

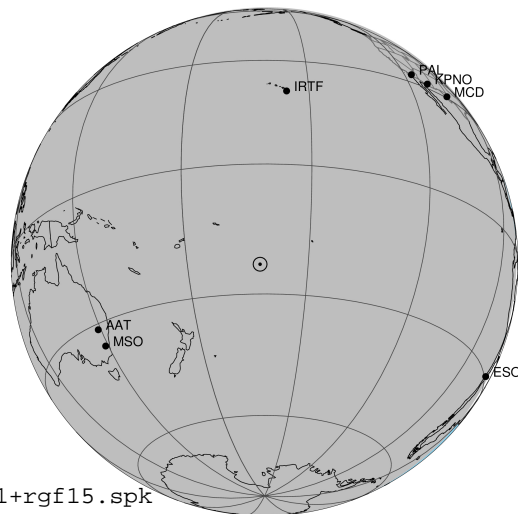
target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2031-06-14T10:47:43.300
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 4117456469458180992
 2Mass ID (if available) : 17330066-2249398

Jupiter 2031-06-14T10:47:43 K7.71 G12.98 Pgt

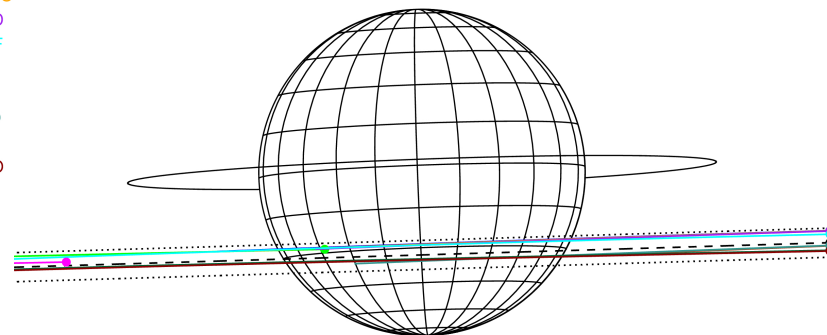
ICRS Star Coord at Epoch: 17h 33m 00.65794s -22:49:39.92783s

RUWE (>1.4 is poor) : 0.88
 K magnitude : 7.710
 G magnitude : 12.979
 RP magnitude : 11.675
 BP magnitude : 14.951
 DUPflag : 0
 Distance (au) : 4.265
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -16.47
 Sun-Target sep (deg) : 178.89
 Sun-Moon sep (deg) : 117.44
 B (ring opening deg) : -2.60
 PA of pole (deg) : 2.07
 Pole direction: RA (deg): 268.05692
 Dec (deg): 64.49651
 C/A sky separation (") : 11.669
 C/A sky separation (km) : 36098.3
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk

Jupiter 2031-06-14T10:47:43 K7.71 G12.98
 Pgt



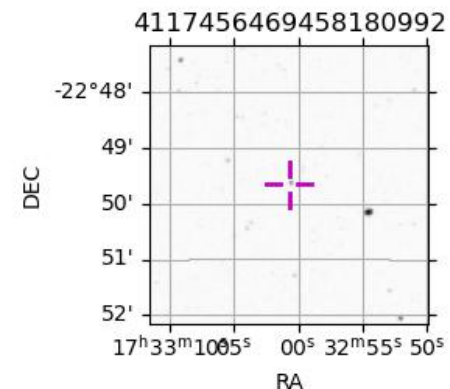
Earth
 PAL
 PMO
 KPNO
 MCD
 IRTF
 KAV
 RIO
 ESO
 AAT
 MSO



2031-06-14T10:47:43.3000 α: 17 33 00.6579 δ: -22 49 39.928 C/A ***** PA 1.72 deg v_sky -16.47 km/s D 04.27 AU
 Credit: Styled after SORA/Lucky Star

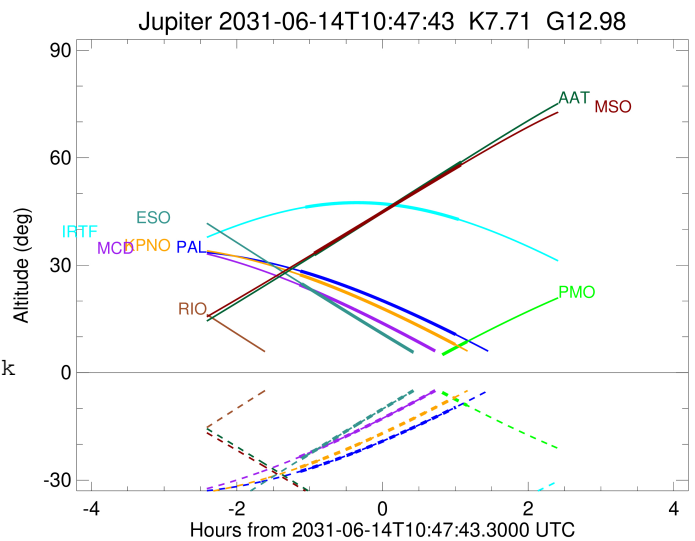
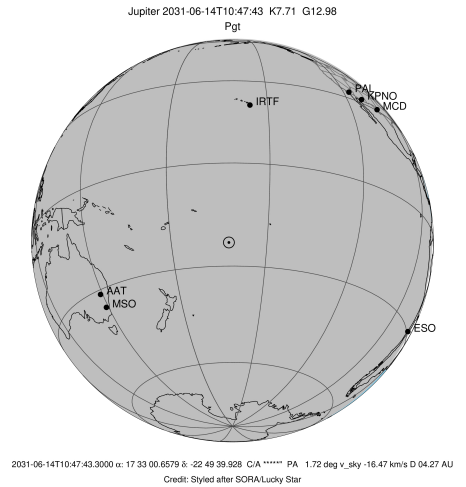
Observable events with sun below -5 deg and altitude above 5 deg

Obs	Location	lat	Elon	Target	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1			Pnn
PAL	Palomar Mt (200")	33.4	243.1	+ +	JUN 14 09:40 - JUN 14 11:48	Pie
PMO	Purple Mtn Obs. Nanking	32.1	118.8	+ +	JUN 14 11:57 - JUN 14 11:57	Pne
KPNO	Kitt Peak Natl Obs	32.0	248.4	+ +	JUN 14 09:39 - JUN 14 11:47	Pie
MCD	McDonald Obs. 2.7m	30.7	256.0	+ +	JUN 14 09:39 - JUN 14 09:39	Pin
TEN	Teide Obs./Tenerife	28.3	343.5			Pnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+ +	JUN 14 09:44 - JUN 14 11:50	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 14 09:41 - JUN 14 09:41	Pin
AAT	Siding Spring (AAT)	-31.3	149.1	+ +	JUN 14 09:51 - JUN 14 11:52	Pie
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8			Pnn
MSO	Mt. Stromlo Observatory	-35.3	149.0	+ +	JUN 14 09:51 - JUN 14 11:52	Pie



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-14T10:43:59.530
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     : 4117456469458180992
2Mass ID (if available) : 17330066-2249398
ICRS Star Coord at Epoch: 17h 33m 00.65794s -22:49:39.92783s
RUWE (>1.4 is poor) : 0.88
K magnitude         : 7.710
G magnitude         : 12.979
RP magnitude        : 11.675
BP magnitude        : 14.951
DUPflag            : 0
Distance (au)      : 4.265
f0 (km)            : 0.00
g0 (km)            : 0.00
skyplane vel. (km/s) : -16.47
Sun-Target sep (deg) : 178.89
Sun-Moon sep (deg)  : 117.99
B (ring opening deg) : -2.60
PA of pole (deg)    : 2.07
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 10.109
C/A sky separation (km) : 31273.0
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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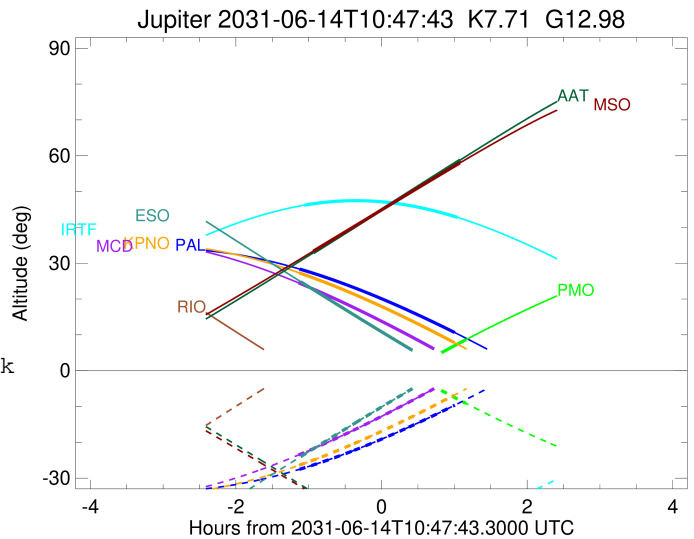
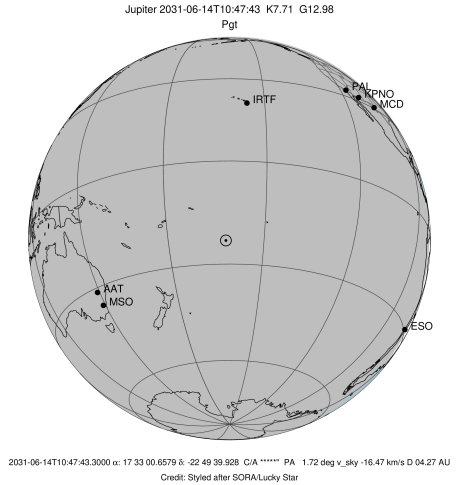


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-14T09:40:11.507	28.37	-27.52	71490.2	-25.99	-29.10
Jupiter	E	2031-06-14T11:48:04.355	10.64	-9.63	71490.2	-25.95	-29.05

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-14T10:53:29.740
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        : 4117456469458180992
2Mass ID (if available) : 17330066-2249398
ICRS Star Coord at Epoch: 17h 33m 00.65794s -22:49:39.92783s
RUWE (>1.4 is poor) : 0.88
K magnitude           : 7.710
G magnitude           : 12.979
RP magnitude          : 11.675
BP magnitude          : 14.951
DUPflag              : 0
Distance (au)         : 4.265
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.47
Sun-Target sep (deg)  : 178.89
Sun-Moon sep (deg)    : 117.03
B (ring opening deg) : -2.60
PA of pole (deg)      : 2.07
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 10.583
C/A sky separation (km) : 32738.8
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
    
```

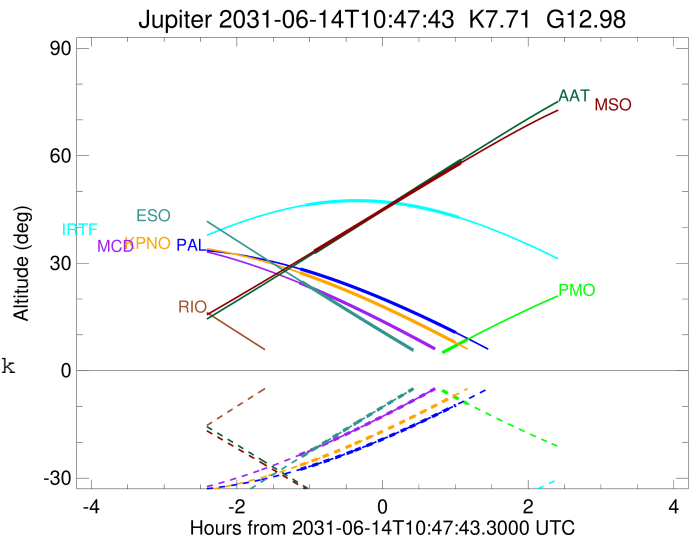
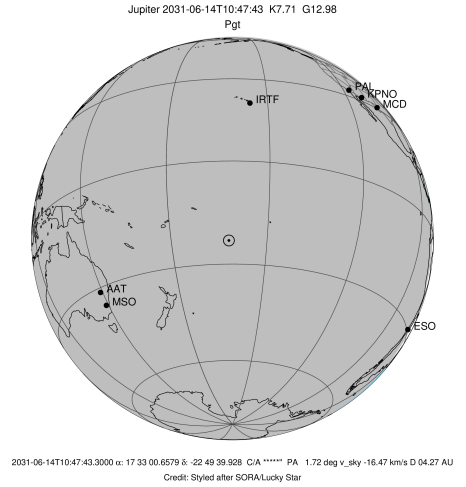


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-14T09:49:13.988	-15.94x	15.20x	71489.9	-28.10	-31.35
Jupiter	E	2031-06-14T11:57:19.854	8.65	-9.12	71490.2	-26.37	-29.50

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-14T10:43:33.520
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        : 4117456469458180992
2Mass ID (if available) : 17330066-2249398
ICRS Star Coord at Epoch: 17h 33m 00.65794s -22:49:39.92783s
RUWE (>1.4 is poor)  : 0.88
K magnitude           : 7.710
G magnitude           : 12.979
RP magnitude          : 11.675
BP magnitude          : 14.951
DUPflag              : 0
Distance (au)         : 4.265
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s)  : -16.47
Sun-Target sep (deg)  : 178.89
Sun-Moon sep (deg)    : 117.99
B (ring opening deg)  : -2.60
PA of pole (deg)      : 2.07
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 10.180
C/A sky separation (km) : 31493.3
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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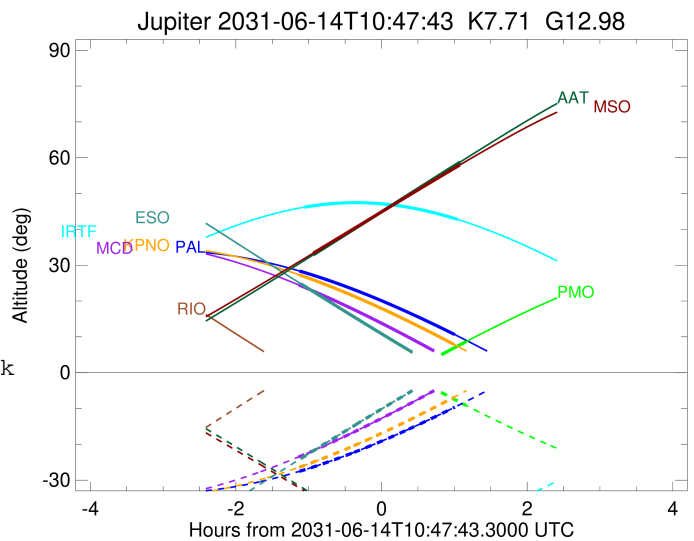
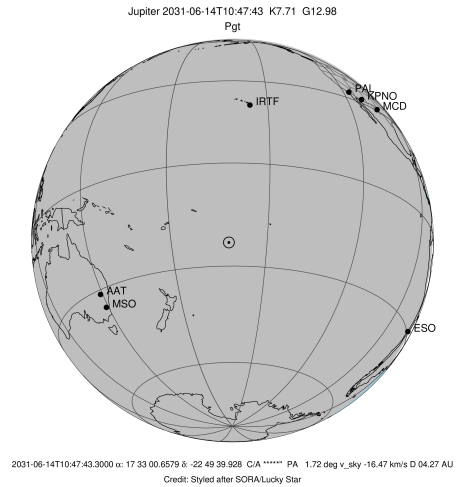


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-14T09:39:48.138	27.32	-26.41	71490.2	-26.15	-29.26
Jupiter	E	2031-06-14T11:47:37.606	7.86	-6.84	71490.2	-26.18	-29.30

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-14T10:43:01.010
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      : 4117456469458180992
2Mass ID (if available) : 17330066-2249398
ICRS Star Coord at Epoch: 17h 33m 00.65794s -22:49:39.92783s
RUWE (>1.4 is poor) : 0.88
K magnitude          : 7.710
G magnitude          : 12.979
RP magnitude         : 11.675
BP magnitude         : 14.951
DUPflag             : 0
Distance (au)       : 4.265
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -16.47
Sun-Target sep (deg) : 178.89
Sun-Moon sep (deg)  : 117.96
B (ring opening deg) : -2.60
PA of pole (deg)    : 2.07
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 10.277
C/A sky separation (km) : 31791.3
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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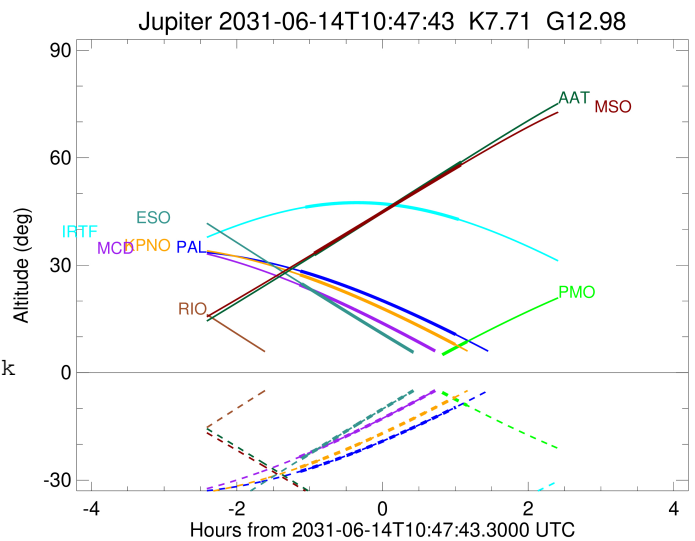
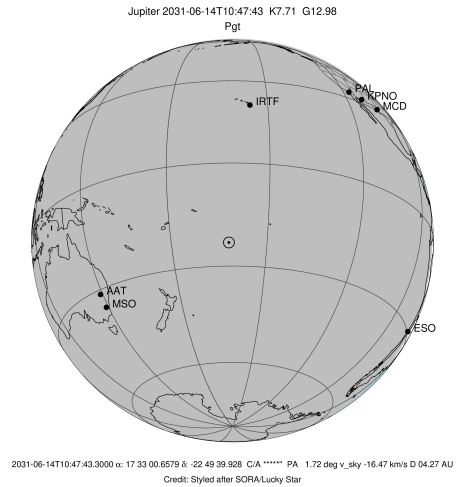


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-14T09:39:17.123	24.52	-23.54	71490.2	-26.35	-29.49
Jupiter	E	2031-06-14T11:47:06.029	3.06x	-2.01x	71490.2	-26.49	-29.63

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-14T10:47:17.050
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       : 4117456469458180992
2Mass ID (if available) : 17330066-2249398
ICRS Star Coord at Epoch: 17h 33m 00.65794s -22:49:39.92783s
RUWE (>1.4 is poor) : 0.88
K magnitude           : 7.710
G magnitude           : 12.979
RP magnitude          : 11.675
BP magnitude          : 14.951
DUPflag              : 0
Distance (au)         : 4.265
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.47
Sun-Target sep (deg) : 178.89
Sun-Moon sep (deg)   : 118.09
B (ring opening deg) : -2.60
PA of pole (deg)     : 2.07
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 10.273
C/A sky separation (km) : 31780.6
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
    
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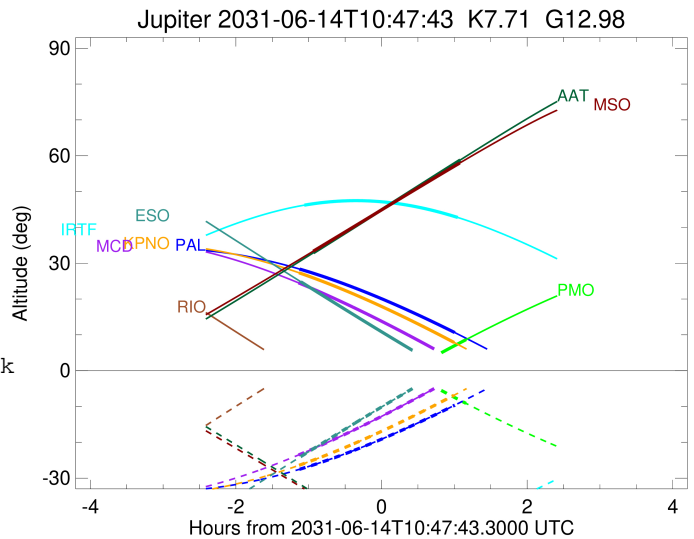
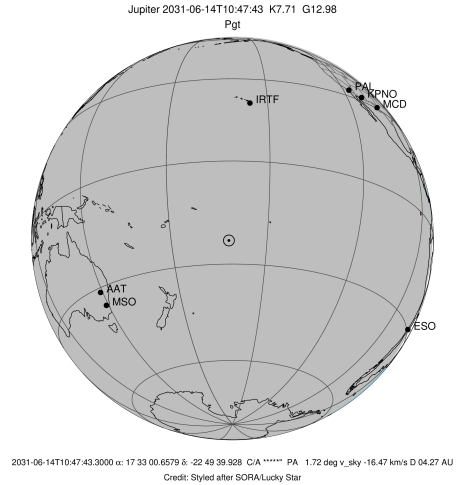


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-14T09:44:10.623	46.20	-46.05	71490.1	-26.78	-29.94
Jupiter	E	2031-06-14T11:50:25.543	42.77	-41.95	71490.2	-26.11	-29.23

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-14T10:41:38.180
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       : 4117456469458180992
2Mass ID (if available) : 17330066-2249398
ICRS Star Coord at Epoch: 17h 33m 00.65794s -22:49:39.92783s
RUWE (>1.4 is poor) : 0.88
K magnitude          : 7.710
G magnitude          : 12.979
RP magnitude         : 11.675
BP magnitude         : 14.951
DUPflag             : 0
Distance (au)        : 4.265
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.47
Sun-Target sep (deg) : 178.89
Sun-Moon sep (deg)   : 117.98
B (ring opening deg) : -2.60
PA of pole (deg)     : 2.07
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 12.526
C/A sky separation (km) : 38750.3
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
    
```

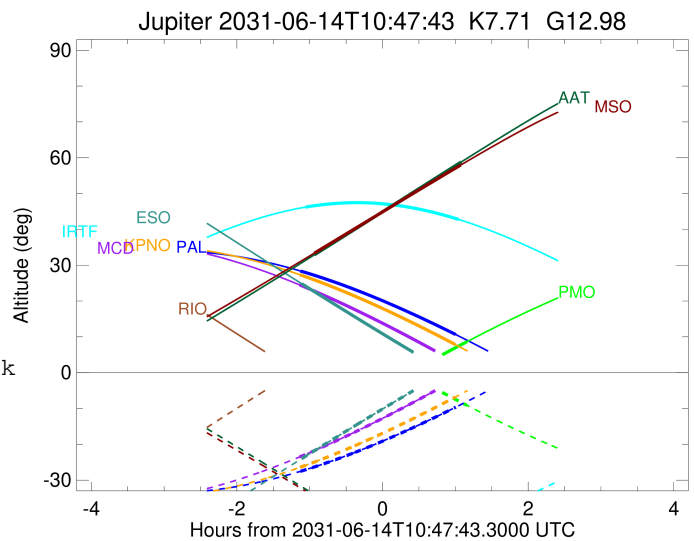
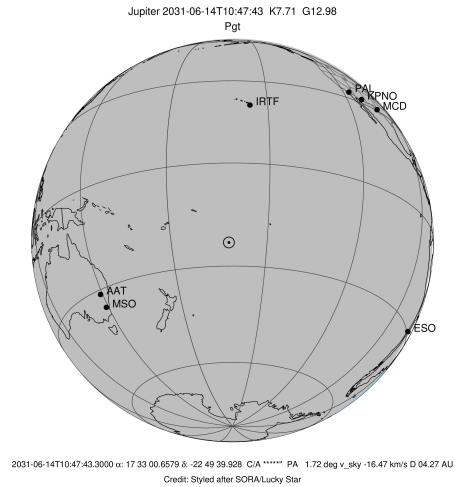


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-14T09:41:05.308	24.84	-24.01	71489.3	-32.60	-36.10
Jupiter	E	2031-06-14T11:42:35.203	-0.17x	0.78x	71489.3	-32.99	-36.51

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-14T10:52:07.990
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       : 4117456469458180992
2Mass ID (if available) : 17330066-2249398
ICRS Star Coord at Epoch: 17h 33m 00.65794s -22:49:39.92783s
RUWE (>1.4 is poor) : 0.88
K magnitude           : 7.710
G magnitude           : 12.979
RP magnitude          : 11.675
BP magnitude          : 14.951
DUPflag              : 0
Distance (au)         : 4.265
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.47
Sun-Target sep (deg) : 178.89
Sun-Moon sep (deg)   : 117.74
B (ring opening deg) : -2.60
PA of pole (deg)     : 2.07
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 12.237
C/A sky separation (km) : 37855.7
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
    
```

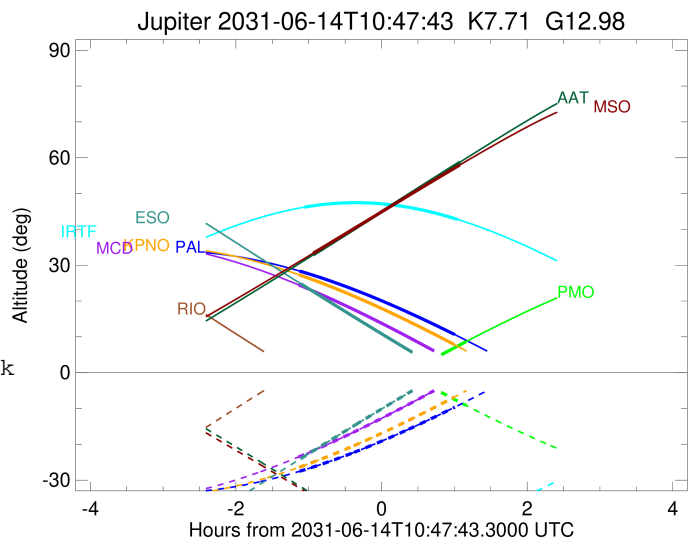
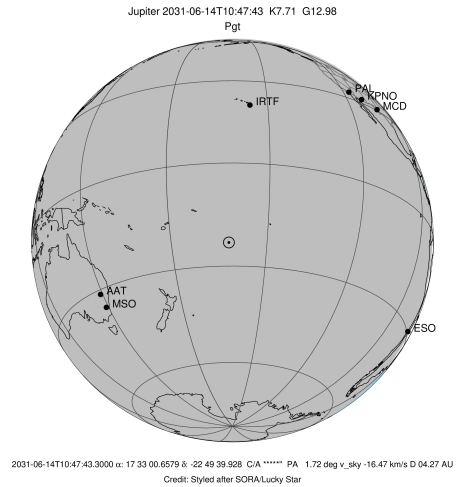


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-14T09:51:33.825	32.90	-34.05	71489.3	-32.74	-36.25
Jupiter	E	2031-06-14T11:52:24.471	58.76	-59.83	71489.5	-31.22	-34.65


```

target                : Jupiter
target radius (km)    : 71492.00
C/A epoch             : 2031-06-14T10:51:55.850
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       : 4117456469458180992
2Mass ID (if available) : 17330066-2249398
ICRS Star Coord at Epoch: 17h 33m 00.65794s -22:49:39.92783s
RUWE (>1.4 is poor) : 0.88
K magnitude           : 7.710
G magnitude           : 12.979
RP magnitude         : 11.675
BP magnitude         : 14.951
DUPflag              : 0
Distance (au)        : 4.265
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.47
Sun-Target sep (deg) : 178.89
Sun-Moon sep (deg)  : 117.75
B (ring opening deg) : -2.60
PA of pole (deg)    : 2.07
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 12.368
C/A sky separation (km) : 38261.4
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	2031-06-14T09:51:34.711	33.37	-34.51	71489.2	-33.11	-36.63
Jupiter	E	2031-06-14T11:52:00.168	57.92	-58.98	71489.5	-31.62	-35.07