

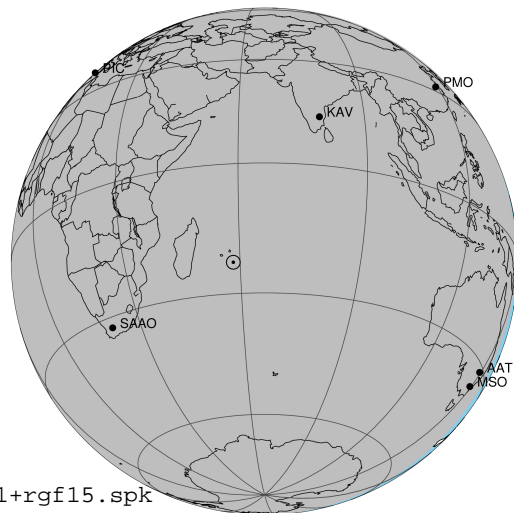
target : Jupiter  
 target radius (km) : 71492.00  
 C/A epoch : 2031-06-08T20:05:47.280  
 Event type : Pgt  
 : Jupiter occs: geocentric, topocentric  
 : Not a ringed target  
 Gaia source ID : 4116784809673278080  
 2Mass ID (if available) : 17360606-2250534

Jupiter 2031-06-08T20:05:47 K9.51 G14.26 Pgt

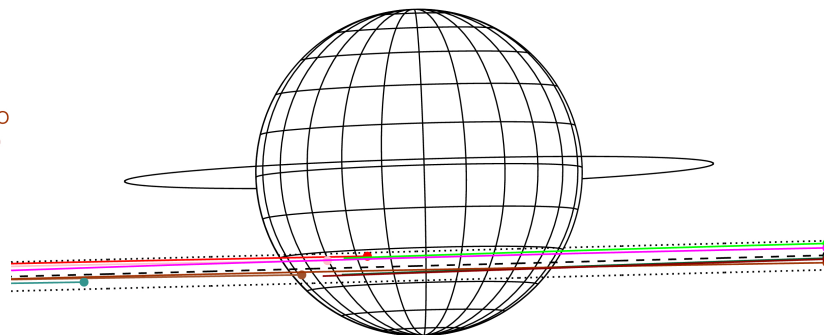
ICRS Star Coord at Epoch: 17h 36m 06.06146s -22:50:53.53132s

RUWE (>1.4 is poor) : 0.94  
 K magnitude : 9.509  
 G magnitude : 14.258  
 RP magnitude : 13.043  
 BP magnitude : 15.877  
 DUPflag : 0  
 Distance (au) : 4.274  
 f0 (km) : 0.00  
 g0 (km) : 0.00  
 skyplane vel. (km/s) : -16.22  
 Sun-Target sep (deg) : 172.90  
 Sun-Moon sep (deg) : 40.04  
 B (ring opening deg) : -2.60  
 PA of pole (deg) : 1.74  
 Pole direction: RA (deg): 268.05692  
 Dec (deg): 64.49651  
 C/A sky separation (") : 13.199  
 C/A sky separation (km) : 40913.2  
 NAIF SPICE kernels : RAJobs\_U111+rgf15.spk

Jupiter 2031-06-08T20:05:47 K9.51 G14.26  
 Pgt



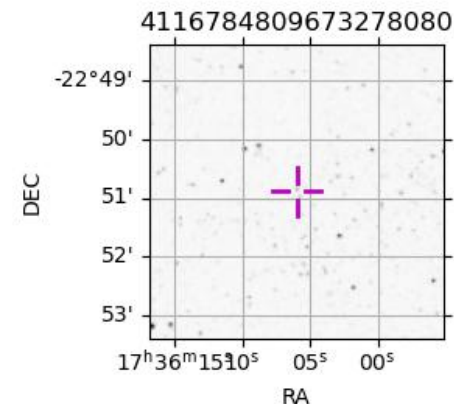
Earth  
 PIC  
 PMO  
 TEN  
 KAV  
 RIO  
 ESO  
 AAT  
 SAAO  
 MSO



2031-06-08T20:05:47.2800 α: 17 36 06.0615 δ: -22 50 53.531 C/A \*\*\*\*\* PA 1.50 deg v\_sky -16.22 km/s D 04.27 AU  
 Credit: Styled after SORA/Lucky Star

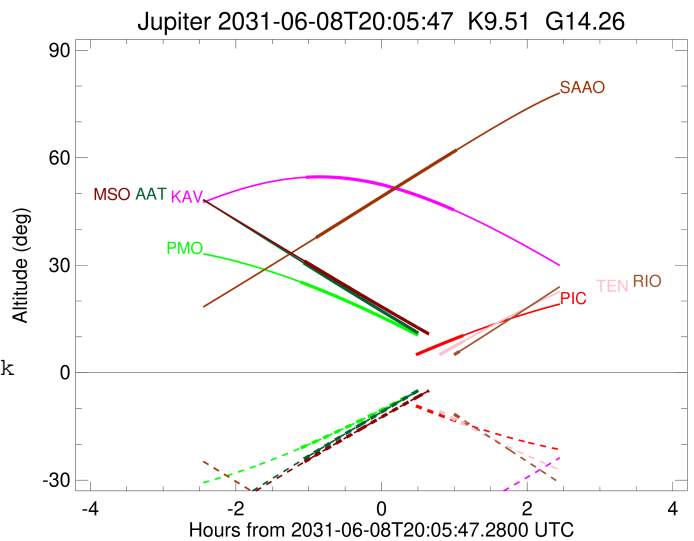
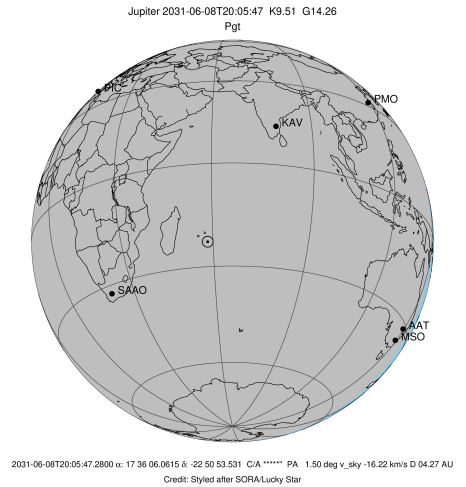
Observable events with sun below -5 deg and altitude above 5 deg

Obs	Location	lat	Elon	Target	Observed Events Interval	OCode
PIC	Pic du Midi	42.9	0.1	+	JUN 08 21:13 - JUN 08 21:13	Pne
PAL	Palomar Mt (200")	33.4	243.1			Pnn
PMO	Purple Mtn Obs. Nanking	32.1	118.8	+	JUN 08 18:59 - JUN 08 18:59	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 08 21:13 - JUN 08 21:13	Pne
IRTF	Mauna Kea/IRTF	19.8	204.5			Pnn
KAV	Kavalur Observatory	12.6	78.8	+ +	JUN 08 19:03 - JUN 08 21:05	Pie
RIO	Rio de Janeiro	-22.9	316.8	+	JUN 08 21:10 - JUN 08 21:10	Pne
ESO	European Southern Obs. (3.6m)	-29.3	289.3			Pnn
AAT	Siding Spring (AAT)	-31.3	149.1	+	JUN 08 19:01 - JUN 08 19:01	Pin
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8	+ +	JUN 08 19:11 - JUN 08 21:07	Pie
MSO	Mt. Stromlo Observatory	-35.3	149.0	+	JUN 08 19:02 - JUN 08 19:02	Pin



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-08T20:10:31.490
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     : 4116784809673278080
2Mass ID (if available) : 17360606-2250534
ICRS Star Coord at Epoch: 17h 36m 06.06146s -22:50:53.53132s
RUWE (>1.4 is poor) : 0.94
K magnitude        : 9.509
G magnitude        : 14.258
RP magnitude       : 13.043
BP magnitude       : 15.877
DUPflag           : 0
Distance (au)     : 4.274
f0 (km)           : 0.00
g0 (km)           : 0.00
skyplane vel. (km/s) : -16.22
Sun-Target sep (deg) : 172.90
Sun-Moon sep (deg) : 40.52
B (ring opening deg) : -2.60
PA of pole (deg)   : 1.74
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 11.694
C/A sky separation (km) : 36250.5
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
    
```

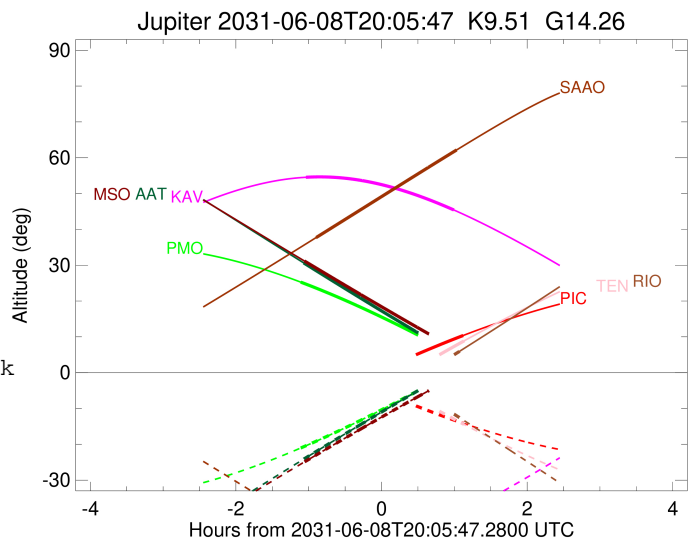
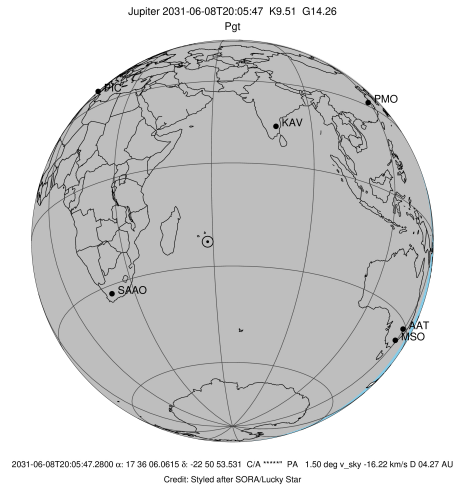


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-08T19:07:36.763	-8.73x	3.61x	71489.5	-31.13	-34.56
Jupiter	E	2031-06-08T21:13:05.784	10.38	-14.12	71489.7	-29.79	-33.15

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-08T20:01:16.350
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      : 4116784809673278080
2Mass ID (if available) : 17360606-2250534
ICRS Star Coord at Epoch: 17h 36m 06.06146s -22:50:53.53132s
RUWE (>1.4 is poor) : 0.94
K magnitude          : 9.509
G magnitude          : 14.258
RP magnitude         : 13.043
BP magnitude         : 15.877
DUPflag             : 0
Distance (au)       : 4.274
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.22
Sun-Target sep (deg) : 172.90
Sun-Moon sep (deg)  : 39.65
B (ring opening deg) : -2.60
PA of pole (deg)    : 1.74
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 11.746
C/A sky separation (km) : 36411.9
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
    
```

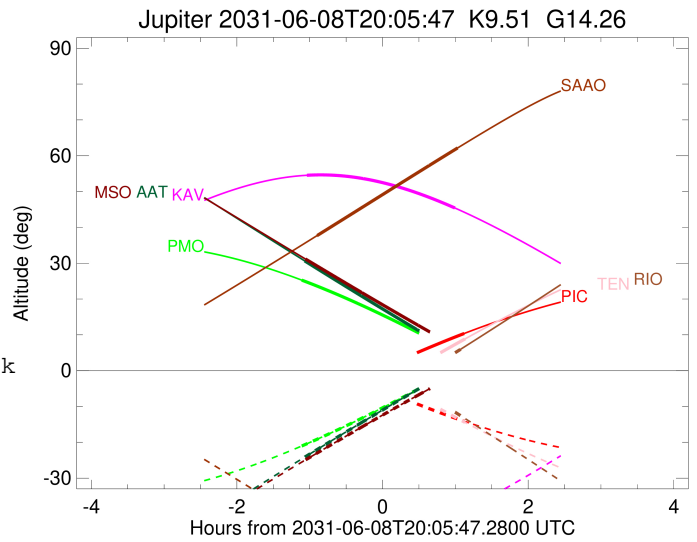
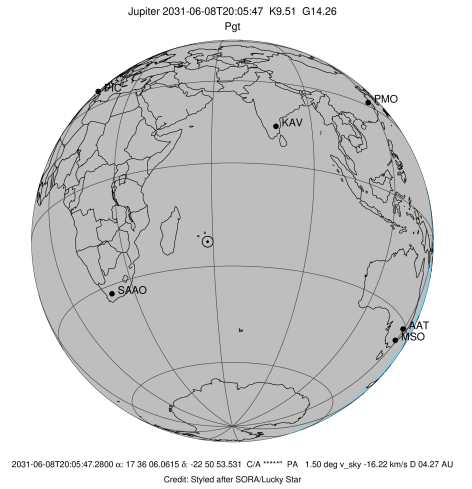


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-08T18:59:11.343	25.28	-21.03	71489.6	-30.48	-33.88
Jupiter	E	2031-06-08T21:03:39.903	5.55	0.13x	71489.6	-30.79	-34.20

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-08T20:11:56.680
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        : 4116784809673278080
2Mass ID (if available) : 17360606-2250534
ICRS Star Coord at Epoch: 17h 36m 06.06146s -22:50:53.53132s
RUWE (>1.4 is poor) : 0.94
K magnitude           : 9.509
G magnitude           : 14.258
RP magnitude          : 13.043
BP magnitude          : 15.877
DUPflag              : 0
Distance (au)         : 4.274
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.22
Sun-Target sep (deg)  : 172.90
Sun-Moon sep (deg)    : 40.63
B (ring opening deg) : -2.60
PA of pole (deg)      : 1.74
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 12.236
C/A sky separation (km) : 37930.2
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
    
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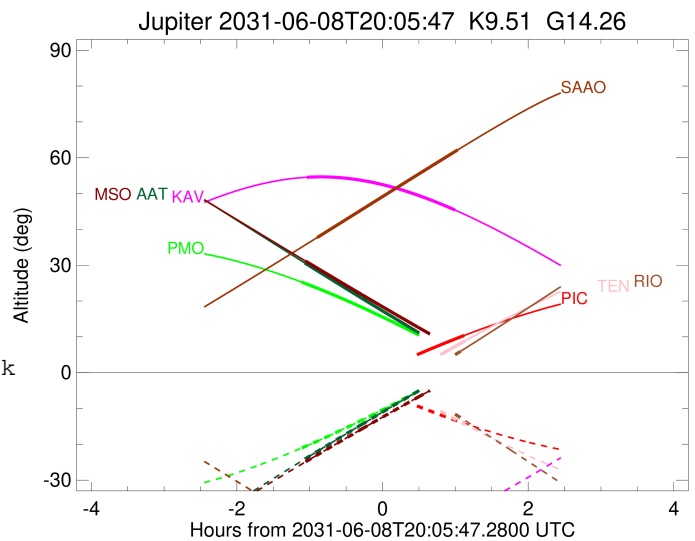
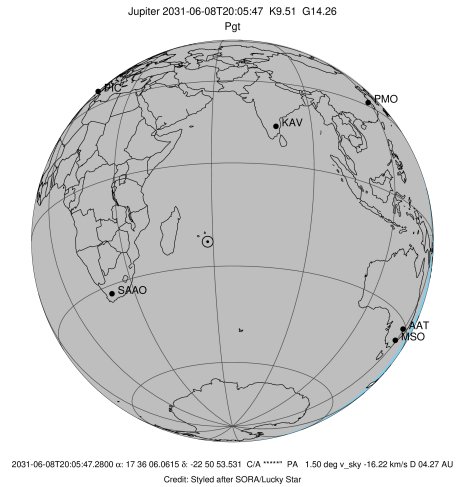


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-08T19:09:42.392	-16.06x	9.61x	71489.3	-32.81	-36.32
Jupiter	E	2031-06-08T21:13:44.841	8.85	-14.43	71489.5	-31.23	-34.66

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-08T20:04:25.790
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      : 4116784809673278080
2Mass ID (if available) : 17360606-2250534
ICRS Star Coord at Epoch: 17h 36m 06.06146s -22:50:53.53132s
RUWE (>1.4 is poor) : 0.94
K magnitude          : 9.509
G magnitude          : 14.258
RP magnitude         : 13.043
BP magnitude         : 15.877
DUPflag             : 0
Distance (au)       : 4.274
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.22
Sun-Target sep (deg) : 172.90
Sun-Moon sep (deg)  : 40.36
B (ring opening deg) : -2.60
PA of pole (deg)    : 1.74
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 12.017
C/A sky separation (km) : 37249.7
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
    
```

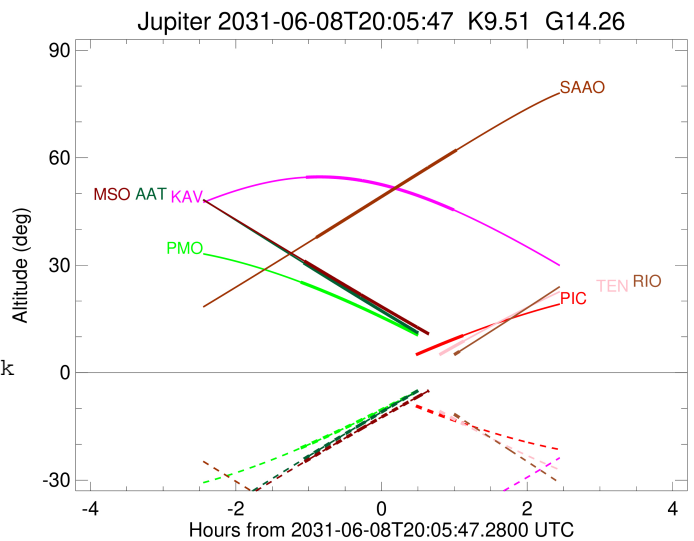
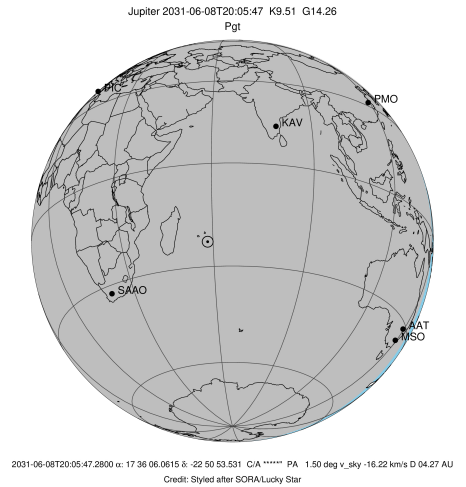


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-08T19:03:29.042	54.54	-54.30	71489.5	-31.59	-35.05
Jupiter	E	2031-06-08T21:05:27.501	45.40	-40.46	71489.5	-31.30	-34.74

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-08T20:11:54.450
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      : 4116784809673278080
2Mass ID (if available) : 17360606-2250534
ICRS Star Coord at Epoch: 17h 36m 06.06146s -22:50:53.53132s
RUWE (>1.4 is poor) : 0.94
K magnitude          : 9.509
G magnitude          : 14.258
RP magnitude         : 13.043
BP magnitude         : 15.877
DUPflag             : 0
Distance (au)       : 4.274
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.22
Sun-Target sep (deg) : 172.90
Sun-Moon sep (deg)  : 40.65
B (ring opening deg) : -2.60
PA of pole (deg)    : 1.74
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (" ) : 14.198
C/A sky separation (km) : 44009.7
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
    
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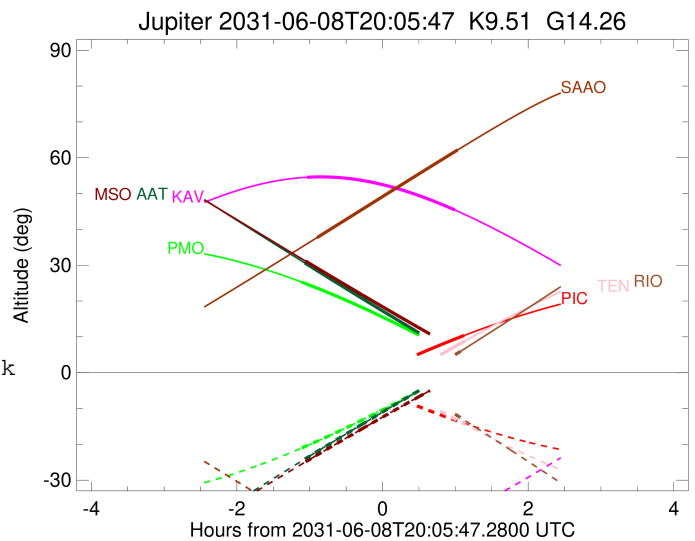
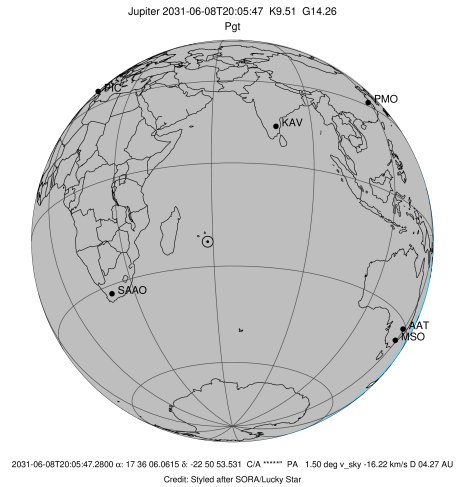


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-08T19:13:20.121	-17.77x	11.78x	71488.4	-38.71	-42.40
Jupiter	E	2031-06-08T21:10:05.113	5.96	-12.55	71488.6	-37.14	-40.80

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-08T19:59:45.860
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      : 4116784809673278080
2Mass ID (if available) : 17360606-2250534
ICRS Star Coord at Epoch: 17h 36m 06.06146s -22:50:53.53132s
RUWE (>1.4 is poor) : 0.94
K magnitude          : 9.509
G magnitude          : 14.258
RP magnitude         : 13.043
BP magnitude         : 15.877
DUPflag             : 0
Distance (au)        : 4.274
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.22
Sun-Target sep (deg) : 172.90
Sun-Moon sep (deg)   : 39.60
B (ring opening deg) : -2.60
PA of pole (deg)     : 1.74
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation ("): 14.037
C/A sky separation (km): 43512.8
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
    
```

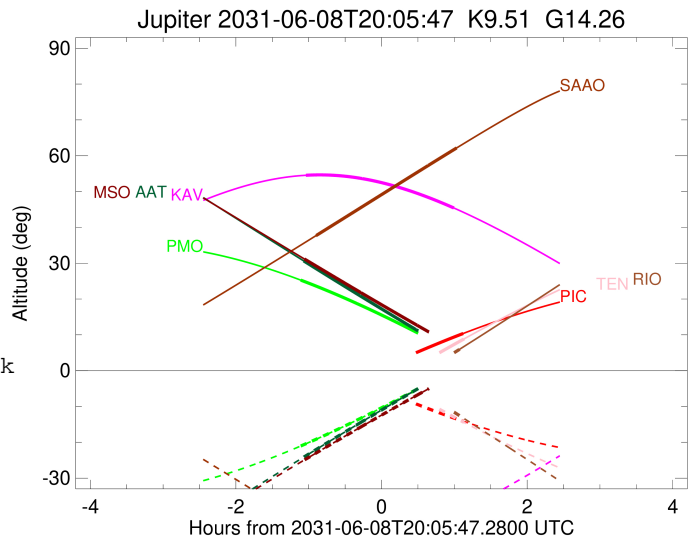
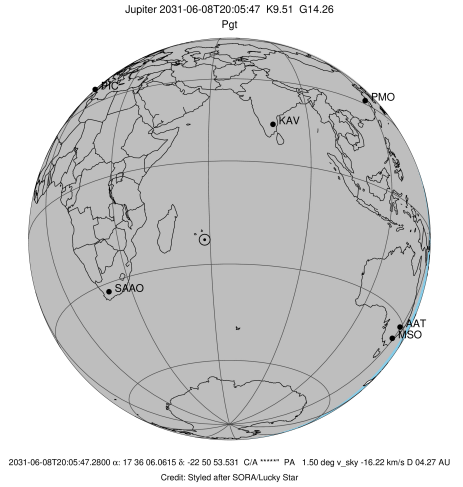


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-08T19:01:53.914	30.59	-24.09	71488.6	-37.18	-40.84
Jupiter	E	2031-06-08T20:57:58.996	6.70	-0.75x	71488.5	-37.75	-41.42

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-08T20:09:54.680
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       : 4116784809673278080
2Mass ID (if available) : 17360606-2250534
ICRS Star Coord at Epoch: 17h 36m 06.06146s -22:50:53.53132s
RUWE (>1.4 is poor) : 0.94
K magnitude          : 9.509
G magnitude          : 14.258
RP magnitude         : 13.043
BP magnitude         : 15.877
DUPflag             : 0
Distance (au)        : 4.274
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.22
Sun-Target sep (deg) : 172.90
Sun-Moon sep (deg)   : 41.01
B (ring opening deg) : -2.60
PA of pole (deg)     : 1.74
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 13.751
C/A sky separation (km) : 42627.0
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
    
```



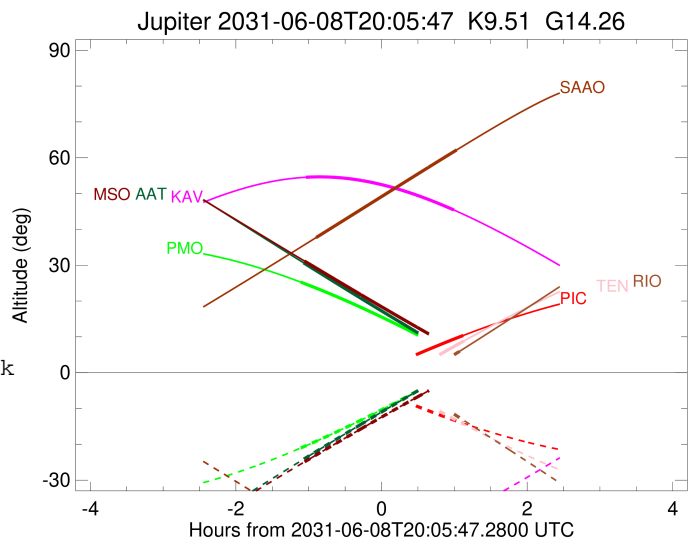
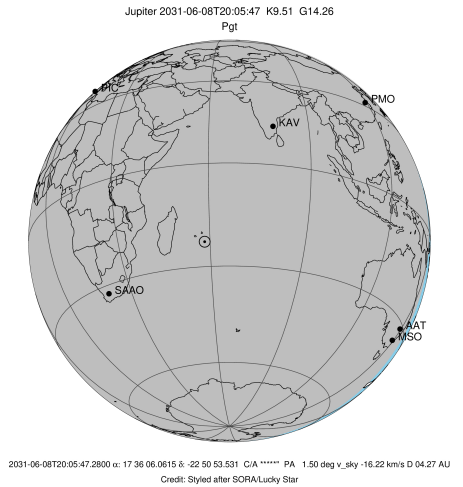
x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-08T19:11:50.623	37.69	-44.25	71488.6	-37.23	-40.90
Jupiter	E	2031-06-08T21:07:43.212	62.17	-68.41	71488.8	-35.98	-39.61



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-08T20:00:01.300
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       : 4116784809673278080
2Mass ID (if available) : 17360606-2250534
ICRS Star Coord at Epoch: 17h 36m 06.06146s -22:50:53.53132s
RUWE (>1.4 is poor) : 0.94
K magnitude           : 9.509
G magnitude           : 14.258
RP magnitude          : 13.043
BP magnitude          : 15.877
DUPflag              : 0
Distance (au)        : 4.274
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.22
Sun-Target sep (deg) : 172.90
Sun-Moon sep (deg)   : 39.65
B (ring opening deg) : -2.60
PA of pole (deg)     : 1.74
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 14.155
C/A sky separation (km) : 43877.6
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	2031-06-08T19:02:25.437	31.14	-24.89	71488.6	-37.57	-41.24
Jupiter	E	2031-06-08T20:57:57.185	8.29	-2.59x	71488.5	-38.09	-41.77