

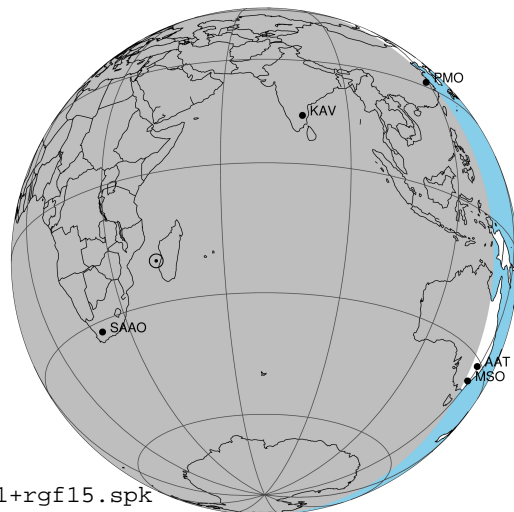
target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2031-05-22T21:05:12.410
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 4116890019203131520
 2Mass ID (if available) : 17444031-2252459

Jupiter 2031-05-22T21:05:12 K9.66 G14.19 Pgt

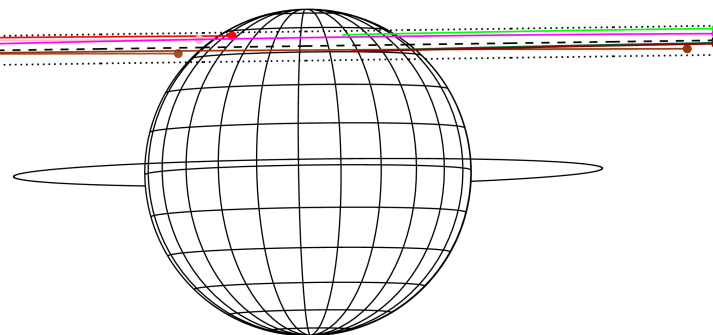
ICRS Star Coord at Epoch: 17h 44m 40.32690s -22:52:46.06928s

RUWE (>1.4 is poor) : 0.99
 K magnitude : 9.664
 G magnitude : 14.189
 RP magnitude : 13.014
 BP magnitude : 15.686
 DUPflag : 0
 Distance (au) : 4.356
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -13.62
 Sun-Target sep (deg) : 154.68
 Sun-Moon sep (deg) : 172.02
 B (ring opening deg) : -2.61
 PA of pole (deg) : 0.81
 Pole direction: RA (deg): 268.05694
 Dec (deg): 64.49651
 C/A sky separation (") : 17.537
 C/A sky separation (km) : 55398.9
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk

Jupiter 2031-05-22T21:05:12 K9.66 G14.19
 Pgt



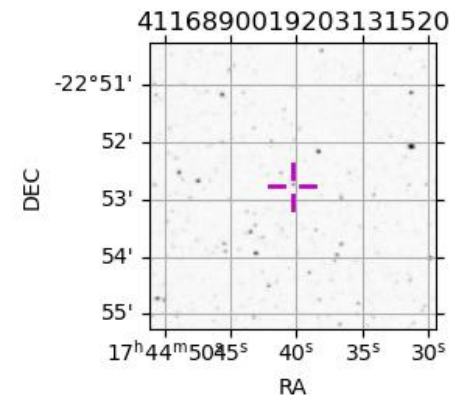
Earth
 PIC
 PMO
 TEN
 KAV
 RIO
 ESO
 AAT
 SAAO
 MSO



2031-05-22T21:05:12.4100 a: 17 44 40.3269 s: -22 52 46.069 C/A ***** PA 180.80 deg v_sky -13.62 km/s D 04.36 AU
 Credit: Styled after SORA/Lucky Star

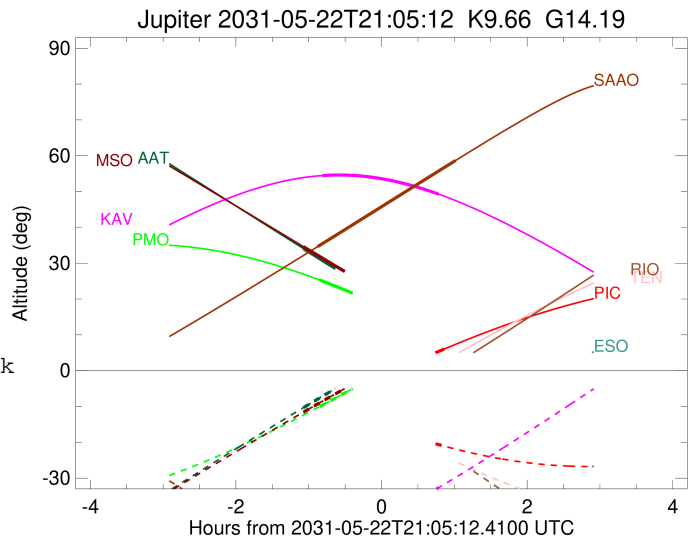
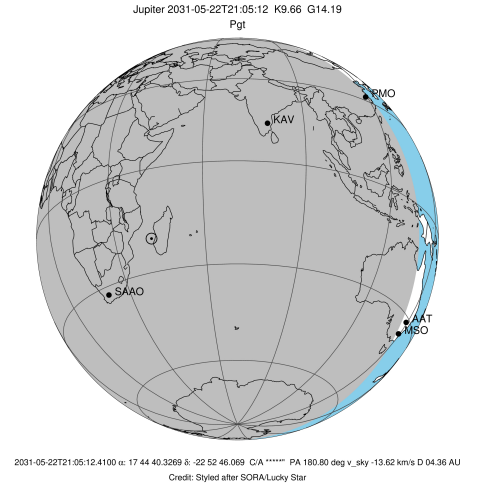
Observable events with sun below -5 deg and altitude above 5 deg

Obs	Location	lat	Elon	Target	Observed Events Interval	OCode
PIC	Pic du Midi	42.9	0.1	+	MAY 22 21:56 - MAY 22 21:56	Pne
PAL	Palomar Mt (200")	33.4	243.1			Pnn
PMO	Purple Mtn Obs. Nanking	32.1	118.8	+	MAY 22 20:14 - MAY 22 20:14	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 22 20:16 - MAY 22 21:52	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 22 20:01 - MAY 22 20:01	Pin
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8	+ +	MAY 22 20:12 - MAY 22 22:06	Pie
MSO	Mt. Stromlo Observatory	-35.3	149.0	+	MAY 22 20:00 - MAY 22 20:00	Pin



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-22T21:09:56.010
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      : 4116890019203131520
2Mass ID (if available) : 17444031-2252459
ICRS Star Coord at Epoch: 17h 44m 40.32690s -22:52:46.06928s
RUWE (>1.4 is poor) : 0.99
K magnitude          : 9.664
G magnitude          : 14.189
RP magnitude         : 13.014
BP magnitude         : 15.686
DUPflag             : 0
Distance (au)       : 4.356
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -13.62
Sun-Target sep (deg) : 154.68
Sun-Moon sep (deg)  : 171.26
B (ring opening deg) : -2.61
PA of pole (deg)    : 0.81
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 18.993
C/A sky separation (km) : 59999.1
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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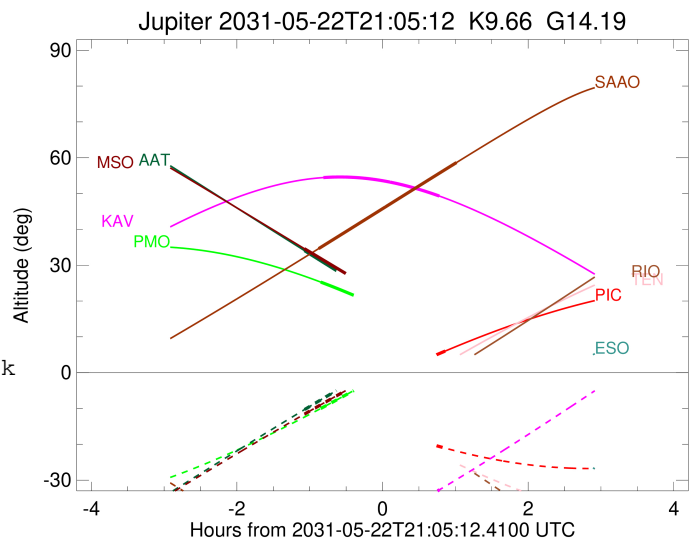
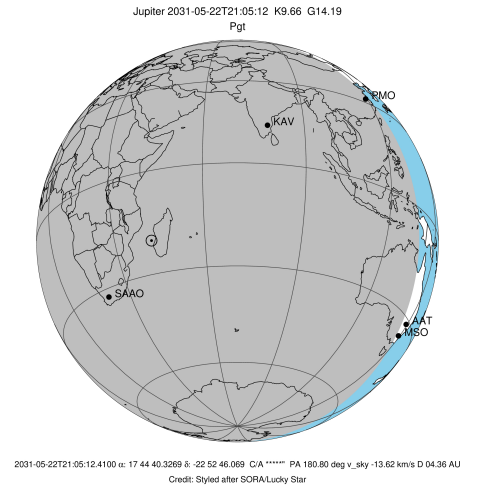


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-22T20:22:39.841	-8.81x	-9.97	71485.5	56.43	59.72
Jupiter	E	2031-05-22T21:56:57.824	6.04	-21.07	71485.4	57.48	60.71

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-22T21:00:57.220
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      : 4116890019203131520
2Mass ID (if available) : 17444031-2252459
ICRS Star Coord at Epoch: 17h 44m 40.32690s -22:52:46.06928s
RUWE (>1.4 is poor) : 0.99
K magnitude          : 9.664
G magnitude          : 14.189
RP magnitude         : 13.014
BP magnitude         : 15.686
DUPflag             : 0
Distance (au)       : 4.356
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -13.62
Sun-Target sep (deg) : 154.68
Sun-Moon sep (deg)  : 172.45
B (ring opening deg) : -2.61
PA of pole (deg)    : 0.81
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 18.981
C/A sky separation (km) : 59960.8
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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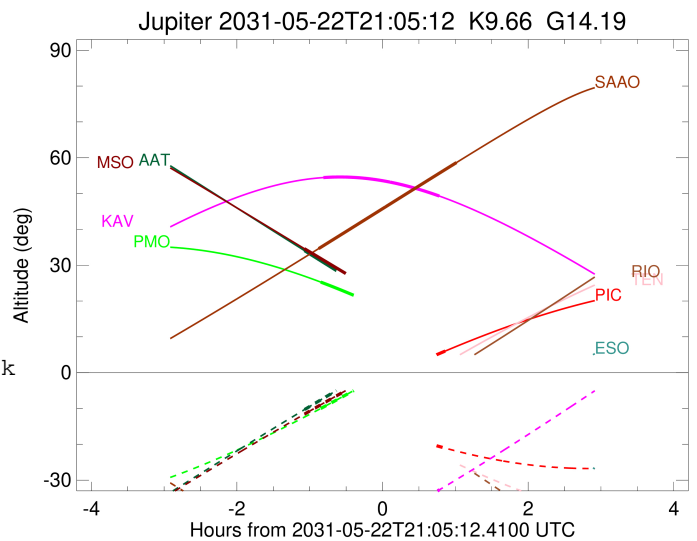
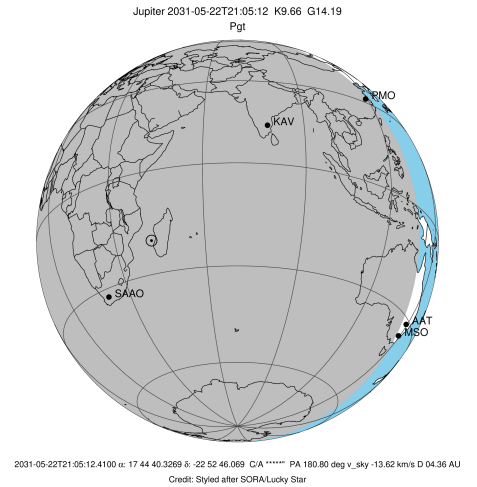


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-22T20:14:16.042	25.29	-10.01	71485.4	57.31	60.55
Jupiter	E	2031-05-22T21:47:48.524	11.06	7.91x	71485.5	56.44	59.73

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-22T21:04:13.980
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        : 4116890019203131520
2Mass ID (if available) : 17444031-2252459
ICRS Star Coord at Epoch: 17h 44m 40.32690s -22:52:46.06928s
RUWE (>1.4 is poor) : 0.99
K magnitude           : 9.664
G magnitude           : 14.189
RP magnitude          : 13.014
BP magnitude          : 15.686
DUPflag              : 0
Distance (au)         : 4.356
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -13.62
Sun-Target sep (deg) : 154.68
Sun-Moon sep (deg)   : 172.13
B (ring opening deg) : -2.61
PA of pole (deg)     : 0.81
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation ("): 18.700
C/A sky separation (km): 59074.7
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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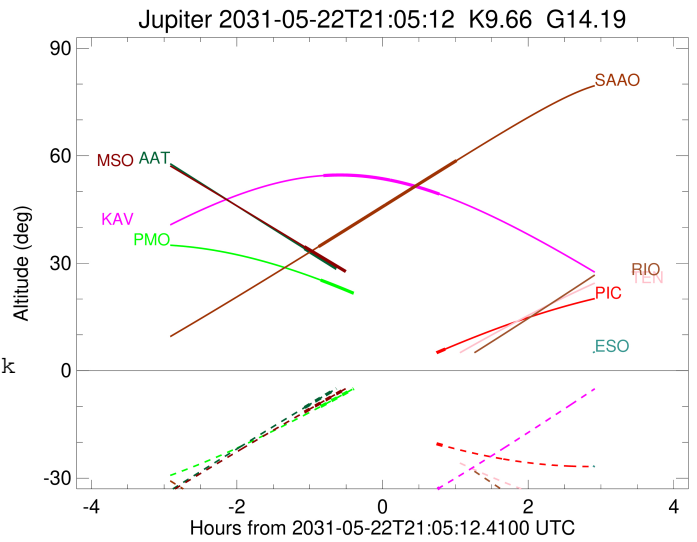
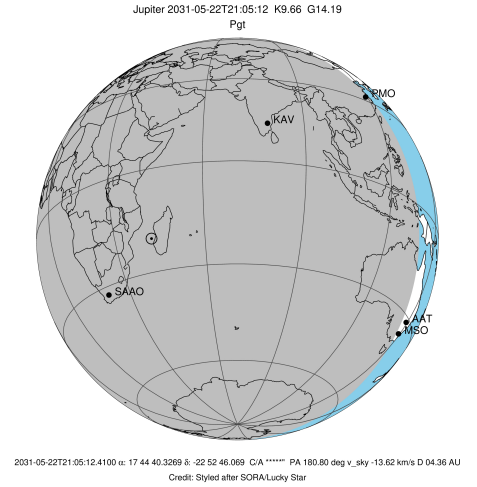


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-22T20:16:27.762	54.45	-49.59	71485.7	55.64	58.98
Jupiter	E	2031-05-22T21:52:01.467	49.30	-32.71	71485.7	55.49	58.84

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-22T20:59:21.760
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      : 4116890019203131520
2Mass ID (if available) : 17444031-2252459
ICRS Star Coord at Epoch: 17h 44m 40.32690s -22:52:46.06928s
RUWE (>1.4 is poor) : 0.99
K magnitude          : 9.664
G magnitude          : 14.189
RP magnitude         : 13.014
BP magnitude         : 15.686
DUPflag             : 0
Distance (au)       : 4.356
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -13.62
Sun-Target sep (deg) : 154.68
Sun-Moon sep (deg)  : 172.87
B (ring opening deg) : -2.61
PA of pole (deg)    : 0.81
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 16.740
C/A sky separation (km) : 52882.7
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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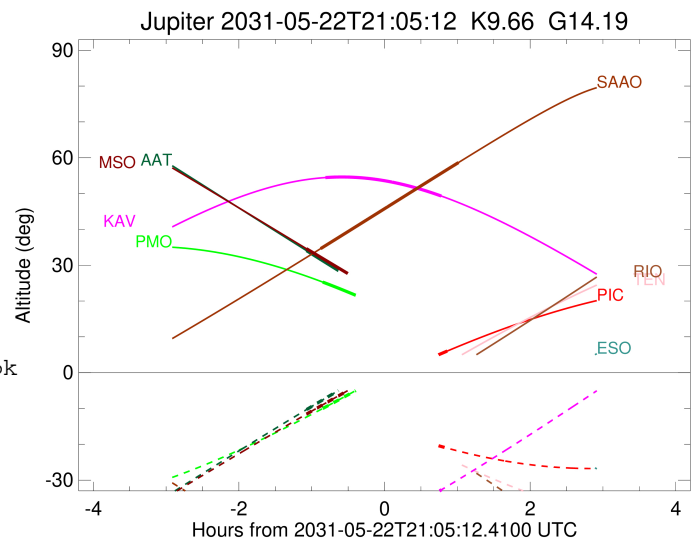
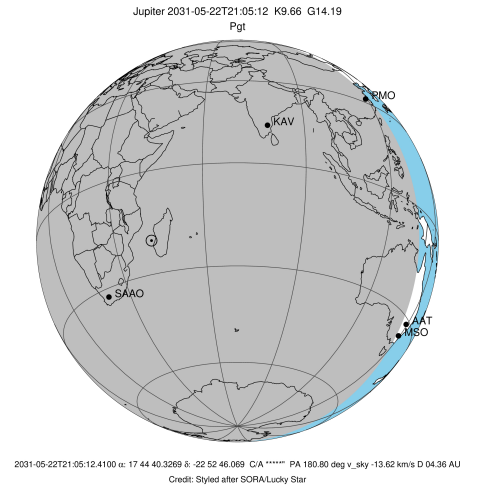


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-22T20:01:02.374	34.05	-10.29	71486.8	48.23	51.87
Jupiter	E	2031-05-22T21:58:03.352	9.77	12.29x	71487.0	47.02	50.68

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-22T21:09:32.830
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       : 4116890019203131520
2Mass ID (if available) : 17444031-2252459
ICRS Star Coord at Epoch: 17h 44m 40.32690s -22:52:46.06928s
RUWE (>1.4 is poor) : 0.99
K magnitude           : 9.664
G magnitude           : 14.189
RP magnitude          : 13.014
BP magnitude          : 15.686
DUPflag              : 0
Distance (au)        : 4.356
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -13.62
Sun-Target sep (deg) : 154.68
Sun-Moon sep (deg)   : 171.59
B (ring opening deg) : -2.61
PA of pole (deg)     : 0.81
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 16.976
C/A sky separation (km) : 53628.3
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
    
```

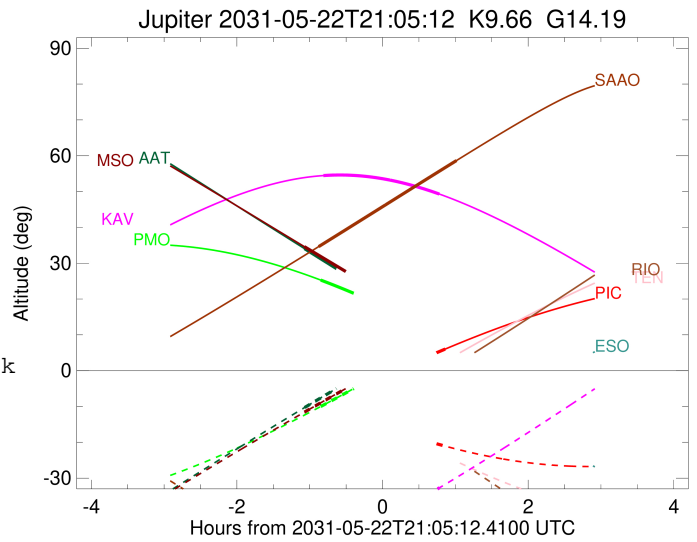
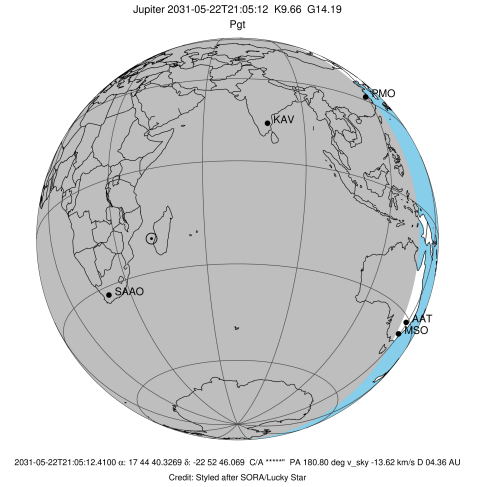


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-22T20:12:34.502	34.62	-56.51	71486.9	48.00	51.64
Jupiter	E	2031-05-22T22:06:11.895	58.65	-76.79	71486.7	48.98	52.59

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-22T20:59:36.940
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        : 4116890019203131520
2Mass ID (if available) : 17444031-2252459
ICRS Star Coord at Epoch: 17h 44m 40.32690s -22:52:46.06928s
RUWE (>1.4 is poor) : 0.99
K magnitude           : 9.664
G magnitude           : 14.189
RP magnitude          : 13.014
BP magnitude          : 15.686
DUPflag              : 0
Distance (au)         : 4.356
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -13.62
Sun-Target sep (deg)  : 154.68
Sun-Moon sep (deg)    : 172.84
B (ring opening deg) : -2.61
PA of pole (deg)      : 0.81
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 16.624
C/A sky separation (km) : 52513.9
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	2031-05-22T20:00:46.886	34.62	-11.59	71486.9	47.77	51.42
Jupiter	E	2031-05-22T21:58:48.481	11.08	10.15x	71487.1	46.61	50.28