

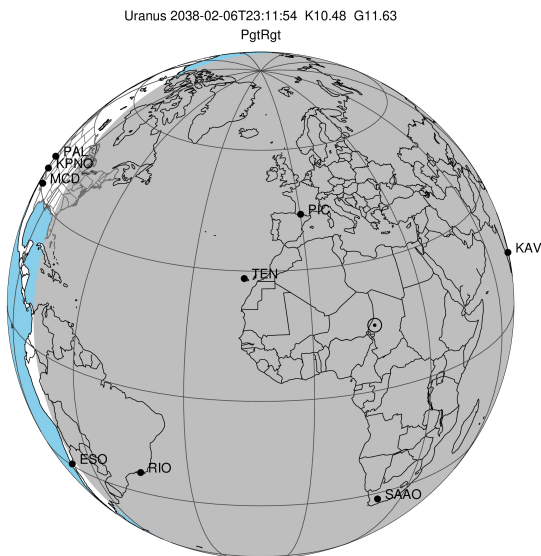
target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2038-02-06T23:11:54.780
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 866402758821944960
 2Mass ID (if available) : 07291367+2221369

Uranus 2038-02-06T23:11:54 K10.48 G11.63 PgtRgt

ICRS Star Coord at Epoch: 07h 29m 13.70387s +22:21:36.72138s

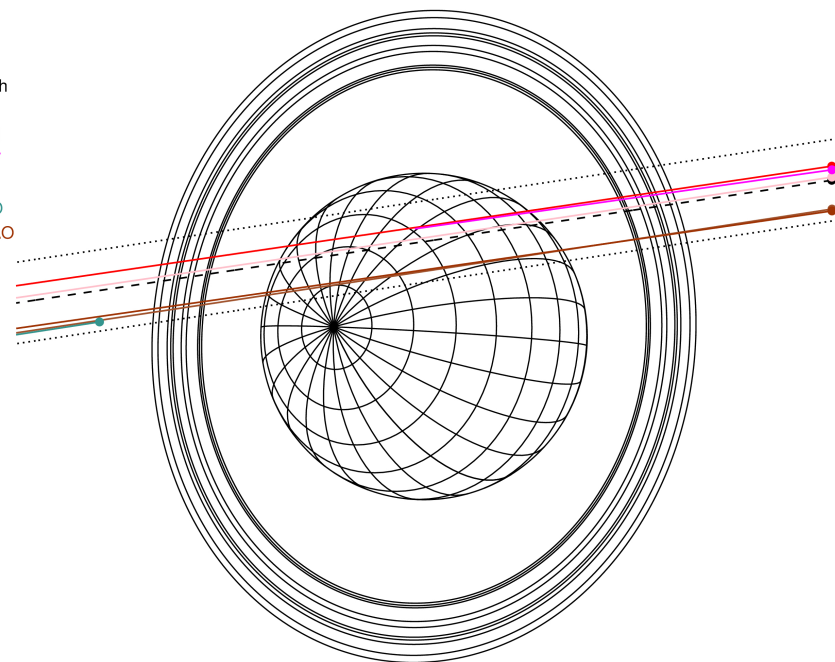
RUWE (>1.4 is poor) : 0.87
 K magnitude : 10.480
 G magnitude : 11.628
 RP magnitude : 11.215
 BP magnitude : 11.881
 DUPflag : 0
 Distance (au) : 17.817
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.02
 Sun-Target sep (deg) : 152.81
 Sun-Moon sep (deg) : 122.04
 B (ring opening deg) : 56.18
 PA of pole (deg) : 83.95

#	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



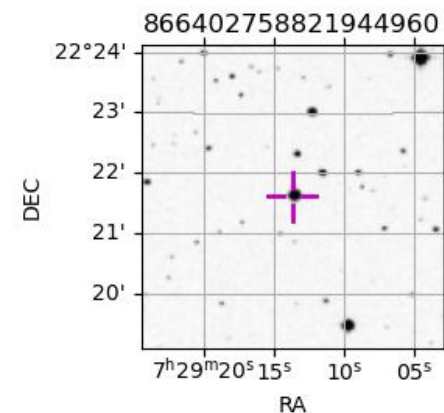
2038-02-06T23:11:54.7800 ra: 07 29 13.7039 s: +22 21 36.721 C/A 1.144 PA 188.56 deg v_sky -20.02 km/s D 17.82 AU
 Credit: Styled after SORA/Lucky Star

Earth
 PIC
 TEN
 KAV
 RIO
 ESO
 SAAO

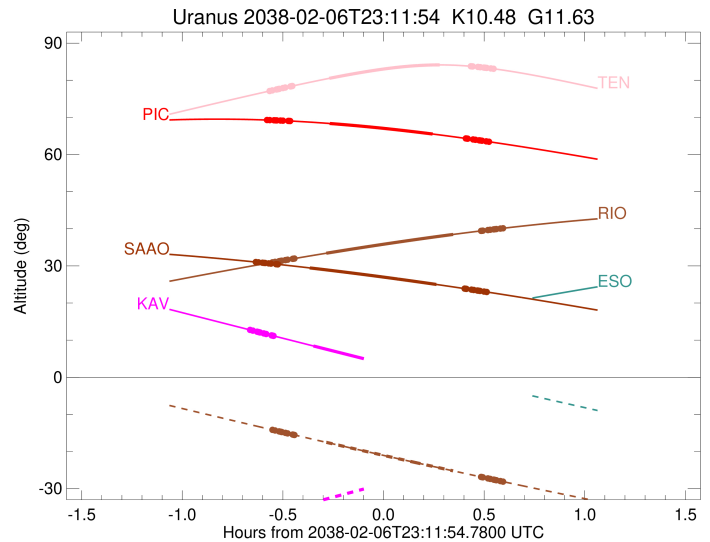
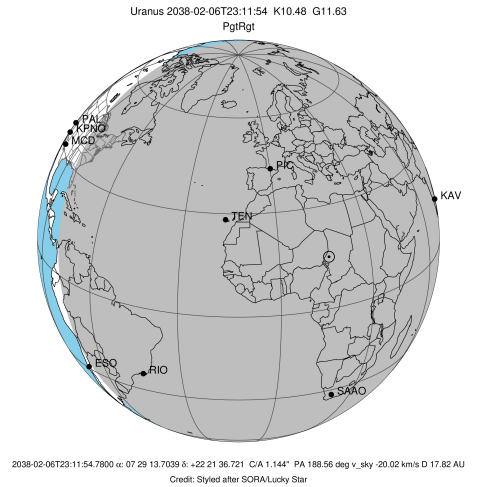


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1	+++++	+ +	+++++	FEB 06 22:37 - FEB 06 23:43	PieRie
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					PnnRnn
MCD	McDonald Obs. 2.7m	30.7	256.0					PnnRnn
TEN	Teide Obs./Tenerife	28.3	343.5	+++++	+ +	+++++	FEB 06 22:38 - FEB 06 23:44	PieRie
IRTF	Mauna Kea/IRTF	19.8	204.5					PnnRnn
KAV	Kavalur Observatory	12.6	78.8	+++++	+		FEB 06 22:32 - FEB 06 22:51	PinRin
RIO	Rio de Janeiro	-22.9	316.8	+++++	+ +	+++++	FEB 06 22:38 - FEB 06 23:47	PieRie
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	+++++	+ +	+++++	FEB 06 22:34 - FEB 06 23:42	PieRie
MSO	Mt. Stromlo Observato	-35.3	149.0					PnnRnn

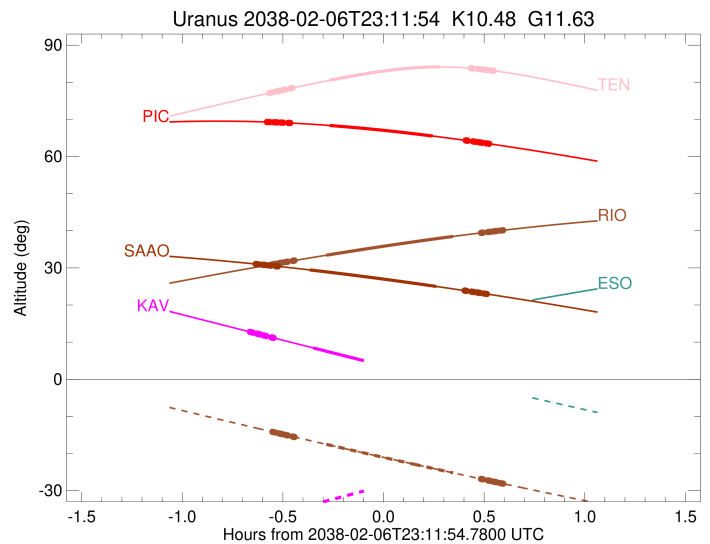
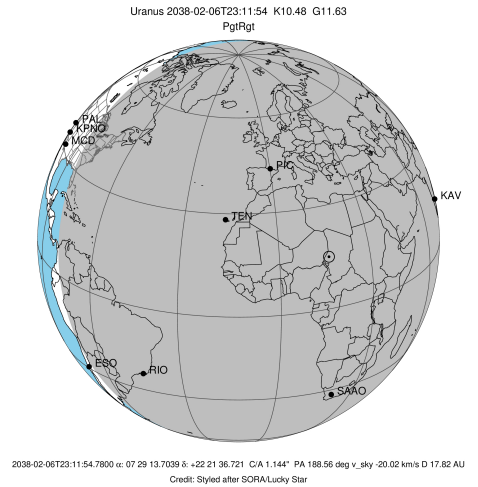


target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2038-02-06T23:11:19.560
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PIC
 Location : Pic du Midi
 Latitude (deg) : 42.93656
 E. Longitude (deg) : 0.14231
 Altitude (km) : 2.890
 Gaia source ID : 866402758821944960
 2Mass ID (if available) : 07291367+2221369
 ICRS Star Coord at Epoch: 07h 29m 13.70387s +22:21:36.72138s
 RUWE (>1.4 is poor) : 0.87
 K magnitude : 10.480
 G magnitude : 11.628
 RP magnitude : 11.215
 BP magnitude : 11.881
 DUPflag : 0
 Distance (au) : 17.817
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.02
 Sun-Target sep (deg) : 152.81
 Sun-Moon sep (deg) : 122.67
 B (ring opening deg) : 56.18
 PA of pole (deg) : 83.95
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.322
 C/A sky separation (km) : 17085.7
 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_itrff93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk



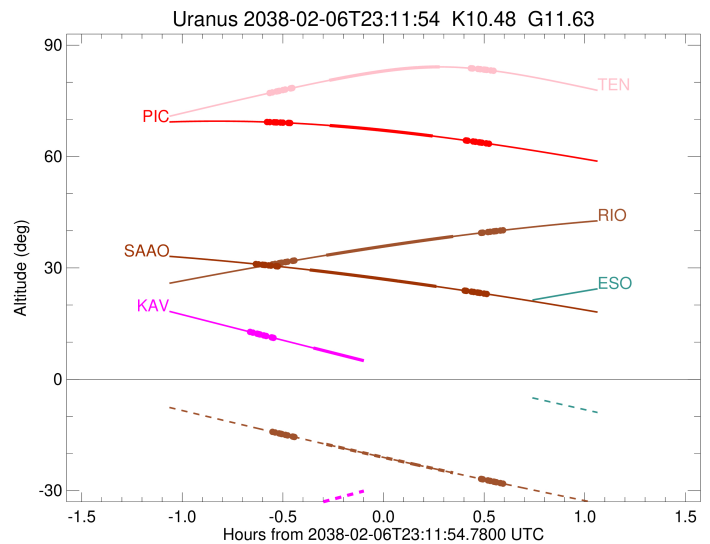
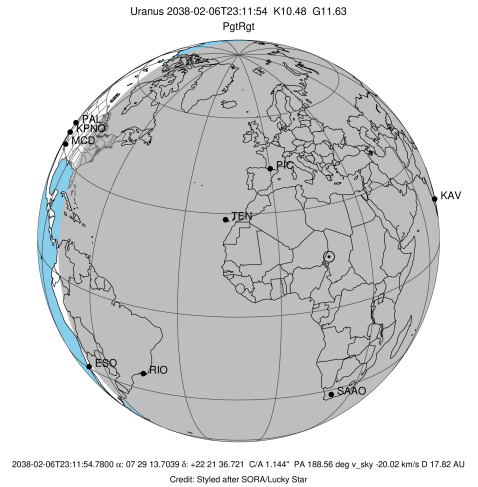
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2038-02-06T22:37:19.464		69.29	-55.75	50985.60	-22.89		
lambda	I	2038-02-06T22:38:01.521		69.27	-55.84	50026.71	-22.77		
delta	I	2038-02-06T22:39:17.522		69.23	-56.00	48300.35	-22.66		
gamma	I	2038-02-06T22:39:47.099		69.21	-56.06	47630.90	-22.61		
eta	I	2038-02-06T22:40:07.228		69.20	-56.10	47176.12	-22.58		
beta	I	2038-02-06T22:41:15.300		69.15	-56.25	45643.66	-22.45		
alpha	I	2038-02-06T22:41:57.649		69.12	-56.33	44687.98	-22.37		
4	I	2038-02-06T22:43:34.491		69.05	-56.53	42541.67	-22.18		
5	I	2038-02-06T22:43:44.785		69.05	-56.55	42314.33	-22.15		
6	I	2038-02-06T22:44:06.163		69.03	-56.60	41853.25	-22.10		
Uranus	I	2038-02-06T22:55:53.619		68.36	-57.97	25434.86		-17.84	-18.63
Uranus	E	2038-02-06T23:26:33.224		65.53	-60.82	25244.45		29.37	30.51
6	E	2038-02-06T23:36:23.696		64.35	-61.47	41797.03	22.07		
5	E	2038-02-06T23:36:43.557		64.30	-61.49	42191.31	22.11		
4	E	2038-02-06T23:37:02.409		64.27	-61.51	42616.56	22.14		
alpha	E	2038-02-06T23:38:38.145		64.06	-61.60	44750.42	22.34		
beta	E	2038-02-06T23:39:18.859		63.98	-61.64	45666.64	22.42		
eta	E	2038-02-06T23:40:26.095		63.83	-61.70	47176.12	22.54		
gamma	E	2038-02-06T23:40:45.979		63.79	-61.72	47624.61	22.57		
delta	E	2038-02-06T23:41:15.884		63.72	-61.75	48300.35	22.62		
lambda	E	2038-02-06T23:42:32.015		63.56	-61.81	50026.71	22.73		
epsilon	E	2038-02-06T23:43:37.142		63.41	-61.86	51509.98	22.85		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2038-02-06T23:12:17.680
 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 : 866402758821944960
 2Mass ID (if available) : 07291367+2221369
 ICRS Star Coord at Epoch: 07h 29m 13.70387s +22:21:36.72138s
 RUWE (>1.4 is poor) : 0.87
 K magnitude : 10.480
 G magnitude : 11.628
 RP magnitude : 11.215
 BP magnitude : 11.881
 DUPflag : 0
 Distance (au) : 17.817
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.02
 Sun-Target sep (deg) : 152.81
 Sun-Moon sep (deg) : 122.83
 B (ring opening deg) : 56.18
 PA of pole (deg) : 83.95
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.182
 C/A sky separation (km) : 15278.5
 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_itr93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk



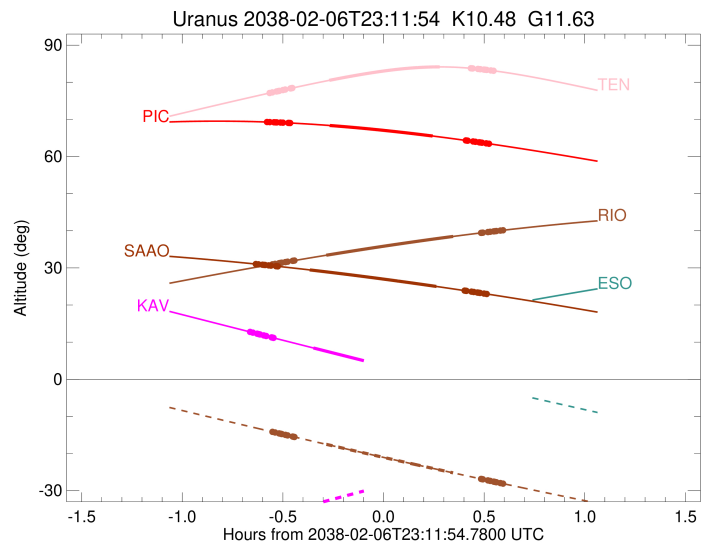
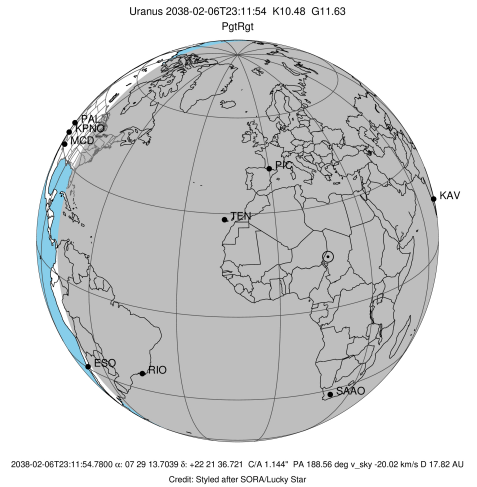
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2038-02-06T22:38:06.434		77.14	-50.52	50972.23	-23.25		
lambda	I	2038-02-06T22:38:47.241		77.28	-50.67	50026.71	-23.15		
delta	I	2038-02-06T22:40:01.961		77.53	-50.94	48300.35	-23.06		
gamma	I	2038-02-06T22:40:31.021		77.63	-51.04	47630.80	-23.02		
eta	I	2038-02-06T22:40:50.782		77.69	-51.11	47176.12	-23.00		
beta	I	2038-02-06T22:41:57.559		77.91	-51.35	45644.09	-22.90		
alpha	I	2038-02-06T22:42:39.107		78.05	-51.50	44687.38	-22.84		
4	I	2038-02-06T22:44:13.916		78.36	-51.84	42540.15	-22.68		
5	I	2038-02-06T22:44:23.921		78.39	-51.88	42313.70	-22.66		
6	I	2038-02-06T22:44:44.800		78.46	-51.96	41855.05	-22.62		
Uranus	I	2038-02-06T22:55:44.298		80.52	-54.32	25400.27		-20.29	-21.17
Uranus	E	2038-02-06T23:28:39.834		84.15	-61.27	25215.55		30.86	32.04
6	E	2038-02-06T23:37:54.032		83.78	-63.15	41797.75	22.62		
5	E	2038-02-06T23:38:13.218		83.76	-63.22	42188.15	22.65		
4	E	2038-02-06T23:38:31.776		83.73	-63.28	42616.46	22.67		
alpha	E	2038-02-06T23:40:05.440		83.60	-63.60	44750.90	22.83		
beta	E	2038-02-06T23:40:45.302		83.53	-63.73	45667.48	22.89		
eta	E	2038-02-06T23:41:51.151		83.42	-63.95	47176.12	22.99		
gamma	E	2038-02-06T23:42:10.641		83.39	-64.02	47624.41	23.01		
delta	E	2038-02-06T23:42:39.989		83.34	-64.12	48300.35	23.05		
lambda	E	2038-02-06T23:43:54.734		83.20	-64.37	50026.71	23.14		
epsilon	E	2038-02-06T23:44:58.415		83.07	-64.58	51502.53	23.24		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2038-02-06T23:06:49.810
 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 : 866402758821944960
 2Mass ID (if available) : 07291367+2221369
 ICRS Star Coord at Epoch: 07h 29m 13.70387s +22:21:36.72138s
 RUWE (>1.4 is poor) : 0.87
 K magnitude : 10.480
 G magnitude : 11.628
 RP magnitude : 11.215
 BP magnitude : 11.881
 DUPflag : 0
 Distance (au) : 17.817
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.02
 Sun-Target sep (deg) : 152.81
 Sun-Moon sep (deg) : 121.63
 B (ring opening deg) : 56.18
 PA of pole (deg) : 83.95
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.308
 C/A sky separation (km) : 16897.7
 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



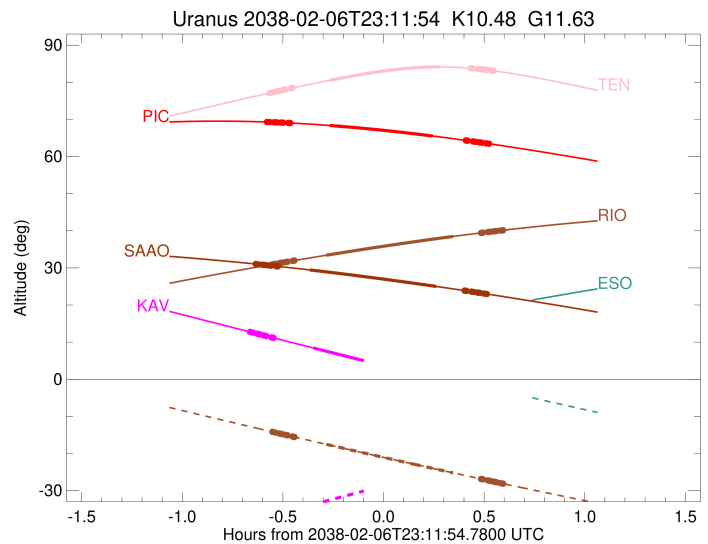
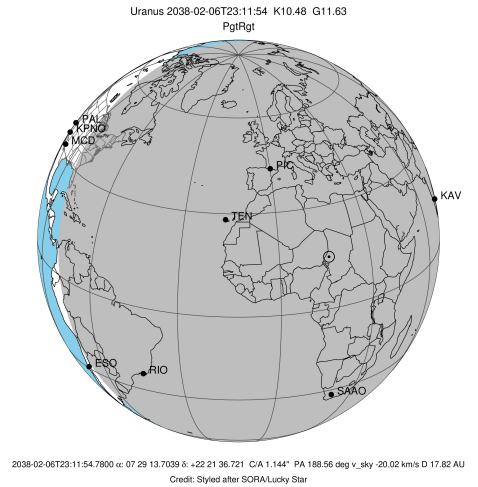
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2038-02-06T22:32:16.531		12.72	-38.22	50982.46	-22.60		
lambda	I	2038-02-06T22:32:58.985		12.56	-38.05	50026.71	-22.48		
delta	I	2038-02-06T22:34:15.955		12.26	-37.74	48300.35	-22.37		
gamma	I	2038-02-06T22:34:45.910		12.15	-37.62	47630.88	-22.33		
eta	I	2038-02-06T22:35:06.294		12.07	-37.54	47176.12	-22.29		
beta	I	2038-02-06T22:36:15.228		11.81	-37.26	45643.75	-22.17		
alpha	I	2038-02-06T22:36:58.123		11.64	-37.09	44687.85	-22.09		
4	I	2038-02-06T22:38:36.191		11.27	-36.69	42541.35	-21.90		
5	I	2038-02-06T22:38:46.602		11.23	-36.65	42314.21	-21.87		
6	I	2038-02-06T22:39:08.247		11.15	-36.57	41853.62	-21.83		
Uranus	I	2038-02-06T22:50:59.992		8.43	-33.72	25429.33		-18.25	-19.06
Uranus	E	2038-02-06T23:22:28.697		1.28x	-26.17	25242.60		29.47	30.61
6	E	2038-02-06T23:32:27.079		-0.97x	-23.78	41797.06	21.70		
5	E	2038-02-06T23:32:47.272		-1.05x	-23.70	42191.20	21.74		
4	E	2038-02-06T23:33:06.452		-1.12x	-23.62	42616.55	21.77		
alpha	E	2038-02-06T23:34:43.850		-1.48x	-23.23	44750.44	21.95		
beta	E	2038-02-06T23:35:25.280		-1.64x	-23.07	45666.66	22.03		
eta	E	2038-02-06T23:36:33.711		-1.90x	-22.80	47176.12	22.14		
gamma	E	2038-02-06T23:36:53.951		-1.97x	-22.71	47624.61	22.17		
delta	E	2038-02-06T23:37:24.395		-2.09x	-22.59	48300.35	22.22		
lambda	E	2038-02-06T23:38:41.908		-2.38x	-22.28	50026.71	22.32		
epsilon	E	2038-02-06T23:39:48.225		-2.62x	-22.02	51509.85	22.43		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2038-02-06T23:13:50.430
 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 : 866402758821944960
 2Mass ID (if available) : 07291367+2221369
 ICRS Star Coord at Epoch: 07h 29m 13.70387s +22:21:36.72138s
 RUWE (>1.4 is poor) : 0.87
 K magnitude : 10.480
 G magnitude : 11.628
 RP magnitude : 11.215
 BP magnitude : 11.881
 DUPflag : 0
 Distance (au) : 17.817
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.02
 Sun-Target sep (deg) : 152.81
 Sun-Moon sep (deg) : 122.69
 B (ring opening deg) : 56.18
 PA of pole (deg) : 83.95
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.780
 C/A sky separation (km) : 10083.4
 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_itrff93_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	2038-02-06T22:38:58.453		30.99	-14.20	50935.74	-23.80		
lambda	I	2038-02-06T22:39:36.710		31.09	-14.34	50026.71	-23.75		
delta	I	2038-02-06T22:40:49.448		31.28	-14.59	48300.35	-23.72		
gamma	I	2038-02-06T22:41:17.705		31.35	-14.69	47630.46	-23.70		
eta	I	2038-02-06T22:41:36.880		31.40	-14.76	47176.12	-23.69		
beta	I	2038-02-06T22:42:41.579		31.57	-14.99	45645.44	-23.65		
alpha	I	2038-02-06T22:43:21.881		31.68	-15.13	44686.00	-23.62		
4	I	2038-02-06T22:44:53.387		31.91	-15.45	42536.25	-23.56		
5	I	2038-02-06T22:45:02.904		31.94	-15.48	42311.06	-23.55		
6	I	2038-02-06T22:45:22.934		31.99	-15.55	41859.86	-23.54		
Uranus	I	2038-02-06T22:54:51.976		33.42	-17.53	25307.73		-25.95	-27.00
Uranus	E	2038-02-06T23:32:40.560		38.48	-25.21	25165.57		33.36	34.58
6	E	2038-02-06T23:40:57.287		39.43	-26.84	41800.21	23.59		
5	E	2038-02-06T23:41:15.116		39.46	-26.89	42179.91	23.60		
4	E	2038-02-06T23:41:33.298		39.49	-26.95	42615.64	23.61		
alpha	E	2038-02-06T23:43:03.650		39.66	-27.25	44751.91	23.67		
beta	E	2038-02-06T23:43:42.148		39.73	-27.37	45669.77	23.70		
eta	E	2038-02-06T23:44:45.727		39.84	-27.58	47176.12	23.74		
gamma	E	2038-02-06T23:45:04.580		39.88	-27.64	47623.83	23.75		
delta	E	2038-02-06T23:45:33.052		39.93	-27.73	48300.35	23.77		
lambda	E	2038-02-06T23:46:45.621		40.06	-27.96	50026.71	23.81		
epsilon	E	2038-02-06T23:47:46.569		40.16	-28.16	51478.69	23.86		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2038-02-06T23:08:51.910
 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 : 866402758821944960
 2Mass ID (if available) : 07291367+2221369
 ICRS Star Coord at Epoch: 07h 29m 13.70387s +22:21:36.72138s
 RUWE (>1.4 is poor) : 0.87
 K magnitude : 10.480
 G magnitude : 11.628
 RP magnitude : 11.215
 BP magnitude : 11.881
 DUPflag : 0
 Distance (au) : 17.817
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.02
 Sun-Target sep (deg) : 152.81
 Sun-Moon sep (deg) : 122.13
 B (ring opening deg) : 56.18
 PA of pole (deg) : 83.95
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.798
 C/A sky separation (km) : 10318.1
 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	2038-02-06T22:34:00.385		31.02	-42.27	50935.07	-23.80		
lambda	I	2038-02-06T22:34:38.623		30.96	-42.28	50026.71	-23.75		
delta	I	2038-02-06T22:35:51.388		30.85	-42.30	48300.35	-23.70		
gamma	I	2038-02-06T22:36:19.659		30.81	-42.31	47630.46	-23.69		
eta	I	2038-02-06T22:36:38.844		30.78	-42.32	47176.12	-23.67		
beta	I	2038-02-06T22:37:43.587		30.67	-42.34	45645.46	-23.63		
alpha	I	2038-02-06T22:38:23.923		30.61	-42.35	44685.99	-23.60		
4	I	2038-02-06T22:39:55.523		30.46	-42.37	42536.23	-23.53		
5	I	2038-02-06T22:40:05.050		30.45	-42.37	42311.04	-23.52		
6	I	2038-02-06T22:40:25.106		30.42	-42.37	41859.88	-23.51		
Uranus	I	2038-02-06T22:49:56.011		29.46	-42.44	25308.66		-25.90	-26.95
Uranus	E	2038-02-06T23:27:41.438		25.00	-41.63	25167.82		33.24	34.47
6	E	2038-02-06T23:36:02.503		23.89	-41.23	41799.97	23.44		
5	E	2038-02-06T23:36:20.499		23.85	-41.21	42180.59	23.45		
4	E	2038-02-06T23:36:38.767		23.81	-41.20	42615.74	23.46		
alpha	E	2038-02-06T23:38:09.676		23.60	-41.11	44751.84	23.52		
beta	E	2038-02-06T23:38:48.417		23.51	-41.08	45669.56	23.55		
eta	E	2038-02-06T23:39:52.411		23.37	-41.02	47176.12	23.59		
gamma	E	2038-02-06T23:40:11.387		23.32	-41.00	47623.89	23.60		
delta	E	2038-02-06T23:40:40.039		23.26	-40.97	48300.35	23.62		
lambda	E	2038-02-06T23:41:53.075		23.09	-40.90	50026.71	23.66		
epsilon	E	2038-02-06T23:42:54.523		22.95	-40.84	51481.22	23.71		