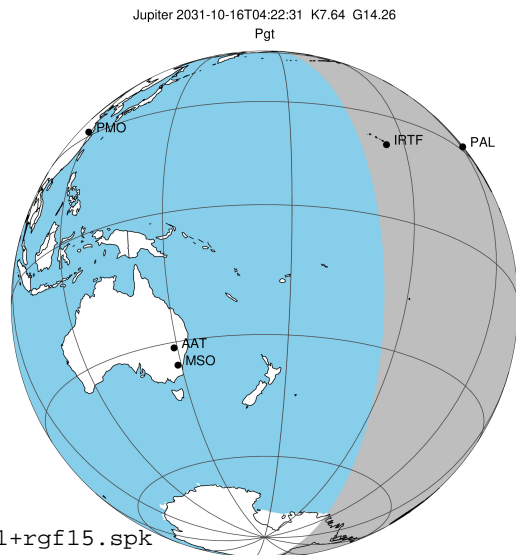


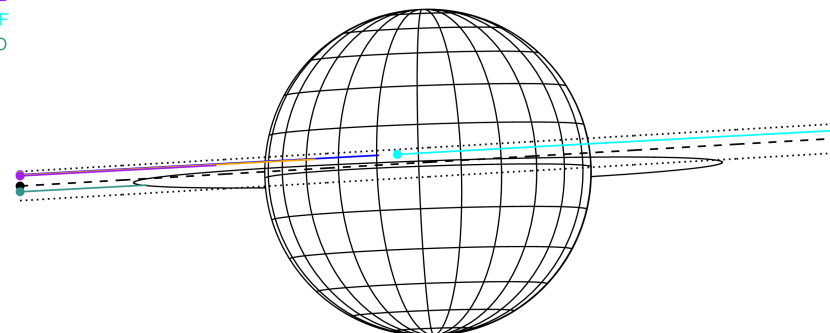
target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2031-10-16T04:22:31.800
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 4116671353819474560
 2Mass ID (if available) : 17334741-2309226

Jupiter 2031-10-16T04:22:31 K7.64 G14.26 Pgt

ICRS Star Coord at Epoch: 17h 33m 47.38833s -23°09'23.06040s
 RUWE (>1.4 is poor) : 0.85
 K magnitude : 7.645
 G magnitude : 14.264
 RP magnitude : 12.691
 BP magnitude : 17.542
 DUPflag : 0
 Distance (au) : 5.634
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : 27.22
 Sun-Target sep (deg) : 61.81
 Sun-Moon sep (deg) : 63.88
 B (ring opening deg) : -2.27
 PA of pole (deg) : 1.98
 Pole direction: RA (deg): 268.05682
 Dec (deg): 64.49652
 C/A sky separation (") : 1.099
 C/A sky separation (km) : 4492.9
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.spk
 naif0012.tls
 nep097.bsp
 nep101.bsp
 sat4401.bsp



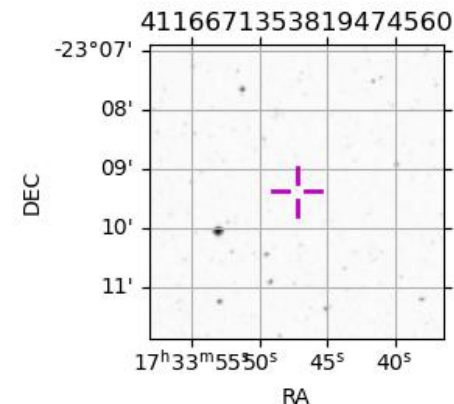
Earth
 PAL
 KPNO
 MCD
 IRTF
 ESO



2031-10-16T04:22:31.8000 cc: 17 33 47.3883 s: -23 09 23.060 C/A 1.091" PA 183.34 deg v_sky +27.22 km/s D 05.63 AU
 Credit: Styled after SORA/Lucky Star

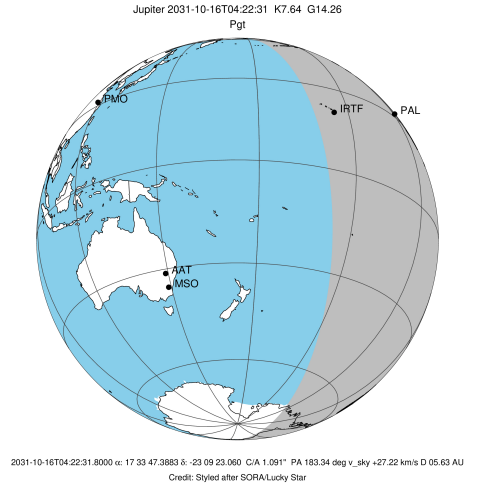
Observable events with sun below -5 deg and altitude above 5 deg

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	+	OCT 16 03:41 - OCT 16 03:41	Pin
PMO	Purple Mtn Obs. Nanking	32.1	118.8			Pnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+	OCT 16 03:41 - OCT 16 03:41	Pin
MCD	McDonald Obs. 2.7m	30.7	256.0			Pnn
TEN	Teide Obs./Tenerife	28.3	343.5			Pnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+	OCT 16 05:08 - OCT 16 05:08	Pne
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			Pnn
AAT	Siding Spring (AAT)	-31.3	149.1			Pnn
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8			Pnn
MSO	Mt. Stromlo Observatory	-35.3	149.0			Pnn

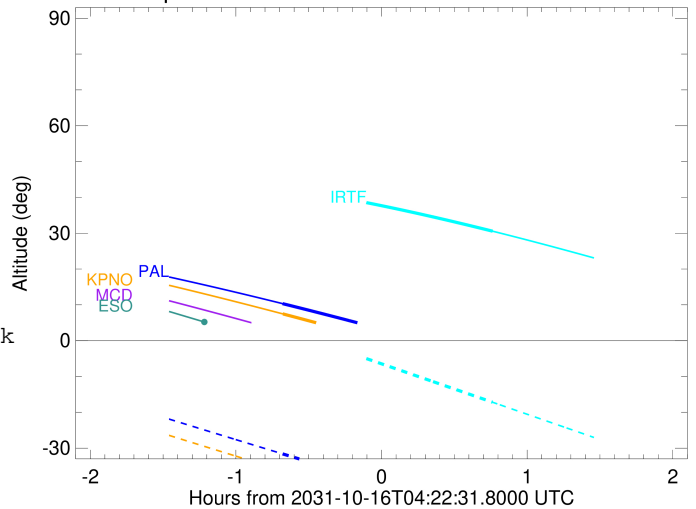


```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-10-16T04:25:29.430
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        : 4116671353819474560
2Mass ID (if available) : 17334741-2309226
ICRS Star Coord at Epoch: 17h 33m 47.38833s -23:09:23.06040s
RUWE (>1.4 is poor) : 0.85
K magnitude           : 7.645
G magnitude           : 14.264
RP magnitude          : 12.691
BP magnitude          : 17.542
DUPflag              : 0
Distance (au)         : 5.634
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : 27.22
Sun-Target sep (deg)  : 61.81
Sun-Moon sep (deg)    : 64.25
B (ring opening deg) : -2.27
PA of pole (deg)      : 1.98
Pole direction: RA (deg): 268.05682
Dec (deg): 64.49652
C/A sky separation (" ) : 2.125
C/A sky separation (km) : 8684.0
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 2031-10-16T04:22:31 K7.64 G14.26

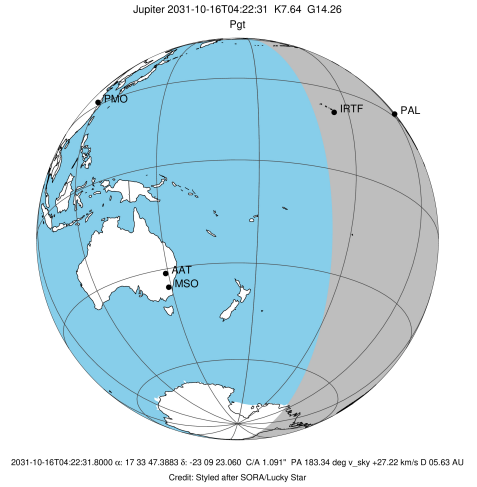


x: target alt < 5.0 deg or sun > -5.0 deg

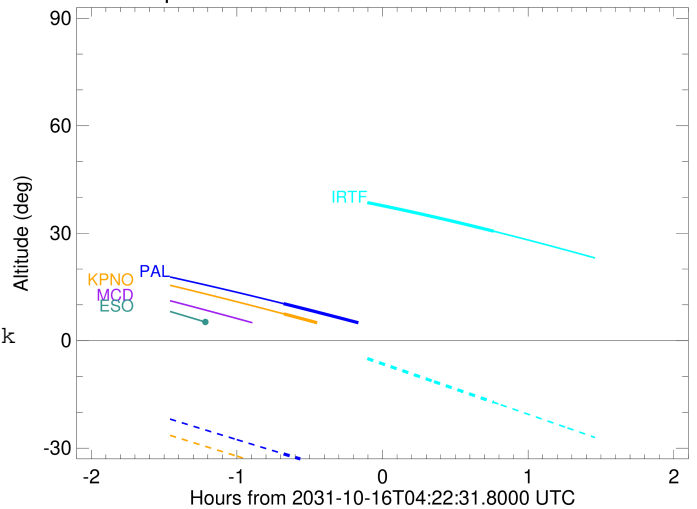
Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-10-16T03:41:45.449	10.34	-31.60	71491.9	5.89	6.73
Jupiter	E	2031-10-16T05:09:05.380	-5.46x	-48.85	71491.9	8.02	9.16

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-10-16T04:25:38.410
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      : 4116671353819474560
2Mass ID (if available) : 17334741-2309226
ICRS Star Coord at Epoch: 17h 33m 47.38833s -23:09:23.06040s
RUWE (>1.4 is poor) : 0.85
K magnitude          : 7.645
G magnitude          : 14.264
RP magnitude         : 12.691
BP magnitude         : 17.542
DUPflag             : 0
Distance (au)       : 5.634
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : 27.22
Sun-Target sep (deg) : 61.81
Sun-Moon sep (deg)  : 64.22
B (ring opening deg) : -2.27
PA of pole (deg)    : 1.98
Pole direction: RA (deg): 268.05682
Dec (deg): 64.49652
C/A sky separation (" ) : 2.056
C/A sky separation (km) : 8400.4
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 2031-10-16T04:22:31 K7.64 G14.26

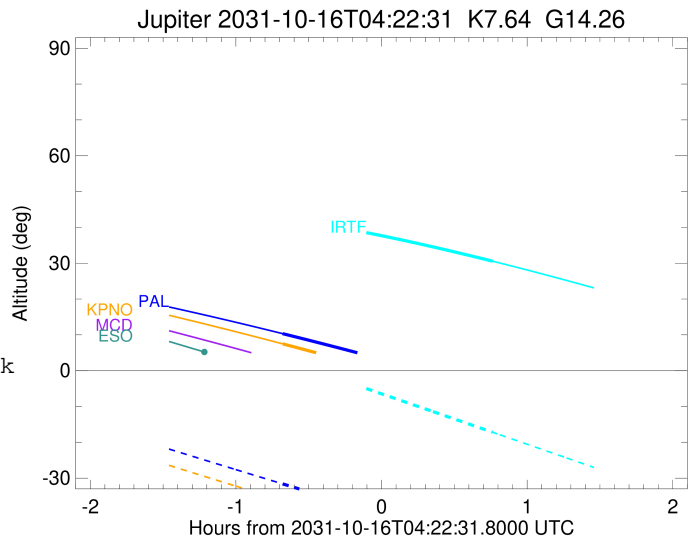
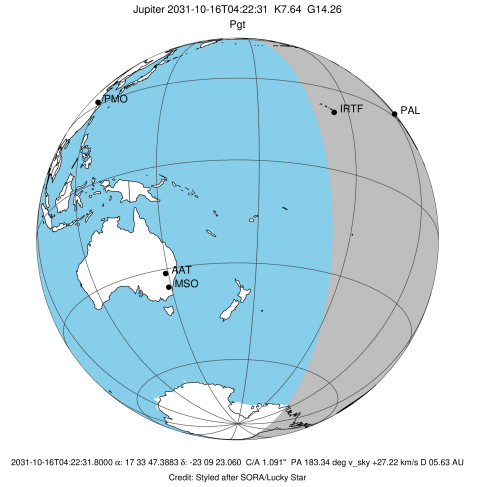


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-10-16T03:41:56.159	7.46	-36.27	71491.9	5.68	6.49
Jupiter	E	2031-10-16T05:09:12.335	-9.03x	-53.40	71491.9	7.78	8.88

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-10-16T04:24:18.590
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      : 4116671353819474560
2Mass ID (if available) : 17334741-2309226
ICRS Star Coord at Epoch: 17h 33m 47.38833s -23:09:23.06040s
RUWE (>1.4 is poor) : 0.85
K magnitude          : 7.645
G magnitude          : 14.264
RP magnitude         : 12.691
BP magnitude         : 17.542
DUPflag             : 0
Distance (au)       : 5.634
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : 27.22
Sun-Target sep (deg) : 61.81
Sun-Moon sep (deg)  : 64.60
B (ring opening deg) : -2.27
PA of pole (deg)    : 1.98
Pole direction: RA (deg): 268.05682
Dec (deg): 64.49652
C/A sky separation (" ) : 2.119
C/A sky separation (km) : 8657.3
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	2031-10-16T03:40:12.422	42.84	3.39x	71491.9	5.71	6.52
Jupiter	E	2031-10-16T05:08:19.235	30.56	-17.19	71491.9	8.13	9.27