

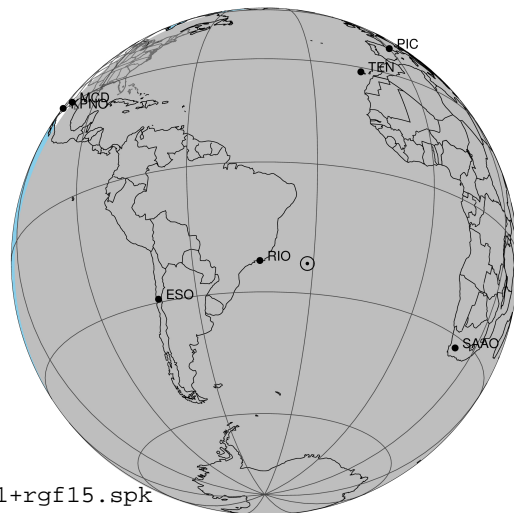
target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2043-06-29T02:09:20.700
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 4068835794799011712
 2Mass ID (if available) : 17464771-2304489

Jupiter 2043-06-29T02:09:20 K7.11 G12.22 Pgt

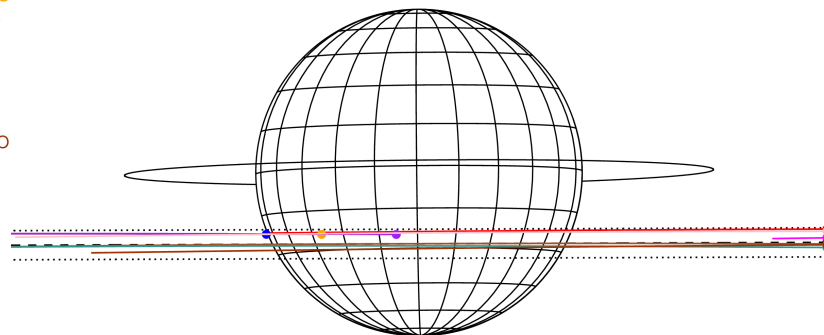
ICRS Star Coord at Epoch: 17h 46m 47.69794s -23°04'48.99273s

RUWE (>1.4 is poor) : 0.69
 K magnitude : 7.112
 G magnitude : 12.222
 RP magnitude : 10.884
 BP magnitude : 14.344
 DUPflag : 0
 Distance (au) : 4.259
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -16.02
 Sun-Target sep (deg) : 170.28
 Sun-Moon sep (deg) : 86.63
 B (ring opening deg) : -2.42
 PA of pole (deg) : 0.59
 Pole direction: RA (deg): 268.05669
 Dec (deg): 64.49732
 C/A sky separation (") : 10.109
 C/A sky separation (km) : 31223.1
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk

Jupiter 2043-06-29T02:09:20 K7.11 G12.22
 Pgt



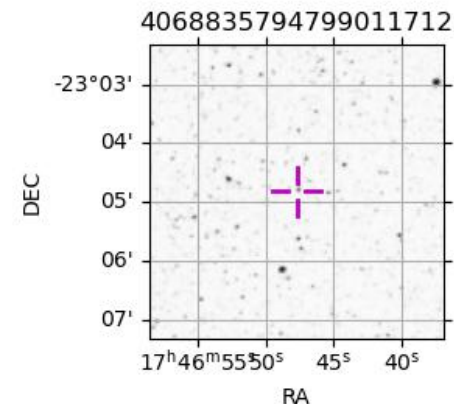
Earth
 PIC
 PAL
 KPNO
 MCD
 TEN
 KAV
 RIO
 ESO
 SAAO



2043-06-29T02:09:20.7000 α: 17 46 47.6979 δ: -23 04 48.993 C/A ***** PA 0.20 deg v_sky -16.02 km/s D 04.26 AU
 Credit: Styled after SORA/Lucky Star

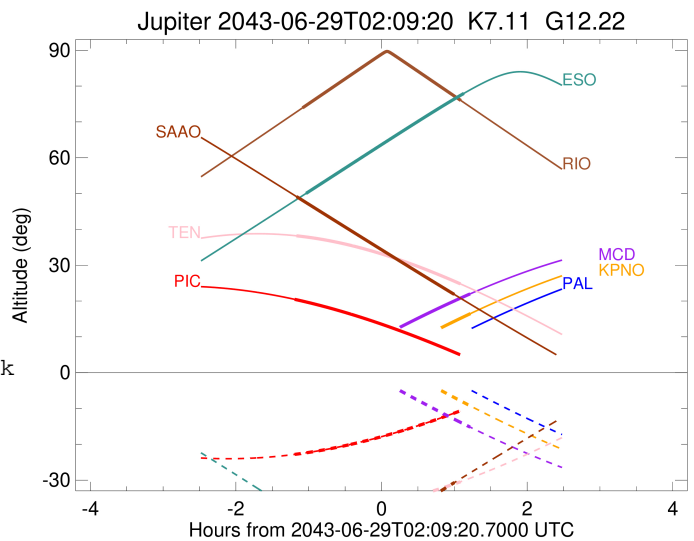
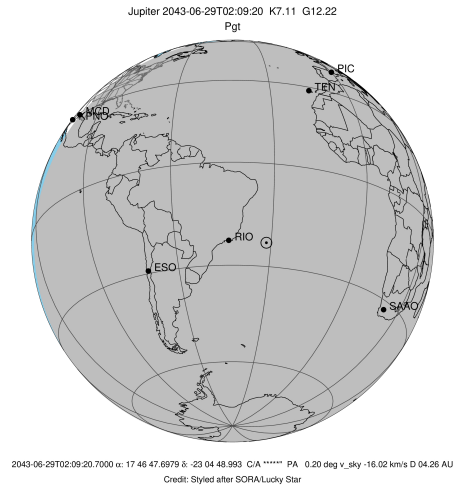
Observable events with sun below -5 deg and altitude above 5 deg

Obs	Location	lat	Elon	Target	Observed Events Interval	OCode
PIC	Pic du Midi	42.9	0.1	+	JUN 29 00:57 - JUN 29 00:57	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	+	JUN 29 03:22 - JUN 29 03:22	Pne
MCD	McDonald Obs. 2.7m	30.7	256.0	+	JUN 29 03:22 - JUN 29 03:22	Pne
TEN	Teide Obs./Tenerife	28.3	343.5	+ +	JUN 29 00:59 - JUN 29 03:14	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	+ +	JUN 29 01:04 - JUN 29 03:14	Pie
ESO	European Southern Obs. (3.6m)	-29.3	289.3	+ +	JUN 29 01:07 - JUN 29 03:17	Pie
AAT	Siding Spring (AAT)	-31.3	149.1			Pnn
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8	+ +	JUN 29 00:59 - JUN 29 03:09	Pie
MSO	Mt. Stromlo Observatory	-35.3	149.0			Pnn



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2043-06-29T02:05:58.530
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       : 4068835794799011712
2Mass ID (if available) : 17464771-2304489
ICRS Star Coord at Epoch: 17h 46m 47.69794s -23:04:48.99273s
RUWE (>1.4 is poor) : 0.69
K magnitude           : 7.112
G magnitude           : 12.222
RP magnitude          : 10.884
BP magnitude          : 14.344
DUPflag              : 0
Distance (au)        : 4.259
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.02
Sun-Target sep (deg) : 170.28
Sun-Moon sep (deg)   : 86.83
B (ring opening deg) : -2.42
PA of pole (deg)     : 0.59
Pole direction: RA (deg): 268.05669
Dec (deg): 64.49732
C/A sky separation (") : 8.376
C/A sky separation (km) : 25871.5
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
    
```

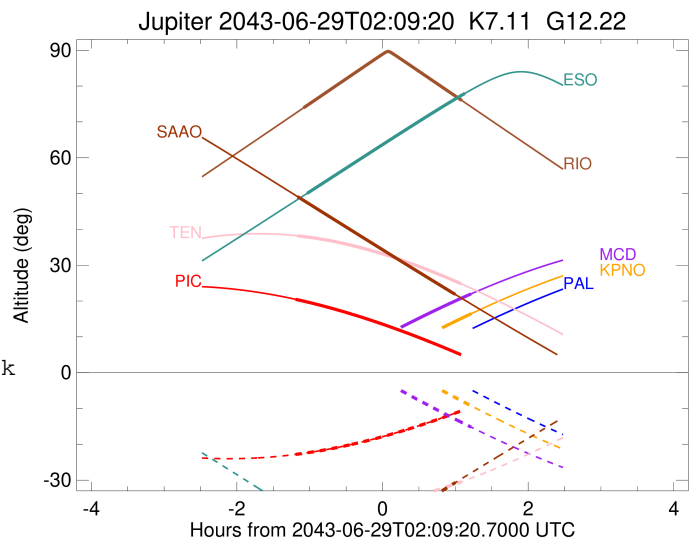
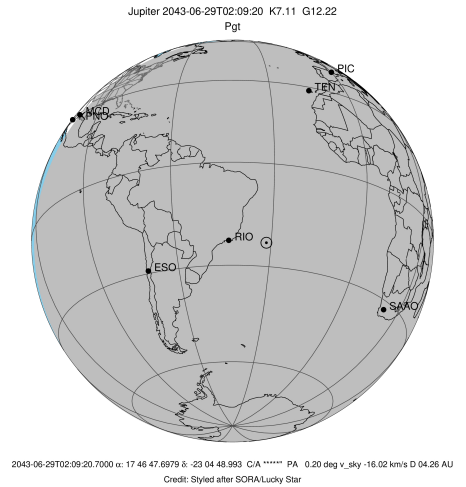


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-06-29T00:57:53.094	20.46	-22.81	71490.9	-21.32	-24.03
Jupiter	E	2043-06-29T03:14:21.960	4.97x	-10.65	71491.0	-21.18	-23.87

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2043-06-29T02:14:49.580
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        : 4068835794799011712
2Mass ID (if available) : 17464771-2304489
ICRS Star Coord at Epoch: 17h 46m 47.69794s -23:04:48.99273s
RUWE (>1.4 is poor) : 0.69
K magnitude           : 7.112
G magnitude           : 12.222
RP magnitude          : 10.884
BP magnitude          : 14.344
DUPflag              : 0
Distance (au)         : 4.259
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.02
Sun-Target sep (deg) : 170.28
Sun-Moon sep (deg)   : 86.74
B (ring opening deg) : -2.42
PA of pole (deg)     : 0.59
Pole direction: RA (deg): 268.05669
Dec (deg): 64.49732
C/A sky separation (") : 8.851
C/A sky separation (km) : 27339.3
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
    
```

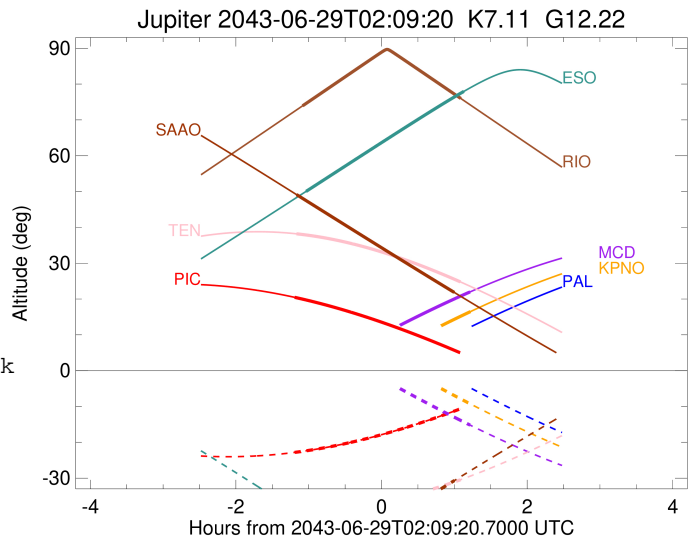
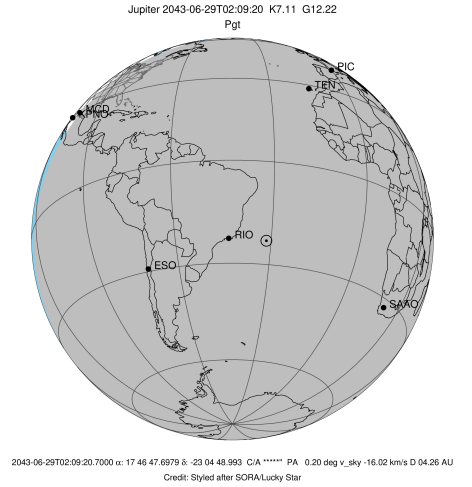


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-06-29T01:06:30.377	-8.19x	16.67x	71490.7	-23.38	-26.27
Jupiter	E	2043-06-29T03:22:41.955	16.50	-9.30	71490.9	-21.61	-24.34

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2043-06-29T02:14:33.620
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        : 4068835794799011712
2Mass ID (if available) : 17464771-2304489
ICRS Star Coord at Epoch: 17h 46m 47.69794s -23:04:48.99273s
RUWE (>1.4 is poor) : 0.69
K magnitude           : 7.112
G magnitude           : 12.222
RP magnitude          : 10.884
BP magnitude          : 14.344
DUPflag              : 0
Distance (au)         : 4.259
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.02
Sun-Target sep (deg)  : 170.28
Sun-Moon sep (deg)    : 86.84
B (ring opening deg) : -2.42
PA of pole (deg)      : 0.59
Pole direction: RA (deg): 268.05669
Dec (deg): 64.49732
C/A sky separation (") : 8.802
C/A sky separation (km) : 27186.7
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
    
```

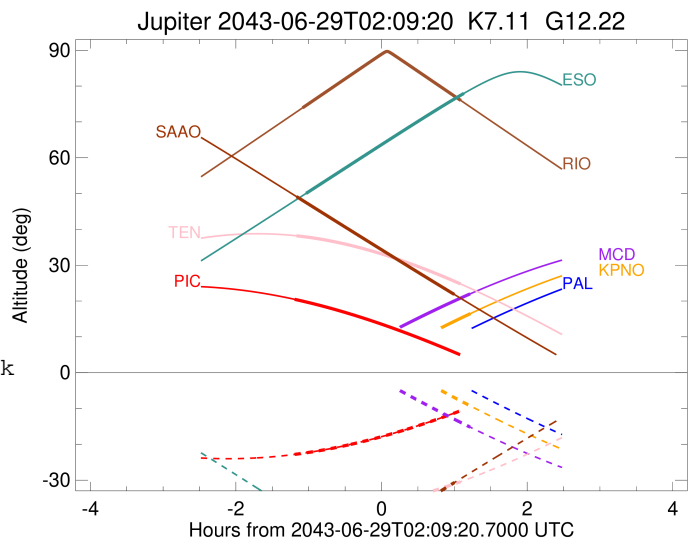
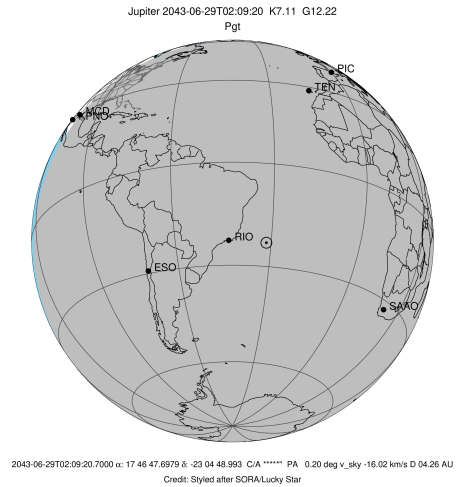


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-06-29T01:06:23.830	-1.77x	10.15x	71490.8	-23.23	-26.11
Jupiter	E	2043-06-29T03:22:18.117	21.98	-15.18	71490.9	-21.52	-24.24

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2043-06-29T02:06:45.630
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        : 4068835794799011712
2Mass ID (if available) : 17464771-2304489
ICRS Star Coord at Epoch: 17h 46m 47.69794s -23:04:48.99273s
RUWE (>1.4 is poor) : 0.69
K magnitude           : 7.112
G magnitude           : 12.222
RP magnitude          : 10.884
BP magnitude          : 14.344
DUPflag              : 0
Distance (au)         : 4.259
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.02
Sun-Target sep (deg)  : 170.28
Sun-Moon sep (deg)   : 87.14
B (ring opening deg) : -2.42
PA of pole (deg)     : 0.59
Pole direction: RA (deg): 268.05669
Dec (deg): 64.49732
C/A sky separation (") : 8.567
C/A sky separation (km) : 26460.4
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
    
```

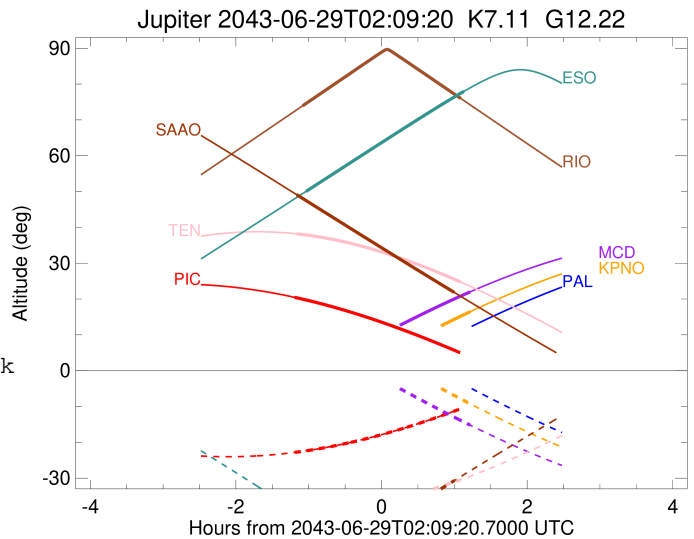
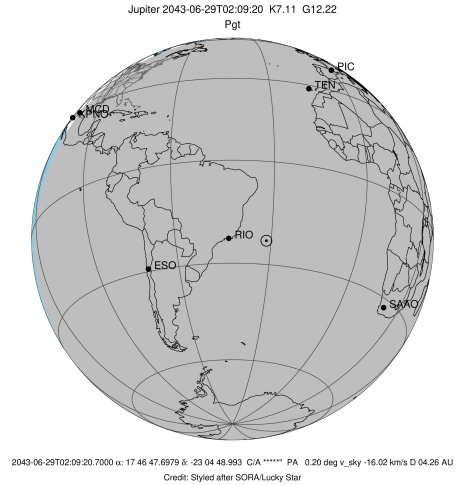


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-06-29T00:59:21.313	38.20	-38.58	71490.9	-21.93	-24.69
Jupiter	E	2043-06-29T03:14:23.558	24.77	-30.45	71490.9	-21.63	-24.37

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2043-06-29T02:09:28.260
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      : 4068835794799011712
2Mass ID (if available) : 17464771-2304489
ICRS Star Coord at Epoch: 17h 46m 47.69794s -23:04:48.99273s
RUWE (>1.4 is poor) : 0.69
K magnitude          : 7.112
G magnitude          : 12.222
RP magnitude         : 10.884
BP magnitude         : 14.344
DUPflag             : 0
Distance (au)       : 4.259
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.02
Sun-Target sep (deg) : 170.28
Sun-Moon sep (deg)  : 87.59
B (ring opening deg) : -2.42
PA of pole (deg)    : 0.59
Pole direction: RA (deg): 268.05669
Dec (deg): 64.49732
C/A sky separation (") : 10.097
C/A sky separation (km) : 31185.8
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
    
```

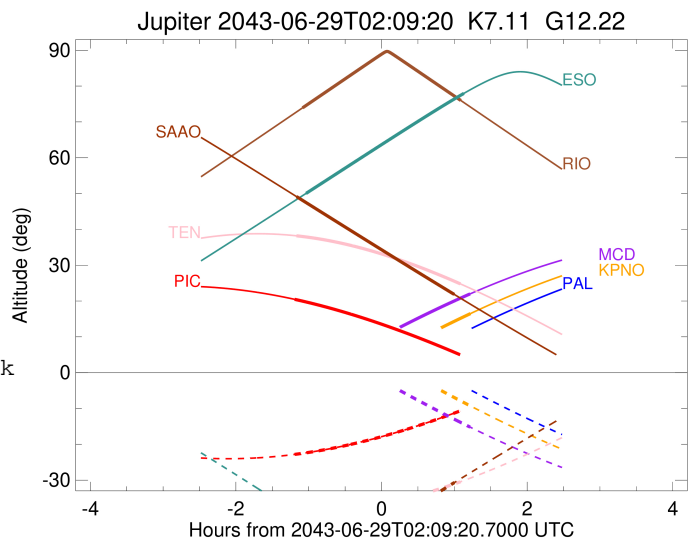
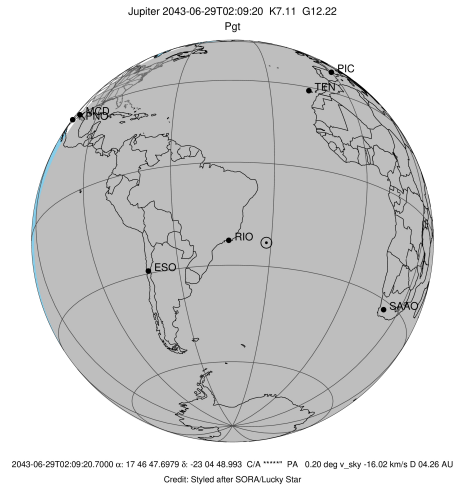


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-06-29T01:04:18.543	73.92	-64.27	71490.4	-26.31	-29.44
Jupiter	E	2043-06-29T03:14:38.292	75.99	-85.75	71490.5	-25.53	-28.60

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2043-06-29T02:12:12.870
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       : 4068835794799011712
2Mass ID (if available) : 17464771-2304489
ICRS Star Coord at Epoch: 17h 46m 47.69794s -23:04:48.99273s
RUWE (>1.4 is poor) : 0.69
K magnitude           : 7.112
G magnitude           : 12.222
RP magnitude         : 10.884
BP magnitude         : 14.344
DUPflag              : 0
Distance (au)        : 4.259
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.02
Sun-Target sep (deg) : 170.28
Sun-Moon sep (deg)  : 87.51
B (ring opening deg) : -2.42
PA of pole (deg)    : 0.59
Pole direction: RA (deg): 268.05669
Dec (deg): 64.49732
C/A sky separation (") : 10.406
C/A sky separation (km) : 32142.2
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
    
```

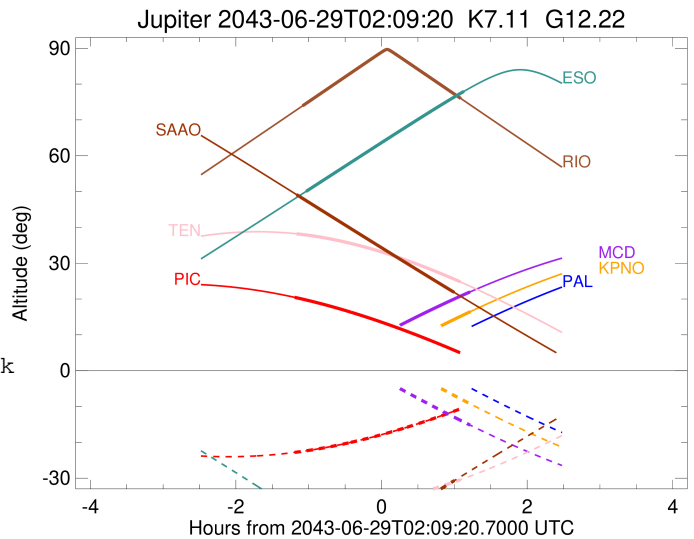
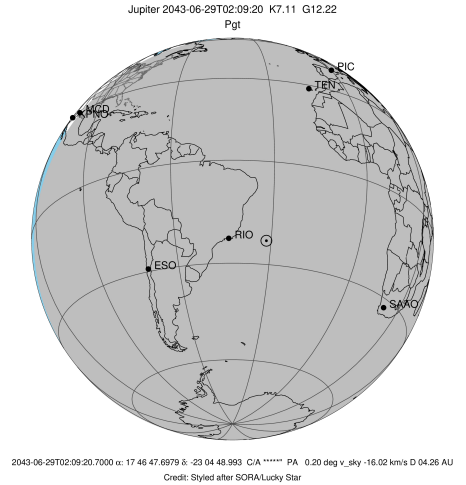


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-06-29T01:07:09.025	50.03	-40.91	71490.3	-27.40	-30.61
Jupiter	E	2043-06-29T03:17:04.610	77.92	-69.18	71490.4	-26.12	-29.24


```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2043-06-29T02:04:07.340
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       : 4068835794799011712
2Mass ID (if available) : 17464771-2304489
ICRS Star Coord at Epoch: 17h 46m 47.69794s -23:04:48.99273s
RUWE (>1.4 is poor) : 0.69
K magnitude           : 7.112
G magnitude           : 12.222
RP magnitude          : 10.884
BP magnitude          : 14.344
DUPflag              : 0
Distance (au)        : 4.259
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.02
Sun-Target sep (deg) : 170.28
Sun-Moon sep (deg)   : 87.14
B (ring opening deg) : -2.42
PA of pole (deg)     : 0.59
Pole direction: RA (deg): 268.05669
Dec (deg): 64.49732
C/A sky separation (") : 10.796
C/A sky separation (km) : 33346.7
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	2043-06-29T00:59:18.567	49.15	-58.08	71490.3	-27.72	-30.95
Jupiter	E	2043-06-29T03:09:20.913	21.83	-30.68	71490.2	-27.91	-31.15