

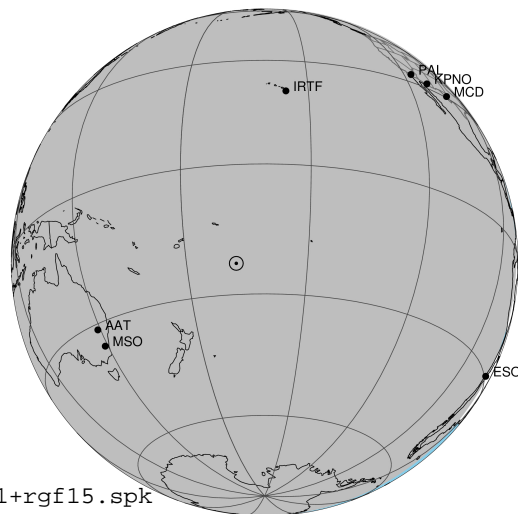
target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2031-06-09T11:09:27.150
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 4116787558452620416
 2Mass ID (if available) : 17354558-2250148

Jupiter 2031-06-09T11:09:27 K8.93 G13.55 Pgt

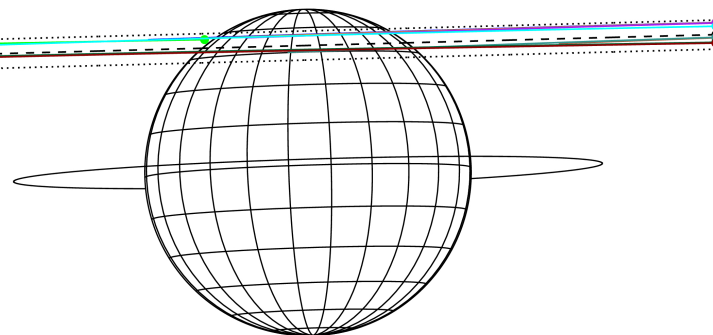
ICRS Star Coord at Epoch: 17h 35m 45.57136s -22:50:14.90792s

RUWE (>1.4 is poor) : 0.92
 K magnitude : 8.929
 G magnitude : 13.546
 RP magnitude : 12.334
 BP magnitude : 15.151
 DUPflag : 0
 Distance (au) : 4.273
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -16.26
 Sun-Target sep (deg) : 173.58
 Sun-Moon sep (deg) : 49.28
 B (ring opening deg) : -2.61
 PA of pole (deg) : 1.77
 Pole direction: RA (deg): 268.05692
 Dec (deg): 64.49651
 C/A sky separation (") : 17.952
 C/A sky separation (km) : 55629.3
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk

Jupiter 2031-06-09T11:09:27 K8.93 G13.55
 Pgt



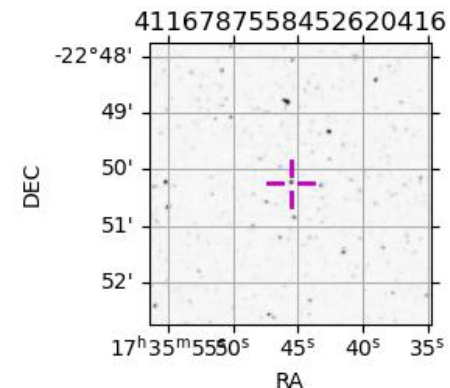
Earth
 PAL
 PMO
 KPNO
 MCD
 IRTF
 KAV
 RIO
 ESO
 AAT
 MSO



2031-06-09T11:09:27.1500 a: 17 35 45.5714 d: -22 50 14.908 C/A ***** PA 181.52 deg v_sky -16.26 km/s D 04.27 AU
 Credit: Styled after SORA/Lucky Star

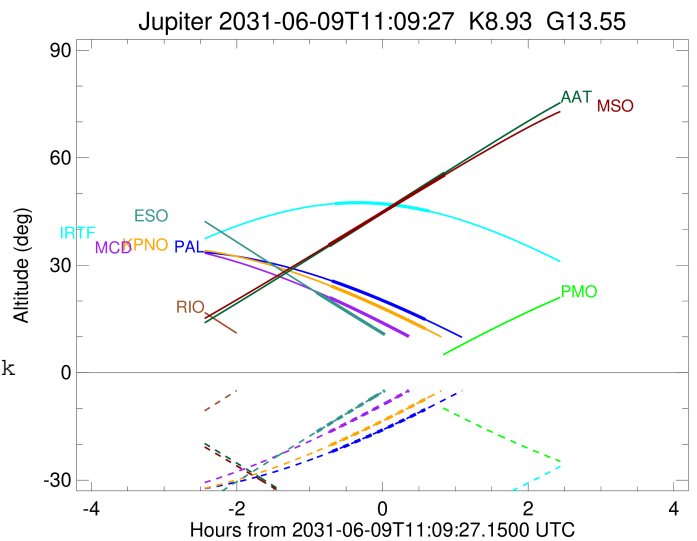
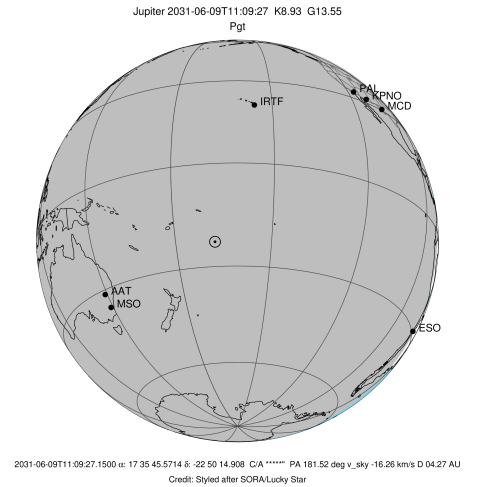
Observable events with sun below -5 deg and altitude above 5 deg

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 09 10:27 - JUN 09 11:44	Pie
PMO	Purple Mtn Obs. Nanking	32.1	118.8			Pnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+ +	JUN 09 10:27 - JUN 09 11:44	Pie
MCD	McDonald Obs. 2.7m	30.7	256.0	+	JUN 09 10:26 - JUN 09 10:26	Pin
TEN	Teide Obs./Tenerife	28.3	343.5			Pnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+ +	JUN 09 10:30 - JUN 09 11:47	Pie
KAV	Kavalur Observatory	12.6	78.8			Pnn
RIO	Rio de Janeiro	-22.9	316.8			Pnn
ESO	European Southern Obs. (3.6m)	-29.3	289.3	+	JUN 09 10:15 - JUN 09 10:15	Pin
AAT	Siding Spring (AAT)	-31.3	149.1	+ +	JUN 09 10:25 - JUN 09 12:00	Pie
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8			Pnn
MSO	Mt. Stromlo Observatory	-35.3	149.0	+ +	JUN 09 10:25 - JUN 09 12:00	Pie



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-09T11:06:12.310
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      : 4116787558452620416
2Mass ID (if available) : 17354558-2250148
ICRS Star Coord at Epoch: 17h 35m 45.57136s -22:50:14.90792s
RUWE (>1.4 is poor) : 0.92
K magnitude          : 8.929
G magnitude          : 13.546
RP magnitude         : 12.334
BP magnitude         : 15.151
DUPflag             : 0
Distance (au)       : 4.273
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.26
Sun-Target sep (deg) : 173.58
Sun-Moon sep (deg)  : 49.13
B (ring opening deg) : -2.61
PA of pole (deg)    : 1.77
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (" ) : 19.506
C/A sky separation (km) : 60445.2
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
    
```

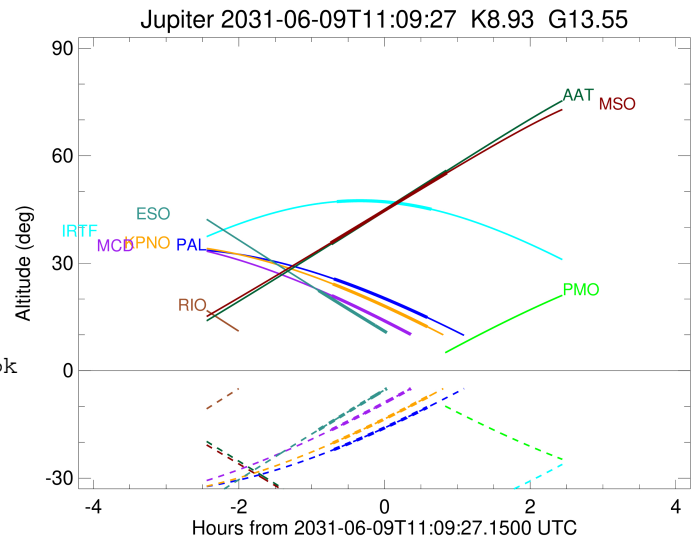
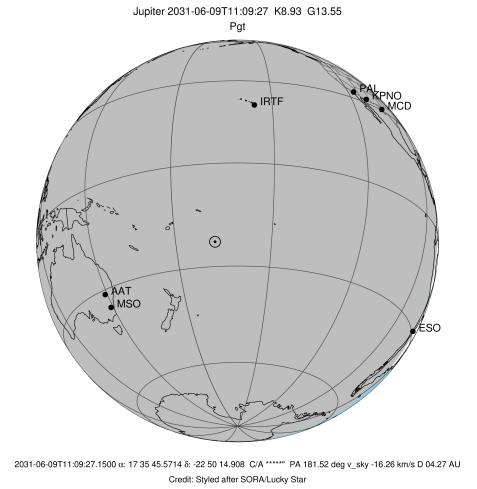


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-09T10:27:46.937	25.61	-22.02	71485.4	57.68	60.90
Jupiter	E	2031-06-09T11:44:43.401	14.85	-10.25	71485.4	57.52	60.75

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-09T11:05:50.000
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      : 4116787558452620416
2Mass ID (if available) : 17354558-2250148
ICRS Star Coord at Epoch: 17h 35m 45.57136s -22:50:14.90792s
RUWE (>1.4 is poor) : 0.92
K magnitude         : 8.929
G magnitude         : 13.546
RP magnitude        : 12.334
BP magnitude        : 15.151
DUPflag            : 0
Distance (au)       : 4.273
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -16.26
Sun-Target sep (deg) : 173.58
Sun-Moon sep (deg)  : 49.06
B (ring opening deg) : -2.61
PA of pole (deg)    : 1.77
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 19.435
C/A sky separation (km) : 60223.6
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
    
```

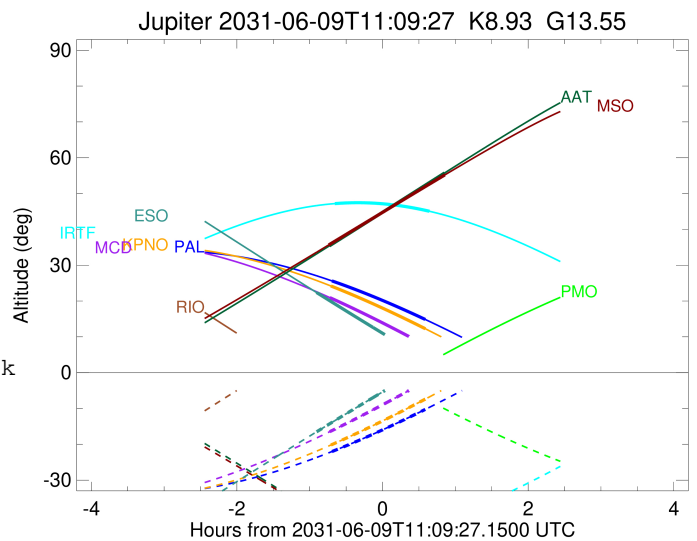
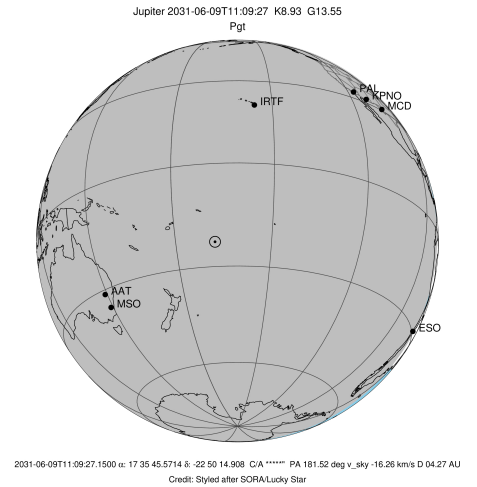


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-09T10:27:01.174	24.18	-20.18	71485.4	57.40	60.63
Jupiter	E	2031-06-09T11:44:45.355	12.26	-7.37	71485.5	57.15	60.40

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-09T11:05:22.250
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        : 4116787558452620416
2Mass ID (if available) : 17354558-2250148
ICRS Star Coord at Epoch: 17h 35m 45.57136s -22:50:14.90792s
RUWE (>1.4 is poor) : 0.92
K magnitude           : 8.929
G magnitude           : 13.546
RP magnitude          : 12.334
BP magnitude          : 15.151
DUPflag              : 0
Distance (au)         : 4.273
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.26
Sun-Target sep (deg) : 173.58
Sun-Moon sep (deg)   : 48.96
B (ring opening deg) : -2.61
PA of pole (deg)     : 1.77
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 19.338
C/A sky separation (km) : 59924.0
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
    
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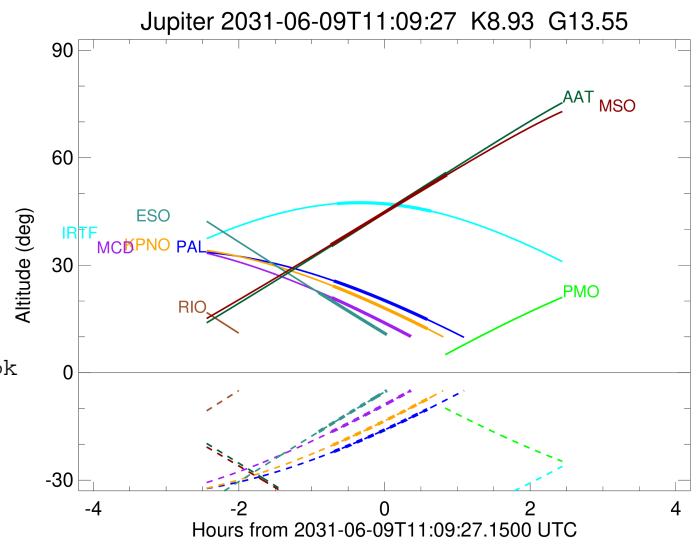
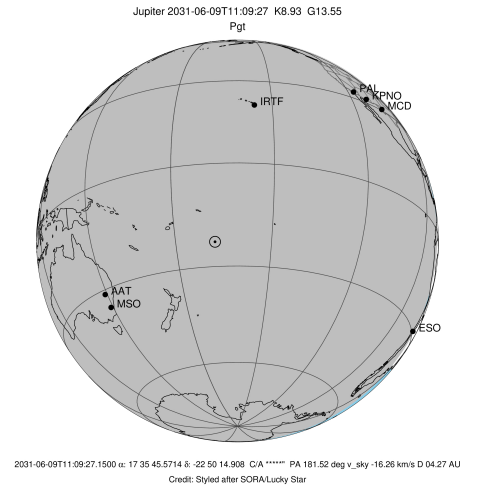


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-09T10:26:00.808	20.96	-16.47	71485.5	57.01	60.27
Jupiter	E	2031-06-09T11:44:51.300	7.63	-2.43x	71485.5	56.66	59.94

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-09T11:09:02.140
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       : 4116787558452620416
2Mass ID (if available) : 17354558-2250148
ICRS Star Coord at Epoch: 17h 35m 45.57136s -22:50:14.90792s
RUWE (>1.4 is poor) : 0.92
K magnitude           : 8.929
G magnitude           : 13.546
RP magnitude          : 12.334
BP magnitude          : 15.151
DUPflag              : 0
Distance (au)        : 4.273
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.26
Sun-Target sep (deg) : 173.58
Sun-Moon sep (deg)   : 49.75
B (ring opening deg) : -2.61
PA of pole (deg)     : 1.77
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 19.345
C/A sky separation (km) : 59946.4
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
    
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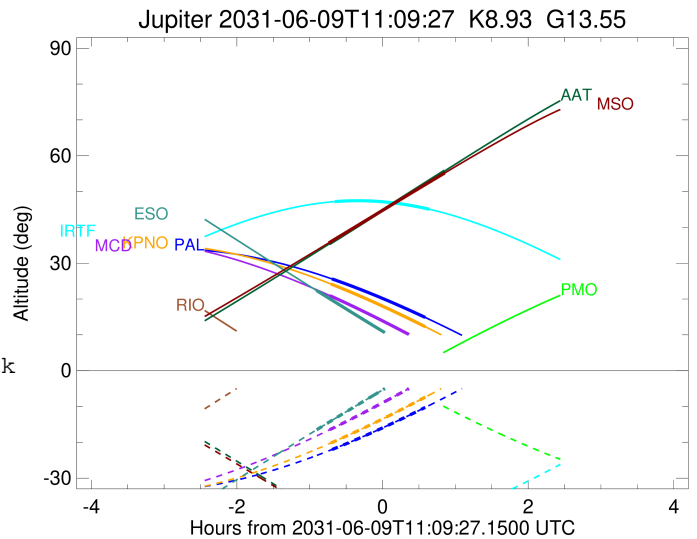
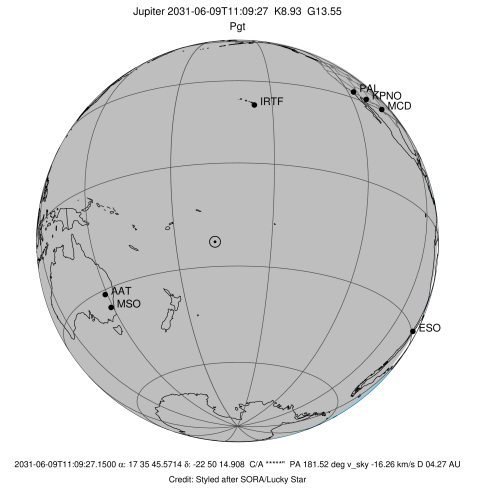


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-09T10:30:07.124	47.18	-47.31	71485.5	56.62	59.90
Jupiter	E	2031-06-09T11:47:57.745	45.06	-42.39	71485.5	57.08	60.34

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-09T11:04:12.320
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      : 4116787558452620416
2Mass ID (if available) : 17354558-2250148
ICRS Star Coord at Epoch: 17h 35m 45.57136s -22:50:14.90792s
RUWE (>1.4 is poor) : 0.92
K magnitude          : 8.929
G magnitude          : 13.546
RP magnitude         : 12.334
BP magnitude         : 15.151
DUPflag             : 0
Distance (au)       : 4.273
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -16.26
Sun-Target sep (deg) : 173.58
Sun-Moon sep (deg)  : 48.87
B (ring opening deg) : -2.61
PA of pole (deg)    : 1.77
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 17.091
C/A sky separation (km) : 52960.4
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
    
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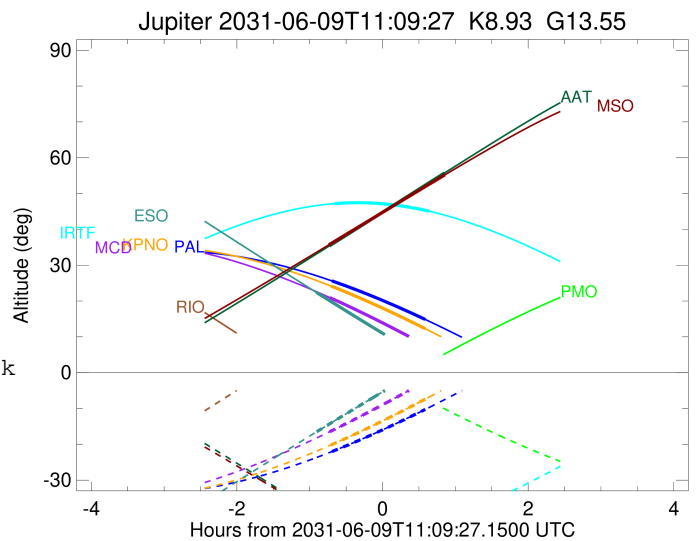
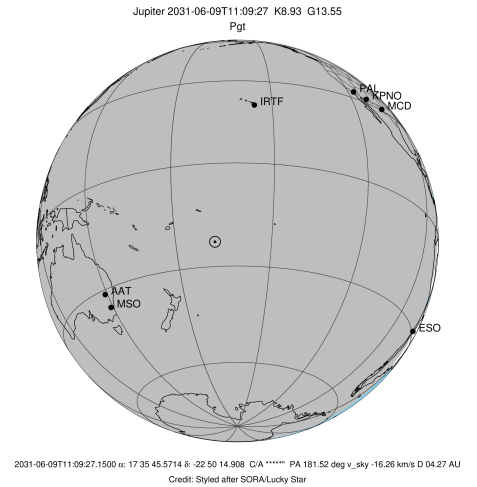


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-09T10:15:09.677	22.36	-16.50	71486.9	48.03	51.67
Jupiter	E	2031-06-09T11:53:29.895	2.10x	3.26x	71487.0	47.43	51.09

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-09T11:13:14.750
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      : 4116787558452620416
2Mass ID (if available) : 17354558-2250148
ICRS Star Coord at Epoch: 17h 35m 45.57136s -22:50:14.90792s
RUWE (>1.4 is poor) : 0.92
K magnitude          : 8.929
G magnitude          : 13.546
RP magnitude         : 12.334
BP magnitude         : 15.151
DUPflag             : 0
Distance (au)       : 4.273
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -16.26
Sun-Target sep (deg) : 173.58
Sun-Moon sep (deg)  : 50.25
B (ring opening deg) : -2.61
PA of pole (deg)    : 1.77
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation ("): 17.387
C/A sky separation (km) : 53879.9
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
    
```

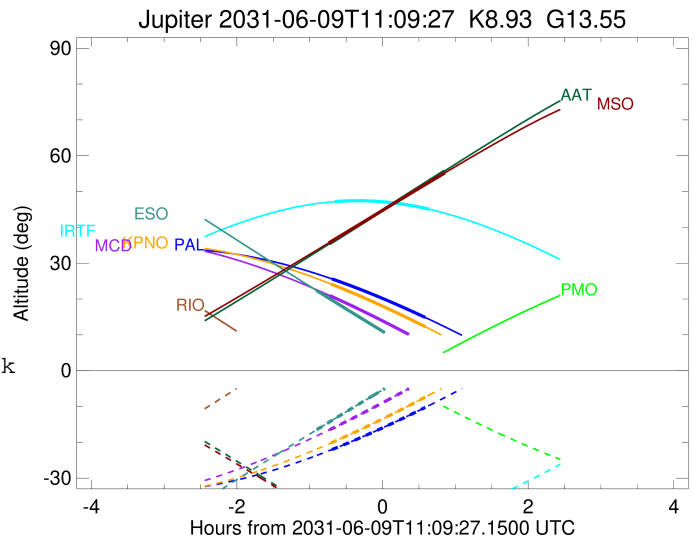
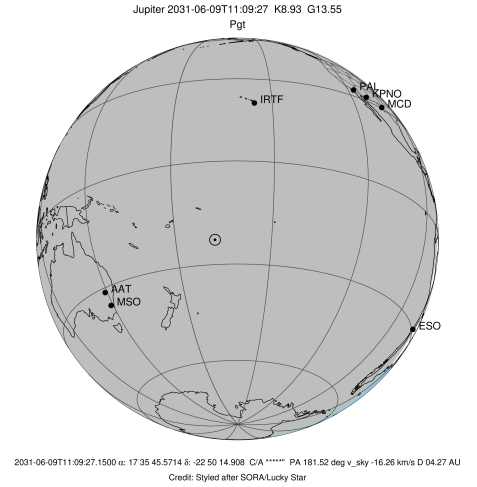


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-09T10:25:43.196	35.40	-41.40	71486.9	48.14	51.78
Jupiter	E	2031-06-09T12:00:35.472	55.73	-61.65	71486.6	49.48	53.09


```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-09T11:13:04.280
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     : 4116787558452620416
2Mass ID (if available) : 17354558-2250148
ICRS Star Coord at Epoch: 17h 35m 45.57136s -22:50:14.90792s
RUWE (>1.4 is poor) : 0.92
K magnitude         : 8.929
G magnitude         : 13.546
RP magnitude        : 12.334
BP magnitude        : 15.151
DUPflag            : 0
Distance (au)      : 4.273
f0 (km)            : 0.00
g0 (km)            : 0.00
skyplane vel. (km/s) : -16.26
Sun-Target sep (deg) : 173.58
Sun-Moon sep (deg) : 50.23
B (ring opening deg) : -2.61
PA of pole (deg)   : 1.77
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 17.256
C/A sky separation (km) : 53473.9
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	2031-06-09T10:25:02.873	35.63	-41.39	71486.9	47.66	51.32
Jupiter	E	2031-06-09T12:00:55.076	55.22	-60.77	71486.7	48.97	52.59