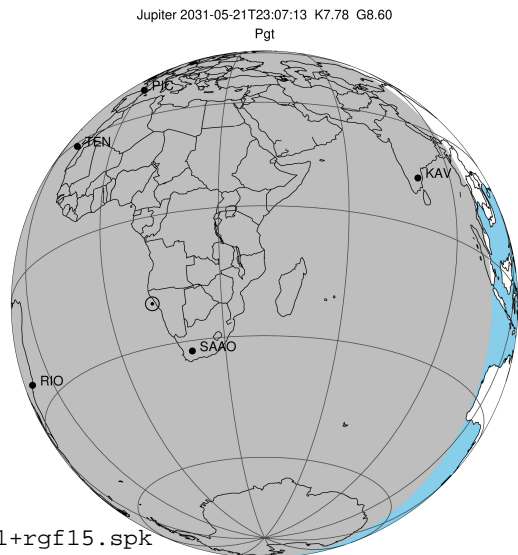


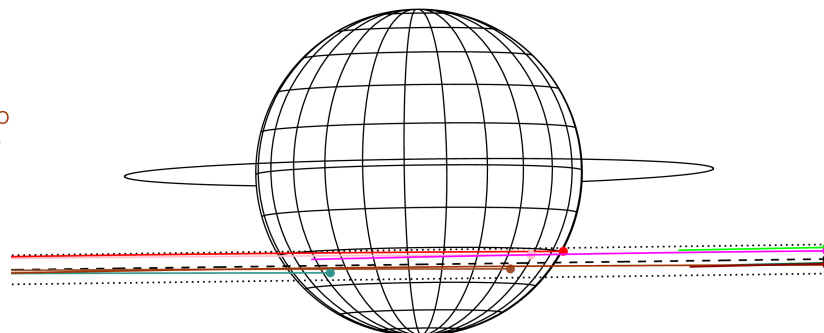
target : Jupiter  
 target radius (km) : 71492.00  
 C/A epoch : 2031-05-21T23:07:13.290  
 Event type : Pgt  
 : Jupiter occs: geocentric, topocentric  
 : Not a ringed target  
 Gaia source ID : 4068852081319759360  
 2Mass ID (if available) : 17450475-2253207

Jupiter 2031-05-21T23:07:13 K7.78 G8.60 Pgt

ICRS Star Coord at Epoch: 17h 45m 04.75734s -22:53:20.92577s  
 RUWE (>1.4 is poor) : 0.95  
 K magnitude : 7.775  
 G magnitude : 8.603  
 RP magnitude : 8.258  
 BP magnitude : 8.783  
 DUPflag : 0  
 Distance (au) : 4.362  
 f0 (km) : 0.00  
 g0 (km) : 0.00  
 skyplane vel. (km/s) : -13.41  
 Sun-Target sep (deg) : 153.70  
 Sun-Moon sep (deg) : 161.06  
 B (ring opening deg) : -2.60  
 PA of pole (deg) : 0.77  
 Pole direction: RA (deg): 268.05694  
 Dec (deg): 64.49651  
 C/A sky separation (") : 12.725  
 C/A sky separation (km) : 40259.8  
 NAIF SPICE kernels : RAJobs\_U111+rgf15.spk



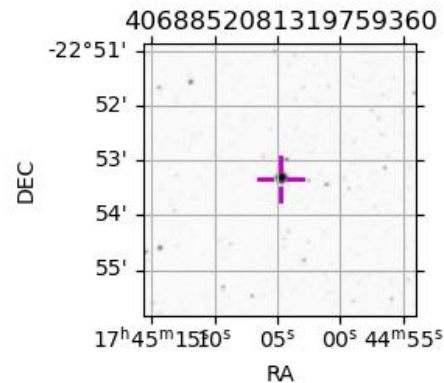
Earth  
 PIC  
 PMO  
 TEN  
 KAV  
 RIO  
 ESO  
 AAT  
 SAAO  
 MSO



2031-05-21T23:07:13.2900 α: 17 45 04.7573 δ: -22 53 20.926 C/A \*\*\*\*\* PA 0.76 deg v\_sky -13.41 km/s D 04.36 AU  
 Credit: Styled after SORA/Lucky Star

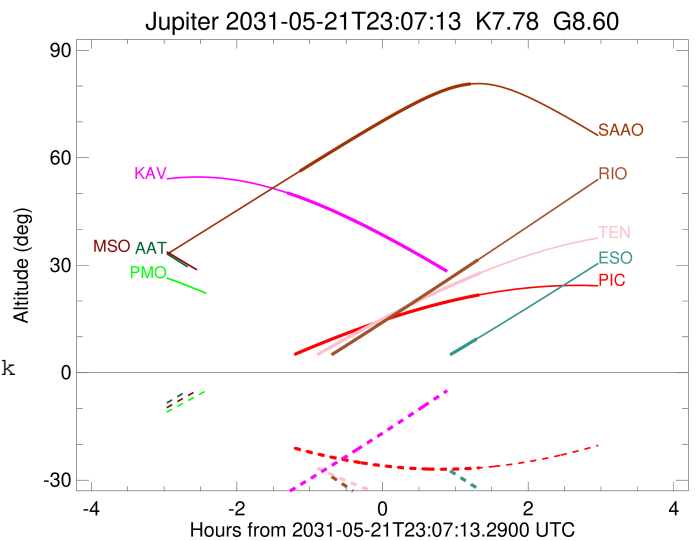
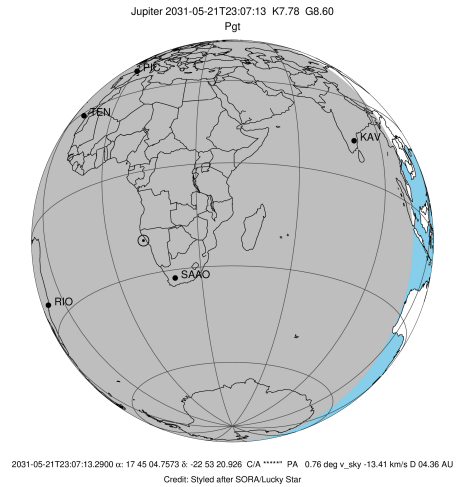
Observable events with sun below -5 deg and altitude above 5 deg

Obs	Location	lat	Elon	Target	Observed Events Interval	OCode
PIC	Pic du Midi	42.9	0.1	+ +	MAY 21 21:54 - MAY 22 00:27	Pie
PAL	Palomar Mt (200")	33.4	243.1			Pnn
PMO	Purple Mtn Obs. Nanking	32.1	118.8			Pnn
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 22 00:28 - MAY 22 00:28	Pne
IRTF	Mauna Kea/IRTF	19.8	204.5			Pnn
KAV	Kavalur Observatory	12.6	78.8	+	MAY 21 21:48 - MAY 21 21:48	Pin
RIO	Rio de Janeiro	-22.9	316.8	+	MAY 22 00:26 - MAY 22 00:26	Pne
ESO	European Southern Obs. (3.6m)	-29.3	289.3	+	MAY 22 00:24 - MAY 22 00:24	Pne
AAT	Siding Spring (AAT)	-31.3	149.1			Pnn
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8	+ +	MAY 21 21:59 - MAY 22 00:19	Pie
MSO	Mt. Stromlo Observatory	-35.3	149.0			Pnn



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-21T23:11:15.280
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      : 4068852081319759360
2Mass ID (if available) : 17450475-2253207
ICRS Star Coord at Epoch: 17h 45m 04.75734s -22:53:20.92577s
RUWE (>1.4 is poor) : 0.95
K magnitude          : 7.775
G magnitude          : 8.603
RP magnitude         : 8.258
BP magnitude         : 8.783
DUPflag             : 0
Distance (au)       : 4.362
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -13.41
Sun-Target sep (deg) : 153.70
Sun-Moon sep (deg)  : 160.68
B (ring opening deg) : -2.60
PA of pole (deg)    : 0.77
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (" ) : 11.031
C/A sky separation (km) : 34899.6
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
    
```

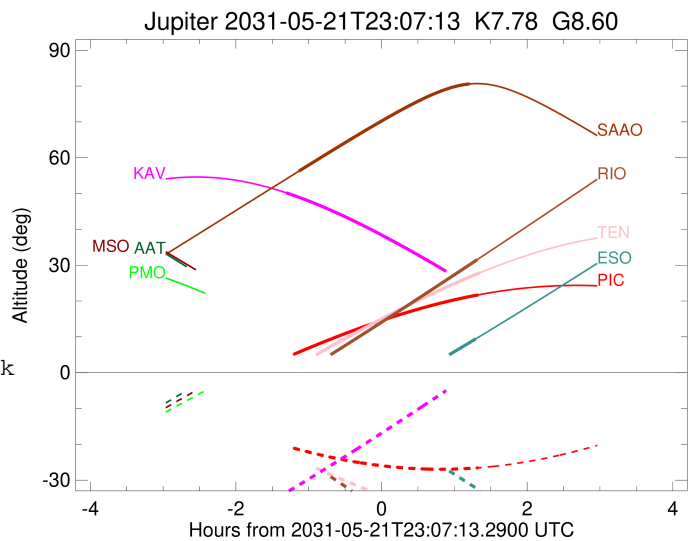
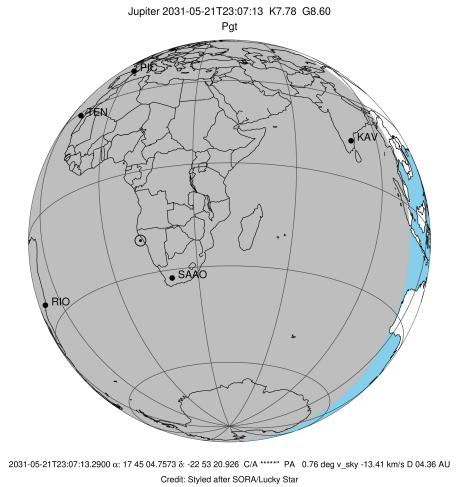


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-21T21:54:58.214	5.12	-21.08	71489.7	-29.63	-32.98
Jupiter	E	2031-05-22T00:27:04.017	21.72	-26.55	71489.8	-28.89	-32.19

```

target          : Jupiter
target radius (km) : 71492.00
C/A epoch       : 2031-05-21T23:13:28.310
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  : 4068852081319759360
2Mass ID (if available) : 17450475-2253207
ICRS Star Coord at Epoch: 17h 45m 04.75734s -22:53:20.92577s
RUWE (>1.4 is poor) : 0.95
K magnitude     : 7.775
G magnitude     : 8.603
RP magnitude    : 8.258
BP magnitude    : 8.783
DUPflag        : 0
Distance (au)   : 4.362
f0 (km)         : 0.00
g0 (km)         : 0.00
skyplane vel. (km/s) : -13.41
Sun-Target sep (deg) : 153.70
Sun-Moon sep (deg) : 160.47
B (ring opening deg) : -2.60
PA of pole (deg) : 0.77
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 11.473
C/A sky separation (km) : 36298.3
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
    
```

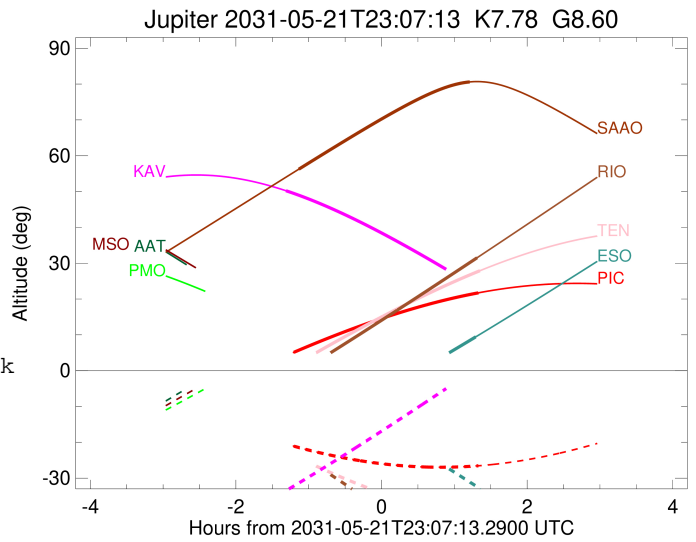
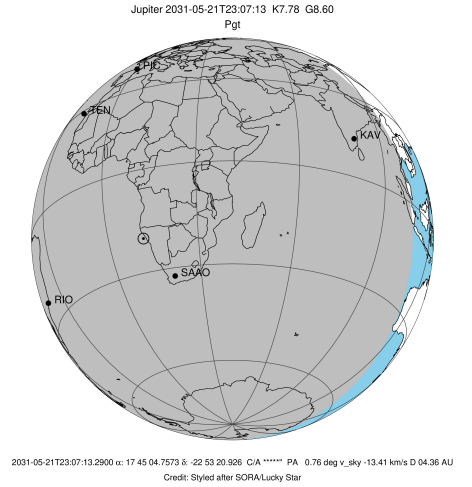


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-21T21:57:53.210	1.99x	-24.16	71489.5	-31.10	-34.54
Jupiter	E	2031-05-22T00:28:22.217	27.90	-40.86	71489.7	-29.98	-33.35

```

target           : Jupiter
target radius (km) : 71492.00
C/A epoch       : 2031-05-21T23:02:15.220
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  : 4068852081319759360
2Mass ID (if available) : 17450475-2253207
ICRS Star Coord at Epoch: 17h 45m 04.75734s -22:53:20.92577s
RUWE (>1.4 is poor) : 0.95
K magnitude     : 7.775
G magnitude     : 8.603
RP magnitude    : 8.258
BP magnitude    : 8.783
DUPflag        : 0
Distance (au)   : 4.362
f0 (km)        : 0.00
g0 (km)        : 0.00
skyplane vel. (km/s) : -13.41
Sun-Target sep (deg) : 153.70
Sun-Moon sep (deg) : 161.73
B (ring opening deg) : -2.60
PA of pole (deg) : 0.77
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 11.701
C/A sky separation (km) : 37019.0
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
    
```

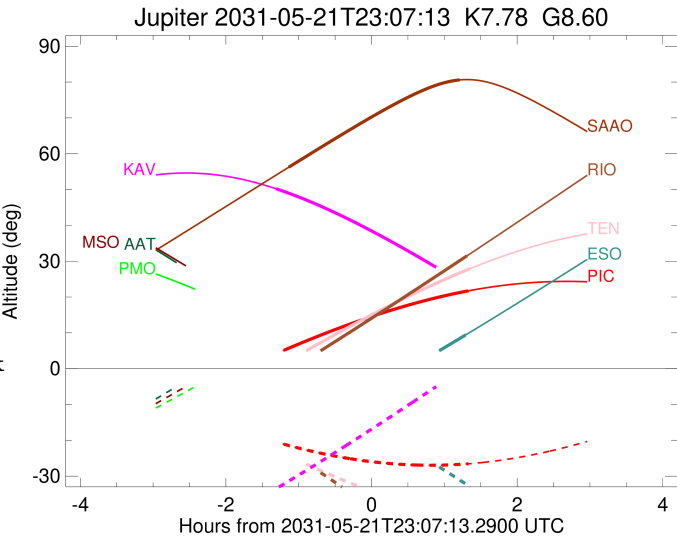
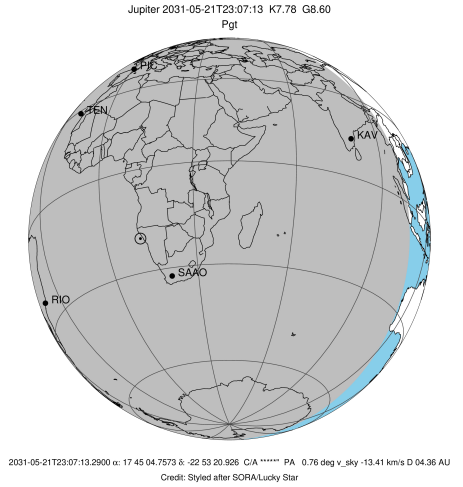


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-21T21:48:28.410	50.22	-33.51	71489.6	-30.84	-34.26
Jupiter	E	2031-05-22T00:16:27.067	25.04	-1.38x	71489.4	-31.66	-35.12

```

target           : Jupiter
target radius (km) : 71492.00
C/A epoch       : 2031-05-21T23:15:04.640
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  : 4068852081319759360
2Mass ID (if available) : 17450475-2253207
ICRS Star Coord at Epoch: 17h 45m 04.75734s -22:53:20.92577s
RUWE (>1.4 is poor) : 0.95
K magnitude     : 7.775
G magnitude     : 8.603
RP magnitude    : 8.258
BP magnitude    : 8.783
DUPflag        : 0
Distance (au)   : 4.362
f0 (km)        : 0.00
g0 (km)        : 0.00
skyplane vel. (km/s) : -13.41
Sun-Target sep (deg) : 153.70
Sun-Moon sep (deg) : 160.35
B (ring opening deg) : -2.60
PA of pole (deg) : 0.77
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 13.359
C/A sky separation (km) : 42265.8
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
    
```

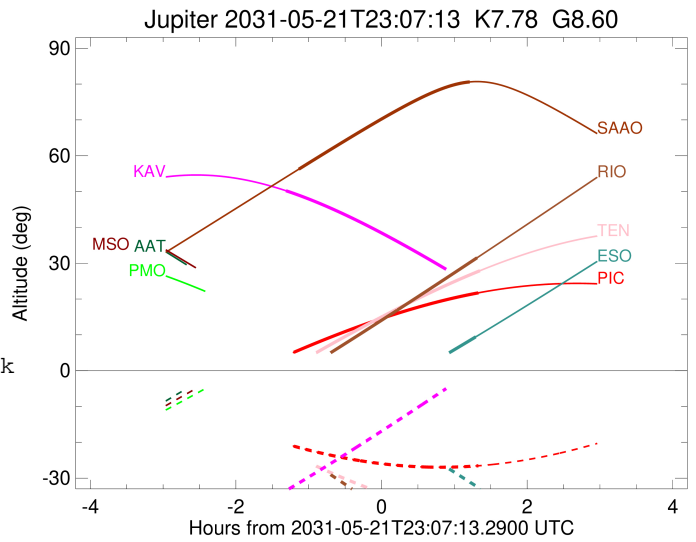
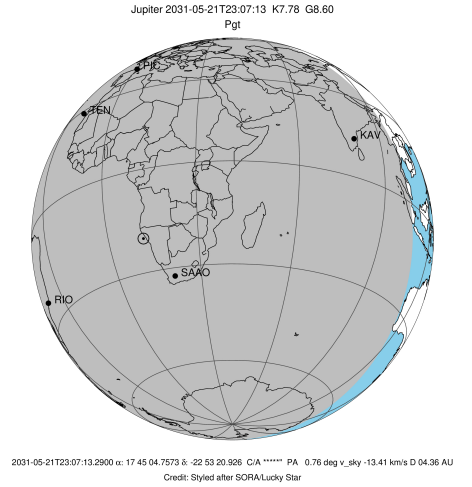


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-21T22:03:20.630	0.35x	-24.07	71488.6	-36.92	-40.58
Jupiter	E	2031-05-22T00:26:02.198	31.52	-56.62	71488.9	-35.51	-39.13

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-21T23:14:18.770
Event type          : Pgt
                    : Jupiter occs: geocentric, topocentric
                    : Not a ringed target
Observer code       : ESO
Location            : European Southern Obs. (3.6m)
Latitude (deg)      : -29.26097
E. Longitude (deg)  : 289.26831
Altitude (km)       : 2.400
Gaia source ID      : 4068852081319759360
2Mass ID (if available) : 17450475-2253207
ICRS Star Coord at Epoch: 17h 45m 04.75734s -22:53:20.92577s
RUWE (>1.4 is poor) : 0.95
K magnitude          : 7.775
G magnitude          : 8.603
RP magnitude         : 8.258
BP magnitude         : 8.783
DUPflag             : 0
Distance (au)        : 4.362
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -13.41
Sun-Target sep (deg) : 153.70
Sun-Moon sep (deg)   : 160.34
B (ring opening deg) : -2.60
PA of pole (deg)     : 0.77
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation ("): 13.874
C/A sky separation (km): 43893.8
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
    
```

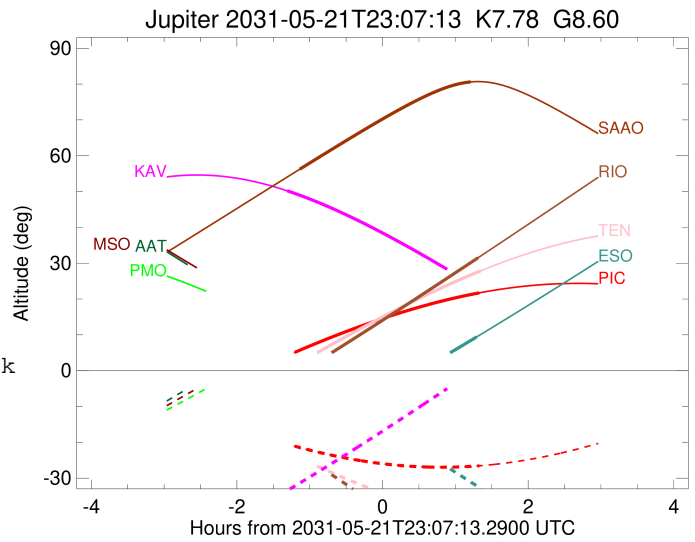
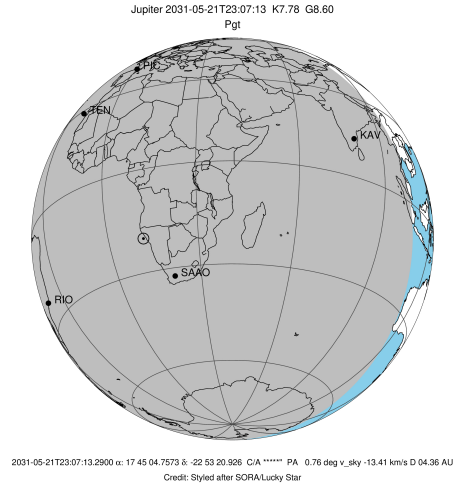


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-21T22:03:04.069	-17.42x	-2.22x	71488.4	-38.44	-42.12
Jupiter	E	2031-05-22T00:24:51.029	9.43	-32.15	71488.6	-37.16	-40.82

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-21T23:09:36.390
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        : 4068852081319759360
2Mass ID (if available) : 17450475-2253207
ICRS Star Coord at Epoch: 17h 45m 04.75734s -22:53:20.92577s
RUWE (>1.4 is poor)  : 0.95
K magnitude           : 7.775
G magnitude           : 8.603
RP magnitude          : 8.258
BP magnitude          : 8.783
DUPflag              : 0
Distance (au)         : 4.362
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s)  : -13.41
Sun-Target sep (deg)  : 153.70
Sun-Moon sep (deg)    : 161.09
B (ring opening deg)  : -2.60
PA of pole (deg)      : 0.77
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 13.093
C/A sky separation (km) : 41424.3
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	2031-05-21T21:59:02.481	56.23	-75.82	71488.8	-35.69	-39.31
Jupiter	E	2031-05-22T00:19:54.471	80.59	-63.43	71488.9	-35.23	-38.84