

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2029-02-09T15:17:03.120
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 144992941953276672
 2Mass ID (if available) : 04323947+2154098

ICRS Star Coord at Epoch: 04h 32m 39.47551s +21:54:09.73490s

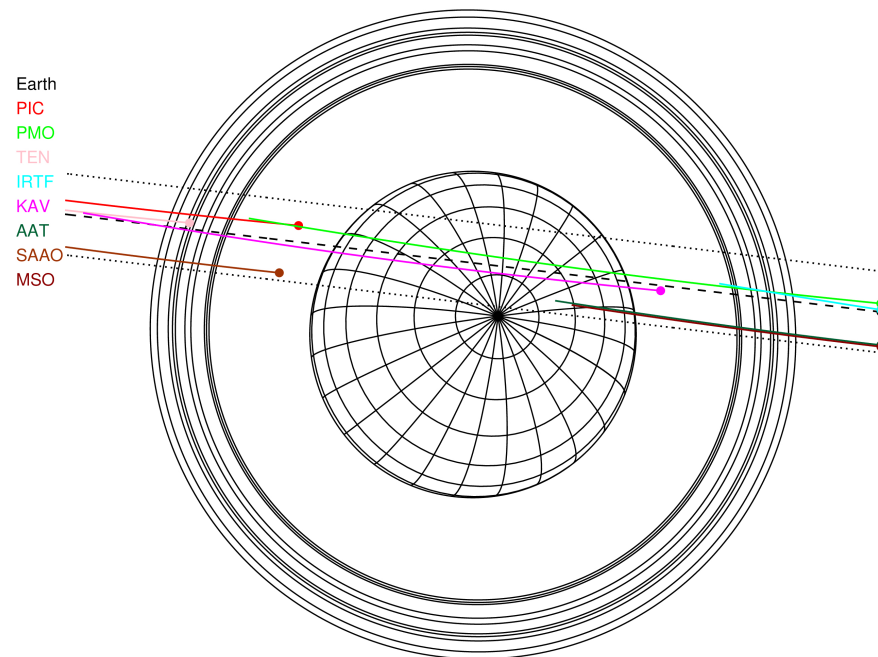
RUWE (>1.4 is poor) : 0.95
 K magnitude : 14.815
 G magnitude : 18.816
 RP magnitude : 17.703
 BP magnitude : 20.221
 DUPflag : 0
 Distance (au) : 18.937
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -3.42
 Sun-Target sep (deg) : 109.06
 Sun-Moon sep (deg) : 152.96
 B (ring opening deg) : 79.03
 PA of pole (deg) : -53.73

#	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



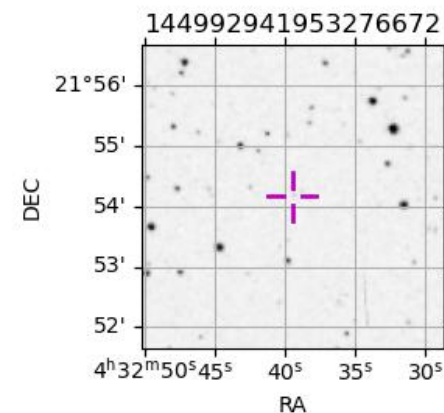
2029-02-09T15:17:03.1200 α: 04 32 39.4755 δ: +21 54 09.735 C/A 0.818° PA 173.16 deg v_sky - 3.42 km/s D 18.94 AU
 Credit: Styled after SORA/Lucky Star

Uranus 2029-02-09T15:17:03 K14.81 G18.82 PgtRgt

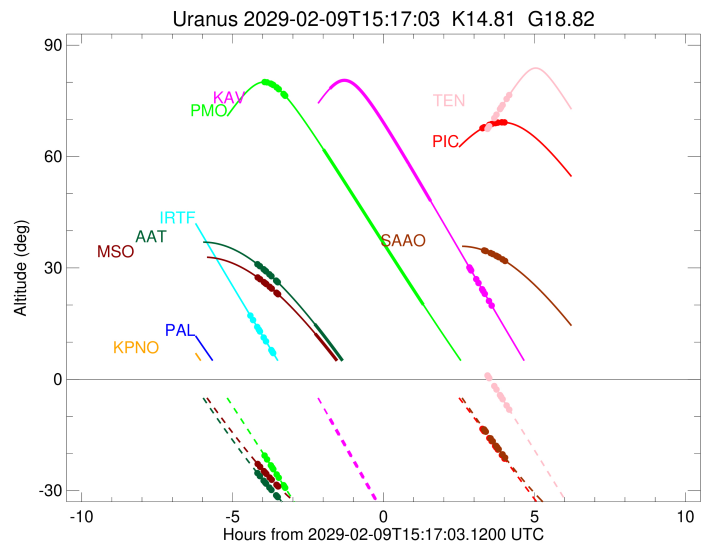
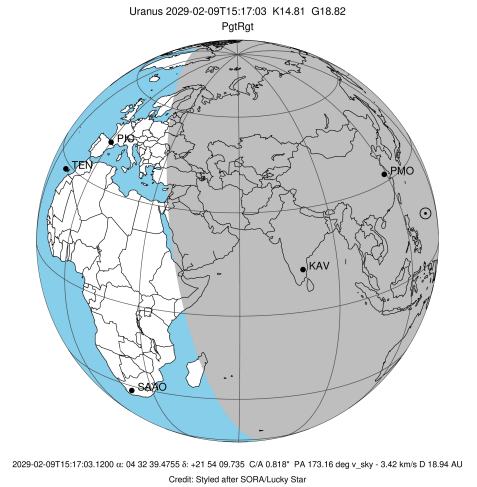


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1			+++++	FEB 09 18:33 - FEB 09 19:15	PnnRne
PAL	Palomar Mt (200")	33.4	243.1					PnnRnn
PMO	Purple Mtn Obs. Nanki	32.1	118.8	+++++	+ +		FEB 09 11:19 - FEB 09 16:36	PieRin
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			+++	FEB 09 19:13 - FEB 09 19:25	PnnRne
IRTF	Mauna Kea/IRTF	19.8	204.5	+++++			FEB 09 10:51 - FEB 09 11:37	PnnRin
KAV	Kavalur Observatory	12.6	78.8		+ +	+++++	FEB 09 13:30 - FEB 09 18:50	PieRne
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	+++++	+		FEB 09 11:05 - FEB 09 13:00	PinRin
SAAO	So. Afr. Astro. Obs.	-32.4	20.8			+++++	FEB 09 18:37 - FEB 09 19:16	PnnRne
MSO	Mt. Stromlo Observato	-35.3	149.0	+++++	+		FEB 09 11:05 - FEB 09 13:01	PinRin

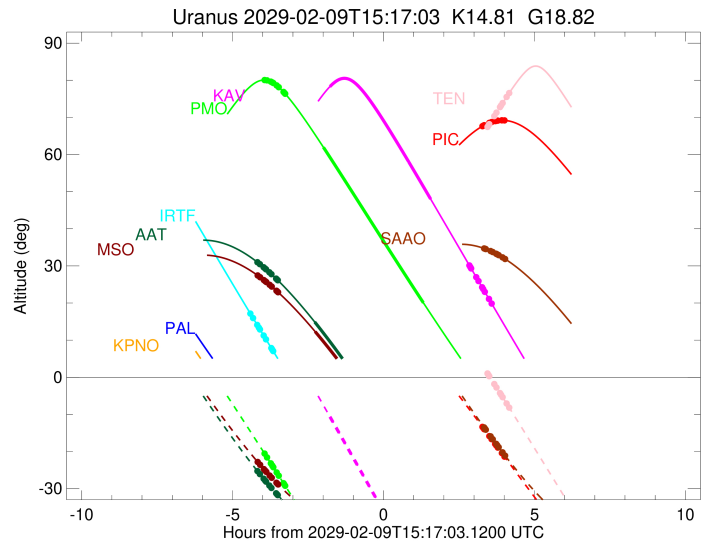
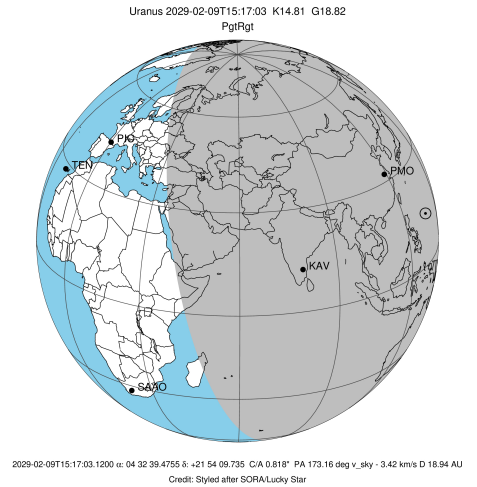


target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2029-02-09T15:36:16.410
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PIC
 Location : Pic du Midi
 Latitude (deg) : 42.93656
 E. Longitude (deg) : 0.14231
 Altitude (km) : 2.890
 Gaia source ID : 144992941953276672
 2Mass ID (if available) : 04323947+2154098
 ICRS Star Coord at Epoch: 04h 32m 39.47551s +21:54:09.73490s
 RUWE (>1.4 is poor) : 0.95
 K magnitude : 14.815
 G magnitude : 18.816
 RP magnitude : 17.703
 BP magnitude : 20.221
 DUPflag : 0
 Distance (au) : 18.937
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -3.42
 Sun-Target sep (deg) : 109.06
 Sun-Moon sep (deg) : 153.67
 B (ring opening deg) : 79.03
 PA of pole (deg) : -53.73
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.059
 C/A sky separation (km) : 14551.2
 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



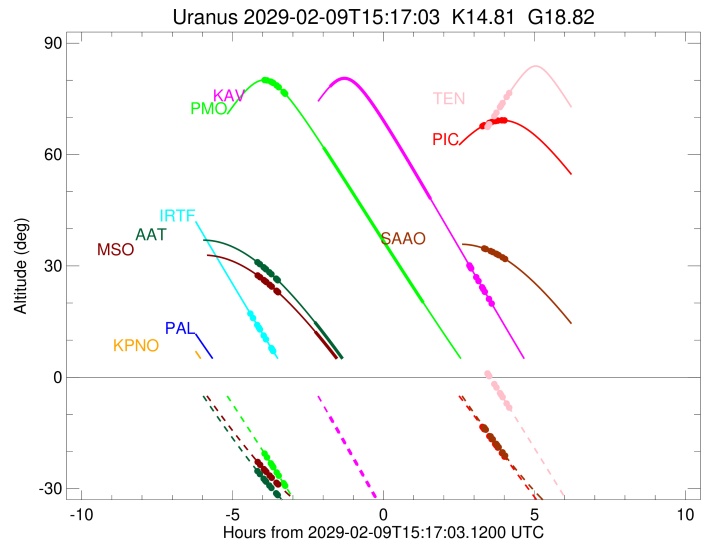
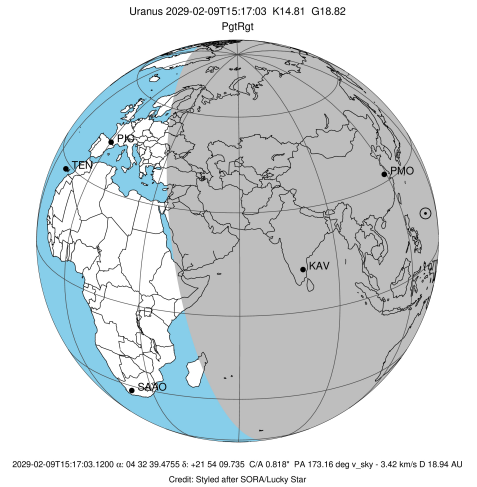
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2029-02-09T11:43:55.699	-0.46x	32.36x	51430.91	-3.23			
lambda	I	2029-02-09T11:51:09.277	0.68x	32.53x	50026.71	-3.24			
delta	I	2029-02-09T12:00:02.526	2.11x	32.68x	48300.35	-3.24			
gamma	I	2029-02-09T12:03:29.506	2.67x	32.72x	47630.56	-3.24			
eta	I	2029-02-09T12:05:49.981	3.05x	32.74x	47176.12	-3.23			
beta	I	2029-02-09T12:13:32.699	4.32x	32.77x	45680.17	-3.23			
alpha	I	2029-02-09T12:18:41.530	5.17	32.76x	44684.69	-3.23			
4	I	2029-02-09T12:29:43.175	7.02	32.65x	42546.48	-3.22			
5	I	2029-02-09T12:31:37.782	7.35	32.62x	42187.20	-3.22			
6	I	2029-02-09T12:33:31.892	7.67	32.59x	41804.73	-3.22			
Uranus	I	2029-02-09T14:01:03.360	23.12	27.70x	24999.30			10.92	11.42
Uranus	E	2029-02-09T17:12:08.163	57.31	1.12x	25525.17			-2.63	-2.75
6	E	2029-02-09T18:33:41.548	67.64	-13.36	41842.82	3.49			
5	E	2029-02-09T18:35:30.043	67.78	-13.69	42227.37	3.50			
4	E	2029-02-09T18:37:07.546	67.89	-13.98	42564.54	3.50			
alpha	E	2029-02-09T18:47:27.102	68.53	-15.87	44746.11	3.53			
beta	E	2029-02-09T18:51:43.416	68.74	-16.65	45650.29	3.53			
eta	E	2029-02-09T18:58:54.442	69.01	-17.96	47176.12	3.55			
gamma	E	2029-02-09T19:01:00.876	69.06	-18.35	47624.71	3.55			
delta	E	2029-02-09T19:04:11.092	69.13	-18.93	48300.35	3.55			
lambda	E	2029-02-09T19:12:16.086	69.22	-20.41	50026.71	3.56			
epsilon	E	2029-02-09T19:15:39.249	69.21	-21.03	50751.30	3.57			

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2029-02-09T14:53:24.770
 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 : 144992941953276672
 2Mass ID (if available) : 04323947+2154098
 ICRS Star Coord at Epoch: 04h 32m 39.47551s +21:54:09.73490s
 RUWE (>1.4 is poor) : 0.95
 K magnitude : 14.815
 G magnitude : 18.816
 RP magnitude : 17.703
 BP magnitude : 20.221
 DUPflag : 0
 Distance (au) : 18.936
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -3.42
 Sun-Target sep (deg) : 109.06
 Sun-Moon sep (deg) : 152.57
 B (ring opening deg) : 79.03
 PA of pole (deg) : -53.73
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.913
 C/A sky separation (km) : 12535.3
 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	2029-02-09T11:19:24.716		80.07	-20.29	51454.25	-3.82		
lambda	I	2029-02-09T11:25:38.002		79.98	-21.61	50026.71	-3.82		
delta	I	2029-02-09T11:33:10.678		79.63	-23.21	48300.35	-3.81		
gamma	I	2029-02-09T11:36:06.784		79.42	-23.83	47630.27	-3.80		
eta	I	2029-02-09T11:38:06.281		79.26	-24.25	47176.12	-3.80		
beta	I	2029-02-09T11:44:40.942		78.62	-25.64	45679.51	-3.79		
alpha	I	2029-02-09T11:49:04.550		78.11	-26.58	44684.62	-3.78		
4	I	2029-02-09T11:58:30.032		76.84	-28.58	42550.21	-3.75		
5	I	2029-02-09T12:00:07.571		76.60	-28.92	42193.61	-3.75		
6	I	2029-02-09T12:01:46.740		76.35	-29.27	41807.53	-3.75		
Uranus	I	2029-02-09T13:17:31.155		61.98	-45.22	25026.53		10.64	11.13
Uranus	E	2029-02-09T16:36:22.672		20.05	-72.08	25516.69		-2.94	-3.08
6	E	2029-02-09T18:01:59.609		2.84x	-60.69	41842.32	3.19		
5	E	2029-02-09T18:03:58.518		2.46x	-60.33	42226.39	3.19		
4	E	2029-02-09T18:05:45.703		2.11x	-60.00	42563.97	3.19		
alpha	E	2029-02-09T18:17:09.859		-0.08x	-57.85	44745.80	3.18		
beta	E	2029-02-09T18:21:54.761		-0.98x	-56.94	45650.57	3.18		
eta	E	2029-02-09T18:29:55.706		-2.50x	-55.38	47176.12	3.17		
gamma	E	2029-02-09T18:32:17.360		-2.94x	-54.92	47624.81	3.17		
delta	E	2029-02-09T18:35:50.838		-3.61x	-54.22	48300.35	3.16		
lambda	E	2029-02-09T18:44:57.572		-5.30x	-52.40	50026.71	3.15		
epsilon	E	2029-02-09T18:48:47.078		-6.00x	-51.63	50749.71	3.15		

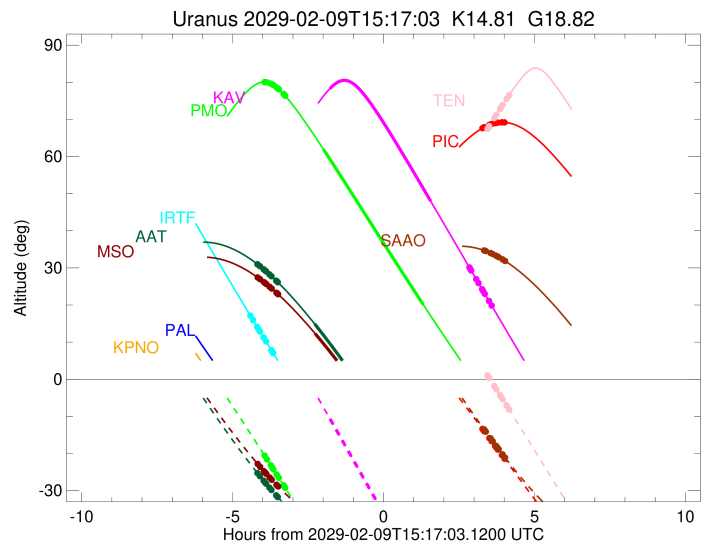
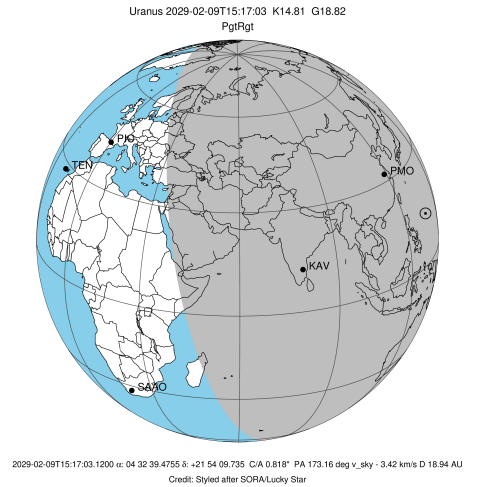
target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2029-02-09T15:44:22.000
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : TEN
 Location : Teide Obs./Tenerife
 Latitude (deg) : 28.30050
 E. Longitude (deg) : 343.48909
 Altitude (km) : 2.395
 Gaia source ID : 144992941953276672
 2Mass ID (if available) : 04323947+2154098
 ICRS Star Coord at Epoch: 04h 32m 39.47551s +21:54:09.73490s
 RUWE (>1.4 is poor) : 0.95
 K magnitude : 14.815
 G magnitude : 18.816
 RP magnitude : 17.703
 BP magnitude : 20.221
 DUPflag : 0
 Distance (au) : 18.937
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -3.42
 Sun-Target sep (deg) : 109.06
 Sun-Moon sep (deg) : 153.78
 B (ring opening deg) : 79.03
 PA of pole (deg) : -53.73
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.003
 C/A sky separation (km) : 13773.2
 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	2029-02-09T11:43:25.386	-20.04x	41.37x	51434.25	-3.12		
lambda	I	2029-02-09T11:50:56.119	-18.76x	42.22x	50026.71	-3.12		
delta	I	2029-02-09T12:00:08.817	-17.16x	43.18x	48300.35	-3.12		
gamma	I	2029-02-09T12:03:43.248	-16.53x	43.54x	47630.53	-3.12		
eta	I	2029-02-09T12:06:08.720	-16.10x	43.77x	47176.12	-3.12		
beta	I	2029-02-09T12:14:07.734	-14.67x	44.48x	45680.09	-3.12		
alpha	I	2029-02-09T12:19:27.181	-13.71x	44.92x	44684.67	-3.12		
4	I	2029-02-09T12:30:50.772	-11.61x	45.75x	42547.00	-3.12		
5	I	2029-02-09T12:32:48.984	-11.24x	45.87x	42188.10	-3.12		
6	I	2029-02-09T12:34:46.984	-10.88x	45.99x	41805.11	-3.12		
Uranus	I	2029-02-09T14:04:13.710	6.78	46.09x	25002.81		10.88	11.39
Uranus	E	2029-02-09T17:23:29.796	49.76	17.39x	25511.20		-3.13	-3.27
6	E	2029-02-09T18:43:45.103	67.43	1.03x	41844.12	3.55		
5	E	2029-02-09T18:45:32.121	67.82	0.65x	42229.84	3.55		
4	E	2029-02-09T18:47:07.905	68.17	0.31x	42565.92	3.56		
alpha	E	2029-02-09T18:57:17.431	70.36	-1.84x	44746.68	3.58		
beta	E	2029-02-09T19:01:29.324	71.26	-2.73x	45649.80	3.59		
eta	E	2029-02-09T19:08:33.364	72.76	-4.24x	47176.12	3.61		
gamma	E	2029-02-09T19:10:37.629	73.20	-4.68x	47624.57	3.61		
delta	E	2029-02-09T19:13:44.648	73.85	-5.35	48300.35	3.62		
lambda	E	2029-02-09T19:21:41.192	75.50	-7.06	50026.71	3.63		
epsilon	E	2029-02-09T19:25:01.363	76.18	-7.77	50753.61	3.63		

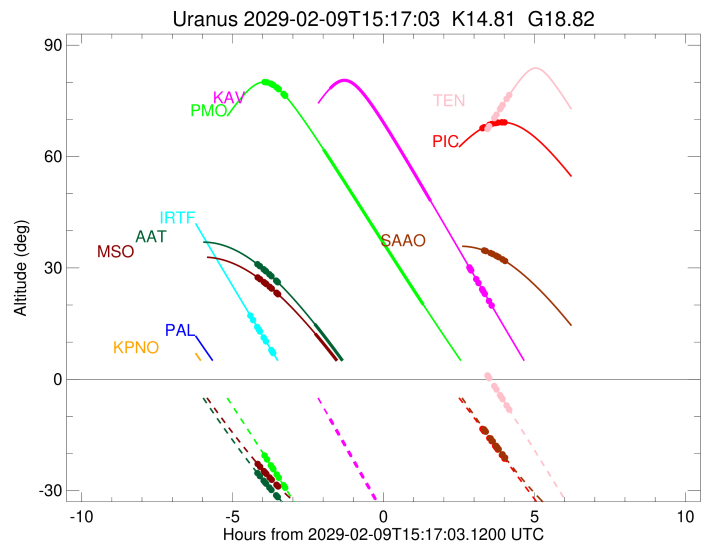
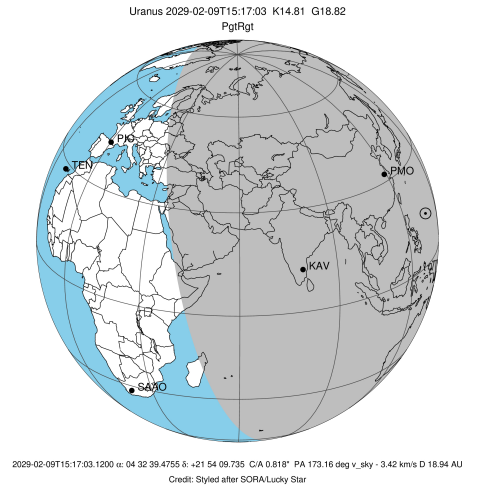
```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2029-02-09T14:52:41.240
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       : 144992941953276672
2Mass ID (if available) : 04323947+2154098
ICRS Star Coord at Epoch: 04h 32m 39.47551s +21:54:09.73490s
RUWE (>1.4 is poor) : 0.95
K magnitude           : 14.815
G magnitude           : 18.816
RP magnitude          : 17.703
BP magnitude          : 20.221
DUPflag              : 0
Distance (au)         : 18.936
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s) : -3.42
Sun-Target sep (deg) : 109.06
Sun-Moon sep (deg)   : 152.17
B (ring opening deg) : 79.03
PA of pole (deg)     : -53.73
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (" ) : 1.045
C/A sky separation (km) : 14355.7
NAIF SPICE kernels   : RAJobs_U111+rgf15.spk
URKALLvl1.spk
urall1.bsp
IAU_URANUS_for_RINGFIT.tpc
vgr2.urall1.bsp
ural61.bsp
vgr2.ural61.bsp
peph.ural60.bsp
earthstns_itr93_040916.bsp
earth_720101_070426.bpc
earth_200101_990628_predict.bpc
pg3f0000r.bsp
pg490000r.bsp
naif0012.tls
earth_flat_IAU.spk
    
```



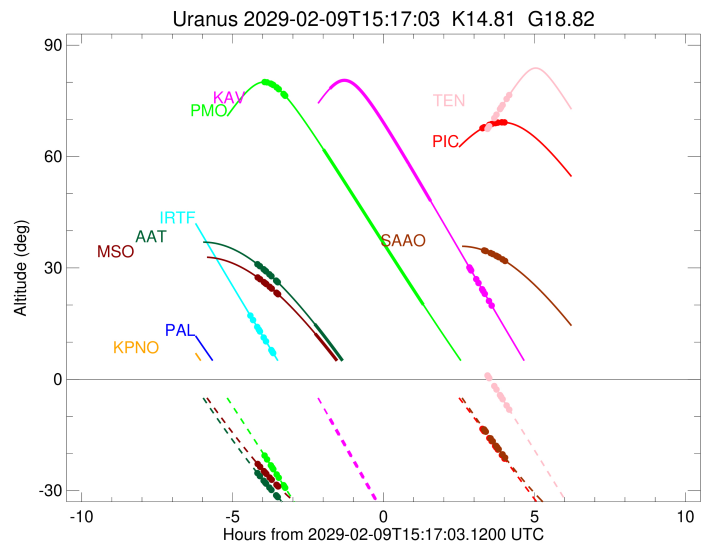
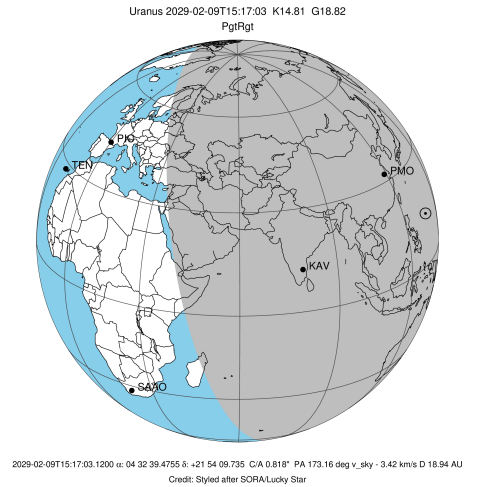
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2029-02-09T10:51:02.019		17.46	-83.69	51455.44	-3.51		
lambda	I	2029-02-09T10:57:50.242		15.93	-82.64	50026.71	-3.49		
delta	I	2029-02-09T11:06:07.303		14.08	-81.13	48300.35	-3.46		
gamma	I	2029-02-09T11:09:21.408		13.36	-80.50	47630.27	-3.45		
eta	I	2029-02-09T11:11:33.353		12.87	-80.05	47176.12	-3.44		
beta	I	2029-02-09T11:18:50.494		11.24	-78.53	45679.53	-3.41		
alpha	I	2029-02-09T11:23:43.675		10.16	-77.48	44684.62	-3.39		
4	I	2029-02-09T11:34:15.948		7.82	-75.16	42549.94	-3.35		
5	I	2029-02-09T11:36:05.533		7.42	-74.75	42193.11	-3.34		
6	I	2029-02-09T11:37:56.913		7.01	-74.33	41807.29	-3.33		
Uranus	I	2029-02-09T13:06:12.512		-11.92x	-53.82	25014.19		10.77	11.27
Uranus	E	2029-02-09T16:49:25.930		-46.81x	-1.77x	25539.62		-1.99	-2.08
6	E	2029-02-09T18:32:27.342		-46.09x	21.07x	41840.70	2.74		
5	E	2029-02-09T18:34:45.190		-45.91x	21.56x	42223.39	2.75		
4	E	2029-02-09T18:36:49.883		-45.74x	22.00x	42562.32	2.75		
alpha	E	2029-02-09T18:49:59.752		-44.55x	24.78x	44745.13	2.77		
beta	E	2029-02-09T18:55:26.739		-44.00x	25.92x	45651.10	2.78		
eta	E	2029-02-09T19:04:34.928		-43.01x	27.81x	47176.12	2.79		
gamma	E	2029-02-09T19:07:15.788		-42.70x	28.36x	47624.94	2.79		
delta	E	2029-02-09T19:11:17.479		-42.23x	29.19x	48300.35	2.80		
lambda	E	2029-02-09T19:21:33.225		-40.95x	31.26x	50026.71	2.81		
epsilon	E	2029-02-09T19:25:49.752		-40.39x	32.11x	50748.32	2.81		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2029-02-09T15:08:35.240
 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 : 144992941953276672
 2Mass ID (if available) : 04323947+2154098
 ICRS Star Coord at Epoch: 04h 32m 39.47551s +21:54:09.73490s
 RUWE (>1.4 is poor) : 0.95
 K magnitude : 14.815
 G magnitude : 18.816
 RP magnitude : 17.703
 BP magnitude : 20.221
 DUPflag : 0
 Distance (au) : 18.936
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -3.42
 Sun-Target sep (deg) : 109.06
 Sun-Moon sep (deg) : 153.11
 B (ring opening deg) : 79.03
 PA of pole (deg) : -53.73
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.726
 C/A sky separation (km) : 9977.0
 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



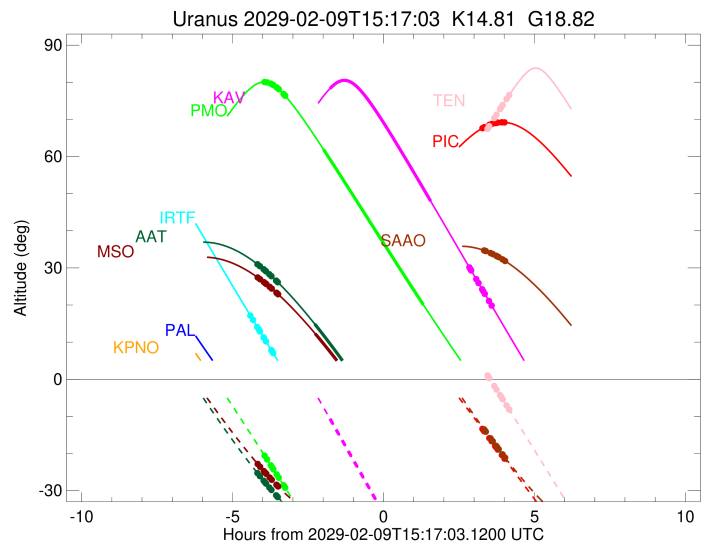
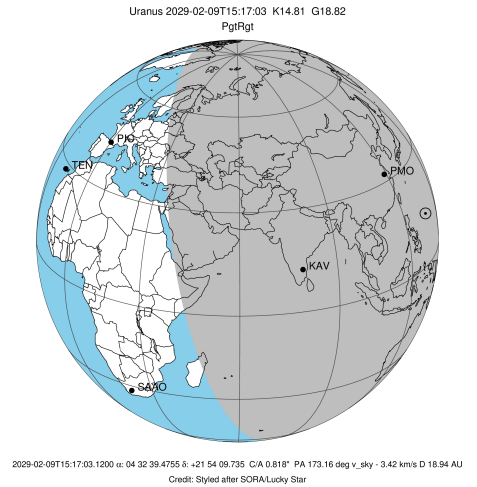
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2029-02-09T11:36:02.578		54.52	16.26x	51461.11	-3.83		
lambda	I	2029-02-09T11:42:17.092		55.95	14.82x	50026.71	-3.83		
delta	I	2029-02-09T11:49:47.780		57.66	13.08x	48300.35	-3.83		
gamma	I	2029-02-09T11:52:42.746		58.33	12.41x	47630.17	-3.83		
eta	I	2029-02-09T11:54:41.294		58.78	11.95x	47176.12	-3.83		
beta	I	2029-02-09T12:01:12.245		60.25	10.44x	45679.23	-3.83		
alpha	I	2029-02-09T12:05:32.573		61.23	9.43x	44684.67	-3.83		
4	I	2029-02-09T12:14:49.009		63.31	7.26x	42551.73	-3.82		
5	I	2029-02-09T12:16:24.462		63.66	6.89x	42196.25	-3.82		
6	I	2029-02-09T12:18:02.260		64.03	6.51x	41808.72	-3.82		
Uranus	I	2029-02-09T13:30:27.976		78.29	-10.61	25053.10		10.36	10.84
Uranus	E	2029-02-09T16:50:52.725		47.98	-58.85	25468.49		-4.31	-4.51
6	E	2029-02-09T18:07:44.641		30.13	-77.43	41845.82	3.53		
5	E	2029-02-09T18:09:32.647		29.71	-77.86	42233.00	3.53		
4	E	2029-02-09T18:11:08.968		29.34	-78.25	42567.66	3.53		
alpha	E	2029-02-09T18:21:26.990		26.95	-80.71	44747.29	3.52		
beta	E	2029-02-09T18:25:44.031		25.95	-81.72	45649.29	3.51		
eta	E	2029-02-09T18:32:59.693		24.27	-83.43	47176.12	3.50		
gamma	E	2029-02-09T18:35:07.823		23.77	-83.93	47624.43	3.50		
delta	E	2029-02-09T18:38:21.214		23.03	-84.66	48300.35	3.49		
lambda	E	2029-02-09T18:46:36.361		21.12	-86.47	50026.71	3.48		
epsilon	E	2029-02-09T18:50:05.950		20.31	-87.15	50755.55	3.47		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2029-02-09T14:51:17.200
 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 : 144992941953276672
 2Mass ID (if available) : 04323947+2154098
 ICRS Star Coord at Epoch: 04h 32m 39.47551s +21:54:09.73490s
 RUWE (>1.4 is poor) : 0.95
 K magnitude : 14.815
 G magnitude : 18.816
 RP magnitude : 17.703
 BP magnitude : 20.221
 DUPflag : 0
 Distance (au) : 18.936
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -3.42
 Sun-Target sep (deg) : 109.06
 Sun-Moon sep (deg) : 152.24
 B (ring opening deg) : 79.03
 PA of pole (deg) : -53.73
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.527
 C/A sky separation (km) : 7235.3
 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_itr93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk



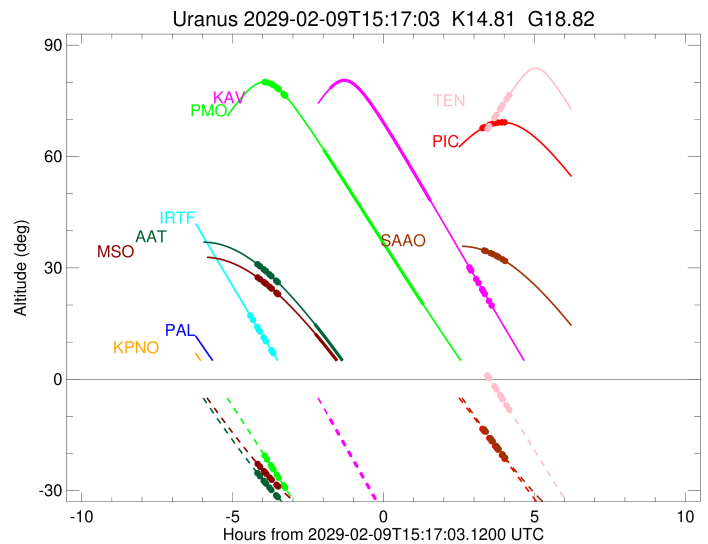
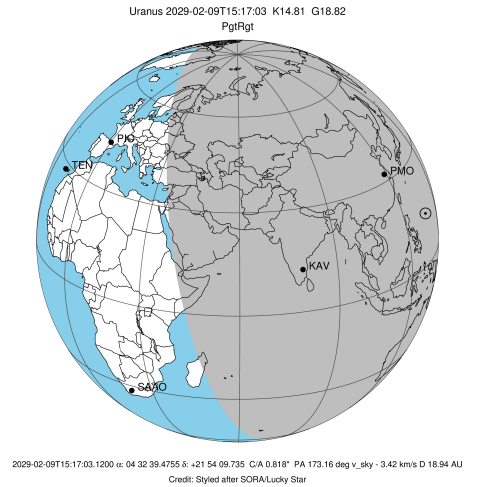
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2029-02-09T11:05:05.356		31.13	-25.03	51485.22	-3.87		
lambda	I	2029-02-09T11:11:22.184		30.46	-26.10	50026.71	-3.87		
delta	I	2029-02-09T11:18:49.413		29.63	-27.34	48300.35	-3.85		
gamma	I	2029-02-09T11:21:43.498		29.29	-27.81	47629.78	-3.85		
eta	I	2029-02-09T11:23:41.393		29.06	-28.13	47176.12	-3.85		
beta	I	2029-02-09T11:30:11.437		28.28	-29.17	45678.22	-3.84		
alpha	I	2029-02-09T11:34:31.089		27.74	-29.86	44685.07	-3.83		
4	I	2029-02-09T11:43:47.249		26.55	-31.28	42556.31	-3.81		
5	I	2029-02-09T11:45:21.983		26.34	-31.52	42204.18	-3.81		
6	I	2029-02-09T11:47:01.675		26.12	-31.77	41812.37	-3.80		
Uranus	I	2029-02-09T13:00:16.738		14.90	-40.76	25118.07		9.65	10.09
Uranus	E	2029-02-09T16:51:40.233		-30.61x	-31.39	25432.93		-5.09	-5.33
6	E	2029-02-09T18:18:50.016		-49.26x	-16.46	41847.44	3.07		
5	E	2029-02-09T18:20:54.527		-49.70x	-16.07	42236.11	3.07		
4	E	2029-02-09T18:22:45.041		-50.10x	-15.72	42569.39	3.06		
alpha	E	2029-02-09T18:34:36.414		-52.64x	-13.47	44747.92	3.05		
beta	E	2029-02-09T18:39:32.377		-53.70x	-12.52	45648.73	3.04		
eta	E	2029-02-09T18:47:55.085		-55.49x	-10.89	47176.12	3.03		
gamma	E	2029-02-09T18:50:22.874		-56.01x	-10.41	47624.27	3.03		
delta	E	2029-02-09T18:54:06.104		-56.80x	-9.68	48300.35	3.03		
lambda	E	2029-02-09T19:03:37.597		-58.83x	-7.81	50026.71	3.02		
epsilon	E	2029-02-09T19:07:40.589		-59.69x	-7.00	50758.81	3.01		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2029-02-09T15:35:24.870
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : SAAO
 Location : So. Afr. Astro. Obs. (Sutherland)
 Latitude (deg) : -32.37953
 E. Longitude (deg) : 20.81070
 Altitude (km) : 1.768
 Gaia source ID : 144992941953276672
 2Mass ID (if available) : 04323947+2154098
 ICRS Star Coord at Epoch: 04h 32m 39.47551s +21:54:09.73490s
 RUWE (>1.4 is poor) : 0.95
 K magnitude : 14.815
 G magnitude : 18.816
 RP magnitude : 17.703
 BP magnitude : 20.221
 DUPflag : 0
 Distance (au) : 18.937
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -3.42
 Sun-Target sep (deg) : 109.06
 Sun-Moon sep (deg) : 153.67
 B (ring opening deg) : 79.03
 PA of pole (deg) : -53.73
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.487
 C/A sky separation (km) : 6691.0
 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	2029-02-09T11:43:17.271	-13.19x	68.64x	51472.58	-3.47			
lambda	I	2029-02-09T11:50:13.260	-11.80x	67.71x	50026.71	-3.48			
delta	I	2029-02-09T11:58:28.732	-10.14x	66.52x	48300.35	-3.49			
gamma	I	2029-02-09T12:01:40.782	-9.50x	66.04x	47629.98	-3.49			
eta	I	2029-02-09T12:03:50.700	-9.07x	65.71x	47176.12	-3.49			
beta	I	2029-02-09T12:10:58.771	-7.66x	64.57x	45678.75	-3.50			
alpha	I	2029-02-09T12:15:42.902	-6.72x	63.78x	44684.82	-3.51			
4	I	2029-02-09T12:25:48.281	-4.74x	62.05x	42554.08	-3.52			
5	I	2029-02-09T12:27:31.412	-4.41x	61.74x	42200.34	-3.52			
6	I	2029-02-09T12:29:18.423	-4.06x	61.43x	41810.60	-3.52			
Uranus	I	2029-02-09T13:46:07.132	10.21	46.43x	25096.34			9.89	10.35
Uranus	E	2029-02-09T17:23:57.697	35.45	0.86x	25387.19			-5.96	-6.24
6	E	2029-02-09T18:37:04.945	34.70	-13.51	41850.61	3.73			
5	E	2029-02-09T18:38:47.776	34.62	-13.84	42242.30	3.73			
4	E	2029-02-09T18:40:18.059	34.54	-14.12	42572.88	3.73			
alpha	E	2029-02-09T18:50:00.341	34.00	-15.93	44749.11	3.73			
beta	E	2029-02-09T18:54:01.606	33.74	-16.67	45647.58	3.73			
eta	E	2029-02-09T19:00:51.818	33.28	-17.92	47176.12	3.73			
gamma	E	2029-02-09T19:02:52.027	33.14	-18.28	47623.91	3.72			
delta	E	2029-02-09T19:05:53.670	32.91	-18.83	48300.35	3.72			
lambda	E	2029-02-09T19:13:37.588	32.30	-20.21	50026.71	3.72			
epsilon	E	2029-02-09T19:16:56.856	32.02	-20.80	50767.62	3.72			

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2029-02-09T14:52:45.170
 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 : 144992941953276672
 2Mass ID (if available) : 04323947+2154098
 ICRS Star Coord at Epoch: 04h 32m 39.47551s +21:54:09.73490s
 RUWE (>1.4 is poor) : 0.95
 K magnitude : 14.815
 G magnitude : 18.816
 RP magnitude : 17.703
 BP magnitude : 20.221
 DUPflag : 0
 Distance (au) : 18.936
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -3.42
 Sun-Target sep (deg) : 109.06
 Sun-Moon sep (deg) : 152.27
 B (ring opening deg) : 79.03
 PA of pole (deg) : -53.73
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.505
 C/A sky separation (km) : 6938.8
 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	2029-02-09T11:05:34.042		27.56	-22.60	51486.35	-3.86		
lambda	I	2029-02-09T11:11:52.536		26.94	-23.59	50026.71	-3.85		
delta	I	2029-02-09T11:19:21.351		26.17	-24.76	48300.35	-3.84		
gamma	I	2029-02-09T11:22:16.046		25.85	-25.20	47629.76	-3.84		
eta	I	2029-02-09T11:24:14.339		25.64	-25.50	47176.12	-3.83		
beta	I	2029-02-09T11:30:45.707		24.91	-26.47	45678.16	-3.82		
alpha	I	2029-02-09T11:35:06.178		24.41	-27.11	44685.10	-3.82		
4	I	2029-02-09T11:44:24.014		23.29	-28.44	42556.57	-3.80		
5	I	2029-02-09T11:45:58.971		23.10	-28.66	42204.64	-3.80		
6	I	2029-02-09T11:47:39.046		22.89	-28.89	41812.58	-3.79		
Uranus	I	2029-02-09T13:01:01.357		12.33	-37.13	25123.20		9.59	10.03
Uranus	E	2029-02-09T16:53:35.719		-31.48x	-28.26	25426.20		-5.23	-5.47
6	E	2029-02-09T18:20:24.655		-49.24x	-14.25	41847.83	3.08		
5	E	2029-02-09T18:22:28.682		-49.67x	-13.88	42236.86	3.08		
4	E	2029-02-09T18:24:18.631		-50.04x	-13.55	42569.81	3.08		
alpha	E	2029-02-09T18:36:06.666		-52.43x	-11.42	44748.07	3.06		
beta	E	2029-02-09T18:41:01.157		-53.42x	-10.53	45648.59	3.06		
eta	E	2029-02-09T18:49:21.503		-55.10x	-8.99	47176.12	3.05		
gamma	E	2029-02-09T18:51:48.557		-55.59x	-8.53	47624.22	3.05		
delta	E	2029-02-09T18:55:30.700		-56.33x	-7.84	48300.35	3.04		
lambda	E	2029-02-09T19:04:59.315		-58.21x	-6.06	50026.71	3.03		
epsilon	E	2029-02-09T19:09:01.352		-59.01x	-5.30	50759.71	3.03		