

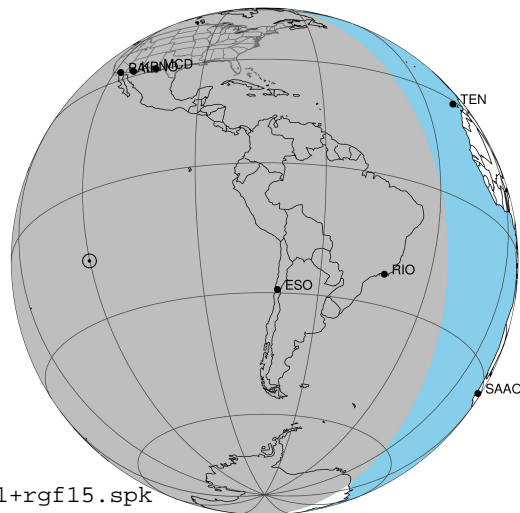
target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2031-05-05T07:57:07.680
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 4068710755316861440
 2Mass ID (if available) : 17510078-2253545

Jupiter 2031-05-05T07:57:07 K7.64 G13.82 Pgt

ICRS Star Coord at Epoch: 17h 51m 00.77996s -22:53:54.61017s

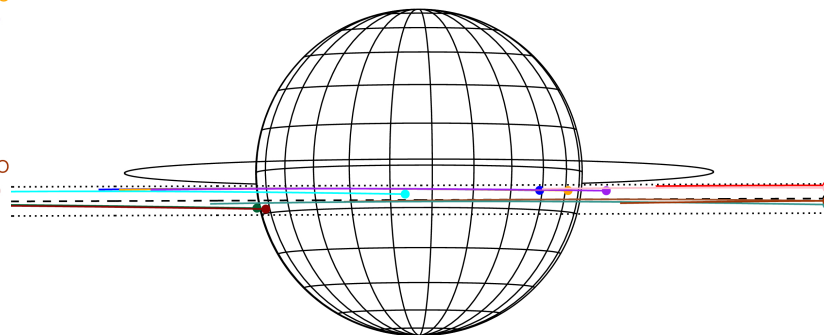
RUWE (>1.4 is poor) : 1.03
 K magnitude : 7.645
 G magnitude : 13.824
 RP magnitude : 12.342
 BP magnitude : 16.689
 DUPflag : 0
 Distance (au) : 4.519
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -8.26
 Sun-Target sep (deg) : 136.28
 Sun-Moon sep (deg) : 67.93
 B (ring opening deg) : -2.60
 PA of pole (deg) : 0.13
 Pole direction: RA (deg): 268.05695
 Dec (deg): 64.49651
 C/A sky separation (") : 3.668
 C/A sky separation (km) : 12023.6
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk

Jupiter 2031-05-05T07:57:07 K7.64 G13.82
 Pgt



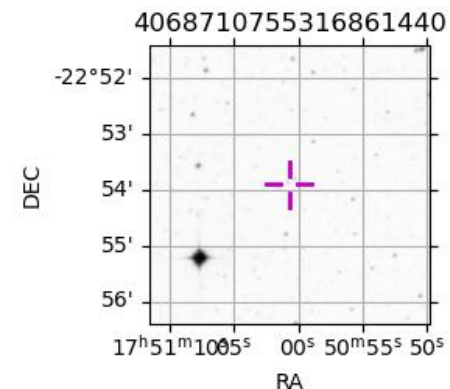
2031-05-05T07:57:07.6800 α: 17 51 00.7800 δ: -22 53 54.610 C/A 3.668° PA 0.20 deg v_sky - 8.26 km/s D 04.52 AU
 Credit: Styled after SORA/Lucky Star

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



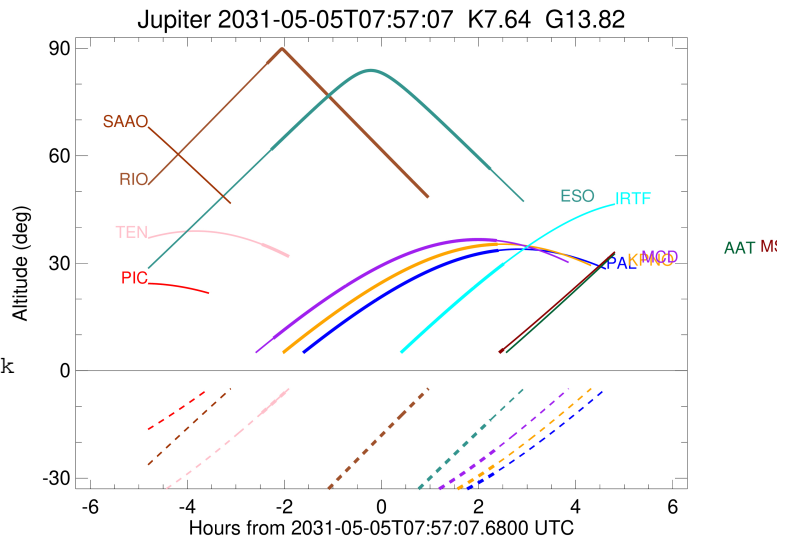
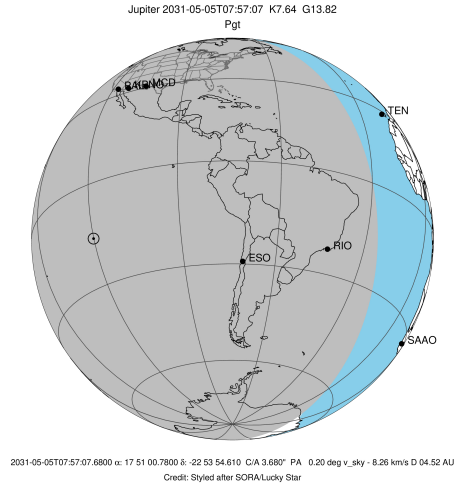
Observable events with sun below -5 deg and altitude above 5 deg

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 05 10:21	- MAY 05 10:21	Pne
PMO	Purple Mtn Obs. Nanking	32.1	118.8				Pnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+	MAY 05 10:20	- MAY 05 10:20	Pne
MCD	McDonald Obs. 2.7m	30.7	256.0	+ +	MAY 05 05:43	- MAY 05 10:19	Pie
TEN	Teide Obs./Tenerife	28.3	343.5	+	MAY 05 05:29	- MAY 05 05:29	Pin
IRTF	Mauna Kea/IRTF	19.8	204.5	+	MAY 05 10:28	- MAY 05 10:28	Pne
KAV	Kavalur Observatory	12.6	78.8				Pnn
RIO	Rio de Janeiro	-22.9	316.8	+	MAY 05 05:35	- MAY 05 05:35	Pin
ESO	European Southern Obs. (3.6m)	-29.3	289.3	+ +	MAY 05 05:40	- MAY 05 10:11	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	+	MAY 05 10:27	- MAY 05 10:27	Pne



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-05T08:04:21.620
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       : 4068710755316861440
2Mass ID (if available) : 17510078-2253545
ICRS Star Coord at Epoch: 17h 51m 00.77996s -22:53:54.61017s
RUWE (>1.4 is poor) : 1.03
K magnitude           : 7.645
G magnitude           : 13.824
RP magnitude          : 12.342
BP magnitude          : 16.689
DUPflag              : 0
Distance (au)        : 4.519
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -8.26
Sun-Target sep (deg) : 136.28
Sun-Moon sep (deg)   : 68.06
B (ring opening deg) : -2.60
PA of pole (deg)     : 0.13
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation ("): 2.210
C/A sky separation (km): 7244.9
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
    
```

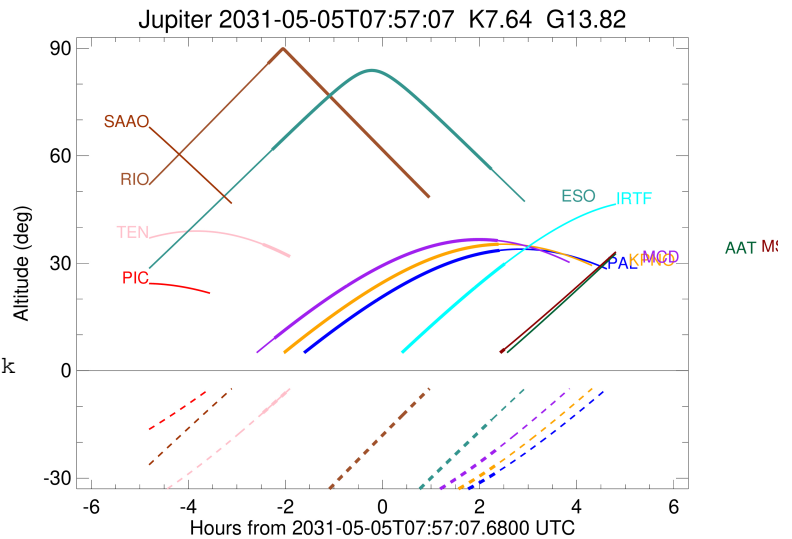
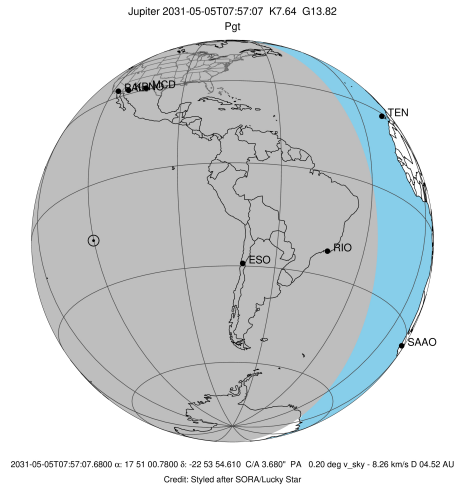


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-05T05:44:02.323	-1.65x	-32.89	71491.9	-6.60	-7.54
Jupiter	E	2031-05-05T10:21:40.887	33.57	-27.90	71491.9	-5.49	-6.27

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-05T08:03:41.600
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      : 4068710755316861440
2Mass ID (if available) : 17510078-2253545
ICRS Star Coord at Epoch: 17h 51m 00.77996s -22:53:54.61017s
RUWE (>1.4 is poor) : 1.03
K magnitude          : 7.645
G magnitude          : 13.824
RP magnitude         : 12.342
BP magnitude         : 16.689
DUPflag             : 0
Distance (au)       : 4.519
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -8.26
Sun-Target sep (deg) : 136.28
Sun-Moon sep (deg)   : 68.13
B (ring opening deg) : -2.60
PA of pole (deg)     : 0.13
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation ("): 2.204
C/A sky separation (km): 7223.2
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
    
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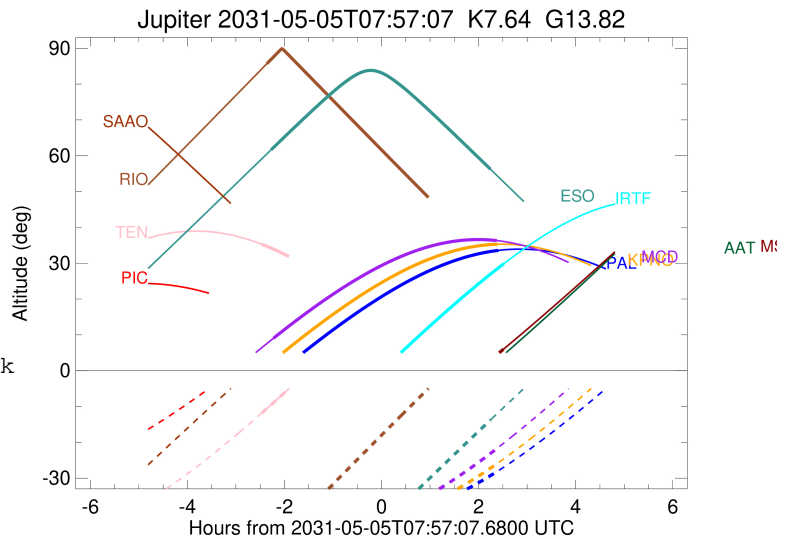
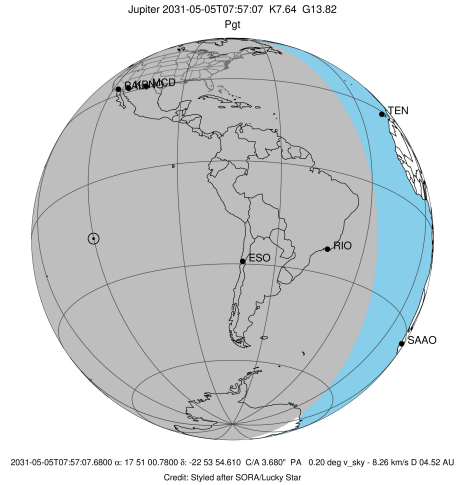


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-05T05:43:54.166	2.90x	-36.43	71491.9	-6.54	-7.47
Jupiter	E	2031-05-05T10:20:44.040	35.29	-25.82	71491.9	-5.54	-6.33

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-05T08:02:33.680
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        : 4068710755316861440
2Mass ID (if available) : 17510078-2253545
ICRS Star Coord at Epoch: 17h 51m 00.77996s -22:53:54.61017s
RUWE (>1.4 is poor) : 1.03
K magnitude           : 7.645
G magnitude           : 13.824
RP magnitude          : 12.342
BP magnitude          : 16.689
DUPflag              : 0
Distance (au)         : 4.519
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -8.26
Sun-Target sep (deg)  : 136.28
Sun-Moon sep (deg)    : 68.24
B (ring opening deg) : -2.60
PA of pole (deg)      : 0.13
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation (") : 2.187
C/A sky separation (km) : 7167.1
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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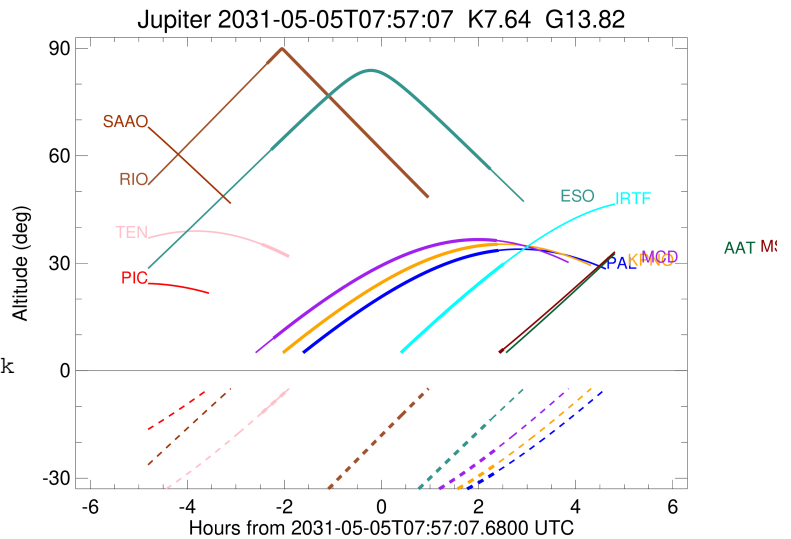
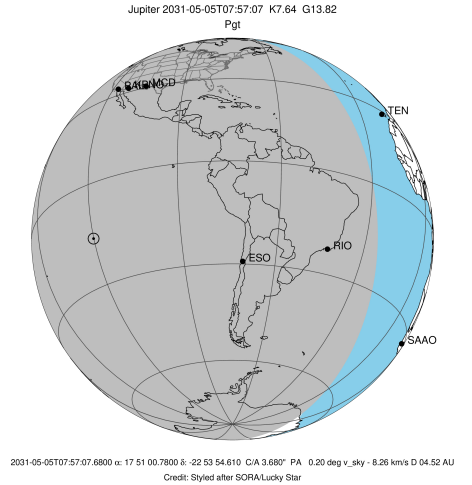


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-05T05:43:26.911	9.02	-40.40	71491.9	-6.42	-7.33
Jupiter	E	2031-05-05T10:19:19.775	36.32	-21.80	71491.9	-5.62	-6.42

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-05T07:47:34.010
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        : 4068710755316861440
2Mass ID (if available) : 17510078-2253545
ICRS Star Coord at Epoch: 17h 51m 00.77996s -22:53:54.61017s
RUWE (>1.4 is poor)  : 1.03
K magnitude           : 7.645
G magnitude           : 13.824
RP magnitude          : 12.342
BP magnitude          : 16.689
DUPflag              : 0
Distance (au)         : 4.519
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -8.26
Sun-Target sep (deg)  : 136.28
Sun-Moon sep (deg)   : 68.44
B (ring opening deg) : -2.60
PA of pole (deg)     : 0.13
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation (") : 2.442
C/A sky separation (km) : 8004.4
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
    
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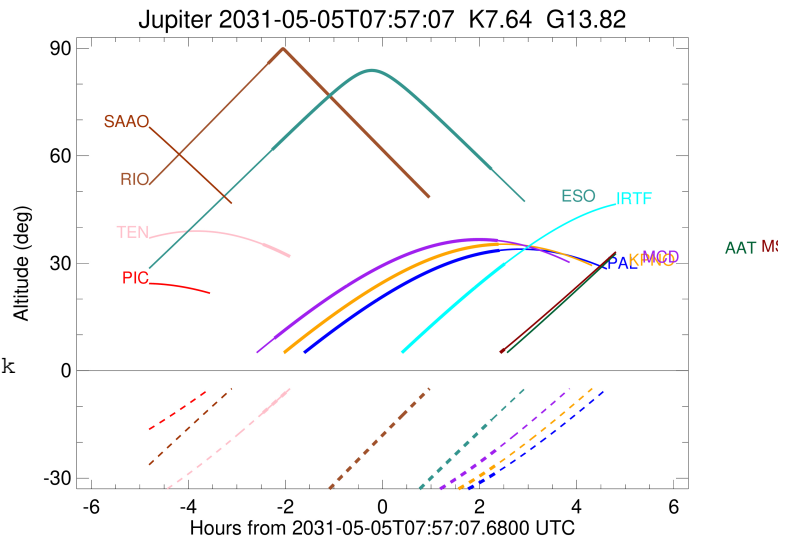
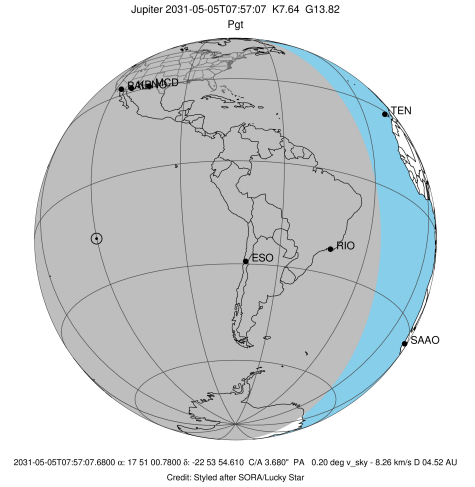


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-05T05:29:18.485	35.27	-11.78	71491.9	-5.71	-6.52
Jupiter	E	2031-05-05T10:08:34.835	-11.00x	48.22x	71491.8	-7.52	-8.58

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-05T08:09:23.010
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        : 4068710755316861440
2Mass ID (if available) : 17510078-2253545
ICRS Star Coord at Epoch: 17h 51m 00.77996s -22:53:54.61017s
RUWE (>1.4 is poor) : 1.03
K magnitude           : 7.645
G magnitude           : 13.824
RP magnitude          : 12.342
BP magnitude          : 16.689
DUPflag              : 0
Distance (au)         : 4.519
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -8.26
Sun-Target sep (deg) : 136.28
Sun-Moon sep (deg)   : 67.59
B (ring opening deg) : -2.60
PA of pole (deg)     : 0.13
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation ("): 2.921
C/A sky separation (km): 9573.0
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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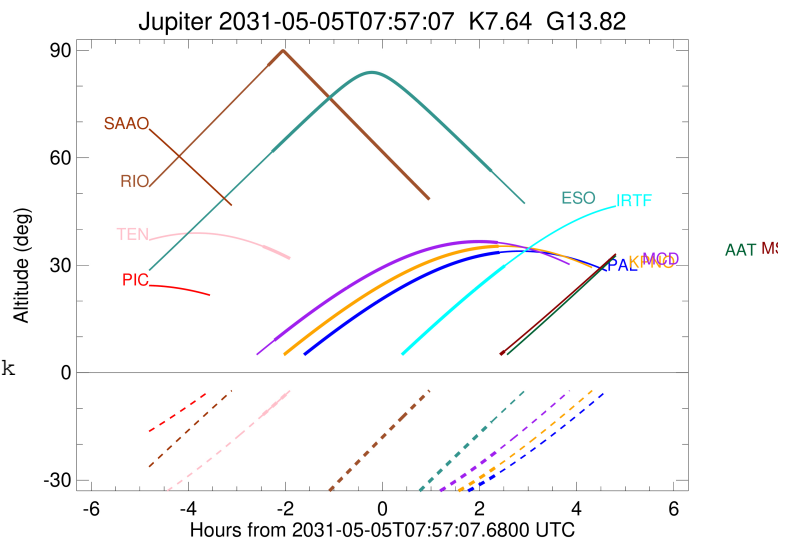
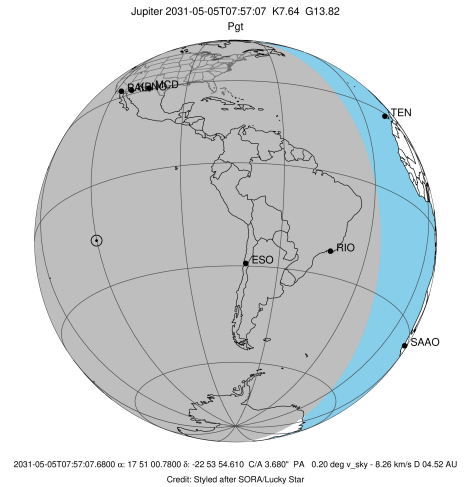


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-05T05:45:21.992	-29.35x	-13.88	71491.8	-8.78	-10.01
Jupiter	E	2031-05-05T10:28:25.139	29.87	-53.96	71491.9	-6.77	-7.73

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-05T07:51:05.040
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      : 4068710755316861440
2Mass ID (if available) : 17510078-2253545
ICRS Star Coord at Epoch: 17h 51m 00.77996s -22:53:54.61017s
RUWE (>1.4 is poor) : 1.03
K magnitude          : 7.645
G magnitude          : 13.824
RP magnitude         : 12.342
BP magnitude         : 16.689
DUPflag             : 0
Distance (au)       : 4.519
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -8.26
Sun-Target sep (deg) : 136.28
Sun-Moon sep (deg)   : 68.90
B (ring opening deg) : -2.60
PA of pole (deg)     : 0.13
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation ("): 3.753
C/A sky separation (km): 12300.3
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
    
```

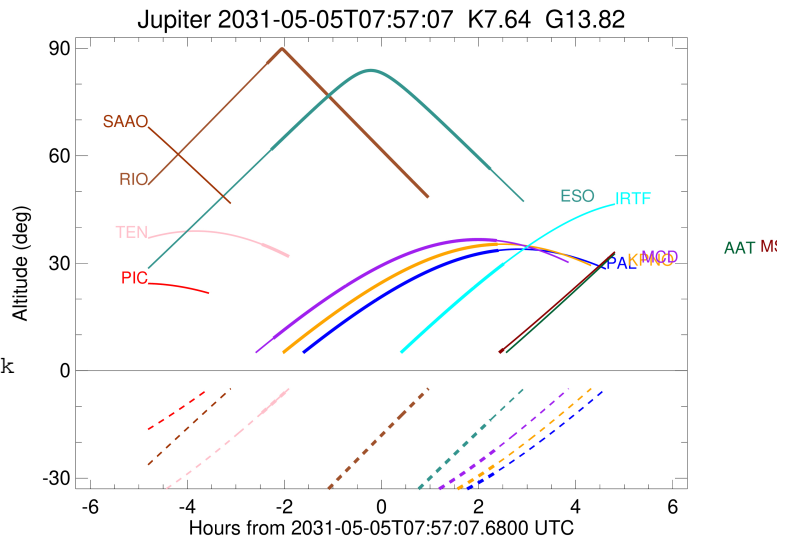
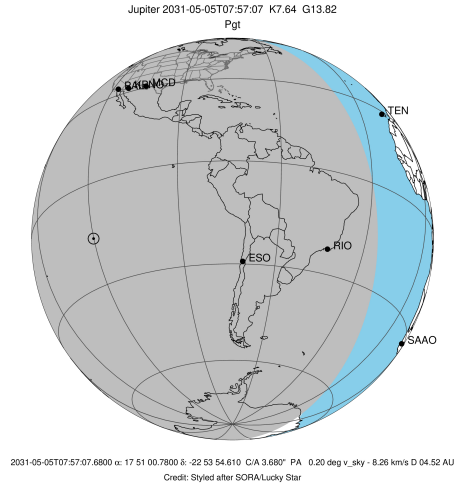


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-05T05:35:35.170	85.71	-50.47	71491.7	-9.59	-10.94
Jupiter	E	2031-05-05T10:08:00.308	31.84	10.87x	71491.7	-10.77	-12.26


```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-05T07:56:28.930
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      : 4068710755316861440
2Mass ID (if available) : 17510078-2253545
ICRS Star Coord at Epoch: 17h 51m 00.77996s -22:53:54.61017s
RUWE (>1.4 is poor) : 1.03
K magnitude          : 7.645
G magnitude          : 13.824
RP magnitude         : 12.342
BP magnitude         : 16.689
DUPflag             : 0
Distance (au)       : 4.519
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -8.26
Sun-Target sep (deg) : 136.28
Sun-Moon sep (deg)  : 68.85
B (ring opening deg) : -2.60
PA of pole (deg)    : 0.13
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation ("): 3.879
C/A sky separation (km): 12714.7
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
    
```

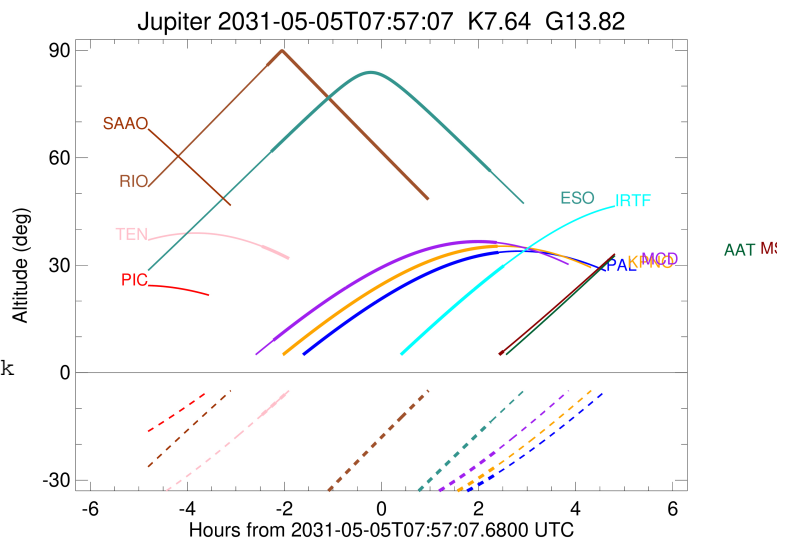
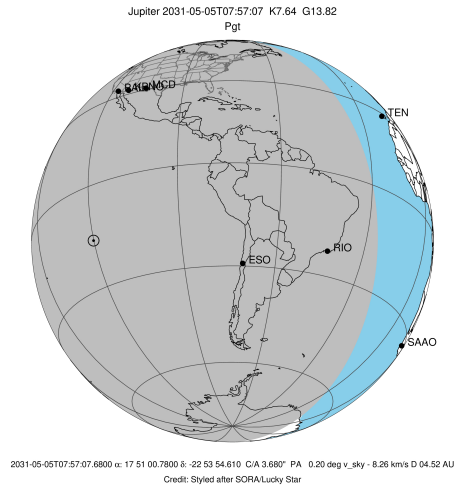


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-05T05:40:46.288	61.66	-70.94	71491.7	-10.41	-11.86
Jupiter	E	2031-05-05T10:11:53.195	56.21	-13.75	71491.7	-10.66	-12.15


```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-05T08:05:00.590
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       : 4068710755316861440
2Mass ID (if available) : 17510078-2253545
ICRS Star Coord at Epoch: 17h 51m 00.77996s -22:53:54.61017s
RUWE (>1.4 is poor) : 1.03
K magnitude           : 7.645
G magnitude           : 13.824
RP magnitude          : 12.342
BP magnitude          : 16.689
DUPflag              : 0
Distance (au)        : 4.519
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -8.26
Sun-Target sep (deg) : 136.28
Sun-Moon sep (deg)   : 67.41
B (ring opening deg) : -2.60
PA of pole (deg)     : 0.13
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation (") : 5.137
C/A sky separation (km) : 16836.9
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	2031-05-05T05:38:26.565	-31.43x	17.23x	71491.5	-14.01	-15.91
Jupiter	E	2031-05-05T10:27:54.624	6.00	-39.16	71491.5	-12.77	-14.52