

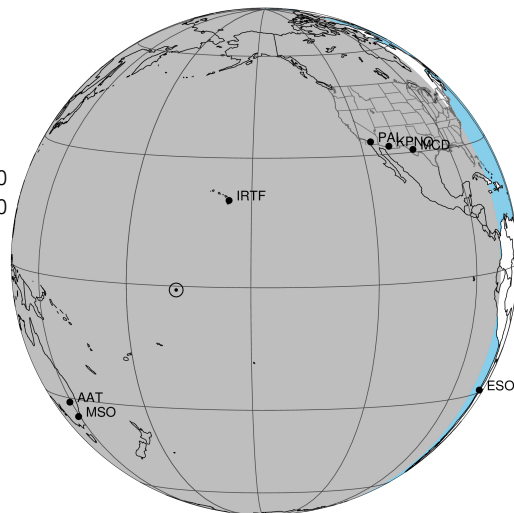
target : Neptune  
 target radius (km) : 24764.00  
 C/A epoch : 2033-09-20T11:02:34.350  
 Event type : PgtRgt  
 : Neptune occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Gaia source ID : 2576238241611293824  
 2Mass ID (if available) : 01115547+0548548

Neptune 2033-09-20T11:02:34 K14.74 G18.30 PgtRgt

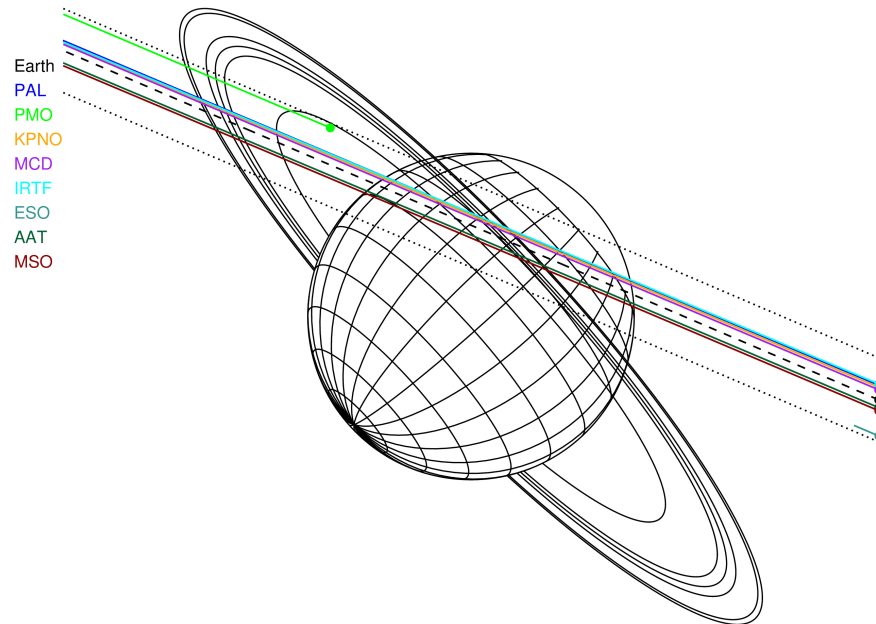
ICRS Star Coord at Epoch: 01h 11m 55.41650s +05:48:54.45417s

RUWE (>1.4 is poor) : 0.94  
 K magnitude : 14.739  
 G magnitude : 18.303  
 RP magnitude : 17.066  
 BP magnitude : 19.812  
 DUPflag : 0  
 Distance (au) : 28.906  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -22.30  
 Sun-Target sep (deg) : 158.48  
 Sun-Moon sep (deg) : 124.05  
 B (ring opening deg) : -12.42  
 PA of pole (deg) : -47.23

Neptune 2033-09-20T11:02:34 K14.74 G18.30  
 PgtRgt



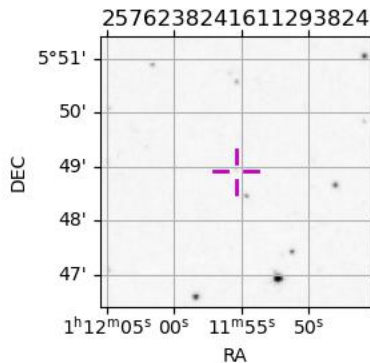
2033-09-20T11:02:34.3500 ra: 01 11 55.4165 s: +05 48 54.454 C/A 0.6077 PA 156.82 deg v\_sky -22.30 km/s D 28.91 AU  
 Credit: Styled after SORA/Lucky Star



#	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

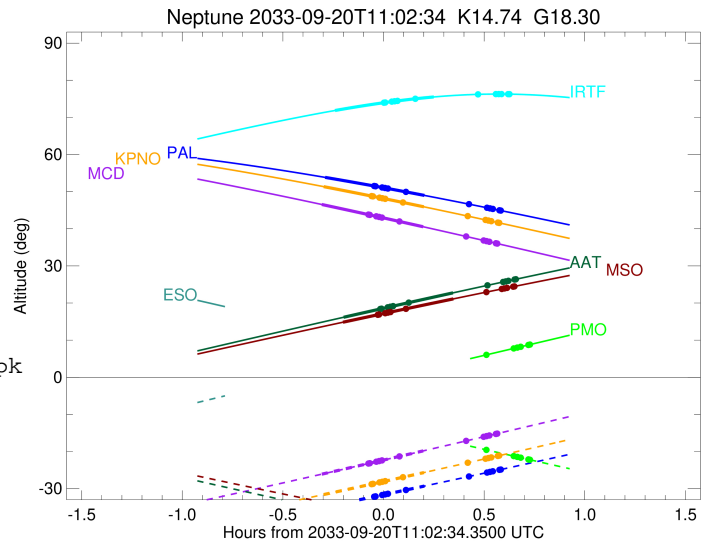
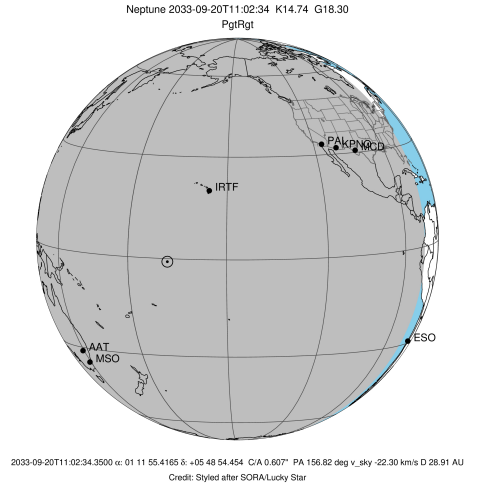
Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1					PnnRnn
PAL	Palomar Mt (200")	33.4	243.1		+	+	SEP 20 10:45 - SEP 20 11:37	PieRne
PMO	Purple Mtn Obs. Nanki	32.1	118.8			+	SEP 20 11:33 - SEP 20 11:45	PnnRne
KPNO	Kitt Peak Natl Obs	32.0	248.4		+	+	SEP 20 10:44 - SEP 20 11:36	PieRne
MCD	McDonald Obs. 2.7m	30.7	256.0		+	+	SEP 20 10:44 - SEP 20 11:36	PieRne
TEN	Teide Obs./Tenerife	28.3	343.5					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5		+	+	SEP 20 10:48 - SEP 20 11:39	PieRne
KAV	Kavalur Observatory	12.6	78.8					PnnRnn
RIO	Rio de Janeiro	-22.9	316.8					PnnRnn
ESO	European Southern Obs	-29.3	289.3					PnnRnn
AAT	Siding Spring (AAT)	-31.3	149.1		+	+	SEP 20 10:50 - SEP 20 11:41	PieRne
SAAO	So. Afr. Astro. Obs.	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Observato	-35.3	149.0		+	+	SEP 20 10:50 - SEP 20 11:41	PieRne



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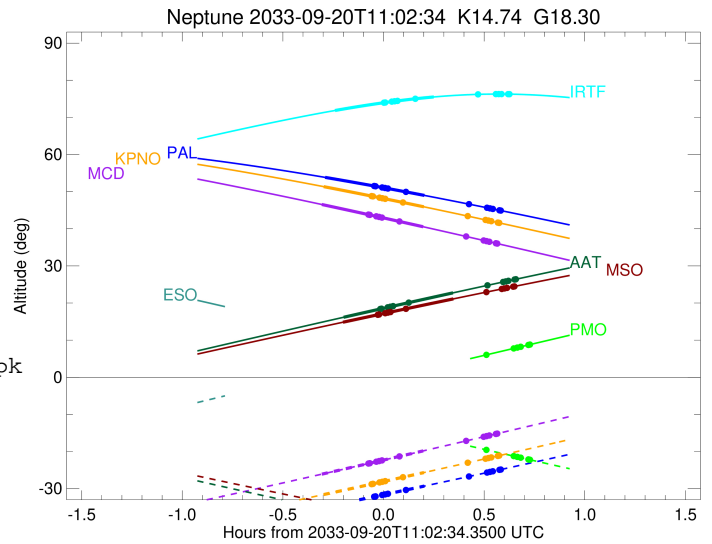
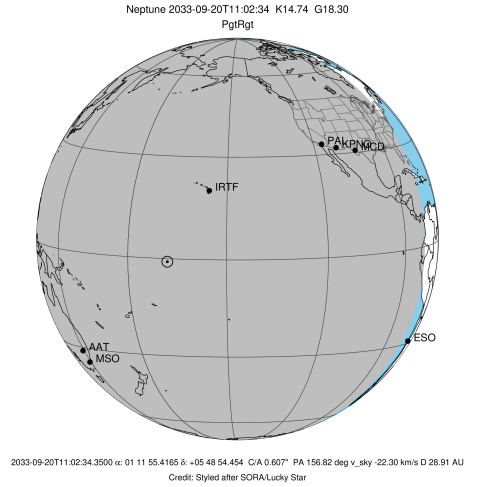
target                : Neptune
target radius (km)   : 24764.00
C/A epoch             : 2033-09-20T10:59:57.200
Event type           : PgtRgt
: Neptune occs: geocentric, topocentric
: Ring occs: geocentric, topocentric
Observer code        : PAL
Location             : Palomar Mt (200")
Latitude (deg)       : 33.35622
E. Longitude (deg)   : 243.13601
Altitude (km)        : 1.706
Gaia source ID       : 2576238241611293824
2Mass ID (if available) : 01115547+0548548
ICRS Star Coord at Epoch: 01h 11m 55.41650s +05:48:54.45417s
RUWE (>1.4 is poor) : 0.94
K magnitude           : 14.739
G magnitude           : 18.303
RP magnitude          : 17.066
BP magnitude          : 19.812
DUPflag              : 0
Distance (au)        : 28.906
f0 (km)              : 0.000
g0 (km)              : 0.000
skyplane vel. (km/s) : -22.30
Sun-Target sep (deg) : 158.48
Sun-Moon sep (deg)   : 124.91
B (ring opening deg) : -12.42
PA of pole (deg)     : -47.23
Pole direction: RA (deg): 299.33374
Dec (deg): 42.95036
C/A sky separation (") : 0.689
C/A sky separation (km) : 14447.4
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	2033-09-20T10:59:32.347	b	51.56	-32.21	62933.00	-41.58		
Galatea	I	2033-09-20T10:59:55.970	b	51.50	-32.14	61953.00	-41.39		
Arago	I	2033-09-20T11:01:52.293	b	51.18	-31.77	57200.00	-40.26		
Lassell	I	2033-09-20T11:02:42.339	b	51.04	-31.62	55200.00	-39.65		
LeVerrier	I	2033-09-20T11:03:33.240	b	50.90	-31.45	53200.00	-38.92		
Galle	I	2033-09-20T11:08:46.508	b	50.02	-30.46	42000.00	-31.70		
Neptune	I	2033-09-20T10:45:08.912		53.85	-34.89	24749.44		57.80	58.68
Neptune	E	2033-09-20T11:14:46.565		48.99	-29.31	24763.25		11.10	11.48
Galle	E	2033-09-20T11:27:50.947		46.67	-26.77	42000.00	31.41		
LeVerrier	E	2033-09-20T11:33:07.791		45.72	-25.73	53200.00	38.45		
Lassell	E	2033-09-20T11:33:59.294		45.56	-25.56	55200.00	39.20		
Arago	E	2033-09-20T11:34:49.887		45.40	-25.40	57200.00	39.85		
Galatea	E	2033-09-20T11:36:47.196		45.04	-25.01	61953.00	41.13		
Adams	E	2033-09-20T11:37:10.958		44.97	-24.93	62933.00	41.35		

```

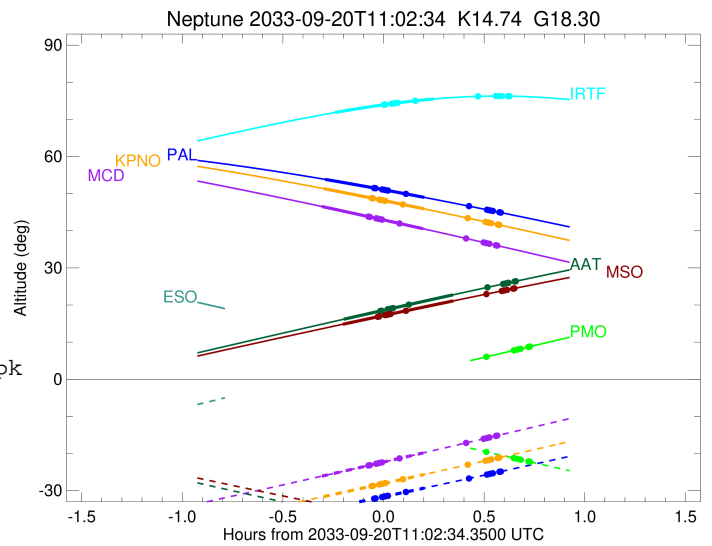
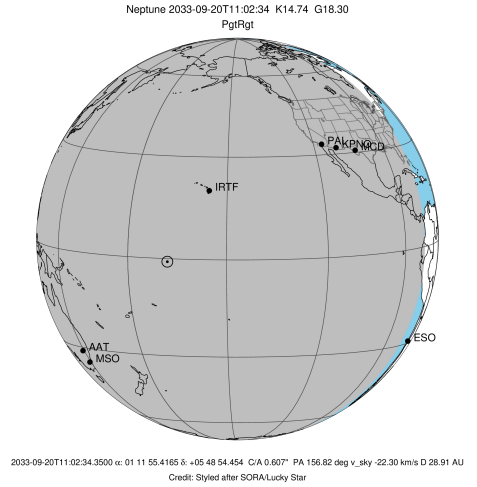
target                : Neptune
target radius (km)   : 24764.00
C/A epoch            : 2033-09-20T11:05:18.490
Event type          : PgtRgt
: Neptune occs: geocentric, topocentric
: Ring occs: geocentric, topocentric
Observer code       : PMO
Location            : Purple Mtn Obs. Nanking
Latitude (deg)      : 32.06667
E. Longitude (deg)  : 118.82089
Altitude (km)       : 0.364
Gaia source ID      : 2576238241611293824
2Mass ID (if available) : 01115547+0548548
ICRS Star Coord at Epoch: 01h 11m 55.41650s +05:48:54.45417s
RUWE (>1.4 is poor) : 0.94
K magnitude          : 14.739
G magnitude          : 18.303
RP magnitude         : 17.066
BP magnitude         : 19.812
DUPflag             : 0
Distance (au)       : 28.906
f0 (km)              : 0.000
g0 (km)              : 0.000
skyplane vel. (km/s) : -22.30
Sun-Target sep (deg) : 158.48
Sun-Moon sep (deg)  : 123.71
B (ring opening deg) : -12.42
PA of pole (deg)    : -47.23
Pole direction: RA (deg): 299.33374
Dec (deg): 42.95036
C/A sky separation (") : 0.857
C/A sky separation (km) : 17963.5
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
    
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Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
Adams	I	2033-09-20T11:11:19.670	b	1.39x	-15.01	62933.00	-36.72		
Galatea	I	2033-09-20T11:11:46.501	b	1.48x	-15.10	61953.00	-36.33		
Arago	I	2033-09-20T11:14:01.343	b	1.96x	-15.57	57200.00	-34.07		
Lassell	I	2033-09-20T11:15:01.067	b	2.17x	-15.78	55200.00	-32.88		
LeVerrier	I	2033-09-20T11:16:03.174	b	2.39x	-15.99	53200.01	-31.50		
Galle	I	2033-09-20T11:23:41.302		4.01x	-17.58	42002.37	-15.55		
Neptune	I	2033-09-20T10:52:33.226		-2.57x	-11.07	24746.74		67.13	67.82
Neptune	E	2033-09-20T11:18:03.938		2.82x	-16.41	24761.19		21.83	22.52
Galle	E	2033-09-20T11:33:29.039		6.09	-19.61	42000.00	15.54		
LeVerrier	E	2033-09-20T11:41:07.706		7.71	-21.18	53200.00	31.44		
Lassell	E	2033-09-20T11:42:09.948		7.94	-21.39	55200.00	32.81		
Arago	E	2033-09-20T11:43:09.815		8.15	-21.60	57200.00	33.99		
Galatea	E	2033-09-20T11:45:24.998		8.63	-22.06	61953.00	36.24		
Adams	E	2033-09-20T11:45:51.894		8.72	-22.15	62933.00	36.63		

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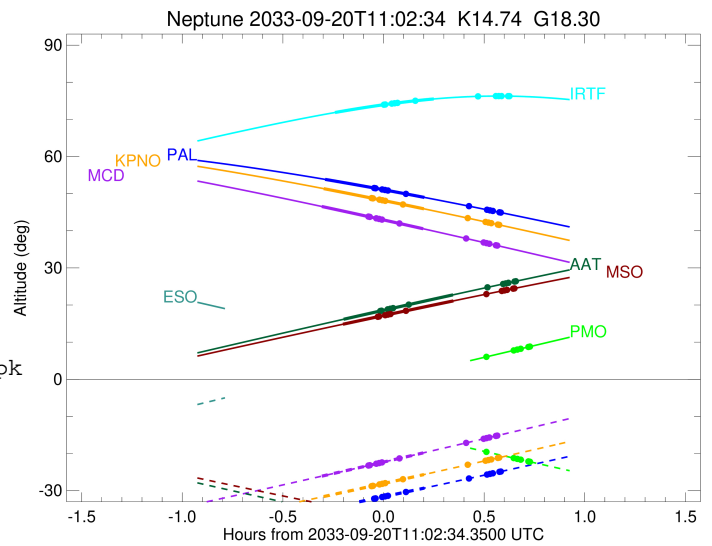
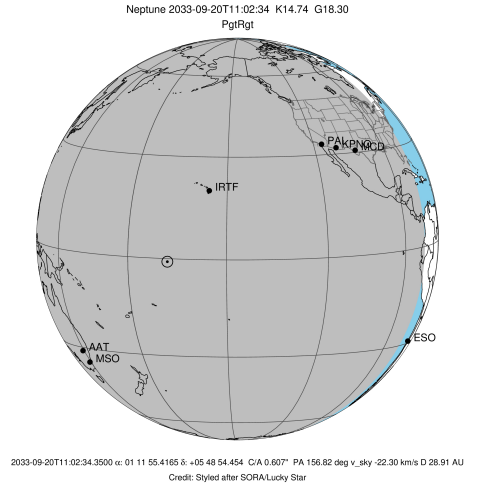
target                : Neptune
target radius (km)   : 24764.00
C/A epoch             : 2033-09-20T10:59:39.960
Event type           : PgtRgt
: Neptune occs: geocentric, topocentric
: Ring occs: geocentric, topocentric
Observer code        : KPNO
Location              : Kitt Peak Natl Obs
Latitude (deg)       : 31.96333
E. Longitude (deg)   : 248.40000
Altitude (km)        : 2.120
Gaia source ID       : 2576238241611293824
2Mass ID (if available) : 01115547+0548548
ICRS Star Coord at Epoch: 01h 11m 55.41650s +05:48:54.45417s
RUWE (>1.4 is poor) : 0.94
K magnitude          : 14.739
G magnitude          : 18.303
RP magnitude         : 17.066
BP magnitude         : 19.812
DUPflag              : 0
Distance (au)        : 28.906
f0 (km)              : 0.000
g0 (km)              : 0.000
skyplane vel. (km/s) : -22.30
Sun-Target sep (deg) : 158.48
Sun-Moon sep (deg)   : 124.92
B (ring opening deg) : -12.42
PA of pole (deg)     : -47.23
Pole direction: RA (deg): 299.33374
Dec (deg): 42.95036
C/A sky separation (") : 0.676
C/A sky separation (km) : 14166.9
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	2033-09-20T10:58:46.812	b	48.85	-28.84	62933.00	-41.74		
Galatea	I	2033-09-20T10:59:10.337	b	48.78	-28.76	61953.00	-41.57		
Arago	I	2033-09-20T11:01:06.044	b	48.43	-28.38	57200.00	-40.53		
Lassell	I	2033-09-20T11:01:55.738	b	48.28	-28.21	55200.00	-39.95		
LeVerrier	I	2033-09-20T11:02:46.217	b	48.12	-28.05	53200.00	-39.27		
Galle	I	2033-09-20T11:07:54.829	b	47.17	-27.02	42000.00	-32.46		
Neptune	I	2033-09-20T10:44:42.479		51.36	-31.60	24749.68		57.06	57.94
Neptune	E	2033-09-20T11:14:38.591		45.91	-25.67	24763.35		10.35	10.70
Galle	E	2033-09-20T11:27:28.383		43.46	-23.07	42000.00	32.13		
LeVerrier	E	2033-09-20T11:32:40.769		42.45	-22.01	53200.00	38.79		
Lassell	E	2033-09-20T11:33:31.855		42.28	-21.83	55200.00	39.50		
Arago	E	2033-09-20T11:34:22.088		42.12	-21.66	57200.00	40.12		
Galatea	E	2033-09-20T11:36:18.714		41.74	-21.26	61953.00	41.34		
Adams	E	2033-09-20T11:36:42.359		41.66	-21.18	62933.00	41.55		

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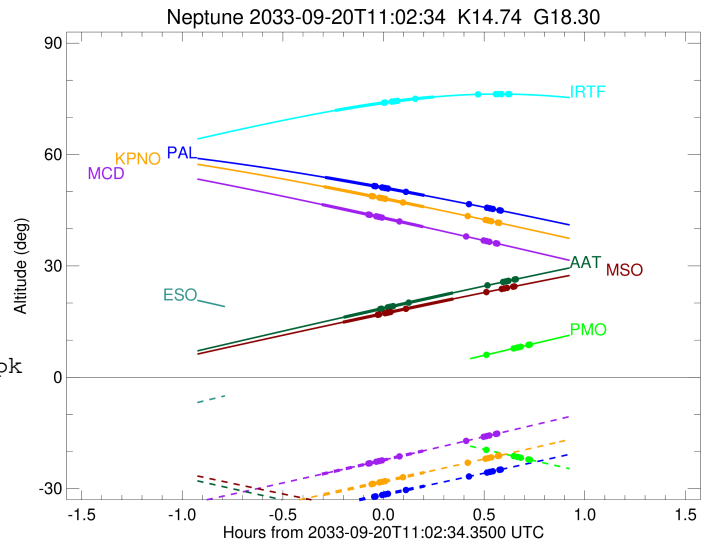
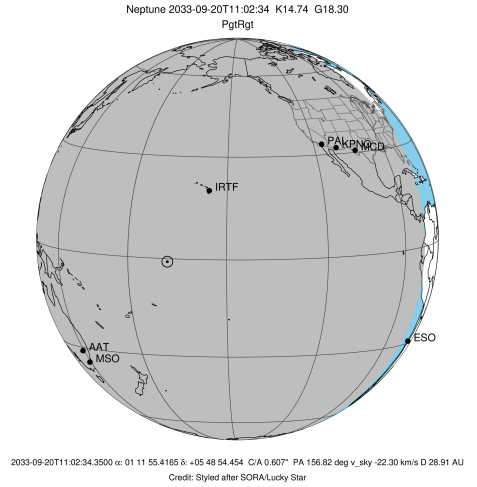
target                : Neptune
target radius (km)   : 24764.00
C/A epoch            : 2033-09-20T10:59:15.980
Event type          : PgtRgt
: Neptune occs: geocentric, topocentric
: Ring occs: geocentric, topocentric
Observer code       : MCD
Location            : McDonald Obs. 2.7m
Latitude (deg)      : 30.67158
E. Longitude (deg)  : 255.97844
Altitude (km)       : 2.075
Gaia source ID      : 2576238241611293824
2Mass ID (if available) : 01115547+0548548
ICRS Star Coord at Epoch: 01h 11m 55.41650s +05:48:54.45417s
RUWE (>1.4 is poor) : 0.94
K magnitude          : 14.739
G magnitude          : 18.303
RP magnitude         : 17.066
BP magnitude         : 19.812
DUPflag             : 0
Distance (au)       : 28.906
f0 (km)              : 0.000
g0 (km)              : 0.000
skyplane vel. (km/s) : -22.30
Sun-Target sep (deg) : 158.48
Sun-Moon sep (deg)  : 124.92
B (ring opening deg) : -12.42
PA of pole (deg)    : -47.23
Pole direction: RA (deg): 299.33374
Dec (deg): 42.95036
C/A sky separation (") : 0.661
C/A sky separation (km) : 13854.3
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	2033-09-20T10:57:51.458	b	43.86	-23.28	62933.00	-41.87		
Galatea	I	2033-09-20T10:58:14.909	b	43.79	-23.20	61953.00	-41.71		
Arago	I	2033-09-20T11:00:10.113	b	43.41	-22.80	57200.00	-40.75		
Lassell	I	2033-09-20T11:00:59.502	b	43.24	-22.63	55200.00	-40.22		
LeVerrier	I	2033-09-20T11:01:49.602	b	43.08	-22.46	53200.00	-39.60		
Galle	I	2033-09-20T11:06:53.776	b	42.06	-21.40	42000.00	-33.22		
Neptune	I	2033-09-20T10:44:08.104		46.55	-26.11	24749.95		56.21	57.11
Neptune	E	2033-09-20T11:14:25.128		40.54	-19.83	24763.45		9.53	9.86
Galle	E	2033-09-20T11:26:59.090		37.98	-17.19	42000.00	32.85		
LeVerrier	E	2033-09-20T11:32:07.262		36.92	-16.11	53200.00	39.10		
Lassell	E	2033-09-20T11:32:57.969		36.74	-15.93	55200.00	39.77		
Arago	E	2033-09-20T11:33:47.879		36.57	-15.75	57200.00	40.36		
Galatea	E	2033-09-20T11:35:43.913		36.17	-15.34	61953.00	41.52		
Adams	E	2033-09-20T11:36:07.460		36.09	-15.26	62933.00	41.72		

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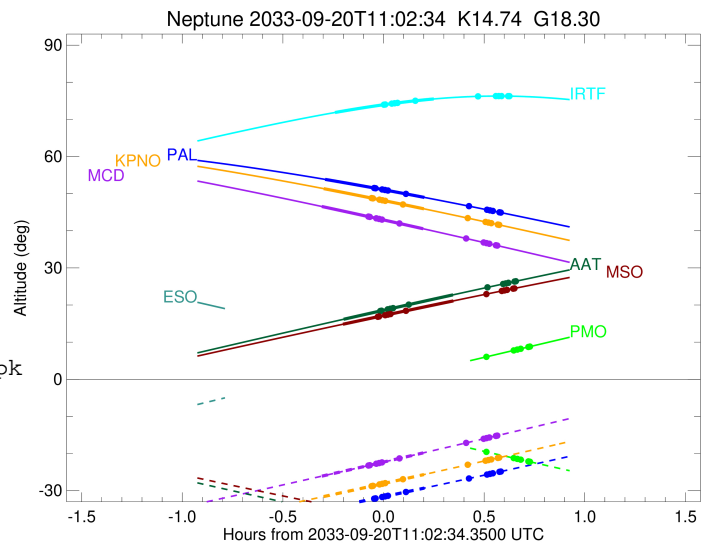
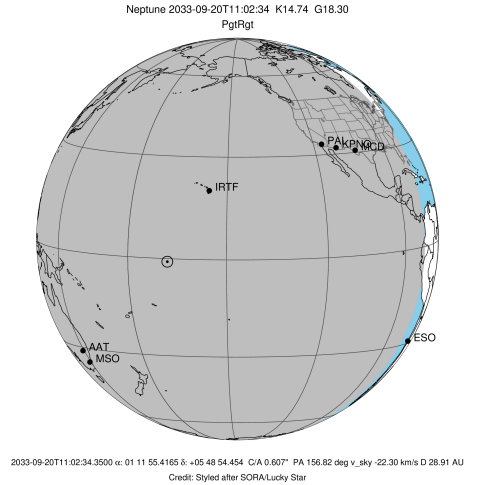
target                : Neptune
target radius (km)   : 24764.00
C/A epoch            : 2033-09-20T11:02:49.360
Event type           : PgtRgt
: Neptune occs: geocentric, topocentric
: Ring occs: geocentric, topocentric
Observer code        : IRTF
Location             : Mauna Kea/IRTF
Latitude (deg)       : 19.82622
E. Longitude (deg)   : 204.52800
Altitude (km)        : 4.168
Gaia source ID       : 2576238241611293824
2Mass ID (if available) : 01115547+0548548
ICRS Star Coord at Epoch: 01h 11m 55.41650s +05:48:54.45417s
RUWE (>1.4 is poor) : 0.94
K magnitude           : 14.739
G magnitude           : 18.303
RP magnitude         : 17.066
BP magnitude         : 19.812
DUPflag              : 0
Distance (au)        : 28.906
f0 (km)              : 0.000
g0 (km)              : 0.000
skyplane vel. (km/s) : -22.30
Sun-Target sep (deg) : 158.48
Sun-Moon sep (deg)   : 124.74
B (ring opening deg) : -12.42
PA of pole (deg)     : -47.23
Pole direction: RA (deg): 299.33374
Dec (deg): 42.95036
C/A sky separation (") : 0.691
C/A sky separation (km) : 14477.8
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	2033-09-20T11:02:26.098	b	73.93	-66.39	62933.00	-41.95		
Galatea	I	2033-09-20T11:02:49.511	b	73.98	-66.35	61953.00	-41.76		
Arago	I	2033-09-20T11:04:44.778	b	74.22	-66.11	57200.00	-40.64		
Lassell	I	2033-09-20T11:05:34.358	b	74.32	-66.01	55200.00	-40.02		
LeVerrier	I	2033-09-20T11:06:24.775	b	74.41	-65.90	53200.00	-39.30		
Galle	I	2033-09-20T11:11:34.711	b	74.97	-65.22	42000.00	-32.09		
Neptune	I	2033-09-20T10:48:04.668		71.86	-67.90	24749.37		58.02	58.89
Neptune	E	2033-09-20T11:17:34.536		75.51	-64.37	24763.26		11.03	11.40
Galle	E	2033-09-20T11:30:32.764		76.20	-62.36	42000.00	31.85		
LeVerrier	E	2033-09-20T11:35:45.653		76.29	-61.49	53200.00	38.91		
Lassell	E	2033-09-20T11:36:36.550		76.29	-61.34	55200.00	39.66		
Arago	E	2033-09-20T11:37:26.552		76.29	-61.20	57200.00	40.32		
Galatea	E	2033-09-20T11:39:22.500		76.27	-60.87	61953.00	41.61		
Adams	E	2033-09-20T11:39:45.988		76.27	-60.80	62933.00	41.84		

```

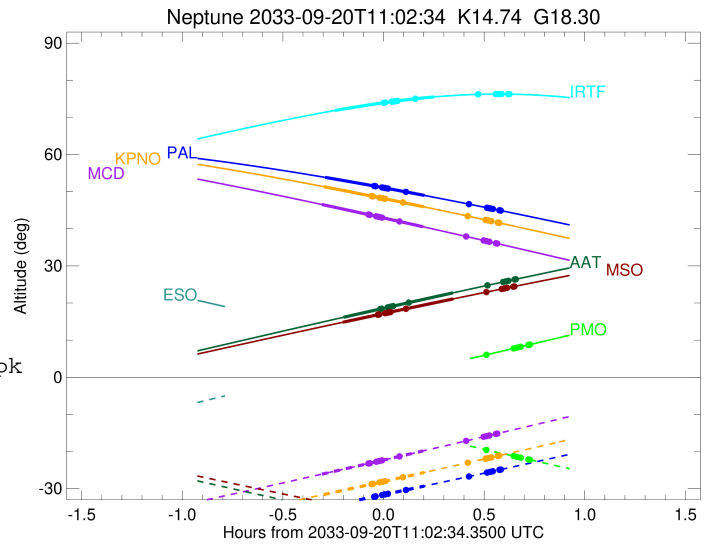
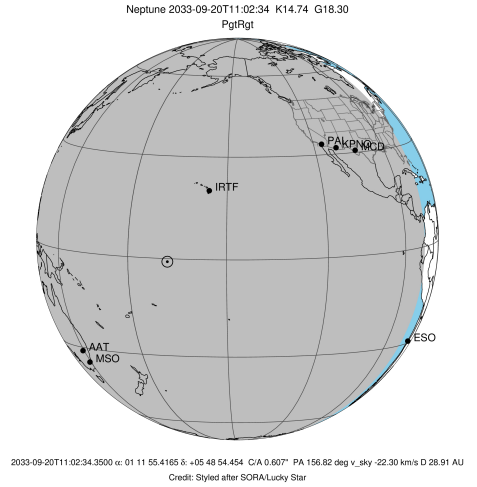
target                : Neptune
target radius (km)   : 24764.00
C/A epoch             : 2033-09-20T11:06:59.440
Event type            : PgtRgt
: Neptune occs: geocentric, topocentric
: Ring occs: geocentric, topocentric
Observer code        : AAT
Location              : Siding Spring (AAT)
Latitude (deg)       : -31.27703
E. Longitude (deg)   : 149.06608
Altitude (km)        : 1.164
Gaia source ID       : 2576238241611293824
2Mass ID (if available) : 01115547+0548548
ICRS Star Coord at Epoch: 01h 11m 55.41650s +05:48:54.45417s
RUWE (>1.4 is poor) : 0.94
K magnitude           : 14.739
G magnitude           : 18.303
RP magnitude          : 17.066
BP magnitude          : 19.812
DUPflag              : 0
Distance (au)         : 28.906
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s) : -22.30
Sun-Target sep (deg) : 158.48
Sun-Moon sep (deg)   : 123.84
B (ring opening deg) : -12.42
PA of pole (deg)     : -47.23
Pole direction: RA (deg): 299.33374
Dec (deg): 42.95036
C/A sky separation (") : 0.543
C/A sky separation (km) : 11389.4
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	2033-09-20T11:01:29.366	b	18.37	-38.67	62933.00	-43.13		
Galatea	I	2033-09-20T11:01:52.117	b	18.44	-38.74	61953.00	-43.02		
Arago	I	2033-09-20T11:03:43.350	b	18.82	-39.09	57200.00	-42.44		
Lassell	I	2033-09-20T11:04:30.619	b	18.98	-39.24	55200.00	-42.18		
LeVerrier	I	2033-09-20T11:05:18.189	b	19.14	-39.39	53200.00	-41.90		
Galle	I	2033-09-20T11:09:53.527	b	20.06	-40.25	42000.00	-38.87		
Neptune	I	2033-09-20T10:50:39.837		16.16	-36.59	24752.06		50.03	50.99
Neptune	E	2033-09-20T11:23:18.507		22.74	-42.72	24763.95		2.99	3.10
Galle	E	2033-09-20T11:33:19.143		24.71	-44.51	42000.00	38.35		
LeVerrier	E	2033-09-20T11:37:55.881		25.61	-45.31	53200.00	42.15		
Lassell	E	2033-09-20T11:38:43.088		25.76	-45.45	55200.00	42.58		
Arago	E	2033-09-20T11:39:29.850		25.91	-45.58	57200.00	42.96		
Galatea	E	2033-09-20T11:41:19.503		26.27	-45.90	61953.00	43.71		
Adams	E	2033-09-20T11:41:41.891		26.34	-45.96	62933.00	43.84		

```

target                : Neptune
target radius (km)   : 24764.00
C/A epoch             : 2033-09-20T11:06:56.660
Event type            : PgtRgt
: Neptune occs: geocentric, topocentric
: Ring occs: geocentric, topocentric
Observer code        : MSO
Location              : Mt. Stromlo Observatory
Latitude (deg)       : -35.32000
E. Longitude (deg)   : 149.00833
Altitude (km)        : 0.770
Gaia source ID       : 2576238241611293824
2Mass ID (if available) : 01115547+0548548
ICRS Star Coord at Epoch: 01h 11m 55.41650s +05:48:54.45417s
RUWE (>1.4 is poor) : 0.94
K magnitude           : 14.739
G magnitude           : 18.303
RP magnitude          : 17.066
BP magnitude          : 19.812
DUPflag               : 0
Distance (au)        : 28.906
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s) : -22.30
Sun-Target sep (deg) : 158.48
Sun-Moon sep (deg)   : 123.83
B (ring opening deg) : -12.42
PA of pole (deg)     : -47.23
Pole direction: RA (deg): 299.33374
Dec (deg): 42.95036
C/A sky separation (") : 0.523
C/A sky separation (km) : 10973.0
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	2033-09-20T11:00:46.009	b	16.82	-36.56	62933.00	-43.34		
Galatea	I	2033-09-20T11:01:08.652	b	16.89	-36.63	61953.00	-43.22		
Arago	I	2033-09-20T11:02:59.357	b	17.24	-36.95	57200.00	-42.64		
Lassell	I	2033-09-20T11:03:46.396	b	17.39	-37.09	55200.00	-42.39		
LeVerrier	I	2033-09-20T11:04:33.718	b	17.54	-37.23	53200.00	-42.13		
Galle	I	2033-09-20T11:09:06.238	b	18.41	-38.02	42000.00	-39.58		
Neptune	I	2033-09-20T10:50:27.341		14.82	-34.71	24752.42		49.00	49.96
Neptune	E	2033-09-20T11:23:25.435		21.12	-40.46	24763.98		1.95	2.02
Galle	E	2033-09-20T11:32:59.272		22.89	-42.03	42000.00	39.06		
LeVerrier	E	2033-09-20T11:37:32.453		23.73	-42.77	53200.00	42.54		
Lassell	E	2033-09-20T11:38:19.254		23.87	-42.89	55200.00	42.93		
Arago	E	2033-09-20T11:39:05.652		24.02	-43.01	57200.00	43.28		
Galatea	E	2033-09-20T11:40:54.577		24.35	-43.30	61953.00	43.97		
Adams	E	2033-09-20T11:41:16.835		24.41	-43.36	62933.00	44.09		