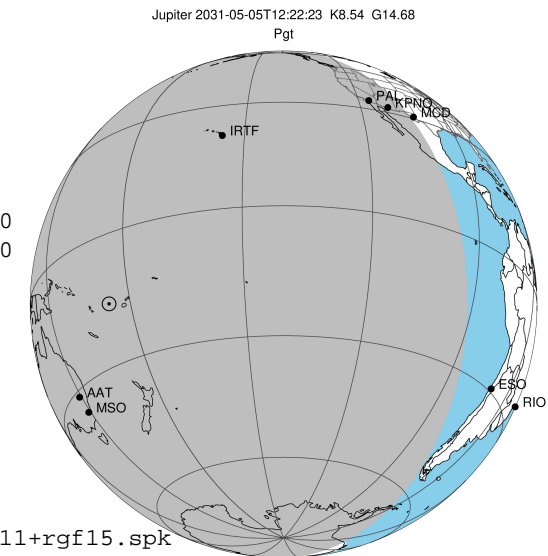


target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2031-05-05T12:22:23.530
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 4068710725369086976
 2Mass ID (if available) : 17505787-2254065

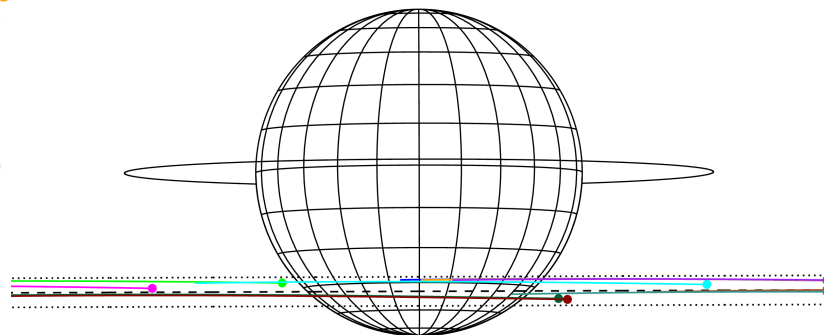
Jupiter 2031-05-05T12:22:23 K8.54 G14.68 Pgt

ICRS Star Coord at Epoch: 17h 50m 57.86207s -22:54:06.68638s

RUWE (>1.4 is poor) : 0.95
 K magnitude : 8.543
 G magnitude : 14.676
 RP magnitude : 13.206
 BP magnitude : 17.625
 DUPflag : 0
 Distance (au) : 4.517
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -8.33
 Sun-Target sep (deg) : 136.47
 Sun-Moon sep (deg) : 65.35
 B (ring opening deg) : -2.60
 PA of pole (deg) : 0.14
 Pole direction: RA (deg): 268.05695
 Dec (deg): 64.49651
 C/A sky separation (") : 15.892
 C/A sky separation (km) : 52065.1
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk



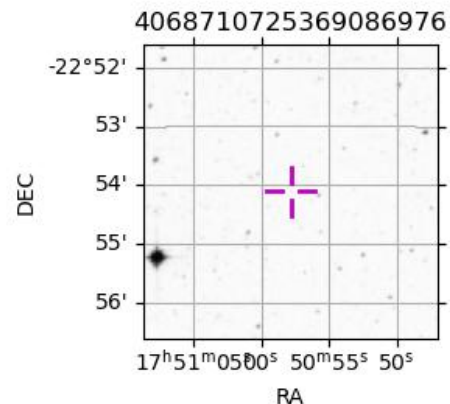
Earth
 PAL
 PMO
 KPNO
 MCD
 IRTF
 KAV
 RIO
 ESO
 AAT
 MSO



2031-05-05T12:22:23.5300 az: 17 50 57.8621 δ: -22 54 06.686 C/A ***** PA 0.20 deg v_sky - 8.33 km/s D 04.52 AU
 Credit: Styled after SORA/Lucky Star

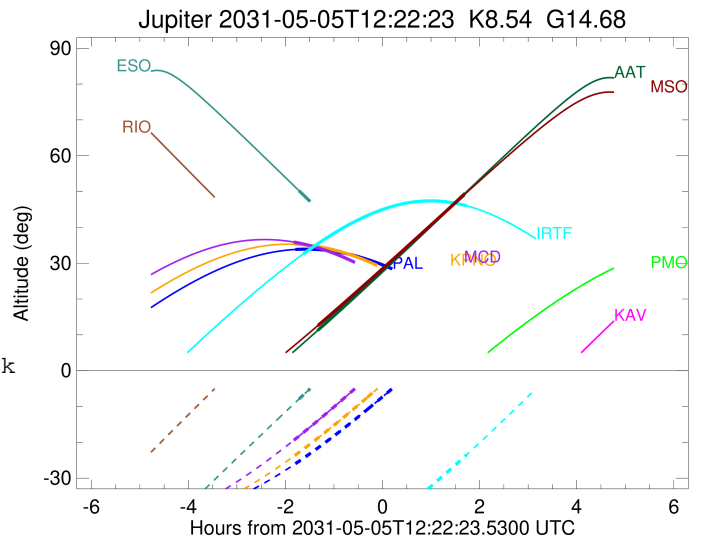
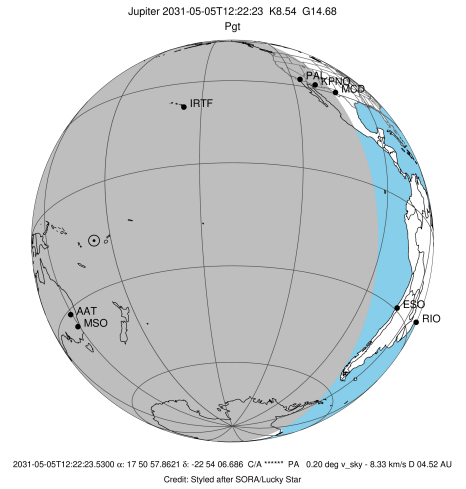
Observable events with sun below -5 deg and altitude above 5 deg

Obs	Location	lat	Elon	Target	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1			Pnn
PAL	Palomar Mt (200")	33.4	243.1	+	MAY 05 10:34 - MAY 05 10:34	Pin
PMO	Purple Mtn Obs. Nanking	32.1	118.8			Pnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+	MAY 05 10:33 - MAY 05 10:33	Pin
MCD	McDonald Obs. 2.7m	30.7	256.0	+	MAY 05 10:32 - MAY 05 10:32	Pin
TEN	Teide Obs./Tenerife	28.3	343.5			Pnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+ +	MAY 05 10:44 - MAY 05 14:06	Pie
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	+	MAY 05 10:39 - MAY 05 10:39	Pin
AAT	Siding Spring (AAT)	-31.3	149.1	+ +	MAY 05 11:02 - MAY 05 14:04	Pie
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8			Pnn
MSO	Mt. Stromlo Observatory	-35.3	149.0	+ +	MAY 05 11:02 - MAY 05 14:03	Pie



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-05T12:17:40.660
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        : 4068710725369086976
2Mass ID (if available) : 17505787-2254065
ICRS Star Coord at Epoch: 17h 50m 57.86207s -22:54:06.68638s
RUWE (>1.4 is poor) : 0.95
K magnitude           : 8.543
G magnitude           : 14.676
RP magnitude          : 13.206
BP magnitude          : 17.625
DUPflag              : 0
Distance (au)         : 4.517
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -8.33
Sun-Target sep (deg) : 136.47
Sun-Moon sep (deg)   : 65.94
B (ring opening deg) : -2.60
PA of pole (deg)     : 0.14
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation ("): 14.326
C/A sky separation (km): 46934.9
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
    
```

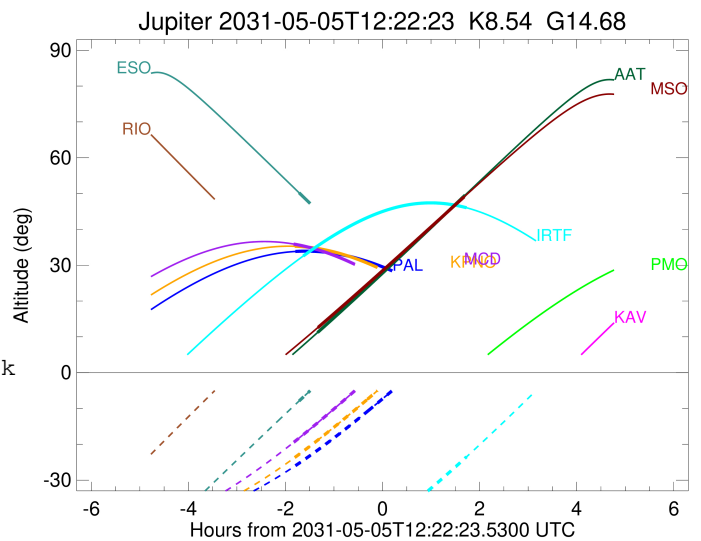
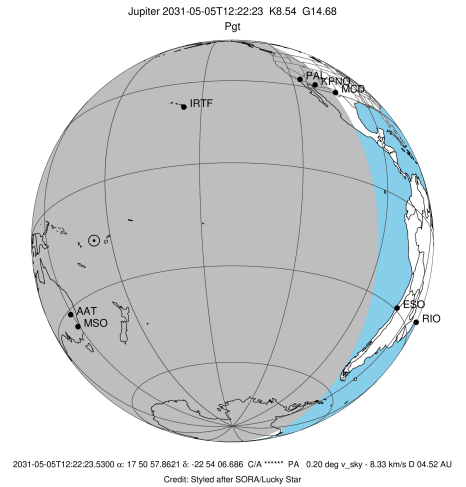


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-05T10:34:38.517	33.83	-25.98	71488.0	-40.76	-44.47
Jupiter	E	2031-05-05T14:01:14.365	17.34	12.32x	71487.9	-41.63	-45.35

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-05T12:16:36.700
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       : 4068710725369086976
2Mass ID (if available) : 17505787-2254065
ICRS Star Coord at Epoch: 17h 50m 57.86207s -22:54:06.68638s
RUWE (>1.4 is poor) : 0.95
K magnitude           : 8.543
G magnitude           : 14.676
RP magnitude          : 13.206
BP magnitude          : 17.625
DUPflag              : 0
Distance (au)         : 4.517
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -8.33
Sun-Target sep (deg) : 136.47
Sun-Moon sep (deg)   : 65.96
B (ring opening deg) : -2.60
PA of pole (deg)     : 0.14
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation (" ) : 14.377
C/A sky separation (km) : 47102.7
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
    
```

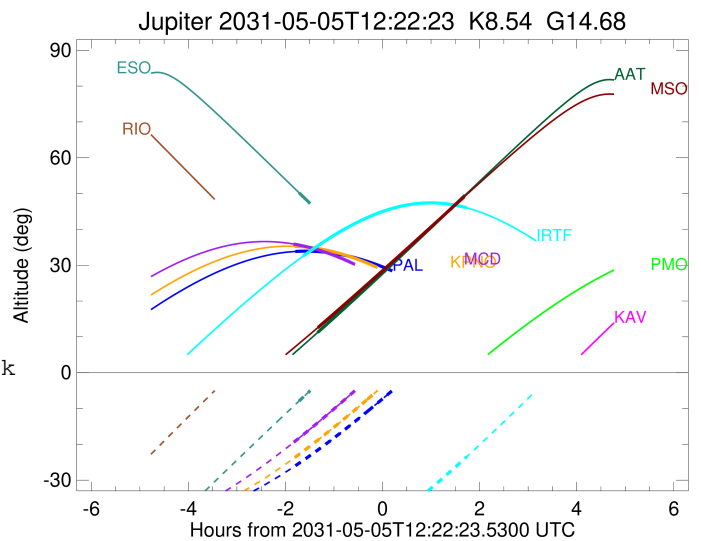
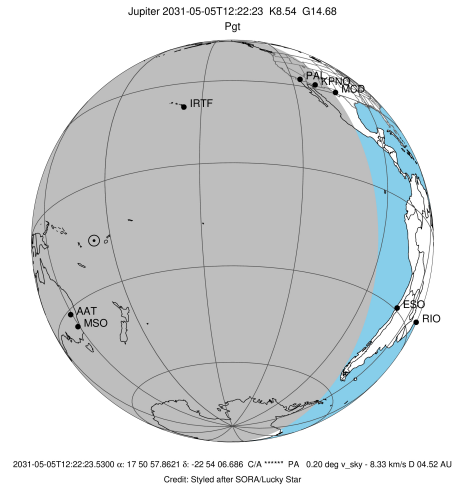


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-05T10:33:50.273	35.28	-23.70	71488.0	-40.85	-44.56
Jupiter	E	2031-05-05T14:00:05.693	15.13	16.19x	71487.9	-41.89	-45.60

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-05T12:15:09.490
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       : 4068710725369086976
2Mass ID (if available) : 17505787-2254065
ICRS Star Coord at Epoch: 17h 50m 57.86207s -22:54:06.68638s
RUWE (>1.4 is poor) : 0.95
K magnitude           : 8.543
G magnitude           : 14.676
RP magnitude          : 13.206
BP magnitude          : 17.625
DUPflag              : 0
Distance (au)         : 4.517
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -8.33
Sun-Target sep (deg) : 136.47
Sun-Moon sep (deg)   : 65.96
B (ring opening deg) : -2.60
PA of pole (deg)     : 0.14
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation ("): 14.446
C/A sky separation (km): 47329.6
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
    
```

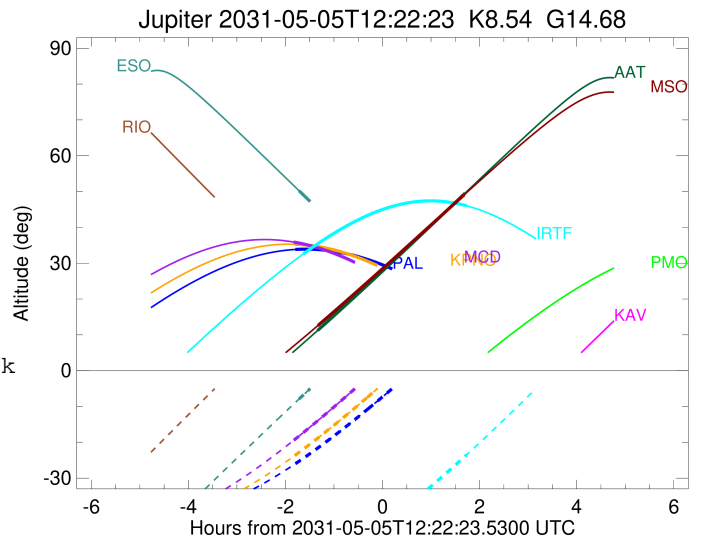
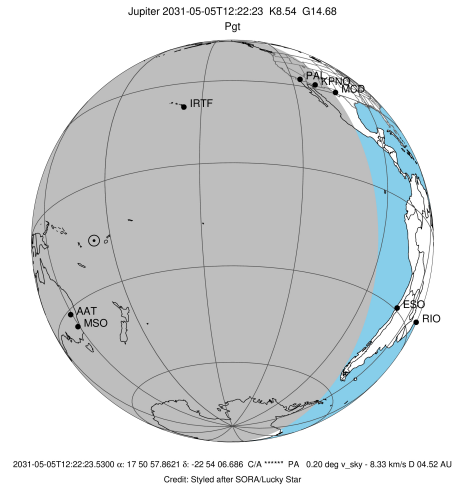


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-05T10:32:37.841	35.90	-19.44	71488.0	-40.96	-44.68
Jupiter	E	2031-05-05T13:58:38.810	11.02	22.13x	71487.8	-42.23	-45.95

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-05T12:25:46.080
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        : 4068710725369086976
2Mass ID (if available) : 17505787-2254065
ICRS Star Coord at Epoch: 17h 50m 57.86207s -22:54:06.68638s
RUWE (>1.4 is poor) : 0.95
K magnitude           : 8.543
G magnitude           : 14.676
RP magnitude          : 13.206
BP magnitude          : 17.625
DUPflag              : 0
Distance (au)         : 4.517
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -8.33
Sun-Target sep (deg) : 136.47
Sun-Moon sep (deg)   : 65.90
B (ring opening deg) : -2.60
PA of pole (deg)     : 0.14
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation (" ) : 14.595
C/A sky separation (km) : 47816.7
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
    
```

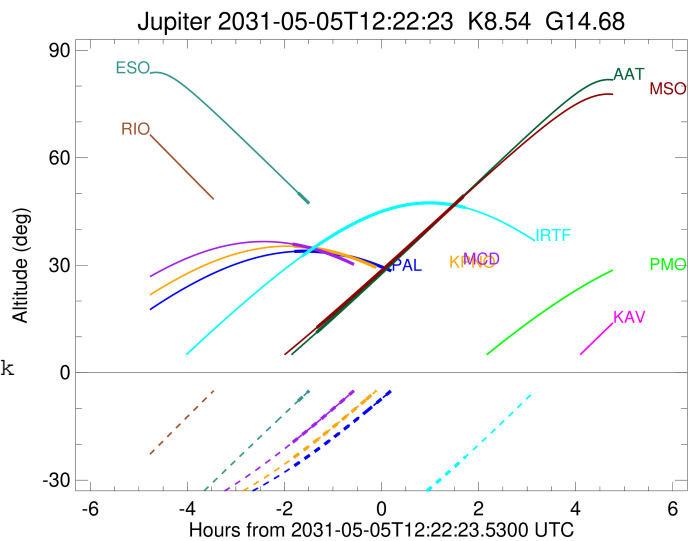
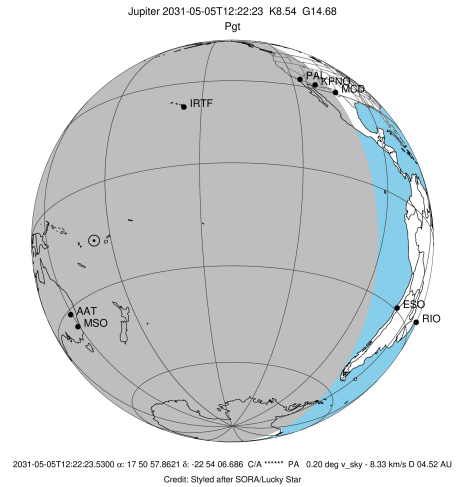


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-05T10:44:22.312	32.56	-53.48	71487.8	-42.36	-46.08
Jupiter	E	2031-05-05T14:06:19.881	46.02	-23.48	71487.8	-41.97	-45.68

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-05T12:10:17.210
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        : 4068710725369086976
2Mass ID (if available) : 17505787-2254065
ICRS Star Coord at Epoch: 17h 50m 57.86207s -22:54:06.68638s
RUWE (>1.4 is poor) : 0.95
K magnitude           : 8.543
G magnitude           : 14.676
RP magnitude          : 13.206
BP magnitude          : 17.625
DUPflag              : 0
Distance (au)         : 4.517
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -8.33
Sun-Target sep (deg)  : 136.47
Sun-Moon sep (deg)   : 66.08
B (ring opening deg) : -2.60
PA of pole (deg)     : 0.14
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation (") : 16.504
C/A sky separation (km) : 54073.8
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
    
```

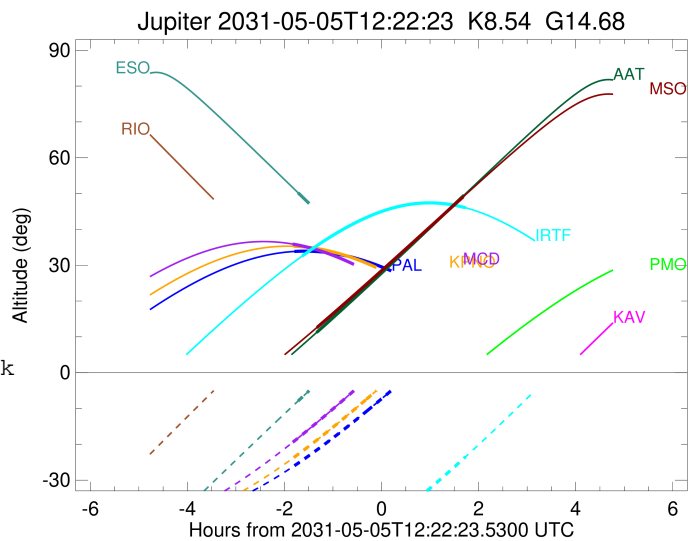
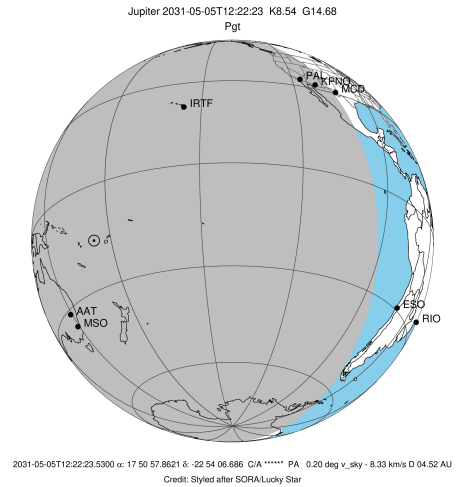


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-05T10:39:16.551	50.21	-7.91	71486.8	-48.15	-51.79
Jupiter	E	2031-05-05T13:42:44.749	10.92	27.68x	71486.5	-50.19	-53.77

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-05T12:34:18.240
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      : 4068710725369086976
2Mass ID (if available) : 17505787-2254065
ICRS Star Coord at Epoch: 17h 50m 57.86207s -22:54:06.68638s
RUWE (>1.4 is poor) : 0.95
K magnitude         : 8.543
G magnitude         : 14.676
RP magnitude        : 13.206
BP magnitude        : 17.625
DUPflag            : 0
Distance (au)       : 4.517
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -8.33
Sun-Target sep (deg) : 136.47
Sun-Moon sep (deg)  : 65.43
B (ring opening deg) : -2.60
PA of pole (deg)    : 0.14
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation (" ) : 16.571
C/A sky separation (km) : 54290.0
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
    
```

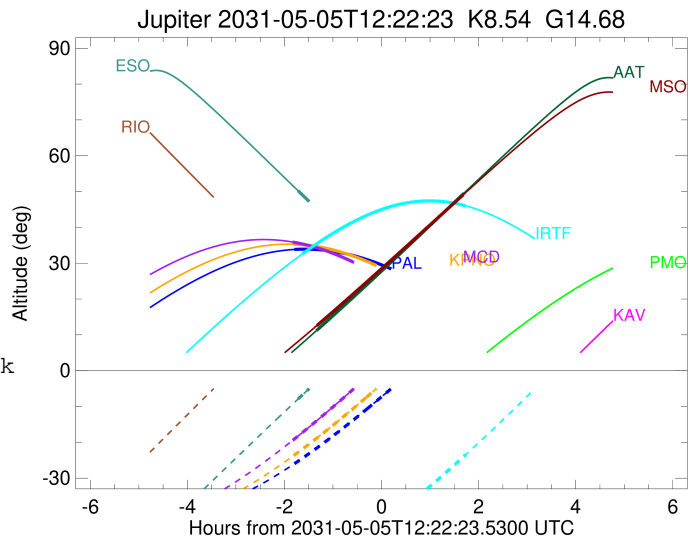
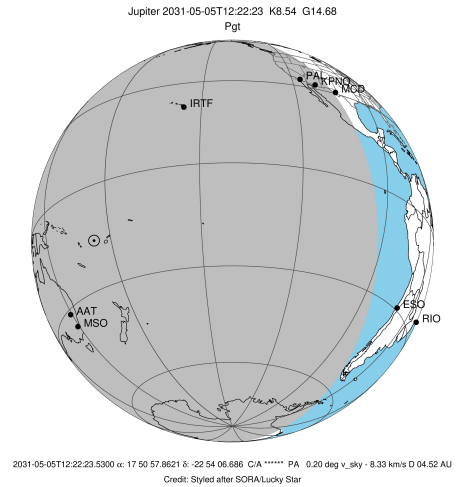


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-05T11:02:06.117	11.20	-46.89	71486.5	-50.31	-53.89
Jupiter	E	2031-05-05T14:04:37.814	49.58	-75.17	71486.8	-48.56	-52.19

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-05T12:33:47.720
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        : 4068710725369086976
2Mass ID (if available) : 17505787-2254065
ICRS Star Coord at Epoch: 17h 50m 57.86207s -22:54:06.68638s
RUWE (>1.4 is poor) : 0.95
K magnitude           : 8.543
G magnitude           : 14.676
RP magnitude          : 13.206
BP magnitude          : 17.625
DUPflag              : 0
Distance (au)         : 4.517
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -8.33
Sun-Target sep (deg) : 136.47
Sun-Moon sep (deg)   : 65.45
B (ring opening deg) : -2.60
PA of pole (deg)     : 0.14
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation (") : 16.689
C/A sky separation (km) : 54677.3
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	2031-05-05T11:02:26.849	12.58	-46.10	71486.4	-50.74	-54.30
Jupiter	E	2031-05-05T14:03:22.072	49.08	-71.16	71486.7	-49.07	-52.69