

target : Jupiter  
 target radius (km) : 71492.00  
 C/A epoch : 2031-05-16T16:56:09.730  
 Event type : Pgt  
 : Jupiter occs: geocentric, topocentric  
 : Not a ringed target  
 Gaia source ID : 4068933616895171200  
 2Mass ID (if available) : 17471635-2253218

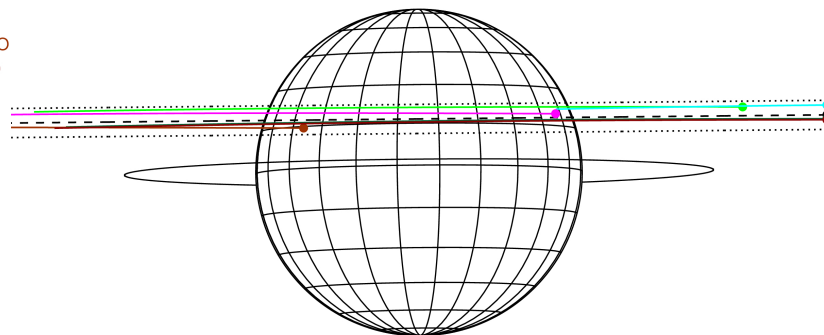
Jupiter 2031-05-16T16:56:09 K9.15 G14.66 Pgt

ICRS Star Coord at Epoch: 17h 47m 16.34133s -22:53:22.02091s  
 RUWE (>1.4 is poor) : 0.94  
 K magnitude : 9.150  
 G magnitude : 14.661  
 RP magnitude : 13.238  
 BP magnitude : 17.051  
 DUPflag : 0  
 Distance (au) : 4.405  
 f0 (km) : 0.00  
 g0 (km) : 0.00  
 skyplane vel. (km/s) : -12.00  
 Sun-Target sep (deg) : 148.13  
 Sun-Moon sep (deg) : 94.60  
 B (ring opening deg) : -2.61  
 PA of pole (deg) : 0.53  
 Pole direction: RA (deg): 268.05694  
 Dec (deg): 64.49651  
 C/A sky separation (") : 7.344  
 C/A sky separation (km) : 23462.7  
 NAIF SPICE kernels : RAJobs\_U111+rgf15.spk  
 URKALLv1.spk  
 naif0012.tls  
 nep097.bsp  
 nep101.bsp  
 sat4401.bsp



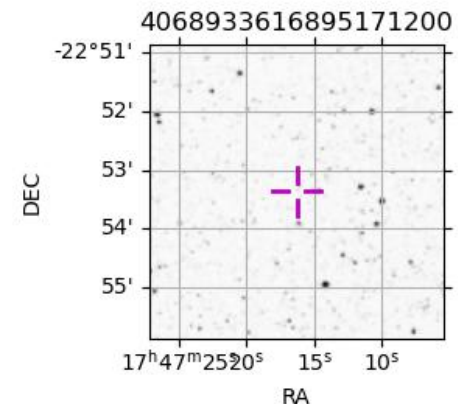
2031-05-16T16:56:09.7300 at: 17 47 16.3413 s: -22 53 22.021 C/A 7.332" PA 180.57 deg v\_sky -12.00 km/s D 04.40 AU  
 Credit: Styled after SORA/Lucky Star

Earth  
 PMO  
 IRTF  
 KAV  
 AAT  
 SAAO  
 MSO



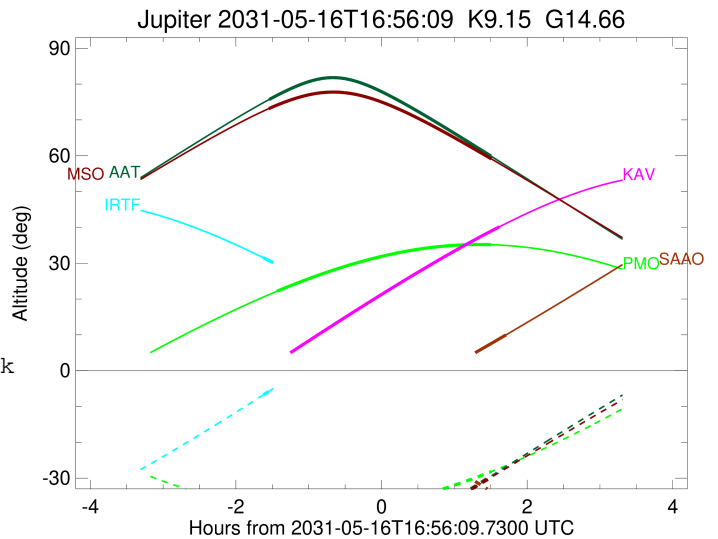
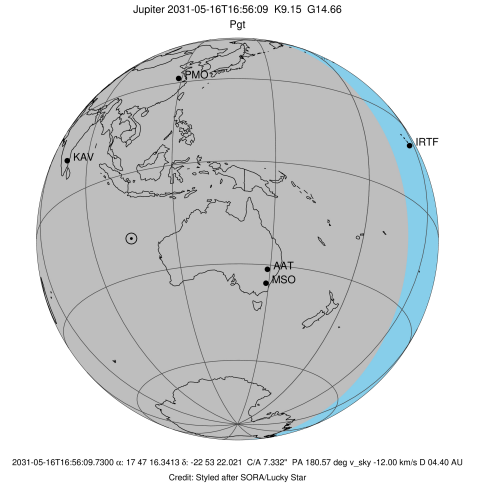
Observable events with sun below -5 deg and altitude above 5 deg

Obs	Location	lat	Elon	Target	Observed Events Interval	OCode
PIC	Pic du Midi	42.9	0.1			Pnn
PAL	Palomar Mt (200")	33.4	243.1			Pnn
PMO	Purple Mtn Obs. Nanking	32.1	118.8	+ +	MAY 16 15:29 - MAY 16 18:26	Pie
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	+	MAY 16 15:18 - MAY 16 15:18	Pin
KAV	Kavalur Observatory	12.6	78.8	+	MAY 16 18:33 - MAY 16 18:33	Pne
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 16 15:23 - MAY 16 18:26	Pie
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8	+	MAY 16 18:38 - MAY 16 18:38	Pne
MSO	Mt. Stromlo Observatory	-35.3	149.0	+ +	MAY 16 15:23 - MAY 16 18:26	Pie



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target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-16T16:58:33.550
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      : 4068933616895171200
2Mass ID (if available) : 17471635-2253218
ICRS Star Coord at Epoch: 17h 47m 16.34133s -22:53:22.02091s
RUWE (>1.4 is poor) : 0.94
K magnitude          : 9.150
G magnitude          : 14.661
RP magnitude         : 13.238
BP magnitude         : 17.051
DUPflag             : 0
Distance (au)       : 4.405
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -12.00
Sun-Target sep (deg) : 148.13
Sun-Moon sep (deg)  : 95.08
B (ring opening deg) : -2.61
PA of pole (deg)    : 0.53
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (" ) : 8.932
C/A sky separation (km) : 28535.2
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
    
```

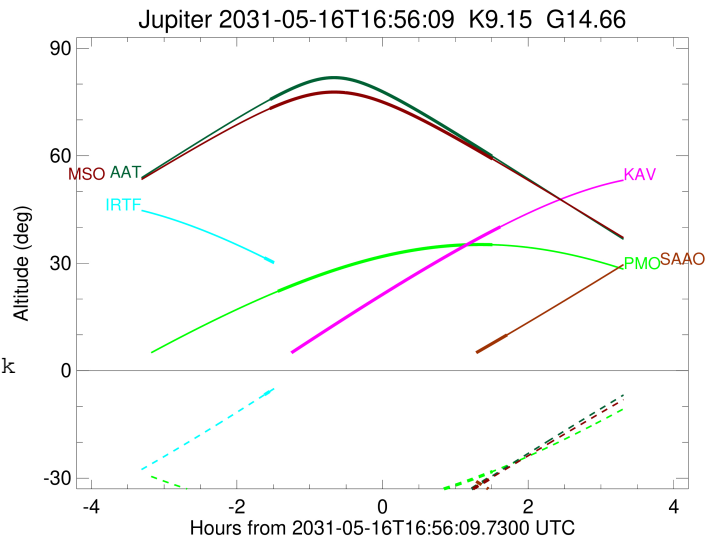
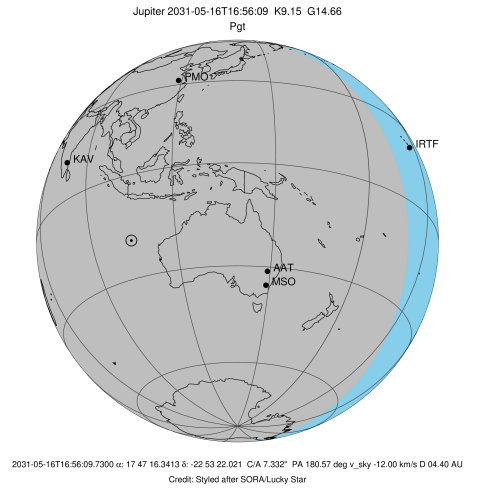


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-16T15:29:52.061	22.15	-38.41	71490.6	23.17	26.04
Jupiter	E	2031-05-16T18:26:46.642	35.15	-28.15	71490.5	23.57	26.48

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-16T16:49:10.020
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        : 4068933616895171200
2Mass ID (if available) : 17471635-2253218
ICRS Star Coord at Epoch: 17h 47m 16.34133s -22:53:22.02091s
RUWE (>1.4 is poor) : 0.94
K magnitude           : 9.150
G magnitude           : 14.661
RP magnitude          : 13.238
BP magnitude          : 17.051
DUPflag              : 0
Distance (au)         : 4.405
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -12.00
Sun-Target sep (deg)  : 148.13
Sun-Moon sep (deg)    : 94.89
B (ring opening deg)  : -2.61
PA of pole (deg)      : 0.53
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 8.300
C/A sky separation (km) : 26516.2
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
    
```

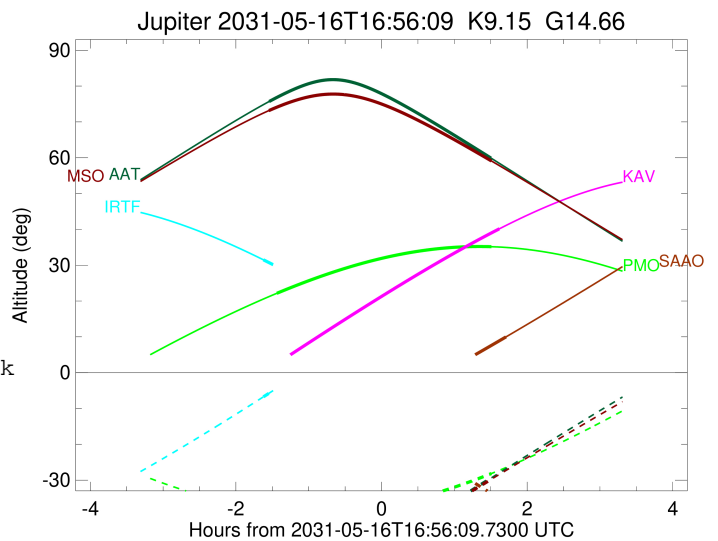
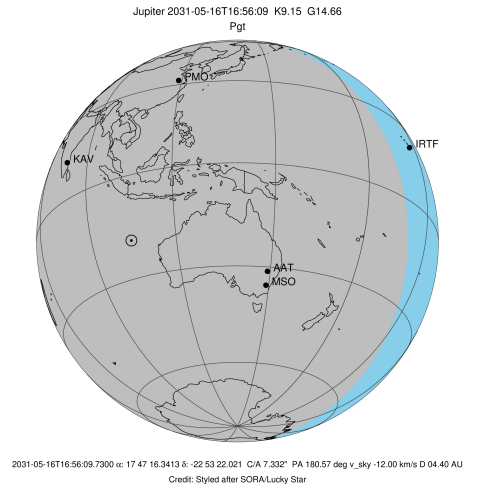


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-16T15:18:50.192	31.50	-6.75	71490.7	22.40	25.21
Jupiter	E	2031-05-16T18:20:29.719	-4.61x	34.25x	71490.8	20.94	23.61

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-16T17:03:06.480
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       : 4068933616895171200
2Mass ID (if available) : 17471635-2253218
ICRS Star Coord at Epoch: 17h 47m 16.34133s -22:53:22.02091s
RUWE (>1.4 is poor) : 0.94
K magnitude           : 9.150
G magnitude           : 14.661
RP magnitude          : 13.238
BP magnitude          : 17.051
DUPflag              : 0
Distance (au)         : 4.405
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -12.00
Sun-Target sep (deg)  : 148.13
Sun-Moon sep (deg)   : 94.88
B (ring opening deg) : -2.61
PA of pole (deg)     : 0.53
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 8.128
C/A sky separation (km) : 25967.4
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
    
```

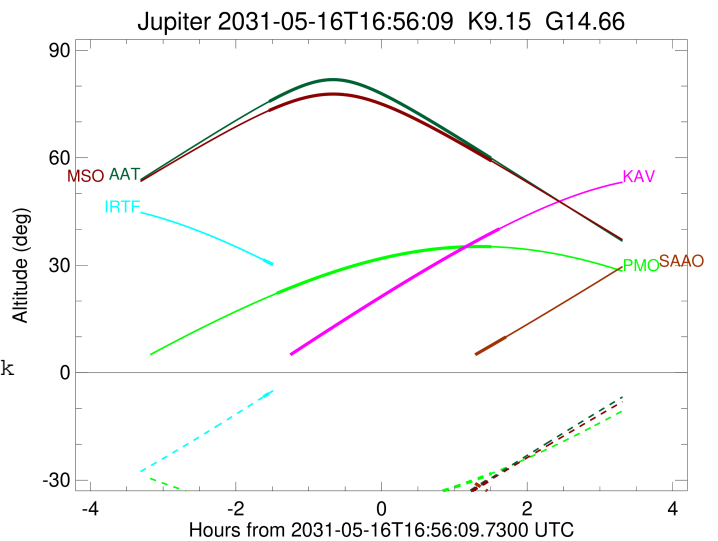
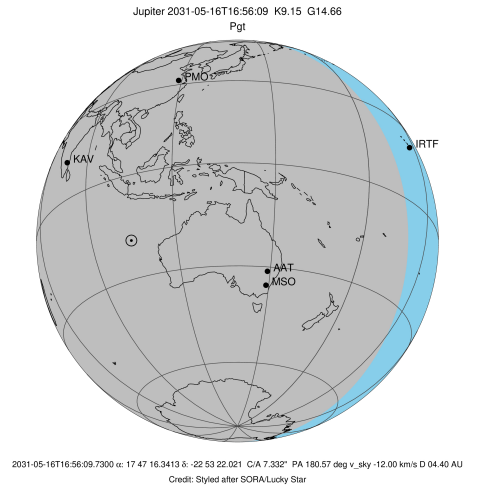


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-16T15:31:40.791	2.89x	-33.64	71490.9	20.53	23.16
Jupiter	E	2031-05-16T18:33:18.395	40.15	-58.27	71490.7	21.84	24.60

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-16T16:54:56.020
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        : 4068933616895171200
2Mass ID (if available) : 17471635-2253218
ICRS Star Coord at Epoch: 17h 47m 16.34133s -22:53:22.02091s
RUWE (>1.4 is poor) : 0.94
K magnitude           : 9.150
G magnitude           : 14.661
RP magnitude          : 13.238
BP magnitude          : 17.051
DUPflag              : 0
Distance (au)         : 4.405
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -12.00
Sun-Target sep (deg)  : 148.13
Sun-Moon sep (deg)    : 95.54
B (ring opening deg) : -2.61
PA of pole (deg)      : 0.53
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 7.052
C/A sky separation (km) : 22528.3
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
    
```

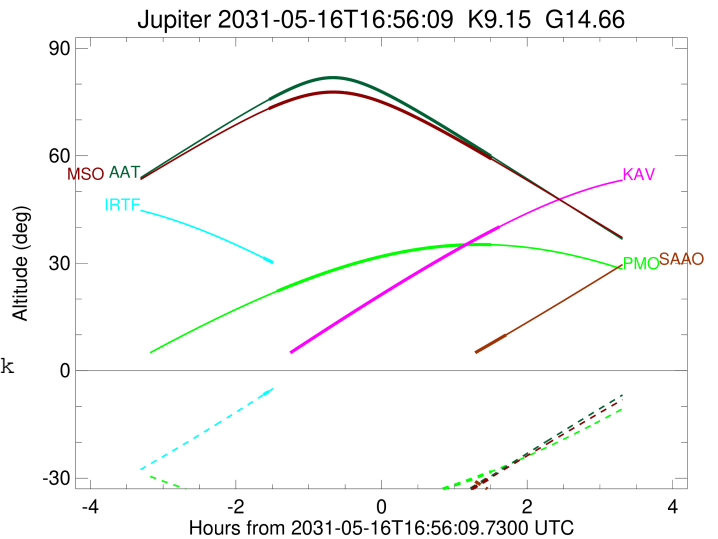
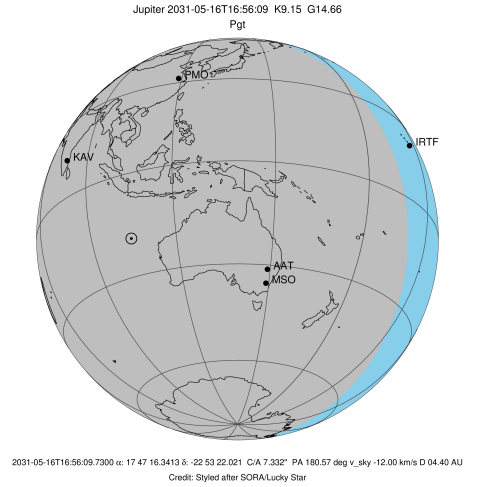


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-16T15:23:33.939	75.68	-67.71	71491.1	18.35	20.76
Jupiter	E	2031-05-16T18:26:21.996	59.90	-29.44	71491.1	18.06	20.43

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-16T17:02:30.660
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       : 4068933616895171200
2Mass ID (if available) : 17471635-2253218
ICRS Star Coord at Epoch: 17h 47m 16.34133s -22:53:22.02091s
RUWE (>1.4 is poor) : 0.94
K magnitude           : 9.150
G magnitude           : 14.661
RP magnitude          : 13.238
BP magnitude          : 17.051
DUPflag              : 0
Distance (au)         : 4.405
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -12.00
Sun-Target sep (deg) : 148.13
Sun-Moon sep (deg)   : 94.39
B (ring opening deg) : -2.61
PA of pole (deg)     : 0.53
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 6.061
C/A sky separation (km) : 19361.8
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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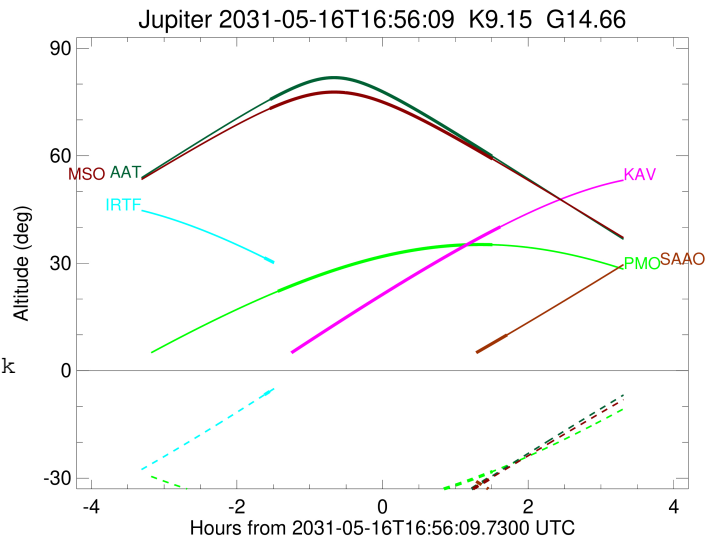
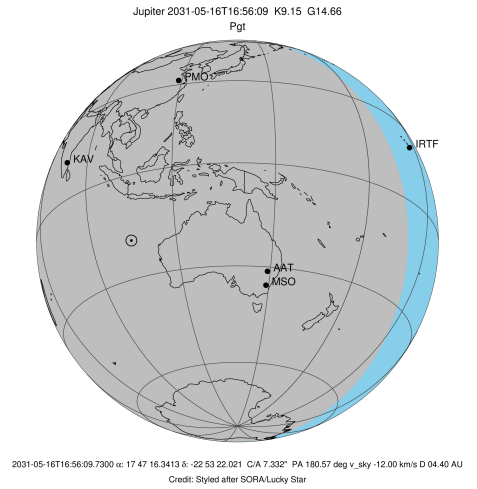


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-16T15:24:54.877	-23.53x	3.41x	71491.4	15.17	17.21
Jupiter	E	2031-05-16T18:38:46.667	9.99	-36.27	71491.3	16.36	18.54

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-16T16:54:59.330
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      : 4068933616895171200
2Mass ID (if available) : 17471635-2253218
ICRS Star Coord at Epoch: 17h 47m 16.34133s -22:53:22.02091s
RUWE (>1.4 is poor) : 0.94
K magnitude          : 9.150
G magnitude          : 14.661
RP magnitude         : 13.238
BP magnitude         : 17.051
DUPflag             : 0
Distance (au)       : 4.405
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -12.00
Sun-Target sep (deg) : 148.13
Sun-Moon sep (deg)  : 95.52
B (ring opening deg) : -2.61
PA of pole (deg)    : 0.53
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 6.914
C/A sky separation (km) : 22088.7
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	2031-05-16T15:23:17.910	73.14	-65.68	71491.1	17.98	20.35
Jupiter	E	2031-05-16T18:26:44.118	59.09	-29.73	71491.1	17.70	20.04