

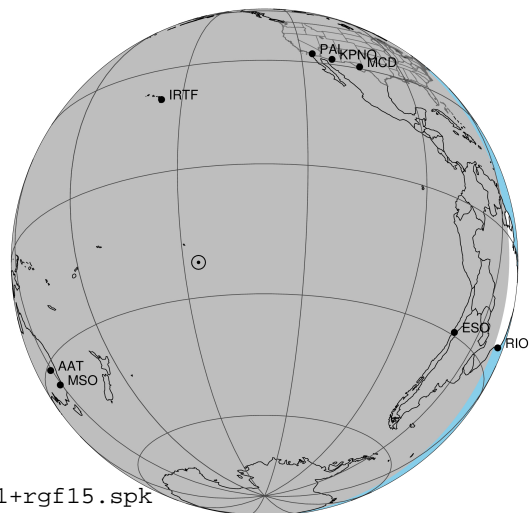
target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2031-06-01T09:42:36.180
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 4116567308156282368
 2Mass ID (if available) : 17400317-2252182

Jupiter 2031-06-01T09:42:36 K8.05 G14.65 Pgt

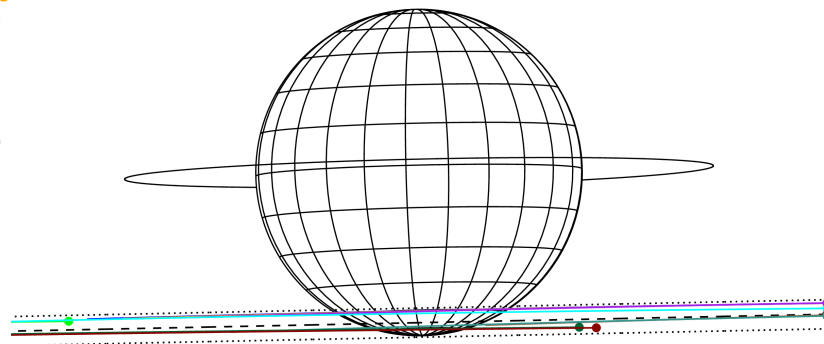
ICRS Star Coord at Epoch: 17h 40m 03.17278s -22:52:18.28865s

RUWE (>1.4 is poor) : 0.89
 K magnitude : 8.051
 G magnitude : 14.648
 RP magnitude : 13.103
 BP magnitude : 18.223
 DUPflag : 0
 Distance (au) : 4.300
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -15.43
 Sun-Target sep (deg) : 164.88
 Sun-Moon sep (deg) : 70.07
 B (ring opening deg) : -2.60
 PA of pole (deg) : 1.31
 Pole direction: RA (deg): 268.05693
 Dec (deg): 64.49651
 C/A sky separation (") : 21.094
 C/A sky separation (km) : 65781.1
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk

Jupiter 2031-06-01T09:42:36 K8.05 G14.65
 Pgt



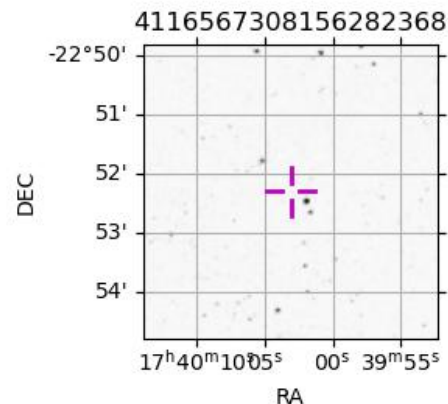
Earth
 PAL
 PMO
 KPNO
 MCD
 IRTF
 RIO
 ESO
 AAT
 MSO



2031-06-01T09:42:36.1800 α: 17 40 03.1728 δ: -22 52 18.2889 C/A ***** PA 1.18 deg v_sky -15.43 km/s D 04.30 AU
 Credit: Styled after SORA/Lucky Star

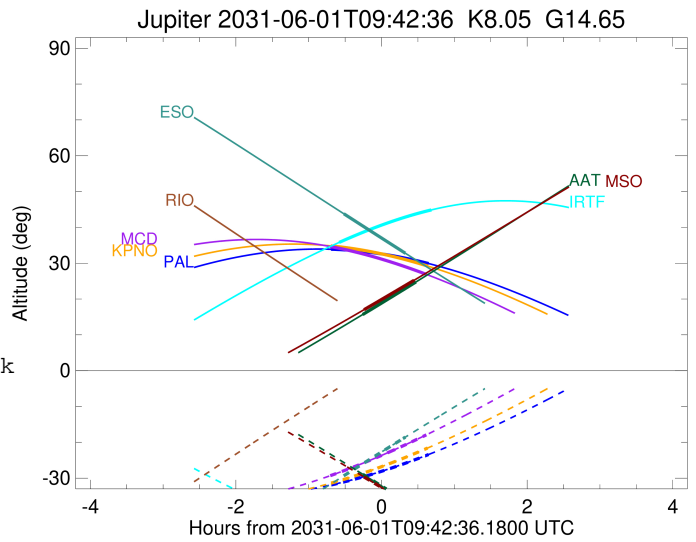
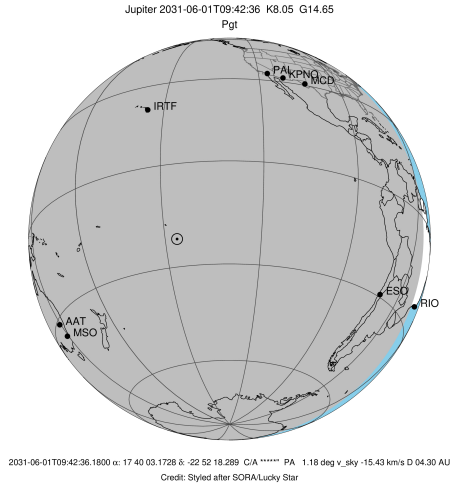
Observable events with sun below -5 deg and altitude above 5 deg

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 01 09:01 - JUN 01 10:21	Pie
PMO	Purple Mtn Obs. Nanking	32.1	118.8			Pnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+ +	JUN 01 09:00 - JUN 01 10:20	Pie
MCD	McDonald Obs. 2.7m	30.7	256.0	+ +	JUN 01 09:00 - JUN 01 10:19	Pie
TEN	Teide Obs./Tenerife	28.3	343.5			Pnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+ +	JUN 01 09:07 - JUN 01 10:23	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 01 09:11 - JUN 01 10:02	Pie
AAT	Siding Spring (AAT)	-31.3	149.1	+ +	JUN 01 09:27 - JUN 01 10:10	Pie
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8			Pnn
MSO	Mt. Stromlo Observatory	-35.3	149.0	+ +	JUN 01 09:28 - JUN 01 10:09	Pie



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-01T09:41:19.650
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        : 4116567308156282368
2Mass ID (if available) : 17400317-2252182
ICRS Star Coord at Epoch: 17h 40m 03.17278s -22:52:18.28865s
RUWE (>1.4 is poor) : 0.89
K magnitude           : 8.051
G magnitude           : 14.648
RP magnitude          : 13.103
BP magnitude          : 18.223
DUPflag              : 0
Distance (au)         : 4.300
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -15.43
Sun-Target sep (deg) : 164.88
Sun-Moon sep (deg)   : 70.63
B (ring opening deg) : -2.60
PA of pole (deg)     : 1.31
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation ("): 19.408
C/A sky separation (km): 60524.4
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
    
```

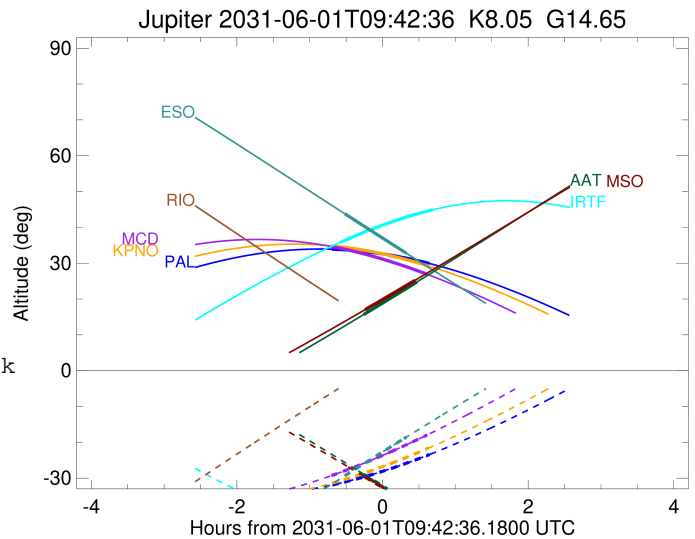
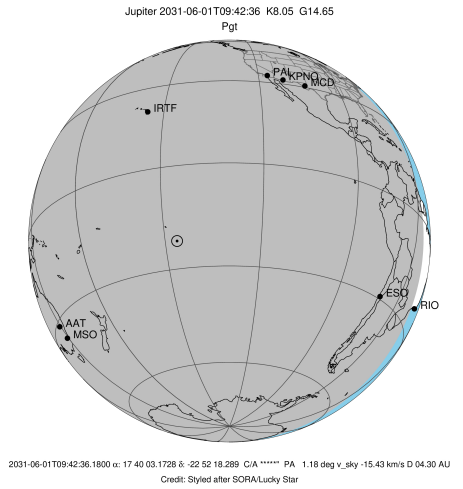


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-01T09:01:16.729	33.88	-31.88	71485.3	-57.84	-61.04
Jupiter	E	2031-06-01T10:21:24.271	29.90	-23.40	71485.3	-57.77	-60.98

```

target                : Jupiter
target radius (km)    : 71492.00
C/A epoch              : 2031-06-01T09:40:44.600
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        : 4116567308156282368
2Mass ID (if available) : 17400317-2252182
ICRS Star Coord at Epoch: 17h 40m 03.17278s -22:52:18.28865s
RUWE (>1.4 is poor)  : 0.89
K magnitude            : 8.051
G magnitude            : 14.648
RP magnitude           : 13.103
BP magnitude           : 18.223
DUPflag               : 0
Distance (au)         : 4.300
f0 (km)                : 0.00
g0 (km)                : 0.00
skyplane vel. (km/s)  : -15.43
Sun-Target sep (deg)  : 164.88
Sun-Moon sep (deg)    : 70.65
B (ring opening deg)  : -2.60
PA of pole (deg)      : 1.31
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (") : 19.450
C/A sky separation (km) : 60653.4
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
    
```

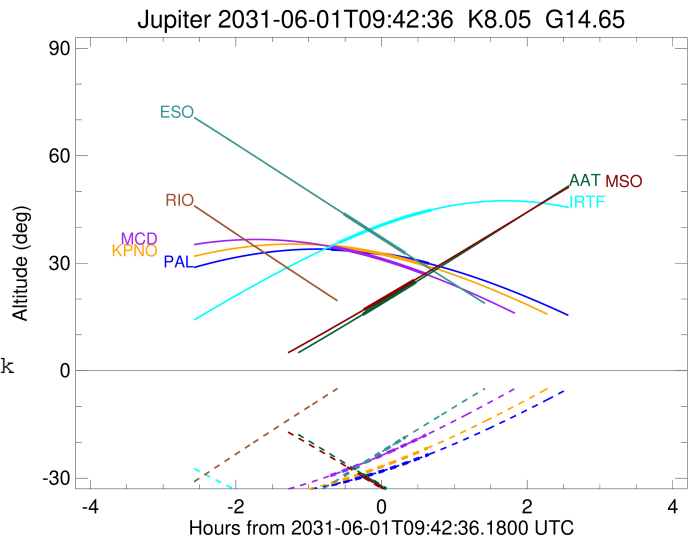
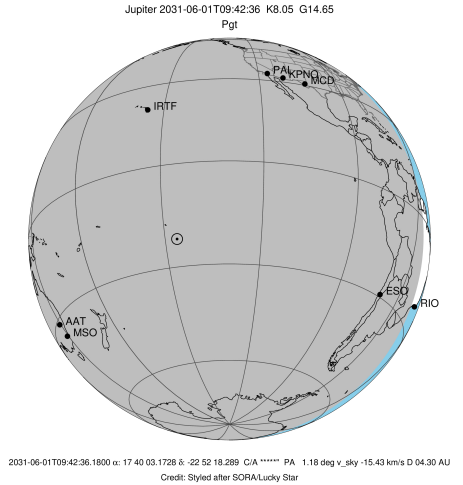


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-01T09:00:54.699	34.82	-31.40	71485.3	-57.98	-61.18
Jupiter	E	2031-06-01T10:20:37.136	29.21	-21.59	71485.3	-58.02	-61.21

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-01T09:39:55.390
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       : 4116567308156282368
2Mass ID (if available) : 17400317-2252182
ICRS Star Coord at Epoch: 17h 40m 03.17278s -22:52:18.28865s
RUWE (>1.4 is poor) : 0.89
K magnitude          : 8.051
G magnitude          : 14.648
RP magnitude         : 13.103
BP magnitude         : 18.223
DUPflag             : 0
Distance (au)        : 4.300
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -15.43
Sun-Target sep (deg) : 164.88
Sun-Moon sep (deg)  : 70.67
B (ring opening deg) : -2.60
PA of pole (deg)    : 1.31
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (") : 19.506
C/A sky separation (km) : 60827.6
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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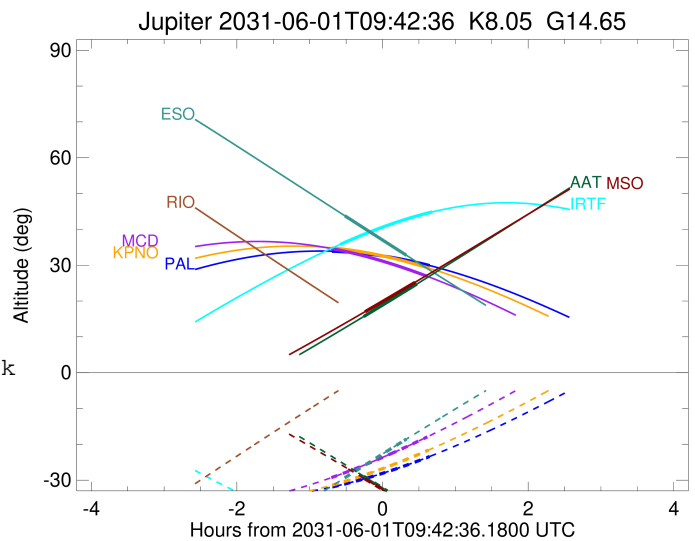
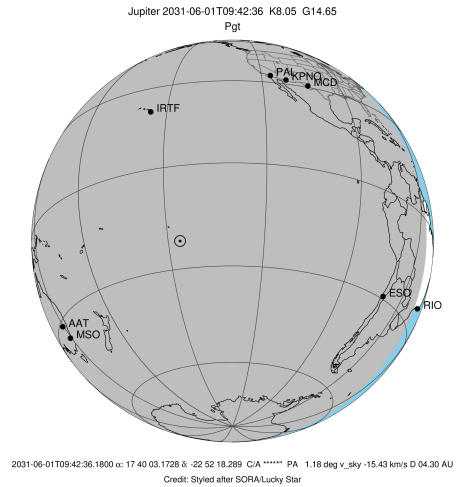


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-01T09:00:21.826	34.65	-29.31	71485.3	-58.17	-61.36
Jupiter	E	2031-06-01T10:19:32.910	26.88	-17.91	71485.3	-58.35	-61.52

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-01T09:45:44.140
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        : 4116567308156282368
2Mass ID (if available) : 17400317-2252182
ICRS Star Coord at Epoch: 17h 40m 03.17278s -22:52:18.28865s
RUWE (>1.4 is poor)  : 0.89
K magnitude           : 8.051
G magnitude           : 14.648
RP magnitude          : 13.103
BP magnitude          : 18.223
DUPflag              : 0
Distance (au)         : 4.300
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -15.43
Sun-Target sep (deg)  : 164.88
Sun-Moon sep (deg)   : 70.54
B (ring opening deg) : -2.60
PA of pole (deg)     : 1.31
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (") : 19.793
C/A sky separation (km) : 61724.8
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
    
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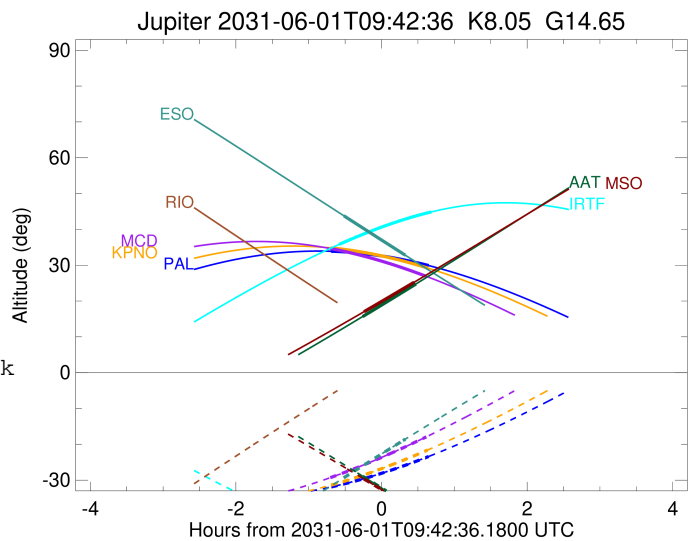
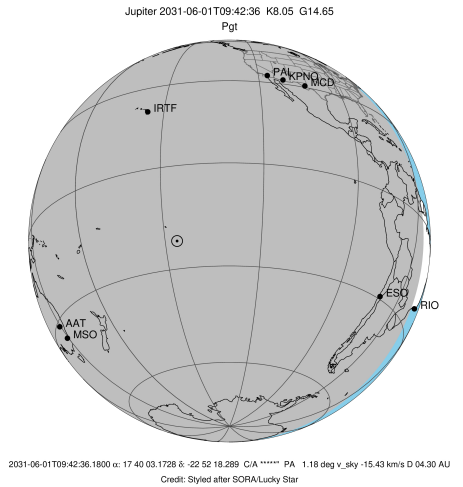


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-01T09:07:45.562	35.80	-44.70	71485.0	-60.06	-63.12
Jupiter	E	2031-06-01T10:23:37.662	44.86	-48.23	71485.1	-59.24	-62.36

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-01T09:36:52.880
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      : 4116567308156282368
2Mass ID (if available) : 17400317-2252182
ICRS Star Coord at Epoch: 17h 40m 03.17278s -22:52:18.28865s
RUWE (>1.4 is poor) : 0.89
K magnitude          : 8.051
G magnitude          : 14.648
RP magnitude         : 13.103
BP magnitude         : 18.223
DUPflag             : 0
Distance (au)       : 4.300
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -15.43
Sun-Target sep (deg) : 164.88
Sun-Moon sep (deg)  : 70.85
B (ring opening deg) : -2.60
PA of pole (deg)    : 1.31
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (") : 21.613
C/A sky separation (km) : 67399.8
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
    
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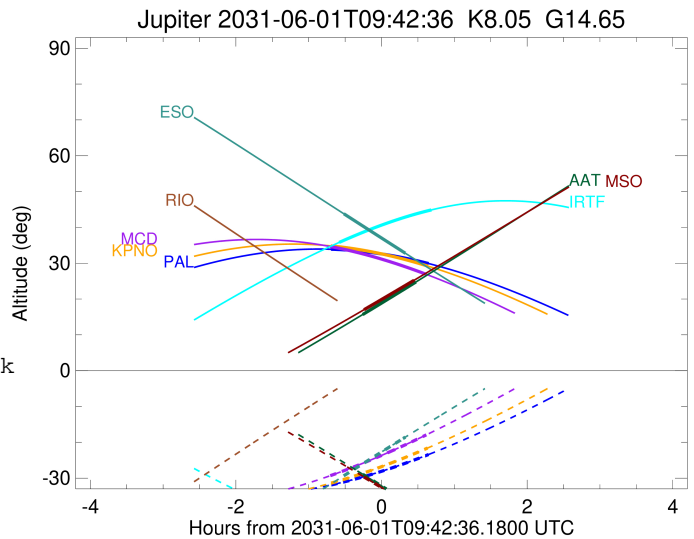
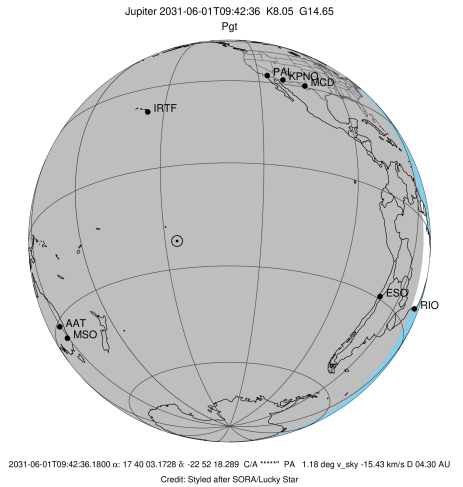


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-01T09:11:33.816	43.79	-29.33	71483.8	-70.05	-72.27
Jupiter	E	2031-06-01T10:02:15.520	32.78	-18.55	71483.7	-70.73	-72.88

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-01T09:49:04.920
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        : 4116567308156282368
2Mass ID (if available) : 17400317-2252182
ICRS Star Coord at Epoch: 17h 40m 03.17278s -22:52:18.28865s
RUWE (>1.4 is poor)  : 0.89
K magnitude           : 8.051
G magnitude           : 14.648
RP magnitude          : 13.103
BP magnitude          : 18.223
DUPflag              : 0
Distance (au)         : 4.300
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -15.43
Sun-Target sep (deg)  : 164.88
Sun-Moon sep (deg)    : 70.08
B (ring opening deg) : -2.60
PA of pole (deg)      : 1.31
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (") : 21.973
C/A sky separation (km) : 68522.4
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
    
```

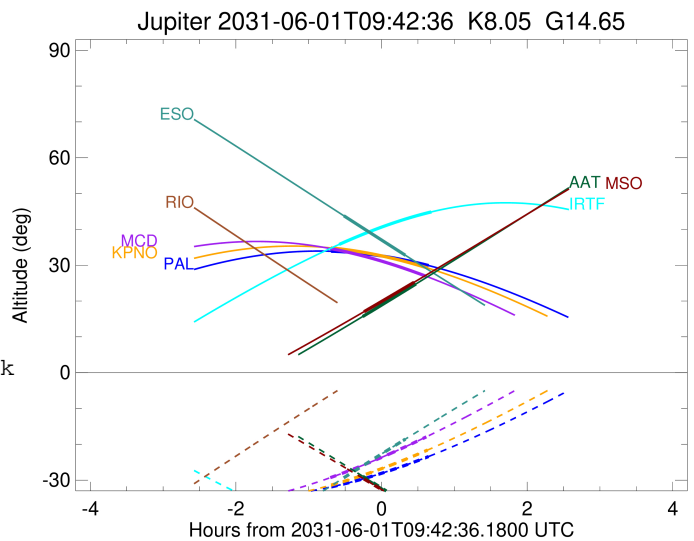
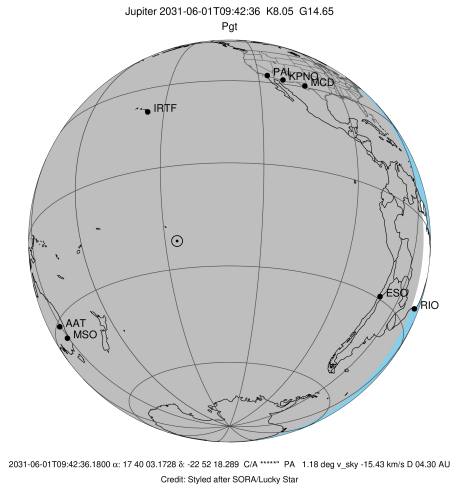


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-01T09:27:09.701	15.68	-28.91	71483.4	-73.94	-75.77
Jupiter	E	2031-06-01T10:10:56.688	24.75	-38.21	71483.5	-72.57	-74.54

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-01T09:48:47.200
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        : 4116567308156282368
2Mass ID (if available) : 17400317-2252182
ICRS Star Coord at Epoch: 17h 40m 03.17278s -22:52:18.28865s
RUWE (>1.4 is poor)  : 0.89
K magnitude           : 8.051
G magnitude           : 14.648
RP magnitude          : 13.103
BP magnitude          : 18.223
DUPflag              : 0
Distance (au)         : 4.300
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -15.43
Sun-Target sep (deg)  : 164.88
Sun-Moon sep (deg)    : 70.10
B (ring opening deg)  : -2.60
PA of pole (deg)      : 1.31
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (") : 22.089
C/A sky separation (km) : 68885.1
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	2031-06-01T09:28:13.413	17.02	-29.68	71483.3	-74.96	-76.67
Jupiter	E	2031-06-01T10:09:18.089	25.20	-38.05	71483.5	-73.64	-75.49