

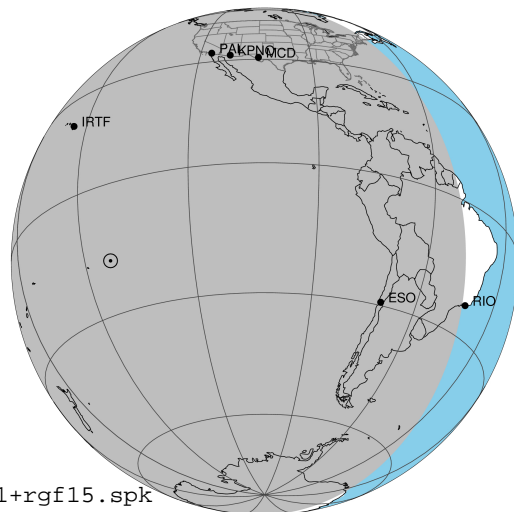
target : Jupiter  
 target radius (km) : 71492.00  
 C/A epoch : 2031-05-11T09:24:45.510  
 Event type : Pgt  
 : Jupiter occs: geocentric, topocentric  
 : Not a ringed target  
 Gaia source ID : 4068878400825820800  
 2Mass ID (if available) : 17491212-2254012

Jupiter 2031-05-11T09:24:45 K9.84 G14.92 Pgt

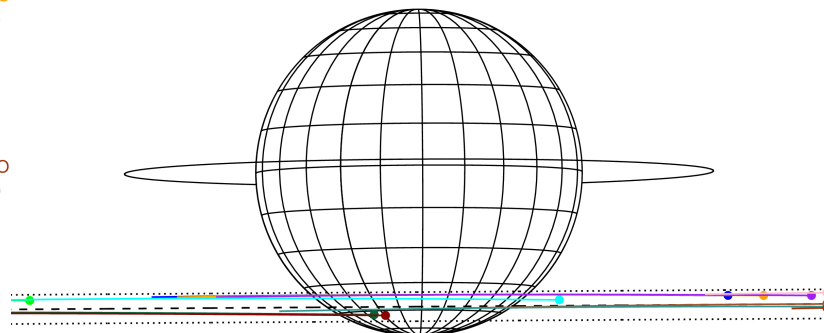
ICRS Star Coord at Epoch: 17h 49m 12.12710s -22:54:01.11027s

RUWE (>1.4 is poor) : 1.11  
 K magnitude : 9.843  
 G magnitude : 14.921  
 RP magnitude : 13.645  
 BP magnitude : 16.624  
 DUPflag : 0  
 Distance (au) : 4.455  
 f0 (km) : 0.00  
 g0 (km) : 0.00  
 skyplane vel. (km/s) : -10.36  
 Sun-Target sep (deg) : 142.56  
 Sun-Moon sep (deg) : 20.91  
 B (ring opening deg) : -2.60  
 PA of pole (deg) : 0.33  
 Pole direction: RA (deg): 268.05695  
 Dec (deg): 64.49651  
 C/A sky separation (") : 18.188  
 C/A sky separation (km) : 58764.5  
 NAIF SPICE kernels : RAJobs\_U111+rgf15.spk

Jupiter 2031-05-11T09:24:45 K9.84 G14.92  
 Pgt



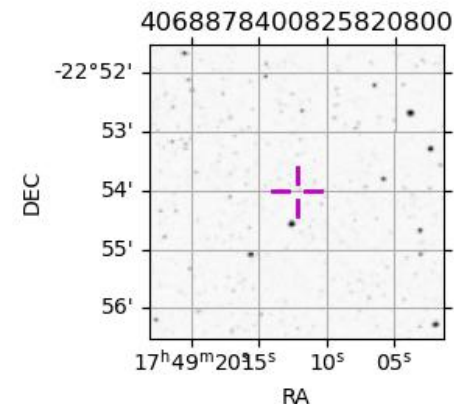
Earth  
 PAL  
 PMO  
 KPNO  
 MCD  
 TEN  
 IRTF  
 RIO  
 ESO  
 AAT  
 SAAO  
 MSO



2031-05-11T09:24:45.5100 α: 17 49 12.1271 δ: -22 54 01.110 C/A \*\*\*\*\* PA 0.39 deg v\_sky -10.36 km/s D 04.45 AU  
 Credit: Styled after SORA/Lucky Star

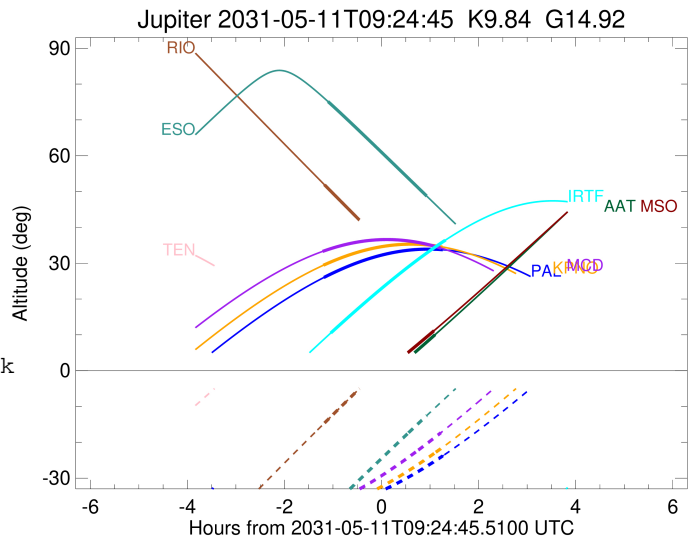
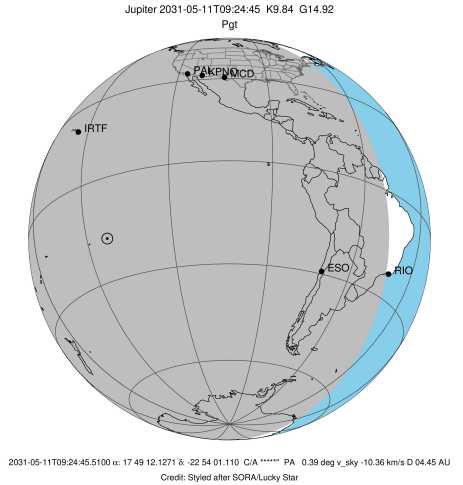
Observable events with sun below -5 deg and altitude above 5 deg

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	+ +	MAY 11 08:13 - MAY 11 10:40	Pie
PMO	Purple Mtn Obs. Nanking	32.1	118.8			Pnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+ +	MAY 11 08:12 - MAY 11 10:39	Pie
MCD	McDonald Obs. 2.7m	30.7	256.0	+ +	MAY 11 08:11 - MAY 11 10:38	Pie
TEN	Teide Obs./Tenerife	28.3	343.5			Pnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+ +	MAY 11 08:22 - MAY 11 10:43	Pie
KAV	Kavalur Observatory	12.6	78.8			Pnn
RIO	Rio de Janeiro	-22.9	316.8	+	MAY 11 08:14 - MAY 11 08:14	Pin
ESO	European Southern Obs. (3.6m)	-29.3	289.3	+ +	MAY 11 08:18 - MAY 11 10:20	Pie
AAT	Siding Spring (AAT)	-31.3	149.1	+	MAY 11 10:31 - MAY 11 10:31	Pne
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8			Pnn
MSO	Mt. Stromlo Observatory	-35.3	149.0	+	MAY 11 10:29 - MAY 11 10:29	Pne



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-11T09:27:08.870
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        : 4068878400825820800
2Mass ID (if available) : 17491212-2254012
ICRS Star Coord at Epoch: 17h 49m 12.12710s -22:54:01.11027s
RUWE (>1.4 is poor) : 1.11
K magnitude           : 9.843
G magnitude           : 14.921
RP magnitude          : 13.645
BP magnitude          : 16.624
DUPflag              : 0
Distance (au)         : 4.455
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -10.36
Sun-Target sep (deg) : 142.56
Sun-Moon sep (deg)   : 21.19
B (ring opening deg) : -2.60
PA of pole (deg)     : 0.33
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation ("): 16.572
C/A sky separation (km): 53540.7
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
    
```

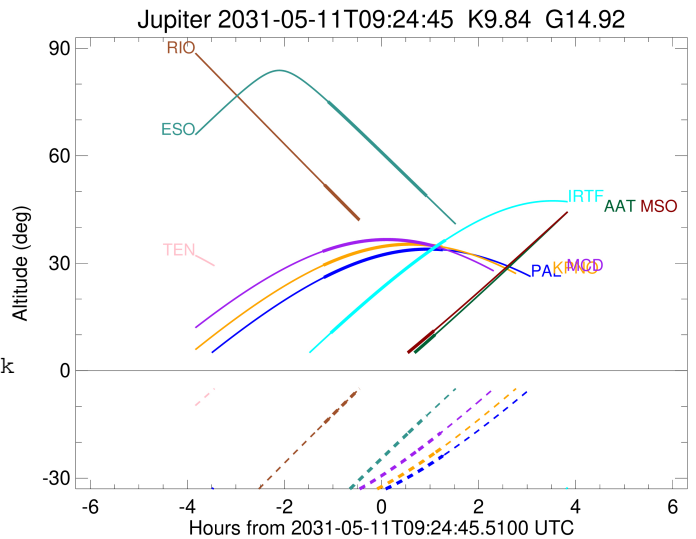
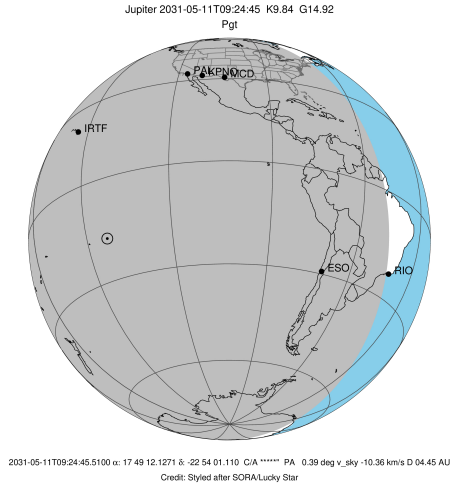


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-11T08:13:35.102	26.01	-38.47	71486.8	-48.69	-52.32
Jupiter	E	2031-05-11T10:40:23.561	33.75	-23.80	71486.8	-48.42	-52.06

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-11T09:26:19.430
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       : 4068878400825820800
2Mass ID (if available) : 17491212-2254012
ICRS Star Coord at Epoch: 17h 49m 12.12710s -22:54:01.11027s
RUWE (>1.4 is poor) : 1.11
K magnitude           : 9.843
G magnitude           : 14.921
RP magnitude         : 13.645
BP magnitude         : 16.624
DUPflag              : 0
Distance (au)        : 4.455
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -10.36
Sun-Target sep (deg) : 142.56
Sun-Moon sep (deg)   : 21.13
B (ring opening deg) : -2.60
PA of pole (deg)     : 0.33
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation (") : 16.587
C/A sky separation (km) : 53590.3
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
    
```

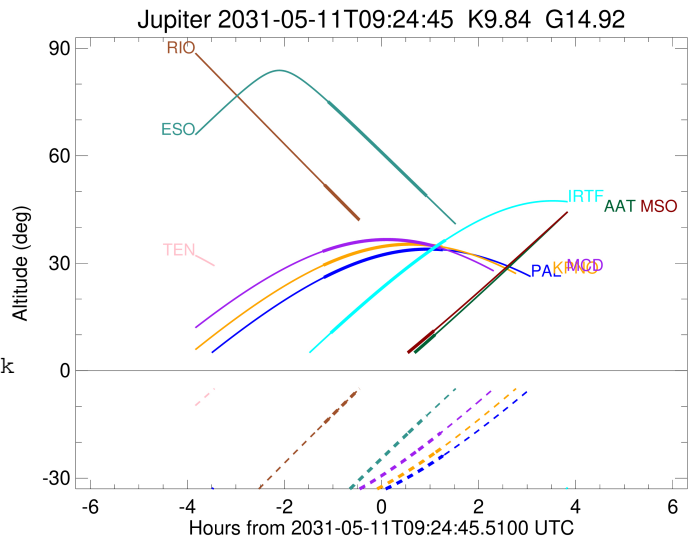
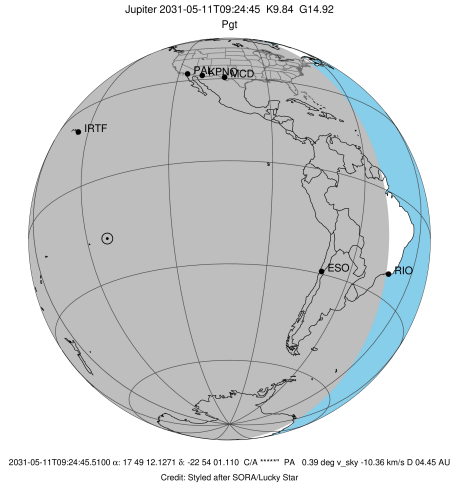


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-11T08:12:58.588	29.43	-38.91	71486.8	-48.69	-52.32
Jupiter	E	2031-05-11T10:39:25.697	34.55	-21.54	71486.8	-48.55	-52.19

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-11T09:25:04.290
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       : 4068878400825820800
2Mass ID (if available) : 17491212-2254012
ICRS Star Coord at Epoch: 17h 49m 12.12710s -22:54:01.11027s
RUWE (>1.4 is poor) : 1.11
K magnitude           : 9.843
G magnitude           : 14.921
RP magnitude          : 13.645
BP magnitude          : 16.624
DUPflag              : 0
Distance (au)        : 4.455
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -10.36
Sun-Target sep (deg) : 142.56
Sun-Moon sep (deg)   : 21.04
B (ring opening deg) : -2.60
PA of pole (deg)     : 0.33
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation (") : 16.605
C/A sky separation (km) : 53647.5
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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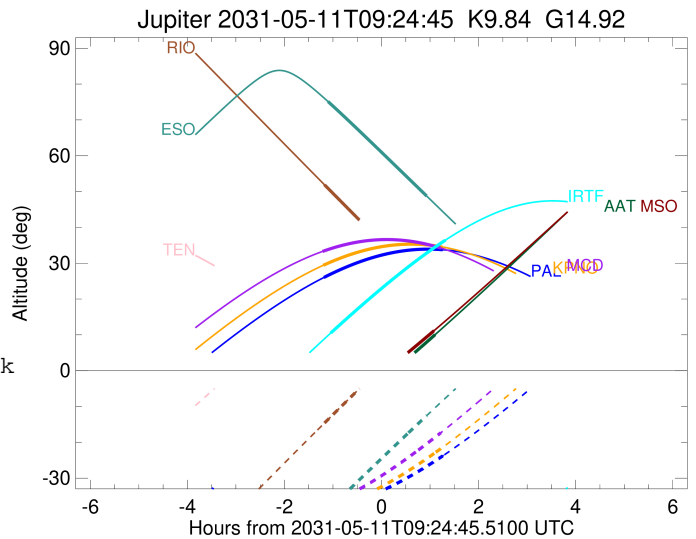
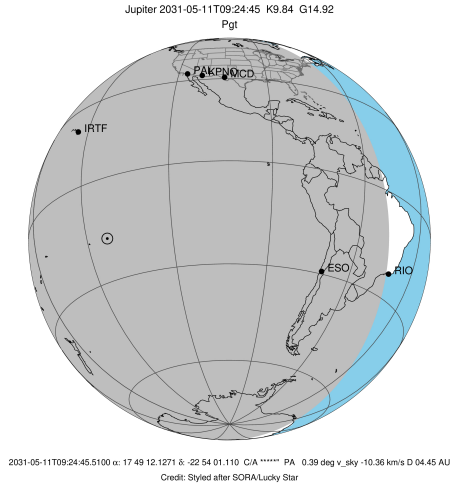


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-11T08:11:57.045	33.29	-37.99	71486.8	-48.66	-52.29
Jupiter	E	2031-05-11T10:38:03.706	34.23	-17.33	71486.7	-48.73	-52.35

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-11T09:33:23.730
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      : 4068878400825820800
2Mass ID (if available) : 17491212-2254012
ICRS Star Coord at Epoch: 17h 49m 12.12710s -22:54:01.11027s
RUWE (>1.4 is poor) : 1.11
K magnitude          : 9.843
G magnitude          : 14.921
RP magnitude         : 13.645
BP magnitude         : 16.624
DUPflag             : 0
Distance (au)       : 4.455
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -10.36
Sun-Target sep (deg) : 142.56
Sun-Moon sep (deg)  : 21.67
B (ring opening deg) : -2.60
PA of pole (deg)    : 0.33
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation (" ) : 17.126
C/A sky separation (km) : 55329.7
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
    
```

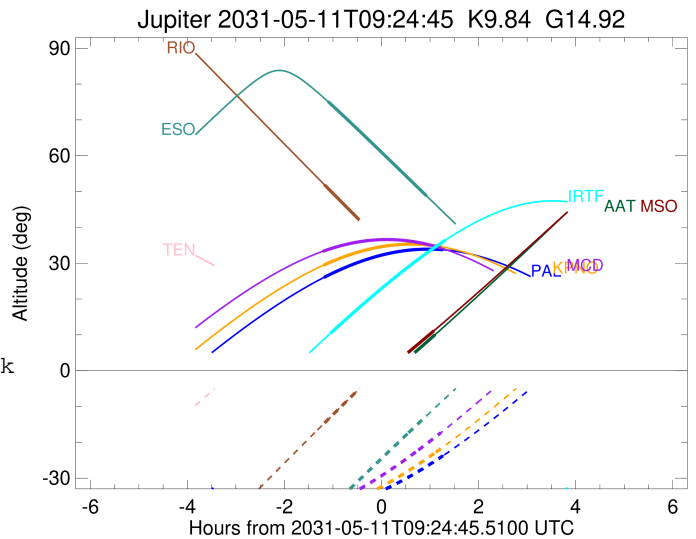
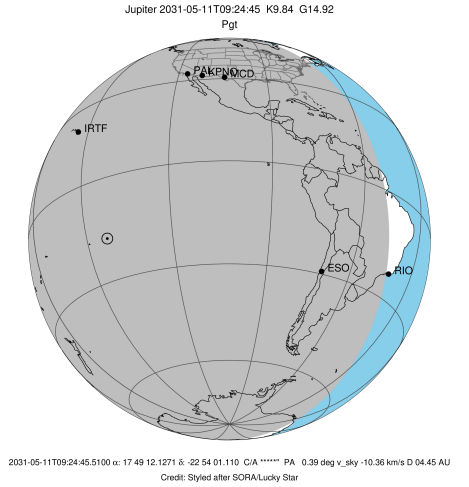


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-11T08:22:09.212	10.53	-42.85	71486.3	-51.38	-54.91
Jupiter	E	2031-05-11T10:43:48.733	36.44	-51.89	71486.5	-50.09	-53.67

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-11T09:15:34.140
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       : 4068878400825820800
2Mass ID (if available) : 17491212-2254012
ICRS Star Coord at Epoch: 17h 49m 12.12710s -22:54:01.11027s
RUWE (>1.4 is poor) : 1.11
K magnitude          : 9.843
G magnitude           : 14.921
RP magnitude         : 13.645
BP magnitude         : 16.624
DUPflag             : 0
Distance (au)        : 4.455
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -10.36
Sun-Target sep (deg) : 142.56
Sun-Moon sep (deg)   : 20.41
B (ring opening deg) : -2.60
PA of pole (deg)     : 0.33
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation (") : 18.500
C/A sky separation (km) : 59773.4
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
    
```

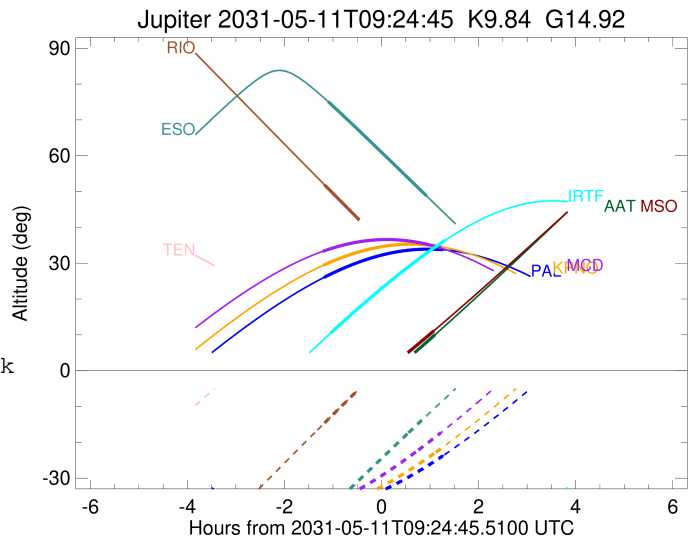
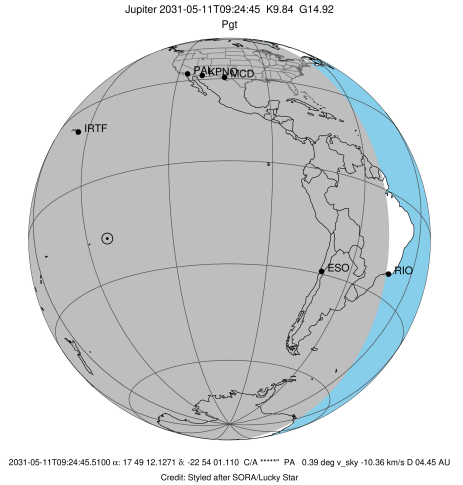


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-11T08:14:13.043	51.90	-14.63	71485.6	-55.91	-59.23
Jupiter	E	2031-05-11T10:17:25.706	24.06	12.15x	71485.4	-57.52	-60.75

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-11T09:19:31.050
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      : 4068878400825820800
2Mass ID (if available) : 17491212-2254012
ICRS Star Coord at Epoch: 17h 49m 12.12710s -22:54:01.11027s
RUWE (>1.4 is poor) : 1.11
K magnitude          : 9.843
G magnitude          : 14.921
RP magnitude         : 13.645
BP magnitude         : 16.624
DUPflag             : 0
Distance (au)       : 4.455
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -10.36
Sun-Target sep (deg) : 142.56
Sun-Moon sep (deg)  : 20.82
B (ring opening deg) : -2.60
PA of pole (deg)    : 0.33
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation (") : 18.491
C/A sky separation (km) : 59741.0
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
    
```



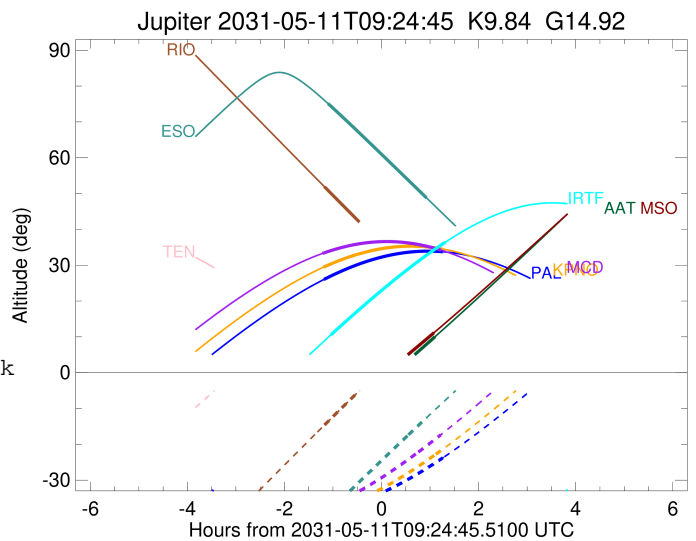
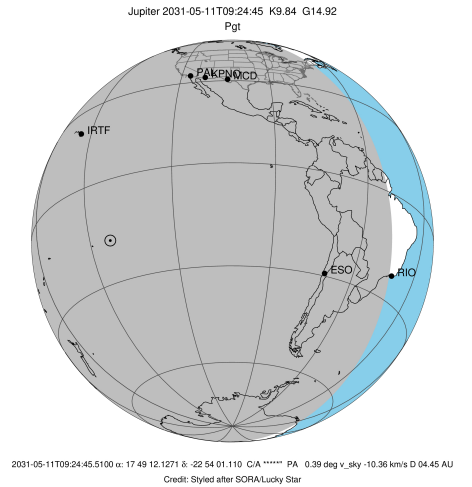
x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-11T08:18:40.090	75.11	-38.92	71485.6	-56.22	-59.52
Jupiter	E	2031-05-11T10:20:36.917	48.74	-12.54	71485.4	-57.18	-60.42



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-11T09:34:37.840
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      : 4068878400825820800
2Mass ID (if available) : 17491212-2254012
ICRS Star Coord at Epoch: 17h 49m 12.12710s -22:54:01.11027s
RUWE (>1.4 is poor) : 1.11
K magnitude          : 9.843
G magnitude          : 14.921
RP magnitude         : 13.645
BP magnitude         : 16.624
DUPflag             : 0
Distance (au)       : 4.455
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -10.36
Sun-Target sep (deg) : 142.56
Sun-Moon sep (deg)  : 21.72
B (ring opening deg) : -2.60
PA of pole (deg)    : 0.33
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation (") : 19.317
C/A sky separation (km) : 62410.2
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
    
```



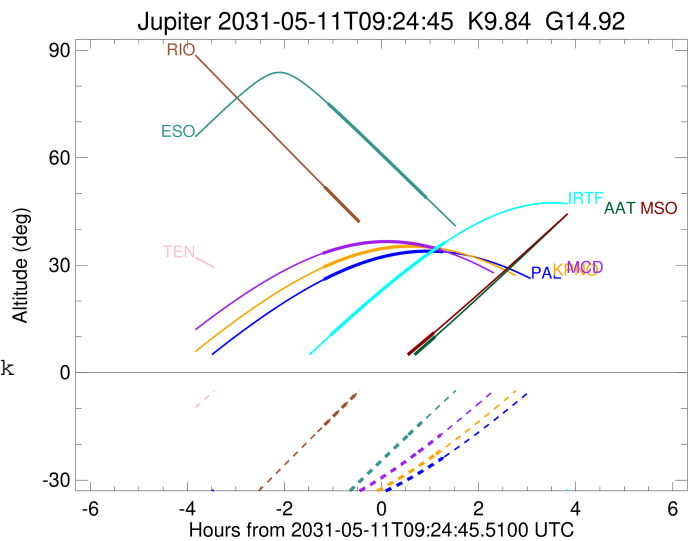
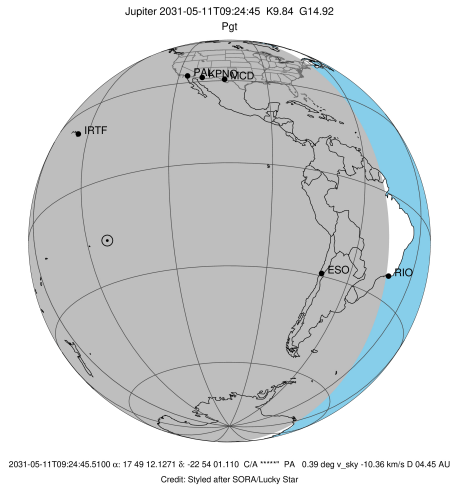
x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-11T08:37:35.736	-11.40x	-16.93	71484.8	-61.44	-64.40
Jupiter	E	2031-05-11T10:31:02.737	10.06	-41.10	71485.0	-59.93	-63.00



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-11T09:34:10.840
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      : 4068878400825820800
2Mass ID (if available) : 17491212-2254012
ICRS Star Coord at Epoch: 17h 49m 12.12710s -22:54:01.11027s
RUWE (>1.4 is poor) : 1.11
K magnitude          : 9.843
G magnitude          : 14.921
RP magnitude         : 13.645
BP magnitude         : 16.624
DUPflag             : 0
Distance (au)       : 4.455
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -10.36
Sun-Target sep (deg) : 142.56
Sun-Moon sep (deg)  : 21.71
B (ring opening deg) : -2.60
PA of pole (deg)    : 0.33
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation (" ) : 19.417
C/A sky separation (km) : 62733.0
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	2031-05-11T08:38:08.460	-8.97x	-17.72	71484.8	-61.93	-64.86
Jupiter	E	2031-05-11T10:29:38.748	11.15	-40.44	71485.0	-60.50	-63.53