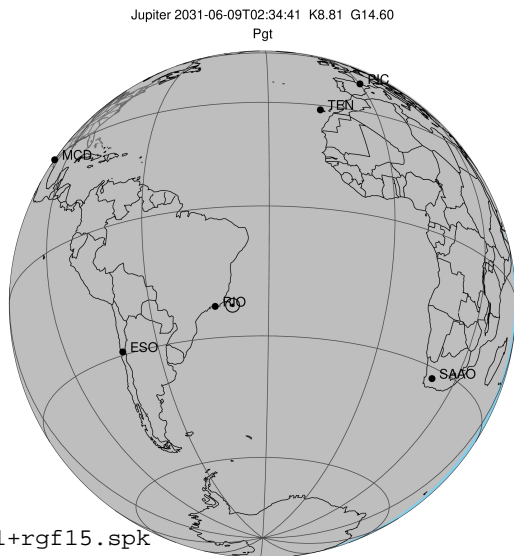


target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2031-06-09T02:34:41.900
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 4116787695891422336
 2Mass ID (if available) : 17355725-2250321

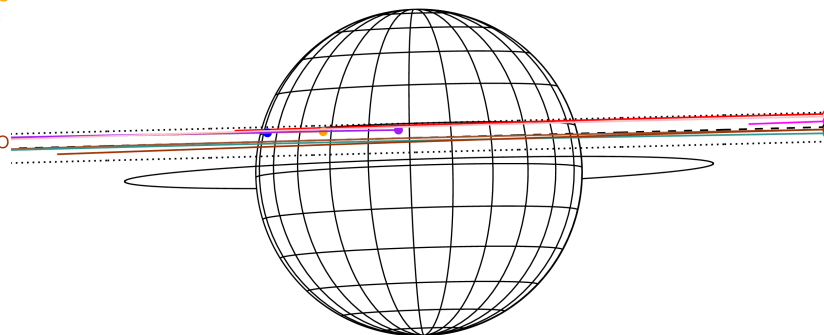
Jupiter 2031-06-09T02:34:41 K8.81 G14.60 Pgt

ICRS Star Coord at Epoch: 17h 35m 57.25912s -22:50:32.22158s
 RUWE (>1.4 is poor) : 0.84
 K magnitude : 8.808
 G magnitude : 14.604
 RP magnitude : 13.147
 BP magnitude : 17.492
 DUPflag : 0
 Distance (au) : 4.273
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -16.24
 Sun-Target sep (deg) : 173.19
 Sun-Moon sep (deg) : 44.03
 B (ring opening deg) : -2.60
 PA of pole (deg) : 1.75
 Pole direction: RA (deg): 268.05692
 Dec (deg): 64.49651
 C/A sky separation (") : 4.915
 C/A sky separation (km) : 15233.1
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk



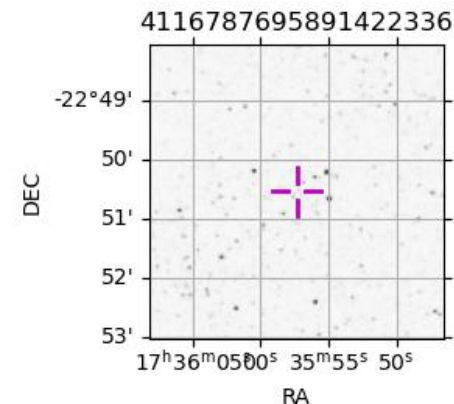
2031-06-09T02:34:41.9000 at: 17 35 57.2591 s: -22 50 32.2222 C/A 4.903" PA 181.51 deg v_sky -16.24 km/s D 04.27 AU
 Credit: Styled after SORA/Lucky Star

Earth
 PIC
 PAL
 KPNO
 MCD
 TEN
 KAV
 RIO
 ESO
 SAAO



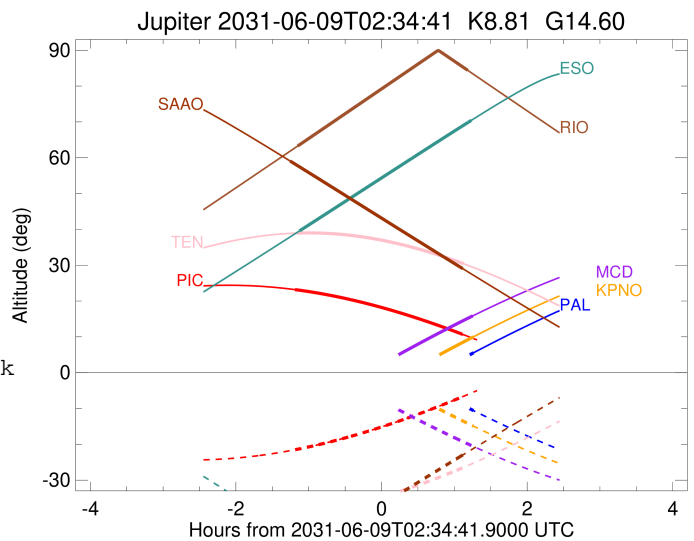
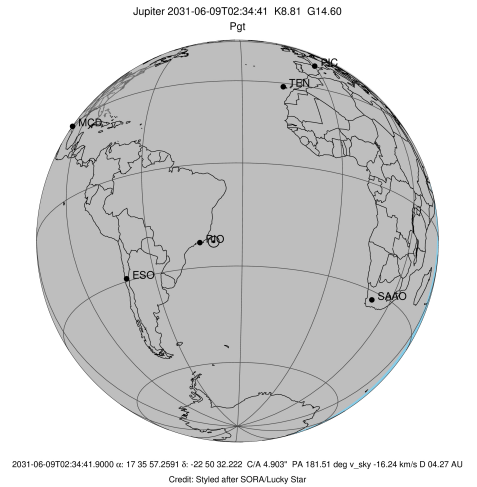
Observable events with sun below -5 deg and altitude above 5 deg

Obs	Location	lat	Elon	Target	Observed Events Interval	OCode
PIC	Pic du Midi	42.9	0.1	+ +	JUN 09 01:23 - JUN 09 03:41	Pie
PAL	Palomar Mt (200")	33.4	243.1	+ +	JUN 09 03:50 - JUN 09 03:50	Pne
PMO	Purple Mtn Obs. Nanking	32.1	118.8	+ +	JUN 09 03:50 - JUN 09 03:50	Pne
KPNO	Kitt Peak Natl Obs	32.0	248.4	+ +	JUN 09 03:50 - JUN 09 03:50	Pne
MCD	McDonald Obs. 2.7m	30.7	256.0	+ +	JUN 09 03:49 - JUN 09 03:49	Pne
TEN	Teide Obs./Tenerife	28.3	343.5	+ +	JUN 09 01:24 - JUN 09 03:42	Pie
IRTF	Mauna Kea/IRTF	19.8	204.5	+ +	JUN 09 01:24 - JUN 09 03:42	Pnn
KAV	Kavalur Observatory	12.6	78.8	+ +	JUN 09 01:24 - JUN 09 03:42	Pnn
RIO	Rio de Janeiro	-22.9	316.8	+ +	JUN 09 01:25 - JUN 09 03:45	Pie
ESO	European Southern Obs. (3.6m)	-29.3	289.3	+ +	JUN 09 01:27 - JUN 09 03:48	Pie
AAT	Siding Spring (AAT)	-31.3	149.1	+ +	JUN 09 01:27 - JUN 09 03:48	Pnn
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8	+ +	JUN 09 01:19 - JUN 09 03:41	Pie
MSO	Mt. Stromlo Observatory	-35.3	149.0	+ +	JUN 09 01:19 - JUN 09 03:41	Pnn



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-09T02:32:25.910
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       : 4116787695891422336
2Mass ID (if available) : 17355725-2250321
ICRS Star Coord at Epoch: 17h 35m 57.25912s -22:50:32.22158s
RUWE (>1.4 is poor) : 0.84
K magnitude          : 8.808
G magnitude          : 14.604
RP magnitude         : 13.147
BP magnitude         : 17.492
DUPflag             : 0
Distance (au)        : 4.273
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.24
Sun-Target sep (deg) : 173.19
Sun-Moon sep (deg)   : 43.93
B (ring opening deg) : -2.60
PA of pole (deg)     : 1.75
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 6.720
C/A sky separation (km) : 20828.9
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
    
```

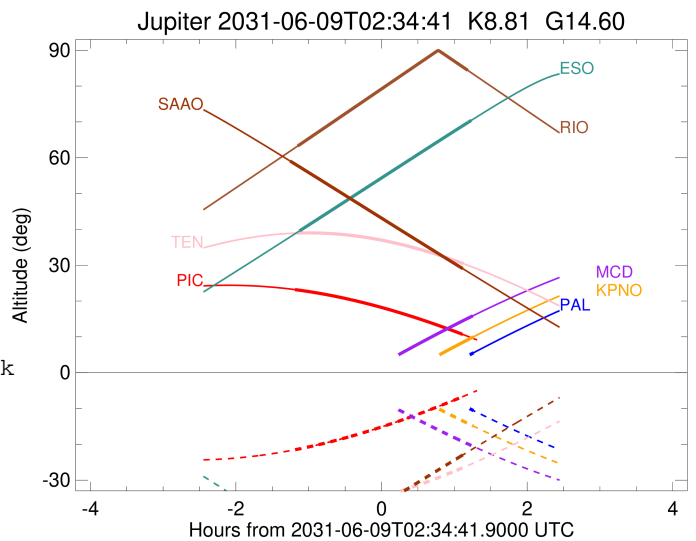
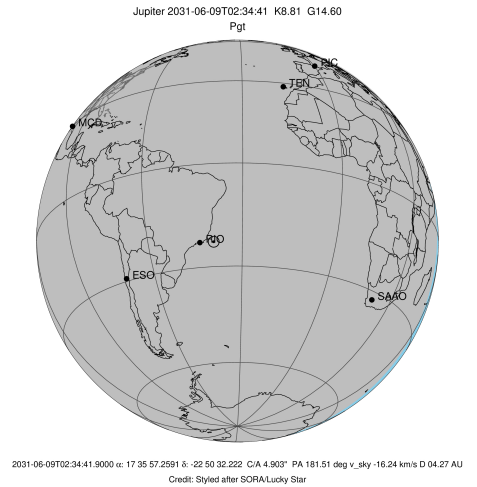


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-09T01:23:33.256	23.17	-21.50	71491.2	16.82	19.06
Jupiter	E	2031-06-09T03:41:30.699	10.70	-6.71	71491.2	16.89	19.14

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-09T02:40:02.740
Event type          : Pgt
                    : Jupiter occs: geocentric, topocentric
                    : Not a ringed target
Observer code       : PAL
Location            : Palomar Mt (200")
Latitude (deg)      : 33.35622
E. Longitude (deg)  : 243.13601
Altitude (km)       : 1.706
Gaia source ID      : 4116787695891422336
2Mass ID (if available) : 17355725-2250321
ICRS Star Coord at Epoch: 17h 35m 57.25912s -22:50:32.22158s
RUWE (>1.4 is poor) : 0.84
K magnitude          : 8.808
G magnitude          : 14.604
RP magnitude         : 13.147
BP magnitude         : 17.492
DUPflag             : 0
Distance (au)       : 4.273
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.24
Sun-Target sep (deg) : 173.19
Sun-Moon sep (deg)  : 44.49
B (ring opening deg) : -2.60
PA of pole (deg)    : 1.75
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation ("): 5.982
C/A sky separation (km): 18540.6
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
    
```

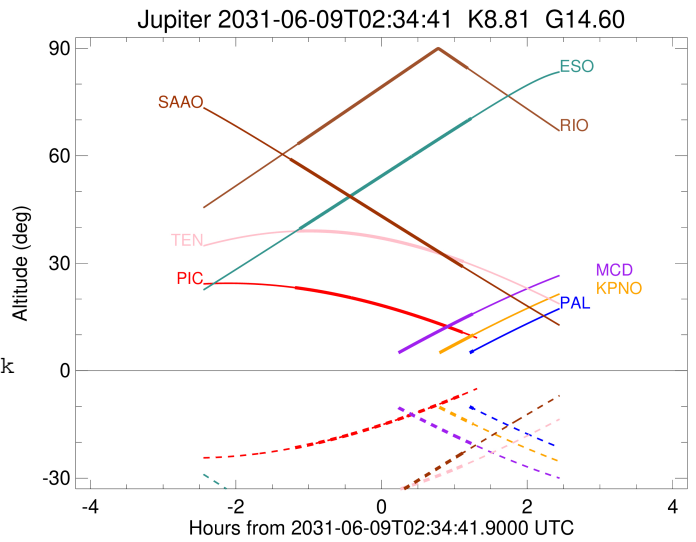
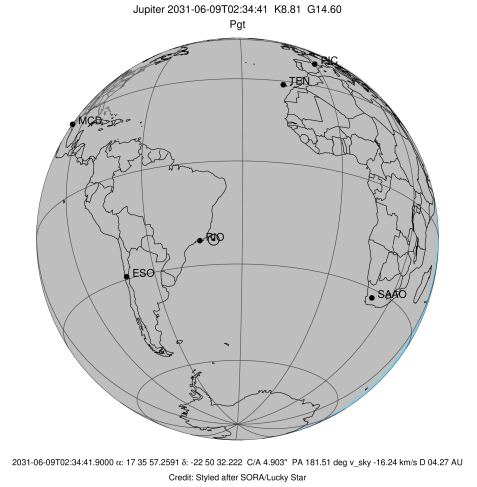


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-09T01:29:05.119	-21.76x	15.77x	71491.4	14.24	16.18
Jupiter	E	2031-06-09T03:50:28.975	5.54	-10.58	71491.3	15.78	17.89

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-09T02:40:03.290
Event type          : Pgt
                    : Jupiter occs: geocentric, topocentric
                    : Not a ringed target
Observer code       : KPNO
Location            : Kitt Peak Natl Obs
Latitude (deg)      : 31.96333
E. Longitude (deg)  : 248.40000
Altitude (km)       : 2.120
Gaia source ID      : 4116787695891422336
2Mass ID (if available) : 17355725-2250321
ICRS Star Coord at Epoch: 17h 35m 57.25912s -22:50:32.22158s
RUWE (>1.4 is poor) : 0.84
K magnitude          : 8.808
G magnitude          : 14.604
RP magnitude         : 13.147
BP magnitude         : 17.492
DUPflag             : 0
Distance (au)       : 4.273
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.24
Sun-Target sep (deg) : 173.19
Sun-Moon sep (deg)  : 44.55
B (ring opening deg) : -2.60
PA of pole (deg)    : 1.75
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (" ) : 6.006
C/A sky separation (km) : 18615.3
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
    
```

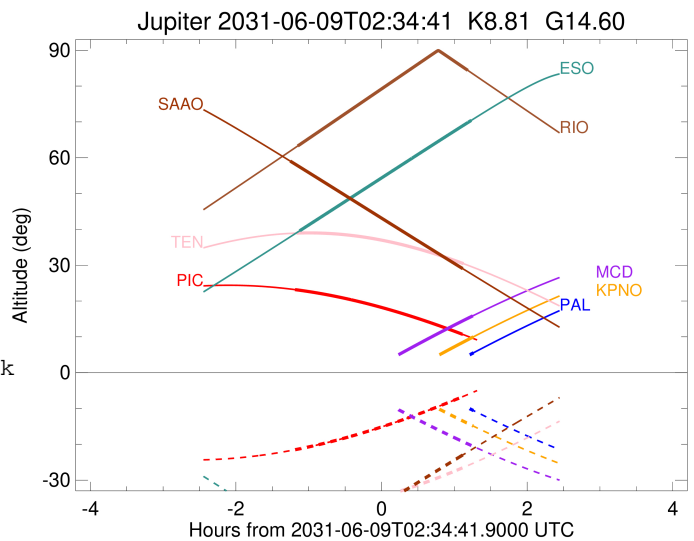
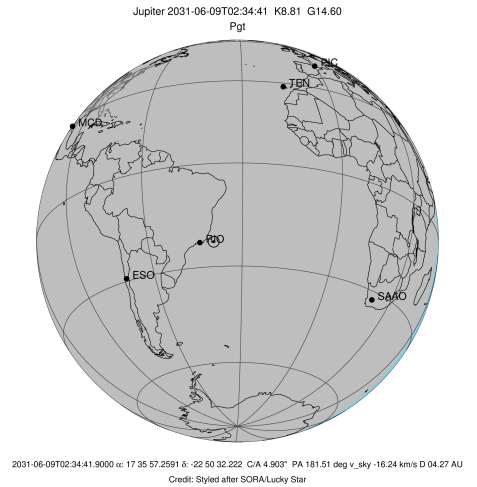


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-09T01:29:16.179	-17.07x	11.09x	71491.4	14.29	16.23
Jupiter	E	2031-06-09T03:50:19.178	9.98	-14.90	71491.3	15.83	17.96

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-09T02:39:56.570
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       : 4116787695891422336
2Mass ID (if available) : 17355725-2250321
ICRS Star Coord at Epoch: 17h 35m 57.25912s -22:50:32.22158s
RUWE (>1.4 is poor) : 0.84
K magnitude          : 8.808
G magnitude          : 14.604
RP magnitude         : 13.147
BP magnitude         : 17.492
DUPflag             : 0
Distance (au)        : 4.273
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.24
Sun-Target sep (deg) : 173.19
Sun-Moon sep (deg)   : 44.62
B (ring opening deg) : -2.60
PA of pole (deg)     : 1.75
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 6.060
C/A sky separation (km) : 18782.1
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
    
```

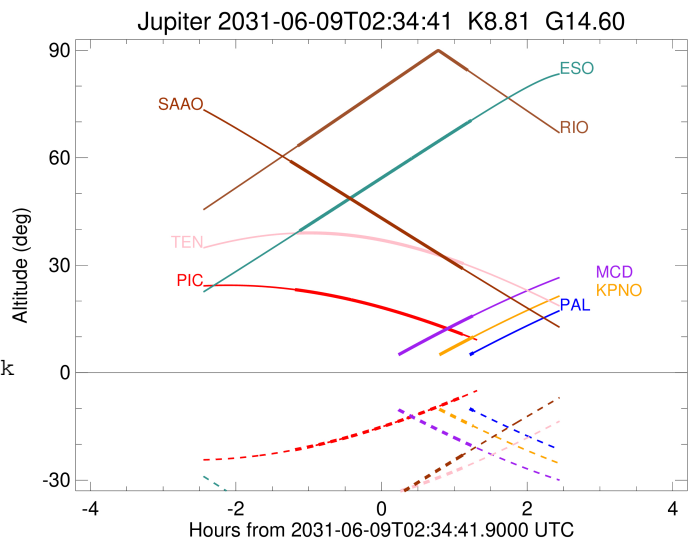
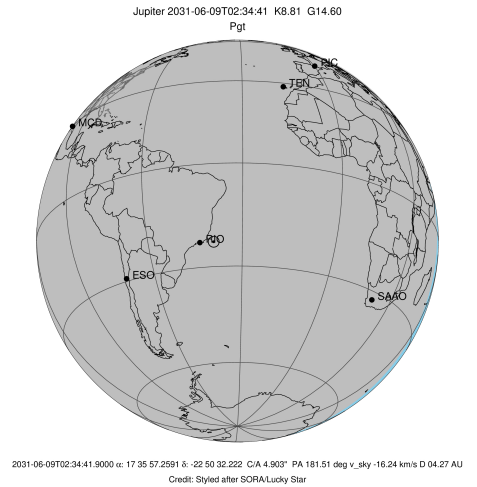


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-09T01:29:25.733	-10.48x	4.56x	71491.4	14.43	16.39
Jupiter	E	2031-06-09T03:49:57.137	15.86	-20.52	71491.3	15.95	18.09


```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-09T02:35:51.260
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      : 4116787695891422336
2Mass ID (if available) : 17355725-2250321
ICRS Star Coord at Epoch: 17h 35m 57.25912s -22:50:32.22158s
RUWE (>1.4 is poor) : 0.84
K magnitude          : 8.808
G magnitude          : 14.604
RP magnitude         : 13.147
BP magnitude         : 17.492
DUPflag             : 0
Distance (au)        : 4.273
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.24
Sun-Target sep (deg) : 173.19
Sun-Moon sep (deg)  : 44.86
B (ring opening deg) : -2.60
PA of pole (deg)    : 1.75
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (" ) : 4.895
C/A sky separation (km) : 15172.3
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
    
```

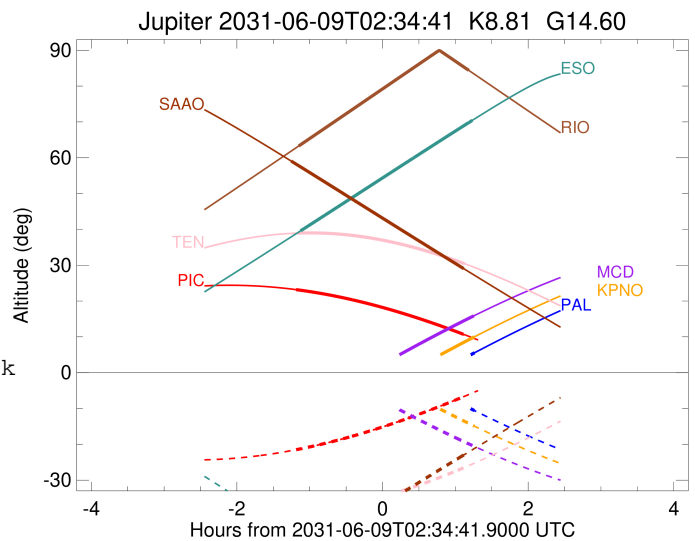
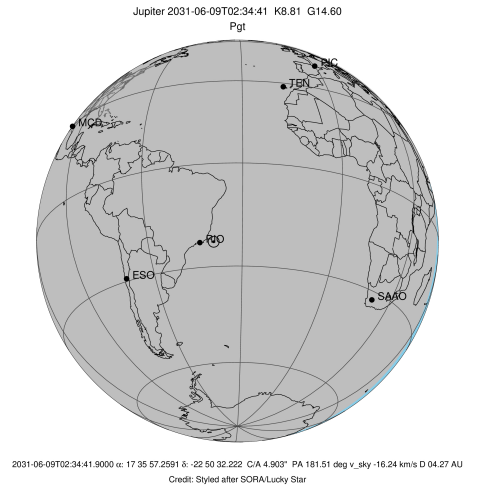


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-09T01:25:51.077	63.31	-70.15	71491.6	11.77	13.39
Jupiter	E	2031-06-09T03:45:44.027	84.39	-77.64	71491.6	12.54	14.27

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-09T02:38:07.710
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        : 4116787695891422336
2Mass ID (if available) : 17355725-2250321
ICRS Star Coord at Epoch: 17h 35m 57.25912s -22:50:32.22158s
RUWE (>1.4 is poor) : 0.84
K magnitude           : 8.808
G magnitude           : 14.604
RP magnitude          : 13.147
BP magnitude          : 17.492
DUPflag              : 0
Distance (au)         : 4.273
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.24
Sun-Target sep (deg) : 173.19
Sun-Moon sep (deg)   : 45.01
B (ring opening deg) : -2.60
PA of pole (deg)     : 1.75
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation ("): 4.515
C/A sky separation (km): 13993.8
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
    
```

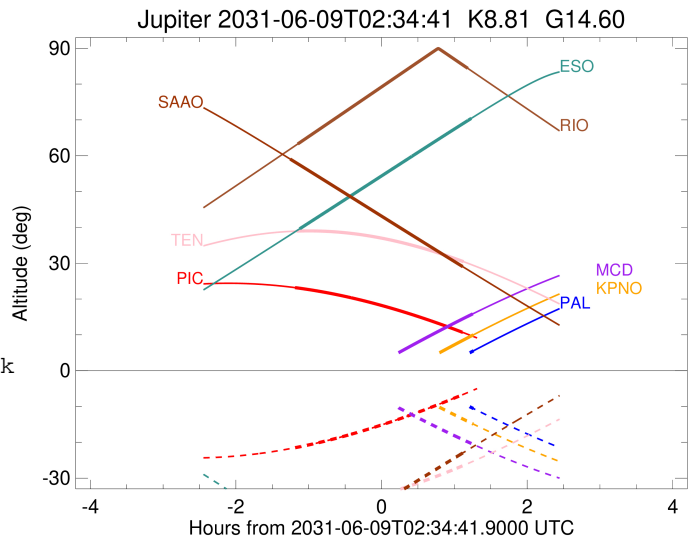
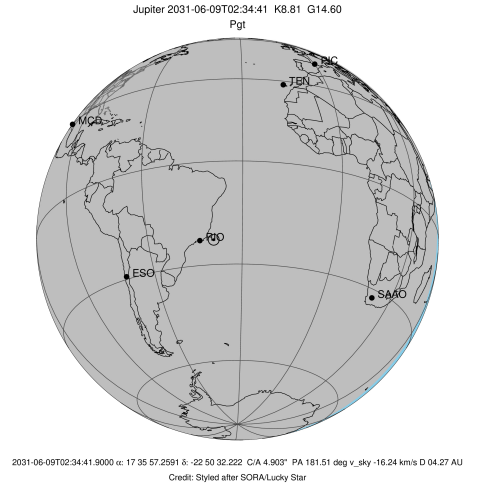


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-09T01:27:20.813	39.62	-46.11	71491.7	10.61	12.09
Jupiter	E	2031-06-09T03:48:34.072	70.39	-76.48	71491.6	11.81	13.45


```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-09T02:30:26.210
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       : 4116787695891422336
2Mass ID (if available) : 17355725-2250321
ICRS Star Coord at Epoch: 17h 35m 57.25912s -22:50:32.22158s
RUWE (>1.4 is poor) : 0.84
K magnitude          : 8.808
G magnitude          : 14.604
RP magnitude         : 13.147
BP magnitude         : 17.492
DUPflag             : 0
Distance (au)        : 4.273
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.24
Sun-Target sep (deg) : 173.19
Sun-Moon sep (deg)   : 44.04
B (ring opening deg) : -2.60
PA of pole (deg)     : 1.75
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation ("): 4.360
C/A sky separation (km): 13512.1
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	2031-06-09T01:19:38.539	59.02	-52.78	71491.7	10.97	12.49
Jupiter	E	2031-06-09T03:41:37.143	29.04	-22.99	71491.7	10.68	12.17