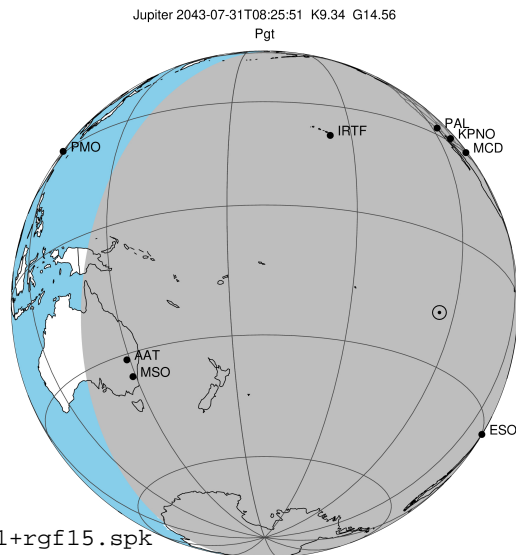


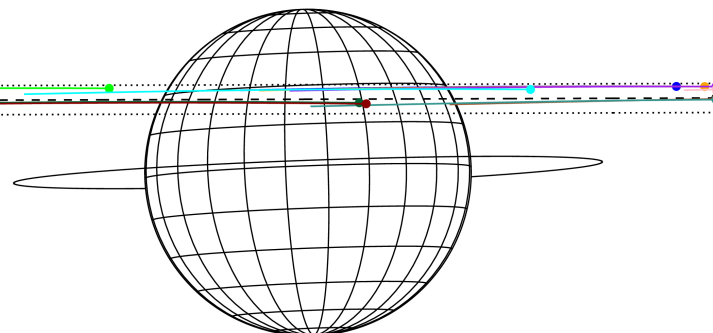
target : Jupiter  
 target radius (km) : 71492.00  
 C/A epoch : 2043-07-31T08:25:51.270  
 Event type : Pgt  
 : Jupiter occs: geocentric, topocentric  
 : Not a ringed target  
 Gaia source ID : 4117427057521620736  
 2Mass ID (if available) : 17325729-2302541

Jupiter 2043-07-31T08:25:51 K9.34 G14.56 Pgt

ICRS Star Coord at Epoch: 17h 32m 57.28848s -23:02:54.24250s  
 RUWE (>1.4 is poor) : 1.00  
 K magnitude : 9.335  
 G magnitude : 14.560  
 RP magnitude : 13.260  
 BP magnitude : 16.508  
 DUPflag : 0  
 Distance (au) : 4.471  
 f0 (km) : 0.00  
 g0 (km) : 0.00  
 skyplane vel. (km/s) : -8.37  
 Sun-Target sep (deg) : 136.32  
 Sun-Moon sep (deg) : 159.73  
 B (ring opening deg) : -2.37  
 PA of pole (deg) : 2.07  
 Pole direction: RA (deg): 268.05671  
 Dec (deg): 64.49731  
 C/A sky separation (") : 9.894  
 C/A sky separation (km) : 32083.5  
 NAIF SPICE kernels : RAJobs\_U111+rgf15.spk  
 URKALLv1.spk  
 naif0012.tls  
 nep097.bsp  
 nep101.bsp  
 sat4401.bsp



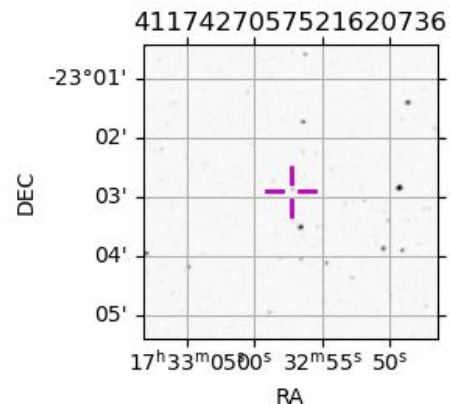
Earth  
 PAL  
 PMO  
 KPNO  
 MCD  
 TEN  
 IRTF  
 KAV  
 RIO  
 ESO  
 AAT  
 MSO



2043-07-31T08:25:51.2700 a: 17 32 57.2885 s: -23 02 54.243 C/A 9.884 PA 180.17 deg v\_sky - 8.37 km/s D 04.47 AU  
 Credit: Styled after SORA/Lucky Star

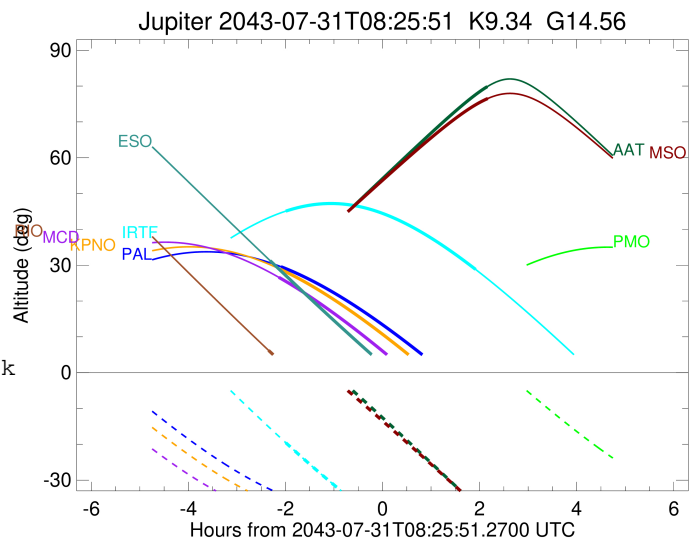
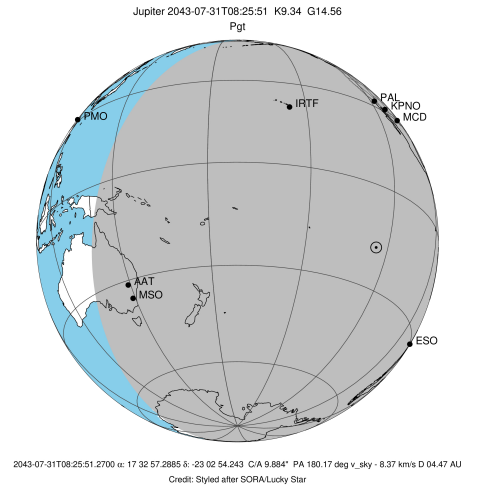
Observable events with sun below -5 deg and altitude above 5 deg

Obs	Location	lat	Elon	Target	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1			Pnn
PAL	Palomar Mt (200")	33.4	243.1	+	JUL 31 06:20 - JUL 31 06:20	Pin
PMO	Purple Mtn Obs. Nanking	32.1	118.8			Pnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+	JUL 31 06:19 - JUL 31 06:19	Pin
MCD	McDonald Obs. 2.7m	30.7	256.0	+	JUL 31 06:17 - JUL 31 06:17	Pin
TEN	Teide Obs./Tenerife	28.3	343.5			Pnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+ +	JUL 31 06:26 - JUL 31 10:20	Pie
KAV	Kavalur Observatory	12.6	78.8			Pnn
RIO	Rio de Janeiro	-22.9	316.8	+	JUL 31 06:04 - JUL 31 06:04	Pin
ESO	European Southern Obs. (3.6m)	-29.3	289.3	+	JUL 31 06:06 - JUL 31 06:06	Pin
AAT	Siding Spring (AAT)	-31.3	149.1	+	JUL 31 10:35 - JUL 31 10:35	Pne
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8			Pnn
MSO	Mt. Stromlo Observatory	-35.3	149.0	+	JUL 31 10:35 - JUL 31 10:35	Pne



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2043-07-31T08:18:25.050
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      : 4117427057521620736
2Mass ID (if available) : 17325729-2302541
ICRS Star Coord at Epoch: 17h 32m 57.28848s -23:02:54.24250s
RUWE (>1.4 is poor) : 1.00
K magnitude          : 9.335
G magnitude          : 14.560
RP magnitude         : 13.260
BP magnitude         : 16.508
DUPflag             : 0
Distance (au)        : 4.471
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -8.37
Sun-Target sep (deg) : 136.32
Sun-Moon sep (deg)  : 160.56
B (ring opening deg) : -2.37
PA of pole (deg)    : 2.07
Pole direction: RA (deg): 268.05671
Dec (deg): 64.49731
C/A sky separation ("): 11.273
C/A sky separation (km): 36555.6
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
    
```

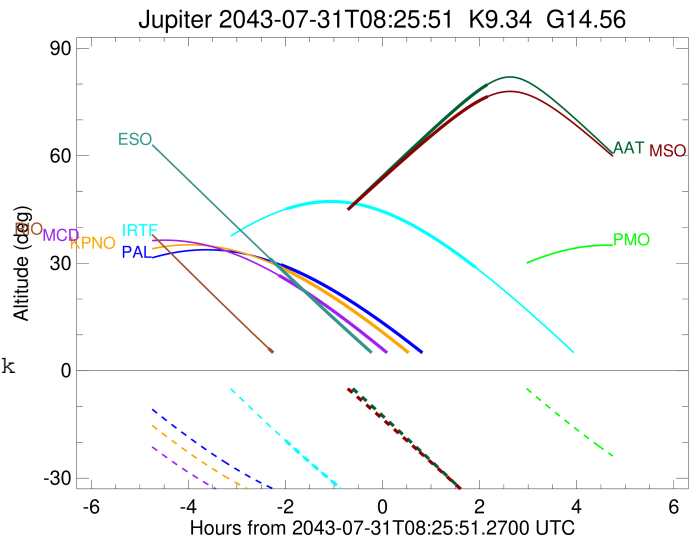
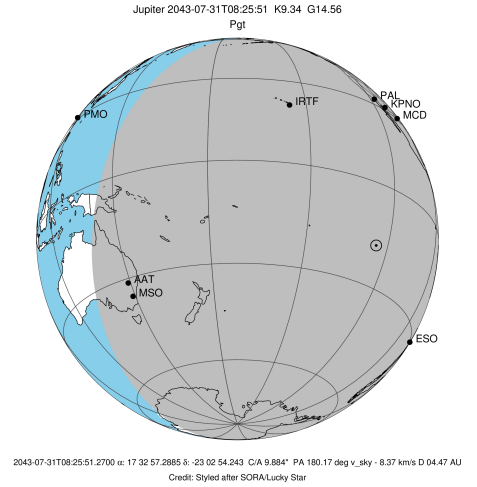


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-07-31T06:20:19.084	29.58	-33.92	71490.1	29.44	32.77
Jupiter	E	2043-07-31T10:19:01.361	-6.90x	-28.01	71489.9	31.69	35.15

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2043-07-31T08:17:48.910
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       : 4117427057521620736
2Mass ID (if available) : 17325729-2302541
ICRS Star Coord at Epoch: 17h 32m 57.28848s -23:02:54.24250s
RUWE (>1.4 is poor) : 1.00
K magnitude           : 9.335
G magnitude           : 14.560
RP magnitude         : 13.260
BP magnitude         : 16.508
DUPflag              : 0
Distance (au)        : 4.471
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -8.37
Sun-Target sep (deg) : 136.32
Sun-Moon sep (deg)   : 160.58
B (ring opening deg) : -2.37
PA of pole (deg)     : 2.07
Pole direction: RA (deg): 268.05671
Dec (deg): 64.49731
C/A sky separation ("): 11.195
C/A sky separation (km): 36300.3
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
    
```

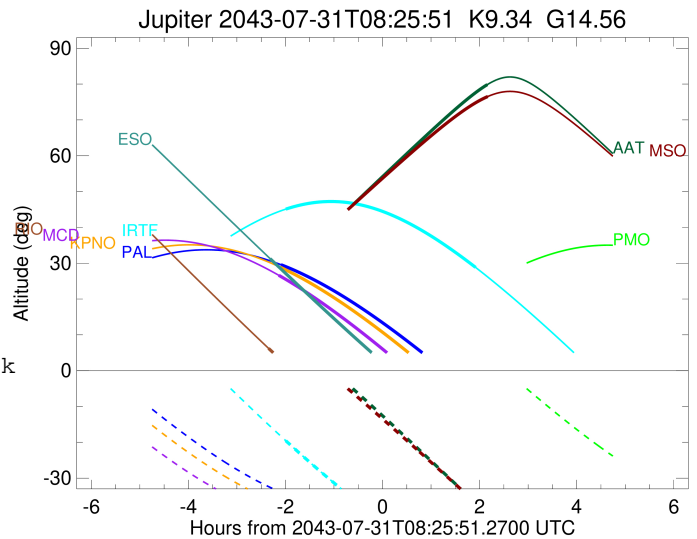
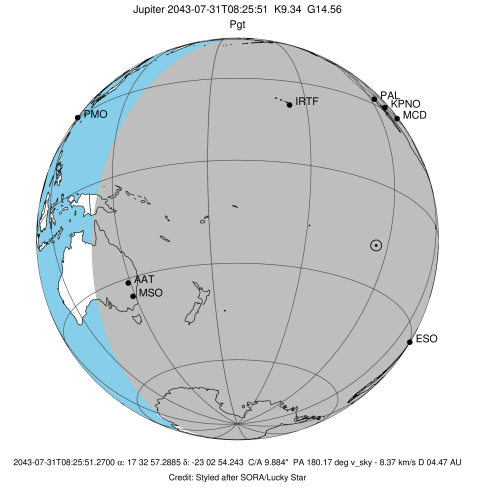


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-07-31T06:19:12.311	28.90	-36.92	71490.2	29.28	32.61
Jupiter	E	2043-07-31T10:19:08.115	-10.53x	-26.04	71489.9	31.40	34.85

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2043-07-31T08:17:06.520
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      : 4117427057521620736
2Mass ID (if available) : 17325729-2302541
ICRS Star Coord at Epoch: 17h 32m 57.28848s -23:02:54.24250s
RUWE (>1.4 is poor) : 1.00
K magnitude         : 9.335
G magnitude         : 14.560
RP magnitude        : 13.260
BP magnitude        : 16.508
DUPflag            : 0
Distance (au)       : 4.471
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -8.37
Sun-Target sep (deg) : 136.32
Sun-Moon sep (deg)  : 160.60
B (ring opening deg) : -2.37
PA of pole (deg)    : 2.07
Pole direction: RA (deg): 268.05671
Dec (deg): 64.49731
C/A sky separation (") : 11.089
C/A sky separation (km) : 35959.0
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
    
```

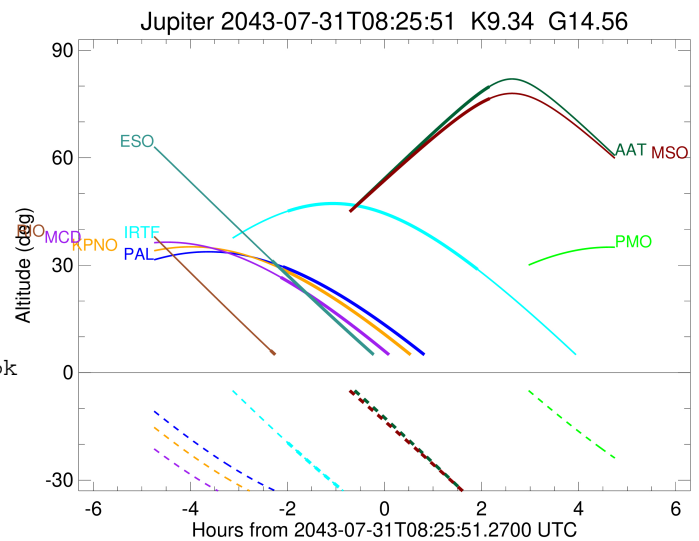
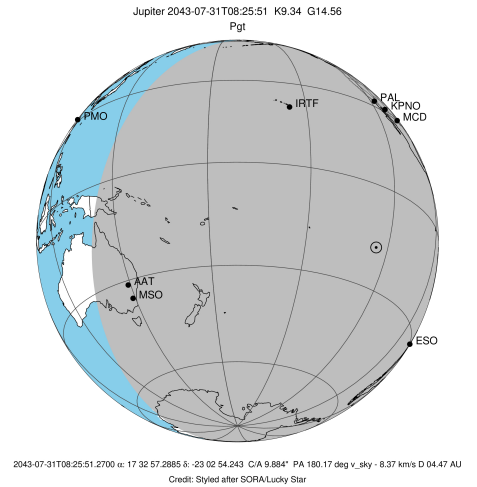


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-07-31T06:17:41.786	26.61	-40.05	71490.2	29.06	32.38
Jupiter	E	2043-07-31T10:19:29.402	-16.31x	-22.05	71490.0	31.04	34.46

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2043-07-31T08:23:04.020
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      : 4117427057521620736
2Mass ID (if available) : 17325729-2302541
ICRS Star Coord at Epoch: 17h 32m 57.28848s -23:02:54.24250s
RUWE (>1.4 is poor) : 1.00
K magnitude         : 9.335
G magnitude         : 14.560
RP magnitude        : 13.260
BP magnitude        : 16.508
DUPflag            : 0
Distance (au)       : 4.471
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -8.37
Sun-Target sep (deg) : 136.32
Sun-Moon sep (deg)  : 160.32
B (ring opening deg) : -2.37
PA of pole (deg)    : 2.07
Pole direction: RA (deg): 268.05671
Dec (deg): 64.49731
C/A sky separation (") : 11.204
C/A sky separation (km) : 36331.5
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
    
```

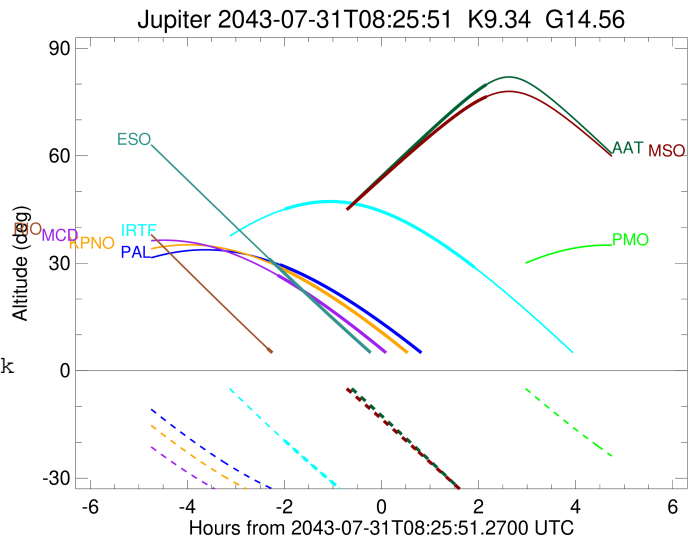
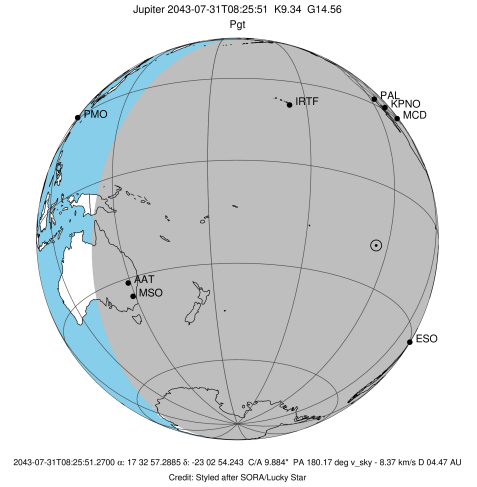


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-07-31T06:26:19.815	45.09	-19.56	71490.2	28.63	31.92
Jupiter	E	2043-07-31T10:20:55.626	28.82	-52.03	71489.9	31.86	35.33

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2043-07-31T08:17:21.120
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       : 4117427057521620736
2Mass ID (if available) : 17325729-2302541
ICRS Star Coord at Epoch: 17h 32m 57.28848s -23:02:54.24250s
RUWE (>1.4 is poor) : 1.00
K magnitude           : 9.335
G magnitude           : 14.560
RP magnitude         : 13.260
BP magnitude         : 16.508
DUPflag              : 0
Distance (au)        : 4.471
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -8.37
Sun-Target sep (deg) : 136.32
Sun-Moon sep (deg)   : 160.15
B (ring opening deg) : -2.37
PA of pole (deg)     : 2.07
Pole direction: RA (deg): 268.05671
Dec (deg): 64.49731
C/A sky separation ("): 8.775
C/A sky separation (km): 28453.5
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
    
```

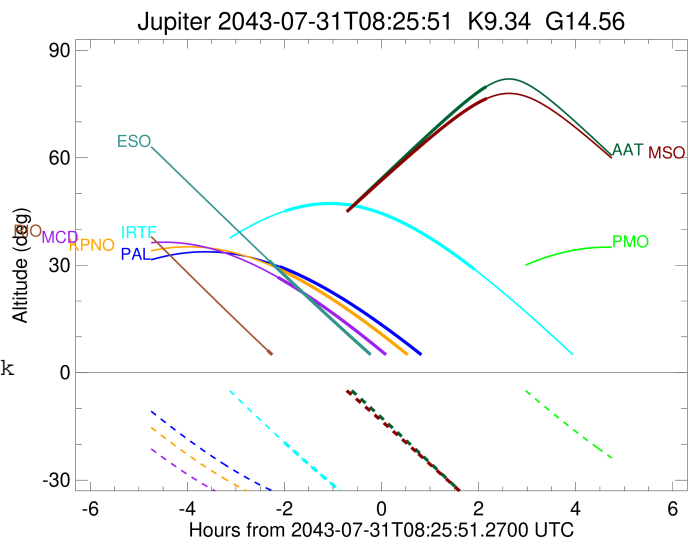
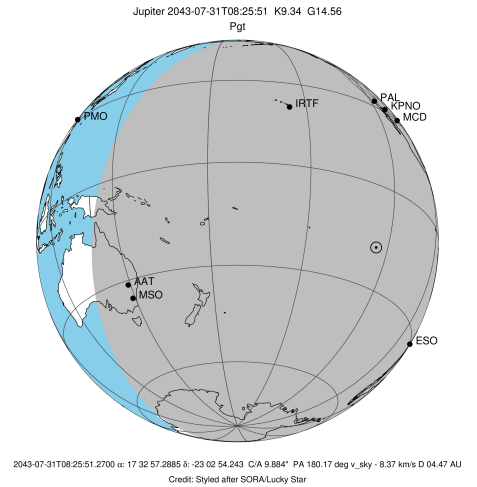


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-07-31T06:04:55.504	6.25	-46.47	71490.9	22.62	25.44
Jupiter	E	2043-07-31T10:33:26.757	-40.29x	13.23x	71490.7	24.63	27.63

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2043-07-31T08:15:58.630
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        : 4117427057521620736
2Mass ID (if available) : 17325729-2302541
ICRS Star Coord at Epoch: 17h 32m 57.28848s -23:02:54.24250s
RUWE (>1.4 is poor) : 1.00
K magnitude           : 9.335
G magnitude           : 14.560
RP magnitude          : 13.260
BP magnitude          : 16.508
DUPflag              : 0
Distance (au)         : 4.471
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -8.37
Sun-Target sep (deg)  : 136.32
Sun-Moon sep (deg)    : 160.43
B (ring opening deg) : -2.37
PA of pole (deg)      : 2.07
Pole direction: RA (deg): 268.05671
Dec (deg): 64.49731
C/A sky separation (") : 8.917
C/A sky separation (km) : 28914.5
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
    
```

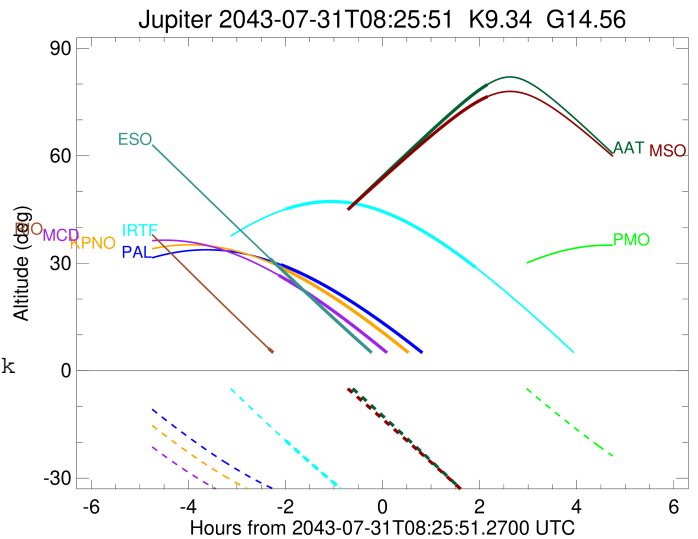
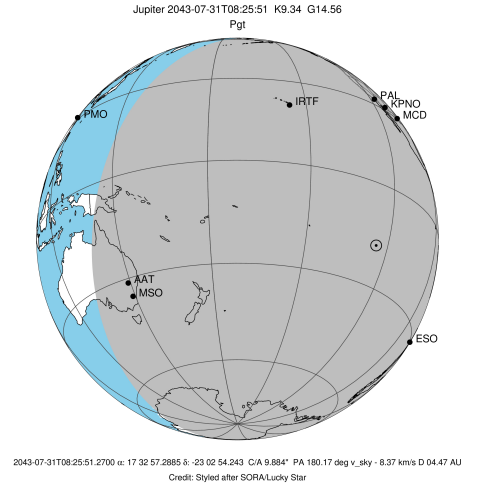


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-07-31T06:06:52.463	31.28	-69.25	71490.8	22.99	25.85
Jupiter	E	2043-07-31T10:28:59.057	-20.06x	-13.04	71490.7	24.75	27.76

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2043-07-31T08:31:52.410
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      : 4117427057521620736
2Mass ID (if available) : 17325729-2302541
ICRS Star Coord at Epoch: 17h 32m 57.28848s -23:02:54.24250s
RUWE (>1.4 is poor) : 1.00
K magnitude          : 9.335
G magnitude          : 14.560
RP magnitude         : 13.260
BP magnitude         : 16.508
DUPflag             : 0
Distance (au)       : 4.471
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -8.37
Sun-Target sep (deg) : 136.32
Sun-Moon sep (deg)  : 159.48
B (ring opening deg) : -2.37
PA of pole (deg)    : 2.07
Pole direction: RA (deg): 268.05671
Dec (deg): 64.49731
C/A sky separation (" ) : 9.482
C/A sky separation (km) : 30747.8
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
    
```



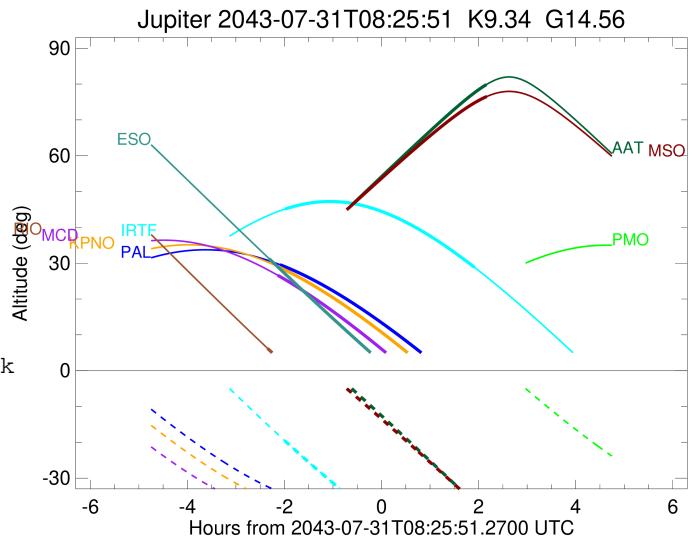
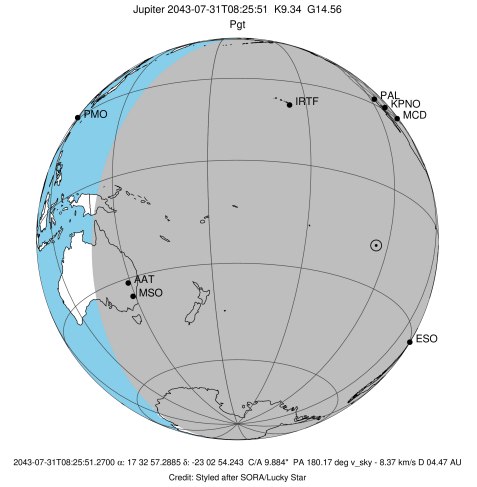
x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-07-31T06:26:49.356	28.72	11.08x	71490.8	22.73	25.56
Jupiter	E	2043-07-31T10:35:32.681	79.86	-40.07	71490.3	27.74	30.97



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2043-07-31T08:31:37.590
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        : 4117427057521620736
2Mass ID (if available) : 17325729-2302541
ICRS Star Coord at Epoch: 17h 32m 57.28848s -23:02:54.24250s
RUWE (>1.4 is poor) : 1.00
K magnitude           : 9.335
G magnitude           : 14.560
RP magnitude          : 13.260
BP magnitude          : 16.508
DUPflag              : 0
Distance (au)         : 4.471
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -8.37
Sun-Target sep (deg)  : 136.32
Sun-Moon sep (deg)    : 159.48
B (ring opening deg) : -2.37
PA of pole (deg)     : 2.07
Pole direction: RA (deg): 268.05671
Dec (deg): 64.49731
C/A sky separation (") : 9.351
C/A sky separation (km) : 30324.1
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	2043-07-31T06:26:01.917	29.21	9.26x	71490.9	22.39	25.19
Jupiter	E	2043-07-31T10:35:54.217	76.52	-39.85	71490.4	27.35	30.55