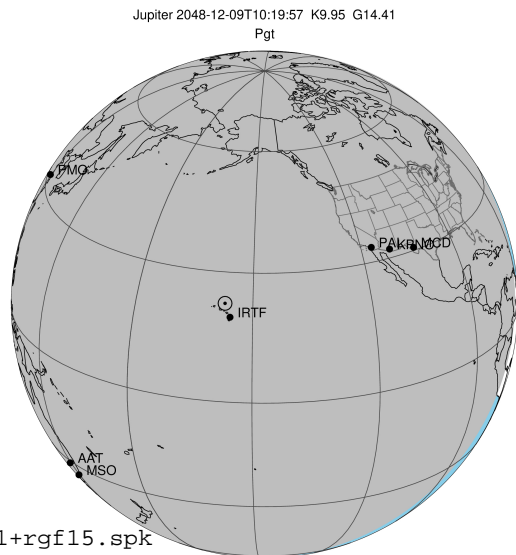


target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2048-12-09T10:19:57.990
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 3403570855469657216
 2Mass ID (if available) : 05435858+2256561

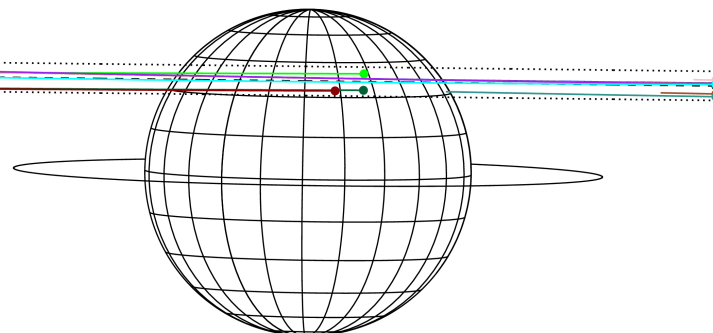
Jupiter 2048-12-09T10:19:57 K9.95 G14.41 Pgt

ICRS Star Coord at Epoch: 05h 43m 58.58394s +22:56:56.06025s

RUWE (>1.4 is poor) : 1.24
 K magnitude : 9.951
 G magnitude : 14.408
 RP magnitude : 13.238
 BP magnitude : 15.813
 DUPflag : 0
 Distance (au) : 4.128
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -16.63
 Sun-Target sep (deg) : 171.01
 Sun-Moon sep (deg) : 136.04
 B (ring opening deg) : 2.54
 PA of pole (deg) : -0.89
 Pole direction: RA (deg): 268.05737
 Dec (deg): 64.49721
 C/A sky separation (") : 13.386
 C/A sky separation (km) : 40075.4
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk



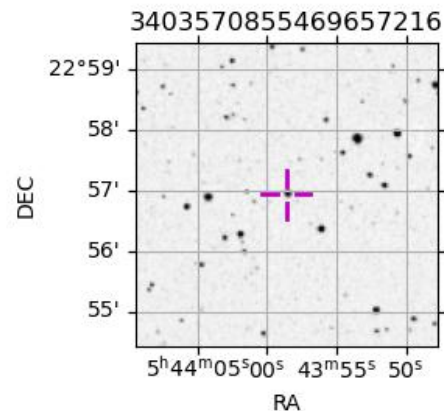
Earth
 PAL
 PMO
 KPNO
 MCD
 TEN
 IRTF
 KAV
 RIO
 ESO
 AAT
 MSO



2048-12-09T10:19:57.9900 a: 05 43 58.5839 s: +22 56 56.060 C/A ***** PA 179.31 deg v_sky -16.63 km/s D 04.13 AU
 Credit: Styled after SORA/Lucky Star

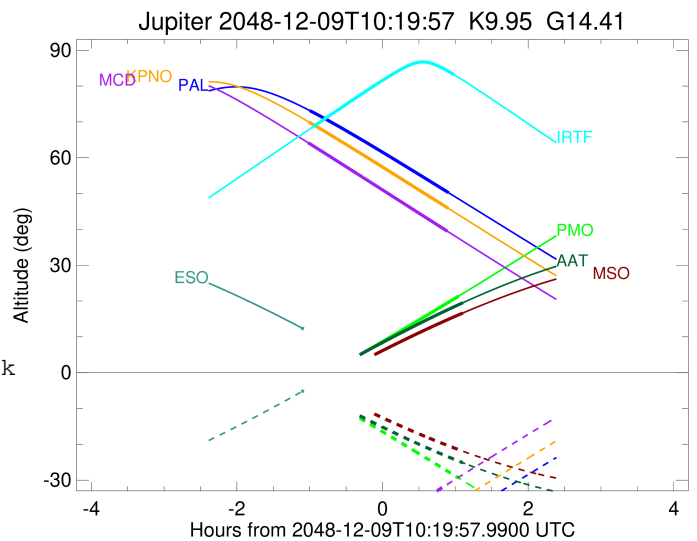
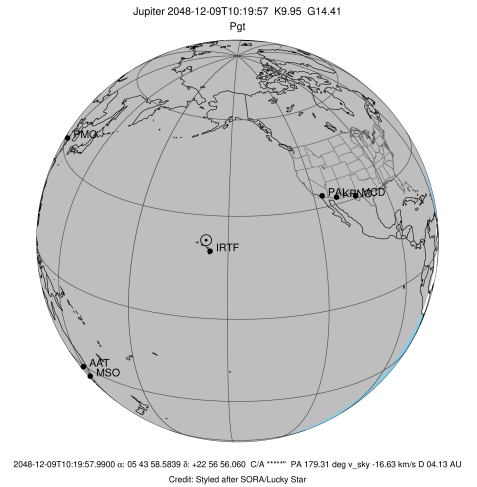
Observable events with sun below -5 deg and altitude above 5 deg

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	+ +	DEC 09 09:20 - DEC 09 11:14	Pie
PMO	Purple Mtn Obs. Nanking	32.1	118.8	+ +	DEC 09 11:22 - DEC 09 11:22	Pne
KPNO	Kitt Peak Natl Obs	32.0	248.4	+ +	DEC 09 09:19 - DEC 09 11:13	Pie
MCD	McDonald Obs. 2.7m	30.7	256.0	+ +	DEC 09 09:18 - DEC 09 11:13	Pie
TEN	Teide Obs./Tenerife	28.3	343.5			Pnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+ +	DEC 09 09:22 - DEC 09 11:18	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	+ +	DEC 09 09:13 - DEC 09 09:13	Pin
AAT	Siding Spring (AAT)	-31.3	149.1	+ +	DEC 09 11:26 - DEC 09 11:26	Pne
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8			Pnn
MSO	Mt. Stromlo Observatory	-35.3	149.0	+ +	DEC 09 11:26 - DEC 09 11:26	Pne



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2048-12-09T10:17:08.600
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       : 3403570855469657216
2Mass ID (if available) : 05435858+2256561
ICRS Star Coord at Epoch: 05h 43m 58.58394s +22:56:56.06025s
RUWE (>1.4 is poor) : 1.24
K magnitude          : 9.951
G magnitude          : 14.408
RP magnitude         : 13.238
BP magnitude         : 15.813
DUPflag             : 0
Distance (au)       : 4.128
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -16.63
Sun-Target sep (deg) : 171.01
Sun-Moon sep (deg)  : 136.36
B (ring opening deg) : 2.54
PA of pole (deg)    : -0.89
Pole direction: RA (deg): 268.05737
Dec (deg): 64.49721
C/A sky separation (") : 13.848
C/A sky separation (km) : 41458.6
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
    
```

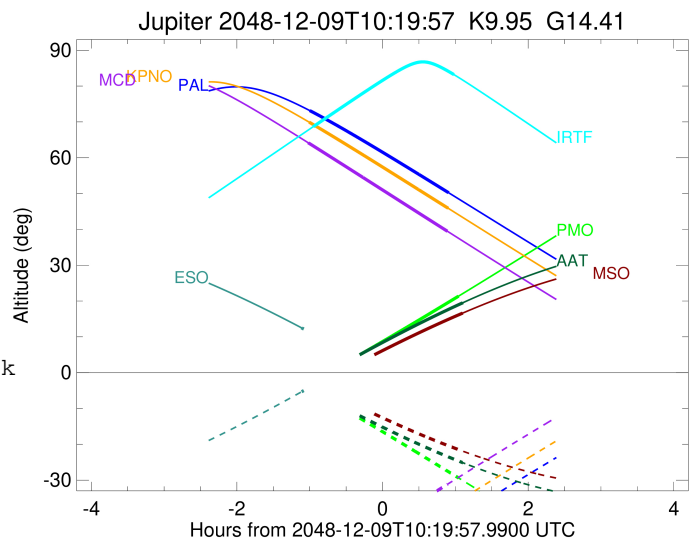
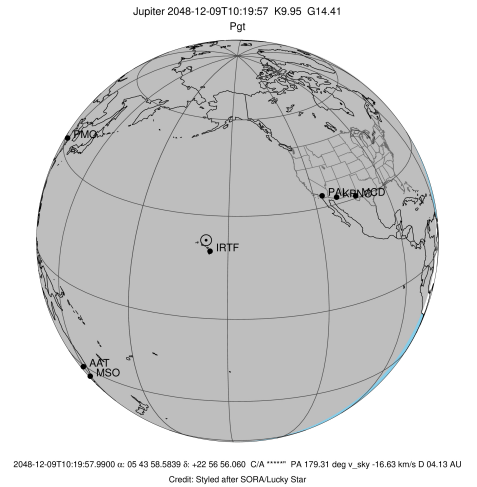


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2048-12-09T09:20:03.666	73.14	-65.70	71489.0	35.42	39.03
Jupiter	E	2048-12-09T11:14:22.657	50.24	-42.09	71489.0	35.51	39.12

```

target                : Jupiter
target radius (km)    : 71492.00
C/A epoch             : 2048-12-09T10:25:45.650
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        : 3403570855469657216
2Mass ID (if available) : 05435858+2256561
ICRS Star Coord at Epoch: 05h 43m 58.58394s +22:56:56.06025s
RUWE (>1.4 is poor)  : 1.24
K magnitude           : 9.951
G magnitude           : 14.408
RP magnitude          : 13.238
BP magnitude          : 15.813
DUPflag              : 0
Distance (au)         : 4.128
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s)  : -16.63
Sun-Target sep (deg)  : 171.01
Sun-Moon sep (deg)    : 136.79
B (ring opening deg)  : 2.54
PA of pole (deg)      : -0.89
Pole direction: RA (deg): 268.05737
Dec (deg): 64.49721
C/A sky separation (") : 14.466
C/A sky separation (km) : 43310.2
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
    
```

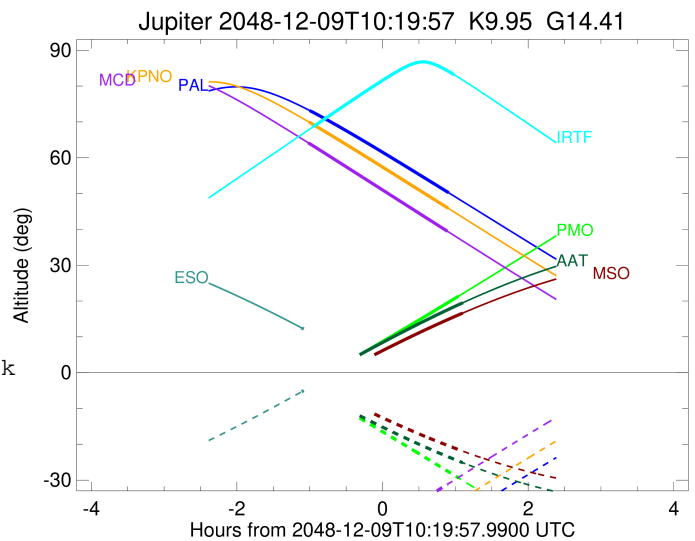
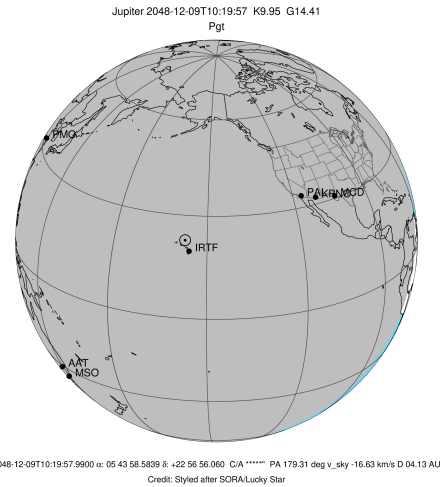


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2048-12-09T09:28:32.075	-1.25x	-6.21	71488.7	37.96	41.64
Jupiter	E	2048-12-09T11:22:37.920	21.35	-29.38	71488.9	36.52	40.17

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2048-12-09T10:16:39.490
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     : 3403570855469657216
2Mass ID (if available) : 05435858+2256561
ICRS Star Coord at Epoch: 05h 43m 58.58394s +22:56:56.06025s
RUWE (>1.4 is poor) : 1.24
K magnitude        : 9.951
G magnitude        : 14.408
RP magnitude       : 13.238
BP magnitude       : 15.813
DUPflag           : 0
Distance (au)     : 4.128
f0 (km)           : 0.00
g0 (km)           : 0.00
skyplane vel. (km/s) : -16.63
Sun-Target sep (deg) : 171.01
Sun-Moon sep (deg) : 136.28
B (ring opening deg) : 2.54
PA of pole (deg)  : -0.89
Pole direction: RA (deg): 268.05737
Dec (deg): 64.49721
C/A sky separation (") : 13.831
C/A sky separation (km) : 41408.5
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
    
```

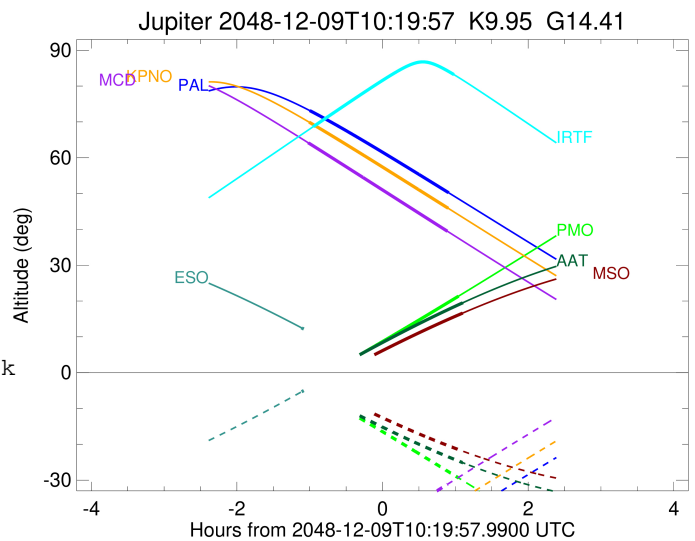
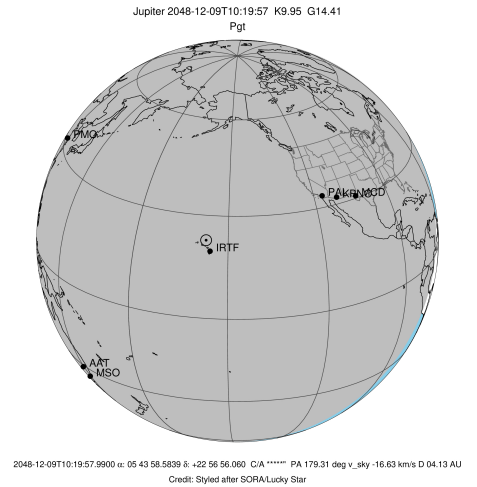


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2048-12-09T09:19:30.543	69.92	-61.87	71489.0	35.32	38.93
Jupiter	E	2048-12-09T11:13:59.288	45.91	-37.65	71489.0	35.50	39.11

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2048-12-09T10:16:00.890
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      : 3403570855469657216
2Mass ID (if available) : 05435858+2256561
ICRS Star Coord at Epoch: 05h 43m 58.58394s +22:56:56.06025s
RUWE (>1.4 is poor) : 1.24
K magnitude         : 9.951
G magnitude         : 14.408
RP magnitude        : 13.238
BP magnitude        : 15.813
DUPflag            : 0
Distance (au)       : 4.128
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -16.63
Sun-Target sep (deg) : 171.01
Sun-Moon sep (deg)  : 136.17
B (ring opening deg) : 2.54
PA of pole (deg)    : -0.89
Pole direction: RA (deg): 268.05737
Dec (deg): 64.49721
C/A sky separation (") : 13.842
C/A sky separation (km) : 41440.3
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
    
```

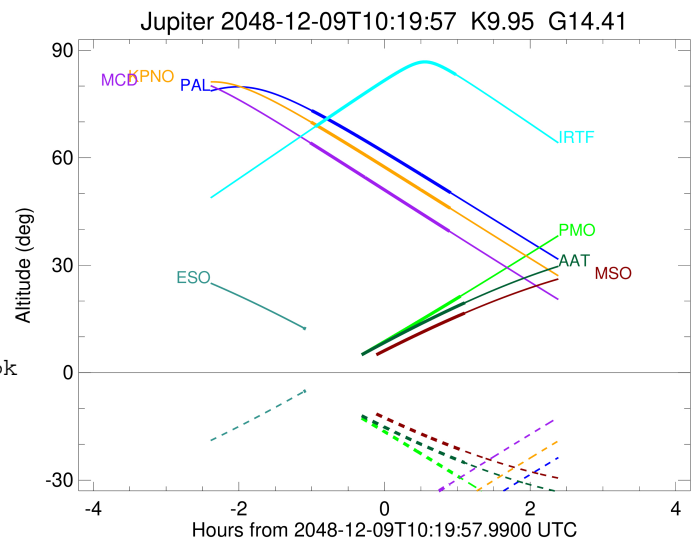
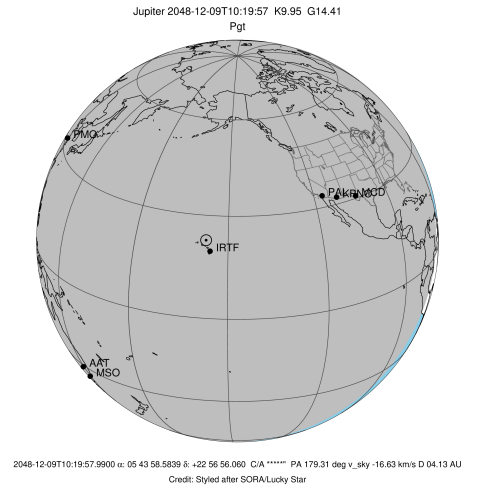


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2048-12-09T09:18:48.718	64.16	-55.74	71489.0	35.29	38.90
Jupiter	E	2048-12-09T11:13:26.221	39.47	-31.16	71489.0	35.59	39.20

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2048-12-09T10:20:52.920
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      : 3403570855469657216
2Mass ID (if available) : 05435858+2256561
ICRS Star Coord at Epoch: 05h 43m 58.58394s +22:56:56.06025s
RUWE (>1.4 is poor) : 1.24
K magnitude         : 9.951
G magnitude         : 14.408
RP magnitude        : 13.238
BP magnitude        : 15.813
DUPflag            : 0
Distance (au)       : 4.128
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -16.63
Sun-Target sep (deg) : 171.01
Sun-Moon sep (deg)  : 136.82
B (ring opening deg) : 2.54
PA of pole (deg)    : -0.89
Pole direction: RA (deg): 268.05737
Dec (deg): 64.49721
C/A sky separation (") : 13.274
C/A sky separation (km) : 39741.8
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
    
```

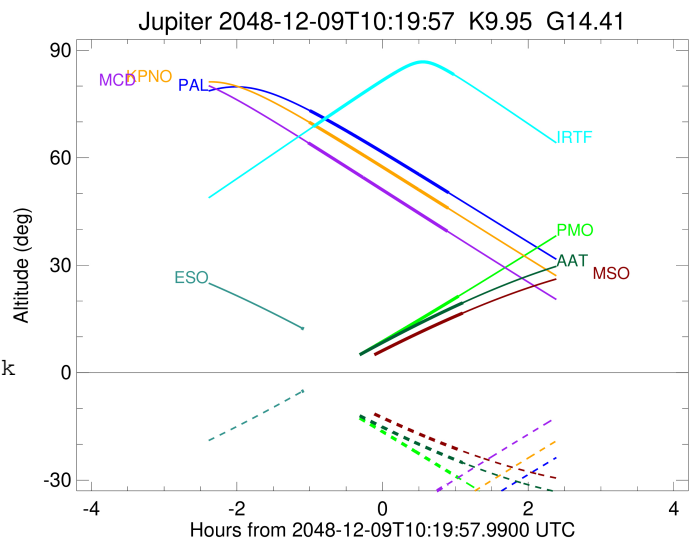
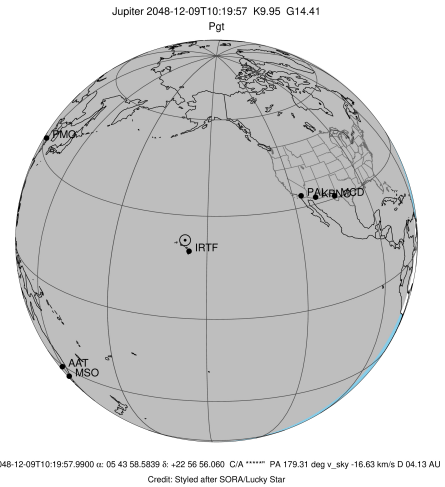


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2048-12-09T09:22:51.307	68.66	-77.61	71489.2	34.10	37.66
Jupiter	E	2048-12-09T11:18:50.556	83.19	-74.65	71489.3	33.52	37.06

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2048-12-09T10:14:15.940
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     : 3403570855469657216
2Mass ID (if available) : 05435858+2256561
ICRS Star Coord at Epoch: 05h 43m 58.58394s +22:56:56.06025s
RUWE (>1.4 is poor) : 1.24
K magnitude         : 9.951
G magnitude         : 14.408
RP magnitude        : 13.238
BP magnitude        : 15.813
DUPflag            : 0
Distance (au)      : 4.128
f0 (km)            : 0.00
g0 (km)            : 0.00
skyplane vel. (km/s) : -16.63
Sun-Target sep (deg) : 171.01
Sun-Moon sep (deg) : 135.41
B (ring opening deg) : 2.54
PA of pole (deg)   : -0.89
Pole direction: RA (deg): 268.05737
Dec (deg): 64.49721
C/A sky separation (" ) : 12.232
C/A sky separation (km) : 36621.5
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
    
```

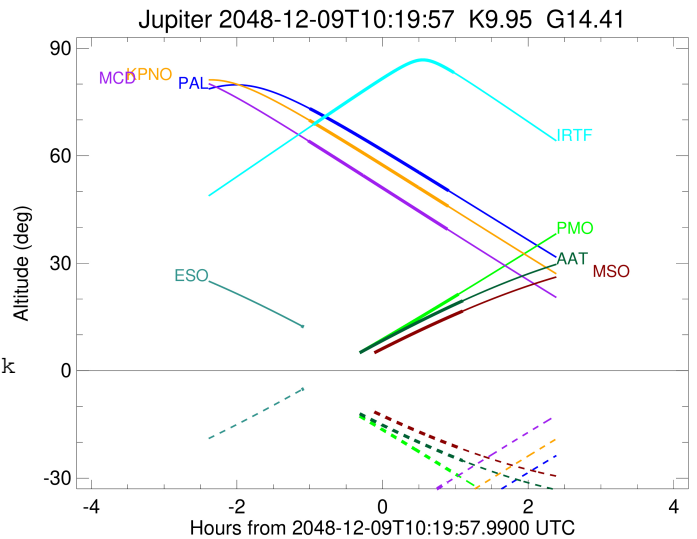
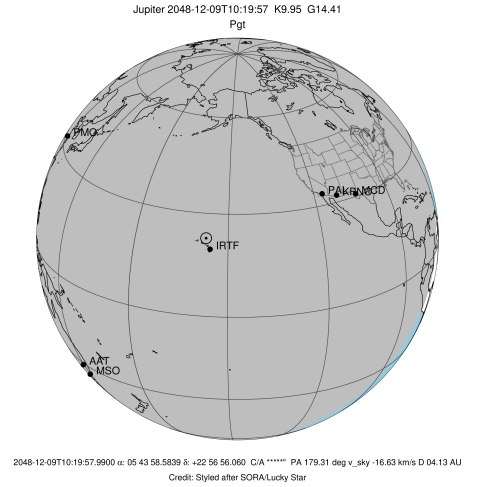


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2048-12-09T09:13:20.308	12.50	-5.33	71489.7	30.49	33.88
Jupiter	E	2048-12-09T11:15:34.072	-11.21x	19.25x	71489.6	31.12	34.55


```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2048-12-09T10:25:08.600
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      : 3403570855469657216
2Mass ID (if available) : 05435858+2256561
ICRS Star Coord at Epoch: 05h 43m 58.58394s +22:56:56.06025s
RUWE (>1.4 is poor) : 1.24
K magnitude          : 9.951
G magnitude          : 14.408
RP magnitude         : 13.238
BP magnitude         : 15.813
DUPflag             : 0
Distance (au)       : 4.128
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.63
Sun-Target sep (deg) : 171.01
Sun-Moon sep (deg)  : 136.66
B (ring opening deg) : 2.54
PA of pole (deg)    : -0.89
Pole direction: RA (deg): 268.05737
Dec (deg): 64.49721
C/A sky separation ("): 12.056
C/A sky separation (km): 36095.4
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
    
```

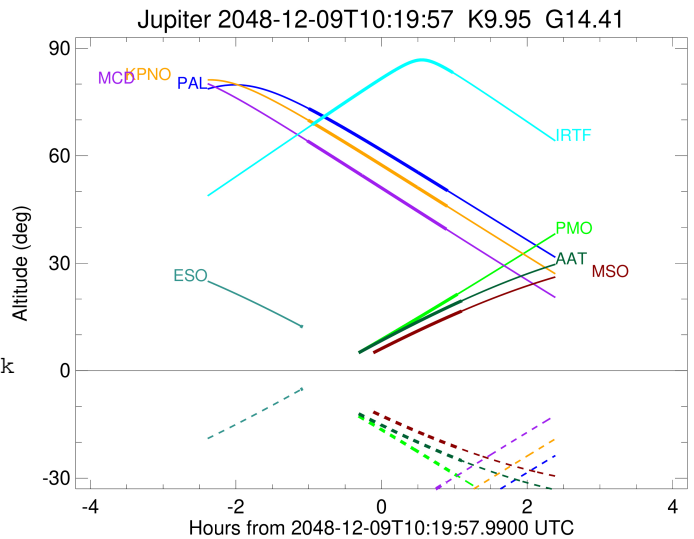
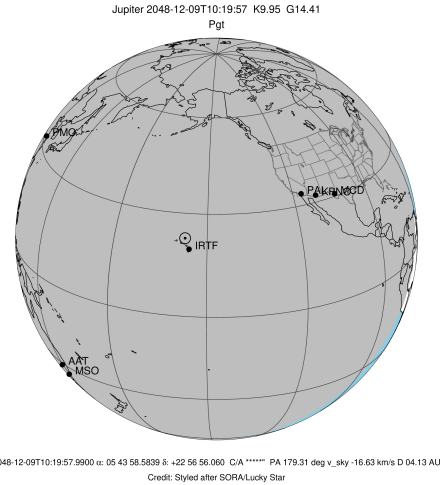


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2048-12-09T09:23:49.372	-2.07x	-5.37	71489.7	30.99	34.41
Jupiter	E	2048-12-09T11:26:06.189	19.50	-25.13	71489.8	29.66	33.01


```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2048-12-09T10:24:54.940
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        : 3403570855469657216
2Mass ID (if available) : 05435858+2256561
ICRS Star Coord at Epoch: 05h 43m 58.58394s +22:56:56.06025s
RUWE (>1.4 is poor) : 1.24
K magnitude           : 9.951
G magnitude           : 14.408
RP magnitude          : 13.238
BP magnitude          : 15.813
DUPflag              : 0
Distance (au)         : 4.128
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.63
Sun-Target sep (deg)  : 171.01
Sun-Moon sep (deg)   : 136.61
B (ring opening deg) : 2.54
PA of pole (deg)     : -0.89
Pole direction: RA (deg): 268.05737
Dec (deg): 64.49721
C/A sky separation (" ) : 11.957
C/A sky separation (km) : 35797.0
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	2048-12-09T09:23:23.764	-3.94x	-3.18x	71489.7	30.69	34.10
Jupiter	E	2048-12-09T11:26:05.254	16.63	-21.91	71489.9	29.40	32.74