

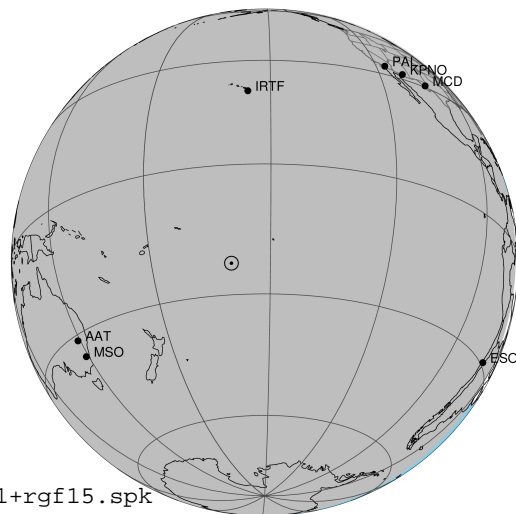
target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2031-06-08T10:37:25.920
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 4116785973522806528
 2Mass ID (if available) : 17361898-2250519

Jupiter 2031-06-08T10:37:25 K9.86 G14.93 Pgt

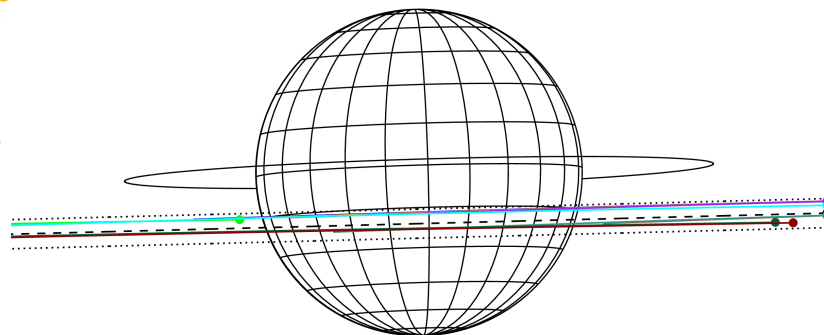
ICRS Star Coord at Epoch: 17h 36m 18.96550s -22:50:52.18921s

RUWE (>1.4 is poor) : 0.96
 K magnitude : 9.859
 G magnitude : 14.935
 RP magnitude : 13.644
 BP magnitude : 16.853
 DUPflag : 0
 Distance (au) : 4.275
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -16.19
 Sun-Target sep (deg) : 172.48
 Sun-Moon sep (deg) : 34.17
 B (ring opening deg) : -2.60
 PA of pole (deg) : 1.71
 Pole direction: RA (deg): 268.05692
 Dec (deg): 64.49651
 C/A sky separation (") : 7.224
 C/A sky separation (km) : 22398.7
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk

Jupiter 2031-06-08T10:37:25 K9.86 G14.93
 Pgt



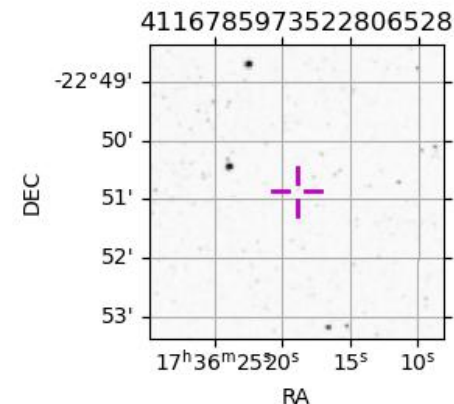
Earth
 PAL
 PMO
 KPNO
 MCD
 IRTF
 RIO
 ESO
 AAT
 MSO



2031-06-08T10:37:25.9200 a: 17 36 18.9655 s: -22 50 52.189 C/A 7.236" PA 1.48 deg v_sky -16.19 km/s D 04.27 AU
 Credit: Styled after SORA/Lucky Star

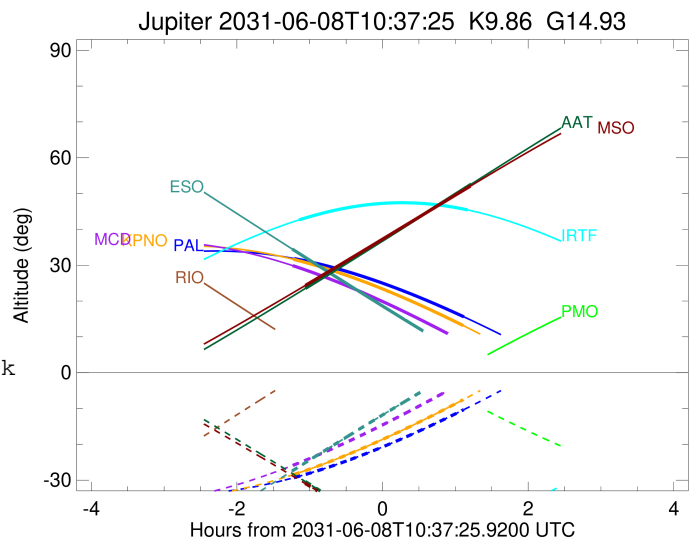
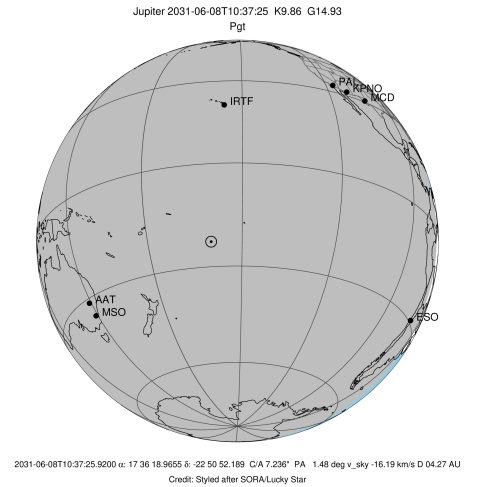
Observable events with sun below -5 deg and altitude above 5 deg

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 08 09:24 - JUN 08 11:44	Pie
PMO	Purple Mtn Obs. Nanking	32.1	118.8			Pnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+ +	JUN 08 09:24 - JUN 08 11:44	Pie
MCD	McDonald Obs. 2.7m	30.7	256.0	+	JUN 08 09:23 - JUN 08 09:23	Pin
TEN	Teide Obs./Tenerife	28.3	343.5			Pnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+ +	JUN 08 09:28 - JUN 08 11:47	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 08 09:23 - JUN 08 09:23	Pin
AAT	Siding Spring (AAT)	-31.3	149.1	+ +	JUN 08 09:33 - JUN 08 11:50	Pie
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8			Pnn
MSO	Mt. Stromlo Observatory	-35.3	149.0	+ +	JUN 08 09:33 - JUN 08 11:50	Pie



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-08T10:34:24.530
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      : 4116785973522806528
2Mass ID (if available) : 17361898-2250519
ICRS Star Coord at Epoch: 17h 36m 18.96550s -22:50:52.18921s
RUWE (>1.4 is poor) : 0.96
K magnitude          : 9.859
G magnitude          : 14.935
RP magnitude         : 13.644
BP magnitude         : 16.853
DUPflag             : 0
Distance (au)       : 4.275
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.19
Sun-Target sep (deg) : 172.48
Sun-Moon sep (deg)  : 33.96
B (ring opening deg) : -2.60
PA of pole (deg)    : 1.71
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation ("): 5.611
C/A sky separation (km): 17397.3
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
    
```

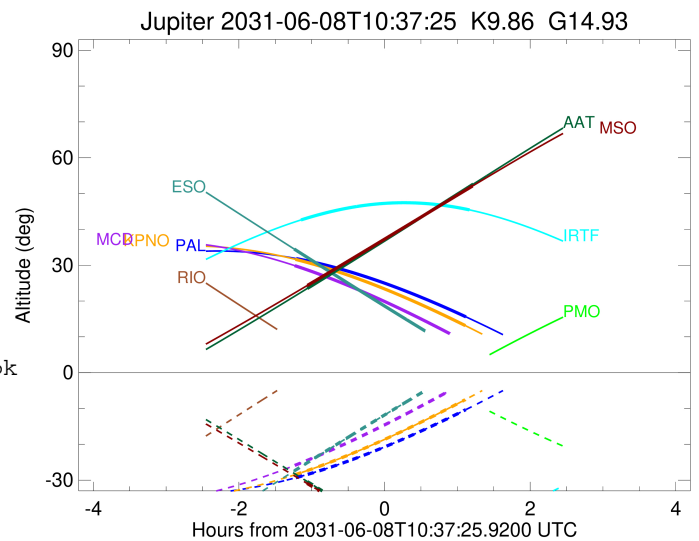
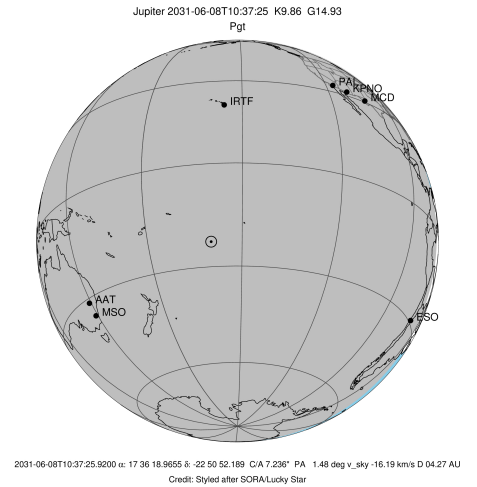


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-08T09:24:34.243	31.84	-29.30	71491.5	-14.11	-16.03
Jupiter	E	2031-06-08T11:44:30.553	15.58	-10.31	71491.4	-14.17	-16.09

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-08T10:33:56.290
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       : 4116785973522806528
2Mass ID (if available) : 17361898-2250519
ICRS Star Coord at Epoch: 17h 36m 18.96550s -22:50:52.18921s
RUWE (>1.4 is poor) : 0.96
K magnitude           : 9.859
G magnitude           : 14.935
RP magnitude          : 13.644
BP magnitude          : 16.853
DUPflag              : 0
Distance (au)        : 4.275
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.19
Sun-Target sep (deg) : 172.48
Sun-Moon sep (deg)   : 33.88
B (ring opening deg) : -2.60
PA of pole (deg)     : 1.71
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 5.674
C/A sky separation (km) : 17592.2
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
    
```

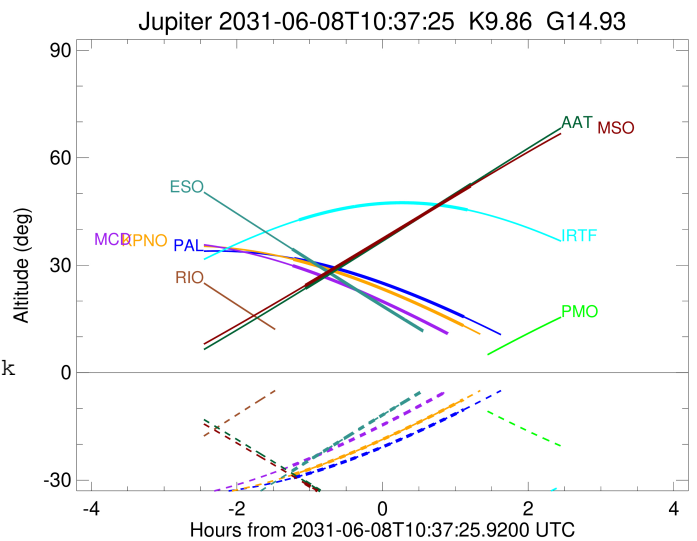
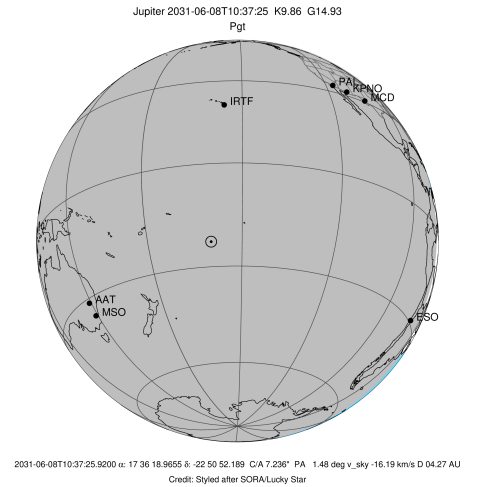


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-08T09:24:06.279	31.62	-28.44	71491.4	-14.23	-16.16
Jupiter	E	2031-06-08T11:44:04.554	13.13	-7.51	71491.4	-14.37	-16.32

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-08T10:33:19.490
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       : 4116785973522806528
2Mass ID (if available) : 17361898-2250519
ICRS Star Coord at Epoch: 17h 36m 18.96550s -22:50:52.18921s
RUWE (>1.4 is poor) : 0.96
K magnitude          : 9.859
G magnitude          : 14.935
RP magnitude         : 13.644
BP magnitude         : 16.853
DUPflag             : 0
Distance (au)        : 4.275
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.19
Sun-Target sep (deg) : 172.48
Sun-Moon sep (deg)   : 33.78
B (ring opening deg) : -2.60
PA of pole (deg)     : 1.71
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation ("): 5.759
C/A sky separation (km): 17857.0
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
    
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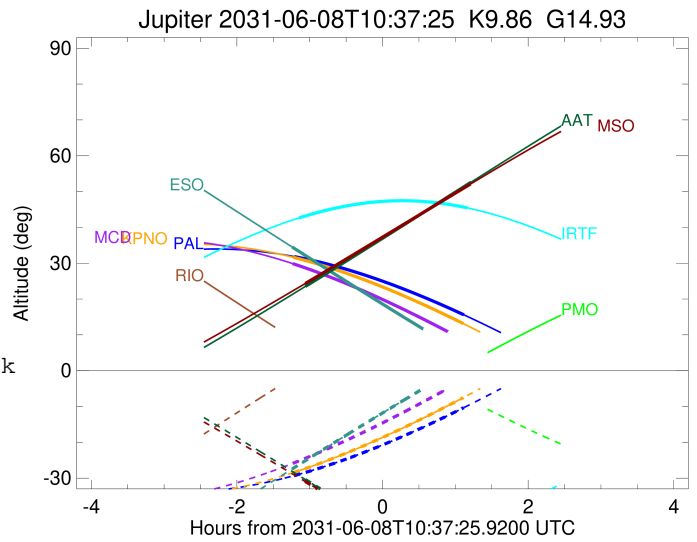
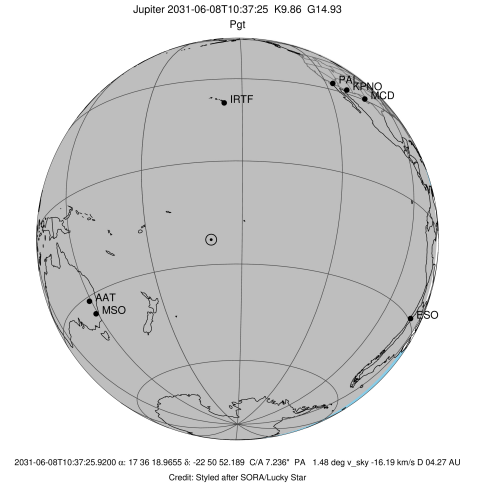


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-08T09:23:27.518	29.88	-25.88	71491.4	-14.38	-16.33
Jupiter	E	2031-06-08T11:43:33.069	8.68	-2.69x	71491.4	-14.64	-16.62

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-08T10:37:58.620
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       : 4116785973522806528
2Mass ID (if available) : 17361898-2250519
ICRS Star Coord at Epoch: 17h 36m 18.96550s -22:50:52.18921s
RUWE (>1.4 is poor) : 0.96
K magnitude          : 9.859
G magnitude          : 14.935
RP magnitude         : 13.644
BP magnitude         : 16.853
DUPflag             : 0
Distance (au)        : 4.275
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.19
Sun-Target sep (deg) : 172.48
Sun-Moon sep (deg)   : 34.60
B (ring opening deg) : -2.60
PA of pole (deg)     : 1.71
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation ("): 5.837
C/A sky separation (km): 18098.7
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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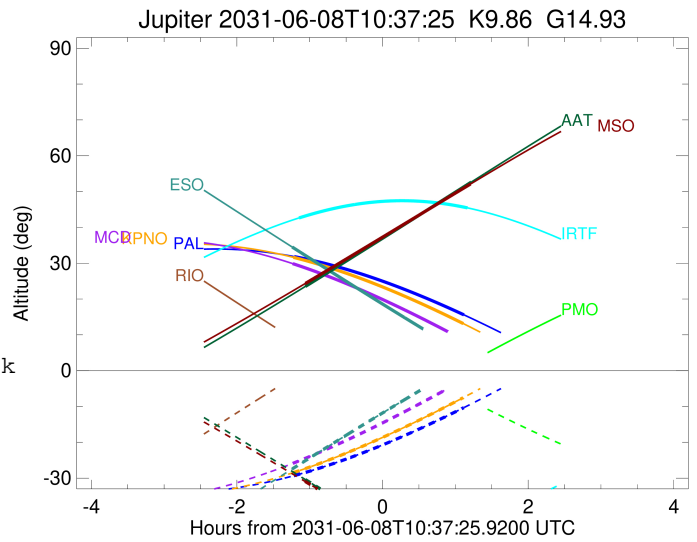
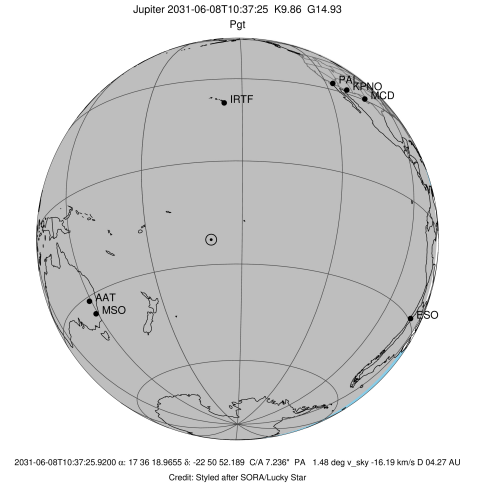


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-08T09:28:37.788	42.63	-45.58	71491.4	-15.04	-17.07
Jupiter	E	2031-06-08T11:47:16.050	45.45	-42.52	71491.4	-14.43	-16.39

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-08T10:31:30.250
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        : 4116785973522806528
2Mass ID (if available) : 17361898-2250519
ICRS Star Coord at Epoch: 17h 36m 18.96550s -22:50:52.18921s
RUWE (>1.4 is poor) : 0.96
K magnitude           : 9.859
G magnitude           : 14.935
RP magnitude          : 13.644
BP magnitude          : 16.853
DUPflag              : 0
Distance (au)         : 4.275
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.19
Sun-Target sep (deg)  : 172.48
Sun-Moon sep (deg)    : 33.66
B (ring opening deg) : -2.60
PA of pole (deg)      : 1.71
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (" ) : 7.975
C/A sky separation (km) : 24727.6
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
    
```

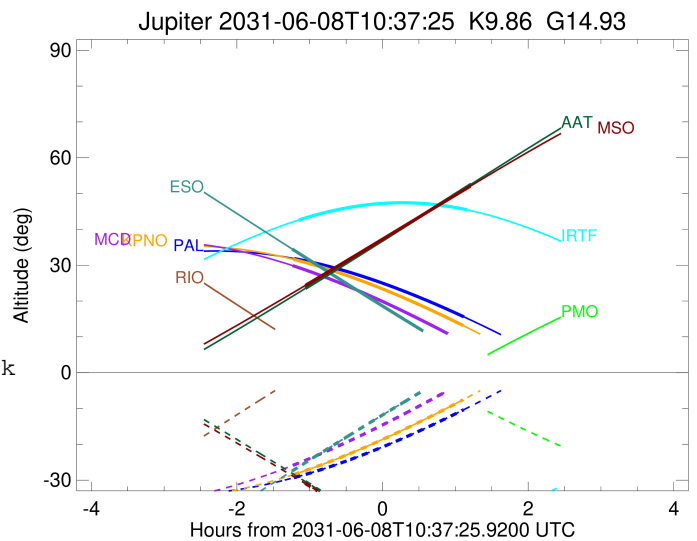
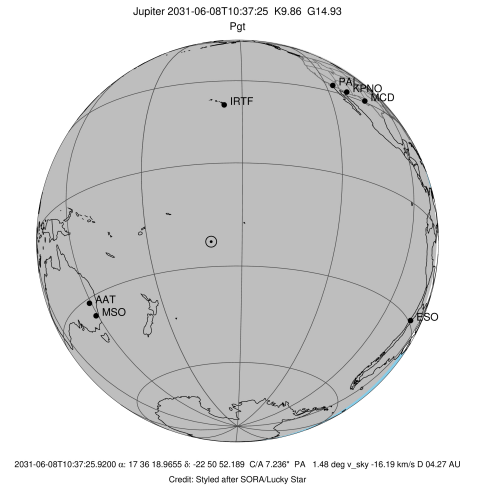


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-08T09:23:03.043	34.50	-27.43	71490.9	-19.94	-22.51
Jupiter	E	2031-06-08T11:40:27.104	5.61	0.82x	71490.9	-20.53	-23.16

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-08T10:42:22.340
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      : 4116785973522806528
2Mass ID (if available) : 17361898-2250519
ICRS Star Coord at Epoch: 17h 36m 18.96550s -22:50:52.18921s
RUWE (>1.4 is poor) : 0.96
K magnitude         : 9.859
G magnitude         : 14.935
RP magnitude        : 13.644
BP magnitude        : 16.853
DUPflag            : 0
Distance (au)       : 4.275
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -16.19
Sun-Target sep (deg) : 172.48
Sun-Moon sep (deg)  : 35.15
B (ring opening deg) : -2.60
PA of pole (deg)    : 1.71
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (" ) : 7.877
C/A sky separation (km) : 24422.3
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
    
```

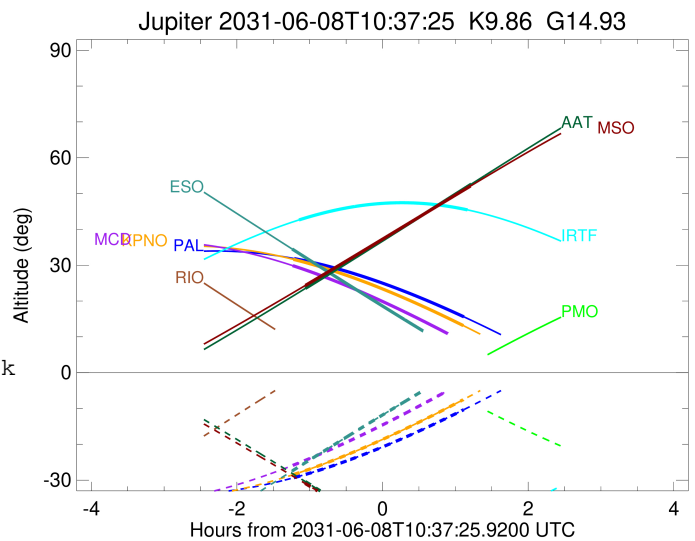
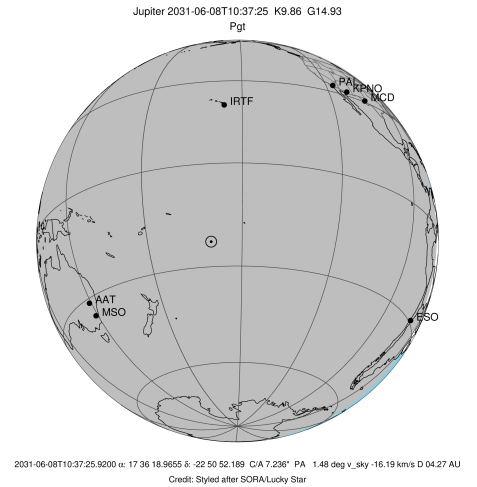


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-08T09:33:52.289	23.52	-30.40	71490.8	-20.70	-23.34
Jupiter	E	2031-06-08T11:50:26.064	52.59	-59.51	71491.0	-19.29	-21.79

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-08T10:42:08.830
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       : 4116785973522806528
2Mass ID (if available) : 17361898-2250519
ICRS Star Coord at Epoch: 17h 36m 18.96550s -22:50:52.18921s
RUWE (>1.4 is poor) : 0.96
K magnitude           : 9.859
G magnitude           : 14.935
RP magnitude         : 13.644
BP magnitude         : 16.853
DUPflag              : 0
Distance (au)        : 4.275
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.19
Sun-Target sep (deg) : 172.48
Sun-Moon sep (deg)   : 35.13
B (ring opening deg) : -2.60
PA of pole (deg)     : 1.71
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation ("): 8.004
C/A sky separation (km): 24816.4
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	2031-06-08T09:33:45.695	24.32	-30.94	71490.8	-21.01	-23.68
Jupiter	E	2031-06-08T11:50:06.810	52.13	-58.64	71491.0	-19.65	-22.19