

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2028-03-27T21:27:34.710  
 Event type : XRgt  
 : No Uranus occs  
 : Ring occs: geocentric, topocentric  
 Gaia source ID : 49479672517873536  
 2Mass ID (if available) : 04180217+2118188

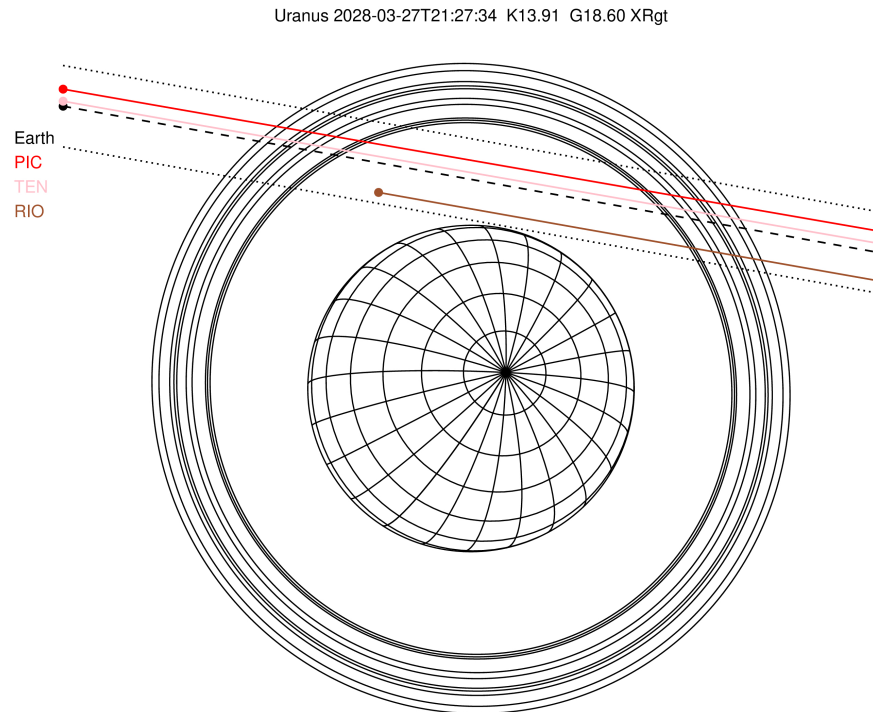
ICRS Star Coord at Epoch: 04h 18m 02.16453s +21:18:18.64016s

RUWE (>1.4 is poor) : 1.05  
 K magnitude : 13.907  
 G magnitude : 18.601  
 RP magnitude : 17.214  
 BP magnitude : 20.682  
 DUPflag : 0  
 Distance (au) : 19.836  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 21.66  
 Sun-Target sep (deg) : 59.02  
 Sun-Moon sep (deg) : 40.10  
 B (ring opening deg) : 76.39  
 PA of pole (deg) : -65.37

#	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

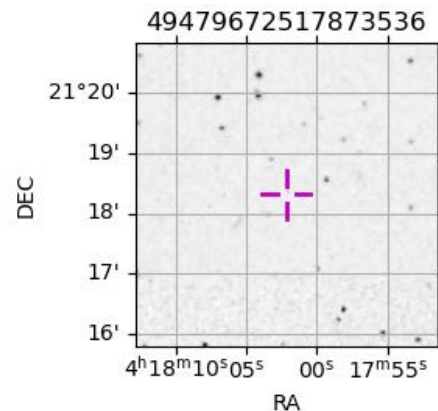


2028-03-27T21:27:34.7100 ex: 04 18 02.1645 8: +21 18 18.640 C/A 2.244" PA 169.83 deg v\_sky +21.66 km/s D 19.84 AU  
 Credit: Styled after SORA/Lucky Star

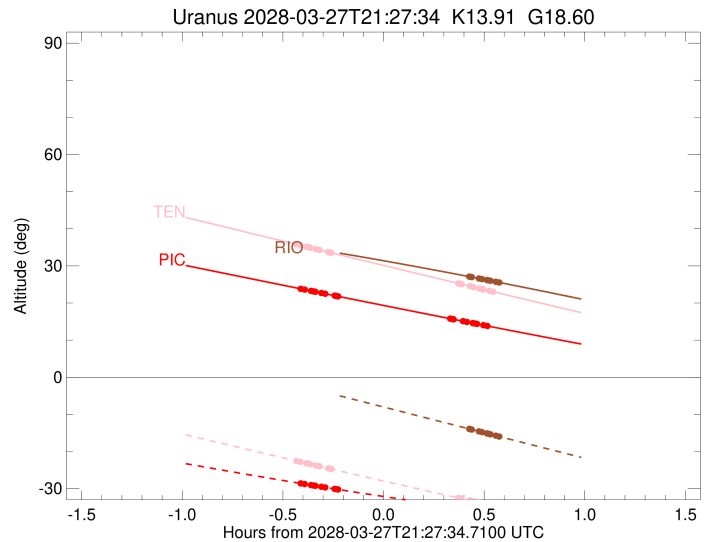
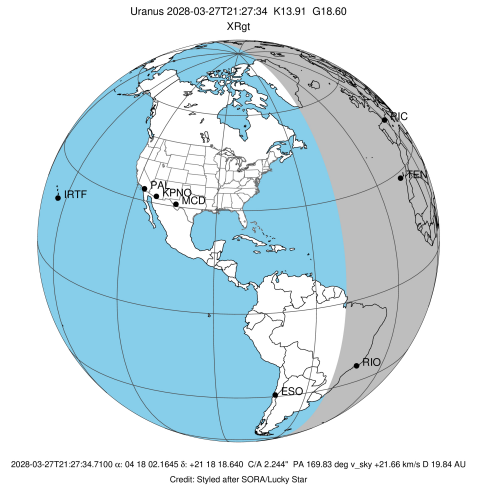


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1	+++++		+++++	MAR 27 21:03 - MAR 27 21:58	PnnRie
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	+++++		+++++	MAR 27 21:01 - MAR 27 21:59	PnnRie
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			+++++	MAR 27 21:53 - MAR 27 22:01	PnnRne
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 : 2028-03-27T21:31:28.370  
 Event type : XRgt  
 : No Uranus occs  
 : 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 : 49479672517873536  
 2Mass ID (if available) : 04180217+2118188  
 ICRS Star Coord at Epoch: 04h 18m 02.16453s +21:18:18.64016s  
 RUWE (>1.4 is poor) : 1.05  
 K magnitude : 13.907  
 G magnitude : 18.601  
 RP magnitude : 17.214  
 BP magnitude : 20.682  
 DUPflag : 0  
 Distance (au) : 19.836  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 21.66  
 Sun-Target sep (deg) : 59.02  
 Sun-Moon sep (deg) : 40.82  
 B (ring opening deg) : 76.39  
 PA of pole (deg) : -65.37  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 2.448  
 C/A sky separation (km) : 35212.1  
 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\_itrf93\_040916.bsp  
 earth\_720101\_070426.bpc  
 earth\_200101\_990628\_predict.bpc  
 pg3f0000r.bsp  
 pg490000r.bsp  
 naif0012.tls  
 earth\_flat\_IAU.spk

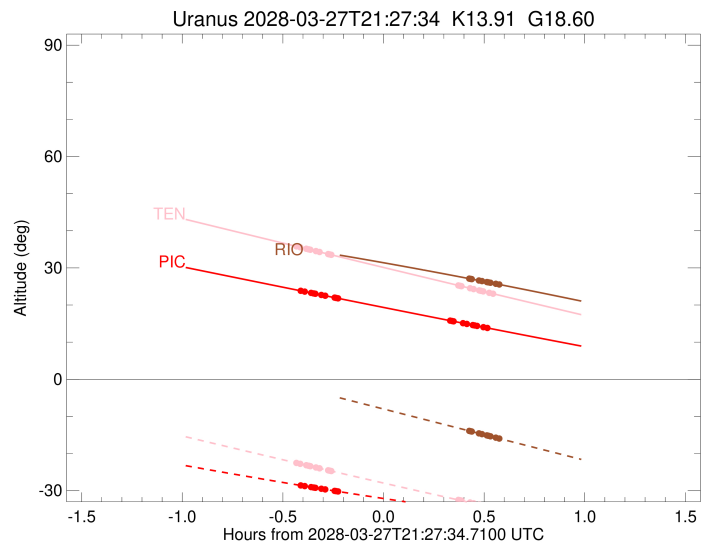
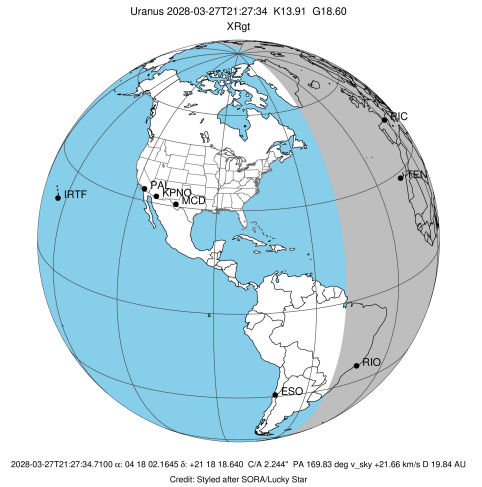


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2028-03-27T21:03:09.596		23.78	-28.63	50917.88	-15.64		
lambda	I	2028-03-27T21:04:06.691		23.61	-28.77	50026.71	-15.47		
delta	I	2028-03-27T21:06:00.376		23.26	-29.05	48300.35	-14.89		
gamma	I	2028-03-27T21:06:46.020		23.12	-29.17	47626.46	-14.63		
eta	I	2028-03-27T21:07:16.975		23.03	-29.24	47176.12	-14.46		
beta	I	2028-03-27T21:09:02.724		22.71	-29.50	45680.57	-13.82		
alpha	I	2028-03-27T21:10:13.798		22.49	-29.67	44715.34	-13.33		
4	I	2028-03-27T21:12:58.815		21.99	-30.07	42610.67	-12.12		
5	I	2028-03-27T21:13:23.387		21.92	-30.13	42315.10	-11.93		
6	I	2028-03-27T21:14:01.065		21.81	-30.22	41870.92	-11.64		

No planet occultations

6	E	2028-03-27T21:47:28.356		15.79	-34.73	41875.34	11.67		
5	E	2028-03-27T21:48:02.085		15.69	-34.80	42263.46	11.96		
4	E	2028-03-27T21:48:27.387		15.61	-34.85	42566.12	12.16		
alpha	E	2028-03-27T21:51:12.830		15.12	-35.19	44685.12	13.38		
beta	E	2028-03-27T21:52:25.317		14.91	-35.34	45670.24	13.87		
eta	E	2028-03-27T21:54:11.363		14.59	-35.56	47176.12	14.51		
gamma	E	2028-03-27T21:54:41.830		14.50	-35.62	47621.02	14.69		
delta	E	2028-03-27T21:55:27.668		14.37	-35.71	48300.35	14.95		
lambda	E	2028-03-27T21:57:20.885		14.04	-35.94	50026.71	15.54		
epsilon	E	2028-03-27T21:58:11.480		13.89	-36.04	50819.09	15.71		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2028-03-27T21:31:38.900  
 Event type : XRgt  
 : No Uranus occs  
 : Ring occs: geocentric, topocentric  
 Observer code : TEN  
 Location : Teide Obs./Tenerife  
 Latitude (deg) : 28.30050  
 E. Longitude (deg) : 343.48909  
 Altitude (km) : 2.395  
 Gaia source ID : 49479672517873536  
 2Mass ID (if available) : 04180217+2118188  
 ICRS Star Coord at Epoch: 04h 18m 02.16453s +21:18:18.64016s  
 RUWE (>1.4 is poor) : 1.05  
 K magnitude : 13.907  
 G magnitude : 18.601  
 RP magnitude : 17.214  
 BP magnitude : 20.682  
 DUPflag : 0  
 Distance (au) : 19.836  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 21.66  
 Sun-Target sep (deg) : 59.02  
 Sun-Moon sep (deg) : 40.97  
 B (ring opening deg) : 76.39  
 PA of pole (deg) : -65.37  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 2.315  
 C/A sky separation (km) : 33310.0  
 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\_itrf93\_040916.bsp  
 earth\_720101\_070426.bpc  
 earth\_200101\_990628\_predict.bpc  
 pg3f0000r.bsp  
 pg490000r.bsp  
 naif0012.tls  
 earth\_flat\_IAU.spk

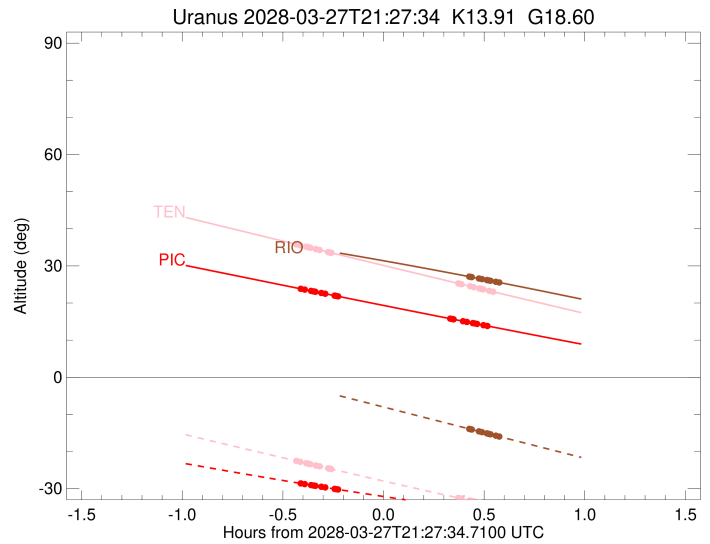
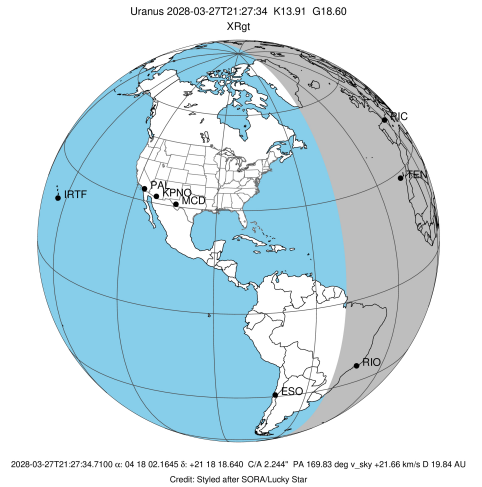


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2028-03-27T21:01:50.463		35.75	-22.58	50935.18	-16.32		
lambda	I	2028-03-27T21:02:46.191		35.55	-22.78	50026.71	-16.18		
delta	I	2028-03-27T21:04:34.474		35.15	-23.16	48300.35	-15.69		
gamma	I	2028-03-27T21:05:17.684		34.99	-23.31	47626.77	-15.48		
eta	I	2028-03-27T21:05:46.930		34.89	-23.41	47176.12	-15.33		
beta	I	2028-03-27T21:07:26.186		34.52	-23.76	45680.20	-14.80		
alpha	I	2028-03-27T21:08:32.095		34.28	-23.99	44717.62	-14.40		
4	I	2028-03-27T21:11:03.166		33.73	-24.52	42612.27	-13.43		
5	I	2028-03-27T21:11:25.353		33.65	-24.60	42315.24	-13.27		
6	I	2028-03-27T21:11:59.352		33.53	-24.72	41868.70	-13.04		

No planet occultations

6	E	2028-03-27T21:49:54.702		25.27	-32.50	41873.67	13.09		
5	E	2028-03-27T21:50:24.675		25.17	-32.60	42257.43	13.32		
4	E	2028-03-27T21:50:47.582		25.08	-32.68	42562.64	13.47		
alpha	E	2028-03-27T21:53:19.058		24.54	-33.18	44684.80	14.46		
beta	E	2028-03-27T21:54:26.358		24.29	-33.41	45669.06	14.86		
eta	E	2028-03-27T21:56:05.881		23.94	-33.74	47176.12	15.40		
gamma	E	2028-03-27T21:56:34.625		23.83	-33.83	47620.98	15.55		
delta	E	2028-03-27T21:57:18.012		23.68	-33.98	48300.35	15.77		
lambda	E	2028-03-27T21:59:05.782		23.29	-34.33	50026.71	16.26		
epsilon	E	2028-03-27T21:59:54.957		23.11	-34.50	50831.70	16.40		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2028-03-27T21:29:52.900  
 Event type : XRgt  
 : No Uranus occs  
 : 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 : 49479672517873536  
 2Mass ID (if available) : 04180217+2118188  
 ICRS Star Coord at Epoch: 04h 18m 02.16453s +21:18:18.64016s  
 RUWE (>1.4 is poor) : 1.05  
 K magnitude : 13.907  
 G magnitude : 18.601  
 RP magnitude : 17.214  
 BP magnitude : 20.682  
 DUPflag : 0  
 Distance (au) : 19.836  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 21.66  
 Sun-Target sep (deg) : 59.02  
 Sun-Moon sep (deg) : 40.81  
 B (ring opening deg) : 76.39  
 PA of pole (deg) : -65.37  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 1.925  
 C/A sky separation (km) : 27699.9  
 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



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2028-03-27T20:56:37.103		36.07	-0.87x	50984.20	-18.06		
lambda	I	2028-03-27T20:57:30.086		35.94	-1.08x	50026.71	-18.00		
delta	I	2028-03-27T20:59:06.808		35.71	-1.45x	48300.35	-17.70		
gamma	I	2028-03-27T20:59:44.961		35.62	-1.59x	47627.57	-17.57		
eta	I	2028-03-27T21:00:10.721		35.56	-1.69x	47176.12	-17.48		
beta	I	2028-03-27T21:01:37.141		35.35	-2.02x	45678.89	-17.17		
alpha	I	2028-03-27T21:02:33.217		35.22	-2.24x	44723.45	-16.93		
4	I	2028-03-27T21:04:39.702		34.91	-2.73x	42615.18	-16.38		
5	I	2028-03-27T21:04:57.995		34.87	-2.80x	42313.47	-16.29		
6	I	2028-03-27T21:05:26.027		34.80	-2.90x	41862.46	-16.17		

No planet occultations

6	E	2028-03-27T21:53:08.883		27.11	-13.91	41868.48	16.22		
5	E	2028-03-27T21:53:32.748		27.04	-14.00	42241.70	16.35		
4	E	2028-03-27T21:53:51.769		26.98	-14.07	42554.11	16.43		
alpha	E	2028-03-27T21:55:58.884		26.61	-14.56	44684.70	16.99		
beta	E	2028-03-27T21:56:56.393		26.45	-14.78	45665.80	17.23		
eta	E	2028-03-27T21:58:23.198		26.19	-15.11	47176.12	17.55		
gamma	E	2028-03-27T21:58:48.484		26.12	-15.21	47620.97	17.64		
delta	E	2028-03-27T21:59:26.862		26.00	-15.36	48300.35	17.77		
lambda	E	2028-03-27T22:01:03.191		25.72	-15.73	50026.71	18.07		
epsilon	E	2028-03-27T22:01:49.729		25.58	-15.91	50870.88	18.14		