18138 - For Whom the Metal Flows: an FUV transit of the young AU Mic c

Cycle: 33, Proposal Category: GO

(Availability Mode: SUPPORTED)

INVESTIGATORS

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Prof. Adina Feinstein (CoI)	Michigan State University

VISITS

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
01	(1) AU-MIC WAVE	STIS/CCD STIS/FUV-MAMA	2	09-Mar-2026 09:00:13.0	yes
02	(1) AU-MIC WAVE	STIS/CCD STIS/FUV-MAMA	5	09-Mar-2026 09:00:14.0	yes

7 Total Orbits Used

ABSTRACT

Atmospheric escape is theoretically a ubiquitous process among planets with atmospheres. It has the power to shape the entire exoplanet population, potentially leading to a lack of close-orbiting gaseous planets and creating the common sub-Neptune exoplanet type. Despite the impact of this process, questions like what variables control it and when it is the most efficient remain open. This motivates the search and characterization of atmospheric escape in young systems, where the process may be the most influential. We propose for one transit of AU Mic c, a sub-Neptune with an 18 day period, with HST/STIS E140M. This will allow us to investigate and confirm the young planet's potentially metallic outflow. Confirmation of the presence of metals will place strong constraints on AU Mic c's outflow structure and kinematics, providing an important test case for atmospheric escape models.

OBSERVING DESCRIPTION

We will observe 1 AU Mic c transit with STIS FUV-MAMA E140M. The transit will be composed of 2 HST visits with 7 total orbits. The first visit will comprise 2 orbits 8-12 hours before the white-light mid-transit, a baseline observation of the unocculted host star. The second visit will comprise 5 orbits starting ~1 hour before the white-light mid-transit and capturing five hours afterward. Five back-to-back orbits can be scheduled while avoiding the South Atlantic Anomaly.

Visit

Proposal 18138, Pre-transit (01), implementation Mon Mar 09 13:00:14 GMT 2026

Diagnostic Status: No Diagnostics

Scientific Instruments: STIS/CCD, STIS/FUV-MAMA

Special Requirements: (none)

Comments: Two exposures 8 - 12 hours before transit to observe the unocculted star.

Fixed Targets

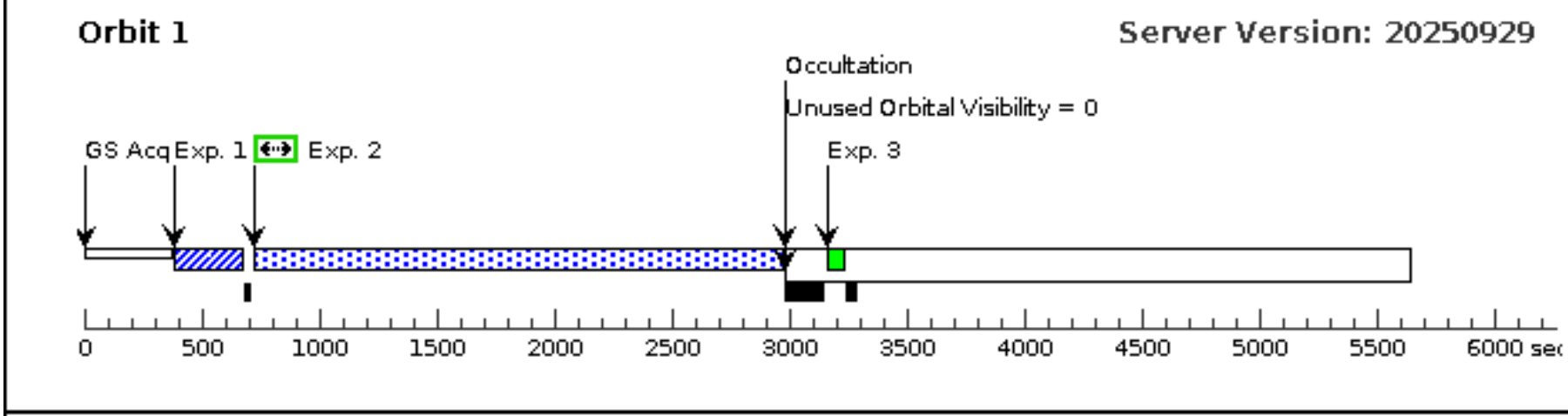
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	AU-MIC	RA: 20 45 9.5325 (311.2897188d) Dec: -31 20 27.24 (-31.34090d) Equinox: J2000	Proper Motion RA: 281.319 mas/yr Proper Motion Dec: -360.148 mas/yr Parallax: 0.1029432" Epoch of Position: 2000	V=8.627	Reference Frame: ICRS

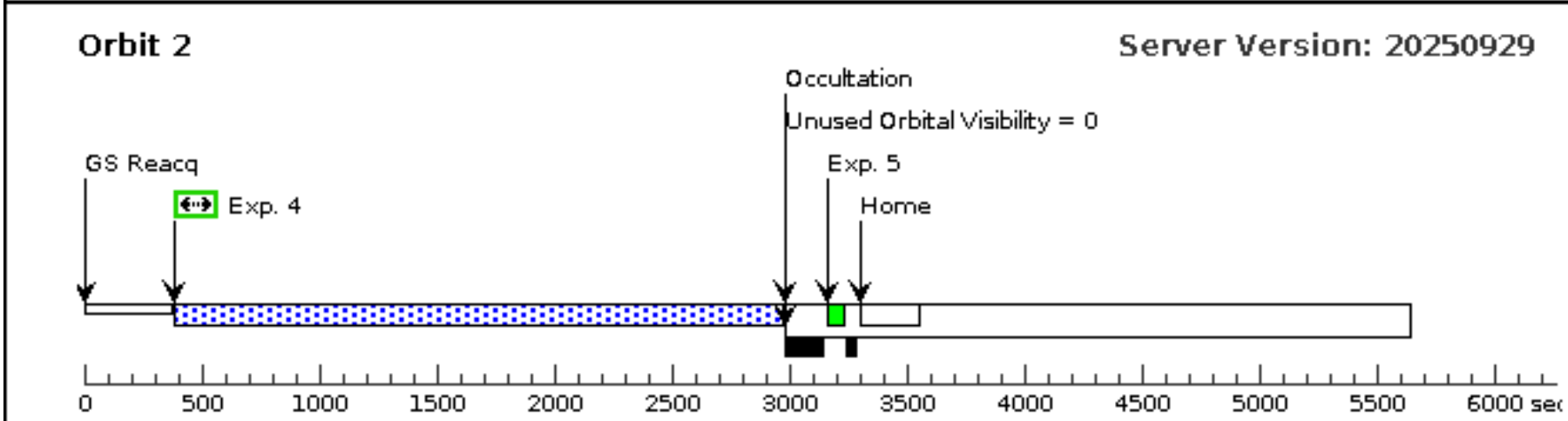
Comments:
Category=STAR
Description=[EXTRA-SOLAR PLANET, M V-IV, PRE-MAIN SEQUENCE STAR]

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	ACQ (STIS.ta.1893165)	(1) AU-MIC	STIS/CCD, ACQ, F25ND3	MIRROR	ACQTYPE=POINT		Sequence 1-3 Non-Int in Pre-transit (01)	0.1 Secs (0.1 Secs) *[==>]*	***[1]***
2	SCIENCE (STIS.sp.1895341)	(1) AU-MIC	STIS/FUV-MAMA, TIME-TAG, 0.2X0.2	E140M 1425 A	BUFFER-TIME=13000; WAVECAL=NO		Sequence 1-3 Non-Int in Pre-transit (01)	3000 Secs (2160 Secs) *[==>2160.0 Secs]*	***[1]***
3	WAVE	WAVE	STIS/FUV-MAMA, ACCUM, 0.2X0.2	E140M 1425 A			Sequence 1-3 Non-Int in Pre-transit (01)	*[==>]*	***[1]***
4	SCIENCE (STIS.sp.1895341)	(1) AU-MIC	STIS/FUV-MAMA, TIME-TAG, 0.2X0.2	E140M 1425 A	BUFFER-TIME=13000; WAVECAL=NO		Sequence 4-5 Non-Int in Pre-transit (01)	3000 Secs (2577 Secs) *[==>2577.0 Secs]*	***[2]***
5	WAVE	WAVE	STIS/FUV-MAMA, ACCUM, 0.2X0.2	E140M 1425 A			Sequence 4-5 Non-Int in Pre-transit (01)	*[==>]*	***[2]***

Orbit Structure





Visit

Proposal 18138, In-transit (02), implementation Mon Mar 09 13:00:14 GMT 2026

Diagnostic Status: No Diagnostics

Scientific Instruments: STIS/CCD, STIS/FUV-MAMA

Special Requirements: AFTER 01 BY 8 H TO 24 H; Period 18.85902 D AND ZERO-PHASE HJD2460850.477303652

Comments: Five exposures starting about 1 hour prior to the predicted white-light mid-transit of the planet.

Fixed Targets

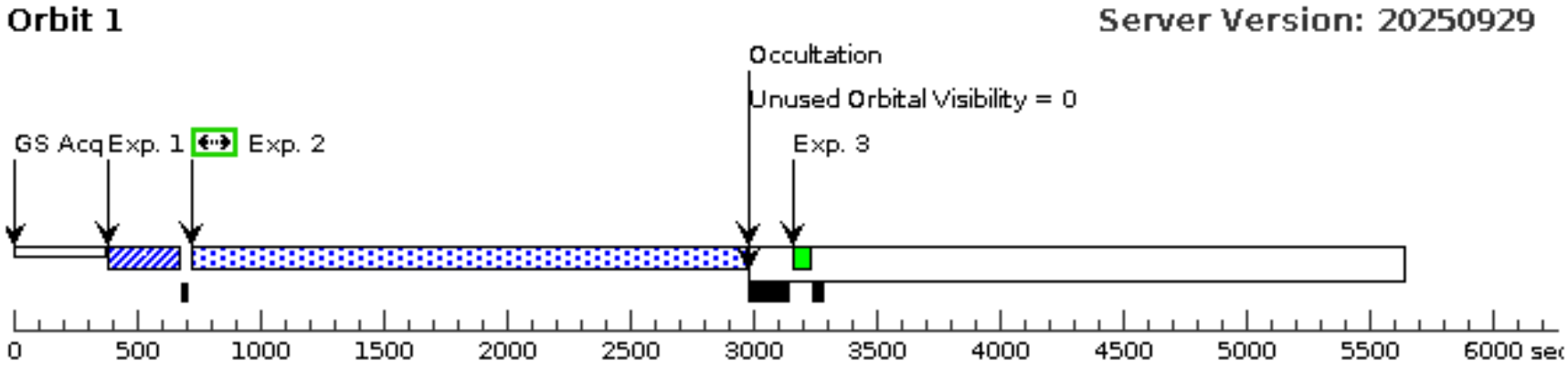
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	AU-MIC	RA: 20 45 9.5325 (311.2897188d) Dec: -31 20 27.24 (-31.34090d) Equinox: J2000	Proper Motion RA: 281.319 mas/yr Proper Motion Dec: -360.148 mas/yr Parallax: 0.1029432" Epoch of Position: 2000	V=8.627	Reference Frame: ICRS

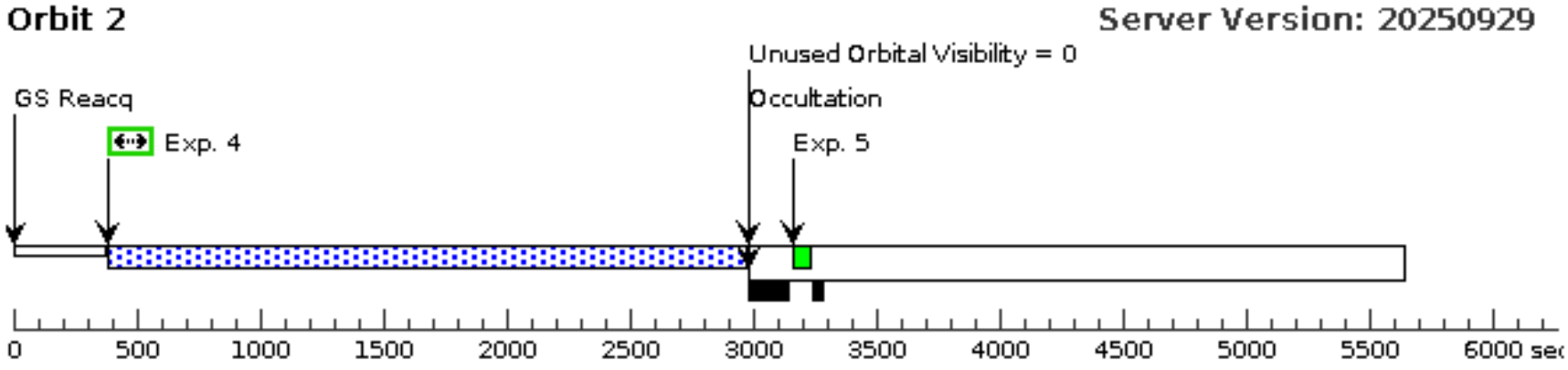
Comments:
Category=STAR
Description=[EXTRA-SOLAR PLANET, M V-IV, PRE-MAIN SEQUENCE STAR]

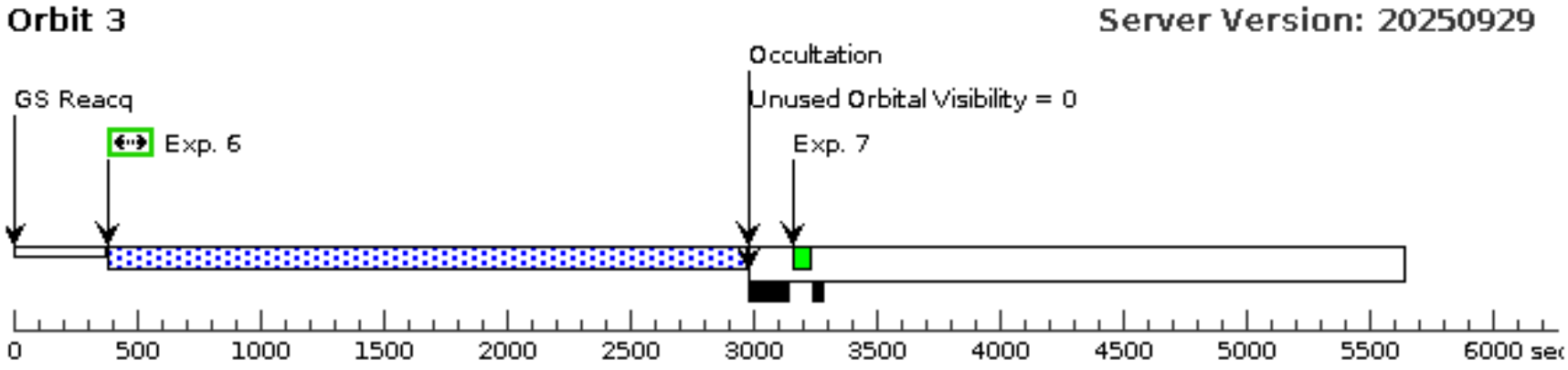
Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	ACQ (STIS.ta.1893165)	(1) AU-MIC	STIS/CCD, ACQ, F25ND3	MIRROR	ACQTYPE=POINT	PHASE 0.992267458620299 TO 0	Sequence 1-3 Non-Int in In-transit (02)	0.1 Secs (0.1 Secs) *[==>]*	*[1]*
2	SCIENCE (STIS.sp.1895341)	(1) AU-MIC	STIS/FUV-MAMA, TIME-TAG, 0.2X0.2	E140M 1425 A	BUFFER-TIME=13000; WAVECAL=NO		Sequence 1-3 Non-Int in In-transit (02)	3000 Secs (2160 Secs) *[==>2160.0 Secs]*	*[1]*
3	WAVE	WAVE	STIS/FUV-MAMA, ACCUM, 0.2X0.2	E140M 1425 A			Sequence 1-3 Non-Int in In-transit (02)	*[==>]*	*[1]*
4	SCIENCE (STIS.sp.1895341)	(1) AU-MIC	STIS/FUV-MAMA, TIME-TAG, 0.2X0.2	E140M 1425 A	BUFFER-TIME=13000; WAVECAL=NO		Sequence 4-5 Non-Int in In-transit (02)	3000 Secs (2577 Secs) *[==>2577.0 Secs]*	*[2]*
5	WAVE	WAVE	STIS/FUV-MAMA, ACCUM, 0.2X0.2	E140M 1425 A			Sequence 4-5 Non-Int in In-transit (02)	*[==>]*	*[2]*
6	SCIENCE (STIS.sp.1895341)	(1) AU-MIC	STIS/FUV-MAMA, TIME-TAG, 0.2X0.2	E140M 1425 A	BUFFER-TIME=13000; WAVECAL=NO		Sequence 6-7 Non-Int in In-transit (02)	3000 Secs (2577 Secs) *[==>2577.0 Secs]*	*[3]*
7	WAVE	WAVE	STIS/FUV-MAMA, ACCUM, 0.2X0.2	E140M 1425 A			Sequence 6-7 Non-Int in In-transit (02)	*[==>]*	*[3]*
8	SCIENCE (STIS.sp.1895341)	(1) AU-MIC	STIS/FUV-MAMA, TIME-TAG, 0.2X0.2	E140M 1425 A	BUFFER-TIME=13000; WAVECAL=NO		Sequence 8-9 Non-Int in In-transit (02)	3000 Secs (2577 Secs) *[==>2577.0 Secs]*	*[4]*
9	WAVE	WAVE	STIS/FUV-MAMA, ACCUM, 0.2X0.2	E140M 1425 A			Sequence 8-9 Non-Int in In-transit (02)	*[==>]*	*[4]*
10	SCIENCE (STIS.sp.1895341)	(1) AU-MIC	STIS/FUV-MAMA, TIME-TAG, 0.2X0.2	E140M 1425 A	BUFFER-TIME=13000; WAVECAL=NO		Sequence 10-11 Non-Int in In-transit (02)	3000 Secs (2577 Secs) *[==>2577.0 Secs]*	*[5]*
11	WAVE	WAVE	STIS/FUV-MAMA, ACCUM, 0.2X0.2	E140M 1425 A			Sequence 10-11 Non-Int in In-transit (02)	*[==>]*	*[5]*

Orbit Structure



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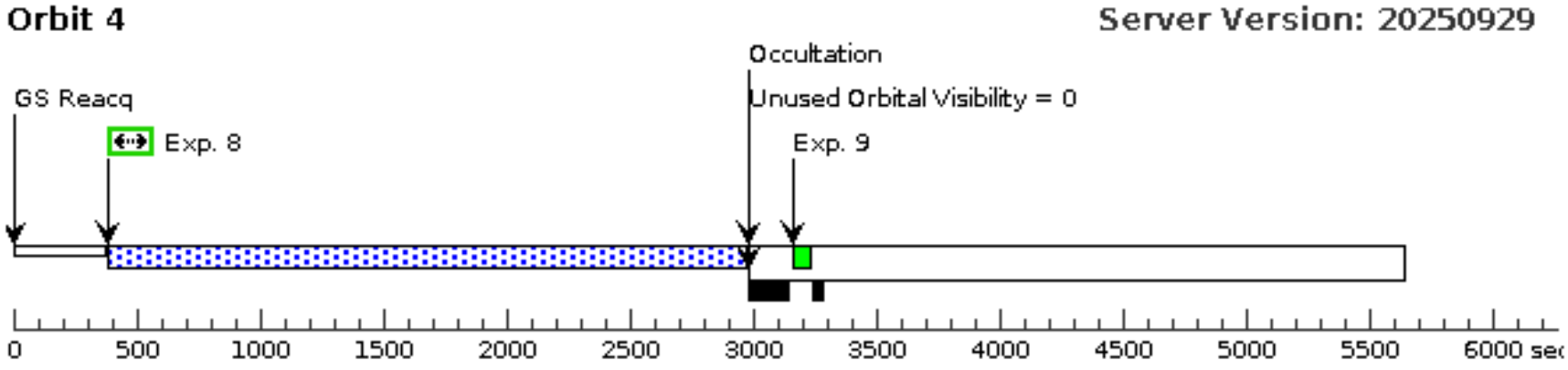
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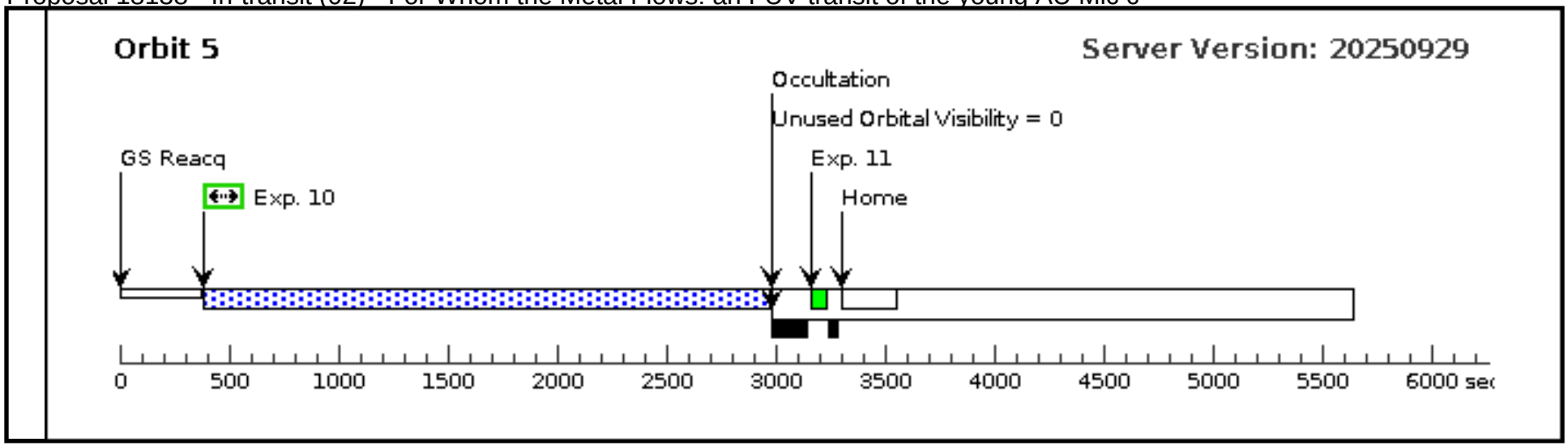
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