

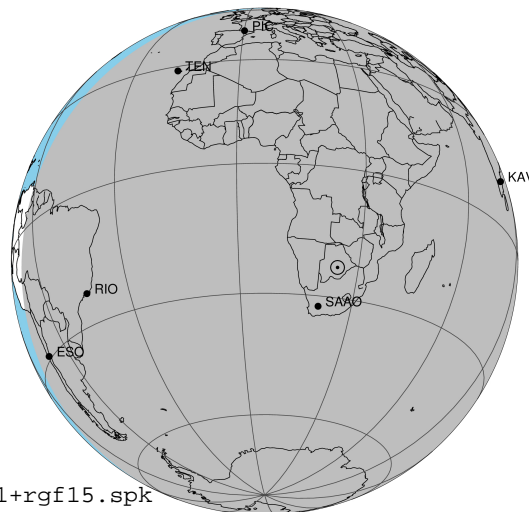
target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2031-06-30T22:25:22.570
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 4111734958887114368
 2Mass ID (if available) : 17240621-2245212

Jupiter 2031-06-30T22:25:22 K8.60 G14.04 Pgt

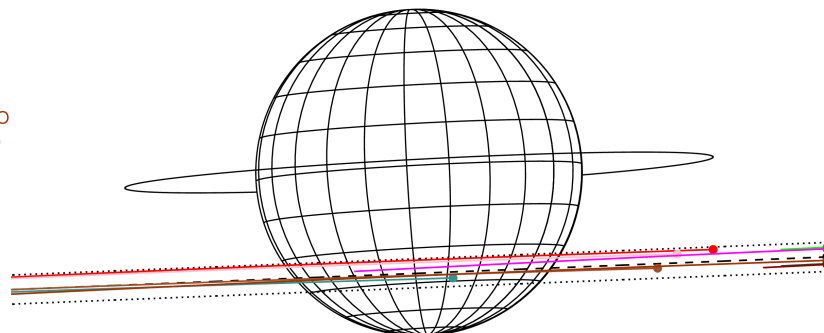
ICRS Star Coord at Epoch: 17h 24m 06.21373s -22:45:21.37663s

RUWE (>1.4 is poor) : 1.07
 K magnitude : 8.603
 G magnitude : 14.036
 RP magnitude : 12.659
 BP magnitude : 16.370
 DUPflag : 0
 Distance (au) : 4.294
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -15.24
 Sun-Target sep (deg) : 163.21
 Sun-Moon sep (deg) : 36.76
 B (ring opening deg) : -2.58
 PA of pole (deg) : 3.02
 Pole direction: RA (deg): 268.05691
 Dec (deg): 64.49651
 C/A sky separation (") : 14.167
 C/A sky separation (km) : 44116.9
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk

Jupiter 2031-06-30T22:25:22 K8.60 G14.04
 Pgt



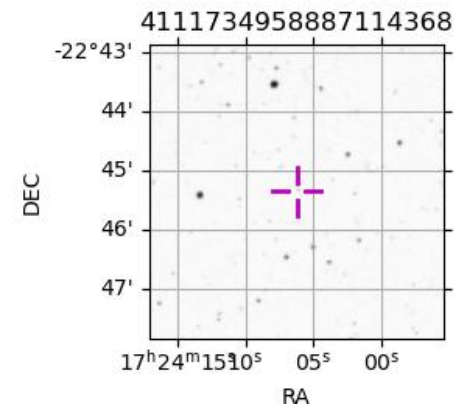
Earth
 PIC
 PMO
 TEN
 KAV
 RIO
 ESO
 AAT
 SAAO
 MSO



2031-06-30T22:25:22.5700 (t: 17 24 06.2137 s: -22 45 21.377 C/A ***** PA 2.29 deg v_sky -15.24 km/s D 04.29 AU
 Credit: Styled after SORA/Lucky Star

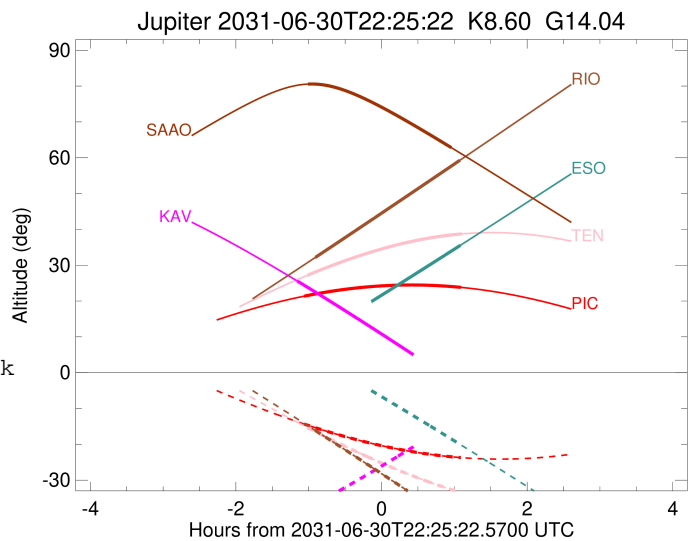
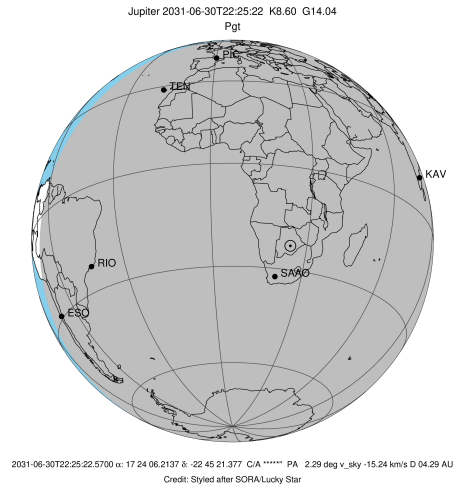
Observable events with sun below -5 deg and altitude above 5 deg

Obs	Location	lat	Elon	Target	Observed Events Interval	OCode
PIC	Pic du Midi	42.9	0.1	+ +	JUN 30 21:21 - JUN 30 23:30	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 30 21:24 - JUN 30 23:31	Pie
IRTF	Mauna Kea/IRTF	19.8	204.5			Pnn
KAV	Kavalur Observatory	12.6	78.8	+	JUN 30 21:16 - JUN 30 21:16	Pin
RIO	Rio de Janeiro	-22.9	316.8	+ +	JUN 30 21:30 - JUN 30 23:30	Pie
ESO	European Southern Obs. (3.6m)	-29.3	289.3	+	JUN 30 23:30 - JUN 30 23:30	Pne
AAT	Siding Spring (AAT)	-31.3	149.1			Pnn
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8	+ +	JUN 30 21:24 - JUN 30 23:22	Pie
MSO	Mt. Stromlo Observatory	-35.3	149.0			Pnn



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-30T22:26:12.880
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      : 4111734958887114368
2Mass ID (if available) : 17240621-2245212
ICRS Star Coord at Epoch: 17h 24m 06.21373s -22:45:21.37663s
RUWE (>1.4 is poor) : 1.07
K magnitude          : 8.603
G magnitude          : 14.036
RP magnitude         : 12.659
BP magnitude         : 16.370
DUPflag             : 0
Distance (au)       : 4.294
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -15.24
Sun-Target sep (deg) : 163.21
Sun-Moon sep (deg)  : 36.93
B (ring opening deg) : -2.58
PA of pole (deg)    : 3.02
Pole direction: RA (deg): 268.05691
Dec (deg): 64.49651
C/A sky separation (") : 12.315
C/A sky separation (km) : 38350.1
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
    
```

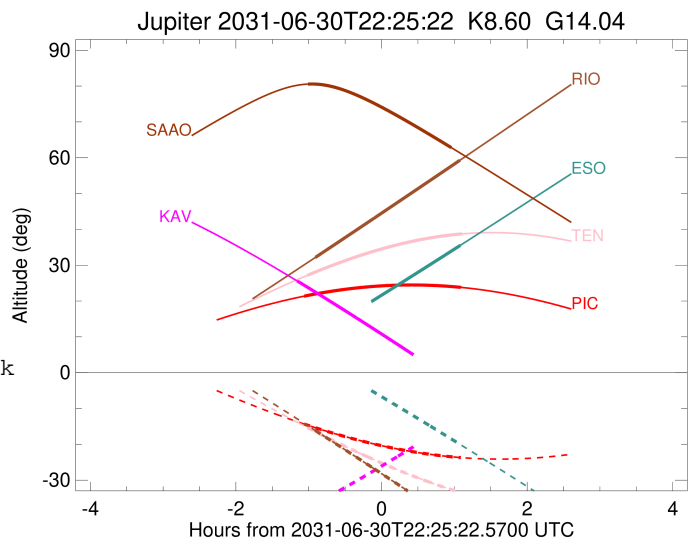
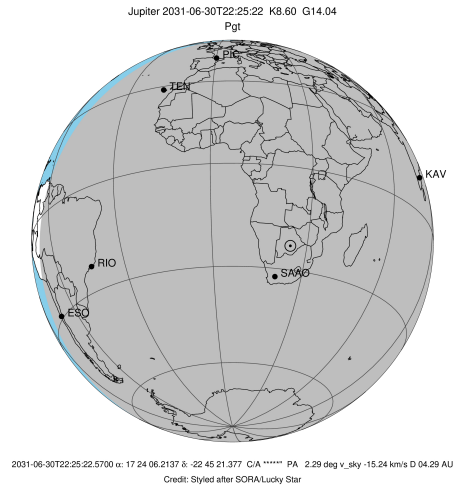


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-30T21:21:40.040	21.36	-14.35	71489.3	-33.30	-36.83
Jupiter	E	2031-06-30T23:30:44.396	23.81	-23.70	71489.5	-31.64	-35.10

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-30T22:28:05.550
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        : 4111734958887114368
2Mass ID (if available) : 17240621-2245212
ICRS Star Coord at Epoch: 17h 24m 06.21373s -22:45:21.37663s
RUWE (>1.4 is poor)  : 1.07
K magnitude           : 8.603
G magnitude           : 14.036
RP magnitude          : 12.659
BP magnitude          : 16.370
DUPflag              : 0
Distance (au)         : 4.294
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -15.24
Sun-Target sep (deg)  : 163.21
Sun-Moon sep (deg)    : 36.82
B (ring opening deg)  : -2.58
PA of pole (deg)      : 3.02
Pole direction: RA (deg): 268.05691
Dec (deg): 64.49651
C/A sky separation (") : 12.656
C/A sky separation (km) : 39410.7
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
    
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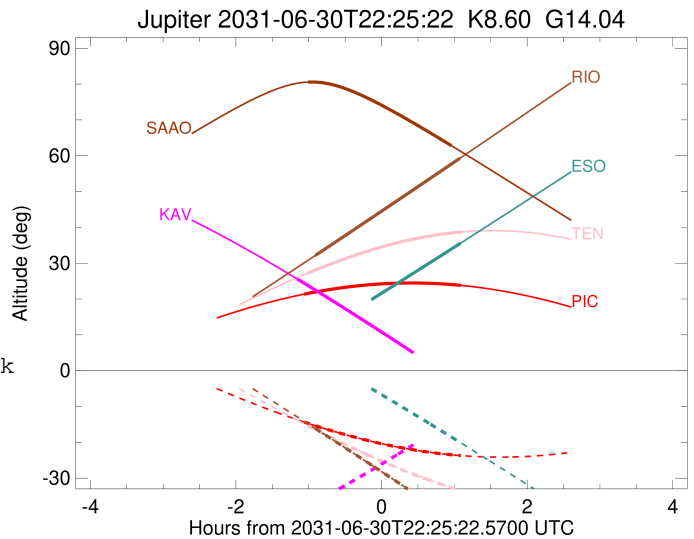
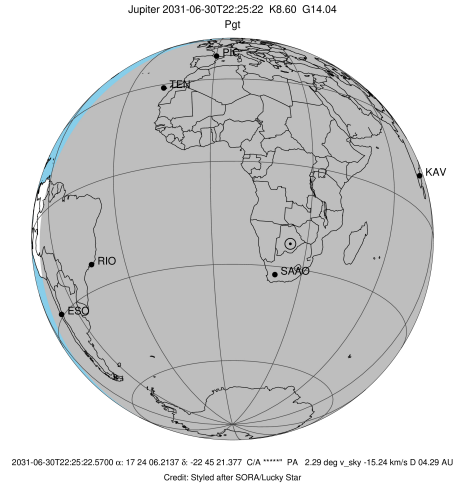


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-30T21:24:22.430	27.18	-15.32	71489.1	-34.49	-38.07
Jupiter	E	2031-06-30T23:31:39.138	38.74	-33.55	71489.4	-32.49	-35.99

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-30T22:18:33.310
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      : 4111734958887114368
2Mass ID (if available) : 17240621-2245212
ICRS Star Coord at Epoch: 17h 24m 06.21373s -22:45:21.37663s
RUWE (>1.4 is poor) : 1.07
K magnitude          : 8.603
G magnitude          : 14.036
RP magnitude         : 12.659
BP magnitude         : 16.370
DUPflag             : 0
Distance (au)       : 4.294
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -15.24
Sun-Target sep (deg) : 163.21
Sun-Moon sep (deg)  : 37.59
B (ring opening deg) : -2.58
PA of pole (deg)    : 3.02
Pole direction: RA (deg): 268.05691
Dec (deg): 64.49651
C/A sky separation (") : 13.435
C/A sky separation (km) : 41838.4
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
    
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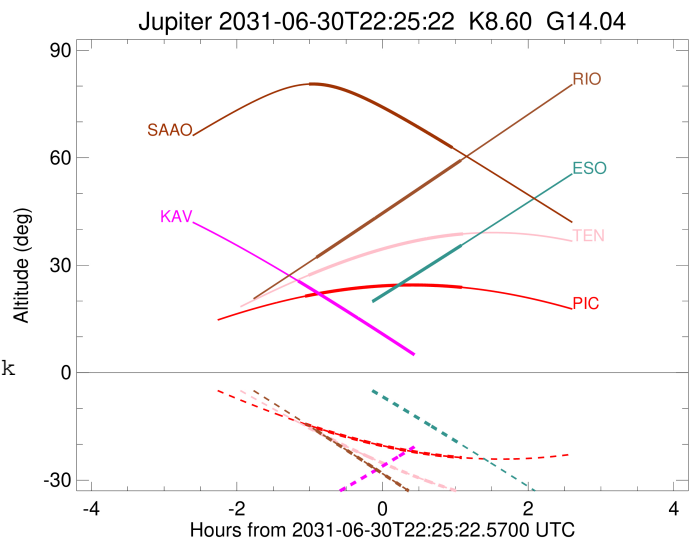
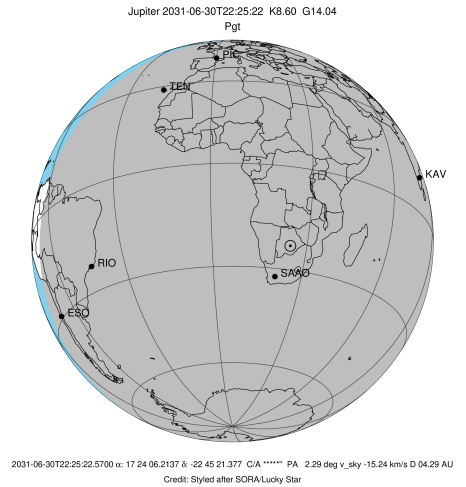


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-30T21:16:03.940	25.56	-39.27	71488.9	-35.96	-39.59
Jupiter	E	2031-06-30T23:21:33.262	-1.70x	-14.32	71488.9	-35.67	-39.29

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-30T22:30:34.180
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       : 4111734958887114368
2Mass ID (if available) : 17240621-2245212
ICRS Star Coord at Epoch: 17h 24m 06.21373s -22:45:21.37663s
RUWE (>1.4 is poor) : 1.07
K magnitude           : 8.603
G magnitude           : 14.036
RP magnitude          : 12.659
BP magnitude          : 16.370
DUPflag              : 0
Distance (au)        : 4.294
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -15.24
Sun-Target sep (deg) : 163.21
Sun-Moon sep (deg)   : 36.62
B (ring opening deg) : -2.58
PA of pole (deg)     : 3.02
Pole direction: RA (deg): 268.05691
Dec (deg): 64.49651
C/A sky separation (") : 14.463
C/A sky separation (km) : 45037.8
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
    
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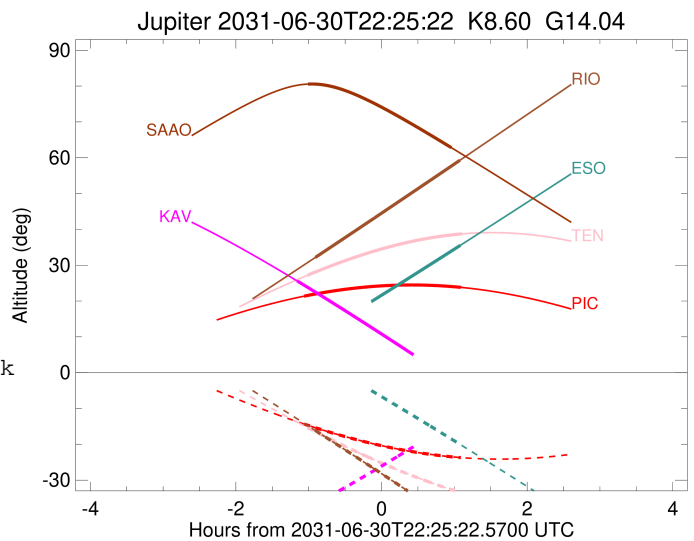
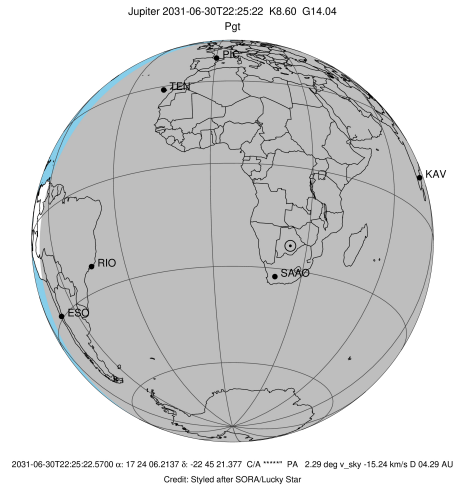


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-30T21:30:48.537	32.15	-16.13	71488.2	-40.27	-43.98
Jupiter	E	2031-06-30T23:30:01.351	59.29	-42.69	71488.6	-37.83	-41.50

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-30T22:31:41.920
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       : 4111734958887114368
2Mass ID (if available) : 17240621-2245212
ICRS Star Coord at Epoch: 17h 24m 06.21373s -22:45:21.37663s
RUWE (>1.4 is poor) : 1.07
K magnitude          : 8.603
G magnitude          : 14.036
RP magnitude         : 12.659
BP magnitude         : 16.370
DUPflag             : 0
Distance (au)        : 4.294
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -15.24
Sun-Target sep (deg) : 163.21
Sun-Moon sep (deg)   : 36.30
B (ring opening deg) : -2.58
PA of pole (deg)     : 3.02
Pole direction: RA (deg): 268.05691
Dec (deg): 64.49651
C/A sky separation (") : 14.975
C/A sky separation (km) : 46634.2
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
    
```

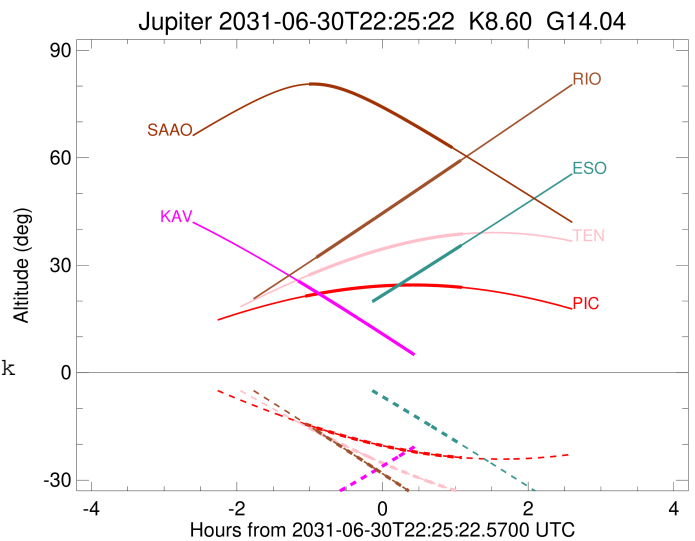
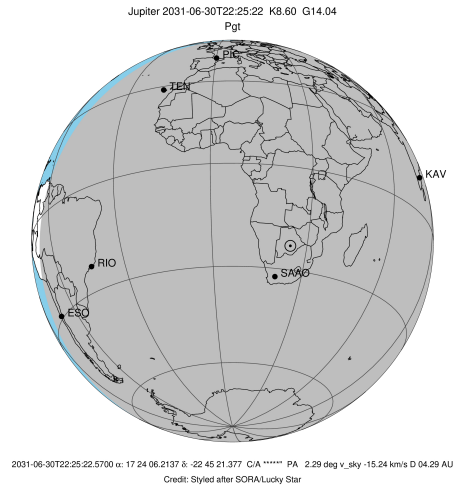


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-30T21:32:36.945	10.58	3.68x	71487.9	-41.99	-45.71
Jupiter	E	2031-06-30T23:30:24.314	35.55	-20.08	71488.3	-39.37	-43.07

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-30T22:23:49.620
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       : 4111734958887114368
2Mass ID (if available) : 17240621-2245212
ICRS Star Coord at Epoch: 17h 24m 06.21373s -22:45:21.37663s
RUWE (>1.4 is poor) : 1.07
K magnitude           : 8.603
G magnitude           : 14.036
RP magnitude         : 12.659
BP magnitude         : 16.370
DUPflag              : 0
Distance (au)        : 4.294
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -15.24
Sun-Target sep (deg) : 163.21
Sun-Moon sep (deg)  : 37.50
B (ring opening deg) : -2.58
PA of pole (deg)    : 3.02
Pole direction: RA (deg): 268.05691
Dec (deg): 64.49651
C/A sky separation (") : 14.507
C/A sky separation (km) : 45174.4
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
    
```



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	2031-06-30T21:24:48.028	80.55	-70.98	71488.3	-39.86	-43.57
Jupiter	E	2031-06-30T23:22:57.875	62.80	-76.95	71488.5	-38.57	-42.25