

target : Neptune
 target radius (km) : 24764.00
 C/A epoch : 2049-11-05T01:08:34.850
 Event type : PgtRgt
 : Neptune occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 54847355142991360
 2Mass ID (if available) : 03294139+1707111

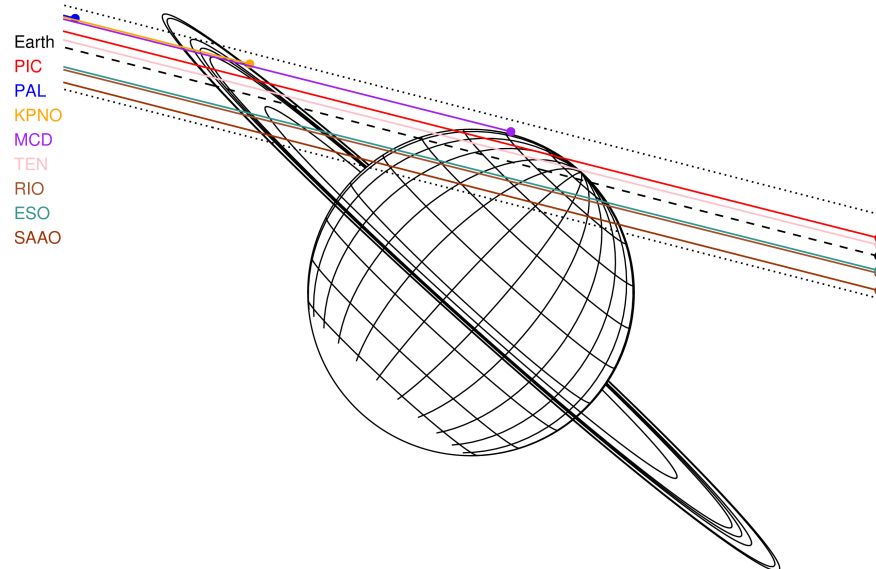
Neptune 2049-11-05T01:08:34 K13.70 G16.95 PgtRgt

ICRS Star Coord at Epoch: 03h 29m 41.38417s +17:07:10.17537s
 RUWE (>1.4 is poor) : 0.92
 K magnitude : 13.695
 G magnitude : 16.951
 RP magnitude : 15.964
 BP magnitude : 17.973
 DUPflag : 0
 Distance (au) : 28.846
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.98
 Sun-Target sep (deg) : 167.90
 Sun-Moon sep (deg) : 71.02
 B (ring opening deg) : 4.01
 PA of pole (deg) : -42.53
 # a(km) ring

Neptune 2049-11-05T01:08:34 K13.70 G16.95
 PgtRgt



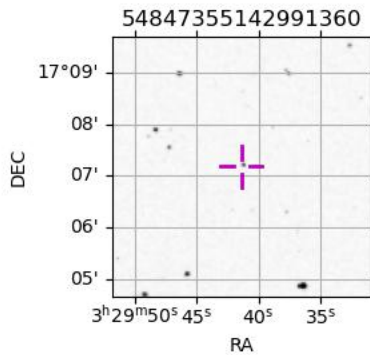
2049-11-05T01:08:34.8500 ra: 03 29 41.3842 s: +17 07 10.175 C/A 0.989° PA 165.61 deg v_sky -23.98 km/s D 28.85 AU
 Credit: Styled after SORA/Lucky Star



- 1 42000.0 Galle
- 2 53200.0 LeVerrier
- 3 55200.0 Lassell
- 4 57200.0 Arago
- 5 61953.0 Galatea
- 6 62933.0 Adams

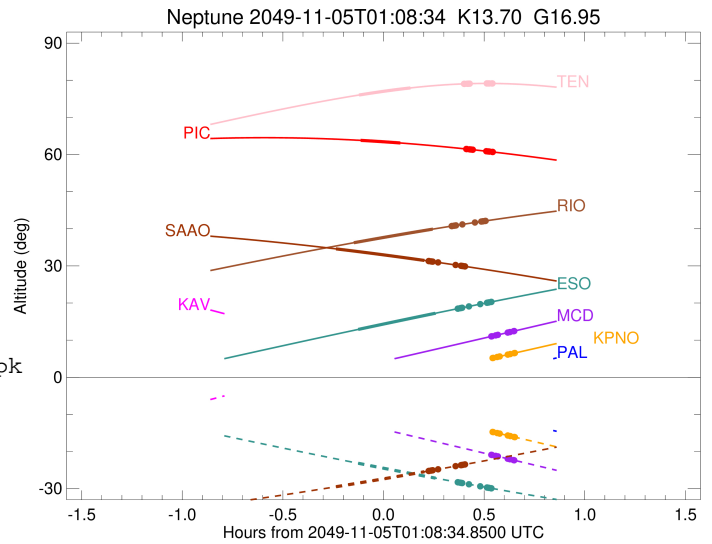
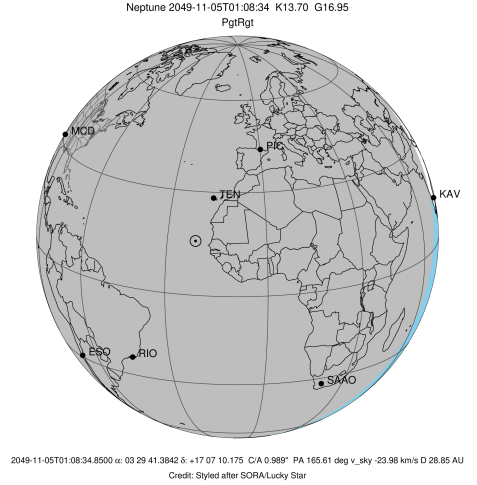
Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1	+ + + + +	+ +	+ + + + +	NOV 05 01:01 - NOV 05 01:40	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	+ + + +		+ + + +	NOV 05 01:40 - NOV 05 01:47	PnnRie
MCD	McDonald Obs. 2.7m	30.7	256.0	+ + + +		+ + + +	NOV 05 01:39 - NOV 05 01:47	PnnRie
TEN	Teide Obs./Tenerife	28.3	343.5	+ + + + +	+ +	+ + + + +	NOV 05 01:01 - NOV 05 01:40	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 05 00:59 - NOV 05 01:38	PieRie
ESO	European Southern Obs	-29.3	289.3	+ + + + +	+ +	+ + + + +	NOV 05 01:01 - NOV 05 01:40	PieRie
AAT	Siding Spring (AAT)	-31.3	149.1					PnnRnn
SAAO	So. Afr. Astro. Obs.	-32.4	20.8	+ + + + +	+ +	+ + + + +	NOV 05 00:54 - NOV 05 01:32	PieRie
MSO	Mt. Stromlo Observato	-35.3	149.0					PnnRnn



```

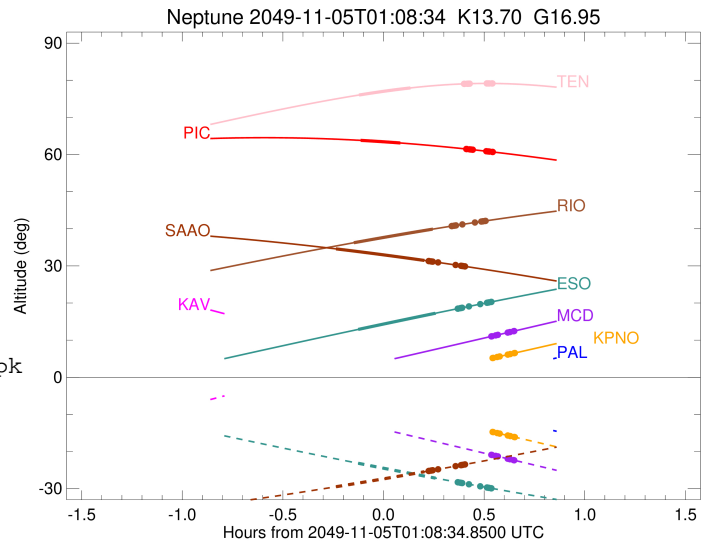
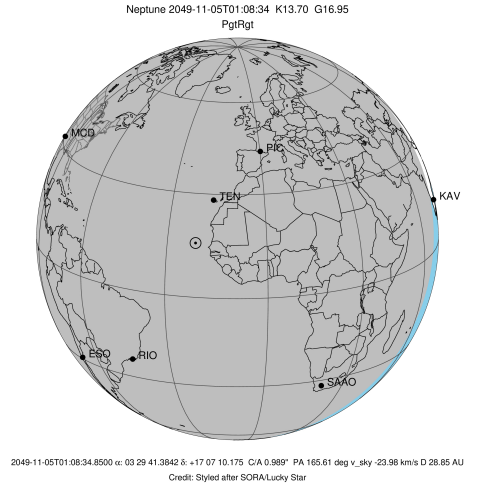
target                : Neptune
target radius (km)   : 24764.00
C/A epoch            : 2049-11-05T01:07:40.910
Event type           : PgtRgt
: Neptune occs: geocentric, topocentric
: Ring occs: geocentric, topocentric
Observer code        : PIC
Location             : Pic du Midi
Latitude (deg)       : 42.93656
E. Longitude (deg)   : 0.14231
Altitude (km)        : 2.890
Gaia source ID       : 54847355142991360
2Mass ID (if available) : 03294139+1707111
ICRS Star Coord at Epoch: 03h 29m 41.38417s +17:07:10.17537s
RUWE (>1.4 is poor) : 0.92
K magnitude          : 13.695
G magnitude           : 16.951
RP magnitude         : 15.964
BP magnitude         : 17.973
DUPflag              : 0
Distance (au)        : 28.846
f0 (km)              : 0.000
g0 (km)              : 0.000
skyplane vel. (km/s) : -23.98
Sun-Target sep (deg) : 167.90
Sun-Moon sep (deg)   : 71.91
B (ring opening deg) : 4.01
PA of pole (deg)     : -42.53
Pole direction: RA (deg): 299.33374
Dec (deg): 42.95036
C/A sky separation (") : 1.109
C/A sky separation (km) : 23196.5
NAIF SPICE kernels   : RAJobs_U111+rgf16.spk
URKALLv1.spk
nep097.bsp
nep101.bsp
sat4401.bsp
de440.bsp
earth_720101_070426.bpc
earthstns_itr93_040916.bsp
earth_200101_990628_predict.bpc
pck00010.tpc
pck.urall1.tpc.Neptune
naif0012.tls
IAU_NEPTUNE_for_RINGFIT.tpc.BECAREFUL
earth_flat_IAU.spk
    
```



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
Adams	I	2049-11-05T01:32:34.909		61.55	-54.26	62933.90	-105.72		
Galatea	I	2049-11-05T01:32:44.288		61.54	-54.24	61954.14	-103.21		
Arago	I	2049-11-05T01:33:33.887		61.46	-54.13	57204.56	-87.83		
Lassell	I	2049-11-05T01:33:57.839		61.42	-54.07	55209.80	-79.05		
LeVerrier	I	2049-11-05T01:34:25.033		61.38	-54.01	53226.88	-68.01		
Neptune	I	2049-11-05T01:01:44.507		63.82	-58.18	24762.01		81.21	81.50
Neptune	E	2049-11-05T01:13:37.445		63.11	-56.77	24763.13		41.08	42.06
LeVerrier	E	2049-11-05T01:38:46.512		60.94	-53.39	53200.77	67.86		
Lassell	E	2049-11-05T01:39:13.721		60.89	-53.32	55200.58	78.99		
Arago	E	2049-11-05T01:39:37.688		60.85	-53.27	57200.42	87.79		
Galatea	E	2049-11-05T01:40:27.324		60.77	-53.15	61953.21	103.15		
Adams	E	2049-11-05T01:40:36.711		60.75	-53.13	62933.17	105.65		

```

target           : Neptune
target radius (km) : 24764.00
C/A epoch       : 2049-11-05T01:11:37.020
Event type      : PgtRgt
: Neptune 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  : 54847355142991360
2Mass ID (if available) : 03294139+1707111
ICRS Star Coord at Epoch: 03h 29m 41.38417s +17:07:10.17537s
RUWE (>1.4 is poor) : 0.92
K magnitude     : 13.695
G magnitude     : 16.951
RP magnitude    : 15.964
BP magnitude    : 17.973
DUPflag        : 0
Distance (au)   : 28.846
f0 (km)         : 0.000
g0 (km)         : 0.000
skyplane vel. (km/s) : -23.98
Sun-Target sep (deg) : 167.90
Sun-Moon sep (deg) : 70.76
B (ring opening deg) : 4.01
PA of pole (deg) : -42.53
Pole direction: RA (deg): 299.33374
Dec (deg): 42.95036
C/A sky separation (") : 1.215
C/A sky separation (km) : 25429.5
NAIF SPICE kernels : RAJobs_U111+rgf16.spk
URKALLv1.spk
nep097.bsp
nep101.bsp
sat4401.bsp
de440.bsp
earth_720101_070426.bpc
earthstns_itr93_040916.bsp
earth_200101_990628_predict.bpc
pck00010.tpc
pck.urall11.tpc.Neptune
naif0012.tls
IAU_NEPTUNE_for_RINGFIT.tpc.BECAREFUL
earth_flat_IAU.spk
    
```



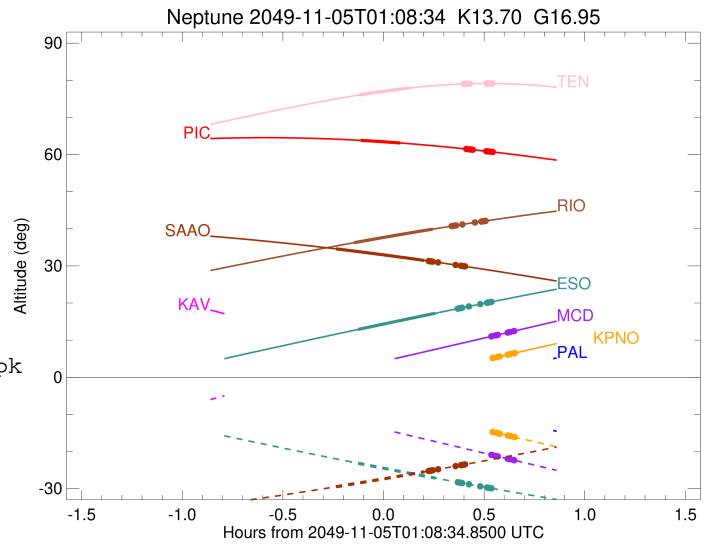
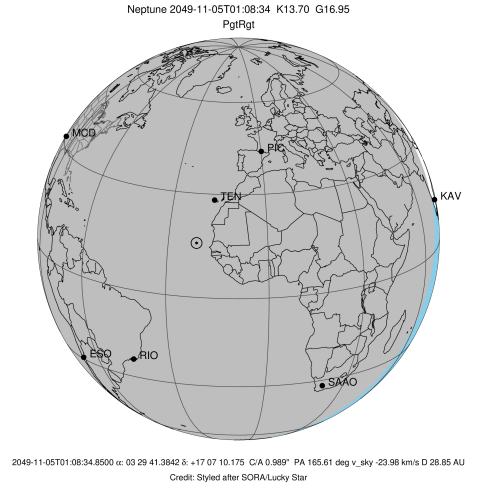
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
Adams	I	2049-11-05T01:40:18.813		5.02	-14.57	62937.39	-88.23		
Galatea	I	2049-11-05T01:40:30.145		5.06	-14.61	61958.99	-84.71		
Arago	I	2049-11-05T01:41:34.864		5.28	-14.83	57252.73	-61.57		
Lassell	I	2049-11-05T01:42:11.950		5.40	-14.96	55657.29	-49.43		

No planet occultations

Lassell	E	2049-11-05T01:45:17.199		6.03	-15.61	55200.72	45.18		
Arago	E	2049-11-05T01:45:54.690		6.16	-15.74	57200.91	61.28		
Galatea	E	2049-11-05T01:46:59.390		6.38	-15.97	61953.50	84.75		
Adams	E	2049-11-05T01:47:10.718		6.42	-16.01	62933.44	88.29		

```

target                : Neptune
target radius (km)   : 24764.00
C/A epoch             : 2049-11-05T01:11:48.210
Event type            : PgtRgt
: Neptune 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       : 54847355142991360
2Mass ID (if available) : 03294139+1707111
ICRS Star Coord at Epoch: 03h 29m 41.38417s +17:07:10.17537s
RUWE (>1.4 is poor) : 0.92
K magnitude           : 13.695
G magnitude           : 16.951
RP magnitude         : 15.964
BP magnitude         : 17.973
DUPflag              : 0
Distance (au)        : 28.846
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s) : -23.98
Sun-Target sep (deg) : 167.90
Sun-Moon sep (deg)   : 70.84
B (ring opening deg) : 4.01
PA of pole (deg)     : -42.53
Pole direction: RA (deg): 299.33374
Dec (deg): 42.95036
C/A sky separation (") : 1.202
C/A sky separation (km) : 25156.0
NAIF SPICE kernels   : RAJobs_U111+rgf16.spk
URKALLv1.spk
nep097.bsp
nep101.bsp
sat4401.bsp
de440.bsp
earth_720101_070426.bpc
earthstns_itr93_040916.bsp
earth_200101_990628_predict.bpc
pck00010.tpc
pck.urall1.tpc.Neptune
naif0012.tls
IAU_NEPTUNE_for_RINGFIT.tpc.BECAREFUL
earth_flat_IAU.spk
    
```



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

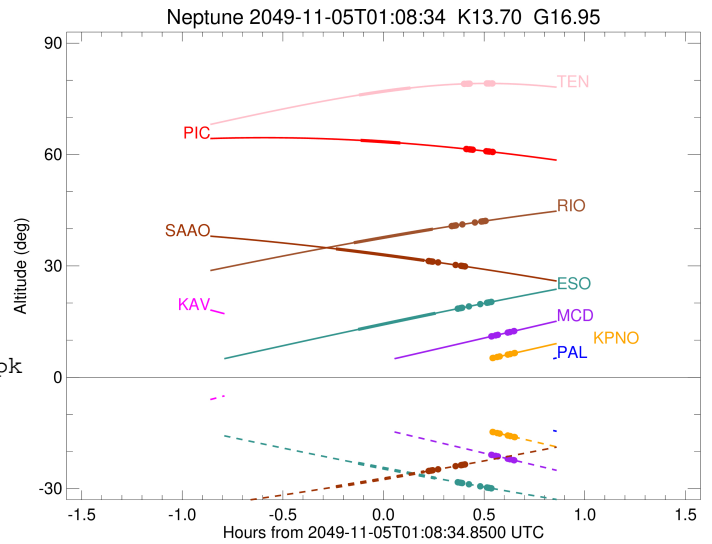
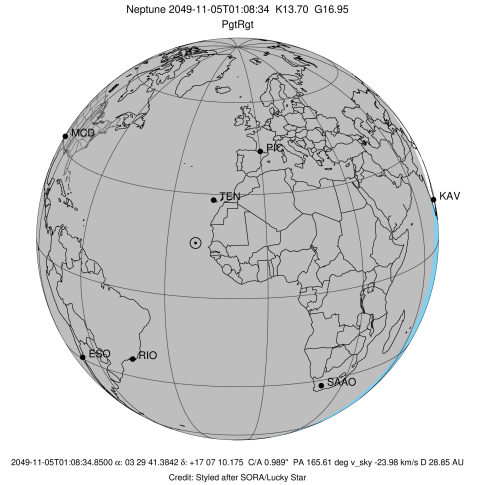
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
Adams	I	2049-11-05T01:39:57.239		10.85	-20.73	62936.47	-91.05		
Galatea	I	2049-11-05T01:40:08.202		10.89	-20.77	61957.65	-87.70		
Arago	I	2049-11-05T01:41:09.793		11.10	-20.99	57233.56	-65.95		
Lassell	I	2049-11-05T01:41:43.810		11.22	-21.11	55369.95	-52.83		

No planet occultations

Lassell	E	2049-11-05T01:45:13.028		11.95	-21.86	55200.89	51.45		
Arago	E	2049-11-05T01:45:47.080		12.07	-21.98	57200.85	65.81		
Galatea	E	2049-11-05T01:46:48.652		12.29	-22.20	61953.44	87.74		
Adams	E	2049-11-05T01:46:59.611		12.33	-22.24	62933.38	91.11		

```

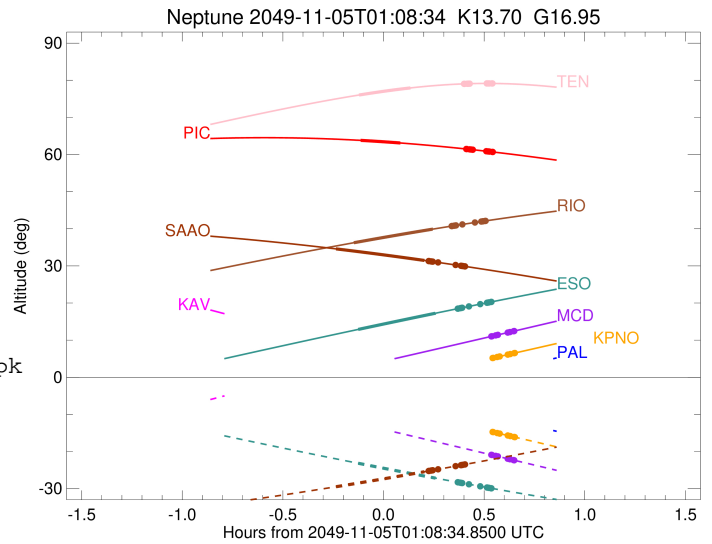
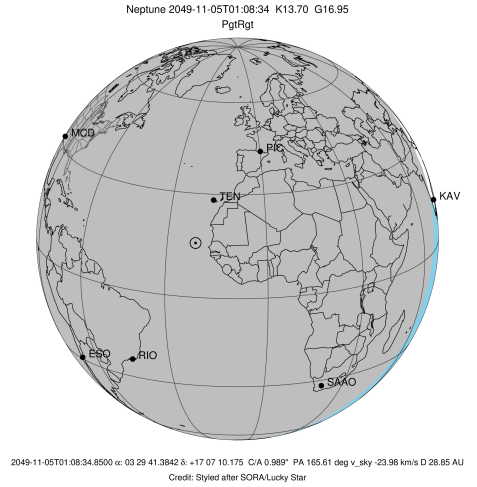
target                : Neptune
target radius (km)   : 24764.00
C/A epoch             : 2049-11-05T01:08:57.060
Event type            : PgtRgt
: Neptune occs: geocentric, topocentric
: Ring occs: geocentric, topocentric
Observer code        : TEN
Location              : Teide Obs./Tenerife
Latitude (deg)       : 28.30050
E. Longitude (deg)   : 343.48909
Altitude (km)        : 2.395
Gaia source ID       : 54847355142991360
2Mass ID (if available) : 03294139+1707111
ICRS Star Coord at Epoch: 03h 29m 41.38417s +17:07:10.17537s
RUWE (>1.4 is poor) : 0.92
K magnitude           : 13.695
G magnitude           : 16.951
RP magnitude         : 15.964
BP magnitude         : 17.973
DUPflag              : 0
Distance (au)        : 28.846
f0 (km)              : 0.000
g0 (km)              : 0.000
skyplane vel. (km/s) : -23.98
Sun-Target sep (deg) : 167.90
Sun-Moon sep (deg)   : 71.90
B (ring opening deg) : 4.01
PA of pole (deg)     : -42.53
Pole direction: RA (deg): 299.33374
Dec (deg): 42.95036
C/A sky separation (") : 1.054
C/A sky separation (km) : 22058.7
NAIF SPICE kernels   : RAJobs_U111+rgf16.spk
URKALLv1.spk
nep097.bsp
nep101.bsp
sat4401.bsp
de440.bsp
earth_720101_070426.bpc
earthstns_itr93_040916.bsp
earth_200101_990628_predict.bpc
pck00010.tpc
pck.urall1.tpc.Neptune
naif0012.tls
IAU_NEPTUNE_for_RINGFIT.tpc.BECAREFUL
earth_flat_IAU.spk
    
```



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
Adams	I	2049-11-05T01:31:58.482		79.02	-74.20	62933.38	-114.13		
Galatea	I	2049-11-05T01:32:07.147		79.02	-74.18	61953.48	-112.02		
Arago	I	2049-11-05T01:32:52.008		79.05	-74.07	57201.60	-99.36		
Lassell	I	2049-11-05T01:33:12.854		79.06	-74.02	55202.97	-92.38		
LeVerrier	I	2049-11-05T01:33:35.520		79.07	-73.96	53206.17	-83.94		
Neptune	I	2049-11-05T01:01:15.404		76.03	-77.32	24761.97		85.75	85.89
Neptune	E	2049-11-05T01:16:38.773		77.95	-76.12	24763.35		34.46	35.38
LeVerrier	E	2049-11-05T01:38:54.622		79.15	-73.16	53200.48	83.91		
Lassell	E	2049-11-05T01:39:17.301		79.16	-73.10	55200.34	92.35		
Arago	E	2049-11-05T01:39:38.162		79.16	-73.04	57200.25	99.31		
Galatea	E	2049-11-05T01:40:23.057		79.15	-72.92	61953.12	111.95		
Adams	E	2049-11-05T01:40:31.730		79.15	-72.90	62933.11	114.06		

```

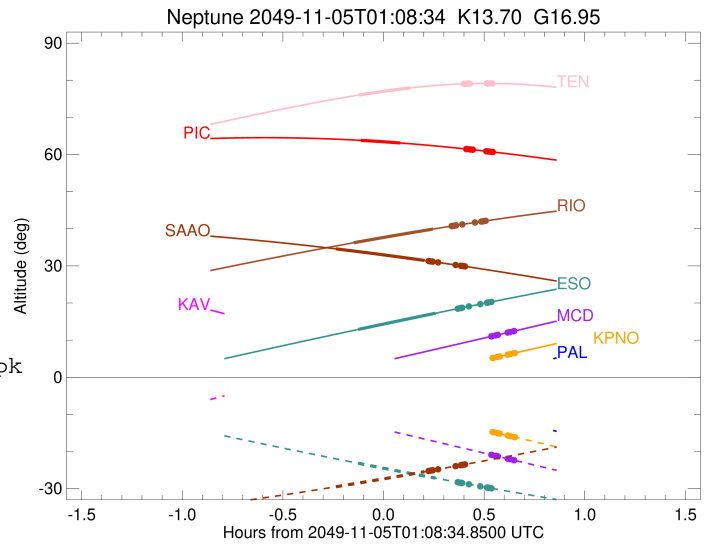
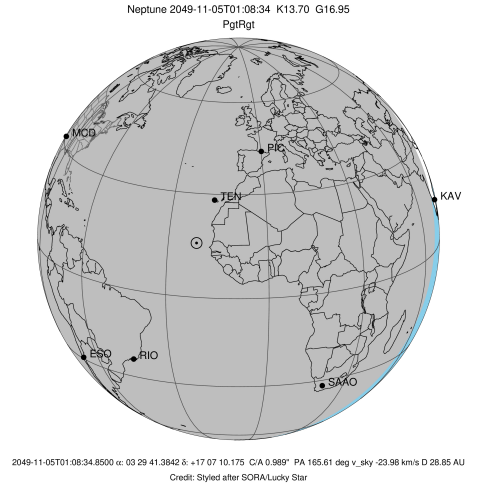
target                : Neptune
target radius (km)   : 24764.00
C/A epoch             : 2049-11-05T01:11:30.450
Event type            : PgtRgt
: Neptune occs: geocentric, topocentric
: Ring occs: geocentric, topocentric
Observer code         : RIO
Location              : Rio de Janeiro
Latitude (deg)        : -22.89506
E. Longitude (deg)    : 316.77708
Altitude (km)         : 0.033
Gaia source ID        : 54847355142991360
2Mass ID (if available) : 03294139+1707111
ICRS Star Coord at Epoch: 03h 29m 41.38417s +17:07:10.17537s
RUWE (>1.4 is poor) : 0.92
K magnitude           : 13.695
G magnitude           : 16.951
RP magnitude          : 15.964
BP magnitude          : 17.973
DUPflag              : 0
Distance (au)         : 28.846
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s) : -23.98
Sun-Target sep (deg)  : 167.90
Sun-Moon sep (deg)    : 71.40
B (ring opening deg) : 4.01
PA of pole (deg)      : -42.53
Pole direction: RA (deg): 299.33374
Dec (deg): 42.95036
C/A sky separation (") : 0.851
C/A sky separation (km) : 17804.7
NAIF SPICE kernels   : RAJobs_U111+rgf16.spk
URKALLv1.spk
nep097.bsp
nep101.bsp
sat4401.bsp
de440.bsp
earth_720101_070426.bpc
earthstns_itr93_040916.bsp
earth_200101_990628_predict.bpc
pck00010.tpc
pck.urall11.tpc.Neptune
naif0012.tls
IAU_NEPTUNE_for_RINGFIT.tpc.BECAREFUL
earth_flat_IAU.spk
    
```



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
Adams	I	2049-11-05T01:28:26.405		40.66	-48.05	62933.03	-135.64		
Galatea	I	2049-11-05T01:28:33.661		40.67	-48.07	61953.03	-134.48		
Arago	I	2049-11-05T01:29:09.861		40.76	-48.12	57200.07	-127.83		
Lassell	I	2049-11-05T01:29:25.716		40.80	-48.15	55200.09	-124.37		
LeVerrier	I	2049-11-05T01:29:42.052		40.84	-48.17	53200.15	-120.40		
Galle	I	2049-11-05T01:31:31.667		41.09	-48.35	42007.52	-79.11		
Neptune	I	2049-11-05T00:59:42.262		36.24	-44.81	24762.11		73.99	74.50
Neptune	E	2049-11-05T01:23:18.315		39.91	-47.54	24763.83		17.41	17.98
Galle	E	2049-11-05T01:35:28.061		41.64	-48.70	42000.48	79.08		
LeVerrier	E	2049-11-05T01:37:17.752		41.89	-48.86	53200.06	120.31		
Lassell	E	2049-11-05T01:37:34.104		41.93	-48.89	55200.04	124.27		
Arago	E	2049-11-05T01:37:49.976		41.97	-48.91	57200.03	127.71		
Galatea	E	2049-11-05T01:38:26.218		42.05	-48.96	61953.01	134.33		
Adams	E	2049-11-05T01:38:33.483		42.06	-48.97	62933.01	135.48		

```

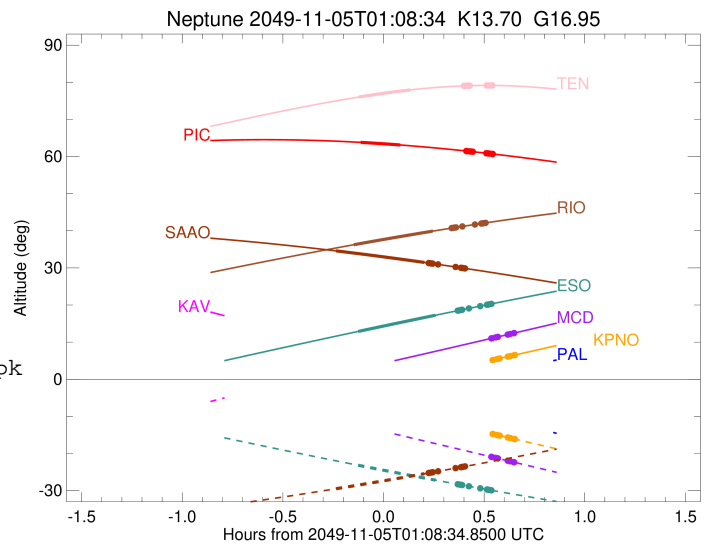
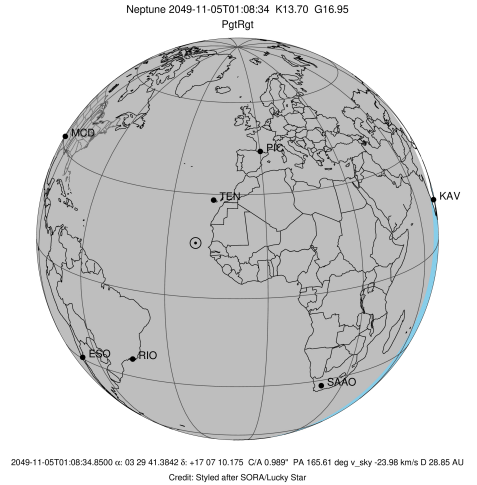
target                : Neptune
target radius (km)   : 24764.00
C/A epoch             : 2049-11-05T01:12:34.960
Event type            : PgtRgt
: Neptune occs: geocentric, topocentric
: Ring occs: geocentric, topocentric
Observer code         : ESO
Location               : European Southern Obs. (3.6m)
Latitude (deg)        : -29.26097
E. Longitude (deg)    : 289.26831
Altitude (km)         : 2.400
Gaia source ID        : 54847355142991360
2Mass ID (if available) : 03294139+1707111
ICRS Star Coord at Epoch: 03h 29m 41.38417s +17:07:10.17537s
RUWE (>1.4 is poor) : 0.92
K magnitude           : 13.695
G magnitude           : 16.951
RP magnitude          : 15.964
BP magnitude          : 17.973
DUPflag              : 0
Distance (au)         : 28.846
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s) : -23.98
Sun-Target sep (deg) : 167.90
Sun-Moon sep (deg)   : 70.98
B (ring opening deg) : 4.01
PA of pole (deg)     : -42.53
Pole direction: RA (deg): 299.33374
Dec (deg): 42.95036
C/A sky separation (") : 0.872
C/A sky separation (km) : 18240.1
NAIF SPICE kernels   : RAJobs_U111+rgf16.spk
URKALLv1.spk
nep097.bsp
nep101.bsp
sat4401.bsp
de440.bsp
earth_720101_070426.bpc
earthstns_itr93_040916.bsp
earth_200101_990628_predict.bpc
pck00010.tpc
pck.urall11.tpc.Neptune
naif0012.tls
IAU_NEPTUNE_for_RINGFIT.tpc.BECAREFUL
earth_flat_IAU.spk
    
```



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
Adams	I	2049-11-05T01:30:14.303		18.39	-28.20	62933.03	-132.99		
Galatea	I	2049-11-05T01:30:21.705		18.41	-28.22	61953.03	-131.78		
Arago	I	2049-11-05T01:30:58.722		18.53	-28.32	57200.08	-124.73		
Lassell	I	2049-11-05T01:31:14.990		18.58	-28.36	55200.14	-121.05		
LeVerrier	I	2049-11-05T01:31:31.798		18.63	-28.41	53200.21	-116.82		
Galle	I	2049-11-05T01:33:27.473		18.98	-28.73	42014.56	-71.57		
Neptune	I	2049-11-05T01:01:01.011		12.88	-23.16	24762.08		75.40	75.86
Neptune	E	2049-11-05T01:24:08.454		17.26	-27.18	24763.79		18.88	19.50
Galle	E	2049-11-05T01:37:03.768		19.64	-29.32	42000.59	71.50		
LeVerrier	E	2049-11-05T01:38:59.483		19.99	-29.63	53200.07	116.79		
Lassell	E	2049-11-05T01:39:16.300		20.04	-29.67	55200.05	121.01		
Arago	E	2049-11-05T01:39:32.578		20.09	-29.72	57200.04	124.68		
Galatea	E	2049-11-05T01:40:09.618		20.20	-29.82	61953.02	131.70		
Adams	E	2049-11-05T01:40:17.025		20.22	-29.84	62933.01	132.92		

```

target                : Neptune
target radius (km)   : 24764.00
C/A epoch            : 2049-11-05T01:07:36.110
Event type           : PgtRgt
: Neptune 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       : 54847355142991360
2Mass ID (if available) : 03294139+1707111
ICRS Star Coord at Epoch: 03h 29m 41.38417s +17:07:10.17537s
RUWE (>1.4 is poor) : 0.92
K magnitude          : 13.695
G magnitude           : 16.951
RP magnitude         : 15.964
BP magnitude         : 17.973
DUPflag             : 0
Distance (au)        : 28.846
f0 (km)              : 0.000
g0 (km)              : 0.000
skyplane vel. (km/s) : -23.98
Sun-Target sep (deg) : 167.90
Sun-Moon sep (deg)   : 71.63
B (ring opening deg) : 4.01
PA of pole (deg)     : -42.53
Pole direction: RA (deg): 299.33374
Dec (deg): 42.95036
C/A sky separation (") : 0.743
C/A sky separation (km) : 15552.3
NAIF SPICE kernels   : RAJobs_U111+rgf16.spk
URKALLv1.spk
nep097.bsp
nep101.bsp
sat4401.bsp
de440.bsp
earth_720101_070426.bpc
earthstns_itr93_040916.bsp
earth_200101_990628_predict.bpc
pck00010.tpc
pck.urall1.tpc.Neptune
naif0012.tls
IAU_NEPTUNE_for_RINGFIT.tpc.BECAREFUL
earth_flat_IAU.spk
    
```



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
Adams	I	2049-11-05T01:21:39.107		31.36	-25.31	62933.00	-142.04		
Galatea	I	2049-11-05T01:21:46.027		31.34	-25.29	61953.01	-141.19		
Arago	I	2049-11-05T01:22:20.251		31.27	-25.20	57200.01	-136.36		
Lassell	I	2049-11-05T01:22:35.049		31.24	-25.16	55200.02	-133.88		
LeVerrier	I	2049-11-05T01:22:50.142		31.20	-25.12	53200.02	-131.07		
Galle	I	2049-11-05T01:24:24.062		31.00	-24.87	42000.64	-104.27		
Neptune	I	2049-11-05T00:54:24.165		34.59	-29.49	24762.27		66.80	67.50
Neptune	E	2049-11-05T01:20:48.426		31.47	-25.45	24763.93		10.67	11.04
Galle	E	2049-11-05T01:29:42.259		30.30	-24.00	42000.14	104.15		
LeVerrier	E	2049-11-05T01:31:16.370		30.09	-23.75	53200.02	130.76		
Lassell	E	2049-11-05T01:31:31.502		30.05	-23.70	55200.01	133.54		
Arago	E	2049-11-05T01:31:46.342		30.02	-23.66	57200.00	135.99		
Galatea	E	2049-11-05T01:32:20.671		29.94	-23.57	61953.01	140.75		
Adams	E	2049-11-05T01:32:27.613		29.93	-23.55	62933.01	141.58		