

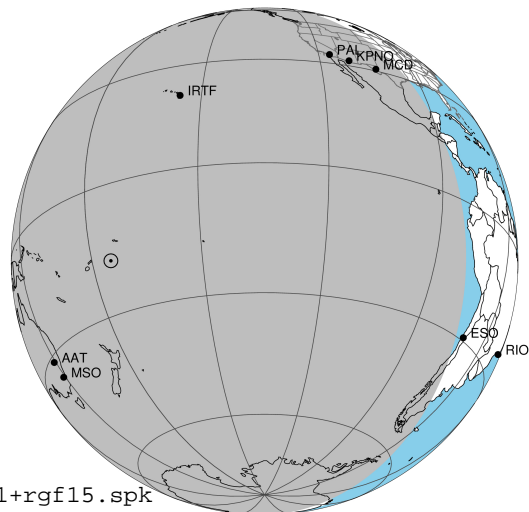
target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2031-05-11T11:33:35.960
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 4068878396475087872
 2Mass ID (if available) : 17491034-2254010

Jupiter 2031-05-11T11:33:35 K8.71 G14.43 Pgt

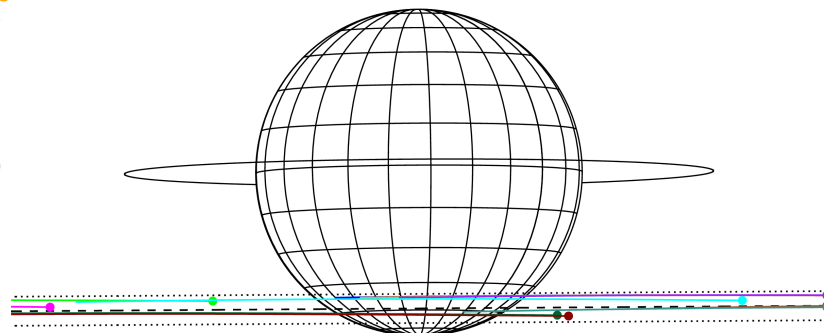
ICRS Star Coord at Epoch: 17h 49m 10.33089s -22:54:01.18620s

RUWE (>1.4 is poor) : 1.04
 K magnitude : 8.712
 G magnitude : 14.431
 RP magnitude : 12.999
 BP magnitude : 16.937
 DUPflag : 0
 Distance (au) : 4.454
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -10.39
 Sun-Target sep (deg) : 142.66
 Sun-Moon sep (deg) : 22.21
 B (ring opening deg) : -2.60
 PA of pole (deg) : 0.33
 Pole direction: RA (deg): 268.05695
 Dec (deg): 64.49651
 C/A sky separation (") : 18.437
 C/A sky separation (km) : 59556.5
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk

Jupiter 2031-05-11T11:33:35 K8.71 G14.43
 Pgt



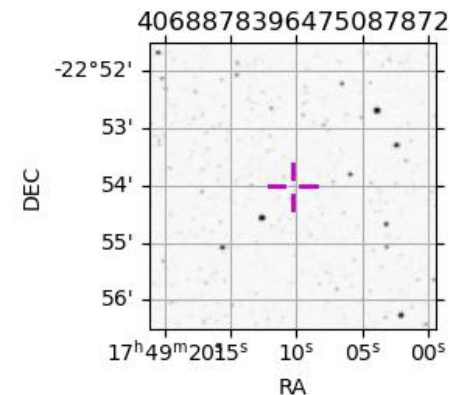
Earth
 PAL
 PMO
 KPNO
 MCD
 IRTF
 KAV
 RIO
 ESO
 AAT
 MSO



2031-05-11T11:33:35.9600 α: 17 49 10.3309 δ: -22 54 01.186 C/A ***** PA 0.39 deg v_sky -10.39 km/s D 04.45 AU
 Credit: Styled after SORA/Lucky Star

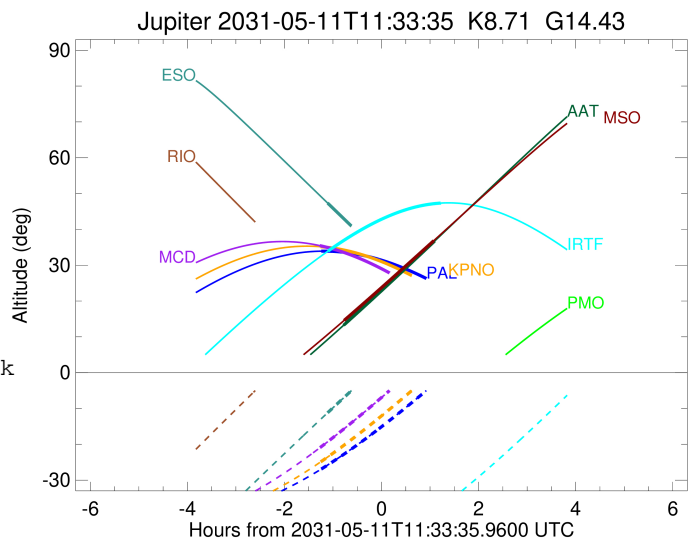
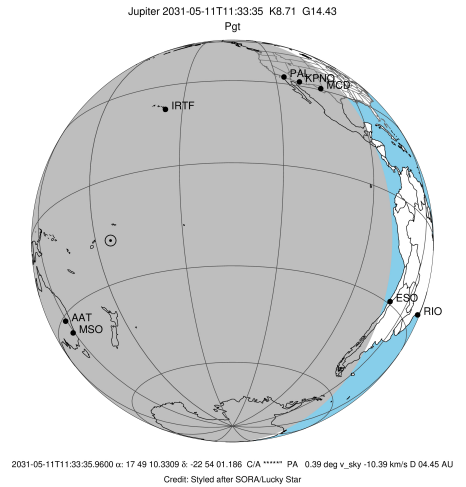
Observable events with sun below -5 deg and altitude above 5 deg

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 11 10:19 - MAY 11 10:19	Pin
PMO	Purple Mtn Obs. Nanking	32.1	118.8			Pnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+	MAY 11 10:18 - MAY 11 10:18	Pin
MCD	McDonald Obs. 2.7m	30.7	256.0	+	MAY 11 10:17 - MAY 11 10:17	Pin
TEN	Teide Obs./Tenerife	28.3	343.5			Pnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+ +	MAY 11 10:27 - MAY 11 12:46	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 11 10:26 - MAY 11 10:26	Pin
AAT	Siding Spring (AAT)	-31.3	149.1	+ +	MAY 11 10:46 - MAY 11 12:39	Pie
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8			Pnn
MSO	Mt. Stromlo Observatory	-35.3	149.0	+ +	MAY 11 10:47 - MAY 11 12:38	Pie



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-11T11:30:45.470
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        : 4068878396475087872
2Mass ID (if available) : 17491034-2254010
ICRS Star Coord at Epoch: 17h 49m 10.33089s -22:54:01.18620s
RUWE (>1.4 is poor) : 1.04
K magnitude           : 8.712
G magnitude           : 14.431
RP magnitude          : 12.999
BP magnitude          : 16.937
DUPflag              : 0
Distance (au)         : 4.454
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -10.39
Sun-Target sep (deg)  : 142.66
Sun-Moon sep (deg)    : 22.06
B (ring opening deg) : -2.60
PA of pole (deg)      : 0.33
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation (" ) : 16.827
C/A sky separation (km) : 54354.3
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
    
```

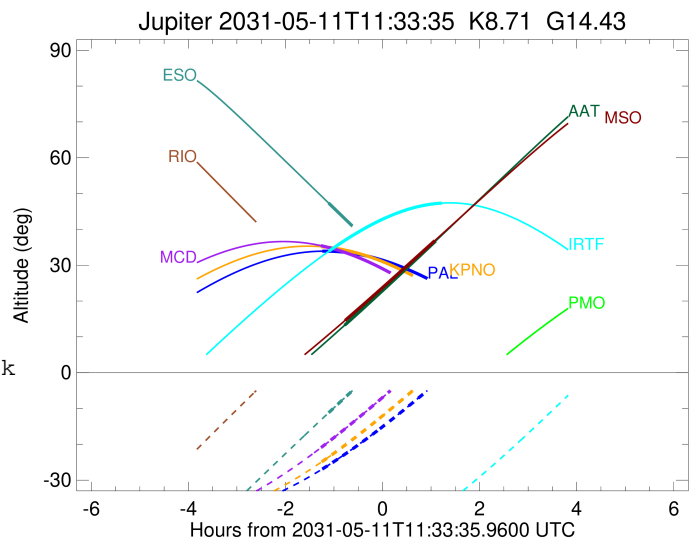
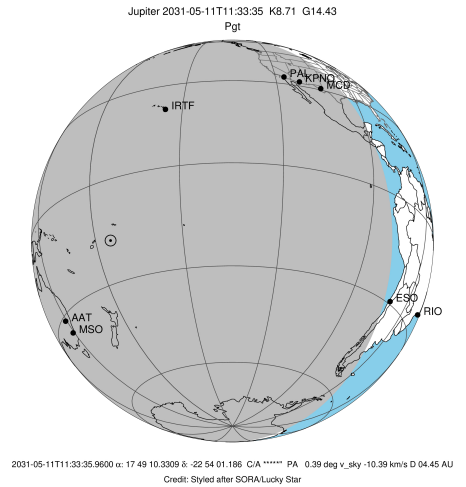


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-11T10:19:01.885	33.91	-26.92	71486.7	-49.26	-52.87
Jupiter	E	2031-05-11T12:42:37.748	24.68	-2.40x	71486.6	-49.84	-53.43

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-11T11:29:53.160
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      : 4068878396475087872
2Mass ID (if available) : 17491034-2254010
ICRS Star Coord at Epoch: 17h 49m 10.33089s -22:54:01.18620s
RUWE (>1.4 is poor) : 1.04
K magnitude          : 8.712
G magnitude          : 14.431
RP magnitude         : 12.999
BP magnitude         : 16.937
DUPflag             : 0
Distance (au)       : 4.454
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -10.39
Sun-Target sep (deg) : 142.66
Sun-Moon sep (deg)  : 21.99
B (ring opening deg) : -2.60
PA of pole (deg)    : 0.33
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation ("): 16.873
C/A sky separation (km): 54503.8
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
    
```

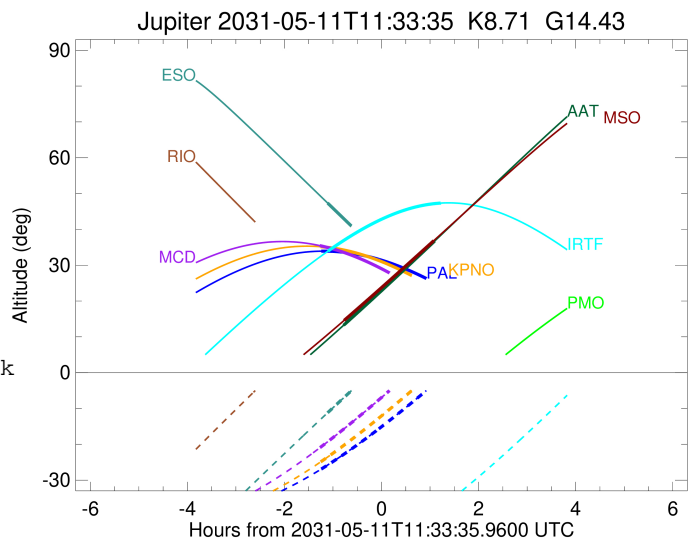
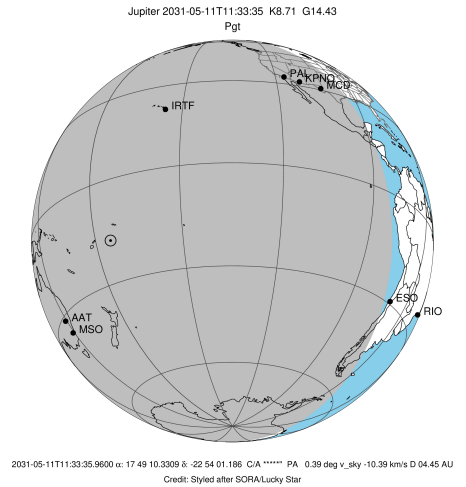


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-11T10:18:25.640	35.16	-24.90	71486.6	-49.37	-52.98
Jupiter	E	2031-05-11T12:41:33.754	23.18	0.99x	71486.5	-50.09	-53.67

```

target                : Jupiter
target radius (km)    : 71492.00
C/A epoch              : 2031-05-11T11:28:40.650
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        : 4068878396475087872
2Mass ID (if available) : 17491034-2254010
ICRS Star Coord at Epoch: 17h 49m 10.33089s -22:54:01.18620s
RUWE (>1.4 is poor)  : 1.04
K magnitude            : 8.712
G magnitude            : 14.431
RP magnitude           : 12.999
BP magnitude           : 16.937
DUPflag                : 0
Distance (au)         : 4.454
f0 (km)                : 0.00
g0 (km)                : 0.00
skyplane vel. (km/s)  : -10.39
Sun-Target sep (deg)  : 142.66
Sun-Moon sep (deg)    : 21.89
B (ring opening deg)  : -2.60
PA of pole (deg)      : 0.33
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation (") : 16.936
C/A sky separation (km) : 54706.2
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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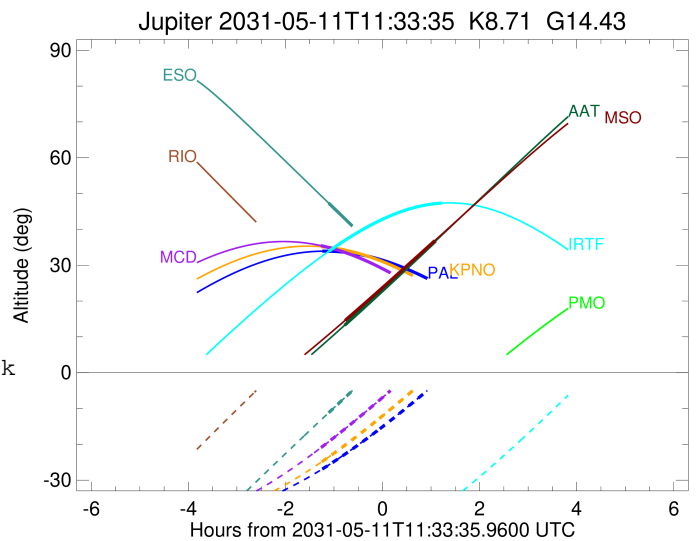
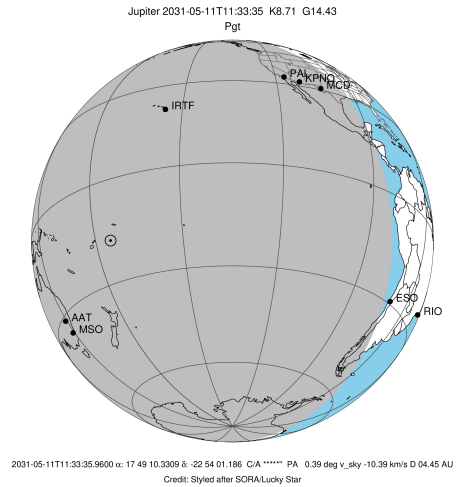


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-11T10:17:31.306	35.45	-20.93	71486.6	-49.52	-53.12
Jupiter	E	2031-05-11T12:40:09.154	19.88	6.43x	71486.5	-50.43	-54.00

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-11T11:37:22.780
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       : 4068878396475087872
2Mass ID (if available) : 17491034-2254010
ICRS Star Coord at Epoch: 17h 49m 10.33089s -22:54:01.18620s
RUWE (>1.4 is poor) : 1.04
K magnitude           : 8.712
G magnitude           : 14.431
RP magnitude         : 12.999
BP magnitude         : 16.937
DUPflag              : 0
Distance (au)        : 4.454
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -10.39
Sun-Target sep (deg) : 142.66
Sun-Moon sep (deg)   : 22.69
B (ring opening deg) : -2.60
PA of pole (deg)     : 0.33
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation ("): 17.146
C/A sky separation (km): 55383.9
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
    
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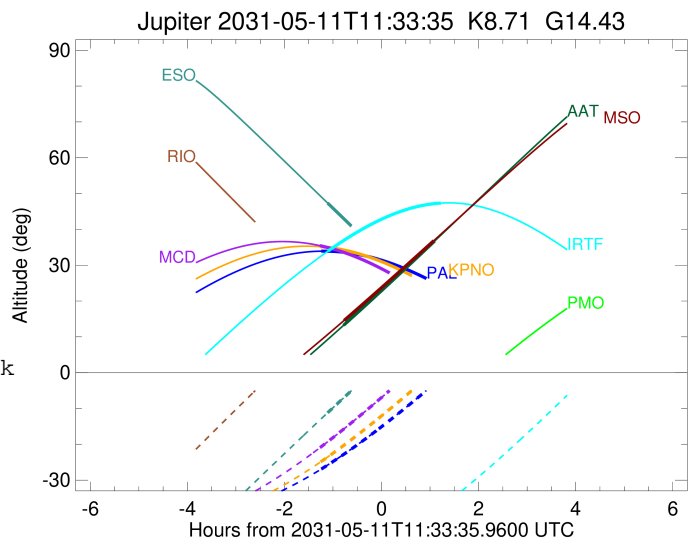
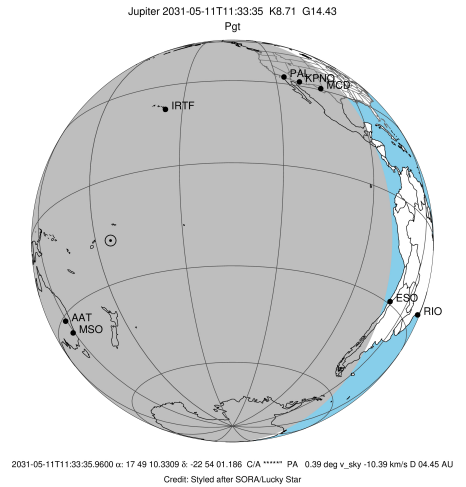


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-11T10:27:34.567	33.94	-52.34	71486.4	-51.09	-54.63
Jupiter	E	2031-05-11T12:46:47.260	47.33	-37.63	71486.4	-50.59	-54.16

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-11T11:24:25.830
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      : 4068878396475087872
2Mass ID (if available) : 17491034-2254010
ICRS Star Coord at Epoch: 17h 49m 10.33089s -22:54:01.18620s
RUWE (>1.4 is poor) : 1.04
K magnitude          : 8.712
G magnitude          : 14.431
RP magnitude         : 12.999
BP magnitude         : 16.937
DUPflag             : 0
Distance (au)       : 4.454
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -10.39
Sun-Target sep (deg) : 142.66
Sun-Moon sep (deg)  : 21.74
B (ring opening deg) : -2.60
PA of pole (deg)    : 0.33
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation ("): 18.999
C/A sky separation (km): 61371.3
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
    
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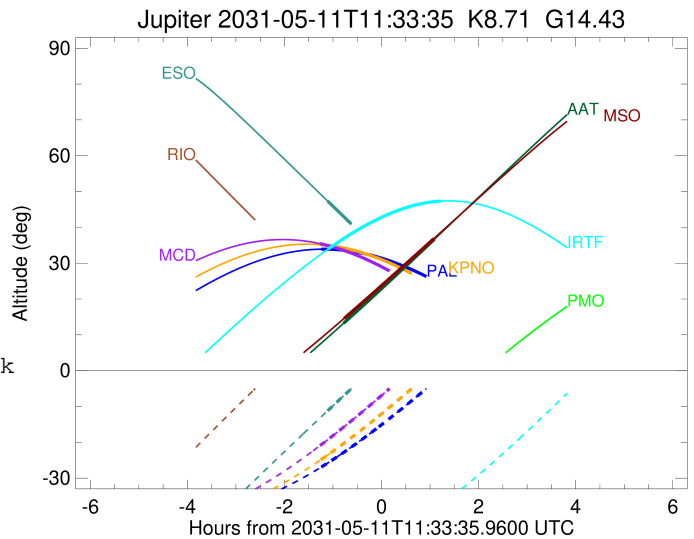
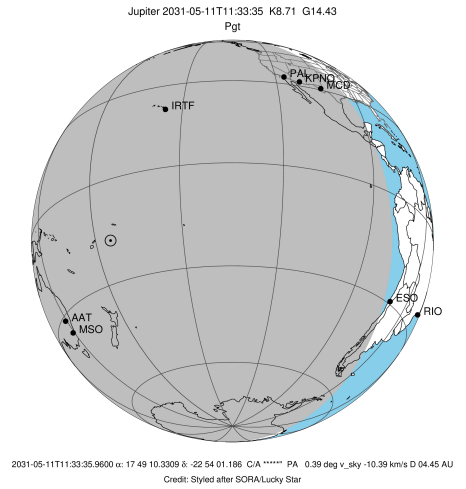


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-11T10:26:58.855	47.35	-11.20	71485.3	-58.30	-61.48
Jupiter	E	2031-05-11T12:22:19.548	22.42	12.22x	71485.0	-59.91	-62.98

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-11T11:43:24.380
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      : 4068878396475087872
2Mass ID (if available) : 17491034-2254010
ICRS Star Coord at Epoch: 17h 49m 10.33089s -22:54:01.18620s
RUWE (>1.4 is poor) : 1.04
K magnitude          : 8.712
G magnitude          : 14.431
RP magnitude        : 12.999
BP magnitude        : 16.937
DUPflag             : 0
Distance (au)       : 4.454
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -10.39
Sun-Target sep (deg) : 142.66
Sun-Moon sep (deg)  : 23.17
B (ring opening deg) : -2.60
PA of pole (deg)    : 0.33
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation ("): 19.200
C/A sky separation (km) : 62020.8
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
    
```

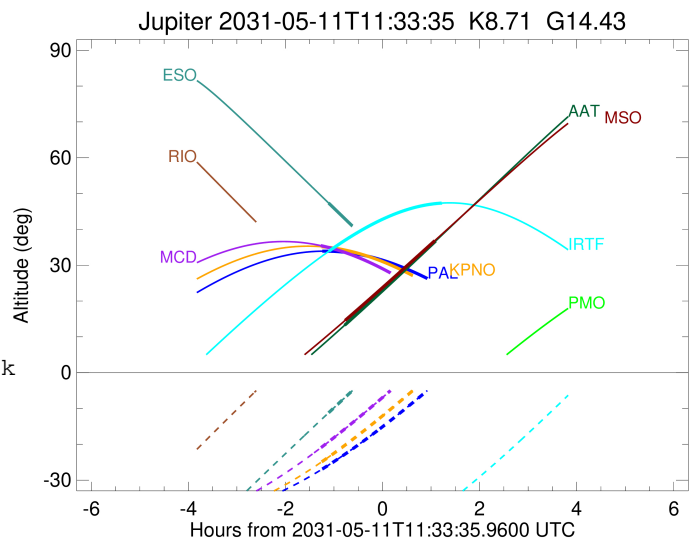
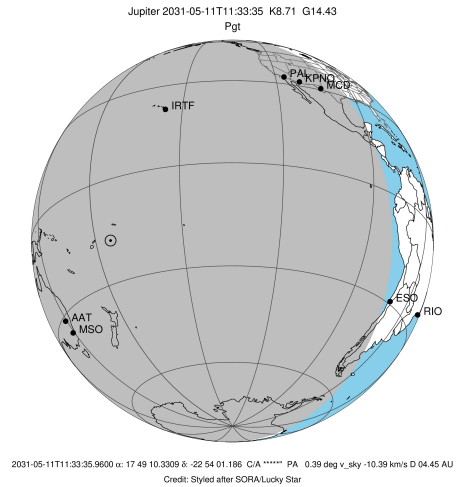


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-11T10:46:44.085	13.22	-44.45	71484.9	-60.85	-63.85
Jupiter	E	2031-05-11T12:39:29.091	36.78	-67.47	71485.1	-59.37	-62.48


```

target                : Jupiter
target radius (km)    : 71492.00
C/A epoch             : 2031-05-11T11:42:58.640
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        : 4068878396475087872
2Mass ID (if available) : 17491034-2254010
ICRS Star Coord at Epoch: 17h 49m 10.33089s -22:54:01.18620s
RUWE (>1.4 is poor)  : 1.04
K magnitude           : 8.712
G magnitude           : 14.431
RP magnitude          : 12.999
BP magnitude          : 16.937
DUPflag              : 0
Distance (au)         : 4.454
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s)  : -10.39
Sun-Target sep (deg)  : 142.66
Sun-Moon sep (deg)    : 23.15
B (ring opening deg)  : -2.60
PA of pole (deg)      : 0.33
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation (") : 19.317
C/A sky separation (km) : 62397.0
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	2031-05-11T10:47:20.808	14.58	-44.03	71484.8	-61.42	-64.38
Jupiter	E	2031-05-11T12:38:03.497	36.81	-64.89	71485.0	-60.01	-63.07