

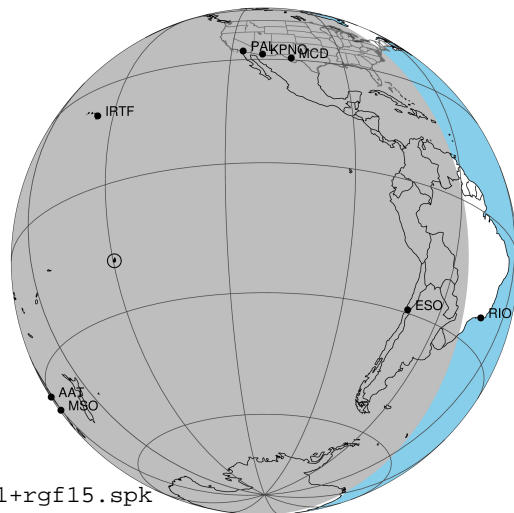
target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2031-05-12T09:54:57.290
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 4068888949270841600
 2Mass ID (if available) : 17485131-2253450

Jupiter 2031-05-12T09:54:57 K8.29 G14.91 Pgt

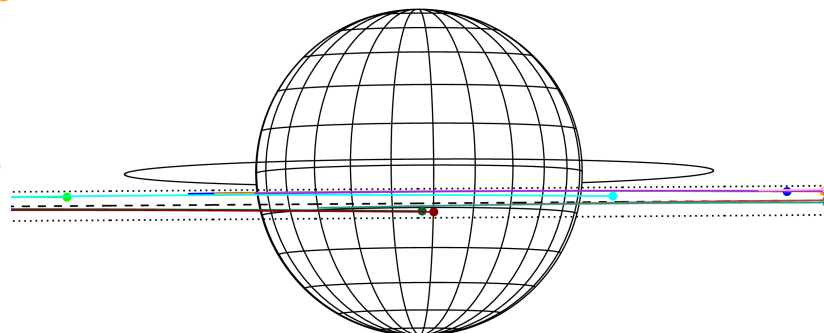
ICRS Star Coord at Epoch: 17h 48m 51.31954s -22:53:45.04117s

RUWE (>1.4 is poor) : 0.88
 K magnitude : 8.294
 G magnitude : 14.912
 RP magnitude : 13.353
 BP magnitude : 18.381
 DUPflag : 0
 Distance (au) : 4.445
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -10.69
 Sun-Target sep (deg) : 143.63
 Sun-Moon sep (deg) : 35.64
 B (ring opening deg) : -2.61
 PA of pole (deg) : 0.36
 Pole direction: RA (deg): 268.05695
 Dec (deg): 64.49651
 C/A sky separation (") : 4.197
 C/A sky separation (km) : 13528.0
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk

Jupiter 2031-05-12T09:54:57 K8.29 G14.91
 Pgt



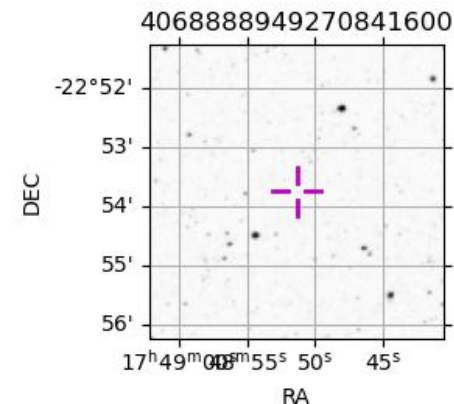
Earth
 PAL
 PMO
 KPNO
 MCD
 TEN
 IRTF
 RIO
 ESO
 AAT
 MSO



2031-05-12T09:54:57.2900 a: 17 48 51.31958 -22 53 45.041 C/A 4.209° PA 0.43 deg v_sky -10.69 km/s D 04.44 AU
 Credit: Styled after SORA/Lucky Star

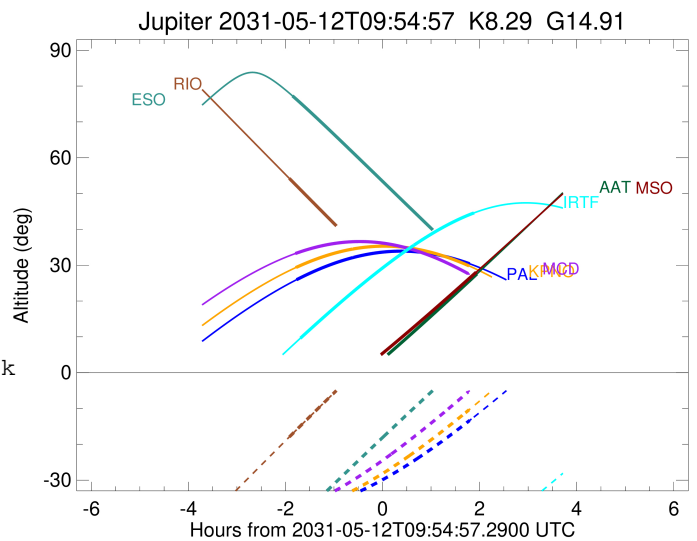
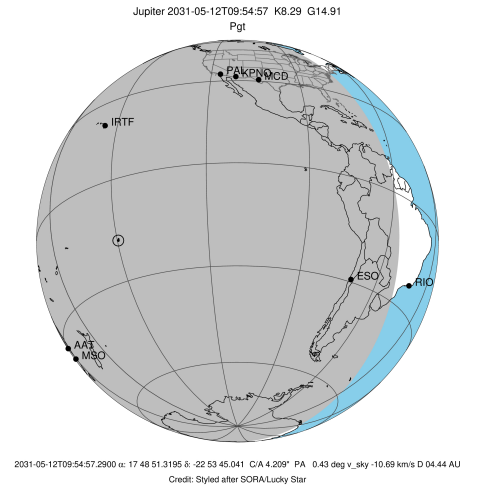
Observable events with sun below -5 deg and altitude above 5 deg

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 12 08:08 - MAY 12 11:42	Pie
PMO	Purple Mtn Obs. Nanking	32.1	118.8			Pnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+ +	MAY 12 08:08 - MAY 12 11:41	Pie
MCD	McDonald Obs. 2.7m	30.7	256.0	+ +	MAY 12 08:07 - MAY 12 11:40	Pie
TEN	Teide Obs./Tenerife	28.3	343.5			Pnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+ +	MAY 12 08:13 - MAY 12 11:48	Pie
KAV	Kavalur Observatory	12.6	78.8			Pnn
RIO	Rio de Janeiro	-22.9	316.8	+	MAY 12 07:59 - MAY 12 07:59	Pin
ESO	European Southern Obs. (3.6m)	-29.3	289.3	+	MAY 12 08:03 - MAY 12 08:03	Pin
AAT	Siding Spring (AAT)	-31.3	149.1	+	MAY 12 11:51 - MAY 12 11:51	Pne
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8			Pnn
MSO	Mt. Stromlo Observatory	-35.3	149.0	+	MAY 12 11:51 - MAY 12 11:51	Pne



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-12T09:55:49.310
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        : 4068888949270841600
2Mass ID (if available) : 17485131-2253450
ICRS Star Coord at Epoch: 17h 48m 51.31954s -22:53:45.04117s
RUWE (>1.4 is poor) : 0.88
K magnitude           : 8.294
G magnitude           : 14.912
RP magnitude          : 13.353
BP magnitude          : 18.381
DUPflag              : 0
Distance (au)         : 4.445
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -10.69
Sun-Target sep (deg)  : 143.63
Sun-Moon sep (deg)   : 35.96
B (ring opening deg) : -2.61
PA of pole (deg)     : 0.36
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation ("): 2.560
C/A sky separation (km): 8251.3
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
    
```

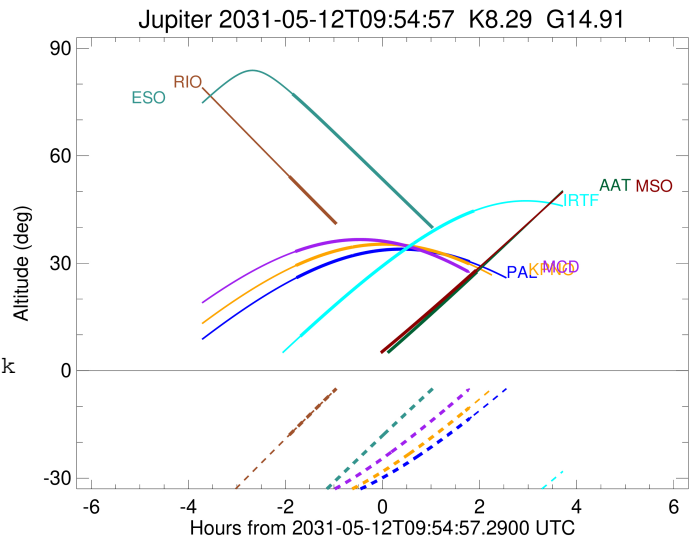
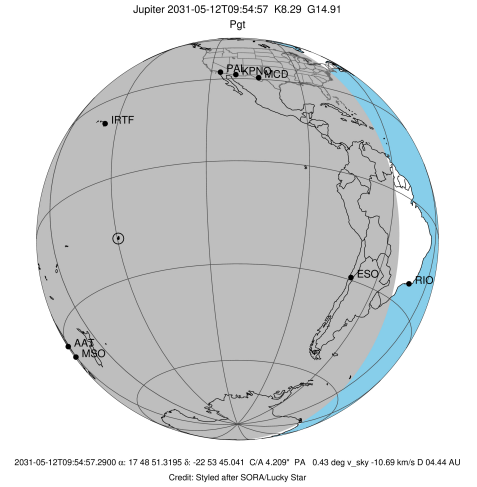


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-12T08:08:39.518	25.94	-38.36	71491.9	-6.82	-7.79
Jupiter	E	2031-05-12T11:42:35.815	30.40	-13.35	71491.9	-6.78	-7.74

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-12T09:55:04.280
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        : 4068888949270841600
2Mass ID (if available) : 17485131-2253450
ICRS Star Coord at Epoch: 17h 48m 51.31954s -22:53:45.04117s
RUWE (>1.4 is poor) : 0.88
K magnitude           : 8.294
G magnitude           : 14.912
RP magnitude          : 13.353
BP magnitude          : 18.381
DUPflag              : 0
Distance (au)         : 4.445
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -10.69
Sun-Target sep (deg)  : 143.63
Sun-Moon sep (deg)    : 35.91
B (ring opening deg) : -2.61
PA of pole (deg)     : 0.36
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation (") : 2.583
C/A sky separation (km) : 8326.5
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
    
```

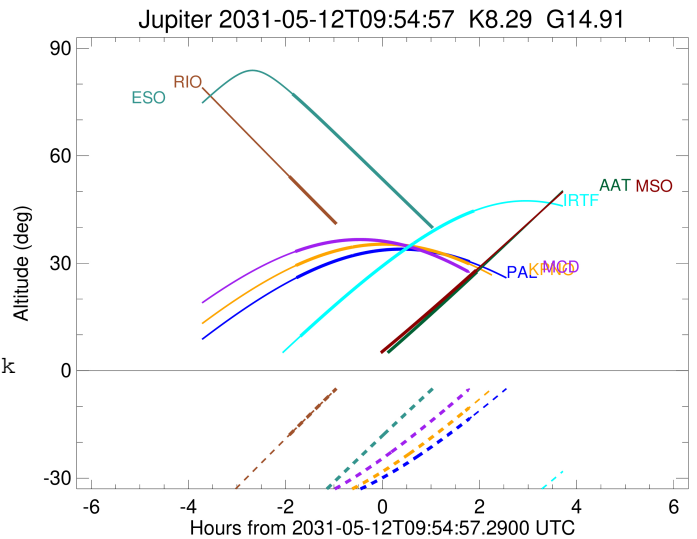
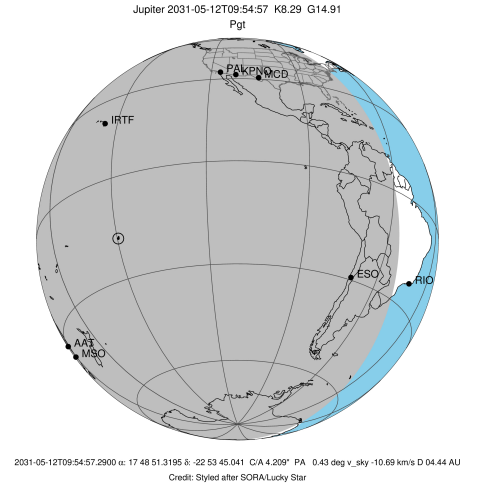


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-12T08:08:04.386	29.36	-38.93	71491.9	-6.82	-7.78
Jupiter	E	2031-05-12T11:41:50.121	29.82	-10.38	71491.9	-6.91	-7.89

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-12T09:53:57.570
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        : 4068888949270841600
2Mass ID (if available) : 17485131-2253450
ICRS Star Coord at Epoch: 17h 48m 51.31954s -22:53:45.04117s
RUWE (>1.4 is poor) : 0.88
K magnitude           : 8.294
G magnitude           : 14.912
RP magnitude          : 13.353
BP magnitude          : 18.381
DUPflag              : 0
Distance (au)         : 4.445
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -10.69
Sun-Target sep (deg) : 143.63
Sun-Moon sep (deg)   : 35.83
B (ring opening deg) : -2.61
PA of pole (deg)     : 0.36
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation (") : 2.613
C/A sky separation (km) : 8422.2
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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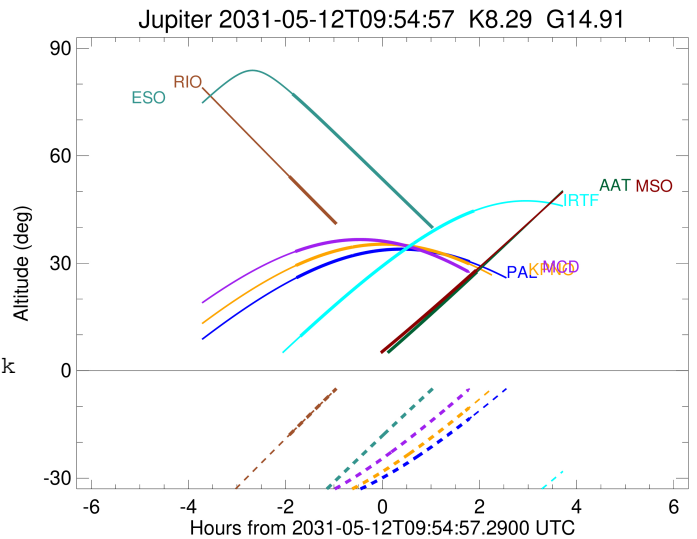
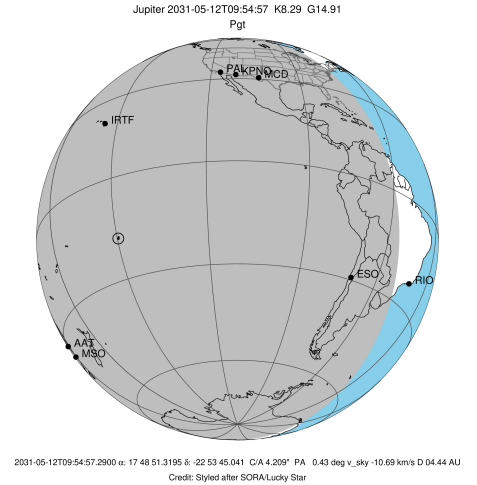


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-12T08:07:06.955	33.24	-38.17	71491.9	-6.80	-7.76
Jupiter	E	2031-05-12T11:40:47.707	27.64	-5.38	71491.9	-7.09	-8.10

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-12T10:01:30.330
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        : 4068888949270841600
2Mass ID (if available) : 17485131-2253450
ICRS Star Coord at Epoch: 17h 48m 51.31954s -22:53:45.04117s
RUWE (>1.4 is poor) : 0.88
K magnitude           : 8.294
G magnitude           : 14.912
RP magnitude          : 13.353
BP magnitude          : 18.381
DUPflag              : 0
Distance (au)         : 4.445
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -10.69
Sun-Target sep (deg)  : 143.63
Sun-Moon sep (deg)   : 36.40
B (ring opening deg) : -2.61
PA of pole (deg)     : 0.36
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation (") : 3.055
C/A sky separation (km) : 9848.8
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
    
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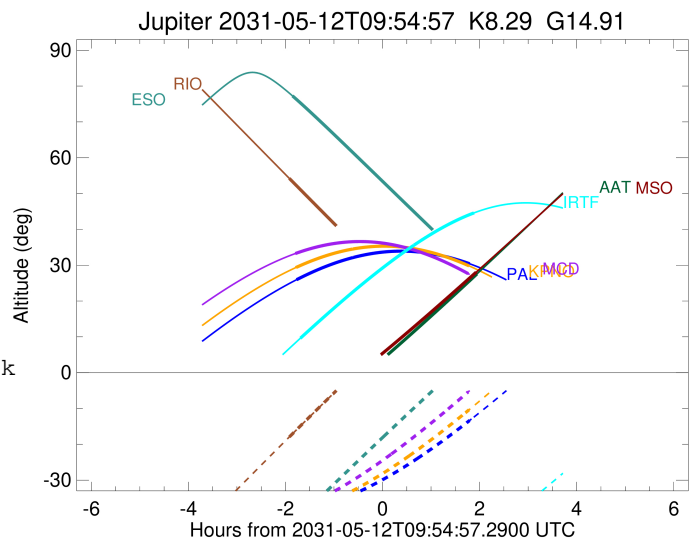
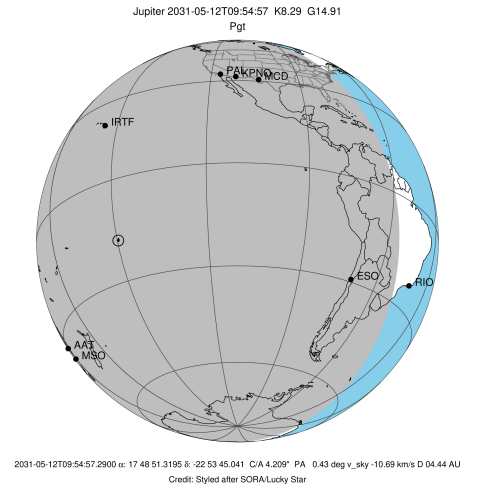


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-12T08:13:26.956	9.61	-41.34	71491.8	-8.59	-9.80
Jupiter	E	2031-05-12T11:47:59.816	44.59	-46.21	71491.8	-7.54	-8.60

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-12T09:46:16.350
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        : 4068888949270841600
2Mass ID (if available) : 17485131-2253450
ICRS Star Coord at Epoch: 17h 48m 51.31954s -22:53:45.04117s
RUWE (>1.4 is poor) : 0.88
K magnitude           : 8.294
G magnitude           : 14.912
RP magnitude          : 13.353
BP magnitude          : 18.381
DUPflag              : 0
Distance (au)         : 4.445
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -10.69
Sun-Target sep (deg) : 143.63
Sun-Moon sep (deg)   : 35.24
B (ring opening deg) : -2.61
PA of pole (deg)     : 0.36
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation (") : 4.602
C/A sky separation (km) : 14835.0
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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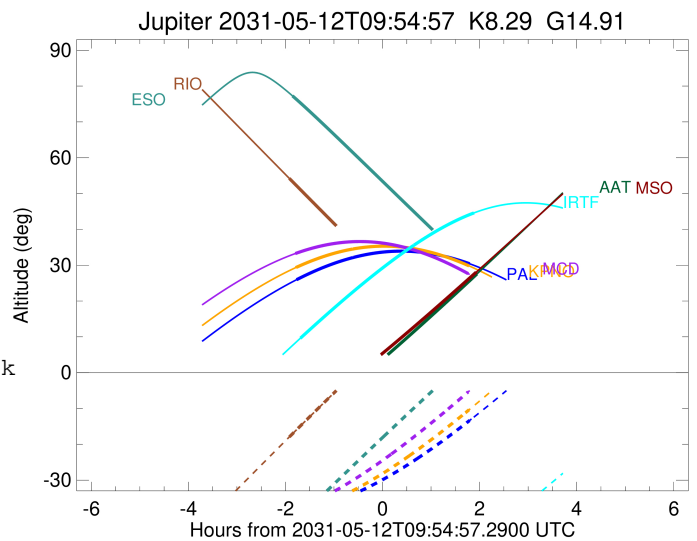
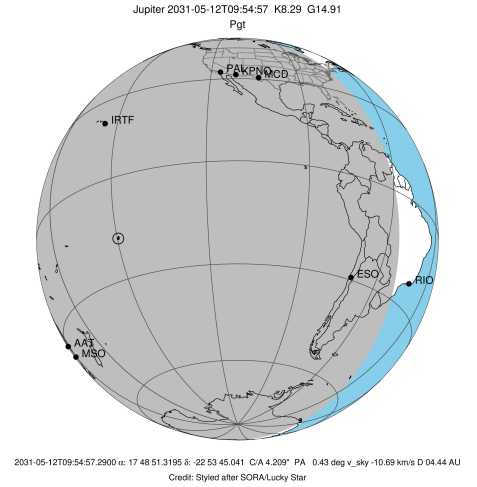


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-12T07:59:43.972	54.24	-17.96	71491.6	-11.22	-12.78
Jupiter	E	2031-05-12T11:34:23.334	6.31	27.23x	71491.5	-12.89	-14.66

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-12T09:49:17.410
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       : 4068888949270841600
2Mass ID (if available) : 17485131-2253450
ICRS Star Coord at Epoch: 17h 48m 51.31954s -22:53:45.04117s
RUWE (>1.4 is poor) : 0.88
K magnitude           : 8.294
G magnitude           : 14.912
RP magnitude          : 13.353
BP magnitude          : 18.381
DUPflag              : 0
Distance (au)        : 4.445
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -10.69
Sun-Target sep (deg) : 143.63
Sun-Moon sep (deg)   : 35.67
B (ring opening deg) : -2.61
PA of pole (deg)     : 0.36
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation (") : 4.555
C/A sky separation (km) : 14682.4
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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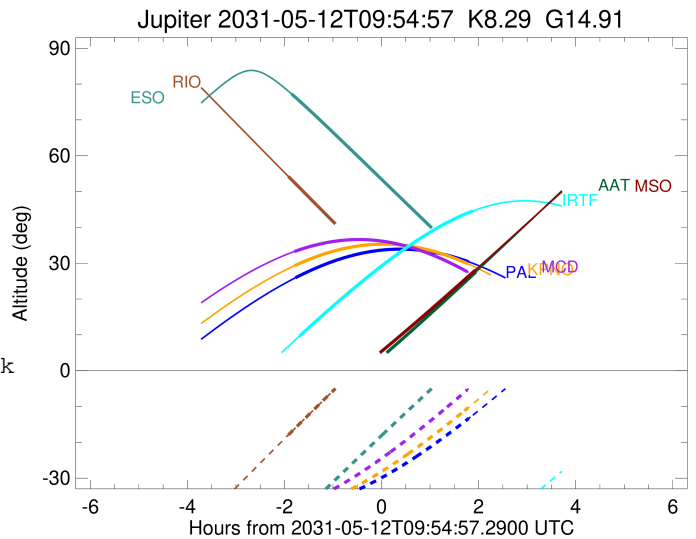
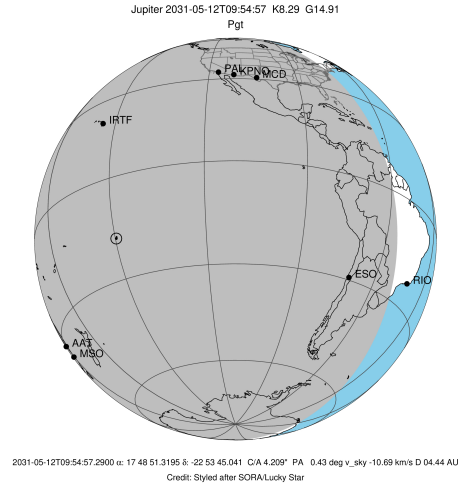


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-12T08:03:42.803	77.25	-42.28	71491.6	-11.43	-13.01
Jupiter	E	2031-05-12T11:35:46.949	31.46	2.92x	71491.6	-12.55	-14.27

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-12T10:03:44.720
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      : 4068888949270841600
2Mass ID (if available) : 17485131-2253450
ICRS Star Coord at Epoch: 17h 48m 51.31954s -22:53:45.04117s
RUWE (>1.4 is poor) : 0.88
K magnitude          : 8.294
G magnitude          : 14.912
RP magnitude         : 13.353
BP magnitude         : 18.381
DUPflag             : 0
Distance (au)       : 4.445
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -10.69
Sun-Target sep (deg) : 143.63
Sun-Moon sep (deg)   : 36.39
B (ring opening deg) : -2.61
PA of pole (deg)     : 0.36
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation ("): 5.233
C/A sky separation (km): 16869.7
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
    
```

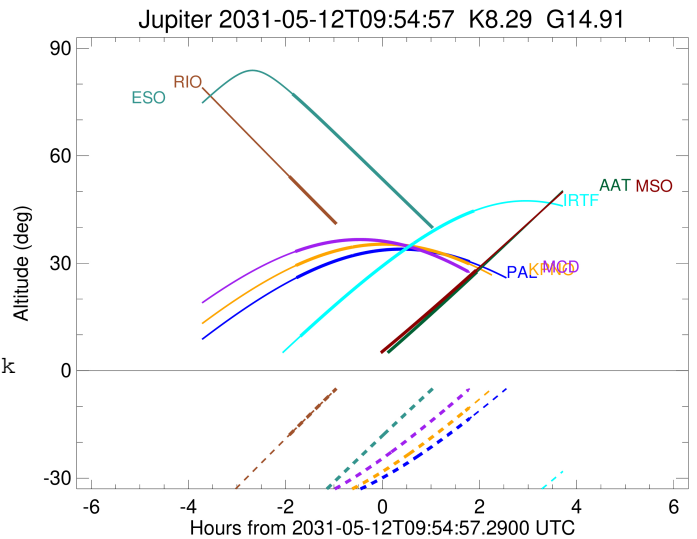
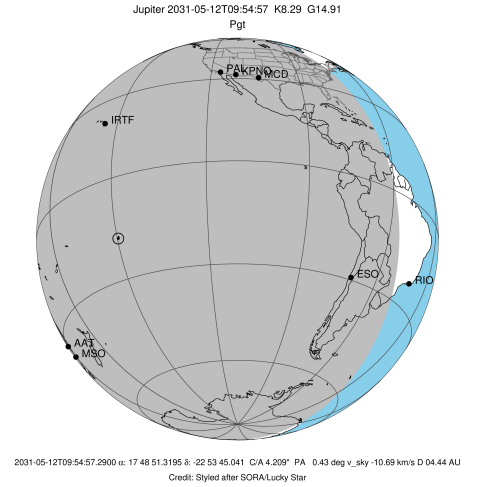


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-12T08:13:48.047	-14.73x	-12.08	71491.4	-14.34	-16.29
Jupiter	E	2031-05-12T11:51:32.572	27.53	-58.20	71491.5	-12.89	-14.65


```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-12T10:03:20.950
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        : 4068888949270841600
2Mass ID (if available) : 17485131-2253450
ICRS Star Coord at Epoch: 17h 48m 51.31954s -22:53:45.04117s
RUWE (>1.4 is poor) : 0.88
K magnitude           : 8.294
G magnitude           : 14.912
RP magnitude          : 13.353
BP magnitude          : 18.381
DUPflag              : 0
Distance (au)         : 4.445
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -10.69
Sun-Target sep (deg)  : 143.63
Sun-Moon sep (deg)    : 36.39
B (ring opening deg) : -2.61
PA of pole (deg)     : 0.36
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation (") : 5.338
C/A sky separation (km) : 17206.2
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	2031-05-12T08:13:35.627	-12.25x	-12.94	71491.4	-14.58	-16.56
Jupiter	E	2031-05-12T11:51:02.989	28.11	-56.72	71491.5	-13.20	-15.01