

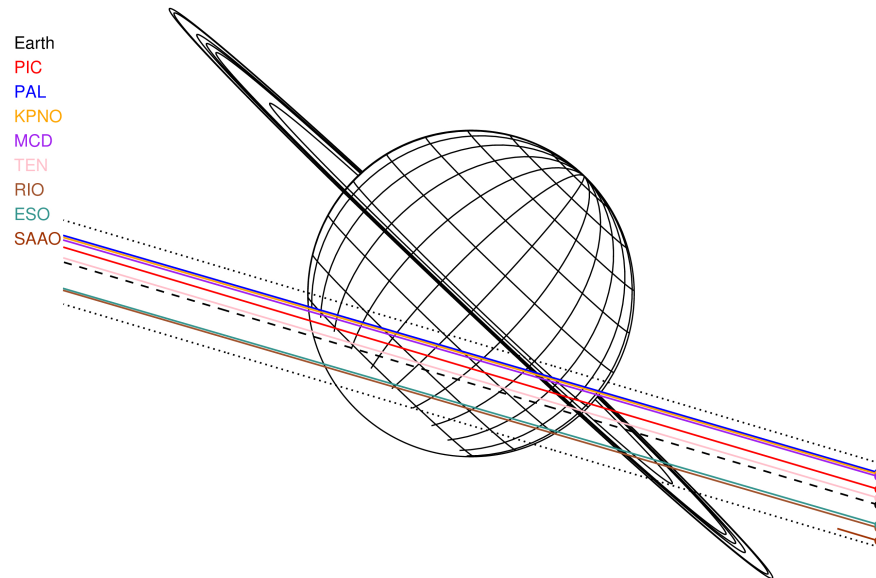
target : Neptune
 target radius (km) : 24764.00
 C/A epoch : 2047-10-13T04:33:38.440
 Event type : PgtRgt
 : Neptune occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 31233315709949184
 2Mass ID (if available) : 03133474+1605189

Neptune 2047-10-13T04:33:38 K14.23 G17.33 PgtRgt

ICRS Star Coord at Epoch: 03h 13m 34.70235s +16:05:18.24869s
 RUWE (>1.4 is poor) : 1.05
 K magnitude : 14.230
 G magnitude : 17.329
 RP magnitude : 16.376
 BP magnitude : 18.301
 DUPflag : 0
 Distance (au) : 28.958
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.28
 Sun-Target sep (deg) : 148.73
 Sun-Moon sep (deg) : 70.43
 B (ring opening deg) : 2.13
 PA of pole (deg) : -43.87
 # a(km) ring



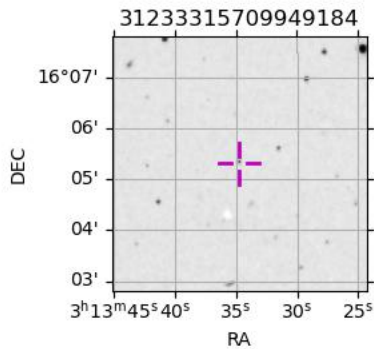
2047-10-13T04:33:38.4400 cc: 03 13 34.7023 s; +16 05 18.249 C/A 0.623° PA 343.42 deg v_sky -20.28 km/s D 28.96 AU
 Credit: Styled after SORA/Lucky Star



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

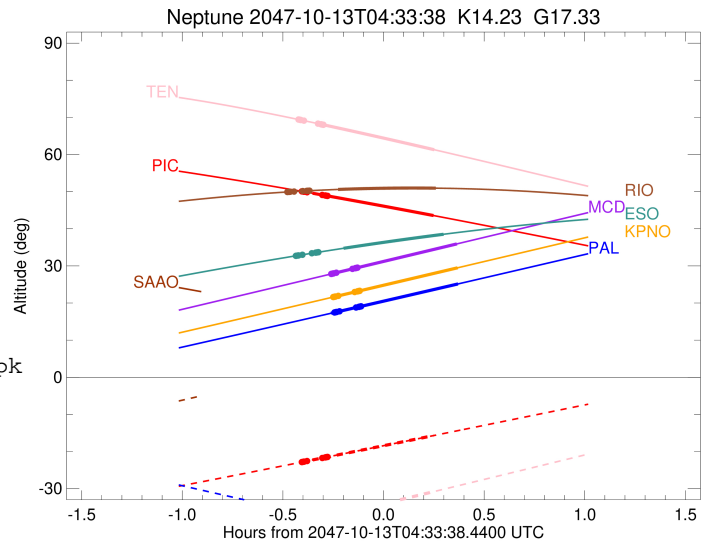
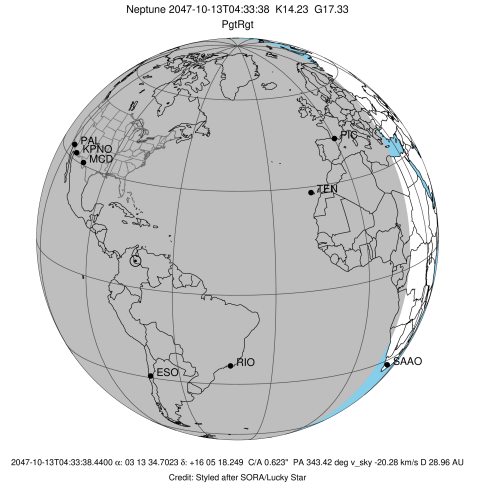
Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1	+ + + + +	+ +		OCT 13 04:09 - OCT 13 04:48	PieRin
PAL	Palomar Mt (200")	33.4	243.1		+ +		OCT 13 04:18 - OCT 13 04:55	PieRnn
PMO	Purple Mtn Obs. Nanki	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl Obs	32.0	248.4		+ +		OCT 13 04:18 - OCT 13 04:55	PieRnn
MCD	McDonald Obs. 2.7m	30.7	256.0		+ +		OCT 13 04:18 - OCT 13 04:55	PieRnn
TEN	Teide Obs./Tenerife	28.3	343.5	+ + + + +	+ +		OCT 13 04:08 - OCT 13 04:48	PieRin
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	+ + + + +	+ +	+ + + + +	OCT 13 04:05 - OCT 13 04:49	PieRie
ESO	European Southern Obs	-29.3	289.3	+ + + + +	+ +	+ + + + +	OCT 13 04:08 - OCT 13 04:51	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



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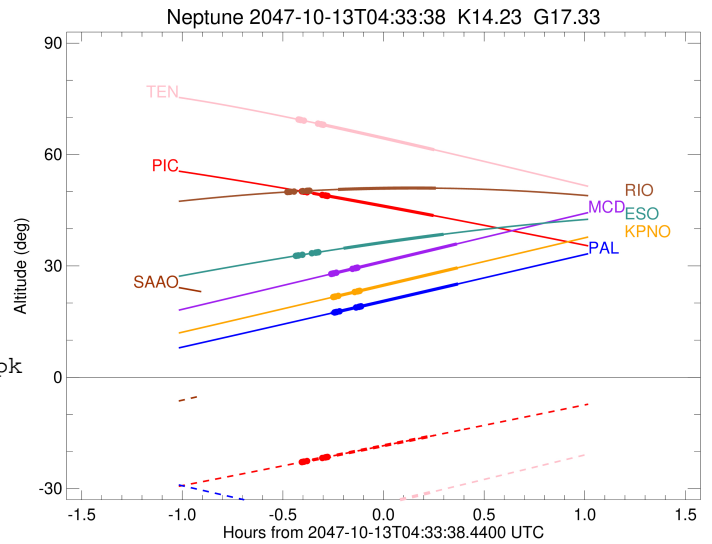
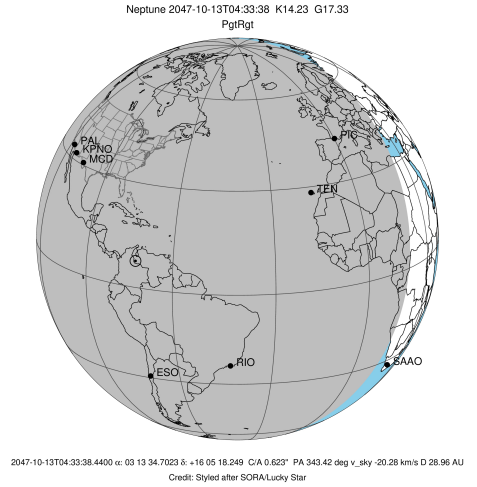
target                : Neptune
target radius (km)   : 24764.00
C/A epoch            : 2047-10-13T04:30:30.780
Event type          : PgtRgt
: Neptune occs: geocentric, topocentric
: Ring occs: geocentric, topocentric
Observer code       : PIC
Location            : Pic du Midi
Latitude (deg)      : 42.93656
E. Longitude (deg)  : 0.14231
Altitude (km)       : 2.890
Gaia source ID      : 31233315709949184
2Mass ID (if available) : 03133474+1605189
ICRS Star Coord at Epoch: 03h 13m 34.70235s +16:05:18.24869s
RUWE (>1.4 is poor) : 1.05
K magnitude          : 14.230
G magnitude          : 17.329
RP magnitude         : 16.376
BP magnitude         : 18.301
DUPflag             : 0
Distance (au)        : 28.958
f0 (km)              : 0.000
g0 (km)              : 0.000
skyplane vel. (km/s) : -20.28
Sun-Target sep (deg) : 148.73
Sun-Moon sep (deg)  : 70.89
B (ring opening deg) : 2.13
PA of pole (deg)    : -43.87
Pole direction: RA (deg): 299.33374
Dec (deg): 42.95036
C/A sky separation (") : 0.520
C/A sky separation (km) : 10920.7
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	2047-10-13T04:09:41.788		50.02	-22.78	62932.98	-236.63		
Galatea	I	2047-10-13T04:09:45.935		50.01	-22.76	61953.00	-236.01		
Arago	I	2047-10-13T04:10:06.220		49.95	-22.70	57199.99	-232.46		
Lassell	I	2047-10-13T04:10:14.856		49.93	-22.68	55199.99	-230.67		
LeVerrier	I	2047-10-13T04:10:23.563		49.91	-22.65	53200.01	-228.65		
Galle	I	2047-10-13T04:11:14.297		49.77	-22.50	42000.05	-210.72		
Neptune	I	2047-10-13T04:12:29.390		49.58	-22.27	24764.00		1.17	1.21
Neptune	E	2047-10-13T04:48:32.777		43.57	-15.71	24763.63		-53.43	-54.36
Galle	E	2047-10-13T04:15:44.974	b	49.05	-21.68	42000.15	211.14		
LeVerrier	E	2047-10-13T04:16:35.602	b	48.92	-21.53	53200.02	229.24		
Lassell	E	2047-10-13T04:16:44.287	b	48.89	-21.50	55200.00	231.29		
Arago	E	2047-10-13T04:16:52.900	b	48.87	-21.48	57199.99	233.11		
Galatea	E	2047-10-13T04:17:13.127	b	48.81	-21.42	61953.00	236.74		
Adams	E	2047-10-13T04:17:17.261	b	48.80	-21.41	62932.99	237.39		

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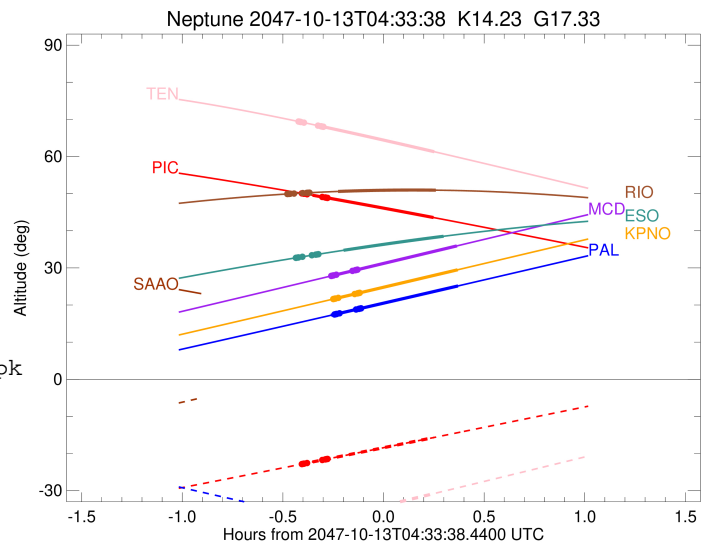
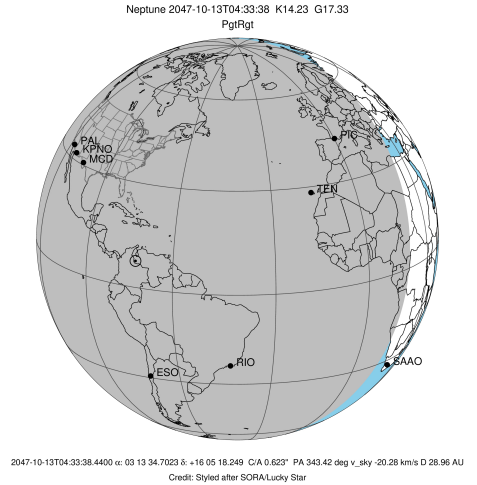
target                : Neptune
target radius (km)   : 24764.00
C/A epoch             : 2047-10-13T04:36:58.200
Event type           : PgtRgt
: Neptune occs: geocentric, topocentric
: Ring occs: geocentric, topocentric
Observer code        : PAL
Location              : Palomar Mt (200")
Latitude (deg)       : 33.35622
E. Longitude (deg)   : 243.13601
Altitude (km)        : 1.706
Gaia source ID       : 31233315709949184
2Mass ID (if available) : 03133474+1605189
ICRS Star Coord at Epoch: 03h 13m 34.70235s +16:05:18.24869s
RUWE (>1.4 is poor) : 1.05
K magnitude           : 14.230
G magnitude           : 17.329
RP magnitude          : 16.376
BP magnitude          : 18.301
DUPflag              : 0
Distance (au)        : 28.958
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s) : -20.28
Sun-Target sep (deg) : 148.73
Sun-Moon sep (deg)   : 70.95
B (ring opening deg) : 2.13
PA of pole (deg)     : -43.87
Pole direction: RA (deg): 299.33374
Dec (deg): 42.95036
C/A sky separation (") : 0.419
C/A sky separation (km) : 8797.4
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
    
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Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
Adams	I	2047-10-13T04:19:22.684	b	17.53	-38.49	62933.00	-243.10		
Galatea	I	2047-10-13T04:19:26.719	b	17.54	-38.51	61953.00	-242.72		
Arago	I	2047-10-13T04:19:46.384	b	17.61	-38.57	57199.99	-240.57		
Lassell	I	2047-10-13T04:19:54.716	b	17.64	-38.60	55199.99	-239.49		
LeVerrier	I	2047-10-13T04:20:03.087	b	17.67	-38.63	53200.00	-238.27		
Galle	I	2047-10-13T04:20:51.035	b	17.84	-38.78	42000.00	-227.62		
Neptune	I	2047-10-13T04:17:59.898		17.24	-38.22	24763.99		6.83	7.07
Neptune	E	2047-10-13T04:55:54.595		25.15	-45.58	24763.68		-48.43	-49.39
Galle	E	2047-10-13T04:25:44.030	b	18.85	-39.75	42000.01	228.83		
LeVerrier	E	2047-10-13T04:26:31.684	b	19.02	-39.91	53199.99	239.99		
Lassell	E	2047-10-13T04:26:39.995	b	19.05	-39.94	55200.00	241.30		
Arago	E	2047-10-13T04:26:48.264	b	19.07	-39.96	57199.98	242.47		
Galatea	E	2047-10-13T04:27:07.767	b	19.14	-40.03	61953.01	244.85		
Adams	E	2047-10-13T04:27:11.766	b	19.16	-40.04	62933.00	245.28		

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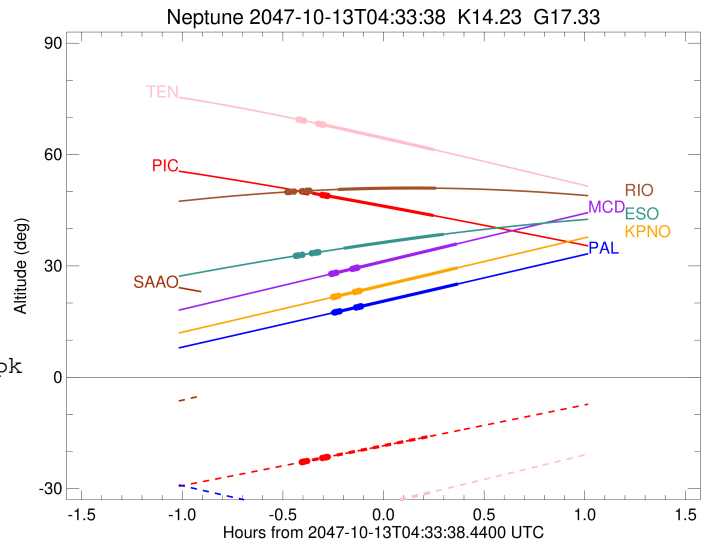
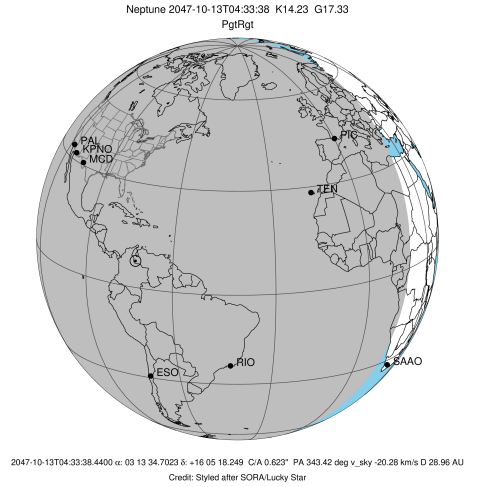
target                : Neptune
target radius (km)   : 24764.00
C/A epoch            : 2047-10-13T04:36:58.280
Event type          : PgtRgt
: Neptune occs: geocentric, topocentric
: Ring occs: geocentric, topocentric
Observer code       : KPNO
Location            : Kitt Peak Natl Obs
Latitude (deg)      : 31.96333
E. Longitude (deg)  : 248.40000
Altitude (km)       : 2.120
Gaia source ID      : 31233315709949184
2Mass ID (if available) : 03133474+1605189
ICRS Star Coord at Epoch: 03h 13m 34.70235s +16:05:18.24869s
RUWE (>1.4 is poor) : 1.05
K magnitude          : 14.230
G magnitude          : 17.329
RP magnitude         : 16.376
BP magnitude         : 18.301
DUPflag             : 0
Distance (au)       : 28.958
f0 (km)              : 0.000
g0 (km)              : 0.000
skyplane vel. (km/s) : -20.28
Sun-Target sep (deg) : 148.73
Sun-Moon sep (deg)  : 71.01
B (ring opening deg) : 2.13
PA of pole (deg)    : -43.87
Pole direction: RA (deg): 299.33374
Dec (deg): 42.95036
C/A sky separation (") : 0.432
C/A sky separation (km) : 9070.0
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.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	2047-10-13T04:19:00.949	b	21.68	-43.07	62933.01	-242.97		
Galatea	I	2047-10-13T04:19:04.986	b	21.70	-43.08	61953.01	-242.57		
Arago	I	2047-10-13T04:19:24.669	b	21.77	-43.15	57200.01	-240.27		
Lassell	I	2047-10-13T04:19:33.013	b	21.80	-43.17	55200.00	-239.11		
LeVerrier	I	2047-10-13T04:19:41.399	b	21.83	-43.20	53199.99	-237.81		
Galle	I	2047-10-13T04:20:29.511	b	22.00	-43.36	42000.01	-226.40		
Neptune	I	2047-10-13T04:18:07.118		21.49	-42.89	24763.99		6.18	6.39
Neptune	E	2047-10-13T04:55:47.568		29.50	-50.13	24763.67		-49.12	-50.09
Galle	E	2047-10-13T04:25:19.546	b	23.02	-44.31	42000.01	227.50		
LeVerrier	E	2047-10-13T04:26:07.391	b	23.19	-44.47	53200.00	239.36		
Lassell	E	2047-10-13T04:26:15.722	b	23.22	-44.50	55199.99	240.75		
Arago	E	2047-10-13T04:26:24.008	b	23.25	-44.52	57199.99	242.00		
Galatea	E	2047-10-13T04:26:43.545	b	23.32	-44.59	61952.99	244.50		
Adams	E	2047-10-13T04:26:47.549	b	23.33	-44.60	62932.99	244.95		

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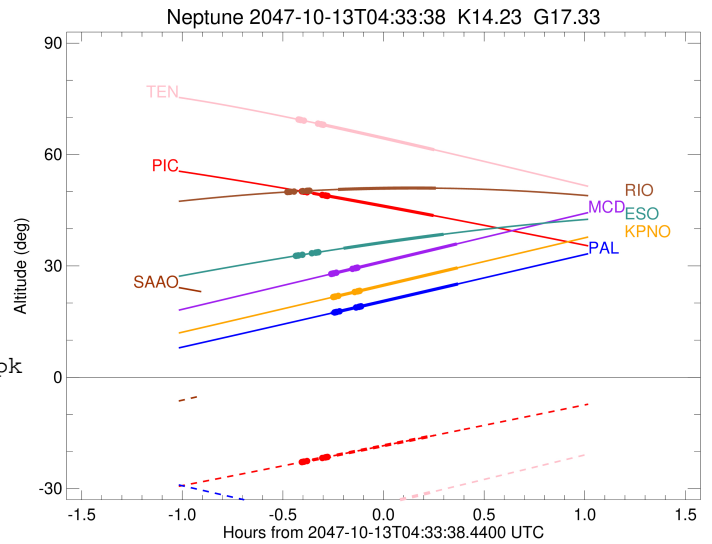
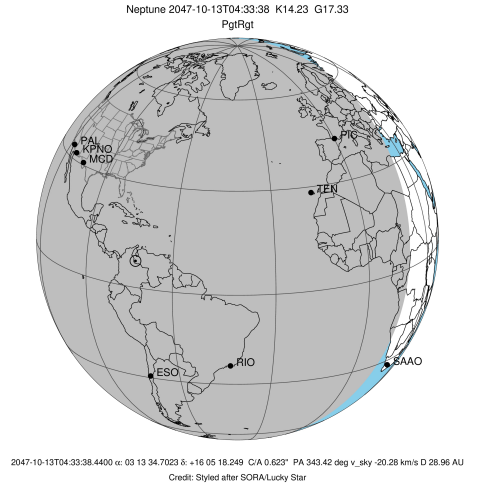
target                : Neptune
target radius (km)   : 24764.00
C/A epoch             : 2047-10-13T04:36:51.610
Event type            : PgtRgt
: Neptune occs: geocentric, topocentric
: Ring occs: geocentric, topocentric
Observer code        : MCD
Location              : McDonald Obs. 2.7m
Latitude (deg)       : 30.67158
E. Longitude (deg)   : 255.97844
Altitude (km)        : 2.075
Gaia source ID       : 31233315709949184
2Mass ID (if available) : 03133474+1605189
ICRS Star Coord at Epoch: 03h 13m 34.70235s +16:05:18.24869s
RUWE (>1.4 is poor) : 1.05
K magnitude           : 14.230
G magnitude           : 17.329
RP magnitude          : 16.376
BP magnitude          : 18.301
DUPflag              : 0
Distance (au)        : 28.958
f0 (km)              : 0.000
g0 (km)              : 0.000
skyplane vel. (km/s) : -20.28
Sun-Target sep (deg) : 148.73
Sun-Moon sep (deg)   : 71.09
B (ring opening deg) : 2.13
PA of pole (deg)     : -43.87
Pole direction: RA (deg): 299.33374
Dec (deg): 42.95036
C/A sky separation (") : 0.449
C/A sky separation (km) : 9430.7
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	2047-10-13T04:18:25.591	b	27.92	-49.40	62933.02	-242.76		
Galatea	I	2047-10-13T04:18:29.631	b	27.93	-49.42	61953.00	-242.32		
Arago	I	2047-10-13T04:18:49.343	b	28.00	-49.48	57200.00	-239.81		
Lassell	I	2047-10-13T04:18:57.704	b	28.03	-49.51	55200.02	-238.55		
LeVerrier	I	2047-10-13T04:19:06.112	b	28.06	-49.53	53200.00	-237.13		
Galle	I	2047-10-13T04:19:54.462	b	28.24	-49.69	42000.01	-224.66		
Neptune	I	2047-10-13T04:18:10.309		27.86	-49.35	24764.00		5.31	5.49
Neptune	E	2047-10-13T04:55:31.121		35.93	-56.22	24763.66		-50.05	-51.00
Galle	E	2047-10-13T04:24:40.448	b	29.26	-50.60	42000.04	225.62		
LeVerrier	E	2047-10-13T04:25:28.562	b	29.44	-50.75	53199.98	238.50		
Lassell	E	2047-10-13T04:25:36.921	b	29.47	-50.78	55199.99	240.00		
Arago	E	2047-10-13T04:25:45.231	b	29.50	-50.80	57200.02	241.34		
Galatea	E	2047-10-13T04:26:04.813	b	29.57	-50.87	61953.00	244.02		
Adams	E	2047-10-13T04:26:08.825	b	29.58	-50.88	62933.00	244.51		

```

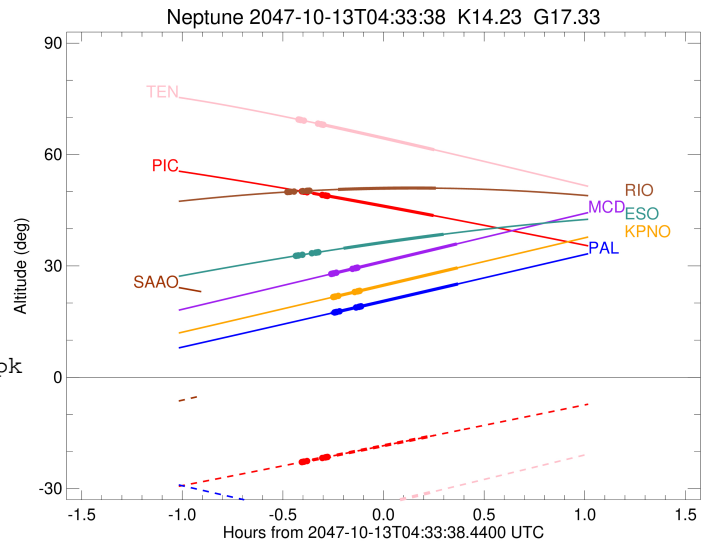
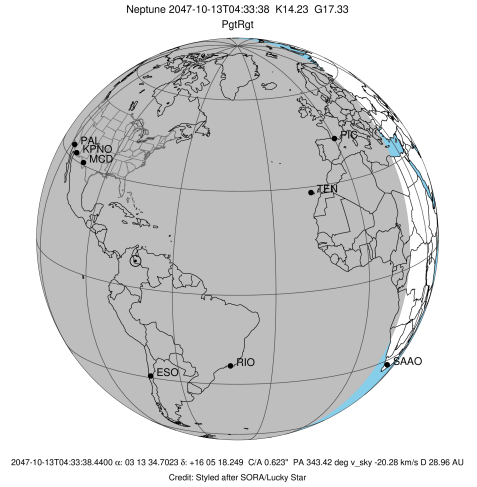
target                : Neptune
target radius (km)   : 24764.00
C/A epoch             : 2047-10-13T04:31:28.320
Event type            : PgtRgt
: Neptune occs: geocentric, topocentric
: Ring occs: geocentric, topocentric
Observer code        : TEN
Location              : Teide Obs./Tenerife
Latitude (deg)       : 28.30050
E. Longitude (deg)   : 343.48909
Altitude (km)        : 2.395
Gaia source ID       : 31233315709949184
2Mass ID (if available) : 03133474+1605189
ICRS Star Coord at Epoch: 03h 13m 34.70235s +16:05:18.24869s
RUWE (>1.4 is poor) : 1.05
K magnitude           : 14.230
G magnitude           : 17.329
RP magnitude          : 16.376
BP magnitude          : 18.301
DUPflag              : 0
Distance (au)        : 28.958
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s) : -20.28
Sun-Target sep (deg) : 148.73
Sun-Moon sep (deg)   : 71.10
B (ring opening deg) : 2.13
PA of pole (deg)     : -43.87
Pole direction: RA (deg): 299.33374
Dec (deg): 42.95036
C/A sky separation (") : 0.588
C/A sky separation (km) : 12347.5
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	2047-10-13T04:08:45.448		69.35	-39.43	62933.00	-233.50		
Galatea	I	2047-10-13T04:08:49.653		69.34	-39.41	61953.02	-232.68		
Arago	I	2047-10-13T04:09:10.277		69.27	-39.34	57200.01	-228.02		
Lassell	I	2047-10-13T04:09:19.092		69.24	-39.31	55200.00	-225.66		
LeVerrier	I	2047-10-13T04:09:28.006		69.22	-39.28	53200.01	-223.00		
Galle	I	2047-10-13T04:10:20.739		69.05	-39.09	42000.17	-198.91		
Neptune	I	2047-10-13T04:14:09.097		68.32	-38.27	24764.00		-2.43	-2.52
Neptune	E	2047-10-13T04:48:47.866		61.29	-30.77	24763.60		-57.29	-58.17
Galle	E	2047-10-13T04:14:31.654	b	68.25	-38.19	42000.70	199.19		
LeVerrier	E	2047-10-13T04:15:24.318	b	68.07	-38.00	53200.06	223.37		
Lassell	E	2047-10-13T04:15:33.217	b	68.05	-37.97	55200.03	226.06		
Arago	E	2047-10-13T04:15:42.018	b	68.02	-37.94	57200.02	228.44		
Galatea	E	2047-10-13T04:16:02.605	b	67.95	-37.87	61953.00	233.14		
Adams	E	2047-10-13T04:16:06.801	b	67.94	-37.85	62933.02	233.98		

```

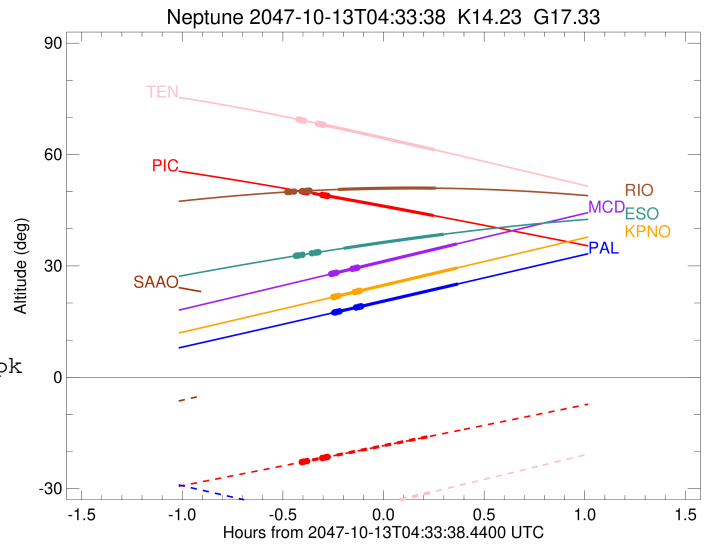
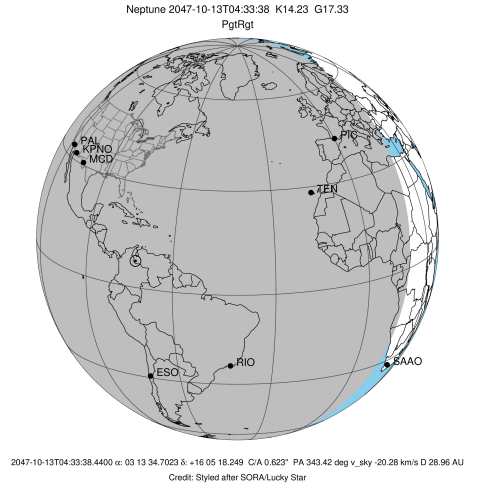
target                : Neptune
target radius (km)   : 24764.00
C/A epoch             : 2047-10-13T04:34:38.540
Event type            : PgtRgt
: Neptune occs: geocentric, topocentric
: Ring occs: geocentric, topocentric
Observer code        : RIO
Location              : Rio de Janeiro
Latitude (deg)       : -22.89506
E. Longitude (deg)   : 316.77708
Altitude (km)        : 0.033
Gaia source ID       : 31233315709949184
2Mass ID (if available) : 03133474+1605189
ICRS Star Coord at Epoch: 03h 13m 34.70235s +16:05:18.24869s
RUWE (>1.4 is poor) : 1.05
K magnitude           : 14.230
G magnitude           : 17.329
RP magnitude          : 16.376
BP magnitude          : 18.301
DUPflag               : 0
Distance (au)        : 28.958
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s) : -20.28
Sun-Target sep (deg) : 148.73
Sun-Moon sep (deg)   : 71.17
B (ring opening deg) : 2.13
PA of pole (deg)     : -43.87
Pole direction: RA (deg): 299.33374
Dec (deg): 42.95036
C/A sky separation (") : 0.804
C/A sky separation (km) : 16885.7
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	2047-10-13T04:05:32.274		49.95	-52.90	62933.08	-211.92		
Galatea	I	2047-10-13T04:05:36.916		49.95	-52.89	61953.10	-210.23		
Arago	I	2047-10-13T04:06:00.039		49.97	-52.83	57200.20	-200.46		
Lassell	I	2047-10-13T04:06:10.140		49.98	-52.81	55200.31	-195.39		
LeVerrier	I	2047-10-13T04:06:20.526		49.99	-52.79	53200.44	-189.59		
Galle	I	2047-10-13T04:07:29.061		50.05	-52.62	42004.51	-130.21		
Neptune	I	2047-10-13T04:20:02.945		50.60	-50.76	24763.97		-15.34	-15.85
Neptune	E	2047-10-13T04:49:13.863		50.94	-45.91	24763.49		-70.50	-71.11
Galle	E	2047-10-13T04:10:11.356		50.19	-52.24	42084.83	131.11		
LeVerrier	E	2047-10-13T04:11:19.858		50.24	-52.07	53202.21	189.76		
Lassell	E	2047-10-13T04:11:30.238		50.25	-52.05	55201.40	195.57		
Arago	E	2047-10-13T04:11:40.332		50.26	-52.02	57200.91	200.64		
Galatea	E	2047-10-13T04:12:03.438		50.28	-51.97	61953.35	210.42		
Adams	E	2047-10-13T04:12:08.077		50.28	-51.95	62933.29	212.12		

```

target                : Neptune
target radius (km)   : 24764.00
C/A epoch            : 2047-10-13T04:36:40.190
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       : 31233315709949184
2Mass ID (if available) : 03133474+1605189
ICRS Star Coord at Epoch: 03h 13m 34.70235s +16:05:18.24869s
RUWE (>1.4 is poor) : 1.05
K magnitude           : 14.230
G magnitude           : 17.329
RP magnitude          : 16.376
BP magnitude          : 18.301
DUPflag              : 0
Distance (au)         : 28.958
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s) : -20.28
Sun-Target sep (deg) : 148.73
Sun-Moon sep (deg)   : 71.13
B (ring opening deg) : 2.13
PA of pole (deg)     : -43.87
Pole direction: RA (deg): 299.33374
Dec (deg): 42.95036
C/A sky separation (") : 0.785
C/A sky separation (km) : 16497.5
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	2047-10-13T04:08:04.230		32.79	-52.83	62933.07	-213.86		
Galatea	I	2047-10-13T04:08:08.829		32.80	-52.83	61953.07	-212.27		
Arago	I	2047-10-13T04:08:31.689		32.86	-52.84	57200.17	-203.16		
Lassell	I	2047-10-13T04:08:41.645		32.89	-52.85	55200.22	-198.45		
LeVerrier	I	2047-10-13T04:08:51.858		32.91	-52.85	53200.32	-193.06		
Galle	I	2047-10-13T04:09:58.023		33.07	-52.89	42003.34	-139.07		
Neptune	I	2047-10-13T04:21:43.696		34.74	-53.13	24763.97		-14.05	-14.52
Neptune	E	2047-10-13T04:51:35.930		38.53	-52.77	24763.50		-69.38	-70.01
Galle	E	2047-10-13T04:12:52.414		33.49	-52.97	42048.90	139.63		
LeVerrier	E	2047-10-13T04:13:58.528		33.65	-53.00	53201.56	193.31		
Lassell	E	2047-10-13T04:14:08.731		33.68	-53.00	55201.00	198.71		
Arago	E	2047-10-13T04:14:18.677		33.70	-53.00	57200.66	203.43		
Galatea	E	2047-10-13T04:14:41.510		33.76	-53.01	61953.28	212.57		
Adams	E	2047-10-13T04:14:46.103		33.77	-53.01	62933.23	214.16		