

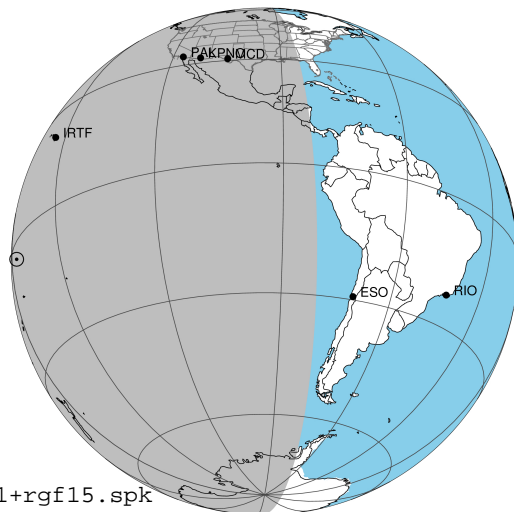
target : Jupiter  
 target radius (km) : 71492.00  
 C/A epoch : 2031-03-31T11:36:31.150  
 Event type : Pgt  
 : Jupiter occs: geocentric, topocentric  
 : Not a ringed target  
 Gaia source ID : 4068702547749958784  
 2Mass ID (if available) : 17520947-2253254

Jupiter 2031-03-31T11:36:31 K8.81 G14.50 Pgt

ICRS Star Coord at Epoch: 17h 52m 09.46971s -22:53:25.52072s

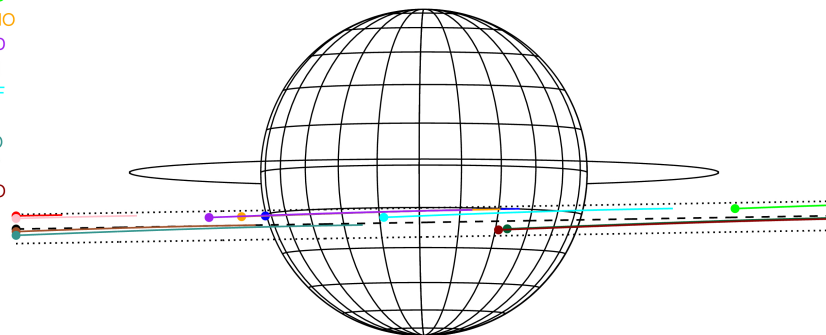
RUWE (>1.4 is poor) : 1.01  
 K magnitude : 8.807  
 G magnitude : 14.503  
 RP magnitude : 13.102  
 BP magnitude : 16.989  
 DUPflag : 0  
 Distance (au) : 5.008  
 f0 (km) : 0.00  
 g0 (km) : 0.00  
 skyplane vel. (km/s) : 6.99  
 Sun-Target sep (deg) : 101.94  
 Sun-Moon sep (deg) : 162.77  
 B (ring opening deg) : -2.61  
 PA of pole (deg) : 0.01  
 Pole direction: RA (deg): 268.05698  
 Dec (deg): 64.49651  
 C/A sky separation (") : 6.019  
 C/A sky separation (km) : 21862.5  
 NAIF SPICE kernels : RAJobs\_U111+rgf15.spk

Jupiter 2031-03-31T11:36:31 K8.81 G14.50  
 Pgt



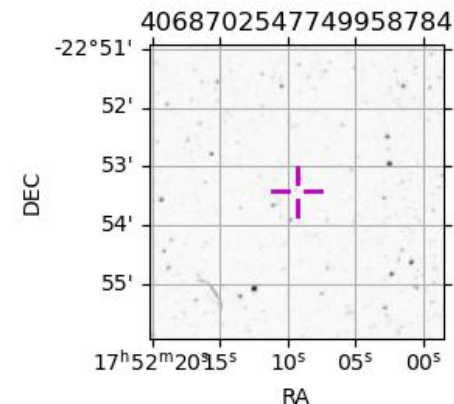
2031-03-31T11:36:31.1500 α: 17 52 09.4697 δ: -22 53 25.521 C/A 6.030° PA 0.93 deg v\_sky + 6.99 km/s D 05.01 AU  
 Credit: Styled after SORA/Lucky Star

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



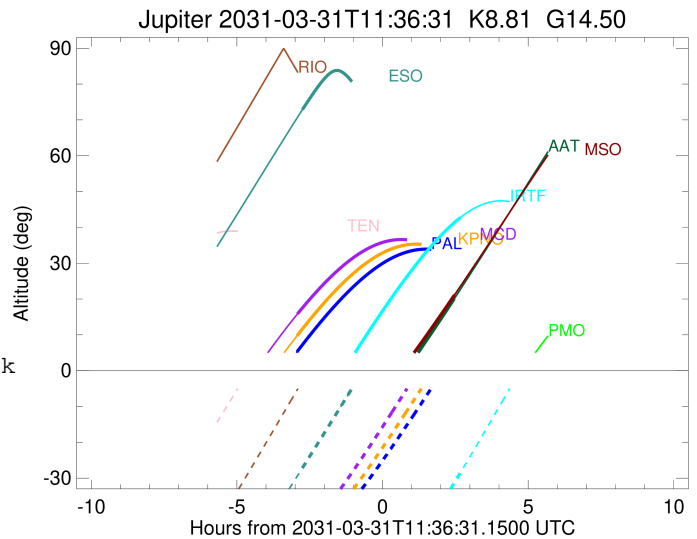
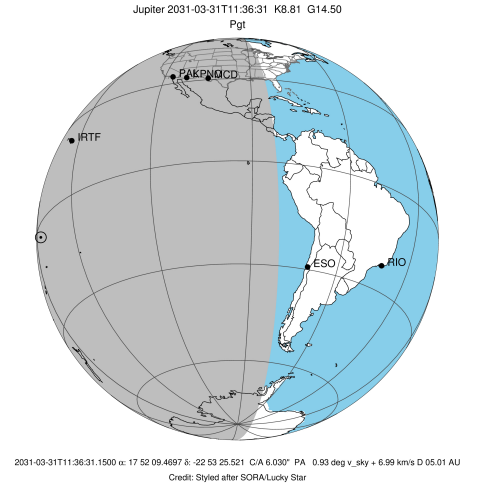
Observable events with sun below -5 deg and altitude above 5 deg

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	+	MAR 31 08:40 - MAR 31 08:40	Pin
PMO	Purple Mtn Obs. Nanking	32.1	118.8			Pnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+	MAR 31 08:40 - MAR 31 08:40	Pin
MCD	McDonald Obs. 2.7m	30.7	256.0	+	MAR 31 08:41 - MAR 31 08:41	Pin
TEN	Teide Obs./Tenerife	28.3	343.5			Pnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+	MAR 31 14:17 - MAR 31 14:17	Pne
KAV	Kavalur Observatory	12.6	78.8			Pnn
RIO	Rio de Janeiro	-22.9	316.8			Pnn
ESO	European Southern Obs. (3.6m)	-29.3	289.3	+	MAR 31 08:51 - MAR 31 08:51	Pin
AAT	Siding Spring (AAT)	-31.3	149.1	+	MAR 31 14:04 - MAR 31 14:04	Pne
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8			Pnn
MSO	Mt. Stromlo Observatory	-35.3	149.0	+	MAR 31 14:04 - MAR 31 14:04	Pne



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-03-31T11:31:37.170
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       : 4068702547749958784
2Mass ID (if available) : 17520947-2253254
ICRS Star Coord at Epoch: 17h 52m 09.46971s -22:53:25.52072s
RUWE (>1.4 is poor) : 1.01
K magnitude          : 8.807
G magnitude          : 14.503
RP magnitude         : 13.102
BP magnitude         : 16.989
DUPflag             : 0
Distance (au)        : 5.008
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : 6.99
Sun-Target sep (deg) : 101.94
Sun-Moon sep (deg)  : 163.04
B (ring opening deg) : -2.61
PA of pole (deg)    : 0.01
Pole direction: RA (deg): 268.05698
Dec (deg): 64.49651
C/A sky separation ("): 4.619
C/A sky separation (km): 16780.0
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
    
```

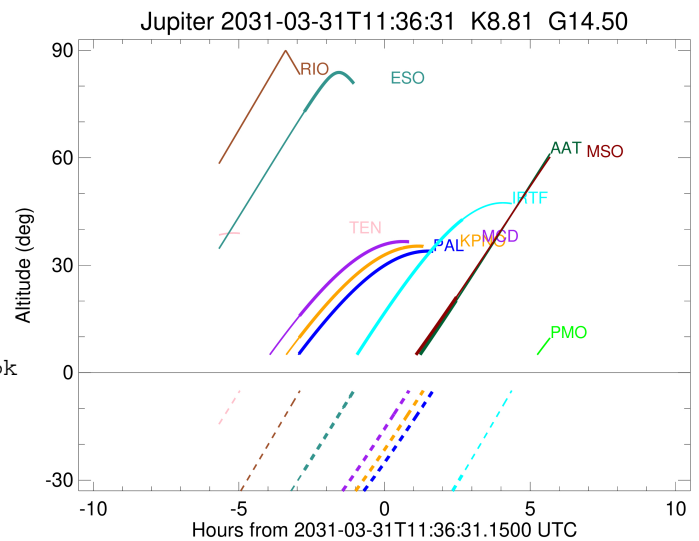
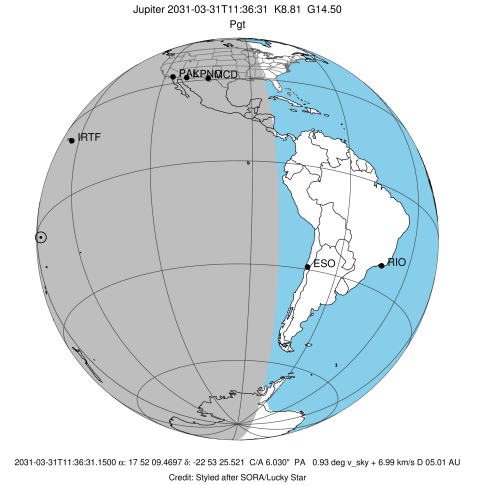


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-03-31T08:40:21.250	5.25	-50.95	71491.3	-15.40	-17.48
Jupiter	E	2031-03-31T14:27:19.675	30.70	9.77x	71491.6	-12.55	-14.28

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-03-31T11:32:37.490
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       : 4068702547749958784
2Mass ID (if available) : 17520947-2253254
ICRS Star Coord at Epoch: 17h 52m 09.46971s -22:53:25.52072s
RUWE (>1.4 is poor) : 1.01
K magnitude           : 8.807
G magnitude           : 14.503
RP magnitude         : 13.102
BP magnitude         : 16.989
DUPflag              : 0
Distance (au)        : 5.008
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : 6.99
Sun-Target sep (deg) : 101.94
Sun-Moon sep (deg)   : 162.99
B (ring opening deg) : -2.61
PA of pole (deg)     : 0.01
Pole direction: RA (deg): 268.05698
Dec (deg): 64.49651
C/A sky separation (") : 4.622
C/A sky separation (km) : 16790.8
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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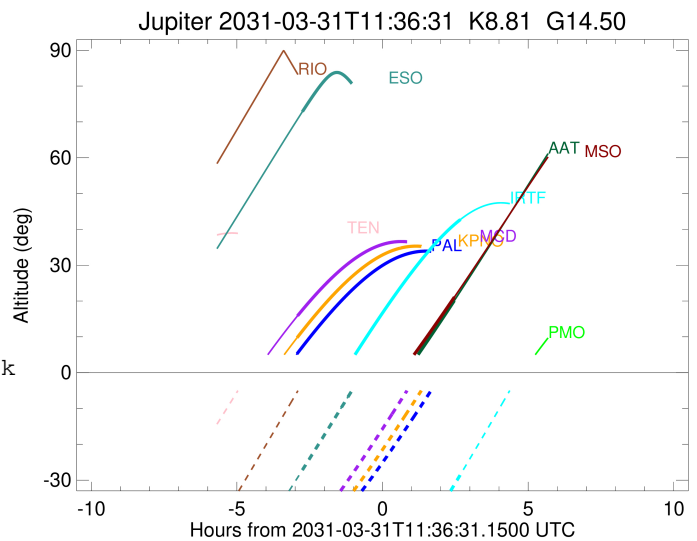
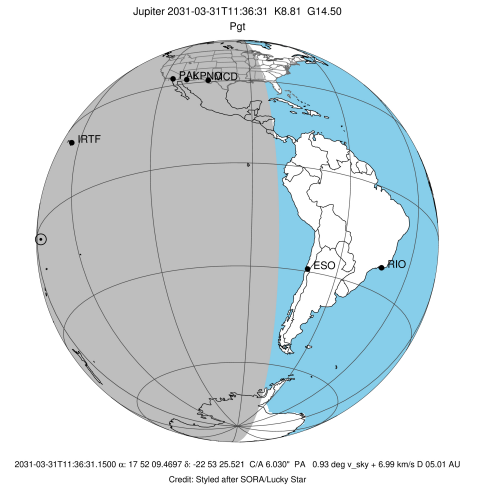


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-03-31T08:40:38.869	9.78	-50.40	71491.3	-15.34	-17.41
Jupiter	E	2031-03-31T14:28:28.237	30.01	14.51x	71491.5	-12.69	-14.43

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-03-31T11:34:12.850
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       : 4068702547749958784
2Mass ID (if available) : 17520947-2253254
ICRS Star Coord at Epoch: 17h 52m 09.46971s -22:53:25.52072s
RUWE (>1.4 is poor) : 1.01
K magnitude           : 8.807
G magnitude           : 14.503
RP magnitude         : 13.102
BP magnitude         : 16.989
DUPflag              : 0
Distance (au)        : 5.008
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : 6.99
Sun-Target sep (deg) : 101.94
Sun-Moon sep (deg)   : 162.92
B (ring opening deg) : -2.61
PA of pole (deg)     : 0.01
Pole direction: RA (deg): 268.05698
Dec (deg): 64.49651
C/A sky separation (") : 4.623
C/A sky separation (km) : 16792.9
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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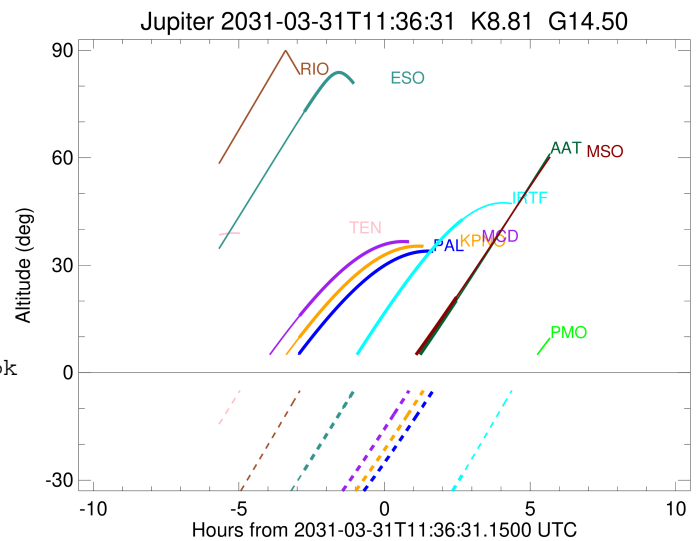
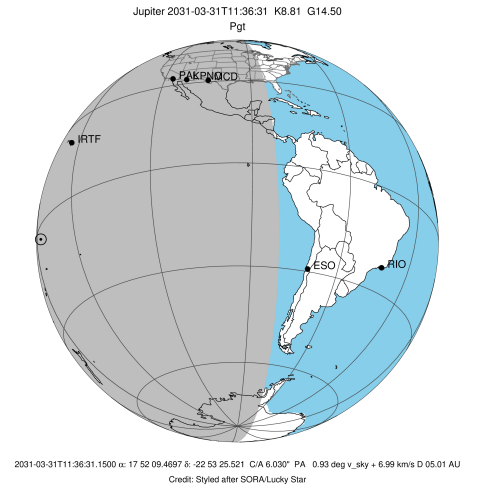


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-03-31T08:41:20.452	15.84	-47.79	71491.4	-15.22	-17.27
Jupiter	E	2031-03-31T14:30:01.041	27.55	21.43x	71491.5	-12.87	-14.64

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-03-31T11:24:33.970
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       : 4068702547749958784
2Mass ID (if available) : 17520947-2253254
ICRS Star Coord at Epoch: 17h 52m 09.46971s -22:53:25.52072s
RUWE (>1.4 is poor) : 1.01
K magnitude          : 8.807
G magnitude           : 14.503
RP magnitude         : 13.102
BP magnitude         : 16.989
DUPflag             : 0
Distance (au)        : 5.008
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : 6.99
Sun-Target sep (deg) : 101.94
Sun-Moon sep (deg)   : 163.47
B (ring opening deg) : -2.61
PA of pole (deg)     : 0.01
Pole direction: RA (deg): 268.05698
Dec (deg): 64.49651
C/A sky separation (") : 5.214
C/A sky separation (km) : 18939.0
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
    
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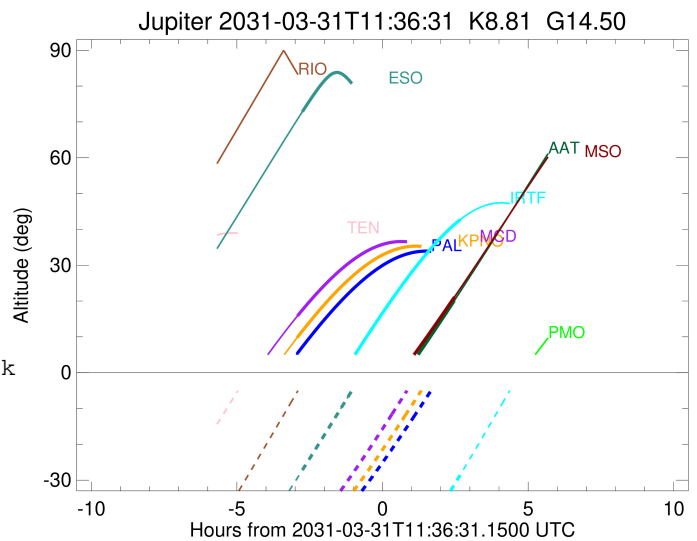
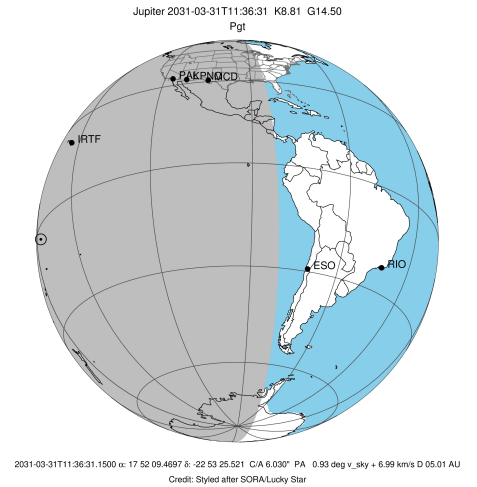


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-03-31T08:40:06.482	-21.21x	-54.68	71491.1	-17.63	-19.96
Jupiter	E	2031-03-31T14:17:08.150	42.75	-28.42	71491.5	-13.42	-15.25

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-03-31T11:41:37.240
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        : 4068702547749958784
2Mass ID (if available) : 17520947-2253254
ICRS Star Coord at Epoch: 17h 52m 09.46971s -22:53:25.52072s
RUWE (>1.4 is poor) : 1.01
K magnitude           : 8.807
G magnitude           : 14.503
RP magnitude          : 13.102
BP magnitude          : 16.989
DUPflag              : 0
Distance (au)         : 5.008
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : 6.99
Sun-Target sep (deg)  : 101.94
Sun-Moon sep (deg)    : 162.75
B (ring opening deg) : -2.61
PA of pole (deg)      : 0.01
Pole direction: RA (deg): 268.05698
Dec (deg): 64.49651
C/A sky separation (") : 6.255
C/A sky separation (km) : 22722.1
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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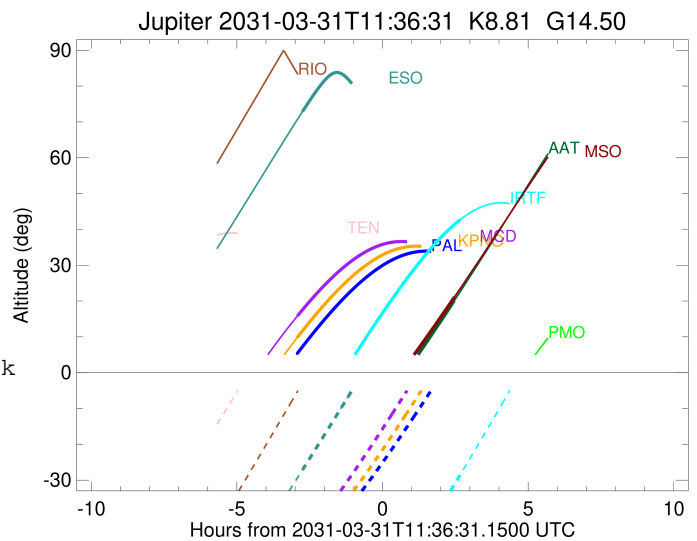
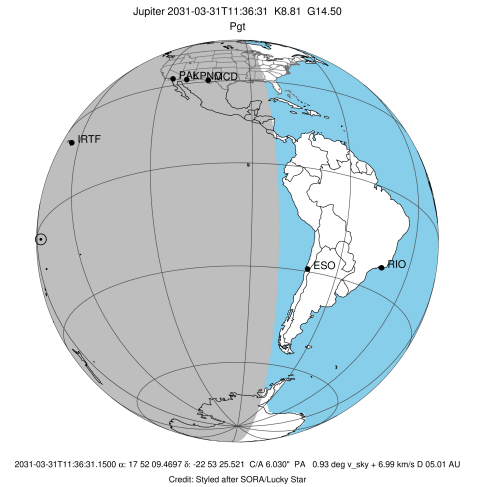


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-03-31T08:51:24.432	72.83	-27.19	71491.0	-19.40	-21.91
Jupiter	E	2031-03-31T14:30:23.325	30.14	43.23x	71491.1	-18.51	-20.93

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-03-31T11:26:25.660
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      : 4068702547749958784
2Mass ID (if available) : 17520947-2253254
ICRS Star Coord at Epoch: 17h 52m 09.46971s -22:53:25.52072s
RUWE (>1.4 is poor) : 1.01
K magnitude         : 8.807
G magnitude         : 14.503
RP magnitude        : 13.102
BP magnitude        : 16.989
DUPflag            : 0
Distance (au)       : 5.008
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : 6.99
Sun-Target sep (deg) : 101.94
Sun-Moon sep (deg)  : 163.48
B (ring opening deg) : -2.61
PA of pole (deg)    : 0.01
Pole direction: RA (deg): 268.05698
Dec (deg): 64.49651
C/A sky separation (") : 7.157
C/A sky separation (km) : 25997.1
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
    
```



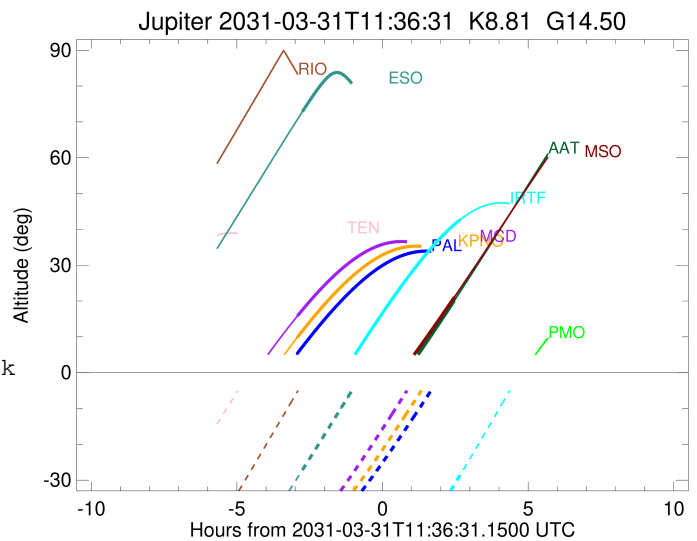
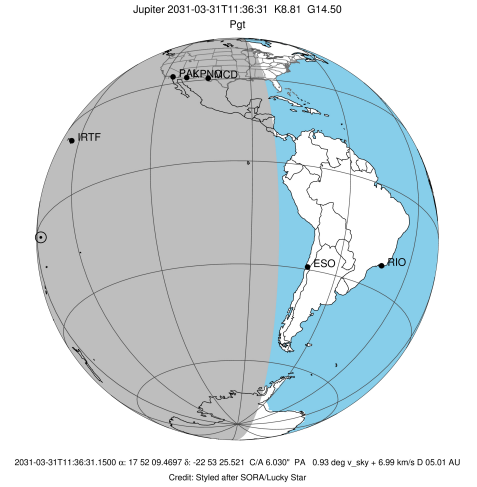
x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-03-31T08:54:16.781	-31.79x	-12.04	71490.6	-22.99	-25.84
Jupiter	E	2031-03-31T14:04:29.606	20.11	-63.11	71491.0	-19.16	-21.65



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-03-31T11:26:54.360
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        : 4068702547749958784
2Mass ID (if available) : 17520947-2253254
ICRS Star Coord at Epoch: 17h 52m 09.46971s -22:53:25.52072s
RUWE (>1.4 is poor) : 1.01
K magnitude           : 8.807
G magnitude           : 14.503
RP magnitude          : 13.102
BP magnitude          : 16.989
DUPflag              : 0
Distance (au)         : 5.008
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : 6.99
Sun-Target sep (deg) : 101.94
Sun-Moon sep (deg)   : 163.47
B (ring opening deg) : -2.61
PA of pole (deg)     : 0.01
Pole direction: RA (deg): 268.05698
Dec (deg): 64.49651
C/A sky separation (") : 7.238
C/A sky separation (km) : 26290.3
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	2031-03-31T08:54:44.784	-28.09x	-11.89	71490.5	-23.21	-26.08
Jupiter	E	2031-03-31T14:04:46.153	21.13	-59.08	71491.0	-19.47	-21.99