

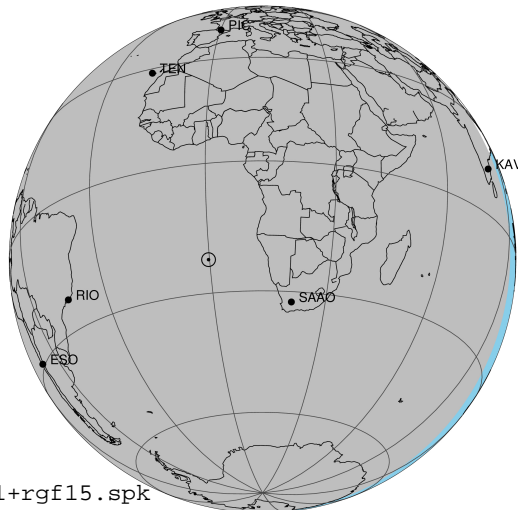
target : Jupiter  
 target radius (km) : 71492.00  
 C/A epoch : 2031-06-03T23:59:13.020  
 Event type : Pgt  
 : Jupiter occs: geocentric, topocentric  
 : Not a ringed target  
 Gaia source ID : 4116752408431157120  
 2Mass ID (if available) : 17384196-2251370

Jupiter 2031-06-03T23:59:13 K9.65 G14.91 Pgt

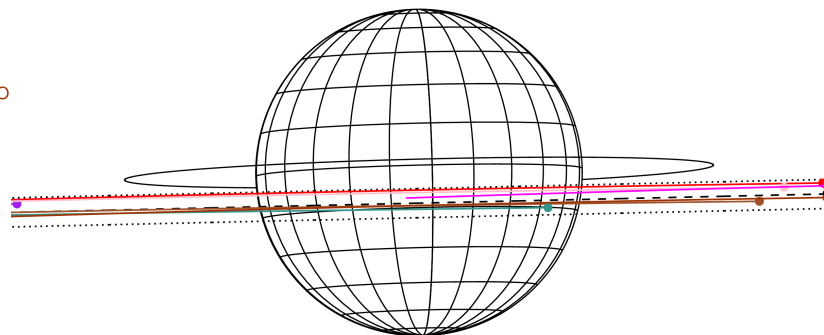
ICRS Star Coord at Epoch: 17h 38m 41.96877s -22:51:37.19110s

RUWE (>1.4 is poor) : 1.00  
 K magnitude : 9.651  
 G magnitude : 14.908  
 RP magnitude : 13.580  
 BP magnitude : 17.023  
 DUPflag : 0  
 Distance (au) : 4.289  
 f0 (km) : 0.00  
 g0 (km) : 0.00  
 skyplane vel. (km/s) : -15.76  
 Sun-Target sep (deg) : 167.68  
 Sun-Moon sep (deg) : 33.15  
 B (ring opening deg) : -2.60  
 PA of pole (deg) : 1.46  
 Pole direction: RA (deg): 268.05693  
 Dec (deg): 64.49651  
 C/A sky separation (") : 4.317  
 C/A sky separation (km) : 13430.0  
 NAIF SPICE kernels : RAJobs\_U111+rgf15.spk

Jupiter 2031-06-03T23:59:13 K9.65 G14.91  
 Pgt



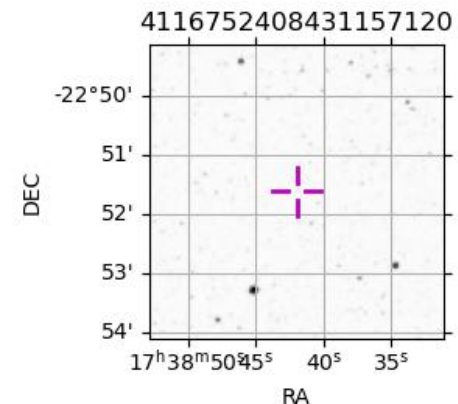
Earth  
 PIC  
 MCD  
 TEN  
 KAV  
 RIO  
 ESO  
 SAAO



2031-06-03T23:59:13.0200 a: 17 38 41.9688 δ: -22 51 37.191 C/A 4.330" PA 1.30 deg v\_sky -15.76 km/s D 04.29 AU  
 Credit: Styled after SORA/Lucky Star

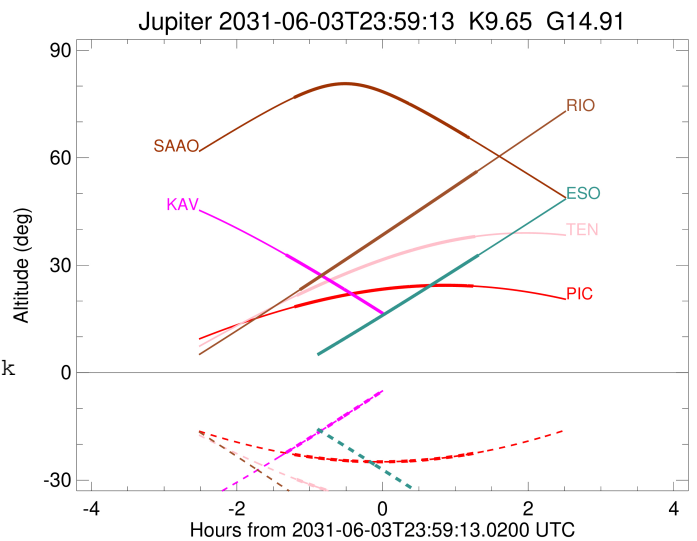
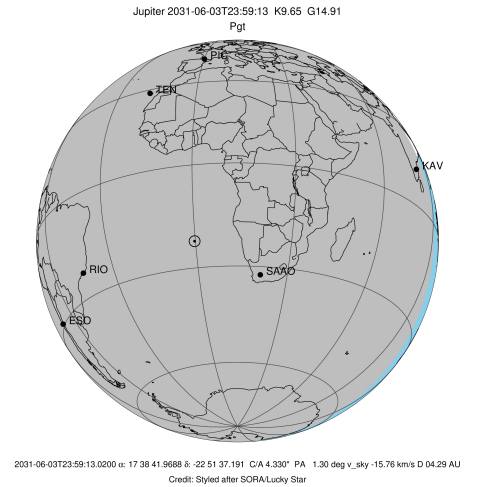
Observable events with sun below -5 deg and altitude above 5 deg

Obs	Location	lat	Elon	Target	Observed Events Interval	OCode
PIC	Pic du Midi	42.9	0.1	+ +	JUN 03 22:46 - JUN 04 01:13	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 03 22:48 - JUN 04 01:15	Pie
IRTF	Mauna Kea/IRTF	19.8	204.5			Pnn
KAV	Kavalur Observatory	12.6	78.8	+	JUN 03 22:39 - JUN 03 22:39	Pin
RIO	Rio de Janeiro	-22.9	316.8	+ +	JUN 03 22:51 - JUN 04 01:17	Pie
ESO	European Southern Obs. (3.6m)	-29.3	289.3	+	JUN 04 01:18 - JUN 04 01:18	Pne
AAT	Siding Spring (AAT)	-31.3	149.1			Pnn
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8	+ +	JUN 03 22:46 - JUN 04 01:10	Pie
MSO	Mt. Stromlo Observatory	-35.3	149.0			Pnn



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-04T00:00:26.150
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        : 4116752408431157120
2Mass ID (if available) : 17384196-2251370
ICRS Star Coord at Epoch: 17h 38m 41.96877s -22:51:37.19110s
RUWE (>1.4 is poor) : 1.00
K magnitude           : 9.651
G magnitude           : 14.908
RP magnitude          : 13.580
BP magnitude          : 17.023
DUPflag              : 0
Distance (au)         : 4.289
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -15.76
Sun-Target sep (deg) : 167.68
Sun-Moon sep (deg)   : 33.23
B (ring opening deg) : -2.60
PA of pole (deg)     : 1.46
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation ("): 2.473
C/A sky separation (km): 7692.0
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
    
```

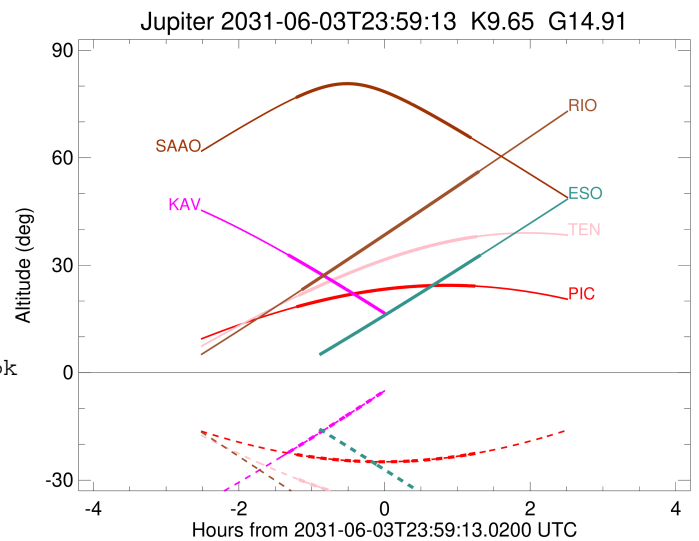
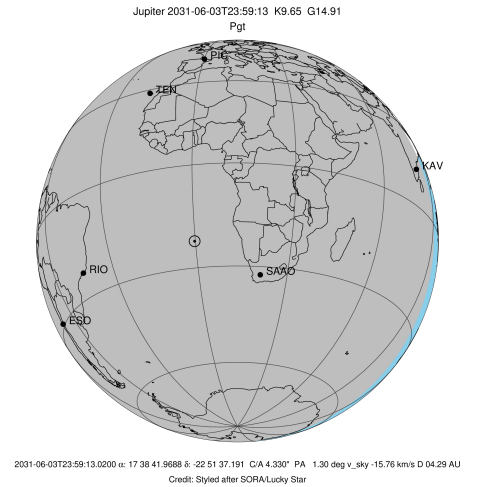


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-03T22:46:45.025	18.38	-22.86	71491.9	-6.53	-7.46
Jupiter	E	2031-06-04T01:13:59.049	24.16	-22.54	71491.9	-5.96	-6.81

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-04T00:02:13.690
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        : 4116752408431157120
2Mass ID (if available) : 17384196-2251370
ICRS Star Coord at Epoch: 17h 38m 41.96877s -22:51:37.19110s
RUWE (>1.4 is poor) : 1.00
K magnitude           : 9.651
G magnitude           : 14.908
RP magnitude          : 13.580
BP magnitude          : 17.023
DUPflag              : 0
Distance (au)         : 4.289
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -15.76
Sun-Target sep (deg) : 167.68
Sun-Moon sep (deg)   : 33.07
B (ring opening deg) : -2.60
PA of pole (deg)     : 1.46
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (") : 2.829
C/A sky separation (km) : 8799.1
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
    
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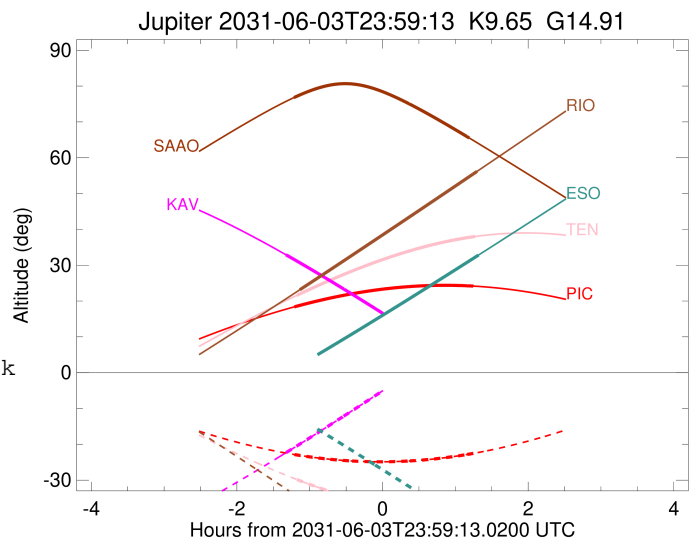
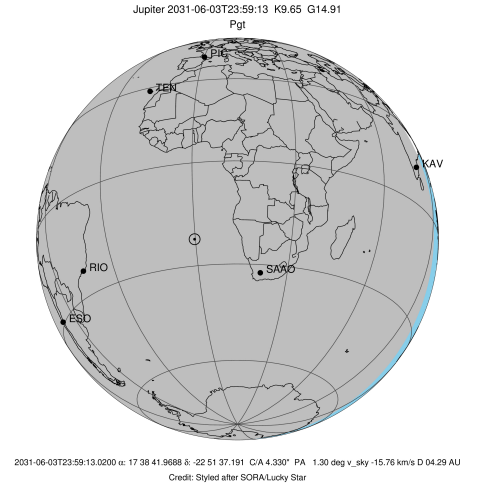


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-03T22:48:42.229	21.59	-29.84	71491.8	-7.60	-8.67
Jupiter	E	2031-06-04T01:15:26.271	38.00	-39.41	71491.9	-6.69	-7.63

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-03T23:53:13.400
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      : 4116752408431157120
2Mass ID (if available) : 17384196-2251370
ICRS Star Coord at Epoch: 17h 38m 41.96877s -22:51:37.19110s
RUWE (>1.4 is poor) : 1.00
K magnitude          : 9.651
G magnitude          : 14.908
RP magnitude         : 13.580
BP magnitude         : 17.023
DUPflag             : 0
Distance (au)       : 4.289
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -15.76
Sun-Target sep (deg) : 167.68
Sun-Moon sep (deg)  : 34.05
B (ring opening deg) : -2.60
PA of pole (deg)    : 1.46
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (") : 3.536
C/A sky separation (km) : 10999.4
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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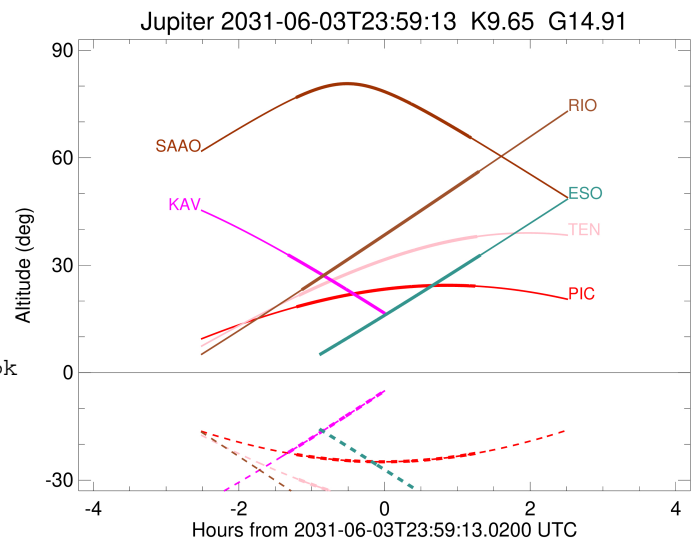
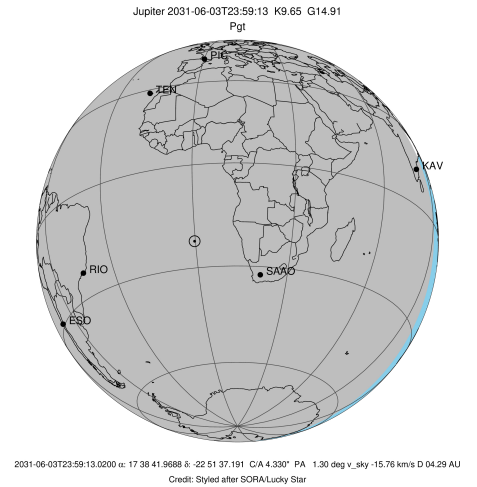


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-03T22:39:45.212	32.89	-22.32	71491.8	-8.51	-9.71
Jupiter	E	2031-06-04T01:07:16.437	1.64x	10.26x	71491.8	-9.28	-10.58

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-04T00:04:25.470
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        : 4116752408431157120
2Mass ID (if available) : 17384196-2251370
ICRS Star Coord at Epoch: 17h 38m 41.96877s -22:51:37.19110s
RUWE (>1.4 is poor)  : 1.00
K magnitude           : 9.651
G magnitude           : 14.908
RP magnitude          : 13.580
BP magnitude          : 17.023
DUPflag              : 0
Distance (au)         : 4.289
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -15.76
Sun-Target sep (deg) : 167.68
Sun-Moon sep (deg)   : 32.84
B (ring opening deg) : -2.60
PA of pole (deg)     : 1.46
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (") : 4.657
C/A sky separation (km) : 14485.2
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
    
```

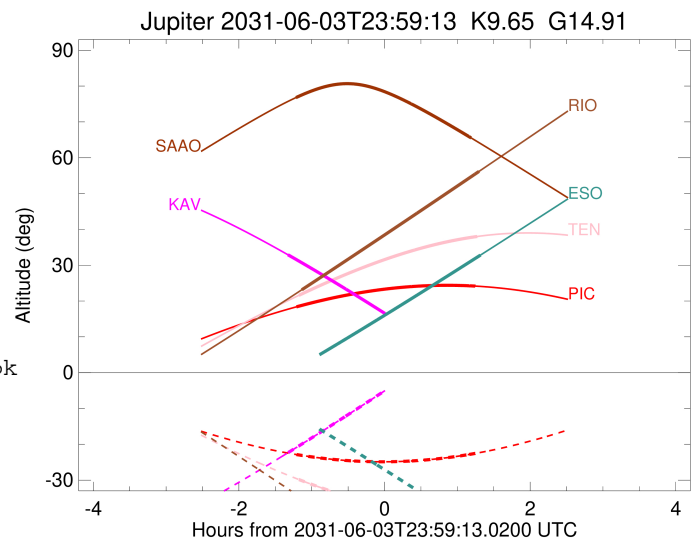
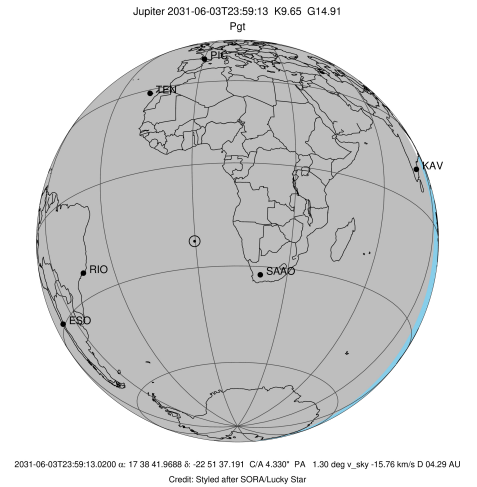


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-03T22:51:15.310	23.18	-35.03	71491.6	-12.39	-14.09
Jupiter	E	2031-06-04T01:17:03.509	56.17	-68.30	71491.7	-11.07	-12.61

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-04T00:05:10.260
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        : 4116752408431157120
2Mass ID (if available) : 17384196-2251370
ICRS Star Coord at Epoch: 17h 38m 41.96877s -22:51:37.19110s
RUWE (>1.4 is poor) : 1.00
K magnitude           : 9.651
G magnitude           : 14.908
RP magnitude          : 13.580
BP magnitude          : 17.023
DUPflag              : 0
Distance (au)         : 4.289
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -15.76
Sun-Target sep (deg) : 167.68
Sun-Moon sep (deg)   : 32.56
B (ring opening deg) : -2.60
PA of pole (deg)     : 1.46
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation ("): 5.177
C/A sky separation (km): 16104.5
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
    
```

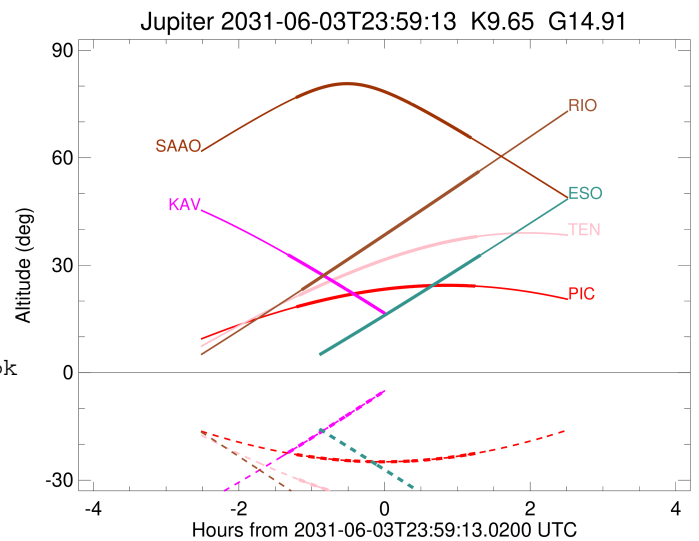
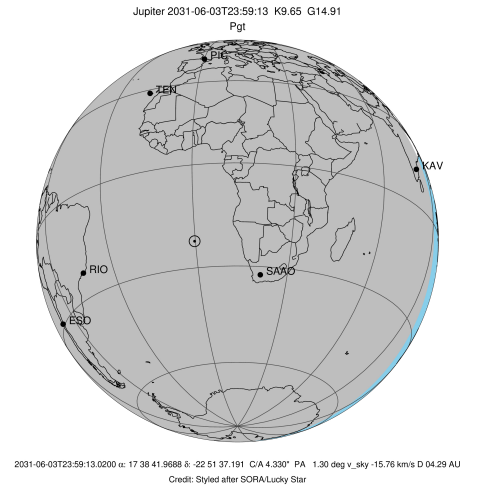


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-03T22:51:27.000	2.17x	-12.79	71491.5	-13.74	-15.61
Jupiter	E	2031-06-04T01:18:16.013	32.81	-44.16	71491.6	-12.29	-13.99

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-03T23:58:26.300
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       : 4116752408431157120
2Mass ID (if available) : 17384196-2251370
ICRS Star Coord at Epoch: 17h 38m 41.96877s -22:51:37.19110s
RUWE (>1.4 is poor) : 1.00
K magnitude           : 9.651
G magnitude           : 14.908
RP magnitude          : 13.580
BP magnitude          : 17.023
DUPflag              : 0
Distance (au)        : 4.289
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -15.76
Sun-Target sep (deg) : 167.68
Sun-Moon sep (deg)   : 33.79
B (ring opening deg) : -2.60
PA of pole (deg)     : 1.46
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (") : 4.651
C/A sky separation (km) : 14467.7
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	2031-06-03T22:46:12.907	76.77	-79.86	71491.6	-11.87	-13.51
Jupiter	E	2031-06-04T01:10:42.415	65.51	-54.26	71491.6	-11.63	-13.24