

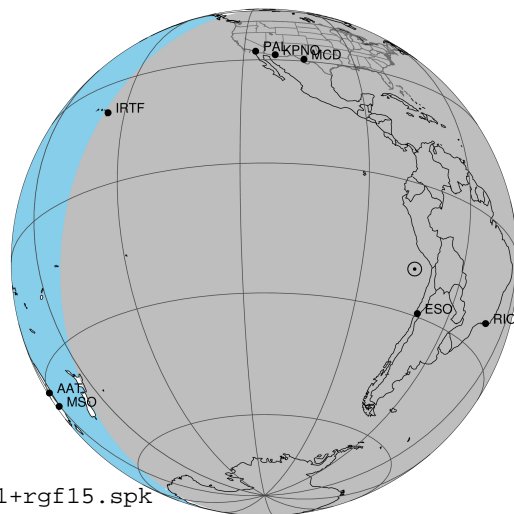
target : Jupiter  
 target radius (km) : 71492.00  
 C/A epoch : 2043-07-24T05:08:07.200  
 Event type : Pgt  
 : Jupiter occs: geocentric, topocentric  
 : Not a ringed target  
 Gaia source ID : 4116687464157067264  
 2Mass ID (if available) : 17351056-2303301

Jupiter 2043-07-24T05:08:07 K9.22 G14.91 Pgt

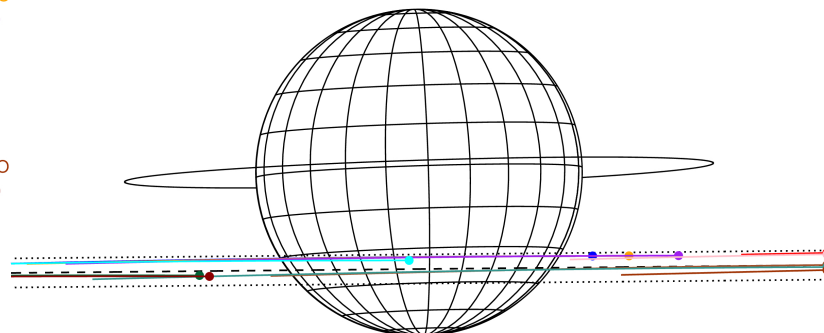
ICRS Star Coord at Epoch: 17h 35m 10.54856s -23°03'30.41979s

RUWE (>1.4 is poor) : 0.89  
 K magnitude : 9.225  
 G magnitude : 14.909  
 RP magnitude : 13.495  
 BP magnitude : 17.420  
 DUPflag : 0  
 Distance (au) : 4.402  
 f0 (km) : 0.00  
 g0 (km) : 0.00  
 skyplane vel. (km/s) : -10.76  
 Sun-Target sep (deg) : 143.65  
 Sun-Moon sep (deg) : 61.27  
 B (ring opening deg) : -2.38  
 PA of pole (deg) : 1.84  
 Pole direction: RA (deg): 268.05670  
 Dec (deg): 64.49731  
 C/A sky separation (") : 13.246  
 C/A sky separation (km) : 42287.8  
 NAIF SPICE kernels : RAJobs\_U111+rgf15.spk

Jupiter 2043-07-24T05:08:07 K9.22 G14.91  
 Pgt



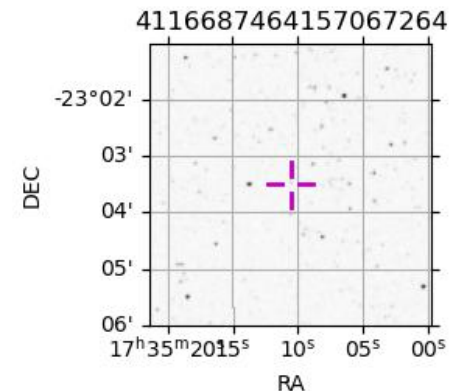
Earth  
 PIC  
 PAL  
 KPNO  
 MCD  
 TEN  
 IRTF  
 RIO  
 ESO  
 AAT  
 SAAO  
 MSO



2043-07-24T05:08:07.2000 α: 17 35 10.5486 δ: -23 03 30.420 C/A \*\*\*\*\* PA 0.55 deg v\_sky -10.76 km/s D 04.40 AU  
 Credit: Styled after SORA/Lucky Star

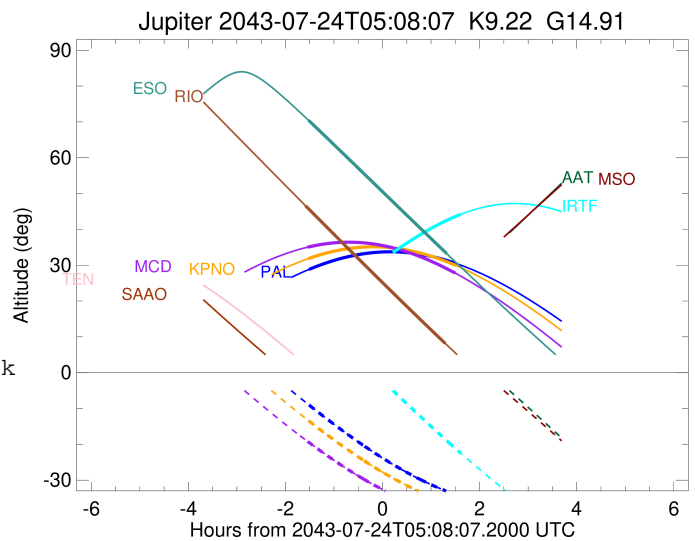
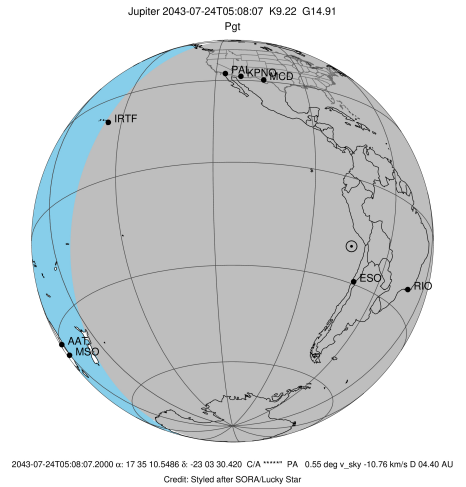
Observable events with sun below -5 deg and altitude above 5 deg

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	+ +	JUL 24 03:37 - JUL 24 06:39	Pie
PMO	Purple Mtn Obs. Nanking	32.1	118.8			Pnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+ +	JUL 24 03:36 - JUL 24 06:39	Pie
MCD	McDonald Obs. 2.7m	30.7	256.0	+ +	JUL 24 03:35 - JUL 24 06:37	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 24 03:33 - JUL 24 06:25	Pie
ESO	European Southern Obs. (3.6m)	-29.3	289.3	+ +	JUL 24 03:36 - JUL 24 06:27	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             : 2043-07-24T05:08:32.410
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        : 4116687464157067264
2Mass ID (if available) : 17351056-2303301
ICRS Star Coord at Epoch: 17h 35m 10.54856s -23:03:30.41979s
RUWE (>1.4 is poor) : 0.89
K magnitude           : 9.225
G magnitude           : 14.909
RP magnitude          : 13.495
BP magnitude          : 17.420
DUPflag              : 0
Distance (au)         : 4.402
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -10.76
Sun-Target sep (deg)  : 143.65
Sun-Moon sep (deg)    : 61.79
B (ring opening deg) : -2.38
PA of pole (deg)      : 1.84
Pole direction: RA (deg): 268.05670
Dec (deg): 64.49731
C/A sky separation (" ) : 11.586
C/A sky separation (km) : 36990.5
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
    
```

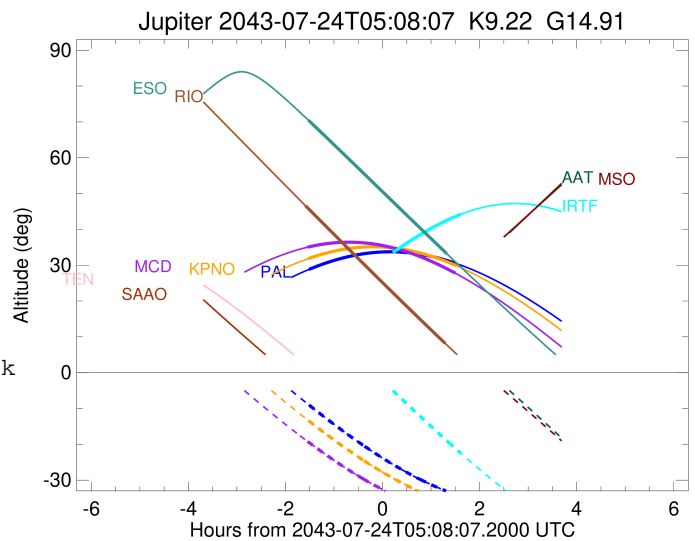
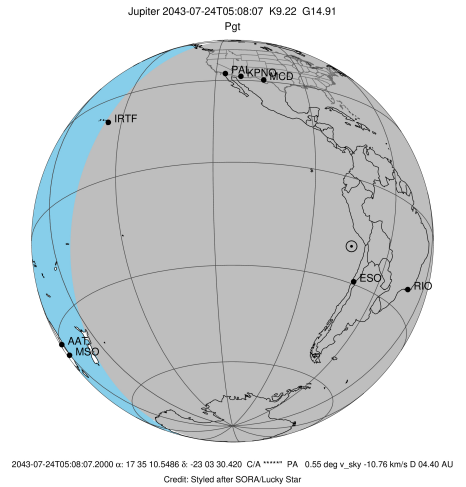


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-07-24T03:37:11.564	28.81	-9.00	71489.7	-32.60	-36.11
Jupiter	E	2043-07-24T06:39:59.064	30.41	-34.10	71490.1	-29.96	-33.33

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2043-07-24T05:07:44.030
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     : 4116687464157067264
2Mass ID (if available) : 17351056-2303301
ICRS Star Coord at Epoch: 17h 35m 10.54856s -23:03:30.41979s
RUWE (>1.4 is poor) : 0.89
K magnitude        : 9.225
G magnitude        : 14.909
RP magnitude       : 13.495
BP magnitude       : 17.420
DUPflag           : 0
Distance (au)     : 4.402
f0 (km)           : 0.00
g0 (km)           : 0.00
skyplane vel. (km/s) : -10.76
Sun-Target sep (deg) : 143.65
Sun-Moon sep (deg) : 61.77
B (ring opening deg) : -2.38
PA of pole (deg)   : 1.84
Pole direction: RA (deg): 268.05670
Dec (deg): 64.49731
C/A sky separation (") : 11.613
C/A sky separation (km) : 37075.3
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
    
```

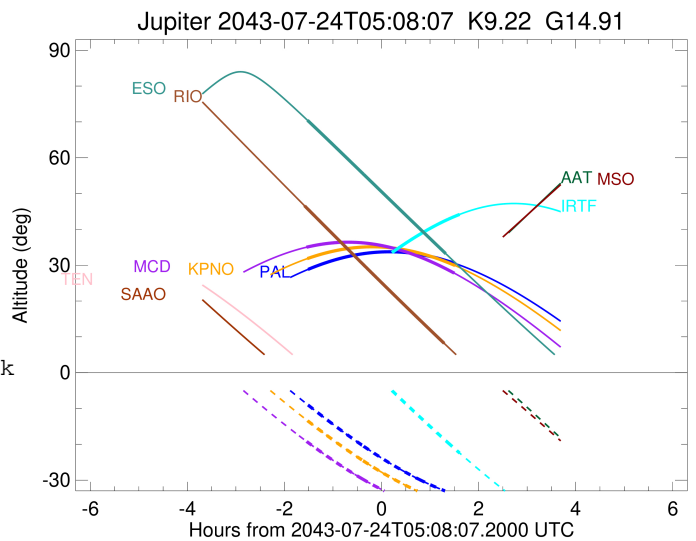
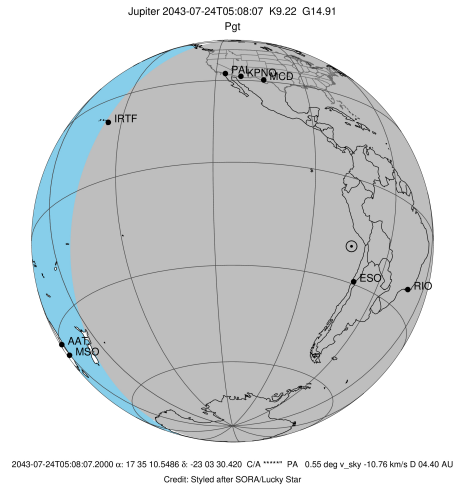


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-07-24T03:36:34.355	31.85	-13.38	71489.7	-32.62	-36.12
Jupiter	E	2043-07-24T06:39:06.356	29.89	-36.76	71490.0	-30.11	-33.49

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2043-07-24T05:06:33.040
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        : 4116687464157067264
2Mass ID (if available) : 17351056-2303301
ICRS Star Coord at Epoch: 17h 35m 10.54856s -23:03:30.41979s
RUWE (>1.4 is poor) : 0.89
K magnitude           : 9.225
G magnitude           : 14.909
RP magnitude          : 13.495
BP magnitude          : 17.420
DUPflag              : 0
Distance (au)         : 4.402
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -10.76
Sun-Target sep (deg)  : 143.65
Sun-Moon sep (deg)    : 61.73
B (ring opening deg) : -2.38
PA of pole (deg)      : 1.84
Pole direction: RA (deg): 268.05670
Dec (deg): 64.49731
C/A sky separation (") : 11.648
C/A sky separation (km) : 37185.7
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
    
```

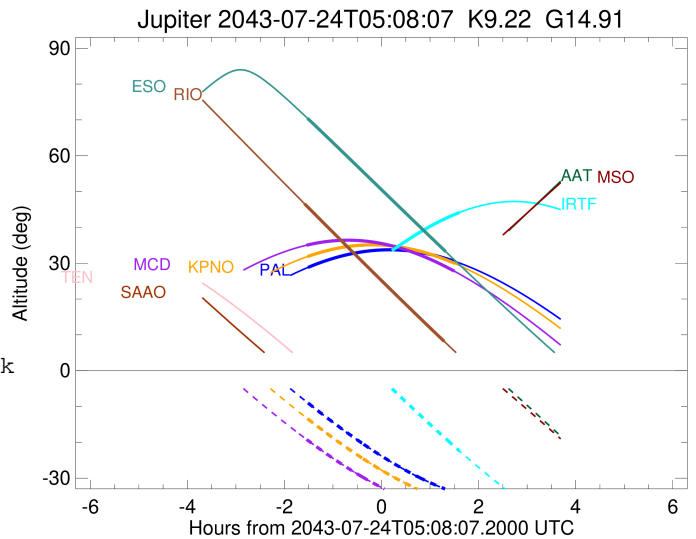
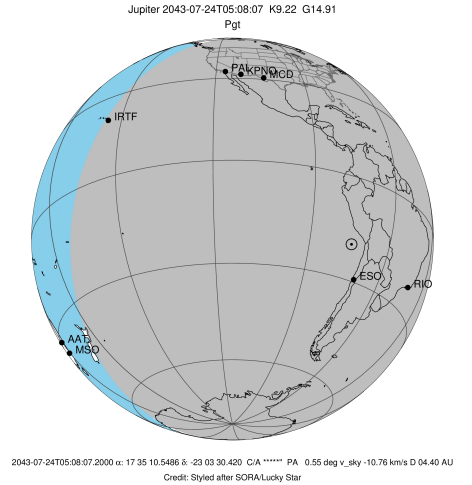


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-07-24T03:35:34.483	35.02	-19.20	71489.7	-32.62	-36.13
Jupiter	E	2043-07-24T06:37:54.260	27.80	-39.28	71490.0	-30.32	-33.70

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2043-07-24T05:14:39.140
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     : 4116687464157067264
2Mass ID (if available) : 17351056-2303301
ICRS Star Coord at Epoch: 17h 35m 10.54856s -23:03:30.41979s
RUWE (>1.4 is poor) : 0.89
K magnitude         : 9.225
G magnitude         : 14.909
RP magnitude        : 13.495
BP magnitude        : 17.420
DUPflag            : 0
Distance (au)      : 4.402
f0 (km)            : 0.00
g0 (km)            : 0.00
skyplane vel. (km/s) : -10.76
Sun-Target sep (deg) : 143.65
Sun-Moon sep (deg)  : 62.01
B (ring opening deg) : -2.38
PA of pole (deg)    : 1.84
Pole direction: RA (deg): 268.05670
Dec (deg): 64.49731
C/A sky separation (") : 12.063
C/A sky separation (km) : 38510.8
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
    
```

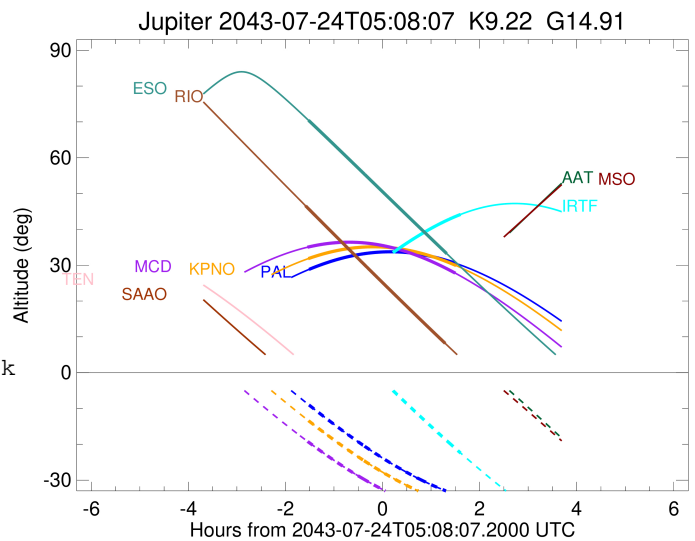
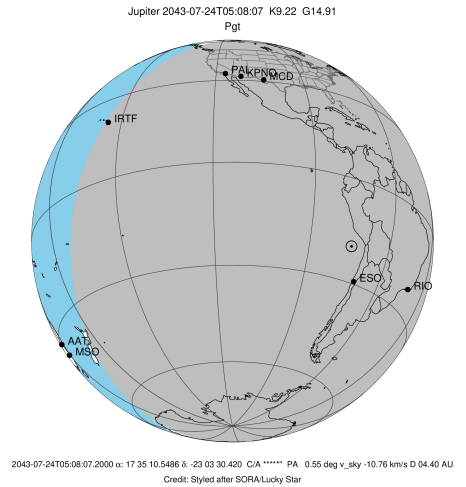


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-07-24T03:43:52.115	15.79	16.59x	71489.5	-34.53	-38.12
Jupiter	E	2043-07-24T06:44:40.513	44.17	-22.43	71490.0	-30.86	-34.28

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2043-07-24T04:58:39.040
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        : 4116687464157067264
2Mass ID (if available) : 17351056-2303301
ICRS Star Coord at Epoch: 17h 35m 10.54856s -23:03:30.41979s
RUWE (>1.4 is poor) : 0.89
K magnitude           : 9.225
G magnitude           : 14.909
RP magnitude          : 13.495
BP magnitude          : 17.420
DUPflag              : 0
Distance (au)         : 4.402
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -10.76
Sun-Target sep (deg) : 143.65
Sun-Moon sep (deg)   : 61.22
B (ring opening deg) : -2.38
PA of pole (deg)     : 1.84
Pole direction: RA (deg): 268.05670
Dec (deg): 64.49731
C/A sky separation (") : 13.688
C/A sky separation (km) : 43700.4
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
    
```

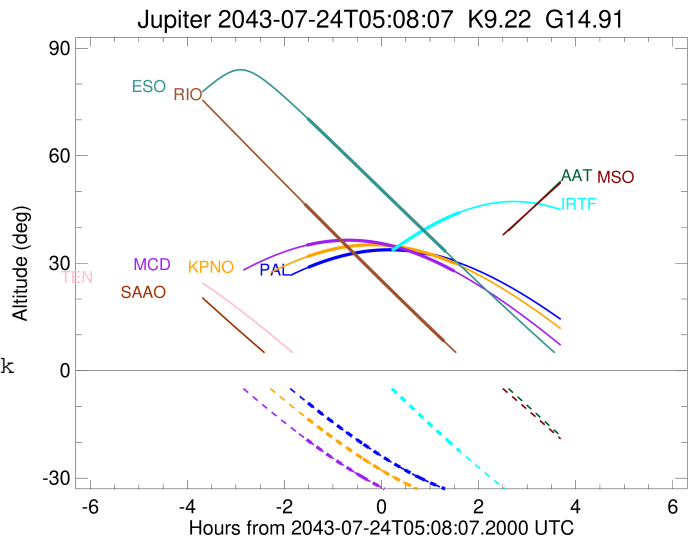
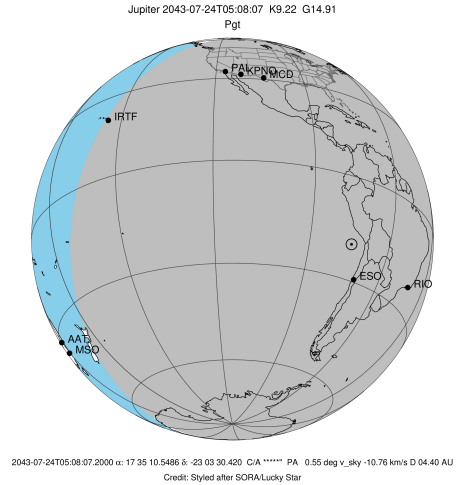


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-07-24T03:33:00.112	46.58	-81.67	71489.0	-38.19	-41.87
Jupiter	E	2043-07-24T06:25:39.445	8.17	-42.11	71489.2	-37.23	-40.89

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2043-07-24T05:01:41.190
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      : 4116687464157067264
2Mass ID (if available) : 17351056-2303301
ICRS Star Coord at Epoch: 17h 35m 10.54856s -23:03:30.41979s
RUWE (>1.4 is poor) : 0.89
K magnitude          : 9.225
G magnitude          : 14.909
RP magnitude         : 13.495
BP magnitude         : 17.420
DUPflag             : 0
Distance (au)        : 4.402
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -10.76
Sun-Target sep (deg) : 143.65
Sun-Moon sep (deg)  : 61.64
B (ring opening deg) : -2.38
PA of pole (deg)    : 1.84
Pole direction: RA (deg): 268.05670
Dec (deg): 64.49731
C/A sky separation (") : 13.626
C/A sky separation (km) : 43501.6
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	2043-07-24T03:36:45.838	70.42	-71.12	71489.0	-38.31	-41.99
Jupiter	E	2043-07-24T06:27:32.432	33.23	-65.91	71489.2	-36.81	-40.46