

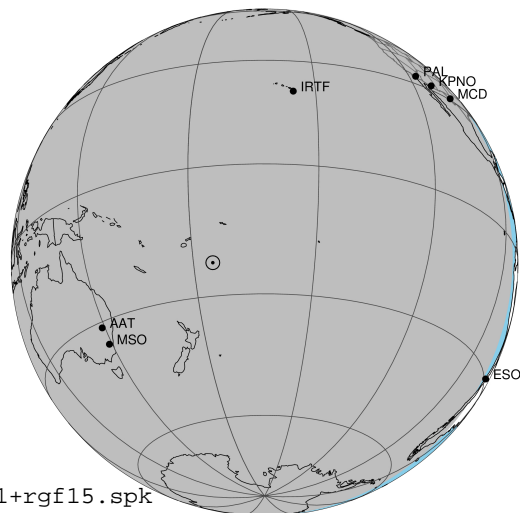
target : Jupiter  
 target radius (km) : 71492.00  
 C/A epoch : 2031-06-04T11:38:53.010  
 Event type : Pgt  
 : Jupiter occs: geocentric, topocentric  
 : Not a ringed target  
 Gaia source ID : 4116752992546863360  
 2Mass ID (if available) : 17382660-2251128

Jupiter 2031-06-04T11:38:53 K9.16 G14.65 Pgt

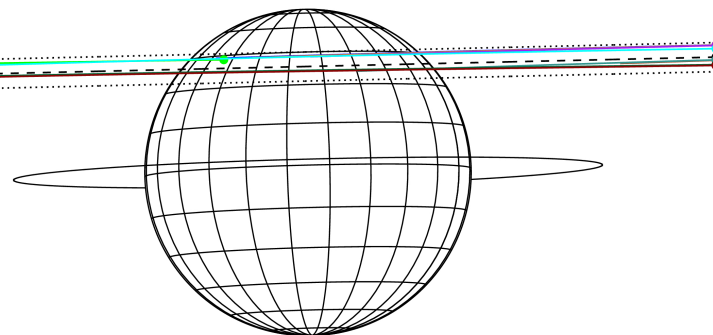
ICRS Star Coord at Epoch: 17h 38m 26.58350s -22:51:13.08927s

RUWE (>1.4 is poor) : 1.01  
 K magnitude : 9.165  
 G magnitude : 14.653  
 RP magnitude : 13.262  
 BP magnitude : 17.060  
 DUPflag : 0  
 Distance (au) : 4.287  
 f0 (km) : 0.00  
 g0 (km) : 0.00  
 skyplane vel. (km/s) : -15.82  
 Sun-Target sep (deg) : 168.20  
 Sun-Moon sep (deg) : 25.93  
 B (ring opening deg) : -2.61  
 PA of pole (deg) : 1.48  
 Pole direction: RA (deg): 268.05693  
 Dec (deg): 64.49651  
 C/A sky separation (") : 14.933  
 C/A sky separation (km) : 46430.6  
 NAIF SPICE kernels : RAJobs\_U111+rgf15.spk

Jupiter 2031-06-04T11:38:53 K9.16 G14.65  
 Pgt



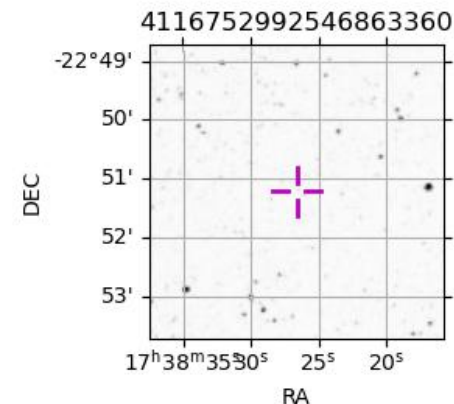
Earth  
 PAL  
 PMO  
 KPNO  
 MCD  
 IRTF  
 KAV  
 RIO  
 ESO  
 AAT  
 MSO



2031-06-04T11:38:53.0100 a: 17 38 26.5835 s: -22 51 13.089 C/A \*\*\*\*\* PA 181.32 deg v\_sky -15.82 km/s D 04.29 AU  
 Credit: Styled after SORA/Lucky Star

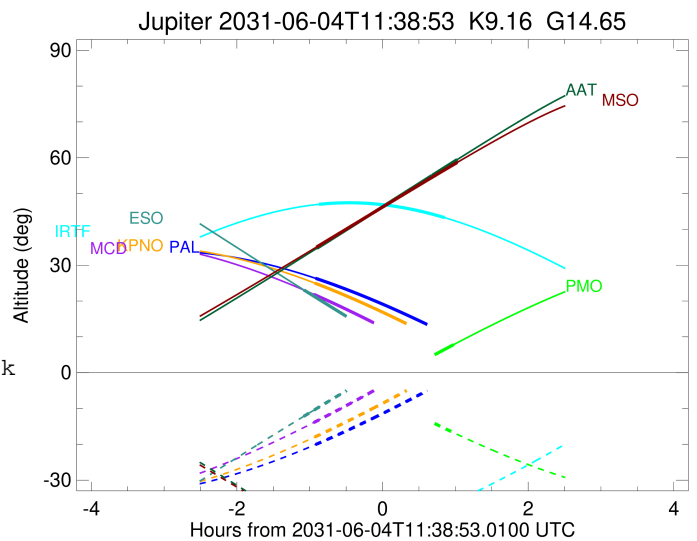
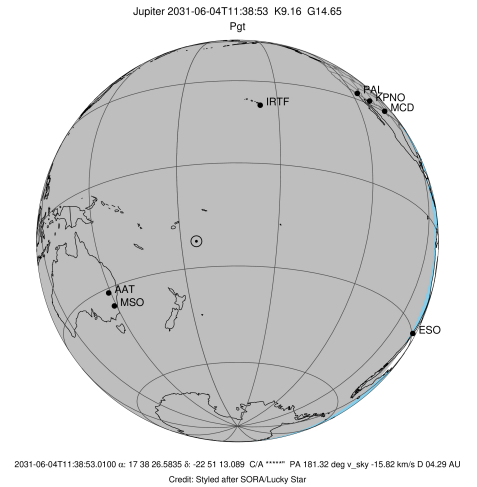
Observable events with sun below -5 deg and altitude above 5 deg

Obs	Location	lat	Elon	Target	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1			Pnn
PAL	Palomar Mt (200")	33.4	243.1	+	JUN 04 10:43 - JUN 04 10:43	Pin
PMO	Purple Mtn Obs. Nanking	32.1	118.8	+	JUN 04 12:37 - JUN 04 12:37	Pne
KPNO	Kitt Peak Natl Obs	32.0	248.4	+	JUN 04 10:43 - JUN 04 10:43	Pin
MCD	McDonald Obs. 2.7m	30.7	256.0	+	JUN 04 10:42 - JUN 04 10:42	Pin
TEN	Teide Obs./Tenerife	28.3	343.5			Pnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+	JUN 04 10:46 - JUN 04 12:29	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 04 10:33 - JUN 04 10:33	Pin
AAT	Siding Spring (AAT)	-31.3	149.1	+	JUN 04 10:44 - JUN 04 12:40	Pie
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8			Pnn
MSO	Mt. Stromlo Observatory	-35.3	149.0	+	JUN 04 10:44 - JUN 04 12:40	Pie



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-04T11:35:22.300
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      : 4116752992546863360
2Mass ID (if available) : 17382660-2251128
ICRS Star Coord at Epoch: 17h 38m 26.58350s -22:51:13.08927s
RUWE (>1.4 is poor) : 1.01
K magnitude          : 9.165
G magnitude          : 14.653
RP magnitude         : 13.262
BP magnitude         : 17.060
DUPflag             : 0
Distance (au)       : 4.287
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -15.82
Sun-Target sep (deg) : 168.20
Sun-Moon sep (deg)  : 26.62
B (ring opening deg) : -2.61
PA of pole (deg)    : 1.48
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (") : 16.465
C/A sky separation (km) : 51193.8
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
    
```

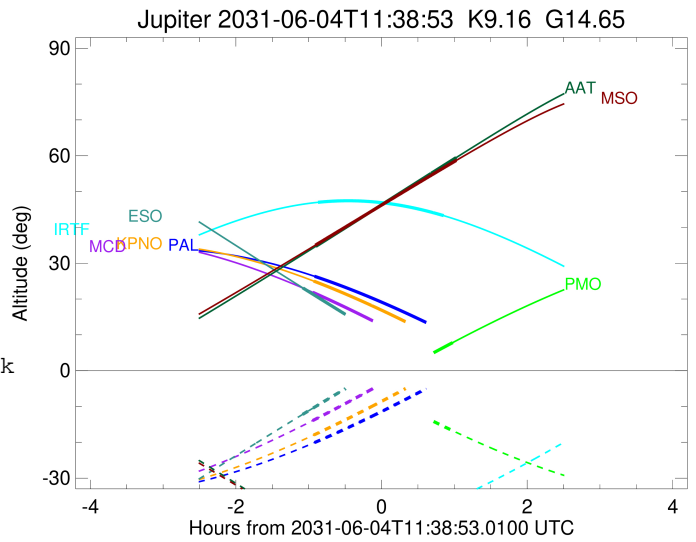
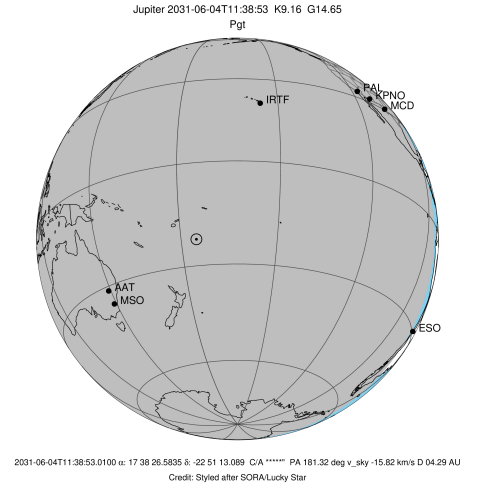


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-04T10:43:45.054	26.33	-20.06	71487.2	45.82	49.51
Jupiter	E	2031-06-04T12:27:10.272	11.56	-2.94x	71487.3	45.44	49.14

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-04T11:44:01.310
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       : 4116752992546863360
2Mass ID (if available) : 17382660-2251128
ICRS Star Coord at Epoch: 17h 38m 26.58350s -22:51:13.08927s
RUWE (>1.4 is poor) : 1.01
K magnitude           : 9.165
G magnitude           : 14.653
RP magnitude          : 13.262
BP magnitude          : 17.060
DUPflag              : 0
Distance (au)        : 4.287
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -15.82
Sun-Target sep (deg) : 168.20
Sun-Moon sep (deg)   : 25.15
B (ring opening deg) : -2.61
PA of pole (deg)     : 1.48
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (") : 16.044
C/A sky separation (km) : 49884.5
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
    
```

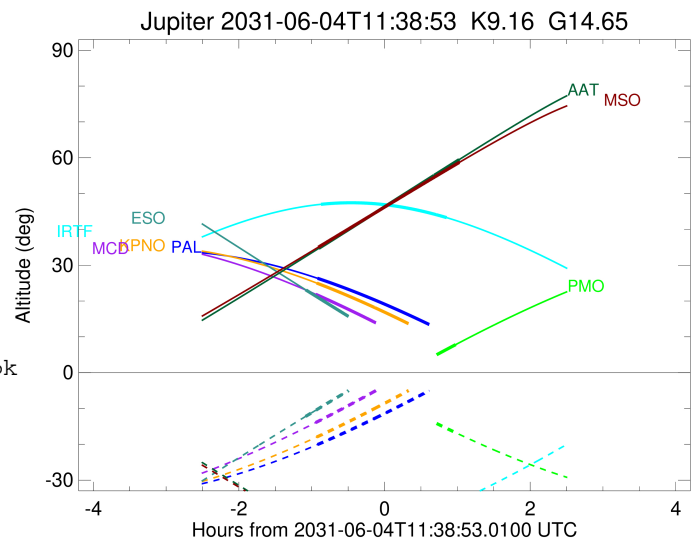
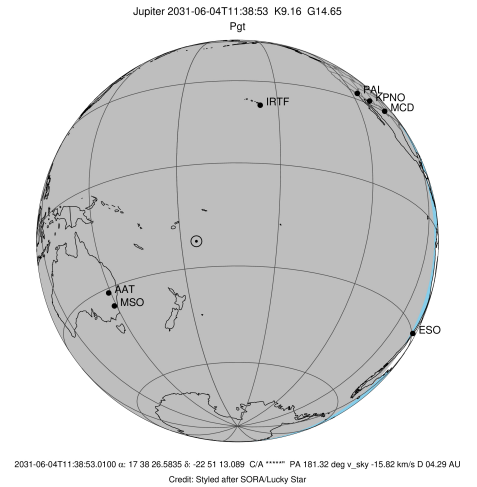


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-04T10:50:11.101	-12.68x	2.37x	71487.6	43.47	47.19
Jupiter	E	2031-06-04T12:37:32.996	7.83	-16.75	71487.4	44.89	48.59

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-04T11:34:59.550
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        : 4116752992546863360
2Mass ID (if available) : 17382660-2251128
ICRS Star Coord at Epoch: 17h 38m 26.58350s -22:51:13.08927s
RUWE (>1.4 is poor) : 1.01
K magnitude           : 9.165
G magnitude           : 14.653
RP magnitude          : 13.262
BP magnitude          : 17.060
DUPflag              : 0
Distance (au)         : 4.287
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -15.82
Sun-Target sep (deg) : 168.20
Sun-Moon sep (deg)   : 26.65
B (ring opening deg) : -2.61
PA of pole (deg)     : 1.48
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (") : 16.391
C/A sky separation (km) : 50965.9
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
    
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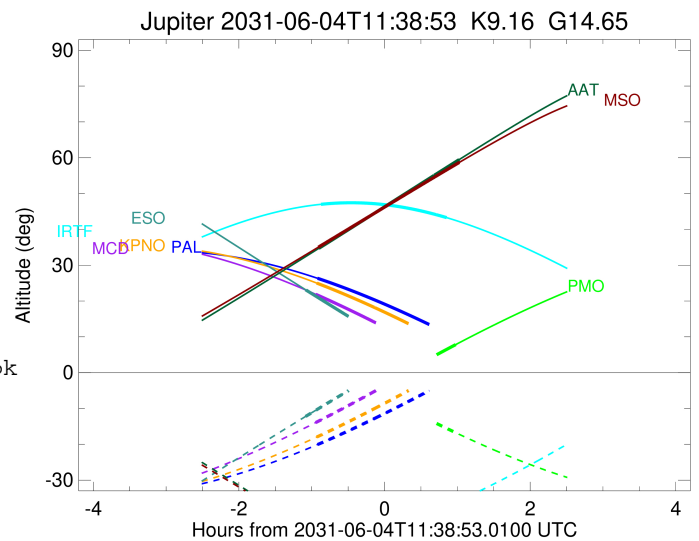
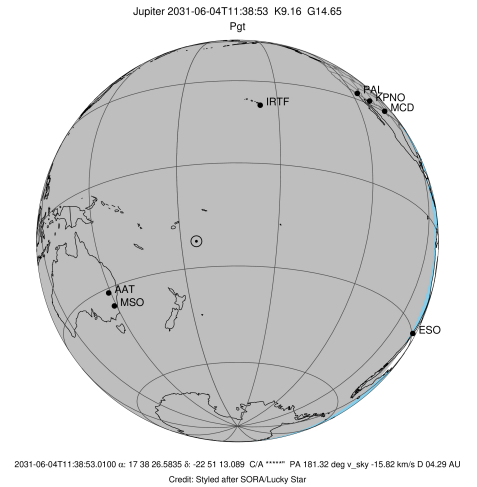


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-04T10:43:04.537	25.00	-17.96	71487.3	45.60	49.29
Jupiter	E	2031-06-04T12:27:06.652	8.77	0.32x	71487.3	45.14	48.84

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-04T11:34:31.490
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       : 4116752992546863360
2Mass ID (if available) : 17382660-2251128
ICRS Star Coord at Epoch: 17h 38m 26.58350s -22:51:13.08927s
RUWE (>1.4 is poor) : 1.01
K magnitude           : 9.165
G magnitude           : 14.653
RP magnitude          : 13.262
BP magnitude          : 17.060
DUPflag              : 0
Distance (au)         : 4.287
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -15.82
Sun-Target sep (deg) : 168.20
Sun-Moon sep (deg)   : 26.69
B (ring opening deg) : -2.61
PA of pole (deg)     : 1.48
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation ("): 16.292
C/A sky separation (km): 50658.4
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
    
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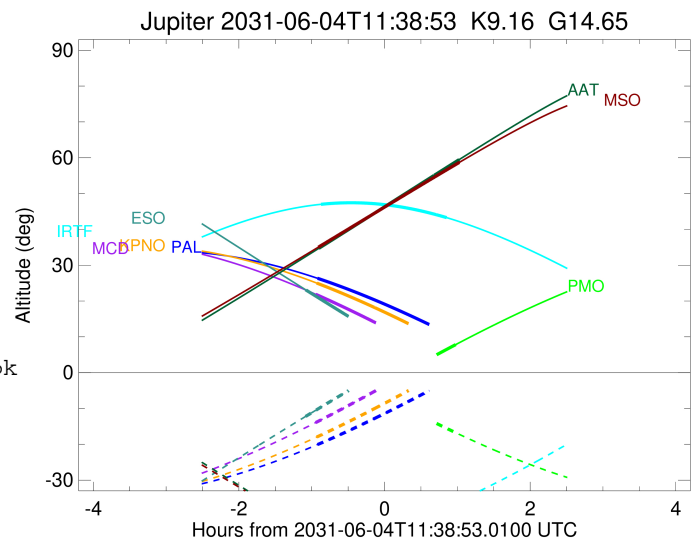
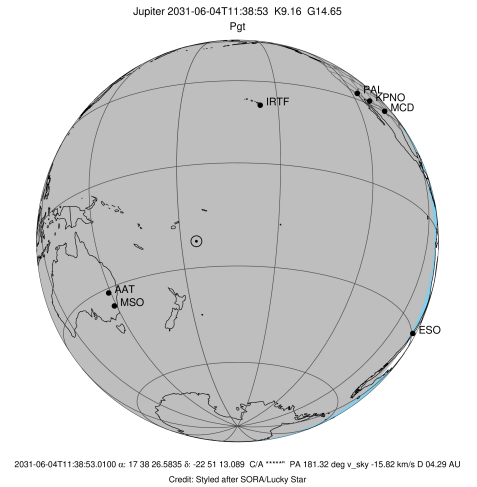


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-04T10:42:10.926	21.88	-13.93	71487.3	45.31	49.00
Jupiter	E	2031-06-04T12:27:05.928	3.93x	5.68x	71487.4	44.74	48.45

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-04T11:38:16.110
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      : 4116752992546863360
2Mass ID (if available) : 17382660-2251128
ICRS Star Coord at Epoch: 17h 38m 26.58350s -22:51:13.08927s
RUWE (>1.4 is poor) : 1.01
K magnitude          : 9.165
G magnitude          : 14.653
RP magnitude         : 13.262
BP magnitude         : 17.060
DUPflag             : 0
Distance (au)       : 4.287
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -15.82
Sun-Target sep (deg) : 168.20
Sun-Moon sep (deg)  : 26.36
B (ring opening deg) : -2.61
PA of pole (deg)    : 1.48
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation ("): 16.320
C/A sky separation (km): 50743.6
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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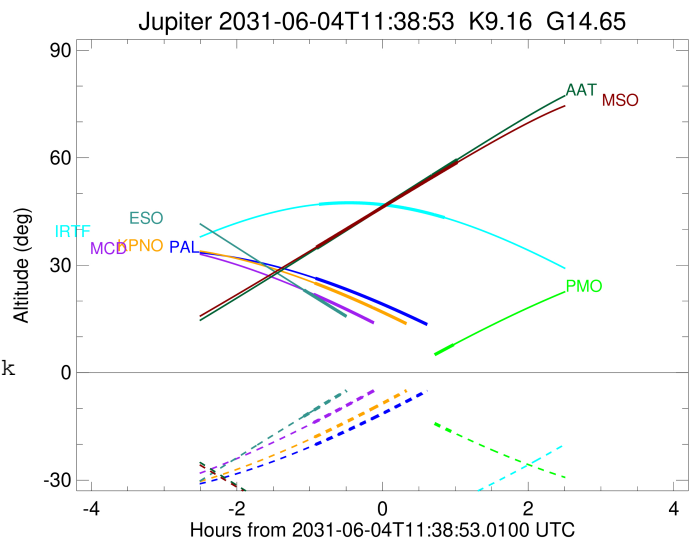
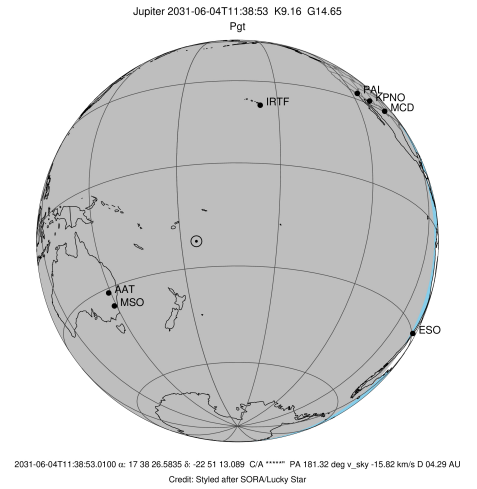


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-04T10:46:34.423	46.99	-47.38	71487.4	44.97	48.67
Jupiter	E	2031-06-04T12:29:59.116	43.28	-37.28	71487.3	45.22	48.92

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-04T11:33:24.910
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      : 4116752992546863360
2Mass ID (if available) : 17382660-2251128
ICRS Star Coord at Epoch: 17h 38m 26.58350s -22:51:13.08927s
RUWE (>1.4 is poor) : 1.01
K magnitude          : 9.165
G magnitude          : 14.653
RP magnitude         : 13.262
BP magnitude         : 17.060
DUPflag             : 0
Distance (au)       : 4.287
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -15.82
Sun-Target sep (deg) : 168.20
Sun-Moon sep (deg)  : 26.81
B (ring opening deg) : -2.61
PA of pole (deg)    : 1.48
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation ("): 14.047
C/A sky separation (km): 43676.5
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
    
```

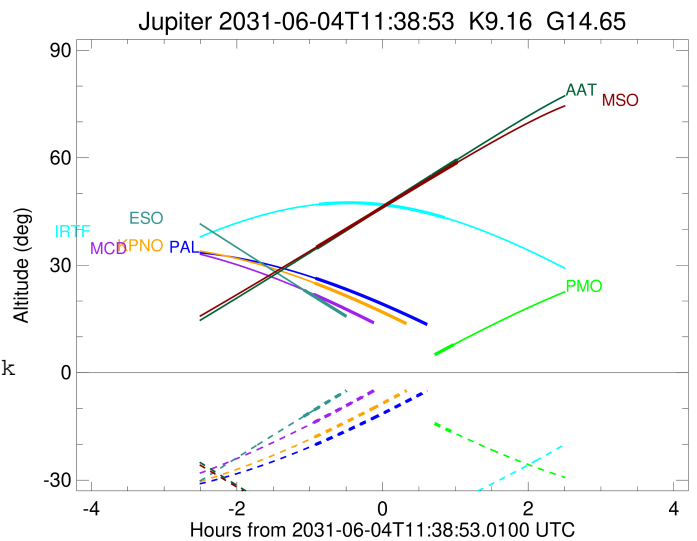
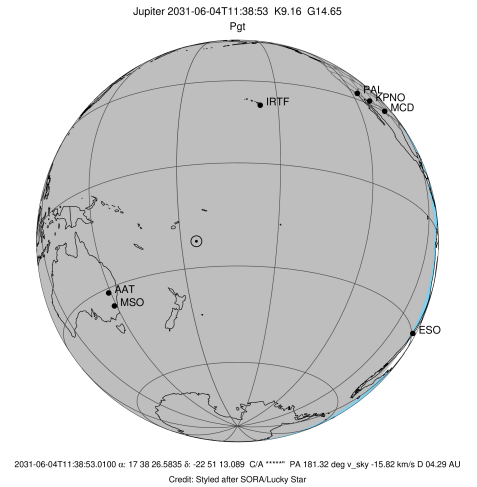


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-04T10:33:58.381	23.12	-12.20	71488.5	38.00	41.68
Jupiter	E	2031-06-04T12:33:13.693	-1.31x	11.15x	71488.6	37.21	40.87

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-04T11:42:44.740
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        : 4116752992546863360
2Mass ID (if available) : 17382660-2251128
ICRS Star Coord at Epoch: 17h 38m 26.58350s -22:51:13.08927s
RUWE (>1.4 is poor) : 1.01
K magnitude           : 9.165
G magnitude           : 14.653
RP magnitude          : 13.262
BP magnitude          : 17.060
DUPflag              : 0
Distance (au)         : 4.287
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -15.82
Sun-Target sep (deg) : 168.20
Sun-Moon sep (deg)   : 25.67
B (ring opening deg) : -2.61
PA of pole (deg)     : 1.48
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation ("): 14.392
C/A sky separation (km): 44748.7
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
    
```



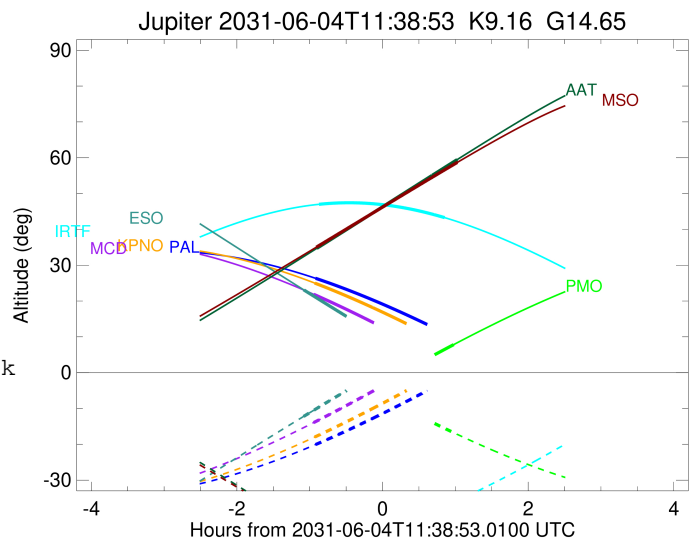
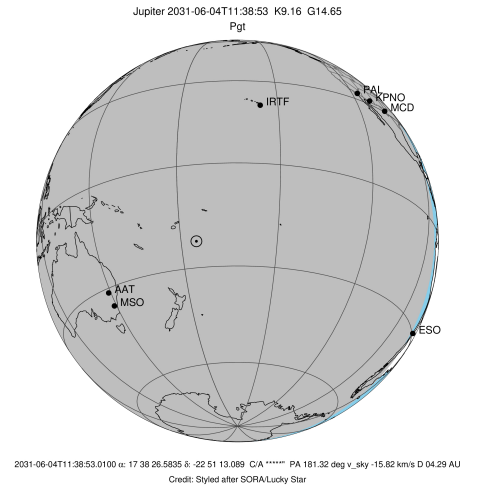
x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-04T10:44:47.731	34.71	-45.49	71488.5	38.07	41.75
Jupiter	E	2031-06-04T12:40:25.239	59.47	-69.87	71488.3	39.25	42.94



```

target           : Jupiter
target radius (km) : 71492.00
C/A epoch       : 2031-06-04T11:42:34.200
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  : 4116752992546863360
2Mass ID (if available) : 17382660-2251128
ICRS Star Coord at Epoch: 17h 38m 26.58350s -22:51:13.08927s
RUWE (>1.4 is poor) : 1.01
K magnitude     : 9.165
G magnitude     : 14.653
RP magnitude    : 13.262
BP magnitude    : 17.060
DUPflag        : 0
Distance (au)   : 4.287
f0 (km)        : 0.00
g0 (km)        : 0.00
skyplane vel. (km/s) : -15.82
Sun-Target sep (deg) : 168.20
Sun-Moon sep (deg) : 25.70
B (ring opening deg) : -2.61
PA of pole (deg) : 1.48
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (" ) : 14.260
C/A sky separation (km) : 44339.8
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	2031-06-04T10:44:14.566	35.00	-45.27	71488.5	37.67	41.34
Jupiter	E	2031-06-04T12:40:37.788	58.71	-68.14	71488.4	38.81	42.50