

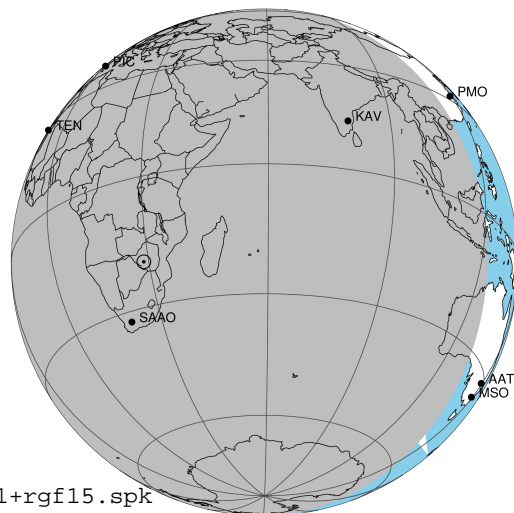
target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2031-05-19T22:01:45.480
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 4068854417783854336
 2Mass ID (if available) : 17455782-2253242

Jupiter 2031-05-19T22:01:45 K8.26 G14.73 Pgt

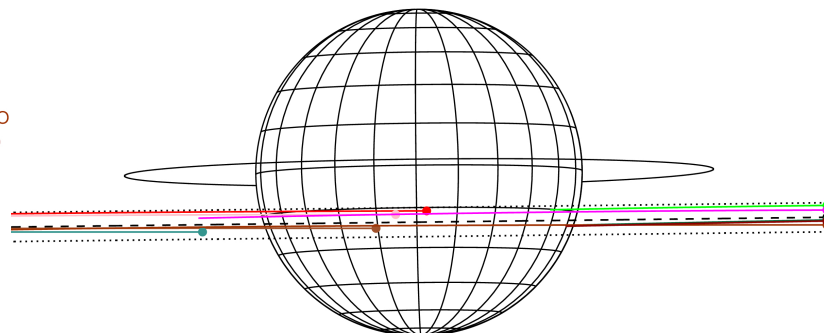
ICRS Star Coord at Epoch: 17h 45m 57.81662s -22:53:24.31021s

RUWE (>1.4 is poor) : 0.96
 K magnitude : 8.255
 G magnitude : 14.726
 RP magnitude : 13.186
 BP magnitude : 18.183
 DUPflag : 0
 Distance (au) : 4.378
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -12.89
 Sun-Target sep (deg) : 151.53
 Sun-Moon sep (deg) : 135.83
 B (ring opening deg) : -2.60
 PA of pole (deg) : 0.67
 Pole direction: RA (deg): 268.05694
 Dec (deg): 64.49651
 C/A sky separation (") : 6.848
 C/A sky separation (km) : 21744.0
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk

Jupiter 2031-05-19T22:01:45 K8.26 G14.73
 Pgt



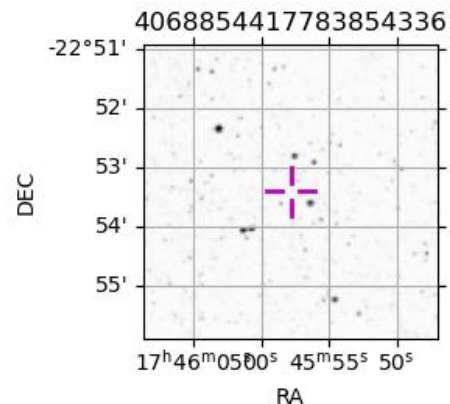
Earth
 PIC
 PMO
 TEN
 KAV
 RIO
 ESO
 AAT
 SAAO
 MSO



2031-05-19T22:01:45:4800 a: 17 45 57.8166 s: -22 53 24.310 C/A 6.860" PA 0.68 deg v_sky -12.89 km/s D 04.38 AU
 Credit: Styled after SORA/Lucky Star

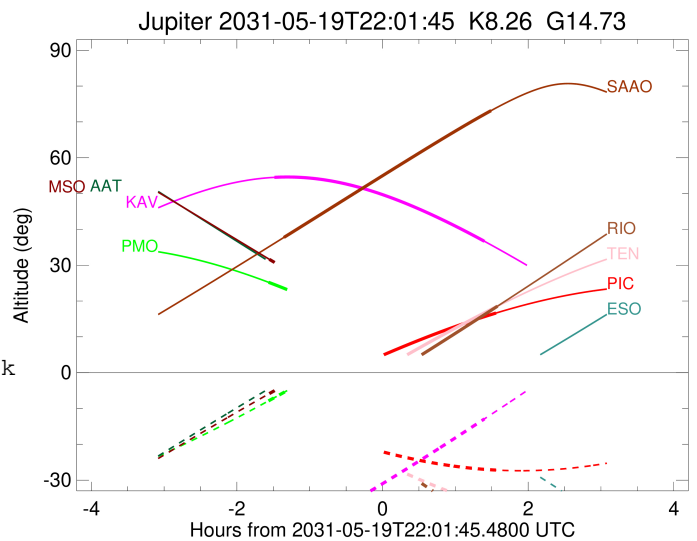
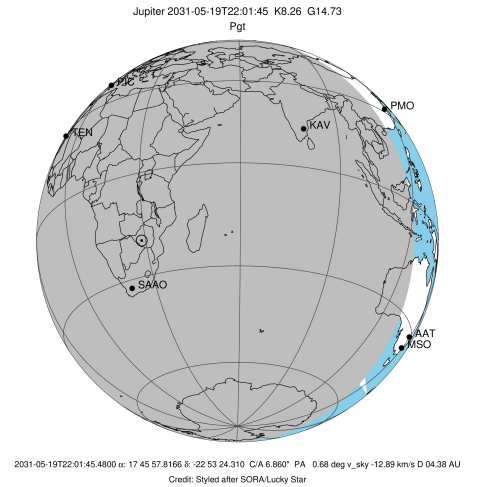
Observable events with sun below -5 deg and altitude above 5 deg

Obs	Location	lat	Elon	Target	Observed Events Interval	OCode
PIC	Pic du Midi	42.9	0.1	+	MAY 19 23:35 - MAY 19 23:35	Pne
PAL	Palomar Mt (200")	33.4	243.1			Pnn
PMO	Purple Mtn Obs. Nanking	32.1	118.8	+	MAY 19 20:27 - MAY 19 20:27	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 19 23:37 - MAY 19 23:37	Pne
IRTF	Mauna Kea/IRTF	19.8	204.5			Pnn
KAV	Kavalur Observatory	12.6	78.8	+ +	MAY 19 20:32 - MAY 19 23:25	Pie
RIO	Rio de Janeiro	-22.9	316.8	+ +	MAY 19 23:36 - MAY 19 23:36	Pne
ESO	European Southern Obs. (3.6m)	-29.3	289.3			Pnn
AAT	Siding Spring (AAT)	-31.3	149.1			Pnn
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8	+ +	MAY 19 20:40 - MAY 19 23:31	Pie
MSO	Mt. Stromlo Observatory	-35.3	149.0	+	MAY 19 20:28 - MAY 19 20:28	Pin



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-19T22:07:06.870
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       : 4068854417783854336
2Mass ID (if available) : 17455782-2253242
ICRS Star Coord at Epoch: 17h 45m 57.81662s -22:53:24.31021s
RUWE (>1.4 is poor) : 0.96
K magnitude           : 8.255
G magnitude           : 14.726
RP magnitude          : 13.186
BP magnitude          : 18.183
DUPflag              : 0
Distance (au)        : 4.378
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -12.89
Sun-Target sep (deg) : 151.53
Sun-Moon sep (deg)   : 135.48
B (ring opening deg) : -2.60
PA of pole (deg)     : 0.67
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 5.298
C/A sky separation (km) : 16821.3
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
    
```

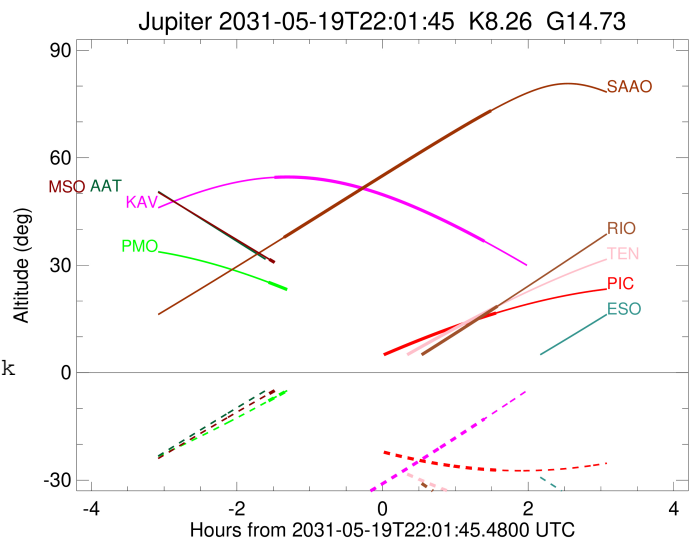
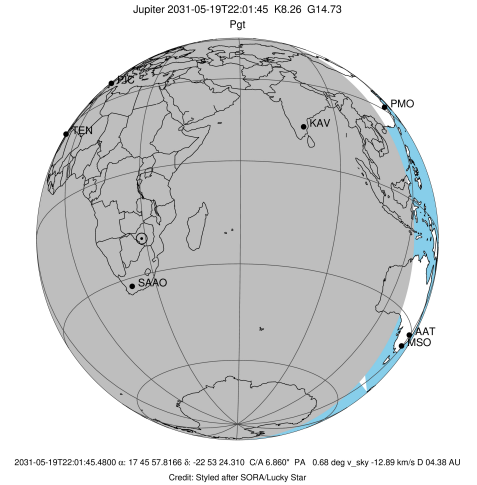


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-19T20:38:04.230	-8.42x	-12.61	71491.4	-14.13	-16.05
Jupiter	E	2031-05-19T23:35:17.995	16.64	-27.19	71491.5	-13.18	-14.98

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-19T21:55:38.390
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       : 4068854417783854336
2Mass ID (if available) : 17455782-2253242
ICRS Star Coord at Epoch: 17h 45m 57.81662s -22:53:24.31021s
RUWE (>1.4 is poor) : 0.96
K magnitude          : 8.255
G magnitude          : 14.726
RP magnitude         : 13.186
BP magnitude         : 18.183
DUPflag             : 0
Distance (au)        : 4.378
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -12.89
Sun-Target sep (deg) : 151.53
Sun-Moon sep (deg)  : 136.45
B (ring opening deg) : -2.60
PA of pole (deg)    : 0.67
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 5.509
C/A sky separation (km) : 17492.7
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
    
```

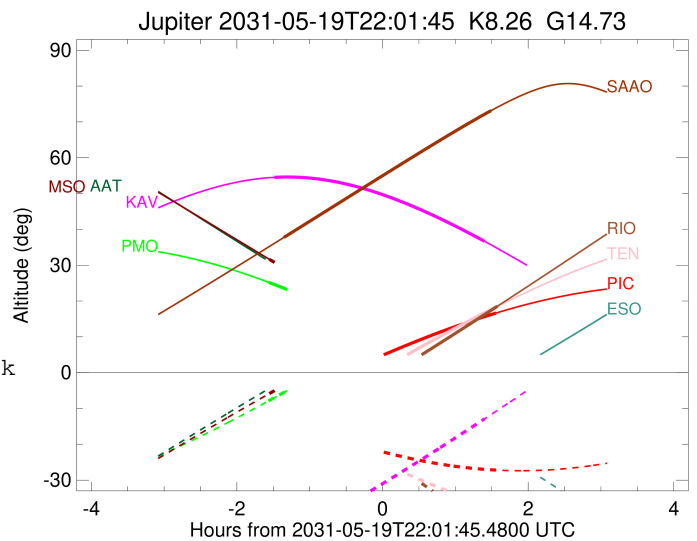
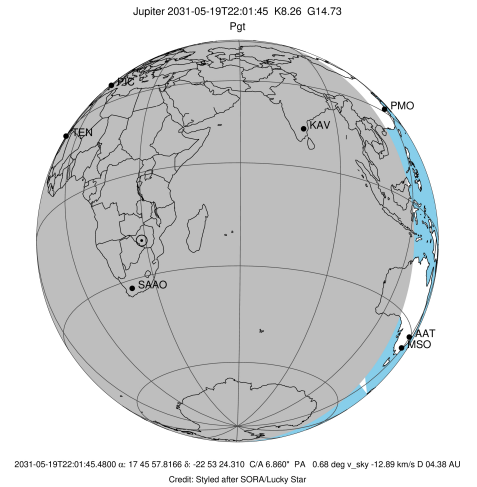


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-19T20:27:47.935	25.23	-7.88	71491.5	-13.66	-15.53
Jupiter	E	2031-05-19T23:24:14.917	-4.28x	27.56x	71491.4	-14.78	-16.78

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-19T22:09:03.630
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        : 4068854417783854336
2Mass ID (if available) : 17455782-2253242
ICRS Star Coord at Epoch: 17h 45m 57.81662s -22:53:24.31021s
RUWE (>1.4 is poor) : 0.96
K magnitude            : 8.255
G magnitude           : 14.726
RP magnitude          : 13.186
BP magnitude          : 18.183
DUPflag               : 0
Distance (au)         : 4.378
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -12.89
Sun-Target sep (deg)  : 151.53
Sun-Moon sep (deg)    : 135.29
B (ring opening deg) : -2.60
PA of pole (deg)      : 0.67
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 5.799
C/A sky separation (km) : 18412.6
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
    
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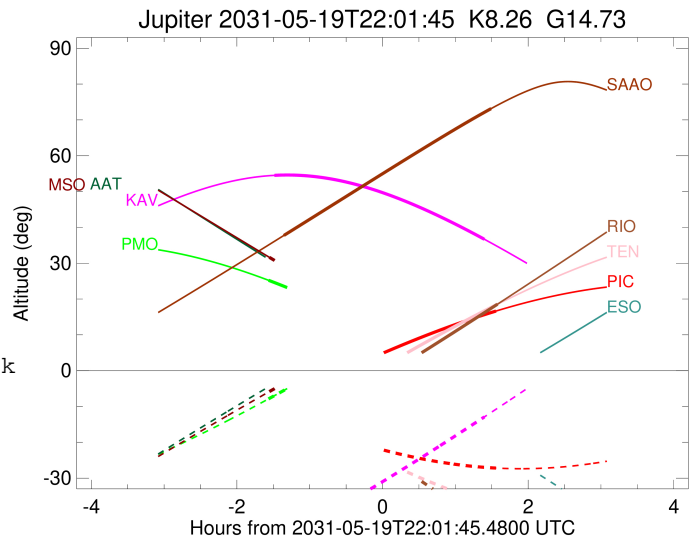
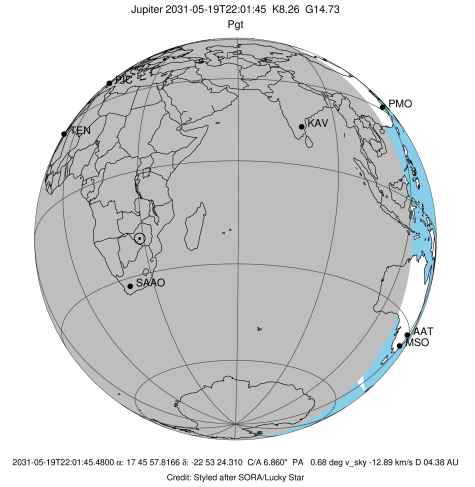


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-19T20:39:56.030	-15.70x	-10.48	71491.3	-15.60	-17.70
Jupiter	E	2031-05-19T23:37:02.776	18.63	-37.73	71491.4	-14.30	-16.24

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-19T21:59:04.750
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      : 4068854417783854336
2Mass ID (if available) : 17455782-2253242
ICRS Star Coord at Epoch: 17h 45m 57.81662s -22:53:24.31021s
RUWE (>1.4 is poor) : 0.96
K magnitude          : 8.255
G magnitude          : 14.726
RP magnitude         : 13.186
BP magnitude         : 18.183
DUPflag             : 0
Distance (au)       : 4.378
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -12.89
Sun-Target sep (deg) : 151.53
Sun-Moon sep (deg)  : 136.54
B (ring opening deg) : -2.60
PA of pole (deg)    : 0.67
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 5.721
C/A sky separation (km) : 18165.1
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
    
```

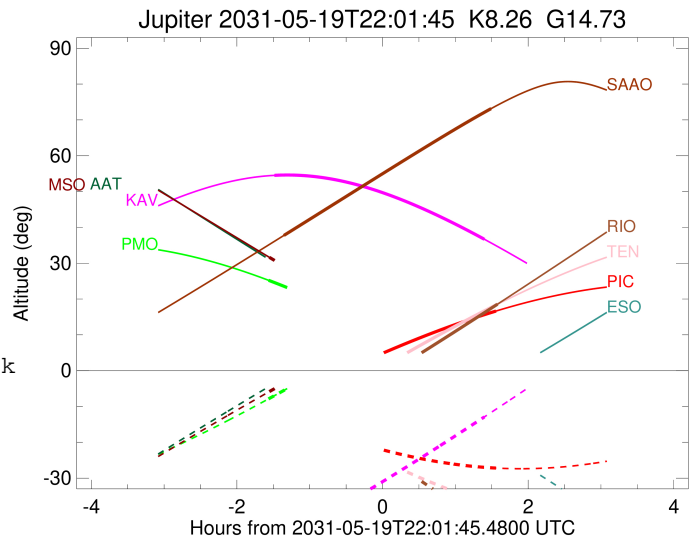
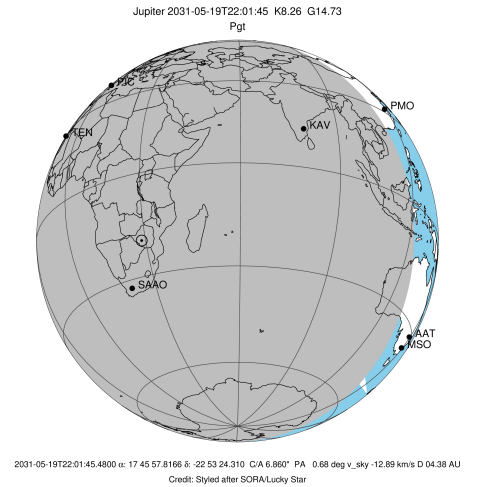


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-19T20:32:39.686	54.51	-47.58	71491.4	-14.61	-16.58
Jupiter	E	2031-05-19T23:25:45.703	36.67	-12.90	71491.4	-15.08	-17.11

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-19T22:09:36.540
Event type            : Pgt
: Jupiter occs: geocentric, topocentric
: Not a ringed target
Observer code         : RIO
Location              : Rio de Janeiro
Latitude (deg)        : -22.89506
E. Longitude (deg)    : 316.77708
Altitude (km)         : 0.033
Gaia source ID        : 4068854417783854336
2Mass ID (if available) : 17455782-2253242
ICRS Star Coord at Epoch: 17h 45m 57.81662s -22:53:24.31021s
RUWE (>1.4 is poor)  : 0.96
K magnitude           : 8.255
G magnitude           : 14.726
RP magnitude          : 13.186
BP magnitude          : 18.183
DUPflag              : 0
Distance (au)         : 4.378
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -12.89
Sun-Target sep (deg)  : 151.53
Sun-Moon sep (deg)    : 135.21
B (ring opening deg) : -2.60
PA of pole (deg)      : 0.67
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 7.710
C/A sky separation (km) : 24480.2
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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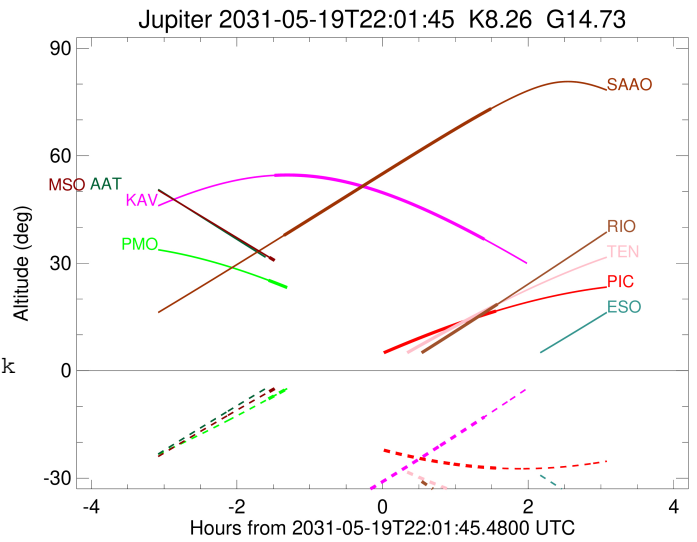
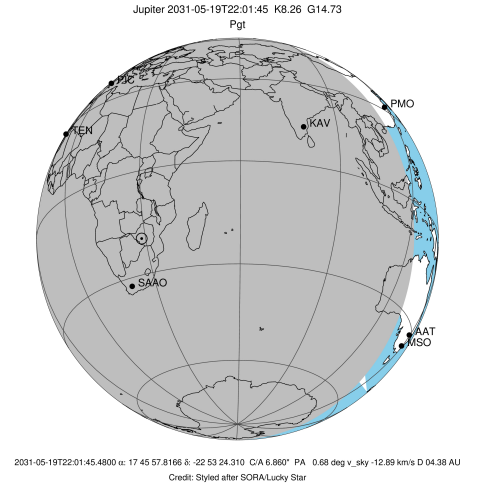


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-19T20:41:36.808	-17.79x	-5.85	71490.8	-20.68	-23.33
Jupiter	E	2031-05-19T23:36:23.908	18.53	-45.15	71491.0	-19.28	-21.78

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-19T22:06:10.680
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        : 4068854417783854336
2Mass ID (if available) : 17455782-2253242
ICRS Star Coord at Epoch: 17h 45m 57.81662s -22:53:24.31021s
RUWE (>1.4 is poor) : 0.96
K magnitude           : 8.255
G magnitude           : 14.726
RP magnitude          : 13.186
BP magnitude          : 18.183
DUPflag              : 0
Distance (au)         : 4.378
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -12.89
Sun-Target sep (deg) : 151.53
Sun-Moon sep (deg)   : 136.00
B (ring opening deg) : -2.60
PA of pole (deg)     : 0.67
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 7.316
C/A sky separation (km) : 23230.9
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
    
```

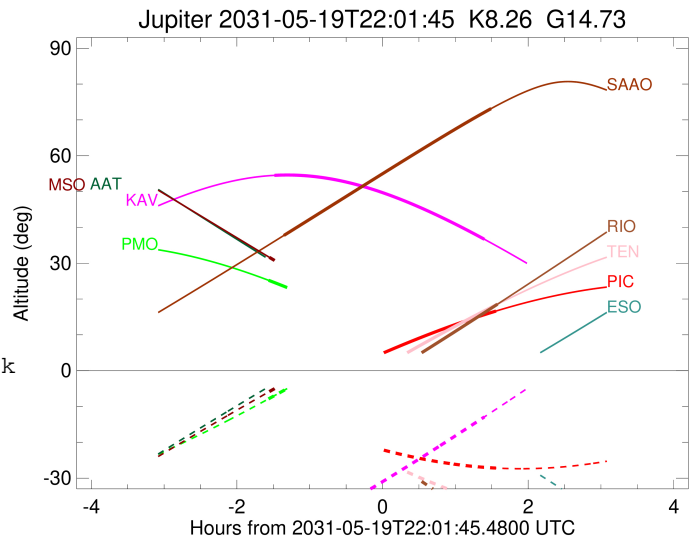
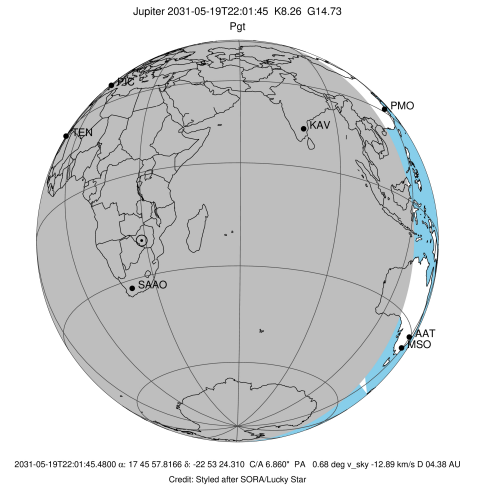


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-19T20:40:28.917	37.74	-61.94	71491.0	-19.44	-21.95
Jupiter	E	2031-05-19T23:31:12.214	73.13	-72.12	71491.1	-18.64	-21.08


```

target          : Jupiter
target radius (km) : 71492.00
C/A epoch       : 2031-05-19T21:54:36.980
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  : 4068854417783854336
2Mass ID (if available) : 17455782-2253242
ICRS Star Coord at Epoch: 17h 45m 57.81662s -22:53:24.31021s
RUWE (>1.4 is poor) : 0.96
K magnitude     : 8.255
G magnitude     : 14.726
RP magnitude    : 13.186
BP magnitude    : 18.183
DUPflag        : 0
Distance (au)   : 4.378
f0 (km)        : 0.00
g0 (km)        : 0.00
skyplane vel. (km/s) : -12.89
Sun-Target sep (deg) : 151.53
Sun-Moon sep (deg) : 136.51
B (ring opening deg) : -2.60
PA of pole (deg) : 0.67
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 7.877
C/A sky separation (km) : 25010.9
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	2031-05-19T20:28:31.867	31.63	-5.84	71490.9	-19.82	-22.37
Jupiter	E	2031-05-19T23:21:34.420	-1.85x	23.30x	71490.8	-21.11	-23.80