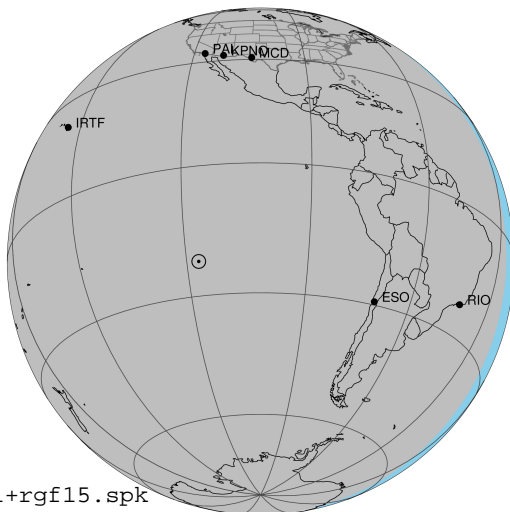


target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2031-06-02T07:45:47.580
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 4116562605311213568
 2Mass ID (if available) : 17393468-2251433

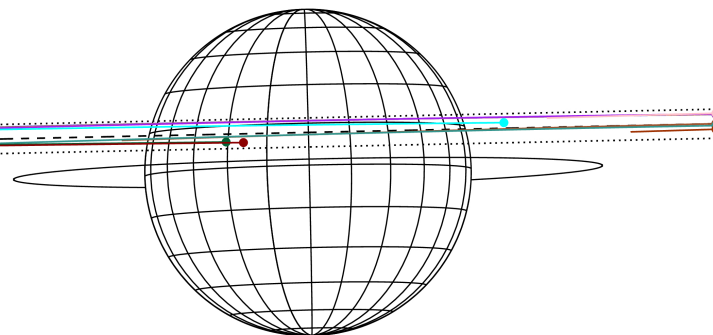
Jupiter 2031-06-02T07:45:47 K9.40 G14.90 Pgt

ICRS Star Coord at Epoch: 17h 39m 34.67432s -22:51:43.26716s
 RUWE (>1.4 is poor) : 0.98
 K magnitude : 9.398
 G magnitude : 14.905
 RP magnitude : 13.543
 BP magnitude : 17.118
 DUPflag : 0
 Distance (au) : 4.296
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -15.55
 Sun-Target sep (deg) : 165.87
 Sun-Moon sep (deg) : 57.34
 B (ring opening deg) : -2.61
 PA of pole (deg) : 1.36
 Pole direction: RA (deg): 268.05693
 Dec (deg): 64.49651
 C/A sky separation (") : 5.632
 C/A sky separation (km) : 17545.5
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk



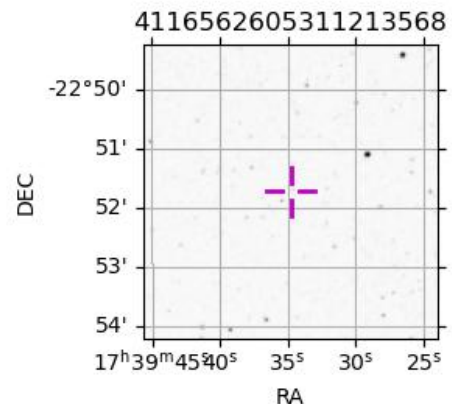
2031-06-02T07:45:47.5800 at: 17 39 34.6743 s: -22 51 43.2671 C/A 5.632" PA 181.22 deg v_sky -15.55 km/s D 04.30 AU
 Credit: Styled after SORA/Lucky Star

Earth
 PAL
 KPNO
 MCD
 TEN
 IRTF
 RIO
 ESO
 AAT
 SAAO
 MSO



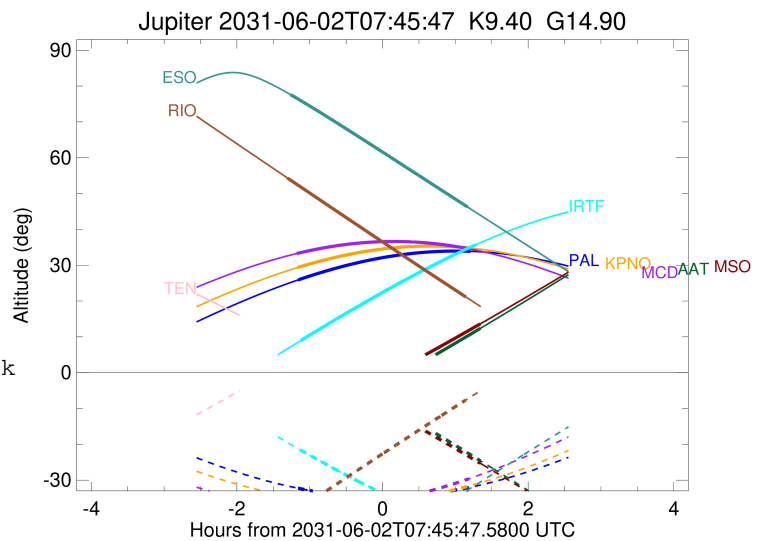
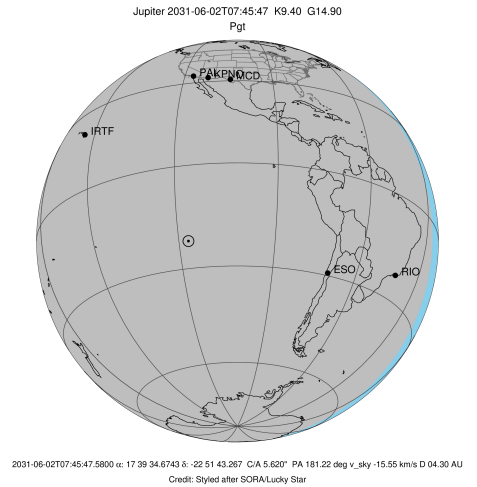
Observable events with sun below -5 deg and altitude above 5 deg

Obs	Location	lat	Elon	Target	Observed Events Interval	OCode
PIC	Pic du Midi	42.9	0.1			Pnn
PAL	Palomar Mt (200")	33.4	243.1	+ +	JUN 02 06:36 - JUN 02 08:58	Pie
PMO	Purple Mtn Obs. Nanking	32.1	118.8			Pnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+ +	JUN 02 06:35 - JUN 02 08:57	Pie
MCD	McDonald Obs. 2.7m	30.7	256.0	+ +	JUN 02 06:35 - JUN 02 08:56	Pie
TEN	Teide Obs./Tenerife	28.3	343.5			Pnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+ +	JUN 02 06:38 - JUN 02 09:02	Pie
KAV	Kavalur Observatory	12.6	78.8			Pnn
RIO	Rio de Janeiro	-22.9	316.8	+ +	JUN 02 06:27 - JUN 02 08:54	Pie
ESO	European Southern Obs. (3.6m)	-29.3	289.3	+ +	JUN 02 06:30 - JUN 02 08:55	Pie
AAT	Siding Spring (AAT)	-31.3	149.1	+ +	JUN 02 09:06 - JUN 02 09:06	Pne
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8			Pnn
MSO	Mt. Stromlo Observatory	-35.3	149.0	+ +	JUN 02 09:06 - JUN 02 09:06	Pne



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-02T07:47:17.170
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       : 4116562605311213568
2Mass ID (if available) : 17393468-2251433
ICRS Star Coord at Epoch: 17h 39m 34.67432s -22:51:43.26716s
RUWE (>1.4 is poor) : 0.98
K magnitude           : 9.398
G magnitude           : 14.905
RP magnitude          : 13.543
BP magnitude          : 17.118
DUPflag              : 0
Distance (au)        : 4.296
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -15.55
Sun-Target sep (deg) : 165.87
Sun-Moon sep (deg)   : 57.68
B (ring opening deg) : -2.61
PA of pole (deg)     : 1.36
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (") : 7.298
C/A sky separation (km) : 22738.4
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
    
```

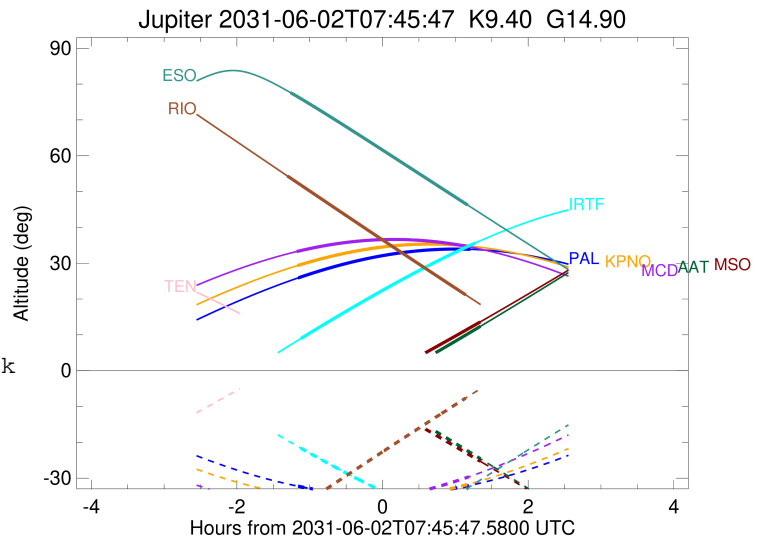
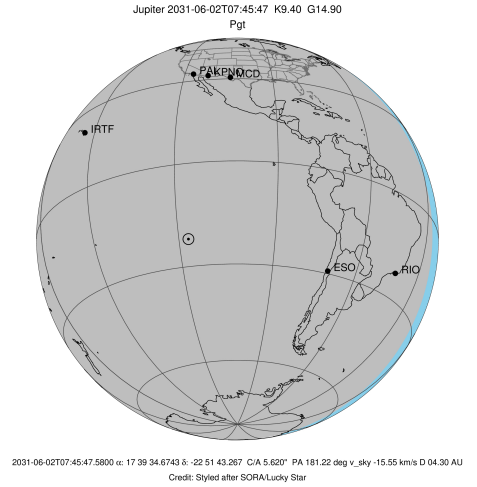


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-02T06:36:13.101	25.89	-32.25	71491.1	18.15	20.53
Jupiter	E	2031-06-02T08:58:11.428	33.87	-31.99	71491.0	18.74	21.19

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-02T07:46:49.100
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      : 4116562605311213568
2Mass ID (if available) : 17393468-2251433
ICRS Star Coord at Epoch: 17h 39m 34.67432s -22:51:43.26716s
RUWE (>1.4 is poor) : 0.98
K magnitude          : 9.398
G magnitude          : 14.905
RP magnitude         : 13.543
BP magnitude         : 17.118
DUPflag             : 0
Distance (au)       : 4.296
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -15.55
Sun-Target sep (deg) : 165.87
Sun-Moon sep (deg)  : 57.74
B (ring opening deg) : -2.61
PA of pole (deg)    : 1.36
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (") : 7.286
C/A sky separation (km) : 22698.5
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
    
```

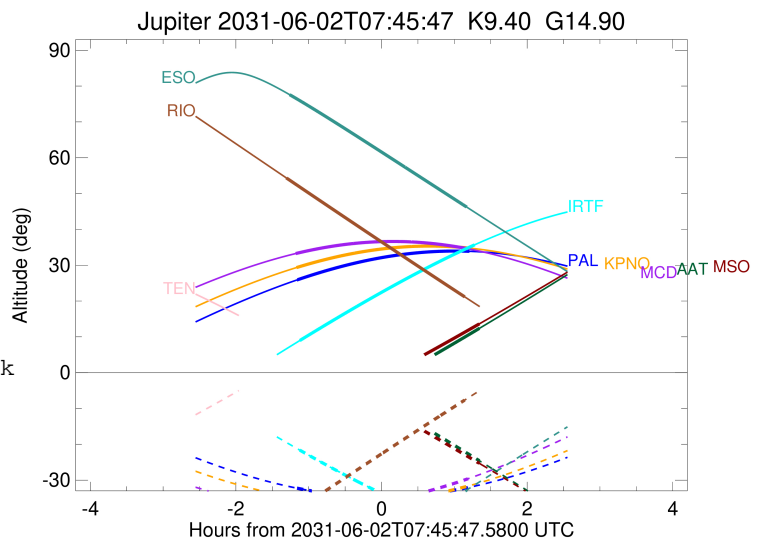
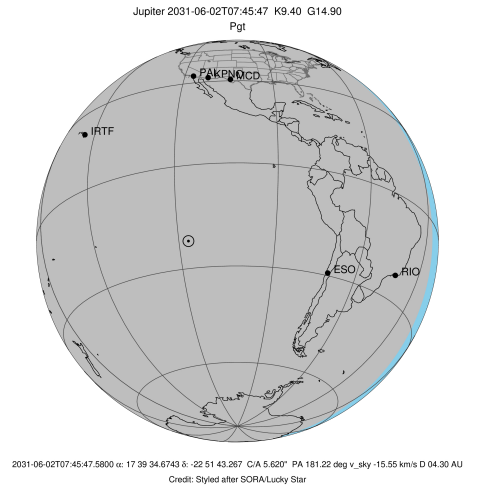


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-02T06:35:49.040	29.34	-34.81	71491.1	18.16	20.54
Jupiter	E	2031-06-02T08:57:42.026	34.78	-31.59	71491.0	18.66	21.10

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-02T07:46:06.290
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        : 4116562605311213568
2Mass ID (if available) : 17393468-2251433
ICRS Star Coord at Epoch: 17h 39m 34.67432s -22:51:43.26716s
RUWE (>1.4 is poor) : 0.98
K magnitude           : 9.398
G magnitude           : 14.905
RP magnitude          : 13.543
BP magnitude          : 17.118
DUPflag              : 0
Distance (au)         : 4.296
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -15.55
Sun-Target sep (deg)  : 165.87
Sun-Moon sep (deg)    : 57.83
B (ring opening deg) : -2.61
PA of pole (deg)      : 1.36
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (") : 7.272
C/A sky separation (km) : 22655.3
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
    
```

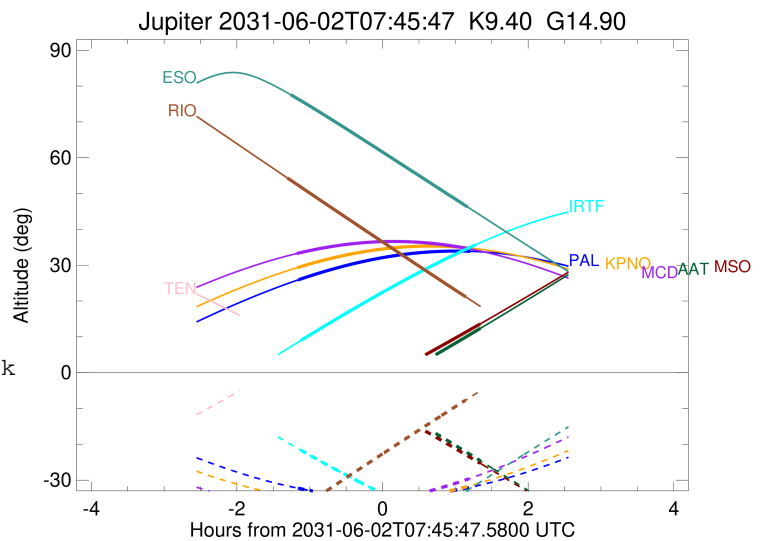
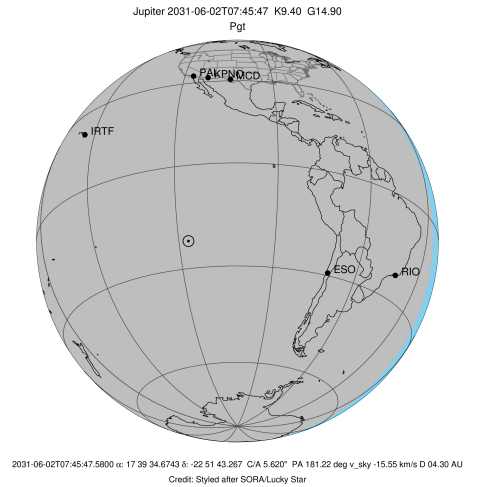


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-02T06:35:10.212	33.25	-37.14	71491.1	18.18	20.57
Jupiter	E	2031-06-02T08:56:59.340	34.58	-29.62	71491.1	18.55	20.98

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-02T07:50:46.230
Event type          : Pgt
                    : Jupiter occs: geocentric, topocentric
                    : Not a ringed target
Observer code       : IRTF
Location            : Mauna Kea/IRTF
Latitude (deg)      : 19.82622
E. Longitude (deg)  : 204.52800
Altitude (km)       : 4.168
Gaia source ID      : 4116562605311213568
2Mass ID (if available) : 17393468-2251433
ICRS Star Coord at Epoch: 17h 39m 34.67432s -22:51:43.26716s
RUWE (>1.4 is poor) : 0.98
K magnitude          : 9.398
G magnitude          : 14.905
RP magnitude         : 13.543
BP magnitude         : 17.118
DUPflag             : 0
Distance (au)       : 4.296
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -15.55
Sun-Target sep (deg) : 165.87
Sun-Moon sep (deg)  : 57.26
B (ring opening deg) : -2.61
PA of pole (deg)    : 1.36
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (") : 6.696
C/A sky separation (km) : 20861.2
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
    
```

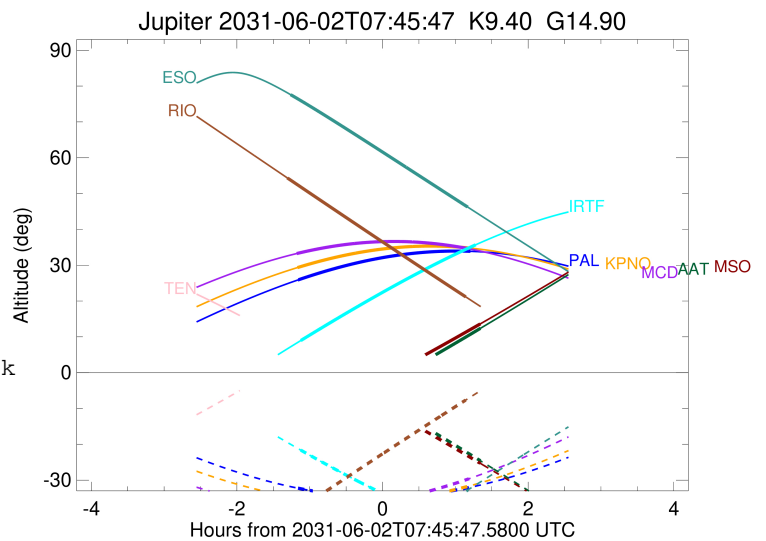
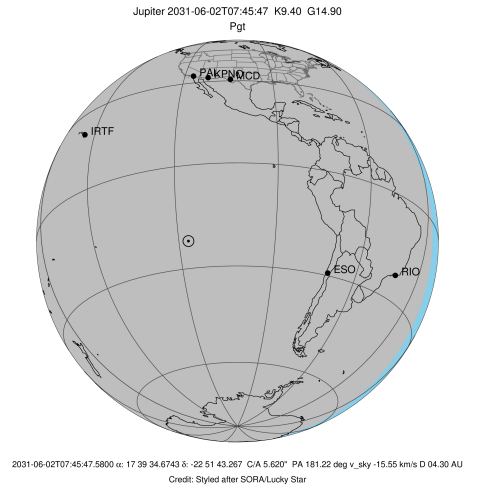


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-02T06:38:24.726	8.95	-21.62	71491.3	16.25	18.43
Jupiter	E	2031-06-02T09:02:36.613	35.69	-44.06	71491.2	17.52	19.84

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-02T07:40:38.030
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        : 4116562605311213568
2Mass ID (if available) : 17393468-2251433
ICRS Star Coord at Epoch: 17h 39m 34.67432s -22:51:43.26716s
RUWE (>1.4 is poor) : 0.98
K magnitude           : 9.398
G magnitude           : 14.905
RP magnitude          : 13.543
BP magnitude          : 17.118
DUPflag              : 0
Distance (au)         : 4.296
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -15.55
Sun-Target sep (deg)  : 165.87
Sun-Moon sep (deg)   : 58.23
B (ring opening deg) : -2.61
PA of pole (deg)     : 1.36
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (") : 5.329
C/A sky separation (km) : 16602.8
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
    
```

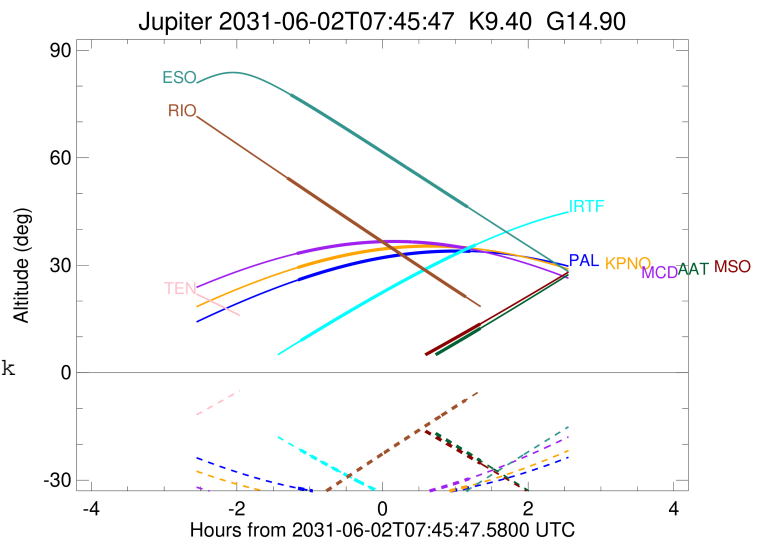
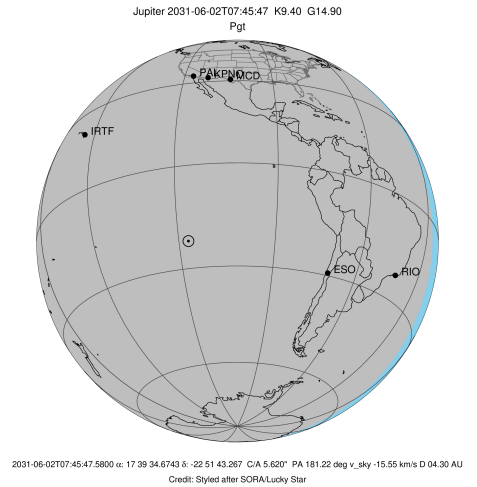


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-02T06:27:25.940	54.34	-40.26	71491.5	13.70	15.57
Jupiter	E	2031-06-02T08:54:20.000	21.17	-7.65	71491.5	13.01	14.79

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-02T07:42:51.170
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       : 4116562605311213568
2Mass ID (if available) : 17393468-2251433
ICRS Star Coord at Epoch: 17h 39m 34.67432s -22:51:43.26716s
RUWE (>1.4 is poor) : 0.98
K magnitude           : 9.398
G magnitude           : 14.905
RP magnitude         : 13.543
BP magnitude         : 17.118
DUPflag              : 0
Distance (au)        : 4.296
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -15.55
Sun-Target sep (deg) : 165.87
Sun-Moon sep (deg)   : 58.30
B (ring opening deg) : -2.61
PA of pole (deg)     : 1.36
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (") : 5.332
C/A sky separation (km) : 16611.5
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
    
```

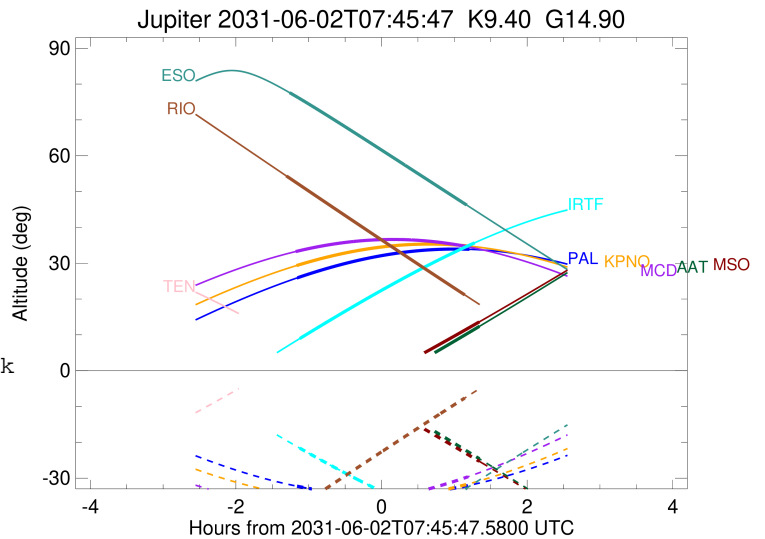
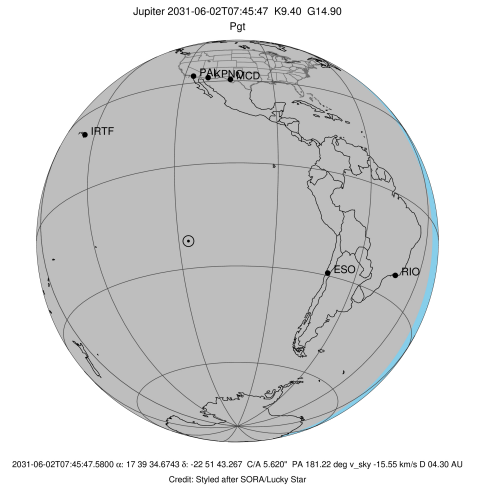


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-02T06:30:03.777	77.60	-64.51	71491.5	13.46	15.30
Jupiter	E	2031-06-02T08:55:54.320	46.24	-32.79	71491.5	13.22	15.03

```

target                : Jupiter
target radius (km)    : 71492.00
C/A epoch              : 2031-06-02T07:51:08.800
Event type             : Pgt
: Jupiter occs: geocentric, topocentric
: Not a ringed target
Observer code         : AAT
Location              : Siding Spring (AAT)
Latitude (deg)        : -31.27703
E. Longitude (deg)    : 149.06608
Altitude (km)         : 1.164
Gaia source ID        : 4116562605311213568
2Mass ID (if available) : 17393468-2251433
ICRS Star Coord at Epoch: 17h 39m 34.67432s -22:51:43.26716s
RUWE (>1.4 is poor)  : 0.98
K magnitude           : 9.398
G magnitude           : 14.905
RP magnitude          : 13.543
BP magnitude          : 17.118
DUPflag              : 0
Distance (au)         : 4.296
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -15.55
Sun-Target sep (deg)  : 165.87
Sun-Moon sep (deg)    : 56.85
B (ring opening deg) : -2.61
PA of pole (deg)     : 1.36
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (") : 4.419
C/A sky separation (km) : 13766.4
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
    
```

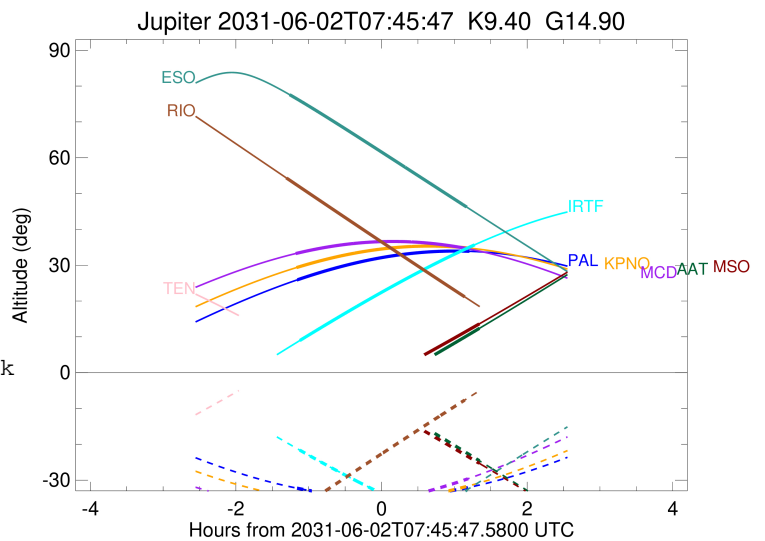
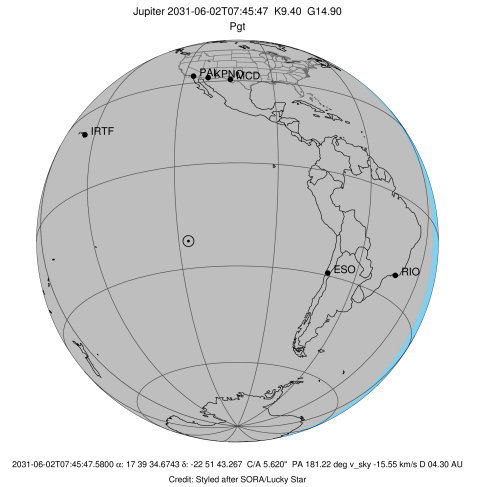


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-02T06:35:03.482	-15.90x	5.61x	71491.7	10.46	11.91
Jupiter	E	2031-06-02T09:06:36.014	12.39	-24.62	71491.6	11.78	13.41


```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-02T07:50:53.700
Event type          : Pgt
                    : Jupiter occs: geocentric, topocentric
                    : Not a ringed target
Observer code       : MSO
Location            : Mt. Stromlo Observatory
Latitude (deg)      : -35.32000
E. Longitude (deg)  : 149.00833
Altitude (km)       : 0.770
Gaia source ID      : 4116562605311213568
2Mass ID (if available) : 17393468-2251433
ICRS Star Coord at Epoch: 17h 39m 34.67432s -22:51:43.26716s
RUWE (>1.4 is poor) : 0.98
K magnitude          : 9.398
G magnitude          : 14.905
RP magnitude         : 13.543
BP magnitude         : 17.118
DUPflag             : 0
Distance (au)       : 4.296
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -15.55
Sun-Target sep (deg) : 165.87
Sun-Moon sep (deg)  : 56.90
B (ring opening deg) : -2.61
PA of pole (deg)    : 1.36
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (") : 4.317
C/A sky separation (km) : 13451.0
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	2031-06-02T06:34:46.609	-13.36x	3.67x	71491.7	10.22	11.65
Jupiter	E	2031-06-02T09:06:24.314	13.62	-25.31	71491.6	11.50	13.09