

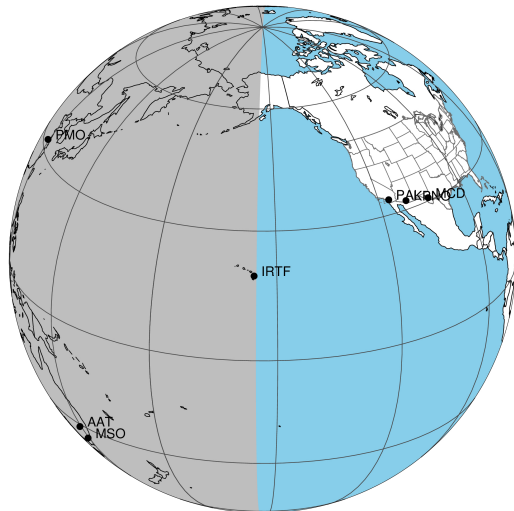
target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2032-09-22T16:12:12.010
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 3426133139013535616
 2Mass ID (if available) : 06045310+2337189

Uranus 2032-09-22T16:12:12 K14.31 G16.80 PgtRgt

ICRS Star Coord at Epoch: 06h 04m 53.09919s +23:37:18.87777s

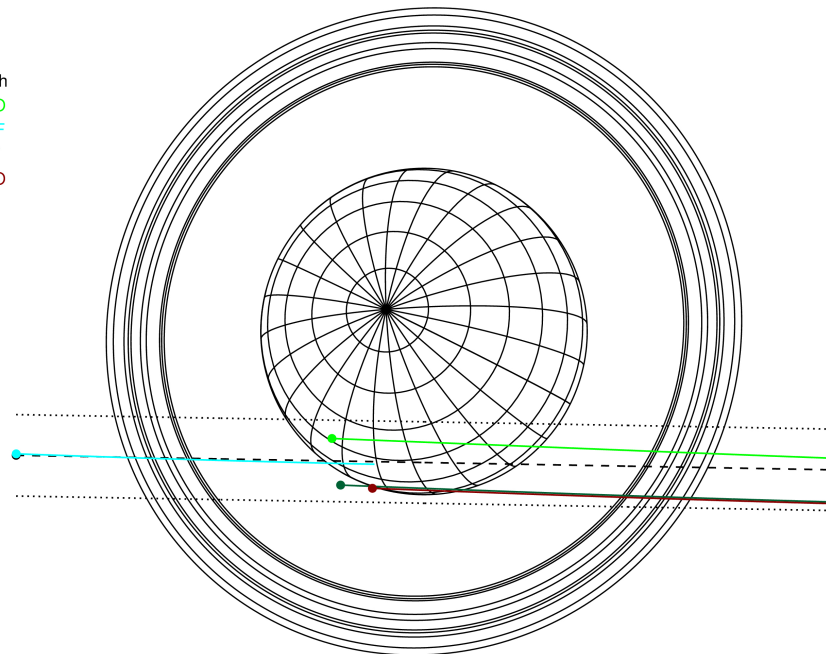
RUWE (>1.4 is poor) : 1.04
 K magnitude : 14.315
 G magnitude : 16.801
 RP magnitude : 16.000
 BP magnitude : 17.476
 DUPflag : 0
 Distance (au) : 19.033
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 7.08
 Sun-Target sep (deg) : 88.63
 Sun-Moon sep (deg) : 46.62
 B (ring opening deg) : 74.41
 PA of pole (deg) : 59.71

Uranus 2032-09-22T16:12:12 K14.31 G16.80
 PgtRgt



2032-09-22T16:12:12.0100 ra: 06 04 53.0992 s: +23 37 18.8778 C/A 1.484 PA 358.98 deg v_sky + 7.08 km/s D 19.03 AU
 Credit: Styled after SORA/Lucky Star

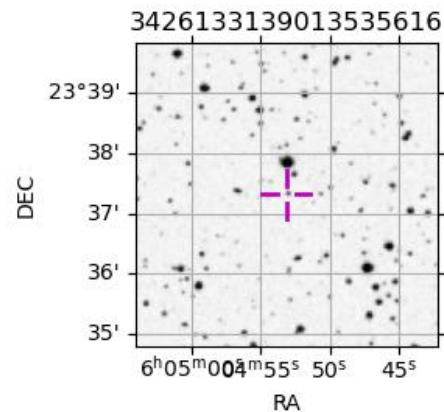
Earth
 PMO
 IRTF
 AAT
 MSO



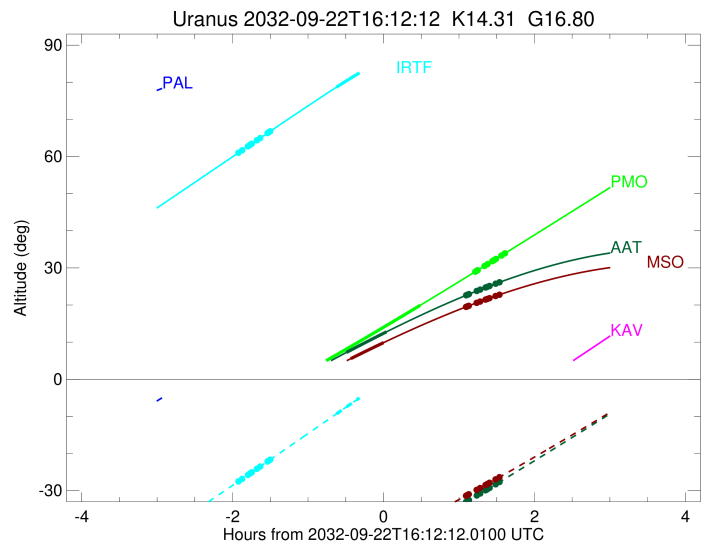
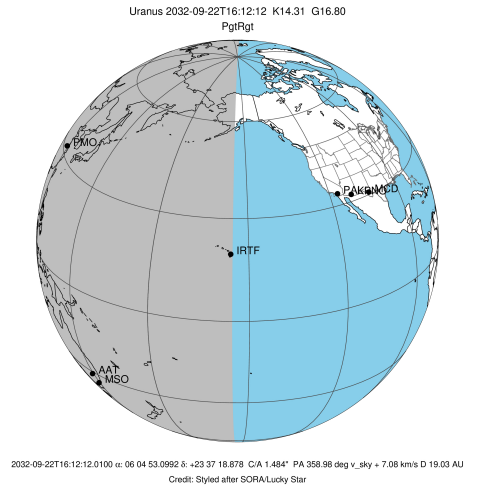
#	a(km)	ring
1	41837.2	6
2	42235.0	5
3	42571.2	4
4	44718.5	alpha
5	45661.1	beta
6	47176.1	eta
7	47626.3	gamma
8	48300.3	delta
9	50026.7	lambda
10	51149.4	epsilon

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 22 16:41 - SEP 22 17:49	PneRne
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	+++++++	+		SEP 22 14:17 - SEP 22 15:34	PinRin
KAV	Kavalur Observatory	12.6	78.8					PnnRnn
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 22 15:42 - SEP 22 17:45	PieRne
SAAO	So. Afr. Astro. Obs.	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Observato	-35.3	149.0		+	+++++++	SEP 22 15:46 - SEP 22 17:45	PieRne

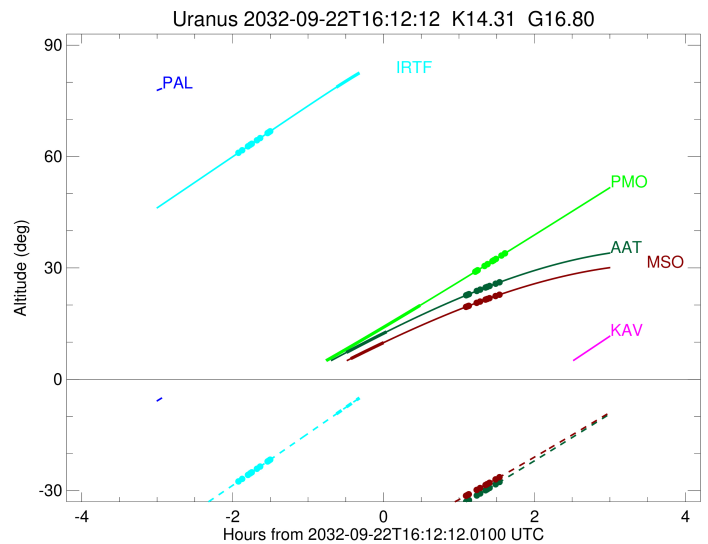
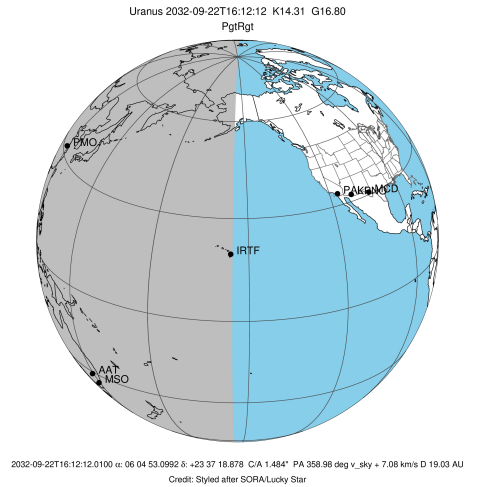


target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2032-09-22T15:58:40.790
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PMO
 Location : Purple Mtn Obs. Nanking
 Latitude (deg) : 32.06667
 E. Longitude (deg) : 118.82089
 Altitude (km) : 0.364
 Gaia source ID : 3426133139013535616
 2Mass ID (if available) : 06045310+2337189
 ICRS Star Coord at Epoch: 06h 04m 53.09919s +23:37:18.87777s
 RUWE (>1.4 is poor) : 1.04
 K magnitude : 14.315
 G magnitude : 16.801
 RP magnitude : 16.000
 BP magnitude : 17.476
 DUPflag : 0
 Distance (au) : 19.033
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 7.08
 Sun-Target sep (deg) : 88.63
 Sun-Moon sep (deg) : 46.22
 B (ring opening deg) : 74.41
 PA of pole (deg) : 59.71
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.254
 C/A sky separation (km) : 17316.4
 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



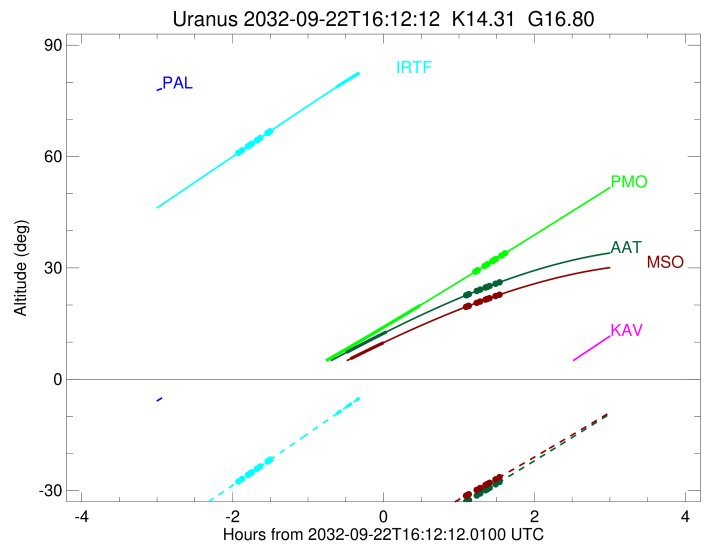
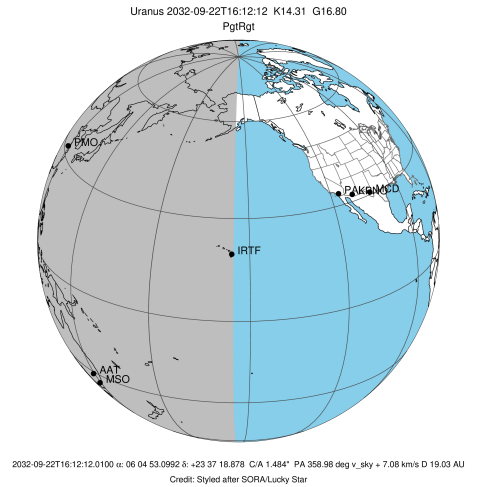
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2032-09-22T14:10:22.982	-9.04x	-49.38	50844.76	-7.09			
lambda	I	2032-09-22T14:12:18.673	-8.71x	-49.66	50026.71	-7.06			
delta	I	2032-09-22T14:16:23.897	-7.99x	-50.24	48300.35	-7.02			
gamma	I	2032-09-22T14:17:59.330	-7.71x	-50.47	47631.45	-7.00			
eta	I	2032-09-22T14:19:04.435	-7.52x	-50.62	47176.12	-6.99			
beta	I	2032-09-22T14:22:39.097	-6.89x	-51.11	45681.18	-6.94			
alpha	I	2032-09-22T14:24:52.791	-6.49x	-51.41	44752.26	-6.91			
4	I	2032-09-22T14:30:11.998	-5.54x	-52.11	42556.91	-6.83			
5	I	2032-09-22T14:30:48.110	-5.43x	-52.18	42312.62	-6.83			
6	I	2032-09-22T14:31:58.877	-5.22x	-52.33	41836.26	-6.82			
Uranus	I	2032-09-22T15:15:02.632	2.79x	-56.66	25498.56			5.07	5.31
Uranus	E	2032-09-22T16:41:26.385	19.93	-56.52	25054.51			-14.99	-15.67
6	E	2032-09-22T17:25:11.037	28.98	-52.01	41870.25	6.48			
5	E	2032-09-22T17:25:57.578	29.14	-51.91	42168.91	6.49			
4	E	2032-09-22T17:26:58.393	29.35	-51.78	42548.25	6.49			
alpha	E	2032-09-22T17:32:27.415	30.50	-51.04	44697.63	6.55			
beta	E	2032-09-22T17:34:51.803	31.00	-50.71	45648.11	6.57			
eta	E	2032-09-22T17:38:44.165	31.81	-50.17	47176.12	6.59			
gamma	E	2032-09-22T17:39:51.933	32.05	-50.01	47623.29	6.60			
delta	E	2032-09-22T17:41:34.395	32.41	-49.76	48300.35	6.61			
lambda	E	2032-09-22T17:45:54.920	33.32	-49.13	50026.71	6.64			
epsilon	E	2032-09-22T17:49:44.795	34.13	-48.55	51555.15	6.66			

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2032-09-22T16:11:32.380
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : IRTF
 Location : Mauna Kea/IRTF
 Latitude (deg) : 19.82622
 E. Longitude (deg) : 204.52800
 Altitude (km) : 4.168
 Gaia source ID : 3426133139013535616
 2Mass ID (if available) : 06045310+2337189
 ICRS Star Coord at Epoch: 06h 04m 53.09919s +23:37:18.87777s
 RUWE (>1.4 is poor) : 1.04
 K magnitude : 14.315
 G magnitude : 16.801
 RP magnitude : 16.000
 BP magnitude : 17.476
 DUPflag : 0
 Distance (au) : 19.033
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 7.08
 Sun-Target sep (deg) : 88.63
 Sun-Moon sep (deg) : 47.31
 B (ring opening deg) : 74.41
 PA of pole (deg) : 59.71
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.518
 C/A sky separation (km) : 20947.8
 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



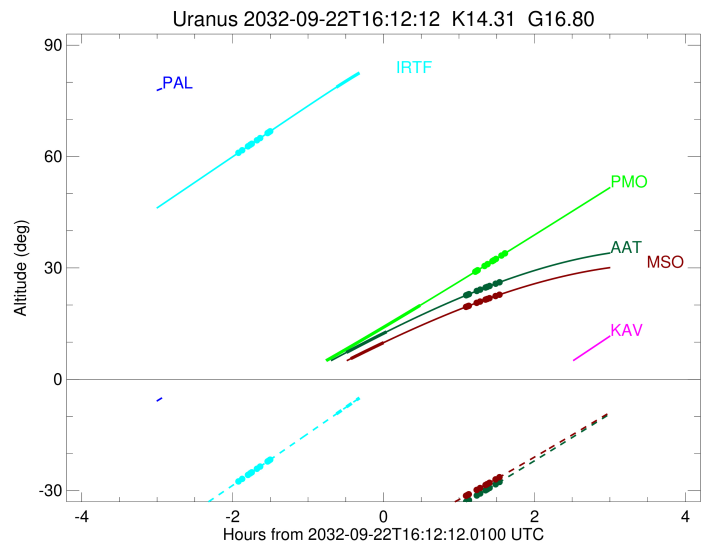
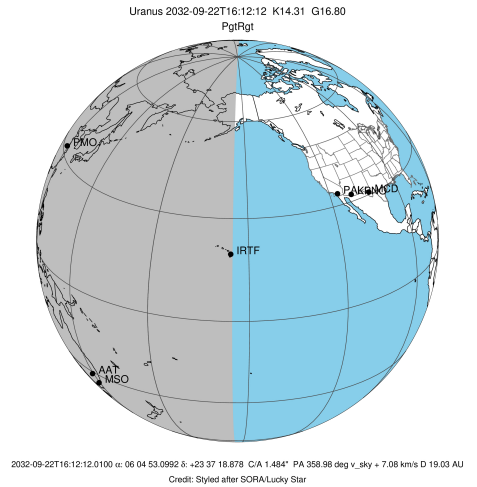
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2032-09-22T14:17:38.742		61.19	-27.34	50869.94	-6.32		
lambda	I	2032-09-22T14:19:52.770		61.70	-26.82	50026.71	-6.28		
delta	I	2032-09-22T14:24:28.937		62.76	-25.76	48300.35	-6.22		
gamma	I	2032-09-22T14:26:16.612		63.17	-25.34	47631.54	-6.20		
eta	I	2032-09-22T14:27:30.167		63.45	-25.06	47176.12	-6.18		
beta	I	2032-09-22T14:31:33.071		64.38	-24.12	45681.22	-6.13		
alpha	I	2032-09-22T14:34:04.803		64.96	-23.53	44752.43	-6.09		
4	I	2032-09-22T14:40:09.162		66.35	-22.12	42552.26	-5.98		
5	I	2032-09-22T14:40:49.869		66.50	-21.96	42309.87	-5.97		
6	I	2032-09-22T14:42:09.425		66.81	-21.65	41841.03	-5.96		
Uranus	I	2032-09-22T15:34:47.572		78.68	-9.33	25553.08		1.58	1.66
Uranus	E	2032-09-22T16:46:28.034		82.78	7.53x	25126.43		-13.83	-14.46
6	E	2032-09-22T17:38:14.760		71.47	19.67x	41872.16	5.88		
5	E	2032-09-22T17:39:06.141		71.27	19.87x	42172.44	5.90		
4	E	2032-09-22T17:40:12.045		71.02	20.12x	42545.47	5.91		
alpha	E	2032-09-22T17:46:12.908		69.65	21.52x	44699.45	6.00		
beta	E	2032-09-22T17:48:50.000		69.06	22.13x	45649.11	6.04		
eta	E	2032-09-22T17:53:01.873		68.10	23.11x	47176.12	6.09		
gamma	E	2032-09-22T17:54:15.212		67.82	23.39x	47623.55	6.11		
delta	E	2032-09-22T17:56:05.815		67.40	23.82x	48300.35	6.13		
lambda	E	2032-09-22T18:00:46.258		66.33	24.91x	50026.71	6.18		
epsilon	E	2032-09-22T18:04:52.712		65.39	25.86x	51555.17	6.22		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2032-09-22T15:59:41.440
 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 : 3426133139013535616
 2Mass ID (if available) : 06045310+2337189
 ICRS Star Coord at Epoch: 06h 04m 53.09919s +23:37:18.87777s
 RUWE (>1.4 is poor) : 1.04
 K magnitude : 14.315
 G magnitude : 16.801
 RP magnitude : 16.000
 BP magnitude : 17.476
 DUPflag : 0
 Distance (au) : 19.033
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 7.08
 Sun-Target sep (deg) : 88.63
 Sun-Moon sep (deg) : 46.27
 B (ring opening deg) : 74.41
 PA of pole (deg) : 59.71
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.778
 C/A sky separation (km) : 24542.9
 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_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	2032-09-22T14:15:04.479	-9.46x	-58.52	50889.90	-6.41			
lambda	I	2032-09-22T14:17:19.911	-9.01x	-58.44	50026.71	-6.35			
delta	I	2032-09-22T14:21:53.392	-8.10x	-58.25	48300.35	-6.27			
gamma	I	2032-09-22T14:23:40.355	-7.75x	-58.17	47631.57	-6.23			
eta	I	2032-09-22T14:24:53.551	-7.51x	-58.11	47176.12	-6.21			
beta	I	2032-09-22T14:28:55.990	-6.71x	-57.89	45681.12	-6.12			
alpha	I	2032-09-22T14:31:28.107	-6.21x	-57.73	44752.31	-6.06			
4	I	2032-09-22T14:37:36.101	-5.01x	-57.33	42548.77	-5.91			
5	I	2032-09-22T14:38:17.109	-4.88x	-57.28	42307.05	-5.89			
6	I	2032-09-22T14:39:36.657	-4.62x	-57.18	41844.78	-5.86			
Uranus	I	2032-09-22T15:42:40.981	7.21	-49.88	25534.53	-3.22		-3.37	
Uranus	E	2032-09-22T16:14:40.438	12.79	-44.73	25309.06	-10.41		-10.89	
6	E	2032-09-22T17:17:58.087	22.63	-32.97	41874.89	5.61			
5	E	2032-09-22T17:18:52.380	22.76	-32.79	42179.03	5.63			
4	E	2032-09-22T17:19:59.546	22.91	-32.57	42541.15	5.65			
alpha	E	2032-09-22T17:26:17.099	23.77	-31.33	44702.79	5.78			
beta	E	2032-09-22T17:28:59.968	24.14	-30.78	45651.00	5.83			
eta	E	2032-09-22T17:33:20.376	24.71	-29.92	47176.12	5.90			
gamma	E	2032-09-22T17:34:36.226	24.88	-29.66	47624.06	5.92			
delta	E	2032-09-22T17:36:30.285	25.12	-29.28	48300.35	5.94			
lambda	E	2032-09-22T17:41:19.146	25.74	-28.31	50026.71	6.01			
epsilon	E	2032-09-22T17:45:31.921	26.26	-27.45	51552.09	6.06			

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2032-09-22T16:00:14.150
 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 : 3426133139013535616
 2Mass ID (if available) : 06045310+2337189
 ICRS Star Coord at Epoch: 06h 04m 53.09919s +23:37:18.87777s
 RUWE (>1.4 is poor) : 1.04
 K magnitude : 14.315
 G magnitude : 16.801
 RP magnitude : 16.000
 BP magnitude : 17.476
 DUPflag : 0
 Distance (au) : 19.033
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 7.08
 Sun-Target sep (deg) : 88.63
 Sun-Moon sep (deg) : 46.26
 B (ring opening deg) : 74.41
 PA of pole (deg) : 59.71
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.800
 C/A sky separation (km) : 24842.8
 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_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	2032-09-22T14:16:02.103	-10.80x	-54.51	50892.33	-6.39			
lambda	I	2032-09-22T14:18:18.466	-10.37x	-54.44	50026.71	-6.33			
delta	I	2032-09-22T14:22:53.129	-9.50x	-54.27	48300.35	-6.24			
gamma	I	2032-09-22T14:24:40.582	-9.16x	-54.20	47631.57	-6.21			
eta	I	2032-09-22T14:25:54.123	-8.93x	-54.14	47176.12	-6.18			
beta	I	2032-09-22T14:29:57.769	-8.16x	-53.95	45681.10	-6.09			
alpha	I	2032-09-22T14:32:30.703	-7.68x	-53.81	44752.28	-6.03			
4	I	2032-09-22T14:38:40.917	-6.52x	-53.45	42548.38	-5.87			
5	I	2032-09-22T14:39:22.167	-6.40x	-53.40	42306.70	-5.85			
6	I	2032-09-22T14:40:42.085	-6.15x	-53.32	41845.20	-5.82			
Uranus	I	2032-09-22T15:46:07.809	5.54	-46.47	25522.03	-3.96		-4.15	
Uranus	E	2032-09-22T16:12:15.937	9.87	-42.64	25335.15	-9.84		-10.30	
6	E	2032-09-22T17:17:49.770	19.50	-31.38	41875.05	5.58			
5	E	2032-09-22T17:18:44.345	19.62	-31.21	42179.49	5.61			
4	E	2032-09-22T17:19:51.676	19.77	-31.00	42540.88	5.62			
alpha	E	2032-09-22T17:26:10.739	20.58	-29.83	44703.01	5.76			
beta	E	2032-09-22T17:28:54.109	20.92	-29.32	45651.12	5.81			
eta	E	2032-09-22T17:33:15.210	21.46	-28.50	47176.12	5.88			
gamma	E	2032-09-22T17:34:31.251	21.61	-28.26	47624.09	5.90			
delta	E	2032-09-22T17:36:25.564	21.84	-27.90	48300.35	5.93			
lambda	E	2032-09-22T17:41:14.992	22.41	-26.98	50026.71	6.00			
epsilon	E	2032-09-22T17:45:28.117	22.90	-26.17	51551.78	6.05			