

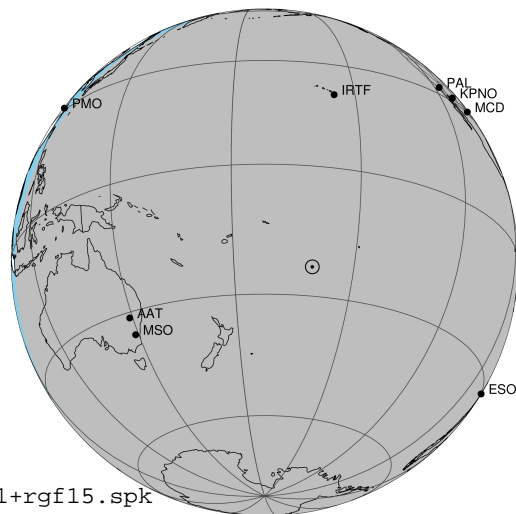
target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2031-06-25T10:44:58.020
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 4111698915532344192
 2Mass ID (if available) : 17265844-2246436

Jupiter 2031-06-25T10:44:58 K9.80 G14.46 Pgt

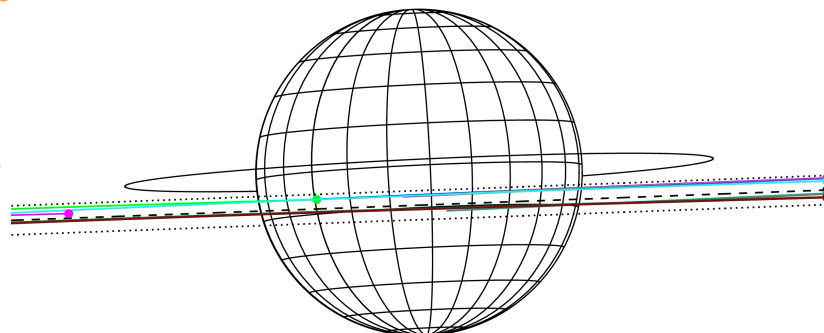
ICRS Star Coord at Epoch: 17h 26m 58.44439s -22:46:43.85964s

RUWE (>1.4 is poor) : 16.85
 K magnitude : 9.797
 G magnitude : 14.463
 RP magnitude : 13.196
 BP magnitude : 15.834
 DUPflag : 0
 Distance (au) : 4.275
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -15.96
 Sun-Target sep (deg) : 169.10
 Sun-Moon sep (deg) : 108.66
 B (ring opening deg) : -2.59
 PA of pole (deg) : 2.72
 Pole direction: RA (deg): 268.05691
 Dec (deg): 64.49651
 C/A sky separation (") : 4.617
 C/A sky separation (km) : 14316.0
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk

Jupiter 2031-06-25T10:44:58 K9.80 G14.46
 Pgt



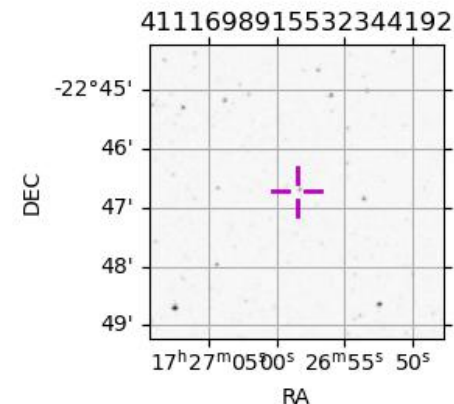
Earth
 PAL
 PMO
 KPNO
 MCD
 IRTF
 KAV
 RIO
 ESO
 AAT
 MSO



2031-06-25T10:44:58.0200 a: 17 26 58.4444 ð -22 46 43.860 C/A 4.629° PA 2.13 deg v_sky -15.96 km/s D 04.28 AU
 Credit: Styled after SORA/Lucky Star

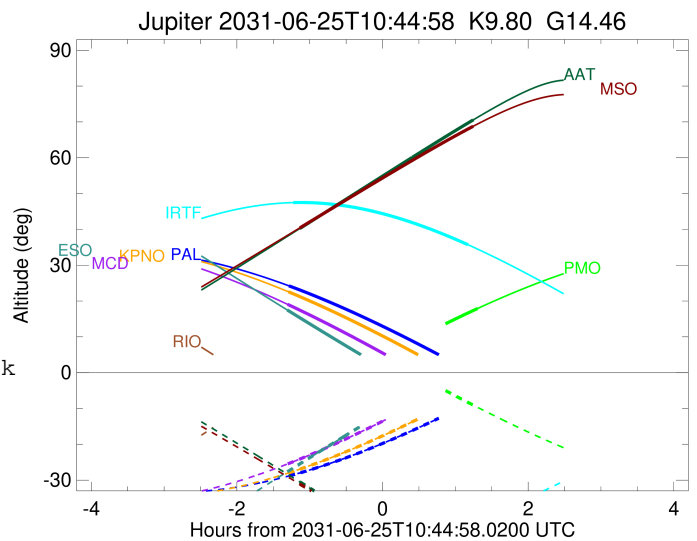
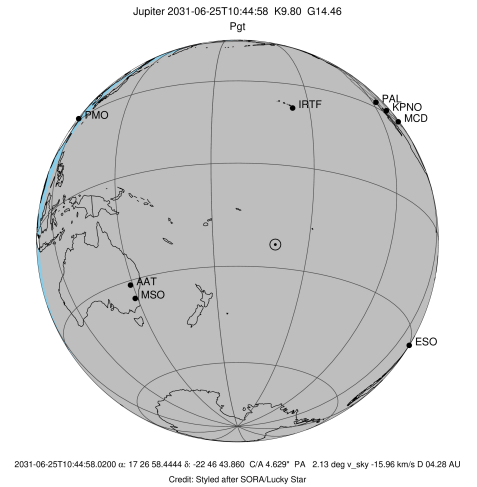
Observable events with sun below -5 deg and altitude above 5 deg

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 25 09:27 - JUN 25 09:27	Pin
PMO	Purple Mtn Obs. Nanking	32.1	118.8	+	JUN 25 12:03 - JUN 25 12:03	Pne
KPNO	Kitt Peak Natl Obs	32.0	248.4	+	JUN 25 09:27 - JUN 25 09:27	Pin
MCD	McDonald Obs. 2.7m	30.7	256.0	+	JUN 25 09:26 - JUN 25 09:26	Pin
TEN	Teide Obs./Tenerife	28.3	343.5			Pnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+	JUN 25 09:31 - JUN 25 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 25 09:26 - JUN 25 09:26	Pin
AAT	Siding Spring (AAT)	-31.3	149.1	+	JUN 25 09:36 - JUN 25 11:59	Pie
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8			Pnn
MSO	Mt. Stromlo Observatory	-35.3	149.0	+	JUN 25 09:36 - JUN 25 11:59	Pie



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-25T10:40:31.360
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        : 4111698915532344192
2Mass ID (if available) : 17265844-2246436
ICRS Star Coord at Epoch: 17h 26m 58.44439s -22:46:43.85964s
RUWE (>1.4 is poor) : 16.85
K magnitude           : 9.797
G magnitude           : 14.463
RP magnitude          : 13.196
BP magnitude          : 15.834
DUPflag              : 0
Distance (au)         : 4.275
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -15.96
Sun-Target sep (deg)  : 169.10
Sun-Moon sep (deg)    : 108.64
B (ring opening deg) : -2.59
PA of pole (deg)      : 2.72
Pole direction: RA (deg): 268.05691
Dec (deg): 64.49651
C/A sky separation (" ) : 3.146
C/A sky separation (km) : 9753.9
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
    
```

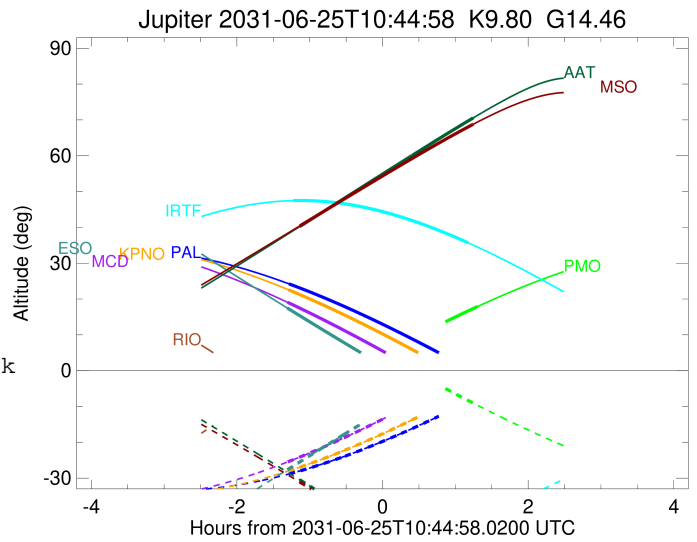
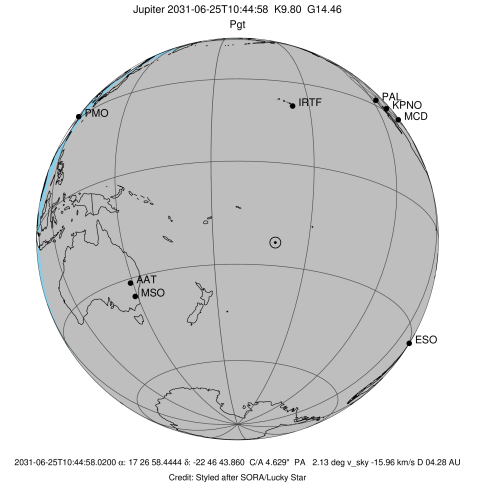


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-25T09:27:50.814	24.23	-28.83	71491.8	-8.08	-9.21
Jupiter	E	2031-06-25T11:53:40.070	0.94x	-9.01	71491.8	-7.71	-8.79

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-25T10:50:25.120
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      : 4111698915532344192
2Mass ID (if available) : 17265844-2246436
ICRS Star Coord at Epoch: 17h 26m 58.44439s -22:46:43.85964s
RUWE (>1.4 is poor) : 16.85
K magnitude          : 9.797
G magnitude          : 14.463
RP magnitude         : 13.196
BP magnitude         : 15.834
DUPflag             : 0
Distance (au)       : 4.275
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -15.96
Sun-Target sep (deg) : 169.10
Sun-Moon sep (deg)  : 108.95
B (ring opening deg) : -2.59
PA of pole (deg)    : 2.72
Pole direction: RA (deg): 268.05691
Dec (deg): 64.49651
C/A sky separation ("): 3.411
C/A sky separation (km) : 10578.4
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
    
```

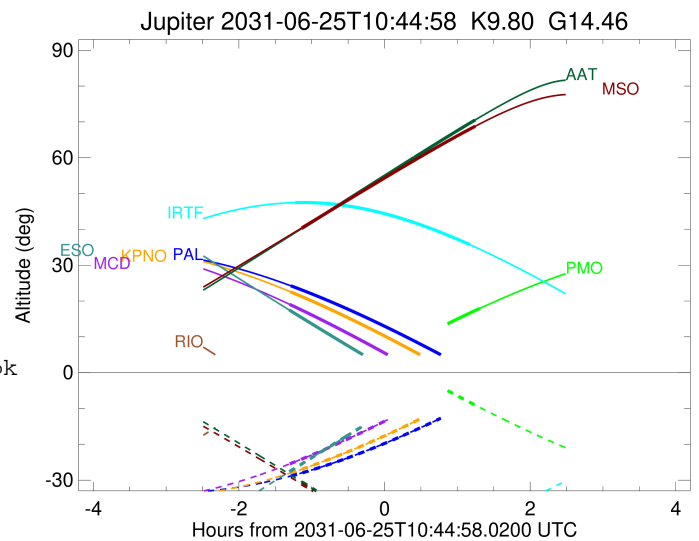
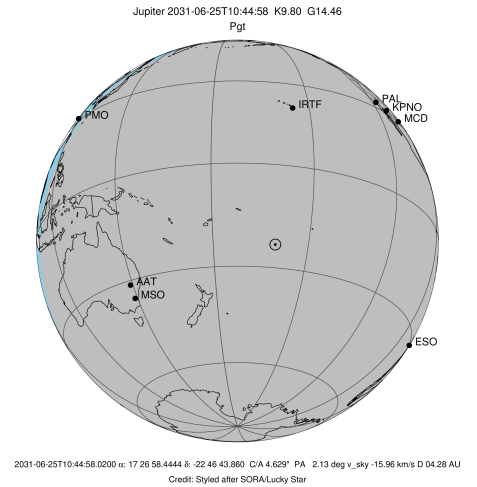


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-25T09:36:59.868	-8.49x	18.22x	71491.7	-9.62	-10.97
Jupiter	E	2031-06-25T12:03:19.859	17.91	-9.67	71491.8	-7.43	-8.48

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-25T10:40:09.360
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       : 4111698915532344192
2Mass ID (if available) : 17265844-2246436
ICRS Star Coord at Epoch: 17h 26m 58.44439s -22:46:43.85964s
RUWE (>1.4 is poor) : 16.85
K magnitude           : 9.797
G magnitude           : 14.463
RP magnitude          : 13.196
BP magnitude          : 15.834
DUPflag              : 0
Distance (au)         : 4.275
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -15.96
Sun-Target sep (deg) : 169.10
Sun-Moon sep (deg)   : 108.59
B (ring opening deg) : -2.59
PA of pole (deg)     : 2.72
Pole direction: RA (deg): 268.05691
Dec (deg): 64.49651
C/A sky separation ("): 3.226
C/A sky separation (km): 10002.3
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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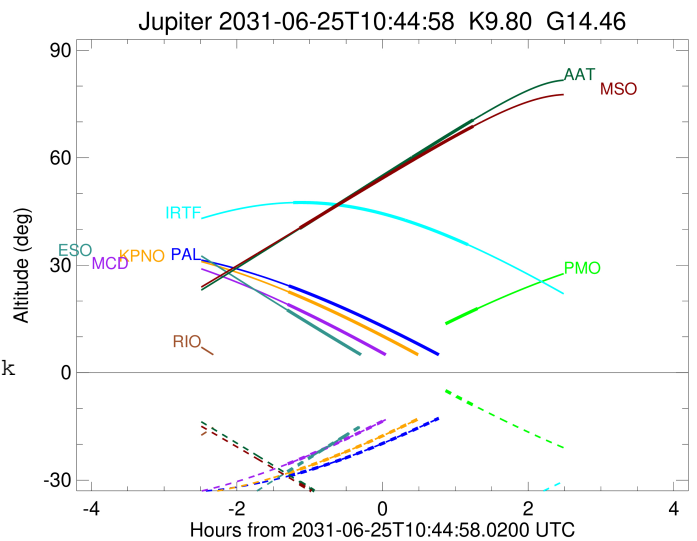
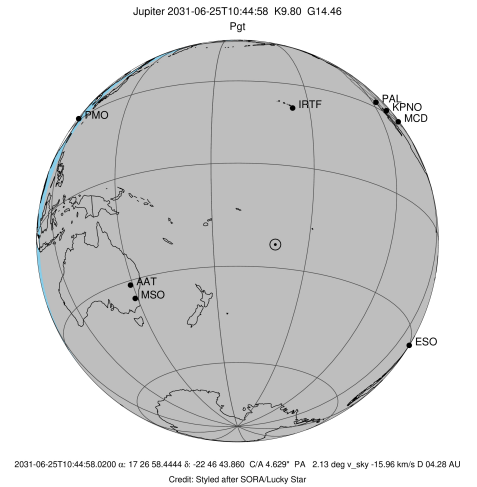


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-25T09:27:25.128	22.58	-27.99	71491.8	-8.24	-9.40
Jupiter	E	2031-06-25T11:53:23.997	-2.34x	-6.16	71491.8	-7.94	-9.06

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-25T10:39:43.820
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      : 4111698915532344192
2Mass ID (if available) : 17265844-2246436
ICRS Star Coord at Epoch: 17h 26m 58.44439s -22:46:43.85964s
RUWE (>1.4 is poor) : 16.85
K magnitude          : 9.797
G magnitude          : 14.463
RP magnitude         : 13.196
BP magnitude         : 15.834
DUPflag             : 0
Distance (au)       : 4.275
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -15.96
Sun-Target sep (deg) : 169.10
Sun-Moon sep (deg)  : 108.50
B (ring opening deg) : -2.59
PA of pole (deg)    : 2.72
Pole direction: RA (deg): 268.05691
Dec (deg): 64.49651
C/A sky separation (") : 3.333
C/A sky separation (km) : 10335.2
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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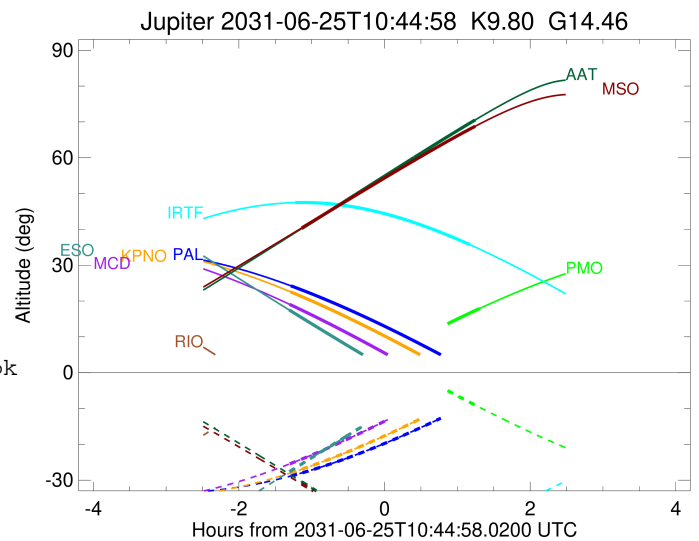
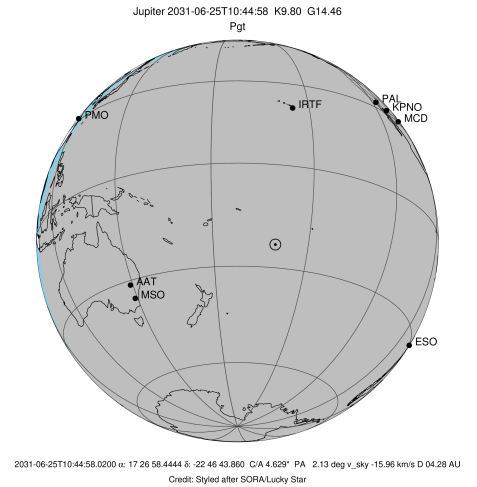


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-25T09:26:52.227	19.05	-25.46	71491.8	-8.45	-9.64
Jupiter	E	2031-06-25T11:53:08.526	-7.71x	-1.26x	71491.8	-8.24	-9.40

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-25T10:43:18.710
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      : 4111698915532344192
2Mass ID (if available) : 17265844-2246436
ICRS Star Coord at Epoch: 17h 26m 58.44439s -22:46:43.85964s
RUWE (>1.4 is poor) : 16.85
K magnitude         : 9.797
G magnitude         : 14.463
RP magnitude        : 13.196
BP magnitude        : 15.834
DUPflag            : 0
Distance (au)       : 4.275
f0 (km)            : 0.00
g0 (km)            : 0.00
skyplane vel. (km/s) : -15.96
Sun-Target sep (deg) : 169.10
Sun-Moon sep (deg)  : 109.17
B (ring opening deg) : -2.59
PA of pole (deg)    : 2.72
Pole direction: RA (deg): 268.05691
Dec (deg): 64.49651
C/A sky separation (" ) : 3.240
C/A sky separation (km) : 10046.0
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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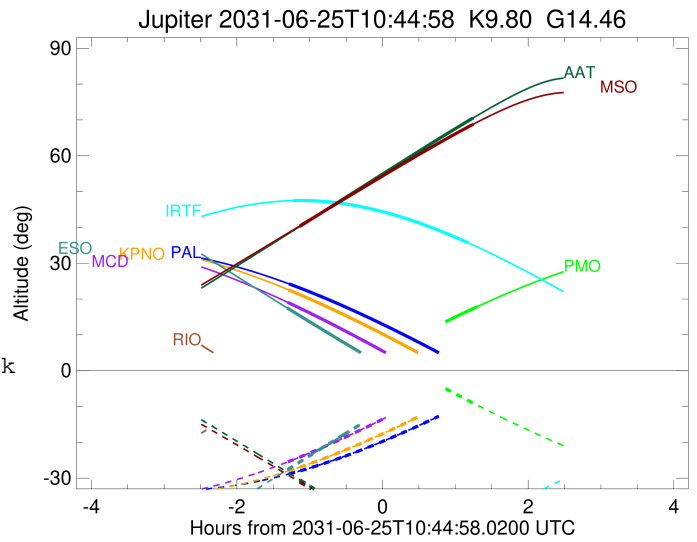
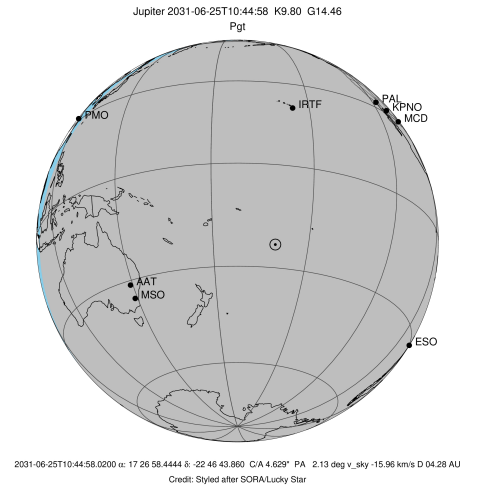


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-25T09:31:22.650	47.47	-45.01	71491.8	-8.63	-9.84
Jupiter	E	2031-06-25T11:55:25.841	35.71	-41.55	71491.8	-7.69	-8.78

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-25T10:38:57.020
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       : 4111698915532344192
2Mass ID (if available) : 17265844-2246436
ICRS Star Coord at Epoch: 17h 26m 58.44439s -22:46:43.85964s
RUWE (>1.4 is poor) : 16.85
K magnitude           : 9.797
G magnitude           : 14.463
RP magnitude         : 13.196
BP magnitude         : 15.834
DUPflag              : 0
Distance (au)        : 4.275
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -15.96
Sun-Target sep (deg) : 169.10
Sun-Moon sep (deg)   : 108.44
B (ring opening deg) : -2.59
PA of pole (deg)     : 2.72
Pole direction: RA (deg): 268.05691
Dec (deg): 64.49651
C/A sky separation ("): 5.601
C/A sky separation (km): 17368.5
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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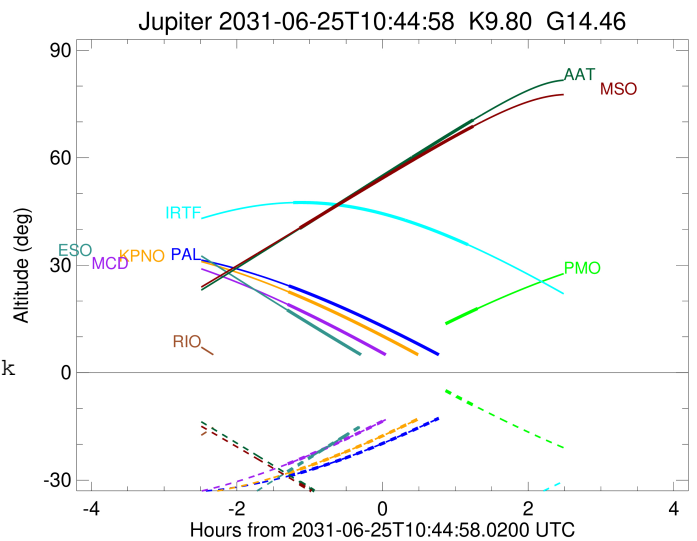
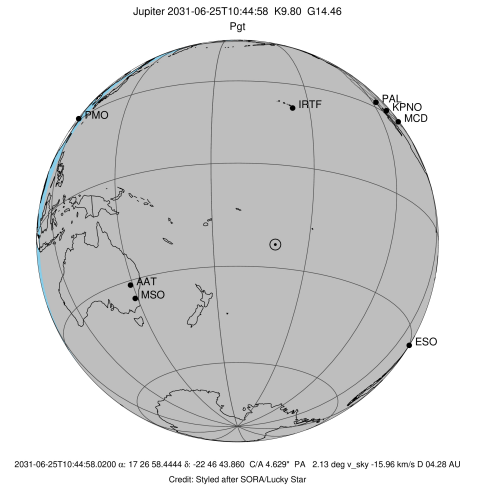


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-25T09:26:32.366	17.48	-27.65	71491.5	-14.07	-15.98
Jupiter	E	2031-06-25T11:51:58.045	-11.28x	2.07x	71491.5	-14.01	-15.92

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-25T10:48:30.190
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        : 4111698915532344192
2Mass ID (if available) : 17265844-2246436
ICRS Star Coord at Epoch: 17h 26m 58.44439s -22:46:43.85964s
RUWE (>1.4 is poor) : 16.85
K magnitude           : 9.797
G magnitude           : 14.463
RP magnitude          : 13.196
BP magnitude          : 15.834
DUPflag              : 0
Distance (au)         : 4.275
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -15.96
Sun-Target sep (deg)  : 169.10
Sun-Moon sep (deg)    : 109.53
B (ring opening deg) : -2.59
PA of pole (deg)     : 2.72
Pole direction: RA (deg): 268.05691
Dec (deg): 64.49651
C/A sky separation (") : 5.092
C/A sky separation (km) : 15789.1
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
    
```

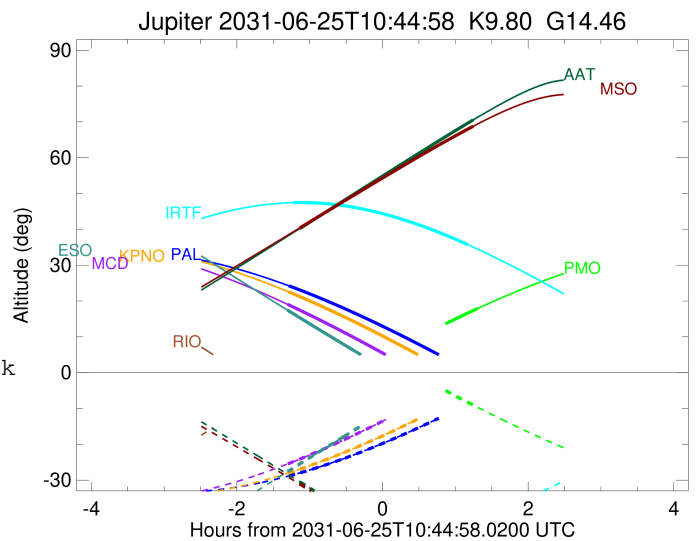
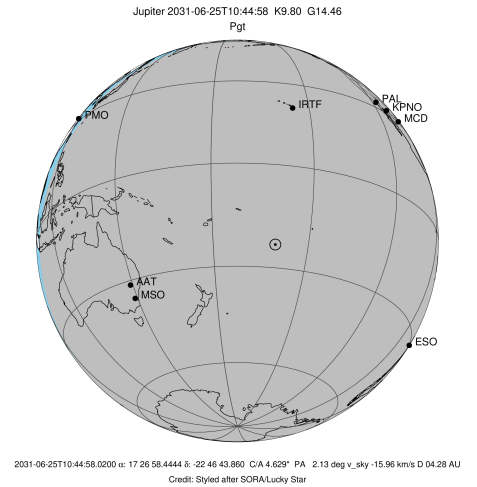


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-25T09:36:55.435	40.26	-30.50	71491.5	-13.76	-15.63
Jupiter	E	2031-06-25T11:59:45.888	70.56	-60.92	71491.6	-11.86	-13.50


```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-25T10:48:20.210
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      : 4111698915532344192
2Mass ID (if available) : 17265844-2246436
ICRS Star Coord at Epoch: 17h 26m 58.44439s -22:46:43.85964s
RUWE (>1.4 is poor) : 16.85
K magnitude          : 9.797
G magnitude          : 14.463
RP magnitude         : 13.196
BP magnitude         : 15.834
DUPflag             : 0
Distance (au)       : 4.275
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -15.96
Sun-Target sep (deg) : 169.10
Sun-Moon sep (deg)  : 109.52
B (ring opening deg) : -2.59
PA of pole (deg)    : 2.72
Pole direction: RA (deg): 268.05691
Dec (deg): 64.49651
C/A sky separation (" ) : 5.227
C/A sky separation (km) : 16207.1
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	2031-06-25T09:36:48.009	40.40	-31.08	71491.5	-14.08	-16.00
Jupiter	E	2031-06-25T11:59:34.213	68.75	-60.06	71491.6	-12.22	-13.90