

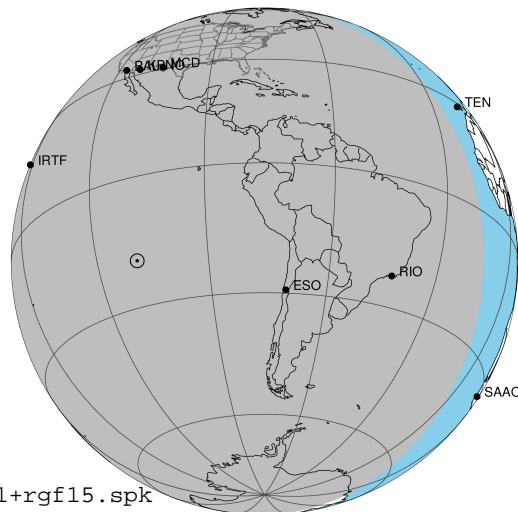
target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2031-05-18T07:10:14.100
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 4068843491382706816
 2Mass ID (if available) : 17463815-2253189

Jupiter 2031-05-18T07:10:14 K9.26 G13.42 Pgt

ICRS Star Coord at Epoch: 17h 46m 38.16089s -22:53:18.94979s

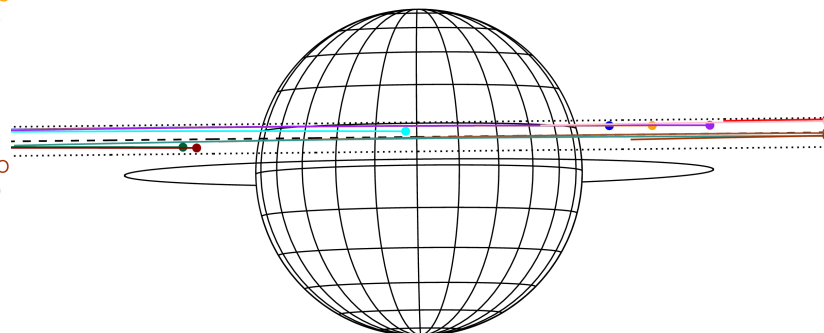
RUWE (>1.4 is poor) : 0.88
 K magnitude : 9.259
 G magnitude : 13.424
 RP magnitude : 12.312
 BP magnitude : 14.642
 DUPflag : 0
 Distance (au) : 4.391
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -12.45
 Sun-Target sep (deg) : 149.82
 Sun-Moon sep (deg) : 115.31
 B (ring opening deg) : -2.61
 PA of pole (deg) : 0.60
 Pole direction: RA (deg): 268.05694
 Dec (deg): 64.49651
 C/A sky separation (") : 4.898
 C/A sky separation (km) : 15598.6
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk

Jupiter 2031-05-18T07:10:14 K9.26 G13.42
 Pgt



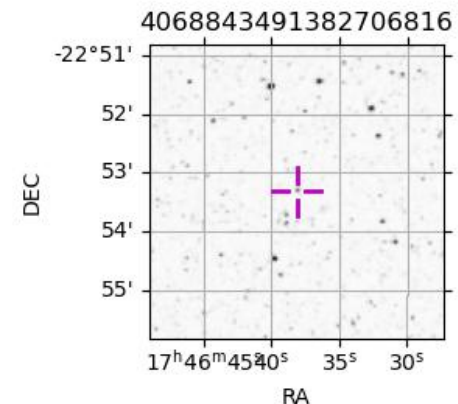
2031-05-18T07:10:14.1000 at: 17 46 38.1609 s: -22 53 18.950 C/A 4.886" PA 180.63 deg v_sky -12.45 km/s D 04.39 AU
 Credit: Styled after SORA/Lucky Star

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



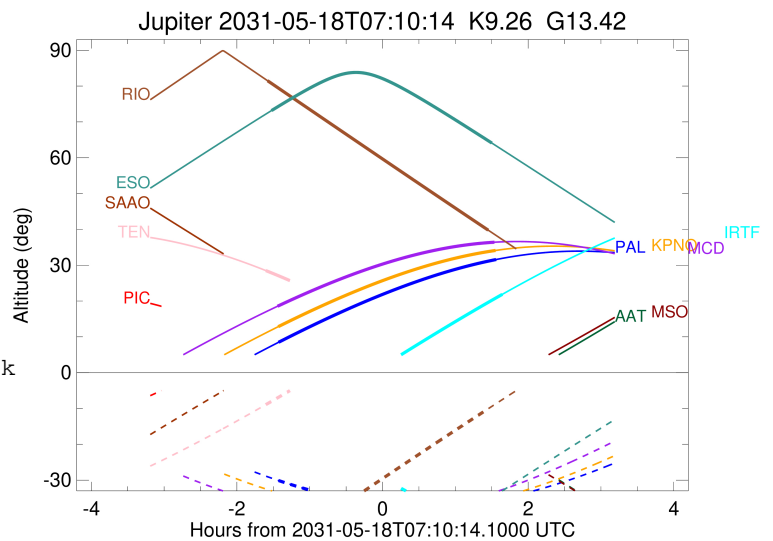
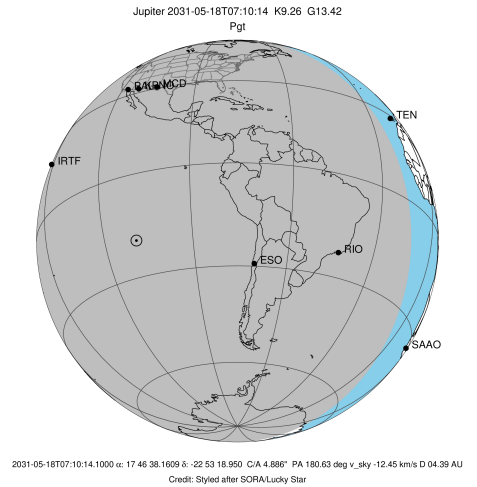
Observable events with sun below -5 deg and altitude above 5 deg

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	+ +	MAY 18 05:44 - MAY 18 08:43	Pie
PMO	Purple Mtn Obs. Nanking	32.1	118.8			Pnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+ +	MAY 18 05:44 - MAY 18 08:43	Pie
MCD	McDonald Obs. 2.7m	30.7	256.0	+ +	MAY 18 05:43 - MAY 18 08:42	Pie
TEN	Teide Obs./Tenerife	28.3	343.5	+	MAY 18 05:34 - MAY 18 05:34	Pin
IRTF	Mauna Kea/IRTF	19.8	204.5	+	MAY 18 08:49 - MAY 18 08:49	Pne
KAV	Kavalur Observatory	12.6	78.8			Pnn
RIO	Rio de Janeiro	-22.9	316.8	+ +	MAY 18 05:35 - MAY 18 08:37	Pie
ESO	European Southern Obs. (3.6m)	-29.3	289.3	+ +	MAY 18 05:38 - MAY 18 08:40	Pie
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             : 2031-05-18T07:14:37.190
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        : 4068843491382706816
2Mass ID (if available) : 17463815-2253189
ICRS Star Coord at Epoch: 17h 46m 38.16089s -22:53:18.94979s
RUWE (>1.4 is poor) : 0.88
K magnitude           : 9.259
G magnitude           : 13.424
RP magnitude          : 12.312
BP magnitude          : 14.642
DUPflag              : 0
Distance (au)         : 4.391
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -12.45
Sun-Target sep (deg)  : 149.82
Sun-Moon sep (deg)    : 115.42
B (ring opening deg)  : -2.61
PA of pole (deg)      : 0.60
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 6.401
C/A sky separation (km) : 20386.5
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
    
```

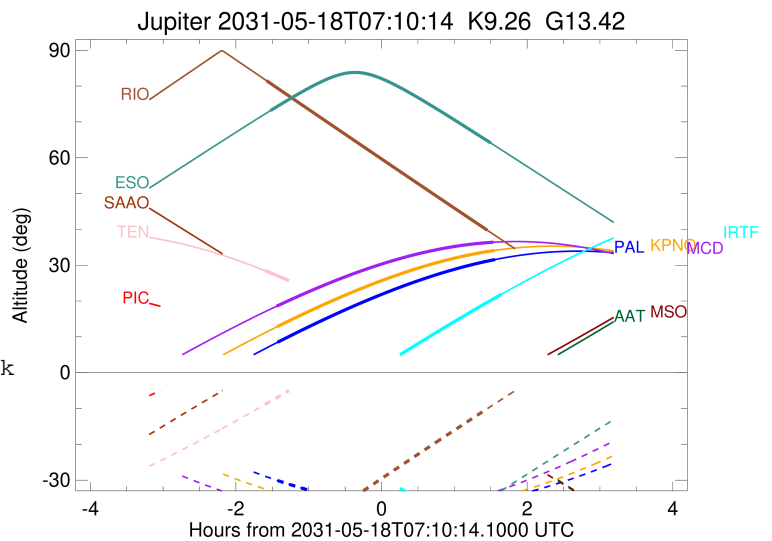
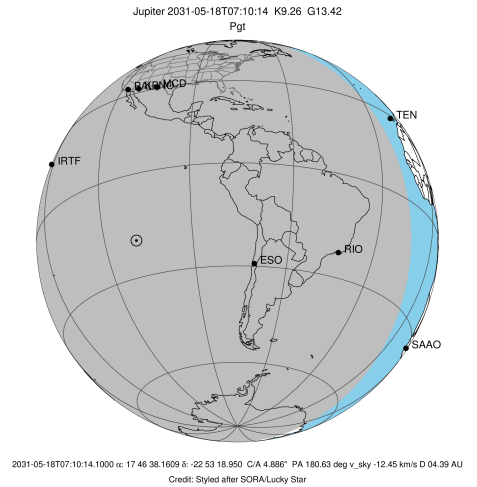


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-18T05:44:33.922	8.48	-30.11	71491.3	16.04	18.19
Jupiter	E	2031-05-18T08:43:53.765	31.58	-35.37	71491.2	16.85	19.09

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-18T07:14:11.430
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      : 4068843491382706816
2Mass ID (if available) : 17463815-2253189
ICRS Star Coord at Epoch: 17h 46m 38.16089s -22:53:18.94979s
RUWE (>1.4 is poor) : 0.88
K magnitude          : 9.259
G magnitude          : 13.424
RP magnitude         : 12.312
BP magnitude         : 14.642
DUPflag             : 0
Distance (au)       : 4.391
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -12.45
Sun-Target sep (deg) : 149.82
Sun-Moon sep (deg)  : 115.49
B (ring opening deg) : -2.61
PA of pole (deg)    : 0.60
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 6.408
C/A sky separation (km) : 20408.5
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
    
```

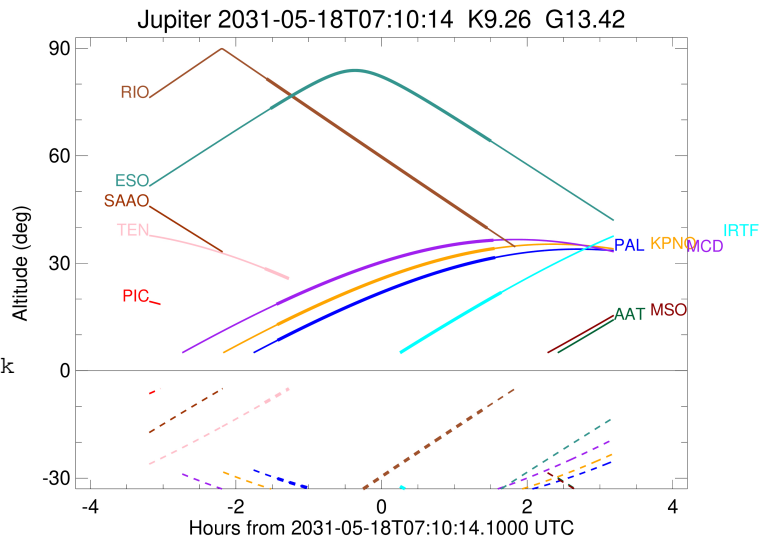
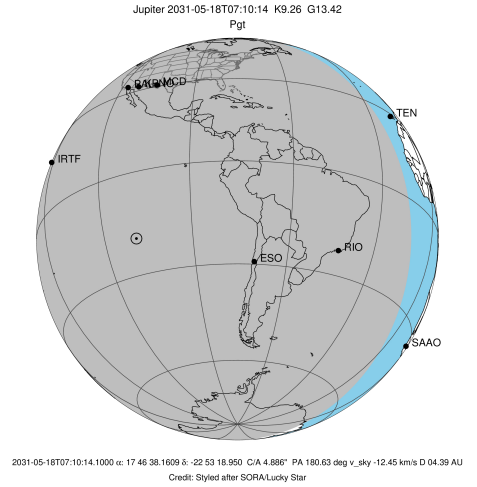


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-18T05:44:21.262	12.85	-33.53	71491.3	16.09	18.25
Jupiter	E	2031-05-18T08:43:19.084	34.11	-35.17	71491.2	16.82	19.06

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-18T07:13:27.940
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       : 4068843491382706816
2Mass ID (if available) : 17463815-2253189
ICRS Star Coord at Epoch: 17h 46m 38.16089s -22:53:18.94979s
RUWE (>1.4 is poor) : 0.88
K magnitude           : 9.259
G magnitude           : 13.424
RP magnitude         : 12.312
BP magnitude         : 14.642
DUPflag              : 0
Distance (au)        : 4.391
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -12.45
Sun-Target sep (deg) : 149.82
Sun-Moon sep (deg)   : 115.59
B (ring opening deg) : -2.61
PA of pole (deg)     : 0.60
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation ("): 6.426
C/A sky separation (km): 20464.5
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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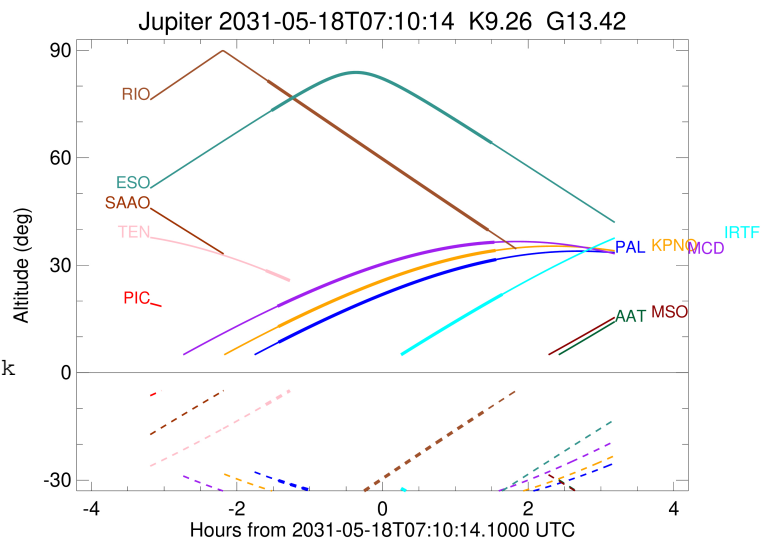
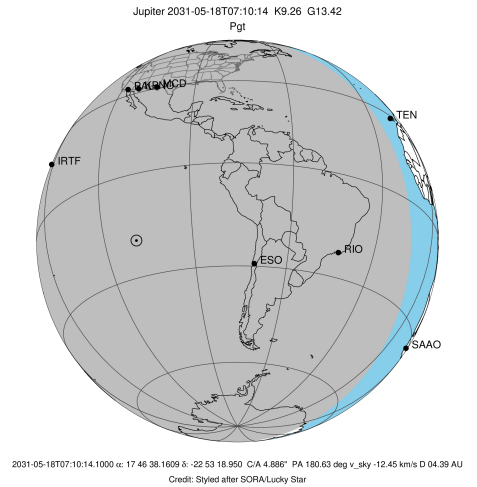


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-18T05:43:54.880	18.57	-37.34	71491.3	16.20	18.37
Jupiter	E	2031-05-18T08:42:25.360	36.41	-33.41	71491.2	16.79	19.02

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-18T07:04:09.370
Event type          : Pgt
                    : Jupiter occs: geocentric, topocentric
                    : Not a ringed target
Observer code       : TEN
Location            : Teide Obs./Tenerife
Latitude (deg)      : 28.30050
E. Longitude (deg)  : 343.48909
Altitude (km)       : 2.395
Gaia source ID      : 4068843491382706816
2Mass ID (if available) : 17463815-2253189
ICRS Star Coord at Epoch: 17h 46m 38.16089s -22:53:18.94979s
RUWE (>1.4 is poor) : 0.88
K magnitude          : 9.259
G magnitude          : 13.424
RP magnitude         : 12.312
BP magnitude         : 14.642
DUPflag             : 0
Distance (au)       : 4.391
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -12.45
Sun-Target sep (deg) : 149.82
Sun-Moon sep (deg)  : 115.82
B (ring opening deg) : -2.61
PA of pole (deg)    : 0.60
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 6.141
C/A sky separation (km) : 19558.5
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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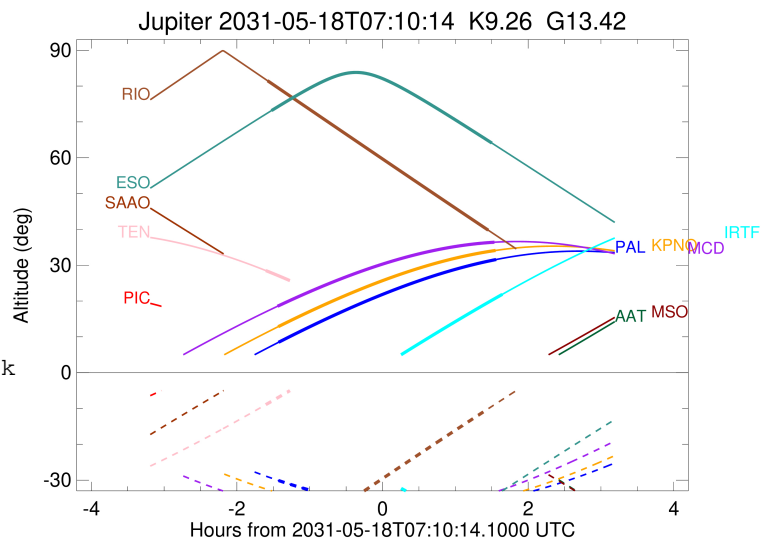
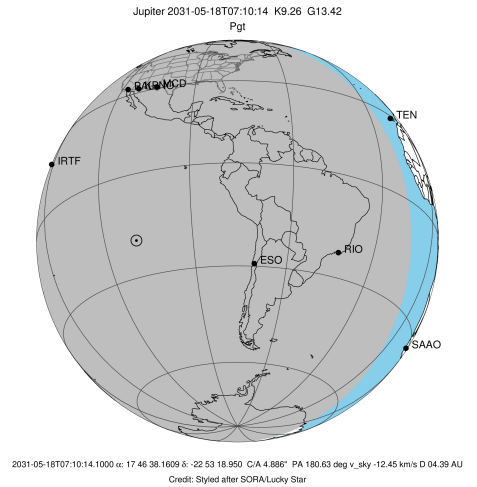


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-18T05:34:01.740	28.50	-8.93	71491.3	16.40	18.58
Jupiter	E	2031-05-18T08:35:07.578	-3.23x	28.99x	71491.4	15.16	17.21

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-18T07:17:47.010
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      : 4068843491382706816
2Mass ID (if available) : 17463815-2253189
ICRS Star Coord at Epoch: 17h 46m 38.16089s -22:53:18.94979s
RUWE (>1.4 is poor) : 0.88
K magnitude          : 9.259
G magnitude          : 13.424
RP magnitude         : 12.312
BP magnitude         : 14.642
DUPflag             : 0
Distance (au)       : 4.391
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -12.45
Sun-Target sep (deg) : 149.82
Sun-Moon sep (deg)  : 114.98
B (ring opening deg) : -2.61
PA of pole (deg)    : 0.60
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 5.667
C/A sky separation (km) : 18047.9
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
    
```

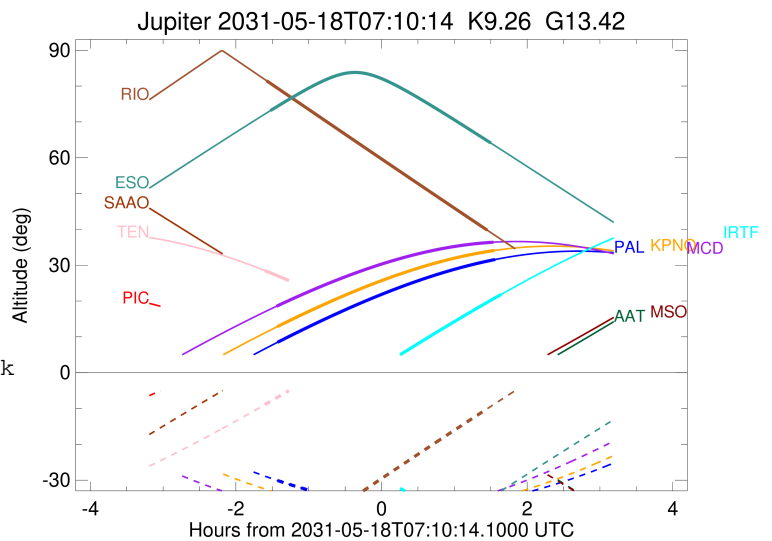
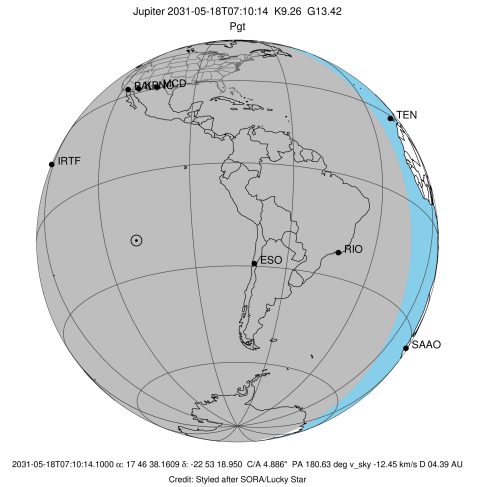


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-18T05:45:11.222	-16.89x	-12.46	71491.5	13.85	15.74
Jupiter	E	2031-05-18T08:49:02.067	21.87	-45.07	71491.4	15.29	17.34

```

target           : Jupiter
target radius (km) : 71492.00
C/A epoch       : 2031-05-18T07:06:12.090
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  : 4068843491382706816
2Mass ID (if available) : 17463815-2253189
ICRS Star Coord at Epoch: 17h 46m 38.16089s -22:53:18.94979s
RUWE (>1.4 is poor) : 0.88
K magnitude     : 9.259
G magnitude     : 13.424
RP magnitude    : 12.312
BP magnitude    : 14.642
DUPflag        : 0
Distance (au)   : 4.391
f0 (km)         : 0.00
g0 (km)         : 0.00
skyplane vel. (km/s) : -12.45
Sun-Target sep (deg) : 149.82
Sun-Moon sep (deg) : 116.24
B (ring opening deg) : -2.61
PA of pole (deg) : 0.60
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 4.801
C/A sky separation (km) : 15291.3
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
    
```

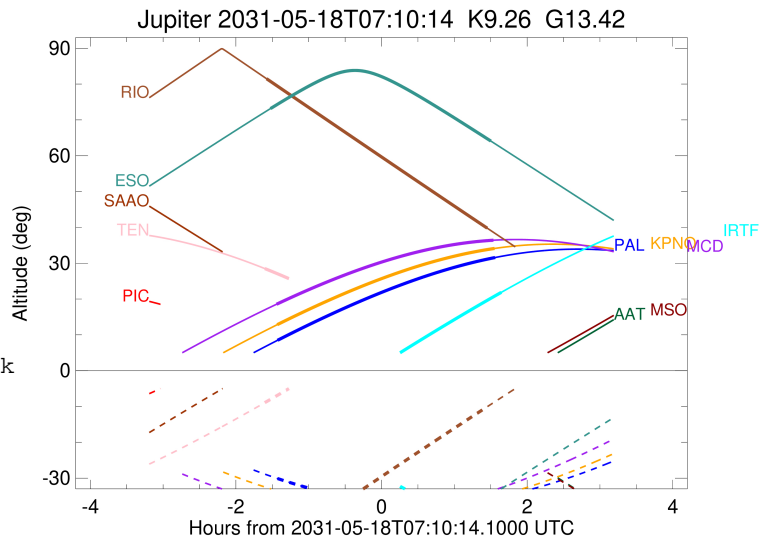
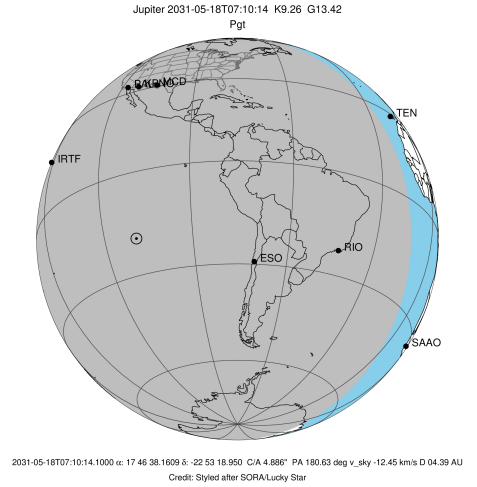


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-18T05:35:30.980	81.49	-51.24	71491.6	12.61	14.34
Jupiter	E	2031-05-18T08:37:23.649	39.77	-10.06	71491.6	11.81	13.44

```

target           : Jupiter
target radius (km) : 71492.00
C/A epoch       : 2031-05-18T07:09:33.380
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  : 4068843491382706816
2Mass ID (if available) : 17463815-2253189
ICRS Star Coord at Epoch: 17h 46m 38.16089s -22:53:18.94979s
RUWE (>1.4 is poor) : 0.88
K magnitude     : 9.259
G magnitude     : 13.424
RP magnitude    : 12.312
BP magnitude    : 14.642
DUPflag        : 0
Distance (au)   : 4.391
f0 (km)         : 0.00
g0 (km)         : 0.00
skyplane vel. (km/s) : -12.45
Sun-Target sep (deg) : 149.82
Sun-Moon sep (deg) : 116.18
B (ring opening deg) : -2.61
PA of pole (deg) : 0.60
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 4.680
C/A sky separation (km) : 14904.7
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	2031-05-18T05:38:46.865	73.15	-73.44	71491.6	11.96	13.61
Jupiter	E	2031-05-18T08:40:19.038	64.09	-34.85	71491.6	11.81	13.44