

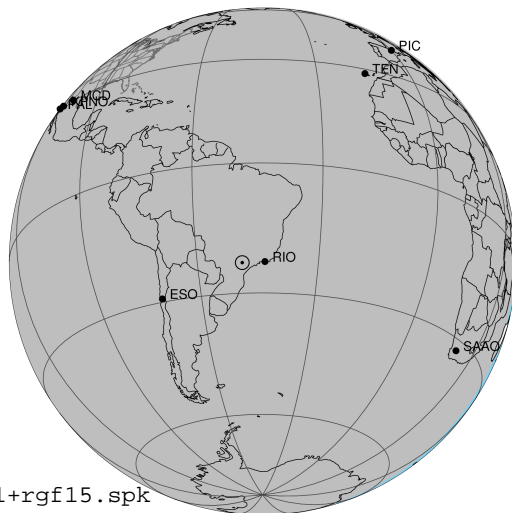
target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2031-06-11T03:14:46.460
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 4116707087965145728
 2Mass ID (if available) : 17345062-2249534

Jupiter 2031-06-11T03:14:46 K9.85 G14.95 Pgt

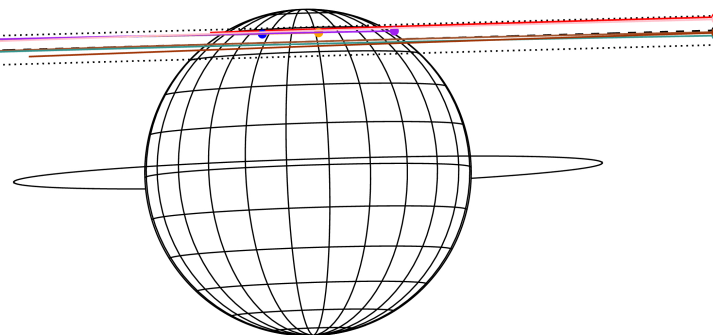
ICRS Star Coord at Epoch: 17h 34m 50.60529s -22:49:53.71527s

RUWE (>1.4 is poor) : 0.93
 K magnitude : 9.854
 G magnitude : 14.950
 RP magnitude : 13.637
 BP magnitude : 16.912
 DUPflag : 0
 Distance (au) : 4.269
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -16.36
 Sun-Target sep (deg) : 175.38
 Sun-Moon sep (deg) : 73.15
 B (ring opening deg) : -2.61
 PA of pole (deg) : 1.87
 Pole direction: RA (deg): 268.05692
 Dec (deg): 64.49651
 C/A sky separation (") : 18.502
 C/A sky separation (km) : 57290.1
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk

Jupiter 2031-06-11T03:14:46 K9.85 G14.95
 Pgt



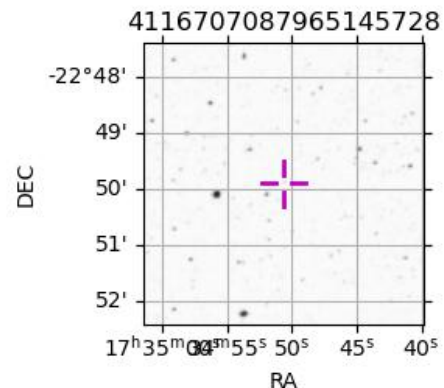
Earth
 PIC
 PAL
 KPNO
 MCD
 TEN
 IRTF
 RIO
 ESO
 SAAO



2031-06-11T03:14:464600 a: 17 34 50.6053 s: -22 49 53.715 C/A ***** PA 181.59 deg v_sky -16.36 km/s D 04.27 AU
 Credit: Styled after SORA/Lucky Star

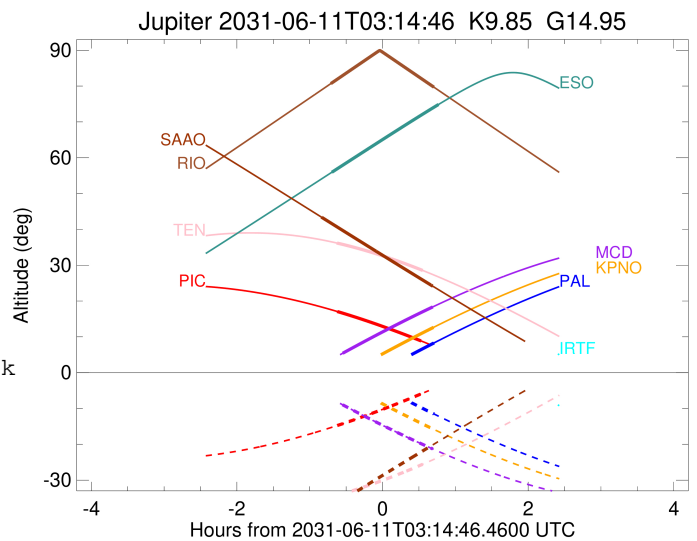
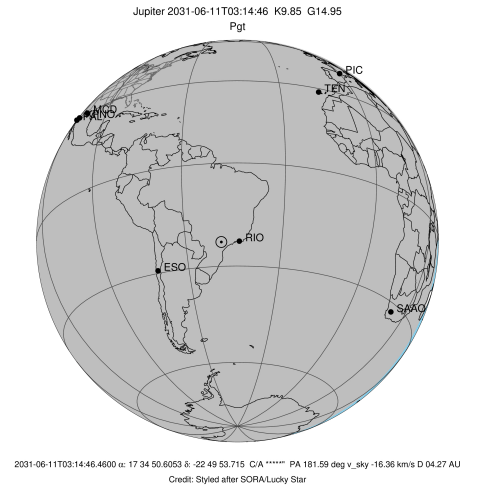
Observable events with sun below -5 deg and altitude above 5 deg

Obs	Location	lat	Elon	Target	Observed Events Interval	OCode
PIC	Pic du Midi	42.9	0.1	+ +	JUN 11 02:37 - JUN 11 03:46	Pie
PAL	Palomar Mt (200")	33.4	243.1	+ +	JUN 11 03:57 - JUN 11 03:57	Pne
PMO	Purple Mtn Obs. Nanking	32.1	118.8	+ +	JUN 11 03:56 - JUN 11 03:56	Pnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+ +	JUN 11 03:56 - JUN 11 03:56	Pne
MCD	McDonald Obs. 2.7m	30.7	256.0	+ +	JUN 11 02:41 - JUN 11 03:56	Pie
TEN	Teide Obs./Tenerife	28.3	343.5	+ +	JUN 11 02:37 - JUN 11 03:47	Pie
IRTF	Mauna Kea/IRTF	19.8	204.5	+ +	JUN 11 02:37 - JUN 11 03:47	Pnn
KAV	Kavalur Observatory	12.6	78.8	+ +	JUN 11 02:37 - JUN 11 03:47	Pnn
RIO	Rio de Janeiro	-22.9	316.8	+ +	JUN 11 02:32 - JUN 11 03:57	Pie
ESO	European Southern Obs. (3.6m)	-29.3	289.3	+ +	JUN 11 02:33 - JUN 11 04:00	Pie
AAT	Siding Spring (AAT)	-31.3	149.1	+ +	JUN 11 02:33 - JUN 11 04:00	Pnn
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8	+ +	JUN 11 02:24 - JUN 11 03:56	Pie
MSO	Mt. Stromlo Observatory	-35.3	149.0	+ +	JUN 11 02:24 - JUN 11 03:56	Pnn



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-11T03:11:58.110
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        : 4116707087965145728
2Mass ID (if available) : 17345062-2249534
ICRS Star Coord at Epoch: 17h 34m 50.60529s -22:49:53.71527s
RUWE (>1.4 is poor) : 0.93
K magnitude           : 9.854
G magnitude           : 14.950
RP magnitude          : 13.637
BP magnitude          : 16.912
DUPflag              : 0
Distance (au)         : 4.269
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.36
Sun-Target sep (deg)  : 175.38
Sun-Moon sep (deg)   : 73.21
B (ring opening deg) : -2.61
PA of pole (deg)     : 1.87
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 20.242
C/A sky separation (km) : 62676.4
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
    
```

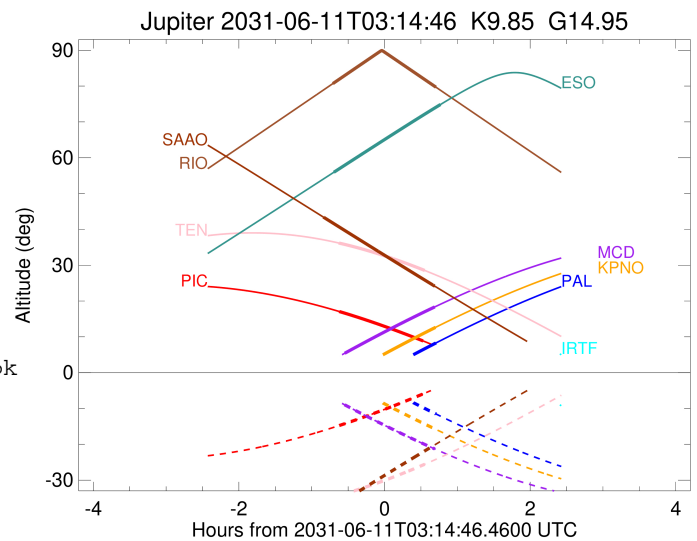
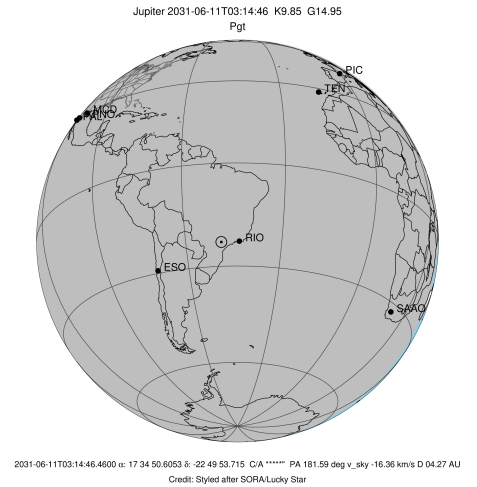


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-11T02:37:28.800	17.07	-14.75	71484.9	61.13	64.11
Jupiter	E	2031-06-11T03:46:31.495	8.86	-5.93	71484.9	61.11	64.09

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-11T03:19:28.870
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       : 4116707087965145728
2Mass ID (if available) : 17345062-2249534
ICRS Star Coord at Epoch: 17h 34m 50.60529s -22:49:53.71527s
RUWE (>1.4 is poor) : 0.93
K magnitude          : 9.854
G magnitude          : 14.950
RP magnitude         : 13.637
BP magnitude         : 16.912
DUPflag             : 0
Distance (au)        : 4.269
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.36
Sun-Target sep (deg) : 175.38
Sun-Moon sep (deg)   : 73.38
B (ring opening deg) : -2.61
PA of pole (deg)     : 1.87
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation ("): 19.708
C/A sky separation (km): 61025.3
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
    
```

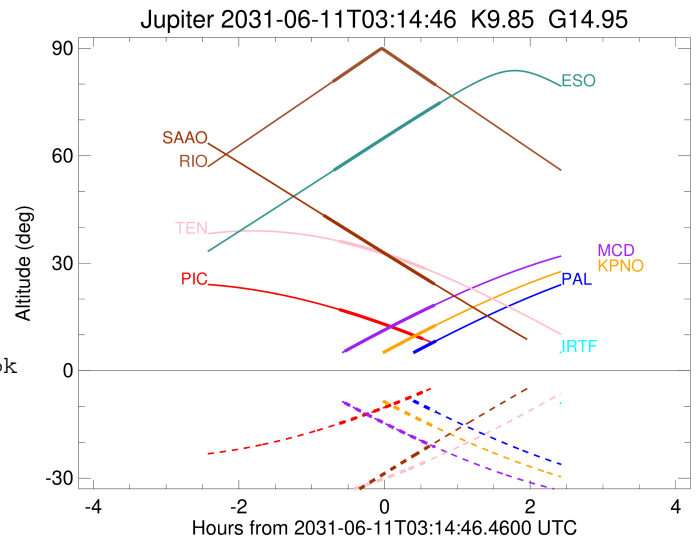
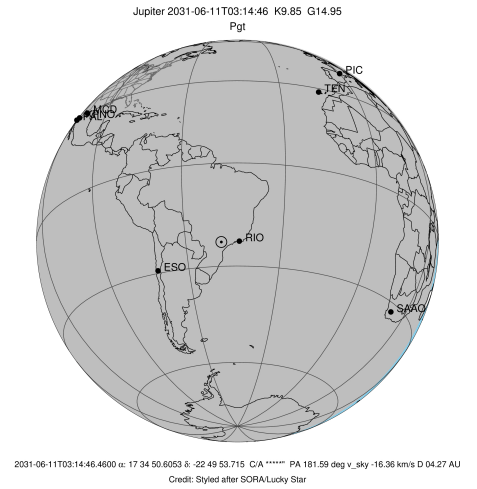


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-11T02:41:44.634	-5.55x	1.85x	71485.4	57.72	60.93
Jupiter	E	2031-06-11T03:57:04.868	8.28	-11.51	71485.2	59.29	62.40

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-11T03:19:23.580
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        : 4116707087965145728
2Mass ID (if available) : 17345062-2249534
ICRS Star Coord at Epoch: 17h 34m 50.60529s -22:49:53.71527s
RUWE (>1.4 is poor) : 0.93
K magnitude           : 9.854
G magnitude           : 14.950
RP magnitude          : 13.637
BP magnitude          : 16.912
DUPflag              : 0
Distance (au)         : 4.269
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.36
Sun-Target sep (deg)  : 175.38
Sun-Moon sep (deg)   : 73.45
B (ring opening deg) : -2.61
PA of pole (deg)     : 1.87
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 19.732
C/A sky separation (km) : 61098.0
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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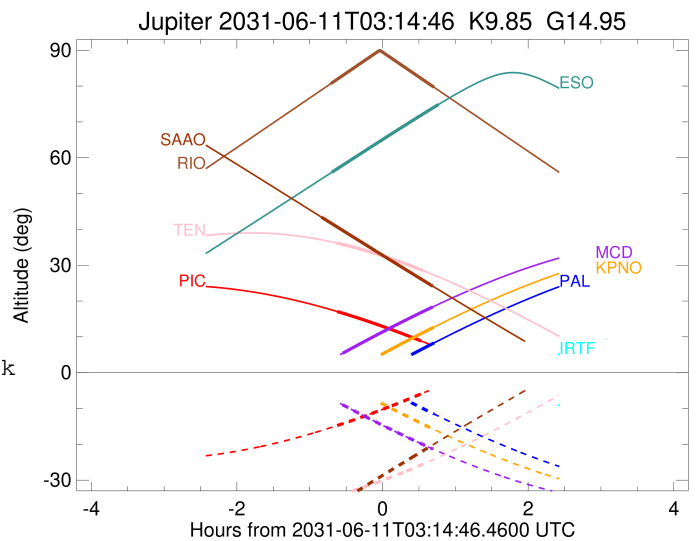
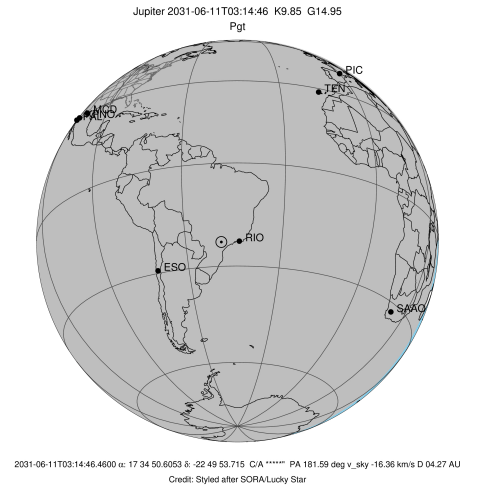


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-11T02:41:51.308	-0.92x	-2.75x	71485.4	57.84	61.04
Jupiter	E	2031-06-11T03:56:47.848	12.64	-15.78	71485.1	59.39	62.49

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-11T03:19:09.330
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       : 4116707087965145728
2Mass ID (if available) : 17345062-2249534
ICRS Star Coord at Epoch: 17h 34m 50.60529s -22:49:53.71527s
RUWE (>1.4 is poor) : 0.93
K magnitude          : 9.854
G magnitude           : 14.950
RP magnitude         : 13.637
BP magnitude         : 16.912
DUPflag             : 0
Distance (au)        : 4.269
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.36
Sun-Target sep (deg) : 175.38
Sun-Moon sep (deg)   : 73.54
B (ring opening deg) : -2.61
PA of pole (deg)     : 1.87
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation ("): 19.782
C/A sky separation (km): 61251.7
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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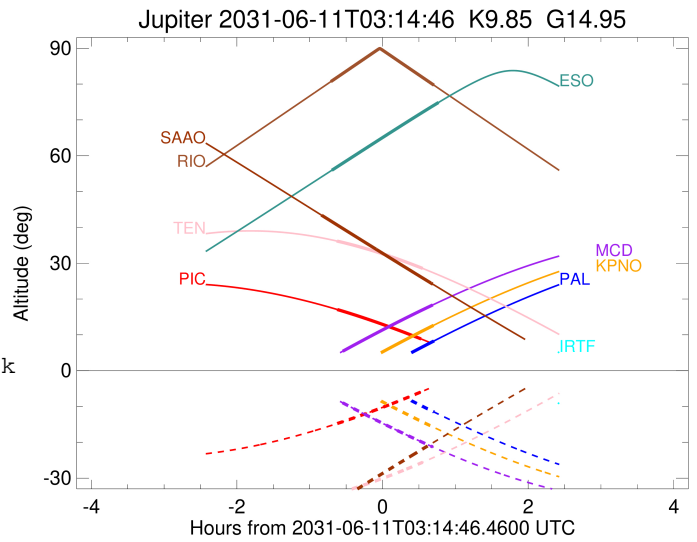
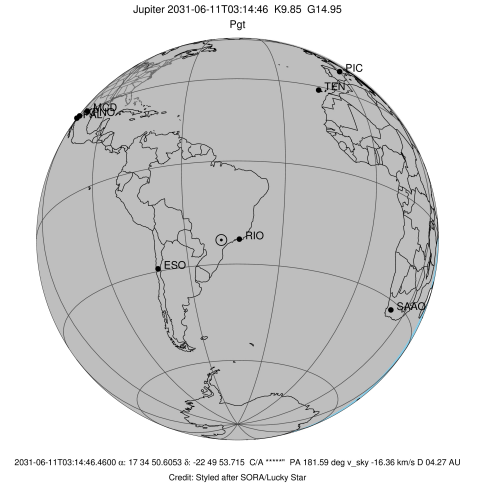


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-11T02:41:58.990	5.42	-8.97	71485.3	58.09	61.28
Jupiter	E	2031-06-11T03:56:12.240	18.35	-21.29	71485.1	59.60	62.69

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-11T03:12:33.180
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        : 4116707087965145728
2Mass ID (if available) : 17345062-2249534
ICRS Star Coord at Epoch: 17h 34m 50.60529s -22:49:53.71527s
RUWE (>1.4 is poor) : 0.93
K magnitude           : 9.854
G magnitude           : 14.950
RP magnitude          : 13.637
BP magnitude          : 16.912
DUPflag              : 0
Distance (au)         : 4.269
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.36
Sun-Target sep (deg) : 175.38
Sun-Moon sep (deg)   : 73.54
B (ring opening deg) : -2.61
PA of pole (deg)     : 1.87
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation ("): 20.046
C/A sky separation (km): 62071.1
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
    
```

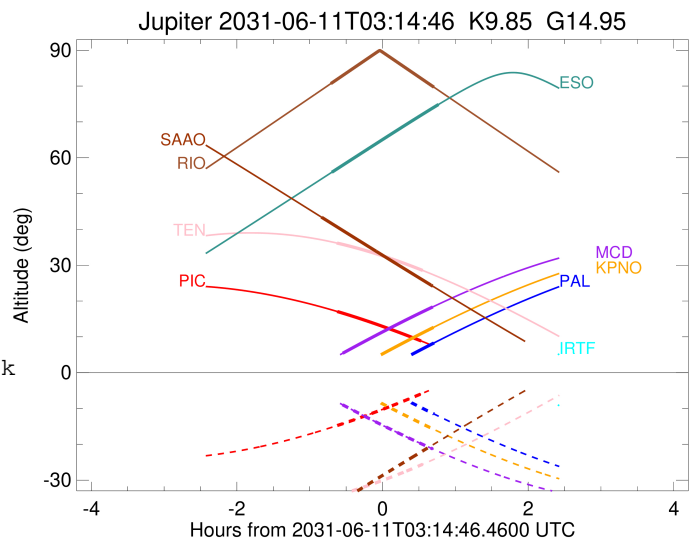
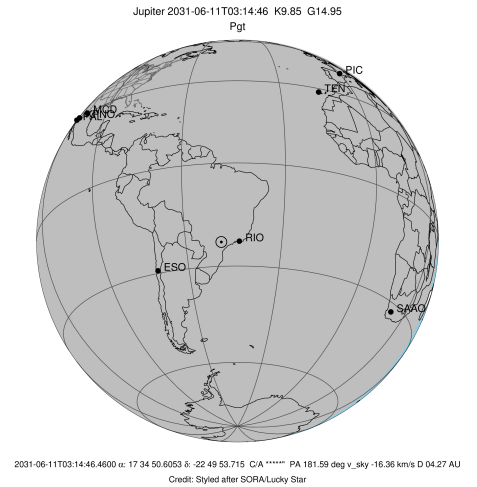


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-11T02:37:12.475	36.18	-34.25	71485.0	60.05	63.11
Jupiter	E	2031-06-11T03:47:57.190	28.52	-25.56	71485.0	60.19	63.24

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-11T03:14:41.240
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      : 4116707087965145728
2Mass ID (if available) : 17345062-2249534
ICRS Star Coord at Epoch: 17h 34m 50.60529s -22:49:53.71527s
RUWE (>1.4 is poor) : 0.93
K magnitude          : 9.854
G magnitude          : 14.950
RP magnitude         : 13.637
BP magnitude         : 16.912
DUPflag             : 0
Distance (au)       : 4.269
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.36
Sun-Target sep (deg) : 175.38
Sun-Moon sep (deg)  : 74.09
B (ring opening deg) : -2.61
PA of pole (deg)    : 1.87
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 18.506
C/A sky separation (km) : 57301.5
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
    
```

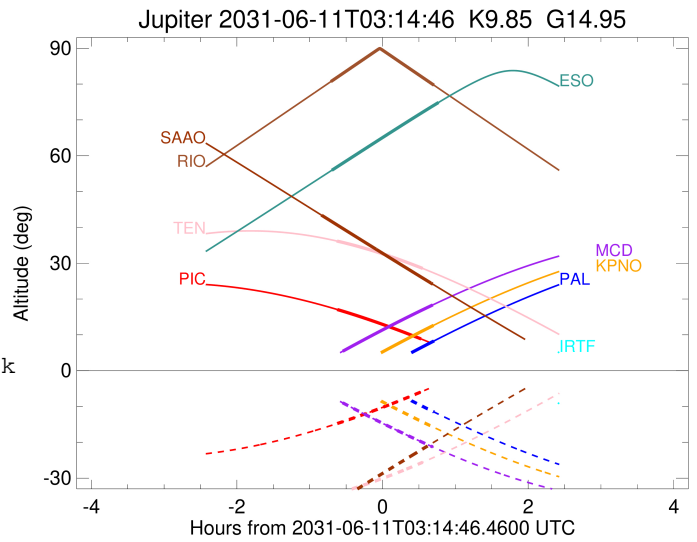
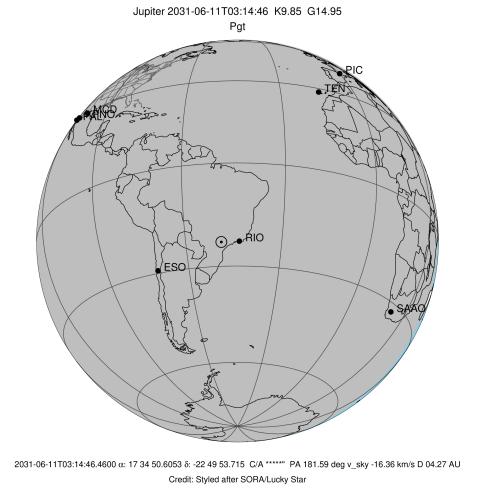


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-11T02:32:11.884	80.68	-85.32	71486.1	52.84	56.31
Jupiter	E	2031-06-11T03:57:10.412	79.68	-75.11	71486.0	53.46	56.91

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-11T03:17:00.130
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       : 4116707087965145728
2Mass ID (if available) : 17345062-2249534
ICRS Star Coord at Epoch: 17h 34m 50.60529s -22:49:53.71527s
RUWE (>1.4 is poor) : 0.93
K magnitude          : 9.854
G magnitude          : 14.950
RP magnitude         : 13.637
BP magnitude         : 16.912
DUPflag             : 0
Distance (au)        : 4.269
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.36
Sun-Target sep (deg) : 175.38
Sun-Moon sep (deg)   : 74.11
B (ring opening deg) : -2.61
PA of pole (deg)     : 1.87
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation ("): 18.186
C/A sky separation (km): 56311.2
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
    
```

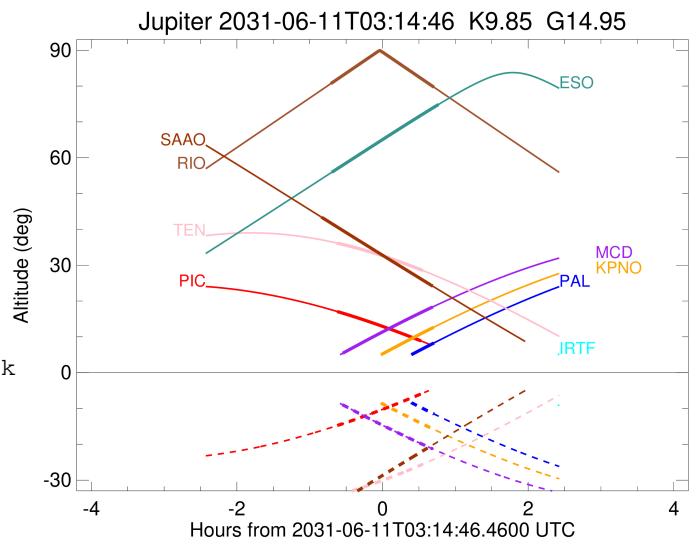
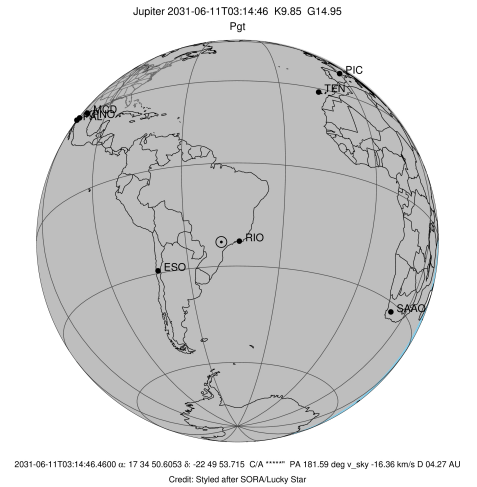


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-11T02:33:00.938	55.93	-60.40	71486.4	51.30	54.84
Jupiter	E	2031-06-11T04:00:53.735	74.85	-78.89	71486.2	52.40	55.89


```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-11T03:10:15.360
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        : 4116707087965145728
2Mass ID (if available) : 17345062-2249534
ICRS Star Coord at Epoch: 17h 34m 50.60529s -22:49:53.71527s
RUWE (>1.4 is poor) : 0.93
K magnitude           : 9.854
G magnitude           : 14.950
RP magnitude          : 13.637
BP magnitude          : 16.912
DUPflag              : 0
Distance (au)         : 4.269
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.36
Sun-Target sep (deg)  : 175.38
Sun-Moon sep (deg)    : 73.45
B (ring opening deg) : -2.61
PA of pole (deg)      : 1.87
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 17.832
C/A sky separation (km) : 55215.5
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	2031-06-11T02:24:33.919	43.39	-39.21	71486.5	50.64	54.21
Jupiter	E	2031-06-11T03:56:07.834	24.15	-20.16	71486.5	50.30	53.87