

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2033-12-15T19:04:33.710
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 3425564450983088128
 2Mass ID (if available) : 06172811+2338575

ICRS Star Coord at Epoch: 06h 17m 28.12657s +23:38:57.42791s

RUWE (>1.4 is poor) : 1.04
 K magnitude : 14.254
 G magnitude : 16.945
 RP magnitude : 16.113
 BP magnitude : 17.680
 DUPflag : 0
 Distance (au) : 17.986
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -22.92
 Sun-Target sep (deg) : 169.64
 Sun-Moon sep (deg) : 102.92
 B (ring opening deg) : 71.84
 PA of pole (deg) : 65.28

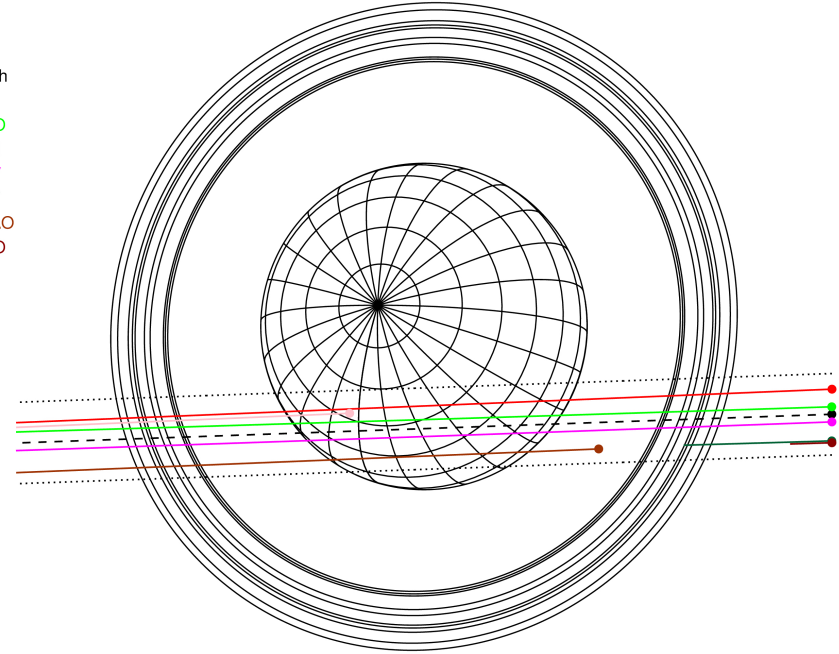
#	a(km)	ring
1	41837.2	6
2	42235.0	5
3	42571.2	4
4	44718.5	alpha
5	45661.1	beta
6	47176.1	eta
7	47626.3	gamma
8	48300.3	delta
9	50026.7	lambda
10	51149.4	epsilon



2033-12-15T19:04:33.7100 α: 06 17 28.1266 δ: +23 38 57.428 C/A 1.218° PA 2.02 deg v_sky -22.92 km/s D 17.99 AU
 Credit: Styled after SORA/Lucky Star

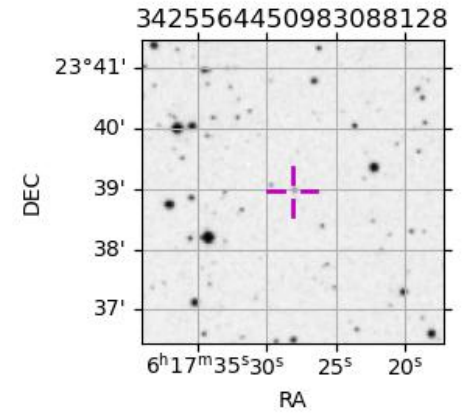
Uranus 2033-12-15T19:04:33 K14.25 G16.95 PgtRgt

Earth
 PIC
 PMO
 TEN
 KAV
 AAT
 SAAO
 MSO

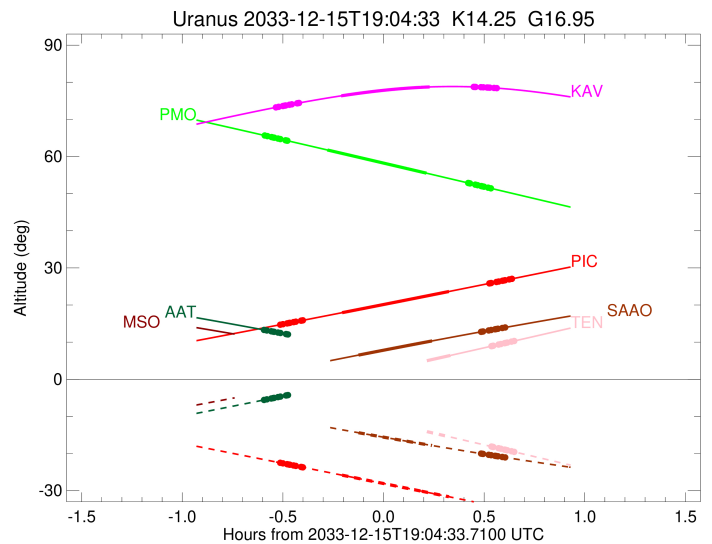
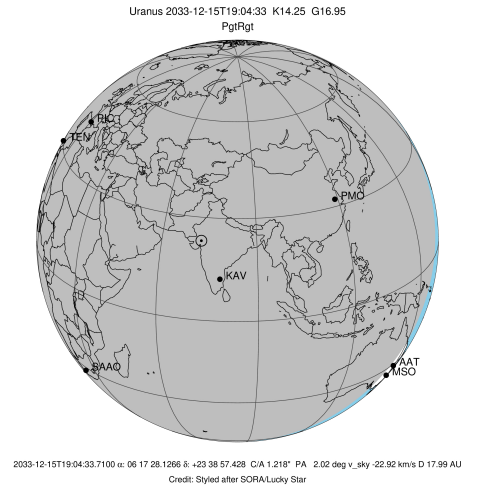


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1	+++++	+ +	+++++	DEC 15 18:33 - DEC 15 19:43	PieRie
PAL	Palomar Mt (200")	33.4	243.1					PnnRnn
PMO	Purple Mtn Obs. Nanki	32.1	118.8	+++++	+ +	+++++	DEC 15 18:29 - DEC 15 19:36	PieRie
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		+	+++++	DEC 15 19:24 - DEC 15 19:43	PneRne
IRTF	Mauna Kea/IRTF	19.8	204.5					PnnRnn
KAV	Kavalur Observatory	12.6	78.8	+++++	+ +	+++++	DEC 15 18:32 - DEC 15 19:38	PieRie
RIO	Rio de Janeiro	-22.9	316.8					PnnRnn
ESO	European Southern Obs	-29.3	289.3					PnnRnn
AAT	Siding Spring (AAT)	-31.3	149.1	+++++			DEC 15 18:29 - DEC 15 18:31	PnnRin
SAAO	So. Afr. Astro. Obs.	-32.4	20.8		+ +	+++++	DEC 15 18:57 - DEC 15 19:41	PieRne
MSO	Mt. Stromlo Observato	-35.3	149.0					PnnRnn

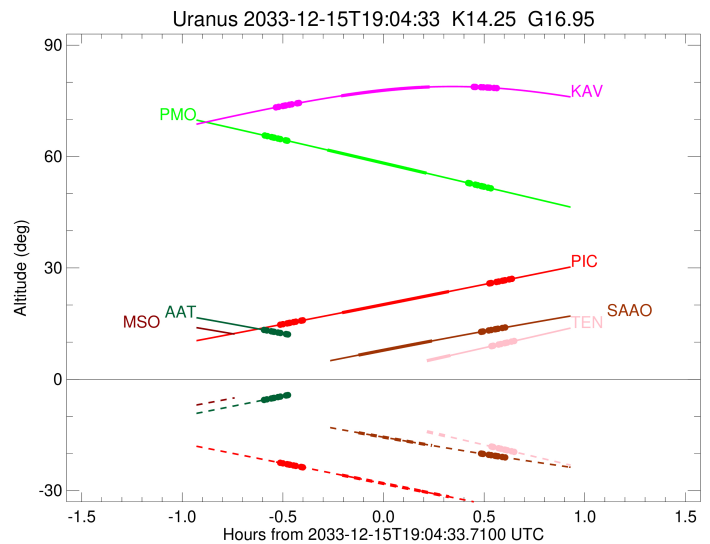
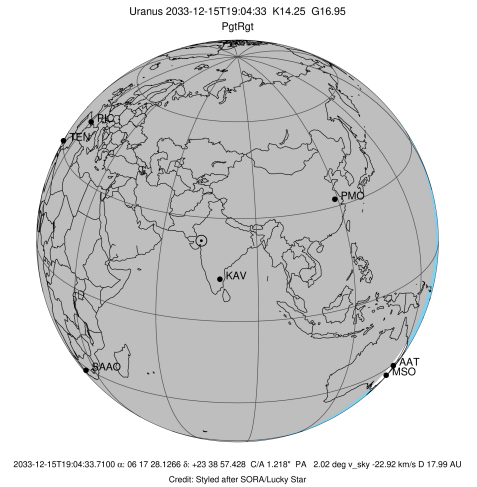


target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2033-12-15T19:07:59.360
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PIC
 Location : Pic du Midi
 Latitude (deg) : 42.93656
 E. Longitude (deg) : 0.14231
 Altitude (km) : 2.890
 Gaia source ID : 3425564450983088128
 2Mass ID (if available) : 06172811+2338575
 ICRS Star Coord at Epoch: 06h 17m 28.12657s +23:38:57.42791s
 RUWE (>1.4 is poor) : 1.04
 K magnitude : 14.254
 G magnitude : 16.945
 RP magnitude : 16.113
 BP magnitude : 17.680
 DUPflag : 0
 Distance (au) : 17.986
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -22.92
 Sun-Target sep (deg) : 169.64
 Sun-Moon sep (deg) : 103.07
 B (ring opening deg) : 71.84
 PA of pole (deg) : 65.28
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.953
 C/A sky separation (km) : 12437.5
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl1.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



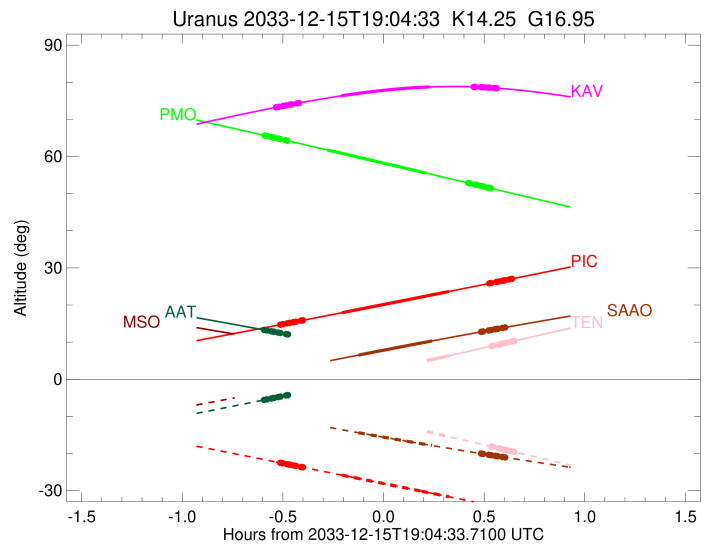
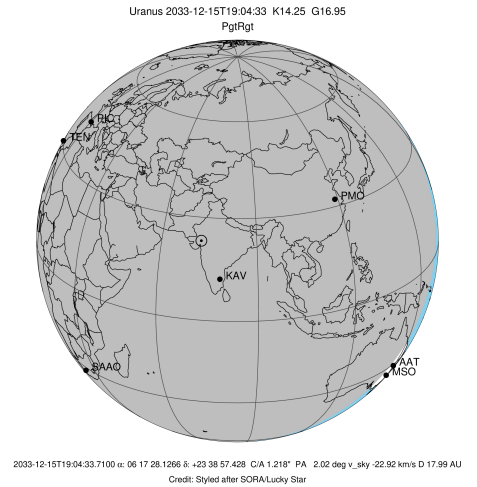
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2033-12-15T18:33:55.122		14.72	-22.53	50955.92	-23.16		
lambda	I	2033-12-15T18:34:35.331		14.84	-22.65	50026.71	-23.10		
delta	I	2033-12-15T18:35:50.168		15.06	-22.87	48300.35	-23.04		
gamma	I	2033-12-15T18:36:19.350		15.14	-22.96	47628.33	-23.02		
eta	I	2033-12-15T18:36:39.003		15.20	-23.02	47176.12	-23.00		
beta	I	2033-12-15T18:37:44.363		15.39	-23.22	45673.59	-22.94		
alpha	I	2033-12-15T18:38:26.986		15.52	-23.35	44699.87	-22.90		
4	I	2033-12-15T18:40:02.017		15.79	-23.63	42527.86	-22.80		
5	I	2033-12-15T18:40:11.375		15.82	-23.66	42299.67	-22.79		
6	I	2033-12-15T18:40:32.358		15.88	-23.72	41822.10	-22.75		
Uranus	I	2033-12-15T18:52:12.848		17.94	-25.83	25031.67		-18.14	-18.94
Uranus	E	2033-12-15T19:24:02.971		23.64	-31.64	25393.62		9.93	10.39
6	E	2033-12-15T19:36:06.928		25.82	-33.85	41826.89	22.84		
5	E	2033-12-15T19:36:23.554		25.87	-33.91	42208.46	22.88		
4	E	2033-12-15T19:36:40.713		25.93	-33.96	42614.48	22.89		
alpha	E	2033-12-15T19:38:12.611		26.21	-34.24	44718.96	22.99		
beta	E	2033-12-15T19:38:52.748		26.33	-34.36	45642.25	23.04		
eta	E	2033-12-15T19:39:59.223		26.53	-34.57	47176.12	23.10		
gamma	E	2033-12-15T19:40:18.734		26.59	-34.62	47626.98	23.12		
delta	E	2033-12-15T19:40:47.848		26.68	-34.71	48300.35	23.14		
lambda	E	2033-12-15T19:42:02.352		26.90	-34.94	50026.71	23.20		
epsilon	E	2033-12-15T19:43:05.208		27.09	-35.13	51486.49	23.27		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2033-12-15T19:02:25.740
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PMO
 Location : Purple Mtn Obs. Nanking
 Latitude (deg) : 32.06667
 E. Longitude (deg) : 118.82089
 Altitude (km) : 0.364
 Gaia source ID : 3425564450983088128
 2Mass ID (if available) : 06172811+2338575
 ICRS Star Coord at Epoch: 06h 17m 28.12657s +23:38:57.42791s
 RUWE (>1.4 is poor) : 1.04
 K magnitude : 14.254
 G magnitude : 16.945
 RP magnitude : 16.113
 BP magnitude : 17.680
 DUPflag : 0
 Distance (au) : 17.986
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -22.92
 Sun-Target sep (deg) : 169.64
 Sun-Moon sep (deg) : 103.76
 B (ring opening deg) : 71.84
 PA of pole (deg) : 65.28
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.117
 C/A sky separation (km) : 14576.7
 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_itrfr93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk



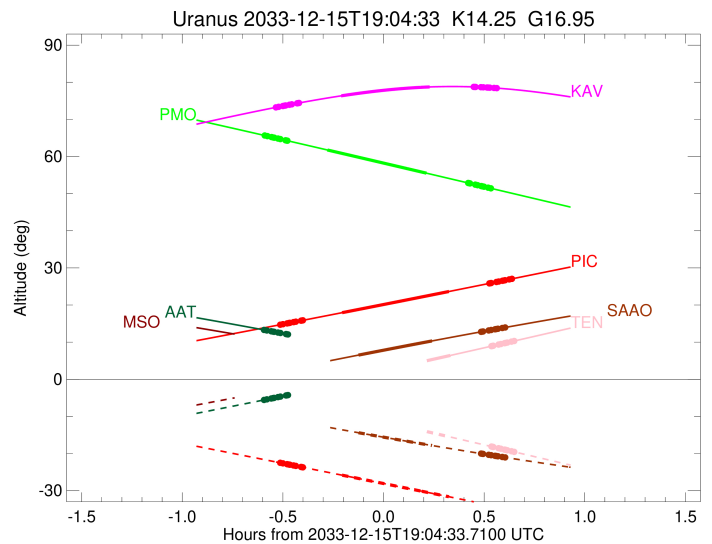
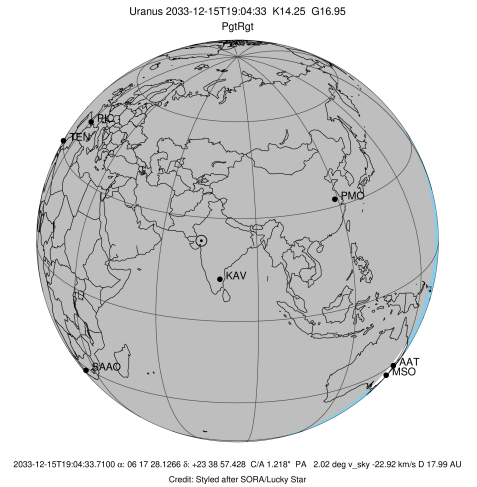
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2033-12-15T18:29:17.038		65.64	-56.02	50975.14	-23.25		
lambda	I	2033-12-15T18:29:57.949		65.50	-55.88	50026.71	-23.16		
delta	I	2033-12-15T18:31:12.612		65.24	-55.61	48300.35	-23.08		
gamma	I	2033-12-15T18:31:41.738		65.14	-55.51	47628.60	-23.05		
eta	I	2033-12-15T18:32:01.381		65.07	-55.44	47176.12	-23.02		
beta	I	2033-12-15T18:33:06.756		64.84	-55.21	45672.64	-22.93		
alpha	I	2033-12-15T18:33:49.449		64.70	-55.06	44698.20	-22.87		
4	I	2033-12-15T18:35:24.533		64.37	-54.73	42528.77	-22.74		
5	I	2033-12-15T18:35:33.860		64.33	-54.69	42302.55	-22.72		
6	I	2033-12-15T18:35:55.168		64.26	-54.62	41819.59	-22.66		
Uranus	I	2033-12-15T18:47:49.568		61.77	-52.10	25043.33		-17.92	-18.71
Uranus	E	2033-12-15T19:17:23.091		55.52	-45.83	25435.32		8.57	8.97
6	E	2033-12-15T19:29:47.798		52.88	-43.20	41825.06	22.62		
5	E	2033-12-15T19:30:04.809		52.82	-43.14	42211.82	22.67		
4	E	2033-12-15T19:30:21.975		52.76	-43.07	42613.85	22.69		
alpha	E	2033-12-15T19:31:54.590		52.43	-42.75	44717.58	22.82		
beta	E	2033-12-15T19:32:35.048		52.29	-42.61	45641.99	22.88		
eta	E	2033-12-15T19:33:41.947		52.05	-42.37	47176.12	22.97		
gamma	E	2033-12-15T19:34:01.575		51.98	-42.30	47627.17	22.99		
delta	E	2033-12-15T19:34:30.833		51.88	-42.20	48300.35	23.02		
lambda	E	2033-12-15T19:35:45.680		51.61	-41.93	50026.71	23.10		
epsilon	E	2033-12-15T19:36:49.098		51.39	-41.71	51493.88	23.19		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2033-12-15T19:08:36.720
 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 : 3425564450983088128
 2Mass ID (if available) : 06172811+2338575
 ICRS Star Coord at Epoch: 06h 17m 28.12657s +23:38:57.42791s
 RUWE (>1.4 is poor) : 1.04
 K magnitude : 14.254
 G magnitude : 16.945
 RP magnitude : 16.113
 BP magnitude : 17.680
 DUPflag : 0
 Distance (au) : 17.986
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -22.92
 Sun-Target sep (deg) : 169.64
 Sun-Moon sep (deg) : 102.78
 B (ring opening deg) : 71.84
 PA of pole (deg) : 65.28
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.003
 C/A sky separation (km) : 13080.1
 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_itr93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk



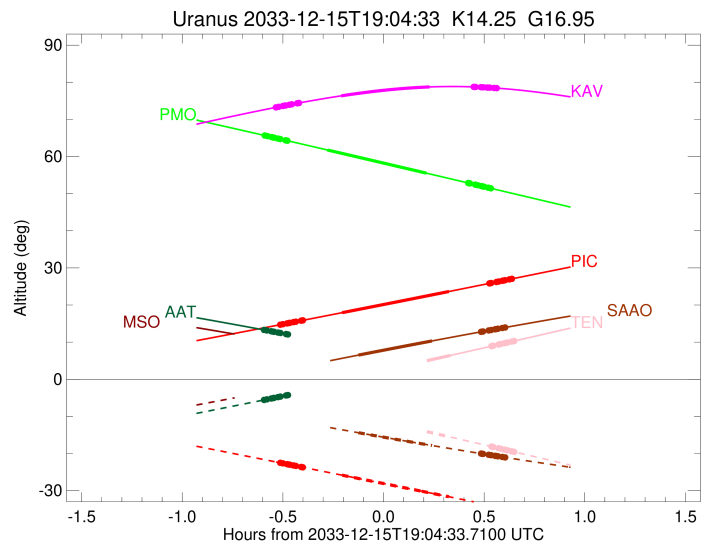
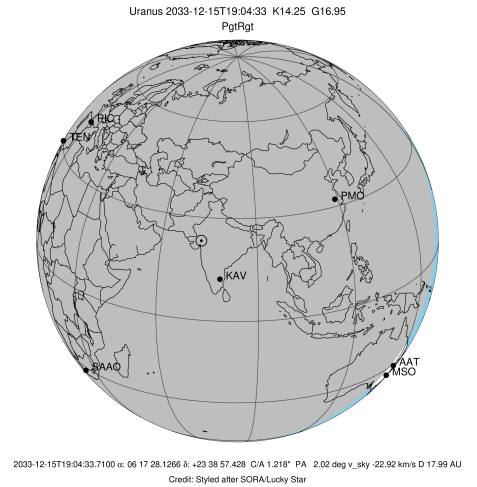
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2033-12-15T18:34:30.472	-3.49x	-5.28	50960.18	-22.97			
lambda	I	2033-12-15T18:35:11.216	-3.36x	-5.41	50026.71	-22.90			
delta	I	2033-12-15T18:36:26.715	-3.12x	-5.67	48300.35	-22.83			
gamma	I	2033-12-15T18:36:56.159	-3.02x	-5.77	47628.39	-22.81			
eta	I	2033-12-15T18:37:15.995	-2.96x	-5.83	47176.12	-22.79			
beta	I	2033-12-15T18:38:21.973	-2.74x	-6.06	45673.38	-22.72			
alpha	I	2033-12-15T18:39:05.016	-2.61x	-6.20	44699.47	-22.68			
4	I	2033-12-15T18:40:40.957	-2.29x	-6.53	42528.06	-22.57			
5	I	2033-12-15T18:40:50.395	-2.26x	-6.56	42300.37	-22.56			
6	I	2033-12-15T18:41:11.654	-2.20x	-6.63	41821.50	-22.52			
Uranus	I	2033-12-15T18:53:02.270	0.12x	-9.05	25033.46			-18.10	-18.90
Uranus	E	2033-12-15T19:24:29.171	6.42	-15.56	25408.39			9.47	9.91
6	E	2033-12-15T19:36:44.259	8.91	-18.13	41826.16	22.62			
5	E	2033-12-15T19:37:01.134	8.97	-18.19	42209.79	22.66			
4	E	2033-12-15T19:37:18.397	9.03	-18.25	42614.24	22.68			
alpha	E	2033-12-15T19:38:51.125	9.35	-18.57	44718.40	22.79			
beta	E	2033-12-15T19:39:31.631	9.49	-18.71	45642.14	22.84			
eta	E	2033-12-15T19:40:38.679	9.72	-18.95	47176.12	22.91			
gamma	E	2033-12-15T19:40:58.356	9.78	-19.02	47627.06	22.93			
delta	E	2033-12-15T19:41:27.705	9.88	-19.12	48300.35	22.95			
lambda	E	2033-12-15T19:42:42.805	10.14	-19.39	50026.71	23.02			
epsilon	E	2033-12-15T19:43:46.288	10.36	-19.61	51489.74	23.10			

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2033-12-15T19:04:55.650
 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 : 3425564450983088128
 2Mass ID (if available) : 06172811+2338575
 ICRS Star Coord at Epoch: 06h 17m 28.12657s +23:38:57.42791s
 RUWE (>1.4 is poor) : 1.04
 K magnitude : 14.254
 G magnitude : 16.945
 RP magnitude : 16.113
 BP magnitude : 17.680
 DUPflag : 0
 Distance (au) : 17.986
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -22.92
 Sun-Target sep (deg) : 169.64
 Sun-Moon sep (deg) : 103.75
 B (ring opening deg) : 71.84
 PA of pole (deg) : 65.28
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.321
 C/A sky separation (km) : 17229.5
 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_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	2033-12-15T18:32:36.377		73.27	-79.05	50994.02	-22.93		
lambda	I	2033-12-15T18:33:18.736		73.39	-79.08	50026.71	-22.81		
delta	I	2033-12-15T18:34:34.622		73.61	-79.12	48300.35	-22.69		
gamma	I	2033-12-15T18:35:04.246		73.70	-79.13	47628.86	-22.64		
eta	I	2033-12-15T18:35:24.255		73.76	-79.14	47176.12	-22.61		
beta	I	2033-12-15T18:36:30.919		73.95	-79.16	45671.66	-22.49		
alpha	I	2033-12-15T18:37:14.526		74.07	-79.17	44696.60	-22.40		
4	I	2033-12-15T18:38:51.606		74.34	-79.19	42529.87	-22.20		
5	I	2033-12-15T18:39:01.122		74.37	-79.19	42305.20	-22.17		
6	I	2033-12-15T18:39:23.204		74.43	-79.19	41817.10	-22.10		
Uranus	I	2033-12-15T18:51:55.970		76.35	-78.83	25072.71		-17.37	-18.14
Uranus	E	2033-12-15T19:18:19.695		78.75	-75.88	25490.83		6.34	6.64
6	E	2033-12-15T19:31:26.571		78.76	-73.70	41822.11	22.11		
5	E	2033-12-15T19:31:44.347		78.75	-73.65	42217.45	22.19		
4	E	2033-12-15T19:32:01.621		78.74	-73.60	42612.63	22.21		
alpha	E	2033-12-15T19:33:36.015		78.68	-73.31	44715.27	22.41		
beta	E	2033-12-15T19:34:17.261		78.65	-73.19	45641.63	22.50		
eta	E	2033-12-15T19:35:25.256		78.60	-72.98	47176.12	22.62		
gamma	E	2033-12-15T19:35:45.193		78.58	-72.92	47627.50	22.66		
delta	E	2033-12-15T19:36:14.857		78.55	-72.83	48300.35	22.71		
lambda	E	2033-12-15T19:37:30.691		78.48	-72.60	50026.71	22.82		
epsilon	E	2033-12-15T19:38:35.381		78.41	-72.39	51505.96	22.94		

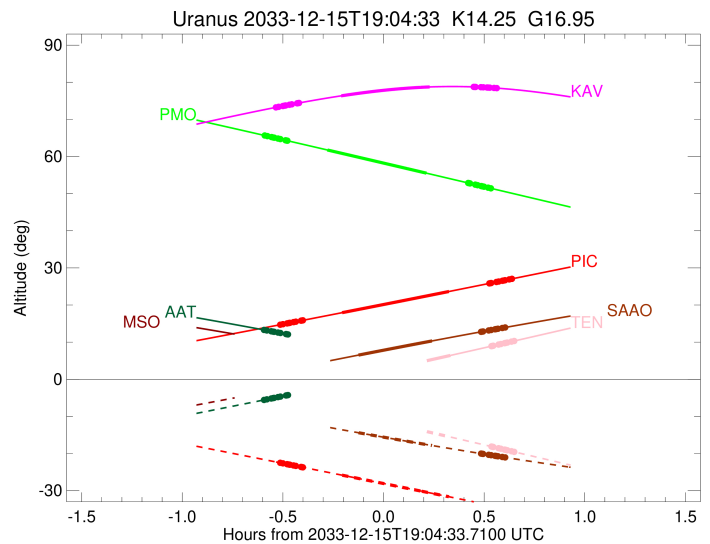
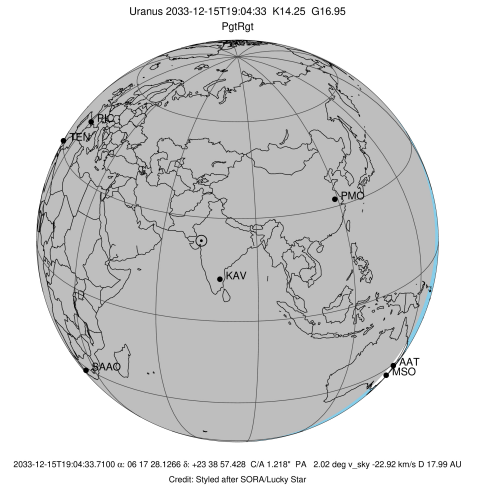
target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2033-12-15T19:00:58.390
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : AAT
 Location : Siding Spring (AAT)
 Latitude (deg) : -31.27703
 E. Longitude (deg) : 149.06608
 Altitude (km) : 1.164
 Gaia source ID : 3425564450983088128
 2Mass ID (if available) : 06172811+2338575
 ICRS Star Coord at Epoch: 06h 17m 28.12657s +23:38:57.42791s
 RUWE (>1.4 is poor) : 1.04
 K magnitude : 14.254
 G magnitude : 16.945
 RP magnitude : 16.113
 BP magnitude : 17.680
 DUPflag : 0
 Distance (au) : 17.986
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -22.92
 Sun-Target sep (deg) : 169.64
 Sun-Moon sep (deg) : 103.19
 B (ring opening deg) : 71.84
 PA of pole (deg) : 65.28
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.515
 C/A sky separation (km) : 19763.0
 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	2033-12-15T18:29:03.135		13.27	-5.55	51016.78	-22.25		
lambda	I	2033-12-15T18:29:47.859		13.14	-5.41	50026.71	-22.10		
delta	I	2033-12-15T18:31:06.260		12.92	-5.17	48300.35	-21.94		
gamma	I	2033-12-15T18:31:36.896		12.84	-5.08	47629.16	-21.88		
eta	I	2033-12-15T18:31:57.627		12.78	-5.02	47176.12	-21.83		
beta	I	2033-12-15T18:33:06.796		12.58	-4.81x	45670.47	-21.66		
alpha	I	2033-12-15T18:33:52.128		12.46	-4.67x	44694.86	-21.55		
4	I	2033-12-15T18:35:33.050		12.17	-4.36x	42531.33	-21.28		
5	I	2033-12-15T18:35:42.971		12.14	-4.33x	42307.88	-21.24		
6	I	2033-12-15T18:36:06.307		12.08	-4.26x	41814.37	-21.15		
Uranus	I	2033-12-15T18:49:46.441		9.71	-1.71x	25125.94		-16.34	-17.07
Uranus	E	2033-12-15T19:12:38.976		5.63	2.64x	25531.81		3.99	4.18
6	E	2033-12-15T19:27:00.658		2.98x	5.43x	41819.65	21.08		
5	E	2033-12-15T19:27:19.645		2.92x	5.49x	42222.31	21.17		
4	E	2033-12-15T19:27:37.505		2.87x	5.55x	42611.43	21.21		
alpha	E	2033-12-15T19:29:16.167		2.56x	5.87x	44713.35	21.47		
beta	E	2033-12-15T19:29:59.260		2.43x	6.01x	45641.39	21.59		
eta	E	2033-12-15T19:31:10.078		2.21x	6.24x	47176.12	21.75		
gamma	E	2033-12-15T19:31:30.824		2.14x	6.31x	47627.77	21.79		
delta	E	2033-12-15T19:32:01.641		2.05x	6.41x	48300.35	21.86		
lambda	E	2033-12-15T19:33:20.353		1.80x	6.67x	50026.71	22.01		
epsilon	E	2033-12-15T19:34:27.792		1.59x	6.89x	51514.81	22.16		

```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2033-12-15T19:07:49.980
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      : 3425564450983088128
2Mass ID (if available) : 06172811+2338575
ICRS Star Coord at Epoch: 06h 17m 28.12657s +23:38:57.42791s
RUWE (>1.4 is poor) : 1.04
K magnitude         : 14.254
G magnitude         : 16.945
RP magnitude        : 16.113
BP magnitude        : 17.680
DUPflag            : 0
Distance (au)       : 17.986
f0 (km)            : 0.000
g0 (km)            : 0.000
skyplane vel. (km/s) : -22.92
Sun-Target sep (deg) : 169.64
Sun-Moon sep (deg)  : 102.89
B (ring opening deg) : 71.84
PA of pole (deg)    : 65.28
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 1.555
C/A sky separation (km) : 20284.8
NAIF SPICE kernels  : RAJobs_U111+rgf15.spk
URKALLvl1.spk
ural11.bsp
IAU_URANUS_for_RINGFIT.tpc
vgr2.ural11.bsp
ural61.bsp
vgr2.ural61.bsp
peph.ural60.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	2033-12-15T18:36:02.554		2.71x	-10.91	51016.66	-22.06		
lambda	I	2033-12-15T18:36:47.672		2.85x	-11.04	50026.71	-21.90		
delta	I	2033-12-15T18:38:06.788		3.09x	-11.26	48300.35	-21.74		
gamma	I	2033-12-15T18:38:37.711		3.19x	-11.35	47629.16	-21.67		
eta	I	2033-12-15T18:38:58.638		3.25x	-11.41	47176.12	-21.62		
beta	I	2033-12-15T18:40:08.477		3.46x	-11.60	45670.45	-21.45		
alpha	I	2033-12-15T18:40:54.263		3.60x	-11.73	44694.82	-21.33		
4	I	2033-12-15T18:42:36.233		3.91x	-12.02	42531.39	-21.05		
5	I	2033-12-15T18:42:46.262		3.94x	-12.04	42307.97	-21.01		
6	I	2033-12-15T18:43:09.864		4.01x	-12.11	41814.26	-20.91		
Uranus	I	2033-12-15T18:57:07.275		6.52	-14.40	25134.80		-16.16	-16.88
Uranus	E	2033-12-15T19:19:01.580		10.32	-17.85	25541.40		3.21	3.36
6	E	2033-12-15T19:33:38.169		12.77	-20.02	41818.64	20.99		
5	E	2033-12-15T19:33:57.382		12.83	-20.07	42224.37	21.08		
4	E	2033-12-15T19:34:15.210		12.88	-20.11	42610.87	21.12		
alpha	E	2033-12-15T19:35:54.182		13.15	-20.35	44712.51	21.41		
beta	E	2033-12-15T19:36:37.416		13.27	-20.45	45641.31	21.54		
eta	E	2033-12-15T19:37:48.378		13.46	-20.62	47176.12	21.71		
gamma	E	2033-12-15T19:38:09.162		13.52	-20.67	47627.90	21.76		
delta	E	2033-12-15T19:38:40.015		13.60	-20.74	48300.35	21.83		
lambda	E	2033-12-15T19:39:58.795		13.81	-20.93	50026.71	21.99		
epsilon	E	2033-12-15T19:41:06.435		14.00	-21.09	51518.79	22.15		