

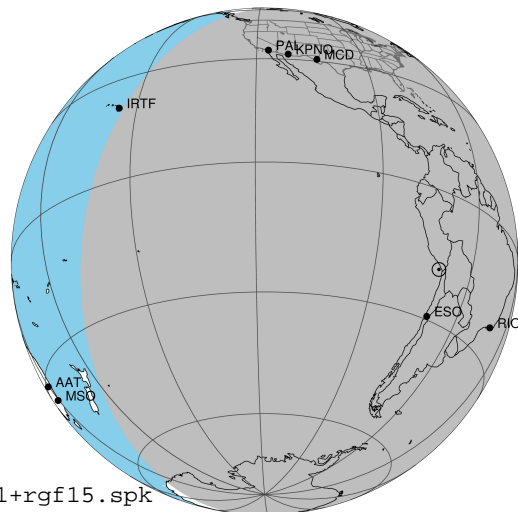
target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2043-07-31T04:52:15.000
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 4117427096235933696
 2Mass ID (if available) : 17325969-2302462

Jupiter 2043-07-31T04:52:15 K8.45 G14.70 Pgt

ICRS Star Coord at Epoch: 17h 32m 59.69465s -23:02:46.44368s

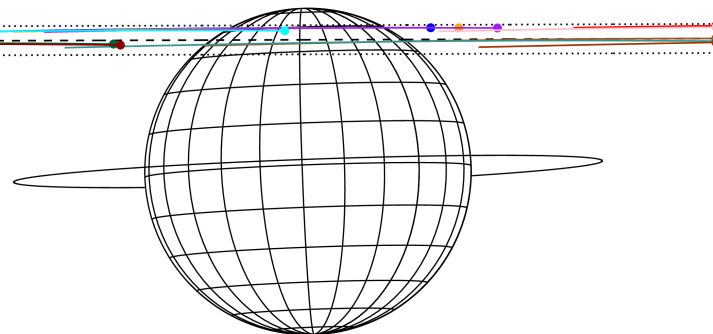
RUWE (>1.4 is poor) : 1.11
 K magnitude : 8.449
 G magnitude : 14.702
 RP magnitude : 13.204
 BP magnitude : 17.955
 DUPflag : 0
 Distance (au) : 4.469
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -8.42
 Sun-Target sep (deg) : 136.47
 Sun-Moon sep (deg) : 157.67
 B (ring opening deg) : -2.38
 PA of pole (deg) : 2.07
 Pole direction: RA (deg): 268.05671
 Dec (deg): 64.49731
 C/A sky separation (") : 17.798
 C/A sky separation (km) : 57692.5
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk

Jupiter 2043-07-31T04:52:15 K8.45 G14.70
 Pgt



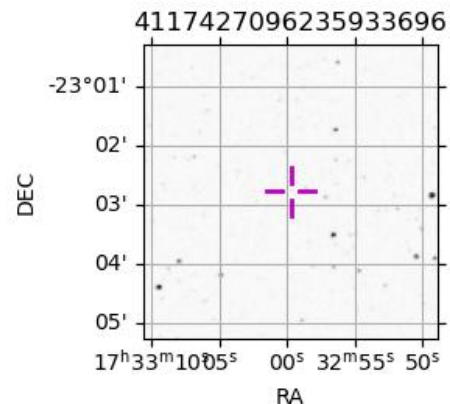
2043-07-31T04:52:15.0000 α: 17 32 59.6947 δ: -23 02 46.444 C/A ***** PA 180.18 deg v_sky - 8.42 km/s D 04.47 AU
 Credit: Styled after SORA/Lucky Star

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



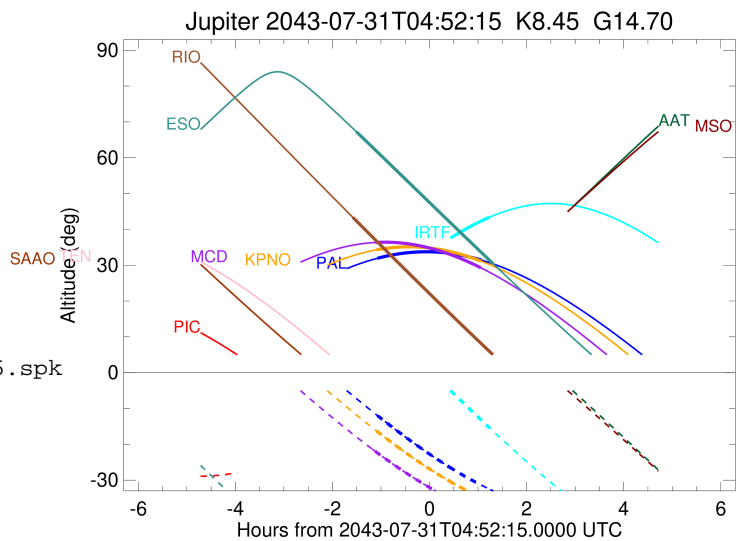
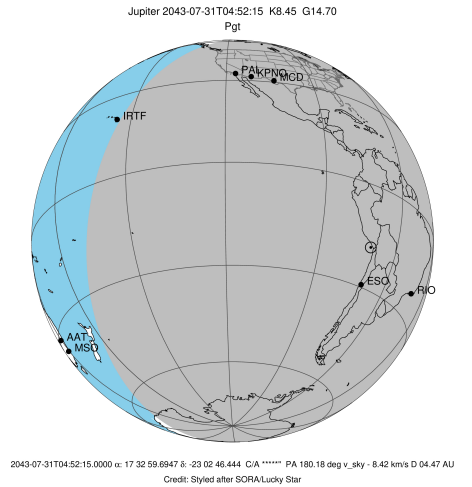
Observable events with sun below -5 deg and altitude above 5 deg

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	+ +	JUL 31 03:47 - JUL 31 05:56	Pie
PMO	Purple Mtn Obs. Nanking	32.1	118.8			Pnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+ +	JUL 31 03:46 - JUL 31 05:56	Pie
MCD	McDonald Obs. 2.7m	30.7	256.0	+ +	JUL 31 03:45 - JUL 31 05:55	Pie
TEN	Teide Obs./Tenerife	28.3	343.5			Pnn
IRTF	Mauna Kea/IRTF	19.8	204.5			Pne
KAV	Kavalur Observatory	12.6	78.8			Pnn
RIO	Rio de Janeiro	-22.9	316.8	+ +	JUL 31 03:17 - JUL 31 06:10	Pie
ESO	European Southern Obs. (3.6m)	-29.3	289.3	+ +	JUL 31 03:21 - JUL 31 06:10	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             : 2043-07-31T04:52:05.850
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        : 4117427096235933696
2Mass ID (if available) : 17325969-2302462
ICRS Star Coord at Epoch: 17h 32m 59.69465s -23:02:46.44368s
RUWE (>1.4 is poor) : 1.11
K magnitude           : 8.449
G magnitude           : 14.702
RP magnitude          : 13.204
BP magnitude          : 17.955
DUPflag              : 0
Distance (au)         : 4.469
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -8.42
Sun-Target sep (deg) : 136.47
Sun-Moon sep (deg)   : 158.01
B (ring opening deg) : -2.38
PA of pole (deg)     : 2.07
Pole direction: RA (deg): 268.05671
Dec (deg): 64.49731
C/A sky separation (") : 19.433
C/A sky separation (km) : 62991.7
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
    
```

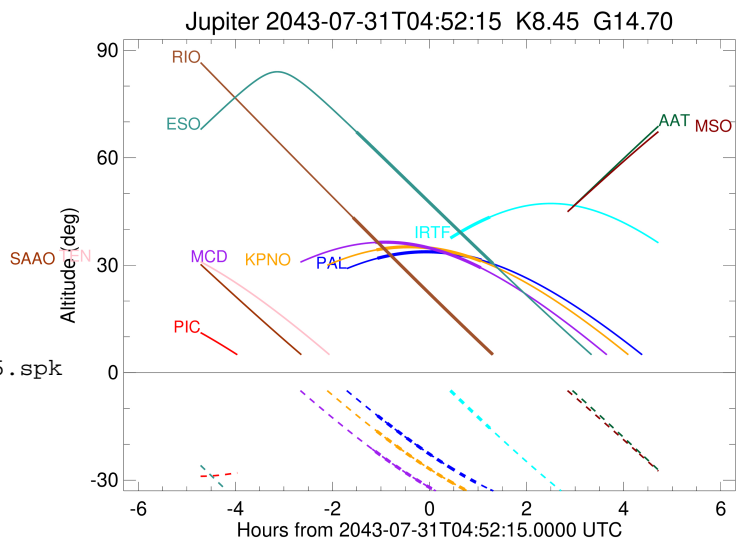
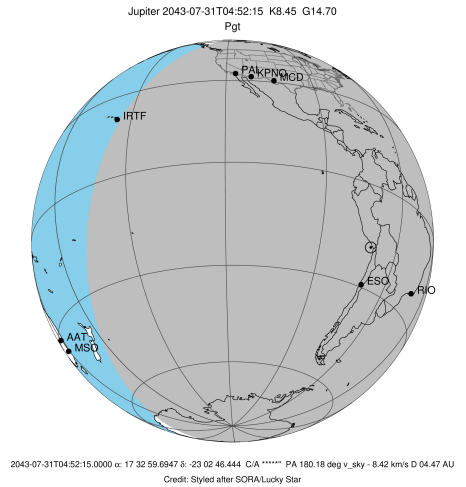


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-07-31T03:47:54.129	31.93	-11.98	71486.3	59.69	62.77
Jupiter	E	2043-07-31T05:56:24.994	31.42	-31.41	71485.9	63.42	66.23

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2043-07-31T04:51:20.480
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      : 4117427096235933696
2Mass ID (if available) : 17325969-2302462
ICRS Star Coord at Epoch: 17h 32m 59.69465s -23:02:46.44368s
RUWE (>1.4 is poor) : 1.11
K magnitude          : 8.449
G magnitude          : 14.702
RP magnitude         : 13.204
BP magnitude         : 17.955
DUPflag             : 0
Distance (au)       : 4.469
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -8.42
Sun-Target sep (deg) : 136.47
Sun-Moon sep (deg)  : 158.08
B (ring opening deg) : -2.38
PA of pole (deg)    : 2.07
Pole direction: RA (deg): 268.05671
Dec (deg): 64.49731
C/A sky separation ("): 19.402
C/A sky separation (km): 62892.9
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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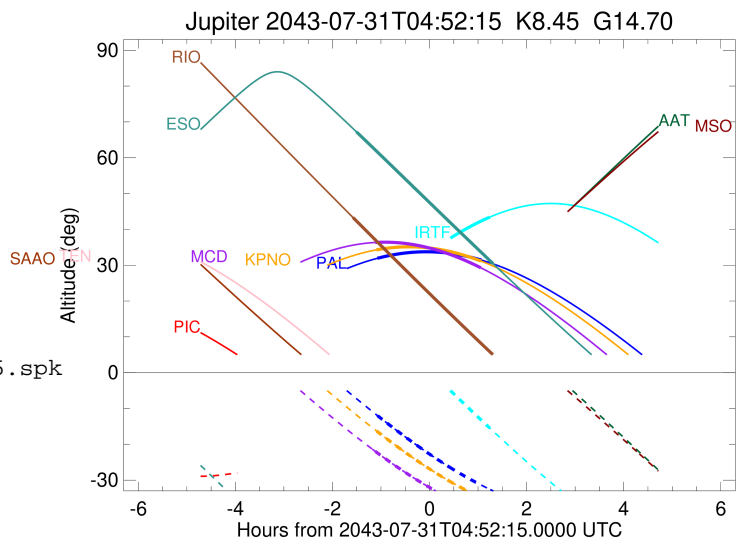
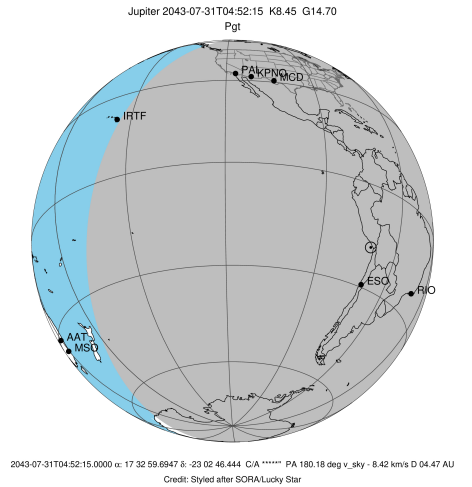


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-07-31T03:46:51.497	34.28	-16.28	71486.3	59.61	62.70
Jupiter	E	2043-07-31T05:56:01.017	31.13	-34.82	71485.9	63.17	65.99

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2043-07-31T04:50:14.530
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        : 4117427096235933696
2Mass ID (if available) : 17325969-2302462
ICRS Star Coord at Epoch: 17h 32m 59.69465s -23:02:46.44368s
RUWE (>1.4 is poor) : 1.11
K magnitude           : 8.449
G magnitude           : 14.702
RP magnitude          : 13.204
BP magnitude          : 17.955
DUPflag              : 0
Distance (au)         : 4.469
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -8.42
Sun-Target sep (deg)  : 136.47
Sun-Moon sep (deg)   : 158.18
B (ring opening deg) : -2.38
PA of pole (deg)     : 2.07
Pole direction: RA (deg): 268.05671
Dec (deg): 64.49731
C/A sky separation (") : 19.362
C/A sky separation (km) : 62762.4
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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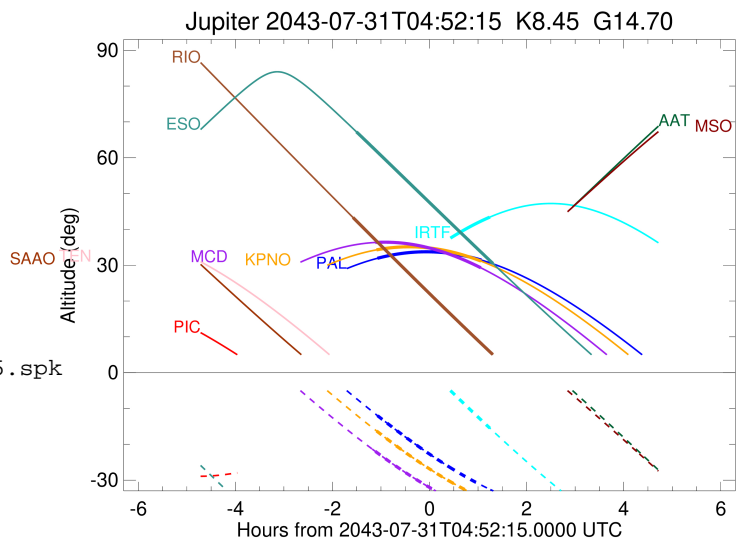
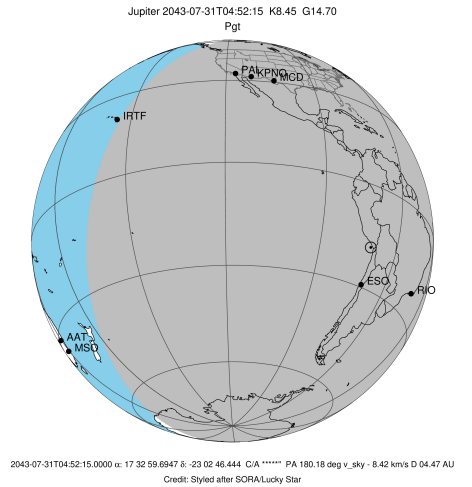


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-07-31T03:45:20.009	36.34	-21.98	71486.3	59.52	62.61
Jupiter	E	2043-07-31T05:55:26.770	29.30	-38.63	71485.9	62.82	65.67

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2043-07-31T04:57:51.260
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      : 4117427096235933696
2Mass ID (if available) : 17325969-2302462
ICRS Star Coord at Epoch: 17h 32m 59.69465s -23:02:46.44368s
RUWE (>1.4 is poor) : 1.11
K magnitude          : 8.449
G magnitude          : 14.702
RP magnitude         : 13.204
BP magnitude         : 17.955
DUPflag             : 0
Distance (au)       : 4.469
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -8.42
Sun-Target sep (deg) : 136.47
Sun-Moon sep (deg)  : 157.44
B (ring opening deg) : -2.38
PA of pole (deg)    : 2.07
Pole direction: RA (deg): 268.05671
Dec (deg): 64.49731
C/A sky separation (") : 18.997
C/A sky separation (km) : 61581.1
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
    
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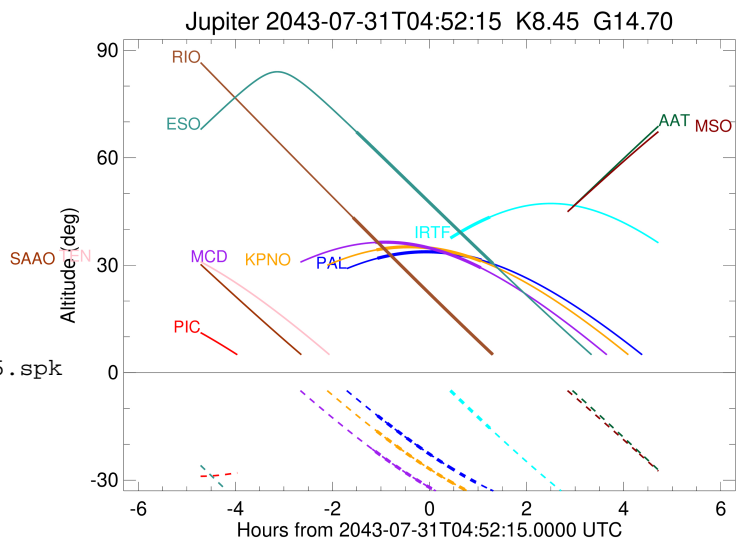
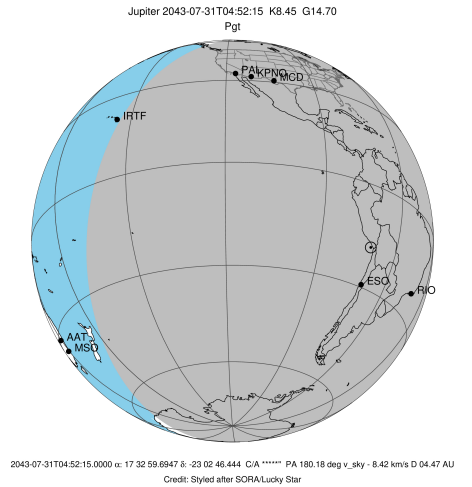


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-07-31T03:48:20.821	22.44	15.12x	71486.6	56.72	60.00
Jupiter	E	2043-07-31T06:06:54.839	43.43	-15.50	71486.0	61.79	64.73

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2043-07-31T04:43:14.940
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       : 4117427096235933696
2Mass ID (if available) : 17325969-2302462
ICRS Star Coord at Epoch: 17h 32m 59.69465s -23:02:46.44368s
RUWE (>1.4 is poor) : 1.11
K magnitude           : 8.449
G magnitude           : 14.702
RP magnitude         : 13.204
BP magnitude         : 17.955
DUPflag              : 0
Distance (au)        : 4.469
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -8.42
Sun-Target sep (deg) : 136.47
Sun-Moon sep (deg)  : 158.57
B (ring opening deg) : -2.38
PA of pole (deg)    : 2.07
Pole direction: RA (deg): 268.05671
Dec (deg): 64.49731
C/A sky separation (") : 17.313
C/A sky separation (km) : 56121.5
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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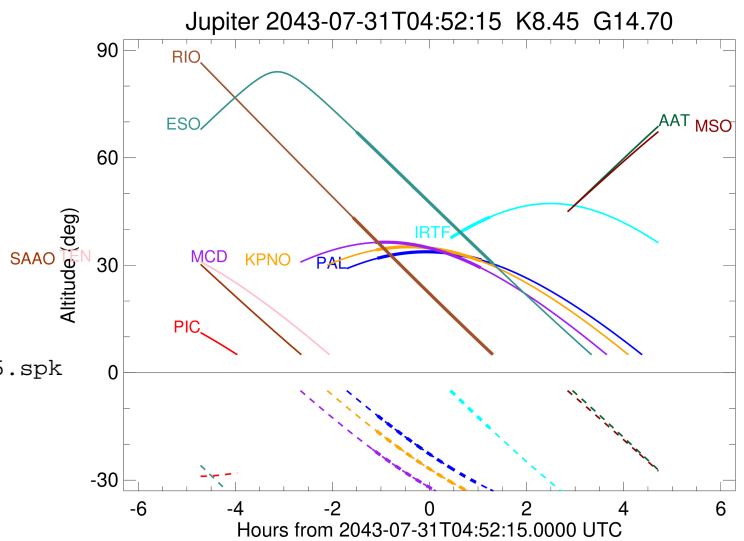
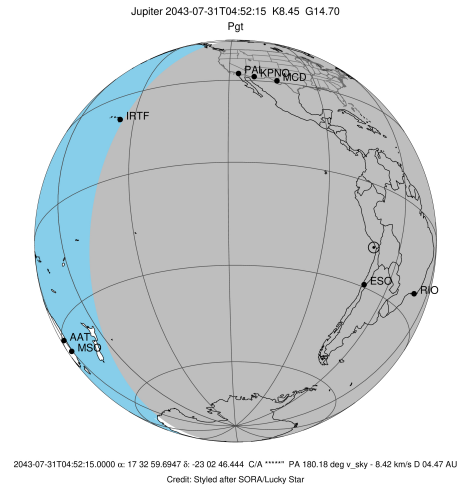


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-07-31T03:17:37.351	43.33	-83.81	71487.4	50.75	54.31
Jupiter	E	2043-07-31T06:10:31.991	5.05	-45.18	71487.2	52.43	55.93

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2043-07-31T04:45:50.790
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       : 4117427096235933696
2Mass ID (if available) : 17325969-2302462
ICRS Star Coord at Epoch: 17h 32m 59.69465s -23:02:46.44368s
RUWE (>1.4 is poor) : 1.11
K magnitude          : 8.449
G magnitude           : 14.702
RP magnitude         : 13.204
BP magnitude         : 17.955
DUPflag             : 0
Distance (au)        : 4.469
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -8.42
Sun-Target sep (deg) : 136.47
Sun-Moon sep (deg)   : 158.48
B (ring opening deg) : -2.38
PA of pole (deg)     : 2.07
Pole direction: RA (deg): 268.05671
Dec (deg): 64.49731
C/A sky separation ("): 17.389
C/A sky separation (km): 56368.1
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	2043-07-31T03:21:57.095	67.22	-67.33	71487.4	50.69	54.25
Jupiter	E	2043-07-31T06:10:54.318	30.41	-68.46	71487.1	53.00	56.47