

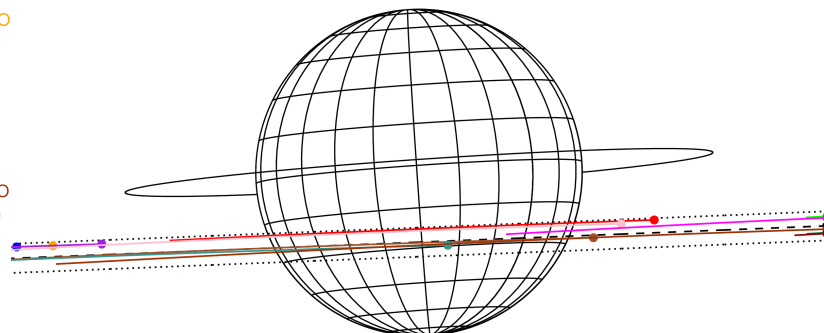
target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2031-07-19T22:35:56.450
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 4114516860736942464
 2Mass ID (if available) : 17154903-2240311

Jupiter 2031-07-19T22:35:56 K9.92 G14.34 Pgt

ICRS Star Coord at Epoch: 17h 15m 49.01325s -22:40:31.09890s
 RUWE (>1.4 is poor) : 1.04
 K magnitude : 9.916
 G magnitude : 14.340
 RP magnitude : 13.187
 BP magnitude : 15.754
 DUPflag : 0
 Distance (au) : 4.420
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -10.68
 Sun-Target sep (deg) : 143.18
 Sun-Moon sep (deg) : 138.95
 B (ring opening deg) : -2.54
 PA of pole (deg) : 3.91
 Pole direction: RA (deg): 268.05689
 Dec (deg): 64.49652
 C/A sky separation (") : 9.512
 C/A sky separation (km) : 30491.4
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk



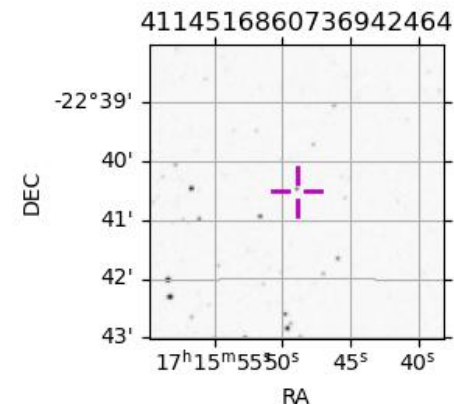
Earth
 PIC
 PAL
 PMO
 KPNO
 MCD
 TEN
 KAV
 RIO
 ESO
 AAT
 SAAO
 MSO



2031-07-19T22:35:56.4500 a: 17 15 49.0133 ð -22 40 31.099 C/A 9.523" PA 2.28 deg v_sky -10.68 km/s D 04.42 AU
 Credit: Styled after SORA/Lucky Star

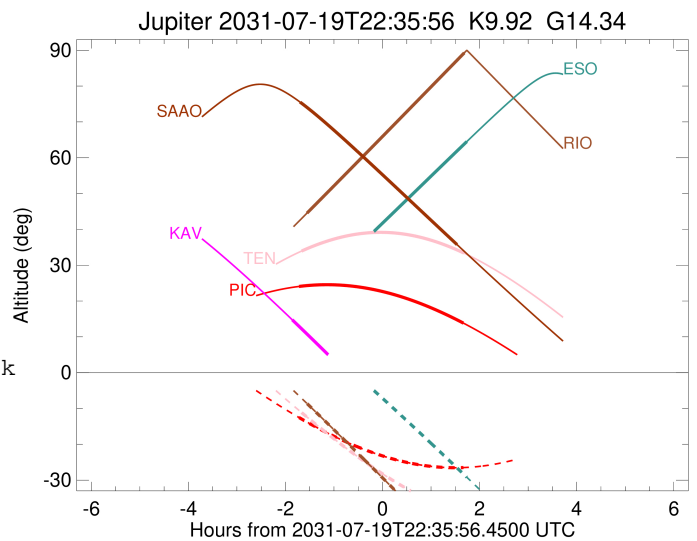
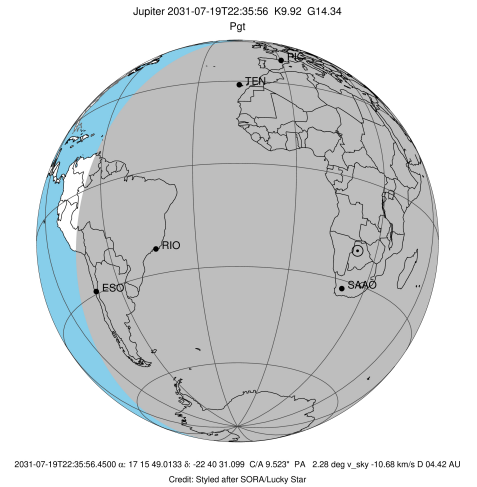
Observable events with sun below -5 deg and altitude above 5 deg

Obs	Location	lat	Elon	Target	Observed Events Interval	OCode
PIC	Pic du Midi	42.9	0.1	+ +	JUL 19 20:52 - JUL 20 00:15	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	+ +	JUL 19 20:55 - JUL 20 00:16	Pie
IRTF	Mauna Kea/IRTF	19.8	204.5			Pnn
KAV	Kavalur Observatory	12.6	78.8	+	JUL 19 20:44 - JUL 19 20:44	Pin
RIO	Rio de Janeiro	-22.9	316.8	+ +	JUL 19 21:02 - JUL 20 00:17	Pie
ESO	European Southern Obs. (3.6m)	-29.3	289.3	+	JUL 20 00:20 - JUL 20 00:20	Pne
AAT	Siding Spring (AAT)	-31.3	149.1			Pnn
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8	+ +	JUL 19 20:54 - JUL 20 00:07	Pie
MSO	Mt. Stromlo Observatory	-35.3	149.0			Pnn



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-07-19T22:34:04.310
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      : 4114516860736942464
2Mass ID (if available) : 17154903-2240311
ICRS Star Coord at Epoch: 17h 15m 49.01325s -22:40:31.09890s
RUWE (>1.4 is poor) : 1.04
K magnitude          : 9.916
G magnitude          : 14.340
RP magnitude         : 13.187
BP magnitude         : 15.754
DUPflag             : 0
Distance (au)       : 4.420
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -10.68
Sun-Target sep (deg) : 143.18
Sun-Moon sep (deg)  : 139.00
B (ring opening deg) : -2.54
PA of pole (deg)    : 3.91
Pole direction: RA (deg): 268.05689
Dec (deg): 64.49652
C/A sky separation ("): 7.714
C/A sky separation (km): 24727.4
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
    
```

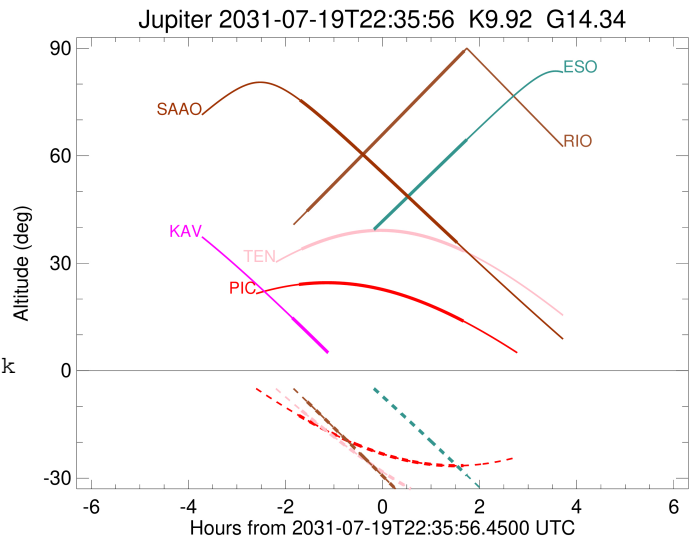
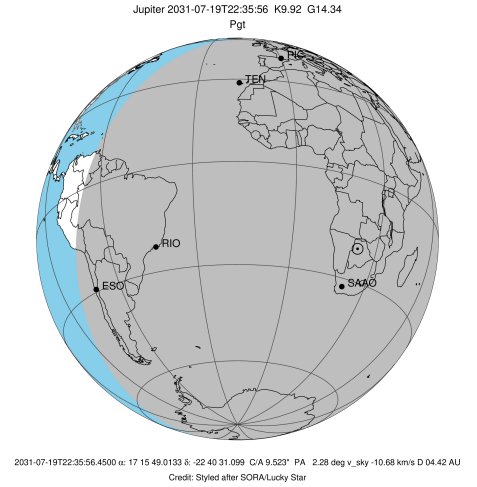


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-07-19T20:52:46.961	24.07	-12.52	71490.8	-21.85	-24.61
Jupiter	E	2031-07-20T00:15:56.332	13.83	-26.49	71491.1	-18.87	-21.33

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-07-19T22:36:10.310
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      : 4114516860736942464
2Mass ID (if available) : 17154903-2240311
ICRS Star Coord at Epoch: 17h 15m 49.01325s -22:40:31.09890s
RUWE (>1.4 is poor) : 1.04
K magnitude          : 9.916
G magnitude          : 14.340
RP magnitude         : 13.187
BP magnitude         : 15.754
DUPflag             : 0
Distance (au)       : 4.420
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -10.68
Sun-Target sep (deg) : 143.18
Sun-Moon sep (deg)  : 139.29
B (ring opening deg) : -2.54
PA of pole (deg)    : 3.91
Pole direction: RA (deg): 268.05689
Dec (deg): 64.49652
C/A sky separation (" ) : 7.970
C/A sky separation (km) : 25549.0
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
    
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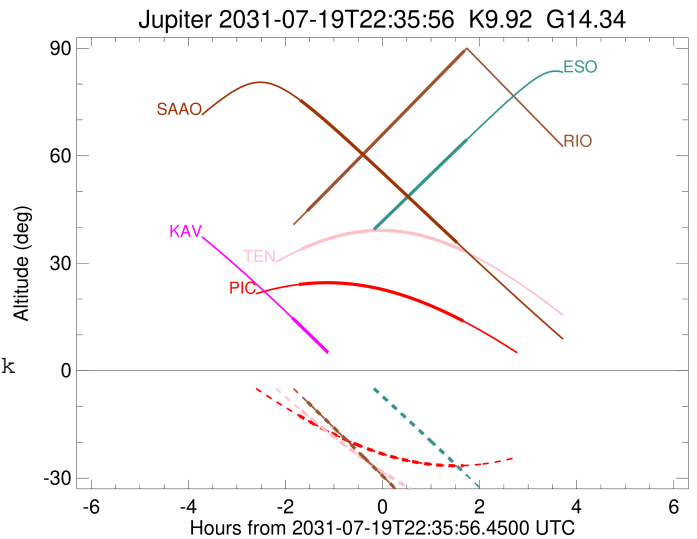
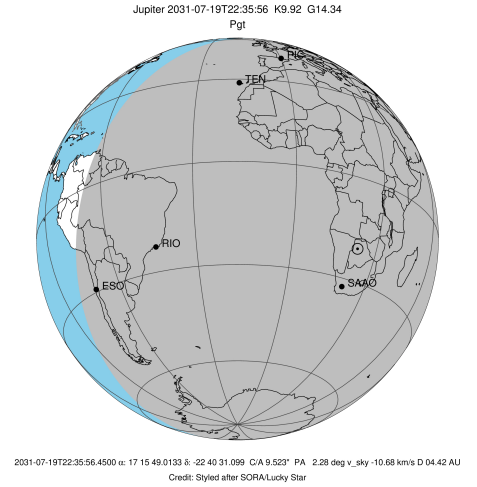


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-07-19T20:55:53.942	33.94	-11.13	71490.7	-22.78	-25.62
Jupiter	E	2031-07-20T00:16:37.626	33.38	-39.32	71491.0	-19.40	-21.92

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-07-19T22:25:33.600
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        : 4114516860736942464
2Mass ID (if available) : 17154903-2240311
ICRS Star Coord at Epoch: 17h 15m 49.01325s -22:40:31.09890s
RUWE (>1.4 is poor)  : 1.04
K magnitude           : 9.916
G magnitude           : 14.340
RP magnitude          : 13.187
BP magnitude          : 15.754
DUPflag              : 0
Distance (au)         : 4.420
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -10.68
Sun-Target sep (deg)  : 143.18
Sun-Moon sep (deg)    : 138.19
B (ring opening deg)  : -2.54
PA of pole (deg)      : 3.91
Pole direction: RA (deg): 268.05689
Dec (deg): 64.49652
C/A sky separation (") : 9.089
C/A sky separation (km) : 29135.0
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
    
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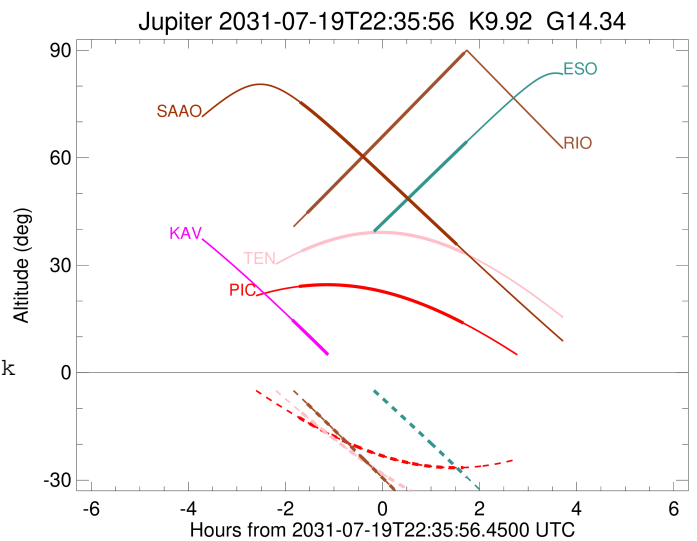
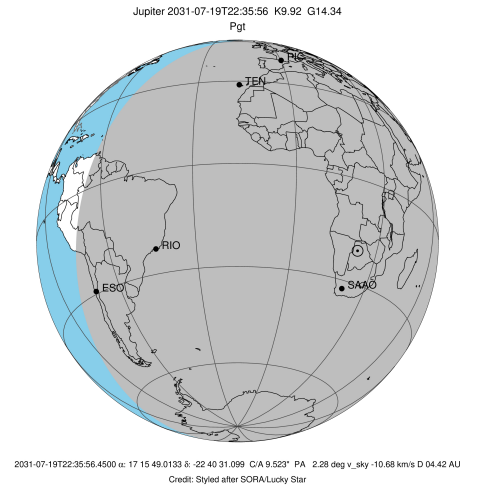


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-07-19T20:44:34.940	14.71	-46.60	71490.4	-24.75	-27.76
Jupiter	E	2031-07-20T00:08:41.690	-31.50x	-5.24	71490.6	-23.33	-26.22

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-07-19T22:40:10.880
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        : 4114516860736942464
2Mass ID (if available) : 17154903-2240311
ICRS Star Coord at Epoch: 17h 15m 49.01325s -22:40:31.09890s
RUWE (>1.4 is poor)  : 1.04
K magnitude           : 9.916
G magnitude           : 14.340
RP magnitude          : 13.187
BP magnitude          : 15.754
DUPflag              : 0
Distance (au)         : 4.420
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s)  : -10.68
Sun-Target sep (deg)  : 143.18
Sun-Moon sep (deg)    : 139.76
B (ring opening deg)  : -2.54
PA of pole (deg)      : 3.91
Pole direction: RA (deg): 268.05689
Dec (deg): 64.49652
C/A sky separation (") : 9.609
C/A sky separation (km) : 30802.7
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
    
```

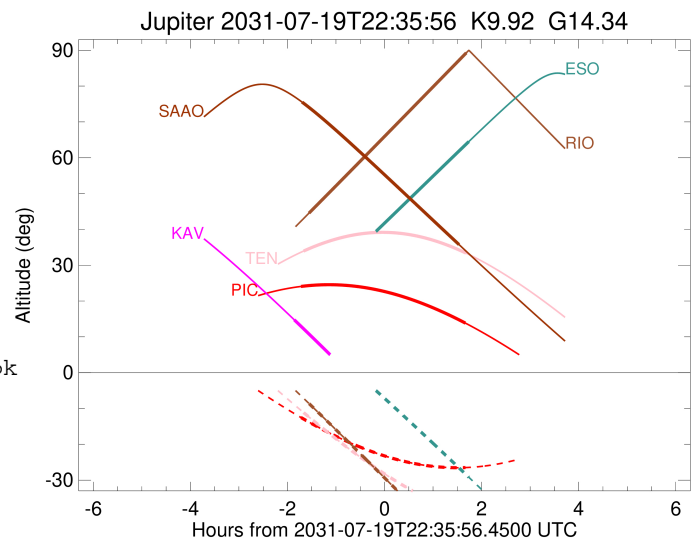
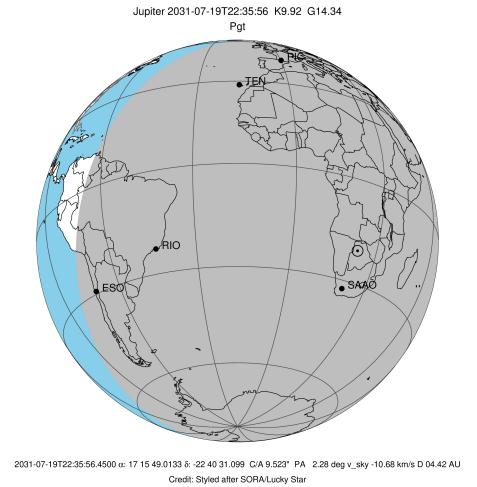


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-07-19T21:02:45.011	44.57	-8.64	71490.1	-27.70	-30.93
Jupiter	E	2031-07-20T00:17:05.140	89.28	-52.40	71490.6	-23.60	-26.51

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-07-19T22:43:17.520
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       : 4114516860736942464
2Mass ID (if available) : 17154903-2240311
ICRS Star Coord at Epoch: 17h 15m 49.01325s -22:40:31.09890s
RUWE (>1.4 is poor) : 1.04
K magnitude           : 9.916
G magnitude           : 14.340
RP magnitude          : 13.187
BP magnitude          : 15.754
DUPflag              : 0
Distance (au)        : 4.420
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -10.68
Sun-Target sep (deg) : 143.18
Sun-Moon sep (deg)   : 139.83
B (ring opening deg) : -2.54
PA of pole (deg)     : 3.91
Pole direction: RA (deg): 268.05689
Dec (deg): 64.49652
C/A sky separation ("): 10.040
C/A sky separation (km): 32183.1
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
    
```

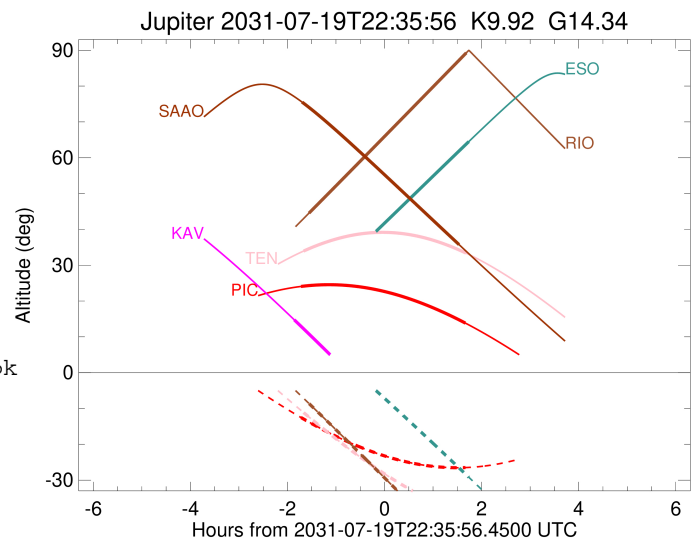
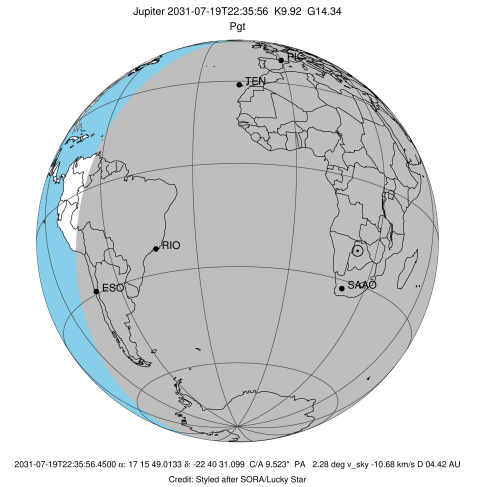


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-07-19T21:05:22.737	22.20	10.70x	71489.9	-29.12	-32.44
Jupiter	E	2031-07-20T00:20:08.873	64.50	-29.19	71490.5	-24.52	-27.51

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-07-19T22:30:29.690
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        : 4114516860736942464
2Mass ID (if available) : 17154903-2240311
ICRS Star Coord at Epoch: 17h 15m 49.01325s -22:40:31.09890s
RUWE (>1.4 is poor) : 1.04
K magnitude           : 9.916
G magnitude           : 14.340
RP magnitude          : 13.187
BP magnitude          : 15.754
DUPflag              : 0
Distance (au)         : 4.420
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -10.68
Sun-Target sep (deg) : 143.18
Sun-Moon sep (deg)   : 139.09
B (ring opening deg) : -2.54
PA of pole (deg)     : 3.91
Pole direction: RA (deg): 268.05689
Dec (deg): 64.49652
C/A sky separation ("): 9.931
C/A sky separation (km): 31834.7
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	2031-07-19T20:54:02.928	75.52	-63.15	71490.1	-27.78	-31.01
Jupiter	E	2031-07-20T00:07:58.872	35.76	-67.88	71490.4	-25.33	-28.39