

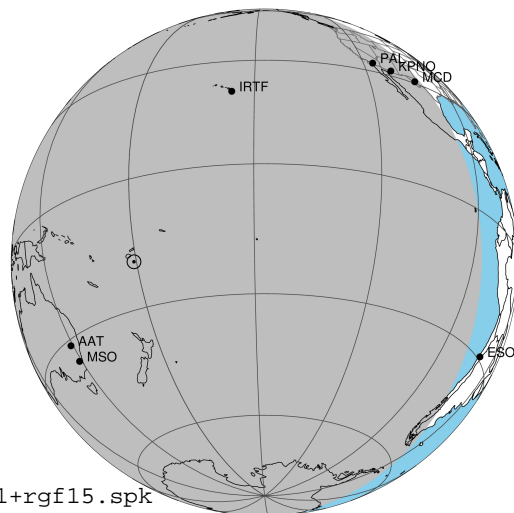
target : Jupiter  
 target radius (km) : 71492.00  
 C/A epoch : 2031-05-17T11:59:01.250  
 Event type : Pgt  
 : Jupiter occs: geocentric, topocentric  
 : Not a ringed target  
 Gaia source ID : 4068936365724490496  
 2Mass ID (if available) : 17465751-2253211

Jupiter 2031-05-17T11:59:01 K8.49 G13.79 Pgt

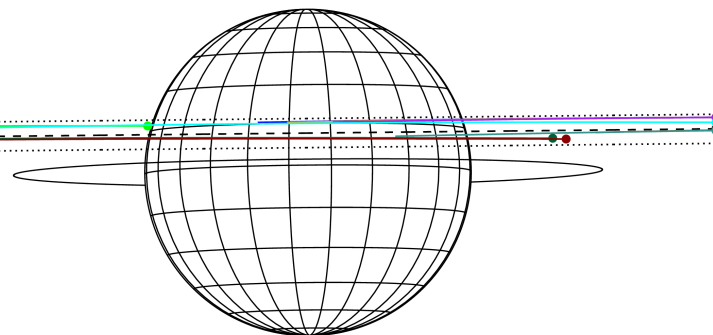
ICRS Star Coord at Epoch: 17h 46m 57.51078s -22:53:21.29669s

RUWE (>1.4 is poor) : 0.91  
 K magnitude : 8.487  
 G magnitude : 13.786  
 RP magnitude : 12.436  
 BP magnitude : 15.922  
 DUPflag : 0  
 Distance (au) : 4.398  
 f0 (km) : 0.00  
 g0 (km) : 0.00  
 skyplane vel. (km/s) : -12.23  
 Sun-Target sep (deg) : 148.97  
 Sun-Moon sep (deg) : 104.99  
 B (ring opening deg) : -2.61  
 PA of pole (deg) : 0.57  
 Pole direction: RA (deg): 268.05694  
 Dec (deg): 64.49651  
 C/A sky separation (") : 5.412  
 C/A sky separation (km) : 17263.3  
 NAIF SPICE kernels : RAJobs\_U111+rgf15.spk

Jupiter 2031-05-17T11:59:01 K8.49 G13.79  
 Pgt



Earth  
 PAL  
 PMO  
 KPNO  
 MCD  
 IRTF  
 KAV  
 RIO  
 ESO  
 AAT  
 MSO

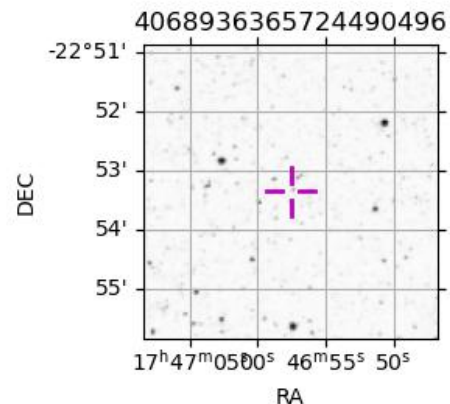


2031-05-17T11:59:01.2500 at: 17 46 57.5108 s: -22 53 21.297 C/A 5.400" PA 180.60 deg v\_sky -12.23 km/s D 04.40 AU

Credit: Styled after SORA/Lucky Star

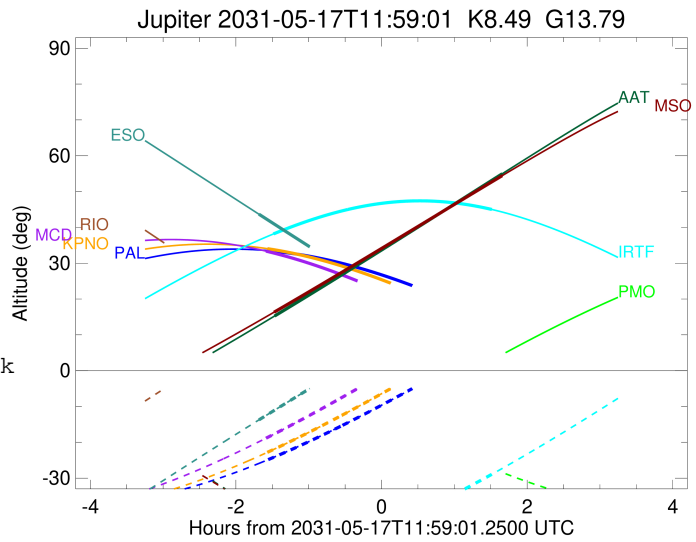
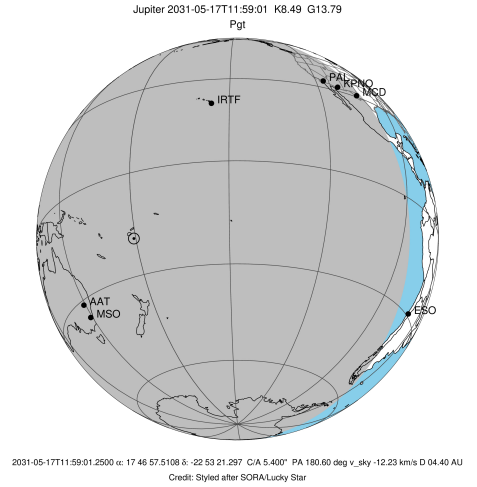
Observable events with sun below -5 deg and altitude above 5 deg

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 17 10:25 - MAY 17 10:25	Pin
PMO	Purple Mtn Obs. Nanking	32.1	118.8			Pnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+	MAY 17 10:24 - MAY 17 10:24	Pin
MCD	McDonald Obs. 2.7m	30.7	256.0	+	MAY 17 10:23 - MAY 17 10:23	Pin
TEN	Teide Obs./Tenerife	28.3	343.5			Pnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+ +	MAY 17 10:30 - MAY 17 13:29	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 17 10:17 - MAY 17 10:17	Pin
AAT	Siding Spring (AAT)	-31.3	149.1	+ +	MAY 17 10:30 - MAY 17 13:38	Pie
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8			Pnn
MSO	Mt. Stromlo Observatory	-35.3	149.0	+ +	MAY 17 10:30 - MAY 17 13:38	Pie



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-17T11:55:37.770
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      : 4068936365724490496
2Mass ID (if available) : 17465751-2253211
ICRS Star Coord at Epoch: 17h 46m 57.51078s -22:53:21.29669s
RUWE (>1.4 is poor) : 0.91
K magnitude          : 8.487
G magnitude          : 13.786
RP magnitude         : 12.436
BP magnitude         : 15.922
DUPflag             : 0
Distance (au)        : 4.398
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -12.23
Sun-Target sep (deg) : 148.97
Sun-Moon sep (deg)   : 105.51
B (ring opening deg) : -2.61
PA of pole (deg)     : 0.57
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation ("): 6.990
C/A sky separation (km) : 22296.3
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
    
```

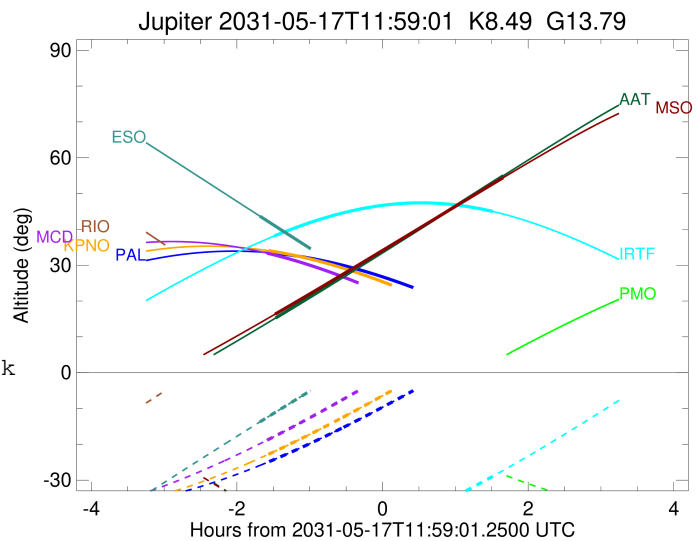
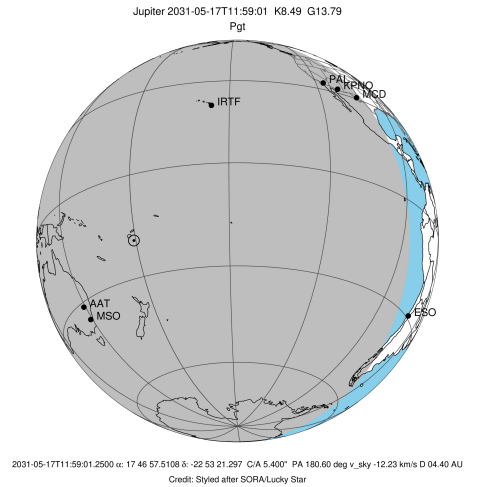


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-17T10:25:36.028	33.50	-24.83	71491.1	18.39	20.80
Jupiter	E	2031-05-17T13:26:04.294	14.86	6.90x	71491.1	17.68	20.01

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-17T11:55:02.610
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      : 4068936365724490496
2Mass ID (if available) : 17465751-2253211
ICRS Star Coord at Epoch: 17h 46m 57.51078s -22:53:21.29669s
RUWE (>1.4 is poor) : 0.91
K magnitude          : 8.487
G magnitude          : 13.786
RP magnitude         : 12.436
BP magnitude         : 15.922
DUPflag             : 0
Distance (au)       : 4.398
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -12.23
Sun-Target sep (deg) : 148.97
Sun-Moon sep (deg)  : 105.51
B (ring opening deg) : -2.61
PA of pole (deg)    : 0.57
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation ("): 6.931
C/A sky separation (km): 22107.4
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
    
```

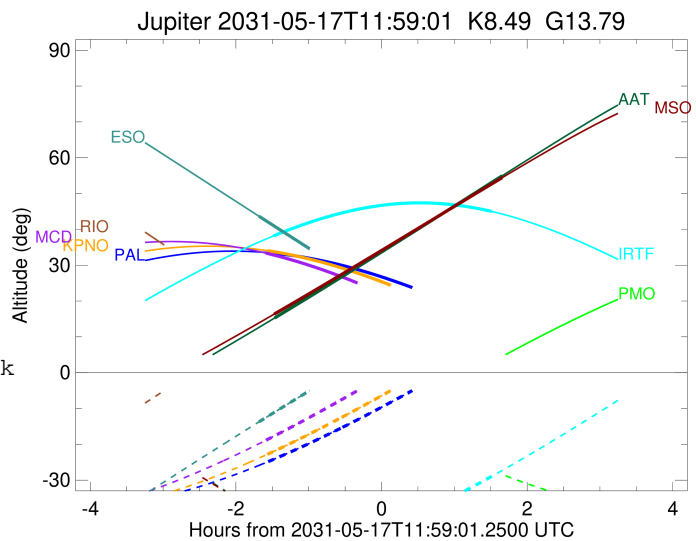
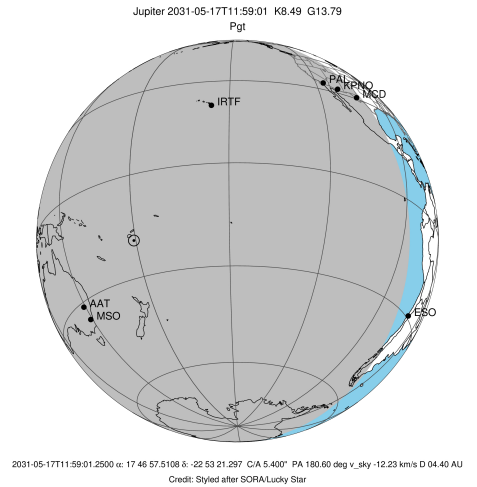


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-17T10:24:53.157	34.05	-22.81	71491.1	18.29	20.69
Jupiter	E	2031-05-17T13:25:42.429	12.34	10.65x	71491.2	17.46	19.77

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-17T11:54:16.100
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      : 4068936365724490496
2Mass ID (if available) : 17465751-2253211
ICRS Star Coord at Epoch: 17h 46m 57.51078s -22:53:21.29669s
RUWE (>1.4 is poor) : 0.91
K magnitude          : 8.487
G magnitude          : 13.786
RP magnitude         : 12.436
BP magnitude         : 15.922
DUPflag             : 0
Distance (au)       : 4.398
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -12.23
Sun-Target sep (deg) : 148.97
Sun-Moon sep (deg)  : 105.49
B (ring opening deg) : -2.61
PA of pole (deg)    : 0.57
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation ("): 6.850
C/A sky separation (km): 21851.1
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
    
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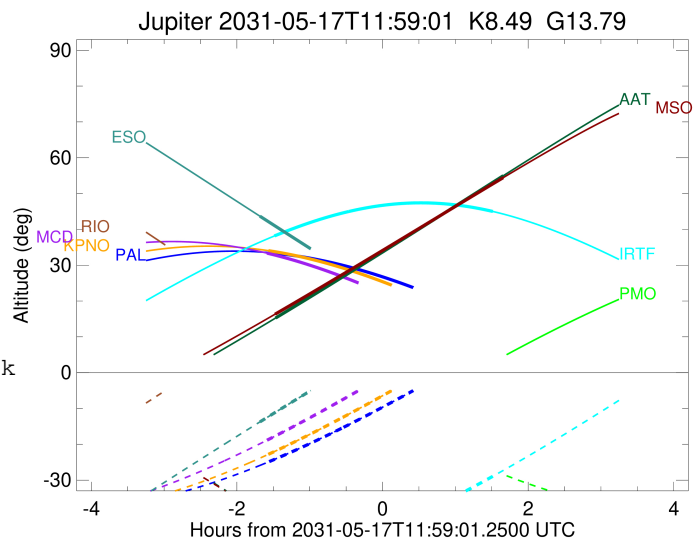
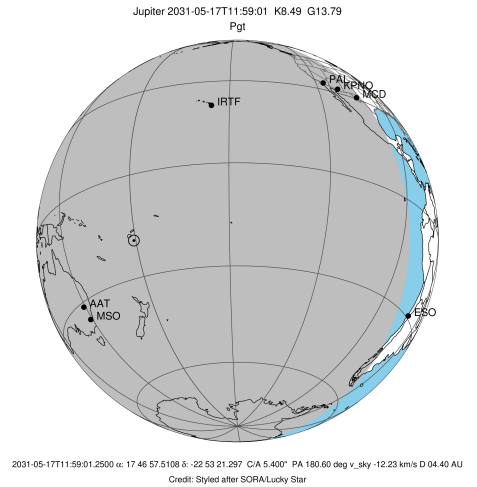


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-17T10:23:52.346	33.36	-18.85	71491.1	18.16	20.54
Jupiter	E	2031-05-17T13:25:17.761	7.82	16.51x	71491.2	17.18	19.45

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-17T12:00:05.700
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      : 4068936365724490496
2Mass ID (if available) : 17465751-2253211
ICRS Star Coord at Epoch: 17h 46m 57.51078s -22:53:21.29669s
RUWE (>1.4 is poor) : 0.91
K magnitude          : 8.487
G magnitude          : 13.786
RP magnitude         : 12.436
BP magnitude         : 15.922
DUPflag             : 0
Distance (au)       : 4.398
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -12.23
Sun-Target sep (deg) : 148.97
Sun-Moon sep (deg)  : 105.62
B (ring opening deg) : -2.61
PA of pole (deg)    : 0.57
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 6.758
C/A sky separation (km) : 21555.1
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
    
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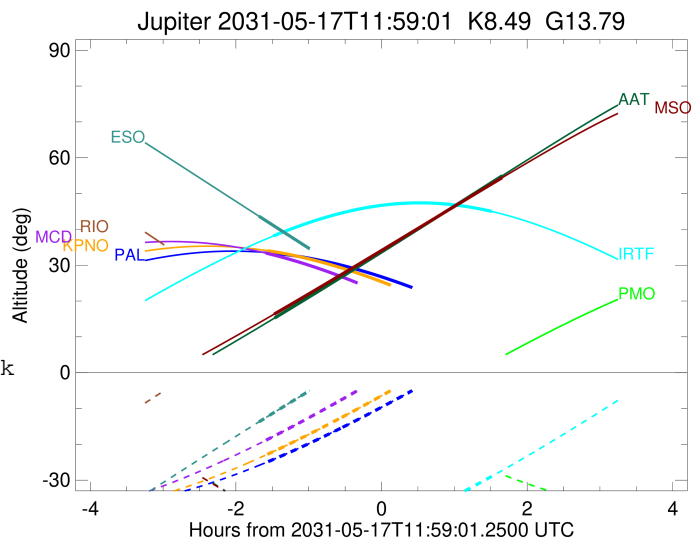
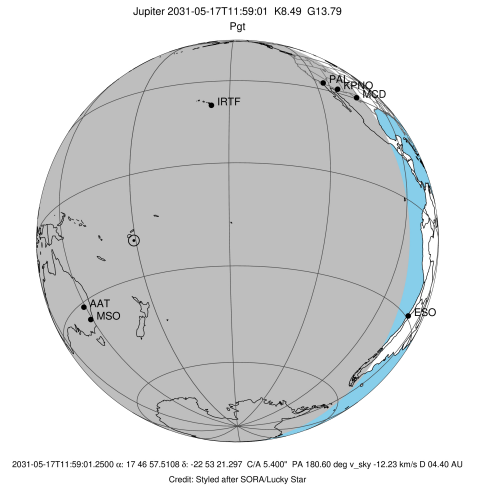


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-17T10:30:03.958	38.17	-50.86	71491.2	17.30	19.59
Jupiter	E	2031-05-17T13:29:50.849	45.00	-28.94	71491.2	17.46	19.77

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-17T11:51:54.840
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      : 4068936365724490496
2Mass ID (if available) : 17465751-2253211
ICRS Star Coord at Epoch: 17h 46m 57.51078s -22:53:21.29669s
RUWE (>1.4 is poor) : 0.91
K magnitude          : 8.487
G magnitude          : 13.786
RP magnitude         : 12.436
BP magnitude         : 15.922
DUPflag             : 0
Distance (au)       : 4.398
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -12.23
Sun-Target sep (deg) : 148.97
Sun-Moon sep (deg)  : 105.54
B (ring opening deg) : -2.61
PA of pole (deg)    : 0.57
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 4.705
C/A sky separation (km) : 15007.0
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
    
```

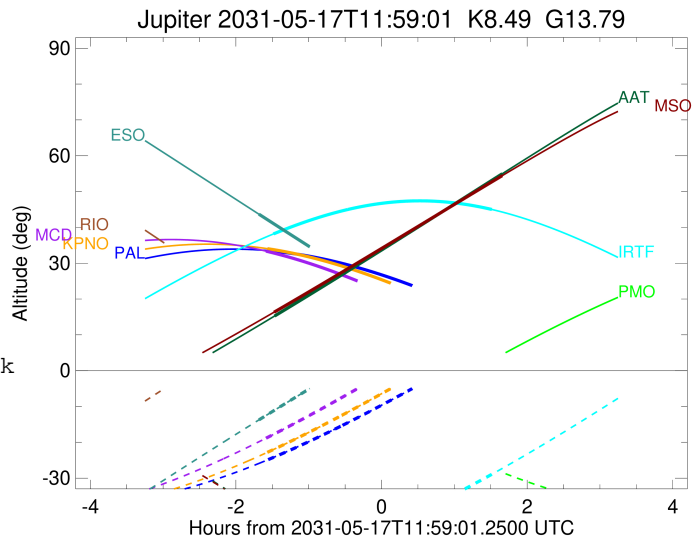
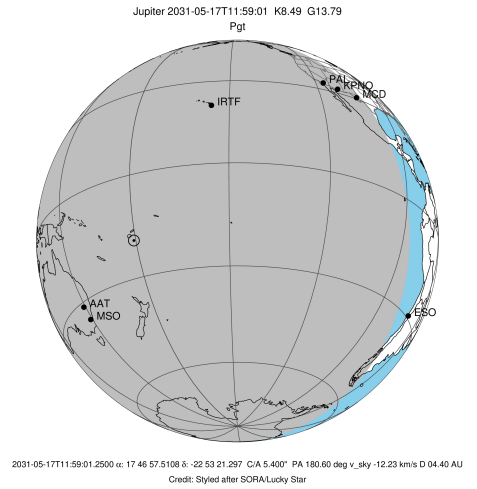


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-17T10:17:56.198	43.69	-13.76	71491.5	12.78	14.53
Jupiter	E	2031-05-17T13:26:58.310	3.74x	22.92x	71491.6	11.34	12.91

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-17T12:05:19.680
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        : 4068936365724490496
2Mass ID (if available) : 17465751-2253211
ICRS Star Coord at Epoch: 17h 46m 57.51078s -22:53:21.29669s
RUWE (>1.4 is poor) : 0.91
K magnitude           : 8.487
G magnitude           : 13.786
RP magnitude          : 12.436
BP magnitude          : 15.922
DUPflag              : 0
Distance (au)         : 4.398
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -12.23
Sun-Target sep (deg)  : 148.97
Sun-Moon sep (deg)    : 105.30
B (ring opening deg) : -2.61
PA of pole (deg)      : 0.57
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 4.765
C/A sky separation (km) : 15199.4
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
    
```

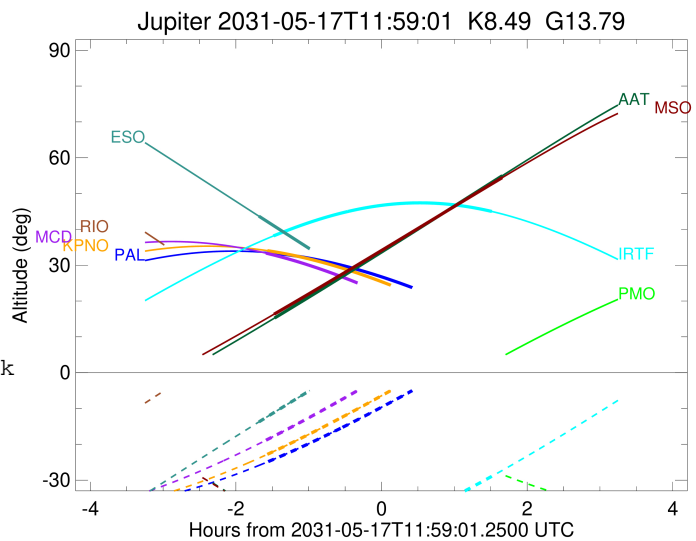
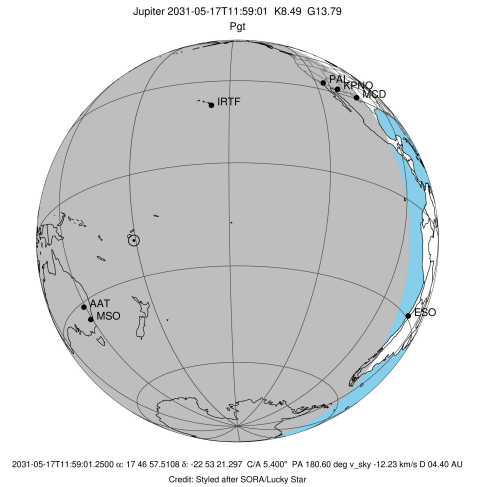


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-17T10:30:52.623	15.24	-41.68	71491.6	11.61	13.21
Jupiter	E	2031-05-17T13:38:35.311	54.97	-77.29	71491.5	12.78	14.53

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-17T12:05:03.060
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        : 4068936365724490496
2Mass ID (if available) : 17465751-2253211
ICRS Star Coord at Epoch: 17h 46m 57.51078s -22:53:21.29669s
RUWE (>1.4 is poor) : 0.91
K magnitude           : 8.487
G magnitude           : 13.786
RP magnitude          : 12.436
BP magnitude          : 15.922
DUPflag              : 0
Distance (au)         : 4.398
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -12.23
Sun-Target sep (deg) : 148.97
Sun-Moon sep (deg)   : 105.31
B (ring opening deg) : -2.61
PA of pole (deg)     : 0.57
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 4.642
C/A sky separation (km) : 14806.6
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	2031-05-17T10:30:26.472	16.31	-41.34	71491.6	11.31	12.88
Jupiter	E	2031-05-17T13:38:30.714	54.43	-73.50	71491.6	12.43	14.14