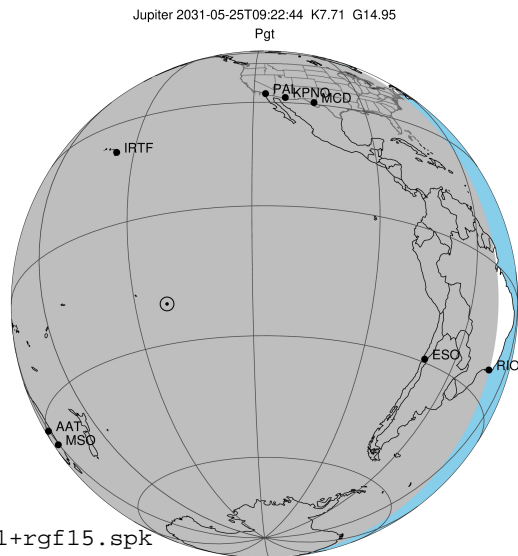


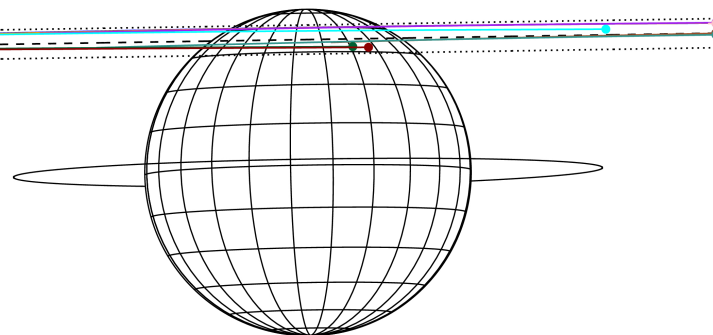
target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2031-05-25T09:22:44.240
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 4116881807222791040
 2Mass ID (if available) : 17433105-2252306

Jupiter 2031-05-25T09:22:44 K7.71 G14.95 Pgt

ICRS Star Coord at Epoch: 17h 43m 31.05162s -22:52:30.95279s
 RUWE (>1.4 is poor) : 1.03
 K magnitude : 7.709
 G magnitude : 14.950
 RP magnitude : 13.307
 BP magnitude : 18.896
 DUPflag : 0
 Distance (au) : 4.338
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -14.18
 Sun-Target sep (deg) : 157.36
 Sun-Moon sep (deg) : 157.53
 B (ring opening deg) : -2.61
 PA of pole (deg) : 0.94
 Pole direction: RA (deg): 268.05694
 Dec (deg): 64.49651
 C/A sky separation (") : 18.505
 C/A sky separation (km) : 58227.6
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk



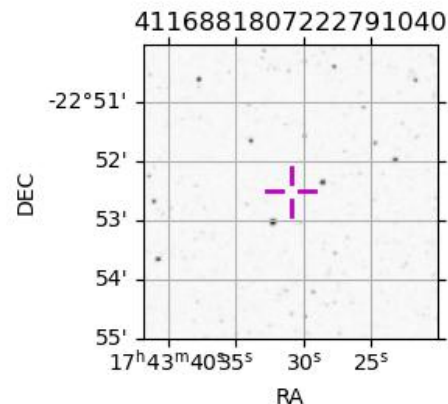
Earth
 PAL
 KPNO
 MCD
 TEN
 IRTF
 RIO
 ESO
 AAT
 MSO



2031-05-25T09:22:44.2400 a: 17 43 31.0516 ð -22 52 30.953 C/A ***** PA 180.90 deg v_sky -14.18 km/s D 04.34 AU
 Credit: Styled after SORA/Lucky Star

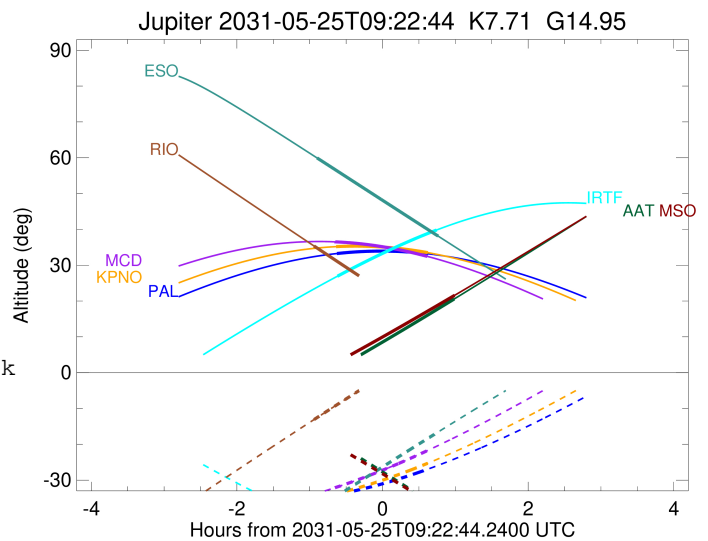
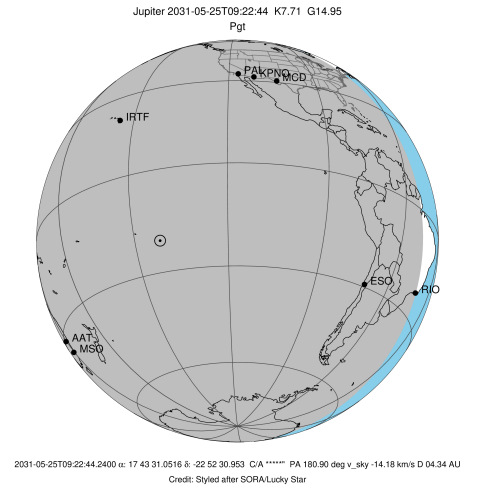
Observable events with sun below -5 deg and altitude above 5 deg

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 25 08:45 - MAY 25 10:00	Pie
PMO	Purple Mtn Obs. Nanking	32.1	118.8			Pnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+ +	MAY 25 08:44 - MAY 25 10:00	Pie
MCD	McDonald Obs. 2.7m	30.7	256.0	+ +	MAY 25 08:43 - MAY 25 09:59	Pie
TEN	Teide Obs./Tenerife	28.3	343.5			Pnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+ +	MAY 25 08:45 - MAY 25 10:07	Pie
KAV	Kavalur Observatory	12.6	78.8			Pnn
RIO	Rio de Janeiro	-22.9	316.8	+	MAY 25 08:26 - MAY 25 08:26	Pin
ESO	European Southern Obs. (3.6m)	-29.3	289.3	+ +	MAY 25 08:28 - MAY 25 10:08	Pie
AAT	Siding Spring (AAT)	-31.3	149.1	+	MAY 25 10:21 - MAY 25 10:21	Pne
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8			Pnn
MSO	Mt. Stromlo Observatory	-35.3	149.0	+	MAY 25 10:22 - MAY 25 10:22	Pne



```

target           : Jupiter
target radius (km) : 71492.00
C/A epoch       : 2031-05-25T09:22:45.950
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  : 4116881807222791040
2Mass ID (if available) : 17433105-2252306
ICRS Star Coord at Epoch: 17h 43m 31.05162s -22:52:30.95279s
RUWE (>1.4 is poor) : 1.03
K magnitude     : 7.709
G magnitude     : 14.950
RP magnitude    : 13.307
BP magnitude    : 18.896
DUPflag        : 0
Distance (au)   : 4.338
f0 (km)         : 0.00
g0 (km)         : 0.00
skyplane vel. (km/s) : -14.18
Sun-Target sep (deg) : 157.36
Sun-Moon sep (deg) : 157.61
B (ring opening deg) : -2.61
PA of pole (deg) : 0.94
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 20.186
C/A sky separation (km) : 63515.4
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
    
```

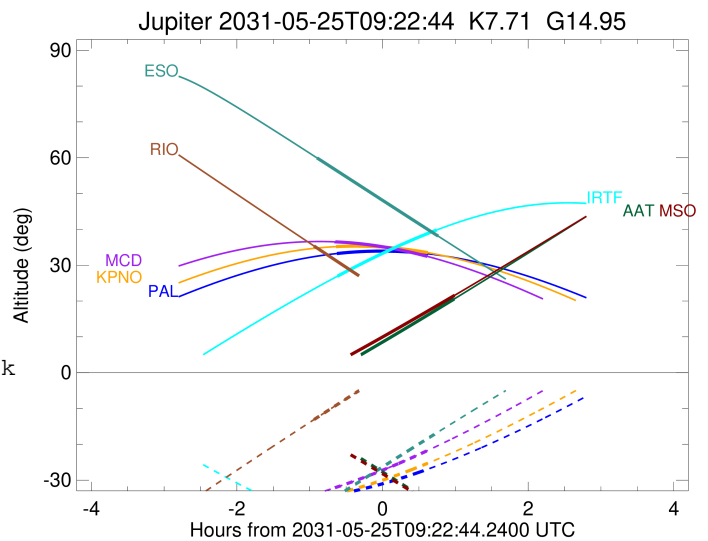
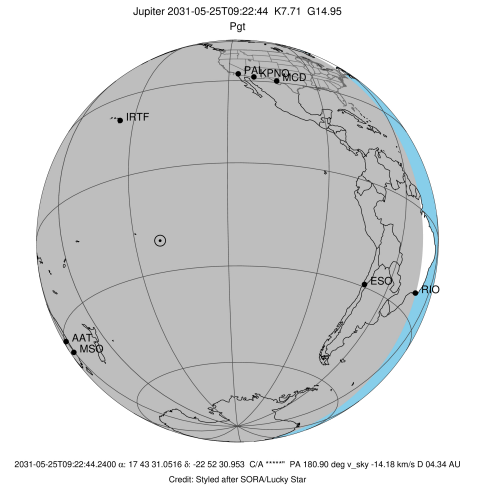


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-25T08:45:10.787	33.25	-33.97	71484.7	62.47	65.35
Jupiter	E	2031-05-25T10:00:20.348	33.18	-26.90	71484.7	62.58	65.45

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-25T09:22:15.860
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       : 4116881807222791040
2Mass ID (if available) : 17433105-2252306
ICRS Star Coord at Epoch: 17h 43m 31.05162s -22:52:30.95279s
RUWE (>1.4 is poor) : 1.03
K magnitude           : 7.709
G magnitude           : 14.950
RP magnitude         : 13.307
BP magnitude         : 18.896
DUPflag              : 0
Distance (au)        : 4.338
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -14.18
Sun-Target sep (deg) : 157.36
Sun-Moon sep (deg)  : 157.56
B (ring opening deg) : -2.61
PA of pole (deg)    : 0.94
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation ("): 20.157
C/A sky separation (km): 63425.1
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
    
```

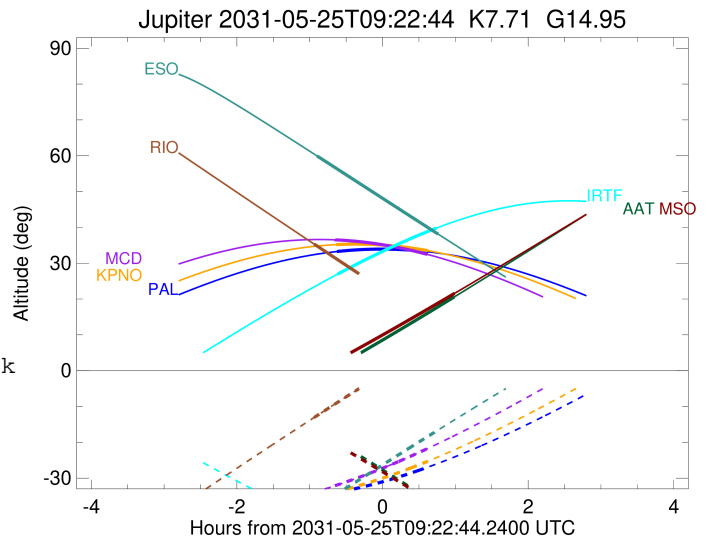
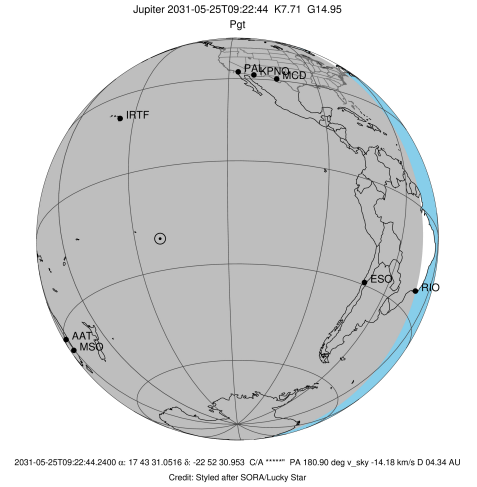


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-25T08:44:29.777	35.18	-33.80	71484.7	62.37	65.25
Jupiter	E	2031-05-25T10:00:02.022	33.50	-25.28	71484.7	62.37	65.26

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-25T09:21:32.070
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        : 4116881807222791040
2Mass ID (if available) : 17433105-2252306
ICRS Star Coord at Epoch: 17h 43m 31.05162s -22:52:30.95279s
RUWE (>1.4 is poor) : 1.03
K magnitude           : 7.709
G magnitude           : 14.950
RP magnitude          : 13.307
BP magnitude          : 18.896
DUPflag              : 0
Distance (au)         : 4.338
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -14.18
Sun-Target sep (deg)  : 157.36
Sun-Moon sep (deg)   : 157.47
B (ring opening deg) : -2.61
PA of pole (deg)     : 0.94
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 20.119
C/A sky separation (km) : 63306.5
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
    
```

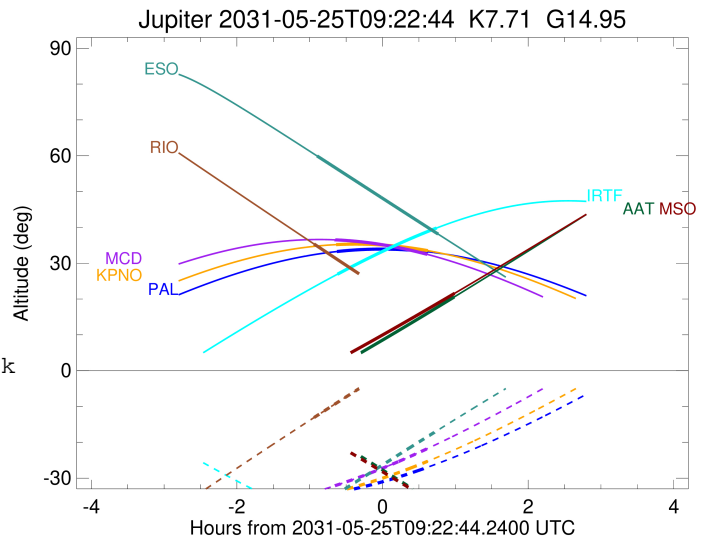
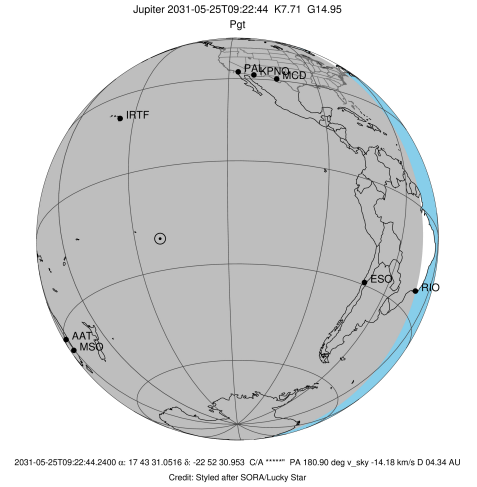


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-25T08:43:30.639	36.51	-32.11	71484.7	62.24	65.14
Jupiter	E	2031-05-25T09:59:34.890	32.47	-21.78	71484.7	62.08	64.99

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-25T09:26:32.410
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        : 4116881807222791040
2Mass ID (if available) : 17433105-2252306
ICRS Star Coord at Epoch: 17h 43m 31.05162s -22:52:30.95279s
RUWE (>1.4 is poor) : 1.03
K magnitude           : 7.709
G magnitude           : 14.950
RP magnitude          : 13.307
BP magnitude          : 18.896
DUPflag              : 0
Distance (au)         : 4.338
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -14.18
Sun-Target sep (deg) : 157.36
Sun-Moon sep (deg)   : 158.12
B (ring opening deg) : -2.61
PA of pole (deg)     : 0.94
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation ("): 19.711
C/A sky separation (km): 62020.9
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
    
```

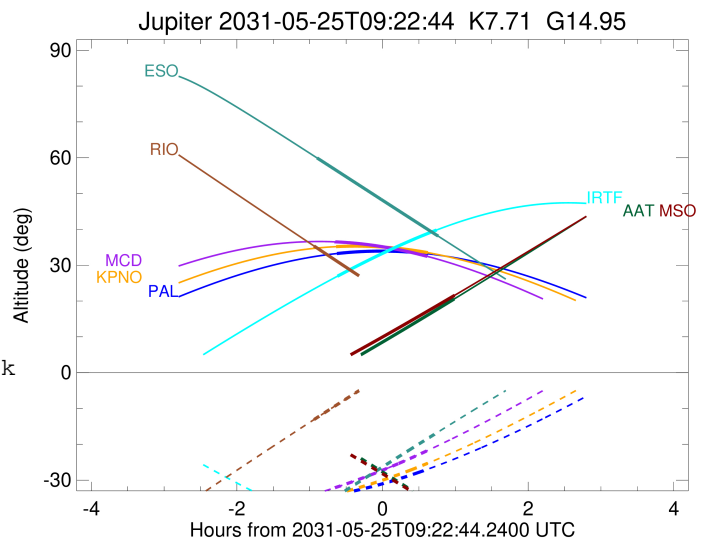
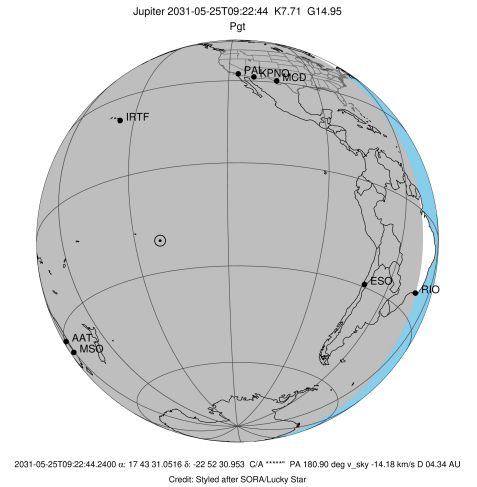


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-25T08:45:38.069	26.93	-43.40	71485.1	59.57	62.66
Jupiter	E	2031-05-25T10:07:18.107	39.81	-49.25	71485.0	60.49	63.52

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-25T09:16:51.750
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       : 4116881807222791040
2Mass ID (if available) : 17433105-2252306
ICRS Star Coord at Epoch: 17h 43m 31.05162s -22:52:30.95279s
RUWE (>1.4 is poor) : 1.03
K magnitude           : 7.709
G magnitude           : 14.950
RP magnitude         : 13.307
BP magnitude         : 18.896
DUPflag              : 0
Distance (au)        : 4.338
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -14.18
Sun-Target sep (deg) : 157.36
Sun-Moon sep (deg)   : 156.97
B (ring opening deg) : -2.61
PA of pole (deg)     : 0.94
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 18.026
C/A sky separation (km) : 56719.6
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
    
```

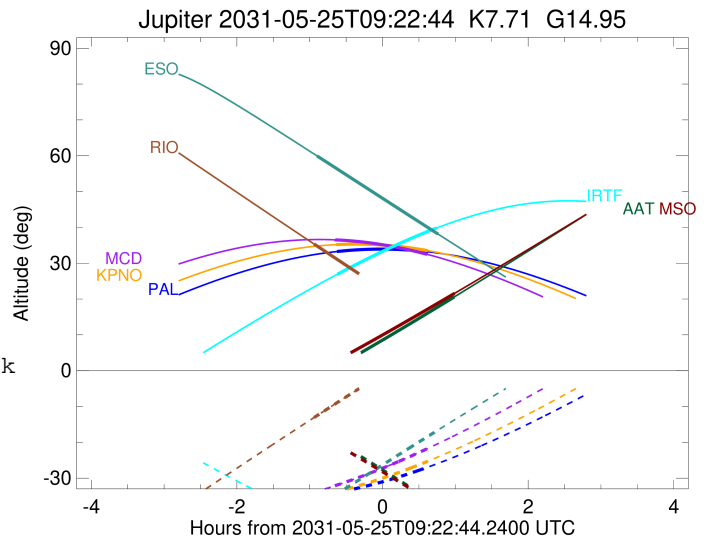
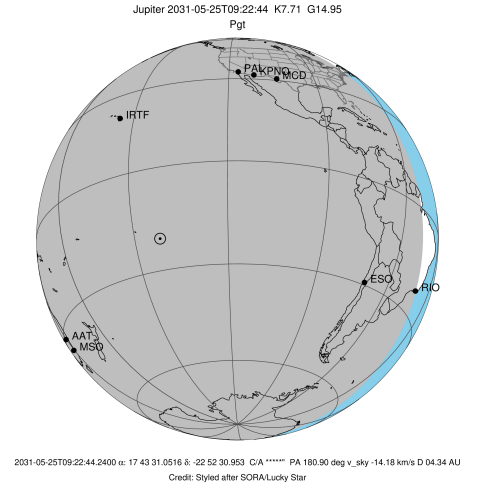


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-25T08:26:18.743	35.36	-13.09	71486.1	52.99	56.46
Jupiter	E	2031-05-25T10:07:41.774	12.84	8.55x	71486.3	51.82	55.34

```

target           : Jupiter
target radius (km) : 71492.00
C/A epoch       : 2031-05-25T09:18:33.980
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  : 4116881807222791040
2Mass ID (if available) : 17433105-2252306
ICRS Star Coord at Epoch: 17h 43m 31.05162s -22:52:30.95279s
RUWE (>1.4 is poor) : 1.03
K magnitude     : 7.709
G magnitude     : 14.950
RP magnitude    : 13.307
BP magnitude    : 18.896
DUPflag        : 0
Distance (au)   : 4.338
f0 (km)         : 0.00
g0 (km)         : 0.00
skyplane vel. (km/s) : -14.18
Sun-Target sep (deg) : 157.36
Sun-Moon sep (deg) : 157.30
B (ring opening deg) : -2.61
PA of pole (deg) : 0.94
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 18.098
C/A sky separation (km) : 56945.3
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
    
```

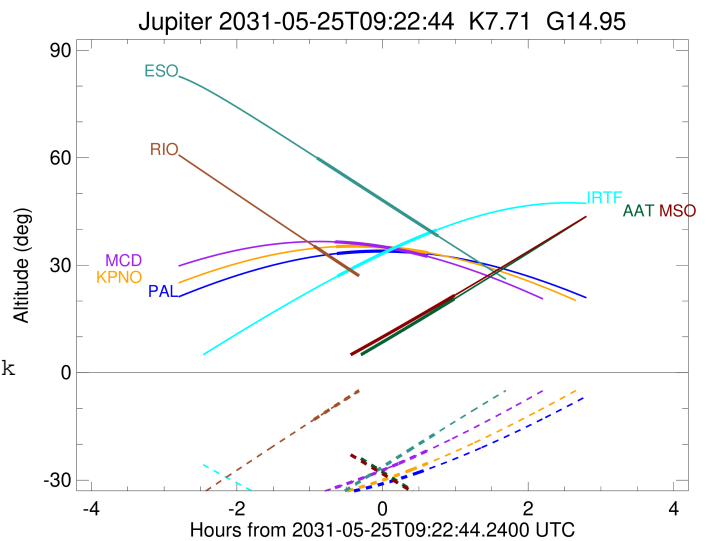
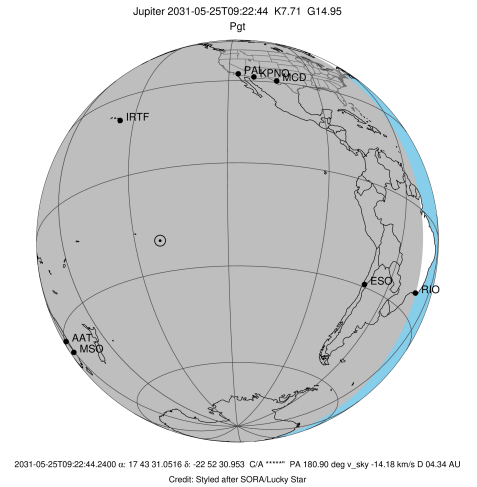


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-25T08:28:49.223	59.93	-37.98	71486.1	53.07	56.53
Jupiter	E	2031-05-25T10:08:29.824	38.14	-16.58	71486.2	52.29	55.79

```

target           : Jupiter
target radius (km) : 71492.00
C/A epoch       : 2031-05-25T09:28:23.580
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  : 4116881807222791040
2Mass ID (if available) : 17433105-2252306
ICRS Star Coord at Epoch: 17h 43m 31.05162s -22:52:30.95279s
RUWE (>1.4 is poor) : 1.03
K magnitude     : 7.709
G magnitude     : 14.950
RP magnitude    : 13.307
BP magnitude    : 18.896
DUPflag        : 0
Distance (au)   : 4.338
f0 (km)         : 0.00
g0 (km)         : 0.00
skyplane vel. (km/s) : -14.18
Sun-Target sep (deg) : 157.36
Sun-Moon sep (deg) : 158.35
B (ring opening deg) : -2.61
PA of pole (deg) : 0.94
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 17.493
C/A sky separation (km) : 55040.8
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
    
```

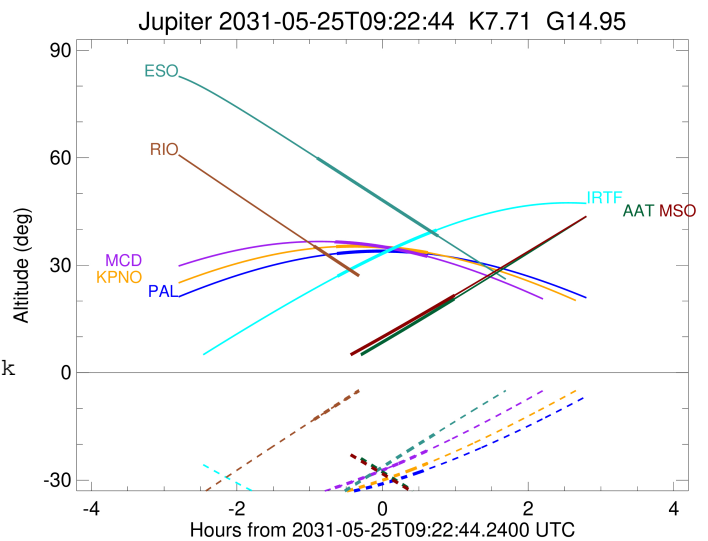
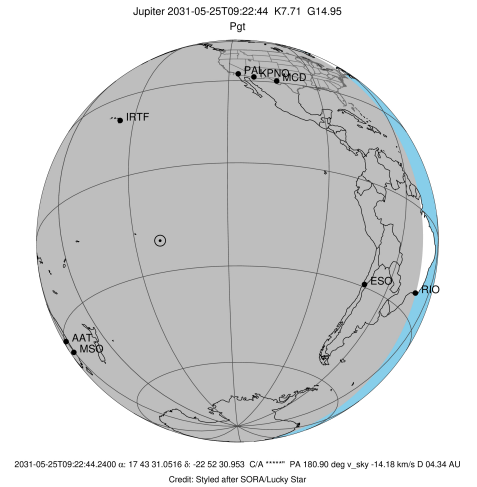


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-25T08:34:32.816	-0.88x	-17.60	71486.6	49.63	53.22
Jupiter	E	2031-05-25T10:21:52.348	20.58	-40.30	71486.4	50.94	54.49


```

target          : Jupiter
target radius (km) : 71492.00
C/A epoch       : 2031-05-25T09:28:08.050
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  : 4116881807222791040
2Mass ID (if available) : 17433105-2252306
ICRS Star Coord at Epoch: 17h 43m 31.05162s -22:52:30.95279s
RUWE (>1.4 is poor) : 1.03
K magnitude     : 7.709
G magnitude     : 14.950
RP magnitude    : 13.307
BP magnitude    : 18.896
DUPflag        : 0
Distance (au)   : 4.338
f0 (km)        : 0.00
g0 (km)        : 0.00
skyplane vel. (km/s) : -14.18
Sun-Target sep (deg) : 157.36
Sun-Moon sep (deg) : 158.33
B (ring opening deg) : -2.61
PA of pole (deg) : 0.94
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 17.384
C/A sky separation (km) : 54698.2
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	2031-05-25T08:33:48.586	0.82x	-18.36	71486.7	49.23	52.84
Jupiter	E	2031-05-25T10:22:06.061	21.57	-40.32	71486.5	50.48	54.05