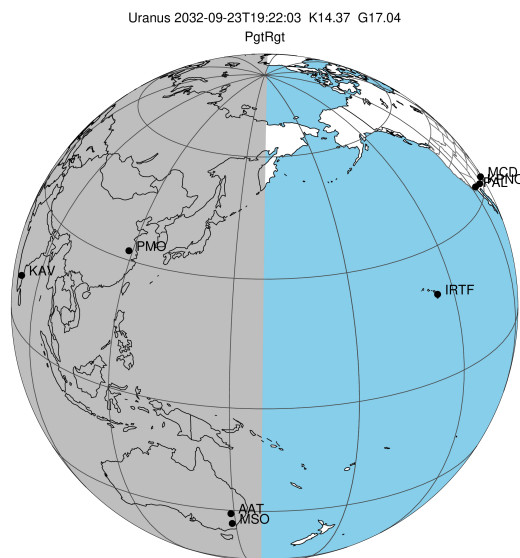


target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2032-09-23T19:22:03.600  
 Event type : PgtRgt  
 : Uranus occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Gaia source ID : 3426133104657515776  
 2Mass ID (if available) : 06045660+2337207

Uranus 2032-09-23T19:22:03 K14.37 G17.04 PgtRgt

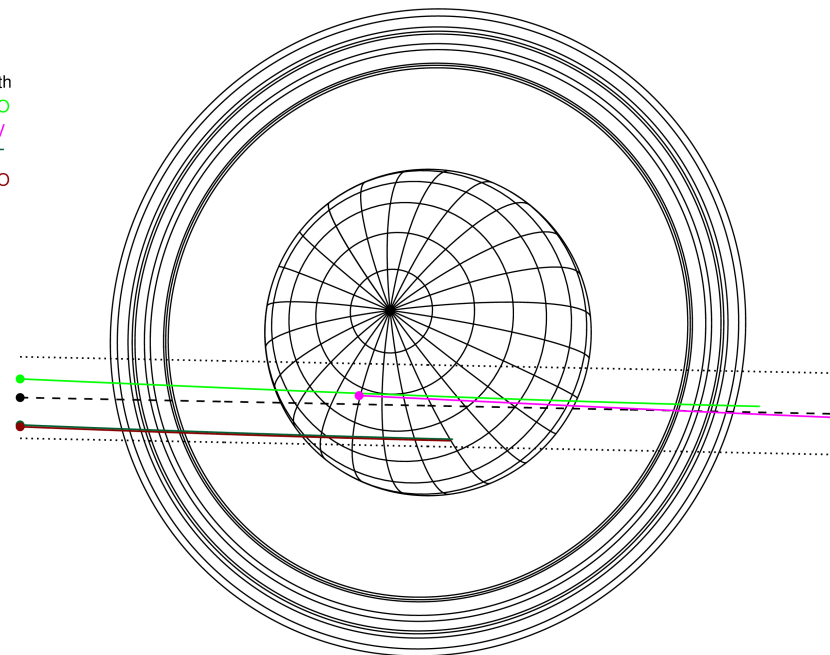
ICRS Star Coord at Epoch: 06h 04m 56.60547s +23:37:20.44319s

RUWE (>1.4 is poor) : 1.01  
 K magnitude : 14.374  
 G magnitude : 17.044  
 RP magnitude : 16.208  
 BP magnitude : 17.756  
 DUPflag : 0  
 Distance (au) : 19.014  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 6.52  
 Sun-Target sep (deg) : 89.73  
 Sun-Moon sep (deg) : 31.20  
 B (ring opening deg) : 74.40  
 PA of pole (deg) : 59.73



2032-09-23T19:22:03.6000 ra: 06 04 56.6055 s: +23 37 20.443 C/A 0.830° PA 358.85 deg v\_sky + 6.52 km/s D 19.01 AU  
 Credit: Styled after SORA/Lucky Star

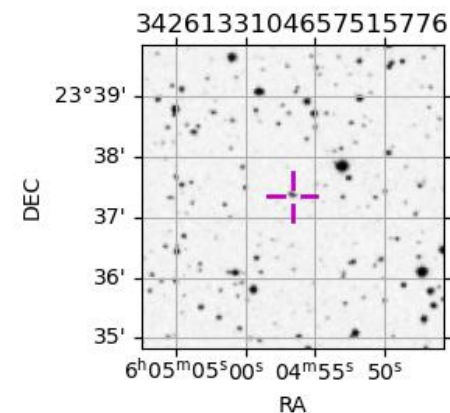
Earth  
 PMO  
 KAV  
 AAT  
 MSO



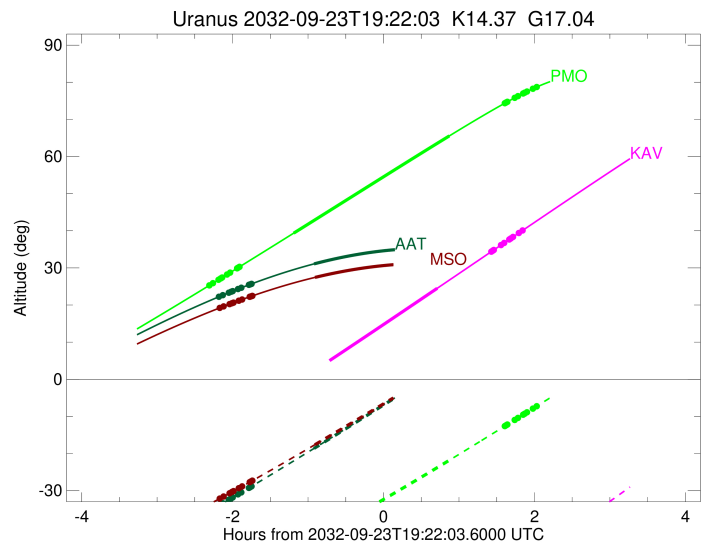
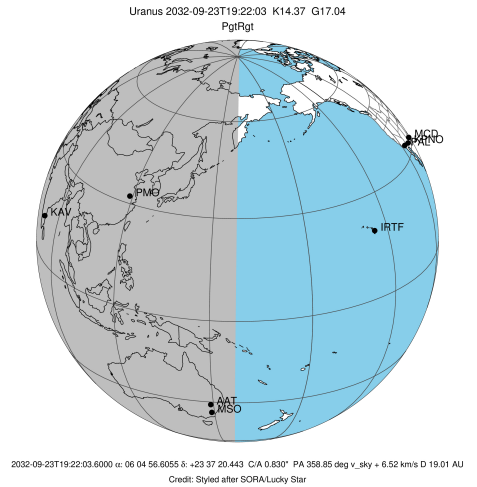
#	a(km)	ring
1	41837.2	6
2	42235.0	5
3	42571.2	4
4	44718.5	alpha
5	45661.1	beta
6	47176.1	eta
7	47626.3	gamma
8	48300.3	delta
9	50026.7	lambda
10	51149.4	epsilon

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 23 17:04 - SEP 23 21:24	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 23 20:04 - SEP 23 21:13	PneRne
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 23 17:12 - SEP 23 18:26	PinRin
SAAO	So. Afr. Astro. Obs.	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Observato	-35.3	149.0	+++++	+		SEP 23 17:12 - SEP 23 18:27	PinRin

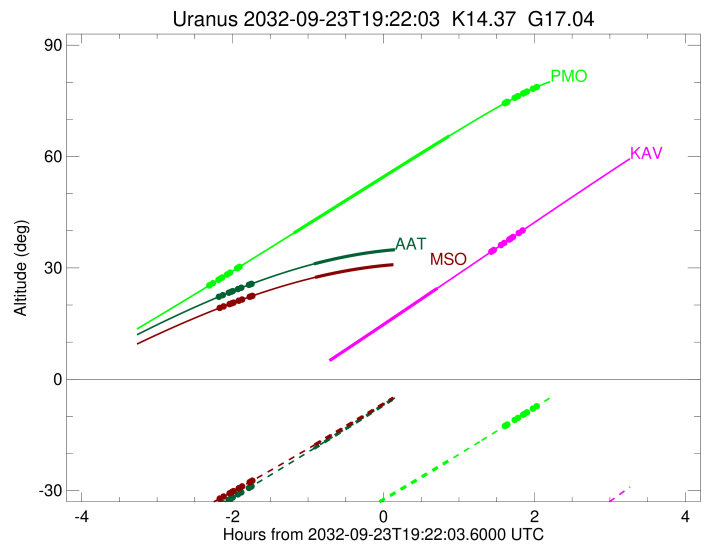
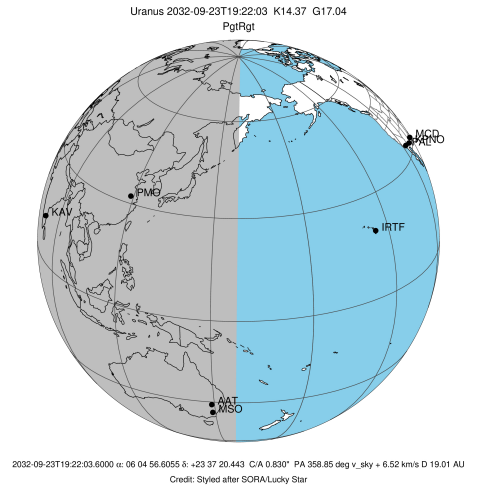


target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2032-09-23T19:12:29.580  
 Event type : PgtRgt  
 : Uranus occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : PMO  
 Location : Purple Mtn Obs. Nanking  
 Latitude (deg) : 32.06667  
 E. Longitude (deg) : 118.82089  
 Altitude (km) : 0.364  
 Gaia source ID : 3426133104657515776  
 2Mass ID (if available) : 06045660+2337207  
 ICRS Star Coord at Epoch: 06h 04m 56.60547s +23:37:20.44319s  
 RUWE (>1.4 is poor) : 1.01  
 K magnitude : 14.374  
 G magnitude : 17.044  
 RP magnitude : 16.208  
 BP magnitude : 17.756  
 DUPflag : 0  
 Distance (au) : 19.014  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 6.52  
 Sun-Target sep (deg) : 89.73  
 Sun-Moon sep (deg) : 31.18  
 B (ring opening deg) : 74.40  
 PA of pole (deg) : 59.73  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 0.721  
 C/A sky separation (km) : 9937.9  
 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



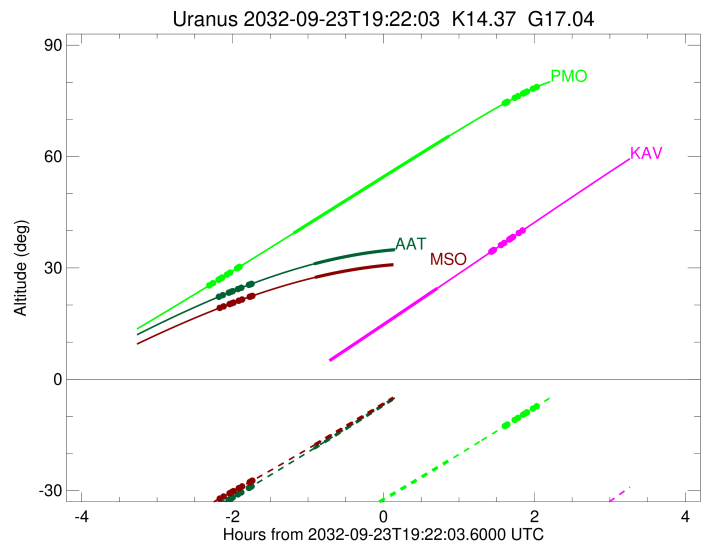
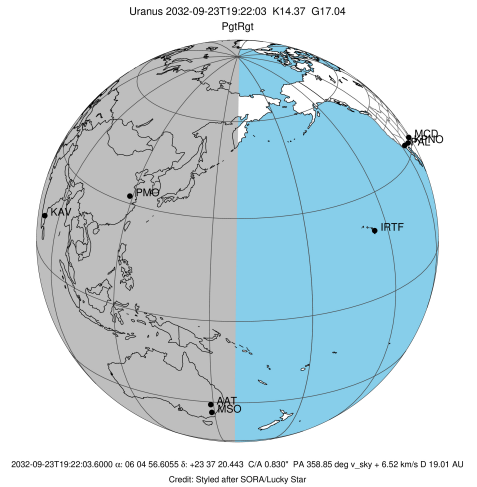
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2032-09-23T17:04:30.569		25.48	-54.76	50801.59	-6.52		
lambda	I	2032-09-23T17:06:29.522		25.89	-54.54	50026.71	-6.51		
delta	I	2032-09-23T17:10:55.094		26.81	-54.05	48300.35	-6.49		
gamma	I	2032-09-23T17:12:38.258		27.17	-53.85	47631.12	-6.48		
eta	I	2032-09-23T17:13:48.468		27.41	-53.71	47176.12	-6.48		
beta	I	2032-09-23T17:17:39.769		28.22	-53.25	45680.41	-6.46		
alpha	I	2032-09-23T17:20:03.338		28.72	-52.95	44750.72	-6.45		
4	I	2032-09-23T17:25:42.616		29.90	-52.23	42567.45	-6.42		
5	I	2032-09-23T17:26:22.664		30.04	-52.14	42315.24	-6.42		
6	I	2032-09-23T17:27:40.084		30.31	-51.97	41826.00	-6.41		
Uranus	I	2032-09-23T18:10:33.965		39.34	-45.48	25340.45		9.73	10.18
Uranus	E	2032-09-23T20:14:25.600		65.56	-21.81	25019.60		-15.54	-16.24
6	E	2032-09-23T20:58:30.638		74.36	-12.62	41866.20	6.09		
5	E	2032-09-23T20:59:20.285		74.52	-12.44	42163.23	6.09		
4	E	2032-09-23T21:00:26.448		74.72	-12.21	42553.91	6.09		
alpha	E	2032-09-23T21:06:16.755		75.79	-10.98	44694.14	6.11		
beta	E	2032-09-23T21:08:51.911		76.25	-10.44	45646.14	6.11		
eta	E	2032-09-23T21:13:02.237		76.98	-9.55	47176.12	6.12		
gamma	E	2032-09-23T21:14:15.211		77.18	-9.30	47622.72	6.12		
delta	E	2032-09-23T21:16:05.892		77.49	-8.91	48300.35	6.12		
lambda	E	2032-09-23T21:20:47.663		78.25	-7.92	50026.71	6.13		
epsilon	E	2032-09-23T21:24:56.112		78.88	-7.04	51550.26	6.14		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2032-09-23T19:05:33.150  
 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 : 3426133104657515776  
 2Mass ID (if available) : 06045660+2337207  
 ICRS Star Coord at Epoch: 06h 04m 56.60547s +23:37:20.44319s  
 RUWE (>1.4 is poor) : 1.01  
 K magnitude : 14.374  
 G magnitude : 17.044  
 RP magnitude : 16.208  
 BP magnitude : 17.756  
 DUPflag : 0  
 Distance (au) : 19.014  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 6.52  
 Sun-Target sep (deg) : 89.73  
 Sun-Moon sep (deg) : 30.54  
 B (ring opening deg) : 74.40  
 PA of pole (deg) : 59.73  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 0.753  
 C/A sky separation (km) : 10387.2  
 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



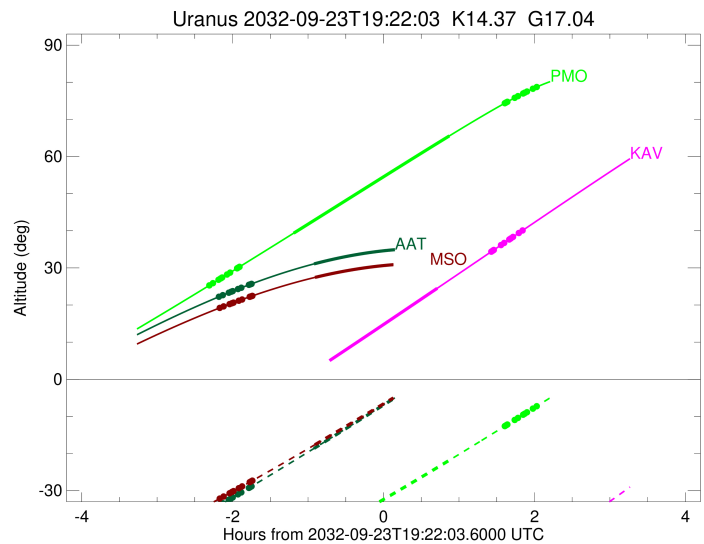
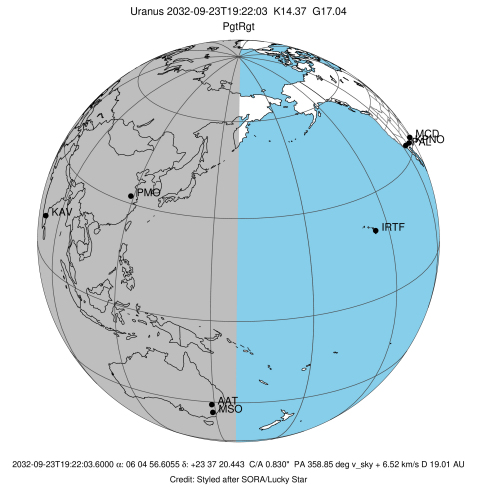
Ring	I/E	UTC	b? alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2032-09-23T17:03:18.503	-16.07x	-63.91	50802.40	-6.82		
lambda	I	2032-09-23T17:05:12.461	-15.66x	-64.33	50026.71	-6.80		
delta	I	2032-09-23T17:09:26.636	-14.76x	-65.25	48300.35	-6.78		
gamma	I	2032-09-23T17:11:05.380	-14.40x	-65.61	47631.13	-6.77		
eta	I	2032-09-23T17:12:12.588	-14.16x	-65.85	47176.12	-6.77		
beta	I	2032-09-23T17:15:54.008	-13.37x	-66.64	45680.43	-6.75		
alpha	I	2032-09-23T17:18:11.464	-12.87x	-67.13	44750.77	-6.73		
4	I	2032-09-23T17:23:36.407	-11.70x	-68.26	42567.22	-6.70		
5	I	2032-09-23T17:24:14.720	-11.57x	-68.39	42315.24	-6.70		
6	I	2032-09-23T17:25:28.843	-11.30x	-68.65	41826.20	-6.69		
Uranus	I	2032-09-23T18:06:41.253	-2.24x	-75.89	25346.47		9.59	10.03
Uranus	E	2032-09-23T20:04:45.016	24.50	-65.11	25017.28		-15.58	-16.28
6	E	2032-09-23T20:47:46.853	34.38	-55.38	41866.95	6.23		
5	E	2032-09-23T20:48:35.402	34.56	-55.19	42164.12	6.23		
4	E	2032-09-23T20:49:39.878	34.81	-54.94	42552.89	6.23		
alpha	E	2032-09-23T20:55:22.978	36.12	-53.61	44694.72	6.24		
beta	E	2032-09-23T20:57:54.891	36.71	-53.01	45646.46	6.24		
eta	E	2032-09-23T21:02:00.130	37.64	-52.05	47176.12	6.24		
gamma	E	2032-09-23T21:03:11.681	37.92	-51.77	47622.82	6.24		
delta	E	2032-09-23T21:05:00.193	38.33	-51.35	48300.35	6.24		
lambda	E	2032-09-23T21:09:36.633	39.39	-50.26	50026.71	6.25		
epsilon	E	2032-09-23T21:13:40.787	40.32	-49.30	51551.65	6.25		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2032-09-23T19:19:16.280  
 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 : 3426133104657515776  
 2Mass ID (if available) : 06045660+2337207  
 ICRS Star Coord at Epoch: 06h 04m 56.60547s +23:37:20.44319s  
 RUWE (>1.4 is poor) : 1.01  
 K magnitude : 14.374  
 G magnitude : 17.044  
 RP magnitude : 16.208  
 BP magnitude : 17.756  
 DUPflag : 0  
 Distance (au) : 19.014  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 6.52  
 Sun-Target sep (deg) : 89.73  
 Sun-Moon sep (deg) : 31.33  
 B (ring opening deg) : 74.40  
 PA of pole (deg) : 59.73  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 1.205  
 C/A sky separation (km) : 16616.2  
 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	2032-09-23T17:12:06.986		22.35	-33.81	50835.61	-6.09		
lambda	I	2032-09-23T17:14:20.169		22.67	-33.38	50026.71	-6.07		
delta	I	2032-09-23T17:19:05.595		23.32	-32.44	48300.35	-6.03		
gamma	I	2032-09-23T17:20:56.655		23.58	-32.08	47631.40	-6.02		
eta	I	2032-09-23T17:22:12.395		23.75	-31.83	47176.12	-6.01		
beta	I	2032-09-23T17:26:22.100		24.31	-31.00	45681.08	-5.97		
alpha	I	2032-09-23T17:28:57.576		24.65	-30.49	44752.04	-5.95		
4	I	2032-09-23T17:35:08.058		25.45	-29.25	42559.57	-5.88		
5	I	2032-09-23T17:35:50.192		25.53	-29.11	42313.75	-5.88		
6	I	2032-09-23T17:37:13.072		25.71	-28.83	41833.51	-5.87		
Uranus	I	2032-09-23T18:26:44.659		31.07	-18.65	25489.40		5.45	5.70
Uranus	E	2032-09-23T20:10:28.323		35.19	3.43x	25040.91		-15.21	-15.90
6	E	2032-09-23T20:59:45.248		33.29	13.94x	41870.72	5.74		
5	E	2032-09-23T21:00:38.020		33.23	14.13x	42169.64	5.75		
4	E	2032-09-23T21:01:46.315		33.16	14.37x	42547.68	5.75		
alpha	E	2032-09-23T21:07:57.804		32.74	15.68x	44697.81	5.80		
beta	E	2032-09-23T21:10:40.603		32.55	16.26x	45648.17	5.82		
eta	E	2032-09-23T21:15:02.486		32.22	17.18x	47176.12	5.85		
gamma	E	2032-09-23T21:16:18.831		32.12	17.45x	47623.28	5.86		
delta	E	2032-09-23T21:18:14.225		31.97	17.85x	48300.35	5.87		
lambda	E	2032-09-23T21:23:07.435		31.57	18.88x	50026.71	5.90		
epsilon	E	2032-09-23T21:27:25.883		31.20	19.78x	51555.06	5.93		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2032-09-23T19:19:21.960  
 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 : 3426133104657515776  
 2Mass ID (if available) : 06045660+2337207  
 ICRS Star Coord at Epoch: 06h 04m 56.60547s +23:37:20.44319s  
 RUWE (>1.4 is poor) : 1.01  
 K magnitude : 14.374  
 G magnitude : 17.044  
 RP magnitude : 16.208  
 BP magnitude : 17.756  
 DUPflag : 0  
 Distance (au) : 19.014  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 6.52  
 Sun-Target sep (deg) : 89.73  
 Sun-Moon sep (deg) : 31.30  
 B (ring opening deg) : 74.40  
 PA of pole (deg) : 59.73  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 1.223  
 C/A sky separation (km) : 16862.4  
 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\_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	2032-09-23T17:12:44.597		19.34	-31.98	50837.08	-6.09		
lambda	I	2032-09-23T17:14:57.995		19.63	-31.58	50026.71	-6.07		
delta	I	2032-09-23T17:19:43.385		20.25	-30.70	48300.35	-6.03		
gamma	I	2032-09-23T17:21:34.439		20.48	-30.36	47631.40	-6.02		
eta	I	2032-09-23T17:22:50.180		20.64	-30.12	47176.12	-6.01		
beta	I	2032-09-23T17:26:59.901		21.16	-29.35	45681.09	-5.97		
alpha	I	2032-09-23T17:29:35.408		21.48	-28.86	44752.07	-5.95		
4	I	2032-09-23T17:35:46.082		22.22	-27.70	42559.27	-5.88		
5	I	2032-09-23T17:36:28.189		22.31	-27.57	42313.64	-5.88		
6	I	2032-09-23T17:37:51.040		22.47	-27.30	41833.80	-5.87		
Uranus	I	2032-09-23T18:27:33.083		27.44	-17.62	25494.13		5.26	5.50
Uranus	E	2032-09-23T20:09:49.167		31.18	3.13x	25043.92		-15.17	-15.85
6	E	2032-09-23T20:59:14.171		29.47	13.20x	41870.89	5.74		
5	E	2032-09-23T21:00:06.950		29.42	13.38x	42169.94	5.75		
4	E	2032-09-23T21:01:15.152		29.35	13.61x	42547.44	5.75		
alpha	E	2032-09-23T21:07:26.597		28.97	14.86x	44697.97	5.81		
beta	E	2032-09-23T21:10:09.305		28.80	15.40x	45648.26	5.83		
eta	E	2032-09-23T21:14:31.014		28.50	16.28x	47176.12	5.86		
gamma	E	2032-09-23T21:15:47.308		28.41	16.54x	47623.31	5.87		
delta	E	2032-09-23T21:17:42.612		28.27	16.92x	48300.35	5.88		
lambda	E	2032-09-23T21:22:35.573		27.90	17.90x	50026.71	5.91		
epsilon	E	2032-09-23T21:26:53.784		27.57	18.76x	51555.13	5.93		