

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2037-03-29T21:08:28.200  
 Event type : PgtRgt  
 : Uranus occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Gaia source ID : 3368426542538702080  
 2Mass ID (if available) : 07052533+2301319

ICRS Star Coord at Epoch: 07h 05m 25.34134s +23:01:31.81876s

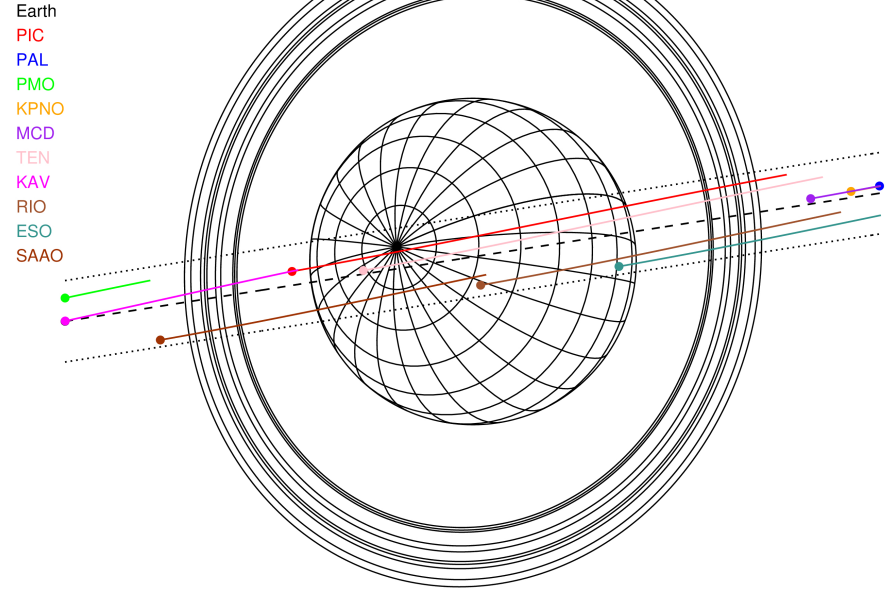
RUWE (>1.4 is poor) : 0.98  
 K magnitude : 14.685  
 G magnitude : 16.009  
 RP magnitude : 15.550  
 BP magnitude : 16.296  
 DUPflag : 0  
 Distance (au) : 18.620  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 3.33  
 Sun-Target sep (deg) : 96.02  
 Sun-Moon sep (deg) : 62.36  
 B (ring opening deg) : 61.51  
 PA of pole (deg) : 79.23

#	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



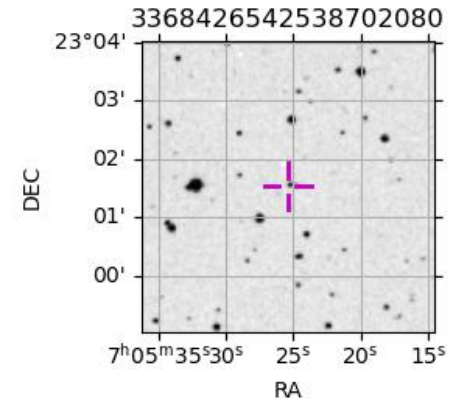
2037-03-29T21:08:28.2000 ra: 07 05 25.3413 s: +23 01 31.819 C/A 0.110° PA 239.44 deg v\_sky + 3.34 km/s D 18.62 AU  
 Credit: Styled after SORA/Lucky Star

Uranus 2037-03-29T21:08:28 K14.69 G16.01 PgtRgt



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

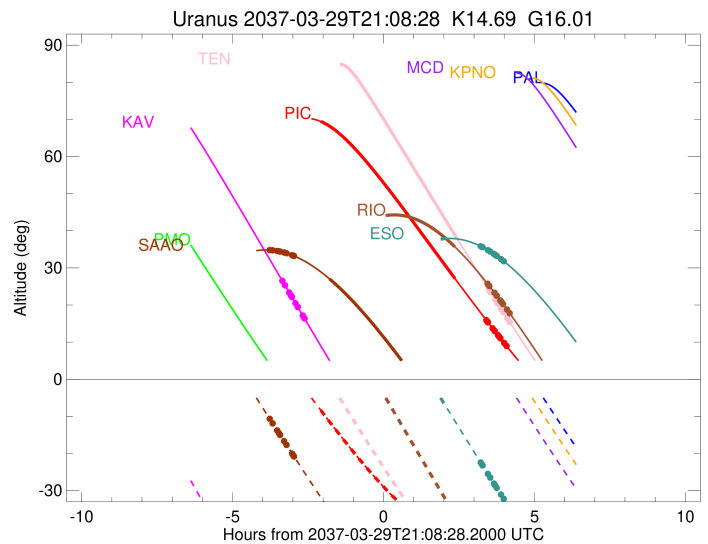
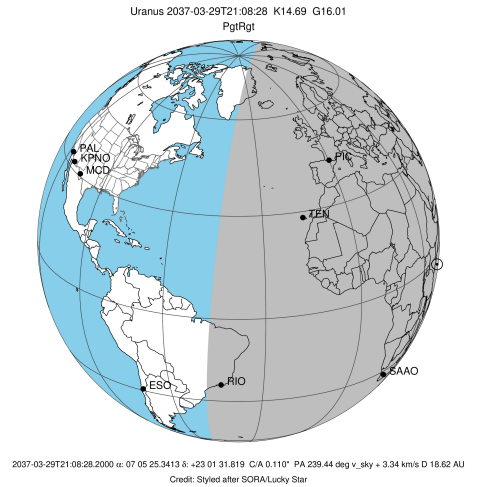
Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1		+	+++++	MAR 29 19:03 - MAR 30 01:13	PieRne
PAL	Palomar Mt (200")	33.4	243.1					PnnRnn
PMO	Purple Mtn Obs. Nanki	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl Obs	32.0	248.4					PnnRnn
MCD	McDonald Obs. 2.7m	30.7	256.0					PnnRnn
TEN	Teide Obs./Tenerife	28.3	343.5		+	+++++	MAR 29 23:34 - MAR 30 01:20	PneRne
IRTF	Mauna Kea/IRTF	19.8	204.5					PnnRnn
KAV	Kavalur Observatory	12.6	78.8	+++++			MAR 29 17:48 - MAR 29 18:31	PnnRin
RIO	Rio de Janeiro	-22.9	316.8		+	+++++	MAR 29 23:30 - MAR 30 01:19	PneRne
ESO	European Southern Obs	-29.3	289.3		+	+++++	MAR 29 23:14 - MAR 30 01:08	PneRne
AAT	Siding Spring (AAT)	-31.3	149.1					PnnRnn
SAAO	So. Afr. Astro. Obs.	-32.4	20.8	+++++	+		MAR 29 17:23 - MAR 29 19:21	PinRin
MSO	Mt. Stromlo Observato	-35.3	149.0					PnnRnn



3368426542538702080

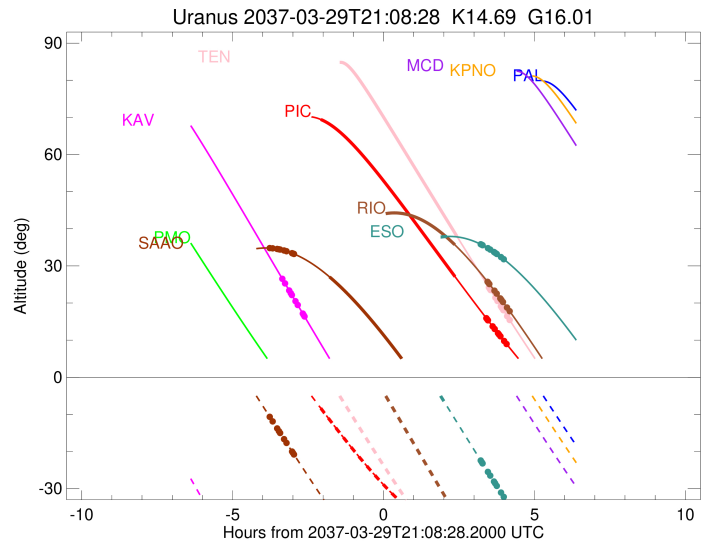
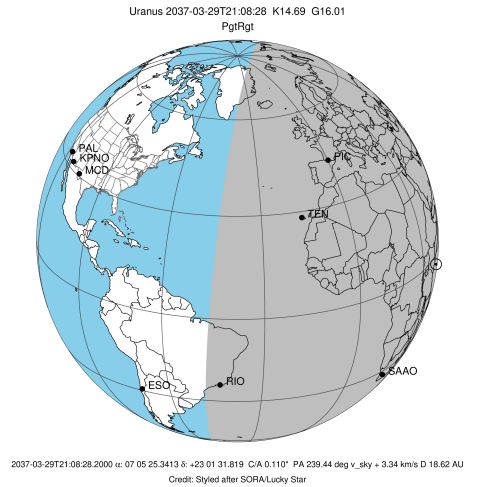
23°04'  
 03'  
 02'  
 01'  
 00'  
 DEC  
 7<sup>h</sup>05<sup>m</sup>35<sup>s</sup>30<sup>s</sup> 25<sup>s</sup> 20<sup>s</sup> 15<sup>s</sup>  
 RA

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2037-03-29T21:20:47.110  
 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 : 3368426542538702080  
 2Mass ID (if available) : 07052533+2301319  
 ICRS Star Coord at Epoch: 07h 05m 25.34134s +23:01:31.81876s  
 RUWE (>1.4 is poor) : 0.98  
 K magnitude : 14.685  
 G magnitude : 16.009  
 RP magnitude : 15.550  
 BP magnitude : 16.296  
 DUPflag : 0  
 Distance (au) : 18.620  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 3.33  
 Sun-Target sep (deg) : 96.02  
 Sun-Moon sep (deg) : 62.88  
 B (ring opening deg) : 61.51  
 PA of pole (deg) : 79.23  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 0.280  
 C/A sky separation (km) : 3780.6  
 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\_itrfr93\_040916.bsp  
 earth\_720101\_070426.bpc  
 earth\_200101\_990628\_predict.bpc  
 pg3f0000r.bsp  
 pg490000r.bsp  
 naif0012.tls  
 earth\_flat\_IAU.spk



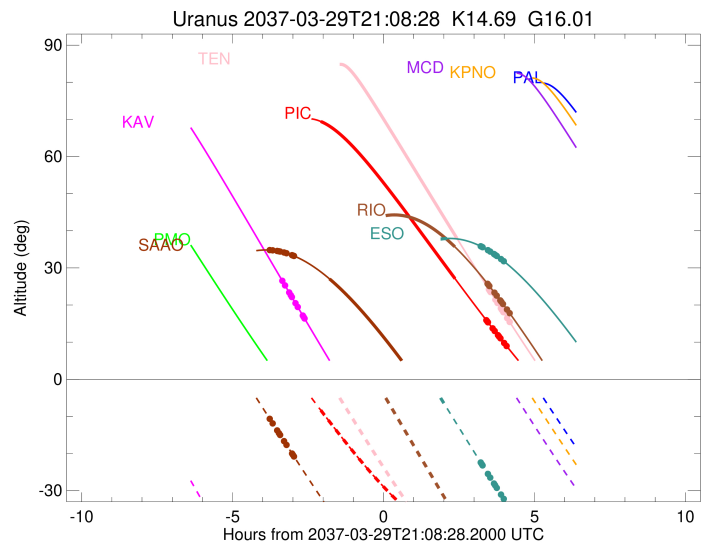
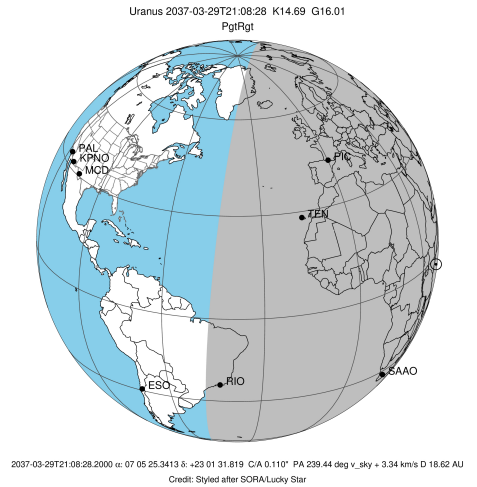
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2037-03-29T17:09:26.145		63.12	12.51x	50976.52	-3.28		
lambda	I	2037-03-29T17:14:15.527		63.79	11.63x	50026.71	-3.28		
delta	I	2037-03-29T17:23:01.746		64.94	10.02x	48300.35	-3.28		
gamma	I	2037-03-29T17:26:26.061		65.37	9.40x	47630.29	-3.28		
eta	I	2037-03-29T17:28:44.565		65.65	8.98x	47176.12	-3.28		
beta	I	2037-03-29T17:36:30.463		66.56	7.56x	45647.06	-3.28		
alpha	I	2037-03-29T17:41:03.510		67.05	6.72x	44747.51	-3.28		
4	I	2037-03-29T17:52:12.754		68.13	4.67x	42548.16	-3.28		
5	I	2037-03-29T17:53:48.876		68.27	4.38x	42228.62	-3.28		
6	I	2037-03-29T17:55:36.314		68.43	4.05x	41879.08	-3.28		
Uranus	I	2037-03-29T19:03:51.407		69.45	-8.35	25129.74		27.69	28.80
Uranus	E	2037-03-29T23:30:33.580		27.12	-42.84	25223.38		-24.19	-25.20
6	E	2037-03-30T00:32:39.542		15.95	-42.98	41797.45	3.81		
5	E	2037-03-30T00:34:34.243		15.61	-42.92	42226.62	3.82		
4	E	2037-03-30T00:36:10.537		15.33	-42.86	42600.90	3.82		
alpha	E	2037-03-30T00:45:13.390		13.75	-42.50	44686.92	3.84		
beta	E	2037-03-30T00:49:28.499		13.01	-42.30	45672.57	3.85		
eta	E	2037-03-30T00:55:57.688		11.88	-41.96	47176.12	3.87		
gamma	E	2037-03-30T00:57:52.896		11.55	-41.85	47621.73	3.87		
delta	E	2037-03-30T01:00:48.106		11.05	-41.68	48300.35	3.88		
lambda	E	2037-03-30T01:08:12.556		9.78	-41.20	50026.71	3.89		
epsilon	E	2037-03-30T01:13:57.880		8.81	-40.79	51372.89	3.91		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2037-03-29T21:18:43.330  
 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 : 3368426542538702080  
 2Mass ID (if available) : 07052533+2301319  
 ICRS Star Coord at Epoch: 07h 05m 25.34134s +23:01:31.81876s  
 RUWE (>1.4 is poor) : 0.98  
 K magnitude : 14.685  
 G magnitude : 16.009  
 RP magnitude : 15.550  
 BP magnitude : 16.296  
 DUPflag : 0  
 Distance (au) : 18.620  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 3.33  
 Sun-Target sep (deg) : 96.02  
 Sun-Moon sep (deg) : 63.07  
 B (ring opening deg) : 61.51  
 PA of pole (deg) : 79.23  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 0.136  
 C/A sky separation (km) : 1833.3  
 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



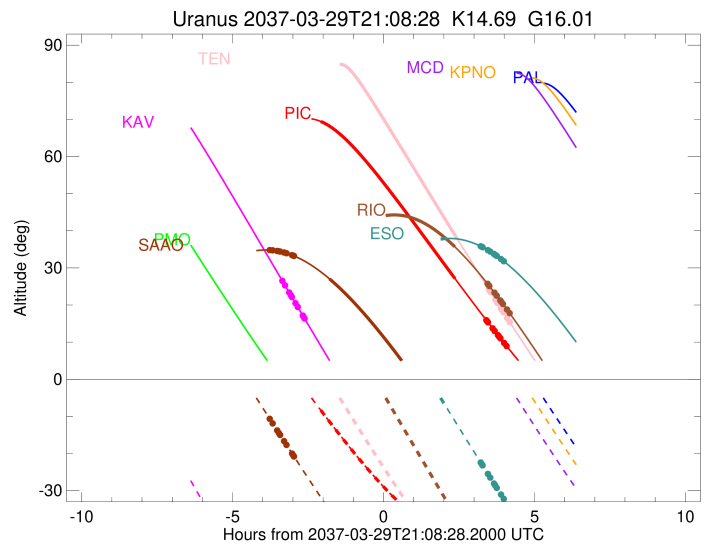
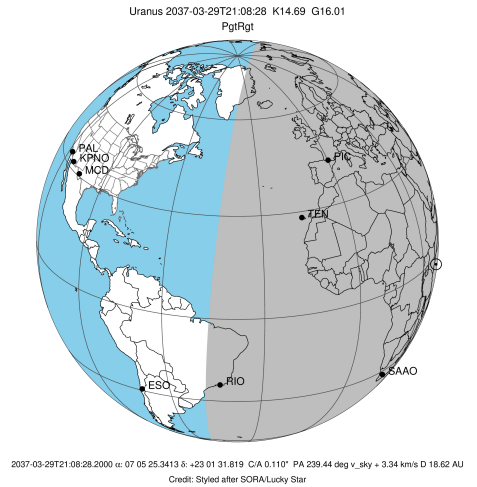
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2037-03-29T16:59:47.157		52.81	30.37x	50965.83	-3.29		
lambda	I	2037-03-29T17:04:33.059		53.87	29.35x	50026.71	-3.28		
delta	I	2037-03-29T17:13:19.559		55.81	27.46x	48300.35	-3.28		
gamma	I	2037-03-29T17:16:44.191		56.56	26.72x	47630.40	-3.27		
eta	I	2037-03-29T17:19:03.042		57.07	26.22x	47176.12	-3.27		
beta	I	2037-03-29T17:26:50.280		58.79	24.53x	45647.57	-3.26		
alpha	I	2037-03-29T17:31:24.508		59.80	23.53x	44748.12	-3.26		
4	I	2037-03-29T17:42:38.344		62.28	21.08x	42546.67	-3.25		
5	I	2037-03-29T17:44:13.603		62.63	20.74x	42231.75	-3.25		
6	I	2037-03-29T17:46:03.266		63.04	20.34x	41878.76	-3.25		
Uranus	I	2037-03-29T18:55:42.560		78.05	5.01x	25145.64		27.12	28.21
Uranus	E	2037-03-29T23:34:38.245		37.92	-50.61	25196.44		-25.23	-26.27
6	E	2037-03-30T00:37:44.512		24.24	-57.09	41796.88	3.71		
5	E	2037-03-30T00:39:43.133		23.82	-57.20	42229.83	3.71		
4	E	2037-03-30T00:41:20.926		23.47	-57.29	42599.51	3.72		
alpha	E	2037-03-30T00:50:38.989		21.49	-57.69	44687.40	3.74		
beta	E	2037-03-30T00:55:00.884		20.56	-57.82	45673.16	3.75		
eta	E	2037-03-30T01:01:40.069		19.14	-57.97	47176.12	3.77		
gamma	E	2037-03-30T01:03:38.261		18.73	-58.00	47621.83	3.77		
delta	E	2037-03-30T01:06:37.902		18.09	-58.02	48300.35	3.78		
lambda	E	2037-03-30T01:14:13.425		16.49	-58.02	50026.71	3.80		
epsilon	E	2037-03-30T01:20:04.332		15.26	-57.95	51362.29	3.81		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2037-03-29T21:31:42.380  
 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 : 3368426542538702080  
 2Mass ID (if available) : 07052533+2301319  
 ICRS Star Coord at Epoch: 07h 05m 25.34134s +23:01:31.81876s  
 RUWE (>1.4 is poor) : 0.98  
 K magnitude : 14.685  
 G magnitude : 16.009  
 RP magnitude : 15.550  
 BP magnitude : 16.296  
 DUPflag : 0  
 Distance (au) : 18.620  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 3.33  
 Sun-Target sep (deg) : 96.02  
 Sun-Moon sep (deg) : 61.67  
 B (ring opening deg) : 61.51  
 PA of pole (deg) : 79.23  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 0.303  
 C/A sky separation (km) : 4096.2  
 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	2037-03-29T17:48:18.923		26.30	-67.83	50971.17	-3.47		
lambda	I	2037-03-29T17:52:51.050		25.26	-68.58	50026.71	-3.48		
delta	I	2037-03-29T18:01:06.328		23.36	-69.86	48300.35	-3.50		
gamma	I	2037-03-29T18:04:17.812		22.62	-70.32	47630.33	-3.50		
eta	I	2037-03-29T18:06:27.386		22.12	-70.62	47176.12	-3.51		
beta	I	2037-03-29T18:13:41.702		20.46	-71.54	45647.21	-3.52		
alpha	I	2037-03-29T18:17:55.240		19.49	-72.02	44747.67	-3.53		
4	I	2037-03-29T18:28:13.711		17.12	-72.96	42547.87	-3.56		
5	I	2037-03-29T18:29:41.903		16.79	-73.07	42229.19	-3.56		
6	I	2037-03-29T18:31:20.931		16.41	-73.18	41879.03	-3.57		
Uranus	I	2037-03-29T19:32:53.799		2.41x	-70.47	25128.74		27.73	28.83
Uranus	E	2037-03-29T23:23:54.791		-44.33x	-19.85	25218.61		-24.38	-25.39
6	E	2037-03-30T00:18:35.127		-51.36x	-6.61	41797.17	4.28		
5	E	2037-03-30T00:20:17.624		-51.52x	-6.19	42228.19	4.28		
4	E	2037-03-30T00:21:42.971		-51.66x	-5.84	42600.21	4.29		
alpha	E	2037-03-30T00:29:47.972		-52.37x	-3.88x	44687.19	4.30		
beta	E	2037-03-30T00:33:36.336		-52.67x	-2.95x	45672.92	4.30		
eta	E	2037-03-30T00:39:25.304		-53.09x	-1.54x	47176.12	4.31		
gamma	E	2037-03-30T00:41:08.801		-53.21x	-1.12x	47621.79	4.31		
delta	E	2037-03-30T00:43:46.307		-53.37x	-0.48x	48300.35	4.31		
lambda	E	2037-03-30T00:50:26.657		-53.75x	1.15x	50026.71	4.31		
epsilon	E	2037-03-30T00:55:36.618		-53.99x	2.41x	51364.77	4.32		

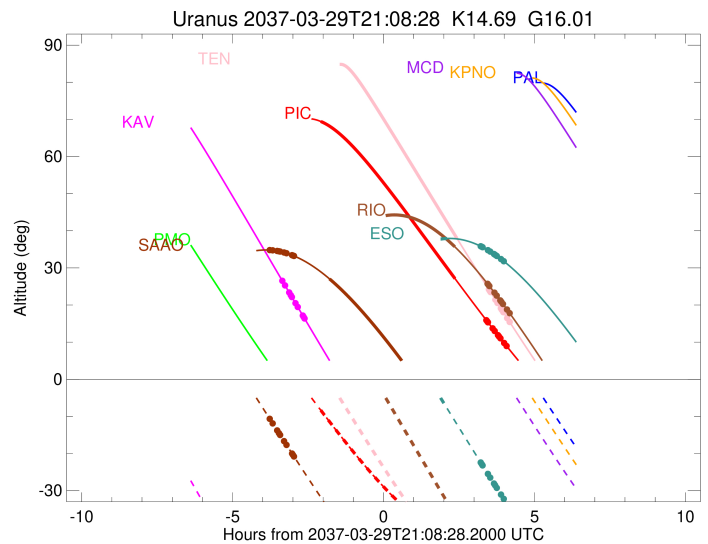
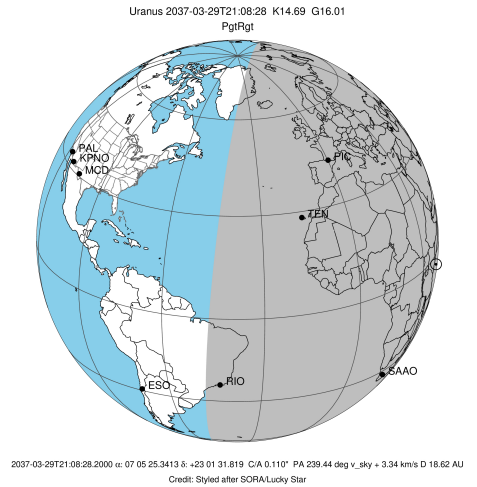
target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2037-03-29T21:09:53.710  
 Event type : PgtRgt  
 : Uranus occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : RIO  
 Location : Rio de Janeiro  
 Latitude (deg) : -22.89506  
 E. Longitude (deg) : 316.77708  
 Altitude (km) : 0.033  
 Gaia source ID : 3368426542538702080  
 2Mass ID (if available) : 07052533+2301319  
 ICRS Star Coord at Epoch: 07h 05m 25.34134s +23:01:31.81876s  
 RUWE (>1.4 is poor) : 0.98  
 K magnitude : 14.685  
 G magnitude : 16.009  
 RP magnitude : 15.550  
 BP magnitude : 16.296  
 DUPflag : 0  
 Distance (au) : 18.620  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 3.33  
 Sun-Target sep (deg) : 96.02  
 Sun-Moon sep (deg) : 63.02  
 B (ring opening deg) : 61.51  
 PA of pole (deg) : 79.23  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 0.286  
 C/A sky separation (km) : 3863.1  
 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	2037-03-29T16:52:52.295		8.44	51.35x	50934.77	-3.44		
lambda	I	2037-03-29T16:57:16.406		9.33	50.56x	50026.71	-3.43		
delta	I	2037-03-29T17:05:40.070		11.00	49.01x	48300.35	-3.42		
gamma	I	2037-03-29T17:08:55.985		11.65	48.40x	47630.70	-3.42		
eta	I	2037-03-29T17:11:09.151		12.09	47.98x	47176.12	-3.41		
beta	I	2037-03-29T17:18:36.988		13.55	46.55x	45649.14	-3.40		
alpha	I	2037-03-29T17:23:00.538		14.41	45.70x	44749.67	-3.39		
4	I	2037-03-29T17:33:50.975		16.49	43.55x	42542.63	-3.37		
5	I	2037-03-29T17:35:18.687		16.77	43.26x	42240.68	-3.37		
6	I	2037-03-29T17:37:08.475		17.12	42.89x	41877.47	-3.37		
Uranus	I	2037-03-29T18:47:04.576		29.43	28.06x	25208.24		24.78	25.80
Uranus	E	2037-03-29T23:30:03.801		35.71	-36.47	25129.08		-27.72	-28.82
6	E	2037-03-30T00:35:06.357		25.76	-50.75	41795.36	3.49		
5	E	2037-03-30T00:37:15.134		25.39	-51.20	42241.59	3.49		
4	E	2037-03-30T00:38:54.643		25.10	-51.55	42594.08	3.49		
alpha	E	2037-03-30T00:48:50.417		23.36	-53.62	44689.56	3.52		
beta	E	2037-03-30T00:53:28.888		22.54	-54.57	45675.23	3.53		
eta	E	2037-03-30T01:00:32.841		21.26	-56.00	47176.12	3.54		
gamma	E	2037-03-30T01:02:38.629		20.88	-56.42	47622.24	3.55		
delta	E	2037-03-30T01:05:49.502		20.30	-57.06	48300.35	3.56		
lambda	E	2037-03-30T01:13:53.687		18.80	-58.63	50026.71	3.57		
epsilon	E	2037-03-30T01:19:54.543		17.67	-59.78	51319.21	3.59		

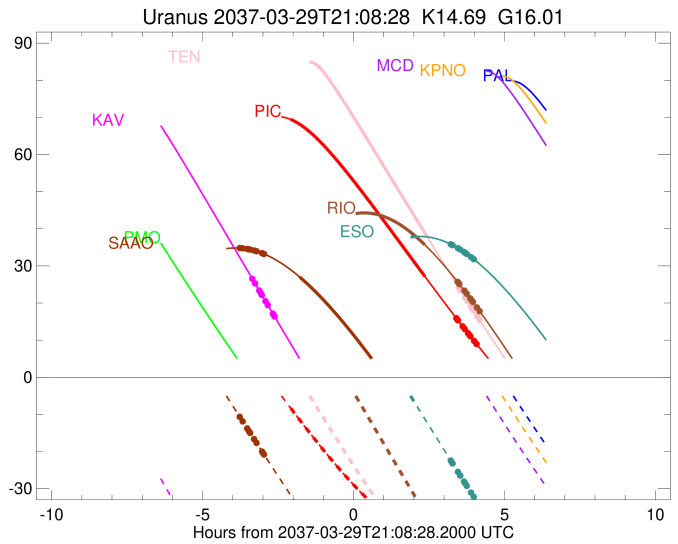
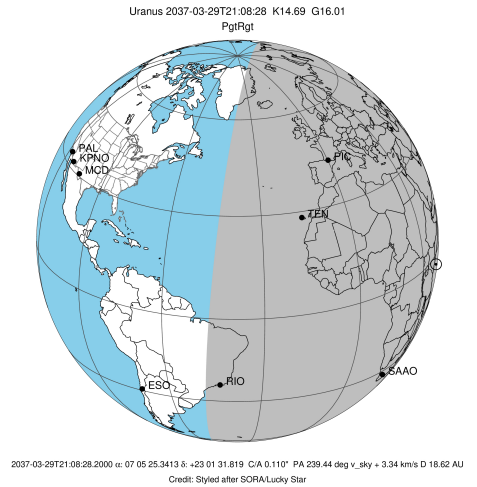


target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2037-03-29T20:55:37.390  
 Event type : PgtRgt  
 : Uranus occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : ESO  
 Location : European Southern Obs. (3.6m)  
 Latitude (deg) : -29.26097  
 E. Longitude (deg) : 289.26831  
 Altitude (km) : 2.400  
 Gaia source ID : 3368426542538702080  
 2Mass ID (if available) : 07052533+2301319  
 ICRS Star Coord at Epoch: 07h 05m 25.34134s +23:01:31.81876s  
 RUWE (>1.4 is poor) : 0.98  
 K magnitude : 14.685  
 G magnitude : 16.009  
 RP magnitude : 15.550  
 BP magnitude : 16.296  
 DUPflag : 0  
 Distance (au) : 18.619  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 3.33  
 Sun-Target sep (deg) : 96.02  
 Sun-Moon sep (deg) : 63.00  
 B (ring opening deg) : 61.51  
 PA of pole (deg) : 79.23  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 0.323  
 C/A sky separation (km) : 4357.1  
 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	2037-03-29T16:52:23.538	-16.81x	57.18x	50938.05	-3.67		
lambda	I	2037-03-29T16:56:32.273	-15.94x	57.13x	50026.71	-3.66		
delta	I	2037-03-29T17:04:24.814	-14.30x	56.95x	48300.35	-3.65		
gamma	I	2037-03-29T17:07:28.605	-13.67x	56.85x	47630.67	-3.64		
eta	I	2037-03-29T17:09:33.511	-13.24x	56.77x	47176.12	-3.64		
beta	I	2037-03-29T17:16:33.618	-11.79x	56.46x	45648.98	-3.62		
alpha	I	2037-03-29T17:20:40.804	-10.94x	56.24x	44749.54	-3.62		
4	I	2037-03-29T17:30:50.776	-8.86x	55.58x	42542.96	-3.60		
5	I	2037-03-29T17:32:13.387	-8.58x	55.48x	42239.91	-3.60		
6	I	2037-03-29T17:33:56.057	-8.23x	55.35x	41877.60	-3.59		
Uranus	I	2037-03-29T18:39:36.284	4.73x	47.56x	25205.45		24.89	25.91
Uranus	E	2037-03-29T23:14:47.247	37.92	-7.83	25120.54		-28.02	-29.13
6	E	2037-03-30T00:21:29.877	35.85	-22.37	41795.12	3.36		
5	E	2037-03-30T00:23:44.257	35.69	-22.85	42244.49	3.36		
4	E	2037-03-30T00:25:26.524	35.58	-23.22	42592.64	3.36		
alpha	E	2037-03-30T00:35:47.282	34.80	-25.45	44690.20	3.38		
beta	E	2037-03-30T00:40:37.586	34.40	-26.49	45675.72	3.38		
eta	E	2037-03-30T00:48:00.078	33.75	-28.07	47176.12	3.39		
gamma	E	2037-03-30T00:50:11.573	33.55	-28.54	47622.36	3.40		
delta	E	2037-03-30T00:53:31.130	33.23	-29.25	48300.35	3.40		
lambda	E	2037-03-30T01:01:58.016	32.39	-31.04	50026.71	3.41		
epsilon	E	2037-03-30T01:08:12.773	31.73	-32.36	51307.08	3.42		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2037-03-29T21:36:28.850  
 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 : 3368426542538702080  
 2Mass ID (if available) : 07052533+2301319  
 ICRS Star Coord at Epoch: 07h 05m 25.34134s +23:01:31.81876s  
 RUWE (>1.4 is poor) : 0.98  
 K magnitude : 14.685  
 G magnitude : 16.009  
 RP magnitude : 15.550  
 BP magnitude : 16.296  
 DUPflag : 0  
 Distance (au) : 18.620  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 3.33  
 Sun-Target sep (deg) : 96.02  
 Sun-Moon sep (deg) : 62.18  
 B (ring opening deg) : 61.51  
 PA of pole (deg) : 79.23  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 0.181  
 C/A sky separation (km) : 2449.6  
 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\_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	2037-03-29T17:23:35.697		34.79	-10.92	50926.70	-3.21		
lambda	I	2037-03-29T17:28:16.237		34.73	-11.91	50026.71	-3.21		
delta	I	2037-03-29T17:37:13.707		34.56	-13.80	48300.35	-3.21		
gamma	I	2037-03-29T17:40:41.919		34.47	-14.54	47630.76	-3.22		
eta	I	2037-03-29T17:43:03.206		34.41	-15.03	47176.12	-3.22		
beta	I	2037-03-29T17:50:56.580		34.14	-16.70	45649.45	-3.22		
alpha	I	2037-03-29T17:55:34.082		33.96	-17.67	44749.91	-3.23		
4	I	2037-03-29T18:06:55.362		33.42	-20.05	42542.07	-3.24		
5	I	2037-03-29T18:08:26.188		33.34	-20.37	42241.92	-3.24		
6	I	2037-03-29T18:10:21.076		33.23	-20.77	41877.26	-3.24		
Uranus	I	2037-03-29T19:21:06.545		27.05	-35.25	25205.77		24.87	25.90
Uranus	E	2037-03-29T23:41:29.016		-17.63x	-58.29	25144.27		-27.17	-28.26
6	E	2037-03-30T00:38:30.570		-29.39x	-50.50	41795.67	3.99		
5	E	2037-03-30T00:40:22.462		-29.78x	-50.20	42238.56	4.00		
4	E	2037-03-30T00:41:50.386		-30.09x	-49.96	42595.53	4.00		
alpha	E	2037-03-30T00:50:30.582		-31.91x	-48.50	44688.97	4.02		
beta	E	2037-03-30T00:54:34.260		-32.76x	-47.81	45674.74	4.03		
eta	E	2037-03-30T01:00:45.652		-34.06x	-46.73	47176.12	4.04		
gamma	E	2037-03-30T01:02:35.870		-34.44x	-46.41	47622.14	4.05		
delta	E	2037-03-30T01:05:23.261		-35.03x	-45.91	48300.35	4.05		
lambda	E	2037-03-30T01:12:28.254		-36.52x	-44.63	50026.71	4.07		
epsilon	E	2037-03-30T01:17:47.898		-37.65x	-43.66	51329.28	4.08		