# 10860 - The largest Kuiper belt objects

Cycle: 15, Proposal Category: GO

(Availability Mode: SUPPORTED)

**INVESTIGATORS**


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**VISITS**

| *Visit* | *Targets used in Visit* | *Configurations used in Visit* | *Orbits Used* | *Last Orbit Planner Run* | *OP Current with Visit?* |
|---|---|---|---|---|---|
| 01 | (8) 2003EL61-APPULSE-STAR | WFPC2 | 5 | 28-Feb-2007 21:01:14.0 | yes |
| 02 | (2) 2003UB313 | ACS/HRC | 2 | 28-Feb-2007 21:01:38.0 | yes |
| 03 | (6) SEDNA | ACS/HRC | 2 | 28-Feb-2007 21:01:52.0 | yes |
| 04 | (5) QUAOAR | WFPC2 | 2 | 28-Feb-2007 21:02:00.0 | yes |
| 05 | (3) 2005FY9 | ACS/HRC | 2 | 28-Feb-2007 21:02:09.0 | yes |
| 06 | (4) ORCUS | ACS/HRC | 1 | 28-Feb-2007 21:02:18.0 | yes |
| 07 | (4) ORCUS | ACS/HRC | 1 | 28-Feb-2007 21:02:23.0 | yes |
| 08 | (4) ORCUS | ACS/HRC | 1 | 28-Feb-2007 21:02:27.0 | yes |
| 09 | (4) ORCUS | ACS/HRC | 1 | 28-Feb-2007 21:02:32.0 | yes |

| *Visit* | *Targets used in Visit* | *Configurations used in Visit* | *Orbits Used* | *Last Orbit Planner Run* | *OP Current with Visit?* |
|---|---|---|---|---|---|
| 10 | (4) ORCUS | ACS/HRC | 1 | 28-Feb-2007 21:02:36.0 | yes |
| 11 | (4) ORCUS | ACS/HRC | 1 | 28-Feb-2007 21:02:41.0 | yes |
| 12 | (7) 2002UX25 | ACS/HRC | 1 | 28-Feb-2007 21:02:45.0 | yes |
| 13 | (7) 2002UX25 | ACS/HRC | 1 | 28-Feb-2007 21:02:50.0 | yes |
| 14 | (7) 2002UX25 | ACS/HRC | 1 | 28-Feb-2007 21:02:54.0 | yes |
| 15 | (7) 2002UX25 | ACS/HRC | 1 | 28-Feb-2007 21:02:58.0 | yes |
| 16 | (7) 2002UX25 | ACS/HRC | 1 | 28-Feb-2007 21:03:03.0 | yes |
| 17 | (7) 2002UX25 | ACS/HRC | 1 | 28-Feb-2007 21:03:07.0 | yes |

25 Total Orbits Used

**ABSTRACT**

The past year has seen an explosion in the discoveries of Pluto-sized objects in the Kuiper belt. With the discoveries of the methane-covered 2003 UB313 and 2005 FY9, the multiple satellite system of 2003 EL61, and the Pluto-Charon analog system of Orcus and its satellite, it is finally apparent that Pluto is not a unique oddball at the edge of the solar system, but rather one of a family of similarly large objects in the Kuiper belt and beyond. HST observations over the past decade have been critical for understanding the interior, surface, and atmosphere of Pluto and Charon. We propose here a comprehensive series of observations designed to similarly expand our knowledge of these recently discovered Pluto-sized and near-Pluto-sized Kuiper belt objects. These observations will measure objects' sizes and densities, explore the outcome of collisions in the outer solar system, and allow the first ever look at the interior structure of a Kuiper belt object.

Our wide field survey that discovered all of these objects is nearly finished, so after five years of continuous searching we are finally almost complete in our tally of these near-Pluto-sized objects. This large HST request is the culmination of this half-decade search for new planetary-sized objects. As has been demonstrated repeatedly by the approximately 100 previous orbits devoted to the study of Pluto, only HST has the resolution and sensitivity for detailed study of these distant objects. With these new Pluto-sized objects only now being discovered we have a limited window left to still use

HST for these critical observations.

**OBSERVING DESCRIPTION**

This proposal consists of 3 separate types of observations.

1) Deep imaging tracking a moving target

2) Imaging of a moving target timed for when a nearby star is in the field for PSF calibration

3) Imaging at a cadence designed to measure the orbit of a satellite

## Visit

**Proposal 10860, Visit 01, completed** Thu Mar 01 02:03:09 GMT 2007

**Diagnostic Status: No Diagnostics**

Scientific Instruments: WFPC2

Special Requirements: BETWEEN 06-FEB-2007:18:00:00 AND 07-FEB-2007:02:00:00

*Comments: The goal of this visit is to observe the large KBO 2003 EL61 over a full rotation to create a shape model. Five sequential orbits are required. The observations must be obtained while 2003 EL61 is near a field star which can be used for PSF calibration.*

*The timing requirements refer to the time during which the star is visible in the HRC field so the entire sequence of 5 orbits needs to happen during this time!*

*This appulse star is the second most favorable, but there are alternatives if this scheduling is impossible, as it was for the most favorable star.*

## Patterns

| # | Primary Pattern | | Secondary Pattern | Exposures |
|---|---|---|---|---|
| (2) | Pattern Type=WFPC2-BOX | Coordinate Frame=POS-TARG | | (1), (2), (3), (4), (5) |
| | Purpose=DITHER | Pattern Orientation=26.6 | | |
| | Number Of Points=4 | Angle Between Sides=143.1 | | |
| | Point Spacing=0.559 | Center Pattern=false | | |
| | Line Spacing=0.559 | | | |

## Fixed Targets

| # | Name | Target Coordinates | Targ. Coord. Corrections | Fluxes | Miscellaneous |
|---|---|---|---|---|---|
| (8) | 2003EL61-APPULSE-STAR | RA: 13 35 49.1400 (203.9547500d)<br>Dec: +19 24 29.10 (19.40808d)<br>Equinox: J2000 | | V=17.7 | Reference Frame: ICRS |

## Exposures

| # | Label | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | (8) 2003EL61-APPULSE-STAR | WFPC2, IMAGE, PC1 | F450W | | | Pattern 1-1 (2) | 100.0 Secs X 3 | |
| | | | | | | | | *[==>(Pattern 1, Copy 1)]* | ***[1]*** |
| | | | | | | | | *[==>(Pattern 1, Copy 2)]* | |
| | | | | | | | | *[==>(Pattern 1, Copy 3)]* | |
| | | | | | | | | *[==>(Pattern 2, Copy 1)]* | |
| | | | | | | | | *[==>(Pattern 2, Copy 2)]* | |
| | | | | | | | | *[==>(Pattern 2, Copy 3)]* | |
| | | | | | | | | *[==>(Pattern 3, Copy 1)]* | |
| | | | | | | | | *[==>(Pattern 3, Copy 2)]* | |
| | | | | | | | | *[==>(Pattern 3, Copy 3)]* | |
| | | | | | | | | *[==>(Pattern 4, Copy 1)]* | |
| | | | | | | | | *[==>(Pattern 4, Copy 2)]* | |
| | | | | | | | | *[==>(Pattern 4, Copy 3)]* | |

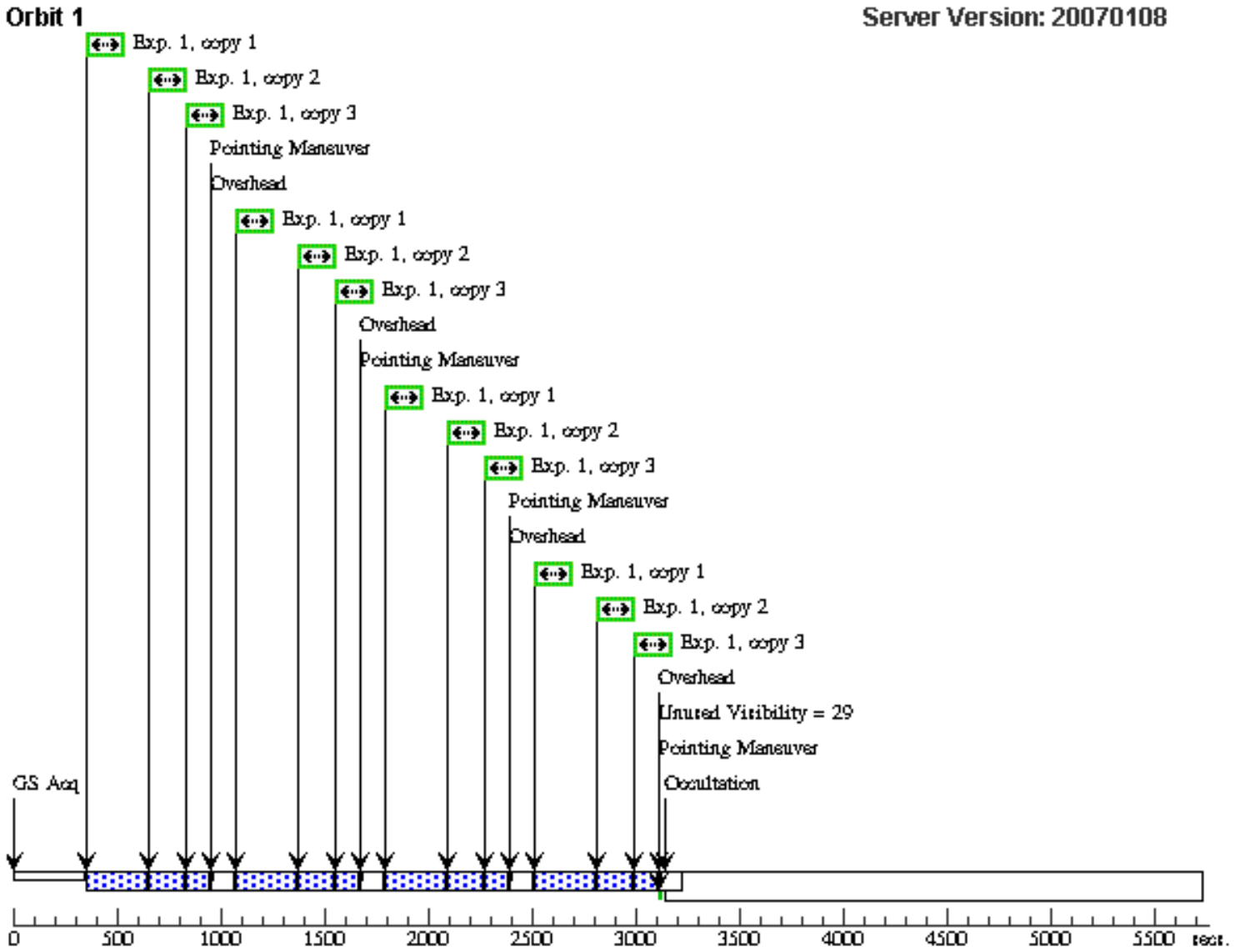
**Exposures (continued)**

| # | Label | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 2 | | (8) 2003EL61-APPULSE-STAR | WFPC2, IMAGE, PC1 | F450W | | | Pattern 2-2 (2) | 100.0 Secs X 3 | |
| | | | | | | | | *[==>(Pattern 1, Copy 1)]*<br>*[==>(Pattern 1, Copy 2)]*<br>*[==>(Pattern 1, Copy 3)]*<br>*[==>(Pattern 2, Copy 1)]*<br>*[==>(Pattern 2, Copy 2)]*<br>*[==>(Pattern 2, Copy 3)]*<br>*[==>(Pattern 3, Copy 1)]*<br>*[==>(Pattern 3, Copy 2)]*<br>*[==>(Pattern 3, Copy 3)]*<br>*[==>(Pattern 4, Copy 1)]*<br>*[==>(Pattern 4, Copy 2)]*<br>*[==>(Pattern 4, Copy 3)]* | ***[2]*** |
| 3 | | (8) 2003EL61-APPULSE-STAR | WFPC2, IMAGE, PC1 | F450W | | | Pattern 3-3 (2) | 100.0 Secs X 3 | |
| | | | | | | | | *[==>(Pattern 1, Copy 1)]*<br>*[==>(Pattern 1, Copy 2)]*<br>*[==>(Pattern 1, Copy 3)]*<br>*[==>(Pattern 2, Copy 1)]*<br>*[==>(Pattern 2, Copy 2)]*<br>*[==>(Pattern 2, Copy 3)]*<br>*[==>(Pattern 3, Copy 1)]*<br>*[==>(Pattern 3, Copy 2)]*<br>*[==>(Pattern 3, Copy 3)]*<br>*[==>(Pattern 4, Copy 1)]*<br>*[==>(Pattern 4, Copy 2)]*<br>*[==>(Pattern 4, Copy 3)]* | ***[3]*** |

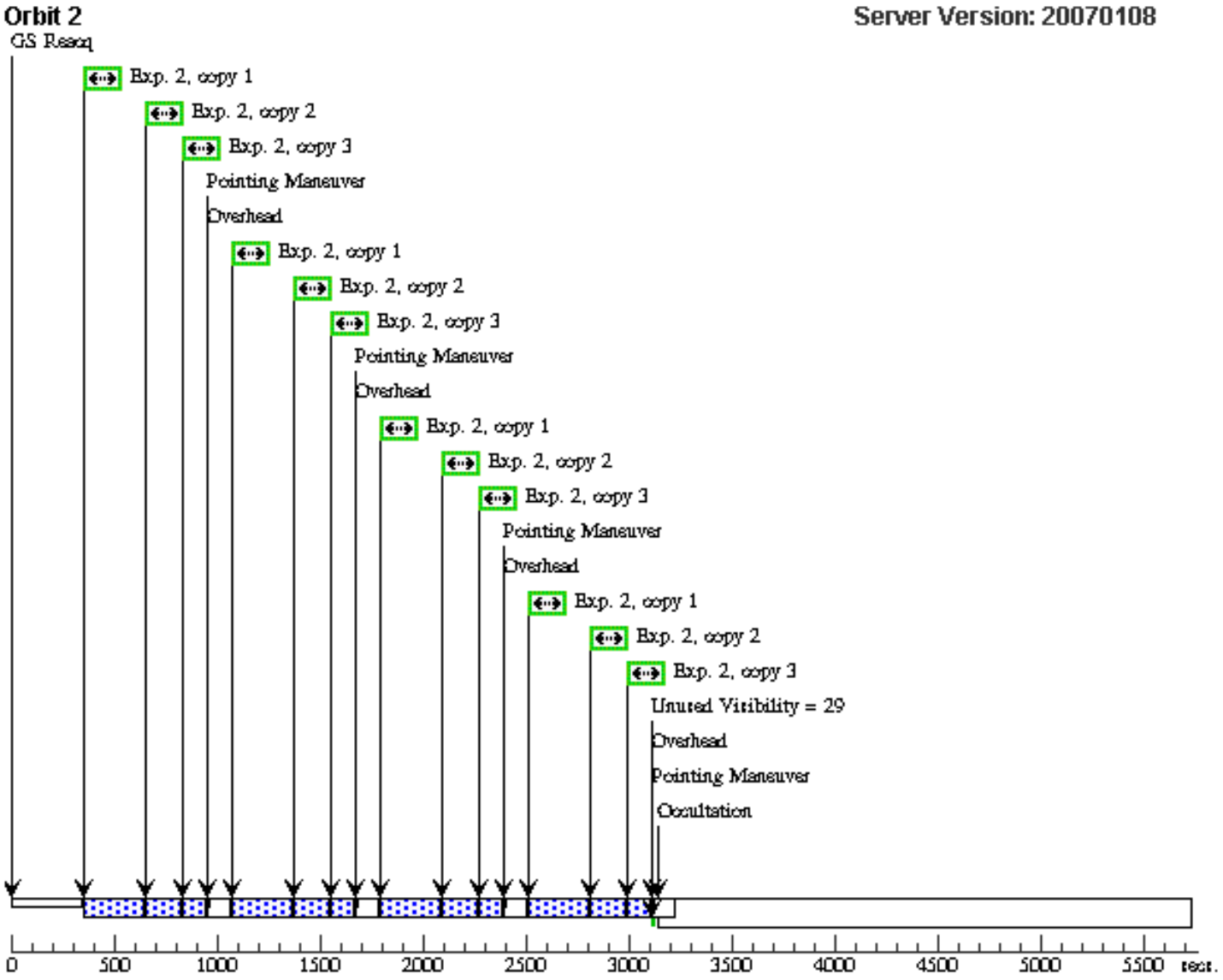
**Exposures (continued)**

| # | Label | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 4 | | (8) 2003EL61-APPULSE-STAR | WFPC2, IMAGE, PC1 | F450W | | | Pattern 4-4 (2) | 100.0 Secs X 3 | |
| | | | | | | | | *[==>(Pattern 1, Copy 1)]*<br>*[==>(Pattern 1, Copy 2)]*<br>*[==>(Pattern 1, Copy 3)]*<br>*[==>(Pattern 2, Copy 1)]*<br>*[==>(Pattern 2, Copy 2)]*<br>*[==>(Pattern 2, Copy 3)]*<br>*[==>(Pattern 3, Copy 1)]*<br>*[==>(Pattern 3, Copy 2)]*<br>*[==>(Pattern 3, Copy 3)]*<br>*[==>(Pattern 4, Copy 1)]*<br>*[==>(Pattern 4, Copy 2)]*<br>*[==>(Pattern 4, Copy 3)]* | ***[4]*** |
| 5 | | (8) 2003EL61-APPULSE-STAR | WFPC2, IMAGE, PC1 | F450W | | | Pattern 5-5 (2) | 100.0 Secs X 3 | |
| | | | | | | | | *[==>(Pattern 1, Copy 1)]*<br>*[==>(Pattern 1, Copy 2)]*<br>*[==>(Pattern 1, Copy 3)]*<br>*[==>(Pattern 2, Copy 1)]*<br>*[==>(Pattern 2, Copy 2)]*<br>*[==>(Pattern 2, Copy 3)]*<br>*[==>(Pattern 3, Copy 1)]*<br>*[==>(Pattern 3, Copy 2)]*<br>*[==>(Pattern 3, Copy 3)]*<br>*[==>(Pattern 4, Copy 1)]*<br>*[==>(Pattern 4, Copy 2)]*<br>*[==>(Pattern 4, Copy 3)]* | ***[5]*** |

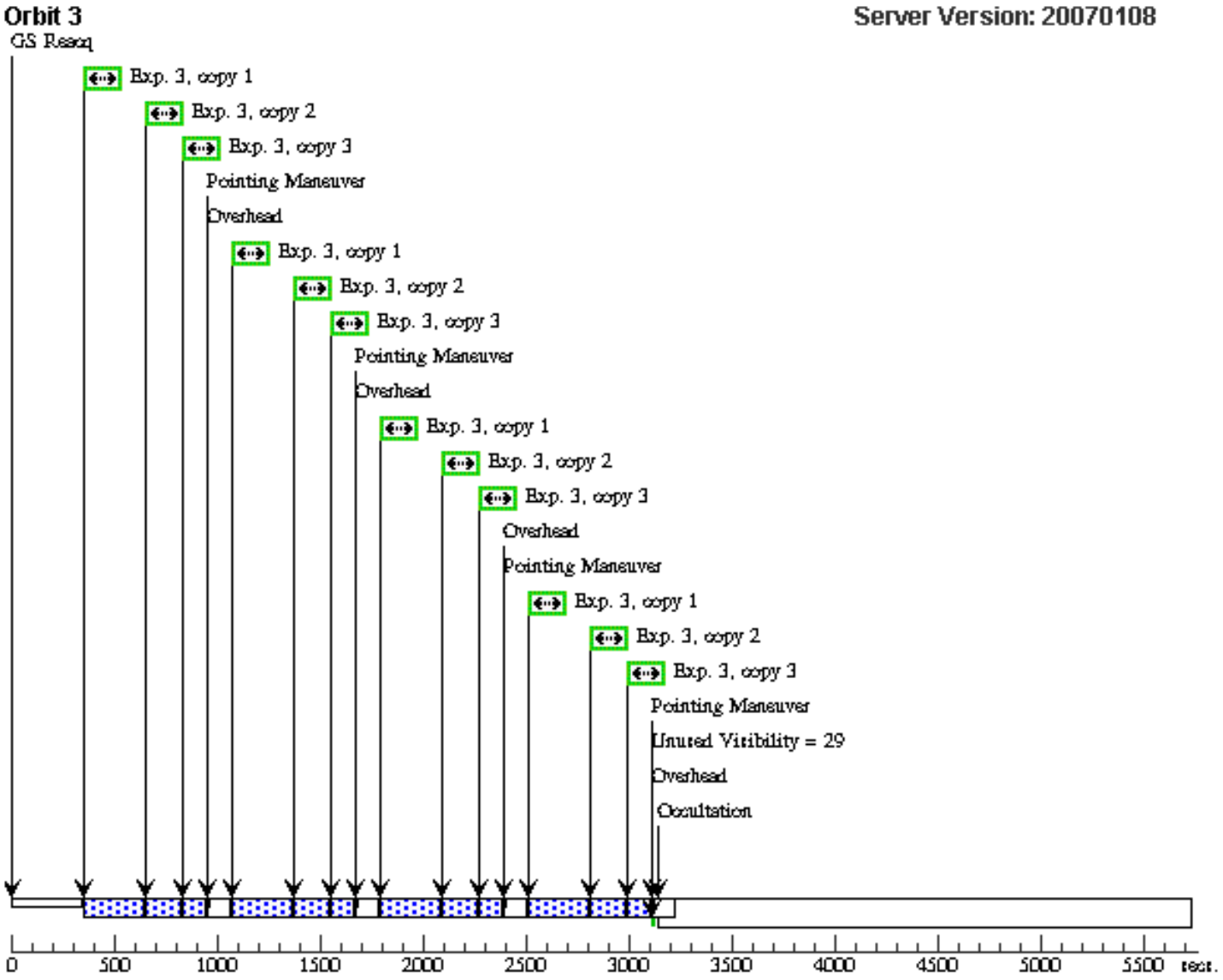
Orbit Structure



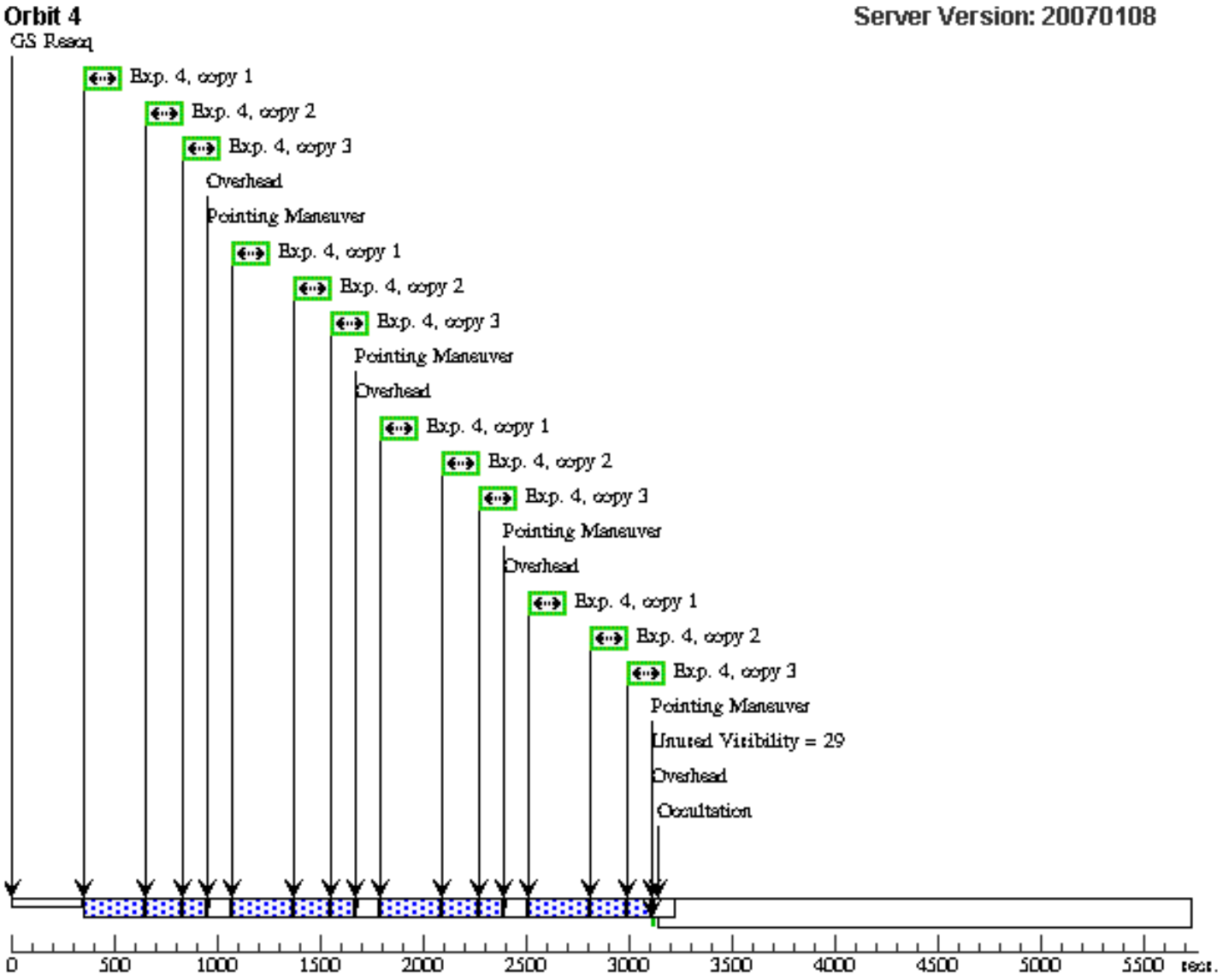
Orbit Structure (continued)



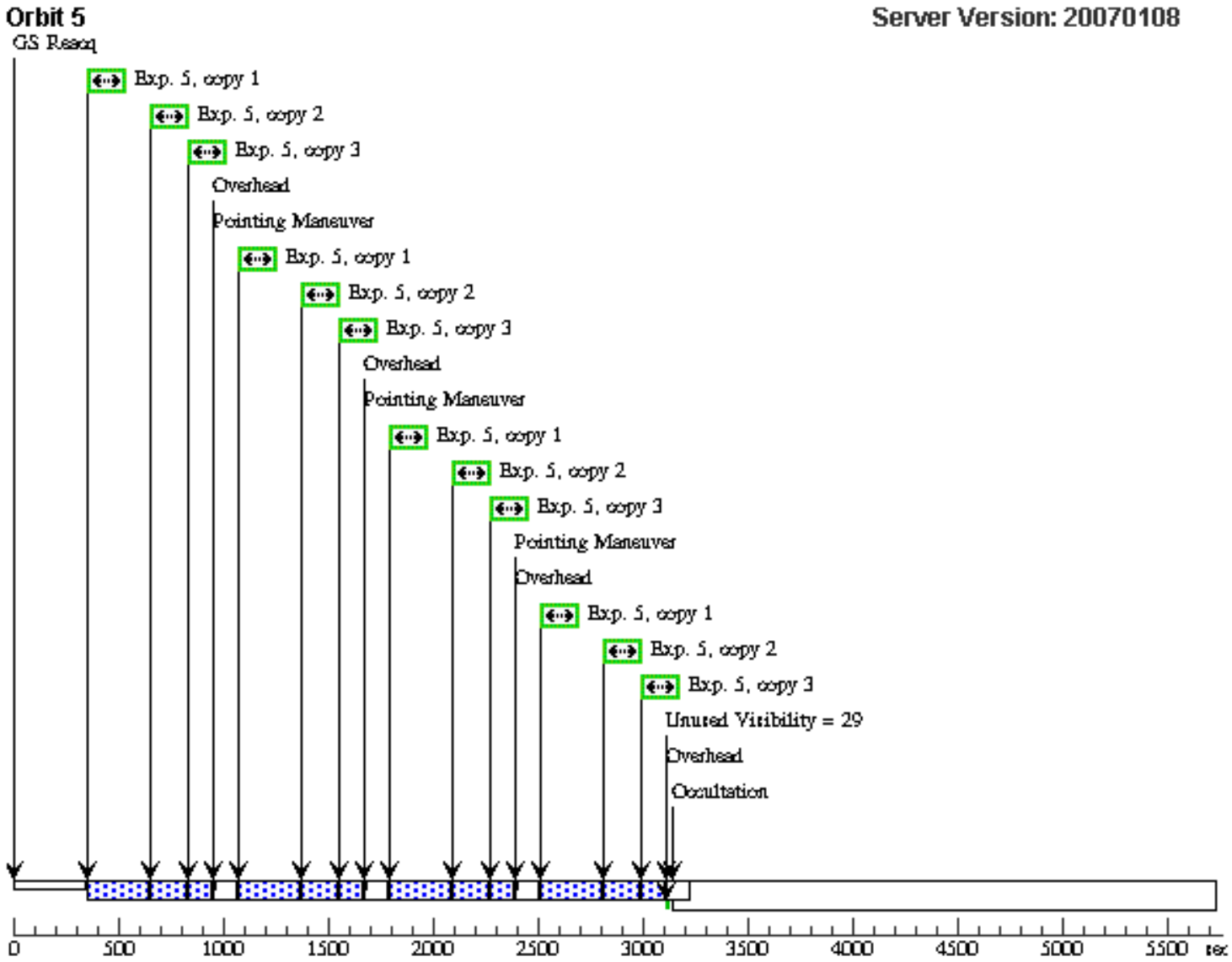
Orbit Structure (continued)



Orbit Structure (continued)



Orbit Structure (continued)



## Visit

**Proposal 10860, Visit 02, completed** Thu Mar 01 02:03:13 GMT 2007

**Diagnostic Status: No Diagnostics**

Scientific Instruments: ACS/HRC

Special Requirements: (none)

*Comments: 2 orbit deep exposure of 2003 UB313*

## Patterns

| # | Primary Pattern | | Secondary Pattern | Exposures |
|---|---|---|---|---|
| (1) | Pattern Type=ACS-HRC-DITHER-BOX<br>Purpose=DITHER<br>Number Of Points=4<br>Point Spacing=0.15<br>Line Spacing=0.098 | Coordinate Frame=POS-TARG<br>Pattern Orientation=19.9<br>Angle Between Sides=63.5<br>Center Pattern=false | | (1), (2) |

## Solar System Targets

| # | Name | Level 1 | Level 2 | Level 3 | Window |
|---|---|---|---|---|---|
| (2) | 2003UB313 | TYPE=ASTEROID,A=67.763603060138 5,E=0.44092853463481,I=44.02855930264 354,O=35.95886882418944,W=150.89677 97282232,M=196.9607112216522,EQUIN OX=J2000,EPOCH=08-JUL-2003:00:00:00 | | | |

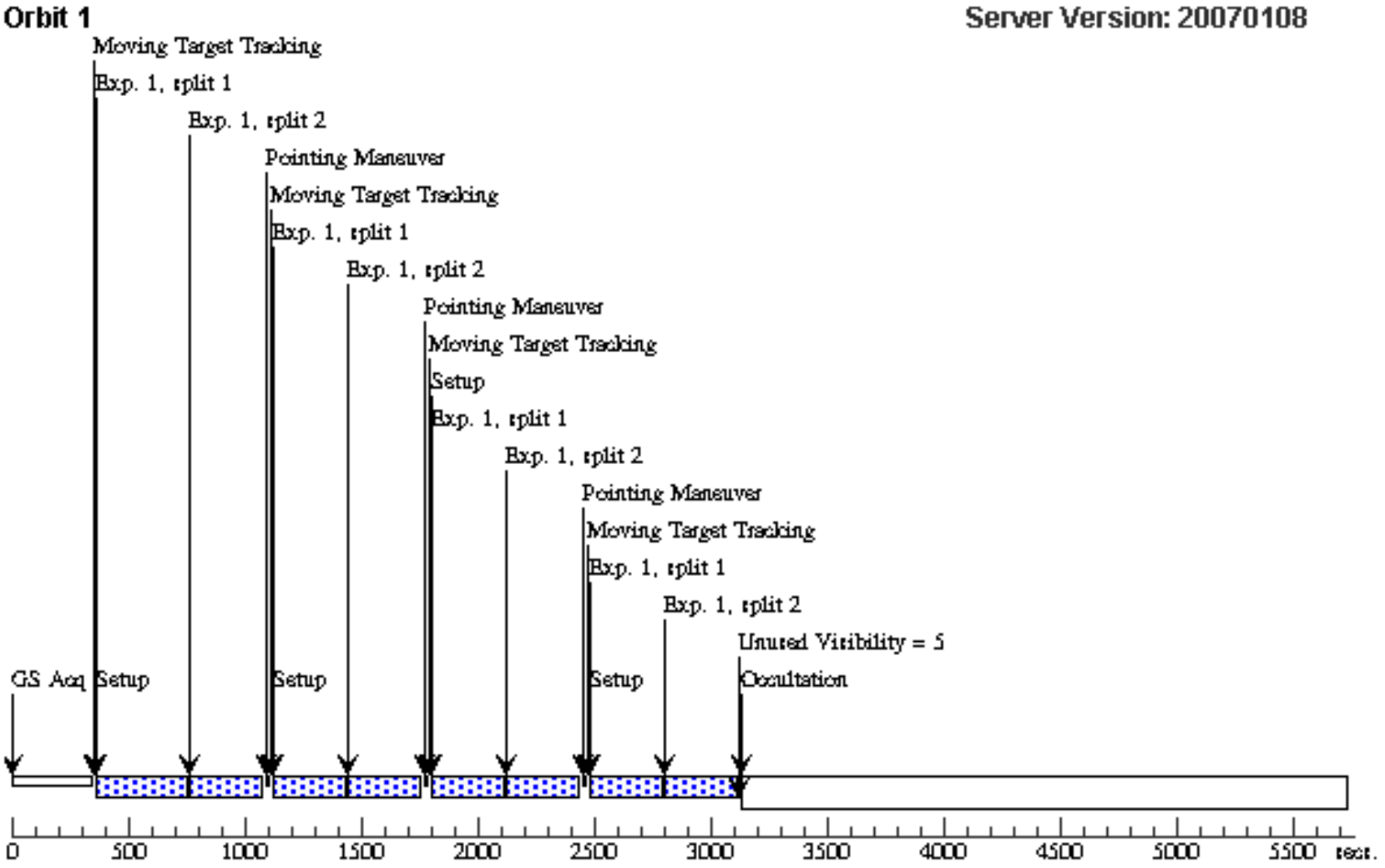
## Exposures

| # | Label | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | (2) 2003UB313 | ACS/HRC, ACCUM, HRC | F606W | CR-SPLIT=2 | | Pattern 1-1 (1) | 550.0 Secs | |
| | | | | | | | | *[==>(Pattern 1, Split 1)]*<br>*[==>(Pattern 1, Split 2)]*<br>*[==>(Pattern 2, Split 1)]*<br>*[==>(Pattern 2, Split 2)]*<br>*[==>(Pattern 3, Split 1)]*<br>*[==>(Pattern 3, Split 2)]*<br>*[==>(Pattern 4, Split 1)]*<br>*[==>(Pattern 4, Split 2)]* | ***[1]*** |

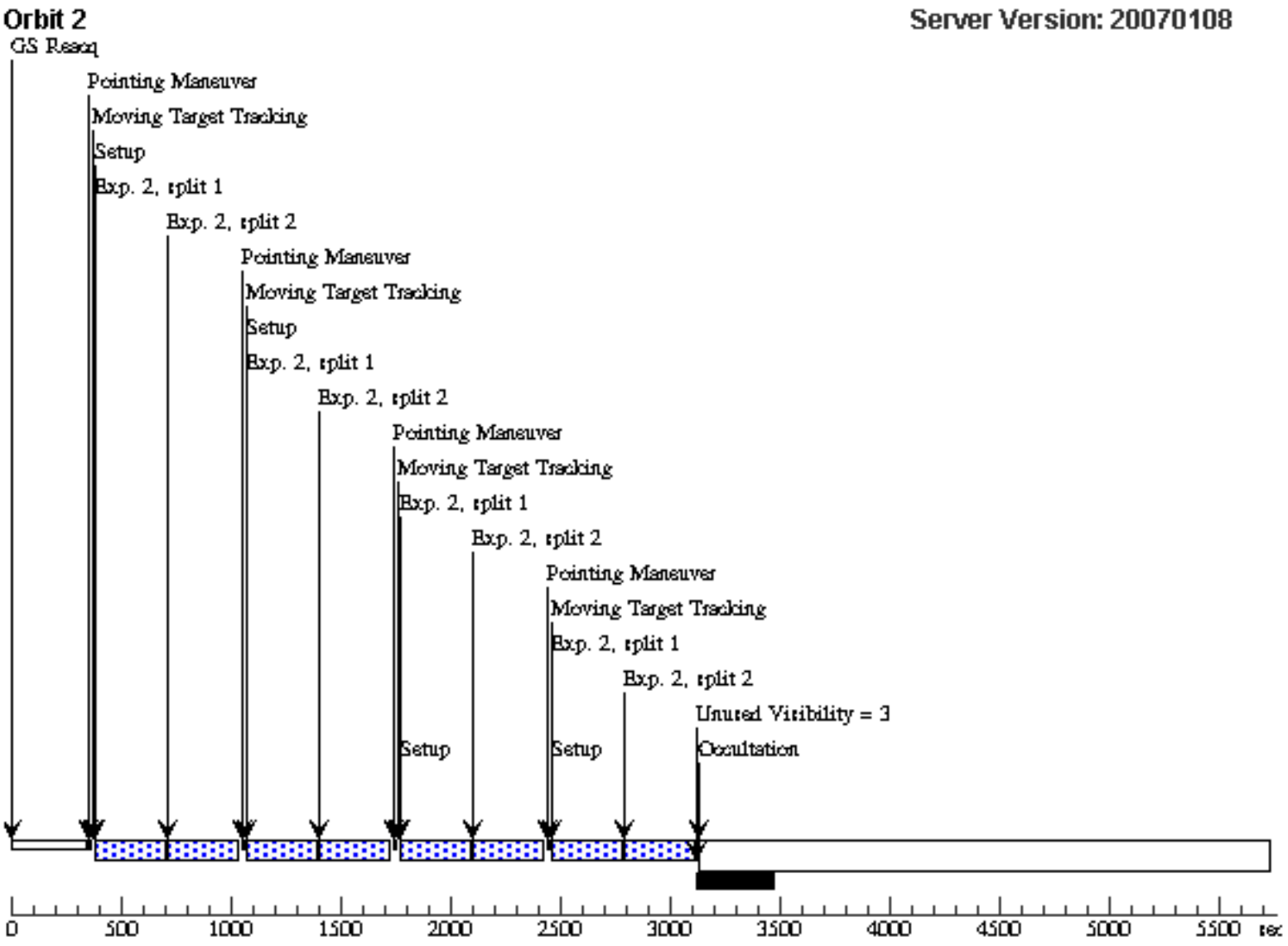
**Exposures (continued)**

| # | Label | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 2 | | (2) 2003UB313 | ACS/HRC, ACCUM, HRC | F606W | CR-SPLIT=2 | | Pattern 2-2 (1) | 565.0 Secs | |
| | | | | | | | | *[==>(Pattern 1, Split 1)]*<br>*[==>(Pattern 1, Split 2)]*<br>*[==>(Pattern 2, Split 1)]*<br>*[==>(Pattern 2, Split 2)]*<br>*[==>(Pattern 3, Split 1)]*<br>*[==>(Pattern 3, Split 2)]*<br>*[==>(Pattern 4, Split 1)]*<br>*[==>(Pattern 4, Split 2)]* | ***[2]*** |

Orbit Structure



Orbit Structure (continued)



## Visit

**Proposal 10860, Visit 03, completed** Thu Mar 01 02:03:14 GMT 2007

**Diagnostic Status: No Diagnostics**

Scientific Instruments: ACS/HRC

Special Requirements: (none)

*Comments: 2 orbit deep exposure of Sedna*

## Patterns

| # | Primary Pattern | | Secondary Pattern | Exposures |
|---|---|---|---|---|
| (1) | Pattern Type=ACS-HRC-DITHER-BOX<br>Purpose=DITHER<br>Number Of Points=4<br>Point Spacing=0.15<br>Line Spacing=0.098 | Coordinate Frame=POS-TARG<br>Pattern Orientation=19.9<br>Angle Between Sides=63.5<br>Center Pattern=false | | (1), (2) |

## Solar System Targets

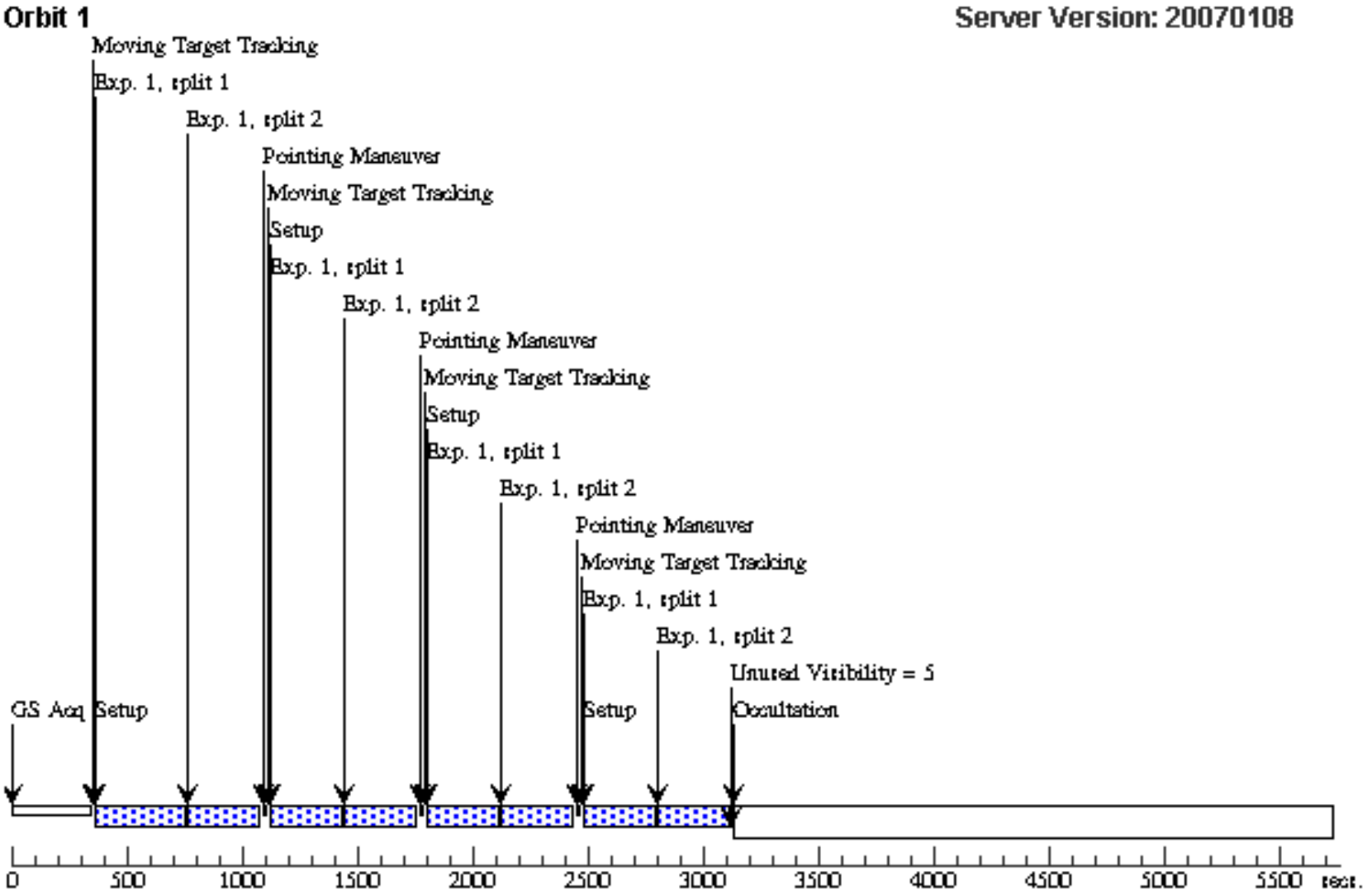
| # | Name | Level 1 | Level 2 | Level 3 | Window |
|---|---|---|---|---|---|
| (6) | SEDNA | TYPE=ASTEROID,A=523.286725671778 9,E=0.85466693045799,I=11.93235787319 574,O=144.5746569848294,W=311.30652 3735294,M=357.8230144149302,EQUINO X=J2000,EPOCH=12-NOV-2003:00:00:00 | | | |

## Exposures

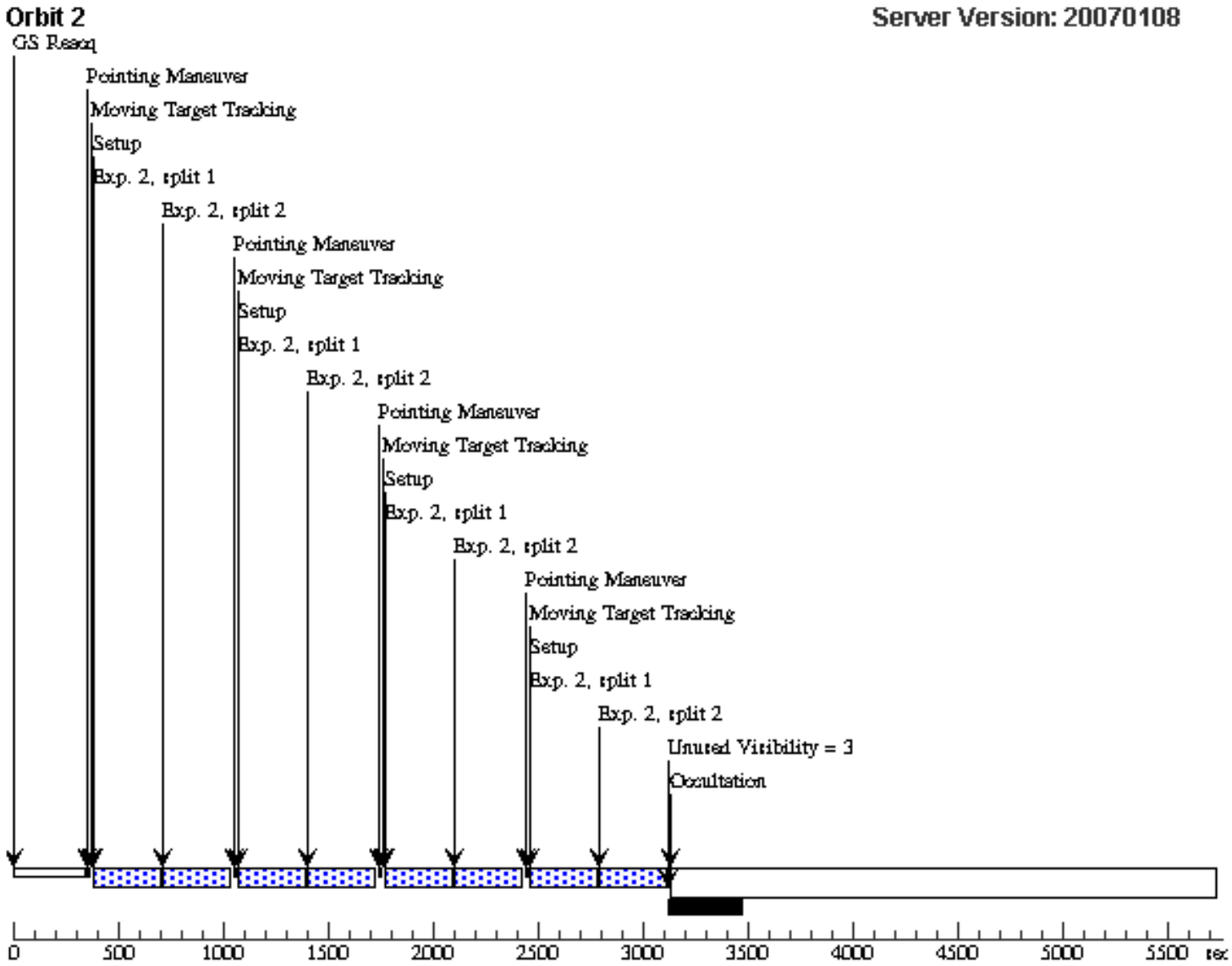
| # | Label | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | (6) SEDNA | ACS/HRC, ACCUM, HRC | F606W | CR-SPLIT=2 | | Pattern 1-1 (1) | 550.0 Secs | |
| | | | | | | | | *[==>(Pattern 1, Split 1)]* | ***[1]*** |
| | | | | | | | | *[==>(Pattern 1, Split 2)]* | |
| | | | | | | | | *[==>(Pattern 2, Split 1)]* | |
| | | | | | | | | *[==>(Pattern 2, Split 2)]* | |
| | | | | | | | | *[==>(Pattern 3, Split 1)]* | |
| | | | | | | | | *[==>(Pattern 3, Split 2)]* | |
| | | | | | | | | *[==>(Pattern 4, Split 1)]* | |
| | | | | | | | | *[==>(Pattern 4, Split 2)]* | |

| Exposures (continued) | # | Label | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2 | | (6) SEDNA | ACS/HRC, ACCUM, HRC | F606W | CR-SPLIT=2 | | Pattern 2-2 (1) | 565.0 Secs | |
| | | | | | | | | | *[==>(Pattern 1, Split 1)]*<br>*[==>(Pattern 1, Split 2)]*<br>*[==>(Pattern 2, Split 1)]*<br>*[==>(Pattern 2, Split 2)]*<br>*[==>(Pattern 3, Split 1)]*<br>*[==>(Pattern 3, Split 2)]*<br>*[==>(Pattern 4, Split 1)]*<br>*[==>(Pattern 4, Split 2)]* | ***[2]*** |

Orbit Structure



**Orbit Structure (continued)**



## Visit

**Proposal 10860, Visit 04, implementation** Thu Mar 01 02:03:14 GMT 2007

**Diagnostic Status: No Diagnostics**

Scientific Instruments: WFPC2

Special Requirements: (none)

*Comments: 2 orbit deep exposure of quaoar*

## Patterns

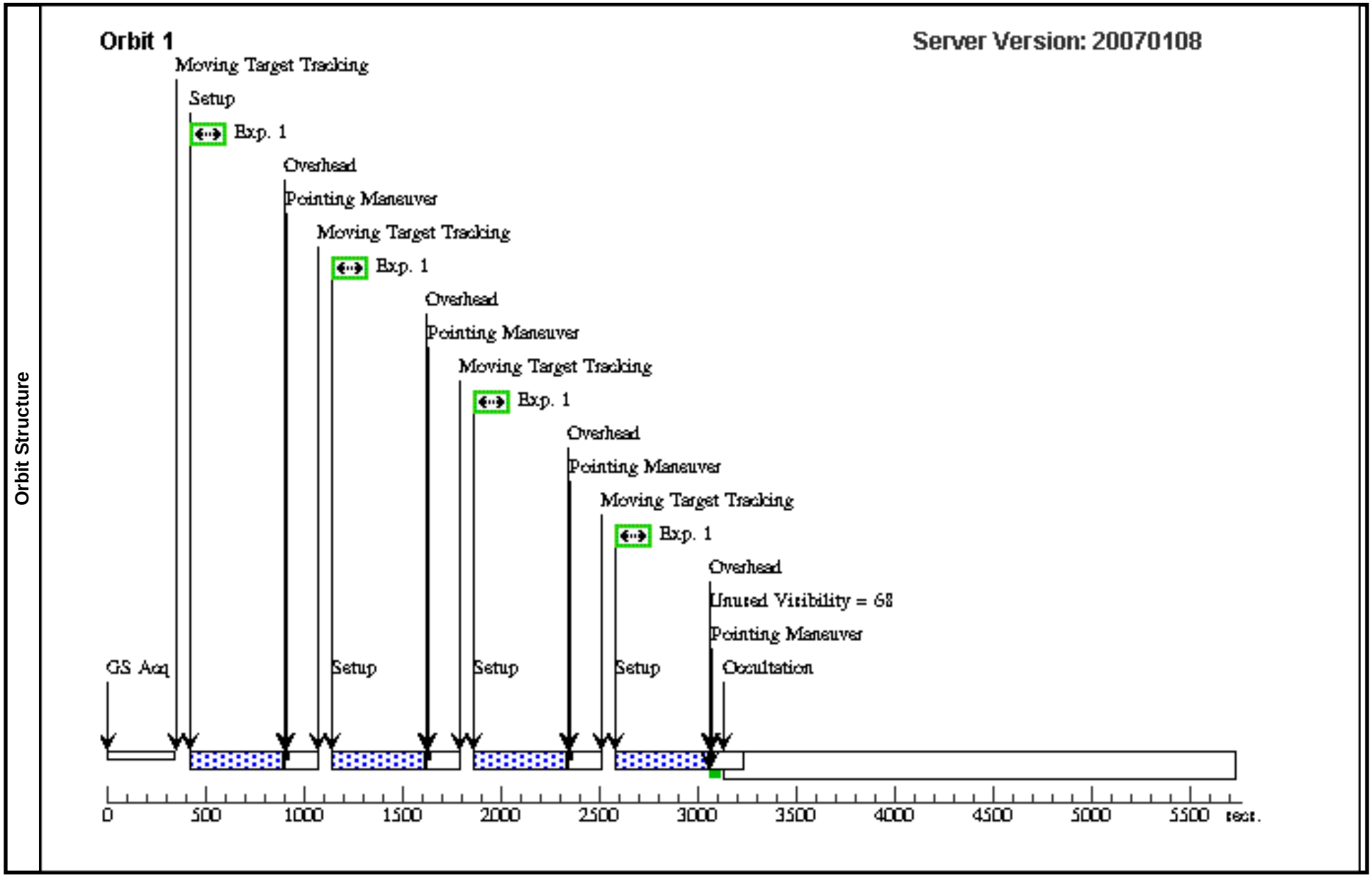
| # | Primary Pattern | | Secondary Pattern | Exposures |
|---|---|---|---|---|
| (2) | Pattern Type=WFPC2-BOX | Coordinate Frame=POS-TARG | | (1), (2) |
| | Purpose=DITHER | Pattern Orientation=26.6 | | |
| | Number Of Points=4 | Angle Between Sides=143.1 | | |
| | Point Spacing=0.559 | Center Pattern=false | | |
| | Line Spacing=0.559 | | | |

## Solar System Targets

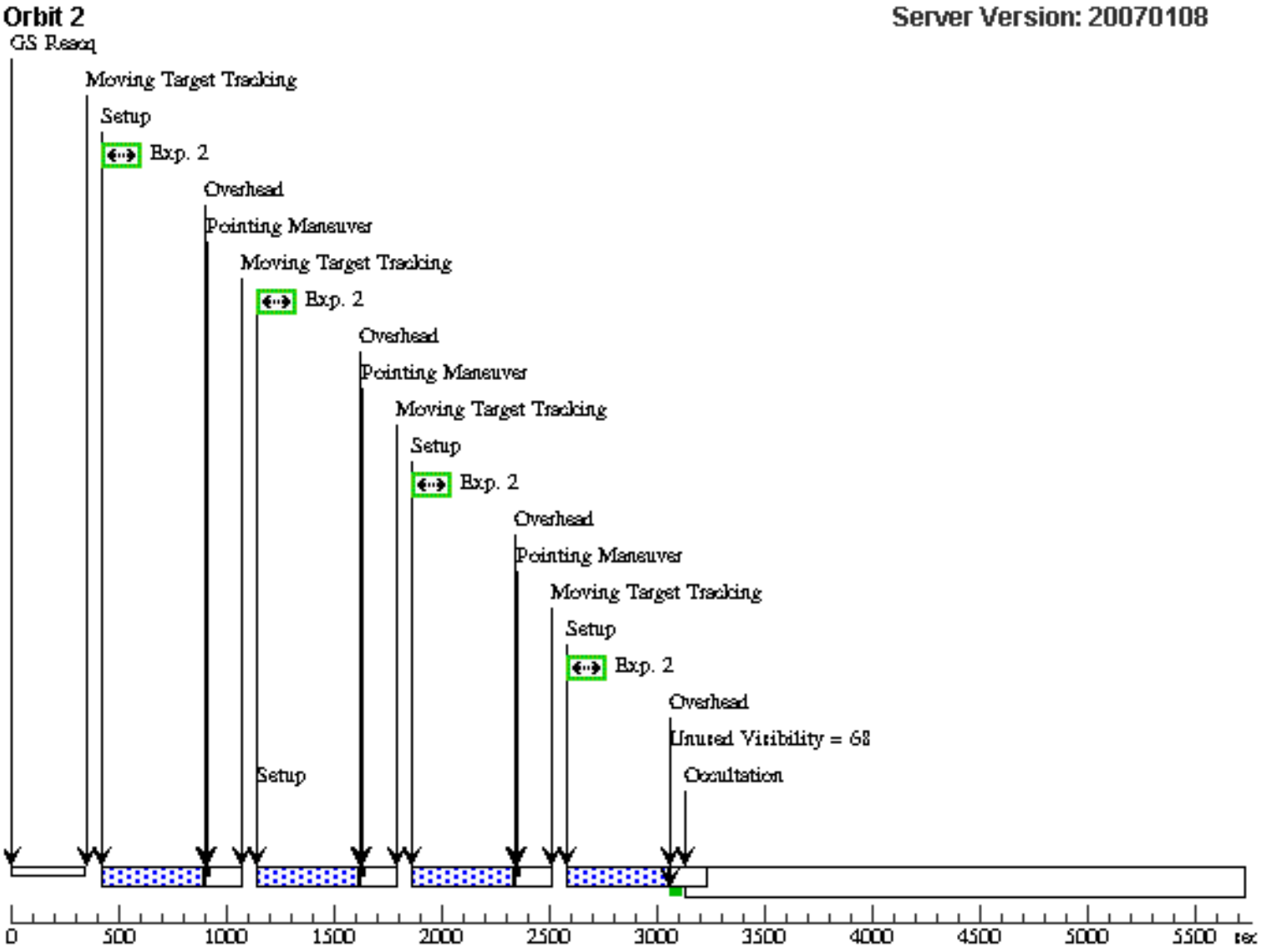
| # | Name | Level 1 | Level 2 | Level 3 | Window |
|---|---|---|---|---|---|
| (5) | QUAOAR | TYPE=ASTEROID,A=43.0862136164555 5,E=0.03843976559958,I=8.001962741676 21,O=189.0420018539052,W=165.753294 7806834,M=258.0120356902188,EQUINO X=J2000,EPOCH=25-NOV-2000:00:00:00 | | | |

## Exposures

| # | Label | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | (5) QUAOAR | WFPC2, IMAGE, PC1 | F606W | | | Pattern 1-1 (2) | 550.0 Secs | |
| | | | | | | | | *[==>400.0 Secs (Pattern 1)]* | ***[1]*** |
| | | | | | | | | *[==>400.0 Secs (Pattern 2)]* | |
| | | | | | | | | *[==>400.0 Secs (Pattern 3)]* | |
| | | | | | | | | *[==>400.0 Secs (Pattern 4)]* | |
| 2 | | (5) QUAOAR | WFPC2, IMAGE, PC1 | F606W | | | Pattern 2-2 (2) | 565.0 Secs | |
| | | | | | | | | *[==>400.0 Secs (Pattern 1)]* | ***[2]*** |
| | | | | | | | | *[==>400.0 Secs (Pattern 2)]* | |
| | | | | | | | | *[==>400.0 Secs (Pattern 3)]* | |
| | | | | | | | | *[==>400.0 Secs (Pattern 4)]* | |


Orbit Structure
Orbit 1
Server Version: 20070108
Moving Target Tracking
Setup
Exp. 1
Overhead
Pointing Maneuver
Moving Target Tracking
Exp. 1
Overhead
Pointing Maneuver
Moving Target Tracking
Exp. 1
Overhead
Pointing Maneuver
Moving Target Tracking
Exp. 1
Overhead
Unused Visibility = 68
Pointing Maneuver
GS Acq
Setup
Setup
Setup
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec.

Orbit Structure (continued)



## Visit

**Proposal 10860, Visit 05, completed** Thu Mar 01 02:03:15 GMT 2007

**Diagnostic Status: No Diagnostics**

Scientific Instruments: ACS/HRC

Special Requirements: (none)

*Comments: 2 orbit deep exposure of 2005 FY9*

## Patterns

| # | Primary Pattern | | Secondary Pattern | Exposures |
|---|---|---|---|---|
| (1) | Pattern Type=ACS-HRC-DITHER-BOX<br>Purpose=DITHER<br>Number Of Points=4<br>Point Spacing=0.15<br>Line Spacing=0.098 | Coordinate Frame=POS-TARG<br>Pattern Orientation=19.9<br>Angle Between Sides=63.5<br>Center Pattern=false | | (1), (2) |

## Solar System Targets

| # | Name | Level 1 | Level 2 | Level 3 | Window |
|---|---|---|---|---|---|
| (3) | 2005FY9 | TYPE=ASTEROID,A=45.7771453911578,E=0.15445043088848,I=28.99981620003449,O=79.4417973945687,W=297.3048477992733,M=144.436753316043,EQUINOX=J2000,EPOCH=01-OCT-2004:00:00:00 | | | |

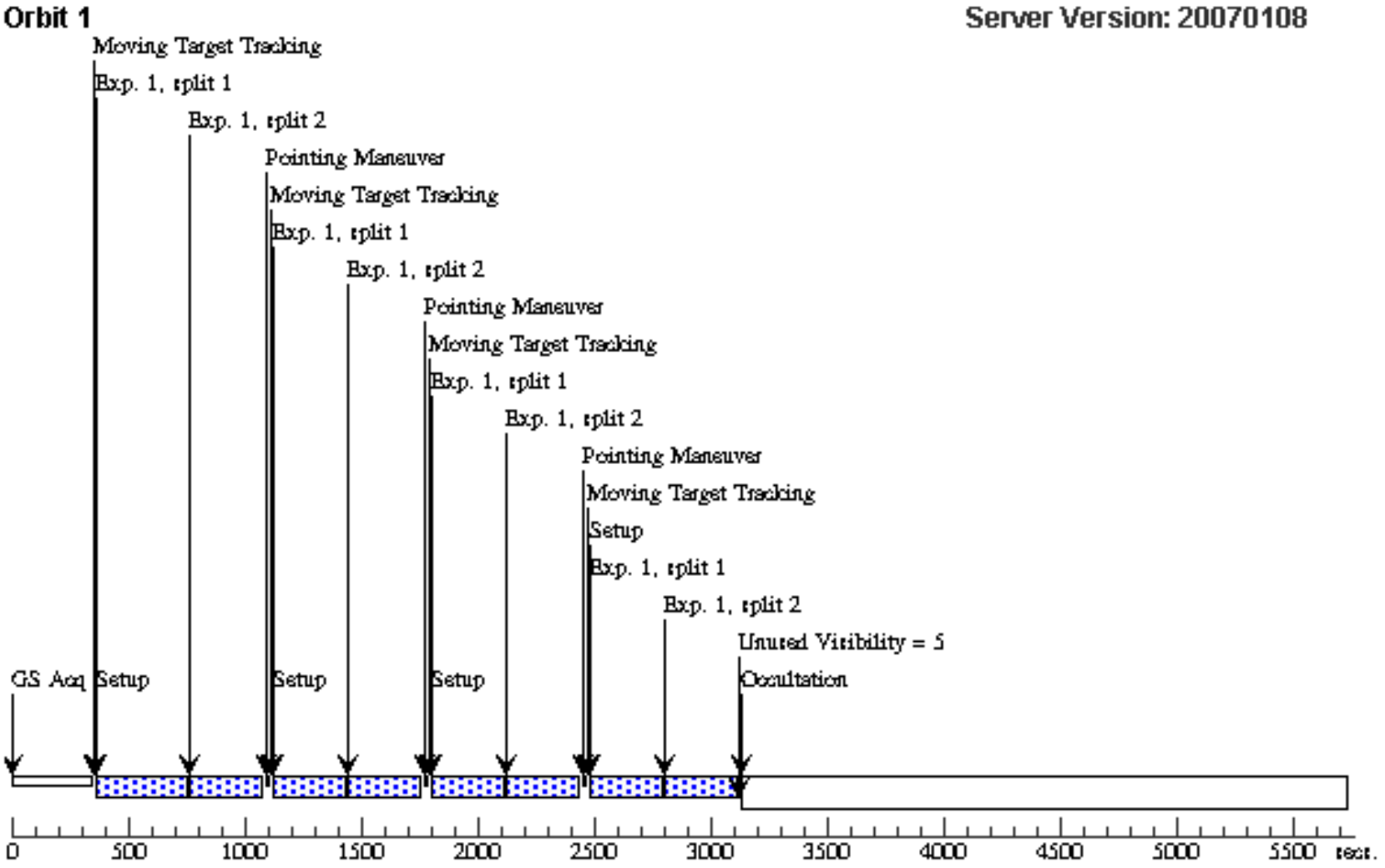
## Exposures

| # | Label | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | (3) 2005FY9 | ACS/HRC, ACCUM, HRC | F606W | CR-SPLIT=2 | | Pattern 1-1 (1) | 550.0 Secs | |
| | | | | | | | | *[==>(Pattern 1, Split 1)]* | ***[1]*** |
| | | | | | | | | *[==>(Pattern 1, Split 2)]* | |
| | | | | | | | | *[==>(Pattern 2, Split 1)]* | |
| | | | | | | | | *[==>(Pattern 2, Split 2)]* | |
| | | | | | | | | *[==>(Pattern 3, Split 1)]* | |
| | | | | | | | | *[==>(Pattern 3, Split 2)]* | |
| | | | | | | | | *[==>(Pattern 4, Split 1)]* | |
| | | | | | | | | *[==>(Pattern 4, Split 2)]* | |

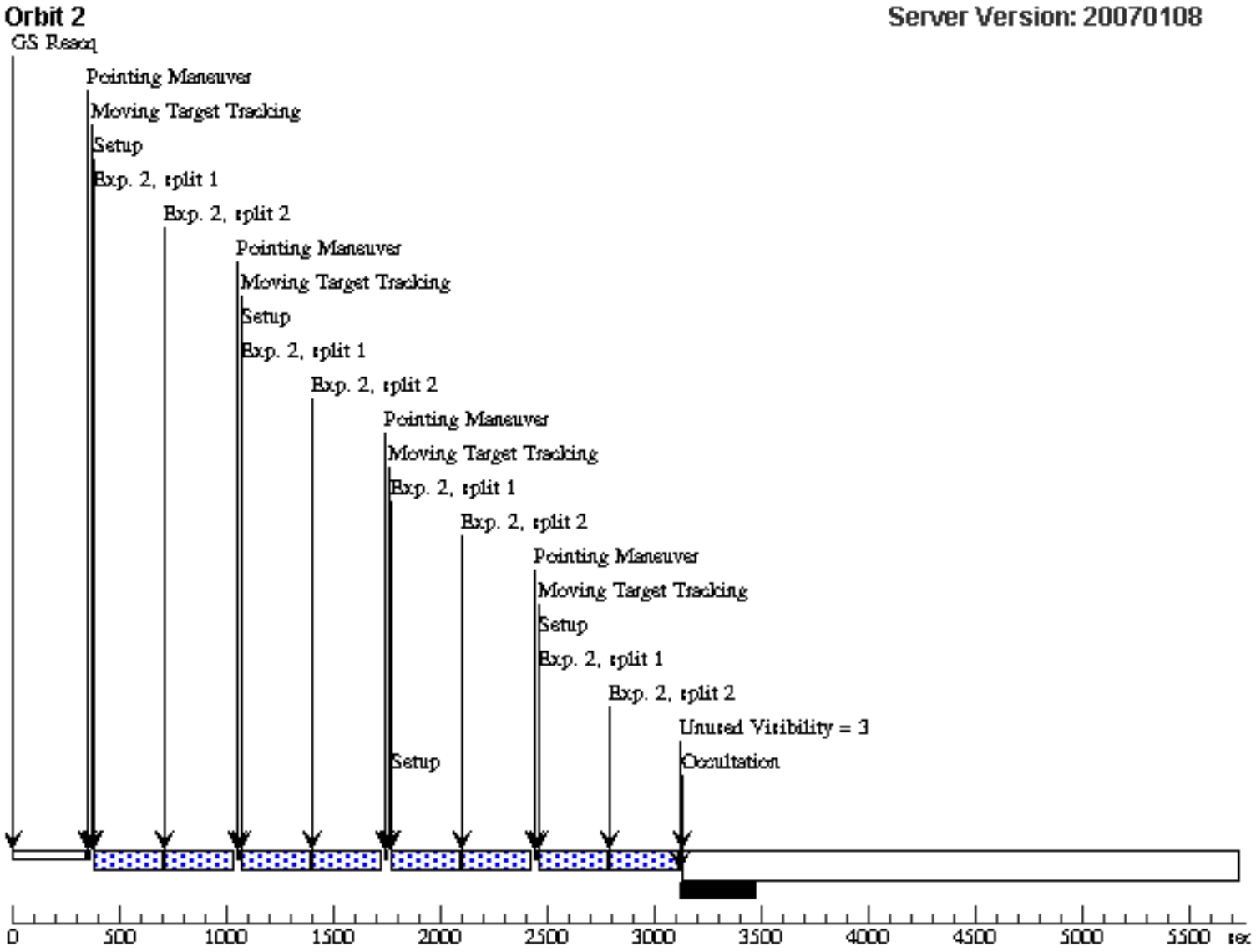
**Exposures (continued)**

| # | Label | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 2 | | (3) 2005FY9 | ACS/HRC, ACCUM, HRC | F606W | CR-SPLIT=2 | | Pattern 2-2 (1) | 565.0 Secs | |
| | | | | | | | | *[==>(Pattern 1, Split 1)]*<br>*[==>(Pattern 1, Split 2)]*<br>*[==>(Pattern 2, Split 1)]*<br>*[==>(Pattern 2, Split 2)]*<br>*[==>(Pattern 3, Split 1)]*<br>*[==>(Pattern 3, Split 2)]*<br>*[==>(Pattern 4, Split 1)]*<br>*[==>(Pattern 4, Split 2)]* | ***[2]*** |

Orbit Structure



Orbit Structure (continued)



## Visit

**Proposal 10860, Visit 06, completed** Thu Mar 01 02:03:16 GMT 2007

**Diagnostic Status: No Diagnostics**

Scientific Instruments: ACS/HRC

Special Requirements: (none)

*Comments: 6 visits are required to determine the orbit of the satellite of Orcus. The timing of the visits is time critical*

*1st epoch*

## Patterns

| # | Primary Pattern | | Secondary Pattern | Exposures |
|---|---|---|---|---|
| (1) | Pattern Type=ACS-HRC-DITHER-BOX<br>Purpose=DITHER<br>Number Of Points=4<br>Point Spacing=0.15<br>Line Spacing=0.098 | Coordinate Frame=POS-TARG<br>Pattern Orientation=19.9<br>Angle Between Sides=63.5<br>Center Pattern=false | | (1) |

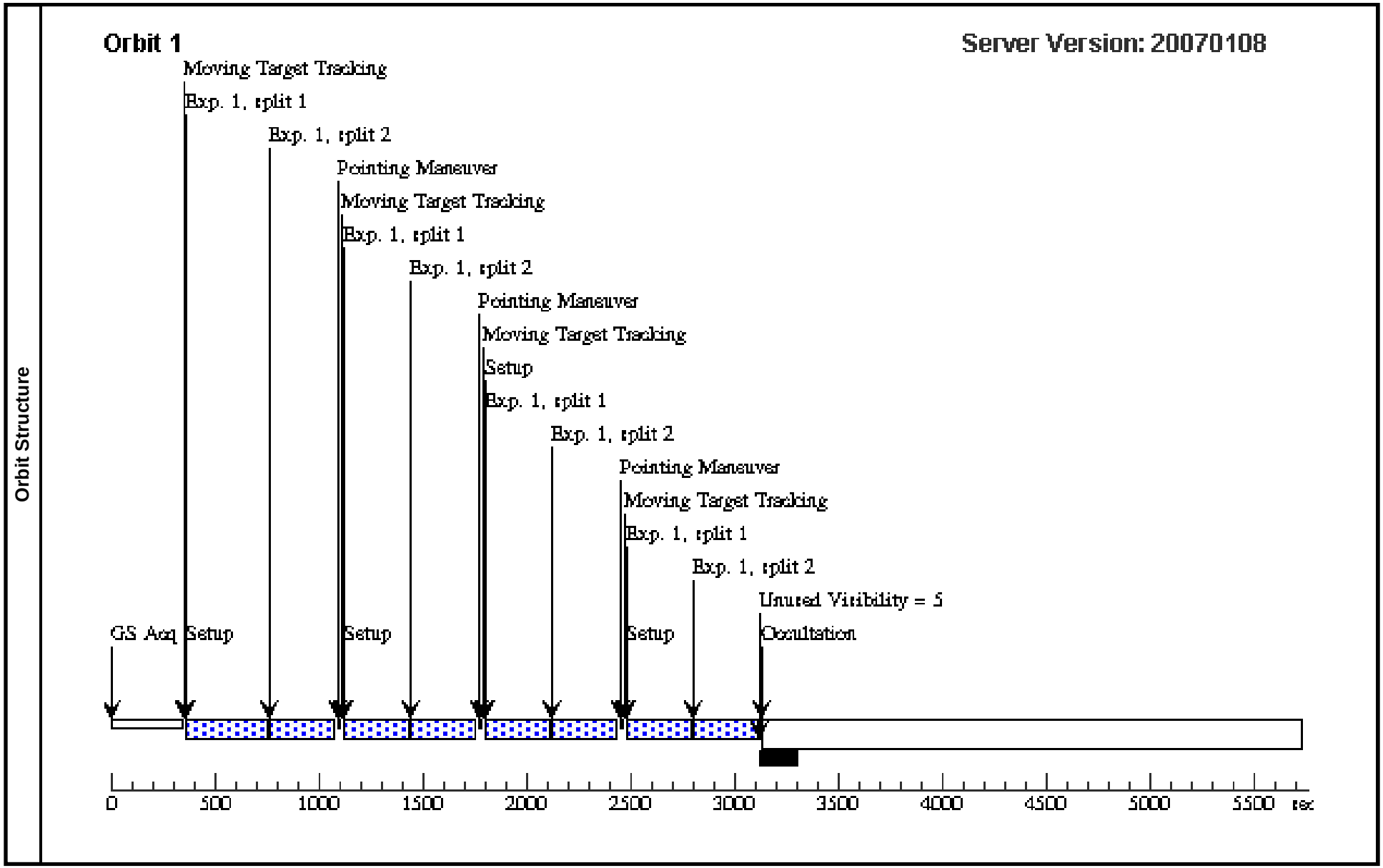
## Solar System Targets

| # | Name | Level 1 | Level 2 | Level 3 | Window |
|---|---|---|---|---|---|
| (4) | ORCUS | TYPE=ASTEROID,A=39.3874016319219<br>6,E=0.2220077213704,I=20.522930876590<br>58,O=268.3917534413838,W=74.1064548<br>2450718,M=151.7437869109494,EQUINO<br>X=J2000,EPOCH=02-MAY-2001:00:00:00 | | | |

## Exposures

| # | Label | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | (4) ORCUS | ACS/HRC, ACCUM, HRC | F606W | CR-SPLIT=2 | | Pattern 1-1 (1) | 550.0 Secs | |
| | | | | | | | | *[==>(Pattern 1, Split 1)]* | ***[1]*** |
| | | | | | | | | *[==>(Pattern 1, Split 2)]* | |
| | | | | | | | | *[==>(Pattern 2, Split 1)]* | |
| | | | | | | | | *[==>(Pattern 2, Split 2)]* | |
| | | | | | | | | *[==>(Pattern 3, Split 1)]* | |
| | | | | | | | | *[==>(Pattern 3, Split 2)]* | |
| | | | | | | | | *[==>(Pattern 4, Split 1)]* | |
| | | | | | | | | *[==>(Pattern 4, Split 2)]* | |

*Comments: 1st epoch for satellite orbit determination*


Orbit Structure
Orbit 1
Server Version: 20070108
Moving Target Tracking
Exp. 1, split 1
Exp. 1, split 2
Pointing Maneuver
Moving Target Tracking
Exp. 1, split 1
Exp. 1, split 2
Pointing Maneuver
Moving Target Tracking
Setup
Exp. 1, split 1
Exp. 1, split 2
Pointing Maneuver
Moving Target Tracking
Exp. 1, split 1
Exp. 1, split 2
Unused Visibility = 5
GS Acq
Setup
Setup
Setup
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

## Visit

**Proposal 10860, Visit 07, completed** Thu Mar 01 02:03:17 GMT 2007

**Diagnostic Status: No Diagnostics**

Scientific Instruments: ACS/HRC

Special Requirements: AFTER 06 BY 3 D TO 7 D

*Comments: 6 visits are required to determine the orbit of the satellite of Orcus. The timing of the visits is time critical*

*2nd epoch*

## Patterns

| # | Primary Pattern | | Secondary Pattern | Exposures |
|---|---|---|---|---|
| (1) | Pattern Type=ACS-HRC-DITHER-BOX<br>Purpose=DITHER<br>Number Of Points=4<br>Point Spacing=0.15<br>Line Spacing=0.098 | Coordinate Frame=POS-TARG<br>Pattern Orientation=19.9<br>Angle Between Sides=63.5<br>Center Pattern=false | | (1) |

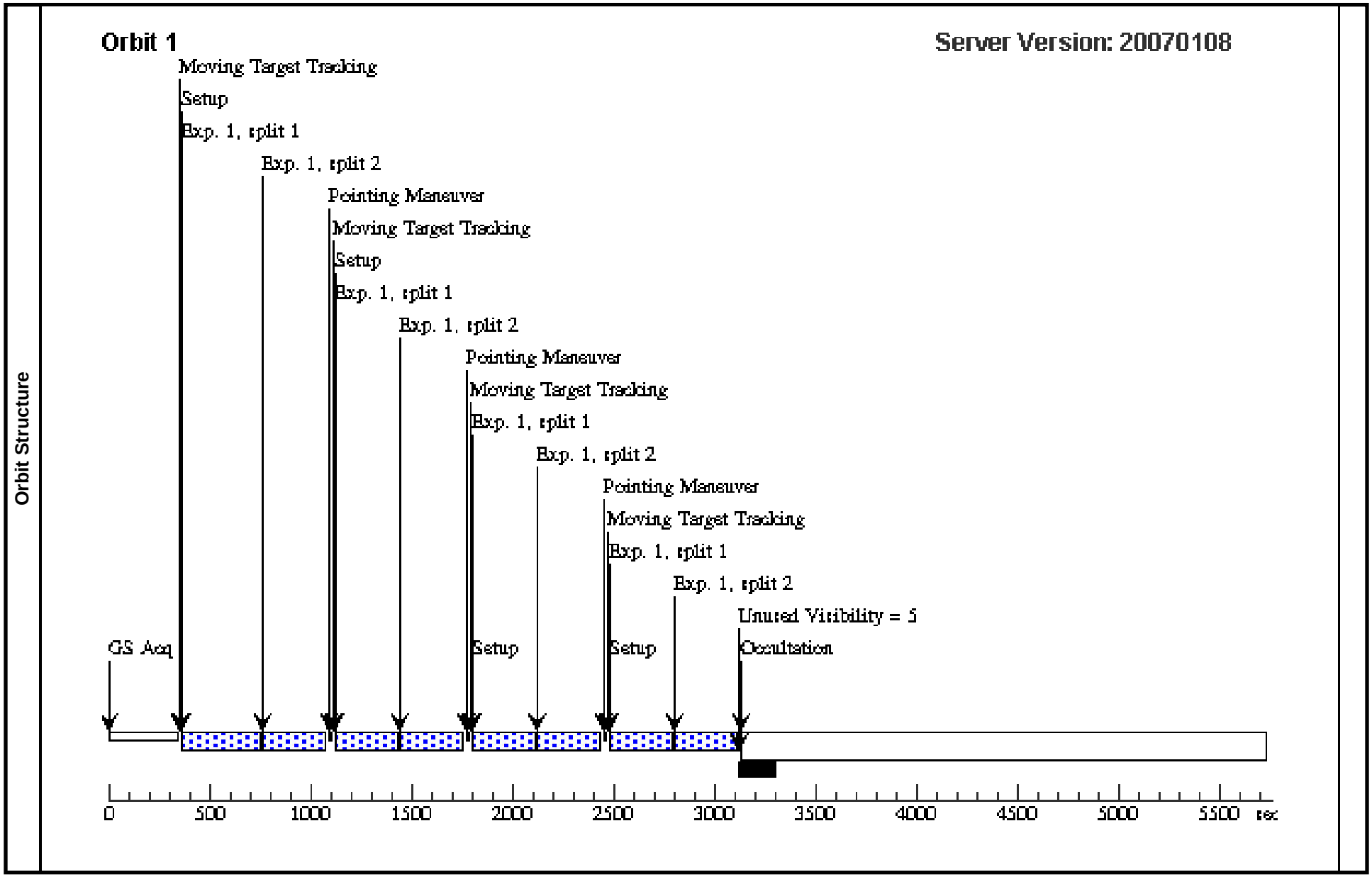
## Solar System Targets

| # | Name | Level 1 | Level 2 | Level 3 | Window |
|---|---|---|---|---|---|
| (4) | ORCUS | TYPE=ASTEROID,A=39.3874016319219<br>6,E=0.2220077213704,I=20.522930876590<br>58,O=268.3917534413838,W=74.1064548<br>2450718,M=151.7437869109494,EQUINO<br>X=J2000,EPOCH=02-MAY-2001:00:00:00 | | | |

## Exposures

| # | Label | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | (4) ORCUS | ACS/HRC, ACCUM, HRC | F606W | CR-SPLIT=2 | | Pattern 1-1 (1) | 550.0 Secs | |
| | | | | | | | | *[==>(Pattern 1, Split 1)]* | ***[1]*** |
| | | | | | | | | *[==>(Pattern 1, Split 2)]* | |
| | | | | | | | | *[==>(Pattern 2, Split 1)]* | |
| | | | | | | | | *[==>(Pattern 2, Split 2)]* | |
| | | | | | | | | *[==>(Pattern 3, Split 1)]* | |
| | | | | | | | | *[==>(Pattern 3, Split 2)]* | |
| | | | | | | | | *[==>(Pattern 4, Split 1)]* | |
| | | | | | | | | *[==>(Pattern 4, Split 2)]* | |

*Comments: 1st eoch for satellite orbit determination*


Orbit Structure
Orbit 1
Server Version: 20070108
Moving Target Tracking
Setup
Exp. 1, split 1
Exp. 1, split 2
Pointing Maneuver
Moving Target Tracking
Setup
Exp. 1, split 1
Exp. 1, split 2
Pointing Maneuver
Moving Target Tracking
Exp. 1, split 1
Exp. 1, split 2
Pointing Maneuver
Moving Target Tracking
Exp. 1, split 1
Exp. 1, split 2
Unused Visibility = 5
GS Acq
Setup
Setup
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

## Visit

**Proposal 10860, Visit 08, completed** Thu Mar 01 02:03:17 GMT 2007

**Diagnostic Status: No Diagnostics**

Scientific Instruments: ACS/HRC

Special Requirements: AFTER 06 BY 8 D TO 12 D

*Comments: 6 visits are required to determine the orbit of the satellite of Orcus. The timing of the visits is time critical*

*3rd epoch*

## Patterns

| # | Primary Pattern | | Secondary Pattern | Exposures |
|---|---|---|---|---|
| (1) | Pattern Type=ACS-HRC-DITHER-BOX<br>Purpose=DITHER<br>Number Of Points=4<br>Point Spacing=0.15<br>Line Spacing=0.098 | Coordinate Frame=POS-TARG<br>Pattern Orientation=19.9<br>Angle Between Sides=63.5<br>Center Pattern=false | | (1) |

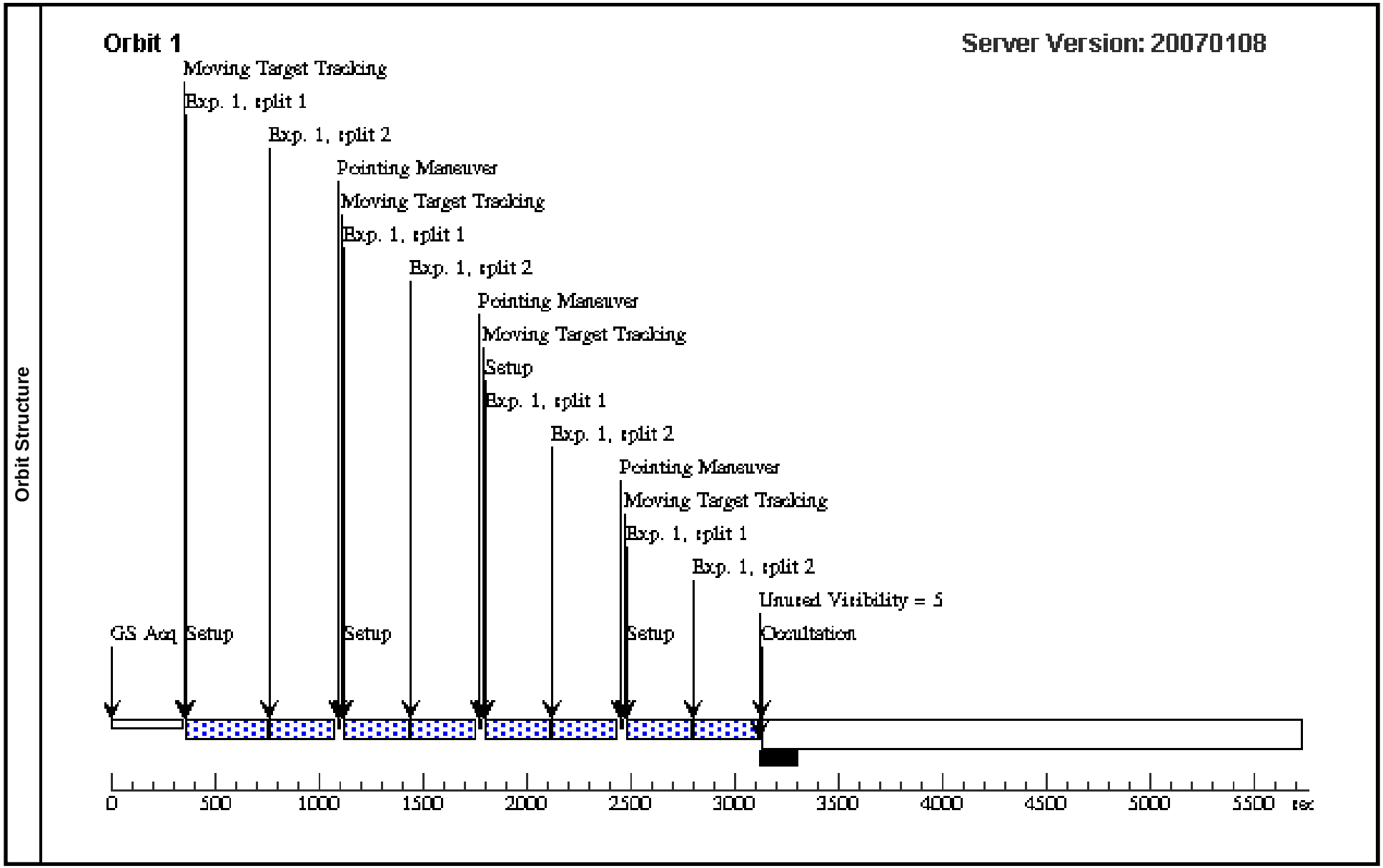
## Solar System Targets

| # | Name | Level 1 | Level 2 | Level 3 | Window |
|---|---|---|---|---|---|
| (4) | ORCUS | TYPE=ASTEROID,A=39.3874016319219<br>6,E=0.2220077213704,I=20.522930876590<br>58,O=268.3917534413838,W=74.1064548<br>2450718,M=151.7437869109494,EQUINO<br>X=J2000,EPOCH=02-MAY-2001:00:00:00 | | | |

## Exposures

| # | Label | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | (4) ORCUS | ACS/HRC, ACCUM, HRC | F606W | CR-SPLIT=2 | | Pattern 1-1 (1) | 550.0 Secs | |
| | | | | | | | | *[==>(Pattern 1, Split 1)]* | ***[1]*** |
| | | | | | | | | *[==>(Pattern 1, Split 2)]* | |
| | | | | | | | | *[==>(Pattern 2, Split 1)]* | |
| | | | | | | | | *[==>(Pattern 2, Split 2)]* | |
| | | | | | | | | *[==>(Pattern 3, Split 1)]* | |
| | | | | | | | | *[==>(Pattern 3, Split 2)]* | |
| | | | | | | | | *[==>(Pattern 4, Split 1)]* | |
| | | | | | | | | *[==>(Pattern 4, Split 2)]* | |

*Comments: 1st eoch for satellite orbit determination*


Orbit Structure
Orbit 1
Server Version: 20070108
Moving Target Tracking
Exp. 1, split 1
Exp. 1, split 2
Pointing Maneuver
Moving Target Tracking
Exp. 1, split 1
Exp. 1, split 2
Pointing Maneuver
Moving Target Tracking
Setup
Exp. 1, split 1
Exp. 1, split 2
Pointing Maneuver
Moving Target Tracking
Exp. 1, split 1
Exp. 1, split 2
Unused Visibility = 5
GS Acq
Setup
Setup
Setup
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

## Visit

**Proposal 10860, Visit 09, completed** Thu Mar 01 02:03:18 GMT 2007

**Diagnostic Status: No Diagnostics**

Scientific Instruments: ACS/HRC

Special Requirements: AFTER 06 BY 15 D TO 20 D

*Comments: 6 visits are required to determine the orbit of the satellite of Orcus. The timing of the visits is time critical*

*4th epoch*

## Patterns

| # | Primary Pattern | | Secondary Pattern | Exposures |
|---|---|---|---|---|
| (1) | Pattern Type=ACS-HRC-DITHER-BOX<br>Purpose=DITHER<br>Number Of Points=4<br>Point Spacing=0.15<br>Line Spacing=0.098 | Coordinate Frame=POS-TARG<br>Pattern Orientation=19.9<br>Angle Between Sides=63.5<br>Center Pattern=false | | (1) |

## Solar System Targets

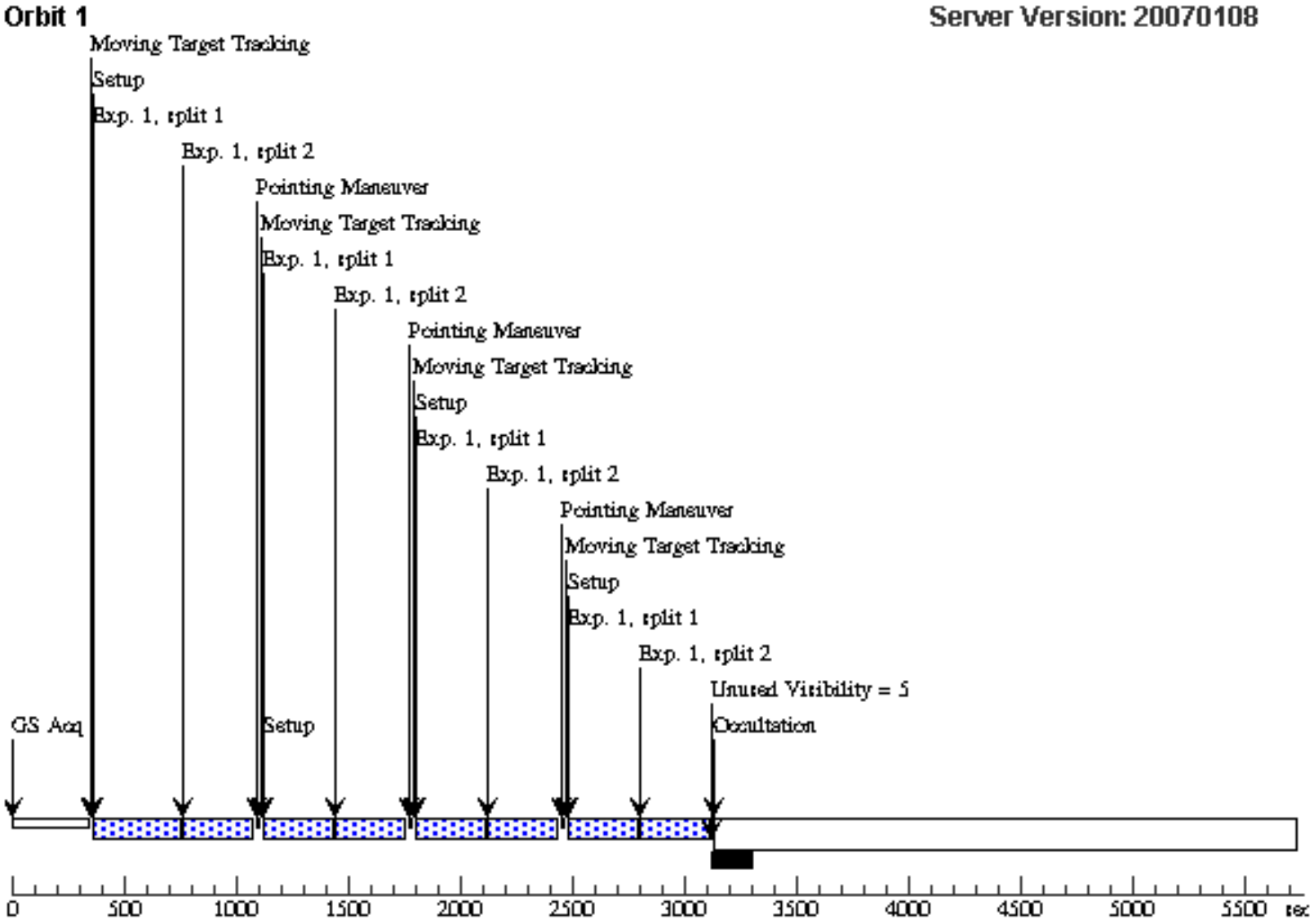
| # | Name | Level 1 | Level 2 | Level 3 | Window |
|---|---|---|---|---|---|
| (4) | ORCUS | TYPE=ASTEROID,A=39.3874016319219<br>6,E=0.2220077213704,I=20.522930876590<br>58,O=268.3917534413838,W=74.1064548<br>2450718,M=151.7437869109494,EQUINO<br>X=J2000,EPOCH=02-MAY-2001:00:00:00 | | | |

## Exposures

| # | Label | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | (4) ORCUS | ACS/HRC, ACCUM, HRC | F606W | CR-SPLIT=2 | | Pattern 1-1 (1) | 550.0 Secs | |
| | | | | | | | | *[==>(Pattern 1, Split 1)]* | ***[1]*** |
| | | | | | | | | *[==>(Pattern 1, Split 2)]* | |
| | | | | | | | | *[==>(Pattern 2, Split 1)]* | |
| | | | | | | | | *[==>(Pattern 2, Split 2)]* | |
| | | | | | | | | *[==>(Pattern 3, Split 1)]* | |
| | | | | | | | | *[==>(Pattern 3, Split 2)]* | |
| | | | | | | | | *[==>(Pattern 4, Split 1)]* | |
| | | | | | | | | *[==>(Pattern 4, Split 2)]* | |

*Comments: 1st eoch for satellite orbit determination*

Orbit Structure



## Visit

**Proposal 10860, Visit 10, completed** Thu Mar 01 02:03:18 GMT 2007

**Diagnostic Status: No Diagnostics**

Scientific Instruments: ACS/HRC

Special Requirements: AFTER 06 BY 22 D TO 28 D

*Comments: 6 visits are required to determine the orbit of the satellite of Orcus. The timing of the visits is time critical*

*5th epoch*

## Patterns

| # | Primary Pattern | | Secondary Pattern | Exposures |
|---|---|---|---|---|
| (1) | Pattern Type=ACS-HRC-DITHER-BOX<br>Purpose=DITHER<br>Number Of Points=4<br>Point Spacing=0.15<br>Line Spacing=0.098 | Coordinate Frame=POS-TARG<br>Pattern Orientation=19.9<br>Angle Between Sides=63.5<br>Center Pattern=false | | (1) |

## Solar System Targets

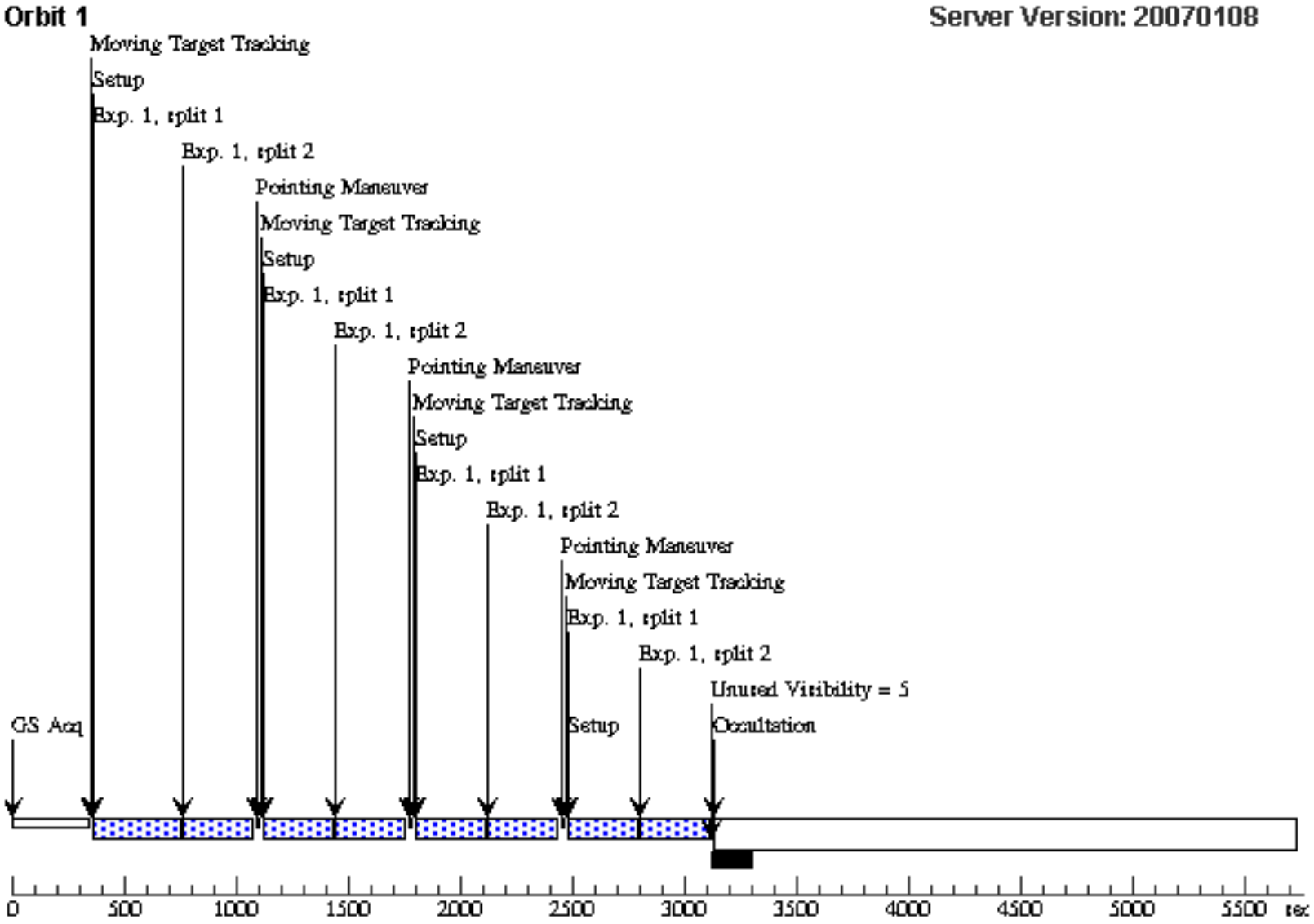
| # | Name | Level 1 | Level 2 | Level 3 | Window |
|---|---|---|---|---|---|
| (4) | ORCUS | TYPE=ASTEROID,A=39.3874016319219<br>6,E=0.2220077213704,I=20.522930876590<br>58,O=268.3917534413838,W=74.1064548<br>2450718,M=151.7437869109494,EQUINO<br>X=J2000,EPOCH=02-MAY-2001:00:00:00 | | | |

## Exposures

| # | Label | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | (4) ORCUS | ACS/HRC, ACCUM, HRC | F606W | CR-SPLIT=2 | | Pattern 1-1 (1) | 550.0 Secs | |
| | | | | | | | | *[==>(Pattern 1, Split 1)]* | ***[1]*** |
| | | | | | | | | *[==>(Pattern 1, Split 2)]* | |
| | | | | | | | | *[==>(Pattern 2, Split 1)]* | |
| | | | | | | | | *[==>(Pattern 2, Split 2)]* | |
| | | | | | | | | *[==>(Pattern 3, Split 1)]* | |
| | | | | | | | | *[==>(Pattern 3, Split 2)]* | |
| | | | | | | | | *[==>(Pattern 4, Split 1)]* | |
| | | | | | | | | *[==>(Pattern 4, Split 2)]* | |

*Comments: 1st eoch for satellite orbit determination*

Orbit Structure



## Visit

**Proposal 10860, Visit 11, completed** Thu Mar 01 02:03:18 GMT 2007

**Diagnostic Status: No Diagnostics**

Scientific Instruments: ACS/HRC

Special Requirements: AFTER 06 BY 35 D TO 40 D

*Comments: 6 visits are required to determine the orbit of the satellite of Orcus. The timing of the visits is time critical*

*6th epoch*

## Patterns

| # | Primary Pattern | | Secondary Pattern | Exposures |
|---|---|---|---|---|
| (1) | Pattern Type=ACS-HRC-DITHER-BOX | Coordinate Frame=POS-TARG | | (1) |
| | Purpose=DITHER | Pattern Orientation=19.9 | | |
| | Number Of Points=4 | Angle Between Sides=63.5 | | |
| | Point Spacing=0.15 | Center Pattern=false | | |
| | Line Spacing=0.098 | | | |

## Solar System Targets

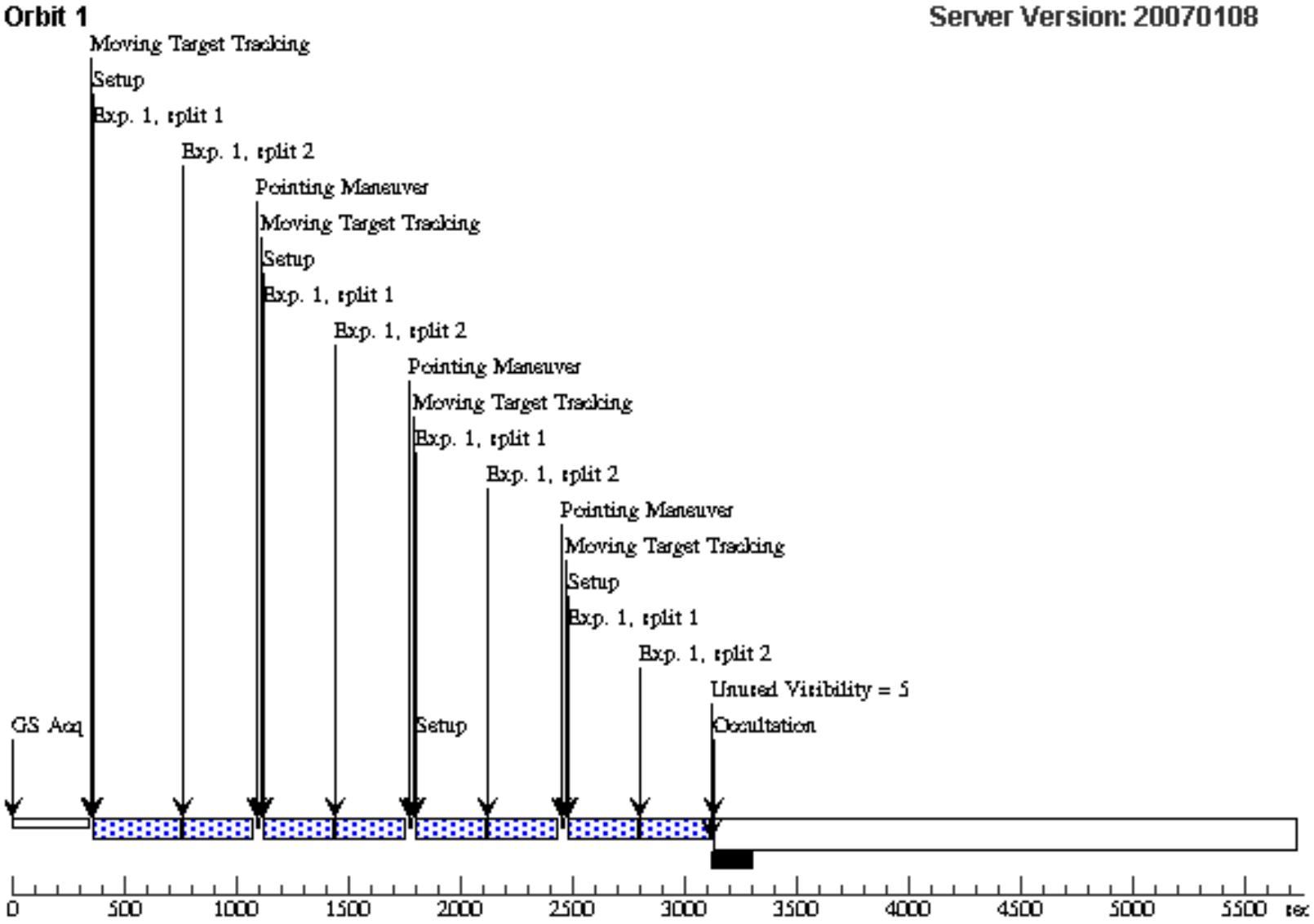
| # | Name | Level 1 | Level 2 | Level 3 | Window |
|---|---|---|---|---|---|
| (4) | ORCUS | TYPE=ASTEROID,A=39.3874016319219 6,E=0.2220077213704,I=20.522930876590 58,O=268.3917534413838,W=74.1064548 2450718,M=151.7437869109494,EQUINO X=J2000,EPOCH=02-MAY-2001:00:00:00 | | | |

## Exposures

| # | Label | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | (4) ORCUS | ACS/HRC, ACCUM, HRC | F606W | CR-SPLIT=2 | | Pattern 1-1 (1) | 550.0 Secs | |
| | | | | | | | | *[==>(Pattern 1, Split 1)]* | ***[1]*** |
| | | | | | | | | *[==>(Pattern 1, Split 2)]* | |
| | | | | | | | | *[==>(Pattern 2, Split 1)]* | |
| | | | | | | | | *[==>(Pattern 2, Split 2)]* | |
| | | | | | | | | *[==>(Pattern 3, Split 1)]* | |
| | | | | | | | | *[==>(Pattern 3, Split 2)]* | |
| | | | | | | | | *[==>(Pattern 4, Split 1)]* | |
| | | | | | | | | *[==>(Pattern 4, Split 2)]* | |

*Comments: 1st eoch for satellite orbit determination*

Orbit Structure



## Visit

**Proposal 10860, Visit 12, completed** Thu Mar 01 02:03:19 GMT 2007

**Diagnostic Status: No Diagnostics**

Scientific Instruments: ACS/HRC

Special Requirements: (none)

*Comments: Observations to determine the orbit of the KBO satellite.*

*1st epoch*

## Patterns

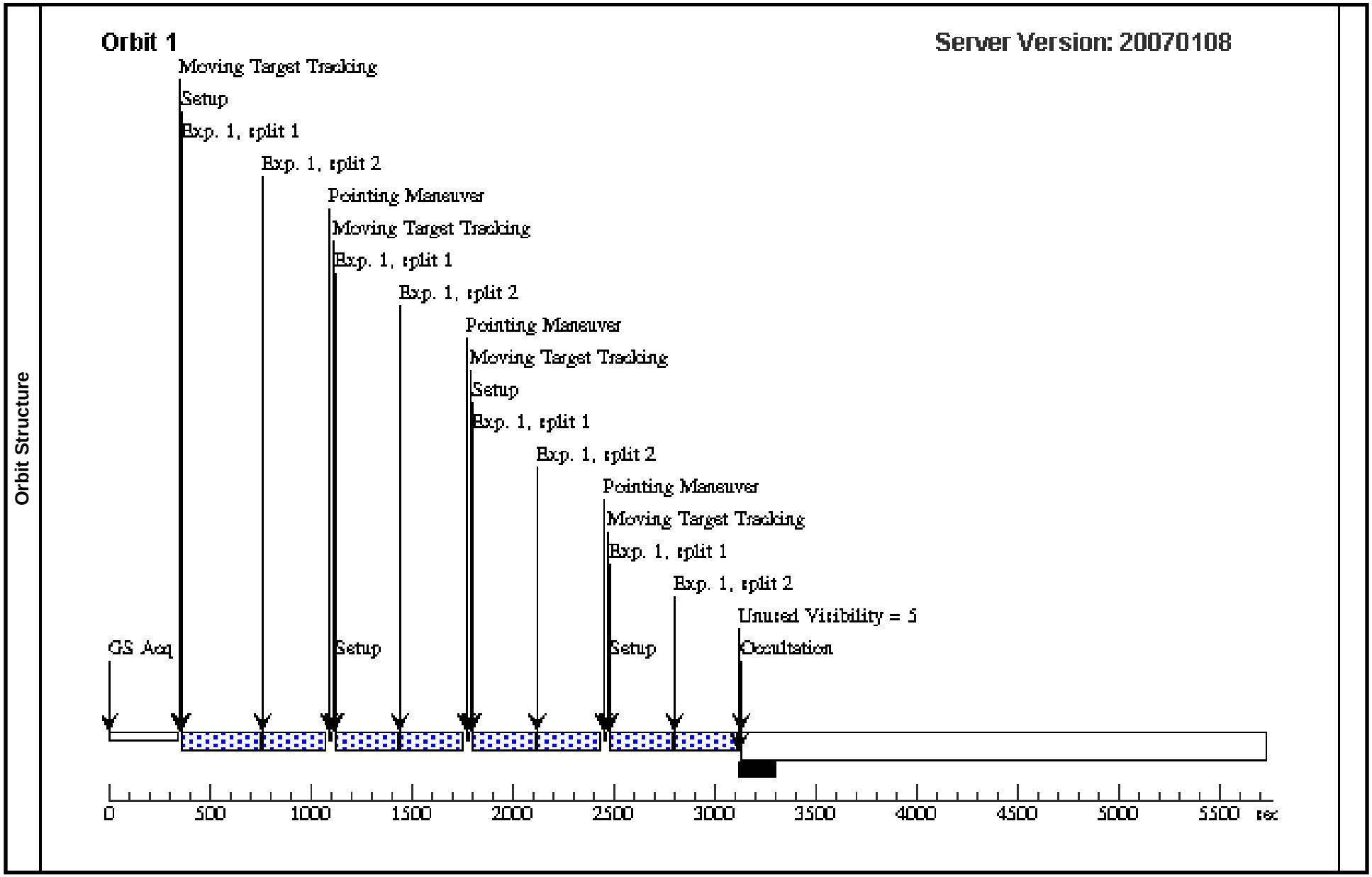
| # | Primary Pattern | | Secondary Pattern | Exposures |
|---|---|---|---|---|
| (1) | Pattern Type=ACS-HRC-DITHER-BOX<br>Purpose=DITHER<br>Number Of Points=4<br>Point Spacing=0.15<br>Line Spacing=0.098 | Coordinate Frame=POS-TARG<br>Pattern Orientation=19.9<br>Angle Between Sides=63.5<br>Center Pattern=false | | (1) |

## Solar System Targets

| # | Name | Level 1 | Level 2 | Level 3 | Window |
|---|---|---|---|---|---|
| (7) | 2002UX25 | TYPE=ASTEROID,A=42.8204042010168 8,E=0.14494307018068,I=19.41838647612 862,O=204.6357799449855,W=276.28119 94322195,M=279.0858312037766,EQUIN OX=J2000,EPOCH=10-JUN-2002:00:00:00 | | | |

## Exposures

| # | Label | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | (7) 2002UX25 | ACS/HRC, ACCUM, HRC | F606W | CR-SPLIT=2 | | Pattern 1-1 (1) | 550.0 Secs | |
| | | | | | | | | *[==>(Pattern 1, Split 1)]* | ***[1]*** |
| | | | | | | | | *[==>(Pattern 1, Split 2)]* | |
| | | | | | | | | *[==>(Pattern 2, Split 1)]* | |
| | | | | | | | | *[==>(Pattern 2, Split 2)]* | |
| | | | | | | | | *[==>(Pattern 3, Split 1)]* | |
| | | | | | | | | *[==>(Pattern 3, Split 2)]* | |
| | | | | | | | | *[==>(Pattern 4, Split 1)]* | |
| | | | | | | | | *[==>(Pattern 4, Split 2)]* | |


Orbit 1
Server Version: 20070108
Orbit Structure
Moving Target Tracking
Setup
Exp. 1, split 1
Exp. 1, split 2
Pointing Maneuver
Moving Target Tracking
Exp. 1, split 1
Exp. 1, split 2
Pointing Maneuver
Moving Target Tracking
Setup
Exp. 1, split 1
Exp. 1, split 2
Pointing Maneuver
Moving Target Tracking
Exp. 1, split 1
Exp. 1, split 2
Unused Visibility = 5
Occultation
GS Acq
Setup
Setup
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

## Visit

**Proposal 10860, Visit 13, completed** Thu Mar 01 02:03:19 GMT 2007

**Diagnostic Status: No Diagnostics**

Scientific Instruments: ACS/HRC

Special Requirements: AFTER 12 BY 12 H TO 36 H

*Comments: Observations to determine the orbit of the KBO satellite.*

*2nd epoch*

## Patterns

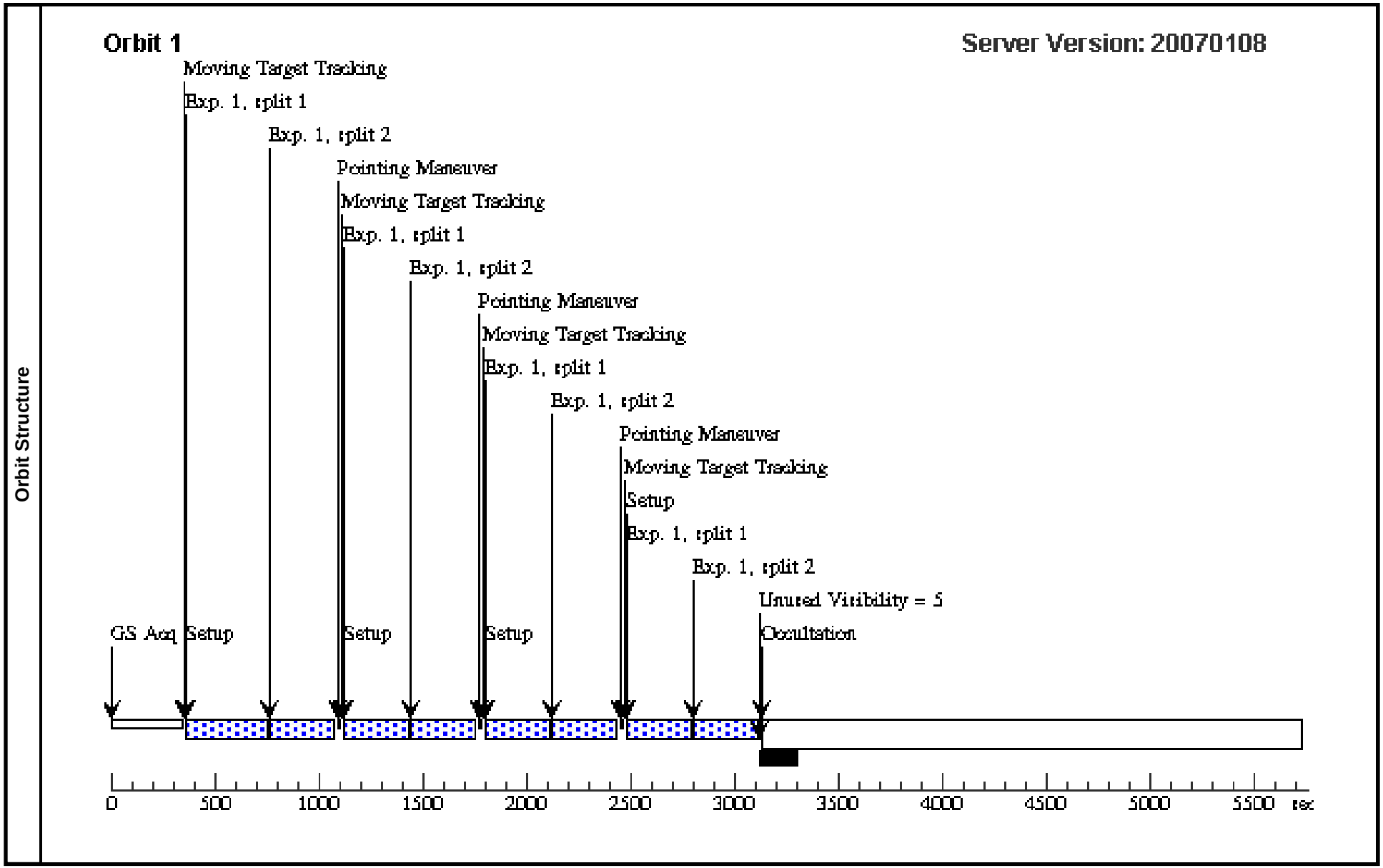
| # | Primary Pattern | | Secondary Pattern | Exposures |
|---|---|---|---|---|
| (1) | Pattern Type=ACS-HRC-DITHER-BOX<br>Purpose=DITHER<br>Number Of Points=4<br>Point Spacing=0.15<br>Line Spacing=0.098 | Coordinate Frame=POS-TARG<br>Pattern Orientation=19.9<br>Angle Between Sides=63.5<br>Center Pattern=false | | (1) |

## Solar System Targets

| # | Name | Level 1 | Level 2 | Level 3 | Window |
|---|---|---|---|---|---|
| (7) | 2002UX25 | TYPE=ASTEROID,A=42.8204042010168 8,E=0.14494307018068,I=19.41838647612 862,O=204.6357799449855,W=276.28119 94322195,M=279.0858312037766,EQUIN OX=J2000,EPOCH=10-JUN-2002:00:00:00 | | | |

## Exposures

| # | Label | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | (7) 2002UX25 | ACS/HRC, ACCUM, HRC | F606W | CR-SPLIT=2 | | Pattern 1-1 (1) | 550.0 Secs | |
| | | | | | | | | *[==>(Pattern 1, Split 1)]* | ***[1]*** |
| | | | | | | | | *[==>(Pattern 1, Split 2)]* | |
| | | | | | | | | *[==>(Pattern 2, Split 1)]* | |
| | | | | | | | | *[==>(Pattern 2, Split 2)]* | |
| | | | | | | | | *[==>(Pattern 3, Split 1)]* | |
| | | | | | | | | *[==>(Pattern 3, Split 2)]* | |
| | | | | | | | | *[==>(Pattern 4, Split 1)]* | |
| | | | | | | | | *[==>(Pattern 4, Split 2)]* | |


Orbit Structure
Orbit 1
Server Version: 20070108
Moving Target Tracking
Exp. 1, split 1
Exp. 1, split 2
Pointing Maneuver
Moving Target Tracking
Exp. 1, split 1
Exp. 1, split 2
Pointing Maneuver
Moving Target Tracking
Exp. 1, split 1
Exp. 1, split 2
Pointing Maneuver
Moving Target Tracking
Setup
Exp. 1, split 1
Exp. 1, split 2
Unused Visibility = 5
Occultation
GS Acq
Setup
Setup
Setup
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

## Visit

**Proposal 10860, Visit 14, completed** Thu Mar 01 02:03:20 GMT 2007

**Diagnostic Status: No Diagnostics**

Scientific Instruments: ACS/HRC

Special Requirements: AFTER 12 BY 4 D TO 7 D

*Comments: Observations to determine the orbit of the KBO satellite.*

*3rd epoch*

## Patterns

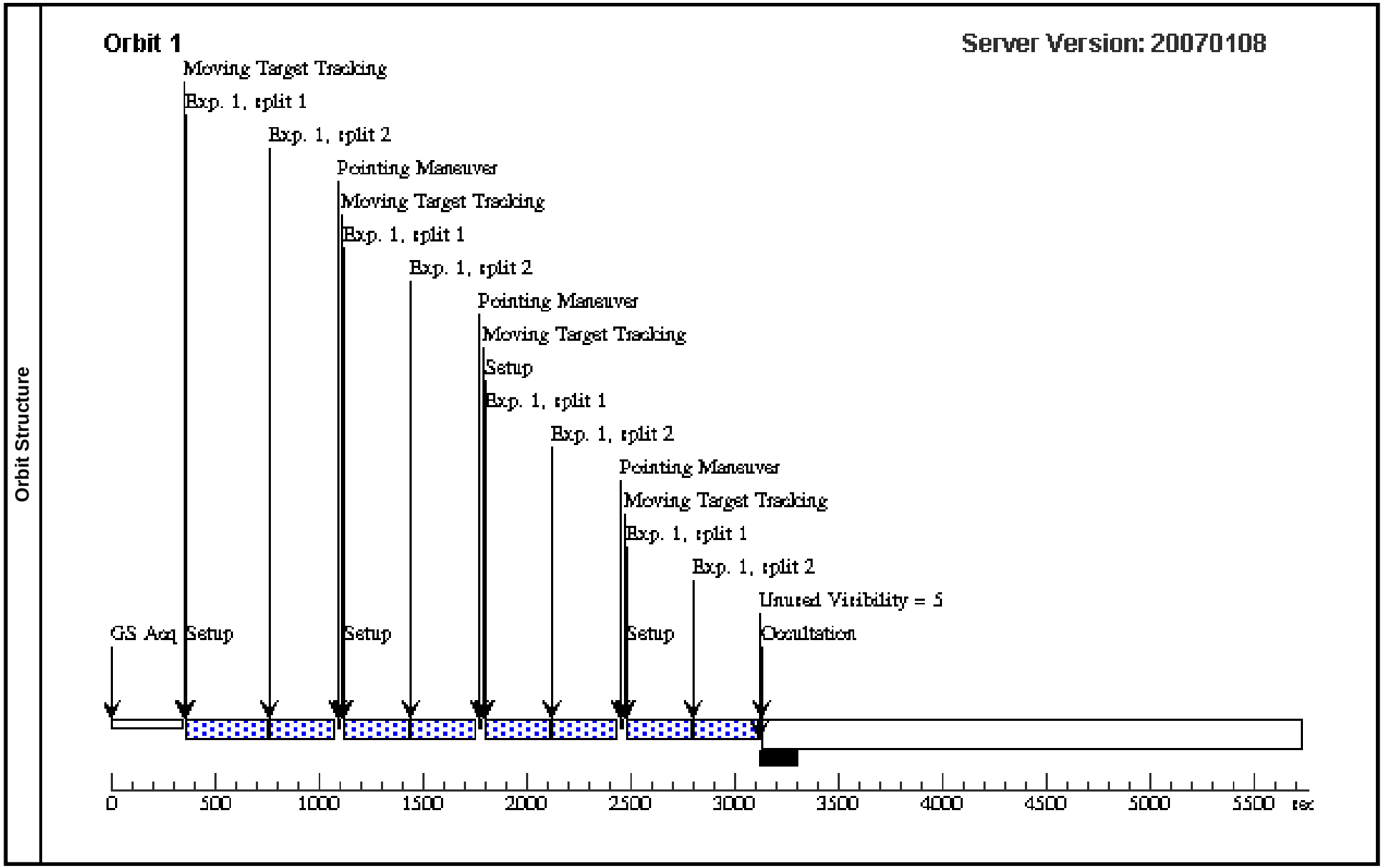
| # | Primary Pattern | | Secondary Pattern | Exposures |
|---|---|---|---|---|
| (1) | Pattern Type=ACS-HRC-DITHER-BOX<br>Purpose=DITHER<br>Number Of Points=4<br>Point Spacing=0.15<br>Line Spacing=0.098 | Coordinate Frame=POS-TARG<br>Pattern Orientation=19.9<br>Angle Between Sides=63.5<br>Center Pattern=false | | (1) |

## Solar System Targets

| # | Name | Level 1 | Level 2 | Level 3 | Window |
|---|---|---|---|---|---|
| (7) | 2002UX25 | TYPE=ASTEROID,A=42.8204042010168 8,E=0.14494307018068,I=19.41838647612 862,O=204.6357799449855,W=276.28119 94322195,M=279.0858312037766,EQUIN OX=J2000,EPOCH=10-JUN-2002:00:00:00 | | | |

## Exposures

| # | Label | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | (7) 2002UX25 | ACS/HRC, ACCUM, HRC | F606W | CR-SPLIT=2 | | Pattern 1-1 (1) | 550.0 Secs | |
| | | | | | | | | *[==>(Pattern 1, Split 1)]* | ***[1]*** |
| | | | | | | | | *[==>(Pattern 1, Split 2)]* | |
| | | | | | | | | *[==>(Pattern 2, Split 1)]* | |
| | | | | | | | | *[==>(Pattern 2, Split 2)]* | |
| | | | | | | | | *[==>(Pattern 3, Split 1)]* | |
| | | | | | | | | *[==>(Pattern 3, Split 2)]* | |
| | | | | | | | | *[==>(Pattern 4, Split 1)]* | |
| | | | | | | | | *[==>(Pattern 4, Split 2)]* | |


Orbit Structure
Orbit 1
Server Version: 20070108
Moving Target Tracking
Exp. 1, split 1
Exp. 1, split 2
Pointing Maneuver
Moving Target Tracking
Exp. 1, split 1
Exp. 1, split 2
Pointing Maneuver
Moving Target Tracking
Setup
Exp. 1, split 1
Exp. 1, split 2
Pointing Maneuver
Moving Target Tracking
Exp. 1, split 1
Exp. 1, split 2
Unused Visibility = 5
GS Acq
Setup
Setup
Setup
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

## Visit

**Proposal 10860, Visit 15, completed** Thu Mar 01 02:03:20 GMT 2007

**Diagnostic Status: No Diagnostics**

Scientific Instruments: ACS/HRC

Special Requirements: AFTER 12 BY 8 D TO 12 D

*Comments: Observations to determine the orbit of the KBO satellite.*

*4th epoch*

## Patterns

| # | Primary Pattern | | Secondary Pattern | Exposures |
|---|---|---|---|---|
| (1) | Pattern Type=ACS-HRC-DITHER-BOX<br>Purpose=DITHER<br>Number Of Points=4<br>Point Spacing=0.15<br>Line Spacing=0.098 | Coordinate Frame=POS-TARG<br>Pattern Orientation=19.9<br>Angle Between Sides=63.5<br>Center Pattern=false | | (1) |

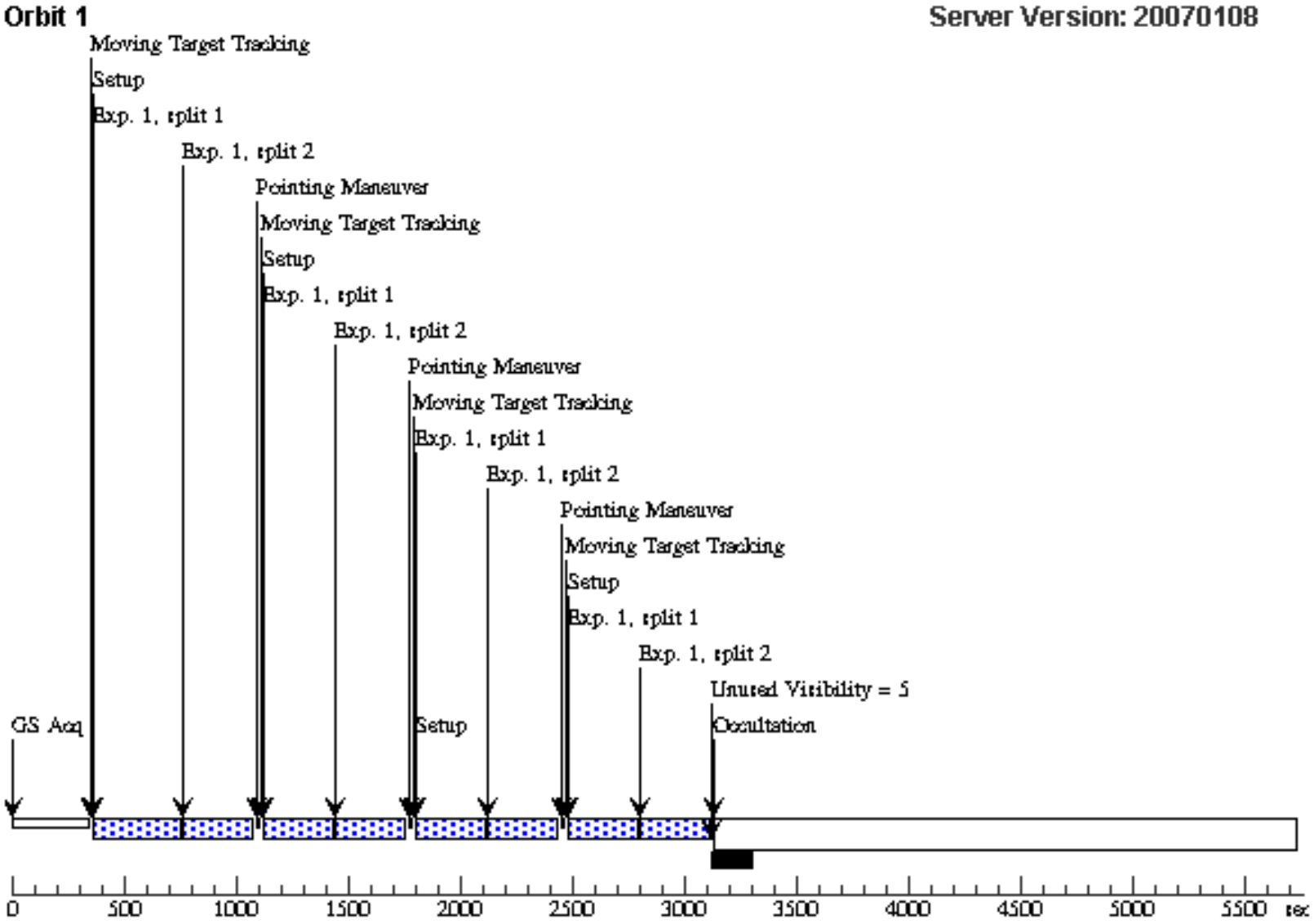
## Solar System Targets

| # | Name | Level 1 | Level 2 | Level 3 | Window |
|---|---|---|---|---|---|
| (7) | 2002UX25 | TYPE=ASTEROID,A=42.8204042010168 8,E=0.14494307018068,I=19.41838647612 862,O=204.6357799449855,W=276.28119 94322195,M=279.0858312037766,EQUIN OX=J2000,EPOCH=10-JUN-2002:00:00:00 | | | |

## Exposures

| # | Label | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | (7) 2002UX25 | ACS/HRC, ACCUM, HRC | F606W | CR-SPLIT=2 | | Pattern 1-1 (1) | 550.0 Secs | |
| | | | | | | | | *[==>(Pattern 1, Split 1)]* | ***[1]*** |
| | | | | | | | | *[==>(Pattern 1, Split 2)]* | |
| | | | | | | | | *[==>(Pattern 2, Split 1)]* | |
| | | | | | | | | *[==>(Pattern 2, Split 2)]* | |
| | | | | | | | | *[==>(Pattern 3, Split 1)]* | |
| | | | | | | | | *[==>(Pattern 3, Split 2)]* | |
| | | | | | | | | *[==>(Pattern 4, Split 1)]* | |
| | | | | | | | | *[==>(Pattern 4, Split 2)]* | |

Orbit Structure



## Visit

**Proposal 10860, Visit 16, completed** Thu Mar 01 02:03:21 GMT 2007

**Diagnostic Status: No Diagnostics**

Scientific Instruments: ACS/HRC

Special Requirements: AFTER 12 BY 15 D TO 25 D

*Comments: Observations to determine the orbit of the KBO satellite.*

*5th epoch*

## Patterns

| # | Primary Pattern | | Secondary Pattern | Exposures |
|---|---|---|---|---|
| (1) | Pattern Type=ACS-HRC-DITHER-BOX<br>Purpose=DITHER<br>Number Of Points=4<br>Point Spacing=0.15<br>Line Spacing=0.098 | Coordinate Frame=POS-TARG<br>Pattern Orientation=19.9<br>Angle Between Sides=63.5<br>Center Pattern=false | | (1) |

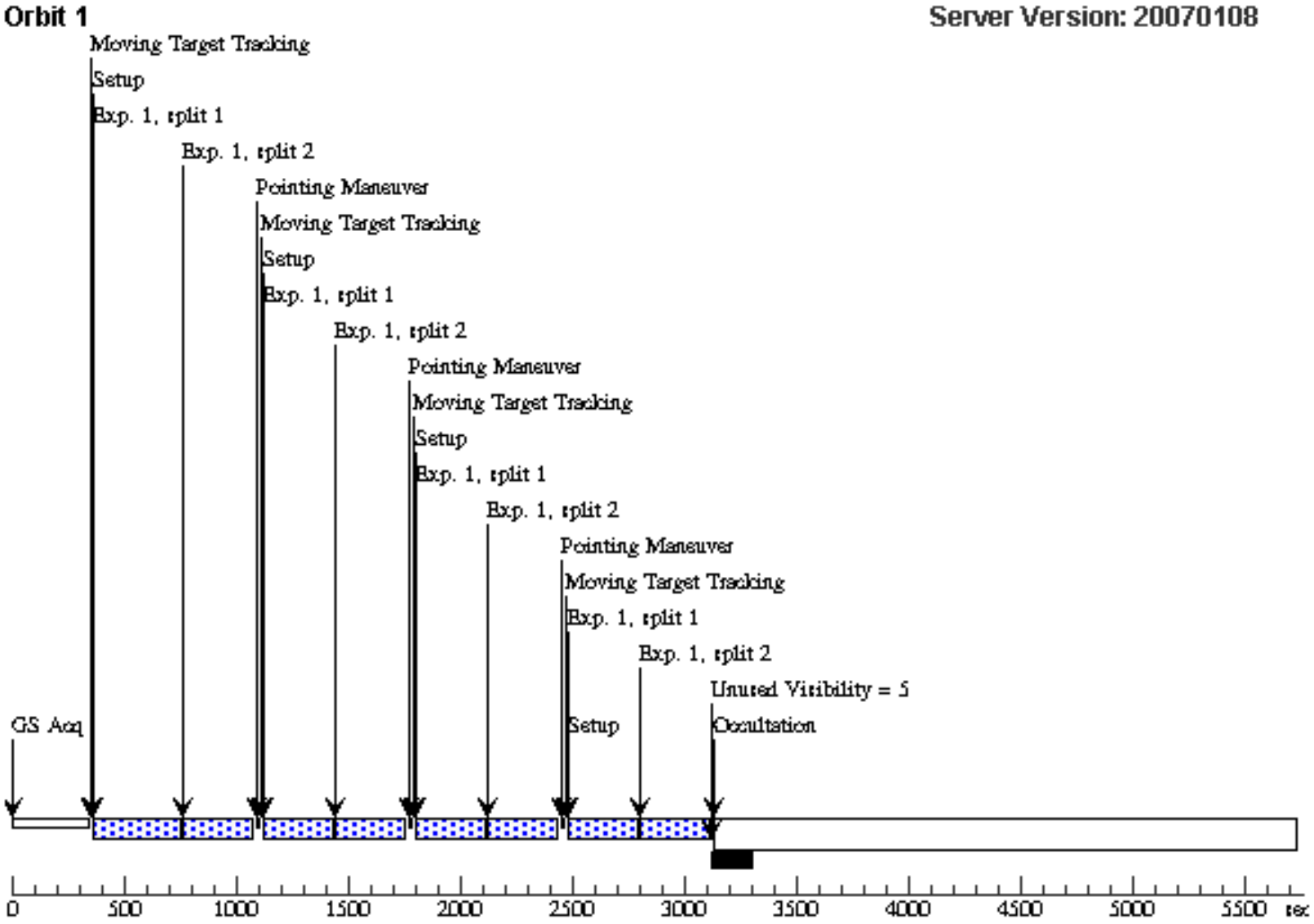
## Solar System Targets

| # | Name | Level 1 | Level 2 | Level 3 | Window |
|---|---|---|---|---|---|
| (7) | 2002UX25 | TYPE=ASTEROID,A=42.8204042010168 8,E=0.14494307018068,I=19.41838647612 862,O=204.6357799449855,W=276.28119 94322195,M=279.0858312037766,EQUIN OX=J2000,EPOCH=10-JUN-2002:00:00:00 | | | |

## Exposures

| # | Label | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | (7) 2002UX25 | ACS/HRC, ACCUM, HRC | F606W | CR-SPLIT=2 | | Pattern 1-1 (1) | 550.0 Secs | |
| | | | | | | | | *[==>(Pattern 1, Split 1)]* | ***[1]*** |
| | | | | | | | | *[==>(Pattern 1, Split 2)]* | |
| | | | | | | | | *[==>(Pattern 2, Split 1)]* | |
| | | | | | | | | *[==>(Pattern 2, Split 2)]* | |
| | | | | | | | | *[==>(Pattern 3, Split 1)]* | |
| | | | | | | | | *[==>(Pattern 3, Split 2)]* | |
| | | | | | | | | *[==>(Pattern 4, Split 1)]* | |
| | | | | | | | | *[==>(Pattern 4, Split 2)]* | |

Orbit Structure



## Visit

**Proposal 10860, Visit 17, completed** Thu Mar 01 02:03:21 GMT 2007

**Diagnostic Status: No Diagnostics**

Scientific Instruments: ACS/HRC

Special Requirements: AFTER 12 BY 25 D TO 40 D

*Comments: Observations to determine the orbit of the KBO satellite.*

*6th epoch*

## Patterns

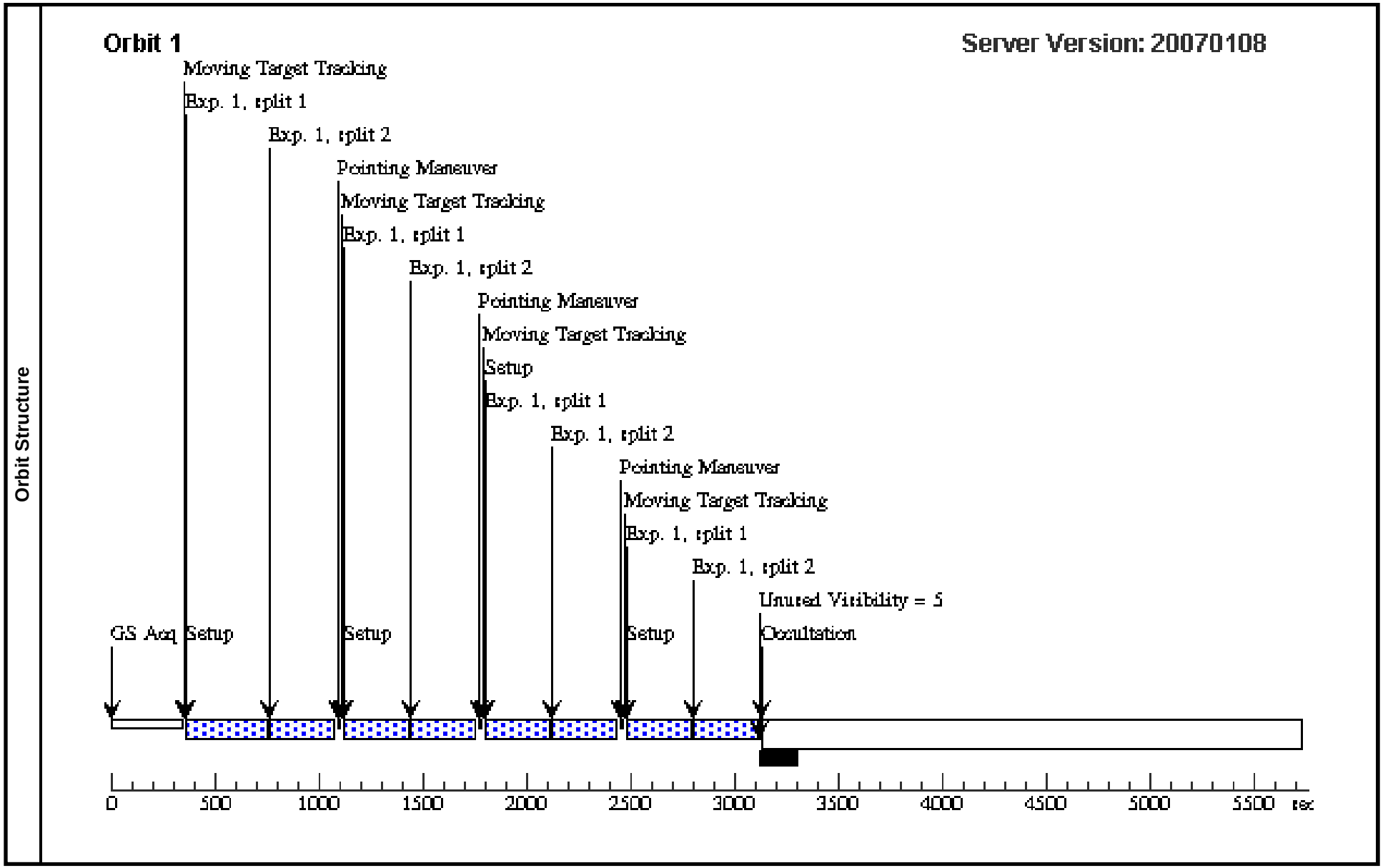
| # | Primary Pattern | | Secondary Pattern | Exposures |
|---|---|---|---|---|
| (1) | Pattern Type=ACS-HRC-DITHER-BOX<br>Purpose=DITHER<br>Number Of Points=4<br>Point Spacing=0.15<br>Line Spacing=0.098 | Coordinate Frame=POS-TARG<br>Pattern Orientation=19.9<br>Angle Between Sides=63.5<br>Center Pattern=false | | (1) |

## Solar System Targets

| # | Name | Level 1 | Level 2 | Level 3 | Window |
|---|---|---|---|---|---|
| (7) | 2002UX25 | TYPE=ASTEROID,A=42.8204042010168 8,E=0.14494307018068,I=19.41838647612 862,O=204.6357799449855,W=276.28119 94322195,M=279.0858312037766,EQUIN OX=J2000,EPOCH=10-JUN-2002:00:00:00 | | | |

## Exposures

| # | Label | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time/[Actual Dur.] | Orbit |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | (7) 2002UX25 | ACS/HRC, ACCUM, HRC | F606W | CR-SPLIT=2 | | Pattern 1-1 (1) | 550.0 Secs | |
| | | | | | | | | *[==>(Pattern 1, Split 1)]* | ***[1]*** |
| | | | | | | | | *[==>(Pattern 1, Split 2)]* | |
| | | | | | | | | *[==>(Pattern 2, Split 1)]* | |
| | | | | | | | | *[==>(Pattern 2, Split 2)]* | |
| | | | | | | | | *[==>(Pattern 3, Split 1)]* | |
| | | | | | | | | *[==>(Pattern 3, Split 2)]* | |
| | | | | | | | | *[==>(Pattern 4, Split 1)]* | |
| | | | | | | | | *[==>(Pattern 4, Split 2)]* | |


Orbit Structure
Orbit 1
Server Version: 20070108
Moving Target Tracking
Exp. 1, split 1
Exp. 1, split 2
Pointing Maneuver
Moving Target Tracking
Exp. 1, split 1
Exp. 1, split 2
Pointing Maneuver
Moving Target Tracking
Setup
Exp. 1, split 1
Exp. 1, split 2
Pointing Maneuver
Moving Target Tracking
Exp. 1, split 1
Exp. 1, split 2
Unused Visibility = 5
GS Acq
Setup
Setup
Setup
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec