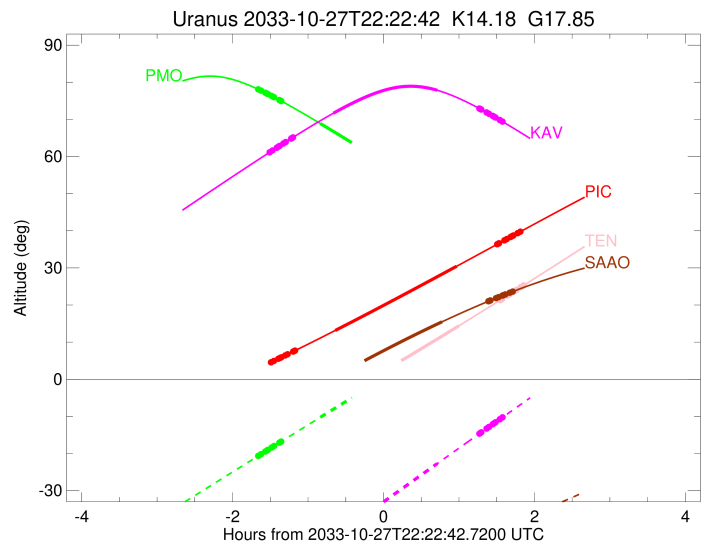
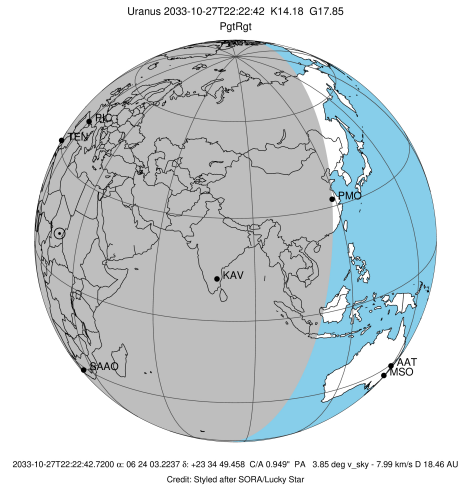


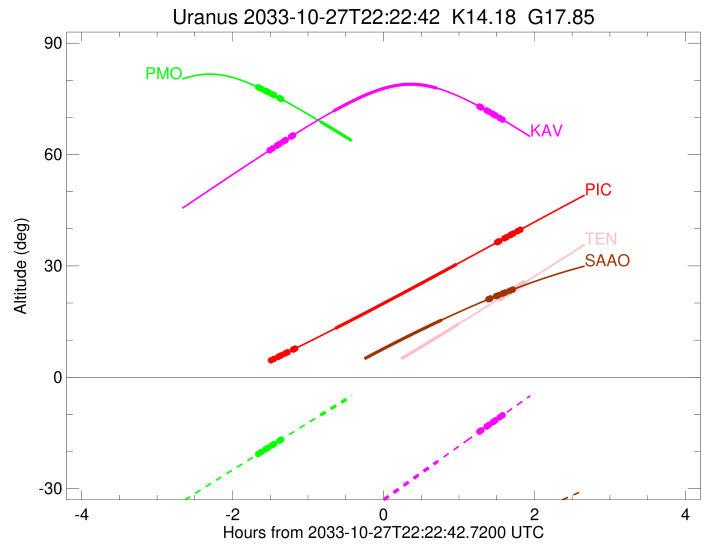
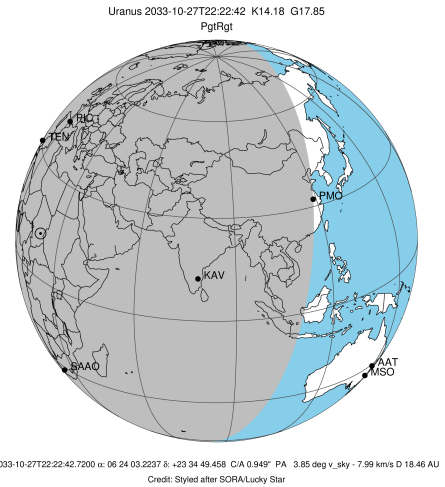


target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2033-10-27T22:32:33.680  
 Event type : PgtRgt  
 : Uranus occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : PIC  
 Location : Pic du Midi  
 Latitude (deg) : 42.93656  
 E. Longitude (deg) : 0.14231  
 Altitude (km) : 2.890  
 Gaia source ID : 3377381897247822208  
 2Mass ID (if available) : 06240324+2334495  
 ICRS Star Coord at Epoch: 06h 24m 03.22371s +23:34:49.45845s  
 RUWE (>1.4 is poor) : 1.76  
 K magnitude : 14.177  
 G magnitude : 17.852  
 RP magnitude : 16.427  
 BP magnitude : 18.764  
 DUPflag : 0  
 Distance (au) : 18.464  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -7.99  
 Sun-Target sep (deg) : 118.84  
 Sun-Moon sep (deg) : 168.38  
 B (ring opening deg) : 70.48  
 PA of pole (deg) : 67.88  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 0.710  
 C/A sky separation (km) : 9511.4  
 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



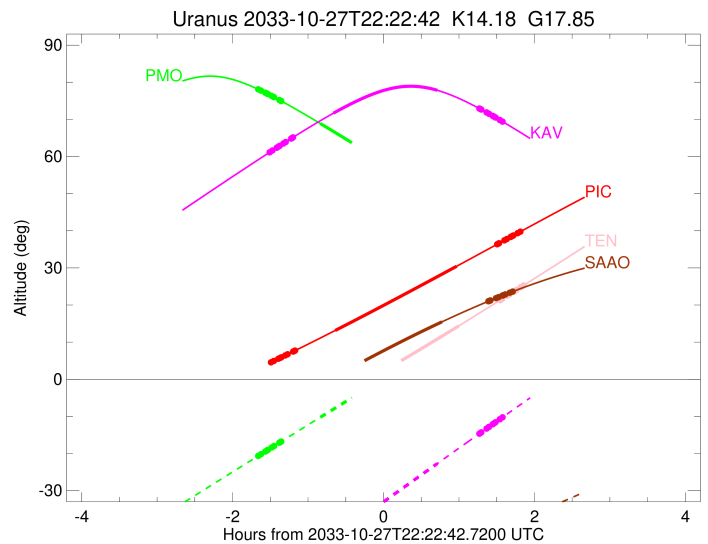
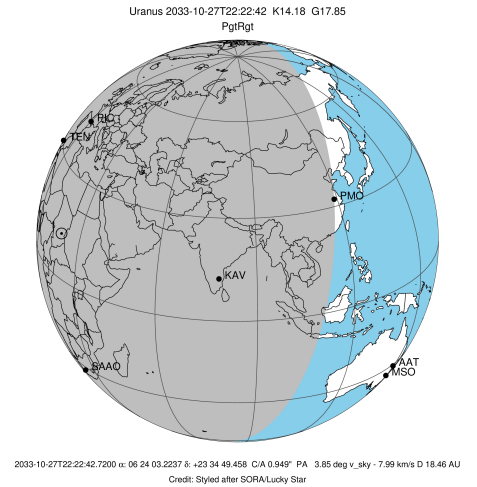
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2033-10-27T20:54:06.317		4.71x	-43.09	50749.40	-8.11		
lambda	I	2033-10-27T20:55:35.434		4.95x	-43.33	50026.71	-8.11		
delta	I	2033-10-27T20:59:08.406		5.53	-43.91	48300.35	-8.10		
gamma	I	2033-10-27T21:00:32.212		5.76	-44.14	47621.34	-8.10		
eta	I	2033-10-27T21:01:27.176		5.91	-44.29	47176.12	-8.10		
beta	I	2033-10-27T21:04:32.725		6.42	-44.79	45673.18	-8.09		
alpha	I	2033-10-27T21:06:27.047		6.73	-45.09	44751.83	-8.09		
4	I	2033-10-27T21:10:53.060		7.47	-45.80	42591.16	-8.07		
5	I	2033-10-27T21:11:49.295		7.62	-45.95	42155.47	-8.07		
6	I	2033-10-27T21:12:24.657		7.72	-46.04	41873.98	-8.07		
Uranus	I	2033-10-27T21:44:21.945		13.15	-50.82	25042.34		-19.45	-20.30
Uranus	E	2033-10-27T23:20:53.563		30.45	-60.00	25330.53		12.68	13.26
6	E	2033-10-27T23:53:00.567		36.35	-60.33	41813.66	8.36		
5	E	2033-10-27T23:54:00.554		36.54	-60.31	42311.03	8.36		
4	E	2033-10-27T23:54:28.665		36.62	-60.30	42535.60	8.36		
alpha	E	2033-10-27T23:58:44.053		37.41	-60.21	44685.57	8.40		
beta	E	2033-10-28T00:00:40.130		37.76	-60.16	45656.66	8.41		
eta	E	2033-10-28T00:03:40.570		38.32	-60.08	47176.12	8.42		
gamma	E	2033-10-28T00:04:34.618		38.48	-60.05	47631.58	8.43		
delta	E	2033-10-28T00:05:53.923		38.73	-60.00	48300.35	8.44		
lambda	E	2033-10-28T00:09:18.340		39.35	-59.87	50026.71	8.45		
epsilon	E	2033-10-28T00:12:11.958		39.88	-59.75	51495.68	8.46		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2033-10-27T22:17:03.510  
 Event type : PgtRgt  
 : Uranus occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : PMO  
 Location : Purple Mtn Obs. Nanking  
 Latitude (deg) : 32.06667  
 E. Longitude (deg) : 118.82089  
 Altitude (km) : 0.364  
 Gaia source ID : 3377381897247822208  
 2Mass ID (if available) : 06240324+2334495  
 ICRS Star Coord at Epoch: 06h 24m 03.22371s +23:34:49.45845s  
 RUWE (>1.4 is poor) : 1.76  
 K magnitude : 14.177  
 G magnitude : 17.852  
 RP magnitude : 16.427  
 BP magnitude : 18.764  
 DUPflag : 0  
 Distance (au) : 18.465  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -7.99  
 Sun-Target sep (deg) : 118.84  
 Sun-Moon sep (deg) : 169.32  
 B (ring opening deg) : 70.48  
 PA of pole (deg) : 67.88  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 0.850  
 C/A sky separation (km) : 11384.2  
 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



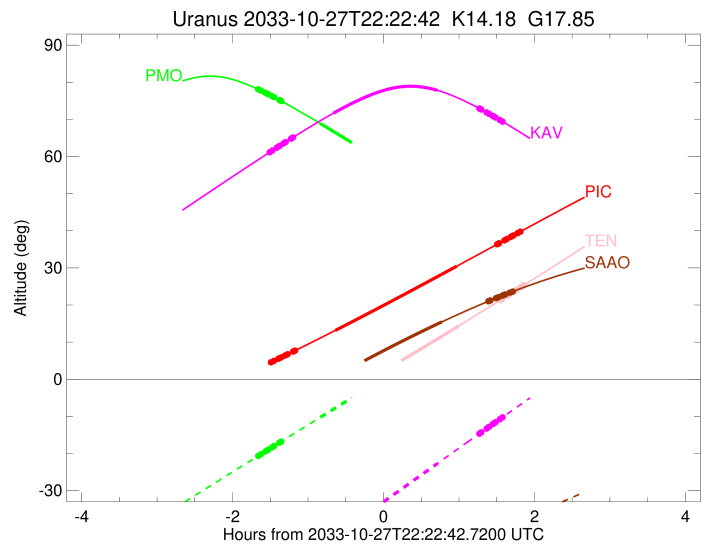
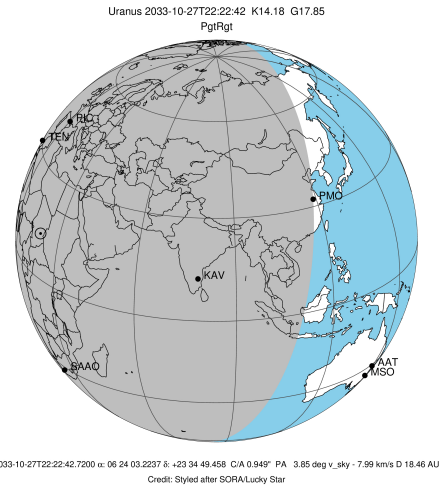
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2033-10-27T20:43:54.763		77.98	-20.48	50745.84	-8.52		
lambda	I	2033-10-27T20:45:19.141		77.75	-20.18	50026.71	-8.52		
delta	I	2033-10-27T20:48:41.986		77.20	-19.46	48300.35	-8.50		
gamma	I	2033-10-27T20:50:01.871		76.97	-19.18	47621.48	-8.49		
eta	I	2033-10-27T20:50:54.317		76.82	-19.00	47176.12	-8.49		
beta	I	2033-10-27T20:53:51.344		76.31	-18.37	45674.25	-8.47		
alpha	I	2033-10-27T20:55:40.770		75.99	-17.99	44751.30	-8.46		
4	I	2033-10-27T20:59:55.733		75.22	-17.09	42588.18	-8.42		
5	I	2033-10-27T21:00:49.258		75.06	-16.90	42156.41	-8.42		
6	I	2033-10-27T21:01:23.078		74.96	-16.78	41875.44	-8.42		
Uranus	I	2033-10-27T21:32:23.451		68.91	-10.25	25039.54		-19.51	-20.36
Uranus	E	2033-10-27T23:02:35.792		49.96	8.20x	25356.56		11.92	12.46
6	E	2033-10-27T23:35:04.482		43.05	14.51x	41814.30	8.32		
5	E	2033-10-27T23:36:04.598		42.84	14.70x	42310.57	8.33		
4	E	2033-10-27T23:36:32.793		42.74	14.79x	42535.13	8.33		
alpha	E	2033-10-27T23:40:49.431		41.83	15.60x	44685.69	8.36		
beta	E	2033-10-27T23:42:46.075		41.42	15.97x	45656.93	8.37		
eta	E	2033-10-27T23:45:47.382		40.78	16.54x	47176.12	8.38		
gamma	E	2033-10-27T23:46:41.711		40.59	16.71x	47631.58	8.39		
delta	E	2033-10-27T23:48:01.439		40.31	16.96x	48300.35	8.39		
lambda	E	2033-10-27T23:51:27.009		39.58	17.60x	50026.71	8.40		
epsilon	E	2033-10-27T23:54:21.471		38.96	18.14x	51493.85	8.41		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2033-10-27T22:34:18.200  
 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 : 3377381897247822208  
 2Mass ID (if available) : 06240324+2334495  
 ICRS Star Coord at Epoch: 06h 24m 03.22371s +23:34:49.45845s  
 RUWE (>1.4 is poor) : 1.76  
 K magnitude : 14.177  
 G magnitude : 17.852  
 RP magnitude : 16.427  
 BP magnitude : 18.764  
 DUPflag : 0  
 Distance (au) : 18.464  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -7.99  
 Sun-Target sep (deg) : 118.84  
 Sun-Moon sep (deg) : 168.17  
 B (ring opening deg) : 70.48  
 PA of pole (deg) : 67.88  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 0.762  
 C/A sky separation (km) : 10207.2  
 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	2033-10-27T20:54:45.888	-14.44x	-33.53	50748.69	-7.96			
lambda	I	2033-10-27T20:56:16.599	-14.18x	-33.87	50026.71	-7.96			
delta	I	2033-10-27T20:59:53.618	-13.54x	-34.66	48300.35	-7.95			
gamma	I	2033-10-27T21:01:19.023	-13.28x	-34.98	47621.36	-7.95			
eta	I	2033-10-27T21:02:15.044	-13.12x	-35.18	47176.12	-7.95			
beta	I	2033-10-27T21:05:24.148	-12.55x	-35.88	45673.37	-7.94			
alpha	I	2033-10-27T21:07:20.720	-12.20x	-36.30	44751.74	-7.93			
4	I	2033-10-27T21:11:52.020	-11.39x	-37.30	42590.61	-7.92			
5	I	2033-10-27T21:12:49.301	-11.21x	-37.51	42155.62	-7.92			
6	I	2033-10-27T21:13:25.343	-11.10x	-37.64	41874.27	-7.92			
Uranus	I	2033-10-27T21:46:05.111	-5.00x	-44.79	25040.57			-19.49	-20.33
Uranus	E	2033-10-27T23:22:37.309	14.40	-64.77	25348.29			12.16	12.72
6	E	2033-10-27T23:55:21.783	21.29	-70.37	41814.45	8.25			
5	E	2033-10-27T23:56:22.378	21.51	-70.53	42310.44	8.26			
4	E	2033-10-27T23:56:50.795	21.61	-70.60	42534.99	8.26			
alpha	E	2033-10-28T00:01:09.494	22.52	-71.22	44685.75	8.29			
beta	E	2033-10-28T00:03:06.994	22.94	-71.49	45657.07	8.31			
eta	E	2033-10-28T00:06:09.496	23.59	-71.90	47176.12	8.33			
gamma	E	2033-10-28T00:07:04.161	23.78	-72.02	47631.57	8.33			
delta	E	2033-10-28T00:08:24.361	24.07	-72.19	48300.35	8.34			
lambda	E	2033-10-28T00:11:51.022	24.81	-72.61	50026.71	8.36			
epsilon	E	2033-10-28T00:14:45.985	25.43	-72.94	51491.55	8.37			

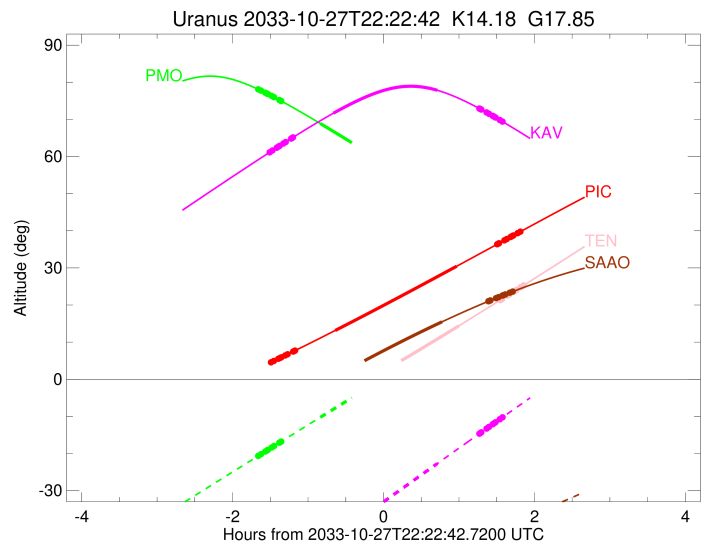
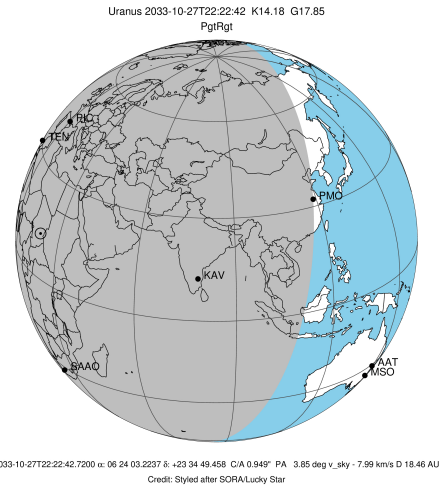
target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2033-10-27T22:23:45.190  
 Event type : PgtRgt  
 : Uranus occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : KAV  
 Location : Kavalur Observatory  
 Latitude (deg) : 12.57556  
 E. Longitude (deg) : 78.83167  
 Altitude (km) : 0.722  
 Gaia source ID : 3377381897247822208  
 2Mass ID (if available) : 06240324+2334495  
 ICRS Star Coord at Epoch: 06h 24m 03.22371s +23:34:49.45845s  
 RUWE (>1.4 is poor) : 1.76  
 K magnitude : 14.177  
 G magnitude : 17.852  
 RP magnitude : 16.427  
 BP magnitude : 18.764  
 DUPflag : 0  
 Distance (au) : 18.465  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -7.99  
 Sun-Target sep (deg) : 118.84  
 Sun-Moon sep (deg) : 168.73  
 B (ring opening deg) : 70.48  
 PA of pole (deg) : 67.88  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 1.054  
 C/A sky separation (km) : 14115.7  
 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	2033-10-27T20:53:00.327		61.32	-54.79	50744.32	-8.41		
lambda	I	2033-10-27T20:54:25.646		61.63	-54.44	50026.71	-8.41		
delta	I	2033-10-27T20:57:51.286		62.38	-53.61	48300.35	-8.38		
gamma	I	2033-10-27T20:59:12.299		62.67	-53.28	47621.60	-8.37		
eta	I	2033-10-27T21:00:05.524		62.86	-53.07	47176.12	-8.37		
beta	I	2033-10-27T21:03:05.141		63.51	-52.34	45675.02	-8.34		
alpha	I	2033-10-27T21:04:56.426		63.91	-51.89	44750.80	-8.32		
4	I	2033-10-27T21:09:15.967		64.84	-50.84	42585.77	-8.27		
5	I	2033-10-27T21:10:10.090		65.03	-50.62	42157.45	-8.27		
6	I	2033-10-27T21:10:44.504		65.15	-50.48	41876.45	-8.27		
Uranus	I	2033-10-27T21:42:48.295		71.65	-42.70	25049.63		-19.30	-20.14
Uranus	E	2033-10-27T23:05:29.969		77.84	-22.70	25421.86		9.77	10.22
6	E	2033-10-27T23:38:51.626		72.95	-14.68	41817.19	8.34		
5	E	2033-10-27T23:39:50.991		72.77	-14.44	42308.23	8.34		
4	E	2033-10-27T23:40:18.977		72.69	-14.33	42533.11	8.35		
alpha	E	2033-10-27T23:44:35.083		71.90	-13.31	44686.41	8.40		
beta	E	2033-10-27T23:46:31.154		71.53	-12.84	45658.36	8.42		
eta	E	2033-10-27T23:49:31.051		70.96	-12.12	47176.12	8.45		
gamma	E	2033-10-27T23:50:24.951		70.78	-11.91	47631.55	8.45		
delta	E	2033-10-27T23:51:44.012		70.52	-11.59	48300.35	8.46		
lambda	E	2033-10-27T23:55:07.632		69.86	-10.78	50026.71	8.49		
epsilon	E	2033-10-27T23:57:58.473		69.29	-10.10	51479.14	8.50		

```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2033-10-27T22:31:23.230
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       : 3377381897247822208
2Mass ID (if available) : 06240324+2334495
ICRS Star Coord at Epoch: 06h 24m 03.22371s +23:34:49.45845s
RUWE (>1.4 is poor) : 1.76
K magnitude           : 14.177
G magnitude           : 17.852
RP magnitude          : 16.427
BP magnitude          : 18.764
DUPflag              : 0
Distance (au)        : 18.464
f0 (km)              : 0.000
g0 (km)              : 0.000
skyplane vel. (km/s) : -7.99
Sun-Target sep (deg) : 118.84
Sun-Moon sep (deg)   : 167.86
B (ring opening deg) : 70.48
PA of pole (deg)     : 67.88
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 1.295
C/A sky separation (km) : 17341.7
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_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	2033-10-27T20:59:39.683	-7.79x	-40.73	50743.53	-7.88			
lambda	I	2033-10-27T21:01:10.702	-7.49x	-40.87	50026.71	-7.87			
delta	I	2033-10-27T21:04:50.539	-6.78x	-41.20	48300.35	-7.84			
gamma	I	2033-10-27T21:06:17.219	-6.50x	-41.33	47621.75	-7.82			
eta	I	2033-10-27T21:07:14.231	-6.31x	-41.41	47176.12	-7.81			
beta	I	2033-10-27T21:10:26.655	-5.69x	-41.68	45675.89	-7.78			
alpha	I	2033-10-27T21:12:26.274	-5.31x	-41.84	44750.07	-7.75			
4	I	2033-10-27T21:17:05.774	-4.41x	-42.21	42582.80	-7.68			
5	I	2033-10-27T21:18:03.552	-4.22x	-42.28	42159.05	-7.67			
6	I	2033-10-27T21:18:40.692	-4.11x	-42.33	41877.51	-7.66			
Uranus	I	2033-10-27T21:54:20.710	2.59x	-44.25	25081.50	-18.65		-19.47	
Uranus	E	2033-10-27T23:09:16.930	15.48	-43.18	25494.33	6.68		6.99	
6	E	2033-10-27T23:46:04.587	21.00	-40.25	41821.11	7.91			
5	E	2033-10-27T23:47:06.092	21.15	-40.15	42304.54	7.93			
4	E	2033-10-27T23:47:35.466	21.22	-40.10	42530.85	7.93			
alpha	E	2033-10-27T23:52:04.784	21.84	-39.64	44687.59	8.02			
beta	E	2033-10-27T23:54:06.266	22.12	-39.43	45660.24	8.05			
eta	E	2033-10-27T23:57:13.816	22.54	-39.09	47176.12	8.10			
gamma	E	2033-10-27T23:58:09.974	22.67	-38.99	47631.48	8.12			
delta	E	2033-10-27T23:59:32.294	22.85	-38.84	48300.35	8.13			
lambda	E	2033-10-28T00:03:03.895	23.32	-38.44	50026.71	8.18			
epsilon	E	2033-10-28T00:05:58.432	23.70	-38.10	51457.83	8.20			