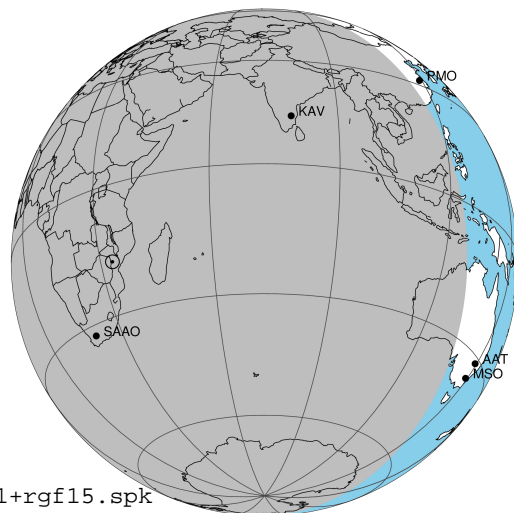


target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2031-05-11T21:42:16.970
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 4068890181865402496
 2Mass ID (if available) : 17490178-2253361

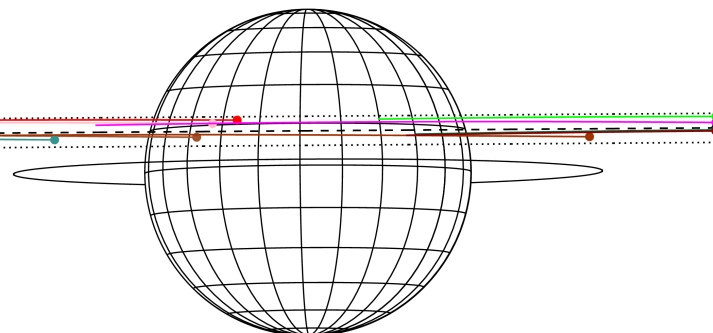
Jupiter 2031-05-11T21:42:16 K9.38 G14.68 Pgt

ICRS Star Coord at Epoch: 17h 49m 01.78496s -22:53:36.24988s
 RUWE (>1.4 is poor) : 2.47
 K magnitude : 9.375
 G magnitude : 14.677
 RP magnitude : 13.353
 BP magnitude : 16.421
 DUPflag : 0
 Distance (au) : 4.450
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -10.52
 Sun-Target sep (deg) : 143.10
 Sun-Moon sep (deg) : 28.32
 B (ring opening deg) : -2.61
 PA of pole (deg) : 0.34
 Pole direction: RA (deg): 268.05695
 Dec (deg): 64.49651
 C/A sky separation (") : 5.659
 C/A sky separation (km) : 18263.7
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLv1.spk
 naif0012.tls
 nep097.bsp
 nep101.bsp
 sat4401.bsp



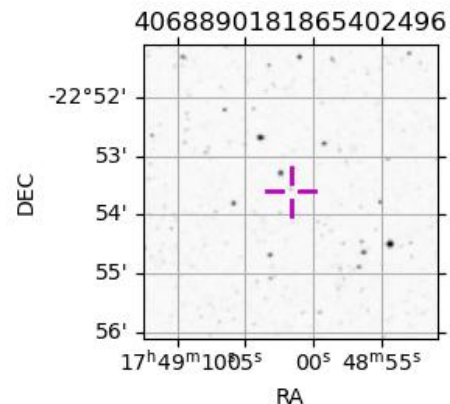
2031-05-11T21:42:16.9700 at: 17 49 01.7850 s: -22 53 36.250 C/A 5.648" PA 180.42 deg v_sky -10.52 km/s D 04.45 AU
 Credit: Styled after SORA/Lucky Star

Earth
 PIC
 PMO
 TEN
 KAV
 RIO
 ESO
 AAT
 SAAO
 MSO



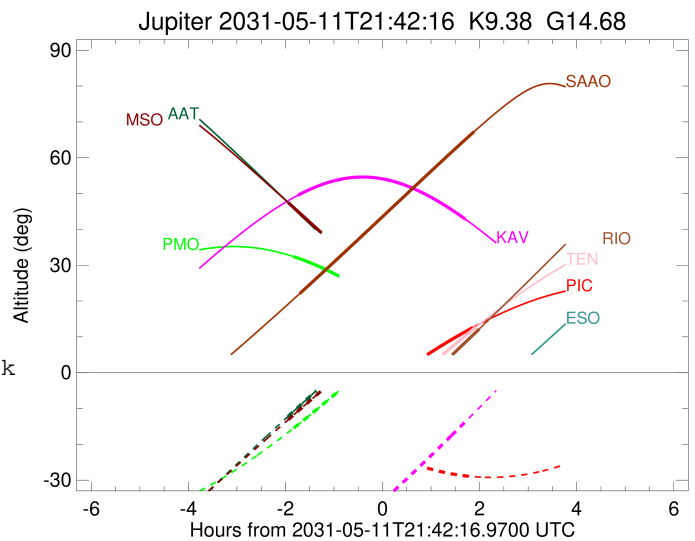
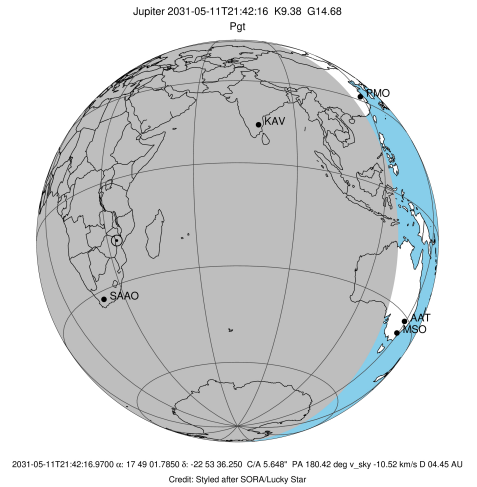
Observable events with sun below -5 deg and altitude above 5 deg

Obs	Location	lat	Elon	Target	Observed Events Interval	OCode
PIC	Pic du Midi	42.9	0.1	+	MAY 11 23:34 - MAY 11 23:34	Pne
PAL	Palomar Mt (200")	33.4	243.1			Pnn
PMO	Purple Mtn Obs. Nanking	32.1	118.8	+	MAY 11 19:52 - MAY 11 19:52	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	+	MAY 11 23:37 - MAY 11 23:37	Pne
IRTF	Mauna Kea/IRTF	19.8	204.5			Pnn
KAV	Kavalur Observatory	12.6	78.8	+ +	MAY 11 19:57 - MAY 11 23:24	Pie
RIO	Rio de Janeiro	-22.9	316.8	+	MAY 11 23:41 - MAY 11 23:41	Pne
ESO	European Southern Obs. (3.6m)	-29.3	289.3			Pnn
AAT	Siding Spring (AAT)	-31.3	149.1	+	MAY 11 19:45 - MAY 11 19:45	Pin
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8	+ +	MAY 11 20:00 - MAY 11 23:35	Pie
MSO	Mt. Stromlo Observatory	-35.3	149.0	+	MAY 11 19:45 - MAY 11 19:45	Pin



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-11T21:48:53.080
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      : 4068890181865402496
2Mass ID (if available) : 17490178-2253361
ICRS Star Coord at Epoch: 17h 49m 01.78496s -22:53:36.24988s
RUWE (>1.4 is poor) : 2.47
K magnitude          : 9.375
G magnitude          : 14.677
RP magnitude         : 13.353
BP magnitude         : 16.421
DUPflag             : 0
Distance (au)       : 4.450
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -10.52
Sun-Target sep (deg) : 143.10
Sun-Moon sep (deg)  : 28.83
B (ring opening deg) : -2.61
PA of pole (deg)    : 0.34
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation ("): 7.074
C/A sky separation (km) : 22827.7
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
    
```

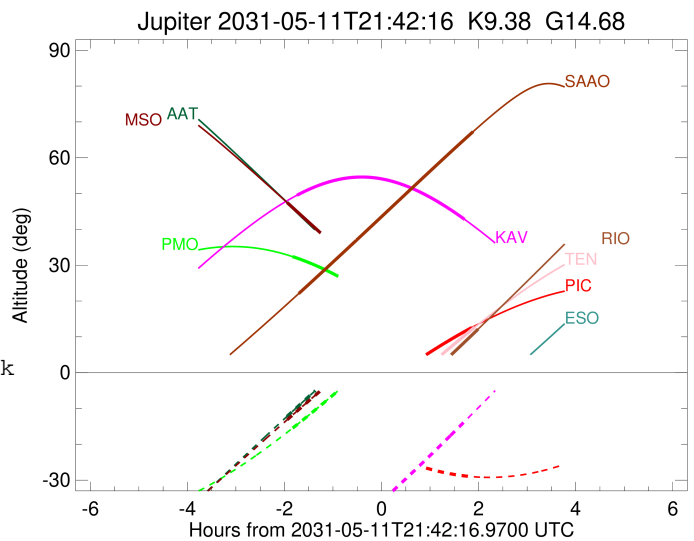
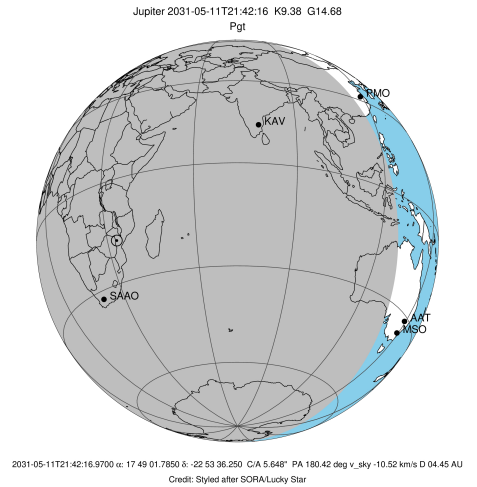


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-11T20:01:48.520	-20.80x	-8.94	71491.1	17.96	20.32
Jupiter	E	2031-05-11T23:34:17.903	12.64	-29.03	71491.0	19.13	21.61

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-11T21:36:38.380
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       : 4068890181865402496
2Mass ID (if available) : 17490178-2253361
ICRS Star Coord at Epoch: 17h 49m 01.78496s -22:53:36.24988s
RUWE (>1.4 is poor) : 2.47
K magnitude           : 9.375
G magnitude           : 14.677
RP magnitude          : 13.353
BP magnitude          : 16.421
DUPflag              : 0
Distance (au)        : 4.450
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -10.52
Sun-Target sep (deg) : 143.10
Sun-Moon sep (deg)   : 27.87
B (ring opening deg) : -2.61
PA of pole (deg)     : 0.34
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation ("): 7.089
C/A sky separation (km): 22877.1
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
    
```

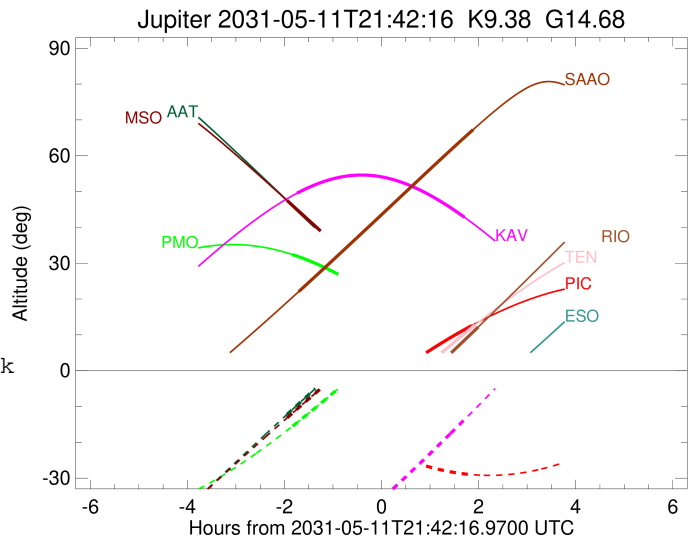
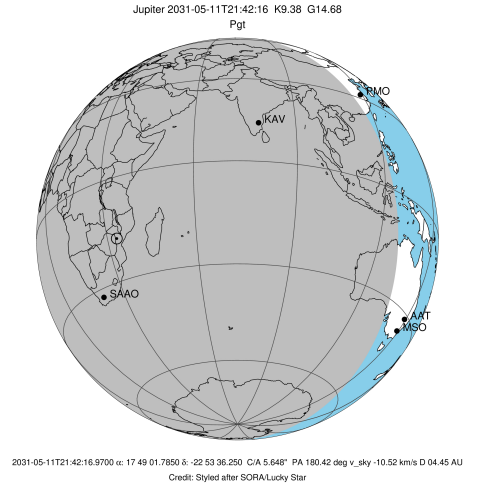


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-11T19:52:27.199	32.39	-15.47	71491.0	19.13	21.61
Jupiter	E	2031-05-11T23:21:48.024	2.74x	26.22x	71491.1	17.89	20.24

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-11T21:50:41.250
Event type          : Pgt
                    : Jupiter occs: geocentric, topocentric
                    : Not a ringed target
Observer code       : TEN
Location            : Teide Obs./Tenerife
Latitude (deg)      : 28.30050
E. Longitude (deg)  : 343.48909
Altitude (km)       : 2.395
Gaia source ID      : 4068890181865402496
2Mass ID (if available) : 17490178-2253361
ICRS Star Coord at Epoch: 17h 49m 01.78496s -22:53:36.24988s
RUWE (>1.4 is poor) : 2.47
K magnitude          : 9.375
G magnitude          : 14.677
RP magnitude         : 13.353
BP magnitude         : 16.421
DUPflag             : 0
Distance (au)       : 4.450
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -10.52
Sun-Target sep (deg) : 143.10
Sun-Moon sep (deg)  : 28.96
B (ring opening deg) : -2.61
PA of pole (deg)    : 0.34
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation (") : 6.546
C/A sky separation (km) : 21125.2
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
    
```

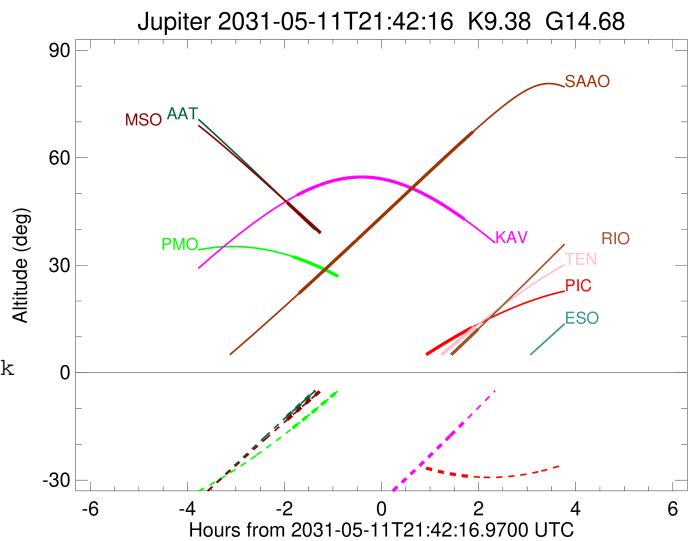
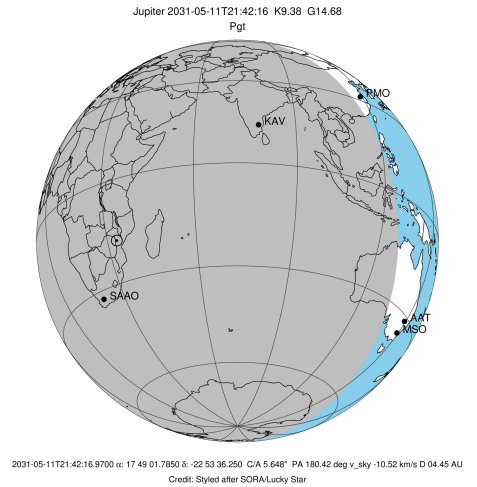


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-11T20:01:38.860	-31.28x	-3.95x	71491.3	16.39	18.58
Jupiter	E	2031-05-11T23:37:35.437	12.68	-39.49	71491.1	17.91	20.27

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-11T21:41:20.490
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        : 4068890181865402496
2Mass ID (if available) : 17490178-2253361
ICRS Star Coord at Epoch: 17h 49m 01.78496s -22:53:36.24988s
RUWE (>1.4 is poor) : 2.47
K magnitude           : 9.375
G magnitude           : 14.677
RP magnitude          : 13.353
BP magnitude          : 16.421
DUPflag              : 0
Distance (au)         : 4.450
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -10.52
Sun-Target sep (deg) : 143.10
Sun-Moon sep (deg)   : 28.56
B (ring opening deg) : -2.61
PA of pole (deg)     : 0.34
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation ("): 6.801
C/A sky separation (km): 21947.3
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
    
```

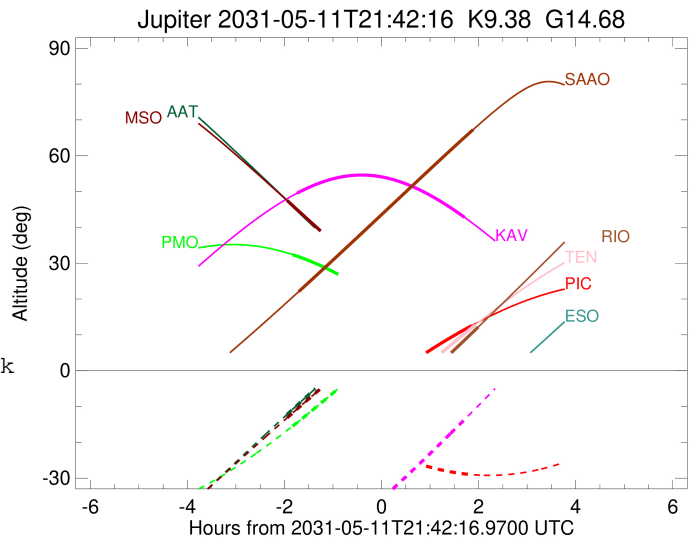
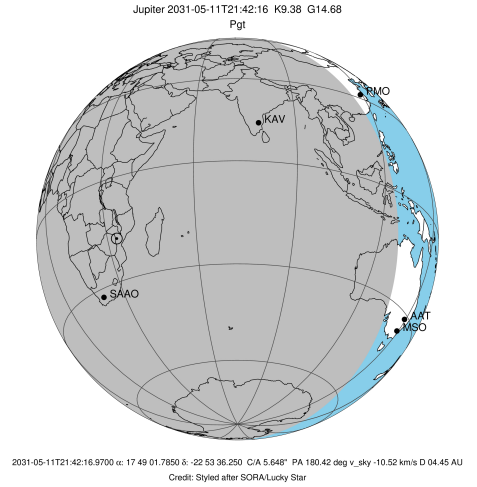


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-11T19:57:44.731	49.52	-54.13	71491.1	17.81	20.15
Jupiter	E	2031-05-11T23:24:55.447	42.80	-13.64	71491.2	17.50	19.81

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-11T21:50:25.640
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       : 4068890181865402496
2Mass ID (if available) : 17490178-2253361
ICRS Star Coord at Epoch: 17h 49m 01.78496s -22:53:36.24988s
RUWE (>1.4 is poor) : 2.47
K magnitude           : 9.375
G magnitude           : 14.677
RP magnitude         : 13.353
BP magnitude         : 16.421
DUPflag              : 0
Distance (au)        : 4.450
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -10.52
Sun-Target sep (deg) : 143.10
Sun-Moon sep (deg)   : 28.99
B (ring opening deg) : -2.61
PA of pole (deg)     : 0.34
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation (") : 4.663
C/A sky separation (km) : 15047.3
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
    
```

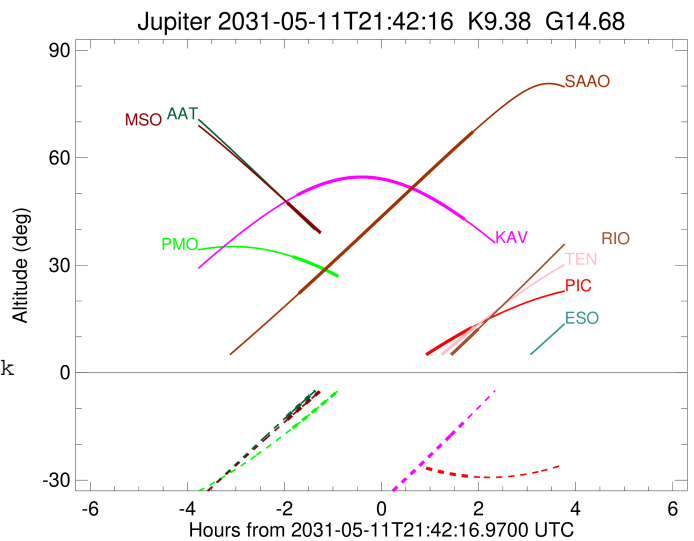
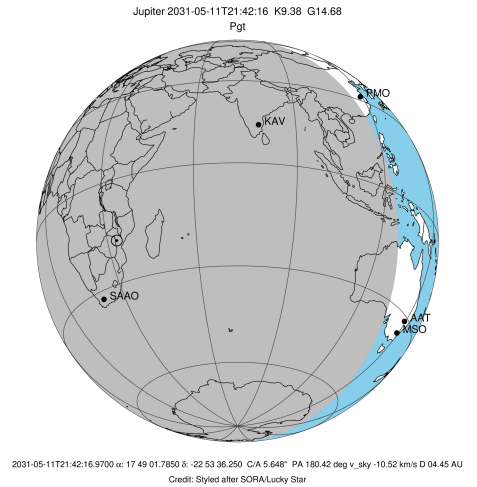


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-11T19:56:51.295	-31.46x	4.55x	71491.6	11.49	13.08
Jupiter	E	2031-05-11T23:41:43.474	12.15	-45.97	71491.5	12.95	14.73

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-11T21:34:17.630
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      : 4068890181865402496
2Mass ID (if available) : 17490178-2253361
ICRS Star Coord at Epoch: 17h 49m 01.78496s -22:53:36.24988s
RUWE (>1.4 is poor) : 2.47
K magnitude          : 9.375
G magnitude          : 14.677
RP magnitude         : 13.353
BP magnitude         : 16.421
DUPflag             : 0
Distance (au)       : 4.450
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -10.52
Sun-Target sep (deg) : 143.10
Sun-Moon sep (deg)  : 27.83
B (ring opening deg) : -2.61
PA of pole (deg)    : 0.34
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation (" ) : 4.903
C/A sky separation (km) : 15824.3
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
    
```

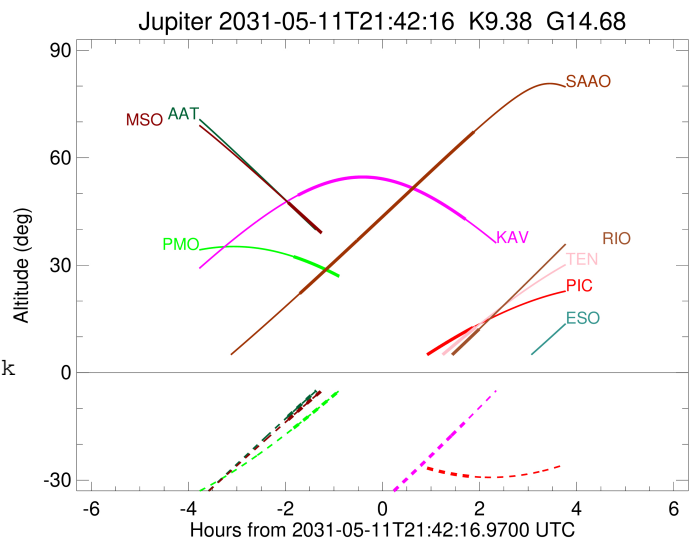
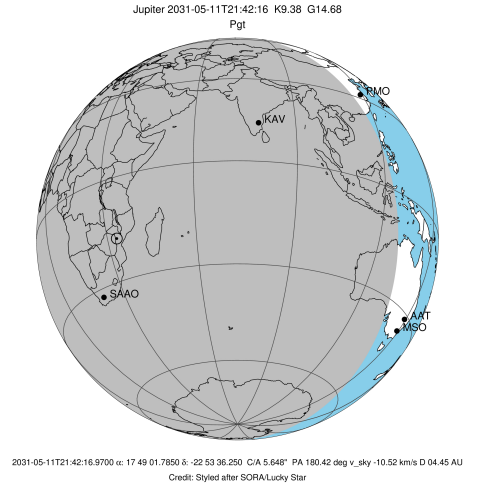


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-11T19:45:42.157	47.51	-12.17	71491.5	13.56	15.41
Jupiter	E	2031-05-11T23:24:28.573	2.11x	28.27x	71491.6	11.87	13.51


```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-11T21:48:33.350
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        : 4068890181865402496
2Mass ID (if available) : 17490178-2253361
ICRS Star Coord at Epoch: 17h 49m 01.78496s -22:53:36.24988s
RUWE (>1.4 is poor) : 2.47
K magnitude           : 9.375
G magnitude           : 14.677
RP magnitude          : 13.353
BP magnitude          : 16.421
DUPflag              : 0
Distance (au)         : 4.450
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -10.52
Sun-Target sep (deg)  : 143.10
Sun-Moon sep (deg)    : 29.26
B (ring opening deg) : -2.61
PA of pole (deg)     : 0.34
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation (") : 5.100
C/A sky separation (km) : 16459.8
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
    
```

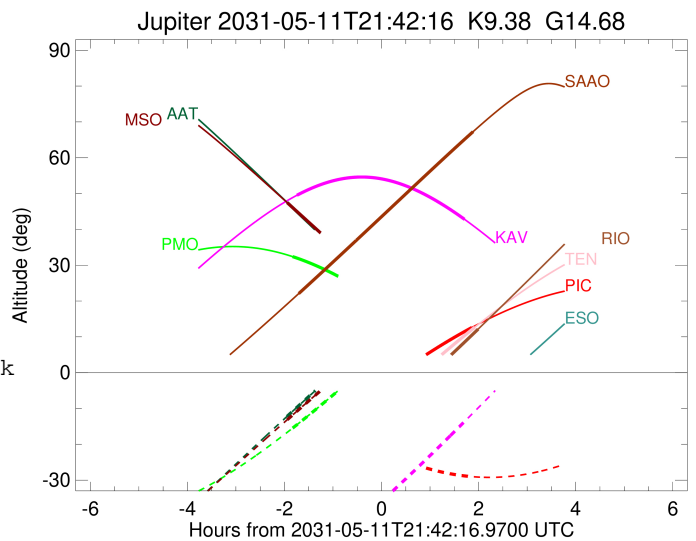
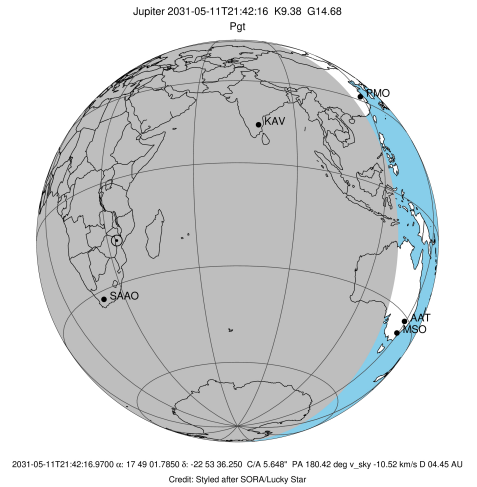


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-11T19:59:59.511	22.08	-52.78	71491.6	12.63	14.37
Jupiter	E	2031-05-11T23:35:30.786	67.27	-70.04	71491.5	13.71	15.58


```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-11T21:34:38.580
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       : 4068890181865402496
2Mass ID (if available) : 17490178-2253361
ICRS Star Coord at Epoch: 17h 49m 01.78496s -22:53:36.24988s
RUWE (>1.4 is poor) : 2.47
K magnitude           : 9.375
G magnitude           : 14.677
RP magnitude         : 13.353
BP magnitude         : 16.421
DUPflag              : 0
Distance (au)        : 4.450
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -10.52
Sun-Target sep (deg) : 143.10
Sun-Moon sep (deg)   : 27.88
B (ring opening deg) : -2.61
PA of pole (deg)     : 0.34
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation ("): 4.788
C/A sky separation (km): 15451.3
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	2031-05-11T19:45:50.101	47.43	-13.12	71491.5	13.22	15.03
Jupiter	E	2031-05-11T23:24:57.950	3.80x	25.31x	71491.6	11.60	13.21