

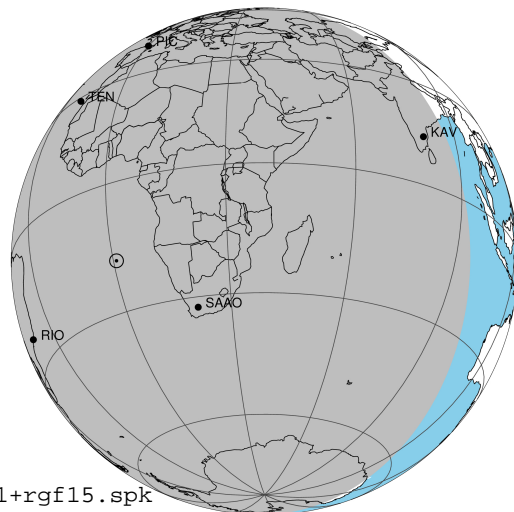
target : Jupiter  
 target radius (km) : 71492.00  
 C/A epoch : 2031-05-12T23:52:44.250  
 Event type : Pgt  
 : Jupiter occs: geocentric, topocentric  
 : Not a ringed target  
 Gaia source ID : 4068889464667188608  
 2Mass ID (if available) : 17483916-2253244

Jupiter 2031-05-12T23:52:44 K8.55 G14.91 Pgt

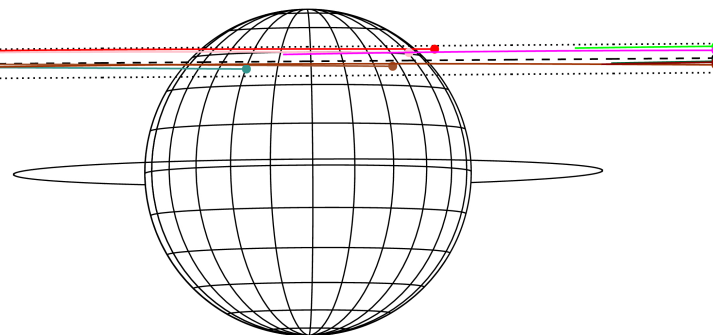
ICRS Star Coord at Epoch: 17h 48m 39.15690s -22:53:24.42696s

RUWE (>1.4 is poor) : 0.99  
 K magnitude : 8.551  
 G magnitude : 14.915  
 RP magnitude : 13.386  
 BP magnitude : 18.301  
 DUPflag : 0  
 Distance (au) : 4.439  
 f0 (km) : 0.00  
 g0 (km) : 0.00  
 skyplane vel. (km/s) : -10.87  
 Sun-Target sep (deg) : 144.24  
 Sun-Moon sep (deg) : 43.92  
 B (ring opening deg) : -2.61  
 PA of pole (deg) : 0.39  
 Pole direction: RA (deg): 268.05695  
 Dec (deg): 64.49651  
 C/A sky separation (") : 15.128  
 C/A sky separation (km) : 48703.6  
 NAIF SPICE kernels : RAJobs\_U111+rgf15.spk

Jupiter 2031-05-12T23:52:44 K8.55 G14.91  
 Pgt



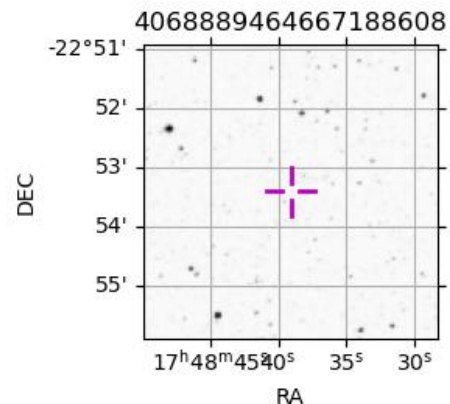
Earth  
 PIC  
 PMO  
 TEN  
 KAV  
 RIO  
 ESO  
 AAT  
 SAAO  
 MSO



2031-05-12T23:52:44.2500 a: 17 48 39.1569 s: -22 53 24.427 C/A \*\*\*\*\* PA 180.45 deg v\_sky -10.87 km/s D 04.44 AU  
 Credit: Styled after SORA/Lucky Star

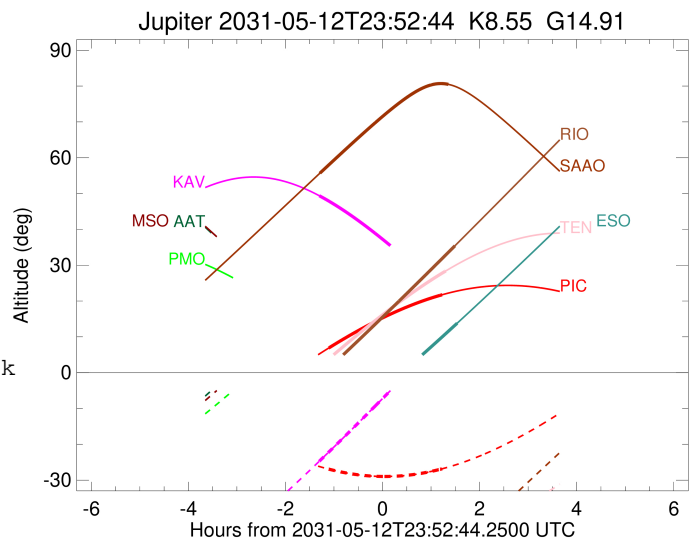
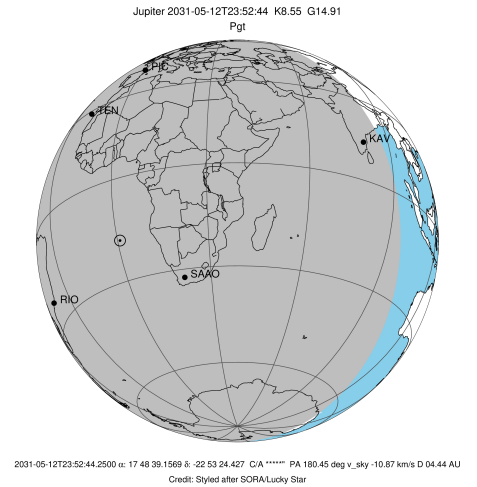
Observable events with sun below -5 deg and altitude above 5 deg

Obs	Location	lat	Elon	Target	Observed Events Interval	OCode
PIC	Pic du Midi	42.9	0.1	+ +	MAY 12 22:46 - MAY 13 01:06	Pie
PAL	Palomar Mt (200")	33.4	243.1			Pnn
PMO	Purple Mtn Obs. Nanking	32.1	118.8			Pnn
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 13 01:10 - MAY 13 01:10	Pne
IRTF	Mauna Kea/IRTF	19.8	204.5			Pnn
KAV	Kavalur Observatory	12.6	78.8	+ +	MAY 12 22:34 - MAY 12 22:34	Pin
RIO	Rio de Janeiro	-22.9	316.8	+ +	MAY 13 01:22 - MAY 13 01:22	Pne
ESO	European Southern Obs. (3.6m)	-29.3	289.3	+ +	MAY 13 01:25 - MAY 13 01:25	Pne
AAT	Siding Spring (AAT)	-31.3	149.1			Pnn
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8	+ +	MAY 12 22:35 - MAY 13 01:13	Pie
MSO	Mt. Stromlo Observatory	-35.3	149.0			Pnn



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-12T23:56:33.350
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       : 4068889464667188608
2Mass ID (if available) : 17483916-2253244
ICRS Star Coord at Epoch: 17h 48m 39.15690s -22:53:24.42696s
RUWE (>1.4 is poor) : 0.99
K magnitude           : 8.551
G magnitude           : 14.915
RP magnitude          : 13.386
BP magnitude          : 18.301
DUPflag              : 0
Distance (au)         : 4.439
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -10.87
Sun-Target sep (deg) : 144.24
Sun-Moon sep (deg)   : 44.37
B (ring opening deg) : -2.61
PA of pole (deg)     : 0.39
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation ("): 16.809
C/A sky separation (km): 54113.9
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
    
```

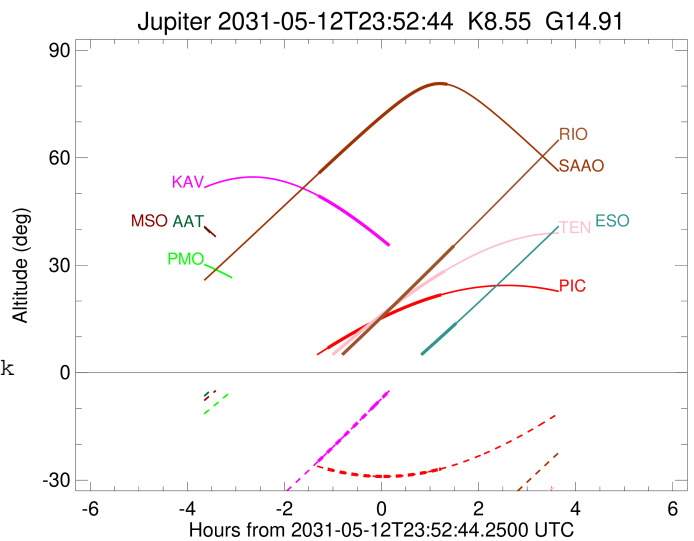
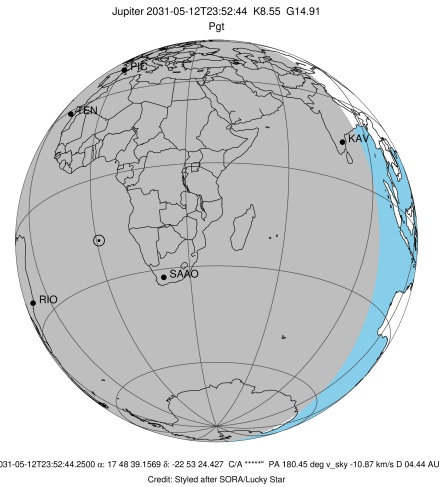


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-12T22:46:19.000	6.89	-26.92	71486.8	48.70	52.33
Jupiter	E	2031-05-13T01:06:19.318	21.74	-26.84	71486.6	49.39	53.00

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-12T23:58:46.890
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       : 4068889464667188608
2Mass ID (if available) : 17483916-2253244
ICRS Star Coord at Epoch: 17h 48m 39.15690s -22:53:24.42696s
RUWE (>1.4 is poor) : 0.99
K magnitude           : 8.551
G magnitude           : 14.915
RP magnitude          : 13.386
BP magnitude          : 18.301
DUPflag              : 0
Distance (au)        : 4.439
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -10.87
Sun-Target sep (deg) : 144.24
Sun-Moon sep (deg)   : 44.58
B (ring opening deg) : -2.61
PA of pole (deg)     : 0.39
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation ("): 16.383
C/A sky separation (km): 52745.1
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
    
```

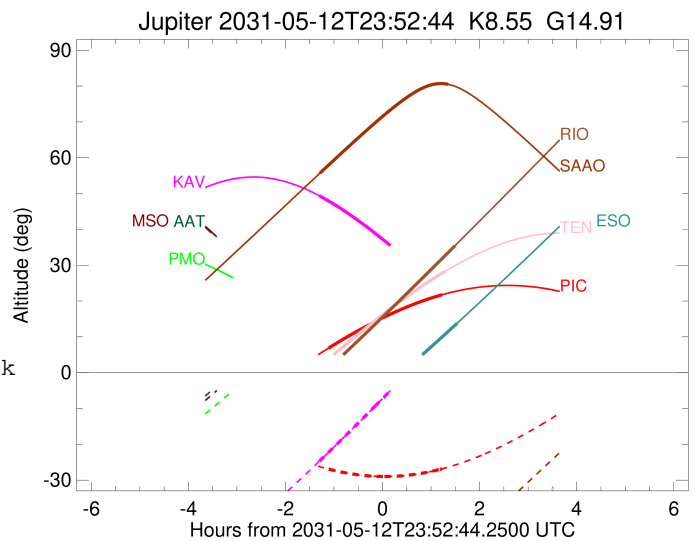
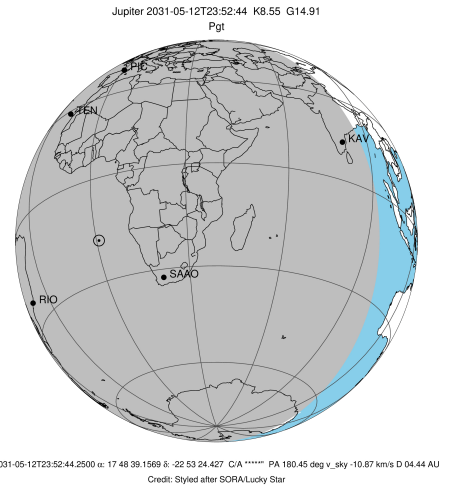


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-12T22:45:55.836	3.76x	-33.07	71487.1	46.81	50.49
Jupiter	E	2031-05-13T01:10:53.077	28.39	-43.53	71486.9	47.99	51.64

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-12T23:47:34.220
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       : 4068889464667188608
2Mass ID (if available) : 17483916-2253244
ICRS Star Coord at Epoch: 17h 48m 39.15690s -22:53:24.42696s
RUWE (>1.4 is poor) : 0.99
K magnitude           : 8.551
G magnitude           : 14.915
RP magnitude         : 13.386
BP magnitude         : 18.301
DUPflag              : 0
Distance (au)        : 4.439
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -10.87
Sun-Target sep (deg) : 144.24
Sun-Moon sep (deg)   : 43.86
B (ring opening deg) : -2.61
PA of pole (deg)     : 0.39
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation ("): 16.117
C/A sky separation (km): 51887.2
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
    
```

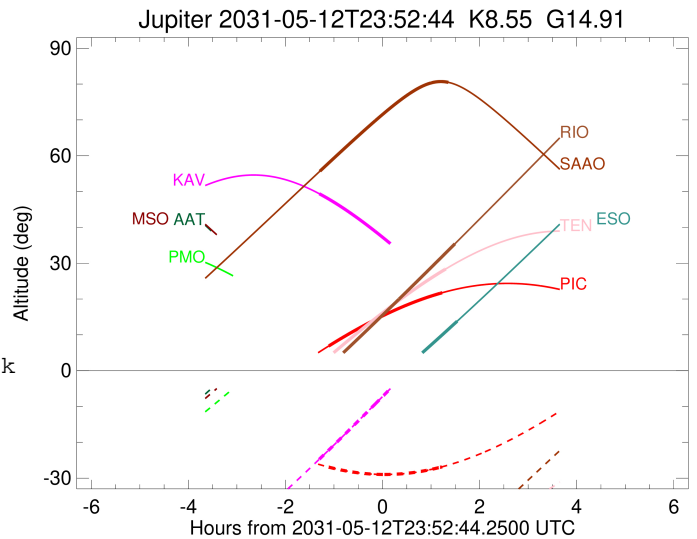
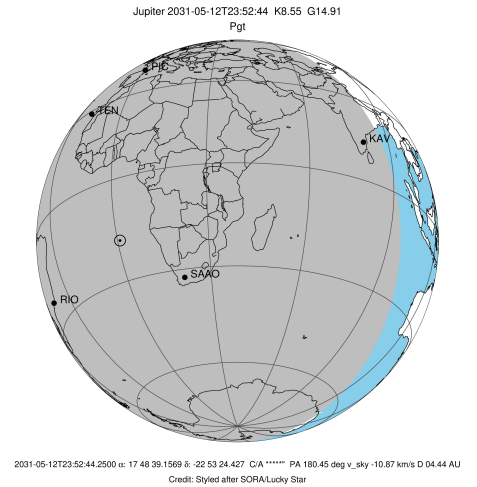


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-12T22:34:37.150	49.38	-24.71	71487.0	46.97	50.64
Jupiter	E	2031-05-13T01:00:59.079	23.89	8.54x	71487.2	45.75	49.44

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-13T00:00:31.340
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       : 4068889464667188608
2Mass ID (if available) : 17483916-2253244
ICRS Star Coord at Epoch: 17h 48m 39.15690s -22:53:24.42696s
RUWE (>1.4 is poor) : 0.99
K magnitude          : 8.551
G magnitude          : 14.915
RP magnitude         : 13.386
BP magnitude         : 18.301
DUPflag             : 0
Distance (au)        : 4.439
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -10.87
Sun-Target sep (deg) : 144.24
Sun-Moon sep (deg)   : 44.77
B (ring opening deg) : -2.61
PA of pole (deg)     : 0.39
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation ("): 14.537
C/A sky separation (km): 46801.1
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
    
```

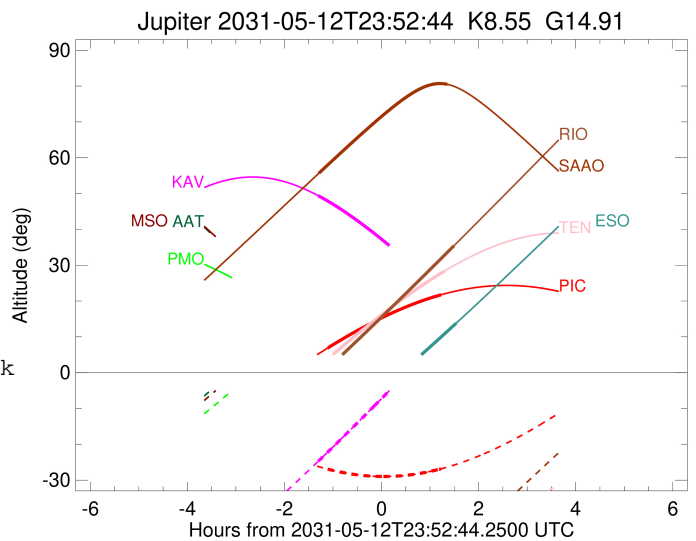
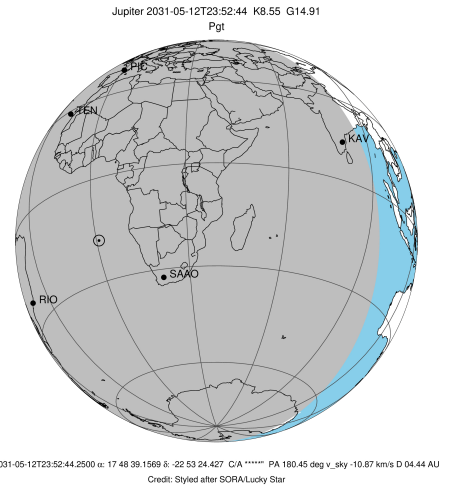


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-12T22:37:36.103	-0.63x	-31.33	71488.2	40.04	43.75
Jupiter	E	2031-05-13T01:22:13.756	35.41	-69.16	71487.9	41.58	45.30

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-12T23:59:52.480
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       : 4068889464667188608
2Mass ID (if available) : 17483916-2253244
ICRS Star Coord at Epoch: 17h 48m 39.15690s -22:53:24.42696s
RUWE (>1.4 is poor) : 0.99
K magnitude          : 8.551
G magnitude          : 14.915
RP magnitude         : 13.386
BP magnitude         : 18.301
DUPflag             : 0
Distance (au)        : 4.439
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -10.87
Sun-Target sep (deg) : 144.24
Sun-Moon sep (deg)  : 44.48
B (ring opening deg) : -2.61
PA of pole (deg)    : 0.39
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation (" ) : 14.028
C/A sky separation (km) : 45163.5
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
    
```

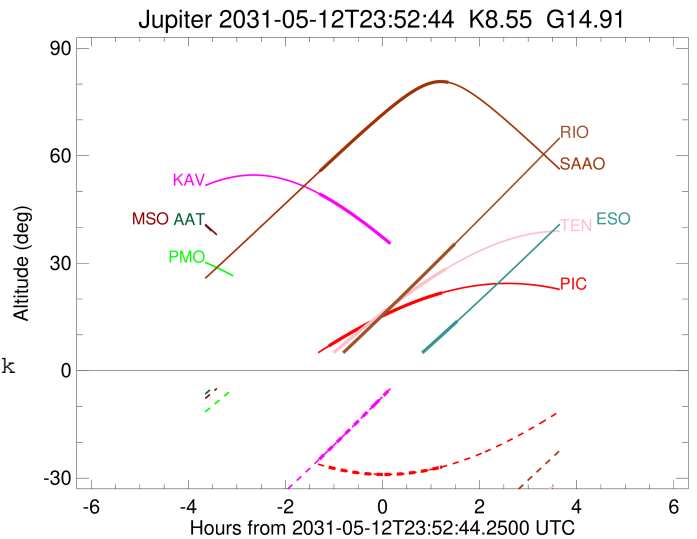
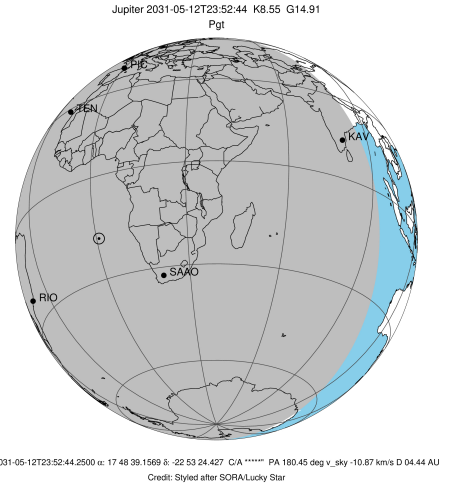


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-12T22:33:25.269	-18.84x	-7.54	71488.4	38.47	42.15
Jupiter	E	2031-05-13T01:25:05.327	13.81	-44.58	71488.2	39.88	43.59

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-12T23:54:54.650
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        : 4068889464667188608
2Mass ID (if available) : 17483916-2253244
ICRS Star Coord at Epoch: 17h 48m 39.15690s -22:53:24.42696s
RUWE (>1.4 is poor) : 0.99
K magnitude           : 8.551
G magnitude           : 14.915
RP magnitude          : 13.386
BP magnitude          : 18.301
DUPflag              : 0
Distance (au)         : 4.439
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -10.87
Sun-Target sep (deg) : 144.24
Sun-Moon sep (deg)   : 44.78
B (ring opening deg) : -2.61
PA of pole (deg)     : 0.39
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation ("): 14.775
C/A sky separation (km): 47567.9
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	2031-05-12T22:35:26.528	55.69	-76.05	71487.9	41.36	45.08
Jupiter	E	2031-05-13T01:13:59.230	80.48	-51.33	71487.9	41.70	45.42