

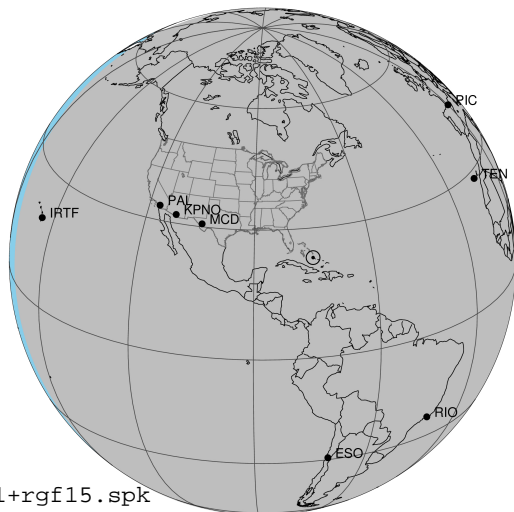
target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2048-12-27T05:02:34.250
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 3404083537126210560
 2Mass ID (if available) : 05333453+2253370

Jupiter 2048-12-27T05:02:34 K8.61 G12.43 Pgt

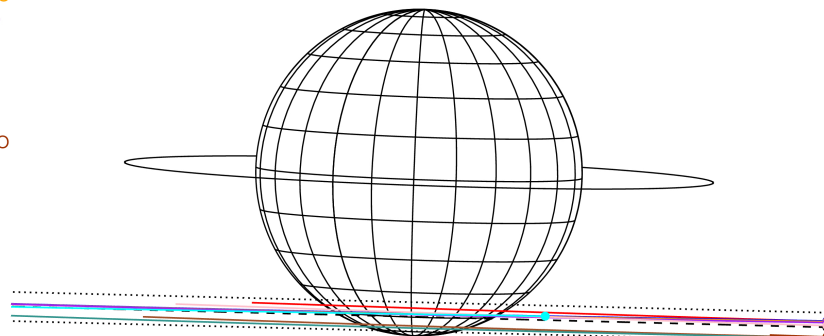
ICRS Star Coord at Epoch: 05h 33m 34.54824s +22:53:36.79188s

RUWE (>1.4 is poor) : 0.87
 K magnitude : 8.609
 G magnitude : 12.427
 RP magnitude : 11.381
 BP magnitude : 13.564
 DUPflag : 0
 Distance (au) : 4.142
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -16.36
 Sun-Target sep (deg) : 168.48
 Sun-Moon sep (deg) : 87.93
 B (ring opening deg) : 2.53
 PA of pole (deg) : -2.01
 Pole direction: RA (deg): 268.05738
 Dec (deg): 64.49721
 C/A sky separation (") : 21.052
 C/A sky separation (km) : 63237.9
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk

Jupiter 2048-12-27T05:02:34 K8.61 G12.43
 Pgt



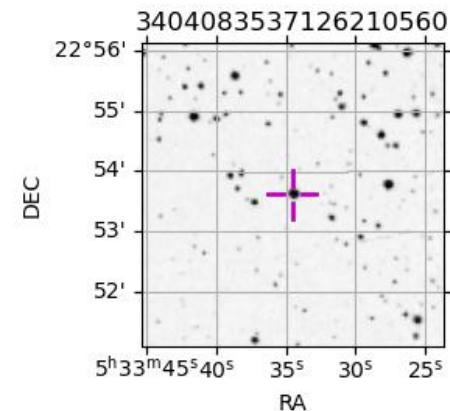
Earth
 PIC
 PAL
 KPNO
 MCD
 TEN
 IRTF
 RIO
 ESO
 SAAO



2048-12-27T05:02:34.2500 a: 05 33 34.5482 s: +22 53 36.792 C/A ***** PA 358.54 deg v_sky -16.36 km/s D 04.14 AU
 Credit: Styled after SORA/Lucky Star

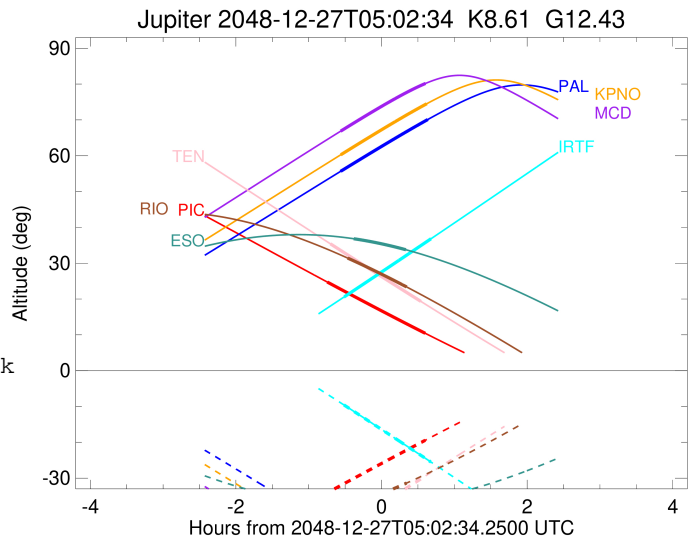
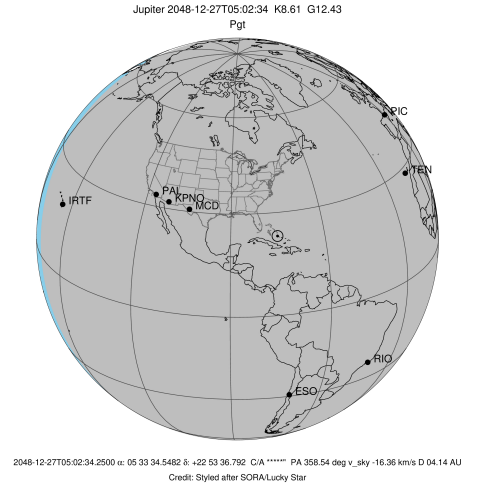
Observable events with sun below -5 deg and altitude above 5 deg

Obs	Location	lat	Elon	Target	Observed Events	Interval	OCode
PIC	Pic du Midi	42.9	0.1	+ +	DEC 27 04:17 - DEC 27 05:38		Pie
PAL	Palomar Mt (200")	33.4	243.1	+ +	DEC 27 04:28 - DEC 27 05:40		Pie
PMO	Purple Mtn Obs. Nanking	32.1	118.8				Pnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+ +	DEC 27 04:29 - DEC 27 05:39		Pie
MCD	McDonald Obs. 2.7m	30.7	256.0	+ +	DEC 27 04:28 - DEC 27 05:38		Pie
TEN	Teide Obs./Tenerife	28.3	343.5	+ +	DEC 27 04:20 - DEC 27 05:34		Pie
IRTF	Mauna Kea/IRTF	19.8	204.5	+ +	DEC 27 04:31 - DEC 27 05:43		Pie
KAV	Kavalur Observatory	12.6	78.8				Pnn
RIO	Rio de Janeiro	-22.9	316.8	+ +	DEC 27 04:34 - DEC 27 05:23		Pie
ESO	European Southern Obs. (3.6m)	-29.3	289.3	+ +	DEC 27 04:39 - DEC 27 05:22		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            : 2048-12-27T04:58:13.340
Event type          : Pgt
                    : Jupiter occs: geocentric, topocentric
                    : Not a ringed target
Observer code       : PIC
Location            : Pic du Midi
Latitude (deg)      : 42.93656
E. Longitude (deg)  : 0.14231
Altitude (km)       : 2.890
Gaia source ID      : 3404083537126210560
2Mass ID (if available) : 05333453+2253370
ICRS Star Coord at Epoch: 05h 33m 34.54824s +22:53:36.79188s
RUWE (>1.4 is poor) : 0.87
K magnitude          : 8.609
G magnitude          : 12.427
RP magnitude         : 11.381
BP magnitude         : 13.564
DUPflag             : 0
Distance (au)       : 4.142
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.36
Sun-Target sep (deg) : 168.48
Sun-Moon sep (deg)  : 88.18
B (ring opening deg) : 2.53
PA of pole (deg)    : -2.01
Pole direction: RA (deg): 268.05738
Dec (deg): 64.49721
C/A sky separation ("): 19.791
C/A sky separation (km): 59449.3
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
    
```

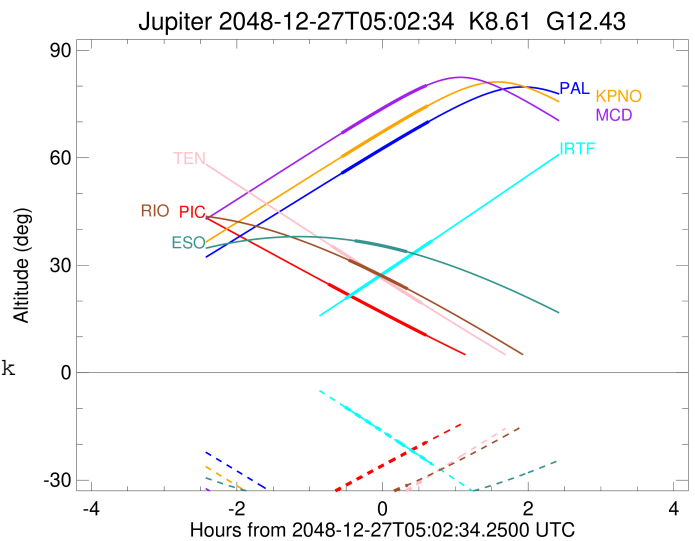
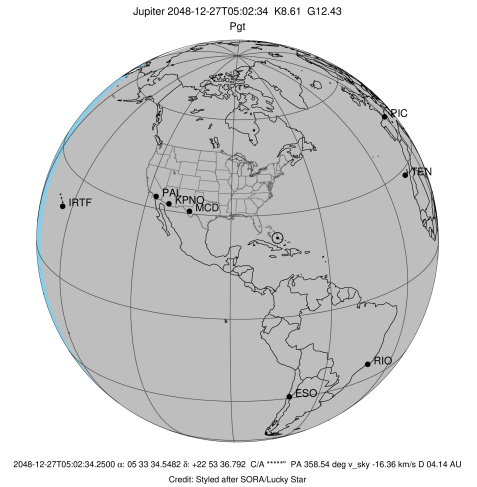


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2048-12-27T04:17:54.763	24.73	-34.07	71486.0	-56.09	-59.40
Jupiter	E	2048-12-27T05:38:40.889	10.42	-19.42	71486.0	-56.27	-59.57

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2048-12-27T05:04:49.680
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        : 3404083537126210560
2Mass ID (if available) : 05333453+2253370
ICRS Star Coord at Epoch: 05h 33m 34.54824s +22:53:36.79188s
RUWE (>1.4 is poor) : 0.87
K magnitude           : 8.609
G magnitude           : 12.427
RP magnitude          : 11.381
BP magnitude          : 13.564
DUPflag              : 0
Distance (au)         : 4.142
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.36
Sun-Target sep (deg)  : 168.48
Sun-Moon sep (deg)    : 88.77
B (ring opening deg) : 2.53
PA of pole (deg)      : -2.01
Pole direction: RA (deg): 268.05738
Dec (deg): 64.49721
C/A sky separation (" ) : 20.574
C/A sky separation (km) : 61802.5
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
    
```

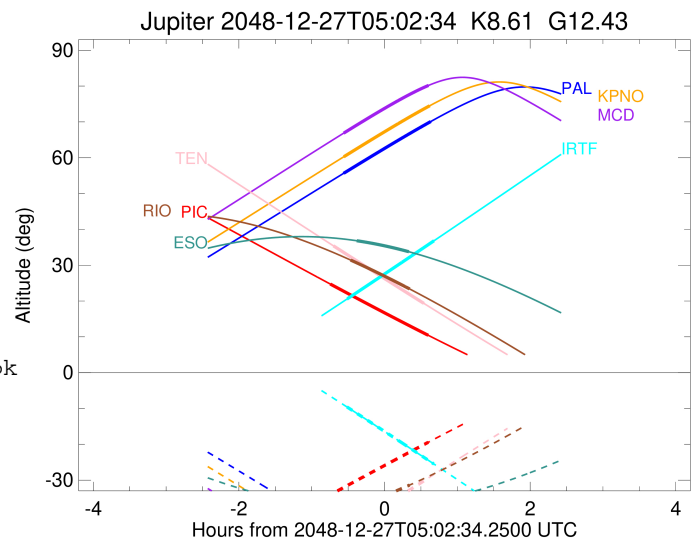
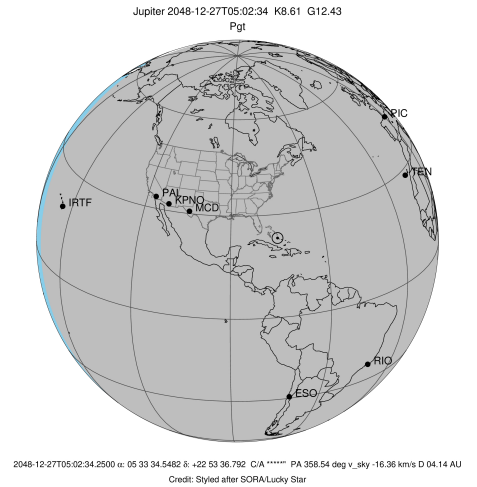


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2048-12-27T04:28:55.034	55.64	-45.37	71485.6	-58.88	-62.02
Jupiter	E	2048-12-27T05:40:40.978	70.09	-60.30	71485.4	-60.52	-63.54

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2048-12-27T05:04:27.940
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        : 3404083537126210560
2Mass ID (if available) : 05333453+2253370
ICRS Star Coord at Epoch: 05h 33m 34.54824s +22:53:36.79188s
RUWE (>1.4 is poor) : 0.87
K magnitude           : 8.609
G magnitude           : 12.427
RP magnitude          : 11.381
BP magnitude          : 13.564
DUPflag              : 0
Distance (au)         : 4.142
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.36
Sun-Target sep (deg)  : 168.48
Sun-Moon sep (deg)    : 88.80
B (ring opening deg) : 2.53
PA of pole (deg)      : -2.01
Pole direction: RA (deg): 268.05738
Dec (deg): 64.49721
C/A sky separation (") : 20.654
C/A sky separation (km) : 62041.7
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
    
```

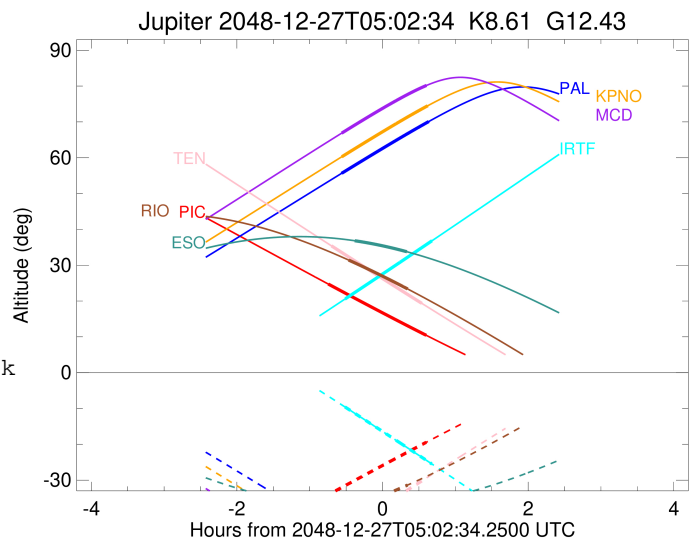
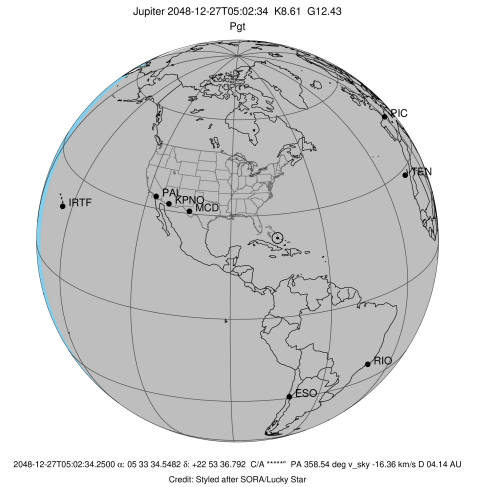


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2048-12-27T04:29:00.992	60.26	-49.83	71485.5	-59.30	-62.41
Jupiter	E	2048-12-27T05:39:52.178	74.51	-64.77	71485.3	-60.86	-63.86

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2048-12-27T05:03:53.020
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        : 3404083537126210560
2Mass ID (if available) : 05333453+2253370
ICRS Star Coord at Epoch: 05h 33m 34.54824s +22:53:36.79188s
RUWE (>1.4 is poor) : 0.87
K magnitude           : 8.609
G magnitude           : 12.427
RP magnitude          : 11.381
BP magnitude          : 13.564
DUPflag              : 0
Distance (au)         : 4.142
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.36
Sun-Target sep (deg)  : 168.48
Sun-Moon sep (deg)    : 88.83
B (ring opening deg) : 2.53
PA of pole (deg)      : -2.01
Pole direction: RA (deg): 268.05738
Dec (deg): 64.49721
C/A sky separation (") : 20.735
C/A sky separation (km) : 62286.4
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
    
```

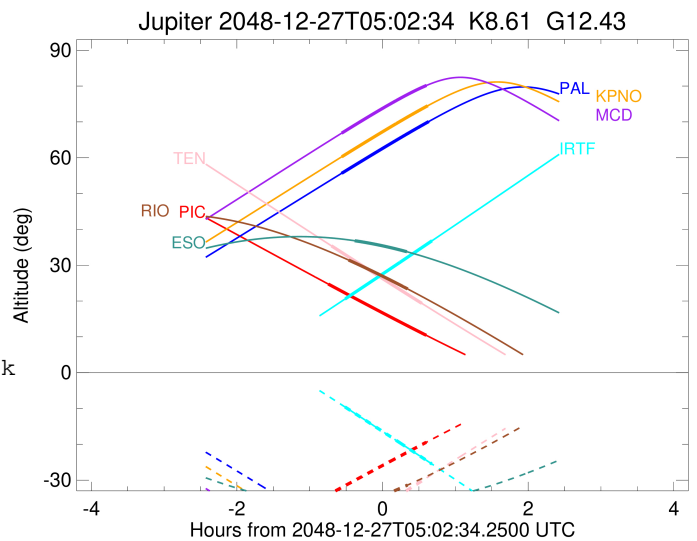
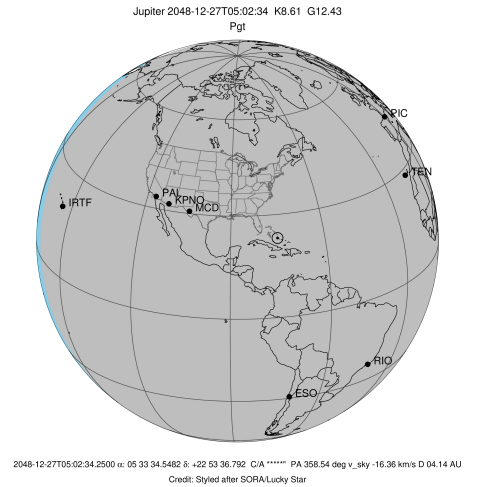


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2048-12-27T04:28:55.020	66.85	-56.34	71485.5	-59.76	-62.84
Jupiter	E	2048-12-27T05:38:49.244	80.17	-71.14	71485.3	-61.19	-64.17

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2048-12-27T04:57:42.050
Event type          : Pgt
                    : Jupiter occs: geocentric, topocentric
                    : Not a ringed target
Observer code       : TEN
Location            : Teide Obs./Tenerife
Latitude (deg)      : 28.30050
E. Longitude (deg)  : 343.48909
Altitude (km)       : 2.395
Gaia source ID      : 3404083537126210560
2Mass ID (if available) : 05333453+2253370
ICRS Star Coord at Epoch: 05h 33m 34.54824s +22:53:36.79188s
RUWE (>1.4 is poor) : 0.87
K magnitude         : 8.609
G magnitude         : 12.427
RP magnitude        : 11.381
BP magnitude        : 13.564
DUPflag            : 0
Distance (au)       : 4.142
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -16.36
Sun-Target sep (deg) : 168.48
Sun-Moon sep (deg)  : 88.32
B (ring opening deg) : 2.53
PA of pole (deg)    : -2.01
Pole direction: RA (deg): 268.05738
Dec (deg): 64.49721
C/A sky separation (" ) : 20.414
C/A sky separation (km) : 61321.6
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
    
```

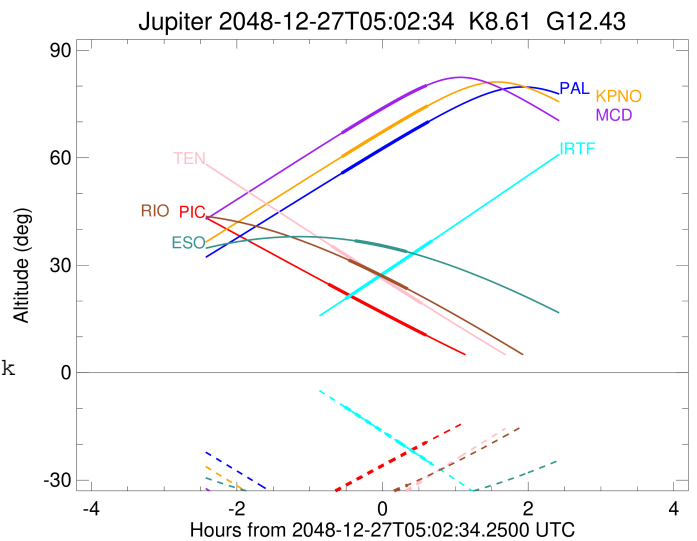
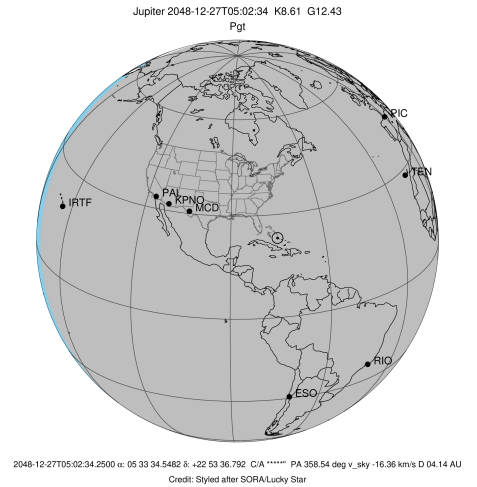


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2048-12-27T04:20:39.329	35.36	-46.40	71485.6	-58.92	-62.06
Jupiter	E	2048-12-27T05:34:53.229	19.36	-30.23	71485.6	-59.00	-62.13

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2048-12-27T05:07:32.380
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       : 3404083537126210560
2Mass ID (if available) : 05333453+2253370
ICRS Star Coord at Epoch: 05h 33m 34.54824s +22:53:36.79188s
RUWE (>1.4 is poor) : 0.87
K magnitude           : 8.609
G magnitude           : 12.427
RP magnitude         : 11.381
BP magnitude         : 13.564
DUPflag              : 0
Distance (au)        : 4.142
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.36
Sun-Target sep (deg) : 168.48
Sun-Moon sep (deg)   : 88.39
B (ring opening deg) : 2.53
PA of pole (deg)     : -2.01
Pole direction: RA (deg): 268.05738
Dec (deg): 64.49721
C/A sky separation ("): 20.669
C/A sky separation (km): 62087.7
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
    
```

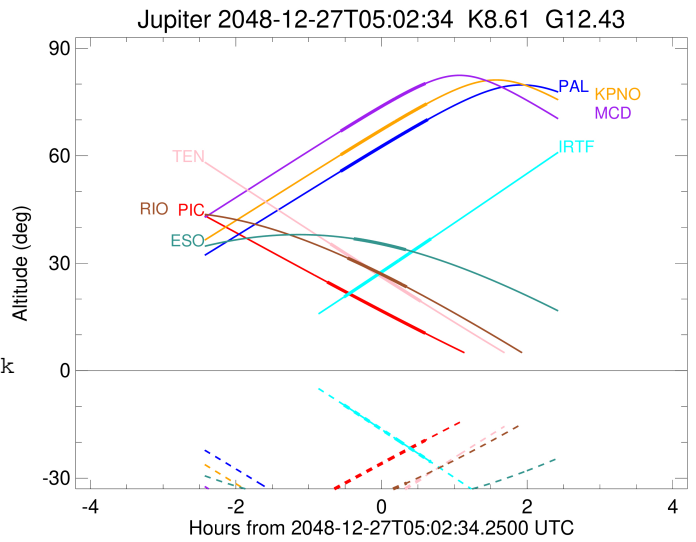
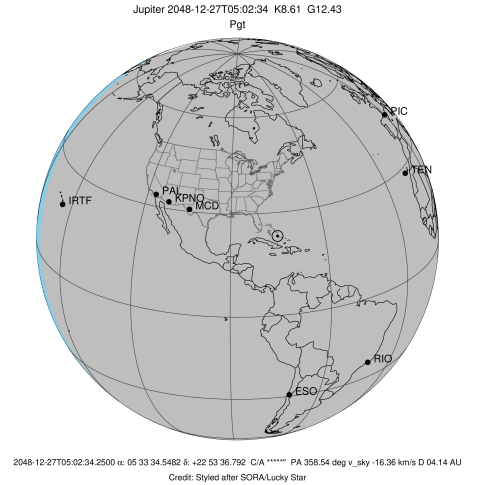


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2048-12-27T04:31:44.989	20.57	-9.59	71485.6	-59.08	-62.20
Jupiter	E	2048-12-27T05:43:12.217	36.78	-25.47	71485.3	-61.27	-64.24


```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2048-12-27T04:58:57.570
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      : 3404083537126210560
2Mass ID (if available) : 05333453+2253370
ICRS Star Coord at Epoch: 05h 33m 34.54824s +22:53:36.79188s
RUWE (>1.4 is poor) : 0.87
K magnitude          : 8.609
G magnitude          : 12.427
RP magnitude         : 11.381
BP magnitude         : 13.564
DUPflag             : 0
Distance (au)       : 4.142
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.36
Sun-Target sep (deg) : 168.48
Sun-Moon sep (deg)  : 88.34
B (ring opening deg) : 2.53
PA of pole (deg)    : -2.01
Pole direction: RA (deg): 268.05738
Dec (deg): 64.49721
C/A sky separation (" ) : 22.386
C/A sky separation (km) : 67245.6
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
    
```

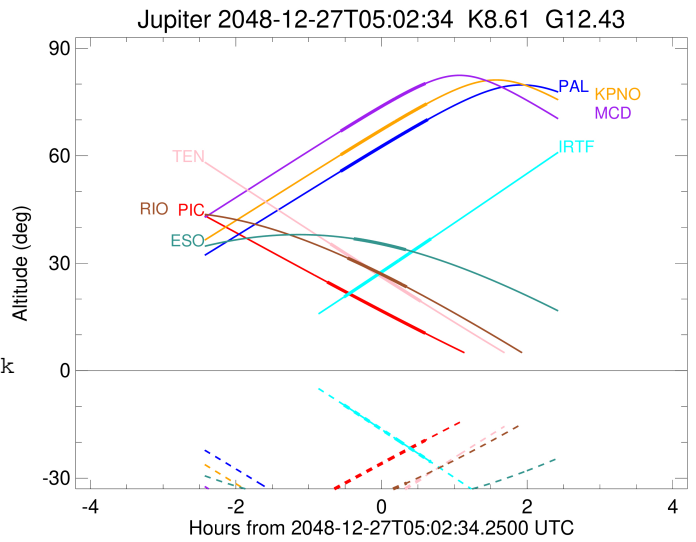
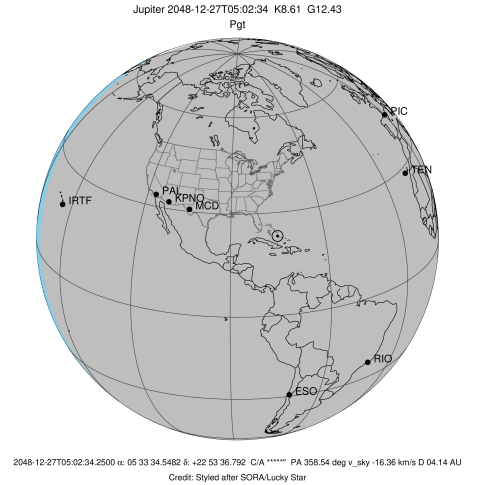


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2048-12-27T04:34:43.190	31.42	-37.84	71484.3	-69.82	-72.06
Jupiter	E	2048-12-27T05:23:14.722	23.37	-31.37	71484.3	-70.17	-72.37


```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2048-12-27T05:01:11.300
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        : 3404083537126210560
2Mass ID (if available) : 05333453+2253370
ICRS Star Coord at Epoch: 05h 33m 34.54824s +22:53:36.79188s
RUWE (>1.4 is poor) : 0.87
K magnitude           : 8.609
G magnitude           : 12.427
RP magnitude          : 11.381
BP magnitude          : 13.564
DUPflag              : 0
Distance (au)         : 4.142
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.36
Sun-Target sep (deg)  : 168.48
Sun-Moon sep (deg)   : 88.46
B (ring opening deg) : 2.53
PA of pole (deg)     : -2.01
Pole direction: RA (deg): 268.05738
Dec (deg): 64.49721
C/A sky separation (" ) : 22.705
C/A sky separation (km) : 68202.1
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	2048-12-27T04:39:52.010	36.81	-37.60	71484.1	-71.95	-73.98
Jupiter	E	2048-12-27T05:22:31.474	33.76	-36.80	71484.0	-72.79	-74.73