

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2030-09-17T14:37:44.260
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 3416211146085463040
 2Mass ID (if available) : 05265561+2317391

Uranus 2030-09-17T14:37:44 K14.34 G18.81 PgtRgt

ICRS Star Coord at Epoch: 05h 26m 55.59919s +23:17:38.76439s

RUWE (>1.4 is poor) : 0.94
 K magnitude : 14.336
 G magnitude : 18.814
 RP magnitude : 17.578
 BP magnitude : 19.967
 DUPflag : 0
 Distance (au) : 19.111
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 5.35
 Sun-Target sep (deg) : 91.92
 Sun-Moon sep (deg) : 22.17
 B (ring opening deg) : 80.87
 PA of pole (deg) : 27.97

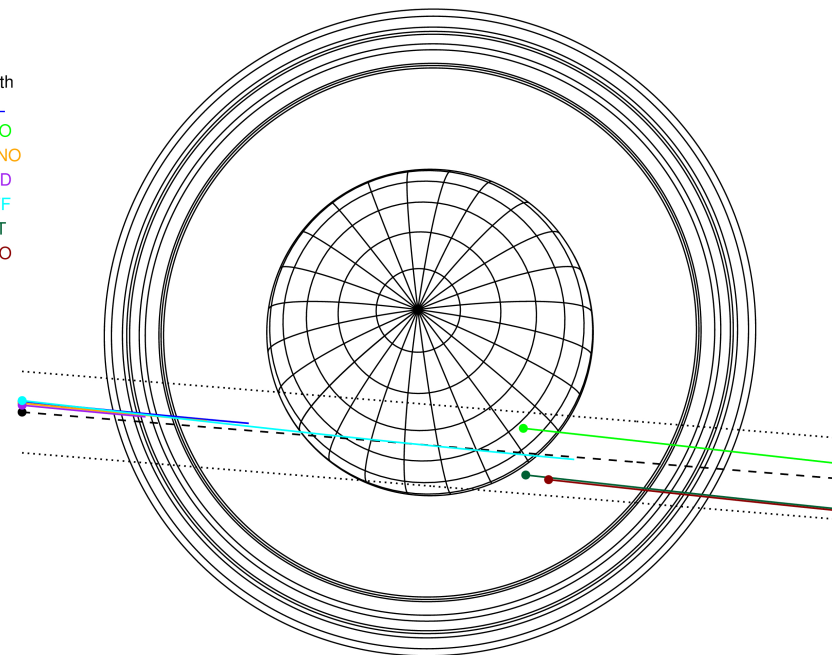
a(km) ring

- 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



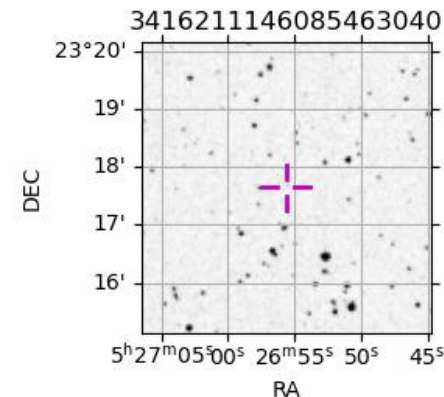
2030-09-17T14:37:44.2600 ra: 05 26 55.59922 cr: +23 17 38.764 C/A 1.268° PA 355.34 deg v_sky + 5.35 km/s D 19.11 AU
 Credit: Styled after SORA/Lucky Star

Earth
 PAL
 PMO
 KPNO
 MCD
 IRTF
 AAT
 MSO

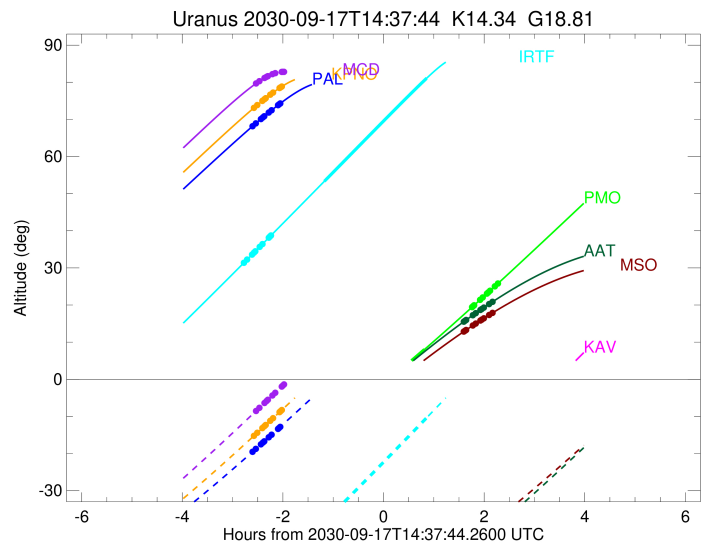
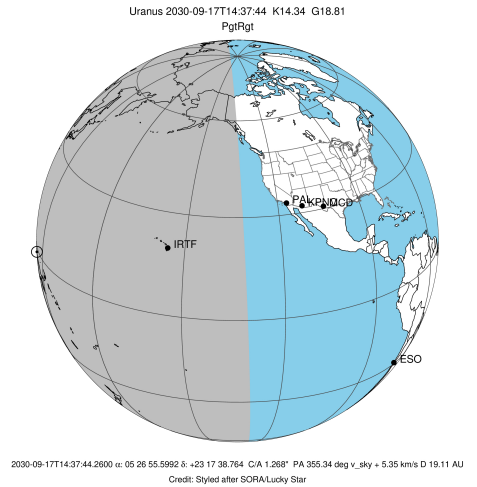


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

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	+++++			SEP 17 12:02 - SEP 17 12:34	PnnRin
PMO	Purple Mtn Obs. Nanki	32.1	118.8		+	+++++	SEP 17 15:26 - SEP 17 16:54	PneRne
KPNO	Kitt Peak Natl Obs	32.0	248.4	+++++			SEP 17 12:04 - SEP 17 12:36	PnnRin
MCD	McDonald Obs. 2.7m	30.7	256.0	+++++			SEP 17 12:06 - SEP 17 12:19	PnnRin
TEN	Teide Obs./Tenerife	28.3	343.5					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+++++	+	+	SEP 17 11:52 - SEP 17 15:29	PieRin
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 17 16:13 - SEP 17 16:47	PnnRne
SAAO	So. Afr. Astro. Obs.	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Observato	-35.3	149.0			+++++	SEP 17 16:13 - SEP 17 16:47	PnnRne

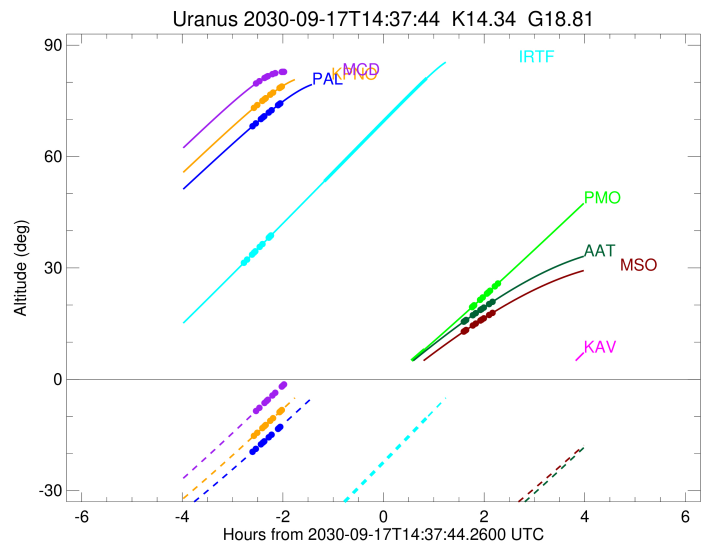
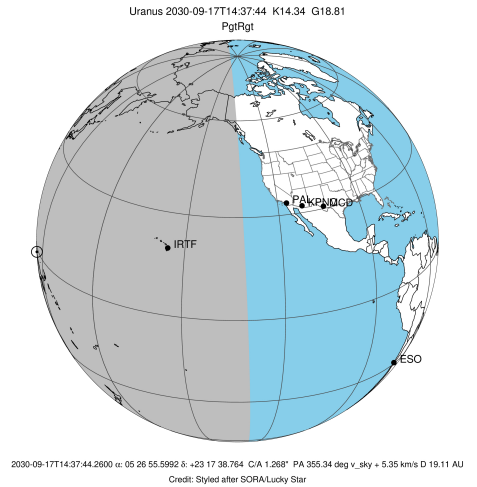


target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2030-09-17T14:43:27.570
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PAL
 Location : Palomar Mt (200")
 Latitude (deg) : 33.35622
 E. Longitude (deg) : 243.13601
 Altitude (km) : 1.706
 Gaia source ID : 3416211146085463040
 2Mass ID (if available) : 05265561+2317391
 ICRS Star Coord at Epoch: 05h 26m 55.59919s +23:17:38.76439s
 RUWE (>1.4 is poor) : 0.94
 K magnitude : 14.336
 G magnitude : 18.814
 RP magnitude : 17.578
 BP magnitude : 19.967
 DUPflag : 0
 Distance (au) : 19.111
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 5.35
 Sun-Target sep (deg) : 91.92
 Sun-Moon sep (deg) : 22.71
 B (ring opening deg) : 80.87
 PA of pole (deg) : 27.97
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.193
 C/A sky separation (km) : 16541.9
 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



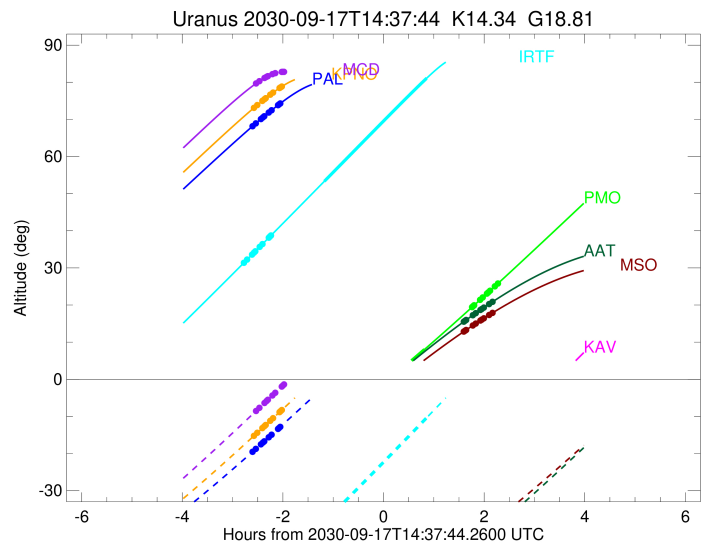
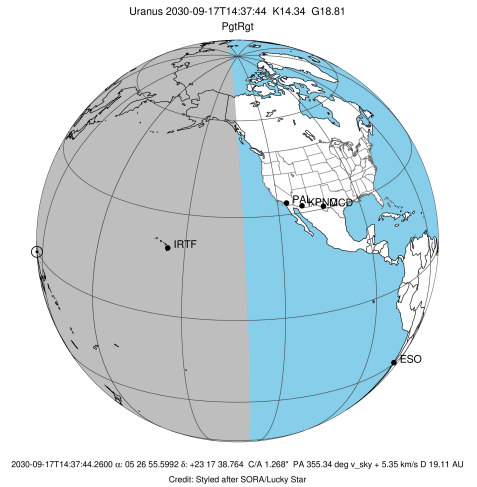
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2030-09-17T12:02:46.600		68.40	-19.29	50814.83	-4.76		
lambda	I	2030-09-17T12:05:32.056		68.94	-18.74	50026.71	-4.76		
delta	I	2030-09-17T12:11:35.990		70.11	-17.51	48300.35	-4.73		
gamma	I	2030-09-17T12:13:59.766		70.56	-17.03	47621.18	-4.72		
eta	I	2030-09-17T12:15:34.174		70.86	-16.71	47176.12	-4.71		
beta	I	2030-09-17T12:20:54.047		71.85	-15.63	45673.91	-4.68		
alpha	I	2030-09-17T12:24:25.467		72.50	-14.91	44686.12	-4.66		
4	I	2030-09-17T12:32:08.405		73.87	-13.33	42536.88	-4.62		
5	I	2030-09-17T12:33:31.372		74.11	-13.05	42154.84	-4.61		
6	I	2030-09-17T12:34:47.286		74.33	-12.79	41803.87	-4.60		
Uranus	I	2030-09-17T13:38:00.109		79.99	0.33x	25548.41		-1.22	-1.27
Uranus	E	2030-09-17T15:46:30.784		58.47	26.90x	25032.43		-8.75	-9.16
6	E	2030-09-17T16:50:35.074		45.08	39.28x	41840.99	4.62		
5	E	2030-09-17T16:52:12.438		44.74	39.57x	42291.78	4.63		
4	E	2030-09-17T16:53:21.730		44.49	39.78x	42616.40	4.64		
alpha	E	2030-09-17T17:00:55.384		42.91	41.15x	44735.25	4.69		
beta	E	2030-09-17T17:04:08.401		42.23	41.72x	45641.26	4.71		
eta	E	2030-09-17T17:09:33.464		41.10	42.68x	47176.12	4.74		
gamma	E	2030-09-17T17:11:09.434		40.76	42.96x	47631.13	4.75		
delta	E	2030-09-17T17:13:30.293		40.27	43.37x	48300.35	4.76		
lambda	E	2030-09-17T17:19:32.140		39.01	44.40x	50026.71	4.78		
epsilon	E	2030-09-17T17:23:51.796		38.11	45.14x	51271.61	4.79		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2030-09-17T14:22:01.140
 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 : 3416211146085463040
 2Mass ID (if available) : 05265561+2317391
 ICRS Star Coord at Epoch: 05h 26m 55.59919s +23:17:38.76439s
 RUWE (>1.4 is poor) : 0.94
 K magnitude : 14.336
 G magnitude : 18.814
 RP magnitude : 17.578
 BP magnitude : 19.967
 DUPflag : 0
 Distance (au) : 19.112
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 5.35
 Sun-Target sep (deg) : 91.92
 Sun-Moon sep (deg) : 21.50
 B (ring opening deg) : 80.87
 PA of pole (deg) : 27.97
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.964
 C/A sky separation (km) : 13358.8
 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



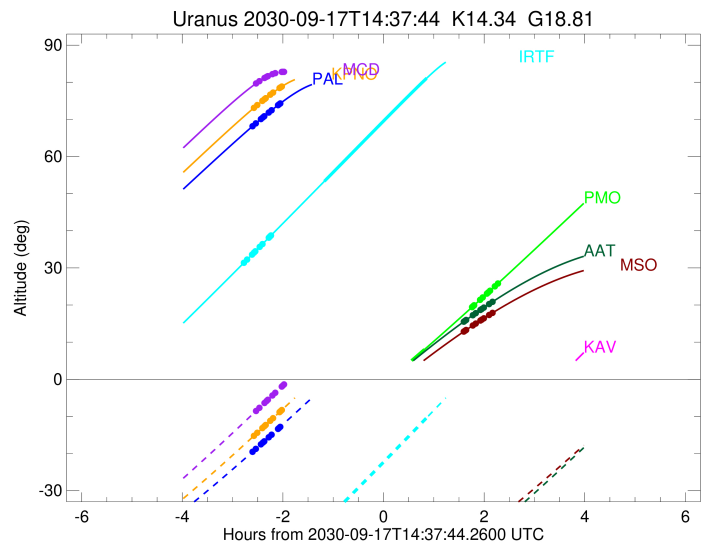
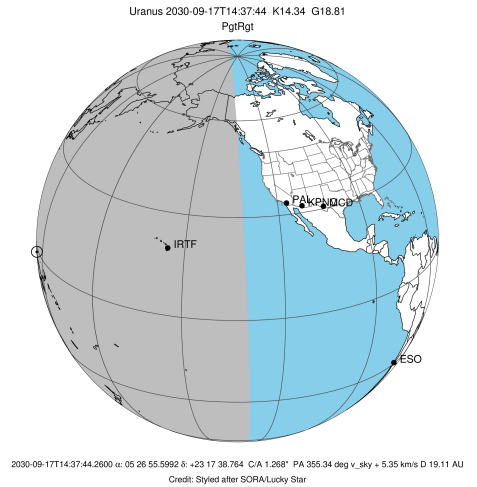
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2030-09-17T11:57:29.283	-26.66x	-23.53	50833.38	-5.56			
lambda	I	2030-09-17T11:59:54.238	-26.37x	-24.02	50026.71	-5.56			
delta	I	2030-09-17T12:05:05.346	-25.75x	-25.05	48300.35	-5.54			
gamma	I	2030-09-17T12:07:08.112	-25.50x	-25.46	47621.07	-5.53			
eta	I	2030-09-17T12:08:28.641	-25.33x	-25.73	47176.12	-5.52			
beta	I	2030-09-17T12:13:01.013	-24.76x	-26.63	45675.21	-5.50			
alpha	I	2030-09-17T12:16:00.980	-24.37x	-27.23	44687.14	-5.48			
4	I	2030-09-17T12:22:34.656	-23.51x	-28.52	42534.25	-5.45			
5	I	2030-09-17T12:23:44.472	-23.35x	-28.74	42155.05	-5.44			
6	I	2030-09-17T12:24:48.209	-23.21x	-28.95	41806.56	-5.43			
Uranus	I	2030-09-17T13:16:56.590	-15.47x	-38.70	25558.01			0.37	0.39
Uranus	E	2030-09-17T15:26:52.425	8.08	-55.19	25077.35			-8.35	-8.74
6	E	2030-09-17T16:23:21.085	19.43	-55.57	41842.82	5.00			
5	E	2030-09-17T16:24:51.161	19.73	-55.51	42294.12	5.01			
4	E	2030-09-17T16:25:54.977	19.95	-55.47	42616.52	5.01			
alpha	E	2030-09-17T16:32:57.180	21.40	-55.12	44736.31	5.02			
beta	E	2030-09-17T16:35:57.493	22.02	-54.95	45641.38	5.03			
eta	E	2030-09-17T16:41:02.697	23.06	-54.63	47176.12	5.03			
gamma	E	2030-09-17T16:42:33.113	23.38	-54.53	47631.19	5.03			
delta	E	2030-09-17T16:44:46.024	23.83	-54.38	48300.35	5.04			
lambda	E	2030-09-17T16:50:28.754	25.02	-53.94	50026.71	5.04			
epsilon	E	2030-09-17T16:54:37.616	25.88	-53.60	51280.79	5.03			

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2030-09-17T14:45:15.280
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : KPNO
 Location : Kitt Peak Natl Obs
 Latitude (deg) : 31.96333
 E. Longitude (deg) : 248.40000
 Altitude (km) : 2.120
 Gaia source ID : 3416211146085463040
 2Mass ID (if available) : 05265561+2317391
 ICRS Star Coord at Epoch: 05h 26m 55.59919s +23:17:38.76439s
 RUWE (>1.4 is poor) : 0.94
 K magnitude : 14.336
 G magnitude : 18.814
 RP magnitude : 17.578
 BP magnitude : 19.967
 DUPflag : 0
 Distance (au) : 19.111
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 5.35
 Sun-Target sep (deg) : 91.92
 Sun-Moon sep (deg) : 22.77
 B (ring opening deg) : 80.87
 PA of pole (deg) : 27.97
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.202
 C/A sky separation (km) : 16656.5
 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	2030-09-17T12:04:27.416		73.35	-14.98	50813.62	-4.74		
lambda	I	2030-09-17T12:07:13.460		73.87	-14.41	50026.71	-4.73		
delta	I	2030-09-17T12:13:19.226		75.00	-13.14	48300.35	-4.71		
gamma	I	2030-09-17T12:15:43.712		75.44	-12.63	47621.19	-4.69		
eta	I	2030-09-17T12:17:18.588		75.72	-12.30	47176.12	-4.69		
beta	I	2030-09-17T12:22:40.035		76.66	-11.18	45673.82	-4.66		
alpha	I	2030-09-17T12:26:12.460		77.26	-10.44	44686.06	-4.64		
4	I	2030-09-17T12:33:57.534		78.48	-8.81	42537.06	-4.60		
5	I	2030-09-17T12:35:20.920		78.69	-8.52	42154.85	-4.59		
6	I	2030-09-17T12:36:37.232		78.88	-8.25	41803.72	-4.58		
Uranus	I	2030-09-17T13:40:08.615		79.08	5.20x	25546.94		-1.30	-1.36
Uranus	E	2030-09-17T15:47:48.707		53.94	31.81x	25031.51		-8.76	-9.17
6	E	2030-09-17T16:51:46.687		40.32	44.02x	41840.98	4.64		
5	E	2030-09-17T16:53:23.671		39.98	44.31x	42291.77	4.65		
4	E	2030-09-17T16:54:32.688		39.73	44.51x	42616.40	4.66		
alpha	E	2030-09-17T17:02:04.456		38.14	45.83x	44735.25	4.71		
beta	E	2030-09-17T17:05:16.628		37.46	46.38x	45641.27	4.73		
eta	E	2030-09-17T17:10:40.217		36.32	47.30x	47176.12	4.76		
gamma	E	2030-09-17T17:12:15.739		35.98	47.57x	47631.13	4.77		
delta	E	2030-09-17T17:14:35.932		35.49	47.95x	48300.35	4.78		
lambda	E	2030-09-17T17:20:36.018		34.22	48.94x	50026.71	4.81		
epsilon	E	2030-09-17T17:24:54.399		33.31	49.63x	51271.76	4.82		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2030-09-17T14:47:44.150
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : MCD
 Location : McDonald Obs. 2.7m
 Latitude (deg) : 30.67158
 E. Longitude (deg) : 255.97844
 Altitude (km) : 2.075
 Gaia source ID : 3416211146085463040
 2Mass ID (if available) : 05265561+2317391
 ICRS Star Coord at Epoch: 05h 26m 55.59919s +23:17:38.76439s
 RUWE (>1.4 is poor) : 0.94
 K magnitude : 14.336
 G magnitude : 18.814
 RP magnitude : 17.578
 BP magnitude : 19.967
 DUPflag : 0
 Distance (au) : 19.111
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 5.35
 Sun-Target sep (deg) : 91.92
 Sun-Moon sep (deg) : 22.85
 B (ring opening deg) : 80.87
 PA of pole (deg) : 27.97
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.205
 C/A sky separation (km) : 16706.0
 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

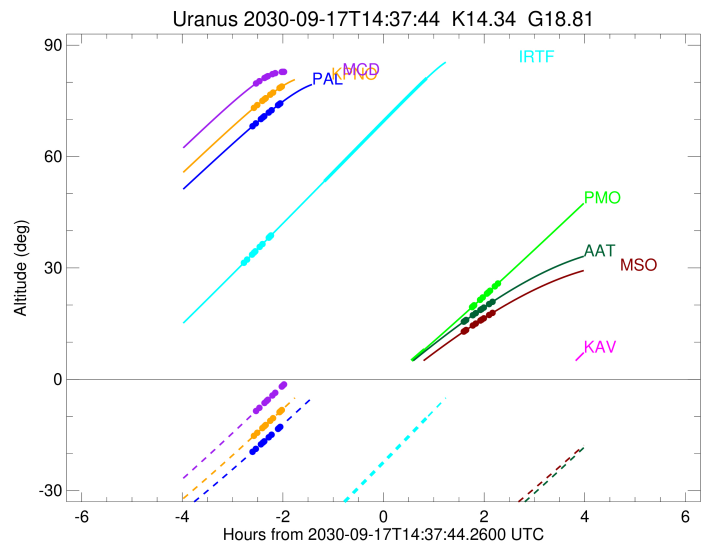
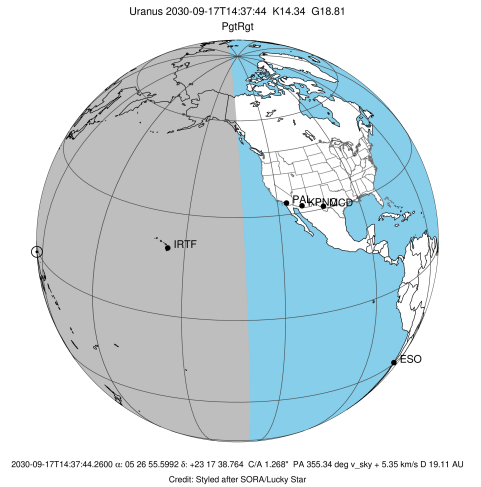


b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b? alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2030-09-17T12:06:59.354	79.88	-8.28	50812.37	-4.72		
lambda	I	2030-09-17T12:09:45.891	80.31	-7.68	50026.71	-4.71		
delta	I	2030-09-17T12:15:53.249	81.17	-6.37	48300.35	-4.69		
gamma	I	2030-09-17T12:18:18.336	81.47	-5.86	47621.20	-4.68		
eta	I	2030-09-17T12:19:53.600	81.66	-5.52	47176.12	-4.67		
beta	I	2030-09-17T12:25:16.329	82.20	-4.36x	45673.73	-4.64		
alpha	I	2030-09-17T12:28:49.539	82.47	-3.60x	44686.01	-4.62		
4	I	2030-09-17T12:36:36.193	82.80	-1.93x	42537.23	-4.58		
5	I	2030-09-17T12:37:59.885	82.81	-1.63x	42154.87	-4.57		
6	I	2030-09-17T12:39:16.490	82.81	-1.36x	41803.57	-4.56		
Uranus	I	2030-09-17T13:42:56.079	74.00	12.34x	25545.70		-1.36	-1.43
Uranus	E	2030-09-17T15:49:48.208	47.04	38.70x	25031.98		-8.75	-9.16
6	E	2030-09-17T16:53:20.362	33.40	50.27x	41841.09	4.68		
5	E	2030-09-17T16:54:56.540	33.05	50.54x	42291.91	4.69		
4	E	2030-09-17T16:56:04.956	32.81	50.72x	42616.41	4.70		
alpha	E	2030-09-17T17:03:32.886	31.22	51.91x	44735.33	4.75		
beta	E	2030-09-17T17:06:43.373	30.55	52.41x	45641.27	4.77		
eta	E	2030-09-17T17:12:04.105	29.42	53.22x	47176.12	4.80		
gamma	E	2030-09-17T17:13:38.776	29.08	53.45x	47631.13	4.81		
delta	E	2030-09-17T17:15:57.709	28.59	53.79x	48300.35	4.82		
lambda	E	2030-09-17T17:21:54.522	27.34	54.65x	50026.71	4.85		
epsilon	E	2030-09-17T17:26:10.725	26.43	55.23x	51272.76	4.86		

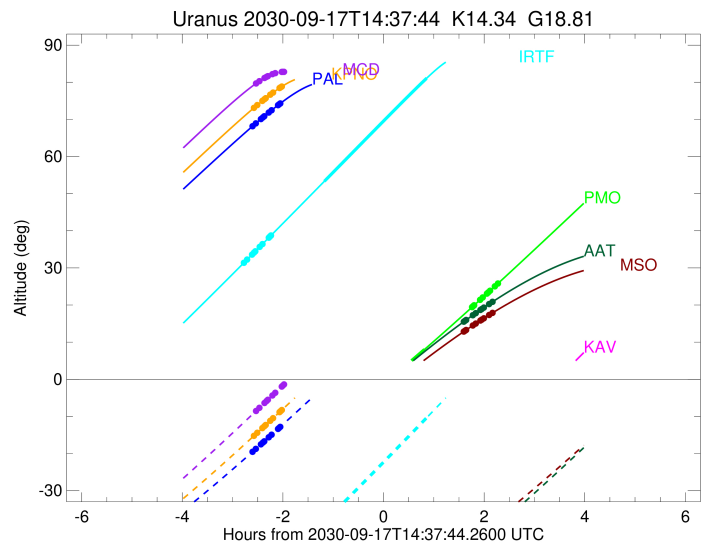
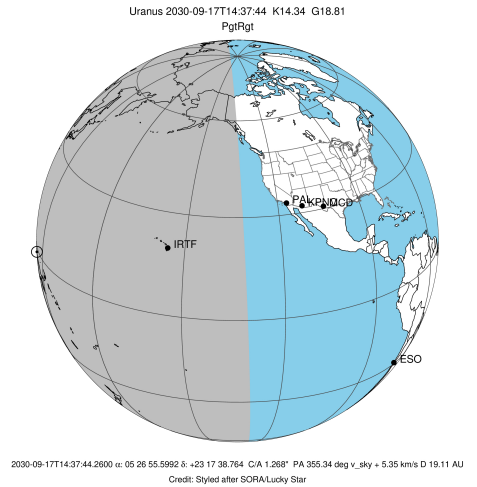

```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2030-09-17T14:29:01.960
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       : 3416211146085463040
2Mass ID (if available) : 05265561+2317391
ICRS Star Coord at Epoch: 05h 26m 55.59919s +23:17:38.76439s
RUWE (>1.4 is poor) : 0.94
K magnitude           : 14.336
G magnitude           : 18.814
RP magnitude          : 17.578
BP magnitude          : 19.967
DUPflag              : 0
Distance (au)         : 19.111
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s) : 5.35
Sun-Target sep (deg) : 91.92
Sun-Moon sep (deg)   : 22.20
B (ring opening deg) : 80.87
PA of pole (deg)     : 27.97
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 1.271
C/A sky separation (km) : 17619.2
NAIF SPICE kernels   : RAJobs_U111+rgf15.spk
URKALLvl1.spk
ural11.bsp
IAU_URANUS_for_RINGFIT.tpc
vgr2.ural11.bsp
ural161.bsp
vgr2.ural161.bsp
peph.ural160.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	2030-09-17T11:52:25.705		31.65	-57.87	50814.40	-4.90		
lambda	I	2030-09-17T11:55:06.577		32.25	-57.39	50026.71	-4.89		
delta	I	2030-09-17T12:01:01.097		33.60	-56.30	48300.35	-4.85		
gamma	I	2030-09-17T12:03:21.340		34.13	-55.86	47621.18	-4.83		
eta	I	2030-09-17T12:04:53.491		34.48	-55.57	47176.12	-4.82		
beta	I	2030-09-17T12:10:06.091		35.67	-54.57	45673.84	-4.79		
alpha	I	2030-09-17T12:13:33.014		36.45	-53.90	44686.07	-4.76		
4	I	2030-09-17T12:21:07.035		38.18	-52.41	42537.07	-4.70		
5	I	2030-09-17T12:22:28.594		38.49	-52.14	42154.85	-4.69		
6	I	2030-09-17T12:23:43.280		38.77	-51.89	41803.69	-4.68		
Uranus	I	2030-09-17T13:27:11.948		53.33	-38.36	25542.50		-1.52	-1.59
Uranus	E	2030-09-17T15:29:17.790		81.11	-10.34	25010.43		-8.94	-9.35
6	E	2030-09-17T16:36:59.642		81.53	5.56x	41838.79	4.40		
5	E	2030-09-17T16:38:41.826		81.17	5.96x	42288.79	4.41		
4	E	2030-09-17T16:39:55.091		80.91	6.25x	42616.14	4.42		
alpha	E	2030-09-17T16:47:51.314		79.19	8.12x	44733.77	4.46		
beta	E	2030-09-17T16:51:14.400		78.44	8.91x	45641.15	4.48		
eta	E	2030-09-17T16:56:56.016		77.17	10.25x	47176.12	4.51		
gamma	E	2030-09-17T16:58:36.865		76.80	10.65x	47631.02	4.51		
delta	E	2030-09-17T17:01:04.967		76.24	11.23x	48300.35	4.52		
lambda	E	2030-09-17T17:07:25.486		74.81	12.72x	50026.71	4.55		
epsilon	E	2030-09-17T17:11:54.780		73.80	13.77x	51253.89	4.55		

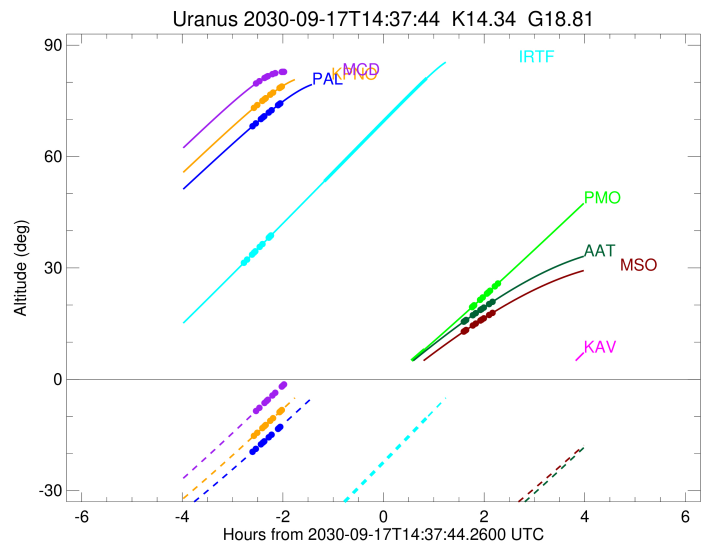
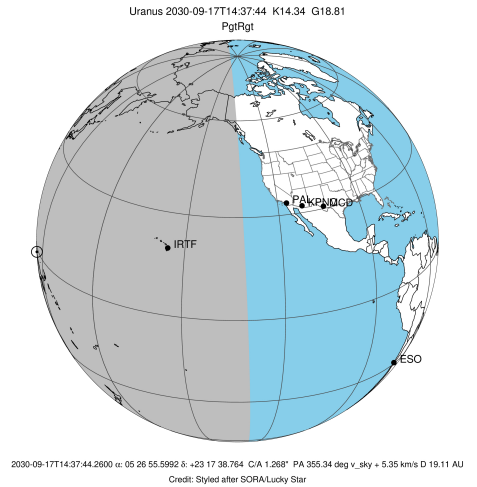
target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2030-09-17T14:18:14.220
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : AAT
 Location : Siding Spring (AAT)
 Latitude (deg) : -31.27703
 E. Longitude (deg) : 149.06608
 Altitude (km) : 1.164
 Gaia source ID : 3416211146085463040
 2Mass ID (if available) : 05265561+2317391
 ICRS Star Coord at Epoch: 05h 26m 55.59919s +23:17:38.76439s
 RUWE (>1.4 is poor) : 0.94
 K magnitude : 14.336
 G magnitude : 18.814
 RP magnitude : 17.578
 BP magnitude : 19.967
 DUPflag : 0
 Distance (au) : 19.112
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 5.35
 Sun-Target sep (deg) : 91.92
 Sun-Moon sep (deg) : 21.46
 B (ring opening deg) : 80.87
 PA of pole (deg) : 27.97
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.480
 C/A sky separation (km) : 20508.1
 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_itrff93_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	2030-09-17T11:56:42.517	-34.57x	-49.23	50800.76	-5.14		
lambda	I	2030-09-17T11:59:13.255	-34.03x	-49.64	50026.71	-5.12		
delta	I	2030-09-17T12:04:51.700	-32.84x	-50.56	48300.35	-5.08		
gamma	I	2030-09-17T12:07:05.739	-32.37x	-50.91	47621.30	-5.06		
eta	I	2030-09-17T12:08:33.910	-32.05x	-51.14	47176.12	-5.04		
beta	I	2030-09-17T12:13:33.540	-31.00x	-51.91	45672.72	-4.99		
alpha	I	2030-09-17T12:16:51.986	-30.30x	-52.42	44685.45	-4.96		
4	I	2030-09-17T12:24:08.326	-28.77x	-53.48	42539.41	-4.88		
5	I	2030-09-17T12:25:27.354	-28.49x	-53.67	42155.25	-4.86		
6	I	2030-09-17T12:26:40.063	-28.24x	-53.84	41801.78	-4.84		
Uranus	I	2030-09-17T13:31:13.320	-14.86x	-60.30	25495.07		-3.00	-3.14
Uranus	E	2030-09-17T15:03:22.696	3.18x	-57.13	24987.96		-9.13	-9.55
6	E	2030-09-17T16:13:28.844	15.51	-46.83	41834.71	4.43		
5	E	2030-09-17T16:15:10.148	15.79	-46.53	42282.88	4.44		
4	E	2030-09-17T16:16:23.800	15.98	-46.32	42615.35	4.46		
alpha	E	2030-09-17T16:24:15.563	17.25	-44.92	44730.97	4.51		
beta	E	2030-09-17T16:27:37.297	17.78	-44.31	45641.06	4.53		
eta	E	2030-09-17T16:33:15.447	18.66	-43.28	47176.12	4.55		
gamma	E	2030-09-17T16:34:55.188	18.92	-42.97	47630.80	4.56		
delta	E	2030-09-17T16:37:21.766	19.29	-42.52	48300.35	4.57		
lambda	E	2030-09-17T16:43:38.208	20.24	-41.34	50026.71	4.60		
epsilon	E	2030-09-17T16:47:57.610	20.89	-40.52	51221.49	4.60		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2030-09-17T14:18:58.340
 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 : 3416211146085463040
 2Mass ID (if available) : 05265561+2317391
 ICRS Star Coord at Epoch: 05h 26m 55.59919s +23:17:38.76439s
 RUWE (>1.4 is poor) : 0.94
 K magnitude : 14.336
 G magnitude : 18.814
 RP magnitude : 17.578
 BP magnitude : 19.967
 DUPflag : 0
 Distance (au) : 19.112
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 5.35
 Sun-Target sep (deg) : 91.92
 Sun-Moon sep (deg) : 21.48
 B (ring opening deg) : 80.87
 PA of pole (deg) : 27.97
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.505
 C/A sky separation (km) : 20860.5
 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	2030-09-17T11:57:47.016	-34.89x	-46.71	50798.95	-5.11		
lambda	I	2030-09-17T12:00:18.225	-34.37x	-47.08	50026.71	-5.10		
delta	I	2030-09-17T12:05:58.590	-33.22x	-47.91	48300.35	-5.05		
gamma	I	2030-09-17T12:08:13.411	-32.76x	-48.23	47621.31	-5.03		
eta	I	2030-09-17T12:09:42.113	-32.46x	-48.44	47176.12	-5.01		
beta	I	2030-09-17T12:14:43.620	-31.44x	-49.14	45672.56	-4.96		
alpha	I	2030-09-17T12:18:03.321	-30.76x	-49.58	44685.38	-4.93		
4	I	2030-09-17T12:25:22.562	-29.28x	-50.54	42539.76	-4.84		
5	I	2030-09-17T12:26:42.201	-29.01x	-50.70	42155.35	-4.82		
6	I	2030-09-17T12:27:55.534	-28.76x	-50.86	41801.53	-4.81		
Uranus	I	2030-09-17T13:33:30.143	-15.71x	-56.46	25485.49		-3.21	-3.37
Uranus	E	2030-09-17T15:02:26.303	0.97x	-53.74	24988.05		-9.13	-9.55
6	E	2030-09-17T16:13:25.556	12.83	-44.43	41834.35	4.42		
5	E	2030-09-17T16:15:07.196	13.10	-44.16	42282.34	4.43		
4	E	2030-09-17T16:16:21.177	13.29	-43.96	42615.26	4.44		
alpha	E	2030-09-17T16:24:14.284	14.48	-42.68	44730.73	4.49		
beta	E	2030-09-17T16:27:36.558	14.98	-42.12	45641.06	4.52		
eta	E	2030-09-17T16:33:15.400	15.82	-41.16	47176.12	4.55		
gamma	E	2030-09-17T16:34:55.315	16.06	-40.88	47630.78	4.55		
delta	E	2030-09-17T16:37:22.137	16.41	-40.46	48300.35	4.57		
lambda	E	2030-09-17T16:43:39.086	17.31	-39.37	50026.71	4.59		
epsilon	E	2030-09-17T16:47:58.210	17.91	-38.61	51218.98	4.59		