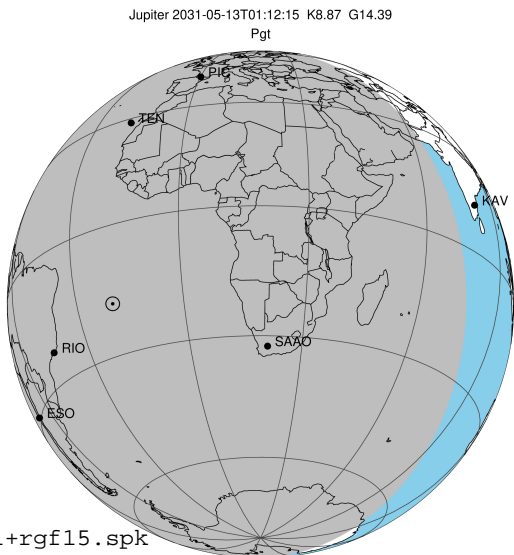


target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2031-05-13T01:12:15.540
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 4068889464667206400
 2Mass ID (if available) : 17483798-2253282

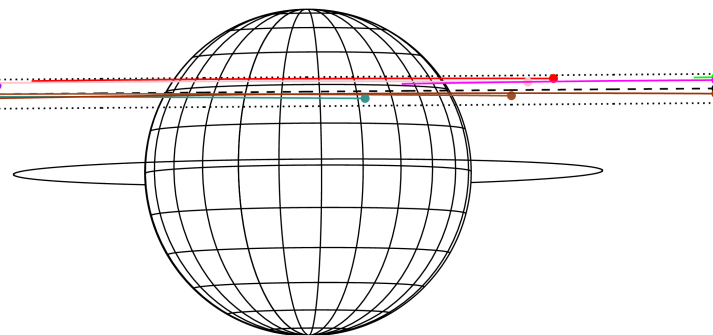
Jupiter 2031-05-13T01:12:15 K8.87 G14.39 Pgt

ICRS Star Coord at Epoch: 17h 48m 37.98726s -22:53:28.42951s
 RUWE (>1.4 is poor) : 0.94
 K magnitude : 8.867
 G magnitude : 14.389
 RP magnitude : 13.030
 BP magnitude : 16.654
 DUPflag : 0
 Distance (au) : 4.438
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -10.89
 Sun-Target sep (deg) : 144.29
 Sun-Moon sep (deg) : 44.70
 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 (") : 10.999
 C/A sky separation (km) : 35405.5
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLv1.spk
 naif0012.tls
 nep097.bsp
 nep101.bsp
 sat4401.bsp



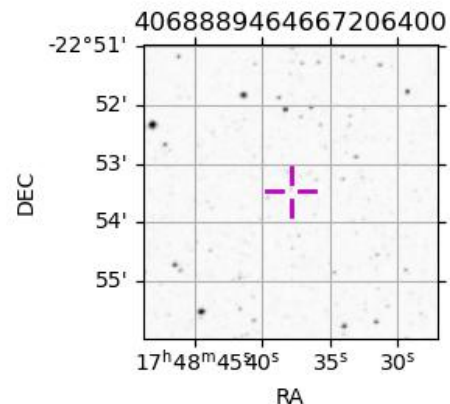
2031-05-13T01:12:15.5400 a: 17 48 37.9873 s: -22 53 28.430 C/A ***** PA 180.45 deg v_sky -10.89 km/s D 04.44 AU
 Credit: Styled after SORA/Lucky Star

Earth
 PIC
 PAL
 PMO
 KPNO
 MCD
 TEN
 KAV
 RIO
 ESO
 SAAO



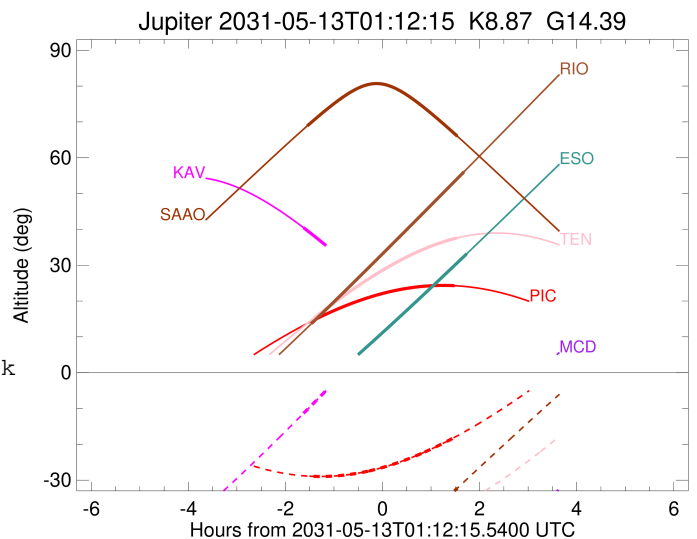
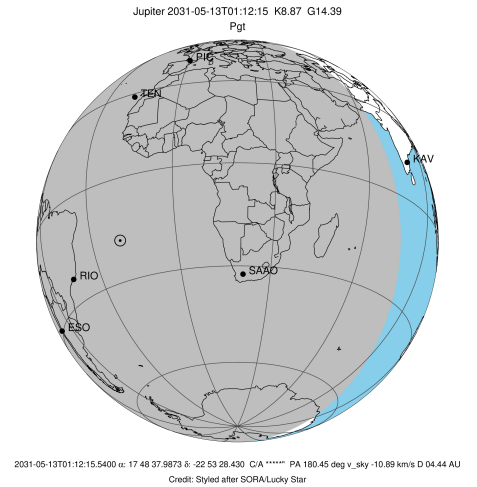
Observable events with sun below -5 deg and altitude above 5 deg

Obs	Location	lat	Elon	Target	Observed Events Interval	OCode
PIC	Pic du Midi	42.9	0.1	+ +	MAY 12 23:46 - MAY 13 02:41	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 12 23:48 - MAY 13 02:44	Pie
IRTF	Mauna Kea/IRTF	19.8	204.5			Pnn
KAV	Kavalur Observatory	12.6	78.8	+	MAY 12 23:34 - MAY 12 23:34	Pin
RIO	Rio de Janeiro	-22.9	316.8	+ +	MAY 12 23:44 - MAY 13 02:53	Pie
ESO	European Southern Obs. (3.6m)	-29.3	289.3	+	MAY 13 02:56 - MAY 13 02:56	Pne
AAT	Siding Spring (AAT)	-31.3	149.1			Pnn
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8	+ +	MAY 12 23:39 - MAY 13 02:44	Pie
MSO	Mt. Stromlo Observatory	-35.3	149.0			Pnn



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-13T01:14:18.320
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        : 4068889464667206400
2Mass ID (if available) : 17483798-2253282
ICRS Star Coord at Epoch: 17h 48m 37.98726s -22:53:28.42951s
RUWE (>1.4 is poor) : 0.94
K magnitude           : 8.867
G magnitude           : 14.389
RP magnitude          : 13.030
BP magnitude          : 16.654
DUPflag              : 0
Distance (au)         : 4.438
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -10.89
Sun-Target sep (deg)  : 144.29
Sun-Moon sep (deg)   : 45.07
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 (") : 12.771
C/A sky separation (km) : 41111.0
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
    
```

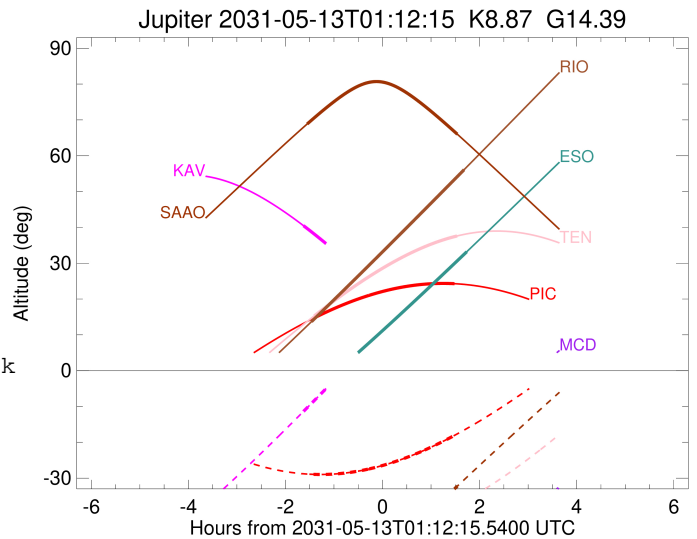
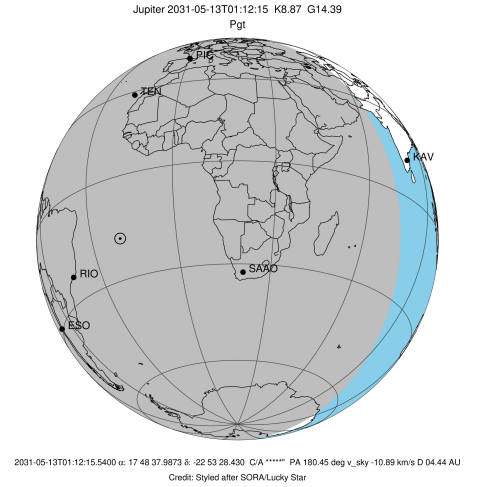


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-12T23:46:59.169	14.63	-28.94	71489.0	34.79	38.38
Jupiter	E	2031-05-13T02:41:10.880	24.28	-18.07	71488.9	35.09	38.69

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-13T01:16:38.840
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      : 4068889464667206400
2Mass ID (if available) : 17483798-2253282
ICRS Star Coord at Epoch: 17h 48m 37.98726s -22:53:28.42951s
RUWE (>1.4 is poor) : 0.94
K magnitude          : 8.867
G magnitude          : 14.389
RP magnitude         : 13.030
BP magnitude         : 16.654
DUPflag             : 0
Distance (au)       : 4.438
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -10.89
Sun-Target sep (deg) : 144.29
Sun-Moon sep (deg)  : 45.35
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 (" ) : 12.416
C/A sky separation (km) : 39967.5
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
    
```

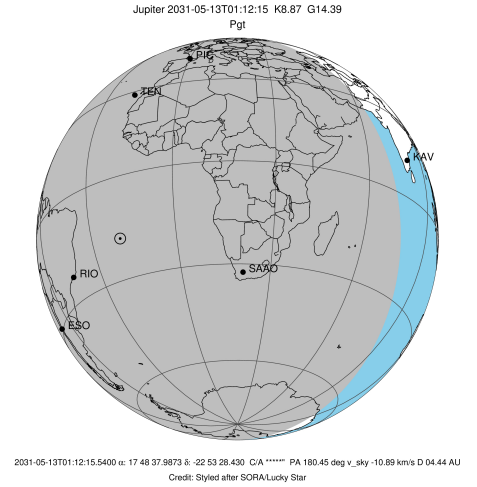


x: target alt < 5.0 deg or sun > -5.0 deg

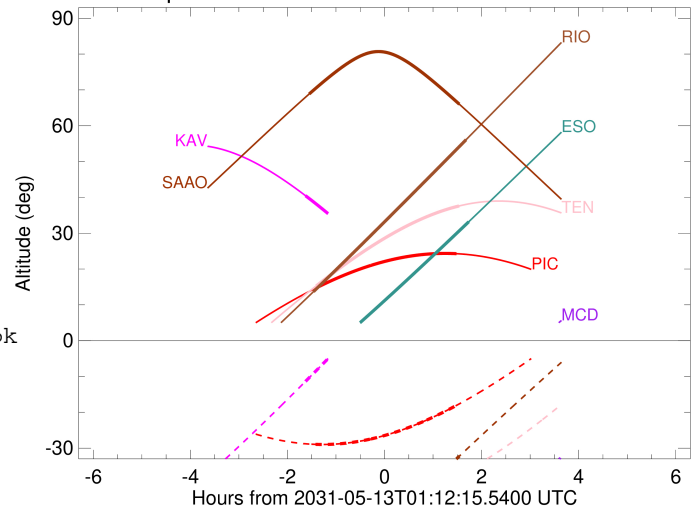
Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-12T23:48:04.769	15.32	-40.23	71489.2	33.43	36.97
Jupiter	E	2031-05-13T02:44:24.114	37.60	-37.41	71489.1	34.21	37.78

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-13T01:04:58.150
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      : 4068889464667206400
2Mass ID (if available) : 17483798-2253282
ICRS Star Coord at Epoch: 17h 48m 37.98726s -22:53:28.42951s
RUWE (>1.4 is poor) : 0.94
K magnitude          : 8.867
G magnitude          : 14.389
RP magnitude         : 13.030
BP magnitude         : 16.654
DUPflag             : 0
Distance (au)       : 4.438
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -10.89
Sun-Target sep (deg) : 144.29
Sun-Moon sep (deg)  : 44.34
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 (" ) : 11.800
C/A sky separation (km) : 37986.4
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
    
```



Jupiter 2031-05-13T01:12:15 K8.87 G14.39

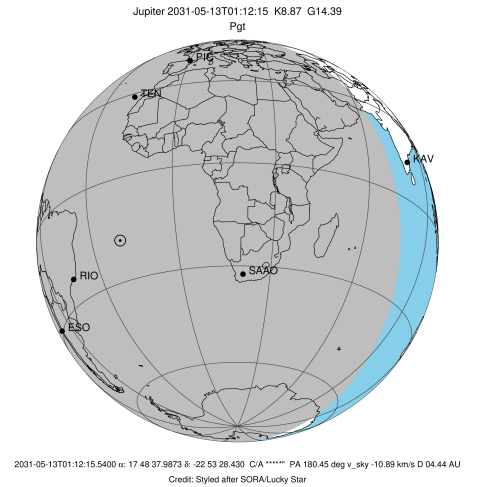


x: target alt < 5.0 deg or sun > -5.0 deg

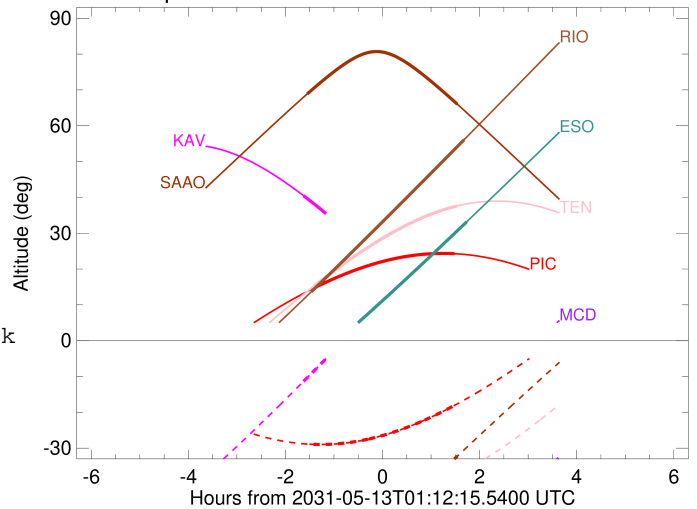
Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-12T23:34:39.795	40.46	-11.36	71489.3	32.77	36.28
Jupiter	E	2031-05-13T02:36:18.987	3.28x	30.98x	71489.5	31.14	34.58

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-13T01:19:22.960
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       : 4068889464667206400
2Mass ID (if available) : 17483798-2253282
ICRS Star Coord at Epoch: 17h 48m 37.98726s -22:53:28.42951s
RUWE (>1.4 is poor) : 0.94
K magnitude           : 8.867
G magnitude           : 14.389
RP magnitude          : 13.030
BP magnitude          : 16.654
DUPflag              : 0
Distance (au)        : 4.438
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -10.89
Sun-Target sep (deg) : 144.29
Sun-Moon sep (deg)   : 45.66
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 (") : 10.638
C/A sky separation (km) : 34243.3
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
    
```



Jupiter 2031-05-13T01:12:15 K8.87 G14.39

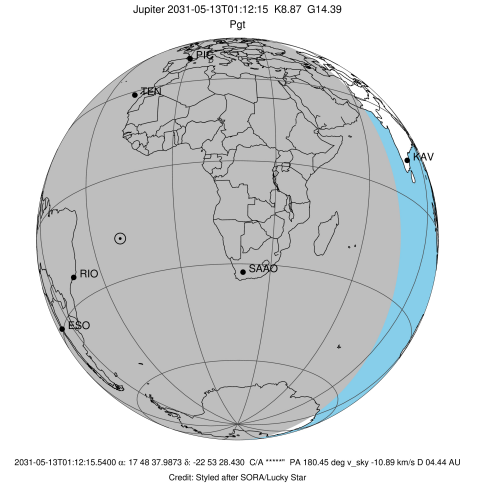


x: target alt < 5.0 deg or sun > -5.0 deg

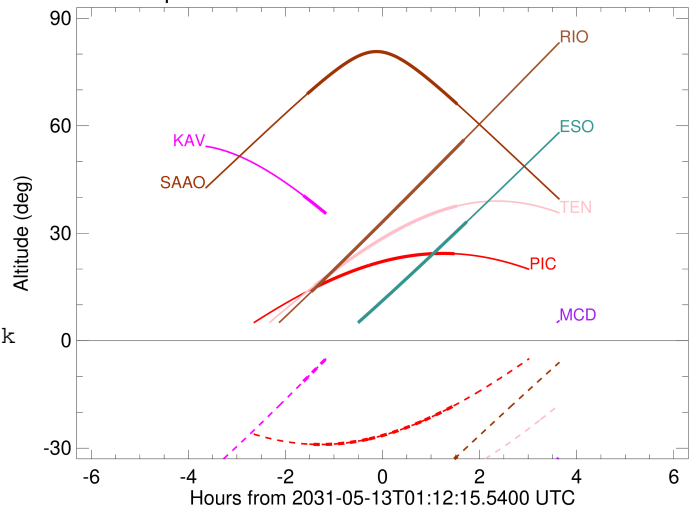
Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-12T23:44:21.073	13.65	-46.64	71490.0	27.83	31.07
Jupiter	E	2031-05-13T02:52:59.827	56.06	-85.47	71489.8	29.16	32.48

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-13T01:20:02.030
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     : 4068889464667206400
2Mass ID (if available) : 17483798-2253282
ICRS Star Coord at Epoch: 17h 48m 37.98726s -22:53:28.42951s
RUWE (>1.4 is poor) : 0.94
K magnitude         : 8.867
G magnitude         : 14.389
RP magnitude        : 13.030
BP magnitude        : 16.654
DUPflag            : 0
Distance (au)      : 4.438
f0 (km)            : 0.00
g0 (km)            : 0.00
skyplane vel. (km/s) : -10.89
Sun-Target sep (deg) : 144.29
Sun-Moon sep (deg)  : 45.47
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 (" ) : 10.131
C/A sky separation (km) : 32612.8
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 2031-05-13T01:12:15 K8.87 G14.39

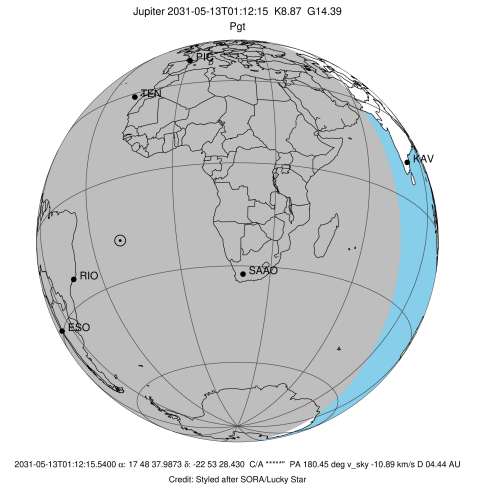


x: target alt < 5.0 deg or sun > -5.0 deg

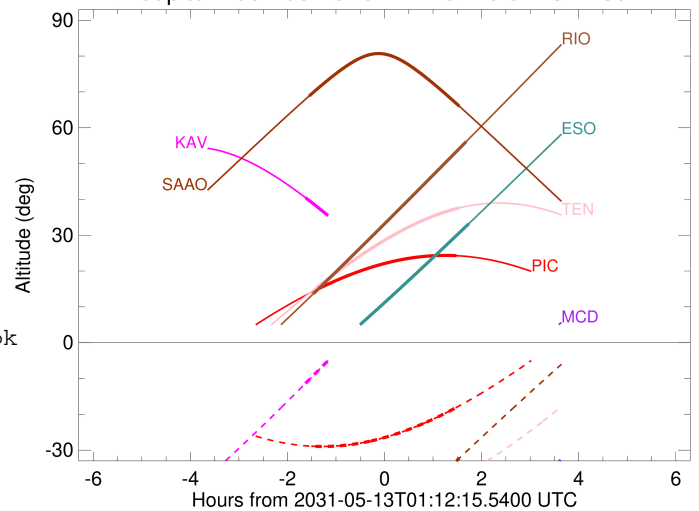
Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-12T23:41:59.630	-6.69x	-22.13	71490.2	26.36	29.49
Jupiter	E	2031-05-13T02:56:25.427	33.20	-64.18	71490.0	27.83	31.07

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-13T01:12:00.480
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        : 4068889464667206400
2Mass ID (if available) : 17483798-2253282
ICRS Star Coord at Epoch: 17h 48m 37.98726s -22:53:28.42951s
RUWE (>1.4 is poor) : 0.94
K magnitude           : 8.867
G magnitude           : 14.389
RP magnitude          : 13.030
BP magnitude          : 16.654
DUPflag              : 0
Distance (au)         : 4.438
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -10.89
Sun-Target sep (deg) : 144.29
Sun-Moon sep (deg)   : 45.39
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 (") : 10.678
C/A sky separation (km) : 34374.4
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
    
```



Jupiter 2031-05-13T01:12:15 K8.87 G14.39



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	2031-05-12T23:39:08.764	68.85	-69.64	71489.9	28.63	31.92
Jupiter	E	2031-05-13T02:44:45.033	66.00	-32.23	71489.9	28.47	31.75