

target : Neptune
 target radius (km) : 24764.00
 C/A epoch : 2045-09-09T04:55:25.940
 Event type : PgtRgt
 : Neptune occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 33866160726465920
 2Mass ID (if available) : 02574261+1500212

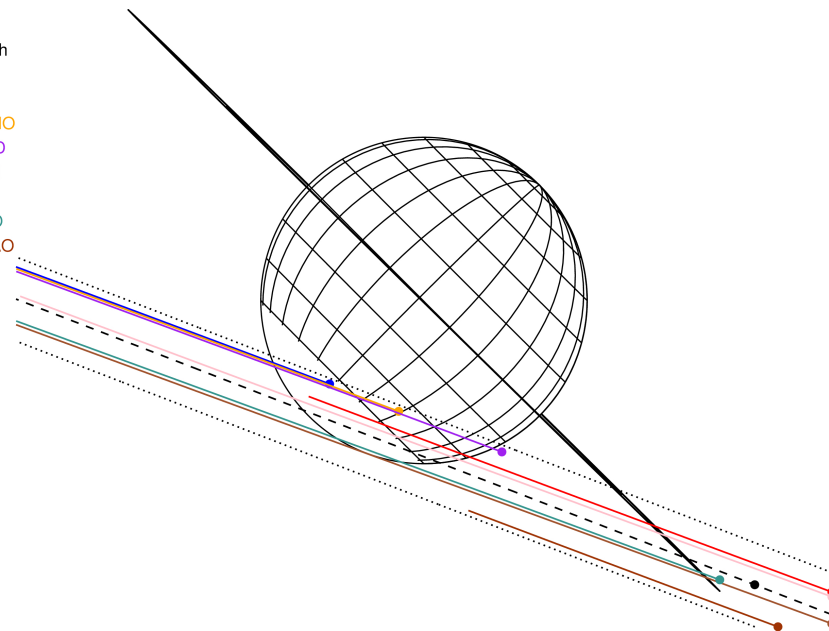
Neptune 2045-09-09T04:55:25 K14.21 G17.95 PgtRgt

ICRS Star Coord at Epoch: 02h 57m 42.63517s +15°00'20.75540s
 RUWE (>1.4 is poor) : 0.99
 K magnitude : 14.215
 G magnitude : 17.950
 RP magnitude : 16.850
 BP magnitude : 19.242
 DUPflag : 0
 Distance (au) : 29.296
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -9.69
 Sun-Target sep (deg) : 119.92
 Sun-Moon sep (deg) : 93.80
 B (ring opening deg) : 0.23
 PA of pole (deg) : -45.01



2045-09-09T04:55:25.9400 α: 02 57 42.6352 δ: +15 00 20.755 C/A 1.041° PA 338.86 deg v_sky - 9.69 km/s D 29.30 AU
 Credit: Styled after SORA/Lucky Star

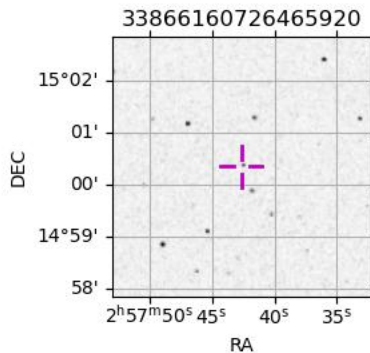
Earth
 PIC
 PAL
 KPNO
 MCD
 TEN
 RIO
 ESO
 SAAO



#	a(km)	ring
1	42000.0	Galle
2	53200.0	LeVerrier
3	55200.0	Lassell
4	57200.0	Arago
5	61953.0	Galatea
6	62933.0	Adams

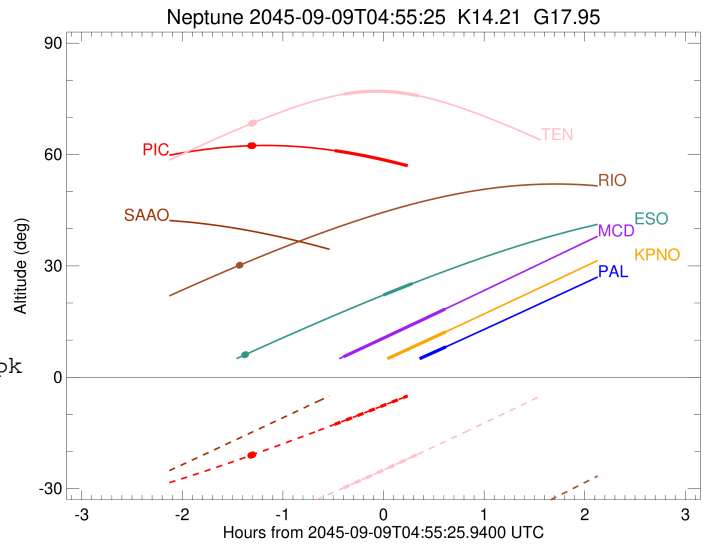
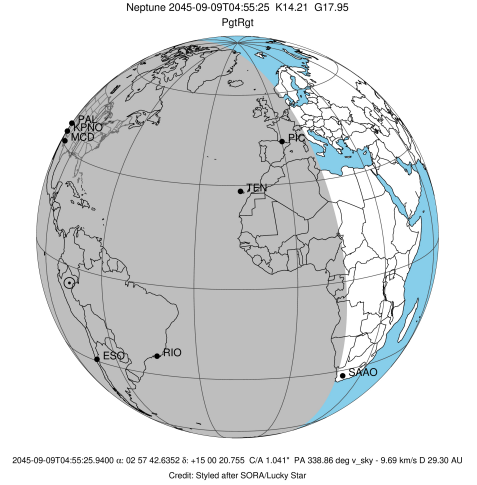
Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1	+ + + + +	+	+ + + + +	SEP 09 03:37 - SEP 09 04:26	PinRie
PAL	Palomar Mt (200")	33.4	243.1		+		SEP 09 05:32 - SEP 09 05:32	PneRnn
PMO	Purple Mtn Obs. Nanki	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl Obs	32.0	248.4		+		SEP 09 05:32 - SEP 09 05:32	PneRnn
MCD	McDonald Obs. 2.7m	30.7	256.0		+		SEP 09 04:31 - SEP 09 05:32	PieRnn
TEN	Teide Obs./Tenerife	28.3	343.5	+ + + + +	+	+ + + + +	SEP 09 03:38 - SEP 09 05:16	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	+ +		+ +	SEP 09 03:31 - SEP 09 03:31	PnnRie
ESO	European Southern Obs	-29.3	289.3	+ +	+	+ +	SEP 09 03:34 - SEP 09 05:12	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



```

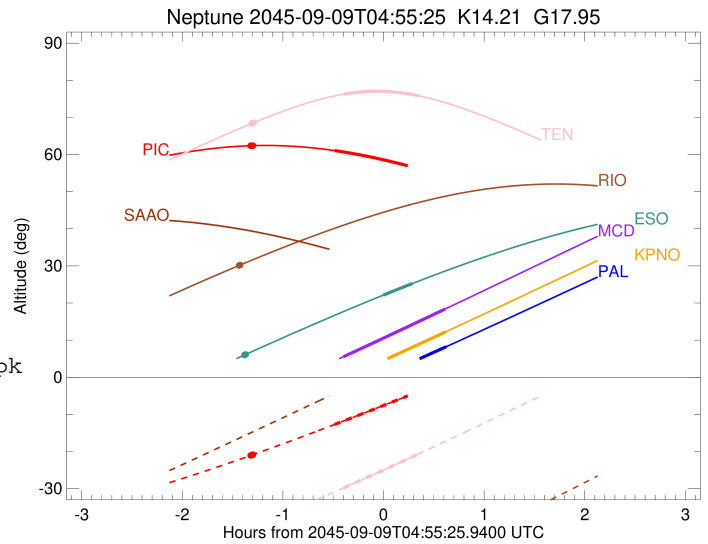
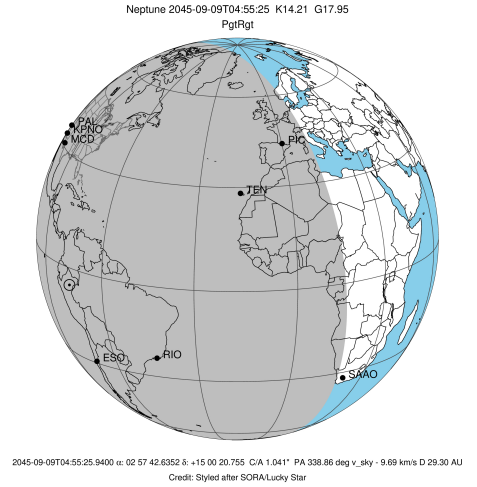
target                : Neptune
target radius (km)   : 24764.00
C/A epoch             : 2045-09-09T04:51:07.860
Event type            : PgtRgt
: Neptune occs: geocentric, topocentric
: Ring occs: geocentric, topocentric
Observer code        : PIC
Location              : Pic du Midi
Latitude (deg)       : 42.93656
E. Longitude (deg)   : 0.14231
Altitude (km)        : 2.890
Gaia source ID       : 33866160726465920
2Mass ID (if available) : 02574261+1500212
ICRS Star Coord at Epoch: 02h 57m 42.63517s +15:00:20.75541s
RUWE (>1.4 is poor) : 0.99
K magnitude           : 14.215
G magnitude           : 17.950
RP magnitude          : 16.850
BP magnitude          : 19.242
DUPflag               : 0
Distance (au)         : 29.296
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s) : -9.69
Sun-Target sep (deg) : 119.92
Sun-Moon sep (deg)   : 94.70
B (ring opening deg) : 0.23
PA of pole (deg)     : -45.01
Pole direction: RA (deg): 299.33374
Dec (deg): 42.95036
C/A sky separation (") : 0.932
C/A sky separation (km) : 19796.1
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	2045-09-09T03:37:57.769		62.40	-20.79	63250.89	-669.50		
Galatea	I	2045-09-09T03:37:59.257		62.40	-20.78	62307.08	-655.74		
Arago	I	2045-09-09T03:38:07.062		62.40	-20.76	57812.27	-574.98		
Lassell	I	2045-09-09T03:38:10.768		62.40	-20.75	55980.99	-532.06		
LeVerrier	I	2045-09-09T03:38:14.880		62.40	-20.74	54203.81	-481.99		
Neptune	I	2045-09-09T04:26:19.297		61.06	-12.70	24763.98		-28.64	-29.47
Neptune	E	2045-09-09T05:15:56.383		56.24	-3.92x	24764.01		-77.44	-77.84
LeVerrier	E	2045-09-09T03:38:14.928		62.40	-20.74	53747.72	-467.41		
Lassell	E	2045-09-09T03:38:10.790		62.40	-20.75	55515.62	-519.87		
Arago	E	2045-09-09T03:38:07.073		62.40	-20.76	57370.89	-565.30		
Galatea	E	2045-09-09T03:37:59.259		62.40	-20.78	61980.26	-650.76		
Adams	E	2045-09-09T03:37:57.770		62.40	-20.79	62949.76	-665.21		

```

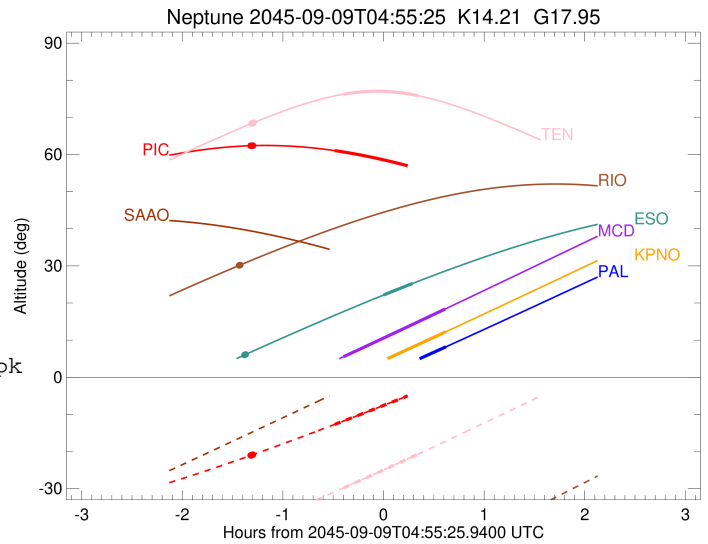
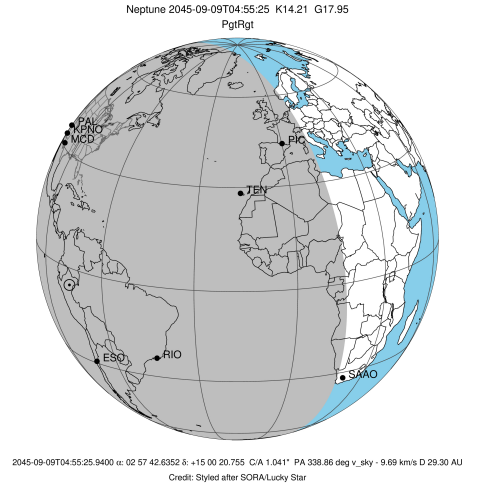
target                : Neptune
target radius (km)   : 24764.00
C/A epoch             : 2045-09-09T05:01:30.130
Event type            : PgtRgt
: Neptune occs: geocentric, topocentric
: Ring occs: geocentric, topocentric
Observer code         : PAL
Location              : Palomar Mt (200")
Latitude (deg)        : 33.35622
E. Longitude (deg)    : 243.13601
Altitude (km)         : 1.706
Gaia source ID        : 33866160726465920
2Mass ID (if available) : 02574261+1500212
ICRS Star Coord at Epoch: 02h 57m 42.63517s +15:00:20.75540s
RUWE (>1.4 is poor) : 0.99
K magnitude           : 14.215
G magnitude           : 17.950
RP magnitude          : 16.850
BP magnitude          : 19.242
DUPflag              : 0
Distance (au)         : 29.296
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s) : -9.69
Sun-Target sep (deg) : 119.92
Sun-Moon sep (deg)   : 93.77
B (ring opening deg) : 0.23
PA of pole (deg)     : -45.01
Pole direction: RA (deg): 299.33374
Dec (deg): 42.95036
C/A sky separation (") : 0.796
C/A sky separation (km) : 16907.0
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
    
```



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
Adams	I	2045-09-09T03:55:00.368	-11.07x	-23.55	63032.88	-718.60			
Galatea	I	2045-09-09T03:55:01.741	-11.07x	-23.56	62064.36	-710.03			
Arago	I	2045-09-09T03:55:08.681	-11.04x	-23.58	57393.57	-660.39			
Lassell	I	2045-09-09T03:55:11.780	-11.03x	-23.59	55447.35	-634.48			
LeVerrier	I	2045-09-09T03:55:15.027	-11.02x	-23.60	53519.05	-604.69			
Neptune	I	2045-09-09T04:30:02.851	-4.35x	-30.09	24764.01			-18.80	-19.41
Neptune	E	2045-09-09T05:32:46.096	8.22	-40.56	24764.01			-67.43	-68.12
LeVerrier	E	2045-09-09T03:55:15.028	-11.02x	-23.60	53228.52	-599.79			
Lassell	E	2045-09-09T03:55:11.781	-11.03x	-23.59	55208.63	-631.04			
Arago	E	2045-09-09T03:55:08.681	-11.04x	-23.58	57201.63	-658.00			
Galatea	E	2045-09-09T03:55:01.741	-11.07x	-23.56	61952.99	-709.01			
Adams	E	2045-09-09T03:55:00.368	-11.07x	-23.55	62933.01	-717.74			

```

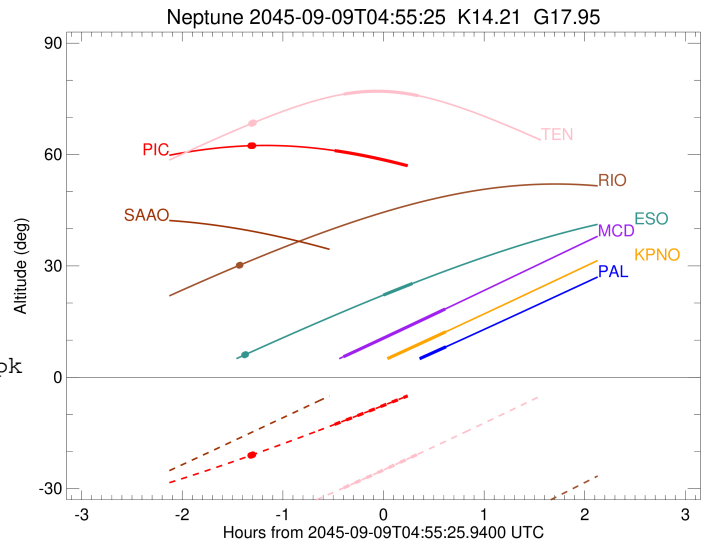
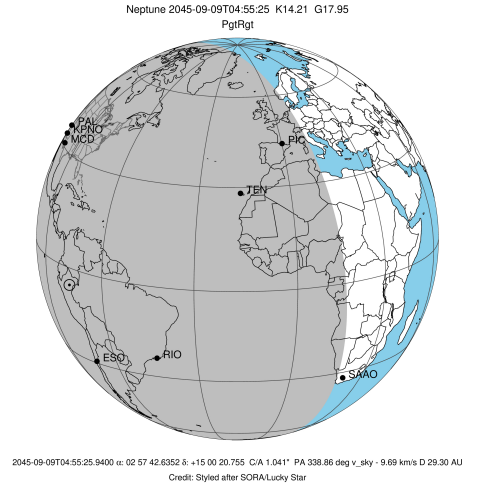
target                : Neptune
target radius (km)   : 24764.00
C/A epoch             : 2045-09-09T05:01:49.030
Event type           : PgtRgt
: Neptune occs: geocentric, topocentric
: Ring occs: geocentric, topocentric
Observer code        : KPNO
Location              : Kitt Peak Natl Obs
Latitude (deg)       : 31.96333
E. Longitude (deg)   : 248.40000
Altitude (km)        : 2.120
Gaia source ID       : 33866160726465920
2Mass ID (if available) : 02574261+1500212
ICRS Star Coord at Epoch: 02h 57m 42.63517s +15:00:20.75540s
RUWE (>1.4 is poor) : 0.99
K magnitude           : 14.215
G magnitude           : 17.950
RP magnitude         : 16.850
BP magnitude         : 19.242
DUPflag              : 0
Distance (au)        : 29.296
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s) : -9.69
Sun-Target sep (deg) : 119.92
Sun-Moon sep (deg)   : 93.84
B (ring opening deg) : 0.23
PA of pole (deg)     : -45.01
Pole direction: RA (deg): 299.33374
Dec (deg): 42.95036
C/A sky separation (") : 0.805
C/A sky separation (km) : 17098.5
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	2045-09-09T03:55:04.858	-7.61x	-28.17	63039.08	-719.18			
Galatea	I	2045-09-09T03:55:06.230	-7.61x	-28.18	62071.35	-710.38			
Arago	I	2045-09-09T03:55:13.175	-7.58x	-28.20	57405.62	-659.35			
Lassell	I	2045-09-09T03:55:16.282	-7.57x	-28.21	55462.86	-632.71			
LeVerrier	I	2045-09-09T03:55:19.542	-7.56x	-28.22	53538.84	-602.04			
Neptune	I	2045-09-09T04:30:46.826	-0.50x	-34.72	24764.01			-19.32	-19.95
Neptune	E	2045-09-09T05:32:39.952	12.27	-44.59	24764.01			-68.13	-68.79
LeVerrier	E	2045-09-09T03:55:19.545	-7.56x	-28.22	53235.40	-596.75			
Lassell	E	2045-09-09T03:55:16.283	-7.57x	-28.21	55211.47	-628.96			
Arago	E	2045-09-09T03:55:13.175	-7.58x	-28.20	57202.55	-656.74			
Galatea	E	2045-09-09T03:55:06.230	-7.61x	-28.18	61952.97	-709.26			
Adams	E	2045-09-09T03:55:04.858	-7.61x	-28.17	62933.02	-718.24			

```

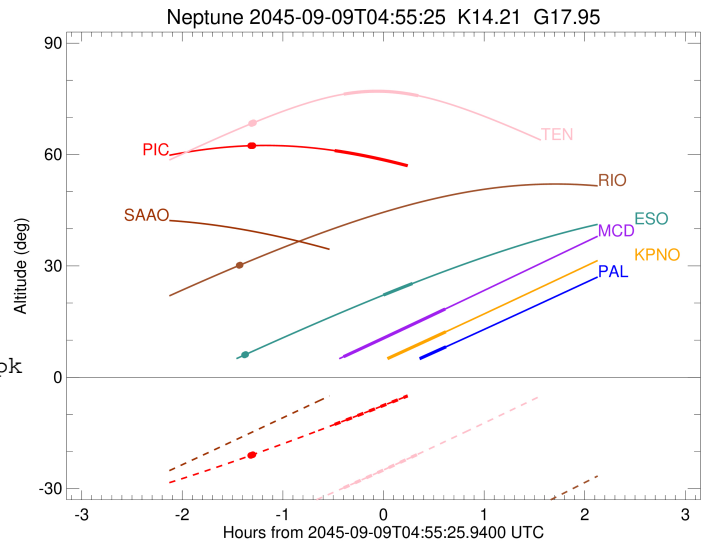
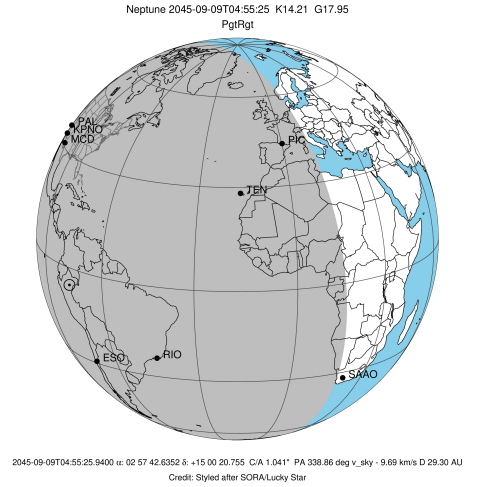
target                : Neptune
target radius (km)   : 24764.00
C/A epoch             : 2045-09-09T05:02:02.130
Event type           : PgtRgt
: Neptune occs: geocentric, topocentric
: Ring occs: geocentric, topocentric
Observer code        : MCD
Location              : McDonald Obs. 2.7m
Latitude (deg)       : 30.67158
E. Longitude (deg)   : 255.97844
Altitude (km)        : 2.075
Gaia source ID       : 33866160726465920
2Mass ID (if available) : 02574261+1500212
ICRS Star Coord at Epoch: 02h 57m 42.63517s +15:00:20.75540s
RUWE (>1.4 is poor) : 0.99
K magnitude           : 14.215
G magnitude           : 17.950
RP magnitude          : 16.850
BP magnitude          : 19.242
DUPflag              : 0
Distance (au)        : 29.296
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s) : -9.69
Sun-Target sep (deg) : 119.92
Sun-Moon sep (deg)   : 93.94
B (ring opening deg) : 0.23
PA of pole (deg)     : -45.01
Pole direction: RA (deg): 299.33374
Dec (deg): 42.95036
C/A sky separation (") : 0.817
C/A sky separation (km) : 17366.6
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	2045-09-09T03:54:59.345	-2.04x	-34.44	63048.53	-720.18			
Galatea	I	2045-09-09T03:55:00.716	-2.03x	-34.44	62081.88	-711.03			
Arago	I	2045-09-09T03:55:07.666	-2.01x	-34.46	57423.78	-657.98			
Lassell	I	2045-09-09T03:55:10.785	-2.00x	-34.47	55485.88	-630.23			
LeVerrier	I	2045-09-09T03:55:14.065	-1.99x	-34.48	53568.75	-598.29			
Neptune	I	2045-09-09T04:31:36.146	5.54	-40.81	24764.01			-20.06	-20.71
Neptune	E	2045-09-09T05:32:17.102	18.40	-49.43	24764.01			-69.10	-69.74
LeVerrier	E	2045-09-09T03:55:14.068	-1.99x	-34.48	53246.96	-592.41			
Lassell	E	2045-09-09T03:55:10.786	-2.00x	-34.47	55216.63	-626.05			
Arago	E	2045-09-09T03:55:07.667	-2.01x	-34.46	57204.29	-655.04			
Galatea	E	2045-09-09T03:55:00.716	-2.03x	-34.44	61953.02	-709.78			
Adams	E	2045-09-09T03:54:59.345	-2.04x	-34.44	62932.97	-719.12			

```

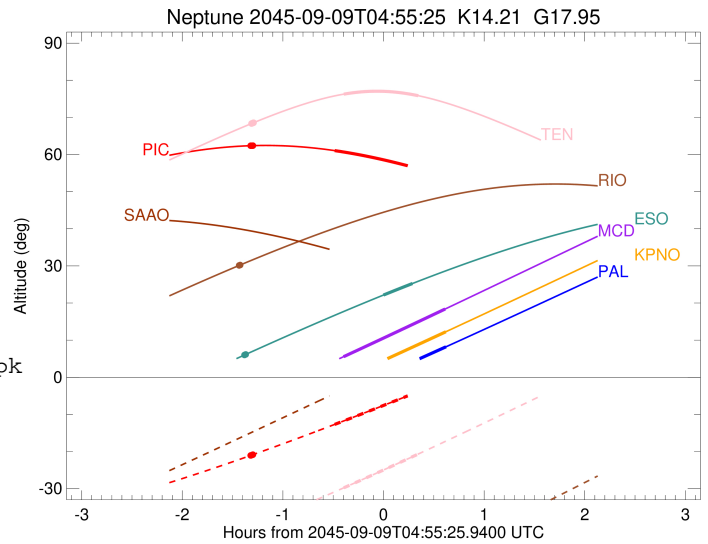
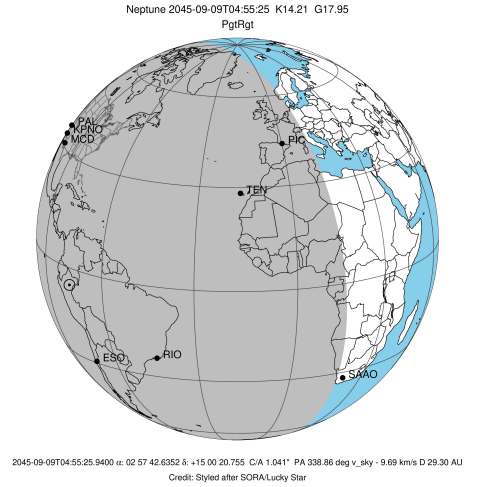
target                : Neptune
target radius (km)   : 24764.00
C/A epoch             : 2045-09-09T04:53:56.470
Event type            : PgtRgt
: Neptune occs: geocentric, topocentric
: Ring occs: geocentric, topocentric
Observer code        : TEN
Location              : Teide Obs./Tenerife
Latitude (deg)       : 28.30050
E. Longitude (deg)   : 343.48909
Altitude (km)        : 2.395
Gaia source ID       : 33866160726465920
2Mass ID (if available) : 02574261+1500212
ICRS Star Coord at Epoch: 02h 57m 42.63517s +15:00:20.75540s
RUWE (>1.4 is poor) : 0.99
K magnitude           : 14.215
G magnitude           : 17.950
RP magnitude          : 16.850
BP magnitude          : 19.242
DUPflag               : 0
Distance (au)        : 29.296
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s) : -9.69
Sun-Target sep (deg) : 119.92
Sun-Moon sep (deg)   : 94.80
B (ring opening deg) : 0.23
PA of pole (deg)     : -45.01
Pole direction: RA (deg): 299.33374
Dec (deg): 42.95036
C/A sky separation (") : 0.979
C/A sky separation (km) : 20808.4
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
    
```



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
Adams	I	2045-09-09T03:38:30.265		68.68	-39.92	63366.50	-642.62		
Galatea	I	2045-09-09T03:38:31.826		68.68	-39.92	62435.78	-626.99		
Arago	I	2045-09-09T03:38:40.163		68.71	-39.89	58033.37	-534.76		
Lassell	I	2045-09-09T03:38:44.257		68.72	-39.88	56263.92	-485.47		
LeVerrier	I	2045-09-09T03:38:48.970		68.73	-39.87	54567.55	-427.58		
Neptune	I	2045-09-09T04:31:42.031		76.26	-29.79	24764.02		-32.45	-33.34
Neptune	E	2045-09-09T05:16:09.673		75.85	-20.68	24764.01		-81.83	-82.10
LeVerrier	E	2045-09-09T03:38:49.073		68.73	-39.87	54162.71	-411.67		
Lassell	E	2045-09-09T03:38:44.310		68.72	-39.88	55792.28	-470.60		
Arago	E	2045-09-09T03:38:40.188		68.71	-39.89	57550.06	-522.20		
Galatea	E	2045-09-09T03:38:31.830		68.68	-39.92	62032.18	-619.86		
Adams	E	2045-09-09T03:38:30.269		68.68	-39.92	62987.73	-636.38		

```

target                : Neptune
target radius (km)   : 24764.00
C/A epoch             : 2045-09-09T05:00:52.760
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       : 33866160726465920
2Mass ID (if available) : 02574261+1500212
ICRS Star Coord at Epoch: 02h 57m 42.63517s +15:00:20.75540s
RUWE (>1.4 is poor) : 0.99
K magnitude           : 14.215
G magnitude           : 17.950
RP magnitude          : 16.850
BP magnitude          : 19.242
DUPflag               : 0
Distance (au)        : 29.296
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s) : -9.69
Sun-Target sep (deg) : 119.92
Sun-Moon sep (deg)   : 94.47
B (ring opening deg) : 0.23
PA of pole (deg)     : -45.01
Pole direction: RA (deg): 299.33374
Dec (deg): 42.95036
C/A sky separation (") : 1.167
C/A sky separation (km) : 24787.2
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
    
```



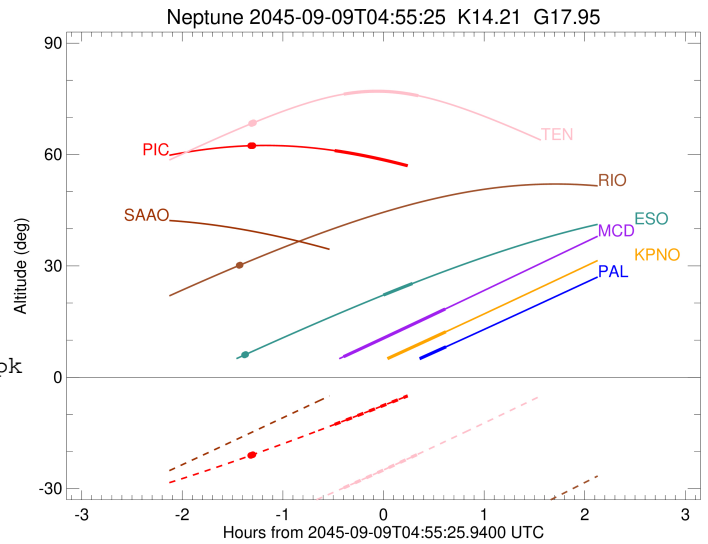
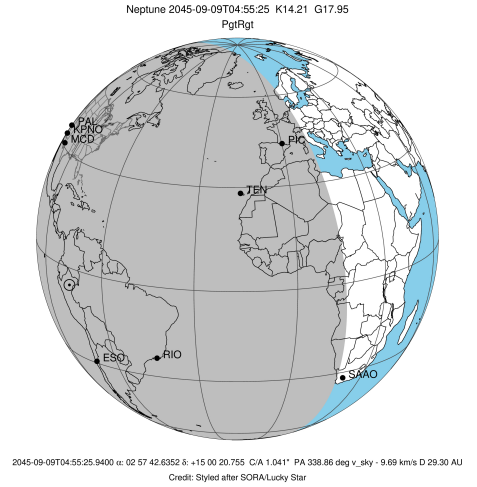
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
Adams	I	2045-09-09T03:31:25.272		30.52	-69.79	64555.55	-421.77		
Galatea	I	2045-09-09T03:31:27.947		30.52	-69.78	63759.44	-394.79		

No planet occultations

Galatea	E	2045-09-09T03:31:28.105		30.53	-69.78	63352.91	-379.85		
Adams	E	2045-09-09T03:31:25.396		30.52	-69.79	64086.92	-406.23		

```

target                : Neptune
target radius (km)   : 24764.00
C/A epoch             : 2045-09-09T05:04:05.260
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       : 33866160726465920
2Mass ID (if available) : 02574261+1500212
ICRS Star Coord at Epoch: 02h 57m 42.63517s +15:00:20.75540s
RUWE (>1.4 is poor) : 0.99
K magnitude           : 14.215
G magnitude           : 17.950
RP magnitude          : 16.850
BP magnitude          : 19.242
DUPflag              : 0
Distance (au)        : 29.296
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s) : -9.69
Sun-Target sep (deg) : 119.92
Sun-Moon sep (deg)   : 94.12
B (ring opening deg) : 0.23
PA of pole (deg)     : -45.01
Pole direction: RA (deg): 299.33374
Dec (deg): 42.95036
C/A sky separation (") : 1.140
C/A sky separation (km) : 24222.0
NAIF SPICE kernels   : RAJobs_U111+rgf16.spk
URKALLv1.bsp
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	2045-09-09T03:34:38.299		6.43	-61.50	64352.30	-437.61		
Galatea	I	2045-09-09T03:34:40.805		6.44	-61.50	63533.06	-412.95		
Neptune	I	2045-09-09T04:55:24.813		22.15	-65.79	24763.99		-53.15	-54.08
Neptune	E	2045-09-09T05:12:44.959		25.26	-64.84	24764.02		-77.16	-77.57
Galatea	E	2045-09-09T03:34:40.927		6.44	-61.50	63066.80	-397.77		
Adams	E	2045-09-09T03:34:38.392		6.43	-61.50	63843.19	-422.56		