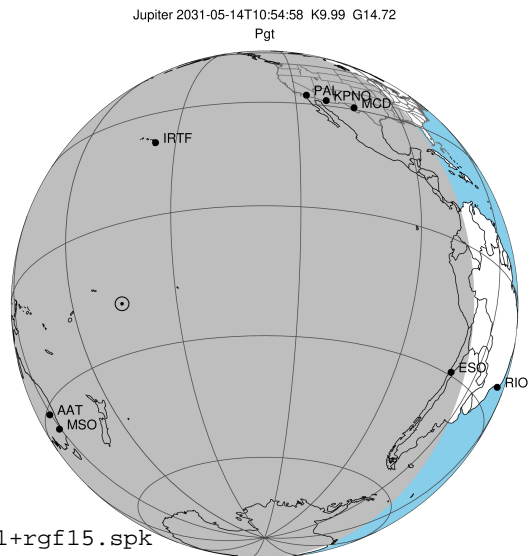


target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2031-05-14T10:54:58.480
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 4068886647165895424
 2Mass ID (if available) : 17480761-2253462

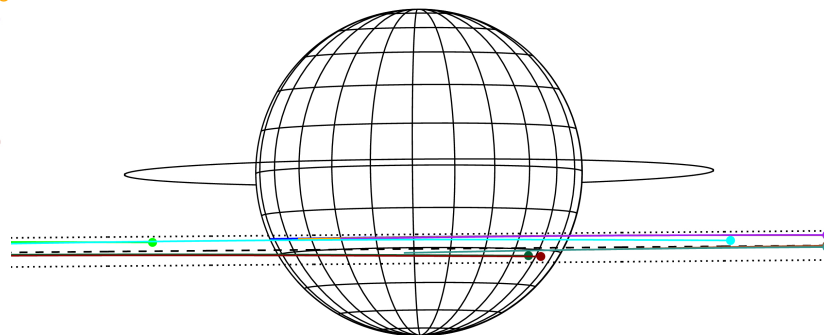
Jupiter 2031-05-14T10:54:58 K9.99 G14.72 Pgt

ICRS Star Coord at Epoch: 17h 48m 07.61296s -22:53:46.39266s

RUWE (>1.4 is poor) : 1.01
 K magnitude : 9.989
 G magnitude : 14.717
 RP magnitude : 13.503
 BP magnitude : 16.324
 DUPflag : 0
 Distance (au) : 4.425
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -11.33
 Sun-Target sep (deg) : 145.77
 Sun-Moon sep (deg) : 64.30
 B (ring opening deg) : -2.60
 PA of pole (deg) : 0.44
 Pole direction: RA (deg): 268.05695
 Dec (deg): 64.49651
 C/A sky separation (") : 10.429
 C/A sky separation (km) : 33472.6
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk



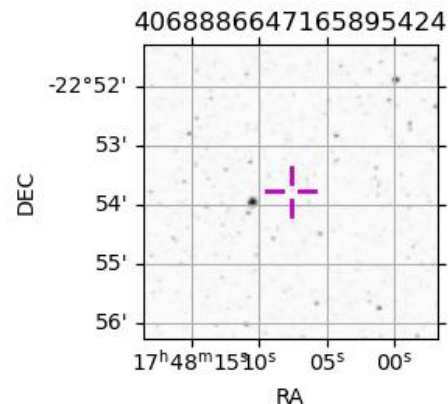
Earth
 PAL
 PMO
 KPNO
 MCD
 IRTF
 RIO
 ESO
 AAT
 MSO



2031-05-14T10:54:58.4800 α: 17 48 07.6130 δ: -22 53 46.393 C/A ***** PA 0.49 deg v_sky -11.33 km/s D 04.43 AU
 Credit: Styled after SORA/Lucky Star

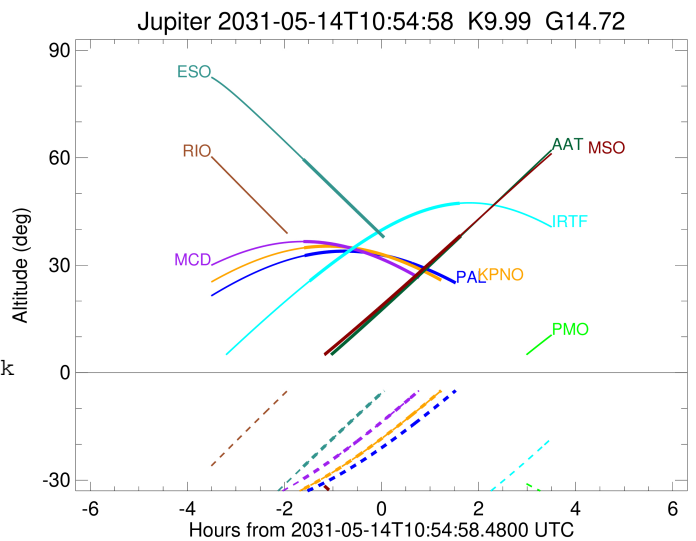
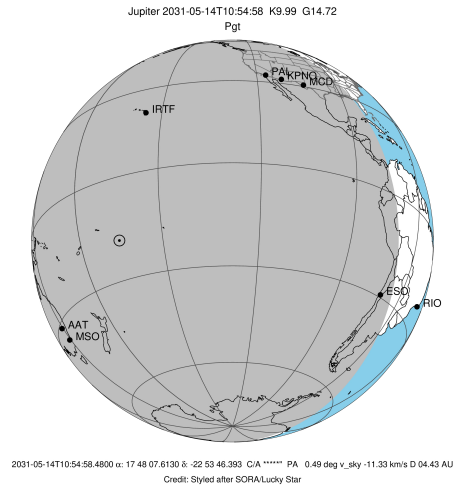
Observable events with sun below -5 deg and altitude above 5 deg

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 14 09:20 - MAY 14 09:20	Pin
PMO	Purple Mtn Obs. Nanking	32.1	118.8			Pnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+	MAY 14 09:19 - MAY 14 09:19	Pin
MCD	McDonald Obs. 2.7m	30.7	256.0	+	MAY 14 09:18 - MAY 14 09:18	Pin
TEN	Teide Obs./Tenerife	28.3	343.5			Pnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+ +	MAY 14 09:26 - MAY 14 12:31	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 14 09:18 - MAY 14 09:18	Pin
AAT	Siding Spring (AAT)	-31.3	149.1	+	MAY 14 12:33 - MAY 14 12:33	Pne
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8			Pnn
MSO	Mt. Stromlo Observatory	-35.3	149.0	+	MAY 14 12:32 - MAY 14 12:32	Pne



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-14T10:53:25.530
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      : 4068886647165895424
2Mass ID (if available) : 17480761-2253462
ICRS Star Coord at Epoch: 17h 48m 07.61296s -22:53:46.39266s
RUWE (>1.4 is poor) : 1.01
K magnitude         : 9.989
G magnitude         : 14.717
RP magnitude        : 13.503
BP magnitude        : 16.324
DUPflag            : 0
Distance (au)       : 4.425
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -11.33
Sun-Target sep (deg) : 145.77
Sun-Moon sep (deg)  : 64.69
B (ring opening deg) : -2.60
PA of pole (deg)    : 0.44
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation ("): 8.792
C/A sky separation (km): 28216.5
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
    
```

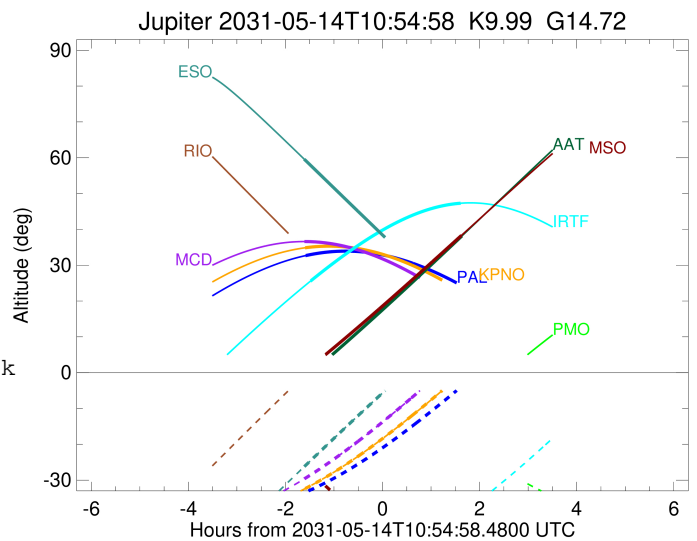
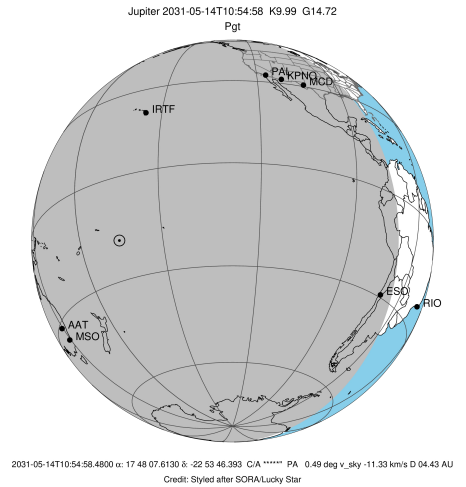


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-14T09:20:00.816	32.68	-33.34	71490.6	-23.19	-26.07
Jupiter	E	2031-05-14T12:26:55.733	25.02	-4.94x	71490.5	-23.55	-26.45

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-14T10:52:39.950
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        : 4068886647165895424
2Mass ID (if available) : 17480761-2253462
ICRS Star Coord at Epoch: 17h 48m 07.61296s -22:53:46.39266s
RUWE (>1.4 is poor) : 1.01
K magnitude           : 9.989
G magnitude           : 14.717
RP magnitude          : 13.503
BP magnitude          : 16.324
DUPflag              : 0
Distance (au)         : 4.425
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -11.33
Sun-Target sep (deg)  : 145.77
Sun-Moon sep (deg)    : 64.66
B (ring opening deg) : -2.60
PA of pole (deg)      : 0.44
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation (") : 8.832
C/A sky separation (km) : 28345.3
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
    
```

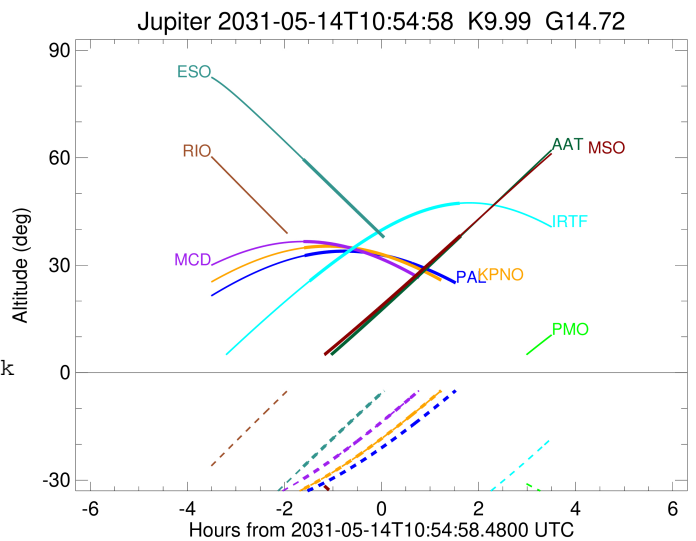
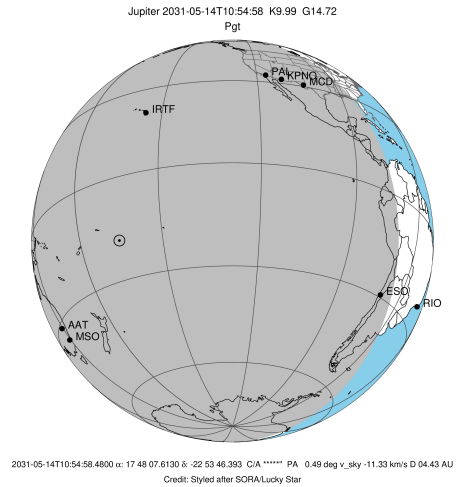


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-14T09:19:22.391	34.86	-32.36	71490.6	-23.24	-26.12
Jupiter	E	2031-05-14T12:26:09.894	23.53	-1.63x	71490.5	-23.72	-26.65

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-14T10:51:35.640
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        : 4068886647165895424
2Mass ID (if available) : 17480761-2253462
ICRS Star Coord at Epoch: 17h 48m 07.61296s -22:53:46.39266s
RUWE (>1.4 is poor) : 1.01
K magnitude           : 9.989
G magnitude           : 14.717
RP magnitude          : 13.503
BP magnitude          : 16.324
DUPflag               : 0
Distance (au)         : 4.425
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -11.33
Sun-Target sep (deg) : 145.77
Sun-Moon sep (deg)   : 64.60
B (ring opening deg) : -2.60
PA of pole (deg)     : 0.44
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation (") : 8.886
C/A sky separation (km) : 28518.7
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
    
```

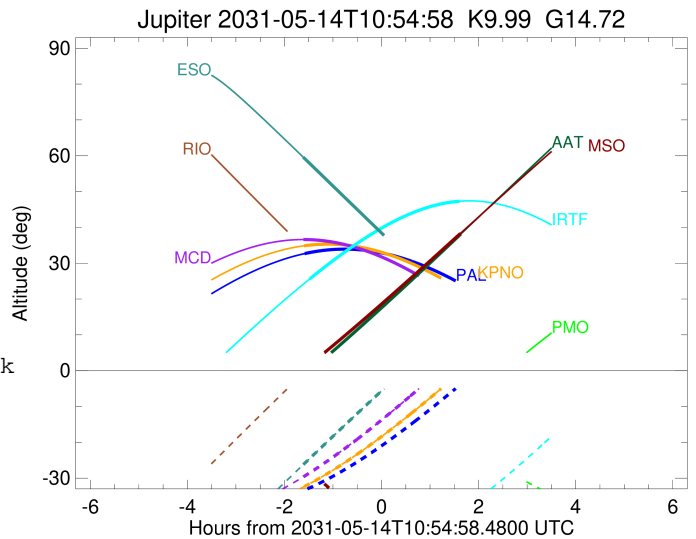
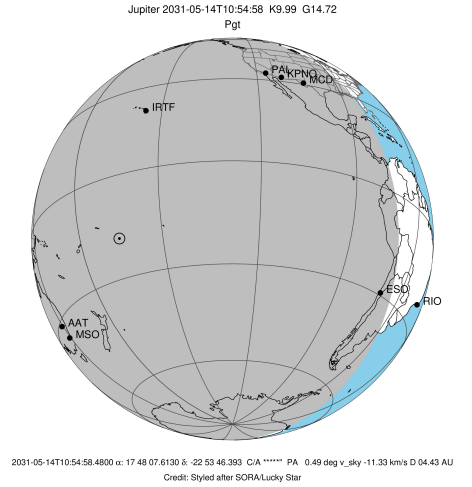


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-14T09:18:23.625	36.60	-29.63	71490.5	-23.29	-26.18
Jupiter	E	2031-05-14T12:25:09.797	20.21	3.75x	71490.5	-23.96	-26.91

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-14T10:59:11.380
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       : 4068886647165895424
2Mass ID (if available) : 17480761-2253462
ICRS Star Coord at Epoch: 17h 48m 07.61296s -22:53:46.39266s
RUWE (>1.4 is poor) : 1.01
K magnitude           : 9.989
G magnitude           : 14.717
RP magnitude          : 13.503
BP magnitude          : 16.324
DUPflag              : 0
Distance (au)         : 4.425
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -11.33
Sun-Target sep (deg) : 145.77
Sun-Moon sep (deg)   : 65.02
B (ring opening deg) : -2.60
PA of pole (deg)     : 0.44
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation (" ) : 9.163
C/A sky separation (km) : 29408.1
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
    
```

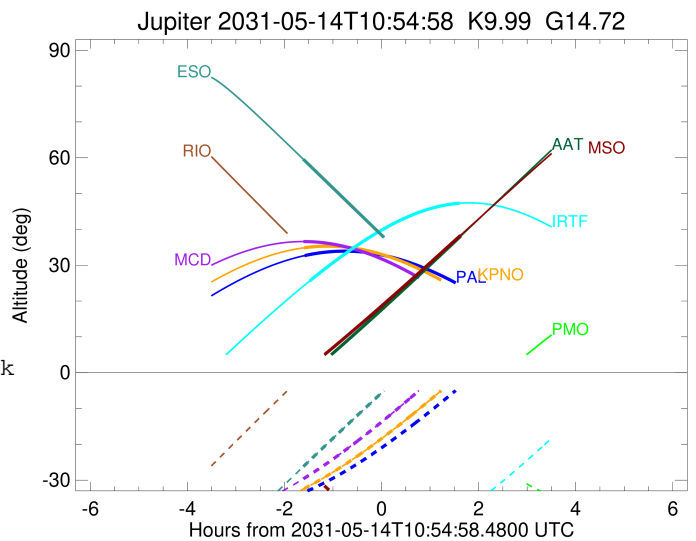
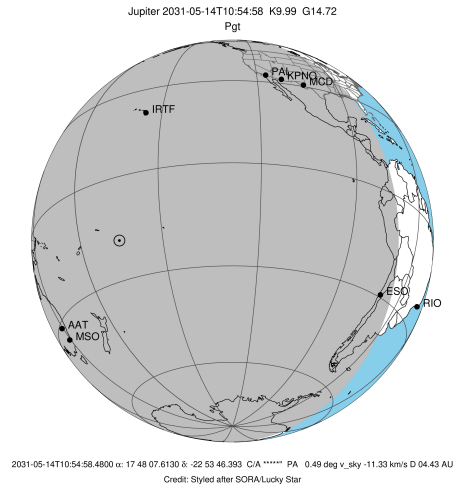


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-14T09:26:11.540	25.60	-49.60	71490.4	-24.73	-27.74
Jupiter	E	2031-05-14T12:31:25.037	47.29	-39.63	71490.4	-24.10	-27.05

```

target                : Jupiter
target radius (km)    : 71492.00
C/A epoch              : 2031-05-14T10:47:37.080
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         : 4068886647165895424
2Mass ID (if available) : 17480761-2253462
ICRS Star Coord at Epoch: 17h 48m 07.61296s -22:53:46.39266s
RUWE (>1.4 is poor)  : 1.01
K magnitude             : 9.989
G magnitude             : 14.717
RP magnitude           : 13.503
BP magnitude           : 16.324
DUPflag                : 0
Distance (au)          : 4.425
f0 (km)                : 0.00
g0 (km)                : 0.00
skyplane vel. (km/s)  : -11.33
Sun-Target sep (deg)   : 145.77
Sun-Moon sep (deg)     : 64.55
B (ring opening deg)   : -2.60
PA of pole (deg)       : 0.44
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation (") : 10.931
C/A sky separation (km) : 35083.5
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
    
```

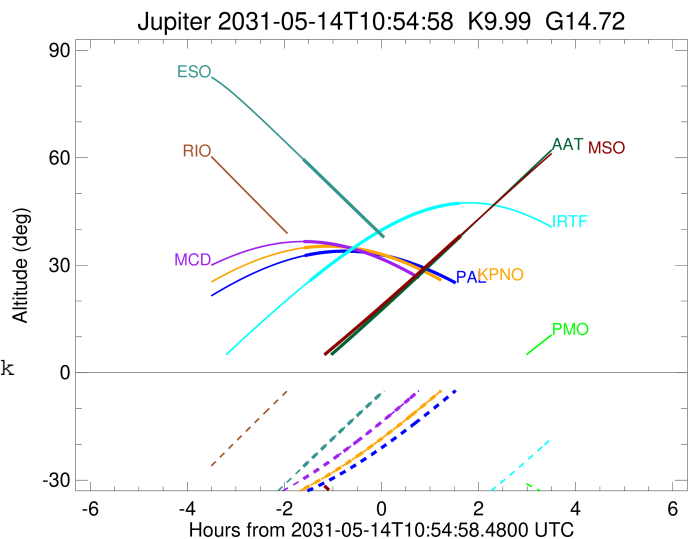
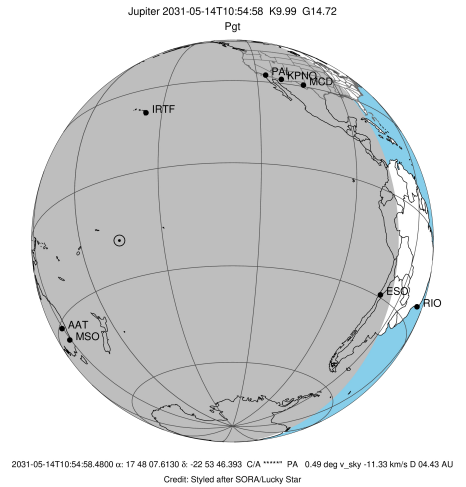


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-14T09:18:16.997	59.58	-26.23	71489.8	-28.77	-32.07
Jupiter	E	2031-05-14T12:17:50.866	20.65	10.93x	71489.7	-30.12	-33.50

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-14T11:03:35.210
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       : 4068886647165895424
2Mass ID (if available) : 17480761-2253462
ICRS Star Coord at Epoch: 17h 48m 07.61296s -22:53:46.39266s
RUWE (>1.4 is poor) : 1.01
K magnitude           : 9.989
G magnitude           : 14.717
RP magnitude          : 13.503
BP magnitude          : 16.324
DUPflag              : 0
Distance (au)        : 4.425
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -11.33
Sun-Target sep (deg) : 145.77
Sun-Moon sep (deg)   : 64.93
B (ring opening deg) : -2.60
PA of pole (deg)     : 0.44
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation ("): 11.276
C/A sky separation (km): 36188.3
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
    
```

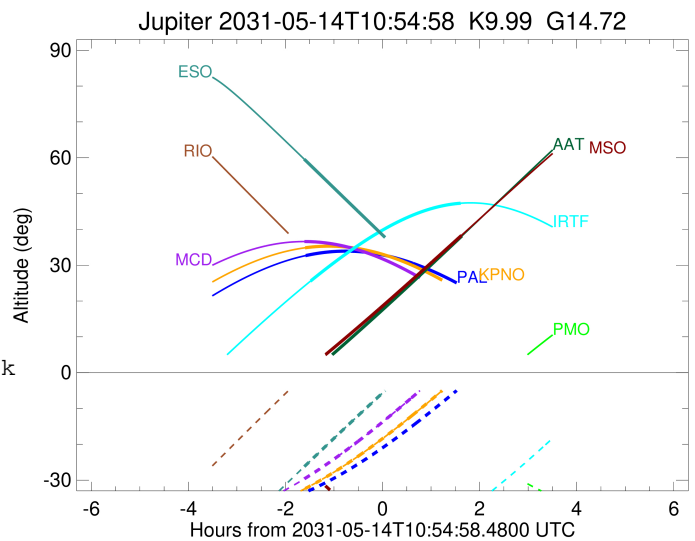
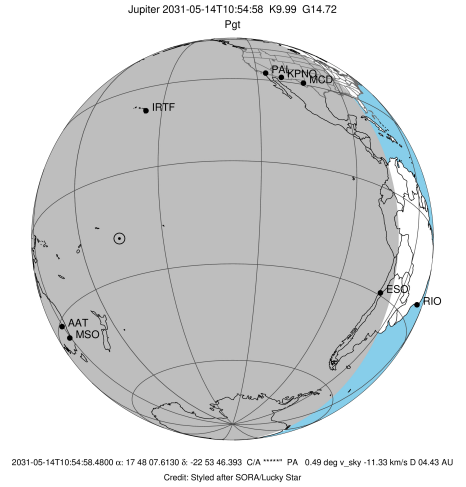


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-14T09:32:44.297	1.11x	-28.96	71489.5	-31.10	-34.54
Jupiter	E	2031-05-14T12:33:02.958	38.15	-66.73	71489.7	-29.71	-33.06

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-14T11:03:12.290
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      : 4068886647165895424
2Mass ID (if available) : 17480761-2253462
ICRS Star Coord at Epoch: 17h 48m 07.61296s -22:53:46.39266s
RUWE (>1.4 is poor) : 1.01
K magnitude         : 9.989
G magnitude         : 14.717
RP magnitude        : 13.503
BP magnitude        : 16.324
DUPflag            : 0
Distance (au)       : 4.425
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -11.33
Sun-Target sep (deg) : 145.77
Sun-Moon sep (deg)  : 64.93
B (ring opening deg) : -2.60
PA of pole (deg)    : 0.44
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation (" ) : 11.389
C/A sky separation (km) : 36552.9
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	2031-05-14T09:32:40.265	2.83x	-29.19	71489.5	-31.41	-34.86
Jupiter	E	2031-05-14T12:32:24.935	38.28	-64.50	71489.7	-30.08	-33.45