

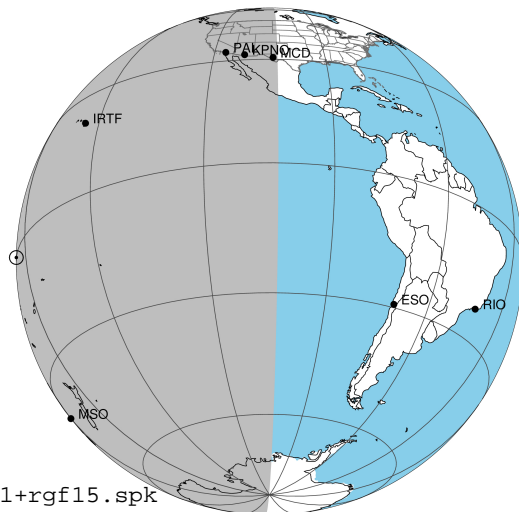
target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2031-03-20T12:59:15.670
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 4068890254940581504
 2Mass ID (if available) : 17491196-2252410

Jupiter 2031-03-20T12:59:15 K8.89 G13.87 Pgt

ICRS Star Coord at Epoch: 17h 49m 11.96514s -22:52:41.06367s

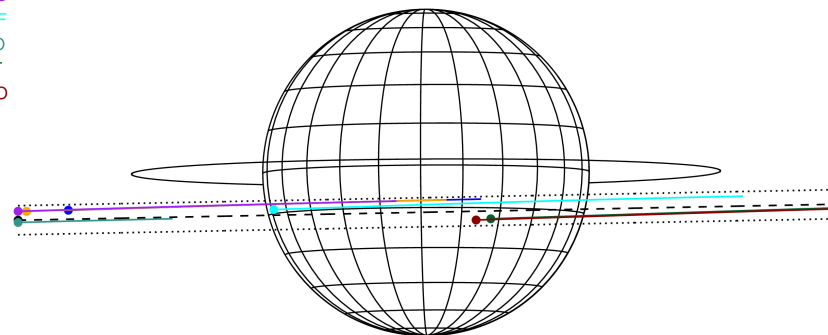
RUWE (>1.4 is poor) : 0.92
 K magnitude : 8.888
 G magnitude : 13.873
 RP magnitude : 12.613
 BP magnitude : 15.639
 DUPflag : 0
 Distance (au) : 5.184
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : 12.23
 Sun-Target sep (deg) : 91.78
 Sun-Moon sep (deg) : 58.13
 B (ring opening deg) : -2.62
 PA of pole (deg) : 0.33
 Pole direction: RA (deg): 268.05699
 Dec (deg): 64.49651
 C/A sky separation (") : 4.629
 C/A sky separation (km) : 17405.4
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk

Jupiter 2031-03-20T12:59:15 K8.89 G13.87
 Pgt



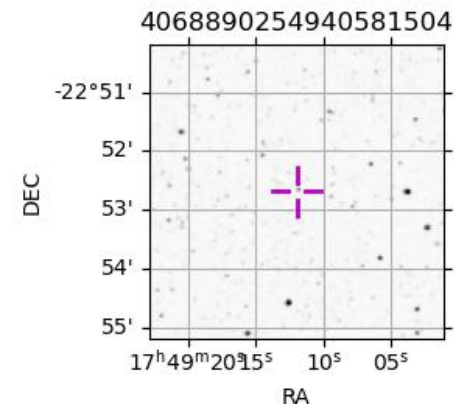
2031-03-20T12:59:15.6700 a: 17 49 11.9651 s: -22 52 41.064 C/A 4.640" PA 1.12 deg v_sky +12.23 km/s D 05.18 AU
 Credit: Styled after SORA/Lucky Star

Earth
 PAL
 KPNO
 MCD
 IRTF
 ESO
 AAT
 MSO



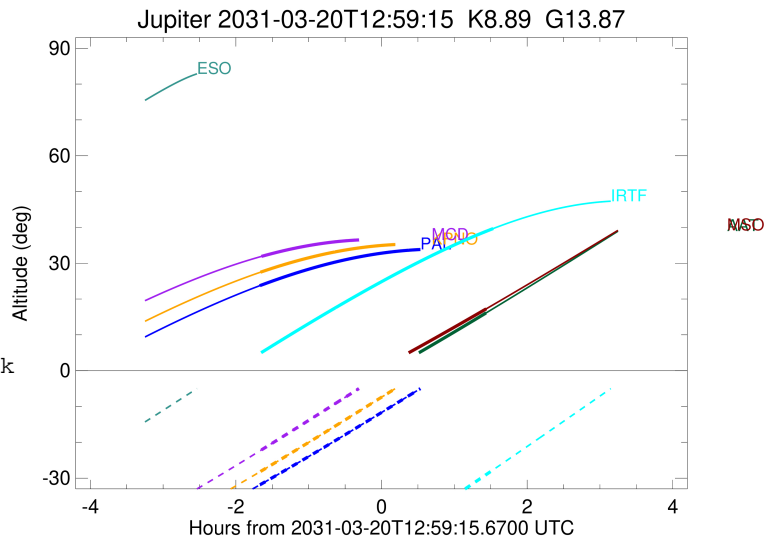
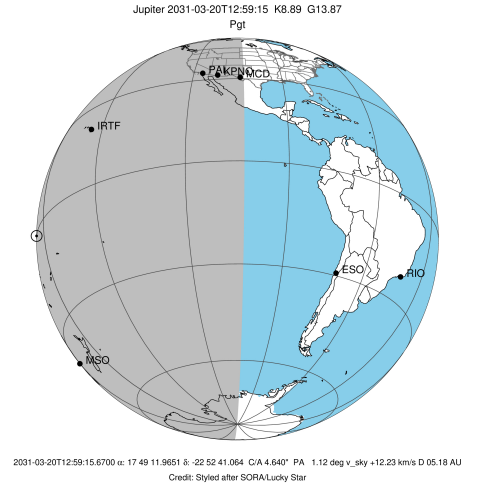
Observable events with sun below -5 deg and altitude above 5 deg

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 20 11:19 - MAR 20 11:19	Pin
PMO	Purple Mtn Obs. Nanking	32.1	118.8			Pnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+	MAR 20 11:19 - MAR 20 11:19	Pin
MCD	McDonald Obs. 2.7m	30.7	256.0	+	MAR 20 11:20 - MAR 20 11:20	Pin
TEN	Teide Obs./Tenerife	28.3	343.5			Pnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+	MAR 20 14:31 - MAR 20 14:31	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			Pnn
AAT	Siding Spring (AAT)	-31.3	149.1	+	MAR 20 14:25 - MAR 20 14:25	Pne
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8			Pnn
MSO	Mt. Stromlo Observatory	-35.3	149.0	+	MAR 20 14:25 - MAR 20 14:25	Pne



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target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-03-20T12:57:38.620
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       : 4068890254940581504
2Mass ID (if available) : 17491196-2252410
ICRS Star Coord at Epoch: 17h 49m 11.96514s -22:52:41.06367s
RUWE (>1.4 is poor) : 0.92
K magnitude           : 8.888
G magnitude           : 13.873
RP magnitude          : 12.613
BP magnitude          : 15.639
DUPflag              : 0
Distance (au)         : 5.184
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : 12.23
Sun-Target sep (deg) : 91.78
Sun-Moon sep (deg)   : 58.64
B (ring opening deg) : -2.62
PA of pole (deg)     : 0.33
Pole direction: RA (deg): 268.05699
Dec (deg): 64.49651
C/A sky separation (") : 3.241
C/A sky separation (km) : 12184.9
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
    
```

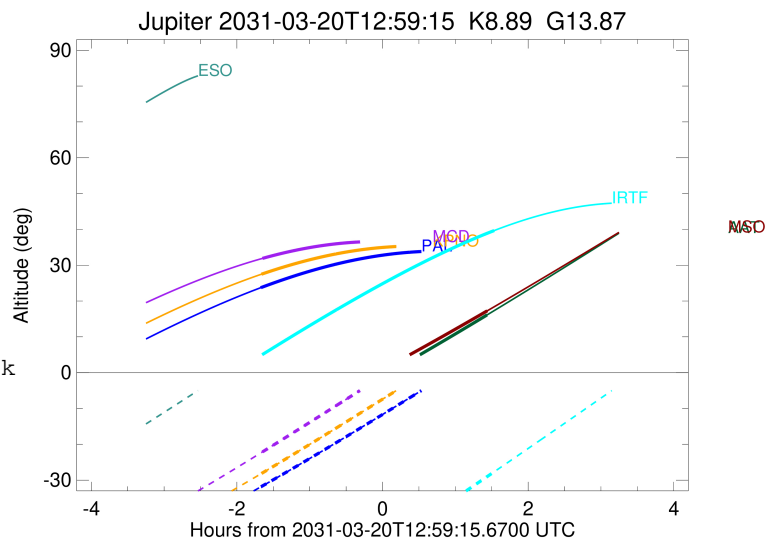
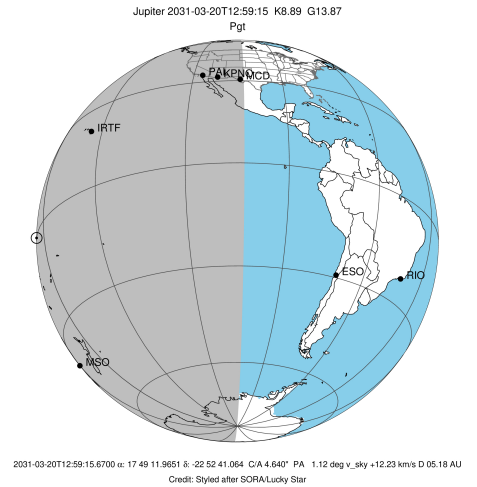


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-03-20T11:18:59.893	23.73	-31.87	71491.7	-10.93	-12.44
Jupiter	E	2031-03-20T14:36:53.200	32.68	8.72x	71491.8	-8.98	-10.24

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-03-20T12:58:17.430
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       : 4068890254940581504
2Mass ID (if available) : 17491196-2252410
ICRS Star Coord at Epoch: 17h 49m 11.96514s -22:52:41.06367s
RUWE (>1.4 is poor) : 0.92
K magnitude           : 8.888
G magnitude           : 13.873
RP magnitude          : 12.613
BP magnitude          : 15.639
DUPflag              : 0
Distance (au)        : 5.184
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : 12.23
Sun-Target sep (deg) : 91.78
Sun-Moon sep (deg)   : 58.63
B (ring opening deg) : -2.62
PA of pole (deg)     : 0.33
Pole direction: RA (deg): 268.05699
Dec (deg): 64.49651
C/A sky separation (") : 3.253
C/A sky separation (km) : 12231.3
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
    
```

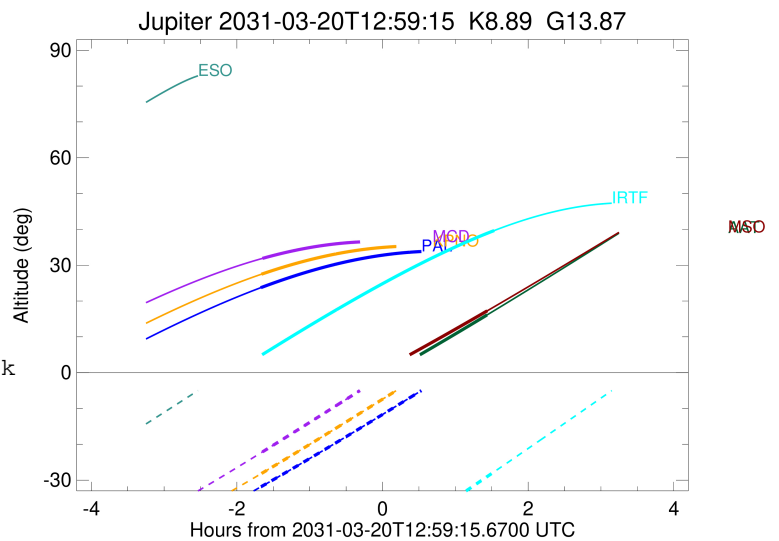
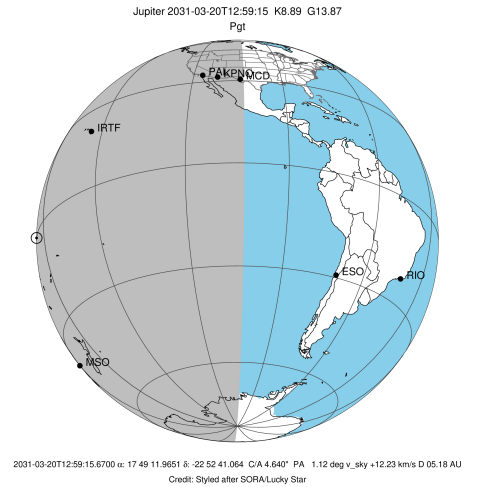


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-03-20T11:19:29.667	27.48	-28.15	71491.7	-10.91	-12.42
Jupiter	E	2031-03-20T14:37:33.631	32.69	13.44x	71491.8	-9.09	-10.37

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-03-20T12:59:16.230
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       : 4068890254940581504
2Mass ID (if available) : 17491196-2252410
ICRS Star Coord at Epoch: 17h 49m 11.96514s -22:52:41.06367s
RUWE (>1.4 is poor) : 0.92
K magnitude           : 8.888
G magnitude           : 13.873
RP magnitude          : 12.613
BP magnitude          : 15.639
DUPflag              : 0
Distance (au)        : 5.184
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : 12.23
Sun-Target sep (deg) : 91.78
Sun-Moon sep (deg)   : 58.59
B (ring opening deg) : -2.62
PA of pole (deg)     : 0.33
Pole direction: RA (deg): 268.05699
Dec (deg): 64.49651
C/A sky separation (") : 3.268
C/A sky separation (km) : 12288.0
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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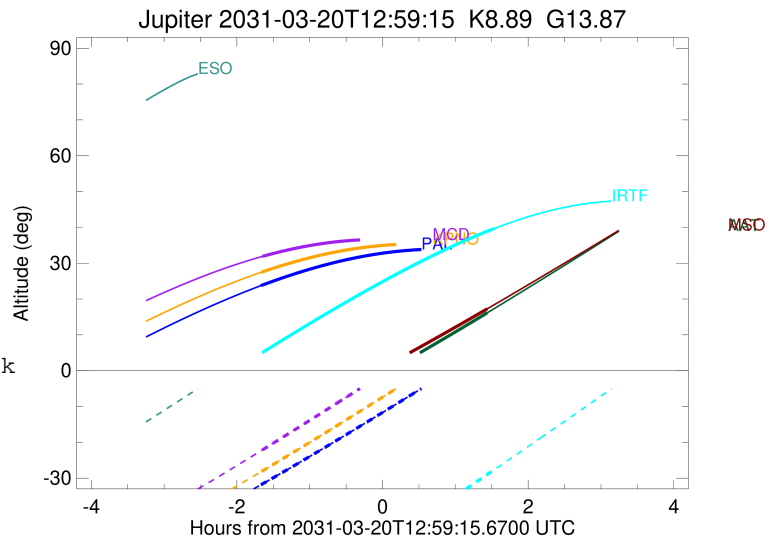
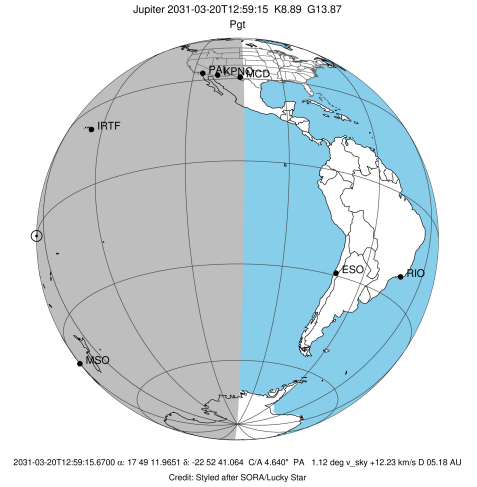


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-03-20T11:20:19.371	31.89	-22.12	71491.7	-10.86	-12.37
Jupiter	E	2031-03-20T14:38:30.116	31.16	20.25x	71491.8	-9.24	-10.53

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-03-20T12:52:56.750
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       : 4068890254940581504
2Mass ID (if available) : 17491196-2252410
ICRS Star Coord at Epoch: 17h 49m 11.96514s -22:52:41.06367s
RUWE (>1.4 is poor) : 0.92
K magnitude           : 8.888
G magnitude           : 13.873
RP magnitude          : 12.613
BP magnitude          : 15.639
DUPflag              : 0
Distance (au)        : 5.184
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : 12.23
Sun-Target sep (deg) : 91.78
Sun-Moon sep (deg)   : 58.83
B (ring opening deg) : -2.62
PA of pole (deg)     : 0.33
Pole direction: RA (deg): 268.05699
Dec (deg): 64.49651
C/A sky separation (") : 3.742
C/A sky separation (km) : 14068.5
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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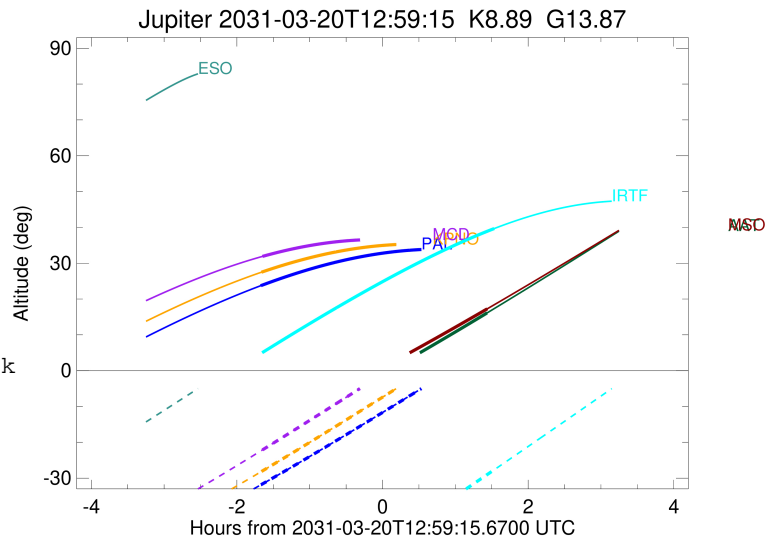
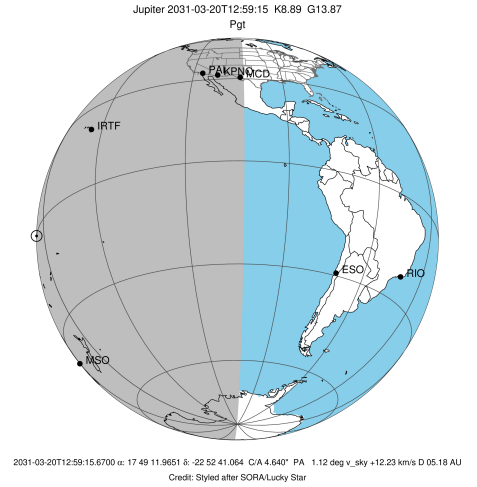


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-03-20T11:16:07.397	4.17x	-67.33	71491.5	-12.87	-14.63
Jupiter	E	2031-03-20T14:31:13.900	39.66	-27.68	71491.7	-10.00	-11.39

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-03-20T12:52:35.850
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       : 4068890254940581504
2Mass ID (if available) : 17491196-2252410
ICRS Star Coord at Epoch: 17h 49m 11.96514s -22:52:41.06367s
RUWE (>1.4 is poor) : 0.92
K magnitude           : 8.888
G magnitude           : 13.873
RP magnitude         : 12.613
BP magnitude         : 15.639
DUPflag              : 0
Distance (au)        : 5.184
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : 12.23
Sun-Target sep (deg) : 91.78
Sun-Moon sep (deg)   : 58.56
B (ring opening deg) : -2.62
PA of pole (deg)     : 0.33
Pole direction: RA (deg): 268.05699
Dec (deg): 64.49651
C/A sky separation (") : 5.630
C/A sky separation (km) : 21169.2
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
    
```

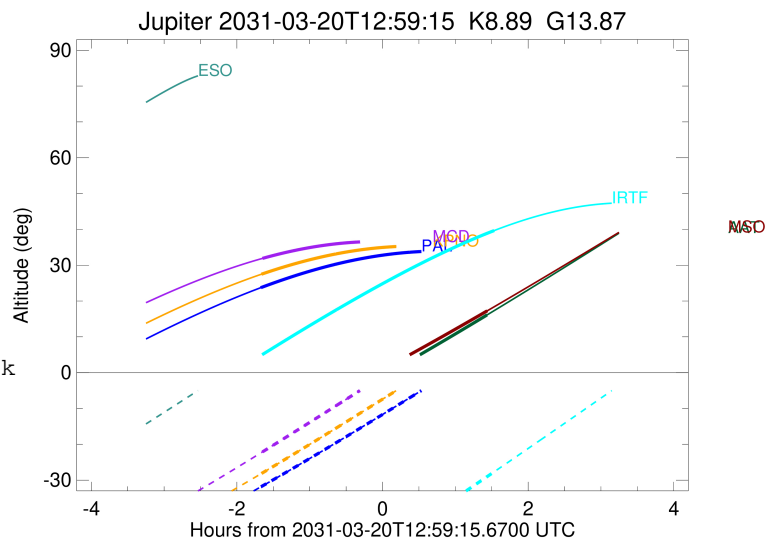
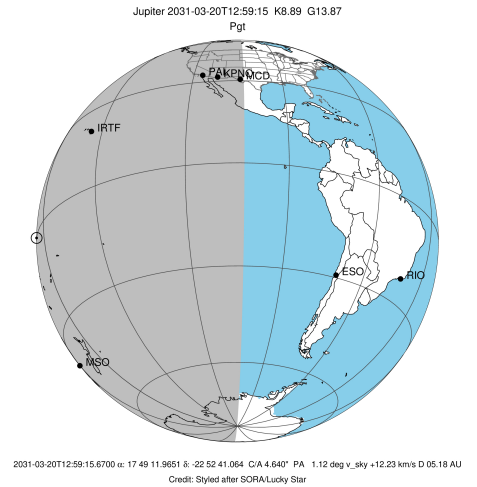


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-03-20T11:21:05.641	-18.22x	-39.03	71491.0	-18.60	-21.03
Jupiter	E	2031-03-20T14:25:27.221	16.12	-58.63	71491.3	-15.70	-17.81

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-03-20T12:52:54.790
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       : 4068890254940581504
2Mass ID (if available) : 17491196-2252410
ICRS Star Coord at Epoch: 17h 49m 11.96514s -22:52:41.06367s
RUWE (>1.4 is poor) : 0.92
K magnitude          : 8.888
G magnitude          : 13.873
RP magnitude         : 12.613
BP magnitude         : 15.639
DUPflag             : 0
Distance (au)        : 5.184
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : 12.23
Sun-Target sep (deg) : 91.78
Sun-Moon sep (deg)   : 58.57
B (ring opening deg) : -2.62
PA of pole (deg)     : 0.33
Pole direction: RA (deg): 268.05699
Dec (deg): 64.49651
C/A sky separation (") : 5.713
C/A sky separation (km) : 21480.4
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	2031-03-20T11:21:28.445	-15.45x	-36.98	71491.0	-18.84	-21.29
Jupiter	E	2031-03-20T14:25:39.191	17.28	-54.62	71491.3	-16.00	-18.14