

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2034-04-14T04:49:14.530  
 Event type : PgtRgt  
 : Uranus occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Gaia source ID : 3425390247112447488  
 2Mass ID (if available) : 06090550+2341331

Uranus 2034-04-14T04:49:14 K13.31 G15.00 PgtRgt

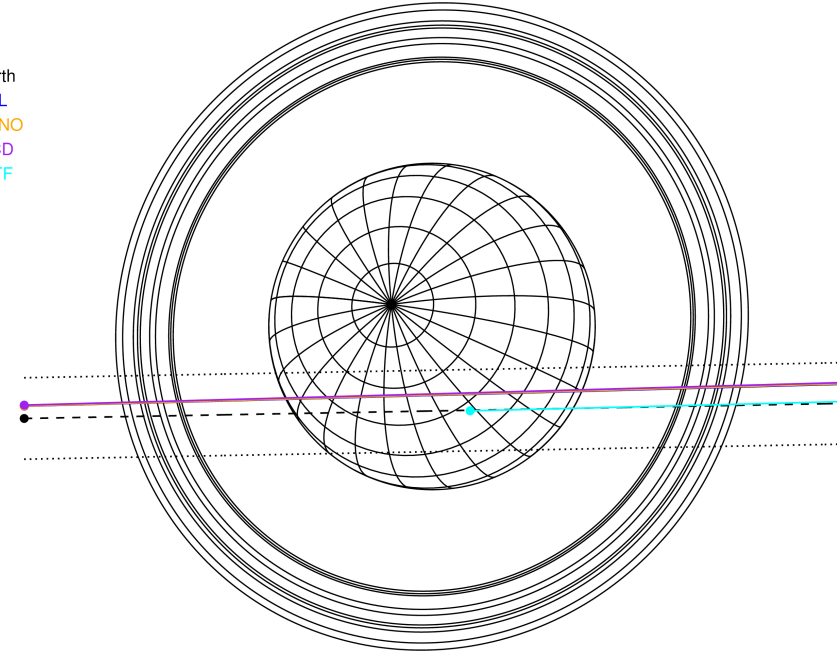
ICRS Star Coord at Epoch: 06h 09m 05.50446s +23:41:33.09927s

RUWE (>1.4 is poor) : 0.96  
 K magnitude : 13.309  
 G magnitude : 15.003  
 RP magnitude : 14.412  
 BP magnitude : 15.419  
 DUPflag : 0  
 Distance (au) : 19.283  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 17.42  
 Sun-Target sep (deg) : 68.23  
 Sun-Moon sep (deg) : 130.70  
 B (ring opening deg) : 73.54  
 PA of pole (deg) : 61.56



2034-04-14T04:49:14.5300 α: 06 09 05.5045 δ: +23 41 33.099 C/A 0.939° PA 1.05 deg v\_sky +17.42 km/s D 19.28 AU  
 Credit: Styled after SORA/Lucky Star

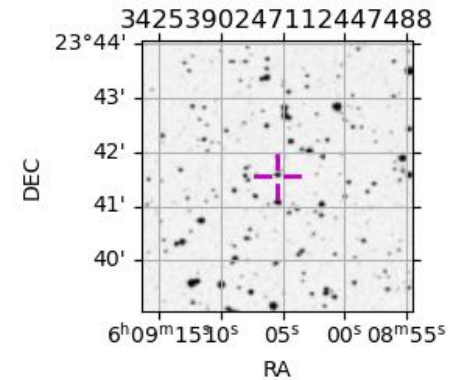
Earth  
 PAL  
 KPNO  
 MCD  
 IRTF



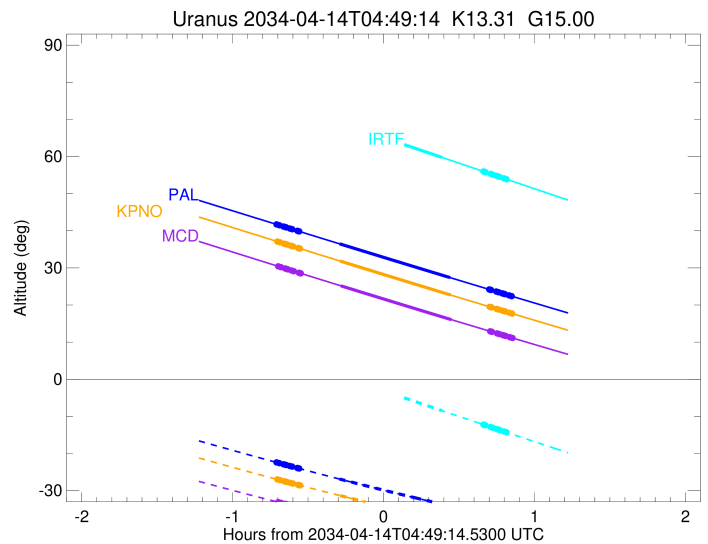
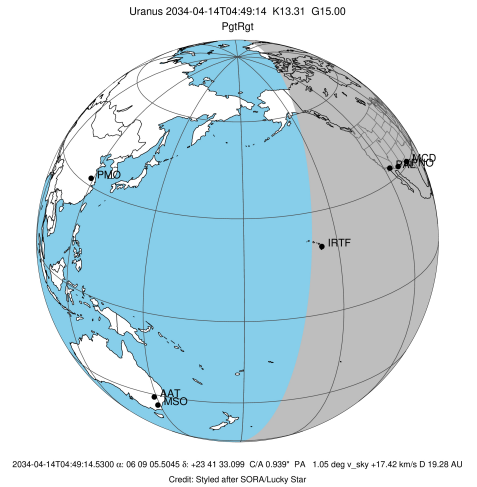
#	a(km)	ring
1	41837.2	6
2	42235.0	5
3	42571.2	4
4	44718.5	alpha
5	45661.1	beta
6	47176.1	eta
7	47626.3	gamma
8	48300.3	delta
9	50026.7	lambda
10	51149.4	epsilon

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	+++++	+ +	+++++	APR 14 04:07 - APR 14 05:40	PieRie
PMO	Purple Mtn Obs. Nanki	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+++++	+ +	+++++	APR 14 04:07 - APR 14 05:40	PieRie
MCD	McDonald Obs. 2.7m	30.7	256.0	+++++	+ +	+++++	APR 14 04:07 - APR 14 05:40	PieRie
TEN	Teide Obs./Tenerife	28.3	343.5					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5		+	+++++	APR 14 05:12 - APR 14 05:38	PneRne
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

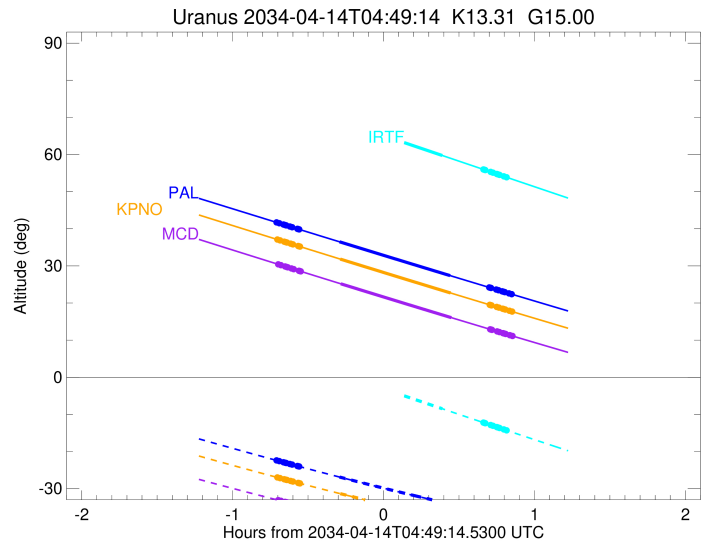
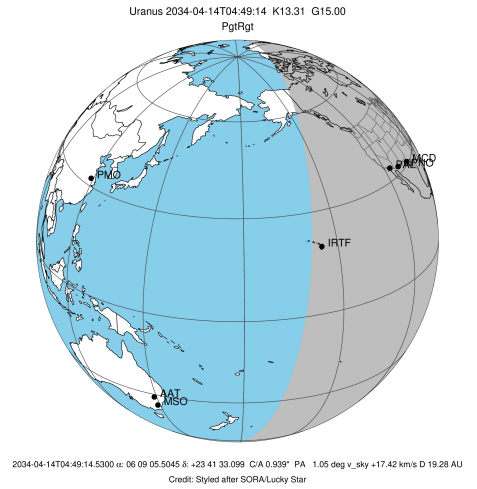


target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2034-04-14T04:53:57.160  
 Event type : PgtRgt  
 : Uranus occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : PAL  
 Location : Palomar Mt (200")  
 Latitude (deg) : 33.35622  
 E. Longitude (deg) : 243.13601  
 Altitude (km) : 1.706  
 Gaia source ID : 3425390247112447488  
 2Mass ID (if available) : 06090550+2341331  
 ICRS Star Coord at Epoch: 06h 09m 05.50446s +23:41:33.09927s  
 RUWE (>1.4 is poor) : 0.96  
 K magnitude : 13.309  
 G magnitude : 15.003  
 RP magnitude : 14.412  
 BP magnitude : 15.419  
 DUPflag : 0  
 Distance (au) : 19.283  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 17.42  
 Sun-Target sep (deg) : 68.23  
 Sun-Moon sep (deg) : 130.64  
 B (ring opening deg) : 73.54  
 PA of pole (deg) : 61.56  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 0.771  
 C/A sky separation (km) : 10789.1  
 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



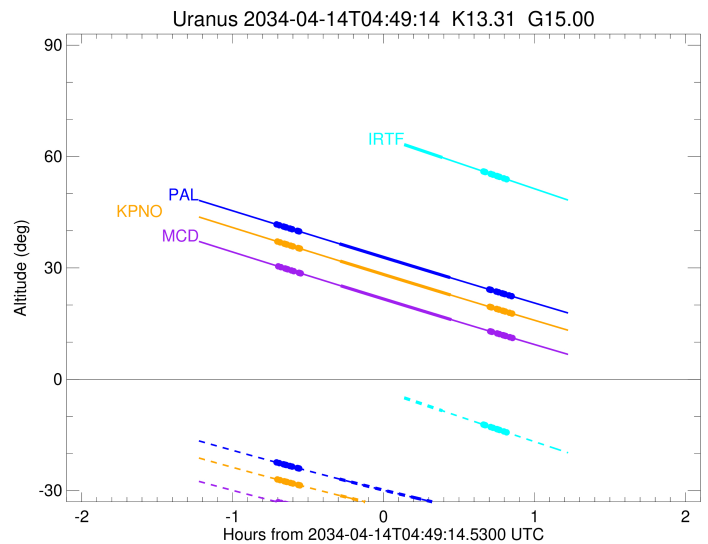
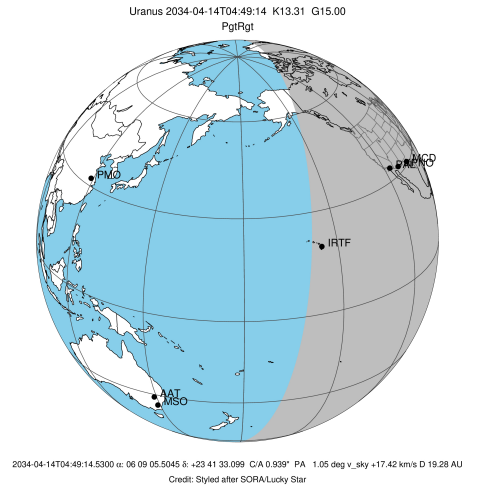
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2034-04-14T04:07:06.720		41.64	-22.46	50763.12	-17.30		
lambda	I	2034-04-14T04:07:49.266		41.49	-22.59	50026.71	-17.30		
delta	I	2034-04-14T04:09:29.123		41.14	-22.90	48300.35	-17.27		
gamma	I	2034-04-14T04:10:08.038		41.01	-23.02	47628.37	-17.26		
eta	I	2034-04-14T04:10:34.245		40.92	-23.10	47176.12	-17.25		
beta	I	2034-04-14T04:12:01.987		40.61	-23.36	45663.11	-17.22		
alpha	I	2034-04-14T04:12:59.004		40.41	-23.53	44684.81	-17.20		
4	I	2034-04-14T04:15:00.787		39.99	-23.90	42590.34	-17.14		
5	I	2034-04-14T04:15:19.504		39.92	-23.96	42261.73	-17.14		
6	I	2034-04-14T04:15:45.923		39.83	-24.04	41808.76	-17.12		
Uranus	I	2034-04-14T04:31:44.935		36.49	-26.87	25379.22		9.32	9.76
Uranus	E	2034-04-14T05:15:43.398		27.39	-34.11	25023.71		-16.41	-17.14
6	E	2034-04-14T05:31:16.698		24.20	-36.43	41845.82	17.26		
5	E	2034-04-14T05:31:40.084		24.12	-36.48	42249.49	17.29		
4	E	2034-04-14T05:31:56.356		24.07	-36.52	42534.22	17.29		
alpha	E	2034-04-14T05:34:03.898		23.63	-36.82	44749.93	17.35		
beta	E	2034-04-14T05:34:56.957		23.45	-36.95	45668.68	17.38		
eta	E	2034-04-14T05:36:23.595		23.16	-37.15	47176.12	17.42		
gamma	E	2034-04-14T05:36:49.202		23.07	-37.21	47622.20	17.43		
delta	E	2034-04-14T05:37:28.103		22.94	-37.30	48300.35	17.44		
lambda	E	2034-04-14T05:39:06.989		22.60	-37.53	50026.71	17.48		
epsilon	E	2034-04-14T05:40:28.149		22.33	-37.72	51446.15	17.48		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2034-04-14T04:54:12.070  
 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 : 3425390247112447488  
 2Mass ID (if available) : 06090550+2341331  
 ICRS Star Coord at Epoch: 06h 09m 05.50446s +23:41:33.09927s  
 RUWE (>1.4 is poor) : 0.96  
 K magnitude : 13.309  
 G magnitude : 15.003  
 RP magnitude : 14.412  
 BP magnitude : 15.419  
 DUPflag : 0  
 Distance (au) : 19.283  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 17.42  
 Sun-Target sep (deg) : 68.23  
 Sun-Moon sep (deg) : 130.57  
 B (ring opening deg) : 73.54  
 PA of pole (deg) : 61.56  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 0.767  
 C/A sky separation (km) : 10727.2  
 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	2034-04-14T04:07:25.880		37.02	-27.05	50763.22	-17.34		
lambda	I	2034-04-14T04:08:08.351		36.87	-27.18	50026.71	-17.34		
delta	I	2034-04-14T04:09:48.016		36.52	-27.48	48300.35	-17.31		
gamma	I	2034-04-14T04:10:26.856		36.39	-27.59	47628.38	-17.29		
eta	I	2034-04-14T04:10:53.011		36.29	-27.67	47176.12	-17.29		
beta	I	2034-04-14T04:12:20.582		35.99	-27.93	45663.09	-17.26		
alpha	I	2034-04-14T04:13:17.484		35.79	-28.10	44684.81	-17.24		
4	I	2034-04-14T04:15:19.016		35.36	-28.46	42590.38	-17.18		
5	I	2034-04-14T04:15:37.702		35.29	-28.51	42261.65	-17.18		
6	I	2034-04-14T04:16:04.059		35.20	-28.59	41808.80	-17.16		
Uranus	I	2034-04-14T04:32:00.675		31.84	-31.35	25378.07		9.35	9.79
Uranus	E	2034-04-14T05:15:57.524		22.70	-38.27	25023.96		-16.41	-17.14
6	E	2034-04-14T05:31:28.343		19.51	-40.42	41845.90	17.30		
5	E	2034-04-14T05:31:51.660		19.43	-40.47	42249.34	17.33		
4	E	2034-04-14T05:32:07.902		19.38	-40.50	42534.27	17.33		
alpha	E	2034-04-14T05:34:15.139		18.94	-40.78	44749.96	17.40		
beta	E	2034-04-14T05:35:08.070		18.76	-40.90	45668.65	17.42		
eta	E	2034-04-14T05:36:34.507		18.47	-41.08	47176.12	17.46		
gamma	E	2034-04-14T05:37:00.055		18.38	-41.14	47622.21	17.47		
delta	E	2034-04-14T05:37:38.865		18.25	-41.22	48300.35	17.48		
lambda	E	2034-04-14T05:39:17.522		17.92	-41.43	50026.71	17.52		
epsilon	E	2034-04-14T05:40:38.520		17.64	-41.60	51446.57	17.52		

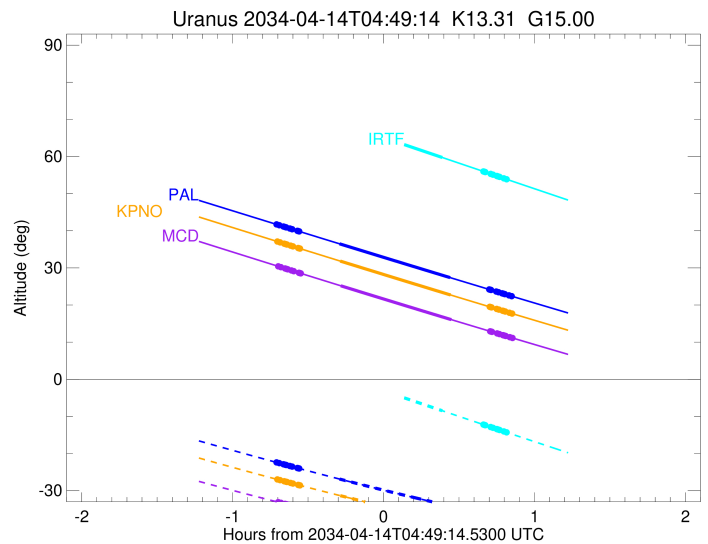
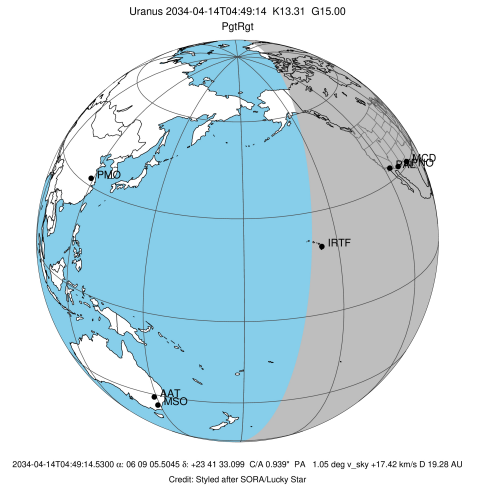
target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2034-04-14T04:54:26.610  
 Event type : PgtRgt  
 : Uranus occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : MCD  
 Location : McDonald Obs. 2.7m  
 Latitude (deg) : 30.67158  
 E. Longitude (deg) : 255.97844  
 Altitude (km) : 2.075  
 Gaia source ID : 3425390247112447488  
 2Mass ID (if available) : 06090550+2341331  
 ICRS Star Coord at Epoch: 06h 09m 05.50446s +23:41:33.09927s  
 RUWE (>1.4 is poor) : 0.96  
 K magnitude : 13.309  
 G magnitude : 15.003  
 RP magnitude : 14.412  
 BP magnitude : 15.419  
 DUPflag : 0  
 Distance (au) : 19.283  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 17.42  
 Sun-Target sep (deg) : 68.23  
 Sun-Moon sep (deg) : 130.47  
 B (ring opening deg) : 73.54  
 PA of pole (deg) : 61.56  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 0.755  
 C/A sky separation (km) : 10558.8  
 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\_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	2034-04-14T04:07:46.504		30.34	-33.17	50763.59	-17.40		
lambda	I	2034-04-14T04:08:28.852		30.19	-33.29	50026.71	-17.40		
delta	I	2034-04-14T04:10:08.173		29.84	-33.57	48300.35	-17.37		
gamma	I	2034-04-14T04:10:46.875		29.71	-33.68	47628.39	-17.36		
eta	I	2034-04-14T04:11:12.939		29.62	-33.75	47176.12	-17.35		
beta	I	2034-04-14T04:12:40.201		29.31	-33.99	45663.03	-17.30		
alpha	I	2034-04-14T04:13:36.893		29.11	-34.15	44684.80	-17.30		
4	I	2034-04-14T04:15:37.962		28.68	-34.49	42590.53	-17.24		
5	I	2034-04-14T04:15:56.603		28.62	-34.54	42261.37	-17.25		
6	I	2034-04-14T04:16:22.836		28.52	-34.61	41808.92	-17.22		
Uranus	I	2034-04-14T04:32:14.764		25.18	-37.17	25374.56		9.45	9.89
Uranus	E	2034-04-14T05:16:12.792		16.06	-43.38	25024.64		-16.40	-17.13
6	E	2034-04-14T05:31:39.098		12.91	-45.18	41846.08	17.38		
5	E	2034-04-14T05:32:02.288		12.84	-45.22	42248.99	17.40		
4	E	2034-04-14T05:32:18.487		12.78	-45.25	42534.38	17.40		
alpha	E	2034-04-14T05:34:25.206		12.35	-45.47	44750.01	17.47		
beta	E	2034-04-14T05:35:17.920		12.18	-45.57	45668.57	17.49		
eta	E	2034-04-14T05:36:44.022		11.89	-45.71	47176.12	17.52		
gamma	E	2034-04-14T05:37:09.471		11.80	-45.76	47622.22	17.53		
delta	E	2034-04-14T05:37:48.130		11.67	-45.82	48300.35	17.55		
lambda	E	2034-04-14T05:39:26.409		11.34	-45.99	50026.71	17.58		
epsilon	E	2034-04-14T05:40:47.158		11.07	-46.13	51447.57	17.59		

```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2034-04-14T04:51:56.170
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       : 3425390247112447488
2Mass ID (if available) : 06090550+2341331
ICRS Star Coord at Epoch: 06h 09m 05.50446s +23:41:33.09927s
RUWE (>1.4 is poor) : 0.96
K magnitude           : 13.309
G magnitude           : 15.003
RP magnitude         : 14.412
BP magnitude         : 15.419
DUPflag              : 0
Distance (au)        : 19.283
f0 (km)              : 0.000
g0 (km)              : 0.000
skyplane vel. (km/s) : 17.42
Sun-Target sep (deg) : 68.23
Sun-Moon sep (deg)   : 131.09
B (ring opening deg) : 73.54
PA of pole (deg)     : 61.56
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 0.954
C/A sky separation (km) : 13344.4
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_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	2034-04-14T04:05:01.029		75.15	7.16x	50757.55	-16.88		
lambda	I	2034-04-14T04:05:44.318		74.99	7.00x	50026.71	-16.87		
delta	I	2034-04-14T04:07:26.769		74.61	6.60x	48300.35	-16.83		
gamma	I	2034-04-14T04:08:06.742		74.46	6.44x	47628.12	-16.81		
eta	I	2034-04-14T04:08:33.647		74.35	6.34x	47176.12	-16.79		
beta	I	2034-04-14T04:10:03.779		74.02	5.99x	45664.21	-16.75		
alpha	I	2034-04-14T04:11:02.494		73.80	5.76x	44685.07	-16.71		
4	I	2034-04-14T04:13:08.173		73.32	5.27x	42587.85	-16.62		
5	I	2034-04-14T04:13:27.062		73.25	5.20x	42266.24	-16.62		
6	I	2034-04-14T04:13:54.710		73.15	5.09x	41806.89	-16.58		
Uranus	I	2034-04-14T04:30:43.566		69.33	1.18x	25432.71		7.79	8.16
Uranus	E	2034-04-14T05:12:38.419		59.73	-8.48	25021.49		-16.45	-17.18
6	E	2034-04-14T05:28:58.276		55.99	-12.21	41843.01	16.67		
5	E	2034-04-14T05:29:22.972		55.89	-12.31	42254.69	16.71		
4	E	2034-04-14T05:29:39.458		55.83	-12.37	42532.58	16.71		
alpha	E	2034-04-14T05:31:51.318		55.32	-12.87	44749.07	16.81		
beta	E	2034-04-14T05:32:46.198		55.11	-13.08	45669.81	16.84		
eta	E	2034-04-14T05:34:15.492		54.77	-13.41	47176.12	16.89		
gamma	E	2034-04-14T05:34:41.874		54.67	-13.51	47622.01	16.91		
delta	E	2034-04-14T05:35:21.965		54.52	-13.67	48300.35	16.93		
lambda	E	2034-04-14T05:37:03.775		54.13	-14.05	50026.71	16.98		
epsilon	E	2034-04-14T05:38:26.349		53.81	-14.36	51430.60	16.99		