

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2049-07-17T20:09:20.440  
 Event type : PtRgt  
 : Uranus occs: topocentric, not geocentric  
 : Ring occs: geocentric, topocentric  
 Gaia source ID : 3865097389577249920  
 2Mass ID (if available) : 10570303+0730410

ICRS Star Coord at Epoch: 10h 57m 03.04105s +07:30:40.71490s

RUWE (>1.4 is poor) : 0.95  
 K magnitude : 13.201  
 G magnitude : 14.664  
 RP magnitude : 14.154  
 BP magnitude : 15.018  
 DUPflag : 0  
 Distance (au) : 18.955  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 26.94  
 Sun-Target sep (deg) : 47.63  
 Sun-Moon sep (deg) : 169.43  
 B (ring opening deg) : 4.88  
 PA of pole (deg) : 104.70

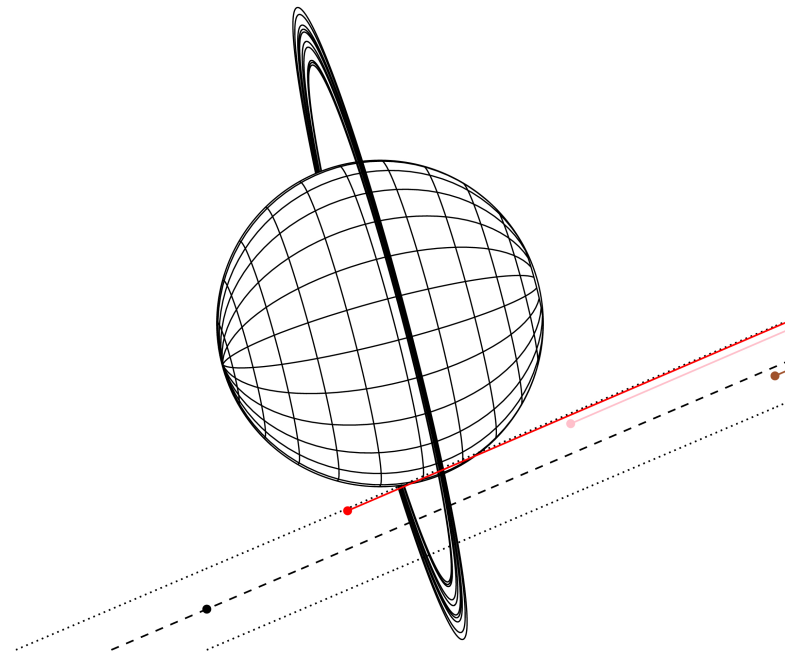
#	a(km)	ring
1	41837.2	6
2	42235.0	5
3	42571.2	4
4	44718.5	alpha
5	45661.1	beta
6	47176.1	eta
7	47626.3	gamma
8	48300.3	delta
9	50026.7	lambda
10	51149.4	epsilon



2049-07-17T20:09:20.4400 cc: 10 57 03.0410 s : +07 30 40.715 C/A 2.2111 PA 23.10 deg v\_sky +26.95 km/s D 18.96 AU  
 Credit: Styled after SORA/Lucky Star

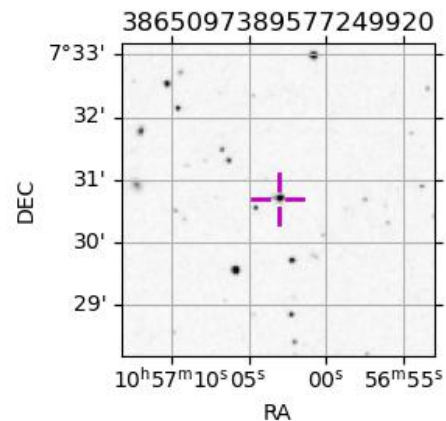
Uranus 2049-07-17T20:09:20 K13.20 G14.66 PtRgt

Earth  
 PIC  
 TEN  
 RIO

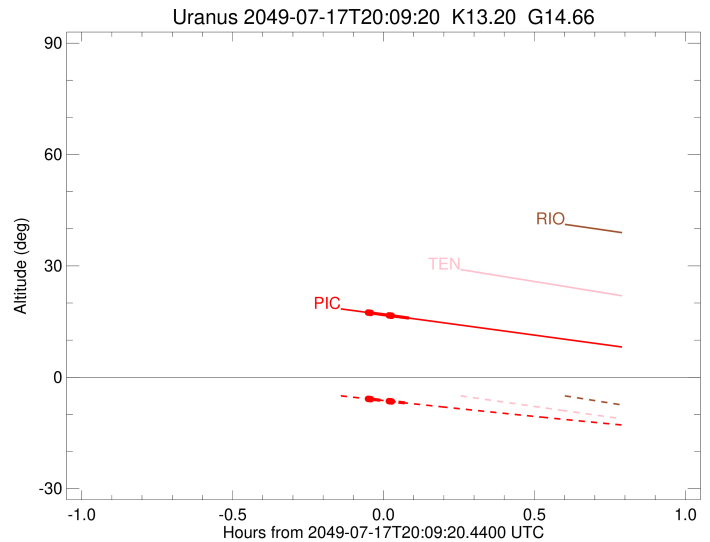
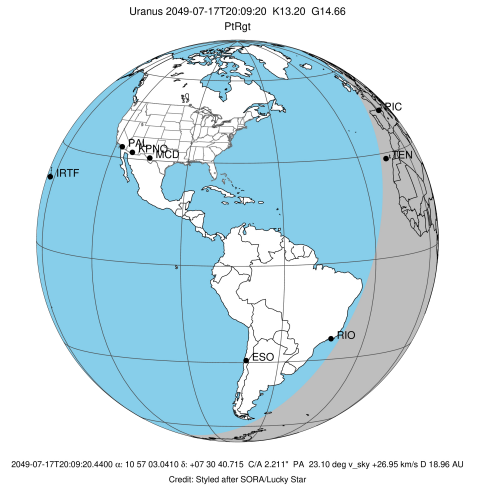


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1	+++++	+ +		JUL 17 20:06 - JUL 17 20:14	PieRin
PAL	Palomar Mt (200")	33.4	243.1					PnnRnn
PMO	Purple Mtn Obs. Nanki	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl Obs	32.0	248.4					PnnRnn
MCD	McDonald Obs. 2.7m	30.7	256.0					PnnRnn
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					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 : 2049-07-17T20:10:56.240  
 Event type : PtRgt  
 : Uranus occs: topocentric, not geocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : PIC  
 Location : Pic du Midi  
 Latitude (deg) : 42.93656  
 E. Longitude (deg) : 0.14231  
 Altitude (km) : 2.890  
 Gaia source ID : 3865097389577249920  
 2Mass ID (if available) : 10570303+0730410  
 ICRS Star Coord at Epoch: 10h 57m 03.04105s +07:30:40.71490s  
 RUWE (>1.4 is poor) : 0.95  
 K magnitude : 13.201  
 G magnitude : 14.664  
 RP magnitude : 14.154  
 BP magnitude : 15.018  
 DUPflag : 0  
 Distance (au) : 18.955  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 26.94  
 Sun-Target sep (deg) : 47.63  
 Sun-Moon sep (deg) : 170.28  
 B (ring opening deg) : 4.88  
 PA of pole (deg) : 104.70  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 1.814  
 C/A sky separation (km) : 24940.8  
 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\_itrf93\_040916.bsp  
 earth\_720101\_070426.bpc  
 earth\_200101\_990628\_predict.bpc  
 pg3f0000r.bsp  
 pg490000r.bsp  
 naif0012.tls  
 earth\_flat\_IAU.spk



b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2049-07-17T20:06:16.408		17.43	-5.81	50842.38	-270.50		
lambda	I	2049-07-17T20:06:19.423		17.42	-5.82	50026.70	-269.84		
delta	I	2049-07-17T20:06:25.859		17.40	-5.84	48300.35	-266.46		
gamma	I	2049-07-17T20:06:28.381		17.39	-5.84	47630.17	-265.03		
eta	I	2049-07-17T20:06:30.097		17.39	-5.85	47176.11	-264.04		
beta	I	2049-07-17T20:06:35.966		17.37	-5.86	45646.90	-260.27		
alpha	I	2049-07-17T20:06:39.625		17.36	-5.87	44715.66	-257.82		
4	I	2049-07-17T20:06:48.572		17.33	-5.89	42616.41	-252.71		
5	I	2049-07-17T20:06:49.833		17.33	-5.90	42154.84	-249.01		
6	I	2049-07-17T20:06:51.866		17.32	-5.90	41814.95	-252.29		
Uranus	I	2049-07-17T20:07:28.356		17.21	-5.99	25558.97		4.05	4.24
Uranus	E	2049-07-17T20:14:23.998		15.94	-7.01	25558.46		-21.10	-22.01
6	E	2049-07-17T20:10:22.782	b	16.68	-6.42	41878.13	252.47		
5	E	2049-07-17T20:10:27.304	b	16.66	-6.44	42257.26	249.19		
4	E	2049-07-17T20:10:27.133	b	16.67	-6.43	42554.45	252.89		
alpha	E	2049-07-17T20:10:36.080	b	16.64	-6.46	44751.05	258.00		
beta	E	2049-07-17T20:10:39.303	b	16.63	-6.46	45653.64	260.44		
eta	E	2049-07-17T20:10:44.986	b	16.61	-6.48	47176.10	264.21		
gamma	E	2049-07-17T20:10:46.669	b	16.61	-6.48	47621.32	265.20		
delta	E	2049-07-17T20:10:49.222	b	16.60	-6.49	48300.33	266.64		
lambda	E	2049-07-17T20:10:55.656	b	16.58	-6.50	50026.70	270.02		
epsilon	E	2049-07-17T20:10:59.514	b	16.57	-6.51	51071.91	270.68		