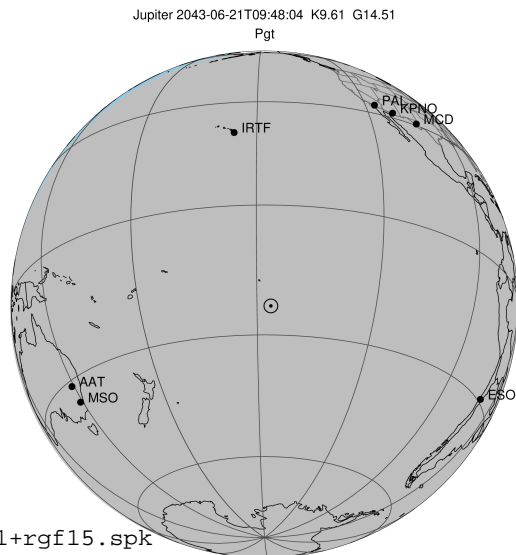


target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2043-06-21T09:48:04.600
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 4068704059580091904
 2Mass ID (if available) : 17510123-2304274

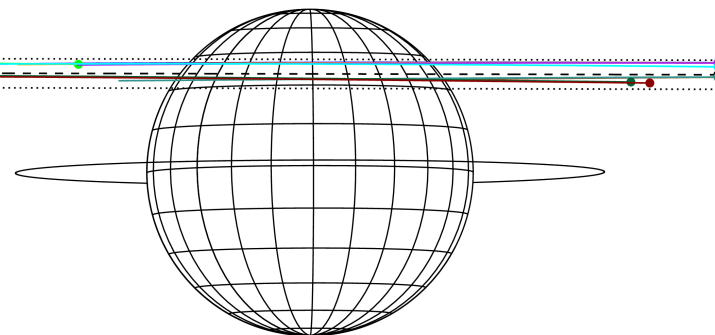
Jupiter 2043-06-21T09:48:04 K9.61 G14.51 Pgt

ICRS Star Coord at Epoch: 17h 51m 01.21039s -23:04:27.67357s

RUWE (>1.4 is poor) : 1.00
 K magnitude : 9.607
 G magnitude : 14.506
 RP magnitude : 13.425
 BP magnitude : 15.577
 DUPflag : 0
 Distance (au) : 4.250
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -16.40
 Sun-Target sep (deg) : 178.54
 Sun-Moon sep (deg) : 12.93
 B (ring opening deg) : -2.43
 PA of pole (deg) : 0.13
 Pole direction: RA (deg): 268.05669
 Dec (deg): 64.49732
 C/A sky separation (") : 14.011
 C/A sky separation (km) : 43190.4
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk



Earth
 PAL
 PMO
 KPNO
 MCD
 IRTF
 RIO
 ESO
 AAT
 MSO

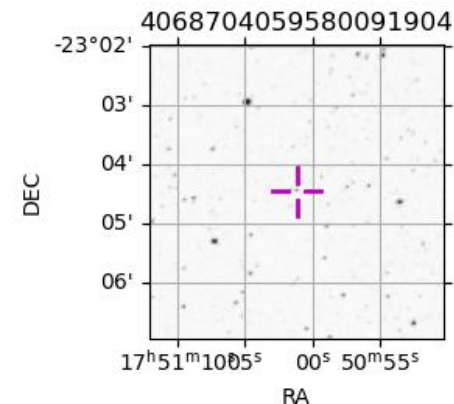


2043-06-21T09:48:04.6000 a: 17 51 01.2104 d: -23 04 27.674 C/A ***** PA 179.88 deg v_sky -16.40 km/s D 04.25 AU

Credit: Styled after SORA/Lucky Star

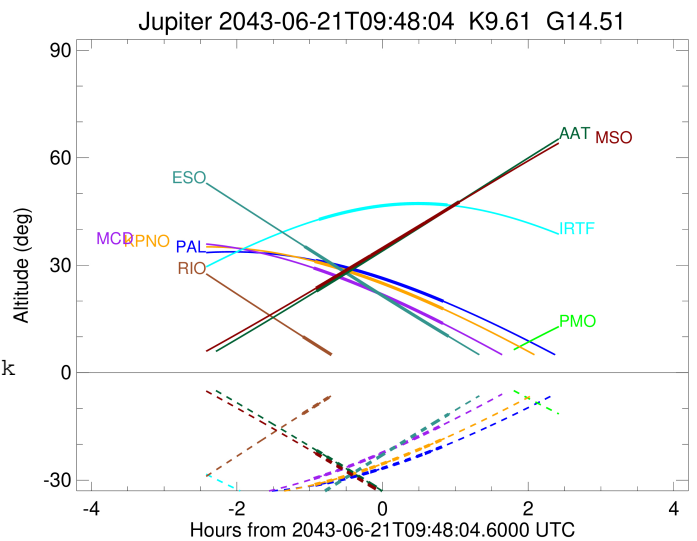
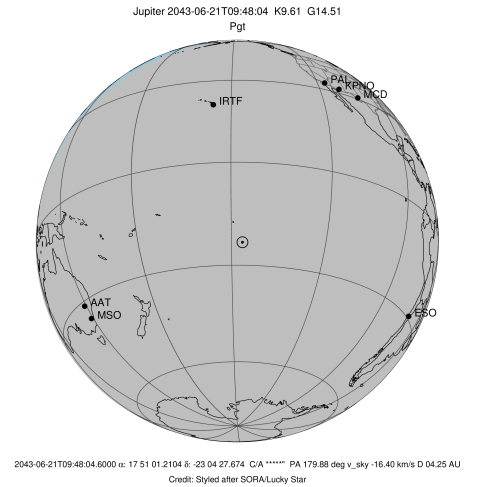
Observable events with sun below -5 deg and altitude above 5 deg

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 21 08:52 - JUN 21 10:38	Pie
PMO	Purple Mtn Obs. Nanking	32.1	118.8			Pnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+ +	JUN 21 08:52 - JUN 21 10:38	Pie
MCD	McDonald Obs. 2.7m	30.7	256.0	+ +	JUN 21 08:51 - JUN 21 10:37	Pie
TEN	Teide Obs./Tenerife	28.3	343.5			Pnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+ +	JUN 21 08:55 - JUN 21 10:41	Pie
KAV	Kavalur Observatory	12.6	78.8			Pnn
RIO	Rio de Janeiro	-22.9	316.8	+	JUN 21 08:42 - JUN 21 08:42	Pin
ESO	European Southern Obs. (3.6m)	-29.3	289.3	+ +	JUN 21 08:43 - JUN 21 10:42	Pie
AAT	Siding Spring (AAT)	-31.3	149.1	+ +	JUN 21 08:53 - JUN 21 10:51	Pie
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8			Pnn
MSO	Mt. Stromlo Observatory	-35.3	149.0	+ +	JUN 21 08:53 - JUN 21 10:51	Pie



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2043-06-21T09:45:31.000
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      : 4068704059580091904
2Mass ID (if available) : 17510123-2304274
ICRS Star Coord at Epoch: 17h 51m 01.21039s -23:04:27.67357s
RUWE (>1.4 is poor) : 1.00
K magnitude          : 9.607
G magnitude          : 14.506
RP magnitude         : 13.425
BP magnitude         : 15.577
DUPflag             : 0
Distance (au)       : 4.250
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -16.40
Sun-Target sep (deg) : 178.54
Sun-Moon sep (deg)  : 13.65
B (ring opening deg) : -2.43
PA of pole (deg)    : 0.13
Pole direction: RA (deg): 268.05669
Dec (deg): 64.49732
C/A sky separation ("): 15.630
C/A sky separation (km): 48181.5
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
    
```

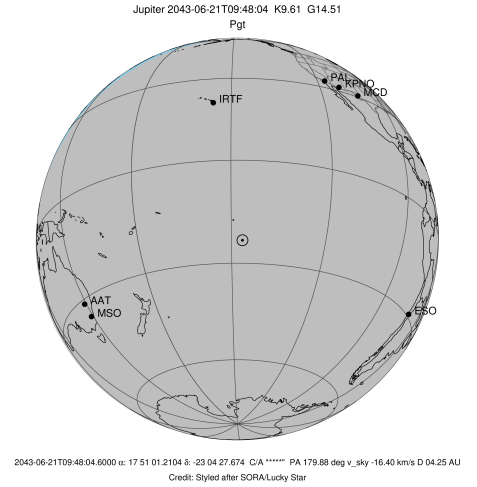


x: target alt < 5.0 deg or sun > -5.0 deg

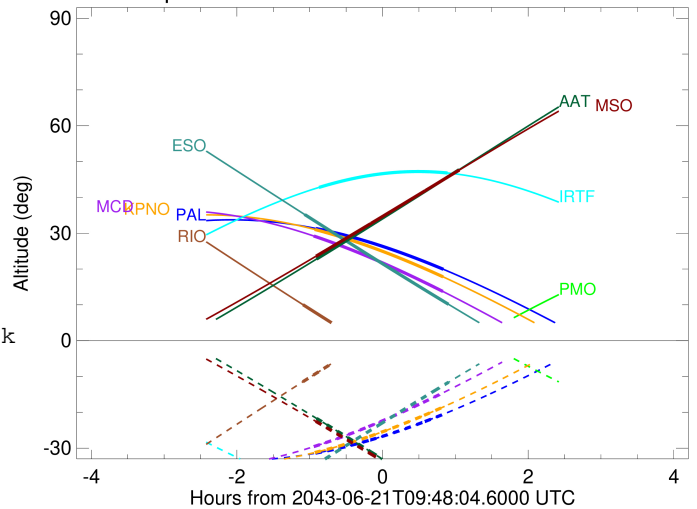
Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-06-21T08:52:56.944	31.33	-31.38	71488.4	42.30	46.02
Jupiter	E	2043-06-21T10:38:13.484	19.92	-20.54	71488.4	42.25	45.97

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2043-06-21T09:45:05.800
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      : 4068704059580091904
2Mass ID (if available) : 17510123-2304274
ICRS Star Coord at Epoch: 17h 51m 01.21039s -23:04:27.67357s
RUWE (>1.4 is poor) : 1.00
K magnitude         : 9.607
G magnitude         : 14.506
RP magnitude        : 13.425
BP magnitude        : 15.577
DUPflag            : 0
Distance (au)       : 4.250
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -16.40
Sun-Target sep (deg) : 178.54
Sun-Moon sep (deg)  : 13.69
B (ring opening deg) : -2.43
PA of pole (deg)    : 0.13
Pole direction: RA (deg): 268.05669
Dec (deg): 64.49732
C/A sky separation ("): 15.566
C/A sky separation (km): 47982.8
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
    
```



Jupiter 2043-06-21T09:48:04 K9.61 G14.51

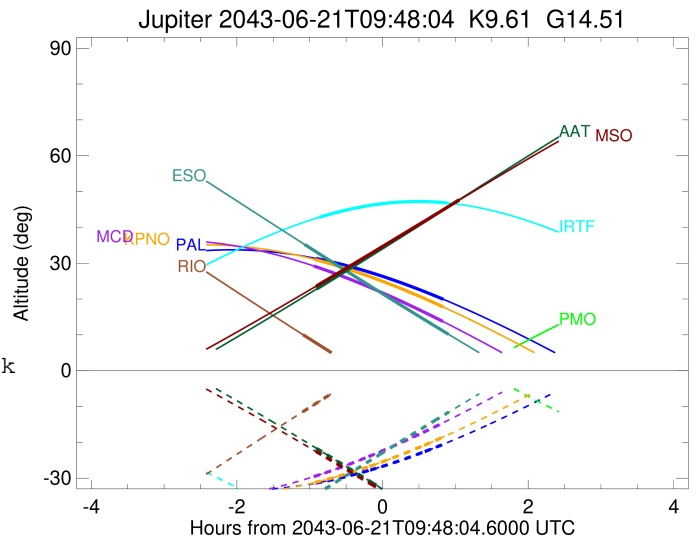
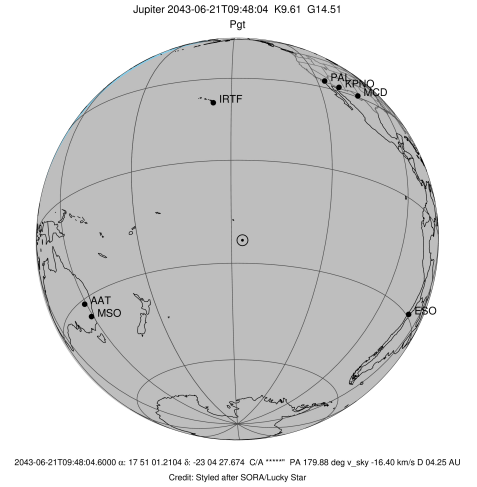


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-06-21T08:52:19.108	31.04	-31.22	71488.4	42.13	45.85
Jupiter	E	2043-06-21T10:38:02.385	17.81	-18.52	71488.4	42.00	45.71

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2043-06-21T09:44:32.590
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      : 4068704059580091904
2Mass ID (if available) : 17510123-2304274
ICRS Star Coord at Epoch: 17h 51m 01.21039s -23:04:27.67357s
RUWE (>1.4 is poor) : 1.00
K magnitude          : 9.607
G magnitude          : 14.506
RP magnitude         : 13.425
BP magnitude         : 15.577
DUPflag             : 0
Distance (au)       : 4.250
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.40
Sun-Target sep (deg) : 178.54
Sun-Moon sep (deg)  : 13.74
B (ring opening deg) : -2.43
PA of pole (deg)    : 0.13
Pole direction: RA (deg): 268.05669
Dec (deg): 64.49732
C/A sky separation (" ) : 15.478
C/A sky separation (km) : 47712.5
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
    
```

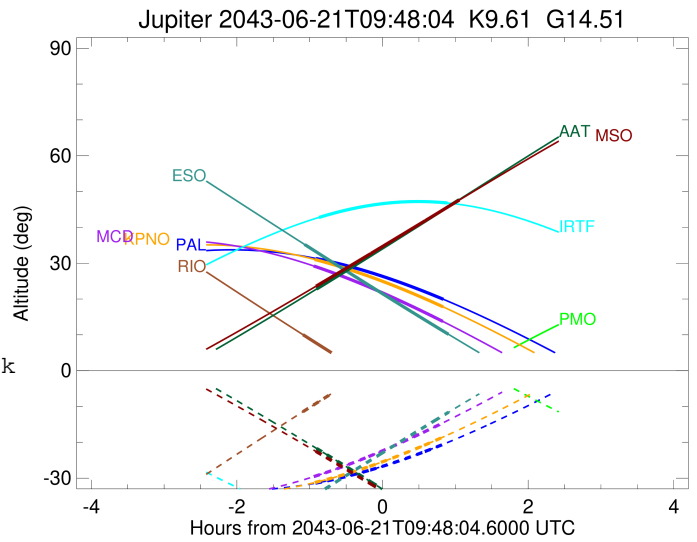
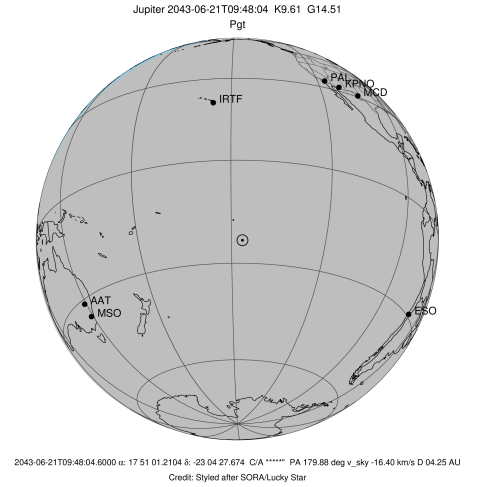


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-06-21T08:51:27.114	29.21	-29.57	71488.4	41.90	45.62
Jupiter	E	2043-06-21T10:37:49.962	13.74	-14.57	71488.4	41.65	45.37

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2043-06-21T09:48:45.430
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        : 4068704059580091904
2Mass ID (if available) : 17510123-2304274
ICRS Star Coord at Epoch: 17h 51m 01.21039s -23:04:27.67357s
RUWE (>1.4 is poor) : 1.00
K magnitude           : 9.607
G magnitude           : 14.506
RP magnitude          : 13.425
BP magnitude          : 15.577
DUPflag              : 0
Distance (au)         : 4.250
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.40
Sun-Target sep (deg)  : 178.54
Sun-Moon sep (deg)   : 13.22
B (ring opening deg) : -2.43
PA of pole (deg)     : 0.13
Pole direction: RA (deg): 268.05669
Dec (deg): 64.49732
C/A sky separation (" ) : 15.413
C/A sky separation (km) : 47510.7
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
    
```

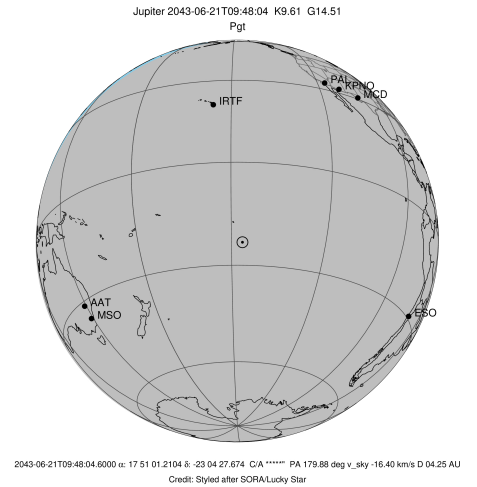


x: target alt < 5.0 deg or sun > -5.0 deg

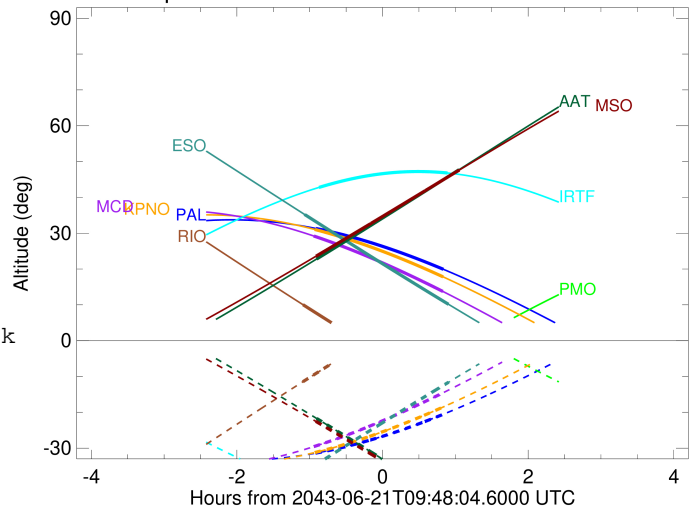
Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-06-21T08:55:48.056	42.78	-41.84	71488.5	41.23	44.95
Jupiter	E	2043-06-21T10:41:40.589	46.80	-46.64	71488.4	41.85	45.57

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2043-06-21T09:42:41.910
Event type          : Pgt
                    : Jupiter occs: geocentric, topocentric
                    : Not a ringed target
Observer code       : RIO
Location            : Rio de Janeiro
Latitude (deg)      : -22.89506
E. Longitude (deg)  : 316.77708
Altitude (km)       : 0.033
Gaia source ID      : 4068704059580091904
2Mass ID (if available) : 17510123-2304274
ICRS Star Coord at Epoch: 17h 51m 01.21039s -23:04:27.67357s
RUWE (>1.4 is poor) : 1.00
K magnitude          : 9.607
G magnitude          : 14.506
RP magnitude         : 13.425
BP magnitude         : 15.577
DUPflag             : 0
Distance (au)        : 4.250
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.40
Sun-Target sep (deg) : 178.54
Sun-Moon sep (deg)  : 13.50
B (ring opening deg) : -2.43
PA of pole (deg)    : 0.13
Pole direction: RA (deg): 268.05669
Dec (deg): 64.49732
C/A sky separation (" ) : 13.089
C/A sky separation (km) : 40346.0
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
    
```



Jupiter 2043-06-21T09:48:04 K9.61 G14.51

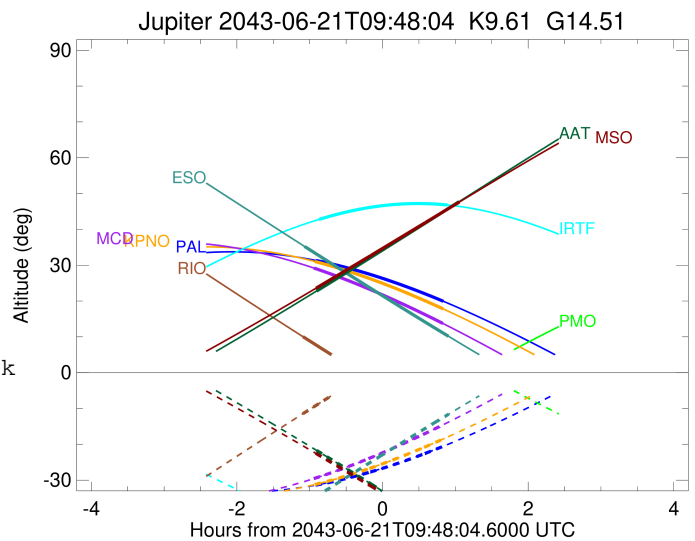
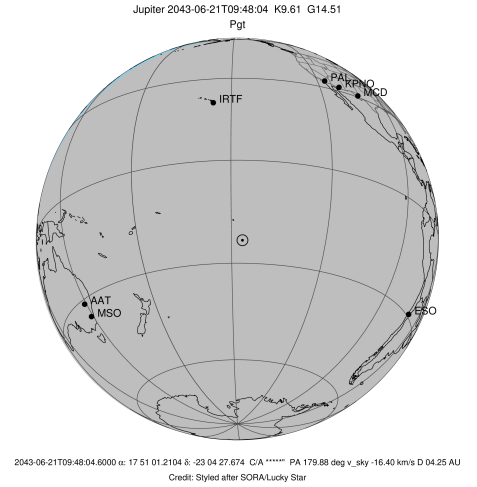


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-06-21T08:42:34.867	10.04	-11.44	71489.4	34.66	38.24
Jupiter	E	2043-06-21T10:43:12.723	-14.83x	13.42x	71489.5	34.02	37.58

```

target                : Jupiter
target radius (km)    : 71492.00
C/A epoch             : 2043-06-21T09:42:59.300
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       : 4068704059580091904
2Mass ID (if available) : 17510123-2304274
ICRS Star Coord at Epoch: 17h 51m 01.21039s -23:04:27.67357s
RUWE (>1.4 is poor) : 1.00
K magnitude           : 9.607
G magnitude           : 14.506
RP magnitude         : 13.425
BP magnitude         : 15.577
DUPflag              : 0
Distance (au)        : 4.250
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.40
Sun-Target sep (deg) : 178.54
Sun-Moon sep (deg)   : 13.58
B (ring opening deg) : -2.43
PA of pole (deg)     : 0.13
Pole direction: RA (deg): 268.05669
Dec (deg): 64.49732
C/A sky separation ("): 13.245
C/A sky separation (km): 40828.5
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
    
```

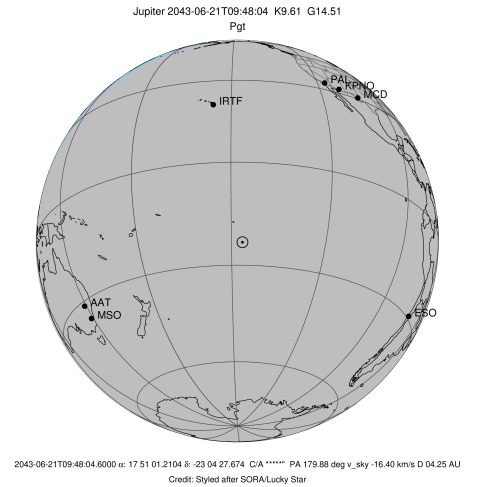


x: target alt < 5.0 deg or sun > -5.0 deg

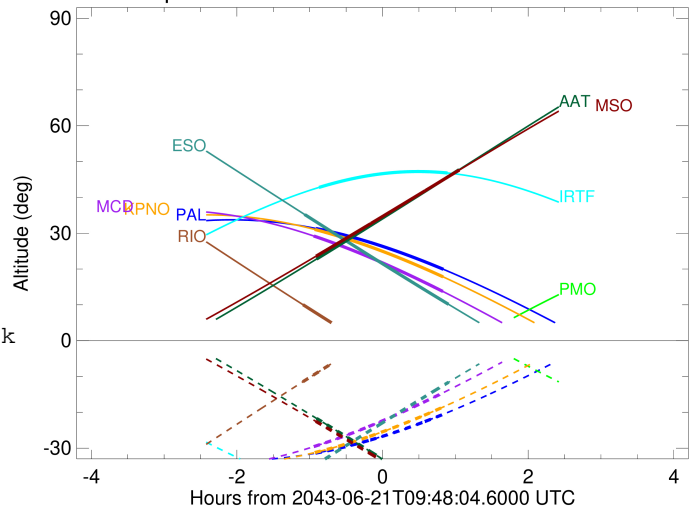
Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-06-21T08:43:52.715	35.23	-36.63	71489.3	35.06	38.66
Jupiter	E	2043-06-21T10:42:27.394	10.15	-11.61	71489.4	34.49	38.07


```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2043-06-21T09:52:37.640
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       : 4068704059580091904
2Mass ID (if available) : 17510123-2304274
ICRS Star Coord at Epoch: 17h 51m 01.21039s -23:04:27.67357s
RUWE (>1.4 is poor) : 1.00
K magnitude           : 9.607
G magnitude           : 14.506
RP magnitude          : 13.425
BP magnitude          : 15.577
DUPflag              : 0
Distance (au)         : 4.250
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.40
Sun-Target sep (deg)  : 178.54
Sun-Moon sep (deg)   : 12.30
B (ring opening deg) : -2.43
PA of pole (deg)     : 0.13
Pole direction: RA (deg): 268.05669
Dec (deg): 64.49732
C/A sky separation (" ) : 13.369
C/A sky separation (km) : 41209.9
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
    
```



Jupiter 2043-06-21T09:48:04 K9.61 G14.51

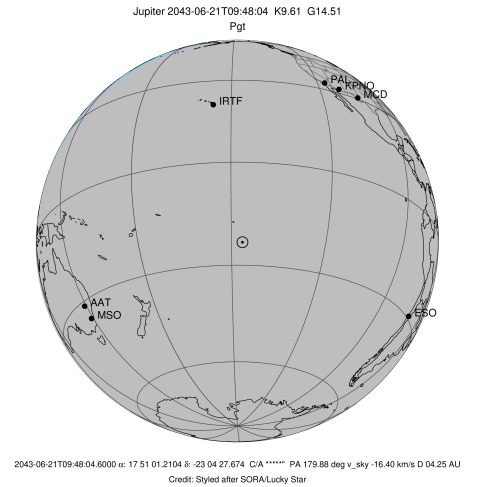


x: target alt < 5.0 deg or sun > -5.0 deg

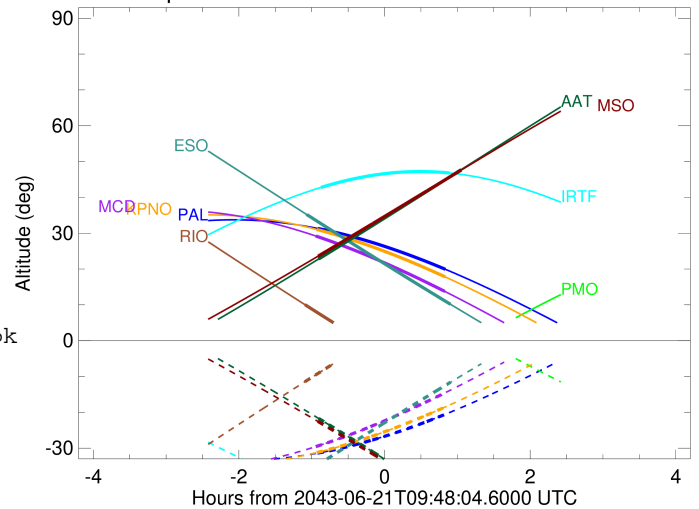
Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-06-21T08:53:46.162	22.79	-21.70	71489.4	34.42	38.00
Jupiter	E	2043-06-21T10:51:10.663	47.72	-46.49	71489.2	35.84	39.46


```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2043-06-21T09:52:25.930
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        : 4068704059580091904
2Mass ID (if available) : 17510123-2304274
ICRS Star Coord at Epoch: 17h 51m 01.21039s -23:04:27.67357s
RUWE (>1.4 is poor) : 1.00
K magnitude           : 9.607
G magnitude           : 14.506
RP magnitude          : 13.425
BP magnitude          : 15.577
DUPflag              : 0
Distance (au)         : 4.250
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.40
Sun-Target sep (deg) : 178.54
Sun-Moon sep (deg)   : 12.31
B (ring opening deg) : -2.43
PA of pole (deg)     : 0.13
Pole direction: RA (deg): 268.05669
Dec (deg): 64.49732
C/A sky separation (") : 13.241
C/A sky separation (km) : 40814.6
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
    
```



Jupiter 2043-06-21T09:48:04 K9.61 G14.51



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	2043-06-21T08:53:16.213	23.57	-22.55	71489.5	34.05	37.62
Jupiter	E	2043-06-21T10:51:17.833	47.61	-46.47	71489.3	35.43	39.05