

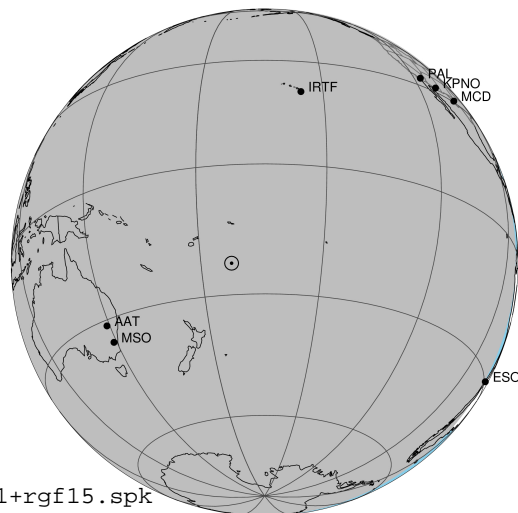
target : Jupiter  
 target radius (km) : 71492.00  
 C/A epoch : 2031-06-08T11:28:26.480  
 Event type : Pgt  
 : Jupiter occs: geocentric, topocentric  
 : Not a ringed target  
 Gaia source ID : 4116786046623734144  
 2Mass ID (if available) : 17361783-2250395

Jupiter 2031-06-08T11:28:26 K9.32 G14.51 Pgt

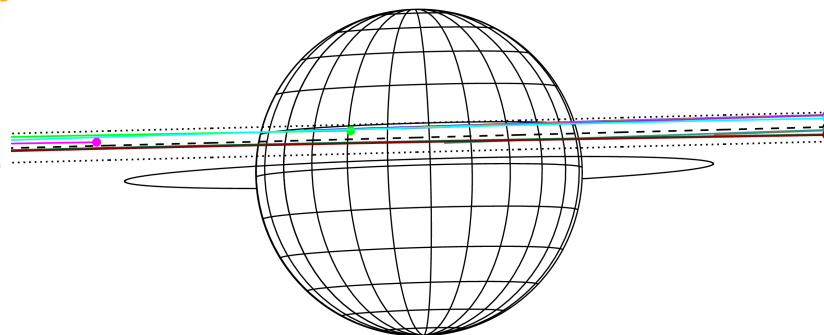
ICRS Star Coord at Epoch: 17h 36m 17.83222s -22:50:39.61419s

RUWE (>1.4 is poor) : 1.03  
 K magnitude : 9.324  
 G magnitude : 14.511  
 RP magnitude : 13.192  
 BP magnitude : 16.558  
 DUPflag : 0  
 Distance (au) : 4.275  
 f0 (km) : 0.00  
 g0 (km) : 0.00  
 skyplane vel. (km/s) : -16.20  
 Sun-Target sep (deg) : 172.51  
 Sun-Moon sep (deg) : 34.70  
 B (ring opening deg) : -2.60  
 PA of pole (deg) : 1.72  
 Pole direction: RA (deg): 268.05692  
 Dec (deg): 64.49651  
 C/A sky separation (") : 4.942  
 C/A sky separation (km) : 15321.8  
 NAIF SPICE kernels : RAJobs\_U111+rgf15.spk

Jupiter 2031-06-08T11:28:26 K9.32 G14.51  
 Pgt



Earth  
 PAL  
 PMO  
 KPNO  
 MCD  
 IRTF  
 KAV  
 RIO  
 ESO  
 AAT  
 MSO

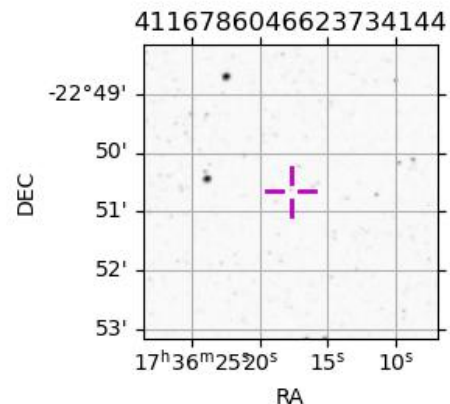


2031-06-08T11:28:26.4800 at: 17 36 17.83222 s: -22 50 39.614 C/A 4.930" PA 181.48 deg v\_sky -16.20 km/s D 04.27 AU

Credit: Styled after SORA/Lucky Star

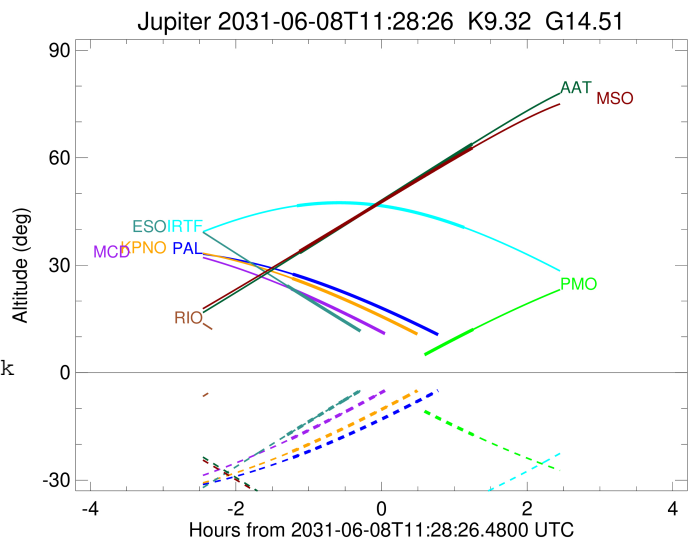
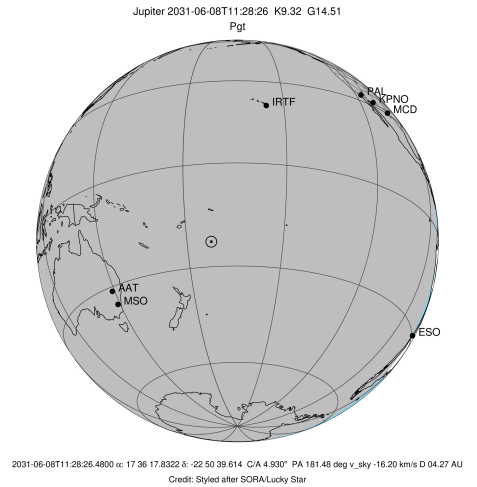
Observable events with sun below -5 deg and altitude above 5 deg

Obs	Location	lat	Elon	Target	Observed Events Interval	OCode
PIC	Pic du Midi	42.9	0.1			Pnn
PAL	Palomar Mt (200")	33.4	243.1	+	JUN 08 10:15 - JUN 08 10:15	Pin
PMO	Purple Mtn Obs. Nanking	32.1	118.8	+ +	JUN 08 12:44 - JUN 08 12:44	Pne
KPNO	Kitt Peak Natl Obs	32.0	248.4	+	JUN 08 10:14 - JUN 08 10:14	Pin
MCD	McDonald Obs. 2.7m	30.7	256.0	+	JUN 08 10:14 - JUN 08 10:14	Pin
TEN	Teide Obs./Tenerife	28.3	343.5			Pnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+ +	JUN 08 10:18 - JUN 08 12:36	Pie
KAV	Kavalur Observatory	12.6	78.8			Pnn
RIO	Rio de Janeiro	-22.9	316.8			Pnn
ESO	European Southern Obs. (3.6m)	-29.3	289.3	+	JUN 08 10:10 - JUN 08 10:10	Pin
AAT	Siding Spring (AAT)	-31.3	149.1	+ +	JUN 08 10:21 - JUN 08 12:43	Pie
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8			Pnn
MSO	Mt. Stromlo Observatory	-35.3	149.0	+ +	JUN 08 10:20 - JUN 08 12:43	Pie



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-08T11:24:42.180
Event type            : Pgt
: Jupiter occs: geocentric, topocentric
: Not a ringed target
Observer code         : PAL
Location              : Palomar Mt (200")
Latitude (deg)        : 33.35622
E. Longitude (deg)    : 243.13601
Altitude (km)         : 1.706
Gaia source ID        : 4116786046623734144
2Mass ID (if available) : 17361783-2250395
ICRS Star Coord at Epoch: 17h 36m 17.83222s -22:50:39.61419s
RUWE (>1.4 is poor) : 1.03
K magnitude           : 9.324
G magnitude           : 14.511
RP magnitude          : 13.192
BP magnitude          : 16.558
DUPflag              : 0
Distance (au)         : 4.275
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.20
Sun-Target sep (deg)  : 172.51
Sun-Moon sep (deg)    : 34.31
B (ring opening deg) : -2.60
PA of pole (deg)      : 1.72
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (" ) : 6.467
C/A sky separation (km) : 20050.6
NAIF SPICE kernels    : RAJobs_U111+rgf15.spk
URKALLv1.spk
naif0012.tls
nep097.bsp
nep101.bsp
sat4401.bsp
de440.bsp
earth_720101_070426.bpc
jup365.bsp
urall6.bsp
IAU_SATURN_for_RINGFIT.tpc
pck00010.tpc
earth_200101_990628_predict.bpc
uranus_ringframes_rfrench20220627_v1.tf
neptune_ringframes_rfrench20220702a_v1.tf
earth_flat_IAU.spk
    
```

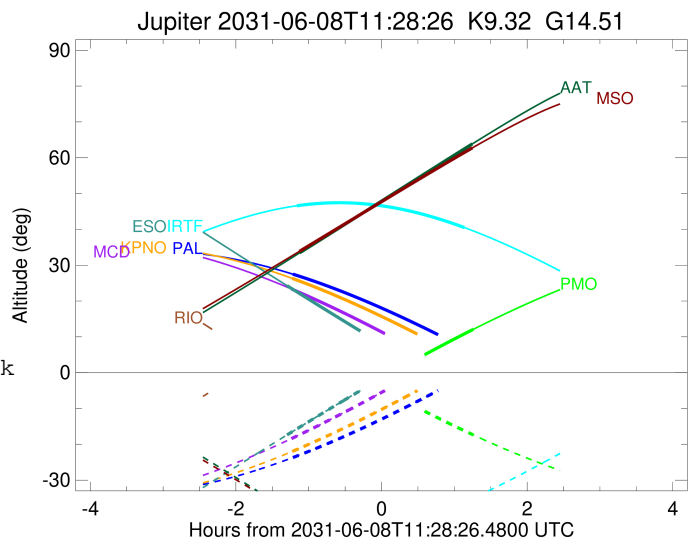
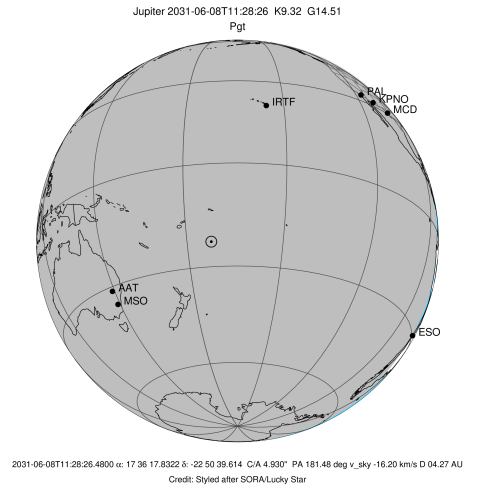


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-08T10:15:22.395	27.49	-23.69	71491.3	16.33	18.51
Jupiter	E	2031-06-08T12:34:22.210	7.28	-1.51x	71491.3	16.09	18.24

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-08T11:33:44.320
Event type            : Pgt
: Jupiter occs: geocentric, topocentric
: Not a ringed target
Observer code         : PMO
Location              : Purple Mtn Obs. Nanking
Latitude (deg)       : 32.06667
E. Longitude (deg)   : 118.82089
Altitude (km)        : 0.364
Gaia source ID       : 4116786046623734144
2Mass ID (if available) : 17361783-2250395
ICRS Star Coord at Epoch: 17h 36m 17.83222s -22:50:39.61419s
RUWE (>1.4 is poor) : 1.03
K magnitude           : 9.324
G magnitude           : 14.511
RP magnitude          : 13.192
BP magnitude          : 16.558
DUPflag              : 0
Distance (au)         : 4.275
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.20
Sun-Target sep (deg) : 172.51
Sun-Moon sep (deg)   : 35.32
B (ring opening deg) : -2.60
PA of pole (deg)     : 1.72
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 6.073
C/A sky separation (km) : 18827.6
NAIF SPICE kernels   : RAJobs_U111+rgf15.spk
URKALLv1.spk
naif0012.tls
nep097.bsp
nep101.bsp
sat4401.bsp
de440.bsp
earth_720101_070426.bpc
jup365.bsp
urall6.bsp
IAU_SATURN_for_RINGFIT.tpc
pck00010.tpc
earth_200101_990628_predict.bpc
uranus_ringframes_rfrench20220627_v1.tf
neptune_ringframes_rfrench20220702a_v1.tf
earth_flat_IAU.spk
    
```

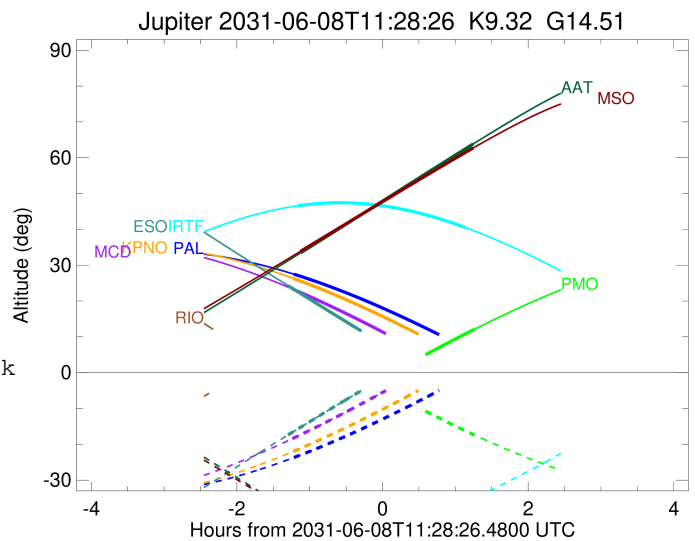
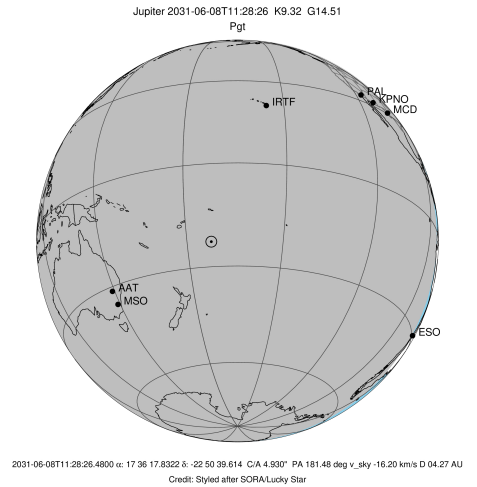


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-08T10:22:54.333	-14.57x	8.04x	71491.4	14.48	16.44
Jupiter	E	2031-06-08T12:44:03.264	12.08	-17.37	71491.3	15.99	18.13

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-08T11:24:19.080
Event type          : Pgt
: Jupiter occs: geocentric, topocentric
: Not a ringed target
Observer code       : KPNO
Location           : Kitt Peak Natl Obs
Latitude (deg)     : 31.96333
E. Longitude (deg) : 248.40000
Altitude (km)     : 2.120
Gaia source ID     : 4116786046623734144
2Mass ID (if available) : 17361783-2250395
ICRS Star Coord at Epoch: 17h 36m 17.83222s -22:50:39.61419s
RUWE (>1.4 is poor) : 1.03
K magnitude        : 9.324
G magnitude        : 14.511
RP magnitude       : 13.192
BP magnitude       : 16.558
DUPflag           : 0
Distance (au)     : 4.275
f0 (km)           : 0.00
g0 (km)           : 0.00
skyplane vel. (km/s) : -16.20
Sun-Target sep (deg) : 172.51
Sun-Moon sep (deg) : 34.24
B (ring opening deg) : -2.60
PA of pole (deg)  : 1.72
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (" ) : 6.392
C/A sky separation (km) : 19818.9
NAIF SPICE kernels : RAJobs_U111+rgf15.spk
URKALLv1.spk
naif0012.tls
nep097.bsp
nep101.bsp
sat4401.bsp
de440.bsp
earth_720101_070426.bpc
jup365.bsp
urall6.bsp
IAU_SATURN_for_RINGFIT.tpc
pck00010.tpc
earth_200101_990628_predict.bpc
uranus_ringframes_rfrench20220627_v1.tf
neptune_ringframes_rfrench20220702a_v1.tf
earth_flat_IAU.spk
    
```

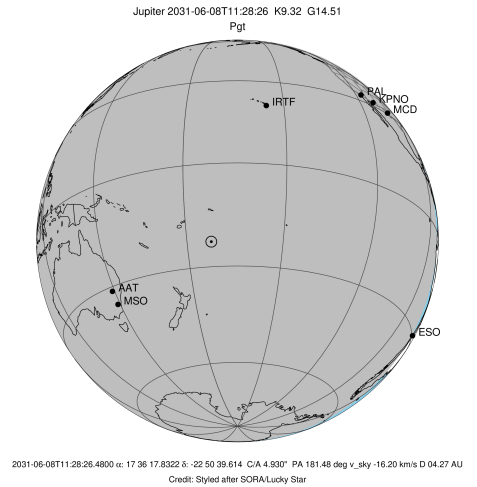


x: target alt < 5.0 deg or sun > -5.0 deg

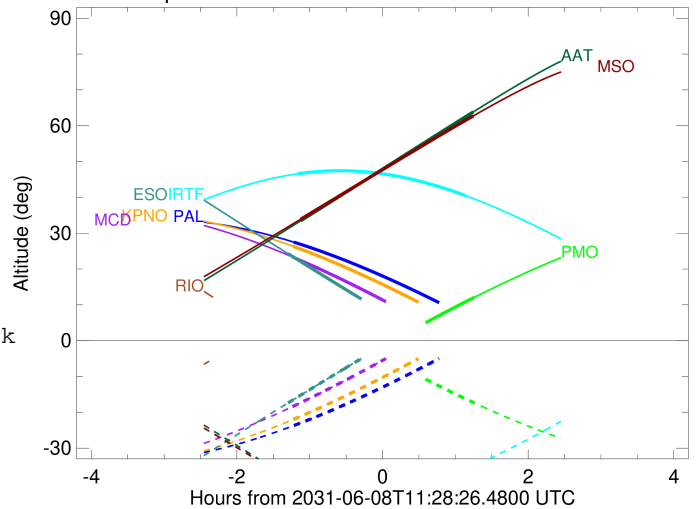
Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-08T10:14:50.819	26.32	-21.99	71491.3	16.18	18.34
Jupiter	E	2031-06-08T12:34:09.834	4.28x	1.76x	71491.3	15.86	17.99

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-08T11:23:50.840
Event type            : Pgt
: Jupiter occs: geocentric, topocentric
: Not a ringed target
Observer code         : MCD
Location              : McDonald Obs. 2.7m
Latitude (deg)        : 30.67158
E. Longitude (deg)    : 255.97844
Altitude (km)         : 2.075
Gaia source ID        : 4116786046623734144
2Mass ID (if available) : 17361783-2250395
ICRS Star Coord at Epoch: 17h 36m 17.83222s -22:50:39.61419s
RUWE (>1.4 is poor) : 1.03
K magnitude           : 9.324
G magnitude           : 14.511
RP magnitude          : 13.192
BP magnitude          : 16.558
DUPflag              : 0
Distance (au)         : 4.275
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.20
Sun-Target sep (deg)  : 172.51
Sun-Moon sep (deg)    : 34.14
B (ring opening deg) : -2.60
PA of pole (deg)      : 1.72
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 6.291
C/A sky separation (km) : 19506.5
NAIF SPICE kernels    : RAJobs_U111+rgf15.spk
URKALLv1.spk
naif0012.tls
nep097.bsp
nep101.bsp
sat4401.bsp
de440.bsp
earth_720101_070426.bpc
jup365.bsp
urall6.bsp
IAU_SATURN_for_RINGFIT.tpc
pck00010.tpc
earth_200101_990628_predict.bpc
uranus_ringframes_rfrench20220627_v1.tf
neptune_ringframes_rfrench20220702a_v1.tf
earth_flat_IAU.spk
    
```



Jupiter 2031-06-08T11:28:26 K9.32 G14.51

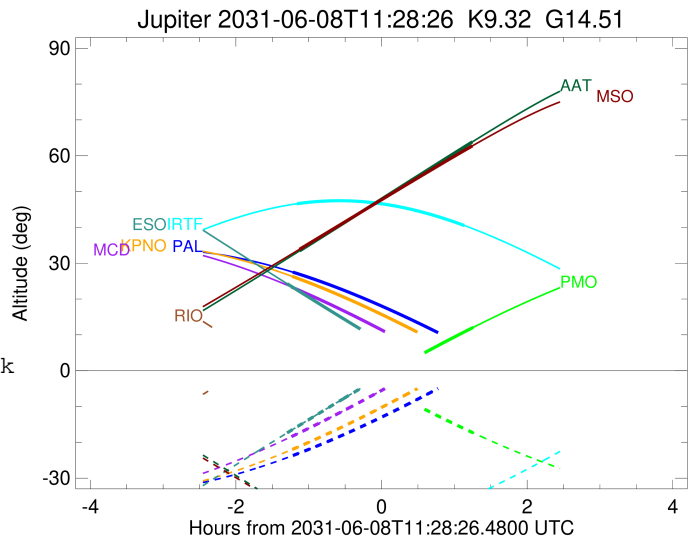
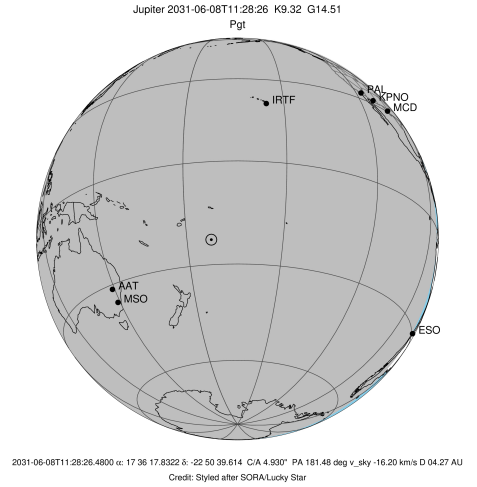


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-08T10:14:08.889	23.38	-18.42	71491.3	15.98	18.12
Jupiter	E	2031-06-08T12:33:58.135	-0.78x	7.11x	71491.3	15.56	17.65

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-08T11:27:38.480
Event type           : Pgt
: Jupiter occs: geocentric, topocentric
: Not a ringed target
Observer code        : IRTF
Location             : Mauna Kea/IRTF
Latitude (deg)       : 19.82622
E. Longitude (deg)   : 204.52800
Altitude (km)        : 4.168
Gaia source ID       : 4116786046623734144
2Mass ID (if available) : 17361783-2250395
ICRS Star Coord at Epoch: 17h 36m 17.83222s -22:50:39.61419s
RUWE (>1.4 is poor) : 1.03
K magnitude           : 9.324
G magnitude           : 14.511
RP magnitude         : 13.192
BP magnitude         : 16.558
DUPflag              : 0
Distance (au)        : 4.275
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.20
Sun-Target sep (deg) : 172.51
Sun-Moon sep (deg)   : 34.95
B (ring opening deg) : -2.60
PA of pole (deg)     : 1.72
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation ("): 6.331
C/A sky separation (km): 19630.3
NAIF SPICE kernels   : RAJobs_U111+rgf15.spk
URKALLv1.spk
naif0012.tls
nep097.bsp
nep101.bsp
sat4401.bsp
de440.bsp
earth_720101_070426.bpc
jup365.bsp
urall6.bsp
IAU_SATURN_for_RINGFIT.tpc
pck00010.tpc
earth_200101_990628_predict.bpc
uranus_ringframes_rfrench20220627_v1.tf
neptune_ringframes_rfrench20220702a_v1.tf
earth_flat_IAU.spk
    
```

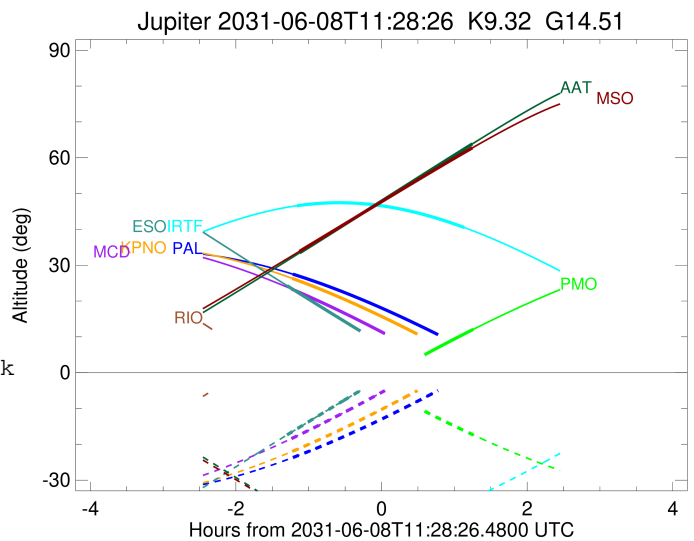
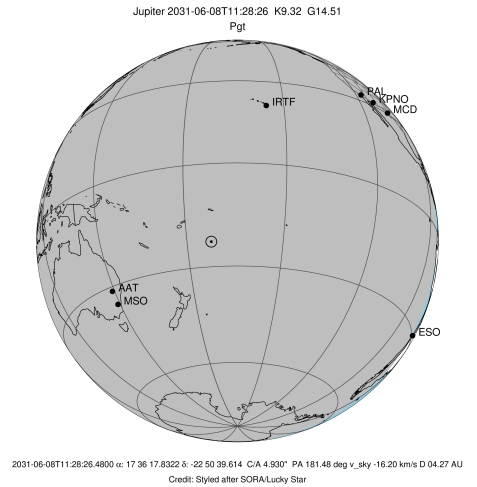


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-08T10:18:42.855	46.59	-47.45	71491.3	15.65	17.75
Jupiter	E	2031-06-08T12:36:37.808	40.52	-36.09	71491.3	16.01	18.16

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-08T11:22:46.270
Event type            : Pgt
: Jupiter occs: geocentric, topocentric
: Not a ringed target
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       : 4116786046623734144
2Mass ID (if available) : 17361783-2250395
ICRS Star Coord at Epoch: 17h 36m 17.83222s -22:50:39.61419s
RUWE (>1.4 is poor) : 1.03
K magnitude           : 9.324
G magnitude           : 14.511
RP magnitude          : 13.192
BP magnitude          : 16.558
DUPflag              : 0
Distance (au)        : 4.275
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.20
Sun-Target sep (deg) : 172.51
Sun-Moon sep (deg)   : 34.09
B (ring opening deg) : -2.60
PA of pole (deg)     : 1.72
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation ("): 4.036
C/A sky separation (km): 12513.6
NAIF SPICE kernels   : RAJobs_U111+rgf15.spk
URKALLv1.spk
naif0012.tls
nep097.bsp
nep101.bsp
sat4401.bsp
de440.bsp
earth_720101_070426.bpc
jup365.bsp
urall6.bsp
IAU_SATURN_for_RINGFIT.tpc
pck00010.tpc
earth_200101_990628_predict.bpc
uranus_ringframes_rfrench20220627_v1.tf
neptune_ringframes_rfrench20220702a_v1.tf
earth_flat_IAU.spk
    
```

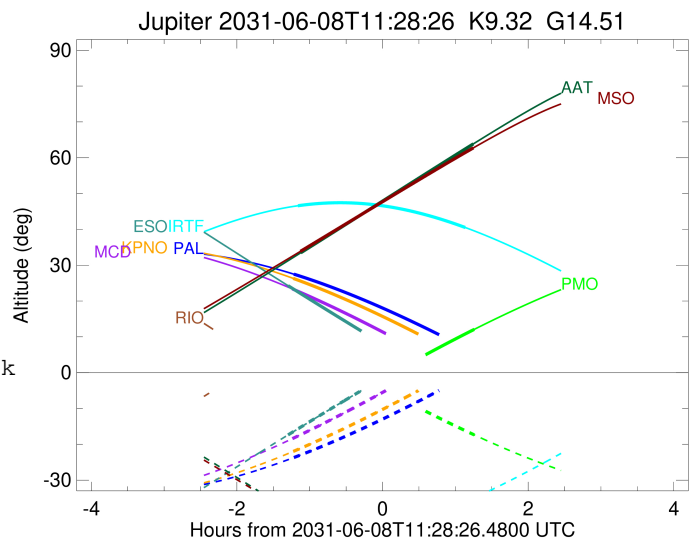
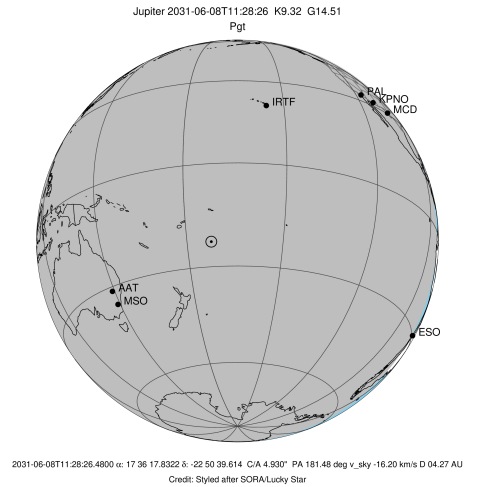


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-08T10:10:33.595	24.29	-17.39	71491.7	10.38	11.83
Jupiter	E	2031-06-08T12:35:32.071	-5.20x	11.18x	71491.7	9.75	11.11

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-08T11:32:19.590
Event type          : Pgt
                    : Jupiter occs: geocentric, topocentric
                    : Not a ringed target
Observer code       : AAT
Location            : Siding Spring (AAT)
Latitude (deg)      : -31.27703
E. Longitude (deg)  : 149.06608
Altitude (km)       : 1.164
Gaia source ID      : 4116786046623734144
2Mass ID (if available) : 17361783-2250395
ICRS Star Coord at Epoch: 17h 36m 17.83222s -22:50:39.61419s
RUWE (>1.4 is poor) : 1.03
K magnitude          : 9.324
G magnitude          : 14.511
RP magnitude         : 13.192
BP magnitude         : 16.558
DUPflag             : 0
Distance (au)       : 4.275
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -16.20
Sun-Target sep (deg) : 172.51
Sun-Moon sep (deg)  : 35.66
B (ring opening deg) : -2.60
PA of pole (deg)    : 1.72
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation ("): 4.412
C/A sky separation (km) : 13679.9
NAIF SPICE kernels  : RAJobs_U111+rgf15.spk
URKALLv1.spk
naif0012.tls
nep097.bsp
nep101.bsp
sat4401.bsp
de440.bsp
earth_720101_070426.bpc
jup365.bsp
urall6.bsp
IAU_SATURN_for_RINGFIT.tpc
pck00010.tpc
earth_200101_990628_predict.bpc
uranus_ringframes_rfrench20220627_v1.tf
neptune_ringframes_rfrench20220702a_v1.tf
earth_flat_IAU.spk
    
```



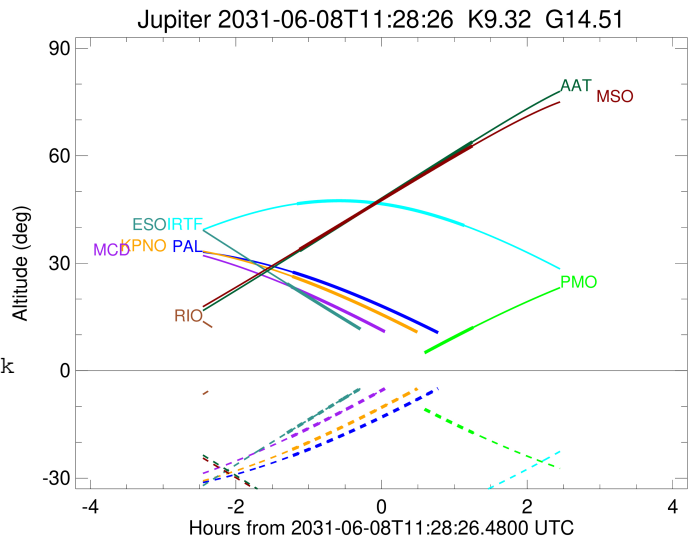
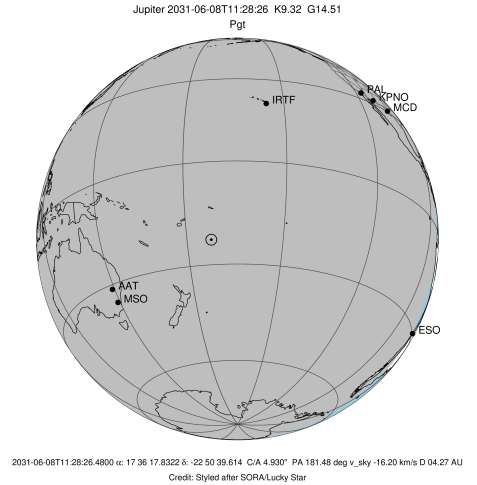
x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-08T10:21:05.484	33.47	-40.42	71491.7	10.33	11.77
Jupiter	E	2031-06-08T12:43:10.099	63.83	-70.48	71491.6	11.60	13.20



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-08T11:32:08.950
Event type            : Pgt
: Jupiter occs: geocentric, topocentric
: Not a ringed target
Observer code         : MSO
Location              : Mt. Stromlo Observatory
Latitude (deg)        : -35.32000
E. Longitude (deg)    : 149.00833
Altitude (km)         : 0.770
Gaia source ID       : 4116786046623734144
2Mass ID (if available) : 17361783-2250395
ICRS Star Coord at Epoch: 17h 36m 17.83222s -22:50:39.61419s
RUWE (>1.4 is poor)  : 1.03
K magnitude           : 9.324
G magnitude           : 14.511
RP magnitude          : 13.192
BP magnitude          : 16.558
DUPflag              : 0
Distance (au)         : 4.275
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s)  : -16.20
Sun-Target sep (deg)  : 172.51
Sun-Moon sep (deg)    : 35.64
B (ring opening deg)  : -2.60
PA of pole (deg)      : 1.72
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 4.280
C/A sky separation (km) : 13269.2
NAIF SPICE kernels    : RAJobs_U111+rgf15.spk
URKALLv1.spk
naif0012.tls
nep097.bsp
nep101.bsp
sat4401.bsp
de440.bsp
earth_720101_070426.bpc
jup365.bsp
urall6.bsp
IAU_SATURN_for_RINGFIT.tpc
pck00010.tpc
earth_200101_990628_predict.bpc
uranus_ringframes_rfrench20220627_v1.tf
neptune_ringframes_rfrench20220702a_v1.tf
earth_flat_IAU.spk
    
```



x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-08T10:20:47.246	33.85	-40.52	71491.7	10.02	11.41
Jupiter	E	2031-06-08T12:43:07.929	62.71	-68.71	71491.6	11.25	12.81