

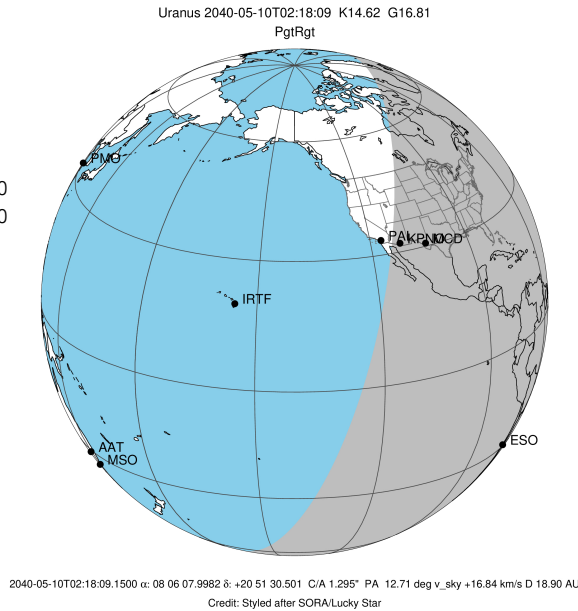
target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2040-05-10T02:18:09.150
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 670724358054565760
 2Mass ID (if available) : 08060800+2051306

Uranus 2040-05-10T02:18:09 K14.62 G16.81 PgtRgt

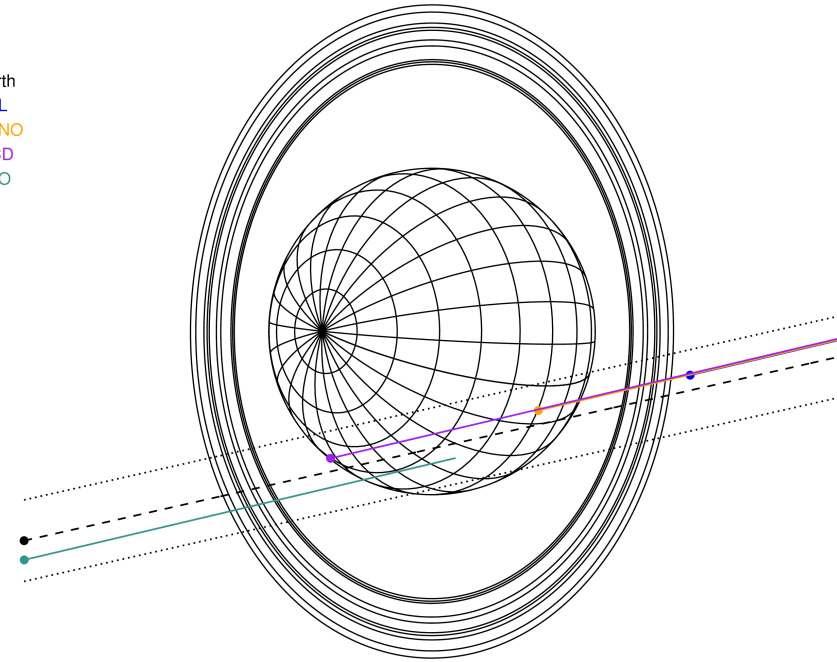
ICRS Star Coord at Epoch: 08h 06m 07.99820s +20:51:30.50093s

RUWE (>1.4 is poor) : 0.95
 K magnitude : 14.622
 G magnitude : 16.813
 RP magnitude : 16.163
 BP magnitude : 17.298
 DUPflag : 0
 Distance (au) : 18.897
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 16.84
 Sun-Target sep (deg) : 69.77
 Sun-Moon sep (deg) : 81.96
 B (ring opening deg) : 47.69
 PA of pole (deg) : 89.86

#	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



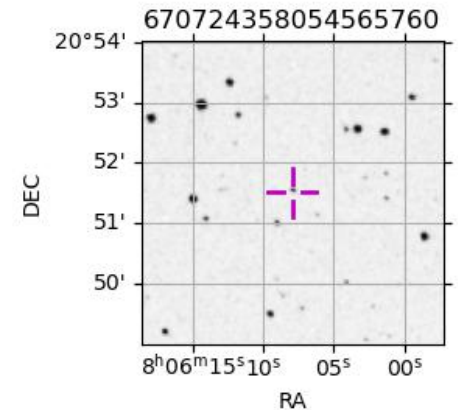
Earth
 PAL
 KPNO
 MCD
 ESO



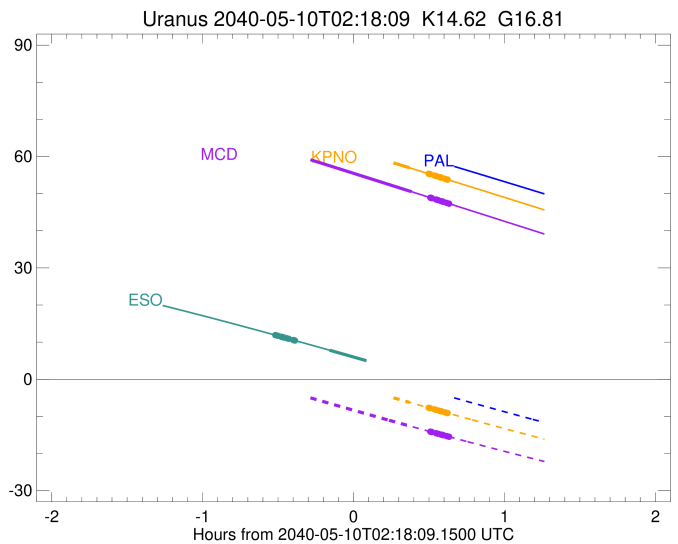
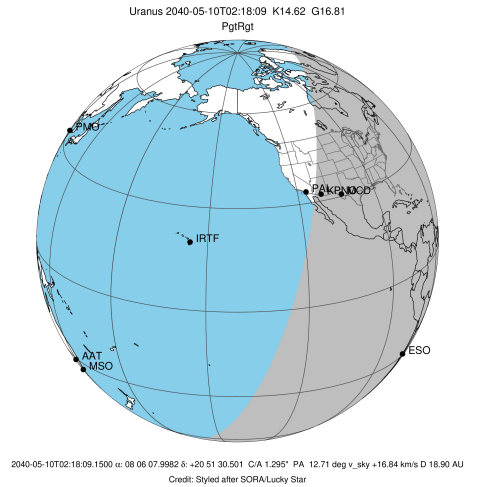
2040-05-10T02:18:09.1500 ra: 08 06 07.9982 s: +20 51 30.501 C/A 1.295° PA 12.71 deg v_sky +16.84 km/s D 18.90 AU
 Credit: Styled after SORA/Lucky Star

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					PnnRnn
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		+	+++++	MAY 10 02:40 - MAY 10 02:55	PneRne
MCD	McDonald Obs. 2.7m	30.7	256.0		+	+++++	MAY 10 02:01 - MAY 10 02:55	PieRne
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	+++++	+		MAY 10 01:46 - MAY 10 02:08	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

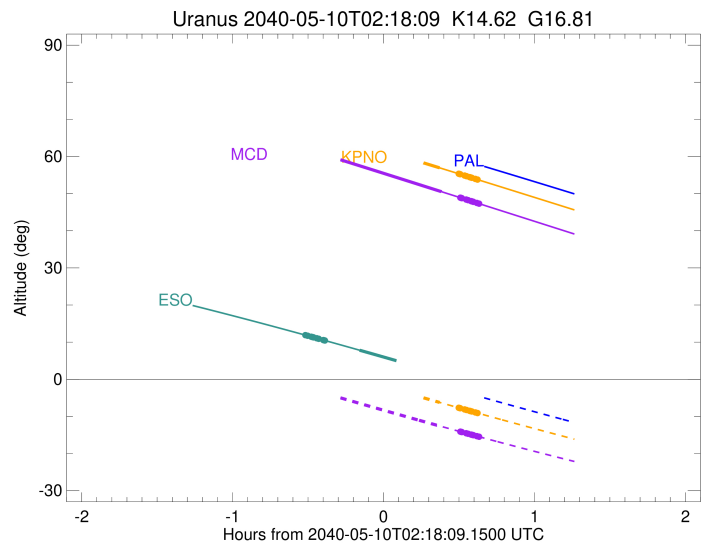
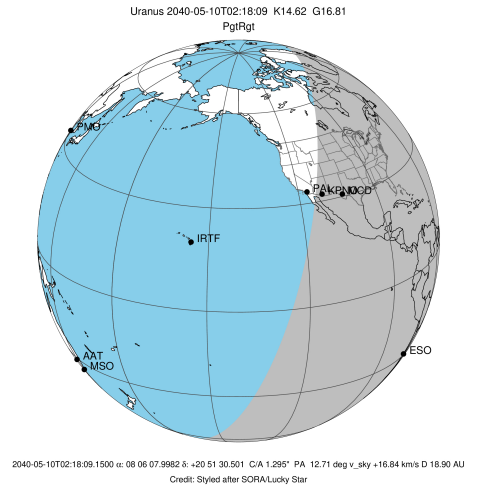


target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2040-05-10T02:20:34.320
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : KPNO
 Location : Kitt Peak Natl Obs
 Latitude (deg) : 31.96333
 E. Longitude (deg) : 248.40000
 Altitude (km) : 2.120
 Gaia source ID : 670724358054565760
 2Mass ID (if available) : 08060800+2051306
 ICRS Star Coord at Epoch: 08h 06m 07.99820s +20:51:30.50093s
 RUWE (>1.4 is poor) : 0.95
 K magnitude : 14.622
 G magnitude : 16.813
 RP magnitude : 16.163
 BP magnitude : 17.298
 DUPflag : 0
 Distance (au) : 18.897
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 16.84
 Sun-Target sep (deg) : 69.77
 Sun-Moon sep (deg) : 82.81
 B (ring opening deg) : 47.69
 PA of pole (deg) : 89.86
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.156
 C/A sky separation (km) : 15849.5
 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



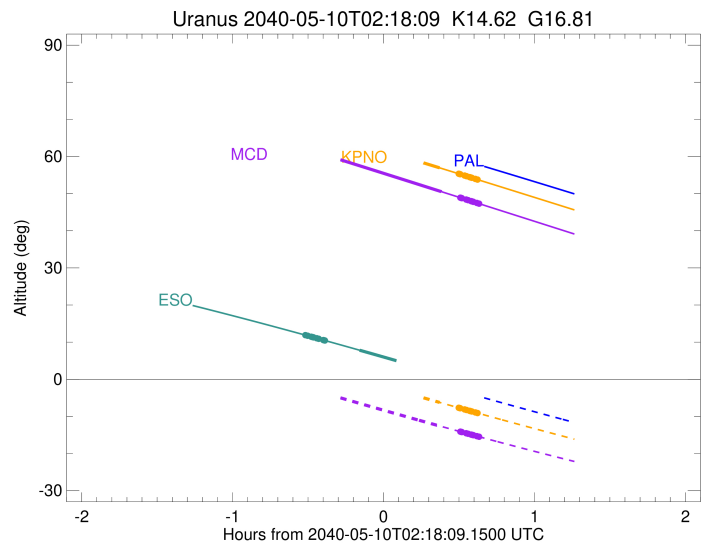
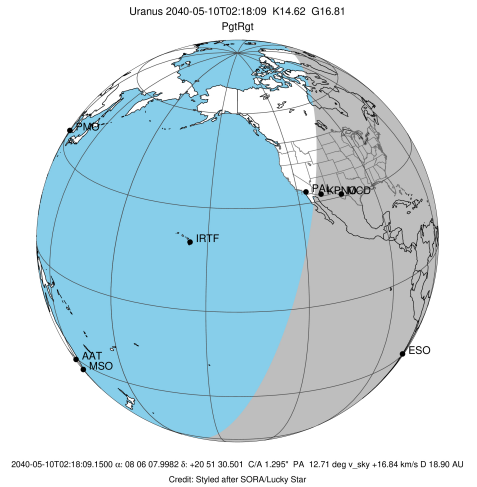
Ring	I/E	UTC	b? alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2040-05-10T01:41:53.206	68.80	5.34x	51520.34	-20.88		
lambda	I	2040-05-10T01:43:04.771	68.58	5.10x	50026.71	-20.84		
delta	I	2040-05-10T01:44:27.790	68.31	4.82x	48300.35	-20.75		
gamma	I	2040-05-10T01:45:00.522	68.20	4.71x	47621.73	-20.71		
eta	I	2040-05-10T01:45:22.046	68.14	4.64x	47176.12	-20.69		
beta	I	2040-05-10T01:46:35.666	67.90	4.39x	45658.24	-20.60		
alpha	I	2040-05-10T01:47:19.375	67.76	4.24x	44748.90	-20.53		
4	I	2040-05-10T01:49:05.364	67.41	3.89x	42586.69	-20.37		
5	I	2040-05-10T01:49:26.477	67.35	3.81x	42181.67	-20.35		
6	I	2040-05-10T01:49:42.205	67.29	3.76x	41807.88	-20.30		
Uranus	I	2040-05-10T02:00:28.950	65.17	1.60x	25436.15		24.55	25.56
Uranus	E	2040-05-10T02:40:27.089	56.96	-6.23	25298.07		-37.44	-38.72
6	E	2040-05-10T02:48:02.455	55.37	-7.68	41836.03	20.39		
5	E	2040-05-10T02:48:21.057	55.30	-7.74	42230.45	20.43		
4	E	2040-05-10T02:48:36.601	55.25	-7.79	42530.38	20.46		
alpha	E	2040-05-10T02:50:20.888	54.88	-8.12	44685.89	20.63		
beta	E	2040-05-10T02:51:07.391	54.72	-8.27	45650.21	20.69		
eta	E	2040-05-10T02:52:20.942	54.46	-8.50	47176.12	20.79		
gamma	E	2040-05-10T02:52:42.662	54.38	-8.57	47628.02	20.82		
delta	E	2040-05-10T02:53:14.927	54.27	-8.67	48300.35	20.86		
lambda	E	2040-05-10T02:54:37.516	53.98	-8.93	50026.71	20.95		
epsilon	E	2040-05-10T02:55:12.184	53.86	-9.04	50753.54	21.00		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2040-05-10T02:21:12.520
 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 : 670724358054565760
 2Mass ID (if available) : 08060800+2051306
 ICRS Star Coord at Epoch: 08h 06m 07.99820s +20:51:30.50093s
 RUWE (>1.4 is poor) : 0.95
 K magnitude : 14.622
 G magnitude : 16.813
 RP magnitude : 16.163
 BP magnitude : 17.298
 DUPflag : 0
 Distance (au) : 18.897
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 16.84
 Sun-Target sep (deg) : 69.77
 Sun-Moon sep (deg) : 82.77
 B (ring opening deg) : 47.69
 PA of pole (deg) : 89.86
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.145
 C/A sky separation (km) : 15695.1
 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	2040-05-10T01:42:33.194		63.03	-1.34x	51520.78	-20.93		
lambda	I	2040-05-10T01:43:44.616		62.78	-1.57x	50026.71	-20.89		
delta	I	2040-05-10T01:45:07.438		62.49	-1.85x	48300.35	-20.80		
gamma	I	2040-05-10T01:45:40.089		62.38	-1.96x	47621.74	-20.77		
eta	I	2040-05-10T01:46:01.560		62.30	-2.03x	47176.12	-20.74		
beta	I	2040-05-10T01:47:14.988		62.05	-2.27x	45658.30	-20.65		
alpha	I	2040-05-10T01:47:58.581		61.89	-2.42x	44748.95	-20.59		
4	I	2040-05-10T01:49:44.267		61.52	-2.77x	42586.84	-20.43		
5	I	2040-05-10T01:50:05.318		61.45	-2.84x	42181.87	-20.41		
6	I	2040-05-10T01:50:21.004		61.39	-2.89x	41807.99	-20.36		
Uranus	I	2040-05-10T02:01:01.932		59.14	-5.00	25433.98		24.78	25.80
Uranus	E	2040-05-10T02:41:10.297		50.54	-12.71	25296.05		-37.61	-38.89
6	E	2040-05-10T02:48:41.216		48.92	-14.11	41836.21	20.46		
5	E	2040-05-10T02:48:59.741		48.85	-14.17	42230.80	20.51		
4	E	2040-05-10T02:49:15.222		48.80	-14.21	42530.46	20.53		
alpha	E	2040-05-10T02:50:59.138		48.42	-14.53	44685.86	20.70		
beta	E	2040-05-10T02:51:45.483		48.26	-14.68	45650.28	20.76		
eta	E	2040-05-10T02:52:58.784		47.99	-14.90	47176.12	20.86		
gamma	E	2040-05-10T02:53:20.434		47.91	-14.97	47628.03	20.89		
delta	E	2040-05-10T02:53:52.592		47.80	-15.07	48300.35	20.93		
lambda	E	2040-05-10T02:55:14.915		47.50	-15.32	50026.71	21.01		
epsilon	E	2040-05-10T02:55:49.457		47.38	-15.42	50753.22	21.06		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2040-05-10T02:24:13.630
 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 : 670724358054565760
 2Mass ID (if available) : 08060800+2051306
 ICRS Star Coord at Epoch: 08h 06m 07.99820s +20:51:30.50093s
 RUWE (>1.4 is poor) : 0.95
 K magnitude : 14.622
 G magnitude : 16.813
 RP magnitude : 16.163
 BP magnitude : 17.298
 DUPflag : 0
 Distance (au) : 18.897
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 16.84
 Sun-Target sep (deg) : 69.77
 Sun-Moon sep (deg) : 82.17
 B (ring opening deg) : 47.69
 PA of pole (deg) : 89.86
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.470
 C/A sky separation (km) : 20141.0
 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	2040-05-10T01:46:49.210		11.94	-49.09	51503.61	-20.41		
lambda	I	2040-05-10T01:48:01.656		11.72	-49.35	50026.71	-20.33		
delta	I	2040-05-10T01:49:26.874		11.46	-49.66	48300.35	-20.18		
gamma	I	2040-05-10T01:50:00.559		11.35	-49.78	47621.48	-20.12		
eta	I	2040-05-10T01:50:22.714		11.28	-49.86	47176.12	-20.08		
beta	I	2040-05-10T01:51:38.799		11.05	-50.14	45656.17	-19.92		
alpha	I	2040-05-10T01:52:24.023		10.90	-50.30	44747.11	-19.82		
4	I	2040-05-10T01:54:14.409		10.56	-50.70	42581.74	-19.54		
5	I	2040-05-10T01:54:36.418		10.49	-50.78	42175.14	-19.49		
6	I	2040-05-10T01:54:52.719		10.44	-50.84	41804.51	-19.43		
Uranus	I	2040-05-10T02:08:38.586		7.83	-53.81	25503.64		16.16	16.88
Uranus	E	2040-05-10T02:39:33.459		1.80x	-60.40	25365.89		-31.46	-32.65
6	E	2040-05-10T02:49:17.054		-0.14x	-62.43	41831.15	19.55		
5	E	2040-05-10T02:49:36.666		-0.21x	-62.50	42221.37	19.62		
4	E	2040-05-10T02:49:53.043		-0.26x	-62.56	42528.43	19.67		
alpha	E	2040-05-10T02:51:41.214		-0.62x	-62.93	44687.06	19.96		
beta	E	2040-05-10T02:52:29.158		-0.78x	-63.09	45648.53	20.07		
eta	E	2040-05-10T02:53:44.936		-1.04x	-63.36	47176.12	20.23		
gamma	E	2040-05-10T02:54:07.221		-1.11x	-63.43	47627.51	20.28		
delta	E	2040-05-10T02:54:40.348		-1.22x	-63.55	48300.35	20.34		
lambda	E	2040-05-10T02:56:04.888		-1.51x	-63.84	50026.71	20.50		
epsilon	E	2040-05-10T02:56:40.773		-1.63x	-63.96	50763.30	20.58		