

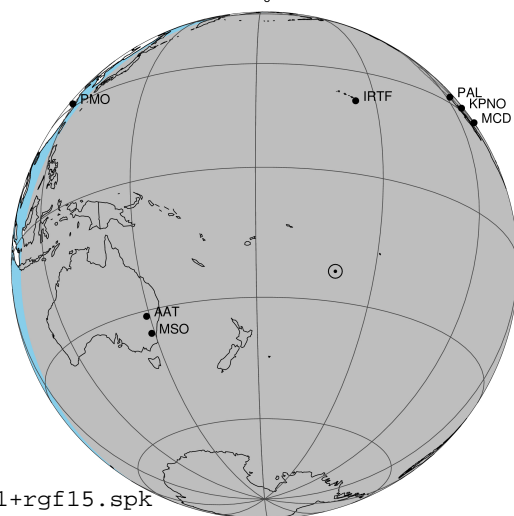
target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2031-06-30T10:44:38.720
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 4111734443490952320
 2Mass ID (if available) : 17242113-2245232

Jupiter 2031-06-30T10:44:38 K9.91 G14.63 Pgt

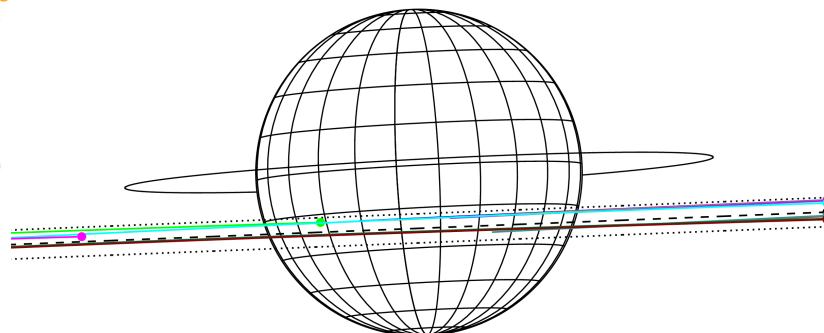
ICRS Star Coord at Epoch: 17h 24m 21.13106s -22:45:23.28230s

RUWE (>1.4 is poor) : 1.03
 K magnitude : 9.908
 G magnitude : 14.627
 RP magnitude : 13.419
 BP magnitude : 16.224
 DUPflag : 0
 Distance (au) : 4.292
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -15.31
 Sun-Target sep (deg) : 163.74
 Sun-Moon sep (deg) : 43.63
 B (ring opening deg) : -2.58
 PA of pole (deg) : 3.00
 Pole direction: RA (deg): 268.05691
 Dec (deg): 64.49651
 C/A sky separation (") : 7.853
 C/A sky separation (km) : 24443.8
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk

Jupiter 2031-06-30T10:44:38 K9.91 G14.63
 Pgt



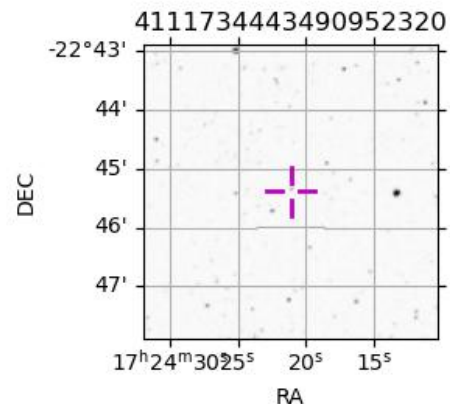
Earth
 PAL
 PMO
 KPNO
 MCD
 IRTF
 KAV
 RIO
 ESO
 AAT
 MSO



2031-06-30T10:44:38.7200 a: 17 24 21.1311 d: -22 45 23.282 C/A 7.865" PA 2.28 deg v_sky -15.31 km/s D 04.29 AU
 Credit: Styled after SORA/Lucky Star

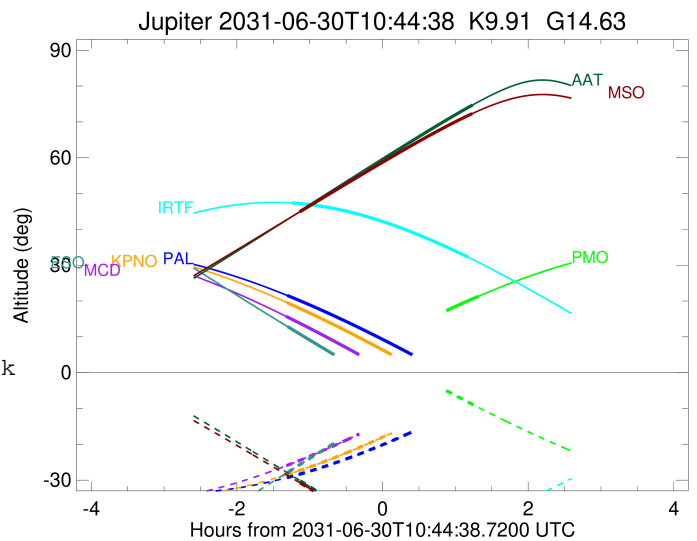
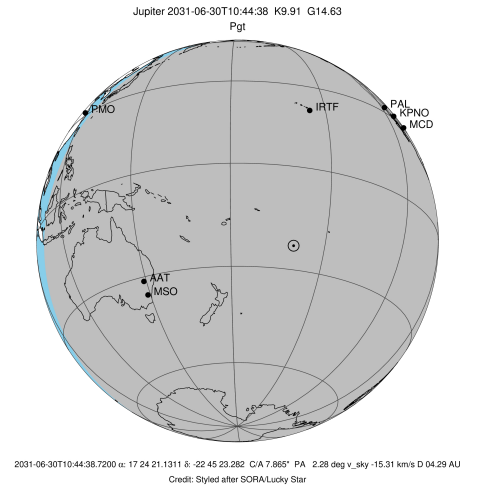
Observable events with sun below -5 deg and altitude above 5 deg

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	+	JUN 30 09:26 - JUN 30 09:26	Pin
PMO	Purple Mtn Obs. Nanking	32.1	118.8	+	JUN 30 12:03 - JUN 30 12:03	Pne
KPNO	Kitt Peak Natl Obs	32.0	248.4	+	JUN 30 09:25 - JUN 30 09:25	Pin
MCD	McDonald Obs. 2.7m	30.7	256.0	+	JUN 30 09:25 - JUN 30 09:25	Pin
TEN	Teide Obs./Tenerife	28.3	343.5			Pnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+	JUN 30 09:29 - JUN 30 11:55	Pie
KAV	Kavalur Observatory	12.6	78.8			Pnn
RIO	Rio de Janeiro	-22.9	316.8			Pnn
ESO	European Southern Obs. (3.6m)	-29.3	289.3	+	JUN 30 09:26 - JUN 30 09:26	Pin
AAT	Siding Spring (AAT)	-31.3	149.1	+	JUN 30 09:36 - JUN 30 11:58	Pie
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8			Pnn
MSO	Mt. Stromlo Observatory	-35.3	149.0	+	JUN 30 09:36 - JUN 30 11:58	Pie



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-30T10:39:37.610
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     : 4111734443490952320
2Mass ID (if available) : 17242113-2245232
ICRS Star Coord at Epoch: 17h 24m 21.13106s -22:45:23.28230s
RUWE (>1.4 is poor) : 1.03
K magnitude         : 9.908
G magnitude         : 14.627
RP magnitude        : 13.419
BP magnitude        : 16.224
DUPflag            : 0
Distance (au)      : 4.292
f0 (km)            : 0.00
g0 (km)            : 0.00
skyplane vel. (km/s) : -15.31
Sun-Target sep (deg) : 163.74
Sun-Moon sep (deg)  : 44.25
B (ring opening deg) : -2.58
PA of pole (deg)    : 3.00
Pole direction: RA (deg): 268.05691
Dec (deg): 64.49651
C/A sky separation (") : 6.433
C/A sky separation (km) : 20024.2
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
    
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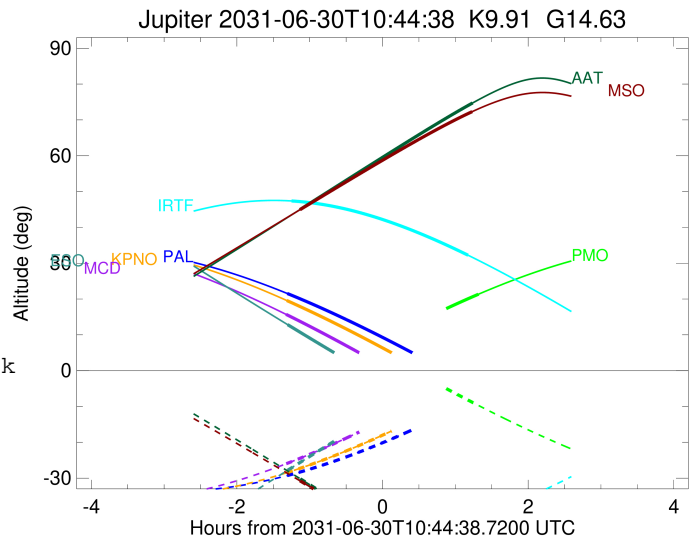
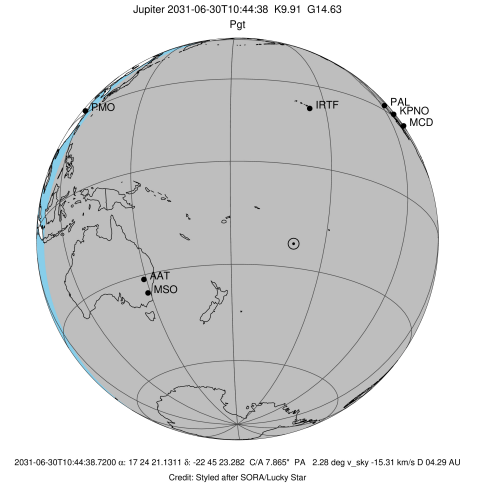


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-30T09:26:10.002	21.54	-29.28	71491.3	-16.58	-18.78
Jupiter	E	2031-06-30T11:53:37.965	-3.21x	-9.34	71491.3	-16.03	-18.17

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-30T10:50:12.130
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      : 4111734443490952320
2Mass ID (if available) : 17242113-2245232
ICRS Star Coord at Epoch: 17h 24m 21.13106s -22:45:23.28230s
RUWE (>1.4 is poor) : 1.03
K magnitude          : 9.908
G magnitude          : 14.627
RP magnitude         : 13.419
BP magnitude         : 16.224
DUPflag             : 0
Distance (au)        : 4.292
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -15.31
Sun-Target sep (deg) : 163.74
Sun-Moon sep (deg)  : 43.19
B (ring opening deg) : -2.58
PA of pole (deg)    : 3.00
Pole direction: RA (deg): 268.05691
Dec (deg): 64.49651
C/A sky separation (" ) : 6.595
C/A sky separation (km) : 20529.3
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
    
```

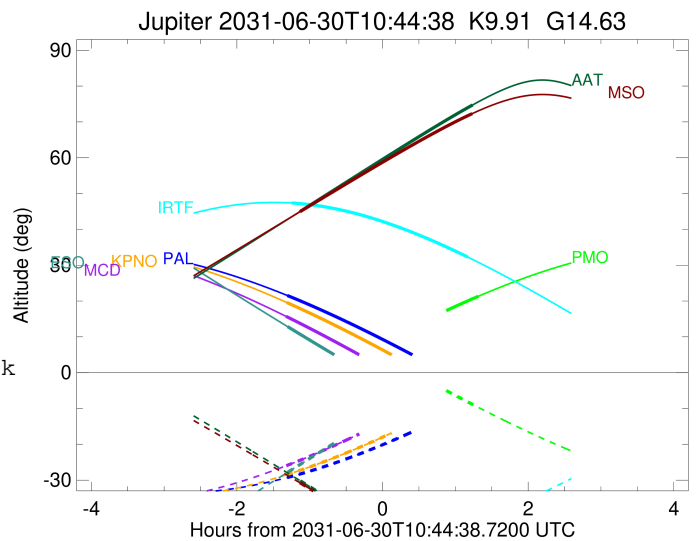
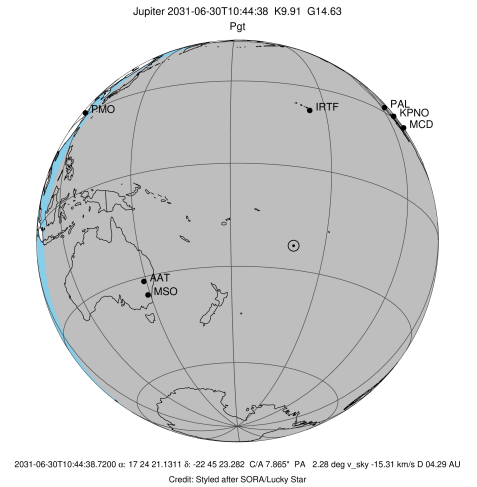


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-30T09:36:16.643	-4.25x	18.47x	71491.1	-17.94	-20.30
Jupiter	E	2031-06-30T12:03:37.386	21.32	-9.69	71491.3	-15.47	-17.56

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-30T10:39:16.480
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        : 4111734443490952320
2Mass ID (if available) : 17242113-2245232
ICRS Star Coord at Epoch: 17h 24m 21.13106s -22:45:23.28230s
RUWE (>1.4 is poor)  : 1.03
K magnitude           : 9.908
G magnitude           : 14.627
RP magnitude          : 13.419
BP magnitude          : 16.224
DUPflag              : 0
Distance (au)         : 4.292
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s)  : -15.31
Sun-Target sep (deg)  : 163.74
Sun-Moon sep (deg)    : 44.25
B (ring opening deg)  : -2.58
PA of pole (deg)      : 3.00
Pole direction: RA (deg): 268.05691
Dec (deg): 64.49651
C/A sky separation (") : 6.517
C/A sky separation (km) : 20284.5
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
    
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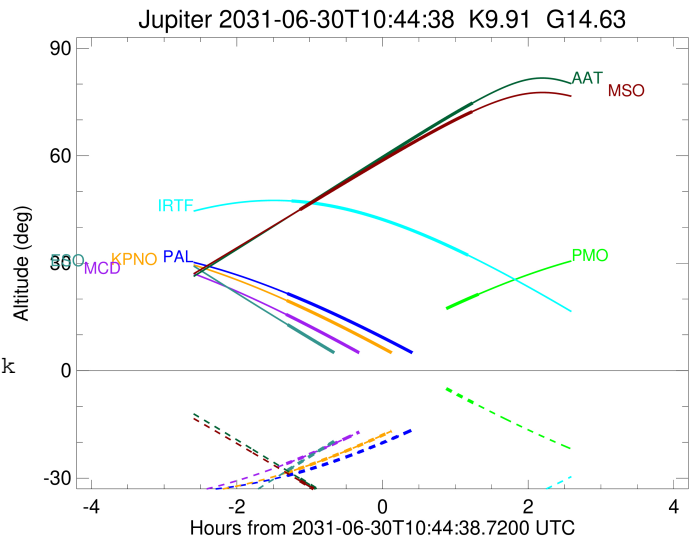
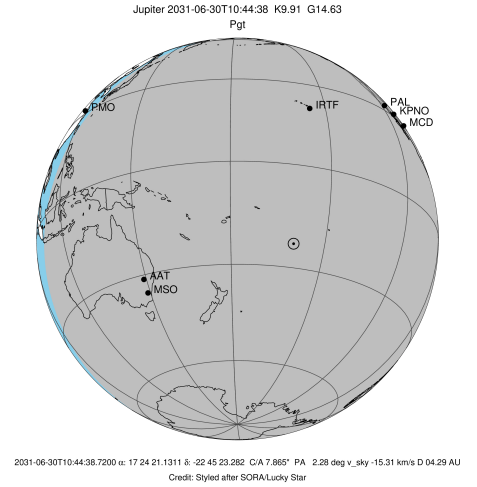


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-30T09:25:46.868	19.58	-28.47	71491.2	-16.75	-18.98
Jupiter	E	2031-06-30T11:53:20.994	-6.65x	-6.49	71491.3	-16.28	-18.45

```

target                : Jupiter
target radius (km)    : 71492.00
C/A epoch              : 2031-06-30T10:38:53.050
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        : 4111734443490952320
2Mass ID (if available) : 17242113-2245232
ICRS Star Coord at Epoch: 17h 24m 21.13106s -22:45:23.28230s
RUWE (>1.4 is poor)  : 1.03
K magnitude           : 9.908
G magnitude           : 14.627
RP magnitude          : 13.419
BP magnitude          : 16.224
DUPflag              : 0
Distance (au)         : 4.292
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s)  : -15.31
Sun-Target sep (deg)  : 163.74
Sun-Moon sep (deg)    : 44.23
B (ring opening deg)  : -2.58
PA of pole (deg)      : 3.00
Pole direction: RA (deg): 268.05691
Dec (deg): 64.49651
C/A sky separation (") : 6.628
C/A sky separation (km) : 20631.7
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
    
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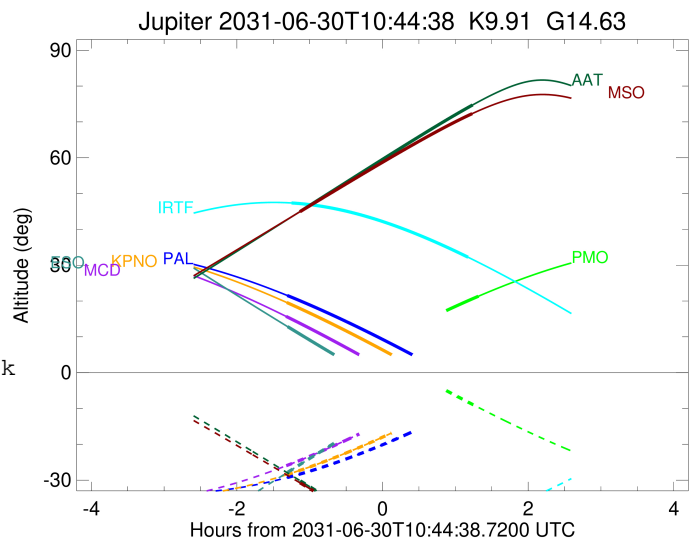
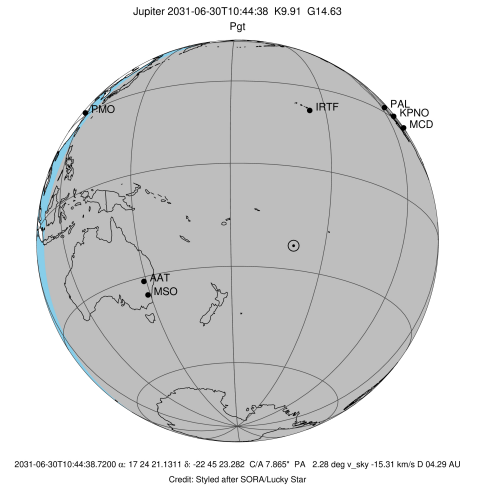


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-30T09:25:18.258	15.69	-25.98	71491.2	-16.99	-19.25
Jupiter	E	2031-06-30T11:53:05.268	-12.19x	-1.59x	71491.3	-16.60	-18.81

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-30T10:42:18.600
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        : 4111734443490952320
2Mass ID (if available) : 17242113-2245232
ICRS Star Coord at Epoch: 17h 24m 21.13106s -22:45:23.28230s
RUWE (>1.4 is poor) : 1.03
K magnitude           : 9.908
G magnitude           : 14.627
RP magnitude          : 13.419
BP magnitude          : 16.224
DUPflag              : 0
Distance (au)         : 4.292
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -15.31
Sun-Target sep (deg)  : 163.74
Sun-Moon sep (deg)    : 44.34
B (ring opening deg) : -2.58
PA of pole (deg)     : 3.00
Pole direction: RA (deg): 268.05691
Dec (deg): 64.49651
C/A sky separation (") : 6.497
C/A sky separation (km) : 20223.4
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
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neptune_ringframes_rfrench20220702a_v1.tf
earth_flat_IAU.spk
    
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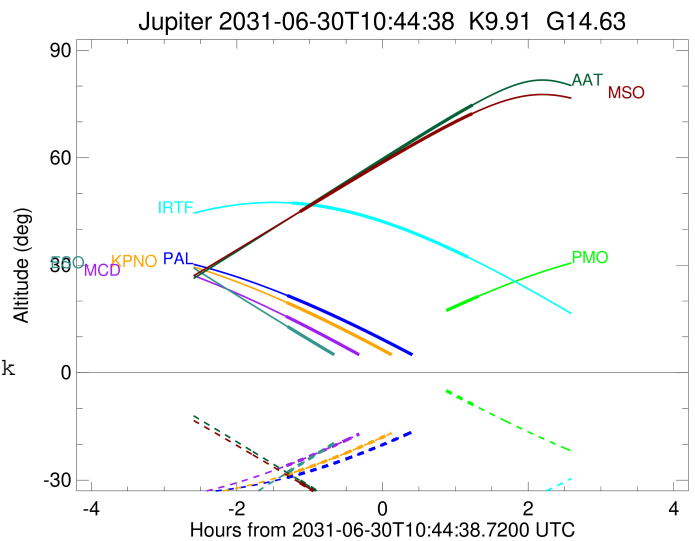
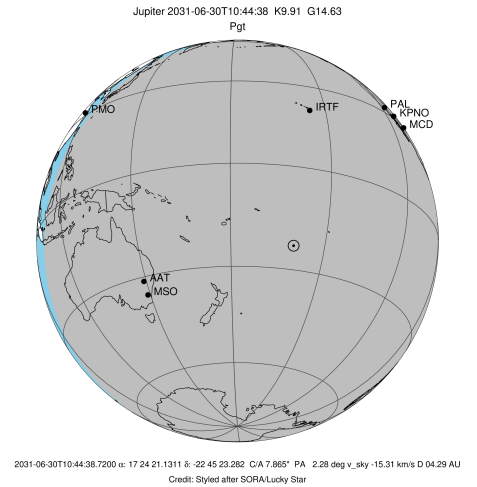


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-30T09:29:44.742	47.37	-45.02	71491.2	-17.06	-19.32
Jupiter	E	2031-06-30T11:55:08.283	32.22	-41.89	71491.3	-15.96	-18.10

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-30T10:38:21.880
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        : 4111734443490952320
2Mass ID (if available) : 17242113-2245232
ICRS Star Coord at Epoch: 17h 24m 21.13106s -22:45:23.28230s
RUWE (>1.4 is poor)  : 1.03
K magnitude           : 9.908
G magnitude           : 14.627
RP magnitude          : 13.419
BP magnitude          : 16.224
DUPflag              : 0
Distance (au)         : 4.292
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s)  : -15.31
Sun-Target sep (deg)  : 163.74
Sun-Moon sep (deg)    : 44.19
B (ring opening deg)  : -2.58
PA of pole (deg)      : 3.00
Pole direction: RA (deg): 268.05691
Dec (deg): 64.49651
C/A sky separation (") : 8.895
C/A sky separation (km) : 27686.3
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
    
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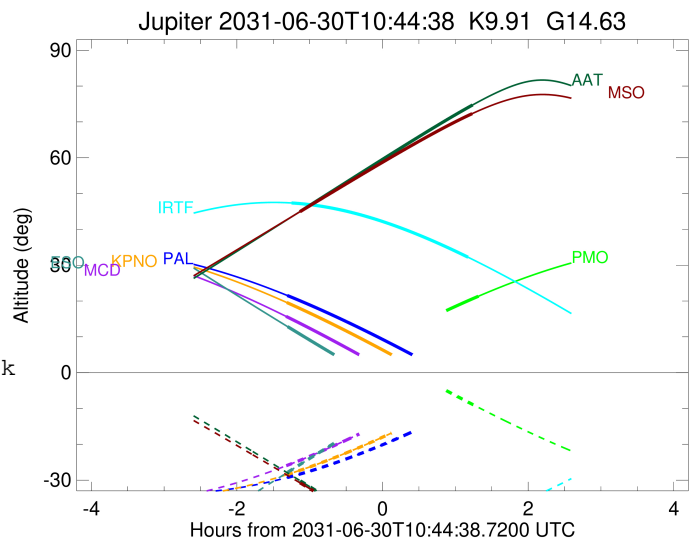
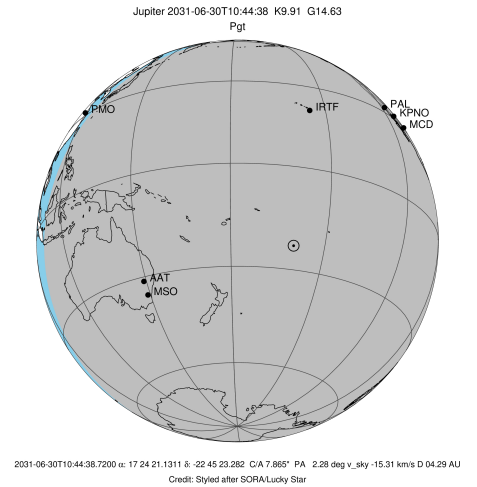


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-30T09:26:26.919	12.85	-27.81	71490.6	-22.89	-25.74
Jupiter	E	2031-06-30T11:50:54.561	-15.06x	1.78x	71490.7	-22.60	-25.43

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-30T10:47:55.720
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       : 4111734443490952320
2Mass ID (if available) : 17242113-2245232
ICRS Star Coord at Epoch: 17h 24m 21.13106s -22:45:23.28230s
RUWE (>1.4 is poor) : 1.03
K magnitude          : 9.908
G magnitude          : 14.627
RP magnitude         : 13.419
BP magnitude         : 16.224
DUPflag             : 0
Distance (au)        : 4.292
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -15.31
Sun-Target sep (deg) : 163.74
Sun-Moon sep (deg)   : 43.89
B (ring opening deg) : -2.58
PA of pole (deg)     : 3.00
Pole direction: RA (deg): 268.05691
Dec (deg): 64.49651
C/A sky separation (") : 8.288
C/A sky separation (km) : 25797.1
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
    
```

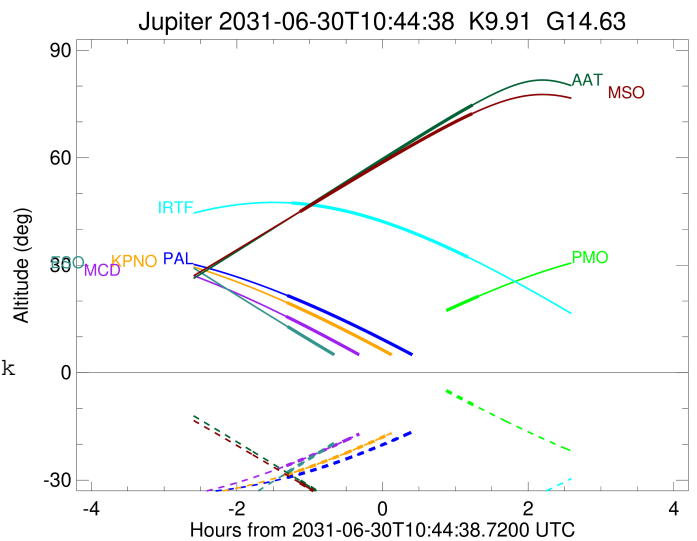
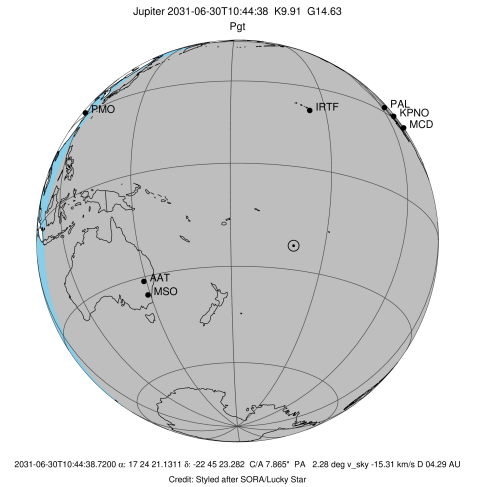


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-30T09:36:46.266	44.99	-30.16	71490.7	-22.26	-25.05
Jupiter	E	2031-06-30T11:58:48.637	74.70	-60.42	71490.9	-20.14	-22.73


```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-30T10:47:46.340
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        : 4111734443490952320
2Mass ID (if available) : 17242113-2245232
ICRS Star Coord at Epoch: 17h 24m 21.13106s -22:45:23.28230s
RUWE (>1.4 is poor) : 1.03
K magnitude           : 9.908
G magnitude           : 14.627
RP magnitude          : 13.419
BP magnitude          : 16.224
DUPflag              : 0
Distance (au)         : 4.292
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -15.31
Sun-Target sep (deg)  : 163.74
Sun-Moon sep (deg)    : 43.90
B (ring opening deg) : -2.58
PA of pole (deg)      : 3.00
Pole direction: RA (deg): 268.05691
Dec (deg): 64.49651
C/A sky separation (") : 8.424
C/A sky separation (km) : 26220.2
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	2031-06-30T09:36:43.682	44.94	-30.76	71490.7	-22.61	-25.43
Jupiter	E	2031-06-30T11:58:33.287	72.30	-59.55	71490.9	-20.52	-23.14