

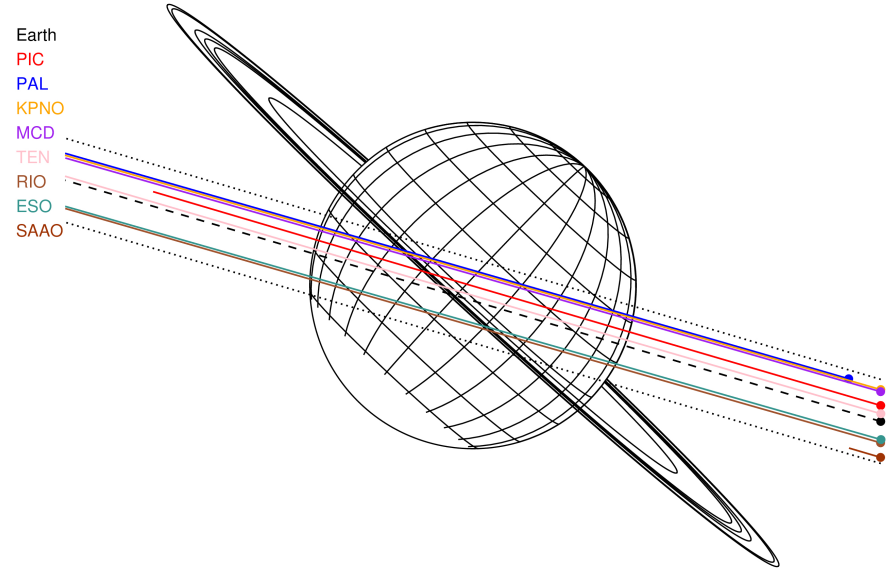
target : Neptune
 target radius (km) : 24764.00
 C/A epoch : 2048-10-04T04:52:16.740
 Event type : PgtX
 : Neptune occs: geocentric, topocentric
 : No ring occs
 Gaia source ID : 54962455969658112
 2Mass ID (if available) : 03232933+1644246

Neptune 2048-10-04T04:52:16 K14.54 G18.25 PgtX

ICRS Star Coord at Epoch: 03h 23m 29.32461s +16:44:23.98163s
 RUWE (>1.4 is poor) : 0.90
 K magnitude : 14.540
 G magnitude : 18.252
 RP magnitude : 17.133
 BP magnitude : 19.699
 DUPflag : 0
 Distance (au) : 29.064
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -17.03
 Sun-Target sep (deg) : 138.14
 Sun-Moon sep (deg) : 93.92
 B (ring opening deg) : 3.28
 PA of pole (deg) : -43.07



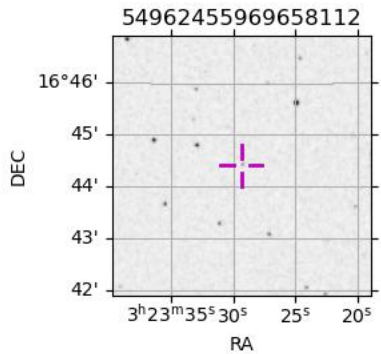
2048-10-04T04:52:16.7400 ra: 03 23 29.3246 s: +16 44 23.982 C/A 0.106° PA 343.53 deg v_sky -17.03 km/s D 29.06 AU
 Credit: Styled after SORA/Lucky Star



- | # | 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 |

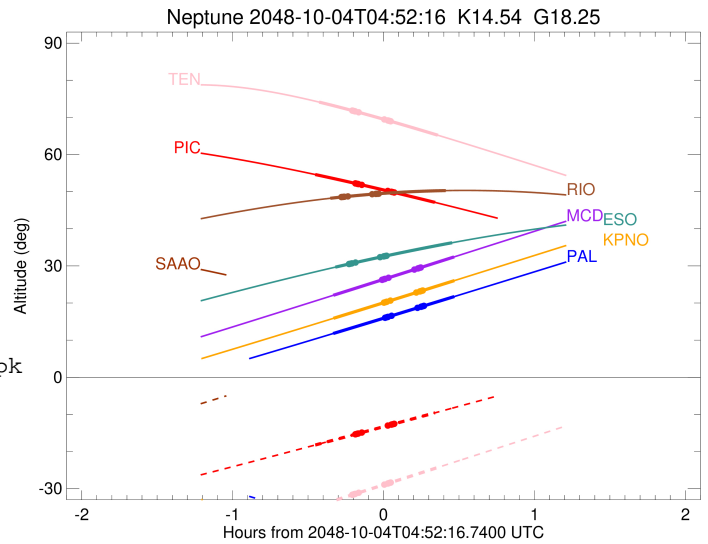
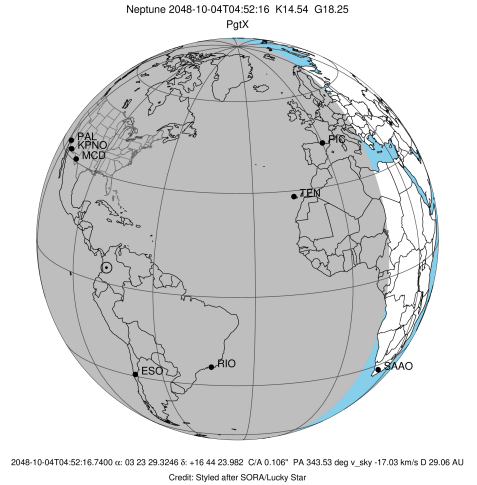
Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1		+	+	OCT 04 04:25 - OCT 04 05:12	PieRnn
PAL	Palomar Mt (200")	33.4	243.1		+	+	OCT 04 04:32 - OCT 04 05:20	PieRnn
PMO	Purple Mtn Obs. Nanki	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl Obs	32.0	248.4		+	+	OCT 04 04:32 - OCT 04 05:20	PieRnn
MCD	McDonald Obs. 2.7m	30.7	256.0		+	+	OCT 04 04:32 - OCT 04 05:20	PieRnn
TEN	Teide Obs./Tenerife	28.3	343.5		+	+	OCT 04 04:26 - OCT 04 05:13	PieRnn
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 04 04:31 - OCT 04 05:17	PieRnn
ESO	European Southern Obs	-29.3	289.3		+	+	OCT 04 04:33 - OCT 04 05:19	PieRnn
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



```

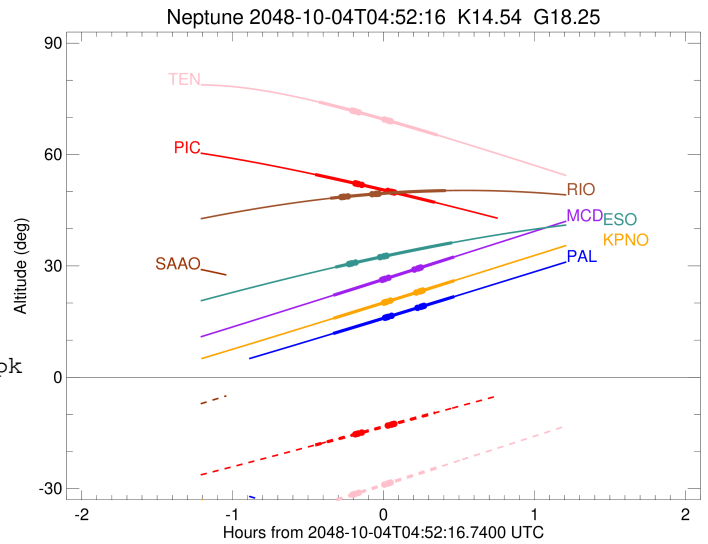
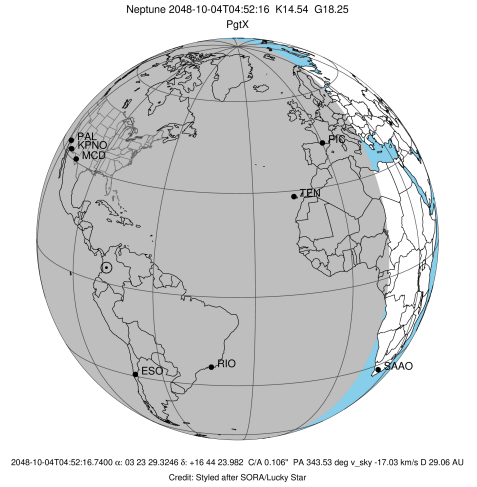
target                : Neptune
target radius (km)   : 24764.00
C/A epoch             : 2048-10-04T04:48:58.170
Event type           : PgtX
: Neptune occs: geocentric, topocentric
: No ring occs
Observer code        : PIC
Location             : Pic du Midi
Latitude (deg)       : 42.93656
E. Longitude (deg)   : 0.14231
Altitude (km)        : 2.890
Gaia source ID       : 54962455969658112
2Mass ID (if available) : 03232933+1644246
ICRS Star Coord at Epoch: 03h 23m 29.32461s +16:44:23.98163s
RUWE (>1.4 is poor) : 0.90
K magnitude           : 14.540
G magnitude           : 18.252
RP magnitude         : 17.133
BP magnitude         : 19.699
DUPflag              : 0
Distance (au)        : 29.064
f0 (km)              : 0.000
g0 (km)              : 0.000
skyplane vel. (km/s) : -17.03
Sun-Target sep (deg) : 138.14
Sun-Moon sep (deg)   : 94.67
B (ring opening deg) : 3.28
PA of pole (deg)     : -43.07
Pole direction: RA (deg): 299.33374
Dec (deg): 42.95036
C/A sky separation (") : 0.004
C/A sky separation (km) : 82.5
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	2048-10-04T04:41:18.836	b	52.19	-15.32	62933.00	-133.32		
Galatea	I	2048-10-04T04:41:26.190	b	52.17	-15.30	61953.01	-133.19		
Arago	I	2048-10-04T04:42:01.974	b	52.08	-15.19	57200.00	-132.42		
Lassell	I	2048-10-04T04:42:17.100	b	52.04	-15.14	55200.00	-132.02		
LeVerrier	I	2048-10-04T04:42:32.274	b	52.00	-15.10	53200.00	-131.56		
Galle	I	2048-10-04T04:43:58.694	b	51.78	-14.84	42000.00	-126.88		
Neptune	I	2048-10-04T04:25:08.739		54.61	-18.25	24763.72		26.47	27.27
Neptune	E	2048-10-04T05:12:48.525		47.10	-9.57	24763.72		-26.79	-27.59
Galle	E	2048-10-04T04:53:37.307	b	50.25	-13.08	42000.00	123.64		
LeVerrier	E	2048-10-04T04:55:05.121	b	50.02	-12.81	53200.00	130.27		
Lassell	E	2048-10-04T04:55:20.437	b	49.98	-12.77	55199.99	130.88		
Arago	E	2048-10-04T04:55:35.688	b	49.94	-12.72	57200.00	131.40		
Galatea	E	2048-10-04T04:56:11.720	b	49.84	-12.61	61953.00	132.37		
Adams	E	2048-10-04T04:56:19.119	b	49.82	-12.59	62933.00	132.53		

```

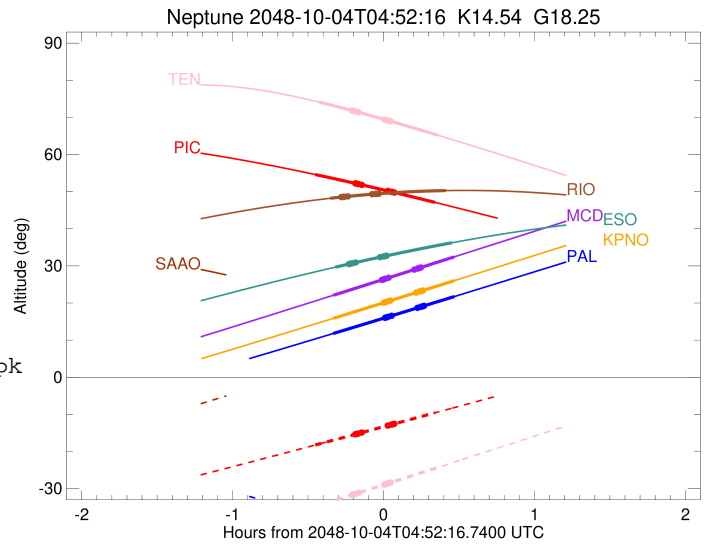
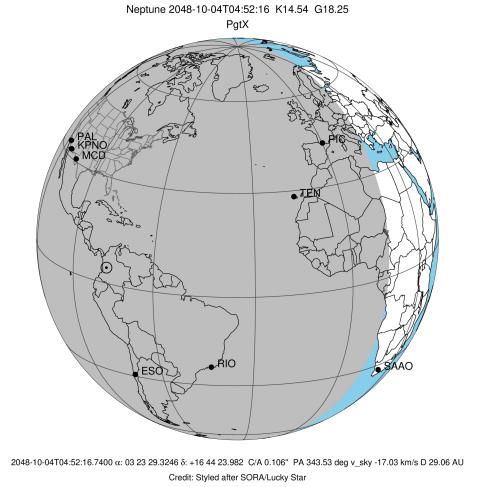
target                : Neptune
target radius (km)   : 24764.00
C/A epoch             : 2048-10-04T04:56:23.690
Event type            : PgtX
: Neptune occs: geocentric, topocentric
: No ring occs
Observer code         : PAL
Location              : Palomar Mt (200")
Latitude (deg)        : 33.35622
E. Longitude (deg)    : 243.13601
Altitude (km)         : 1.706
Gaia source ID        : 54962455969658112
2Mass ID (if available) : 03232933+1644246
ICRS Star Coord at Epoch: 03h 23m 29.32461s +16:44:23.98163s
RUWE (>1.4 is poor) : 0.90
K magnitude           : 14.540
G magnitude           : 18.252
RP magnitude          : 17.133
BP magnitude          : 19.699
DUPflag              : 0
Distance (au)         : 29.064
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s) : -17.03
Sun-Target sep (deg) : 138.14
Sun-Moon sep (deg)   : 94.12
B (ring opening deg) : 3.28
PA of pole (deg)     : -43.07
Pole direction: RA (deg): 299.33374
Dec (deg): 42.95036
C/A sky separation (") : 0.105
C/A sky separation (km) : 2204.3
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.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	2048-10-04T04:53:32.262	b	16.16	-42.64	62933.00	-117.53		
Galatea	I	2048-10-04T04:53:40.573	b	16.19	-42.67	61953.00	-118.36		
Arago	I	2048-10-04T04:54:19.438	b	16.32	-42.79	57199.58	-127.88		
Lassell	I	2048-10-04T04:54:34.729	b	16.37	-42.84	55199.02	-133.83		
LeVerrier	I	2048-10-04T04:54:49.376	b	16.42	-42.88	53199.05	-139.04		
Galle	I	2048-10-04T04:56:36.144	b	16.79	-43.21	41894.30	-83.30		
Neptune	I	2048-10-04T04:32:16.288		11.78	-38.64	24763.61		32.05	32.94
Neptune	E	2048-10-04T05:20:27.269		21.75	-47.46	24763.81		-21.89	-22.58
Galle	E	2048-10-04T05:05:34.503	b	18.65	-44.84	42000.00	135.16		
LeVerrier	E	2048-10-04T05:06:57.279	b	18.94	-45.09	53199.99	135.43		
Lassell	E	2048-10-04T05:07:12.044	b	18.99	-45.13	55199.99	135.47		
Arago	E	2048-10-04T05:07:26.806	b	19.04	-45.17	57200.00	135.50		
Galatea	E	2048-10-04T05:08:01.874	b	19.16	-45.28	61953.00	135.58		
Adams	E	2048-10-04T05:08:09.102	b	19.19	-45.30	62933.00	135.59		

```

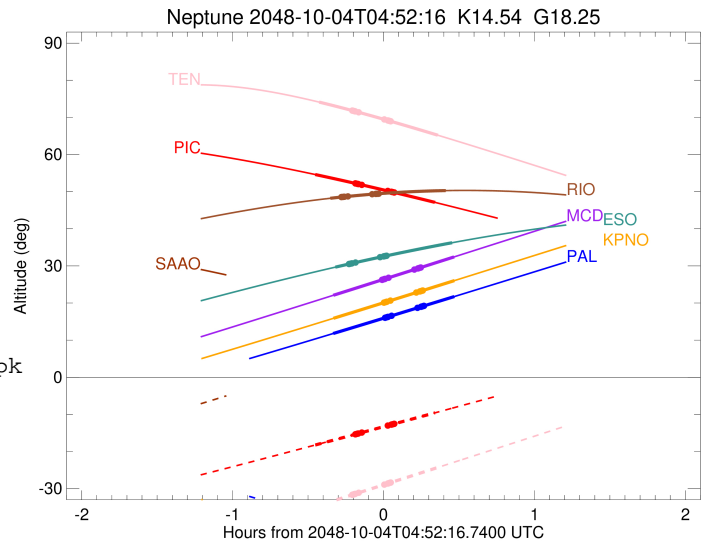
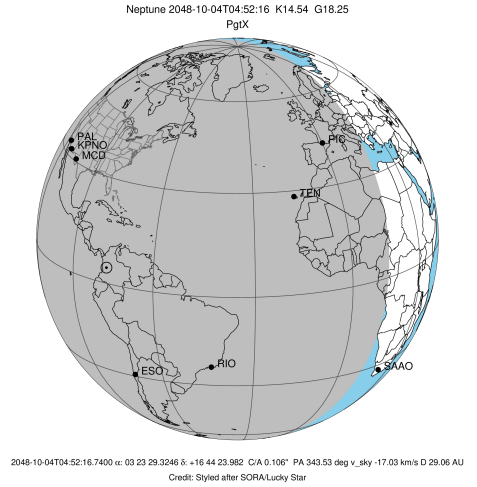
target                : Neptune
target radius (km)   : 24764.00
C/A epoch             : 2048-10-04T04:56:26.930
Event type           : PgtX
: Neptune occs: geocentric, topocentric
: No ring occs
Observer code        : KPNO
Location             : Kitt Peak Natl Obs
Latitude (deg)       : 31.96333
E. Longitude (deg)   : 248.40000
Altitude (km)        : 2.120
Gaia source ID       : 54962455969658112
2Mass ID (if available) : 03232933+1644246
ICRS Star Coord at Epoch: 03h 23m 29.32461s +16:44:23.98163s
RUWE (>1.4 is poor) : 0.90
K magnitude          : 14.540
G magnitude          : 18.252
RP magnitude         : 17.133
BP magnitude         : 19.699
DUPflag             : 0
Distance (au)        : 29.064
f0 (km)              : 0.000
g0 (km)              : 0.000
skyplane vel. (km/s) : -17.03
Sun-Target sep (deg) : 138.14
Sun-Moon sep (deg)  : 94.18
B (ring opening deg) : 3.28
PA of pole (deg)    : -43.07
Pole direction: RA (deg): 299.33374
Dec (deg): 42.95036
C/A sky separation (") : 0.092
C/A sky separation (km) : 1939.4
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.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	2048-10-04T04:53:01.983	b	20.23	-47.09	62933.02	-114.55		
Galatea	I	2048-10-04T04:53:10.559	b	20.26	-47.12	61953.01	-114.02		
Arago	I	2048-10-04T04:53:52.212	b	20.40	-47.24	57200.00	-115.85		
Lassell	I	2048-10-04T04:54:09.170	b	20.46	-47.29	55199.86	-120.49		
LeVerrier	I	2048-10-04T04:54:25.266	b	20.52	-47.34	53198.60	-128.54		
Galle	I	2048-10-04T04:55:41.821	b	20.79	-47.57	42001.44	-123.26		
Neptune	I	2048-10-04T04:32:21.219		15.88	-43.26	24763.62		31.47	32.35
Neptune	E	2048-10-04T05:20:28.826		26.04	-51.84	24763.80		-22.53	-23.24
Galle	E	2048-10-04T05:05:05.975	b	22.78	-49.23	42000.00	135.57		
LeVerrier	E	2048-10-04T05:06:28.516	b	23.07	-49.47	53200.01	135.80		
Lassell	E	2048-10-04T05:06:43.242	b	23.12	-49.52	55200.01	135.84		
Arago	E	2048-10-04T05:06:57.963	b	23.17	-49.56	57200.00	135.87		
Galatea	E	2048-10-04T05:07:32.936	b	23.30	-49.66	61953.00	135.94		
Adams	E	2048-10-04T05:07:40.144	b	23.32	-49.68	62933.01	135.96		

```

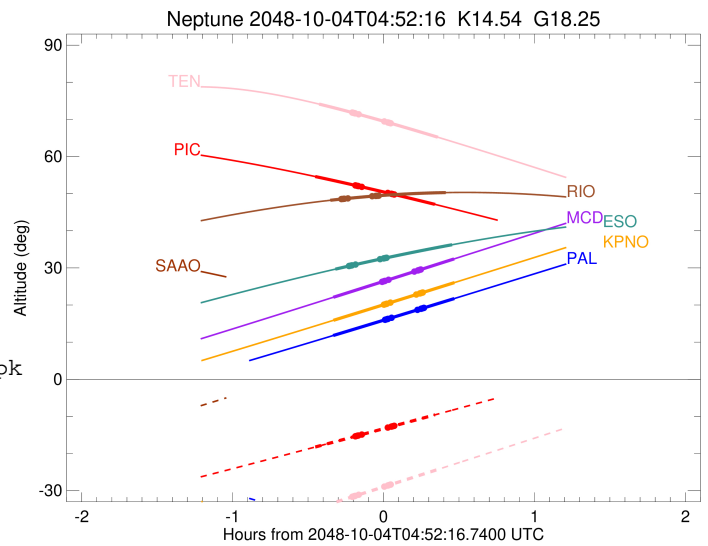
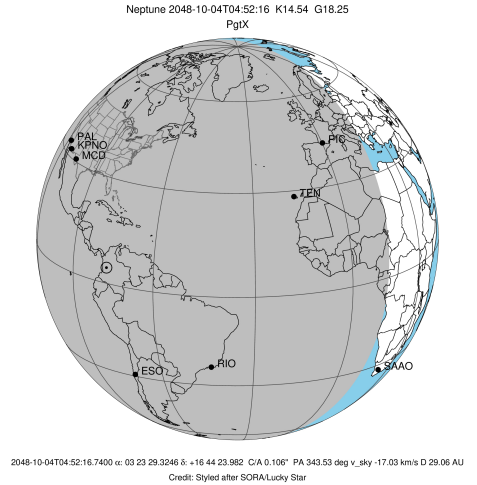
target                : Neptune
target radius (km)   : 24764.00
C/A epoch            : 2048-10-04T04:56:23.350
Event type          : PgtX
: Neptune occs: geocentric, topocentric
: No ring occs
Observer code       : MCD
Location            : McDonald Obs. 2.7m
Latitude (deg)      : 30.67158
E. Longitude (deg)  : 255.97844
Altitude (km)       : 2.075
Gaia source ID      : 54962455969658112
2Mass ID (if available) : 03232933+1644246
ICRS Star Coord at Epoch: 03h 23m 29.32461s +16:44:23.98163s
RUWE (>1.4 is poor) : 0.90
K magnitude          : 14.540
G magnitude          : 18.252
RP magnitude         : 17.133
BP magnitude         : 19.699
DUPflag             : 0
Distance (au)       : 29.064
f0 (km)             : 0.000
g0 (km)             : 0.000
skyplane vel. (km/s) : -17.03
Sun-Target sep (deg) : 138.14
Sun-Moon sep (deg)  : 94.28
B (ring opening deg) : 3.28
PA of pole (deg)    : -43.07
Pole direction: RA (deg): 299.33374
Dec (deg): 42.95036
C/A sky separation (") : 0.075
C/A sky separation (km) : 1586.0
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	2048-10-04T04:52:12.418	b	26.35	-52.98	62933.00	-117.66		
Galatea	I	2048-10-04T04:52:20.788	b	26.38	-53.01	61953.01	-116.48		
Arago	I	2048-10-04T04:53:02.745	b	26.53	-53.12	57200.06	-110.02		
Lassell	I	2048-10-04T04:53:21.138	b	26.60	-53.18	55200.06	-107.58		
LeVerrier	I	2048-10-04T04:53:39.851	b	26.67	-53.23	53200.00	-106.55		
Galle	I	2048-10-04T04:55:04.230	b	26.97	-53.46	41882.95	-197.91		
Neptune	I	2048-10-04T04:32:20.456		22.09	-49.51	24763.64		30.69	31.56
Neptune	E	2048-10-04T05:20:22.502		32.43	-57.39	24763.78		-23.38	-24.11
Galle	E	2048-10-04T05:04:20.082	b	28.97	-54.97	42000.00	135.91		
LeVerrier	E	2048-10-04T05:05:42.405	b	29.26	-55.18	53200.01	136.18		
Lassell	E	2048-10-04T05:05:57.090	b	29.32	-55.22	55199.99	136.22		
Arago	E	2048-10-04T05:06:11.770	b	29.37	-55.26	57200.00	136.26		
Galatea	E	2048-10-04T05:06:46.641	b	29.49	-55.35	61953.00	136.35		
Adams	E	2048-10-04T05:06:53.828	b	29.52	-55.37	62933.01	136.37		


```

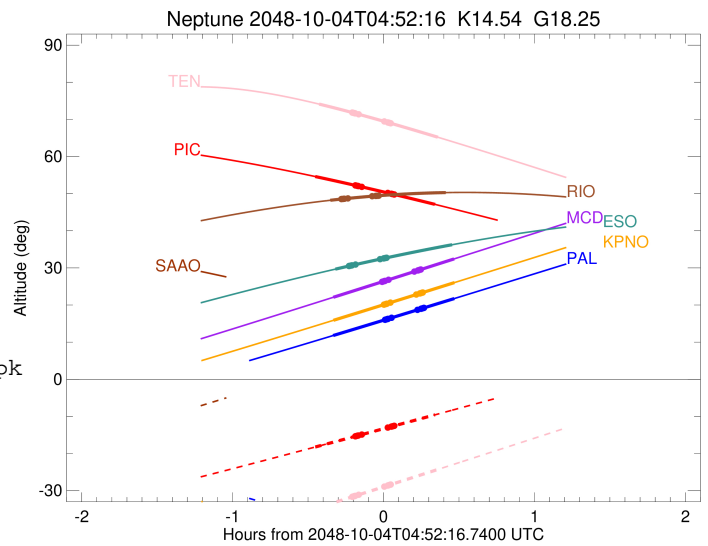
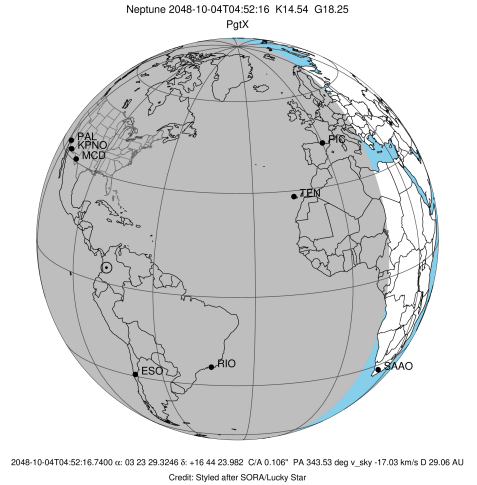
target                : Neptune
target radius (km)   : 24764.00
C/A epoch            : 2048-10-04T04:50:16.210
Event type          : PgtX
: Neptune occs: geocentric, topocentric
: No ring occs
Observer code       : TEN
Location           : Teide Obs./Tenerife
Latitude (deg)     : 28.30050
E. Longitude (deg) : 343.48909
Altitude (km)     : 2.395
Gaia source ID     : 54962455969658112
2Mass ID (if available) : 03232933+1644246
ICRS Star Coord at Epoch: 03h 23m 29.32461s +16:44:23.98163s
RUWE (>1.4 is poor) : 0.90
K magnitude         : 14.540
G magnitude         : 18.252
RP magnitude        : 17.133
BP magnitude        : 19.699
DUPflag            : 0
Distance (au)      : 29.064
f0 (km)            : 0.000
g0 (km)            : 0.000
skyplane vel. (km/s) : -17.03
Sun-Target sep (deg) : 138.14
Sun-Moon sep (deg)  : 94.81
B (ring opening deg) : 3.28
PA of pole (deg)    : -43.07
Pole direction: RA (deg): 299.33374
Dec (deg): 42.95036
C/A sky separation (") : 0.069
C/A sky separation (km) : 1453.0
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	2048-10-04T04:40:04.801	b	71.81	-31.62	62933.00	-137.20		
Galatea	I	2048-10-04T04:40:11.944	b	71.79	-31.59	61953.00	-137.18		
Arago	I	2048-10-04T04:40:46.604	b	71.68	-31.47	57200.00	-137.08		
Lassell	I	2048-10-04T04:41:01.196	b	71.64	-31.42	55199.99	-137.04		
LeVerrier	I	2048-10-04T04:41:15.793	b	71.59	-31.36	53200.00	-136.99		
Galle	I	2048-10-04T04:42:37.635	b	71.34	-31.07	42000.01	-136.70		
Neptune	I	2048-10-04T04:26:36.993		74.14	-34.50	24763.78		23.46	24.19
Neptune	E	2048-10-04T05:13:55.726		65.19	-24.28	24763.65		-30.13	-30.99
Galle	E	2048-10-04T04:51:42.830	b	69.63	-29.11	41721.09	190.86		
LeVerrier	E	2048-10-04T04:53:17.117	b	69.32	-28.77	53200.22	105.20		
Lassell	E	2048-10-04T04:53:35.809	b	69.26	-28.70	55200.14	108.89		
Arago	E	2048-10-04T04:53:53.873	b	69.21	-28.64	57200.08	112.53		
Galatea	E	2048-10-04T04:54:34.784	b	69.07	-28.49	61953.02	119.50		
Adams	E	2048-10-04T04:54:42.945	b	69.05	-28.46	62933.01	120.64		

```

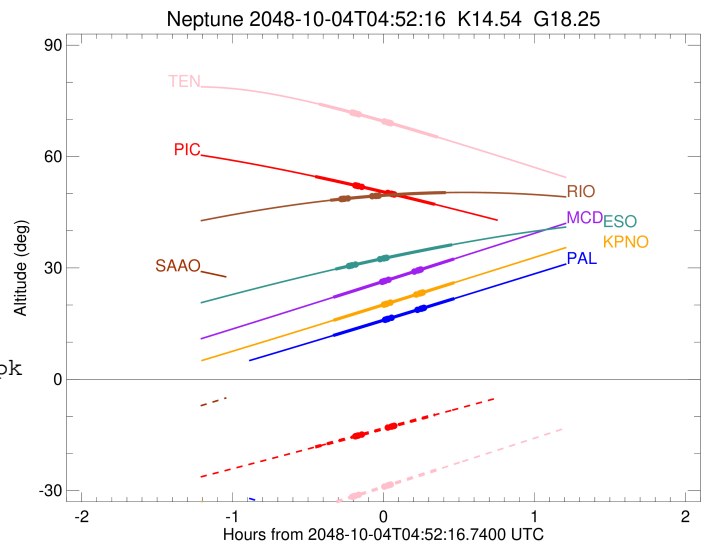
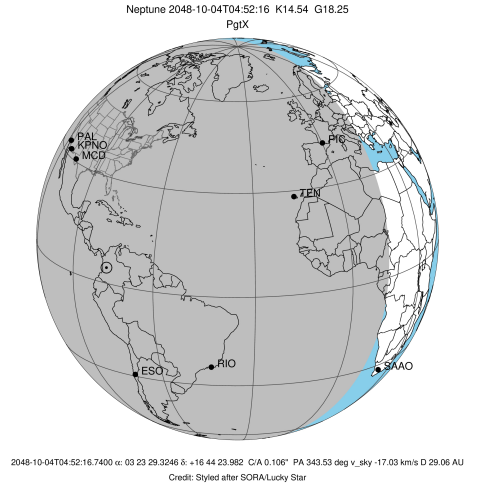
target                : Neptune
target radius (km)   : 24764.00
C/A epoch            : 2048-10-04T04:54:04.870
Event type          : PgtX
: Neptune occs: geocentric, topocentric
: No ring occs
Observer code       : RIO
Location           : Rio de Janeiro
Latitude (deg)     : -22.89506
E. Longitude (deg) : 316.77708
Altitude (km)      : 0.033
Gaia source ID     : 54962455969658112
2Mass ID (if available) : 03232933+1644246
ICRS Star Coord at Epoch: 03h 23m 29.32461s +16:44:23.98163s
RUWE (>1.4 is poor) : 0.90
K magnitude         : 14.540
G magnitude         : 18.252
RP magnitude        : 17.133
BP magnitude        : 19.699
DUPflag            : 0
Distance (au)      : 29.064
f0 (km)            : 0.000
g0 (km)            : 0.000
skyplane vel. (km/s) : -17.03
Sun-Target sep (deg) : 138.14
Sun-Moon sep (deg) : 94.61
B (ring opening deg) : 3.28
PA of pole (deg)   : -43.07
Pole direction: RA (deg): 299.33374
Dec (deg): 42.95036
C/A sky separation (") : 0.280
C/A sky separation (km) : 5905.7
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	2048-10-04T04:35:51.046	b	48.56	-50.88	62933.00	-136.37		
Galatea	I	2048-10-04T04:35:58.234	b	48.57	-50.86	61953.00	-136.28		
Arago	I	2048-10-04T04:36:33.175	b	48.61	-50.76	57200.01	-135.76		
Lassell	I	2048-10-04T04:36:47.921	b	48.63	-50.71	55200.00	-135.50		
LeVerrier	I	2048-10-04T04:37:02.697	b	48.65	-50.67	53200.00	-135.21		
Galle	I	2048-10-04T04:38:26.218	b	48.74	-50.43	42000.00	-132.68		
Neptune	I	2048-10-04T04:31:05.022		48.21	-51.70	24763.93		13.24	13.69
Neptune	E	2048-10-04T05:17:03.564		50.29	-43.15	24763.41		-40.74	-41.71
Galle	E	2048-10-04T04:47:53.131	b	49.32	-48.73	42000.00	137.05		
LeVerrier	E	2048-10-04T04:49:13.402	b	49.39	-48.48	53199.99	141.76		
Lassell	E	2048-10-04T04:49:27.476	b	49.40	-48.44	55200.01	142.45		
Arago	E	2048-10-04T04:49:41.485	b	49.41	-48.40	57199.99	143.09		
Galatea	E	2048-10-04T04:50:14.540	b	49.44	-48.29	61953.00	144.44		
Adams	E	2048-10-04T04:50:21.319	b	49.45	-48.27	62933.00	144.68		

```

target                : Neptune
target radius (km)   : 24764.00
C/A epoch             : 2048-10-04T04:56:22.740
Event type           : PgtX
: Neptune occs: geocentric, topocentric
: No ring occs
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       : 54962455969658112
2Mass ID (if available) : 03232933+1644246
ICRS Star Coord at Epoch: 03h 23m 29.32461s +16:44:23.98163s
RUWE (>1.4 is poor) : 0.90
K magnitude           : 14.540
G magnitude           : 18.252
RP magnitude          : 17.133
BP magnitude          : 19.699
DUPflag              : 0
Distance (au)         : 29.064
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s) : -17.03
Sun-Target sep (deg) : 138.14
Sun-Moon sep (deg)   : 94.37
B (ring opening deg) : 3.28
PA of pole (deg)     : -43.07
Pole direction: RA (deg): 299.33374
Dec (deg): 42.95036
C/A sky separation (") : 0.260
C/A sky separation (km) : 5476.3
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.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	2048-10-04T04:38:51.618	b	30.55	-56.25	62933.00	-136.19		
Galatea	I	2048-10-04T04:38:58.816	b	30.57	-56.25	61953.01	-136.11		
Arago	I	2048-10-04T04:39:33.787	b	30.66	-56.24	57200.00	-135.69		
Lassell	I	2048-10-04T04:39:48.538	b	30.70	-56.24	55200.00	-135.47		
LeVerrier	I	2048-10-04T04:40:03.314	b	30.73	-56.24	53199.99	-135.23		
Galle	I	2048-10-04T04:41:26.706	b	30.95	-56.21	41999.99	-133.12		
Neptune	I	2048-10-04T04:33:08.487		29.67	-56.30	24763.92		14.33	14.81
Neptune	E	2048-10-04T05:19:34.510		36.25	-54.36	24763.43		-39.81	-40.78
Galle	E	2048-10-04T04:50:58.523	b	32.36	-55.97	42000.00	139.08		
LeVerrier	E	2048-10-04T04:52:17.595	b	32.55	-55.92	53200.00	143.97		
Lassell	E	2048-10-04T04:52:31.453	b	32.59	-55.92	55199.99	144.67		
Arago	E	2048-10-04T04:52:45.247	b	32.62	-55.91	57200.00	145.30		
Galatea	E	2048-10-04T04:53:17.816	b	32.70	-55.89	61952.99	146.49		
Adams	E	2048-10-04T04:53:24.502	b	32.72	-55.88	62933.00	146.66		