

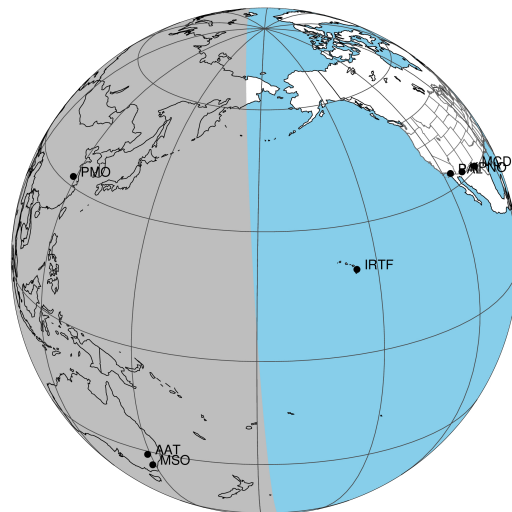
target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2030-09-12T17:54:22.290
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 3416213658640686336
 2Mass ID (if available) : 05264123+2317229

Uranus 2030-09-12T17:54:22 K13.27 G15.90 PgtRgt

ICRS Star Coord at Epoch: 05h 26m 41.23655s +23:17:22.98049s

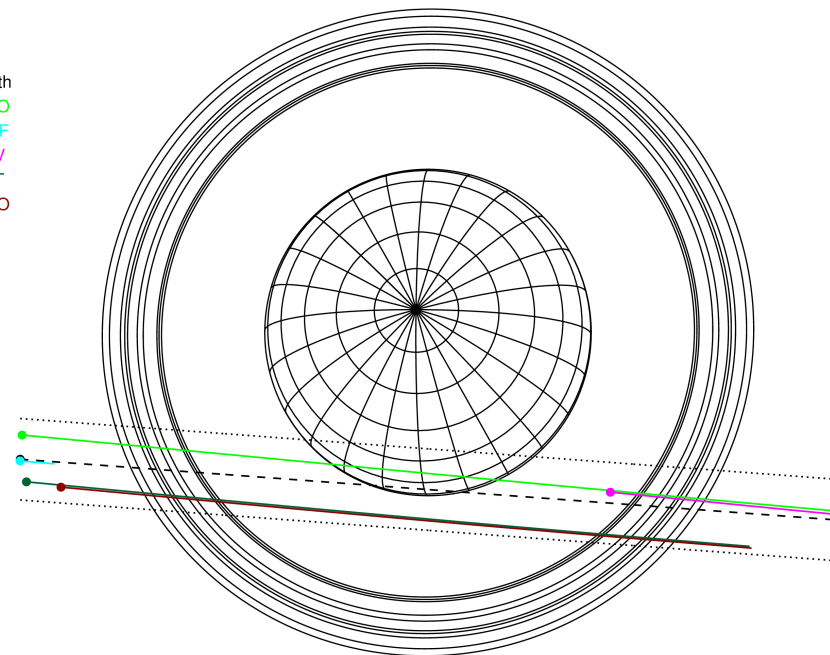
RUWE (>1.4 is poor) : 1.01
 K magnitude : 13.271
 G magnitude : 15.901
 RP magnitude : 15.057
 BP magnitude : 16.629
 DUPflag : 0
 Distance (au) : 19.194
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 7.77
 Sun-Target sep (deg) : 87.24
 Sun-Moon sep (deg) : 82.32
 B (ring opening deg) : 80.90
 PA of pole (deg) : 27.65

Uranus 2030-09-12T17:54:22 K13.27 G15.90
 PgtRgt



2030-09-12T17:54:22.2900 ra: 05 26 41.2366 s: +23 17 22.980 C/A 1.759° PA 355.74 deg v_sky + 7.77 km/s D 19.19 AU
 Credit: Styled after SORA/Lucky Star

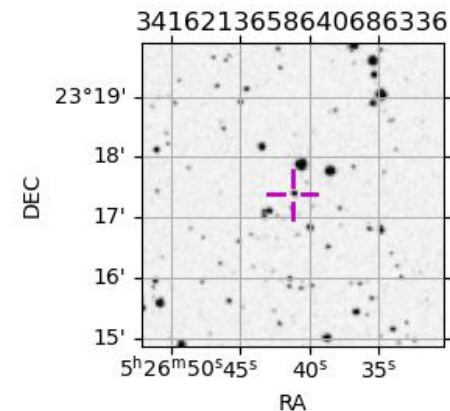
Earth
 PMO
 IRTF
 KAV
 AAT
 MSO



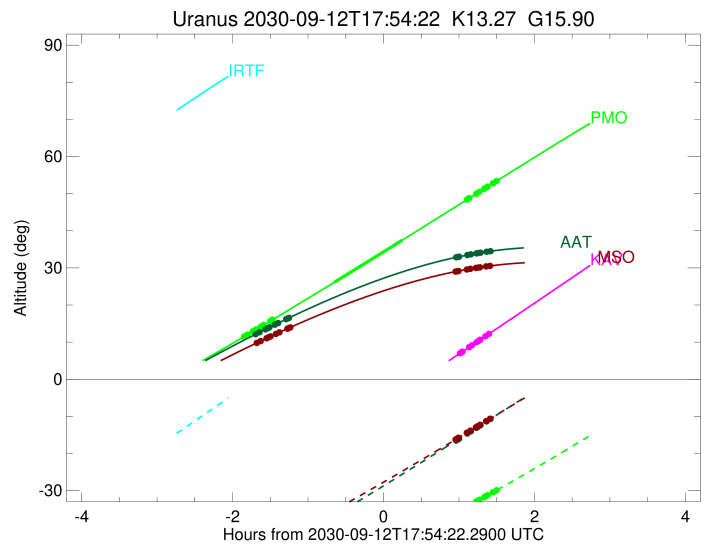
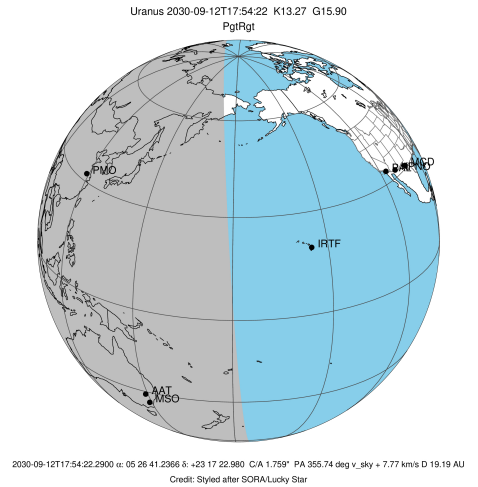
#	a(km)	ring
1	41837.2	6
2	42235.0	5
3	42571.2	4
4	44718.5	alpha
5	45661.1	beta
6	47176.1	eta
7	47626.3	gamma
8	48300.3	delta
9	50026.7	lambda
10	51149.4	epsilon

Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1					PnnRnn
PAL	Palomar Mt (200")	33.4	243.1					PnnRnn
PMO	Purple Mtn Obs. Nanki	32.1	118.8	+++++	+ +	+++++	SEP 12 16:04 - SEP 12 19:24	PieRie
KPNO	Kitt Peak Natl Obs	32.0	248.4					PnnRnn
MCD	McDonald Obs. 2.7m	30.7	256.0					PnnRnn
TEN	Teide Obs./Tenerife	28.3	343.5					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5					PnnRnn
KAV	Kavalur Observatory	12.6	78.8			+++++	SEP 12 18:55 - SEP 12 19:18	PnnRne
RIO	Rio de Janeiro	-22.9	316.8					PnnRnn
ESO	European Southern Obs	-29.3	289.3					PnnRnn
AAT	Siding Spring (AAT)	-31.3	149.1	+++++		+++++	SEP 12 16:13 - SEP 12 19:19	PnnRie
SAAO	So. Afr. Astro. Obs.	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Observato	-35.3	149.0	+++++		+++++	SEP 12 16:14 - SEP 12 19:19	PnnRie

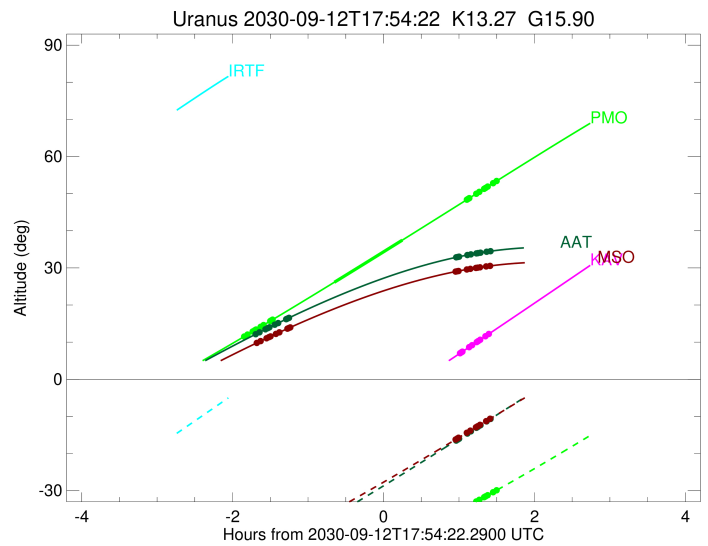
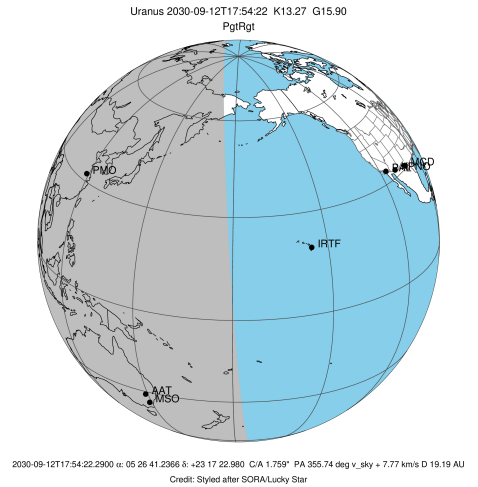


target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2030-09-12T17:43:12.700
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PMO
 Location : Purple Mtn Obs. Nanking
 Latitude (deg) : 32.06667
 E. Longitude (deg) : 118.82089
 Altitude (km) : 0.364
 Gaia source ID : 3416213658640686336
 2Mass ID (if available) : 05264123+2317229
 ICRS Star Coord at Epoch: 05h 26m 41.23655s +23:17:22.98049s
 RUWE (>1.4 is poor) : 1.01
 K magnitude : 13.271
 G magnitude : 15.901
 RP magnitude : 15.057
 BP magnitude : 16.629
 DUPflag : 0
 Distance (au) : 19.195
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 7.77
 Sun-Target sep (deg) : 87.24
 Sun-Moon sep (deg) : 82.75
 B (ring opening deg) : 80.90
 PA of pole (deg) : 27.65
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.579
 C/A sky separation (km) : 21979.3
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.spk
 ura111.bsp
 IAU_URANUS_for_RINGFIT.tpc
 vgr2.ura111.bsp
 ura161.bsp
 vgr2.ura161.bsp
 peph.ura160.bsp
 earthstns_itrff93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2030-09-12T16:04:31.541		11.69	-54.12	50772.03	-7.06		
lambda	I	2030-09-12T16:06:17.224		12.04	-54.11	50026.71	-7.04		
delta	I	2030-09-12T16:10:23.734		12.87	-54.06	48300.35	-6.97		
gamma	I	2030-09-12T16:12:01.340		13.19	-54.03	47621.76	-6.94		
eta	I	2030-09-12T16:13:05.672		13.41	-54.01	47176.12	-6.92		
beta	I	2030-09-12T16:16:44.735		14.14	-53.93	45668.81	-6.84		
alpha	I	2030-09-12T16:19:09.093		14.63	-53.87	44684.62	-6.79		
4	I	2030-09-12T16:24:26.304		15.69	-53.70	42549.34	-6.67		
5	I	2030-09-12T16:25:24.726		15.89	-53.66	42160.68	-6.64		
6	I	2030-09-12T16:26:19.619		16.08	-53.63	41796.57	-6.62		
Uranus	I	2030-09-12T17:15:18.306		26.14	-50.02	25440.59		-4.07	-4.27
Uranus	E	2030-09-12T18:09:18.297		37.47	-42.93	24991.41		-9.07	-9.49
6	E	2030-09-12T19:00:38.520		48.38	-34.29	41843.71	6.36		
5	E	2030-09-12T19:01:50.005		48.63	-34.07	42295.03	6.38		
4	E	2030-09-12T19:02:39.275		48.81	-33.92	42616.54	6.40		
alpha	E	2030-09-12T19:08:07.541		49.97	-32.92	44736.04	6.50		
beta	E	2030-09-12T19:10:26.417		50.46	-32.50	45641.32	6.54		
eta	E	2030-09-12T19:14:19.891		51.29	-31.77	47176.12	6.60		
gamma	E	2030-09-12T19:15:28.703		51.53	-31.56	47631.13	6.62		
delta	E	2030-09-12T19:17:09.612		51.89	-31.25	48300.35	6.64		
lambda	E	2030-09-12T19:21:28.406		52.81	-30.44	50026.71	6.70		
epsilon	E	2030-09-12T19:24:32.415		53.46	-29.86	51262.30	6.71		

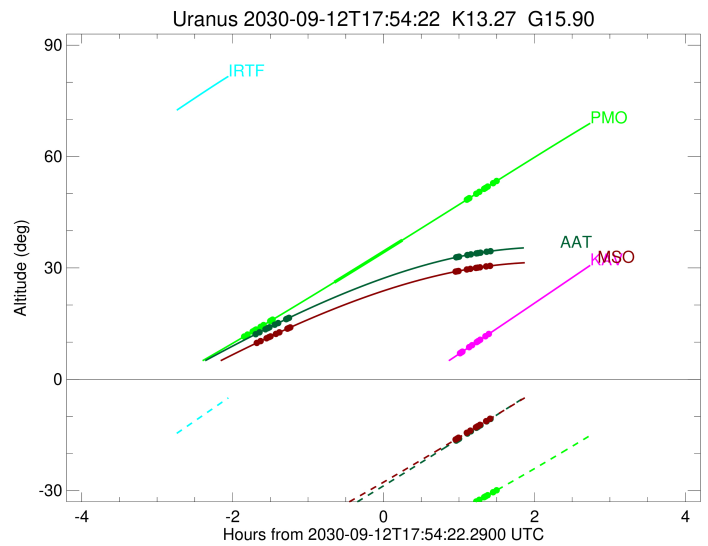
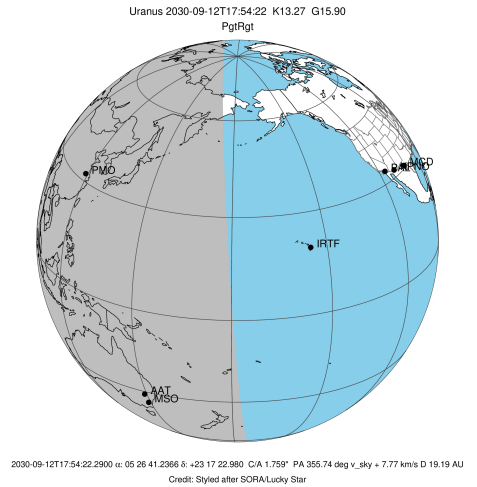
target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2030-09-12T17:40:54.760
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : KAV
 Location : Kavalur Observatory
 Latitude (deg) : 12.57556
 E. Longitude (deg) : 78.83167
 Altitude (km) : 0.722
 Gaia source ID : 3416213658640686336
 2Mass ID (if available) : 05264123+2317229
 ICRS Star Coord at Epoch: 05h 26m 41.23655s +23:17:22.98049s
 RUWE (>1.4 is poor) : 1.01
 K magnitude : 13.271
 G magnitude : 15.901
 RP magnitude : 15.057
 BP magnitude : 16.629
 DUPflag : 0
 Distance (au) : 19.195
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 7.77
 Sun-Target sep (deg) : 87.24
 Sun-Moon sep (deg) : 82.08
 B (ring opening deg) : 80.90
 PA of pole (deg) : 27.65
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.592
 C/A sky separation (km) : 22158.1
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.spk
 ura111.bsp
 IAU_URANUS_for_RINGFIT.tpc
 vgr2.ura111.bsp
 ura161.bsp
 vgr2.ura161.bsp
 peph.ura160.bsp
 earthstns_itr93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk



b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2030-09-12T16:06:09.241	-29.43x	-48.19	50771.06	-7.31			
lambda	I	2030-09-12T16:07:51.129	-29.09x	-48.58	50026.71	-7.29			
delta	I	2030-09-12T16:11:49.094	-28.31x	-49.48	48300.35	-7.22			
gamma	I	2030-09-12T16:13:23.313	-27.99x	-49.83	47621.78	-7.19			
eta	I	2030-09-12T16:14:25.418	-27.79x	-50.07	47176.12	-7.17			
beta	I	2030-09-12T16:17:56.910	-27.08x	-50.87	45668.68	-7.09			
alpha	I	2030-09-12T16:20:16.254	-26.61x	-51.39	44684.62	-7.04			
4	I	2030-09-12T16:25:22.486	-25.57x	-52.53	42549.62	-6.91			
5	I	2030-09-12T16:26:18.905	-25.38x	-52.74	42160.89	-6.88			
6	I	2030-09-12T16:27:11.963	-25.20x	-52.94	41796.49	-6.85			
Uranus	I	2030-09-12T17:14:45.654	-15.23x	-63.02	25433.48			-4.19	-4.39
Uranus	E	2030-09-12T18:05:18.321	-4.18x	-71.34	24993.02			-9.05	-9.48
6	E	2030-09-12T18:55:12.861	7.01	-73.19	41843.38	6.57			
5	E	2030-09-12T18:56:22.041	7.27	-73.13	42294.60	6.60			
4	E	2030-09-12T18:57:09.772	7.45	-73.08	42616.53	6.62			
alpha	E	2030-09-12T19:02:27.420	8.65	-72.72	44735.81	6.72			
beta	E	2030-09-12T19:04:41.851	9.15	-72.54	45641.29	6.76			
eta	E	2030-09-12T19:08:27.821	10.01	-72.20	47176.12	6.82			
gamma	E	2030-09-12T19:09:34.423	10.26	-72.09	47631.11	6.84			
delta	E	2030-09-12T19:11:12.102	10.63	-71.93	48300.35	6.86			
lambda	E	2030-09-12T19:15:22.636	11.58	-71.47	50026.71	6.92			
epsilon	E	2030-09-12T19:18:20.370	12.26	-71.12	51259.30	6.93			

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2030-09-12T17:46:02.450
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : AAT
 Location : Siding Spring (AAT)
 Latitude (deg) : -31.27703
 E. Longitude (deg) : 149.06608
 Altitude (km) : 1.164
 Gaia source ID : 3416213658640686336
 2Mass ID (if available) : 05264123+2317229
 ICRS Star Coord at Epoch: 05h 26m 41.23655s +23:17:22.98049s
 RUWE (>1.4 is poor) : 1.01
 K magnitude : 13.271
 G magnitude : 15.901
 RP magnitude : 15.057
 BP magnitude : 16.629
 DUPflag : 0
 Distance (au) : 19.195
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 7.77
 Sun-Target sep (deg) : 87.24
 Sun-Moon sep (deg) : 82.69
 B (ring opening deg) : 80.90
 PA of pole (deg) : 27.65
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.090
 C/A sky separation (km) : 29099.4
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.spk
 ura111.bsp
 IAU_URANUS_for_RINGFIT.tpc
 vgr2.ura111.bsp
 ura161.bsp
 vgr2.ura161.bsp
 peph.ura160.bsp
 earthstns_itr93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk



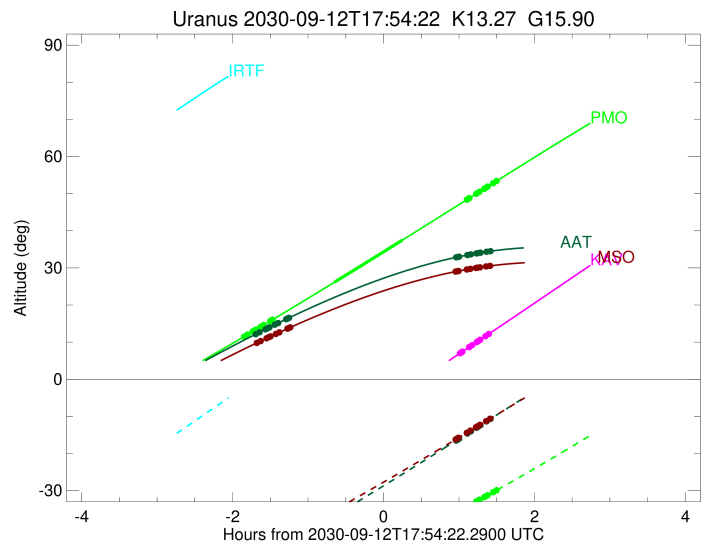
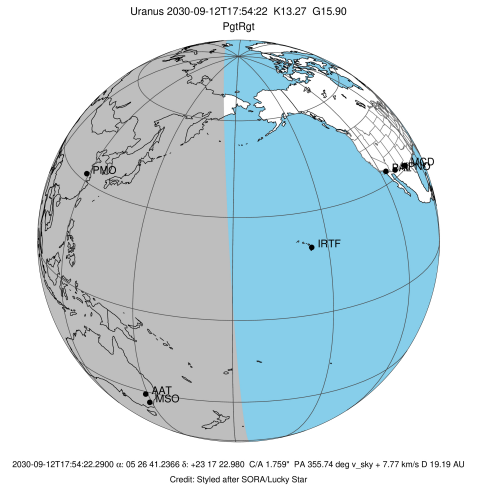
b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2030-09-12T16:13:52.296		12.33	-48.44	50752.50	-6.21		
lambda	I	2030-09-12T16:15:49.481		12.66	-48.09	50026.71	-6.17		
delta	I	2030-09-12T16:20:32.185		13.46	-47.24	48300.35	-6.04		
gamma	I	2030-09-12T16:22:24.893		13.78	-46.90	47622.34	-5.99		
eta	I	2030-09-12T16:23:39.637		13.98	-46.67	47176.12	-5.95		
beta	I	2030-09-12T16:27:56.374		14.70	-45.89	45665.08	-5.81		
alpha	I	2030-09-12T16:30:46.149		15.16	-45.36	44685.39	-5.72		
4	I	2030-09-12T16:37:05.715		16.20	-44.17	42558.35	-5.49		
5	I	2030-09-12T16:38:16.837		16.39	-43.95	42168.99	-5.44		
6	I	2030-09-12T16:39:26.302		16.57	-43.73	41794.86	-5.39		

No planet occultations

6	E	2030-09-12T18:52:06.296		32.85	-16.53	41834.69	5.25		
5	E	2030-09-12T18:53:32.375		32.95	-16.22	42282.64	5.30		
4	E	2030-09-12T18:54:33.256		33.02	-16.00	42615.28	5.35		
alpha	E	2030-09-12T19:01:00.911		33.46	-14.63	44730.21	5.56		
beta	E	2030-09-12T19:03:43.615		33.64	-14.05	45641.06	5.64		
eta	E	2030-09-12T19:08:12.637		33.91	-13.09	47176.12	5.77		
gamma	E	2030-09-12T19:09:31.218		33.98	-12.81	47630.69	5.80		
delta	E	2030-09-12T19:11:26.174		34.09	-12.40	48300.35	5.85		
lambda	E	2030-09-12T19:16:18.477		34.35	-11.35	50026.71	5.96		
epsilon	E	2030-09-12T19:19:34.172		34.51	-10.66	51200.07	6.00		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2030-09-12T17:46:20.420
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : MSO
 Location : Mt. Stromlo Observatory
 Latitude (deg) : -35.32000
 E. Longitude (deg) : 149.00833
 Altitude (km) : 0.770
 Gaia source ID : 3416213658640686336
 2Mass ID (if available) : 05264123+2317229
 ICRS Star Coord at Epoch: 05h 26m 41.23655s +23:17:22.98049s
 RUWE (>1.4 is poor) : 1.01
 K magnitude : 13.271
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 BP magnitude : 16.629
 DUPflag : 0
 Distance (au) : 19.194
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 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.110
 C/A sky separation (km) : 29372.8
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.spk
 ura111.bsp
 IAU_URANUS_for_RINGFIT.tpc
 vgr2.ura111.bsp
 ura161.bsp
 vgr2.ura161.bsp
 peph.ura160.bsp
 earthstns_itr93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2030-09-12T16:14:44.551		9.98	-45.98	50751.88	-6.19		
lambda	I	2030-09-12T16:16:42.085		10.29	-45.66	50026.71	-6.14		
delta	I	2030-09-12T16:21:25.974		11.05	-44.88	48300.35	-6.02		
gamma	I	2030-09-12T16:23:19.196		11.35	-44.56	47622.37	-5.96		
eta	I	2030-09-12T16:24:34.304		11.55	-44.35	47176.12	-5.92		
beta	I	2030-09-12T16:28:52.407		12.22	-43.62	45664.91	-5.78		
alpha	I	2030-09-12T16:31:43.124		12.66	-43.13	44685.46	-5.69		
4	I	2030-09-12T16:38:05.183		13.64	-42.03	42558.78	-5.45		
5	I	2030-09-12T16:39:16.826		13.82	-41.82	42169.45	-5.40		
6	I	2030-09-12T16:40:26.951		14.00	-41.62	41794.83	-5.34		

No planet occultations

6	E	2030-09-12T18:51:38.017		29.00	-16.24	41834.32	5.22		
5	E	2030-09-12T18:53:04.652		29.10	-15.95	42282.09	5.27		
4	E	2030-09-12T18:54:05.993		29.17	-15.74	42615.18	5.31		
alpha	E	2030-09-12T19:00:35.734		29.57	-14.42	44729.97	5.53		
beta	E	2030-09-12T19:03:19.212		29.74	-13.87	45641.06	5.62		
eta	E	2030-09-12T19:07:49.274		29.99	-12.95	47176.12	5.75		
gamma	E	2030-09-12T19:09:08.121		30.06	-12.68	47630.67	5.78		
delta	E	2030-09-12T19:11:03.449		30.16	-12.29	48300.35	5.83		
lambda	E	2030-09-12T19:15:56.559		30.39	-11.29	50026.71	5.95		
epsilon	E	2030-09-12T19:19:12.297		30.54	-10.62	51197.61	5.98		