

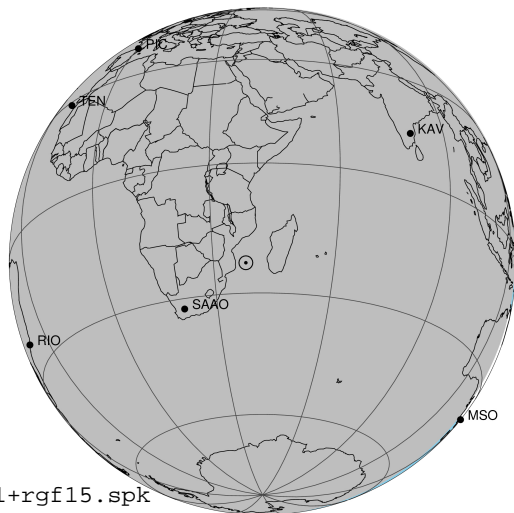
target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2031-06-11T21:27:30.350
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 4116708805952212864
 2Mass ID (if available) : 17342551-2249501

Jupiter 2031-06-11T21:27:30 K9.79 G14.19 Pgt

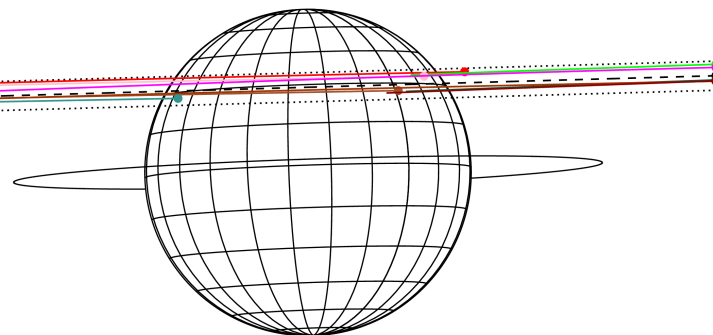
ICRS Star Coord at Epoch: 17h 34m 25.51223s -22:49:50.43791s

RUWE (>1.4 is poor) : 0.96
 K magnitude : 9.788
 G magnitude : 14.192
 RP magnitude : 13.040
 BP magnitude : 15.603
 DUPflag : 0
 Distance (au) : 4.268
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -16.40
 Sun-Target sep (deg) : 176.20
 Sun-Moon sep (deg) : 83.64
 B (ring opening deg) : -2.60
 PA of pole (deg) : 1.92
 Pole direction: RA (deg): 268.05692
 Dec (deg): 64.49651
 C/A sky separation (") : 12.059
 C/A sky separation (km) : 37328.5
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk

Jupiter 2031-06-11T21:27:30 K9.79 G14.19
 Pgt



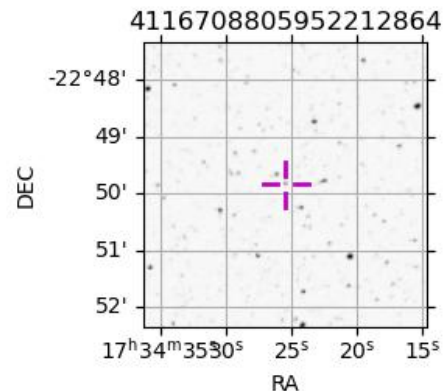
Earth
 PIC
 PMO
 TEN
 KAV
 RIO
 ESO
 AAT
 SAAO
 MSO



2031-06-11T21:27:30.3500 a: 17 34 25.512228 -22 49 50.438 C/A ***** PA 181.62 deg v_sky -16.40 km/s D 04.27 AU
 Credit: Styled after SORA/Lucky Star

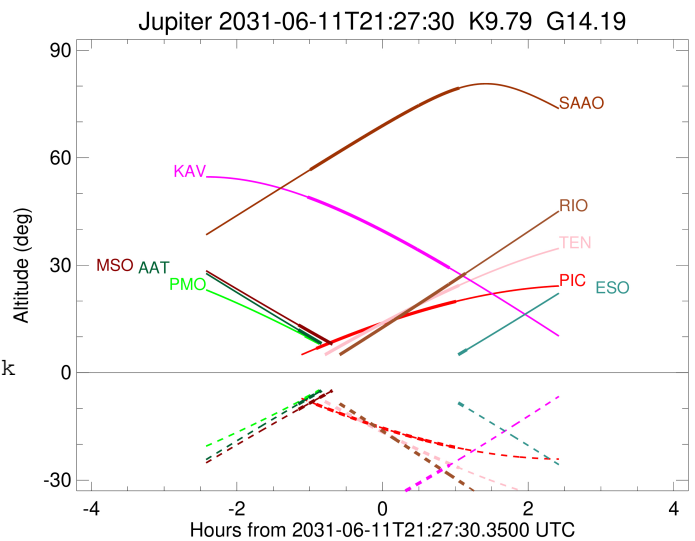
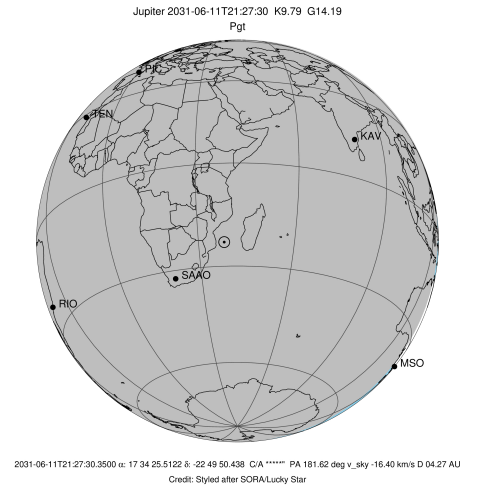
Observable events with sun below -5 deg and altitude above 5 deg

Obs	Location	lat	Elon	Target	Observed Events Interval	OCode
PIC	Pic du Midi	42.9	0.1	+ +	JUN 11 20:32 - JUN 11 22:27	Pie
PAL	Palomar Mt (200")	33.4	243.1			Pnn
PMO	Purple Mtn Obs. Nanking	32.1	118.8	+	JUN 11 20:23 - JUN 11 20:23	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	+	JUN 11 22:30 - JUN 11 22:30	Pne
IRTF	Mauna Kea/IRTF	19.8	204.5			Pnn
KAV	Kavalur Observatory	12.6	78.8	+ +	JUN 11 20:25 - JUN 11 22:22	Pie
RIO	Rio de Janeiro	-22.9	316.8	+	JUN 11 22:35 - JUN 11 22:35	Pne
ESO	European Southern Obs. (3.6m)	-29.3	289.3	+	JUN 11 22:36 - JUN 11 22:36	Pne
AAT	Siding Spring (AAT)	-31.3	149.1	+	JUN 11 20:18 - JUN 11 20:18	Pin
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8	+ +	JUN 11 20:27 - JUN 11 22:30	Pie
MSO	Mt. Stromlo Observatory	-35.3	149.0	+	JUN 11 20:18 - JUN 11 20:18	Pin



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-11T21:30:32.050
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      : 4116708805952212864
2Mass ID (if available) : 17342551-2249501
ICRS Star Coord at Epoch: 17h 34m 25.51223s -22:49:50.43791s
RUWE (>1.4 is poor) : 0.96
K magnitude          : 9.788
G magnitude          : 14.192
RP magnitude         : 13.040
BP magnitude         : 15.603
DUPflag             : 0
Distance (au)       : 4.268
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -16.40
Sun-Target sep (deg) : 176.20
Sun-Moon sep (deg)  : 83.92
B (ring opening deg) : -2.60
PA of pole (deg)    : 1.92
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 13.762
C/A sky separation (km) : 42600.8
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
    
```

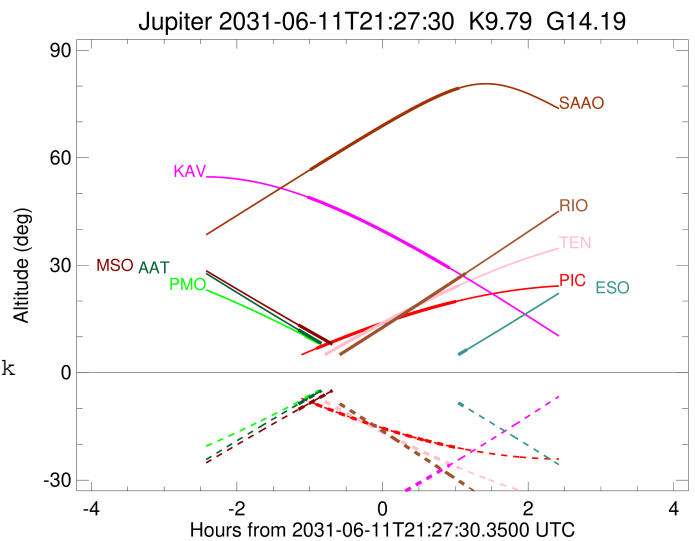
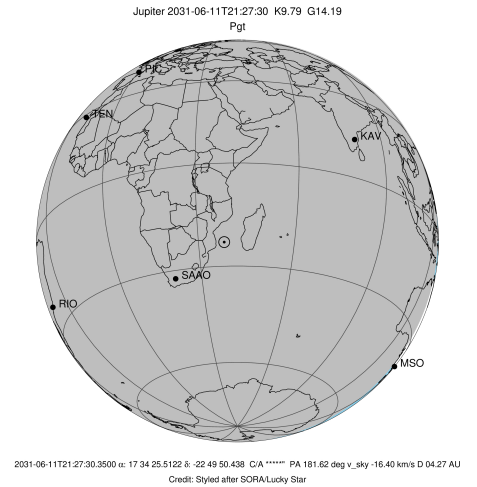


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-11T20:32:55.914	6.75	-8.84	71488.8	35.88	39.50
Jupiter	E	2031-06-11T22:27:56.363	19.88	-20.87	71488.6	37.11	40.76

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-11T21:22:38.760
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     : 4116708805952212864
2Mass ID (if available) : 17342551-2249501
ICRS Star Coord at Epoch: 17h 34m 25.51223s -22:49:50.43791s
RUWE (>1.4 is poor) : 0.96
K magnitude         : 9.788
G magnitude         : 14.192
RP magnitude        : 13.040
BP magnitude        : 15.603
DUPflag            : 0
Distance (au)      : 4.268
f0 (km)            : 0.00
g0 (km)            : 0.00
skyplane vel. (km/s) : -16.40
Sun-Target sep (deg) : 176.20
Sun-Moon sep (deg)  : 83.52
B (ring opening deg) : -2.60
PA of pole (deg)   : 1.92
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 13.274
C/A sky separation (km) : 41091.1
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
    
```

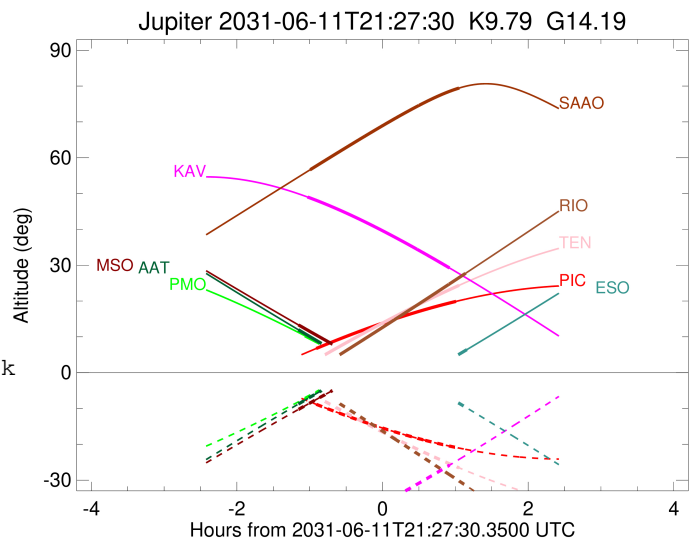
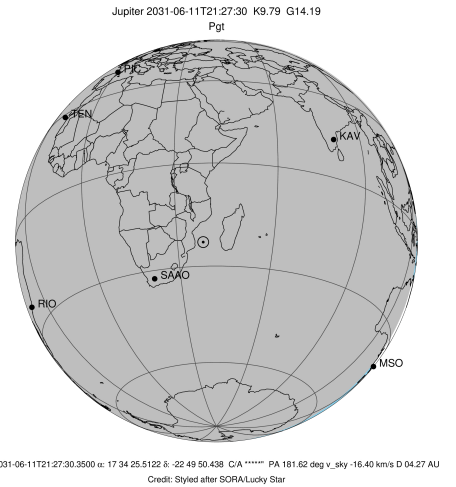


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-11T20:23:42.104	10.28	-7.18	71488.9	35.22	38.83
Jupiter	E	2031-06-11T22:21:55.622	-12.07x	15.48x	71489.0	34.81	38.41

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-11T21:32:04.450
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        : 4116708805952212864
2Mass ID (if available) : 17342551-2249501
ICRS Star Coord at Epoch: 17h 34m 25.51223s -22:49:50.43791s
RUWE (>1.4 is poor) : 0.96
K magnitude           : 9.788
G magnitude           : 14.192
RP magnitude          : 13.040
BP magnitude          : 15.603
DUPflag              : 0
Distance (au)         : 4.268
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.40
Sun-Target sep (deg)  : 176.20
Sun-Moon sep (deg)   : 83.94
B (ring opening deg) : -2.60
PA of pole (deg)     : 1.92
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 13.294
C/A sky separation (km) : 41152.7
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
    
```

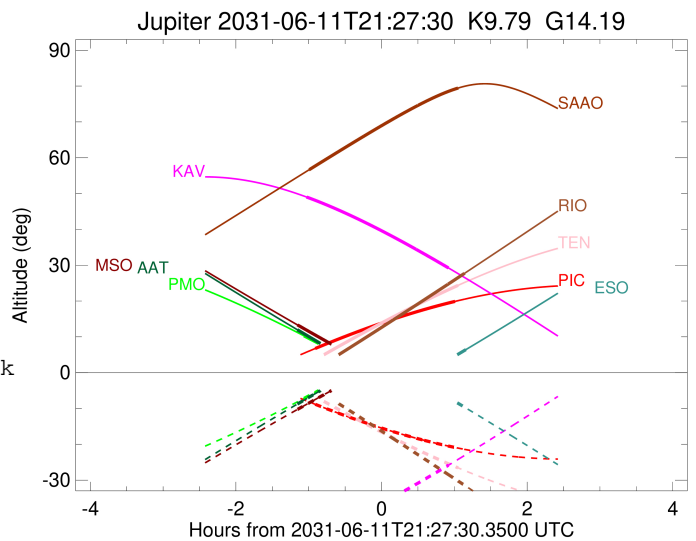
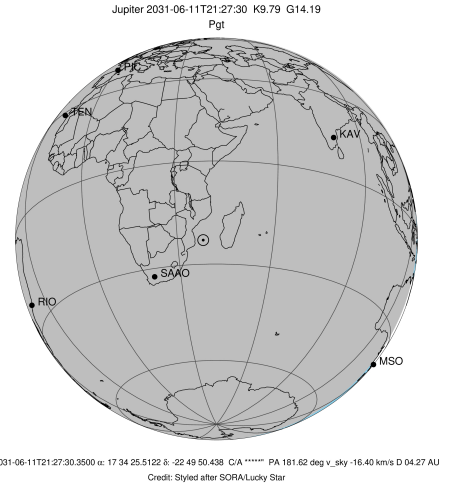


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-11T20:33:14.477	3.68x	-6.74	71489.1	34.30	37.87
Jupiter	E	2031-06-11T22:30:35.703	24.37	-26.56	71488.8	35.84	39.46

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-11T21:24:07.070
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      : 4116708805952212864
2Mass ID (if available) : 17342551-2249501
ICRS Star Coord at Epoch: 17h 34m 25.51223s -22:49:50.43791s
RUWE (>1.4 is poor) : 0.96
K magnitude          : 9.788
G magnitude          : 14.192
RP magnitude         : 13.040
BP magnitude         : 15.603
DUPflag             : 0
Distance (au)       : 4.268
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -16.40
Sun-Target sep (deg) : 176.20
Sun-Moon sep (deg)  : 84.19
B (ring opening deg) : -2.60
PA of pole (deg)    : 1.92
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 13.132
C/A sky separation (km) : 40651.5
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
    
```

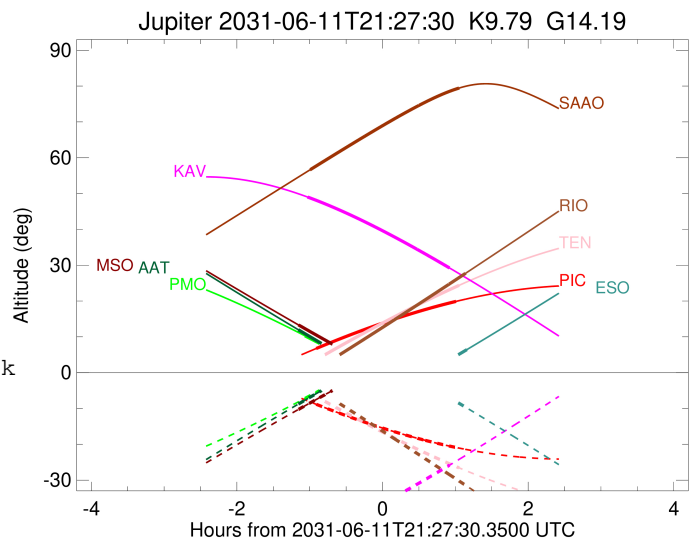
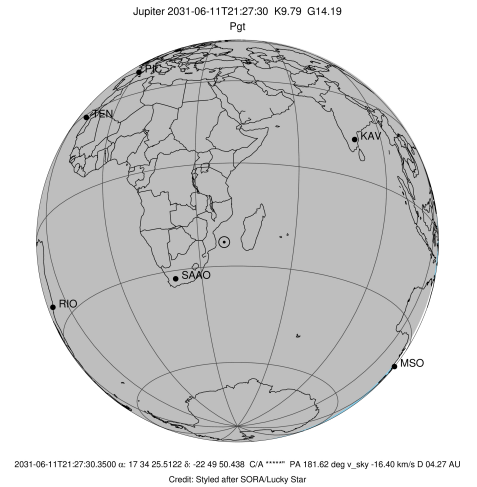


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-11T20:25:42.892	49.03	-46.61	71489.0	34.57	38.15
Jupiter	E	2031-06-11T22:22:44.568	29.22	-25.82	71489.0	34.53	38.11

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-11T21:33:01.980
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      : 4116708805952212864
2Mass ID (if available) : 17342551-2249501
ICRS Star Coord at Epoch: 17h 34m 25.51223s -22:49:50.43791s
RUWE (>1.4 is poor) : 0.96
K magnitude          : 9.788
G magnitude          : 14.192
RP magnitude         : 13.040
BP magnitude         : 15.603
DUPflag             : 0
Distance (au)       : 4.268
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -16.40
Sun-Target sep (deg) : 176.20
Sun-Moon sep (deg)  : 83.94
B (ring opening deg) : -2.60
PA of pole (deg)    : 1.92
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 11.355
C/A sky separation (km) : 35150.4
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
    
```

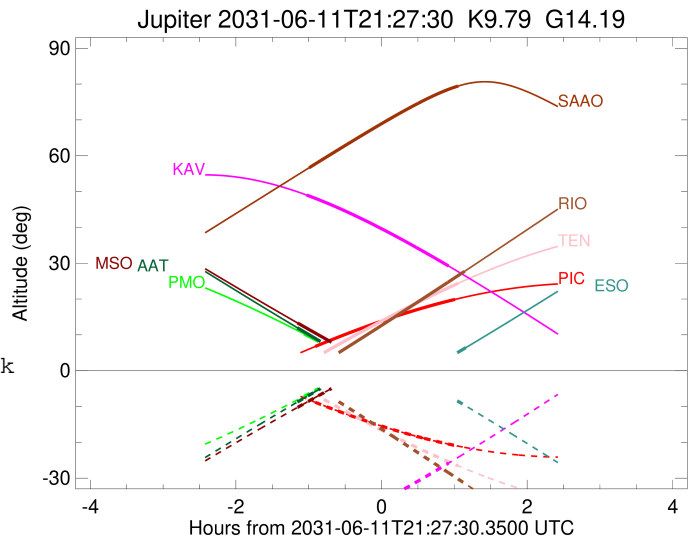
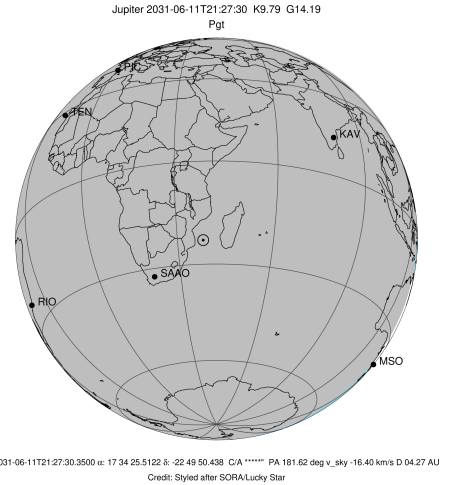


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-11T20:29:41.092	0.23x	-3.85x	71489.9	28.54	31.83
Jupiter	E	2031-06-11T22:35:56.039	27.73	-31.42	71489.6	30.28	33.67

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-11T21:32:22.400
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      : 4116708805952212864
2Mass ID (if available) : 17342551-2249501
ICRS Star Coord at Epoch: 17h 34m 25.51223s -22:49:50.43791s
RUWE (>1.4 is poor) : 0.96
K magnitude          : 9.788
G magnitude          : 14.192
RP magnitude         : 13.040
BP magnitude         : 15.603
DUPflag             : 0
Distance (au)       : 4.268
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -16.40
Sun-Target sep (deg) : 176.20
Sun-Moon sep (deg)  : 83.61
B (ring opening deg) : -2.60
PA of pole (deg)    : 1.92
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 10.837
C/A sky separation (km) : 33545.2
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
    
```

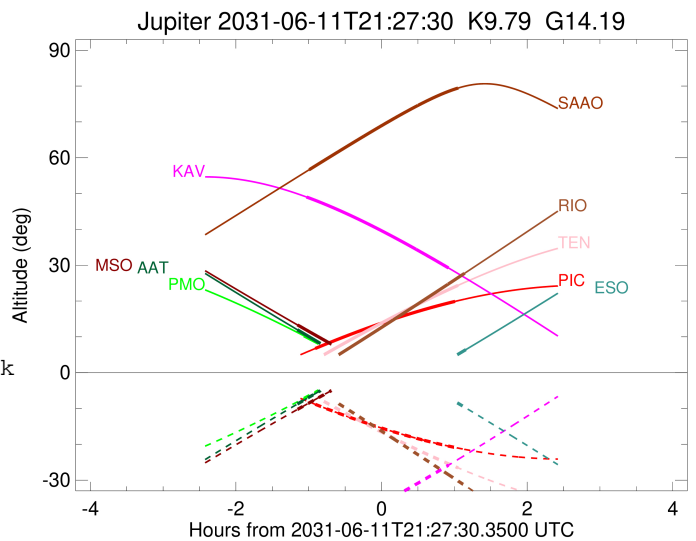
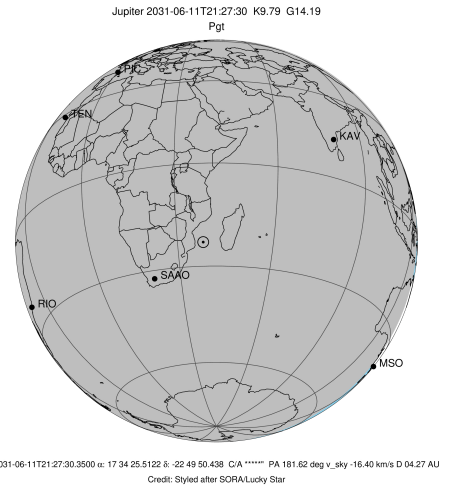


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-11T20:27:24.755	-17.86x	14.85x	71490.1	27.19	30.38
Jupiter	E	2031-06-11T22:36:54.778	6.41	-9.83	71489.9	28.77	32.07


```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-11T21:22:23.600
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      : 4116708805952212864
2Mass ID (if available) : 17342551-2249501
ICRS Star Coord at Epoch: 17h 34m 25.51223s -22:49:50.43791s
RUWE (>1.4 is poor) : 0.96
K magnitude          : 9.788
G magnitude          : 14.192
RP magnitude         : 13.040
BP magnitude         : 15.603
DUPflag             : 0
Distance (au)       : 4.268
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -16.40
Sun-Target sep (deg) : 176.20
Sun-Moon sep (deg)  : 83.53
B (ring opening deg) : -2.60
PA of pole (deg)    : 1.92
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 10.938
C/A sky separation (km) : 33857.8
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
    
```

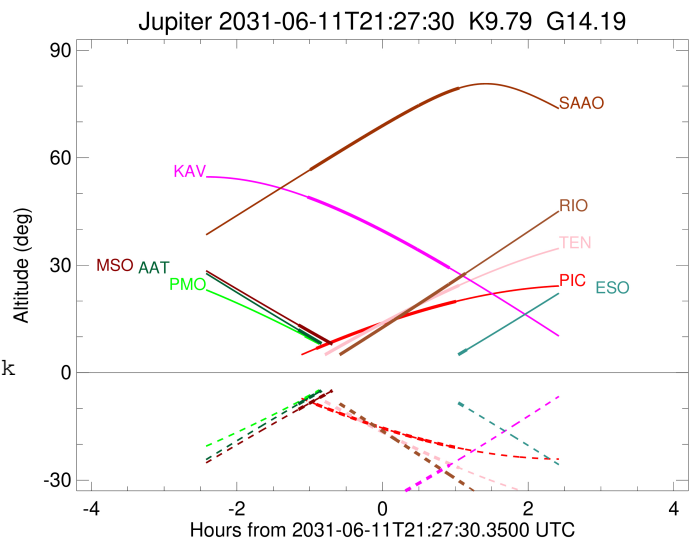
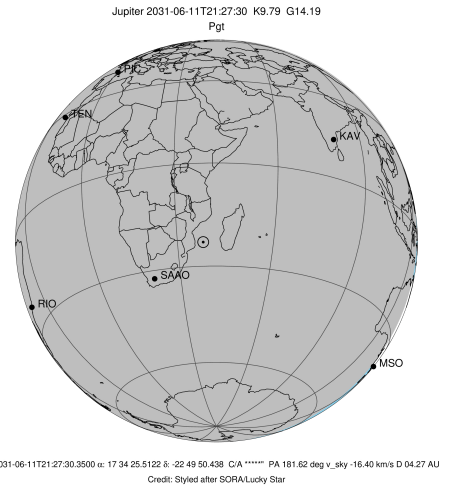


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-11T20:18:12.322	11.97	-8.75	71489.9	28.48	31.76
Jupiter	E	2031-06-11T22:26:59.460	-12.43x	14.99x	71490.0	28.02	31.27


```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-11T21:29:17.610
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        : 4116708805952212864
2Mass ID (if available) : 17342551-2249501
ICRS Star Coord at Epoch: 17h 34m 25.51223s -22:49:50.43791s
RUWE (>1.4 is poor) : 0.96
K magnitude           : 9.788
G magnitude           : 14.192
RP magnitude          : 13.040
BP magnitude          : 15.603
DUPflag              : 0
Distance (au)         : 4.268
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.40
Sun-Target sep (deg)  : 176.20
Sun-Moon sep (deg)   : 84.57
B (ring opening deg) : -2.60
PA of pole (deg)     : 1.92
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 11.664
C/A sky separation (km) : 36106.7
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
    
```

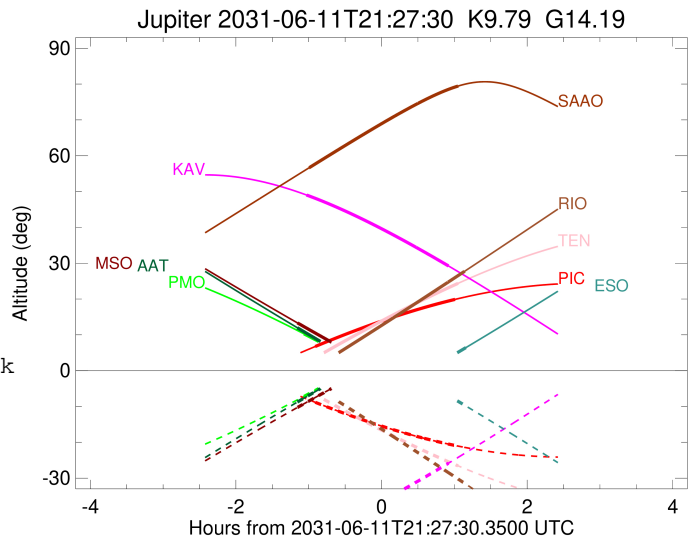
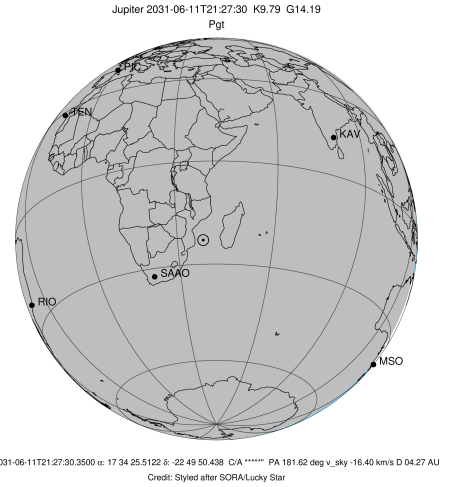


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-11T20:27:48.986	56.62	-60.23	71489.7	29.73	33.08
Jupiter	E	2031-06-11T22:30:37.612	79.44	-80.82	71489.6	30.75	34.16

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-11T21:22:36.540
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      : 4116708805952212864
2Mass ID (if available) : 17342551-2249501
ICRS Star Coord at Epoch: 17h 34m 25.51223s -22:49:50.43791s
RUWE (>1.4 is poor) : 0.96
K magnitude          : 9.788
G magnitude          : 14.192
RP magnitude         : 13.040
BP magnitude         : 15.603
DUPflag             : 0
Distance (au)       : 4.268
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.40
Sun-Target sep (deg) : 176.20
Sun-Moon sep (deg)  : 83.56
B (ring opening deg) : -2.60
PA of pole (deg)    : 1.92
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 10.833
C/A sky separation (km) : 33532.6
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	2031-06-11T20:18:15.151	13.33	-10.26	71489.9	28.16	31.42
Jupiter	E	2031-06-11T22:27:21.486	-10.02x	12.42x	71490.0	27.75	30.98