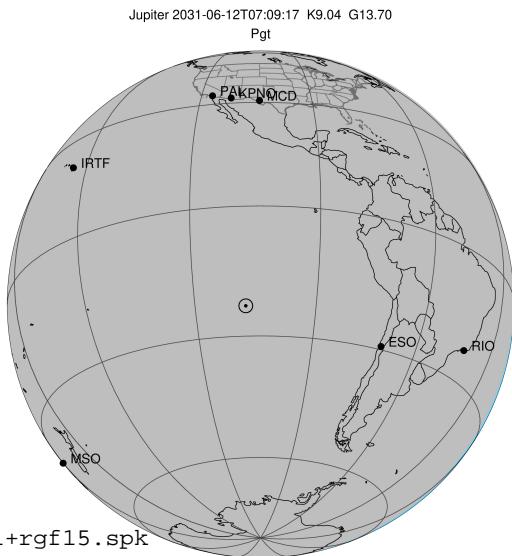


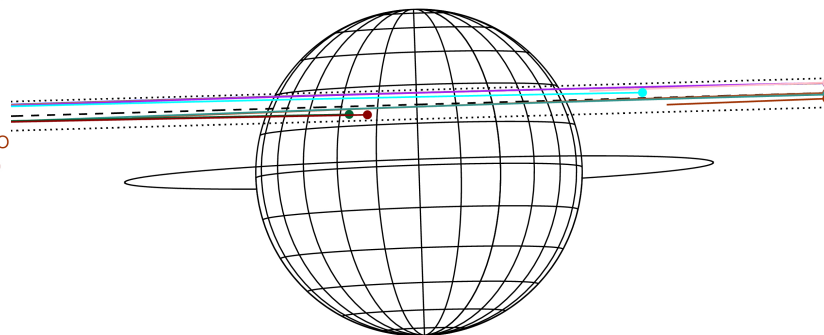
target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2031-06-12T07:09:17.820
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 4116709183908789376
 2Mass ID (if available) : 17341213-2249474

Jupiter 2031-06-12T07:09:17 K9.04 G13.70 Pgt

ICRS Star Coord at Epoch: 17h 34m 12.13039s -22:49:47.61360s
 RUWE (>1.4 is poor) : 0.94
 K magnitude : 9.036
 G magnitude : 13.702
 RP magnitude : 12.500
 BP magnitude : 15.290
 DUPflag : 0
 Distance (au) : 4.268
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -16.41
 Sun-Target sep (deg) : 176.63
 Sun-Moon sep (deg) : 89.13
 B (ring opening deg) : -2.60
 PA of pole (deg) : 1.94
 Pole direction: RA (deg): 268.05692
 Dec (deg): 64.49651
 C/A sky separation (") : 9.623
 C/A sky separation (km) : 29784.0
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk



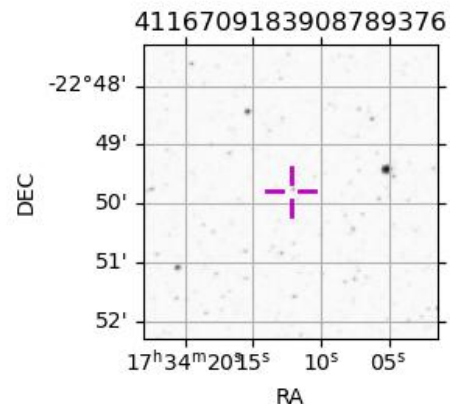
Earth
 PAL
 KPNO
 MCD
 TEN
 IRTF
 RIO
 ESO
 AAT
 SAAO
 MSO



2031-06-12T07:09:17.8200 at: 17 34 12.1304 s: -22 49 47.614 C/A 9.611" PA 181.64 deg v_sky -16.41 km/s D 04.27 AU
 Credit: Styled after SORA/Lucky Star

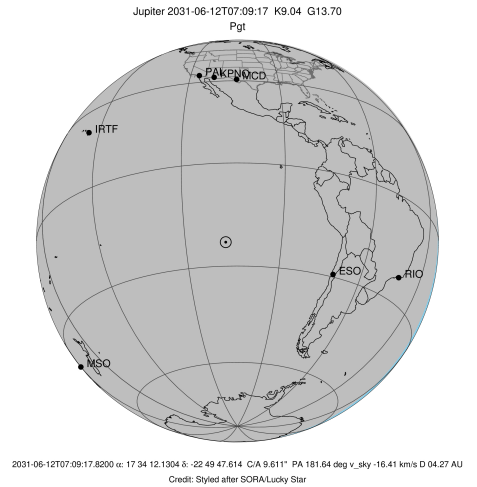
Observable events with sun below -5 deg and altitude above 5 deg

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 12 06:08 - JUN 12 08:12	Pie
PMO	Purple Mtn Obs. Nanking	32.1	118.8			Pnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+ +	JUN 12 06:08 - JUN 12 08:11	Pie
MCD	McDonald Obs. 2.7m	30.7	256.0	+ +	JUN 12 06:07 - JUN 12 08:11	Pie
TEN	Teide Obs./Tenerife	28.3	343.5			Pnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+ +	JUN 12 06:10 - JUN 12 08:16	Pie
KAV	Kavalur Observatory	12.6	78.8			Pnn
RIO	Rio de Janeiro	-22.9	316.8	+ +	JUN 12 05:59 - JUN 12 08:10	Pie
ESO	European Southern Obs. (3.6m)	-29.3	289.3	+ +	JUN 12 06:01 - JUN 12 08:11	Pie
AAT	Siding Spring (AAT)	-31.3	149.1	+ +	JUN 12 08:22 - JUN 12 08:22	Pne
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8			Pnn
MSO	Mt. Stromlo Observatory	-35.3	149.0	+ +	JUN 12 08:22 - JUN 12 08:22	Pne

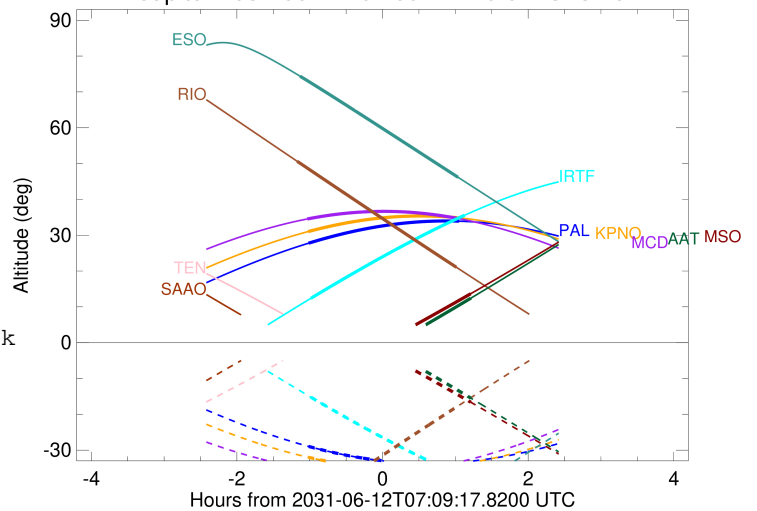


```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-12T07:10:32.550
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      : 4116709183908789376
2Mass ID (if available) : 17341213-2249474
ICRS Star Coord at Epoch: 17h 34m 12.13039s -22:49:47.61360s
RUWE (>1.4 is poor) : 0.94
K magnitude          : 9.036
G magnitude          : 13.702
RP magnitude         : 12.500
BP magnitude         : 15.290
DUPflag             : 0
Distance (au)       : 4.268
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.41
Sun-Target sep (deg) : 176.63
Sun-Moon sep (deg)  : 89.65
B (ring opening deg) : -2.60
PA of pole (deg)    : 1.94
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 11.304
C/A sky separation (km) : 34986.3
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
    
```



Jupiter 2031-06-12T07:09:17 K9.04 G13.70

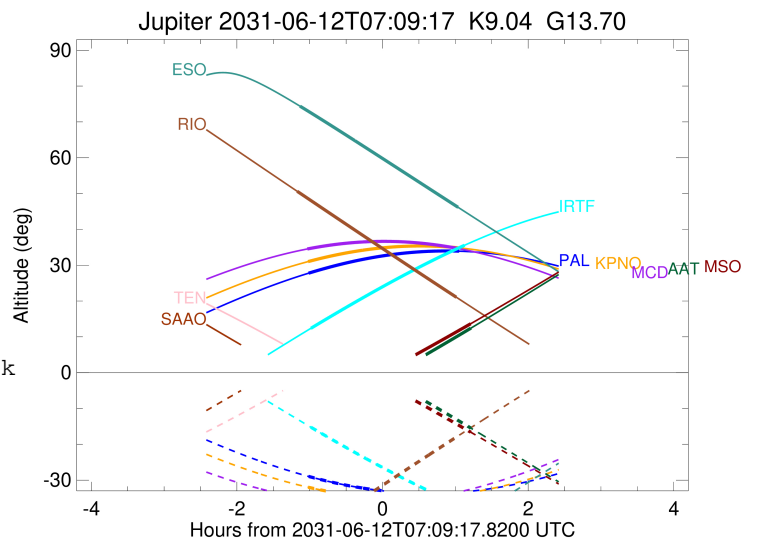
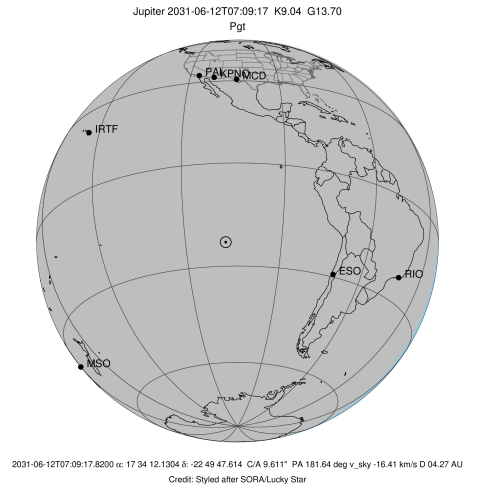


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-12T06:08:33.406	27.78	-28.97	71489.9	28.75	32.05
Jupiter	E	2031-06-12T08:12:26.154	33.91	-33.36	71489.7	29.65	33.00

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-12T07:10:06.020
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      : 4116709183908789376
2Mass ID (if available) : 17341213-2249474
ICRS Star Coord at Epoch: 17h 34m 12.13039s -22:49:47.61360s
RUWE (>1.4 is poor) : 0.94
K magnitude          : 9.036
G magnitude          : 13.702
RP magnitude         : 12.500
BP magnitude         : 15.290
DUPflag             : 0
Distance (au)       : 4.268
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.41
Sun-Target sep (deg) : 176.63
Sun-Moon sep (deg)  : 89.68
B (ring opening deg) : -2.60
PA of pole (deg)    : 1.94
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation ("): 11.290
C/A sky separation (km): 34943.6
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
    
```

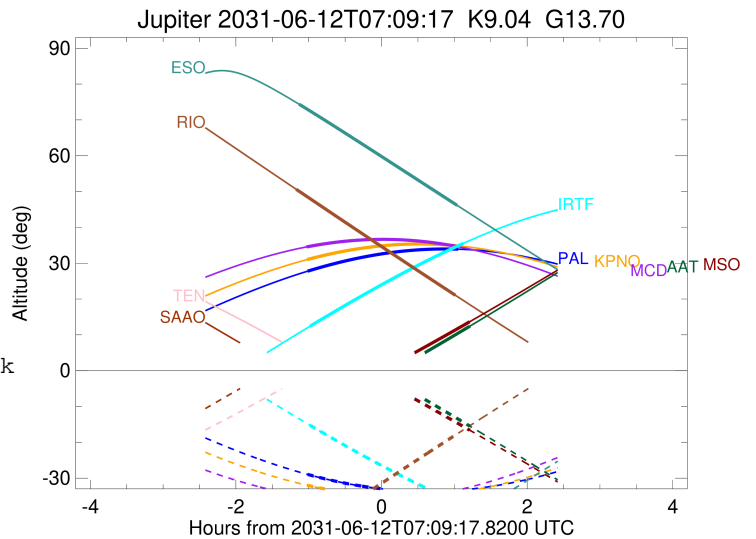
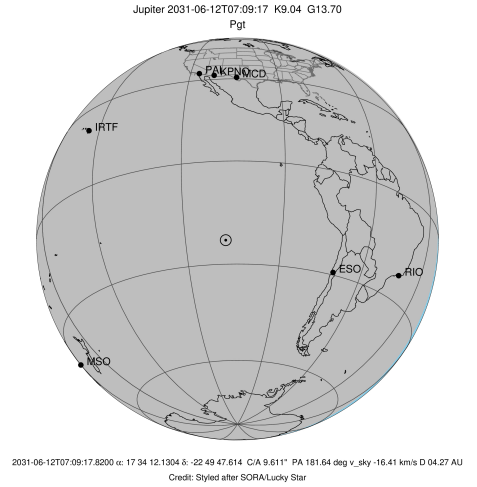


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-12T06:08:09.099	31.02	-31.99	71489.9	28.75	32.05
Jupiter	E	2031-06-12T08:11:59.374	34.85	-33.99	71489.7	29.56	32.91

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-12T07:09:25.870
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       : 4116709183908789376
2Mass ID (if available) : 17341213-2249474
ICRS Star Coord at Epoch: 17h 34m 12.13039s -22:49:47.61360s
RUWE (>1.4 is poor) : 0.94
K magnitude           : 9.036
G magnitude           : 13.702
RP magnitude          : 12.500
BP magnitude          : 15.290
DUPflag              : 0
Distance (au)        : 4.268
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.41
Sun-Target sep (deg) : 176.63
Sun-Moon sep (deg)   : 89.70
B (ring opening deg) : -2.60
PA of pole (deg)     : 1.94
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 11.275
C/A sky separation (km) : 34896.1
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
    
```

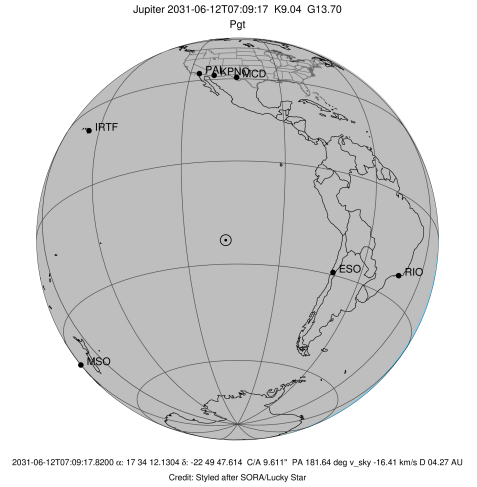


x: target alt < 5.0 deg or sun > -5.0 deg

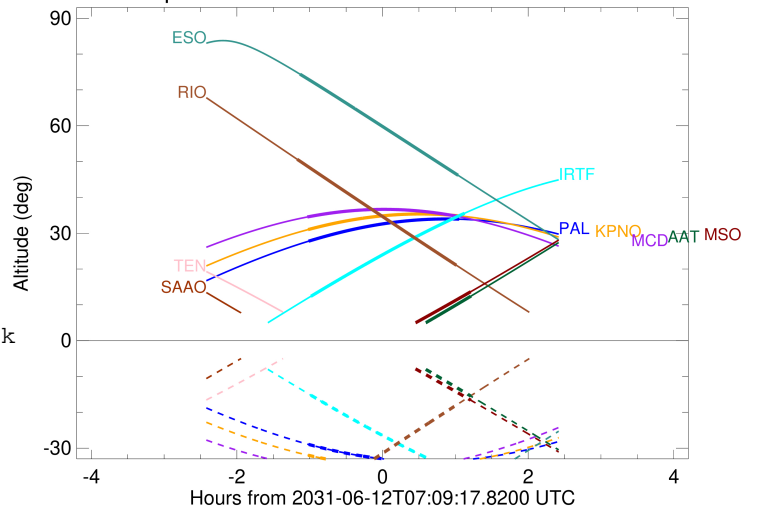
Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-12T06:07:30.835	34.53	-35.12	71489.9	28.77	32.07
Jupiter	E	2031-06-12T08:11:20.300	34.67	-33.39	71489.8	29.45	32.79

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-12T07:13:49.160
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       : 4116709183908789376
2Mass ID (if available) : 17341213-2249474
ICRS Star Coord at Epoch: 17h 34m 12.13039s -22:49:47.61360s
RUWE (>1.4 is poor) : 0.94
K magnitude           : 9.036
G magnitude           : 13.702
RP magnitude         : 12.500
BP magnitude         : 15.290
DUPflag              : 0
Distance (au)        : 4.268
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.41
Sun-Target sep (deg) : 176.63
Sun-Moon sep (deg)   : 89.53
B (ring opening deg) : -2.60
PA of pole (deg)     : 1.94
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 10.704
C/A sky separation (km) : 33128.9
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
    
```



Jupiter 2031-06-12T07:09:17 K9.04 G13.70

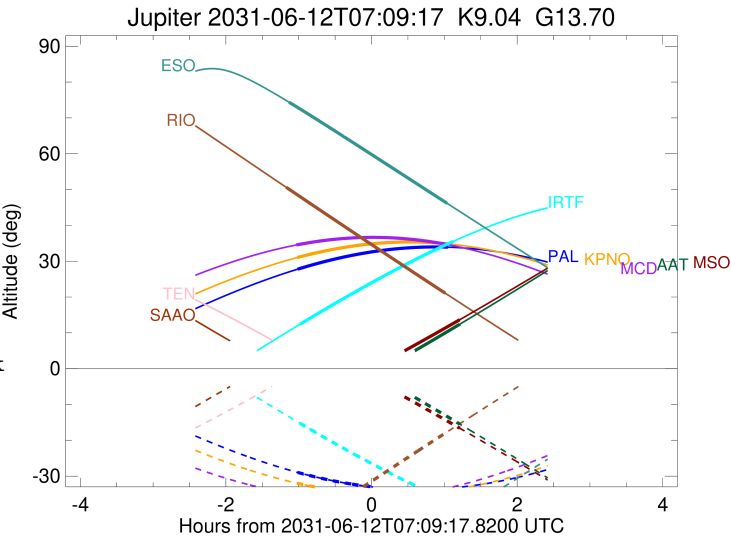
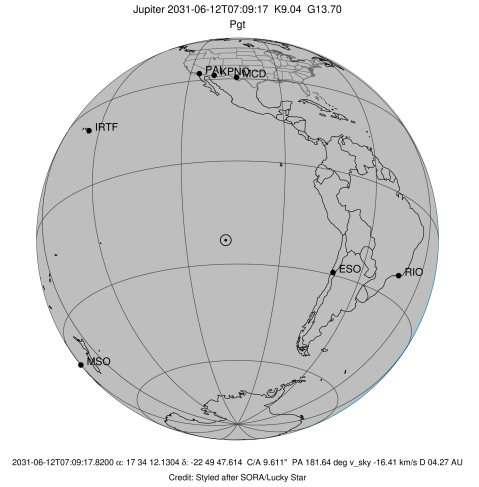


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-12T06:10:19.784	12.39	-15.23	71490.1	26.76	29.92
Jupiter	E	2031-06-12T08:16:57.279	35.57	-37.45	71489.9	28.30	31.57

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-12T07:04:22.860
Event type          : Pgt
                    : Jupiter occs: geocentric, topocentric
                    : Not a ringed target
Observer code       : RIO
Location            : Rio de Janeiro
Latitude (deg)      : -22.89506
E. Longitude (deg)  : 316.77708
Altitude (km)       : 0.033
Gaia source ID      : 4116709183908789376
2Mass ID (if available) : 17341213-2249474
ICRS Star Coord at Epoch: 17h 34m 12.13039s -22:49:47.61360s
RUWE (>1.4 is poor) : 0.94
K magnitude          : 9.036
G magnitude          : 13.702
RP magnitude         : 12.500
BP magnitude         : 15.290
DUPflag             : 0
Distance (au)       : 4.268
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.41
Sun-Target sep (deg) : 176.63
Sun-Moon sep (deg)  : 89.67
B (ring opening deg) : -2.60
PA of pole (deg)    : 1.94
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation ("): 9.307
C/A sky separation (km): 28806.8
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
    
```

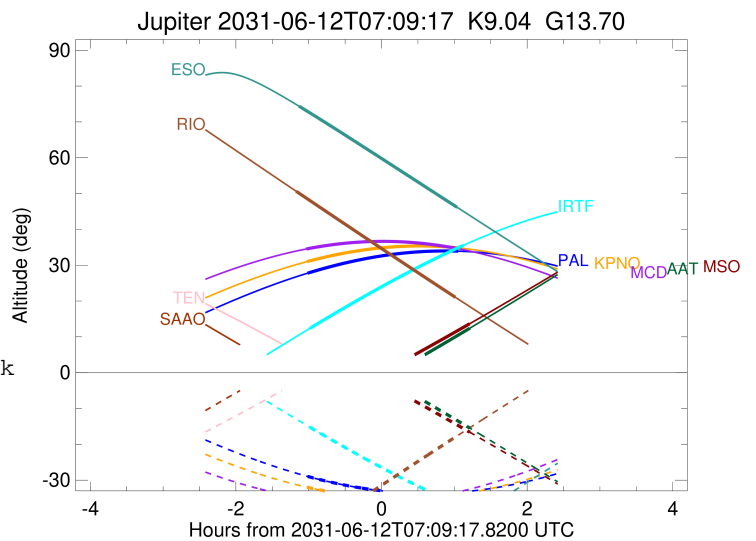
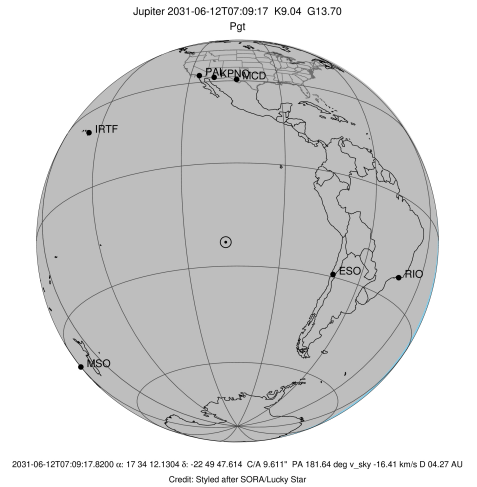


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-12T05:58:59.510	50.63	-47.30	71490.5	23.85	26.78
Jupiter	E	2031-06-12T08:10:10.155	21.05	-17.97	71490.5	23.52	26.43

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-12T07:06:23.050
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      : 4116709183908789376
2Mass ID (if available) : 17341213-2249474
ICRS Star Coord at Epoch: 17h 34m 12.13039s -22:49:47.61360s
RUWE (>1.4 is poor) : 0.94
K magnitude          : 9.036
G magnitude          : 13.702
RP magnitude         : 12.500
BP magnitude         : 15.290
DUPflag             : 0
Distance (au)       : 4.268
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.41
Sun-Target sep (deg) : 176.63
Sun-Moon sep (deg)  : 89.96
B (ring opening deg) : -2.60
PA of pole (deg)    : 1.94
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 9.315
C/A sky separation (km) : 28831.7
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
    
```

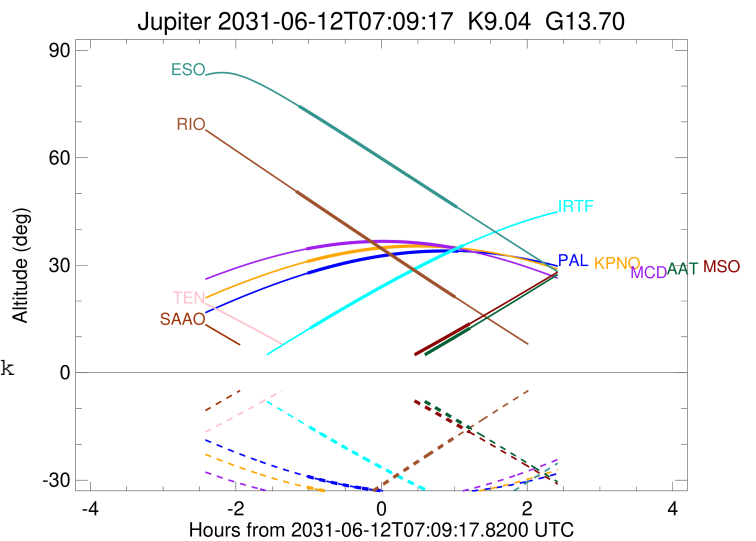
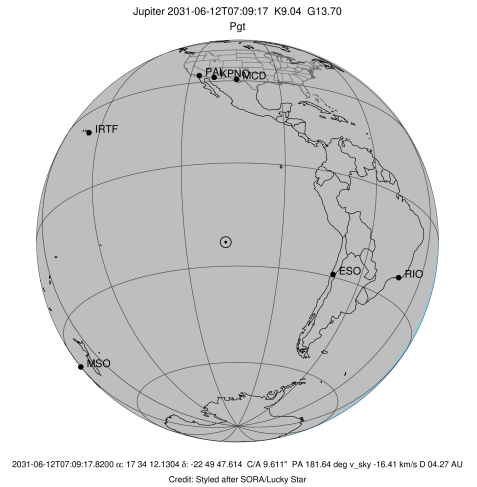


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-12T06:01:23.010	74.37	-71.40	71490.5	23.64	26.56
Jupiter	E	2031-06-12T08:11:36.612	46.15	-43.11	71490.5	23.74	26.66

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-12T07:14:17.650
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      : 4116709183908789376
2Mass ID (if available) : 17341213-2249474
ICRS Star Coord at Epoch: 17h 34m 12.13039s -22:49:47.61360s
RUWE (>1.4 is poor) : 0.94
K magnitude          : 9.036
G magnitude          : 13.702
RP magnitude         : 12.500
BP magnitude         : 15.290
DUPflag             : 0
Distance (au)       : 4.268
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -16.41
Sun-Target sep (deg) : 176.63
Sun-Moon sep (deg)  : 89.11
B (ring opening deg) : -2.60
PA of pole (deg)    : 1.94
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 8.412
C/A sky separation (km) : 26036.7
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
    
```

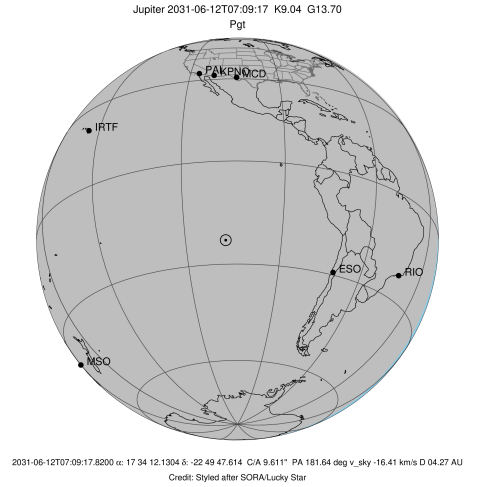


x: target alt < 5.0 deg or sun > -5.0 deg

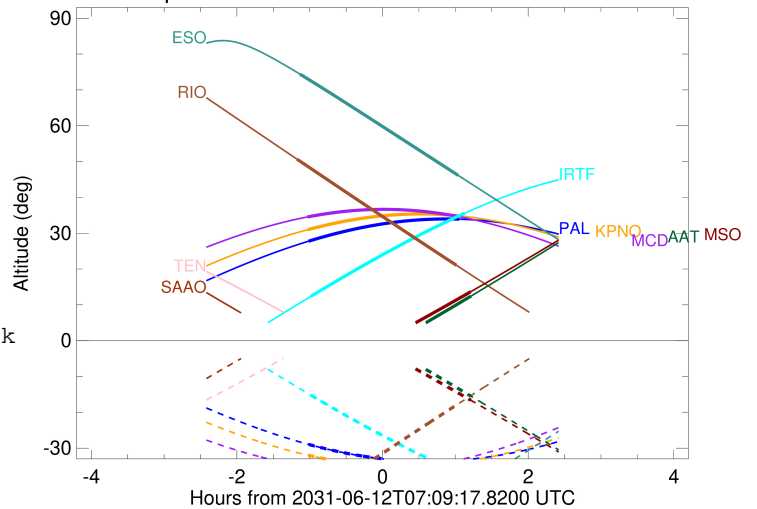
Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-12T06:05:59.925	-13.30x	10.56x	71490.9	20.55	23.18
Jupiter	E	2031-06-12T08:22:07.162	12.42	-15.47	71490.7	22.17	24.95


```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-12T07:14:03.360
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        : 4116709183908789376
2Mass ID (if available) : 17341213-2249474
ICRS Star Coord at Epoch: 17h 34m 12.13039s -22:49:47.61360s
RUWE (>1.4 is poor) : 0.94
K magnitude           : 9.036
G magnitude           : 13.702
RP magnitude          : 12.500
BP magnitude          : 15.290
DUPflag              : 0
Distance (au)         : 4.268
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.41
Sun-Target sep (deg) : 176.63
Sun-Moon sep (deg)   : 89.14
B (ring opening deg) : -2.60
PA of pole (deg)     : 1.94
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 8.310
C/A sky separation (km) : 25719.9
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
    
```



Jupiter 2031-06-12T07:09:17 K9.04 G13.70



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	2031-06-12T06:05:39.721	-10.92x	8.30x	71490.9	20.30	22.91
Jupiter	E	2031-06-12T08:21:59.974	13.66	-16.61	71490.7	21.87	24.63