

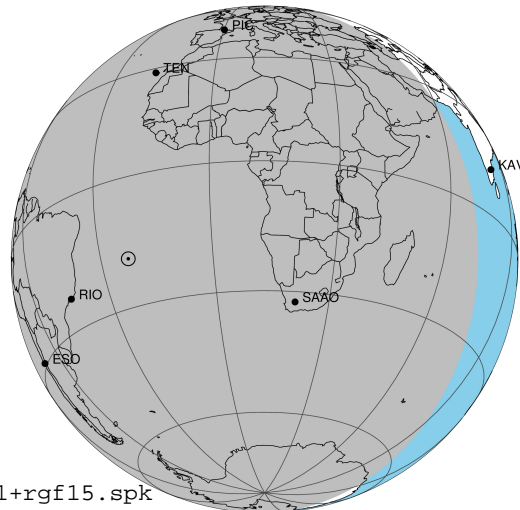
target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2031-05-16T01:24:31.210
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 4068932964108593408
 2Mass ID (if available) : 17473141-2253247

Jupiter 2031-05-16T01:24:31 K9.39 G14.91 Pgt

ICRS Star Coord at Epoch: 17h 47m 31.40551s -22:53:25.06794s

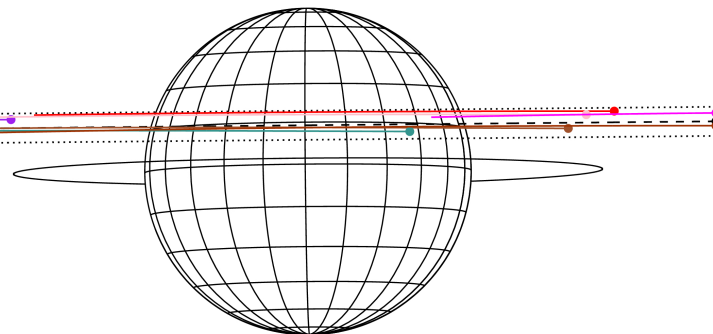
RUWE (>1.4 is poor) : 1.00
 K magnitude : 9.391
 G magnitude : 14.906
 RP magnitude : 13.501
 BP magnitude : 17.340
 DUPflag : 0
 Distance (au) : 4.411
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -11.81
 Sun-Target sep (deg) : 147.45
 Sun-Moon sep (deg) : 86.02
 B (ring opening deg) : -2.61
 PA of pole (deg) : 0.51
 Pole direction: RA (deg): 268.05694
 Dec (deg): 64.49651
 C/A sky separation (") : 6.333
 C/A sky separation (km) : 20257.2
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk

Jupiter 2031-05-16T01:24:31 K9.39 G14.91
 Pgt



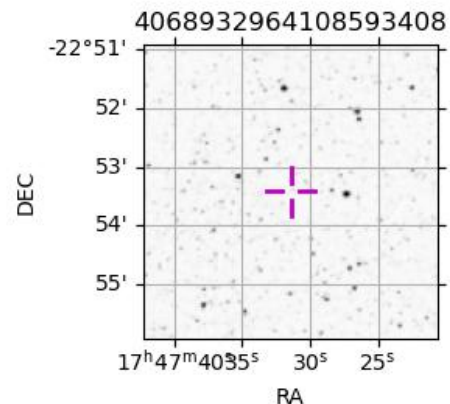
2031-05-16T01:24:31.2100 at: 17 47 31.4055 s: -22 53 25.068 C/A 6.321" PA 180.55 deg v_sky -11.81 km/s D 04.41 AU
 Credit: Styled after SORA/Lucky Star

Earth
 PIC
 PAL
 KPNO
 MCD
 TEN
 KAV
 RIO
 ESO
 SAAO



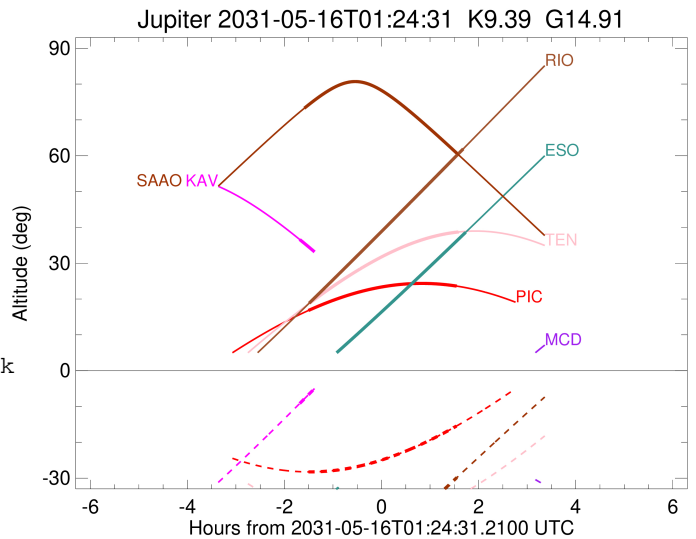
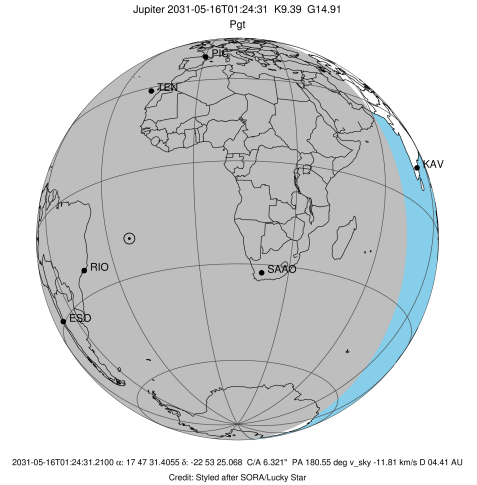
Observable events with sun below -5 deg and altitude above 5 deg

Obs	Location	lat	Elon	Target	Observed Events Interval	OCode
PIC	Pic du Midi	42.9	0.1	+ +	MAY 15 23:54 - MAY 16 02:57	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 15 23:55 - MAY 16 02:59	Pie
IRTF	Mauna Kea/IRTF	19.8	204.5			Pnn
KAV	Kavalur Observatory	12.6	78.8	+ +	MAY 15 23:43 - MAY 15 23:43	Pin
RIO	Rio de Janeiro	-22.9	316.8	+ +	MAY 15 23:55 - MAY 16 03:05	Pie
ESO	European Southern Obs. (3.6m)	-29.3	289.3	+ +	MAY 16 03:08 - MAY 16 03:08	Pne
AAT	Siding Spring (AAT)	-31.3	149.1			Pnn
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8	+ +	MAY 15 23:49 - MAY 16 02:57	Pie
MSO	Mt. Stromlo Observatory	-35.3	149.0			Pnn



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-16T01:25:52.320
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       : 4068932964108593408
2Mass ID (if available) : 17473141-2253247
ICRS Star Coord at Epoch: 17h 47m 31.40551s -22:53:25.06794s
RUWE (>1.4 is poor) : 1.00
K magnitude           : 9.391
G magnitude           : 14.906
RP magnitude         : 13.501
BP magnitude         : 17.340
DUPflag              : 0
Distance (au)        : 4.411
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -11.81
Sun-Target sep (deg) : 147.45
Sun-Moon sep (deg)   : 86.41
B (ring opening deg) : -2.61
PA of pole (deg)     : 0.51
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation ("): 8.132
C/A sky separation (km): 26014.2
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
    
```

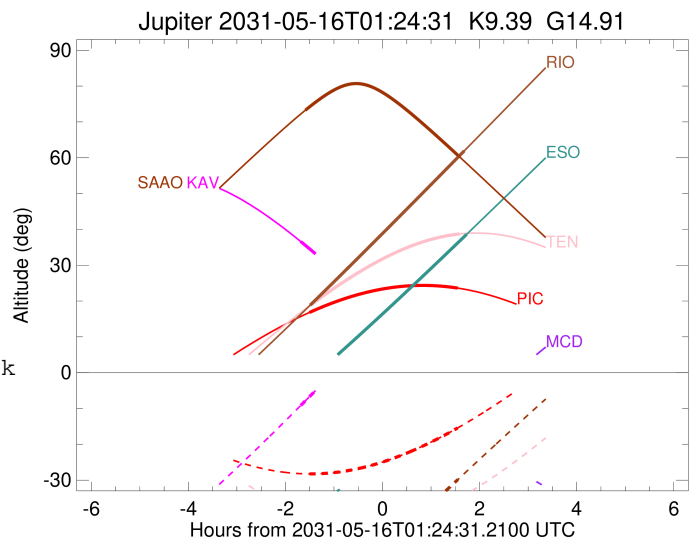
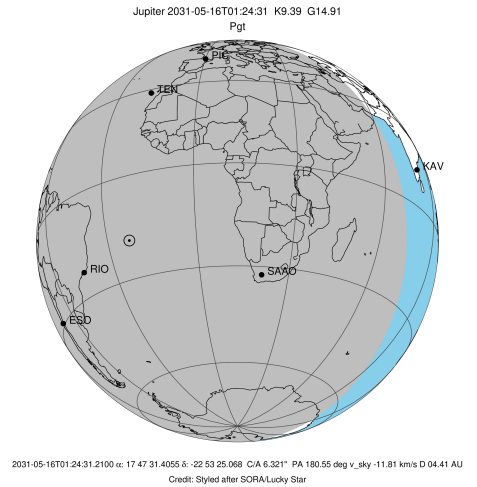


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-15T23:54:10.311	16.80	-28.25	71490.8	21.10	23.78
Jupiter	E	2031-05-16T02:57:13.778	23.61	-15.46	71490.8	21.29	23.99

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-16T01:28:05.540
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      : 4068932964108593408
2Mass ID (if available) : 17473141-2253247
ICRS Star Coord at Epoch: 17h 47m 31.40551s -22:53:25.06794s
RUWE (>1.4 is poor) : 1.00
K magnitude          : 9.391
G magnitude          : 14.906
RP magnitude         : 13.501
BP magnitude         : 17.340
DUPflag             : 0
Distance (au)       : 4.411
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -11.81
Sun-Target sep (deg) : 147.45
Sun-Moon sep (deg)  : 86.55
B (ring opening deg) : -2.61
PA of pole (deg)    : 0.51
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation ("): 7.796
C/A sky separation (km): 24937.3
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
    
```

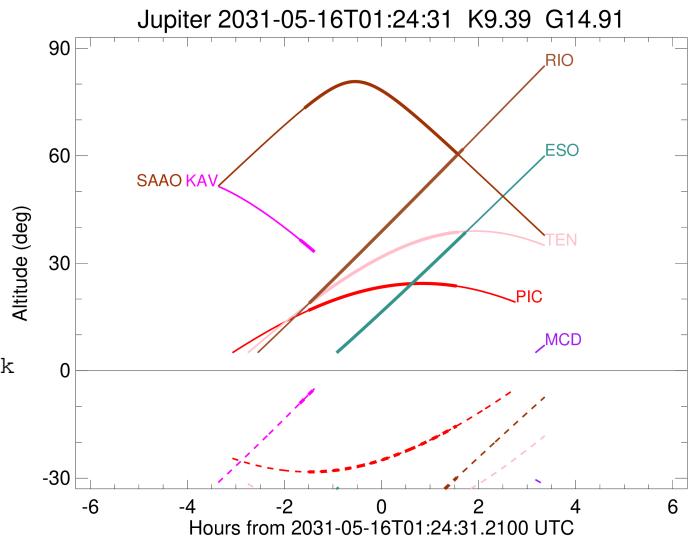
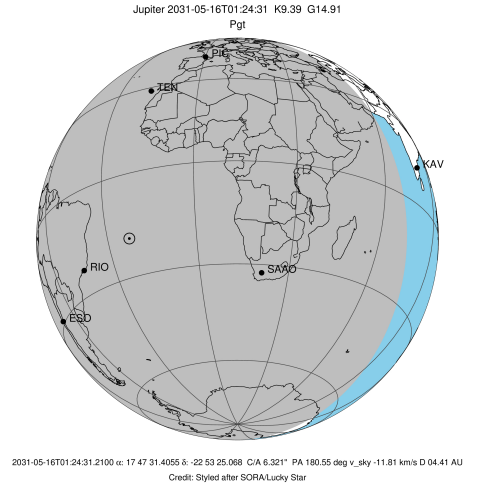


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-15T23:55:50.870	18.88	-40.20	71490.9	19.95	22.52
Jupiter	E	2031-05-16T02:59:37.989	38.71	-34.97	71490.9	20.57	23.20

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-16T01:17:02.530
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       : 4068932964108593408
2Mass ID (if available) : 17473141-2253247
ICRS Star Coord at Epoch: 17h 47m 31.40551s -22:53:25.06794s
RUWE (>1.4 is poor) : 1.00
K magnitude          : 9.391
G magnitude          : 14.906
RP magnitude         : 13.501
BP magnitude         : 17.340
DUPflag             : 0
Distance (au)        : 4.411
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -11.81
Sun-Target sep (deg) : 147.45
Sun-Moon sep (deg)   : 86.23
B (ring opening deg) : -2.61
PA of pole (deg)     : 0.51
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 7.070
C/A sky separation (km) : 22615.8
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
    
```

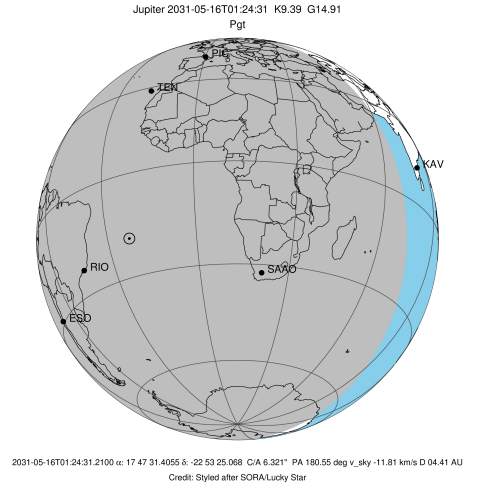


x: target alt < 5.0 deg or sun > -5.0 deg

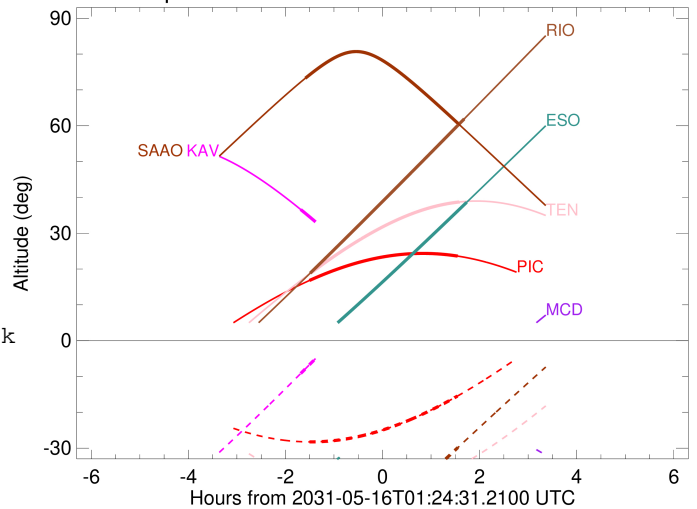
Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-15T23:43:23.263	36.61	-9.17	71491.0	19.12	21.60
Jupiter	E	2031-05-16T02:51:50.231	-3.10x	34.69x	71491.2	17.56	19.88

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-16T01:30:56.170
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        : 4068932964108593408
2Mass ID (if available) : 17473141-2253247
ICRS Star Coord at Epoch: 17h 47m 31.40551s -22:53:25.06794s
RUWE (>1.4 is poor) : 1.00
K magnitude           : 9.391
G magnitude           : 14.906
RP magnitude          : 13.501
BP magnitude          : 17.340
DUPflag              : 0
Distance (au)         : 4.410
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -11.81
Sun-Target sep (deg)  : 147.45
Sun-Moon sep (deg)    : 86.66
B (ring opening deg) : -2.61
PA of pole (deg)     : 0.51
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 6.031
C/A sky separation (km) : 19292.7
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
    
```



Jupiter 2031-05-16T01:24:31 K9.39 G14.91

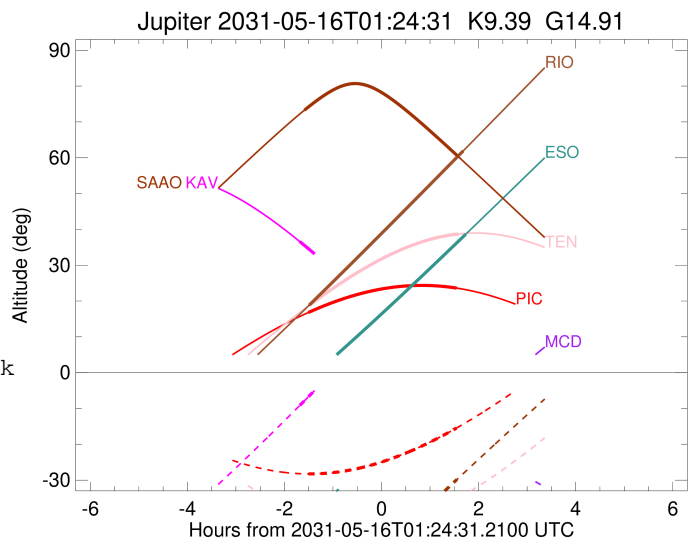
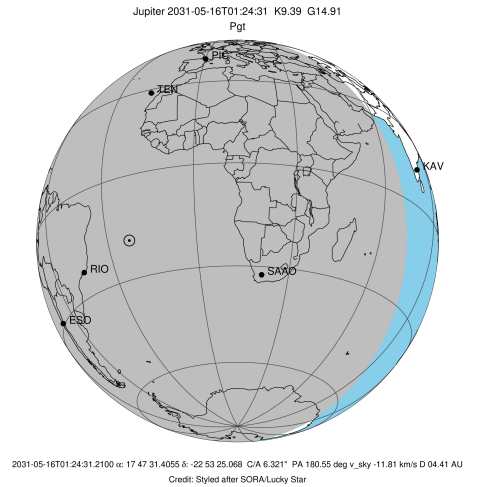


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-15T23:55:04.932	18.83	-49.28	71491.4	14.95	16.97
Jupiter	E	2031-05-16T03:05:32.100	61.90	-84.68	71491.3	16.13	18.29

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-16T01:31:56.580
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        : 4068932964108593408
2Mass ID (if available) : 17473141-2253247
ICRS Star Coord at Epoch: 17h 47m 31.40551s -22:53:25.06794s
RUWE (>1.4 is poor) : 1.00
K magnitude           : 9.391
G magnitude           : 14.906
RP magnitude          : 13.501
BP magnitude          : 17.340
DUPflag              : 0
Distance (au)         : 4.410
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -11.81
Sun-Target sep (deg)  : 147.45
Sun-Moon sep (deg)   : 86.35
B (ring opening deg) : -2.61
PA of pole (deg)     : 0.51
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 5.530
C/A sky separation (km) : 17687.8
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
    
```

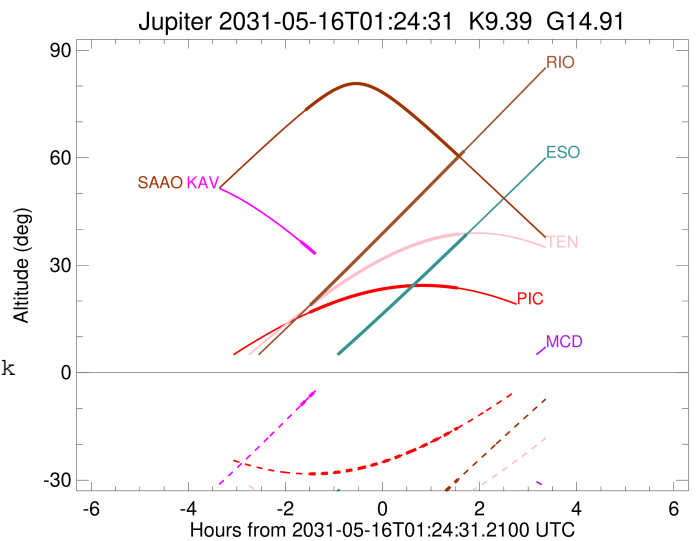
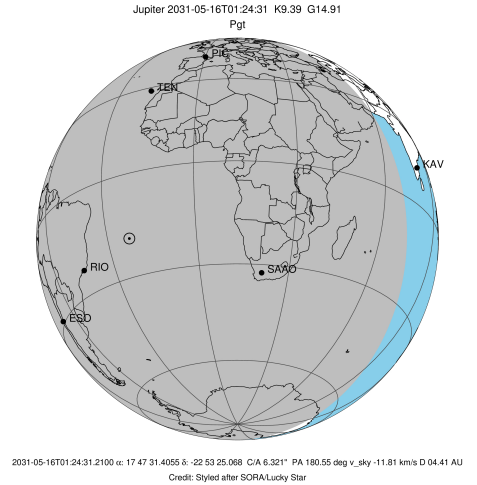


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-15T23:53:54.344	-1.95x	-25.00	71491.5	13.59	15.45
Jupiter	E	2031-05-16T03:08:28.100	38.60	-67.01	71491.4	14.97	16.99

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-16T01:23:30.330
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       : 4068932964108593408
2Mass ID (if available) : 17473141-2253247
ICRS Star Coord at Epoch: 17h 47m 31.40551s -22:53:25.06794s
RUWE (>1.4 is poor) : 1.00
K magnitude          : 9.391
G magnitude          : 14.906
RP magnitude         : 13.501
BP magnitude         : 17.340
DUPflag             : 0
Distance (au)        : 4.411
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -11.81
Sun-Target sep (deg) : 147.45
Sun-Moon sep (deg)   : 86.95
B (ring opening deg) : -2.61
PA of pole (deg)     : 0.51
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation ("): 6.006
C/A sky separation (km): 19211.1
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	2031-05-15T23:49:17.782	73.28	-68.40	71491.3	15.55	17.65
Jupiter	E	2031-05-16T02:57:44.478	60.66	-29.82	71491.3	15.30	17.36