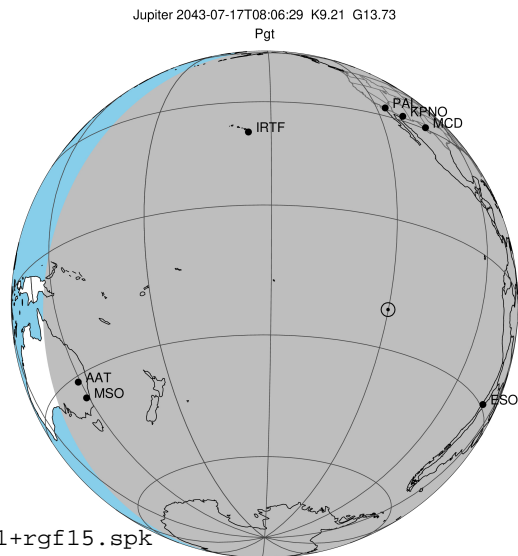


target : Jupiter  
 target radius (km) : 71492.00  
 C/A epoch : 2043-07-17T08:06:29.960  
 Event type : Pgt  
 : Jupiter occs: geocentric, topocentric  
 : Not a ringed target  
 Gaia source ID : 4116725470391618560  
 2Mass ID (if available) : 17375038-2303499

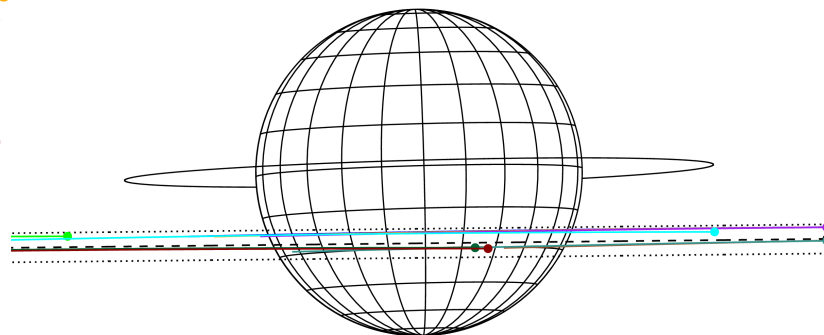
Jupiter 2043-07-17T08:06:29 K9.21 G13.73 Pgt

ICRS Star Coord at Epoch: 17h 37m 50.37529s -23°03:50.12846s

RUWE (>1.4 is poor) : 0.96  
 K magnitude : 9.212  
 G magnitude : 13.730  
 RP magnitude : 12.564  
 BP magnitude : 15.187  
 DUPflag : 0  
 Distance (au) : 4.346  
 f0 (km) : 0.00  
 g0 (km) : 0.00  
 skyplane vel. (km/s) : -12.73  
 Sun-Target sep (deg) : 150.82  
 Sun-Moon sep (deg) : 25.58  
 B (ring opening deg) : -2.39  
 PA of pole (deg) : 1.55  
 Pole direction: RA (deg): 268.05670  
 Dec (deg): 64.49732  
 C/A sky separation (") : 9.844  
 C/A sky separation (km) : 31032.0  
 NAIF SPICE kernels : RAJobs\_U111+rgf15.spk



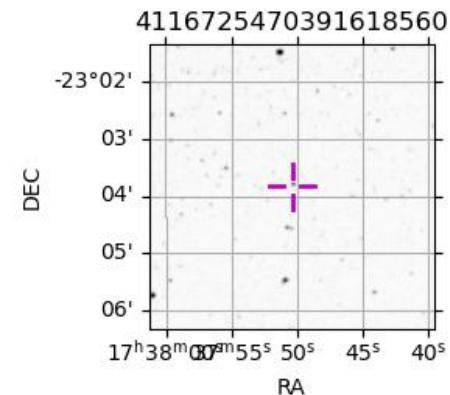
Earth  
 PAL  
 PMO  
 KPNO  
 MCD  
 IRTF  
 RIO  
 ESO  
 AAT  
 MSO



2043-07-17T08:06:29.9600 a: 17 37 50.3753 s -23 03 50.128 C/A 9.855" PA 0.62 deg v\_sky -12.73 km/s D 04.35 AU  
 Credit: Styled after SORA/Lucky Star

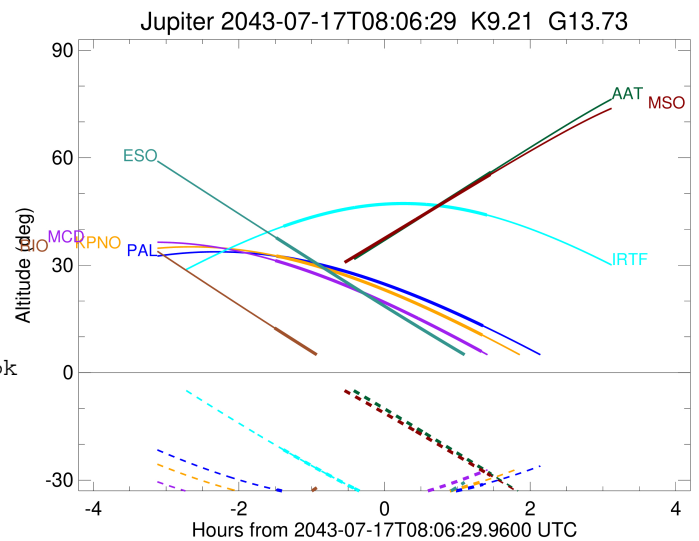
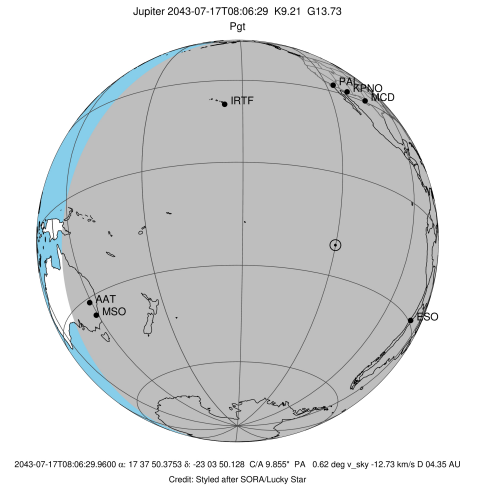
Observable events with sun below -5 deg and altitude above 5 deg

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 17 06:37 - JUL 17 09:27	Pie
PMO	Purple Mtn Obs. Nanking	32.1	118.8			Pnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+ +	JUL 17 06:37 - JUL 17 09:27	Pie
MCD	McDonald Obs. 2.7m	30.7	256.0	+ +	JUL 17 06:36 - JUL 17 09:26	Pie
TEN	Teide Obs./Tenerife	28.3	343.5			Pnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+ +	JUL 17 06:43 - JUL 17 09:31	Pie
KAV	Kavalur Observatory	12.6	78.8			Pnn
RIO	Rio de Janeiro	-22.9	316.8	+	JUL 17 06:35 - JUL 17 06:35	Pin
ESO	European Southern Obs. (3.6m)	-29.3	289.3	+	JUL 17 06:37 - JUL 17 06:37	Pin
AAT	Siding Spring (AAT)	-31.3	149.1	+	JUL 17 09:34 - JUL 17 09:34	Pne
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8			Pnn
MSO	Mt. Stromlo Observatory	-35.3	149.0	+	JUL 17 09:33 - JUL 17 09:33	Pne



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2043-07-17T08:02:27.030
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        : 4116725470391618560
2Mass ID (if available) : 17375038-2303499
ICRS Star Coord at Epoch: 17h 37m 50.37529s -23:03:50.12846s
RUWE (>1.4 is poor) : 0.96
K magnitude           : 9.212
G magnitude           : 13.730
RP magnitude          : 12.564
BP magnitude          : 15.187
DUPflag              : 0
Distance (au)         : 4.346
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -12.73
Sun-Target sep (deg)  : 150.82
Sun-Moon sep (deg)   : 26.23
B (ring opening deg) : -2.39
PA of pole (deg)     : 1.55
Pole direction: RA (deg): 268.05670
Dec (deg): 64.49732
C/A sky separation (" ) : 8.269
C/A sky separation (km) : 26065.3
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
    
```

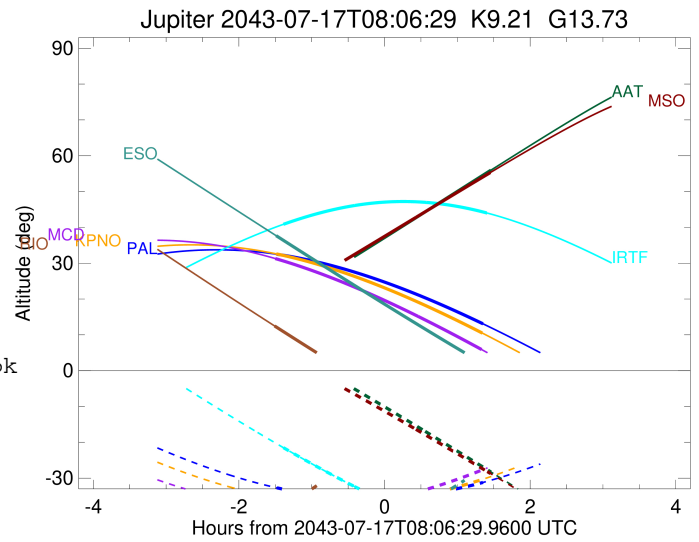
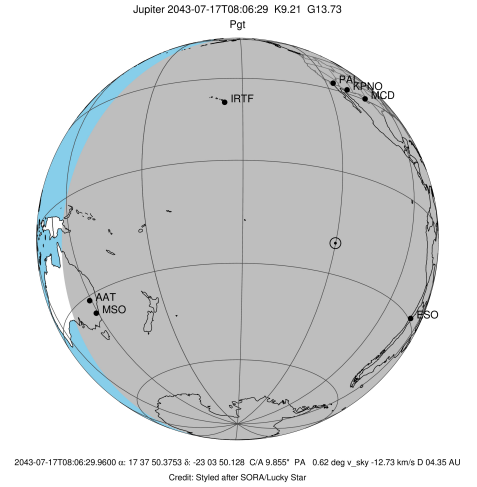


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-07-17T06:37:48.381	32.49	-32.70	71490.9	-22.04	-24.81
Jupiter	E	2043-07-17T09:27:42.573	13.07	-31.19	71491.0	-20.89	-23.56

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2043-07-17T08:01:50.570
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       : 4116725470391618560
2Mass ID (if available) : 17375038-2303499
ICRS Star Coord at Epoch: 17h 37m 50.37529s -23:03:50.12846s
RUWE (>1.4 is poor) : 0.96
K magnitude           : 9.212
G magnitude           : 13.730
RP magnitude         : 12.564
BP magnitude         : 15.187
DUPflag              : 0
Distance (au)        : 4.346
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -12.73
Sun-Target sep (deg) : 150.82
Sun-Moon sep (deg)   : 26.27
B (ring opening deg) : -2.39
PA of pole (deg)     : 1.55
Pole direction: RA (deg): 268.05670
Dec (deg): 64.49732
C/A sky separation (") : 8.333
C/A sky separation (km) : 26267.0
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
    
```

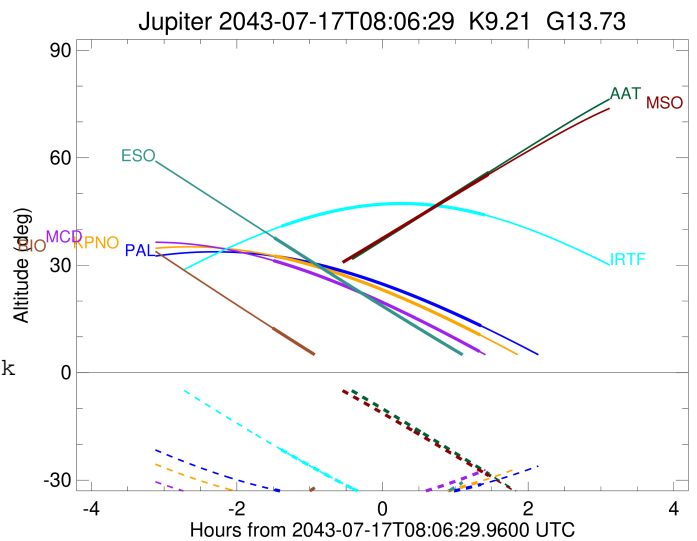
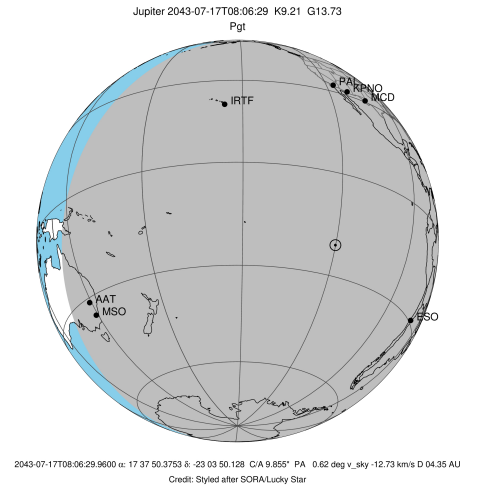


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-07-17T06:37:14.284	32.60	-35.39	71490.9	-22.16	-24.94
Jupiter	E	2043-07-17T09:27:08.463	10.49	-30.35	71491.0	-21.12	-23.80

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2043-07-17T08:01:03.020
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      : 4116725470391618560
2Mass ID (if available) : 17375038-2303499
ICRS Star Coord at Epoch: 17h 37m 50.37529s -23:03:50.12846s
RUWE (>1.4 is poor) : 0.96
K magnitude          : 9.212
G magnitude          : 13.730
RP magnitude         : 12.564
BP magnitude         : 15.187
DUPflag             : 0
Distance (au)       : 4.346
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -12.73
Sun-Target sep (deg) : 150.82
Sun-Moon sep (deg)  : 26.31
B (ring opening deg) : -2.39
PA of pole (deg)    : 1.55
Pole direction: RA (deg): 268.05670
Dec (deg): 64.49732
C/A sky separation (") : 8.420
C/A sky separation (km) : 26540.9
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
    
```

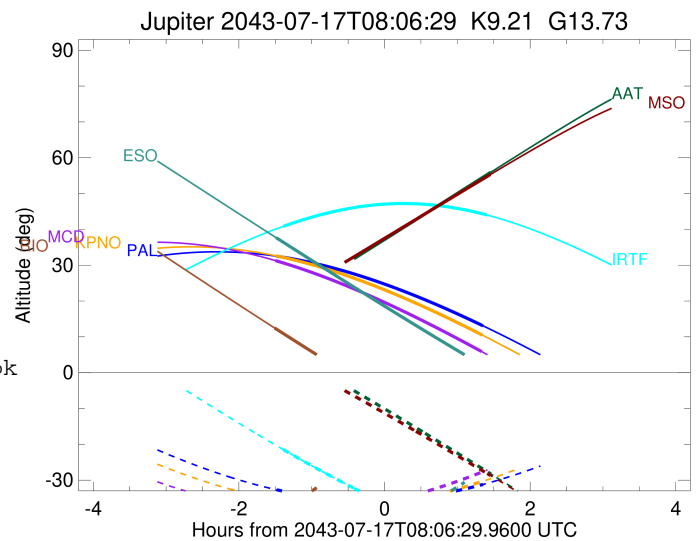
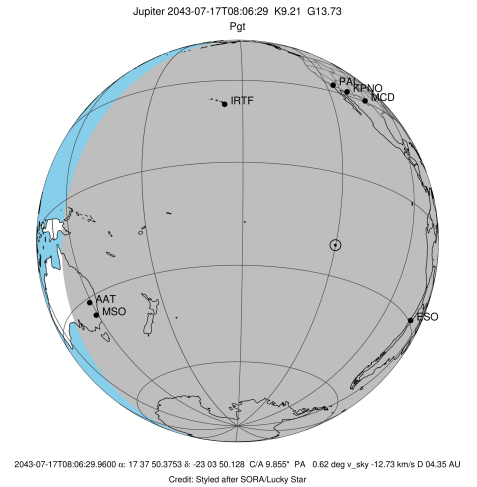


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-07-17T06:36:26.322	31.30	-37.93	71490.9	-22.31	-25.11
Jupiter	E	2043-07-17T09:26:27.570	5.91	-27.79	71491.0	-21.42	-24.13

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2043-07-17T08:07:05.140
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       : 4116725470391618560
2Mass ID (if available) : 17375038-2303499
ICRS Star Coord at Epoch: 17h 37m 50.37529s -23:03:50.12846s
RUWE (>1.4 is poor) : 0.96
K magnitude           : 9.212
G magnitude           : 13.730
RP magnitude          : 12.564
BP magnitude          : 15.187
DUPflag              : 0
Distance (au)         : 4.346
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -12.73
Sun-Target sep (deg) : 150.82
Sun-Moon sep (deg)   : 25.91
B (ring opening deg) : -2.39
PA of pole (deg)     : 1.55
Pole direction: RA (deg): 268.05670
Dec (deg): 64.49732
C/A sky separation ("): 8.472
C/A sky separation (km): 26705.5
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
    
```

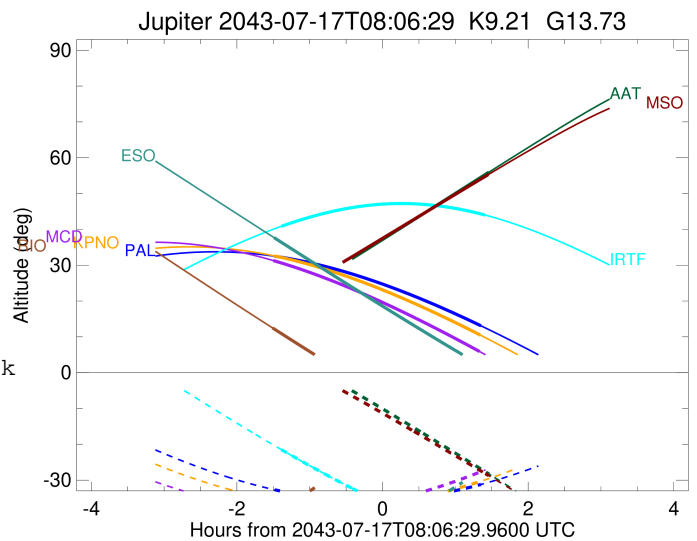
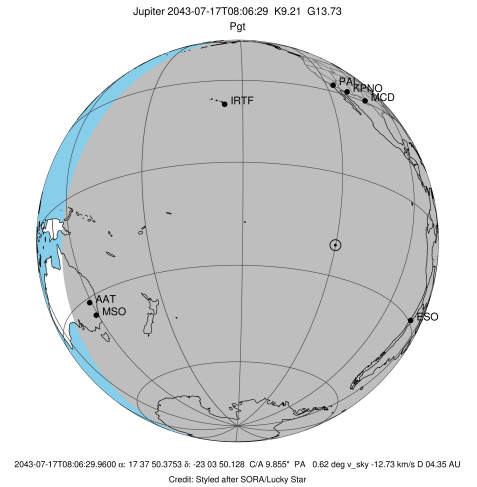


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-07-17T06:43:11.689	40.85	-21.49	71490.8	-23.04	-25.90
Jupiter	E	2043-07-17T09:30:59.830	44.00	-46.81	71491.0	-21.06	-23.74

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2043-07-17T07:58:31.360
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       : 4116725470391618560
2Mass ID (if available) : 17375038-2303499
ICRS Star Coord at Epoch: 17h 37m 50.37529s -23:03:50.12846s
RUWE (>1.4 is poor) : 0.96
K magnitude           : 9.212
G magnitude           : 13.730
RP magnitude          : 12.564
BP magnitude          : 15.187
DUPflag              : 0
Distance (au)        : 4.346
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -12.73
Sun-Target sep (deg) : 150.82
Sun-Moon sep (deg)   : 26.19
B (ring opening deg) : -2.39
PA of pole (deg)     : 1.55
Pole direction: RA (deg): 268.05670
Dec (deg): 64.49732
C/A sky separation (") : 10.760
C/A sky separation (km) : 33917.3
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
    
```

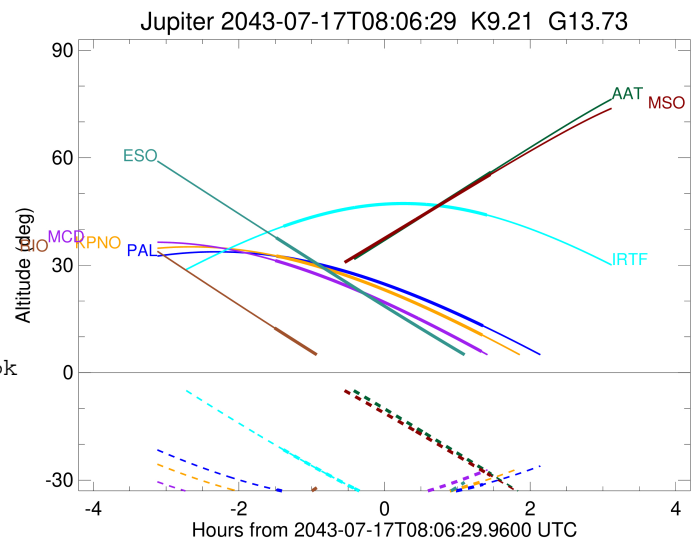
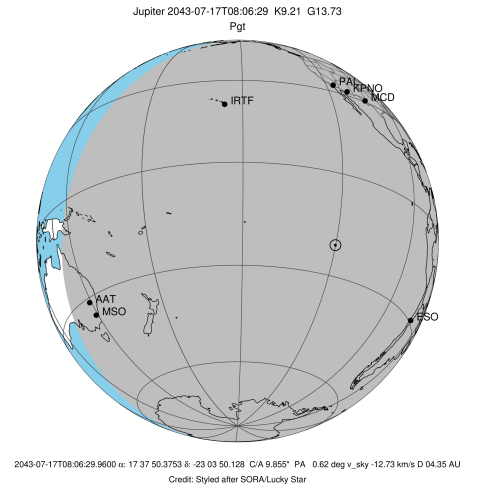


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-07-17T06:35:55.173	12.48	-39.98	71490.2	-28.47	-31.75
Jupiter	E	2043-07-17T09:22:13.286	-21.28x	-3.04x	71490.3	-28.05	-31.30

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2043-07-17T07:58:47.550
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     : 4116725470391618560
2Mass ID (if available) : 17375038-2303499
ICRS Star Coord at Epoch: 17h 37m 50.37529s -23:03:50.12846s
RUWE (>1.4 is poor) : 0.96
K magnitude         : 9.212
G magnitude         : 13.730
RP magnitude        : 12.564
BP magnitude        : 15.187
DUPflag            : 0
Distance (au)      : 4.346
f0 (km)            : 0.00
g0 (km)            : 0.00
skyplane vel. (km/s) : -12.73
Sun-Target sep (deg) : 150.82
Sun-Moon sep (deg)  : 26.36
B (ring opening deg) : -2.39
PA of pole (deg)    : 1.55
Pole direction: RA (deg): 268.05670
Dec (deg): 64.49732
C/A sky separation (") : 10.606
C/A sky separation (km) : 33432.4
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
    
```

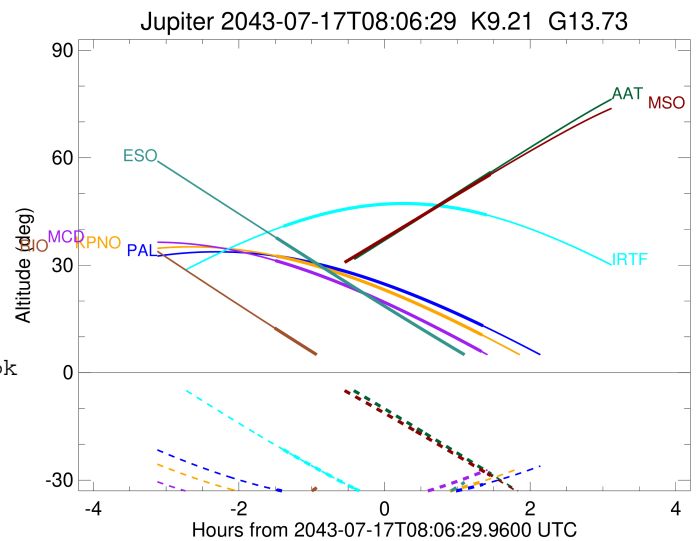
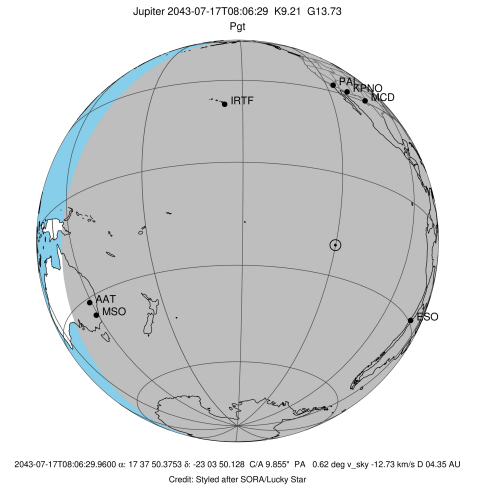


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-07-17T06:37:07.436	37.69	-64.37	71490.3	-28.13	-31.39
Jupiter	E	2043-07-17T09:21:28.816	3.21x	-28.66	71490.3	-27.64	-30.86

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2043-07-17T08:12:58.090
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        : 4116725470391618560
2Mass ID (if available) : 17375038-2303499
ICRS Star Coord at Epoch: 17h 37m 50.37529s -23:03:50.12846s
RUWE (>1.4 is poor) : 0.96
K magnitude           : 9.212
G magnitude           : 13.730
RP magnitude          : 12.564
BP magnitude          : 15.187
DUPflag              : 0
Distance (au)         : 4.346
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -12.73
Sun-Target sep (deg)  : 150.82
Sun-Moon sep (deg)   : 25.18
B (ring opening deg) : -2.39
PA of pole (deg)     : 1.55
Pole direction: RA (deg): 268.05670
Dec (deg): 64.49732
C/A sky separation (") : 10.453
C/A sky separation (km) : 32949.1
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
    
```



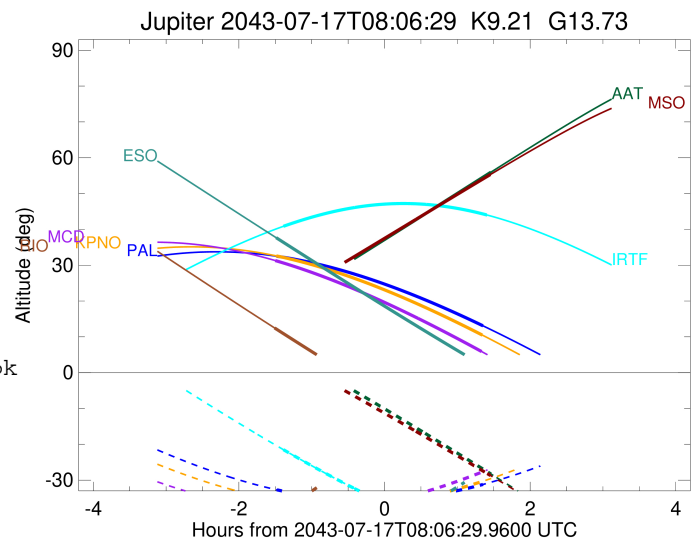
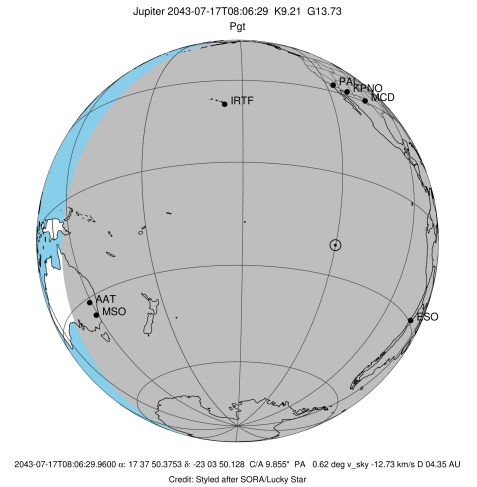
x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-07-17T06:50:57.592	21.24	4.74x	71490.2	-28.99	-32.30
Jupiter	E	2043-07-17T09:34:17.757	55.98	-28.30	71490.5	-25.98	-29.08



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2043-07-17T08:12:41.170
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      : 4116725470391618560
2Mass ID (if available) : 17375038-2303499
ICRS Star Coord at Epoch: 17h 37m 50.37529s -23:03:50.12846s
RUWE (>1.4 is poor) : 0.96
K magnitude          : 9.212
G magnitude          : 13.730
RP magnitude         : 12.564
BP magnitude         : 15.187
DUPflag             : 0
Distance (au)       : 4.346
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -12.73
Sun-Target sep (deg) : 150.82
Sun-Moon sep (deg)  : 25.20
B (ring opening deg) : -2.39
PA of pole (deg)    : 1.55
Pole direction: RA (deg): 268.05670
Dec (deg): 64.49732
C/A sky separation (" ) : 10.579
C/A sky separation (km) : 33347.7
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	2043-07-17T06:50:53.983	22.17	2.88x	71490.1	-29.32	-32.65
Jupiter	E	2043-07-17T09:33:49.692	55.32	-28.70	71490.5	-26.36	-29.49