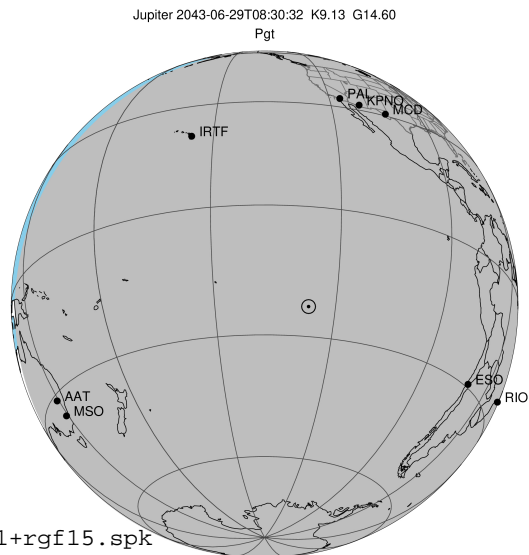


target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2043-06-29T08:30:32.530
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 4068836030919278208
 2Mass ID (if available) : 17463912-2304365

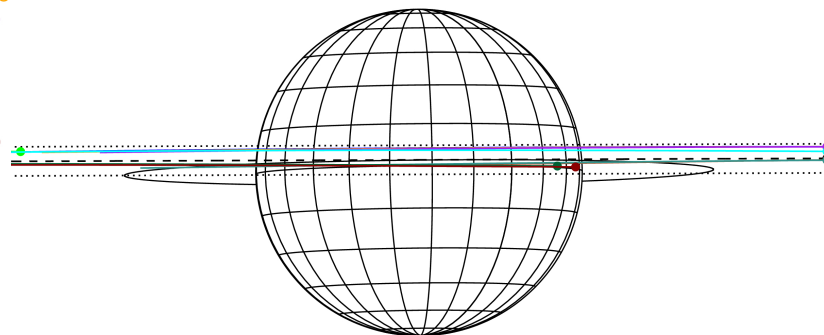
Jupiter 2043-06-29T08:30:32 K9.13 G14.60 Pgt

ICRS Star Coord at Epoch: 17h 46m 39.11228s -23:04:36.66305s

RUWE (>1.4 is poor) : 0.95
 K magnitude : 9.135
 G magnitude : 14.603
 RP magnitude : 13.216
 BP magnitude : 17.033
 DUPflag : 0
 Distance (au) : 4.259
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -15.99
 Sun-Target sep (deg) : 170.00
 Sun-Moon sep (deg) : 90.24
 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 (") : 1.792
 C/A sky separation (km) : 5537.1
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk



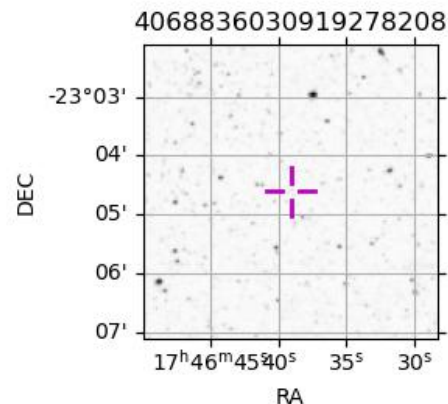
Earth
 PAL
 PMO
 KPNO
 MCD
 IRTF
 RIO
 ESO
 AAT
 MSO



2043-06-29T08:30:32.5300 at: 17 46 39.1123 s: -23 04 36.663 C/A 1.781" PA 180.21 deg v_sky -15.99 km/s D 04.26 AU
 Credit: Styled after SORA/Lucky Star

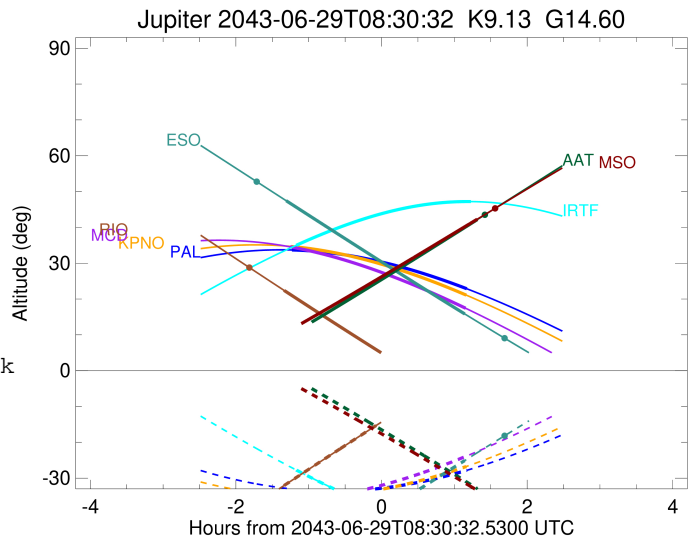
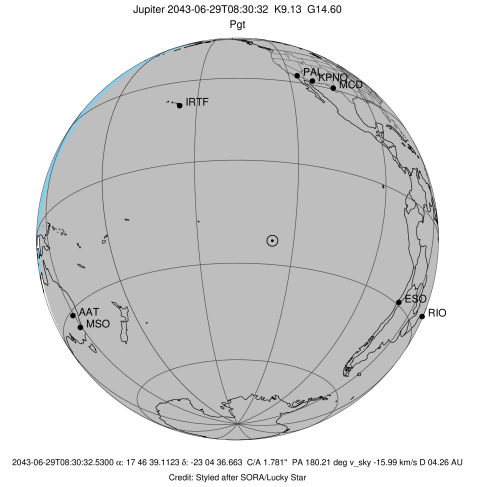
Observable events with sun below -5 deg and altitude above 5 deg

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 29 07:16 - JUN 29 09:40	Pie
PMO	Purple Mtn Obs. Nanking	32.1	118.8			Pnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+ +	JUN 29 07:16 - JUN 29 09:40	Pie
MCD	McDonald Obs. 2.7m	30.7	256.0	+ +	JUN 29 07:15 - JUN 29 09:39	Pie
TEN	Teide Obs./Tenerife	28.3	343.5			Pnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+ +	JUN 29 07:20 - JUN 29 09:44	Pie
KAV	Kavalur Observatory	12.6	78.8			Pnn
RIO	Rio de Janeiro	-22.9	316.8	+	JUN 29 07:10 - JUN 29 07:10	Pin
ESO	European Southern Obs. (3.6m)	-29.3	289.3	+ +	JUN 29 07:11 - JUN 29 09:39	Pie
AAT	Siding Spring (AAT)	-31.3	149.1	+	JUN 29 09:49 - JUN 29 09:49	Pne
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8			Pnn
MSO	Mt. Stromlo Observatory	-35.3	149.0	+	JUN 29 09:49 - JUN 29 09:49	Pne



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2043-06-29T08:28:38.610
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       : 4068836030919278208
2Mass ID (if available) : 17463912-2304365
ICRS Star Coord at Epoch: 17h 46m 39.11228s -23:04:36.66305s
RUWE (>1.4 is poor) : 0.95
K magnitude           : 9.135
G magnitude           : 14.603
RP magnitude         : 13.216
BP magnitude         : 17.033
DUPflag              : 0
Distance (au)        : 4.259
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -15.99
Sun-Target sep (deg) : 170.00
Sun-Moon sep (deg)   : 90.74
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 ("): 3.466
C/A sky separation (km): 10706.0
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
    
```

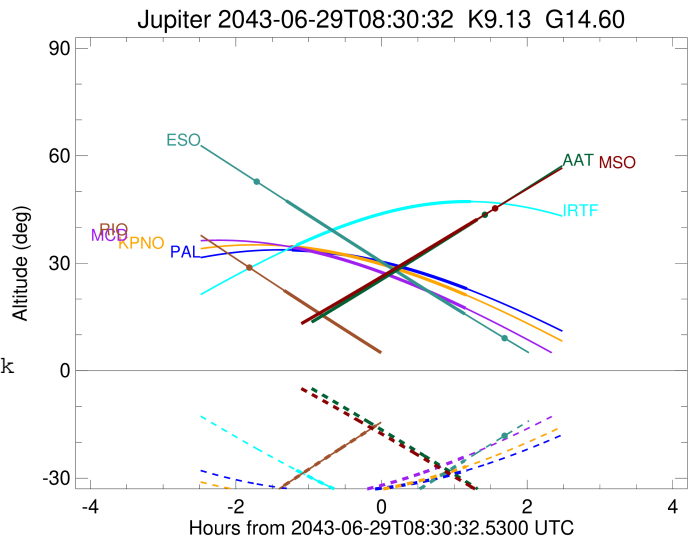
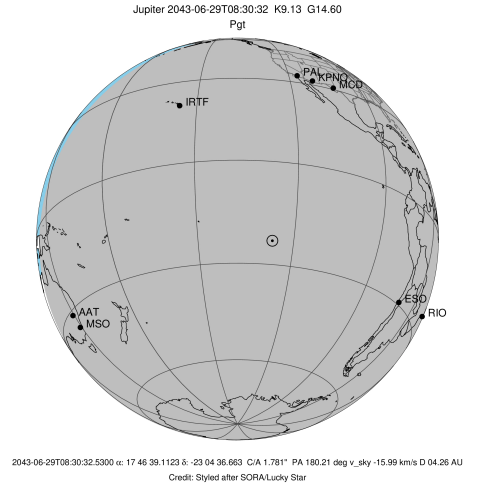


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-06-29T07:16:41.400	33.69	-33.01	71491.8	8.32	9.49
Jupiter	E	2043-06-29T09:40:48.023	22.87	-27.82	71491.8	8.73	9.96

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2043-06-29T08:28:09.320
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      : 4068836030919278208
2Mass ID (if available) : 17463912-2304365
ICRS Star Coord at Epoch: 17h 46m 39.11228s -23:04:36.66305s
RUWE (>1.4 is poor) : 0.95
K magnitude         : 9.135
G magnitude         : 14.603
RP magnitude        : 13.216
BP magnitude        : 17.033
DUPflag            : 0
Distance (au)       : 4.259
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -15.99
Sun-Target sep (deg) : 170.00
Sun-Moon sep (deg)  : 90.73
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 (" ) : 3.413
C/A sky separation (km) : 10542.8
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
    
```

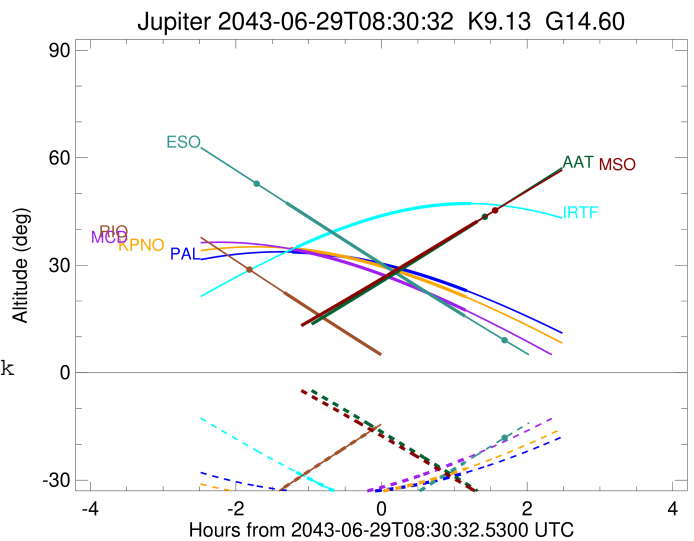
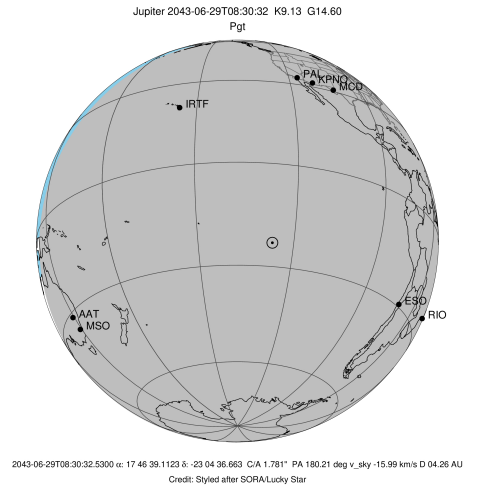


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-06-29T07:16:09.995	34.66	-34.89	71491.8	8.24	9.40
Jupiter	E	2043-06-29T09:40:23.740	21.09	-26.75	71491.8	8.55	9.76

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2043-06-29T08:27:29.260
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       : 4068836030919278208
2Mass ID (if available) : 17463912-2304365
ICRS Star Coord at Epoch: 17h 46m 39.11228s -23:04:36.66305s
RUWE (>1.4 is poor) : 0.95
K magnitude           : 9.135
G magnitude           : 14.603
RP magnitude          : 13.216
BP magnitude          : 17.033
DUPflag              : 0
Distance (au)         : 4.259
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -15.99
Sun-Target sep (deg)  : 170.00
Sun-Moon sep (deg)    : 90.70
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 (" ) : 3.341
C/A sky separation (km) : 10320.3
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
    
```

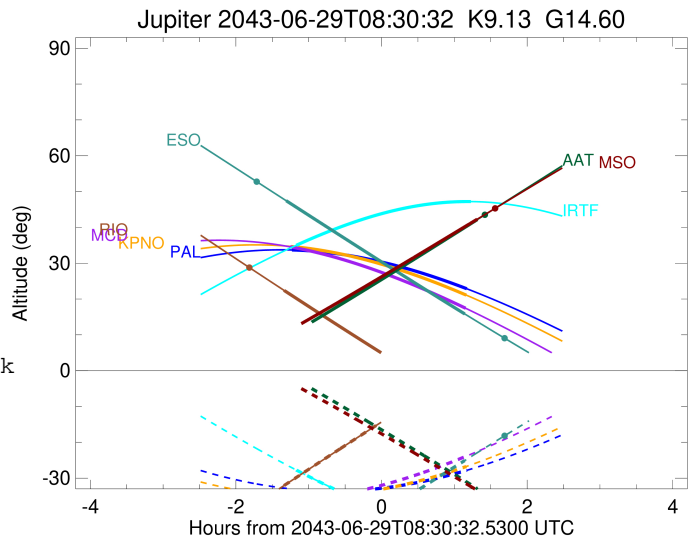
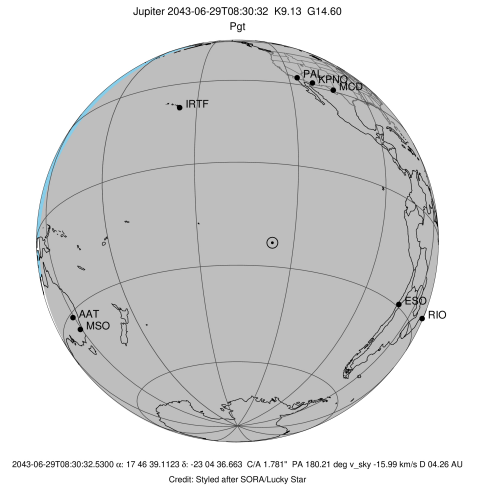


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-06-29T07:15:24.689	34.55	-36.14	71491.8	8.13	9.27
Jupiter	E	2043-06-29T09:39:52.914	17.42	-23.93	71491.8	8.31	9.48

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2043-06-29T08:32:22.410
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        : 4068836030919278208
2Mass ID (if available) : 17463912-2304365
ICRS Star Coord at Epoch: 17h 46m 39.11228s -23:04:36.66305s
RUWE (>1.4 is poor) : 0.95
K magnitude           : 9.135
G magnitude           : 14.603
RP magnitude          : 13.216
BP magnitude          : 17.033
DUPflag              : 0
Distance (au)         : 4.259
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -15.99
Sun-Target sep (deg)  : 170.00
Sun-Moon sep (deg)    : 90.91
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 (") : 3.161
C/A sky separation (km) : 9766.0
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
    
```

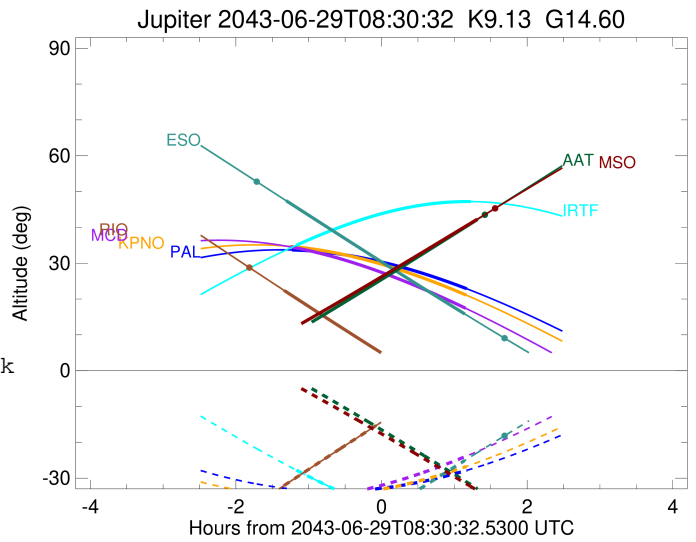
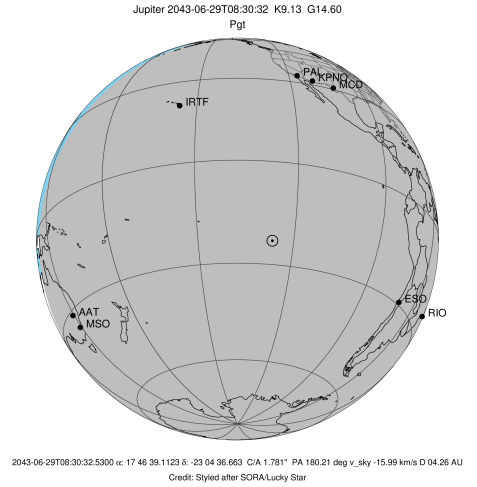


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-06-29T07:20:19.793	35.00	-27.74	71491.9	7.19	8.21
Jupiter	E	2043-06-29T09:44:15.501	47.20	-45.93	71491.8	8.32	9.49

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2043-06-29T08:24:27.660
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      : 4068836030919278208
2Mass ID (if available) : 17463912-2304365
ICRS Star Coord at Epoch: 17h 46m 39.11228s -23:04:36.66305s
RUWE (>1.4 is poor) : 0.95
K magnitude          : 9.135
G magnitude          : 14.603
RP magnitude         : 13.216
BP magnitude         : 17.033
DUPflag             : 0
Distance (au)       : 4.259
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -15.99
Sun-Target sep (deg) : 170.00
Sun-Moon sep (deg)  : 90.33
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 ("): 1.019
C/A sky separation (km): 3146.5
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
    
```

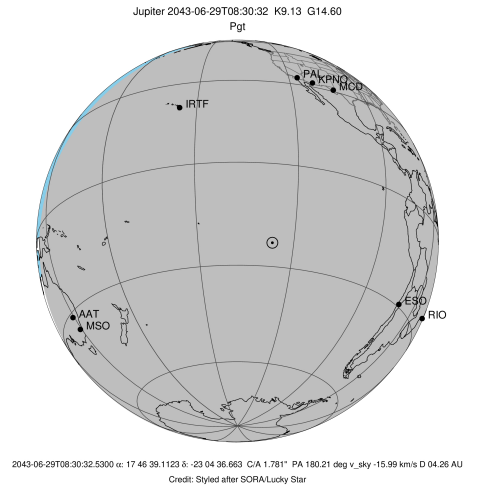


x: target alt < 5.0 deg or sun > -5.0 deg

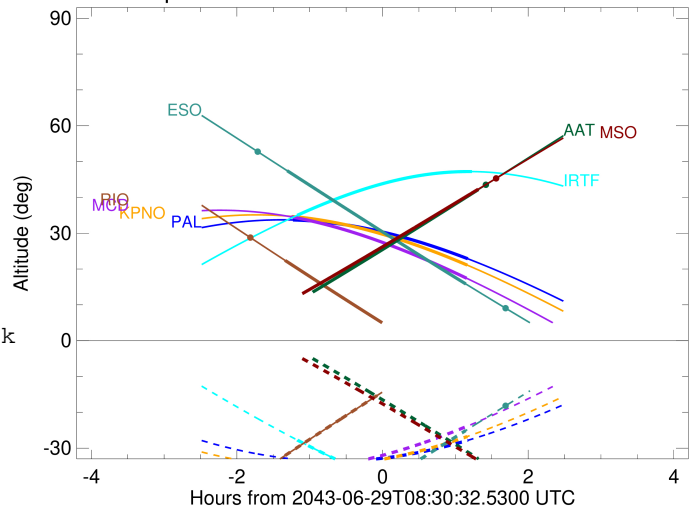
Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-06-29T07:10:16.293	22.40	-32.06	71492.0	2.72	3.11
Jupiter	E	2043-06-29T09:39:18.930	-9.31x	0.31x	71492.0	2.32	2.65

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2043-06-29T08:25:17.440
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      : 4068836030919278208
2Mass ID (if available) : 17463912-2304365
ICRS Star Coord at Epoch: 17h 46m 39.11228s -23:04:36.66305s
RUWE (>1.4 is poor) : 0.95
K magnitude          : 9.135
G magnitude          : 14.603
RP magnitude         : 13.216
BP magnitude         : 17.033
DUPflag             : 0
Distance (au)       : 4.259
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -15.99
Sun-Target sep (deg) : 170.00
Sun-Moon sep (deg)  : 90.74
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 (") : 1.160
C/A sky separation (km) : 3583.0
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 2043-06-29T08:30:32 K9.13 G14.60

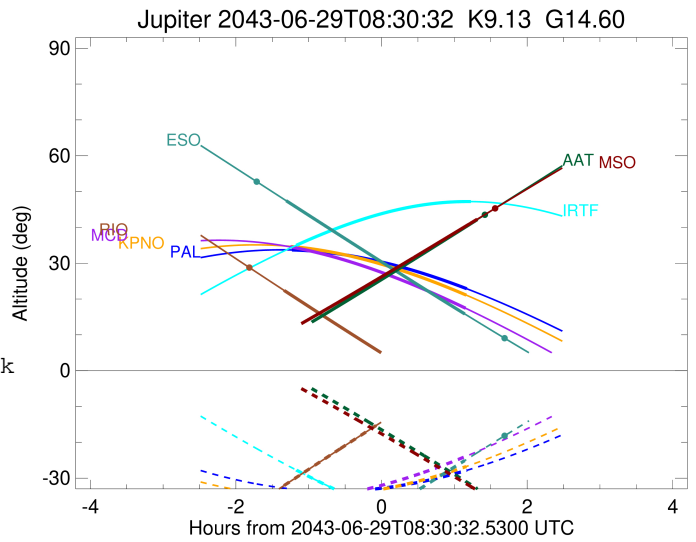
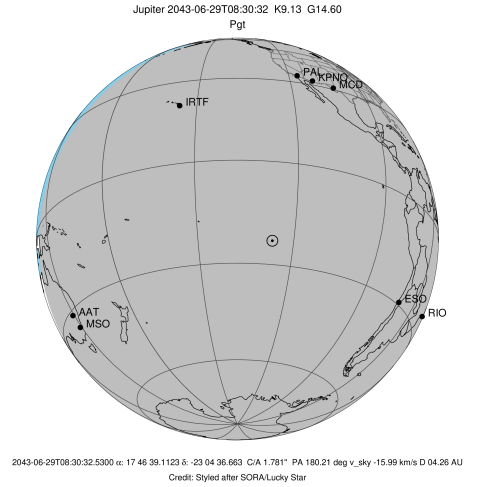


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-06-29T07:11:55.449	47.45	-56.94	71492.0	2.95	3.37
Jupiter	E	2043-06-29T09:39:12.831	15.82	-25.07	71492.0	2.71	3.10

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2043-06-29T08:35:55.190
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      : 4068836030919278208
2Mass ID (if available) : 17463912-2304365
ICRS Star Coord at Epoch: 17h 46m 39.11228s -23:04:36.66305s
RUWE (>1.4 is poor) : 0.95
K magnitude          : 9.135
G magnitude          : 14.603
RP magnitude         : 13.216
BP magnitude         : 17.033
DUPflag             : 0
Distance (au)       : 4.259
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -15.99
Sun-Target sep (deg) : 170.00
Sun-Moon sep (deg)  : 90.65
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 ("): 1.028
C/A sky separation (km): 3177.0
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
    
```

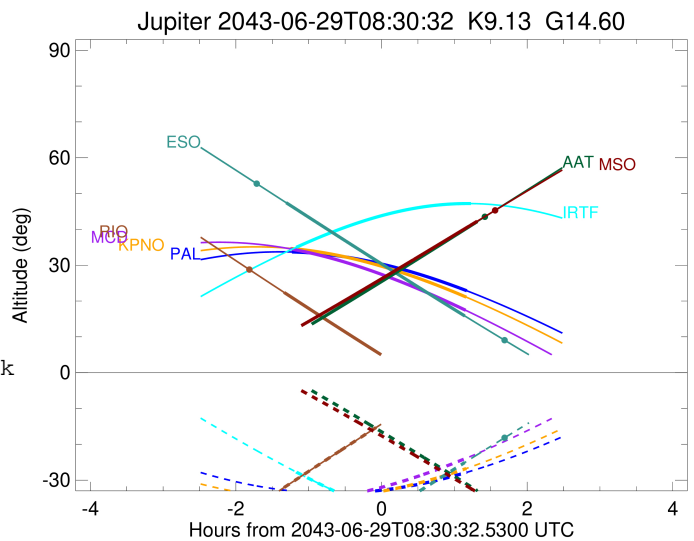
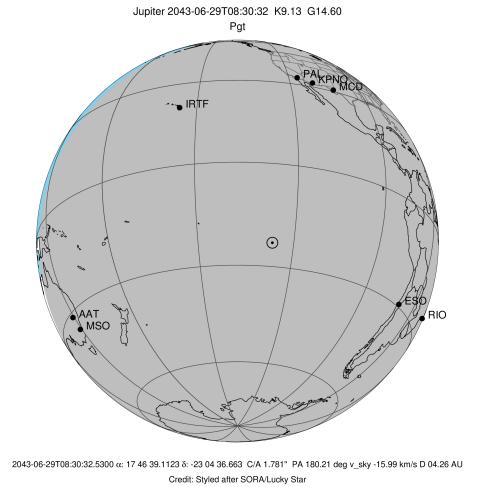


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-06-29T07:21:47.320	11.28	-2.81x	71492.0	1.61	1.84
Jupiter	E	2043-06-29T09:49:31.030	42.18	-32.92	71492.0	3.42	3.91


```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2043-06-29T08:35:41.050
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       : 4068836030919278208
2Mass ID (if available) : 17463912-2304365
ICRS Star Coord at Epoch: 17h 46m 39.11228s -23:04:36.66305s
RUWE (>1.4 is poor) : 0.95
K magnitude           : 9.135
G magnitude           : 14.603
RP magnitude         : 13.216
BP magnitude         : 17.033
DUPflag              : 0
Distance (au)        : 4.259
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -15.99
Sun-Target sep (deg) : 170.00
Sun-Moon sep (deg)   : 90.66
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 ("): 0.906
C/A sky separation (km): 2798.3
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	2043-06-29T07:21:31.219	12.55	-4.45x	71492.0	1.33	1.52
Jupiter	E	2043-06-29T09:49:20.284	42.26	-33.39	71492.0	3.10	3.54