

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2026-07-19T11:18:08.680  
 Event type : PgtRgt  
 : Uranus occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Gaia source ID : 52030543790169472  
 2Mass ID (if available) : 04085419+2049324

ICRS Star Coord at Epoch: 04h 08m 54.18159s +20:49:31.75345s

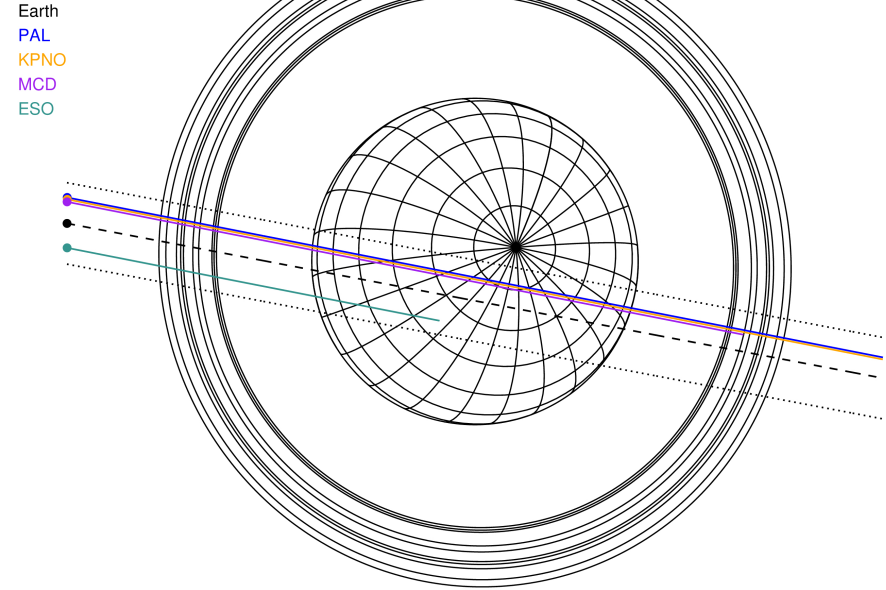
RUWE (>1.4 is poor) : 1.01  
 K magnitude : 12.501  
 G magnitude : 15.790  
 RP magnitude : 14.796  
 BP magnitude : 16.807  
 DUPflag : 0  
 Distance (au) : 20.060  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 24.56  
 Sun-Target sep (deg) : 52.27  
 Sun-Moon sep (deg) : 118.87  
 B (ring opening deg) : 74.59  
 PA of pole (deg) : -70.97

#	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



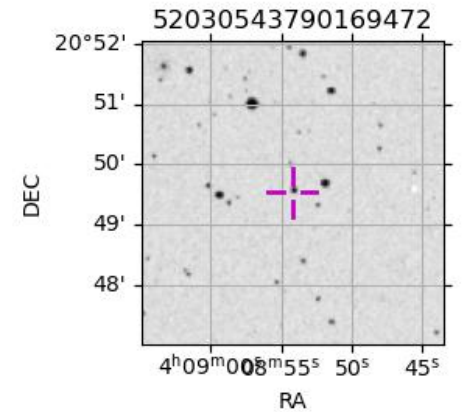
2026-07-19T11:18:08.6800 ex: 04 08 54.1816 s: +20 49 31.753 C/A 0.413° PA 349.26 deg v\_sky +24.56 km/s D 20.06 AU  
 Credit: Styled after SORA/Lucky Star

Uranus 2026-07-19T11:18:08 K12.50 G15.79 PgtRgt



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

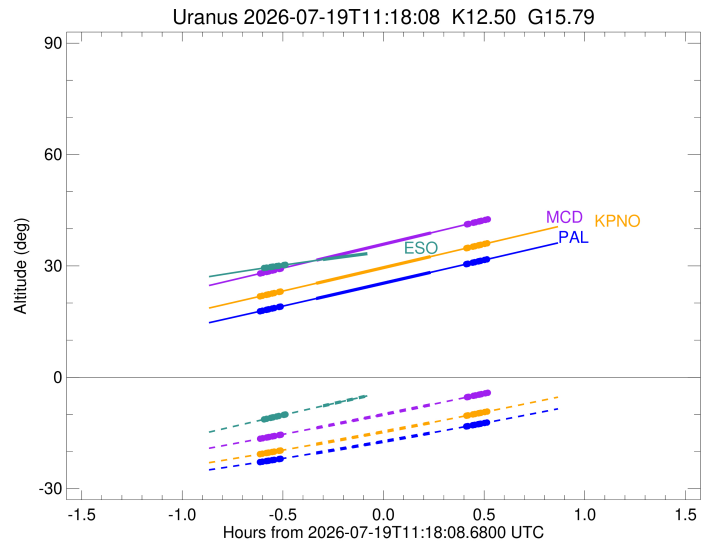
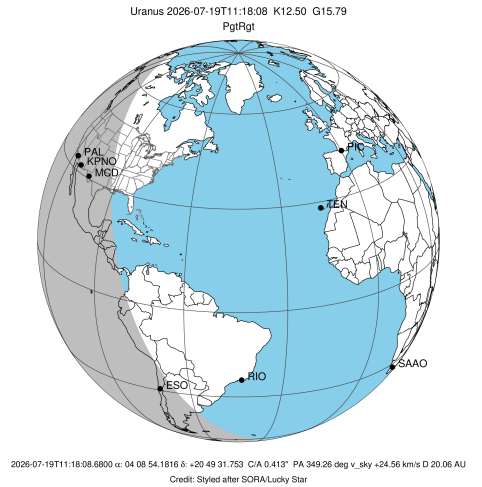
Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1					PnnRnn
PAL	Palomar Mt (200")	33.4	243.1	+++++	+ +	+++++	JUL 19 10:41 - JUL 19 11:48	PieRie
PNO	Purple Mtn Obs. Nanki	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+++++	+ +	+++++	JUL 19 10:41 - JUL 19 11:48	PieRie
MCD	McDonald Obs. 2.7m	30.7	256.0	+++++	+ +	+++	JUL 19 10:41 - JUL 19 11:43	PieRie
TEN	Teide Obs./Tenerife	28.3	343.5					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5					PnnRnn
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	+++++	+		JUL 19 10:42 - JUL 19 11:00	PinRin
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



52030543790169472

```

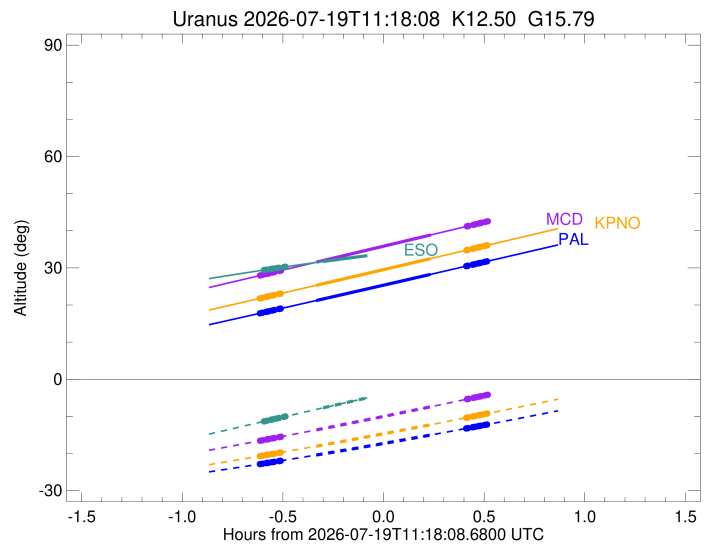
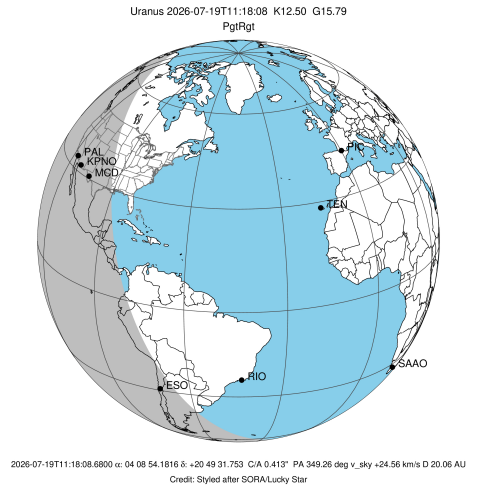
target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2026-07-19T11:15:03.750
Event type          : PgtRgt
: Uranus occs: geocentric, topocentric
: Ring occs: geocentric, topocentric
Observer code       : PAL
Location            : Palomar Mt (200")
Latitude (deg)      : 33.35622
E. Longitude (deg)  : 243.13601
Altitude (km)       : 1.706
Gaia source ID      : 52030543790169472
2Mass ID (if available) : 04085419+2049324
ICRS Star Coord at Epoch: 04h 08m 54.18159s +20:49:31.75345s
RUWE (>1.4 is poor) : 1.01
K magnitude          : 12.501
G magnitude          : 15.790
RP magnitude         : 14.796
BP magnitude         : 16.807
DUPflag             : 0
Distance (au)       : 20.060
f0 (km)             : 0.000
g0 (km)             : 0.000
skyplane vel. (km/s) : 24.56
Sun-Target sep (deg) : 52.27
Sun-Moon sep (deg)  : 118.89
B (ring opening deg) : 74.59
PA of pole (deg)    : -70.97
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 0.168
C/A sky separation (km) : 2439.1
NAIF SPICE kernels  : RAJobs_U111+rgf15.spk
URKALLvl1.spk
ural11.bsp
IAU_URANUS_for_RINGFIT.tpc
vgr2.ural11.bsp
ural61.bsp
vgr2.ural61.bsp
peph.ural60.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	2026-07-19T10:41:08.014		17.74	-22.88	51439.69	-25.18		
lambda	I	2026-07-19T10:42:04.110		17.93	-22.75	50026.71	-25.19		
delta	I	2026-07-19T10:43:12.661		18.16	-22.58	48300.35	-25.18		
gamma	I	2026-07-19T10:43:39.260		18.25	-22.52	47630.58	-25.18		
eta	I	2026-07-19T10:43:57.309		18.31	-22.48	47176.12	-25.18		
beta	I	2026-07-19T10:44:57.888		18.52	-22.33	45651.85	-25.17		
alpha	I	2026-07-19T10:45:35.775		18.65	-22.24	44696.40	-25.17		
4	I	2026-07-19T10:47:02.146		18.94	-22.03	42527.29	-25.16		
5	I	2026-07-19T10:47:14.242		18.98	-22.00	42229.47	-25.17		
6	I	2026-07-19T10:47:27.751		19.03	-21.97	41879.64	-25.16		
Uranus	I	2026-07-19T10:58:03.441		21.20	-20.41	25106.26		-13.99	-14.62
Uranus	E	2026-07-19T11:32:09.108		28.25	-15.03	25196.04		12.46	13.03
6	E	2026-07-19T11:42:46.133		30.46	-13.25	41794.80	25.05		
5	E	2026-07-19T11:43:03.979		30.52	-13.20	42249.74	25.06		
4	E	2026-07-19T11:43:18.862		30.58	-13.16	42616.20	25.05		
alpha	E	2026-07-19T11:44:43.904		30.87	-12.92	44743.35	25.05		
beta	E	2026-07-19T11:45:20.929		31.00	-12.82	45672.32	25.06		
eta	E	2026-07-19T11:46:20.977		31.21	-12.65	47176.12	25.06		
gamma	E	2026-07-19T11:46:38.785		31.27	-12.60	47622.30	25.06		
delta	E	2026-07-19T11:47:05.846		31.36	-12.52	48300.35	25.06		
lambda	E	2026-07-19T11:48:14.745		31.60	-12.32	50026.71	25.06		
epsilon	E	2026-07-19T11:48:46.812		31.72	-12.23	50830.21	25.05		

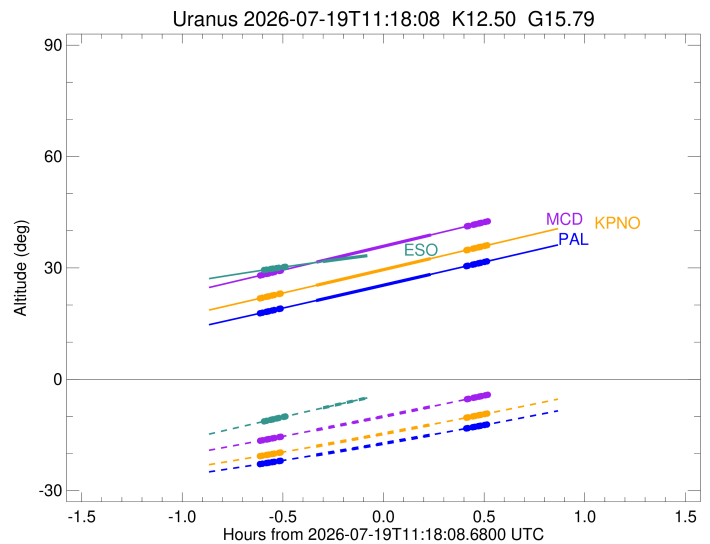
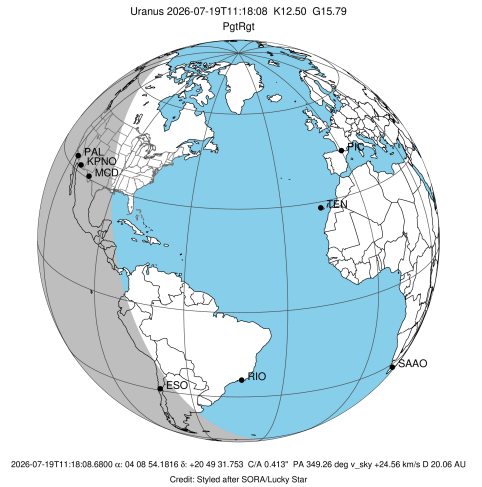
```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2026-07-19T11:15:04.760
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      : 52030543790169472
2Mass ID (if available) : 04085419+2049324
ICRS Star Coord at Epoch: 04h 08m 54.18159s +20:49:31.75345s
RUWE (>1.4 is poor) : 1.01
K magnitude          : 12.501
G magnitude          : 15.790
RP magnitude         : 14.796
BP magnitude         : 16.807
DUPflag             : 0
Distance (au)       : 20.060
f0 (km)             : 0.000
g0 (km)             : 0.000
skyplane vel. (km/s) : 24.56
Sun-Target sep (deg) : 52.27
Sun-Moon sep (deg)  : 118.94
B (ring opening deg) : 74.59
PA of pole (deg)    : -70.97
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 0.189
C/A sky separation (km) : 2746.9
NAIF SPICE kernels  : RAJobs_U111+rgf15.spk
URKALLvl1.spk
ural11.bsp
IAU_URANUS_for_RINGFIT.tpc
vgr2.ural11.bsp
ural61.bsp
vgr2.ural61.bsp
peph.ural60.bsp
earthstns_itrf93_040916.bsp
earth_720101_070426.bpc
earth_200101_990628_predict.bpc
pg3f0000r.bsp
pg490000r.bsp
naif0012.tls
earth_flat_IAU.spk
    
```



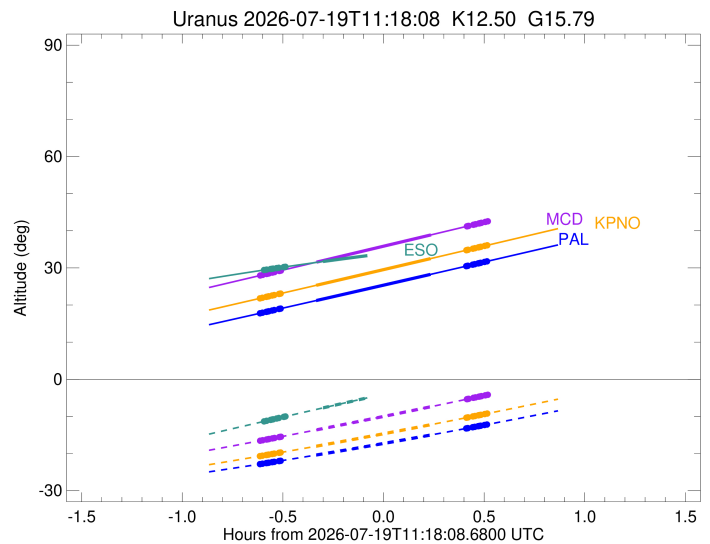
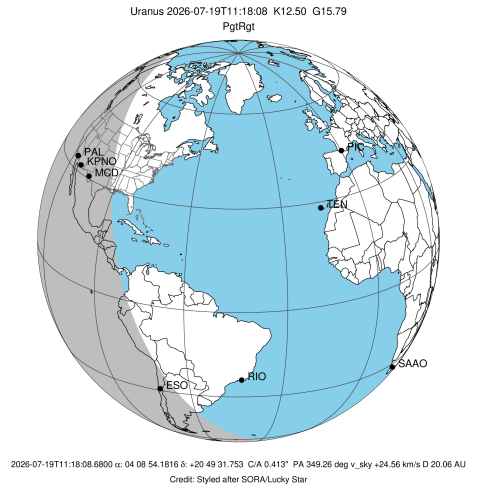
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2026-07-19T10:41:07.109		21.76	-20.73	51438.02	-25.14		
lambda	I	2026-07-19T10:42:03.240		21.95	-20.59	50026.71	-25.14		
delta	I	2026-07-19T10:43:11.914		22.19	-20.41	48300.35	-25.14		
gamma	I	2026-07-19T10:43:38.561		22.29	-20.34	47630.60	-25.13		
eta	I	2026-07-19T10:43:56.645		22.35	-20.29	47176.12	-25.13		
beta	I	2026-07-19T10:44:57.332		22.56	-20.13	45651.97	-25.13		
alpha	I	2026-07-19T10:45:35.286		22.69	-20.03	44696.58	-25.12		
4	I	2026-07-19T10:47:01.828		22.99	-19.81	42527.37	-25.12		
5	I	2026-07-19T10:47:13.928		23.04	-19.77	42230.04	-25.12		
6	I	2026-07-19T10:47:27.482		23.08	-19.74	41879.62	-25.11		
Uranus	I	2026-07-19T10:58:04.457		25.31	-18.03	25101.43		-14.06	-14.70
Uranus	E	2026-07-19T11:32:10.574		32.50	-12.25	25202.41		12.35	12.92
6	E	2026-07-19T11:42:49.189		34.76	-10.36	41794.82	25.00		
5	E	2026-07-19T11:43:07.098		34.82	-10.31	42250.33	25.01		
4	E	2026-07-19T11:43:21.987		34.88	-10.26	42616.24	25.01		
alpha	E	2026-07-19T11:44:47.190		35.18	-10.01	44743.51	25.01		
beta	E	2026-07-19T11:45:24.283		35.31	-9.90	45672.44	25.01		
eta	E	2026-07-19T11:46:24.435		35.52	-9.72	47176.12	25.01		
gamma	E	2026-07-19T11:46:42.276		35.59	-9.66	47622.33	25.01		
delta	E	2026-07-19T11:47:09.385		35.68	-9.58	48300.35	25.01		
lambda	E	2026-07-19T11:48:18.407		35.93	-9.37	50026.71	25.01		
epsilon	E	2026-07-19T11:48:50.468		36.04	-9.28	50828.66	25.01		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2026-07-19T11:15:11.800  
 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 : 52030543790169472  
 2Mass ID (if available) : 04085419+2049324  
 ICRS Star Coord at Epoch: 04h 08m 54.18159s +20:49:31.75345s  
 RUWE (>1.4 is poor) : 1.01  
 K magnitude : 12.501  
 G magnitude : 15.790  
 RP magnitude : 14.796  
 BP magnitude : 16.807  
 DUPflag : 0  
 Distance (au) : 20.060  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 24.56  
 Sun-Target sep (deg) : 52.27  
 Sun-Moon sep (deg) : 119.03  
 B (ring opening deg) : 74.59  
 PA of pole (deg) : -70.97  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 0.216  
 C/A sky separation (km) : 3144.7  
 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\_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	2026-07-19T10:41:11.392		27.92	-16.59	51435.82	-25.07		
lambda	I	2026-07-19T10:42:07.581		28.12	-16.43	50026.71	-25.08		
delta	I	2026-07-19T10:43:16.435		28.37	-16.23	48300.35	-25.07		
gamma	I	2026-07-19T10:43:43.152		28.46	-16.15	47630.62	-25.07		
eta	I	2026-07-19T10:44:01.285		28.53	-16.10	47176.12	-25.06		
beta	I	2026-07-19T10:45:02.128		28.74	-15.92	45652.12	-25.06		
alpha	I	2026-07-19T10:45:40.181		28.88	-15.81	44696.80	-25.05		
4	I	2026-07-19T10:47:06.970		29.19	-15.56	42527.47	-25.05		
5	I	2026-07-19T10:47:19.079		29.23	-15.53	42230.79	-25.05		
6	I	2026-07-19T10:47:32.695		29.28	-15.49	41879.59	-25.04		
Uranus	I	2026-07-19T10:58:11.555		31.56	-13.62	25095.29		-14.16	-14.81
Uranus	E	2026-07-19T11:32:18.133		38.89	-7.39	25210.67		12.20	12.76
6	E	2026-07-19T11:42:58.977		41.20	-5.37	41794.84	24.94		
5	E	2026-07-19T11:43:16.970		41.26	-5.32	42251.09	24.95		
4	E	2026-07-19T11:43:31.869		41.31	-5.27	42616.29	24.94		
alpha	E	2026-07-19T11:44:57.298		41.62	-5.00x	44743.72	24.94		
beta	E	2026-07-19T11:45:34.485		41.76	-4.88x	45672.58	24.95		
eta	E	2026-07-19T11:46:34.783		41.97	-4.69x	47176.12	24.95		
gamma	E	2026-07-19T11:46:52.670		42.04	-4.63x	47622.36	24.95		
delta	E	2026-07-19T11:47:19.846		42.14	-4.54x	48300.35	24.95		
lambda	E	2026-07-19T11:48:29.037		42.38	-4.32x	50026.71	24.95		
epsilon	E	2026-07-19T11:49:01.098		42.50	-4.22x	50826.70	24.94		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2026-07-19T11:15:49.830  
 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 : 52030543790169472  
 2Mass ID (if available) : 04085419+2049324  
 ICRS Star Coord at Epoch: 04h 08m 54.18159s +20:49:31.75345s  
 RUWE (>1.4 is poor) : 1.01  
 K magnitude : 12.501  
 G magnitude : 15.790  
 RP magnitude : 14.796  
 BP magnitude : 16.807  
 DUPflag : 0  
 Distance (au) : 20.060  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 24.56  
 Sun-Target sep (deg) : 52.27  
 Sun-Moon sep (deg) : 119.11  
 B (ring opening deg) : 74.59  
 PA of pole (deg) : -70.97  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 0.699  
 C/A sky separation (km) : 10168.0  
 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\_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	2026-07-19T10:42:22.251		29.41	-11.38	51392.63	-24.39		
lambda	I	2026-07-19T10:43:18.205		29.54	-11.19	50026.71	-24.40		
delta	I	2026-07-19T10:44:29.027		29.70	-10.94	48300.35	-24.36		
gamma	I	2026-07-19T10:44:56.519		29.76	-10.85	47631.03	-24.34		
eta	I	2026-07-19T10:45:15.215		29.80	-10.78	47176.12	-24.33		
beta	I	2026-07-19T10:46:17.838		29.94	-10.56	45655.05	-24.29		
alpha	I	2026-07-19T10:46:57.035		30.03	-10.43	44701.27	-24.26		
4	I	2026-07-19T10:48:26.943		30.23	-10.12	42530.08	-24.18		
5	I	2026-07-19T10:48:39.019		30.25	-10.08	42244.48	-24.19		
6	I	2026-07-19T10:48:53.631		30.29	-10.03	41878.33	-24.15		
Uranus	I	2026-07-19T11:00:06.024		31.72	-7.71	25020.79		-15.32	-16.01
Uranus	E	2026-07-19T11:31:49.881		35.27	-1.25x	25364.32		9.05	9.47
6	E	2026-07-19T11:43:10.746		36.32	1.01x	41795.95	24.09		
5	E	2026-07-19T11:43:29.982		36.35	1.08x	42264.07	24.12		
4	E	2026-07-19T11:43:44.835		36.37	1.13x	42616.49	24.12		
alpha	E	2026-07-19T11:45:13.111		36.50	1.42x	44747.00	24.19		
beta	E	2026-07-19T11:45:51.430		36.56	1.54x	45675.01	24.22		
eta	E	2026-07-19T11:46:53.392		36.64	1.75x	47176.12	24.25		
gamma	E	2026-07-19T11:47:11.810		36.67	1.81x	47622.94	24.27		
delta	E	2026-07-19T11:47:39.718		36.71	1.90x	48300.35	24.28		
lambda	E	2026-07-19T11:48:50.758		36.81	2.14x	50026.71	24.32		
epsilon	E	2026-07-19T11:49:22.370		36.85	2.24x	50795.75	24.32		