

target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2031-06-07T06:13:46.500
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 4116744226440676736
 2Mass ID (if available) : 17365744-2251006

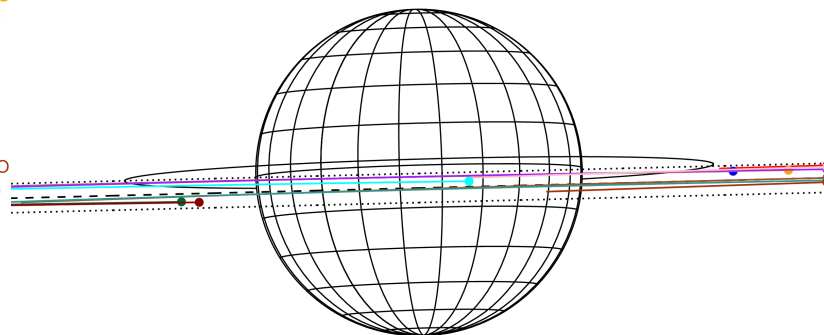
Jupiter 2031-06-07T06:13:46 K9.52 G14.19 Pgt

ICRS Star Coord at Epoch: 17h 36m 57.45275s -22:51:00.67444s

RUWE (>1.4 is poor) : 0.91
 K magnitude : 9.519
 G magnitude : 14.189
 RP magnitude : 12.992
 BP magnitude : 15.734
 DUPflag : 0
 Distance (au) : 4.278
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -16.10
 Sun-Target sep (deg) : 171.20
 Sun-Moon sep (deg) : 16.36
 B (ring opening deg) : -2.60
 PA of pole (deg) : 1.64
 Pole direction: RA (deg): 268.05693
 Dec (deg): 64.49651
 C/A sky separation (") : 2.192
 C/A sky separation (km) : 6799.9
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk



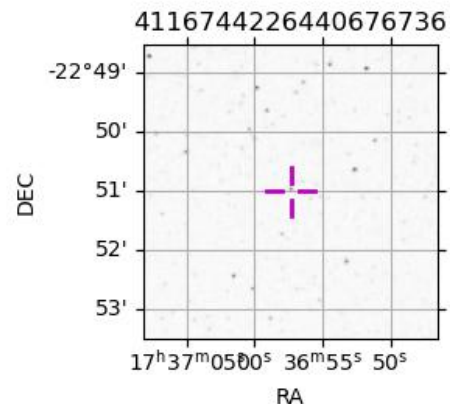
Earth
 PIC
 PAL
 KPNO
 MCD
 TEN
 IRTF
 RIO
 ESO
 AAT
 SAAO
 MSO



2031-06-07T06:13:46.5000 a: 17 36 57.4527 s: -22 51 00.674 C/A 2.204" PA 1.43 deg v_sky -16.10 km/s D 04.28 AU
 Credit: Styled after SORA/Lucky Star

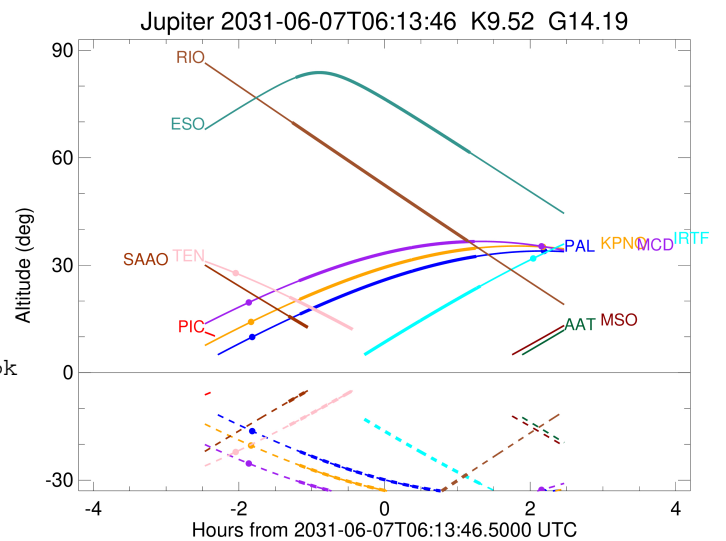
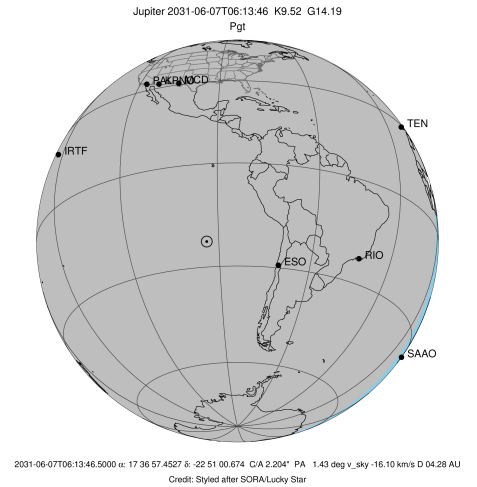
Observable events with sun below -5 deg and altitude above 5 deg

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 07 05:04 - JUN 07 07:29	Pie
PMO	Purple Mtn Obs. Nanking	32.1	118.8			Pnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+ +	JUN 07 05:03 - JUN 07 07:28	Pie
MCD	McDonald Obs. 2.7m	30.7	256.0	+ +	JUN 07 05:03 - JUN 07 07:28	Pie
TEN	Teide Obs./Tenerife	28.3	343.5	+	JUN 07 04:55 - JUN 07 04:55	Pin
IRTF	Mauna Kea/IRTF	19.8	204.5	+	JUN 07 07:32 - JUN 07 07:32	Pne
KAV	Kavalur Observatory	12.6	78.8			Pnn
RIO	Rio de Janeiro	-22.9	316.8	+ +	JUN 07 04:57 - JUN 07 07:22	Pie
ESO	European Southern Obs. (3.6m)	-29.3	289.3	+ +	JUN 07 05:00 - JUN 07 07:24	Pie
AAT	Siding Spring (AAT)	-31.3	149.1			Pnn
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8	+	JUN 07 04:54 - JUN 07 04:54	Pin
MSO	Mt. Stromlo Observatory	-35.3	149.0			Pnn



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-07T06:16:48.980
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        : 4116744226440676736
2Mass ID (if available) : 17365744-2251006
ICRS Star Coord at Epoch: 17h 36m 57.45275s -22:51:00.67444s
RUWE (>1.4 is poor) : 0.91
K magnitude           : 9.519
G magnitude           : 14.189
RP magnitude          : 12.992
BP magnitude          : 15.734
DUPflag              : 0
Distance (au)         : 4.278
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.10
Sun-Target sep (deg)  : 171.20
Sun-Moon sep (deg)    : 16.83
B (ring opening deg) : -2.60
PA of pole (deg)      : 1.64
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (" ) : 0.609
C/A sky separation (km) : 1888.9
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
    
```

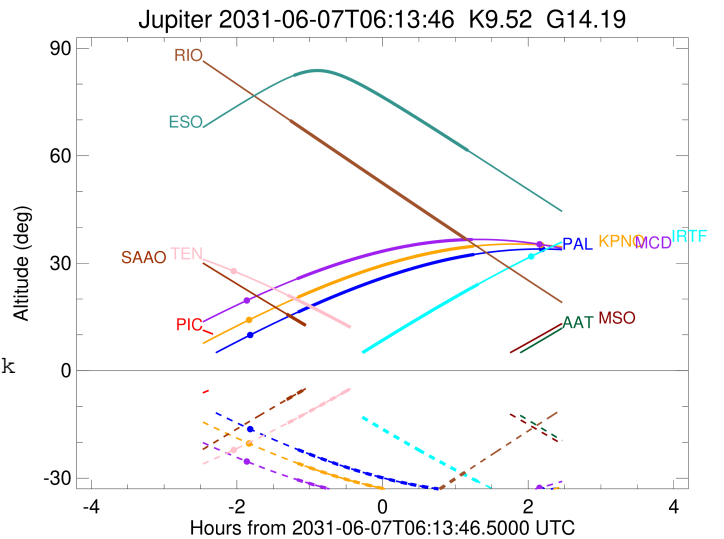
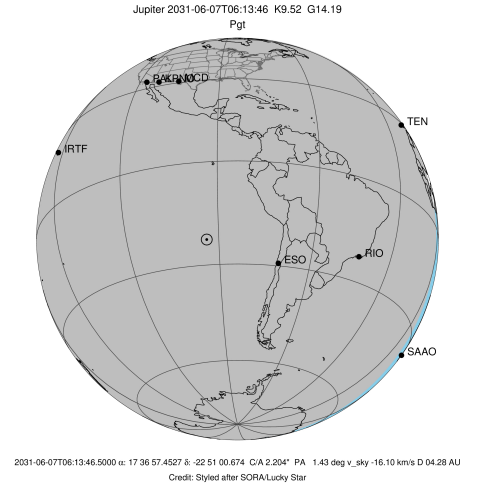


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-07T05:04:07.063	16.35	-22.04	71492.0	-2.09	-2.39
Jupiter	E	2031-06-07T07:29:12.548	32.44	-33.94	71492.0	-1.07	-1.22

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-07T06:16:25.210
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      : 4116744226440676736
2Mass ID (if available) : 17365744-2251006
ICRS Star Coord at Epoch: 17h 36m 57.45275s -22:51:00.67444s
RUWE (>1.4 is poor) : 0.91
K magnitude          : 9.519
G magnitude          : 14.189
RP magnitude         : 12.992
BP magnitude         : 15.734
DUPflag             : 0
Distance (au)       : 4.278
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -16.10
Sun-Target sep (deg) : 171.20
Sun-Moon sep (deg)  : 16.79
B (ring opening deg) : -2.60
PA of pole (deg)    : 1.64
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (" ) : 0.606
C/A sky separation (km) : 1879.7
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
    
```

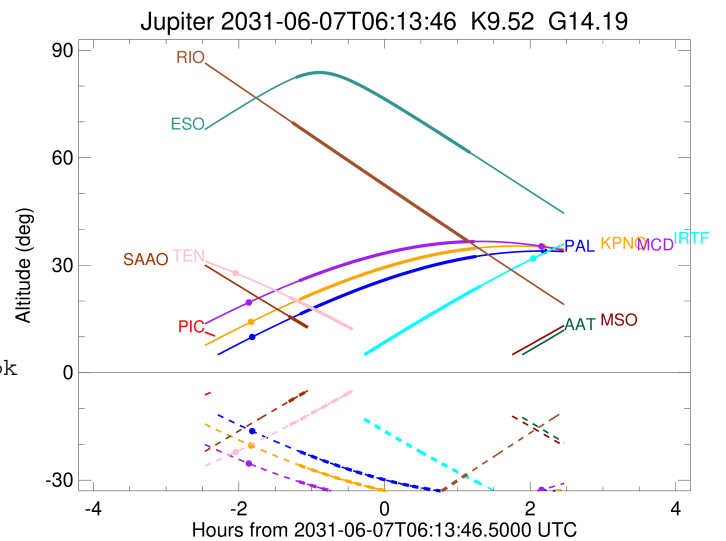
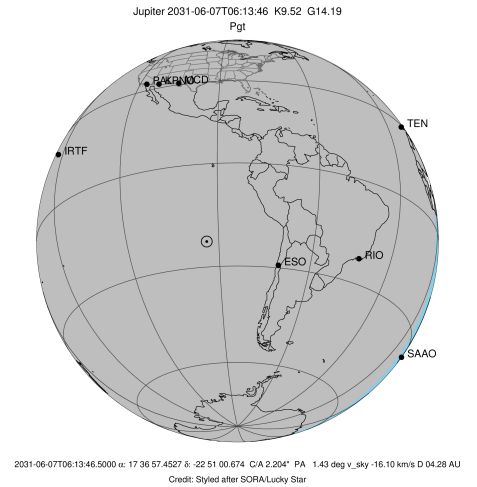


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-07T05:03:50.422	20.46	-25.85	71492.0	-2.06	-2.35
Jupiter	E	2031-06-07T07:28:44.030	34.73	-35.47	71492.0	-1.10	-1.26

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-07T06:15:46.580
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       : 4116744226440676736
2Mass ID (if available) : 17365744-2251006
ICRS Star Coord at Epoch: 17h 36m 57.45275s -22:51:00.67444s
RUWE (>1.4 is poor) : 0.91
K magnitude           : 9.519
G magnitude           : 14.189
RP magnitude         : 12.992
BP magnitude         : 15.734
DUPflag              : 0
Distance (au)        : 4.278
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.10
Sun-Target sep (deg) : 171.20
Sun-Moon sep (deg)   : 16.71
B (ring opening deg) : -2.60
PA of pole (deg)     : 1.64
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (") : 0.595
C/A sky separation (km) : 1845.4
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
    
```

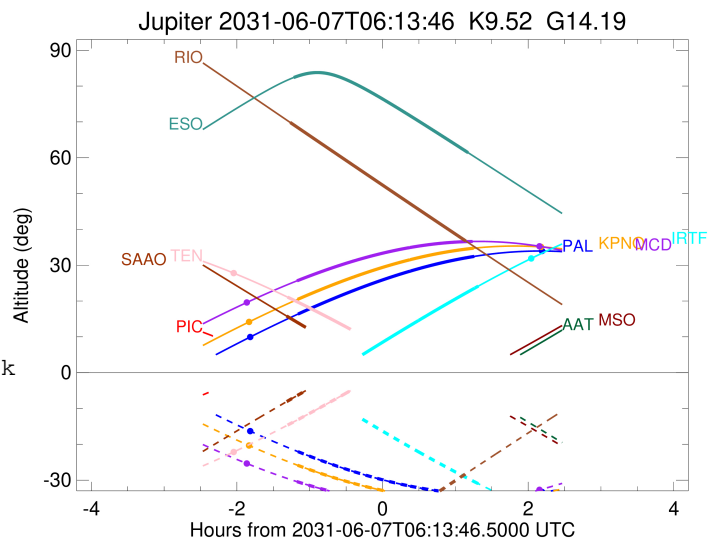
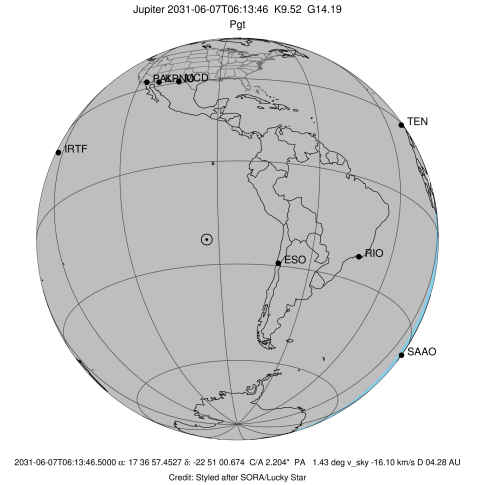


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-07T05:03:20.250	25.63	-30.42	71492.0	-1.97	-2.26
Jupiter	E	2031-06-07T07:28:00.730	36.62	-36.17	71492.0	-1.14	-1.30

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-07T06:08:29.790
Event type          : Pgt
                    : Jupiter occs: geocentric, topocentric
                    : Not a ringed target
Observer code       : TEN
Location            : Teide Obs./Tenerife
Latitude (deg)      : 28.30050
E. Longitude (deg)  : 343.48909
Altitude (km)       : 2.395
Gaia source ID      : 4116744226440676736
2Mass ID (if available) : 17365744-2251006
ICRS Star Coord at Epoch: 17h 36m 57.45275s -22:51:00.67444s
RUWE (>1.4 is poor) : 0.91
K magnitude          : 9.519
G magnitude          : 14.189
RP magnitude         : 12.992
BP magnitude         : 15.734
DUPflag             : 0
Distance (au)       : 4.278
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.10
Sun-Target sep (deg) : 171.20
Sun-Moon sep (deg)  : 15.53
B (ring opening deg) : -2.60
PA of pole (deg)    : 1.64
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation ("): 0.981
C/A sky separation (km): 3043.9
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
    
```

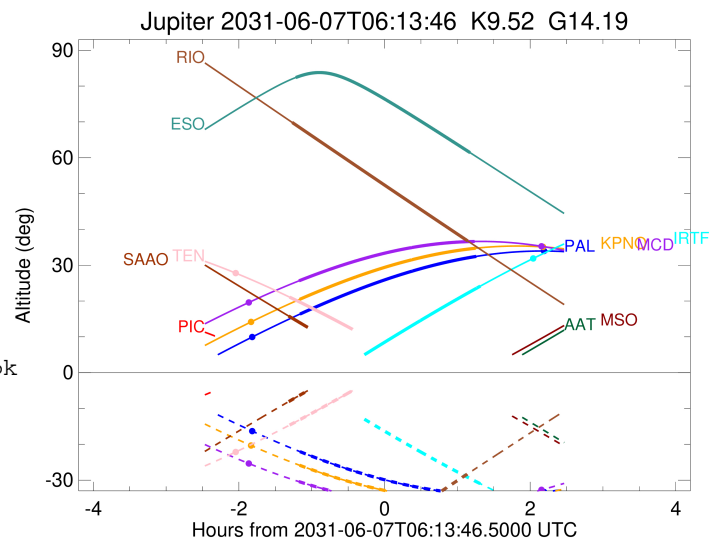
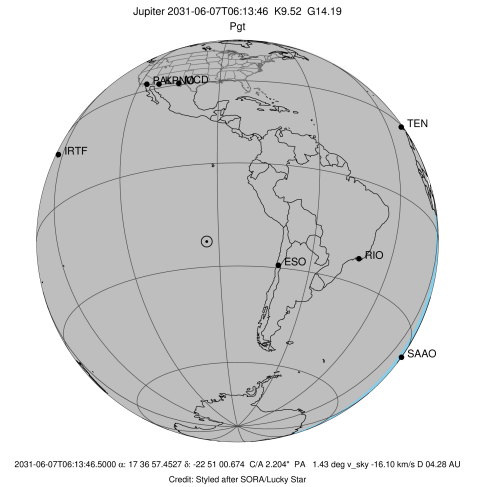


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-07T04:55:32.598	21.08	-14.64	71492.0	-2.20	-2.52
Jupiter	E	2031-06-07T07:21:58.073	-6.29x	14.06x	71492.0	-2.76	-3.16

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-07T06:19:42.960
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      : 4116744226440676736
2Mass ID (if available) : 17365744-2251006
ICRS Star Coord at Epoch: 17h 36m 57.45275s -22:51:00.67444s
RUWE (>1.4 is poor) : 0.91
K magnitude          : 9.519
G magnitude          : 14.189
RP magnitude         : 12.992
BP magnitude         : 15.734
DUPflag             : 0
Distance (au)       : 4.278
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.10
Sun-Target sep (deg) : 171.20
Sun-Moon sep (deg)  : 17.21
B (ring opening deg) : -2.60
PA of pole (deg)    : 1.64
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (" ) : 1.333
C/A sky separation (km) : 4134.7
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
    
```

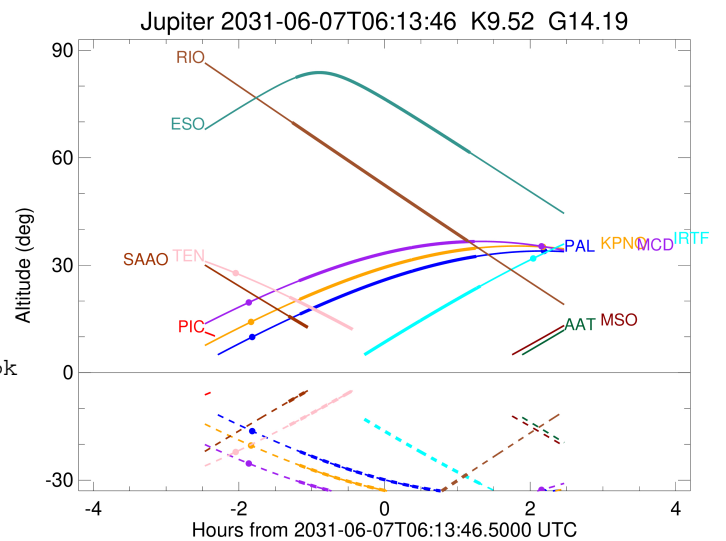
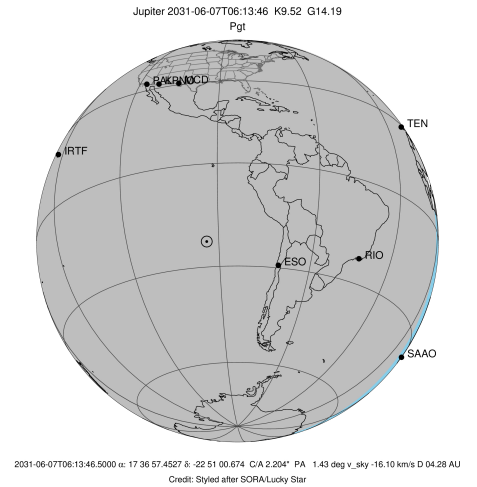


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-07T05:06:10.268	-5.99x	-2.34x	71492.0	-4.12	-4.71
Jupiter	E	2031-06-07T07:32:39.148	24.14	-30.98	71492.0	-2.57	-2.93

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-07T06:09:48.500
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        : 4116744226440676736
2Mass ID (if available) : 17365744-2251006
ICRS Star Coord at Epoch: 17h 36m 57.45275s -22:51:00.67444s
RUWE (>1.4 is poor) : 0.91
K magnitude           : 9.519
G magnitude           : 14.189
RP magnitude          : 12.992
BP magnitude          : 15.734
DUPflag              : 0
Distance (au)         : 4.278
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.10
Sun-Target sep (deg)  : 171.20
Sun-Moon sep (deg)   : 16.02
B (ring opening deg) : -2.60
PA of pole (deg)     : 1.64
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (") : 2.333
C/A sky separation (km) : 7239.9
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
    
```

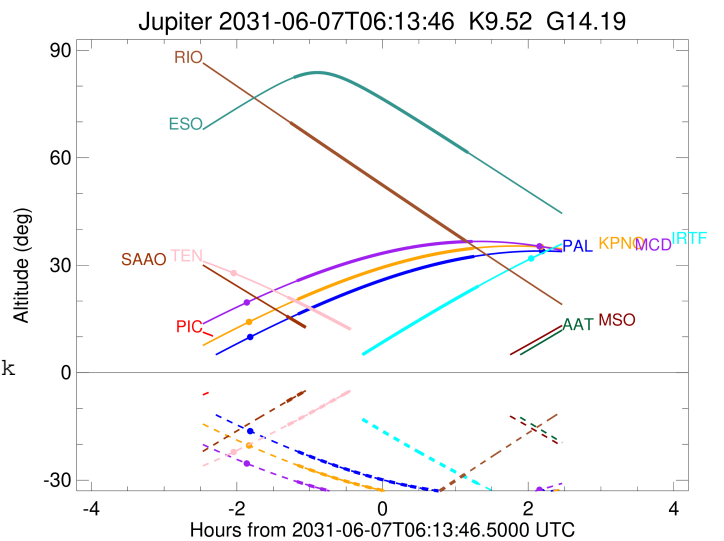
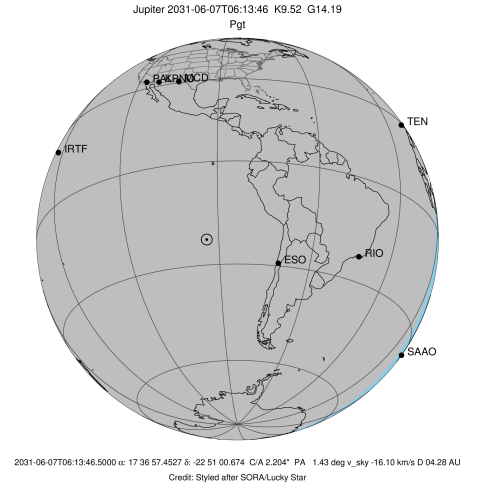


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-07T04:57:48.397	69.82	-60.98	71491.9	-5.75	-6.57
Jupiter	E	2031-06-07T07:22:10.173	36.80	-28.26	71491.9	-6.01	-6.86


```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-07T06:12:26.190
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      : 4116744226440676736
2Mass ID (if available) : 17365744-2251006
ICRS Star Coord at Epoch: 17h 36m 57.45275s -22:51:00.67444s
RUWE (>1.4 is poor) : 0.91
K magnitude         : 9.519
G magnitude         : 14.189
RP magnitude        : 12.992
BP magnitude        : 15.734
DUPflag            : 0
Distance (au)       : 4.278
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -16.10
Sun-Target sep (deg) : 171.20
Sun-Moon sep (deg)  : 16.47
B (ring opening deg) : -2.60
PA of pole (deg)    : 1.64
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (") : 2.424
C/A sky separation (km) : 7521.0
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
    
```

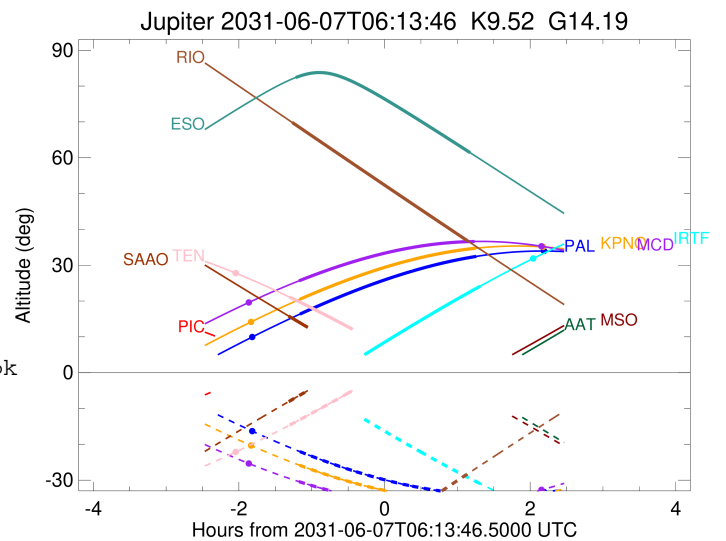
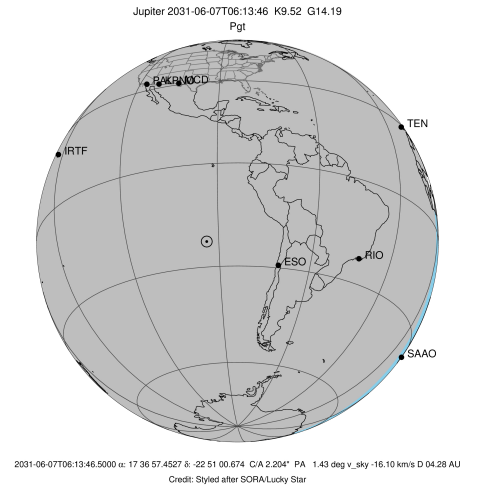


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-07T05:00:37.284	82.38	-82.35	71491.9	-6.24	-7.12
Jupiter	E	2031-06-07T07:24:21.382	61.40	-53.07	71491.9	-6.00	-6.85


```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-07T06:08:09.990
Event type          : Pgt
                    : Jupiter occs: geocentric, topocentric
                    : Not a ringed target
Observer code       : SAAO
Location            : So. Afr. Astro. Obs. (Sutherland)
Latitude (deg)      : -32.37953
E. Longitude (deg)  : 20.81070
Altitude (km)       : 1.768
Gaia source ID      : 4116744226440676736
2Mass ID (if available) : 17365744-2251006
ICRS Star Coord at Epoch: 17h 36m 57.45275s -22:51:00.67444s
RUWE (>1.4 is poor) : 0.91
K magnitude          : 9.519
G magnitude          : 14.189
RP magnitude         : 12.992
BP magnitude         : 15.734
DUPflag             : 0
Distance (au)       : 4.278
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.10
Sun-Target sep (deg) : 171.20
Sun-Moon sep (deg)  : 15.68
B (ring opening deg) : -2.60
PA of pole (deg)    : 1.64
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation ("): 3.322
C/A sky separation (km): 10308.7
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	2031-06-07T04:54:46.864	15.81	-8.08	71491.8	-7.95	-9.08
Jupiter	E	2031-06-07T07:22:06.090	-11.98x	18.20x	71491.8	-8.58	-9.79