

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2029-10-26T10:26:58.800
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 3418380585604834816
 2Mass ID (if available) : 05062621+2253256

Uranus 2029-10-26T10:26:58 K13.94 G17.90 PgtRgt

ICRS Star Coord at Epoch: 05h 06m 26.22377s +22:53:24.85650s

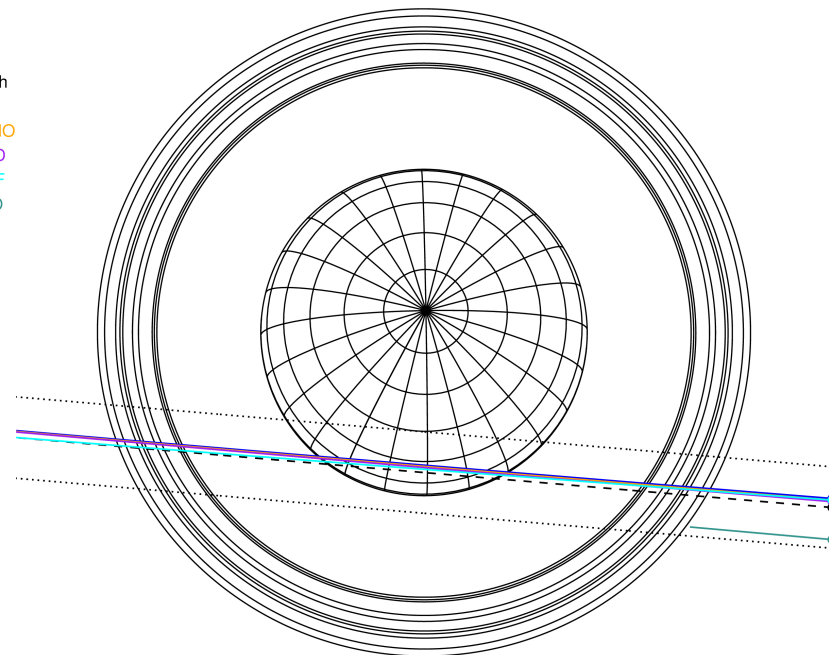
RUWE (>1.4 is poor) : 1.05
 K magnitude : 13.944
 G magnitude : 17.896
 RP magnitude : 16.764
 BP magnitude : 19.241
 DUPflag : 0
 Distance (au) : 18.515
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -14.79
 Sun-Target sep (deg) : 135.20
 Sun-Moon sep (deg) : 1.22
 B (ring opening deg) : 82.26
 PA of pole (deg) : -5.03

#	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



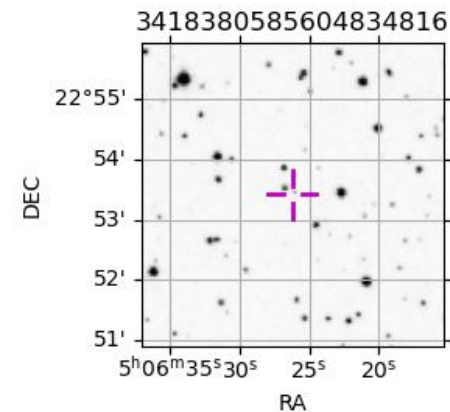
2029-10-26T10:26:58.8000 cc: 05 06 26.22377 s +22 53 24.857 C/A 1.622° PA 355.10 deg v_sky -14.79 km/s D 18.51 AU
 Credit: Styled after SORA/Lucky Star

Earth
 PAL
 KPNO
 MCD
 IRTF
 ESO

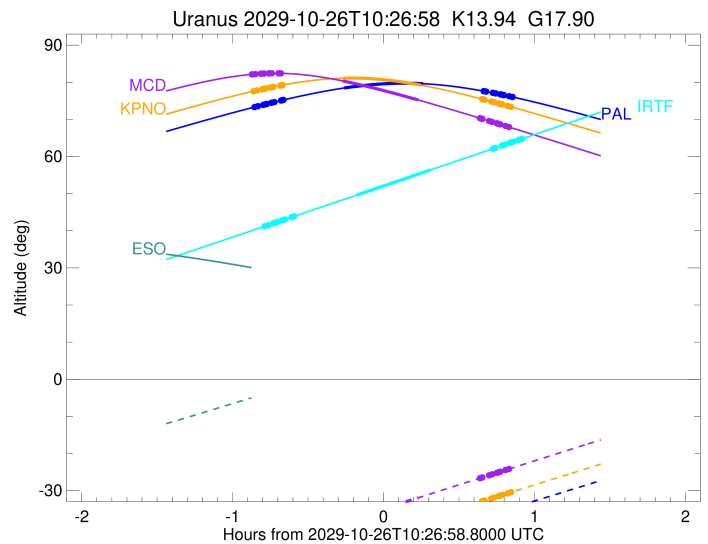
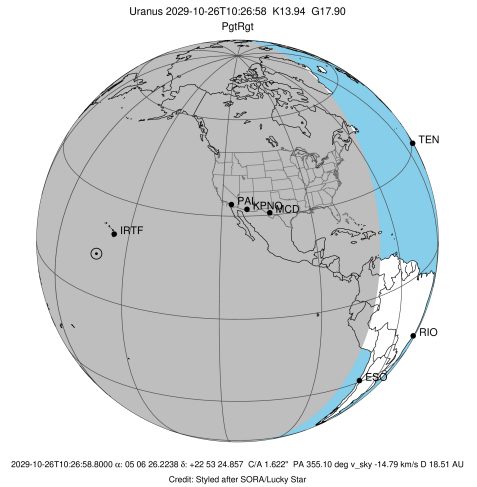


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1					PnnRnn
PAL	Palomar Mt (200")	33.4	243.1	+++++	+ +	+++++	OCT 26 09:35 - OCT 26 11:18	PieRie
PMO	Purple Mtn Obs. Nanki	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+++++	+ +	+++++	OCT 26 09:34 - OCT 26 11:17	PieRie
MCD	McDonald Obs. 2.7m	30.7	256.0	+++++	+ +	+++++	OCT 26 09:34 - OCT 26 11:16	PieRie
TEN	Teide Obs./Tenerife	28.3	343.5					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+++++	+ +	+++++	OCT 26 09:39 - OCT 26 11:21	PieRie
KAV	Kavalur Observatory	12.6	78.8					PnnRnn
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					PnnRnn
MSO	Mt. Stromlo Observato	-35.3	149.0					PnnRnn

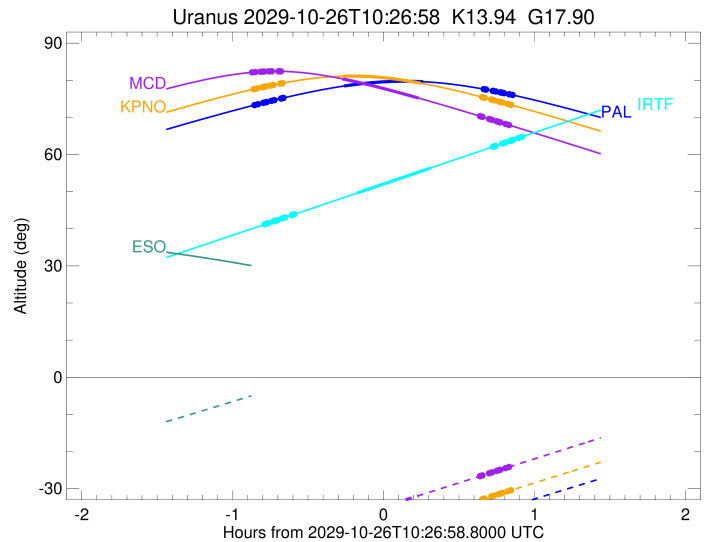
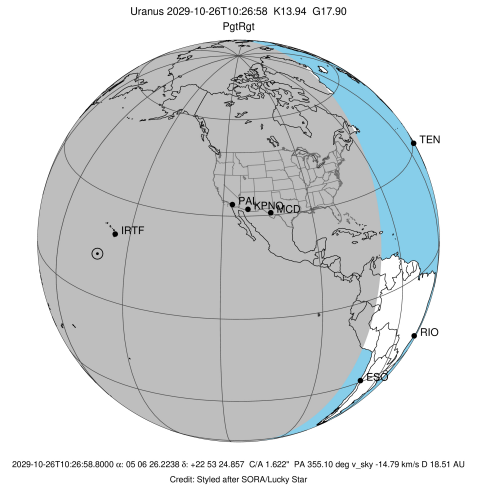


target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2029-10-26T10:27:02.060
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PAL
 Location : Palomar Mt (200")
 Latitude (deg) : 33.35622
 E. Longitude (deg) : 243.13601
 Altitude (km) : 1.706
 Gaia source ID : 3418380585604834816
 2Mass ID (if available) : 05062621+2253256
 ICRS Star Coord at Epoch: 05h 06m 26.22377s +22:53:24.85650s
 RUWE (>1.4 is poor) : 1.05
 K magnitude : 13.944
 G magnitude : 17.896
 RP magnitude : 16.764
 BP magnitude : 19.241
 DUPflag : 0
 Distance (au) : 18.515
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -14.79
 Sun-Target sep (deg) : 135.20
 Sun-Moon sep (deg) : 1.12
 B (ring opening deg) : 82.26
 PA of pole (deg) : -5.03
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.542
 C/A sky separation (km) : 20705.7
 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



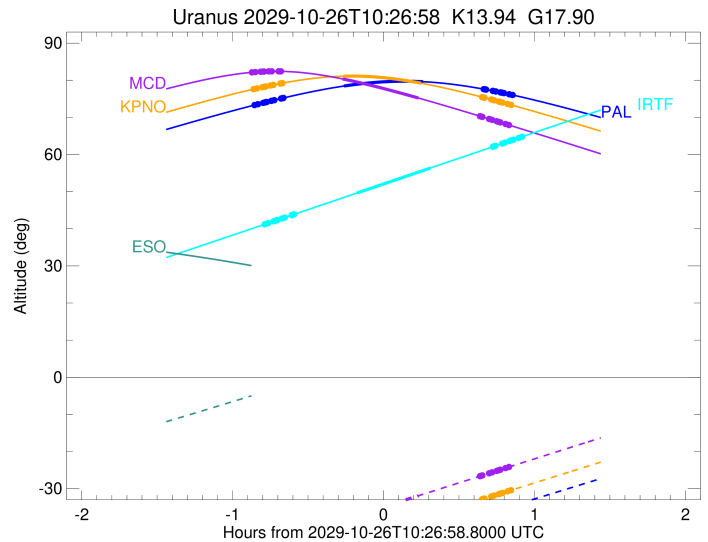
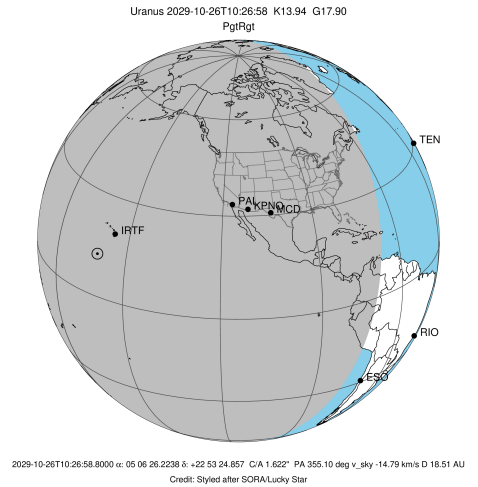
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2029-10-26T09:35:14.660		73.25	-55.07	51550.05	-13.85		
lambda	I	2029-10-26T09:37:05.051		73.56	-54.73	50026.71	-13.76		
delta	I	2029-10-26T09:39:11.014		73.92	-54.34	48300.35	-13.65		
gamma	I	2029-10-26T09:40:00.860		74.06	-54.19	47620.97	-13.61		
eta	I	2029-10-26T09:40:33.590		74.16	-54.08	47176.12	-13.58		
beta	I	2029-10-26T09:42:26.535		74.47	-53.73	45649.22	-13.47		
alpha	I	2029-10-26T09:43:35.110		74.66	-53.52	44728.96	-13.38		
4	I	2029-10-26T09:46:19.033		75.10	-53.01	42550.15	-13.20		
5	I	2029-10-26T09:46:44.130		75.17	-52.93	42218.67	-13.17		
6	I	2029-10-26T09:47:13.287		75.24	-52.84	41836.35	-13.13		
Uranus	I	2029-10-26T10:11:18.956		78.46	-48.19	25168.12		-6.34	-6.64
Uranus	E	2029-10-26T10:42:44.220		79.62	-41.90	25162.88		-6.39	-6.69
6	E	2029-10-26T11:06:51.545		77.61	-36.96	41874.34	13.15		
5	E	2029-10-26T11:07:24.277		77.54	-36.84	42310.73	13.20		
4	E	2029-10-26T11:07:47.707		77.49	-36.76	42616.47	13.23		
alpha	E	2029-10-26T11:10:22.985		77.16	-36.23	44686.01	13.41		
beta	E	2029-10-26T11:11:36.914		76.99	-35.97	45681.23	13.50		
eta	E	2029-10-26T11:13:27.218		76.74	-35.59	47176.12	13.61		
gamma	E	2029-10-26T11:14:00.485		76.66	-35.48	47629.29	13.64		
delta	E	2029-10-26T11:14:49.609		76.55	-35.31	48300.35	13.68		
lambda	E	2029-10-26T11:16:55.277		76.24	-34.88	50026.71	13.79		
epsilon	E	2029-10-26T11:18:00.408		76.08	-34.65	50926.53	13.88		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2029-10-26T10:26:31.600
 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 : 3418380585604834816
 2Mass ID (if available) : 05062621+2253256
 ICRS Star Coord at Epoch: 05h 06m 26.22377s +22:53:24.85650s
 RUWE (>1.4 is poor) : 1.05
 K magnitude : 13.944
 G magnitude : 17.896
 RP magnitude : 16.764
 BP magnitude : 19.241
 DUPflag : 0
 Distance (au) : 18.515
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -14.79
 Sun-Target sep (deg) : 135.20
 Sun-Moon sep (deg) : 1.20
 B (ring opening deg) : 82.26
 PA of pole (deg) : -5.03
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.556
 C/A sky separation (km) : 20895.5
 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	2029-10-26T09:34:51.922		77.53	-51.71	51550.37	-13.84		
lambda	I	2029-10-26T09:36:42.443		77.82	-51.35	50026.71	-13.74		
delta	I	2029-10-26T09:38:48.549		78.13	-50.93	48300.35	-13.63		
gamma	I	2029-10-26T09:39:38.459		78.25	-50.77	47620.96	-13.59		
eta	I	2029-10-26T09:40:11.233		78.33	-50.66	47176.12	-13.56		
beta	I	2029-10-26T09:42:04.338		78.60	-50.28	45649.31	-13.44		
alpha	I	2029-10-26T09:43:13.048		78.76	-50.05	44728.78	-13.36		
4	I	2029-10-26T09:45:57.253		79.12	-49.51	42550.39	-13.17		
5	I	2029-10-26T09:46:22.387		79.18	-49.42	42219.15	-13.14		
6	I	2029-10-26T09:46:51.624		79.24	-49.32	41836.62	-13.10		
Uranus	I	2029-10-26T10:11:08.238		81.11	-44.39	25160.32		-6.41	-6.71
Uranus	E	2029-10-26T10:41:54.257		79.23	-37.99	25156.08		-6.44	-6.74
6	E	2029-10-26T11:06:13.256		75.46	-32.87	41874.43	13.11		
5	E	2029-10-26T11:06:46.084		75.36	-32.75	42310.85	13.16		
4	E	2029-10-26T11:07:09.578		75.29	-32.67	42616.48	13.19		
alpha	E	2029-10-26T11:09:45.279		74.83	-32.12	44685.97	13.38		
beta	E	2029-10-26T11:10:59.397		74.61	-31.86	45681.23	13.46		
eta	E	2029-10-26T11:12:49.965		74.27	-31.47	47176.12	13.58		
gamma	E	2029-10-26T11:13:23.306		74.17	-31.35	47629.27	13.61		
delta	E	2029-10-26T11:14:12.540		74.02	-31.18	48300.35	13.65		
lambda	E	2029-10-26T11:16:18.473		73.63	-30.73	50026.71	13.76		
epsilon	E	2029-10-26T11:17:23.812		73.42	-30.50	50927.62	13.86		

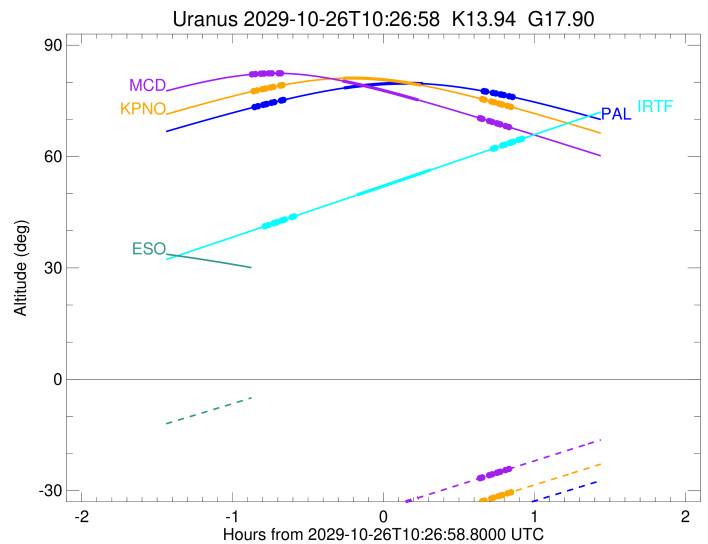
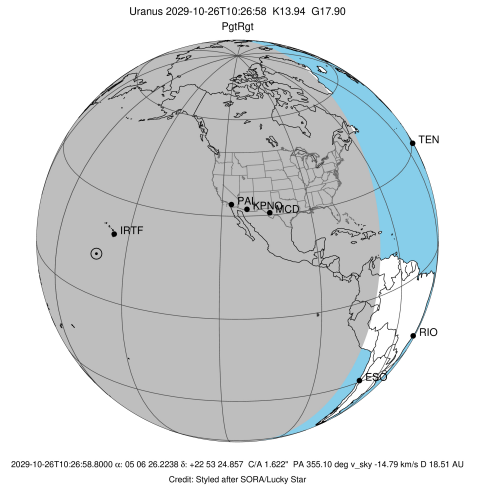
target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2029-10-26T10:25:46.440
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : MCD
 Location : McDonald Obs. 2.7m
 Latitude (deg) : 30.67158
 E. Longitude (deg) : 255.97844
 Altitude (km) : 2.075
 Gaia source ID : 3418380585604834816
 2Mass ID (if available) : 05062621+2253256
 ICRS Star Coord at Epoch: 05h 06m 26.22377s +22:53:24.85650s
 RUWE (>1.4 is poor) : 1.05
 K magnitude : 13.944
 G magnitude : 17.896
 RP magnitude : 16.764
 BP magnitude : 19.241
 DUPflag : 0
 Distance (au) : 18.515
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -14.79
 Sun-Target sep (deg) : 135.20
 Sun-Moon sep (deg) : 1.30
 B (ring opening deg) : 82.26
 PA of pole (deg) : -5.03
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.569
 C/A sky separation (km) : 21062.6
 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	2029-10-26T09:34:13.058		82.11	-46.07	51550.67	-13.82		
lambda	I	2029-10-26T09:36:03.700		82.22	-45.69	50026.71	-13.73		
delta	I	2029-10-26T09:38:09.942		82.31	-45.25	48300.35	-13.62		
gamma	I	2029-10-26T09:38:59.912		82.34	-45.07	47620.96	-13.57		
eta	I	2029-10-26T09:39:32.728		82.36	-44.96	47176.12	-13.54		
beta	I	2029-10-26T09:41:25.986		82.40	-44.56	45649.40	-13.42		
alpha	I	2029-10-26T09:42:34.824		82.42	-44.32	44728.60	-13.34		
4	I	2029-10-26T09:45:19.295		82.42	-43.74	42550.62	-13.15		
5	I	2029-10-26T09:45:44.464		82.42	-43.66	42219.61	-13.12		
6	I	2029-10-26T09:46:13.776		82.41	-43.55	41836.87	-13.07		
Uranus	I	2029-10-26T10:10:40.717		80.37	-38.37	25153.10		-6.47	-6.77
Uranus	E	2029-10-26T10:40:51.845		75.22	-31.91	25150.31		-6.49	-6.79
6	E	2029-10-26T11:05:22.231		70.33	-26.64	41874.50	13.07		
5	E	2029-10-26T11:05:55.165		70.21	-26.52	42310.93	13.12		
4	E	2029-10-26T11:06:18.730		70.13	-26.44	42616.49	13.15		
alpha	E	2029-10-26T11:08:54.899		69.60	-25.88	44685.94	13.34		
beta	E	2029-10-26T11:10:09.231		69.34	-25.61	45681.23	13.42		
eta	E	2029-10-26T11:12:00.099		68.96	-25.21	47176.12	13.54		
gamma	E	2029-10-26T11:12:33.527		68.84	-25.09	47629.26	13.57		
delta	E	2029-10-26T11:13:22.889		68.67	-24.92	48300.35	13.62		
lambda	E	2029-10-26T11:15:29.135		68.23	-24.46	50026.71	13.73		
epsilon	E	2029-10-26T11:16:34.687		68.00	-24.23	50928.40	13.82		

```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2029-10-26T10:31:03.120
Event type           : PgtRgt
: 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       : 3418380585604834816
2Mass ID (if available) : 05062621+2253256
ICRS Star Coord at Epoch: 05h 06m 26.22377s +22:53:24.85650s
RUWE (>1.4 is poor) : 1.05
K magnitude          : 13.944
G magnitude          : 17.896
RP magnitude         : 16.764
BP magnitude         : 19.241
DUPflag             : 0
Distance (au)        : 18.515
f0 (km)              : 0.000
g0 (km)              : 0.000
skyplane vel. (km/s) : -14.79
Sun-Target sep (deg) : 135.20
Sun-Moon sep (deg)  : 0.83
B (ring opening deg) : 82.26
PA of pole (deg)    : -5.03
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 1.591
C/A sky separation (km) : 21358.9
NAIF SPICE kernels   : RAJobs_U111+rgf15.spk
URKALLvl1.spk
urall11.bsp
IAU_URANUS_for_RINGFIT.tpc
vgr2.urall11.bsp
ural161.bsp
vgr2.ural161.bsp
peph.ural160.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	2029-10-26T09:39:17.681		41.10	-80.46	51550.55	-13.66		
lambda	I	2029-10-26T09:41:09.668		41.52	-80.75	50026.71	-13.56		
delta	I	2029-10-26T09:43:17.461		42.01	-81.07	48300.35	-13.45		
gamma	I	2029-10-26T09:44:08.049		42.21	-81.19	47620.96	-13.41		
eta	I	2029-10-26T09:44:41.271		42.33	-81.27	47176.12	-13.37		
beta	I	2029-10-26T09:46:35.943		42.77	-81.53	45649.38	-13.26		
alpha	I	2029-10-26T09:47:45.645		43.04	-81.68	44728.62	-13.17		
4	I	2029-10-26T09:50:32.225		43.68	-82.01	42550.62	-12.98		
5	I	2029-10-26T09:50:57.721		43.77	-82.05	42219.60	-12.95		
6	I	2029-10-26T09:51:27.416		43.89	-82.11	41836.87	-12.90		
Uranus	I	2029-10-26T10:16:24.599		49.63	-82.46	25145.98		-6.52	-6.83
Uranus	E	2029-10-26T10:45:38.889		56.37	-78.10	25134.09		-6.62	-6.93
6	E	2029-10-26T11:10:32.238		62.12	-72.94	41874.85	13.00		
5	E	2029-10-26T11:11:05.331		62.24	-72.82	42311.37	13.05		
4	E	2029-10-26T11:11:28.993		62.34	-72.73	42616.53	13.08		
alpha	E	2029-10-26T11:14:05.839		62.94	-72.16	44685.79	13.29		
beta	E	2029-10-26T11:15:20.467		63.23	-71.89	45681.22	13.37		
eta	E	2029-10-26T11:17:11.717		63.65	-71.48	47176.12	13.50		
gamma	E	2029-10-26T11:17:45.244		63.78	-71.35	47629.19	13.53		
delta	E	2029-10-26T11:18:34.755		63.97	-71.17	48300.35	13.58		
lambda	E	2029-10-26T11:20:41.328		64.46	-70.70	50026.71	13.70		
epsilon	E	2029-10-26T11:21:47.408		64.71	-70.45	50933.66	13.80		