

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2032-02-06T06:33:21.500
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 3416228811285405568
 2Mass ID (if available) : 05292628+2324386

ICRS Star Coord at Epoch: 05h 29m 26.29907s +23:24:38.41802s

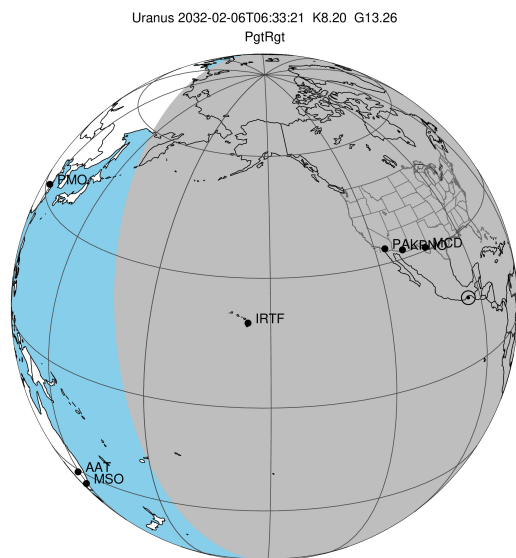
RUWE (>1.4 is poor) : 1.04
 K magnitude : 8.198
 G magnitude : 13.255
 RP magnitude : 12.019
 BP magnitude : 14.974
 DUPflag : 0
 Distance (au) : 18.475
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -11.36
 Sun-Target sep (deg) : 126.42
 Sun-Moon sep (deg) : 164.50
 B (ring opening deg) : 80.49
 PA of pole (deg) : 30.93

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

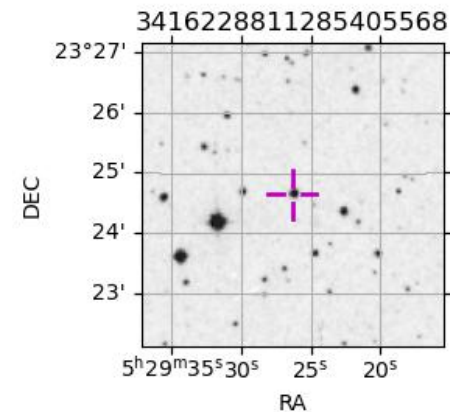
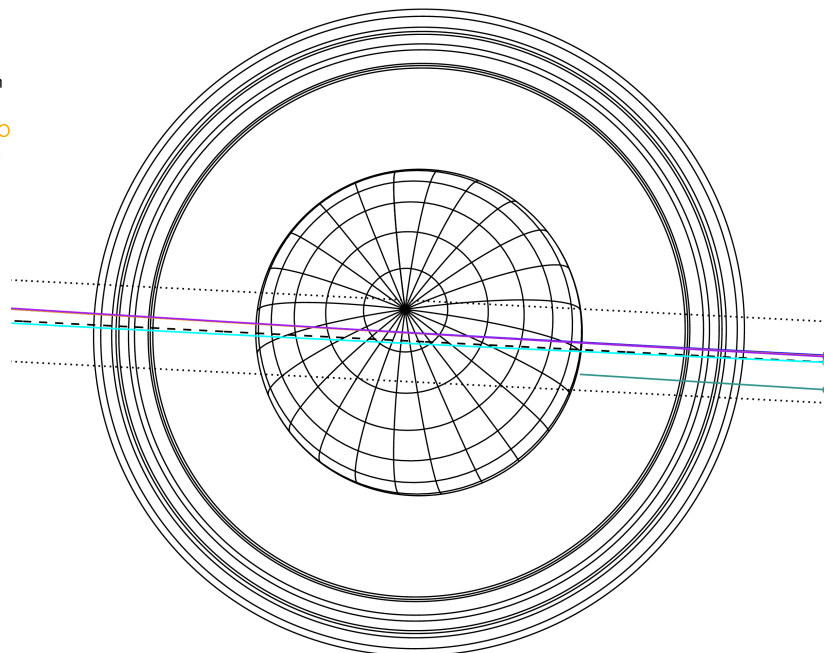
Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1					PnnRnn
PAL	Palomar Mt (200")	33.4	243.1	+++++	+ +	+++++	FEB 06 05:16 - FEB 06 07:41	PieRie
PMO	Purple Mtn Obs. Nanki	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+++++	+ +	+++++	FEB 06 05:15 - FEB 06 07:40	PieRie
MCD	McDonald Obs. 2.7m	30.7	256.0	+++++	+ +	+++++	FEB 06 05:14 - FEB 06 07:40	PieRie
TEN	Teide Obs./Tenerife	28.3	343.5					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+++++	+ +	+++++	FEB 06 05:21 - FEB 06 07:45	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	+++++			FEB 06 05:11 - FEB 06 05:25	PnnRin
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



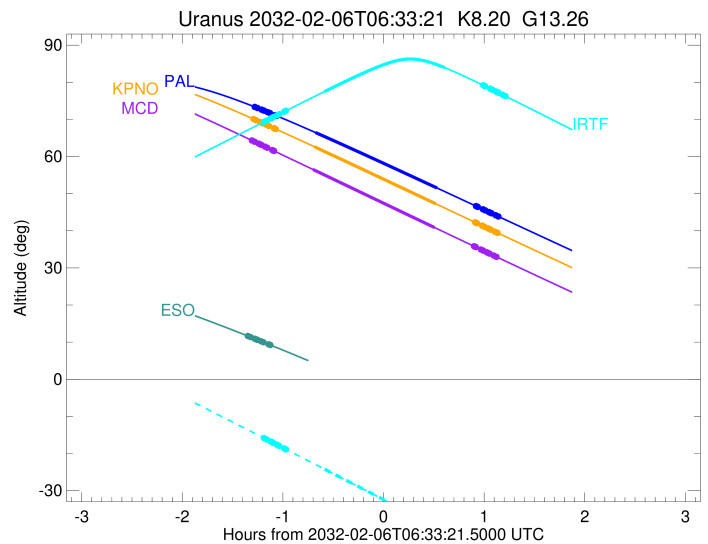
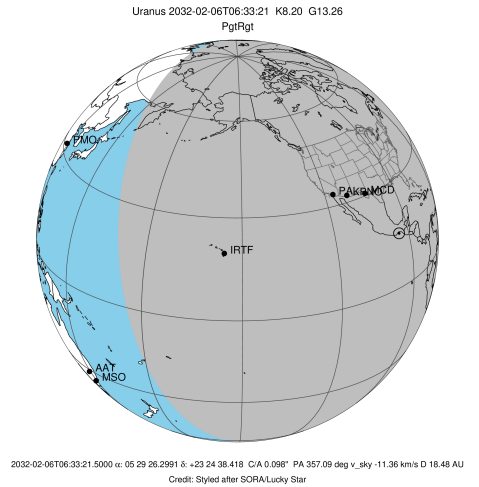
2032-02-06T06:33:21.5000 cc: 05 29 26.2991 s: +23 24 38.418 C/A 0.098" PA 357.09 deg v_sky -11.36 km/s D 18.48 AU
 Credit: Styled after SORA/Lucky Star

Uranus 2032-02-06T06:33:21 K8.20 G13.26 PgtRgt

Earth
 PAL
 KPNO
 MCD
 IRTF
 ESO

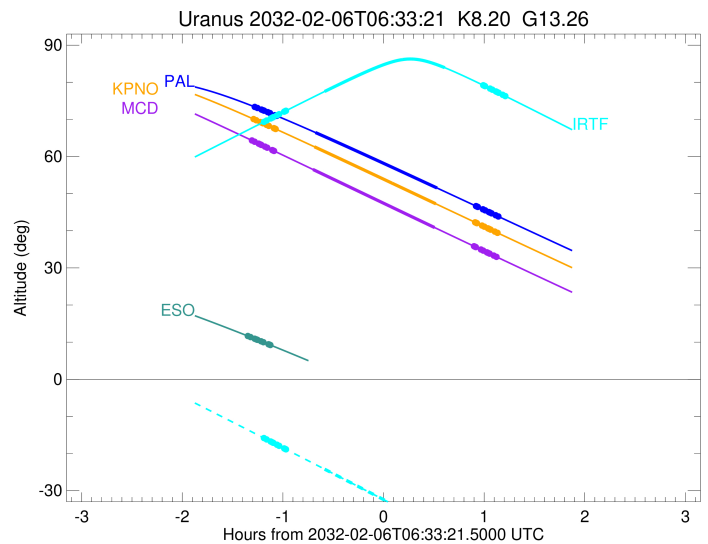
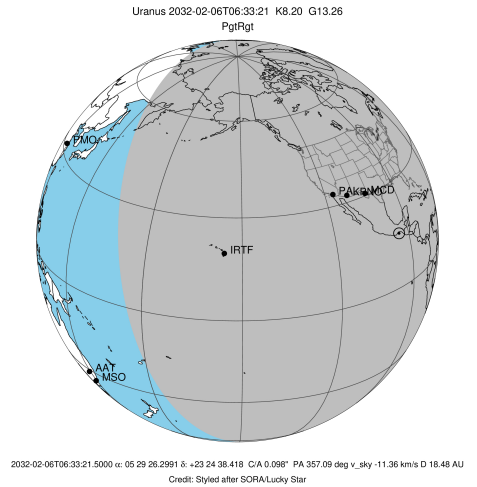


target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2032-02-06T06:28:56.780
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PAL
 Location : Palomar Mt (200")
 Latitude (deg) : 33.35622
 E. Longitude (deg) : 243.13601
 Altitude (km) : 1.706
 Gaia source ID : 3416228811285405568
 2Mass ID (if available) : 05292628+2324386
 ICRS Star Coord at Epoch: 05h 29m 26.29907s +23:24:38.41802s
 RUWE (>1.4 is poor) : 1.04
 K magnitude : 8.198
 G magnitude : 13.255
 RP magnitude : 12.019
 BP magnitude : 14.974
 DUPflag : 0
 Distance (au) : 18.475
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -11.36
 Sun-Target sep (deg) : 126.42
 Sun-Moon sep (deg) : 165.19
 B (ring opening deg) : 80.49
 PA of pole (deg) : 30.93
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.009
 C/A sky separation (km) : 114.6
 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



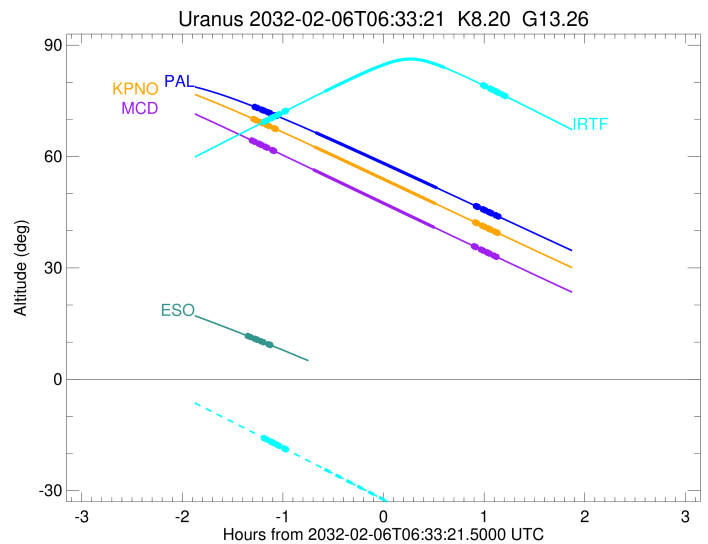
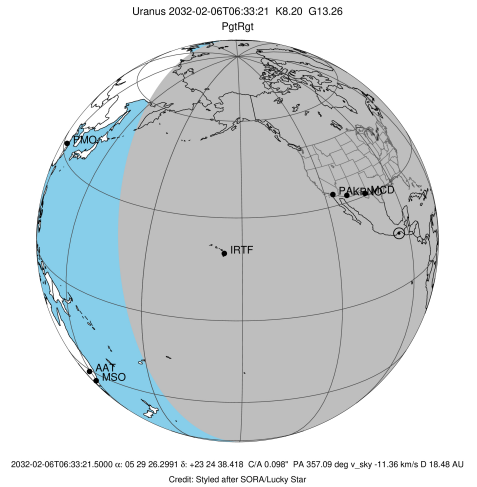
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2032-02-06T05:16:04.280		73.46	-48.88	51521.79	-11.81		
lambda	I	2032-02-06T05:18:10.903		73.08	-49.31	50026.71	-11.81		
delta	I	2032-02-06T05:20:37.137		72.64	-49.80	48300.35	-11.80		
gamma	I	2032-02-06T05:21:34.686		72.47	-49.99	47621.04	-11.80		
eta	I	2032-02-06T05:22:12.381		72.35	-50.12	47176.12	-11.80		
beta	I	2032-02-06T05:24:21.010		71.96	-50.55	45658.16	-11.80		
alpha	I	2032-02-06T05:25:39.495		71.71	-50.81	44732.84	-11.80		
4	I	2032-02-06T05:28:45.847		71.13	-51.43	42535.28	-11.80		
5	I	2032-02-06T05:29:07.984		71.06	-51.50	42268.14	-11.80		
6	I	2032-02-06T05:29:41.415		70.96	-51.61	41877.18	-11.80		
Uranus	I	2032-02-06T05:52:50.076		66.45	-56.15	25373.10		-5.35	-5.61
Uranus	E	2032-02-06T07:05:11.878		51.54	-68.41	25376.85		5.30	5.55
6	E	2032-02-06T07:28:27.130		46.66	-71.01	41797.33	11.65		
5	E	2032-02-06T07:29:02.102		46.54	-71.06	42201.56	11.65		
4	E	2032-02-06T07:29:36.392		46.42	-71.11	42607.14	11.65		
alpha	E	2032-02-06T07:32:36.475		45.79	-71.36	44704.21	11.65		
beta	E	2032-02-06T07:33:58.957		45.50	-71.47	45664.14	11.65		
eta	E	2032-02-06T07:36:08.802		45.05	-71.62	47176.12	11.64		
gamma	E	2032-02-06T07:36:47.912		44.91	-71.67	47631.50	11.64		
delta	E	2032-02-06T07:37:45.362		44.71	-71.73	48300.35	11.64		
lambda	E	2032-02-06T07:40:13.677		44.19	-71.89	50026.71	11.64		
epsilon	E	2032-02-06T07:41:18.089		43.97	-71.95	50776.29	11.64		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2032-02-06T06:28:18.610
 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 : 3416228811285405568
 2Mass ID (if available) : 05292628+2324386
 ICRS Star Coord at Epoch: 05h 29m 26.29907s +23:24:38.41802s
 RUWE (>1.4 is poor) : 1.04
 K magnitude : 8.198
 G magnitude : 13.255
 RP magnitude : 12.019
 BP magnitude : 14.974
 DUPflag : 0
 Distance (au) : 18.475
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -11.36
 Sun-Target sep (deg) : 126.42
 Sun-Moon sep (deg) : 165.25
 B (ring opening deg) : 80.49
 PA of pole (deg) : 30.93
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.013
 C/A sky separation (km) : 167.7
 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	2032-02-06T05:15:22.763		70.20	-53.39	51521.42	-11.80		
lambda	I	2032-02-06T05:17:29.397		69.77	-53.82	50026.71	-11.80		
delta	I	2032-02-06T05:19:55.685		69.28	-54.31	48300.35	-11.80		
gamma	I	2032-02-06T05:20:53.257		69.09	-54.50	47621.04	-11.80		
eta	I	2032-02-06T05:21:30.966		68.96	-54.63	47176.12	-11.80		
beta	I	2032-02-06T05:23:39.654		68.52	-55.06	45658.11	-11.80		
alpha	I	2032-02-06T05:24:58.176		68.26	-55.32	44732.76	-11.79		
4	I	2032-02-06T05:28:04.603		67.62	-55.94	42535.35	-11.79		
5	I	2032-02-06T05:28:26.740		67.55	-56.02	42268.32	-11.79		
6	I	2032-02-06T05:29:00.207		67.43	-56.13	41877.14	-11.79		
Uranus	I	2032-02-06T05:52:09.831		62.63	-60.63	25371.31		-5.38	-5.63
Uranus	E	2032-02-06T07:04:36.945		47.25	-71.99	25377.40		5.29	5.54
6	E	2032-02-06T07:27:54.715		42.29	-73.68	41797.33	11.63		
5	E	2032-02-06T07:28:29.757		42.17	-73.70	42201.58	11.63		
4	E	2032-02-06T07:29:04.113		42.05	-73.72	42607.14	11.63		
alpha	E	2032-02-06T07:32:04.550		41.41	-73.82	44704.21	11.63		
beta	E	2032-02-06T07:33:27.197		41.12	-73.85	45664.14	11.62		
eta	E	2032-02-06T07:35:37.304		40.66	-73.89	47176.12	11.62		
gamma	E	2032-02-06T07:36:16.493		40.52	-73.90	47631.50	11.62		
delta	E	2032-02-06T07:37:14.060		40.31	-73.91	48300.35	11.62		
lambda	E	2032-02-06T07:39:42.680		39.79	-73.92	50026.71	11.61		
epsilon	E	2032-02-06T07:40:47.226		39.56	-73.92	50776.29	11.61		

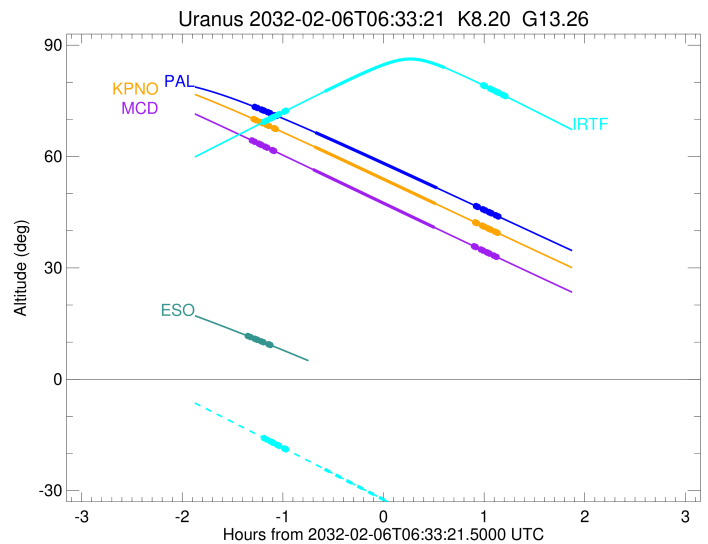
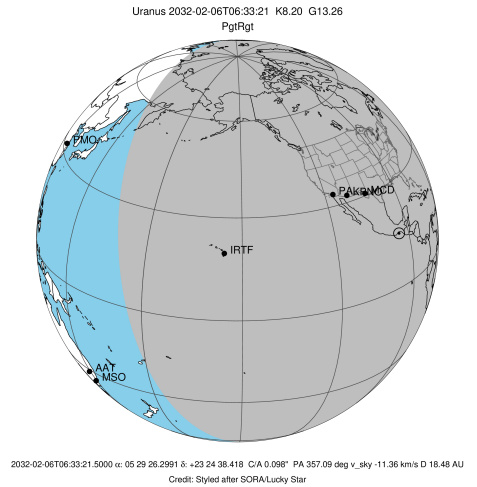
target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2032-02-06T06:27:28.400
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : MCD
 Location : McDonald Obs. 2.7m
 Latitude (deg) : 30.67158
 E. Longitude (deg) : 255.97844
 Altitude (km) : 2.075
 Gaia source ID : 3416228811285405568
 2Mass ID (if available) : 05292628+2324386
 ICRS Star Coord at Epoch: 05h 29m 26.29907s +23:24:38.41802s
 RUWE (>1.4 is poor) : 1.04
 K magnitude : 8.198
 G magnitude : 13.255
 RP magnitude : 12.019
 BP magnitude : 14.974
 DUPflag : 0
 Distance (au) : 18.475
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -11.36
 Sun-Target sep (deg) : 126.42
 Sun-Moon sep (deg) : 165.31
 B (ring opening deg) : 80.49
 PA of pole (deg) : 30.93
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.011
 C/A sky separation (km) : 142.4
 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_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	2032-02-06T05:14:24.403		64.44	-59.73	51521.24	-11.79		
lambda	I	2032-02-06T05:16:31.177		63.99	-60.15	50026.71	-11.79		
delta	I	2032-02-06T05:18:57.650		63.47	-60.63	48300.35	-11.78		
gamma	I	2032-02-06T05:19:55.296		63.26	-60.82	47621.04	-11.78		
eta	I	2032-02-06T05:20:33.055		63.13	-60.94	47176.12	-11.78		
beta	I	2032-02-06T05:22:41.916		62.67	-61.36	45658.09	-11.78		
alpha	I	2032-02-06T05:24:00.547		62.39	-61.62	44732.73	-11.78		
4	I	2032-02-06T05:27:07.231		61.72	-62.22	42535.38	-11.78		
5	I	2032-02-06T05:27:29.395		61.64	-62.29	42268.40	-11.77		
6	I	2032-02-06T05:28:02.919		61.52	-62.40	41877.12	-11.77		
Uranus	I	2032-02-06T05:51:14.857		56.53	-66.70	25371.00		-5.38	-5.64
Uranus	E	2032-02-06T07:03:52.713		40.86	-75.15	25376.05		5.31	5.56
6	E	2032-02-06T07:27:15.028		35.85	-74.70	41797.36	11.59		
5	E	2032-02-06T07:27:50.175		35.73	-74.67	42201.43	11.59		
4	E	2032-02-06T07:28:24.654		35.60	-74.63	42607.09	11.59		
alpha	E	2032-02-06T07:31:25.720		34.96	-74.43	44704.27	11.59		
beta	E	2032-02-06T07:32:48.650		34.66	-74.32	45664.18	11.58		
eta	E	2032-02-06T07:34:59.205		34.20	-74.15	47176.12	11.58		
gamma	E	2032-02-06T07:35:38.532		34.06	-74.10	47631.50	11.58		
delta	E	2032-02-06T07:36:36.300		33.85	-74.01	48300.35	11.58		
lambda	E	2032-02-06T07:39:05.443		33.32	-73.79	50026.71	11.57		
epsilon	E	2032-02-06T07:40:10.245		33.09	-73.69	50776.60	11.57		

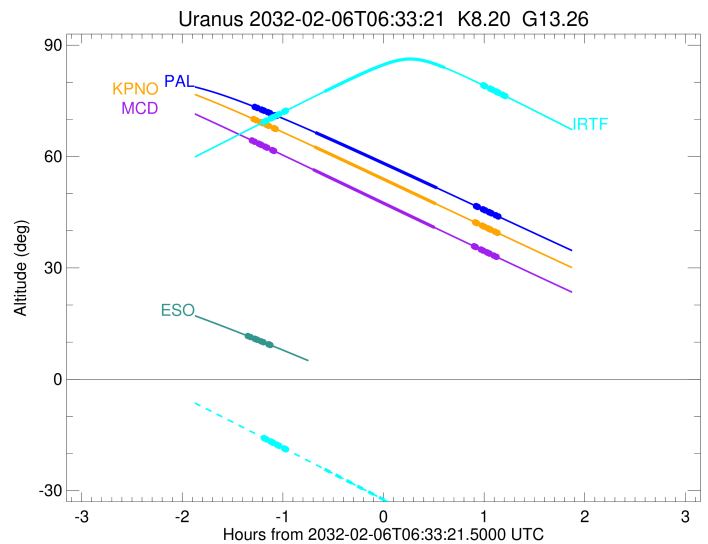
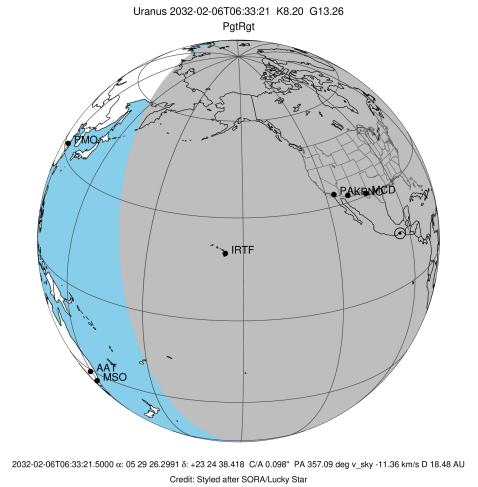
```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2032-02-06T06:33:58.280
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      : 3416228811285405568
2Mass ID (if available) : 05292628+2324386
ICRS Star Coord at Epoch: 05h 29m 26.29907s +23:24:38.41802s
RUWE (>1.4 is poor) : 1.04
K magnitude          : 8.198
G magnitude          : 13.255
RP magnitude         : 12.019
BP magnitude         : 14.974
DUPflag             : 0
Distance (au)       : 18.475
f0 (km)             : 0.000
g0 (km)             : 0.000
skyplane vel. (km/s) : -11.36
Sun-Target sep (deg) : 126.42
Sun-Moon sep (deg)  : 164.68
B (ring opening deg) : 80.49
PA of pole (deg)    : 30.93
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 0.134
C/A sky separation (km) : 1793.1
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_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	2032-02-06T05:21:34.196		69.22	-15.73	51517.77	-11.82		
lambda	I	2032-02-06T05:23:40.309		69.70	-16.21	50026.71	-11.82		
delta	I	2032-02-06T05:26:06.320		70.26	-16.77	48300.35	-11.82		
gamma	I	2032-02-06T05:27:03.775		70.48	-16.99	47621.02	-11.82		
eta	I	2032-02-06T05:27:41.403		70.62	-17.14	47176.12	-11.82		
beta	I	2032-02-06T05:29:49.845		71.11	-17.63	45657.60	-11.82		
alpha	I	2032-02-06T05:31:08.210		71.41	-17.93	44731.94	-11.82		
4	I	2032-02-06T05:34:14.019		72.11	-18.65	42536.15	-11.82		
5	I	2032-02-06T05:34:35.969		72.19	-18.73	42270.42	-11.82		
6	I	2032-02-06T05:35:09.581		72.32	-18.86	41876.69	-11.82		
Uranus	I	2032-02-06T05:58:15.331		77.53	-24.22	25341.64		-5.80	-6.07
Uranus	E	2032-02-06T07:09:48.373		83.95	-40.94	25415.51		4.70	4.92
6	E	2032-02-06T07:32:46.316		79.21	-46.34	41796.67	11.81		
5	E	2032-02-06T07:33:21.155		79.09	-46.48	42205.13	11.81		
4	E	2032-02-06T07:33:54.836		78.96	-46.61	42608.43	11.81		
alpha	E	2032-02-06T07:36:52.295		78.31	-47.30	44702.81	11.81		
beta	E	2032-02-06T07:38:13.696		78.01	-47.62	45663.23	11.81		
eta	E	2032-02-06T07:40:21.839		77.54	-48.12	47176.12	11.81		
gamma	E	2032-02-06T07:41:00.404		77.40	-48.28	47631.45	11.81		
delta	E	2032-02-06T07:41:57.058		77.19	-48.50	48300.35	11.81		
lambda	E	2032-02-06T07:44:23.283		76.64	-49.07	50026.71	11.81		
epsilon	E	2032-02-06T07:45:26.245		76.41	-49.32	50770.01	11.80		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2032-02-06T06:25:40.560
 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 : 3416228811285405568
 2Mass ID (if available) : 05292628+2324386
 ICRS Star Coord at Epoch: 05h 29m 26.29907s +23:24:38.41802s
 RUWE (>1.4 is poor) : 1.04
 K magnitude : 8.198
 G magnitude : 13.255
 RP magnitude : 12.019
 BP magnitude : 14.974
 DUPflag : 0
 Distance (au) : 18.475
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -11.36
 Sun-Target sep (deg) : 126.42
 Sun-Moon sep (deg) : 165.18
 B (ring opening deg) : 80.49
 PA of pole (deg) : 30.93
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.368
 C/A sky separation (km) : 4933.6
 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	2032-02-06T05:11:58.096		11.74	-45.01	51503.04	-11.58		
lambda	I	2032-02-06T05:14:05.564		11.36	-44.97	50026.71	-11.58		
delta	I	2032-02-06T05:16:34.724		10.92	-44.91	48300.35	-11.57		
gamma	I	2032-02-06T05:17:33.456		10.74	-44.88	47620.97	-11.57		
eta	I	2032-02-06T05:18:11.923		10.62	-44.87	47176.12	-11.56		
beta	I	2032-02-06T05:20:23.454		10.23	-44.80	45655.90	-11.55		
alpha	I	2032-02-06T05:21:43.777		9.99	-44.76	44729.14	-11.55		
4	I	2032-02-06T05:24:53.633		9.41	-44.65	42538.93	-11.54		
5	I	2032-02-06T05:25:15.761		9.34	-44.64	42276.91	-11.53		
6	I	2032-02-06T05:25:51.000		9.23	-44.62	41875.05	-11.53		
Uranus	I	2032-02-06T05:49:43.459		4.79x	-43.39	25260.85		-6.81	-7.13
Uranus	E	2032-02-06T07:02:09.792		-9.48x	-35.93	25466.09		3.77	3.95
6	E	2032-02-06T07:26:12.568		-14.42x	-32.49	41795.97	11.29		
5	E	2032-02-06T07:26:49.427		-14.55x	-32.40	42209.69	11.29		
4	E	2032-02-06T07:27:24.424		-14.67x	-32.31	42609.91	11.29		
alpha	E	2032-02-06T07:30:29.708		-15.31x	-31.84	44701.14	11.29		
beta	E	2032-02-06T07:31:54.861		-15.61x	-31.62	45662.13	11.29		
eta	E	2032-02-06T07:34:08.940		-16.07x	-31.27	47176.12	11.29		
gamma	E	2032-02-06T07:34:49.255		-16.21x	-31.17	47631.38	11.29		
delta	E	2032-02-06T07:35:48.493		-16.42x	-31.01	48300.35	11.29		
lambda	E	2032-02-06T07:38:21.375		-16.95x	-30.61	50026.71	11.29		
epsilon	E	2032-02-06T07:39:26.631		-17.17x	-30.44	50763.56	11.29		