

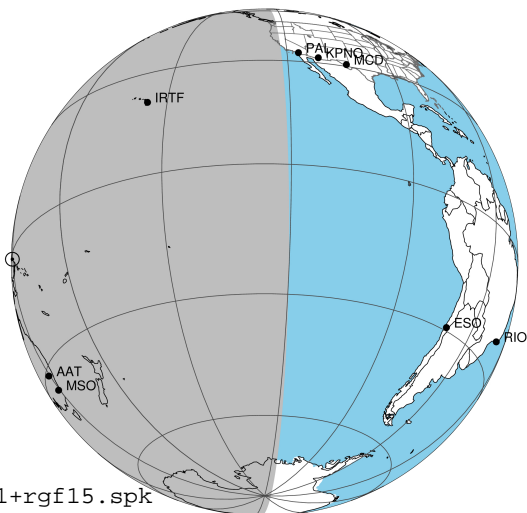
target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2031-03-24T14:09:05.980
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 4068898982317689344
 2Mass ID (if available) : 17502820-2253078

Jupiter 2031-03-24T14:09:05 K8.36 G14.30 Pgt

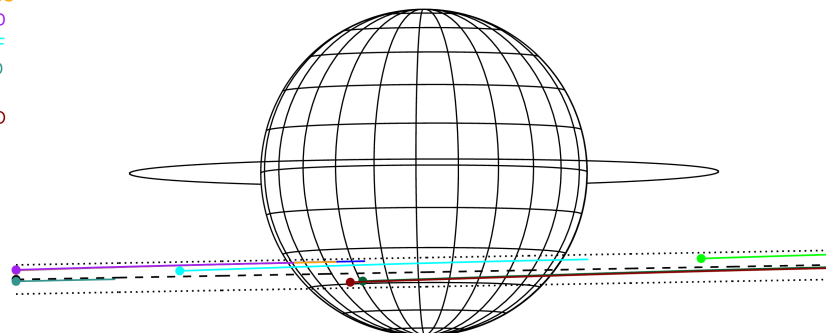
ICRS Star Coord at Epoch: 17h 50m 28.19527s -22:53:07.75986s

RUWE (>1.4 is poor) : 0.92
 K magnitude : 8.361
 G magnitude : 14.300
 RP magnitude : 12.892
 BP magnitude : 16.821
 DUPflag : 0
 Distance (au) : 5.119
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : 10.29
 Sun-Target sep (deg) : 95.50
 Sun-Moon sep (deg) : 113.07
 B (ring opening deg) : -2.62
 PA of pole (deg) : 0.19
 Pole direction: RA (deg): 268.05699
 Dec (deg): 64.49651
 C/A sky separation (") : 11.761
 C/A sky separation (km) : 43662.0
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk

Jupiter 2031-03-24T14:09:05 K8.36 G14.30
 Pgt



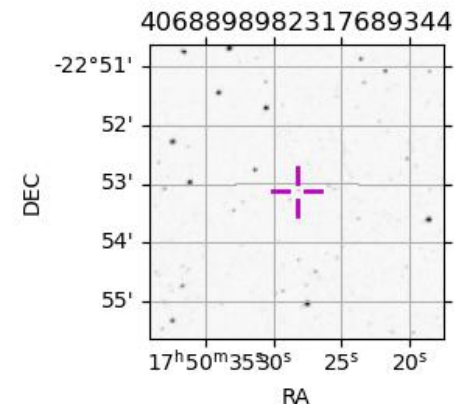
Earth
 PAL
 PMO
 KPNO
 MCD
 IRTF
 ESO
 AAT
 MSO



2031-03-24T14:09:05.9800 α: 17 50 28.1953 δ: -22 53 07.760 C/A ***** PA 1.02 deg v_sky +10.29 km/s D 05.12 AU
 Credit: Styled after SORA/Lucky Star

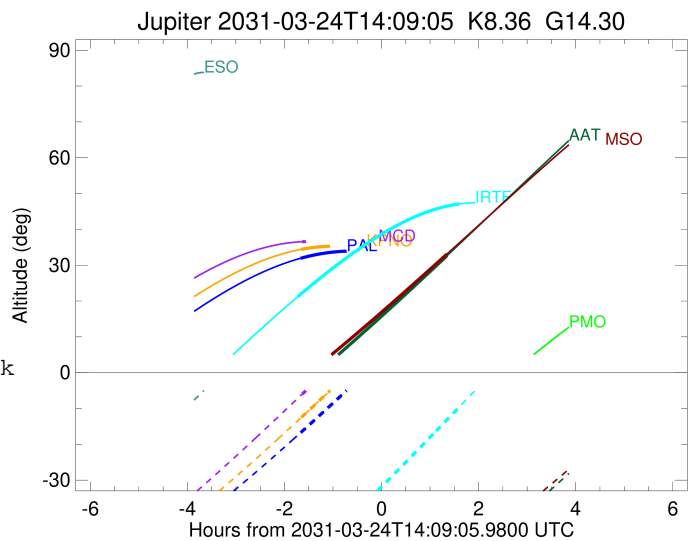
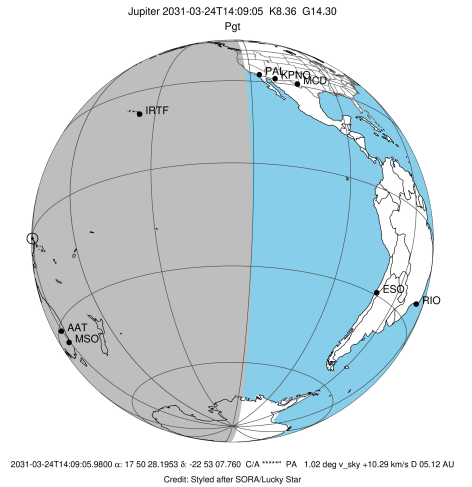
Observable events with sun below -5 deg and altitude above 5 deg

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	+	MAR 24 12:29 - MAR 24 12:29	Pin
PMO	Purple Mtn Obs. Nanking	32.1	118.8			Pnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+	MAR 24 12:29 - MAR 24 12:29	Pin
MCD	McDonald Obs. 2.7m	30.7	256.0	+	MAR 24 12:31 - MAR 24 12:31	Pin
TEN	Teide Obs./Tenerife	28.3	343.5			Pnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+ +	MAR 24 12:25 - MAR 24 15:44	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			Pnn
AAT	Siding Spring (AAT)	-31.3	149.1	+	MAR 24 15:30 - MAR 24 15:30	Pne
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8			Pnn
MSO	Mt. Stromlo Observatory	-35.3	149.0	+	MAR 24 15:29 - MAR 24 15:29	Pne



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-03-24T14:10:16.630
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       : 4068898982317689344
2Mass ID (if available) : 17502820-2253078
ICRS Star Coord at Epoch: 17h 50m 28.19527s -22:53:07.75986s
RUWE (>1.4 is poor) : 0.92
K magnitude           : 8.361
G magnitude           : 14.300
RP magnitude          : 12.892
BP magnitude          : 16.821
DUPflag              : 0
Distance (au)        : 5.119
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : 10.29
Sun-Target sep (deg) : 95.50
Sun-Moon sep (deg)   : 113.61
B (ring opening deg) : -2.62
PA of pole (deg)     : 0.19
Pole direction: RA (deg): 268.05699
Dec (deg): 64.49651
C/A sky separation (") : 10.341
C/A sky separation (km) : 38390.0
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
    
```

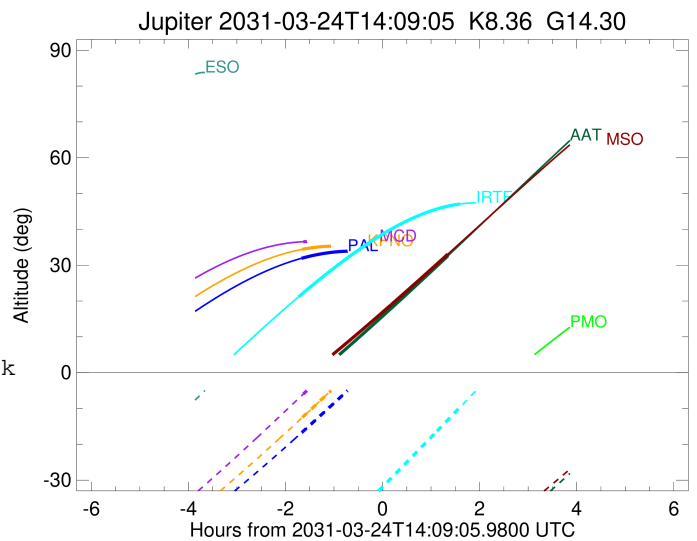
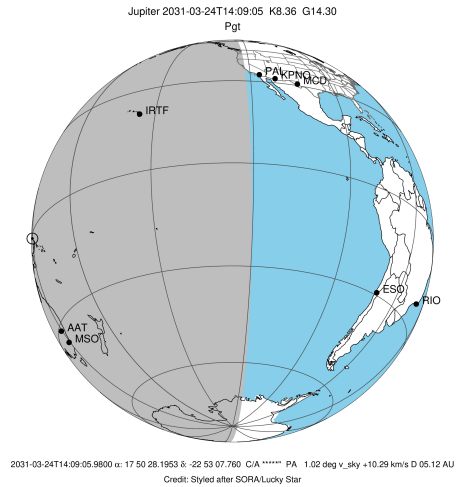


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-03-24T12:29:09.195	31.93	-16.74	71489.2	-33.36	-36.89
Jupiter	E	2031-03-24T15:51:30.049	24.83	25.20x	71489.4	-31.91	-35.38

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-03-24T14:11:01.540
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      : 4068898982317689344
2Mass ID (if available) : 17502820-2253078
ICRS Star Coord at Epoch: 17h 50m 28.19527s -22:53:07.75986s
RUWE (>1.4 is poor) : 0.92
K magnitude         : 8.361
G magnitude         : 14.300
RP magnitude        : 12.892
BP magnitude        : 16.821
DUPflag            : 0
Distance (au)       : 5.119
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : 10.29
Sun-Target sep (deg) : 95.50
Sun-Moon sep (deg)  : 113.65
B (ring opening deg) : -2.62
PA of pole (deg)    : 0.19
Pole direction: RA (deg): 268.05699
Dec (deg): 64.49651
C/A sky separation (") : 10.374
C/A sky separation (km) : 38512.5
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
    
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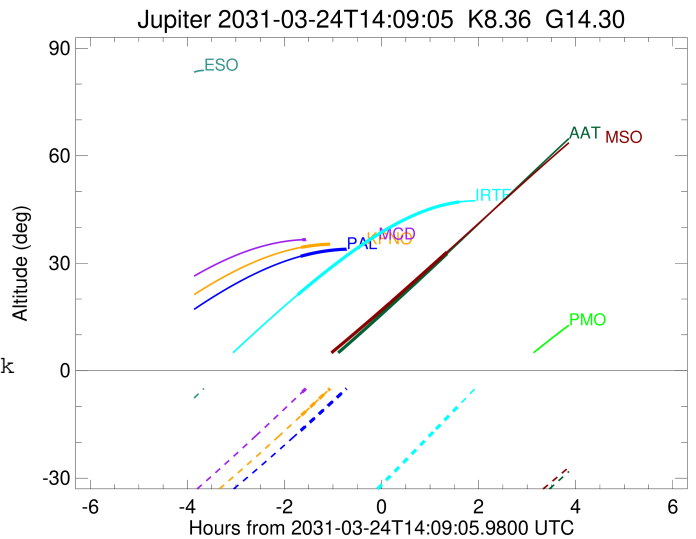
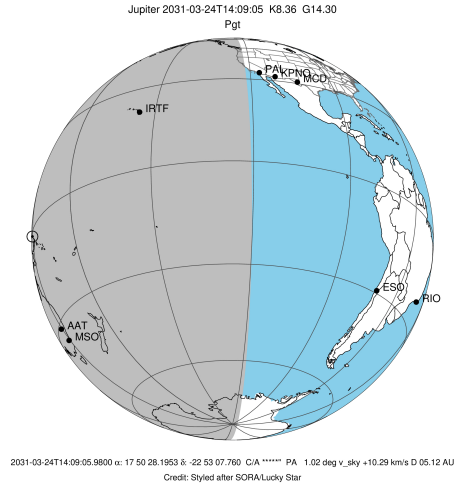


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-03-24T12:29:58.004	34.42	-12.49	71489.2	-33.39	-36.93
Jupiter	E	2031-03-24T15:52:01.397	23.13	29.95x	71489.3	-32.10	-35.58

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-03-24T14:12:04.810
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        : 4068898982317689344
2Mass ID (if available) : 17502820-2253078
ICRS Star Coord at Epoch: 17h 50m 28.19527s -22:53:07.75986s
RUWE (>1.4 is poor) : 0.92
K magnitude           : 8.361
G magnitude           : 14.300
RP magnitude          : 12.892
BP magnitude          : 16.821
DUPflag              : 0
Distance (au)         : 5.119
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : 10.29
Sun-Target sep (deg)  : 95.50
Sun-Moon sep (deg)    : 113.68
B (ring opening deg) : -2.62
PA of pole (deg)      : 0.19
Pole direction: RA (deg): 268.05699
Dec (deg): 64.49651
C/A sky separation (") : 10.419
C/A sky separation (km) : 38681.4
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
    
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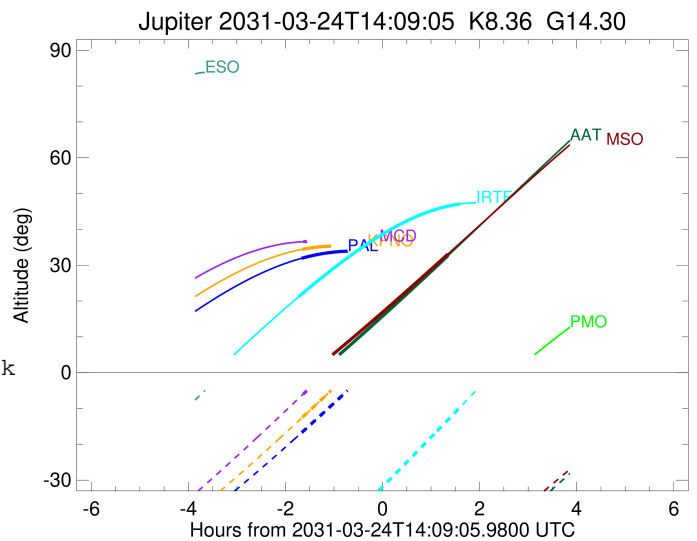
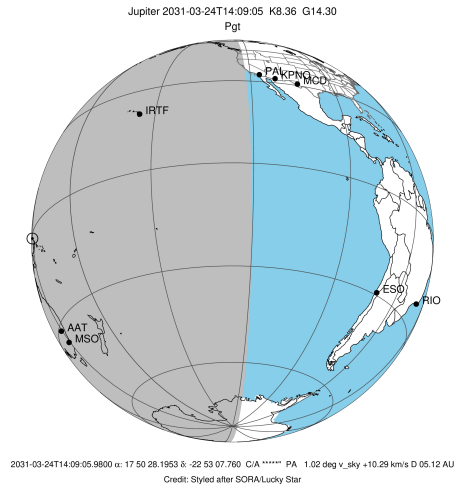


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-03-24T12:31:12.018	36.55	-5.97	71489.1	-33.43	-36.97
Jupiter	E	2031-03-24T15:52:40.428	19.50	36.60x	71489.3	-32.37	-35.87

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-03-24T14:04:39.500
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       : 4068898982317689344
2Mass ID (if available) : 17502820-2253078
ICRS Star Coord at Epoch: 17h 50m 28.19527s -22:53:07.75986s
RUWE (>1.4 is poor) : 0.92
K magnitude          : 8.361
G magnitude          : 14.300
RP magnitude         : 12.892
BP magnitude         : 16.821
DUPflag             : 0
Distance (au)        : 5.119
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : 10.29
Sun-Target sep (deg) : 95.50
Sun-Moon sep (deg)   : 113.45
B (ring opening deg) : -2.62
PA of pole (deg)     : 0.19
Pole direction: RA (deg): 268.05699
Dec (deg): 64.49651
C/A sky separation (") : 10.697
C/A sky separation (km) : 39714.6
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
    
```

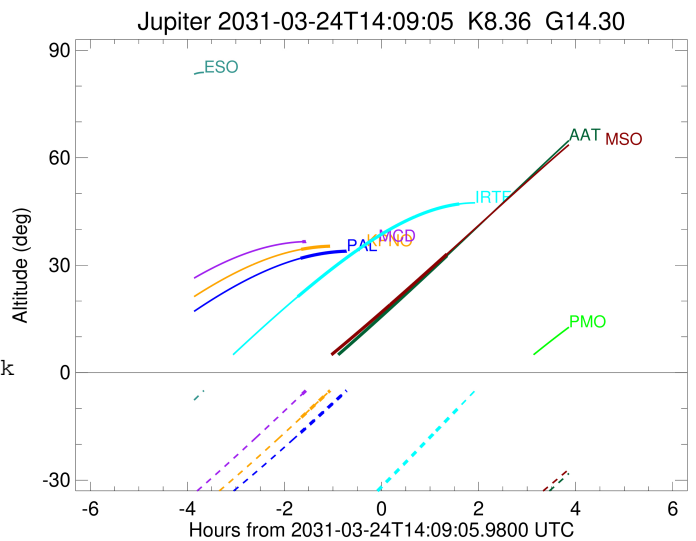
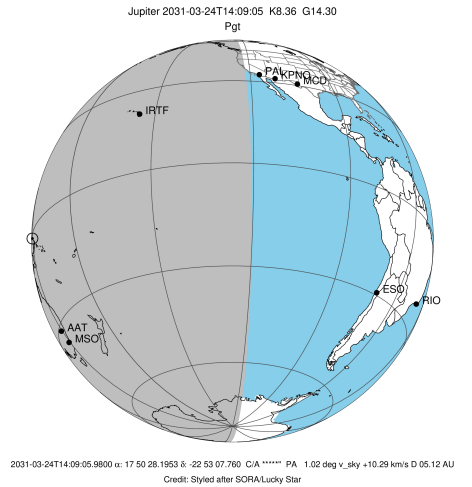


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-03-24T12:25:39.566	21.22	-54.26	71488.9	-35.23	-38.83
Jupiter	E	2031-03-24T15:44:56.368	47.08	-9.65	71489.3	-32.54	-36.04

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-03-24T14:01:28.880
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      : 4068898982317689344
2Mass ID (if available) : 17502820-2253078
ICRS Star Coord at Epoch: 17h 50m 28.19527s -22:53:07.75986s
RUWE (>1.4 is poor) : 0.92
K magnitude          : 8.361
G magnitude          : 14.300
RP magnitude         : 12.892
BP magnitude         : 16.821
DUPflag             : 0
Distance (au)       : 5.119
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : 10.29
Sun-Target sep (deg) : 95.50
Sun-Moon sep (deg)  : 112.99
B (ring opening deg) : -2.62
PA of pole (deg)    : 0.19
Pole direction: RA (deg): 268.05699
Dec (deg): 64.49651
C/A sky separation (") : 12.568
C/A sky separation (km) : 46661.1
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
    
```

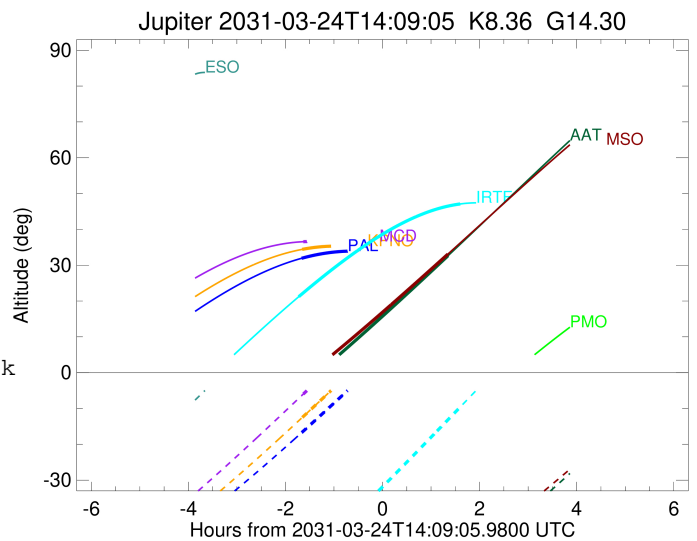
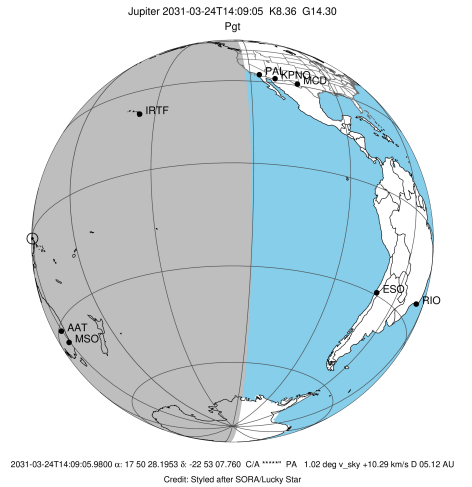


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-03-24T12:34:19.345	-2.94x	-52.71	71487.7	-42.37	-46.08
Jupiter	E	2031-03-24T15:30:08.756	32.66	-54.86	71488.3	-39.02	-42.71

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-03-24T14:01:50.700
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       : 4068898982317689344
2Mass ID (if available) : 17502820-2253078
ICRS Star Coord at Epoch: 17h 50m 28.19527s -22:53:07.75986s
RUWE (>1.4 is poor) : 0.92
K magnitude           : 8.361
G magnitude           : 14.300
RP magnitude          : 12.892
BP magnitude          : 16.821
DUPflag              : 0
Distance (au)         : 5.119
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : 10.29
Sun-Target sep (deg)  : 95.50
Sun-Moon sep (deg)   : 113.01
B (ring opening deg) : -2.62
PA of pole (deg)     : 0.19
Pole direction: RA (deg): 268.05699
Dec (deg): 64.49651
C/A sky separation (") : 12.661
C/A sky separation (km) : 47006.3
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	2031-03-24T12:35:08.477	-0.87x	-49.71	71487.7	-42.69	-46.41
Jupiter	E	2031-03-24T15:29:58.919	33.10	-51.60	71488.2	-39.42	-43.12