

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2031-10-30T08:38:11.120
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 3427624695254911360
 2Mass ID (if available) : 05444260+2332030

Uranus 2031-10-30T08:38:11 K14.37 G16.63 PgtRgt

ICRS Star Coord at Epoch: 05h 44m 42.61221s +23:32:03.18319s

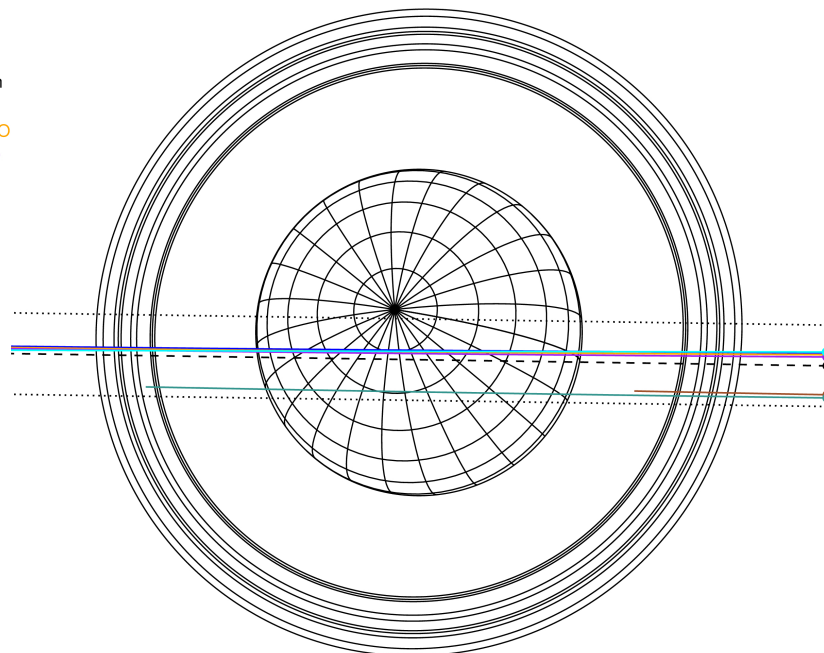
RUWE (>1.4 is poor) : 1.00
 K magnitude : 14.371
 G magnitude : 16.634
 RP magnitude : 15.946
 BP magnitude : 17.161
 DUPflag : 0
 Distance (au) : 18.445
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -12.71
 Sun-Target sep (deg) : 129.78
 Sun-Moon sep (deg) : 49.68
 B (ring opening deg) : 78.18
 PA of pole (deg) : 46.58

Uranus 2031-10-30T08:38:11 K14.37 G16.63
 PgtRgt



2031-10-30T08:38:11.1200 ra: 05 44 42.6122 s: +23 32 03.183 C/A 0.311" PA 359.14 deg v_sky -12.71 km/s D 18.44 AU
 Credit: Styled after SORA/Lucky Star

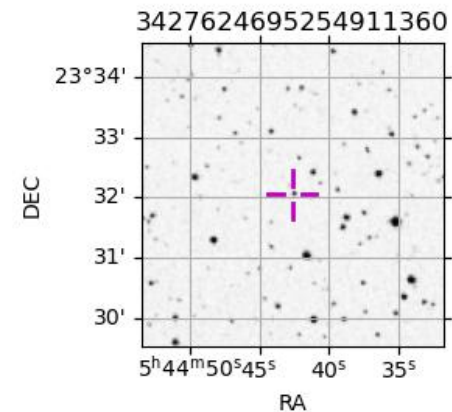
Earth
 PAL
 KPNO
 MCD
 IRTF
 RIO
 ESO



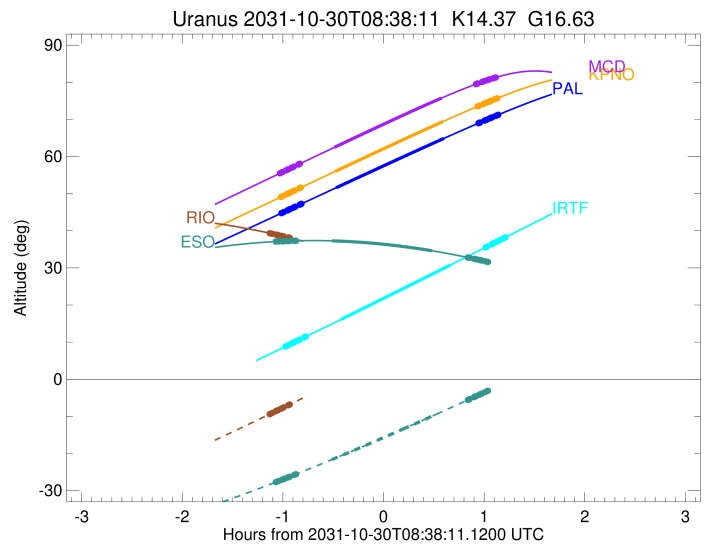
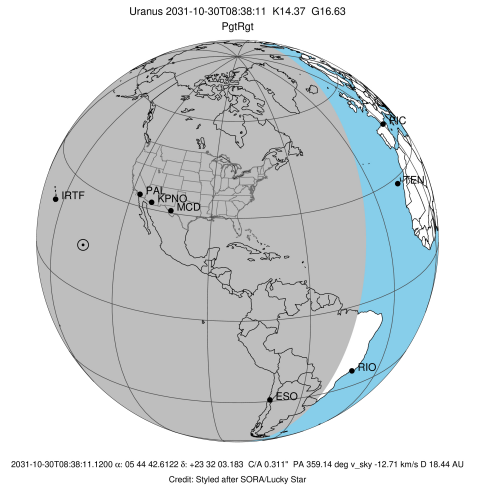
#	a(km)	ring
1	41837.2	6
2	42235.0	5
3	42571.2	4
4	44718.5	alpha
5	45661.1	beta
6	47176.1	eta
7	47626.3	gamma
8	48300.3	delta
9	50026.7	lambda
10	51149.4	epsilon

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	+++++	+ +	+++++	OCT 30 07:37 - OCT 30 09:46	PieRie
PMO	Purple Mtn Obs. Nanki	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+++++	+ +	+++++	OCT 30 07:37 - OCT 30 09:46	PieRie
MCD	McDonald Obs. 2.7m	30.7	256.0	+++++	+ +	+++++	OCT 30 07:36 - OCT 30 09:45	PieRie
TEN	Teide Obs./Tenerife	28.3	343.5					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+++++	+ +	+++++	OCT 30 07:40 - OCT 30 09:51	PieRie
KAV	Kavalur Observatory	12.6	78.8					PnnRnn
RIO	Rio de Janeiro	-22.9	316.8	+++++			OCT 30 07:30 - OCT 30 07:42	PnnRin
ESO	European Southern Obs	-29.3	289.3	+++++	+ +	+++	OCT 30 07:34 - OCT 30 09:29	PieRie
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

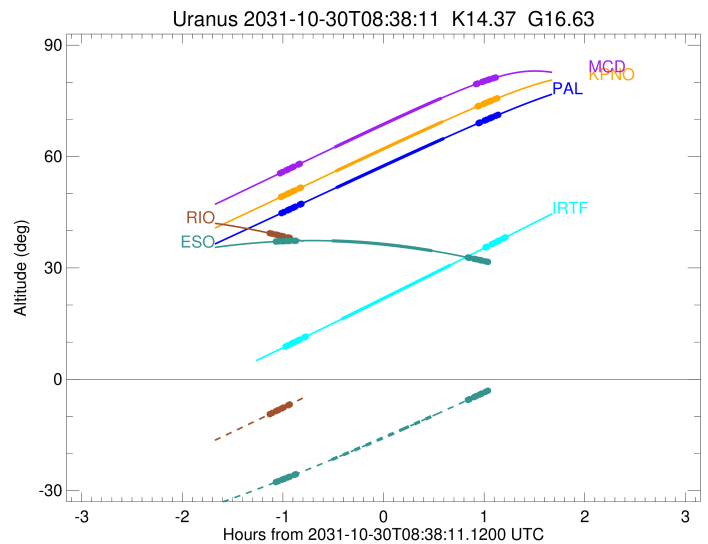
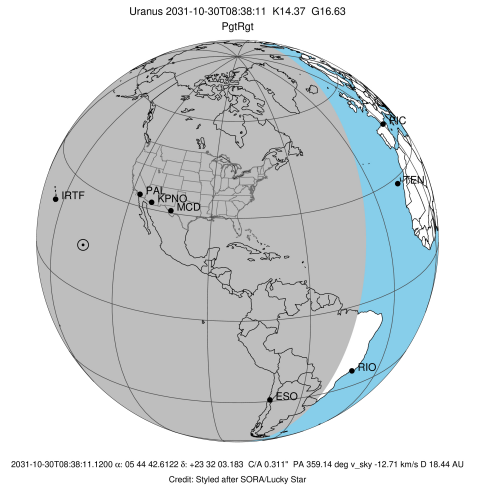


target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2031-10-30T08:42:06.140
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PAL
 Location : Palomar Mt (200")
 Latitude (deg) : 33.35622
 E. Longitude (deg) : 243.13601
 Altitude (km) : 1.706
 Gaia source ID : 3427624695254911360
 2Mass ID (if available) : 05444260+2332030
 ICRS Star Coord at Epoch: 05h 44m 42.61221s +23:32:03.18319s
 RUWE (>1.4 is poor) : 1.00
 K magnitude : 14.371
 G magnitude : 16.634
 RP magnitude : 15.946
 BP magnitude : 17.161
 DUPflag : 0
 Distance (au) : 18.445
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -12.71
 Sun-Target sep (deg) : 129.78
 Sun-Moon sep (deg) : 50.00
 B (ring opening deg) : 78.18
 PA of pole (deg) : 46.58
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.208
 C/A sky separation (km) : 2785.7
 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



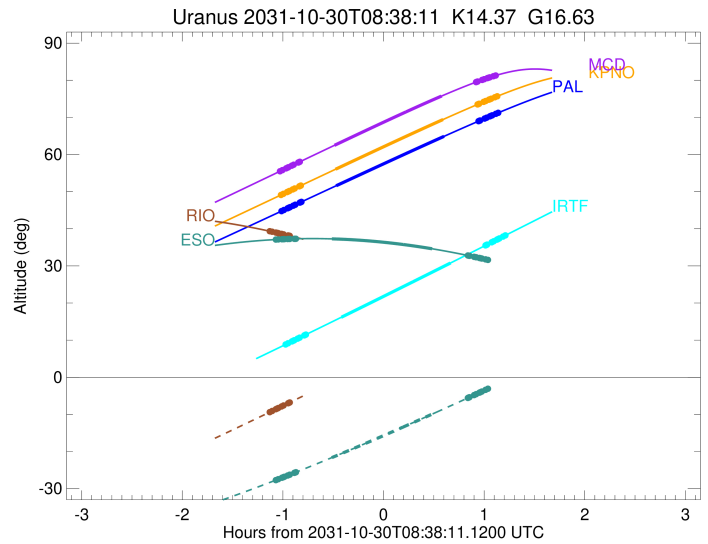
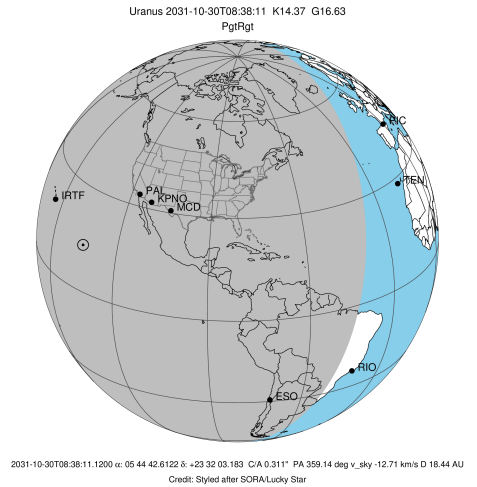
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2031-10-30T07:37:33.756		44.80	-70.51	51009.20	-13.07		
lambda	I	2031-10-30T07:38:48.977		45.06	-70.49	50026.71	-13.06		
delta	I	2031-10-30T07:41:01.134		45.52	-70.44	48300.35	-13.06		
gamma	I	2031-10-30T07:41:52.325		45.70	-70.41	47631.58	-13.06		
eta	I	2031-10-30T07:42:27.187		45.82	-70.40	47176.12	-13.06		
beta	I	2031-10-30T07:44:23.412		46.23	-70.33	45657.58	-13.07		
alpha	I	2031-10-30T07:45:37.355		46.49	-70.29	44689.47	-13.07		
4	I	2031-10-30T07:48:16.876		47.05	-70.18	42607.39	-13.07		
5	I	2031-10-30T07:48:40.147		47.13	-70.16	42302.52	-13.07		
6	I	2031-10-30T07:49:16.293		47.25	-70.13	41823.17	-13.06		
Uranus	I	2031-10-30T08:10:00.854		51.60	-68.65	25193.57		-9.46	-9.90
Uranus	E	2031-10-30T09:14:14.927		64.89	-59.57	25315.23		7.68	8.04
6	E	2031-10-30T09:34:50.754		68.99	-55.85	41845.97	13.20		
5	E	2031-10-30T09:35:14.209		69.06	-55.78	42162.52	13.20		
4	E	2031-10-30T09:35:42.754		69.16	-55.69	42538.81	13.20		
alpha	E	2031-10-30T09:38:30.288		69.70	-55.16	44749.45	13.21		
beta	E	2031-10-30T09:39:39.621		69.92	-54.95	45666.99	13.21		
eta	E	2031-10-30T09:41:33.834		70.28	-54.59	47176.12	13.21		
gamma	E	2031-10-30T09:42:07.500		70.39	-54.48	47621.01	13.22		
delta	E	2031-10-30T09:42:58.903		70.55	-54.32	48300.35	13.22		
lambda	E	2031-10-30T09:45:09.504		70.97	-53.91	50026.71	13.22		
epsilon	E	2031-10-30T09:46:47.582		71.28	-53.60	51323.47	13.23		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2031-10-30T08:41:37.680
 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 : 3427624695254911360
 2Mass ID (if available) : 05444260+2332030
 ICRS Star Coord at Epoch: 05h 44m 42.61221s +23:32:03.18319s
 RUWE (>1.4 is poor) : 1.00
 K magnitude : 14.371
 G magnitude : 16.634
 RP magnitude : 15.946
 BP magnitude : 17.161
 DUPflag : 0
 Distance (au) : 18.445
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -12.71
 Sun-Target sep (deg) : 129.78
 Sun-Moon sep (deg) : 50.06
 B (ring opening deg) : 78.18
 PA of pole (deg) : 46.58
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.227
 C/A sky separation (km) : 3039.4
 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	2031-10-30T07:37:14.783		49.15	-70.91	51011.38	-13.09		
lambda	I	2031-10-30T07:38:30.016		49.42	-70.81	50026.71	-13.09		
delta	I	2031-10-30T07:40:41.907		49.89	-70.64	48300.35	-13.09		
gamma	I	2031-10-30T07:41:32.996		50.07	-70.57	47631.58	-13.09		
eta	I	2031-10-30T07:42:07.789		50.19	-70.52	47176.12	-13.09		
beta	I	2031-10-30T07:44:03.777		50.61	-70.35	45657.71	-13.09		
alpha	I	2031-10-30T07:45:17.579		50.87	-70.23	44689.59	-13.09		
4	I	2031-10-30T07:47:56.797		51.43	-69.98	42607.57	-13.09		
5	I	2031-10-30T07:48:20.056		51.52	-69.94	42302.22	-13.09		
6	I	2031-10-30T07:48:56.134		51.64	-69.88	41822.90	-13.09		
Uranus	I	2031-10-30T08:09:38.859		56.05	-67.38	25187.79		-9.53	-9.98
Uranus	E	2031-10-30T09:13:41.430		69.43	-56.48	25320.36		7.60	7.96
6	E	2031-10-30T09:34:16.361		73.50	-52.45	41845.75	13.21		
5	E	2031-10-30T09:34:39.800		73.57	-52.37	42162.35	13.21		
4	E	2031-10-30T09:35:08.349		73.66	-52.28	42538.97	13.21		
alpha	E	2031-10-30T09:37:55.726		74.19	-51.72	44749.52	13.22		
beta	E	2031-10-30T09:39:05.000		74.41	-51.49	45667.09	13.22		
eta	E	2031-10-30T09:40:59.104		74.77	-51.11	47176.12	13.23		
gamma	E	2031-10-30T09:41:32.741		74.87	-50.99	47621.01	13.23		
delta	E	2031-10-30T09:42:24.098		75.03	-50.82	48300.35	13.23		
lambda	E	2031-10-30T09:44:34.582		75.43	-50.38	50026.71	13.23		
epsilon	E	2031-10-30T09:46:12.687		75.72	-50.05	51324.98	13.24		

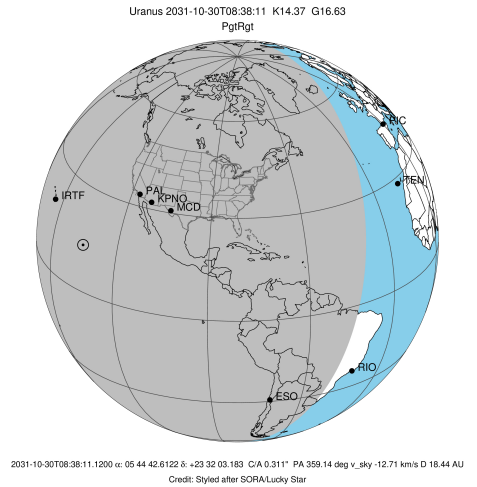
target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2031-10-30T08:40:50.850
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : MCD
 Location : McDonald Obs. 2.7m
 Latitude (deg) : 30.67158
 E. Longitude (deg) : 255.97844
 Altitude (km) : 2.075
 Gaia source ID : 3427624695254911360
 2Mass ID (if available) : 05444260+2332030
 ICRS Star Coord at Epoch: 05h 44m 42.61221s +23:32:03.18319s
 RUWE (>1.4 is poor) : 1.00
 K magnitude : 14.371
 G magnitude : 16.634
 RP magnitude : 15.946
 BP magnitude : 17.161
 DUPflag : 0
 Distance (au) : 18.445
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -12.71
 Sun-Target sep (deg) : 129.78
 Sun-Moon sep (deg) : 50.16
 B (ring opening deg) : 78.18
 PA of pole (deg) : 46.58
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.247
 C/A sky separation (km) : 3306.8
 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



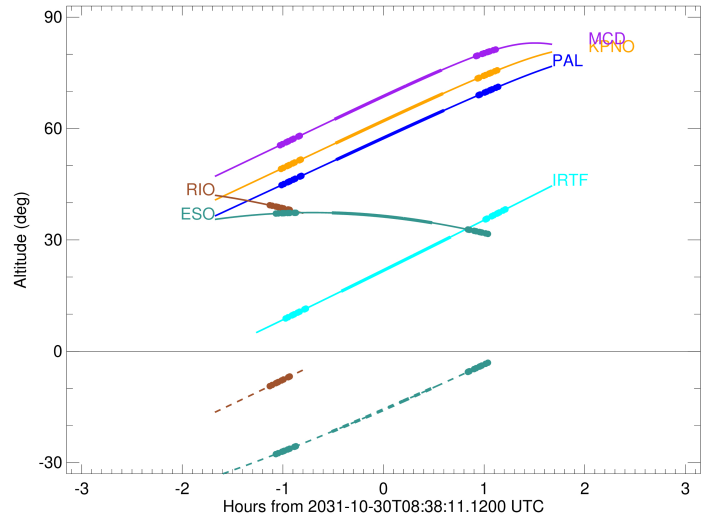
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2031-10-30T07:36:39.253		55.53	-68.73	51013.85	-13.13		
lambda	I	2031-10-30T07:37:54.478		55.80	-68.55	50026.71	-13.12		
delta	I	2031-10-30T07:40:06.031		56.28	-68.23	48300.35	-13.12		
gamma	I	2031-10-30T07:40:56.992		56.46	-68.10	47631.58	-13.12		
eta	I	2031-10-30T07:41:31.698		56.59	-68.02	47176.12	-13.12		
beta	I	2031-10-30T07:43:27.388		57.00	-67.73	45657.85	-13.12		
alpha	I	2031-10-30T07:44:41.010		57.27	-67.54	44689.71	-13.12		
4	I	2031-10-30T07:47:19.847		57.84	-67.13	42607.78	-13.12		
5	I	2031-10-30T07:47:43.086		57.92	-67.07	42301.89	-13.12		
6	I	2031-10-30T07:48:19.080		58.05	-66.98	41822.59	-13.12		
Uranus	I	2031-10-30T08:08:59.496		62.49	-63.50	25181.47		-9.62	-10.06
Uranus	E	2031-10-30T09:12:48.948		75.75	-51.06	25325.49		7.52	7.87
6	E	2031-10-30T09:33:23.101		79.51	-46.78	41845.54	13.22		
5	E	2031-10-30T09:33:46.526		79.58	-46.70	42162.18	13.22		
4	E	2031-10-30T09:34:15.081		79.66	-46.60	42539.13	13.23		
alpha	E	2031-10-30T09:37:02.321		80.11	-46.01	44749.58	13.23		
beta	E	2031-10-30T09:38:11.545		80.29	-45.77	45667.17	13.23		
eta	E	2031-10-30T09:40:05.556		80.58	-45.37	47176.12	13.24		
gamma	E	2031-10-30T09:40:39.167		80.66	-45.25	47621.01	13.24		
delta	E	2031-10-30T09:41:30.485		80.79	-45.07	48300.35	13.24		
lambda	E	2031-10-30T09:43:40.872		81.10	-44.61	50026.71	13.24		
epsilon	E	2031-10-30T09:45:19.012		81.32	-44.27	51326.40	13.25		

```

target                : Uranus
target radius (km)    : 25559.00
C/A epoch             : 2031-10-30T08:45:37.060
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        : 3427624695254911360
2Mass ID (if available) : 05444260+2332030
ICRS Star Coord at Epoch: 05h 44m 42.61221s +23:32:03.18319s
RUWE (>1.4 is poor)  : 1.00
K magnitude           : 14.371
G magnitude           : 16.634
RP magnitude          : 15.946
BP magnitude          : 17.161
DUPflag              : 0
Distance (au)         : 18.445
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s)  : -12.71
Sun-Target sep (deg)  : 129.78
Sun-Moon sep (deg)    : 49.39
B (ring opening deg)  : 78.18
PA of pole (deg)      : 46.58
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 0.221
C/A sky separation (km) : 2956.2
NAIF SPICE kernels    : RAJobs_U111+rgf15.spk
URKALLvl1.spk
urall11.bsp
IAU_URANUS_for_RINGFIT.tpc
vgr2.urall11.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
    
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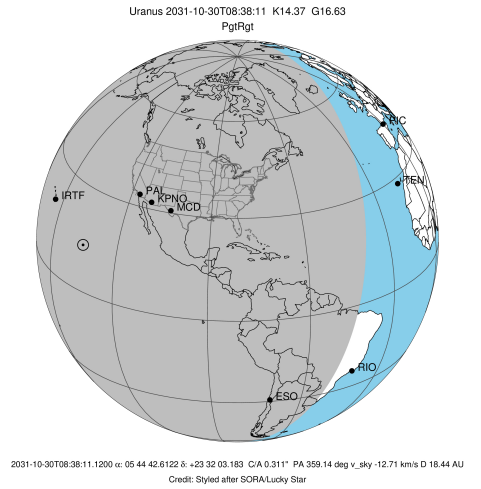


Uranus 2031-10-30T08:38:11 K14.37 G16.63

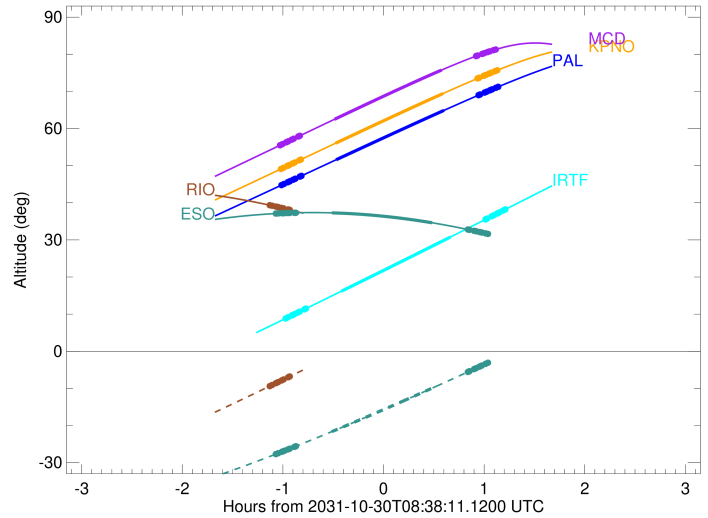


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2031-10-30T07:40:01.154		8.88	-54.72	51008.53	-12.83		
lambda	I	2031-10-30T07:41:17.733		9.16	-55.02	50026.71	-12.82		
delta	I	2031-10-30T07:43:32.360		9.65	-55.55	48300.35	-12.82		
gamma	I	2031-10-30T07:44:24.505		9.84	-55.75	47631.58	-12.83		
eta	I	2031-10-30T07:45:00.014		9.97	-55.89	47176.12	-12.83		
beta	I	2031-10-30T07:46:58.394		10.41	-56.36	45657.55	-12.83		
alpha	I	2031-10-30T07:48:13.701		10.68	-56.65	44689.45	-12.83		
4	I	2031-10-30T07:50:56.151		11.28	-57.28	42607.36	-12.83		
5	I	2031-10-30T07:51:19.842		11.36	-57.38	42302.57	-12.83		
6	I	2031-10-30T07:51:56.649		11.50	-57.52	41823.22	-12.83		
Uranus	I	2031-10-30T08:13:03.409		16.17	-62.46	25192.96		-9.47	-9.91
Uranus	E	2031-10-30T09:18:10.501		30.79	-77.21	25322.55		7.57	7.92
6	E	2031-10-30T09:39:00.923		35.52	-81.31	41845.53	13.06		
5	E	2031-10-30T09:39:24.640		35.61	-81.38	42162.17	13.06		
4	E	2031-10-30T09:39:53.553		35.72	-81.47	42539.14	13.06		
alpha	E	2031-10-30T09:42:42.850		36.36	-81.94	44749.60	13.07		
beta	E	2031-10-30T09:43:52.914		36.63	-82.12	45667.19	13.08		
eta	E	2031-10-30T09:45:48.291		37.07	-82.42	47176.12	13.08		
gamma	E	2031-10-30T09:46:22.301		37.20	-82.50	47621.01	13.08		
delta	E	2031-10-30T09:47:14.225		37.39	-82.63	48300.35	13.08		
lambda	E	2031-10-30T09:49:26.133		37.90	-82.93	50026.71	13.09		
epsilon	E	2031-10-30T09:51:05.457		38.27	-83.14	51327.15	13.10		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2031-10-30T08:33:41.440
 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 : 3427624695254911360
 2Mass ID (if available) : 05444260+2332030
 ICRS Star Coord at Epoch: 05h 44m 42.61221s +23:32:03.18319s
 RUWE (>1.4 is poor) : 1.00
 K magnitude : 14.371
 G magnitude : 16.634
 RP magnitude : 15.946
 BP magnitude : 17.161
 DUPflag : 0
 Distance (au) : 18.445
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -12.71
 Sun-Target sep (deg) : 129.78
 Sun-Moon sep (deg) : 50.40
 B (ring opening deg) : 78.18
 PA of pole (deg) : 46.58
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.631
 C/A sky separation (km) : 8439.6
 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

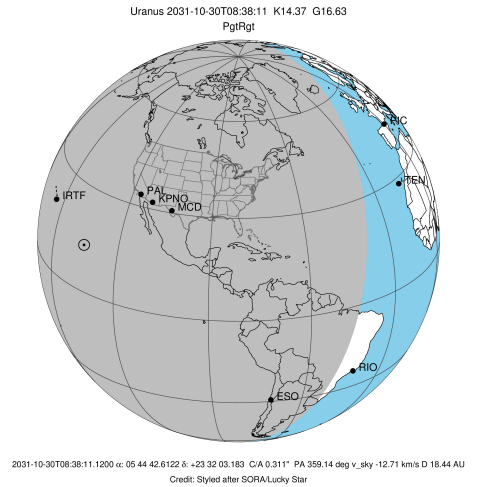


Uranus 2031-10-30T08:38:11 K14.37 G16.63

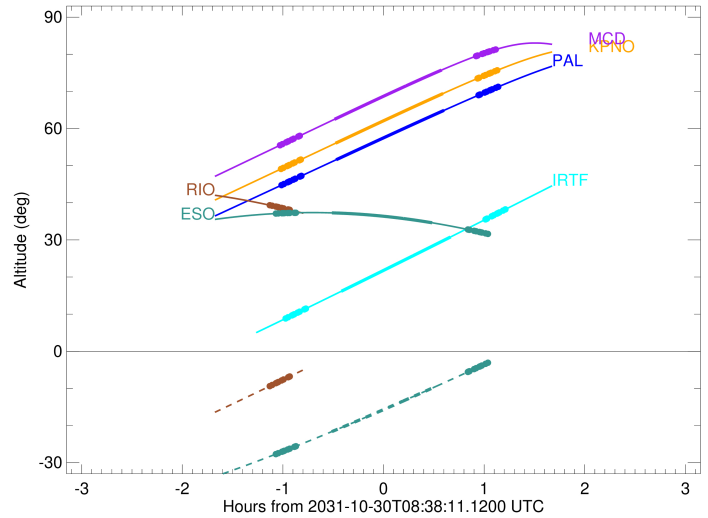


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2031-10-30T07:30:29.284		39.33	-9.37	51058.35	-13.07		
lambda	I	2031-10-30T07:31:48.356		39.20	-9.08	50026.71	-13.04		
delta	I	2031-10-30T07:34:00.796		38.98	-8.60	48300.35	-13.03		
gamma	I	2031-10-30T07:34:52.148		38.89	-8.41	47631.54	-13.02		
eta	I	2031-10-30T07:35:27.130		38.83	-8.29	47176.12	-13.02		
beta	I	2031-10-30T07:37:23.656		38.63	-7.86	45660.38	-13.00		
alpha	I	2031-10-30T07:38:37.988		38.50	-7.59	44692.26	-12.99		
4	I	2031-10-30T07:41:18.619		38.21	-7.00	42611.06	-12.96		
5	I	2031-10-30T07:41:42.786		38.16	-6.92	42295.24	-12.96		
6	I	2031-10-30T07:42:19.172		38.10	-6.78	41817.26	-12.95		
Uranus	I	2031-10-30T08:03:32.878		35.56	-2.10x	25077.74		-10.91	-11.41
Uranus	E	2031-10-30T09:04:22.011		26.51	11.56x	25427.66		5.61	5.88
6	E	2031-10-30T09:25:42.948		22.85	16.42x	41840.78	12.86		
5	E	2031-10-30T09:26:07.162		22.77	16.52x	42158.88	12.87		
4	E	2031-10-30T09:26:37.099		22.69	16.63x	42542.87	12.88		
alpha	E	2031-10-30T09:29:28.490		22.18	17.28x	44750.84	12.90		
beta	E	2031-10-30T09:30:39.537		21.97	17.55x	45669.10	12.91		
eta	E	2031-10-30T09:32:36.209		21.62	18.00x	47176.12	12.92		
gamma	E	2031-10-30T09:33:10.642		21.52	18.13x	47621.11	12.93		
delta	E	2031-10-30T09:34:03.183		21.36	18.33x	48300.35	12.93		
lambda	E	2031-10-30T09:36:16.634		20.96	18.84x	50026.71	12.94		
epsilon	E	2031-10-30T09:37:59.501		20.65	19.23x	51358.45	12.97		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2031-10-30T08:36:58.490
 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 : 3427624695254911360
 2Mass ID (if available) : 05444260+2332030
 ICRS Star Coord at Epoch: 05h 44m 42.61221s +23:32:03.18319s
 RUWE (>1.4 is poor) : 1.00
 K magnitude : 14.371
 G magnitude : 16.634
 RP magnitude : 15.946
 BP magnitude : 17.161
 DUPflag : 0
 Distance (au) : 18.445
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -12.71
 Sun-Target sep (deg) : 129.78
 Sun-Moon sep (deg) : 50.21
 B (ring opening deg) : 78.18
 PA of pole (deg) : 46.58
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.696
 C/A sky separation (km) : 9305.4
 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



Uranus 2031-10-30T08:38:11 K14.37 G16.63



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2031-10-30T07:34:07.497		37.10	-27.68	51062.95	-13.03		
lambda	I	2031-10-30T07:35:27.156		37.13	-27.45	50026.71	-13.00		
delta	I	2031-10-30T07:37:39.996		37.18	-27.06	48300.35	-12.99		
gamma	I	2031-10-30T07:38:31.507		37.19	-26.91	47631.54	-12.98		
eta	I	2031-10-30T07:39:06.598		37.21	-26.81	47176.12	-12.98		
beta	I	2031-10-30T07:41:03.479		37.24	-26.46	45660.66	-12.96		
alpha	I	2031-10-30T07:42:18.055		37.26	-26.24	44692.57	-12.95		
4	I	2031-10-30T07:44:59.255		37.29	-25.76	42611.39	-12.92		
5	I	2031-10-30T07:45:23.584		37.30	-25.69	42294.41	-12.91		
6	I	2031-10-30T07:46:00.093		37.31	-25.58	41816.67	-12.90		
Uranus	I	2031-10-30T08:07:21.976		37.28	-21.65	25066.00		-11.04	-11.56
Uranus	E	2031-10-30T09:07:06.438		34.62	-9.95	25447.10		5.18	5.42
6	E	2031-10-30T09:28:28.949		32.81	-5.57	41839.64	12.90		
5	E	2031-10-30T09:28:53.149		32.77	-5.49	42158.24	12.91		
4	E	2031-10-30T09:29:23.139		32.72	-5.39	42543.81	12.92		
alpha	E	2031-10-30T09:32:13.935		32.45	-4.80x	44751.09	12.94		
beta	E	2031-10-30T09:33:24.752		32.33	-4.55x	45669.56	12.96		
eta	E	2031-10-30T09:35:20.942		32.14	-4.15x	47176.12	12.97		
gamma	E	2031-10-30T09:35:55.237		32.08	-4.03x	47621.14	12.98		
delta	E	2031-10-30T09:36:47.556		31.99	-3.85x	48300.35	12.99		
lambda	E	2031-10-30T09:39:00.413		31.77	-3.39x	50026.71	13.00		
epsilon	E	2031-10-30T09:40:43.396		31.59	-3.03x	51366.32	13.03		