

target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2031-06-13T05:31:38.990
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 4117454240444696960
 2Mass ID (if available) : 17334123-2249369

Jupiter 2031-06-13T05:31:38 K8.32 G14.89 Pgt

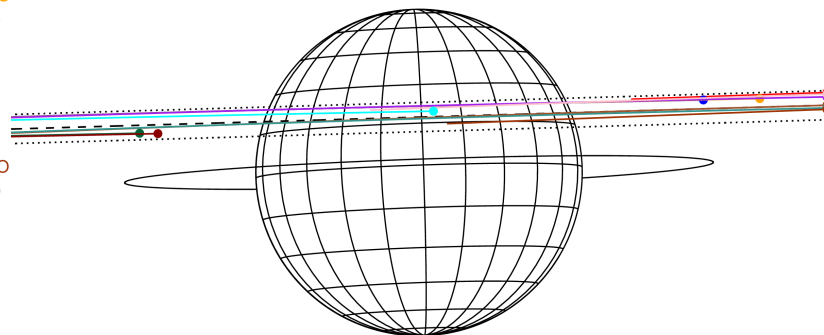
ICRS Star Coord at Epoch: 17h 33m 41.21518s -22:49:37.04704s

RUWE (>1.4 is poor) : 1.06
 K magnitude : 8.322
 G magnitude : 14.892
 RP magnitude : 13.336
 BP magnitude : 18.365
 DUPflag : 0
 Distance (au) : 4.266
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -16.44
 Sun-Target sep (deg) : 177.63
 Sun-Moon sep (deg) : 101.58
 B (ring opening deg) : -2.60
 PA of pole (deg) : 2.00
 Pole direction: RA (deg): 268.05692
 Dec (deg): 64.49651
 C/A sky separation (") : 7.836
 C/A sky separation (km) : 24245.6
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk

Jupiter 2031-06-13T05:31:38 K8.32 G14.89
 Pgt



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

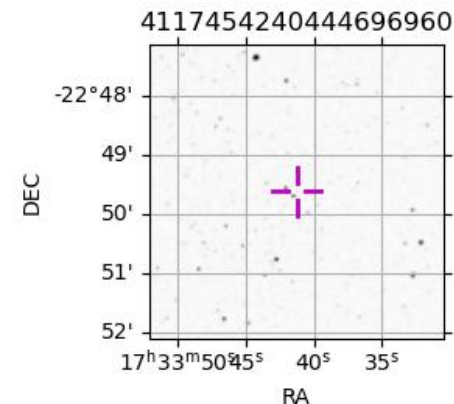


2031-06-13T05:31:38.9900 at: 17 33 41.2152 s: -22 49 37.047 C/A 7.823" PA 181.67 deg v_sky -16.44 km/s D 04.27 AU

Credit: Styled after SORA/Lucky Star

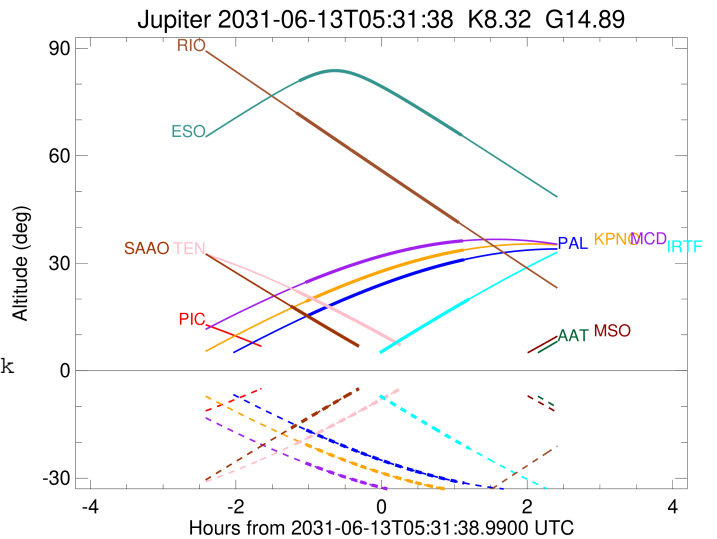
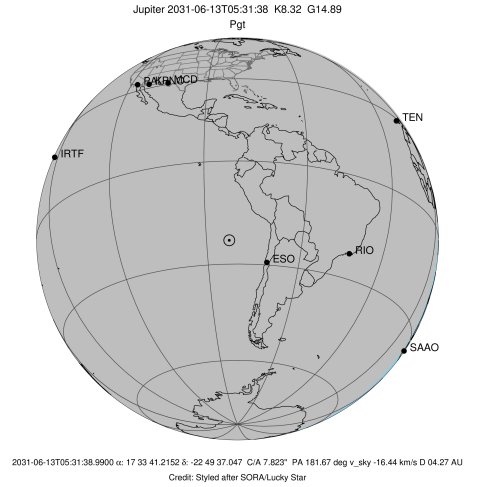
Observable events with sun below -5 deg and altitude above 5 deg

Obs	Location	lat	Elon	Target	Observed Events	Interval	OEcode
PIC	Pic du Midi	42.9	0.1				Pnn
PAL	Palomar Mt (200")	33.4	243.1	+ +	JUN 13 04:29	- JUN 13 06:39	Pie
PMO	Purple Mtn Obs. Nanking	32.1	118.8				Pnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+ +	JUN 13 04:29	- JUN 13 06:39	Pie
MCD	McDonald Obs. 2.7m	30.7	256.0	+ +	JUN 13 04:28	- JUN 13 06:38	Pie
TEN	Teide Obs./Tenerife	28.3	343.5	+	JUN 13 04:21	- JUN 13 04:21	Pin
IRTF	Mauna Kea/IRTF	19.8	204.5	+	JUN 13 06:43	- JUN 13 06:43	Pne
KAV	Kavalur Observatory	12.6	78.8				Pnn
RIO	Rio de Janeiro	-22.9	316.8	+ +	JUN 13 04:21	- JUN 13 06:35	Pie
ESO	European Southern Obs. (3.6m)	-29.3	289.3	+ +	JUN 13 04:23	- JUN 13 06:37	Pie
AAT	Siding Spring (AAT)	-31.3	149.1				Pnn
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8	+	JUN 13 04:17	- JUN 13 04:17	Pin
MSO	Mt. Stromlo Observatory	-35.3	149.0				Pnn



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-13T05:34:45.920
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      : 4117454240444696960
2Mass ID (if available) : 17334123-2249369
ICRS Star Coord at Epoch: 17h 33m 41.21518s -22:49:37.04704s
RUWE (>1.4 is poor) : 1.06
K magnitude          : 8.322
G magnitude          : 14.892
RP magnitude         : 13.336
BP magnitude         : 18.365
DUPflag             : 0
Distance (au)       : 4.266
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.44
Sun-Target sep (deg) : 177.63
Sun-Moon sep (deg)  : 101.87
B (ring opening deg) : -2.60
PA of pole (deg)    : 2.00
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation ("): 9.391
C/A sky separation (km): 29059.5
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
    
```

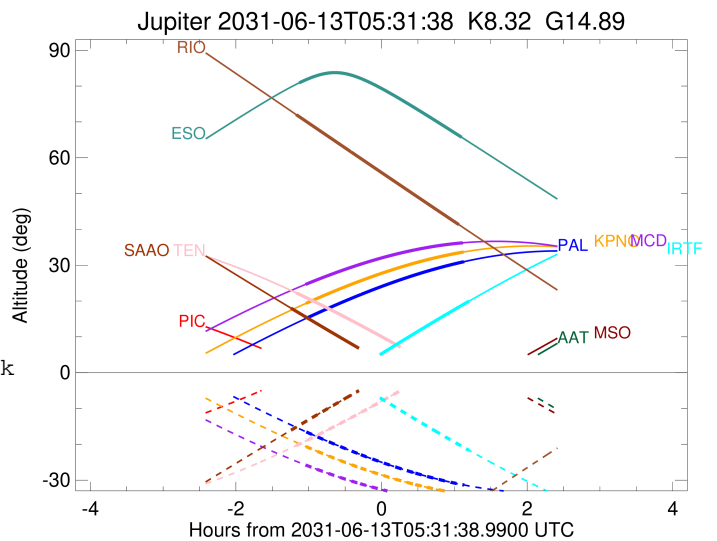
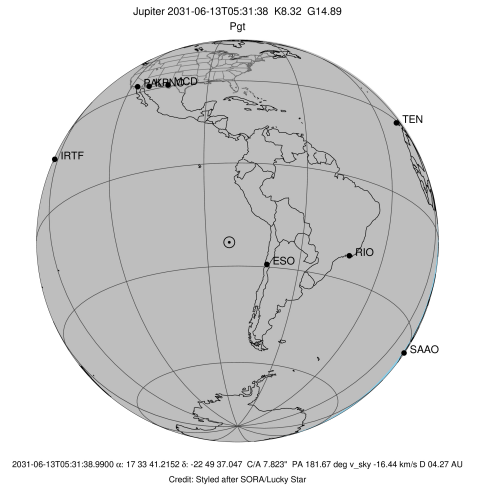


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-13T04:29:37.002	15.17	-16.53	71490.6	23.25	26.14
Jupiter	E	2031-06-13T06:39:39.723	30.98	-31.35	71490.4	24.55	27.54

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-13T05:34:25.020
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        : 4117454240444696960
2Mass ID (if available) : 17334123-2249369
ICRS Star Coord at Epoch: 17h 33m 41.21518s -22:49:37.04704s
RUWE (>1.4 is poor) : 1.06
K magnitude           : 8.322
G magnitude           : 14.892
RP magnitude          : 13.336
BP magnitude          : 18.365
DUPflag              : 0
Distance (au)         : 4.266
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.44
Sun-Target sep (deg) : 177.63
Sun-Moon sep (deg)   : 101.93
B (ring opening deg) : -2.60
PA of pole (deg)     : 2.00
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 9.398
C/A sky separation (km) : 29079.3
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
    
```

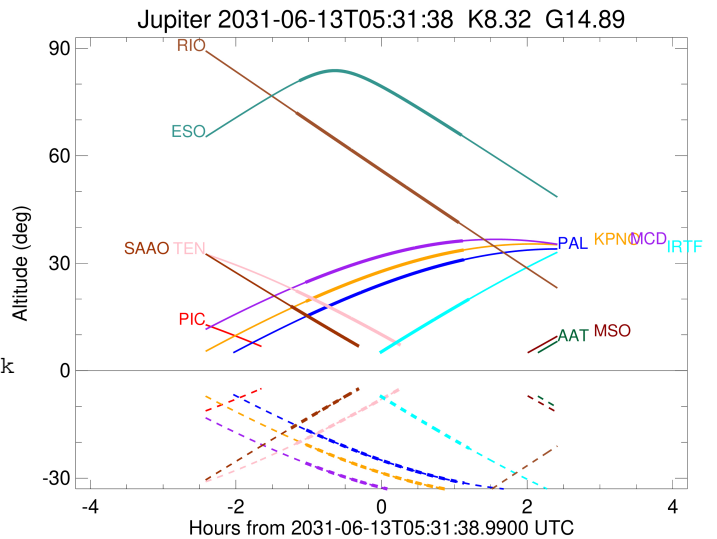
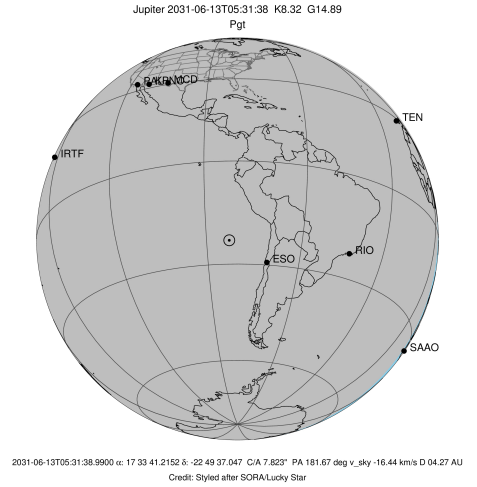


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-13T04:29:23.023	19.33	-20.62	71490.6	23.30	26.18
Jupiter	E	2031-06-13T06:39:13.636	33.68	-33.87	71490.4	24.53	27.51

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-13T05:33:50.440
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       : 4117454240444696960
2Mass ID (if available) : 17334123-2249369
ICRS Star Coord at Epoch: 17h 33m 41.21518s -22:49:37.04704s
RUWE (>1.4 is poor) : 1.06
K magnitude          : 8.322
G magnitude          : 14.892
RP magnitude         : 13.336
BP magnitude         : 18.365
DUPflag             : 0
Distance (au)        : 4.266
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.44
Sun-Target sep (deg) : 177.63
Sun-Moon sep (deg)   : 102.01
B (ring opening deg) : -2.60
PA of pole (deg)     : 2.00
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 9.415
C/A sky separation (km) : 29131.5
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
    
```

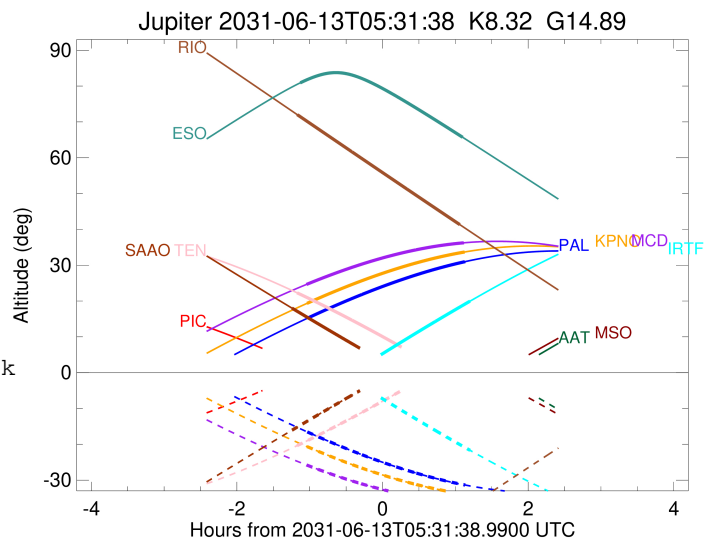
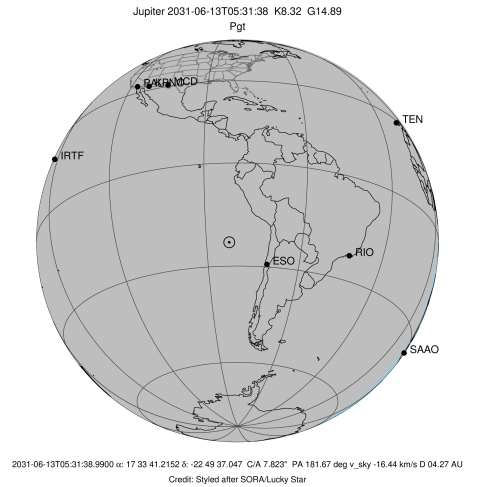


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-13T04:28:57.614	24.62	-25.75	71490.5	23.39	26.29
Jupiter	E	2031-06-13T06:38:32.744	36.24	-36.14	71490.4	24.51	27.50

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-13T05:26:55.250
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        : 4117454240444696960
2Mass ID (if available) : 17334123-2249369
ICRS Star Coord at Epoch: 17h 33m 41.21518s -22:49:37.04704s
RUWE (>1.4 is poor)  : 1.06
K magnitude           : 8.322
G magnitude           : 14.892
RP magnitude          : 13.336
BP magnitude          : 18.365
DUPflag              : 0
Distance (au)         : 4.266
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s)  : -16.44
Sun-Target sep (deg)  : 177.63
Sun-Moon sep (deg)    : 101.90
B (ring opening deg)  : -2.60
PA of pole (deg)      : 2.00
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 9.096
C/A sky separation (km) : 28147.0
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
    
```

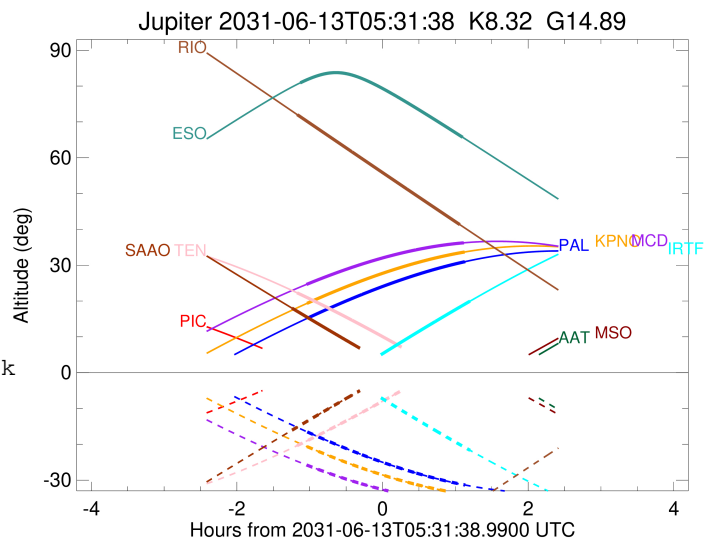
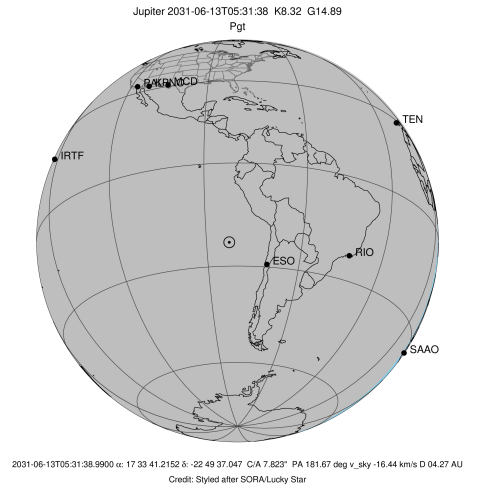


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-13T04:21:14.251	22.29	-20.37	71490.6	23.26	26.14
Jupiter	E	2031-06-13T06:33:00.235	-1.80x	3.98x	71490.6	22.98	25.83

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-13T05:37:17.340
Event type          : Pgt
                    : Jupiter occs: geocentric, topocentric
                    : Not a ringed target
Observer code       : IRTF
Location            : Mauna Kea/IRTF
Latitude (deg)      : 19.82622
E. Longitude (deg)  : 204.52800
Altitude (km)       : 4.168
Gaia source ID      : 4117454240444696960
2Mass ID (if available) : 17334123-2249369
ICRS Star Coord at Epoch: 17h 33m 41.21518s -22:49:37.04704s
RUWE (>1.4 is poor) : 1.06
K magnitude          : 8.322
G magnitude          : 14.892
RP magnitude         : 13.336
BP magnitude         : 18.365
DUPflag             : 0
Distance (au)        : 4.266
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.44
Sun-Target sep (deg) : 177.63
Sun-Moon sep (deg)  : 101.50
B (ring opening deg) : -2.60
PA of pole (deg)    : 2.00
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 8.640
C/A sky separation (km) : 26733.6
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
    
```

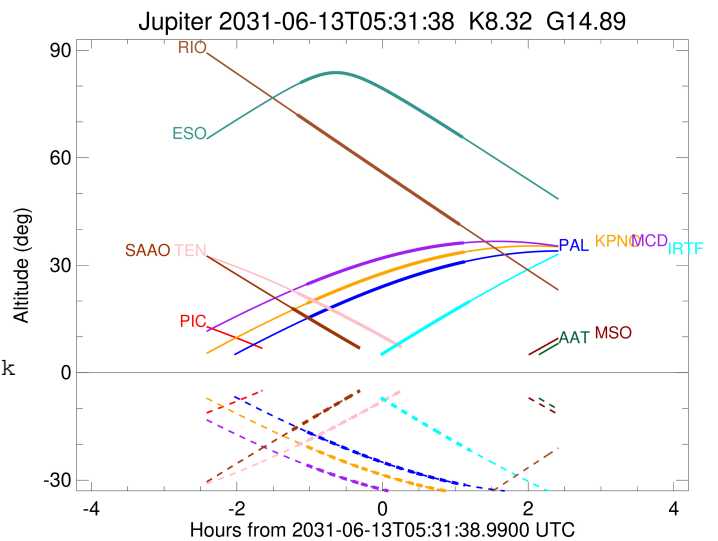
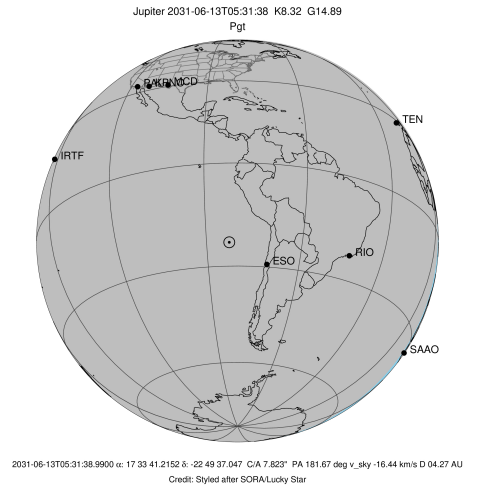


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-13T04:30:17.681	-7.96x	5.80x	71490.8	21.03	23.70
Jupiter	E	2031-06-13T06:43:47.634	19.96	-21.68	71490.6	22.80	25.64

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-13T05:28:14.540
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     : 4117454240444696960
2Mass ID (if available) : 17334123-2249369
ICRS Star Coord at Epoch: 17h 33m 41.21518s -22:49:37.04704s
RUWE (>1.4 is poor) : 1.06
K magnitude         : 8.322
G magnitude         : 14.892
RP magnitude        : 13.336
BP magnitude        : 18.365
DUPflag            : 0
Distance (au)      : 4.266
f0 (km)            : 0.00
g0 (km)            : 0.00
skyplane vel. (km/s) : -16.44
Sun-Target sep (deg) : 177.63
Sun-Moon sep (deg) : 102.46
B (ring opening deg) : -2.60
PA of pole (deg)   : 2.00
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 7.725
C/A sky separation (km) : 23903.4
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
    
```

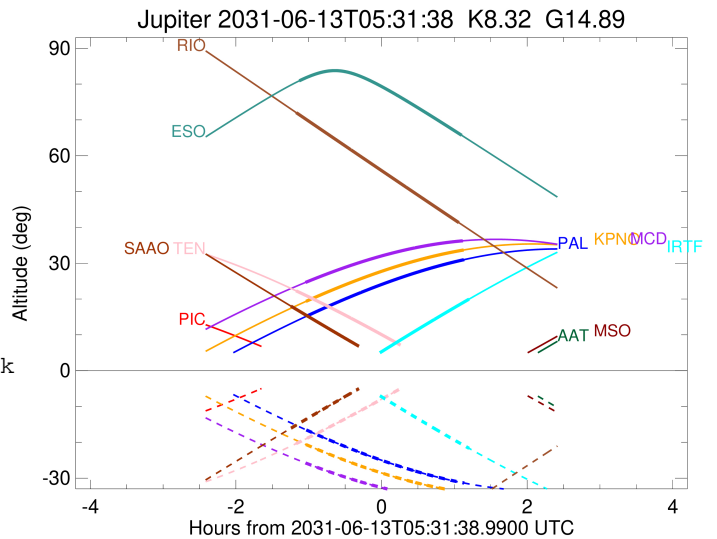
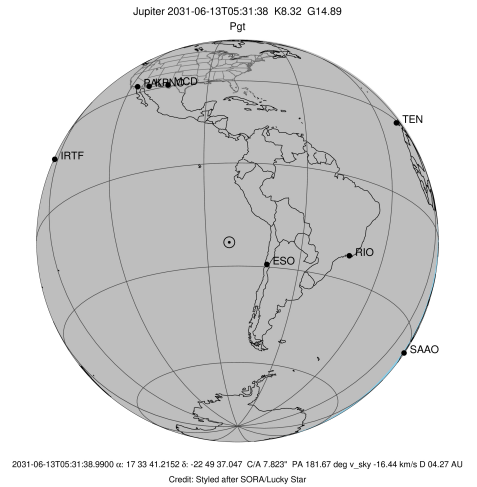


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-13T04:21:26.796	72.01	-69.63	71491.0	19.42	21.94
Jupiter	E	2031-06-13T06:35:19.192	41.33	-39.14	71491.0	19.46	21.98

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-13T05:30:43.860
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        : 4117454240444696960
2Mass ID (if available) : 17334123-2249369
ICRS Star Coord at Epoch: 17h 33m 41.21518s -22:49:37.04704s
RUWE (>1.4 is poor) : 1.06
K magnitude           : 8.322
G magnitude           : 14.892
RP magnitude          : 13.336
BP magnitude          : 18.365
DUPflag              : 0
Distance (au)         : 4.266
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.44
Sun-Target sep (deg)  : 177.63
Sun-Moon sep (deg)    : 102.52
B (ring opening deg) : -2.60
PA of pole (deg)      : 2.00
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 7.610
C/A sky separation (km) : 23546.1
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
    
```

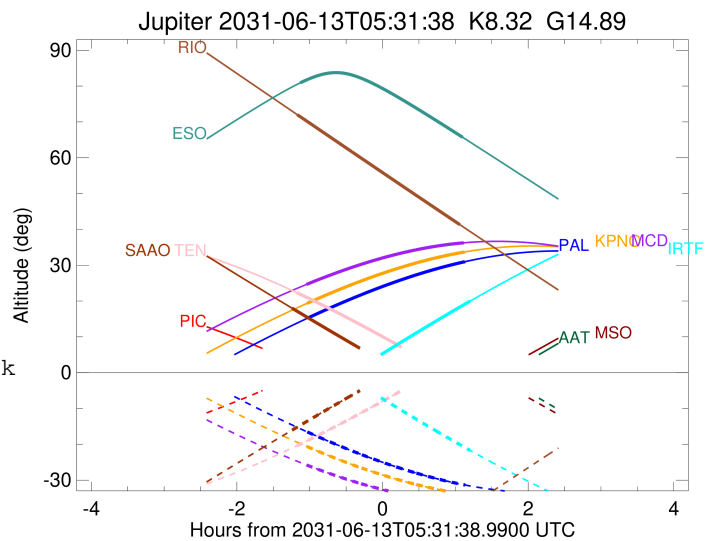
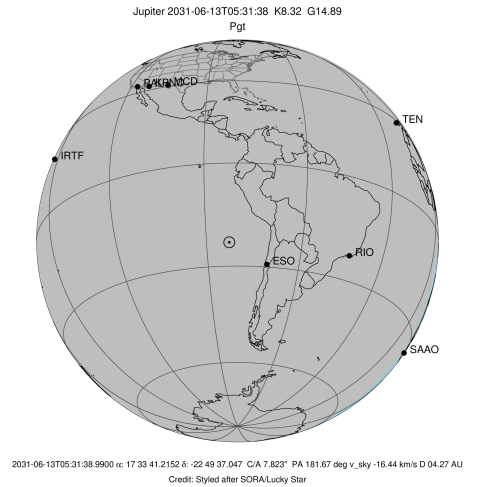


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-13T04:23:54.575	80.90	-82.72	71491.0	18.86	21.32
Jupiter	E	2031-06-13T06:37:37.153	65.71	-63.67	71491.0	19.40	21.91


```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-13T05:26:22.200
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       : 4117454240444696960
2Mass ID (if available) : 17334123-2249369
ICRS Star Coord at Epoch: 17h 33m 41.21518s -22:49:37.04704s
RUWE (>1.4 is poor) : 1.06
K magnitude           : 8.322
G magnitude           : 14.892
RP magnitude         : 13.336
BP magnitude         : 18.365
DUPflag              : 0
Distance (au)        : 4.266
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.44
Sun-Target sep (deg) : 177.63
Sun-Moon sep (deg)   : 101.79
B (ring opening deg) : -2.60
PA of pole (deg)     : 2.00
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 6.753
C/A sky separation (km) : 20896.7
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	2031-06-13T04:17:02.589	18.01	-16.07	71491.2	17.19	19.46
Jupiter	E	2031-06-13T06:36:11.039	-8.71x	10.20x	71491.2	16.78	19.01