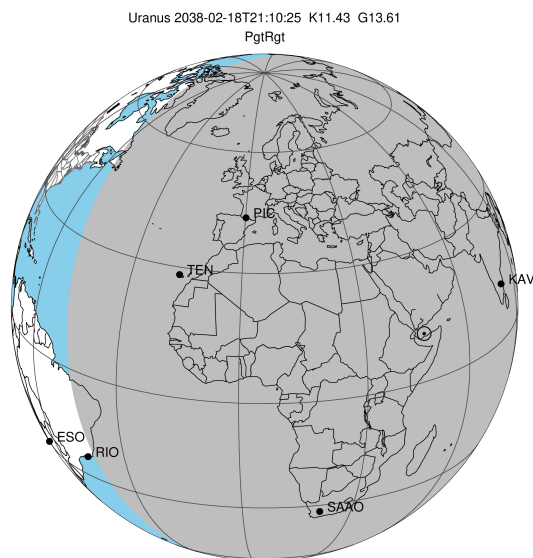


target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2038-02-18T21:10:25.610
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 866090433098001152
 2Mass ID (if available) : 07272998+2225100

ICRS Star Coord at Epoch: 07h 27m 29.87903s +22:25:09.43979s

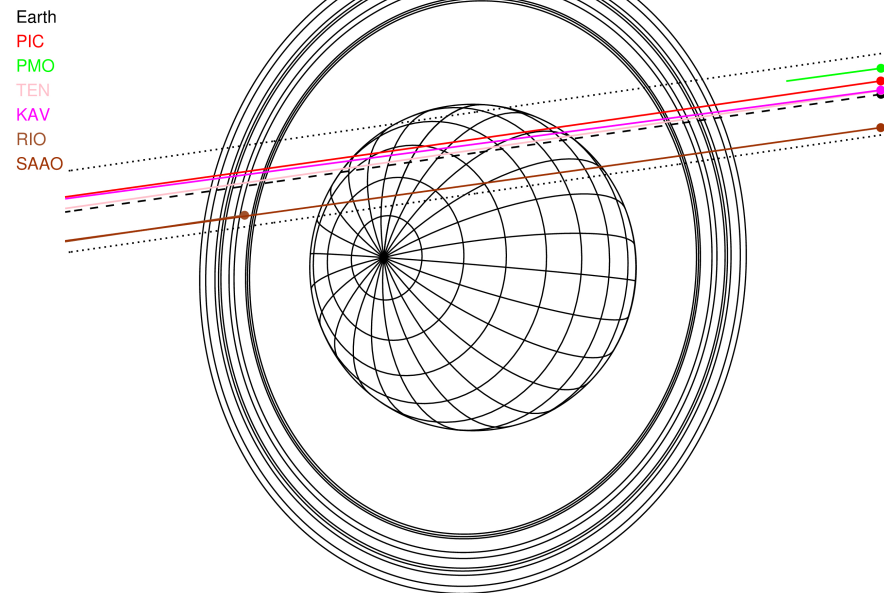
RUWE (>1.4 is poor) : 0.93
 K magnitude : 11.434
 G magnitude : 13.607
 RP magnitude : 12.910
 BP magnitude : 14.157
 DUPflag : 0
 Distance (au) : 17.926
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -16.44
 Sun-Target sep (deg) : 140.36
 Sun-Moon sep (deg) : 28.89
 B (ring opening deg) : 56.57
 PA of pole (deg) : 83.63

#	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



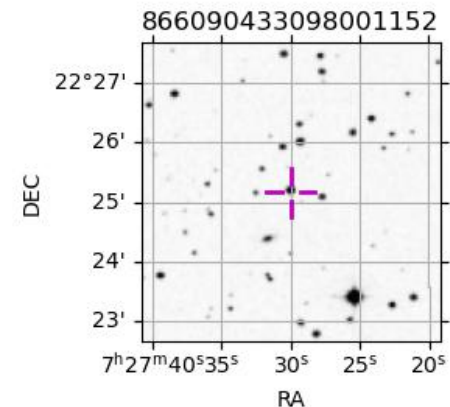
2038-02-18T21:10:25.6100 α: 07 27 29.8790 α: +22 25 09.440 C/A 1.369° PA 188.21 deg v_sky -16.45 km/s D 17.93 AU
 Credit: Styled after SORA/Lucky Star

Uranus 2038-02-18T21:10:25 K11.43 G13.61 PgtRgt

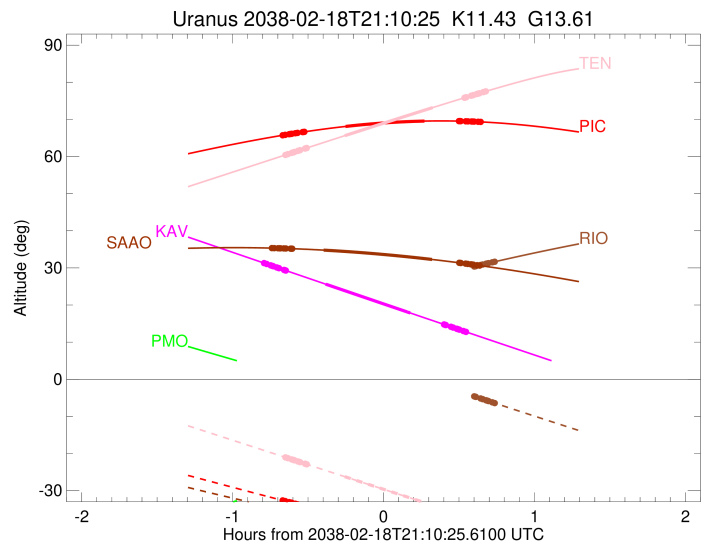
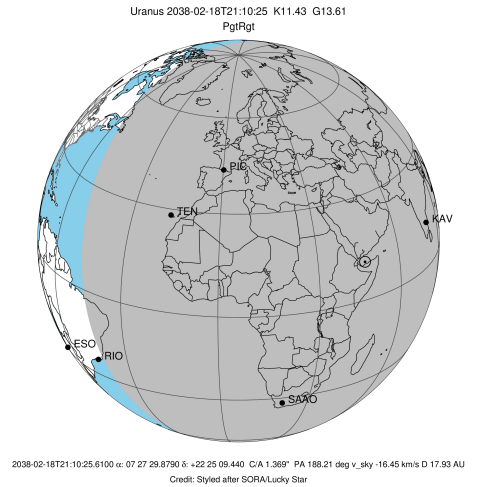


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1	+++++++	+ +	+++++++	FEB 18 20:30 - FEB 18 21:49	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 18 20:31 - FEB 18 21:51	PieRie
IRTF	Mauna Kea/IRTF	19.8	204.5					PnnRnn
KAV	Kavalur Observatory	12.6	78.8	+++++++	+ +	+++++++	FEB 18 20:23 - FEB 18 21:43	PieRie
RIO	Rio de Janeiro	-22.9	316.8			+++++	FEB 18 21:49 - FEB 18 21:54	PnnRne
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 18 20:26 - FEB 18 21:48	PieRie
MSO	Mt. Stromlo Observato	-35.3	149.0					PnnRnn

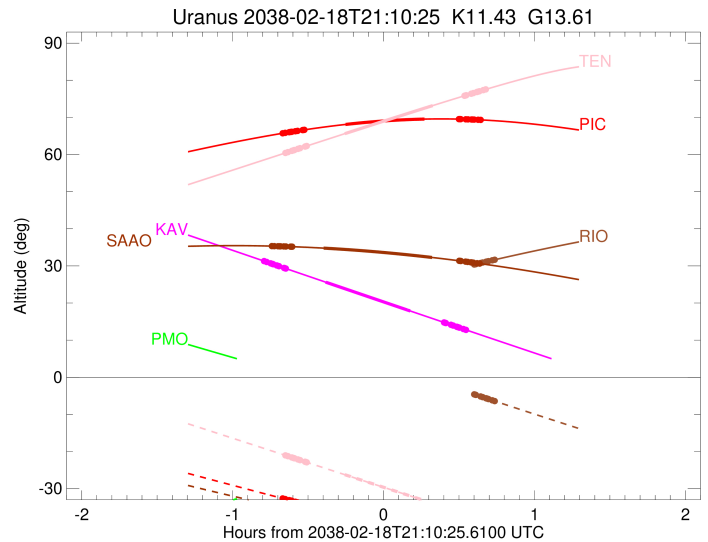
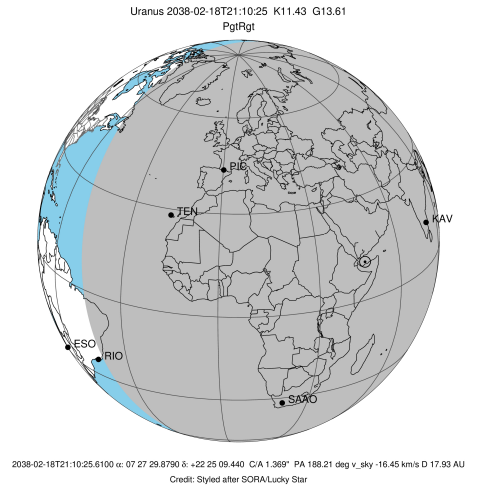


target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2038-02-18T21:11:10.060
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PIC
 Location : Pic du Midi
 Latitude (deg) : 42.93656
 E. Longitude (deg) : 0.14231
 Altitude (km) : 2.890
 Gaia source ID : 866090433098001152
 2Mass ID (if available) : 07272998+2225100
 ICRS Star Coord at Epoch: 07h 27m 29.87903s +22:25:09.43979s
 RUWE (>1.4 is poor) : 0.93
 K magnitude : 11.434
 G magnitude : 13.607
 RP magnitude : 12.910
 BP magnitude : 14.157
 DUPflag : 0
 Distance (au) : 17.926
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -16.44
 Sun-Target sep (deg) : 140.36
 Sun-Moon sep (deg) : 29.44
 B (ring opening deg) : 56.57
 PA of pole (deg) : 83.63
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.527
 C/A sky separation (km) : 19858.9
 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_itr93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk



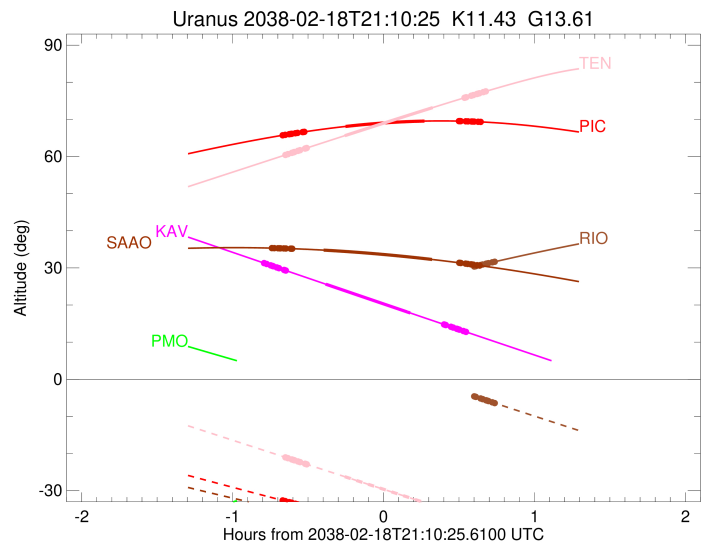
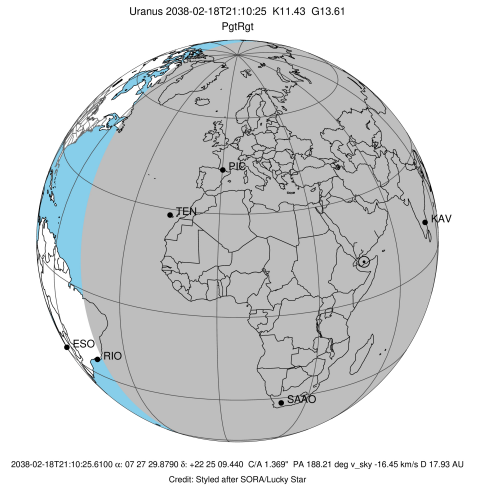
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2038-02-18T20:30:34.092		65.75	-32.68	50907.14	-18.36		
lambda	I	2038-02-18T20:31:22.261		65.84	-32.82	50026.71	-18.25		
delta	I	2038-02-18T20:32:57.197		66.02	-33.10	48300.35	-18.12		
gamma	I	2038-02-18T20:33:34.252		66.08	-33.21	47629.92	-18.07		
eta	I	2038-02-18T20:33:59.397		66.13	-33.29	47176.12	-18.03		
beta	I	2038-02-18T20:35:24.426		66.28	-33.53	45648.21	-17.89		
alpha	I	2038-02-18T20:36:18.109		66.38	-33.69	44684.68	-17.80		
4	I	2038-02-18T20:38:20.901		66.59	-34.05	42529.37	-17.57		
5	I	2038-02-18T20:38:34.333		66.61	-34.09	42299.59	-17.55		
6	I	2038-02-18T20:38:58.143		66.65	-34.16	41870.20	-17.48		
Uranus	I	2038-02-18T20:55:18.417		68.10	-36.99	25488.49		-13.13	-13.73
Uranus	E	2038-02-18T21:26:43.779		69.55	-42.22	25299.24		26.00	27.06
6	E	2038-02-18T21:40:19.818		69.54	-44.37	41796.91	17.47		
5	E	2038-02-18T21:40:46.758		69.54	-44.44	42239.33	17.54		
4	E	2038-02-18T21:41:07.649		69.53	-44.50	42608.84	17.56		
alpha	E	2038-02-18T21:43:08.502		69.49	-44.81	44740.36	17.79		
beta	E	2038-02-18T21:43:59.511		69.47	-44.94	45656.88	17.88		
eta	E	2038-02-18T21:45:24.221		69.44	-45.16	47176.12	18.02		
gamma	E	2038-02-18T21:45:49.212		69.43	-45.22	47626.86	18.06		
delta	E	2038-02-18T21:46:26.459		69.41	-45.31	48300.35	18.11		
lambda	E	2038-02-18T21:48:01.453		69.37	-45.56	50026.71	18.24		
epsilon	E	2038-02-18T21:49:24.849		69.32	-45.77	51551.79	18.35		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2038-02-18T21:12:38.580
 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 : 866090433098001152
 2Mass ID (if available) : 07272998+2225100
 ICRS Star Coord at Epoch: 07h 27m 29.87903s +22:25:09.43979s
 RUWE (>1.4 is poor) : 0.93
 K magnitude : 11.434
 G magnitude : 13.607
 RP magnitude : 12.910
 BP magnitude : 14.157
 DUPflag : 0
 Distance (au) : 17.926
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -16.44
 Sun-Target sep (deg) : 140.36
 Sun-Moon sep (deg) : 29.65
 B (ring opening deg) : 56.57
 PA of pole (deg) : 83.63
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.400
 C/A sky separation (km) : 18201.4
 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_itrfr93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk



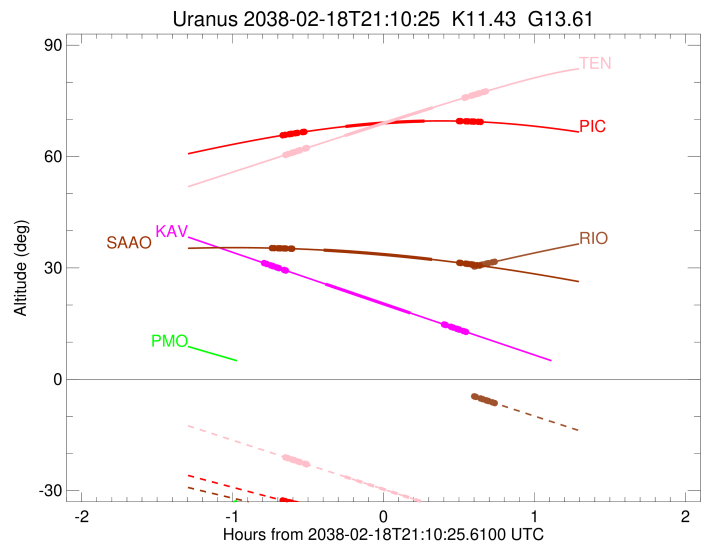
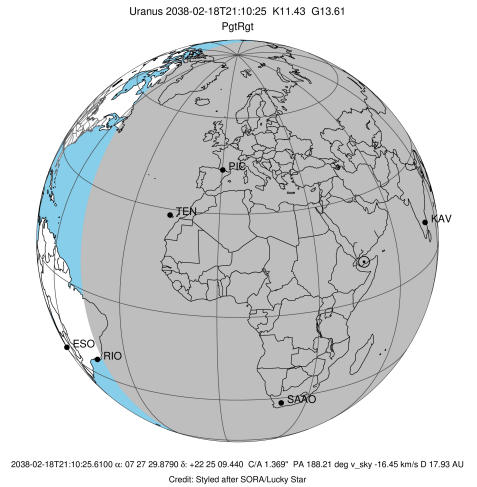
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2038-02-18T20:31:40.704		60.48	-21.09	50896.50	-18.64		
lambda	I	2038-02-18T20:32:27.533		60.65	-21.26	50026.71	-18.55		
delta	I	2038-02-18T20:34:00.862		61.00	-21.61	48300.35	-18.44		
gamma	I	2038-02-18T20:34:37.262		61.13	-21.74	47629.78	-18.40		
eta	I	2038-02-18T20:35:01.938		61.22	-21.83	47176.12	-18.37		
beta	I	2038-02-18T20:36:25.298		61.53	-22.14	45648.81	-18.25		
alpha	I	2038-02-18T20:37:17.902		61.72	-22.33	44684.62	-18.18		
4	I	2038-02-18T20:39:18.007		62.16	-22.77	42528.68	-17.99		
5	I	2038-02-18T20:39:31.192		62.21	-22.82	42297.51	-17.98		
6	I	2038-02-18T20:39:54.311		62.30	-22.90	41871.32	-17.92		
Uranus	I	2038-02-18T20:55:01.229		65.62	-26.24	25457.06		-15.86	-16.58
Uranus	E	2038-02-18T21:29:58.895		73.18	-33.93	25261.60		28.01	29.12
6	E	2038-02-18T21:42:32.970		75.82	-36.68	41796.33	17.95		
5	E	2038-02-18T21:42:58.951		75.90	-36.78	42235.63	18.00		
4	E	2038-02-18T21:43:19.601		75.98	-36.85	42609.96	18.02		
alpha	E	2038-02-18T21:45:17.585		76.38	-37.28	44741.46	18.21		
beta	E	2038-02-18T21:46:07.417		76.55	-37.46	45657.71	18.28		
eta	E	2038-02-18T21:47:30.264		76.83	-37.76	47176.12	18.40		
gamma	E	2038-02-18T21:47:54.730		76.91	-37.85	47626.65	18.43		
delta	E	2038-02-18T21:48:31.239		77.04	-37.99	48300.35	18.48		
lambda	E	2038-02-18T21:50:04.408		77.35	-38.33	50026.71	18.58		
epsilon	E	2038-02-18T21:51:26.171		77.62	-38.62	51549.54	18.68		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2038-02-18T21:04:22.400
 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 : 866090433098001152
 2Mass ID (if available) : 07272998+2225100
 ICRS Star Coord at Epoch: 07h 27m 29.87903s +22:25:09.43979s
 RUWE (>1.4 is poor) : 0.93
 K magnitude : 11.434
 G magnitude : 13.607
 RP magnitude : 12.910
 BP magnitude : 14.157
 DUPflag : 0
 Distance (au) : 17.926
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -16.44
 Sun-Target sep (deg) : 140.36
 Sun-Moon sep (deg) : 28.24
 B (ring opening deg) : 56.57
 PA of pole (deg) : 83.63
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.469
 C/A sky separation (km) : 19102.2
 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_itrfr93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk



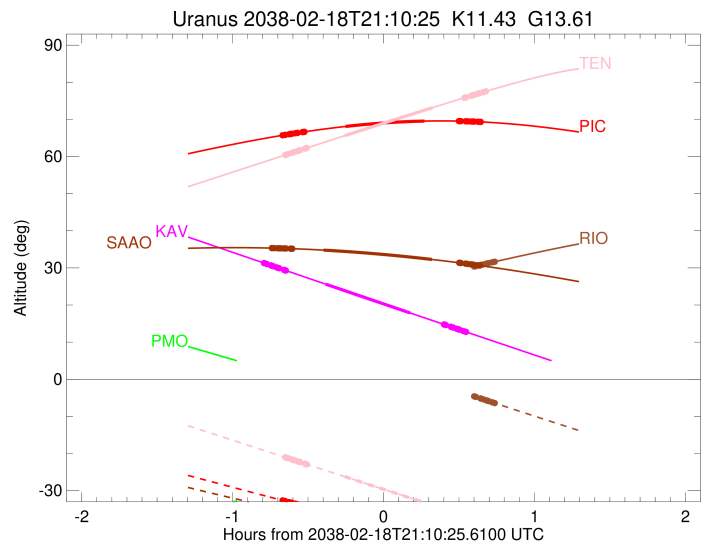
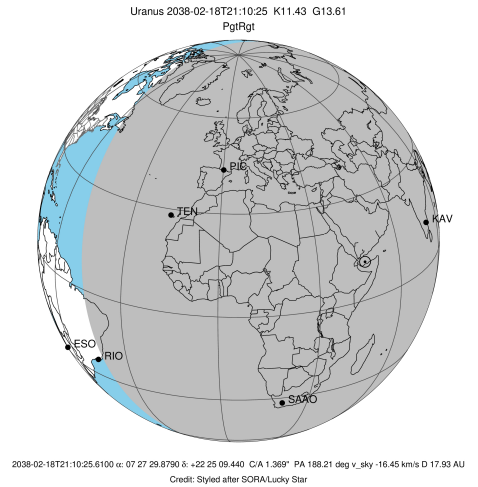
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2038-02-18T20:23:12.090		31.24	-69.24	50899.29	-18.34		
lambda	I	2038-02-18T20:23:59.849		31.05	-69.05	50026.71	-18.24		
delta	I	2038-02-18T20:25:34.792		30.69	-68.66	48300.35	-18.12		
gamma	I	2038-02-18T20:26:11.843		30.54	-68.51	47629.82	-18.07		
eta	I	2038-02-18T20:26:36.973		30.45	-68.41	47176.12	-18.04		
beta	I	2038-02-18T20:28:01.919		30.12	-68.07	45648.63	-17.91		
alpha	I	2038-02-18T20:28:55.555		29.91	-67.85	44684.64	-17.82		
4	I	2038-02-18T20:30:58.156		29.44	-67.35	42528.89	-17.61		
5	I	2038-02-18T20:31:11.604		29.39	-67.29	42298.20	-17.59		
6	I	2038-02-18T20:31:35.274		29.29	-67.20	41870.96	-17.53		
Uranus	I	2038-02-18T20:47:26.482		25.62	-63.33	25470.87		-14.72	-15.38
Uranus	E	2038-02-18T21:21:03.453		17.86	-55.12	25284.73		26.79	27.86
6	E	2038-02-18T21:34:24.797		14.78	-51.87	41796.72	17.39		
5	E	2038-02-18T21:34:51.797		14.68	-51.76	42238.22	17.45		
4	E	2038-02-18T21:35:12.893		14.60	-51.67	42609.19	17.46		
alpha	E	2038-02-18T21:37:14.523		14.13	-51.18	44740.68	17.66		
beta	E	2038-02-18T21:38:05.896		13.94	-50.97	45657.12	17.74		
eta	E	2038-02-18T21:39:31.271		13.61	-50.62	47176.12	17.87		
gamma	E	2038-02-18T21:39:56.473		13.52	-50.52	47626.80	17.90		
delta	E	2038-02-18T21:40:34.053		13.37	-50.37	48300.35	17.95		
lambda	E	2038-02-18T21:42:09.944		13.00	-49.98	50026.71	18.06		
epsilon	E	2038-02-18T21:43:34.159		12.68	-49.63	51551.26	18.15		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2038-02-18T21:14:19.150
 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 : 866090433098001152
 2Mass ID (if available) : 07272998+2225100
 ICRS Star Coord at Epoch: 07h 27m 29.87903s +22:25:09.43979s
 RUWE (>1.4 is poor) : 0.93
 K magnitude : 11.434
 G magnitude : 13.607
 RP magnitude : 12.910
 BP magnitude : 14.157
 DUPflag : 0
 Distance (au) : 17.926
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -16.44
 Sun-Target sep (deg) : 140.36
 Sun-Moon sep (deg) : 29.66
 B (ring opening deg) : 56.57
 PA of pole (deg) : 83.63
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.027
 C/A sky separation (km) : 13346.9
 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	2038-02-18T20:32:06.393		17.21	12.24x	50866.97	-19.12		
lambda	I	2038-02-18T20:32:50.433		17.35	12.07x	50026.71	-19.07		
delta	I	2038-02-18T20:34:21.098		17.64	11.73x	48300.35	-19.01		
gamma	I	2038-02-18T20:34:56.407		17.75	11.59x	47629.34	-18.99		
eta	I	2038-02-18T20:35:20.280		17.83	11.50x	47176.12	-18.98		
beta	I	2038-02-18T20:36:40.761		18.08	11.19x	45650.64	-18.92		
alpha	I	2038-02-18T20:37:31.518		18.24	11.00x	44684.75	-18.88		
4	I	2038-02-18T20:39:26.954		18.61	10.56x	42527.12	-18.79		
5	I	2038-02-18T20:39:39.815		18.65	10.51x	42290.96	-18.79		
6	I	2038-02-18T20:40:01.636		18.71	10.43x	41874.18	-18.76		
Uranus	I	2038-02-18T20:52:50.475		21.11	7.51x	25364.75		-22.23	-23.18
Uranus	E	2038-02-18T21:35:33.560		28.60	-2.16x	25187.00		31.76	32.95
6	E	2038-02-18T21:46:24.689		30.37	-4.59x	41795.18	18.84		
5	E	2038-02-18T21:46:48.712		30.43	-4.68x	42225.31	18.87		
4	E	2038-02-18T21:47:09.185		30.48	-4.75x	42612.65	18.88		
alpha	E	2038-02-18T21:49:02.292		30.78	-5.17	44744.31	18.97		
beta	E	2038-02-18T21:49:50.119		30.91	-5.35	45660.07	19.01		
eta	E	2038-02-18T21:51:09.782		31.12	-5.65	47176.12	19.07		
gamma	E	2038-02-18T21:51:33.361		31.18	-5.73	47626.05	19.09		
delta	E	2038-02-18T21:52:08.662		31.27	-5.87	48300.35	19.11		
lambda	E	2038-02-18T21:53:38.846		31.50	-6.20	50026.71	19.17		
epsilon	E	2038-02-18T21:54:57.704		31.71	-6.49	51540.25	19.23		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2038-02-18T21:08:15.090
 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 : 866090433098001152
 2Mass ID (if available) : 07272998+2225100
 ICRS Star Coord at Epoch: 07h 27m 29.87903s +22:25:09.43979s
 RUWE (>1.4 is poor) : 0.93
 K magnitude : 11.434
 G magnitude : 13.607
 RP magnitude : 12.910
 BP magnitude : 14.157
 DUPflag : 0
 Distance (au) : 17.926
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -16.44
 Sun-Target sep (deg) : 140.36
 Sun-Moon sep (deg) : 28.93
 B (ring opening deg) : 56.57
 PA of pole (deg) : 83.63
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.988
 C/A sky separation (km) : 12843.6
 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_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	2038-02-18T20:26:18.490		35.33	-34.44	50861.46	-19.36		
lambda	I	2038-02-18T20:27:01.703		35.32	-34.55	50026.71	-19.31		
delta	I	2038-02-18T20:28:31.246		35.29	-34.77	48300.35	-19.25		
gamma	I	2038-02-18T20:29:06.122		35.28	-34.86	47629.25	-19.23		
eta	I	2038-02-18T20:29:29.693		35.27	-34.91	47176.12	-19.22		
beta	I	2038-02-18T20:30:49.149		35.25	-35.11	45650.99	-19.16		
alpha	I	2038-02-18T20:31:39.275		35.23	-35.23	44684.82	-19.12		
4	I	2038-02-18T20:33:33.252		35.19	-35.50	42526.91	-19.04		
5	I	2038-02-18T20:33:45.995		35.18	-35.53	42289.71	-19.03		
6	I	2038-02-18T20:34:07.488		35.17	-35.58	41874.63	-19.00		
Uranus	I	2038-02-18T20:46:36.263		34.79	-37.32	25351.29		-23.04	-24.01
Uranus	E	2038-02-18T21:29:43.612		32.27	-42.35	25184.08		31.90	33.10
6	E	2038-02-18T21:40:27.499		31.38	-43.33	41795.15	18.95		
5	E	2038-02-18T21:40:51.357		31.35	-43.37	42224.94	18.98		
4	E	2038-02-18T21:41:11.741		31.32	-43.40	42612.73	18.98		
alpha	E	2038-02-18T21:43:04.263		31.15	-43.55	44744.39	19.06		
beta	E	2038-02-18T21:43:51.860		31.08	-43.62	45660.14	19.10		
eta	E	2038-02-18T21:45:11.163		30.96	-43.73	47176.12	19.15		
gamma	E	2038-02-18T21:45:34.643		30.92	-43.76	47626.04	19.17		
delta	E	2038-02-18T21:46:09.800		30.87	-43.81	48300.35	19.19		
lambda	E	2038-02-18T21:47:39.643		30.73	-43.92	50026.71	19.24		
epsilon	E	2038-02-18T21:48:58.219		30.60	-44.03	51540.03	19.29		