

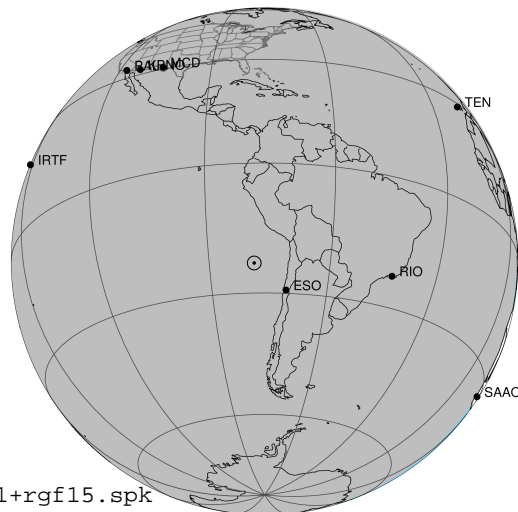
target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2031-06-13T05:15:21.780
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 4117454236075193344
 2Mass ID (if available) : 17334159-2249431

Jupiter 2031-06-13T05:15:21 K8.19 G13.47 Pgt

ICRS Star Coord at Epoch: 17h 33m 41.57781s -22:49:43.23035s

RUWE (>1.4 is poor) : 1.35
 K magnitude : 8.188
 G magnitude : 13.471
 RP magnitude : 12.122
 BP magnitude : 15.521
 DUPflag : 0
 Distance (au) : 4.266
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -16.44
 Sun-Target sep (deg) : 177.61
 Sun-Moon sep (deg) : 101.43
 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 (") : 1.801
 C/A sky separation (km) : 5574.1
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk

Jupiter 2031-06-13T05:15:21 K8.19 G13.47
 Pgt

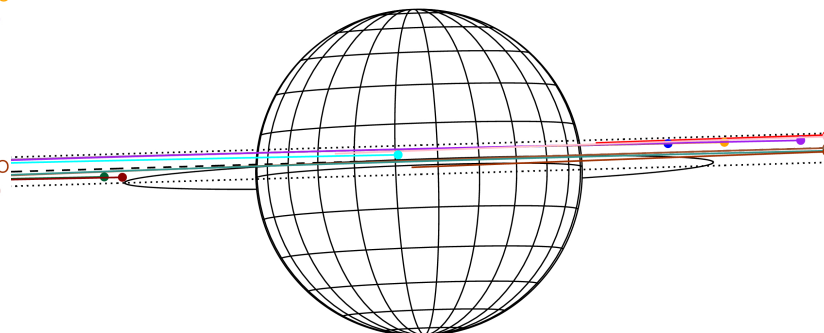


2031-06-13T05:15:21.7800 at: 17 33 41.5778 s: -22 49 43.230 C/A 1.789° PA 181.67 deg v_sky -16.44 km/s D 04.27 AU

Credit: Styled after SORA/Lucky Star

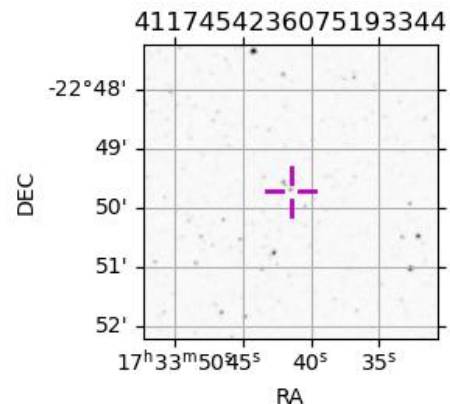
Earth

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



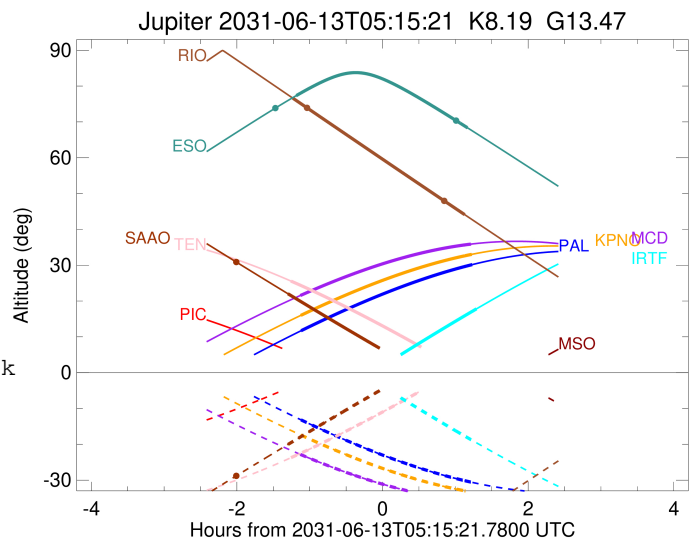
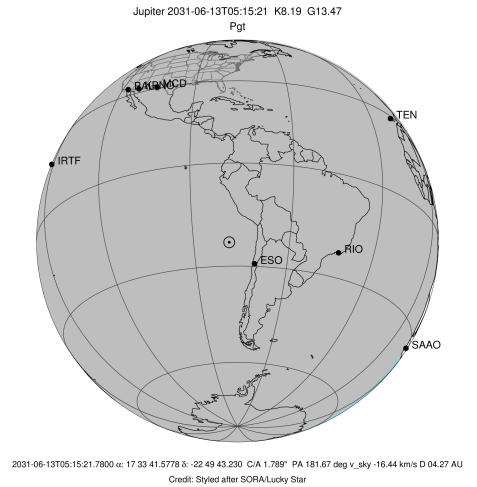
Observable events with sun below -5 deg and altitude above 5 deg

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	+ +	JUN 13 04:08 - JUN 13 06:29	Pie
PMO	Purple Mtn Obs. Nanking	32.1	118.8			Pnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+ +	JUN 13 04:08 - JUN 13 06:28	Pie
MCD	McDonald Obs. 2.7m	30.7	256.0	+ +	JUN 13 04:07 - JUN 13 06:28	Pie
TEN	Teide Obs./Tenerife	28.3	343.5	+	JUN 13 04:00 - JUN 13 04:00	Pin
IRTF	Mauna Kea/IRTF	19.8	204.5	+	JUN 13 06:32 - JUN 13 06:32	Pne
KAV	Kavalur Observatory	12.6	78.8			Pnn
RIO	Rio de Janeiro	-22.9	316.8	+ +	JUN 13 04:01 - JUN 13 06:23	Pie
ESO	European Southern Obs. (3.6m)	-29.3	289.3	+ +	JUN 13 04:04 - JUN 13 06:25	Pie
AAT	Siding Spring (AAT)	-31.3	149.1			Pnn
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8	+	JUN 13 03:57 - JUN 13 03:57	Pin
MSO	Mt. Stromlo Observatory	-35.3	149.0			Pnn



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-13T05:18:52.680
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        : 4117454236075193344
2Mass ID (if available) : 17334159-2249431
ICRS Star Coord at Epoch: 17h 33m 41.57781s -22:49:43.23035s
RUWE (>1.4 is poor) : 1.35
K magnitude           : 8.188
G magnitude           : 13.471
RP magnitude          : 12.122
BP magnitude          : 15.521
DUPflag              : 0
Distance (au)         : 4.266
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.44
Sun-Target sep (deg) : 177.61
Sun-Moon sep (deg)   : 101.68
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 ("): 3.326
C/A sky separation (km): 10292.2
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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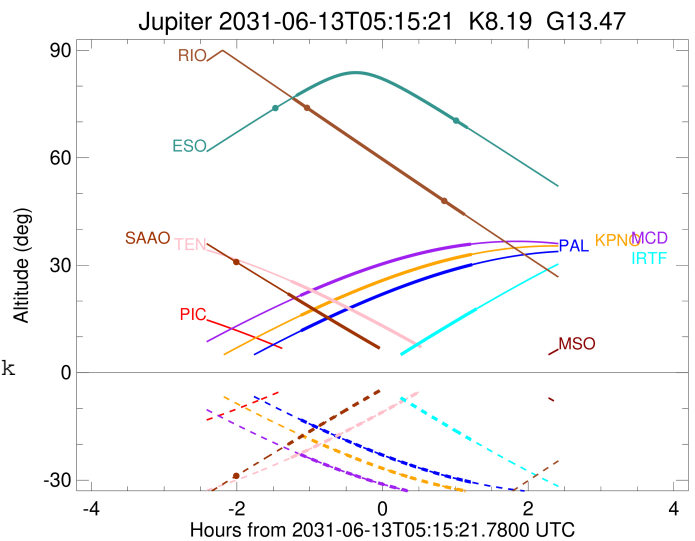
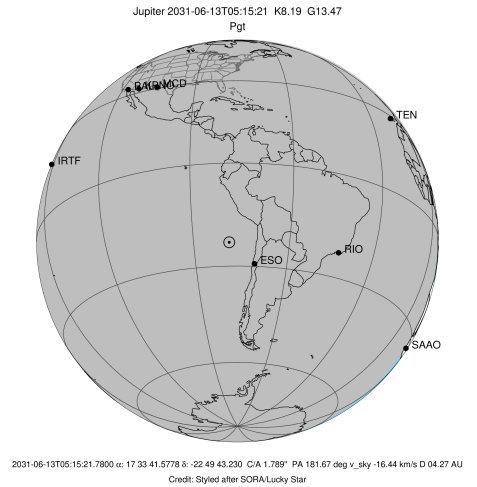


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-13T04:08:14.096	11.70	-13.18	71491.8	7.54	8.60
Jupiter	E	2031-06-13T06:29:11.688	30.15	-30.62	71491.8	8.88	10.13

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-13T05:18:32.550
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       : 4117454236075193344
2Mass ID (if available) : 17334159-2249431
ICRS Star Coord at Epoch: 17h 33m 41.57781s -22:49:43.23035s
RUWE (>1.4 is poor) : 1.35
K magnitude           : 8.188
G magnitude           : 13.471
RP magnitude         : 12.122
BP magnitude         : 15.521
DUPflag              : 0
Distance (au)        : 4.266
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.44
Sun-Target sep (deg) : 177.61
Sun-Moon sep (deg)  : 101.74
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 (") : 3.335
C/A sky separation (km) : 10320.9
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
    
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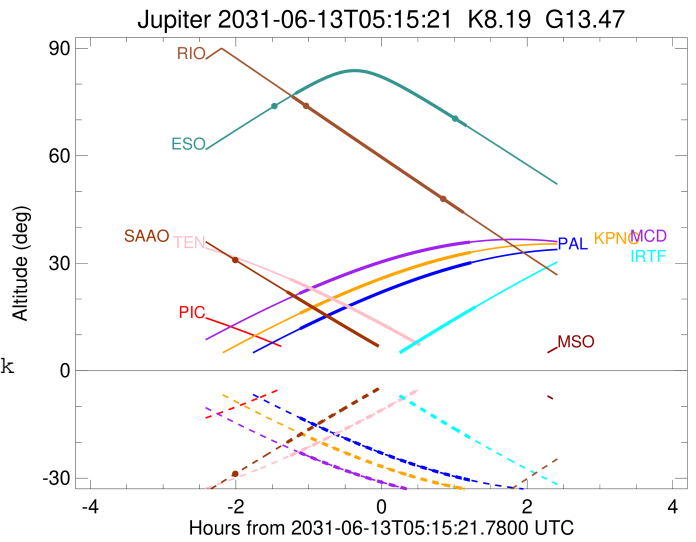
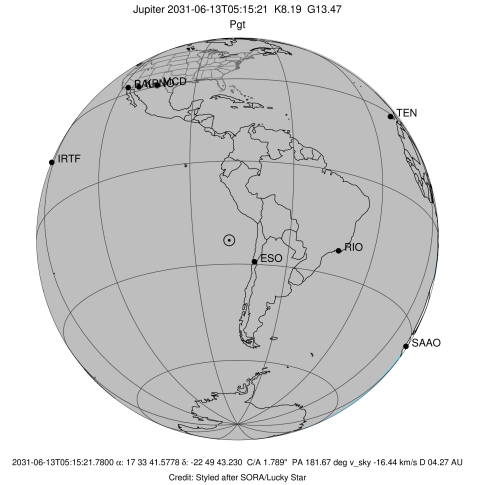


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-13T04:08:01.710	15.99	-17.40	71491.8	7.59	8.66
Jupiter	E	2031-06-13T06:28:45.768	33.01	-33.31	71491.8	8.87	10.12

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-13T05:17:58.560
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       : 4117454236075193344
2Mass ID (if available) : 17334159-2249431
ICRS Star Coord at Epoch: 17h 33m 41.57781s -22:49:43.23035s
RUWE (>1.4 is poor) : 1.35
K magnitude           : 8.188
G magnitude           : 13.471
RP magnitude         : 12.122
BP magnitude         : 15.521
DUPflag              : 0
Distance (au)        : 4.266
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.44
Sun-Target sep (deg) : 177.61
Sun-Moon sep (deg)   : 101.83
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 (") : 3.357
C/A sky separation (km) : 10388.3
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
    
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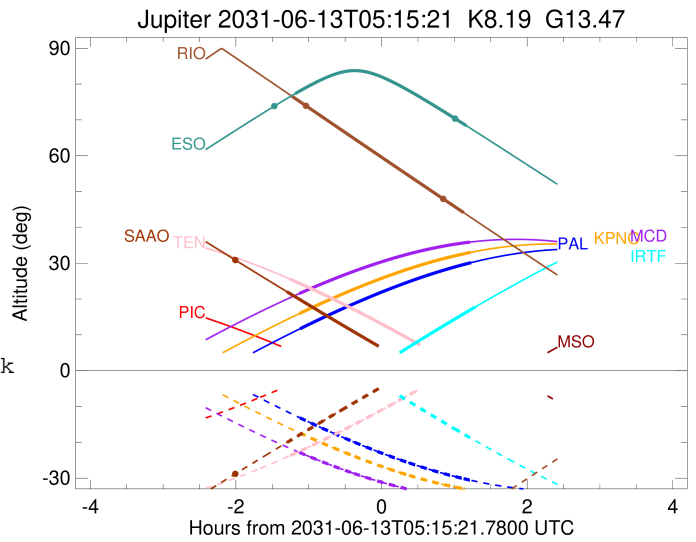
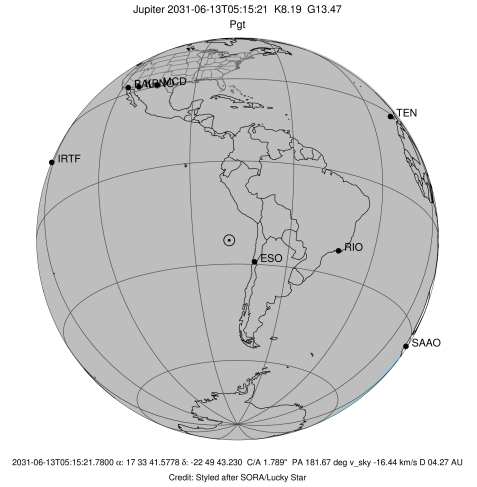


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-13T04:07:37.636	21.53	-22.81	71491.8	7.69	8.77
Jupiter	E	2031-06-13T06:28:05.089	35.87	-35.88	71491.8	8.86	10.11

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-13T05:10:40.680
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       : 4117454236075193344
2Mass ID (if available) : 17334159-2249431
ICRS Star Coord at Epoch: 17h 33m 41.57781s -22:49:43.23035s
RUWE (>1.4 is poor) : 1.35
K magnitude          : 8.188
G magnitude          : 13.471
RP magnitude         : 12.122
BP magnitude         : 15.521
DUPflag             : 0
Distance (au)        : 4.266
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.44
Sun-Target sep (deg) : 177.61
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 ("): 3.104
C/A sky separation (km): 9604.9
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
    
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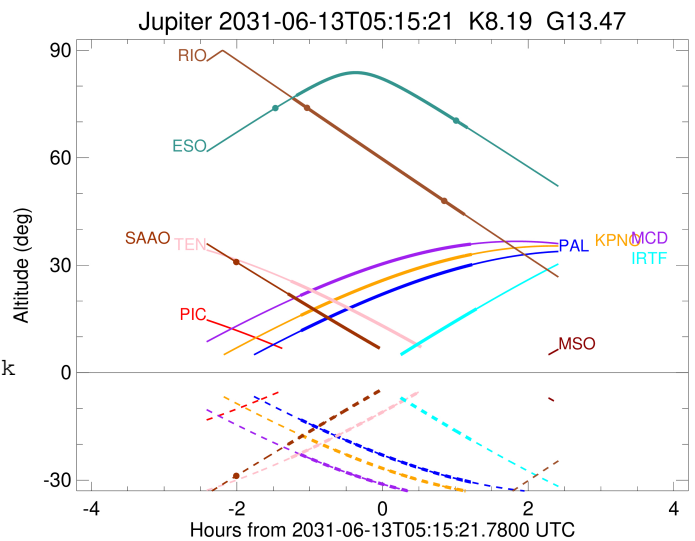
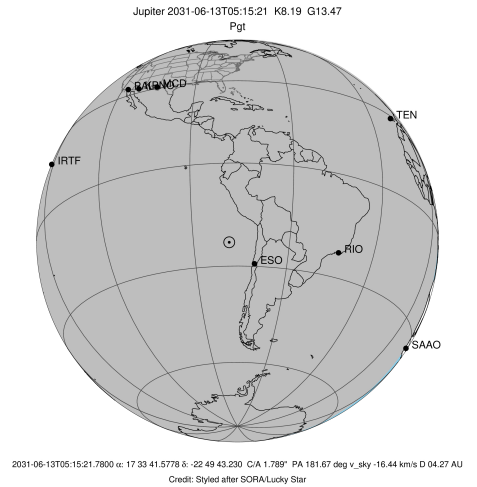


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-13T03:59:59.706	25.56	-23.72	71491.8	7.78	8.88
Jupiter	E	2031-06-13T06:21:48.508	0.43x	1.74x	71491.8	7.54	8.61

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-13T05:21:17.640
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       : 4117454236075193344
2Mass ID (if available) : 17334159-2249431
ICRS Star Coord at Epoch: 17h 33m 41.57781s -22:49:43.23035s
RUWE (>1.4 is poor) : 1.35
K magnitude           : 8.188
G magnitude           : 13.471
RP magnitude         : 12.122
BP magnitude         : 15.521
DUPflag              : 0
Distance (au)        : 4.266
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.44
Sun-Target sep (deg) : 177.61
Sun-Moon sep (deg)   : 101.29
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 (") : 2.553
C/A sky separation (km) : 7900.4
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
    
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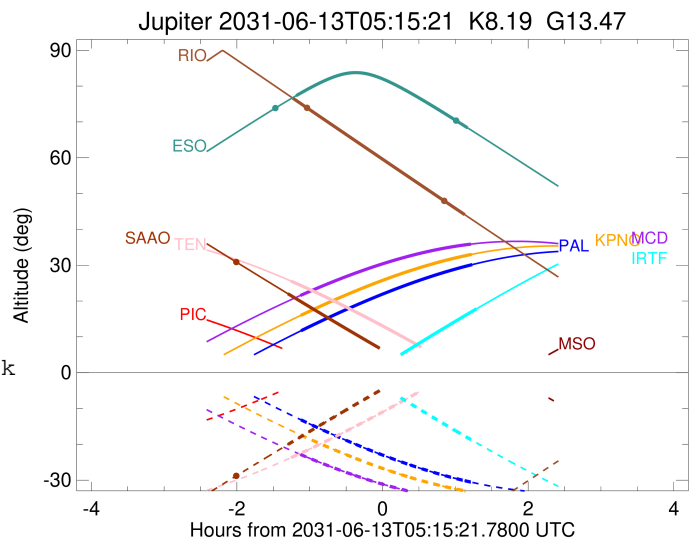
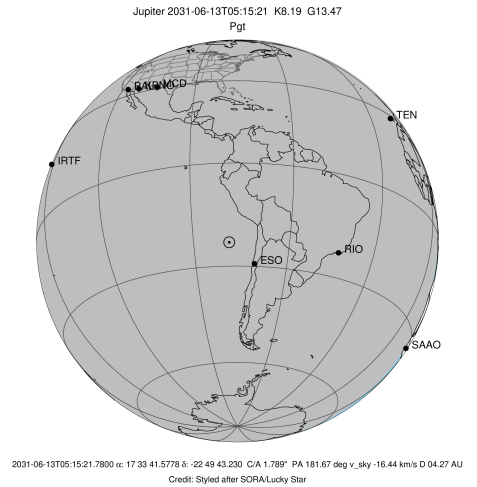


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-13T04:09:21.087	-12.58x	10.37x	71491.9	5.43	6.20
Jupiter	E	2031-06-13T06:32:39.376	17.78	-19.55	71491.9	7.22	8.24

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-13T05:12:11.990
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        : 4117454236075193344
2Mass ID (if available) : 17334159-2249431
ICRS Star Coord at Epoch: 17h 33m 41.57781s -22:49:43.23035s
RUWE (>1.4 is poor) : 1.35
K magnitude           : 8.188
G magnitude           : 13.471
RP magnitude          : 12.122
BP magnitude          : 15.521
DUPflag              : 0
Distance (au)         : 4.266
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.44
Sun-Target sep (deg)  : 177.61
Sun-Moon sep (deg)    : 102.33
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 (") : 1.717
C/A sky separation (km) : 5313.2
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
    
```

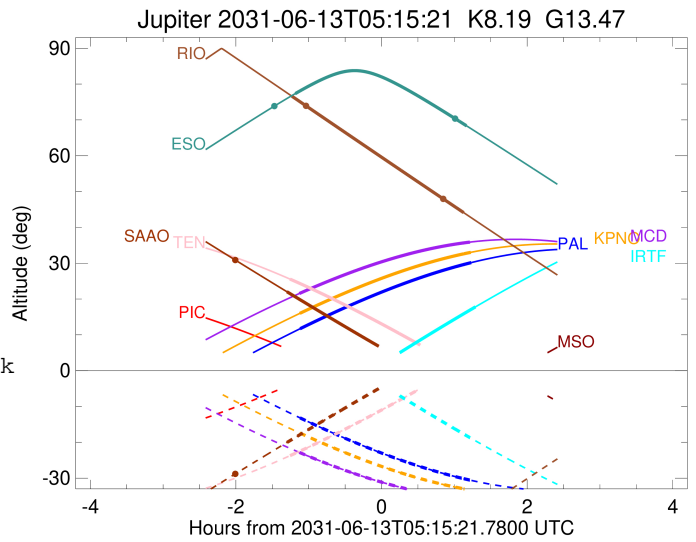
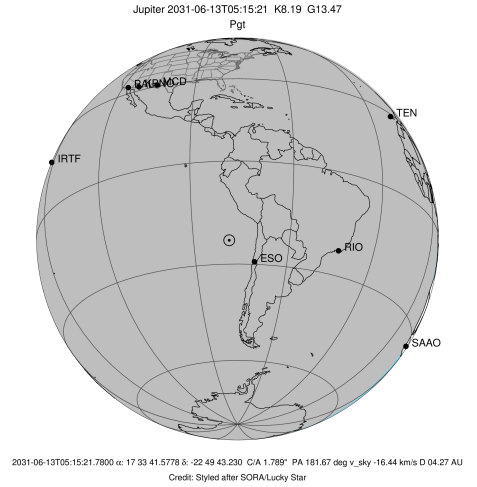


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-13T04:01:36.166	76.59	-74.19	71491.9	4.13	4.71
Jupiter	E	2031-06-13T06:23:04.893	44.11	-41.90	71492.0	4.23	4.84


```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-13T05:14:48.850
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        : 4117454236075193344
2Mass ID (if available) : 17334159-2249431
ICRS Star Coord at Epoch: 17h 33m 41.57781s -22:49:43.23035s
RUWE (>1.4 is poor) : 1.35
K magnitude           : 8.188
G magnitude           : 13.471
RP magnitude          : 12.122
BP magnitude          : 15.521
DUPflag              : 0
Distance (au)         : 4.266
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.44
Sun-Target sep (deg)  : 177.61
Sun-Moon sep (deg)    : 102.37
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 (") : 1.578
C/A sky separation (km) : 4884.2
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
    
```

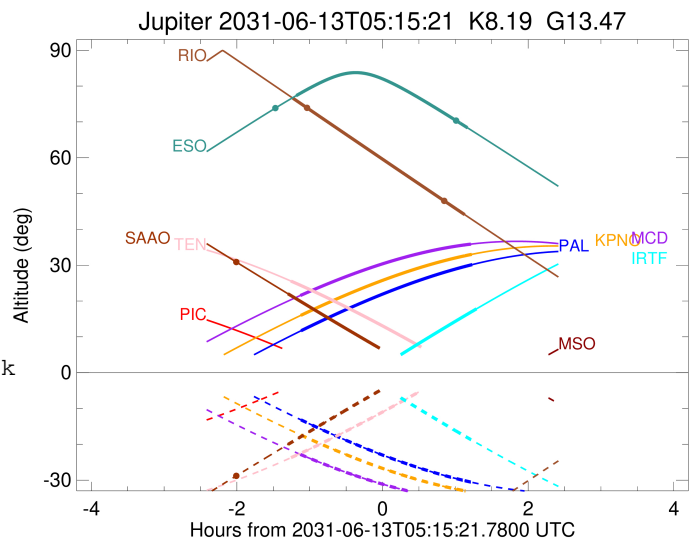
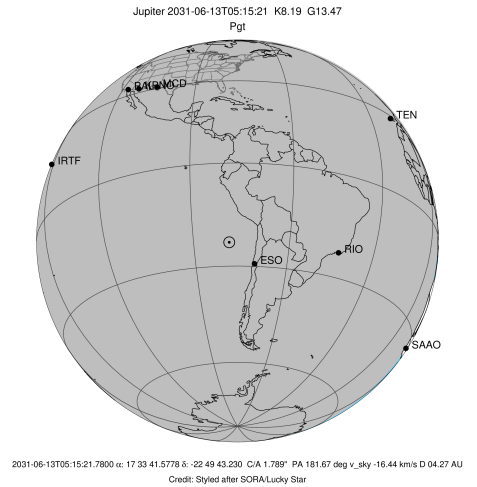


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-13T04:04:13.770	77.31	-79.51	71492.0	3.52	4.03
Jupiter	E	2031-06-13T06:25:26.276	68.34	-66.31	71492.0	4.14	4.73


```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-13T05:09:51.560
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        : 4117454236075193344
2Mass ID (if available) : 17334159-2249431
ICRS Star Coord at Epoch: 17h 33m 41.57781s -22:49:43.23035s
RUWE (>1.4 is poor) : 1.35
K magnitude           : 8.188
G magnitude           : 13.471
RP magnitude          : 12.122
BP magnitude          : 15.521
DUPflag              : 0
Distance (au)         : 4.266
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.44
Sun-Target sep (deg) : 177.61
Sun-Moon sep (deg)   : 101.69
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 (") : 0.768
C/A sky separation (km) : 2375.6
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	2031-06-13T03:57:32.429	22.01	-20.02	71492.0	2.11	2.41
Jupiter	E	2031-06-13T06:22:43.075	-6.31x	7.87x	71492.0	1.70	1.94