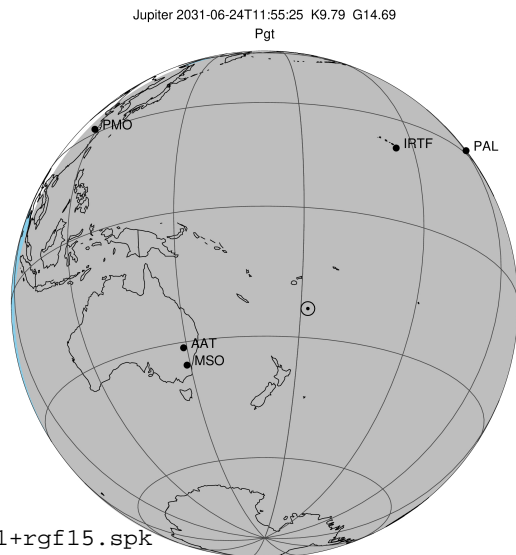


target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2031-06-24T11:55:25.040
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 4111688603254659584
 2Mass ID (if available) : 17272915-2246445

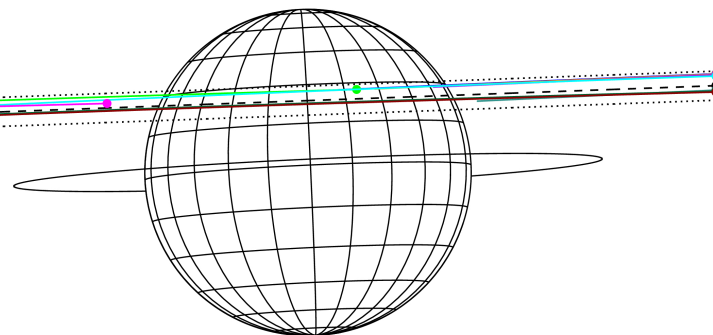
Jupiter 2031-06-24T11:55:25 K9.79 G14.69 Pgt

ICRS Star Coord at Epoch: 17h 27m 29.14788s -22:46:44.76164s

RUWE (>1.4 is poor) : 1.02
 K magnitude : 9.792
 G magnitude : 14.686
 RP magnitude : 13.462
 BP magnitude : 16.314
 DUPflag : 0
 Distance (au) : 4.273
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -16.06
 Sun-Target sep (deg) : 170.13
 Sun-Moon sep (deg) : 120.22
 B (ring opening deg) : -2.59
 PA of pole (deg) : 2.66
 Pole direction: RA (deg): 268.05691
 Dec (deg): 64.49651
 C/A sky separation (") : 10.153
 C/A sky separation (km) : 31466.9
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk



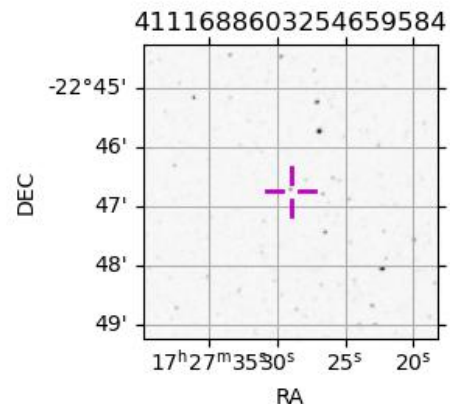
Earth
 PAL
 PMO
 KPNO
 MCD
 IRTF
 KAV
 ESO
 AAT
 MSO



2031-06-24T11:55:25.0400 a: 17 27 29.14788 s: -22 46 44.762 C/A ***** PA 182.10 deg v_sky -16.06 km/s D 04.27 AU
 Credit: Styled after SORA/Lucky Star

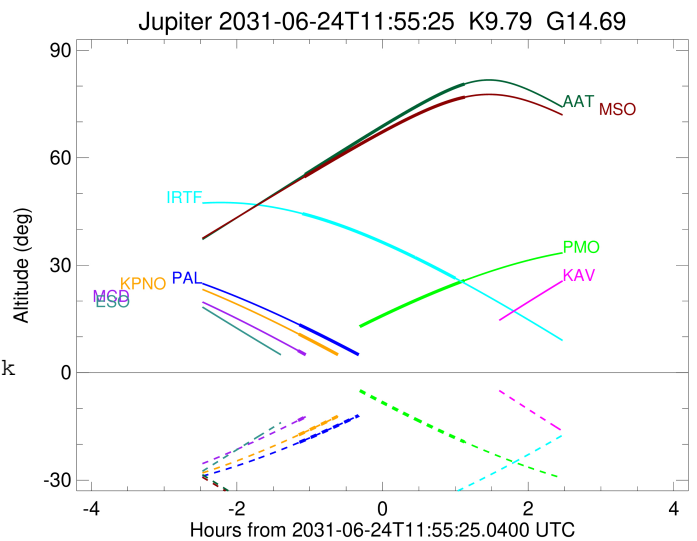
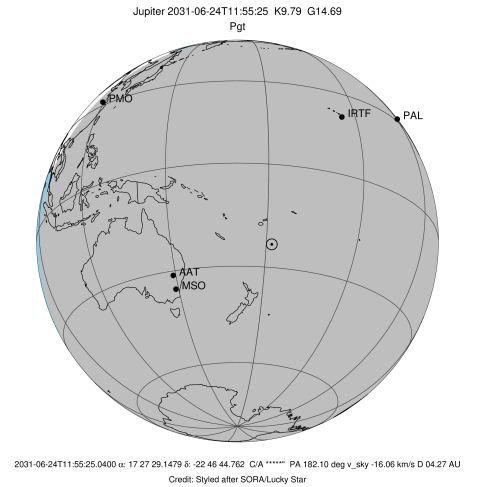
Observable events with sun below -5 deg and altitude above 5 deg

Obs	Location	lat	Elon	Target	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1			Pnn
PAL	Palomar Mt (200")	33.4	243.1	+	JUN 24 10:46 - JUN 24 10:46	Pin
PMO	Purple Mtn Obs. Nanking	32.1	118.8	+	JUN 24 13:02 - JUN 24 13:02	Pne
KPNO	Kitt Peak Natl Obs	32.0	248.4	+	JUN 24 10:46 - JUN 24 10:46	Pin
MCD	McDonald Obs. 2.7m	30.7	256.0	+	JUN 24 10:45 - JUN 24 10:45	Pin
TEN	Teide Obs./Tenerife	28.3	343.5			Pnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+	JUN 24 10:49 - JUN 24 12:55	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			Pnn
AAT	Siding Spring (AAT)	-31.3	149.1	+	JUN 24 10:51 - JUN 24 13:03	Pie
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8			Pnn
MSO	Mt. Stromlo Observatory	-35.3	149.0	+	JUN 24 10:51 - JUN 24 13:03	Pie



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-24T11:50:38.250
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        : 4111688603254659584
2Mass ID (if available) : 17272915-2246445
ICRS Star Coord at Epoch: 17h 27m 29.14788s -22:46:44.76163s
RUWE (>1.4 is poor) : 1.02
K magnitude           : 9.792
G magnitude           : 14.686
RP magnitude          : 13.462
BP magnitude          : 16.314
DUPflag              : 0
Distance (au)         : 4.273
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.06
Sun-Target sep (deg) : 170.13
Sun-Moon sep (deg)    : 119.87
B (ring opening deg) : -2.59
PA of pole (deg)      : 2.66
Pole direction: RA (deg): 268.05691
Dec (deg): 64.49651
C/A sky separation (") : 11.463
C/A sky separation (km) : 35525.9
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
    
```

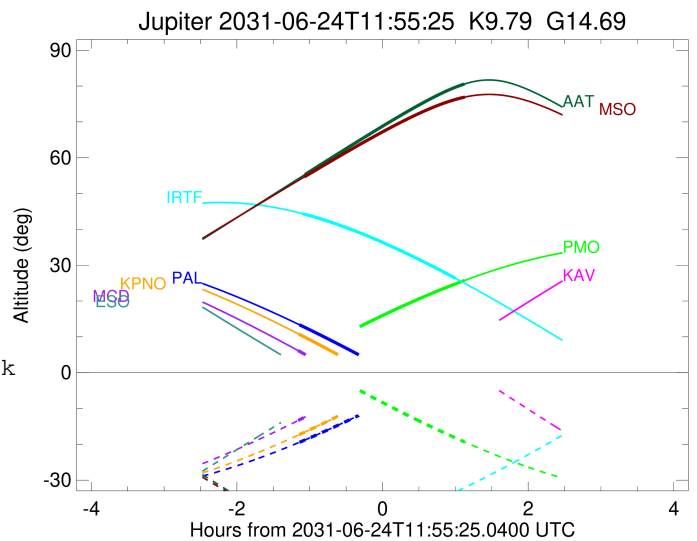
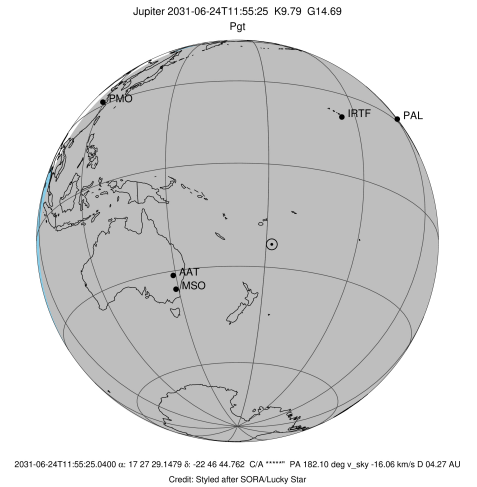


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-24T10:46:56.817	13.37	-19.43	71489.8	29.65	33.00
Jupiter	E	2031-06-24T12:54:44.140	-9.86x	1.96x	71489.7	29.81	33.17

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-24T11:59:39.140
Event type            : Pgt
: Jupiter occs: geocentric, topocentric
: Not a ringed target
Observer code         : PMO
Location              : Purple Mtn Obs. Nanking
Latitude (deg)        : 32.06667
E. Longitude (deg)    : 118.82089
Altitude (km)         : 0.364
Gaia source ID        : 4111688603254659584
2Mass ID (if available) : 17272915-2246445
ICRS Star Coord at Epoch: 17h 27m 29.14788s -22:46:44.76164s
RUWE (>1.4 is poor) : 1.02
K magnitude           : 9.792
G magnitude           : 14.686
RP magnitude          : 13.462
BP magnitude          : 16.314
DUPflag              : 0
Distance (au)         : 4.273
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.06
Sun-Target sep (deg) : 170.13
Sun-Moon sep (deg)   : 120.73
B (ring opening deg) : -2.59
PA of pole (deg)     : 2.66
Pole direction: RA (deg): 268.05691
Dec (deg): 64.49651
C/A sky separation (" ) : 11.533
C/A sky separation (km) : 35743.9
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
    
```

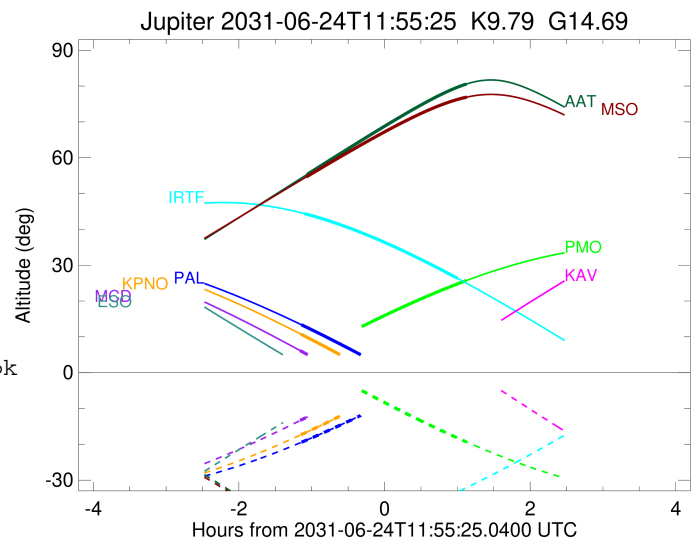
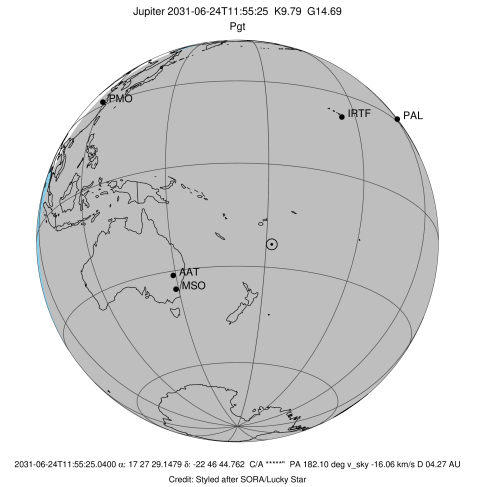


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-24T10:56:09.182	5.74	2.55x	71489.9	28.92	32.22
Jupiter	E	2031-06-24T13:02:50.469	25.71	-19.31	71489.6	30.93	34.35

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-24T11:50:24.890
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        : 4111688603254659584
2Mass ID (if available) : 17272915-2246445
ICRS Star Coord at Epoch: 17h 27m 29.14788s -22:46:44.76163s
RUWE (>1.4 is poor) : 1.02
K magnitude           : 9.792
G magnitude           : 14.686
RP magnitude          : 13.462
BP magnitude          : 16.314
DUPflag              : 0
Distance (au)         : 4.273
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.06
Sun-Target sep (deg) : 170.13
Sun-Moon sep (deg)   : 119.81
B (ring opening deg) : -2.59
PA of pole (deg)     : 2.66
Pole direction: RA (deg): 268.05691
Dec (deg): 64.49651
C/A sky separation ("): 11.371
C/A sky separation (km): 35241.5
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
    
```

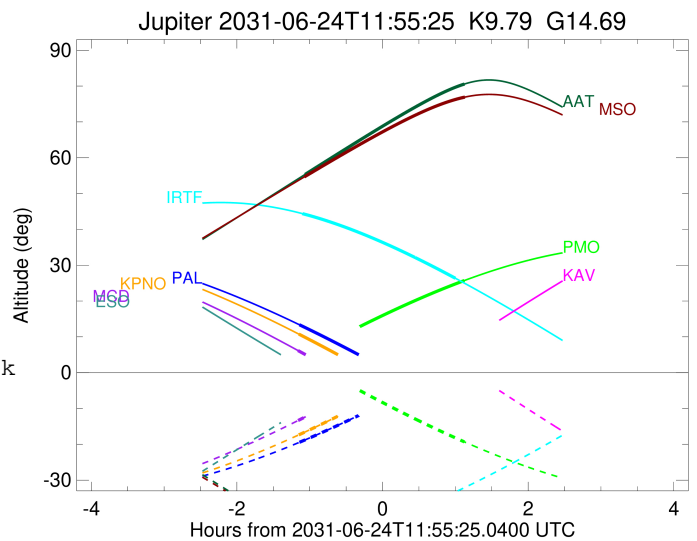
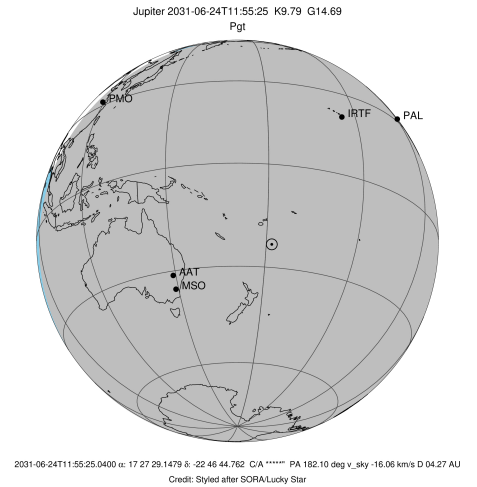


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-24T10:46:26.780	10.77	-17.36	71489.8	29.42	32.76
Jupiter	E	2031-06-24T12:54:48.788	-13.59x	5.38x	71489.8	29.53	32.87

```

target           : Jupiter
target radius (km) : 71492.00
C/A epoch       : 2031-06-24T11:50:12.540
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  : 4111688603254659584
2Mass ID (if available) : 17272915-2246445
ICRS Star Coord at Epoch: 17h 27m 29.14788s -22:46:44.76163s
RUWE (>1.4 is poor) : 1.02
K magnitude     : 9.792
G magnitude     : 14.686
RP magnitude    : 13.462
BP magnitude    : 16.314
DUPflag        : 0
Distance (au)   : 4.273
f0 (km)         : 0.00
g0 (km)         : 0.00
skyplane vel. (km/s) : -16.06
Sun-Target sep (deg) : 170.13
Sun-Moon sep (deg) : 119.73
B (ring opening deg) : -2.59
PA of pole (deg) : 2.66
Pole direction: RA (deg): 268.05691
Dec (deg): 64.49651
C/A sky separation (") : 11.251
C/A sky separation (km) : 34867.5
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
    
```

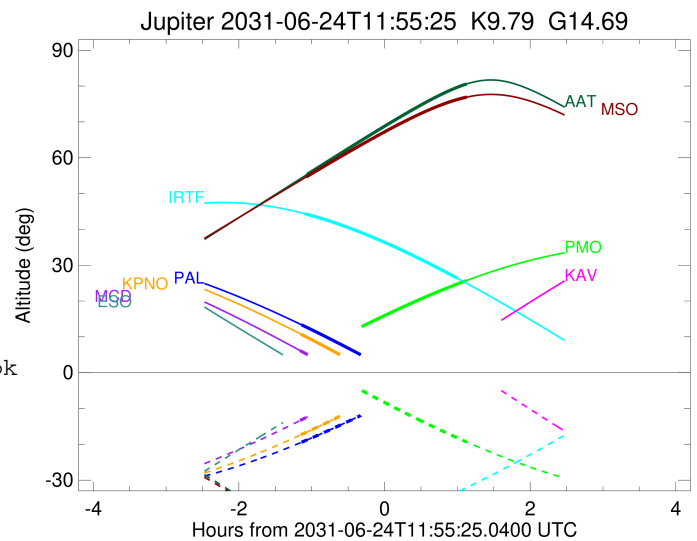
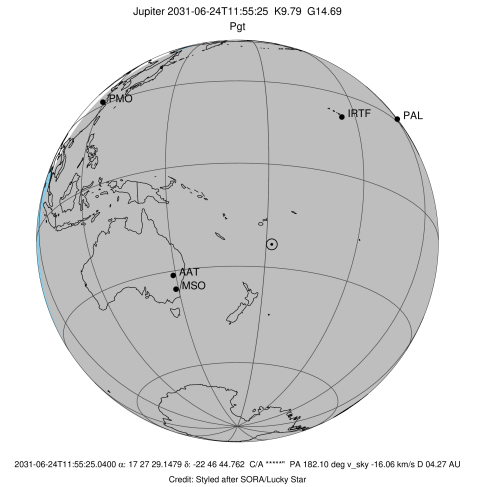


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-24T10:45:50.579	6.16	-13.36	71489.8	29.11	32.43
Jupiter	E	2031-06-24T12:55:01.704	-19.46x	10.92x	71489.8	29.17	32.49

```

target           : Jupiter
target radius (km) : 71492.00
C/A epoch       : 2031-06-24T11:52:21.840
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  : 4111688603254659584
2Mass ID (if available) : 17272915-2246445
ICRS Star Coord at Epoch: 17h 27m 29.14788s -22:46:44.76163s
RUWE (>1.4 is poor) : 1.02
K magnitude     : 9.792
G magnitude     : 14.686
RP magnitude    : 13.462
BP magnitude    : 16.314
DUPflag        : 0
Distance (au)   : 4.273
f0 (km)        : 0.00
g0 (km)        : 0.00
skyplane vel. (km/s) : -16.06
Sun-Target sep (deg) : 170.13
Sun-Moon sep (deg) : 120.43
B (ring opening deg) : -2.59
PA of pole (deg) : 2.66
Pole direction: RA (deg): 268.05691
Dec (deg): 64.49651
C/A sky separation (") : 11.459
C/A sky separation (km) : 35514.6
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
    
```

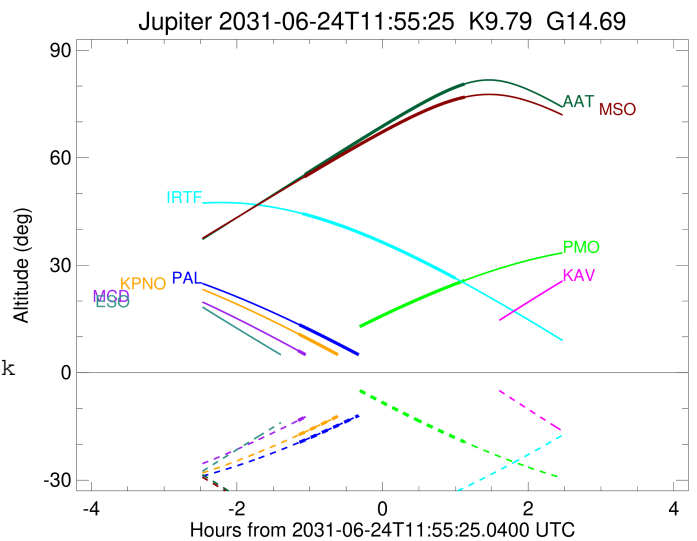
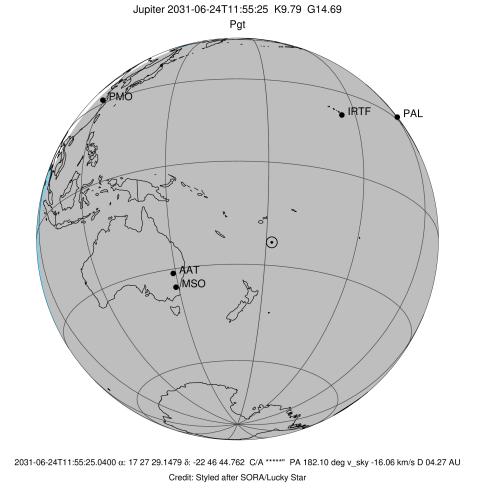


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-24T10:49:28.950	44.38	-46.46	71489.8	29.39	32.73
Jupiter	E	2031-06-24T12:55:29.923	26.35	-33.29	71489.7	29.97	33.34

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-24T11:57:19.410
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       : 4111688603254659584
2Mass ID (if available) : 17272915-2246445
ICRS Star Coord at Epoch: 17h 27m 29.14788s -22:46:44.76164s
RUWE (>1.4 is poor) : 1.02
K magnitude           : 9.792
G magnitude           : 14.686
RP magnitude         : 13.462
BP magnitude         : 16.314
DUPflag              : 0
Distance (au)        : 4.273
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.06
Sun-Target sep (deg) : 170.13
Sun-Moon sep (deg)   : 121.10
B (ring opening deg) : -2.59
PA of pole (deg)     : 2.66
Pole direction: RA (deg): 268.05691
Dec (deg): 64.49651
C/A sky separation ("): 9.788
C/A sky separation (km): 30333.4
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
    
```

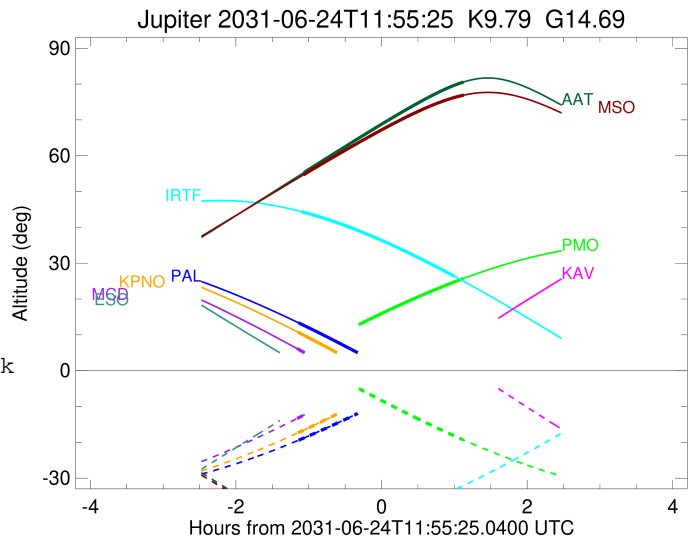
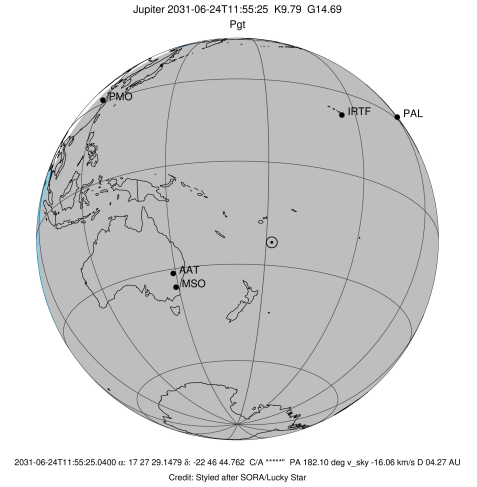


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-24T10:51:30.030	55.30	-46.40	71490.5	24.21	27.17
Jupiter	E	2031-06-24T13:02:59.607	80.57	-74.01	71490.3	25.81	28.90


```

target           : Jupiter
target radius (km) : 71492.00
C/A epoch       : 2031-06-24T11:57:13.750
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  : 4111688603254659584
2Mass ID (if available) : 17272915-2246445
ICRS Star Coord at Epoch: 17h 27m 29.14788s -22:46:44.76164s
RUWE (>1.4 is poor) : 1.02
K magnitude     : 9.792
G magnitude     : 14.686
RP magnitude    : 13.462
BP magnitude    : 16.314
DUPflag        : 0
Distance (au)   : 4.273
f0 (km)        : 0.00
g0 (km)        : 0.00
skyplane vel. (km/s) : -16.06
Sun-Target sep (deg) : 170.13
Sun-Moon sep (deg) : 121.09
B (ring opening deg) : -2.59
PA of pole (deg) : 2.66
Pole direction: RA (deg): 268.05691
Dec (deg): 64.49651
C/A sky separation (" ) : 9.648
C/A sky separation (km) : 29901.2
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	2031-06-24T10:51:08.416	54.67	-46.29	71490.5	23.84	26.77
Jupiter	E	2031-06-24T13:03:10.238	76.91	-71.93	71490.3	25.42	28.48