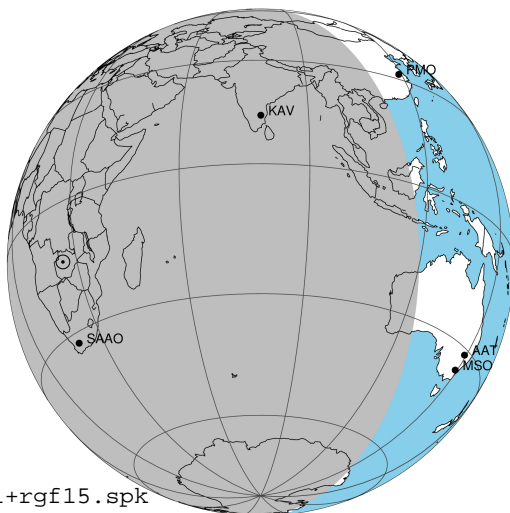


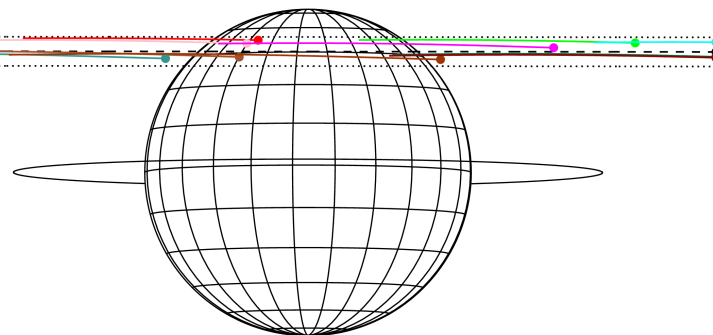
target : Jupiter  
 target radius (km) : 71492.00  
 C/A epoch : 2031-04-27T22:16:31.050  
 Event type : Pgt  
 : Jupiter occs: geocentric, topocentric  
 : Not a ringed target  
 Gaia source ID : 4070202998748362240  
 2Mass ID (if available) : 17523680-2253367

Jupiter 2031-04-27T22:16:31 K9.19 G14.69 Pgt

ICRS Star Coord at Epoch: 17h 52m 36.80719s -22:53:37.08843s  
 RUWE (>1.4 is poor) : 0.94  
 K magnitude : 9.194  
 G magnitude : 14.690  
 RP magnitude : 13.320  
 BP magnitude : 16.927  
 DUPflag : 0  
 Distance (au) : 4.608  
 f0 (km) : 0.00  
 g0 (km) : 0.00  
 skyplane vel. (km/s) : -5.41  
 Sun-Target sep (deg) : 128.73  
 Sun-Moon sep (deg) : 161.51  
 B (ring opening deg) : -2.61  
 PA of pole (deg) : -0.04  
 Pole direction: RA (deg): 268.05696  
 Dec (deg): 64.49651  
 C/A sky separation (") : 15.853  
 C/A sky separation (km) : 52988.7  
 NAIF SPICE kernels : RAJobs\_U111+rgf15.spk



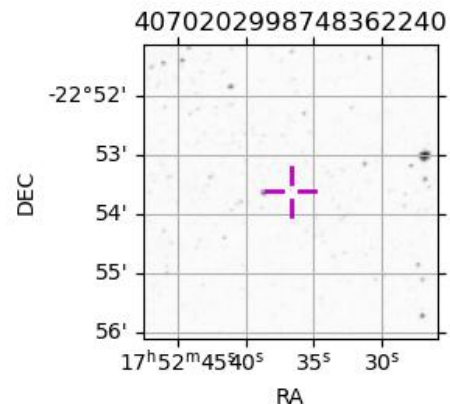
Earth  
 PIC  
 PAL  
 PMO  
 KPNO  
 MCD  
 TEN  
 IRTF  
 KAV  
 RIO  
 ESO  
 AAT  
 SAAO  
 MSO



2031-04-27T22:16:31.0500 α: 17 52 36.8072 δ: -22 53 37.088 C/A \*\*\*\*\* PA 179.95 deg v\_sky - 5.41 km/s D 04.61 AU  
 Credit: Styled after SORA/Lucky Star

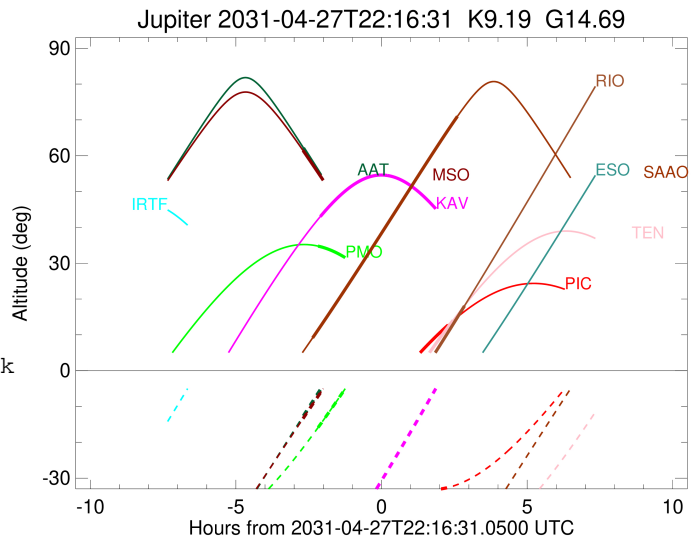
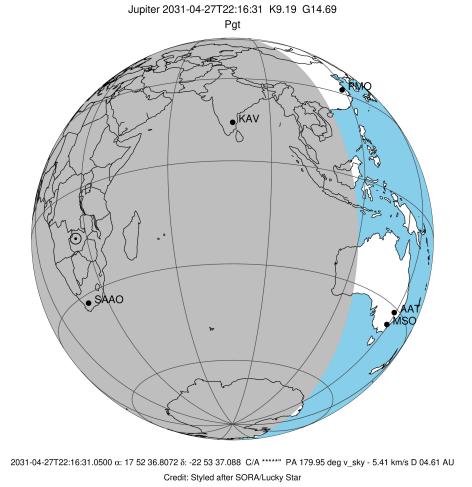
Observable events with sun below -5 deg and altitude above 5 deg

Obs	Location	lat	Elon	Target	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1	+	APR 28 00:33 - APR 28 00:33	Pne
PAL	Palomar Mt (200")	33.4	243.1			Pnn
PMO	Purple Mtn Obs. Nanking	32.1	118.8	+	APR 27 20:05 - APR 27 20:05	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	+	APR 28 00:43 - APR 28 00:43	Pne
IRTF	Mauna Kea/IRTF	19.8	204.5			Pnn
KAV	Kavalur Observatory	12.6	78.8	+	APR 27 20:10 - APR 27 20:10	Pin
RIO	Rio de Janeiro	-22.9	316.8	+	APR 28 01:07 - APR 28 01:07	Pne
ESO	European Southern Obs. (3.6m)	-29.3	289.3			Pnn
AAT	Siding Spring (AAT)	-31.3	149.1	+	APR 27 19:35 - APR 27 19:35	Pin
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8	+	APR 27 19:54 - APR 28 00:52	Pie
MSO	Mt. Stromlo Observatory	-35.3	149.0	+	APR 27 19:34 - APR 27 19:34	Pin



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-04-27T22:26:19.060
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       : 4070202998748362240
2Mass ID (if available) : 17523680-2253367
ICRS Star Coord at Epoch: 17h 52m 36.80719s -22:53:37.08843s
RUWE (>1.4 is poor) : 0.94
K magnitude          : 9.194
G magnitude          : 14.690
RP magnitude         : 13.320
BP magnitude         : 16.927
DUPflag             : 0
Distance (au)        : 4.608
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -5.41
Sun-Target sep (deg) : 128.73
Sun-Moon sep (deg)   : 161.97
B (ring opening deg) : -2.61
PA of pole (deg)     : -0.04
Pole direction: RA (deg): 268.05696
Dec (deg): 64.49651
C/A sky separation ("): 17.186
C/A sky separation (km): 57441.5
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
    
```

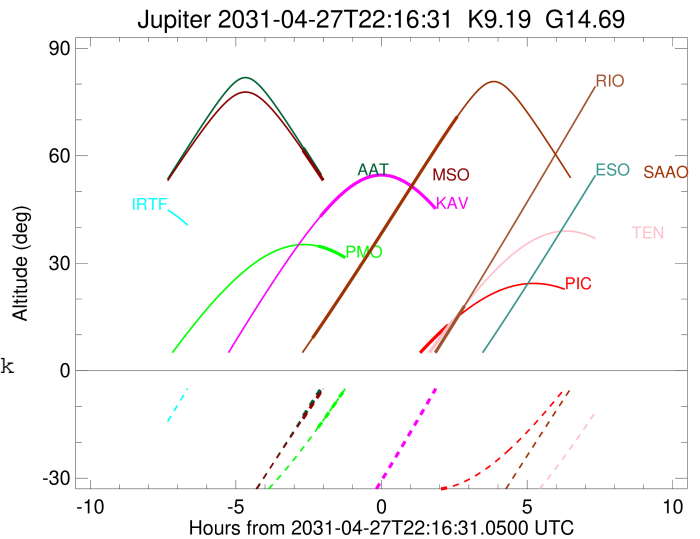
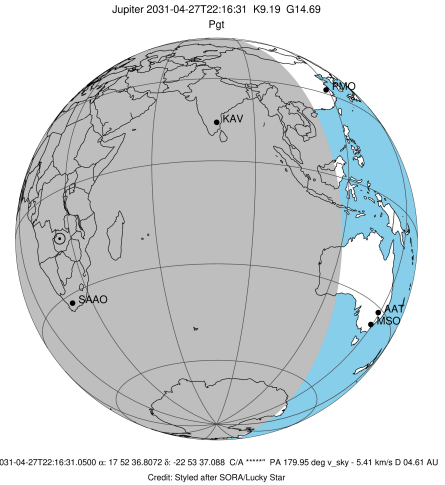


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-04-27T20:14:18.334	-29.18x	-13.76	71486.2	51.99	55.50
Jupiter	E	2031-04-28T00:33:34.928	12.72	-32.61	71485.8	54.55	57.94

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-04-27T22:09:08.510
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      : 4070202998748362240
2Mass ID (if available) : 17523680-2253367
ICRS Star Coord at Epoch: 17h 52m 36.80719s -22:53:37.08843s
RUWE (>1.4 is poor) : 0.94
K magnitude          : 9.194
G magnitude          : 14.690
RP magnitude         : 13.320
BP magnitude         : 16.927
DUPflag             : 0
Distance (au)       : 4.609
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -5.41
Sun-Target sep (deg) : 128.73
Sun-Moon sep (deg)  : 161.05
B (ring opening deg) : -2.61
PA of pole (deg)    : -0.04
Pole direction: RA (deg): 268.05696
Dec (deg): 64.49651
C/A sky separation ("): 17.275
C/A sky separation (km): 57739.1
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
    
```

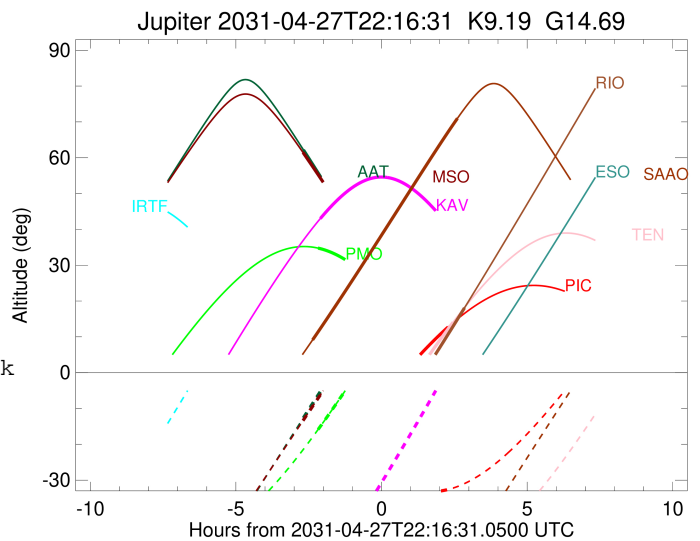
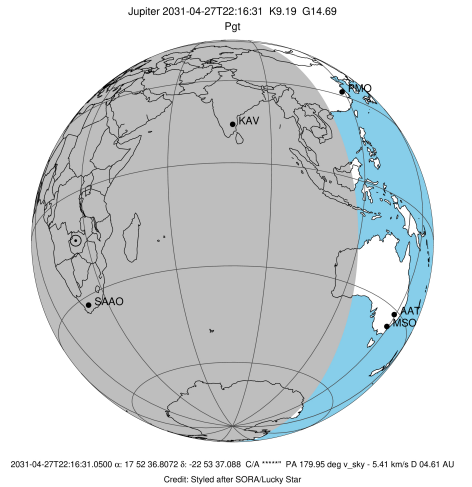


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-04-27T20:05:53.076	34.76	-15.87	71485.9	54.38	57.78
Jupiter	E	2031-04-28T00:14:14.674	3.88x	35.20x	71486.1	52.55	56.04

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-04-27T22:28:43.240
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       : 4070202998748362240
2Mass ID (if available) : 17523680-2253367
ICRS Star Coord at Epoch: 17h 52m 36.80719s -22:53:37.08843s
RUWE (>1.4 is poor) : 0.94
K magnitude           : 9.194
G magnitude           : 14.690
RP magnitude          : 13.320
BP magnitude          : 16.927
DUPflag              : 0
Distance (au)        : 4.608
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -5.41
Sun-Target sep (deg) : 128.73
Sun-Moon sep (deg)   : 162.12
B (ring opening deg) : -2.61
PA of pole (deg)     : -0.04
Pole direction: RA (deg): 268.05696
Dec (deg): 64.49651
C/A sky separation ("): 16.671
C/A sky separation (km): 55720.8
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
    
```

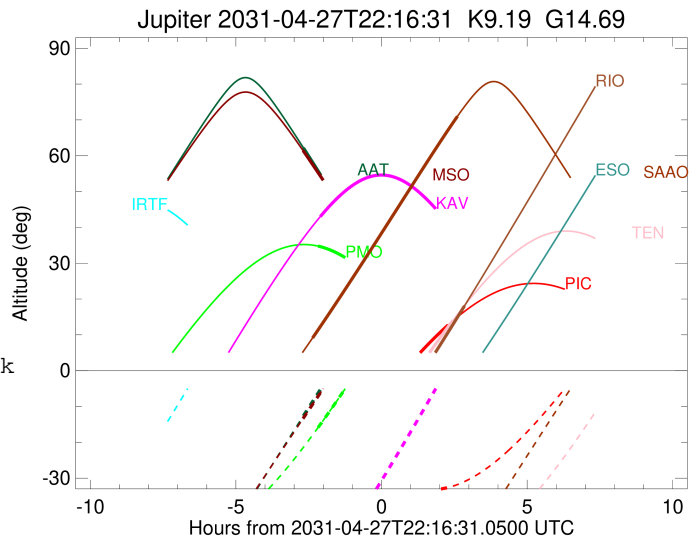
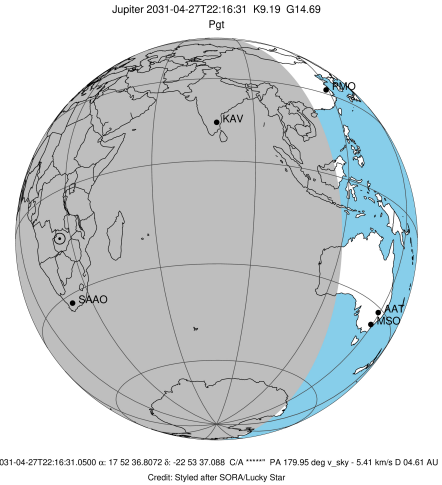


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-04-27T20:06:59.068	-42.92x	-6.88	71486.6	49.52	53.12
Jupiter	E	2031-04-28T00:43:55.471	14.06	-47.57	71486.1	52.71	56.19

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-04-27T22:16:31.050
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        : 4070202998748362240
2Mass ID (if available) : 17523680-2253367
ICRS Star Coord at Epoch: 17h 52m 36.80719s -22:53:37.08843s
RUWE (>1.4 is poor) : 0.94
K magnitude           : 9.194
G magnitude           : 14.690
RP magnitude          : 13.320
BP magnitude          : 16.927
DUPflag              : 0
Distance (au)         : 4.608
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -5.41
Sun-Target sep (deg)  : 128.73
Sun-Moon sep (deg)   : 161.65
B (ring opening deg) : -2.61
PA of pole (deg)     : -0.04
Pole direction: RA (deg): 268.05696
Dec (deg): 64.49651
C/A sky separation (") : 16.959
C/A sky separation (km) : 56682.4
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
    
```

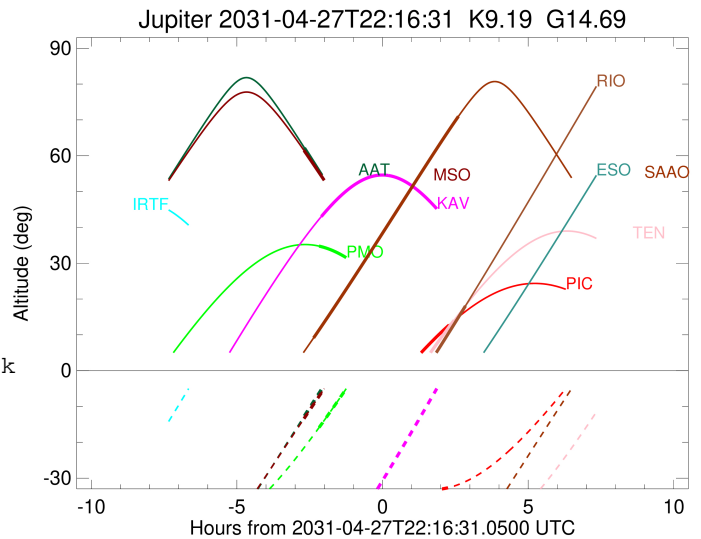
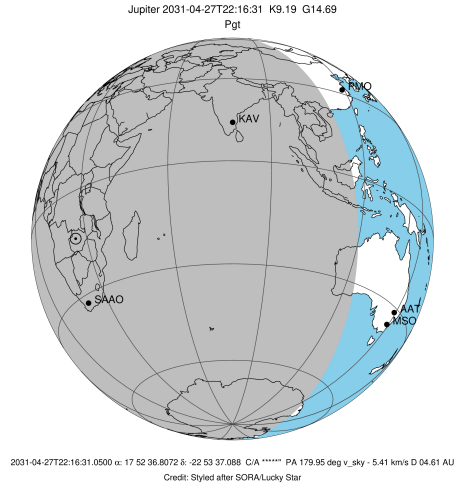


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-04-27T20:10:30.617	43.02	-55.68	71486.2	51.92	55.44
Jupiter	E	2031-04-28T00:21:46.718	43.09	-1.85x	71486.2	51.91	55.42

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-04-27T22:28:04.590
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       : 4070202998748362240
2Mass ID (if available) : 17523680-2253367
ICRS Star Coord at Epoch: 17h 52m 36.80719s -22:53:37.08843s
RUWE (>1.4 is poor) : 0.94
K magnitude           : 9.194
G magnitude           : 14.690
RP magnitude         : 13.320
BP magnitude         : 16.927
DUPflag              : 0
Distance (au)        : 4.608
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -5.41
Sun-Target sep (deg) : 128.73
Sun-Moon sep (deg)   : 162.17
B (ring opening deg) : -2.61
PA of pole (deg)     : -0.04
Pole direction: RA (deg): 268.05696
Dec (deg): 64.49651
C/A sky separation ("): 14.854
C/A sky separation (km): 49645.3
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
    
```

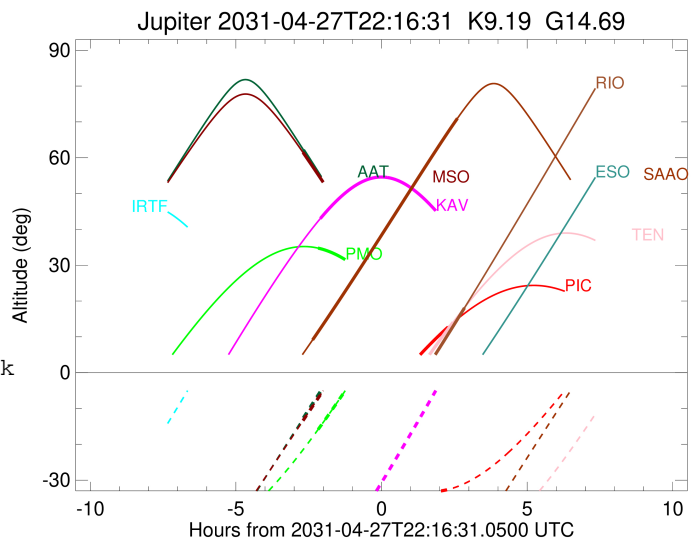
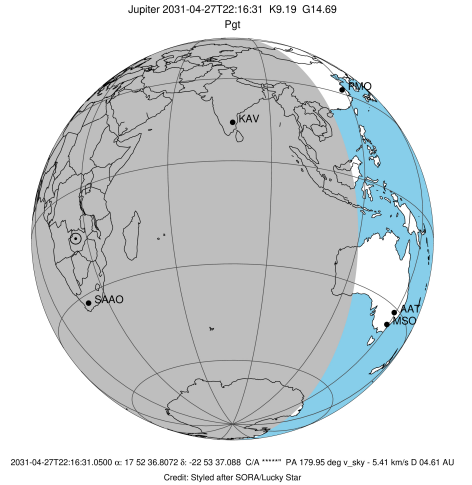


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-04-27T19:40:06.868	-40.82x	10.21x	71487.7	42.72	46.44
Jupiter	E	2031-04-28T01:07:26.547	18.08	-64.09	71487.3	45.65	49.35

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-04-27T22:05:03.470
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      : 4070202998748362240
2Mass ID (if available) : 17523680-2253367
ICRS Star Coord at Epoch: 17h 52m 36.80719s -22:53:37.08843s
RUWE (>1.4 is poor) : 0.94
K magnitude          : 9.194
G magnitude          : 14.690
RP magnitude         : 13.320
BP magnitude         : 16.927
DUPflag             : 0
Distance (au)       : 4.609
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -5.41
Sun-Target sep (deg) : 128.73
Sun-Moon sep (deg)  : 161.03
B (ring opening deg) : -2.61
PA of pole (deg)    : -0.04
Pole direction: RA (deg): 268.05696
Dec (deg): 64.49651
C/A sky separation ("): 15.188
C/A sky separation (km): 50767.0
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
    
```



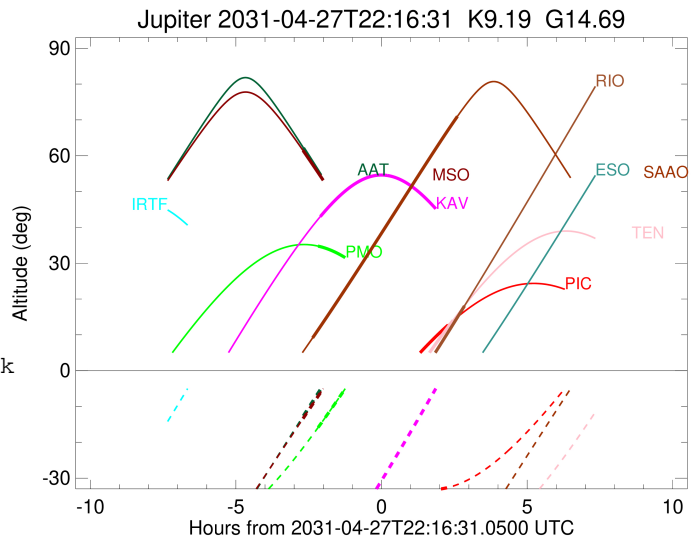
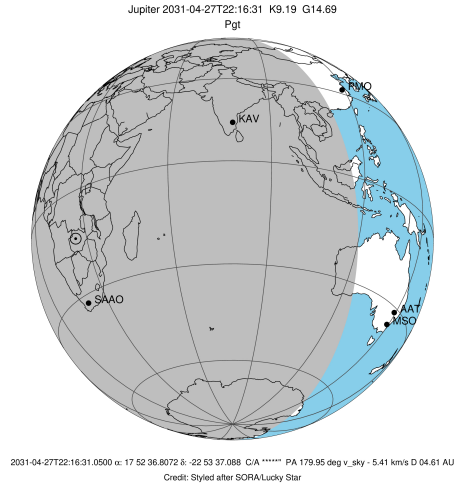
x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-04-27T19:35:36.892	62.20	-12.59	71487.1	46.34	50.03
Jupiter	E	2031-04-28T00:39:17.781	-0.99x	40.75x	71487.6	43.60	47.32



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-04-27T22:26:43.910
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       : 4070202998748362240
2Mass ID (if available) : 17523680-2253367
ICRS Star Coord at Epoch: 17h 52m 36.80719s -22:53:37.08843s
RUWE (>1.4 is poor) : 0.94
K magnitude           : 9.194
G magnitude           : 14.690
RP magnitude          : 13.320
BP magnitude          : 16.927
DUPflag              : 0
Distance (au)        : 4.608
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -5.41
Sun-Target sep (deg) : 128.73
Sun-Moon sep (deg)   : 162.34
B (ring opening deg) : -2.61
PA of pole (deg)     : -0.04
Pole direction: RA (deg): 268.05696
Dec (deg): 64.49651
C/A sky separation ("): 15.283
C/A sky separation (km): 51081.5
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
    
```



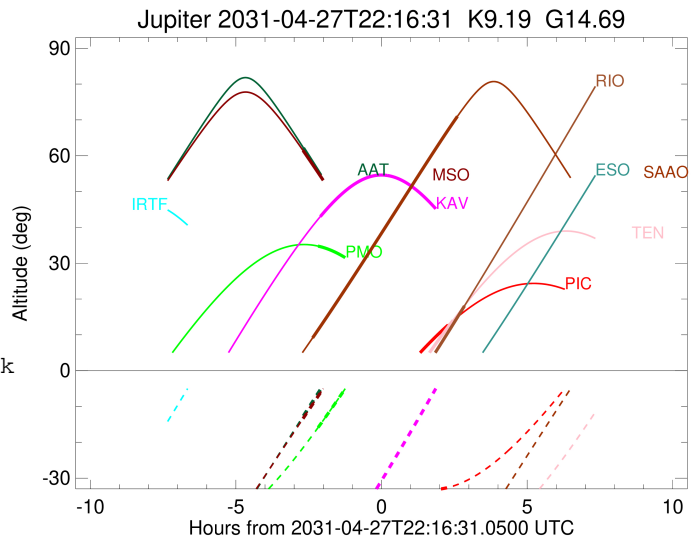
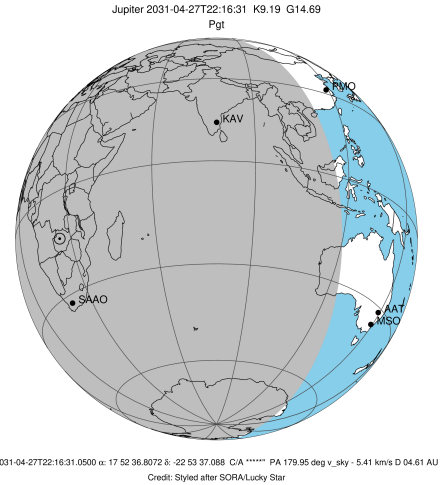
x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-04-27T19:54:26.348	9.12	-49.27	71487.5	44.03	47.75
Jupiter	E	2031-04-28T00:52:55.325	70.98	-53.58	71487.1	46.44	50.12



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-04-27T22:05:33.150
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        : 4070202998748362240
2Mass ID (if available) : 17523680-2253367
ICRS Star Coord at Epoch: 17h 52m 36.80719s -22:53:37.08843s
RUWE (>1.4 is poor) : 0.94
K magnitude           : 9.194
G magnitude           : 14.690
RP magnitude          : 13.320
BP magnitude          : 16.927
DUPflag              : 0
Distance (au)         : 4.609
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -5.41
Sun-Target sep (deg) : 128.73
Sun-Moon sep (deg)   : 161.07
B (ring opening deg) : -2.61
PA of pole (deg)     : -0.04
Pole direction: RA (deg): 268.05696
Dec (deg): 64.49651
C/A sky separation (") : 15.073
C/A sky separation (km) : 50382.4
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	2031-04-27T19:34:42.292	61.48	-13.41	71487.2	45.86	49.55
Jupiter	E	2031-04-28T00:41:00.721	0.61x	37.25x	71487.6	43.24	46.95