

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2037-01-05T04:09:54.390
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 3367489247532793856
 2Mass ID (if available) : 07143877+2246406

Uranus 2037-01-05T04:09:54 K13.87 G15.26 PgtRgt

ICRS Star Coord at Epoch: 07h 14m 38.76138s +22:46:40.60072s

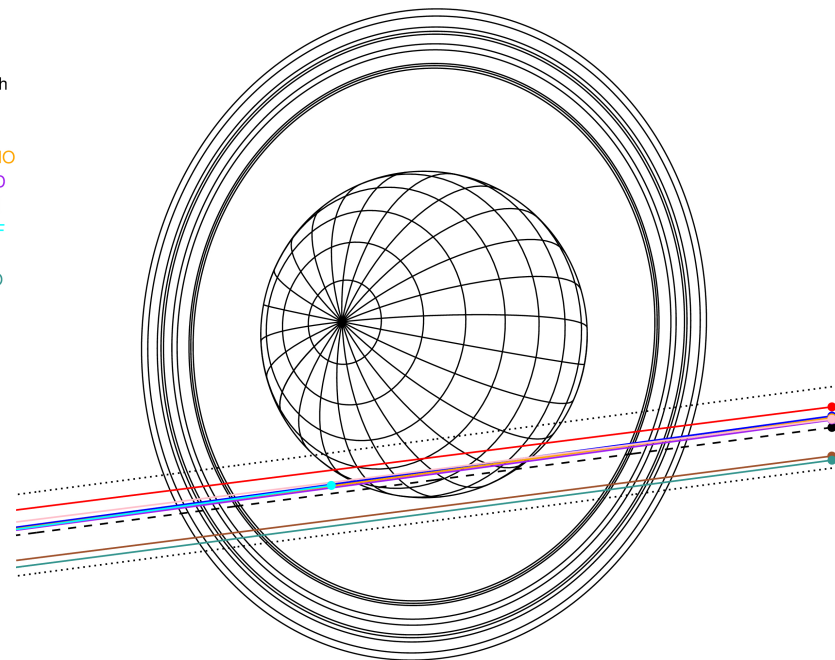
RUWE (>1.4 is poor) : 1.08
 K magnitude : 13.870
 G magnitude : 15.264
 RP magnitude : 14.795
 BP magnitude : 15.566
 DUPflag : 0
 Distance (au) : 17.782
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.28
 Sun-Target sep (deg) : 177.45
 Sun-Moon sep (deg) : 39.72
 B (ring opening deg) : 59.46
 PA of pole (deg) : 81.20

#	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



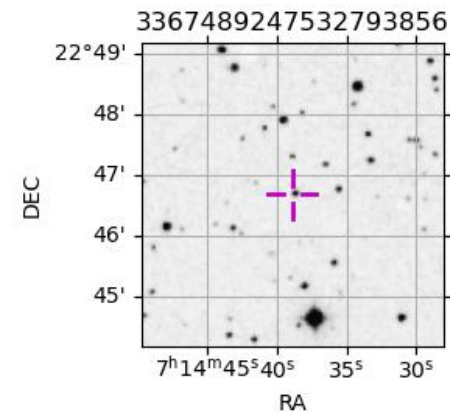
2037-01-05T04:09:54.3900 at: 07 14 38.7614 & +22 46 40.601 C/A 1.760° PA 7.53 deg v_sky -23.28 km/s D 17.78 AU
 Credit: Styled after SORA/Lucky Star

Earth
 PIC
 PAL
 KPNO
 MCD
 TEN
 IRTF
 RIO
 ESO

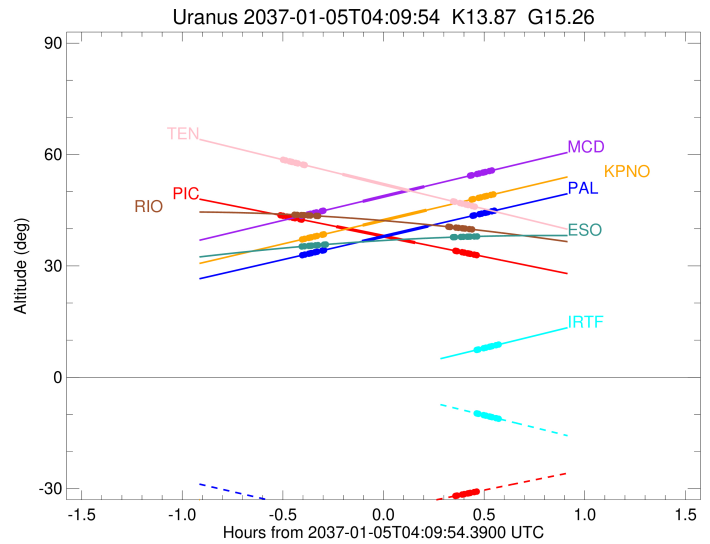
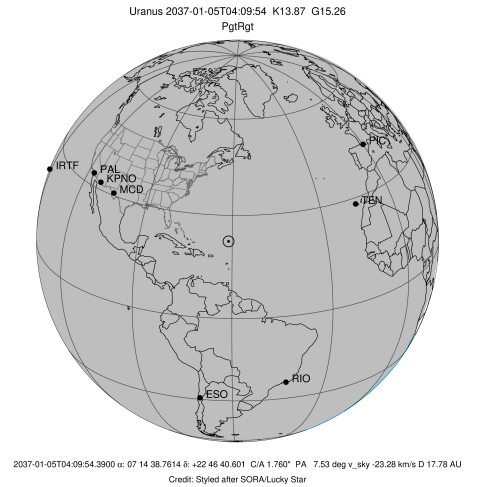


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1	+++++	+ +	+++++	JAN 05 03:38 - JAN 05 04:37	PieRie
PAL	Palomar Mt (200")	33.4	243.1	+++++	+ +	+++++	JAN 05 03:45 - JAN 05 04:42	PieRie
PNO	Purple Mtn Obs. Nanki	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+++++	+ +	+++++	JAN 05 03:45 - JAN 05 04:42	PieRie
MCD	McDonald Obs. 2.7m	30.7	256.0	+++++	+ +	+++++	JAN 05 03:45 - JAN 05 04:42	PieRie
TEN	Teide Obs./Tenerife	28.3	343.5	+++++	+ +	+++++	JAN 05 03:39 - JAN 05 04:37	PieRie
IRTF	Mauna Kea/IRTF	19.8	204.5			+++++	JAN 05 04:37 - JAN 05 04:44	PnnRne
KAV	Kavalur Observatory	12.6	78.8					PnnRnn
RIO	Rio de Janeiro	-22.9	316.8	+++++		+++++	JAN 05 03:43 - JAN 05 04:36	PnnRie
ESO	European Southern Obs	-29.3	289.3	+++++		+++++	JAN 05 03:45 - JAN 05 04:37	PnnRie
AAT	Siding Spring (AAT)	-31.3	149.1					PnnRnn
SAAO	So. Afr. Astro. Obs.	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Observato	-35.3	149.0					PnnRnn

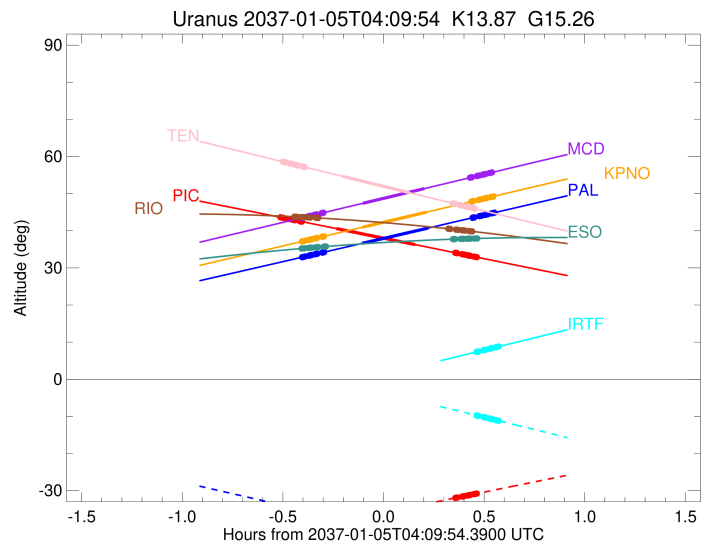
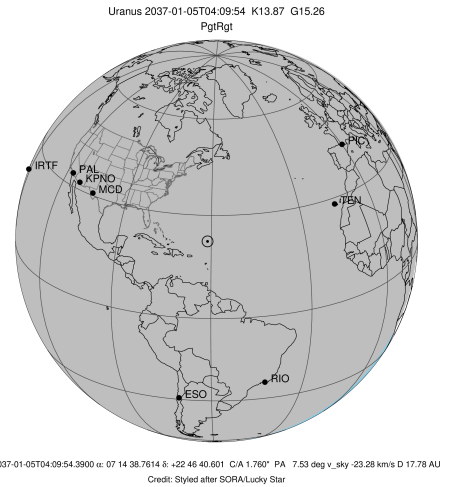


target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2037-01-05T04:07:27.960
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PIC
 Location : Pic du Midi
 Latitude (deg) : 42.93656
 E. Longitude (deg) : 0.14231
 Altitude (km) : 2.890
 Gaia source ID : 3367489247532793856
 2Mass ID (if available) : 07143877+2246406
 ICRS Star Coord at Epoch: 07h 14m 38.76138s +22:46:40.60072s
 RUWE (>1.4 is poor) : 1.08
 K magnitude : 13.870
 G magnitude : 15.264
 RP magnitude : 14.795
 BP magnitude : 15.566
 DUPflag : 0
 Distance (au) : 17.782
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.28
 Sun-Target sep (deg) : 177.45
 Sun-Moon sep (deg) : 39.67
 B (ring opening deg) : 59.46
 PA of pole (deg) : 81.20
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.494
 C/A sky separation (km) : 19267.5
 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



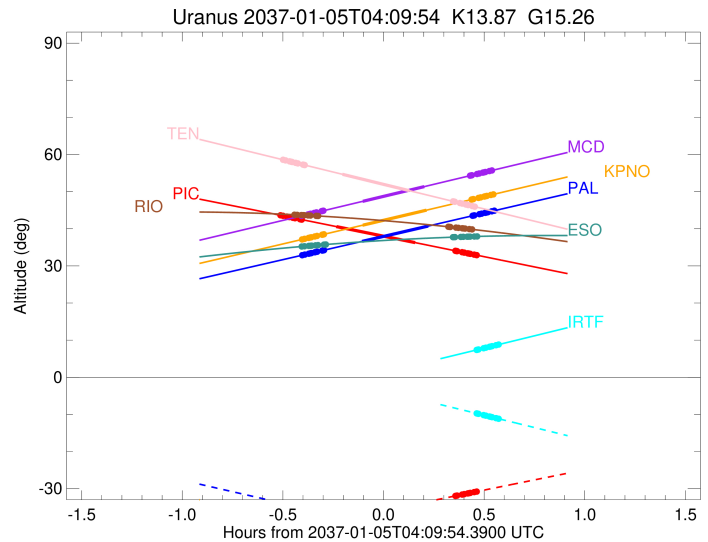
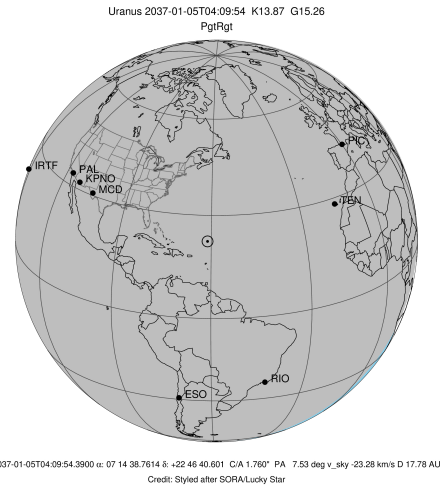
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2037-01-05T03:38:57.720		43.67	-41.56	51509.72	-25.02		
lambda	I	2037-01-05T03:39:57.236		43.49	-41.38	50026.71	-24.85		
delta	I	2037-01-05T03:41:06.923		43.28	-41.17	48300.35	-24.69		
gamma	I	2037-01-05T03:41:34.293		43.20	-41.09	47625.55	-24.62		
eta	I	2037-01-05T03:41:52.565		43.14	-41.03	47176.12	-24.57		
beta	I	2037-01-05T03:42:55.299		42.95	-40.84	45641.43	-24.40		
alpha	I	2037-01-05T03:43:32.542		42.84	-40.73	44738.79	-24.28		
4	I	2037-01-05T03:45:03.563		42.56	-40.45	42540.99	-24.00		
5	I	2037-01-05T03:45:15.116		42.53	-40.42	42252.61	-23.92		
6	I	2037-01-05T03:45:32.314		42.48	-40.36	41872.18	-23.90		
Uranus	I	2037-01-05T03:55:51.609		40.59	-38.48	25256.73		-25.00	-26.03
Uranus	E	2037-01-05T04:19:19.456		36.28	-34.17	25480.72		12.34	12.90
6	E	2037-01-05T04:31:18.966		34.07	-31.97	41837.21	23.84		
5	E	2037-01-05T04:31:32.789		34.03	-31.93	42160.85	23.86		
4	E	2037-01-05T04:31:51.885		33.97	-31.87	42616.31	23.94		
alpha	E	2037-01-05T04:33:17.983		33.70	-31.61	44684.63	24.22		
beta	E	2037-01-05T04:33:58.750		33.58	-31.48	45670.73	24.33		
eta	E	2037-01-05T04:35:00.467		33.39	-31.29	47176.12	24.50		
gamma	E	2037-01-05T04:35:18.679		33.33	-31.24	47622.82	24.55		
delta	E	2037-01-05T04:35:46.237		33.25	-31.15	48300.35	24.62		
lambda	E	2037-01-05T04:36:56.129		33.03	-30.94	50026.71	24.78		
epsilon	E	2037-01-05T04:37:36.127		32.91	-30.82	51019.55	24.94		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2037-01-05T04:13:14.640
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PAL
 Location : Palomar Mt (200")
 Latitude (deg) : 33.35622
 E. Longitude (deg) : 243.13601
 Altitude (km) : 1.706
 Gaia source ID : 3367489247532793856
 2Mass ID (if available) : 07143877+2246406
 ICRS Star Coord at Epoch: 07h 14m 38.76138s +22:46:40.60072s
 RUWE (>1.4 is poor) : 1.08
 K magnitude : 13.870
 G magnitude : 15.264
 RP magnitude : 14.795
 BP magnitude : 15.566
 DUPflag : 0
 Distance (au) : 17.782
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.28
 Sun-Target sep (deg) : 177.45
 Sun-Moon sep (deg) : 40.69
 B (ring opening deg) : 59.46
 PA of pole (deg) : 81.20
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.653
 C/A sky separation (km) : 21314.0
 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_itr93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk



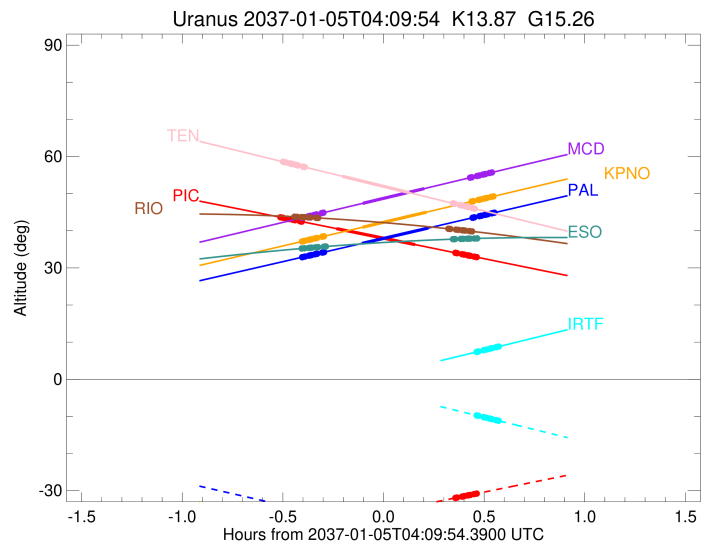
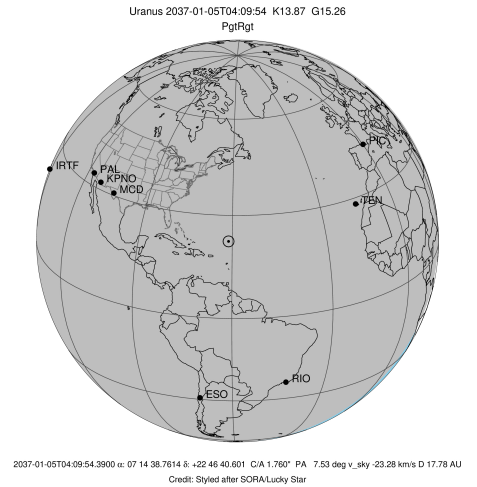
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2037-01-05T03:45:25.925		32.83	-35.09	51516.12	-24.51		
lambda	I	2037-01-05T03:46:26.982		33.04	-35.30	50026.71	-24.31		
delta	I	2037-01-05T03:47:38.274		33.29	-35.55	48300.35	-24.11		
gamma	I	2037-01-05T03:48:06.316		33.39	-35.65	47625.35	-24.03		
eta	I	2037-01-05T03:48:25.035		33.45	-35.71	47176.12	-23.97		
beta	I	2037-01-05T03:49:29.410		33.68	-35.93	45641.28	-23.75		
alpha	I	2037-01-05T03:50:07.726		33.81	-36.07	44737.58	-23.61		
4	I	2037-01-05T03:51:41.359		34.14	-36.39	42542.61	-23.25		
5	I	2037-01-05T03:51:53.505		34.18	-36.43	42248.85	-23.16		
6	I	2037-01-05T03:52:11.065		34.24	-36.50	41873.32	-23.13		
Uranus	I	2037-01-05T04:03:33.783		36.61	-38.87	25307.87		-22.62	-23.58
Uranus	E	2037-01-05T04:23:11.889		40.73	-42.97	25521.92		8.45	8.84
6	E	2037-01-05T04:36:26.257		43.50	-45.74	41839.99	23.19		
5	E	2037-01-05T04:36:40.185		43.55	-45.79	42159.03	23.22		
4	E	2037-01-05T04:36:59.885		43.62	-45.86	42615.90	23.32		
alpha	E	2037-01-05T04:38:28.117		43.93	-46.16	44684.63	23.68		
beta	E	2037-01-05T04:39:09.724		44.07	-46.31	45669.67	23.83		
eta	E	2037-01-05T04:40:12.723		44.29	-46.53	47176.12	24.05		
gamma	E	2037-01-05T04:40:31.268		44.36	-46.59	47622.60	24.10		
delta	E	2037-01-05T04:40:59.333		44.46	-46.69	48300.35	24.19		
lambda	E	2037-01-05T04:42:10.385		44.71	-46.94	50026.71	24.40		
epsilon	E	2037-01-05T04:42:51.821		44.85	-47.08	51039.97	24.60		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2037-01-05T04:13:04.290
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : KPNO
 Location : Kitt Peak Natl Obs
 Latitude (deg) : 31.96333
 E. Longitude (deg) : 248.40000
 Altitude (km) : 2.120
 Gaia source ID : 3367489247532793856
 2Mass ID (if available) : 07143877+2246406
 ICRS Star Coord at Epoch: 07h 14m 38.76138s +22:46:40.60072s
 RUWE (>1.4 is poor) : 1.08
 K magnitude : 13.870
 G magnitude : 15.264
 RP magnitude : 14.795
 BP magnitude : 15.566
 DUPflag : 0
 Distance (au) : 17.782
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.28
 Sun-Target sep (deg) : 177.45
 Sun-Moon sep (deg) : 40.70
 B (ring opening deg) : 59.46
 PA of pole (deg) : 81.20
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.673
 C/A sky separation (km) : 21576.0
 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_itrfr93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk



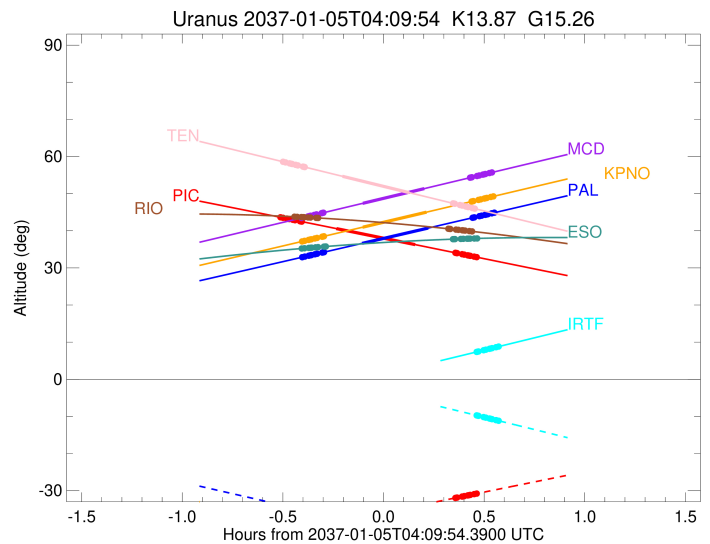
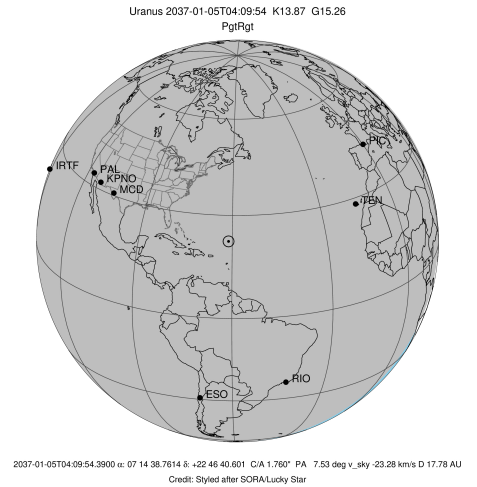
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2037-01-05T03:45:23.117		37.08	-39.38	51517.17	-24.48		
lambda	I	2037-01-05T03:46:24.295		37.29	-39.60	50026.71	-24.28		
delta	I	2037-01-05T03:47:35.694		37.54	-39.85	48300.35	-24.07		
gamma	I	2037-01-05T03:48:03.785		37.64	-39.95	47625.31	-23.98		
eta	I	2037-01-05T03:48:22.536		37.71	-40.01	47176.12	-23.93		
beta	I	2037-01-05T03:49:27.038		37.94	-40.24	45641.26	-23.70		
alpha	I	2037-01-05T03:50:05.445		38.07	-40.38	44737.38	-23.55		
4	I	2037-01-05T03:51:39.295		38.41	-40.71	42542.88	-23.19		
5	I	2037-01-05T03:51:51.512		38.45	-40.75	42248.25	-23.09		
6	I	2037-01-05T03:52:09.091		38.51	-40.81	41873.49	-23.06		
Uranus	I	2037-01-05T04:03:41.307		40.96	-43.26	25316.18		-22.22	-23.16
Uranus	E	2037-01-05T04:22:43.848		45.02	-47.30	25526.27		7.93	8.30
6	E	2037-01-05T04:36:08.875		47.88	-50.15	41840.29	23.12		
5	E	2037-01-05T04:36:22.818		47.93	-50.20	42158.86	23.15		
4	E	2037-01-05T04:36:42.586		48.00	-50.27	42615.84	23.25		
alpha	E	2037-01-05T04:38:11.061		48.31	-50.59	44684.64	23.62		
beta	E	2037-01-05T04:38:52.761		48.46	-50.73	45669.56	23.77		
eta	E	2037-01-05T04:39:55.898		48.68	-50.96	47176.12	24.00		
gamma	E	2037-01-05T04:40:14.478		48.75	-51.02	47622.57	24.06		
delta	E	2037-01-05T04:40:42.597		48.85	-51.12	48300.35	24.15		
lambda	E	2037-01-05T04:41:53.768		49.10	-51.37	50026.71	24.36		
epsilon	E	2037-01-05T04:42:35.350		49.25	-51.52	51042.03	24.56		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2037-01-05T04:12:45.300
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : MCD
 Location : McDonald Obs. 2.7m
 Latitude (deg) : 30.67158
 E. Longitude (deg) : 255.97844
 Altitude (km) : 2.075
 Gaia source ID : 3367489247532793856
 2Mass ID (if available) : 07143877+2246406
 ICRS Star Coord at Epoch: 07h 14m 38.76138s +22:46:40.60072s
 RUWE (>1.4 is poor) : 1.08
 K magnitude : 13.870
 G magnitude : 15.264
 RP magnitude : 14.795
 BP magnitude : 15.566
 DUPflag : 0
 Distance (au) : 17.782
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.28
 Sun-Target sep (deg) : 177.45
 Sun-Moon sep (deg) : 40.70
 B (ring opening deg) : 59.46
 PA of pole (deg) : 81.20
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.695
 C/A sky separation (km) : 21855.6
 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	2037-01-05T03:45:12.743		43.40	-45.75	51518.31	-24.46		
lambda	I	2037-01-05T03:46:14.030		43.62	-45.97	50026.71	-24.25		
delta	I	2037-01-05T03:47:25.521		43.88	-46.22	48300.35	-24.04		
gamma	I	2037-01-05T03:47:53.655		43.98	-46.33	47625.27	-23.95		
eta	I	2037-01-05T03:48:12.434		44.05	-46.39	47176.12	-23.89		
beta	I	2037-01-05T03:49:17.052		44.28	-46.62	45641.24	-23.66		
alpha	I	2037-01-05T03:49:55.546		44.42	-46.76	44737.16	-23.50		
4	I	2037-01-05T03:51:29.602		44.76	-47.10	42543.18	-23.12		
5	I	2037-01-05T03:51:41.893		44.80	-47.14	42247.58	-23.02		
6	I	2037-01-05T03:51:59.486		44.86	-47.21	41873.68	-22.99		
Uranus	I	2037-01-05T04:03:42.325		47.39	-49.73	25325.49		-21.76	-22.69
Uranus	E	2037-01-05T04:22:05.058		51.36	-53.68	25530.70		7.37	7.72
6	E	2037-01-05T04:35:41.868		54.30	-56.61	41840.60	23.04		
5	E	2037-01-05T04:35:55.826		54.35	-56.66	42158.68	23.08		
4	E	2037-01-05T04:36:15.663		54.42	-56.73	42615.79	23.18		
alpha	E	2037-01-05T04:37:44.383		54.74	-57.05	44684.65	23.56		
beta	E	2037-01-05T04:38:26.175		54.89	-57.20	45669.44	23.72		
eta	E	2037-01-05T04:39:29.450		55.12	-57.42	47176.12	23.95		
gamma	E	2037-01-05T04:39:48.065		55.19	-57.49	47622.55	24.01		
delta	E	2037-01-05T04:40:16.235		55.29	-57.59	48300.35	24.11		
lambda	E	2037-01-05T04:41:27.521		55.54	-57.84	50026.71	24.32		
epsilon	E	2037-01-05T04:42:09.249		55.69	-57.99	51044.15	24.53		

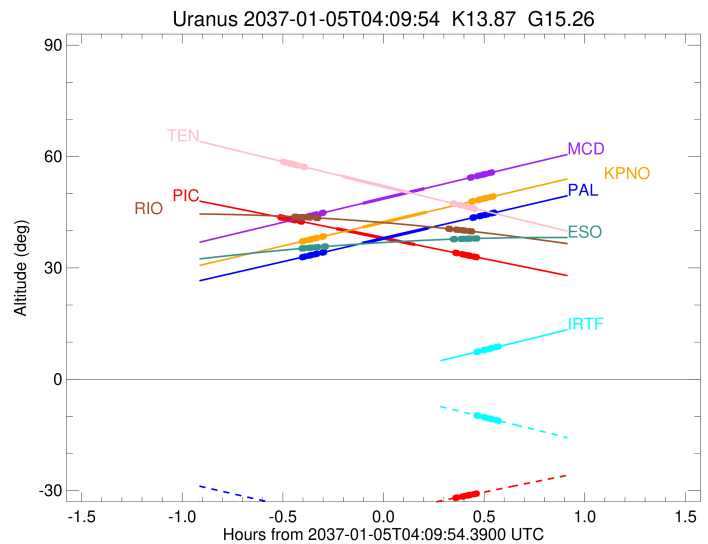
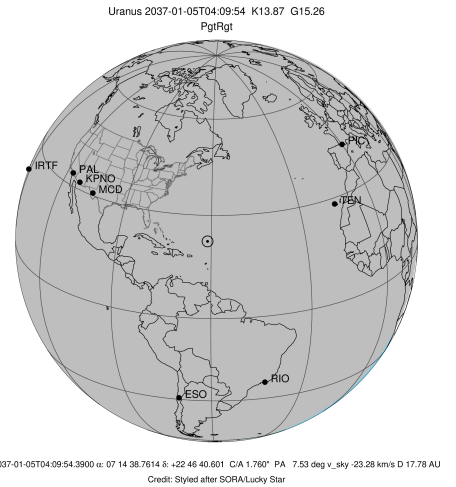
target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2037-01-05T04:07:28.730
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : TEN
 Location : Teide Obs./Tenerife
 Latitude (deg) : 28.30050
 E. Longitude (deg) : 343.48909
 Altitude (km) : 2.395
 Gaia source ID : 3367489247532793856
 2Mass ID (if available) : 07143877+2246406
 ICRS Star Coord at Epoch: 07h 14m 38.76138s +22:46:40.60072s
 RUWE (>1.4 is poor) : 1.08
 K magnitude : 13.870
 G magnitude : 15.264
 RP magnitude : 14.795
 BP magnitude : 15.566
 DUPflag : 0
 Distance (au) : 17.782
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.28
 Sun-Target sep (deg) : 177.45
 Sun-Moon sep (deg) : 39.79
 B (ring opening deg) : 59.46
 PA of pole (deg) : 81.20
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.642
 C/A sky separation (km) : 21172.4
 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	2037-01-05T03:39:43.459	58.64	-56.15	51517.10	-24.71		
lambda	I	2037-01-05T03:40:44.053	58.42	-55.92	50026.71	-24.52		
delta	I	2037-01-05T03:41:54.755	58.16	-55.66	48300.35	-24.31		
gamma	I	2037-01-05T03:42:22.566	58.06	-55.56	47625.32	-24.23		
eta	I	2037-01-05T03:42:41.129	57.99	-55.49	47176.12	-24.17		
beta	I	2037-01-05T03:43:44.968	57.75	-55.26	45641.27	-23.95		
alpha	I	2037-01-05T03:44:22.968	57.61	-55.12	44737.44	-23.81		
4	I	2037-01-05T03:45:55.793	57.27	-54.78	42542.78	-23.45		
5	I	2037-01-05T03:46:07.856	57.23	-54.73	42248.49	-23.36		
6	I	2037-01-05T03:46:25.246	57.16	-54.67	41873.42	-23.33		
Uranus	I	2037-01-05T03:57:40.612	54.67	-52.19	25307.89		-22.62	-23.58
Uranus	E	2037-01-05T04:17:33.177	50.28	-47.81	25516.88		9.01	9.43
6	E	2037-01-05T04:30:38.018	47.39	-44.94	41839.44	23.28		
5	E	2037-01-05T04:30:51.949	47.34	-44.89	42159.38	23.31		
4	E	2037-01-05T04:31:11.563	47.27	-44.81	42616.00	23.40		
alpha	E	2037-01-05T04:32:39.500	46.95	-44.49	44684.62	23.75		
beta	E	2037-01-05T04:33:20.996	46.79	-44.34	45669.90	23.90		
eta	E	2037-01-05T04:34:23.813	46.56	-44.11	47176.12	24.11		
gamma	E	2037-01-05T04:34:42.313	46.49	-44.04	47622.64	24.17		
delta	E	2037-01-05T04:35:10.307	46.39	-43.94	48300.35	24.25		
lambda	E	2037-01-05T04:36:21.198	46.13	-43.68	50026.71	24.45		
epsilon	E	2037-01-05T04:37:02.356	45.98	-43.53	51035.21	24.64		

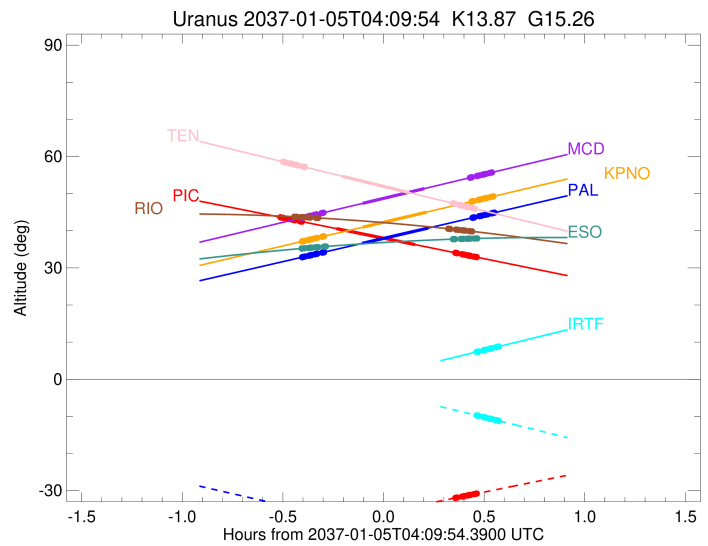
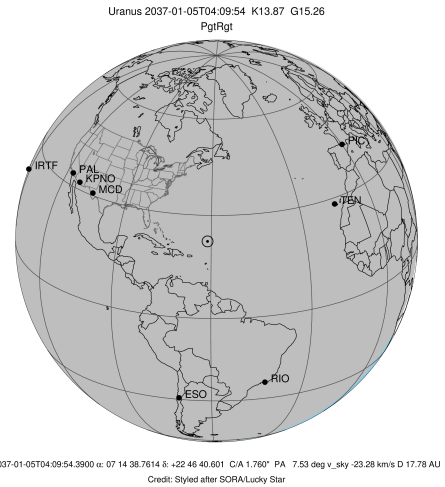
```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2037-01-05T04:14:14.700
Event type          : PgtRgt
: Uranus occs: geocentric, topocentric
: Ring occs: geocentric, topocentric
Observer code       : IRTF
Location            : Mauna Kea/IRTF
Latitude (deg)      : 19.82622
E. Longitude (deg)  : 204.52800
Altitude (km)       : 4.168
Gaia source ID      : 3367489247532793856
2Mass ID (if available) : 07143877+2246406
ICRS Star Coord at Epoch: 07h 14m 38.76138s +22:46:40.60072s
RUWE (>1.4 is poor) : 1.08
K magnitude          : 13.870
G magnitude          : 15.264
RP magnitude         : 14.795
BP magnitude         : 15.566
DUPflag             : 0
Distance (au)       : 17.782
f0 (km)             : 0.000
g0 (km)             : 0.000
skyplane vel. (km/s) : -23.28
Sun-Target sep (deg) : 177.45
Sun-Moon sep (deg)  : 40.48
B (ring opening deg) : 59.46
PA of pole (deg)    : 81.20
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation ("): 1.659
C/A sky separation (km): 21401.7
NAIF SPICE kernels  : RAJobs_U111+rgf15.spk
URKALLvl1.spk
urall1.bsp
IAU_URANUS_for_RINGFIT.tpc
vgr2.urall1.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	2037-01-05T03:46:10.197	-3.78x	1.46x	51516.00	-24.21			
lambda	I	2037-01-05T03:47:11.997	-3.56x	1.24x	50026.71	-24.02			
delta	I	2037-01-05T03:48:24.165	-3.30x	0.98x	48300.35	-23.82			
gamma	I	2037-01-05T03:48:52.553	-3.20x	0.88x	47625.35	-23.73			
eta	I	2037-01-05T03:49:11.504	-3.13x	0.81x	47176.12	-23.68			
beta	I	2037-01-05T03:50:16.678	-2.90x	0.58x	45641.28	-23.46			
alpha	I	2037-01-05T03:50:55.473	-2.76x	0.44x	44737.59	-23.32			
4	I	2037-01-05T03:52:30.286	-2.43x	0.10x	42542.61	-22.96			
5	I	2037-01-05T03:52:42.585	-2.38x	0.05x	42248.86	-22.87			
6	I	2037-01-05T03:53:00.369	-2.32x	-0.01x	41873.31	-22.84			
Uranus	I	2037-01-05T04:04:33.539	0.16x	-2.50x	25309.23	-22.56		-22.56	-23.51
Uranus	E	2037-01-05T04:24:12.533	4.42x	-6.78	25524.22	8.18		8.18	8.56
6	E	2037-01-05T04:37:39.681	7.36	-9.73	41840.23	22.92			
5	E	2037-01-05T04:37:53.748	7.41	-9.78	42158.89	22.95			
4	E	2037-01-05T04:38:13.684	7.49	-9.85	42615.86	23.05			
alpha	E	2037-01-05T04:39:42.935	7.81	-10.18	44684.63	23.41			
beta	E	2037-01-05T04:40:25.010	7.97	-10.34	45669.57	23.56			
eta	E	2037-01-05T04:41:28.721	8.20	-10.57	47176.12	23.78			
gamma	E	2037-01-05T04:41:47.472	8.27	-10.64	47622.58	23.84			
delta	E	2037-01-05T04:42:15.850	8.37	-10.74	48300.35	23.93			
lambda	E	2037-01-05T04:43:27.687	8.64	-11.01	50026.71	24.13			
epsilon	E	2037-01-05T04:44:09.658	8.79	-11.16	51041.95	24.33			

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2037-01-05T04:08:29.400
 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 : 3367489247532793856
 2Mass ID (if available) : 07143877+2246406
 ICRS Star Coord at Epoch: 07h 14m 38.76138s +22:46:40.60072s
 RUWE (>1.4 is poor) : 1.08
 K magnitude : 13.870
 G magnitude : 15.264
 RP magnitude : 14.795
 BP magnitude : 15.566
 DUPflag : 0
 Distance (au) : 17.782
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.28
 Sun-Target sep (deg) : 177.45
 Sun-Moon sep (deg) : 39.93
 B (ring opening deg) : 59.46
 PA of pole (deg) : 81.20
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.096
 C/A sky separation (km) : 27029.2
 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_itr93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk

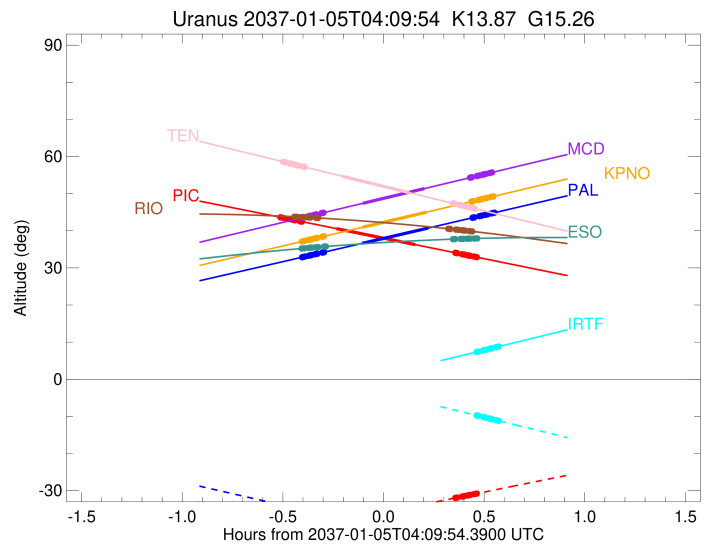
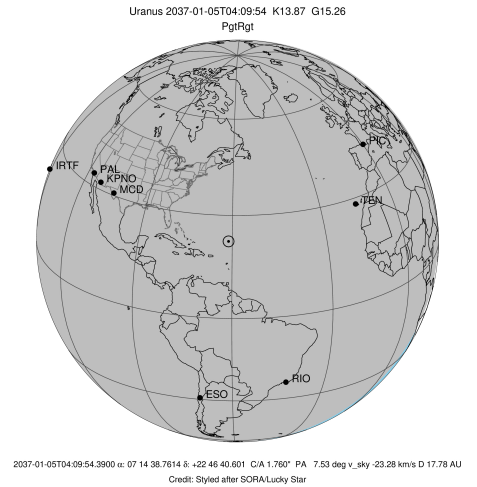


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2037-01-05T03:43:04.782		43.80	-43.38	51536.22	-23.12		
lambda	I	2037-01-05T03:44:10.559		43.75	-43.31	50026.71	-22.81		
delta	I	2037-01-05T03:45:26.836		43.69	-43.24	48300.35	-22.45		
gamma	I	2037-01-05T03:45:57.036		43.67	-43.21	47624.58	-22.30		
eta	I	2037-01-05T03:46:17.194		43.65	-43.19	47176.12	-22.19		
beta	I	2037-01-05T03:47:26.998		43.60	-43.12	45641.06	-21.81		
alpha	I	2037-01-05T03:48:09.027		43.56	-43.07	44732.83	-21.55		
4	I	2037-01-05T03:49:51.809		43.48	-42.96	42549.08	-20.89		
5	I	2037-01-05T03:50:06.307		43.46	-42.95	42234.87	-20.73		
6	I	2037-01-05T03:50:25.062		43.45	-42.93	41876.72	-20.65		

No planet occultations

6	E	2037-01-05T04:29:13.546		40.54	-39.56	41846.84	20.64		
5	E	2037-01-05T04:29:28.510		40.52	-39.53	42155.91	20.72		
4	E	2037-01-05T04:29:50.672		40.48	-39.49	42614.11	20.88		
alpha	E	2037-01-05T04:31:28.528		40.32	-39.32	44685.15	21.53		
beta	E	2037-01-05T04:32:13.975		40.25	-39.23	45667.00	21.79		
eta	E	2037-01-05T04:33:22.675		40.14	-39.11	47176.12	22.17		
gamma	E	2037-01-05T04:33:42.741		40.10	-39.07	47622.12	22.28		
delta	E	2037-01-05T04:34:13.081		40.05	-39.01	48300.35	22.43		
lambda	E	2037-01-05T04:35:29.433		39.92	-38.87	50026.71	22.78		
epsilon	E	2037-01-05T04:36:15.803		39.84	-38.78	51087.85	23.10		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2037-01-05T04:10:17.060
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : ESO
 Location : European Southern Obs. (3.6m)
 Latitude (deg) : -29.26097
 E. Longitude (deg) : 289.26831
 Altitude (km) : 2.400
 Gaia source ID : 3367489247532793856
 2Mass ID (if available) : 07143877+2246406
 ICRS Star Coord at Epoch: 07h 14m 38.76138s +22:46:40.60072s
 RUWE (>1.4 is poor) : 1.08
 K magnitude : 13.870
 G magnitude : 15.264
 RP magnitude : 14.795
 BP magnitude : 15.566
 DUPflag : 0
 Distance (au) : 17.782
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.28
 Sun-Target sep (deg) : 177.45
 Sun-Moon sep (deg) : 40.21
 B (ring opening deg) : 59.46
 PA of pole (deg) : 81.20
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.162
 C/A sky separation (km) : 27878.8
 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	2037-01-05T03:45:14.495		35.20	-36.15	51538.27	-22.80		
lambda	I	2037-01-05T03:46:21.337		35.29	-36.23	50026.71	-22.46		
delta	I	2037-01-05T03:47:38.843		35.39	-36.31	48300.35	-22.08		
gamma	I	2037-01-05T03:48:09.567		35.43	-36.34	47624.49	-21.91		
eta	I	2037-01-05T03:48:30.078		35.46	-36.37	47176.12	-21.80		
beta	I	2037-01-05T03:49:41.197		35.54	-36.44	45641.06	-21.39		
alpha	I	2037-01-05T03:50:24.109		35.60	-36.49	44732.15	-21.10		
4	I	2037-01-05T03:52:09.139		35.72	-36.60	42550.04	-20.39		
5	I	2037-01-05T03:52:24.141		35.74	-36.61	42232.91	-20.22		
6	I	2037-01-05T03:52:43.246		35.77	-36.63	41877.09	-20.13		

No planet occultations

6	E	2037-01-05T04:30:36.802		37.74	-38.16	41848.09	20.14		
5	E	2037-01-05T04:30:52.019		37.74	-38.17	42155.55	20.23		
4	E	2037-01-05T04:31:14.703		37.76	-38.17	42613.66	20.41		
alpha	E	2037-01-05T04:32:54.656		37.81	-38.20	44685.33	21.12		
beta	E	2037-01-05T04:33:40.919		37.83	-38.22	45666.49	21.40		
eta	E	2037-01-05T04:34:50.821		37.86	-38.23	47176.12	21.82		
gamma	E	2037-01-05T04:35:11.205		37.87	-38.24	47622.03	21.93		
delta	E	2037-01-05T04:35:42.017		37.88	-38.25	48300.35	22.10		
lambda	E	2037-01-05T04:36:59.461		37.92	-38.26	50026.71	22.48		
epsilon	E	2037-01-05T04:37:46.843		37.94	-38.27	51097.02	22.81		