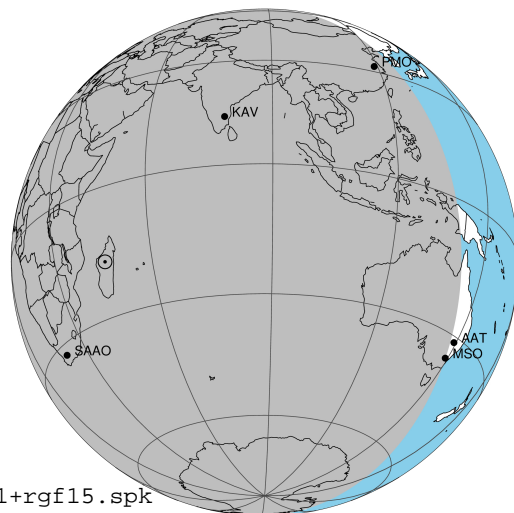


target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2031-05-09T20:49:05.620
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 4068877915467340672
 2Mass ID (if available) : 17494189-2253421

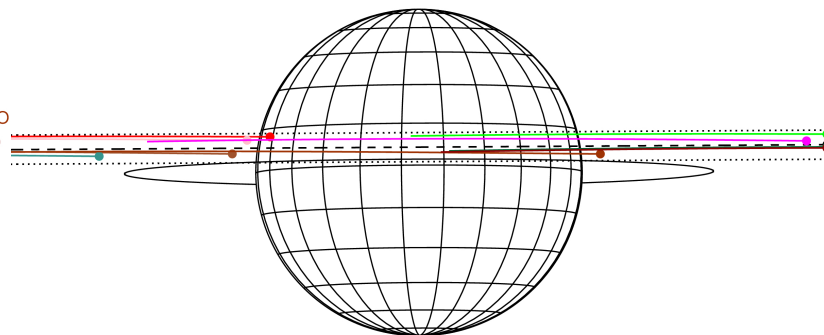
Jupiter 2031-05-09T20:49:05 K6.48 G11.97 Pgt

ICRS Star Coord at Epoch: 17h 49m 41.89827s -22:53:42.18169s
 RUWE (>1.4 is poor) : 0.76
 K magnitude : 6.479
 G magnitude : 11.975
 RP magnitude : 10.604
 BP magnitude : 14.286
 DUPflag : 0
 Distance (au) : 4.470
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -9.85
 Sun-Target sep (deg) : 140.97
 Sun-Moon sep (deg) : 2.69
 B (ring opening deg) : -2.61
 PA of pole (deg) : 0.27
 Pole direction: RA (deg): 268.05695
 Dec (deg): 64.49651
 C/A sky separation (") : 3.425
 C/A sky separation (km) : 11103.8
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl1.spk
 naif0012.tls
 nep097.bsp
 nep101.bsp
 sat4401.bsp



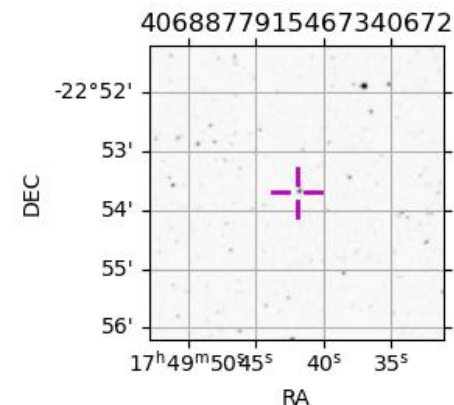
2031-05-09T20:49:05.6200 at: 17 49 41.8983 s -22 53 42.182 C/A 3.413° PA 180.35 deg v_sky - 9.85 km/s D 04.47 AU
 Credit: Styled after SORA/Lucky Star

Earth
 PIC
 PMO
 TEN
 KAV
 RIO
 ESO
 AAT
 SAAO
 MSO



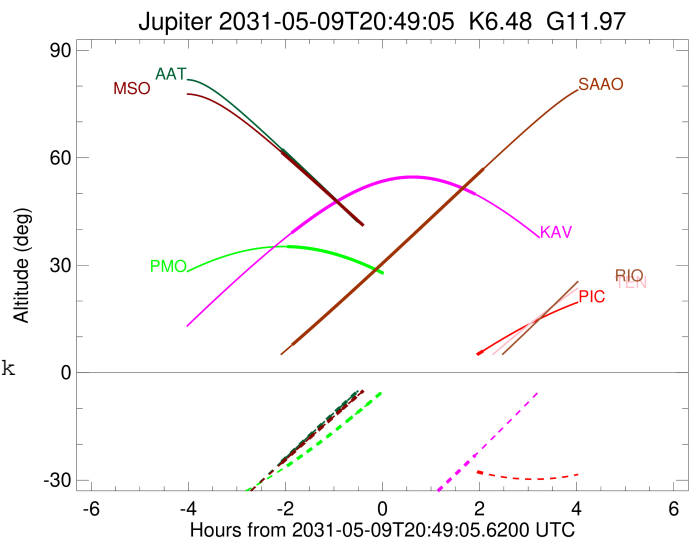
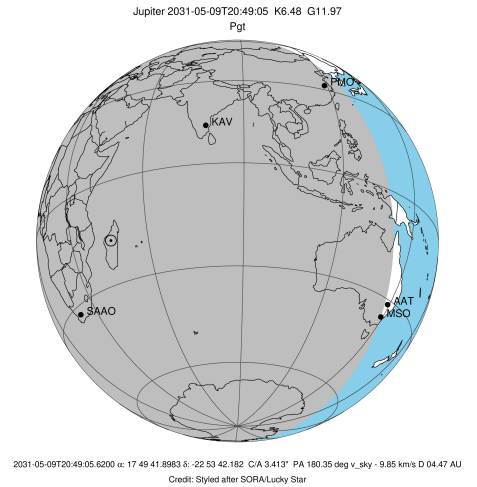
Observable events with sun below -5 deg and altitude above 5 deg

Obs	Location	lat	Elon	Target	Observed Events Interval	OCode
PIC	Pic du Midi	42.9	0.1	+	MAY 09 22:53 - MAY 09 22:53	Pne
PAL	Palomar Mt (200")	33.4	243.1			Pnn
PMO	Purple Mtn Obs. Nanking	32.1	118.8	+	MAY 09 18:51 - MAY 09 18:51	Pin
KPNO	Kitt Peak Natl Obs	32.0	248.4			Pnn
MCD	McDonald Obs. 2.7m	30.7	256.0			Pnn
TEN	Teide Obs./Tenerife	28.3	343.5			Pnn
IRTF	Mauna Kea/IRTF	19.8	204.5			Pnn
KAV	Kavalur Observatory	12.6	78.8	+ +	MAY 09 18:56 - MAY 09 22:43	Pie
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	+	MAY 09 18:44 - MAY 09 18:44	Pin
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8	+ +	MAY 09 18:57 - MAY 09 22:54	Pie
MSO	Mt. Stromlo Observatory	-35.3	149.0	+	MAY 09 18:44 - MAY 09 18:44	Pin



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-09T20:56:40.010
Event type          : Pgt
                    : Jupiter occs: geocentric, topocentric
                    : Not a ringed target
Observer code       : PIC
Location            : Pic du Midi
Latitude (deg)      : 42.93656
E. Longitude (deg)  : 0.14231
Altitude (km)       : 2.890
Gaia source ID      : 4068877915467340672
2Mass ID (if available) : 17494189-2253421
ICRS Star Coord at Epoch: 17h 49m 41.89827s -22:53:42.18169s
RUWE (>1.4 is poor) : 0.76
K magnitude          : 6.479
G magnitude          : 11.975
RP magnitude         : 10.604
BP magnitude         : 14.286
DUPflag             : 0
Distance (au)       : 4.470
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -9.85
Sun-Target sep (deg) : 140.97
Sun-Moon sep (deg)  : 1.72
B (ring opening deg) : -2.61
PA of pole (deg)    : 0.27
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation (" ) : 4.688
C/A sky separation (km) : 15199.1
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
    
```

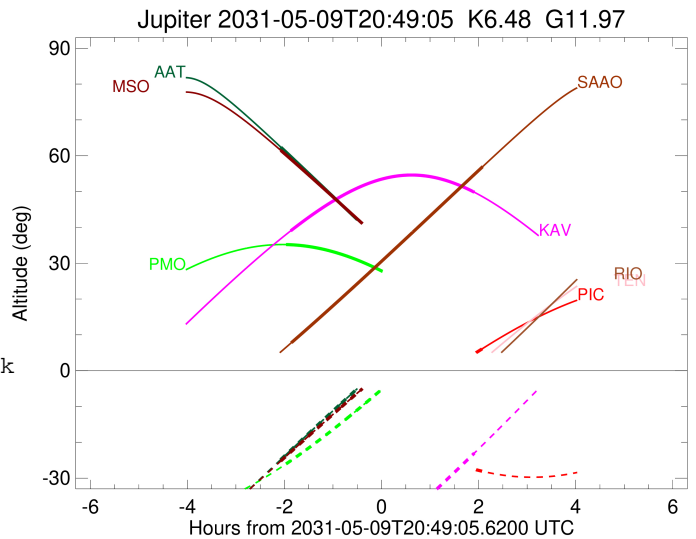
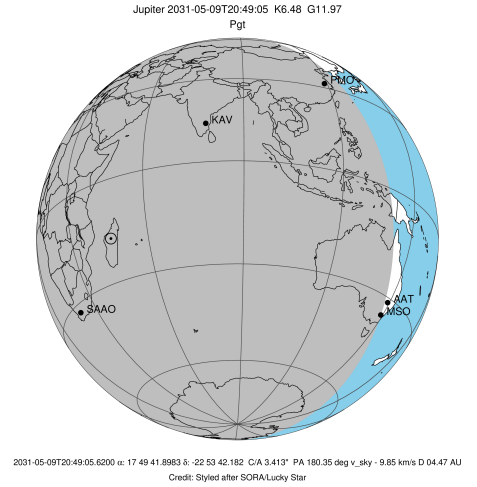


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-09T18:57:32.522	-34.09x	1.00x	71491.6	11.59	13.19
Jupiter	E	2031-05-09T22:53:27.795	6.09	-28.07	71491.5	12.90	14.67

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-09T20:44:47.700
Event type          : Pgt
                    : Jupiter occs: geocentric, topocentric
                    : Not a ringed target
Observer code       : PMO
Location            : Purple Mtn Obs. Nanking
Latitude (deg)      : 32.06667
E. Longitude (deg)  : 118.82089
Altitude (km)       : 0.364
Gaia source ID      : 4068877915467340672
2Mass ID (if available) : 17494189-2253421
ICRS Star Coord at Epoch: 17h 49m 41.89827s -22:53:42.18169s
RUWE (>1.4 is poor) : 0.76
K magnitude          : 6.479
G magnitude          : 11.975
RP magnitude         : 10.604
BP magnitude         : 14.286
DUPflag             : 0
Distance (au)       : 4.470
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -9.85
Sun-Target sep (deg) : 140.97
Sun-Moon sep (deg)  : 2.57
B (ring opening deg) : -2.61
PA of pole (deg)    : 0.27
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation ("): 4.949
C/A sky separation (km): 16044.0
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
    
```

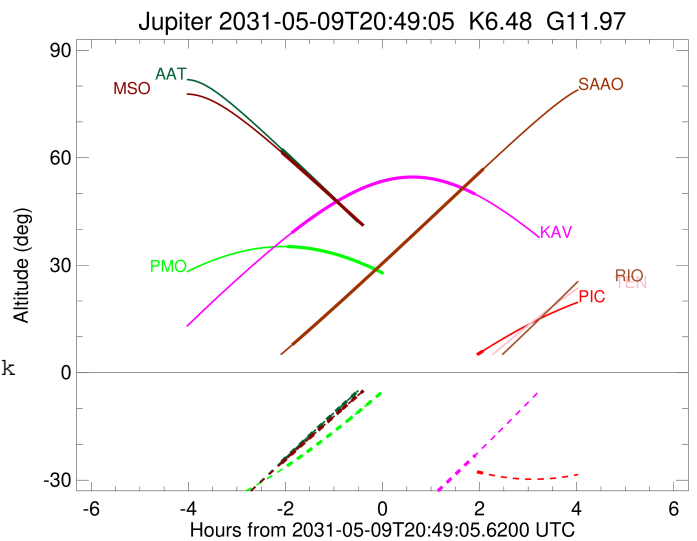
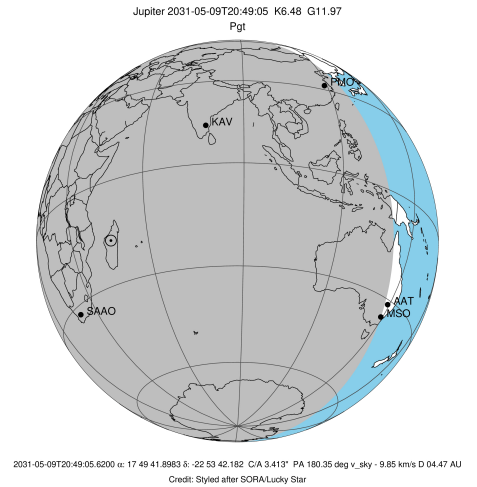


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-09T18:51:00.026	35.19	-26.05	71491.5	13.25	15.06
Jupiter	E	2031-05-09T22:39:21.727	11.84	17.05x	71491.6	12.28	13.98

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-09T20:50:40.570
Event type            : Pgt
: Jupiter occs: geocentric, topocentric
: Not a ringed target
Observer code         : KAV
Location              : Kavalur Observatory
Latitude (deg)        : 12.57556
E. Longitude (deg)    : 78.83167
Altitude (km)         : 0.722
Gaia source ID        : 4068877915467340672
2Mass ID (if available) : 17494189-2253421
ICRS Star Coord at Epoch: 17h 49m 41.89827s -22:53:42.18169s
RUWE (>1.4 is poor) : 0.76
K magnitude           : 6.479
G magnitude           : 11.975
RP magnitude          : 10.604
BP magnitude          : 14.286
DUPflag              : 0
Distance (au)         : 4.470
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -9.85
Sun-Target sep (deg)  : 140.97
Sun-Moon sep (deg)    : 2.20
B (ring opening deg) : -2.61
PA of pole (deg)     : 0.27
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation (") : 4.554
C/A sky separation (km) : 14766.0
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
    
```

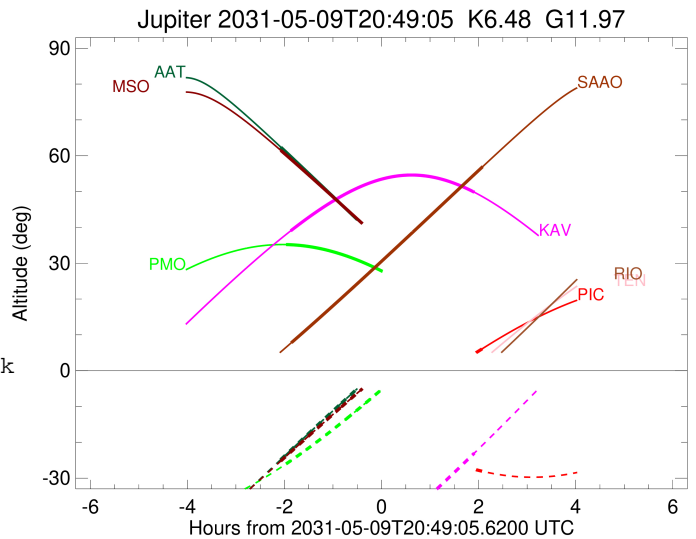
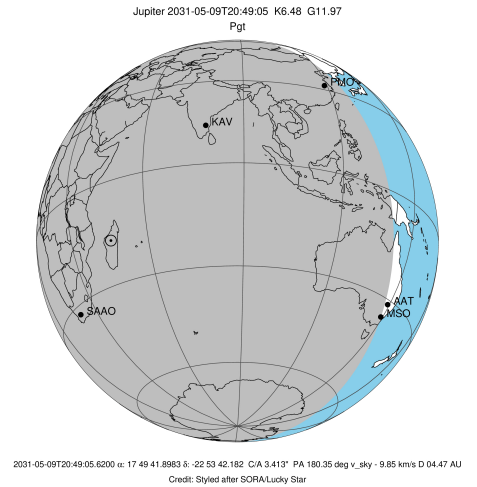


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-09T18:56:50.098	39.02	-59.80	71491.6	11.59	13.20
Jupiter	E	2031-05-09T22:43:52.142	49.80	-23.01	71491.6	11.75	13.37

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-09T20:41:22.440
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       : 4068877915467340672
2Mass ID (if available) : 17494189-2253421
ICRS Star Coord at Epoch: 17h 49m 41.89827s -22:53:42.18169s
RUWE (>1.4 is poor) : 0.76
K magnitude           : 6.479
G magnitude           : 11.975
RP magnitude         : 10.604
BP magnitude         : 14.286
DUPflag              : 0
Distance (au)        : 4.470
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -9.85
Sun-Target sep (deg) : 140.97
Sun-Moon sep (deg)   : 3.48
B (ring opening deg) : -2.61
PA of pole (deg)     : 0.27
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation ("): 2.831
C/A sky separation (km): 9178.8
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
    
```

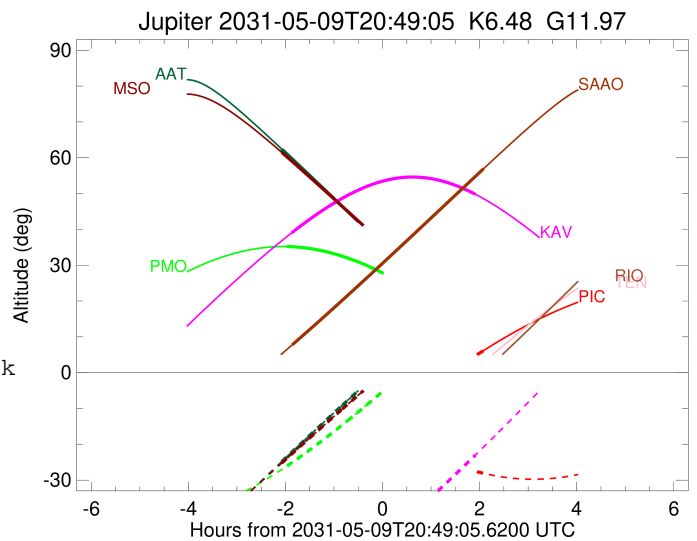
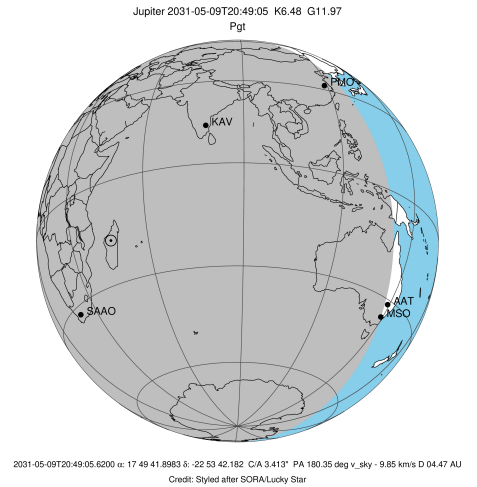


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-09T18:44:31.760	62.41	-24.82	71491.8	8.05	9.18
Jupiter	E	2031-05-09T22:39:54.716	12.64	21.64x	71491.9	6.45	7.36

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-09T20:57:10.020
Event type          : Pgt
                    : Jupiter occs: geocentric, topocentric
                    : Not a ringed target
Observer code       : SAAO
Location            : So. Afr. Astro. Obs. (Sutherland)
Latitude (deg)      : -32.37953
E. Longitude (deg)  : 20.81070
Altitude (km)       : 1.768
Gaia source ID      : 4068877915467340672
2Mass ID (if available) : 17494189-2253421
ICRS Star Coord at Epoch: 17h 49m 41.89827s -22:53:42.18169s
RUWE (>1.4 is poor) : 0.76
K magnitude          : 6.479
G magnitude          : 11.975
RP magnitude         : 10.604
BP magnitude         : 14.286
DUPflag             : 0
Distance (au)       : 4.470
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -9.85
Sun-Target sep (deg) : 140.97
Sun-Moon sep (deg)  : 2.60
B (ring opening deg) : -2.61
PA of pole (deg)    : 0.27
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation (" ) : 2.726
C/A sky separation (km) : 8838.2
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
    
```

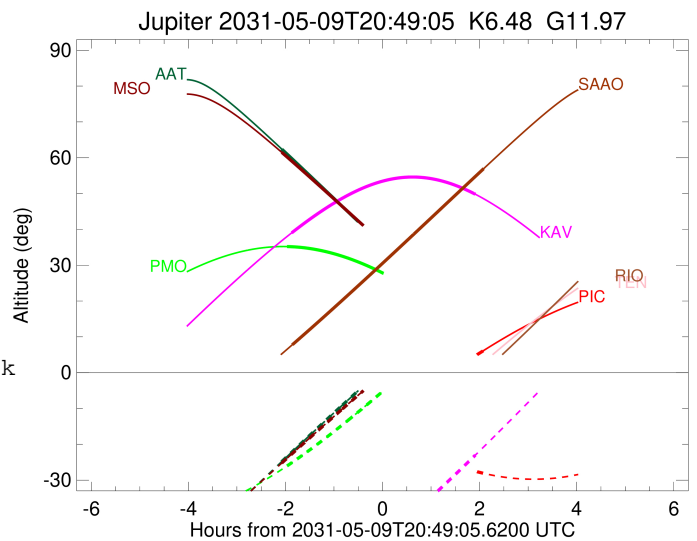
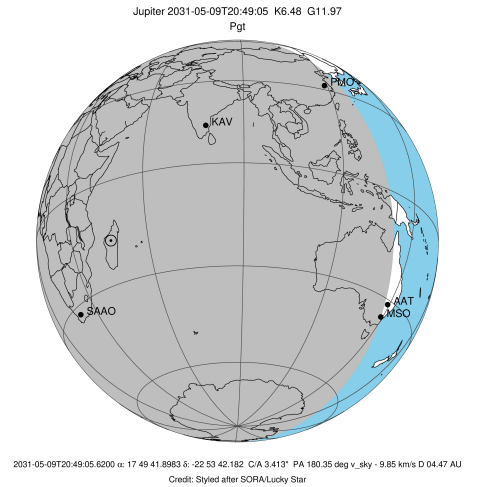


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-09T18:57:45.651	7.82	-39.49	71491.9	6.31	7.20
Jupiter	E	2031-05-09T22:54:09.220	56.94	-74.55	71491.8	7.68	8.77

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-09T20:41:42.610
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        : 4068877915467340672
2Mass ID (if available) : 17494189-2253421
ICRS Star Coord at Epoch: 17h 49m 41.89827s -22:53:42.18169s
RUWE (>1.4 is poor) : 0.76
K magnitude           : 6.479
G magnitude           : 11.975
RP magnitude          : 10.604
BP magnitude          : 14.286
DUPflag              : 0
Distance (au)         : 4.470
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -9.85
Sun-Target sep (deg)  : 140.97
Sun-Moon sep (deg)    : 3.50
B (ring opening deg) : -2.61
PA of pole (deg)      : 0.27
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation (" ) : 2.709
C/A sky separation (km) : 8782.9
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	2031-05-09T18:44:38.335	61.48	-25.21	71491.8	7.70	8.79
Jupiter	E	2031-05-09T22:40:23.538	13.90	19.16x	71491.9	6.16	7.04