

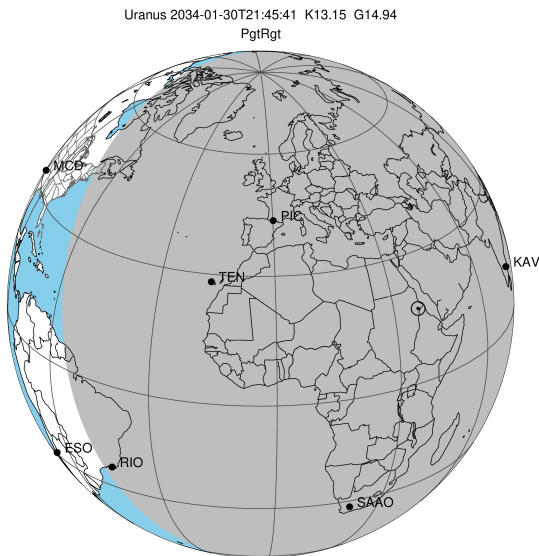
target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2034-01-30T21:45:41.440
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 3425387605706768640
 2Mass ID (if available) : 06092800+2341474

Uranus 2034-01-30T21:45:41 K13.15 G14.94 PgtRgt

ICRS Star Coord at Epoch: 06h 09m 28.00638s +23:41:47.48418s

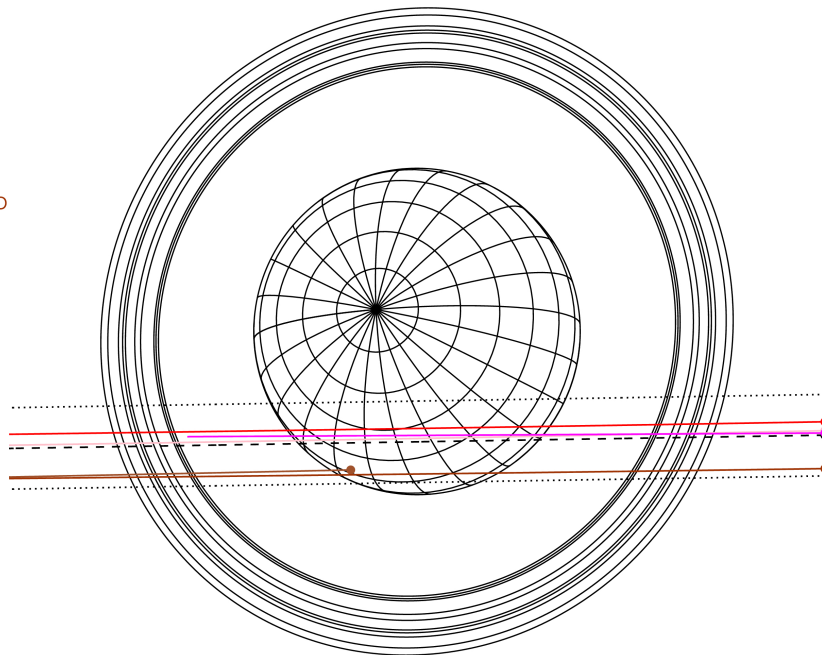
RUWE (>1.4 is poor) : 1.09
 K magnitude : 13.150
 G magnitude : 14.935
 RP magnitude : 14.317
 BP magnitude : 15.376
 DUPflag : 0
 Distance (au) : 18.166
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -16.94
 Sun-Target sep (deg) : 141.57
 Sun-Moon sep (deg) : 7.64
 B (ring opening deg) : 73.46
 PA of pole (deg) : 61.72

#	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



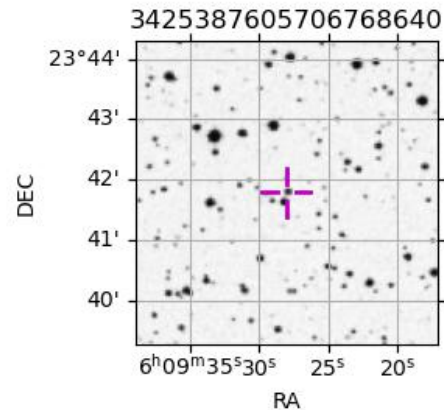
2034-01-30T21:45:41.4400 a: 06 09 28.0064 s: +23 41 47.484 C/A 1.304" PA 0.93 deg v_sky -16.94 km/s D 18.17 AU
 Credit: Styled after SORA/Lucky Star

Earth
 PIC
 TEN
 KAV
 RIO
 SAAO

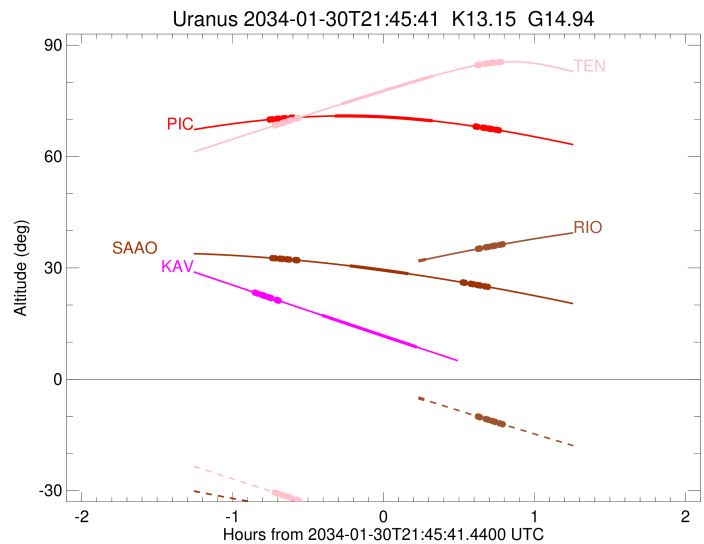
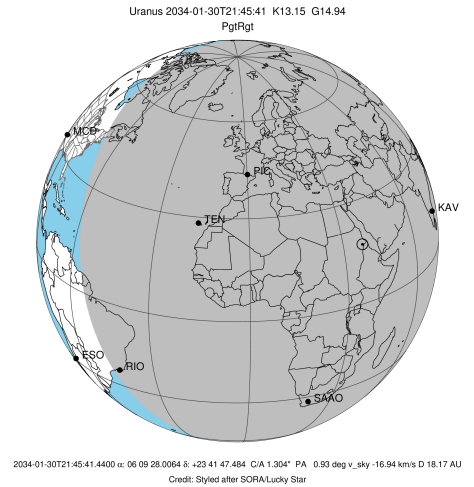


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1	+++++	+ +	+++++	JAN 30 21:00 - JAN 30 22:31	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	+++++	+ +	+++++	JAN 30 21:02 - JAN 30 22:32	PieRie
IRTF	Mauna Kea/IRTF	19.8	204.5					PnnRnn
KAV	Kavalur Observatory	12.6	78.8	+++++	+ +		JAN 30 20:54 - JAN 30 21:59	PieRin
RIO	Rio de Janeiro	-22.9	316.8		+	+++++	JAN 30 22:02 - JAN 30 22:33	PneRne
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	+++++	+ +	+++++	JAN 30 21:01 - JAN 30 22:27	PieRie
MSO	Mt. Stromlo Observato	-35.3	149.0					PnnRnn

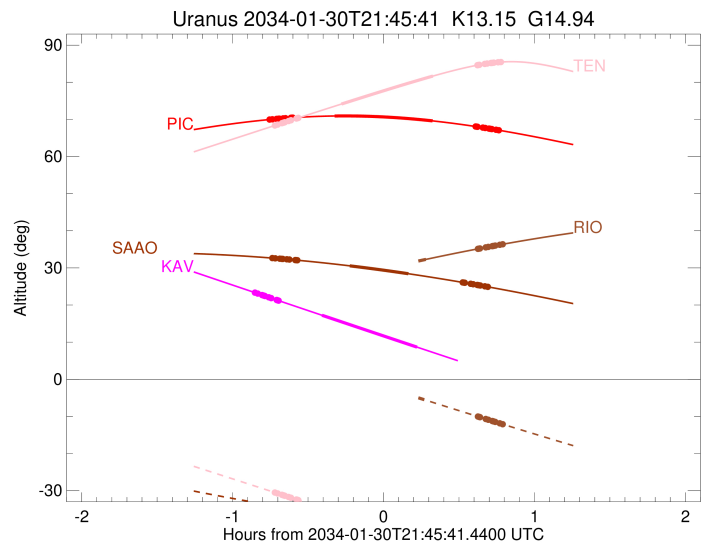
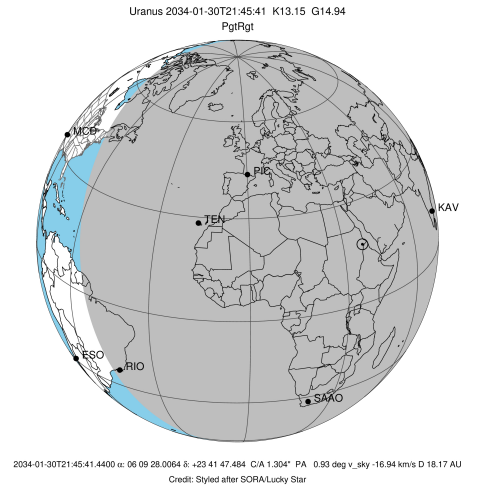


target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2034-01-30T21:45:26.310
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PIC
 Location : Pic du Midi
 Latitude (deg) : 42.93656
 E. Longitude (deg) : 0.14231
 Altitude (km) : 2.890
 Gaia source ID : 3425387605706768640
 2Mass ID (if available) : 06092800+2341474
 ICRS Star Coord at Epoch: 06h 09m 28.00638s +23:41:47.48418s
 RUWE (>1.4 is poor) : 1.09
 K magnitude : 13.150
 G magnitude : 14.935
 RP magnitude : 14.317
 BP magnitude : 15.376
 DUPflag : 0
 Distance (au) : 18.166
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -16.94
 Sun-Target sep (deg) : 141.57
 Sun-Moon sep (deg) : 8.02
 B (ring opening deg) : 73.46
 PA of pole (deg) : 61.72
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.153
 C/A sky separation (km) : 15184.4
 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



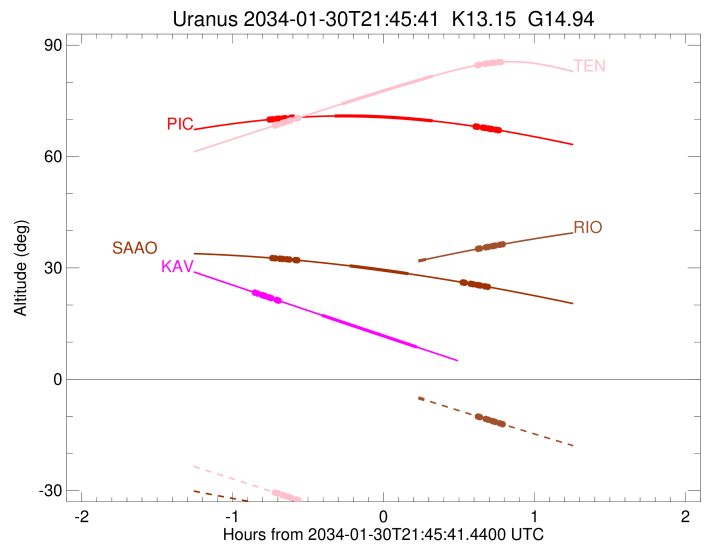
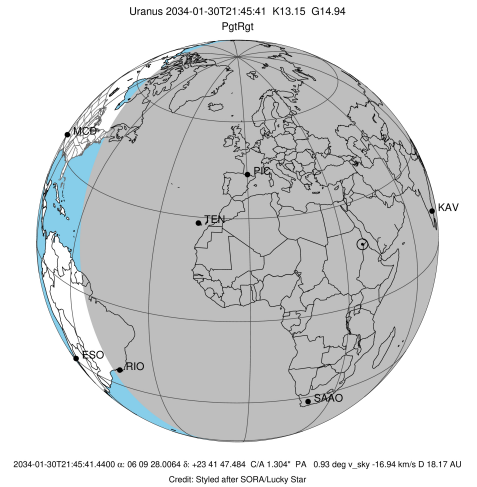
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2034-01-30T21:00:10.380		69.95	-42.16	51399.98	-17.07		
lambda	I	2034-01-30T21:01:31.084		70.03	-42.39	50026.71	-16.99		
delta	I	2034-01-30T21:03:12.869		70.14	-42.69	48300.35	-16.93		
gamma	I	2034-01-30T21:03:52.423		70.17	-42.80	47631.33	-16.90		
eta	I	2034-01-30T21:04:19.372		70.20	-42.88	47176.12	-16.88		
beta	I	2034-01-30T21:05:50.360		70.28	-43.15	45643.82	-16.81		
alpha	I	2034-01-30T21:06:46.587		70.33	-43.31	44696.02	-16.77		
4	I	2034-01-30T21:08:52.128		70.43	-43.68	42606.51	-16.66		
5	I	2034-01-30T21:09:14.455		70.45	-43.74	42232.71	-16.62		
6	I	2034-01-30T21:09:39.272		70.47	-43.81	41817.79	-16.61		
Uranus	I	2034-01-30T21:26:14.737		70.92	-46.66	25031.53		-16.37	-17.10
Uranus	E	2034-01-30T22:05:09.783		69.61	-52.97	25465.76		6.72	7.03
6	E	2034-01-30T22:22:19.914		68.09	-55.52	41877.17	16.59		
5	E	2034-01-30T22:22:38.280		68.06	-55.56	42182.48	16.60		
4	E	2034-01-30T22:23:01.606		68.02	-55.62	42564.03	16.64		
alpha	E	2034-01-30T22:25:12.894		67.79	-55.93	44752.05	16.75		
beta	E	2034-01-30T22:26:07.343		67.69	-56.06	45668.18	16.79		
eta	E	2034-01-30T22:27:37.022		67.53	-56.27	47176.12	16.86		
gamma	E	2034-01-30T22:28:03.417		67.48	-56.33	47621.27	16.87		
delta	E	2034-01-30T22:28:43.627		67.40	-56.42	48300.35	16.90		
lambda	E	2034-01-30T22:30:25.574		67.21	-56.66	50026.71	16.97		
epsilon	E	2034-01-30T22:31:29.892		67.09	-56.80	51119.05	17.04		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2034-01-30T21:46:52.090
 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 : 3425387605706768640
 2Mass ID (if available) : 06092800+2341474
 ICRS Star Coord at Epoch: 06h 09m 28.00638s +23:41:47.48418s
 RUWE (>1.4 is poor) : 1.09
 K magnitude : 13.150
 G magnitude : 14.935
 RP magnitude : 14.317
 BP magnitude : 15.376
 DUPflag : 0
 Distance (au) : 18.166
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -16.94
 Sun-Target sep (deg) : 141.57
 Sun-Moon sep (deg) : 7.69
 B (ring opening deg) : 73.46
 PA of pole (deg) : 61.72
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.271
 C/A sky separation (km) : 16751.6
 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_itr93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk



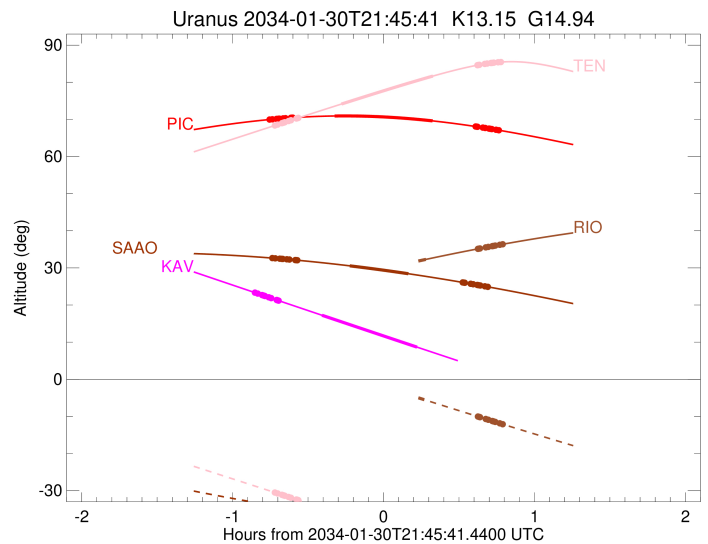
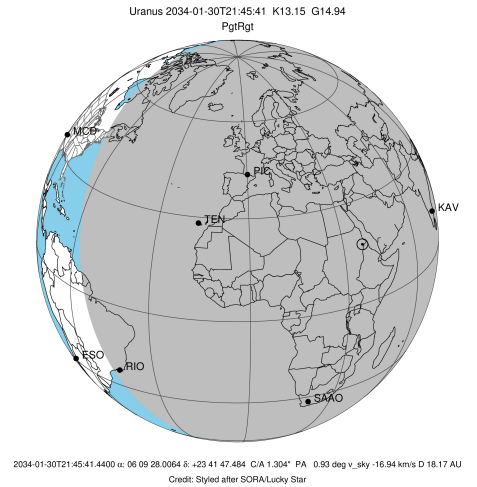
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2034-01-30T21:02:15.472		68.31	-30.46	51409.45	-16.93		
lambda	I	2034-01-30T21:03:37.466		68.61	-30.76	50026.71	-16.83		
delta	I	2034-01-30T21:05:20.250		68.99	-31.13	48300.35	-16.76		
gamma	I	2034-01-30T21:06:00.220		69.14	-31.28	47631.27	-16.72		
eta	I	2034-01-30T21:06:27.456		69.24	-31.38	47176.12	-16.70		
beta	I	2034-01-30T21:07:59.499		69.57	-31.72	45643.48	-16.61		
alpha	I	2034-01-30T21:08:56.342		69.78	-31.93	44696.93	-16.56		
4	I	2034-01-30T21:11:03.563		70.24	-32.39	42607.56	-16.42		
5	I	2034-01-30T21:11:26.423		70.33	-32.48	42229.66	-16.38		
6	I	2034-01-30T21:11:51.327		70.42	-32.57	41819.27	-16.37		
Uranus	I	2034-01-30T21:28:58.018		74.14	-36.33	25046.05		-16.13	-16.85
Uranus	E	2034-01-30T22:05:20.710		81.68	-44.35	25496.44		5.49	5.75
6	E	2034-01-30T22:23:03.739		84.61	-48.24	41877.76	16.38		
5	E	2034-01-30T22:23:22.153		84.65	-48.31	42179.93	16.39		
4	E	2034-01-30T22:23:46.043		84.70	-48.40	42565.94	16.44		
alpha	E	2034-01-30T22:25:58.680		84.96	-48.88	44752.23	16.57		
beta	E	2034-01-30T22:26:53.626		85.05	-49.08	45667.43	16.63		
eta	E	2034-01-30T22:28:24.164		85.19	-49.41	47176.12	16.71		
gamma	E	2034-01-30T22:28:50.785		85.23	-49.51	47621.34	16.74		
delta	E	2034-01-30T22:29:31.317		85.28	-49.66	48300.35	16.77		
lambda	E	2034-01-30T22:31:14.016		85.40	-50.03	50026.71	16.85		
epsilon	E	2034-01-30T22:32:19.593		85.45	-50.27	51133.16	16.94		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2034-01-30T21:39:49.700
 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 : 3425387605706768640
 2Mass ID (if available) : 06092800+2341474
 ICRS Star Coord at Epoch: 06h 09m 28.00638s +23:41:47.48418s
 RUWE (>1.4 is poor) : 1.09
 K magnitude : 13.150
 G magnitude : 14.935
 RP magnitude : 14.317
 BP magnitude : 15.376
 DUPflag : 0
 Distance (au) : 18.166
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -16.94
 Sun-Target sep (deg) : 141.57
 Sun-Moon sep (deg) : 8.46
 B (ring opening deg) : 73.46
 PA of pole (deg) : 61.72
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.235
 C/A sky separation (km) : 16276.8
 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_itr93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk



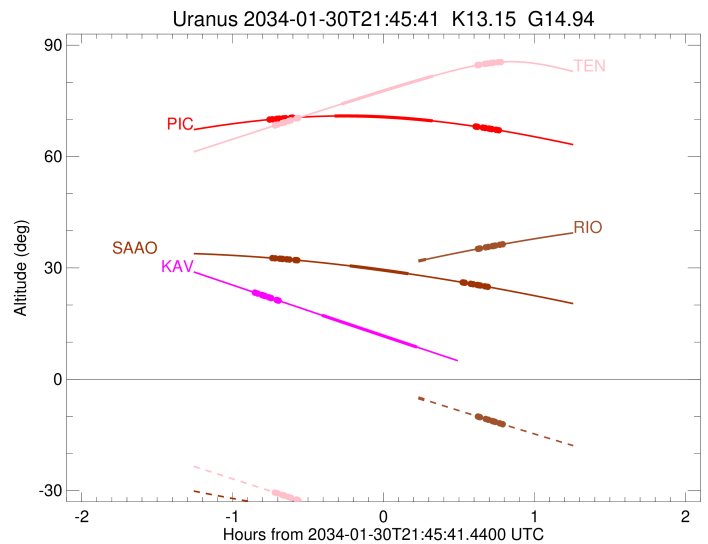
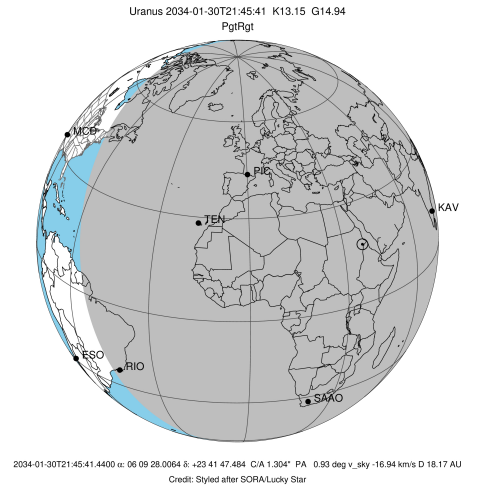
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2034-01-30T20:54:20.455		23.39	-61.49	51410.24	-16.78		
lambda	I	2034-01-30T20:55:43.210		23.08	-61.16	50026.71	-16.69		
delta	I	2034-01-30T20:57:26.885		22.68	-60.75	48300.35	-16.61		
gamma	I	2034-01-30T20:58:07.201		22.53	-60.59	47631.27	-16.58		
eta	I	2034-01-30T20:58:34.671		22.42	-60.48	47176.12	-16.56		
beta	I	2034-01-30T21:00:07.502		22.07	-60.12	45643.47	-16.47		
alpha	I	2034-01-30T21:01:04.825		21.85	-59.89	44696.94	-16.42		
4	I	2034-01-30T21:03:13.103		21.36	-59.38	42607.55	-16.29		
5	I	2034-01-30T21:03:36.148		21.27	-59.29	42229.68	-16.25		
6	I	2034-01-30T21:04:01.255		21.18	-59.19	41819.25	-16.24		
Uranus	I	2034-01-30T21:21:12.132		17.25	-55.10	25043.32		-16.17	-16.90
Uranus	E	2034-01-30T21:59:03.838		8.65	-46.08	25483.35		6.04	6.33
6	E	2034-01-30T22:16:58.015		4.61x	-41.81	41877.45	16.09		
5	E	2034-01-30T22:17:16.867		4.54x	-41.74	42181.32	16.10		
4	E	2034-01-30T22:17:41.042		4.45x	-41.64	42564.88	16.14		
alpha	E	2034-01-30T22:19:56.256		3.94x	-41.10	44752.14	16.26		
beta	E	2034-01-30T22:20:52.300		3.73x	-40.88	45667.86	16.31		
eta	E	2034-01-30T22:22:24.616		3.39x	-40.51	47176.12	16.38		
gamma	E	2034-01-30T22:22:51.773		3.29x	-40.41	47621.30	16.40		
delta	E	2034-01-30T22:23:33.135		3.13x	-40.24	48300.35	16.43		
lambda	E	2034-01-30T22:25:17.971		2.74x	-39.82	50026.71	16.50		
epsilon	E	2034-01-30T22:26:24.425		2.49x	-39.56	51124.65	16.59		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2034-01-30T21:49:05.800
 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 : 3425387605706768640
 2Mass ID (if available) : 06092800+2341474
 ICRS Star Coord at Epoch: 06h 09m 28.00638s +23:41:47.48418s
 RUWE (>1.4 is poor) : 1.09
 K magnitude : 13.150
 G magnitude : 14.935
 RP magnitude : 14.317
 BP magnitude : 15.376
 DUPflag : 0
 Distance (au) : 18.166
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -16.94
 Sun-Target sep (deg) : 141.57
 Sun-Moon sep (deg) : 6.86
 B (ring opening deg) : 73.46
 PA of pole (deg) : 61.72
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.628
 C/A sky separation (km) : 21450.6
 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_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	2034-01-30T21:06:12.377		23.23	6.65x	51438.15	-16.17		
lambda	I	2034-01-30T21:07:40.137		23.49	6.33x	50026.71	-16.03		
delta	I	2034-01-30T21:09:28.256		23.80	5.93x	48300.35	-15.90		
gamma	I	2034-01-30T21:10:10.426		23.92	5.77x	47631.06	-15.84		
eta	I	2034-01-30T21:10:39.177		24.00	5.67x	47176.12	-15.80		
beta	I	2034-01-30T21:12:16.689		24.28	5.31x	45642.53	-15.66		
alpha	I	2034-01-30T21:13:16.845		24.46	5.09x	44700.04	-15.57		
4	I	2034-01-30T21:15:32.701		24.84	4.59x	42610.58	-15.33		
5	I	2034-01-30T21:15:57.925		24.92	4.50x	42219.89	-15.26		
6	I	2034-01-30T21:16:23.698		24.99	4.40x	41824.18	-15.23		
Uranus	I	2034-01-30T21:36:25.991		28.30	0.01x	25144.33		-14.42	-15.07
Uranus	E	2034-01-30T22:02:29.921		32.28	-5.63	25557.05		0.97	1.01
6	E	2034-01-30T22:23:15.614		35.13	-10.05	41879.10	15.29		
5	E	2034-01-30T22:23:34.795		35.18	-10.11	42172.78	15.31		
4	E	2034-01-30T22:24:01.174		35.23	-10.21	42571.80	15.38		
alpha	E	2034-01-30T22:26:21.917		35.53	-10.70	44752.43	15.63		
beta	E	2034-01-30T22:27:19.974		35.66	-10.90	45665.12	15.72		
eta	E	2034-01-30T22:28:55.653		35.86	-11.24	47176.12	15.87		
gamma	E	2034-01-30T22:29:23.687		35.92	-11.34	47621.59	15.91		
delta	E	2034-01-30T22:30:06.270		36.00	-11.49	48300.35	15.97		
lambda	E	2034-01-30T22:31:53.908		36.23	-11.86	50026.71	16.11		
epsilon	E	2034-01-30T22:33:05.045		36.37	-12.11	51175.47	16.25		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2034-01-30T21:43:31.400
 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 : 3425387605706768640
 2Mass ID (if available) : 06092800+2341474
 ICRS Star Coord at Epoch: 06h 09m 28.00638s +23:41:47.48418s
 RUWE (>1.4 is poor) : 1.09
 K magnitude : 13.150
 G magnitude : 14.935
 RP magnitude : 14.317
 BP magnitude : 15.376
 DUPflag : 0
 Distance (au) : 18.166
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -16.94
 Sun-Target sep (deg) : 141.57
 Sun-Moon sep (deg) : 7.46
 B (ring opening deg) : 73.46
 PA of pole (deg) : 61.72
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.694
 C/A sky separation (km) : 22320.2
 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_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	2034-01-30T21:01:11.806		32.66	-33.92	51446.15	-16.13		
lambda	I	2034-01-30T21:02:40.344		32.58	-34.08	50026.71	-15.98		
delta	I	2034-01-30T21:04:28.908		32.48	-34.28	48300.35	-15.83		
gamma	I	2034-01-30T21:05:11.289		32.44	-34.36	47630.99	-15.76		
eta	I	2034-01-30T21:05:40.188		32.41	-34.41	47176.12	-15.72		
beta	I	2034-01-30T21:07:18.299		32.32	-34.59	45642.30	-15.56		
alpha	I	2034-01-30T21:08:18.810		32.26	-34.69	44700.96	-15.45		
4	I	2034-01-30T21:10:35.818		32.12	-34.93	42611.31	-15.18		
5	I	2034-01-30T21:11:01.475		32.09	-34.98	42217.24	-15.11		
6	I	2034-01-30T21:11:27.237		32.06	-35.02	41825.56	-15.08		
Uranus	I	2034-01-30T21:32:17.569		30.55	-36.97	25180.76		-13.74	-14.37
Uranus	E	2034-01-30T21:55:31.705		28.44	-38.67	25559.00		0.06	0.06
6	E	2034-01-30T22:17:12.536		26.09	-39.74	41879.21	15.03		
5	E	2034-01-30T22:17:31.994		26.05	-39.75	42172.05	15.06		
4	E	2034-01-30T22:17:58.907		26.00	-39.77	42572.45	15.13		
alpha	E	2034-01-30T22:20:21.845		25.72	-39.85	44752.42	15.40		
beta	E	2034-01-30T22:21:20.754		25.60	-39.89	45664.88	15.50		
eta	E	2034-01-30T22:22:57.806		25.41	-39.94	47176.12	15.65		
gamma	E	2034-01-30T22:23:26.226		25.35	-39.95	47621.62	15.70		
delta	E	2034-01-30T22:24:09.378		25.26	-39.97	48300.35	15.76		
lambda	E	2034-01-30T22:25:58.405		25.04	-40.03	50026.71	15.91		
epsilon	E	2034-01-30T22:27:10.657		24.90	-40.06	51179.21	16.06		