

target : Jupiter  
 target radius (km) : 71492.00  
 C/A epoch : 2031-06-08T02:55:29.640  
 Event type : Pgt  
 : Jupiter occs: geocentric, topocentric  
 : Not a ringed target  
 Gaia source ID : 4116785290709356544  
 2Mass ID (if available) : 17362943-2250529

Jupiter 2031-06-08T02:55:29 K9.70 G14.33 Pgt

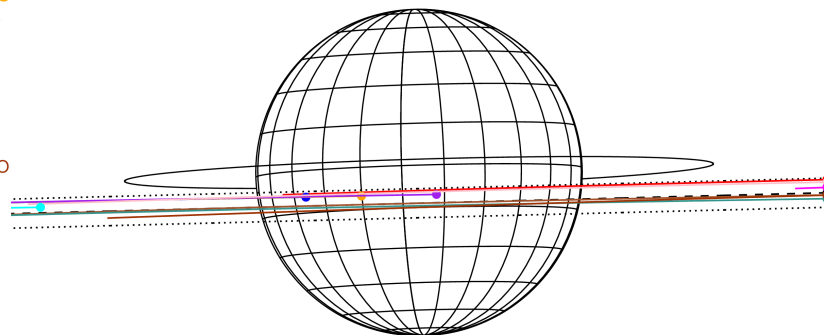
ICRS Star Coord at Epoch: 17h 36m 29.42951s -22:50:53.01954s

RUWE (>1.4 is poor) : 0.97  
 K magnitude : 9.699  
 G magnitude : 14.335  
 RP magnitude : 13.128  
 BP magnitude : 15.930  
 DUPflag : 0  
 Distance (au) : 4.276  
 f0 (km) : 0.00  
 g0 (km) : 0.00  
 skyplane vel. (km/s) : -16.17  
 Sun-Target sep (deg) : 172.13  
 Sun-Moon sep (deg) : 29.36  
 B (ring opening deg) : -2.60  
 PA of pole (deg) : 1.69  
 Pole direction: RA (deg): 268.05693  
 Dec (deg): 64.49651  
 C/A sky separation (") : 4.334  
 C/A sky separation (km) : 13441.6  
 NAIF SPICE kernels : RAJobs\_U111+rgf15.spk

Jupiter 2031-06-08T02:55:29 K9.70 G14.33  
 Pgt



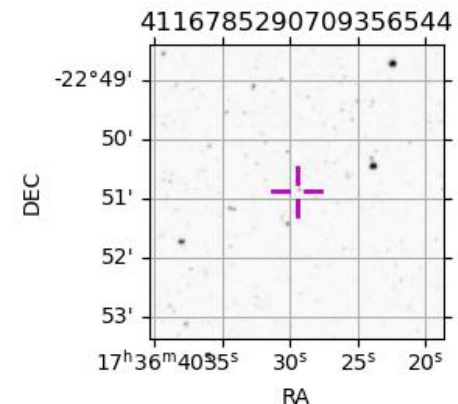
Earth  
 PIC  
 PAL  
 KPNO  
 MCD  
 TEN  
 IRTF  
 KAV  
 RIO  
 ESO  
 SAAO



2031-06-08T02:55:29.6400 a: 17 36 29.4295 s: -22 50 53.020 C/A 4.347" PA 1.46 deg v\_sky -16.17 km/s D 04.28 AU  
 Credit: Styled after SORA/Lucky Star

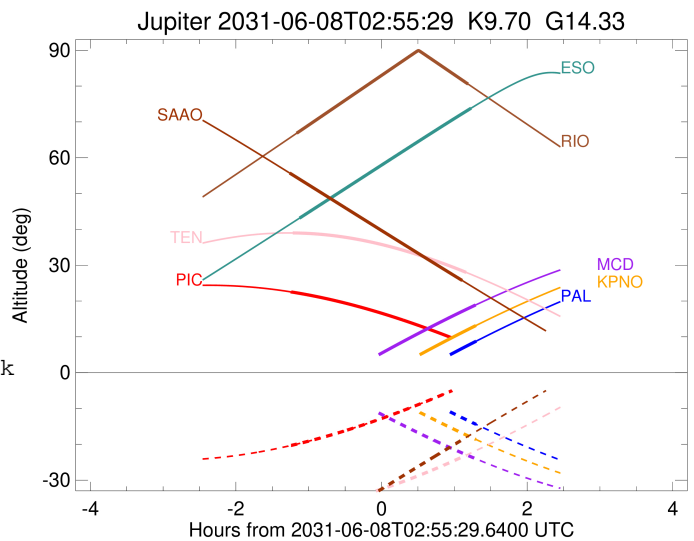
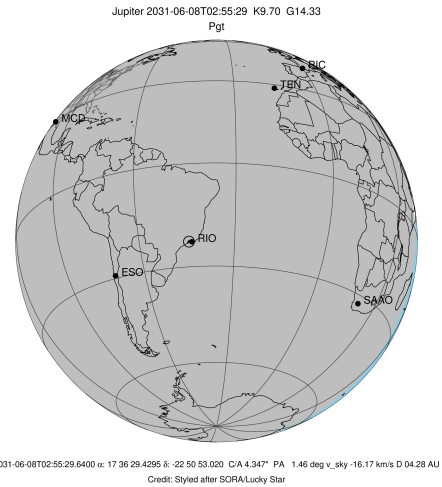
Observable events with sun below -5 deg and altitude above 5 deg

Obs	Location	lat	Elon	Target	Observed Events Interval	OCode
PIC	Pic du Midi	42.9	0.1	+	JUN 08 01:40 - JUN 08 01:40	Pin
PAL	Palomar Mt (200")	33.4	243.1	+	JUN 08 04:13 - JUN 08 04:13	Pne
PMO	Purple Mtn Obs. Nanking	32.1	118.8			Pnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+	JUN 08 04:13 - JUN 08 04:13	Pne
MCD	McDonald Obs. 2.7m	30.7	256.0	+	JUN 08 04:12 - JUN 08 04:12	Pne
TEN	Teide Obs./Tenerife	28.3	343.5	+	JUN 08 01:42 - JUN 08 04:05	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 08 01:45 - JUN 08 04:06	Pie
ESO	European Southern Obs. (3.6m)	-29.3	289.3	+	JUN 08 01:47 - JUN 08 04:09	Pie
AAT	Siding Spring (AAT)	-31.3	149.1			Pnn
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8	+	JUN 08 01:39 - JUN 08 04:01	Pie
MSO	Mt. Stromlo Observatory	-35.3	149.0			Pnn



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-08T02:52:48.910
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        : 4116785290709356544
2Mass ID (if available) : 17362943-2250529
ICRS Star Coord at Epoch: 17h 36m 29.42951s -22:50:53.01954s
RUWE (>1.4 is poor)  : 0.97
K magnitude           : 9.699
G magnitude           : 14.335
RP magnitude          : 13.128
BP magnitude          : 15.930
DUPflag              : 0
Distance (au)         : 4.276
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.17
Sun-Target sep (deg)  : 172.13
Sun-Moon sep (deg)    : 29.06
B (ring opening deg)  : -2.60
PA of pole (deg)      : 1.69
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (") : 2.551
C/A sky separation (km) : 7910.5
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
    
```

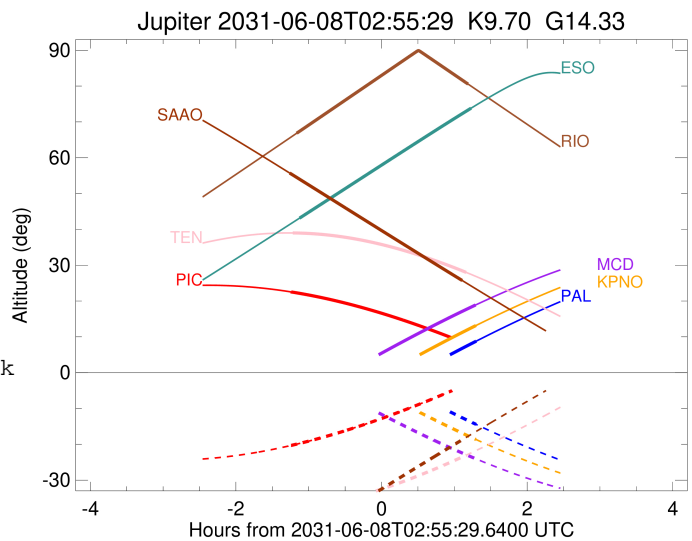
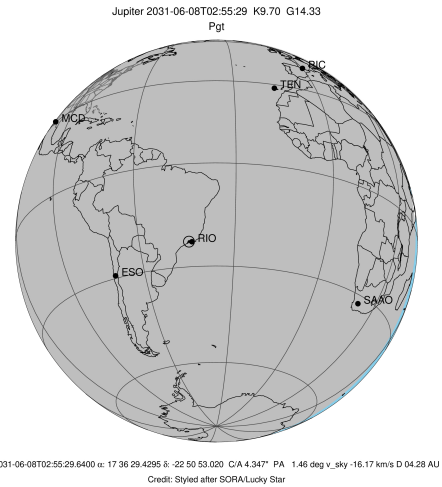


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-08T01:40:55.660	22.54	-20.32	71491.9	-6.40	-7.31
Jupiter	E	2031-06-08T04:04:57.116	8.17	-3.35x	71491.9	-6.42	-7.33

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-08T03:01:05.020
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      : 4116785290709356544
2Mass ID (if available) : 17362943-2250529
ICRS Star Coord at Epoch: 17h 36m 29.42951s -22:50:53.01954s
RUWE (>1.4 is poor) : 0.97
K magnitude          : 9.699
G magnitude          : 14.335
RP magnitude         : 13.128
BP magnitude         : 15.930
DUPflag             : 0
Distance (au)       : 4.276
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.17
Sun-Target sep (deg) : 172.13
Sun-Moon sep (deg)  : 29.99
B (ring opening deg) : -2.60
PA of pole (deg)    : 1.69
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation ("): 3.219
C/A sky separation (km): 9981.7
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
    
```

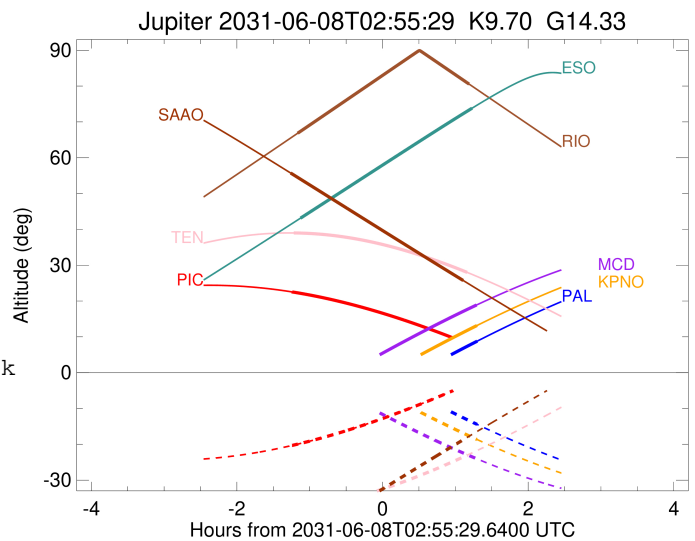
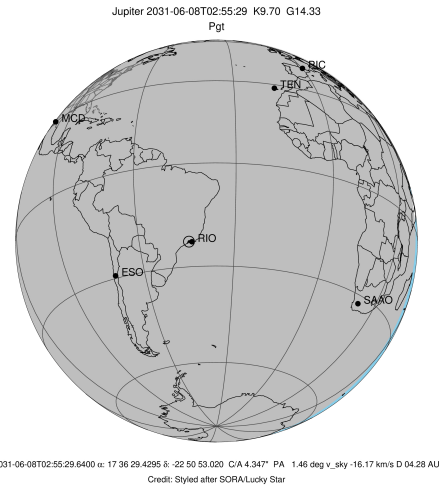


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-08T01:48:06.788	-18.80x	11.92x	71491.8	-8.78	-10.01
Jupiter	E	2031-06-08T04:13:29.608	8.79	-14.45	71491.8	-7.28	-8.31

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-08T03:01:03.390
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       : 4116785290709356544
2Mass ID (if available) : 17362943-2250529
ICRS Star Coord at Epoch: 17h 36m 29.42951s -22:50:53.01954s
RUWE (>1.4 is poor) : 0.97
K magnitude          : 9.699
G magnitude          : 14.335
RP magnitude         : 13.128
BP magnitude         : 15.930
DUPflag             : 0
Distance (au)        : 4.276
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.17
Sun-Target sep (deg) : 172.13
Sun-Moon sep (deg)   : 30.03
B (ring opening deg) : -2.60
PA of pole (deg)     : 1.69
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation ("): 3.195
C/A sky separation (km): 9906.7
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
    
```

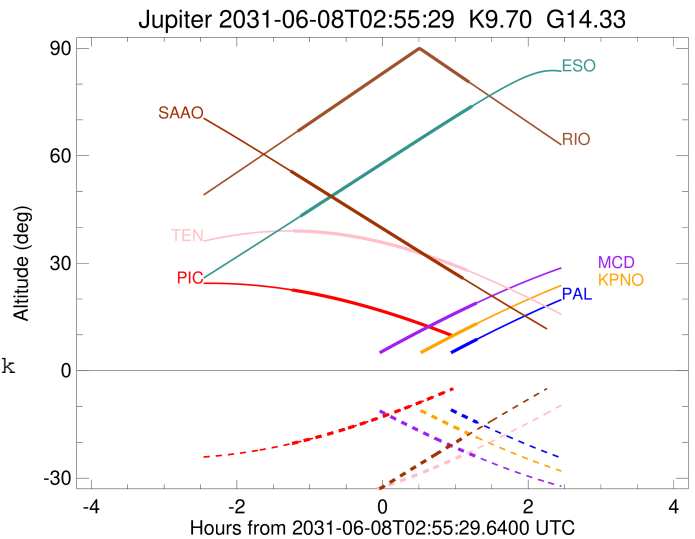
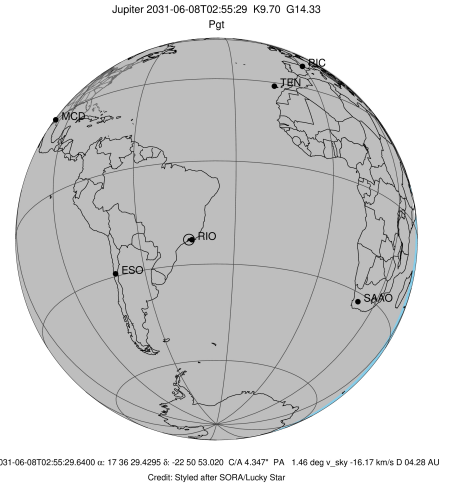


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-08T01:48:14.375	-14.13x	7.25x	71491.8	-8.73	-9.95
Jupiter	E	2031-06-08T04:13:19.114	13.16	-18.65	71491.9	-7.23	-8.25

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-08T03:00:53.160
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        : 4116785290709356544
2Mass ID (if available) : 17362943-2250529
ICRS Star Coord at Epoch: 17h 36m 29.42951s -22:50:53.01954s
RUWE (>1.4 is poor) : 0.97
K magnitude           : 9.699
G magnitude           : 14.335
RP magnitude          : 13.128
BP magnitude          : 15.930
DUPflag              : 0
Distance (au)         : 4.276
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.17
Sun-Target sep (deg) : 172.13
Sun-Moon sep (deg)   : 30.06
B (ring opening deg) : -2.60
PA of pole (deg)     : 1.69
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (") : 3.142
C/A sky separation (km) : 9743.2
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
    
```

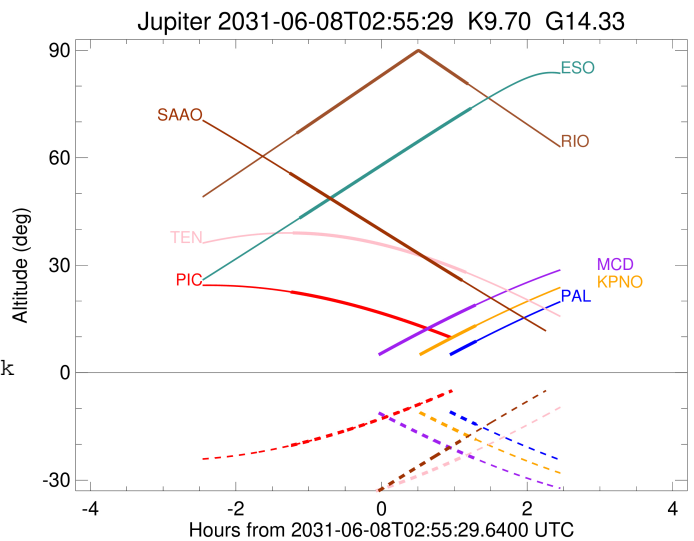
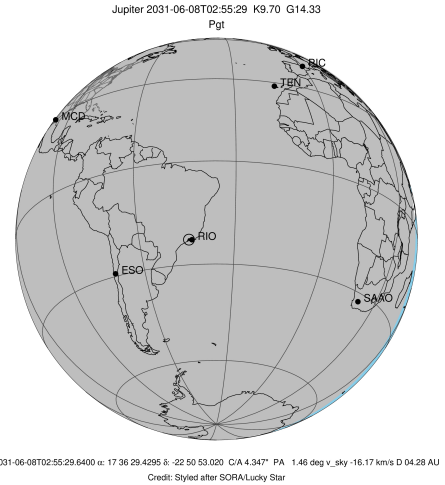


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-08T01:48:16.953	-7.59x	0.80x	71491.8	-8.59	-9.80
Jupiter	E	2031-06-08T04:12:57.363	18.88	-24.00	71491.9	-7.12	-8.13

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-08T02:53:43.790
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       : 4116785290709356544
2Mass ID (if available) : 17362943-2250529
ICRS Star Coord at Epoch: 17h 36m 29.42951s -22:50:53.01954s
RUWE (>1.4 is poor) : 0.97
K magnitude           : 9.699
G magnitude           : 14.335
RP magnitude          : 13.128
BP magnitude          : 15.930
DUPflag              : 0
Distance (au)        : 4.276
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.17
Sun-Target sep (deg) : 172.13
Sun-Moon sep (deg)   : 29.34
B (ring opening deg) : -2.60
PA of pole (deg)     : 1.69
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation ("): 2.761
C/A sky separation (km): 8562.9
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
    
```

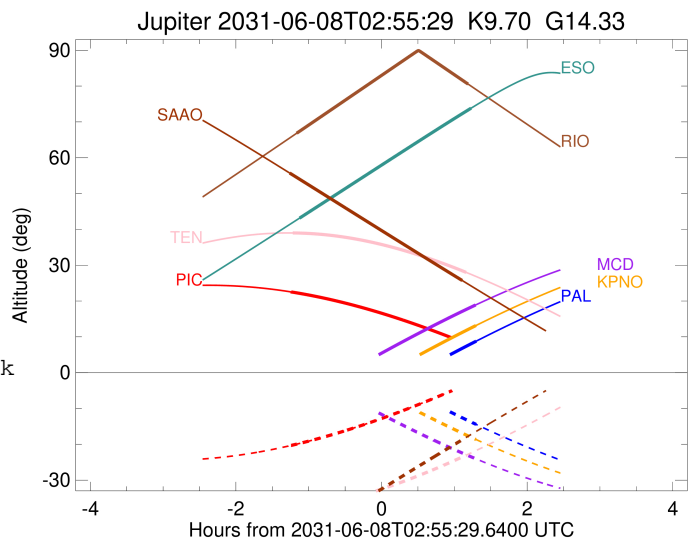
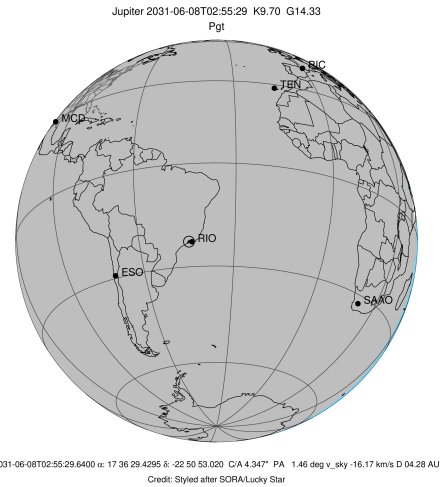


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-08T01:42:20.456	39.00	-38.27	71491.9	-7.04	-8.04
Jupiter	E	2031-06-08T04:05:16.467	27.99	-23.03	71491.9	-6.87	-7.85

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-08T02:56:18.250
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      : 4116785290709356544
2Mass ID (if available) : 17362943-2250529
ICRS Star Coord at Epoch: 17h 36m 29.42951s -22:50:53.01954s
RUWE (>1.4 is poor) : 0.97
K magnitude          : 9.699
G magnitude          : 14.335
RP magnitude         : 13.128
BP magnitude         : 15.930
DUPflag             : 0
Distance (au)       : 4.276
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.17
Sun-Target sep (deg) : 172.13
Sun-Moon sep (deg)  : 29.97
B (ring opening deg) : -2.60
PA of pole (deg)    : 1.69
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (" ) : 4.342
C/A sky separation (km) : 13465.9
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
    
```

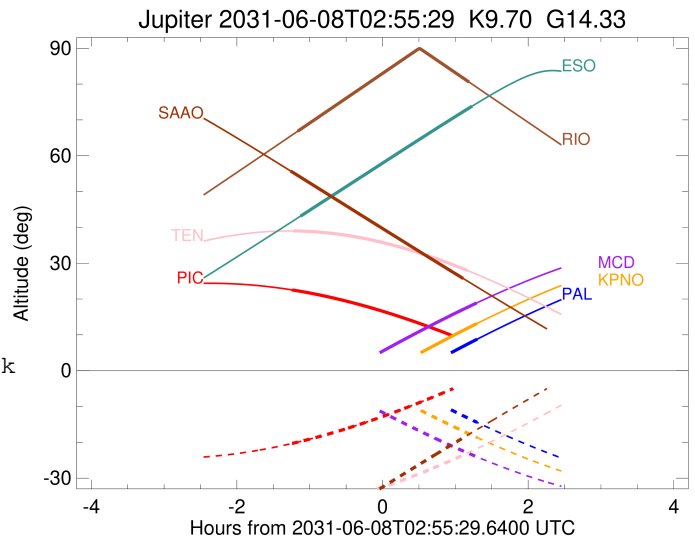
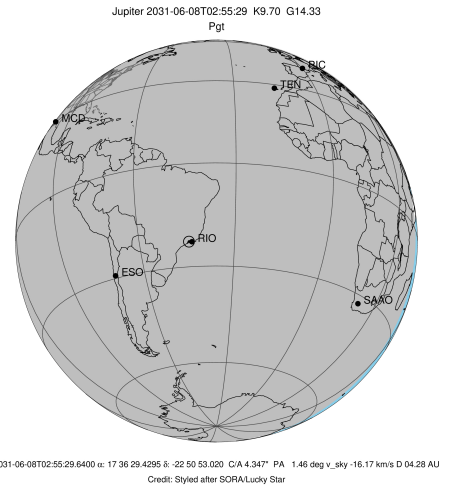


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-08T01:45:43.063	66.86	-74.76	71491.6	-11.27	-12.83
Jupiter	E	2031-06-08T04:06:47.873	80.56	-72.75	71491.7	-10.60	-12.08

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-08T02:58:47.690
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        : 4116785290709356544
2Mass ID (if available) : 17362943-2250529
ICRS Star Coord at Epoch: 17h 36m 29.42951s -22:50:53.01954s
RUWE (>1.4 is poor) : 0.97
K magnitude           : 9.699
G magnitude           : 14.335
RP magnitude          : 13.128
BP magnitude          : 15.930
DUPflag              : 0
Distance (au)         : 4.276
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.17
Sun-Target sep (deg)  : 172.13
Sun-Moon sep (deg)    : 30.25
B (ring opening deg) : -2.60
PA of pole (deg)      : 1.69
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (") : 4.702
C/A sky separation (km) : 14580.6
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
    
```



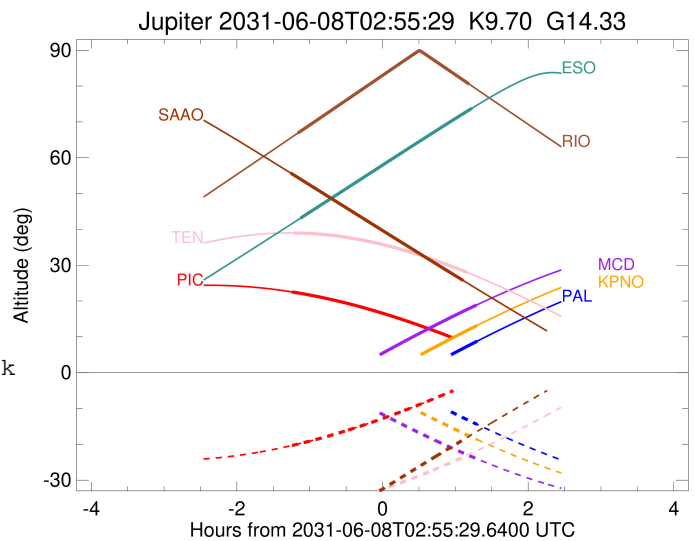
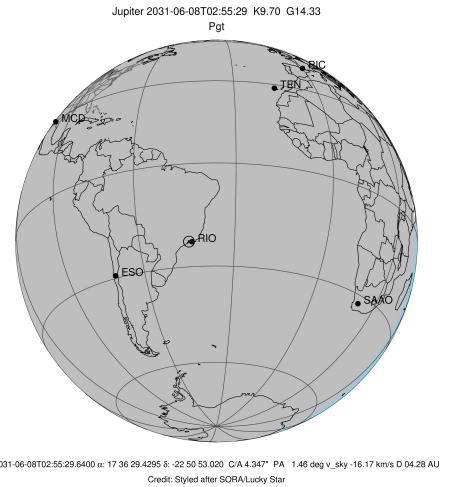
x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-08T01:47:56.004	43.13	-50.61	71491.6	-12.38	-14.09
Jupiter	E	2031-06-08T04:09:20.050	73.82	-80.36	71491.6	-11.27	-12.83



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-08T02:50:46.130
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       : 4116785290709356544
2Mass ID (if available) : 17362943-2250529
ICRS Star Coord at Epoch: 17h 36m 29.42951s -22:50:53.01954s
RUWE (>1.4 is poor) : 0.97
K magnitude           : 9.699
G magnitude           : 14.335
RP magnitude          : 13.128
BP magnitude          : 15.930
DUPflag              : 0
Distance (au)        : 4.276
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.17
Sun-Target sep (deg) : 172.13
Sun-Moon sep (deg)   : 29.09
B (ring opening deg) : -2.60
PA of pole (deg)     : 1.69
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (") : 4.926
C/A sky separation (km) : 15277.4
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	2031-06-08T01:39:58.281	55.69	-48.41	71491.6	-12.19	-13.87
Jupiter	E	2031-06-08T04:01:58.924	25.73	-18.74	71491.6	-12.57	-14.29