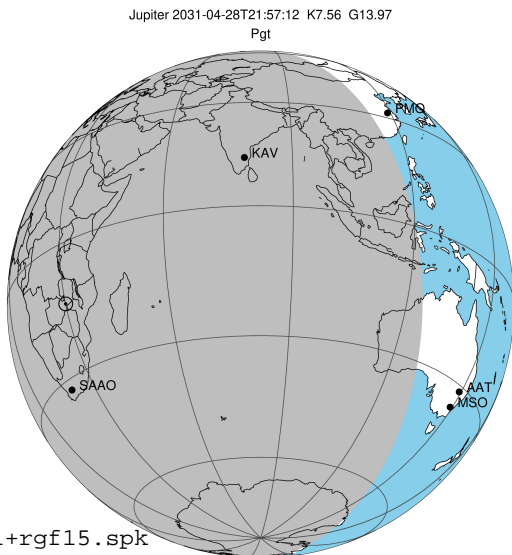


target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2031-04-28T21:57:12.650
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 4068701963634259072
 2Mass ID (if available) : 17522644-2253539

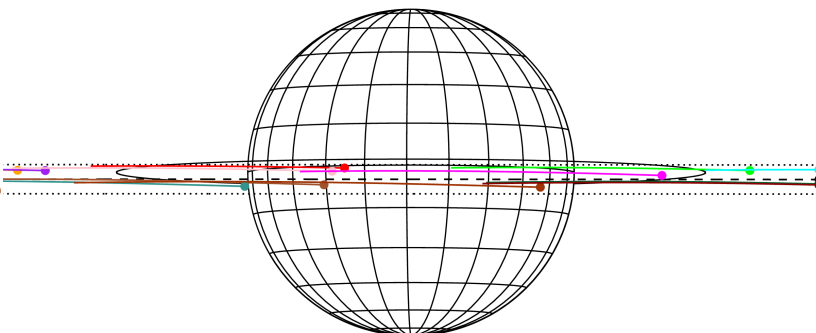
Jupiter 2031-04-28T21:57:12 K7.56 G13.97 Pgt

ICRS Star Coord at Epoch: 17h 52m 26.44298s -22:53:53.94949s
 RUWE (>1.4 is poor) : 0.99
 K magnitude : 7.556
 G magnitude : 13.968
 RP magnitude : 12.442
 BP magnitude : 17.441
 DUPflag : 0
 Distance (au) : 4.596
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -5.81
 Sun-Target sep (deg) : 129.73
 Sun-Moon sep (deg) : 149.84
 B (ring opening deg) : -2.61
 PA of pole (deg) : -0.02
 Pole direction: RA (deg): 268.05696
 Dec (deg): 64.49651
 C/A sky separation (") : 0.895
 C/A sky separation (km) : 2982.9
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLv1.spk
 naif0012.tls
 nep097.bsp
 nep101.bsp
 sat4401.bsp



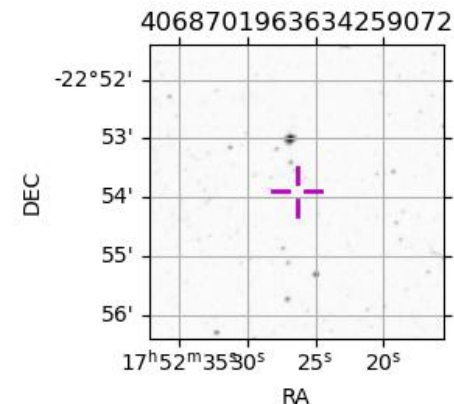
2031-04-28T21:57:12.6500 at: 17 52 26.4430 & -22 53 53.949 C/A 0.906" PA 359.97 deg v_sky - 5.81 km/s D 04.60 AU
 Credit: Styled after SORA/Lucky Star

Earth
 PIC
 PMO
 KPNO
 MCD
 TEN
 IRTF
 KAV
 RIO
 ESO
 AAT
 SAAO
 MSO



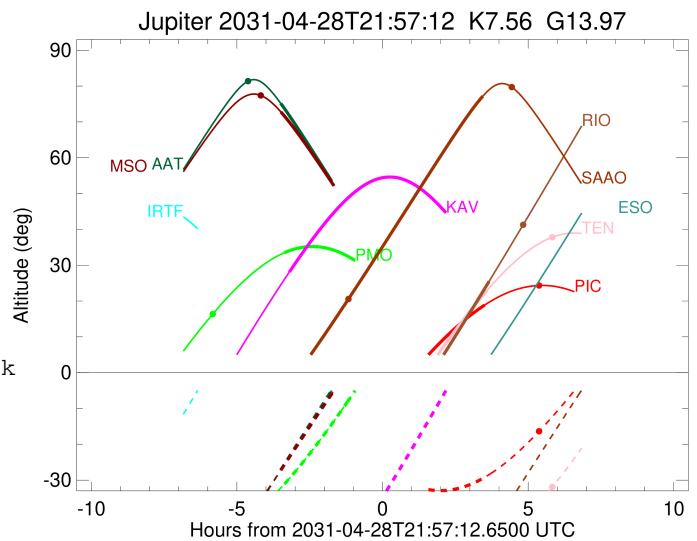
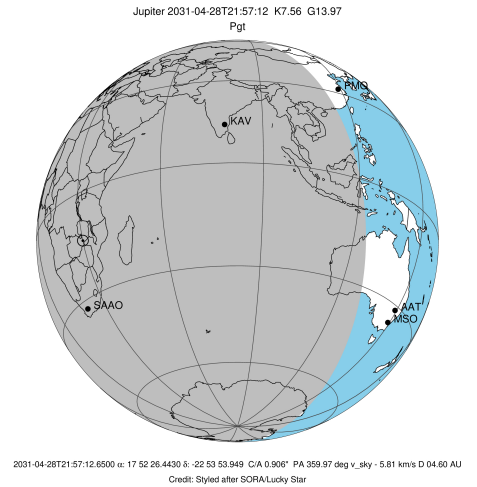
Observable events with sun below -5 deg and altitude above 5 deg

Obs	Location	lat	Elon	Target	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1	+	APR 29 01:27 - APR 29 01:27	Pne
PAL	Palomar Mt (200")	33.4	243.1			Pnn
PMO	Purple Mtn Obs. Nanking	32.1	118.8	+	APR 28 18:35 - APR 28 18:35	Pin
KPNO	Kitt Peak Natl Obs	32.0	248.4			Pnn
MCD	McDonald Obs. 2.7m	30.7	256.0			Pnn
TEN	Teide Obs./Tenerife	28.3	343.5	+	APR 29 01:32 - APR 29 01:32	Pne
IRTF	Mauna Kea/IRTF	19.8	204.5			Pnn
KAV	Kavalur Observatory	12.6	78.8	+	APR 28 18:45 - APR 28 18:45	Pin
RIO	Rio de Janeiro	-22.9	316.8	+	APR 29 01:36 - APR 29 01:36	Pne
ESO	European Southern Obs. (3.6m)	-29.3	289.3			Pnn
AAT	Siding Spring (AAT)	-31.3	149.1	+	APR 28 18:27 - APR 28 18:27	Pin
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8	+	APR 29 01:23 - APR 29 01:23	Pne
MSO	Mt. Stromlo Observatory	-35.3	149.0	+	APR 28 18:27 - APR 28 18:27	Pin



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-04-28T22:10:15.720
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     : 4068701963634259072
2Mass ID (if available) : 17522644-2253539
ICRS Star Coord at Epoch: 17h 52m 26.44298s -22:53:53.94949s
RUWE (>1.4 is poor) : 0.99
K magnitude        : 7.556
G magnitude        : 13.968
RP magnitude       : 12.442
BP magnitude       : 17.441
DUPflag           : 0
Distance (au)     : 4.596
f0 (km)           : 0.00
g0 (km)           : 0.00
skyplane vel. (km/s) : -5.81
Sun-Target sep (deg) : 129.73
Sun-Moon sep (deg) : 150.25
B (ring opening deg) : -2.61
PA of pole (deg)   : -0.02
Pole direction: RA (deg): 268.05696
Dec (deg): 64.49651
C/A sky separation (") : 0.408
C/A sky separation (km) : 1359.8
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
    
```

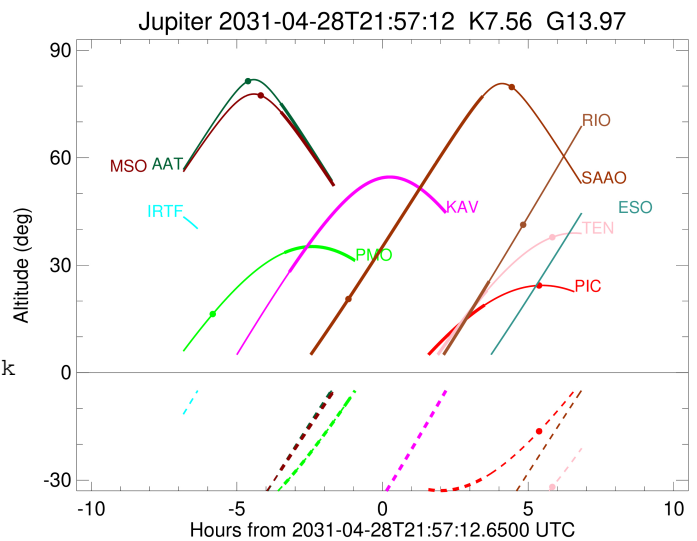
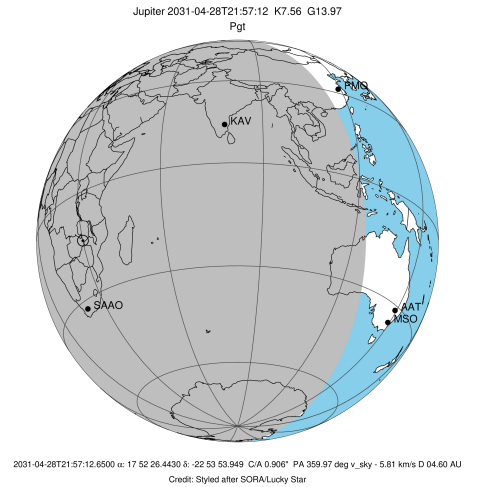


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-04-28T18:41:10.525	-45.51x	1.76x	71492.0	-0.16	-0.18
Jupiter	E	2031-04-29T01:27:47.963	18.89	-29.21	71492.0	2.07	2.37

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-04-28T21:48:32.420
Event type          : Pgt
                    : Jupiter occs: geocentric, topocentric
                    : Not a ringed target
Observer code       : PMO
Location            : Purple Mtn Obs. Nanking
Latitude (deg)      : 32.06667
E. Longitude (deg)  : 118.82089
Altitude (km)       : 0.364
Gaia source ID      : 4068701963634259072
2Mass ID (if available) : 17522644-2253539
ICRS Star Coord at Epoch: 17h 52m 26.44298s -22:53:53.94949s
RUWE (>1.4 is poor) : 0.99
K magnitude          : 7.556
G magnitude          : 13.968
RP magnitude         : 12.442
BP magnitude         : 17.441
DUPflag             : 0
Distance (au)       : 4.596
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -5.81
Sun-Target sep (deg) : 129.73
Sun-Moon sep (deg)  : 149.56
B (ring opening deg) : -2.61
PA of pole (deg)    : -0.02
Pole direction: RA (deg): 268.05696
Dec (deg): 64.49651
C/A sky separation (") : 0.556
C/A sky separation (km) : 1852.2
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
    
```

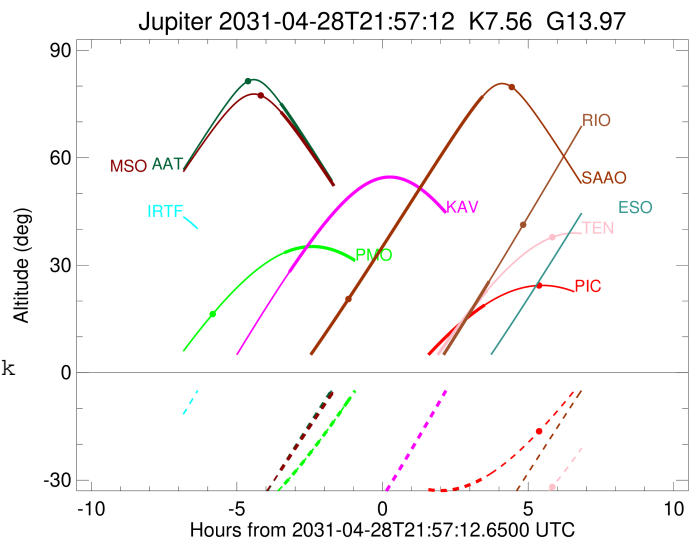
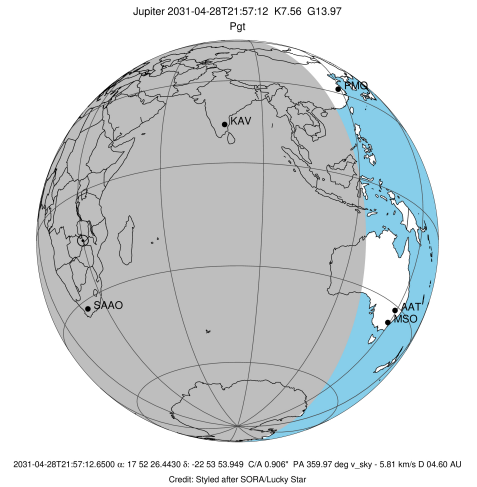


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-04-28T18:35:01.527	33.48	-31.09	71492.0	1.73	1.97
Jupiter	E	2031-04-29T01:06:04.846	-6.78x	46.25x	71492.0	0.27	0.31

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-04-28T22:13:16.740
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      : 4068701963634259072
2Mass ID (if available) : 17522644-2253539
ICRS Star Coord at Epoch: 17h 52m 26.44298s -22:53:53.94949s
RUWE (>1.4 is poor) : 0.99
K magnitude         : 7.556
G magnitude         : 13.968
RP magnitude        : 12.442
BP magnitude        : 17.441
DUPflag            : 0
Distance (au)      : 4.596
f0 (km)            : 0.00
g0 (km)            : 0.00
skyplane vel. (km/s) : -5.81
Sun-Target sep (deg) : 129.73
Sun-Moon sep (deg)  : 150.33
B (ring opening deg) : -2.61
PA of pole (deg)    : -0.02
Pole direction: RA (deg): 268.05696
Dec (deg): 64.49651
C/A sky separation (") : 0.116
C/A sky separation (km) : 386.9
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
    
```

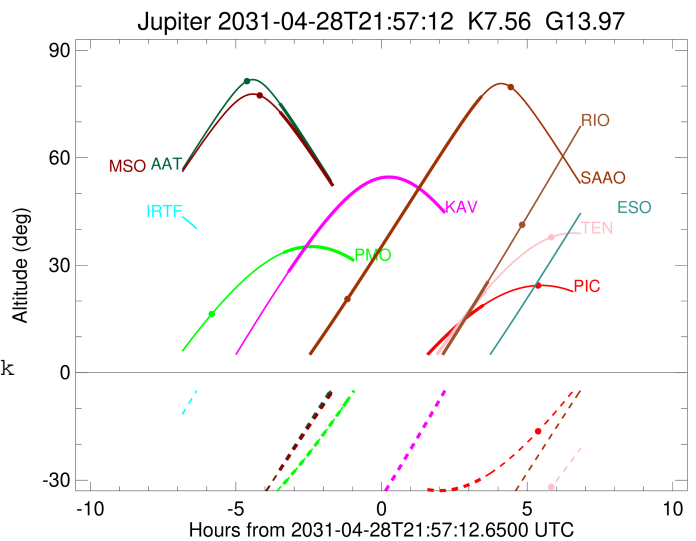
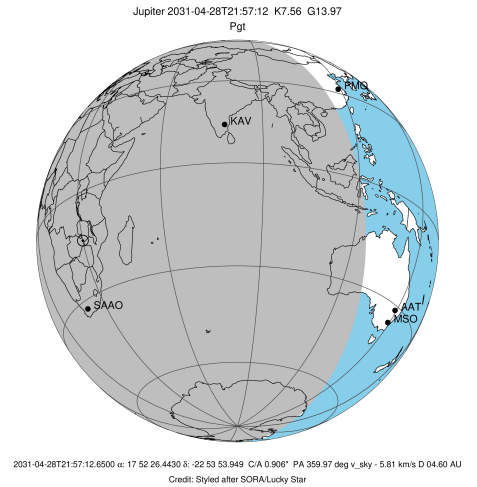


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-04-28T18:39:37.572	-61.30x	11.83x	71492.0	-1.66	-1.90
Jupiter	E	2031-04-29T01:32:38.720	22.96	-46.93	71492.0	1.08	1.23

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-04-28T21:58:15.700
Event type          : Pgt
                    : Jupiter occs: geocentric, topocentric
                    : Not a ringed target
Observer code       : KAV
Location            : Kavalur Observatory
Latitude (deg)      : 12.57556
E. Longitude (deg)  : 78.83167
Altitude (km)       : 0.722
Gaia source ID      : 4068701963634259072
2Mass ID (if available) : 17522644-2253539
ICRS Star Coord at Epoch: 17h 52m 26.44298s -22:53:53.94949s
RUWE (>1.4 is poor) : 0.99
K magnitude          : 7.556
G magnitude          : 13.968
RP magnitude         : 12.442
BP magnitude         : 17.441
DUPflag             : 0
Distance (au)       : 4.596
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -5.81
Sun-Target sep (deg) : 129.73
Sun-Moon sep (deg)  : 150.19
B (ring opening deg) : -2.61
PA of pole (deg)    : -0.02
Pole direction: RA (deg): 268.05696
Dec (deg): 64.49651
C/A sky separation ("): 0.212
C/A sky separation (km): 708.3
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
    
```

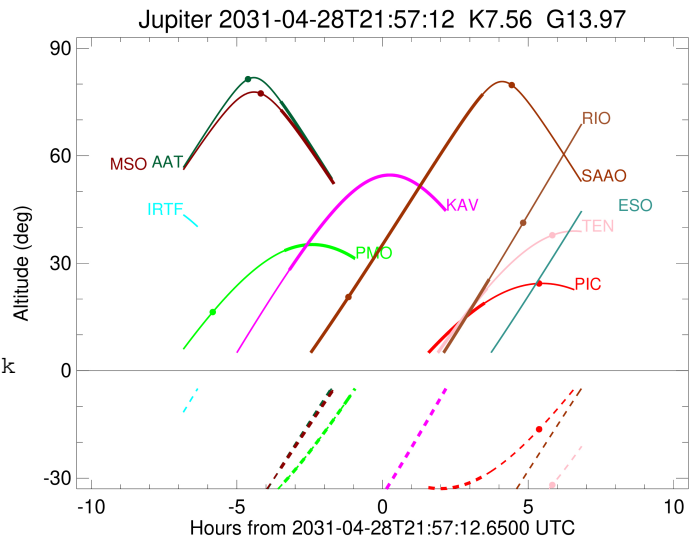
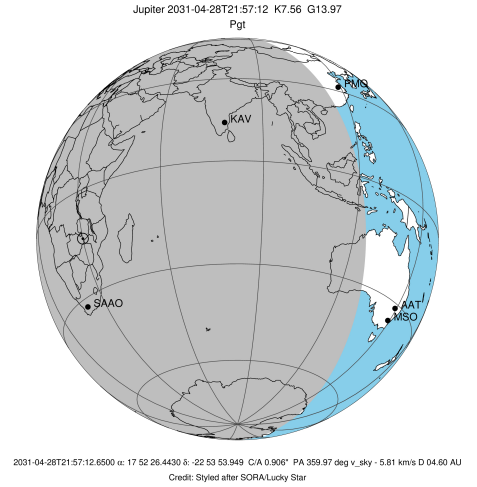


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-04-28T18:45:14.019	28.08	-63.23	71492.0	-0.16	-0.19
Jupiter	E	2031-04-29T01:09:00.461	34.01	9.45x	71492.0	0.00	0.00

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-04-28T22:12:00.160
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      : 4068701963634259072
2Mass ID (if available) : 17522644-2253539
ICRS Star Coord at Epoch: 17h 52m 26.44298s -22:53:53.94949s
RUWE (>1.4 is poor) : 0.99
K magnitude         : 7.556
G magnitude         : 13.968
RP magnitude        : 12.442
BP magnitude        : 17.441
DUPflag            : 0
Distance (au)       : 4.596
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -5.81
Sun-Target sep (deg) : 129.73
Sun-Moon sep (deg)  : 150.32
B (ring opening deg) : -2.61
PA of pole (deg)    : -0.02
Pole direction: RA (deg): 268.05696
Dec (deg): 64.49651
C/A sky separation (") : 1.936
C/A sky separation (km) : 6454.1
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
    
```

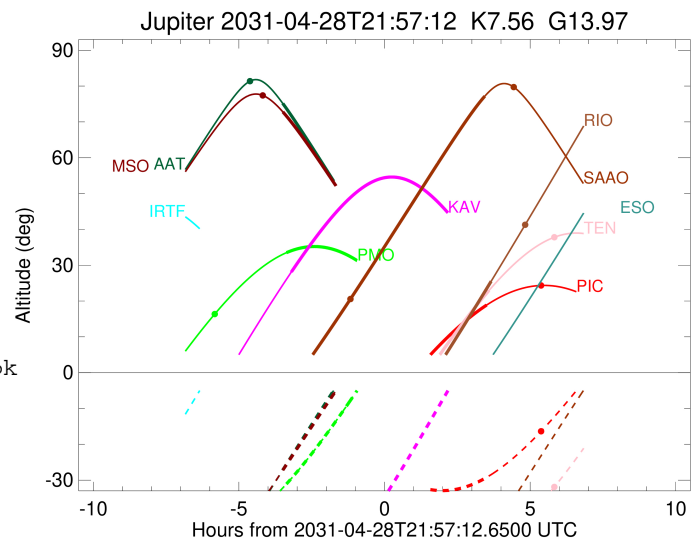
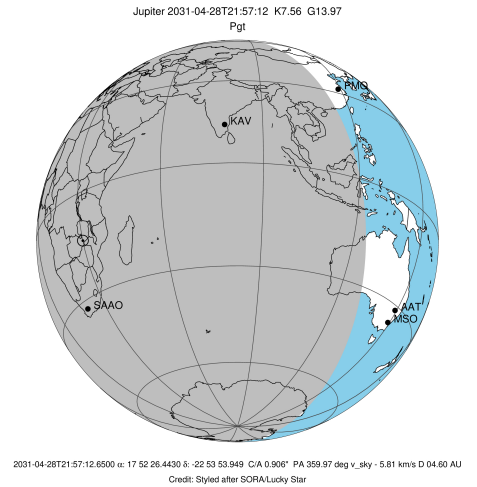


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-04-28T18:33:10.533	-44.25x	24.10x	71491.9	-6.05	-6.91
Jupiter	E	2031-04-29T01:36:48.043	25.49	-70.68	71492.0	-3.59	-4.10

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-04-28T21:42:57.190
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       : 4068701963634259072
2Mass ID (if available) : 17522644-2253539
ICRS Star Coord at Epoch: 17h 52m 26.44298s -22:53:53.94949s
RUWE (>1.4 is poor) : 0.99
K magnitude           : 7.556
G magnitude           : 13.968
RP magnitude          : 12.442
BP magnitude          : 17.441
DUPflag              : 0
Distance (au)        : 4.596
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -5.81
Sun-Target sep (deg) : 129.73
Sun-Moon sep (deg)   : 149.50
B (ring opening deg) : -2.61
PA of pole (deg)     : -0.02
Pole direction: RA (deg): 268.05696
Dec (deg): 64.49651
C/A sky separation ("): 1.520
C/A sky separation (km): 5068.0
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
    
```

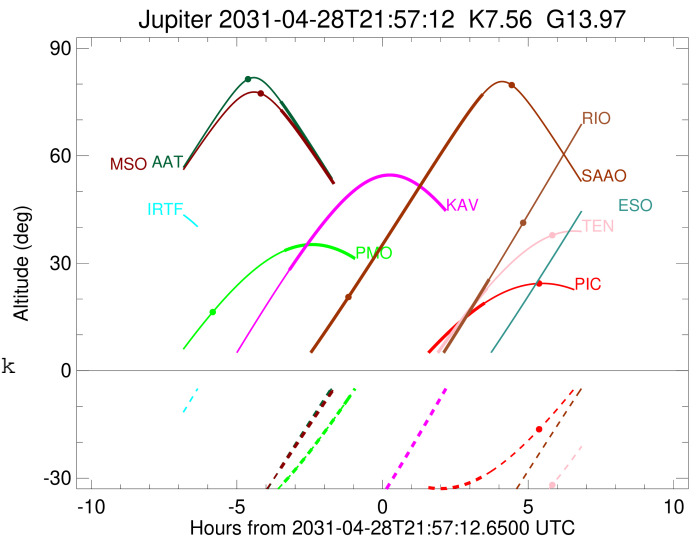
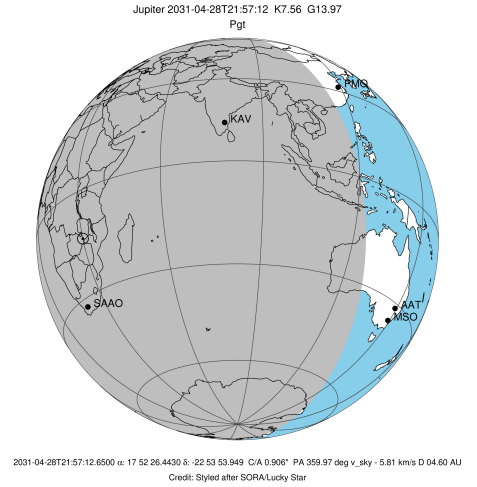


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-04-28T18:27:35.889	75.16	-27.20	71492.0	-3.18	-3.63
Jupiter	E	2031-04-29T01:06:18.571	-6.79x	42.67x	71491.9	-5.53	-6.32


```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-04-28T22:10:43.200
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        : 4068701963634259072
2Mass ID (if available) : 17522644-2253539
ICRS Star Coord at Epoch: 17h 52m 26.44298s -22:53:53.94949s
RUWE (>1.4 is poor) : 0.99
K magnitude           : 7.556
G magnitude           : 13.968
RP magnitude          : 12.442
BP magnitude          : 17.441
DUPflag              : 0
Distance (au)         : 4.596
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -5.81
Sun-Target sep (deg)  : 129.73
Sun-Moon sep (deg)   : 150.71
B (ring opening deg) : -2.61
PA of pole (deg)     : -0.02
Pole direction: RA (deg): 268.05696
Dec (deg): 64.49651
C/A sky separation (") : 1.499
C/A sky separation (km) : 4996.4
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
    
```

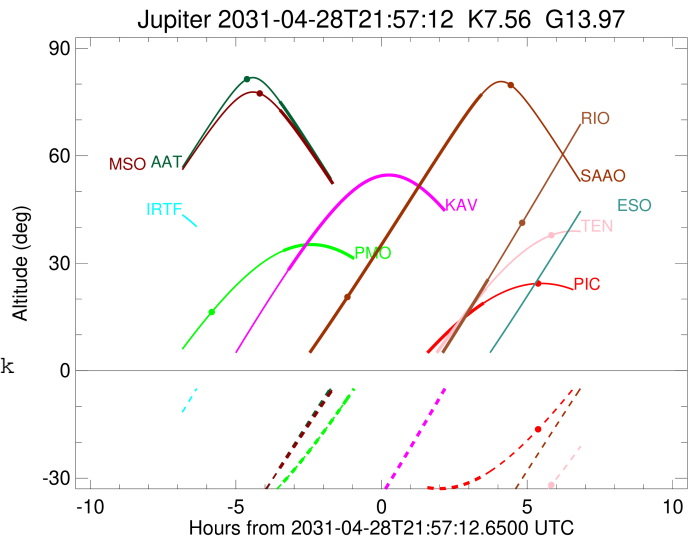
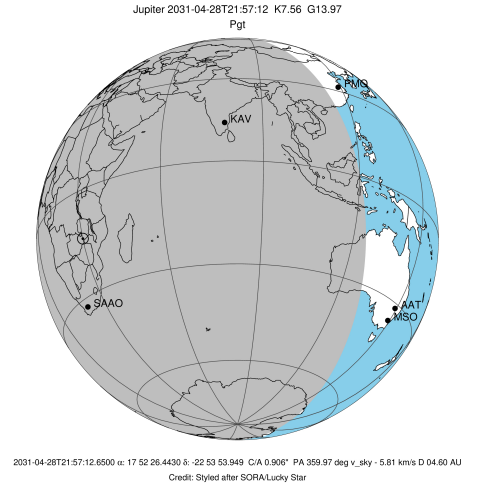


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-04-28T18:46:46.336	-3.05x	-35.42	71491.9	-5.45	-6.23
Jupiter	E	2031-04-29T01:23:45.656	77.16	-47.53	71492.0	-3.24	-3.70


```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-04-28T21:43:33.940
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      : 4068701963634259072
2Mass ID (if available) : 17522644-2253539
ICRS Star Coord at Epoch: 17h 52m 26.44298s -22:53:53.94949s
RUWE (>1.4 is poor) : 0.99
K magnitude          : 7.556
G magnitude          : 13.968
RP magnitude         : 12.442
BP magnitude         : 17.441
DUPflag             : 0
Distance (au)       : 4.596
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -5.81
Sun-Target sep (deg) : 129.73
Sun-Moon sep (deg)  : 149.54
B (ring opening deg) : -2.61
PA of pole (deg)    : -0.02
Pole direction: RA (deg): 268.05696
Dec (deg): 64.49651
C/A sky separation ("): 1.638
C/A sky separation (km): 5459.0
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	2031-04-28T18:27:50.872	72.78	-27.17	71492.0	-3.53	-4.03
Jupiter	E	2031-04-29T01:06:52.563	-4.70x	38.84x	71491.9	-5.78	-6.60