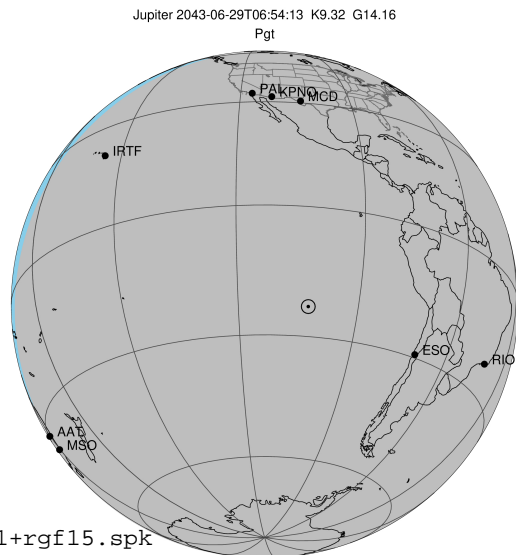


target : Jupiter  
 target radius (km) : 71492.00  
 C/A epoch : 2043-06-29T06:54:13.860  
 Event type : Pgt  
 : Jupiter occs: geocentric, topocentric  
 : Not a ringed target  
 Gaia source ID : 4068836035317332864  
 2Mass ID (if available) : 17464127-2304313

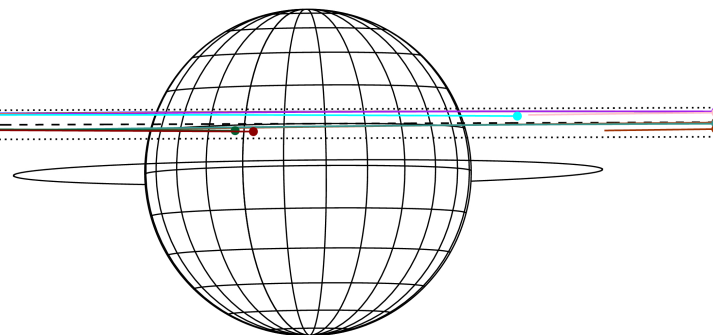
Jupiter 2043-06-29T06:54:13 K9.32 G14.16 Pgt

ICRS Star Coord at Epoch: 17h 46m 41.28226s -23:04:31.64530s  
 RUWE (>1.4 is poor) : 3.50  
 K magnitude : 9.319  
 G magnitude : 14.156  
 RP magnitude : 12.903  
 BP magnitude : 15.820  
 DUPflag : 0  
 Distance (au) : 4.259  
 f0 (km) : 0.00  
 g0 (km) : 0.00  
 skyplane vel. (km/s) : -16.00  
 Sun-Target sep (deg) : 170.07  
 Sun-Moon sep (deg) : 89.33  
 B (ring opening deg) : -2.42  
 PA of pole (deg) : 0.60  
 Pole direction: RA (deg): 268.05669  
 Dec (deg): 64.49732  
 C/A sky separation (") : 6.920  
 C/A sky separation (km) : 21376.9  
 NAIF SPICE kernels : RAJobs\_U111+rgf15.spk



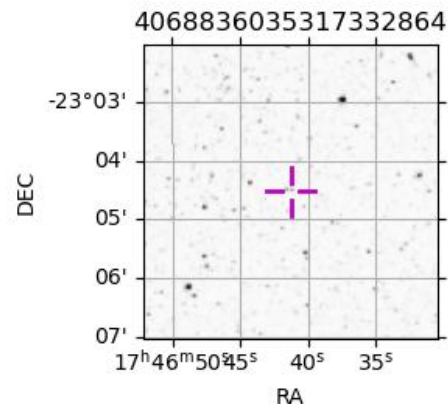
2043-06-29T06:54:13.8600 at: 17 46 41.2823 s: -23 04 31.645 C/A 6.909" PA 180.21 deg v\_sky -16.00 km/s D 04.26 AU  
 Credit: Styled after SORA/Lucky Star

Earth  
 PAL  
 KPNO  
 MCD  
 TEN  
 IRTF  
 RIO  
 ESO  
 AAT  
 SAAO  
 MSO



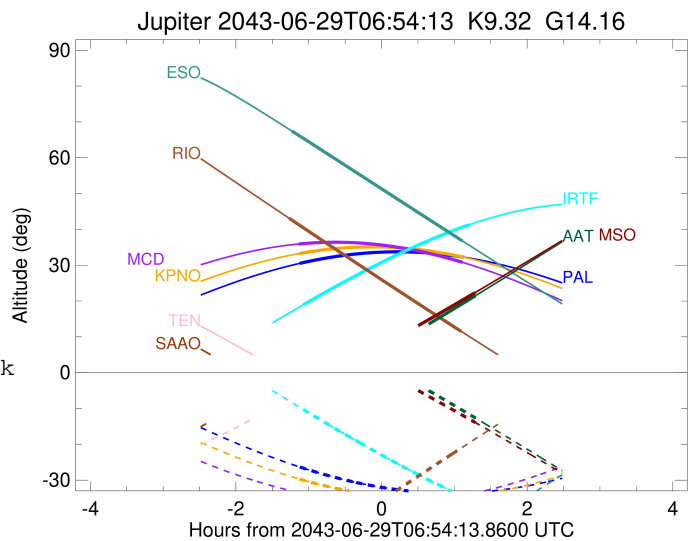
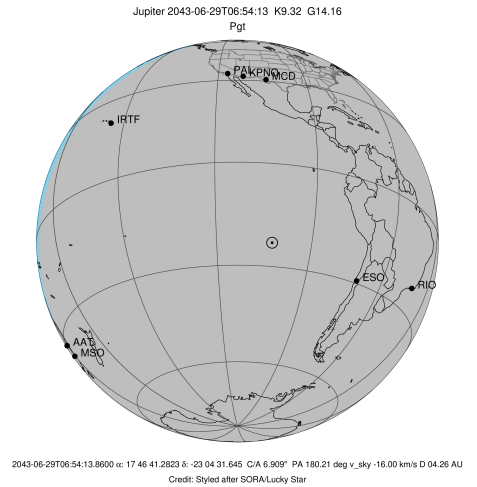
Observable events with sun below -5 deg and altitude above 5 deg

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 29 05:47 - JUN 29 08:02	Pie
PMO	Purple Mtn Obs. Nanking	32.1	118.8			Pnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+ +	JUN 29 05:46 - JUN 29 08:01	Pie
MCD	McDonald Obs. 2.7m	30.7	256.0	+ +	JUN 29 05:45 - JUN 29 08:00	Pie
TEN	Teide Obs./Tenerife	28.3	343.5			Pnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+ +	JUN 29 05:49 - JUN 29 08:06	Pie
KAV	Kavalur Observatory	12.6	78.8			Pnn
RIO	Rio de Janeiro	-22.9	316.8	+ +	JUN 29 05:38 - JUN 29 07:59	Pie
ESO	European Southern Obs. (3.6m)	-29.3	289.3	+ +	JUN 29 05:40 - JUN 29 08:00	Pie
AAT	Siding Spring (AAT)	-31.3	149.1		JUN 29 08:11 - JUN 29 08:11	Pne
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8			Pnn
MSO	Mt. Stromlo Observatory	-35.3	149.0		JUN 29 08:11 - JUN 29 08:11	Pne



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2043-06-29T06:54:31.790
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      : 4068836035317332864
2Mass ID (if available) : 17464127-2304313
ICRS Star Coord at Epoch: 17h 46m 41.28226s -23:04:31.64530s
RUWE (>1.4 is poor) : 3.50
K magnitude         : 9.319
G magnitude         : 14.156
RP magnitude        : 12.903
BP magnitude        : 15.820
DUPflag            : 0
Distance (au)       : 4.259
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -16.00
Sun-Target sep (deg) : 170.07
Sun-Moon sep (deg)  : 89.87
B (ring opening deg) : -2.42
PA of pole (deg)    : 0.60
Pole direction: RA (deg): 268.05669
Dec (deg): 64.49732
C/A sky separation (" ) : 8.635
C/A sky separation (km) : 26674.3
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
    
```

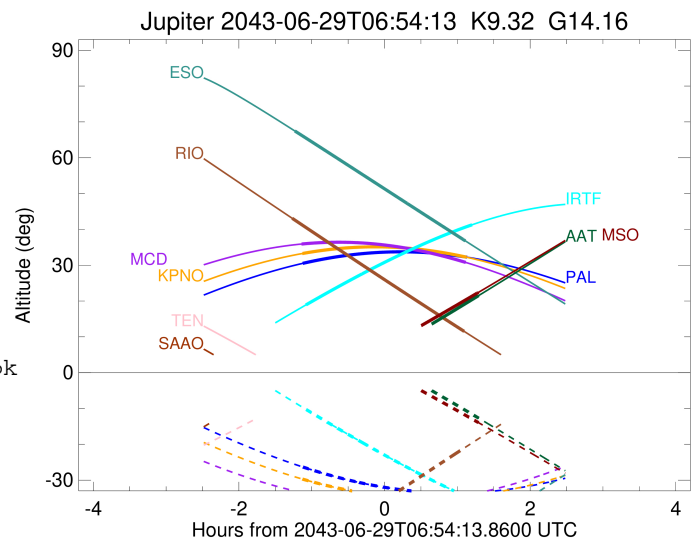
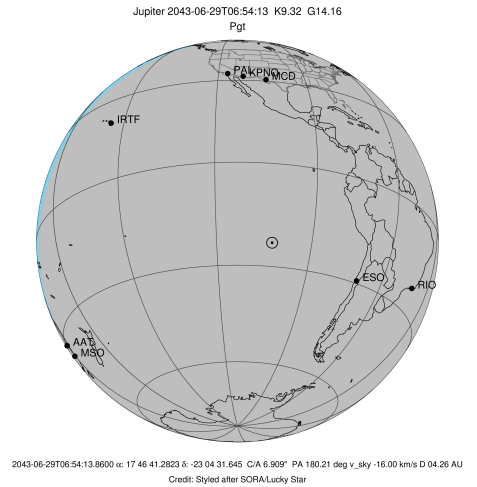


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-06-29T05:47:00.749	30.52	-26.34	71490.9	21.39	24.10
Jupiter	E	2043-06-29T08:02:02.219	32.24	-33.54	71490.9	22.22	25.01

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2043-06-29T06:54:03.100
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        : 4068836035317332864
2Mass ID (if available) : 17464127-2304313
ICRS Star Coord at Epoch: 17h 46m 41.28226s -23:04:31.64530s
RUWE (>1.4 is poor) : 3.50
K magnitude           : 9.319
G magnitude           : 14.156
RP magnitude          : 12.903
BP magnitude          : 15.820
DUPflag              : 0
Distance (au)         : 4.259
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.00
Sun-Target sep (deg) : 170.07
Sun-Moon sep (deg)   : 89.89
B (ring opening deg) : -2.42
PA of pole (deg)     : 0.60
Pole direction: RA (deg): 268.05669
Dec (deg): 64.49732
C/A sky separation ("): 8.608
C/A sky separation (km): 26589.6
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
    
```

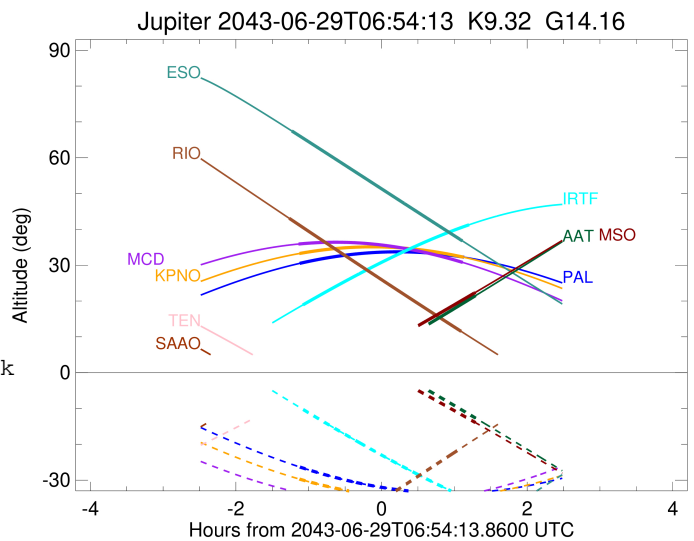
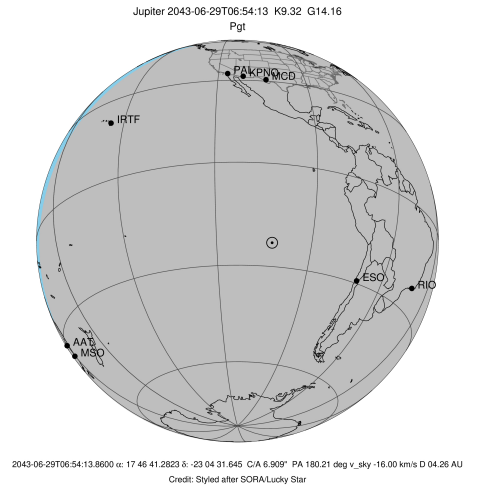


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-06-29T05:46:32.805	33.25	-29.70	71490.9	21.37	24.07
Jupiter	E	2043-06-29T08:01:35.297	32.24	-34.47	71490.9	22.10	24.88

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2043-06-29T06:53:20.890
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      : 4068836035317332864
2Mass ID (if available) : 17464127-2304313
ICRS Star Coord at Epoch: 17h 46m 41.28226s -23:04:31.64530s
RUWE (>1.4 is poor) : 3.50
K magnitude          : 9.319
G magnitude          : 14.156
RP magnitude         : 12.903
BP magnitude         : 15.820
DUPflag             : 0
Distance (au)       : 4.259
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.00
Sun-Target sep (deg) : 170.07
Sun-Moon sep (deg)  : 89.89
B (ring opening deg) : -2.42
PA of pole (deg)    : 0.60
Pole direction: RA (deg): 268.05669
Dec (deg): 64.49732
C/A sky separation (") : 8.572
C/A sky separation (km) : 26478.5
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
    
```

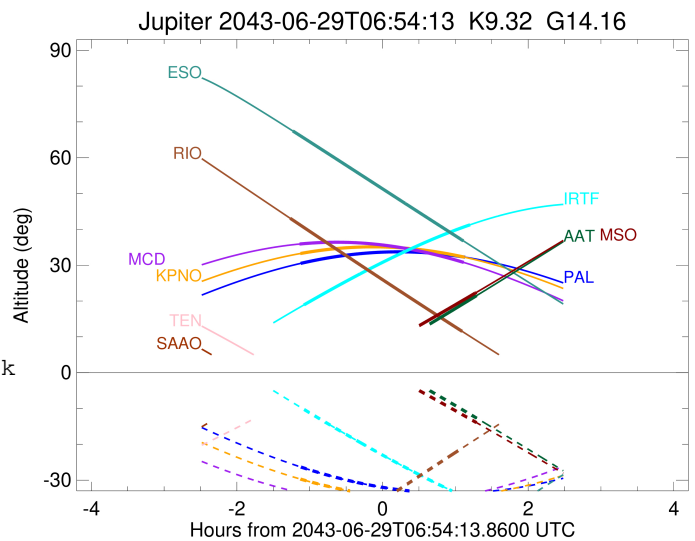
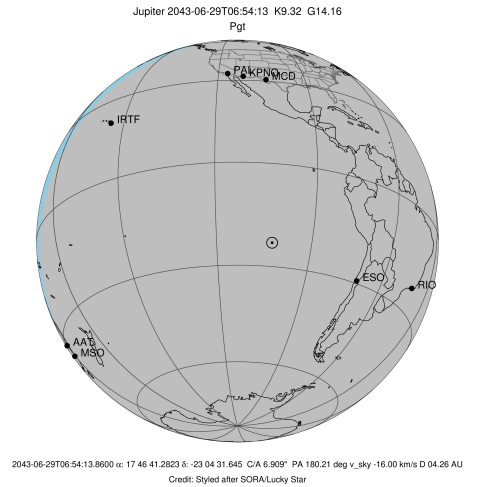


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-06-29T05:45:49.841	35.90	-33.44	71490.9	21.34	24.04
Jupiter	E	2043-06-29T08:00:57.530	30.79	-34.29	71490.9	21.94	24.70

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2043-06-29T06:58:09.020
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        : 4068836035317332864
2Mass ID (if available) : 17464127-2304313
ICRS Star Coord at Epoch: 17h 46m 41.28226s -23:04:31.64530s
RUWE (>1.4 is poor) : 3.50
K magnitude           : 9.319
G magnitude           : 14.156
RP magnitude          : 12.903
BP magnitude          : 15.820
DUPflag              : 0
Distance (au)         : 4.259
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.00
Sun-Target sep (deg) : 170.07
Sun-Moon sep (deg)   : 89.83
B (ring opening deg) : -2.42
PA of pole (deg)     : 0.60
Pole direction: RA (deg): 268.05669
Dec (deg): 64.49732
C/A sky separation (") : 8.138
C/A sky separation (km) : 25138.2
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
    
```

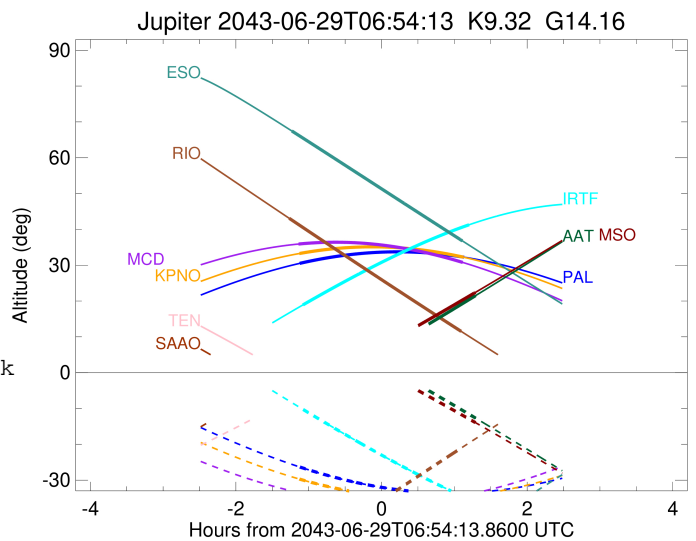
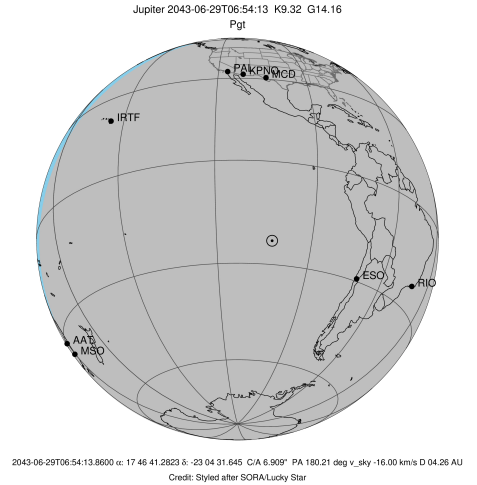


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-06-29T05:49:37.918	18.94	-10.27	71491.1	19.72	22.27
Jupiter	E	2043-06-29T08:06:20.053	41.27	-35.31	71490.9	21.27	23.97

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2043-06-29T06:48:43.290
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       : 4068836035317332864
2Mass ID (if available) : 17464127-2304313
ICRS Star Coord at Epoch: 17h 46m 41.28226s -23:04:31.64530s
RUWE (>1.4 is poor) : 3.50
K magnitude           : 9.319
G magnitude           : 14.156
RP magnitude         : 12.903
BP magnitude         : 15.820
DUPflag              : 0
Distance (au)        : 4.259
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.00
Sun-Target sep (deg) : 170.07
Sun-Moon sep (deg)   : 89.75
B (ring opening deg) : -2.42
PA of pole (deg)     : 0.60
Pole direction: RA (deg): 268.05669
Dec (deg): 64.49732
C/A sky separation ("): 6.453
C/A sky separation (km): 19934.1
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
    
```

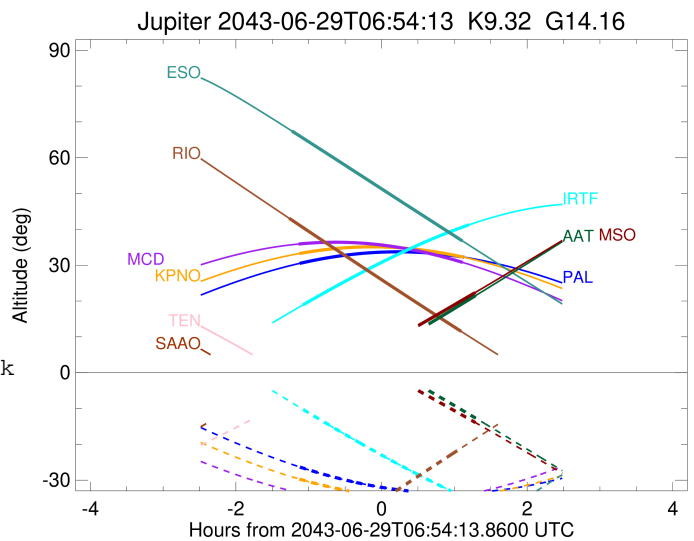
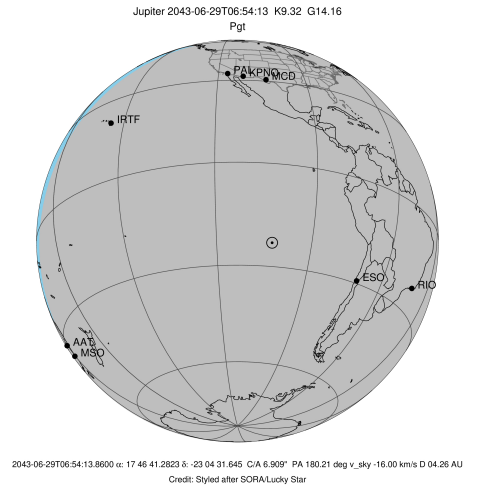


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-06-29T05:38:08.683	43.09	-52.87	71491.4	16.30	18.48
Jupiter	E	2043-06-29T07:59:50.949	11.53	-21.05	71491.4	15.98	18.12

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2043-06-29T06:50:29.930
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      : 4068836035317332864
2Mass ID (if available) : 17464127-2304313
ICRS Star Coord at Epoch: 17h 46m 41.28226s -23:04:31.64530s
RUWE (>1.4 is poor) : 3.50
K magnitude          : 9.319
G magnitude          : 14.156
RP magnitude         : 12.903
BP magnitude         : 15.820
DUPflag             : 0
Distance (au)       : 4.259
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.00
Sun-Target sep (deg) : 170.07
Sun-Moon sep (deg)  : 90.09
B (ring opening deg) : -2.42
PA of pole (deg)    : 0.60
Pole direction: RA (deg): 268.05669
Dec (deg): 64.49732
C/A sky separation ("): 6.523
C/A sky separation (km): 20149.6
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
    
```

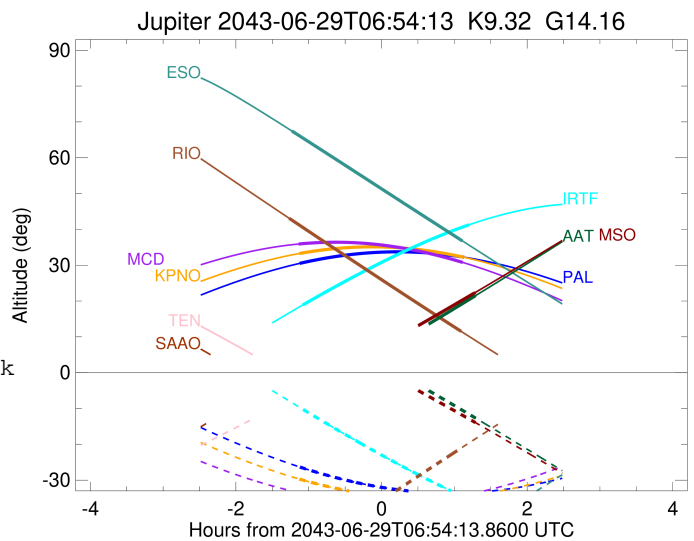
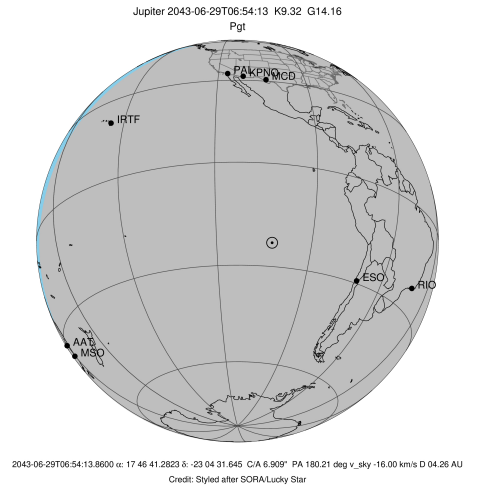


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-06-29T05:40:31.118	67.42	-76.51	71491.4	16.27	18.44
Jupiter	E	2043-06-29T08:00:50.846	36.79	-46.26	71491.4	16.31	18.49

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2043-06-29T06:59:42.190
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       : 4068836035317332864
2Mass ID (if available) : 17464127-2304313
ICRS Star Coord at Epoch: 17h 46m 41.28226s -23:04:31.64530s
RUWE (>1.4 is poor) : 3.50
K magnitude           : 9.319
G magnitude           : 14.156
RP magnitude         : 12.903
BP magnitude         : 15.820
DUPflag              : 0
Distance (au)        : 4.259
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.00
Sun-Target sep (deg) : 170.07
Sun-Moon sep (deg)   : 89.43
B (ring opening deg) : -2.42
PA of pole (deg)     : 0.60
Pole direction: RA (deg): 268.05669
Dec (deg): 64.49732
C/A sky separation ("): 5.869
C/A sky separation (km): 18128.2
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
    
```



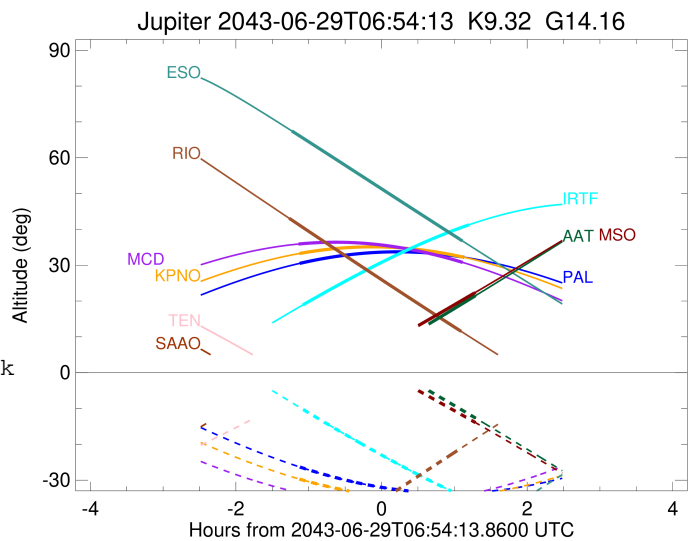
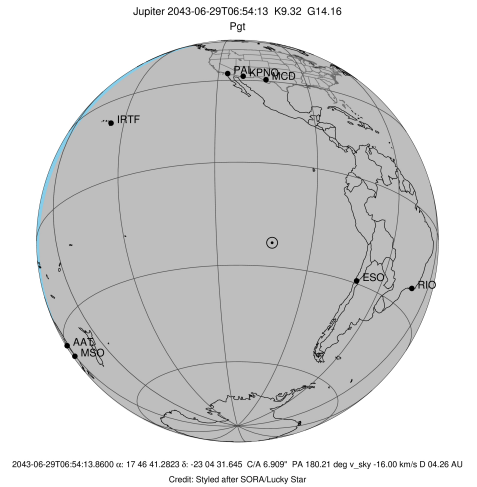
x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-06-29T05:47:13.089	-6.93x	14.32x	71491.6	13.75	15.62
Jupiter	E	2043-06-29T08:11:39.124	21.48	-12.66	71491.4	15.62	17.71



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2043-06-29T06:59:27.520
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       : 4068836035317332864
2Mass ID (if available) : 17464127-2304313
ICRS Star Coord at Epoch: 17h 46m 41.28226s -23:04:31.64530s
RUWE (>1.4 is poor) : 3.50
K magnitude          : 9.319
G magnitude          : 14.156
RP magnitude         : 12.903
BP magnitude         : 15.820
DUPflag             : 0
Distance (au)        : 4.259
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.00
Sun-Target sep (deg) : 170.07
Sun-Moon sep (deg)   : 89.46
B (ring opening deg) : -2.42
PA of pole (deg)     : 0.60
Pole direction: RA (deg): 268.05669
Dec (deg): 64.49732
C/A sky separation ("): 5.759
C/A sky separation (km): 17789.3
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	2043-06-29T05:46:53.909	-4.86x	11.84x	71491.6	13.49	15.33
Jupiter	E	2043-06-29T08:11:30.389	22.38	-13.92	71491.4	15.31	17.37