

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2029-04-04T21:09:33.480
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 144910792113911680
 2Mass ID (if available) : 04364038+2202524

ICRS Star Coord at Epoch: 04h 36m 40.35200s +22:02:51.72151s

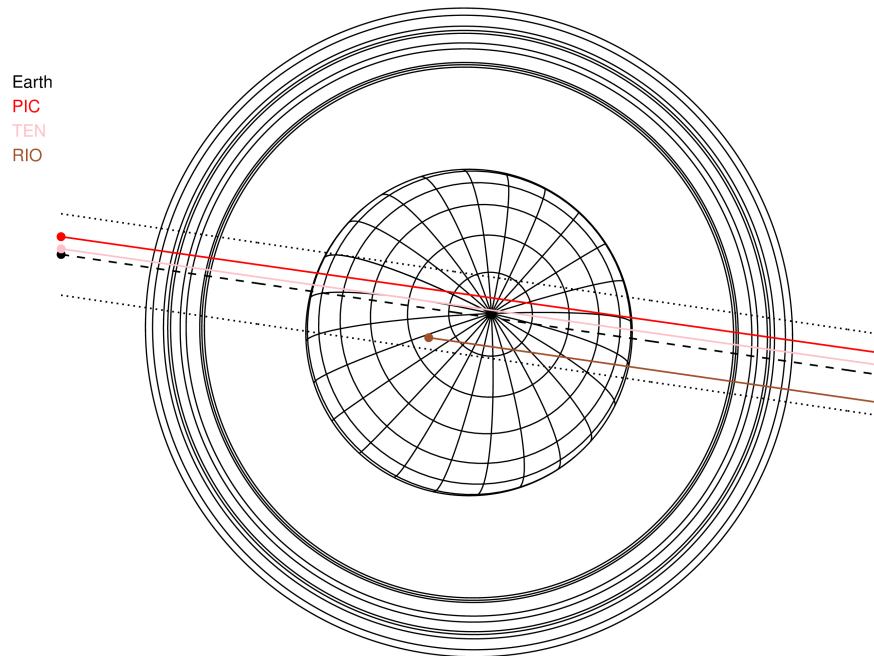
RUWE (>1.4 is poor) : 1.02
 K magnitude : 13.808
 G magnitude : 17.005
 RP magnitude : 16.056
 BP magnitude : 17.966
 DUPflag : 0
 Distance (au) : 19.816
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 23.06
 Sun-Target sep (deg) : 55.78
 Sun-Moon sep (deg) : 157.27
 B (ring opening deg) : 79.67
 PA of pole (deg) : -49.68

#	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



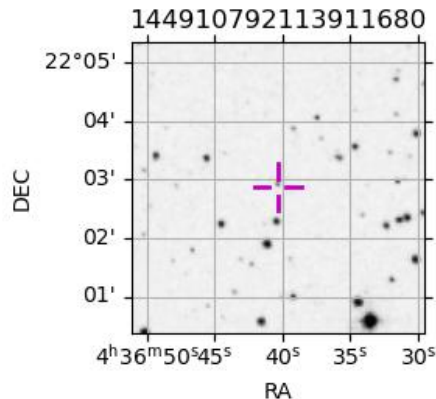
2029-04-04T21:09:33.4800 ex: 04 36 40.3520 s: +22 02 51.722 C/A 0.198° PA 171.63 deg v_sky +23.06 km/s D 19.82 AU
 Credit: Styled after SORA/Lucky Star

Uranus 2029-04-04T21:09:33 K13.81 G17.01 PgtRgt

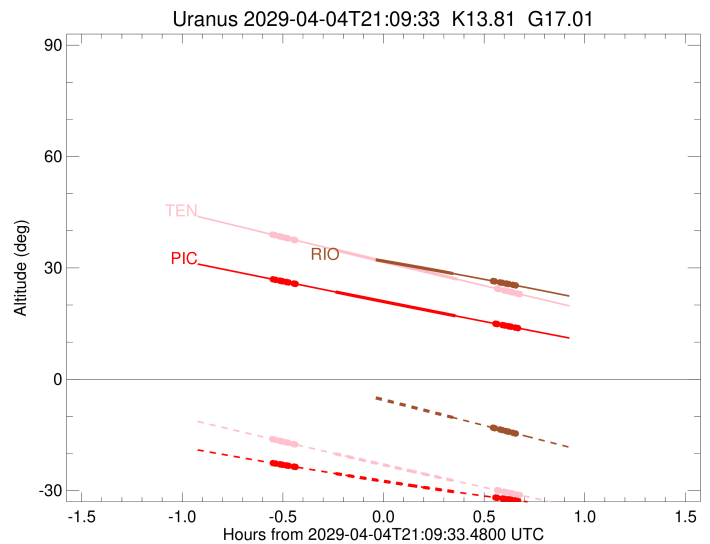
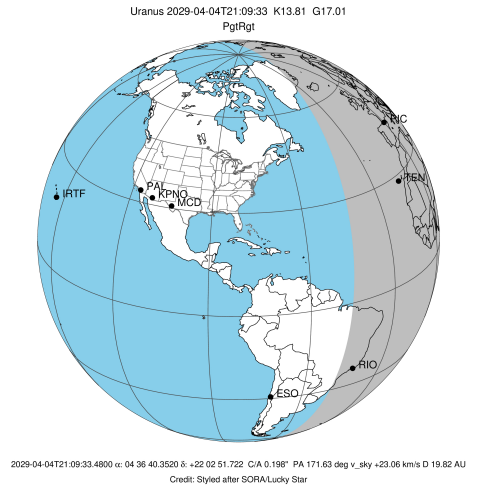


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1	+++++	+ +	+++++	APR 04 20:36 - APR 04 21:49	PieRie
PAL	Palomar Mt (200")	33.4	243.1					PnnRnn
PMO	Purple Mtn Obs. Nanki	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl Obs	32.0	248.4					PnnRnn
MCD	McDonald Obs. 2.7m	30.7	256.0					PnnRnn
TEN	Teide Obs./Tenerife	28.3	343.5	+++++	+ +	+++++	APR 04 20:36 - APR 04 21:50	PieRie
IRTF	Mauna Kea/IRTF	19.8	204.5					PnnRnn
KAV	Kavalur Observatory	12.6	78.8					PnnRnn
RIO	Rio de Janeiro	-22.9	316.8		+	+++++	APR 04 21:30 - APR 04 21:49	PneRne
ESO	European Southern Obs	-29.3	289.3					PnnRnn
AAT	Siding Spring (AAT)	-31.3	149.1					PnnRnn
SAAO	So. Afr. Astro. Obs.	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Observato	-35.3	149.0					PnnRnn

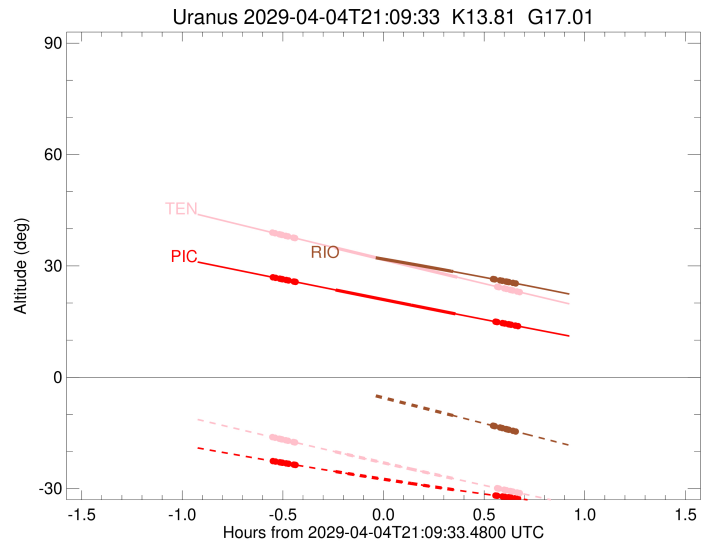
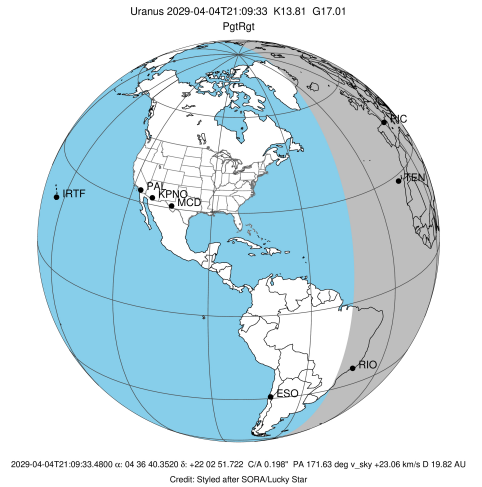


target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2029-04-04T21:13:14.510
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PIC
 Location : Pic du Midi
 Latitude (deg) : 42.93656
 E. Longitude (deg) : 0.14231
 Altitude (km) : 2.890
 Gaia source ID : 144910792113911680
 2Mass ID (if available) : 04364038+2202524
 ICRS Star Coord at Epoch: 04h 36m 40.35200s +22:02:51.72151s
 RUWE (>1.4 is poor) : 1.02
 K magnitude : 13.808
 G magnitude : 17.005
 RP magnitude : 16.056
 BP magnitude : 17.966
 DUPflag : 0
 Distance (au) : 19.816
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 23.06
 Sun-Target sep (deg) : 55.78
 Sun-Moon sep (deg) : 156.68
 B (ring opening deg) : 79.67
 PA of pole (deg) : -49.68
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.408
 C/A sky separation (km) : 5863.8
 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



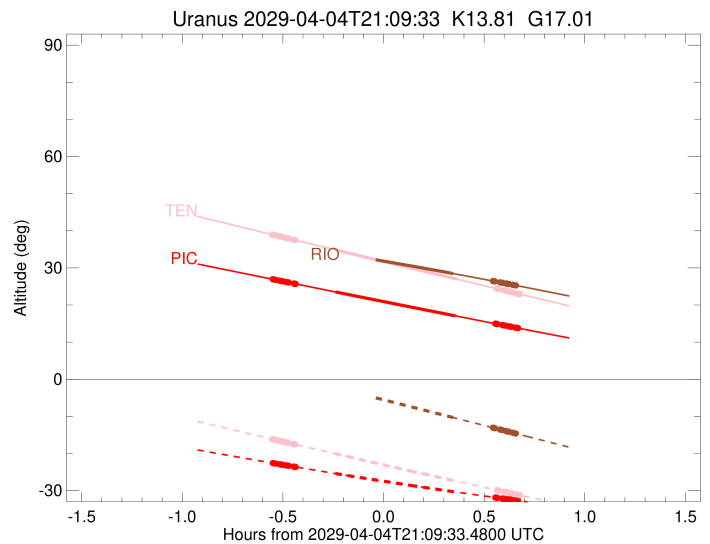
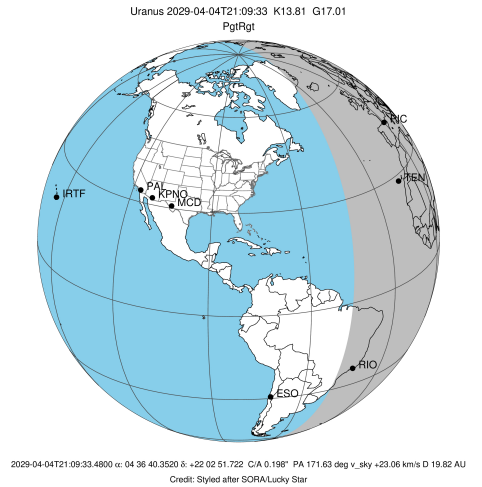
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2029-04-04T20:36:45.051		26.90	-22.61	50915.99	-22.96		
lambda	I	2029-04-04T20:37:23.821		26.78	-22.71	50026.71	-22.93		
delta	I	2029-04-04T20:38:39.111		26.55	-22.90	48300.35	-22.92		
gamma	I	2029-04-04T20:39:08.300		26.46	-22.98	47631.26	-22.92		
eta	I	2029-04-04T20:39:28.159		26.40	-23.03	47176.12	-22.92		
beta	I	2029-04-04T20:40:33.446		26.20	-23.20	45679.89	-22.91		
alpha	I	2029-04-04T20:41:16.650		26.07	-23.31	44690.63	-22.90		
4	I	2029-04-04T20:42:50.630		25.78	-23.55	42542.07	-22.88		
5	I	2029-04-04T20:43:06.140		25.74	-23.58	42184.23	-22.88		
6	I	2029-04-04T20:43:22.774		25.69	-23.63	41805.93	-22.87		
Uranus	I	2029-04-04T20:55:17.917		23.51	-25.41	25428.46		-4.87	-5.10
Uranus	E	2029-04-04T21:30:58.255		17.09	-30.35	25173.60		8.45	8.85
6	E	2029-04-04T21:42:56.830		14.97	-31.86	41875.31	22.98		
5	E	2029-04-04T21:43:15.618		14.91	-31.90	42300.89	22.98		
4	E	2029-04-04T21:43:28.762		14.87	-31.93	42608.78	22.99		
alpha	E	2029-04-04T21:45:01.625		14.60	-32.12	44740.38	23.01		
beta	E	2029-04-04T21:45:40.919		14.48	-32.20	45644.87	23.02		
eta	E	2029-04-04T21:46:47.394		14.29	-32.33	47176.12	23.03		
gamma	E	2029-04-04T21:47:06.744		14.23	-32.37	47621.88	23.04		
delta	E	2029-04-04T21:47:36.190		14.14	-32.43	48300.35	23.04		
lambda	E	2029-04-04T21:48:51.080		13.93	-32.58	50026.71	23.06		
epsilon	E	2029-04-04T21:49:52.764		13.74	-32.70	51449.44	23.08		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2029-04-04T21:13:24.440
 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 : 144910792113911680
 2Mass ID (if available) : 04364038+2202524
 ICRS Star Coord at Epoch: 04h 36m 40.35200s +22:02:51.72151s
 RUWE (>1.4 is poor) : 1.02
 K magnitude : 13.808
 G magnitude : 17.005
 RP magnitude : 16.056
 BP magnitude : 17.966
 DUPflag : 0
 Distance (au) : 19.816
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 23.06
 Sun-Target sep (deg) : 55.78
 Sun-Moon sep (deg) : 156.73
 B (ring opening deg) : 79.67
 PA of pole (deg) : -49.68
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.275
 C/A sky separation (km) : 3957.1
 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_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	2029-04-04T20:36:36.605		38.93	-16.16	50903.73	-22.91		
lambda	I	2029-04-04T20:37:14.909		38.79	-16.29	50026.71	-22.90		
delta	I	2029-04-04T20:38:30.317		38.52	-16.56	48300.35	-22.89		
gamma	I	2029-04-04T20:38:59.550		38.41	-16.66	47631.18	-22.89		
eta	I	2029-04-04T20:39:19.431		38.34	-16.73	47176.12	-22.89		
beta	I	2029-04-04T20:40:24.801		38.10	-16.96	45679.57	-22.88		
alpha	I	2029-04-04T20:41:07.987		37.94	-17.11	44691.49	-22.88		
4	I	2029-04-04T20:42:42.127		37.60	-17.45	42540.53	-22.88		
5	I	2029-04-04T20:42:57.675		37.54	-17.50	42181.45	-22.87		
6	I	2029-04-04T20:43:14.269		37.48	-17.56	41804.64	-22.87		
Uranus	I	2029-04-04T20:55:07.236		34.88	-20.05	25390.26		-5.55	-5.81
Uranus	E	2029-04-04T21:31:32.283		26.96	-27.51	25215.50		7.97	8.34
6	E	2029-04-04T21:43:27.414		24.39	-29.88	41874.39	22.99		
5	E	2029-04-04T21:43:46.111		24.32	-29.94	42298.72	22.99		
4	E	2029-04-04T21:43:59.314		24.27	-29.99	42607.58	22.99		
alpha	E	2029-04-04T21:45:32.271		23.94	-30.29	44741.48	23.00		
beta	E	2029-04-04T21:46:11.514		23.80	-30.42	45644.38	23.01		
eta	E	2029-04-04T21:47:18.052		23.56	-30.64	47176.12	23.02		
gamma	E	2029-04-04T21:47:37.413		23.49	-30.70	47621.76	23.02		
delta	E	2029-04-04T21:48:06.890		23.38	-30.80	48300.35	23.02		
lambda	E	2029-04-04T21:49:21.862		23.11	-31.04	50026.71	23.03		
epsilon	E	2029-04-04T21:50:23.170		22.90	-31.24	51438.91	23.05		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2029-04-04T21:11:46.170
 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 : 144910792113911680
 2Mass ID (if available) : 04364038+2202524
 ICRS Star Coord at Epoch: 04h 36m 40.35200s +22:02:51.72151s
 RUWE (>1.4 is poor) : 1.02
 K magnitude : 13.808
 G magnitude : 17.005
 RP magnitude : 16.056
 BP magnitude : 17.966
 DUPflag : 0
 Distance (au) : 19.816
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 23.06
 Sun-Target sep (deg) : 55.78
 Sun-Moon sep (deg) : 157.05
 B (ring opening deg) : 79.67
 PA of pole (deg) : -49.68
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.119
 C/A sky separation (km) : 1703.4
 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	2029-04-04T20:34:43.489		36.83	2.46x	50870.06	-22.81		
lambda	I	2029-04-04T20:35:20.459		36.75	2.32x	50026.71	-22.81		
delta	I	2029-04-04T20:36:36.138		36.59	2.03x	48300.35	-22.81		
gamma	I	2029-04-04T20:37:05.485		36.52	1.92x	47630.91	-22.81		
eta	I	2029-04-04T20:37:25.421		36.48	1.84x	47176.12	-22.81		
beta	I	2029-04-04T20:38:31.054		36.33	1.59x	45678.45	-22.81		
alpha	I	2029-04-04T20:39:14.199		36.24	1.43x	44694.25	-22.81		
4	I	2029-04-04T20:40:48.949		36.02	1.07x	42536.42	-22.81		
5	I	2029-04-04T20:41:04.628		35.99	1.01x	42174.03	-22.81		
6	I	2029-04-04T20:41:21.169		35.95	0.94x	41801.29	-22.81		
Uranus	I	2029-04-04T20:53:15.664		34.28	-1.79x	25267.87		-7.32	-7.66
Uranus	E	2029-04-04T21:30:18.765		28.48	-10.31	25343.40		6.28	6.58
6	E	2029-04-04T21:42:13.305		26.46	-13.06	41871.16	22.90		
5	E	2029-04-04T21:42:31.810		26.41	-13.13	42291.40	22.89		
4	E	2029-04-04T21:42:45.270		26.37	-13.18	42603.54	22.90		
alpha	E	2029-04-04T21:44:18.900		26.10	-13.54	44744.53	22.90		
beta	E	2029-04-04T21:44:58.138		25.98	-13.69	45643.11	22.90		
eta	E	2029-04-04T21:46:05.046		25.79	-13.95	47176.12	22.91		
gamma	E	2029-04-04T21:46:24.486		25.73	-14.02	47621.45	22.91		
delta	E	2029-04-04T21:46:54.121		25.65	-14.14	48300.35	22.91		
lambda	E	2029-04-04T21:48:09.471		25.43	-14.43	50026.71	22.91		
epsilon	E	2029-04-04T21:49:09.601		25.25	-14.66	51404.56	22.91		