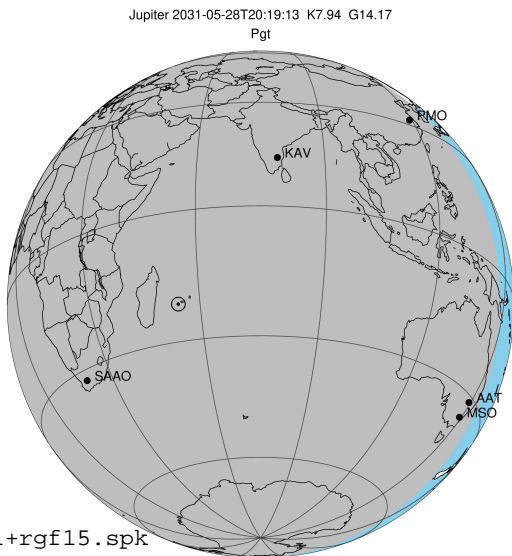


target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2031-05-28T20:19:13.330
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 4116925199182885248
 2Mass ID (if available) : 17415104-2252181

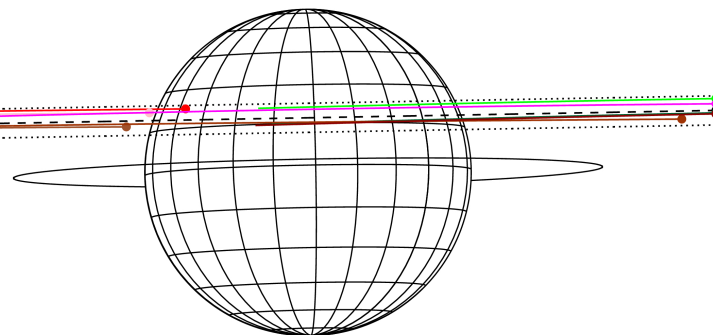
Jupiter 2031-05-28T20:19:13 K7.94 G14.17 Pgt

ICRS Star Coord at Epoch: 17h 41m 51.03924s -22:52:18.47774s
 RUWE (>1.4 is poor) : 0.86
 K magnitude : 7.937
 G magnitude : 14.174
 RP magnitude : 12.654
 BP magnitude : 17.347
 DUPflag : 0
 Distance (au) : 4.318
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -14.86
 Sun-Target sep (deg) : 161.06
 Sun-Moon sep (deg) : 115.98
 B (ring opening deg) : -2.61
 PA of pole (deg) : 1.12
 Pole direction: RA (deg): 268.05693
 Dec (deg): 64.49651
 C/A sky separation (") : 7.651
 C/A sky separation (km) : 23957.9
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.spk
 naif0012.tls
 nep097.bsp
 nep101.bsp
 sat4401.bsp



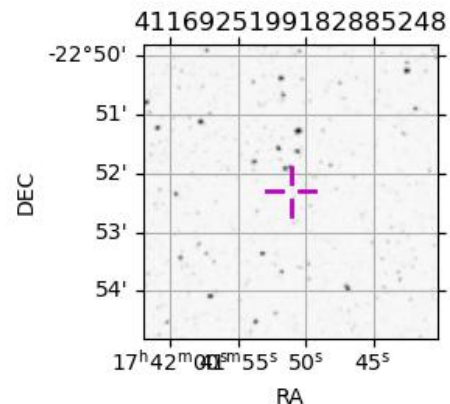
2031-05-28T20:19:13.3300 at: 17 41 51.0392 s: -22 52 18.478 C/A 7.639° PA 181.04 deg v_sky -14.86 km/s D 04.32 AU
 Credit: Styled after SORA/Lucky Star

Earth
 PIC
 PMO
 TEN
 KAV
 RIO
 ESO
 AAT
 SAAO
 MSO



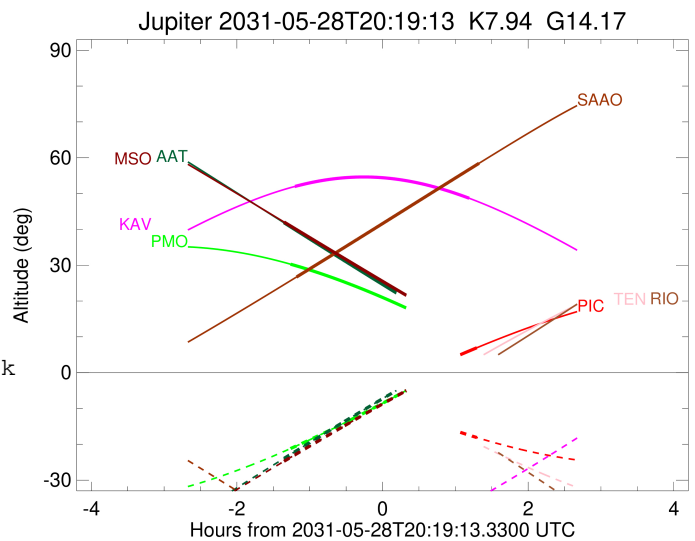
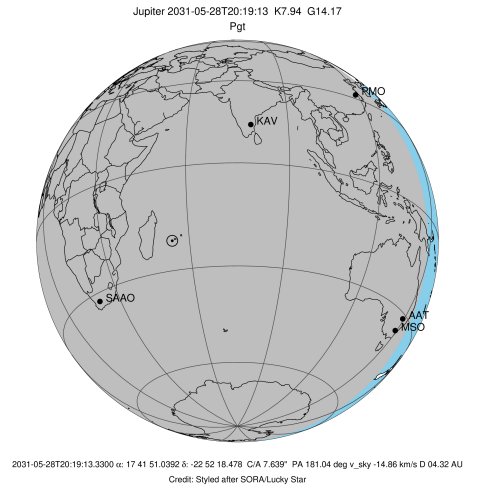
Observable events with sun below -5 deg and altitude above 5 deg

Obs	Location	lat	Elon	Target	Observed Events Interval	OCode
PIC	Pic du Midi	42.9	0.1	+	MAY 28 21:36 - MAY 28 21:36	Pne
PAL	Palomar Mt (200")	33.4	243.1			Pnn
PMO	Purple Mtn Obs. Nanking	32.1	118.8	+	MAY 28 19:03 - MAY 28 19:03	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			Pnn
IRTF	Mauna Kea/IRTF	19.8	204.5			Pnn
KAV	Kavalur Observatory	12.6	78.8	+ +	MAY 28 19:06 - MAY 28 21:30	Pie
RIO	Rio de Janeiro	-22.9	316.8			Pnn
ESO	European Southern Obs. (3.6m)	-29.3	289.3			Pnn
AAT	Siding Spring (AAT)	-31.3	149.1	+	MAY 28 18:58 - MAY 28 18:58	Pin
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8	+ +	MAY 28 19:08 - MAY 28 21:38	Pie
MSO	Mt. Stromlo Observatory	-35.3	149.0	+	MAY 28 18:58 - MAY 28 18:58	Pin



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-28T20:24:03.420
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     : 4116925199182885248
2Mass ID (if available) : 17415104-2252181
ICRS Star Coord at Epoch: 17h 41m 51.03924s -22:52:18.47774s
RUWE (>1.4 is poor) : 0.86
K magnitude        : 7.937
G magnitude        : 14.174
RP magnitude       : 12.654
BP magnitude       : 17.347
DUPflag           : 0
Distance (au)     : 4.318
f0 (km)           : 0.00
g0 (km)           : 0.00
skyplane vel. (km/s) : -14.86
Sun-Target sep (deg) : 161.06
Sun-Moon sep (deg) : 116.17
B (ring opening deg) : -2.61
PA of pole (deg)   : 1.12
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (") : 9.066
C/A sky separation (km) : 28389.8
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
    
```

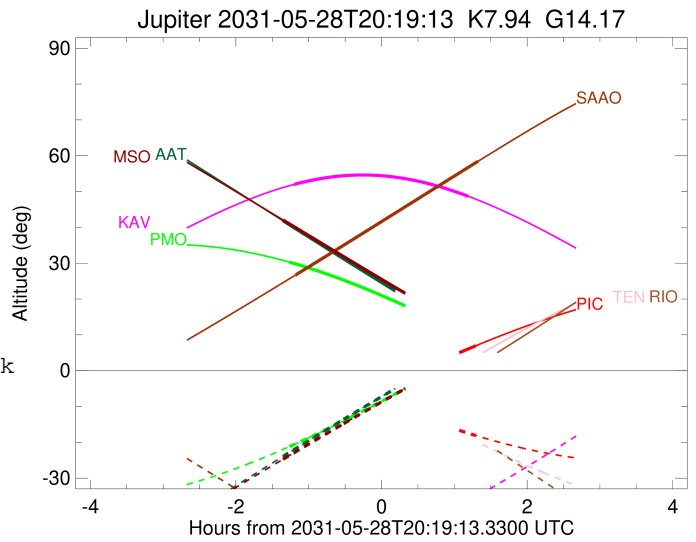
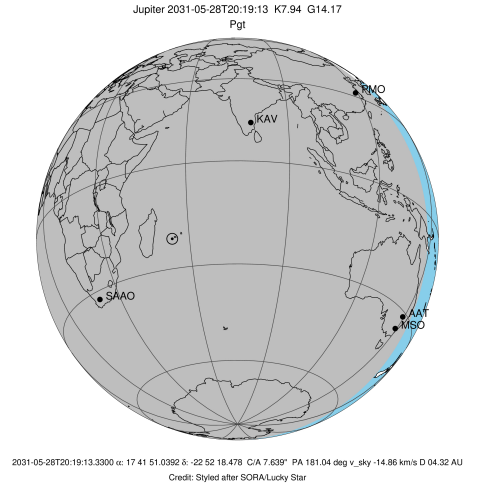


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-28T19:10:38.022	-16.72x	1.86x	71490.6	22.79	25.63
Jupiter	E	2031-05-28T21:36:56.436	6.95	-18.10	71490.5	23.91	26.85

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-28T20:15:22.810
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      : 4116925199182885248
2Mass ID (if available) : 17415104-2252181
ICRS Star Coord at Epoch: 17h 41m 51.03924s -22:52:18.47774s
RUWE (>1.4 is poor) : 0.86
K magnitude          : 7.937
G magnitude          : 14.174
RP magnitude         : 12.654
BP magnitude         : 17.347
DUPflag             : 0
Distance (au)       : 4.318
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -14.86
Sun-Target sep (deg) : 161.06
Sun-Moon sep (deg)  : 116.02
B (ring opening deg) : -2.61
PA of pole (deg)    : 1.12
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (") : 9.151
C/A sky separation (km) : 28655.4
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
    
```

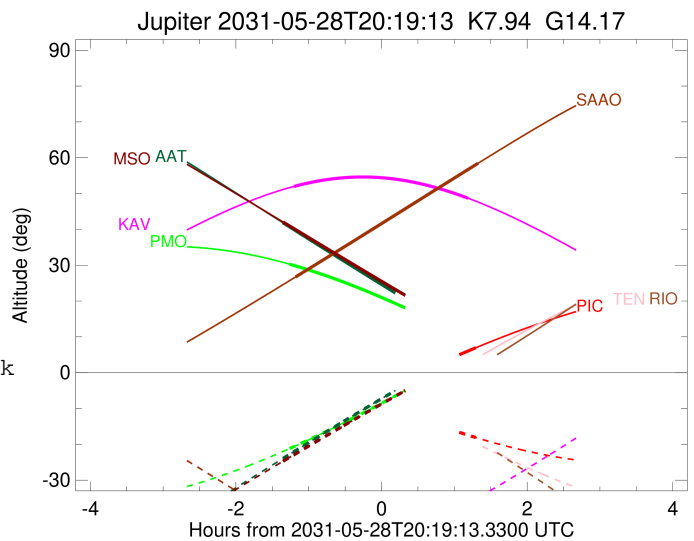
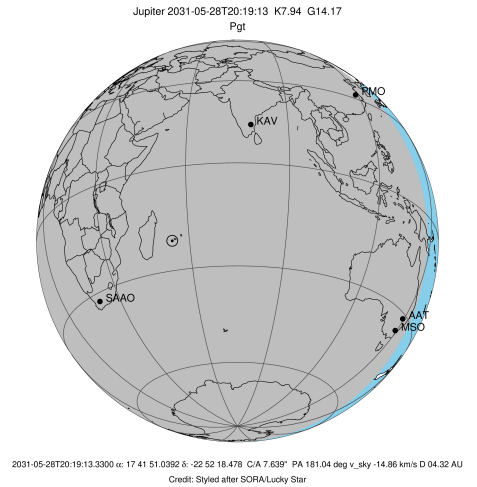


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-28T19:03:25.838	30.28	-21.18	71490.5	23.83	26.76
Jupiter	E	2031-05-28T21:27:40.928	9.98	4.35x	71490.5	23.24	26.12

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-28T20:18:49.960
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       : 4116925199182885248
2Mass ID (if available) : 17415104-2252181
ICRS Star Coord at Epoch: 17h 41m 51.03924s -22:52:18.47774s
RUWE (>1.4 is poor) : 0.86
K magnitude           : 7.937
G magnitude           : 14.174
RP magnitude          : 12.654
BP magnitude          : 17.347
DUPflag              : 0
Distance (au)        : 4.318
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -14.86
Sun-Target sep (deg) : 161.06
Sun-Moon sep (deg)   : 116.60
B (ring opening deg) : -2.61
PA of pole (deg)     : 1.12
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation ("): 8.830
C/A sky separation (km): 27650.8
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
    
```

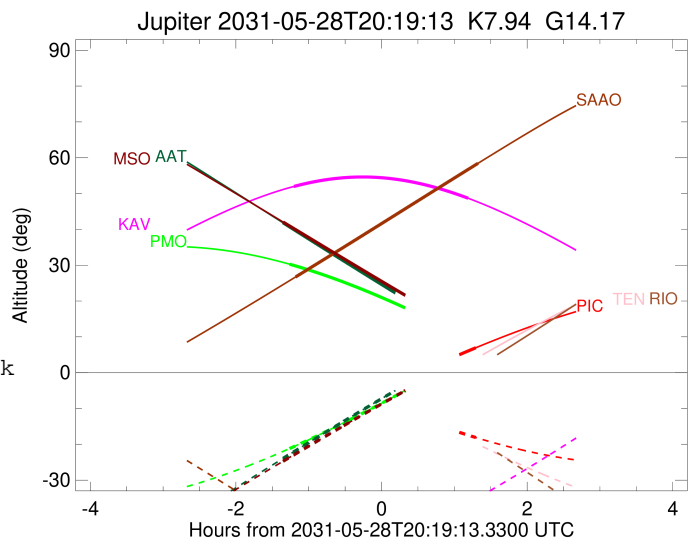
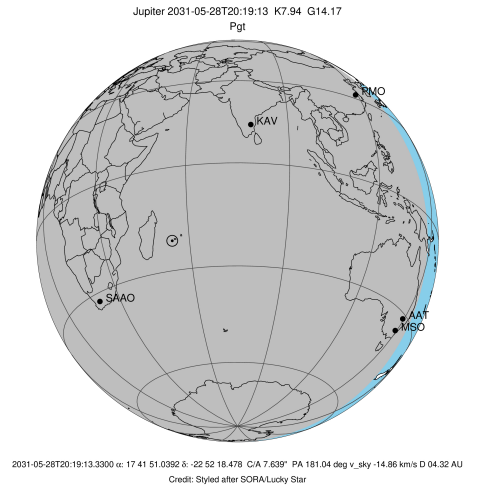


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-28T19:06:58.713	51.97	-55.44	71490.6	22.56	25.38
Jupiter	E	2031-05-28T21:30:41.333	48.68	-36.42	71490.6	22.69	25.52

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-28T20:13:34.490
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      : 4116925199182885248
2Mass ID (if available) : 17415104-2252181
ICRS Star Coord at Epoch: 17h 41m 51.03924s -22:52:18.47774s
RUWE (>1.4 is poor) : 0.86
K magnitude          : 7.937
G magnitude          : 14.174
RP magnitude         : 12.654
BP magnitude         : 17.347
DUPflag             : 0
Distance (au)       : 4.318
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -14.86
Sun-Target sep (deg) : 161.06
Sun-Moon sep (deg)  : 116.00
B (ring opening deg) : -2.61
PA of pole (deg)    : 1.12
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (" ) : 6.908
C/A sky separation (km) : 21633.7
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
    
```

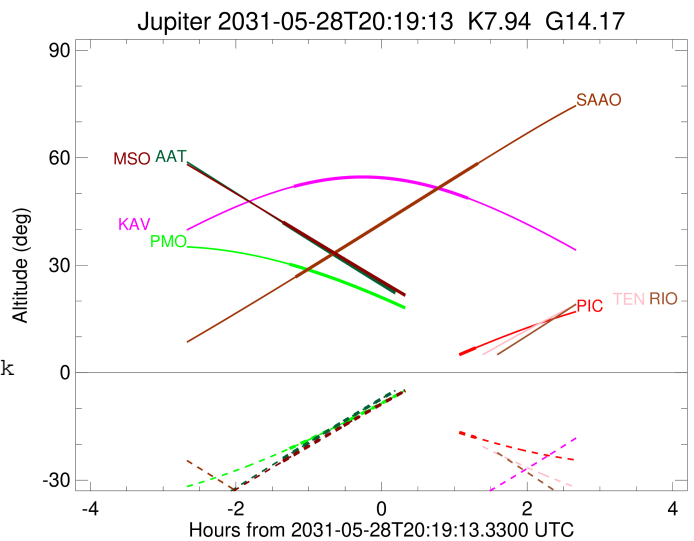
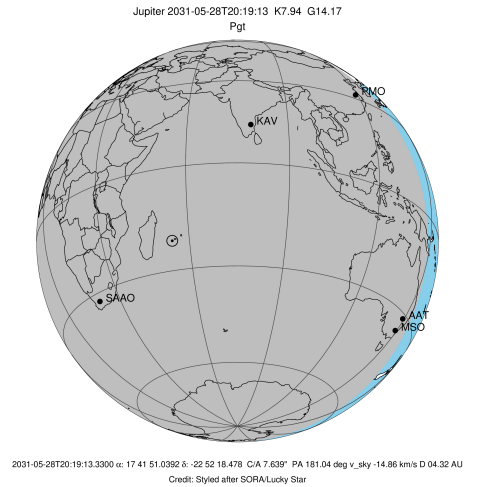


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-28T18:58:00.911	41.86	-23.95	71491.1	18.03	20.40
Jupiter	E	2031-05-28T21:29:42.851	10.15	6.36x	71491.2	17.09	19.36

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-28T20:23:48.960
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        : 4116925199182885248
2Mass ID (if available) : 17415104-2252181
ICRS Star Coord at Epoch: 17h 41m 51.03924s -22:52:18.47774s
RUWE (>1.4 is poor) : 0.86
K magnitude           : 7.937
G magnitude           : 14.174
RP magnitude          : 12.654
BP magnitude          : 17.347
DUPflag              : 0
Distance (au)         : 4.318
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -14.86
Sun-Target sep (deg) : 161.06
Sun-Moon sep (deg)   : 116.82
B (ring opening deg) : -2.61
PA of pole (deg)     : 1.12
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation ("): 7.034
C/A sky separation (km): 22027.9
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
    
```

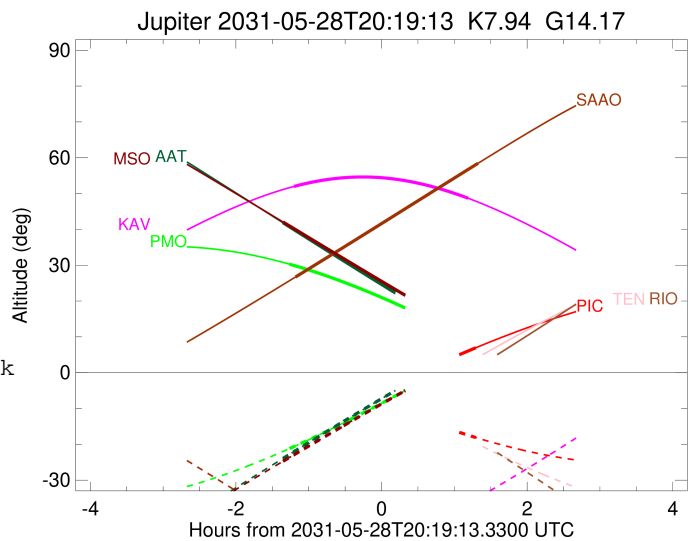
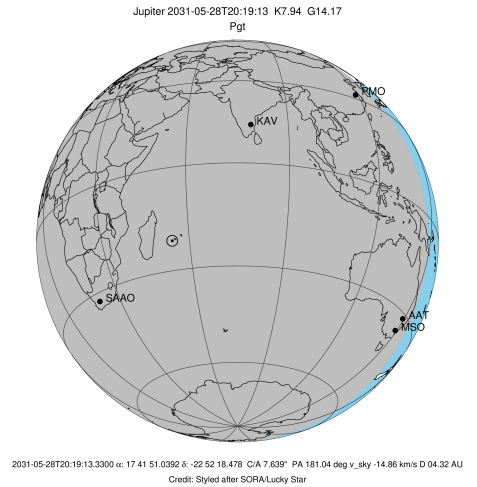


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-28T19:08:23.628	26.71	-43.34	71491.2	17.32	19.61
Jupiter	E	2031-05-28T21:38:41.532	58.42	-73.70	71491.1	18.42	20.83

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-28T20:13:49.080
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      : 4116925199182885248
2Mass ID (if available) : 17415104-2252181
ICRS Star Coord at Epoch: 17h 41m 51.03924s -22:52:18.47774s
RUWE (>1.4 is poor) : 0.86
K magnitude          : 7.937
G magnitude          : 14.174
RP magnitude         : 12.654
BP magnitude         : 17.347
DUPflag             : 0
Distance (au)       : 4.318
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -14.86
Sun-Target sep (deg) : 161.06
Sun-Moon sep (deg)  : 116.03
B (ring opening deg) : -2.61
PA of pole (deg)    : 1.12
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (") : 6.788
C/A sky separation (km) : 21256.4
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	2031-05-28T18:58:05.233	42.05	-24.73	71491.1	17.69	20.02
Jupiter	E	2031-05-28T21:30:06.178	11.52	4.36x	71491.2	16.80	19.03