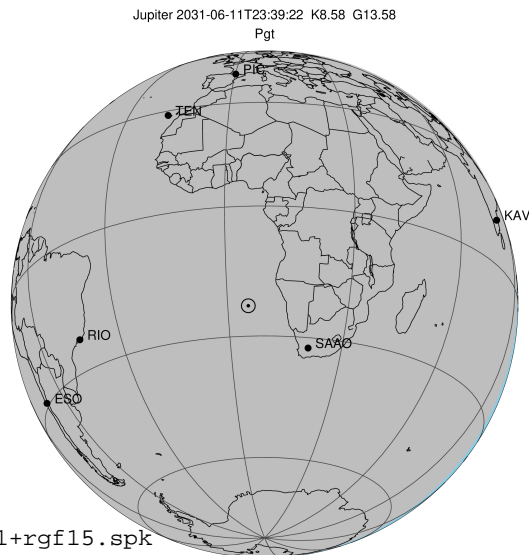


target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2031-06-11T23:39:22.410
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 4116708771592496768
 2Mass ID (if available) : 17342250-2249469

Jupiter 2031-06-11T23:39:22 K8.58 G13.58 Pgt

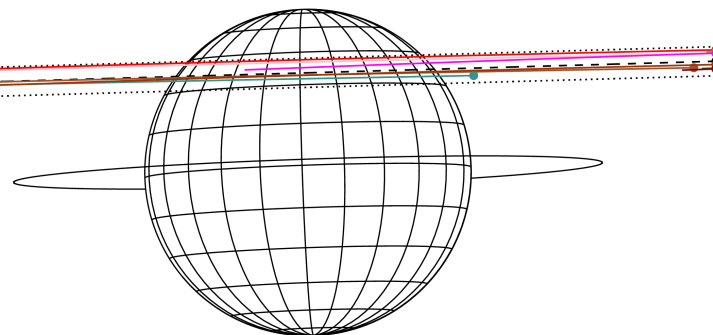
ICRS Star Coord at Epoch: 17h 34m 22.48578s -22:49:47.20855s

RUWE (>1.4 is poor) : 1.04
 K magnitude : 8.581
 G magnitude : 13.584
 RP magnitude : 12.287
 BP magnitude : 15.488
 DUPflag : 0
 Distance (au) : 4.268
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -16.40
 Sun-Target sep (deg) : 176.30
 Sun-Moon sep (deg) : 84.89
 B (ring opening deg) : -2.60
 PA of pole (deg) : 1.92
 Pole direction: RA (deg): 268.05692
 Dec (deg): 64.49651
 C/A sky separation (") : 14.102
 C/A sky separation (km) : 43652.0
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk



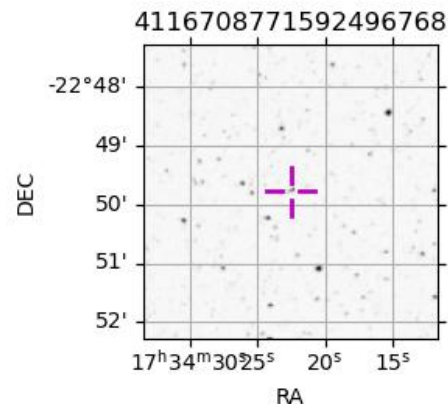
2031-06-11T23:39:22.4100 a: 17 34 22.4858 s: -22 49 47.209 C/A ***** PA 181.62 deg v_sky -16.40 km/s D 04.27 AU
 Credit: Styled after SORA/Lucky Star

Earth
 PIC
 PMO
 MCD
 TEN
 KAV
 RIO
 ESO
 AAT
 SAAO
 MSO



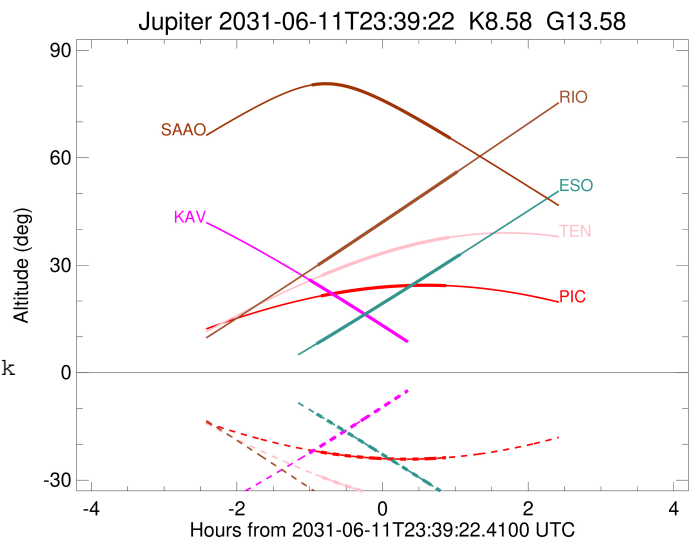
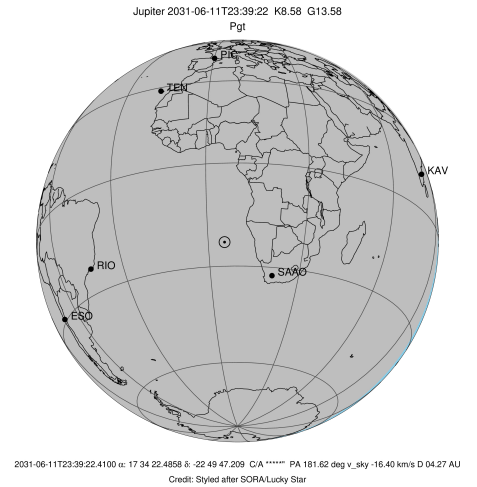
Observable events with sun below -5 deg and altitude above 5 deg

Obs	Location	lat	Elon	Target	Observed Events Interval	OCode
PIC	Pic du Midi	42.9	0.1	+ +	JUN 11 22:48 - JUN 12 00:31	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	+ +	JUN 11 22:49 - JUN 12 00:34	Pie
IRTF	Mauna Kea/IRTF	19.8	204.5			Pnn
KAV	Kavalur Observatory	12.6	78.8	+	JUN 11 22:39 - JUN 11 22:39	Pin
RIO	Rio de Janeiro	-22.9	316.8	+ +	JUN 11 22:46 - JUN 12 00:40	Pie
ESO	European Southern Obs. (3.6m)	-29.3	289.3	+ +	JUN 11 22:45 - JUN 12 00:43	Pie
AAT	Siding Spring (AAT)	-31.3	149.1			Pnn
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8	+ +	JUN 11 22:41 - JUN 12 00:35	Pie
MSO	Mt. Stromlo Observatory	-35.3	149.0			Pnn



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-11T23:40:09.560
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      : 4116708771592496768
2Mass ID (if available) : 17342250-2249469
ICRS Star Coord at Epoch: 17h 34m 22.48578s -22:49:47.20855s
RUWE (>1.4 is poor) : 1.04
K magnitude          : 8.581
G magnitude          : 13.584
RP magnitude         : 12.287
BP magnitude         : 15.488
DUPflag             : 0
Distance (au)       : 4.268
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.40
Sun-Target sep (deg) : 176.30
Sun-Moon sep (deg)  : 85.28
B (ring opening deg) : -2.60
PA of pole (deg)    : 1.92
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation ("): 15.963
C/A sky separation (km): 49412.9
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
    
```

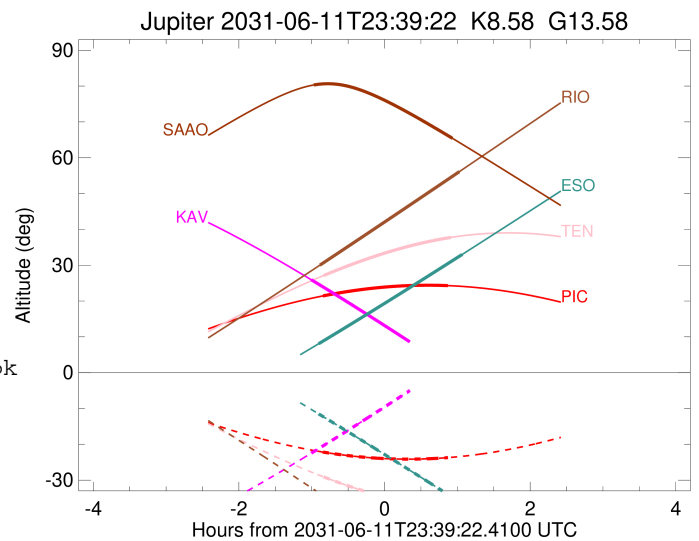
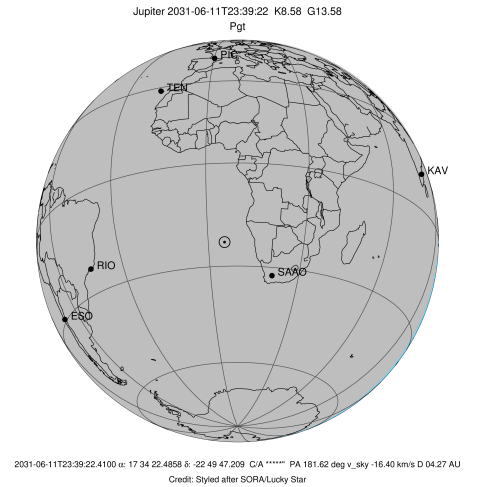


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-11T22:48:38.608	21.42	-22.16	71487.7	43.23	46.94
Jupiter	E	2031-06-12T00:31:38.061	24.29	-23.71	71487.5	44.01	47.72

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-11T23:41:41.170
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       : 4116708771592496768
2Mass ID (if available) : 17342250-2249469
ICRS Star Coord at Epoch: 17h 34m 22.48578s -22:49:47.20855s
RUWE (>1.4 is poor) : 1.04
K magnitude          : 8.581
G magnitude          : 13.584
RP magnitude         : 12.287
BP magnitude         : 15.488
DUPflag             : 0
Distance (au)        : 4.268
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.40
Sun-Target sep (deg) : 176.30
Sun-Moon sep (deg)   : 85.44
B (ring opening deg) : -2.60
PA of pole (deg)     : 1.92
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 15.617
C/A sky separation (km) : 48339.9
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
    
```

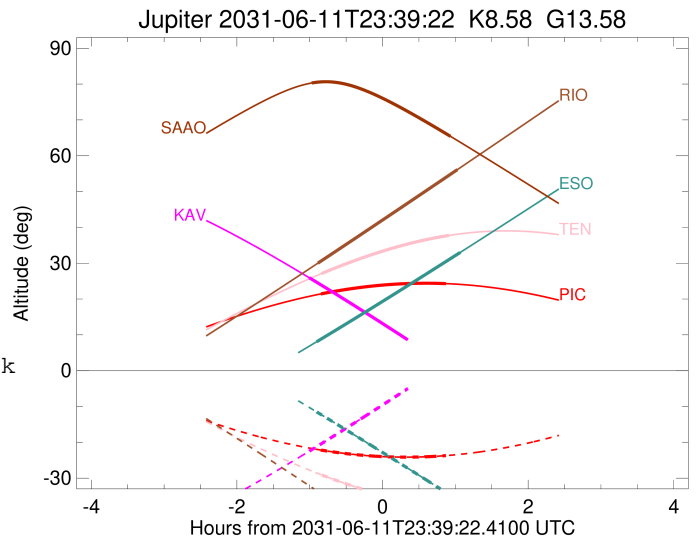
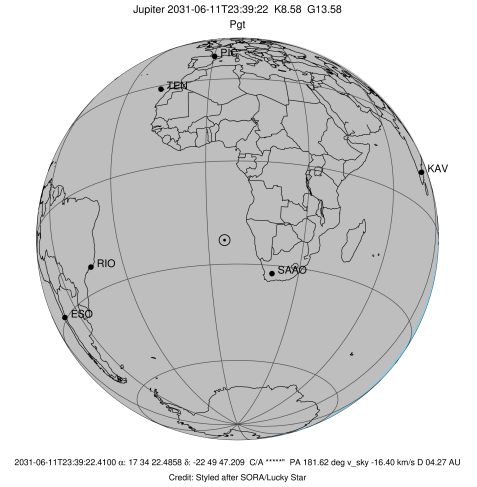


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-11T22:49:13.529	27.11	-29.10	71487.9	41.88	45.60
Jupiter	E	2031-06-12T00:34:01.214	37.74	-38.18	71487.7	42.99	46.71

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-11T23:33:59.870
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      : 4116708771592496768
2Mass ID (if available) : 17342250-2249469
ICRS Star Coord at Epoch: 17h 34m 22.48578s -22:49:47.20855s
RUWE (>1.4 is poor) : 1.04
K magnitude          : 8.581
G magnitude          : 13.584
RP magnitude         : 12.287
BP magnitude         : 15.488
DUPflag             : 0
Distance (au)       : 4.268
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.40
Sun-Target sep (deg) : 176.30
Sun-Moon sep (deg)  : 85.03
B (ring opening deg) : -2.60
PA of pole (deg)    : 1.92
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 14.848
C/A sky separation (km) : 45960.8
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
    
```

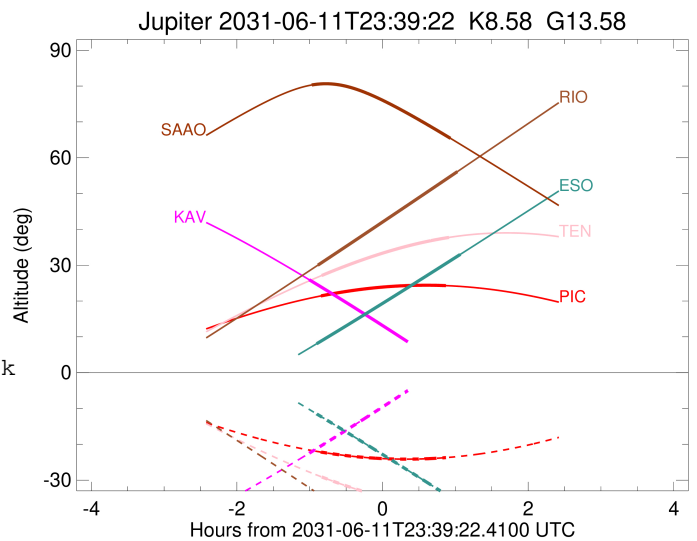
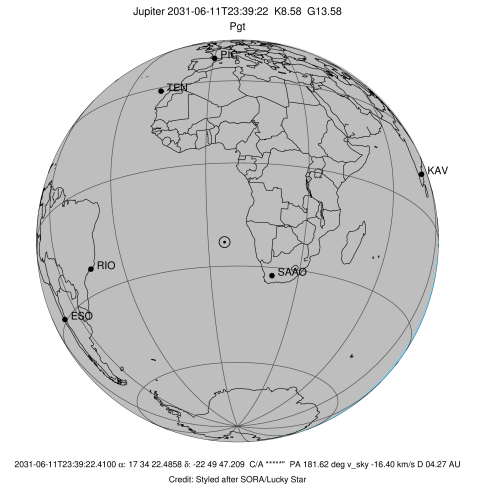


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-11T22:39:03.522	25.92	-22.46	71488.1	40.18	43.88
Jupiter	E	2031-06-12T00:29:15.544	2.15x	1.46x	71488.2	39.68	43.38

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-11T23:43:39.300
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      : 4116708771592496768
2Mass ID (if available) : 17342250-2249469
ICRS Star Coord at Epoch: 17h 34m 22.48578s -22:49:47.20855s
RUWE (>1.4 is poor) : 1.04
K magnitude          : 8.581
G magnitude          : 13.584
RP magnitude         : 12.287
BP magnitude         : 15.488
DUPflag             : 0
Distance (au)       : 4.268
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -16.40
Sun-Target sep (deg) : 176.30
Sun-Moon sep (deg)  : 85.59
B (ring opening deg) : -2.60
PA of pole (deg)    : 1.92
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 13.793
C/A sky separation (km) : 42694.8
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
    
```

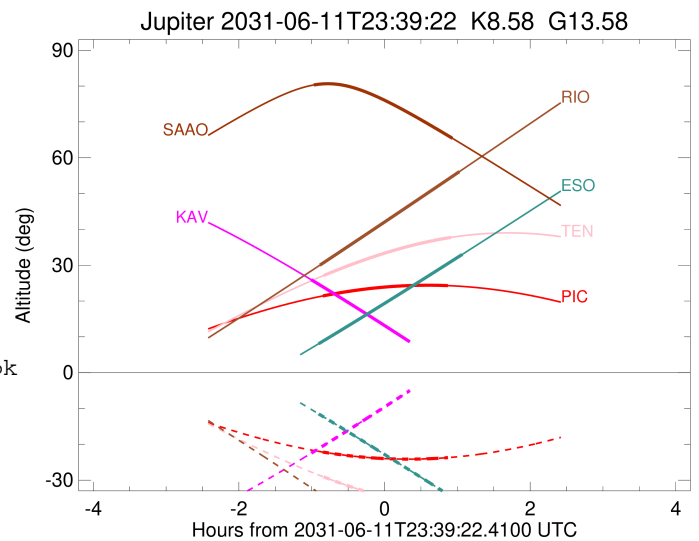
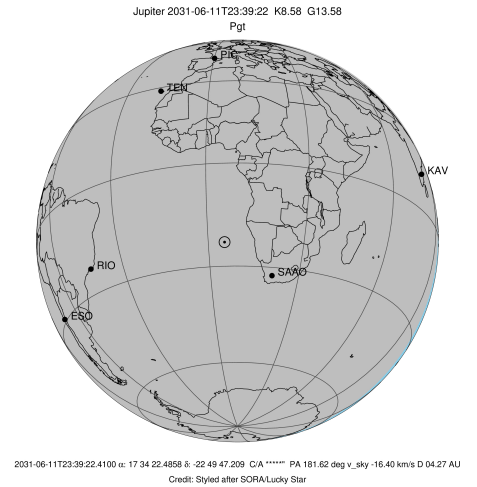


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-11T22:46:07.654	30.01	-33.71	71488.8	35.82	39.45
Jupiter	E	2031-06-12T00:40:53.682	56.07	-59.73	71488.6	37.34	41.01

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-11T23:44:27.730
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        : 4116708771592496768
2Mass ID (if available) : 17342250-2249469
ICRS Star Coord at Epoch: 17h 34m 22.48578s -22:49:47.20855s
RUWE (>1.4 is poor) : 1.04
K magnitude           : 8.581
G magnitude           : 13.584
RP magnitude          : 12.287
BP magnitude          : 15.488
DUPflag              : 0
Distance (au)         : 4.268
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.40
Sun-Target sep (deg)  : 176.30
Sun-Moon sep (deg)    : 85.28
B (ring opening deg) : -2.60
PA of pole (deg)      : 1.92
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 13.274
C/A sky separation (km) : 41089.7
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
    
```

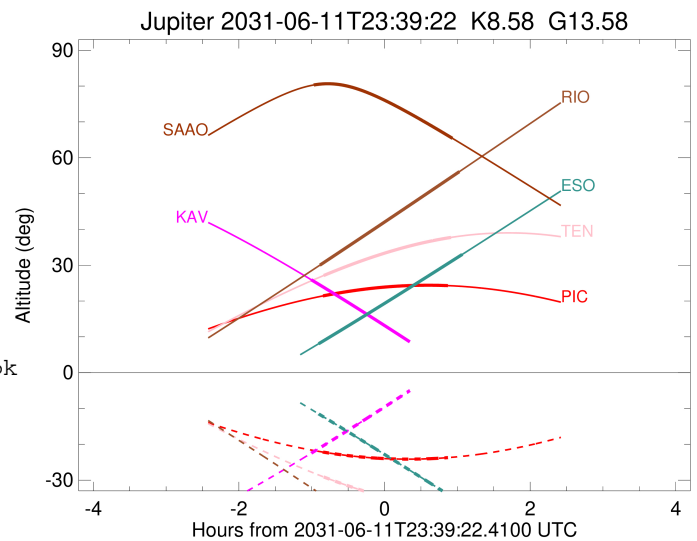
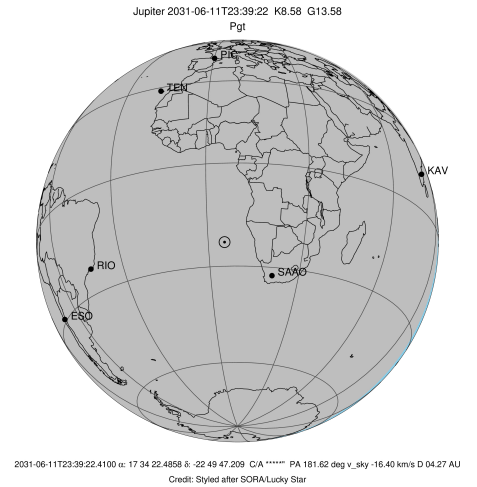


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-11T22:45:05.763	8.07	-11.51	71489.1	34.20	37.77
Jupiter	E	2031-06-12T00:43:27.746	33.01	-36.52	71488.8	35.86	39.49

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-11T23:38:18.790
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       : 4116708771592496768
2Mass ID (if available) : 17342250-2249469
ICRS Star Coord at Epoch: 17h 34m 22.48578s -22:49:47.20855s
RUWE (>1.4 is poor) : 1.04
K magnitude           : 8.581
G magnitude           : 13.584
RP magnitude         : 12.287
BP magnitude         : 15.488
DUPflag              : 0
Distance (au)        : 4.268
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.40
Sun-Target sep (deg) : 176.30
Sun-Moon sep (deg)   : 85.81
B (ring opening deg) : -2.60
PA of pole (deg)     : 1.92
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 13.763
C/A sky separation (km) : 42601.1
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	2031-06-11T22:41:16.857	80.31	-80.85	71488.8	36.24	39.88
Jupiter	E	2031-06-12T00:35:24.107	65.40	-62.26	71488.7	36.70	40.34