

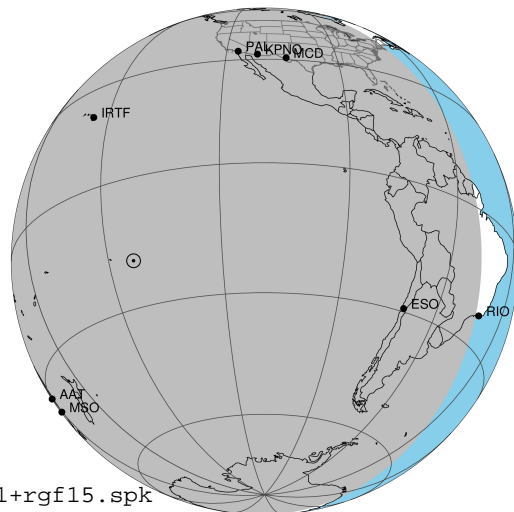
target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2031-05-17T09:28:02.700
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 4068936326994428672
 2Mass ID (if available) : 17470001-2253335

Jupiter 2031-05-17T09:28:02 K9.24 G13.55 Pgt

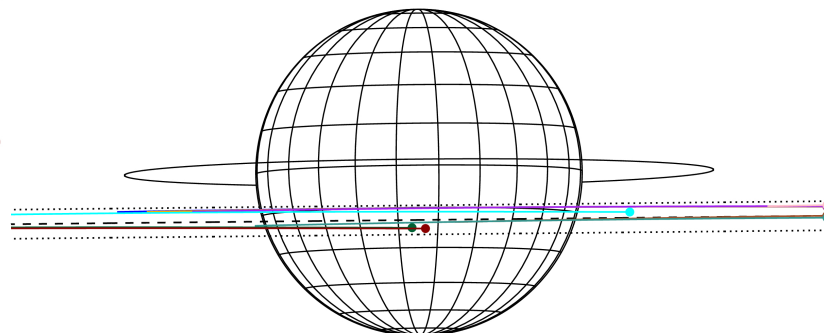
ICRS Star Coord at Epoch: 17h 47m 00.01092s -22:53:33.58580s

RUWE (>1.4 is poor) : 0.97
 K magnitude : 9.240
 G magnitude : 13.554
 RP magnitude : 12.418
 BP magnitude : 14.901
 DUPflag : 0
 Distance (au) : 4.399
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -12.20
 Sun-Target sep (deg) : 148.86
 Sun-Moon sep (deg) : 103.62
 B (ring opening deg) : -2.60
 PA of pole (deg) : 0.56
 Pole direction: RA (deg): 268.05694
 Dec (deg): 64.49651
 C/A sky separation (") : 6.516
 C/A sky separation (km) : 20789.3
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk

Jupiter 2031-05-17T09:28:02 K9.24 G13.55
 Pgt



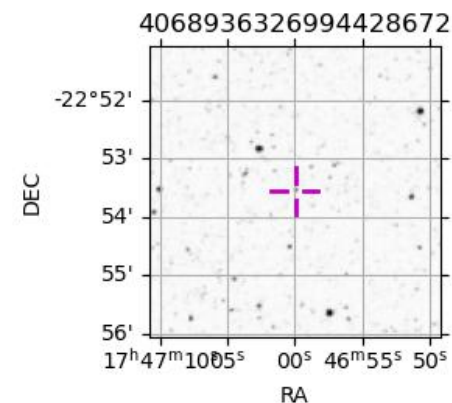
Earth
 PAL
 KPNO
 MCD
 TEN
 IRTF
 RIO
 ESO
 AAT
 MSO



2031-05-17T09:28:02.7000 a: 17 47 00.0109 s: -22 53 33.586 C/A 6.528" PA 0.59 deg v_sky -12.20 km/s D 04.40 AU
 Credit: Styled after SORA/Lucky Star

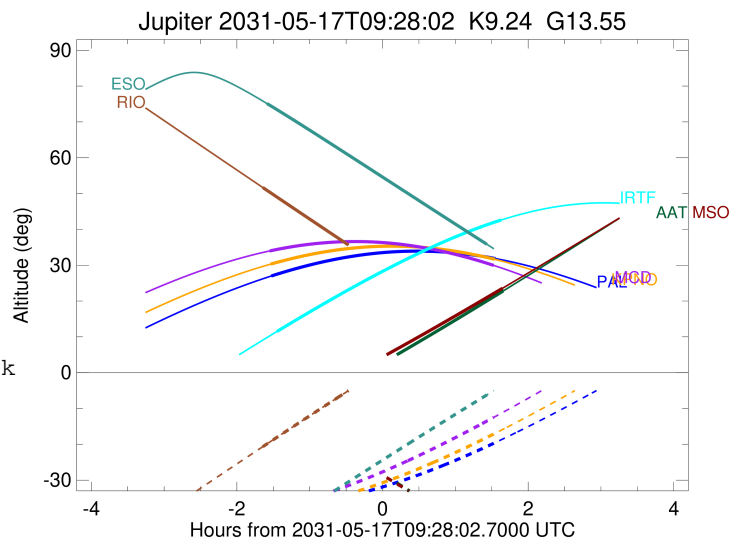
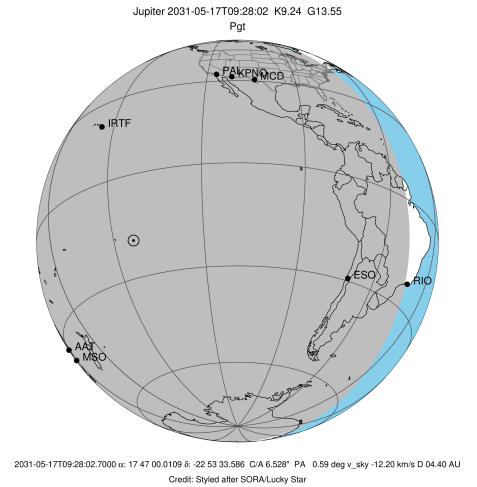
Observable events with sun below -5 deg and altitude above 5 deg

Obs	Location	lat	Elon	Target	Observed Events Interval	OCode
PIC	Pic du Midi	42.9	0.1			Pnn
PAL	Palomar Mt (200")	33.4	243.1	+ +	MAY 17 07:56 - MAY 17 11:01	Pie
PMO	Purple Mtn Obs. Nanking	32.1	118.8			Pnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+ +	MAY 17 07:55 - MAY 17 11:00	Pie
MCD	McDonald Obs. 2.7m	30.7	256.0	+ +	MAY 17 07:55 - MAY 17 10:59	Pie
TEN	Teide Obs./Tenerife	28.3	343.5			Pnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+ +	MAY 17 08:01 - MAY 17 11:06	Pie
KAV	Kavalur Observatory	12.6	78.8			Pnn
RIO	Rio de Janeiro	-22.9	316.8	+	MAY 17 07:49 - MAY 17 07:49	Pin
ESO	European Southern Obs. (3.6m)	-29.3	289.3	+ +	MAY 17 07:52 - MAY 17 10:54	Pie
AAT	Siding Spring (AAT)	-31.3	149.1	+	MAY 17 11:07 - MAY 17 11:07	Pne
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8			Pnn
MSO	Mt. Stromlo Observatory	-35.3	149.0	+	MAY 17 11:07 - MAY 17 11:07	Pne



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-17T09:29:00.720
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      : 4068936326994428672
2Mass ID (if available) : 17470001-2253335
ICRS Star Coord at Epoch: 17h 47m 00.01092s -22:53:33.58580s
RUWE (>1.4 is poor) : 0.97
K magnitude          : 9.240
G magnitude          : 13.554
RP magnitude         : 12.418
BP magnitude         : 14.901
DUPflag             : 0
Distance (au)       : 4.399
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -12.20
Sun-Target sep (deg) : 148.86
Sun-Moon sep (deg)  : 104.11
B (ring opening deg) : -2.60
PA of pole (deg)    : 0.56
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation ("): 4.865
C/A sky separation (km): 15520.4
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
    
```

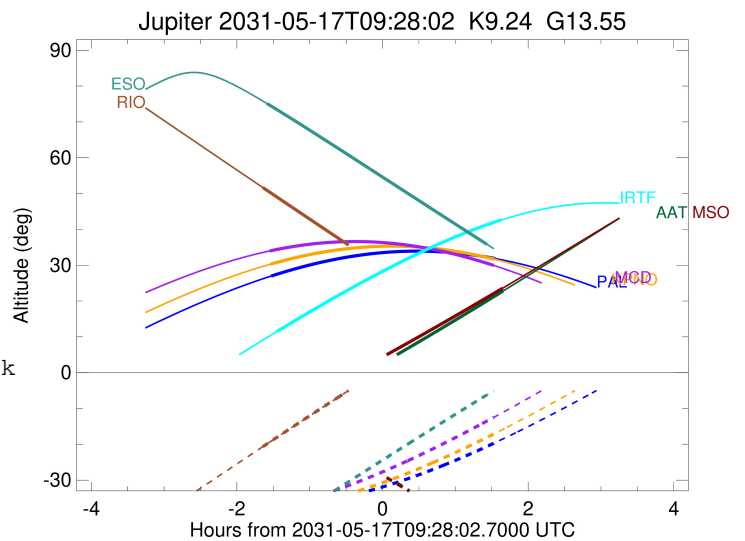
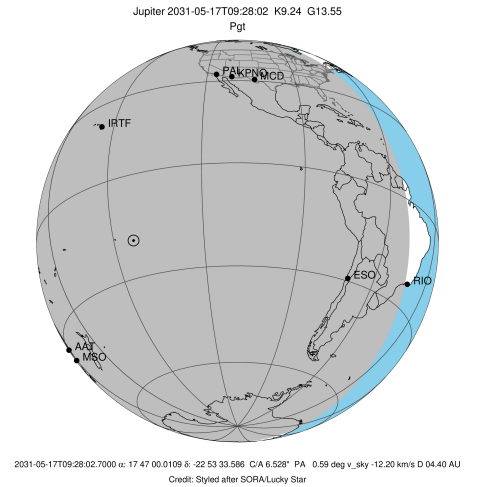


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-17T07:56:24.748	26.98	-37.43	71491.6	-12.73	-14.47
Jupiter	E	2031-05-17T11:01:20.823	31.83	-19.45	71491.6	-12.60	-14.33

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-17T09:28:20.780
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       : 4068936326994428672
2Mass ID (if available) : 17470001-2253335
ICRS Star Coord at Epoch: 17h 47m 00.01092s -22:53:33.58580s
RUWE (>1.4 is poor) : 0.97
K magnitude           : 9.240
G magnitude           : 13.554
RP magnitude          : 12.418
BP magnitude          : 14.901
DUPflag              : 0
Distance (au)        : 4.399
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -12.20
Sun-Target sep (deg) : 148.86
Sun-Moon sep (deg)   : 104.15
B (ring opening deg) : -2.60
PA of pole (deg)     : 0.56
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 4.887
C/A sky separation (km) : 15590.0
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
    
```

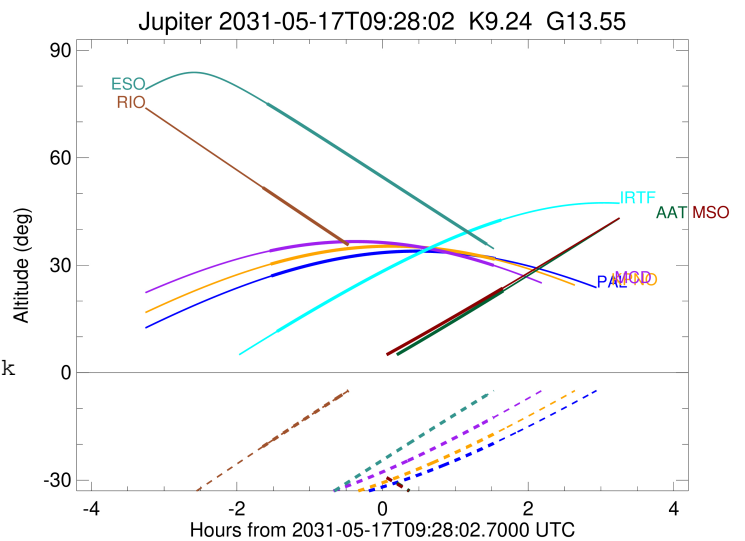
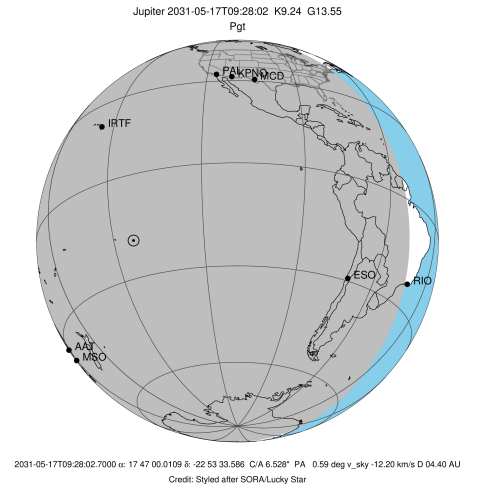


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-17T07:55:52.930	30.30	-38.29	71491.5	-12.73	-14.48
Jupiter	E	2031-05-17T11:00:38.862	31.64	-16.96	71491.6	-12.72	-14.46

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-17T09:27:21.360
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        : 4068936326994428672
2Mass ID (if available) : 17470001-2253335
ICRS Star Coord at Epoch: 17h 47m 00.01092s -22:53:33.58580s
RUWE (>1.4 is poor) : 0.97
K magnitude           : 9.240
G magnitude           : 13.554
RP magnitude          : 12.418
BP magnitude          : 14.901
DUPflag              : 0
Distance (au)         : 4.399
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -12.20
Sun-Target sep (deg)  : 148.86
Sun-Moon sep (deg)    : 104.19
B (ring opening deg) : -2.60
PA of pole (deg)      : 0.56
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 4.914
C/A sky separation (km) : 15677.6
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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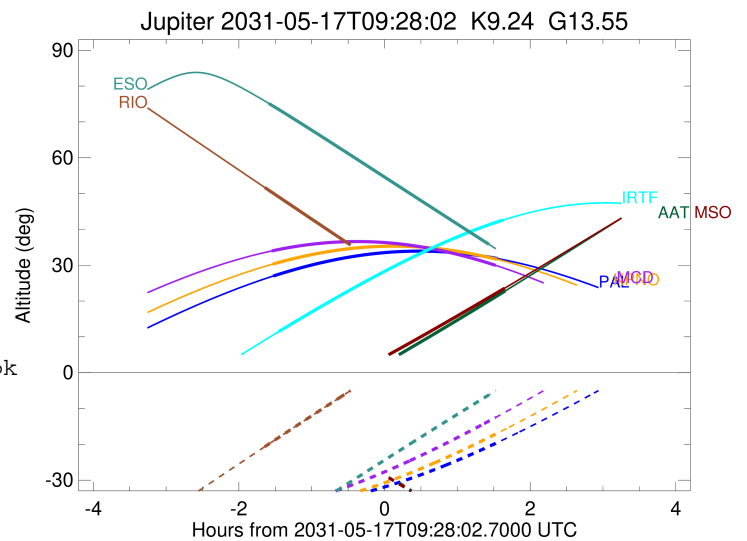
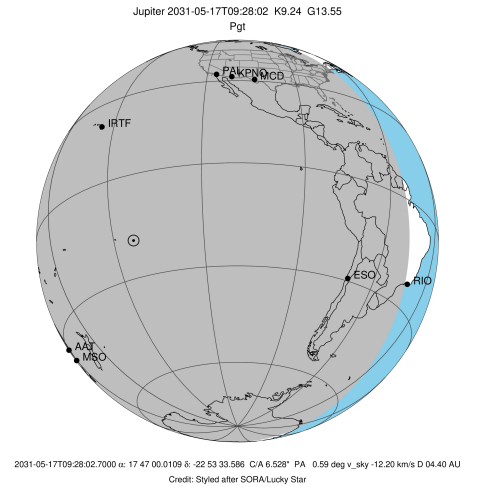


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-17T07:55:01.258	33.97	-37.97	71491.5	-12.71	-14.46
Jupiter	E	2031-05-17T10:59:40.718	29.94	-12.49	71491.5	-12.88	-14.65

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-17T09:34:02.310
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      : 4068936326994428672
2Mass ID (if available) : 17470001-2253335
ICRS Star Coord at Epoch: 17h 47m 00.01092s -22:53:33.58580s
RUWE (>1.4 is poor) : 0.97
K magnitude          : 9.240
G magnitude          : 13.554
RP magnitude         : 12.418
BP magnitude         : 14.901
DUPflag             : 0
Distance (au)       : 4.399
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -12.20
Sun-Target sep (deg) : 148.86
Sun-Moon sep (deg)  : 103.91
B (ring opening deg) : -2.60
PA of pole (deg)    : 0.56
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 5.380
C/A sky separation (km) : 17165.1
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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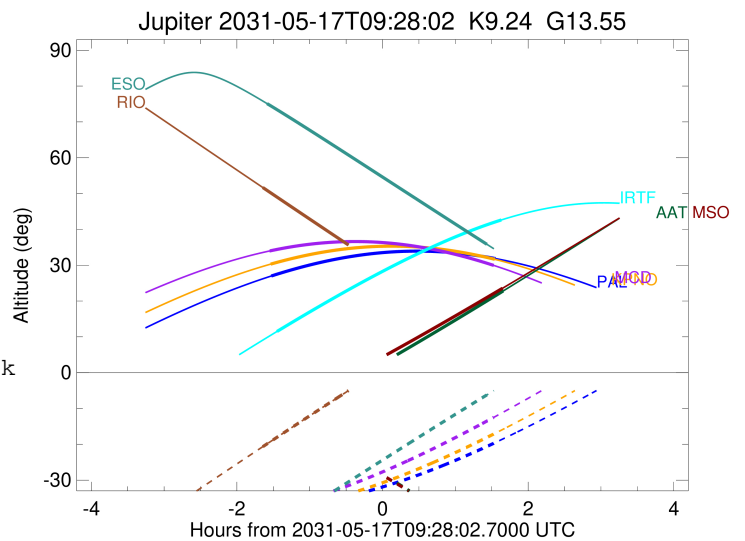
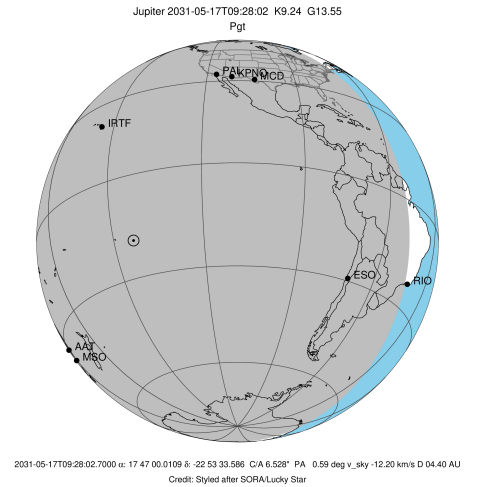


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-17T08:01:02.459	11.49	-38.49	71491.4	-14.50	-16.47
Jupiter	E	2031-05-17T11:05:59.936	42.63	-49.25	71491.5	-13.48	-15.32

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-17T09:20:24.940
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      : 4068936326994428672
2Mass ID (if available) : 17470001-2253335
ICRS Star Coord at Epoch: 17h 47m 00.01092s -22:53:33.58580s
RUWE (>1.4 is poor) : 0.97
K magnitude          : 9.240
G magnitude          : 13.554
RP magnitude         : 12.418
BP magnitude         : 14.901
DUPflag             : 0
Distance (au)       : 4.399
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -12.20
Sun-Target sep (deg) : 148.86
Sun-Moon sep (deg)  : 104.26
B (ring opening deg) : -2.60
PA of pole (deg)    : 0.56
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 6.909
C/A sky separation (km) : 22042.1
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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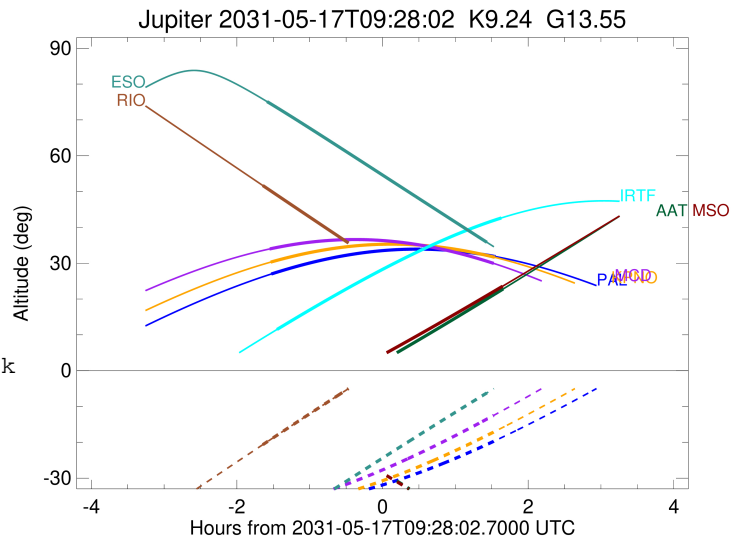
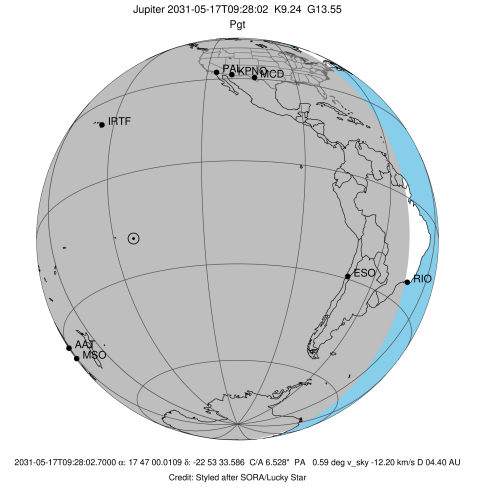


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-17T07:49:22.445	51.69	-20.67	71491.2	-17.31	-19.60
Jupiter	E	2031-05-17T10:52:28.895	10.70	18.50x	71491.0	-18.71	-21.16

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-17T09:23:09.040
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       : 4068936326994428672
2Mass ID (if available) : 17470001-2253335
ICRS Star Coord at Epoch: 17h 47m 00.01092s -22:53:33.58580s
RUWE (>1.4 is poor) : 0.97
K magnitude          : 9.240
G magnitude          : 13.554
RP magnitude         : 12.418
BP magnitude         : 14.901
DUPflag             : 0
Distance (au)        : 4.399
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -12.20
Sun-Target sep (deg) : 148.86
Sun-Moon sep (deg)  : 104.50
B (ring opening deg) : -2.60
PA of pole (deg)    : 0.56
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation ("): 6.867
C/A sky separation (km) : 21907.3
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
    
```

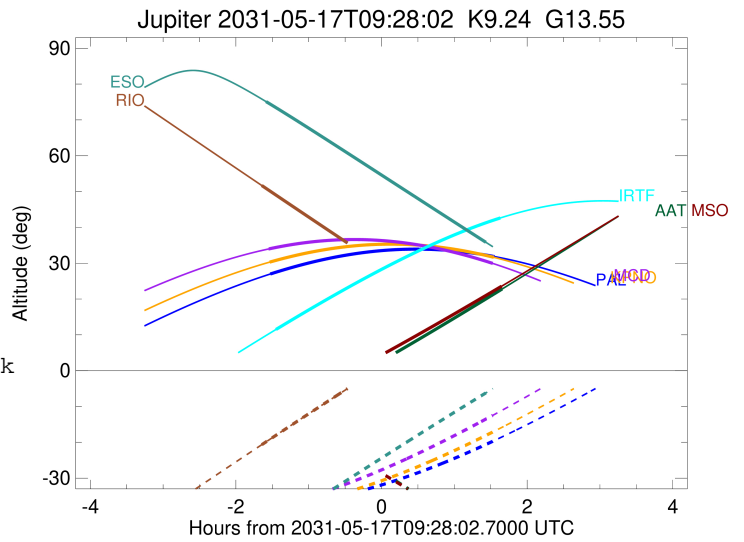
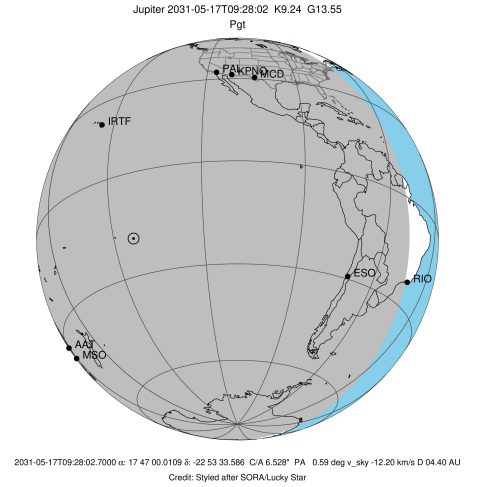


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-17T07:52:50.132	75.12	-45.12	71491.2	-17.49	-19.80
Jupiter	E	2031-05-17T10:54:03.482	35.83	-6.21	71491.1	-18.39	-20.80


```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-17T09:35:47.190
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       : 4068936326994428672
2Mass ID (if available) : 17470001-2253335
ICRS Star Coord at Epoch: 17h 47m 00.01092s -22:53:33.58580s
RUWE (>1.4 is poor) : 0.97
K magnitude           : 9.240
G magnitude           : 13.554
RP magnitude          : 12.418
BP magnitude          : 14.901
DUPflag              : 0
Distance (au)         : 4.399
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -12.20
Sun-Target sep (deg)  : 148.86
Sun-Moon sep (deg)   : 103.48
B (ring opening deg) : -2.60
PA of pole (deg)     : 0.56
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 7.587
C/A sky separation (km) : 24205.8
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
    
```

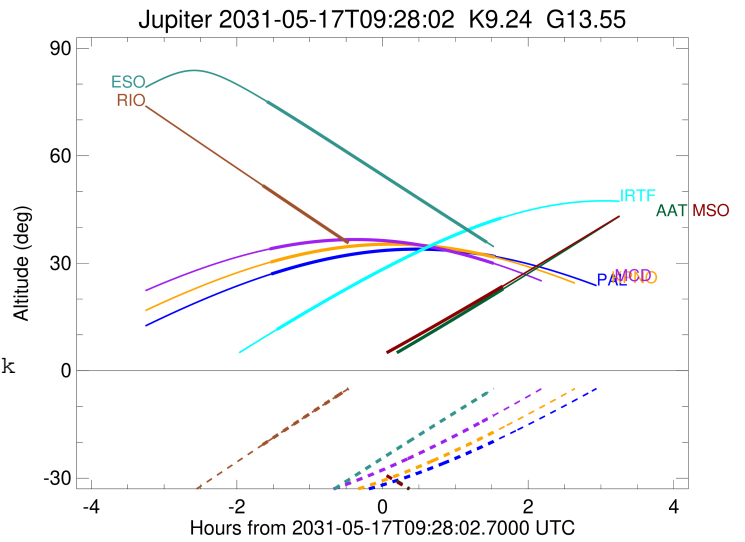
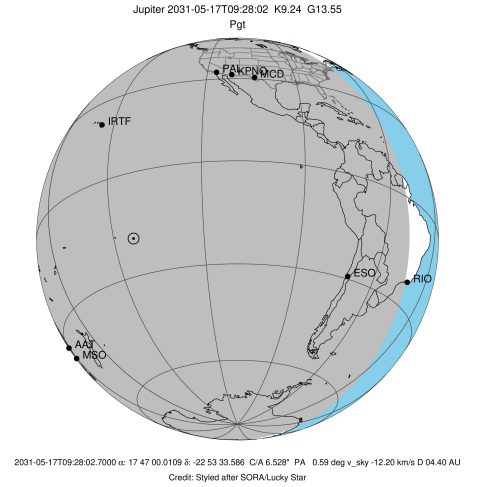


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-17T08:02:42.199	-12.98x	-10.37	71490.9	-20.42	-23.03
Jupiter	E	2031-05-17T11:07:31.657	22.81	-49.51	71491.0	-19.08	-21.56


```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-17T09:35:26.070
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      : 4068936326994428672
2Mass ID (if available) : 17470001-2253335
ICRS Star Coord at Epoch: 17h 47m 00.01092s -22:53:33.58580s
RUWE (>1.4 is poor) : 0.97
K magnitude          : 9.240
G magnitude          : 13.554
RP magnitude         : 12.418
BP magnitude         : 14.901
DUPflag             : 0
Distance (au)       : 4.399
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -12.20
Sun-Target sep (deg) : 148.86
Sun-Moon sep (deg)  : 103.51
B (ring opening deg) : -2.60
PA of pole (deg)    : 0.56
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 7.692
C/A sky separation (km) : 24538.6
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	2031-05-17T08:02:33.705	-10.58x	-11.41	71490.8	-20.67	-23.31
Jupiter	E	2031-05-17T11:07:01.519	23.57	-48.75	71491.0	-19.40	-21.91