

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2040-01-31T18:29:04.490  
 Event type : PgtRgt  
 : Uranus occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Gaia source ID : 675899209530050944  
 2Mass ID (if available) : 08105178+2038591

ICRS Star Coord at Epoch: 08h 10m 51.75613s +20:38:59.52408s

RUWE (>1.4 is poor) : 1.02  
 K magnitude : 14.685  
 G magnitude : 18.327  
 RP magnitude : 17.104  
 BP magnitude : 19.941  
 DUPflag : 0  
 Distance (au) : 17.618  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -22.73  
 Sun-Target sep (deg) : 169.43  
 Sun-Moon sep (deg) : 38.37  
 B (ring opening deg) : 46.58  
 PA of pole (deg) : 90.50

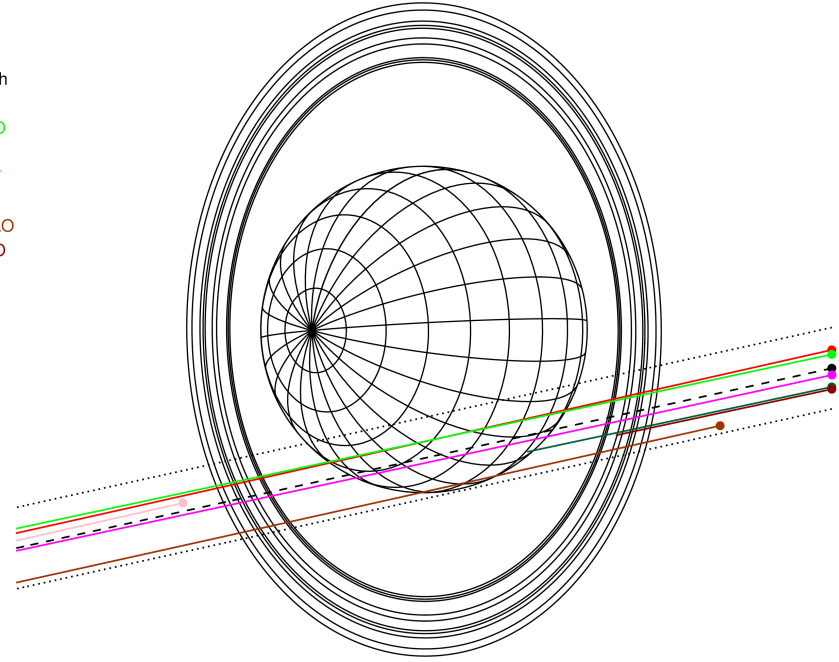
#	a(km)	ring
1	41837.2	6
2	42235.0	5
3	42571.2	4
4	44718.5	alpha
5	45661.1	beta
6	47176.1	eta
7	47626.3	gamma
8	48300.3	delta
9	50026.7	lambda
10	51149.4	epsilon



2040-01-31T18:29:04.4900 α: 08 10 51.75613 s: +20 38 59.524 C/A 1.533° PA 12.44 deg v\_sky -22.73 km/s D 17.62 AU  
 Credit: Styled after SORA/Lucky Star

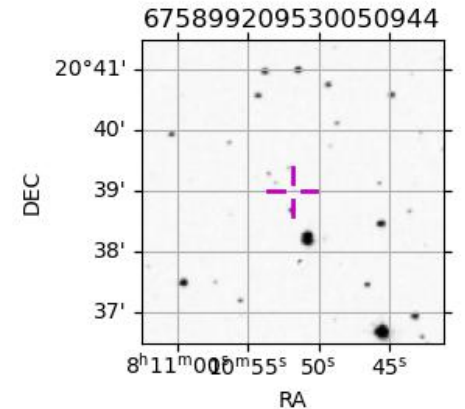
Uranus 2040-01-31T18:29:04 K14.69 G18.33 PgtRgt

Earth  
 PIC  
 PMO  
 TEN  
 KAV  
 AAT  
 SAAO  
 MSO

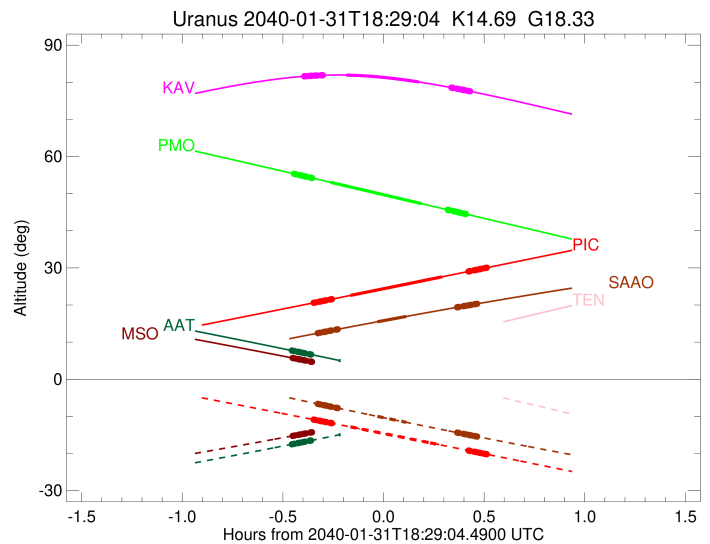
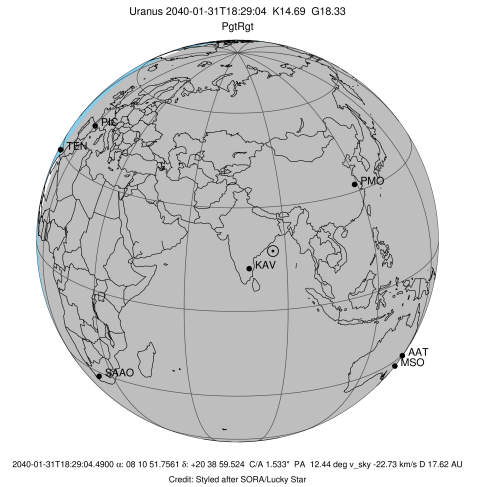


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1	+++++	+ +	+++++	JAN 31 18:08 - JAN 31 18:59	PieRie
PAL	Palomar Mt (200")	33.4	243.1					PnnRnn
PMO	Purple Mtn Obs. Nanki	32.1	118.8	+++++	+ +	+++++	JAN 31 18:02 - JAN 31 18:53	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					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5					PnnRnn
KAV	Kavalur Observatory	12.6	78.8	+++++	+ +	+++++	JAN 31 18:05 - JAN 31 18:54	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	+++++	+		JAN 31 18:01 - JAN 31 18:15	PinRin
SAAO	So. Afr. Astro. Obs.	-32.4	20.8	+++++	+ +	+++++	JAN 31 18:09 - JAN 31 18:56	PieRie
MSO	Mt. Stromlo Observato	-35.3	149.0	+++++			JAN 31 18:01 - JAN 31 18:05	PnnRin

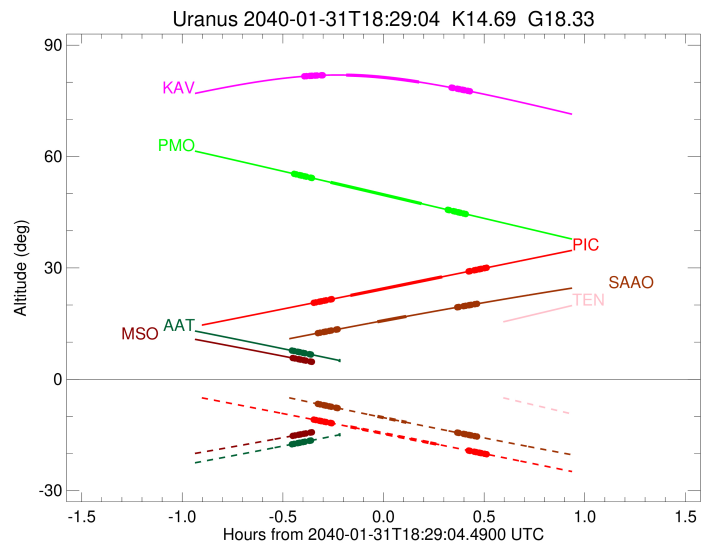
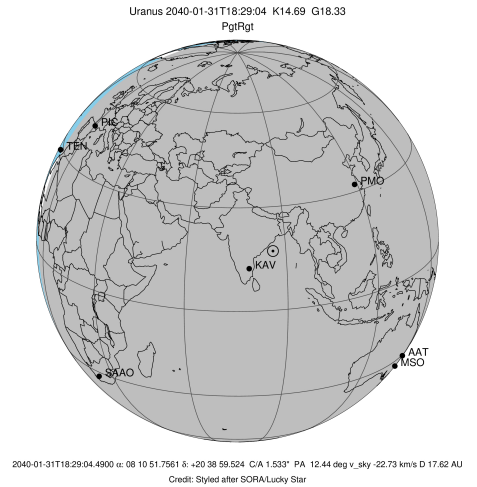


target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2040-01-31T18:32:49.580  
 Event type : PgtRgt  
 : Uranus occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : PIC  
 Location : Pic du Midi  
 Latitude (deg) : 42.93656  
 E. Longitude (deg) : 0.14231  
 Altitude (km) : 2.890  
 Gaia source ID : 675899209530050944  
 2Mass ID (if available) : 08105178+2038591  
 ICRS Star Coord at Epoch: 08h 10m 51.75613s +20:38:59.52408s  
 RUWE (>1.4 is poor) : 1.02  
 K magnitude : 14.685  
 G magnitude : 18.327  
 RP magnitude : 17.104  
 BP magnitude : 19.941  
 DUPflag : 0  
 Distance (au) : 17.618  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -22.73  
 Sun-Target sep (deg) : 169.43  
 Sun-Moon sep (deg) : 39.16  
 B (ring opening deg) : 46.58  
 PA of pole (deg) : 90.50  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 1.342  
 C/A sky separation (km) : 17152.3  
 NAIF SPICE kernels : RAJobs\_U111+rgf15.spk  
 URKALLvl.bsp  
 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



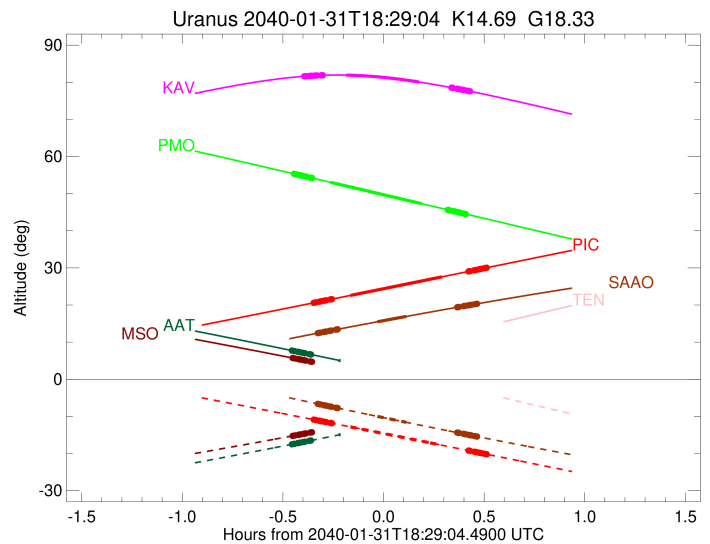
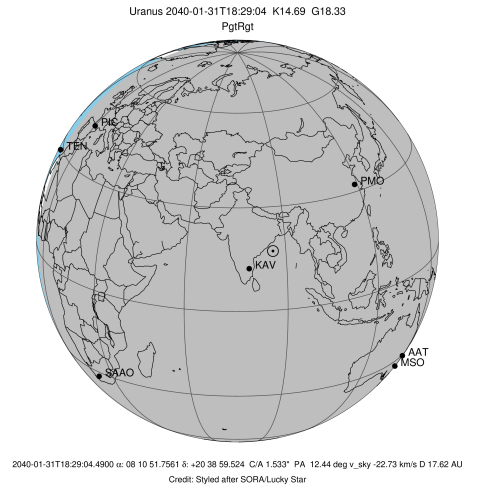
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2040-01-31T18:08:10.249		20.58	-10.85	51353.30	-29.16		
lambda	I	2040-01-31T18:08:55.714		20.71	-10.99	50026.71	-29.13		
delta	I	2040-01-31T18:09:55.129		20.89	-11.17	48300.35	-28.98		
gamma	I	2040-01-31T18:10:18.446		20.97	-11.24	47625.27	-28.92		
eta	I	2040-01-31T18:10:33.987		21.01	-11.28	47176.12	-28.88		
beta	I	2040-01-31T18:11:26.471		21.17	-11.44	45665.88	-28.73		
alpha	I	2040-01-31T18:11:58.194		21.27	-11.53	44750.62	-28.63		
4	I	2040-01-31T18:13:15.697		21.50	-11.76	42562.48	-28.39		
5	I	2040-01-31T18:13:30.762		21.55	-11.81	42156.15	-28.33		
6	I	2040-01-31T18:13:40.819		21.58	-11.84	41794.75	-28.23		
Uranus	I	2040-01-31T18:19:13.170		22.59	-12.83	25329.38		-36.34	-37.60
Uranus	E	2040-01-31T18:46:32.774		27.60	-17.77	25454.20		23.51	24.49
6	E	2040-01-31T18:54:28.094		29.05	-19.21	41865.10	28.31		
5	E	2040-01-31T18:54:42.080		29.10	-19.26	42298.23	28.41		
4	E	2040-01-31T18:54:53.069		29.13	-19.29	42610.11	28.46		
alpha	E	2040-01-31T18:56:06.845		29.36	-19.51	44703.83	28.71		
beta	E	2040-01-31T18:56:40.676		29.46	-19.62	45671.45	28.81		
eta	E	2040-01-31T18:57:32.725		29.62	-19.78	47176.12	28.96		
gamma	E	2040-01-31T18:57:48.403		29.67	-19.82	47630.54	29.01		
delta	E	2040-01-31T18:58:11.469		29.74	-19.89	48300.35	29.07		
lambda	E	2040-01-31T18:59:10.705		29.92	-20.07	50026.71	29.22		
epsilon	E	2040-01-31T18:59:36.023		30.00	-20.15	50767.17	29.25		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2040-01-31T18:26:48.570  
 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 : 675899209530050944  
 2Mass ID (if available) : 08105178+2038591  
 ICRS Star Coord at Epoch: 08h 10m 51.75613s +20:38:59.52408s  
 RUWE (>1.4 is poor) : 1.02  
 K magnitude : 14.685  
 G magnitude : 18.327  
 RP magnitude : 17.104  
 BP magnitude : 19.941  
 DUPflag : 0  
 Distance (au) : 17.617  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -22.73  
 Sun-Target sep (deg) : 169.43  
 Sun-Moon sep (deg) : 38.41  
 B (ring opening deg) : 46.58  
 PA of pole (deg) : 90.50  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 1.343  
 C/A sky separation (km) : 17162.0  
 NAIF SPICE kernels : RAJobs\_U111+rgf15.spk  
 URKALLvl.bsp  
 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



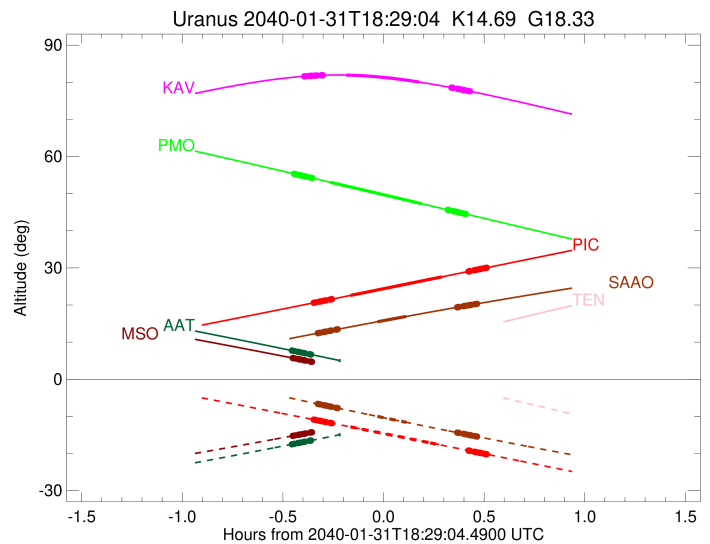
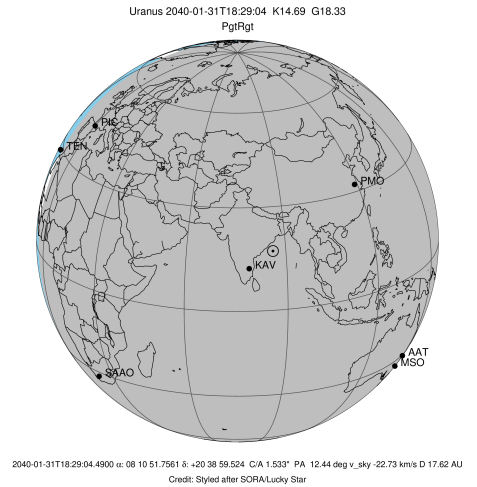
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2040-01-31T18:02:18.770		55.36	-62.31	51350.53	-29.46		
lambda	I	2040-01-31T18:03:03.675		55.21	-62.16	50026.71	-29.43		
delta	I	2040-01-31T18:04:02.485		55.00	-61.97	48300.35	-29.28		
gamma	I	2040-01-31T18:04:25.565		54.92	-61.90	47625.31	-29.22		
eta	I	2040-01-31T18:04:40.951		54.87	-61.85	47176.12	-29.17		
beta	I	2040-01-31T18:05:32.906		54.68	-61.68	45666.03	-29.02		
alpha	I	2040-01-31T18:06:04.313		54.57	-61.58	44750.70	-28.92		
4	I	2040-01-31T18:07:21.042		54.30	-61.33	42562.82	-28.67		
5	I	2040-01-31T18:07:35.971		54.25	-61.29	42156.27	-28.61		
6	I	2040-01-31T18:07:45.936		54.22	-61.25	41794.75	-28.51		
Uranus	I	2040-01-31T18:13:18.277		53.05	-60.17	25332.40		-36.05	-37.32
Uranus	E	2040-01-31T18:40:26.507		47.31	-54.72	25451.24		23.86	24.85
6	E	2040-01-31T18:48:15.517		45.65	-53.12	41865.35	28.45		
5	E	2040-01-31T18:48:29.414		45.60	-53.07	42298.62	28.55		
4	E	2040-01-31T18:48:40.334		45.56	-53.04	42609.93	28.61		
alpha	E	2040-01-31T18:49:53.747		45.30	-52.78	44703.58	28.85		
beta	E	2040-01-31T18:50:27.415		45.18	-52.67	45671.31	28.95		
eta	E	2040-01-31T18:51:19.221		44.99	-52.49	47176.12	29.10		
gamma	E	2040-01-31T18:51:34.824		44.94	-52.44	47630.51	29.14		
delta	E	2040-01-31T18:51:57.785		44.86	-52.36	48300.35	29.20		
lambda	E	2040-01-31T18:52:56.749		44.65	-52.15	50026.71	29.35		
epsilon	E	2040-01-31T18:53:21.991		44.56	-52.07	50768.26	29.38		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2040-01-31T18:28:44.570  
 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 : 675899209530050944  
 2Mass ID (if available) : 08105178+2038591  
 ICRS Star Coord at Epoch: 08h 10m 51.75613s +20:38:59.52408s  
 RUWE (>1.4 is poor) : 1.02  
 K magnitude : 14.685  
 G magnitude : 18.327  
 RP magnitude : 17.104  
 BP magnitude : 19.941  
 DUPflag : 0  
 Distance (au) : 17.618  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -22.73  
 Sun-Target sep (deg) : 169.43  
 Sun-Moon sep (deg) : 38.89  
 B (ring opening deg) : 46.58  
 PA of pole (deg) : 90.50  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 1.602  
 C/A sky separation (km) : 20472.9  
 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



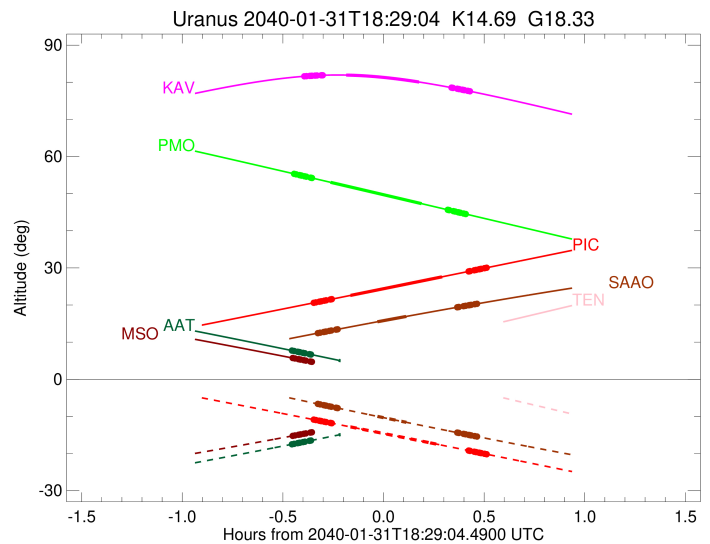
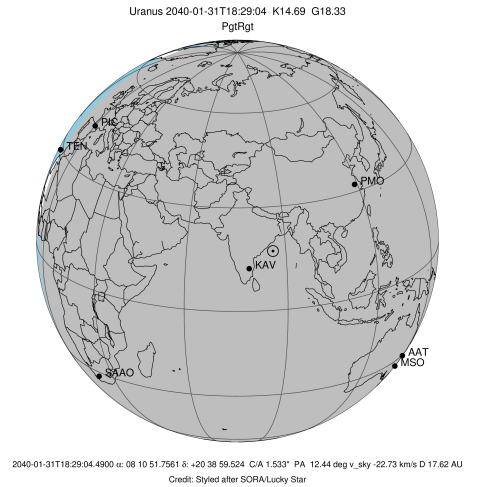
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2040-01-31T18:05:22.278		81.61	-76.41	51325.74	-28.80		
lambda	I	2040-01-31T18:06:07.347		81.66	-76.57	50026.71	-28.75		
delta	I	2040-01-31T18:07:07.623		81.72	-76.80	48300.35	-28.53		
gamma	I	2040-01-31T18:07:31.308		81.74	-76.89	47625.70	-28.44		
eta	I	2040-01-31T18:07:47.134		81.76	-76.95	47176.12	-28.37		
beta	I	2040-01-31T18:08:40.575		81.80	-77.15	45667.56	-28.15		
alpha	I	2040-01-31T18:09:12.978		81.83	-77.27	44751.46	-28.00		
4	I	2040-01-31T18:10:32.275		81.88	-77.56	42566.69	-27.62		
5	I	2040-01-31T18:10:47.892		81.89	-77.62	42157.89	-27.54		
6	I	2040-01-31T18:10:58.361		81.89	-77.66	41794.93	-27.41		
Uranus	I	2040-01-31T18:17:56.389		81.94	-79.19	25388.15		-30.68	-31.85
Uranus	E	2040-01-31T18:39:41.245		80.07	-83.45	25503.49		16.85	17.60
6	E	2040-01-31T18:49:21.458		78.55	-84.74	41862.33	27.40		
5	E	2040-01-31T18:49:36.083		78.51	-84.76	42293.95	27.53		
4	E	2040-01-31T18:49:47.567		78.48	-84.78	42611.88	27.61		
alpha	E	2040-01-31T18:51:03.390		78.26	-84.88	44706.19	27.99		
beta	E	2040-01-31T18:51:38.043		78.16	-84.93	45672.70	28.14		
eta	E	2040-01-31T18:52:31.214		78.00	-84.99	47176.12	28.36		
gamma	E	2040-01-31T18:52:47.224		77.95	-85.01	47630.75	28.43		
delta	E	2040-01-31T18:53:10.741		77.88	-85.03	48300.35	28.52		
lambda	E	2040-01-31T18:54:11.043		77.70	-85.08	50026.71	28.73		
epsilon	E	2040-01-31T18:54:36.497		77.63	-85.10	50759.21	28.79		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2040-01-31T18:24:52.350  
 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 : 675899209530050944  
 2Mass ID (if available) : 08105178+2038591  
 ICRS Star Coord at Epoch: 08h 10m 51.75613s +20:38:59.52408s  
 RUWE (>1.4 is poor) : 1.02  
 K magnitude : 14.685  
 G magnitude : 18.327  
 RP magnitude : 17.104  
 BP magnitude : 19.941  
 DUPflag : 0  
 Distance (au) : 17.617  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -22.73  
 Sun-Target sep (deg) : 169.43  
 Sun-Moon sep (deg) : 37.76  
 B (ring opening deg) : 46.58  
 PA of pole (deg) : 90.50  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 1.731  
 C/A sky separation (km) : 22114.2  
 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\_itr93\_040916.bsp  
 earth\_720101\_070426.bpc  
 earth\_200101\_990628\_predict.bpc  
 pg3f0000r.bsp  
 pg490000r.bsp  
 naif0012.tls  
 earth\_flat\_IAU.spk



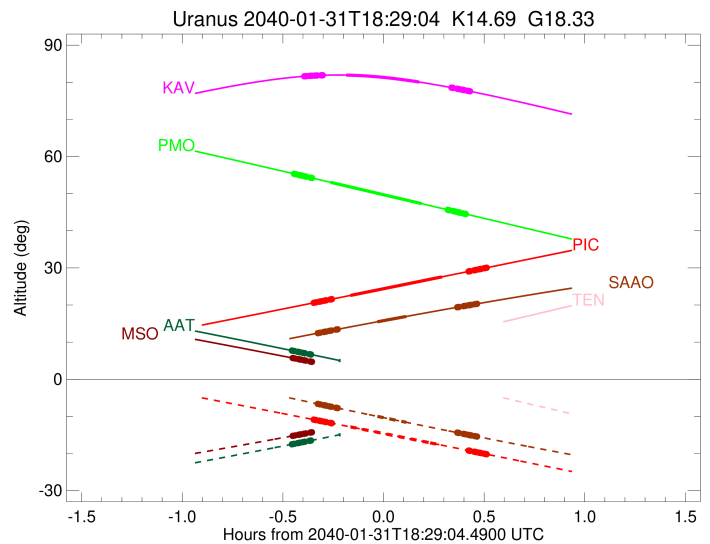
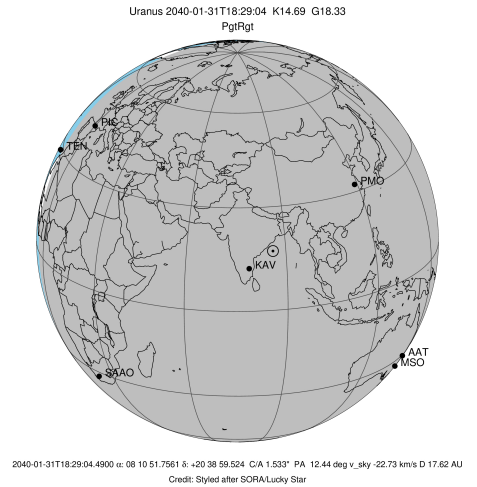
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2040-01-31T18:01:40.864		7.75	-17.53	51311.88	-27.95		
lambda	I	2040-01-31T18:02:26.827		7.61	-17.40	50026.71	-27.87		
delta	I	2040-01-31T18:03:29.044		7.41	-17.21	48300.35	-27.62		
gamma	I	2040-01-31T18:03:53.513		7.34	-17.14	47625.92	-27.51		
eta	I	2040-01-31T18:04:09.886		7.28	-17.09	47176.12	-27.43		
beta	I	2040-01-31T18:05:05.185		7.11	-16.92	45668.37	-27.17		
alpha	I	2040-01-31T18:05:38.781		7.01	-16.82	44751.78	-26.99		
4	I	2040-01-31T18:07:01.092		6.75	-16.58	42568.80	-26.54		
5	I	2040-01-31T18:07:17.401		6.70	-16.53	42159.01	-26.44		
6	I	2040-01-31T18:07:28.395		6.66	-16.50	41795.18	-26.30		
Uranus	I	2040-01-31T18:15:42.681		5.11	-15.00	25424.68		-26.87	-27.95
Uranus	E	2040-01-31T18:34:11.512		1.56x	-11.58	25527.79		12.54	13.12
6	E	2040-01-31T18:45:22.685	-0.63x	-9.46	41860.77	26.23			
5	E	2040-01-31T18:45:38.059	-0.68x	-9.42	42291.48	26.36			
4	E	2040-01-31T18:45:50.137	-0.72x	-9.38	42612.72	26.46			
alpha	E	2040-01-31T18:47:09.114	-0.98x	-9.13	44707.50	26.91			
beta	E	2040-01-31T18:47:45.126	-1.10x	-9.01	45673.35	27.09			
eta	E	2040-01-31T18:48:40.299	-1.28x	-8.84	47176.12	27.34			
gamma	E	2040-01-31T18:48:56.906	-1.33x	-8.78	47630.85	27.42			
delta	E	2040-01-31T18:49:21.277	-1.41x	-8.70	48300.35	27.52			
lambda	E	2040-01-31T18:50:23.709	-1.62x	-8.51	50026.71	27.78			
epsilon	E	2040-01-31T18:50:49.905	-1.70x	-8.42	50755.58	27.85			

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2040-01-31T18:31:27.730  
 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 : 675899209530050944  
 2Mass ID (if available) : 08105178+2038591  
 ICRS Star Coord at Epoch: 08h 10m 51.75613s +20:38:59.52408s  
 RUWE (>1.4 is poor) : 1.02  
 K magnitude : 14.685  
 G magnitude : 18.327  
 RP magnitude : 17.104  
 BP magnitude : 19.941  
 DUPflag : 0  
 Distance (au) : 17.618  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -22.73  
 Sun-Target sep (deg) : 169.43  
 Sun-Moon sep (deg) : 38.98  
 B (ring opening deg) : 46.58  
 PA of pole (deg) : 90.50  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 1.943  
 C/A sky separation (km) : 24829.2  
 NAIF SPICE kernels : RAJobs\_U111+rgf15.spk  
 URKALLvl.bsp  
 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	2040-01-31T18:09:25.066		12.41	-6.62	51291.54	-27.14		
lambda	I	2040-01-31T18:10:11.667		12.55	-6.77	50026.71	-27.03		
delta	I	2040-01-31T18:11:15.922		12.74	-6.98	48300.35	-26.70		
gamma	I	2040-01-31T18:11:41.237		12.81	-7.06	47626.24	-26.56		
eta	I	2040-01-31T18:11:58.217		12.86	-7.11	47176.12	-26.46		
beta	I	2040-01-31T18:12:55.607		13.03	-7.29	45669.55	-26.11		
alpha	I	2040-01-31T18:13:30.613		13.13	-7.40	44752.15	-25.88		
4	I	2040-01-31T18:14:56.584		13.38	-7.68	42572.03	-25.28		
5	I	2040-01-31T18:15:13.775		13.43	-7.73	42161.06	-25.14		
6	I	2040-01-31T18:15:25.511		13.46	-7.77	41795.73	-24.98		
Uranus	I	2040-01-31T18:27:14.343		15.48	-9.99	25502.09		-17.07	-17.83
Uranus	E	2040-01-31T18:35:51.650		16.92	-11.60	25558.75		1.13	1.18
6	E	2040-01-31T18:51:03.880		19.39	-14.37	41857.61	25.03		
5	E	2040-01-31T18:51:20.159		19.44	-14.42	42286.40	25.20		
4	E	2040-01-31T18:51:32.980		19.47	-14.46	42614.12	25.33		
alpha	E	2040-01-31T18:52:55.168		19.69	-14.70	44710.07	25.94		
beta	E	2040-01-31T18:53:32.441		19.79	-14.82	45674.54	26.18		
eta	E	2040-01-31T18:54:29.371		19.94	-14.99	47176.12	26.53		
gamma	E	2040-01-31T18:54:46.489		19.98	-15.04	47631.04	26.63		
delta	E	2040-01-31T18:55:11.560		20.05	-15.11	48300.35	26.77		
lambda	E	2040-01-31T18:56:15.650		20.21	-15.30	50026.71	27.10		
epsilon	E	2040-01-31T18:56:42.267		20.28	-15.38	50749.84	27.21		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2040-01-31T18:24:59.160  
 Event type : PgtRgt  
 : Uranus occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : MSO  
 Location : Mt. Stromlo Observatory  
 Latitude (deg) : -35.32000  
 E. Longitude (deg) : 149.00833  
 Altitude (km) : 0.770  
 Gaia source ID : 675899209530050944  
 2Mass ID (if available) : 08105178+2038591  
 ICRS Star Coord at Epoch: 08h 10m 51.75613s +20:38:59.52408s  
 RUWE (>1.4 is poor) : 1.02  
 K magnitude : 14.685  
 G magnitude : 18.327  
 RP magnitude : 17.104  
 BP magnitude : 19.941  
 DUPflag : 0  
 Distance (au) : 17.617  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -22.73  
 Sun-Target sep (deg) : 169.43  
 Sun-Moon sep (deg) : 37.77  
 B (ring opening deg) : 46.58  
 PA of pole (deg) : 90.50  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 1.760  
 C/A sky separation (km) : 22483.7  
 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\_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	2040-01-31T18:01:54.969		5.74	-15.26	51308.92	-27.83		
lambda	I	2040-01-31T18:02:41.028		5.60	-15.13	50026.71	-27.75		
delta	I	2040-01-31T18:03:43.537		5.41	-14.96	48300.35	-27.48		
gamma	I	2040-01-31T18:04:08.126		5.34	-14.89	47625.96	-27.37		
eta	I	2040-01-31T18:04:24.585		5.29	-14.84	47176.12	-27.29		
beta	I	2040-01-31T18:05:20.175		5.13	-14.69	45668.54	-27.02		
alpha	I	2040-01-31T18:05:53.967		5.03	-14.59	44751.85	-26.83		
4	I	2040-01-31T18:07:16.776		4.78x	-14.36	42569.26	-26.36		
5	I	2040-01-31T18:07:33.205		4.73x	-14.31	42159.27	-26.26		
6	I	2040-01-31T18:07:44.296		4.70x	-14.28	41795.24	-26.11		
Uranus	I	2040-01-31T18:16:18.120		3.16x	-12.81	25433.60		-25.88	-26.94
Uranus	E	2040-01-31T18:33:49.796		-0.06x	-9.74	25533.12		11.41	11.93
6	E	2040-01-31T18:45:23.654		-2.21x	-7.66	41860.38	26.05		
5	E	2040-01-31T18:45:39.156		-2.26x	-7.61	42290.87	26.19		
4	E	2040-01-31T18:45:51.336		-2.30x	-7.58	42612.91	26.29		
alpha	E	2040-01-31T18:47:10.796		-2.55x	-7.33	44707.81	26.75		
beta	E	2040-01-31T18:47:47.006		-2.66x	-7.23	45673.50	26.94		
eta	E	2040-01-31T18:48:42.461		-2.84x	-7.06	47176.12	27.21		
gamma	E	2040-01-31T18:48:59.152		-2.89x	-7.01	47630.87	27.29		
delta	E	2040-01-31T18:49:23.639		-2.96x	-6.93	48300.35	27.39		
lambda	E	2040-01-31T18:50:26.354		-3.16x	-6.74	50026.71	27.66		
epsilon	E	2040-01-31T18:50:52.632		-3.24x	-6.66	50754.77	27.73		