

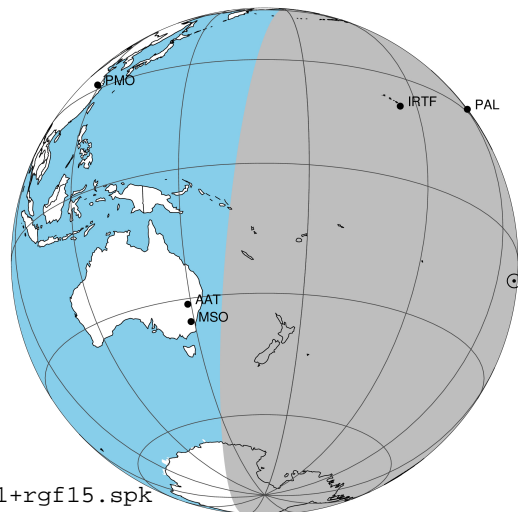
target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2031-09-03T07:06:38.020
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 4114549188915773568
 2Mass ID (if available) : 17130656-2245315

Jupiter 2031-09-03T07:06:38 K7.14 G12.32 Pgt

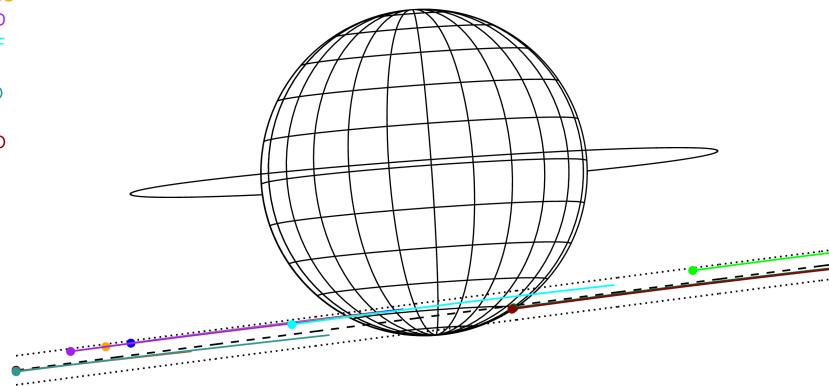
ICRS Star Coord at Epoch: 17h 13m 06.53535s -22:45:31.85870s

RUWE (>1.4 is poor) : 0.96
 K magnitude : 7.145
 G magnitude : 12.321
 RP magnitude : 10.946
 BP magnitude : 14.683
 DUPflag : 0
 Distance (au) : 4.999
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : 8.36
 Sun-Target sep (deg) : 99.03
 Sun-Moon sep (deg) : 106.57
 B (ring opening deg) : -2.41
 PA of pole (deg) : 4.20
 Pole direction: RA (deg): 268.05685
 Dec (deg): 64.49652
 C/A sky separation (") : 17.344
 C/A sky separation (km) : 62883.0
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk

Jupiter 2031-09-03T07:06:38 K7.14 G12.32
 Pgt



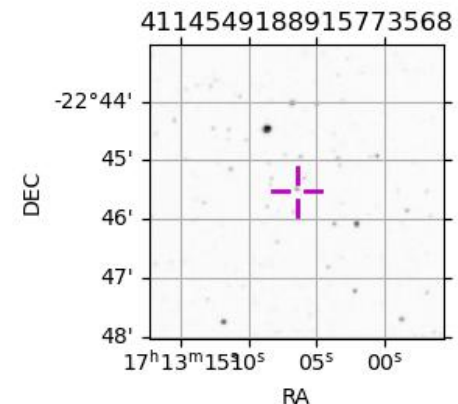
Earth
 PAL
 PMO
 KPNO
 MCD
 IRTF
 RIO
 ESO
 AAT
 MSO



2031-09-03T07:06:38.0200 α: 17 13 06.53535 δ: -22 45 31.859 C/A ***** PA 7.38 deg v_sky + 8.36 km/s D 05.00 AU
 Credit: Styled after SORA/Lucky Star

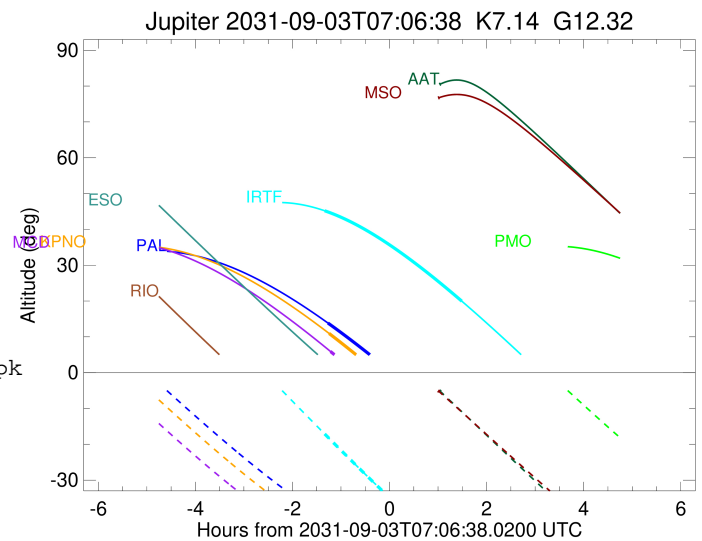
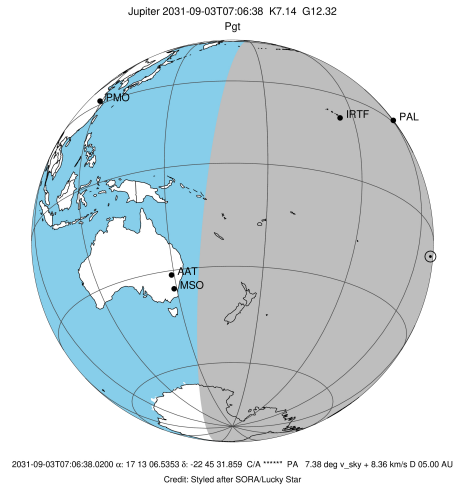
Observable events with sun below -5 deg and altitude above 5 deg

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	+	SEP 03 05:50 - SEP 03 05:50	Pin
PMO	Purple Mtn Obs. Nanking	32.1	118.8			Pnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+	SEP 03 05:51 - SEP 03 05:51	Pin
MCD	McDonald Obs. 2.7m	30.7	256.0	+	SEP 03 05:53 - SEP 03 05:53	Pin
TEN	Teide Obs./Tenerife	28.3	343.5			Pnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+ +	SEP 03 05:46 - SEP 03 08:36	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			Pnn
AAT	Siding Spring (AAT)	-31.3	149.1	+	SEP 03 08:09 - SEP 03 08:09	Pne
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8			Pnn
MSO	Mt. Stromlo Observatory	-35.3	149.0	+	SEP 03 08:08 - SEP 03 08:08	Pne



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-09-03T07:14:01.630
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        : 4114549188915773568
2Mass ID (if available) : 17130656-2245315
ICRS Star Coord at Epoch: 17h 13m 06.53535s -22:45:31.85870s
RUWE (>1.4 is poor) : 0.96
K magnitude           : 7.145
G magnitude           : 12.321
RP magnitude          : 10.946
BP magnitude          : 14.683
DUPflag              : 0
Distance (au)         : 4.999
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : 8.36
Sun-Target sep (deg)  : 99.03
Sun-Moon sep (deg)    : 106.81
B (ring opening deg) : -2.41
PA of pole (deg)      : 4.20
Pole direction: RA (deg): 268.05685
Dec (deg): 64.49652
C/A sky separation (" ) : 16.143
C/A sky separation (km) : 58528.2
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
    
```

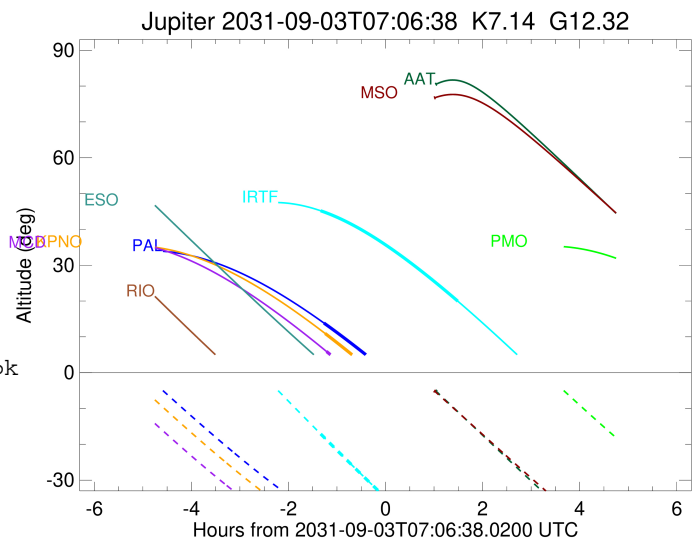
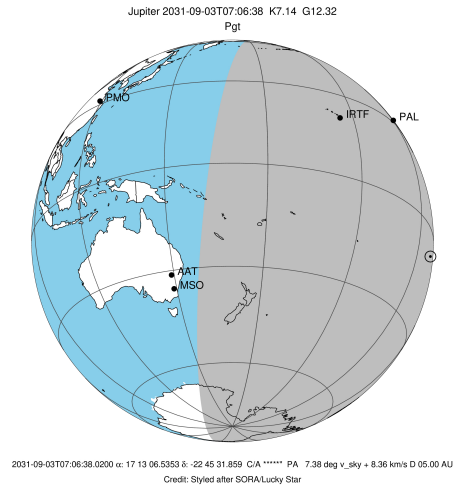


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-09-03T05:50:30.178	13.86	-40.72	71486.3	-57.27	-60.51
Jupiter	E	2031-09-03T08:36:02.091	-16.76x	-47.62	71486.9	-52.70	-56.18

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-09-03T07:14:20.220
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      : 4114549188915773568
2Mass ID (if available) : 17130656-2245315
ICRS Star Coord at Epoch: 17h 13m 06.53535s -22:45:31.85870s
RUWE (>1.4 is poor) : 0.96
K magnitude          : 7.145
G magnitude          : 12.321
RP magnitude         : 10.946
BP magnitude         : 14.683
DUPflag             : 0
Distance (au)       : 4.999
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : 8.36
Sun-Target sep (deg) : 99.03
Sun-Moon sep (deg)  : 106.76
B (ring opening deg) : -2.41
PA of pole (deg)    : 4.20
Pole direction: RA (deg): 268.05685
Dec (deg): 64.49652
C/A sky separation ("): 16.219
C/A sky separation (km): 58806.0
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
    
```

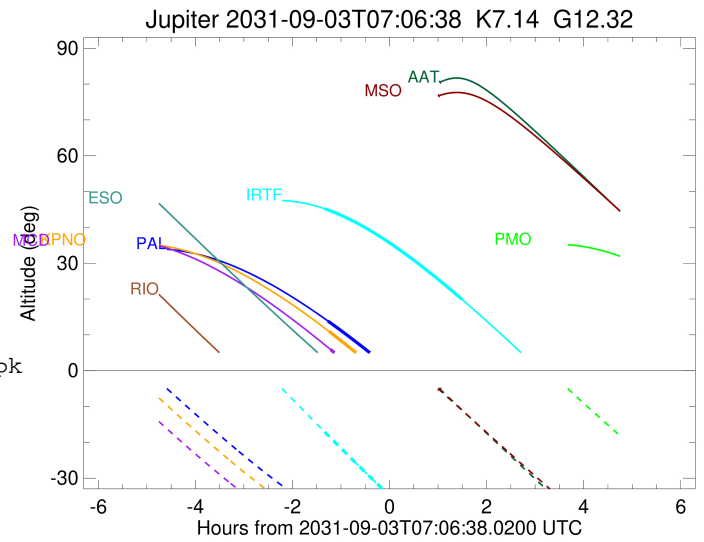
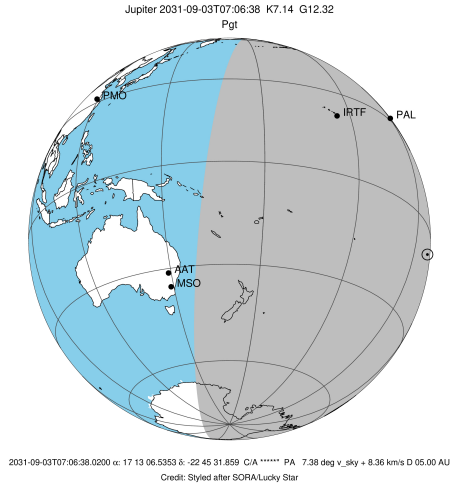


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-09-03T05:51:54.638	10.96	-44.66	71486.3	-57.58	-60.80
Jupiter	E	2031-09-03T08:35:14.650	-20.50x	-47.30	71486.9	-53.14	-56.60

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-09-03T07:14:34.380
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      : 4114549188915773568
2Mass ID (if available) : 17130656-2245315
ICRS Star Coord at Epoch: 17h 13m 06.53535s -22:45:31.85870s
RUWE (>1.4 is poor) : 0.96
K magnitude          : 7.145
G magnitude          : 12.321
RP magnitude         : 10.946
BP magnitude         : 14.683
DUPflag             : 0
Distance (au)       : 4.999
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : 8.36
Sun-Target sep (deg) : 99.03
Sun-Moon sep (deg)  : 106.68
B (ring opening deg) : -2.41
PA of pole (deg)    : 4.20
Pole direction: RA (deg): 268.05685
Dec (deg): 64.49652
C/A sky separation ("): 16.321
C/A sky separation (km): 59176.0
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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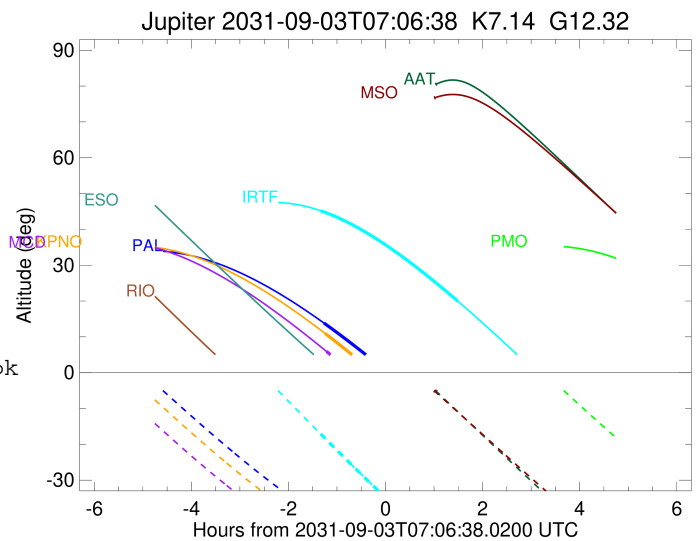
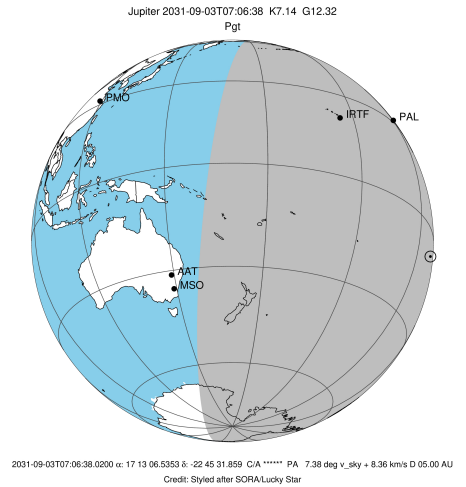


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-09-03T05:53:41.051	5.92	-49.11	71486.2	-58.01	-61.21
Jupiter	E	2031-09-03T08:33:58.063	-26.24x	-45.22	71486.8	-53.70	-57.14

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-09-03T07:11:51.010
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        : 4114549188915773568
2Mass ID (if available) : 17130656-2245315
ICRS Star Coord at Epoch: 17h 13m 06.53535s -22:45:31.85870s
RUWE (>1.4 is poor) : 0.96
K magnitude           : 7.145
G magnitude           : 12.321
RP magnitude          : 10.946
BP magnitude          : 14.683
DUPflag              : 0
Distance (au)         : 4.999
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : 8.36
Sun-Target sep (deg)  : 99.03
Sun-Moon sep (deg)   : 107.27
B (ring opening deg) : -2.41
PA of pole (deg)     : 4.20
Pole direction: RA (deg): 268.05685
Dec (deg): 64.49652
C/A sky separation (") : 16.164
C/A sky separation (km) : 58606.7
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
    
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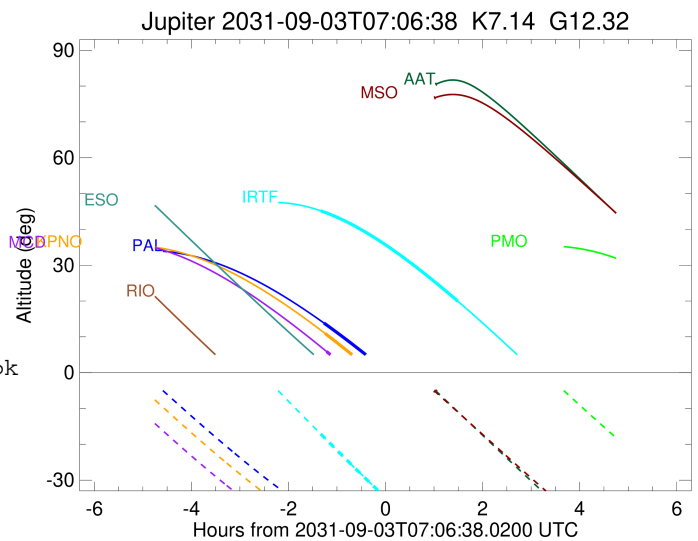
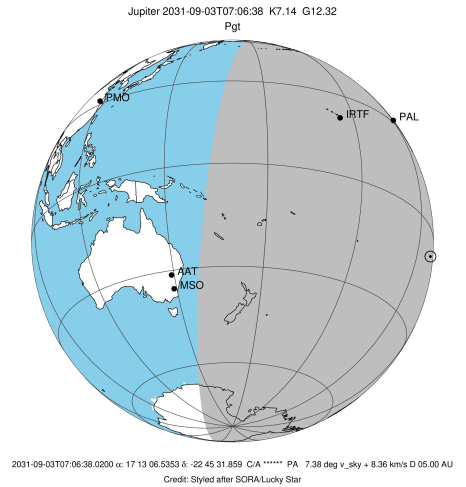


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-09-03T05:46:29.014	45.19	-17.10	71486.2	-58.02	-61.21
Jupiter	E	2031-09-03T08:36:02.418	19.95	-52.38	71487.0	-52.42	-55.91

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-09-03T07:04:36.610
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       : 4114549188915773568
2Mass ID (if available) : 17130656-2245315
ICRS Star Coord at Epoch: 17h 13m 06.53535s -22:45:31.85870s
RUWE (>1.4 is poor) : 0.96
K magnitude           : 7.145
G magnitude           : 12.321
RP magnitude          : 10.946
BP magnitude          : 14.683
DUPflag              : 0
Distance (au)        : 4.999
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : 8.36
Sun-Target sep (deg) : 99.03
Sun-Moon sep (deg)   : 107.36
B (ring opening deg) : -2.41
PA of pole (deg)     : 4.20
Pole direction: RA (deg): 268.05685
Dec (deg): 64.49652
C/A sky separation (") : 17.706
C/A sky separation (km) : 64194.2
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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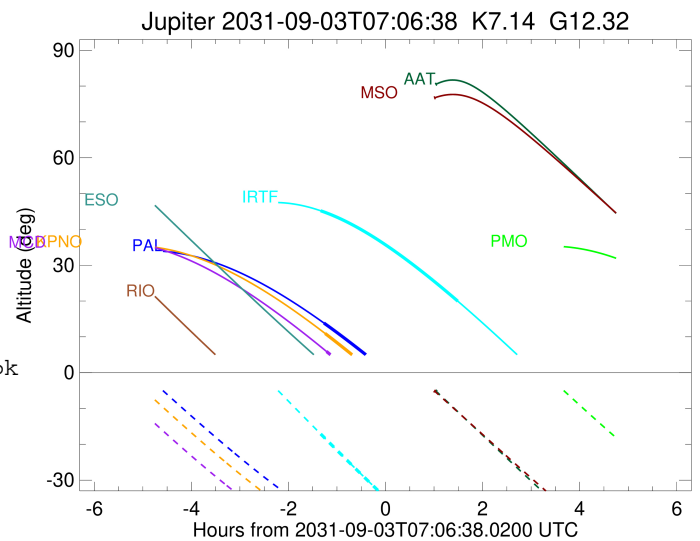
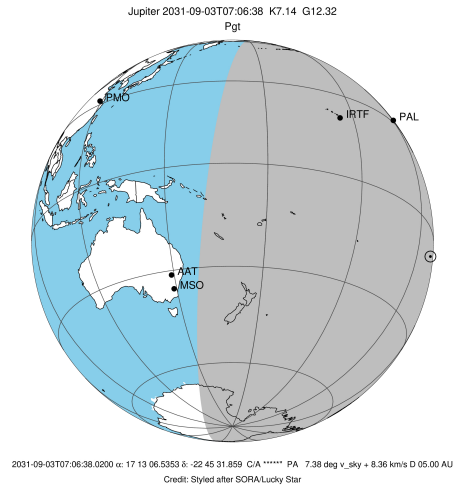


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-09-03T05:59:28.062	55.61	21.59x	71485.1	-67.81	-70.24
Jupiter	E	2031-09-03T08:09:54.170	80.59	-5.33	71486.0	-60.03	-63.09

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-09-03T07:04:49.700
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      : 4114549188915773568
2Mass ID (if available) : 17130656-2245315
ICRS Star Coord at Epoch: 17h 13m 06.53535s -22:45:31.85870s
RUWE (>1.4 is poor) : 0.96
K magnitude          : 7.145
G magnitude          : 12.321
RP magnitude         : 10.946
BP magnitude         : 14.683
DUPflag             : 0
Distance (au)       : 4.999
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : 8.36
Sun-Target sep (deg) : 99.03
Sun-Moon sep (deg)  : 107.36
B (ring opening deg) : -2.41
PA of pole (deg)    : 4.20
Pole direction: RA (deg): 268.05685
Dec (deg): 64.49652
C/A sky separation (") : 17.821
C/A sky separation (km) : 64613.5
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	2031-09-03T06:01:35.631	55.47	19.56x	71485.1	-68.54	-70.90
Jupiter	E	2031-09-03T08:08:11.461	76.77	-5.32	71485.9	-60.82	-63.83