

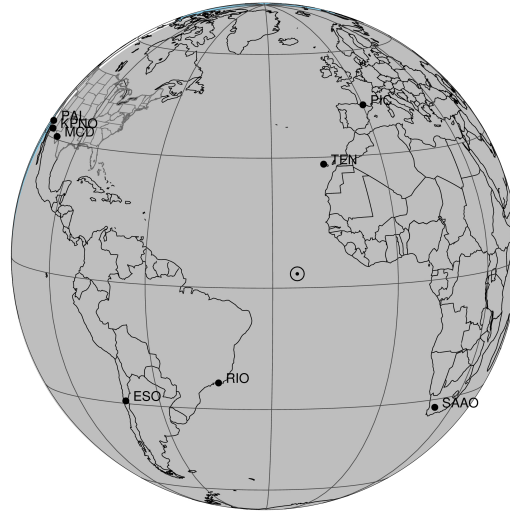
target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2049-03-12T01:47:17.150
 Event type : PgtRt
 : Uranus occs: geocentric, topocentric
 : Ring occs: topocentric, not geocentric
 Gaia source ID : 3865094159761871104
 2Mass ID (if available) : 10580561+0728539

Uranus 2049-03-12T01:47:17 K14.20 G17.76 PgtRt

ICRS Star Coord at Epoch: 10h 58m 05.70331s +07:28:53.11192s

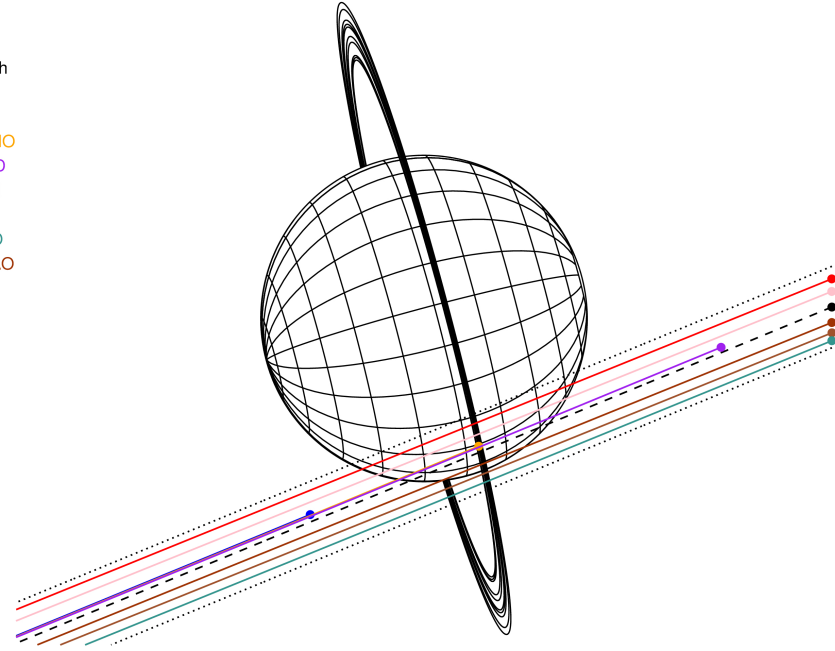
RUWE (>1.4 is poor) : 0.91
 K magnitude : 14.199
 G magnitude : 17.757
 RP magnitude : 16.670
 BP magnitude : 18.974
 DUPflag : 0
 Distance (au) : 17.305
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -22.59
 Sun-Target sep (deg) : 171.59
 Sun-Moon sep (deg) : 75.17
 B (ring opening deg) : 4.62
 PA of pole (deg) : 104.73

Uranus 2049-03-12T01:47:17 K14.20 G17.76 PgtRt



2049-03-12T01:47:17.1500 α: 10 58 05.7033 s; +07 28 53.112 C/A 1.804" PA 22.40 deg v_sky -22.59 km/s D 17.30 AU
 Credit: Styled after SORA/Lucky Star

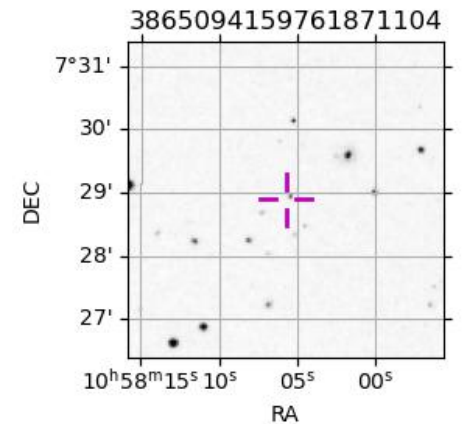
Earth
 PIC
 PAL
 KPNO
 MCD
 TEN
 RIO
 ESO
 SAAO



#	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

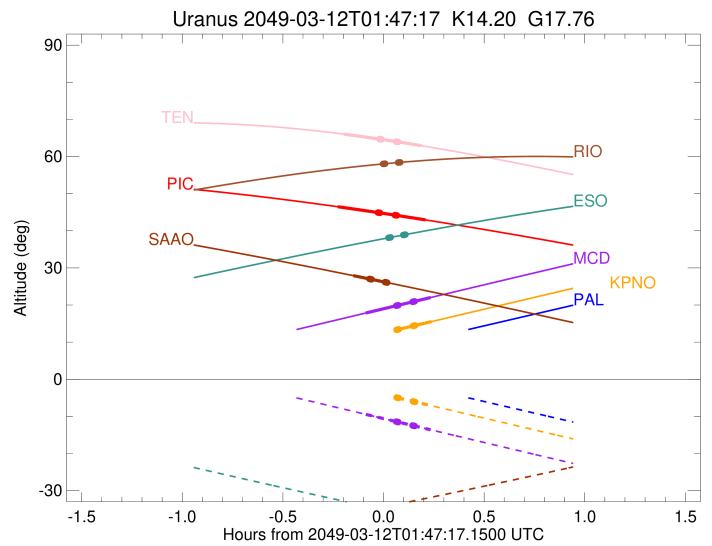
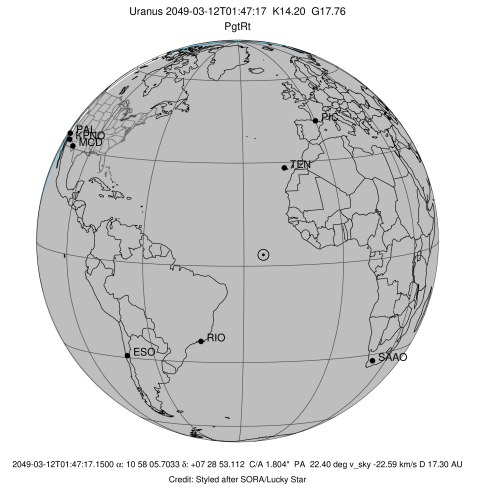
Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1		+	+	MAR 12 01:33 - MAR 12 01:59	PieRnn
PAL	Palomar Mt (200")	33.4	243.1					PnnRnn
PMO	Purple Mtn Obs. Nanki	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl Obs	32.0	248.4		+		MAR 12 02:01 - MAR 12 02:01	PneRnn
MCD	McDonald Obs. 2.7m	30.7	256.0		+	+	MAR 12 01:42 - MAR 12 02:01	PieRnn
TEN	Teide Obs./Tenerife	28.3	343.5		+	+	MAR 12 01:35 - MAR 12 01:58	PieRnn
IRTF	Mauna Kea/IRTF	19.8	204.5					PnnRnn
KAV	Kavalur Observatory	12.6	78.8					PnnRnn
RIO	Rio de Janeiro	-22.9	316.8	+++++		+++++	MAR 12 01:47 - MAR 12 01:52	PnnRie
ESO	European Southern Obs	-29.3	289.3	+++++		+++++	MAR 12 01:48 - MAR 12 01:53	PnnRie
AAT	Siding Spring (AAT)	-31.3	149.1					PnnRnn
SAAO	So. Afr. Astro. Obs.	-32.4	20.8		+	+	MAR 12 01:38 - MAR 12 01:48	PieRnn
MSO	Mt. Stromlo Observato	-35.3	149.0					PnnRnn



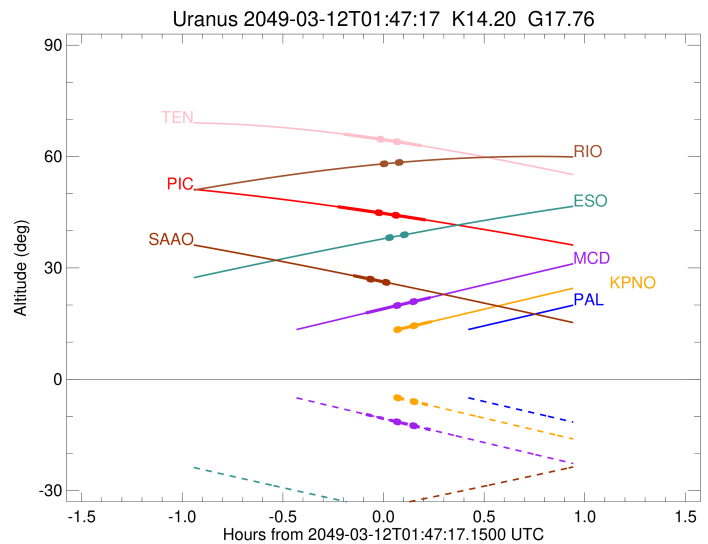
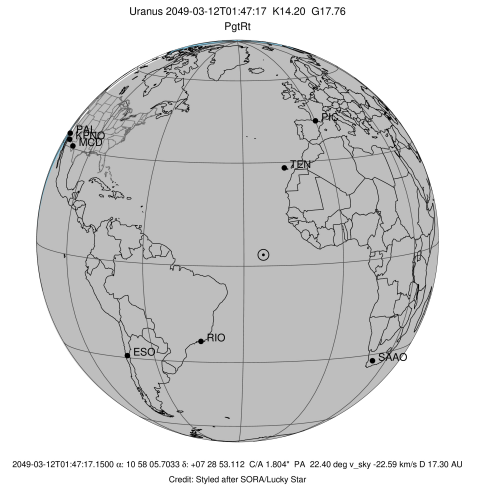
```

target                : Uranus
target radius (km)    : 25559.00
C/A epoch              : 2049-03-12T01:46:44.930
Event type             : PgtRt
: Uranus occs: geocentric, topocentric
: Ring occs: topocentric, not geocentric
Observer code         : PIC
Location              : Pic du Midi
Latitude (deg)        : 42.93656
E. Longitude (deg)    : 0.14231
Altitude (km)         : 2.890
Gaia source ID        : 3865094159761871104
2Mass ID (if available) : 10580561+0728539
ICRS Star Coord at Epoch: 10h 58m 05.70331s +07:28:53.11192s
RUWE (>1.4 is poor)  : 0.91
K magnitude           : 14.199
G magnitude           : 17.757
RP magnitude          : 16.670
BP magnitude          : 18.974
DUPflag              : 0
Distance (au)         : 17.305
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s)  : -22.59
Sun-Target sep (deg)  : 171.59
Sun-Moon sep (deg)    : 75.82
B (ring opening deg)  : 4.62
PA of pole (deg)      : 104.73
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 1.453
C/A sky separation (km) : 18235.9
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_itrf93_040916.bsp
earth_720101_070426.bpc
earth_200101_990628_predict.bpc
pg3f0000r.bsp
pg490000r.bsp
naif0012.tls
earth_flat_IAU.spk
  
```



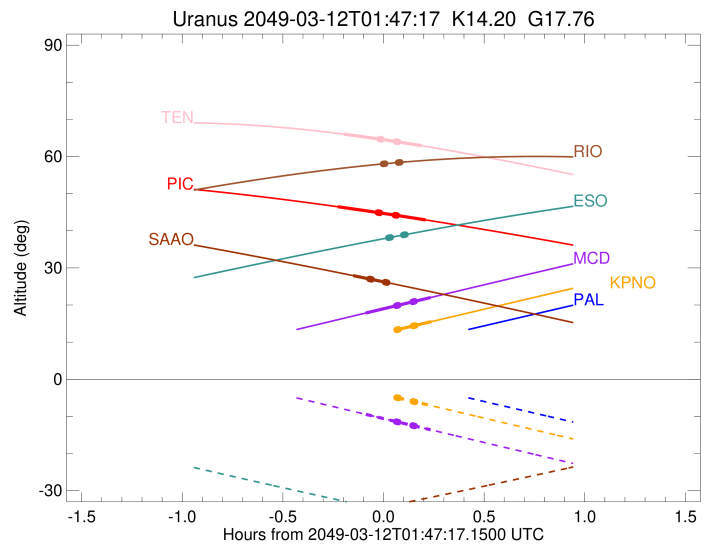
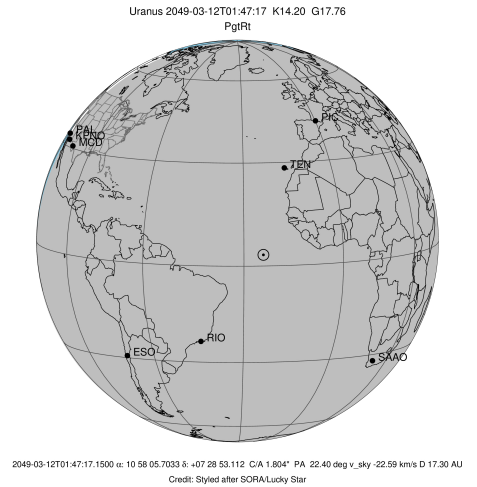
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2049-03-12T01:45:37.465	b	44.91	-44.99	51202.78	-263.63		
lambda	I	2049-03-12T01:45:41.947	b	44.90	-44.98	50026.72	-261.90		
delta	I	2049-03-12T01:45:48.557	b	44.88	-44.97	48300.36	-260.40		
gamma	I	2049-03-12T01:45:51.131	b	44.88	-44.96	47630.80	-259.78		
eta	I	2049-03-12T01:45:52.883	b	44.87	-44.96	47176.12	-259.33		
beta	I	2049-03-12T01:45:58.963	b	44.86	-44.95	45642.63	-258.03		
alpha	I	2049-03-12T01:46:02.643	b	44.85	-44.94	44738.19	-257.39		
4	I	2049-03-12T01:46:11.447	b	44.83	-44.93	42567.89	-255.63		
5	I	2049-03-12T01:46:11.079	b	44.83	-44.93	42246.29	-252.84		
6	I	2049-03-12T01:46:15.521	b	44.82	-44.92	41878.79	-255.96		
Uranus	I	2049-03-12T01:33:41.384		46.47	-46.20	25556.68		-51.58	-52.84
Uranus	E	2049-03-12T01:59:48.910		42.93	-43.40	25557.63		37.00	38.27
6	E	2049-03-12T01:50:39.118	b	44.22	-44.44	41804.71	255.88		
5	E	2049-03-12T01:50:41.178	b	44.22	-44.44	42165.60	252.76		
4	E	2049-03-12T01:50:42.435	b	44.21	-44.44	42608.54	255.54		
alpha	E	2049-03-12T01:50:51.070	b	44.19	-44.42	44684.78	257.29		
beta	E	2049-03-12T01:50:55.297	b	44.19	-44.41	45679.40	257.93		
eta	E	2049-03-12T01:51:01.256	b	44.17	-44.40	47176.12	259.22		
gamma	E	2049-03-12T01:51:02.986	b	44.17	-44.40	47625.08	259.67		
delta	E	2049-03-12T01:51:05.584	b	44.16	-44.40	48300.35	260.29		
lambda	E	2049-03-12T01:51:12.198	b	44.15	-44.38	50026.72	261.78		
epsilon	E	2049-03-12T01:51:17.337	b	44.13	-44.37	51374.65	263.50		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2049-03-12T01:51:47.930
 Event type : PgtRt
 : Uranus occs: geocentric, topocentric
 : Ring occs: topocentric, not geocentric
 Observer code : KPNO
 Location : Kitt Peak Natl Obs
 Latitude (deg) : 31.96333
 E. Longitude (deg) : 248.40000
 Altitude (km) : 2.120
 Gaia source ID : 3865094159761871104
 2Mass ID (if available) : 10580561+0728539
 ICRS Star Coord at Epoch: 10h 58m 05.70331s +07:28:53.11192s
 RUWE (>1.4 is poor) : 0.91
 K magnitude : 14.199
 G magnitude : 17.757
 RP magnitude : 16.670
 BP magnitude : 18.974
 DUPflag : 0
 Distance (au) : 17.305
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -22.59
 Sun-Target sep (deg) : 171.59
 Sun-Moon sep (deg) : 75.14
 B (ring opening deg) : 4.62
 PA of pole (deg) : 104.73
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.734
 C/A sky separation (km) : 21757.9
 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_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	2049-03-12T01:51:11.185	b	13.31	-4.92x	51232.83	-253.11		
lambda	I	2049-03-12T01:51:15.981	b	13.33	-4.94x	50026.70	-250.79		
delta	I	2049-03-12T01:51:22.894	b	13.36	-4.96x	48300.36	-248.60		
gamma	I	2049-03-12T01:51:25.591	b	13.36	-4.97x	47631.00	-247.68		
eta	I	2049-03-12T01:51:27.430	b	13.37	-4.98x	47176.11	-247.03		
beta	I	2049-03-12T01:51:33.806	b	13.39	-5.00x	45643.37	-244.97		
alpha	I	2049-03-12T01:51:37.661	b	13.41	-5.01	44735.66	-243.78		
4	I	2049-03-12T01:51:46.898	b	13.44	-5.04	42572.19	-240.70		
5	I	2049-03-12T01:51:46.585	b	13.44	-5.04	42238.61	-237.72		
6	I	2049-03-12T01:51:51.257	b	13.46	-5.06	41877.71	-240.41		
Uranus	I	2049-03-12T01:41:56.305		11.34	-2.95x	25557.49		-39.21	-40.50
Uranus	E	2049-03-12T02:01:39.254		15.54	-7.14	25558.38		23.87	24.86
6	E	2049-03-12T01:56:03.220	b	14.35	-5.95	41807.52	240.49		
5	E	2049-03-12T01:56:05.024	b	14.36	-5.96	42162.07	237.80		
4	E	2049-03-12T01:56:06.576	b	14.36	-5.96	42610.84	240.77		
alpha	E	2049-03-12T01:56:15.673	b	14.40	-6.00	44684.61	243.85		
beta	E	2049-03-12T01:56:20.116	b	14.41	-6.01	45678.59	245.04		
eta	E	2049-03-12T01:56:26.369	b	14.43	-6.03	47176.13	247.10		
gamma	E	2049-03-12T01:56:28.185	b	14.44	-6.04	47625.51	247.75		
delta	E	2049-03-12T01:56:30.904	b	14.45	-6.05	48300.36	248.67		
lambda	E	2049-03-12T01:56:37.816	b	14.47	-6.07	50026.73	250.86		
epsilon	E	2049-03-12T01:56:43.272	b	14.49	-6.09	51399.66	253.18		

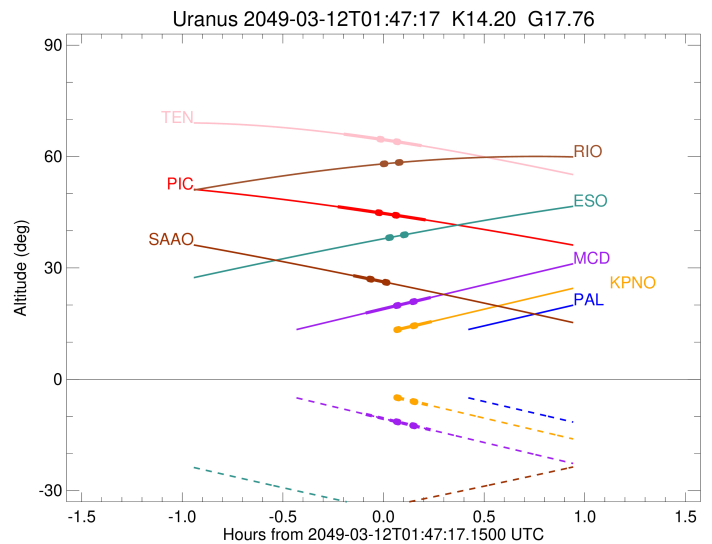
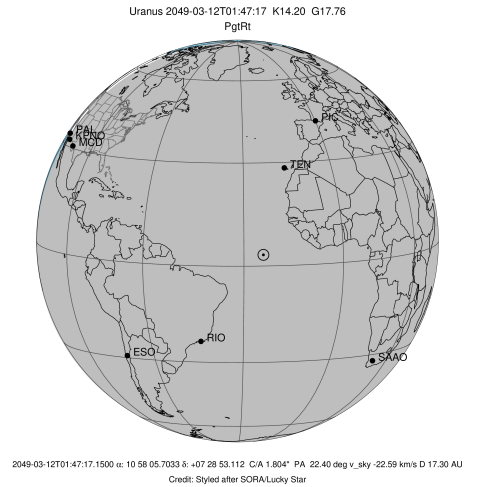
target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2049-03-12T01:51:40.510
 Event type : PgtRt
 : Uranus occs: geocentric, topocentric
 : Ring occs: topocentric, not geocentric
 Observer code : MCD
 Location : McDonald Obs. 2.7m
 Latitude (deg) : 30.67158
 E. Longitude (deg) : 255.97844
 Altitude (km) : 2.075
 Gaia source ID : 3865094159761871104
 2Mass ID (if available) : 10580561+0728539
 ICRS Star Coord at Epoch: 10h 58m 05.70331s +07:28:53.11192s
 RUWE (>1.4 is poor) : 0.91
 K magnitude : 14.199
 G magnitude : 17.757
 RP magnitude : 16.670
 BP magnitude : 18.974
 DUPflag : 0
 Distance (au) : 17.305
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -22.59
 Sun-Target sep (deg) : 171.59
 Sun-Moon sep (deg) : 75.24
 B (ring opening deg) : 4.62
 PA of pole (deg) : 104.73
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.746
 C/A sky separation (km) : 21908.5
 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_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	2049-03-12T01:51:04.096	b	19.80	-11.40	51234.13	-253.29		
lambda	I	2049-03-12T01:51:08.893	b	19.82	-11.42	50026.72	-250.93		
delta	I	2049-03-12T01:51:15.803	b	19.85	-11.44	48300.34	-248.70		
gamma	I	2049-03-12T01:51:18.499	b	19.86	-11.45	47631.03	-247.77		
eta	I	2049-03-12T01:51:20.337	b	19.86	-11.46	47176.11	-247.10		
beta	I	2049-03-12T01:51:26.711	b	19.89	-11.48	45643.40	-245.00		
alpha	I	2049-03-12T01:51:30.565	b	19.90	-11.50	44735.54	-243.78		
4	I	2049-03-12T01:51:39.799	b	19.93	-11.53	42572.38	-240.63		
5	I	2049-03-12T01:51:39.491	b	19.93	-11.53	42238.27	-237.64		
6	I	2049-03-12T01:51:44.160	b	19.95	-11.55	41877.69	-240.31		
Uranus	I	2049-03-12T01:42:01.017		17.85	-9.46	25557.54		-38.51	-39.80
Uranus	E	2049-03-12T02:01:19.713		22.02	-13.61	25558.42		23.27	24.25
6	E	2049-03-12T01:55:54.917	b	20.85	-12.44	41807.64	240.39		
5	E	2049-03-12T01:55:56.707	b	20.86	-12.45	42161.90	237.71		
4	E	2049-03-12T01:55:58.268	b	20.86	-12.46	42610.93	240.71		
alpha	E	2049-03-12T01:56:07.364	b	20.89	-12.49	44684.61	243.86		
beta	E	2049-03-12T01:56:11.806	b	20.91	-12.50	45678.56	245.07		
eta	E	2049-03-12T01:56:18.057	b	20.93	-12.53	47176.12	247.17		
gamma	E	2049-03-12T01:56:19.873	b	20.94	-12.53	47625.50	247.84		
delta	E	2049-03-12T01:56:22.591	b	20.95	-12.54	48300.33	248.77		
lambda	E	2049-03-12T01:56:29.499	b	20.97	-12.57	50026.71	251.00		
epsilon	E	2049-03-12T01:56:34.956	b	20.99	-12.59	51400.67	253.35		

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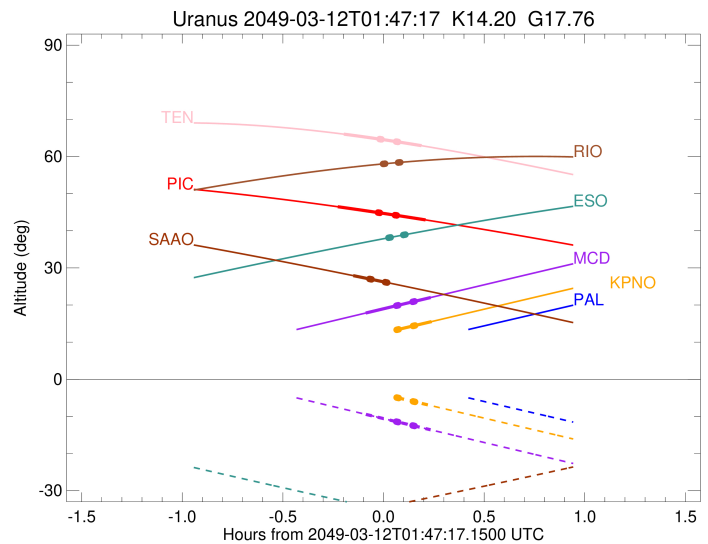
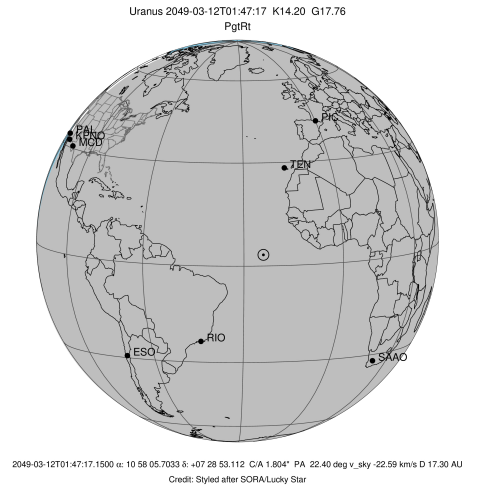
target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2049-03-12T01:47:01.770
Event type          : PgtRt
: Uranus occs: geocentric, topocentric
: Ring occs: topocentric, not geocentric
Observer code       : TEN
Location            : Teide Obs./Tenerife
Latitude (deg)      : 28.30050
E. Longitude (deg)  : 343.48909
Altitude (km)       : 2.395
Gaia source ID      : 3865094159761871104
2Mass ID (if available) : 10580561+0728539
ICRS Star Coord at Epoch: 10h 58m 05.70331s +07:28:53.11192s
RUWE (>1.4 is poor) : 0.91
K magnitude          : 14.199
G magnitude          : 17.757
RP magnitude         : 16.670
BP magnitude         : 18.974
DUPflag             : 0
Distance (au)       : 17.305
f0 (km)             : 0.000
g0 (km)             : 0.000
skyplane vel. (km/s) : -22.59
Sun-Target sep (deg) : 171.59
Sun-Moon sep (deg)  : 75.98
B (ring opening deg) : 4.62
PA of pole (deg)    : 104.73
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 1.593
C/A sky separation (km) : 19990.0
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_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	2049-03-12T01:46:05.695	b	64.70	-64.03	51217.69	-260.88		
lambda	I	2049-03-12T01:46:10.285	b	64.69	-64.03	50026.70	-258.85		
delta	I	2049-03-12T01:46:16.977	b	64.68	-64.02	48300.35	-257.02		
gamma	I	2049-03-12T01:46:19.586	b	64.67	-64.02	47630.93	-256.25		
eta	I	2049-03-12T01:46:21.362	b	64.67	-64.01	47176.11	-255.70		
beta	I	2049-03-12T01:46:27.526	b	64.65	-64.01	45643.00	-254.03		
alpha	I	2049-03-12T01:46:31.253	b	64.65	-64.00	44736.97	-253.13		
4	I	2049-03-12T01:46:40.176	b	64.63	-63.99	42570.00	-250.74		
5	I	2049-03-12T01:46:39.834	b	64.63	-63.99	42242.51	-247.83		
6	I	2049-03-12T01:46:44.349	b	64.62	-63.99	41878.32	-250.78		
Uranus	I	2049-03-12T01:35:27.910		66.03	-64.63	25557.07		-45.61	-46.92
Uranus	E	2049-03-12T01:58:35.888		62.93	-63.04	25557.99		31.17	32.35
6	E	2049-03-12T01:51:00.418	b	64.03	-63.68	41806.04	250.75		
5	E	2049-03-12T01:51:02.336	b	64.03	-63.68	42163.80	247.79		
4	E	2049-03-12T01:51:03.721	b	64.02	-63.67	42609.71	250.69		
alpha	E	2049-03-12T01:51:12.493	b	64.00	-63.66	44684.65	253.07		
beta	E	2049-03-12T01:51:16.783	b	63.99	-63.66	45679.01	253.97		
eta	E	2049-03-12T01:51:22.826	b	63.98	-63.65	47176.11	255.63		
gamma	E	2049-03-12T01:51:24.582	b	63.97	-63.65	47625.27	256.18		
delta	E	2049-03-12T01:51:27.213	b	63.97	-63.64	48300.35	256.94		
lambda	E	2049-03-12T01:51:33.908	b	63.95	-63.63	50026.71	258.77		
epsilon	E	2049-03-12T01:51:39.151	b	63.94	-63.63	51386.98	260.80		

```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2049-03-12T01:47:18.500
Event type           : PgtRt
: Uranus occs: geocentric, topocentric
: Ring occs: topocentric, not geocentric
Observer code        : RIO
Location             : Rio de Janeiro
Latitude (deg)       : -22.89506
E. Longitude (deg)   : 316.77708
Altitude (km)        : 0.033
Gaia source ID       : 3865094159761871104
2Mass ID (if available) : 10580561+0728539
ICRS Star Coord at Epoch: 10h 58m 05.70331s +07:28:53.11192s
RUWE (>1.4 is poor) : 0.91
K magnitude           : 14.199
G magnitude           : 17.757
RP magnitude          : 16.670
BP magnitude          : 18.974
DUPflag              : 0
Distance (au)         : 17.305
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s) : -22.59
Sun-Target sep (deg) : 171.59
Sun-Moon sep (deg)   : 75.92
B (ring opening deg) : 4.62
PA of pole (deg)     : 104.73
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 2.076
C/A sky separation (km) : 26055.7
NAIF SPICE kernels   : RAJobs_U111+rgf15.spk
URKALLvl1.spk
urall1.bsp
IAU_URANUS_for_RINGFIT.tpc
vgr2.urall1.bsp
ural61.bsp
vgr2.ural61.bsp
peph.ural60.bsp
earthstns_itrf93_040916.bsp
earth_720101_070426.bpc
earth_200101_990628_predict.bpc
pg3f0000r.bsp
pg490000r.bsp
naif0012.tls
earth_flat_IAU.spk
  
```

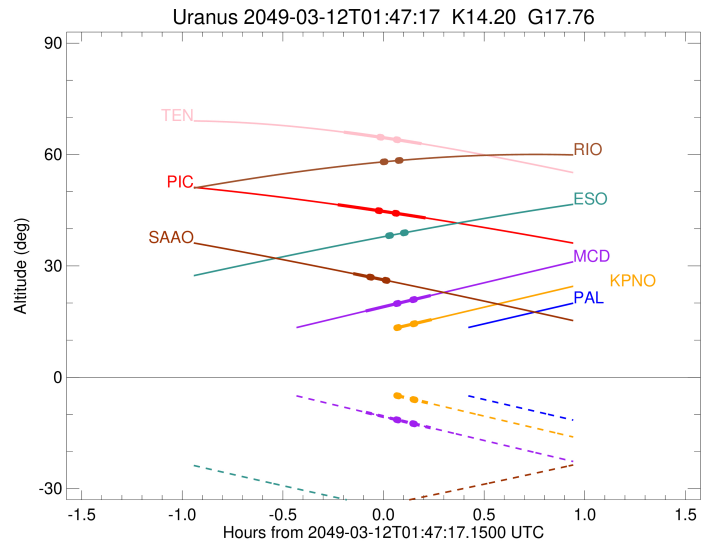
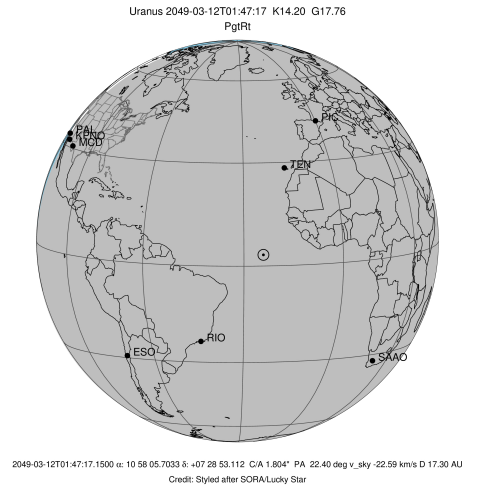


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2049-03-12T01:47:07.165		58.01	-58.19	51270.39	-244.12		
lambda	I	2049-03-12T01:47:12.305		58.02	-58.20	50026.71	-240.83		
delta	I	2049-03-12T01:47:19.522		58.03	-58.22	48300.34	-237.46		
gamma	I	2049-03-12T01:47:22.348		58.03	-58.23	47631.23	-236.04		
eta	I	2049-03-12T01:47:24.280		58.04	-58.23	47176.13	-235.03		
beta	I	2049-03-12T01:47:30.974		58.04	-58.25	45644.54	-231.68		
alpha	I	2049-03-12T01:47:35.027		58.05	-58.26	44732.18	-229.56		
4	I	2049-03-12T01:47:44.768		58.06	-58.28	42577.73	-224.18		
5	I	2049-03-12T01:47:44.601		58.06	-58.28	42228.60	-220.80		
6	I	2049-03-12T01:47:49.443		58.07	-58.29	41875.77	-222.85		

No planet occultations

6	E	2049-03-12T01:51:36.693		58.38	-58.81	41811.57	222.91		
5	E	2049-03-12T01:51:38.162		58.38	-58.82	42158.50	220.86		
4	E	2049-03-12T01:51:40.099		58.38	-58.82	42613.24	224.24		
alpha	E	2049-03-12T01:51:49.749		58.40	-58.84	44684.81	229.61		
beta	E	2049-03-12T01:51:54.428		58.40	-58.85	45677.38	231.72		
eta	E	2049-03-12T01:52:01.006		58.41	-58.87	47176.11	235.07		
gamma	E	2049-03-12T01:52:02.917		58.41	-58.87	47626.04	236.08		
delta	E	2049-03-12T01:52:05.765		58.42	-58.88	48300.34	237.49		
lambda	E	2049-03-12T01:52:12.983		58.43	-58.89	50026.71	240.85		
epsilon	E	2049-03-12T01:52:18.774		58.43	-58.91	51428.74	244.14		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2049-03-12T01:48:42.700
 Event type : PgtRt
 : Uranus occs: geocentric, topocentric
 : Ring occs: topocentric, not geocentric
 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 : 3865094159761871104
 2Mass ID (if available) : 10580561+0728539
 ICRS Star Coord at Epoch: 10h 58m 05.70331s +07:28:53.11192s
 RUWE (>1.4 is poor) : 0.91
 K magnitude : 14.199
 G magnitude : 17.757
 RP magnitude : 16.670
 BP magnitude : 18.974
 DUPflag : 0
 Distance (au) : 17.305
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -22.59
 Sun-Target sep (deg) : 171.59
 Sun-Moon sep (deg) : 75.64
 B (ring opening deg) : 4.62
 PA of pole (deg) : 104.73
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.180
 C/A sky separation (km) : 27357.0
 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_itrf93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk

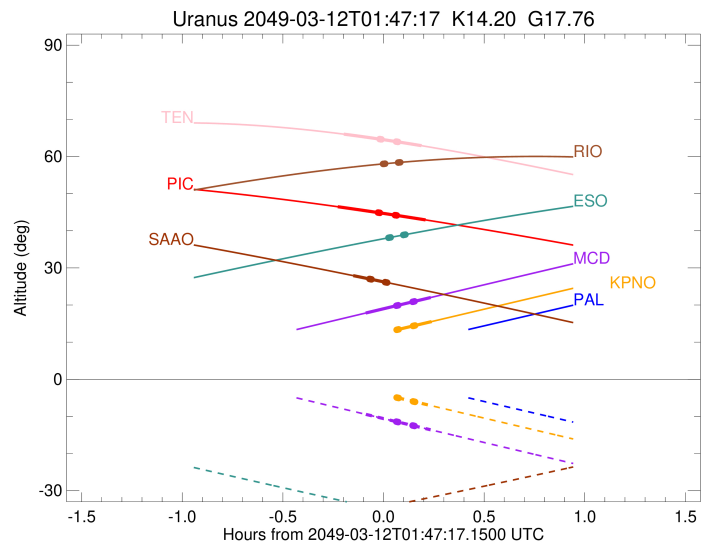
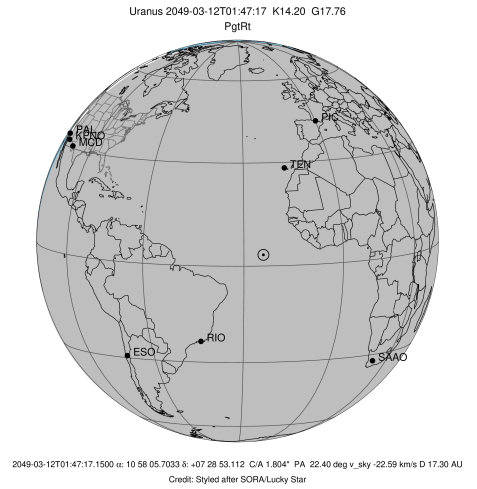


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2049-03-12T01:48:44.383		38.11	-35.42	51281.97	-238.67		
lambda	I	2049-03-12T01:48:49.694		38.12	-35.44	50026.71	-235.06		
delta	I	2049-03-12T01:48:57.096		38.14	-35.46	48300.35	-231.28		
gamma	I	2049-03-12T01:48:59.999		38.15	-35.47	47631.28	-229.69		
eta	I	2049-03-12T01:49:01.985		38.16	-35.48	47176.12	-228.55		
beta	I	2049-03-12T01:49:08.868		38.18	-35.50	45644.95	-224.74		
alpha	I	2049-03-12T01:49:13.041		38.19	-35.51	44731.03	-222.29		
4	I	2049-03-12T01:49:23.083		38.22	-35.54	42579.53	-216.07		
5	I	2049-03-12T01:49:22.979		38.22	-35.54	42225.36	-212.55		
6	I	2049-03-12T01:49:27.919		38.23	-35.56	41875.01	-214.33		

No planet occultations

6	E	2049-03-12T01:53:08.318		38.86	-36.26	41813.01	214.43		
5	E	2049-03-12T01:53:09.701		38.86	-36.27	42157.58	212.65		
4	E	2049-03-12T01:53:11.793		38.87	-36.27	42613.88	216.17		
alpha	E	2049-03-12T01:53:21.757		38.90	-36.31	44684.92	222.37		
beta	E	2049-03-12T01:53:26.571		38.91	-36.32	45676.95	224.82		
eta	E	2049-03-12T01:53:33.338		38.93	-36.34	47176.11	228.63		
gamma	E	2049-03-12T01:53:35.302		38.93	-36.35	47626.24	229.77		
delta	E	2049-03-12T01:53:38.226		38.94	-36.36	48300.35	231.35		
lambda	E	2049-03-12T01:53:45.627		38.96	-36.38	50026.72	235.13		
epsilon	E	2049-03-12T01:53:51.593		38.98	-36.40	51437.54	238.74		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2049-03-12T01:43:26.030
 Event type : PgtRt
 : Uranus occs: geocentric, topocentric
 : Ring occs: topocentric, not geocentric
 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 : 3865094159761871104
 2Mass ID (if available) : 10580561+0728539
 ICRS Star Coord at Epoch: 10h 58m 05.70331s +07:28:53.11192s
 RUWE (>1.4 is poor) : 0.91
 K magnitude : 14.199
 G magnitude : 17.757
 RP magnitude : 16.670
 BP magnitude : 18.974
 DUPflag : 0
 Distance (au) : 17.305
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -22.59
 Sun-Target sep (deg) : 171.59
 Sun-Moon sep (deg) : 75.75
 B (ring opening deg) : 4.62
 PA of pole (deg) : 104.73
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.958
 C/A sky separation (km) : 24567.7
 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_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	2049-03-12T01:43:04.282	b	27.03	-35.18	51257.25	-246.83		
lambda	I	2049-03-12T01:43:09.307	b	27.02	-35.16	50026.71	-243.91		
delta	I	2049-03-12T01:43:16.426	b	26.99	-35.14	48300.36	-241.00		
gamma	I	2049-03-12T01:43:19.209	b	26.99	-35.13	47631.16	-239.79		
eta	I	2049-03-12T01:43:21.110	b	26.98	-35.12	47176.12	-238.91		
beta	I	2049-03-12T01:43:27.698	b	26.96	-35.11	45644.10	-236.06		
alpha	I	2049-03-12T01:43:31.683	b	26.95	-35.09	44733.45	-234.31		
4	I	2049-03-12T01:43:41.247	b	26.92	-35.06	42575.79	-229.84		
5	I	2049-03-12T01:43:41.018	b	26.92	-35.07	42232.18	-226.62		
6	I	2049-03-12T01:43:45.815	b	26.90	-35.05	41876.54	-228.92		
Uranus	I	2049-03-12T01:38:17.000		27.91	-36.03	25558.41		-23.27	-24.24
Uranus	E	2049-03-12T01:48:35.235		26.01	-34.18	25558.92		8.63	9.04
6	E	2049-03-12T01:47:43.029	b	26.17	-34.34	41810.08	228.90		
5	E	2049-03-12T01:47:44.618	b	26.16	-34.33	42159.63	226.60		
4	E	2049-03-12T01:47:46.418	b	26.16	-34.32	42612.45	229.82		
alpha	E	2049-03-12T01:47:55.878	b	26.13	-34.30	44684.69	234.27		
beta	E	2049-03-12T01:48:00.480	b	26.11	-34.28	45677.84	236.02		
eta	E	2049-03-12T01:48:06.951	b	26.09	-34.26	47176.13	238.85		
gamma	E	2049-03-12T01:48:08.831	b	26.09	-34.26	47625.85	239.72		
delta	E	2049-03-12T01:48:11.638	b	26.08	-34.25	48300.36	240.94		
lambda	E	2049-03-12T01:48:18.760	b	26.06	-34.23	50026.69	243.84		
epsilon	E	2049-03-12T01:48:24.444	b	26.04	-34.21	51418.74	246.75		