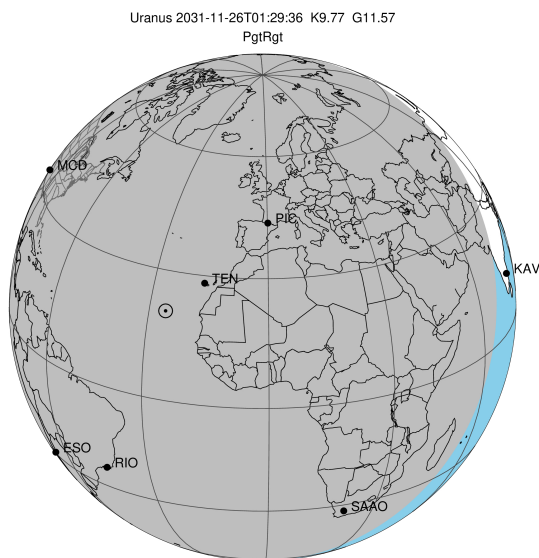


target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2031-11-26T01:29:36.370  
 Event type : PgtRgt  
 : Uranus occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Gaia source ID : 3404413665492320896  
 2Mass ID (if available) : 05410275+2330580

ICRS Star Coord at Epoch: 05h 41m 02.73875s +23:30:58.00425s

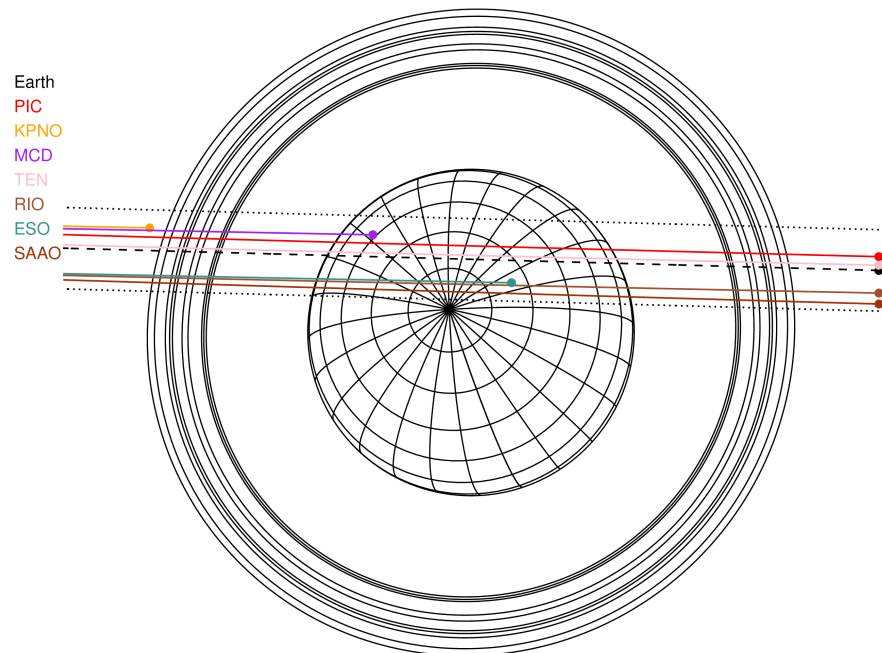
RUWE (>1.4 is poor) : 1.19  
 K magnitude : 9.766  
 G magnitude : 11.574  
 RP magnitude : 10.959  
 BP magnitude : 12.025  
 DUPflag : 0  
 Distance (au) : 18.175  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -21.16  
 Sun-Target sep (deg) : 157.48  
 Sun-Moon sep (deg) : 56.72  
 B (ring opening deg) : 78.79  
 PA of pole (deg) : 43.36

#	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



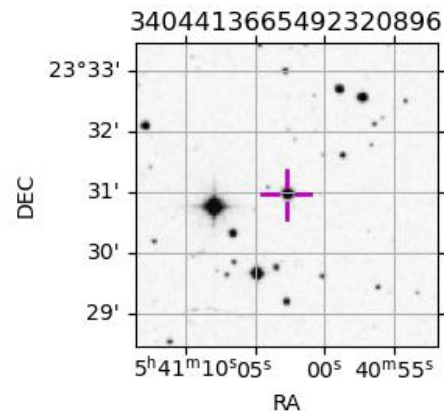
2031-11-26T01:29:36.37000000: 05 41 02.7388 0: +23 30 58.004 C/A 0.878° PA 178.44 deg v\_sky -21.16 km/s D 18.18 AU  
 Credit: Styled after SORA/Lucky Star

Uranus 2031-11-26T01:29:36 K9.77 G11.57 PgtRgt

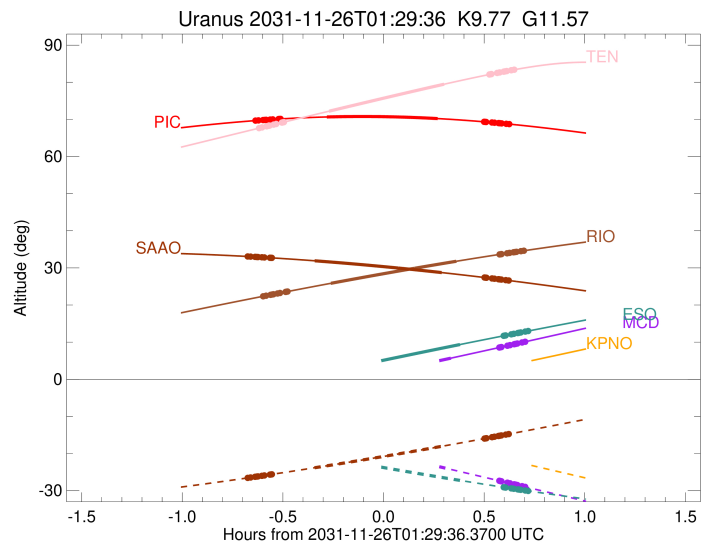
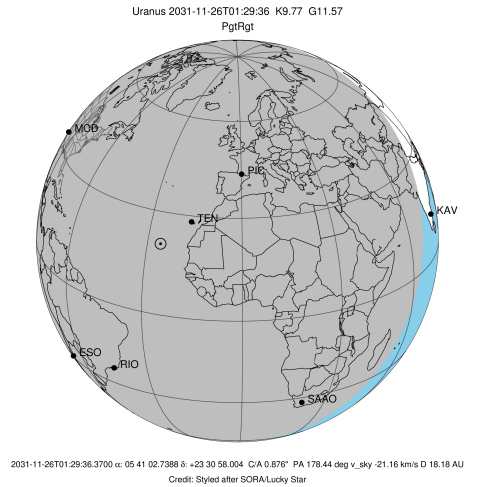


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1	+++++	+ +	+++++	NOV 26 00:51 - NOV 26 02:06	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		+	+++++	NOV 26 01:49 - NOV 26 02:11	PneRne
TEN	Teide Obs./Tenerife	28.3	343.5	+++++	+ +	+++++	NOV 26 00:52 - NOV 26 02:08	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	+++++	+ +	+++++	NOV 26 00:53 - NOV 26 02:11	PieRie
ESO	European Southern Obs	-29.3	289.3		+	+++++	NOV 26 01:52 - NOV 26 02:12	PneRne
AAT	Siding Spring (AAT)	-31.3	149.1					PnnRnn
SAAO	So. Afr. Astro. Obs.	-32.4	20.8	+++++	+ +	+++++	NOV 26 00:49 - NOV 26 02:06	PieRie
MSO	Mt. Stromlo Observato	-35.3	149.0					PnnRnn

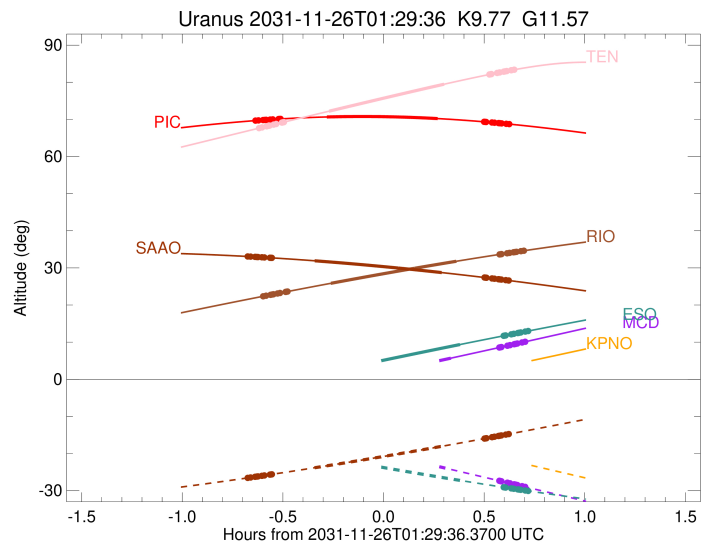
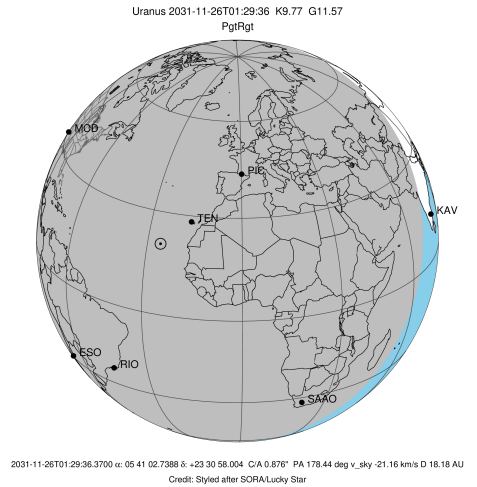


target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2031-11-26T01:29:28.120  
 Event type : PgtRgt  
 : Uranus occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : PIC  
 Location : Pic du Midi  
 Latitude (deg) : 42.93656  
 E. Longitude (deg) : 0.14231  
 Altitude (km) : 2.890  
 Gaia source ID : 3404413665492320896  
 2Mass ID (if available) : 05410275+2330580  
 ICRS Star Coord at Epoch: 05h 41m 02.73875s +23:30:58.00425s  
 RUWE (>1.4 is poor) : 1.19  
 K magnitude : 9.766  
 G magnitude : 11.574  
 RP magnitude : 10.959  
 BP magnitude : 12.025  
 DUPflag : 0  
 Distance (au) : 18.175  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -21.16  
 Sun-Target sep (deg) : 157.48  
 Sun-Moon sep (deg) : 57.48  
 B (ring opening deg) : 78.79  
 PA of pole (deg) : 43.36  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 1.028  
 C/A sky separation (km) : 13553.3  
 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



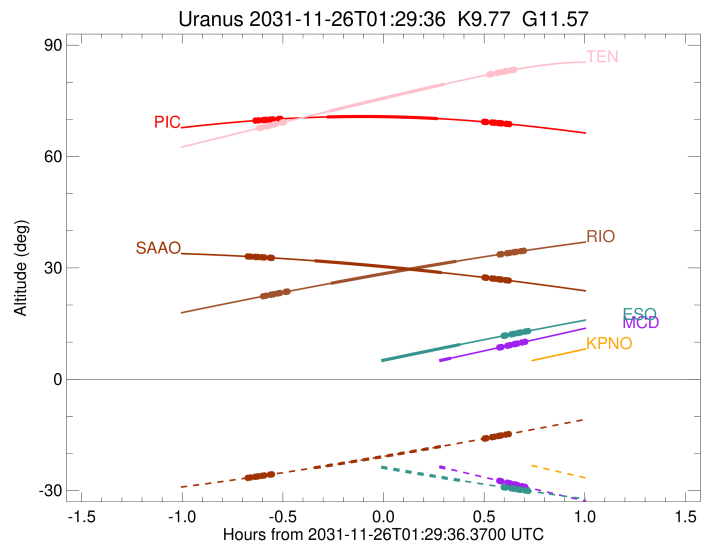
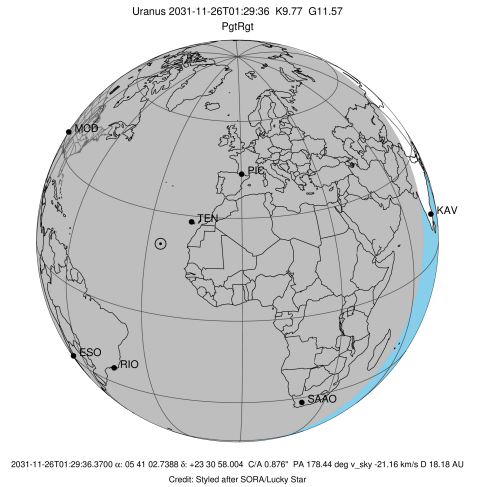
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2031-11-26T00:51:27.399		69.68	-64.23	51137.18	-20.86		
lambda	I	2031-11-26T00:52:20.559		69.74	-64.13	50026.71	-20.87		
delta	I	2031-11-26T00:53:43.396		69.83	-63.98	48300.35	-20.81		
gamma	I	2031-11-26T00:54:15.580		69.86	-63.92	47631.03	-20.78		
eta	I	2031-11-26T00:54:37.478		69.89	-63.87	47176.12	-20.77		
beta	I	2031-11-26T00:55:50.137		69.96	-63.74	45669.26	-20.70		
alpha	I	2031-11-26T00:56:36.708		70.00	-63.65	44706.23	-20.65		
4	I	2031-11-26T00:58:18.084		70.10	-63.45	42615.80	-20.55		
5	I	2031-11-26T00:58:36.371		70.11	-63.41	42245.93	-20.54		
6	I	2031-11-26T00:58:58.096		70.13	-63.37	41797.09	-20.50		
Uranus	I	2031-11-26T01:12:41.975		70.66	-61.64	25530.30		-2.47	-2.59
Uranus	E	2031-11-26T01:45:46.069		70.22	-56.84	25020.09		10.95	11.46
6	E	2031-11-26T01:59:38.136		69.35	-54.63	41877.37	20.51		
5	E	2031-11-26T01:59:57.028		69.33	-54.58	42275.11	20.55		
4	E	2031-11-26T02:00:10.406		69.31	-54.54	42541.05	20.56		
alpha	E	2031-11-26T02:01:55.583		69.17	-54.26	44709.95	20.66		
beta	E	2031-11-26T02:02:40.671		69.11	-54.13	45643.94	20.71		
eta	E	2031-11-26T02:03:54.521		69.01	-53.93	47176.12	20.77		
gamma	E	2031-11-26T02:04:16.052		68.98	-53.87	47623.59	20.79		
delta	E	2031-11-26T02:04:48.581		68.94	-53.78	48300.35	20.82		
lambda	E	2031-11-26T02:06:11.384		68.82	-53.56	50026.71	20.88		
epsilon	E	2031-11-26T02:06:55.294		68.75	-53.44	50944.18	20.87		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2031-11-26T01:33:52.000  
 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 : 3404413665492320896  
 2Mass ID (if available) : 05410275+2330580  
 ICRS Star Coord at Epoch: 05h 41m 02.73875s +23:30:58.00425s  
 RUWE (>1.4 is poor) : 1.19  
 K magnitude : 9.766  
 G magnitude : 11.574  
 RP magnitude : 10.959  
 BP magnitude : 12.025  
 DUPflag : 0  
 Distance (au) : 18.175  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -21.16  
 Sun-Target sep (deg) : 157.48  
 Sun-Moon sep (deg) : 56.30  
 B (ring opening deg) : 78.79  
 PA of pole (deg) : 43.36  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 1.137  
 C/A sky separation (km) : 14990.9  
 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	2031-11-26T00:55:20.715	-4.73x	-12.92	51122.55	-20.20			
lambda	I	2031-11-26T00:56:14.882	-4.57x	-13.11	50026.71	-20.21			
delta	I	2031-11-26T00:57:40.456	-4.30x	-13.40	48300.35	-20.14			
gamma	I	2031-11-26T00:58:13.714	-4.20x	-13.52	47631.12	-20.11			
eta	I	2031-11-26T00:58:36.355	-4.13x	-13.60	47176.12	-20.09			
beta	I	2031-11-26T00:59:51.538	-3.89x	-13.85	45668.52	-20.01			
alpha	I	2031-11-26T01:00:39.758	-3.74x	-14.02	44704.95	-19.95			
4	I	2031-11-26T01:02:24.676	-3.42x	-14.38	42616.11	-19.83			
5	I	2031-11-26T01:02:43.448	-3.36x	-14.45	42249.33	-19.82			
6	I	2031-11-26T01:03:06.132	-3.29x	-14.53	41797.73	-19.78			
Uranus	I	2031-11-26T01:17:29.898	-0.57x	-17.52	25546.06	-1.66		-1.74	
Uranus	E	2031-11-26T01:49:41.008	5.68	-24.28	25007.80	11.08		11.59	
6	E	2031-11-26T02:04:10.233	8.56	-27.36	41876.94	19.88			
5	E	2031-11-26T02:04:29.831	8.63	-27.43	42277.11	19.93			
4	E	2031-11-26T02:04:43.569	8.67	-27.48	42542.03	19.94			
alpha	E	2031-11-26T02:06:31.840	9.03	-27.86	44709.07	20.07			
beta	E	2031-11-26T02:07:18.270	9.19	-28.02	45643.68	20.13			
eta	E	2031-11-26T02:08:34.229	9.44	-28.29	47176.12	20.21			
gamma	E	2031-11-26T02:08:56.364	9.51	-28.37	47623.70	20.23			
delta	E	2031-11-26T02:09:29.782	9.63	-28.49	48300.35	20.26			
lambda	E	2031-11-26T02:10:54.807	9.91	-28.79	50026.71	20.34			
epsilon	E	2031-11-26T02:11:39.490	10.06	-28.95	50936.52	20.34			

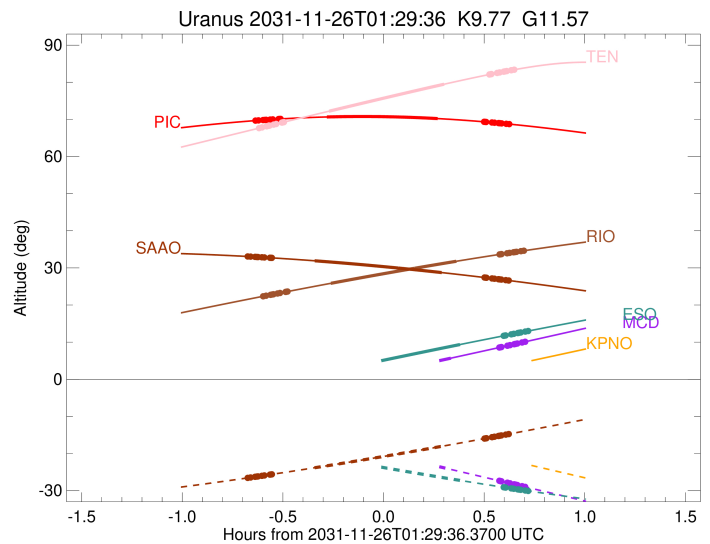
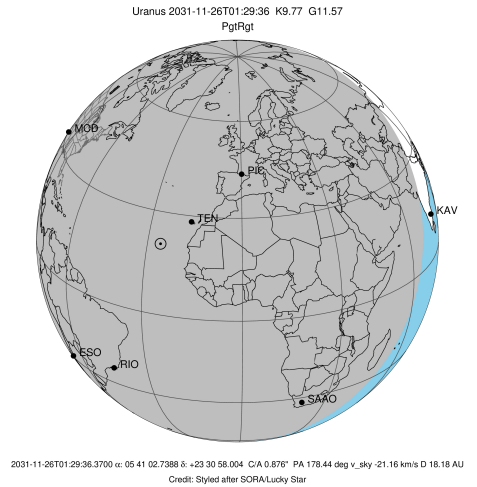
target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2031-11-26T01:30:44.740  
 Event type : PgtRgt  
 : Uranus occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : TEN  
 Location : Teide Obs./Tenerife  
 Latitude (deg) : 28.30050  
 E. Longitude (deg) : 343.48909  
 Altitude (km) : 2.395  
 Gaia source ID : 3404413665492320896  
 2Mass ID (if available) : 05410275+2330580  
 ICRS Star Coord at Epoch: 05h 41m 02.73875s +23:30:58.00425s  
 RUWE (>1.4 is poor) : 1.19  
 K magnitude : 9.766  
 G magnitude : 11.574  
 RP magnitude : 10.959  
 BP magnitude : 12.025  
 DUPflag : 0  
 Distance (au) : 18.175  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -21.16  
 Sun-Target sep (deg) : 157.48  
 Sun-Moon sep (deg) : 57.37  
 B (ring opening deg) : 78.79  
 PA of pole (deg) : 43.36  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 0.916  
 C/A sky separation (km) : 12079.0  
 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



b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2031-11-26T00:52:31.598		67.65	-82.73	51148.50	-21.06		
lambda	I	2031-11-26T00:53:24.785		67.85	-82.73	50026.71	-21.08		
delta	I	2031-11-26T00:54:46.784		68.15	-82.72	48300.35	-21.03		
gamma	I	2031-11-26T00:55:18.630		68.27	-82.71	47630.96	-21.01		
eta	I	2031-11-26T00:55:40.287		68.34	-82.70	47176.12	-21.00		
beta	I	2031-11-26T00:56:52.098		68.61	-82.68	45669.84	-20.94		
alpha	I	2031-11-26T00:57:38.091		68.78	-82.65	44707.26	-20.91		
4	I	2031-11-26T00:59:18.238		69.14	-82.59	42615.48	-20.83		
5	I	2031-11-26T00:59:36.416		69.21	-82.58	42243.15	-20.82		
6	I	2031-11-26T00:59:57.715		69.29	-82.56	41796.62	-20.79		
Uranus	I	2031-11-26T01:13:22.161		72.21	-81.39	25512.06		-3.17	-3.32
Uranus	E	2031-11-26T01:47:41.812		79.49	-75.62	25038.74		10.75	11.25
6	E	2031-11-26T02:01:13.204		82.11	-72.90	41877.89	20.83		
5	E	2031-11-26T02:01:31.668		82.17	-72.84	42272.37	20.86		
4	E	2031-11-26T02:01:44.922		82.21	-72.79	42539.76	20.86		
alpha	E	2031-11-26T02:03:28.717		82.52	-72.44	44711.16	20.95		
beta	E	2031-11-26T02:04:13.164		82.65	-72.28	45644.33	20.98		
eta	E	2031-11-26T02:05:26.044		82.86	-72.03	47176.12	21.04		
gamma	E	2031-11-26T02:05:47.300		82.92	-71.96	47623.44	21.05		
delta	E	2031-11-26T02:06:19.439		83.02	-71.85	48300.35	21.07		
lambda	E	2031-11-26T02:07:41.265		83.24	-71.56	50026.71	21.12		
epsilon	E	2031-11-26T02:08:25.214		83.36	-71.41	50955.55	21.11		

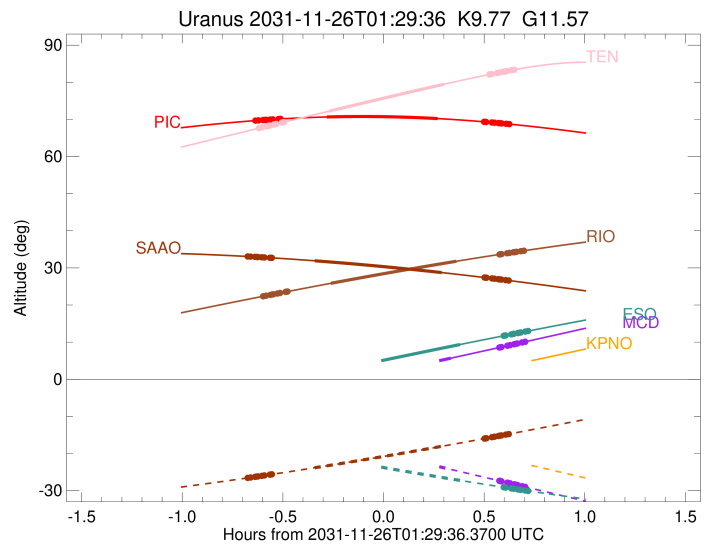
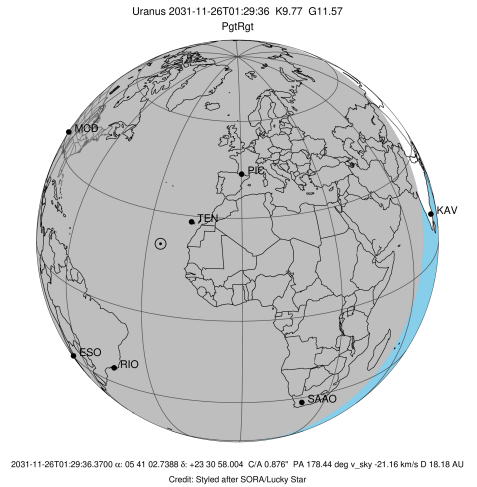
target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2031-11-26T01:32:45.040  
 Event type : PgtRgt  
 : Uranus occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : RIO  
 Location : Rio de Janeiro  
 Latitude (deg) : -22.89506  
 E. Longitude (deg) : 316.77708  
 Altitude (km) : 0.033  
 Gaia source ID : 3404413665492320896  
 2Mass ID (if available) : 05410275+2330580  
 ICRS Star Coord at Epoch: 05h 41m 02.73875s +23:30:58.00425s  
 RUWE (>1.4 is poor) : 1.19  
 K magnitude : 9.766  
 G magnitude : 11.574  
 RP magnitude : 10.959  
 BP magnitude : 12.025  
 DUPflag : 0  
 Distance (au) : 18.175  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -21.16  
 Sun-Target sep (deg) : 157.48  
 Sun-Moon sep (deg) : 56.78  
 B (ring opening deg) : 78.79  
 PA of pole (deg) : 43.36  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 0.570  
 C/A sky separation (km) : 7519.9  
 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	2031-11-26T00:53:42.474		22.35	-39.28	51184.53	-21.36		
lambda	I	2031-11-26T00:54:36.625		22.51	-39.39	50026.71	-21.38		
delta	I	2031-11-26T00:55:57.418		22.75	-39.55	48300.35	-21.36		
gamma	I	2031-11-26T00:56:28.774		22.84	-39.62	47630.70	-21.35		
eta	I	2031-11-26T00:56:50.066		22.90	-39.66	47176.12	-21.35		
beta	I	2031-11-26T00:58:00.552		23.11	-39.80	45671.61	-21.33		
alpha	I	2031-11-26T00:58:45.611		23.24	-39.89	44710.60	-21.31		
4	I	2031-11-26T01:00:23.931		23.53	-40.09	42614.16	-21.29		
5	I	2031-11-26T01:00:42.110		23.58	-40.12	42234.42	-21.29		
6	I	2031-11-26T01:01:02.516		23.64	-40.16	41795.50	-21.27		
Uranus	I	2031-11-26T01:13:53.273		25.85	-41.60	25436.52		-5.13	-5.37
Uranus	E	2031-11-26T01:51:19.832		31.79	-44.80	25116.12		9.89	10.35
6	E	2031-11-26T02:04:14.704		33.64	-45.52	41879.06	21.36		
5	E	2031-11-26T02:04:32.311		33.68	-45.53	42263.95	21.38		
4	E	2031-11-26T02:04:45.476		33.71	-45.54	42536.25	21.38		
alpha	E	2031-11-26T02:06:27.230		33.94	-45.62	44714.80	21.41		
beta	E	2031-11-26T02:07:10.645		34.04	-45.65	45645.59	21.42		
eta	E	2031-11-26T02:08:22.023		34.21	-45.70	47176.12	21.45		
gamma	E	2031-11-26T02:08:42.857		34.25	-45.71	47622.99	21.45		
delta	E	2031-11-26T02:09:14.426		34.33	-45.74	48300.35	21.46		
lambda	E	2031-11-26T02:10:34.830		34.51	-45.79	50026.71	21.48		
epsilon	E	2031-11-26T02:11:19.678		34.61	-45.82	50990.33	21.47		

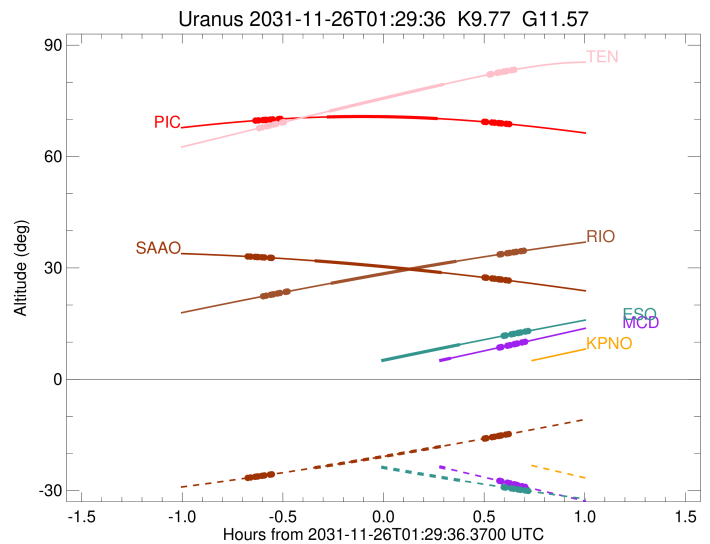
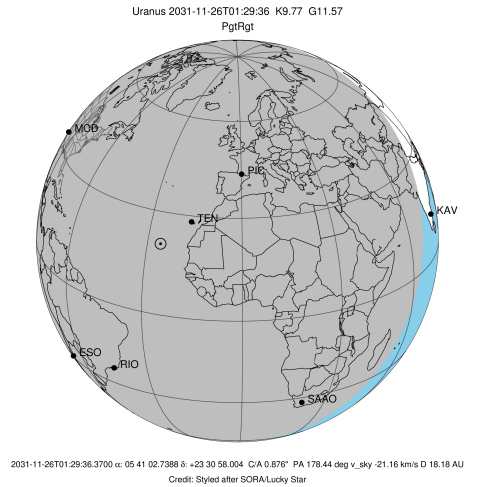


target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2031-11-26T01:33:47.620  
 Event type : PgtRgt  
 : Uranus occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : ESO  
 Location : European Southern Obs. (3.6m)  
 Latitude (deg) : -29.26097  
 E. Longitude (deg) : 289.26831  
 Altitude (km) : 2.400  
 Gaia source ID : 3404413665492320896  
 2Mass ID (if available) : 05410275+2330580  
 ICRS Star Coord at Epoch: 05h 41m 02.73875s +23:30:58.00425s  
 RUWE (>1.4 is poor) : 1.19  
 K magnitude : 9.766  
 G magnitude : 11.574  
 RP magnitude : 10.959  
 BP magnitude : 12.025  
 DUPflag : 0  
 Distance (au) : 18.175  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -21.16  
 Sun-Target sep (deg) : 157.48  
 Sun-Moon sep (deg) : 56.36  
 B (ring opening deg) : 78.79  
 PA of pole (deg) : 43.36  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 0.601  
 C/A sky separation (km) : 7916.5  
 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\_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	2031-11-26T00:54:27.664	-1.65x	-17.95	51180.77	-21.15			
lambda	I	2031-11-26T00:55:22.188	-1.47x	-18.11	50026.71	-21.16			
delta	I	2031-11-26T00:56:43.805	-1.20x	-18.34	48300.35	-21.14			
gamma	I	2031-11-26T00:57:15.482	-1.10x	-18.43	47630.73	-21.14			
eta	I	2031-11-26T00:57:36.995	-1.03x	-18.50	47176.12	-21.13			
beta	I	2031-11-26T00:58:48.219	-0.80x	-18.70	45671.43	-21.11			
alpha	I	2031-11-26T00:59:33.756	-0.65x	-18.83	44710.25	-21.09			
4	I	2031-11-26T01:01:13.088	-0.33x	-19.11	42614.32	-21.06			
5	I	2031-11-26T01:01:31.420	-0.27x	-19.16	42235.30	-21.07			
6	I	2031-11-26T01:01:52.087	-0.20x	-19.22	41795.59	-21.05			
Uranus	I	2031-11-26T01:14:51.913	2.32x	-21.40	25444.76	-4.96		-5.19	
Uranus	E	2031-11-26T01:52:24.970	9.36	-27.24	25109.36	9.97		10.43	
6	E	2031-11-26T02:05:28.263	11.71	-29.09	41879.00	21.16			
5	E	2031-11-26T02:05:46.062	11.76	-29.13	42264.53	21.18			
4	E	2031-11-26T02:05:59.333	11.80	-29.16	42536.47	21.18			
alpha	E	2031-11-26T02:07:41.999	12.11	-29.40	44714.56	21.22			
beta	E	2031-11-26T02:08:25.812	12.24	-29.50	45645.50	21.23			
eta	E	2031-11-26T02:09:37.831	12.45	-29.66	47176.12	21.26			
gamma	E	2031-11-26T02:09:58.850	12.51	-29.71	47623.02	21.27			
delta	E	2031-11-26T02:10:30.695	12.60	-29.78	48300.35	21.27			
lambda	E	2031-11-26T02:11:51.798	12.84	-29.96	50026.71	21.30			
epsilon	E	2031-11-26T02:12:36.925	12.97	-30.06	50988.07	21.28			

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2031-11-26T01:28:06.460  
 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 : 3404413665492320896  
 2Mass ID (if available) : 05410275+2330580  
 ICRS Star Coord at Epoch: 05h 41m 02.73875s +23:30:58.00425s  
 RUWE (>1.4 is poor) : 1.19  
 K magnitude : 9.766  
 G magnitude : 11.574  
 RP magnitude : 10.959  
 BP magnitude : 12.025  
 DUPflag : 0  
 Distance (au) : 18.175  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -21.16  
 Sun-Target sep (deg) : 157.48  
 Sun-Moon sep (deg) : 57.29  
 B (ring opening deg) : 78.79  
 PA of pole (deg) : 43.36  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 0.478  
 C/A sky separation (km) : 6300.4  
 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\_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	2031-11-26T00:49:05.705		33.08	-26.57	51197.47	-21.56		
lambda	I	2031-11-26T00:49:59.973		33.03	-26.45	50026.71	-21.57		
delta	I	2031-11-26T00:51:20.036		32.97	-26.28	48300.35	-21.56		
gamma	I	2031-11-26T00:51:51.111		32.94	-26.21	47630.60	-21.55		
eta	I	2031-11-26T00:52:12.203		32.92	-26.16	47176.12	-21.55		
beta	I	2031-11-26T00:53:22.005		32.86	-26.01	45672.20	-21.53		
alpha	I	2031-11-26T00:54:06.608		32.82	-25.91	44711.78	-21.52		
4	I	2031-11-26T00:55:44.058		32.73	-25.69	42613.59	-21.50		
5	I	2031-11-26T00:56:02.185		32.72	-25.65	42231.43	-21.50		
6	I	2031-11-26T00:56:22.242		32.70	-25.60	41795.23	-21.49		
Uranus	I	2031-11-26T01:09:03.302		31.92	-23.84	25408.60		-5.69	-5.96
Uranus	E	2031-11-26T01:46:57.041		28.74	-18.07	25136.28		9.65	10.10
6	E	2031-11-26T01:59:45.208		27.41	-15.97	41879.22	21.46		
5	E	2031-11-26T02:00:02.663		27.38	-15.92	42262.31	21.47		
4	E	2031-11-26T02:00:15.817		27.35	-15.88	42535.63	21.47		
alpha	E	2031-11-26T02:01:57.224		27.17	-15.60	44715.48	21.49		
beta	E	2031-11-26T02:02:40.466		27.09	-15.48	45645.84	21.50		
eta	E	2031-11-26T02:03:51.601		26.95	-15.28	47176.12	21.51		
gamma	E	2031-11-26T02:04:12.369		26.91	-15.22	47622.92	21.52		
delta	E	2031-11-26T02:04:43.851		26.86	-15.14	48300.35	21.52		
lambda	E	2031-11-26T02:06:04.046		26.70	-14.91	50026.71	21.53		
epsilon	E	2031-11-26T02:06:49.076		26.62	-14.78	50996.50	21.52		