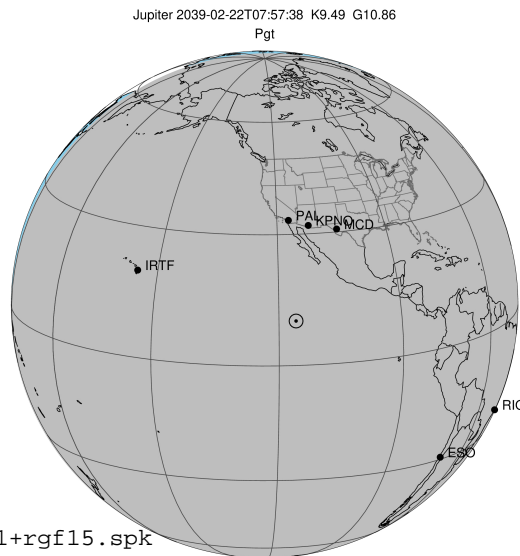


target : Jupiter  
 target radius (km) : 71492.00  
 C/A epoch : 2039-02-22T07:57:38.780  
 Event type : Pgt  
 : Jupiter occs: geocentric, topocentric  
 : Not a ringed target  
 Gaia source ID : 616000225526042240  
 2Mass ID (if available) : 09504537+1416169

Jupiter 2039-02-22T07:57:38 K9.49 G10.86 Pgt

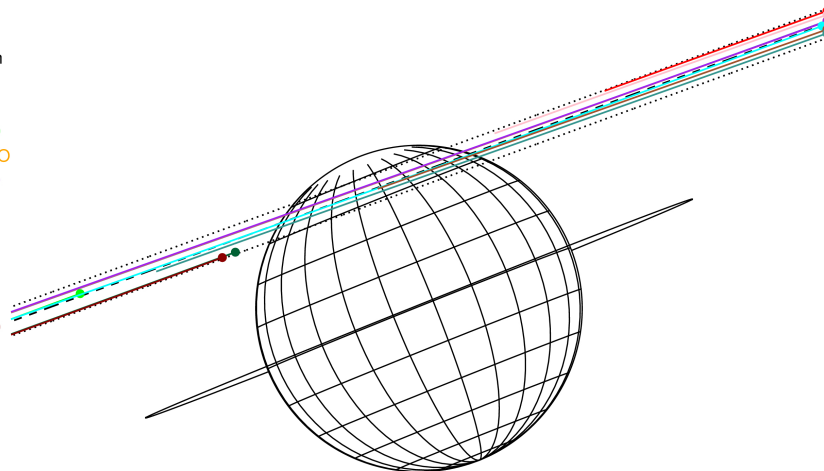
ICRS Star Coord at Epoch: 09h 50m 45.24862s +14:16:15.69866s

RUWE (>1.4 is poor) : 1.04  
 K magnitude : 9.486  
 G magnitude : 10.856  
 RP magnitude : 10.371  
 BP magnitude : 11.175  
 DUPflag : 0  
 Distance (au) : 4.382  
 f0 (km) : 0.00  
 g0 (km) : 0.00  
 skyplane vel. (km/s) : -17.22  
 Sun-Target sep (deg) : 171.93  
 Sun-Moon sep (deg) : 176.45  
 B (ring opening deg) : -0.66  
 PA of pole (deg) : 21.81  
 Pole direction: RA (deg): 268.05614  
 Dec (deg): 64.49697  
 C/A sky separation (") : 17.609  
 C/A sky separation (km) : 55958.1  
 NAIF SPICE kernels : RAJobs\_U111+rgf15.spk



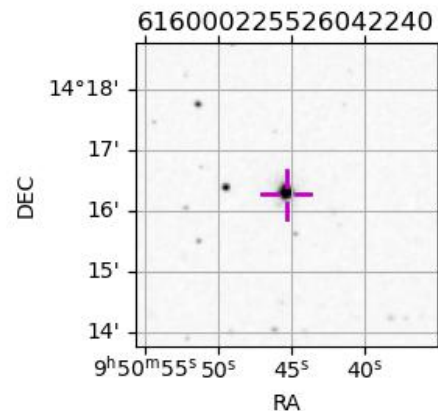
2039-02-22T07:57:38.7800 a: 09 50 45.2486 s: +14 16 15.699 C/A \*\*\*\*\* PA 200.06 deg v\_sky -17.22 km/s D 04.38 AU  
 Credit: Styled after SORA/Lucky Star

Earth  
 PIC  
 PAL  
 PMO  
 KPNO  
 MCD  
 TEN  
 IRTF  
 RIO  
 ESO  
 AAT  
 MSO



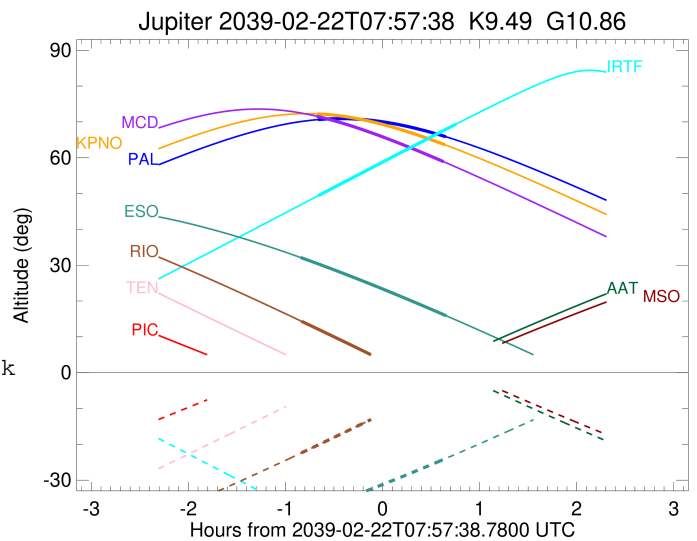
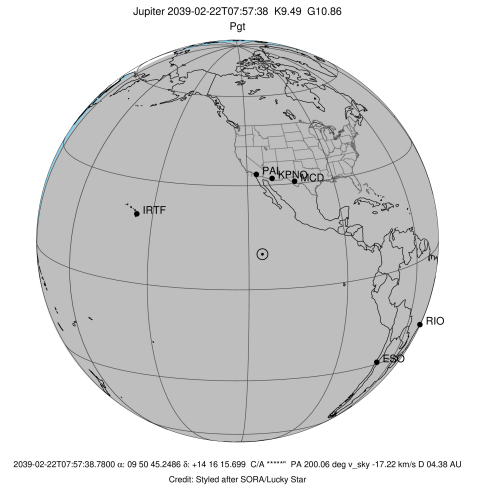
Observable events with sun below -5 deg and altitude above 5 deg

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	+ +	FEB 22 07:17 - FEB 22 08:36	Pie
PMO	Purple Mtn Obs. Nanking	32.1	118.8			Pnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+ +	FEB 22 07:17 - FEB 22 08:36	Pie
MCD	McDonald Obs. 2.7m	30.7	256.0	+ +	FEB 22 07:16 - FEB 22 08:35	Pie
TEN	Teide Obs./Tenerife	28.3	343.5			Pnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+ +	FEB 22 07:18 - FEB 22 08:42	Pie
KAV	Kavalur Observatory	12.6	78.8			Pnn
RIO	Rio de Janeiro	-22.9	316.8	+	FEB 22 07:07 - FEB 22 07:07	Pin
ESO	European Southern Obs. (3.6m)	-29.3	289.3	+ +	FEB 22 07:07 - FEB 22 08:37	Pie
AAT	Siding Spring (AAT)	-31.3	149.1			Pnn
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8			Pnn
MSO	Mt. Stromlo Observatory	-35.3	149.0			Pnn



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2039-02-22T07:57:20.970
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        : 616000225526042240
2Mass ID (if available) : 09504537+1416169
ICRS Star Coord at Epoch: 09h 50m 45.24862s +14:16:15.69866s
RUWE (>1.4 is poor) : 1.04
K magnitude           : 9.486
G magnitude           : 10.856
RP magnitude          : 10.371
BP magnitude          : 11.175
DUPflag              : 0
Distance (au)         : 4.382
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -17.22
Sun-Target sep (deg) : 171.93
Sun-Moon sep (deg)   : 176.22
B (ring opening deg) : -0.66
PA of pole (deg)     : 21.81
Pole direction: RA (deg): 268.05614
Dec (deg): 64.49697
C/A sky separation (" ) : 18.292
C/A sky separation (km) : 58128.3
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
    
```

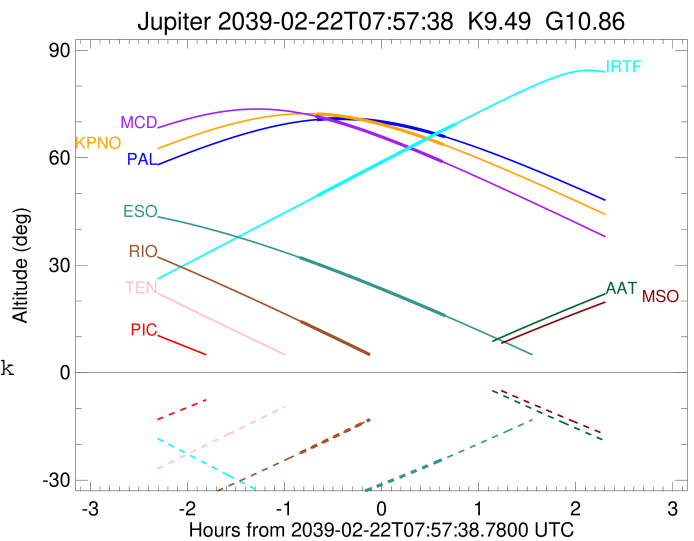
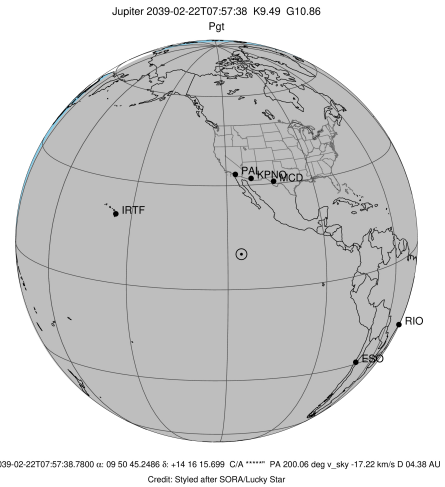


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2039-02-22T07:17:54.993	70.64	-65.00	71491.6	52.21	55.71
Jupiter	E	2039-02-22T08:36:49.155	65.85	-65.57	71491.6	56.62	59.90

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2039-02-22T07:56:50.120
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       : 616000225526042240
2Mass ID (if available) : 09504537+1416169
ICRS Star Coord at Epoch: 09h 50m 45.24862s +14:16:15.69866s
RUWE (>1.4 is poor) : 1.04
K magnitude           : 9.486
G magnitude           : 10.856
RP magnitude          : 10.371
BP magnitude          : 11.175
DUPflag              : 0
Distance (au)        : 4.382
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -17.22
Sun-Target sep (deg) : 171.93
Sun-Moon sep (deg)   : 176.25
B (ring opening deg) : -0.66
PA of pole (deg)     : 21.81
Pole direction: RA (deg): 268.05614
Dec (deg): 64.49697
C/A sky separation (") : 18.307
C/A sky separation (km) : 58177.2
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
    
```

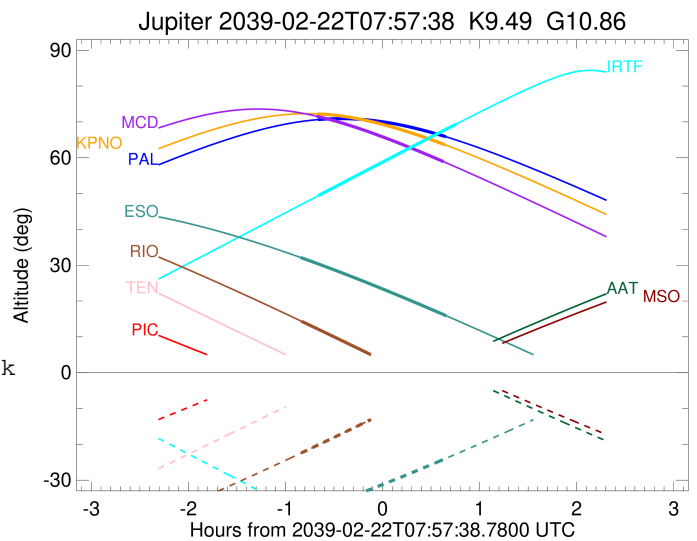
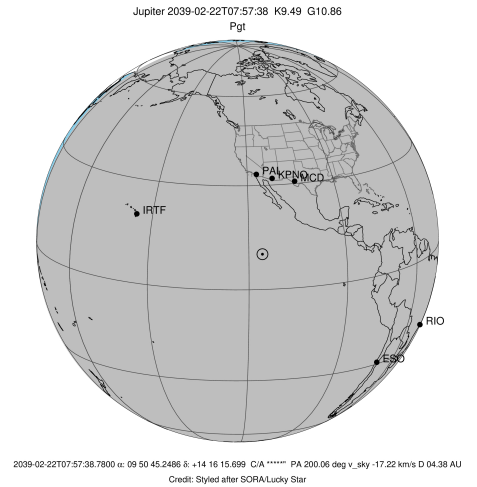


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2039-02-22T07:17:27.923	72.23	-67.82	71491.6	52.24	55.74
Jupiter	E	2039-02-22T08:36:15.322	63.62	-64.77	71491.6	56.71	59.99

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2039-02-22T07:56:08.370
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      : 616000225526042240
2Mass ID (if available) : 09504537+1416169
ICRS Star Coord at Epoch: 09h 50m 45.24862s +14:16:15.69866s
RUWE (>1.4 is poor) : 1.04
K magnitude          : 9.486
G magnitude          : 10.856
RP magnitude         : 10.371
BP magnitude         : 11.175
DUPflag             : 0
Distance (au)       : 4.382
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -17.22
Sun-Target sep (deg) : 171.93
Sun-Moon sep (deg)  : 176.28
B (ring opening deg) : -0.66
PA of pole (deg)    : 21.81
Pole direction: RA (deg): 268.05614
Dec (deg): 64.49697
C/A sky separation (" ) : 18.356
C/A sky separation (km) : 58333.1
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
    
```

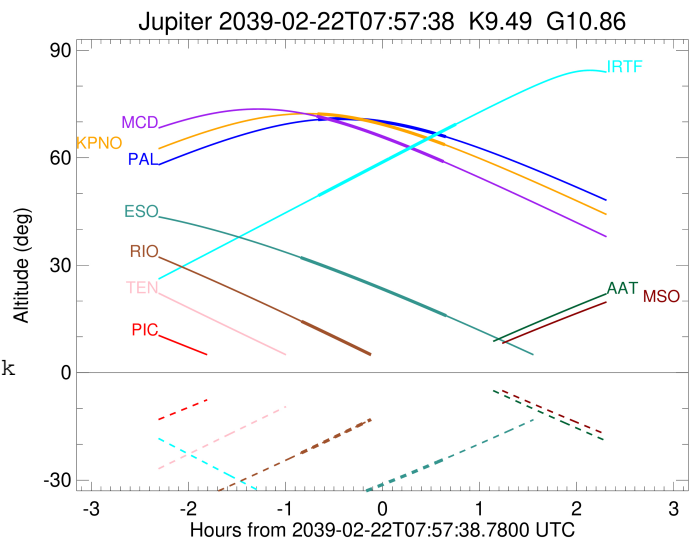
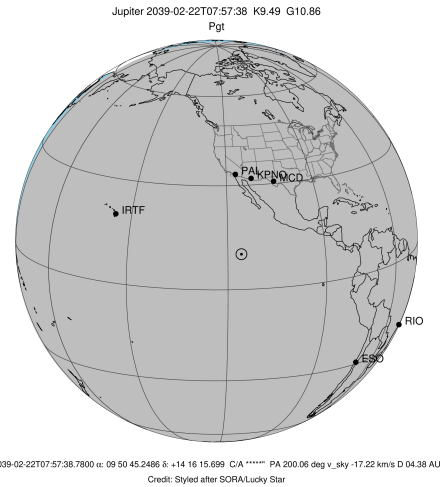


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2039-02-22T07:16:57.294	71.57	-69.64	71491.6	52.42	55.92
Jupiter	E	2039-02-22T08:35:23.529	58.89	-61.52	71491.6	56.95	60.21

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2039-02-22T08:00:32.320
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       : 616000225526042240
2Mass ID (if available) : 09504537+1416169
ICRS Star Coord at Epoch: 09h 50m 45.24862s +14:16:15.69866s
RUWE (>1.4 is poor) : 1.04
K magnitude           : 9.486
G magnitude           : 10.856
RP magnitude          : 10.371
BP magnitude          : 11.175
DUPflag              : 0
Distance (au)        : 4.382
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -17.22
Sun-Target sep (deg) : 171.93
Sun-Moon sep (deg)   : 176.24
B (ring opening deg) : -0.66
PA of pole (deg)     : 21.81
Pole direction: RA (deg): 268.05614
Dec (deg): 64.49697
C/A sky separation ("): 17.517
C/A sky separation (km): 55665.1
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
    
```

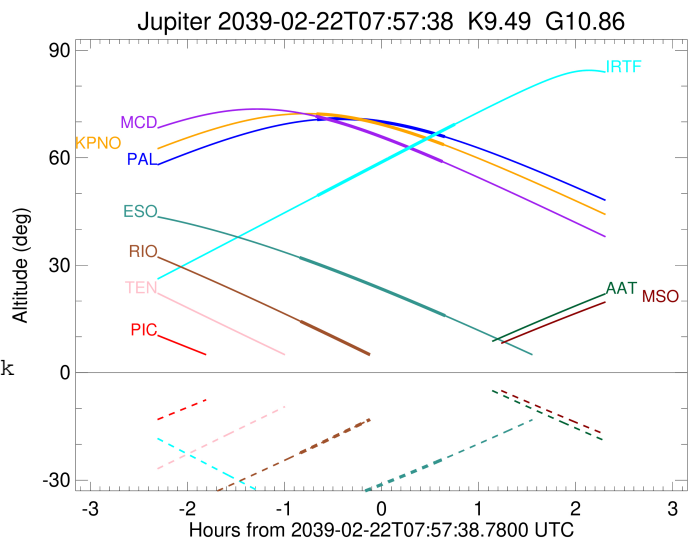
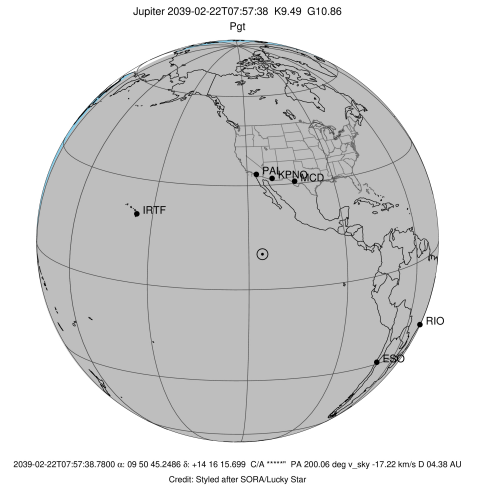


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2039-02-22T07:18:01.510	49.42	-41.59	71491.7	49.19	52.80
Jupiter	E	2039-02-22T08:42:58.670	69.34	-61.31	71491.6	53.17	56.63

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2039-02-22T07:51:07.670
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       : 616000225526042240
2Mass ID (if available) : 09504537+1416169
ICRS Star Coord at Epoch: 09h 50m 45.24862s +14:16:15.69866s
RUWE (>1.4 is poor) : 1.04
K magnitude           : 9.486
G magnitude           : 10.856
RP magnitude          : 10.371
BP magnitude          : 11.175
DUPflag              : 0
Distance (au)        : 4.382
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -17.22
Sun-Target sep (deg) : 171.93
Sun-Moon sep (deg)   : 176.95
B (ring opening deg) : -0.66
PA of pole (deg)     : 21.81
Pole direction: RA (deg): 268.05614
Dec (deg): 64.49697
C/A sky separation (") : 17.444
C/A sky separation (km) : 55433.0
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
    
```

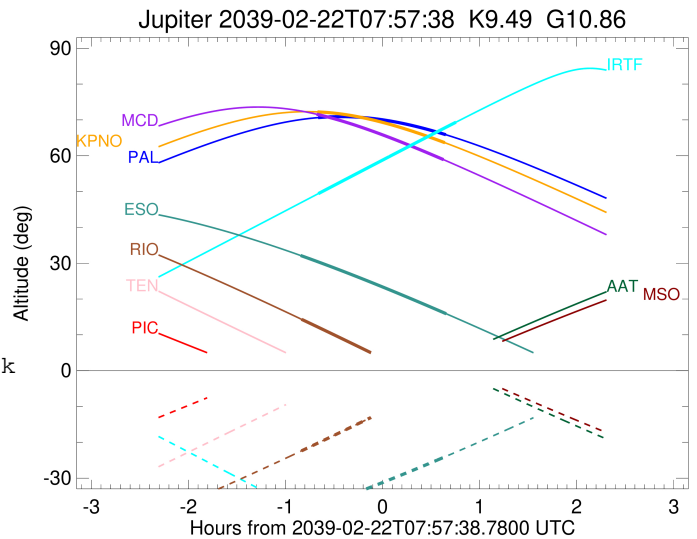
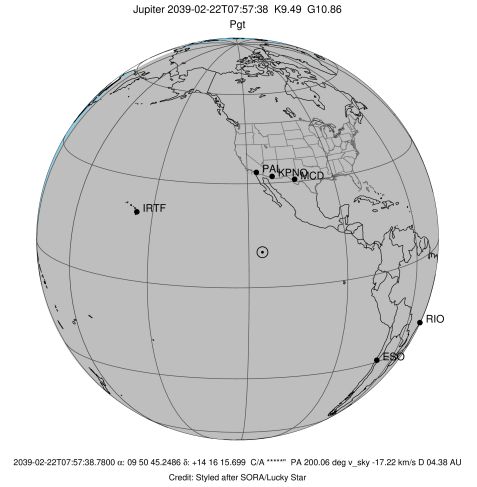


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2039-02-22T07:07:36.106	14.34	-22.38	71491.7	48.64	52.27
Jupiter	E	2039-02-22T08:34:51.478	-4.88x	-3.19x	71491.6	52.95	56.42

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2039-02-22T07:51:56.220
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       : 616000225526042240
2Mass ID (if available) : 09504537+1416169
ICRS Star Coord at Epoch: 09h 50m 45.24862s +14:16:15.69866s
RUWE (>1.4 is poor) : 1.04
K magnitude           : 9.486
G magnitude           : 10.856
RP magnitude         : 10.371
BP magnitude         : 11.175
DUPflag              : 0
Distance (au)        : 4.382
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -17.22
Sun-Target sep (deg) : 171.93
Sun-Moon sep (deg)   : 177.14
B (ring opening deg) : -0.66
PA of pole (deg)     : 21.81
Pole direction: RA (deg): 268.05614
Dec (deg): 64.49697
C/A sky separation ("): 16.941
C/A sky separation (km): 53836.3
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	2039-02-22T07:07:01.467	32.15	-39.62	71491.7	46.57	50.25
Jupiter	E	2039-02-22T08:37:01.383	15.88	-23.90	71491.6	51.10	54.65