

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2029-12-06T07:52:09.190
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 3412513905092383232
 2Mass ID (if available) : 04595680+2245031

Uranus 2029-12-06T07:52:09 K12.46 G14.50 PgtRgt

ICRS Star Coord at Epoch: 04h 59m 56.83211s +22:45:03.04058s

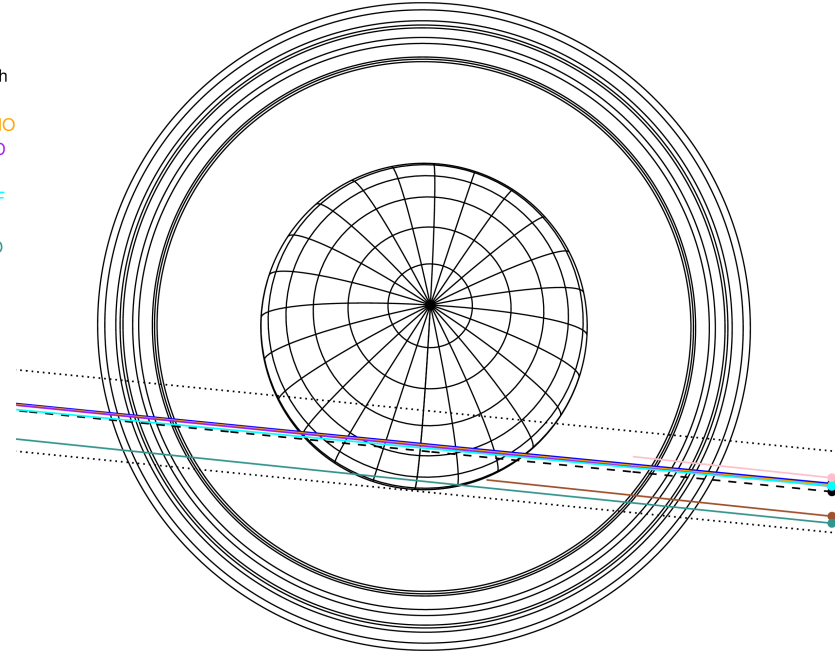
RUWE (>1.4 is poor) : 0.99
 K magnitude : 12.458
 G magnitude : 14.500
 RP magnitude : 13.822
 BP magnitude : 15.003
 DUPflag : 0
 Distance (au) : 18.240
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.45
 Sun-Target sep (deg) : 177.88
 Sun-Moon sep (deg) : 172.31
 B (ring opening deg) : 82.11
 PA of pole (deg) : -16.57

Uranus 2029-12-06T07:52:09 K12.46 G14.50
 PgtRgt



2029-12-06T07:52:09.1900 α: 04 59 56.83211 δ: +22 45 03.041 C/A 1.462° PA 354.31 deg v_sky -23.45 km/s D 18.24 AU
 Credit: Styled after SORA/Lucky Star

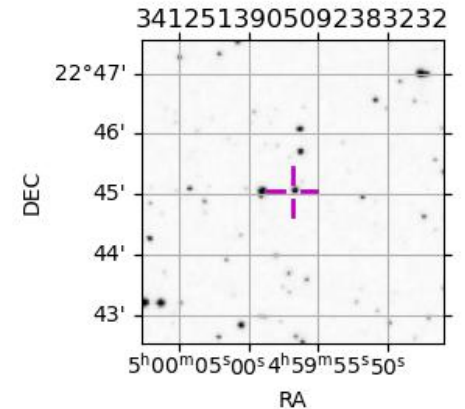
Earth
 PAL
 KPNO
 MCD
 TEN
 IRTF
 RIO
 ESO



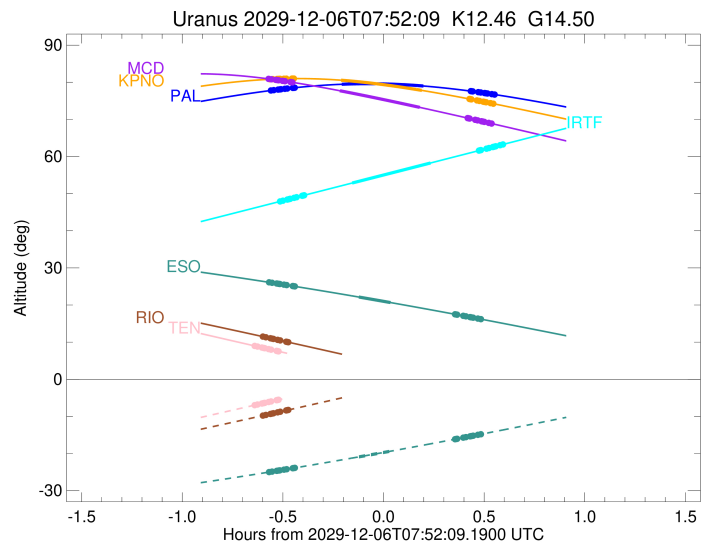
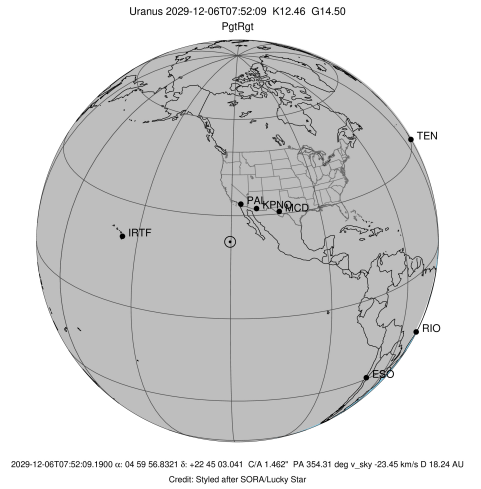
#	a(km)	ring
1	41837.2	6
2	42235.0	5
3	42571.2	4
4	44718.5	alpha
5	45661.1	beta
6	47176.1	eta
7	47626.3	gamma
8	48300.3	delta
9	50026.7	lambda
10	51149.4	epsilon

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	+++++	+ +	+++++	DEC 06 07:18 - DEC 06 08:24	PieRie
PNO	Purple Mtn Obs. Nanki	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+++++	+ +	+++++	DEC 06 07:18 - DEC 06 08:24	PieRie
MCD	McDonald Obs. 2.7m	30.7	256.0	+++++	+ +	+++++	DEC 06 07:17 - DEC 06 08:24	PieRie
TEN	Teide Obs./Tenerife	28.3	343.5	+++++			DEC 06 07:13 - DEC 06 07:20	PnnRin
IRTF	Mauna Kea/IRTF	19.8	204.5	+++++	+ +	+++++	DEC 06 07:21 - DEC 06 08:27	PieRie
KAV	Kavalur Observatory	12.6	78.8					PnnRnn
RIO	Rio de Janeiro	-22.9	316.8	+++++			DEC 06 07:16 - DEC 06 07:23	PnnRin
ESO	European Southern Obs	-29.3	289.3	+++++	+ +	+++++	DEC 06 07:17 - DEC 06 08:20	PieRie
AAT	Siding Spring (AAT)	-31.3	149.1					PnnRnn
SAAO	So. Afr. Astro. Obs.	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Observato	-35.3	149.0					PnnRnn

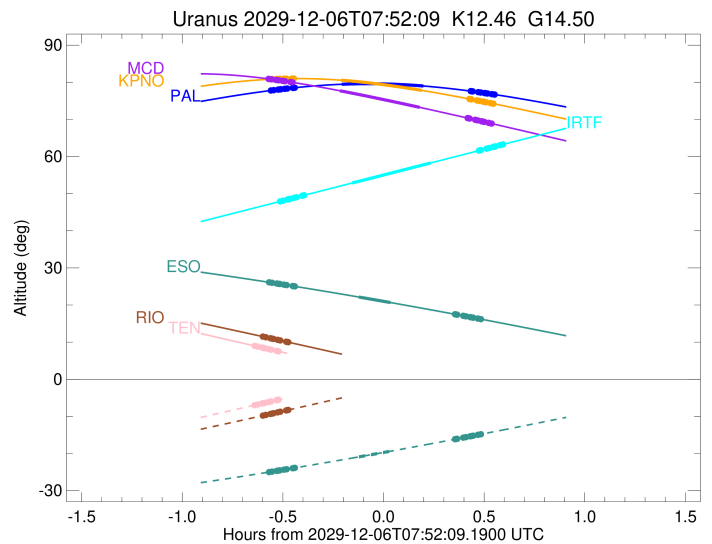
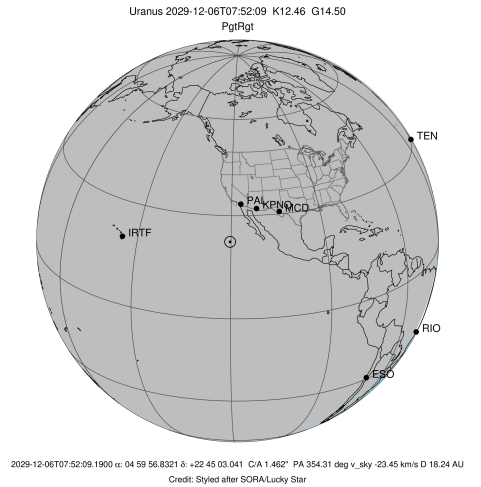


target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2029-12-06T07:51:59.070
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PAL
 Location : Palomar Mt (200")
 Latitude (deg) : 33.35622
 E. Longitude (deg) : 243.13601
 Altitude (km) : 1.706
 Gaia source ID : 3412513905092383232
 2Mass ID (if available) : 04595680+2245031
 ICRS Star Coord at Epoch: 04h 59m 56.83211s +22:45:03.04058s
 RUWE (>1.4 is poor) : 0.99
 K magnitude : 12.458
 G magnitude : 14.500
 RP magnitude : 13.822
 BP magnitude : 15.003
 DUPflag : 0
 Distance (au) : 18.240
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.45
 Sun-Target sep (deg) : 177.88
 Sun-Moon sep (deg) : 172.40
 B (ring opening deg) : 82.11
 PA of pole (deg) : -16.57
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.382
 C/A sky separation (km) : 18286.6
 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	2029-12-06T07:18:22.808		77.77	-78.46	51439.87	-22.19		
lambda	I	2029-12-06T07:19:26.477		77.89	-78.55	50026.71	-22.15		
delta	I	2029-12-06T07:20:44.645		78.03	-78.65	48300.35	-22.02		
gamma	I	2029-12-06T07:21:15.396		78.09	-78.69	47624.04	-21.97		
eta	I	2029-12-06T07:21:35.805		78.13	-78.72	47176.12	-21.93		
beta	I	2029-12-06T07:22:44.463		78.25	-78.80	45674.97	-21.80		
alpha	I	2029-12-06T07:23:29.894		78.32	-78.85	44687.03	-21.70		
4	I	2029-12-06T07:25:05.874		78.48	-78.95	42615.03	-21.48		
5	I	2029-12-06T07:25:19.773		78.50	-78.96	42315.05	-21.44		
6	I	2029-12-06T07:25:40.316		78.54	-78.98	41877.60	-21.38		
Uranus	I	2029-12-06T07:39:41.574		79.47	-79.35	25364.03		-4.53	-4.75
Uranus	E	2029-12-06T08:04:03.234		79.00	-77.96	25145.11		-6.66	-6.97
6	E	2029-12-06T08:18:08.745		77.62	-76.23	41801.99	21.39		
5	E	2029-12-06T08:18:26.422		77.59	-76.19	42180.91	21.44		
4	E	2029-12-06T08:18:43.786		77.55	-76.15	42552.91	21.48		
alpha	E	2029-12-06T08:20:24.620		77.34	-75.91	44729.85	21.70		
beta	E	2029-12-06T08:21:07.514		77.25	-75.81	45662.55	21.80		
eta	E	2029-12-06T08:22:16.750		77.10	-75.64	47176.12	21.93		
gamma	E	2029-12-06T08:22:37.486		77.06	-75.59	47631.27	21.97		
delta	E	2029-12-06T08:23:07.904		76.99	-75.51	48300.35	22.02		
lambda	E	2029-12-06T08:24:26.065		76.82	-75.32	50026.71	22.15		
epsilon	E	2029-12-06T08:24:58.399		76.74	-75.24	50743.70	22.20		

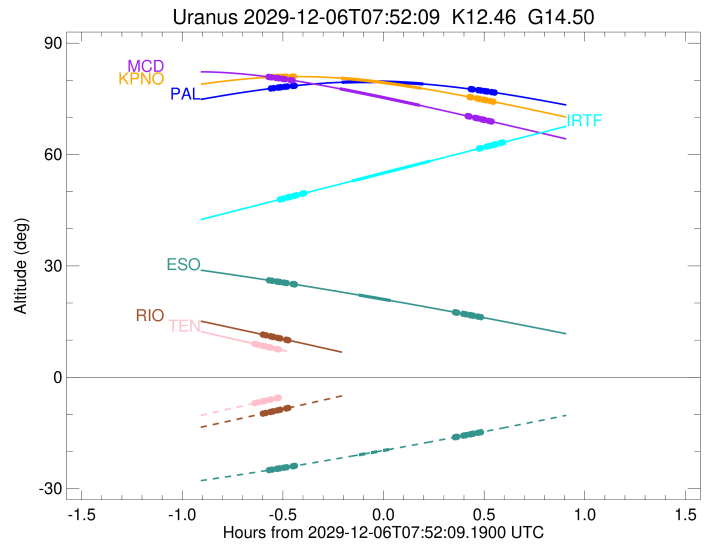
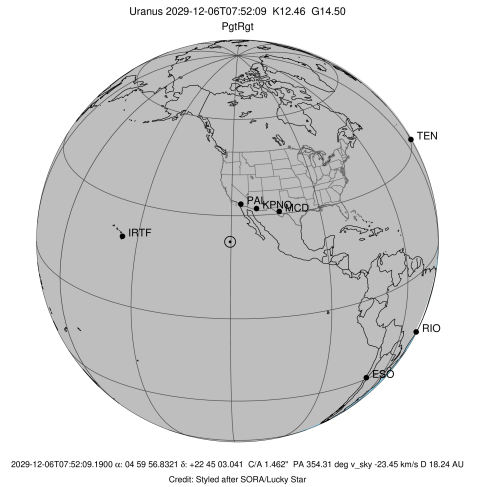
target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2029-12-06T07:51:39.260
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : KPNO
 Location : Kitt Peak Natl Obs
 Latitude (deg) : 31.96333
 E. Longitude (deg) : 248.40000
 Altitude (km) : 2.120
 Gaia source ID : 3412513905092383232
 2Mass ID (if available) : 04595680+2245031
 ICRS Star Coord at Epoch: 04h 59m 56.83211s +22:45:03.04058s
 RUWE (>1.4 is poor) : 0.99
 K magnitude : 12.458
 G magnitude : 14.500
 RP magnitude : 13.822
 BP magnitude : 15.003
 DUPflag : 0
 Distance (au) : 18.240
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.45
 Sun-Target sep (deg) : 177.88
 Sun-Moon sep (deg) : 172.33
 B (ring opening deg) : 82.11
 PA of pole (deg) : -16.57
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.396
 C/A sky separation (km) : 18473.0
 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	2029-12-06T07:18:06.717		80.80	-80.74	51438.59	-22.17		
lambda	I	2029-12-06T07:19:10.401		80.85	-80.73	50026.71	-22.12		
delta	I	2029-12-06T07:20:28.670		80.90	-80.72	48300.35	-21.99		
gamma	I	2029-12-06T07:20:59.462		80.92	-80.71	47624.06	-21.94		
eta	I	2029-12-06T07:21:19.901		80.93	-80.70	47176.12	-21.90		
beta	I	2029-12-06T07:22:28.662		80.96	-80.67	45675.04	-21.76		
alpha	I	2029-12-06T07:23:14.175		80.97	-80.65	44686.97	-21.66		
4	I	2029-12-06T07:24:50.328		80.99	-80.60	42615.10	-21.44		
5	I	2029-12-06T07:25:04.257		81.00	-80.59	42315.02	-21.40		
6	I	2029-12-06T07:25:24.848		81.00	-80.57	41877.53	-21.34		
Uranus	I	2029-12-06T07:39:30.556		80.56	-79.53	25357.72		-4.61	-4.82
Uranus	E	2029-12-06T08:03:34.596		77.82	-76.20	25139.74		-6.70	-7.01
6	E	2029-12-06T08:17:44.821		75.51	-73.74	41802.09	21.33		
5	E	2029-12-06T08:18:02.550		75.46	-73.68	42181.17	21.39		
4	E	2029-12-06T08:18:19.950		75.41	-73.63	42553.09	21.43		
alpha	E	2029-12-06T08:20:00.994		75.11	-73.32	44729.72	21.65		
beta	E	2029-12-06T08:20:43.985		74.99	-73.19	45662.63	21.76		
eta	E	2029-12-06T08:21:53.351		74.78	-72.98	47176.12	21.89		
gamma	E	2029-12-06T08:22:14.125		74.72	-72.91	47631.27	21.93		
delta	E	2029-12-06T08:22:44.597		74.63	-72.82	48300.35	21.98		
lambda	E	2029-12-06T08:24:02.890		74.39	-72.57	50026.71	22.11		
epsilon	E	2029-12-06T08:24:35.274		74.29	-72.47	50743.66	22.16		

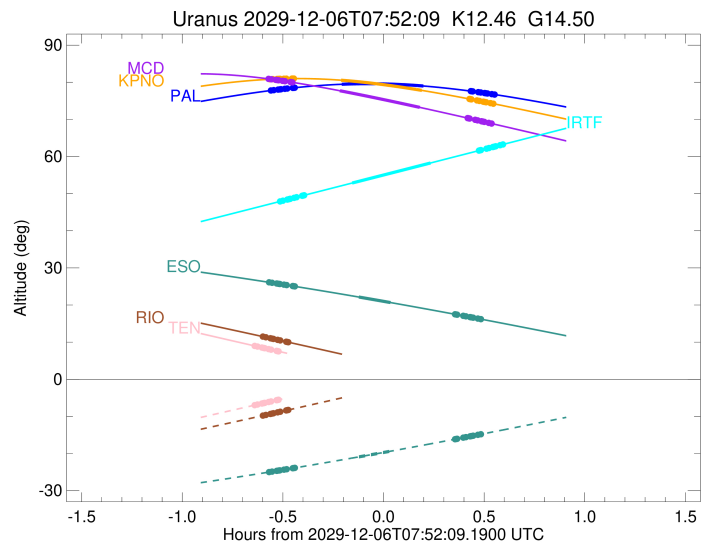
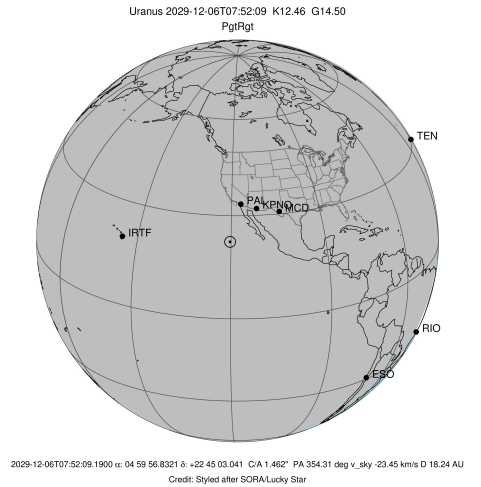
```

target                : Uranus
target radius (km)    : 25559.00
C/A epoch              : 2029-12-06T07:51:10.110
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        : 3412513905092383232
2Mass ID (if available) : 04595680+2245031
ICRS Star Coord at Epoch: 04h 59m 56.83211s +22:45:03.04058s
RUWE (>1.4 is poor)  : 0.99
K magnitude            : 12.458
G magnitude            : 14.500
RP magnitude           : 13.822
BP magnitude           : 15.003
DUPflag               : 0
Distance (au)         : 18.240
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s)  : -23.45
Sun-Target sep (deg)  : 177.88
Sun-Moon sep (deg)    : 172.22
B (ring opening deg)  : 82.11
PA of pole (deg)      : -16.57
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 1.409
C/A sky separation (km) : 18634.4
NAIF SPICE kernels    : RAJobs_U111+rgf15.spk
URKALLvl1.spk
ural11.bsp
IAU_URANUS_for_RINGFIT.tpc
vgr2.ural11.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
  
```



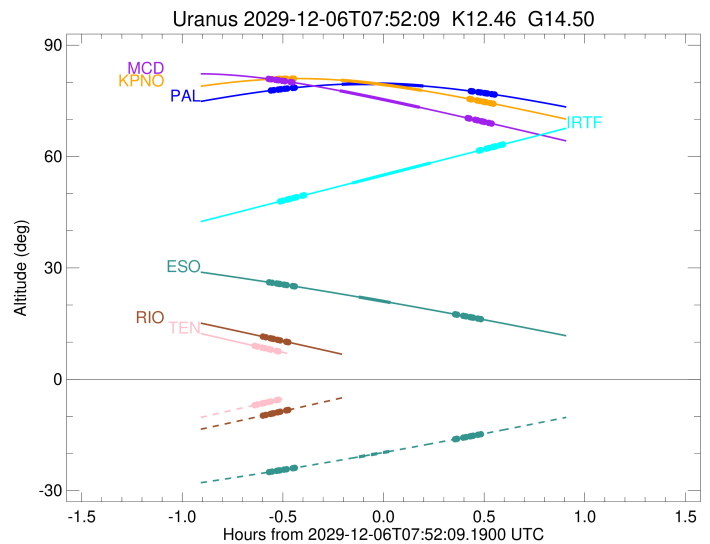
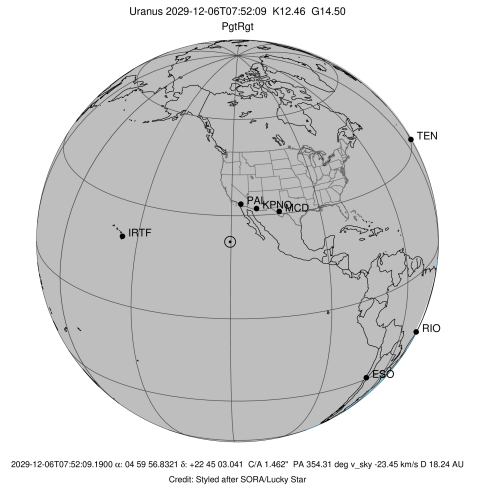
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2029-12-06T07:17:40.436		80.94	-79.51	51437.37	-22.14		
lambda	I	2029-12-06T07:18:44.138		80.82	-79.35	50026.71	-22.09		
delta	I	2029-12-06T07:20:02.505		80.65	-79.16	48300.35	-21.96		
gamma	I	2029-12-06T07:20:33.338		80.59	-79.08	47624.08	-21.91		
eta	I	2029-12-06T07:20:53.807		80.54	-79.03	47176.12	-21.87		
beta	I	2029-12-06T07:22:02.667		80.39	-78.85	45675.11	-21.73		
alpha	I	2029-12-06T07:22:48.259		80.29	-78.73	44686.91	-21.62		
4	I	2029-12-06T07:24:24.580		80.07	-78.48	42615.15	-21.39		
5	I	2029-12-06T07:24:38.538		80.04	-78.44	42314.99	-21.35		
6	I	2029-12-06T07:24:59.174		79.99	-78.38	41877.46	-21.30		
Uranus	I	2029-12-06T07:39:09.014		77.72	-75.92	25351.95		-4.67	-4.89
Uranus	E	2029-12-06T08:02:57.857		73.24	-71.30	25135.28		-6.74	-7.05
6	E	2029-12-06T08:17:12.555		70.37	-68.39	41802.18	21.28		
5	E	2029-12-06T08:17:30.334		70.30	-68.33	42181.38	21.34		
4	E	2029-12-06T08:17:47.774		70.25	-68.27	42553.23	21.38		
alpha	E	2029-12-06T08:19:29.040		69.90	-67.92	44729.62	21.61		
beta	E	2029-12-06T08:20:12.131		69.75	-67.77	45662.69	21.71		
eta	E	2029-12-06T08:21:21.636		69.51	-67.53	47176.12	21.85		
gamma	E	2029-12-06T08:21:42.451		69.44	-67.46	47631.28	21.89		
delta	E	2029-12-06T08:22:12.983		69.33	-67.35	48300.35	21.94		
lambda	E	2029-12-06T08:23:31.421		69.06	-67.08	50026.71	22.07		
epsilon	E	2029-12-06T08:24:03.861		68.95	-66.97	50743.63	22.12		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2029-12-06T07:48:06.520
 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 : 3412513905092383232
 2Mass ID (if available) : 04595680+2245031
 ICRS Star Coord at Epoch: 04h 59m 56.83211s +22:45:03.04058s
 RUWE (>1.4 is poor) : 0.99
 K magnitude : 12.458
 G magnitude : 14.500
 RP magnitude : 13.822
 BP magnitude : 15.003
 DUPflag : 0
 Distance (au) : 18.240
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.45
 Sun-Target sep (deg) : 177.88
 Sun-Moon sep (deg) : 171.39
 B (ring opening deg) : 82.11
 PA of pole (deg) : -16.57
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.270
 C/A sky separation (km) : 16799.2
 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



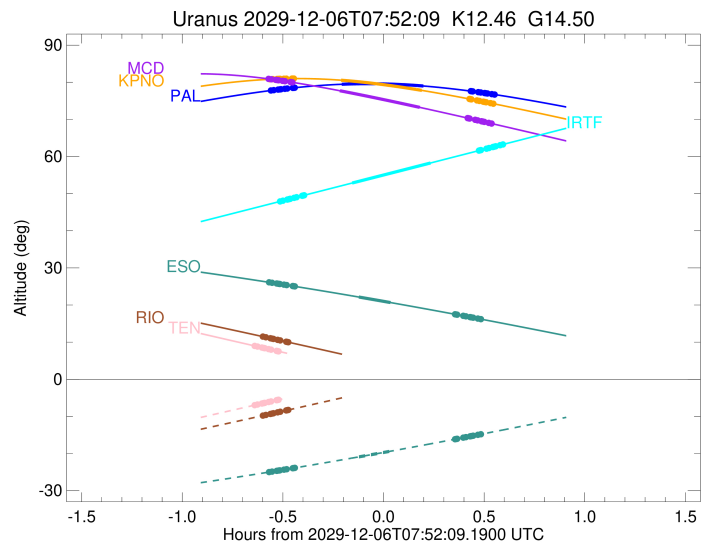
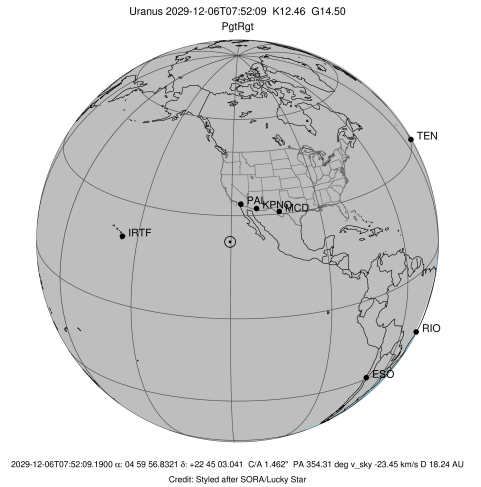
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2029-12-06T07:13:31.486		9.03	-7.02	51446.17	-22.10		
lambda	I	2029-12-06T07:14:35.707		8.81	-6.80	50026.71	-22.06		
delta	I	2029-12-06T07:15:54.145		8.54	-6.53	48300.35	-21.95		
gamma	I	2029-12-06T07:16:24.986		8.44	-6.43	47623.92	-21.91		
eta	I	2029-12-06T07:16:45.439		8.37	-6.36	47176.12	-21.88		
beta	I	2029-12-06T07:17:54.241		8.13	-6.12	45674.57	-21.77		
alpha	I	2029-12-06T07:18:39.678		7.97	-5.97	44687.40	-21.68		
4	I	2029-12-06T07:20:15.663		7.65	-5.64	42614.66	-21.50		
5	I	2029-12-06T07:20:29.530		7.60	-5.60	42315.19	-21.47		
6	I	2029-12-06T07:20:50.011		7.53	-5.53	41877.99	-21.42		
Uranus	I	2029-12-06T07:34:32.264		4.73x	-2.76x	25403.46		-4.04	-4.23
Uranus	E	2029-12-06T08:01:29.641		-0.67x	2.59x	25194.52		-6.23	-6.53
6	E	2029-12-06T08:15:17.838		-3.39x	5.28x	41800.90	21.34		
5	E	2029-12-06T08:15:35.468		-3.44x	5.33x	42178.18	21.38		
4	E	2029-12-06T08:15:52.927		-3.50x	5.39x	42550.99	21.42		
alpha	E	2029-12-06T08:17:34.322		-3.83x	5.71x	44731.26	21.59		
beta	E	2029-12-06T08:18:17.343		-3.97x	5.85x	45661.68	21.67		
eta	E	2029-12-06T08:19:27.068		-4.19x	6.07x	47176.12	21.78		
gamma	E	2029-12-06T08:19:47.951		-4.26x	6.14x	47631.19	21.81		
delta	E	2029-12-06T08:20:18.606		-4.36x	6.24x	48300.35	21.85		
lambda	E	2029-12-06T08:21:37.427		-4.62x	6.49x	50026.71	21.95		
epsilon	E	2029-12-06T08:22:10.094		-4.72x	6.59x	50744.49	21.99		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2029-12-06T07:54:37.060
 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 : 3412513905092383232
 2Mass ID (if available) : 04595680+2245031
 ICRS Star Coord at Epoch: 04h 59m 56.83211s +22:45:03.04058s
 RUWE (>1.4 is poor) : 0.99
 K magnitude : 12.458
 G magnitude : 14.500
 RP magnitude : 13.822
 BP magnitude : 15.003
 DUPflag : 0
 Distance (au) : 18.240
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.45
 Sun-Target sep (deg) : 177.88
 Sun-Moon sep (deg) : 172.98
 B (ring opening deg) : 82.11
 PA of pole (deg) : -16.57
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.433
 C/A sky separation (km) : 18954.6
 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



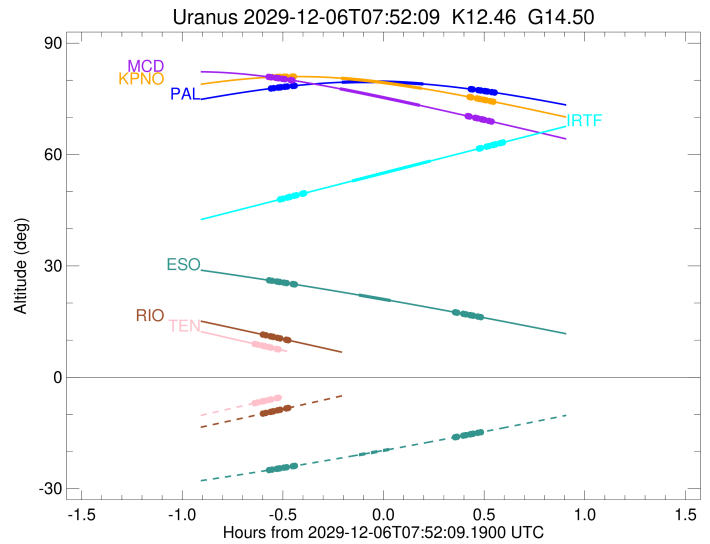
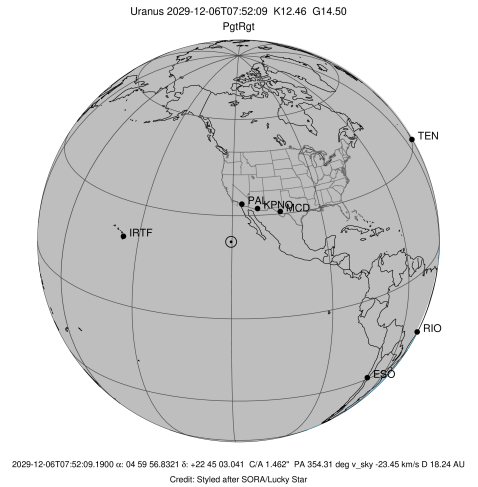
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2029-12-06T07:21:06.302		47.86	-49.96	51437.00	-21.99		
lambda	I	2029-12-06T07:22:10.432		48.11	-50.21	50026.71	-21.94		
delta	I	2029-12-06T07:23:29.357		48.41	-50.51	48300.35	-21.80		
gamma	I	2029-12-06T07:24:00.413		48.53	-50.63	47624.09	-21.75		
eta	I	2029-12-06T07:24:21.031		48.61	-50.71	47176.12	-21.71		
beta	I	2029-12-06T07:25:30.401		48.87	-50.97	45675.14	-21.57		
alpha	I	2029-12-06T07:26:16.343		49.05	-51.15	44686.88	-21.46		
4	I	2029-12-06T07:27:53.416		49.42	-51.52	42615.19	-21.22		
5	I	2029-12-06T07:28:07.488		49.48	-51.58	42314.97	-21.18		
6	I	2029-12-06T07:28:28.294		49.56	-51.66	41877.41	-21.12		
Uranus	I	2029-12-06T07:42:49.516		52.87	-54.96	25344.40		-4.76	-4.98
Uranus	E	2029-12-06T08:06:10.060		58.26	-60.35	25122.68		-6.84	-7.16
6	E	2029-12-06T08:20:34.413		61.59	-63.68	41802.52	21.18		
5	E	2029-12-06T08:20:52.305		61.66	-63.75	42182.23	21.24		
4	E	2029-12-06T08:21:09.810		61.73	-63.81	42553.82	21.28		
alpha	E	2029-12-06T08:22:51.462		62.12	-64.20	44729.18	21.52		
beta	E	2029-12-06T08:23:34.754		62.28	-64.37	45662.96	21.63		
eta	E	2029-12-06T08:24:44.496		62.55	-64.64	47176.12	21.77		
gamma	E	2029-12-06T08:25:05.382		62.63	-64.72	47631.30	21.81		
delta	E	2029-12-06T08:25:36.011		62.75	-64.84	48300.35	21.87		
lambda	E	2029-12-06T08:26:54.685		63.05	-65.14	50026.71	22.01		
epsilon	E	2029-12-06T08:27:27.211		63.18	-65.26	50743.54	22.06		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2029-12-06T07:48:27.500
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : RIO
 Location : Rio de Janeiro
 Latitude (deg) : -22.89506
 E. Longitude (deg) : 316.77708
 Altitude (km) : 0.033
 Gaia source ID : 3412513905092383232
 2Mass ID (if available) : 04595680+2245031
 ICRS Star Coord at Epoch: 04h 59m 56.83211s +22:45:03.04058s
 RUWE (>1.4 is poor) : 0.99
 K magnitude : 12.458
 G magnitude : 14.500
 RP magnitude : 13.822
 BP magnitude : 15.003
 DUPflag : 0
 Distance (au) : 18.240
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.45
 Sun-Target sep (deg) : 177.88
 Sun-Moon sep (deg) : 171.47
 B (ring opening deg) : 82.11
 PA of pole (deg) : -16.57
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.728
 C/A sky separation (km) : 22857.3
 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	2029-12-06T07:15:59.508		11.53	-9.83	51407.96	-21.06		
lambda	I	2029-12-06T07:17:05.133		11.32	-9.61	50026.71	-20.97		
delta	I	2029-12-06T07:18:27.861		11.04	-9.34	48300.35	-20.76		
gamma	I	2029-12-06T07:19:00.478		10.93	-9.23	47624.61	-20.67		
eta	I	2029-12-06T07:19:22.206		10.86	-9.15	47176.12	-20.61		
beta	I	2029-12-06T07:20:35.340		10.62	-8.91	45676.63	-20.39		
alpha	I	2029-12-06T07:21:24.134		10.46	-8.74	44685.72	-20.23		
4	I	2029-12-06T07:23:07.377		10.11	-8.40	42616.19	-19.86		
5	I	2029-12-06T07:23:22.494		10.06	-8.35	42313.59	-19.80		
6	I	2029-12-06T07:23:44.875		9.99	-8.27	41875.44	-19.70		
Uranus	I	2029-12-06T07:41:00.530		6.50	-4.75x	25171.71		-6.43	-6.73
Uranus	E	2029-12-06T07:55:38.533		3.49x	-1.72x	25014.26		-7.67	-8.03
6	E	2029-12-06T08:13:02.601		-0.13x	1.93x	41805.08	19.63		
5	E	2029-12-06T08:13:22.102		-0.20x	2.00x	42188.27	19.72		
4	E	2029-12-06T08:13:40.819		-0.27x	2.06x	42557.87	19.79		
alpha	E	2029-12-06T08:15:29.418		-0.65x	2.44x	44726.29	20.15		
beta	E	2029-12-06T08:16:15.819		-0.81x	2.61x	45664.67	20.31		
eta	E	2029-12-06T08:17:29.868		-1.07x	2.87x	47176.12	20.52		
gamma	E	2029-12-06T08:17:52.020		-1.15x	2.95x	47631.42	20.58		
delta	E	2029-12-06T08:18:24.450		-1.26x	3.06x	48300.35	20.67		
lambda	E	2029-12-06T08:19:47.554		-1.55x	3.36x	50026.71	20.87		
epsilon	E	2029-12-06T08:20:21.865		-1.67x	3.48x	50744.28	20.96		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2029-12-06T07:49:38.840
 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 : 3412513905092383232
 2Mass ID (if available) : 04595680+2245031
 ICRS Star Coord at Epoch: 04h 59m 56.83211s +22:45:03.04058s
 RUWE (>1.4 is poor) : 0.99
 K magnitude : 12.458
 G magnitude : 14.500
 RP magnitude : 13.822
 BP magnitude : 15.003
 DUPflag : 0
 Distance (au) : 18.240
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.45
 Sun-Target sep (deg) : 177.88
 Sun-Moon sep (deg) : 171.77
 B (ring opening deg) : 82.11
 PA of pole (deg) : -16.57
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.824
 C/A sky separation (km) : 24130.2
 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	2029-12-06T07:17:50.845		26.14	-25.03	51399.85	-20.86		
lambda	I	2029-12-06T07:18:56.710		25.99	-24.87	50026.71	-20.76		
delta	I	2029-12-06T07:20:20.334		25.79	-24.67	48300.35	-20.52		
gamma	I	2029-12-06T07:20:53.334		25.71	-24.59	47624.75	-20.42		
eta	I	2029-12-06T07:21:15.339		25.66	-24.53	47176.12	-20.35		
beta	I	2029-12-06T07:22:29.443		25.49	-24.35	45677.01	-20.11		
alpha	I	2029-12-06T07:23:19.001		25.37	-24.23	44685.46	-19.92		
4	I	2029-12-06T07:25:03.992		25.11	-23.97	42616.36	-19.50		
5	I	2029-12-06T07:25:19.421		25.08	-23.93	42312.99	-19.42		
6	I	2029-12-06T07:25:42.264		25.02	-23.87	41874.77	-19.32		
Uranus	I	2029-12-06T07:44:48.259		22.15	-20.91	25096.54		-7.05	-7.38
Uranus	E	2029-12-06T07:54:12.277		20.67	-19.38	24987.41		-7.86	-8.23
6	E	2029-12-06T08:13:26.535		17.51	-16.15	41806.21	19.27		
5	E	2029-12-06T08:13:46.491		17.46	-16.10	42190.86	19.37		
4	E	2029-12-06T08:14:05.482		17.40	-16.04	42559.56	19.45		
alpha	E	2029-12-06T08:15:55.658		17.09	-15.73	44725.09	19.87		
beta	E	2029-12-06T08:16:42.789		16.96	-15.59	45665.37	20.05		
eta	E	2029-12-06T08:17:57.704		16.75	-15.37	47176.12	20.29		
gamma	E	2029-12-06T08:18:20.103		16.68	-15.31	47631.46	20.36		
delta	E	2029-12-06T08:18:52.871		16.59	-15.21	48300.35	20.46		
lambda	E	2029-12-06T08:20:16.753		16.35	-14.97	50026.71	20.70		
epsilon	E	2029-12-06T08:20:51.395		16.25	-14.87	50745.24	20.79		