

target : Neptune
 target radius (km) : 24764.00
 C/A epoch : 2049-09-30T08:13:23.740
 Event type : PgtRgt
 : Neptune occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 56319669931648256
 2Mass ID (if available) : 03330110+1719587

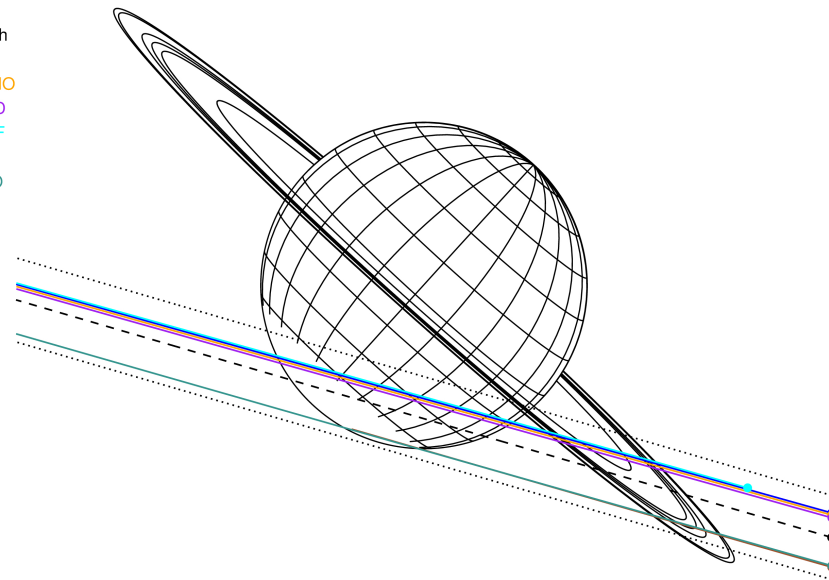
Neptune 2049-09-30T08:13:23 K14.10 G16.92 PgtRgt

ICRS Star Coord at Epoch: 03h 33m 01.11738s +17:19:58.12146s
 RUWE (>1.4 is poor) : 1.23
 K magnitude : 14.103
 G magnitude : 16.924
 RP magnitude : 16.035
 BP magnitude : 17.699
 DUPflag : 0
 Distance (au) : 29.140
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -14.72
 Sun-Target sep (deg) : 131.75
 Sun-Moon sep (deg) : 170.04
 B (ring opening deg) : 4.39
 PA of pole (deg) : -42.23
 # a(km) ring



2049-09-30T08:13:23.7400 α: 03 33 01.1174 δ: +17 19 58.121 C/A 0.918° PA 343.76 deg v_sky -14.72 km/s D 29.14 AU
 Credit: Styled after SORA/Lucky Star

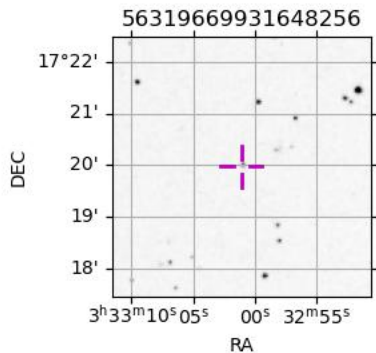
Earth
 PAL
 KPNO
 MCD
 IRTF
 RIO
 ESO



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

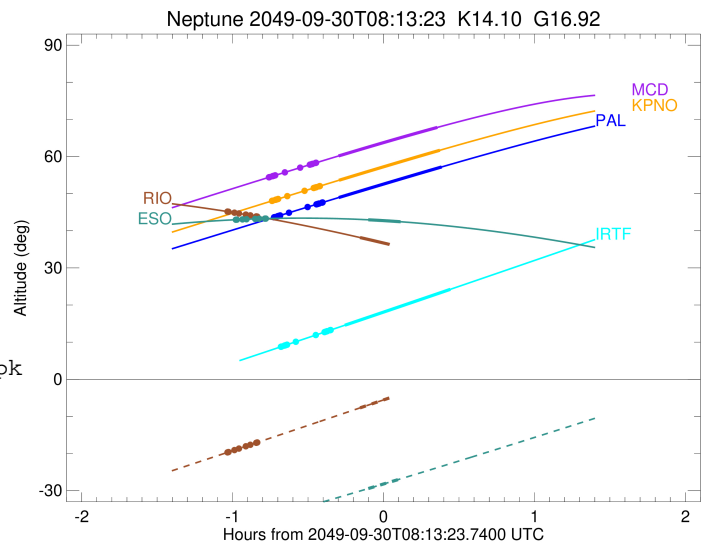
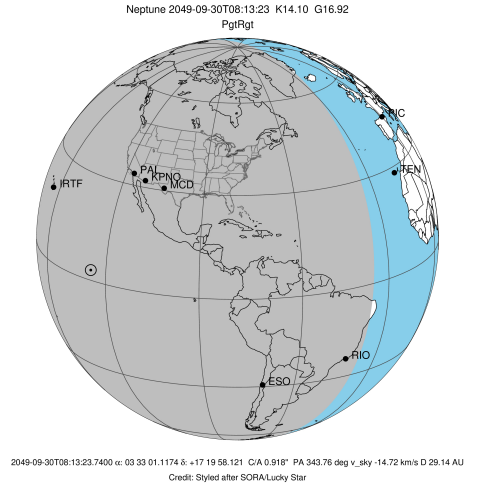
Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1					PnnRnn
PAL	Palomar Mt (200")	33.4	243.1	+ + + + +	+ +	+ + + + +	SEP 30 07:30 - SEP 30 08:36	PieRie
PMO	Purple Mtn Obs. Nanki	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+ + + + +	+ +	+ + + + +	SEP 30 07:29 - SEP 30 08:35	PieRie
MCD	McDonald Obs. 2.7m	30.7	256.0	+ + + + +	+ +	+ + + + +	SEP 30 07:28 - SEP 30 08:34	PieRie
TEN	Teide Obs./Tenerife	28.3	343.5					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+ + + + +	+ +	+ + + + +	SEP 30 07:33 - SEP 30 08:40	PieRie
KAV	Kavalur Observatory	12.6	78.8					PnnRnn
RIO	Rio de Janeiro	-22.9	316.8	+ + + +	+	+ + + +	SEP 30 07:12 - SEP 30 08:04	PinRie
ESO	European Southern Obs	-29.3	289.3	+ + + +	+ +	+ + + +	SEP 30 07:15 - SEP 30 08:20	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



```

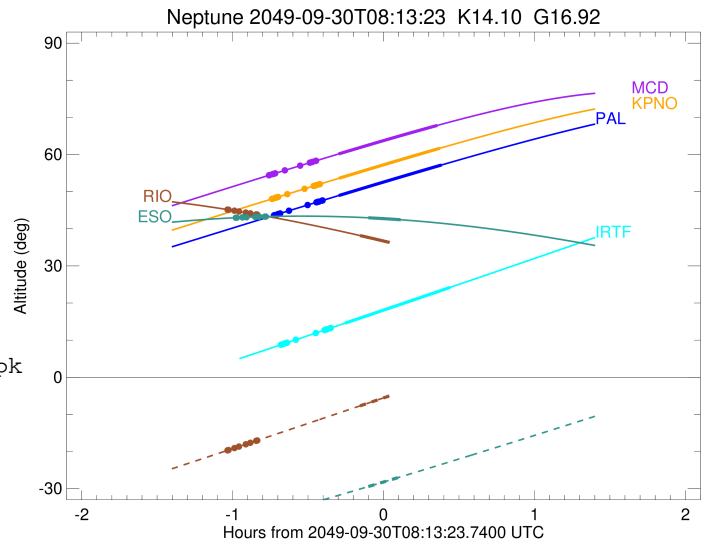
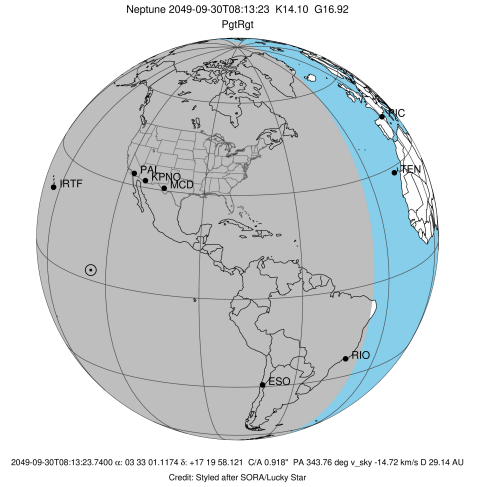
target           : Neptune
target radius (km) : 24764.00
C/A epoch       : 2049-09-30T08:16:04.750
Event type      : PgtRgt
: Neptune occs: geocentric, topocentric
: Ring occs: geocentric, topocentric
Observer code   : PAL
Location        : Palomar Mt (200")
Latitude (deg)  : 33.35622
E. Longitude (deg) : 243.13601
Altitude (km)   : 1.706
Gaia source ID  : 56319669931648256
2Mass ID (if available) : 03330110+1719587
ICRS Star Coord at Epoch: 03h 33m 01.11738s +17:19:58.12146s
RUWE (>1.4 is poor) : 1.23
K magnitude     : 14.103
G magnitude     : 16.924
RP magnitude    : 16.035
BP magnitude    : 17.699
DUPflag        : 0
Distance (au)   : 29.140
f0 (km)         : 0.000
g0 (km)         : 0.000
skyplane vel. (km/s) : -14.72
Sun-Target sep (deg) : 131.75
Sun-Moon sep (deg) : 169.67
B (ring opening deg) : 4.39
PA of pole (deg) : -42.23
Pole direction: RA (deg): 299.33374
Dec (deg): 42.95036
C/A sky separation (") : 0.783
C/A sky separation (km) : 16546.6
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.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	2049-09-30T07:30:40.229		43.79	-59.80	62933.01	-71.92		
Galatea	I	2049-09-30T07:30:53.910		43.84	-59.80	61953.01	-71.34		
Arago	I	2049-09-30T07:32:02.084		44.08	-59.81	57200.01	-67.96		
Lassell	I	2049-09-30T07:32:31.889		44.18	-59.82	55200.02	-66.21		
LeVerrier	I	2049-09-30T07:33:02.553		44.29	-59.82	53200.03	-64.20		
Galle	I	2049-09-30T07:36:25.992		44.99	-59.84	42000.22	-43.45		
Neptune	I	2049-09-30T07:55:34.864		48.95	-59.54	24763.84		-15.29	-15.80
Neptune	E	2049-09-30T08:36:32.196		57.20	-56.82	24761.89		-68.09	-68.75
Galle	E	2049-09-30T07:44:12.029		46.60	-59.80	42004.23	43.55		
LeVerrier	E	2049-09-30T07:47:35.012		47.30	-59.74	53200.10	64.39		
Lassell	E	2049-09-30T07:48:05.582		47.40	-59.73	55200.06	66.43		
Arago	E	2049-09-30T07:48:35.289		47.51	-59.72	57200.04	68.20		
Galatea	E	2049-09-30T07:49:43.214		47.74	-59.70	61953.02	71.62		
Adams	E	2049-09-30T07:49:56.840		47.79	-59.69	62933.01	72.22		

```

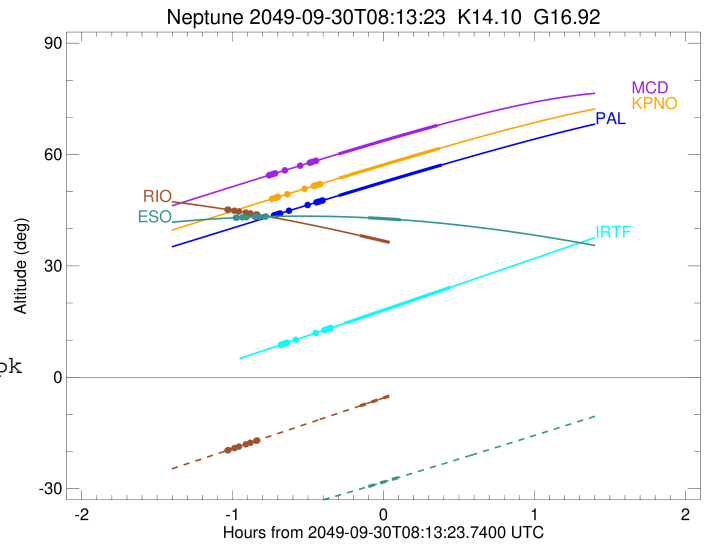
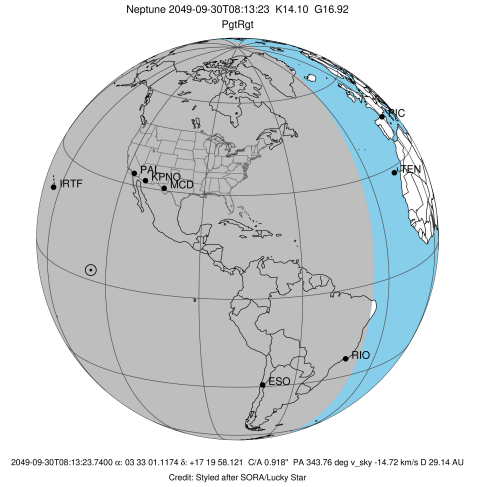
target                : Neptune
target radius (km)   : 24764.00
C/A epoch            : 2049-09-30T08:15:45.830
Event type           : PgtRgt
: Neptune occs: geocentric, topocentric
: Ring occs: geocentric, topocentric
Observer code        : KPNO
Location             : Kitt Peak Natl Obs
Latitude (deg)       : 31.96333
E. Longitude (deg)  : 248.40000
Altitude (km)        : 2.120
Gaia source ID       : 56319669931648256
2Mass ID (if available) : 03330110+1719587
ICRS Star Coord at Epoch: 03h 33m 01.11738s +17:19:58.12146s
RUWE (>1.4 is poor) : 1.23
K magnitude           : 14.103
G magnitude           : 16.924
RP magnitude          : 16.035
BP magnitude          : 17.699
DUPflag              : 0
Distance (au)         : 29.140
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s) : -14.72
Sun-Target sep (deg) : 131.75
Sun-Moon sep (deg)   : 169.73
B (ring opening deg) : 4.39
PA of pole (deg)     : -42.23
Pole direction: RA (deg): 299.33374
Dec (deg): 42.95036
C/A sky separation (") : 0.798
C/A sky separation (km) : 16862.6
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	2049-09-30T07:29:51.301		48.22	-61.05	62933.01	-71.37		
Galatea	I	2049-09-30T07:30:05.091		48.27	-61.04	61953.01	-70.76		
Arago	I	2049-09-30T07:31:13.923		48.51	-61.01	57200.02	-67.20		
Lassell	I	2049-09-30T07:31:44.092		48.61	-60.99	55200.02	-65.35		
LeVerrier	I	2049-09-30T07:32:15.193		48.72	-60.98	53200.03	-63.22		
Galle	I	2049-09-30T07:35:45.119		49.46	-60.86	42000.25	-40.83		
Neptune	I	2049-09-30T07:55:37.395		53.59	-59.77	24763.81		-16.28	-16.82
Neptune	E	2049-09-30T08:35:52.068		61.70	-55.68	24761.85		-69.05	-69.69
Galle	E	2049-09-30T07:43:01.229		50.98	-60.54	42006.77	40.93		
LeVerrier	E	2049-09-30T07:46:30.743		51.70	-60.36	53200.13	63.39		
Lassell	E	2049-09-30T07:47:01.759		51.81	-60.33	55200.08	65.54		
Arago	E	2049-09-30T07:47:31.839		51.91	-60.30	57200.06	67.41		
Galatea	E	2049-09-30T07:48:40.446		52.15	-60.23	61953.02	71.01		
Adams	E	2049-09-30T07:48:54.187		52.20	-60.22	62933.02	71.63		

```

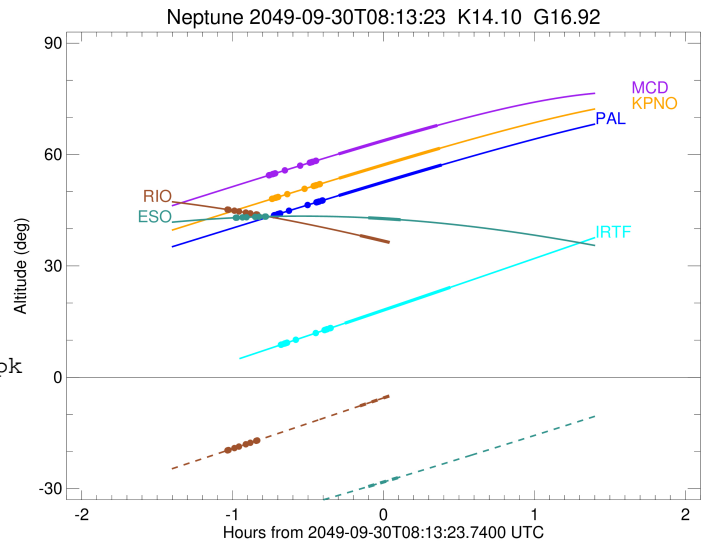
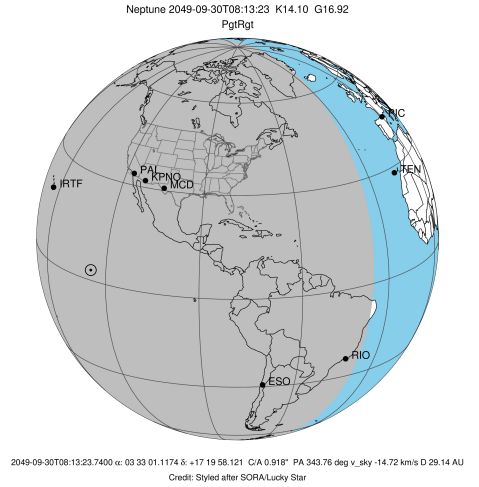
target                : Neptune
target radius (km)   : 24764.00
C/A epoch            : 2049-09-30T08:15:12.000
Event type           : PgtRgt
: Neptune occs: geocentric, topocentric
: Ring occs: geocentric, topocentric
Observer code        : MCD
Location             : McDonald Obs. 2.7m
Latitude (deg)       : 30.67158
E. Longitude (deg)   : 255.97844
Altitude (km)        : 2.075
Gaia source ID       : 56319669931648256
2Mass ID (if available) : 03330110+1719587
ICRS Star Coord at Epoch: 03h 33m 01.11738s +17:19:58.12146s
RUWE (>1.4 is poor) : 1.23
K magnitude           : 14.103
G magnitude           : 16.924
RP magnitude         : 16.035
BP magnitude         : 17.699
DUPflag              : 0
Distance (au)        : 29.140
f0 (km)              : 0.000
g0 (km)              : 0.000
skyplane vel. (km/s) : -14.72
Sun-Target sep (deg) : 131.75
Sun-Moon sep (deg)   : 169.83
B (ring opening deg) : 4.39
PA of pole (deg)     : -42.23
Pole direction: RA (deg): 299.33374
Dec (deg): 42.95036
C/A sky separation (") : 0.816
C/A sky separation (km) : 17252.7
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	2049-09-30T07:28:39.526		54.58	-60.71	62933.01	-70.62		
Galatea	I	2049-09-30T07:28:53.466		54.63	-60.69	61953.01	-69.96		
Arago	I	2049-09-30T07:30:03.214		54.87	-60.60	57200.02	-66.17		
Lassell	I	2049-09-30T07:30:33.889		54.98	-60.55	55200.02	-64.19		
LeVerrier	I	2049-09-30T07:31:05.601		55.09	-60.51	53200.04	-61.90		
Galle	I	2049-09-30T07:34:45.268		55.86	-60.18	42000.30	-37.14		
Neptune	I	2049-09-30T07:55:30.834		60.15	-57.97	24763.78		-17.54	-18.11
Neptune	E	2049-09-30T08:34:51.318		67.86	-52.35	24761.82		-70.24	-70.85
Galle	E	2049-09-30T07:41:20.170		57.23	-59.55	42013.29	37.25		
LeVerrier	E	2049-09-30T07:44:59.488		57.99	-59.17	53200.18	62.04		
Lassell	E	2049-09-30T07:45:31.128		58.10	-59.11	55200.11	64.35		
Arago	E	2049-09-30T07:46:01.728		58.20	-59.06	57200.07	66.34		
Galatea	E	2049-09-30T07:47:11.285		58.44	-58.93	61953.03	70.18		
Adams	E	2049-09-30T07:47:25.184		58.49	-58.91	62933.02	70.84		

```

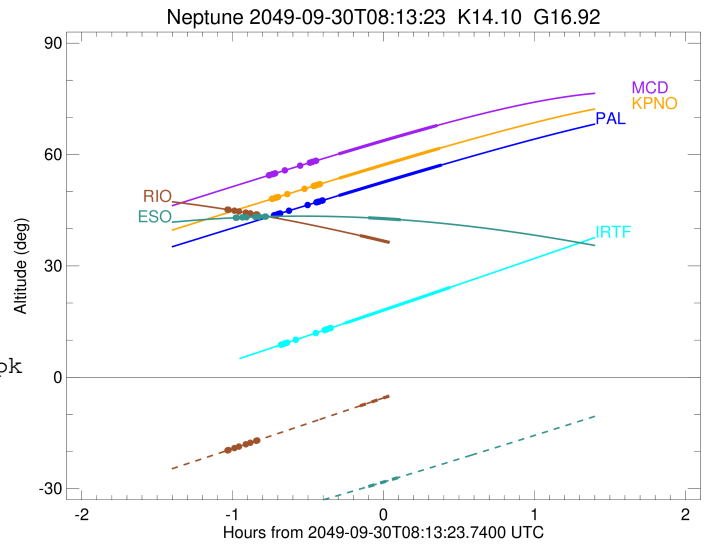
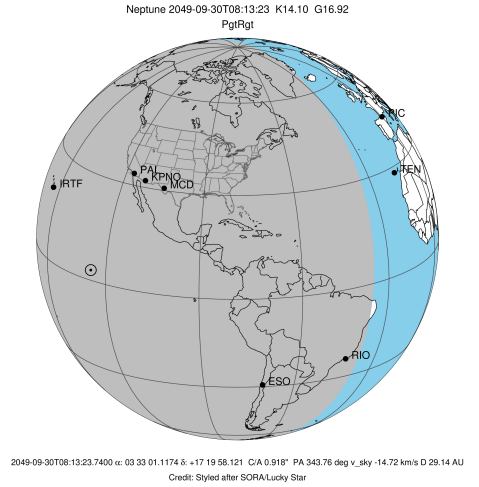
target                : Neptune
target radius (km)   : 24764.00
C/A epoch             : 2049-09-30T08:19:01.680
Event type            : PgtRgt
: Neptune occs: geocentric, topocentric
: Ring occs: geocentric, topocentric
Observer code         : IRTF
Location              : Mauna Kea/IRTF
Latitude (deg)        : 19.82622
E. Longitude (deg)    : 204.52800
Altitude (km)         : 4.168
Gaia source ID        : 56319669931648256
2Mass ID (if available) : 03330110+1719587
ICRS Star Coord at Epoch: 03h 33m 01.11738s +17:19:58.12146s
RUWE (>1.4 is poor) : 1.23
K magnitude           : 14.103
G magnitude           : 16.924
RP magnitude          : 16.035
BP magnitude          : 17.699
DUPflag              : 0
Distance (au)         : 29.140
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s) : -14.72
Sun-Target sep (deg)  : 131.75
Sun-Moon sep (deg)   : 169.22
B (ring opening deg) : 4.39
PA of pole (deg)     : -42.23
Pole direction: RA (deg): 299.33374
Dec (deg): 42.95036
C/A sky separation (") : 0.770
C/A sky separation (km) : 16280.7
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	2049-09-30T07:33:24.337		8.93	-47.94	62933.00	-71.16		
Galatea	I	2049-09-30T07:33:38.161		8.99	-47.99	61953.01	-70.61		
Arago	I	2049-09-30T07:34:46.955		9.25	-48.25	57200.01	-67.44		
Lassell	I	2049-09-30T07:35:16.972		9.36	-48.36	55200.02	-65.79		
LeVerrier	I	2049-09-30T07:35:47.806		9.48	-48.48	53200.02	-63.90		
Galle	I	2049-09-30T07:39:09.866		10.24	-49.23	42000.19	-44.67		
Neptune	I	2049-09-30T07:57:58.572		14.54	-53.36	24763.85		-14.49	-14.97
Neptune	E	2049-09-30T08:40:00.903		24.24	-62.10	24761.91		-67.31	-67.99
Galle	E	2049-09-30T07:47:25.992		12.13	-51.06	42003.00	44.81		
LeVerrier	E	2049-09-30T07:50:47.332		12.90	-51.79	53200.09	64.20		
Lassell	E	2049-09-30T07:51:18.018		13.02	-51.91	55200.05	66.12		
Arago	E	2049-09-30T07:51:47.881		13.13	-52.01	57200.03	67.80		
Galatea	E	2049-09-30T07:52:56.284		13.39	-52.26	61953.01	71.05		
Adams	E	2049-09-30T07:53:10.024		13.44	-52.31	62933.01	71.61		

```

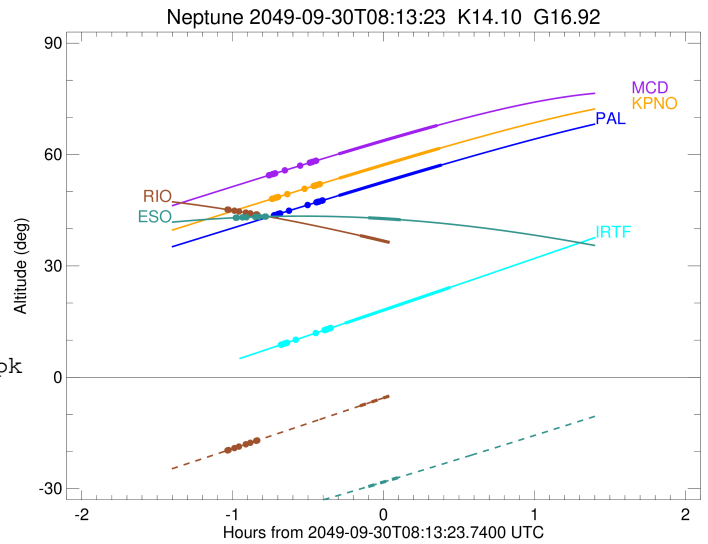
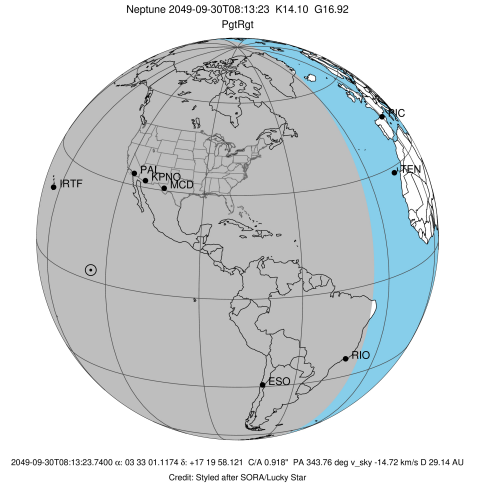
target                : Neptune
target radius (km)   : 24764.00
C/A epoch             : 2049-09-30T08:10:51.460
Event type            : PgtRgt
: Neptune occs: geocentric, topocentric
: Ring occs: geocentric, topocentric
Observer code        : RIO
Location              : Rio de Janeiro
Latitude (deg)       : -22.89506
E. Longitude (deg)   : 316.77708
Altitude (km)        : 0.033
Gaia source ID       : 56319669931648256
2Mass ID (if available) : 03330110+1719587
ICRS Star Coord at Epoch: 03h 33m 01.11738s +17:19:58.12146s
RUWE (>1.4 is poor) : 1.23
K magnitude           : 14.103
G magnitude           : 16.924
RP magnitude         : 16.035
BP magnitude         : 17.699
DUPflag              : 0
Distance (au)        : 29.141
f0 (km)              : 0.000
g0 (km)              : 0.000
skyplane vel. (km/s) : -14.72
Sun-Target sep (deg) : 131.75
Sun-Moon sep (deg)   : 170.67
B (ring opening deg) : 4.39
PA of pole (deg)     : -42.23
Pole direction: RA (deg): 299.33374
Dec (deg): 42.95036
C/A sky separation (") : 1.135
C/A sky separation (km) : 23989.0
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	2049-09-30T07:12:17.607		45.07	-19.49	62933.26	-45.87		
Galatea	I	2049-09-30T07:12:39.447		45.03	-19.41	61953.30	-43.85		
Arago	I	2049-09-30T07:14:47.092		44.80	-18.93	57200.38	-30.07		
Lassell	I	2049-09-30T07:16:06.869		44.65	-18.63	55200.01	-19.88		
Neptune	I	2049-09-30T08:04:03.852		38.18	-7.71	24762.57		-49.34	-50.31
Neptune	E	2049-09-30T08:17:38.944		36.02	-4.59x	24761.67		-77.48	-77.89
Lassell	E	2049-09-30T07:21:34.701		44.02	-17.39	61041.35	41.75		
Arago	E	2049-09-30T07:22:08.187		43.95	-17.26	57277.89	30.37		
Galatea	E	2049-09-30T07:24:15.911		43.70	-16.78	61959.09	43.83		
Adams	E	2049-09-30T07:24:37.771		43.65	-16.70	62937.36	45.85		


```

target                : Neptune
target radius (km)   : 24764.00
C/A epoch             : 2049-09-30T08:13:47.450
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        : 56319669931648256
2Mass ID (if available) : 03330110+1719587
ICRS Star Coord at Epoch: 03h 33m 01.11738s +17:19:58.12146s
RUWE (>1.4 is poor) : 1.23
K magnitude           : 14.103
G magnitude           : 16.924
RP magnitude          : 16.035
BP magnitude          : 17.699
DUPflag              : 0
Distance (au)         : 29.140
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s) : -14.72
Sun-Target sep (deg)  : 131.75
Sun-Moon sep (deg)   : 170.30
B (ring opening deg) : 4.39
PA of pole (deg)     : -42.23
Pole direction: RA (deg): 299.33374
Dec (deg): 42.95036
C/A sky separation (") : 1.139
C/A sky separation (km) : 24064.2
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	2049-09-30T07:15:36.229		43.01	-39.48	62933.25	-46.81		
Galatea	I	2049-09-30T07:15:57.615		43.02	-39.42	61953.29	-44.82		
Arago	I	2049-09-30T07:18:01.408		43.08	-39.04	57200.40	-31.43		
Lassell	I	2049-09-30T07:19:16.238		43.12	-38.80	55200.07	-21.84		
Neptune	I	2049-09-30T08:07:20.740		42.96	-29.44	24762.56		-49.80	-50.76
Neptune	E	2049-09-30T08:20:13.907		42.43	-26.82	24761.69		-76.56	-76.99
Lassell	E	2049-09-30T07:24:26.685		43.24	-37.83	56416.66	28.19		
Arago	E	2049-09-30T07:25:36.111		43.26	-37.62	57259.36	31.67		
Galatea	E	2049-09-30T07:27:39.887		43.30	-37.23	61958.40	44.84		
Adams	E	2049-09-30T07:28:01.271		43.30	-37.16	62936.89	46.83		