

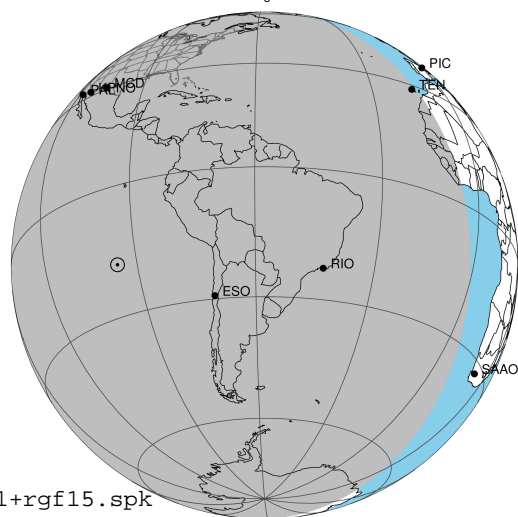
target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2031-05-13T06:18:11.100
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 4068889430308695040
 2Mass ID (if available) : 17483346-2253598

Jupiter 2031-05-13T06:18:11 K8.81 G14.46 Pgt

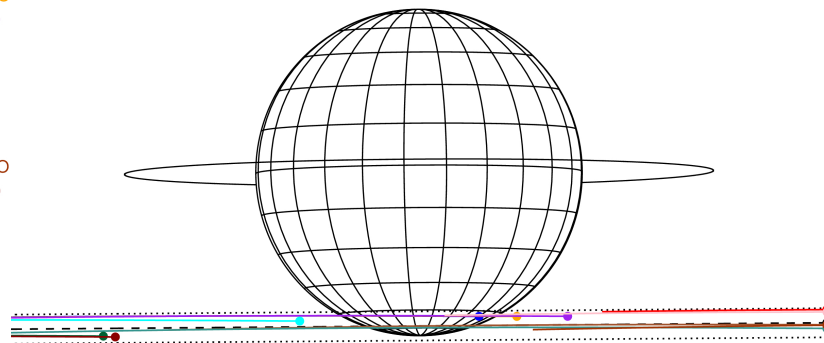
ICRS Star Coord at Epoch: 17h 48m 33.45972s -22:53:59.82699s

RUWE (>1.4 is poor) : 0.96
 K magnitude : 8.809
 G magnitude : 14.462
 RP magnitude : 13.064
 BP magnitude : 16.925
 DUPflag : 0
 Distance (au) : 4.436
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -10.96
 Sun-Target sep (deg) : 144.52
 Sun-Moon sep (deg) : 47.70
 B (ring opening deg) : -2.60
 PA of pole (deg) : 0.40
 Pole direction: RA (deg): 268.05695
 Dec (deg): 64.49651
 C/A sky separation (") : 20.893
 C/A sky separation (km) : 67225.7
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk

Jupiter 2031-05-13T06:18:11 K8.81 G14.46
 Pgt



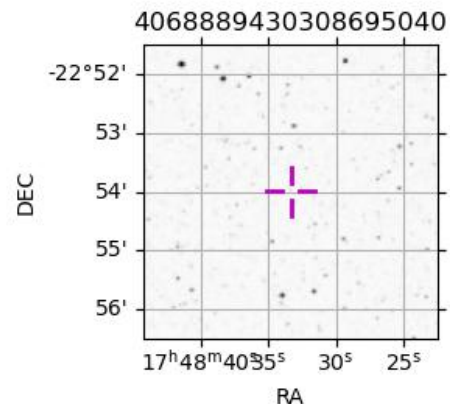
Earth
 PIC
 PAL
 KPNO
 MCD
 TEN
 IRTF
 RIO
 ESO
 AAT
 SAAO
 MSO



2031-05-13T06:18:11.1000 α: 17 48 33.45972 δ: -22 53 59.827 C/A ***** PA 0.45 deg v_sky -10.96 km/s D 04.44 AU
 Credit: Styled after SORA/Lucky Star

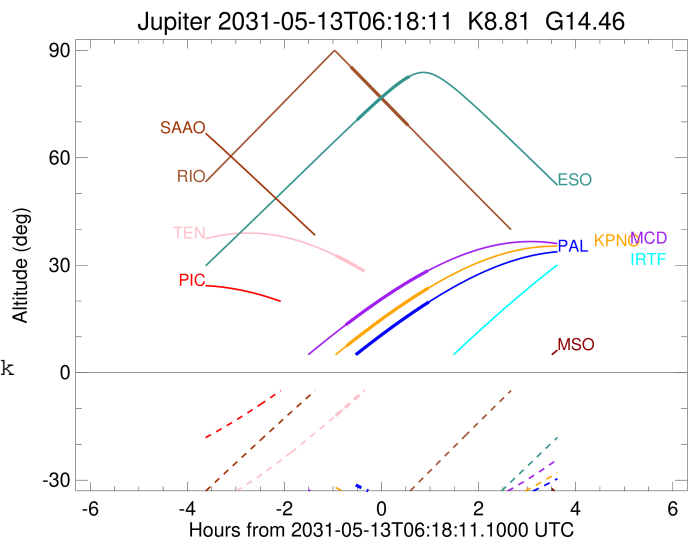
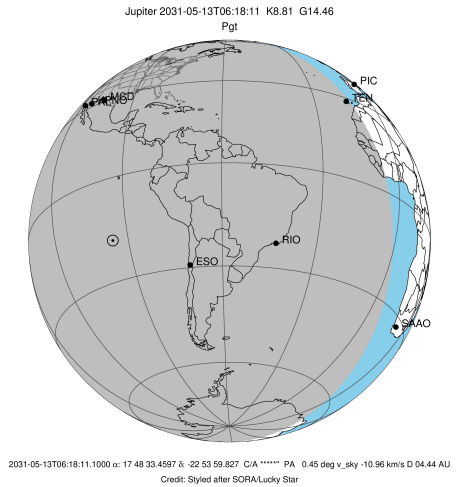
Observable events with sun below -5 deg and altitude above 5 deg

Obs	Location	lat	Elon	Target	Observed Events	Interval	OCode
PIC	Pic du Midi	42.9	0.1				Pnn
PAL	Palomar Mt (200")	33.4	243.1	+	MAY 13 07:16	- MAY 13 07:16	Pne
PMO	Purple Mtn Obs. Nanking	32.1	118.8				Pnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+ +	MAY 13 05:35	- MAY 13 07:16	Pie
MCD	McDonald Obs. 2.7m	30.7	256.0	+ +	MAY 13 05:34	- MAY 13 07:15	Pie
TEN	Teide Obs./Tenerife	28.3	343.5	+	MAY 13 05:21	- MAY 13 05:21	Pin
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 13 05:40	- MAY 13 06:51	Pie
ESO	European Southern Obs. (3.6m)	-29.3	289.3	+ +	MAY 13 05:47	- MAY 13 06:52	Pie
AAT	Siding Spring (AAT)	-31.3	149.1				Pnn
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8				Pnn
MSO	Mt. Stromlo Observatory	-35.3	149.0				Pnn



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-13T06:26:07.430
Event type           : Pgt
: Jupiter occs: geocentric, topocentric
: Not a ringed target
Observer code        : PAL
Location             : Palomar Mt (200")
Latitude (deg)       : 33.35622
E. Longitude (deg)   : 243.13601
Altitude (km)        : 1.706
Gaia source ID       : 4068889430308695040
2Mass ID (if available) : 17483346-2253598
ICRS Star Coord at Epoch: 17h 48m 33.45972s -22:53:59.82699s
RUWE (>1.4 is poor) : 0.96
K magnitude          : 8.809
G magnitude          : 14.462
RP magnitude         : 13.064
BP magnitude         : 16.925
DUPflag             : 0
Distance (au)        : 4.436
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -10.96
Sun-Target sep (deg) : 144.52
Sun-Moon sep (deg)   : 48.27
B (ring opening deg) : -2.60
PA of pole (deg)     : 0.40
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation (") : 19.552
C/A sky separation (km) : 62909.9
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
    
```

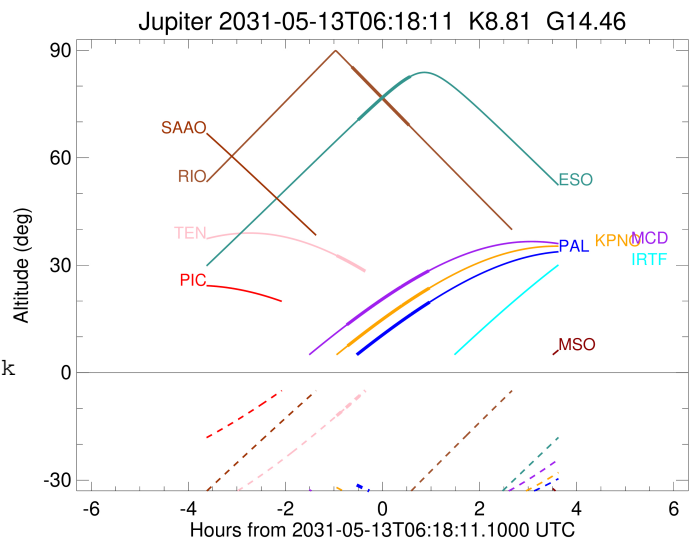
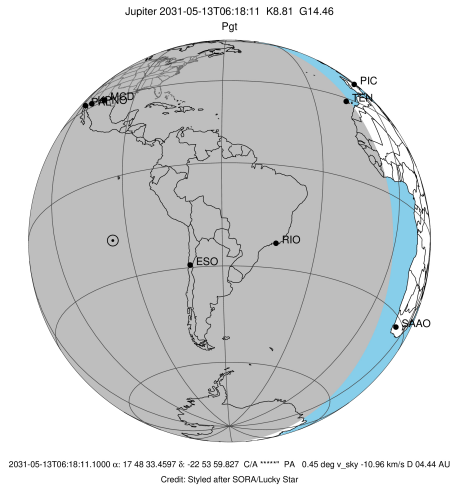


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-13T05:35:21.463	3.02x	-30.05	71484.7	-62.18	-65.09
Jupiter	E	2031-05-13T07:16:30.163	19.70	-38.05	71484.9	-60.99	-63.98

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-13T06:25:44.740
Event type            : Pgt
: Jupiter occs: geocentric, topocentric
: Not a ringed target
Observer code         : KPNO
Location              : Kitt Peak Natl Obs
Latitude (deg)        : 31.96333
E. Longitude (deg)    : 248.40000
Altitude (km)         : 2.120
Gaia source ID        : 4068889430308695040
2Mass ID (if available) : 17483346-2253598
ICRS Star Coord at Epoch: 17h 48m 33.45972s -22:53:59.82699s
RUWE (>1.4 is poor) : 0.96
K magnitude           : 8.809
G magnitude           : 14.462
RP magnitude          : 13.064
BP magnitude          : 16.925
DUPflag              : 0
Distance (au)         : 4.436
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -10.96
Sun-Target sep (deg) : 144.52
Sun-Moon sep (deg)   : 48.30
B (ring opening deg) : -2.60
PA of pole (deg)     : 0.40
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation ("): 19.535
C/A sky separation (km): 62855.5
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
    
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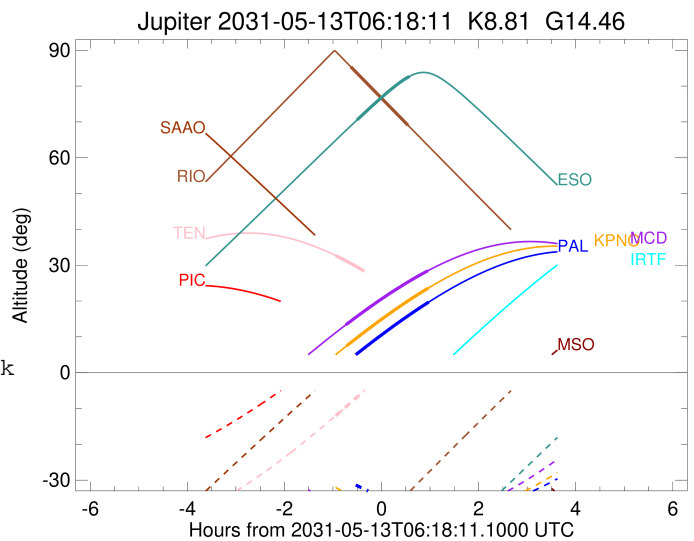
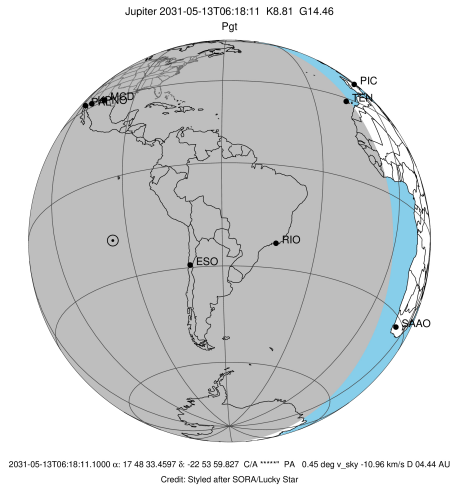


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-13T05:34:59.646	7.46	-33.61	71484.7	-62.07	-64.98
Jupiter	E	2031-05-13T07:16:07.649	23.62	-39.83	71484.9	-60.94	-63.93

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-13T06:25:00.880
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       : 4068889430308695040
2Mass ID (if available) : 17483346-2253598
ICRS Star Coord at Epoch: 17h 48m 33.45972s -22:53:59.82699s
RUWE (>1.4 is poor) : 0.96
K magnitude          : 8.809
G magnitude          : 14.462
RP magnitude         : 13.064
BP magnitude         : 16.925
DUPflag             : 0
Distance (au)        : 4.436
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -10.96
Sun-Target sep (deg) : 144.52
Sun-Moon sep (deg)   : 48.33
B (ring opening deg) : -2.60
PA of pole (deg)     : 0.40
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation (") : 19.500
C/A sky separation (km) : 62742.2
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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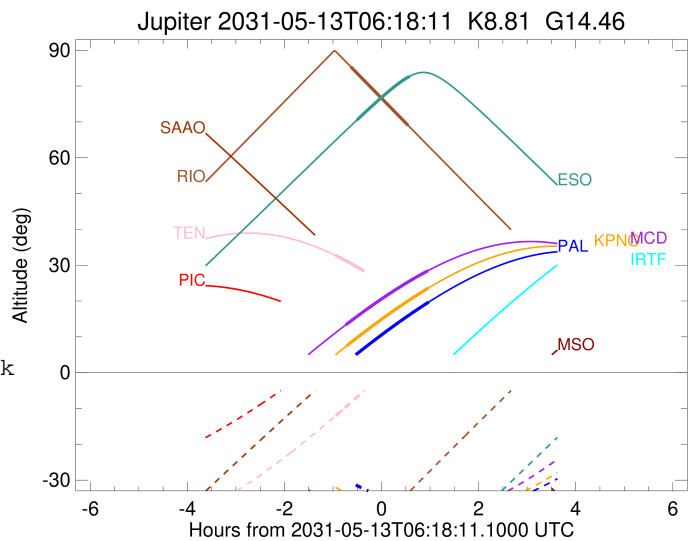
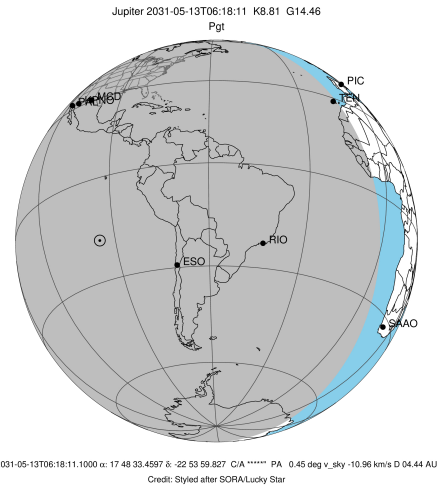


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-13T05:34:10.197	13.37	-37.66	71484.8	-61.83	-64.76
Jupiter	E	2031-05-13T07:15:31.273	28.45	-40.83	71484.9	-60.82	-63.82

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-13T06:11:54.280
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        : 4068889430308695040
2Mass ID (if available) : 17483346-2253598
ICRS Star Coord at Epoch: 17h 48m 33.45972s -22:53:59.82699s
RUWE (>1.4 is poor) : 0.96
K magnitude           : 8.809
G magnitude           : 14.462
RP magnitude          : 13.064
BP magnitude          : 16.925
DUPflag              : 0
Distance (au)         : 4.436
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -10.96
Sun-Target sep (deg) : 144.52
Sun-Moon sep (deg)   : 47.59
B (ring opening deg) : -2.60
PA of pole (deg)     : 0.40
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation (") : 19.505
C/A sky separation (km) : 62758.8
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
    
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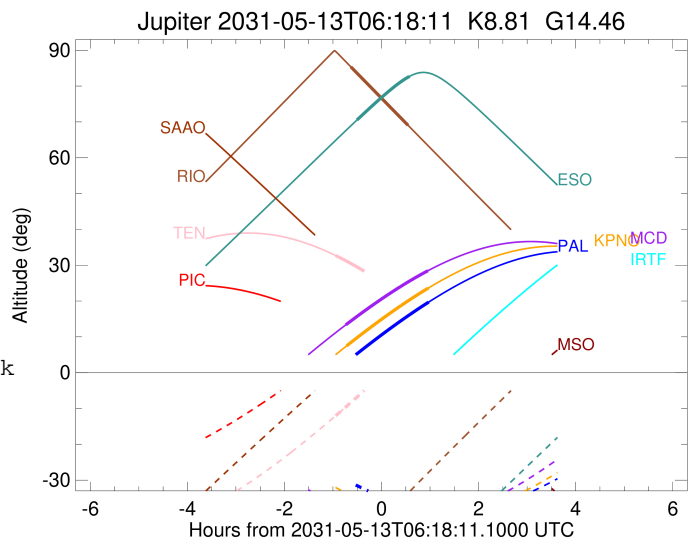
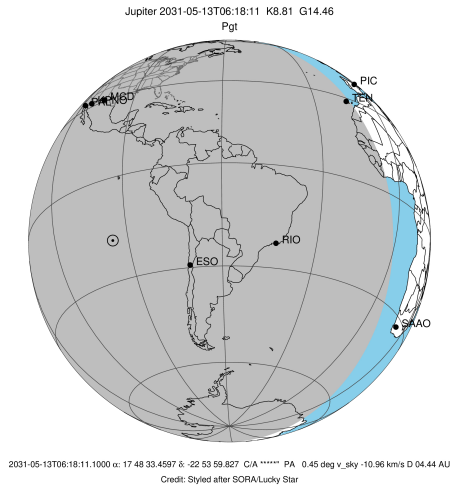


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-13T05:21:31.401	32.68	-12.02	71484.9	-60.80	-63.80
Jupiter	E	2031-05-13T07:02:30.506	18.21	8.57x	71484.8	-61.91	-64.84

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-13T06:15:41.560
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        : 4068889430308695040
2Mass ID (if available) : 17483346-2253598
ICRS Star Coord at Epoch: 17h 48m 33.45972s -22:53:59.82699s
RUWE (>1.4 is poor)  : 0.96
K magnitude           : 8.809
G magnitude           : 14.462
RP magnitude          : 13.064
BP magnitude          : 16.925
DUPflag              : 0
Distance (au)         : 4.436
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -10.96
Sun-Target sep (deg)  : 144.52
Sun-Moon sep (deg)    : 48.27
B (ring opening deg) : -2.60
PA of pole (deg)      : 0.40
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation (") : 20.907
C/A sky separation (km) : 67270.1
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
    
```

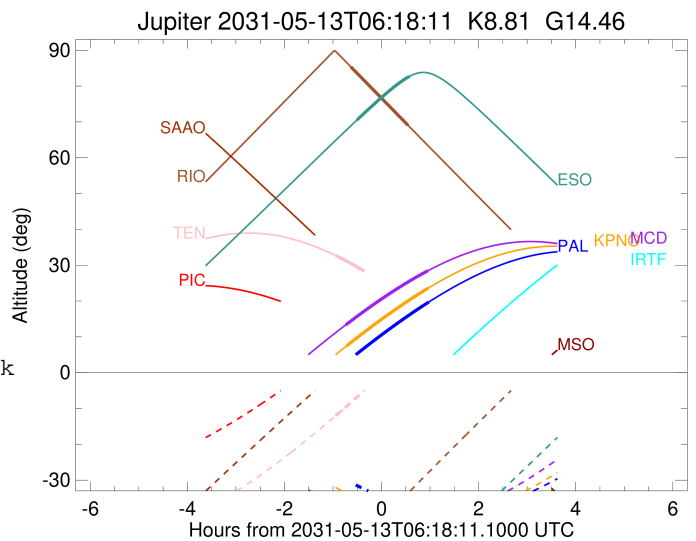
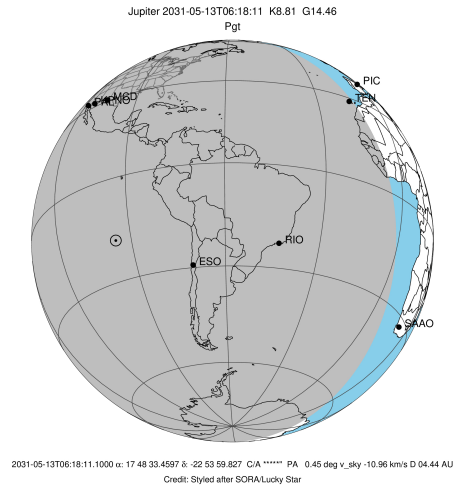


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-13T05:40:22.997	85.34	-49.83	71483.8	-69.89	-72.12
Jupiter	E	2031-05-13T06:51:01.843	69.04	-33.61	71483.8	-70.37	-72.56

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-13T06:20:19.890
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      : 4068889430308695040
2Mass ID (if available) : 17483346-2253598
ICRS Star Coord at Epoch: 17h 48m 33.45972s -22:53:59.82699s
RUWE (>1.4 is poor) : 0.96
K magnitude          : 8.809
G magnitude          : 14.462
RP magnitude         : 13.064
BP magnitude         : 16.925
DUPflag             : 0
Distance (au)       : 4.436
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -10.96
Sun-Target sep (deg) : 144.52
Sun-Moon sep (deg)  : 48.56
B (ring opening deg) : -2.60
PA of pole (deg)    : 0.40
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation (") : 21.125
C/A sky separation (km) : 67969.8
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	2031-05-13T05:47:54.527	70.53	-71.00	71483.6	-71.96	-73.99
Jupiter	E	2031-05-13T06:52:41.920	82.69	-57.77	71483.6	-71.71	-73.76