

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2030-11-18T21:48:15.490
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 3416342473299924096
 2Mass ID (if available) : 05223134+2314466

Uranus 2030-11-18T21:48:15 K14.53 G17.28 PgtRgt

ICRS Star Coord at Epoch: 05h 22m 31.33271s +23:14:46.73474s

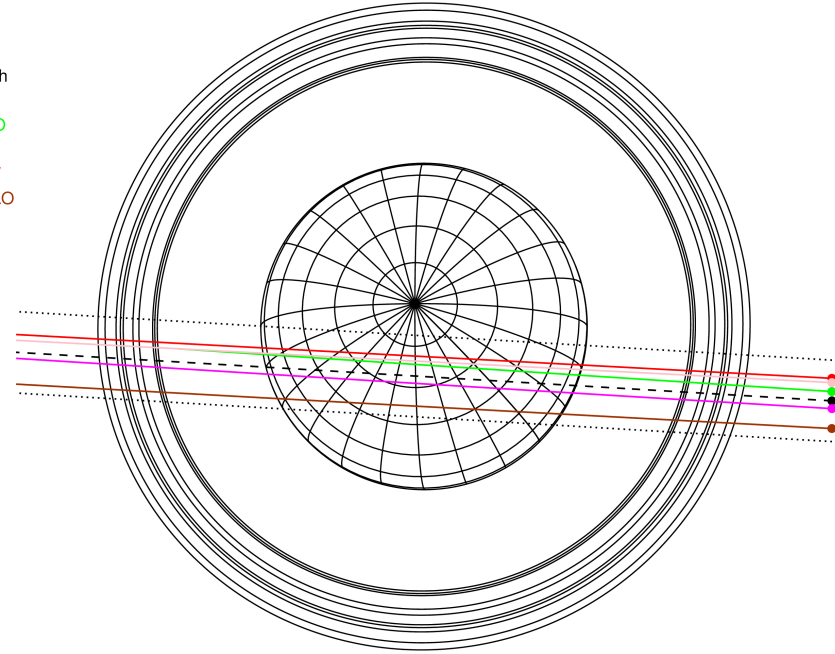
RUWE (>1.4 is poor) : 1.05
 K magnitude : 14.530
 G magnitude : 17.276
 RP magnitude : 16.327
 BP magnitude : 18.188
 DUPflag : 0
 Distance (au) : 18.261
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.61
 Sun-Target sep (deg) : 154.77
 Sun-Moon sep (deg) : 71.31
 B (ring opening deg) : 81.34
 PA of pole (deg) : 21.79

Uranus 2030-11-18T21:48:15 K14.53 G17.28
 PgtRgt



2030-11-18T21:48:15.4900 ra: 05 22 31.3327 s: +23 14 46.735 C/A 0.585° PA 356.60 deg v_sky -20.61 km/s D 18.26 AU
 Credit: Styled after SORA/Lucky Star

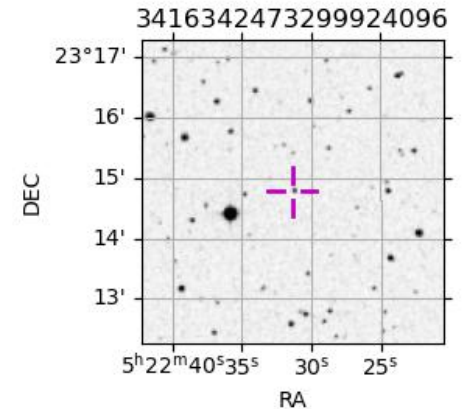
Earth
 PIC
 PMO
 TEN
 KAV
 SAAO



#	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

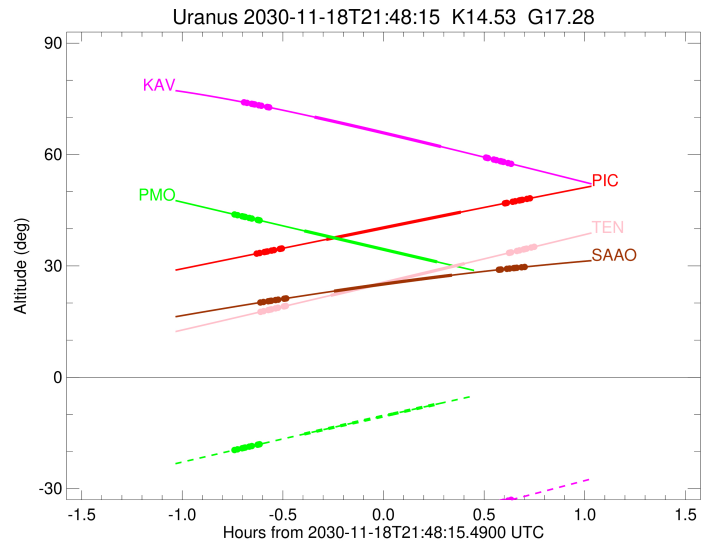
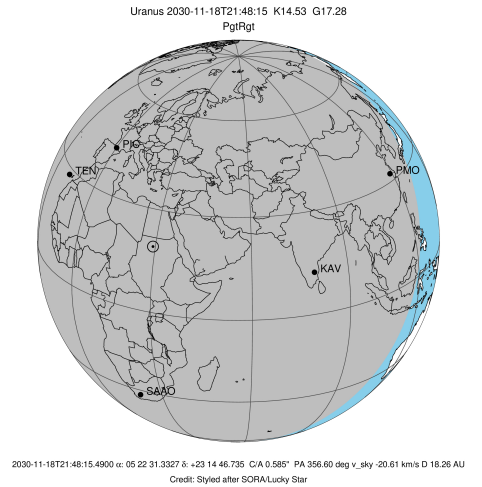
Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1	+++++	+ +	+++++	NOV 18 21:10 - NOV 18 22:32	PieRie
PAL	Palomar Mt (200")	33.4	243.1					PnnRnn
PMO	Purple Mtn Obs. Nanki	32.1	118.8	+++++	+ +		NOV 18 21:04 - NOV 18 22:04	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	+++++	+ +	+++++	NOV 18 21:11 - NOV 18 22:33	PieRie
IRTF	Mauna Kea/IRTF	19.8	204.5					PnnRnn
KAV	Kavalur Observatory	12.6	78.8	+++++	+ +	+++++	NOV 18 21:06 - NOV 18 22:26	PieRie
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					PnnRnn
SAAO	So. Afr. Astro. Obs.	-32.4	20.8	+++++	+ +	+++++	NOV 18 21:11 - NOV 18 22:30	PieRie
MSO	Mt. Stromlo Observato	-35.3	149.0					PnnRnn



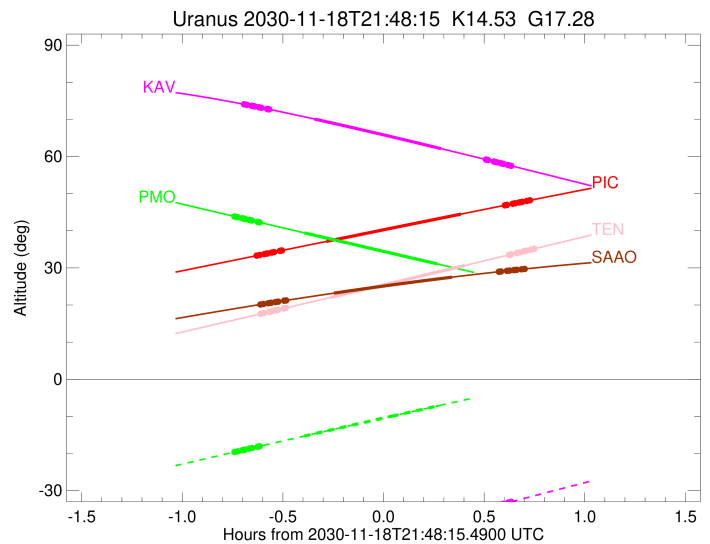
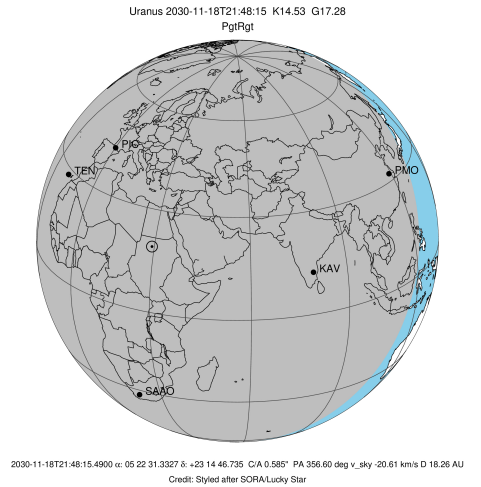
```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2030-11-18T21:51:12.310
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       : 3416342473299924096
2Mass ID (if available) : 05223134+2314466
ICRS Star Coord at Epoch: 05h 22m 31.33271s +23:14:46.73474s
RUWE (>1.4 is poor) : 1.05
K magnitude          : 14.530
G magnitude          : 17.276
RP magnitude         : 16.327
BP magnitude         : 18.188
DUPflag             : 0
Distance (au)        : 18.261
f0 (km)              : 0.000
g0 (km)              : 0.000
skyplane vel. (km/s) : -20.61
Sun-Target sep (deg) : 154.77
Sun-Moon sep (deg)   : 72.06
B (ring opening deg) : 81.34
PA of pole (deg)     : 21.79
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 0.355
C/A sky separation (km) : 4702.1
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	2030-11-18T21:10:42.814		33.36	-50.13	50828.77	-20.67		
lambda	I	2030-11-18T21:11:21.599		33.48	-50.24	50026.71	-20.68		
delta	I	2030-11-18T21:12:45.095		33.73	-50.48	48300.35	-20.67		
gamma	I	2030-11-18T21:13:17.818		33.83	-50.57	47623.90	-20.67		
eta	I	2030-11-18T21:13:39.481		33.90	-50.63	47176.12	-20.67		
beta	I	2030-11-18T21:14:52.593		34.12	-50.83	45665.03	-20.66		
alpha	I	2030-11-18T21:15:40.016		34.27	-50.96	44684.62	-20.66		
4	I	2030-11-18T21:17:24.231		34.59	-51.25	42532.59	-20.65		
5	I	2030-11-18T21:17:42.509		34.64	-51.30	42156.84	-20.65		
6	I	2030-11-18T21:17:59.102		34.70	-51.35	41814.89	-20.65		
Uranus	I	2030-11-18T21:31:12.996		37.13	-53.51	25361.15		-5.02	-5.26
Uranus	E	2030-11-18T22:11:17.935		44.48	-59.48	25523.15		2.12	2.23
6	E	2030-11-18T22:24:27.600		46.86	-61.18	41867.05	20.74		
5	E	2030-11-18T22:24:49.268		46.93	-61.22	42315.25	20.74		
4	E	2030-11-18T22:25:03.193		46.97	-61.25	42603.75	20.74		
alpha	E	2030-11-18T22:26:46.727		47.28	-61.46	44751.57	20.76		
beta	E	2030-11-18T22:27:30.528		47.41	-61.55	45661.35	20.77		
eta	E	2030-11-18T22:28:43.456		47.63	-61.70	47176.12	20.77		
gamma	E	2030-11-18T22:29:05.191		47.70	-61.74	47627.66	20.78		
delta	E	2030-11-18T22:29:37.566		47.79	-61.80	48300.35	20.78		
lambda	E	2030-11-18T22:31:00.626		48.04	-61.97	50026.71	20.79		
epsilon	E	2030-11-18T22:32:07.430		48.24	-62.09	51415.74	20.78		

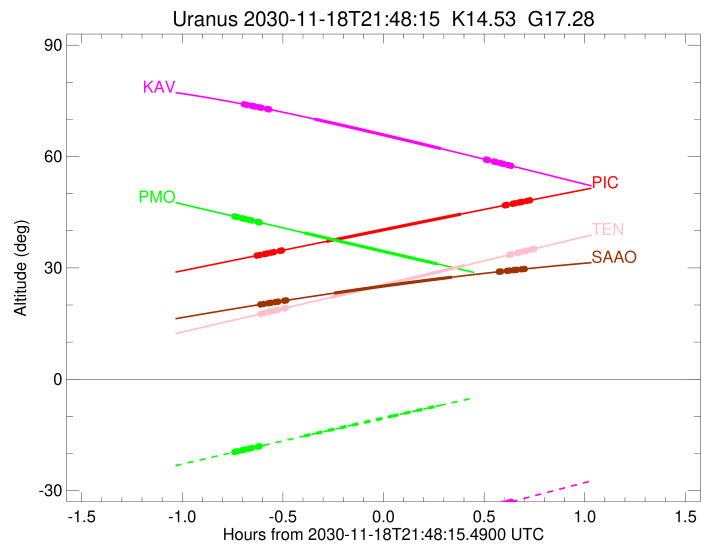
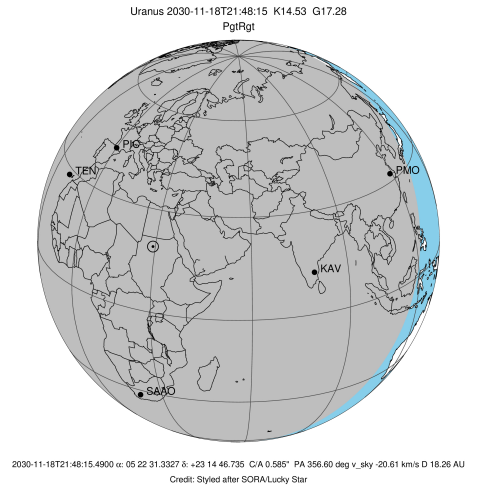
target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2030-11-18T21:44:20.580
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PMO
 Location : Purple Mtn Obs. Nanking
 Latitude (deg) : 32.06667
 E. Longitude (deg) : 118.82089
 Altitude (km) : 0.364
 Gaia source ID : 3416342473299924096
 2Mass ID (if available) : 05223134+2314466
 ICRS Star Coord at Epoch: 05h 22m 31.33271s +23:14:46.73474s
 RUWE (>1.4 is poor) : 1.05
 K magnitude : 14.530
 G magnitude : 17.276
 RP magnitude : 16.327
 BP magnitude : 18.188
 DUPflag : 0
 Distance (au) : 18.261
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.61
 Sun-Target sep (deg) : 154.77
 Sun-Moon sep (deg) : 71.59
 B (ring opening deg) : 81.34
 PA of pole (deg) : 21.79
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.454
 C/A sky separation (km) : 6018.3
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.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	2030-11-18T21:04:06.086		43.80	-19.54	50819.60	-20.73		
lambda	I	2030-11-18T21:04:44.325		43.67	-19.41	50026.71	-20.73		
delta	I	2030-11-18T21:06:07.623		43.37	-19.12	48300.35	-20.72		
gamma	I	2030-11-18T21:06:40.286		43.25	-19.01	47623.71	-20.71		
eta	I	2030-11-18T21:07:01.897		43.18	-18.94	47176.12	-20.71		
beta	I	2030-11-18T21:08:14.844		42.92	-18.68	45665.84	-20.70		
alpha	I	2030-11-18T21:09:02.238		42.75	-18.52	44684.62	-20.69		
4	I	2030-11-18T21:10:46.395		42.38	-18.16	42531.60	-20.66		
5	I	2030-11-18T21:11:04.589		42.32	-18.09	42157.69	-20.66		
6	I	2030-11-18T21:11:21.126		42.26	-18.04	41816.49	-20.66		
Uranus	I	2030-11-18T21:24:38.537		39.44	-15.29	25324.78		-5.47	-5.73
Uranus	E	2030-11-18T22:04:14.466		31.08	-7.22	25533.74		1.78	1.87
6	E	2030-11-18T22:17:31.941		28.30	-4.55x	41867.65	20.57		
5	E	2030-11-18T22:17:53.757		28.23	-4.48x	42315.24	20.57		
4	E	2030-11-18T22:18:07.762		28.18	-4.43x	42603.13	20.57		
alpha	E	2030-11-18T22:19:52.158		27.81	-4.09x	44751.43	20.59		
beta	E	2030-11-18T22:20:36.335		27.66	-3.94x	45661.70	20.60		
eta	E	2030-11-18T22:21:49.825		27.40	-3.70x	47176.12	20.61		
gamma	E	2030-11-18T22:22:11.728		27.33	-3.63x	47627.58	20.61		
delta	E	2030-11-18T22:22:44.362		27.21	-3.52x	48300.35	20.62		
lambda	E	2030-11-18T22:24:08.075		26.92	-3.24x	50026.71	20.63		
epsilon	E	2030-11-18T22:25:15.192		26.69	-3.02x	51411.40	20.62		

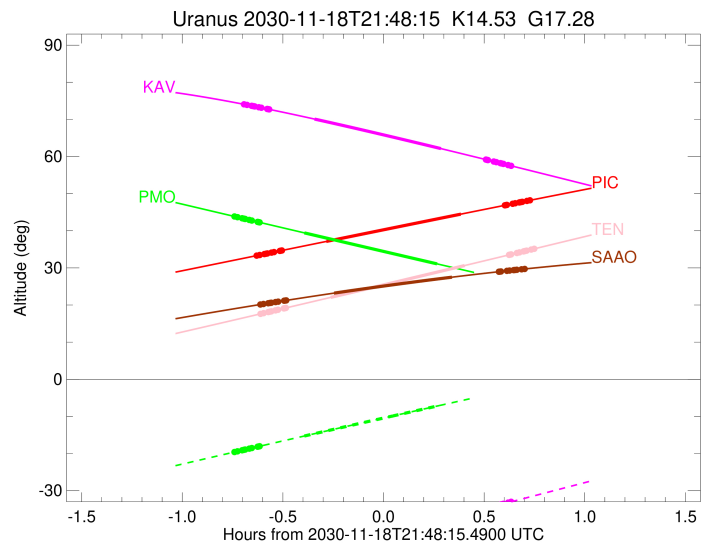
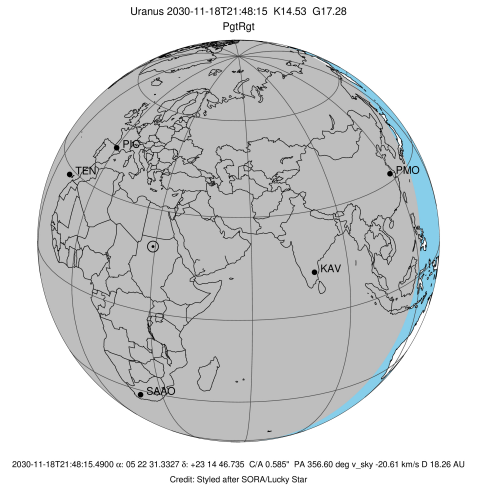
```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2030-11-18T21:52:26.190
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      : 3416342473299924096
2Mass ID (if available) : 05223134+2314466
ICRS Star Coord at Epoch: 05h 22m 31.33271s +23:14:46.73474s
RUWE (>1.4 is poor) : 1.05
K magnitude          : 14.530
G magnitude          : 17.276
RP magnitude         : 16.327
BP magnitude         : 18.188
DUPflag             : 0
Distance (au)       : 18.261
f0 (km)             : 0.000
g0 (km)             : 0.000
skyplane vel. (km/s) : -20.61
Sun-Target sep (deg) : 154.77
Sun-Moon sep (deg)  : 71.94
B (ring opening deg) : 81.34
PA of pole (deg)    : 21.79
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 0.414
C/A sky separation (km) : 5477.1
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_itrf93_040916.bsp
earth_720101_070426.bpc
earth_200101_990628_predict.bpc
pg3f0000r.bsp
pg490000r.bsp
naif0012.tls
earth_flat_IAU.spk
  
```



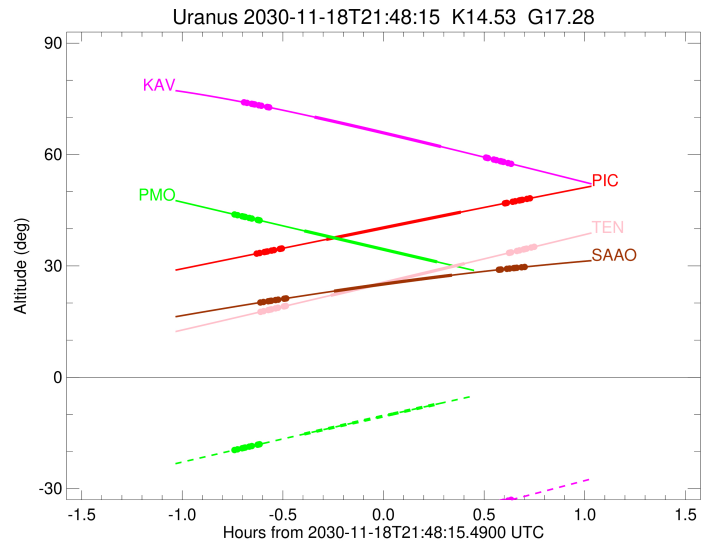
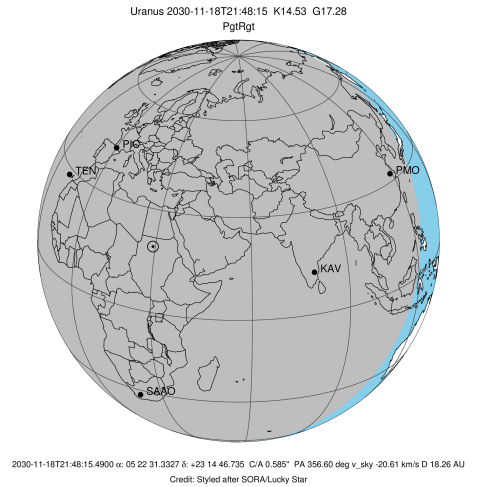
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2030-11-18T21:11:52.074		17.68	-39.46	50825.42	-20.55		
lambda	I	2030-11-18T21:12:30.917		17.81	-39.61	50026.71	-20.56		
delta	I	2030-11-18T21:13:54.895		18.11	-39.92	48300.35	-20.55		
gamma	I	2030-11-18T21:14:27.812		18.22	-40.04	47623.83	-20.55		
eta	I	2030-11-18T21:14:49.598		18.30	-40.12	47176.12	-20.55		
beta	I	2030-11-18T21:16:03.129		18.56	-40.39	45665.33	-20.54		
alpha	I	2030-11-18T21:16:50.852		18.73	-40.56	44684.62	-20.54		
4	I	2030-11-18T21:18:35.724		19.10	-40.95	42532.20	-20.52		
5	I	2030-11-18T21:18:54.088		19.16	-41.01	42157.16	-20.52		
6	I	2030-11-18T21:19:10.766		19.22	-41.08	41815.51	-20.52		
Uranus	I	2030-11-18T21:32:31.237		22.06	-44.02	25344.87		-5.23	-5.47
Uranus	E	2030-11-18T22:12:28.223		30.64	-52.82	25531.85		1.85	1.94
6	E	2030-11-18T22:25:42.843		33.51	-55.72	41867.67	20.64		
5	E	2030-11-18T22:26:04.583		33.59	-55.80	42315.24	20.64		
4	E	2030-11-18T22:26:18.538		33.64	-55.85	42603.10	20.64		
alpha	E	2030-11-18T22:28:02.566		34.02	-56.23	44751.42	20.67		
beta	E	2030-11-18T22:28:46.586		34.18	-56.39	45661.74	20.68		
eta	E	2030-11-18T22:29:59.805		34.44	-56.66	47176.12	20.69		
gamma	E	2030-11-18T22:30:21.625		34.52	-56.74	47627.57	20.69		
delta	E	2030-11-18T22:30:54.137		34.64	-56.86	48300.35	20.70		
lambda	E	2030-11-18T22:32:17.527		34.94	-57.16	50026.71	20.71		
epsilon	E	2030-11-18T22:33:24.329		35.19	-57.40	51410.37	20.70		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2030-11-18T21:46:24.590
 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 : 3416342473299924096
 2Mass ID (if available) : 05223134+2314466
 ICRS Star Coord at Epoch: 05h 22m 31.33271s +23:14:46.73474s
 RUWE (>1.4 is poor) : 1.05
 K magnitude : 14.530
 G magnitude : 17.276
 RP magnitude : 16.327
 BP magnitude : 18.188
 DUPflag : 0
 Distance (au) : 18.261
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.61
 Sun-Target sep (deg) : 154.77
 Sun-Moon sep (deg) : 72.01
 B (ring opening deg) : 81.34
 PA of pole (deg) : 21.79
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.677
 C/A sky separation (km) : 8969.3
 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	2030-11-18T21:06:57.288		74.02	-51.71	50807.15	-20.73		
lambda	I	2030-11-18T21:07:34.924		73.91	-51.56	50026.71	-20.73		
delta	I	2030-11-18T21:08:58.252		73.66	-51.24	48300.35	-20.70		
gamma	I	2030-11-18T21:09:30.954		73.56	-51.11	47623.44	-20.69		
eta	I	2030-11-18T21:09:52.575		73.50	-51.02	47176.12	-20.69		
beta	I	2030-11-18T21:11:05.572		73.28	-50.74	45667.04	-20.66		
alpha	I	2030-11-18T21:11:53.112		73.13	-50.55	44684.75	-20.64		
4	I	2030-11-18T21:13:37.631		72.81	-50.14	42530.22	-20.59		
5	I	2030-11-18T21:13:55.773		72.76	-50.07	42159.31	-20.59		
6	I	2030-11-18T21:14:12.304		72.70	-50.00	41819.07	-20.58		
Uranus	I	2030-11-18T21:27:41.886		70.09	-46.83	25256.87		-6.23	-6.52
Uranus	E	2030-11-18T22:05:22.995		62.14	-37.94	25554.87		0.72	0.75
6	E	2030-11-18T22:18:48.620		59.17	-34.78	41869.82	20.55		
5	E	2030-11-18T22:19:10.334		59.09	-34.69	42314.91	20.55		
4	E	2030-11-18T22:19:24.235		59.04	-34.64	42600.63	20.55		
alpha	E	2030-11-18T22:21:08.732		58.65	-34.23	44750.76	20.60		
beta	E	2030-11-18T22:21:52.979		58.49	-34.05	45663.10	20.62		
eta	E	2030-11-18T22:23:06.301		58.22	-33.77	47176.12	20.65		
gamma	E	2030-11-18T22:23:28.146		58.14	-33.68	47627.23	20.65		
delta	E	2030-11-18T22:24:00.728		58.01	-33.55	48300.35	20.66		
lambda	E	2030-11-18T22:25:24.220		57.70	-33.23	50026.71	20.69		
epsilon	E	2030-11-18T22:26:30.156		57.46	-32.97	51391.48	20.68		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2030-11-18T21:50:53.990
 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 : 3416342473299924096
 2Mass ID (if available) : 05223134+2314466
 ICRS Star Coord at Epoch: 05h 22m 31.33271s +23:14:46.73474s
 RUWE (>1.4 is poor) : 1.05
 K magnitude : 14.530
 G magnitude : 17.276
 RP magnitude : 16.327
 BP magnitude : 18.188
 DUPflag : 0
 Distance (au) : 18.261
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.61
 Sun-Target sep (deg) : 154.77
 Sun-Moon sep (deg) : 71.82
 B (ring opening deg) : 81.34
 PA of pole (deg) : 21.79
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.946
 C/A sky separation (km) : 12525.4
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.spk
 ural11.bsp
 IAU_URANUS_for_RINGFIT.tpc
 vgr2.ural11.bsp
 ural61.bsp
 vgr2.ural61.bsp
 peph.ural60.bsp
 earthstns_itrf93_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	2030-11-18T21:11:50.710		20.19	-35.75	50793.68	-20.23		
lambda	I	2030-11-18T21:12:28.602		20.28	-35.79	50026.71	-20.23		
delta	I	2030-11-18T21:13:54.038		20.48	-35.90	48300.35	-20.18		
gamma	I	2030-11-18T21:14:27.611		20.56	-35.94	47623.13	-20.16		
eta	I	2030-11-18T21:14:49.791		20.62	-35.96	47176.12	-20.15		
beta	I	2030-11-18T21:16:04.717		20.80	-36.05	45668.44	-20.10		
alpha	I	2030-11-18T21:16:53.663		20.91	-36.11	44685.08	-20.06		
4	I	2030-11-18T21:18:41.393		21.17	-36.23	42528.81	-19.97		
5	I	2030-11-18T21:18:59.949		21.21	-36.25	42161.70	-19.96		
6	I	2030-11-18T21:19:16.934		21.25	-36.27	41822.28	-19.94		
Uranus	I	2030-11-18T21:33:29.796		23.20	-37.12	25173.00		-7.06	-7.39
Uranus	E	2030-11-18T22:08:38.193		27.50	-38.30	25555.47		-0.67	-0.70
6	E	2030-11-18T22:22:40.852		28.97	-38.40	41872.29	20.01		
5	E	2030-11-18T22:23:02.945		29.01	-38.40	42313.84	20.03		
4	E	2030-11-18T22:23:17.082		29.03	-38.40	42597.24	20.04		
alpha	E	2030-11-18T22:25:04.233		29.21	-38.39	44749.69	20.14		
beta	E	2030-11-18T22:25:49.629		29.28	-38.39	45664.86	20.18		
eta	E	2030-11-18T22:27:04.439		29.40	-38.38	47176.12	20.23		
gamma	E	2030-11-18T22:27:26.710		29.44	-38.38	47626.78	20.24		
delta	E	2030-11-18T22:27:59.967		29.49	-38.38	48300.35	20.26		
lambda	E	2030-11-18T22:29:25.047		29.63	-38.37	50026.71	20.32		
epsilon	E	2030-11-18T22:30:30.852		29.73	-38.36	51364.88	20.32		