

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2029-02-04T15:59:25.130
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 144992804514327424
 2Mass ID (if available) : 04324987+2154274

Uranus 2029-02-04T15:59:25 K14.87 G17.20 PgtRgt

ICRS Star Coord at Epoch: 04h 32m 49.87621s +21:54:27.20801s

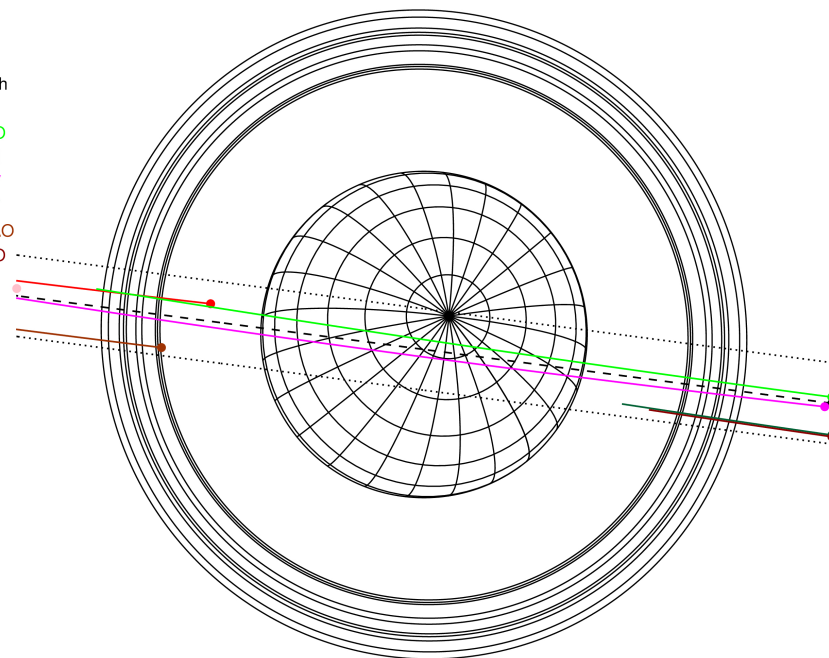
RUWE (>1.4 is poor) : 1.02
 K magnitude : 14.871
 G magnitude : 17.200
 RP magnitude : 16.490
 BP magnitude : 17.752
 DUPflag : 0
 Distance (au) : 18.858
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -5.87
 Sun-Target sep (deg) : 114.13
 Sun-Moon sep (deg) : 139.32
 B (ring opening deg) : 79.06
 PA of pole (deg) : -53.57

Uranus 2029-02-04T15:59:25 K14.87 G17.20
 PgtRgt



2029-02-04T15:59:25.1300 α: 04 32 49.8762 δ: +21 54 27.208 C/A 0.164° PA 352.48 deg v_sky - 5.87 km/s D 18.86 AU
 Credit: Styled after SORA/Lucky Star

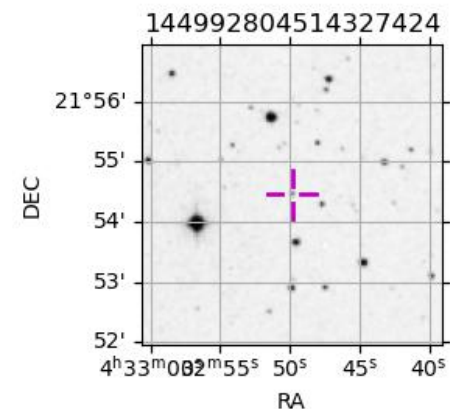
Earth
 PIC
 PMO
 TEN
 KAV
 AAT
 SAAO
 MSO



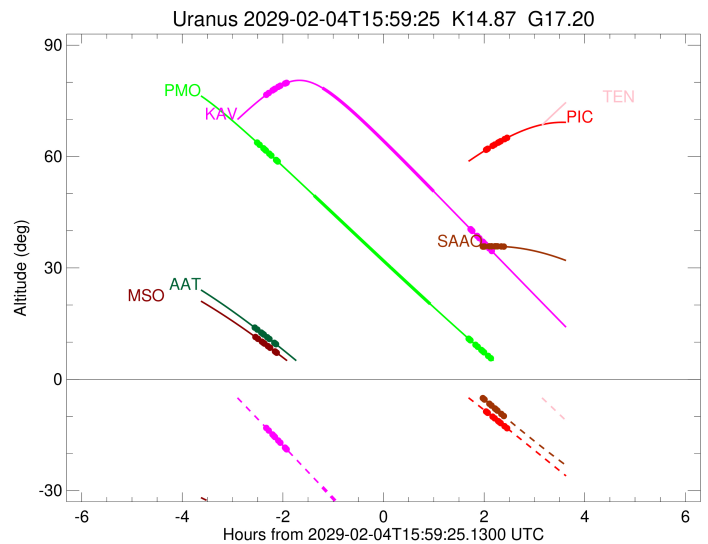
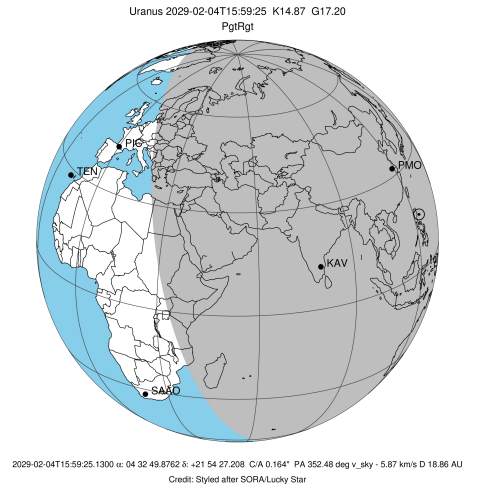
#	a(km)	ring
1	41837.2	6
2	42235.0	5
3	42571.2	4
4	44718.5	alpha
5	45661.1	beta
6	47176.1	eta
7	47626.3	gamma
8	48300.3	delta
9	50026.7	lambda
10	51149.4	epsilon

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			+++++	FEB 04 18:01 - FEB 04 18:25	PnnRne
PAL	Palomar Mt (200")	33.4	243.1					PnnRnn
PMO	Purple Mtn Obs. Nanki	32.1	118.8	+++++	+ +	+++++	FEB 04 13:27 - FEB 04 18:06	PieRie
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					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5					PnnRnn
KAV	Kavalur Observatory	12.6	78.8	+++++	+ +	+++++	FEB 04 13:38 - FEB 04 18:07	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	+++++			FEB 04 13:24 - FEB 04 13:51	PnnRin
SAAO	So. Afr. Astro. Obs.	-32.4	20.8			+++++	FEB 04 17:57 - FEB 04 18:22	PnnRne
MSO	Mt. Stromlo Observato	-35.3	149.0	+++++			FEB 04 13:25 - FEB 04 13:52	PnnRin

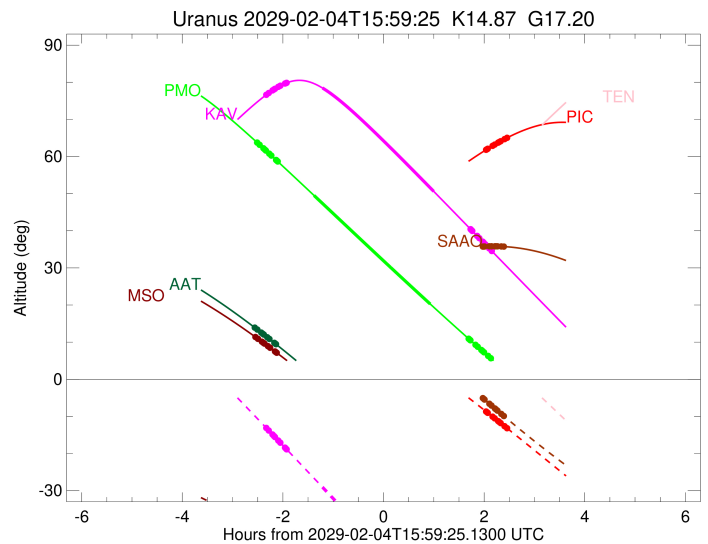
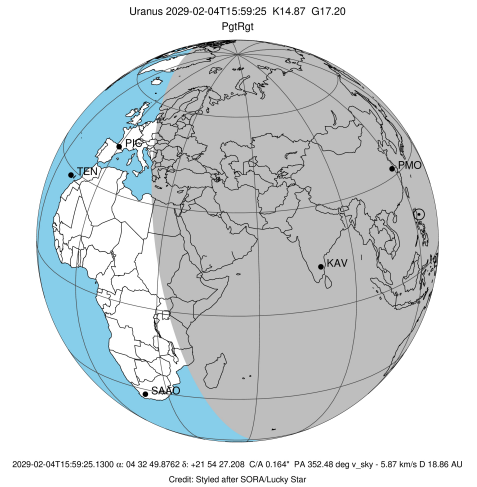


target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2029-02-04T16:08:41.650
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PIC
 Location : Pic du Midi
 Latitude (deg) : 42.93656
 E. Longitude (deg) : 0.14231
 Altitude (km) : 2.890
 Gaia source ID : 144992804514327424
 2Mass ID (if available) : 04324987+2154274
 ICRS Star Coord at Epoch: 04h 32m 49.87621s +21:54:27.20801s
 RUWE (>1.4 is poor) : 1.02
 K magnitude : 14.871
 G magnitude : 17.200
 RP magnitude : 16.490
 BP magnitude : 17.752
 DUPflag : 0
 Distance (au) : 18.858
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -5.87
 Sun-Target sep (deg) : 114.13
 Sun-Moon sep (deg) : 139.30
 B (ring opening deg) : 79.06
 PA of pole (deg) : -53.57
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.075
 C/A sky separation (km) : 1030.7
 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_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	2029-02-04T13:47:09.057		17.04	27.39x	51478.50	-5.97		
lambda	I	2029-02-04T13:51:11.957		17.77	27.07x	50026.71	-5.98		
delta	I	2029-02-04T13:56:00.555		18.63	26.67x	48300.35	-5.98		
gamma	I	2029-02-04T13:57:52.551		18.96	26.51x	47629.99	-5.99		
eta	I	2029-02-04T13:59:08.355		19.19	26.40x	47176.12	-5.99		
beta	I	2029-02-04T14:03:18.343		19.94	26.03x	45678.94	-5.99		
alpha	I	2029-02-04T14:06:04.428		20.44	25.77x	44684.73	-6.00		
4	I	2029-02-04T14:11:59.194		21.51	25.21x	42551.64	-6.00		
5	I	2029-02-04T14:12:59.695		21.69	25.12x	42195.77	-6.00		
6	I	2029-02-04T14:14:02.745		21.88	25.01x	41808.32	-6.00		
Uranus	I	2029-02-04T14:59:04.741		30.11	20.00x	25226.62		8.31	8.70
Uranus	E	2029-02-04T17:17:45.620		55.00	-0.99x	25273.73		-7.69	-8.05
6	E	2029-02-04T18:01:48.211		61.82	-8.70	41864.16	6.19		
5	E	2029-02-04T18:02:52.405		61.97	-8.89	42269.75	6.19		
4	E	2029-02-04T18:03:44.948		62.09	-9.04	42588.29	6.19		
alpha	E	2029-02-04T18:09:33.565		62.88	-10.08	44752.11	6.19		
beta	E	2029-02-04T18:11:57.722		63.20	-10.51	45643.89	6.20		
eta	E	2029-02-04T18:16:05.080		63.74	-11.25	47176.12	6.20		
gamma	E	2029-02-04T18:17:17.159		63.89	-11.47	47622.76	6.20		
delta	E	2029-02-04T18:19:06.503		64.12	-11.80	48300.35	6.20		
lambda	E	2029-02-04T18:23:45.054		64.68	-12.64	50026.71	6.20		
epsilon	E	2029-02-04T18:25:50.928		64.93	-13.01	50806.93	6.20		

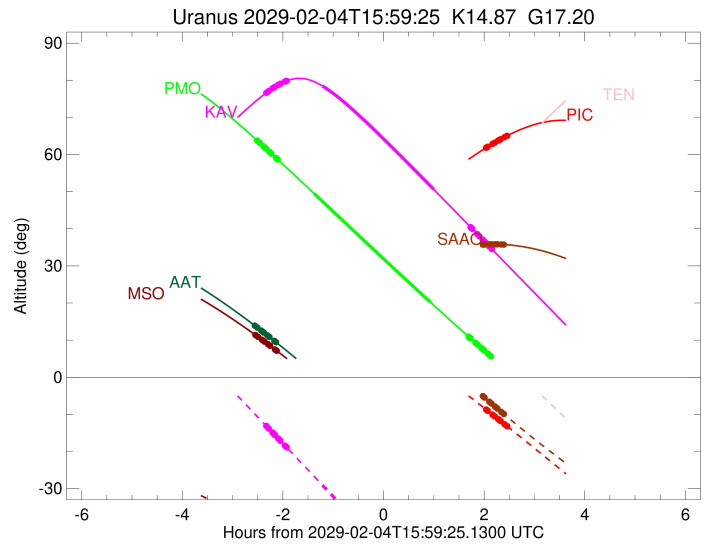
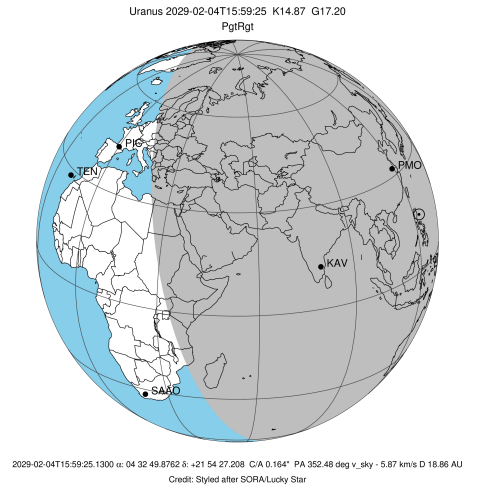
target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2029-02-04T15:45:16.620
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PMO
 Location : Purple Mtn Obs. Nanking
 Latitude (deg) : 32.06667
 E. Longitude (deg) : 118.82089
 Altitude (km) : 0.364
 Gaia source ID : 144992804514327424
 2Mass ID (if available) : 04324987+2154274
 ICRS Star Coord at Epoch: 04h 32m 49.87621s +21:54:27.20801s
 RUWE (>1.4 is poor) : 1.02
 K magnitude : 14.871
 G magnitude : 17.200
 RP magnitude : 16.490
 BP magnitude : 17.752
 DUPflag : 0
 Distance (au) : 18.858
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -5.87
 Sun-Target sep (deg) : 114.13
 Sun-Moon sep (deg) : 140.24
 B (ring opening deg) : 79.06
 PA of pole (deg) : -53.57
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.058
 C/A sky separation (km) : 794.4
 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



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

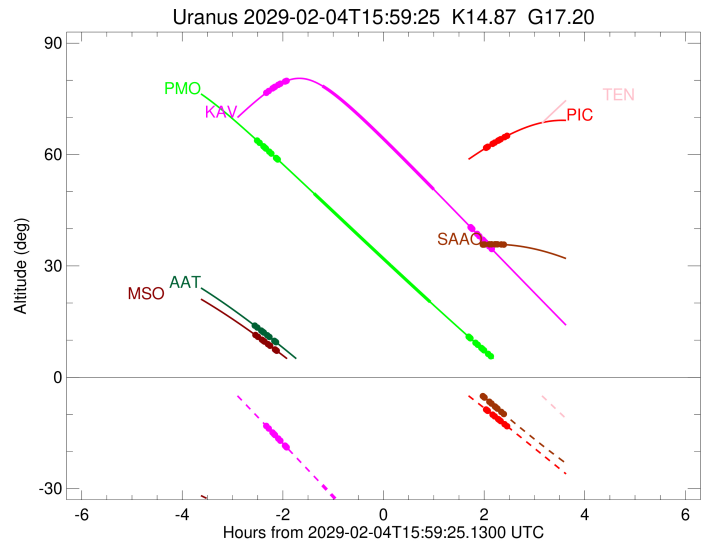
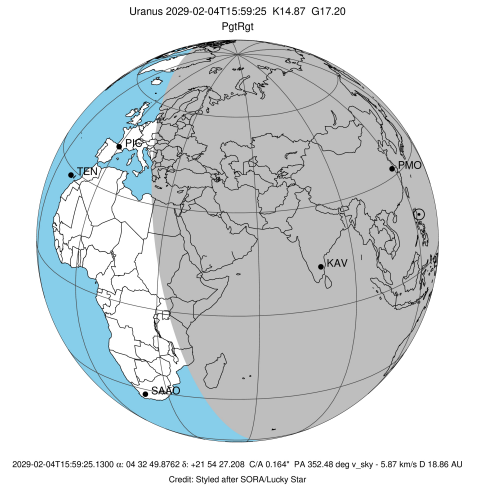
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2029-02-04T13:27:50.419		63.94	-48.21	51493.96	-6.33		
lambda	I	2029-02-04T13:31:42.159		63.15	-49.01	50026.71	-6.33		
delta	I	2029-02-04T13:36:15.027		62.21	-49.95	48300.35	-6.32		
gamma	I	2029-02-04T13:38:01.089		61.85	-50.32	47629.71	-6.32		
eta	I	2029-02-04T13:39:12.844		61.60	-50.56	47176.12	-6.32		
beta	I	2029-02-04T13:43:09.974		60.78	-51.38	45678.21	-6.32		
alpha	I	2029-02-04T13:45:47.450		60.23	-51.91	44685.02	-6.31		
4	I	2029-02-04T13:51:24.362		59.06	-53.06	42554.81	-6.31		
5	I	2029-02-04T13:52:21.478		58.86	-53.25	42201.25	-6.31		
6	I	2029-02-04T13:53:22.206		58.65	-53.46	41810.81	-6.30		
Uranus	I	2029-02-04T14:36:37.171		49.50	-61.93	25287.29		7.50	7.85
Uranus	E	2029-02-04T16:55:15.259		20.25	-72.05	25255.16		-7.94	-8.31
6	E	2029-02-04T17:41:02.316		10.91	-65.44	41864.33	5.90		
5	E	2029-02-04T17:42:09.694		10.68	-65.24	42270.09	5.90		
4	E	2029-02-04T17:43:04.830		10.50	-65.08	42588.47	5.90		
alpha	E	2029-02-04T17:49:11.265		9.28	-64.00	44752.12	5.89		
beta	E	2029-02-04T17:51:43.055		8.77	-63.55	45643.88	5.88		
eta	E	2029-02-04T17:56:03.866		7.91	-62.75	47176.12	5.87		
gamma	E	2029-02-04T17:57:19.948		7.65	-62.52	47622.76	5.87		
delta	E	2029-02-04T17:59:15.433		7.27	-62.16	48300.35	5.87		
lambda	E	2029-02-04T18:04:10.014		6.30	-61.24	50026.71	5.86		
epsilon	E	2029-02-04T18:06:23.203		5.86	-60.82	50806.30	5.85		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2029-02-04T15:52:46.050
 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 : 144992804514327424
 2Mass ID (if available) : 04324987+2154274
 ICRS Star Coord at Epoch: 04h 32m 49.87621s +21:54:27.20801s
 RUWE (>1.4 is poor) : 1.02
 K magnitude : 14.871
 G magnitude : 17.200
 RP magnitude : 16.490
 BP magnitude : 17.752
 DUPflag : 0
 Distance (au) : 18.858
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -5.87
 Sun-Target sep (deg) : 114.13
 Sun-Moon sep (deg) : 140.21
 B (ring opening deg) : 79.06
 PA of pole (deg) : -53.57
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.255
 C/A sky separation (km) : 3494.2
 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



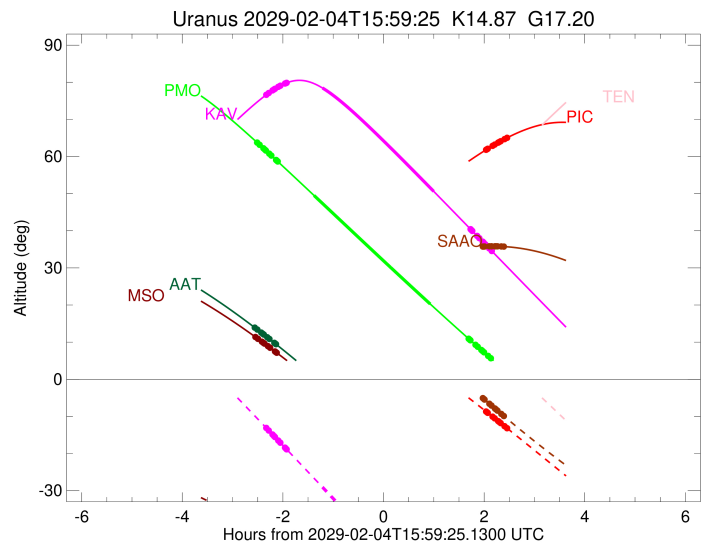
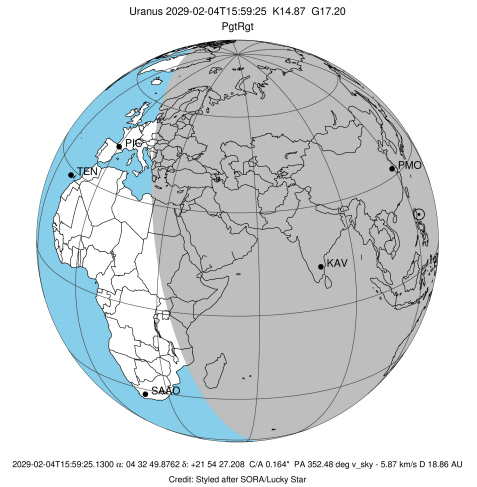
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2029-02-04T13:38:44.716		76.48	-12.91	51501.64	-6.40		
lambda	I	2029-02-04T13:42:35.224		77.12	-13.82	50026.71	-6.40		
delta	I	2029-02-04T13:47:05.068		77.82	-14.88	48300.35	-6.40		
gamma	I	2029-02-04T13:48:49.934		78.08	-15.30	47629.54	-6.40		
eta	I	2029-02-04T13:50:00.822		78.25	-15.58	47176.12	-6.40		
beta	I	2029-02-04T13:53:55.167		78.77	-16.51	45677.73	-6.39		
alpha	I	2029-02-04T13:56:30.545		79.09	-17.12	44685.29	-6.39		
4	I	2029-02-04T14:02:02.835		79.68	-18.44	42556.86	-6.39		
5	I	2029-02-04T14:02:58.871		79.77	-18.66	42204.82	-6.39		
6	I	2029-02-04T14:03:59.203		79.86	-18.90	41812.48	-6.39		
Uranus	I	2029-02-04T14:46:33.920		78.47	-29.05	25338.28		6.74	7.06
Uranus	E	2029-02-04T16:59:17.143		50.62	-60.90	25188.29		-8.79	-9.20
6	E	2029-02-04T17:43:20.215		40.41	-71.44	41866.79	6.16		
5	E	2029-02-04T17:44:25.001		40.16	-71.70	42275.55	6.16		
4	E	2029-02-04T17:45:17.528		39.96	-71.90	42591.63	6.16		
alpha	E	2029-02-04T17:51:07.655		38.60	-73.29	44752.36	6.15		
beta	E	2029-02-04T17:53:32.707		38.04	-73.86	45643.19	6.15		
eta	E	2029-02-04T17:57:42.184		37.07	-74.84	47176.12	6.14		
gamma	E	2029-02-04T17:58:54.863		36.79	-75.13	47622.49	6.14		
delta	E	2029-02-04T18:00:45.278		36.36	-75.56	48300.35	6.14		
lambda	E	2029-02-04T18:05:26.727		35.27	-76.66	50026.71	6.13		
epsilon	E	2029-02-04T18:07:36.365		34.77	-77.16	50821.15	6.13		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2029-02-04T15:45:34.930
 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 : 144992804514327424
 2Mass ID (if available) : 04324987+2154274
 ICRS Star Coord at Epoch: 04h 32m 49.87621s +21:54:27.20801s
 RUWE (>1.4 is poor) : 1.02
 K magnitude : 14.871
 G magnitude : 17.200
 RP magnitude : 16.490
 BP magnitude : 17.752
 DUPflag : 0
 Distance (au) : 18.858
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -5.87
 Sun-Target sep (deg) : 114.13
 Sun-Moon sep (deg) : 139.79
 B (ring opening deg) : 79.06
 PA of pole (deg) : -53.57
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.438
 C/A sky separation (km) : 5987.8
 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_itrf93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk



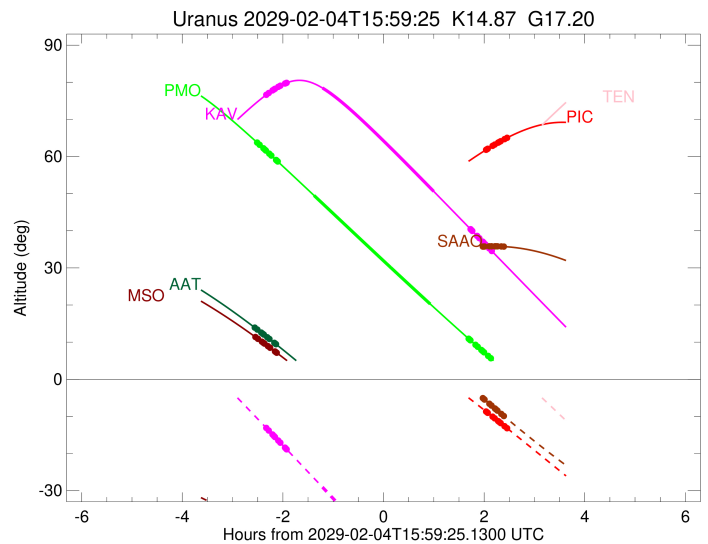
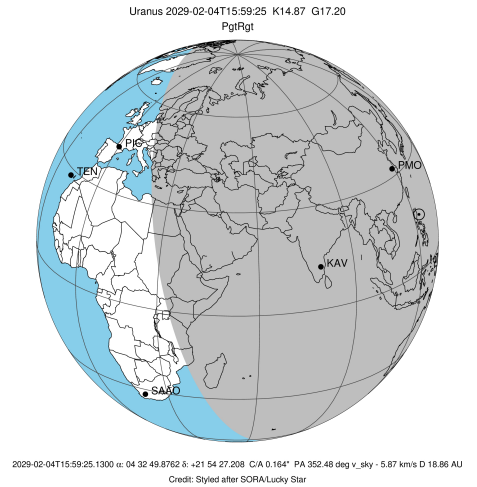
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2029-02-04T13:24:57.334		14.07	-41.19	51515.99	-6.17		
lambda	I	2029-02-04T13:28:59.153		13.38	-41.44	50026.71	-6.15		
delta	I	2029-02-04T13:33:39.954		12.57	-41.69	48300.35	-6.14		
gamma	I	2029-02-04T13:35:29.266		12.25	-41.79	47629.19	-6.14		
eta	I	2029-02-04T13:36:43.106		12.03	-41.85	47176.12	-6.13		
beta	I	2029-02-04T13:40:47.800		11.31	-42.04	45676.75	-6.12		
alpha	I	2029-02-04T13:43:29.842		10.83	-42.16	44685.97	-6.12		
4	I	2029-02-04T13:49:17.168		9.80	-42.38	42560.59	-6.10		
5	I	2029-02-04T13:50:15.289		9.63	-42.41	42211.32	-6.10		
6	I	2029-02-04T13:51:19.328		9.43	-42.45	41815.56	-6.09		
Uranus	I	2029-02-04T14:36:25.417	1.03x	-42.66	25404.91			5.62	5.89
Uranus	E	2029-02-04T16:55:39.444	-27.26x	-29.53	25146.44			-9.29	-9.73
6	E	2029-02-04T17:43:59.961	-37.54x	-21.67	41868.07		5.64		
5	E	2029-02-04T17:45:10.982	-37.79x	-21.47	42278.43		5.64		
4	E	2029-02-04T17:46:08.281	-38.00x	-21.30	42593.30		5.63		
alpha	E	2029-02-04T17:52:30.817	-39.36x	-20.18	44752.42		5.63		
beta	E	2029-02-04T17:55:09.332	-39.93x	-19.72	45642.86		5.63		
eta	E	2029-02-04T17:59:42.066	-40.90x	-18.91	47176.12		5.62		
gamma	E	2029-02-04T18:01:01.470	-41.19x	-18.67	47622.36		5.62		
delta	E	2029-02-04T18:03:02.150	-41.62x	-18.31	48300.35		5.62		
lambda	E	2029-02-04T18:08:09.656	-42.72x	-17.38	50026.71		5.61		
epsilon	E	2029-02-04T18:10:32.710	-43.23x	-16.94	50829.22		5.61		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2029-02-04T16:08:33.450
 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 : 144992804514327424
 2Mass ID (if available) : 04324987+2154274
 ICRS Star Coord at Epoch: 04h 32m 49.87621s +21:54:27.20801s
 RUWE (>1.4 is poor) : 1.02
 K magnitude : 14.871
 G magnitude : 17.200
 RP magnitude : 16.490
 BP magnitude : 17.752
 DUPflag : 0
 Distance (au) : 18.858
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -5.87
 Sun-Target sep (deg) : 114.13
 Sun-Moon sep (deg) : 139.26
 B (ring opening deg) : 79.06
 PA of pole (deg) : -53.57
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.499
 C/A sky separation (km) : 6823.5
 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	2029-02-04T13:50:53.366		7.53	46.19x	51511.14	-6.07		
lambda	I	2029-02-04T13:54:58.123		8.26	45.34x	50026.71	-6.07		
delta	I	2029-02-04T13:59:42.703		9.11	44.35x	48300.35	-6.07		
gamma	I	2029-02-04T14:01:33.305		9.43	43.97x	47629.31	-6.07		
eta	I	2029-02-04T14:02:47.997		9.65	43.71x	47176.12	-6.07		
beta	I	2029-02-04T14:06:55.107		10.38	42.84x	45677.06	-6.07		
alpha	I	2029-02-04T14:09:38.634		10.85	42.27x	44685.74	-6.07		
4	I	2029-02-04T14:15:28.393		11.86	41.05x	42559.56	-6.07		
5	I	2029-02-04T14:16:26.981		12.03	40.84x	42209.55	-6.07		
6	I	2029-02-04T14:17:31.107		12.21	40.62x	41814.72	-6.07		
Uranus	I	2029-02-04T15:02:25.702		19.52	31.13x	25399.50		5.72	5.99
Uranus	E	2029-02-04T17:13:28.278		34.12	3.78x	25109.54		-9.71	-10.17
6	E	2029-02-04T17:57:58.299		35.74	-5.09	41869.80	6.19		
5	E	2029-02-04T17:59:03.196		35.76	-5.30	42282.46	6.19		
4	E	2029-02-04T17:59:55.176		35.77	-5.47	42595.66	6.19		
alpha	E	2029-02-04T18:05:42.611		35.81	-6.60	44752.41	6.20		
beta	E	2029-02-04T18:08:06.483		35.82	-7.06	45642.40	6.20		
eta	E	2029-02-04T18:12:13.900		35.82	-7.86	47176.12	6.20		
gamma	E	2029-02-04T18:13:25.813		35.82	-8.09	47622.16	6.20		
delta	E	2029-02-04T18:15:15.136		35.81	-8.44	48300.35	6.20		
lambda	E	2029-02-04T18:19:53.322		35.78	-9.33	50026.71	6.21		
epsilon	E	2029-02-04T18:22:04.930		35.76	-9.75	50843.71	6.21		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2029-02-04T15:46:24.260
 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 : 144992804514327424
 2Mass ID (if available) : 04324987+2154274
 ICRS Star Coord at Epoch: 04h 32m 49.87621s +21:54:27.20801s
 RUWE (>1.4 is poor) : 1.02
 K magnitude : 14.871
 G magnitude : 17.200
 RP magnitude : 16.490
 BP magnitude : 17.752
 DUPflag : 0
 Distance (au) : 18.858
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -5.87
 Sun-Target sep (deg) : 114.13
 Sun-Moon sep (deg) : 139.75
 B (ring opening deg) : 79.06
 PA of pole (deg) : -53.57
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.461
 C/A sky separation (km) : 6298.7
 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_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	2029-02-04T13:25:42.452		11.54	-37.35	51516.91	-6.15		
lambda	I	2029-02-04T13:29:45.054		10.88	-37.57	50026.71	-6.14		
delta	I	2029-02-04T13:34:26.592		10.11	-37.81	48300.35	-6.13		
gamma	I	2029-02-04T13:36:16.197		9.81	-37.89	47629.17	-6.12		
eta	I	2029-02-04T13:37:30.229		9.60	-37.94	47176.12	-6.12		
beta	I	2029-02-04T13:41:35.587		8.92	-38.12	45676.67	-6.11		
alpha	I	2029-02-04T13:44:18.039		8.46	-38.22	44686.02	-6.10		
4	I	2029-02-04T13:50:06.277		7.48	-38.41	42560.88	-6.08		
5	I	2029-02-04T13:51:04.511		7.31	-38.44	42211.83	-6.08		
6	I	2029-02-04T13:52:08.786		7.13	-38.47	41815.80	-6.08		
Uranus	I	2029-02-04T14:37:23.681	-0.92x	-38.64	25410.73			5.51	5.77
Uranus	E	2029-02-04T16:56:13.126	-27.99x	-26.58	25139.52			-9.37	-9.81
6	E	2029-02-04T17:44:36.310	-37.86x	-19.22	41868.33		5.64		
5	E	2029-02-04T17:45:47.346	-38.10x	-19.02	42279.02		5.64		
4	E	2029-02-04T17:46:44.597	-38.30x	-18.87	42593.64		5.64		
alpha	E	2029-02-04T17:53:06.911	-39.60x	-17.81	44752.43		5.63		
beta	E	2029-02-04T17:55:45.330	-40.15x	-17.37	45642.79		5.63		
eta	E	2029-02-04T18:00:17.902	-41.08x	-16.61	47176.12		5.62		
gamma	E	2029-02-04T18:01:37.243	-41.35x	-16.38	47622.33		5.62		
delta	E	2029-02-04T18:03:37.837	-41.76x	-16.04	48300.35		5.62		
lambda	E	2029-02-04T18:08:45.083	-42.81x	-15.17	50026.71		5.62		
epsilon	E	2029-02-04T18:11:08.334	-43.30x	-14.75	50831.07		5.62		