

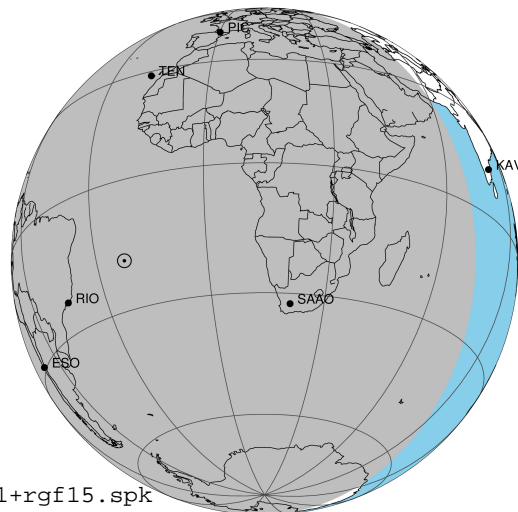
target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2031-05-15T01:23:26.940
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 4068887265641452672
 2Mass ID (if available) : 17475420-2253239

Jupiter 2031-05-15T01:23:26 K9.49 G14.11 Pgt

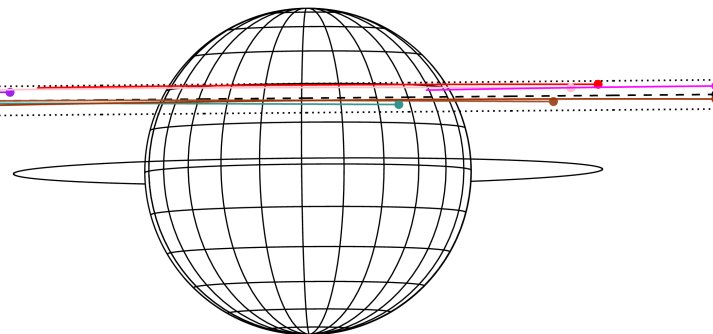
ICRS Star Coord at Epoch: 17h 47m 54.19695s -22:53:24.29757s

RUWE (>1.4 is poor) : 0.84
 K magnitude : 9.495
 G magnitude : 14.108
 RP magnitude : 12.929
 BP magnitude : 15.615
 DUPflag : 0
 Distance (au) : 4.420
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -11.51
 Sun-Target sep (deg) : 146.40
 Sun-Moon sep (deg) : 72.55
 B (ring opening deg) : -2.61
 PA of pole (deg) : 0.47
 Pole direction: RA (deg): 268.05695
 Dec (deg): 64.49651
 C/A sky separation (") : 10.028
 C/A sky separation (km) : 32144.9
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk

Jupiter 2031-05-15T01:23:26 K9.49 G14.11
 Pgt



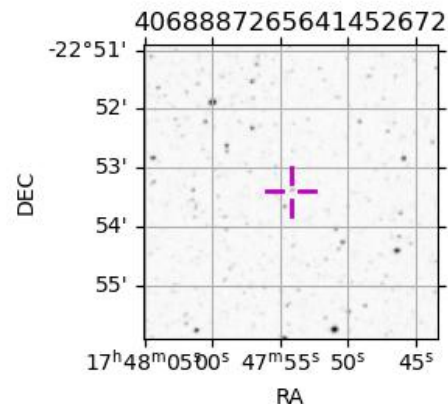
Earth
 PIC
 PAL
 KPNO
 MCD
 TEN
 KAV
 RIO
 ESO
 SAAO



2031-05-15T01:23:26.9400 a: 17 47 54.1970 d: -22 53 24.298 C/A ***** PA 180.52 deg v_sky -11.51 km/s D 04.42 AU
 Credit: Styled after SORA/Lucky Star

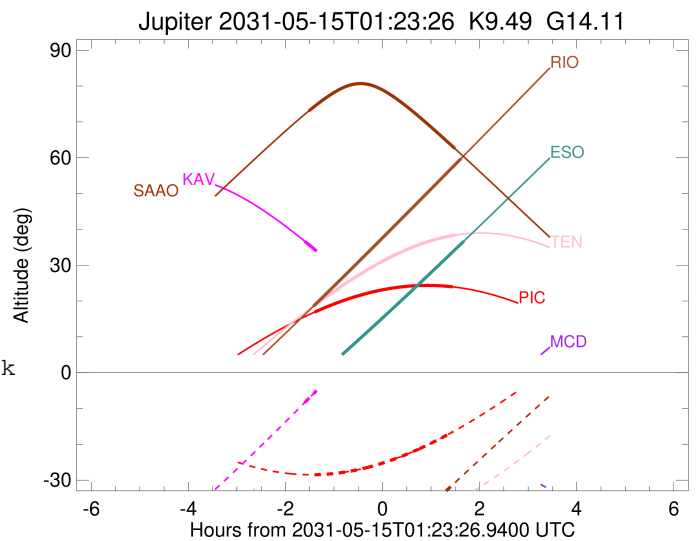
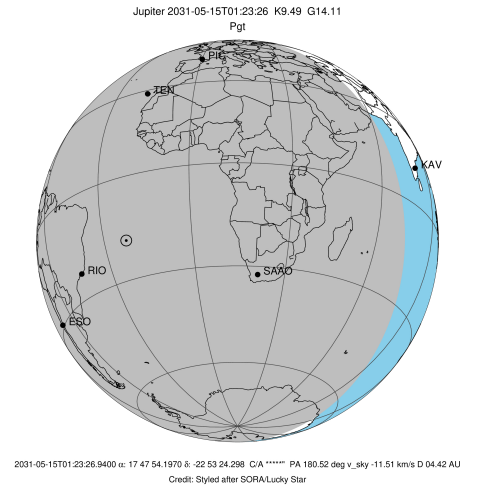
Observable events with sun below -5 deg and altitude above 5 deg

Obs	Location	lat	Elon	Target	Observed Events Interval	OCode
PIC	Pic du Midi	42.9	0.1	+ +	MAY 14 23:59 - MAY 15 02:50	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 00:00 - MAY 15 02:53	Pie
IRTF	Mauna Kea/IRTF	19.8	204.5			Pnn
KAV	Kavalur Observatory	12.6	78.8	+	MAY 14 23:47 - MAY 14 23:47	Pin
RIO	Rio de Janeiro	-22.9	316.8	+ +	MAY 14 23:57 - MAY 15 03:00	Pie
ESO	European Southern Obs. (3.6m)	-29.3	289.3	+	MAY 15 03:03 - MAY 15 03:03	Pne
AAT	Siding Spring (AAT)	-31.3	149.1			Pnn
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8	+ +	MAY 14 23:52 - MAY 15 02:52	Pie
MSO	Mt. Stromlo Observatory	-35.3	149.0			Pnn



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target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-15T01:24:55.440
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        : 4068887265641452672
2Mass ID (if available) : 17475420-2253239
ICRS Star Coord at Epoch: 17h 47m 54.19695s -22:53:24.29757s
RUWE (>1.4 is poor) : 0.84
K magnitude           : 9.495
G magnitude           : 14.108
RP magnitude          : 12.929
BP magnitude          : 15.615
DUPflag               : 0
Distance (au)         : 4.420
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -11.51
Sun-Target sep (deg) : 146.40
Sun-Moon sep (deg)   : 72.95
B (ring opening deg) : -2.61
PA of pole (deg)     : 0.47
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation (") : 11.822
C/A sky separation (km) : 37892.5
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
    
```

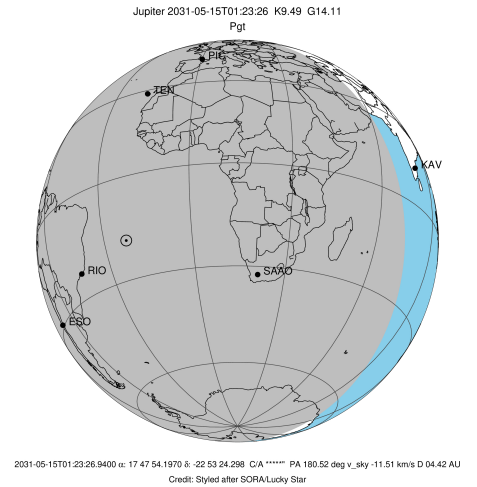


x: target alt < 5.0 deg or sun > -5.0 deg

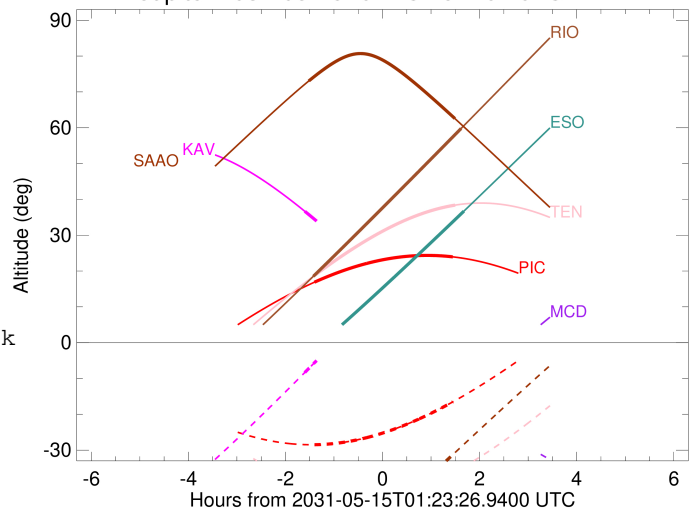
Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-14T23:59:18.501	16.88	-28.48	71489.4	31.75	35.22
Jupiter	E	2031-05-15T02:50:12.788	23.95	-16.54	71489.4	31.96	35.43

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-15T01:27:08.480
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        : 4068887265641452672
2Mass ID (if available) : 17475420-2253239
ICRS Star Coord at Epoch: 17h 47m 54.19695s -22:53:24.29757s
RUWE (>1.4 is poor) : 0.84
K magnitude           : 9.495
G magnitude           : 14.108
RP magnitude          : 12.929
BP magnitude          : 15.615
DUPflag              : 0
Distance (au)         : 4.420
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -11.51
Sun-Target sep (deg) : 146.40
Sun-Moon sep (deg)   : 73.14
B (ring opening deg) : -2.61
PA of pole (deg)     : 0.47
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation (") : 11.481
C/A sky separation (km) : 36801.8
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
    
```



Jupiter 2031-05-15T01:23:26 K9.49 G14.11

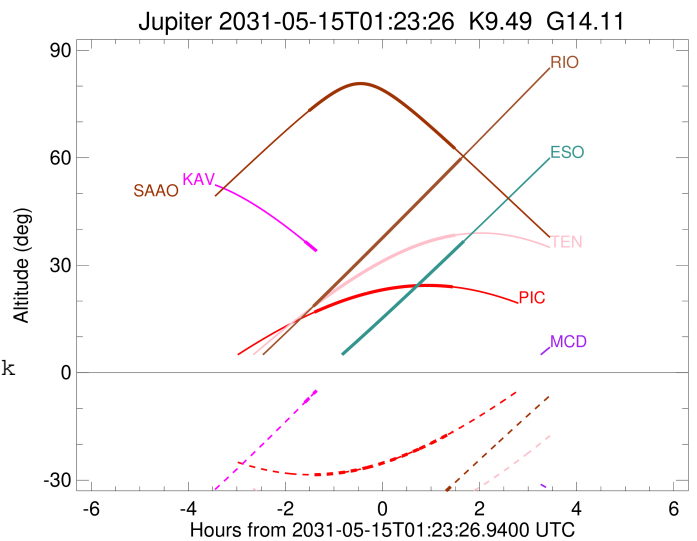
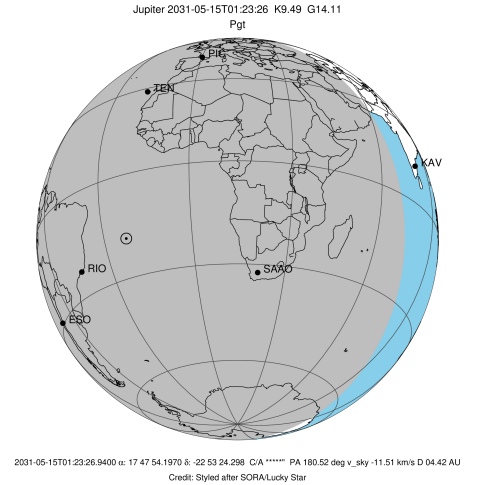


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-15T00:00:35.453	18.95	-40.78	71489.6	30.49	33.89
Jupiter	E	2031-05-15T02:53:02.212	38.38	-35.98	71489.5	31.15	34.58

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-15T01:16:06.280
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       : 4068887265641452672
2Mass ID (if available) : 17475420-2253239
ICRS Star Coord at Epoch: 17h 47m 54.19695s -22:53:24.29757s
RUWE (>1.4 is poor) : 0.84
K magnitude           : 9.495
G magnitude           : 14.108
RP magnitude         : 12.929
BP magnitude         : 15.615
DUPflag              : 0
Distance (au)        : 4.420
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -11.51
Sun-Target sep (deg) : 146.40
Sun-Moon sep (deg)   : 72.56
B (ring opening deg) : -2.61
PA of pole (deg)     : 0.47
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation (") : 10.779
C/A sky separation (km) : 34550.9
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
    
```

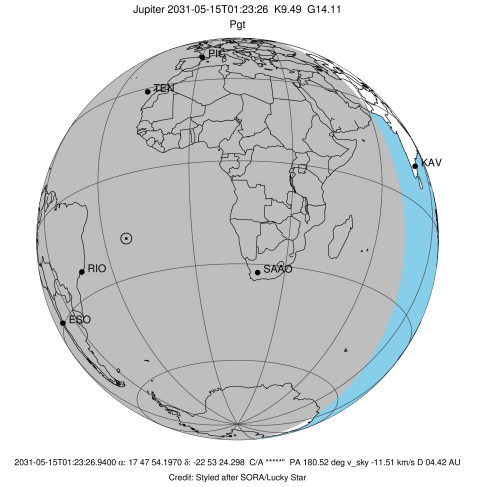


x: target alt < 5.0 deg or sun > -5.0 deg

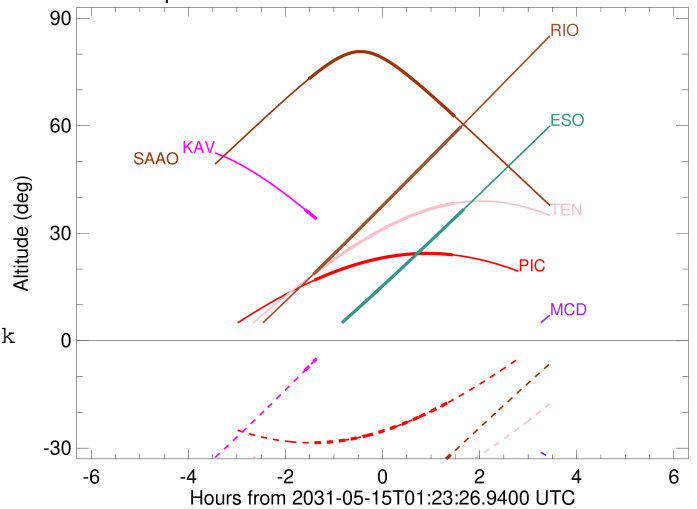
Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-14T23:47:30.243	36.65	-8.30	71489.7	29.58	32.93
Jupiter	E	2031-05-15T02:45:43.534	-0.75x	33.24x	71490.0	27.99	31.23

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-15T01:29:55.710
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       : 4068887265641452672
2Mass ID (if available) : 17475420-2253239
ICRS Star Coord at Epoch: 17h 47m 54.19695s -22:53:24.29757s
RUWE (>1.4 is poor) : 0.84
K magnitude           : 9.495
G magnitude           : 14.108
RP magnitude          : 12.929
BP magnitude          : 15.615
DUPflag              : 0
Distance (au)        : 4.420
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -11.51
Sun-Target sep (deg) : 146.40
Sun-Moon sep (deg)   : 73.33
B (ring opening deg) : -2.61
PA of pole (deg)     : 0.47
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation (") : 9.715
C/A sky separation (km) : 31139.9
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
    
```



Jupiter 2031-05-15T01:23:26 K9.49 G14.11

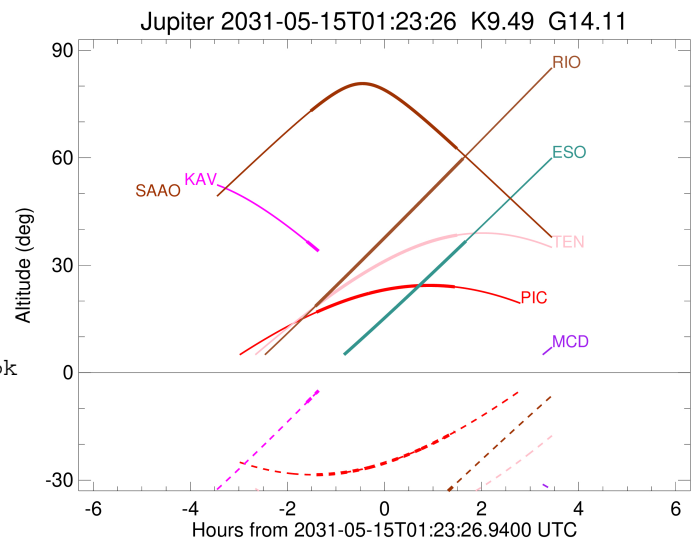
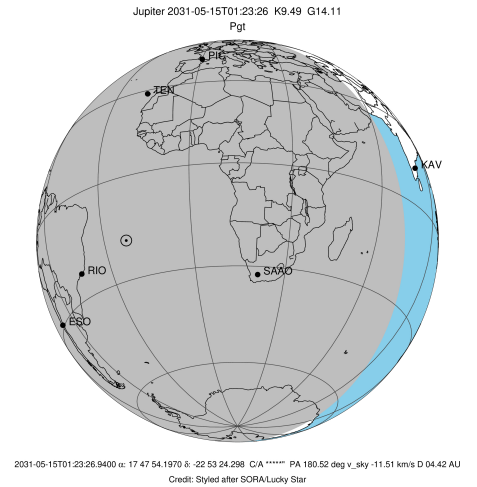


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-14T23:57:58.933	18.52	-49.90	71490.3	25.09	28.13
Jupiter	E	2031-05-15T03:00:40.755	59.80	-85.23	71490.2	26.31	29.43

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-15T01:30:50.860
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       : 4068887265641452672
2Mass ID (if available) : 17475420-2253239
ICRS Star Coord at Epoch: 17h 47m 54.19695s -22:53:24.29757s
RUWE (>1.4 is poor) : 0.84
K magnitude          : 9.495
G magnitude          : 14.108
RP magnitude         : 12.929
BP magnitude         : 15.615
DUPflag             : 0
Distance (au)        : 4.420
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -11.51
Sun-Target sep (deg) : 146.40
Sun-Moon sep (deg)   : 73.05
B (ring opening deg) : -2.61
PA of pole (deg)     : 0.47
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation ("): 9.212
C/A sky separation (km): 29528.8
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
    
```

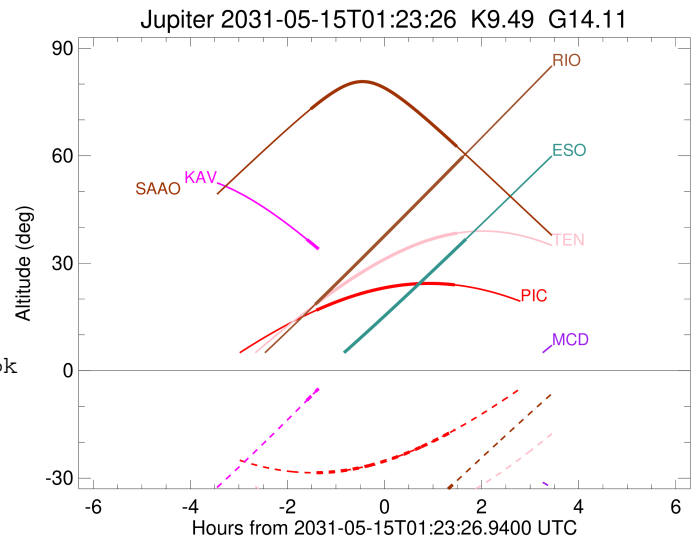
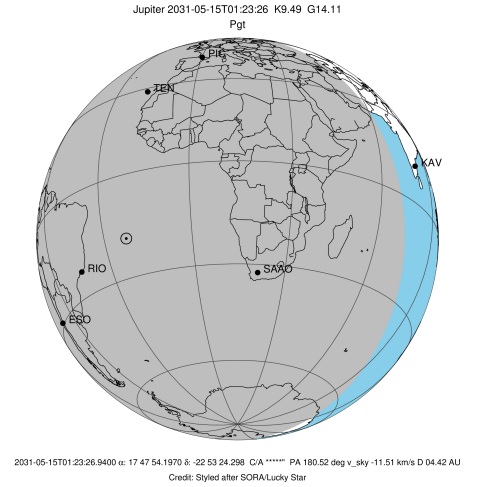


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-14T23:56:16.213	-2.33x	-25.42	71490.5	23.64	26.56
Jupiter	E	2031-05-15T03:03:59.142	36.69	-65.98	71490.3	25.05	28.08

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-15T01:22:36.080
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      : 4068887265641452672
2Mass ID (if available) : 17475420-2253239
ICRS Star Coord at Epoch: 17h 47m 54.19695s -22:53:24.29757s
RUWE (>1.4 is poor) : 0.84
K magnitude          : 9.495
G magnitude          : 14.108
RP magnitude         : 12.929
BP magnitude         : 15.615
DUPflag             : 0
Distance (au)       : 4.420
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -11.51
Sun-Target sep (deg) : 146.40
Sun-Moon sep (deg)  : 73.43
B (ring opening deg) : -2.61
PA of pole (deg)    : 0.47
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation (" ) : 9.704
C/A sky separation (km) : 31103.6
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	2031-05-14T23:52:17.875	73.04	-67.71	71490.2	25.74	28.83
Jupiter	E	2031-05-15T02:52:54.059	62.56	-30.73	71490.3	25.49	28.56