

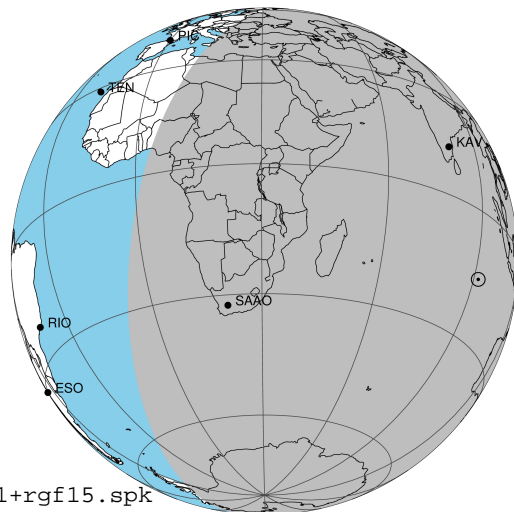
target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2031-08-09T17:58:11.410
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 4115214324730802688
 2Mass ID (if available) : 17111352-2238373

Jupiter 2031-08-09T17:58:11 K9.68 G11.74 Pgt

ICRS Star Coord at Epoch: 17h 11m 13.50646s -22:38:37.39492s

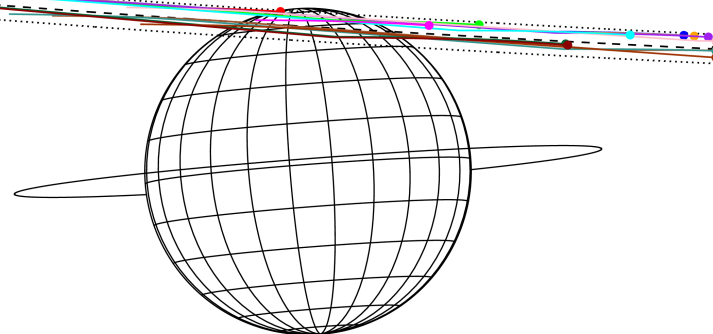
RUWE (>1.4 is poor) : 1.42
 K magnitude : 9.679
 G magnitude : 11.743
 RP magnitude : 11.051
 BP magnitude : 12.259
 DUPflag : 0
 Distance (au) : 4.650
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -2.84
 Sun-Target sep (deg) : 122.23
 Sun-Moon sep (deg) : 144.66
 B (ring opening deg) : -2.50
 PA of pole (deg) : 4.40
 Pole direction: RA (deg): 268.05687
 Dec (deg): 64.49652
 C/A sky separation (") : 18.790
 C/A sky separation (km) : 63373.2
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk

Jupiter 2031-08-09T17:58:11 K9.68 G11.74
 Pgt



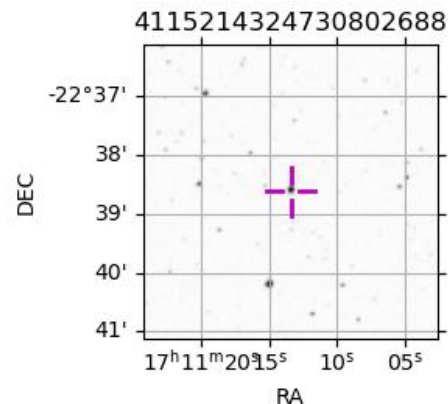
2031-08-09T17:58:11.4100 α: 17 11 13.5066 δ: -22 38 37.395 C/A ***** PA 176.45 deg v_sky - 2.84 km/s D 0.65 AU
 Credit: Styled after SORA/Lucky Star

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



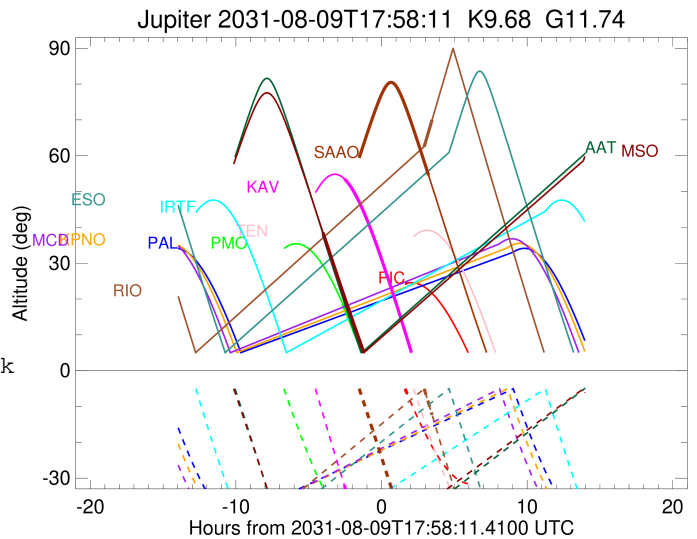
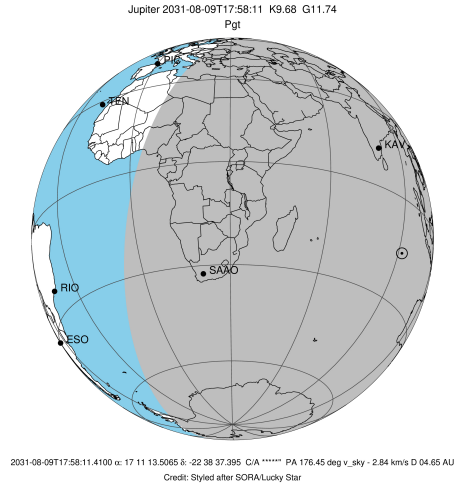
Observable events with sun below -5 deg and altitude above 5 deg

Obs	Location	lat	Elon	Target	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1	+	AUG 09 19:43 - AUG 09 19:43	Pne
PAL	Palomar Mt (200")	33.4	243.1			Pnn
PMO	Purple Mtn Obs. Nanking	32.1	118.8	+	AUG 09 15:18 - AUG 09 15:18	Pin
KPNO	Kitt Peak Natl Obs	32.0	248.4			Pnn
MCD	McDonald Obs. 2.7m	30.7	256.0			Pnn
TEN	Teide Obs./Tenerife	28.3	343.5			Pnn
IRTF	Mauna Kea/IRTF	19.8	204.5			Pnn
KAV	Kavalur Observatory	12.6	78.8	+	AUG 09 15:25 - AUG 09 15:25	Pin
RIO	Rio de Janeiro	-22.9	316.8	+	AUG 09 21:26 - AUG 09 21:26	Pne
ESO	European Southern Obs. (3.6m)	-29.3	289.3			Pnn
AAT	Siding Spring (AAT)	-31.3	149.1	+	AUG 09 13:58 - AUG 09 13:58	Pin
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8	+	AUG 09 21:12 - AUG 09 21:12	Pne
MSO	Mt. Stromlo Observatory	-35.3	149.0	+	AUG 09 13:56 - AUG 09 13:56	Pin



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-08-09T18:03:38.210
Event type          : Pgt
                    : Jupiter occs: geocentric, topocentric
                    : Not a ringed target
Observer code       : PIC
Location           : Pic du Midi
Latitude (deg)     : 42.93656
E. Longitude (deg) : 0.14231
Altitude (km)     : 2.890
Gaia source ID     : 4115214324730802688
2Mass ID (if available) : 17111352-2238373
ICRS Star Coord at Epoch: 17h 11m 13.50646s -22:38:37.39492s
RUWE (>1.4 is poor) : 1.42
K magnitude        : 9.679
G magnitude        : 11.743
RP magnitude       : 11.051
BP magnitude       : 12.259
DUPflag           : 0
Distance (au)     : 4.650
f0 (km)           : 0.00
g0 (km)           : 0.00
skyplane vel. (km/s) : -2.84
Sun-Target sep (deg) : 122.23
Sun-Moon sep (deg) : 144.51
B (ring opening deg) : -2.50
PA of pole (deg)  : 4.40
Pole direction: RA (deg): 268.05687
Dec (deg): 64.49652
C/A sky separation (") : 20.483
C/A sky separation (km) : 69082.2
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
    
```

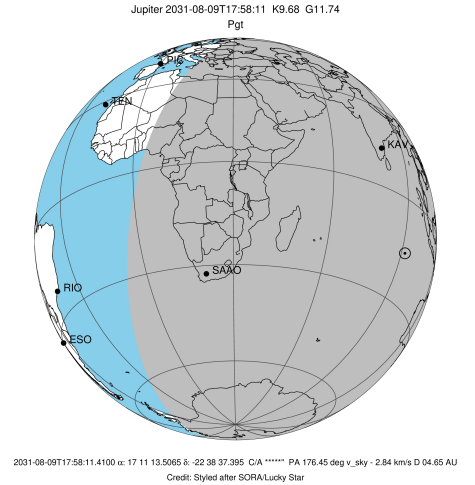


x: target alt < 5.0 deg or sun > -5.0 deg

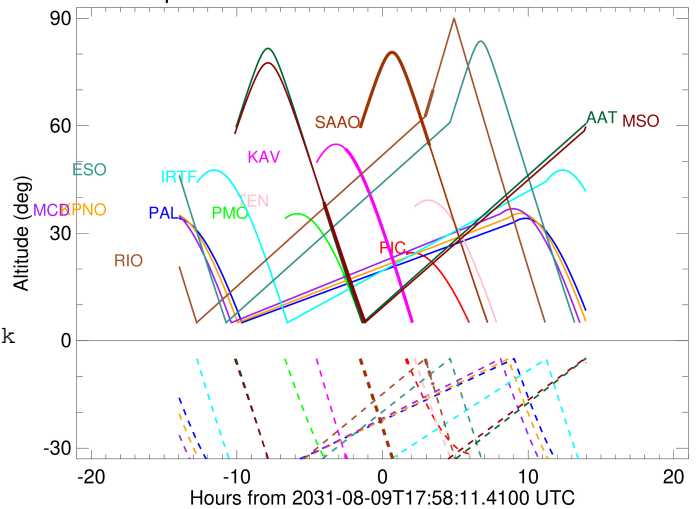
Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-08-09T16:22:24.297	7.53	29.35x	71484.9	65.77	68.38
Jupiter	E	2031-08-09T19:43:49.674	24.46	-6.42	71483.6	82.93	83.76

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-08-09T17:46:15.110
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      : 4115214324730802688
2Mass ID (if available) : 17111352-2238373
ICRS Star Coord at Epoch: 17h 11m 13.50646s -22:38:37.39492s
RUWE (>1.4 is poor) : 1.42
K magnitude         : 9.679
G magnitude         : 11.743
RP magnitude        : 11.051
BP magnitude        : 12.259
DUPflag            : 0
Distance (au)       : 4.650
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -2.84
Sun-Target sep (deg) : 122.23
Sun-Moon sep (deg)  : 145.19
B (ring opening deg) : -2.50
PA of pole (deg)    : 4.40
Pole direction: RA (deg): 268.05687
Dec (deg): 64.49652
C/A sky separation (") : 19.686
C/A sky separation (km) : 66393.8
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
    
```



Jupiter 2031-08-09T17:58:11 K9.68 G11.74

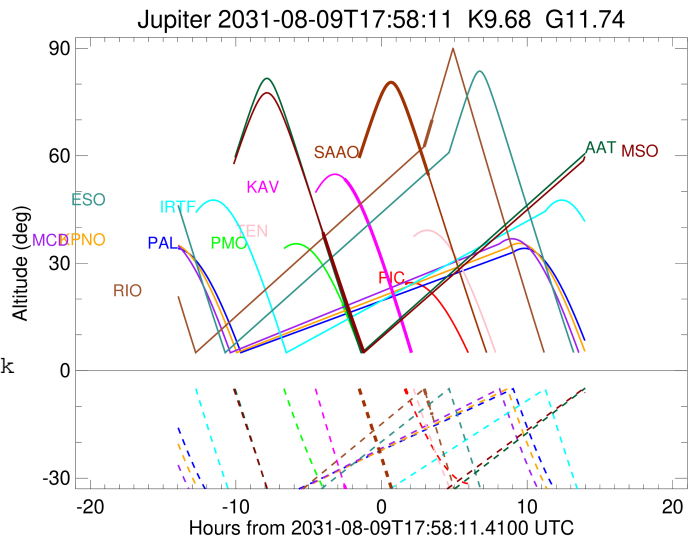
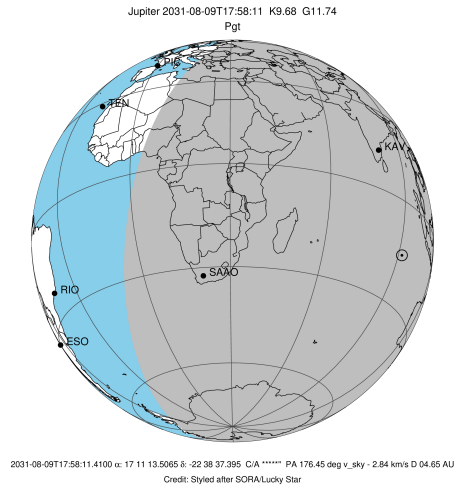


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-08-09T15:18:33.969	18.62	-40.75	71485.3	63.05	65.89
Jupiter	E	2031-08-09T20:27:02.835	-41.15x	-12.27	71484.2	73.19	75.09

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-08-09T17:48:54.490
Event type           : Pgt
: Jupiter occs: geocentric, topocentric
: Not a ringed target
Observer code        : KAV
Location             : Kavalur Observatory
Latitude (deg)       : 12.57556
E. Longitude (deg)  : 78.83167
Altitude (km)        : 0.722
Gaia source ID       : 4115214324730802688
2Mass ID (if available) : 17111352-2238373
ICRS Star Coord at Epoch: 17h 11m 13.50646s -22:38:37.39492s
RUWE (>1.4 is poor) : 1.42
K magnitude          : 9.679
G magnitude          : 11.743
RP magnitude         : 11.051
BP magnitude         : 12.259
DUPflag             : 0
Distance (au)        : 4.650
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -2.84
Sun-Target sep (deg) : 122.23
Sun-Moon sep (deg)  : 145.47
B (ring opening deg) : -2.50
PA of pole (deg)    : 4.40
Pole direction: RA (deg): 268.05687
Dec (deg): 64.49652
C/A sky separation ("): 19.597
C/A sky separation (km): 66093.6
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
    
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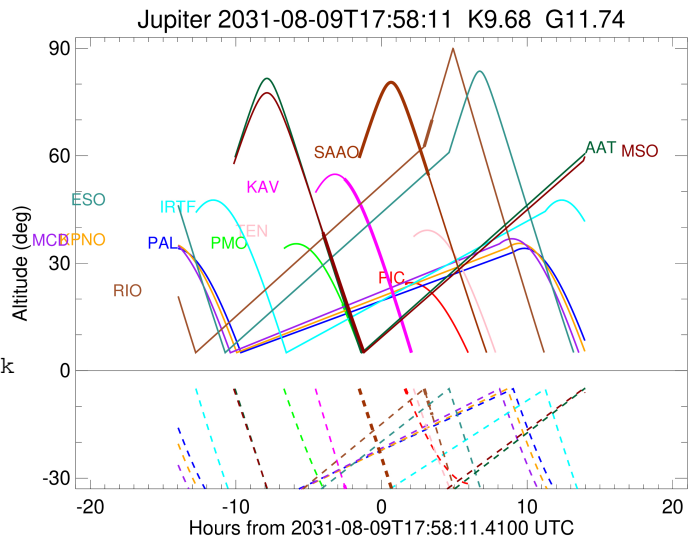
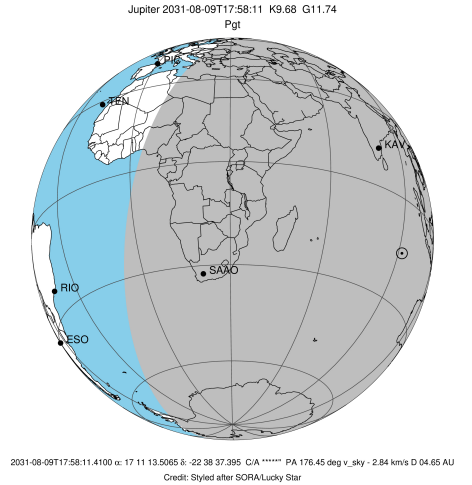


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-08-09T15:25:12.861	53.54	-31.96	71485.4	61.47	64.42
Jupiter	E	2031-08-09T20:23:03.258	0.21x	-53.62	71484.3	72.24	74.24

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-08-09T18:13:17.890
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       : 4115214324730802688
2Mass ID (if available) : 17111352-2238373
ICRS Star Coord at Epoch: 17h 11m 13.50646s -22:38:37.39492s
RUWE (>1.4 is poor) : 1.42
K magnitude           : 9.679
G magnitude           : 11.743
RP magnitude          : 11.051
BP magnitude          : 12.259
DUPflag              : 0
Distance (au)        : 4.650
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -2.84
Sun-Target sep (deg) : 122.23
Sun-Moon sep (deg)   : 144.21
B (ring opening deg) : -2.50
PA of pole (deg)     : 4.40
Pole direction: RA (deg): 268.05687
Dec (deg): 64.49652
C/A sky separation ("): 18.473
C/A sky separation (km): 62306.4
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
    
```

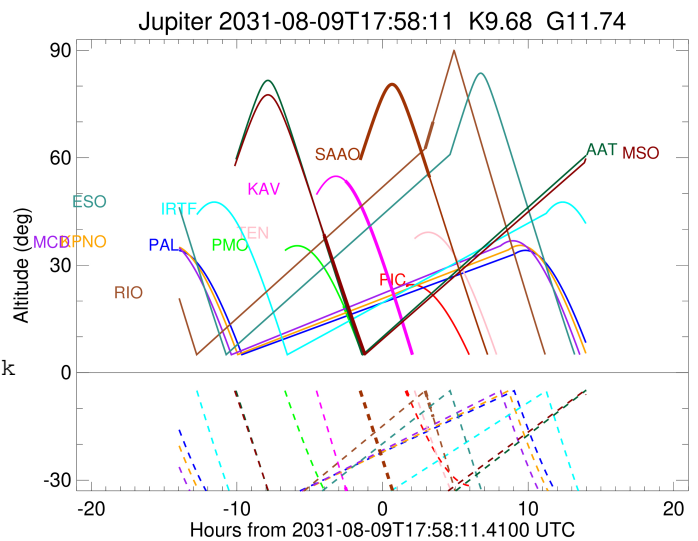
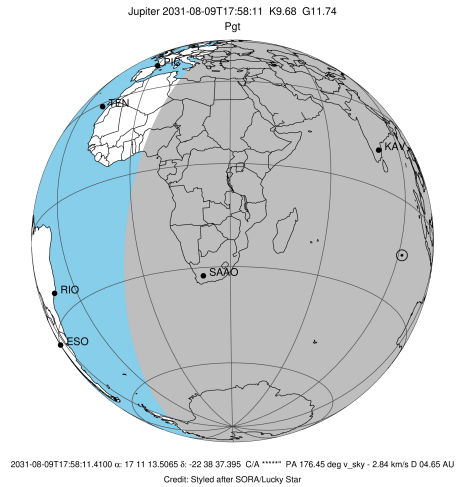


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-08-09T14:45:08.774	-17.80x	51.32x	71487.1	49.45	53.05
Jupiter	E	2031-08-09T21:26:37.964	70.03	-12.35	71484.5	70.29	72.48

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-08-09T17:47:28.520
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        : 4115214324730802688
2Mass ID (if available) : 17111352-2238373
ICRS Star Coord at Epoch: 17h 11m 13.50646s -22:38:37.39492s
RUWE (>1.4 is poor) : 1.42
K magnitude           : 9.679
G magnitude           : 11.743
RP magnitude          : 11.051
BP magnitude          : 12.259
DUPflag              : 0
Distance (au)         : 4.650
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -2.84
Sun-Target sep (deg) : 122.23
Sun-Moon sep (deg)   : 145.16
B (ring opening deg) : -2.50
PA of pole (deg)     : 4.40
Pole direction: RA (deg): 268.05687
Dec (deg): 64.49652
C/A sky separation (") : 17.547
C/A sky separation (km) : 59178.2
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
    
```

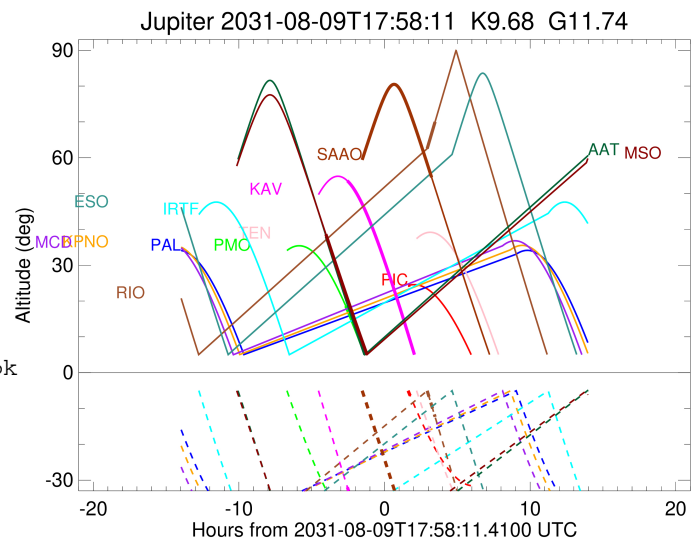
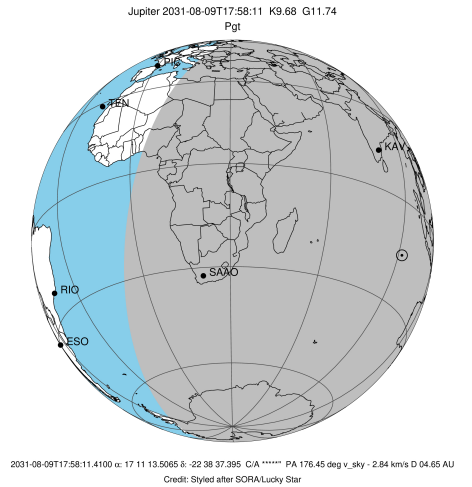


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-08-09T13:58:23.233	37.95	-74.49	71486.9	50.89	54.45
Jupiter	E	2031-08-09T22:05:42.709	-36.21x	15.15x	71485.3	62.52	65.40

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-08-09T18:03:35.270
Event type          : Pgt
                    : Jupiter occs: geocentric, topocentric
                    : Not a ringed target
Observer code       : SAAO
Location            : So. Afr. Astro. Obs. (Sutherland)
Latitude (deg)      : -32.37953
E. Longitude (deg)  : 20.81070
Altitude (km)       : 1.768
Gaia source ID      : 4115214324730802688
2Mass ID (if available) : 17111352-2238373
ICRS Star Coord at Epoch: 17h 11m 13.50646s -22:38:37.39492s
RUWE (>1.4 is poor) : 1.42
K magnitude          : 9.679
G magnitude          : 11.743
RP magnitude         : 11.051
BP magnitude         : 12.259
DUPflag             : 0
Distance (au)       : 4.650
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -2.84
Sun-Target sep (deg) : 122.23
Sun-Moon sep (deg)  : 145.07
B (ring opening deg) : -2.50
PA of pole (deg)    : 4.40
Pole direction: RA (deg): 268.05687
Dec (deg): 64.49652
C/A sky separation (") : 18.486
C/A sky separation (km) : 62349.9
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
    
```

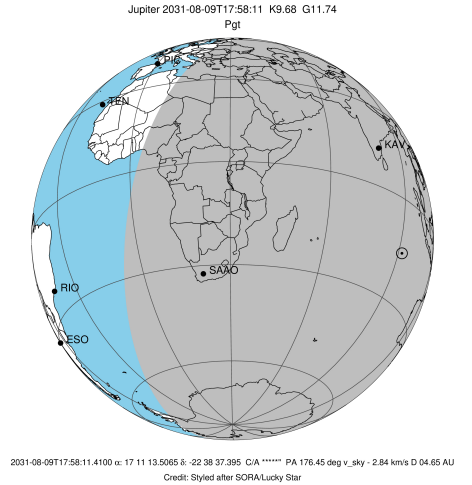


x: target alt < 5.0 deg or sun > -5.0 deg

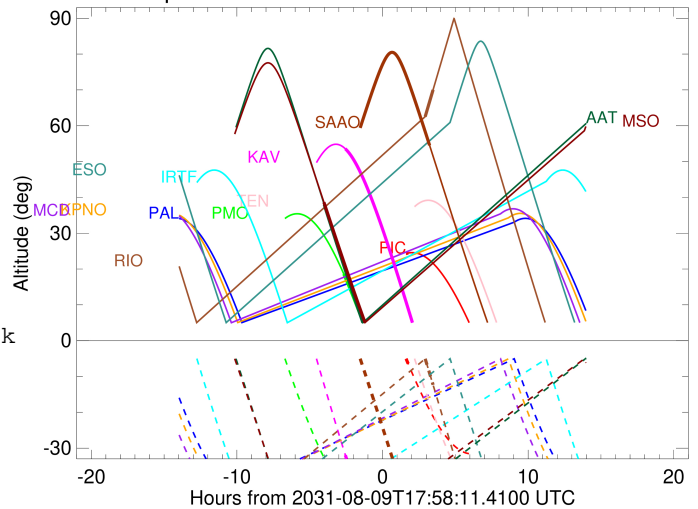
Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-08-09T14:55:36.199	40.23	12.74x	71486.8	51.73	55.25
Jupiter	E	2031-08-09T21:12:33.091	54.45	-63.80	71484.8	67.47	69.93

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-08-09T17:48:01.500
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      : 4115214324730802688
2Mass ID (if available) : 17111352-2238373
ICRS Star Coord at Epoch: 17h 11m 13.50646s -22:38:37.39492s
RUWE (>1.4 is poor) : 1.42
K magnitude          : 9.679
G magnitude          : 11.743
RP magnitude         : 11.051
BP magnitude         : 12.259
DUPflag             : 0
Distance (au)       : 4.650
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -2.84
Sun-Target sep (deg) : 122.23
Sun-Moon sep (deg)  : 145.15
B (ring opening deg) : -2.50
PA of pole (deg)    : 4.40
Pole direction: RA (deg): 268.05687
Dec (deg): 64.49652
C/A sky separation (") : 17.458
C/A sky separation (km) : 58879.9
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
    
```



Jupiter 2031-08-09T17:58:11 K9.68 G11.74



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	2031-08-09T13:56:28.399	38.68	-70.44	71487.0	50.34	53.91
Jupiter	E	2031-08-09T22:08:10.179	-32.17x	13.54x	71485.4	62.18	65.09