

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2032-11-07T01:29:41.870  
 Event type : PgtRgt  
 : Uranus occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Gaia source ID : 3424684738603516416  
 2Mass ID (if available) : 06032615+2338216

Uranus 2032-11-07T01:29:41 K14.88 G17.62 PgtRgt

ICRS Star Coord at Epoch: 06h 03m 26.15359s +23:38:21.64930s

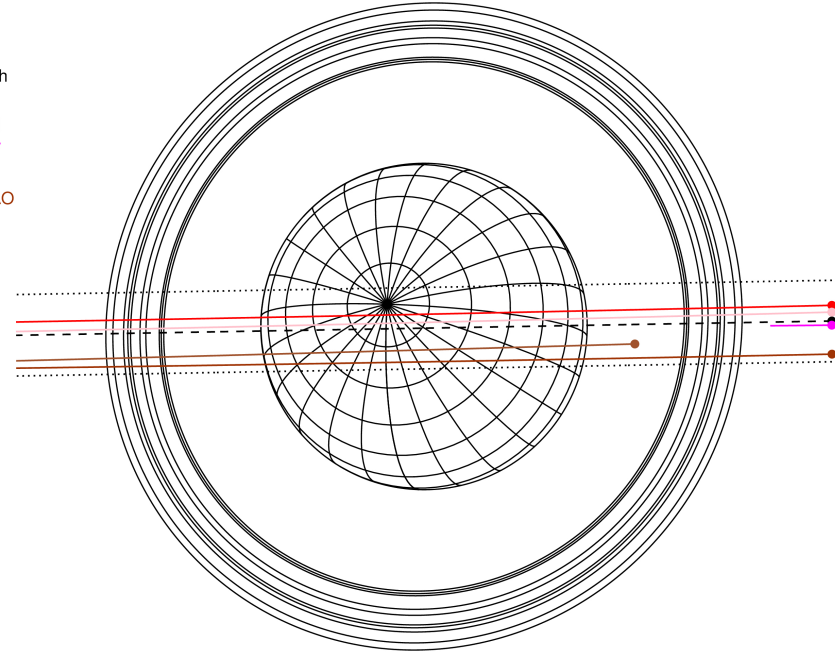
RUWE (>1.4 is poor) : 0.95  
 K magnitude : 14.882  
 G magnitude : 17.624  
 RP magnitude : 16.737  
 BP magnitude : 18.375  
 DUPflag : 0  
 Distance (au) : 18.326  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -14.32  
 Sun-Target sep (deg) : 133.95  
 Sun-Moon sep (deg) : 175.19  
 B (ring opening deg) : 74.69  
 PA of pole (deg) : 58.89

Uranus 2032-11-07T01:29:41 K14.88 G17.62  
 PgtRgt



2032-11-07T01:29:41.8700 α: 06 03 26.1536 δ: +23 38 21.649 C/A 0.012" PA 0.86 deg v\_sky -14.32 km/s D 18.33 AU  
 Credit: Styled after SORA/Lucky Star

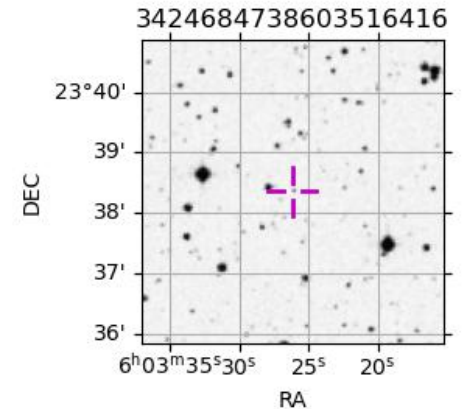
Earth  
 PIC  
 TEN  
 KAV  
 RIO  
 SAAO



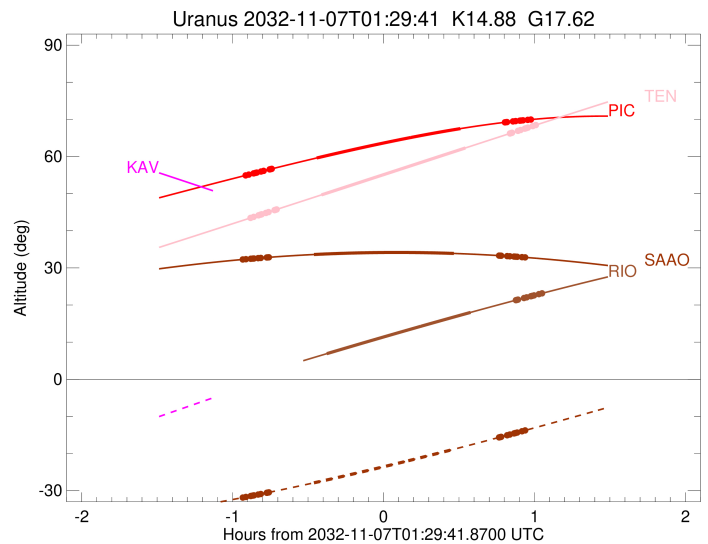
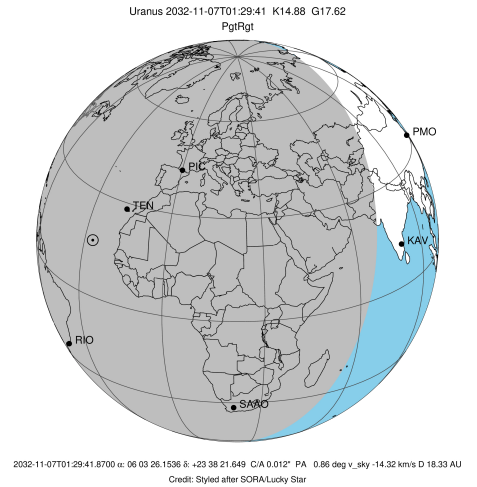
#	a(km)	ring
1	41837.2	6
2	42235.0	5
3	42571.2	4
4	44718.5	alpha
5	45661.1	beta
6	47176.1	eta
7	47626.3	gamma
8	48300.3	delta
9	50026.7	lambda
10	51149.4	epsilon

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 07 00:34 - NOV 07 02:27	PieRie
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	+++++	+ +	+++++	NOV 07 00:36 - NOV 07 02:29	PieRie
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		+ +	+++++	NOV 07 01:07 - NOV 07 02:32	PieRne
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	+++++	+ +	+++++	NOV 07 00:33 - NOV 07 02:25	PieRie
MSO	Mt. Stromlo Observato	-35.3	149.0					PnnRnn

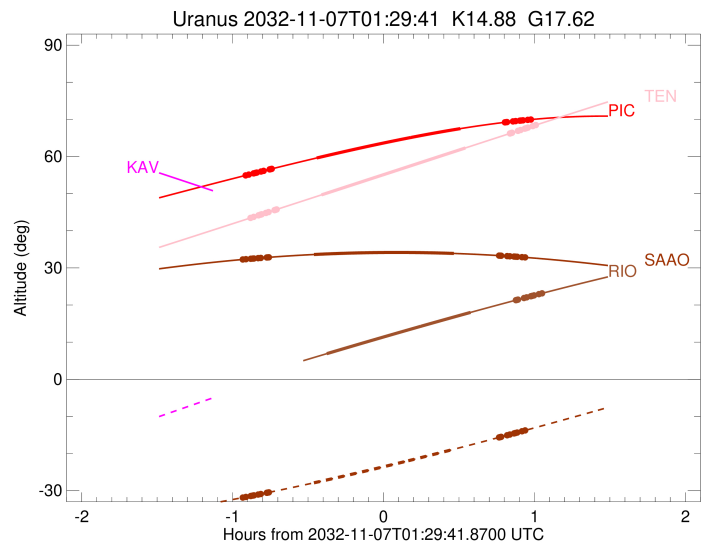
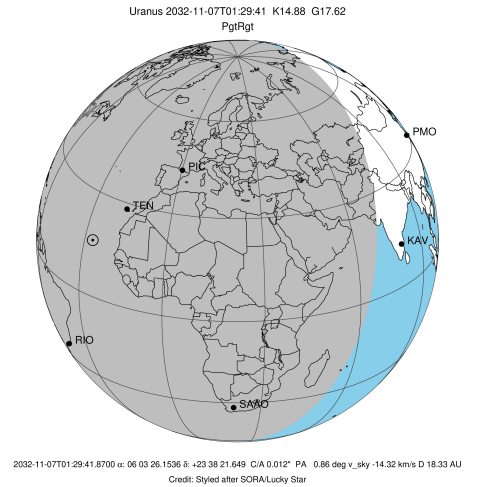


target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2032-11-07T01:31:45.020  
 Event type : PgtRgt  
 : Uranus occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : PIC  
 Location : Pic du Midi  
 Latitude (deg) : 42.93656  
 E. Longitude (deg) : 0.14231  
 Altitude (km) : 2.890  
 Gaia source ID : 3424684738603516416  
 2Mass ID (if available) : 06032615+2338216  
 ICRS Star Coord at Epoch: 06h 03m 26.15359s +23:38:21.64930s  
 RUWE (>1.4 is poor) : 0.95  
 K magnitude : 14.882  
 G magnitude : 17.624  
 RP magnitude : 16.737  
 BP magnitude : 18.375  
 DUPflag : 0  
 Distance (au) : 18.326  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -14.32  
 Sun-Target sep (deg) : 133.95  
 Sun-Moon sep (deg) : 175.58  
 B (ring opening deg) : 74.69  
 PA of pole (deg) : 58.89  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 0.144  
 C/A sky separation (km) : 1917.9  
 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\_itrff93\_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	2032-11-07T00:34:32.127		54.86	-61.44	51482.04	-14.96		
lambda	I	2032-11-07T00:36:09.437		55.14	-61.30	50026.71	-14.96		
delta	I	2032-11-07T00:38:04.861		55.47	-61.14	48300.35	-14.96		
gamma	I	2032-11-07T00:38:49.819		55.59	-61.07	47627.89	-14.96		
eta	I	2032-11-07T00:39:20.022		55.68	-61.03	47176.12	-14.96		
beta	I	2032-11-07T00:41:00.735		55.96	-60.88	45669.00	-14.96		
alpha	I	2032-11-07T00:42:03.129		56.14	-60.79	44736.43	-14.96		
4	I	2032-11-07T00:44:30.871		56.55	-60.56	42531.13	-14.96		
5	I	2032-11-07T00:44:46.662		56.60	-60.53	42280.81	-14.96		
6	I	2032-11-07T00:45:14.807		56.68	-60.49	41861.45	-14.96		
Uranus	I	2032-11-07T01:03:06.993		59.61	-58.59	25204.61		-12.23	-12.79
Uranus	E	2032-11-07T02:00:15.316		67.52	-50.68	25130.36		13.50	14.11
6	E	2032-11-07T02:17:56.664		69.21	-47.85	41816.49	15.03		
5	E	2032-11-07T02:18:21.204		69.25	-47.78	42182.94	15.03		
4	E	2032-11-07T02:18:48.562		69.28	-47.70	42609.14	15.04		
alpha	E	2032-11-07T02:21:07.798		69.46	-47.32	44698.03	15.04		
beta	E	2032-11-07T02:22:11.231		69.54	-47.15	45651.66	15.04		
eta	E	2032-11-07T02:23:52.528		69.67	-46.87	47176.12	15.04		
gamma	E	2032-11-07T02:24:22.312		69.70	-46.79	47624.22	15.04		
delta	E	2032-11-07T02:25:07.252		69.75	-46.66	48300.35	15.05		
lambda	E	2032-11-07T02:27:01.984		69.88	-46.34	50026.71	15.05		
epsilon	E	2032-11-07T02:27:55.625		69.94	-46.19	50833.92	15.05		

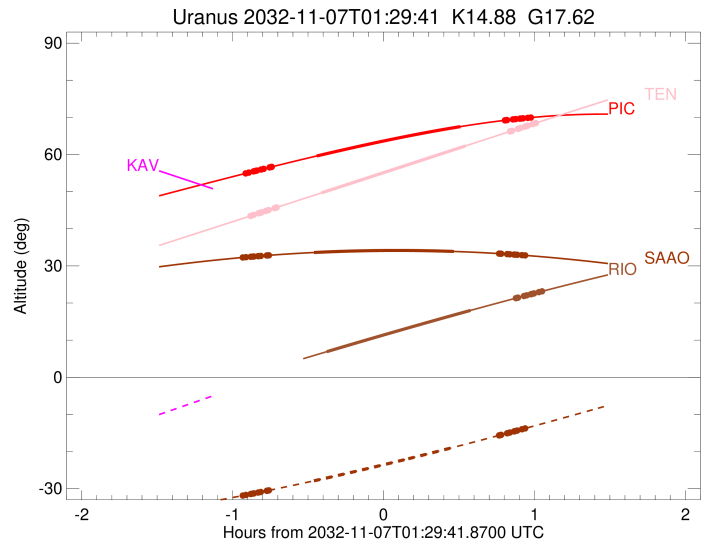
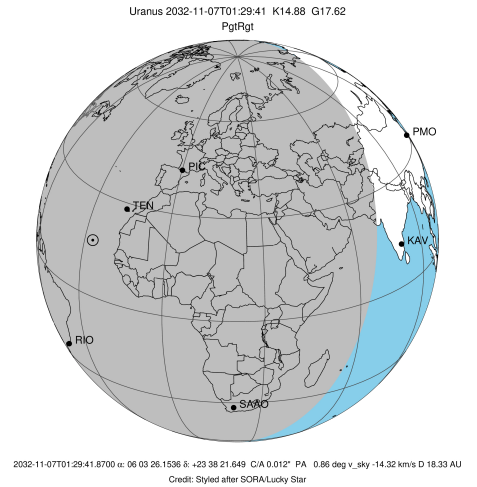
target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2032-11-07T01:33:43.100  
 Event type : PgtRgt  
 : Uranus occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : TEN  
 Location : Teide Obs./Tenerife  
 Latitude (deg) : 28.30050  
 E. Longitude (deg) : 343.48909  
 Altitude (km) : 2.395  
 Gaia source ID : 3424684738603516416  
 2Mass ID (if available) : 06032615+2338216  
 ICRS Star Coord at Epoch: 06h 03m 26.15359s +23:38:21.64930s  
 RUWE (>1.4 is poor) : 0.95  
 K magnitude : 14.882  
 G magnitude : 17.624  
 RP magnitude : 16.737  
 BP magnitude : 18.375  
 DUPflag : 0  
 Distance (au) : 18.326  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -14.32  
 Sun-Target sep (deg) : 133.95  
 Sun-Moon sep (deg) : 175.38  
 B (ring opening deg) : 74.69  
 PA of pole (deg) : 58.89  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 0.048  
 C/A sky separation (km) : 634.7  
 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\_itrff93\_040916.bsp  
 earth\_720101\_070426.bpc  
 earth\_200101\_990628\_predict.bpc  
 pg3f0000r.bsp  
 pg490000r.bsp  
 naif0012.tls  
 earth\_flat\_IAU.spk



b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2032-11-07T00:36:29.224		43.39	-77.86	51476.86	-14.94		
lambda	I	2032-11-07T00:38:06.283		43.74	-77.95	50026.71	-14.94		
delta	I	2032-11-07T00:40:01.808		44.17	-78.04	48300.35	-14.95		
gamma	I	2032-11-07T00:40:46.794		44.33	-78.07	47628.01	-14.95		
eta	I	2032-11-07T00:41:17.028		44.44	-78.09	47176.12	-14.95		
beta	I	2032-11-07T00:42:57.779		44.81	-78.15	45669.46	-14.95		
alpha	I	2032-11-07T00:44:00.186		45.04	-78.18	44737.17	-14.95		
4	I	2032-11-07T00:46:28.012		45.58	-78.23	42531.71	-14.96		
5	I	2032-11-07T00:46:43.713		45.64	-78.23	42282.60	-14.95		
6	I	2032-11-07T00:47:12.069		45.74	-78.24	41860.48	-14.95		
Uranus	I	2032-11-07T01:05:02.369		49.67	-77.73	25180.46		-12.65	-13.23
Uranus	E	2032-11-07T02:02:17.631		62.32	-69.54	25155.36		13.08	13.68
6	E	2032-11-07T02:19:56.492		66.21	-66.11	41815.24	15.08		
5	E	2032-11-07T02:20:21.154		66.30	-66.02	42185.03	15.08		
4	E	2032-11-07T02:20:48.358		66.40	-65.93	42609.96	15.09		
alpha	E	2032-11-07T02:23:07.156		66.91	-65.47	44698.91	15.09		
beta	E	2032-11-07T02:24:10.376		67.14	-65.25	45652.22	15.09		
eta	E	2032-11-07T02:25:51.318		67.51	-64.91	47176.12	15.09		
gamma	E	2032-11-07T02:26:21.019		67.62	-64.81	47624.37	15.09		
delta	E	2032-11-07T02:27:05.807		67.79	-64.66	48300.35	15.09		
lambda	E	2032-11-07T02:29:00.177		68.21	-64.27	50026.71	15.10		
epsilon	E	2032-11-07T02:29:53.174		68.40	-64.09	50826.76	15.10		

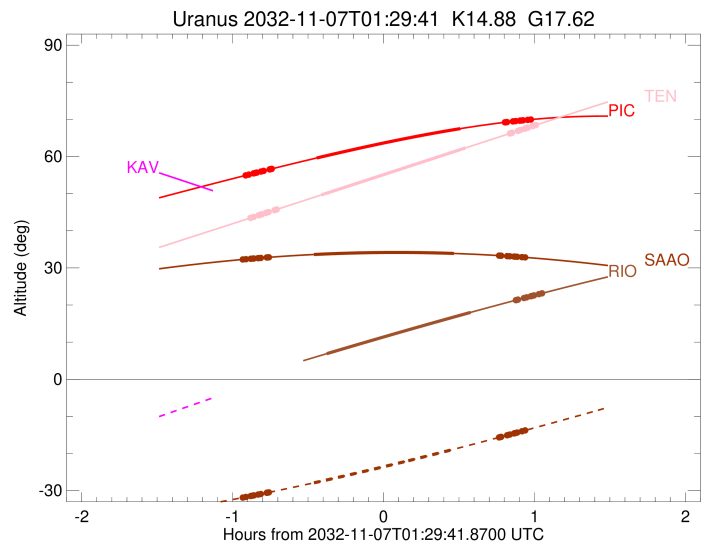
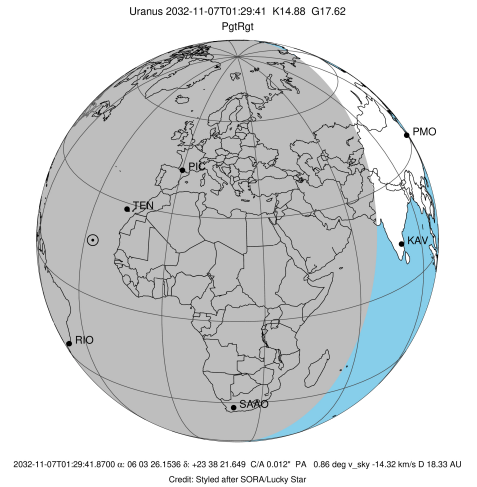
target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2032-11-07T01:35:42.710  
 Event type : PgtRgt  
 : Uranus occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : RIO  
 Location : Rio de Janeiro  
 Latitude (deg) : -22.89506  
 E. Longitude (deg) : 316.77708  
 Altitude (km) : 0.033  
 Gaia source ID : 3424684738603516416  
 2Mass ID (if available) : 06032615+2338216  
 ICRS Star Coord at Epoch: 06h 03m 26.15359s +23:38:21.64930s  
 RUWE (>1.4 is poor) : 0.95  
 K magnitude : 14.882  
 G magnitude : 17.624  
 RP magnitude : 16.737  
 BP magnitude : 18.375  
 DUPflag : 0  
 Distance (au) : 18.326  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -14.32  
 Sun-Target sep (deg) : 133.95  
 Sun-Moon sep (deg) : 174.67  
 B (ring opening deg) : 74.69  
 PA of pole (deg) : 58.89  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 0.276  
 C/A sky separation (km) : 3670.4  
 NAIF SPICE kernels : RAJobs\_U111+rgf15.spk  
 URKALLvl.spk  
 ural11.bsp  
 IAU\_URANUS\_for\_RINGFIT.tpc  
 vgr2.ural11.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	2032-11-07T00:38:12.490		0.97x	-41.33	51456.19	-14.73		
lambda	I	2032-11-07T00:39:49.517		1.31x	-41.56	50026.71	-14.73		
delta	I	2032-11-07T00:41:46.687		1.71x	-41.84	48300.35	-14.73		
gamma	I	2032-11-07T00:42:32.288		1.87x	-41.95	47628.44	-14.73		
eta	I	2032-11-07T00:43:02.986		1.98x	-42.02	47176.12	-14.73		
beta	I	2032-11-07T00:44:45.086		2.33x	-42.26	45671.10	-14.74		
alpha	I	2032-11-07T00:45:48.321		2.54x	-42.41	44739.74	-14.74		
4	I	2032-11-07T00:48:18.368		3.06x	-42.75	42534.09	-14.74		
5	I	2032-11-07T00:48:33.999		3.11x	-42.79	42288.79	-14.73		
6	I	2032-11-07T00:49:03.519		3.21x	-42.85	41856.78	-14.73		
Uranus	I	2032-11-07T01:07:08.368		6.89	-45.16	25104.22		-13.92	-14.56
Uranus	E	2032-11-07T02:04:20.333		18.02	-50.06	25244.82		11.49	12.02
6	E	2032-11-07T02:22:17.869		21.30	-50.69	41811.44	14.91		
5	E	2032-11-07T02:22:43.461		21.38	-50.70	42192.04	14.92		
4	E	2032-11-07T02:23:10.712		21.46	-50.71	42612.24	14.92		
alpha	E	2032-11-07T02:25:31.013		21.88	-50.75	44701.82	14.93		
beta	E	2032-11-07T02:26:34.838		22.07	-50.77	45654.05	14.94		
eta	E	2032-11-07T02:28:16.681		22.37	-50.79	47176.12	14.94		
gamma	E	2032-11-07T02:28:46.711		22.46	-50.80	47624.85	14.94		
delta	E	2032-11-07T02:29:31.909		22.59	-50.81	48300.35	14.95		
lambda	E	2032-11-07T02:31:27.385		22.93	-50.82	50026.71	14.95		
epsilon	E	2032-11-07T02:32:19.500		23.08	-50.83	50806.07	14.95		

```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2032-11-07T01:29:42.820
Event type           : PgtRgt
: Uranus occs: geocentric, topocentric
: Ring occs: geocentric, topocentric
Observer code        : SAAO
Location             : So. Afr. Astro. Obs. (Sutherland)
Latitude (deg)       : -32.37953
E. Longitude (deg)   : 20.81070
Altitude (km)        : 1.768
Gaia source ID       : 3424684738603516416
2Mass ID (if available) : 06032615+2338216
ICRS Star Coord at Epoch: 06h 03m 26.15359s +23:38:21.64930s
RUWE (>1.4 is poor) : 0.95
K magnitude          : 14.882
G magnitude          : 17.624
RP magnitude         : 16.737
BP magnitude         : 18.375
DUPflag             : 0
Distance (au)        : 18.326
f0 (km)              : 0.000
g0 (km)              : 0.000
skyplane vel. (km/s) : -14.32
Sun-Target sep (deg) : 133.95
Sun-Moon sep (deg)   : 174.45
B (ring opening deg) : 74.69
PA of pole (deg)     : 58.89
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 0.417
C/A sky separation (km) : 5536.6
NAIF SPICE kernels   : RAJobs_U111+rgf15.spk
URKALLvl1.spk
ural11.bsp
IAU_URANUS_for_RINGFIT.tpc
vgr2.ural11.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	2032-11-07T00:33:26.788		32.25	-31.91	51443.41	-14.97		
lambda	I	2032-11-07T00:35:01.382		32.35	-31.70	50026.71	-14.97		
delta	I	2032-11-07T00:36:56.691		32.46	-31.45	48300.35	-14.97		
gamma	I	2032-11-07T00:37:41.566		32.50	-31.35	47628.68	-14.97		
eta	I	2032-11-07T00:38:11.807		32.53	-31.28	47176.12	-14.96		
beta	I	2032-11-07T00:39:52.304		32.63	-31.05	45671.98	-14.96		
alpha	I	2032-11-07T00:40:54.561		32.68	-30.91	44741.09	-14.95		
4	I	2032-11-07T00:43:22.464		32.81	-30.57	42535.56	-14.95		
5	I	2032-11-07T00:43:37.747		32.83	-30.54	42291.97	-14.94		
6	I	2032-11-07T00:44:07.254		32.85	-30.47	41854.67	-14.93		
Uranus	I	2032-11-07T01:02:00.056		33.61	-27.90	25072.54		-14.43	-15.08
Uranus	E	2032-11-07T01:57:39.099		33.90	-18.85	25279.46		10.82	11.32
6	E	2032-11-07T02:15:36.974		33.32	-15.67	41810.28	14.96		
5	E	2032-11-07T02:16:02.695		33.30	-15.59	42194.38	14.97		
4	E	2032-11-07T02:16:29.766		33.28	-15.51	42612.87	14.97		
alpha	E	2032-11-07T02:18:49.593		33.18	-15.09	44702.76	14.99		
beta	E	2032-11-07T02:19:53.173		33.13	-14.89	45654.63	14.99		
eta	E	2032-11-07T02:21:34.609		33.05	-14.59	47176.12	15.00		
gamma	E	2032-11-07T02:22:04.539		33.03	-14.50	47625.00	15.00		
delta	E	2032-11-07T02:22:49.561		32.99	-14.36	48300.35	15.00		
lambda	E	2032-11-07T02:24:44.610		32.90	-14.01	50026.71	15.01		
epsilon	E	2032-11-07T02:25:36.161		32.86	-13.85	50800.51	15.00		