

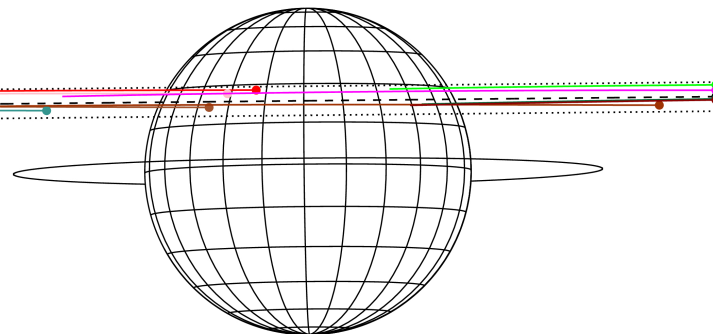
target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2031-05-16T21:39:30.490
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 4068933440784563200
 2Mass ID (if available) : 17471171-2253189

Jupiter 2031-05-16T21:39:30 K9.45 G13.04 Pgt

ICRS Star Coord at Epoch: 17h 47m 11.71023s -22:53:19.02085s
 RUWE (>1.4 is poor) : 1.13
 K magnitude : 9.447
 G magnitude : 13.037
 RP magnitude : 12.026
 BP magnitude : 14.040
 DUPflag : 0
 Distance (au) : 4.403
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -12.06
 Sun-Target sep (deg) : 148.34
 Sun-Moon sep (deg) : 97.19
 B (ring opening deg) : -2.61
 PA of pole (deg) : 0.54
 Pole direction: RA (deg): 268.05694
 Dec (deg): 64.49651
 C/A sky separation (") : 9.703
 C/A sky separation (km) : 30984.4
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk



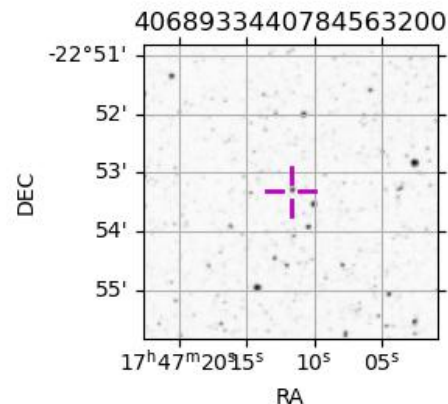
Earth
 PIC
 PMO
 TEN
 KAV
 RIO
 ESO
 AAT
 SAAO
 MSO



2031-05-16T21:39:30.490 at: 17 47 11.71023 s: -22 53 19.021 C/A 9.691" PA 180.58 deg v_sky -12.06 km/s D 04.40 AU
 Credit: Styled after SORA/Lucky Star

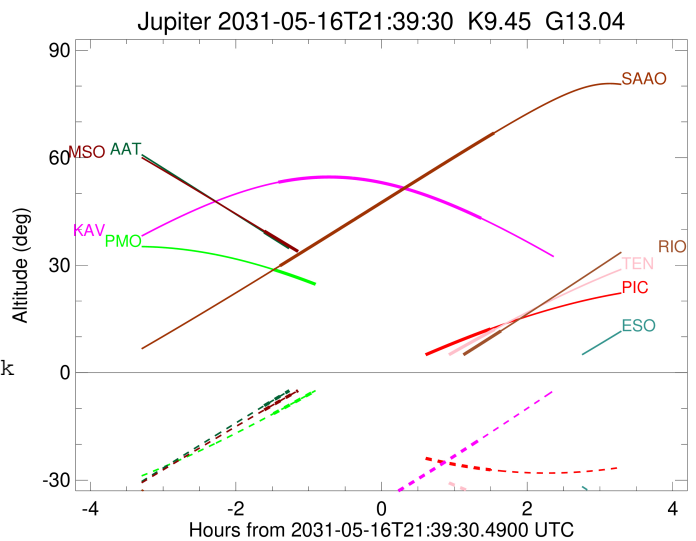
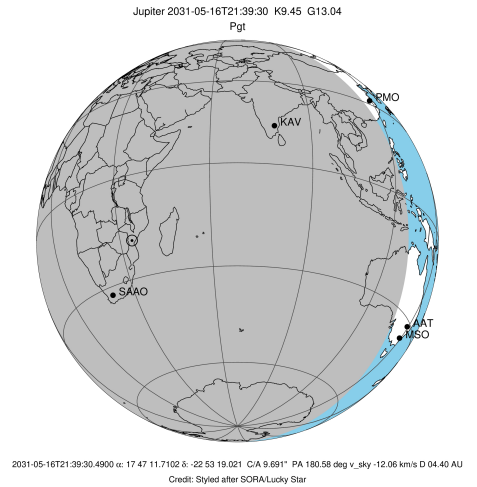
Observable events with sun below -5 deg and altitude above 5 deg

Obs	Location	lat	Elon	Target	Observed Events Interval	OCode
PIC	Pic du Midi	42.9	0.1	+	MAY 16 23:09 - MAY 16 23:09	Pne
PAL	Palomar Mt (200")	33.4	243.1			Pnn
PMO	Purple Mtn Obs. Nanking	32.1	118.8	+	MAY 16 20:10 - MAY 16 20:10	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 16 23:12 - MAY 16 23:12	Pne
IRTF	Mauna Kea/IRTF	19.8	204.5			Pnn
KAV	Kavalur Observatory	12.6	78.8	+ +	MAY 16 20:14 - MAY 16 23:01	Pie
RIO	Rio de Janeiro	-22.9	316.8	+	MAY 16 23:17 - MAY 16 23:17	Pne
ESO	European Southern Obs. (3.6m)	-29.3	289.3			Pnn
AAT	Siding Spring (AAT)	-31.3	149.1	+	MAY 16 20:02 - MAY 16 20:02	Pin
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8	+ +	MAY 16 20:15 - MAY 16 23:12	Pie
MSO	Mt. Stromlo Observatory	-35.3	149.0	+	MAY 16 20:02 - MAY 16 20:02	Pin



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-16T21:44:59.190
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        : 4068933440784563200
2Mass ID (if available) : 17471171-2253189
ICRS Star Coord at Epoch: 17h 47m 11.71023s -22:53:19.02085s
RUWE (>1.4 is poor) : 1.13
K magnitude           : 9.447
G magnitude           : 13.037
RP magnitude          : 12.026
BP magnitude          : 14.040
DUPflag              : 0
Distance (au)         : 4.403
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -12.06
Sun-Target sep (deg) : 148.34
Sun-Moon sep (deg)   : 97.11
B (ring opening deg) : -2.61
PA of pole (deg)     : 0.54
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation ("): 11.169
C/A sky separation (km): 35667.2
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
    
```

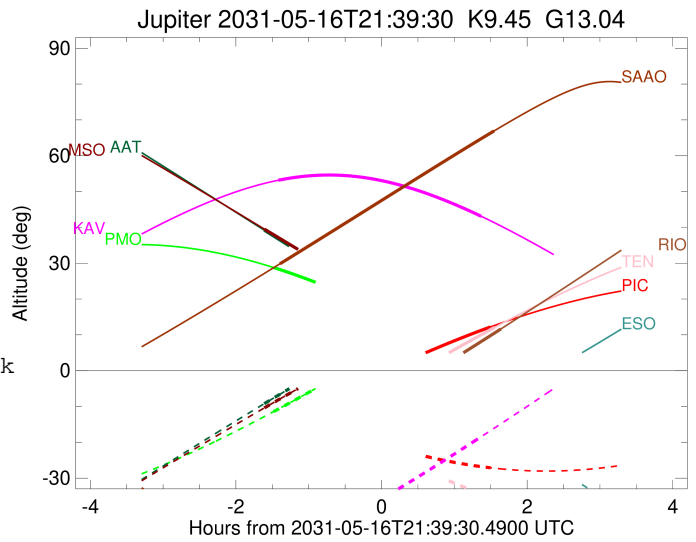
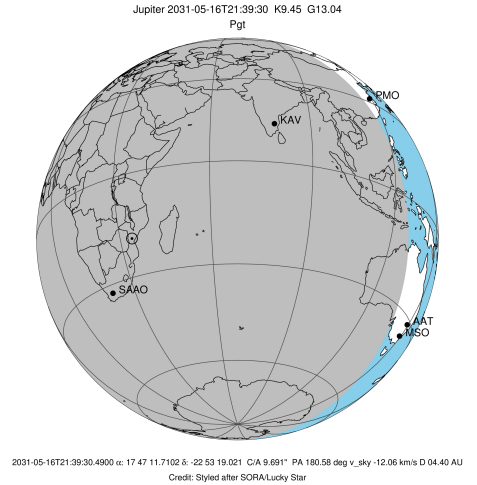


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-16T20:19:47.656	-13.80x	-10.63	71489.8	29.32	32.65
Jupiter	E	2031-05-16T23:09:17.720	12.21	-27.11	71489.6	30.37	33.76

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-16T21:34:19.120
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      : 4068933440784563200
2Mass ID (if available) : 17471171-2253189
ICRS Star Coord at Epoch: 17h 47m 11.71023s -22:53:19.02085s
RUWE (>1.4 is poor) : 1.13
K magnitude          : 9.447
G magnitude          : 13.037
RP magnitude         : 12.026
BP magnitude         : 14.040
DUPflag             : 0
Distance (au)       : 4.403
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -12.06
Sun-Target sep (deg) : 148.34
Sun-Moon sep (deg)  : 97.55
B (ring opening deg) : -2.61
PA of pole (deg)    : 0.54
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation ("): 11.111
C/A sky separation (km): 35481.7
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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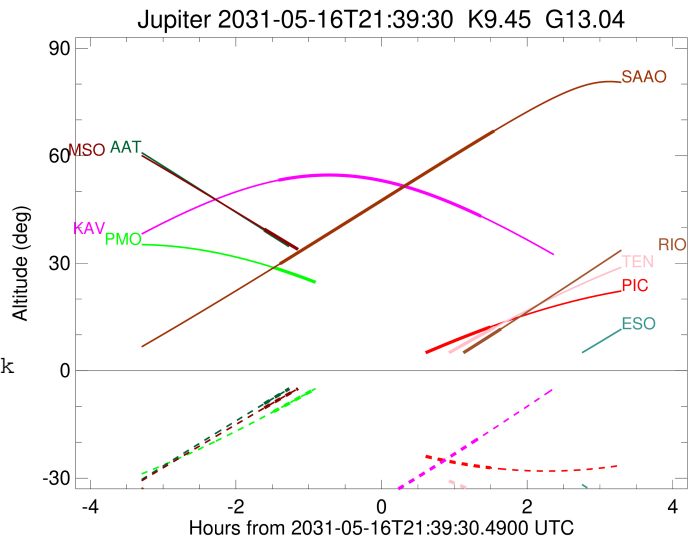
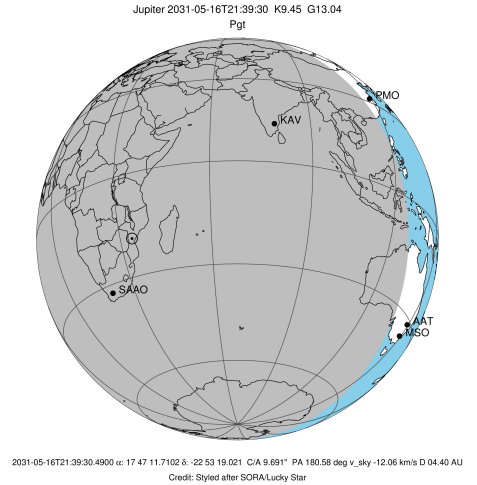


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-16T20:10:30.378	28.79	-11.44	71489.7	30.20	33.58
Jupiter	E	2031-05-16T22:58:45.070	3.03x	21.93x	71489.8	29.07	32.39

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-16T21:46:37.820
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        : 4068933440784563200
2Mass ID (if available) : 17471171-2253189
ICRS Star Coord at Epoch: 17h 47m 11.71023s -22:53:19.02085s
RUWE (>1.4 is poor) : 1.13
K magnitude           : 9.447
G magnitude           : 13.037
RP magnitude          : 12.026
BP magnitude          : 14.040
DUPflag              : 0
Distance (au)         : 4.403
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -12.06
Sun-Target sep (deg) : 148.34
Sun-Moon sep (deg)   : 96.99
B (ring opening deg) : -2.61
PA of pole (deg)     : 0.54
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation ("): 10.646
C/A sky separation (km): 33996.6
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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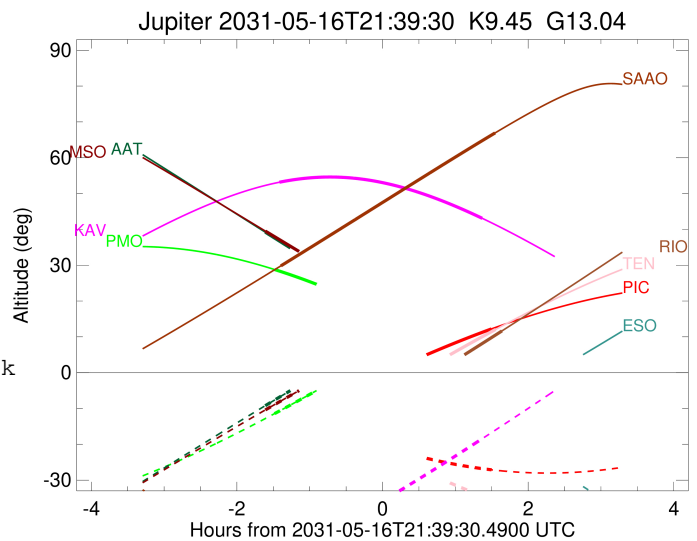
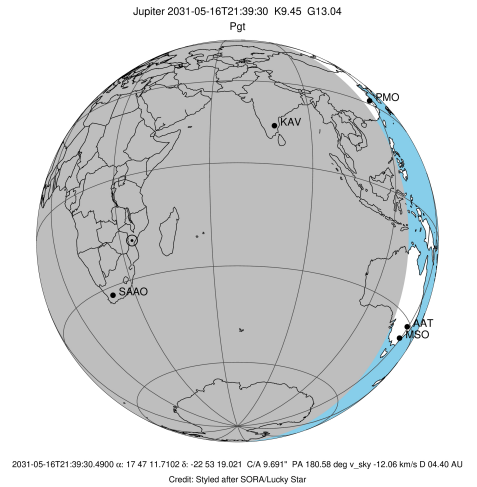


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-16T20:19:27.457	-22.81x	-6.88	71490.0	27.65	30.87
Jupiter	E	2031-05-16T23:12:37.810	12.05	-35.72	71489.8	29.03	32.35

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-16T21:38:05.260
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        : 4068933440784563200
2Mass ID (if available) : 17471171-2253189
ICRS Star Coord at Epoch: 17h 47m 11.71023s -22:53:19.02085s
RUWE (>1.4 is poor)  : 1.13
K magnitude           : 9.447
G magnitude           : 13.037
RP magnitude          : 12.026
BP magnitude          : 14.040
DUPflag              : 0
Distance (au)         : 4.403
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -12.06
Sun-Target sep (deg)  : 148.34
Sun-Moon sep (deg)    : 97.97
B (ring opening deg) : -2.61
PA of pole (deg)     : 0.54
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 10.849
C/A sky separation (km) : 34645.4
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
    
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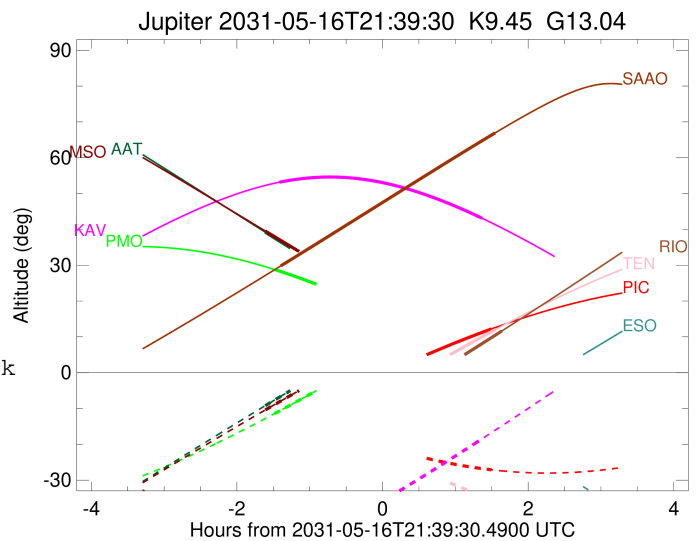
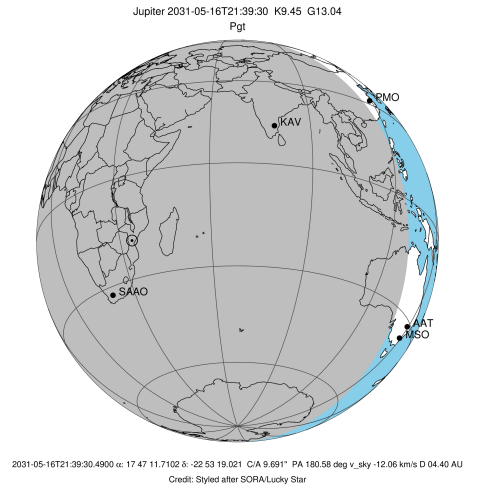


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-16T20:14:35.552	53.16	-50.82	71489.8	28.98	32.29
Jupiter	E	2031-05-16T23:01:40.377	43.09	-18.43	71489.9	28.64	31.93

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-16T21:46:38.200
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        : 4068933440784563200
2Mass ID (if available) : 17471171-2253189
ICRS Star Coord at Epoch: 17h 47m 11.71023s -22:53:19.02085s
RUWE (>1.4 is poor)  : 1.13
K magnitude           : 9.447
G magnitude           : 13.037
RP magnitude          : 12.026
BP magnitude          : 14.040
DUPflag              : 0
Distance (au)         : 4.403
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -12.06
Sun-Target sep (deg)  : 148.34
Sun-Moon sep (deg)    : 96.94
B (ring opening deg) : -2.61
PA of pole (deg)      : 0.54
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 8.742
C/A sky separation (km) : 27916.8
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
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neptune_ringframes_rfrench20220702a_v1.tf
earth_flat_IAU.spk
    
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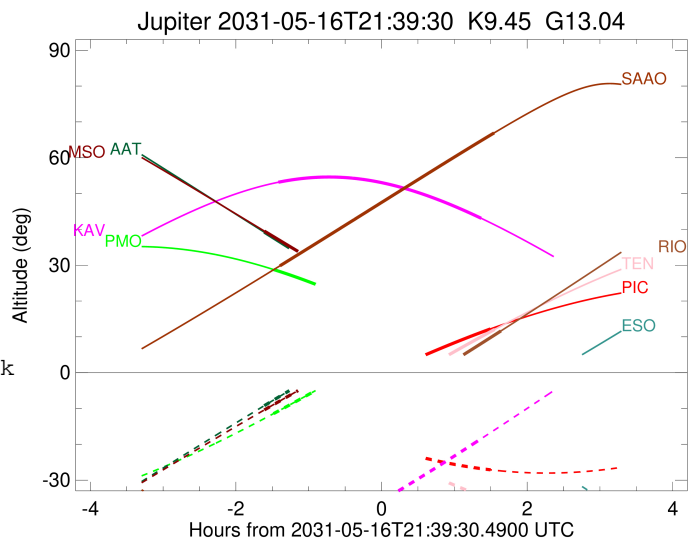
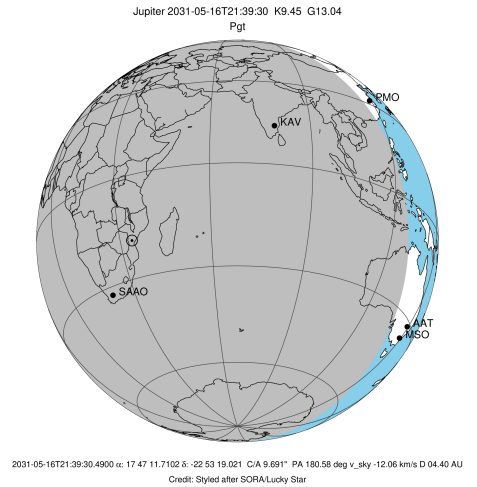


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-16T20:13:57.722	-25.16x	0.37x	71490.7	22.32	25.12
Jupiter	E	2031-05-16T23:17:58.277	11.66	-40.81	71490.5	23.70	26.62

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-16T21:32:33.620
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      : 4068933440784563200
2Mass ID (if available) : 17471171-2253189
ICRS Star Coord at Epoch: 17h 47m 11.71023s -22:53:19.02085s
RUWE (>1.4 is poor) : 1.13
K magnitude          : 9.447
G magnitude          : 13.037
RP magnitude         : 12.026
BP magnitude         : 14.040
DUPflag             : 0
Distance (au)       : 4.403
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -12.06
Sun-Target sep (deg) : 148.34
Sun-Moon sep (deg)  : 97.60
B (ring opening deg) : -2.61
PA of pole (deg)    : 0.54
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (" ) : 8.888
C/A sky separation (km) : 28382.8
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
    
```

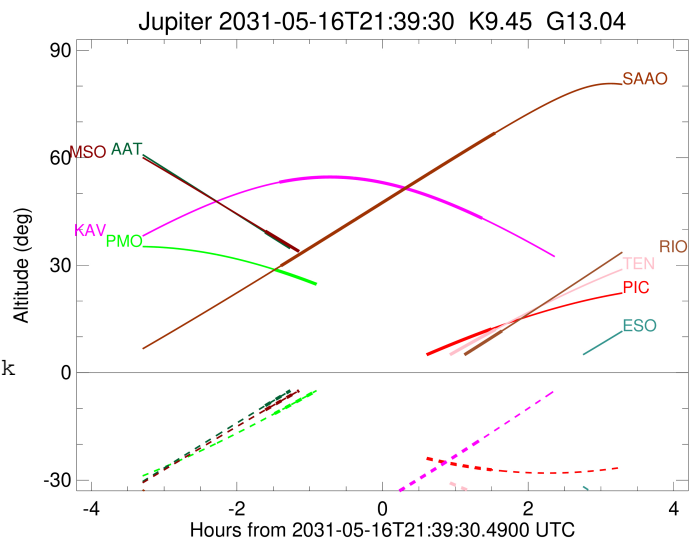
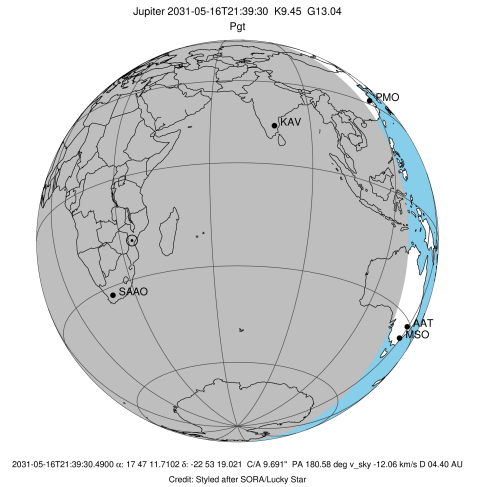


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-16T20:02:51.798	39.23	-9.22	71490.5	24.07	27.02
Jupiter	E	2031-05-16T23:03:14.557	2.06x	24.16x	71490.6	22.60	25.42

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-16T21:44:28.910
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      : 4068933440784563200
2Mass ID (if available) : 17471171-2253189
ICRS Star Coord at Epoch: 17h 47m 11.71023s -22:53:19.02085s
RUWE (>1.4 is poor) : 1.13
K magnitude          : 9.447
G magnitude          : 13.037
RP magnitude         : 12.026
BP magnitude         : 14.040
DUPflag             : 0
Distance (au)       : 4.403
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -12.06
Sun-Target sep (deg) : 148.34
Sun-Moon sep (deg)  : 97.80
B (ring opening deg) : -2.61
PA of pole (deg)    : 0.54
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation ("): 9.172
C/A sky separation (km) : 29289.4
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
    
```

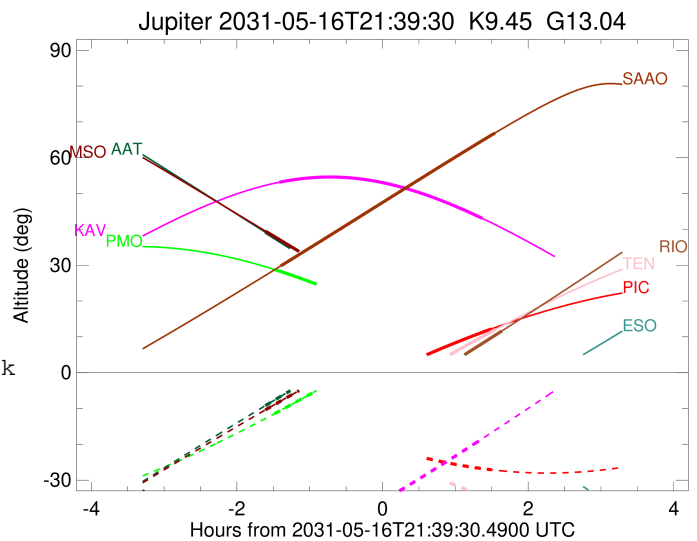
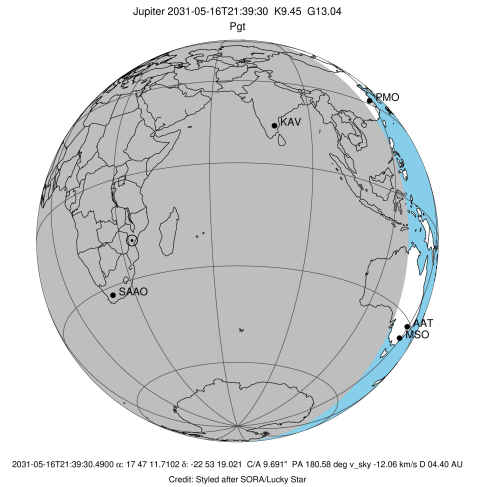


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-16T20:15:46.897	29.81	-56.62	71490.5	23.59	26.51
Jupiter	E	2031-05-16T23:12:18.656	66.92	-74.33	71490.4	24.53	27.52


```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-16T21:32:51.810
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       : 4068933440784563200
2Mass ID (if available) : 17471171-2253189
ICRS Star Coord at Epoch: 17h 47m 11.71023s -22:53:19.02085s
RUWE (>1.4 is poor) : 1.13
K magnitude           : 9.447
G magnitude           : 13.037
RP magnitude          : 12.026
BP magnitude          : 14.040
DUPflag              : 0
Distance (au)        : 4.403
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -12.06
Sun-Target sep (deg) : 148.34
Sun-Moon sep (deg)   : 97.61
B (ring opening deg) : -2.61
PA of pole (deg)     : 0.54
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 8.773
C/A sky separation (km) : 28017.5
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	2031-05-16T20:02:54.289	39.53	-10.41	71490.5	23.72	26.64
Jupiter	E	2031-05-16T23:03:45.760	3.75x	21.38x	71490.7	22.31	25.11