

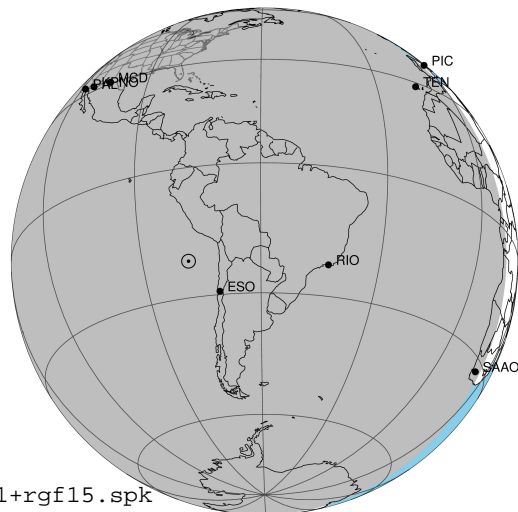
target : Jupiter  
 target radius (km) : 71492.00  
 C/A epoch : 2031-05-30T05:09:15.980  
 Event type : Pgt  
 : Jupiter occs: geocentric, topocentric  
 : Not a ringed target  
 Gaia source ID : 4116553564260083712  
 2Mass ID (if available) : 17411012-2252106

Jupiter 2031-05-30T05:09:15 K8.60 G14.36 Pgt

ICRS Star Coord at Epoch: 17h 41m 10.10824s -22:52:10.79245s

RUWE (>1.4 is poor) : 0.93  
 K magnitude : 8.595  
 G magnitude : 14.356  
 RP magnitude : 12.924  
 BP magnitude : 16.916  
 DUPflag : 0  
 Distance (au) : 4.310  
 f0 (km) : 0.00  
 g0 (km) : 0.00  
 skyplane vel. (km/s) : -15.09  
 Sun-Target sep (deg) : 162.53  
 Sun-Moon sep (deg) : 98.88  
 B (ring opening deg) : -2.61  
 PA of pole (deg) : 1.19  
 Pole direction: RA (deg): 268.05693  
 Dec (deg): 64.49651  
 C/A sky separation (") : 4.813  
 C/A sky separation (km) : 15046.8  
 NAIF SPICE kernels : RAJobs\_U111+rgf15.spk

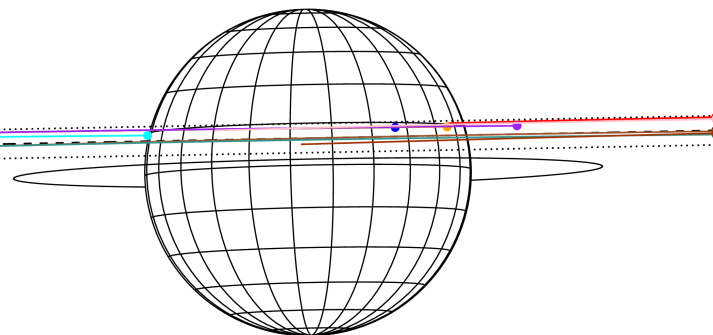
Jupiter 2031-05-30T05:09:15 K8.60 G14.36  
 Pgt



2031-05-30T05:09:15.9800 at: 17 41 10.10824 s: -22 52 10.792 C/A 4.801" PA 181.09 deg v\_sky -15.09 km/s D 04.31 AU  
 Credit: Styled after SORA/Lucky Star

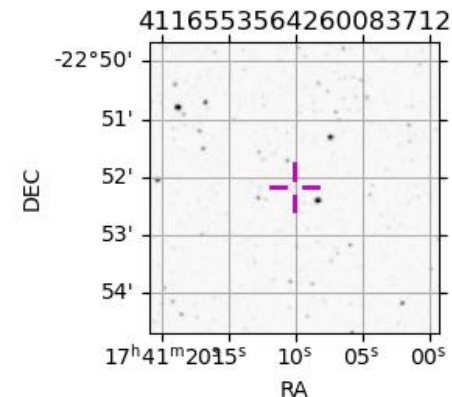
Earth

- PIC
- PAL
- KPNO
- MCD
- TEN
- IRTF
- RIO
- ESO
- SAAO



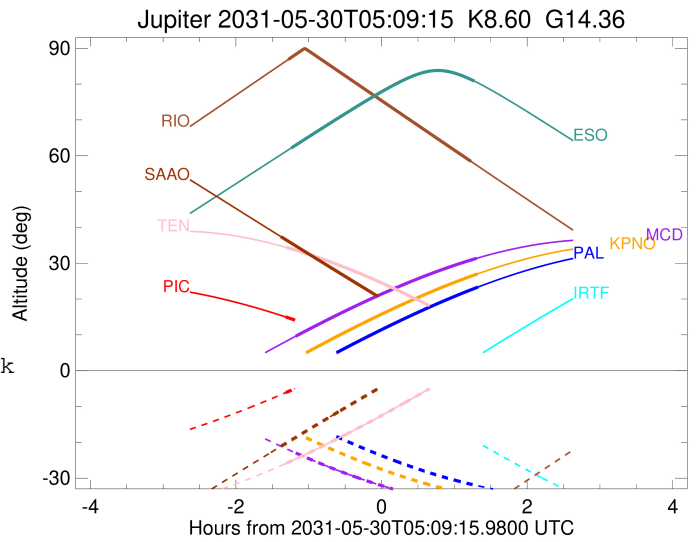
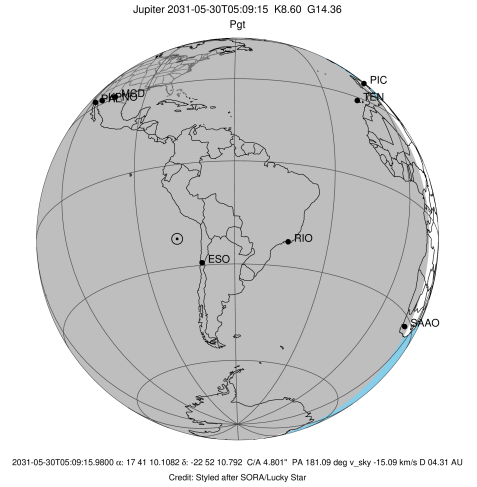
Observable events with sun below -5 deg and altitude above 5 deg

Obs	Location	lat	Elon	Target	Observed Events	Interval	OCode
PIC	Pic du Midi	42.9	0.1	+	MAY 30 03:50	- MAY 30 03:50	Pin
PAL	Palomar Mt (200")	33.4	243.1	+	MAY 30 06:28	- MAY 30 06:28	Pne
PMO	Purple Mtn Obs. Nanking	32.1	118.8				Pnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+	MAY 30 06:28	- MAY 30 06:28	Pne
MCD	McDonald Obs. 2.7m	30.7	256.0	+	MAY 30 03:58	- MAY 30 06:27	Pie
TEN	Teide Obs./Tenerife	28.3	343.5	+	MAY 30 03:51	- MAY 30 03:51	Pin
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	+	MAY 30 03:52	- MAY 30 06:22	Pie
ESO	European Southern Obs. (3.6m)	-29.3	289.3	+	MAY 30 03:54	- MAY 30 06:25	Pie
AAT	Siding Spring (AAT)	-31.3	149.1				Pnn
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8	+	MAY 30 03:46	- MAY 30 03:46	Pin
MSO	Mt. Stromlo Observatory	-35.3	149.0				Pnn



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-30T05:05:07.260
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       : 4116553564260083712
2Mass ID (if available) : 17411012-2252106
ICRS Star Coord at Epoch: 17h 41m 10.10824s -22:52:10.79245s
RUWE (>1.4 is poor) : 0.93
K magnitude          : 8.595
G magnitude          : 14.356
RP magnitude         : 12.924
BP magnitude         : 16.916
DUPflag             : 0
Distance (au)        : 4.310
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -15.09
Sun-Target sep (deg) : 162.53
Sun-Moon sep (deg)  : 98.86
B (ring opening deg) : -2.61
PA of pole (deg)    : 1.19
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (") : 6.414
C/A sky separation (km) : 20052.6
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
    
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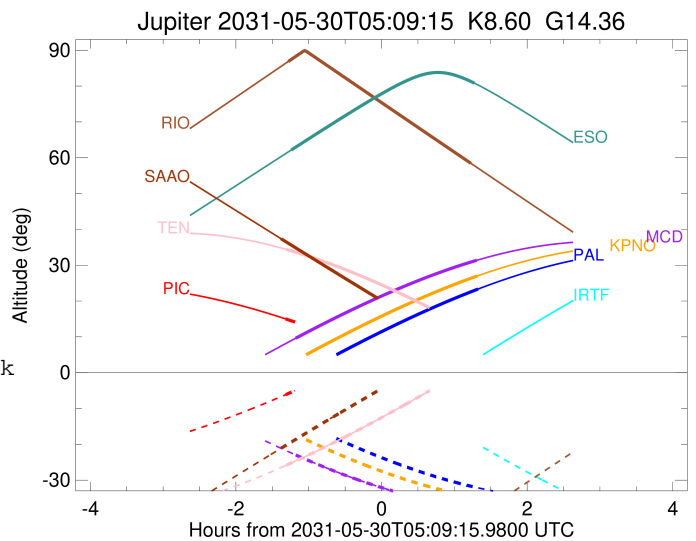
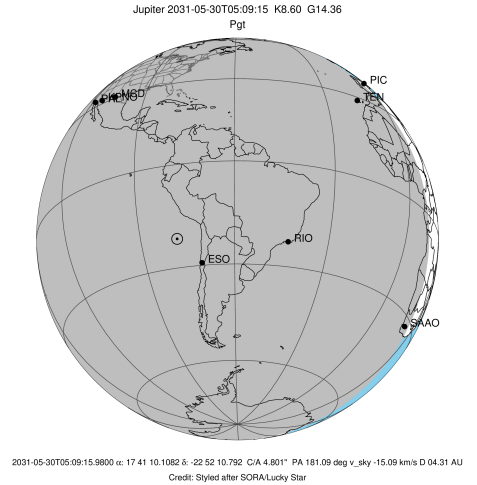


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-30T03:50:23.999	14.98	-6.12	71491.2	16.53	18.74
Jupiter	E	2031-05-30T06:20:15.530	-6.43x	18.70x	71491.3	15.92	18.05

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-30T05:14:04.710
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      : 4116553564260083712
2Mass ID (if available) : 17411012-2252106
ICRS Star Coord at Epoch: 17h 41m 10.10824s -22:52:10.79245s
RUWE (>1.4 is poor) : 0.93
K magnitude          : 8.595
G magnitude          : 14.356
RP magnitude         : 12.924
BP magnitude         : 16.916
DUPflag             : 0
Distance (au)       : 4.310
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -15.09
Sun-Target sep (deg) : 162.53
Sun-Moon sep (deg)  : 99.16
B (ring opening deg) : -2.61
PA of pole (deg)    : 1.19
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (") : 6.184
C/A sky separation (km) : 19332.6
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
    
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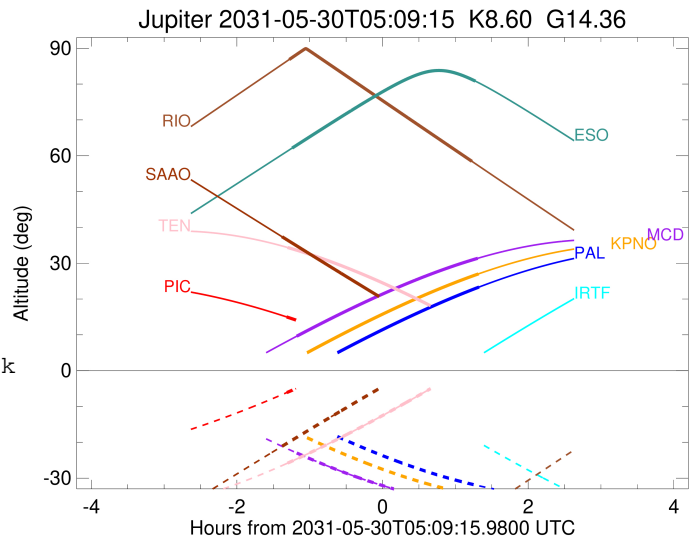
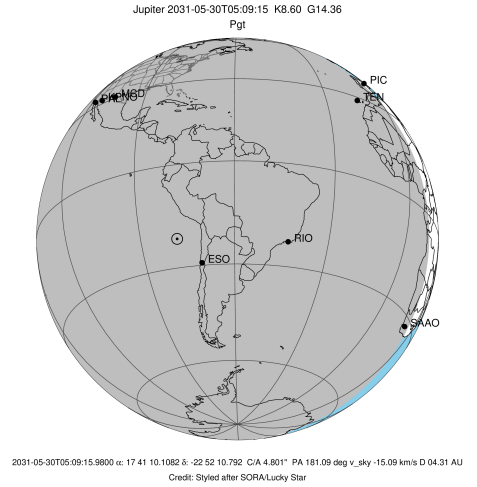


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-30T03:58:47.995	-1.10x	-13.06	71491.4	15.05	17.08
Jupiter	E	2031-05-30T06:28:48.384	23.34	-32.15	71491.3	16.19	18.36

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-30T05:13:50.690
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        : 4116553564260083712
2Mass ID (if available) : 17411012-2252106
ICRS Star Coord at Epoch: 17h 41m 10.10824s -22:52:10.79245s
RUWE (>1.4 is poor) : 0.93
K magnitude           : 8.595
G magnitude           : 14.356
RP magnitude          : 12.924
BP magnitude          : 16.916
DUPflag              : 0
Distance (au)         : 4.310
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -15.09
Sun-Target sep (deg) : 162.53
Sun-Moon sep (deg)   : 99.23
B (ring opening deg) : -2.61
PA of pole (deg)     : 1.19
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation ("): 6.202
C/A sky separation (km): 19389.1
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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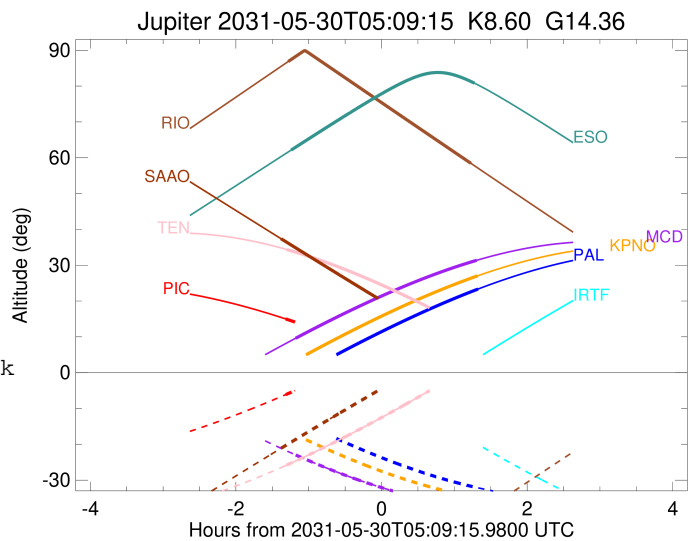
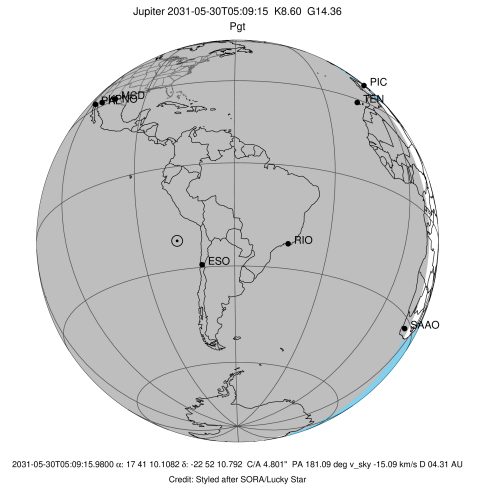


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-30T03:58:45.059	3.46x	-17.38	71491.4	15.11	17.15
Jupiter	E	2031-05-30T06:28:24.988	27.02	-34.84	71491.3	16.21	18.38

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-30T05:13:23.650
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       : 4116553564260083712
2Mass ID (if available) : 17411012-2252106
ICRS Star Coord at Epoch: 17h 41m 10.10824s -22:52:10.79245s
RUWE (>1.4 is poor) : 0.93
K magnitude          : 8.595
G magnitude          : 14.356
RP magnitude         : 12.924
BP magnitude         : 16.916
DUPflag             : 0
Distance (au)        : 4.310
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -15.09
Sun-Target sep (deg) : 162.53
Sun-Moon sep (deg)   : 99.30
B (ring opening deg) : -2.61
PA of pole (deg)     : 1.19
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (") : 6.240
C/A sky separation (km) : 19506.4
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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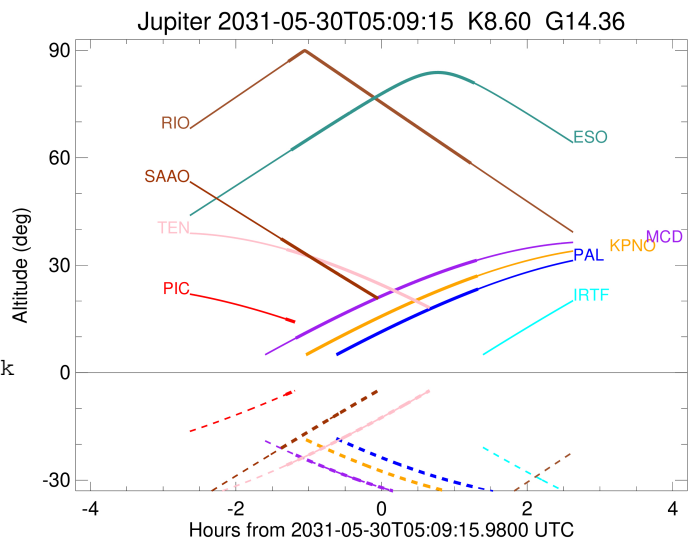
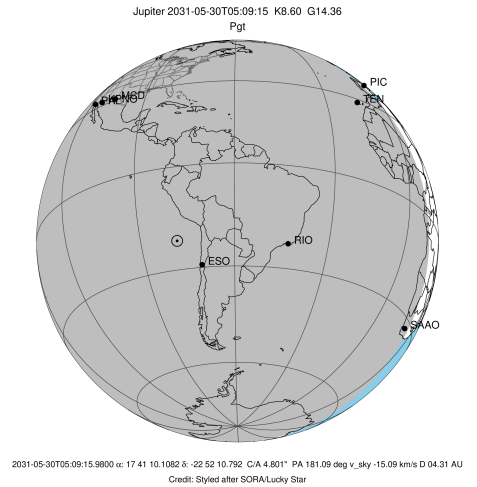


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-30T03:58:33.600	9.61	-22.96	71491.4	15.24	17.30
Jupiter	E	2031-05-30T06:27:45.504	31.37	-37.38	71491.3	16.26	18.43

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-30T05:05:21.690
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        : 4116553564260083712
2Mass ID (if available) : 17411012-2252106
ICRS Star Coord at Epoch: 17h 41m 10.10824s -22:52:10.79245s
RUWE (>1.4 is poor)  : 0.93
K magnitude           : 8.595
G magnitude           : 14.356
RP magnitude          : 12.924
BP magnitude          : 16.916
DUPflag              : 0
Distance (au)         : 4.310
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -15.09
Sun-Target sep (deg)  : 162.53
Sun-Moon sep (deg)    : 99.17
B (ring opening deg) : -2.61
PA of pole (deg)      : 1.19
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (") : 6.241
C/A sky separation (km) : 19509.9
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
    
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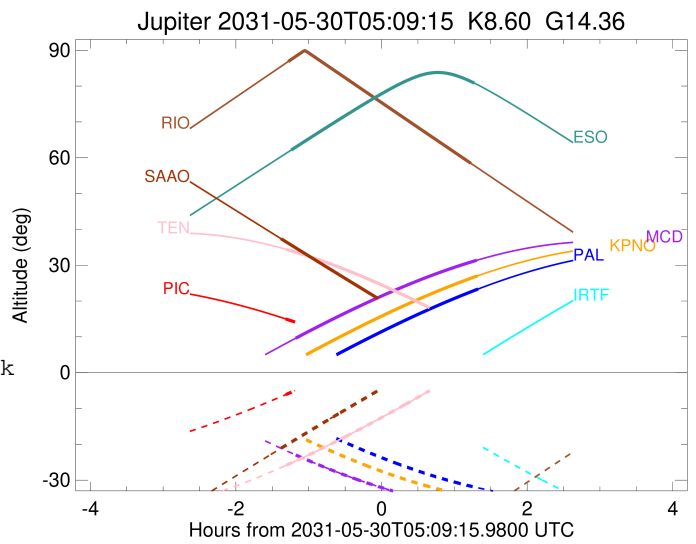
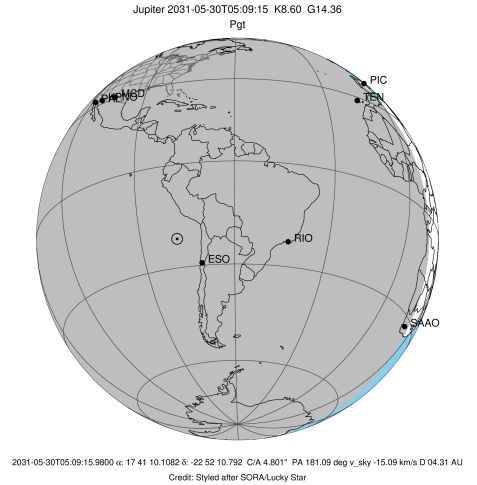


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-30T03:51:02.911	34.38	-25.81	71491.3	16.02	18.16
Jupiter	E	2031-05-30T06:20:03.294	12.64	1.16x	71491.3	15.47	17.55

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-30T05:07:34.690
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      : 4116553564260083712
2Mass ID (if available) : 17411012-2252106
ICRS Star Coord at Epoch: 17h 41m 10.10824s -22:52:10.79245s
RUWE (>1.4 is poor) : 0.93
K magnitude          : 8.595
G magnitude          : 14.356
RP magnitude         : 12.924
BP magnitude         : 16.916
DUPflag             : 0
Distance (au)       : 4.310
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -15.09
Sun-Target sep (deg) : 162.53
Sun-Moon sep (deg)  : 99.73
B (ring opening deg) : -2.61
PA of pole (deg)    : 1.19
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (") : 4.799
C/A sky separation (km) : 15003.0
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
    
```



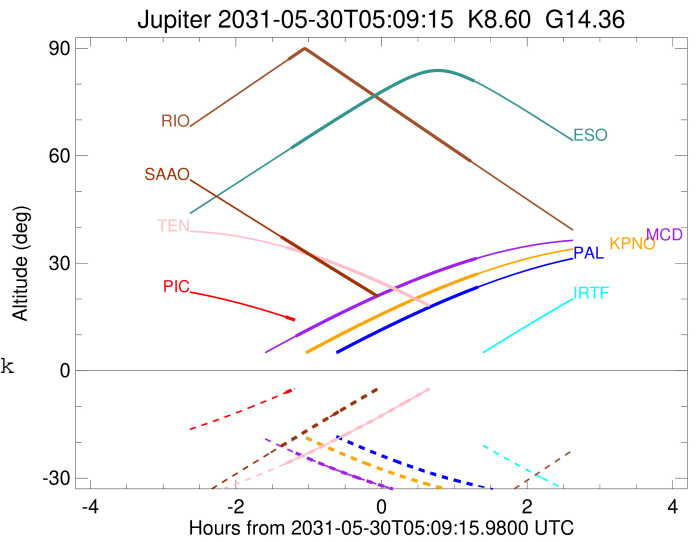
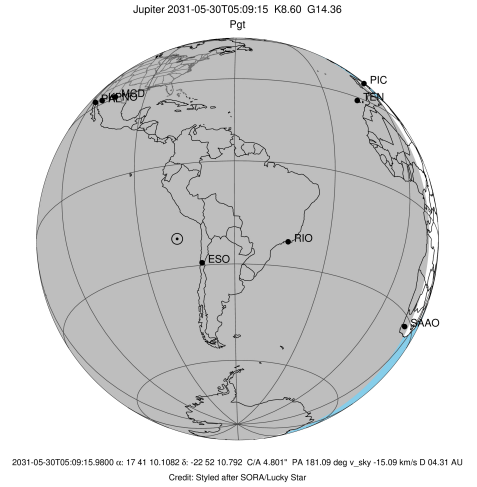
x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-30T03:52:26.155	86.85	-75.62	71491.6	12.04	13.71
Jupiter	E	2031-05-30T06:22:51.466	58.45	-41.11	71491.6	11.96	13.61



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-30T05:10:25.660
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      : 4116553564260083712
2Mass ID (if available) : 17411012-2252106
ICRS Star Coord at Epoch: 17h 41m 10.10824s -22:52:10.79245s
RUWE (>1.4 is poor) : 0.93
K magnitude          : 8.595
G magnitude          : 14.356
RP magnitude         : 12.924
BP magnitude         : 16.916
DUPflag             : 0
Distance (au)        : 4.310
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -15.09
Sun-Target sep (deg) : 162.53
Sun-Moon sep (deg)  : 99.81
B (ring opening deg) : -2.61
PA of pole (deg)    : 1.19
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (" ) : 4.573
C/A sky separation (km) : 14297.0
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
    
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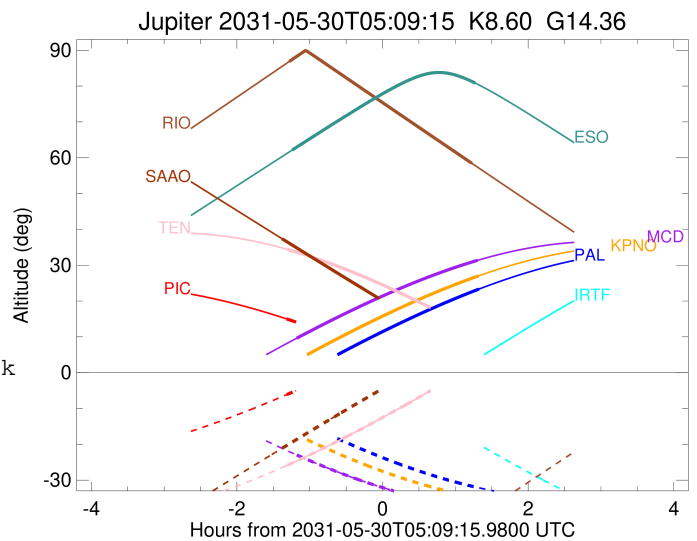
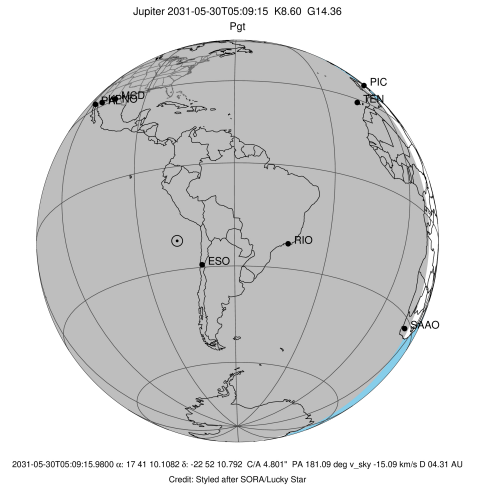
x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-30T03:54:54.038	62.15	-77.36	71491.6	11.20	12.75
Jupiter	E	2031-05-30T06:25:47.242	80.81	-65.17	71491.6	11.66	13.27



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-30T05:03:31.080
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      : 4116553564260083712
2Mass ID (if available) : 17411012-2252106
ICRS Star Coord at Epoch: 17h 41m 10.10824s -22:52:10.79245s
RUWE (>1.4 is poor) : 0.93
K magnitude         : 8.595
G magnitude         : 14.356
RP magnitude        : 12.924
BP magnitude        : 16.916
DUPflag            : 0
Distance (au)       : 4.310
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -15.09
Sun-Target sep (deg) : 162.53
Sun-Moon sep (deg)  : 99.08
B (ring opening deg) : -2.61
PA of pole (deg)    : 1.19
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (") : 3.973
C/A sky separation (km) : 12421.4
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	2031-05-30T03:46:27.530	37.39	-21.11	71491.7	10.42	11.87
Jupiter	E	2031-05-30T06:21:11.350	5.72	8.97x	71491.7	9.51	10.85