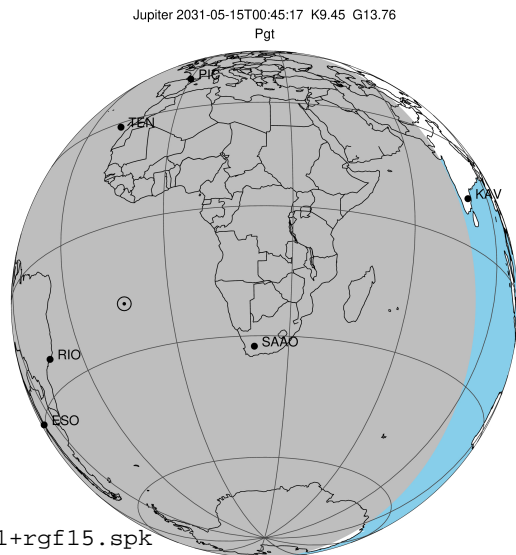


target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2031-05-15T00:45:17.980
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 4068887265641418752
 2Mass ID (if available) : 17475478-2253408

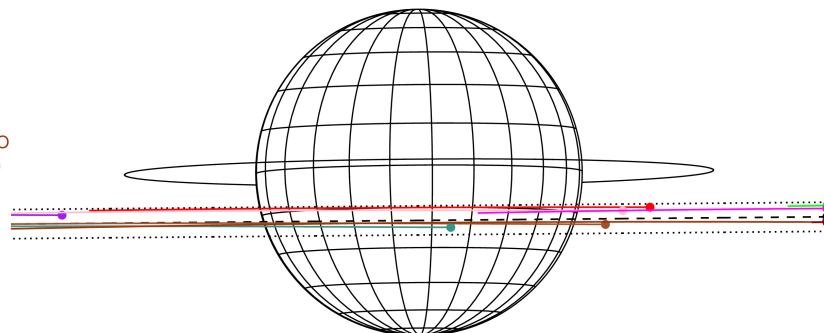
Jupiter 2031-05-15T00:45:17 K9.45 G13.76 Pgt

ICRS Star Coord at Epoch: 17h 47m 54.78092s -22:53:40.95023s
 RUWE (>1.4 is poor) : 1.75
 K magnitude : 9.447
 G magnitude : 13.764
 RP magnitude : 12.625
 BP magnitude : 15.141
 DUPflag : 0
 Distance (au) : 4.420
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -11.51
 Sun-Target sep (deg) : 146.37
 Sun-Moon sep (deg) : 72.19
 B (ring opening deg) : -2.60
 PA of pole (deg) : 0.46
 Pole direction: RA (deg): 268.05695
 Dec (deg): 64.49651
 C/A sky separation (") : 6.551
 C/A sky separation (km) : 20999.8
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk



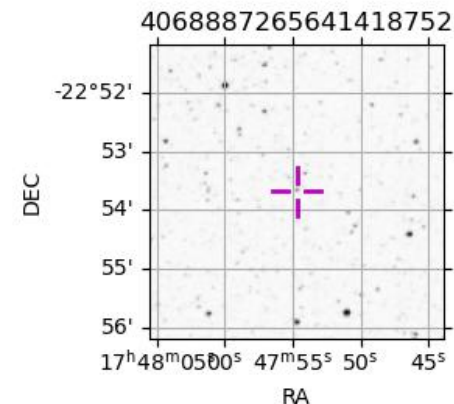
2031-05-15T00:45:17.9800 a: 17 47 54.7809 s: -22 53 40.9502 C/A 6.563" PA 0.51 deg v_sky -11.51 km/s D 04.42 AU
 Credit: Styled after SORA/Lucky Star

Earth
 PIC
 PMO
 MCD
 TEN
 KAV
 RIO
 ESO
 AAT
 SAAO
 MSO



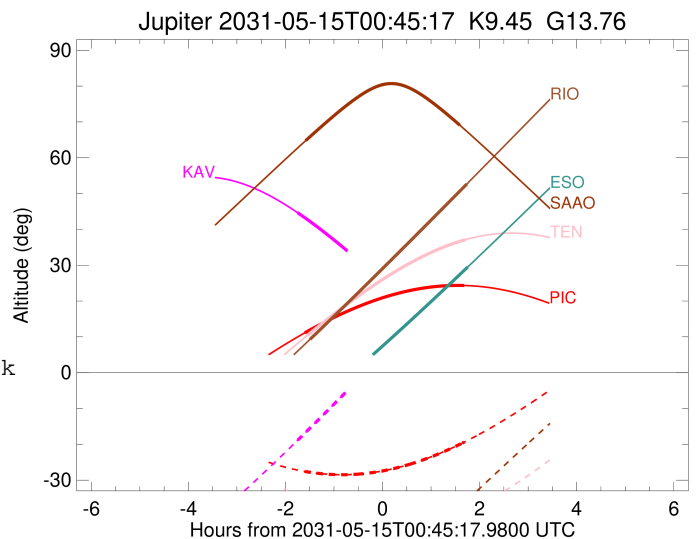
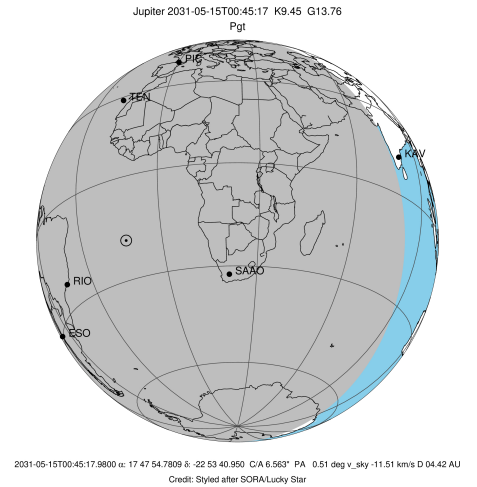
Observable events with sun below -5 deg and altitude above 5 deg

Obs	Location	lat	Elon	Target	Observed Events Interval	OCode
PIC	Pic du Midi	42.9	0.1	+ +	MAY 14 23:09 - MAY 15 02:26	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 14 23:12 - MAY 15 02:28	Pie
IRTF	Mauna Kea/IRTF	19.8	204.5			Pnn
KAV	Kavalur Observatory	12.6	78.8	+	MAY 14 23:00 - MAY 14 23:00	Pin
RIO	Rio de Janeiro	-22.9	316.8	+ +	MAY 14 23:15 - MAY 15 02:29	Pie
ESO	European Southern Obs. (3.6m)	-29.3	289.3	+	MAY 15 02:30 - MAY 15 02:30	Pne
AAT	Siding Spring (AAT)	-31.3	149.1			Pnn
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8	+ +	MAY 14 23:10 - MAY 15 02:20	Pie
MSO	Mt. Stromlo Observatory	-35.3	149.0			Pnn



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-15T00:48:03.830
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      : 4068887265641418752
2Mass ID (if available) : 17475478-2253408
ICRS Star Coord at Epoch: 17h 47m 54.78092s -22:53:40.95023s
RUWE (>1.4 is poor) : 1.75
K magnitude         : 9.447
G magnitude         : 13.764
RP magnitude        : 12.625
BP magnitude        : 15.141
DUPflag            : 0
Distance (au)       : 4.420
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -11.51
Sun-Target sep (deg) : 146.37
Sun-Moon sep (deg)  : 72.59
B (ring opening deg) : -2.60
PA of pole (deg)    : 0.46
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation (") : 4.788
C/A sky separation (km) : 15347.3
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
    
```

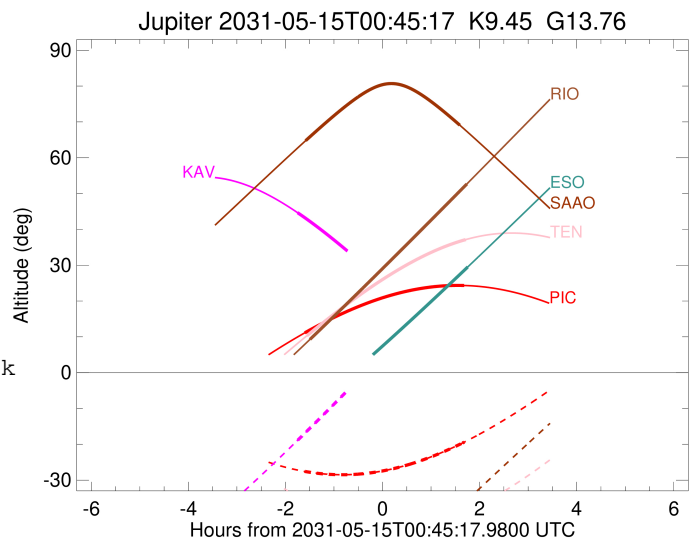
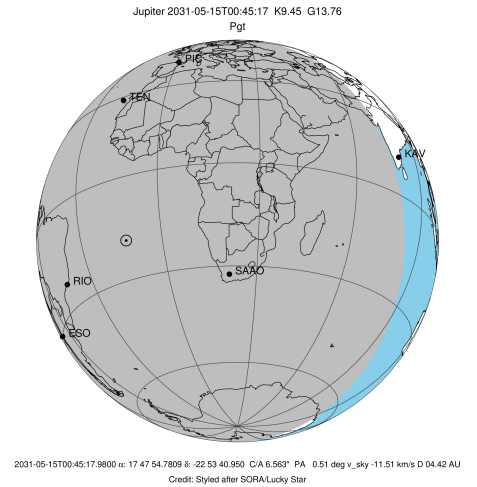


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-14T23:09:16.224	11.12	-27.57	71491.5	-12.71	-14.46
Jupiter	E	2031-05-15T02:26:13.576	24.33	-19.40	71491.6	-12.31	-14.00

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-15T00:50:38.170
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       : 4068887265641418752
2Mass ID (if available) : 17475478-2253408
ICRS Star Coord at Epoch: 17h 47m 54.78092s -22:53:40.95023s
RUWE (>1.4 is poor) : 1.75
K magnitude           : 9.447
G magnitude           : 13.764
RP magnitude          : 12.625
BP magnitude          : 15.141
DUPflag              : 0
Distance (au)        : 4.420
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -11.51
Sun-Target sep (deg) : 146.37
Sun-Moon sep (deg)   : 72.74
B (ring opening deg) : -2.60
PA of pole (deg)     : 0.46
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation (") : 5.161
C/A sky separation (km) : 16544.0
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
    
```

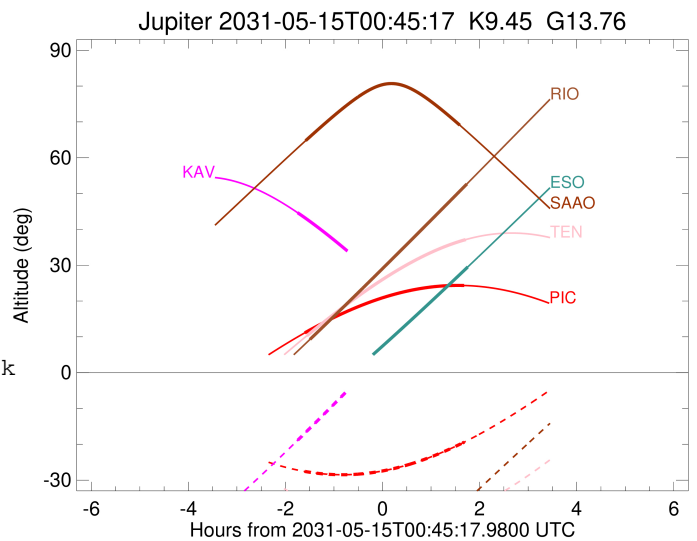
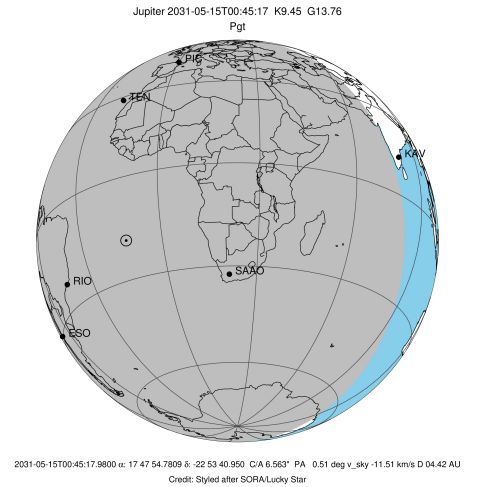


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-14T23:12:03.555	10.36	-36.05	71491.5	-13.93	-15.82
Jupiter	E	2031-05-15T02:28:08.793	37.14	-38.69	71491.5	-13.06	-14.85

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-15T00:37:46.040
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      : 4068887265641418752
2Mass ID (if available) : 17475478-2253408
ICRS Star Coord at Epoch: 17h 47m 54.78092s -22:53:40.95023s
RUWE (>1.4 is poor) : 1.75
K magnitude         : 9.447
G magnitude         : 13.764
RP magnitude        : 12.625
BP magnitude        : 15.141
DUPflag            : 0
Distance (au)      : 4.420
f0 (km)            : 0.00
g0 (km)            : 0.00
skyplane vel. (km/s) : -11.51
Sun-Target sep (deg) : 146.37
Sun-Moon sep (deg)  : 72.34
B (ring opening deg) : -2.60
PA of pole (deg)    : 0.46
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation (") : 5.695
C/A sky separation (km) : 18256.7
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
    
```

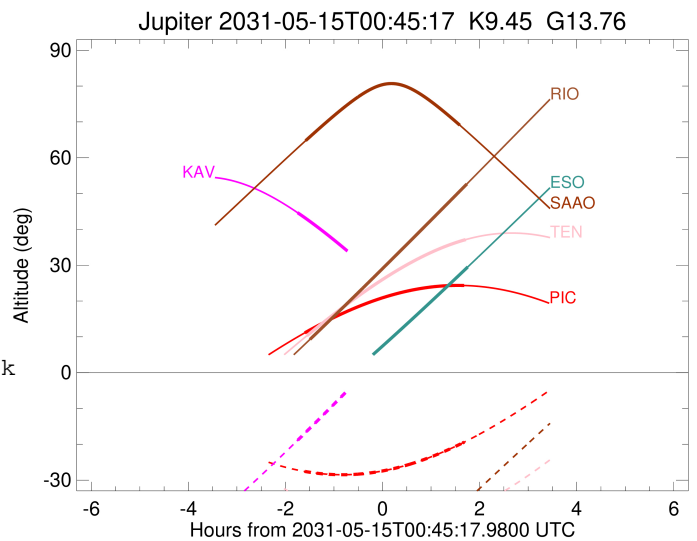
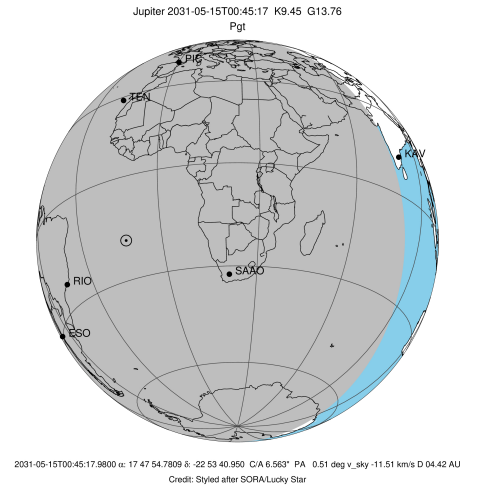


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-14T23:00:29.698	44.63	-18.85	71491.4	-14.18	-16.11
Jupiter	E	2031-05-15T02:16:10.344	5.85	26.26x	71491.3	-15.60	-17.70

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-15T00:53:24.630
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       : 4068887265641418752
2Mass ID (if available) : 17475478-2253408
ICRS Star Coord at Epoch: 17h 47m 54.78092s -22:53:40.95023s
RUWE (>1.4 is poor) : 1.75
K magnitude           : 9.447
G magnitude           : 13.764
RP magnitude          : 12.625
BP magnitude          : 15.141
DUPflag              : 0
Distance (au)        : 4.420
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -11.51
Sun-Target sep (deg) : 146.37
Sun-Moon sep (deg)   : 72.88
B (ring opening deg) : -2.60
PA of pole (deg)     : 0.46
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation (") : 6.965
C/A sky separation (km) : 22327.4
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
    
```

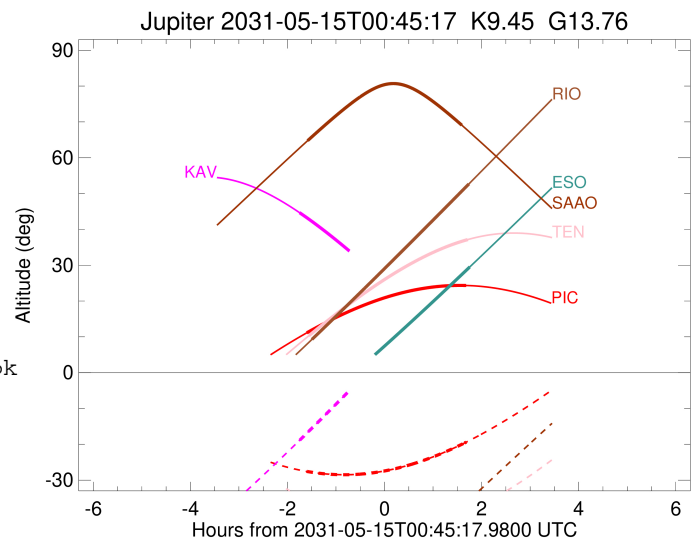
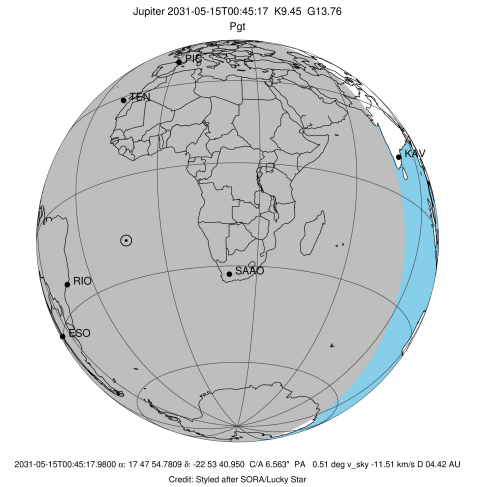


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-14T23:15:49.040	9.32	-40.21	71491.0	-18.93	-21.40
Jupiter	E	2031-05-15T02:29:29.165	52.65	-83.91	71491.2	-17.58	-19.90

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-15T00:53:48.940
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        : 4068887265641418752
2Mass ID (if available) : 17475478-2253408
ICRS Star Coord at Epoch: 17h 47m 54.78092s -22:53:40.95023s
RUWE (>1.4 is poor) : 1.75
K magnitude           : 9.447
G magnitude           : 13.764
RP magnitude          : 12.625
BP magnitude          : 15.141
DUPflag              : 0
Distance (au)         : 4.420
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -11.51
Sun-Target sep (deg) : 146.37
Sun-Moon sep (deg)   : 72.57
B (ring opening deg) : -2.60
PA of pole (deg)     : 0.46
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation (") : 7.478
C/A sky separation (km) : 23970.9
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
    
```

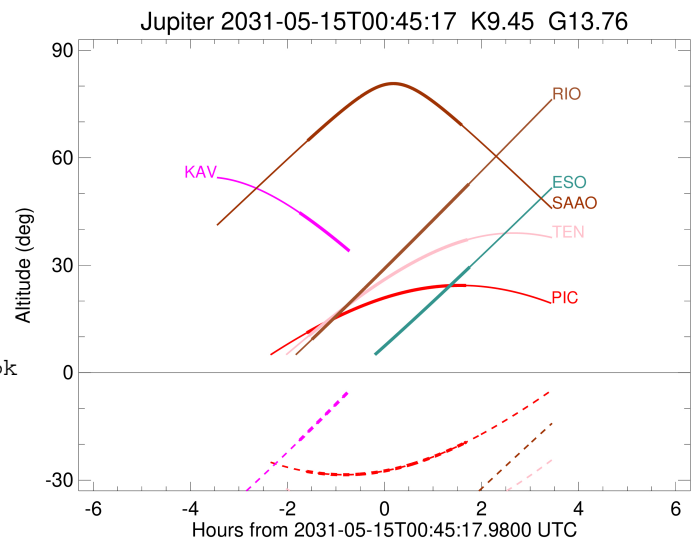
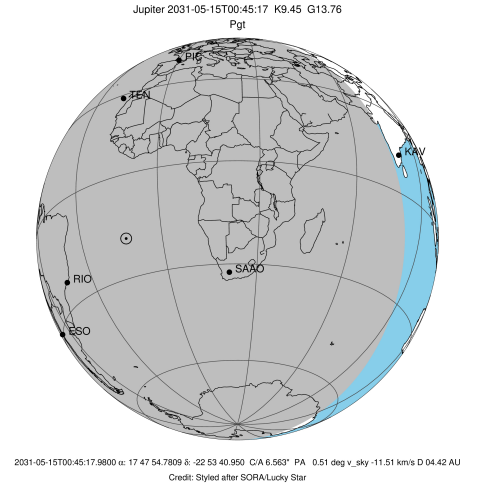


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-14T23:15:18.712	-10.05x	-16.62	71490.9	-20.28	-22.89
Jupiter	E	2031-05-15T02:30:40.720	29.50	-58.98	71491.0	-18.85	-21.31

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-15T00:45:40.730
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      : 4068887265641418752
2Mass ID (if available) : 17475478-2253408
ICRS Star Coord at Epoch: 17h 47m 54.78092s -22:53:40.95023s
RUWE (>1.4 is poor) : 1.75
K magnitude          : 9.447
G magnitude          : 13.764
RP magnitude         : 12.625
BP magnitude         : 15.141
DUPflag             : 0
Distance (au)        : 4.420
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -11.51
Sun-Target sep (deg) : 146.37
Sun-Moon sep (deg)   : 73.12
B (ring opening deg) : -2.60
PA of pole (deg)     : 0.46
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation (") : 6.874
C/A sky separation (km) : 22033.9
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	2031-05-14T23:10:18.356	64.76	-74.17	71491.1	-18.08	-20.45
Jupiter	E	2031-05-15T02:20:50.448	69.08	-37.50	71491.1	-18.09	-20.46