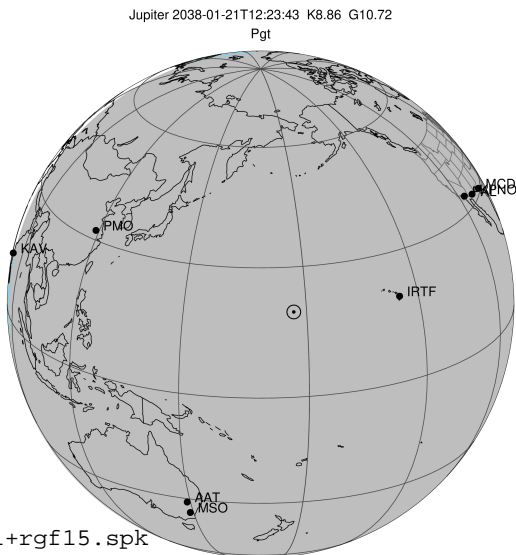


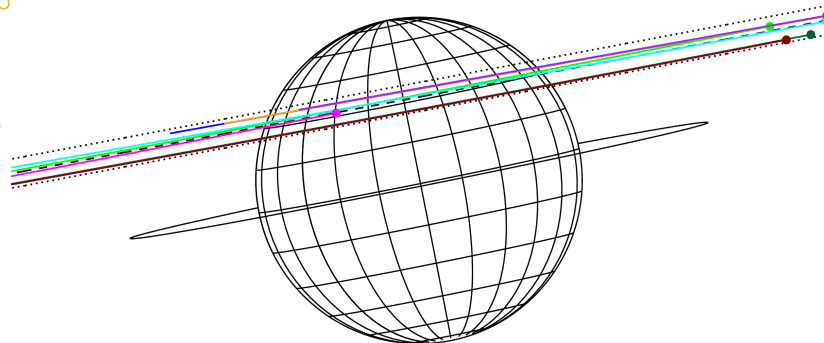
target : Jupiter  
 target radius (km) : 71492.00  
 C/A epoch : 2038-01-21T12:23:43.940  
 Event type : Pgt  
 : Jupiter occs: geocentric, topocentric  
 : Not a ringed target  
 Gaia source ID : 673283956700242176  
 2Mass ID (if available) : 07405708+2149046

Jupiter 2038-01-21T12:23:43 K8.86 G10.72 Pgt

ICRS Star Coord at Epoch: 07h 40m 57.12856s +21:49:04.06212s  
 RUWE (>1.4 is poor) : 1.09  
 K magnitude : 8.858  
 G magnitude : 10.716  
 RP magnitude : 10.111  
 BP magnitude : 11.156  
 DUPflag : 0  
 Distance (au) : 4.259  
 f0 (km) : 0.00  
 g0 (km) : 0.00  
 skyplane vel. (km/s) : -17.02  
 Sun-Target sep (deg) : 172.28  
 Sun-Moon sep (deg) : 12.31  
 B (ring opening deg) : 1.15  
 PA of pole (deg) : 11.35  
 Pole direction: RA (deg): 268.05621  
 Dec (deg): 64.49690  
 C/A sky separation (") : 11.636  
 C/A sky separation (km) : 35939.4  
 NAIF SPICE kernels : RAJobs\_U111+rgf15.spk



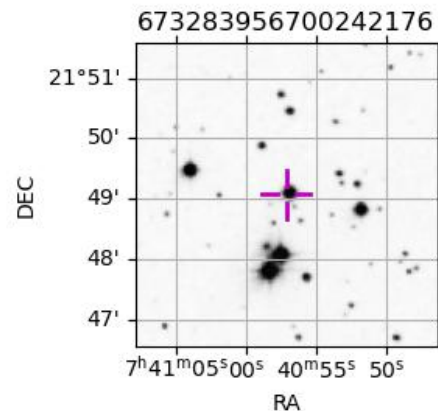
Earth  
 PAL  
 PMO  
 KPNO  
 MCD  
 IRTF  
 KAV  
 AAT  
 MSO



2038-01-21T12:23:43.9400 a: 07 40 57.1286 s: +21 49 04.062 C/A \*\*\*\*\* PA 190.64 deg v\_sky -17.02 km/s D 04.26 AU  
 Credit: Styled after SORA/Lucky Star

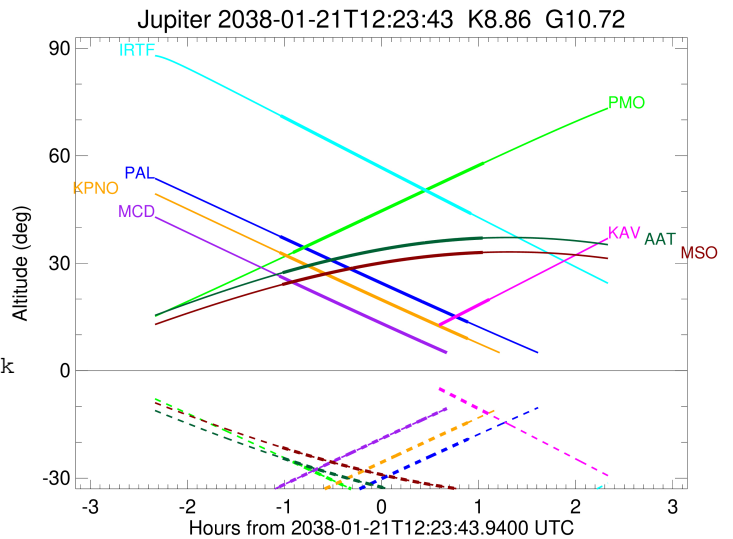
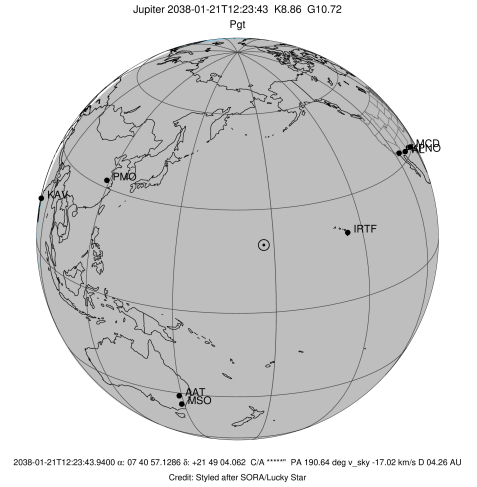
Observable events with sun below -5 deg and altitude above 5 deg

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	+ +	JAN 21 11:21 - JAN 21 13:17	Pie
PMO	Purple Mtn Obs. Nanking	32.1	118.8	+ +	JAN 21 11:29 - JAN 21 13:26	Pie
KPNO	Kitt Peak Natl Obs	32.0	248.4	+ +	JAN 21 11:20 - JAN 21 13:17	Pie
MCD	McDonald Obs. 2.7m	30.7	256.0	+	JAN 21 11:20 - JAN 21 11:20	Pin
TEN	Teide Obs./Tenerife	28.3	343.5			Pnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+ +	JAN 21 11:21 - JAN 21 13:19	Pie
KAV	Kavalur Observatory	12.6	78.8	+	JAN 21 13:30 - JAN 21 13:30	Pne
RIO	Rio de Janeiro	-22.9	316.8			Pnn
ESO	European Southern Obs. (3.6m)	-29.3	289.3			Pnn
AAT	Siding Spring (AAT)	-31.3	149.1	+ +	JAN 21 11:22 - JAN 21 13:26	Pie
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8			Pnn
MSO	Mt. Stromlo Observatory	-35.3	149.0	+ +	JAN 21 11:22 - JAN 21 13:26	Pie



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2038-01-21T12:18:57.730
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      : 673283956700242176
2Mass ID (if available) : 07405708+2149046
ICRS Star Coord at Epoch: 07h 40m 57.12856s +21:49:04.06212s
RUWE (>1.4 is poor) : 1.09
K magnitude         : 8.858
G magnitude         : 10.716
RP magnitude        : 10.111
BP magnitude        : 11.156
DUPflag            : 0
Distance (au)       : 4.259
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -17.02
Sun-Target sep (deg) : 172.28
Sun-Moon sep (deg)  : 11.66
B (ring opening deg) : 1.15
PA of pole (deg)    : 11.35
Pole direction: RA (deg): 268.05621
Dec (deg): 64.49690
C/A sky separation (") : 12.795
C/A sky separation (km) : 39518.4
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
    
```

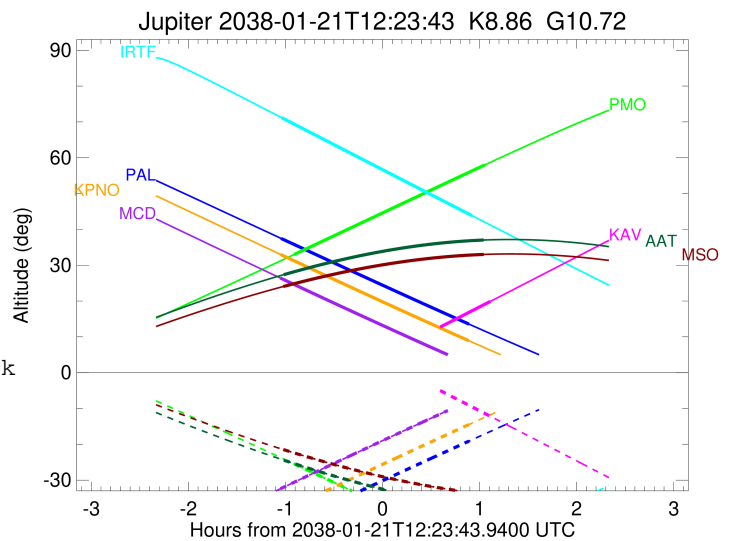
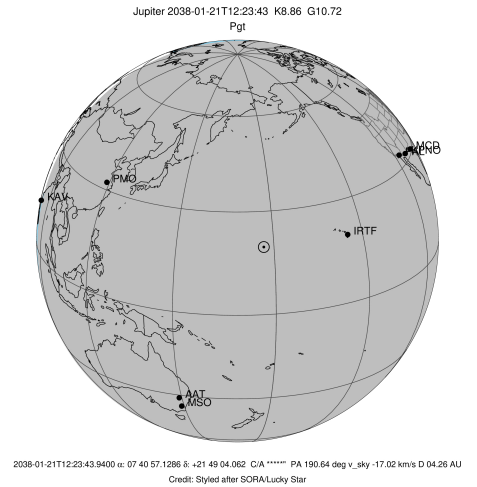


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2038-01-21T11:21:05.019	37.46	-43.26	71491.5	32.32	35.81
Jupiter	E	2038-01-21T13:17:10.678	13.55	-19.11	71491.4	34.76	38.35

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2038-01-21T12:28:06.890
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       : 673283956700242176
2Mass ID (if available) : 07405708+2149046
ICRS Star Coord at Epoch: 07h 40m 57.12856s +21:49:04.06212s
RUWE (>1.4 is poor) : 1.09
K magnitude           : 8.858
G magnitude           : 10.716
RP magnitude         : 10.111
BP magnitude         : 11.156
DUPflag              : 0
Distance (au)        : 4.259
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -17.02
Sun-Target sep (deg) : 172.28
Sun-Moon sep (deg)   : 13.11
B (ring opening deg) : 1.15
PA of pole (deg)     : 11.35
Pole direction: RA (deg): 268.05621
Dec (deg): 64.49690
C/A sky separation (") : 11.964
C/A sky separation (km) : 36952.2
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
    
```

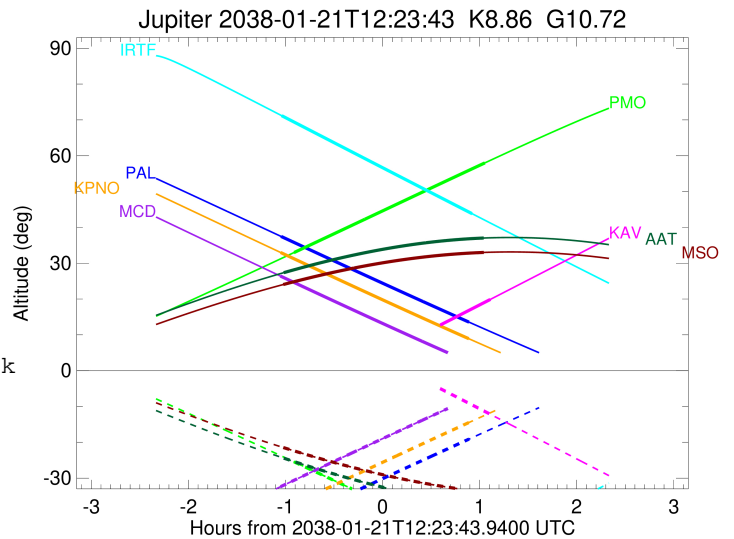
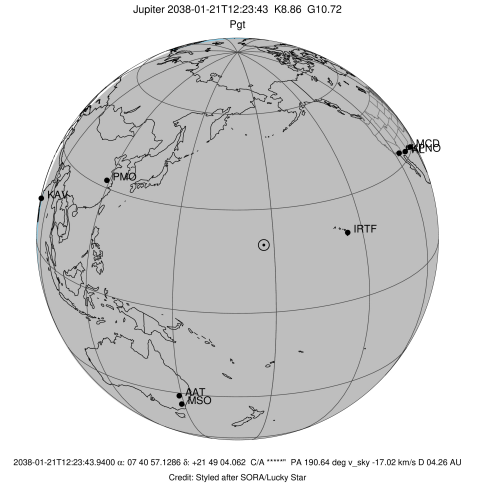


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2038-01-21T11:29:03.577	32.97	-25.45	71491.5	30.67	34.08
Jupiter	E	2038-01-21T13:26:56.294	57.98	-50.37	71491.5	31.69	35.15

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2038-01-21T12:18:46.610
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       : 673283956700242176
2Mass ID (if available) : 07405708+2149046
ICRS Star Coord at Epoch: 07h 40m 57.12856s +21:49:04.06212s
RUWE (>1.4 is poor) : 1.09
K magnitude          : 8.858
G magnitude           : 10.716
RP magnitude         : 10.111
BP magnitude         : 11.156
DUPflag             : 0
Distance (au)        : 4.259
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -17.02
Sun-Target sep (deg) : 172.28
Sun-Moon sep (deg)   : 11.62
B (ring opening deg) : 1.15
PA of pole (deg)     : 11.35
Pole direction: RA (deg): 268.05621
Dec (deg): 64.49690
C/A sky separation (") : 12.822
C/A sky separation (km) : 39602.8
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
    
```

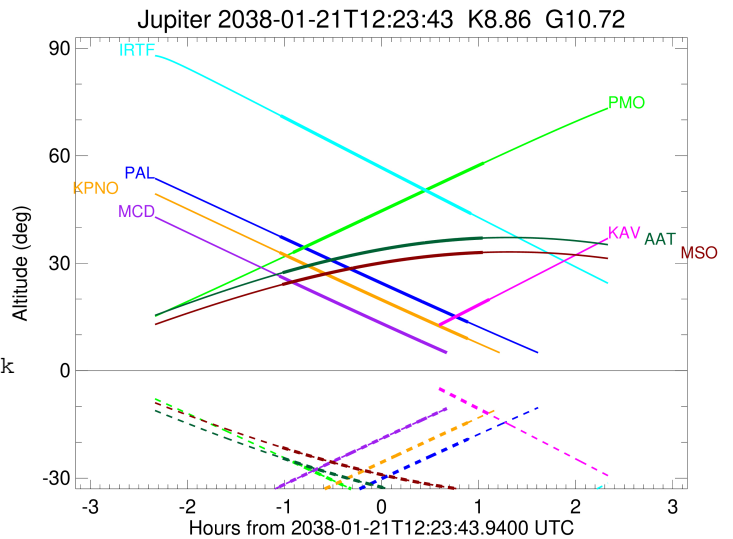
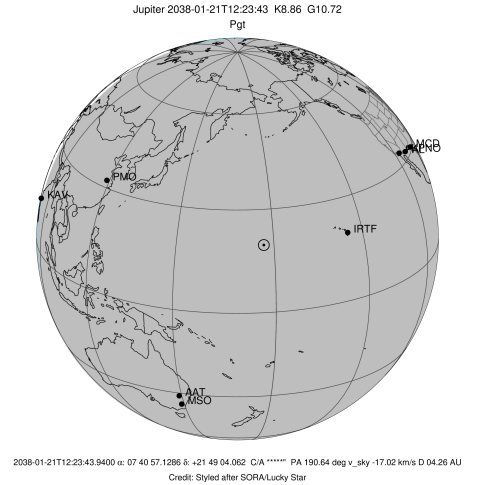


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2038-01-21T11:20:50.532	32.97	-38.91	71491.5	32.39	35.89
Jupiter	E	2038-01-21T13:17:03.660	8.92	-14.49	71491.4	34.84	38.43

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2038-01-21T12:18:38.780
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        : 673283956700242176
2Mass ID (if available) : 07405708+2149046
ICRS Star Coord at Epoch: 07h 40m 57.12856s +21:49:04.06212s
RUWE (>1.4 is poor) : 1.09
K magnitude           : 8.858
G magnitude           : 10.716
RP magnitude          : 10.111
BP magnitude          : 11.156
DUPflag              : 0
Distance (au)         : 4.259
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -17.02
Sun-Target sep (deg)  : 172.28
Sun-Moon sep (deg)    : 11.58
B (ring opening deg) : 1.15
PA of pole (deg)      : 11.35
Pole direction: RA (deg): 268.05621
Dec (deg): 64.49690
C/A sky separation (") : 12.879
C/A sky separation (km) : 39778.3
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
    
```

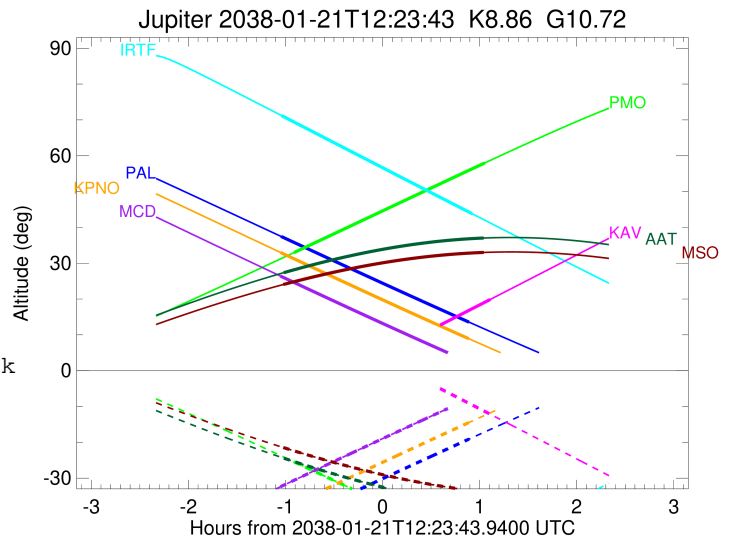
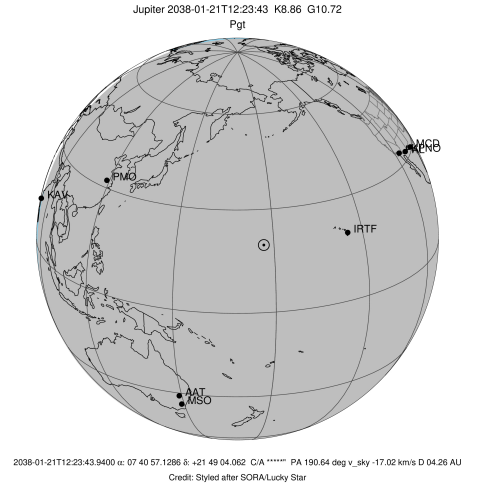


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2038-01-21T11:20:39.142	26.41	-32.40	71491.5	32.57	36.07
Jupiter	E	2038-01-21T13:16:59.958	2.44x	-7.92	71491.4	34.98	38.58

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2038-01-21T12:20:08.600
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       : 673283956700242176
2Mass ID (if available) : 07405708+2149046
ICRS Star Coord at Epoch: 07h 40m 57.12856s +21:49:04.06212s
RUWE (>1.4 is poor) : 1.09
K magnitude           : 8.858
G magnitude           : 10.716
RP magnitude         : 10.111
BP magnitude         : 11.156
DUPflag              : 0
Distance (au)        : 4.259
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -17.02
Sun-Target sep (deg) : 172.28
Sun-Moon sep (deg)   : 11.96
B (ring opening deg) : 1.15
PA of pole (deg)     : 11.35
Pole direction: RA (deg): 268.05621
Dec (deg): 64.49690
C/A sky separation (") : 11.899
C/A sky separation (km) : 36753.3
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
    
```

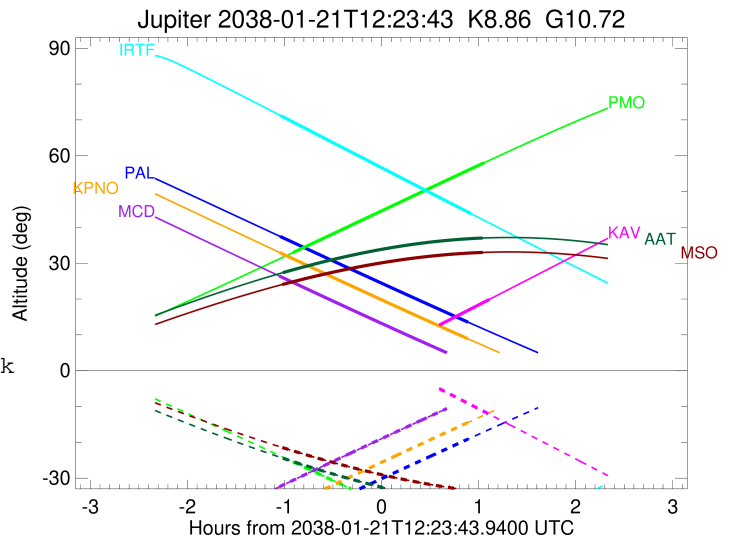
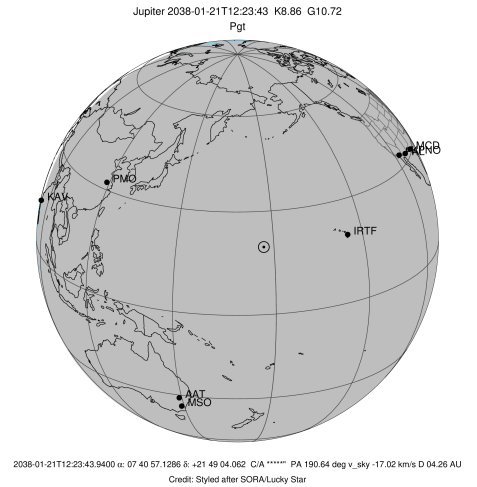


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2038-01-21T11:21:24.314	71.18	-78.64	71491.5	29.74	33.10
Jupiter	E	2038-01-21T13:19:07.938	43.81	-51.05	71491.5	32.19	35.68

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2038-01-21T12:30:16.660
Event type           : Pgt
: Jupiter occs: geocentric, topocentric
: Not a ringed target
Observer code        : KAV
Location             : Kavalur Observatory
Latitude (deg)       : 12.57556
E. Longitude (deg)   : 78.83167
Altitude (km)        : 0.722
Gaia source ID       : 673283956700242176
2Mass ID (if available) : 07405708+2149046
ICRS Star Coord at Epoch: 07h 40m 57.12856s +21:49:04.06212s
RUWE (>1.4 is poor) : 1.09
K magnitude           : 8.858
G magnitude           : 10.716
RP magnitude         : 10.111
BP magnitude         : 11.156
DUPflag              : 0
Distance (au)        : 4.259
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -17.02
Sun-Target sep (deg) : 172.28
Sun-Moon sep (deg)   : 13.28
B (ring opening deg) : 1.15
PA of pole (deg)     : 11.35
Pole direction: RA (deg): 268.05621
Dec (deg): 64.49690
C/A sky separation (") : 11.644
C/A sky separation (km) : 35965.9
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
    
```

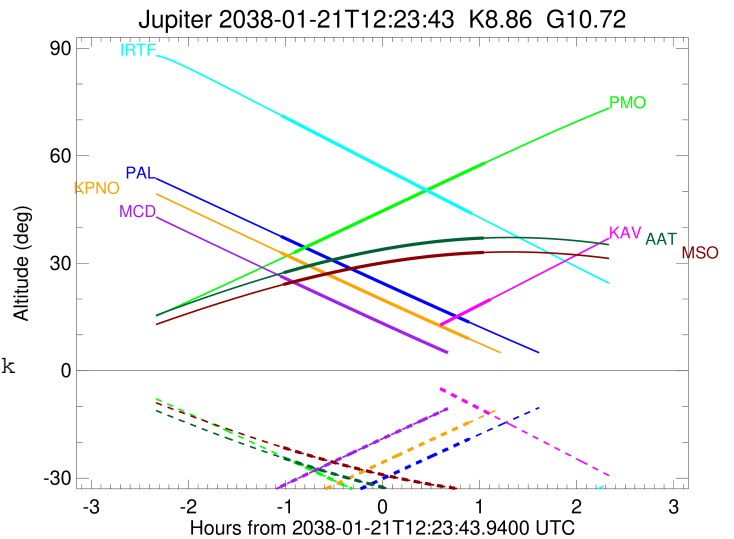
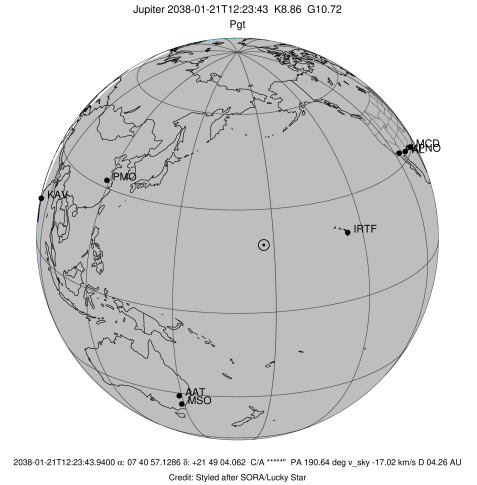


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2038-01-21T11:29:45.565	-7.64x	15.30x	71491.5	30.07	33.45
Jupiter	E	2038-01-21T13:30:23.239	19.89	-12.18	71491.5	30.41	33.80

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2038-01-21T12:24:32.500
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       : 673283956700242176
2Mass ID (if available) : 07405708+2149046
ICRS Star Coord at Epoch: 07h 40m 57.12856s +21:49:04.06212s
RUWE (>1.4 is poor) : 1.09
K magnitude           : 8.858
G magnitude           : 10.716
RP magnitude          : 10.111
BP magnitude          : 11.156
DUPflag              : 0
Distance (au)        : 4.259
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -17.02
Sun-Target sep (deg) : 172.28
Sun-Moon sep (deg)   : 12.67
B (ring opening deg) : 1.15
PA of pole (deg)     : 11.35
Pole direction: RA (deg): 268.05621
Dec (deg): 64.49690
C/A sky separation (") : 9.947
C/A sky separation (km) : 30721.7
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
    
```



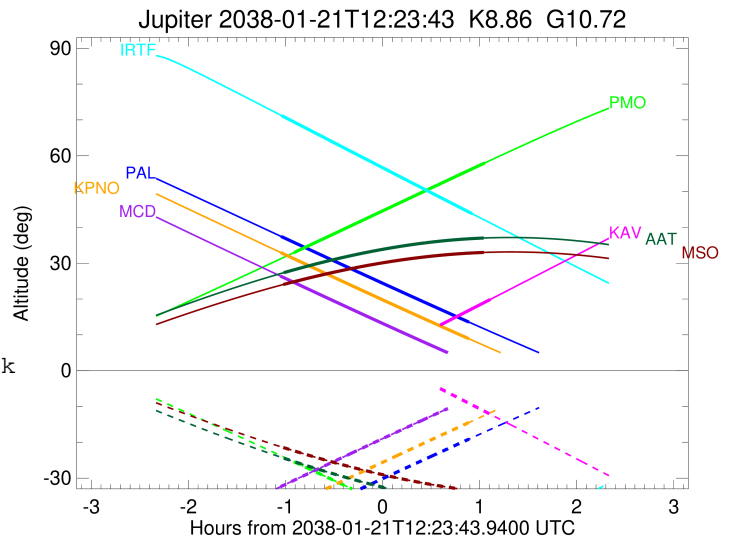
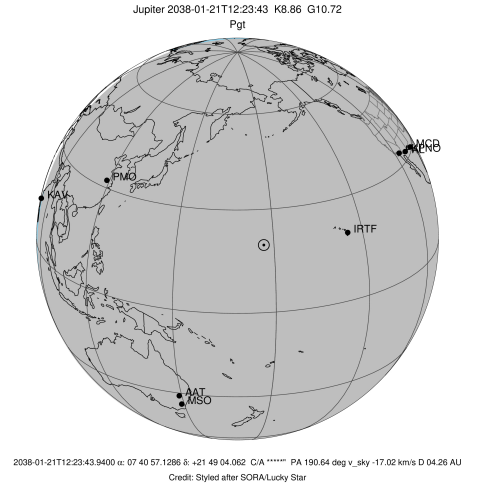
x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2038-01-21T11:22:41.063	27.35	-24.41	71491.7	24.74	27.75
Jupiter	E	2038-01-21T13:26:18.605	37.02	-37.77	71491.6	26.29	29.42



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2038-01-21T12:24:25.420
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       : 673283956700242176
2Mass ID (if available) : 07405708+2149046
ICRS Star Coord at Epoch: 07h 40m 57.12856s +21:49:04.06212s
RUWE (>1.4 is poor) : 1.09
K magnitude           : 8.858
G magnitude           : 10.716
RP magnitude         : 10.111
BP magnitude         : 11.156
DUPflag              : 0
Distance (au)        : 4.259
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -17.02
Sun-Target sep (deg) : 172.28
Sun-Moon sep (deg)   : 12.64
B (ring opening deg) : 1.15
PA of pole (deg)     : 11.35
Pole direction: RA (deg): 268.05621
Dec (deg): 64.49690
C/A sky separation (") : 9.868
C/A sky separation (km) : 30479.5
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	2038-01-21T11:22:23.741	24.04	-21.45	71491.7	24.53	27.51
Jupiter	E	2038-01-21T13:26:21.962	33.00	-33.85	71491.6	26.07	29.18