

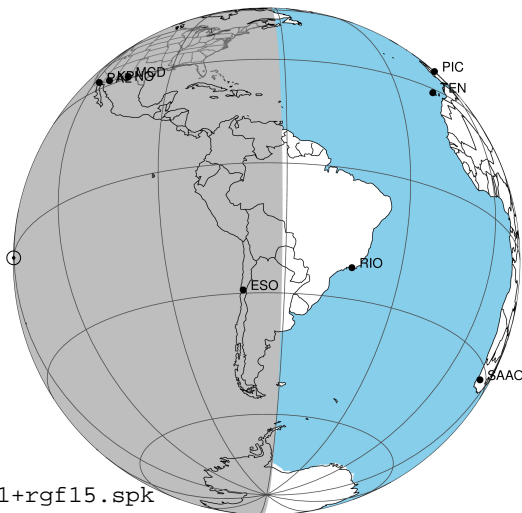
target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2031-03-22T10:11:21.380
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 4068901215701163648
 2Mass ID (if available) : 17494896-2252424

Jupiter 2031-03-22T10:11:21 K8.51 G14.79 Pgt

ICRS Star Coord at Epoch: 17h 49m 48.95876s -22:52:42.66102s

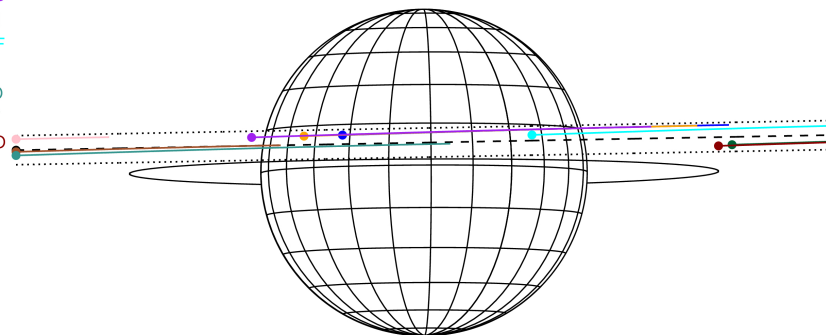
RUWE (>1.4 is poor) : 1.02
 K magnitude : 8.509
 G magnitude : 14.788
 RP magnitude : 13.286
 BP magnitude : 17.894
 DUPflag : 0
 Distance (au) : 5.154
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : 11.33
 Sun-Target sep (deg) : 93.51
 Sun-Moon sep (deg) : 84.18
 B (ring opening deg) : -2.62
 PA of pole (deg) : 0.26
 Pole direction: RA (deg): 268.05699
 Dec (deg): 64.49651
 C/A sky separation (") : 3.502
 C/A sky separation (km) : 13090.2
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk

Jupiter 2031-03-22T10:11:21 K8.51 G14.79
 Pgt



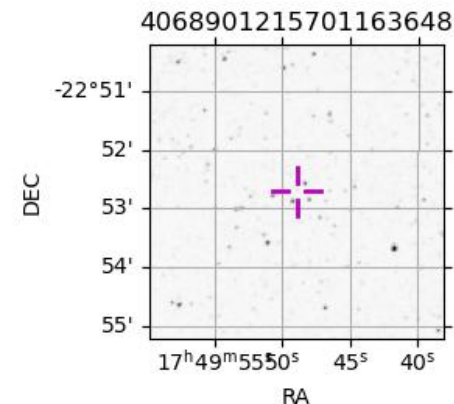
2031-03-22T10:11:21.3800 cc: 17 49 48.9588 s: -22 52 42.661 C/A 3.491" PA 181.06 deg v_sky +11.33 km/s D 05.15 AU
 Credit: Styled after SORA/Lucky Star

Earth
 PAL
 KPNO
 MCD
 TEN
 IRTF
 RIO
 ESO
 AAT
 MSO



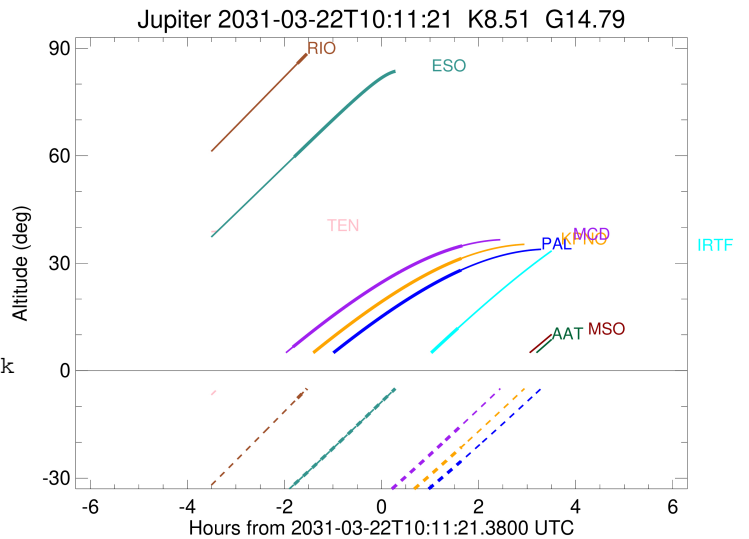
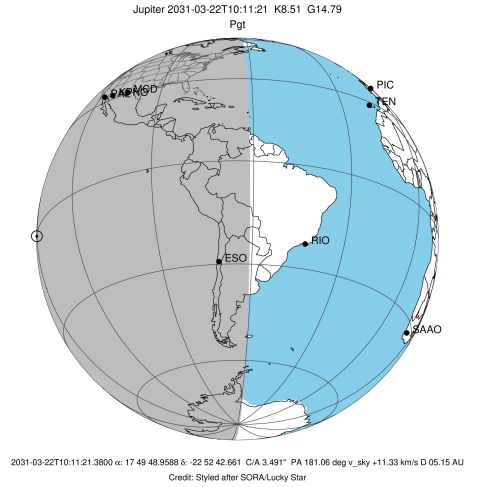
Observable events with sun below -5 deg and altitude above 5 deg

Obs	Location	lat	Elon	Target	Observed Events	Interval	OCode
PIC	Pic du Midi	42.9	0.1				Pnn
PAL	Palomar Mt (200")	33.4	243.1	+	MAR 22 11:49	- MAR 22 11:49	Pne
PMO	Purple Mtn Obs. Nanking	32.1	118.8				Pnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+	MAR 22 11:50	- MAR 22 11:50	Pne
MCD	McDonald Obs. 2.7m	30.7	256.0	+ +	MAR 22 08:21	- MAR 22 11:51	Pie
TEN	Teide Obs./Tenerife	28.3	343.5				Pnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+	MAR 22 11:45	- MAR 22 11:45	Pne
KAV	Kavalur Observatory	12.6	78.8				Pnn
RIO	Rio de Janeiro	-22.9	316.8	+	MAR 22 08:27	- MAR 22 08:27	Pin
ESO	European Southern Obs. (3.6m)	-29.3	289.3	+	MAR 22 08:23	- MAR 22 08:23	Pin
AAT	Siding Spring (AAT)	-31.3	149.1				Pnn
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8				Pnn
MSO	Mt. Stromlo Observatory	-35.3	149.0				Pnn



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-03-22T10:04:37.440
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        : 4068901215701163648
2Mass ID (if available) : 17494896-2252424
ICRS Star Coord at Epoch: 17h 49m 48.95876s -22:52:42.66102s
RUWE (>1.4 is poor) : 1.02
K magnitude           : 8.509
G magnitude           : 14.788
RP magnitude          : 13.286
BP magnitude          : 17.894
DUPflag              : 0
Distance (au)         : 5.154
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : 11.33
Sun-Target sep (deg) : 93.51
Sun-Moon sep (deg)   : 84.49
B (ring opening deg) : -2.62
PA of pole (deg)     : 0.26
Pole direction: RA (deg): 268.05699
Dec (deg): 64.49651
C/A sky separation ("): 4.671
C/A sky separation (km): 17460.5
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
    
```

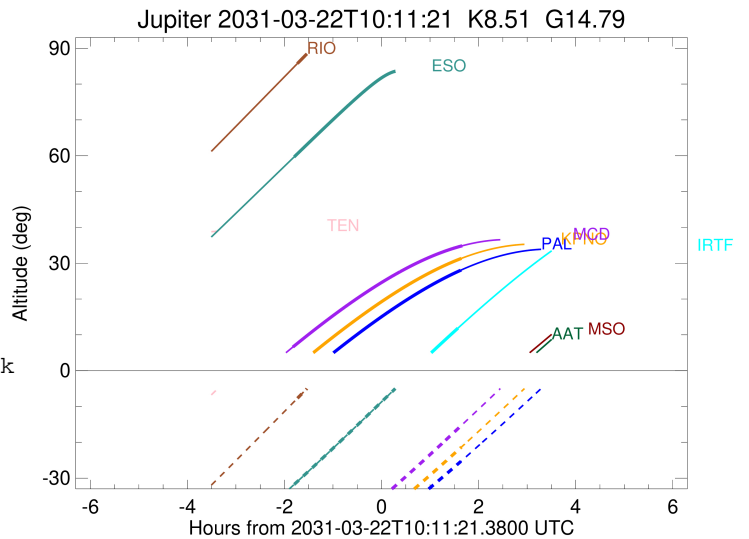
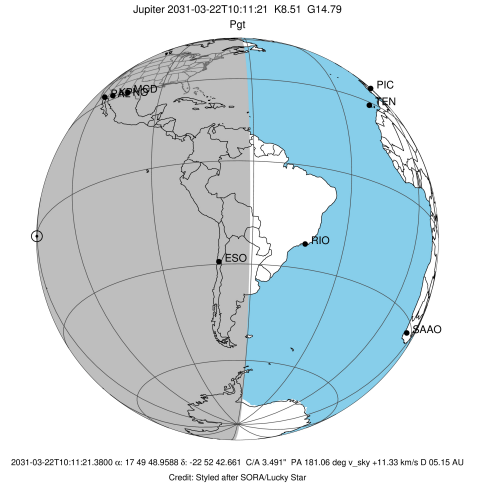


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-03-22T08:21:24.689	-4.36x	-55.62	71491.6	12.60	14.33
Jupiter	E	2031-03-22T11:49:32.048	28.06	-25.30	71491.3	15.45	17.53

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-03-22T10:05:00.200
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      : 4068901215701163648
2Mass ID (if available) : 17494896-2252424
ICRS Star Coord at Epoch: 17h 49m 48.95876s -22:52:42.66102s
RUWE (>1.4 is poor) : 1.02
K magnitude         : 8.509
G magnitude         : 14.788
RP magnitude        : 13.286
BP magnitude        : 17.894
DUPflag            : 0
Distance (au)       : 5.154
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : 11.33
Sun-Target sep (deg) : 93.51
Sun-Moon sep (deg)  : 84.55
B (ring opening deg) : -2.62
PA of pole (deg)    : 0.26
Pole direction: RA (deg): 268.05699
Dec (deg): 64.49651
C/A sky separation (") : 4.686
C/A sky separation (km) : 17517.3
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
    
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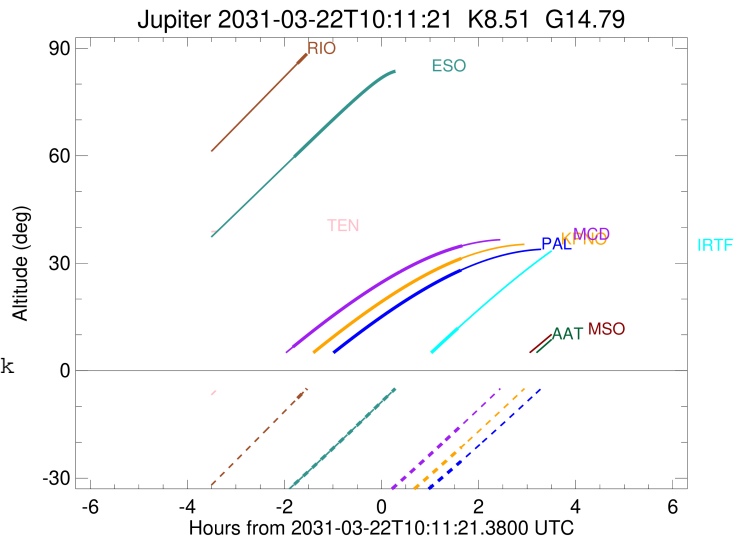
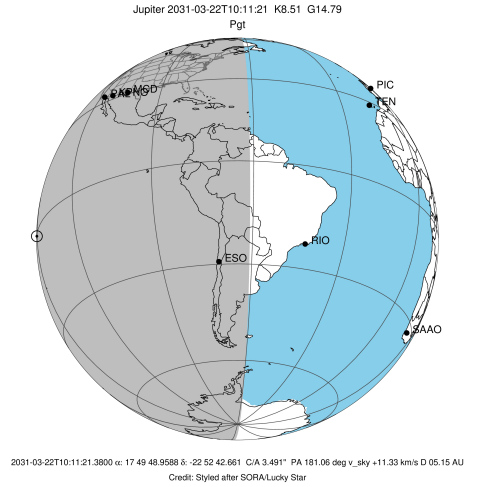


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-03-22T08:21:28.703	0.25x	-55.66	71491.6	12.66	14.41
Jupiter	E	2031-03-22T11:50:09.796	31.34	-21.33	71491.3	15.45	17.53

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-03-22T10:05:43.410
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       : 4068901215701163648
2Mass ID (if available) : 17494896-2252424
ICRS Star Coord at Epoch: 17h 49m 48.95876s -22:52:42.66102s
RUWE (>1.4 is poor) : 1.02
K magnitude           : 8.509
G magnitude           : 14.788
RP magnitude          : 13.286
BP magnitude          : 17.894
DUPflag              : 0
Distance (au)        : 5.154
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : 11.33
Sun-Target sep (deg) : 93.51
Sun-Moon sep (deg)   : 84.62
B (ring opening deg) : -2.62
PA of pole (deg)     : 0.26
Pole direction: RA (deg): 268.05699
Dec (deg): 64.49651
C/A sky separation ("): 4.718
C/A sky separation (km): 17633.9
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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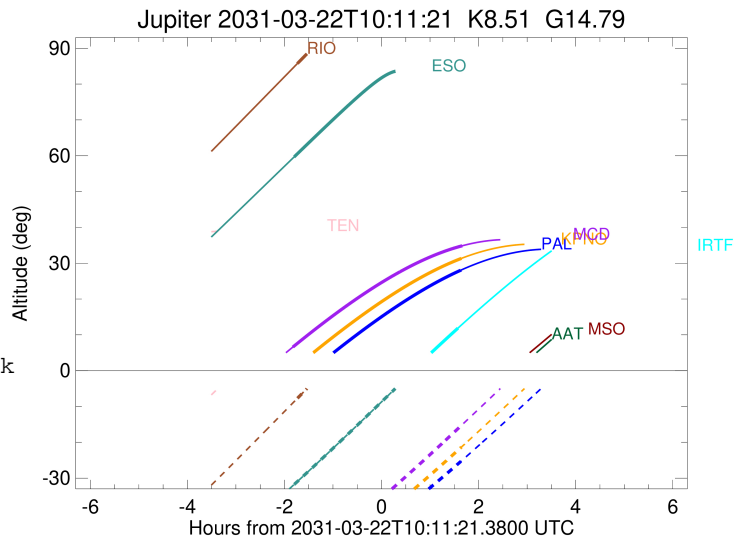
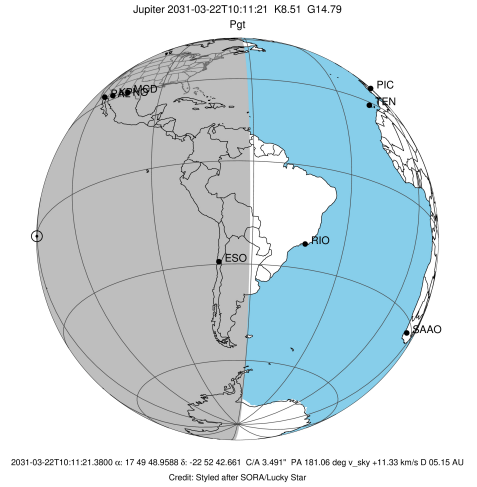


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-03-22T08:21:47.051	6.59	-53.69	71491.5	12.80	14.56
Jupiter	E	2031-03-22T11:51:10.002	34.86	-15.06	71491.3	15.47	17.55

```

target                : Jupiter
target radius (km)    : 71492.00
C/A epoch             : 2031-03-22T10:02:09.910
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        : 4068901215701163648
2Mass ID (if available) : 17494896-2252424
ICRS Star Coord at Epoch: 17h 49m 48.95876s -22:52:42.66102s
RUWE (>1.4 is poor) : 1.02
K magnitude           : 8.509
G magnitude           : 14.788
RP magnitude          : 13.286
BP magnitude          : 17.894
DUPflag              : 0
Distance (au)         : 5.154
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : 11.33
Sun-Target sep (deg)  : 93.51
Sun-Moon sep (deg)   : 84.13
B (ring opening deg) : -2.62
PA of pole (deg)     : 0.26
Pole direction: RA (deg): 268.05699
Dec (deg): 64.49651
C/A sky separation (") : 3.974
C/A sky separation (km) : 14854.3
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
    
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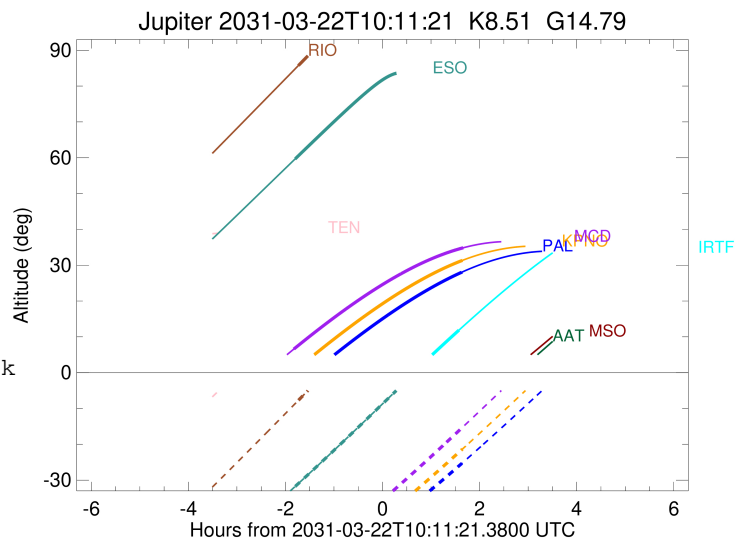
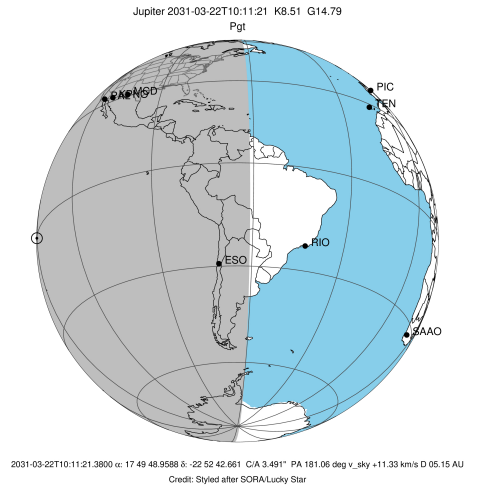


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-03-22T08:20:34.108	-33.11x	-52.58	71491.7	10.38	11.82
Jupiter	E	2031-03-22T11:45:51.699	11.87	-62.23	71491.5	13.63	15.49

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-03-22T10:14:44.200
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       : 4068901215701163648
2Mass ID (if available) : 17494896-2252424
ICRS Star Coord at Epoch: 17h 49m 48.95876s -22:52:42.66102s
RUWE (>1.4 is poor) : 1.02
K magnitude          : 8.509
G magnitude          : 14.788
RP magnitude         : 13.286
BP magnitude         : 17.894
DUPflag             : 0
Distance (au)        : 5.154
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : 11.33
Sun-Target sep (deg) : 93.51
Sun-Moon sep (deg)   : 85.06
B (ring opening deg) : -2.62
PA of pole (deg)     : 0.26
Pole direction: RA (deg): 268.05699
Dec (deg): 64.49651
C/A sky separation (") : 3.469
C/A sky separation (km) : 12968.0
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
    
```

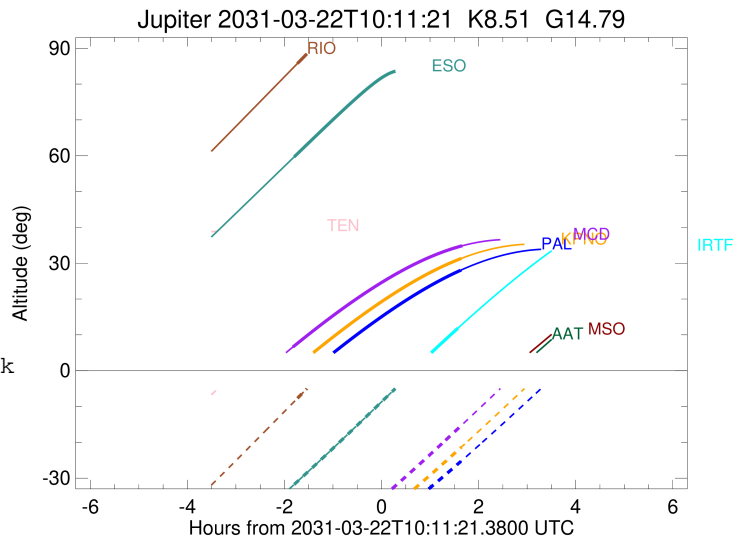
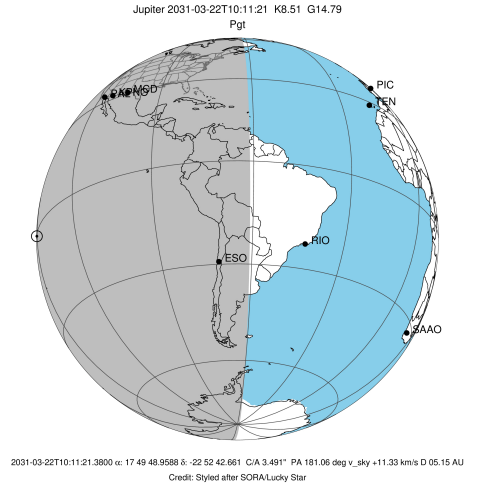


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-03-22T08:27:24.055	85.72	-7.72	71491.7	9.74	11.10
Jupiter	E	2031-03-22T12:01:43.089	44.99	40.76x	71491.7	10.76	12.26

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-03-22T10:10:25.770
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        : 4068901215701163648
2Mass ID (if available) : 17494896-2252424
ICRS Star Coord at Epoch: 17h 49m 48.95876s -22:52:42.66102s
RUWE (>1.4 is poor) : 1.02
K magnitude           : 8.509
G magnitude           : 14.788
RP magnitude          : 13.286
BP magnitude          : 17.894
DUPflag              : 0
Distance (au)         : 5.154
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : 11.33
Sun-Target sep (deg)  : 93.51
Sun-Moon sep (deg)    : 85.14
B (ring opening deg) : -2.62
PA of pole (deg)      : 0.26
Pole direction: RA (deg): 268.05699
Dec (deg): 64.49651
C/A sky separation (") : 3.311
C/A sky separation (km) : 12377.9
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	2031-03-22T08:23:22.130	59.66	-31.77	71491.8	8.85	10.10
Jupiter	E	2031-03-22T11:58:05.207	70.45	14.52x	71491.7	10.69	12.18