

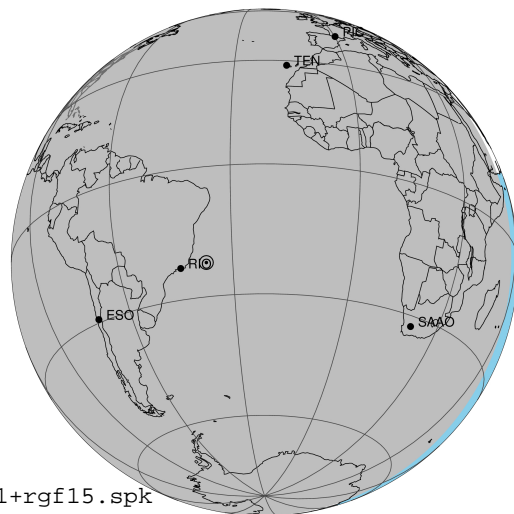
target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2031-06-03T02:24:16.390
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 4116750033241355648
 2Mass ID (if available) : 17391031-2251552

Jupiter 2031-06-03T02:24:16 K8.52 G11.94 Pgt

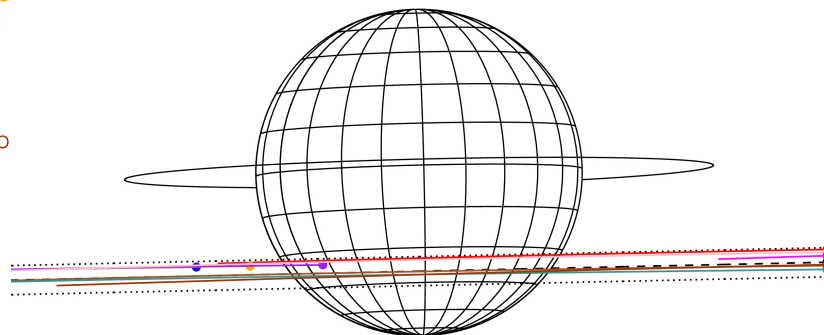
ICRS Star Coord at Epoch: 17h 39m 10.32384s -22:51:55.49197s

RUWE (>1.4 is poor) : 0.88
 K magnitude : 8.517
 G magnitude : 11.943
 RP magnitude : 10.956
 BP magnitude : 12.902
 DUPflag : 0
 Distance (au) : 4.292
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -15.65
 Sun-Target sep (deg) : 166.71
 Sun-Moon sep (deg) : 46.27
 B (ring opening deg) : -2.60
 PA of pole (deg) : 1.41
 Pole direction: RA (deg): 268.05693
 Dec (deg): 64.49651
 C/A sky separation (") : 13.882
 C/A sky separation (km) : 43218.5
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk

Jupiter 2031-06-03T02:24:16 K8.52 G11.94 Pgt



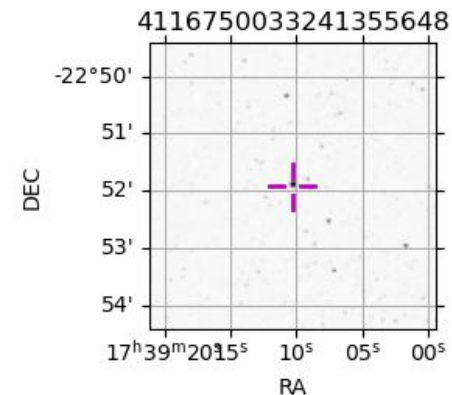
Earth
 PIC
 PAL
 KPNO
 MCD
 TEN
 KAV
 RIO
 ESO
 SAO



2031-06-03T02:24:16.3900 α: 17 39 10.3238 δ: -22 51 55.492 C/A ***** PA 1.26 deg v_sky -15.65 km/s D 04.29 AU
 Credit: Styled after SORA/Lucky Star

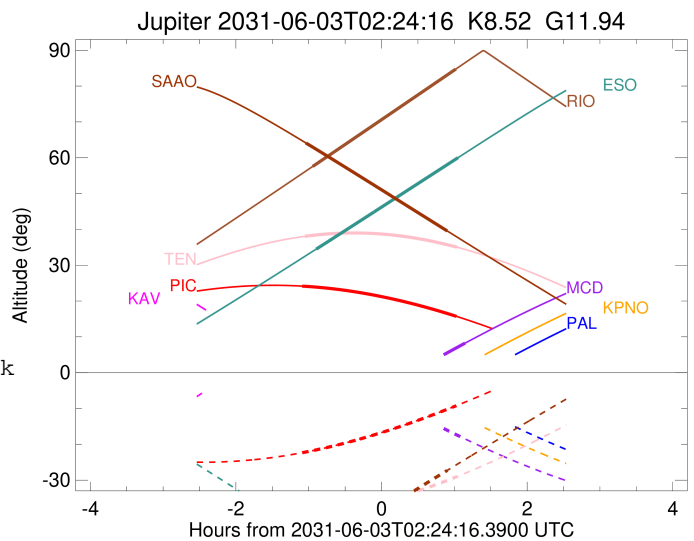
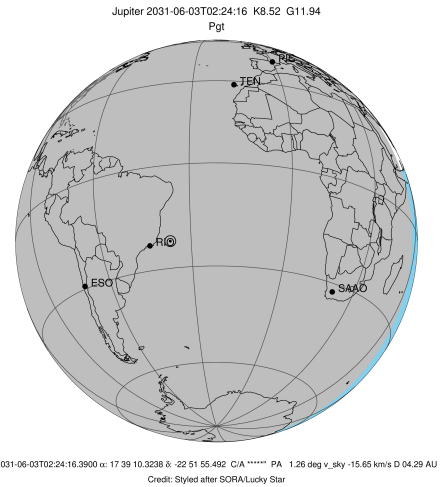
Observable events with sun below -5 deg and altitude above 5 deg

Obs	Location	lat	Elon	Target	Observed Events Interval	OCode
PIC	Pic du Midi	42.9	0.1	+ +	JUN 03 01:19 - JUN 03 03:25	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	+ +	JUN 03 03:33 - JUN 03 03:33	Pne
TEN	Teide Obs./Tenerife	28.3	343.5	+ +	JUN 03 01:21 - JUN 03 03:26	Pie
IRTF	Mauna Kea/IRTF	19.8	204.5			Pnn
KAV	Kavalur Observatory	12.6	78.8			Pnn
RIO	Rio de Janeiro	-22.9	316.8	+ +	JUN 03 01:27 - JUN 03 03:25	Pie
ESO	European Southern Obs. (3.6m)	-29.3	289.3	+ +	JUN 03 01:30 - JUN 03 03:27	Pie
AAT	Siding Spring (AAT)	-31.3	149.1			Pnn
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8	+ +	JUN 03 01:21 - JUN 03 03:18	Pie
MSO	Mt. Stromlo Observatory	-35.3	149.0			Pnn



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-03T02:22:25.450
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        : 4116750033241355648
2Mass ID (if available) : 17391031-2251552
ICRS Star Coord at Epoch: 17h 39m 10.32384s -22:51:55.49197s
RUWE (>1.4 is poor) : 0.88
K magnitude           : 8.517
G magnitude           : 11.943
RP magnitude          : 10.956
BP magnitude          : 12.902
DUPflag              : 0
Distance (au)         : 4.292
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -15.65
Sun-Target sep (deg) : 166.71
Sun-Moon sep (deg)   : 46.74
B (ring opening deg) : -2.60
PA of pole (deg)     : 1.41
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (") : 12.050
C/A sky separation (km) : 37514.6
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
    
```

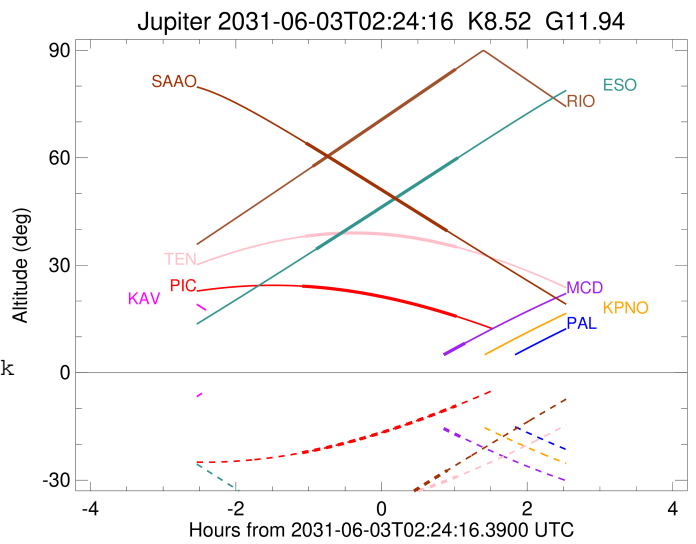
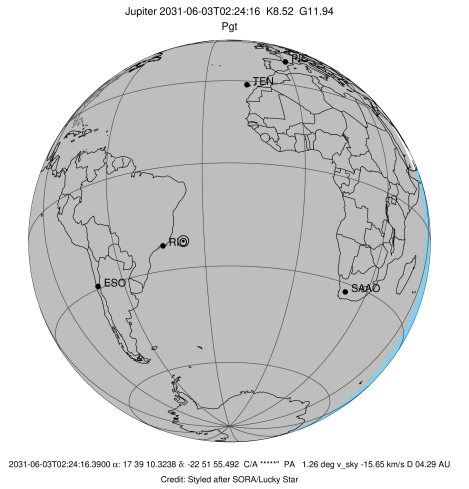


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-03T01:19:00.335	24.15	-22.33	71489.4	-31.67	-35.13
Jupiter	E	2031-06-03T03:25:57.691	15.72	-9.22	71489.4	-31.68	-35.14

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-03T02:30:31.280
Event type          : Pgt
: Jupiter occs: geocentric, topocentric
: Not a ringed target
Observer code       : MCD
Location            : McDonald Obs. 2.7m
Latitude (deg)      : 30.67158
E. Longitude (deg)  : 255.97844
Altitude (km)       : 2.075
Gaia source ID      : 4116750033241355648
2Mass ID (if available) : 17391031-2251552
ICRS Star Coord at Epoch: 17h 39m 10.32384s -22:51:55.49197s
RUWE (>1.4 is poor) : 0.88
K magnitude         : 8.517
G magnitude         : 11.943
RP magnitude        : 10.956
BP magnitude        : 12.902
DUPflag            : 0
Distance (au)       : 4.292
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -15.65
Sun-Target sep (deg) : 166.71
Sun-Moon sep (deg)  : 45.63
B (ring opening deg) : -2.60
PA of pole (deg)    : 1.41
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (" ) : 12.842
C/A sky separation (km) : 39980.6
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
    
```

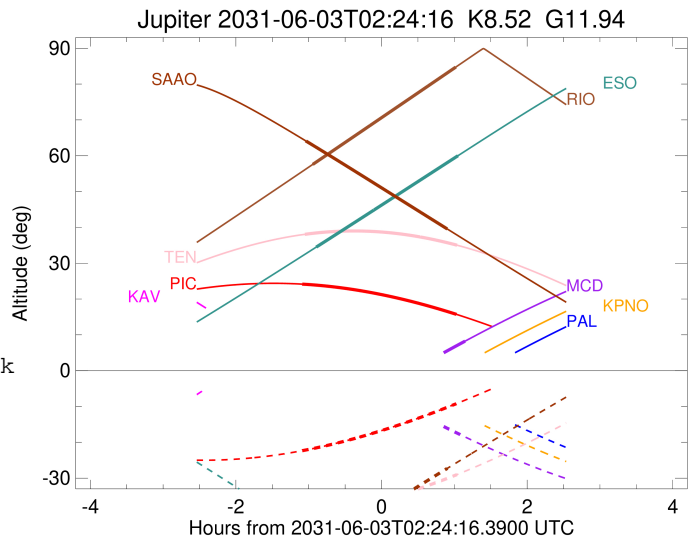
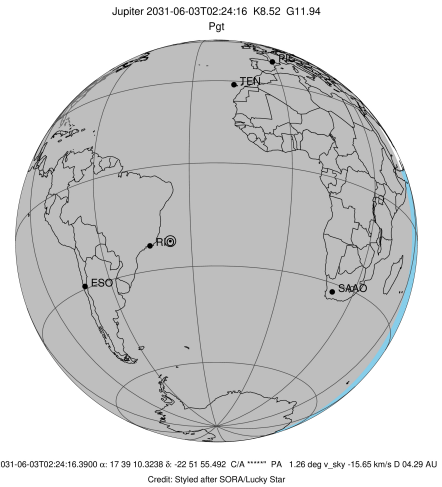


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-03T01:27:27.642	-16.37x	4.41x	71489.0	-34.68	-38.27
Jupiter	E	2031-06-03T03:33:07.241	8.23	-18.50	71489.2	-33.27	-36.80

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-03T02:23:46.430
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      : 4116750033241355648
2Mass ID (if available) : 17391031-2251552
ICRS Star Coord at Epoch: 17h 39m 10.32384s -22:51:55.49197s
RUWE (>1.4 is poor) : 0.88
K magnitude          : 8.517
G magnitude          : 11.943
RP magnitude         : 10.956
BP magnitude         : 12.902
DUPflag             : 0
Distance (au)        : 4.292
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -15.65
Sun-Target sep (deg) : 166.71
Sun-Moon sep (deg)  : 46.80
B (ring opening deg) : -2.60
PA of pole (deg)    : 1.41
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation ("): 12.291
C/A sky separation (km): 38263.9
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
    
```

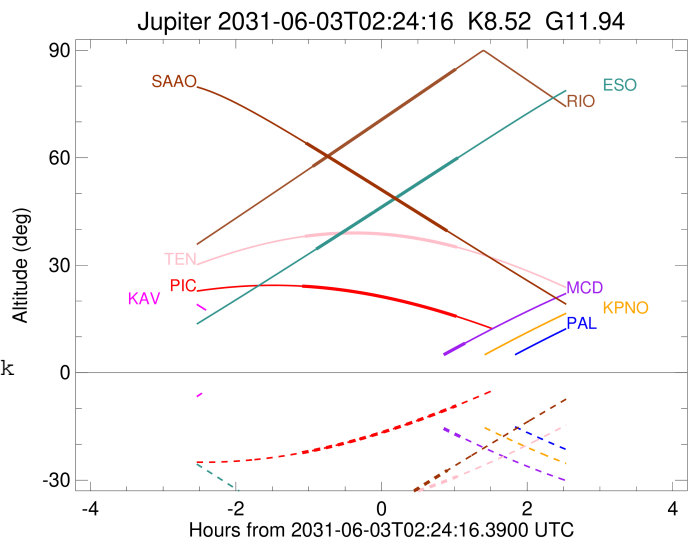
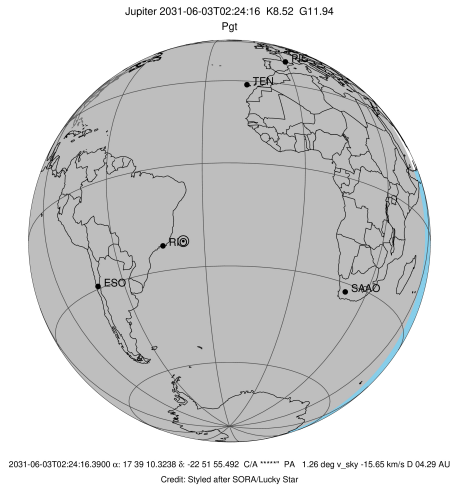


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-03T01:21:09.504	38.06	-39.44	71489.3	-32.52	-36.02
Jupiter	E	2031-06-03T03:26:24.556	35.03	-29.01	71489.4	-32.28	-35.77

```

target                : Jupiter
target radius (km)    : 71492.00
C/A epoch             : 2031-06-03T02:26:38.900
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        : 4116750033241355648
2Mass ID (if available) : 17391031-2251552
ICRS Star Coord at Epoch: 17h 39m 10.32384s -22:51:55.49197s
RUWE (>1.4 is poor)  : 0.88
K magnitude           : 8.517
G magnitude           : 11.943
RP magnitude          : 10.956
BP magnitude          : 12.902
DUPflag              : 0
Distance (au)         : 4.292
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -15.65
Sun-Target sep (deg)  : 166.71
Sun-Moon sep (deg)    : 46.73
B (ring opening deg)  : -2.60
PA of pole (deg)      : 1.41
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (") : 13.937
C/A sky separation (km) : 43387.8
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
    
```

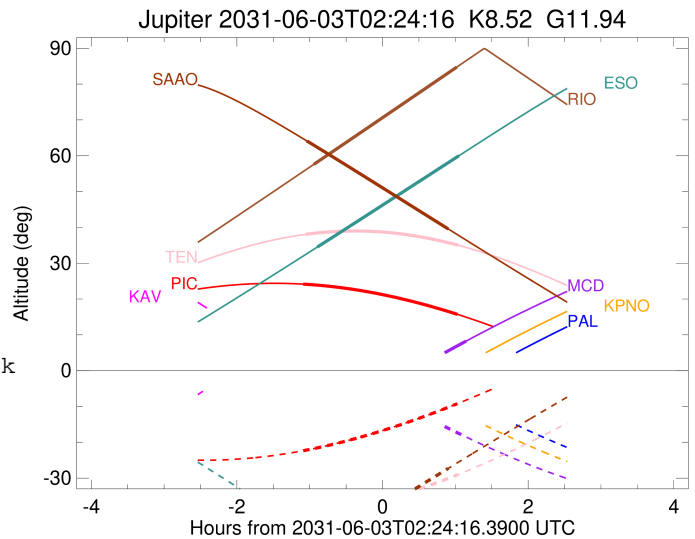
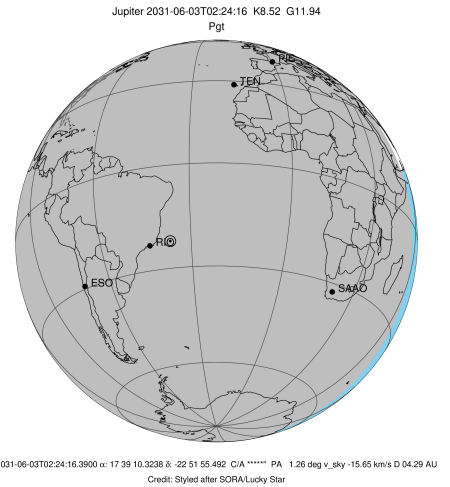


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-03T01:27:37.410	57.57	-70.76	71488.5	-37.77	-41.45
Jupiter	E	2031-06-03T03:25:30.542	84.74	-82.02	71488.6	-37.01	-40.67

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-03T02:28:58.390
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        : 4116750033241355648
2Mass ID (if available) : 17391031-2251552
ICRS Star Coord at Epoch: 17h 39m 10.32384s -22:51:55.49197s
RUWE (>1.4 is poor) : 0.88
K magnitude           : 8.517
G magnitude           : 11.943
RP magnitude          : 10.956
BP magnitude          : 12.902
DUPflag              : 0
Distance (au)         : 4.292
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -15.65
Sun-Target sep (deg) : 166.71
Sun-Moon sep (deg)   : 46.34
B (ring opening deg) : -2.60
PA of pole (deg)     : 1.41
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation ("): 14.354
C/A sky separation (km): 44686.0
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
    
```

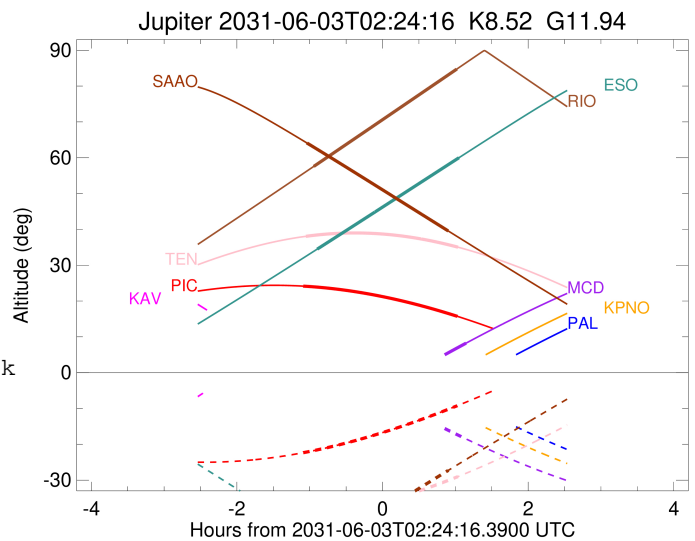
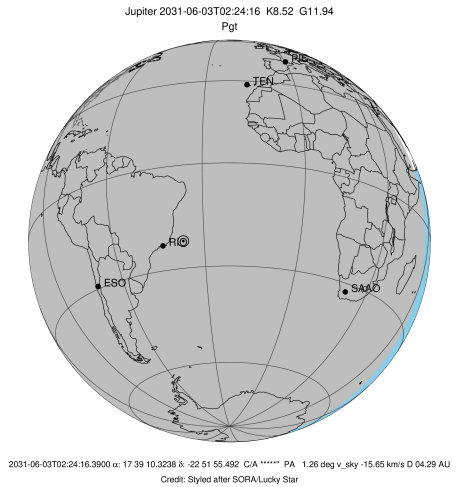


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-03T01:30:27.510	34.48	-46.81	71488.3	-39.27	-42.97
Jupiter	E	2031-06-03T03:27:11.062	59.97	-72.05	71488.5	-38.11	-41.79

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-03T02:20:07.040
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       : 4116750033241355648
2Mass ID (if available) : 17391031-2251552
ICRS Star Coord at Epoch: 17h 39m 10.32384s -22:51:55.49197s
RUWE (>1.4 is poor) : 0.88
K magnitude           : 8.517
G magnitude           : 11.943
RP magnitude          : 10.956
BP magnitude          : 12.902
DUPflag              : 0
Distance (au)         : 4.292
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -15.65
Sun-Target sep (deg) : 166.71
Sun-Moon sep (deg)   : 47.22
B (ring opening deg) : -2.60
PA of pole (deg)     : 1.41
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (") : 14.365
C/A sky separation (km) : 44721.9
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	2031-06-03T01:21:58.849	64.11	-51.80	71488.4	-38.54	-42.23
Jupiter	E	2031-06-03T03:18:29.002	39.55	-27.27	71488.3	-38.93	-42.62