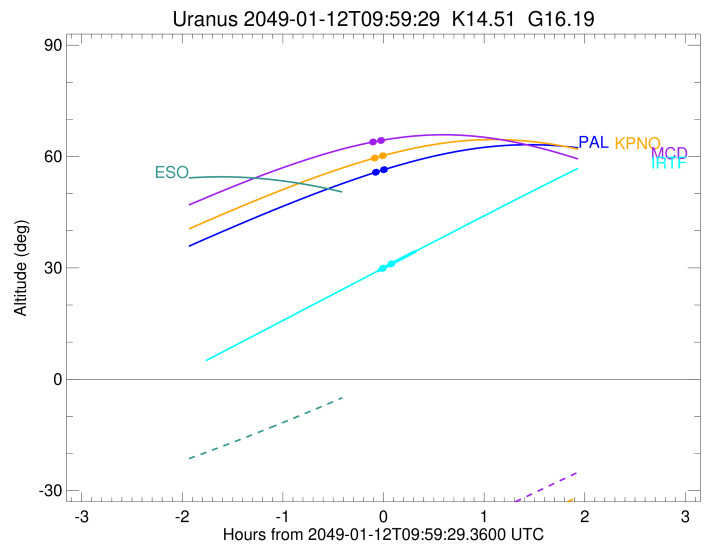
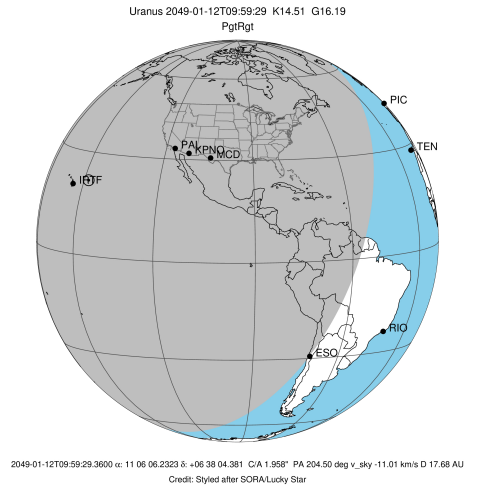


target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2049-01-12T10:03:26.350
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PAL
 Location : Palomar Mt (200")
 Latitude (deg) : 33.35622
 E. Longitude (deg) : 243.13601
 Altitude (km) : 1.706
 Gaia source ID : 3816711112654275200
 2Mass ID (if available) : 11060626+0638047
 ICRS Star Coord at Epoch: 11h 06m 06.23228s +06:38:04.38148s
 RUWE (>1.4 is poor) : 1.00
 K magnitude : 14.510
 G magnitude : 16.188
 RP magnitude : 15.630
 BP magnitude : 16.588
 DUPflag : 0
 Distance (au) : 17.682
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -11.01
 Sun-Target sep (deg) : 126.91
 Sun-Moon sep (deg) : 126.58
 B (ring opening deg) : 2.49
 PA of pole (deg) : 104.99
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.087
 C/A sky separation (km) : 26768.3
 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_itrf93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk

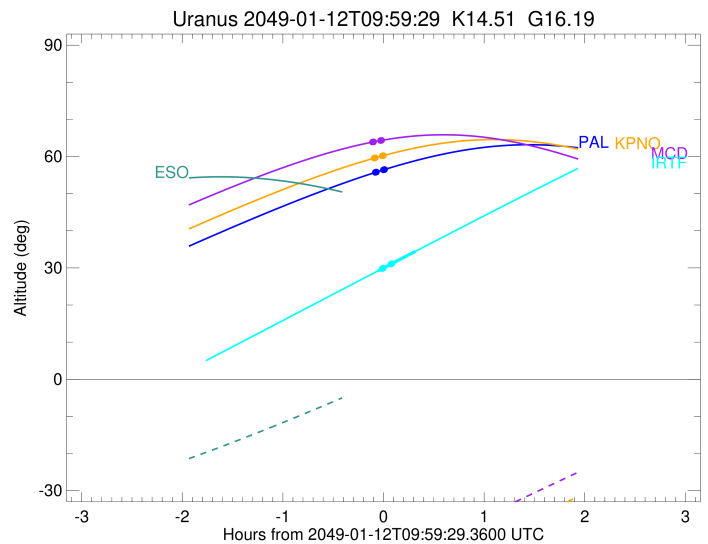
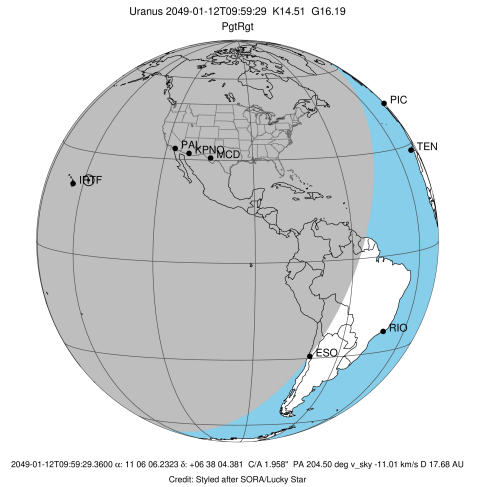


Ring	I/E	UTC	b? alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2049-01-12T09:54:35.439	55.72	-61.29	50817.52	-219.45		
lambda	I	2049-01-12T09:54:39.064	55.73	-61.27	50026.70	-217.43		
delta	I	2049-01-12T09:54:47.063	55.75	-61.25	48300.34	-214.11		
gamma	I	2049-01-12T09:54:50.246	55.76	-61.24	47621.07	-212.70		
eta	I	2049-01-12T09:54:52.342	55.76	-61.23	47176.12	-211.73		
beta	I	2049-01-12T09:54:59.467	55.78	-61.21	45679.57	-208.00		
alpha	I	2049-01-12T09:55:03.688	55.79	-61.19	44694.34	-204.42		
4	I	2049-01-12T09:55:12.954	55.81	-61.16	42601.48	-197.18		
5	I	2049-01-12T09:55:13.731	55.81	-61.16	42172.76	-196.79		
6	I	2049-01-12T09:55:18.292	55.82	-61.14	41803.07	-193.69		

No planet occultations

6	E	2049-01-12T09:59:28.774	56.42	-60.30	41867.65	193.83		
5	E	2049-01-12T09:59:24.914	56.41	-60.31	42195.83	196.93		
4	E	2049-01-12T09:59:30.096	56.42	-60.30	42598.61	197.32		
alpha	E	2049-01-12T09:59:39.883	56.44	-60.26	44701.94	204.56		
beta	E	2049-01-12T09:59:43.822	56.45	-60.25	45663.34	208.14		
eta	E	2049-01-12T09:59:50.681	56.47	-60.23	47176.11	211.87		
gamma	E	2049-01-12T09:59:52.814	56.47	-60.22	47629.10	212.84		
delta	E	2049-01-12T09:59:55.957	56.48	-60.21	48300.34	214.26		
lambda	E	2049-01-12T10:00:03.953	56.50	-60.18	50026.72	217.58		
epsilon	E	2049-01-12T10:00:10.707	56.51	-60.16	51505.02	219.60		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2049-01-12T10:02:43.120
 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 : 3816711112654275200
 2Mass ID (if available) : 11060626+0638047
 ICRS Star Coord at Epoch: 11h 06m 06.23228s +06:38:04.38148s
 RUWE (>1.4 is poor) : 1.00
 K magnitude : 14.510
 G magnitude : 16.188
 RP magnitude : 15.630
 BP magnitude : 16.588
 DUPflag : 0
 Distance (au) : 17.682
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -11.01
 Sun-Target sep (deg) : 126.91
 Sun-Moon sep (deg) : 126.57
 B (ring opening deg) : 2.49
 PA of pole (deg) : 104.99
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.090
 C/A sky separation (km) : 26805.5
 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

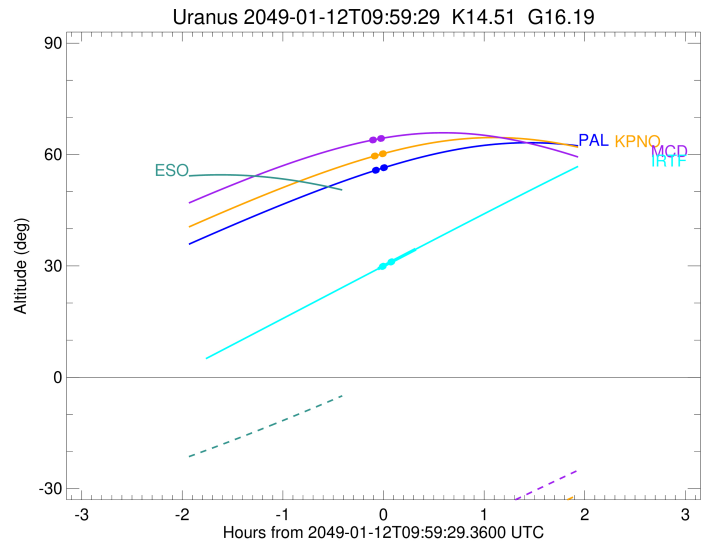
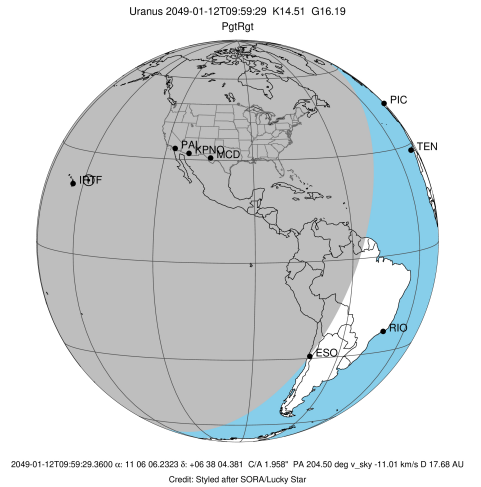


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2049-01-12T09:53:54.575		59.56	-57.41	50817.70	-219.66		
lambda	I	2049-01-12T09:53:58.198		59.57	-57.40	50026.71	-217.63		
delta	I	2049-01-12T09:54:06.190		59.59	-57.37	48300.36	-214.30		
gamma	I	2049-01-12T09:54:09.370		59.59	-57.36	47621.07	-212.88		
eta	I	2049-01-12T09:54:11.464		59.60	-57.35	47176.13	-211.90		
beta	I	2049-01-12T09:54:18.583		59.61	-57.32	45679.58	-208.16		
alpha	I	2049-01-12T09:54:22.802		59.62	-57.31	44694.32	-204.56		
4	I	2049-01-12T09:54:32.064		59.64	-57.28	42601.52	-197.30		
5	I	2049-01-12T09:54:32.839		59.64	-57.28	42172.72	-196.89		
6	I	2049-01-12T09:54:37.400		59.65	-57.26	41803.08	-193.79		

No planet occultations

6	E	2049-01-12T09:58:47.304		60.17	-56.39	41867.61	193.92		
5	E	2049-01-12T09:58:43.446		60.17	-56.40	42195.74	197.02		
4	E	2049-01-12T09:58:48.626		60.18	-56.38	42598.63	197.43		
alpha	E	2049-01-12T09:58:58.408		60.20	-56.35	44701.92	204.69		
beta	E	2049-01-12T09:59:02.345		60.21	-56.33	45663.35	208.29		
eta	E	2049-01-12T09:59:09.199		60.22	-56.31	47176.12	212.03		
gamma	E	2049-01-12T09:59:11.331		60.22	-56.30	47629.10	213.01		
delta	E	2049-01-12T09:59:14.472		60.23	-56.29	48300.36	214.43		
lambda	E	2049-01-12T09:59:22.460		60.25	-56.26	50026.72	217.76		
epsilon	E	2049-01-12T09:59:29.208		60.26	-56.24	51504.87	219.80		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2049-01-12T10:01:40.060
 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 : 3816711112654275200
 2Mass ID (if available) : 11060626+0638047
 ICRS Star Coord at Epoch: 11h 06m 06.23228s +06:38:04.38148s
 RUWE (>1.4 is poor) : 1.00
 K magnitude : 14.510
 G magnitude : 16.188
 RP magnitude : 15.630
 BP magnitude : 16.588
 DUPflag : 0
 Distance (au) : 17.682
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -11.01
 Sun-Target sep (deg) : 126.91
 Sun-Moon sep (deg) : 126.54
 B (ring opening deg) : 2.49
 PA of pole (deg) : 104.99
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.101
 C/A sky separation (km) : 26949.7
 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_itrfr93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk

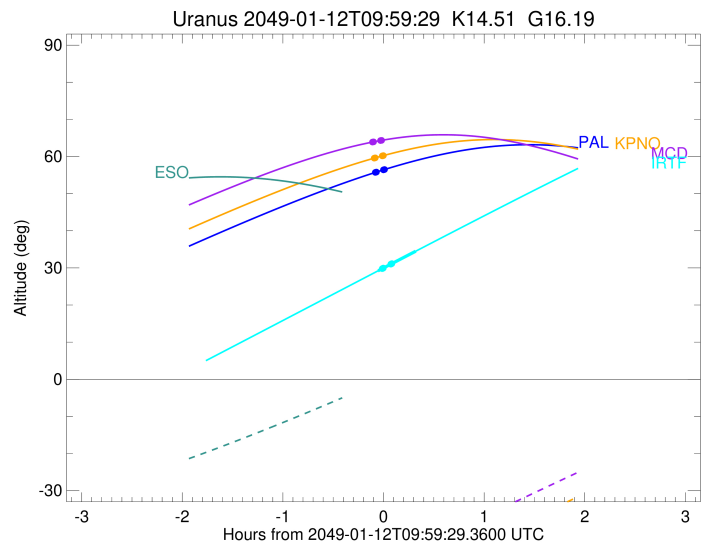
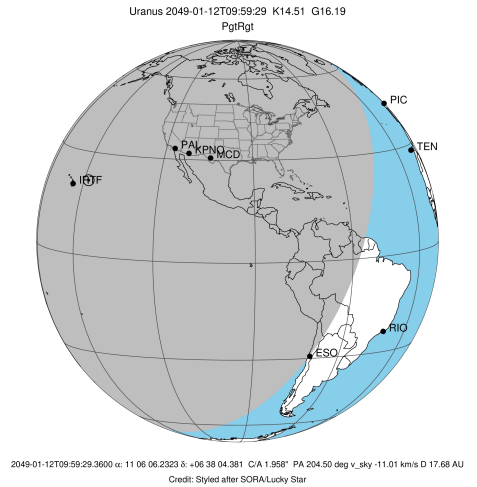


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2049-01-12T09:52:52.955		63.89	-51.32	50818.43	-219.51		
lambda	I	2049-01-12T09:52:56.584		63.90	-51.31	50026.70	-217.45		
delta	I	2049-01-12T09:53:04.583		63.91	-51.28	48300.34	-214.07		
gamma	I	2049-01-12T09:53:07.767		63.91	-51.27	47621.08	-212.63		
eta	I	2049-01-12T09:53:09.864		63.92	-51.26	47176.12	-211.64		
beta	I	2049-01-12T09:53:16.994		63.93	-51.24	45679.61	-207.84		
alpha	I	2049-01-12T09:53:21.224		63.93	-51.22	44694.22	-204.21		
4	I	2049-01-12T09:53:30.508		63.95	-51.19	42601.65	-196.86		
5	I	2049-01-12T09:53:31.277		63.95	-51.19	42172.51	-196.43		
6	I	2049-01-12T09:53:35.864		63.96	-51.17	41803.20	-193.32		

No planet occultations

6	E	2049-01-12T09:57:44.489		64.31	-50.28	41867.47	193.43		
5	E	2049-01-12T09:57:40.625		64.30	-50.29	42195.46	196.55		
4	E	2049-01-12T09:57:45.817		64.31	-50.27	42598.81	196.97		
alpha	E	2049-01-12T09:57:55.625		64.32	-50.24	44701.79	204.33		
beta	E	2049-01-12T09:57:59.573		64.33	-50.22	45663.44	207.96		
eta	E	2049-01-12T09:58:06.437		64.34	-50.20	47176.12	211.75		
gamma	E	2049-01-12T09:58:08.571		64.34	-50.19	47629.09	212.74		
delta	E	2049-01-12T09:58:11.716		64.34	-50.18	48300.35	214.19		
lambda	E	2049-01-12T09:58:19.712		64.35	-50.15	50026.72	217.56		
epsilon	E	2049-01-12T09:58:26.464		64.36	-50.13	51504.21	219.62		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2049-01-12T10:07:27.960
 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 : 3816711112654275200
 2Mass ID (if available) : 11060626+0638047
 ICRS Star Coord at Epoch: 11h 06m 06.23228s +06:38:04.38148s
 RUWE (>1.4 is poor) : 1.00
 K magnitude : 14.510
 G magnitude : 16.188
 RP magnitude : 15.630
 BP magnitude : 16.588
 DUPflag : 0
 Distance (au) : 17.682
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -11.01
 Sun-Target sep (deg) : 126.91
 Sun-Moon sep (deg) : 126.54
 B (ring opening deg) : 2.49
 PA of pole (deg) : 104.99
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.903
 C/A sky separation (km) : 24404.7
 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	2049-01-12T09:58:43.144	b	29.80	-82.42	50805.52	-223.88		
lambda	I	2049-01-12T09:58:46.639	b	29.81	-82.44	50026.72	-222.27		
delta	I	2049-01-12T09:58:54.451	b	29.84	-82.46	48300.35	-219.64		
gamma	I	2049-01-12T09:58:57.552	b	29.85	-82.48	47621.03	-218.51		
eta	I	2049-01-12T09:58:59.591	b	29.86	-82.48	47176.11	-217.74		
beta	I	2049-01-12T09:59:06.486	b	29.89	-82.51	45679.03	-214.74		
alpha	I	2049-01-12T09:59:10.497	b	29.90	-82.53	44695.93	-211.68		
4	I	2049-01-12T09:59:19.351	b	29.94	-82.56	42599.06	-205.69		
5	I	2049-01-12T09:59:20.235	b	29.94	-82.56	42176.52	-205.68		
6	I	2049-01-12T09:59:24.333	b	29.96	-82.58	41801.34	-202.72		
Uranus	I	2049-01-12T09:56:12.529		29.21	-81.85	25558.99		-8.05	-8.43
Uranus	E	2049-01-12T10:18:42.170		34.50	-86.76	25558.79		26.44	27.51
6	E	2049-01-12T10:03:52.484	b	31.01	-83.59	41869.72	202.94		
5	E	2049-01-12T10:03:48.788	b	31.00	-83.57	42200.91	205.90		
4	E	2049-01-12T10:03:53.726	b	31.02	-83.59	42596.01	205.91		
alpha	E	2049-01-12T10:04:03.059	b	31.05	-83.62	44703.89	211.92		
beta	E	2049-01-12T10:04:06.797	b	31.07	-83.64	45662.07	214.99		
eta	E	2049-01-12T10:04:13.450	b	31.09	-83.66	47176.12	218.00		
gamma	E	2049-01-12T10:04:15.525	b	31.10	-83.67	47629.36	218.77		
delta	E	2049-01-12T10:04:18.585	b	31.11	-83.68	48300.34	219.89		
lambda	E	2049-01-12T10:04:26.388	b	31.14	-83.71	50026.70	222.54		
epsilon	E	2049-01-12T10:04:33.046	b	31.17	-83.74	51515.03	224.16		