

target : Jupiter  
 target radius (km) : 71492.00  
 C/A epoch : 2031-06-01T06:36:38.020  
 Event type : Pgt  
 : Jupiter occs: geocentric, topocentric  
 : Not a ringed target  
 Gaia source ID : 4116567690553486080  
 2Mass ID (if available) : 17400720-2251580

Jupiter 2031-06-01T06:36:38 K6.41 G13.53 Pgt

ICRS Star Coord at Epoch: 17h 40m 07.19461s -22:51:58.04516s

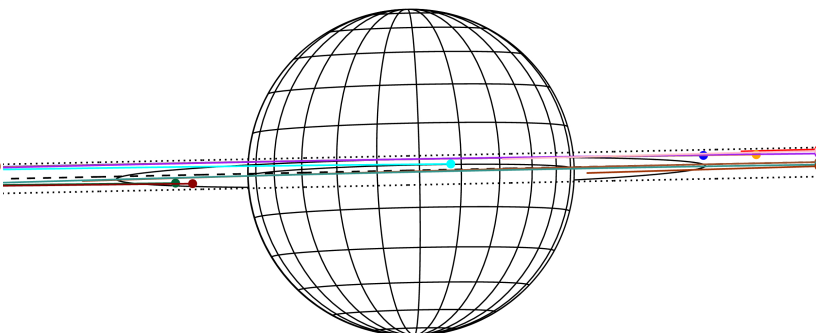
RUWE (>1.4 is poor) : 0.81  
 K magnitude : 6.410  
 G magnitude : 13.532  
 RP magnitude : 11.924  
 BP magnitude : 17.576  
 DUPflag : 0  
 Distance (au) : 4.300  
 f0 (km) : 0.00  
 g0 (km) : 0.00  
 skyplane vel. (km/s) : -15.41  
 Sun-Target sep (deg) : 164.75  
 Sun-Moon sep (deg) : 71.82  
 B (ring opening deg) : -2.61  
 PA of pole (deg) : 1.30  
 Pole direction: RA (deg): 268.05693  
 Dec (deg): 64.49651  
 C/A sky separation (") : 0.294  
 C/A sky separation (km) : 915.5  
 NAIF SPICE kernels : RAJobs\_U111+rgf15.spk

Jupiter 2031-06-01T06:36:38 K6.41 G13.53  
 Pgt



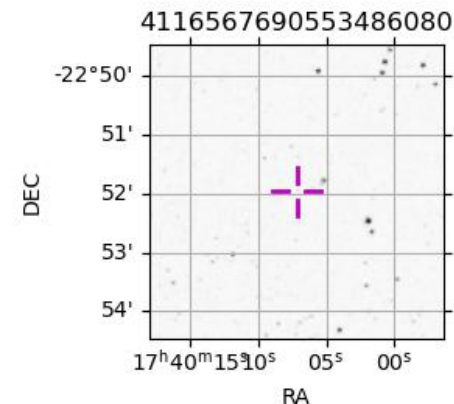
2031-06-01T06:36:38.0200 at: 17 40 07.1946 s: -22 51 58.045 C/A 0.281" PA 181.20 deg v\_sky -15.41 km/s D 04.30 AU  
 Credit: Styled after SORA/Lucky Star

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



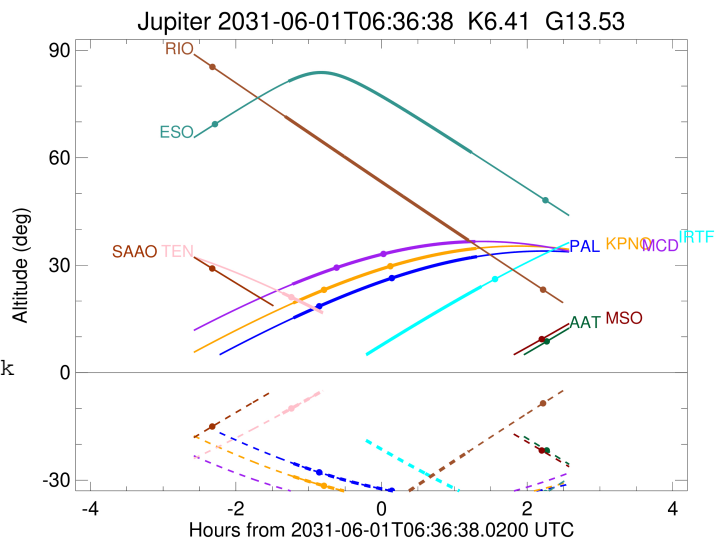
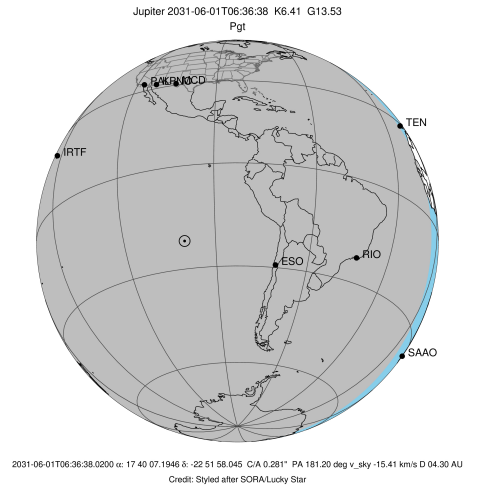
Observable events with sun below -5 deg and altitude above 5 deg

Obs	Location	lat	Elon	Target	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1			Pnn
PAL	Palomar Mt (200")	33.4	243.1	+ +	JUN 01 05:24 - JUN 01 07:55	Pie
PMO	Purple Mtn Obs. Nanking	32.1	118.8			Pnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+ +	JUN 01 05:23 - JUN 01 07:54	Pie
MCD	McDonald Obs. 2.7m	30.7	256.0	+ +	JUN 01 05:23 - JUN 01 07:53	Pie
TEN	Teide Obs./Tenerife	28.3	343.5	+	JUN 01 05:15 - JUN 01 05:15	Pin
IRTF	Mauna Kea/IRTF	19.8	204.5	+	JUN 01 07:58 - JUN 01 07:58	Pne
KAV	Kavalur Observatory	12.6	78.8			Pnn
RIO	Rio de Janeiro	-22.9	316.8	+ +	JUN 01 05:17 - JUN 01 07:48	Pie
ESO	European Southern Obs. (3.6m)	-29.3	289.3	+ +	JUN 01 05:19 - JUN 01 07:50	Pie
AAT	Siding Spring (AAT)	-31.3	149.1			Pnn
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8			Pnn
MSO	Mt. Stromlo Observatory	-35.3	149.0			Pnn



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-01T06:39:49.270
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       : 4116567690553486080
2Mass ID (if available) : 17400720-2251580
ICRS Star Coord at Epoch: 17h 40m 07.19461s -22:51:58.04516s
RUWE (>1.4 is poor) : 0.81
K magnitude           : 6.410
G magnitude           : 13.532
RP magnitude         : 11.924
BP magnitude         : 17.576
DUPflag              : 0
Distance (au)        : 4.300
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -15.41
Sun-Target sep (deg) : 164.75
Sun-Moon sep (deg)  : 72.09
B (ring opening deg) : -2.61
PA of pole (deg)    : 1.30
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (") : 1.866
C/A sky separation (km) : 5820.7
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
    
```

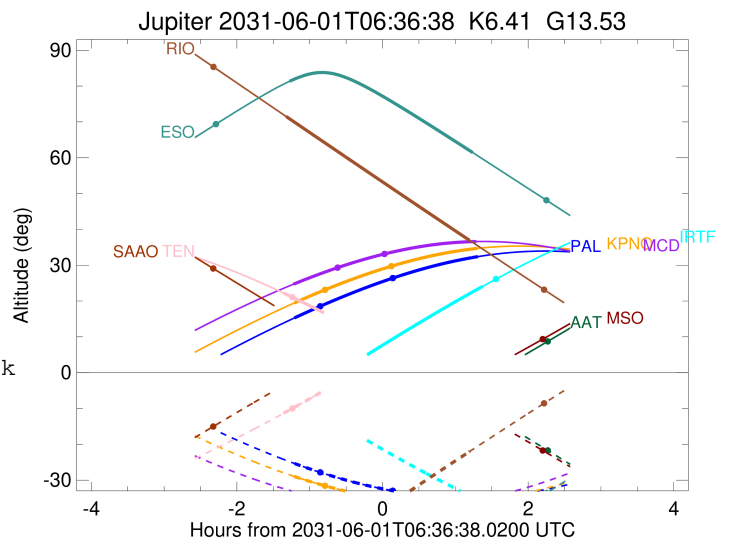
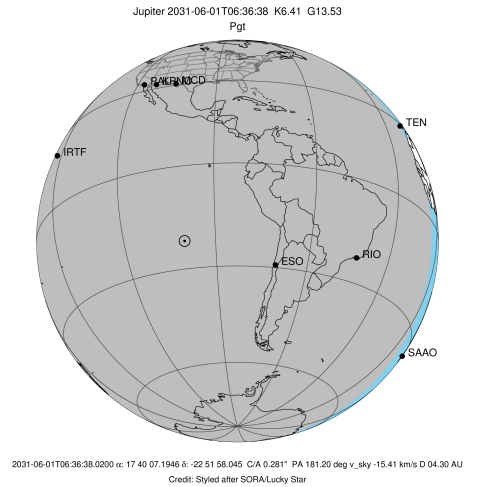


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-01T05:24:06.921	15.29	-25.35	71492.0	4.15	4.75
Jupiter	E	2031-06-01T07:55:09.631	32.38	-34.73	71491.9	5.03	5.74

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-01T06:39:25.110
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       : 4116567690553486080
2Mass ID (if available) : 17400720-2251580
ICRS Star Coord at Epoch: 17h 40m 07.19461s -22:51:58.04516s
RUWE (>1.4 is poor) : 0.81
K magnitude           : 6.410
G magnitude           : 13.532
RP magnitude          : 11.924
BP magnitude          : 17.576
DUPflag              : 0
Distance (au)        : 4.300
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -15.41
Sun-Target sep (deg) : 164.75
Sun-Moon sep (deg)   : 72.16
B (ring opening deg) : -2.61
PA of pole (deg)     : 1.30
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (") : 1.869
C/A sky separation (km) : 5830.5
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
    
```

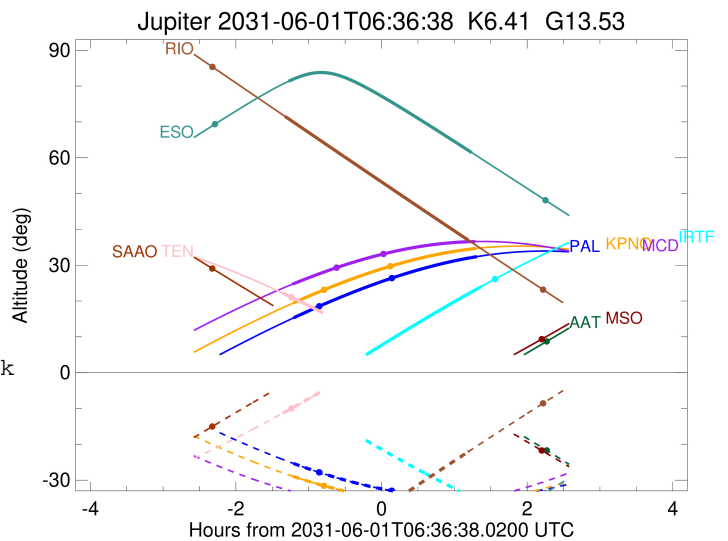
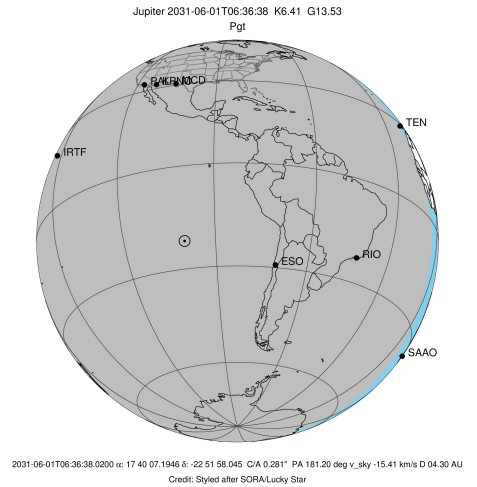


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-01T05:23:50.664	19.44	-28.96	71492.0	4.19	4.79
Jupiter	E	2031-06-01T07:54:40.219	34.68	-35.68	71491.9	4.99	5.70

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-01T06:38:45.670
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       : 4116567690553486080
2Mass ID (if available) : 17400720-2251580
ICRS Star Coord at Epoch: 17h 40m 07.19461s -22:51:58.04516s
RUWE (>1.4 is poor) : 0.81
K magnitude           : 6.410
G magnitude           : 13.532
RP magnitude          : 11.924
BP magnitude          : 17.576
DUPflag              : 0
Distance (au)        : 4.300
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -15.41
Sun-Target sep (deg) : 164.75
Sun-Moon sep (deg)   : 72.24
B (ring opening deg) : -2.61
PA of pole (deg)     : 1.30
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (") : 1.881
C/A sky separation (km) : 5866.2
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
    
```

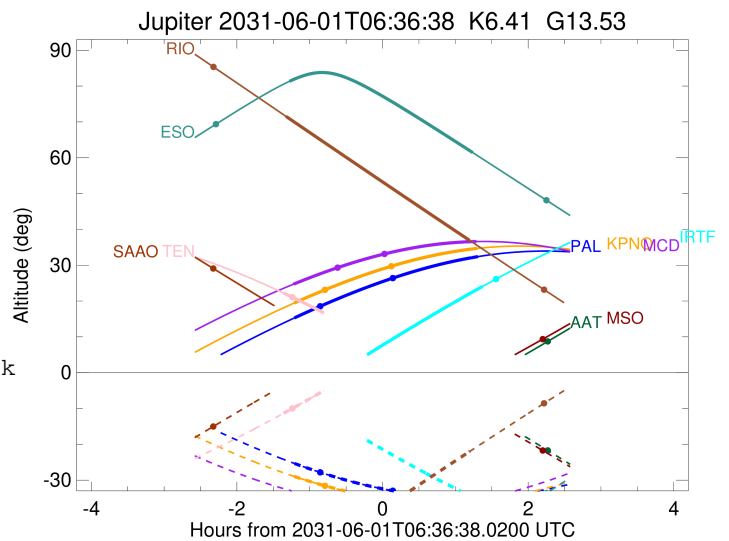
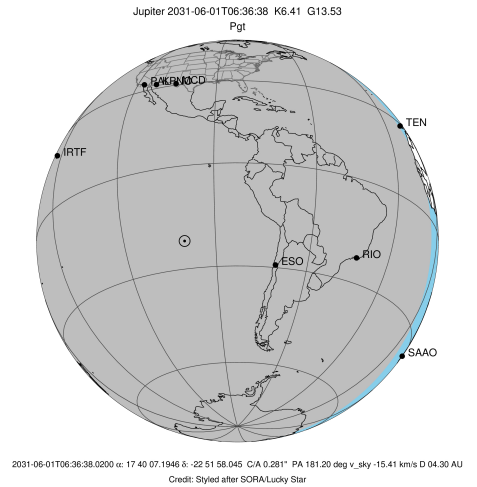


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-01T05:23:20.846	24.70	-33.15	71492.0	4.28	4.89
Jupiter	E	2031-06-01T07:53:55.411	36.60	-35.52	71491.9	4.95	5.66

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-01T06:31:13.250
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       : 4116567690553486080
2Mass ID (if available) : 17400720-2251580
ICRS Star Coord at Epoch: 17h 40m 07.19461s -22:51:58.04516s
RUWE (>1.4 is poor) : 0.81
K magnitude           : 6.410
G magnitude           : 13.532
RP magnitude          : 11.924
BP magnitude          : 17.576
DUPflag              : 0
Distance (au)         : 4.300
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -15.41
Sun-Target sep (deg) : 164.75
Sun-Moon sep (deg)   : 72.20
B (ring opening deg) : -2.61
PA of pole (deg)     : 1.30
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (") : 1.502
C/A sky separation (km) : 4684.5
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
    
```

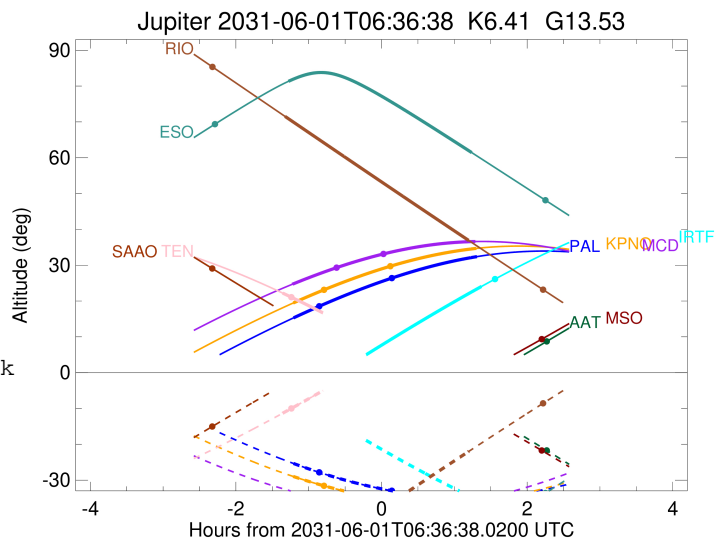
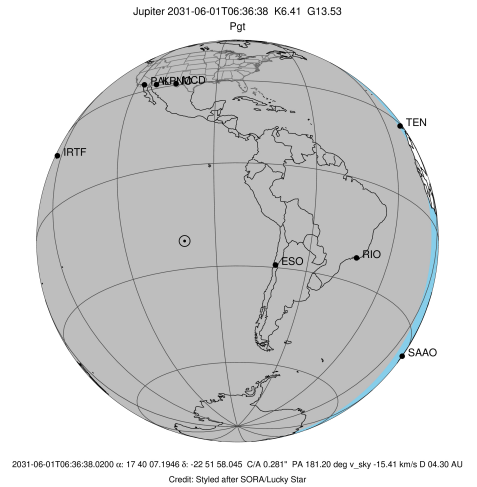


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-01T05:15:10.148	22.22	-11.32	71492.0	4.09	4.68
Jupiter	E	2031-06-01T07:47:50.302	-6.11x	19.45x	71492.0	3.32	3.79

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-01T06:42:46.600
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      : 4116567690553486080
2Mass ID (if available) : 17400720-2251580
ICRS Star Coord at Epoch: 17h 40m 07.19461s -22:51:58.04516s
RUWE (>1.4 is poor) : 0.81
K magnitude          : 6.410
G magnitude          : 13.532
RP magnitude         : 11.924
BP magnitude         : 17.576
DUPflag             : 0
Distance (au)       : 4.300
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -15.41
Sun-Target sep (deg) : 164.75
Sun-Moon sep (deg)  : 71.68
B (ring opening deg) : -2.61
PA of pole (deg)    : 1.30
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation ("): 1.145
C/A sky separation (km): 3570.4
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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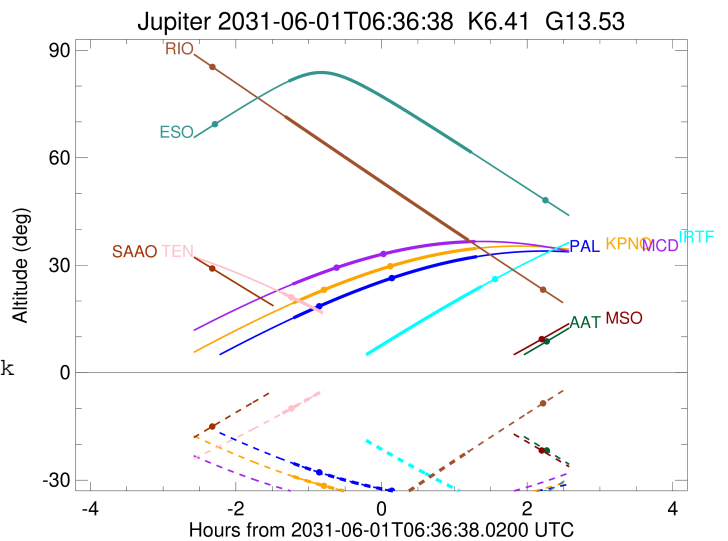
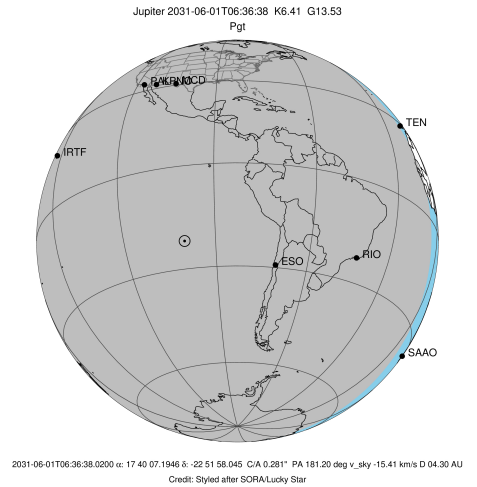


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-01T05:25:52.371	-7.53x	-7.01	71492.0	2.11	2.42
Jupiter	E	2031-06-01T07:58:58.278	24.05	-35.92	71492.0	3.54	4.04

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-01T06:32:37.650
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       : 4116567690553486080
2Mass ID (if available) : 17400720-2251580
ICRS Star Coord at Epoch: 17h 40m 07.19461s -22:51:58.04516s
RUWE (>1.4 is poor) : 0.81
K magnitude           : 6.410
G magnitude           : 13.532
RP magnitude          : 11.924
BP magnitude          : 17.576
DUPflag              : 0
Distance (au)         : 4.300
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -15.41
Sun-Target sep (deg) : 164.75
Sun-Moon sep (deg)   : 72.73
B (ring opening deg) : -2.61
PA of pole (deg)     : 1.30
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (") : 0.155
C/A sky separation (km) : 484.6
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
    
```

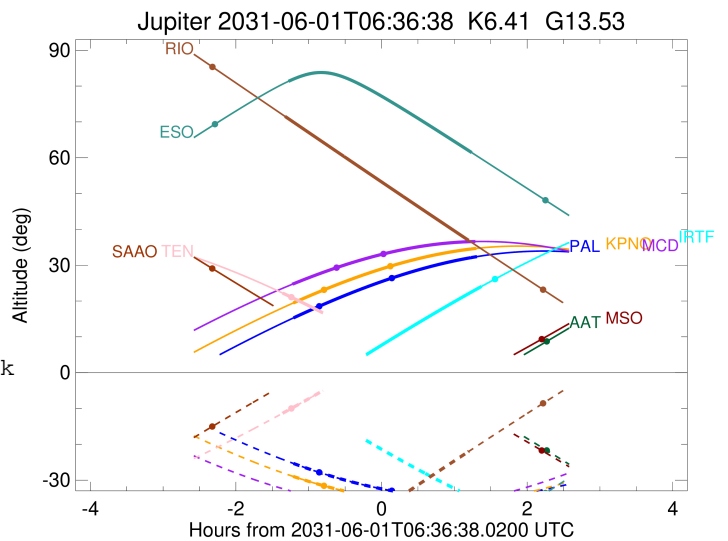
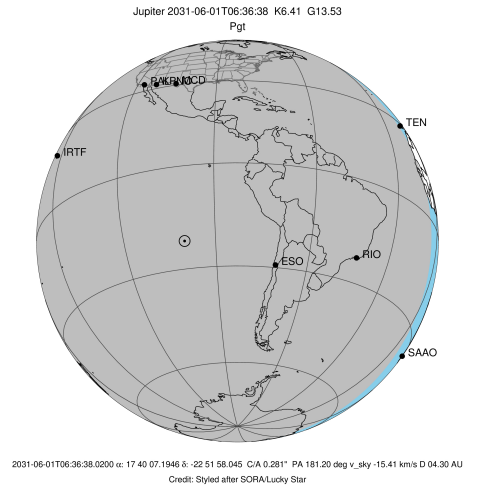


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-01T05:17:05.949	71.54	-56.24	71492.0	0.54	0.61
Jupiter	E	2031-06-01T07:48:32.636	36.89	-21.98	71492.0	0.07	0.08

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-01T06:35:21.070
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      : 4116567690553486080
2Mass ID (if available) : 17400720-2251580
ICRS Star Coord at Epoch: 17h 40m 07.19461s -22:51:58.04516s
RUWE (>1.4 is poor) : 0.81
K magnitude          : 6.410
G magnitude          : 13.532
RP magnitude         : 11.924
BP magnitude         : 17.576
DUPflag             : 0
Distance (au)       : 4.300
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -15.41
Sun-Target sep (deg) : 164.75
Sun-Moon sep (deg)  : 72.77
B (ring opening deg) : -2.61
PA of pole (deg)    : 1.30
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (") : 0.063
C/A sky separation (km) : 197.5
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	2031-06-01T05:19:58.307	81.32	-78.68	71492.0	0.04	0.04
Jupiter	E	2031-06-01T07:50:49.607	61.46	-46.84	71492.0	0.09	0.11