

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2043-02-27T07:47:36.970
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 611251537884918016
 2Mass ID (if available) : 09060112+1721316

Uranus 2043-02-27T07:47:36 K11.80 G13.66 PgtRgt

ICRS Star Coord at Epoch: 09h 06m 01.11424s +17:21:30.59090s

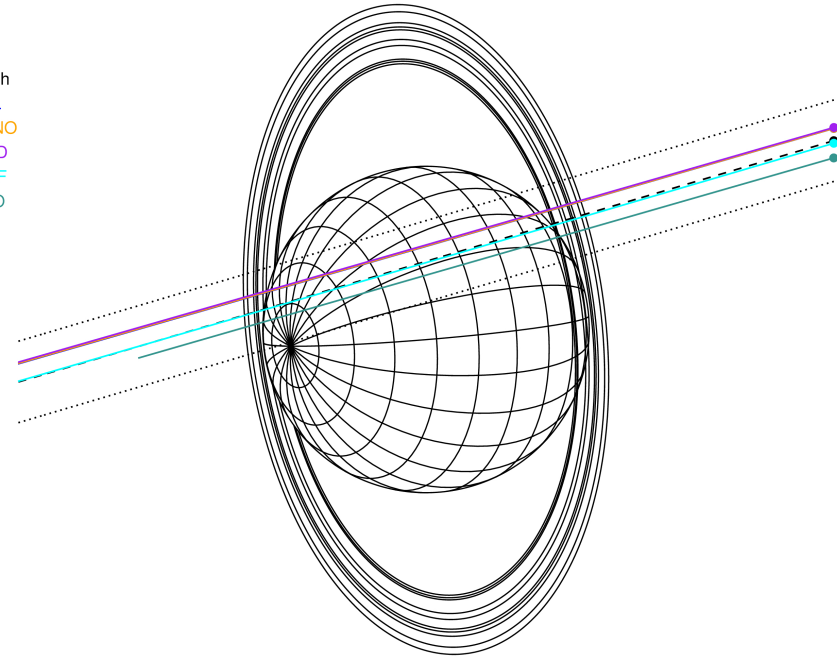
RUWE (>1.4 is poor) : 1.07
 K magnitude : 11.803
 G magnitude : 13.663
 RP magnitude : 13.050
 BP magnitude : 14.116
 DUPflag : 0
 Distance (au) : 17.529
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.54
 Sun-Target sep (deg) : 155.81
 Sun-Moon sep (deg) : 62.81
 B (ring opening deg) : 33.36
 PA of pole (deg) : 97.04

Uranus 2043-02-27T07:47:36 K11.80 G13.66
 PgtRgt



2043-02-27T07:47:36.9700 ex: 09 06 01.11424 s: +17 21 30.591 C/A 0.8111 PA 196.48 deg v_sky -20.54 km/s D 17.53 AU
 Credit: Styled after SORA/Lucky Star

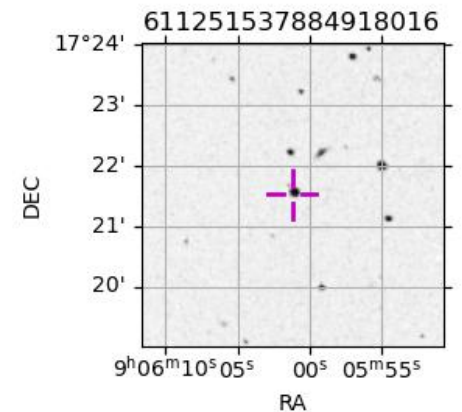
Earth
 PAL
 KPNO
 MCD
 IRTF
 ESO



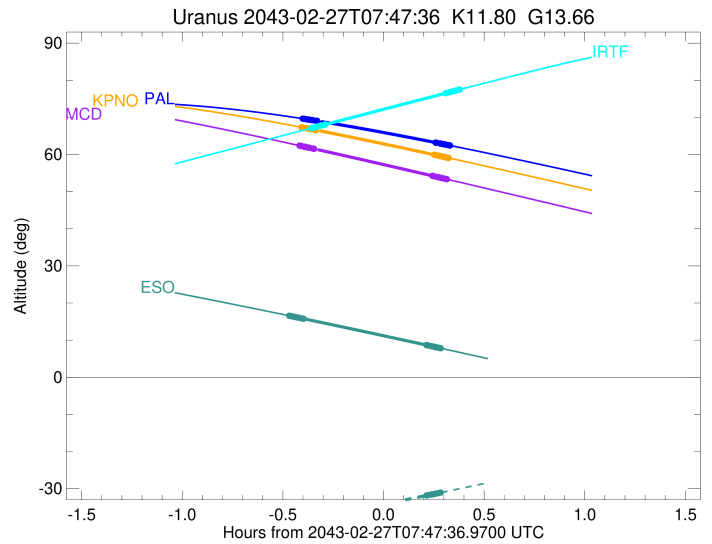
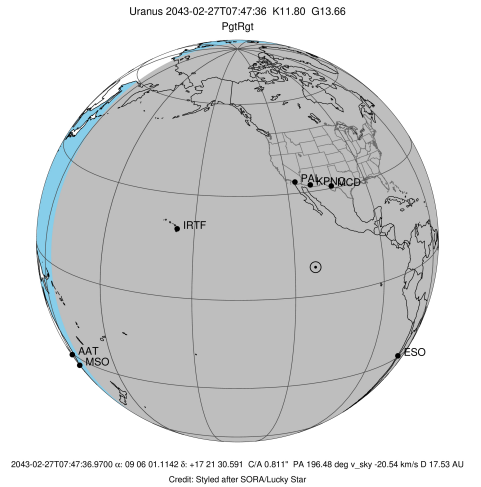
#	a(km)	ring
1	41837.2	6
2	42235.0	5
3	42571.2	4
4	44718.5	alpha
5	45661.1	beta
6	47176.1	eta
7	47626.3	gamma
8	48300.3	delta
9	50026.7	lambda
10	51149.4	epsilon

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					PnnRnn
PAL	Palomar Mt (200")	33.4	243.1	+++++	+ +	+++++	FEB 27 07:23 - FEB 27 08:07	PieRie
PNO	Purple Mtn Obs. Nanki	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+++++	+ +	+++++	FEB 27 07:23 - FEB 27 08:07	PieRie
MCD	McDonald Obs. 2.7m	30.7	256.0	+++++	+ +	+++++	FEB 27 07:22 - FEB 27 08:06	PieRie
TEN	Teide Obs./Tenerife	28.3	343.5					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+++++	+ +	+++++	FEB 27 07:26 - FEB 27 08:10	PieRie
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	+++++	+ +	+++++	FEB 27 07:19 - FEB 27 08:04	PieRie
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



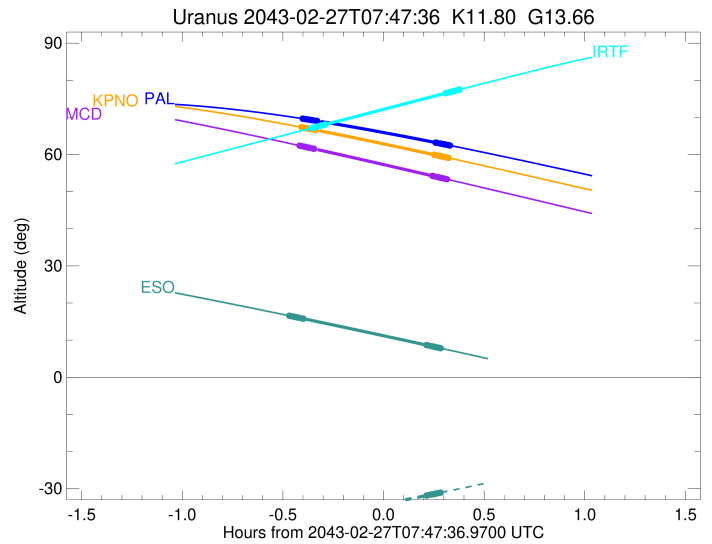
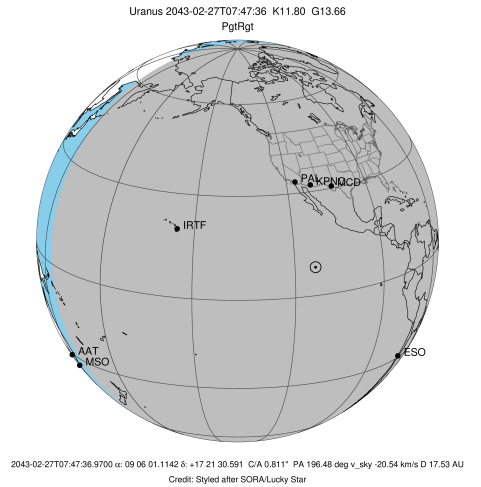
target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2043-02-27T07:46:34.580
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PAL
 Location : Palomar Mt (200")
 Latitude (deg) : 33.35622
 E. Longitude (deg) : 243.13601
 Altitude (km) : 1.706
 Gaia source ID : 611251537884918016
 2Mass ID (if available) : 09060112+1721316
 ICRS Star Coord at Epoch: 09h 06m 01.11424s +17:21:30.59090s
 RUWE (>1.4 is poor) : 1.07
 K magnitude : 11.803
 G magnitude : 13.663
 RP magnitude : 13.050
 BP magnitude : 14.116
 DUPflag : 0
 Distance (au) : 17.529
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.54
 Sun-Target sep (deg) : 155.81
 Sun-Moon sep (deg) : 63.48
 B (ring opening deg) : 33.36
 PA of pole (deg) : 97.04
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.985
 C/A sky separation (km) : 12520.4
 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	2043-02-27T07:23:38.214		69.65	-63.78	50964.87	-36.54		
lambda	I	2043-02-27T07:24:03.949		69.59	-63.81	50026.71	-36.43		
delta	I	2043-02-27T07:24:51.397		69.48	-63.87	48300.35	-36.34		
gamma	I	2043-02-27T07:25:09.829		69.43	-63.89	47630.90	-36.30		
eta	I	2043-02-27T07:25:22.363		69.40	-63.90	47176.12	-36.27		
beta	I	2043-02-27T07:26:03.509		69.31	-63.95	45681.13	-36.17		
alpha	I	2043-02-27T07:26:30.413		69.24	-63.98	44699.45	-36.09		
4	I	2043-02-27T07:27:30.967		69.10	-64.05	42559.34	-35.96		
5	I	2043-02-27T07:27:37.776		69.08	-64.06	42232.76	-35.85		
6	I	2043-02-27T07:27:49.205		69.05	-64.07	41879.74	-35.91		
Uranus	I	2043-02-27T07:28:53.661		68.89	-64.14	25451.01		-40.80	-42.11
Uranus	E	2043-02-27T08:04:13.695		63.03	-65.14	25404.57		51.49	52.75
6	E	2043-02-27T08:03:04.925	b	63.23	-65.15	41802.13	35.85		
5	E	2043-02-27T08:03:17.890	b	63.19	-65.15	42190.76	35.80		
4	E	2043-02-27T08:03:26.126	b	63.17	-65.15	42556.11	35.90		
alpha	E	2043-02-27T08:04:27.731		62.98	-65.14	44719.24	36.03		
beta	E	2043-02-27T08:04:53.061		62.91	-65.13	45645.29	36.11		
eta	E	2043-02-27T08:05:35.230		62.78	-65.13	47176.12	36.21		
gamma	E	2043-02-27T08:05:47.584		62.74	-65.12	47623.61	36.24		
delta	E	2043-02-27T08:06:06.250		62.69	-65.12	48300.35	36.27		
lambda	E	2043-02-27T08:06:53.783		62.54	-65.11	50026.71	36.36		
epsilon	E	2043-02-27T08:07:33.762		62.42	-65.10	51481.89	36.47		

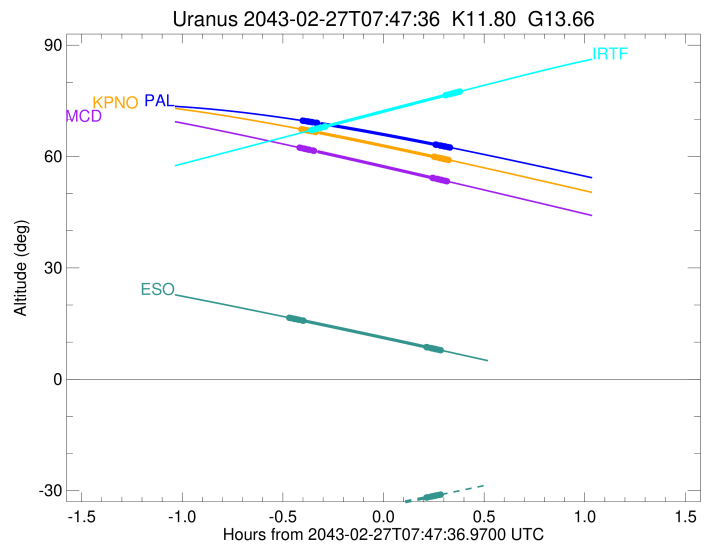
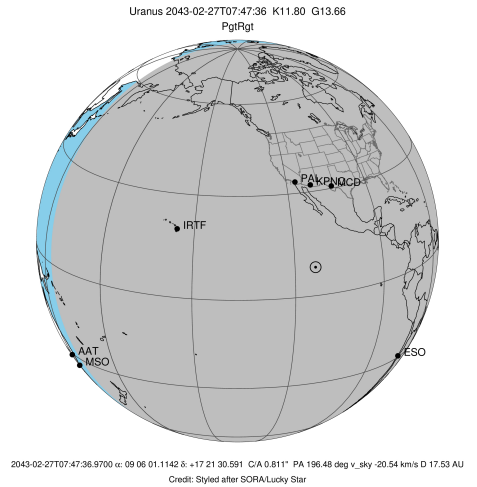
```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2043-02-27T07:46:10.660
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      : 611251537884918016
2Mass ID (if available) : 09060112+1721316
ICRS Star Coord at Epoch: 09h 06m 01.11424s +17:21:30.59090s
RUWE (>1.4 is poor) : 1.07
K magnitude          : 11.803
G magnitude          : 13.663
RP magnitude         : 13.050
BP magnitude         : 14.116
DUPflag             : 0
Distance (au)       : 17.529
f0 (km)              : 0.000
g0 (km)              : 0.000
skyplane vel. (km/s) : -20.54
Sun-Target sep (deg) : 155.81
Sun-Moon sep (deg)  : 63.43
B (ring opening deg) : 33.36
PA of pole (deg)    : 97.04
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 0.989
C/A sky separation (km) : 12569.3
NAIF SPICE kernels  : RAJobs_U111+rgf15.spk
URKALLvl.spk
urall1.bsp
IAU_URANUS_for_RINGFIT.tpc
vgr2.urall1.bsp
ural61.bsp
vgr2.ural61.bsp
peph.ural60.bsp
earthstns_itr93_040916.bsp
earth_720101_070426.bpc
earth_200101_990628_predict.bpc
pg3f0000r.bsp
pg490000r.bsp
naif0012.tls
earth_flat_IAU.spk
    
```



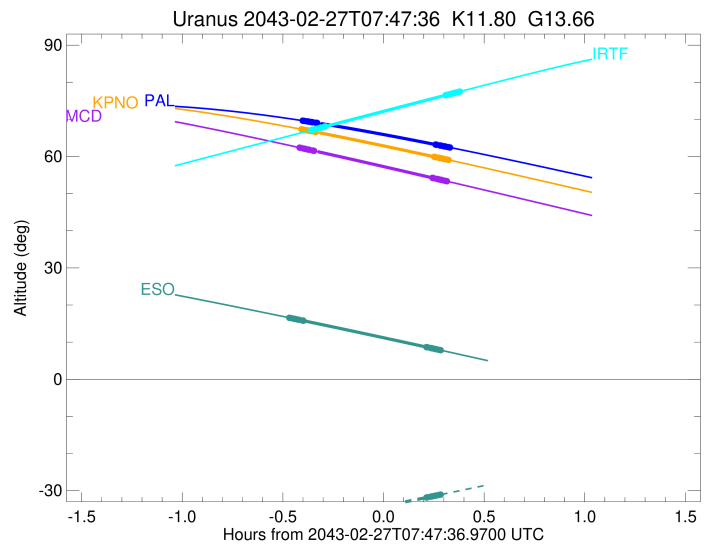
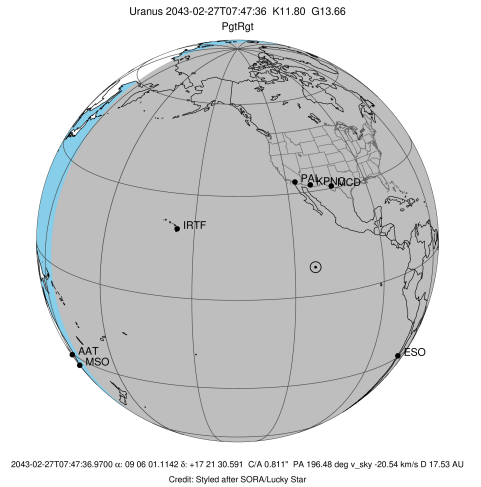
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2043-02-27T07:23:13.999		67.33	-66.27	50965.15	-36.52		
lambda	I	2043-02-27T07:23:39.757		67.26	-66.29	50026.71	-36.41		
delta	I	2043-02-27T07:24:27.231		67.12	-66.31	48300.35	-36.32		
gamma	I	2043-02-27T07:24:45.674		67.06	-66.32	47630.91	-36.28		
eta	I	2043-02-27T07:24:58.215		67.03	-66.33	47176.12	-36.25		
beta	I	2043-02-27T07:25:39.386		66.91	-66.35	45681.13	-36.15		
alpha	I	2043-02-27T07:26:06.309		66.83	-66.36	44699.43	-36.07		
4	I	2043-02-27T07:27:06.903		66.65	-66.39	42559.30	-35.94		
5	I	2043-02-27T07:27:13.718		66.63	-66.40	42232.68	-35.83		
6	I	2043-02-27T07:27:25.152		66.60	-66.40	41879.74	-35.88		
Uranus	I	2043-02-27T07:28:30.580		66.40	-66.43	25451.32		-40.73	-42.03
Uranus	E	2043-02-27T08:03:49.059		59.72	-65.85	25404.87		51.42	52.69
6	E	2043-02-27T08:02:40.998	b	59.95	-65.91	41802.16	35.82		
5	E	2043-02-27T08:02:53.971	b	59.91	-65.90	42190.67	35.76		
4	E	2043-02-27T08:03:02.219	b	59.88	-65.89	42556.05	35.87		
alpha	E	2043-02-27T08:04:03.882		59.68	-65.84	44719.20	36.00		
beta	E	2043-02-27T08:04:29.236		59.59	-65.81	45645.31	36.08		
eta	E	2043-02-27T08:05:11.443		59.45	-65.77	47176.12	36.18		
gamma	E	2043-02-27T08:05:23.808		59.41	-65.76	47623.62	36.20		
delta	E	2043-02-27T08:05:42.490		59.35	-65.74	48300.35	36.24		
lambda	E	2043-02-27T08:06:30.064		59.19	-65.69	50026.71	36.33		
epsilon	E	2043-02-27T08:07:10.085		59.06	-65.65	51482.16	36.44		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2043-02-27T07:45:39.190
 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 : 611251537884918016
 2Mass ID (if available) : 09060112+1721316
 ICRS Star Coord at Epoch: 09h 06m 01.11424s +17:21:30.59090s
 RUWE (>1.4 is poor) : 1.07
 K magnitude : 11.803
 G magnitude : 13.663
 RP magnitude : 13.050
 BP magnitude : 14.116
 DUPflag : 0
 Distance (au) : 17.529
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.54
 Sun-Target sep (deg) : 155.81
 Sun-Moon sep (deg) : 63.35
 B (ring opening deg) : 33.36
 PA of pole (deg) : 97.04
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.001
 C/A sky separation (km) : 12723.4
 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



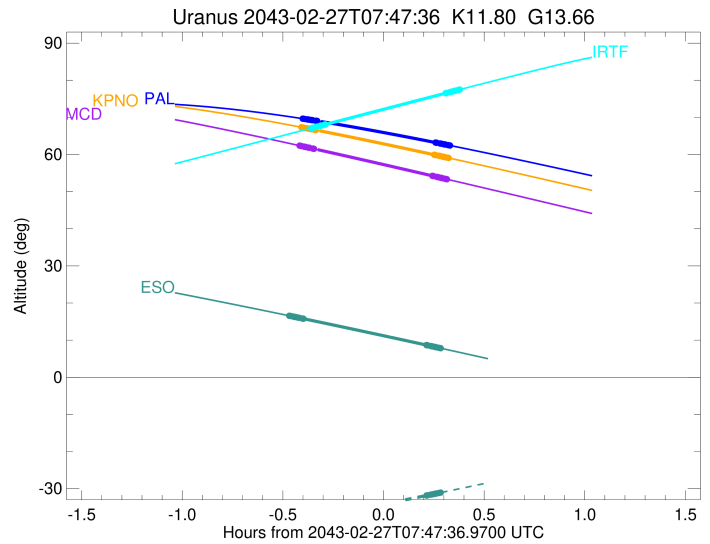
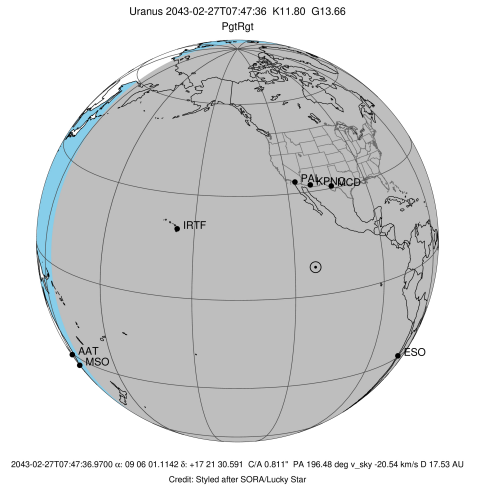
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2043-02-27T07:22:41.599		62.38	-67.61	50966.20	-36.46		
lambda	I	2043-02-27T07:23:07.428		62.29	-67.59	50026.71	-36.35		
delta	I	2043-02-27T07:23:54.984		62.13	-67.56	48300.35	-36.25		
gamma	I	2043-02-27T07:24:13.460		62.07	-67.55	47630.92	-36.21		
eta	I	2043-02-27T07:24:26.023		62.03	-67.54	47176.12	-36.18		
beta	I	2043-02-27T07:25:07.271		61.89	-67.52	45681.14	-36.08		
alpha	I	2043-02-27T07:25:34.249		61.80	-67.50	44699.33	-36.00		
4	I	2043-02-27T07:26:34.962		61.60	-67.45	42559.14	-35.86		
5	I	2043-02-27T07:26:41.798		61.58	-67.45	42232.38	-35.75		
6	I	2043-02-27T07:26:53.241		61.54	-67.44	41879.74	-35.81		
Uranus	I	2043-02-27T07:28:02.177		61.31	-67.39	25452.44		-40.47	-41.77
Uranus	E	2043-02-27T08:03:14.674		54.04	-64.44	25405.72		51.22	52.49
6	E	2043-02-27T08:02:08.699	b	54.27	-64.56	41802.26	35.73		
5	E	2043-02-27T08:02:21.692	b	54.22	-64.54	42190.40	35.68		
4	E	2043-02-27T08:02:29.970	b	54.19	-64.52	42555.88	35.78		
alpha	E	2043-02-27T08:03:31.778		53.98	-64.40	44719.07	35.91		
beta	E	2043-02-27T08:03:57.196		53.89	-64.35	45645.36	36.00		
eta	E	2043-02-27T08:04:39.496		53.74	-64.27	47176.12	36.10		
gamma	E	2043-02-27T08:04:51.888		53.70	-64.24	47623.64	36.13		
delta	E	2043-02-27T08:05:10.611		53.63	-64.21	48300.35	36.16		
lambda	E	2043-02-27T08:05:58.287		53.46	-64.11	50026.71	36.26		
epsilon	E	2043-02-27T08:06:38.412		53.32	-64.03	51482.93	36.37		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2043-02-27T07:49:07.890
 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 : 611251537884918016
 2Mass ID (if available) : 09060112+1721316
 ICRS Star Coord at Epoch: 09h 06m 01.11424s +17:21:30.59090s
 RUWE (>1.4 is poor) : 1.07
 K magnitude : 11.803
 G magnitude : 13.663
 RP magnitude : 13.050
 BP magnitude : 14.116
 DUPflag : 0
 Distance (au) : 17.529
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.54
 Sun-Target sep (deg) : 155.81
 Sun-Moon sep (deg) : 63.71
 B (ring opening deg) : 33.36
 PA of pole (deg) : 97.04
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.790
 C/A sky separation (km) : 10047.9
 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	2043-02-27T07:26:12.236		67.14	-43.10	50947.67	-37.01		
lambda	I	2043-02-27T07:26:37.164		67.23	-43.19	50026.71	-36.93		
delta	I	2043-02-27T07:27:23.945		67.42	-43.38	48300.35	-36.87		
gamma	I	2043-02-27T07:27:42.111		67.49	-43.45	47630.76	-36.85		
eta	I	2043-02-27T07:27:54.452		67.54	-43.50	47176.12	-36.83		
beta	I	2043-02-27T07:28:34.949		67.70	-43.65	45680.99	-36.77		
alpha	I	2043-02-27T07:29:01.347		67.80	-43.76	44701.05	-36.71		
4	I	2043-02-27T07:30:00.870		68.04	-43.99	42561.94	-36.65		
5	I	2043-02-27T07:30:07.448		68.06	-44.01	42237.54	-36.55		
6	I	2043-02-27T07:30:18.898		68.11	-44.06	41879.70	-36.61		
Uranus	I	2043-02-27T07:30:32.471		68.16	-44.11	25433.64		-44.78	-46.09
Uranus	E	2043-02-27T08:07:40.955		76.88	-52.72	25393.58		54.10	55.34
6	E	2043-02-27T08:06:05.534	b	76.51	-52.35	41800.68	36.62		
5	E	2043-02-27T08:06:18.399	b	76.56	-52.40	42195.05	36.56		
4	E	2043-02-27T08:06:26.314	b	76.59	-52.43	42558.80	36.66		
alpha	E	2043-02-27T08:07:26.702	b	76.83	-52.66	44721.25	36.72		
beta	E	2043-02-27T08:07:51.486		76.92	-52.76	45644.60	36.78		
eta	E	2043-02-27T08:08:32.922		77.08	-52.91	47176.12	36.85		
gamma	E	2043-02-27T08:08:45.056		77.13	-52.96	47623.37	36.87		
delta	E	2043-02-27T08:09:03.413		77.20	-53.03	48300.35	36.89		
lambda	E	2043-02-27T08:09:50.170		77.38	-53.21	50026.71	36.95		
epsilon	E	2043-02-27T08:10:29.191		77.54	-53.36	51469.48	37.03		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2043-02-27T07:42:47.560
 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 : 611251537884918016
 2Mass ID (if available) : 09060112+1721316
 ICRS Star Coord at Epoch: 09h 06m 01.11424s +17:21:30.59090s
 RUWE (>1.4 is poor) : 1.07
 K magnitude : 11.803
 G magnitude : 13.663
 RP magnitude : 13.050
 BP magnitude : 14.116
 DUPflag : 0
 Distance (au) : 17.529
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.54
 Sun-Target sep (deg) : 155.81
 Sun-Moon sep (deg) : 62.58
 B (ring opening deg) : 33.36
 PA of pole (deg) : 97.04
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.643
 C/A sky separation (km) : 8173.0
 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	2043-02-27T07:19:38.015		16.55	-38.96	50933.81	-36.87		
lambda	I	2043-02-27T07:20:02.652		16.47	-38.89	50026.71	-36.81		
delta	I	2043-02-27T07:20:49.579		16.32	-38.76	48300.35	-36.77		
gamma	I	2043-02-27T07:21:07.798		16.27	-38.71	47630.64	-36.75		
eta	I	2043-02-27T07:21:20.168		16.23	-38.68	47176.12	-36.74		
beta	I	2043-02-27T07:22:00.758		16.10	-38.57	45680.84	-36.69		
alpha	I	2043-02-27T07:22:27.153		16.02	-38.49	44702.39	-36.65		
4	I	2043-02-27T07:23:26.782	b	15.83	-38.33	42564.07	-36.62		
5	I	2043-02-27T07:23:33.295	b	15.81	-38.31	42241.39	-36.53		
6	I	2043-02-27T07:23:44.941	b	15.77	-38.28	41879.57	-36.59		
Uranus	I	2043-02-27T07:23:24.040		15.84	-38.34	25421.08		-47.65	-48.96
Uranus	E	2043-02-27T08:02:11.326		8.32	-31.53	25388.24		55.40	56.62
6	E	2043-02-27T08:00:21.973	b	8.68	-31.87	41799.74	36.47		
5	E	2043-02-27T08:00:35.006	b	8.64	-31.83	42198.18	36.40		
4	E	2043-02-27T08:00:42.857	b	8.61	-31.80	42560.73	36.49		
alpha	E	2043-02-27T08:01:43.549	b	8.41	-31.62	44722.65	36.52		
beta	E	2043-02-27T08:02:08.430	b	8.33	-31.54	45644.16	36.56		
eta	E	2043-02-27T08:02:50.148		8.19	-31.41	47176.12	36.60		
gamma	E	2043-02-27T08:03:02.361		8.15	-31.37	47623.19	36.61		
delta	E	2043-02-27T08:03:20.854		8.09	-31.32	48300.35	36.63		
lambda	E	2043-02-27T08:04:07.965		7.94	-31.17	50026.71	36.66		
epsilon	E	2043-02-27T08:04:47.052		7.81	-31.05	51460.29	36.72		