

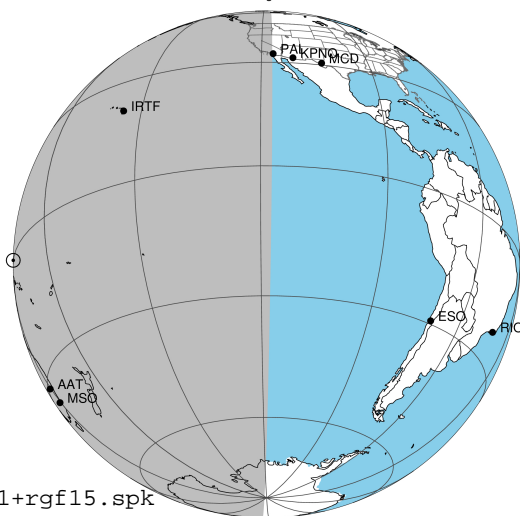
target : Jupiter  
 target radius (km) : 71492.00  
 C/A epoch : 2031-03-19T13:57:31.280  
 Event type : Pgt  
 : Jupiter occs: geocentric, topocentric  
 : Not a ringed target  
 Gaia source ID : 4068889739544925056  
 2Mass ID (if available) : 17485214-2252299

Jupiter 2031-03-19T13:57:31 K7.96 G13.85 Pgt

ICRS Star Coord at Epoch: 17h 48m 52.13365s -22:52:30.09759s

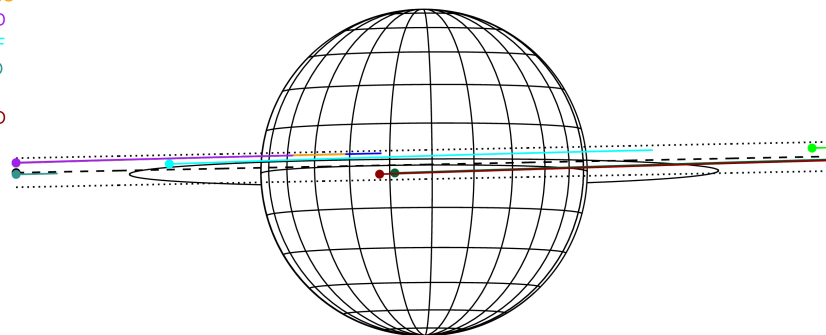
RUWE (>1.4 is poor) : 0.96  
 K magnitude : 7.955  
 G magnitude : 13.853  
 RP magnitude : 12.413  
 BP magnitude : 16.385  
 DUPflag : 0  
 Distance (au) : 5.200  
 f0 (km) : 0.00  
 g0 (km) : 0.00  
 skyplane vel. (km/s) : 12.68  
 Sun-Target sep (deg) : 90.90  
 Sun-Moon sep (deg) : 44.67  
 B (ring opening deg) : -2.63  
 PA of pole (deg) : 0.36  
 Pole direction: RA (deg): 268.05699  
 Dec (deg): 64.49651  
 C/A sky separation (") : 0.924  
 C/A sky separation (km) : 3486.3  
 NAIF SPICE kernels : RAJobs\_U111+rgf15.spk

Jupiter 2031-03-19T13:57:31 K7.96 G13.85  
 Pgt



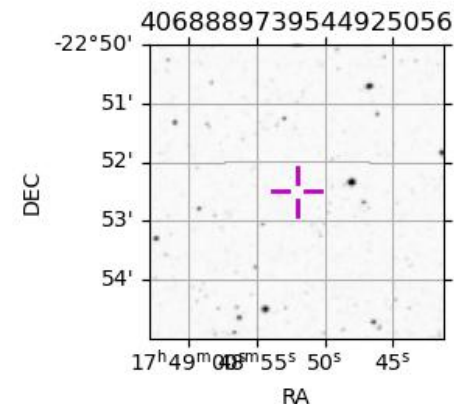
2031-03-19T13:57:31.2800 cr: 17 48 52.1337 s: -22 52 30.098 C/A 0.914" PA 181.15 deg v\_sky +12.68 km/s D 05.20 AU  
 Credit: Styled after SORA/Lucky Star

Earth  
 PAL  
 PMO  
 KPNO  
 MCD  
 IRTF  
 ESO  
 AAT  
 MSO



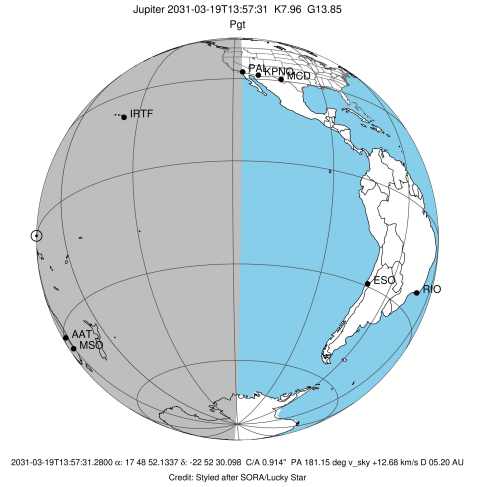
Observable events with sun below -5 deg and altitude above 5 deg

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	+	MAR 19 12:21 - MAR 19 12:21	Pin
PMO	Purple Mtn Obs. Nanking	32.1	118.8			Pnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+	MAR 19 12:22 - MAR 19 12:22	Pin
MCD	McDonald Obs. 2.7m	30.7	256.0	+	MAR 19 12:23 - MAR 19 12:23	Pin
TEN	Teide Obs./Tenerife	28.3	343.5			Pnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+ +	MAR 19 12:17 - MAR 19 15:29	Pie
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			Pnn
AAT	Siding Spring (AAT)	-31.3	149.1	+	MAR 19 15:24 - MAR 19 15:24	Pne
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8			Pnn
MSO	Mt. Stromlo Observatory	-35.3	149.0	+	MAR 19 15:25 - MAR 19 15:25	Pne

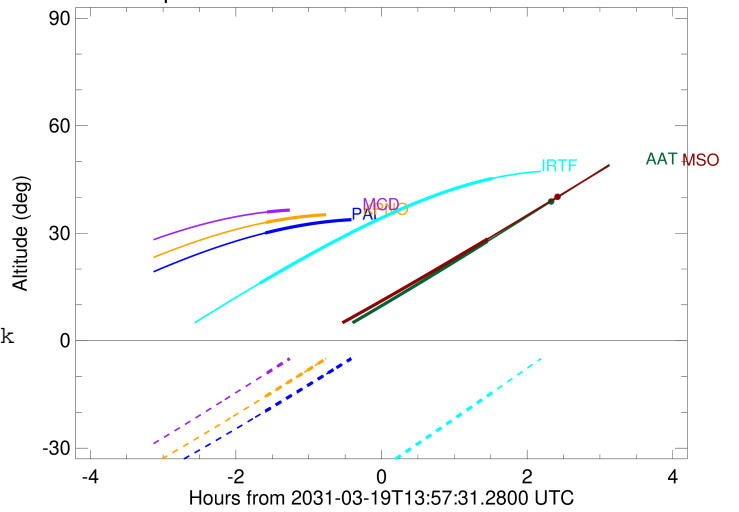


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target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-03-19T13:57:37.250
Event type            : Pgt
: Jupiter occs: geocentric, topocentric
: Not a ringed target
Observer code         : PAL
Location              : Palomar Mt (200")
Latitude (deg)        : 33.35622
E. Longitude (deg)    : 243.13601
Altitude (km)         : 1.706
Gaia source ID        : 4068889739544925056
2Mass ID (if available) : 17485214-2252299
ICRS Star Coord at Epoch: 17h 48m 52.13365s -22:52:30.09759s
RUWE (>1.4 is poor) : 0.96
K magnitude           : 7.955
G magnitude           : 13.853
RP magnitude          : 12.413
BP magnitude          : 16.385
DUPflag              : 0
Distance (au)         : 5.200
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : 12.68
Sun-Target sep (deg)  : 90.90
Sun-Moon sep (deg)   : 44.99
B (ring opening deg) : -2.63
PA of pole (deg)     : 0.36
Pole direction: RA (deg): 268.05699
Dec (deg): 64.49651
C/A sky separation (" ) : 2.327
C/A sky separation (km) : 8775.0
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
    
```



Jupiter 2031-03-19T13:57:31 K7.96 G13.85

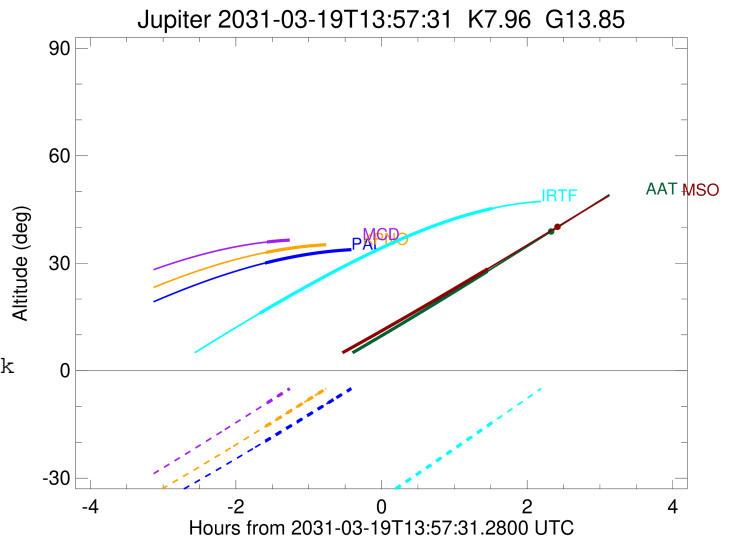
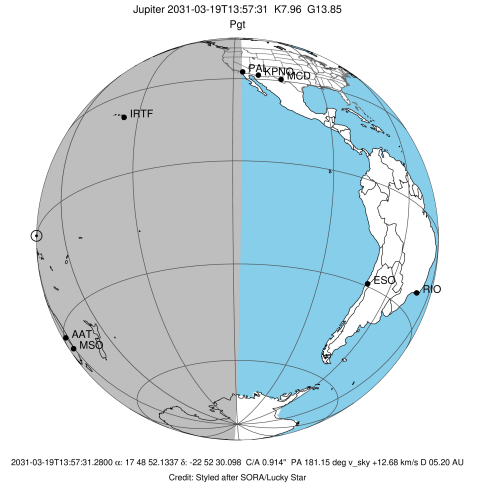


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-03-19T12:21:37.053	30.05	-19.72	71491.9	6.11	6.97
Jupiter	E	2031-03-19T15:33:51.627	28.74	20.17x	71491.8	7.69	8.77

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-03-19T13:58:18.800
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        : 4068889739544925056
2Mass ID (if available) : 17485214-2252299
ICRS Star Coord at Epoch: 17h 48m 52.13365s -22:52:30.09759s
RUWE (>1.4 is poor) : 0.96
K magnitude           : 7.955
G magnitude           : 13.853
RP magnitude          : 12.413
BP magnitude          : 16.385
DUPflag              : 0
Distance (au)         : 5.200
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : 12.68
Sun-Target sep (deg)  : 90.90
Sun-Moon sep (deg)   : 44.95
B (ring opening deg) : -2.63
PA of pole (deg)     : 0.36
Pole direction: RA (deg): 268.05699
Dec (deg): 64.49651
C/A sky separation (" ) : 2.302
C/A sky separation (km) : 8680.8
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
    
```

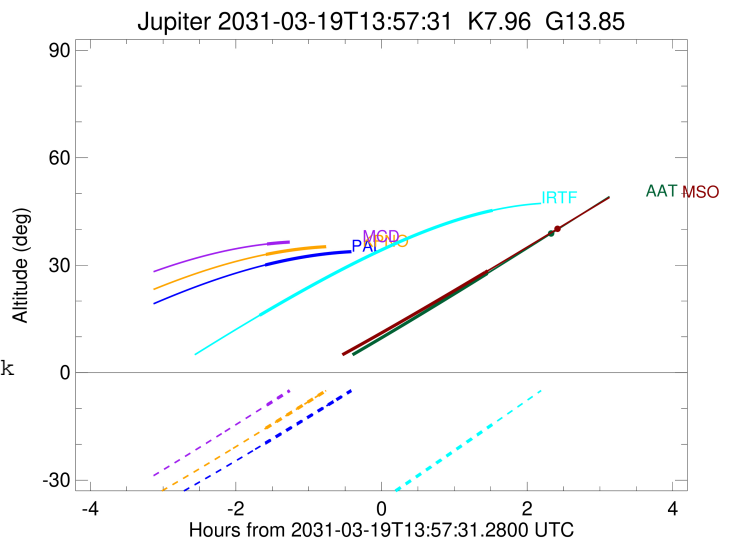
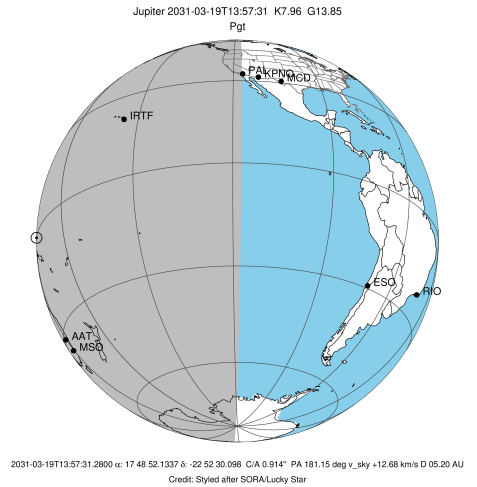


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-03-19T12:22:12.328	32.99	-15.51	71491.9	6.09	6.96
Jupiter	E	2031-03-19T15:34:32.086	27.65	24.96x	71491.8	7.54	8.61

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-03-19T13:59:18.880
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        : 4068889739544925056
2Mass ID (if available) : 17485214-2252299
ICRS Star Coord at Epoch: 17h 48m 52.13365s -22:52:30.09759s
RUWE (>1.4 is poor) : 0.96
K magnitude            : 7.955
G magnitude           : 13.853
RP magnitude          : 12.413
BP magnitude          : 16.385
DUPflag               : 0
Distance (au)         : 5.200
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : 12.68
Sun-Target sep (deg)  : 90.90
Sun-Moon sep (deg)    : 44.87
B (ring opening deg) : -2.63
PA of pole (deg)      : 0.36
Pole direction: RA (deg): 268.05699
Dec (deg): 64.49651
C/A sky separation (") : 2.268
C/A sky separation (km) : 8552.9
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
    
```

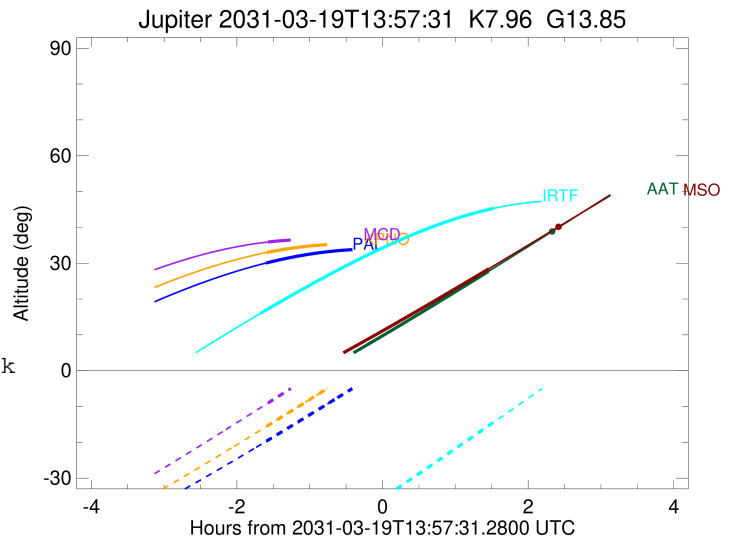
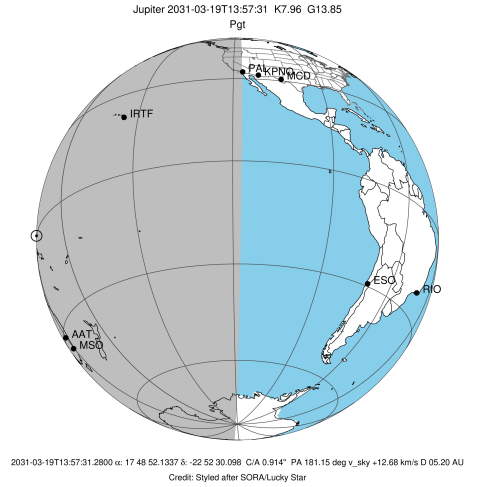


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-03-19T12:23:07.897	35.91	-9.03	71491.9	6.09	6.95
Jupiter	E	2031-03-19T15:35:26.008	24.73	31.68x	71491.8	7.35	8.38

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-03-19T13:52:28.860
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       : 4068889739544925056
2Mass ID (if available) : 17485214-2252299
ICRS Star Coord at Epoch: 17h 48m 52.13365s -22:52:30.09759s
RUWE (>1.4 is poor) : 0.96
K magnitude           : 7.955
G magnitude           : 13.853
RP magnitude         : 12.413
BP magnitude         : 16.385
DUPflag              : 0
Distance (au)        : 5.200
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : 12.68
Sun-Target sep (deg) : 90.90
Sun-Moon sep (deg)   : 45.42
B (ring opening deg) : -2.63
PA of pole (deg)     : 0.36
Pole direction: RA (deg): 268.05699
Dec (deg): 64.49651
C/A sky separation (") : 1.921
C/A sky separation (km) : 7243.4
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
    
```

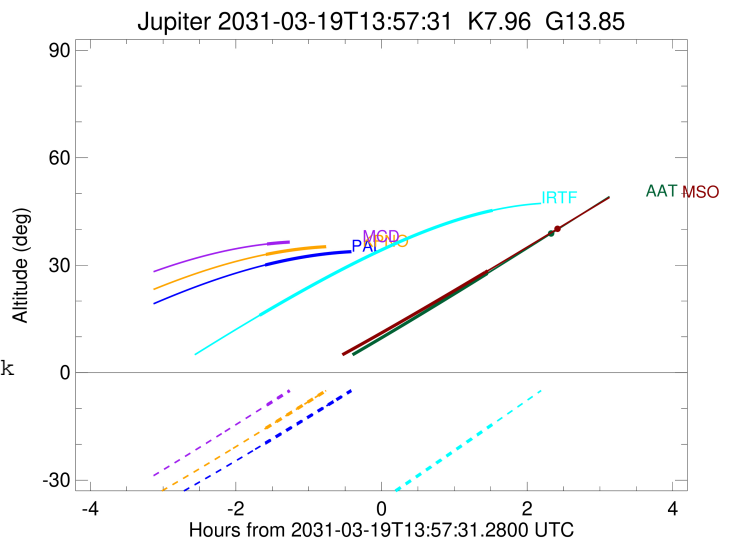
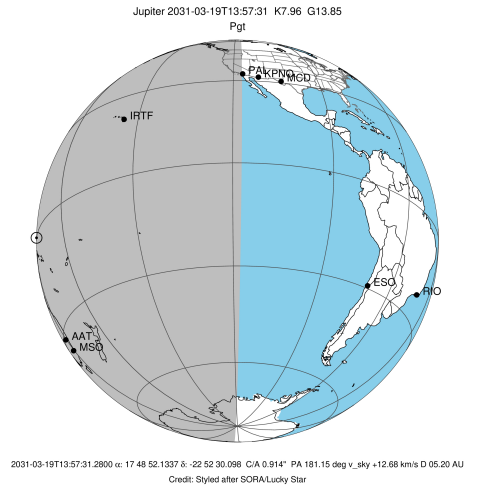


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-03-19T12:17:04.178	16.00	-57.46	71491.9	4.41	5.04
Jupiter	E	2031-03-19T15:29:02.500	45.30	-14.41	71491.9	6.97	7.95

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-03-19T13:50:26.210
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      : 4068889739544925056
2Mass ID (if available) : 17485214-2252299
ICRS Star Coord at Epoch: 17h 48m 52.13365s -22:52:30.09759s
RUWE (>1.4 is poor) : 0.96
K magnitude          : 7.955
G magnitude          : 13.853
RP magnitude         : 12.413
BP magnitude         : 16.385
DUPflag             : 0
Distance (au)       : 5.200
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : 12.68
Sun-Target sep (deg) : 90.90
Sun-Moon sep (deg)  : 45.41
B (ring opening deg) : -2.63
PA of pole (deg)    : 0.36
Pole direction: RA (deg): 268.05699
Dec (deg): 64.49651
C/A sky separation ("): 0.056
C/A sky separation (km) : 212.5
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
    
```

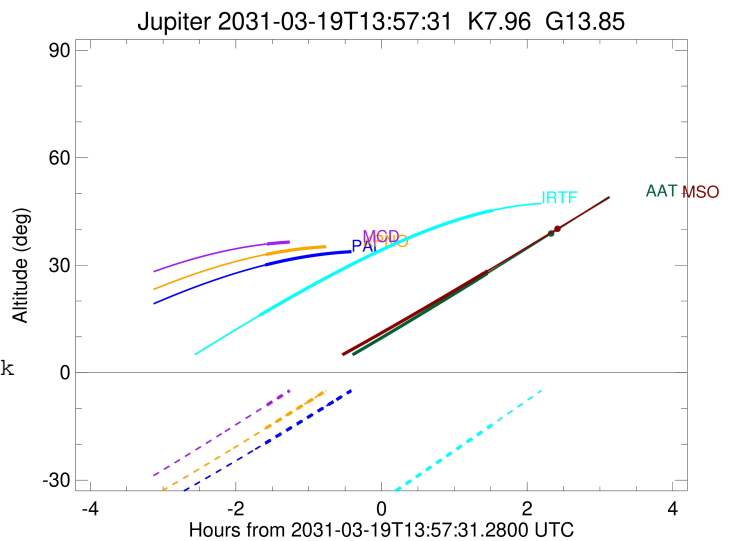
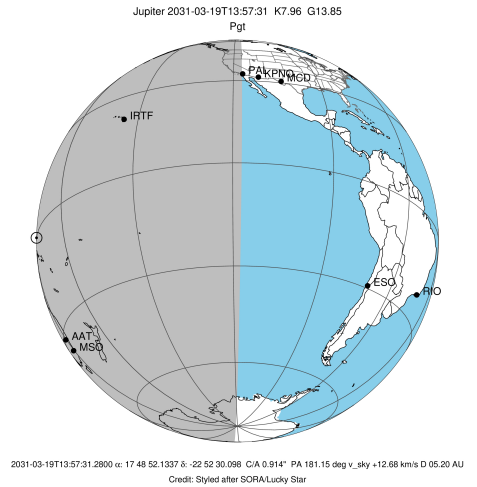


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-03-19T12:17:26.781	-9.33x	-48.39	71492.0	-1.27	-1.45
Jupiter	E	2031-03-19T15:24:51.277	27.72	-53.95	71492.0	1.64	1.88

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-03-19T13:50:46.330
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       : 4068889739544925056
2Mass ID (if available) : 17485214-2252299
ICRS Star Coord at Epoch: 17h 48m 52.13365s -22:52:30.09759s
RUWE (>1.4 is poor) : 0.96
K magnitude           : 7.955
G magnitude           : 13.853
RP magnitude          : 12.413
BP magnitude          : 16.385
DUPflag              : 0
Distance (au)        : 5.200
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : 12.68
Sun-Target sep (deg) : 90.90
Sun-Moon sep (deg)   : 45.41
B (ring opening deg) : -2.63
PA of pole (deg)     : 0.36
Pole direction: RA (deg): 268.05699
Dec (deg): 64.49651
C/A sky separation (") : 0.033
C/A sky separation (km) : 122.7
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	2031-03-19T12:17:44.567	-7.05x	-45.52	71492.0	-1.51	-1.72
Jupiter	E	2031-03-19T15:25:10.548	28.45	-50.49	71492.0	1.35	1.54