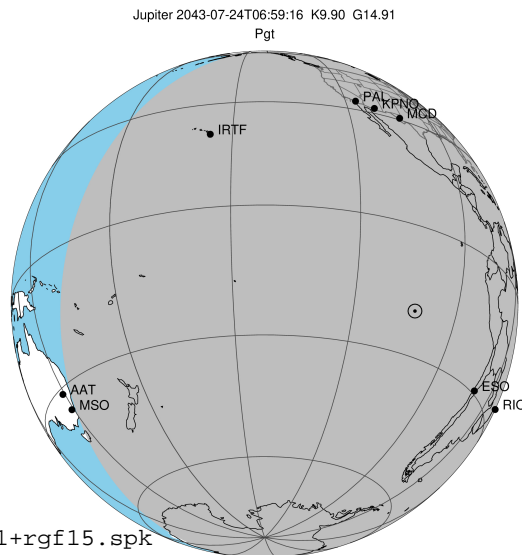


target : Jupiter  
 target radius (km) : 71492.00  
 C/A epoch : 2043-07-24T06:59:16.340  
 Event type : Pgt  
 : Jupiter occs: geocentric, topocentric  
 : Not a ringed target  
 Gaia source ID : 4116687468505143168  
 2Mass ID (if available) : 17350893-2303107

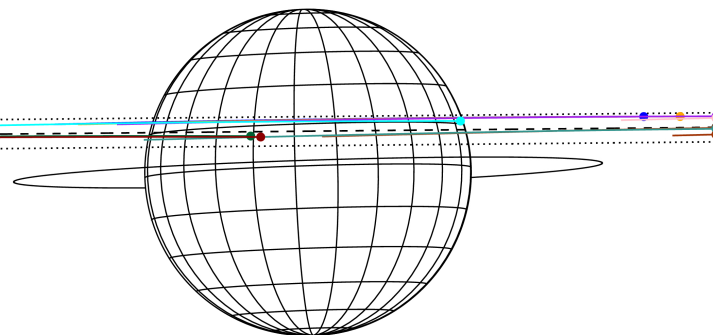
Jupiter 2043-07-24T06:59:16 K9.90 G14.91 Pgt

ICRS Star Coord at Epoch: 17h 35m 08.93530s -23:03:11.29469s

RUWE (>1.4 is poor) : 1.15  
 K magnitude : 9.900  
 G magnitude : 14.914  
 RP magnitude : 13.568  
 BP magnitude : 16.534  
 DUPflag : 0  
 Distance (au) : 4.403  
 f0 (km) : 0.00  
 g0 (km) : 0.00  
 skyplane vel. (km/s) : -10.74  
 Sun-Target sep (deg) : 143.57  
 Sun-Moon sep (deg) : 62.29  
 B (ring opening deg) : -2.39  
 PA of pole (deg) : 1.84  
 Pole direction: RA (deg): 268.05670  
 Dec (deg): 64.49731  
 C/A sky separation (") : 5.666  
 C/A sky separation (km) : 18090.5  
 NAIF SPICE kernels : RAJobs\_U111+rgf15.spk



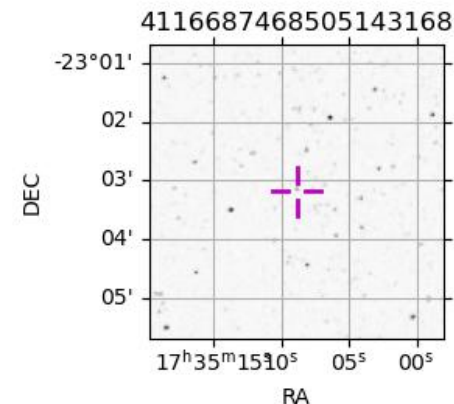
Earth  
 PAL  
 PMO  
 KPNO  
 MCD  
 TEN  
 IRTF  
 RIO  
 ESO  
 AAT  
 SAAO  
 MSO



2043-07-24T06:59:16.3400 at: 17 35 08.9353 s: -23 03 11.295 C/A 5.666 PA 180.55 deg v\_sky -10.74 km/s D 04.40 AU  
 Credit: Styled after SORA/Lucky Star

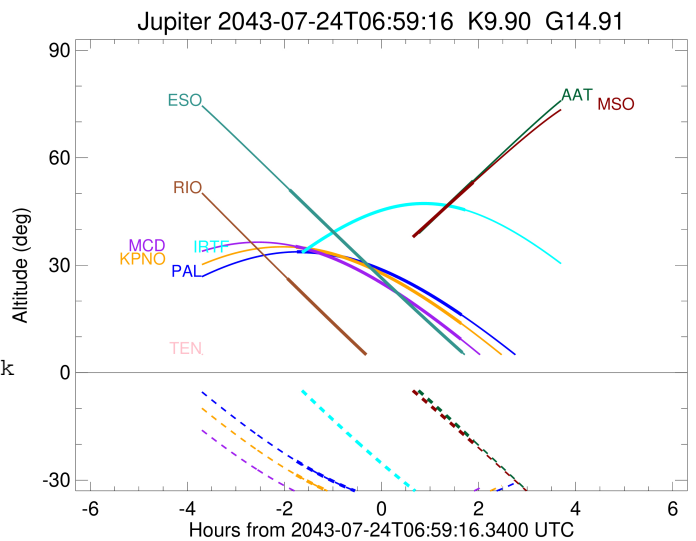
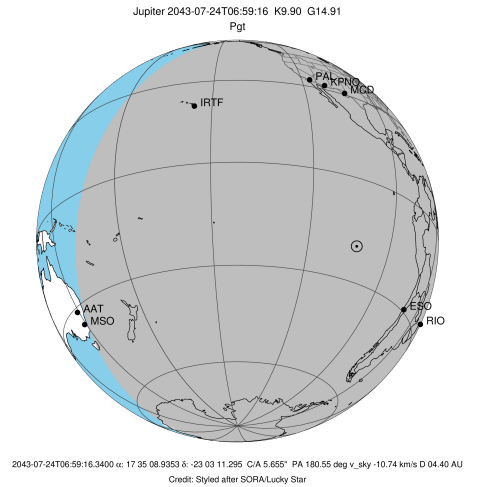
Observable events with sun below -5 deg and altitude above 5 deg

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	+ +	JUL 24 05:14 - JUL 24 08:38	Pie
PMO	Purple Mtn Obs. Nanking	32.1	118.8			Pnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+ +	JUL 24 05:13 - JUL 24 08:37	Pie
MCD	McDonald Obs. 2.7m	30.7	256.0	+ +	JUL 24 05:12 - JUL 24 08:37	Pie
TEN	Teide Obs./Tenerife	28.3	343.5			Pnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+	JUL 24 08:42 - JUL 24 08:42	Pne
KAV	Kavalur Observatory	12.6	78.8			Pnn
RIO	Rio de Janeiro	-22.9	316.8	+	JUL 24 05:02 - JUL 24 05:02	Pin
ESO	European Southern Obs. (3.6m)	-29.3	289.3	+ +	JUL 24 05:05 - JUL 24 08:39	Pie
AAT	Siding Spring (AAT)	-31.3	149.1	+	JUL 24 08:52 - JUL 24 08:52	Pne
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8			Pnn
MSO	Mt. Stromlo Observatory	-35.3	149.0	+	JUL 24 08:52 - JUL 24 08:52	Pne



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2043-07-24T06:56:03.690
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       : 4116687468505143168
2Mass ID (if available) : 17350893-2303107
ICRS Star Coord at Epoch: 17h 35m 08.93530s -23:03:11.29469s
RUWE (>1.4 is poor) : 1.15
K magnitude           : 9.900
G magnitude           : 14.914
RP magnitude         : 13.568
BP magnitude         : 16.534
DUPflag              : 0
Distance (au)        : 4.403
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -10.74
Sun-Target sep (deg) : 143.57
Sun-Moon sep (deg)   : 62.58
B (ring opening deg) : -2.39
PA of pole (deg)     : 1.84
Pole direction: RA (deg): 268.05670
Dec (deg): 64.49731
C/A sky separation ("): 7.269
C/A sky separation (km): 23211.5
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
    
```

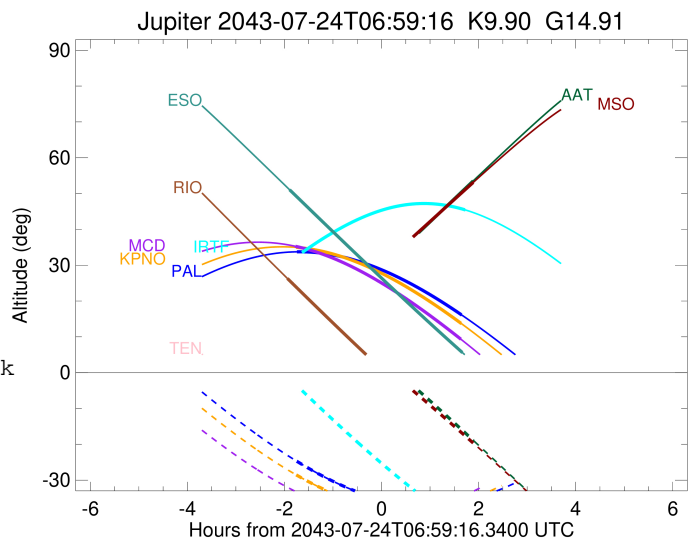
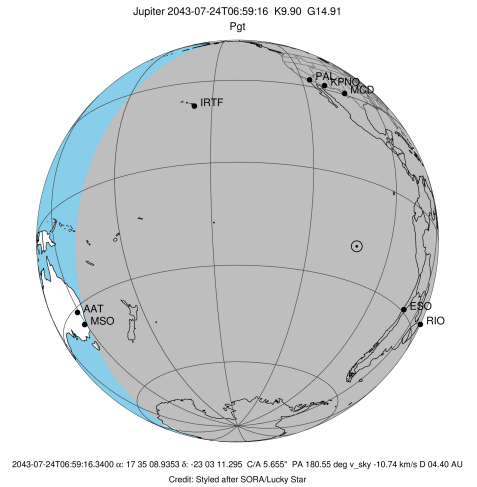


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-07-24T05:14:38.941	33.73	-24.74	71491.3	17.79	20.13
Jupiter	E	2043-07-24T08:38:18.079	16.12	-35.93	71491.1	19.75	22.30

```

target                : Jupiter
target radius (km)    : 71492.00
C/A epoch              : 2043-07-24T06:55:22.950
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        : 4116687468505143168
2Mass ID (if available) : 17350893-2303107
ICRS Star Coord at Epoch: 17h 35m 08.93530s -23:03:11.29469s
RUWE (>1.4 is poor) : 1.15
K magnitude           : 9.900
G magnitude           : 14.914
RP magnitude          : 13.568
BP magnitude          : 16.534
DUPflag              : 0
Distance (au)         : 4.403
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -10.74
Sun-Target sep (deg) : 143.57
Sun-Moon sep (deg)   : 62.53
B (ring opening deg) : -2.39
PA of pole (deg)     : 1.84
Pole direction: RA (deg): 268.05670
Dec (deg): 64.49731
C/A sky separation (") : 7.215
C/A sky separation (km) : 23038.1
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
    
```

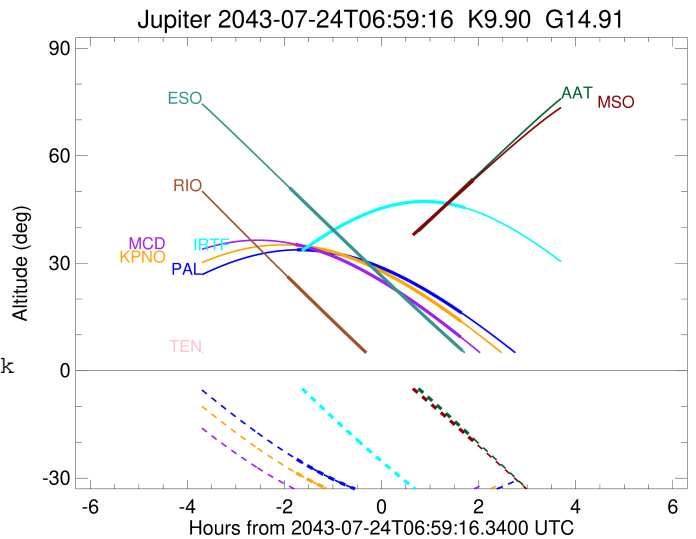
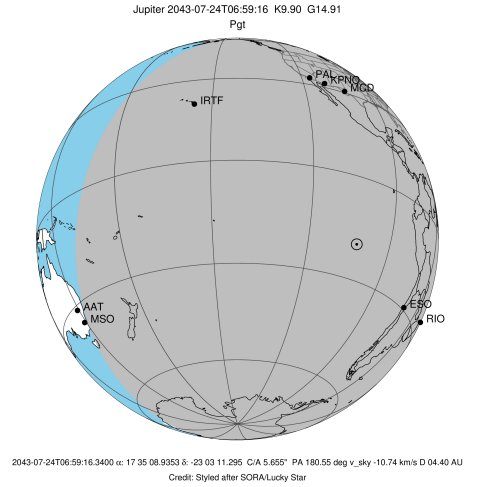


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-07-24T05:13:51.614	34.97	-28.53	71491.3	17.71	20.05
Jupiter	E	2043-07-24T08:37:52.197	13.72	-36.07	71491.1	19.54	22.07

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2043-07-24T06:54:28.000
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       : 4116687468505143168
2Mass ID (if available) : 17350893-2303107
ICRS Star Coord at Epoch: 17h 35m 08.93530s -23:03:11.29469s
RUWE (>1.4 is poor) : 1.15
K magnitude           : 9.900
G magnitude           : 14.914
RP magnitude          : 13.568
BP magnitude          : 16.534
DUPflag              : 0
Distance (au)        : 4.403
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -10.74
Sun-Target sep (deg) : 143.57
Sun-Moon sep (deg)   : 62.45
B (ring opening deg) : -2.39
PA of pole (deg)     : 1.84
Pole direction: RA (deg): 268.05670
Dec (deg): 64.49731
C/A sky separation ("): 7.141
C/A sky separation (km): 22802.3
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
    
```

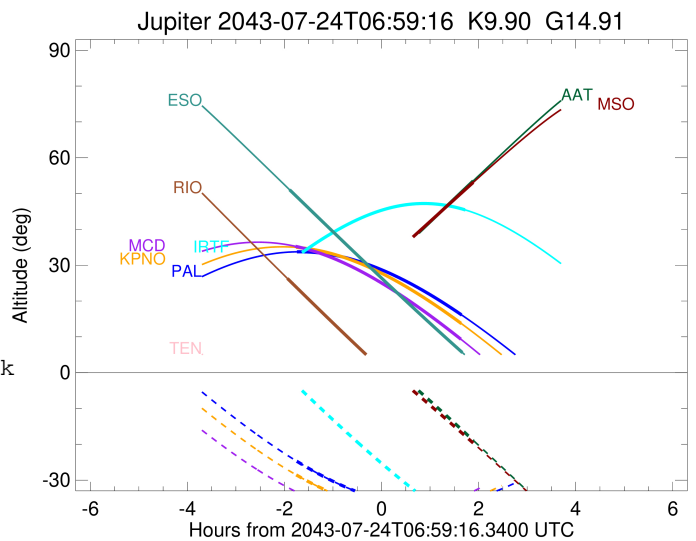
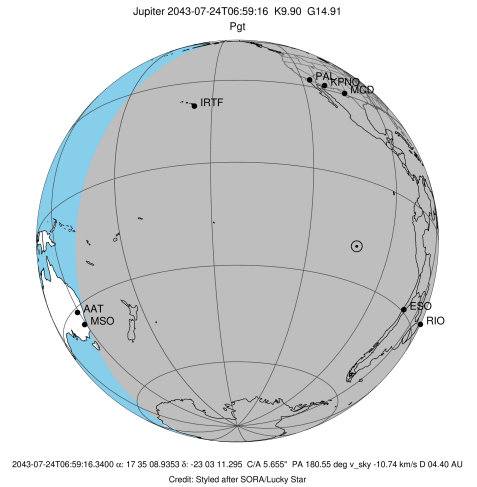


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-07-24T05:12:42.963	35.28	-33.12	71491.3	17.61	19.94
Jupiter	E	2043-07-24T08:37:22.358	9.34	-34.74	71491.2	19.26	21.76

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2043-07-24T07:01:13.730
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       : 4116687468505143168
2Mass ID (if available) : 17350893-2303107
ICRS Star Coord at Epoch: 17h 35m 08.93530s -23:03:11.29469s
RUWE (>1.4 is poor) : 1.15
K magnitude          : 9.900
G magnitude          : 14.914
RP magnitude         : 13.568
BP magnitude         : 16.534
DUPflag             : 0
Distance (au)        : 4.403
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -10.74
Sun-Target sep (deg) : 143.57
Sun-Moon sep (deg)   : 63.02
B (ring opening deg) : -2.39
PA of pole (deg)     : 1.84
Pole direction: RA (deg): 268.05670
Dec (deg): 64.49731
C/A sky separation (") : 7.003
C/A sky separation (km) : 22360.1
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
    
```

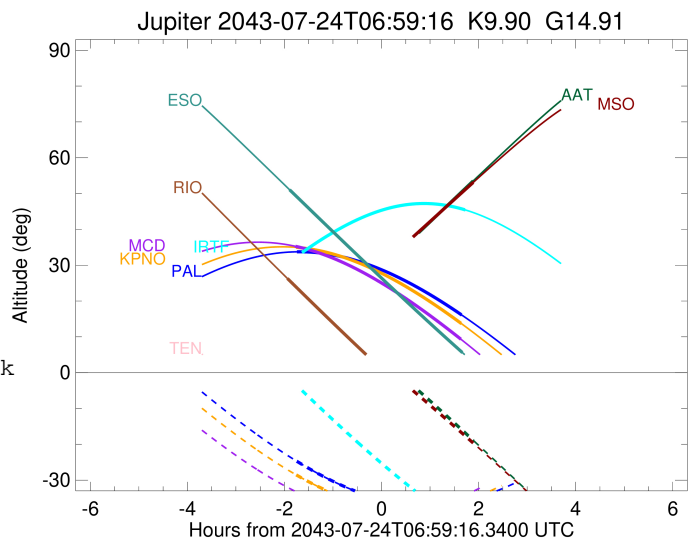
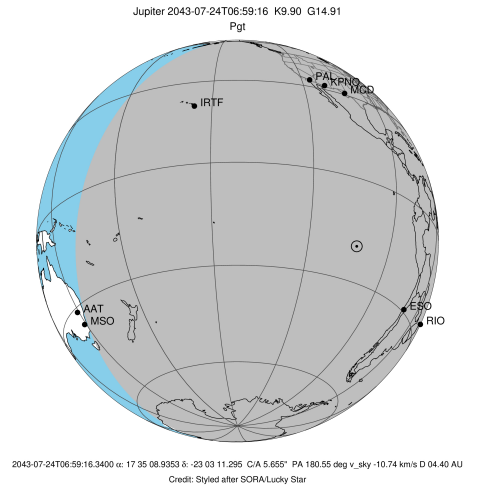


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-07-24T05:19:30.375	33.27	-4.66x	71491.4	16.53	18.73
Jupiter	E	2043-07-24T08:42:45.673	45.43	-42.74	71491.1	19.51	22.04

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2043-07-24T06:50:34.270
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        : 4116687468505143168
2Mass ID (if available) : 17350893-2303107
ICRS Star Coord at Epoch: 17h 35m 08.93530s -23:03:11.29469s
RUWE (>1.4 is poor)  : 1.15
K magnitude           : 9.900
G magnitude           : 14.914
RP magnitude          : 13.568
BP magnitude          : 16.534
DUPflag              : 0
Distance (au)         : 4.403
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -10.74
Sun-Target sep (deg)  : 143.57
Sun-Moon sep (deg)    : 61.88
B (ring opening deg) : -2.39
PA of pole (deg)      : 1.84
Pole direction: RA (deg): 268.05670
Dec (deg): 64.49731
C/A sky separation (") : 4.878
C/A sky separation (km) : 15576.0
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
    
```

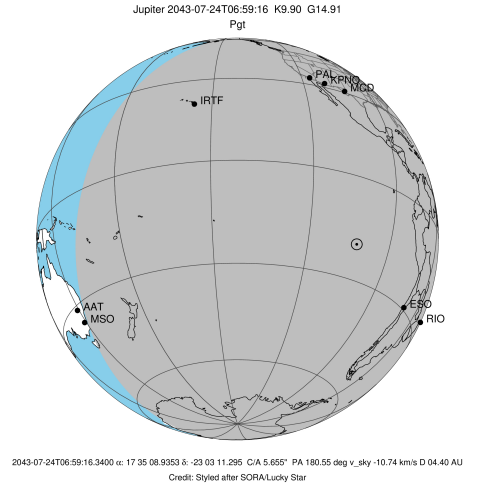


x: target alt < 5.0 deg or sun > -5.0 deg

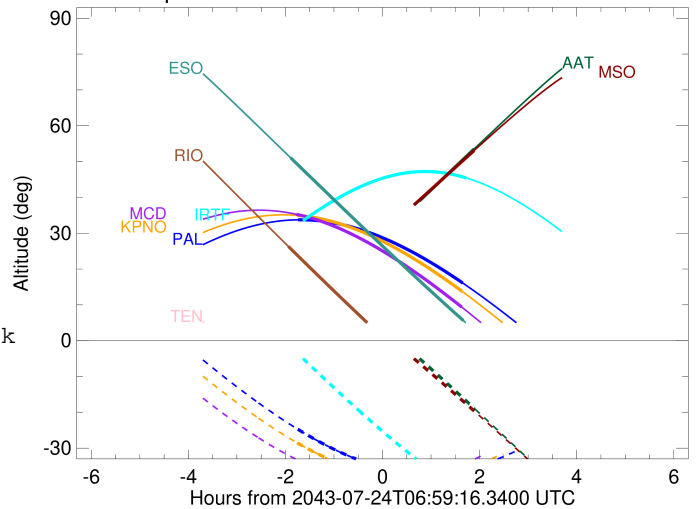
Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-07-24T05:02:52.577	26.32	-61.15	71491.7	12.16	13.83
Jupiter	E	2043-07-24T08:40:29.181	-19.17x	-11.70	71491.6	13.02	14.80

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2043-07-24T06:51:29.390
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       : 4116687468505143168
2Mass ID (if available) : 17350893-2303107
ICRS Star Coord at Epoch: 17h 35m 08.93530s -23:03:11.29469s
RUWE (>1.4 is poor) : 1.15
K magnitude           : 9.900
G magnitude           : 14.914
RP magnitude         : 13.568
BP magnitude         : 16.534
DUPflag              : 0
Distance (au)        : 4.403
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -10.74
Sun-Target sep (deg) : 143.57
Sun-Moon sep (deg)   : 62.29
B (ring opening deg) : -2.39
PA of pole (deg)     : 1.84
Pole direction: RA (deg): 268.05670
Dec (deg): 64.49731
C/A sky separation (") : 5.019
C/A sky separation (km) : 16026.3
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 2043-07-24T06:59:16 K9.90 G14.91



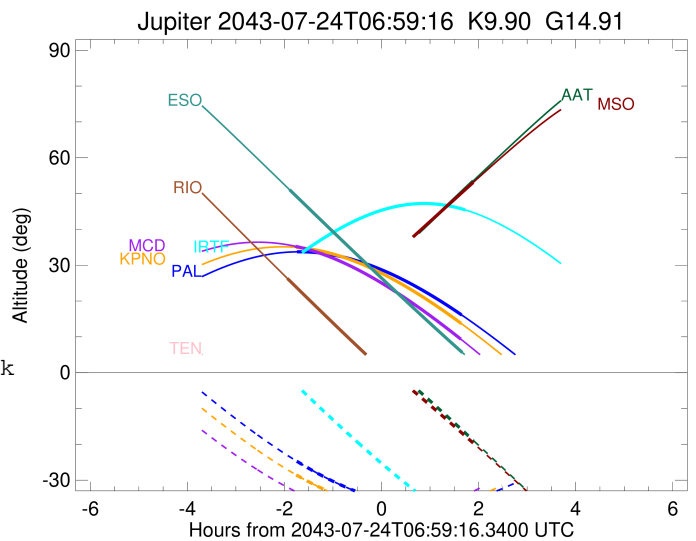
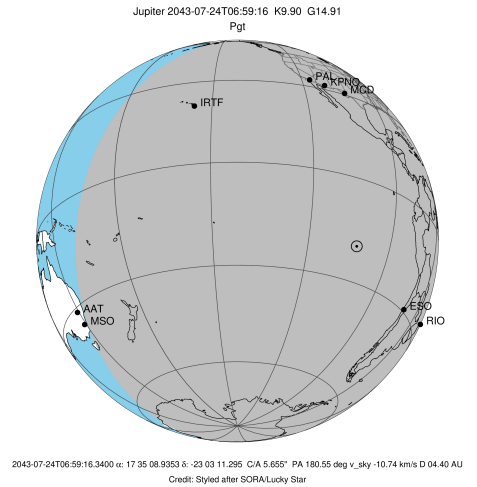
x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-07-24T05:05:36.902	51.07	-80.08	71491.6	12.33	14.03
Jupiter	E	2043-07-24T08:39:16.114	5.61	-37.39	71491.6	13.41	15.24



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2043-07-24T07:06:42.910
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      : 4116687468505143168
2Mass ID (if available) : 17350893-2303107
ICRS Star Coord at Epoch: 17h 35m 08.93530s -23:03:11.29469s
RUWE (>1.4 is poor) : 1.15
K magnitude          : 9.900
G magnitude          : 14.914
RP magnitude         : 13.568
BP magnitude         : 16.534
DUPflag             : 0
Distance (au)       : 4.403
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -10.74
Sun-Target sep (deg) : 143.57
Sun-Moon sep (deg)  : 63.03
B (ring opening deg) : -2.39
PA of pole (deg)    : 1.84
Pole direction: RA (deg): 268.05670
Dec (deg): 64.49731
C/A sky separation (") : 4.974
C/A sky separation (km) : 15881.8
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
    
```



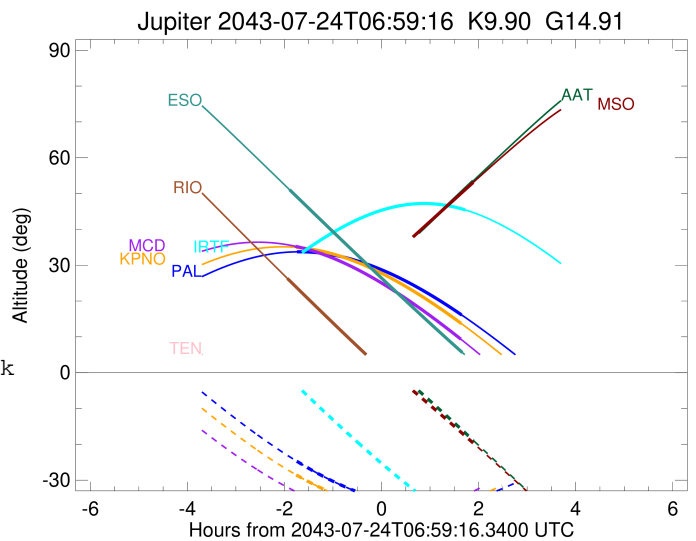
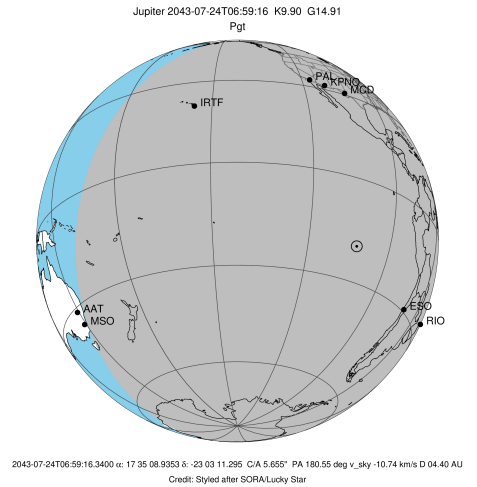
x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-07-24T05:19:14.486	8.71	21.77x	71491.7	10.72	12.22
Jupiter	E	2043-07-24T08:52:46.696	53.55	-18.91	71491.5	14.77	16.77



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2043-07-24T07:06:23.400
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       : 4116687468505143168
2Mass ID (if available) : 17350893-2303107
ICRS Star Coord at Epoch: 17h 35m 08.93530s -23:03:11.29469s
RUWE (>1.4 is poor) : 1.15
K magnitude           : 9.900
G magnitude           : 14.914
RP magnitude         : 13.568
BP magnitude         : 16.534
DUPflag              : 0
Distance (au)        : 4.403
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -10.74
Sun-Target sep (deg) : 143.57
Sun-Moon sep (deg)   : 63.02
B (ring opening deg) : -2.39
PA of pole (deg)     : 1.84
Pole direction: RA (deg): 268.05670
Dec (deg): 64.49731
C/A sky separation ("): 4.853
C/A sky separation (km): 15495.5
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	2043-07-24T05:18:44.632	10.05	19.15x	71491.7	10.44	11.90
Jupiter	E	2043-07-24T08:52:41.446	53.11	-19.65	71491.5	14.43	16.38