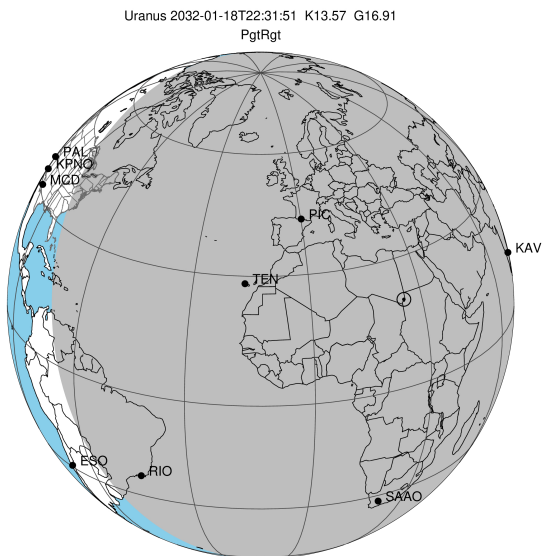


target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2032-01-18T22:31:51.890
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 3416547802799494272
 2Mass ID (if available) : 05313557+2326047

ICRS Star Coord at Epoch: 05h 31m 35.57979s +23:26:04.72532s

RUWE (>1.4 is poor) : 1.04
 K magnitude : 13.575
 G magnitude : 16.913
 RP magnitude : 15.944
 BP magnitude : 17.901
 DUPflag : 0
 Distance (au) : 18.261
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -18.22
 Sun-Target sep (deg) : 145.54
 Sun-Moon sep (deg) : 62.55
 B (ring opening deg) : 80.20
 PA of pole (deg) : 33.53

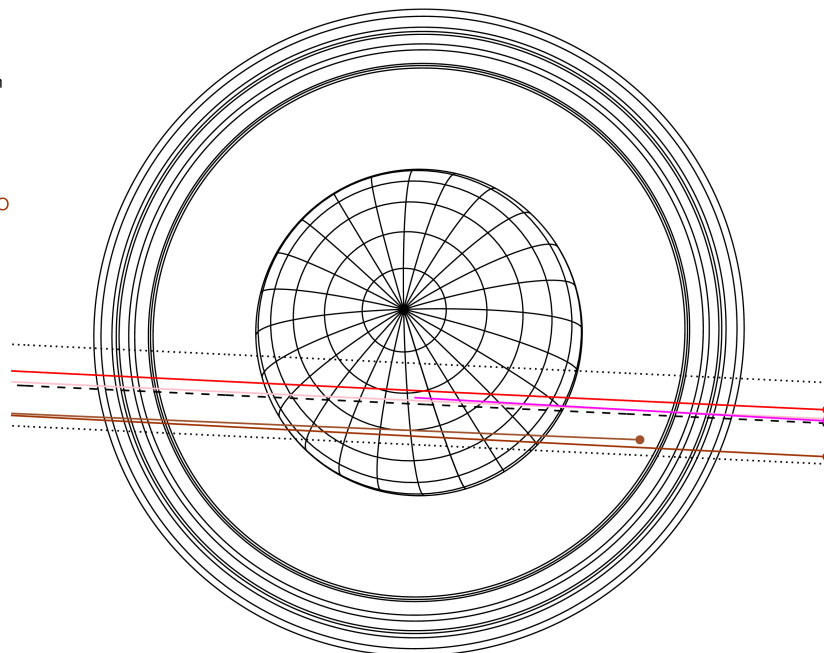
#	a(km)	ring
1	41837.2	6
2	42235.0	5
3	42571.2	4
4	44718.5	alpha
5	45661.1	beta
6	47176.1	eta
7	47626.3	gamma
8	48300.3	delta
9	50026.7	lambda
10	51149.4	epsilon



2032-01-18T22:31:51.8900 ex: 05 31 35.5796 s: +23 26 04.725 C/A 0.840° PA 357.32 deg v_sky -18.22 km/s D 18.26 AU
 Credit: Styled after SORA/Lucky Star

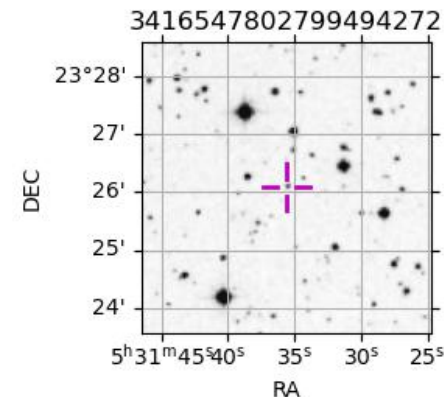
Uranus 2032-01-18T22:31:51 K13.57 G16.91 PgtRgt

Earth
 PIC
 TEN
 KAV
 RIO
 SAAO

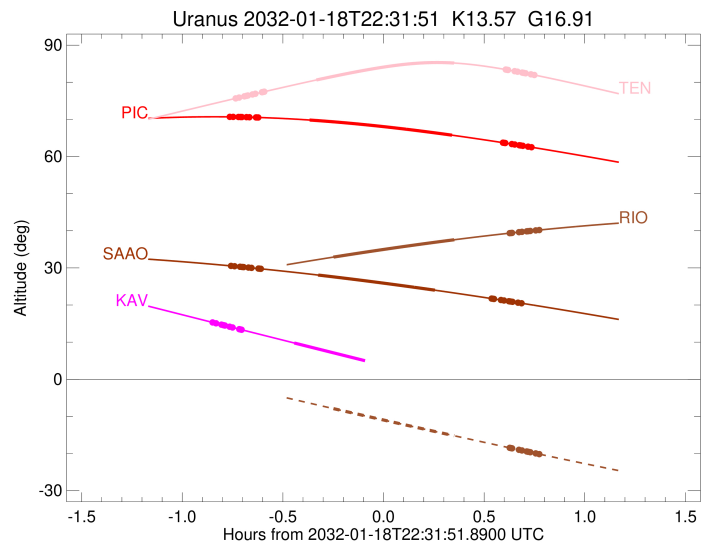
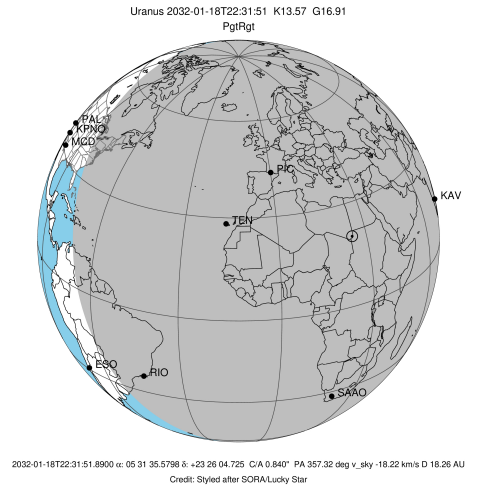


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1	+++++	+ +	+++++	JAN 18 21:45 - JAN 18 23:15	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 18 21:47 - JAN 18 23:16	PieRie
IRTF	Mauna Kea/IRTF	19.8	204.5					PnnRnn
KAV	Kavalur Observatory	12.6	78.8	+++++	+		JAN 18 21:40 - JAN 18 22:05	PinRin
RIO	Rio de Janeiro	-22.9	316.8		+ +	+++++	JAN 18 22:16 - JAN 18 23:17	PieRne
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 18 21:46 - JAN 18 23:12	PieRie
MSO	Mt. Stromlo Observato	-35.3	149.0					PnnRnn

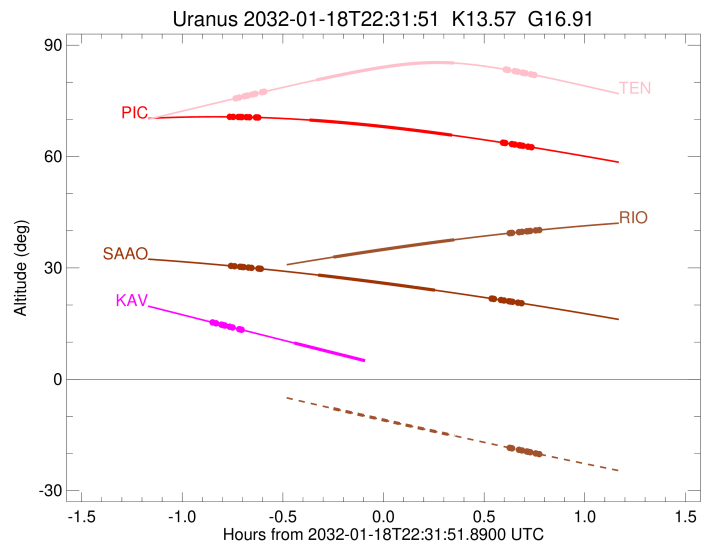
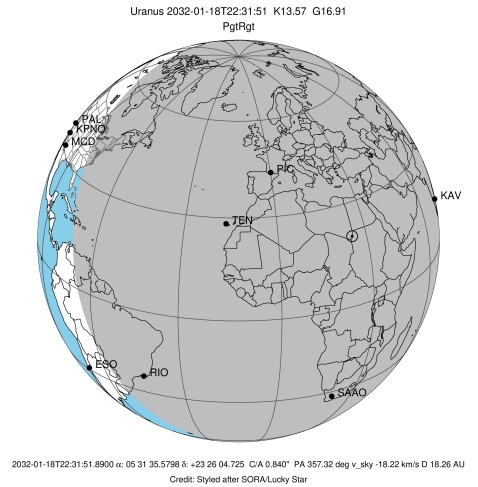


target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2032-01-18T22:30:52.180
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PIC
 Location : Pic du Midi
 Latitude (deg) : 42.93656
 E. Longitude (deg) : 0.14231
 Altitude (km) : 2.890
 Gaia source ID : 3416547802799494272
 2Mass ID (if available) : 05313557+2326047
 ICRS Star Coord at Epoch: 05h 31m 35.57979s +23:26:04.72532s
 RUWE (>1.4 is poor) : 1.04
 K magnitude : 13.575
 G magnitude : 16.913
 RP magnitude : 15.944
 BP magnitude : 17.901
 DUPflag : 0
 Distance (au) : 18.261
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -18.22
 Sun-Target sep (deg) : 145.54
 Sun-Moon sep (deg) : 63.42
 B (ring opening deg) : 80.20
 PA of pole (deg) : 33.53
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.688
 C/A sky separation (km) : 9111.4
 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



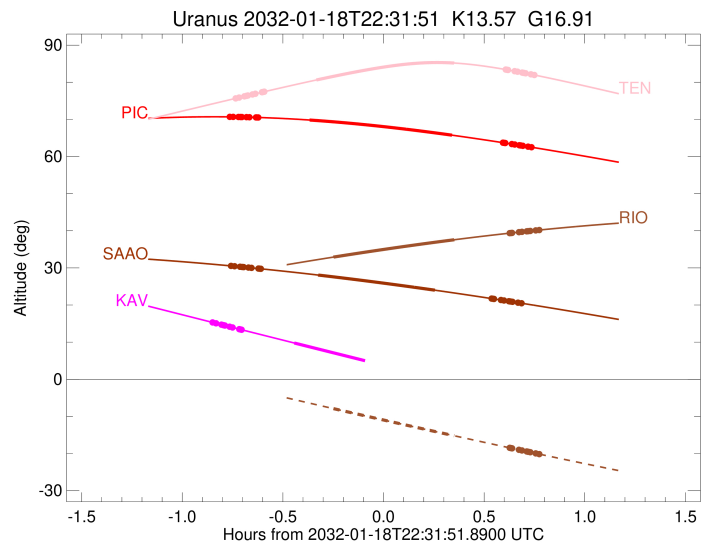
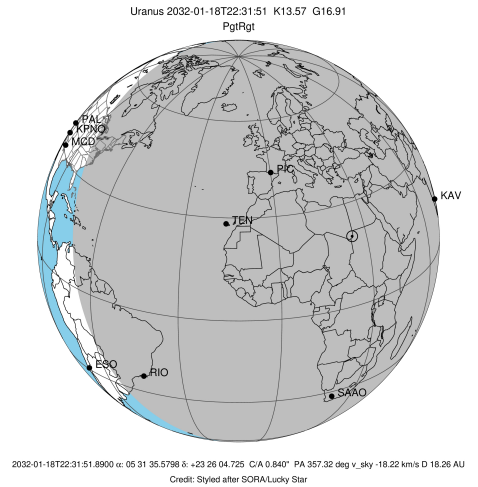
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2032-01-18T21:45:40.637		70.69	-52.55	51551.06	-18.35		
lambda	I	2032-01-18T21:47:03.723		70.68	-52.78	50026.71	-18.34		
delta	I	2032-01-18T21:48:37.931		70.65	-53.04	48300.35	-18.31		
gamma	I	2032-01-18T21:49:14.998		70.64	-53.14	47621.73	-18.30		
eta	I	2032-01-18T21:49:39.350		70.64	-53.21	47176.12	-18.30		
beta	I	2032-01-18T21:51:01.871		70.61	-53.43	45667.16	-18.27		
alpha	I	2032-01-18T21:51:52.414		70.59	-53.57	44745.79	-18.25		
4	I	2032-01-18T21:53:54.123		70.54	-53.90	42525.96	-18.21		
5	I	2032-01-18T21:54:10.898		70.53	-53.95	42217.85	-18.21		
6	I	2032-01-18T21:54:29.977		70.52	-54.00	41877.60	-18.20		
Uranus	I	2032-01-18T22:09:48.661		69.83	-56.44	25150.69	-18.25	-8.25	-8.63
Uranus	E	2032-01-18T22:52:17.644		65.76	-62.43	25517.84	-18.25	2.58	2.70
6	E	2032-01-18T23:07:26.610		63.74	-64.17	41806.39	18.16		
5	E	2032-01-18T23:07:53.082		63.68	-64.21	42283.46	18.17		
4	E	2032-01-18T23:08:11.045		63.63	-64.24	42613.03	18.17		
alpha	E	2032-01-18T23:10:04.949		63.37	-64.44	44685.47	18.21		
beta	E	2032-01-18T23:10:57.821		63.24	-64.53	45648.09	18.23		
eta	E	2032-01-18T23:12:21.578		63.04	-64.67	47176.12	18.26		
gamma	E	2032-01-18T23:12:46.405		62.98	-64.71	47629.43	18.26		
delta	E	2032-01-18T23:13:23.134		62.89	-64.77	48300.35	18.27		
lambda	E	2032-01-18T23:14:57.558		62.66	-64.93	50026.71	18.29		
epsilon	E	2032-01-18T23:15:37.236		62.57	-64.99	50752.75	18.31		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2032-01-18T22:32:10.900
 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 : 3416547802799494272
 2Mass ID (if available) : 05313557+2326047
 ICRS Star Coord at Epoch: 05h 31m 35.57979s +23:26:04.72532s
 RUWE (>1.4 is poor) : 1.04
 K magnitude : 13.575
 G magnitude : 16.913
 RP magnitude : 15.944
 BP magnitude : 17.901
 DUPflag : 0
 Distance (au) : 18.261
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -18.22
 Sun-Target sep (deg) : 145.54
 Sun-Moon sep (deg) : 63.38
 B (ring opening deg) : 80.20
 PA of pole (deg) : 33.53
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.806
 C/A sky separation (km) : 10672.3
 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



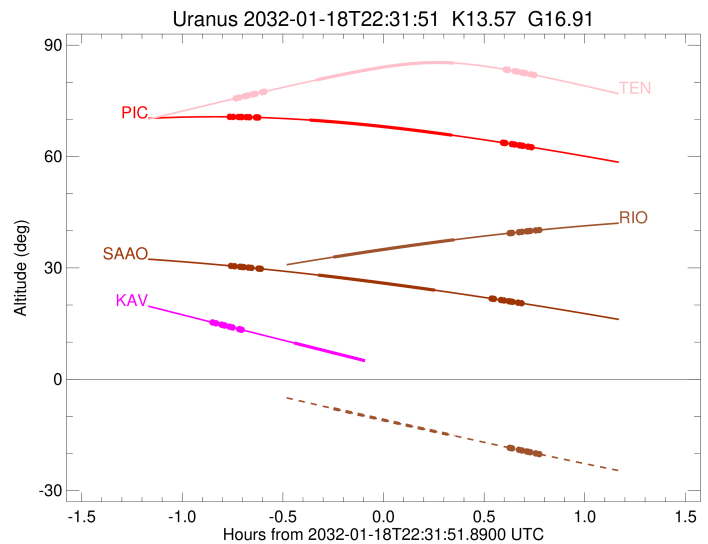
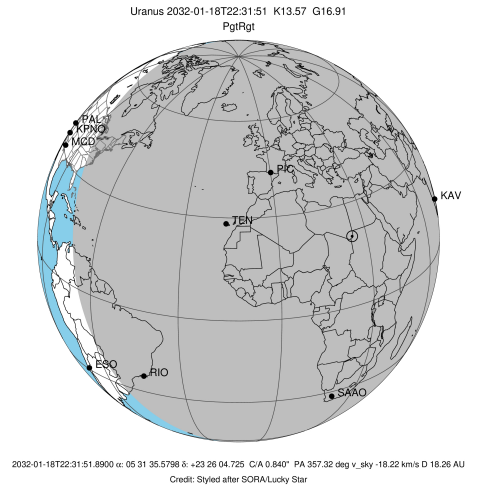
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2032-01-18T21:47:26.295		75.59	-42.14	51549.20	-18.29		
lambda	I	2032-01-18T21:48:49.580		75.89	-42.45	50026.71	-18.27		
delta	I	2032-01-18T21:50:24.166		76.22	-42.79	48300.35	-18.24		
gamma	I	2032-01-18T21:51:01.399		76.35	-42.93	47621.65	-18.22		
eta	I	2032-01-18T21:51:25.856		76.44	-43.02	47176.12	-18.21		
beta	I	2032-01-18T21:52:48.809		76.73	-43.32	45666.52	-18.18		
alpha	I	2032-01-18T21:53:39.622		76.91	-43.51	44745.10	-18.15		
4	I	2032-01-18T21:55:41.991		77.34	-43.96	42526.04	-18.10		
5	I	2032-01-18T21:55:58.733		77.40	-44.02	42220.68	-18.09		
6	I	2032-01-18T21:56:18.075		77.46	-44.09	41878.05	-18.08		
Uranus	I	2032-01-18T22:11:49.794		80.62	-47.51	25118.45		-8.58	-8.98
Uranus	E	2032-01-18T22:52:56.809		85.19	-56.56	25535.89		1.93	2.03
6	E	2032-01-18T23:08:16.508		83.44	-59.92	41807.62	18.08		
5	E	2032-01-18T23:08:43.158		83.37	-60.02	42286.02	18.09		
4	E	2032-01-18T23:09:01.030		83.32	-60.08	42612.29	18.09		
alpha	E	2032-01-18T23:10:55.416		83.01	-60.50	44685.20	18.15		
beta	E	2032-01-18T23:11:48.444		82.86	-60.69	45647.52	18.17		
eta	E	2032-01-18T23:13:12.472		82.62	-61.00	47176.12	18.21		
gamma	E	2032-01-18T23:13:37.352		82.54	-61.09	47629.27	18.22		
delta	E	2032-01-18T23:14:14.175		82.43	-61.22	48300.35	18.23		
lambda	E	2032-01-18T23:15:48.783		82.15	-61.56	50026.71	18.26		
epsilon	E	2032-01-18T23:16:28.693		82.03	-61.71	50755.86	18.28		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2032-01-18T22:26:12.950
 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 : 3416547802799494272
 2Mass ID (if available) : 05313557+2326047
 ICRS Star Coord at Epoch: 05h 31m 35.57979s +23:26:04.72532s
 RUWE (>1.4 is poor) : 1.04
 K magnitude : 13.575
 G magnitude : 16.913
 RP magnitude : 15.944
 BP magnitude : 17.901
 DUPflag : 0
 Distance (au) : 18.261
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -18.22
 Sun-Target sep (deg) : 145.54
 Sun-Moon sep (deg) : 63.03
 B (ring opening deg) : 80.20
 PA of pole (deg) : 33.53
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.772
 C/A sky separation (km) : 10224.8
 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



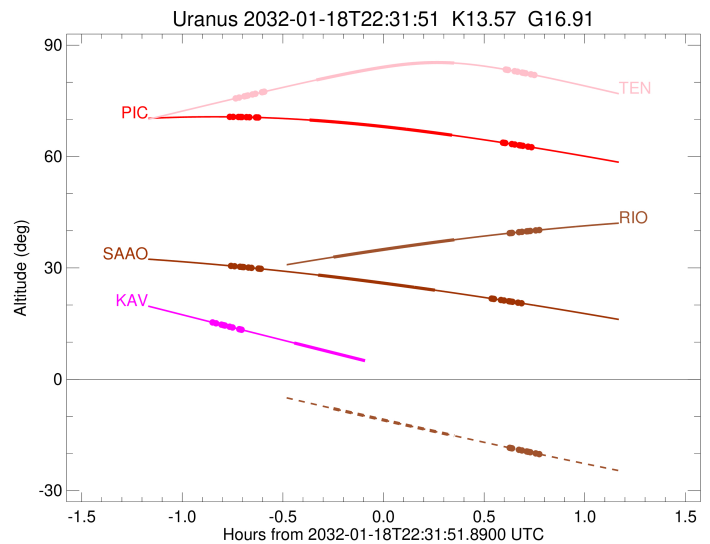
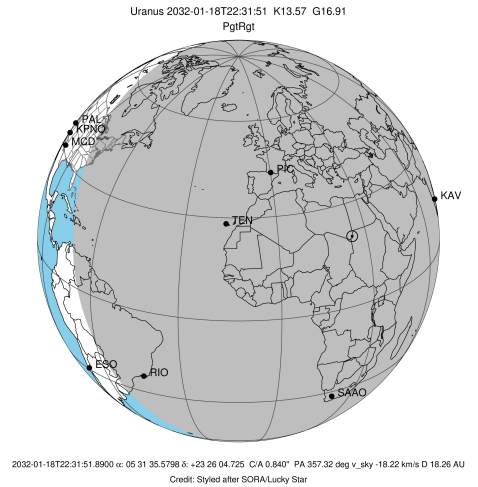
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2032-01-18T21:40:32.854		15.39	-49.65	51548.99	-18.04		
lambda	I	2032-01-18T21:41:57.275		15.07	-49.32	50026.71	-18.02		
delta	I	2032-01-18T21:43:33.173		14.71	-48.94	48300.35	-17.99		
gamma	I	2032-01-18T21:44:10.923		14.57	-48.80	47621.64	-17.97		
eta	I	2032-01-18T21:44:35.720		14.47	-48.70	47176.12	-17.96		
beta	I	2032-01-18T21:45:59.830		14.15	-48.37	45666.49	-17.93		
alpha	I	2032-01-18T21:46:51.352		13.96	-48.17	44745.07	-17.90		
4	I	2032-01-18T21:48:55.424		13.49	-47.69	42526.05	-17.85		
5	I	2032-01-18T21:49:12.396		13.42	-47.62	42220.74	-17.85		
6	I	2032-01-18T21:49:32.010		13.35	-47.55	41878.06	-17.83		
Uranus	I	2032-01-18T22:05:15.530		9.77	-43.87	25122.19		-8.54	-8.94
Uranus	E	2032-01-18T22:47:37.968		0.22x	-33.95	25528.51		2.22	2.33
6	E	2032-01-18T23:03:15.722		-3.26x	-30.29	41806.96	17.67		
5	E	2032-01-18T23:03:42.949		-3.36x	-30.19	42284.66	17.69		
4	E	2032-01-18T23:04:01.323		-3.43x	-30.12	42612.70	17.69		
alpha	E	2032-01-18T23:05:58.334		-3.86x	-29.66	44685.34	17.74		
beta	E	2032-01-18T23:06:52.617		-4.06x	-29.45	45647.84	17.75		
eta	E	2032-01-18T23:08:18.618		-4.38x	-29.11	47176.12	17.78		
gamma	E	2032-01-18T23:08:44.098		-4.47x	-29.02	47629.36	17.79		
delta	E	2032-01-18T23:09:21.800		-4.61x	-28.87	48300.35	17.80		
lambda	E	2032-01-18T23:10:58.700		-4.97x	-28.49	50026.71	17.83		
epsilon	E	2032-01-18T23:11:39.481		-5.12x	-28.33	50753.99	17.85		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2032-01-18T22:34:38.940
 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 : 3416547802799494272
 2Mass ID (if available) : 05313557+2326047
 ICRS Star Coord at Epoch: 05h 31m 35.57979s +23:26:04.72532s
 RUWE (>1.4 is poor) : 1.04
 K magnitude : 13.575
 G magnitude : 16.913
 RP magnitude : 15.944
 BP magnitude : 17.901
 DUPflag : 0
 Distance (au) : 18.261
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -18.22
 Sun-Target sep (deg) : 145.54
 Sun-Moon sep (deg) : 62.83
 B (ring opening deg) : 80.20
 PA of pole (deg) : 33.53
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.160
 C/A sky separation (km) : 15369.8
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl1.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	2032-01-18T21:50:56.700		28.98	-2.47x	51541.04	-17.75		
lambda	I	2032-01-18T21:52:22.071		29.20	-2.77x	50026.71	-17.71		
delta	I	2032-01-18T21:53:59.729		29.46	-3.11x	48300.35	-17.64		
gamma	I	2032-01-18T21:54:38.241		29.56	-3.25x	47621.41	-17.61		
eta	I	2032-01-18T21:55:03.535		29.63	-3.34x	47176.12	-17.59		
beta	I	2032-01-18T21:56:29.602		29.85	-3.64x	45664.47	-17.52		
alpha	I	2032-01-18T21:57:22.378		29.99	-3.82x	44742.68	-17.47		
4	I	2032-01-18T21:59:29.551		30.32	-4.27x	42526.70	-17.35		
5	I	2032-01-18T21:59:46.577		30.36	-4.33x	42229.81	-17.34		
6	I	2032-01-18T22:00:07.251		30.41	-4.40x	41879.15	-17.31		
Uranus	I	2032-01-18T22:16:54.996		32.91	-7.90	25033.30		-9.40	-9.84
Uranus	E	2032-01-18T22:52:57.717		37.58	-15.22	25558.81		-0.18	-0.19
6	E	2032-01-18T23:09:27.337		39.35	-18.46	41811.60	17.36		
5	E	2032-01-18T23:09:55.193		39.40	-18.55	42293.19	17.39		
4	E	2032-01-18T23:10:13.257		39.43	-18.61	42609.67	17.40		
alpha	E	2032-01-18T23:12:12.066		39.62	-18.99	44684.70	17.53		
beta	E	2032-01-18T23:13:06.862		39.71	-19.17	45645.95	17.58		
eta	E	2032-01-18T23:14:33.730		39.85	-19.45	47176.12	17.65		
gamma	E	2032-01-18T23:14:59.360		39.89	-19.53	47628.78	17.67		
delta	E	2032-01-18T23:15:37.329		39.95	-19.65	48300.35	17.70		
lambda	E	2032-01-18T23:17:14.660		40.10	-19.96	50026.71	17.77		
epsilon	E	2032-01-18T23:17:56.325		40.16	-20.10	50767.75	17.82		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2032-01-18T22:29:27.280
 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 : 3416547802799494272
 2Mass ID (if available) : 05313557+2326047
 ICRS Star Coord at Epoch: 05h 31m 35.57979s +23:26:04.72532s
 RUWE (>1.4 is poor) : 1.04
 K magnitude : 13.575
 G magnitude : 16.913
 RP magnitude : 15.944
 BP magnitude : 17.901
 DUPflag : 0
 Distance (au) : 18.261
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -18.22
 Sun-Target sep (deg) : 145.54
 Sun-Moon sep (deg) : 63.13
 B (ring opening deg) : 80.20
 PA of pole (deg) : 33.53
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.228
 C/A sky separation (km) : 16258.7
 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	2032-01-18T21:46:03.096		30.57	-35.32	51537.95	-17.69		
lambda	I	2032-01-18T21:47:28.591		30.45	-35.41	50026.71	-17.64		
delta	I	2032-01-18T21:49:06.649		30.31	-35.51	48300.35	-17.57		
gamma	I	2032-01-18T21:49:45.342		30.25	-35.55	47621.35	-17.53		
eta	I	2032-01-18T21:50:10.754		30.21	-35.58	47176.12	-17.51		
beta	I	2032-01-18T21:51:37.309		30.09	-35.66	45663.87	-17.42		
alpha	I	2032-01-18T21:52:30.405		30.01	-35.71	44741.94	-17.37		
4	I	2032-01-18T21:54:38.365		29.82	-35.84	42526.99	-17.23		
5	I	2032-01-18T21:54:55.402		29.79	-35.85	42232.37	-17.21		
6	I	2032-01-18T21:55:16.373		29.76	-35.87	41879.36	-17.18		
Uranus	I	2032-01-18T22:12:22.540		28.08	-36.66	25018.28		-9.54	-9.98
Uranus	E	2032-01-18T22:47:11.043		24.00	-37.32	25557.32		-0.52	-0.55
6	E	2032-01-18T23:04:03.507		21.74	-37.17	41812.08	17.11		
5	E	2032-01-18T23:04:31.779		21.68	-37.16	42293.95	17.14		
4	E	2032-01-18T23:04:50.045		21.64	-37.15	42609.34	17.15		
alpha	E	2032-01-18T23:06:50.531		21.36	-37.11	44684.67	17.29		
beta	E	2032-01-18T23:07:46.055		21.23	-37.09	45645.80	17.34		
eta	E	2032-01-18T23:09:14.068		21.02	-37.06	47176.12	17.43		
gamma	E	2032-01-18T23:09:40.023		20.96	-37.05	47628.73	17.45		
delta	E	2032-01-18T23:10:18.476		20.87	-37.03	48300.35	17.48		
lambda	E	2032-01-18T23:11:57.013		20.63	-36.99	50026.71	17.56		
epsilon	E	2032-01-18T23:12:39.259		20.53	-36.97	50769.06	17.60		