

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2039-11-15T07:18:33.570
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 663634677016109440
 2Mass ID (if available) : 08210496+2004242

Uranus 2039-11-15T07:18:33 K14.95 G17.66 PgtRgt

ICRS Star Coord at Epoch: 08h 21m 04.96721s +20:04:24.15236s

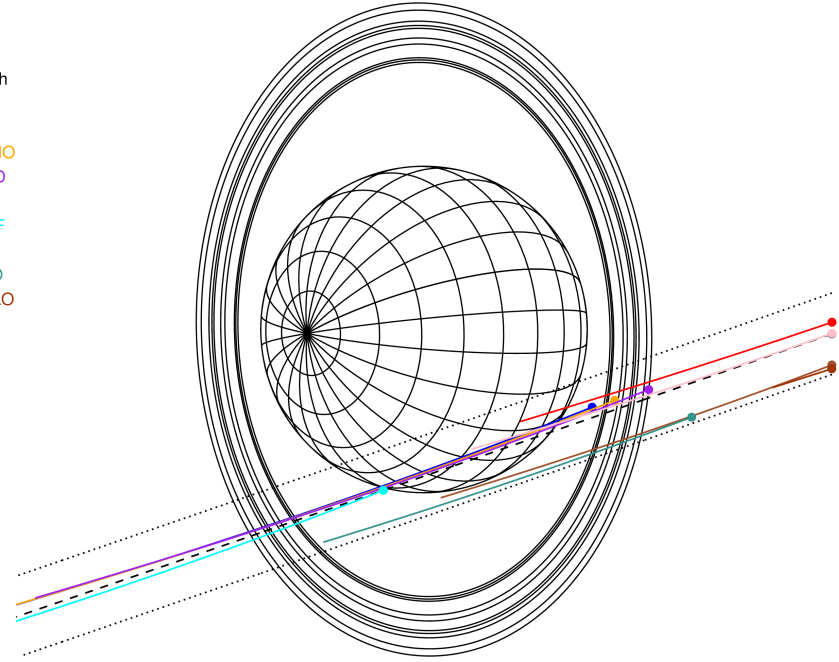
RUWE (>1.4 is poor) : 1.16
 K magnitude : 14.950
 G magnitude : 17.663
 RP magnitude : 16.845
 BP magnitude : 18.418
 DUPflag : 0
 Distance (au) : 18.247
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -3.34
 Sun-Target sep (deg) : 109.38
 Sun-Moon sep (deg) : 96.37
 B (ring opening deg) : 44.18
 PA of pole (deg) : 91.92

Uranus 2039-11-15T07:18:33 K14.95 G17.66
 PgtRgt



2039-11-15T07:18:33.5700 α: 08 21 04.9672 δ: +20 04 24.152 C/A 1.1610° PA 14.25 deg v_sky - 3.34 km/s D 18.25 AU
 Credit: Styled after SORA/Lucky Star

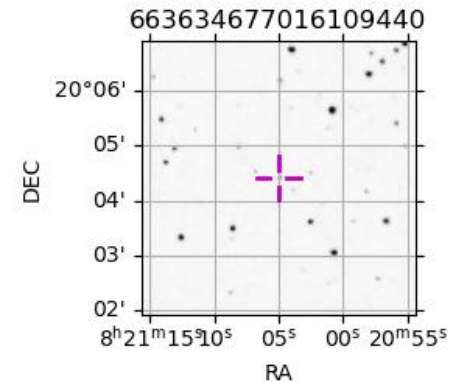
Earth
 PIC
 PAL
 KPNO
 MCD
 TEN
 IRTF
 RIO
 ESO
 SAAO



#	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

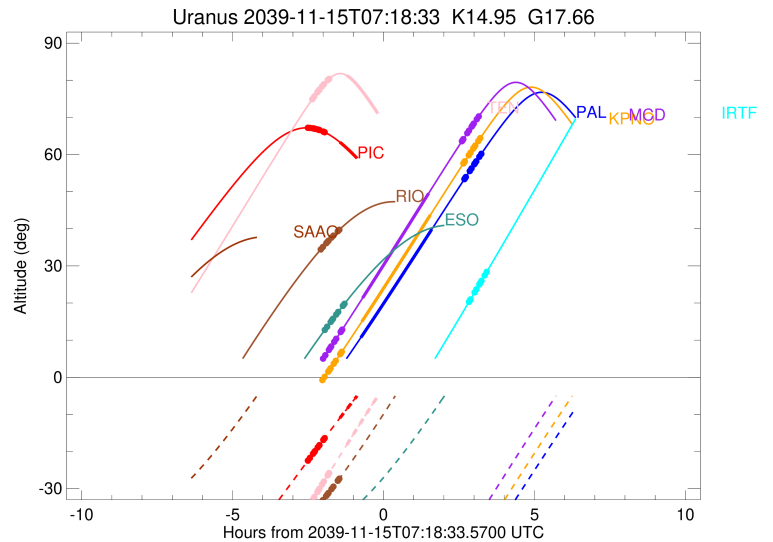
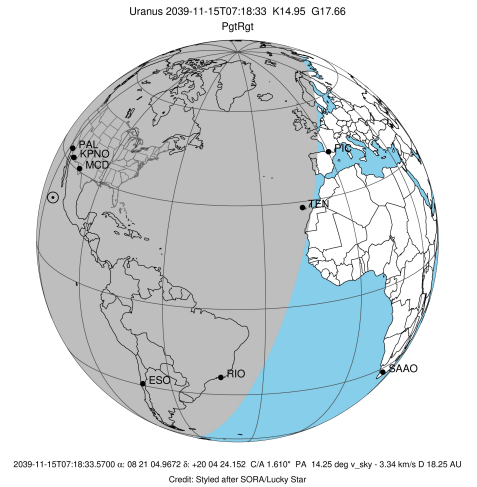
Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1	+++++	+		NOV 15 04:47 - NOV 15 05:51	PinRin
PAL	Palomar Mt (200")	33.4	243.1		+ +	+++++	NOV 15 06:33 - NOV 15 10:33	PieRne
PNO	Purple Mtn Obs. Nanki	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl Obs	32.0	248.4		+ +	+++++	NOV 15 05:52 - NOV 15 10:30	PieRie
MCD	McDonald Obs. 2.7m	30.7	256.0	+++++	+ +	+++++	NOV 15 05:23 - NOV 15 10:27	PieRie
TEN	Teide Obs./Tenerife	28.3	343.5	+++++	+		NOV 15 04:56 - NOV 15 06:05	PinRin
IRTF	Mauna Kea/IRTF	19.8	204.5			+++++	NOV 15 10:08 - NOV 15 10:43	PnnRne
KAV	Kavalur Observatory	12.6	78.8					PnnRnn
RIO	Rio de Janeiro	-22.9	316.8	+++++			NOV 15 05:12 - NOV 15 05:50	PnnRin
ESO	European Southern Obs	-29.3	289.3	+++++			NOV 15 05:20 - NOV 15 06:01	PnnRin
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



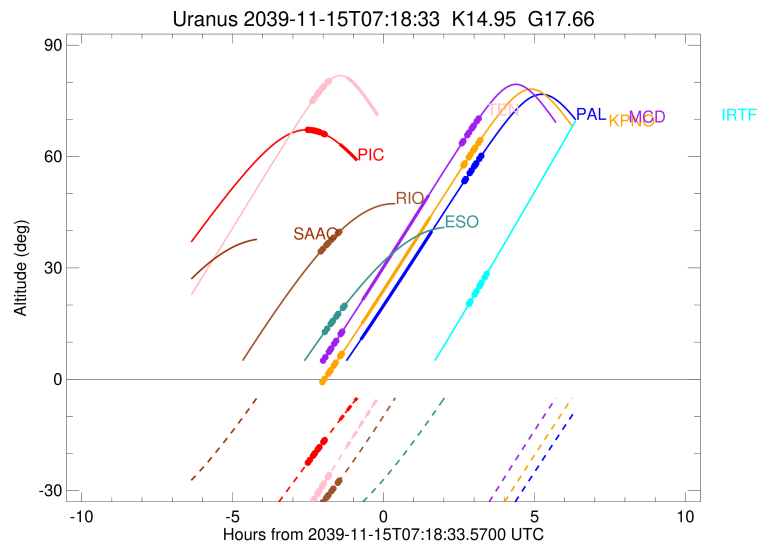
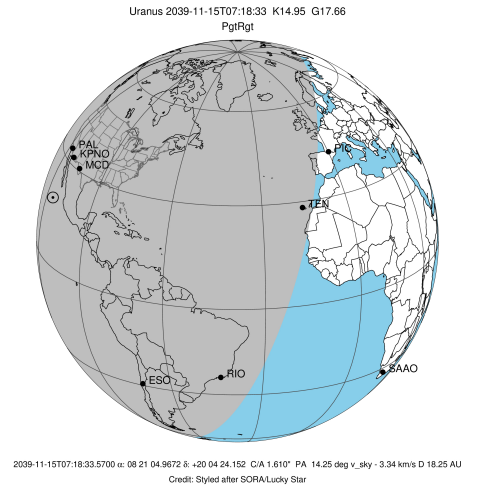
```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2039-11-15T07:13:51.900
Event type           : PgtRgt
: Uranus occs: geocentric, topocentric
: 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       : 663634677016109440
2Mass ID (if available) : 08210496+2004242
ICRS Star Coord at Epoch: 08h 21m 04.96721s +20:04:24.15236s
RUWE (>1.4 is poor) : 1.16
K magnitude           : 14.950
G magnitude           : 17.663
RP magnitude          : 16.845
BP magnitude          : 18.418
DUPflag              : 0
Distance (au)        : 18.247
f0 (km)              : 0.000
g0 (km)              : 0.000
skyplane vel. (km/s) : -3.34
Sun-Target sep (deg) : 109.38
Sun-Moon sep (deg)   : 97.19
B (ring opening deg) : 44.18
PA of pole (deg)     : 91.92
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 1.372
C/A sky separation (km) : 18150.6
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_itrf93_040916.bsp
earth_720101_070426.bpc
earth_200101_990628_predict.bpc
pg3f0000r.bsp
pg490000r.bsp
naif0012.tls
earth_flat_IAU.spk
  
```



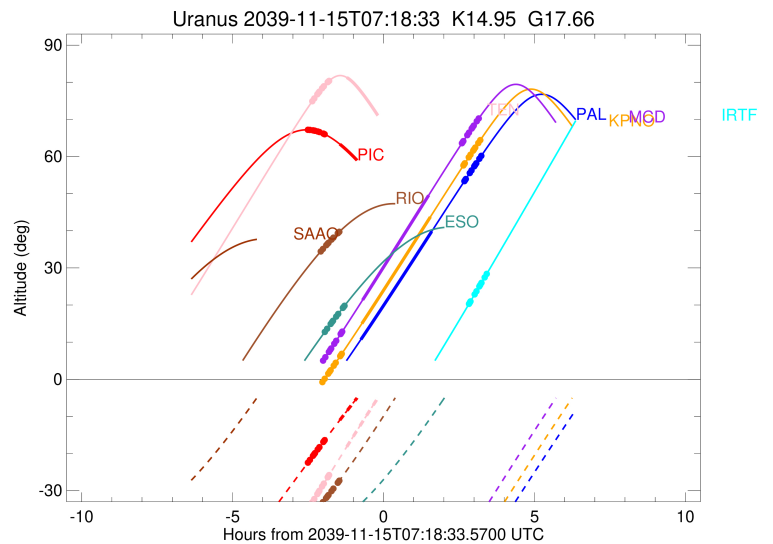
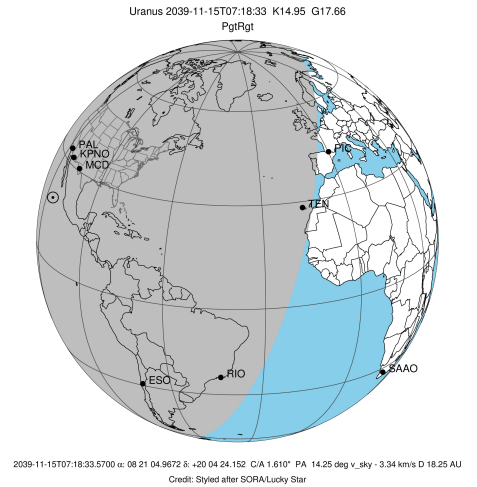
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2039-11-15T04:47:26.660		67.20	-22.61	51422.28	-4.75		
lambda	I	2039-11-15T04:52:21.727		67.16	-21.71	50026.71	-4.72		
delta	I	2039-11-15T04:58:28.421		67.05	-20.60	48300.35	-4.69		
gamma	I	2039-11-15T05:00:52.770		66.99	-20.16	47623.42	-4.68		
eta	I	2039-11-15T05:02:28.343		66.94	-19.87	47176.12	-4.68		
beta	I	2039-11-15T05:07:55.715		66.74	-18.88	45649.52	-4.65		
alpha	I	2039-11-15T05:11:24.046		66.59	-18.25	44685.03	-4.63		
4	I	2039-11-15T05:18:54.564		66.18	-16.89	42596.09	-4.58		
5	I	2039-11-15T05:19:50.938		66.12	-16.72	42311.53	-4.57		
6	I	2039-11-15T05:21:44.504		66.00	-16.38	41872.06	-4.57		
Uranus	I	2039-11-15T05:51:43.637		63.34	-11.01	25349.56		-38.01	-39.29
Uranus	E	2039-11-15T08:37:59.323		36.60	15.34x	25487.80		20.95	21.85
6	E	2039-11-15T09:30:43.921		26.90	21.53x	41834.76	4.39		
5	E	2039-11-15T09:32:22.350		26.60	21.69x	42205.77	4.39		
4	E	2039-11-15T09:33:33.191		26.38	21.81x	42526.17	4.39		
alpha	E	2039-11-15T09:41:51.278		24.86	22.63x	44736.84	4.43		
beta	E	2039-11-15T09:45:16.595		24.23	22.95x	45657.02	4.44		
eta	E	2039-11-15T09:50:58.189		23.19	23.47x	47176.12	4.46		
gamma	E	2039-11-15T09:52:38.711		22.88	23.62x	47625.10	4.47		
delta	E	2039-11-15T09:55:09.676		22.42	23.84x	48300.35	4.48		
lambda	E	2039-11-15T10:01:34.573		21.25	24.38x	50026.71	4.49		
epsilon	E	2039-11-15T10:05:42.076		20.50	24.72x	51140.05	4.52		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2039-11-15T07:44:34.770
 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 : 663634677016109440
 2Mass ID (if available) : 08210496+2004242
 ICRS Star Coord at Epoch: 08h 21m 04.96721s +20:04:24.15236s
 RUWE (>1.4 is poor) : 1.16
 K magnitude : 14.950
 G magnitude : 17.663
 RP magnitude : 16.845
 BP magnitude : 18.418
 DUPflag : 0
 Distance (au) : 18.246
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -3.34
 Sun-Target sep (deg) : 109.38
 Sun-Moon sep (deg) : 96.60
 B (ring opening deg) : 44.18
 PA of pole (deg) : 91.92
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.573
 C/A sky separation (km) : 20816.6
 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



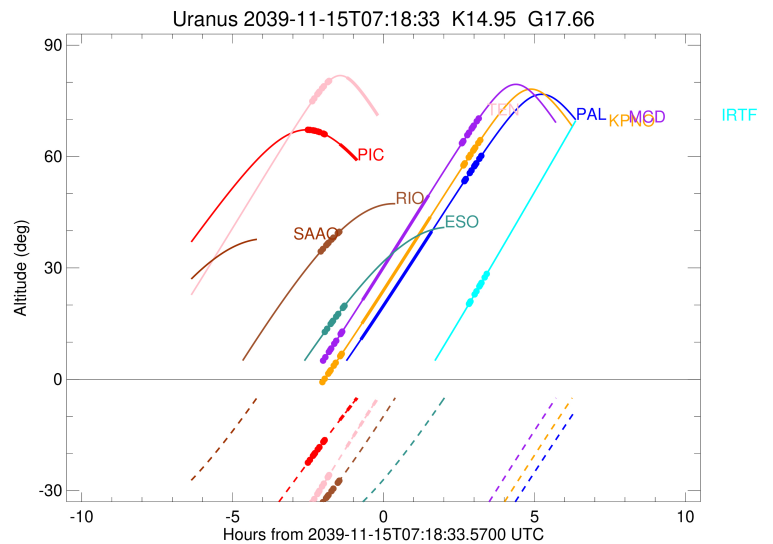
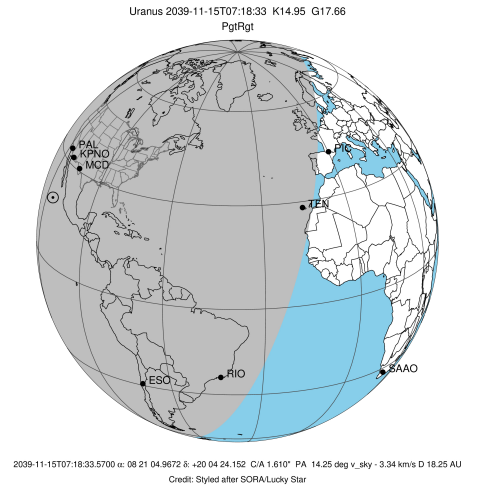
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2039-11-15T05:14:39.069	-4.63x	-55.99	51424.56	-4.06			
lambda	I	2039-11-15T05:20:24.525	-3.55x	-57.14	50026.71	-4.04			
delta	I	2039-11-15T05:27:32.514	-2.21x	-58.55	48300.35	-4.03			
gamma	I	2039-11-15T05:30:20.838	-1.68x	-59.10	47623.36	-4.02			
eta	I	2039-11-15T05:32:12.211	-1.32x	-59.46	47176.12	-4.01			
beta	I	2039-11-15T05:38:33.566	-0.11x	-60.69	45649.22	-3.99			
alpha	I	2039-11-15T05:42:36.069	0.66x	-61.47	44684.93	-3.98			
4	I	2039-11-15T05:51:20.485	2.35x	-63.11	42595.11	-3.94			
5	I	2039-11-15T05:52:25.671	2.56x	-63.32	42312.14	-3.93			
6	I	2039-11-15T05:54:37.406	2.99x	-63.72	41872.72	-3.93			
Uranus	I	2039-11-15T06:33:32.998	10.69	-70.32	25373.52			-35.38	-36.64
Uranus	E	2039-11-15T08:54:25.837	39.83	-66.41	25533.56			12.33	12.89
6	E	2039-11-15T09:59:13.951	53.34	-54.00	41839.61	4.46			
5	E	2039-11-15T10:00:49.292	53.67	-53.67	42214.38	4.47			
4	E	2039-11-15T10:01:57.461	53.90	-53.44	42525.93	4.48			
alpha	E	2039-11-15T10:10:02.647	55.56	-51.80	44733.69	4.57			
beta	E	2039-11-15T10:13:21.537	56.23	-51.12	45654.98	4.60			
eta	E	2039-11-15T10:18:50.876	57.35	-50.00	47176.12	4.65			
gamma	E	2039-11-15T10:20:27.165	57.67	-49.67	47624.59	4.66			
delta	E	2039-11-15T10:22:51.733	58.16	-49.17	48300.35	4.68			
lambda	E	2039-11-15T10:28:58.384	59.38	-47.91	50026.71	4.73			
epsilon	E	2039-11-15T10:33:00.934	60.19	-47.08	51178.04	4.78			

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2039-11-15T07:44:05.480
 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 : 663634677016109440
 2Mass ID (if available) : 08210496+2004242
 ICRS Star Coord at Epoch: 08h 21m 04.96721s +20:04:24.15236s
 RUWE (>1.4 is poor) : 1.16
 K magnitude : 14.950
 G magnitude : 17.663
 RP magnitude : 16.845
 BP magnitude : 18.418
 DUPflag : 0
 Distance (au) : 18.246
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -3.34
 Sun-Target sep (deg) : 109.38
 Sun-Moon sep (deg) : 96.67
 B (ring opening deg) : 44.18
 PA of pole (deg) : 91.92
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.591
 C/A sky separation (km) : 21055.7
 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



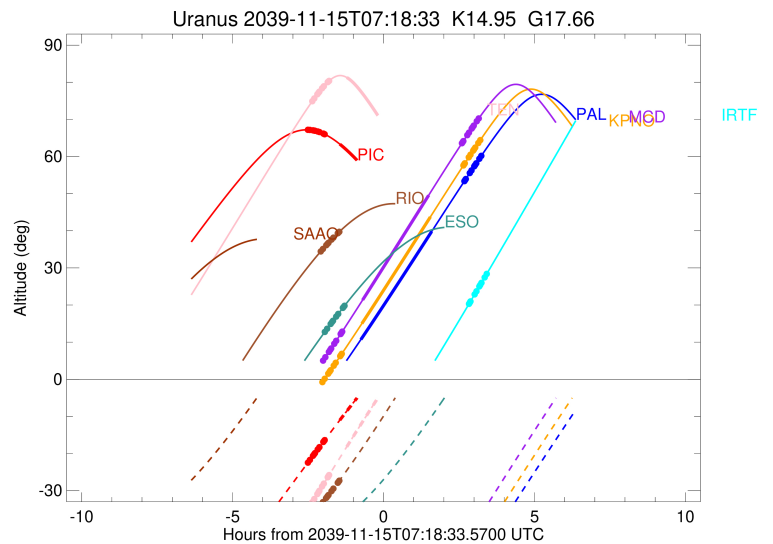
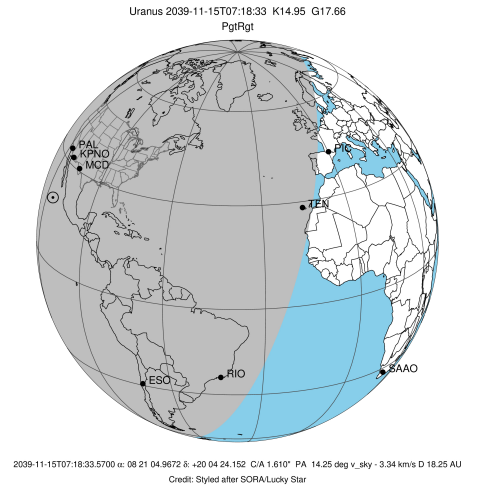
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2039-11-15T05:16:06.043	-0.96x	-60.93	51426.82	-4.10			
lambda	I	2039-11-15T05:21:49.123	0.15x	-62.06	50026.71	-4.08			
delta	I	2039-11-15T05:28:53.542	1.54x	-63.45	48300.35	-4.06			
gamma	I	2039-11-15T05:31:40.493	2.09x	-63.98	47623.32	-4.05			
eta	I	2039-11-15T05:33:30.949	2.45x	-64.34	47176.12	-4.05			
beta	I	2039-11-15T05:39:49.272	3.70x	-65.54	45649.09	-4.02			
alpha	I	2039-11-15T05:43:49.884	4.50x	-66.29	44684.89	-4.01			
4	I	2039-11-15T05:52:30.444	6.23	-67.87	42594.76	-3.96			
5	I	2039-11-15T05:53:35.020	6.45	-68.07	42312.33	-3.96			
6	I	2039-11-15T05:55:45.669	6.88	-68.45	41872.93	-3.96			
Uranus	I	2039-11-15T06:35:23.382	14.96	-74.45	25379.02			-34.77	-36.02
Uranus	E	2039-11-15T08:51:49.403	43.76	-63.66	25535.52			11.83	12.38
6	E	2039-11-15T09:57:14.540	57.56	-50.35	41839.75	4.47			
5	E	2039-11-15T09:58:49.648	57.89	-50.02	42214.64	4.48			
4	E	2039-11-15T09:59:57.637	58.13	-49.78	42525.93	4.49			
alpha	E	2039-11-15T10:08:01.744	59.79	-48.09	44733.60	4.58			
beta	E	2039-11-15T10:11:20.177	60.47	-47.39	45654.93	4.61			
eta	E	2039-11-15T10:16:48.734	61.58	-46.24	47176.12	4.66			
gamma	E	2039-11-15T10:18:24.785	61.91	-45.90	47624.57	4.68			
delta	E	2039-11-15T10:20:48.998	62.40	-45.39	48300.35	4.70			
lambda	E	2039-11-15T10:26:54.734	63.62	-44.10	50026.71	4.74			
epsilon	E	2039-11-15T10:30:56.844	64.42	-43.25	51178.84	4.79			

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2039-11-15T07:43:01.570
 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 : 663634677016109440
 2Mass ID (if available) : 08210496+2004242
 ICRS Star Coord at Epoch: 08h 21m 04.96721s +20:04:24.15236s
 RUWE (>1.4 is poor) : 1.16
 K magnitude : 14.950
 G magnitude : 17.663
 RP magnitude : 16.845
 BP magnitude : 18.418
 DUPflag : 0
 Distance (au) : 18.246
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -3.34
 Sun-Target sep (deg) : 109.38
 Sun-Moon sep (deg) : 96.77
 B (ring opening deg) : 44.18
 PA of pole (deg) : 91.92
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.609
 C/A sky separation (km) : 21292.5
 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



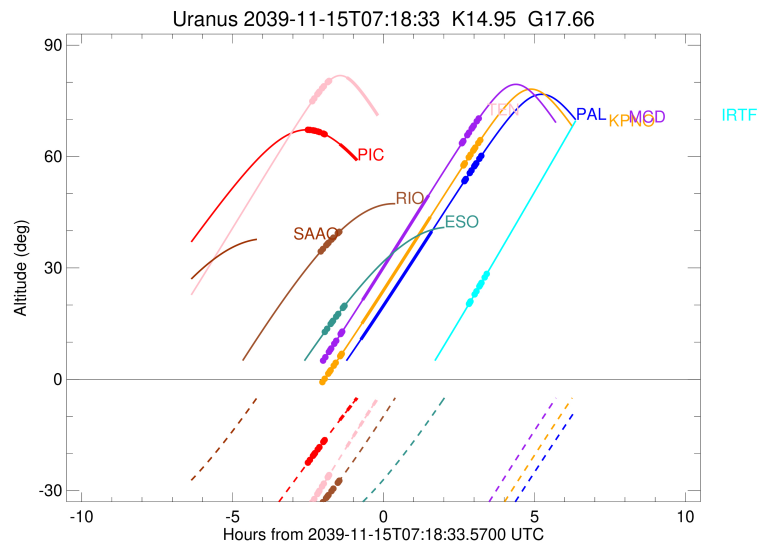
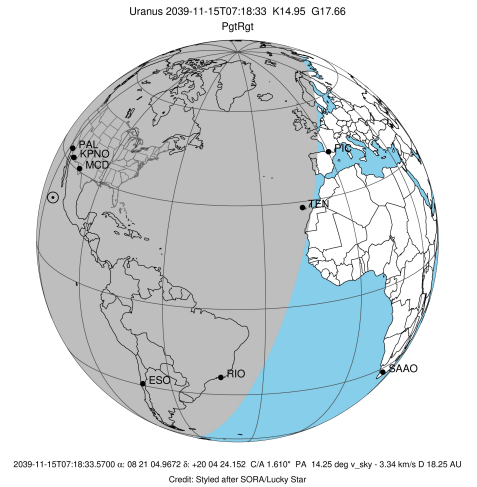
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2039-11-15T05:17:27.281		4.82x	-67.64	51429.47	-4.15		
lambda	I	2039-11-15T05:23:06.302		5.97	-68.71	50026.71	-4.13		
delta	I	2039-11-15T05:30:04.989		7.39	-69.99	48300.35	-4.11		
gamma	I	2039-11-15T05:32:49.724		7.95	-70.48	47623.28	-4.11		
eta	I	2039-11-15T05:34:38.707		8.32	-70.80	47176.12	-4.10		
beta	I	2039-11-15T05:40:52.116		9.60	-71.88	45648.93	-4.08		
alpha	I	2039-11-15T05:44:49.650		10.42	-72.54	44684.85	-4.06		
4	I	2039-11-15T05:53:23.839		12.19	-73.89	42594.36	-4.01		
5	I	2039-11-15T05:54:27.480		12.41	-74.05	42312.56	-4.01		
6	I	2039-11-15T05:56:36.394		12.86	-74.36	41873.18	-4.01		
Uranus	I	2039-11-15T06:36:52.768		21.31	-77.92	25385.25		-34.07	-35.31
Uranus	E	2039-11-15T08:48:27.743		49.59	-58.66	25537.13		11.41	11.94
6	E	2039-11-15T09:54:19.278		63.55	-44.68	41839.83	4.48		
5	E	2039-11-15T09:55:54.078		63.88	-44.34	42214.78	4.49		
4	E	2039-11-15T09:57:01.837		64.11	-44.09	42525.94	4.50		
alpha	E	2039-11-15T10:05:04.434		65.76	-42.36	44733.56	4.59		
beta	E	2039-11-15T10:08:22.249		66.42	-41.66	45654.91	4.63		
eta	E	2039-11-15T10:13:49.785		67.52	-40.48	47176.12	4.68		
gamma	E	2039-11-15T10:15:25.536		67.83	-40.14	47624.57	4.69		
delta	E	2039-11-15T10:17:49.306		68.31	-39.62	48300.35	4.71		
lambda	E	2039-11-15T10:23:53.934		69.49	-38.31	50026.71	4.76		
epsilon	E	2039-11-15T10:27:55.371		70.27	-37.45	51179.03	4.81		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2039-11-15T07:15:34.820
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : 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 : 663634677016109440
 2Mass ID (if available) : 08210496+2004242
 ICRS Star Coord at Epoch: 08h 21m 04.96721s +20:04:24.15236s
 RUWE (>1.4 is poor) : 1.16
 K magnitude : 14.950
 G magnitude : 17.663
 RP magnitude : 16.845
 BP magnitude : 18.418
 DUPflag : 0
 Distance (au) : 18.247
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -3.34
 Sun-Target sep (deg) : 109.38
 Sun-Moon sep (deg) : 97.33
 B (ring opening deg) : 44.18
 PA of pole (deg) : 91.92
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.518
 C/A sky separation (km) : 20085.4
 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



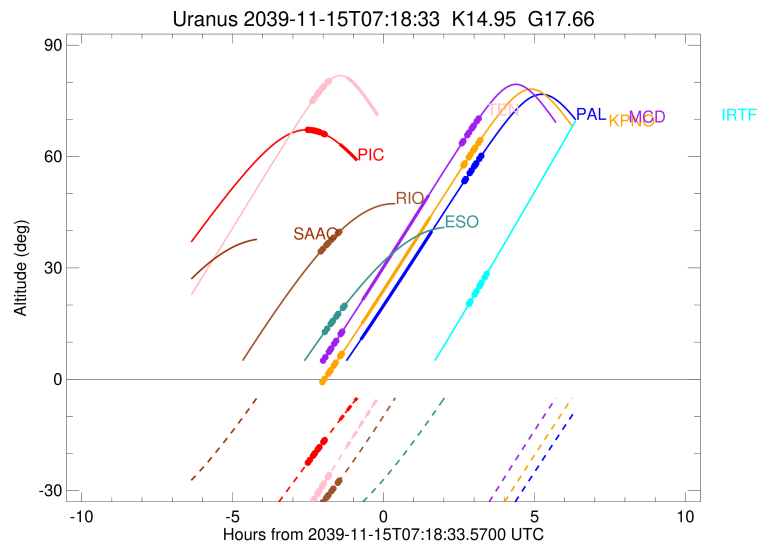
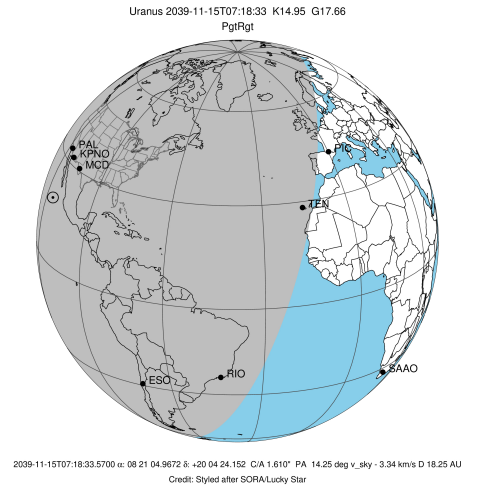
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2039-11-15T04:56:05.713		74.72	-33.33	51434.44	-4.75		
lambda	I	2039-11-15T05:01:03.593		75.67	-32.24	50026.71	-4.72		
delta	I	2039-11-15T05:07:10.845		76.79	-30.89	48300.35	-4.69		
gamma	I	2039-11-15T05:09:35.550		77.22	-30.37	47623.22	-4.67		
eta	I	2039-11-15T05:11:11.320		77.50	-30.02	47176.12	-4.66		
beta	I	2039-11-15T05:16:39.862		78.41	-28.82	45648.75	-4.63		
alpha	I	2039-11-15T05:20:09.102		78.96	-28.05	44684.81	-4.61		
4	I	2039-11-15T05:27:42.703		80.04	-26.40	42594.06	-4.55		
5	I	2039-11-15T05:28:38.795		80.16	-26.20	42312.70	-4.54		
6	I	2039-11-15T05:30:32.528		80.39	-25.78	41873.32	-4.54		
Uranus	I	2039-11-15T06:05:20.127		81.31	-18.23	25379.99		-34.66	-35.91
Uranus	E	2039-11-15T08:27:16.261		53.80	11.15x	25512.64		16.76	17.50
6	E	2039-11-15T09:25:37.219		40.91	21.99x	41836.77	4.42		
5	E	2039-11-15T09:27:14.246		40.55	22.27x	42209.29	4.43		
4	E	2039-11-15T09:28:23.881		40.30	22.47x	42526.00	4.43		
alpha	E	2039-11-15T09:36:36.310		38.49	23.89x	44735.60	4.49		
beta	E	2039-11-15T09:39:58.976		37.74	24.47x	45656.20	4.51		
eta	E	2039-11-15T09:45:35.767		36.51	25.41x	47176.12	4.53		
gamma	E	2039-11-15T09:47:14.674		36.14	25.69x	47624.90	4.54		
delta	E	2039-11-15T09:49:43.245		35.60	26.10x	48300.35	4.55		
lambda	E	2039-11-15T09:56:01.523		34.21	27.13x	50026.71	4.58		
epsilon	E	2039-11-15T10:00:07.594		33.31	27.79x	51154.26	4.60		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2039-11-15T07:43:33.140
 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 : 663634677016109440
 2Mass ID (if available) : 08210496+2004242
 ICRS Star Coord at Epoch: 08h 21m 04.96721s +20:04:24.15236s
 RUWE (>1.4 is poor) : 1.16
 K magnitude : 14.950
 G magnitude : 17.663
 RP magnitude : 16.845
 BP magnitude : 18.418
 DUPflag : 0
 Distance (au) : 18.246
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -3.34
 Sun-Target sep (deg) : 109.38
 Sun-Moon sep (deg) : 95.98
 B (ring opening deg) : 44.18
 PA of pole (deg) : 91.92
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.586
 C/A sky separation (km) : 20982.9
 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_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	2039-11-15T05:02:50.102	-41.47x	-18.94	51420.33	-3.73		
lambda	I	2039-11-15T05:09:05.319	-40.57x	-20.38	50026.71	-3.71		
delta	I	2039-11-15T05:16:52.039	-39.41x	-22.16	48300.35	-3.69		
gamma	I	2039-11-15T05:19:55.707	-38.94x	-22.87	47623.42	-3.68		
eta	I	2039-11-15T05:21:57.299	-38.62x	-23.33	47176.12	-3.68		
beta	I	2039-11-15T05:28:53.760	-37.52x	-24.93	45649.45	-3.65		
alpha	I	2039-11-15T05:33:18.777	-36.80x	-25.95	44685.00	-3.64		
4	I	2039-11-15T05:42:52.161	-35.21x	-28.15	42595.65	-3.60		
5	I	2039-11-15T05:44:03.726	-35.01x	-28.43	42311.82	-3.59		
6	I	2039-11-15T05:46:28.124	-34.60x	-28.99	41872.39	-3.59		
Uranus	I	2039-11-15T06:28:14.425	-27.01x	-38.68	25368.40		-35.95	-37.21
Uranus	E	2039-11-15T08:57:05.108	4.19x	-73.60	25540.53		10.48	10.96
6	E	2039-11-15T10:08:21.877	20.27	-88.70	41841.01	4.23		
5	E	2039-11-15T10:10:01.989	20.65	-88.51	42216.96	4.24		
4	E	2039-11-15T10:11:13.436	20.92	-88.33	42525.97	4.25		
alpha	E	2039-11-15T10:19:43.855	22.87	-86.62	44732.70	4.35		
beta	E	2039-11-15T10:23:12.811	23.66	-85.84	45654.37	4.38		
eta	E	2039-11-15T10:28:58.292	24.99	-84.53	47176.12	4.44		
gamma	E	2039-11-15T10:30:39.105	25.37	-84.14	47624.43	4.45		
delta	E	2039-11-15T10:33:10.454	25.95	-83.56	48300.35	4.48		
lambda	E	2039-11-15T10:39:33.674	27.42	-82.07	50026.71	4.53		
epsilon	E	2039-11-15T10:43:49.521	28.40	-81.07	51190.62	4.58		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2039-11-15T07:18:23.240
 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 : 663634677016109440
 2Mass ID (if available) : 08210496+2004242
 ICRS Star Coord at Epoch: 08h 21m 04.96721s +20:04:24.15236s
 RUWE (>1.4 is poor) : 1.16
 K magnitude : 14.950
 G magnitude : 17.663
 RP magnitude : 16.845
 BP magnitude : 18.418
 DUPflag : 0
 Distance (au) : 18.247
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -3.34
 Sun-Target sep (deg) : 109.38
 Sun-Moon sep (deg) : 97.10
 B (ring opening deg) : 44.18
 PA of pole (deg) : 91.92
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.962
 C/A sky separation (km) : 25963.4
 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

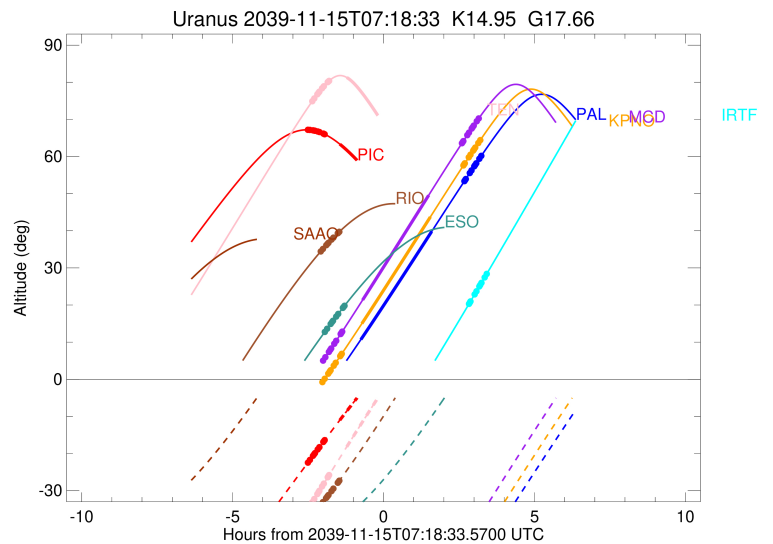
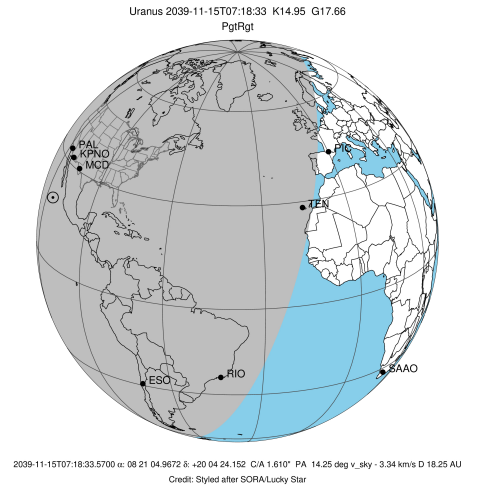


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2039-11-15T05:12:42.564		34.26	-33.99	51467.32	-4.38		
lambda	I	2039-11-15T05:18:13.686		35.12	-33.07	50026.71	-4.33		
delta	I	2039-11-15T05:24:54.527		36.13	-31.93	48300.35	-4.28		
gamma	I	2039-11-15T05:27:33.248		36.52	-31.47	47622.66	-4.26		
eta	I	2039-11-15T05:29:18.301		36.78	-31.17	47176.12	-4.24		
beta	I	2039-11-15T05:35:21.024		37.65	-30.10	45646.61	-4.18		
alpha	I	2039-11-15T05:39:13.139		38.19	-29.41	44684.64	-4.14		
4	I	2039-11-15T05:47:42.806		39.34	-27.88	42587.51	-4.04		
5	I	2039-11-15T05:48:44.203		39.47	-27.69	42314.92	-4.02		
6	I	2039-11-15T05:50:49.711		39.74	-27.31	41876.52	-4.01		

No planet occultations

6	E	2039-11-15T09:16:29.931		41.10	15.74x	41844.37	4.08		
5	E	2039-11-15T09:18:12.654		40.90	16.12x	42223.07	4.10		
4	E	2039-11-15T09:19:25.567		40.75	16.39x	42526.25	4.11		
alpha	E	2039-11-15T09:28:11.099		39.65	18.36x	44730.61	4.23		
beta	E	2039-11-15T09:31:45.726		39.18	19.16x	45653.19	4.28		
eta	E	2039-11-15T09:37:39.672		38.38	20.49x	47176.12	4.34		
gamma	E	2039-11-15T09:39:22.673		38.15	20.88x	47624.15	4.36		
delta	E	2039-11-15T09:41:57.372		37.79	21.46x	48300.35	4.38		
lambda	E	2039-11-15T09:48:28.559		36.85	22.93x	50026.71	4.44		
epsilon	E	2039-11-15T09:52:53.719		36.20	23.93x	51209.22	4.50		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2039-11-15T07:26:13.410
 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 : 663634677016109440
 2Mass ID (if available) : 08210496+2004242
 ICRS Star Coord at Epoch: 08h 21m 04.96721s +20:04:24.15236s
 RUWE (>1.4 is poor) : 1.16
 K magnitude : 14.950
 G magnitude : 17.663
 RP magnitude : 16.845
 BP magnitude : 18.418
 DUPflag : 0
 Distance (au) : 18.247
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -3.34
 Sun-Target sep (deg) : 109.38
 Sun-Moon sep (deg) : 96.85
 B (ring opening deg) : 44.18
 PA of pole (deg) : 91.92
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.035
 C/A sky separation (km) : 26936.5
 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	2039-11-15T05:20:43.760		12.54	-40.75	51469.43	-4.14		
lambda	I	2039-11-15T05:26:34.575		13.62	-40.36	50026.71	-4.09		
delta	I	2039-11-15T05:33:38.788		14.92	-39.84	48300.35	-4.04		
gamma	I	2039-11-15T05:36:26.845		15.43	-39.62	47622.62	-4.02		
eta	I	2039-11-15T05:38:18.084		15.77	-39.47	47176.12	-4.01		
beta	I	2039-11-15T05:44:42.445		16.92	-38.93	45646.42	-3.95		
alpha	I	2039-11-15T05:48:48.576		17.65	-38.56	44684.66	-3.91		
4	I	2039-11-15T05:57:50.071		19.24	-37.68	42586.79	-3.80		
5	I	2039-11-15T05:58:55.196		19.43	-37.57	42315.04	-3.78		
6	I	2039-11-15T06:01:08.320		19.81	-37.35	41876.81	-3.76		

No planet occultations

6	E	2039-11-15T09:24:06.890		40.94	-4.12x	41846.28	3.99		
5	E	2039-11-15T09:25:51.307		40.95	-3.77x	42226.67	4.01		
4	E	2039-11-15T09:27:05.183		40.95	-3.52x	42526.54	4.03		
alpha	E	2039-11-15T09:35:59.758		40.93	-1.73x	44729.26	4.17		
beta	E	2039-11-15T09:39:37.481		40.89	-0.99x	45652.43	4.22		
eta	E	2039-11-15T09:45:35.439		40.79	0.22x	47176.12	4.30		
gamma	E	2039-11-15T09:47:19.301		40.75	0.57x	47623.96	4.32		
delta	E	2039-11-15T09:49:55.236		40.69	1.10x	48300.35	4.35		
lambda	E	2039-11-15T09:56:28.569		40.50	2.45x	50026.71	4.42		
epsilon	E	2039-11-15T10:00:57.765		40.35	3.37x	51223.70	4.49		