

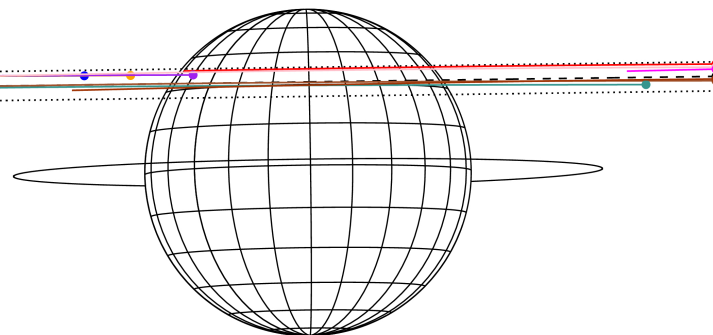
target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2031-05-22T03:00:35.390
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 4116890530206723584
 2Mass ID (if available) : 17450047-2252544

Jupiter 2031-05-22T03:00:35 K8.21 G14.68 Pgt

ICRS Star Coord at Epoch: 17h 45m 00.48204s -22:52:54.85890s
 RUWE (>1.4 is poor) : 0.96
 K magnitude : 8.211
 G magnitude : 14.683
 RP magnitude : 13.098
 BP magnitude : 18.036
 DUPflag : 0
 Distance (au) : 4.361
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -13.44
 Sun-Target sep (deg) : 153.88
 Sun-Moon sep (deg) : 163.02
 B (ring opening deg) : -2.61
 PA of pole (deg) : 0.78
 Pole direction: RA (deg): 268.05694
 Dec (deg): 64.49651
 C/A sky separation (") : 12.551
 C/A sky separation (km) : 39698.0
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLv1.spk
 naif0012.tls
 nep097.bsp
 nep101.bsp
 sat4401.bsp



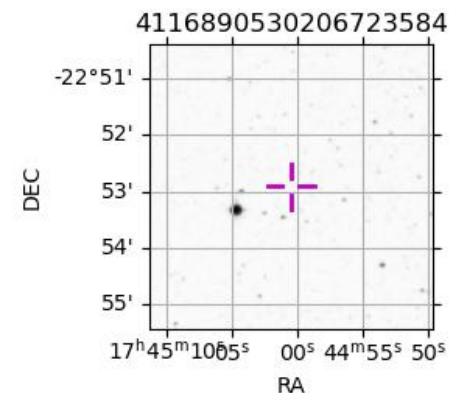
Earth
 PIC
 PAL
 KPNO
 MCD
 TEN
 KAV
 RIO
 ESO
 SAAO



2031-05-22T03:00:35.3900 a: 17 45 00.4820 s: -22 52 54.8589 C/A ***** PA 180.77 deg v_sky -13.44 km/s D 04.36 AU
 Credit: Styled after SORA/Lucky Star

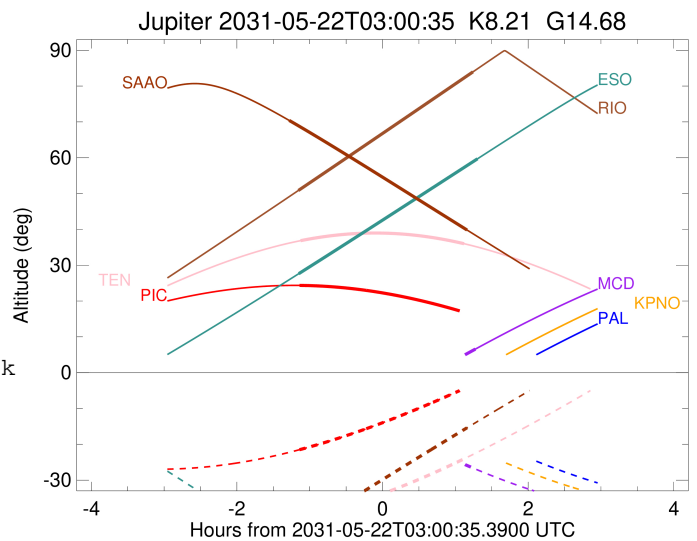
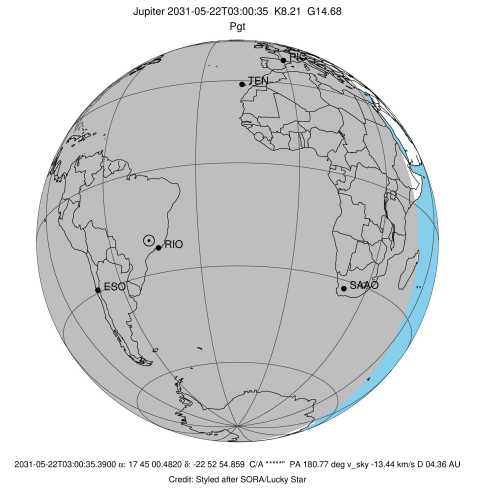
Observable events with sun below -5 deg and altitude above 5 deg

Obs	Location	lat	Elon	Target	Observed Events Interval	OCode
PIC	Pic du Midi	42.9	0.1	+	MAY 22 01:52 - MAY 22 01:52	Pin
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	+	MAY 22 04:17 - MAY 22 04:17	Pne
TEN	Teide Obs./Tenerife	28.3	343.5	+ +	MAY 22 01:53 - MAY 22 04:07	Pie
IRTF	Mauna Kea/IRTF	19.8	204.5			Pnn
KAV	Kavalur Observatory	12.6	78.8			Pnn
RIO	Rio de Janeiro	-22.9	316.8	+ +	MAY 22 01:51 - MAY 22 04:15	Pie
ESO	European Southern Obs. (3.6m)	-29.3	289.3	+ +	MAY 22 01:51 - MAY 22 04:18	Pie
AAT	Siding Spring (AAT)	-31.3	149.1			Pnn
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8	+ +	MAY 22 01:43 - MAY 22 04:10	Pie
MSO	Mt. Stromlo Observatory	-35.3	149.0			Pnn



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-22T02:59:02.830
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      : 4116890530206723584
2Mass ID (if available) : 17450047-2252544
ICRS Star Coord at Epoch: 17h 45m 00.48204s -22:52:54.85890s
RUWE (>1.4 is poor) : 0.96
K magnitude          : 8.211
G magnitude          : 14.683
RP magnitude         : 13.098
BP magnitude         : 18.036
DUPflag             : 0
Distance (au)        : 4.361
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -13.44
Sun-Target sep (deg) : 153.88
Sun-Moon sep (deg)   : 163.25
B (ring opening deg) : -2.61
PA of pole (deg)     : 0.78
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 14.363
C/A sky separation (km) : 45429.6
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
    
```

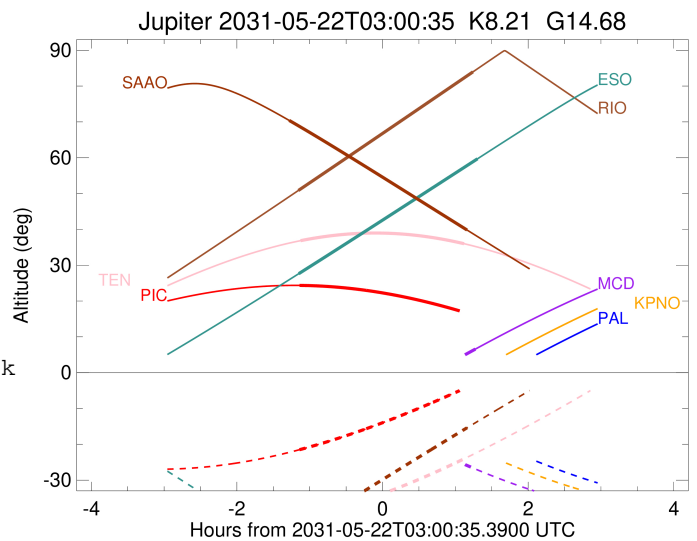
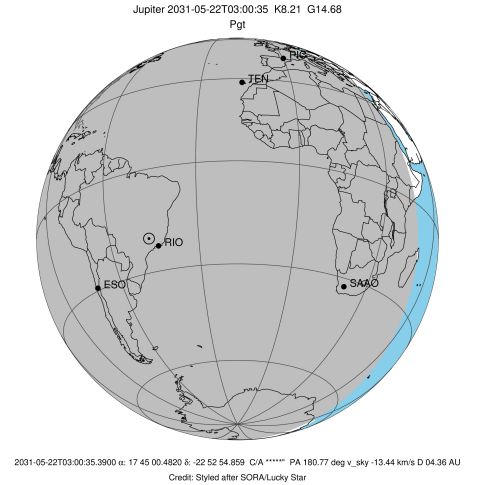


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-22T01:52:11.230	24.35	-21.50	71488.2	39.47	43.18
Jupiter	E	2031-05-22T04:05:59.920	17.06	-4.72x	71488.3	39.18	42.88

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-22T03:06:47.660
Event type            : Pgt
: Jupiter occs: geocentric, topocentric
: Not a ringed target
Observer code         : MCD
Location              : McDonald Obs. 2.7m
Latitude (deg)       : 30.67158
E. Longitude (deg)   : 255.97844
Altitude (km)        : 2.075
Gaia source ID       : 4116890530206723584
2Mass ID (if available) : 17450047-2252544
ICRS Star Coord at Epoch: 17h 45m 00.48204s -22:52:54.85890s
RUWE (>1.4 is poor) : 0.96
K magnitude           : 8.211
G magnitude           : 14.683
RP magnitude          : 13.098
BP magnitude          : 18.036
DUPflag              : 0
Distance (au)        : 4.361
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -13.44
Sun-Target sep (deg) : 153.88
Sun-Moon sep (deg)   : 162.21
B (ring opening deg) : -2.61
PA of pole (deg)     : 0.78
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation ("): 13.542
C/A sky separation (km): 42831.4
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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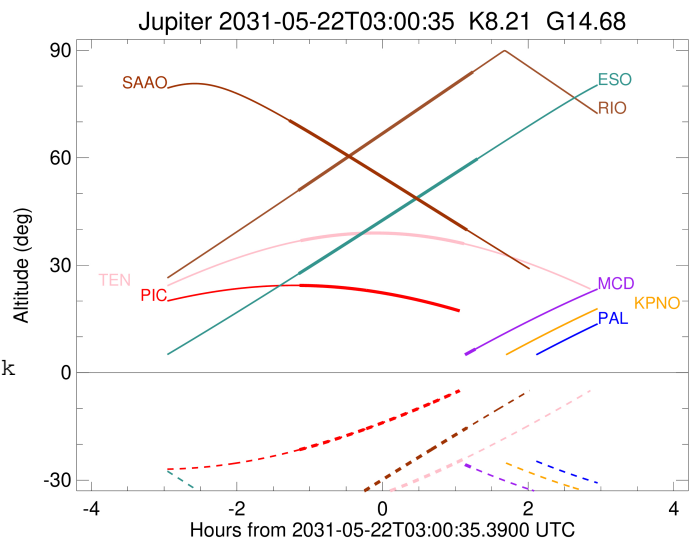
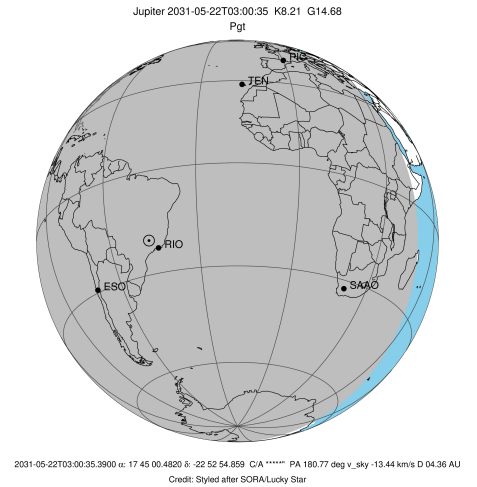


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-22T01:55:41.277	-21.52x	-2.46x	71488.8	36.10	39.73
Jupiter	E	2031-05-22T04:17:13.234	6.59	-26.90	71488.6	37.41	41.07

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-22T03:00:28.510
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        : 4116890530206723584
2Mass ID (if available) : 17450047-2252544
ICRS Star Coord at Epoch: 17h 45m 00.48204s -22:52:54.85890s
RUWE (>1.4 is poor) : 0.96
K magnitude           : 8.211
G magnitude           : 14.683
RP magnitude          : 13.098
BP magnitude          : 18.036
DUPflag              : 0
Distance (au)         : 4.361
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -13.44
Sun-Target sep (deg)  : 153.88
Sun-Moon sep (deg)   : 163.15
B (ring opening deg) : -2.61
PA of pole (deg)     : 0.78
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 14.118
C/A sky separation (km) : 44655.0
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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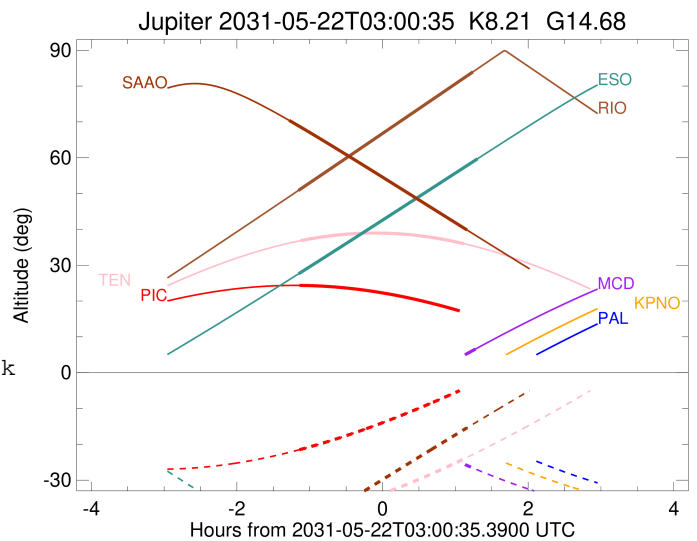
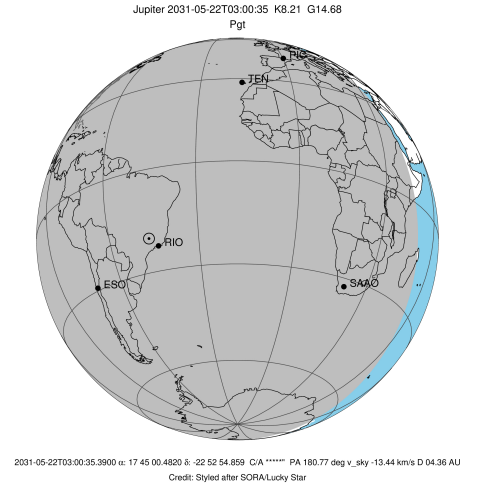


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-22T01:53:10.841	36.85	-40.04	71488.4	38.50	42.19
Jupiter	E	2031-05-22T04:07:43.967	36.00	-24.06	71488.4	38.52	42.21

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-22T03:03:21.390
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      : 4116890530206723584
2Mass ID (if available) : 17450047-2252544
ICRS Star Coord at Epoch: 17h 45m 00.48204s -22:52:54.85890s
RUWE (>1.4 is poor) : 0.96
K magnitude          : 8.211
G magnitude          : 14.683
RP magnitude         : 13.098
BP magnitude         : 18.036
DUPflag             : 0
Distance (au)        : 4.361
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -13.44
Sun-Target sep (deg) : 153.88
Sun-Moon sep (deg)  : 162.92
B (ring opening deg) : -2.61
PA of pole (deg)    : 0.78
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 12.483
C/A sky separation (km) : 39482.0
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
    
```

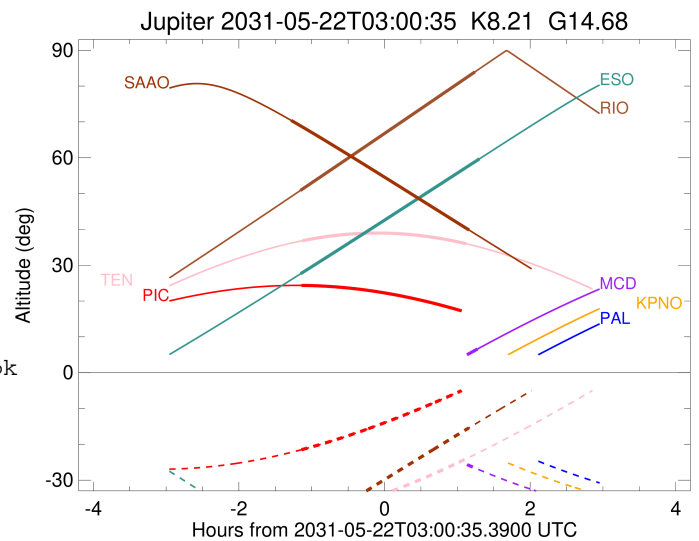
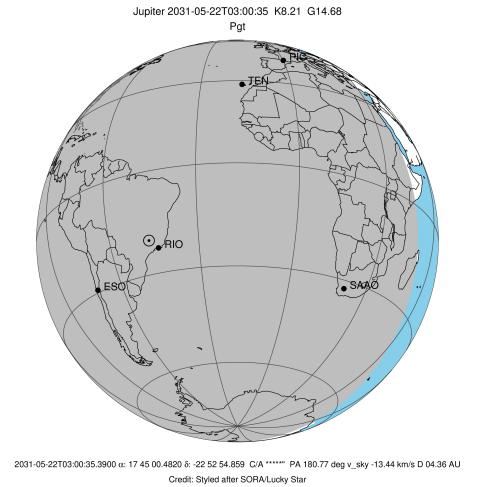


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-22T01:51:16.395	50.85	-76.24	71489.2	33.08	36.61
Jupiter	E	2031-05-22T04:15:05.996	83.95	-69.98	71489.1	33.69	37.24

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-22T03:05:32.430
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        : 4116890530206723584
2Mass ID (if available) : 17450047-2252544
ICRS Star Coord at Epoch: 17h 45m 00.48204s -22:52:54.85890s
RUWE (>1.4 is poor)  : 0.96
K magnitude           : 8.211
G magnitude           : 14.683
RP magnitude          : 13.098
BP magnitude          : 18.036
DUPflag              : 0
Distance (au)         : 4.361
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s)  : -13.44
Sun-Target sep (deg)  : 153.88
Sun-Moon sep (deg)    : 162.61
B (ring opening deg)  : -2.61
PA of pole (deg)      : 0.78
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 12.061
C/A sky separation (km) : 38148.0
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
    
```

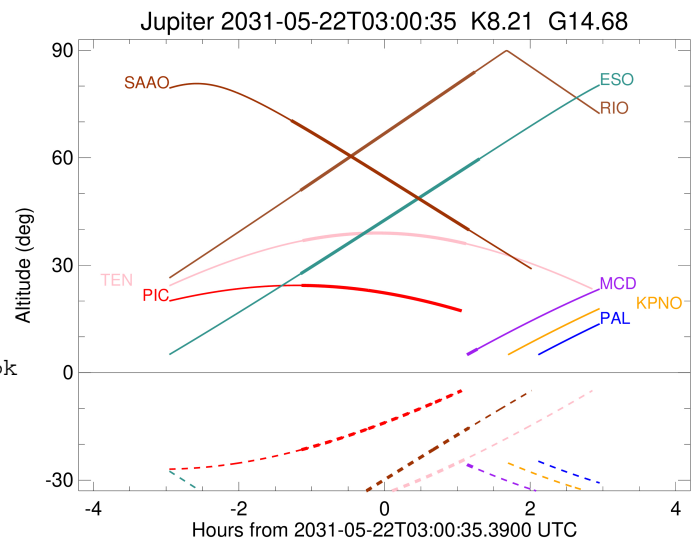
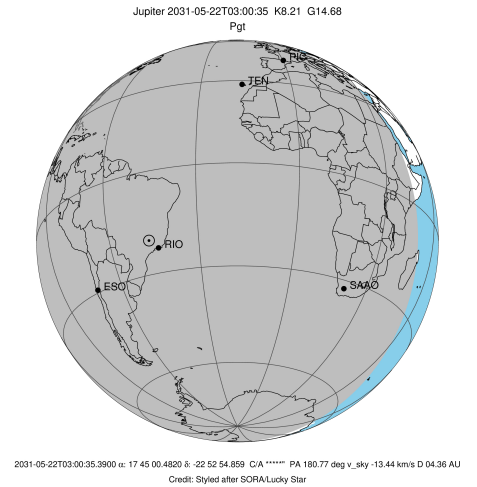


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-22T01:51:35.939	27.63	-51.07	71489.4	31.62	35.08
Jupiter	E	2031-05-22T04:18:53.322	59.70	-80.06	71489.3	32.67	36.18

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-22T02:56:47.030
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       : 4116890530206723584
2Mass ID (if available) : 17450047-2252544
ICRS Star Coord at Epoch: 17h 45m 00.48204s -22:52:54.85890s
RUWE (>1.4 is poor) : 0.96
K magnitude          : 8.211
G magnitude          : 14.683
RP magnitude         : 13.098
BP magnitude         : 18.036
DUPflag             : 0
Distance (au)        : 4.361
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -13.44
Sun-Target sep (deg) : 153.88
Sun-Moon sep (deg)   : 163.70
B (ring opening deg) : -2.61
PA of pole (deg)     : 0.78
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 12.096
C/A sky separation (km) : 38259.8
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	2031-05-22T01:43:41.311	70.41	-46.09	71489.3	32.60	36.10
Jupiter	E	2031-05-22T04:10:12.951	39.82	-15.39	71489.4	31.87	35.34