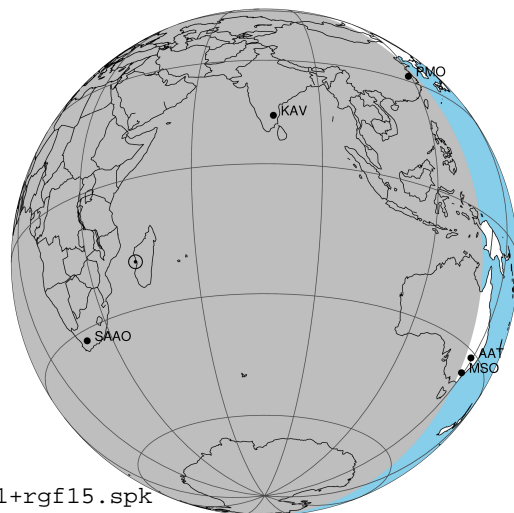


target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2031-05-17T21:00:00.090
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 406884276977219200
 2Mass ID (if available) : 17464846-2253290

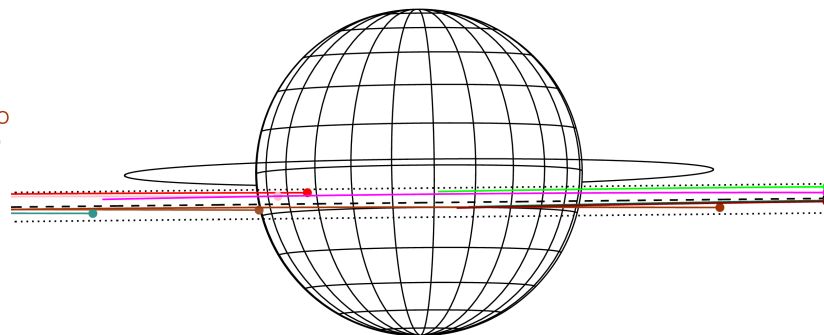
Jupiter 2031-05-17T21:00:00 K9.86 G14.83 Pgt

ICRS Star Coord at Epoch: 17h 46m 48.45845s -22:53:29.54085s
 RUWE (>1.4 is poor) : 1.00
 K magnitude : 9.859
 G magnitude : 14.831
 RP magnitude : 13.472
 BP magnitude : 16.517
 DUPflag : 0
 Distance (au) : 4.395
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -12.33
 Sun-Target sep (deg) : 149.37
 Sun-Moon sep (deg) : 109.86
 B (ring opening deg) : -2.61
 PA of pole (deg) : 0.58
 Pole direction: RA (deg): 268.05694
 Dec (deg): 64.49651
 C/A sky separation (") : 4.153
 C/A sky separation (km) : 13238.7
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk



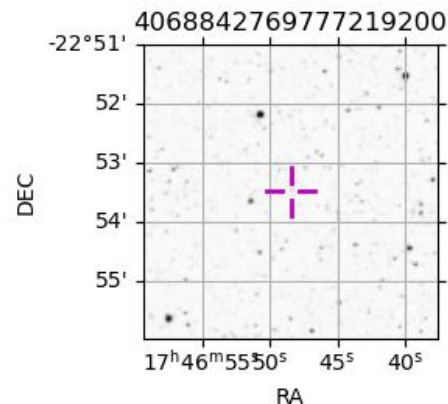
2031-05-17T21:00:00.0900 a: 17 46 48.4584 s -22 53 29.541 C/A 4.166" PA 0.61 deg v_sky -12.33 km/s D 04.39 AU
 Credit: Styled after SORA/Lucky Star

Earth
 PIC
 PMO
 TEN
 KAV
 RIO
 ESO
 AAT
 SAAO
 MSO



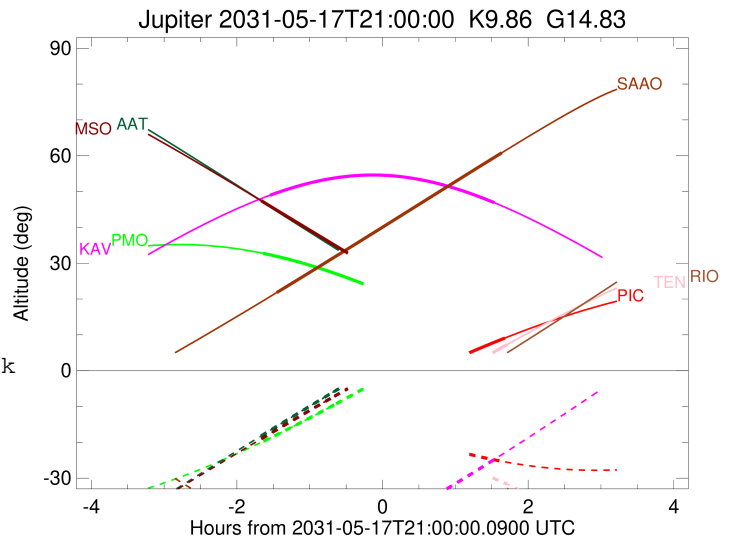
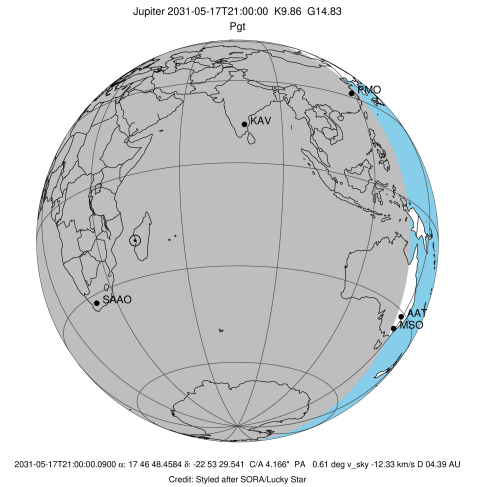
Observable events with sun below -5 deg and altitude above 5 deg

Obs	Location	lat	Elon	Target	Observed Events Interval	OCode
PIC	Pic du Midi	42.9	0.1	+	MAY 17 22:40 - MAY 17 22:40	Pne
PAL	Palomar Mt (200")	33.4	243.1			Pnn
PMO	Purple Mtn Obs. Nanking	32.1	118.8	+	MAY 17 19:21 - MAY 17 19:21	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	+	MAY 17 22:42 - MAY 17 22:42	Pne
IRTF	Mauna Kea/IRTF	19.8	204.5			Pnn
KAV	Kavalur Observatory	12.6	78.8	+ +	MAY 17 19:27 - MAY 17 22:32	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 17 19:19 - MAY 17 19:19	Pin
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8	+ +	MAY 17 19:32 - MAY 17 22:38	Pie
MSO	Mt. Stromlo Observatory	-35.3	149.0	+	MAY 17 19:20 - MAY 17 19:20	Pin



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-17T21:06:16.770
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      : 4068842769777219200
2Mass ID (if available) : 17464846-2253290
ICRS Star Coord at Epoch: 17h 46m 48.45845s -22:53:29.54085s
RUWE (>1.4 is poor) : 1.00
K magnitude          : 9.859
G magnitude          : 14.831
RP magnitude         : 13.472
BP magnitude         : 16.517
DUPflag             : 0
Distance (au)       : 4.395
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -12.33
Sun-Target sep (deg) : 149.37
Sun-Moon sep (deg)  : 109.55
B (ring opening deg) : -2.61
PA of pole (deg)    : 0.58
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation ("): 2.767
C/A sky separation (km): 8820.6
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
    
```

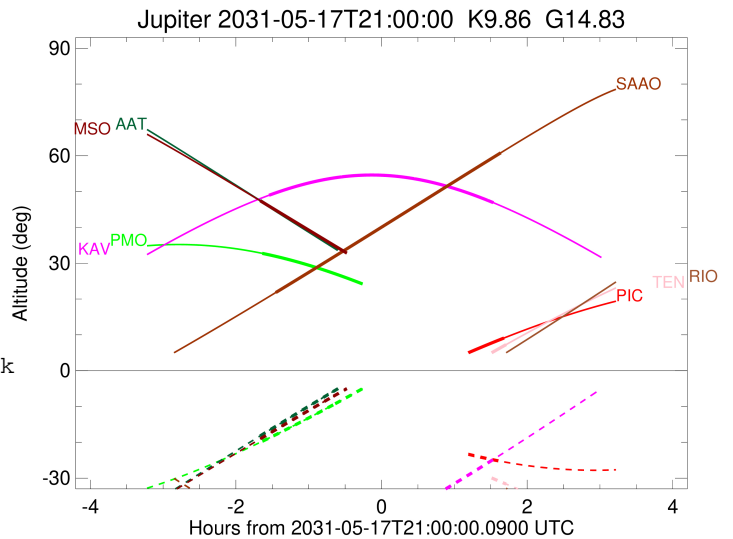
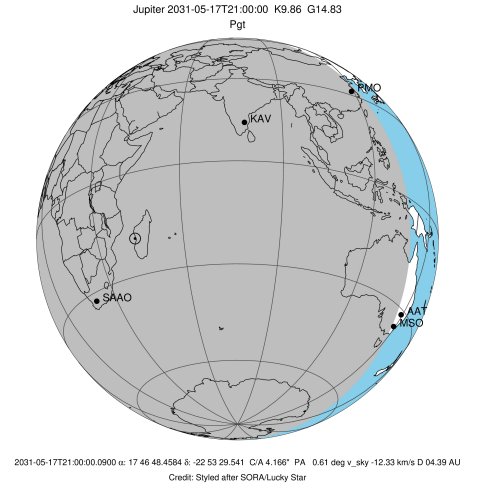


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-17T19:30:28.451	-21.79x	-3.00x	71491.8	-7.66	-8.75
Jupiter	E	2031-05-17T22:40:54.497	9.11	-25.46	71491.9	-6.56	-7.49

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-17T20:55:10.830
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        : 4068842769777219200
2Mass ID (if available) : 17464846-2253290
ICRS Star Coord at Epoch: 17h 46m 48.45845s -22:53:29.54085s
RUWE (>1.4 is poor) : 1.00
K magnitude           : 9.859
G magnitude           : 14.831
RP magnitude          : 13.472
BP magnitude          : 16.517
DUPflag              : 0
Distance (au)         : 4.395
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -12.33
Sun-Target sep (deg) : 149.37
Sun-Moon sep (deg)   : 110.38
B (ring opening deg) : -2.61
PA of pole (deg)     : 0.58
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation ("): 2.672
C/A sky separation (km): 8518.1
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
    
```

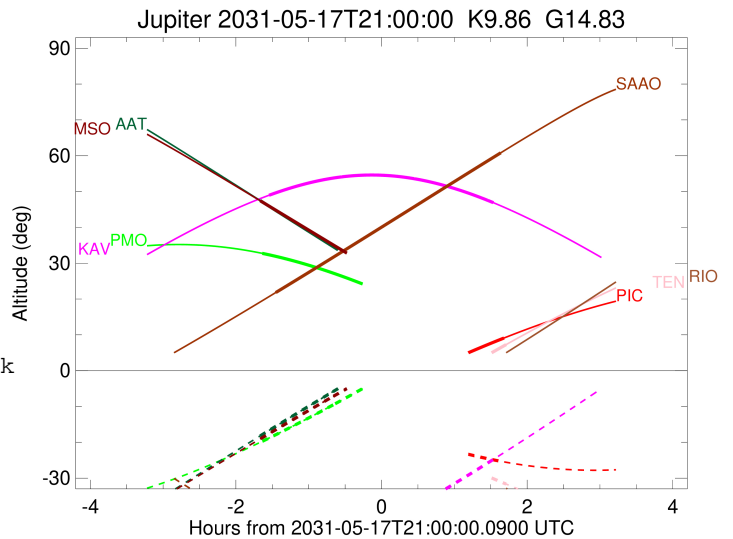
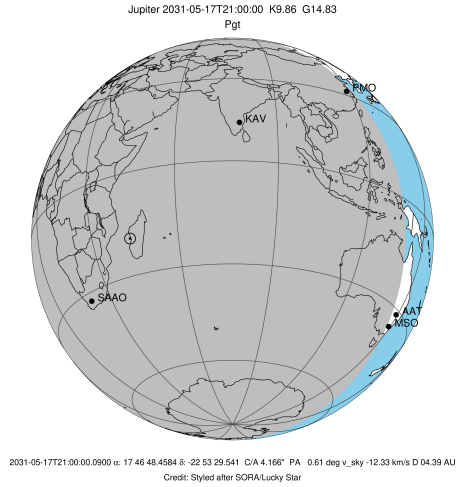


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-17T19:21:48.051	32.74	-19.71	71491.9	-6.49	-7.41
Jupiter	E	2031-05-17T22:29:12.503	7.62	15.88x	71491.8	-7.41	-8.45

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-17T21:07:48.550
Event type           : Pgt
: Jupiter occs: geocentric, topocentric
: Not a ringed target
Observer code        : TEN
Location             : Teide Obs./Tenerife
Latitude (deg)       : 28.30050
E. Longitude (deg)   : 343.48909
Altitude (km)        : 2.395
Gaia source ID       : 4068842769777219200
2Mass ID (if available) : 17464846-2253290
ICRS Star Coord at Epoch: 17h 46m 48.45845s -22:53:29.54085s
RUWE (>1.4 is poor) : 1.00
K magnitude           : 9.859
G magnitude           : 14.831
RP magnitude         : 13.472
BP magnitude         : 16.517
DUPflag              : 0
Distance (au)        : 4.395
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -12.33
Sun-Target sep (deg) : 149.37
Sun-Moon sep (deg)   : 109.38
B (ring opening deg) : -2.61
PA of pole (deg)     : 0.58
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation ("): 3.314
C/A sky separation (km): 10563.2
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
    
```

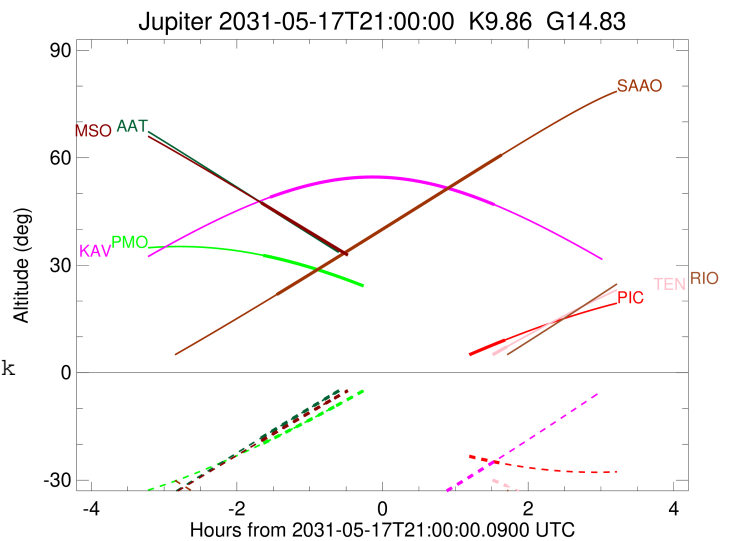
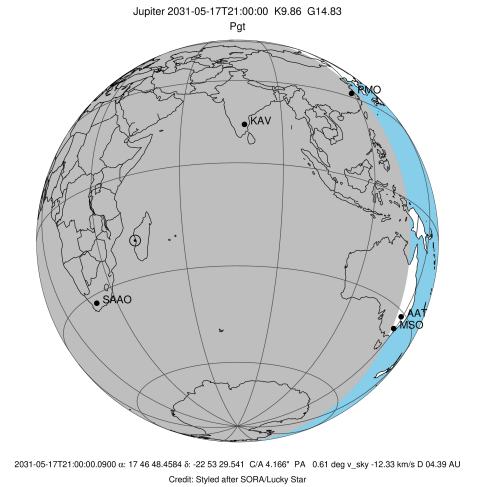


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-17T19:31:26.863	-32.23x	2.96x	71491.8	-9.18	-10.47
Jupiter	E	2031-05-17T22:42:42.878	7.28	-31.66	71491.8	-7.80	-8.90

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-17T20:59:44.880
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       : 4068842769777219200
2Mass ID (if available) : 17464846-2253290
ICRS Star Coord at Epoch: 17h 46m 48.45845s -22:53:29.54085s
RUWE (>1.4 is poor) : 1.00
K magnitude           : 9.859
G magnitude           : 14.831
RP magnitude         : 13.472
BP magnitude         : 16.517
DUPflag              : 0
Distance (au)        : 4.395
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -12.33
Sun-Target sep (deg) : 149.37
Sun-Moon sep (deg)   : 110.59
B (ring opening deg) : -2.61
PA of pole (deg)     : 0.58
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation ("): 2.995
C/A sky separation (km): 9544.7
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
    
```

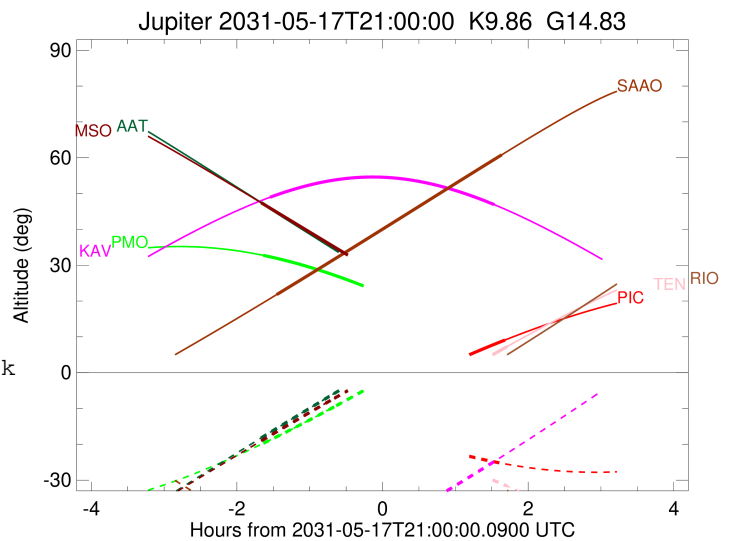
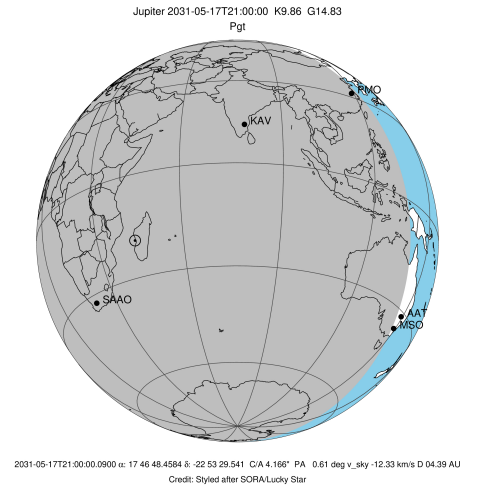


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-17T19:27:17.874	48.96	-56.12	71491.8	-7.78	-8.88
Jupiter	E	2031-05-17T22:32:07.109	46.90	-24.78	71491.8	-7.86	-8.97

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-17T20:52:47.080
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        : 406884276977219200
2Mass ID (if available) : 17464846-2253290
ICRS Star Coord at Epoch: 17h 46m 48.45845s -22:53:29.54085s
RUWE (>1.4 is poor) : 1.00
K magnitude           : 9.859
G magnitude           : 14.831
RP magnitude          : 13.472
BP magnitude          : 16.517
DUPflag              : 0
Distance (au)         : 4.395
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -12.33
Sun-Target sep (deg) : 149.37
Sun-Moon sep (deg)   : 110.51
B (ring opening deg) : -2.61
PA of pole (deg)     : 0.58
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation ("): 4.871
C/A sky separation (km): 15524.7
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
    
```

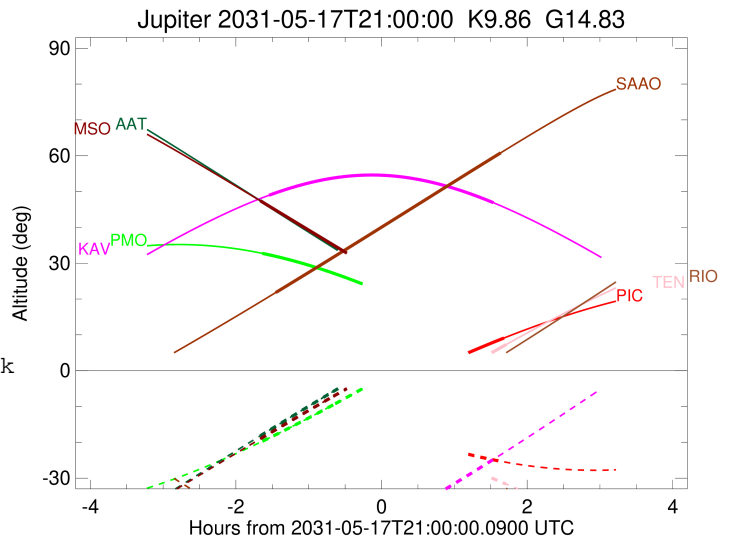
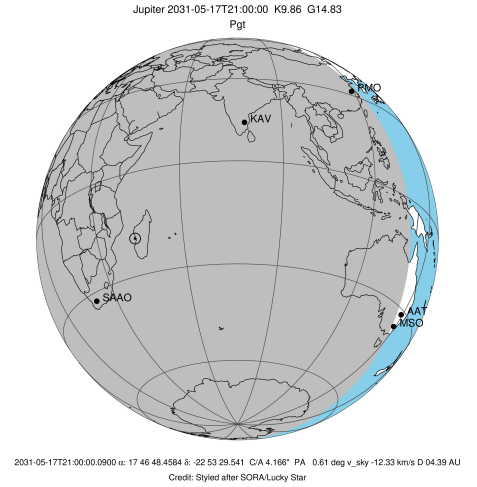


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-17T19:19:58.612	47.49	-18.22	71491.6	-11.91	-13.55
Jupiter	E	2031-05-17T22:26:36.432	8.42	18.03x	71491.5	-13.26	-15.07

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-17T21:06:07.190
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        : 4068842769777219200
2Mass ID (if available) : 17464846-2253290
ICRS Star Coord at Epoch: 17h 46m 48.45845s -22:53:29.54085s
RUWE (>1.4 is poor) : 1.00
K magnitude           : 9.859
G magnitude           : 14.831
RP magnitude          : 13.472
BP magnitude          : 16.517
DUPflag              : 0
Distance (au)         : 4.395
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -12.33
Sun-Target sep (deg)  : 149.37
Sun-Moon sep (deg)   : 110.19
B (ring opening deg) : -2.61
PA of pole (deg)     : 0.58
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 4.763
C/A sky separation (km) : 15181.2
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
    
```

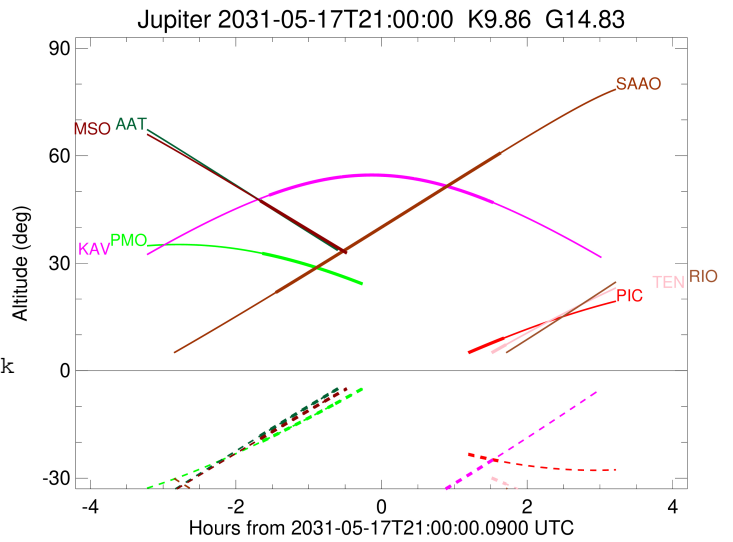
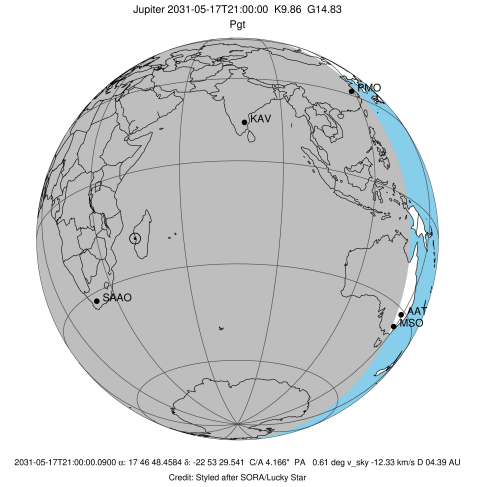


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-17T19:32:51.921	21.80	-47.79	71491.5	-12.86	-14.63
Jupiter	E	2031-05-17T22:38:17.691	60.81	-77.19	71491.6	-11.80	-13.43

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-17T20:53:05.950
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       : 4068842769777219200
2Mass ID (if available) : 17464846-2253290
ICRS Star Coord at Epoch: 17h 46m 48.45845s -22:53:29.54085s
RUWE (>1.4 is poor) : 1.00
K magnitude           : 9.859
G magnitude           : 14.831
RP magnitude          : 13.472
BP magnitude          : 16.517
DUPflag              : 0
Distance (au)         : 4.395
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -12.33
Sun-Target sep (deg) : 149.37
Sun-Moon sep (deg)   : 110.50
B (ring opening deg) : -2.61
PA of pole (deg)     : 0.58
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation ("): 4.990
C/A sky separation (km): 15904.2
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	2031-05-17T19:20:20.081	47.37	-18.99	71491.6	-12.25	-13.93
Jupiter	E	2031-05-17T22:26:49.589	9.89	15.56x	71491.5	-13.54	-15.39