

target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2031-06-11T02:48:23.800
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 4116706881819880064
 2Mass ID (if available) : 17345118-2250126

Jupiter 2031-06-11T02:48:23 K9.31 G14.60 Pgt

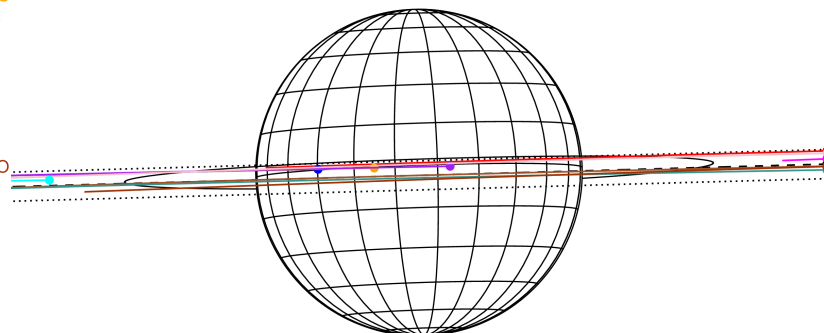
ICRS Star Coord at Epoch: 17h 34m 51.17198s -22:50:12.84940s

RUWE (>1.4 is poor) : 0.85
 K magnitude : 9.306
 G magnitude : 14.598
 RP magnitude : 13.233
 BP magnitude : 16.843
 DUPflag : 0
 Distance (au) : 4.269
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -16.36
 Sun-Target sep (deg) : 175.36
 Sun-Moon sep (deg) : 72.90
 B (ring opening deg) : -2.60
 PA of pole (deg) : 1.87
 Pole direction: RA (deg): 268.05692
 Dec (deg): 64.49651
 C/A sky separation (") : 0.407
 C/A sky separation (km) : 1261.4
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk

Jupiter 2031-06-11T02:48:23 K9.31 G14.60
 Pgt



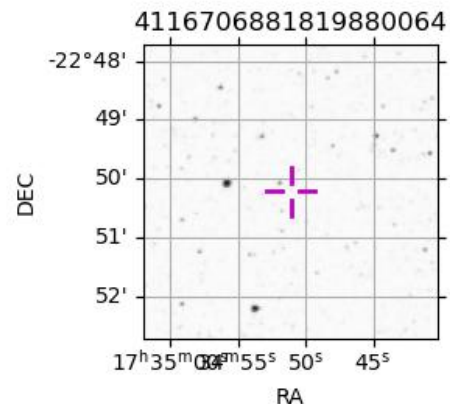
Earth
 PIC
 PAL
 KPNO
 MCD
 TEN
 IRTF
 KAV
 RIO
 ESO
 SAAO



2031-06-11T02:48:23.8000 a: 17 34 51.1720 d: -22 50 12.849 C/A 0.419° PA 1.60 deg v_sky -16.36 km/s D 04.27 AU
 Credit: Styled after SORA/Lucky Star

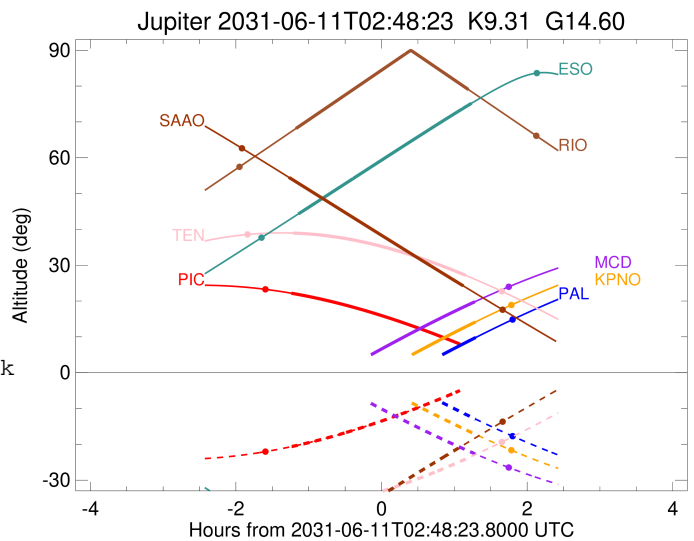
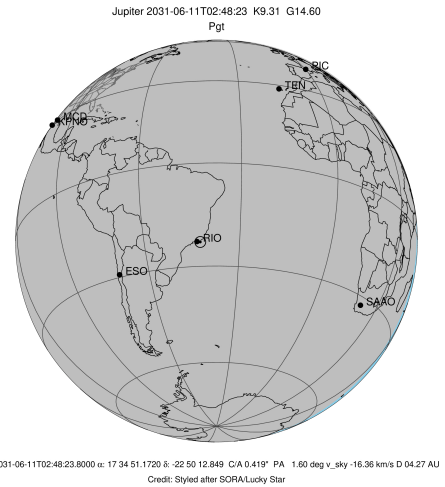
Observable events with sun below -5 deg and altitude above 5 deg

Obs	Location	lat	Elon	Target	Observed Events Interval	OCode
PIC	Pic du Midi	42.9	0.1	+	JUN 11 01:34 - JUN 11 01:34	Pin
PAL	Palomar Mt (200")	33.4	243.1	+	JUN 11 04:05 - JUN 11 04:05	Pne
PMO	Purple Mtn Obs. Nanking	32.1	118.8			Pnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+	JUN 11 04:05 - JUN 11 04:05	Pne
MCD	McDonald Obs. 2.7m	30.7	256.0	+	JUN 11 04:05 - JUN 11 04:05	Pne
TEN	Teide Obs./Tenerife	28.3	343.5	+	JUN 11 01:35 - JUN 11 03:57	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 11 01:37 - JUN 11 03:59	Pie
ESO	European Southern Obs. (3.6m)	-29.3	289.3	+	JUN 11 01:39 - JUN 11 04:02	Pie
AAT	Siding Spring (AAT)	-31.3	149.1			Pnn
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8	+	JUN 11 01:32 - JUN 11 03:55	Pie
MSO	Mt. Stromlo Observatory	-35.3	149.0			Pnn



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-11T02:45:42.430
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        : 4116706881819880064
2Mass ID (if available) : 17345118-2250126
ICRS Star Coord at Epoch: 17h 34m 51.17198s -22:50:12.84940s
RUWE (>1.4 is poor) : 0.85
K magnitude           : 9.306
G magnitude           : 14.598
RP magnitude          : 13.233
BP magnitude          : 16.843
DUPflag              : 0
Distance (au)         : 4.269
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.36
Sun-Target sep (deg)  : 175.36
Sun-Moon sep (deg)   : 73.02
B (ring opening deg) : -2.60
PA of pole (deg)     : 1.87
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 1.372
C/A sky separation (km) : 4248.2
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
    
```

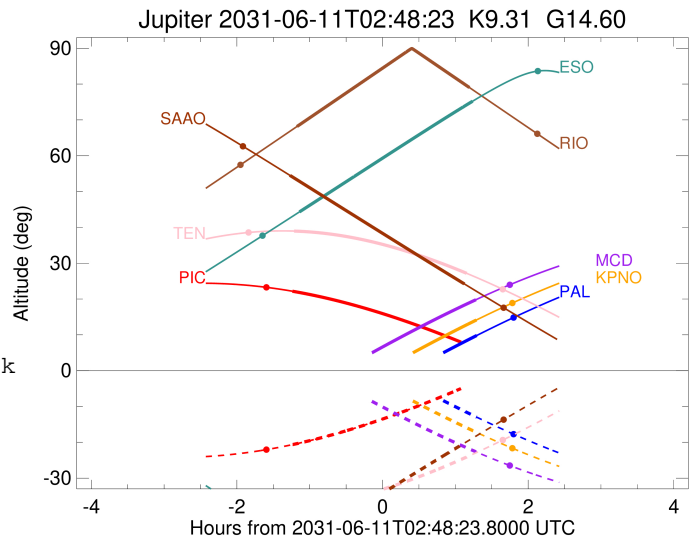
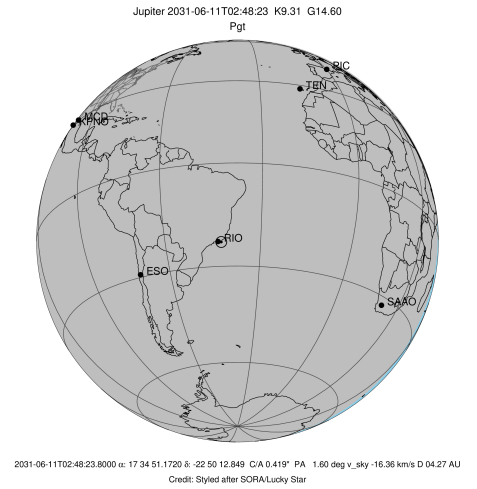


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-11T01:34:18.798	22.16	-20.63	71492.0	3.31	3.78
Jupiter	E	2031-06-11T03:57:21.546	7.37	-4.37x	71492.0	3.38	3.86

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-11T02:53:47.200
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        : 4116706881819880064
2Mass ID (if available) : 17345118-2250126
ICRS Star Coord at Epoch: 17h 34m 51.17198s -22:50:12.84940s
RUWE (>1.4 is poor) : 0.85
K magnitude           : 9.306
G magnitude           : 14.598
RP magnitude          : 13.233
BP magnitude          : 16.843
DUPflag              : 0
Distance (au)         : 4.269
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.36
Sun-Target sep (deg) : 175.36
Sun-Moon sep (deg)   : 73.05
B (ring opening deg) : -2.60
PA of pole (deg)     : 1.87
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 0.724
C/A sky separation (km) : 2243.0
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
    
```

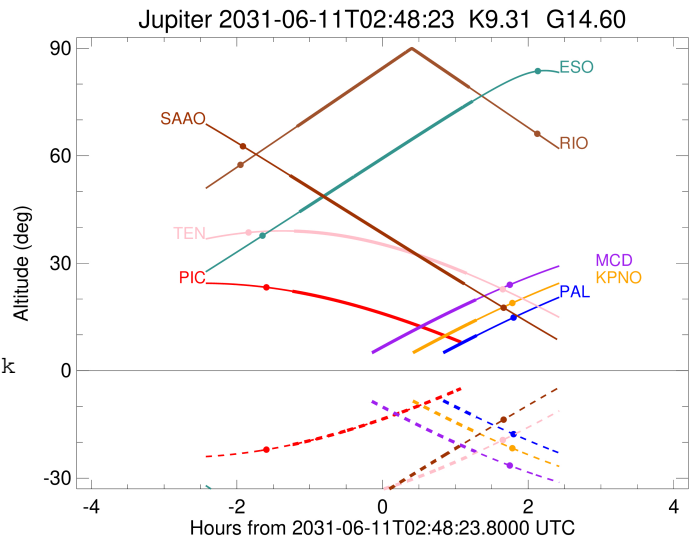
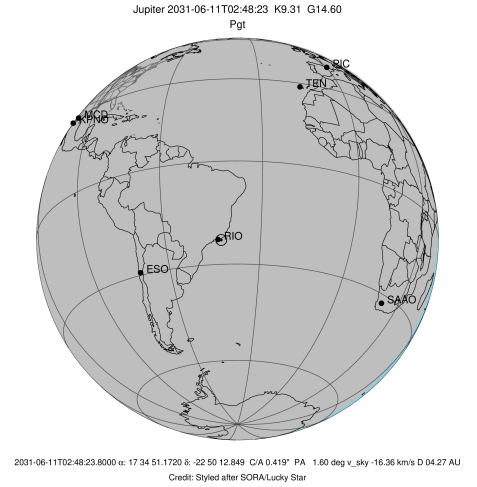


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-11T01:41:02.943	-17.51x	13.55x	71492.0	0.99	1.13
Jupiter	E	2031-06-11T04:05:59.212	9.81	-12.97	71492.0	2.58	2.94

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-11T02:53:44.800
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      : 4116706881819880064
2Mass ID (if available) : 17345118-2250126
ICRS Star Coord at Epoch: 17h 34m 51.17198s -22:50:12.84940s
RUWE (>1.4 is poor) : 0.85
K magnitude          : 9.306
G magnitude          : 14.598
RP magnitude         : 13.233
BP magnitude         : 16.843
DUPflag             : 0
Distance (au)       : 4.269
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.36
Sun-Target sep (deg) : 175.36
Sun-Moon sep (deg)  : 73.13
B (ring opening deg) : -2.60
PA of pole (deg)    : 1.87
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (" ) : 0.749
C/A sky separation (km) : 2317.8
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
    
```

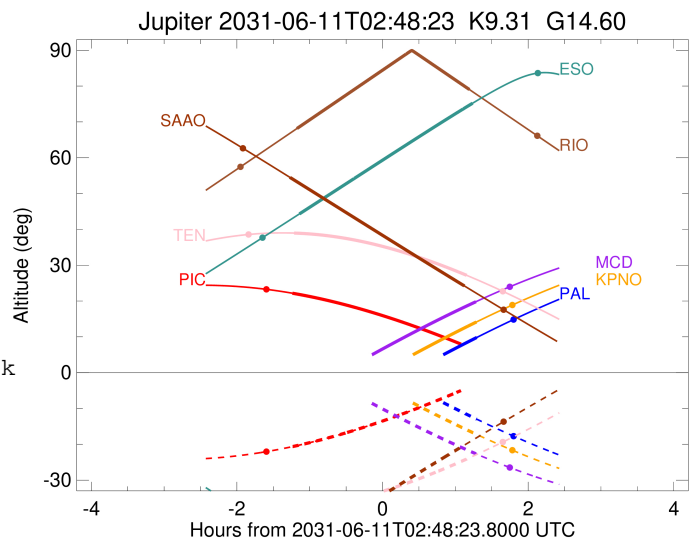
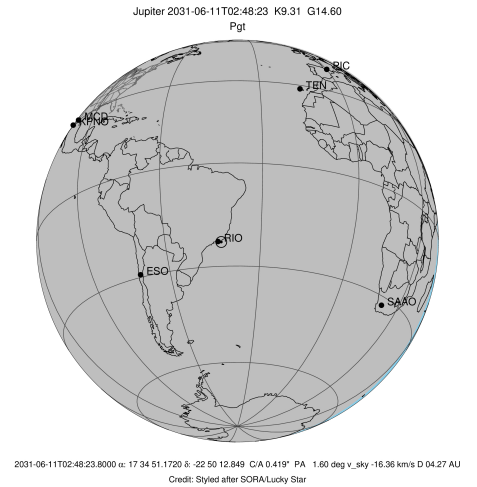


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-11T01:41:10.322	-12.84x	8.88x	71492.0	1.04	1.19
Jupiter	E	2031-06-11T04:05:47.462	14.15	-17.21	71492.0	2.63	3.00

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-11T02:53:33.770
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       : 4116706881819880064
2Mass ID (if available) : 17345118-2250126
ICRS Star Coord at Epoch: 17h 34m 51.17198s -22:50:12.84940s
RUWE (>1.4 is poor) : 0.85
K magnitude           : 9.306
G magnitude           : 14.598
RP magnitude          : 13.233
BP magnitude          : 16.843
DUPflag              : 0
Distance (au)        : 4.269
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.36
Sun-Target sep (deg)  : 175.36
Sun-Moon sep (deg)   : 73.22
B (ring opening deg) : -2.60
PA of pole (deg)     : 1.87
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 0.801
C/A sky separation (km) : 2480.0
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
    
```

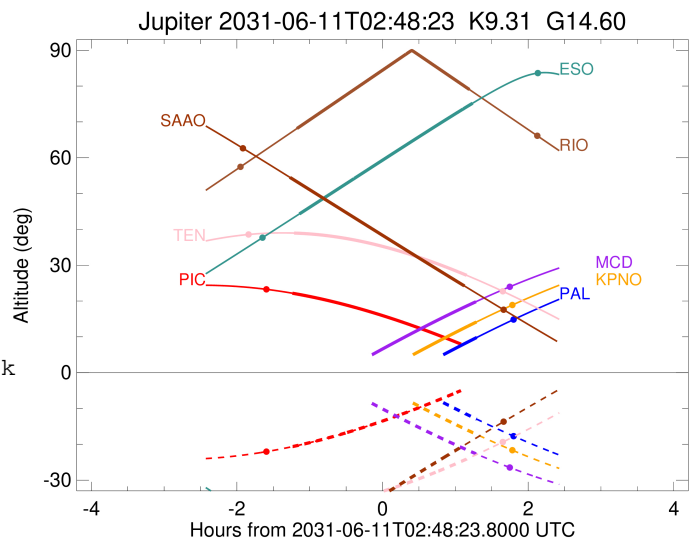
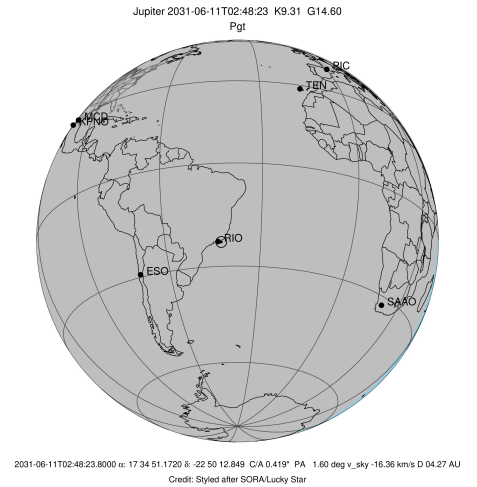


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-11T01:41:13.421	-6.31x	2.41x	71492.0	1.18	1.34
Jupiter	E	2031-06-11T04:05:23.659	19.81	-22.64	71492.0	2.73	3.12

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-11T02:46:32.890
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        : 4116706881819880064
2Mass ID (if available) : 17345118-2250126
ICRS Star Coord at Epoch: 17h 34m 51.17198s -22:50:12.84940s
RUWE (>1.4 is poor) : 0.85
K magnitude           : 9.306
G magnitude           : 14.598
RP magnitude          : 13.233
BP magnitude          : 16.843
DUPflag              : 0
Distance (au)         : 4.269
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.36
Sun-Target sep (deg) : 175.36
Sun-Moon sep (deg)   : 73.34
B (ring opening deg) : -2.60
PA of pole (deg)     : 1.87
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 1.164
C/A sky separation (km) : 3604.1
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
    
```

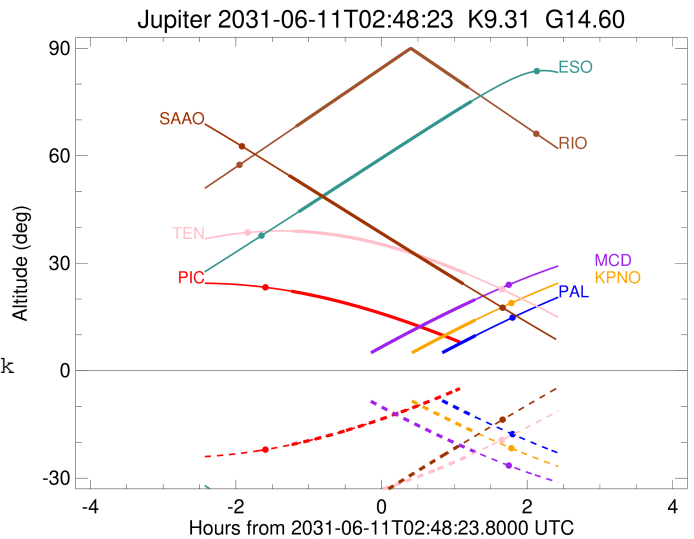
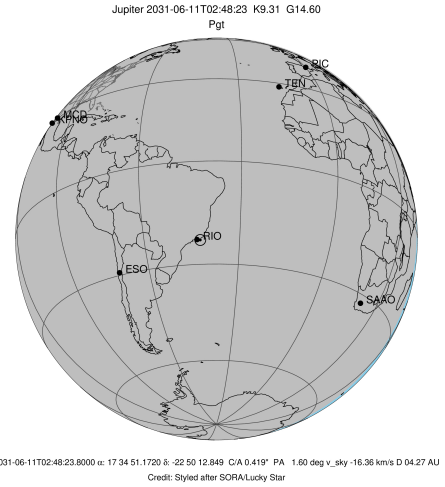


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-11T01:35:32.356	38.96	-38.31	71492.0	2.68	3.06
Jupiter	E	2031-06-11T03:57:43.709	27.17	-24.10	71492.0	2.93	3.35

```

target                : Jupiter
target radius (km)    : 71492.00
C/A epoch              : 2031-06-11T02:49:00.840
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        : 4116706881819880064
2Mass ID (if available) : 17345118-2250126
ICRS Star Coord at Epoch: 17h 34m 51.17198s -22:50:12.84940s
RUWE (>1.4 is poor)  : 0.85
K magnitude            : 9.306
G magnitude            : 14.598
RP magnitude           : 13.233
BP magnitude           : 16.843
DUPflag               : 0
Distance (au)         : 4.269
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s)  : -16.36
Sun-Target sep (deg)  : 175.36
Sun-Moon sep (deg)    : 73.86
B (ring opening deg)  : -2.60
PA of pole (deg)      : 1.87
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 0.413
C/A sky separation (km) : 1277.5
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
    
```

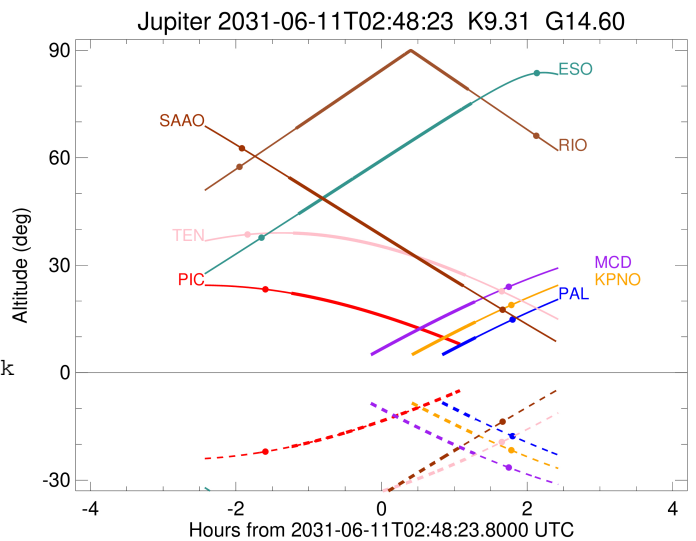
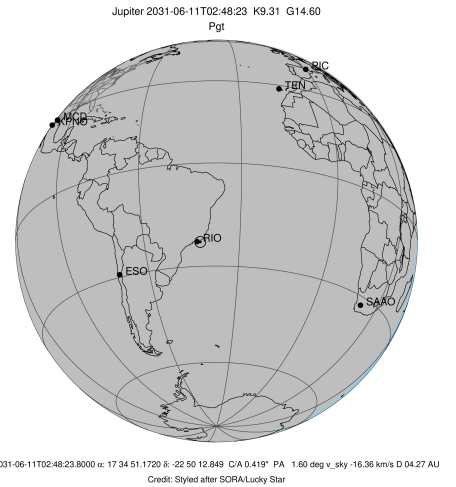


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-11T01:37:58.715	68.17	-72.86	71492.0	-1.48	-1.70
Jupiter	E	2031-06-11T03:59:58.701	79.03	-74.46	71492.0	-0.74	-0.84

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-11T02:51:27.450
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        : 4116706881819880064
2Mass ID (if available) : 17345118-2250126
ICRS Star Coord at Epoch: 17h 34m 51.17198s -22:50:12.84940s
RUWE (>1.4 is poor) : 0.85
K magnitude           : 9.306
G magnitude           : 14.598
RP magnitude          : 13.233
BP magnitude          : 16.843
DUPflag              : 0
Distance (au)         : 4.269
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.36
Sun-Target sep (deg) : 175.36
Sun-Moon sep (deg)   : 73.84
B (ring opening deg) : -2.60
PA of pole (deg)     : 1.87
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 0.766
C/A sky separation (km) : 2372.8
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
    
```

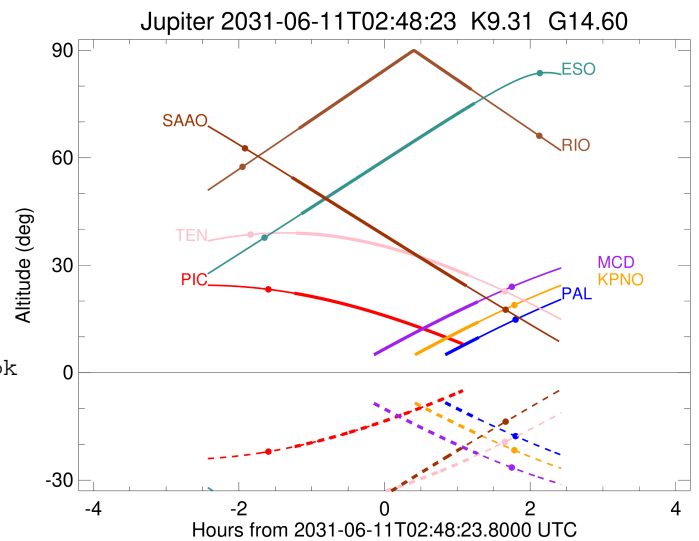
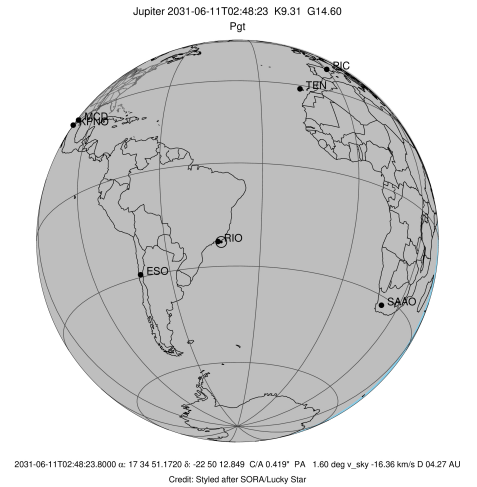


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-11T01:39:58.364	44.32	-48.83	71492.0	-2.57	-2.93
Jupiter	E	2031-06-11T04:02:38.307	75.20	-79.21	71492.0	-1.37	-1.57


```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-11T02:43:43.630
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      : 4116706881819880064
2Mass ID (if available) : 17345118-2250126
ICRS Star Coord at Epoch: 17h 34m 51.17198s -22:50:12.84940s
RUWE (>1.4 is poor) : 0.85
K magnitude          : 9.306
G magnitude          : 14.598
RP magnitude         : 13.233
BP magnitude         : 16.843
DUPflag             : 0
Distance (au)       : 4.269
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.36
Sun-Target sep (deg) : 175.36
Sun-Moon sep (deg)  : 73.28
B (ring opening deg) : -2.60
PA of pole (deg)    : 1.87
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation ("): 1.012
C/A sky separation (km): 3134.5
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	2031-06-11T01:32:07.612	54.51	-50.29	71492.0	-2.43	-2.77
Jupiter	E	2031-06-11T03:55:45.602	24.23	-20.24	71492.0	-2.70	-3.08