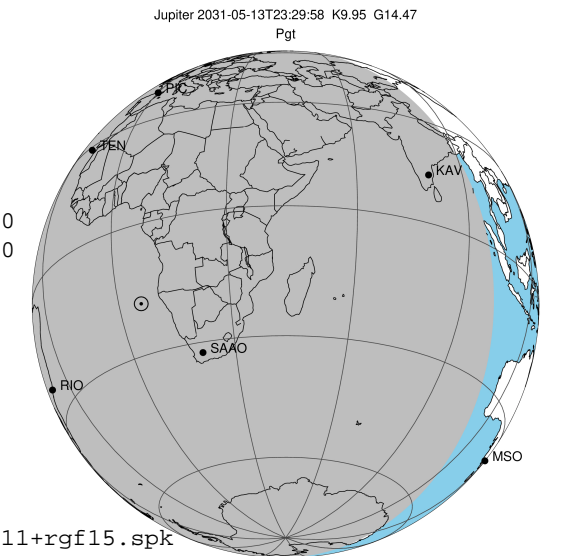


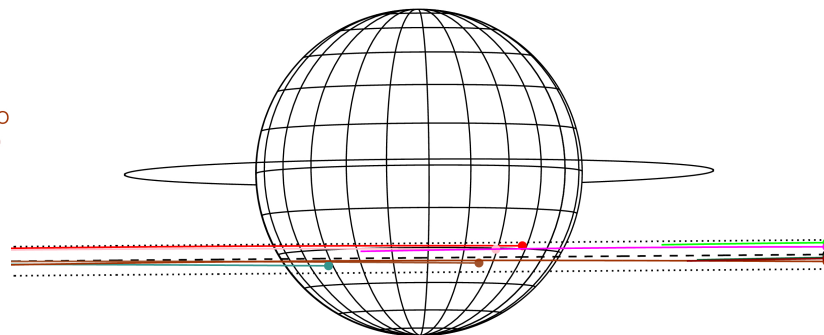
target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2031-05-13T23:29:58.240
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 4068886505373730304
 2Mass ID (if available) : 17481803-2253485

Jupiter 2031-05-13T23:29:58 K9.95 G14.47 Pgt

ICRS Star Coord at Epoch: 17h 48m 18.03833s -22:53:48.82637s
 RUWE (>1.4 is poor) : 1.82
 K magnitude : 9.945
 G magnitude : 14.466
 RP magnitude : 13.280
 BP magnitude : 15.951
 DUPflag : 0
 Distance (au) : 4.430
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -11.18
 Sun-Target sep (deg) : 145.27
 Sun-Moon sep (deg) : 57.73
 B (ring opening deg) : -2.60
 PA of pole (deg) : 0.42
 Pole direction: RA (deg): 268.05695
 Dec (deg): 64.49651
 C/A sky separation (") : 11.636
 C/A sky separation (km) : 37381.7
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.spk
 naif0012.tls
 nep097.bsp
 nep101.bsp
 sat4401.bsp



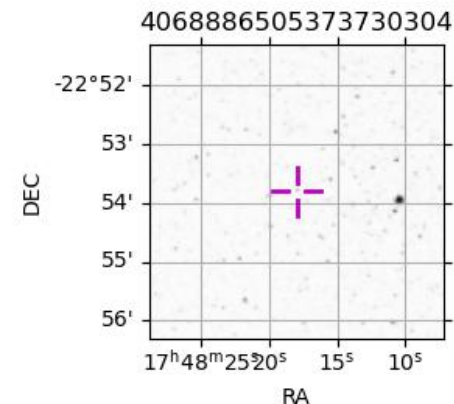
Earth
 PIC
 PMO
 TEN
 KAV
 RIO
 ESO
 AAT
 SAAO
 MSO



2031-05-13T23:29:58.2400 α: 17 48 18.0383 δ: -22 53 48.826 C/A ***** PA 0.48 deg v_sky -11.18 km/s D 04.43 AU
 Credit: Styled after SORA/Lucky Star

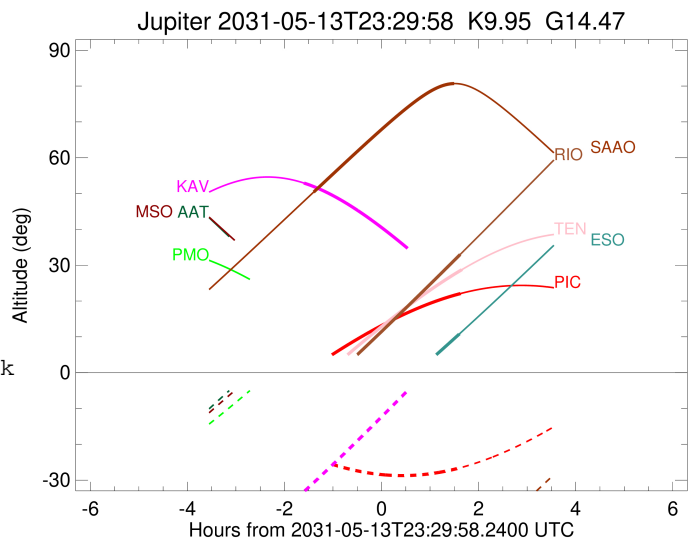
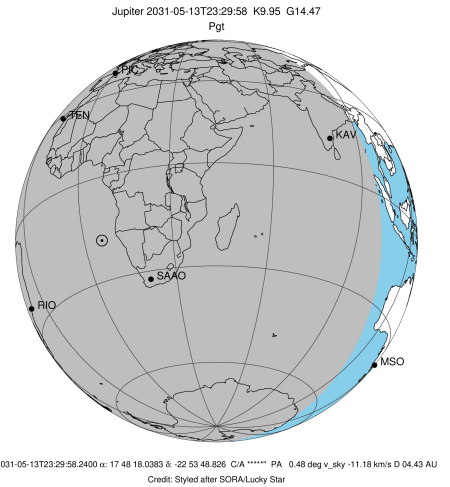
Observable events with sun below -5 deg and altitude above 5 deg

Obs	Location	lat	Elon	Target	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1	+	MAY 14 01:07 - MAY 14 01:07	Pne
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 01:09 - MAY 14 01:09	Pne
IRTF	Mauna Kea/IRTF	19.8	204.5			Pnn
KAV	Kavalur Observatory	12.6	78.8	+	MAY 13 21:54 - MAY 13 21:54	Pin
RIO	Rio de Janeiro	-22.9	316.8	+	MAY 14 01:07 - MAY 14 01:07	Pne
ESO	European Southern Obs. (3.6m)	-29.3	289.3	+	MAY 14 01:06 - MAY 14 01:06	Pne
AAT	Siding Spring (AAT)	-31.3	149.1			Pnn
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8	+	MAY 13 22:06 - MAY 14 00:59	Pie
MSO	Mt. Stromlo Observatory	-35.3	149.0			Pnn



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-13T23:35:03.810
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        : 4068886505373730304
2Mass ID (if available) : 17481803-2253485
ICRS Star Coord at Epoch: 17h 48m 18.03833s -22:53:48.82637s
RUWE (>1.4 is poor) : 1.82
K magnitude           : 9.945
G magnitude           : 14.466
RP magnitude          : 13.280
BP magnitude          : 15.951
DUPflag              : 0
Distance (au)         : 4.430
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -11.18
Sun-Target sep (deg)  : 145.27
Sun-Moon sep (deg)    : 58.14
B (ring opening deg) : -2.60
PA of pole (deg)      : 0.42
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation (") : 9.981
C/A sky separation (km) : 32064.1
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
    
```

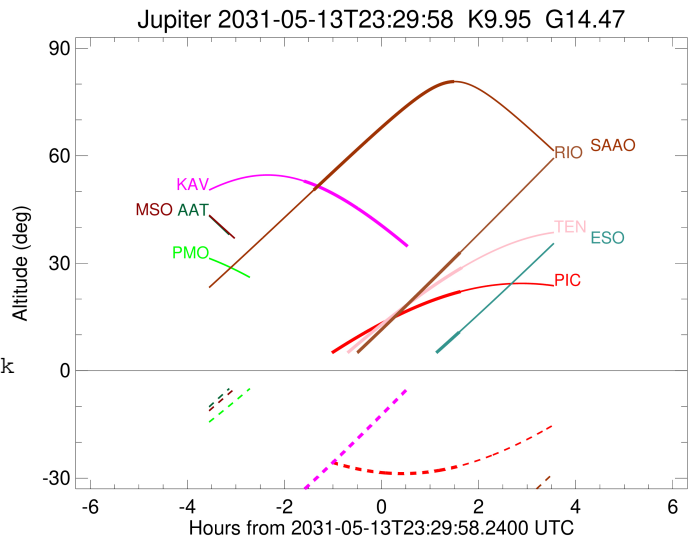
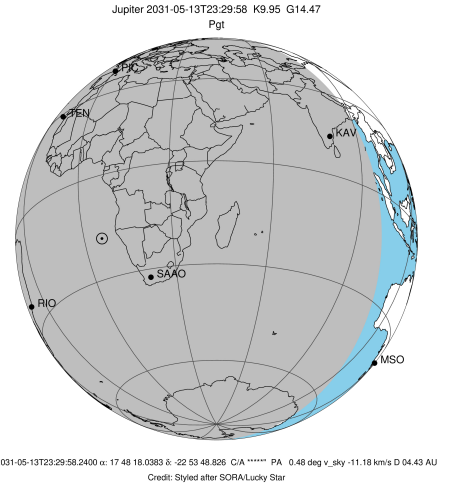


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-13T22:01:30.393	0.90x	-23.34	71490.1	-27.11	-30.29
Jupiter	E	2031-05-14T01:07:42.150	22.08	-26.52	71490.2	-26.33	-29.46

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-13T23:37:42.610
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      : 4068886505373730304
2Mass ID (if available) : 17481803-2253485
ICRS Star Coord at Epoch: 17h 48m 18.03833s -22:53:48.82637s
RUWE (>1.4 is poor) : 1.82
K magnitude          : 9.945
G magnitude          : 14.466
RP magnitude         : 13.280
BP magnitude         : 15.951
DUPflag             : 0
Distance (au)       : 4.430
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -11.18
Sun-Target sep (deg) : 145.27
Sun-Moon sep (deg)  : 58.28
B (ring opening deg) : -2.60
PA of pole (deg)    : 0.42
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation (" ) : 10.422
C/A sky separation (km) : 33481.9
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
    
```

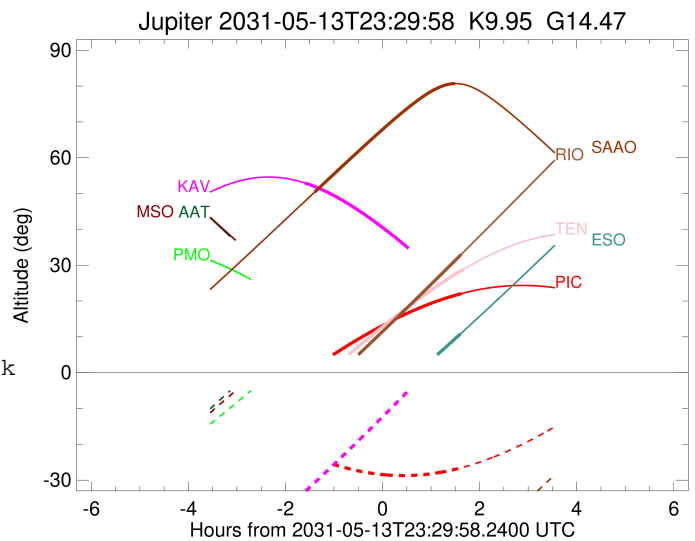
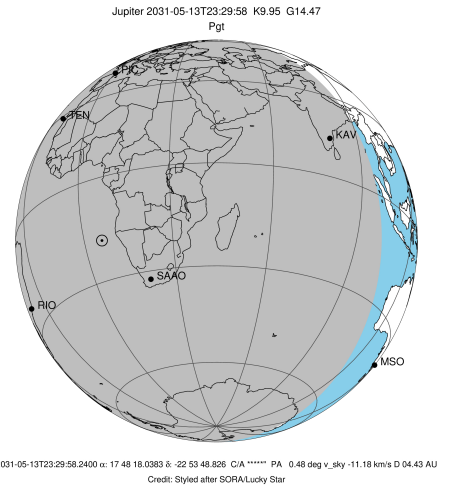


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-13T22:04:44.275	-3.55x	-26.60	71489.9	-28.60	-31.89
Jupiter	E	2031-05-14T01:09:22.907	28.76	-43.30	71490.0	-27.37	-30.57

```

target                : Jupiter
target radius (km)    : 71492.00
C/A epoch              : 2031-05-13T23:24:23.580
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        : 4068886505373730304
2Mass ID (if available) : 17481803-2253485
ICRS Star Coord at Epoch: 17h 48m 18.03833s -22:53:48.82637s
RUWE (>1.4 is poor)  : 1.82
K magnitude            : 9.945
G magnitude            : 14.466
RP magnitude           : 13.280
BP magnitude           : 15.951
DUPflag               : 0
Distance (au)         : 4.430
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s)  : -11.18
Sun-Target sep (deg)  : 145.27
Sun-Moon sep (deg)    : 57.95
B (ring opening deg)  : -2.60
PA of pole (deg)      : 0.42
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation (") : 10.609
C/A sky separation (km) : 34083.3
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
    
```

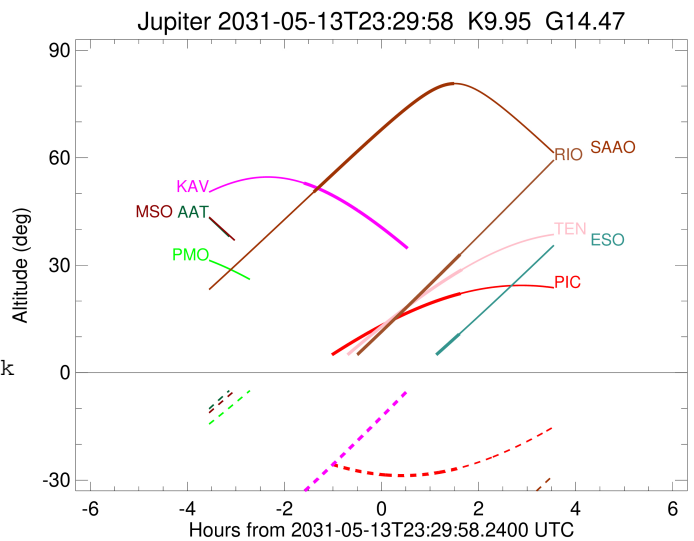
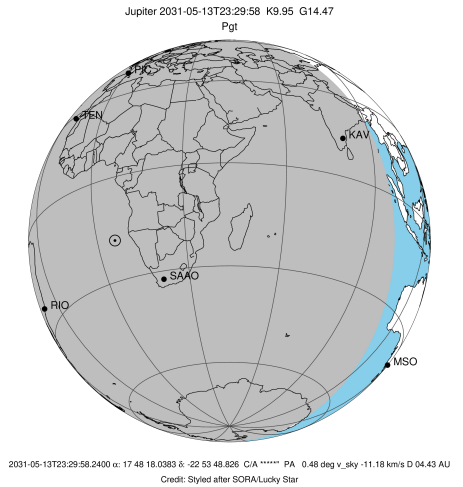


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-13T21:54:09.138	52.92	-33.20	71489.9	-28.07	-31.32
Jupiter	E	2031-05-14T00:55:16.978	24.18	7.25x	71489.8	-29.11	-32.42

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-13T23:39:32.690
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     : 4068886505373730304
2Mass ID (if available) : 17481803-2253485
ICRS Star Coord at Epoch: 17h 48m 18.03833s -22:53:48.82637s
RUWE (>1.4 is poor) : 1.82
K magnitude         : 9.945
G magnitude         : 14.466
RP magnitude        : 13.280
BP magnitude        : 15.951
DUPflag            : 0
Distance (au)      : 4.430
f0 (km)            : 0.00
g0 (km)            : 0.00
skyplane vel. (km/s) : -11.18
Sun-Target sep (deg) : 145.27
Sun-Moon sep (deg) : 58.38
B (ring opening deg) : -2.60
PA of pole (deg)   : 0.42
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation (") : 12.283
C/A sky separation (km) : 39461.5
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
    
```

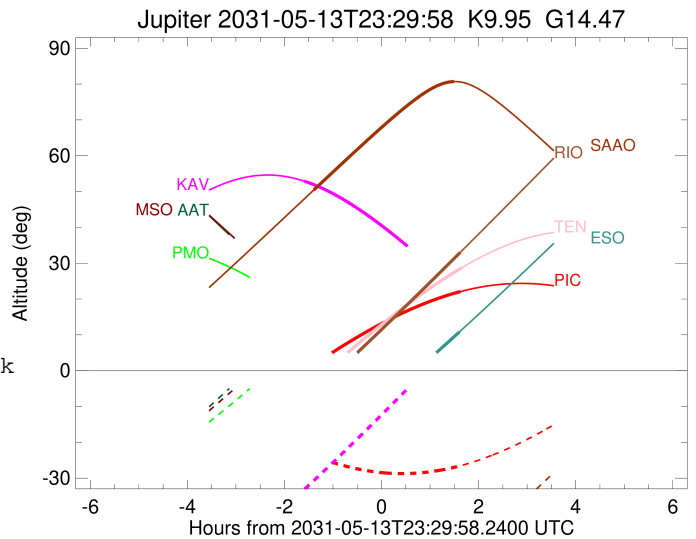
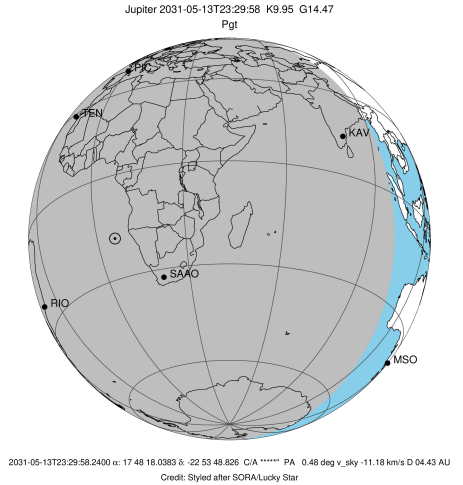


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-13T22:10:19.021	-5.39x	-25.20	71489.1	-34.26	-37.83
Jupiter	E	2031-05-14T01:07:18.386	33.01	-65.81	71489.3	-32.71	-36.22

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-13T23:38:26.540
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      : 4068886505373730304
2Mass ID (if available) : 17481803-2253485
ICRS Star Coord at Epoch: 17h 48m 18.03833s -22:53:48.82637s
RUWE (>1.4 is poor) : 1.82
K magnitude          : 9.945
G magnitude          : 14.466
RP magnitude         : 13.280
BP magnitude         : 15.951
DUPflag             : 0
Distance (au)       : 4.430
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -11.18
Sun-Target sep (deg) : 145.27
Sun-Moon sep (deg)   : 58.05
B (ring opening deg) : -2.60
PA of pole (deg)     : 0.42
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation ("): 12.788
C/A sky separation (km): 41083.8
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
    
```

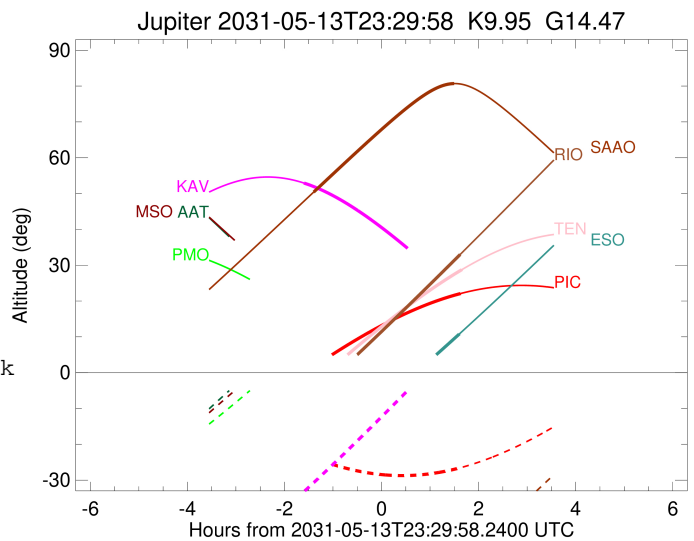
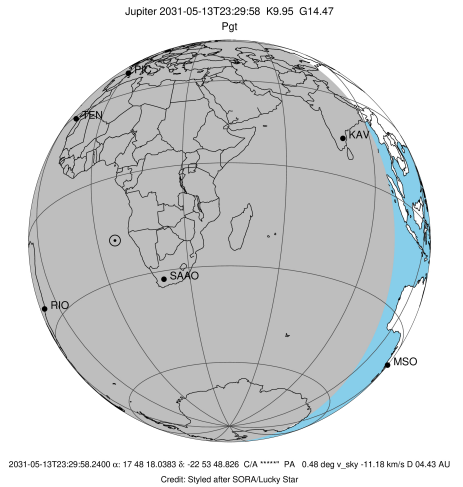


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-13T22:09:20.471	-22.01x	-2.66x	71488.8	-35.66	-39.28
Jupiter	E	2031-05-14T01:06:12.429	10.80	-40.55	71489.1	-34.30	-37.87

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-13T23:33:15.180
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        : 4068886505373730304
2Mass ID (if available) : 17481803-2253485
ICRS Star Coord at Epoch: 17h 48m 18.03833s -22:53:48.82637s
RUWE (>1.4 is poor) : 1.82
K magnitude           : 9.945
G magnitude           : 14.466
RP magnitude          : 13.280
BP magnitude          : 15.951
DUPflag              : 0
Distance (au)         : 4.430
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -11.18
Sun-Target sep (deg) : 145.27
Sun-Moon sep (deg)   : 58.67
B (ring opening deg) : -2.60
PA of pole (deg)     : 0.42
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation (") : 12.007
C/A sky separation (km) : 38573.8
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	2031-05-13T22:06:09.959	50.41	-75.02	71489.2	-32.98	-36.50
Jupiter	E	2031-05-14T00:59:47.016	80.69	-54.39	71489.3	-32.52	-36.02