

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2033-11-23T23:06:06.570
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 3377488511216663552
 2Mass ID (if available) : 06210892+2336558

Uranus 2033-11-23T23:06:06 K14.80 G17.19 PgtRgt

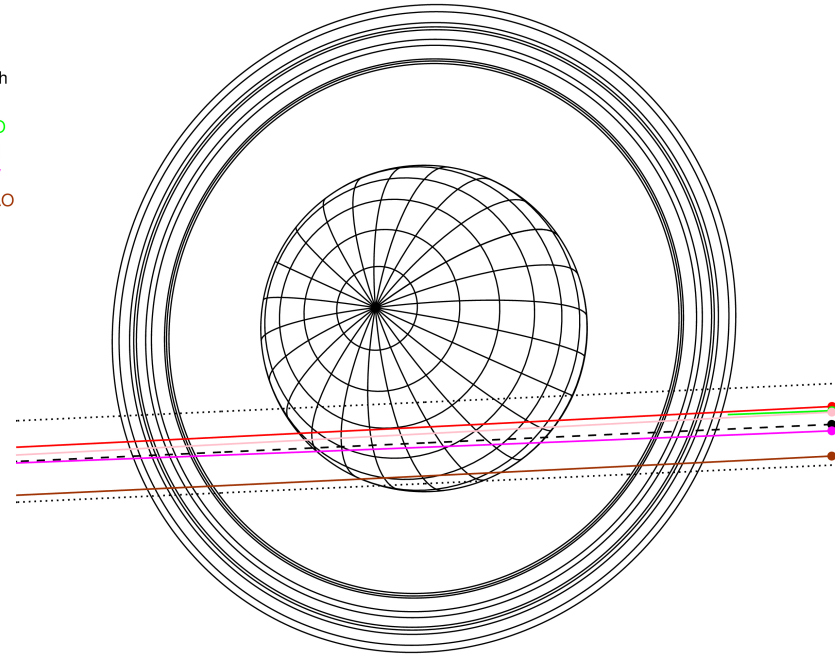
ICRS Star Coord at Epoch: 06h 21m 08.93455s +23:36:55.73514s

RUWE (>1.4 is poor) : 1.01
 K magnitude : 14.801
 G magnitude : 17.193
 RP magnitude : 16.438
 BP magnitude : 17.791
 DUPflag : 0
 Distance (au) : 18.126
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -18.51
 Sun-Target sep (deg) : 146.66
 Sun-Moon sep (deg) : 167.06
 B (ring opening deg) : 71.09
 PA of pole (deg) : 66.76



2033-11-23T23:06:06.5700 α: 06 21 08.9346 δ: +23 36 55.735 C/A 1.354" PA 2.61 deg v_sky -18.51 km/s D 18.13 AU
 Credit: Styled after SORA/Lucky Star

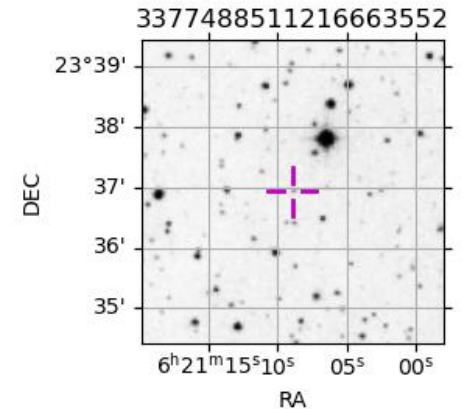
Earth
 PIC
 PMO
 TEN
 KAV
 SAAO



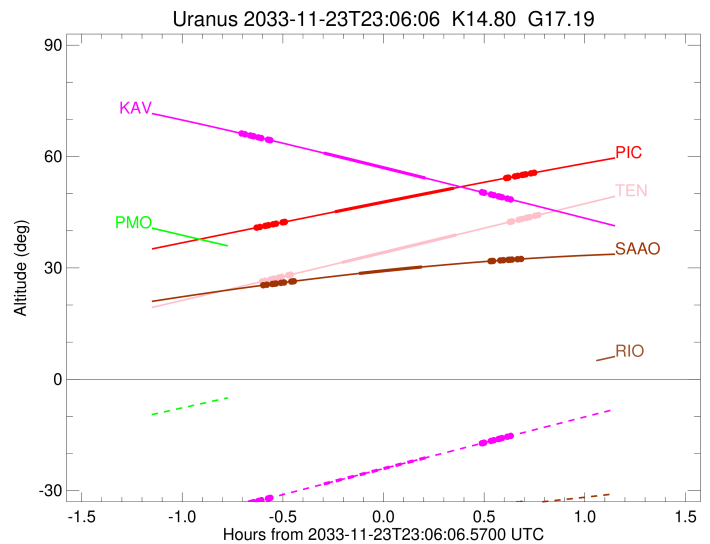
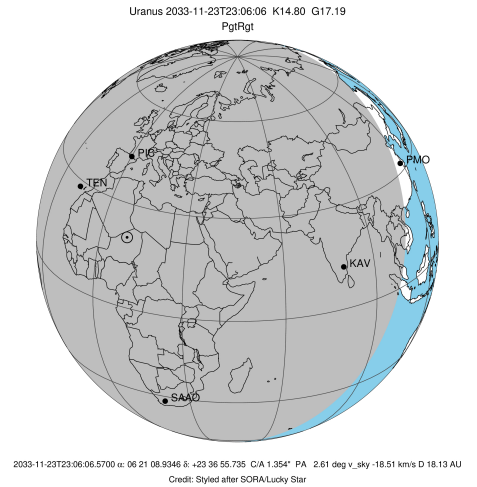
#	a(km)	ring
1	41837.2	6
2	42235.0	5
3	42571.2	4
4	44718.5	alpha
5	45661.1	beta
6	47176.1	eta
7	47626.3	gamma
8	48300.3	delta
9	50026.7	lambda
10	51149.4	epsilon

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 23 22:28 - NOV 23 23:51	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	+++++	+ +	+++++	NOV 23 22:30 - NOV 23 23:52	PieRie
IRTF	Mauna Kea/IRTF	19.8	204.5					PnnRnn
KAV	Kavalur Observatory	12.6	78.8	+++++	+ +	+++++	NOV 23 22:24 - NOV 23 23:44	PieRie
RIO	Rio de Janeiro	-22.9	316.8					PnnRnn
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	+++++	+ +	+++++	NOV 23 22:30 - NOV 23 23:47	PieRie
MSO	Mt. Stromlo Observato	-35.3	149.0					PnnRnn

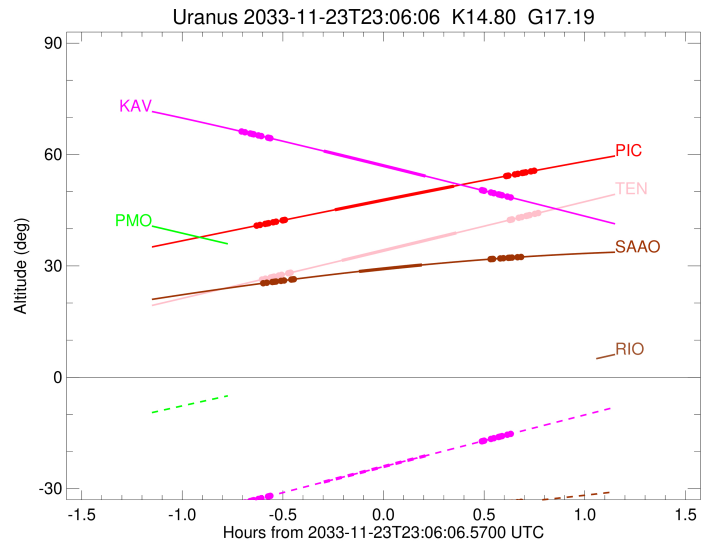
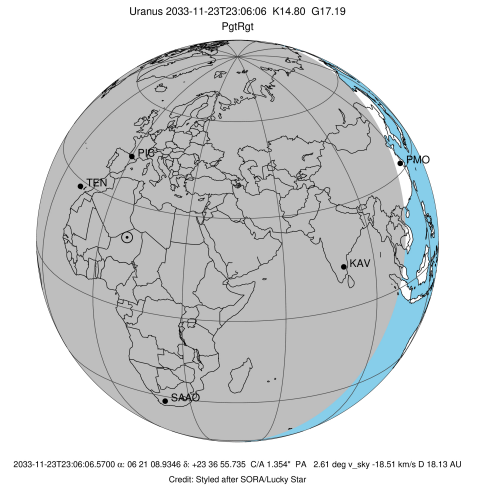


target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2033-11-23T23:09:08.760
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PIC
 Location : Pic du Midi
 Latitude (deg) : 42.93656
 E. Longitude (deg) : 0.14231
 Altitude (km) : 2.890
 Gaia source ID : 3377488511216663552
 2Mass ID (if available) : 06210892+2336558
 ICRS Star Coord at Epoch: 06h 21m 08.93455s +23:36:55.73514s
 RUWE (>1.4 is poor) : 1.01
 K magnitude : 14.801
 G magnitude : 17.193
 RP magnitude : 16.438
 BP magnitude : 17.791
 DUPflag : 0
 Distance (au) : 18.126
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -18.51
 Sun-Target sep (deg) : 146.66
 Sun-Moon sep (deg) : 166.89
 B (ring opening deg) : 71.09
 PA of pole (deg) : 66.76
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.174
 C/A sky separation (km) : 15430.5
 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



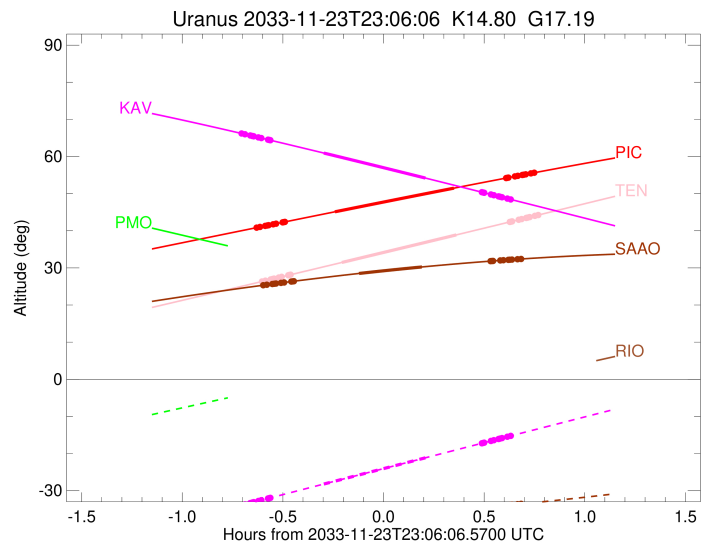
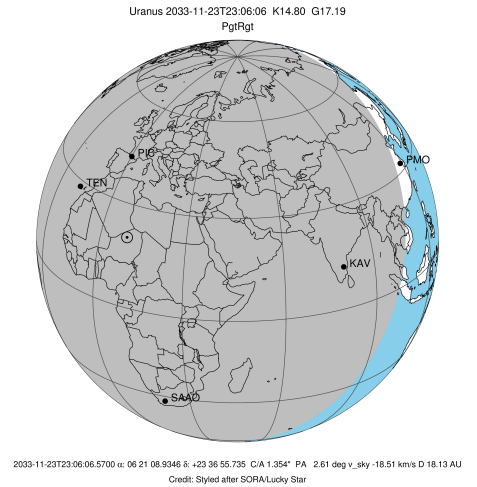
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2033-11-23T22:28:35.586		40.90	-62.50	50818.24	-18.64		
lambda	I	2033-11-23T22:29:18.147		41.03	-62.59	50026.71	-18.58		
delta	I	2033-11-23T22:30:51.227		41.32	-62.78	48300.35	-18.51		
gamma	I	2033-11-23T22:31:27.730		41.43	-62.85	47625.18	-18.48		
eta	I	2033-11-23T22:31:52.043		41.50	-62.90	47176.12	-18.46		
beta	I	2033-11-23T22:33:13.132		41.75	-63.06	45680.85	-18.38		
alpha	I	2033-11-23T22:34:05.509		41.91	-63.17	44724.65	-18.33		
4	I	2033-11-23T22:36:04.850		42.28	-63.40	42534.46	-18.20		
5	I	2033-11-23T22:36:21.476		42.33	-63.43	42234.38	-18.19		
6	I	2033-11-23T22:36:42.237		42.39	-63.47	41861.75	-18.15		
Uranus	I	2033-11-23T22:51:35.252		45.11	-65.04	25056.82		-18.49	-19.31
Uranus	E	2033-11-23T23:27:07.609		51.49	-67.46	25451.45		8.34	8.73
6	E	2033-11-23T23:42:37.573		54.19	-67.80	41795.54	18.23		
5	E	2033-11-23T23:43:04.757		54.27	-67.80	42290.18	18.27		
4	E	2033-11-23T23:43:20.194		54.31	-67.81	42580.17	18.28		
alpha	E	2033-11-23T23:45:15.127		54.64	-67.81	44692.11	18.42		
beta	E	2033-11-23T23:46:06.863		54.79	-67.81	45643.51	18.47		
eta	E	2033-11-23T23:47:29.597		55.03	-67.81	47176.12	18.55		
gamma	E	2033-11-23T23:47:54.063		55.10	-67.81	47630.32	18.58		
delta	E	2033-11-23T23:48:30.103		55.20	-67.81	48300.35	18.61		
lambda	E	2033-11-23T23:50:02.693		55.46	-67.80	50026.71	18.68		
epsilon	E	2033-11-23T23:51:24.379		55.70	-67.78	51555.29	18.74		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2033-11-23T23:10:31.100
 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 : 3377488511216663552
 2Mass ID (if available) : 06210892+2336558
 ICRS Star Coord at Epoch: 06h 21m 08.93455s +23:36:55.73514s
 RUWE (>1.4 is poor) : 1.01
 K magnitude : 14.801
 G magnitude : 17.193
 RP magnitude : 16.438
 BP magnitude : 17.791
 DUPflag : 0
 Distance (au) : 18.126
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -18.51
 Sun-Target sep (deg) : 146.66
 Sun-Moon sep (deg) : 166.60
 B (ring opening deg) : 71.09
 PA of pole (deg) : 66.76
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.253
 C/A sky separation (km) : 16472.2
 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_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	2033-11-23T22:30:11.253		26.40	-56.82	50822.81	-18.44		
lambda	I	2033-11-23T22:30:54.526		26.55	-56.98	50026.71	-18.38		
delta	I	2033-11-23T22:32:28.657		26.89	-57.33	48300.35	-18.30		
gamma	I	2033-11-23T22:33:05.582		27.02	-57.46	47625.29	-18.27		
eta	I	2033-11-23T22:33:30.191		27.11	-57.55	47176.12	-18.24		
beta	I	2033-11-23T22:34:52.285		27.41	-57.85	45680.76	-18.15		
alpha	I	2033-11-23T22:35:45.374		27.60	-58.05	44723.89	-18.09		
4	I	2033-11-23T22:37:46.329		28.03	-58.49	42533.83	-17.94		
5	I	2033-11-23T22:38:03.075		28.09	-58.55	42236.35	-17.93		
6	I	2033-11-23T22:38:24.299		28.17	-58.63	41860.88	-17.88		
Uranus	I	2033-11-23T22:53:40.242		31.46	-61.96	25068.47		-18.26	-19.07
Uranus	E	2033-11-23T23:27:48.900		38.89	-69.30	25473.76		7.42	7.76
6	E	2033-11-23T23:43:43.762		42.37	-72.61	41795.32	18.00		
5	E	2033-11-23T23:44:11.392		42.47	-72.71	42291.88	18.05		
4	E	2033-11-23T23:44:26.852		42.53	-72.76	42578.86	18.05		
alpha	E	2033-11-23T23:46:23.195		42.95	-73.15	44691.53	18.21		
beta	E	2033-11-23T23:47:15.535		43.15	-73.33	45643.78	18.28		
eta	E	2033-11-23T23:48:39.109		43.45	-73.61	47176.12	18.37		
gamma	E	2033-11-23T23:49:03.822		43.54	-73.69	47630.41	18.40		
delta	E	2033-11-23T23:49:40.204		43.68	-73.82	48300.35	18.43		
lambda	E	2033-11-23T23:51:13.640		44.02	-74.13	50026.71	18.52		
epsilon	E	2033-11-23T23:52:36.019		44.32	-74.40	51555.22	18.59		

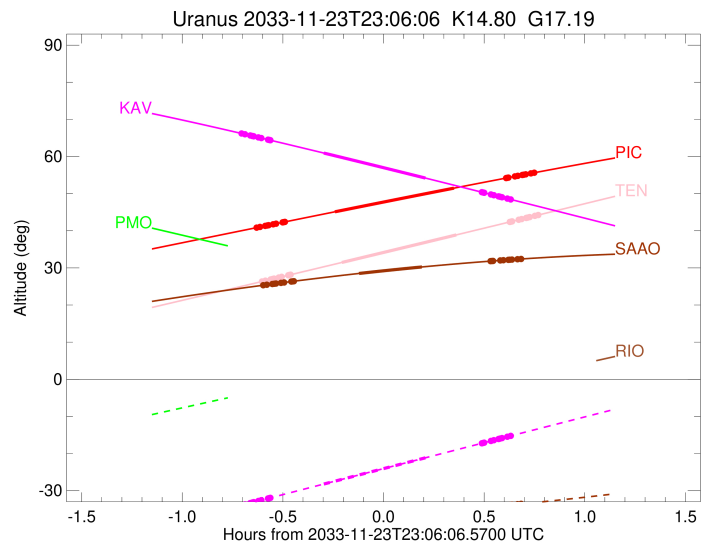
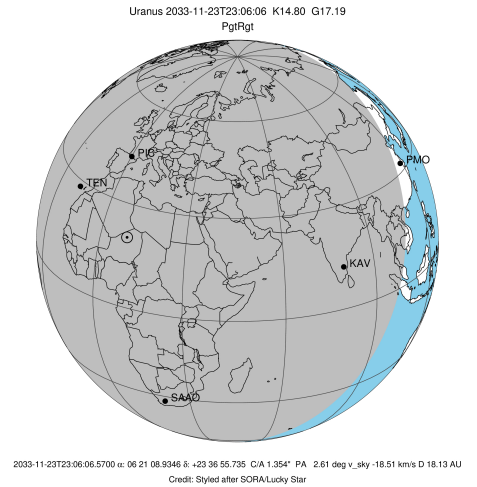
target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2033-11-23T23:03:12.050
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : KAV
 Location : Kavalur Observatory
 Latitude (deg) : 12.57556
 E. Longitude (deg) : 78.83167
 Altitude (km) : 0.722
 Gaia source ID : 3377488511216663552
 2Mass ID (if available) : 06210892+2336558
 ICRS Star Coord at Epoch: 06h 21m 08.93455s +23:36:55.73514s
 RUWE (>1.4 is poor) : 1.01
 K magnitude : 14.801
 G magnitude : 17.193
 RP magnitude : 16.438
 BP magnitude : 17.791
 DUPflag : 0
 Distance (au) : 18.126
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -18.51
 Sun-Target sep (deg) : 146.66
 Sun-Moon sep (deg) : 167.62
 B (ring opening deg) : 71.09
 PA of pole (deg) : 66.76
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.414
 C/A sky separation (km) : 18591.1
 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_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	2033-11-23T22:24:05.468		66.15	-33.89	50837.02	-18.42		
lambda	I	2033-11-23T22:24:49.593		66.00	-33.71	50026.71	-18.34		
delta	I	2033-11-23T22:26:24.007		65.66	-33.35	48300.35	-18.23		
gamma	I	2033-11-23T22:27:01.070		65.53	-33.20	47625.61	-18.18		
eta	I	2033-11-23T22:27:25.814		65.45	-33.10	47176.12	-18.15		
beta	I	2033-11-23T22:28:48.411		65.15	-32.78	45680.45	-18.03		
alpha	I	2033-11-23T22:29:41.994		64.96	-32.57	44721.72	-17.95		
4	I	2033-11-23T22:31:44.055		64.53	-32.10	42532.19	-17.74		
5	I	2033-11-23T22:32:00.665		64.47	-32.03	42241.80	-17.73		
6	I	2033-11-23T22:32:22.597		64.39	-31.95	41858.40	-17.67		
Uranus	I	2033-11-23T22:48:18.573		60.94	-28.22	25108.39		-17.46	-18.23
Uranus	E	2033-11-23T23:18:37.440		54.20	-21.15	25509.04		5.67	5.93
6	E	2033-11-23T23:35:23.204		50.41	-17.26	41795.05	17.62		
5	E	2033-11-23T23:35:51.557		50.30	-17.15	42294.25	17.68		
4	E	2033-11-23T23:36:07.092		50.24	-17.09	42576.96	17.69		
alpha	E	2033-11-23T23:38:05.740		49.79	-16.63	44690.75	17.89		
beta	E	2033-11-23T23:38:59.042		49.59	-16.42	45644.17	17.98		
eta	E	2033-11-23T23:40:23.947		49.27	-16.09	47176.12	18.09		
gamma	E	2033-11-23T23:40:49.043		49.18	-16.00	47630.53	18.12		
delta	E	2033-11-23T23:41:25.957		49.04	-15.85	48300.35	18.17		
lambda	E	2033-11-23T23:43:00.692		48.68	-15.49	50026.71	18.28		
epsilon	E	2033-11-23T23:44:24.101		48.36	-15.17	51554.76	18.36		

```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2033-11-23T23:07:51.940
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      : 3377488511216663552
2Mass ID (if available) : 06210892+2336558
ICRS Star Coord at Epoch: 06h 21m 08.93455s +23:36:55.73514s
RUWE (>1.4 is poor) : 1.01
K magnitude          : 14.801
G magnitude          : 17.193
RP magnitude         : 16.438
BP magnitude         : 17.791
DUPflag             : 0
Distance (au)       : 18.126
f0 (km)             : 0.000
g0 (km)             : 0.000
skyplane vel. (km/s) : -18.51
Sun-Target sep (deg) : 146.66
Sun-Moon sep (deg)  : 166.59
B (ring opening deg) : 71.09
PA of pole (deg)    : 66.76
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (" ) : 1.756
C/A sky separation (km) : 23083.8
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	2033-11-23T22:30:32.133		25.37	-37.22	50861.39	-17.55		
lambda	I	2033-11-23T22:31:19.943		25.46	-37.22	50026.71	-17.42		
delta	I	2033-11-23T22:32:59.545		25.66	-37.20	48300.35	-17.24		
gamma	I	2033-11-23T22:33:38.730		25.74	-37.19	47626.13	-17.17		
eta	I	2033-11-23T22:34:04.981		25.79	-37.19	47176.12	-17.12		
beta	I	2033-11-23T22:35:32.793		25.96	-37.17	45679.76	-16.93		
alpha	I	2033-11-23T22:36:30.120		26.08	-37.16	44718.09	-16.80		
4	I	2033-11-23T22:38:40.977		26.33	-37.12	42529.81	-16.46		
5	I	2033-11-23T22:38:58.308		26.36	-37.12	42251.02	-16.44		
6	I	2033-11-23T22:39:22.833		26.41	-37.11	41853.91	-16.34		
Uranus	I	2033-11-23T22:58:49.507		28.51	-36.57	25248.57		-14.36	-15.01
Uranus	E	2033-11-23T23:17:33.572		30.25	-35.67	25558.96		-0.18	-0.19
6	E	2033-11-23T23:37:59.147		31.82	-34.30	41794.75	16.39		
5	E	2033-11-23T23:38:29.984		31.86	-34.26	42300.88	16.49		
4	E	2033-11-23T23:38:45.896		31.87	-34.24	42571.02	16.51		
alpha	E	2033-11-23T23:40:52.718		32.01	-34.07	44688.56	16.85		
beta	E	2033-11-23T23:41:49.403		32.07	-34.00	45645.59	16.99		
eta	E	2033-11-23T23:43:18.975		32.17	-33.88	47176.12	17.17		
gamma	E	2033-11-23T23:43:45.412		32.20	-33.84	47630.86	17.23		
delta	E	2033-11-23T23:44:24.188		32.24	-33.79	48300.35	17.30		
lambda	E	2033-11-23T23:46:03.438		32.34	-33.65	50026.71	17.48		
epsilon	E	2033-11-23T23:47:30.231		32.42	-33.53	51550.29	17.61		