transiting Planet HD189733b

| Exposures (continued) | # | Label                     | Target       | Config,Mode,Aperture        | Spectral Els. | Opt. Params.                                           | Special Req.                | Groups | Exp. Time/[Actual Dur.] | Orbit |
|-----------------------|---|---------------------------|--------------|-----------------------------|---------------|--------------------------------------------------------|-----------------------------|--------|-------------------------|-------|
|                       | 8 | Orbit 3 F187 N In Transit | (1) HD189733 | NIC1, MULTIACCUM, NIC1-FIXD | F187N         | NSAMP=3;<br>SAMP-SEQ=SPAR S4;<br>CAMERA-FOCUS =DEFOCUS | SAME POS AS 1;<br>NEW OBSET |        | [==>]                   | [3]   |

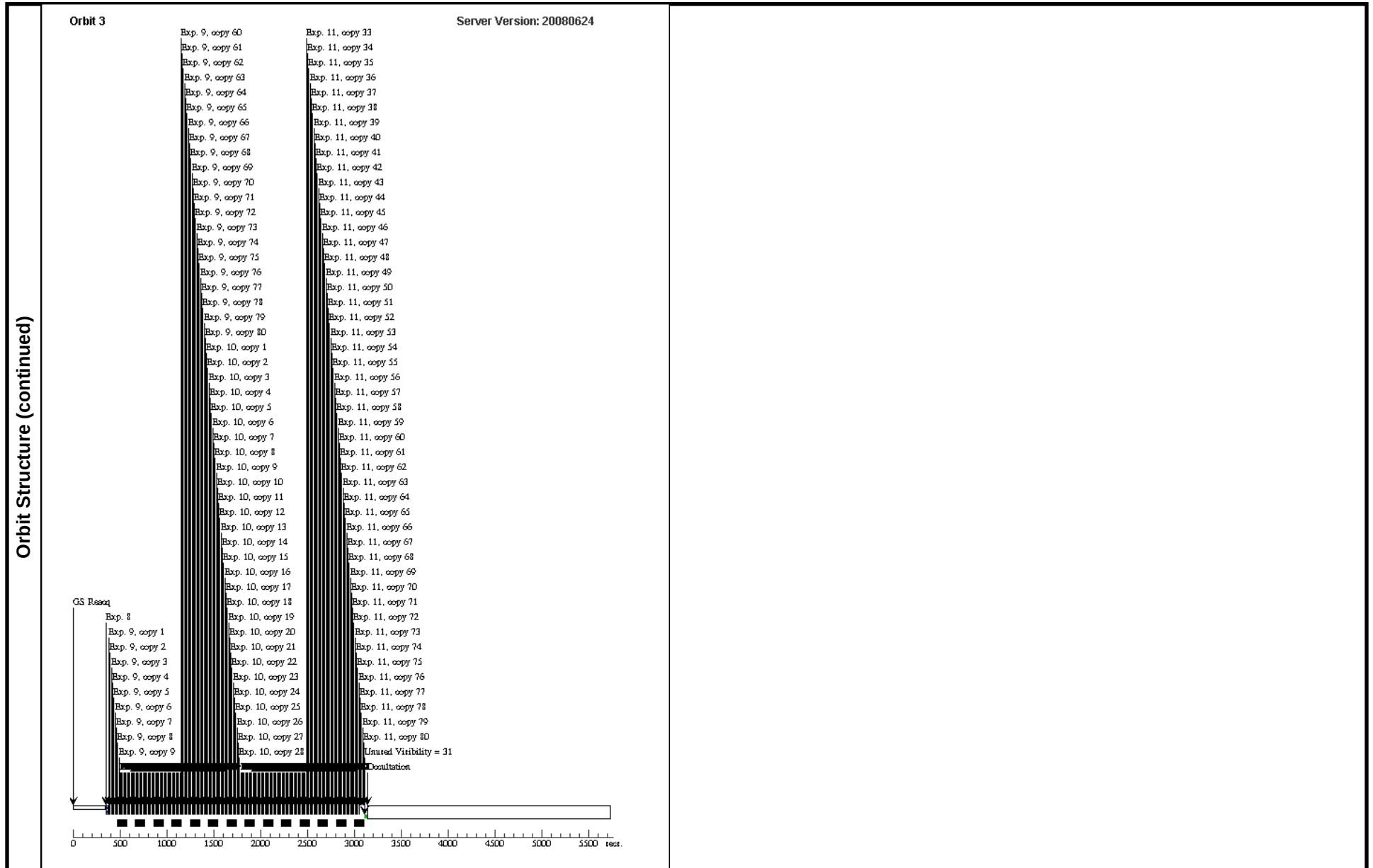
Proposal 11117 - Visit 03 - The Search for Atmospheric Water in the Transiting Planet HD189733b

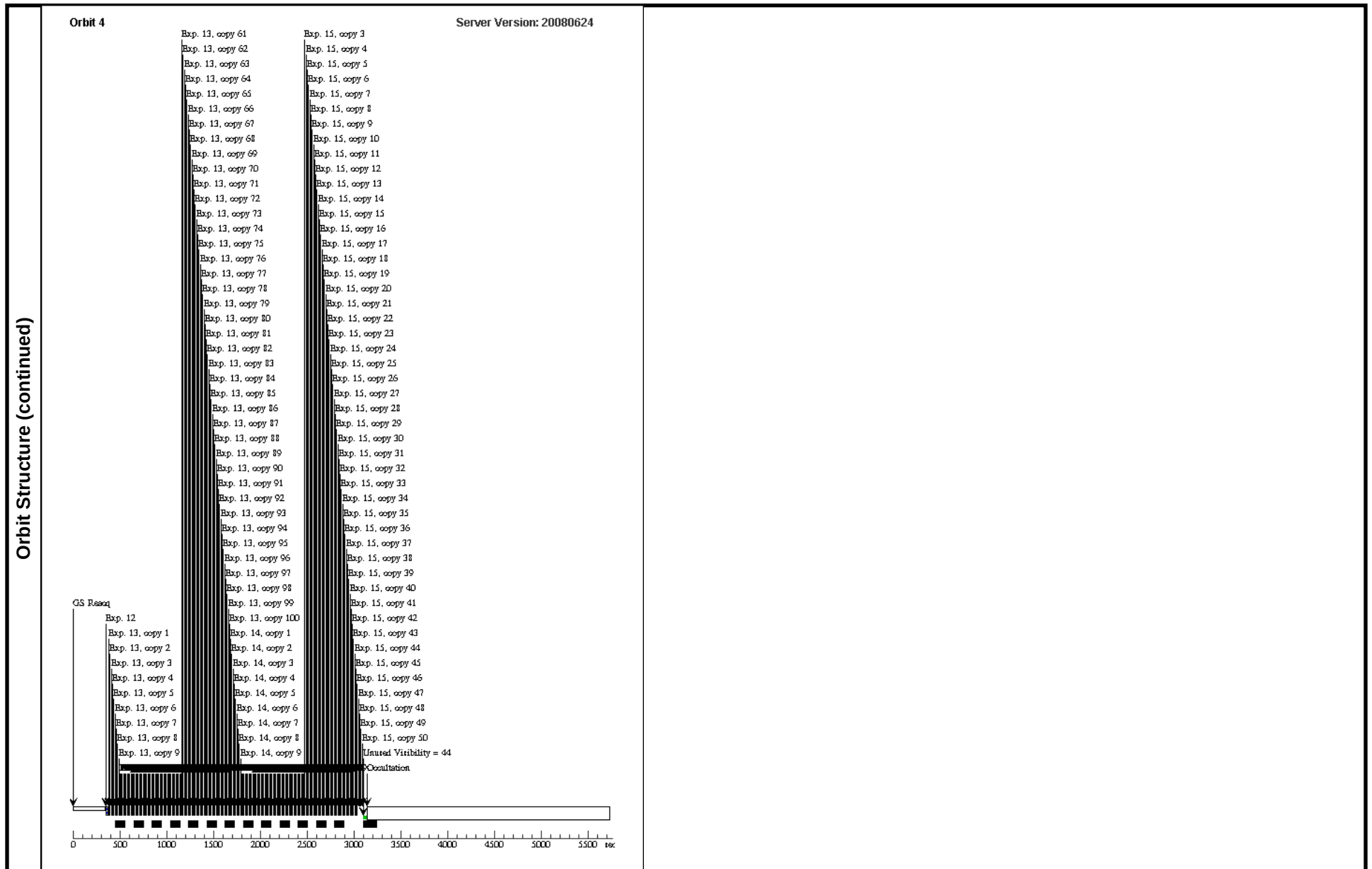
| Exposures (continued) | #  | Label          | Target       | Config,Mode,Aperture        | Spectral Els. | Opt. Params.                                           | Special Req.                | Groups | Exp. Time/[Actual Dur.] | Orbit |
|-----------------------|----|----------------|--------------|-----------------------------|---------------|--------------------------------------------------------|-----------------------------|--------|-------------------------|-------|
|                       | 12 | Orbit 4 F187 N | (1) HD189733 | NIC1, MULTIACCUM, NIC1-FIXD | F187N         | NSAMP=3;<br>SAMP-SEQ=SPAR S4;<br>CAMERA-FOCUS =DEFOCUS | SAME POS AS 1;<br>NEW OBSET |        | [==>]                   | [4]   |











# Proposal 11117 - Visit 53 - The Search for Atmospheric Water in the Transiting Planet HD189733b

|                                                                                                                      |                                                                                                                                                                                           |                             |                                                                                     |                                |               |                                                      |                        |        |                         |       |
|----------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|-------------------------------------------------------------------------------------|--------------------------------|---------------|------------------------------------------------------|------------------------|--------|-------------------------|-------|
| Visit                                                                                                                | <b>Proposal 11117, Visit 53, implementation</b> <span style="float: right;">Thu Jul 10 03:29:53 GMT 2008</span>                                                                           |                             |                                                                                     |                                |               |                                                      |                        |        |                         |       |
|                                                                                                                      | <b>Diagnostic Status: No Diagnostics</b><br>Scientific Instruments: NIC1<br>Special Requirements: Period 2.218573 D AND ZERO-PHASE HJD2454037.611956<br>Comments: HOPR repeat of visit 3. |                             |                                                                                     |                                |               |                                                      |                        |        |                         |       |
| Fixed Targets                                                                                                        | #                                                                                                                                                                                         | Name                        | Target Coordinates                                                                  | Targ. Coord. Corrections       | Fluxes        | Miscellaneous                                        |                        |        |                         |       |
|                                                                                                                      | (1)                                                                                                                                                                                       | HD189733                    | RA: 20 00 43.7133 (300.1821388d)<br>Dec: +22 42 39.07 (22.71085d)<br>Equinox: J2000 |                                | V=7.67+/-0.01 | Reference Frame: ICRS                                |                        |        |                         |       |
| Exposures                                                                                                            | #                                                                                                                                                                                         | Label                       | Target                                                                              | Config,Mode,Aperture           | Spectral Els. | Opt. Params.                                         | Special Reqs.          | Groups | Exp. Time/[Actual Dur.] | Orbit |
|                                                                                                                      | 1                                                                                                                                                                                         | F166N Cons<br>trained Phase | (1) HD189733                                                                        | NIC1, MULTIACCUM,<br>NIC1-FIXD | F166N         | NSAMP=3;<br>SAMP-SEQ=SPARS4;<br>CAMERA-FOCUS=DEFOCUS | PHASE 0.9325 TO 0.9625 |        | [==>]                   | [1]   |
| Comments: Phase constrained such that the full ingress (or full outgress) is covered by the second (or third) orbit. |                                                                                                                                                                                           |                             |                                                                                     |                                |               |                                                      |                        |        |                         |       |

Proposal 11117 - Visit 53 - The Search for Atmospheric Water in the Transiting Planet HD189733b

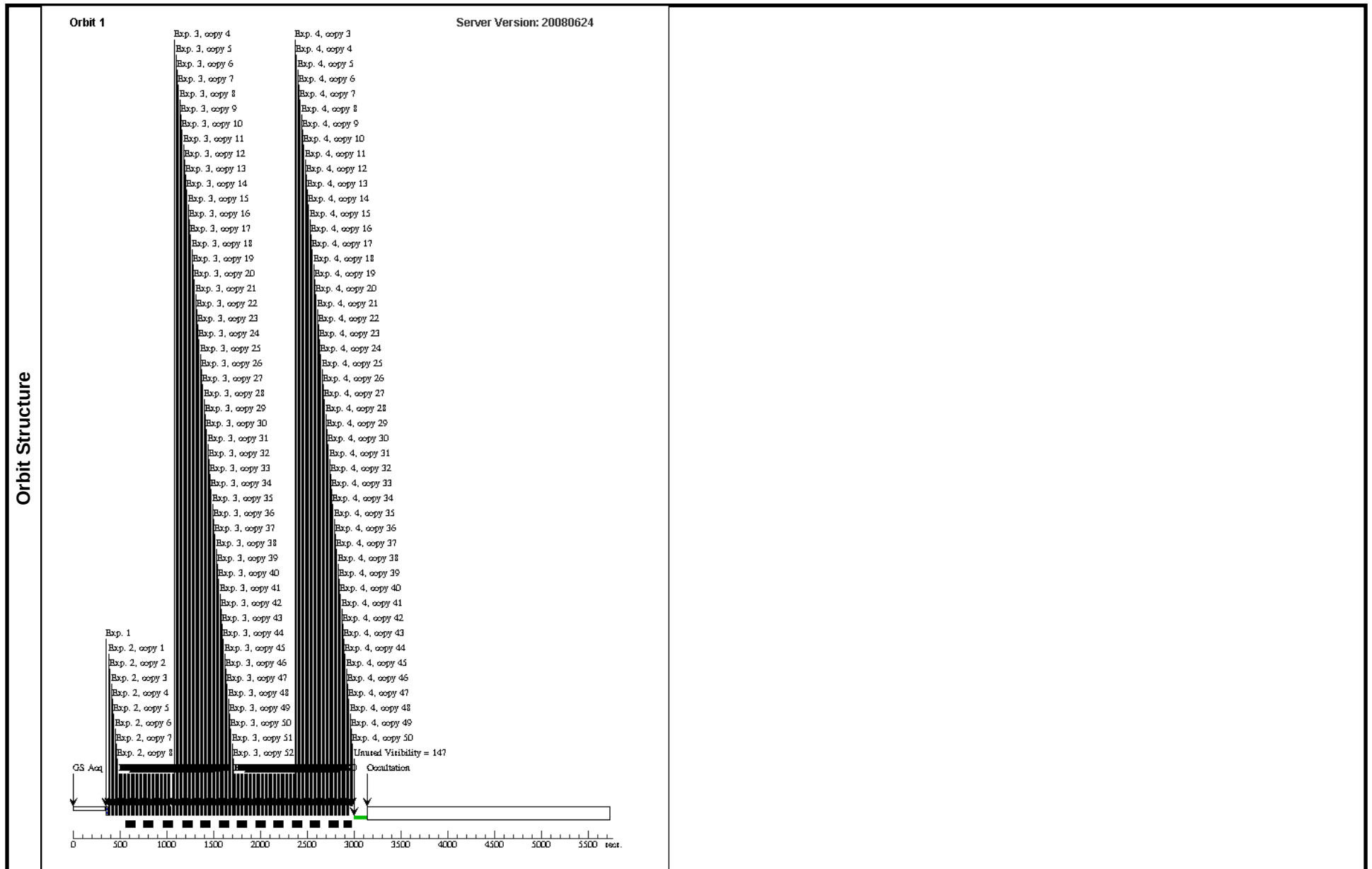
| Exposures (continued) | # | Label          | Target       | Config,Mode,Aperture        | Spectral Els. | Opt. Params.                                           | Special Reqs.               | Groups | Exp. Time/[Actual Dur.] | Orbit |
|-----------------------|---|----------------|--------------|-----------------------------|---------------|--------------------------------------------------------|-----------------------------|--------|-------------------------|-------|
|                       | 5 | Orbit 2 F187 N | (1) HD189733 | NIC1, MULTIACCUM, NIC1-FIXD | F187N         | NSAMP=3;<br>SAMP-SEQ=SPAR S4;<br>CAMERA-FOCUS =DEFOCUS | SAME POS AS 1;<br>NEW OBSET |        | [==>]                   | [2]   |

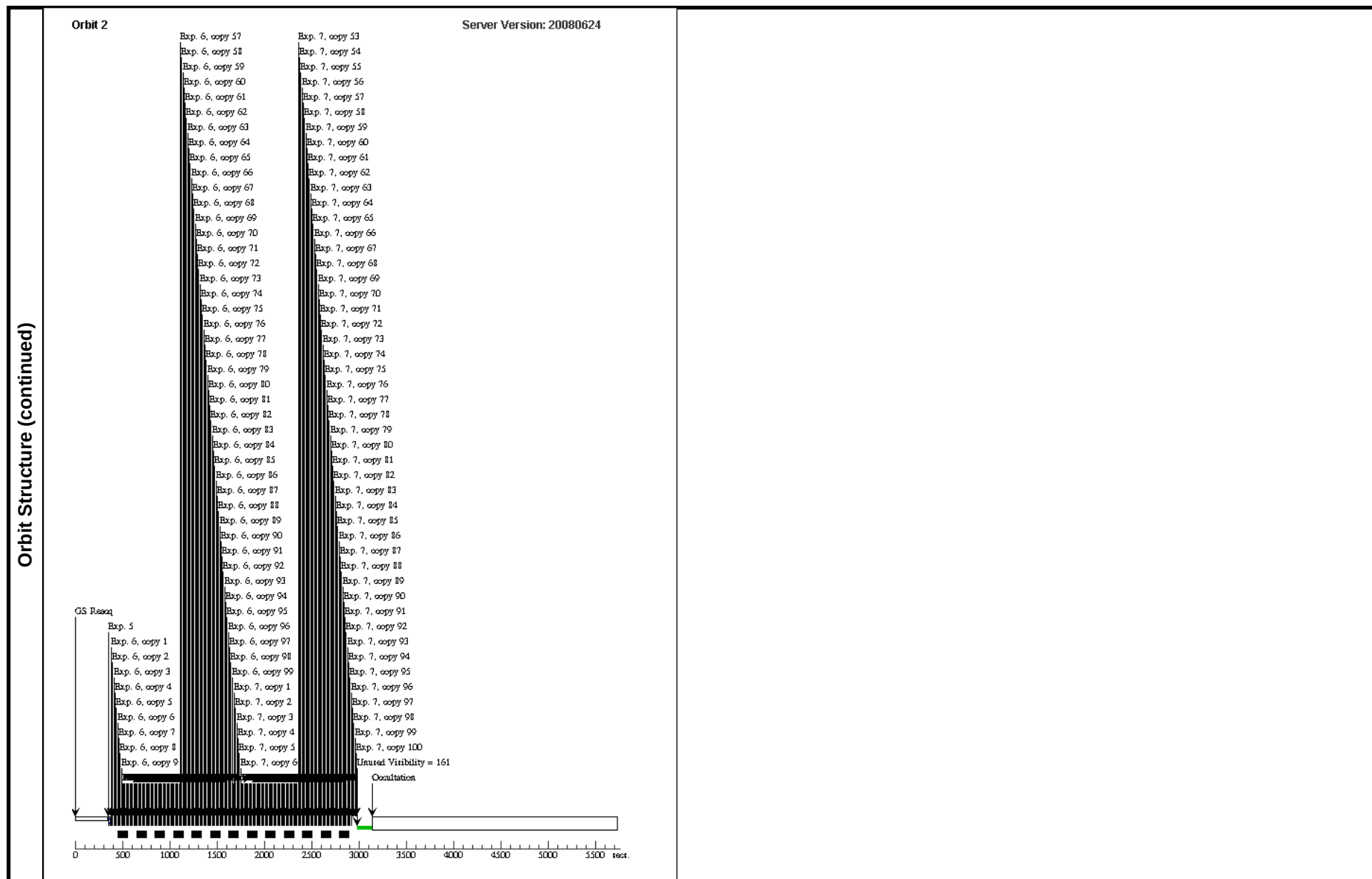
Proposal 11117 - Visit 53 - The Search for Atmospheric Water in the Transiting Planet HD189733b

| Exposures (continued) | # | Label                     | Target       | Config,Mode,Aperture        | Spectral Els. | Opt. Params.                                           | Special Reqs.               | Groups | Exp. Time/[Actual Dur.] | Orbit |
|-----------------------|---|---------------------------|--------------|-----------------------------|---------------|--------------------------------------------------------|-----------------------------|--------|-------------------------|-------|
|                       | 8 | Orbit 3 F187 N In Transit | (1) HD189733 | NIC1, MULTIACCUM, NIC1-FIXD | F187N         | NSAMP=3;<br>SAMP-SEQ=SPAR S4;<br>CAMERA-FOCUS =DEFOCUS | SAME POS AS 1;<br>NEW OBSET |        | [==>]                   | [3]   |

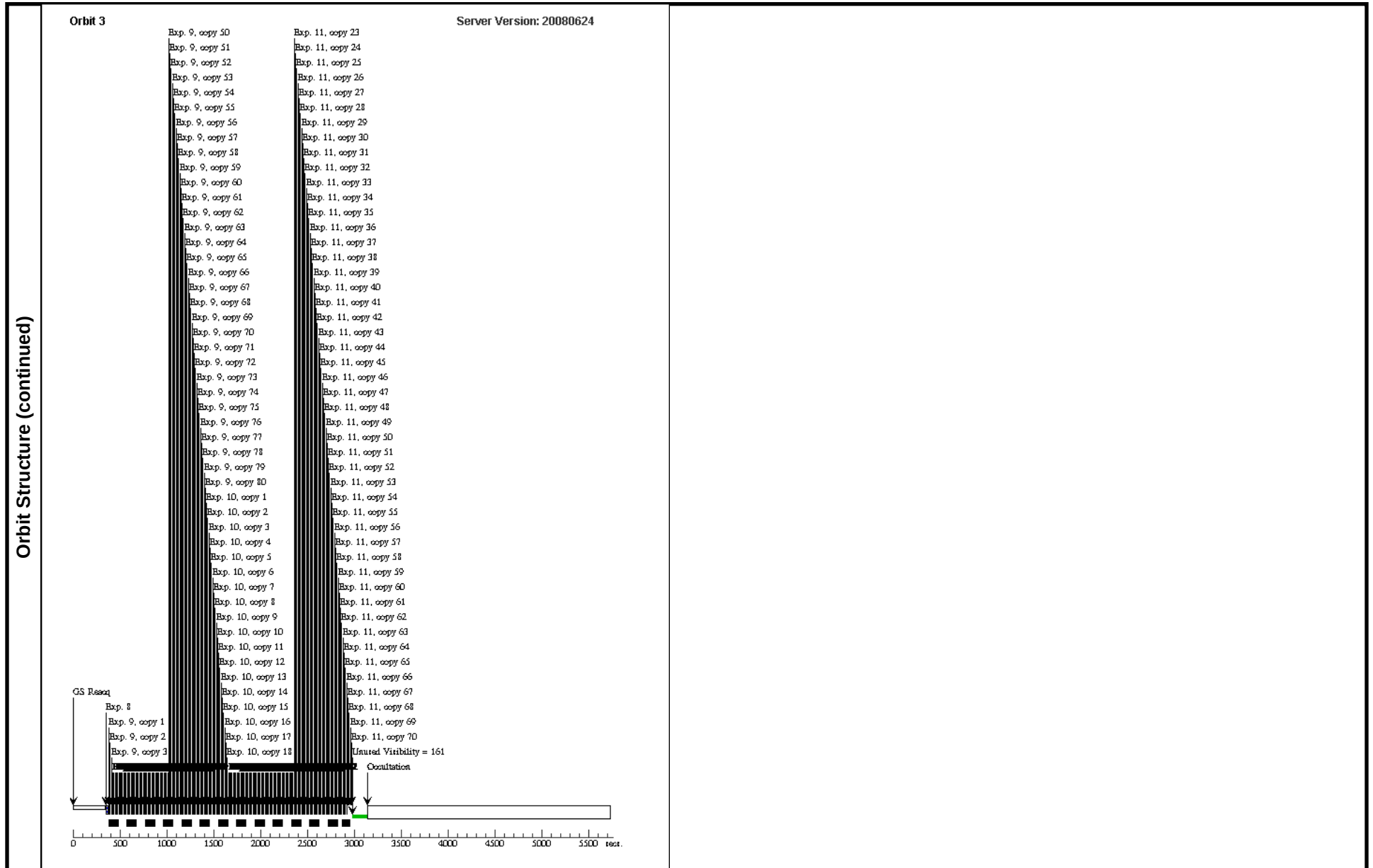
Proposal 11117 - Visit 53 - The Search for Atmospheric Water in the Transiting Planet HD189733b

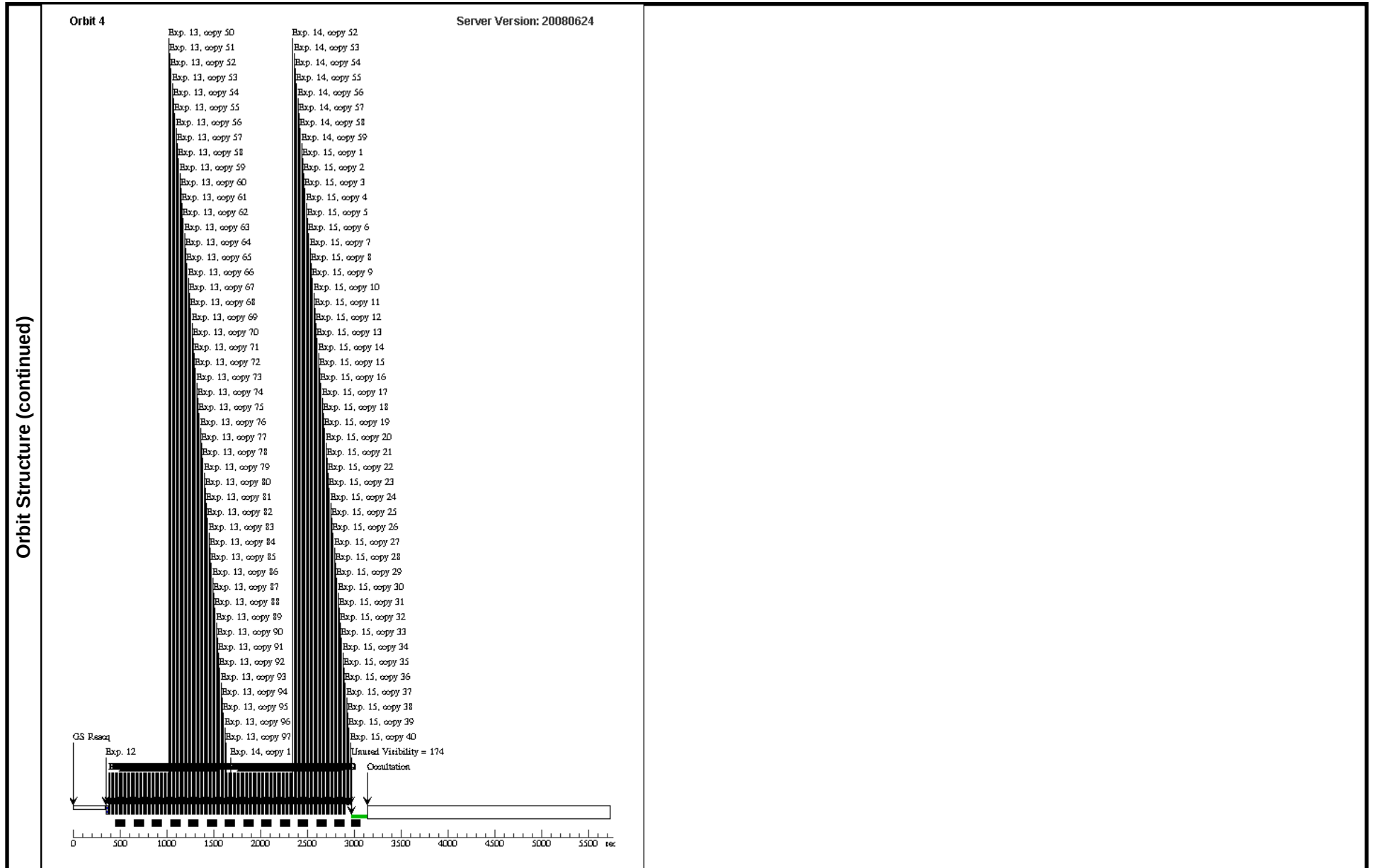
| Exposures (continued) | #  | Label          | Target       | Config,Mode,Aperture        | Spectral Els. | Opt. Params.                                           | Special Req.                | Groups | Exp. Time/[Actual Dur.] | Orbit |
|-----------------------|----|----------------|--------------|-----------------------------|---------------|--------------------------------------------------------|-----------------------------|--------|-------------------------|-------|
|                       | 12 | Orbit 4 F187 N | (1) HD189733 | NIC1, MULTIACCUM, NIC1-FIXD | F187N         | NSAMP=3;<br>SAMP-SEQ=SPAR S4;<br>CAMERA-FOCUS =DEFOCUS | SAME POS AS 1;<br>NEW OBSET |        | [==>]                   | [4]   |











# Proposal 11117 - Visit 04 - The Search for Atmospheric Water in the Transiting Planet HD189733b

|                                                                                                                      |                                                                                                                                                      |                             |                                                                                     |                                |               |                                                              |                            |        |                         |       |
|----------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|-------------------------------------------------------------------------------------|--------------------------------|---------------|--------------------------------------------------------------|----------------------------|--------|-------------------------|-------|
| Visit                                                                                                                | <b>Proposal 11117, Visit 04, withdrawn</b> <span style="float: right;">Thu Jul 10 03:30:02 GMT 2008</span>                                           |                             |                                                                                     |                                |               |                                                              |                            |        |                         |       |
|                                                                                                                      | <b>Diagnostic Status: No Diagnostics</b><br>Scientific Instruments: NIC1<br>Special Requirements: Period 2.218573 D AND ZERO-PHASE HJD2454037.611956 |                             |                                                                                     |                                |               |                                                              |                            |        |                         |       |
| Fixed Targets                                                                                                        | #                                                                                                                                                    | Name                        | Target Coordinates                                                                  | Targ. Coord. Corrections       | Fluxes        | Miscellaneous                                                |                            |        |                         |       |
|                                                                                                                      | (1)                                                                                                                                                  | HD189733                    | RA: 20 00 43.7133 (300.1821388d)<br>Dec: +22 42 39.07 (22.71085d)<br>Equinox: J2000 |                                | V=7.67+/-0.01 | Reference Frame: ICRS                                        |                            |        |                         |       |
| Exposures                                                                                                            | #                                                                                                                                                    | Label                       | Target                                                                              | Config,Mode,Aperture           | Spectral Els. | Opt. Params.                                                 | Special Reqs.              | Groups | Exp. Time/[Actual Dur.] | Orbit |
|                                                                                                                      | 1                                                                                                                                                    | F187N Cons<br>trained Phase | (1) HD189733                                                                        | NIC1, MULTIACCUM,<br>NIC1-FIXD | F187N         | NSAMP=3;<br>SAMP-SEQ=SPAR<br>S4;<br>CAMERA-FOCUS<br>=DEFOCUS | PHASE 0.9425 TO 0<br>.9525 |        | [==>]                   | [1]   |
| Comments: Phase constrained such that the full ingress (or full outgress) is covered by the second (or third) orbit. |                                                                                                                                                      |                             |                                                                                     |                                |               |                                                              |                            |        |                         |       |

Proposal 11117 - Visit 04 - The Search for Atmospheric Water in the Transiting Planet HD189733b

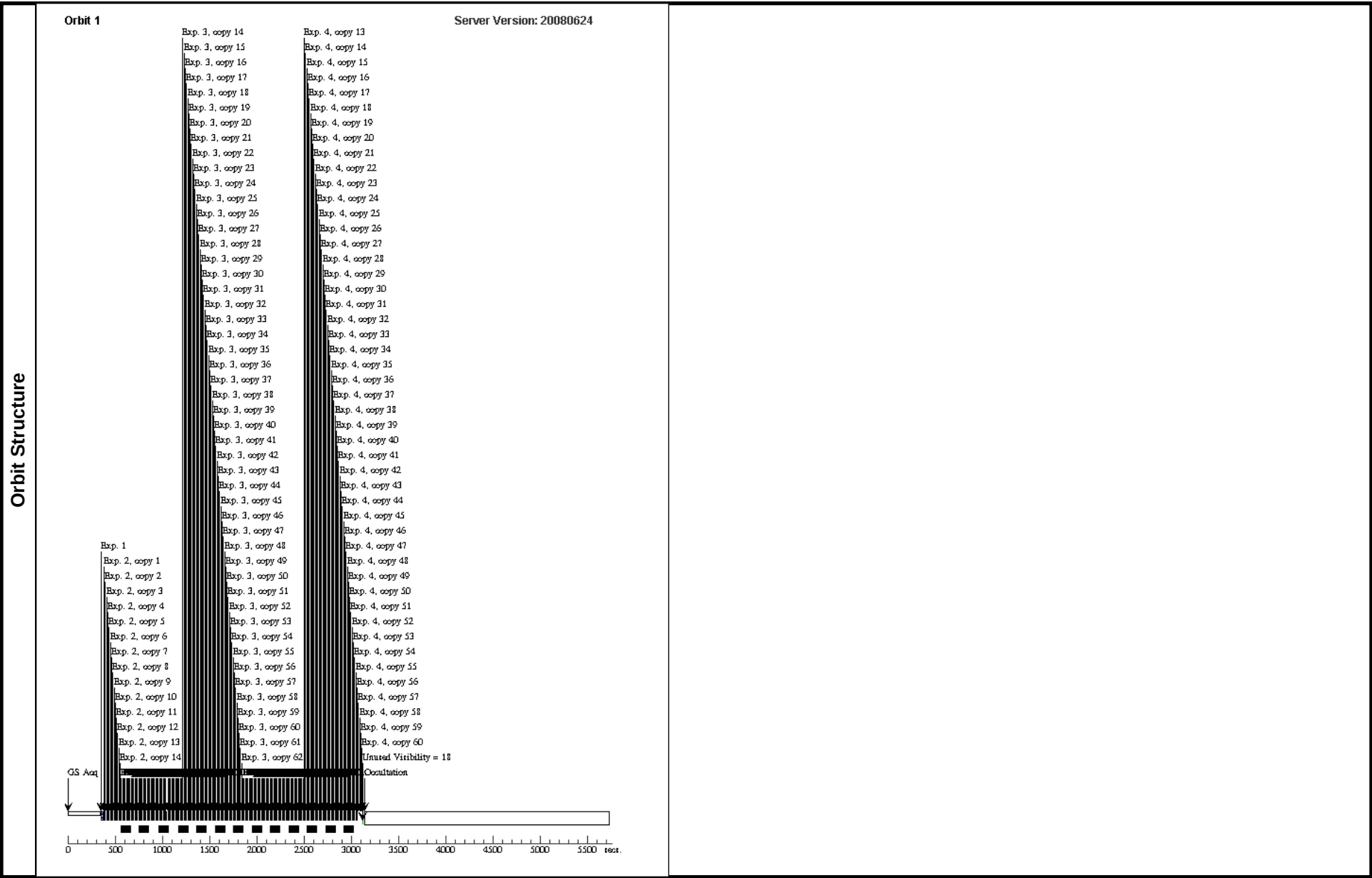
| Exposures (continued) | # | Label          | Target       | Config,Mode,Aperture        | Spectral Els. | Opt. Params.                                           | Special Reqs.               | Groups | Exp. Time/[Actual Dur.] | Orbit |
|-----------------------|---|----------------|--------------|-----------------------------|---------------|--------------------------------------------------------|-----------------------------|--------|-------------------------|-------|
|                       | 5 | Orbit 2 F166 N | (1) HD189733 | NIC1, MULTIACCUM, NIC1-FIXD | F166N         | NSAMP=3;<br>SAMP-SEQ=SPAR S4;<br>CAMERA-FOCUS =DEFOCUS | SAME POS AS 1;<br>NEW OBSET |        | [==>]                   | [2]   |

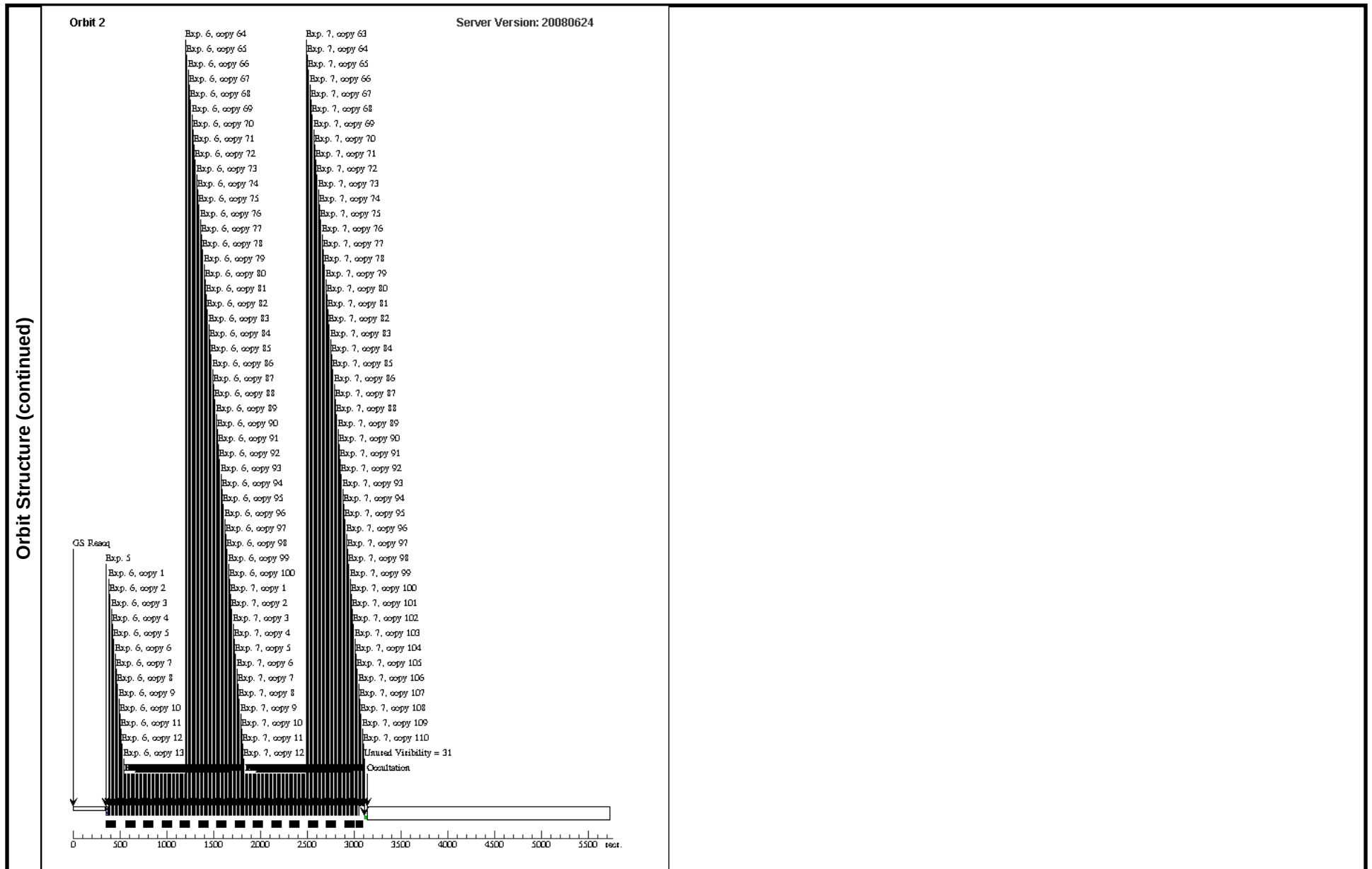
Proposal 11117 - Visit 04 - The Search for Atmospheric Water in the Transiting Planet HD189733b

| Exposures (continued) | # | Label                     | Target       | Config,Mode,Aperture        | Spectral Els. | Opt. Params.                                           | Special Req.                | Groups | Exp. Time/[Actual Dur.] | Orbit |
|-----------------------|---|---------------------------|--------------|-----------------------------|---------------|--------------------------------------------------------|-----------------------------|--------|-------------------------|-------|
|                       | 8 | Orbit 3 F166 N In Transit | (1) HD189733 | NIC1, MULTIACCUM, NIC1-FIXD | F166N         | NSAMP=3;<br>SAMP-SEQ=SPAR S4;<br>CAMERA-FOCUS =DEFOCUS | SAME POS AS 1;<br>NEW OBSET |        | [==>]                   | [3]   |

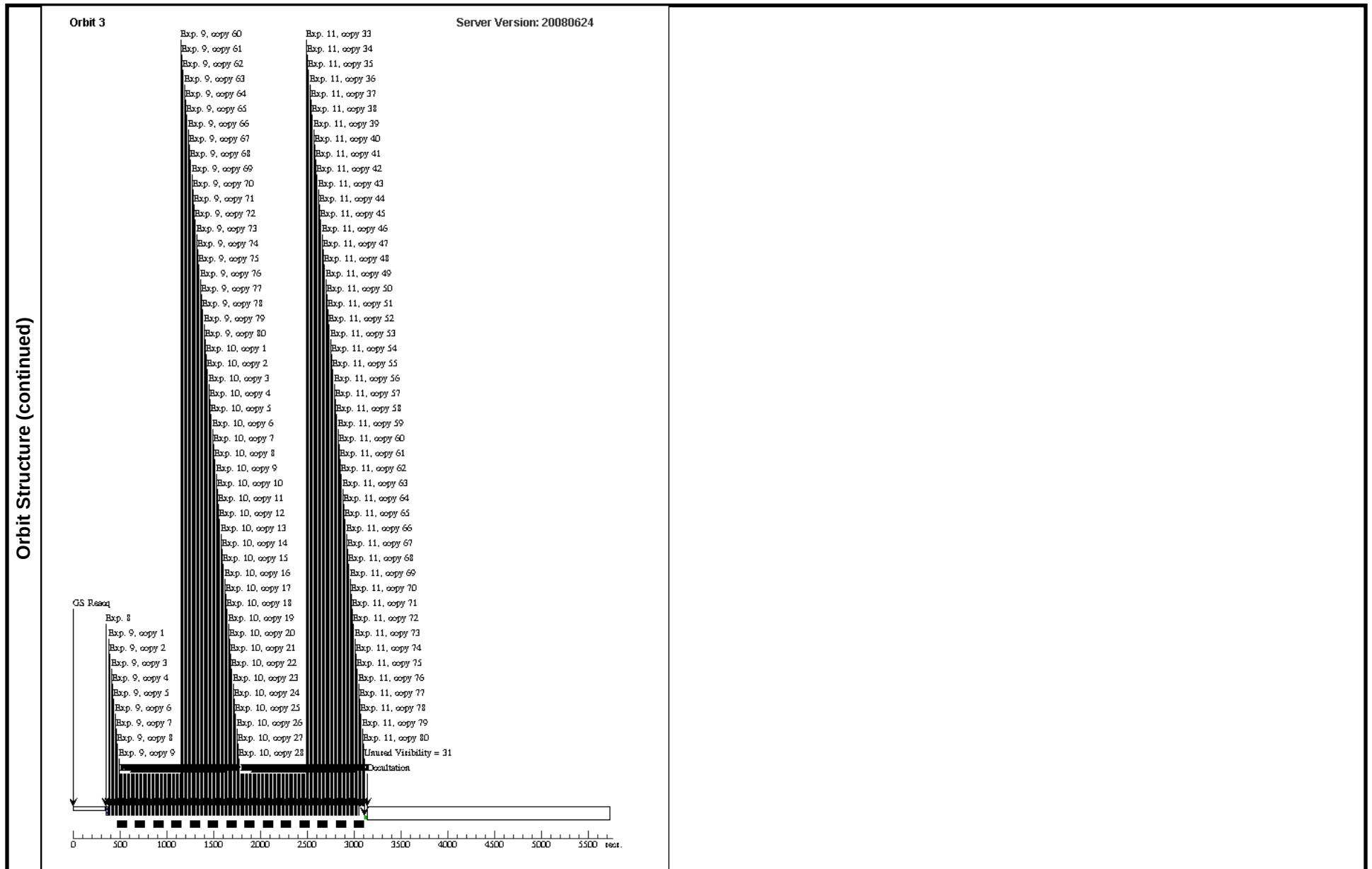
Proposal 11117 - Visit 04 - The Search for Atmospheric Water in the Transiting Planet HD189733b

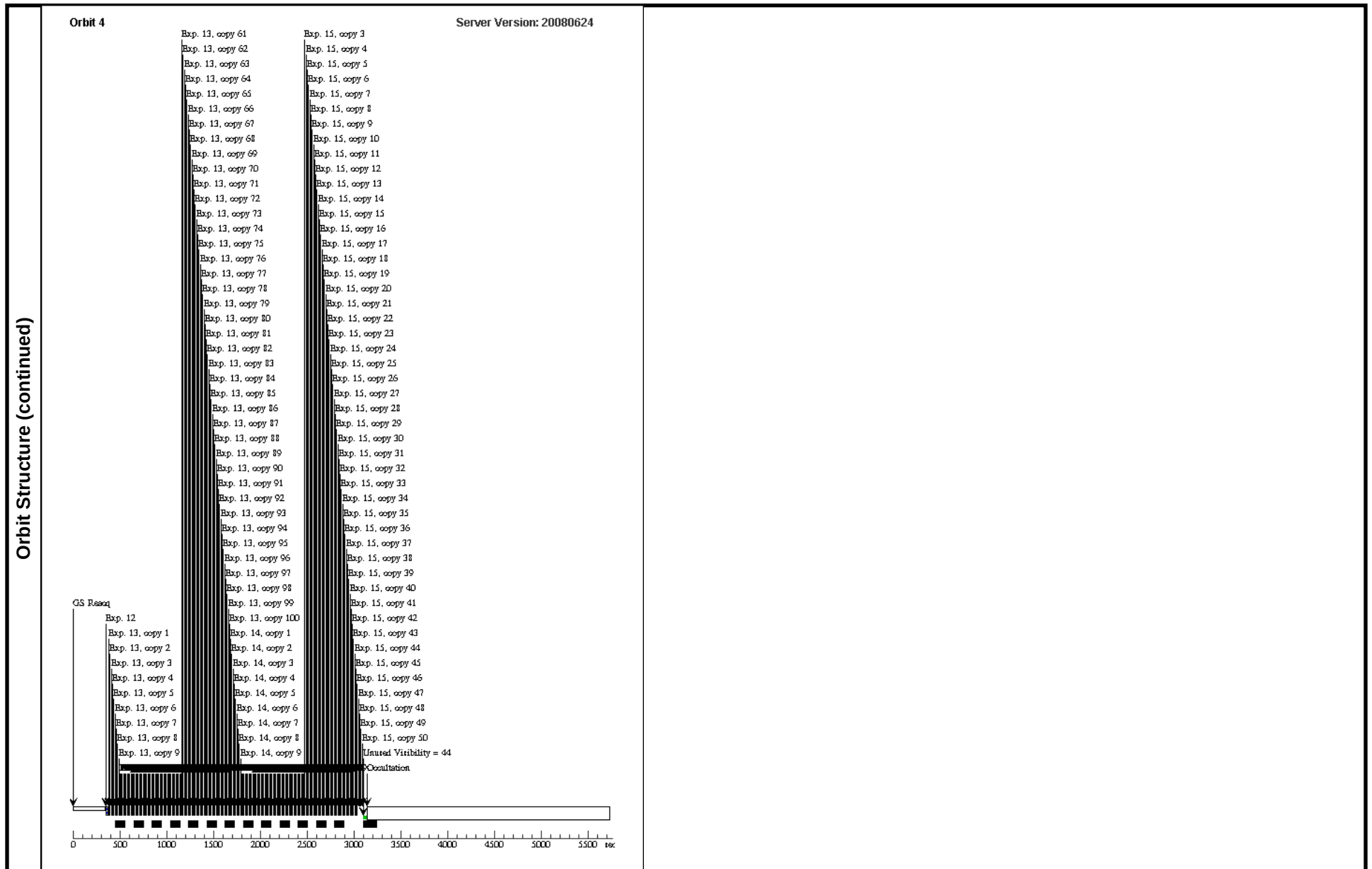
| Exposures (continued) | #  | Label          | Target       | Config,Mode,Aperture        | Spectral Els. | Opt. Params.                                           | Special Req.                | Groups | Exp. Time/[Actual Dur.] | Orbit |
|-----------------------|----|----------------|--------------|-----------------------------|---------------|--------------------------------------------------------|-----------------------------|--------|-------------------------|-------|
|                       | 12 | Orbit 4 F166 N | (1) HD189733 | NIC1, MULTIACCUM, NIC1-FIXD | F166N         | NSAMP=3;<br>SAMP-SEQ=SPAR S4;<br>CAMERA-FOCUS =DEFOCUS | SAME POS AS 1;<br>NEW OBSET |        | [==>]                   | [4]   |











# Proposal 11117 - Visit 06 - The Search for Atmospheric Water in the Transiting Planet HD189733b

|                                                                                                                      |                                                                                                                                                      |                             |                                                                                     |                                |               |                                                              |                            |        |                         |       |
|----------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|-------------------------------------------------------------------------------------|--------------------------------|---------------|--------------------------------------------------------------|----------------------------|--------|-------------------------|-------|
| Visit                                                                                                                | <b>Proposal 11117, Visit 06, completed</b> <span style="float: right;">Thu Jul 10 03:30:11 GMT 2008</span>                                           |                             |                                                                                     |                                |               |                                                              |                            |        |                         |       |
|                                                                                                                      | <b>Diagnostic Status: No Diagnostics</b><br>Scientific Instruments: NIC1<br>Special Requirements: Period 2.218573 D AND ZERO-PHASE HJD2454037.611956 |                             |                                                                                     |                                |               |                                                              |                            |        |                         |       |
| Fixed Targets                                                                                                        | #                                                                                                                                                    | Name                        | Target Coordinates                                                                  | Targ. Coord. Corrections       | Fluxes        | Miscellaneous                                                |                            |        |                         |       |
|                                                                                                                      | (1)                                                                                                                                                  | HD189733                    | RA: 20 00 43.7133 (300.1821388d)<br>Dec: +22 42 39.07 (22.71085d)<br>Equinox: J2000 |                                | V=7.67+/-0.01 | Reference Frame: ICRS                                        |                            |        |                         |       |
| Exposures                                                                                                            | #                                                                                                                                                    | Label                       | Target                                                                              | Config,Mode,Aperture           | Spectral Els. | Opt. Params.                                                 | Special Reqs.              | Groups | Exp. Time/[Actual Dur.] | Orbit |
|                                                                                                                      | 1                                                                                                                                                    | F187N Cons<br>trained Phase | (1) HD189733                                                                        | NIC1, MULTIACCUM,<br>NIC1-FIXD | F187N         | NSAMP=3;<br>SAMP-SEQ=SPAR<br>S4;<br>CAMERA-FOCUS<br>=DEFOCUS | PHASE 0.9425 TO 0<br>.9525 |        | [==>]                   | [1]   |
| Comments: Phase constrained such that the full ingress (or full outgress) is covered by the second (or third) orbit. |                                                                                                                                                      |                             |                                                                                     |                                |               |                                                              |                            |        |                         |       |

Proposal 11117 - Visit 06 - The Search for Atmospheric Water in the Transiting Planet HD189733b

| Exposures (continued) | # | Label          | Target       | Config,Mode,Aperture        | Spectral Els. | Opt. Params.                                                | Special Req.                | Groups | Exp. Time/[Actual Dur.] | Orbit |
|-----------------------|---|----------------|--------------|-----------------------------|---------------|-------------------------------------------------------------|-----------------------------|--------|-------------------------|-------|
|                       | 5 | Orbit 2 F166 N | (1) HD189733 | NIC1, MULTIACCUM, NIC1-FIXD | F166N         | NSAMP=4;<br>SAMP-SEQ=STEP1<br>;<br>CAMERA-FOCUS<br>=DEFOCUS | SAME POS AS 1;<br>NEW OBSET |        | [==>]                   | [2]   |

Proposal 11117 - Visit 06 - The Search for Atmospheric Water in the Transiting Planet HD189733b

| Exposures (continued) | # | Label     | Target       | Config,Mode,Aperture           | Spectral Els. | Opt. Params.                                                | Special Reqs. | Groups | Exp. Time/[Actual Dur.] | Orbit |
|-----------------------|---|-----------|--------------|--------------------------------|---------------|-------------------------------------------------------------|---------------|--------|-------------------------|-------|
|                       | 8 | F166N X40 | (1) HD189733 | NIC1, MULTIACCUM,<br>NIC1-FIXD | F166N         | NSAMP=4;<br>SAMP-SEQ=STEP1<br>;<br>CAMERA-FOCUS<br>=DEFOCUS | SAME POS AS 1 |        | [==>(Copy 1)]           | [2]   |
|                       |   |           |              |                                |               |                                                             |               |        | [==>(Copy 2)]           |       |
|                       |   |           |              |                                |               |                                                             |               |        | [==>(Copy 3)]           |       |
|                       |   |           |              |                                |               |                                                             |               |        | [==>(Copy 4)]           |       |
|                       |   |           |              |                                |               |                                                             |               |        | [==>(Copy 5)]           |       |
|                       |   |           |              |                                |               |                                                             |               |        | [==>(Copy 6)]           |       |
|                       |   |           |              |                                |               |                                                             |               |        | [==>(Copy 7)]           |       |
|                       |   |           |              |                                |               |                                                             |               |        | [==>(Copy 8)]           |       |
|                       |   |           |              |                                |               |                                                             |               |        | [==>(Copy 9)]           |       |
|                       |   |           |              |                                |               |                                                             |               |        | [==>(Copy 10)]          |       |
|                       |   |           |              |                                |               |                                                             |               |        | [==>(Copy 11)]          |       |
|                       |   |           |              |                                |               |                                                             |               |        | [==>(Copy 12)]          |       |
|                       |   |           |              |                                |               |                                                             |               |        | [==>(Copy 13)]          |       |
|                       |   |           |              |                                |               |                                                             |               |        | [==>(Copy 14)]          |       |
|                       |   |           |              |                                |               |                                                             |               |        | [==>(Copy 15)]          |       |
|                       |   |           |              |                                |               |                                                             |               |        | [==>(Copy 16)]          |       |
|                       |   |           |              |                                |               |                                                             |               |        | [==>(Copy 17)]          |       |
|                       |   |           |              |                                |               |                                                             |               |        | [==>(Copy 18)]          |       |
|                       |   |           |              |                                |               |                                                             |               |        | [==>(Copy 19)]          |       |
|                       |   |           |              |                                |               |                                                             |               |        | [==>(Copy 20)]          |       |
|                       |   |           |              |                                |               |                                                             |               |        | [==>(Copy 21)]          |       |
|                       |   |           |              |                                |               |                                                             |               |        | [==>(Copy 22)]          |       |
|                       |   |           |              |                                |               |                                                             |               |        | [==>(Copy 23)]          |       |
|                       |   |           |              |                                |               |                                                             |               |        | [==>(Copy 24)]          |       |
|                       |   |           |              |                                |               |                                                             |               |        | [==>(Copy 25)]          |       |
|                       |   |           |              |                                |               |                                                             |               |        | [==>(Copy 26)]          |       |
|                       |   |           |              |                                |               |                                                             |               |        | [==>(Copy 27)]          |       |
|                       |   |           |              |                                |               |                                                             |               |        | [==>(Copy 28)]          |       |
|                       |   |           |              |                                |               |                                                             |               |        | [==>(Copy 29)]          |       |
|                       |   |           |              |                                |               |                                                             |               |        | [==>(Copy 30)]          |       |
|                       |   |           |              |                                |               |                                                             |               |        | [==>(Copy 31)]          |       |
|                       |   |           |              |                                |               |                                                             |               |        | [==>(Copy 32)]          |       |
|                       |   |           |              |                                |               |                                                             |               |        | [==>(Copy 33)]          |       |
|                       |   |           |              |                                |               |                                                             |               |        | [==>(Copy 34)]          |       |
|                       |   |           |              |                                |               |                                                             |               |        | [==>(Copy 35)]          |       |
|                       |   |           |              |                                |               |                                                             |               |        | [==>(Copy 36)]          |       |

Proposal 11117 - Visit 06 - The Search for Atmospheric Water in the Transiting Planet HD189733b

| Exposures (continued) | # | Label                     | Target       | Config,Mode,Aperture        | Spectral Els. | Opt. Params.                                                | Special Req.                | Groups | Exp. Time/[Actual Dur.] | Orbit |
|-----------------------|---|---------------------------|--------------|-----------------------------|---------------|-------------------------------------------------------------|-----------------------------|--------|-------------------------|-------|
|                       | 9 | Orbit 3 F166 N In Transit | (1) HD189733 | NIC1, MULTIACCUM, NIC1-FIXD | F166N         | NSAMP=4;<br>SAMP-SEQ=STEP1<br>;<br>CAMERA-FOCUS<br>=DEFOCUS | SAME POS AS 1;<br>NEW OBSET |        | [==>]                   | [3]   |

Proposal 11117 - Visit 06 - The Search for Atmospheric Water in the Transiting Planet HD189733b

| Exposures (continued) | #  | Label          | Target       | Config,Mode,Aperture        | Spectral Els. | Opt. Params.                                                | Special Req.                | Groups | Exp. Time/[Actual Dur.] | Orbit |
|-----------------------|----|----------------|--------------|-----------------------------|---------------|-------------------------------------------------------------|-----------------------------|--------|-------------------------|-------|
|                       | 13 | Orbit 4 F166 N | (1) HD189733 | NIC1, MULTIACCUM, NIC1-FIXD | F166N         | NSAMP=4;<br>SAMP-SEQ=STEP1<br>;<br>CAMERA-FOCUS<br>=DEFOCUS | SAME POS AS 1;<br>NEW OBSET |        | [==>]                   | [4]   |

