

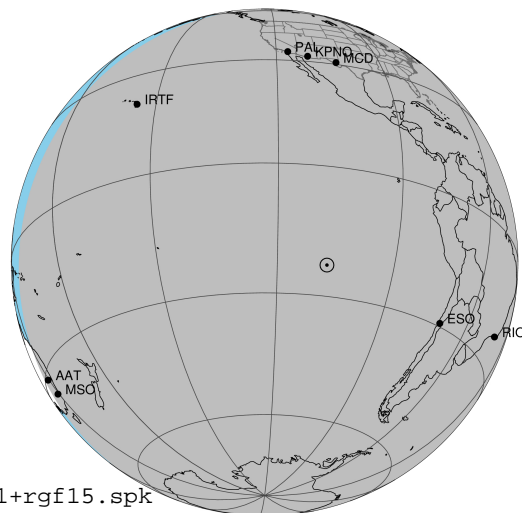
target : Jupiter  
 target radius (km) : 71492.00  
 C/A epoch : 2043-07-03T07:14:45.410  
 Event type : Pgt  
 : Jupiter occs: geocentric, topocentric  
 : Not a ringed target  
 Gaia source ID : 4068824662238370432  
 2Mass ID (if available) : 17443296-2304435

Jupiter 2043-07-03T07:14:45 K8.35 G13.60 Pgt

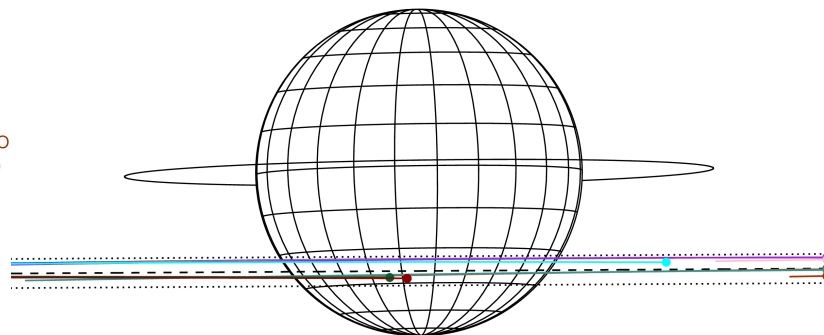
ICRS Star Coord at Epoch: 17h 44m 32.96529s -23:04:43.80676s

RUWE (>1.4 is poor) : 0.82  
 K magnitude : 8.349  
 G magnitude : 13.595  
 RP magnitude : 12.261  
 BP magnitude : 15.690  
 DUPflag : 0  
 Distance (au) : 4.271  
 f0 (km) : 0.00  
 g0 (km) : 0.00  
 skyplane vel. (km/s) : -15.55  
 Sun-Target sep (deg) : 165.75  
 Sun-Moon sep (deg) : 146.37  
 B (ring opening deg) : -2.41  
 PA of pole (deg) : 0.83  
 Pole direction: RA (deg): 268.05669  
 Dec (deg): 64.49732  
 C/A sky separation (") : 13.931  
 C/A sky separation (km) : 43149.1  
 NAIF SPICE kernels : RAJobs\_U111+rgf15.spk

Jupiter 2043-07-03T07:14:45 K8.35 G13.60 Pgt



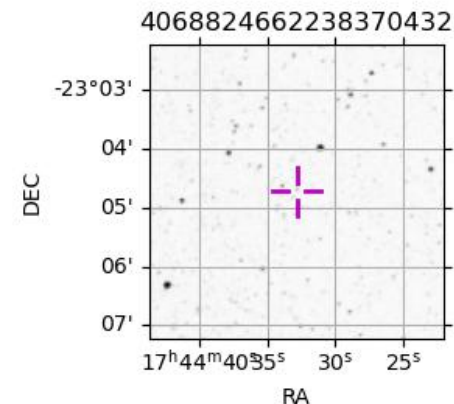
Earth  
 PAL  
 KPNO  
 MCD  
 TEN  
 IRTF  
 RIO  
 ESO  
 AAT  
 SAAO  
 MSO



2043-07-03T07:14:45.4100 α: 17 44 32.9653 δ: -23 04 43.807 C/A \*\*\*\*\* PA 0.35 deg v\_sky -15.55 km/s D 04.27 AU  
 Credit: Styled after SORA/Lucky Star

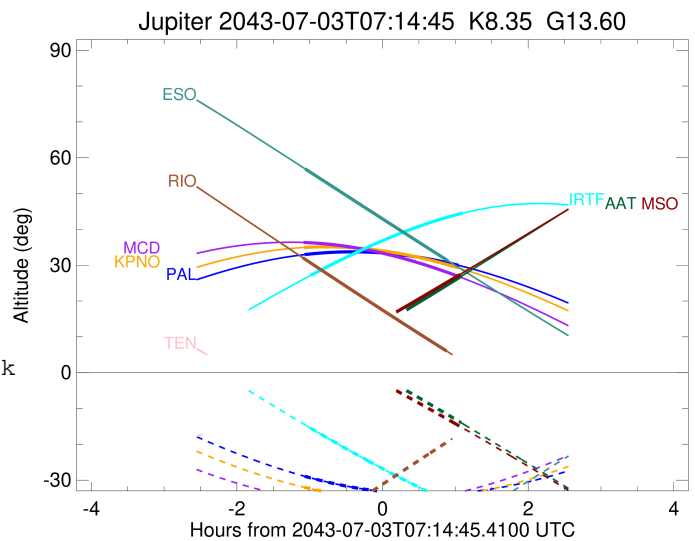
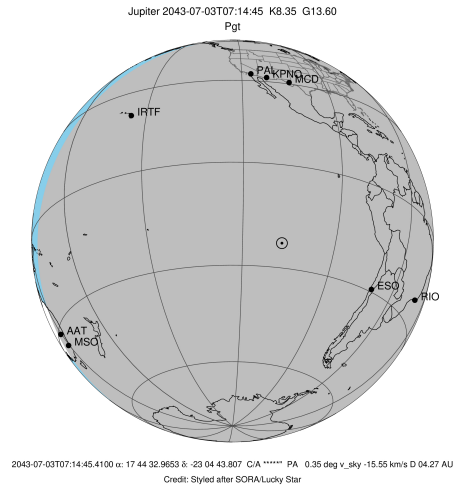
Observable events with sun below -5 deg and altitude above 5 deg

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 03 06:10 - JUL 03 08:17	Pie
PMO	Purple Mtn Obs. Nanking	32.1	118.8			Pnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+ +	JUL 03 06:10 - JUL 03 08:16	Pie
MCD	McDonald Obs. 2.7m	30.7	256.0	+ +	JUL 03 06:09 - JUL 03 08:16	Pie
TEN	Teide Obs./Tenerife	28.3	343.5			Pnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+ +	JUL 03 06:15 - JUL 03 08:20	Pie
KAV	Kavalur Observatory	12.6	78.8			Pnn
RIO	Rio de Janeiro	-22.9	316.8	+ +	JUL 03 06:09 - JUL 03 08:07	Pie
ESO	European Southern Obs. (3.6m)	-29.3	289.3	+ +	JUL 03 06:11 - JUL 03 08:08	Pie
AAT	Siding Spring (AAT)	-31.3	149.1	+ +	JUL 03 08:19 - JUL 03 08:19	Pne
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8			Pnn
MSO	Mt. Stromlo Observatory	-35.3	149.0	+ +	JUL 03 08:18 - JUL 03 08:18	Pne



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2043-07-03T07:14:07.070
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        : 4068824662238370432
2Mass ID (if available) : 17443296-2304435
ICRS Star Coord at Epoch: 17h 44m 32.96529s -23:04:43.80676s
RUWE (>1.4 is poor) : 0.82
K magnitude           : 8.349
G magnitude           : 13.595
RP magnitude          : 12.261
BP magnitude          : 15.690
DUPflag              : 0
Distance (au)         : 4.271
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -15.55
Sun-Target sep (deg)  : 165.75
Sun-Moon sep (deg)    : 146.82
B (ring opening deg) : -2.41
PA of pole (deg)     : 0.83
Pole direction: RA (deg): 268.05669
Dec (deg): 64.49732
C/A sky separation (" ) : 12.223
C/A sky separation (km) : 37859.2
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
    
```

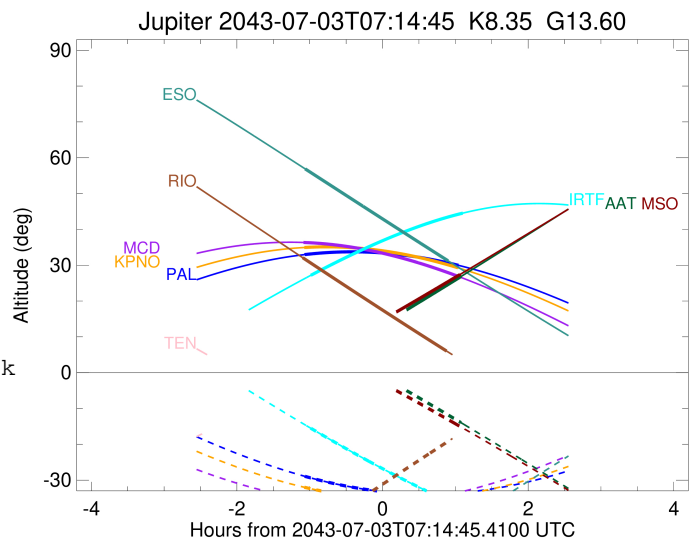
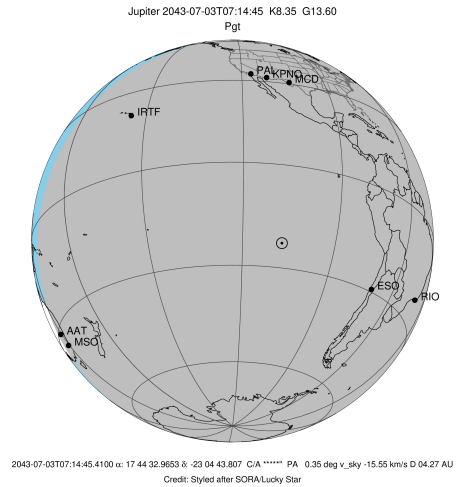


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-07-03T06:10:46.564	32.96	-28.93	71489.7	-32.44	-35.94
Jupiter	E	2043-07-03T08:17:31.593	29.94	-33.53	71489.8	-31.60	-35.06

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2043-07-03T07:13:33.550
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       : 4068824662238370432
2Mass ID (if available) : 17443296-2304435
ICRS Star Coord at Epoch: 17h 44m 32.96529s -23:04:43.80676s
RUWE (>1.4 is poor) : 0.82
K magnitude           : 8.349
G magnitude           : 13.595
RP magnitude          : 12.261
BP magnitude          : 15.690
DUPflag              : 0
Distance (au)         : 4.271
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -15.55
Sun-Target sep (deg) : 165.75
Sun-Moon sep (deg)   : 146.89
B (ring opening deg) : -2.41
PA of pole (deg)     : 0.83
Pole direction: RA (deg): 268.05669
Dec (deg): 64.49732
C/A sky separation (") : 12.260
C/A sky separation (km) : 37973.9
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
    
```

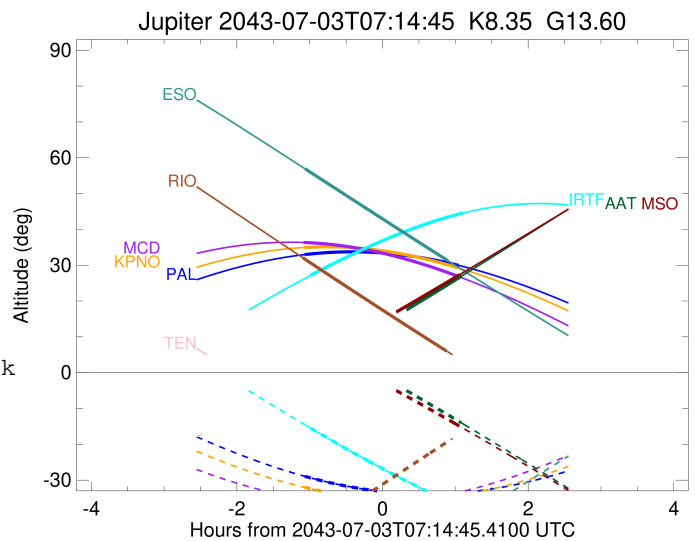
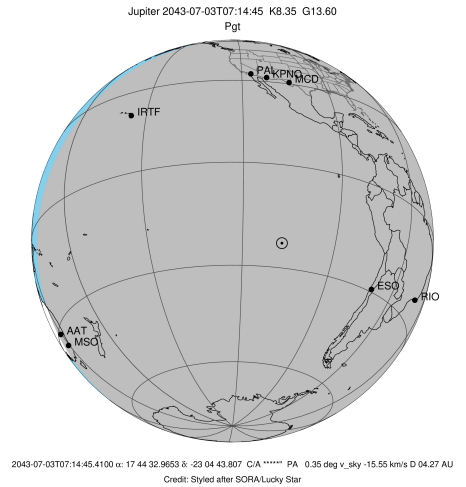


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-07-03T06:10:18.945	34.94	-31.98	71489.7	-32.50	-36.00
Jupiter	E	2043-07-03T08:16:54.541	29.29	-34.15	71489.8	-31.76	-35.22

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2043-07-03T07:12:45.600
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      : 4068824662238370432
2Mass ID (if available) : 17443296-2304435
ICRS Star Coord at Epoch: 17h 44m 32.96529s -23:04:43.80676s
RUWE (>1.4 is poor) : 0.82
K magnitude          : 8.349
G magnitude          : 13.595
RP magnitude         : 12.261
BP magnitude         : 15.690
DUPflag             : 0
Distance (au)       : 4.271
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -15.55
Sun-Target sep (deg) : 165.75
Sun-Moon sep (deg)  : 146.97
B (ring opening deg) : -2.41
PA of pole (deg)    : 0.83
Pole direction: RA (deg): 268.05669
Dec (deg): 64.49732
C/A sky separation (") : 12.310
C/A sky separation (km) : 38128.3
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
    
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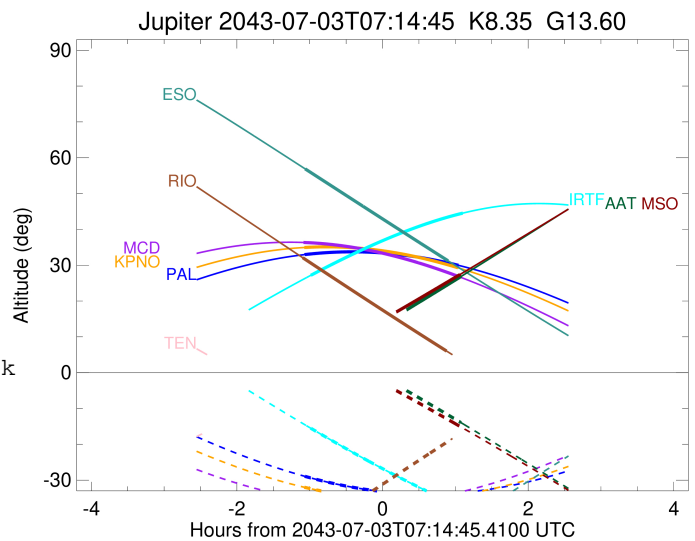
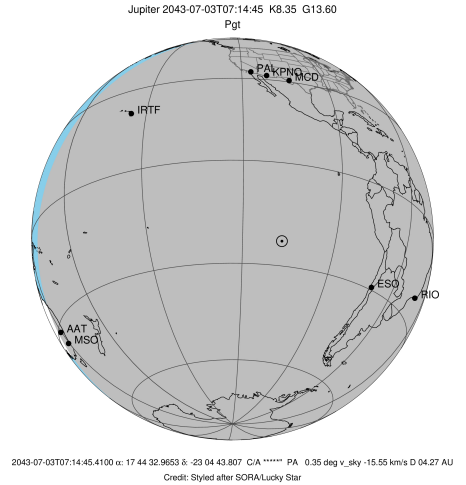


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-07-03T06:09:36.891	36.34	-35.18	71489.7	-32.57	-36.08
Jupiter	E	2043-07-03T08:16:04.068	27.01	-33.54	71489.8	-31.97	-35.45

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2043-07-03T07:18:21.500
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        : 4068824662238370432
2Mass ID (if available) : 17443296-2304435
ICRS Star Coord at Epoch: 17h 44m 32.96529s -23:04:43.80676s
RUWE (>1.4 is poor) : 0.82
K magnitude           : 8.349
G magnitude           : 13.595
RP magnitude          : 12.261
BP magnitude          : 15.690
DUPflag               : 0
Distance (au)         : 4.271
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -15.55
Sun-Target sep (deg)  : 165.75
Sun-Moon sep (deg)    : 146.34
B (ring opening deg) : -2.41
PA of pole (deg)      : 0.83
Pole direction: RA (deg): 268.05669
Dec (deg): 64.49732
C/A sky separation (") : 12.645
C/A sky separation (km) : 39165.7
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
    
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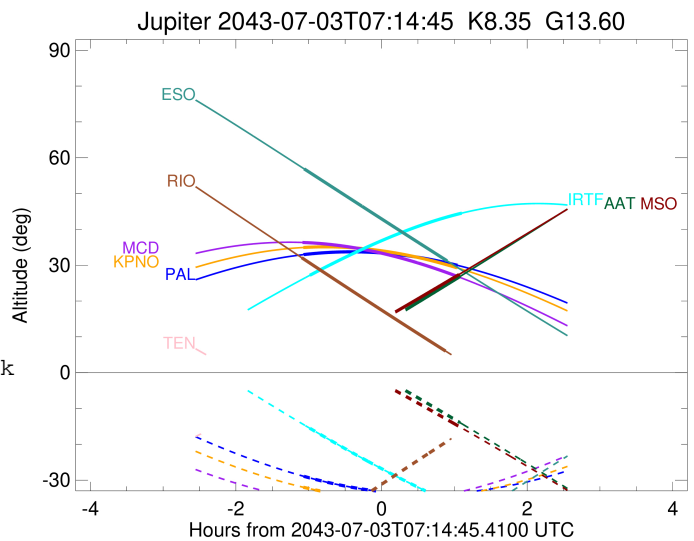
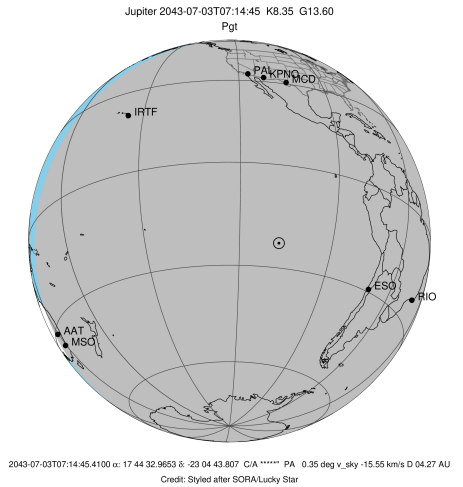


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-07-03T06:15:41.465	27.17	-15.52	71489.5	-34.05	-37.62
Jupiter	E	2043-07-03T08:20:47.862	44.52	-37.53	71489.7	-32.46	-35.96

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2043-07-03T07:08:04.810
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      : 4068824662238370432
2Mass ID (if available) : 17443296-2304435
ICRS Star Coord at Epoch: 17h 44m 32.96529s -23:04:43.80676s
RUWE (>1.4 is poor) : 0.82
K magnitude         : 8.349
G magnitude         : 13.595
RP magnitude        : 12.261
BP magnitude        : 15.690
DUPflag            : 0
Distance (au)      : 4.271
f0 (km)            : 0.00
g0 (km)            : 0.00
skyplane vel. (km/s) : -15.55
Sun-Target sep (deg) : 165.75
Sun-Moon sep (deg)  : 147.27
B (ring opening deg) : -2.41
PA of pole (deg)    : 0.83
Pole direction: RA (deg): 268.05669
Dec (deg): 64.49732
C/A sky separation (") : 14.510
C/A sky separation (km) : 44940.8
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
    
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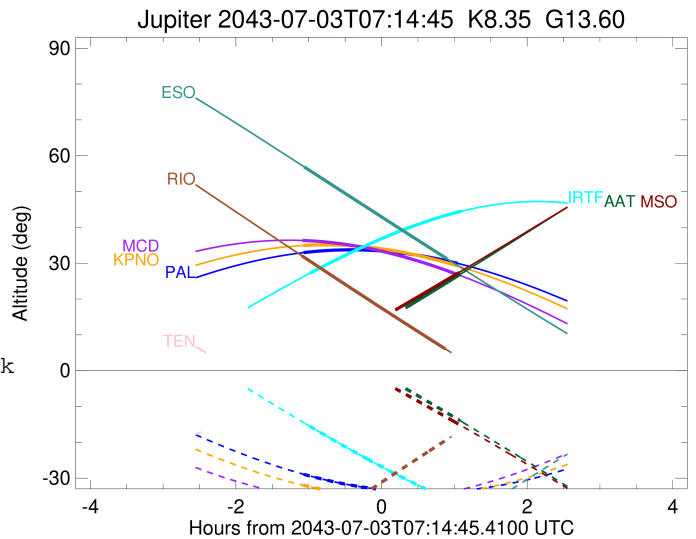
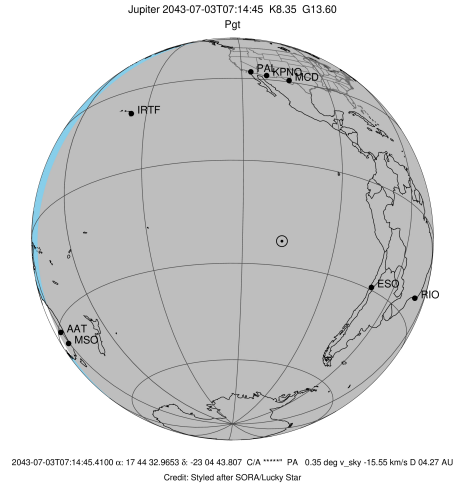


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-07-03T06:09:04.280	32.08	-45.98	71488.9	-38.81	-42.50
Jupiter	E	2043-07-03T08:07:31.672	6.04	-19.46	71488.8	-39.05	-42.74

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2043-07-03T07:09:43.910
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        : 4068824662238370432
2Mass ID (if available) : 17443296-2304435
ICRS Star Coord at Epoch: 17h 44m 32.96529s -23:04:43.80676s
RUWE (>1.4 is poor) : 0.82
K magnitude           : 8.349
G magnitude           : 13.595
RP magnitude          : 12.261
BP magnitude          : 15.690
DUPflag              : 0
Distance (au)         : 4.271
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -15.55
Sun-Target sep (deg)  : 165.75
Sun-Moon sep (deg)   : 147.30
B (ring opening deg) : -2.41
PA of pole (deg)     : 0.83
Pole direction: RA (deg): 268.05669
Dec (deg): 64.49732
C/A sky separation (") : 14.407
C/A sky separation (km) : 44624.5
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
    
```



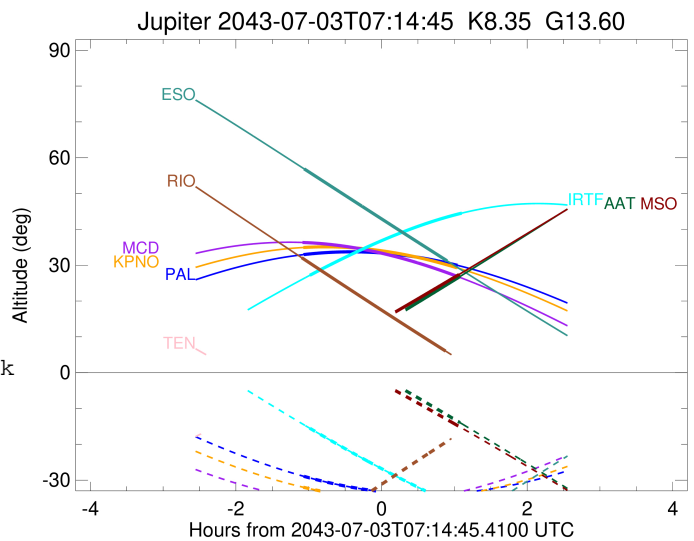
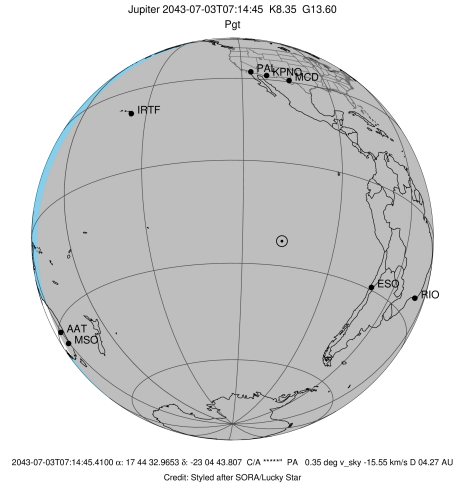
x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-07-03T06:11:02.512	56.88	-70.21	71488.9	-38.66	-42.35
Jupiter	E	2043-07-03T08:08:44.909	31.23	-44.63	71488.9	-38.60	-42.29



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2043-07-03T07:21:04.860
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       : 4068824662238370432
2Mass ID (if available) : 17443296-2304435
ICRS Star Coord at Epoch: 17h 44m 32.96529s -23:04:43.80676s
RUWE (>1.4 is poor) : 0.82
K magnitude          : 8.349
G magnitude          : 13.595
RP magnitude         : 12.261
BP magnitude         : 15.690
DUPflag             : 0
Distance (au)        : 4.271
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -15.55
Sun-Target sep (deg) : 165.75
Sun-Moon sep (deg)   : 145.76
B (ring opening deg) : -2.41
PA of pole (deg)     : 0.83
Pole direction: RA (deg): 268.05669
Dec (deg): 64.49732
C/A sky separation ("): 14.867
C/A sky separation (km): 46047.4
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
    
```



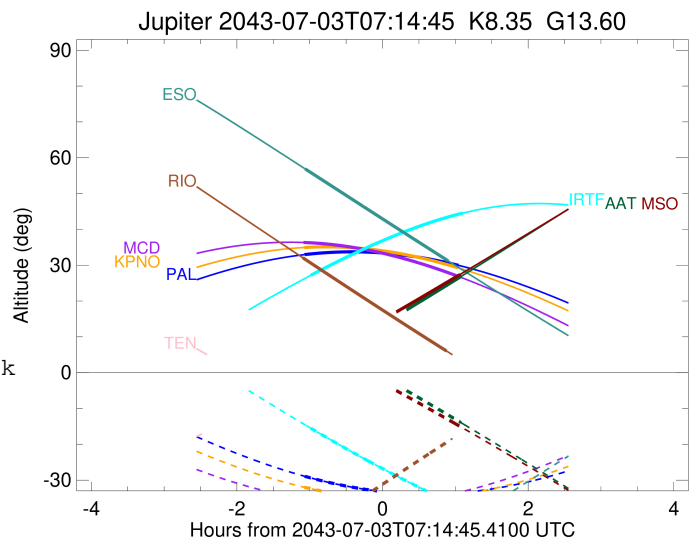
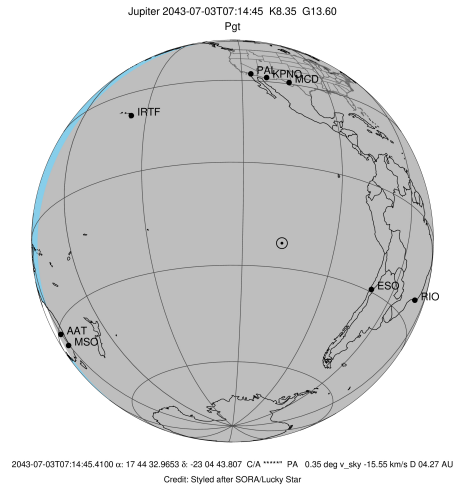
x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-07-03T06:22:23.878	3.05x	8.55x	71488.6	-41.10	-44.82
Jupiter	E	2043-07-03T08:19:23.560	26.83	-13.94	71488.8	-39.02	-42.72



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2043-07-03T07:20:47.940
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      : 4068824662238370432
2Mass ID (if available) : 17443296-2304435
ICRS Star Coord at Epoch: 17h 44m 32.96529s -23:04:43.80676s
RUWE (>1.4 is poor) : 0.82
K magnitude          : 8.349
G magnitude          : 13.595
RP magnitude         : 12.261
BP magnitude         : 15.690
DUPflag             : 0
Distance (au)       : 4.271
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -15.55
Sun-Target sep (deg) : 165.75
Sun-Moon sep (deg)  : 145.79
B (ring opening deg) : -2.41
PA of pole (deg)    : 0.83
Pole direction: RA (deg): 268.05669
Dec (deg): 64.49732
C/A sky separation (") : 14.981
C/A sky separation (km) : 46402.4
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	2043-07-03T06:22:26.440	4.73x	6.35x	71488.5	-41.45	-45.17
Jupiter	E	2043-07-03T08:18:48.443	27.43	-15.04	71488.8	-39.42	-43.12