

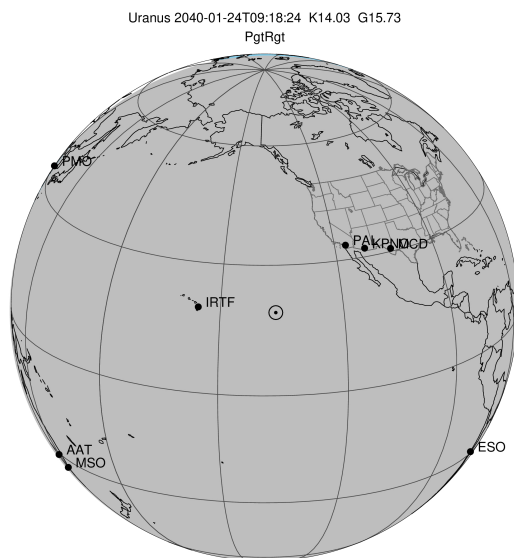
target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2040-01-24T09:18:24.070
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 675849976321519616
 2Mass ID (if available) : 08121165+2034508

Uranus 2040-01-24T09:18:24 K14.03 G15.73 PgtRgt

ICRS Star Coord at Epoch: 08h 12m 11.64571s +20:34:50.81767s

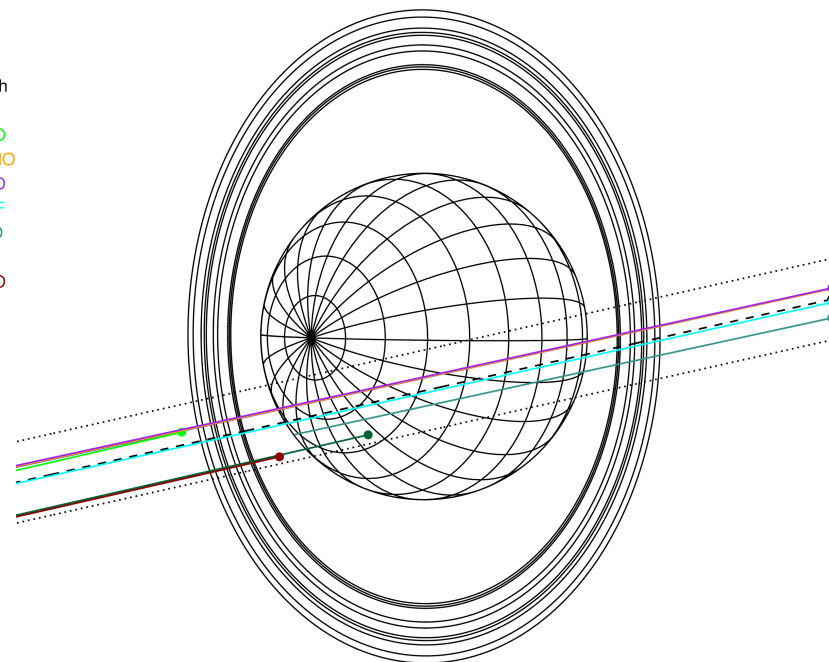
RUWE (>1.4 is poor) : 1.00
 K magnitude : 14.034
 G magnitude : 15.728
 RP magnitude : 15.173
 BP magnitude : 16.110
 DUPflag : 0
 Distance (au) : 17.605
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.20
 Sun-Target sep (deg) : 177.20
 Sun-Moon sep (deg) : 50.97
 B (ring opening deg) : 46.27
 PA of pole (deg) : 90.69

#	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



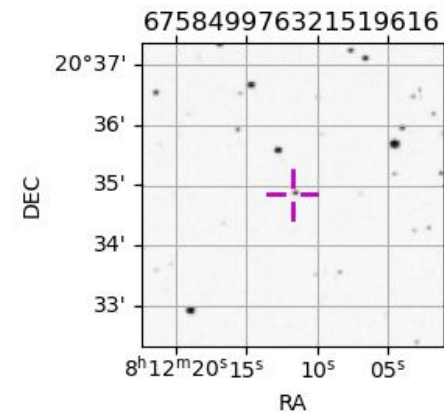
2040-01-24T09:18:24.0700 α: 08 12 11.6457 s; +20 34 50.818 C/A 0.641° PA 12.65 deg v_sky -23.20 km/s D 17.60 AU
 Credit: Styled after SORA/Lucky Star

Earth
 PAL
 PMO
 KPNO
 MCD
 IRTF
 ESO
 AAT
 MSO

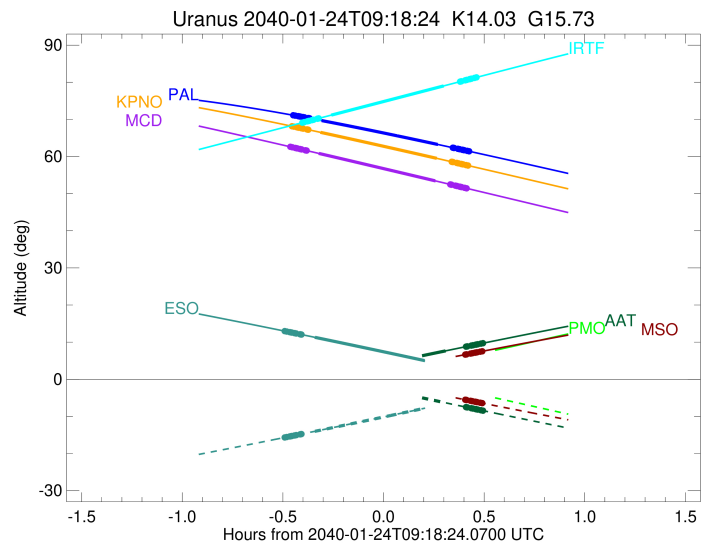
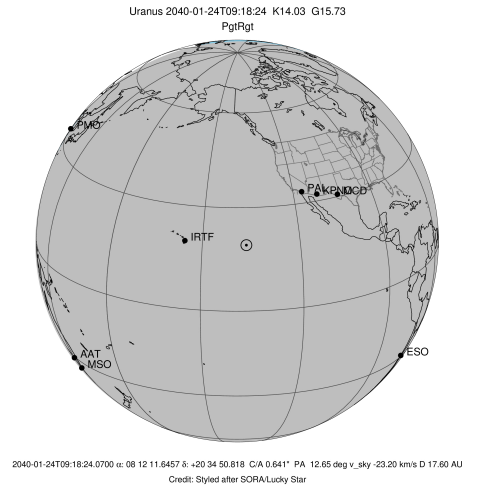


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

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	+++++	+ +	+++++	JAN 24 08:51 - JAN 24 09:43	PieRie
PMO	Purple Mtn Obs. Nanki	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+++++	+ +	+++++	JAN 24 08:50 - JAN 24 09:43	PieRie
MCD	McDonald Obs. 2.7m	30.7	256.0	+++++	+ +	+++++	JAN 24 08:50 - JAN 24 09:42	PieRie
TEN	Teide Obs./Tenerife	28.3	343.5					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+++++	+ +	+++++	JAN 24 08:54 - JAN 24 09:45	PieRie
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	+++++	+ +		JAN 24 08:48 - JAN 24 09:30	PieRin
AAT	Siding Spring (AAT)	-31.3	149.1		+	+++++	JAN 24 09:36 - JAN 24 09:47	PneRne
SAAO	So. Afr. Astro. Obs.	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Observato	-35.3	149.0			+++++	JAN 24 09:42 - JAN 24 09:47	PnnRne



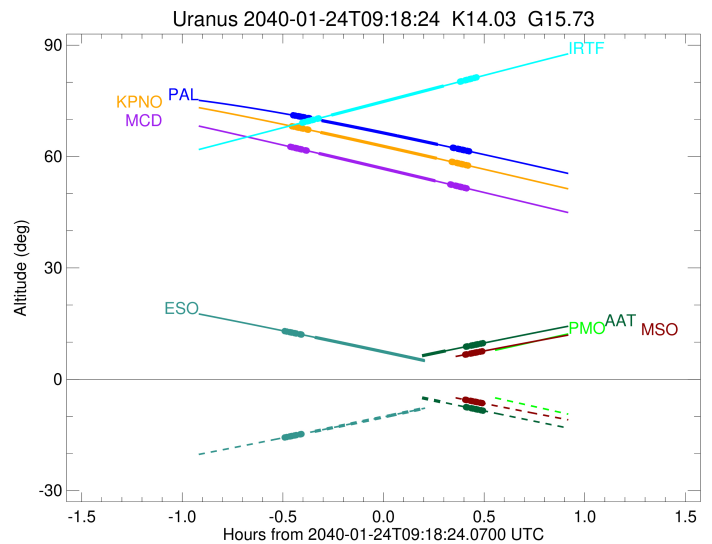
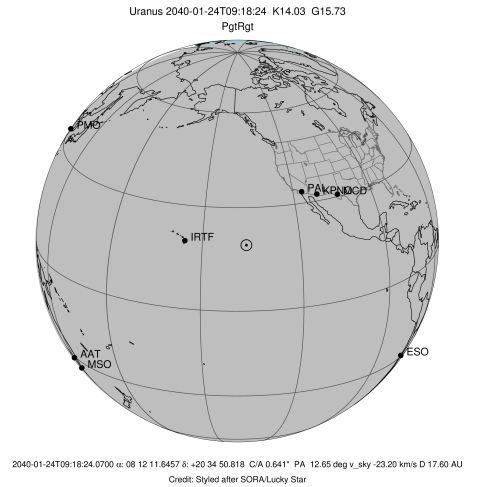
target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2040-01-24T09:17:15.780
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PAL
 Location : Palomar Mt (200")
 Latitude (deg) : 33.35622
 E. Longitude (deg) : 243.13601
 Altitude (km) : 1.706
 Gaia source ID : 675849976321519616
 2Mass ID (if available) : 08121165+2034508
 ICRS Star Coord at Epoch: 08h 12m 11.64571s +20:34:50.81767s
 RUWE (>1.4 is poor) : 1.00
 K magnitude : 14.034
 G magnitude : 15.728
 RP magnitude : 15.173
 BP magnitude : 16.110
 DUPflag : 0
 Distance (au) : 17.605
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.20
 Sun-Target sep (deg) : 177.20
 Sun-Moon sep (deg) : 51.77
 B (ring opening deg) : 46.27
 PA of pole (deg) : 90.69
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.497
 C/A sky separation (km) : 6348.3
 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	2040-01-24T08:51:19.542		71.15	-71.87	51471.82	-31.99		
lambda	I	2040-01-24T08:52:04.706		71.02	-71.77	50026.71	-31.99		
delta	I	2040-01-24T08:52:58.692		70.87	-71.64	48300.35	-31.97		
gamma	I	2040-01-24T08:53:19.881		70.81	-71.58	47623.07	-31.96		
eta	I	2040-01-24T08:53:33.868		70.77	-71.55	47176.12	-31.95		
beta	I	2040-01-24T08:54:21.516		70.64	-71.43	45655.85	-31.93		
alpha	I	2040-01-24T08:54:49.994		70.56	-71.36	44740.67	-31.92		
4	I	2040-01-24T08:55:59.669		70.37	-71.19	42538.99	-31.89		
5	I	2040-01-24T08:56:12.211		70.33	-71.16	42162.01	-31.89		
6	I	2040-01-24T08:56:20.924		70.31	-71.14	41802.80	-31.83		
Uranus	I	2040-01-24T08:59:57.391		69.69	-70.59	25255.45		-43.66	-44.97
Uranus	E	2040-01-24T09:34:37.278		63.25	-64.59	25313.03		38.34	39.63
6	E	2040-01-24T09:39:05.279		62.37	-63.76	41862.54	31.79		
5	E	2040-01-24T09:39:16.571		62.34	-63.72	42294.70	31.86		
4	E	2040-01-24T09:39:27.027		62.30	-63.69	42611.46	31.85		
alpha	E	2040-01-24T09:40:33.371		62.08	-63.48	44704.49	31.87		
beta	E	2040-01-24T09:41:03.651		61.98	-63.38	45671.58	31.89		
eta	E	2040-01-24T09:41:50.839		61.83	-63.23	47176.12	31.91		
gamma	E	2040-01-24T09:42:05.078		61.78	-63.19	47630.48	31.91		
delta	E	2040-01-24T09:42:26.066		61.71	-63.12	48300.35	31.92		
lambda	E	2040-01-24T09:43:20.132		61.53	-62.95	50026.71	31.94		
epsilon	E	2040-01-24T09:43:43.547		61.46	-62.88	50774.71	31.94		

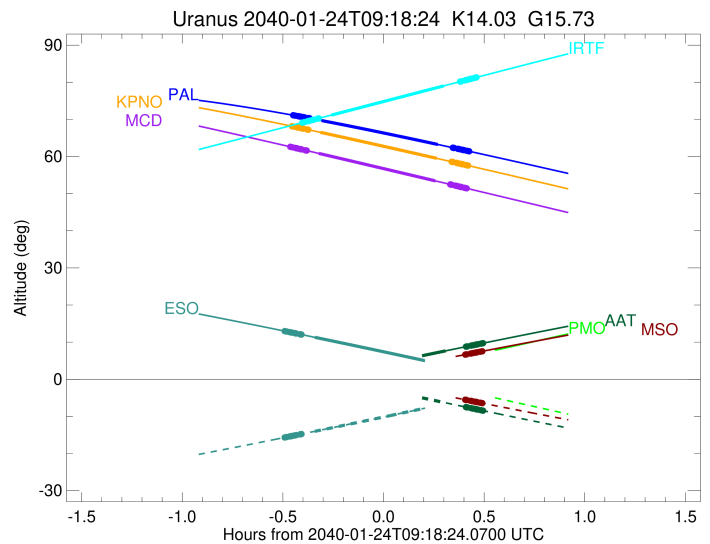
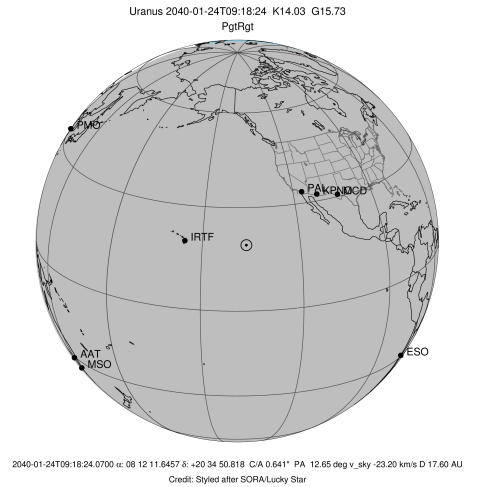
```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2040-01-24T09:16:55.140
Event type          : PgtRgt
: 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      : 675849976321519616
2Mass ID (if available) : 08121165+2034508
ICRS Star Coord at Epoch: 08h 12m 11.64571s +20:34:50.81767s
RUWE (>1.4 is poor) : 1.00
K magnitude          : 14.034
G magnitude          : 15.728
RP magnitude         : 15.173
BP magnitude         : 16.110
DUPflag             : 0
Distance (au)       : 17.605
f0 (km)             : 0.000
g0 (km)             : 0.000
skyplane vel. (km/s) : -23.20
Sun-Target sep (deg) : 177.20
Sun-Moon sep (deg)  : 51.79
B (ring opening deg) : 46.27
PA of pole (deg)    : 90.69
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 0.495
C/A sky separation (km) : 6317.6
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_itrfr93_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	2040-01-24T08:50:58.021		68.19	-69.41	51471.89	-31.98		
lambda	I	2040-01-24T08:51:43.197		68.05	-69.28	50026.71	-31.98		
delta	I	2040-01-24T08:52:37.194		67.87	-69.12	48300.35	-31.96		
gamma	I	2040-01-24T08:52:58.388		67.81	-69.06	47623.06	-31.95		
eta	I	2040-01-24T08:53:12.377		67.76	-69.01	47176.12	-31.95		
beta	I	2040-01-24T08:54:00.036		67.61	-68.87	45655.84	-31.93		
alpha	I	2040-01-24T08:54:28.519		67.52	-68.78	44740.66	-31.91		
4	I	2040-01-24T08:55:38.209		67.29	-68.57	42538.98	-31.89		
5	I	2040-01-24T08:55:50.753		67.25	-68.54	42162.03	-31.89		
6	I	2040-01-24T08:55:59.468		67.22	-68.51	41802.81	-31.82		
Uranus	I	2040-01-24T08:59:35.955		66.52	-67.85	25255.42		-43.66	-44.97
Uranus	E	2040-01-24T09:34:17.524		59.51	-61.11	25312.64		38.38	39.67
6	E	2040-01-24T09:38:45.295		58.58	-60.20	41862.58	31.78		
5	E	2040-01-24T09:38:56.592		58.55	-60.17	42294.76	31.84		
4	E	2040-01-24T09:39:07.051		58.51	-60.13	42611.44	31.84		
alpha	E	2040-01-24T09:40:13.428		58.28	-59.91	44704.46	31.86		
beta	E	2040-01-24T09:40:43.723		58.17	-59.80	45671.56	31.87		
eta	E	2040-01-24T09:41:30.936		58.01	-59.64	47176.12	31.89		
gamma	E	2040-01-24T09:41:45.182		57.96	-59.60	47630.47	31.90		
delta	E	2040-01-24T09:42:06.181		57.89	-59.52	48300.35	31.90		
lambda	E	2040-01-24T09:43:00.276		57.70	-59.34	50026.71	31.92		
epsilon	E	2040-01-24T09:43:23.708		57.62	-59.26	50774.84	31.92		

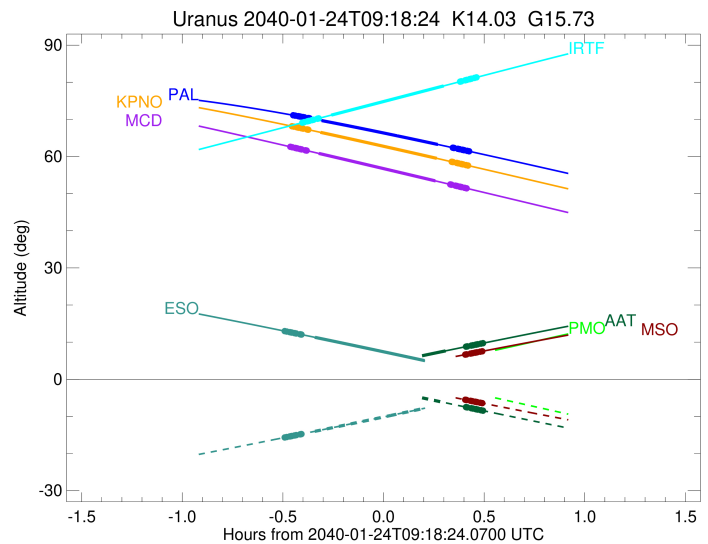
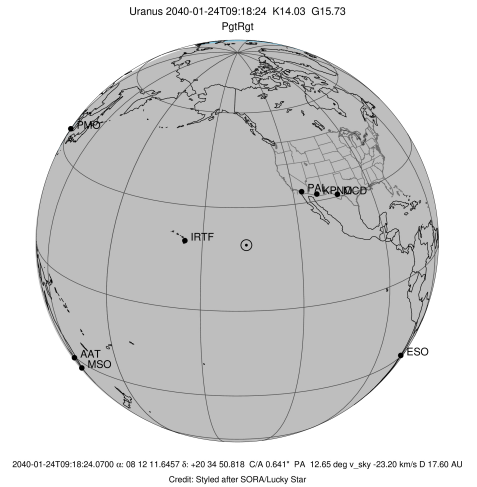
target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2040-01-24T09:16:27.960
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : MCD
 Location : McDonald Obs. 2.7m
 Latitude (deg) : 30.67158
 E. Longitude (deg) : 255.97844
 Altitude (km) : 2.075
 Gaia source ID : 675849976321519616
 2Mass ID (if available) : 08121165+2034508
 ICRS Star Coord at Epoch: 08h 12m 11.64571s +20:34:50.81767s
 RUWE (>1.4 is poor) : 1.00
 K magnitude : 14.034
 G magnitude : 15.728
 RP magnitude : 15.173
 BP magnitude : 16.110
 DUPflag : 0
 Distance (au) : 17.605
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.20
 Sun-Target sep (deg) : 177.20
 Sun-Moon sep (deg) : 51.81
 B (ring opening deg) : 46.27
 PA of pole (deg) : 90.69
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.484
 C/A sky separation (km) : 6182.4
 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



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2040-01-24T08:50:28.288		62.65	-64.26	51472.46	-31.96		
lambda	I	2040-01-24T08:51:13.502		62.50	-64.11	50026.71	-31.97		
delta	I	2040-01-24T08:52:07.522		62.31	-63.93	48300.35	-31.95		
gamma	I	2040-01-24T08:52:28.725		62.23	-63.85	47623.06	-31.94		
eta	I	2040-01-24T08:52:42.720		62.19	-63.81	47176.12	-31.93		
beta	I	2040-01-24T08:53:30.399		62.02	-63.64	45655.79	-31.91		
alpha	I	2040-01-24T08:53:58.896		61.92	-63.55	44740.59	-31.90		
4	I	2040-01-24T08:55:08.612		61.68	-63.31	42538.88	-31.88		
5	I	2040-01-24T08:55:21.152		61.63	-63.27	42162.12	-31.88		
6	I	2040-01-24T08:55:29.871		61.60	-63.24	41802.88	-31.81		
Uranus	I	2040-01-24T08:59:06.294		60.84	-62.50	25255.28		-43.67	-44.99
Uranus	E	2040-01-24T09:33:52.940		53.44	-55.23	25311.23		38.51	39.80
6	E	2040-01-24T09:38:19.623		52.48	-54.28	41862.70	31.75		
5	E	2040-01-24T09:38:30.924		52.44	-54.24	42294.95	31.82		
4	E	2040-01-24T09:38:41.385		52.41	-54.21	42611.37	31.82		
alpha	E	2040-01-24T09:39:47.812		52.17	-53.97	44704.35	31.83		
beta	E	2040-01-24T09:40:18.130		52.06	-53.86	45671.51	31.85		
eta	E	2040-01-24T09:41:05.384		51.89	-53.70	47176.12	31.86		
gamma	E	2040-01-24T09:41:19.642		51.84	-53.64	47630.46	31.87		
delta	E	2040-01-24T09:41:40.659		51.76	-53.57	48300.35	31.88		
lambda	E	2040-01-24T09:42:34.801		51.57	-53.38	50026.71	31.89		
epsilon	E	2040-01-24T09:42:58.269		51.49	-53.29	50775.32	31.89		

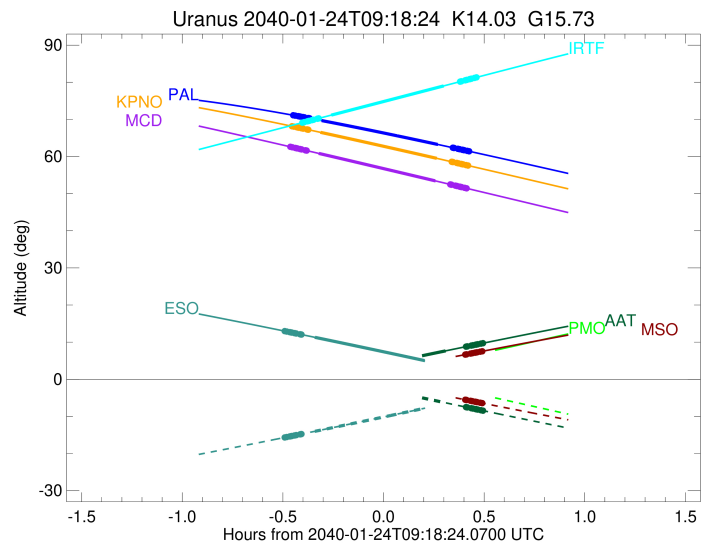
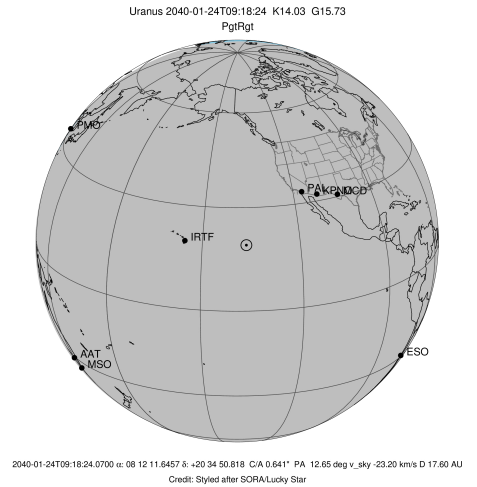
```

target                : Uranus
target radius (km)    : 25559.00
C/A epoch             : 2040-01-24T09:19:33.890
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       : 675849976321519616
2Mass ID (if available) : 08121165+2034508
ICRS Star Coord at Epoch: 08h 12m 11.64571s +20:34:50.81767s
RUWE (>1.4 is poor) : 1.00
K magnitude           : 14.034
G magnitude           : 15.728
RP magnitude          : 15.173
BP magnitude          : 16.110
DUPflag              : 0
Distance (au)         : 17.605
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s) : -23.20
Sun-Target sep (deg) : 177.20
Sun-Moon sep (deg)   : 51.51
B (ring opening deg) : 46.27
PA of pole (deg)     : 90.69
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 0.679
C/A sky separation (km) : 8667.9
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
    
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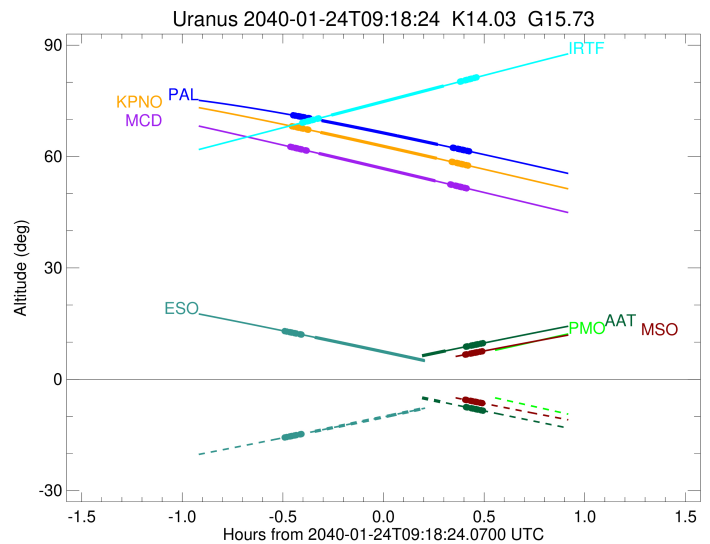
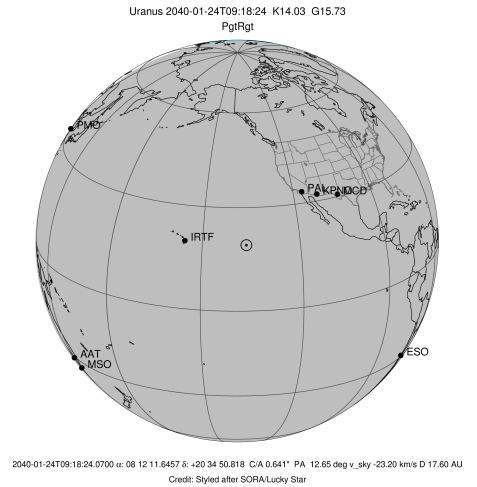
Ring	I/E	UTC	b? alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2040-01-24T08:54:02.579	69.09	-66.52	51460.69	-31.81		
lambda	I	2040-01-24T08:54:47.632	69.27	-66.69	50026.71	-31.81		
delta	I	2040-01-24T08:55:41.927	69.48	-66.91	48300.35	-31.78		
gamma	I	2040-01-24T08:56:03.240	69.56	-66.99	47623.27	-31.76		
eta	I	2040-01-24T08:56:17.320	69.62	-67.04	47176.12	-31.75		
beta	I	2040-01-24T08:57:05.259	69.81	-67.23	45656.82	-31.72		
alpha	I	2040-01-24T08:57:33.905	69.92	-67.34	44741.95	-31.69		
4	I	2040-01-24T08:58:44.092	70.19	-67.62	42540.74	-31.64		
5	I	2040-01-24T08:58:56.872	70.24	-67.67	42160.32	-31.63		
6	I	2040-01-24T08:59:05.645	70.28	-67.70	41801.49	-31.56		
Uranus	I	2040-01-24T09:02:48.920	71.15	-68.58	25260.78		-43.17	-44.48
Uranus	E	2040-01-24T09:36:22.096	79.03	-76.47	25338.25		35.96	37.23
6	E	2040-01-24T09:41:15.301	80.18	-77.62	41860.48	31.59		
5	E	2040-01-24T09:41:26.730	80.22	-77.66	42291.45	31.66		
4	E	2040-01-24T09:41:37.338	80.27	-77.71	42612.61	31.67		
alpha	E	2040-01-24T09:42:44.049	80.53	-77.97	44706.22	31.72		
beta	E	2040-01-24T09:43:14.475	80.65	-78.09	45672.50	31.74		
eta	E	2040-01-24T09:44:01.830	80.83	-78.27	47176.12	31.78		
gamma	E	2040-01-24T09:44:16.129	80.89	-78.33	47630.64	31.79		
delta	E	2040-01-24T09:44:37.189	80.97	-78.41	48300.35	31.81		
lambda	E	2040-01-24T09:45:31.431	81.18	-78.62	50026.71	31.85		
epsilon	E	2040-01-24T09:45:54.690	81.27	-78.72	50767.56	31.85		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2040-01-24T09:14:15.890
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : ESO
 Location : European Southern Obs. (3.6m)
 Latitude (deg) : -29.26097
 E. Longitude (deg) : 289.26831
 Altitude (km) : 2.400
 Gaia source ID : 675849976321519616
 2Mass ID (if available) : 08121165+2034508
 ICRS Star Coord at Epoch: 08h 12m 11.64571s +20:34:50.81767s
 RUWE (>1.4 is poor) : 1.00
 K magnitude : 14.034
 G magnitude : 15.728
 RP magnitude : 15.173
 BP magnitude : 16.110
 DUPflag : 0
 Distance (au) : 17.605
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.20
 Sun-Target sep (deg) : 177.20
 Sun-Moon sep (deg) : 51.58
 B (ring opening deg) : 46.27
 PA of pole (deg) : 90.69
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.839
 C/A sky separation (km) : 10710.4
 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



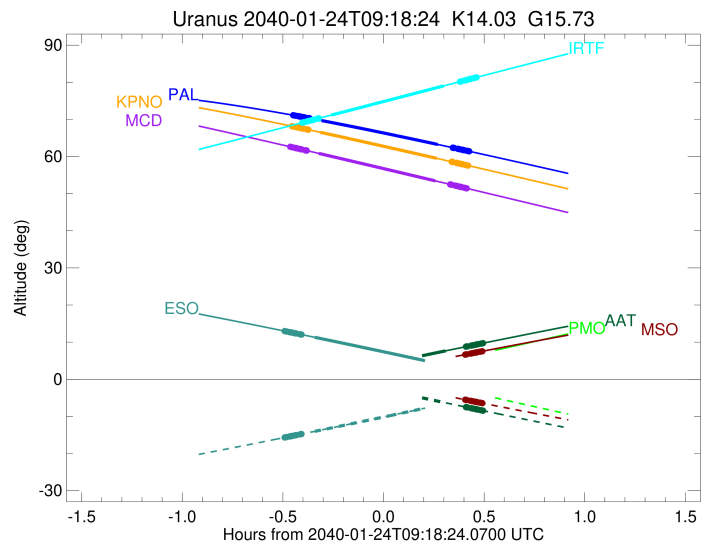
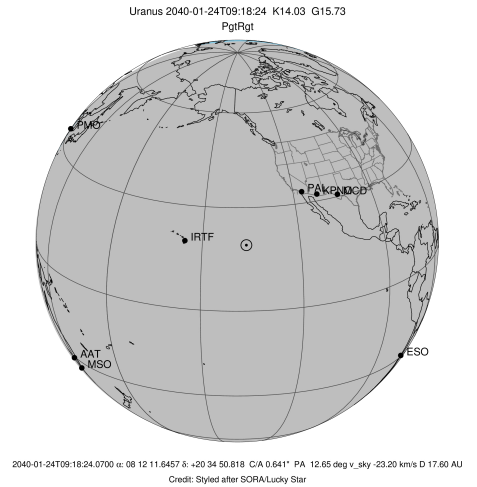
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2040-01-24T08:48:48.105		13.00	-15.70	51448.70	-31.25		
lambda	I	2040-01-24T08:49:33.592		12.86	-15.56	50026.71	-31.24		
delta	I	2040-01-24T08:50:28.905		12.69	-15.39	48300.35	-31.18		
gamma	I	2040-01-24T08:50:50.621		12.62	-15.33	47623.48	-31.16		
eta	I	2040-01-24T08:51:04.984		12.57	-15.28	47176.12	-31.14		
beta	I	2040-01-24T08:51:53.856		12.42	-15.13	45657.80	-31.08		
alpha	I	2040-01-24T08:52:23.066		12.33	-15.05	44743.16	-31.04		
4	I	2040-01-24T08:53:34.730		12.11	-14.83	42542.57	-30.95		
5	I	2040-01-24T08:53:47.924		12.07	-14.79	42158.87	-30.93		
6	I	2040-01-24T08:53:56.901		12.04	-14.76	41800.29	-30.86		
Uranus	I	2040-01-24T08:57:54.874		11.30	-14.02	25271.01		-42.23	-43.54
Uranus	E	2040-01-24T09:30:42.339		5.02	-7.80	25361.39		33.73	34.96
6	E	2040-01-24T09:36:06.490		3.96x	-6.74	41858.76	30.77		
5	E	2040-01-24T09:36:18.281		3.92x	-6.71	42288.70	30.84		
4	E	2040-01-24T09:36:29.240		3.89x	-6.67	42613.43	30.86		
alpha	E	2040-01-24T09:37:37.662		3.66x	-6.45	44707.63	30.94		
beta	E	2040-01-24T09:38:08.841		3.56x	-6.34	45673.20	30.98		
eta	E	2040-01-24T09:38:57.320		3.40x	-6.19	47176.12	31.04		
gamma	E	2040-01-24T09:39:11.966		3.35x	-6.14	47630.76	31.05		
delta	E	2040-01-24T09:39:33.522		3.28x	-6.07	48300.35	31.07		
lambda	E	2040-01-24T09:40:29.029		3.10x	-5.89	50026.71	31.13		
epsilon	E	2040-01-24T09:40:52.662		3.02x	-5.81	50762.60	31.13		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2040-01-24T09:21:22.800
 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 : 675849976321519616
 2Mass ID (if available) : 08121165+2034508
 ICRS Star Coord at Epoch: 08h 12m 11.64571s +20:34:50.81767s
 RUWE (>1.4 is poor) : 1.00
 K magnitude : 14.034
 G magnitude : 15.728
 RP magnitude : 15.173
 BP magnitude : 16.110
 DUPflag : 0
 Distance (au) : 17.605
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.20
 Sun-Target sep (deg) : 177.20
 Sun-Moon sep (deg) : 50.64
 B (ring opening deg) : 46.27
 PA of pole (deg) : 90.69
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.023
 C/A sky separation (km) : 13062.8
 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	2040-01-24T08:56:23.594	-0.11x	1.56x	51437.59	-30.78			
lambda	I	2040-01-24T08:57:09.408	0.03x	1.41x	50026.71	-30.76			
delta	I	2040-01-24T08:58:05.598	0.22x	1.22x	48300.35	-30.68			
gamma	I	2040-01-24T08:58:27.665	0.29x	1.15x	47623.68	-30.65			
eta	I	2040-01-24T08:58:42.275	0.34x	1.10x	47176.12	-30.62			
beta	I	2040-01-24T08:59:31.968	0.50x	0.94x	45658.72	-30.54			
alpha	I	2040-01-24T09:00:01.682	0.60x	0.84x	44744.24	-30.48			
4	I	2040-01-24T09:01:14.679	0.83x	0.60x	42544.37	-30.34			
5	I	2040-01-24T09:01:28.254	0.88x	0.55x	42157.68	-30.32			
6	I	2040-01-24T09:01:37.438	0.91x	0.52x	41799.26	-30.23			
Uranus	I	2040-01-24T09:05:55.074	1.74x	-0.33x	25286.04	-40.85		-42.15	
Uranus	E	2040-01-24T09:36:55.065	7.65	-6.34	25395.71	30.28		31.44	
6	E	2040-01-24T09:43:01.049	8.79	-7.50	41856.23	30.32			
5	E	2040-01-24T09:43:13.107	8.82	-7.54	42284.60	30.41			
4	E	2040-01-24T09:43:24.326	8.86	-7.58	42614.44	30.44			
alpha	E	2040-01-24T09:44:33.638	9.07	-7.79	44709.68	30.58			
beta	E	2040-01-24T09:45:05.173	9.17	-7.89	45674.18	30.64			
eta	E	2040-01-24T09:45:54.130	9.32	-8.05	47176.12	30.72			
gamma	E	2040-01-24T09:46:08.927	9.36	-8.09	47630.92	30.75			
delta	E	2040-01-24T09:46:30.684	9.43	-8.16	48300.35	30.79			
lambda	E	2040-01-24T09:47:26.679	9.60	-8.34	50026.71	30.87			
epsilon	E	2040-01-24T09:47:50.299	9.68	-8.41	50756.33	30.89			

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2040-01-24T09:21:10.140
 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 : 675849976321519616
 2Mass ID (if available) : 08121165+2034508
 ICRS Star Coord at Epoch: 08h 12m 11.64571s +20:34:50.81767s
 RUWE (>1.4 is poor) : 1.00
 K magnitude : 14.034
 G magnitude : 15.728
 RP magnitude : 15.173
 BP magnitude : 16.110
 DUPflag : 0
 Distance (au) : 17.605
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.20
 Sun-Target sep (deg) : 177.20
 Sun-Moon sep (deg) : 50.64
 B (ring opening deg) : 46.27
 PA of pole (deg) : 90.69
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.043
 C/A sky separation (km) : 13323.0
 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	2040-01-24T08:56:13.870	-1.83x	3.12x	51436.02	-30.73			
lambda	I	2040-01-24T08:56:59.712	-1.68x	2.97x	50026.71	-30.71			
delta	I	2040-01-24T08:57:56.003	-1.51x	2.80x	48300.35	-30.62			
gamma	I	2040-01-24T08:58:18.111	-1.44x	2.73x	47623.71	-30.59			
eta	I	2040-01-24T08:58:32.750	-1.39x	2.68x	47176.12	-30.56			
beta	I	2040-01-24T08:59:22.539	-1.24x	2.52x	45658.84	-30.48			
alpha	I	2040-01-24T08:59:52.313	-1.15x	2.43x	44744.37	-30.41			
4	I	2040-01-24T09:01:05.471	-0.92x	2.20x	42544.62	-30.27			
5	I	2040-01-24T09:01:19.092	-0.88x	2.15x	42157.54	-30.24			
6	I	2040-01-24T09:01:28.304	-0.85x	2.12x	41799.13	-30.16			
Uranus	I	2040-01-24T09:05:48.844	-0.04x	1.30x	25288.32			-40.64	-41.94
Uranus	E	2040-01-24T09:36:36.141	5.55	-4.40x	25399.27			29.91	31.07
6	E	2040-01-24T09:42:47.141	6.65	-5.52	41855.99	30.24			
5	E	2040-01-24T09:42:59.240	6.68	-5.56	42284.19	30.33			
4	E	2040-01-24T09:43:10.498	6.72	-5.59	42614.52	30.36			
alpha	E	2040-01-24T09:44:19.978	6.92	-5.80	44709.88	30.51			
beta	E	2040-01-24T09:44:51.583	7.01	-5.89	45674.27	30.57			
eta	E	2040-01-24T09:45:40.642	7.16	-6.04	47176.12	30.66			
gamma	E	2040-01-24T09:45:55.470	7.20	-6.08	47630.94	30.69			
delta	E	2040-01-24T09:46:17.271	7.26	-6.15	48300.35	30.72			
lambda	E	2040-01-24T09:47:13.376	7.43	-6.32	50026.71	30.81			
epsilon	E	2040-01-24T09:47:37.023	7.50	-6.39	50755.81	30.83			