

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2032-11-13T00:58:36.360
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 3424691408687608704
 2Mass ID (if available) : 06024243+2338311

ICRS Star Coord at Epoch: 06h 02m 42.43484s +23:38:31.03529s

RUWE (>1.4 is poor) : 0.97
 K magnitude : 14.352
 G magnitude : 16.840
 RP magnitude : 16.033
 BP magnitude : 17.516
 DUPflag : 0
 Distance (au) : 18.256
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -16.50
 Sun-Target sep (deg) : 140.12
 Sun-Moon sep (deg) : 95.95
 B (ring opening deg) : 74.83
 PA of pole (deg) : 58.49

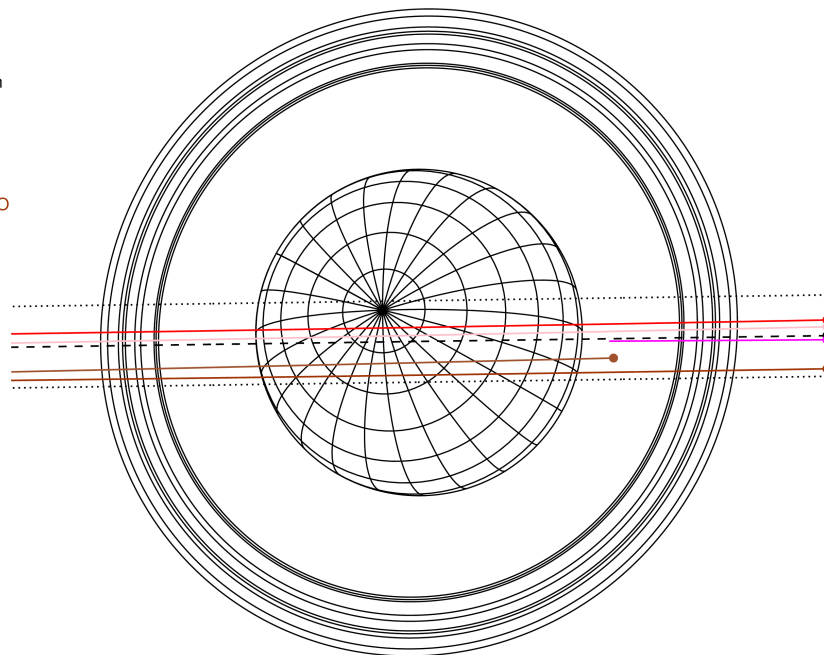
#	a(km)	ring
1	41837.2	6
2	42235.0	5
3	42571.2	4
4	44718.5	alpha
5	45661.1	beta
6	47176.1	eta
7	47626.3	gamma
8	48300.3	delta
9	50026.7	lambda
10	51149.4	epsilon



2032-11-13T00:58:36.3600 α: 06 02 42.4348 δ: +23 38 31.035 C/A 0.098° PA 0.83 deg v_sky -16.50 km/s D 18.26 AU
 Credit: Styled after SORA/Lucky Star

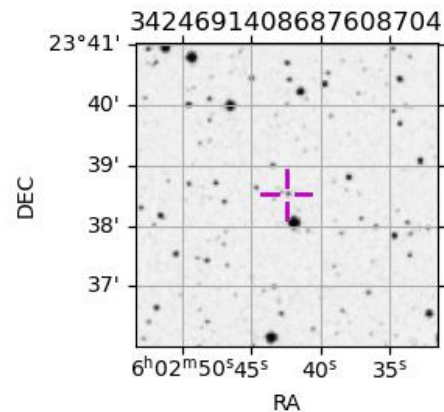
Uranus 2032-11-13T00:58:36 K14.35 G16.84 PgtRgt

Earth
 PIC
 TEN
 KAV
 RIO
 SAAO



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

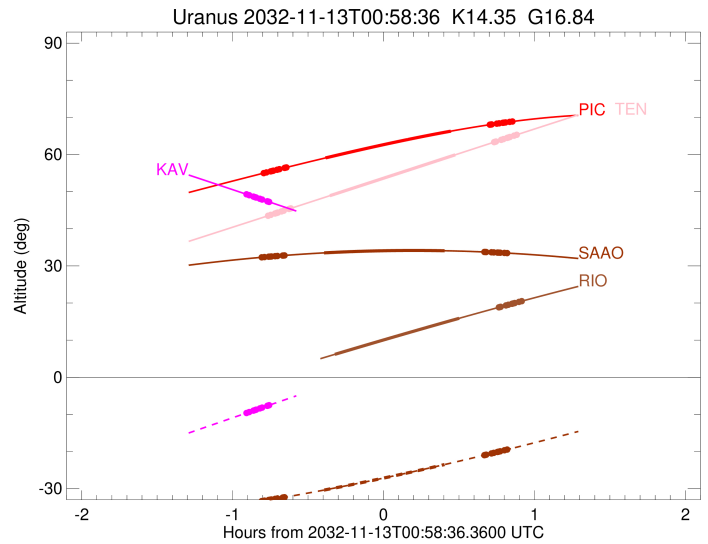
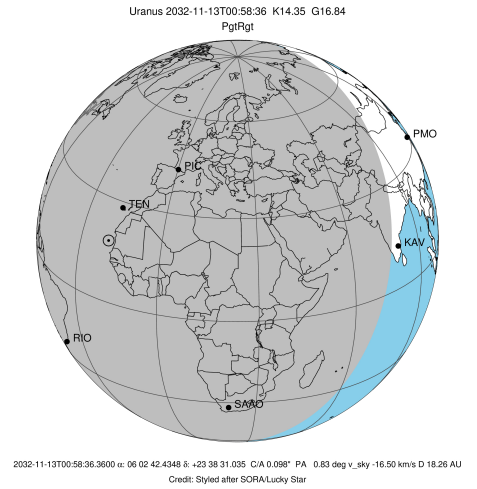
Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1	+++++	+ +	+++++	NOV 13 00:10 - NOV 13 01:49	PieRie
PAL	Palomar Mt (200")	33.4	243.1					PnnRnn
PMO	Purple Mtn Obs. Nanki	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl Obs	32.0	248.4					PnnRnn
MCD	McDonald Obs. 2.7m	30.7	256.0					PnnRnn
TEN	Teide Obs./Tenerife	28.3	343.5	+++++	+ +	+++++	NOV 13 00:12 - NOV 13 01:51	PieRie
IRTF	Mauna Kea/IRTF	19.8	204.5					PnnRnn
KAV	Kavalur Observatory	12.6	78.8	+++++			NOV 13 00:03 - NOV 13 00:13	PnnRin
RIO	Rio de Janeiro	-22.9	316.8		+ +	+++++	NOV 13 00:39 - NOV 13 01:53	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	+++++	+ +	+++++	NOV 13 00:09 - NOV 13 01:47	PieRie
MSO	Mt. Stromlo Observato	-35.3	149.0					PnnRnn



3424691408687608704

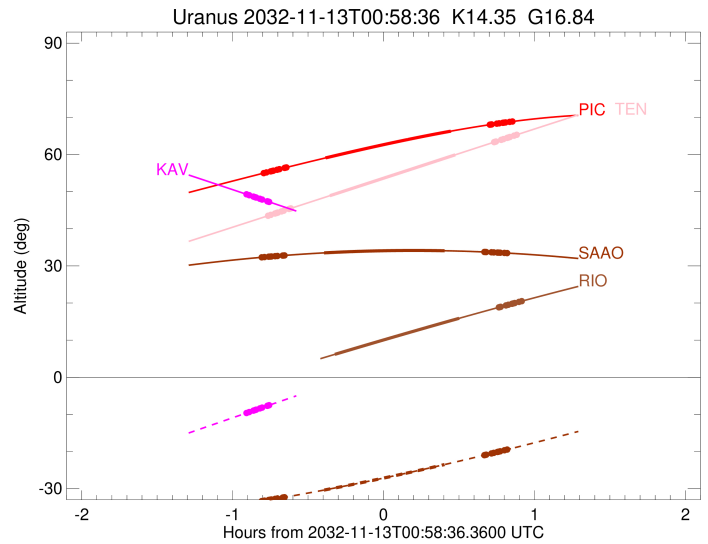
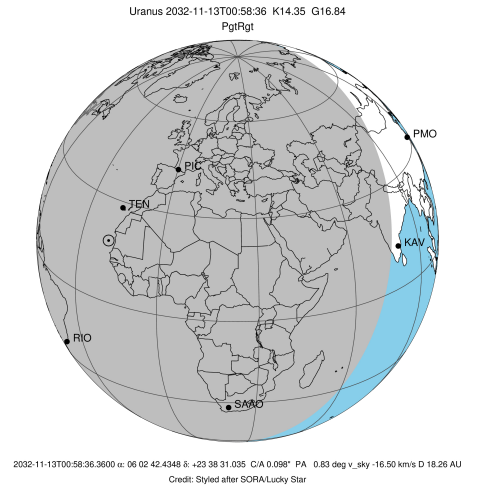
23°41'
 40'
 39'
 38'
 37'
 6h02m50s45s 40s 35s
 RA

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2032-11-13T01:00:30.600
 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 : 3424691408687608704
 2Mass ID (if available) : 06024243+2338311
 ICRS Star Coord at Epoch: 06h 02m 42.43484s +23:38:31.03529s
 RUWE (>1.4 is poor) : 0.97
 K magnitude : 14.352
 G magnitude : 16.840
 RP magnitude : 16.033
 BP magnitude : 17.516
 DUPflag : 0
 Distance (au) : 18.256
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -16.50
 Sun-Target sep (deg) : 140.12
 Sun-Moon sep (deg) : 96.86
 B (ring opening deg) : 74.83
 PA of pole (deg) : 58.49
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.061
 C/A sky separation (km) : 801.9
 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



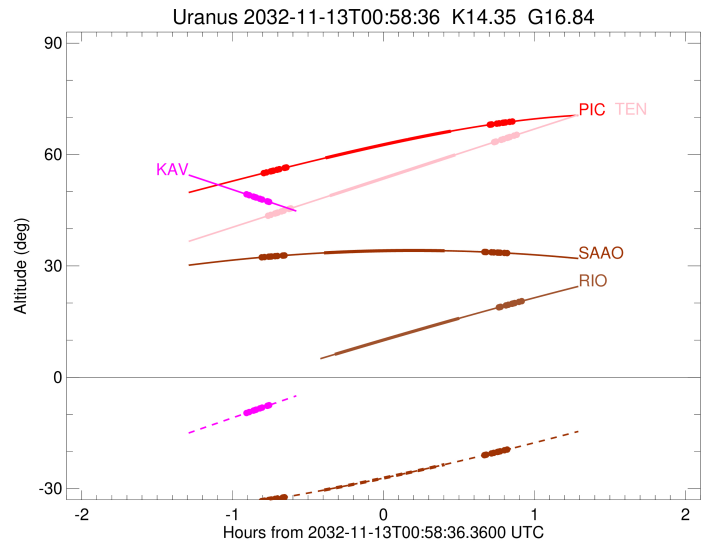
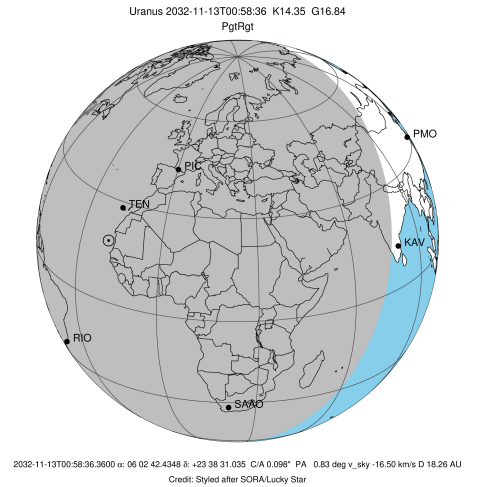
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2032-11-13T00:10:43.430		54.95	-64.65	51438.56	-17.19		
lambda	I	2032-11-13T00:12:05.565		55.18	-64.58	50026.71	-17.19		
delta	I	2032-11-13T00:13:45.991		55.47	-64.49	48300.35	-17.19		
gamma	I	2032-11-13T00:14:25.048		55.58	-64.46	47628.90	-17.19		
eta	I	2032-11-13T00:14:51.385		55.65	-64.43	47176.12	-17.19		
beta	I	2032-11-13T00:16:18.761		55.90	-64.35	45673.16	-17.19		
alpha	I	2032-11-13T00:17:12.936		56.05	-64.30	44743.14	-17.19		
4	I	2032-11-13T00:19:21.385		56.41	-64.17	42539.15	-17.20		
5	I	2032-11-13T00:19:34.568		56.45	-64.16	42298.65	-17.19		
6	I	2032-11-13T00:20:00.669		56.52	-64.13	41849.33	-17.19		
Uranus	I	2032-11-13T00:35:32.382		59.09	-62.97	25183.26		-12.48	-13.05
Uranus	E	2032-11-13T01:25:25.153		66.30	-57.24	25151.81		13.01	13.61
6	E	2032-11-13T01:40:51.396		68.04	-55.02	41826.84	17.26		
5	E	2032-11-13T01:41:11.221		68.07	-54.97	42169.31	17.26		
4	E	2032-11-13T01:41:35.455		68.11	-54.91	42601.93	17.27		
alpha	E	2032-11-13T01:43:36.844		68.32	-54.61	44692.97	17.27		
beta	E	2032-11-13T01:44:32.261		68.41	-54.47	45648.50	17.27		
eta	E	2032-11-13T01:46:00.682		68.55	-54.25	47176.12	17.27		
gamma	E	2032-11-13T01:46:26.586		68.59	-54.18	47623.46	17.27		
delta	E	2032-11-13T01:47:05.782		68.65	-54.08	48300.35	17.27		
lambda	E	2032-11-13T01:48:45.741		68.80	-53.83	50026.71	17.27		
epsilon	E	2032-11-13T01:49:34.397		68.87	-53.70	50867.07	17.27		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2032-11-13T01:02:13.610
 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 : 3424691408687608704
 2Mass ID (if available) : 06024243+2338311
 ICRS Star Coord at Epoch: 06h 02m 42.43484s +23:38:31.03529s
 RUWE (>1.4 is poor) : 0.97
 K magnitude : 14.352
 G magnitude : 16.840
 RP magnitude : 16.033
 BP magnitude : 17.516
 DUPflag : 0
 Distance (au) : 18.256
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -16.50
 Sun-Target sep (deg) : 140.12
 Sun-Moon sep (deg) : 96.81
 B (ring opening deg) : 74.83
 PA of pole (deg) : 58.49
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.034
 C/A sky separation (km) : 454.1
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.spk
 ural11.bsp
 IAU_URANUS_for_RINGFIT.tpc
 vgr2.ural11.bsp
 ural61.bsp
 vgr2.ural61.bsp
 peph.ural60.bsp
 earthstns_itrf93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk



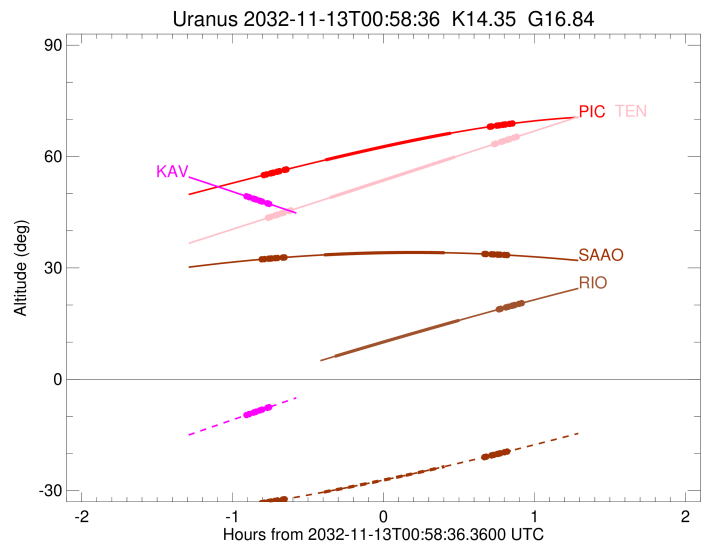
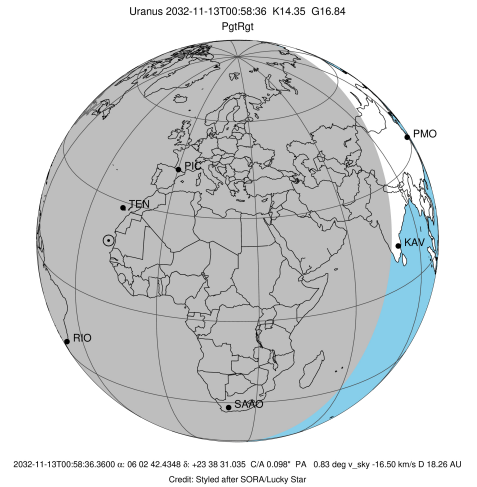
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2032-11-13T00:12:27.024		43.45	-76.70	51432.27	-17.16		
lambda	I	2032-11-13T00:13:48.904		43.75	-76.90	50026.71	-17.17		
delta	I	2032-11-13T00:15:29.460		44.12	-77.15	48300.35	-17.17		
gamma	I	2032-11-13T00:16:08.560		44.26	-77.24	47629.01	-17.17		
eta	I	2032-11-13T00:16:34.936		44.36	-77.30	47176.12	-17.17		
beta	I	2032-11-13T00:18:02.394		44.68	-77.50	45673.55	-17.17		
alpha	I	2032-11-13T00:18:56.617		44.88	-77.62	44743.72	-17.17		
4	I	2032-11-13T00:21:05.199		45.35	-77.90	42540.02	-17.18		
5	I	2032-11-13T00:21:18.353		45.40	-77.93	42299.95	-17.17		
6	I	2032-11-13T00:21:44.635		45.49	-77.98	41848.21	-17.17		
Uranus	I	2032-11-13T00:37:16.027		48.91	-79.49	25160.23		-12.87	-13.46
Uranus	E	2032-11-13T01:27:09.213		59.93	-76.84	25177.42		12.58	13.16
6	E	2032-11-13T01:42:35.078		63.34	-74.33	41825.48	17.29		
5	E	2032-11-13T01:42:55.024		63.41	-74.27	42170.86	17.29		
4	E	2032-11-13T01:43:19.213		63.50	-74.20	42603.00	17.29		
alpha	E	2032-11-13T01:45:20.374		63.95	-73.84	44693.68	17.30		
beta	E	2032-11-13T01:46:15.689		64.15	-73.68	45648.98	17.30		
eta	E	2032-11-13T01:47:43.931		64.47	-73.41	47176.12	17.30		
gamma	E	2032-11-13T01:48:09.798		64.57	-73.33	47623.59	17.30		
delta	E	2032-11-13T01:48:48.917		64.71	-73.21	48300.35	17.30		
lambda	E	2032-11-13T01:50:28.699		65.08	-72.91	50026.71	17.30		
epsilon	E	2032-11-13T01:51:16.807		65.26	-72.76	50859.12	17.30		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2032-11-13T00:53:32.600
 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 : 3424691408687608704
 2Mass ID (if available) : 06024243+2338311
 ICRS Star Coord at Epoch: 06h 02m 42.43484s +23:38:31.03529s
 RUWE (>1.4 is poor) : 0.97
 K magnitude : 14.352
 G magnitude : 16.840
 RP magnitude : 16.033
 BP magnitude : 17.516
 DUPflag : 0
 Distance (au) : 18.256
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -16.50
 Sun-Target sep (deg) : 140.12
 Sun-Moon sep (deg) : 96.45
 B (ring opening deg) : 74.83
 PA of pole (deg) : 58.49
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.115
 C/A sky separation (km) : 1526.0
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.spk
 ural11.bsp
 IAU_URANUS_for_RINGFIT.tpc
 vgr2.ural11.bsp
 ural61.bsp
 vgr2.ural61.bsp
 peph.ural60.bsp
 earthstns_itrfr93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk



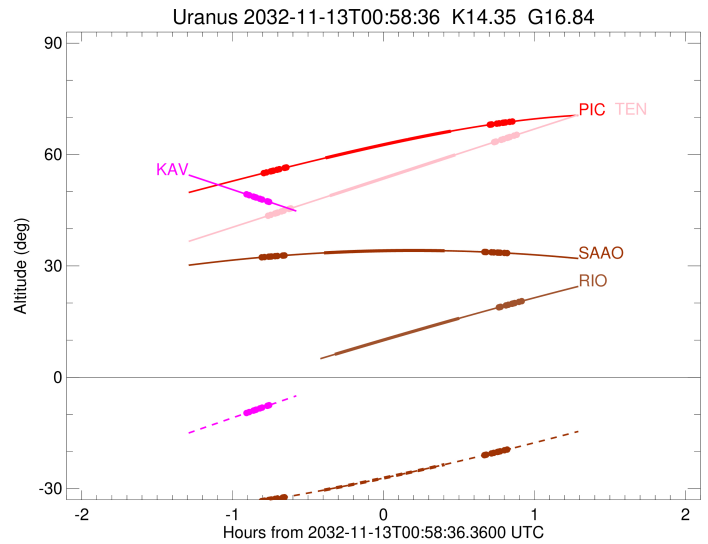
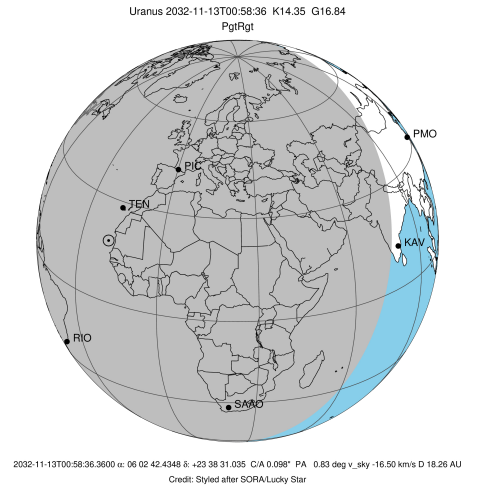
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2032-11-13T00:03:53.611		49.35	-9.69	51421.65	-17.25		
lambda	I	2032-11-13T00:05:14.484		49.04	-9.37	50026.71	-17.25		
delta	I	2032-11-13T00:06:54.586		48.66	-8.98	48300.35	-17.24		
gamma	I	2032-11-13T00:07:33.508		48.51	-8.83	47629.18	-17.24		
eta	I	2032-11-13T00:07:59.783		48.41	-8.73	47176.12	-17.24		
beta	I	2032-11-13T00:09:26.854		48.08	-8.39	45674.15	-17.24		
alpha	I	2032-11-13T00:10:20.850		47.88	-8.18	44744.58	-17.24		
4	I	2032-11-13T00:12:28.961		47.39	-7.68	42541.35	-17.24		
5	I	2032-11-13T00:12:42.016		47.34	-7.63	42301.79	-17.23		
6	I	2032-11-13T00:13:08.438		47.24	-7.52	41846.54	-17.23		
Uranus	I	2032-11-13T00:28:37.306		43.71	-3.92x	25133.43		-13.32	-13.92
Uranus	E	2032-11-13T01:18:34.421		32.25	7.61x	25191.40		12.34	12.90
6	E	2032-11-13T01:34:09.167		28.67	11.16x	41825.00	17.12		
5	E	2032-11-13T01:34:29.367		28.60	11.23x	42171.42	17.12		
4	E	2032-11-13T01:34:53.795		28.50	11.32x	42603.36	17.12		
alpha	E	2032-11-13T01:36:56.181		28.03	11.79x	44693.91	17.12		
beta	E	2032-11-13T01:37:52.067		27.82	12.00x	45649.14	17.12		
eta	E	2032-11-13T01:39:21.232		27.48	12.33x	47176.12	17.12		
gamma	E	2032-11-13T01:39:47.378		27.38	12.43x	47623.63	17.12		
delta	E	2032-11-13T01:40:26.916		27.23	12.58x	48300.35	17.12		
lambda	E	2032-11-13T01:42:07.788		26.84	12.96x	50026.71	17.11		
epsilon	E	2032-11-13T01:42:56.314		26.66	13.15x	50857.14	17.11		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2032-11-13T01:03:55.020
 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 : 3424691408687608704
 2Mass ID (if available) : 06024243+2338311
 ICRS Star Coord at Epoch: 06h 02m 42.43484s +23:38:31.03529s
 RUWE (>1.4 is poor) : 0.97
 K magnitude : 14.352
 G magnitude : 16.840
 RP magnitude : 16.033
 BP magnitude : 17.516
 DUPflag : 0
 Distance (au) : 18.256
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -16.50
 Sun-Target sep (deg) : 140.12
 Sun-Moon sep (deg) : 96.21
 B (ring opening deg) : 74.83
 PA of pole (deg) : 58.49
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.357
 C/A sky separation (km) : 4725.7
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.spk
 ural11.bsp
 IAU_URANUS_for_RINGFIT.tpc
 vgr2.ural11.bsp
 ural61.bsp
 vgr2.ural61.bsp
 peph.ural60.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	2032-11-13T00:14:03.262	1.01x	-36.27	51407.58	-16.91			
lambda	I	2032-11-13T00:15:24.866	1.29x	-36.48	50026.71	-16.92			
delta	I	2032-11-13T00:17:06.901	1.64x	-36.75	48300.35	-16.92			
gamma	I	2032-11-13T00:17:46.560	1.78x	-36.85	47629.40	-16.92			
eta	I	2032-11-13T00:18:13.355	1.87x	-36.92	47176.12	-16.92			
beta	I	2032-11-13T00:19:42.062	2.17x	-37.15	45674.95	-16.91			
alpha	I	2032-11-13T00:20:37.072	2.36x	-37.30	44745.74	-16.91			
4	I	2032-11-13T00:22:47.633	2.81x	-37.63	42543.40	-16.91			
5	I	2032-11-13T00:23:00.883	2.86x	-37.66	42304.31	-16.90			
6	I	2032-11-13T00:23:28.151	2.95x	-37.73	41844.03	-16.90			
Uranus	I	2032-11-13T00:39:15.362	6.17	-40.05	25088.03	-14.04	-14.68		
Uranus	E	2032-11-13T01:28:41.464	15.89	-45.89	25268.65	10.92	11.43		
6	E	2032-11-13T01:44:27.182	18.84	-47.20	41821.19	17.06			
5	E	2032-11-13T01:44:47.919	18.90	-47.22	42176.31	17.06			
4	E	2032-11-13T01:45:12.379	18.98	-47.25	42606.22	17.07			
alpha	E	2032-11-13T01:47:15.023	19.35	-47.40	44696.12	17.08			
beta	E	2032-11-13T01:48:10.988	19.52	-47.46	45650.61	17.09			
eta	E	2032-11-13T01:49:40.199	19.79	-47.56	47176.12	17.10			
gamma	E	2032-11-13T01:50:06.397	19.87	-47.59	47624.04	17.10			
delta	E	2032-11-13T01:50:45.947	19.99	-47.63	48300.35	17.10			
lambda	E	2032-11-13T01:52:26.862	20.30	-47.74	50026.71	17.11			
epsilon	E	2032-11-13T01:53:14.110	20.44	-47.79	50835.29	17.11			

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2032-11-13T00:58:47.550
 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 : 3424691408687608704
 2Mass ID (if available) : 06024243+2338311
 ICRS Star Coord at Epoch: 06h 02m 42.43484s +23:38:31.03529s
 RUWE (>1.4 is poor) : 0.97
 K magnitude : 14.352
 G magnitude : 16.840
 RP magnitude : 16.033
 BP magnitude : 17.516
 DUPflag : 0
 Distance (au) : 18.256
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -16.50
 Sun-Target sep (deg) : 140.12
 Sun-Moon sep (deg) : 96.50
 B (ring opening deg) : 74.83
 PA of pole (deg) : 58.49
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.504
 C/A sky separation (km) : 6678.0
 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	2032-11-13T00:09:58.084		32.30	-33.38	51392.50	-17.13		
lambda	I	2032-11-13T00:11:17.768		32.38	-33.23	50026.71	-17.14		
delta	I	2032-11-13T00:12:58.543		32.48	-33.05	48300.35	-17.13		
gamma	I	2032-11-13T00:13:37.714		32.51	-32.97	47629.61	-17.12		
eta	I	2032-11-13T00:14:04.204		32.54	-32.92	47176.12	-17.12		
beta	I	2032-11-13T00:15:31.845		32.62	-32.76	45675.69	-17.11		
alpha	I	2032-11-13T00:16:26.215		32.67	-32.65	44746.77	-17.10		
4	I	2032-11-13T00:18:35.348		32.79	-32.40	42545.42	-17.08		
5	I	2032-11-13T00:18:48.430		32.80	-32.38	42306.45	-17.07		
6	I	2032-11-13T00:19:15.721		32.82	-32.32	41841.67	-17.06		
Uranus	I	2032-11-13T00:34:56.903		33.51	-30.39	25058.29		-14.50	-15.16
Uranus	E	2032-11-13T01:22:52.816		34.08	-23.52	25306.58		10.16	10.64
6	E	2032-11-13T01:38:41.228		33.75	-20.98	41819.68	17.09		
5	E	2032-11-13T01:39:02.118		33.74	-20.93	42178.42	17.10		
4	E	2032-11-13T01:39:26.493		33.73	-20.86	42607.28	17.11		
alpha	E	2032-11-13T01:41:28.811		33.67	-20.52	44697.03	17.13		
beta	E	2032-11-13T01:42:24.608		33.64	-20.37	45651.20	17.14		
eta	E	2032-11-13T01:43:53.525		33.59	-20.13	47176.12	17.15		
gamma	E	2032-11-13T01:44:19.653		33.58	-20.05	47624.20	17.15		
delta	E	2032-11-13T01:44:59.070		33.55	-19.94	48300.35	17.16		
lambda	E	2032-11-13T01:46:39.660		33.49	-19.67	50026.71	17.17		
epsilon	E	2032-11-13T01:47:26.316		33.46	-19.54	50827.82	17.16		