

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2023-09-17T08:49:04.370
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 56055718419988224
 2Mass ID (if available) : 03210502+1806238

Uranus 2023-09-17T08:49:04 K11.88 G13.28 PgtRgt

ICRS Star Coord at Epoch: 03h 21m 05.03263s +18:06:23.36557s

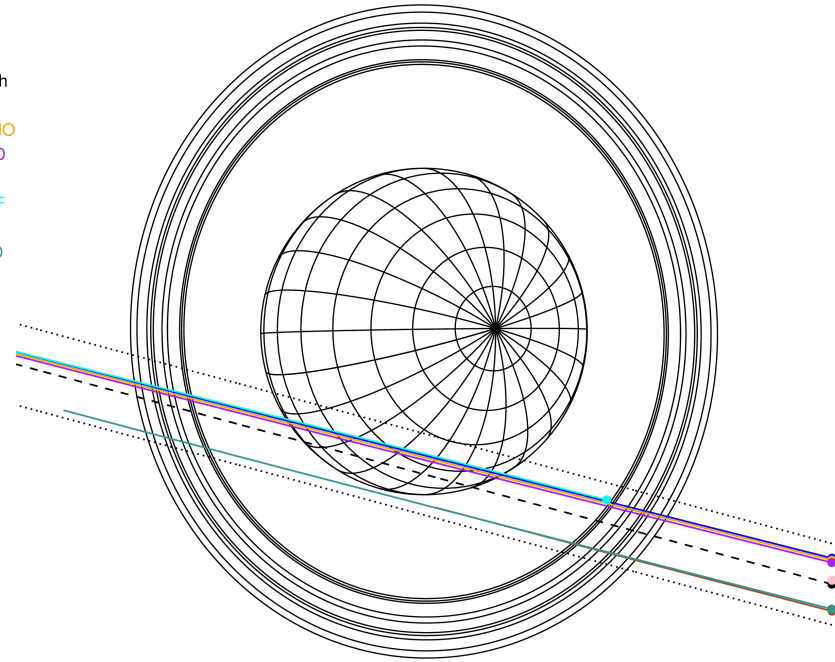
RUWE (>1.4 is poor) : 1.40
 K magnitude : 11.884
 G magnitude : 13.280
 RP magnitude : 12.779
 BP magnitude : 13.578
 DUPflag : 0
 Distance (au) : 19.089
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -9.14
 Sun-Target sep (deg) : 121.30
 Sun-Moon sep (deg) : 146.78
 B (ring opening deg) : 63.95
 PA of pole (deg) : -87.60

#	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



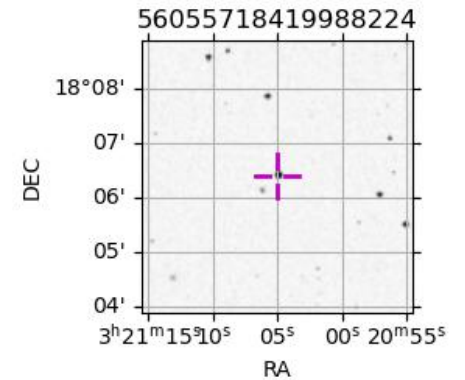
2023-09-17T08:49:04.3700 α: 03 21 05.0326 s; +18 06 23.366 C/A 1.558° PA 344.91 deg v_sky - 9.14 km/s D 19.09 AU
 Credit: Styled after SORA/Lucky Star

Earth
 PAL
 KPNO
 MCD
 TEN
 IRTF
 RIO
 ESO

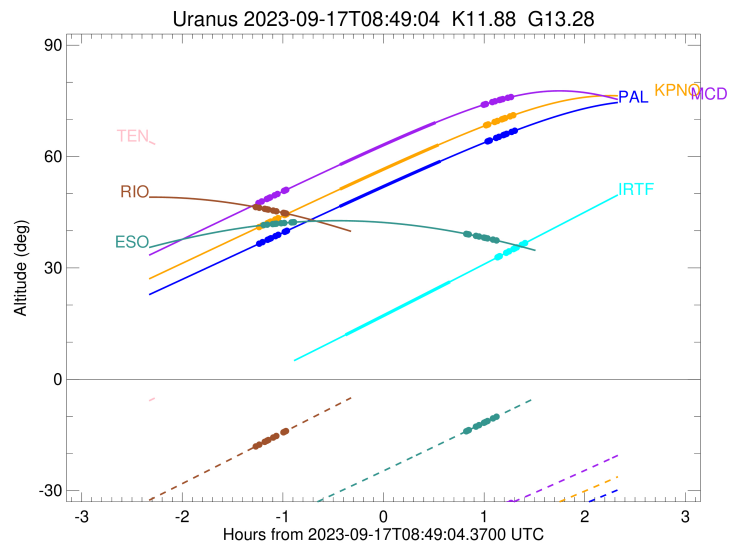
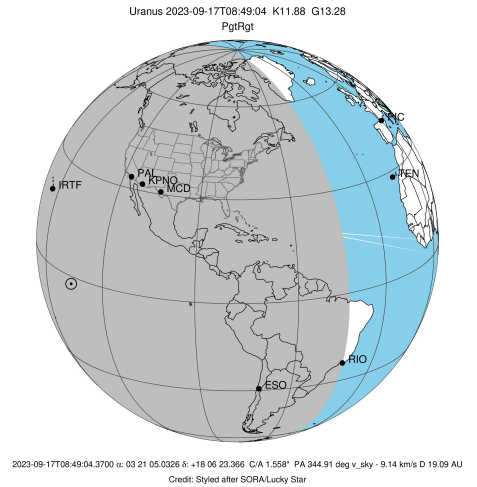


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

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	+++++	+ +	+++++	SEP 17 07:35 - SEP 17 10:07	PieRie
PNO	Purple Mtn Obs. Nanki	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+++++	+ +	+++++	SEP 17 07:35 - SEP 17 10:07	PieRie
MCD	McDonald Obs. 2.7m	30.7	256.0	+++++	+ +	+++++	SEP 17 07:35 - SEP 17 10:05	PieRie
TEN	Teide Obs./Tenerife	28.3	343.5					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5		+ +	+++++	SEP 17 08:26 - SEP 17 10:14	PieRne
KAV	Kavalur Observatory	12.6	78.8					PnnRnn
RIO	Rio de Janeiro	-22.9	316.8	+++++			SEP 17 07:33 - SEP 17 07:51	PnnRin
ESO	European Southern Obs	-29.3	289.3	+++++		+++++	SEP 17 07:38 - SEP 17 09:56	PnnRie
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

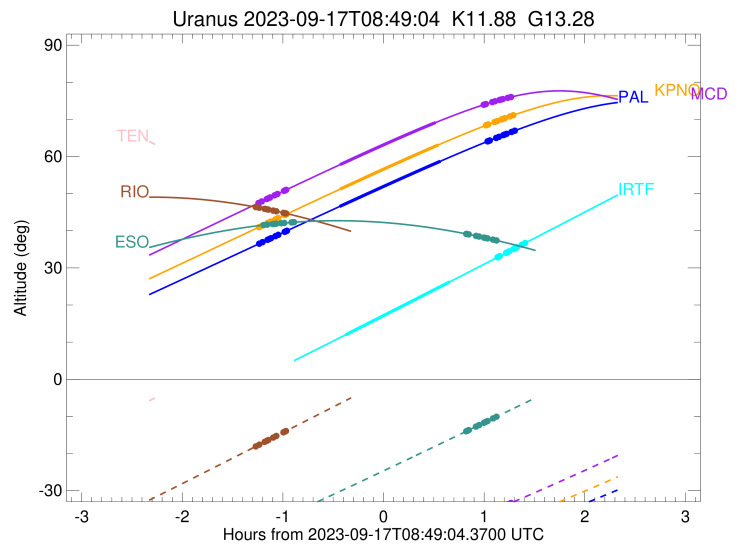
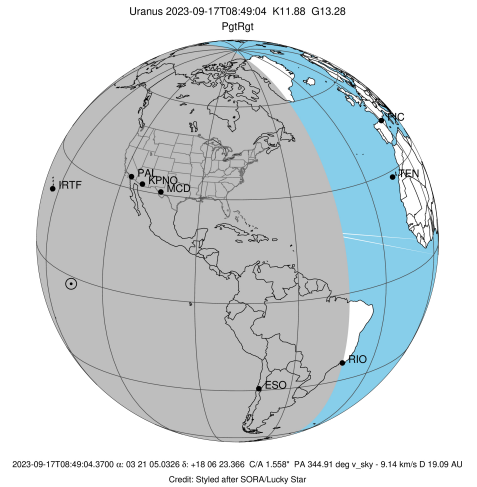


target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2023-09-17T08:53:22.400
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PAL
 Location : Palomar Mt (200")
 Latitude (deg) : 33.35622
 E. Longitude (deg) : 243.13601
 Altitude (km) : 1.706
 Gaia source ID : 56055718419988224
 2Mass ID (if available) : 03210502+1806238
 ICRS Star Coord at Epoch: 03h 21m 05.03263s +18:06:23.36557s
 RUWE (>1.4 is poor) : 1.40
 K magnitude : 11.884
 G magnitude : 13.280
 RP magnitude : 12.779
 BP magnitude : 13.578
 DUPflag : 0
 Distance (au) : 19.089
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -9.14
 Sun-Target sep (deg) : 121.30
 Sun-Moon sep (deg) : 146.85
 B (ring opening deg) : 63.95
 PA of pole (deg) : -87.60
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.358
 C/A sky separation (km) : 18801.7
 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



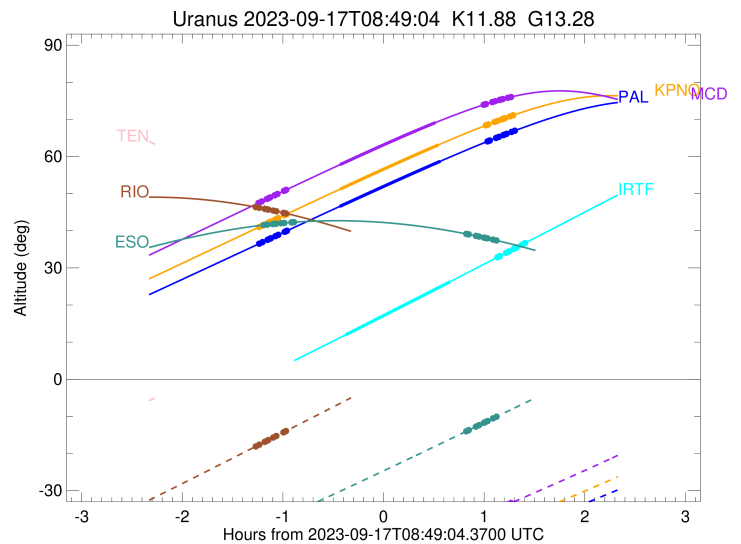
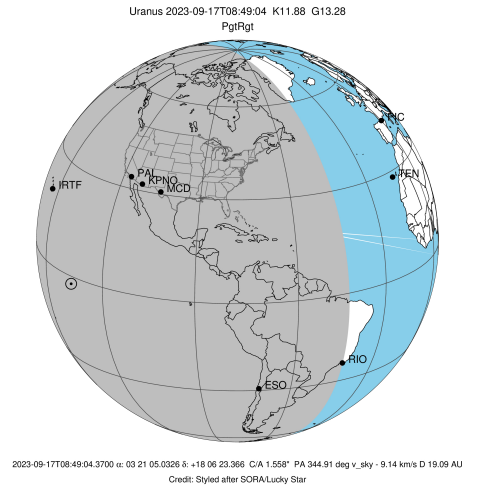
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2023-09-17T07:35:41.454		36.68	-54.48	50746.62	-9.52		
lambda	I	2023-09-17T07:36:57.166		36.94	-54.49	50026.71	-9.50		
delta	I	2023-09-17T07:39:59.420		37.58	-54.51	48300.35	-9.45		
gamma	I	2023-09-17T07:41:11.259		37.83	-54.51	47622.62	-9.42		
eta	I	2023-09-17T07:41:58.685		38.00	-54.51	47176.12	-9.41		
beta	I	2023-09-17T07:44:38.357		38.56	-54.51	45680.00	-9.35		
alpha	I	2023-09-17T07:46:23.844		38.92	-54.50	44698.52	-9.31		
4	I	2023-09-17T07:50:17.257		39.74	-54.46	42529.52	-9.21		
5	I	2023-09-17T07:50:44.934		39.84	-54.45	42280.99	-9.19		
6	I	2023-09-17T07:51:36.439		40.02	-54.44	41806.54	-9.17		
Uranus	I	2023-09-17T08:22:54.017		46.54	-53.24	25467.12		11.05	11.56
Uranus	E	2023-09-17T09:23:02.716		58.75	-47.28	25214.34		-21.95	-22.89
6	E	2023-09-17T09:51:12.366		64.10	-43.26	41879.12	9.34		
5	E	2023-09-17T09:51:41.549		64.19	-43.19	42154.87	9.35		
4	E	2023-09-17T09:52:29.972		64.33	-43.06	42610.62	9.38		
alpha	E	2023-09-17T09:56:15.239		65.01	-42.48	44752.35	9.49		
beta	E	2023-09-17T09:57:49.302		65.29	-42.24	45643.51	9.54		
eta	E	2023-09-17T10:00:29.629		65.76	-41.81	47176.12	9.60		
gamma	E	2023-09-17T10:01:17.027		65.90	-41.69	47631.58	9.62		
delta	E	2023-09-17T10:02:26.462		66.10	-41.50	48300.35	9.64		
lambda	E	2023-09-17T10:05:24.872		66.62	-41.02	50026.71	9.71		
epsilon	E	2023-09-17T10:07:53.785		67.04	-40.62	51475.84	9.74		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2023-09-17T08:52:52.400
 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 : 56055718419988224
 2Mass ID (if available) : 03210502+1806238
 ICRS Star Coord at Epoch: 03h 21m 05.03263s +18:06:23.36557s
 RUWE (>1.4 is poor) : 1.40
 K magnitude : 11.884
 G magnitude : 13.280
 RP magnitude : 12.779
 BP magnitude : 13.578
 DUPflag : 0
 Distance (au) : 19.089
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -9.14
 Sun-Target sep (deg) : 121.30
 Sun-Moon sep (deg) : 146.90
 B (ring opening deg) : 63.95
 PA of pole (deg) : -87.60
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.381
 C/A sky separation (km) : 19114.7
 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_itrff93_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	2023-09-17T07:35:36.428		41.15	-55.72	50746.95	-9.53		
lambda	I	2023-09-17T07:36:52.123		41.42	-55.69	50026.71	-9.50		
delta	I	2023-09-17T07:39:54.284		42.07	-55.61	48300.35	-9.45		
gamma	I	2023-09-17T07:41:06.097		42.32	-55.57	47622.65	-9.43		
eta	I	2023-09-17T07:41:53.515		42.49	-55.54	47176.12	-9.41		
beta	I	2023-09-17T07:44:33.185		43.05	-55.45	45679.94	-9.35		
alpha	I	2023-09-17T07:46:18.661		43.43	-55.38	44698.73	-9.31		
4	I	2023-09-17T07:50:12.223		44.25	-55.21	42529.67	-9.20		
5	I	2023-09-17T07:50:40.000		44.35	-55.18	42280.44	-9.18		
6	I	2023-09-17T07:51:31.470		44.53	-55.14	41806.79	-9.16		
Uranus	I	2023-09-17T08:23:05.261		51.19	-52.87	25473.88		10.62	11.12
Uranus	E	2023-09-17T09:21:51.823		63.15	-45.48	25222.00		-21.69	-22.62
6	E	2023-09-17T09:50:17.017		68.43	-40.89	41879.06	9.31		
5	E	2023-09-17T09:50:46.274		68.52	-40.81	42154.85	9.33		
4	E	2023-09-17T09:51:34.781		68.66	-40.67	42610.44	9.35		
alpha	E	2023-09-17T09:55:20.526		69.31	-40.02	44752.37	9.48		
beta	E	2023-09-17T09:56:54.757		69.57	-39.75	45643.58	9.52		
eta	E	2023-09-17T09:59:35.322		70.02	-39.28	47176.12	9.59		
gamma	E	2023-09-17T10:00:22.786		70.15	-39.15	47631.58	9.61		
delta	E	2023-09-17T10:01:32.313		70.34	-38.94	48300.35	9.63		
lambda	E	2023-09-17T10:04:30.932		70.82	-38.42	50026.71	9.70		
epsilon	E	2023-09-17T10:06:59.836		71.21	-37.98	51474.30	9.73		

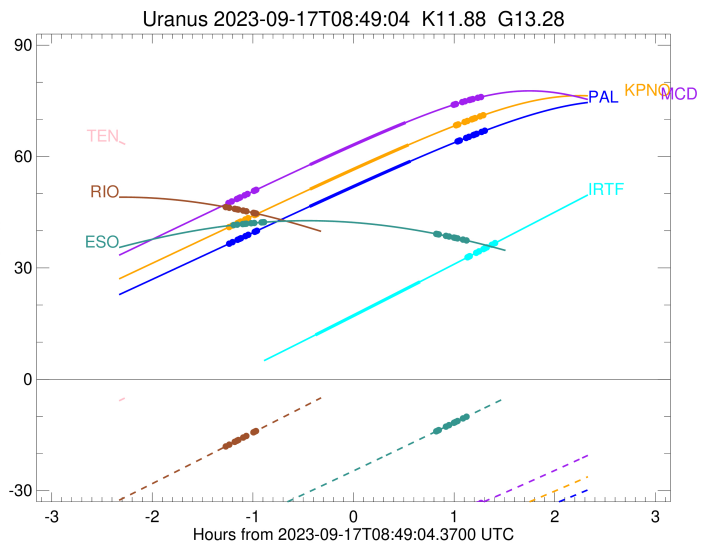
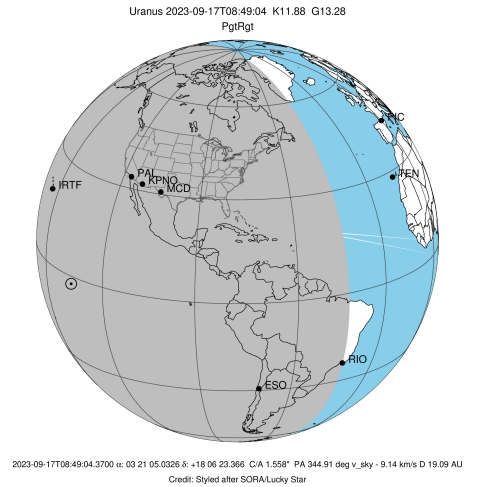
target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2023-09-17T08:51:59.170
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : MCD
 Location : McDonald Obs. 2.7m
 Latitude (deg) : 30.67158
 E. Longitude (deg) : 255.97844
 Altitude (km) : 2.075
 Gaia source ID : 56055718419988224
 2Mass ID (if available) : 03210502+1806238
 ICRS Star Coord at Epoch: 03h 21m 05.03263s +18:06:23.36557s
 RUWE (>1.4 is poor) : 1.40
 K magnitude : 11.884
 G magnitude : 13.280
 RP magnitude : 12.779
 BP magnitude : 13.578
 DUPflag : 0
 Distance (au) : 19.089
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -9.14
 Sun-Target sep (deg) : 121.30
 Sun-Moon sep (deg) : 146.99
 B (ring opening deg) : 63.95
 PA of pole (deg) : -87.60
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.408
 C/A sky separation (km) : 19498.1
 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_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	2023-09-17T07:35:14.163	47.64	-55.51	50747.41	-9.54		
lambda	I	2023-09-17T07:36:29.829	47.91	-55.42	50026.71	-9.51		
delta	I	2023-09-17T07:39:31.848	48.56	-55.19	48300.35	-9.45		
gamma	I	2023-09-17T07:40:43.619	48.82	-55.09	47622.69	-9.43		
eta	I	2023-09-17T07:41:31.022	48.99	-55.03	47176.12	-9.41		
beta	I	2023-09-17T07:44:10.671	49.56	-54.80	45679.88	-9.35		
alpha	I	2023-09-17T07:45:56.122	49.93	-54.65	44699.00	-9.31		
4	I	2023-09-17T07:49:49.854	50.77	-54.29	42529.86	-9.19		
5	I	2023-09-17T07:50:17.758	50.87	-54.25	42279.74	-9.17		
6	I	2023-09-17T07:51:09.177	51.05	-54.17	41807.11	-9.15		
Uranus	I	2023-09-17T08:23:04.043	57.80	-50.50	25482.18		10.08	10.55
Uranus	E	2023-09-17T09:20:07.108	69.15	-41.62	25231.63		-21.36	-22.27
6	E	2023-09-17T09:48:53.089	73.96	-36.41	41878.98	9.28		
5	E	2023-09-17T09:49:22.454	74.03	-36.31	42154.83	9.30		
4	E	2023-09-17T09:50:11.090	74.14	-36.16	42610.22	9.32		
alpha	E	2023-09-17T09:53:57.540	74.67	-35.45	44752.38	9.45		
beta	E	2023-09-17T09:55:32.026	74.88	-35.15	45643.67	9.50		
eta	E	2023-09-17T09:58:12.967	75.23	-34.64	47176.12	9.56		
gamma	E	2023-09-17T09:59:00.537	75.33	-34.49	47631.58	9.58		
delta	E	2023-09-17T10:00:10.213	75.47	-34.27	48300.35	9.61		
lambda	E	2023-09-17T10:03:09.182	75.82	-33.69	50026.71	9.68		
epsilon	E	2023-09-17T10:05:38.161	76.09	-33.22	51472.49	9.71		

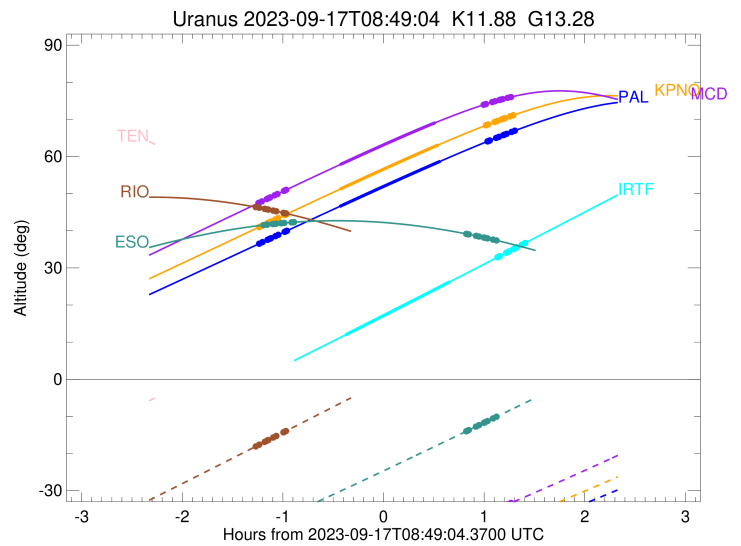
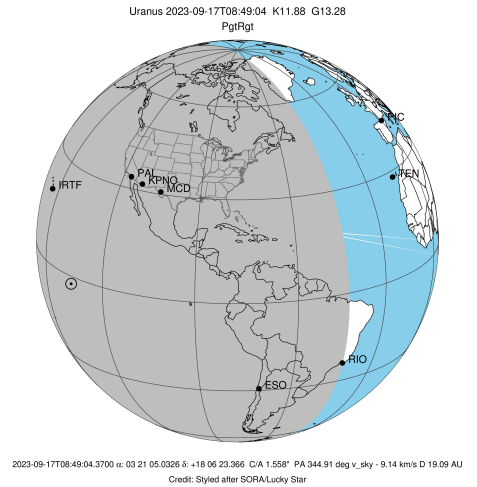
```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2023-09-17T08:57:59.980
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      : 56055718419988224
2Mass ID (if available) : 03210502+1806238
ICRS Star Coord at Epoch: 03h 21m 05.03263s +18:06:23.36557s
RUWE (>1.4 is poor) : 1.40
K magnitude          : 11.884
G magnitude          : 13.280
RP magnitude         : 12.779
BP magnitude         : 13.578
DUPflag             : 0
Distance (au)       : 19.089
f0 (km)             : 0.000
g0 (km)             : 0.000
skyplane vel. (km/s) : -9.14
Sun-Target sep (deg) : 121.30
Sun-Moon sep (deg)  : 146.30
B (ring opening deg) : 63.95
PA of pole (deg)    : -87.60
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 1.341
C/A sky separation (km) : 18562.3
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	2023-09-17T07:38:17.255		1.10x	-45.36	50746.42	-9.29		
lambda	I	2023-09-17T07:39:34.837		1.39x	-45.64	50026.71	-9.27		
delta	I	2023-09-17T07:42:41.597		2.09x	-46.30	48300.35	-9.22		
gamma	I	2023-09-17T07:43:55.195		2.36x	-46.56	47622.61	-9.20		
eta	I	2023-09-17T07:44:43.773		2.54x	-46.73	47176.12	-9.18		
beta	I	2023-09-17T07:47:27.292		3.15x	-47.30	45680.03	-9.13		
alpha	I	2023-09-17T07:49:15.311		3.56x	-47.68	44698.38	-9.10		
4	I	2023-09-17T07:53:14.165		4.45x	-48.51	42529.42	-9.00		
5	I	2023-09-17T07:53:42.427		4.56x	-48.61	42281.36	-8.98		
6	I	2023-09-17T07:54:35.169		4.75x	-48.79	41806.38	-8.97		
Uranus	I	2023-09-17T08:26:23.045		11.95	-55.14	25461.91		11.36	11.88
Uranus	E	2023-09-17T09:28:43.353		26.28	-65.08	25209.24		-22.13	-23.07
6	E	2023-09-17T09:57:07.866		32.87	-67.51	41879.15	9.22		
5	E	2023-09-17T09:57:37.405		32.99	-67.54	42154.88	9.24		
4	E	2023-09-17T09:58:26.436		33.18	-67.58	42610.72	9.26		
alpha	E	2023-09-17T10:02:14.450		34.06	-67.74	44752.34	9.38		
beta	E	2023-09-17T10:03:49.661		34.43	-67.80	45643.47	9.42		
eta	E	2023-09-17T10:06:31.941		35.06	-67.89	47176.12	9.49		
gamma	E	2023-09-17T10:07:19.912		35.25	-67.91	47631.58	9.50		
delta	E	2023-09-17T10:08:30.184		35.52	-67.94	48300.35	9.53		
lambda	E	2023-09-17T10:11:30.729		36.23	-67.99	50026.71	9.59		
epsilon	E	2023-09-17T10:14:01.474		36.81	-68.02	51476.51	9.62		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2023-09-17T08:45:04.880
 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 : 56055718419988224
 2Mass ID (if available) : 03210502+1806238
 ICRS Star Coord at Epoch: 03h 21m 05.03263s +18:06:23.36557s
 RUWE (>1.4 is poor) : 1.40
 K magnitude : 11.884
 G magnitude : 13.280
 RP magnitude : 12.779
 BP magnitude : 13.578
 DUPflag : 0
 Distance (au) : 19.089
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -9.14
 Sun-Target sep (deg) : 121.30
 Sun-Moon sep (deg) : 147.34
 B (ring opening deg) : 63.95
 PA of pole (deg) : -87.60
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.890
 C/A sky separation (km) : 26165.0
 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

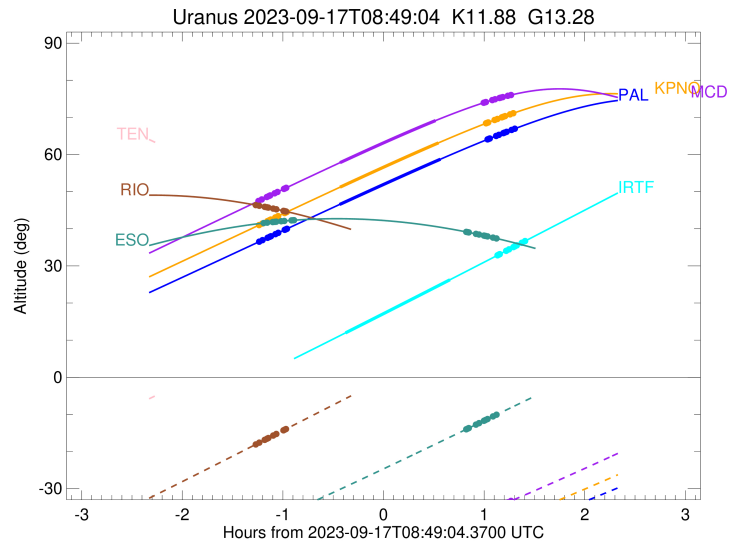
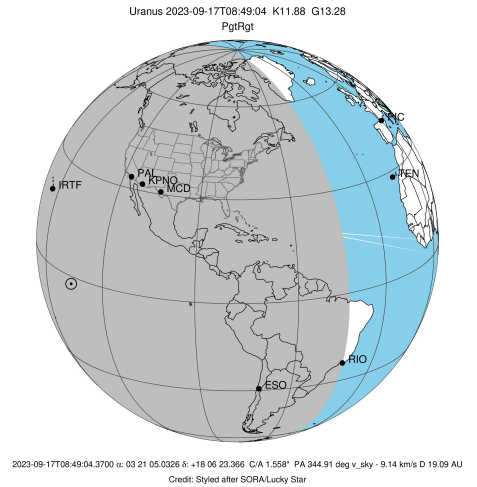


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2023-09-17T07:33:38.967		46.32	-17.92	50761.27	-8.98		
lambda	I	2023-09-17T07:35:01.119		46.20	-17.61	50026.71	-8.92		
delta	I	2023-09-17T07:38:16.095		45.91	-16.86	48300.35	-8.79		
gamma	I	2023-09-17T07:39:33.345		45.79	-16.56	47623.41	-8.74		
eta	I	2023-09-17T07:40:24.656		45.71	-16.37	47176.12	-8.70		
beta	I	2023-09-17T07:43:18.307		45.44	-15.70	45678.26	-8.56		
alpha	I	2023-09-17T07:45:12.866		45.25	-15.26	44704.50	-8.47		
4	I	2023-09-17T07:49:32.239		44.81	-14.27	42534.34	-8.23		
5	I	2023-09-17T07:50:05.701		44.75	-14.14	42265.47	-8.18		
6	I	2023-09-17T07:51:00.915		44.66	-13.93	41813.82	-8.14		

No planet occultations

6	E	2023-09-17T09:34:20.633		29.32	9.87x	41876.86	8.09		
5	E	2023-09-17T09:34:54.708		29.22	10.00x	42155.90	8.13		
4	E	2023-09-17T09:35:49.349		29.06	10.21x	42605.55	8.17		
alpha	E	2023-09-17T09:40:06.224		28.28	11.19x	44752.22	8.41		
beta	E	2023-09-17T09:41:52.236		27.95	11.59x	45645.46	8.50		
eta	E	2023-09-17T09:44:51.058		27.40	12.28x	47176.12	8.63		
gamma	E	2023-09-17T09:45:43.710		27.24	12.48x	47631.51	8.67		
delta	E	2023-09-17T09:47:00.648		27.00	12.77x	48300.35	8.72		
lambda	E	2023-09-17T09:50:17.247		26.39	13.52x	50026.71	8.84		
epsilon	E	2023-09-17T09:52:55.888		25.89	14.12x	51436.48	8.90		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2023-09-17T08:49:36.860
 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 : 56055718419988224
 2Mass ID (if available) : 03210502+1806238
 ICRS Star Coord at Epoch: 03h 21m 05.03263s +18:06:23.36557s
 RUWE (>1.4 is poor) : 1.40
 K magnitude : 11.884
 G magnitude : 13.280
 RP magnitude : 12.779
 BP magnitude : 13.578
 DUPflag : 0
 Distance (au) : 19.089
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -9.14
 Sun-Target sep (deg) : 121.30
 Sun-Moon sep (deg) : 147.04
 B (ring opening deg) : 63.95
 PA of pole (deg) : -87.60
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.898
 C/A sky separation (km) : 26276.4
 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	2023-09-17T07:38:23.462		41.58	-39.41	50760.86	-8.95		
lambda	I	2023-09-17T07:39:45.858		41.65	-39.14	50026.71	-8.89		
delta	I	2023-09-17T07:43:01.502		41.81	-38.48	48300.35	-8.76		
gamma	I	2023-09-17T07:44:19.013		41.87	-38.22	47623.40	-8.71		
eta	I	2023-09-17T07:45:10.493		41.91	-38.04	47176.12	-8.67		
beta	I	2023-09-17T07:48:04.708		42.03	-37.45	45678.29	-8.54		
alpha	I	2023-09-17T07:49:59.653		42.11	-37.06	44704.40	-8.45		
4	I	2023-09-17T07:54:19.848		42.26	-36.18	42534.26	-8.20		
5	I	2023-09-17T07:54:53.384		42.28	-36.06	42265.68	-8.16		
6	I	2023-09-17T07:55:48.812		42.31	-35.87	41813.73	-8.12		

No planet occultations

6	E	2023-09-17T09:38:29.794		39.15	-14.00	41876.70	8.13		
5	E	2023-09-17T09:39:03.722		39.10	-13.88	42156.03	8.17		
4	E	2023-09-17T09:39:57.998		39.02	-13.68	42605.26	8.22		
alpha	E	2023-09-17T09:44:13.380		38.63	-12.76	44752.19	8.47		
beta	E	2023-09-17T09:45:58.725		38.46	-12.37	45645.57	8.56		
eta	E	2023-09-17T09:48:56.320		38.17	-11.73	47176.12	8.69		
gamma	E	2023-09-17T09:49:48.601		38.08	-11.54	47631.50	8.73		
delta	E	2023-09-17T09:51:04.988		37.96	-11.26	48300.35	8.78		
lambda	E	2023-09-17T09:54:20.120		37.62	-10.55	50026.71	8.91		
epsilon	E	2023-09-17T09:56:57.225		37.35	-9.98	51433.81	8.97		