

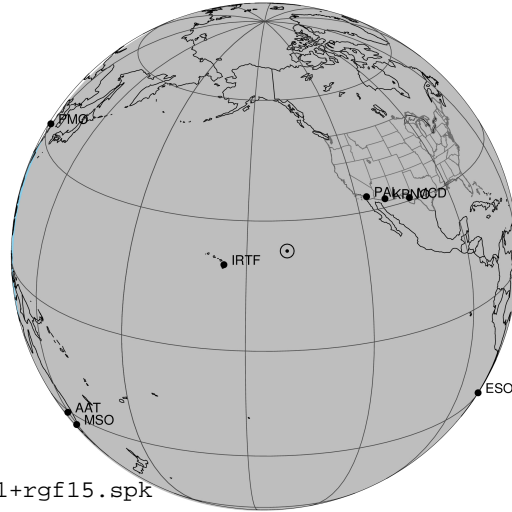
target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2024-12-12T09:14:09.380
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 3412376259980251904
 2Mass ID (if available) : 04562605+2158227

Jupiter 2024-12-12T09:14:09 K9.97 G12.83 Pgt

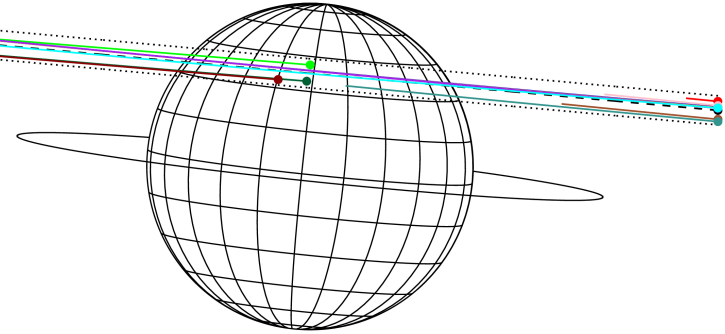
ICRS Star Coord at Epoch: 04h 56m 26.06291s +21:58:22.72094s

RUWE (>1.4 is poor) : 1.25
 K magnitude : 9.966
 G magnitude : 12.835
 RP magnitude : 11.995
 BP magnitude : 13.575
 DUPflag : 0
 Distance (au) : 4.095
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -16.72
 Sun-Target sep (deg) : 174.75
 Sun-Moon sep (deg) : 35.34
 B (ring opening deg) : 2.85
 PA of pole (deg) : -5.97
 Pole direction: RA (deg): 268.05784
 Dec (deg): 64.49672
 C/A sky separation (") : 13.683
 C/A sky separation (km) : 40638.8
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk

Jupiter 2024-12-12T09:14:09 K9.97 G12.83
 Pgt



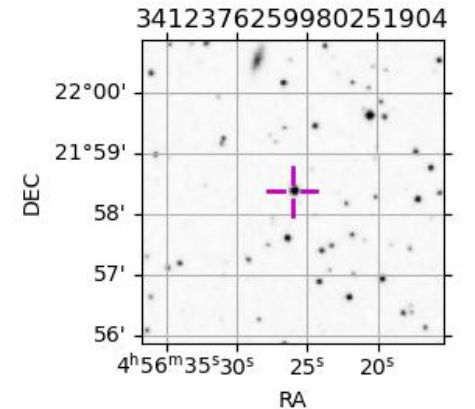
Earth
 PIC
 PAL
 PMO
 KPNO
 MCD
 TEN
 IRTF
 RIO
 ESO
 AAT
 MSO



2024-12-12T09:14:09.3800 a: 04 56 26.0629 s: +21 58 22.721 C/A ***** PA 174.81 deg v_sky -16.72 km/s D 04.10 AU
 Credit: Styled after SORA/Lucky Star

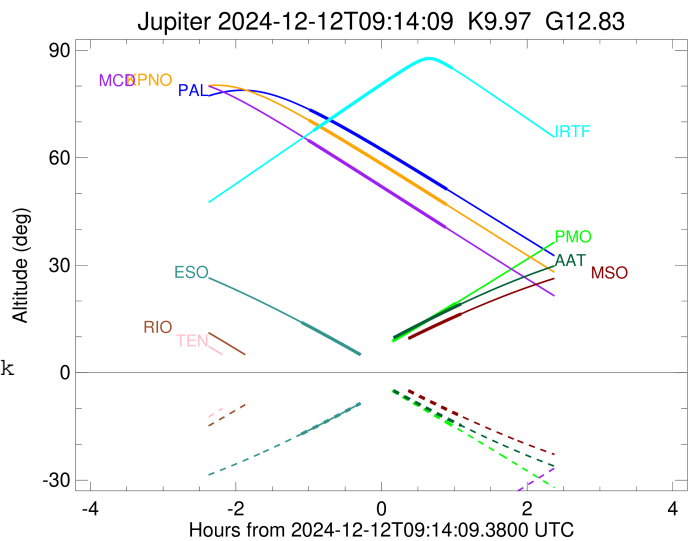
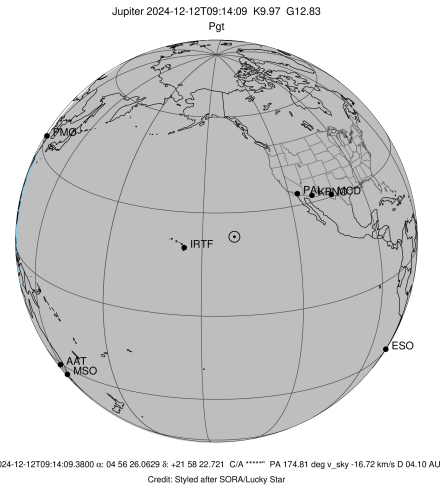
Observable events with sun below -5 deg and altitude above 5 deg

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 12 08:14 - DEC 12 10:08	Pie
PMO	Purple Mtn Obs. Nanking	32.1	118.8	+ +	DEC 12 10:15 - DEC 12 10:15	Pne
KPNO	Kitt Peak Natl Obs	32.0	248.4	+ +	DEC 12 08:14 - DEC 12 10:07	Pie
MCD	McDonald Obs. 2.7m	30.7	256.0	+ +	DEC 12 08:13 - DEC 12 10:07	Pie
TEN	Teide Obs./Tenerife	28.3	343.5			Pnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+ +	DEC 12 08:18 - DEC 12 10:12	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 12 08:08 - DEC 12 08:08	Pin
AAT	Siding Spring (AAT)	-31.3	149.1	+ +	DEC 12 10:19 - DEC 12 10:19	Pne
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8			Pnn
MSO	Mt. Stromlo Observatory	-35.3	149.0	+ +	DEC 12 10:19 - DEC 12 10:19	Pne



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2024-12-12T09:11:26.490
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        : 3412376259980251904
2Mass ID (if available) : 04562605+2158227
ICRS Star Coord at Epoch: 04h 56m 26.06291s +21:58:22.72094s
RUWE (>1.4 is poor) : 1.25
K magnitude           : 9.966
G magnitude           : 12.835
RP magnitude          : 11.995
BP magnitude          : 13.575
DUPflag              : 0
Distance (au)         : 4.095
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.72
Sun-Target sep (deg) : 174.75
Sun-Moon sep (deg)   : 36.18
B (ring opening deg) : 2.85
PA of pole (deg)     : -5.97
Pole direction: RA (deg): 268.05784
Dec (deg): 64.49672
C/A sky separation ("): 14.102
C/A sky separation (km): 41882.1
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
    
```

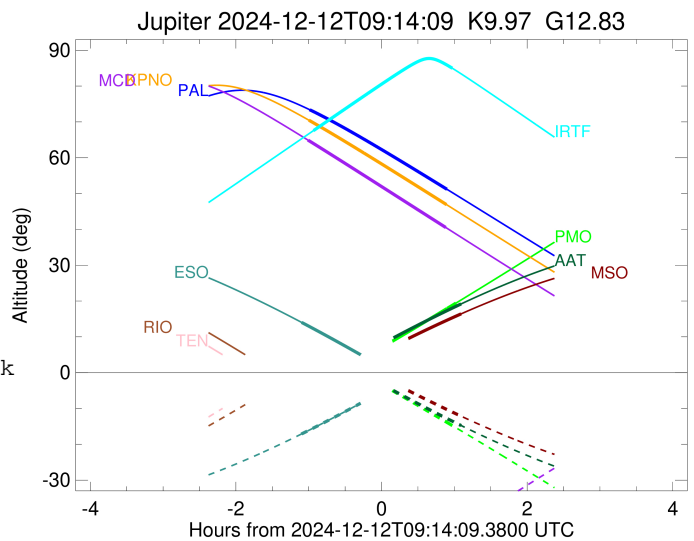
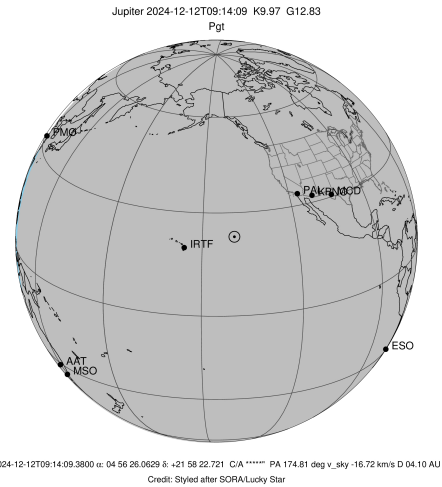


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2024-12-12T08:14:58.705	73.39	-77.51	71488.0	36.52	40.16
Jupiter	E	2024-12-12T10:08:03.152	51.19	-56.34	71488.3	35.22	38.83

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2024-12-12T09:19:36.620
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       : 3412376259980251904
2Mass ID (if available) : 04562605+2158227
ICRS Star Coord at Epoch: 04h 56m 26.06291s +21:58:22.72094s
RUWE (>1.4 is poor) : 1.25
K magnitude           : 9.966
G magnitude           : 12.835
RP magnitude         : 11.995
BP magnitude         : 13.575
DUPflag              : 0
Distance (au)        : 4.095
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.72
Sun-Target sep (deg) : 174.75
Sun-Moon sep (deg)   : 34.72
B (ring opening deg) : 2.85
PA of pole (deg)     : -5.97
Pole direction: RA (deg): 268.05784
Dec (deg): 64.49672
C/A sky separation (") : 14.940
C/A sky separation (km) : 44371.9
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
    
```

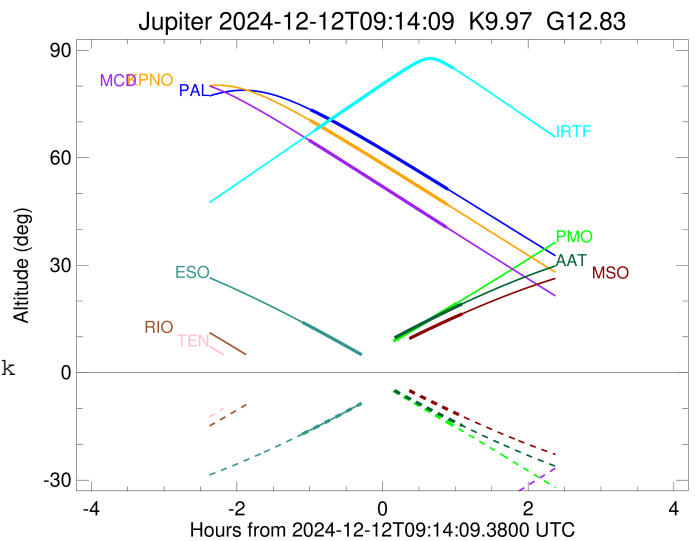
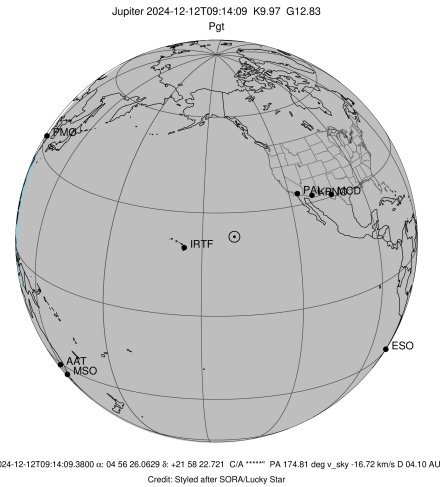


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2024-12-12T08:23:25.895	-2.80x	6.17x	71487.5	39.56	43.26
Jupiter	E	2024-12-12T10:15:28.081	19.40	-15.36	71487.9	37.03	40.68

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2024-12-12T09:10:57.540
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        : 3412376259980251904
2Mass ID (if available) : 04562605+2158227
ICRS Star Coord at Epoch: 04h 56m 26.06291s +21:58:22.72094s
RUWE (>1.4 is poor)  : 1.25
K magnitude           : 9.966
G magnitude           : 12.835
RP magnitude          : 11.995
BP magnitude          : 13.575
DUPflag              : 0
Distance (au)         : 4.095
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.72
Sun-Target sep (deg)  : 174.75
Sun-Moon sep (deg)    : 36.22
B (ring opening deg)  : 2.85
PA of pole (deg)      : -5.97
Pole direction: RA (deg): 268.05784
Dec (deg): 64.49672
C/A sky separation (") : 14.070
C/A sky separation (km) : 41787.0
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
    
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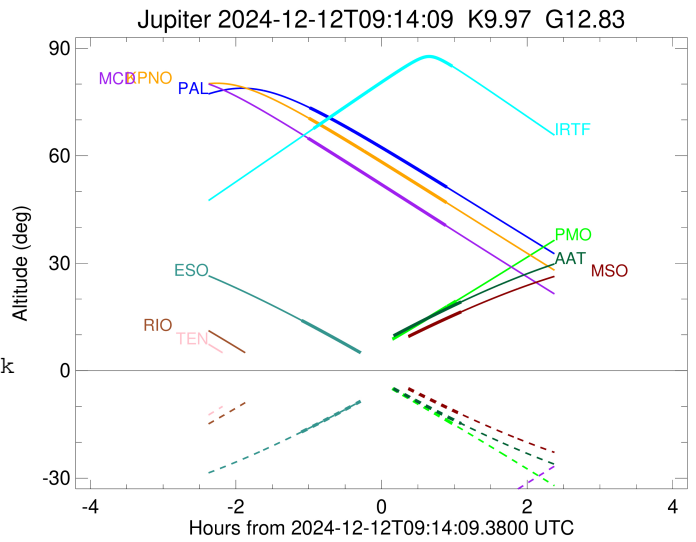
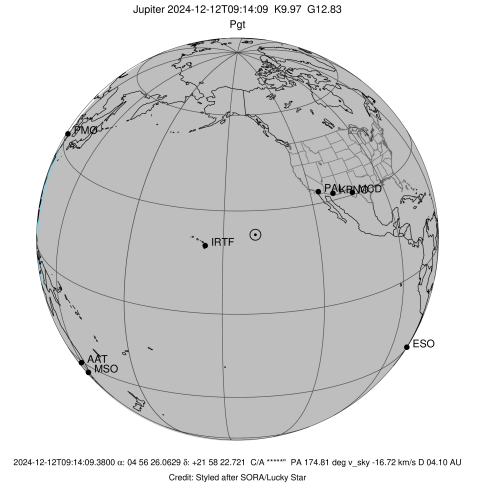


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2024-12-12T08:14:24.290	70.45	-75.21	71488.1	36.38	40.02
Jupiter	E	2024-12-12T10:07:41.381	46.91	-52.11	71488.3	35.17	38.78

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2024-12-12T09:10:18.380
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      : 3412376259980251904
2Mass ID (if available) : 04562605+2158227
ICRS Star Coord at Epoch: 04h 56m 26.06291s +21:58:22.72094s
RUWE (>1.4 is poor) : 1.25
K magnitude          : 9.966
G magnitude          : 12.835
RP magnitude         : 11.995
BP magnitude         : 13.575
DUPflag             : 0
Distance (au)       : 4.095
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.72
Sun-Target sep (deg) : 174.75
Sun-Moon sep (deg)  : 36.26
B (ring opening deg) : 2.85
PA of pole (deg)    : -5.97
Pole direction: RA (deg): 268.05784
Dec (deg): 64.49672
C/A sky separation (") : 14.060
C/A sky separation (km) : 41756.6
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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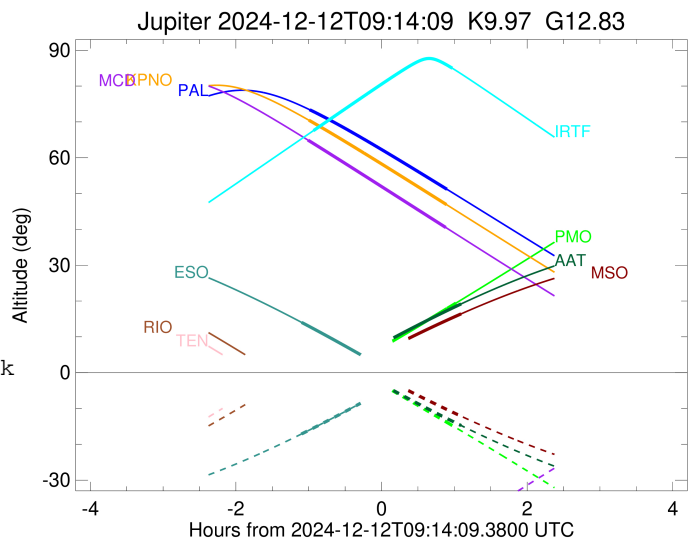
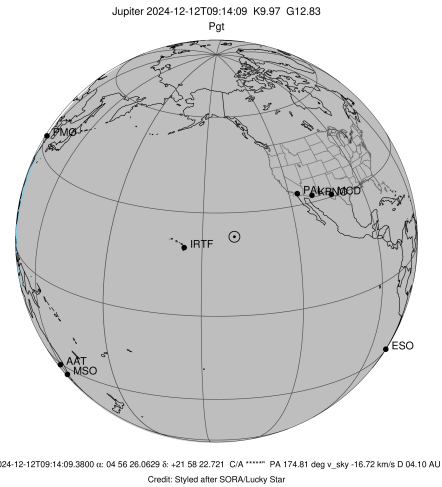


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2024-12-12T08:13:39.991	64.89	-69.96	71488.1	36.29	39.92
Jupiter	E	2024-12-12T10:07:09.697	40.51	-45.74	71488.3	35.21	38.81

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2024-12-12T09:15:19.190
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        : 3412376259980251904
2Mass ID (if available) : 04562605+2158227
ICRS Star Coord at Epoch: 04h 56m 26.06291s +21:58:22.72094s
RUWE (>1.4 is poor) : 1.25
K magnitude           : 9.966
G magnitude           : 12.835
RP magnitude          : 11.995
BP magnitude          : 13.575
DUPflag              : 0
Distance (au)         : 4.095
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.72
Sun-Target sep (deg) : 174.75
Sun-Moon sep (deg)   : 35.78
B (ring opening deg) : 2.85
PA of pole (deg)     : -5.97
Pole direction: RA (deg): 268.05784
Dec (deg): 64.49672
C/A sky separation (") : 13.637
C/A sky separation (km) : 40501.9
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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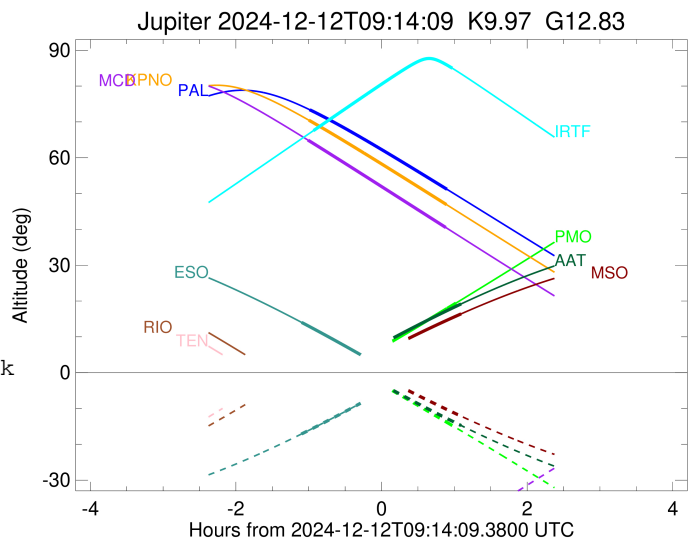
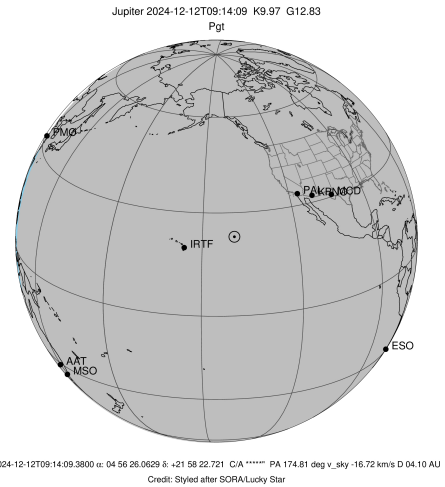


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2024-12-12T08:18:03.915	67.56	-62.44	71488.2	35.52	39.13
Jupiter	E	2024-12-12T10:12:30.434	84.97	-86.49	71488.6	33.54	37.08

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2024-12-12T09:08:51.650
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       : 3412376259980251904
2Mass ID (if available) : 04562605+2158227
ICRS Star Coord at Epoch: 04h 56m 26.06291s +21:58:22.72094s
RUWE (>1.4 is poor) : 1.25
K magnitude          : 9.966
G magnitude          : 12.835
RP magnitude         : 11.995
BP magnitude         : 13.575
DUPflag             : 0
Distance (au)        : 4.095
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.72
Sun-Target sep (deg) : 174.75
Sun-Moon sep (deg)  : 36.04
B (ring opening deg) : 2.85
PA of pole (deg)    : -5.97
Pole direction: RA (deg): 268.05784
Dec (deg): 64.49672
C/A sky separation (") : 12.363
C/A sky separation (km) : 36718.4
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
    
```

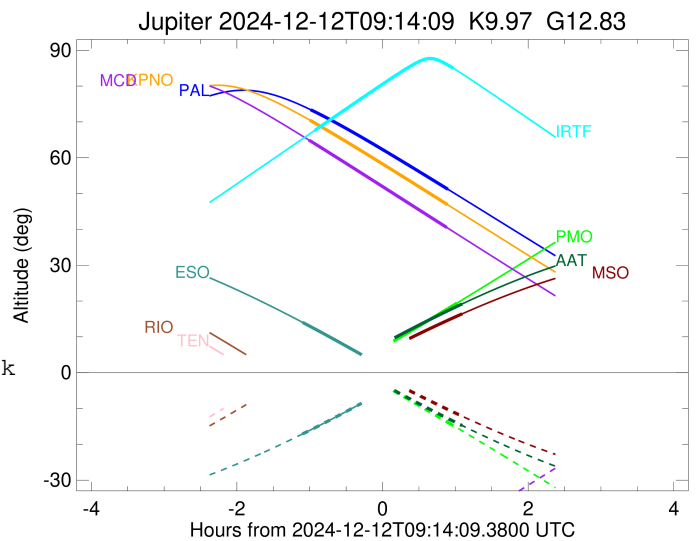
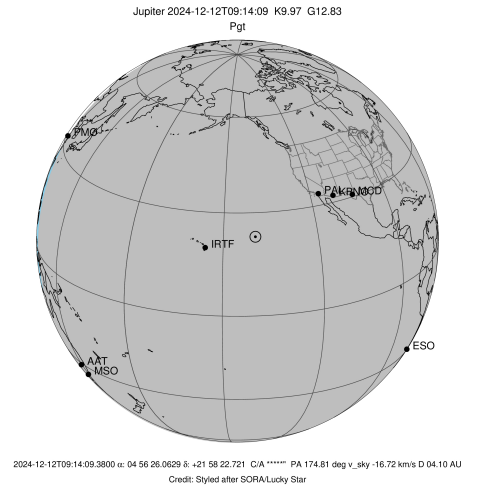


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2024-12-12T08:08:23.599	14.02	-17.09	71489.0	31.22	34.66
Jupiter	E	2024-12-12T10:09:42.444	-9.53x	5.51x	71489.1	30.58	33.98

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2024-12-12T09:19:41.750
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       : 3412376259980251904
2Mass ID (if available) : 04562605+2158227
ICRS Star Coord at Epoch: 04h 56m 26.06291s +21:58:22.72094s
RUWE (>1.4 is poor) : 1.25
K magnitude           : 9.966
G magnitude           : 12.835
RP magnitude          : 11.995
BP magnitude          : 13.575
DUPflag              : 0
Distance (au)         : 4.095
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.72
Sun-Target sep (deg)  : 174.75
Sun-Moon sep (deg)   : 34.78
B (ring opening deg) : 2.85
PA of pole (deg)     : -5.97
Pole direction: RA (deg): 268.05784
Dec (deg): 64.49672
C/A sky separation (") : 12.503
C/A sky separation (km) : 37134.7
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
    
```

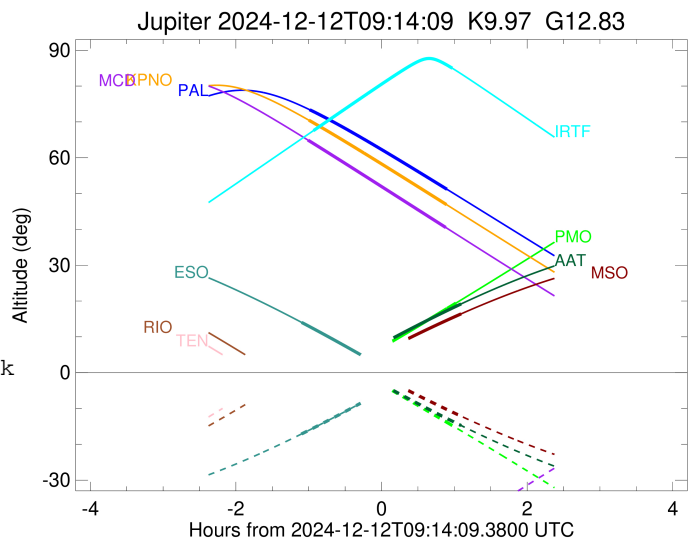
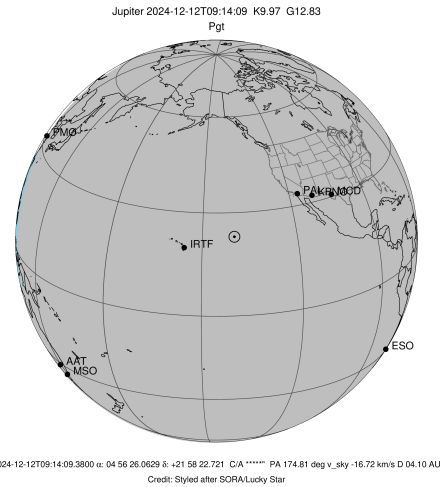


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2024-12-12T08:19:13.766	-2.48x	7.39x	71488.8	32.54	36.04
Jupiter	E	2024-12-12T10:19:49.454	19.20	-14.77	71489.2	29.99	33.36


```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2024-12-12T09:19:29.380
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        : 3412376259980251904
2Mass ID (if available) : 04562605+2158227
ICRS Star Coord at Epoch: 04h 56m 26.06291s +21:58:22.72094s
RUWE (>1.4 is poor) : 1.25
K magnitude           : 9.966
G magnitude           : 12.835
RP magnitude          : 11.995
BP magnitude          : 13.575
DUPflag              : 0
Distance (au)         : 4.095
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.72
Sun-Target sep (deg)  : 174.75
Sun-Moon sep (deg)    : 34.79
B (ring opening deg) : 2.85
PA of pole (deg)      : -5.97
Pole direction: RA (deg): 268.05784
Dec (deg): 64.49672
C/A sky separation (") : 12.395
C/A sky separation (km) : 36813.3
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	2024-12-12T08:18:48.534	-4.26x	9.05x	71488.8	32.22	35.71
Jupiter	E	2024-12-12T10:19:50.728	16.42	-12.16	71489.3	29.72	33.07