

target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2031-06-17T03:41:16.150
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 4117448467994574720
 2Mass ID (if available) : 17313078-2248421

Jupiter 2031-06-17T03:41:16 K8.85 G14.65 Pgt

ICRS Star Coord at Epoch: 17h 31m 30.76307s -22:48:42.37585s

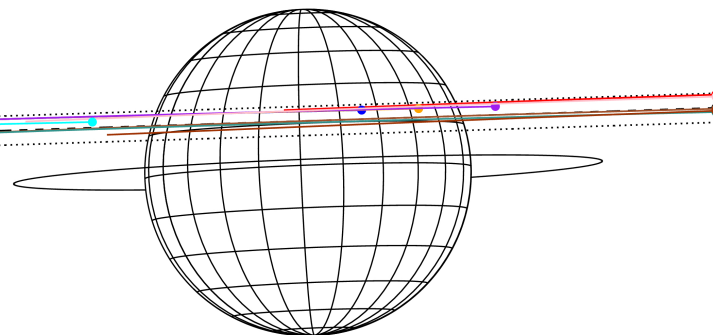
RUWE (>1.4 is poor) : 1.00
 K magnitude : 8.850
 G magnitude : 14.652
 RP magnitude : 13.260
 BP magnitude : 17.072
 DUPflag : 0
 Distance (au) : 4.264
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -16.47
 Sun-Target sep (deg) : 178.02
 Sun-Moon sep (deg) : 151.31
 B (ring opening deg) : -2.60
 PA of pole (deg) : 2.23
 Pole direction: RA (deg): 268.05692
 Dec (deg): 64.49651
 C/A sky separation (") : 7.310
 C/A sky separation (km) : 22608.0
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk

Jupiter 2031-06-17T03:41:16 K8.85 G14.65
 Pgt



Earth

PIC
 PAL
 KPNO
 MCD
 TEN
 IRTF
 RIO
 ESO
 SAAO

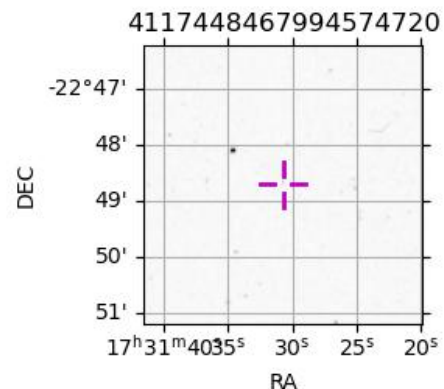


2031-06-17T03:41:16.1500 at: 17 31 30.7631 s: -22 48 42.376 C/A 7.298° PA 181.83 deg v_sky -16.47 km/s D 04.26 AU

Credit: Styled after SORA/Lucky Star

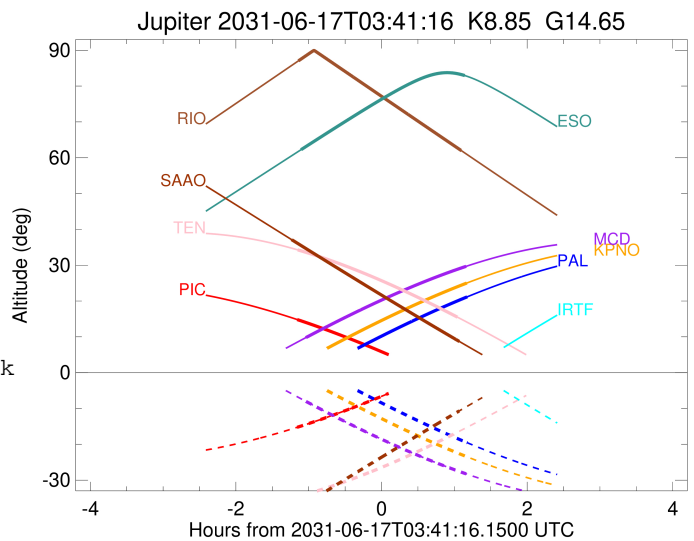
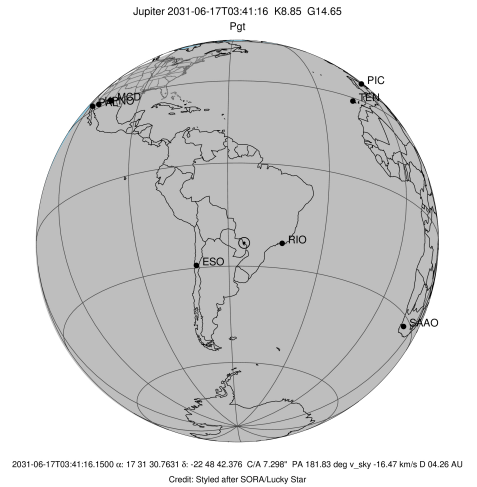
Observable events with sun below -5 deg and altitude above 5 deg

Obs	Location	lat	Elon	Target	Observed Events Interval	OCode
PIC	Pic du Midi	42.9	0.1	+	JUN 17 02:31 - JUN 17 02:31	Pin
PAL	Palomar Mt (200")	33.4	243.1	+	JUN 17 04:51 - JUN 17 04:51	Pne
PMO	Purple Mtn Obs. Nanking	32.1	118.8			Pnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+	JUN 17 04:51 - JUN 17 04:51	Pne
MCD	McDonald Obs. 2.7m	30.7	256.0	+	JUN 17 02:39 - JUN 17 04:50	Pie
TEN	Teide Obs./Tenerife	28.3	343.5	+	JUN 17 02:32 - JUN 17 04:43	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 17 02:32 - JUN 17 04:46	Pie
ESO	European Southern Obs. (3.6m)	-29.3	289.3	+	JUN 17 02:35 - JUN 17 04:49	Pie
AAT	Siding Spring (AAT)	-31.3	149.1			Pnn
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8	+	JUN 17 02:27 - JUN 17 04:45	Pie
MSO	Mt. Stromlo Observatory	-35.3	149.0			Pnn



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-17T03:37:38.800
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      : 4117448467994574720
2Mass ID (if available) : 17313078-2248421
ICRS Star Coord at Epoch: 17h 31m 30.76307s -22:48:42.37585s
RUWE (>1.4 is poor) : 1.00
K magnitude          : 8.850
G magnitude          : 14.652
RP magnitude         : 13.260
BP magnitude         : 17.072
DUPflag             : 0
Distance (au)       : 4.264
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.47
Sun-Target sep (deg) : 178.02
Sun-Moon sep (deg)  : 151.83
B (ring opening deg) : -2.60
PA of pole (deg)    : 2.23
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation ("): 8.959
C/A sky separation (km): 27708.0
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
    
```

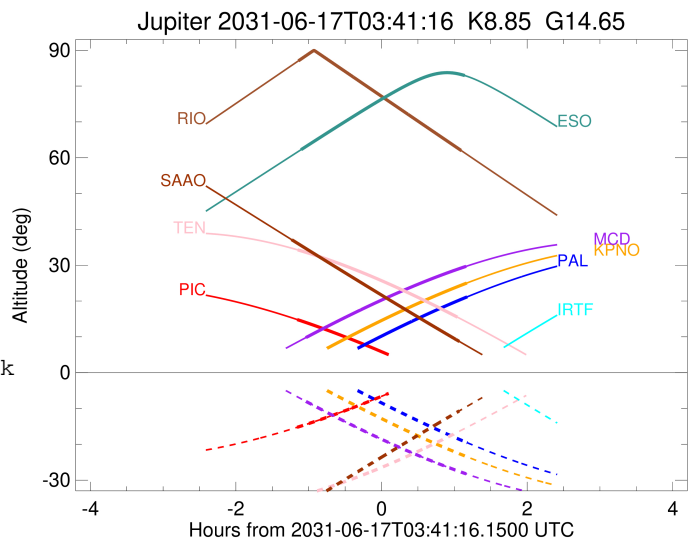
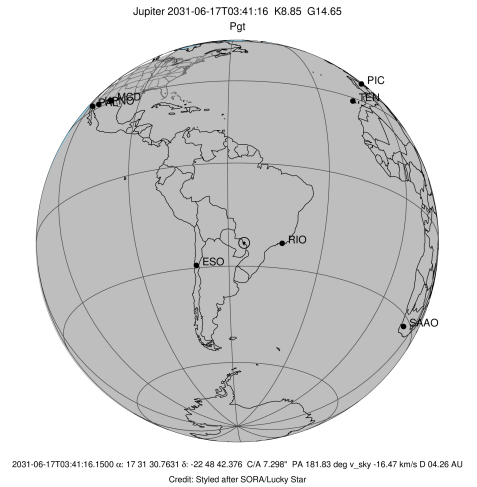


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-17T02:31:50.036	14.82	-15.24	71490.6	22.69	25.52
Jupiter	E	2031-06-17T04:43:46.603	-3.75x	2.77x	71490.6	22.78	25.62

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-17T03:45:46.790
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        : 4117448467994574720
2Mass ID (if available) : 17313078-2248421
ICRS Star Coord at Epoch: 17h 31m 30.76307s -22:48:42.37585s
RUWE (>1.4 is poor) : 1.00
K magnitude           : 8.850
G magnitude           : 14.652
RP magnitude          : 13.260
BP magnitude          : 17.072
DUPflag              : 0
Distance (au)         : 4.264
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.47
Sun-Target sep (deg) : 178.02
Sun-Moon sep (deg)   : 150.80
B (ring opening deg) : -2.60
PA of pole (deg)     : 2.23
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation ("): 8.656
C/A sky separation (km): 26771.2
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
    
```

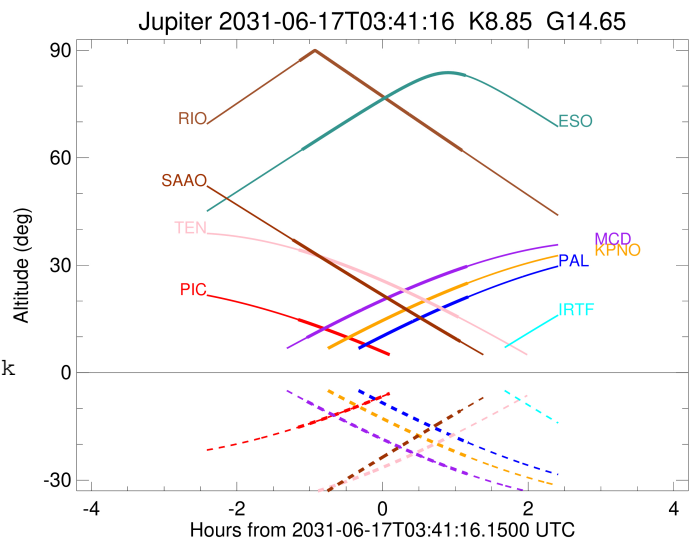
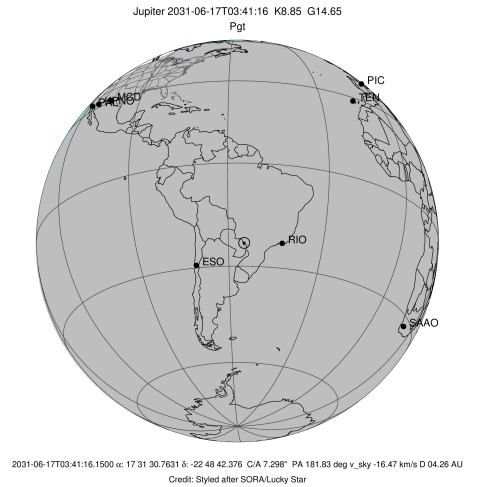


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-17T02:39:15.987	-0.91x	2.72x	71490.8	21.08	23.76
Jupiter	E	2031-06-17T04:51:55.097	21.17	-19.56	71490.6	22.79	25.63

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-17T03:45:34.940
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       : 4117448467994574720
2Mass ID (if available) : 17313078-2248421
ICRS Star Coord at Epoch: 17h 31m 30.76307s -22:48:42.37585s
RUWE (>1.4 is poor) : 1.00
K magnitude           : 8.850
G magnitude           : 14.652
RP magnitude         : 13.260
BP magnitude         : 17.072
DUPflag              : 0
Distance (au)        : 4.264
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.47
Sun-Target sep (deg) : 178.02
Sun-Moon sep (deg)   : 150.86
B (ring opening deg) : -2.60
PA of pole (deg)     : 2.23
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 8.676
C/A sky separation (km) : 26832.7
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
    
```

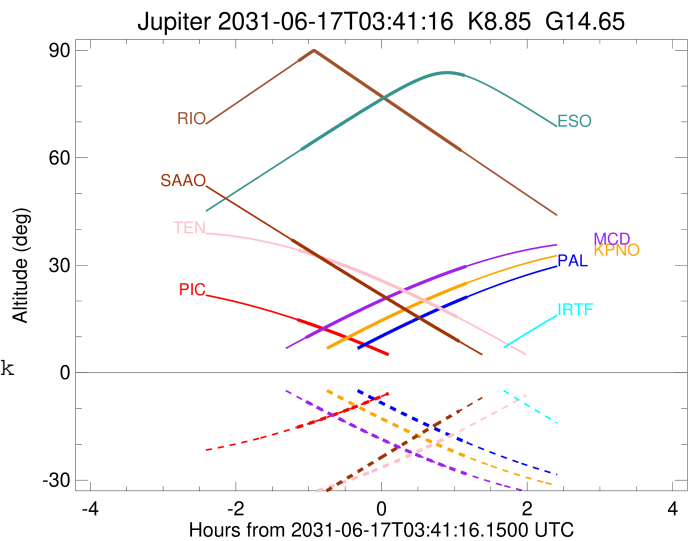
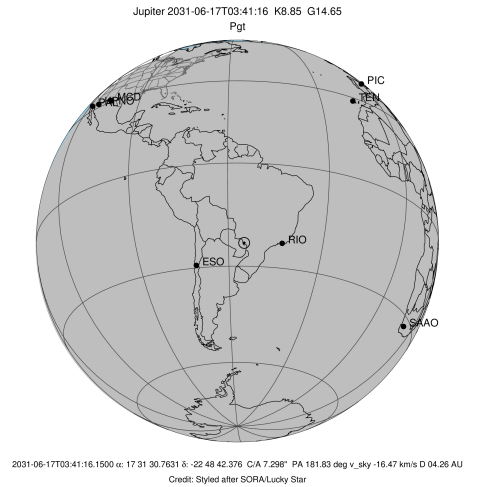


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-17T02:39:13.798	3.65x	-1.85x	71490.8	21.14	23.83
Jupiter	E	2031-06-17T04:51:34.713	25.02	-23.46	71490.6	22.82	25.66

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-17T03:45:11.540
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        : 4117448467994574720
2Mass ID (if available) : 17313078-2248421
ICRS Star Coord at Epoch: 17h 31m 30.76307s -22:48:42.37585s
RUWE (>1.4 is poor) : 1.00
K magnitude           : 8.850
G magnitude           : 14.652
RP magnitude          : 13.260
BP magnitude          : 17.072
DUPflag              : 0
Distance (au)         : 4.264
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.47
Sun-Target sep (deg) : 178.02
Sun-Moon sep (deg)   : 150.95
B (ring opening deg) : -2.60
PA of pole (deg)     : 2.23
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation ("): 8.717
C/A sky separation (km): 26960.3
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
    
```

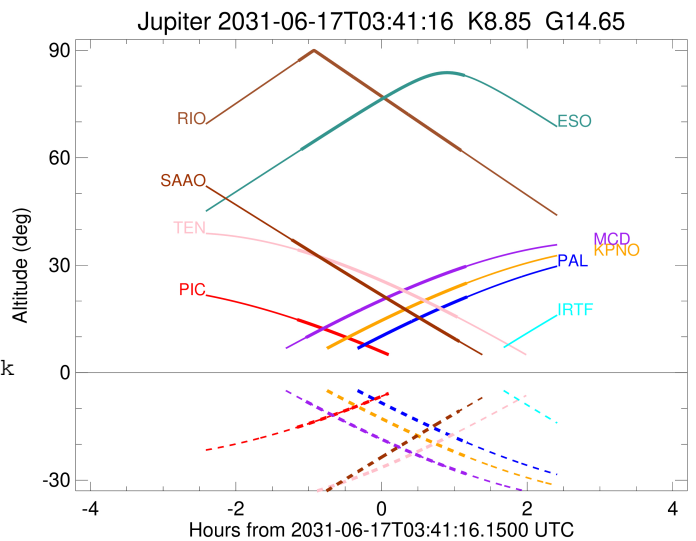
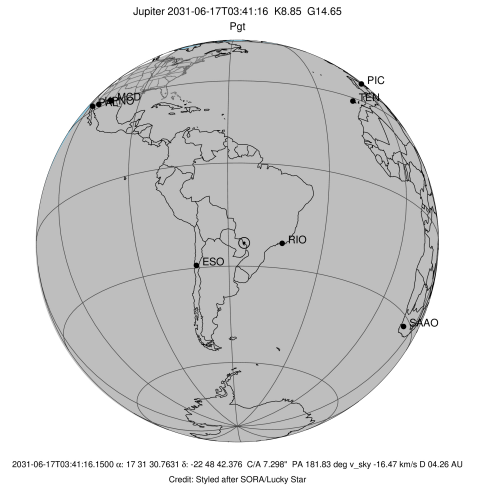


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-17T02:39:04.472	9.81	-8.03	71490.8	21.28	23.98
Jupiter	E	2031-06-17T04:50:59.386	29.68	-28.24	71490.6	22.88	25.73

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-17T03:37:54.360
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       : 4117448467994574720
2Mass ID (if available) : 17313078-2248421
ICRS Star Coord at Epoch: 17h 31m 30.76307s -22:48:42.37585s
RUWE (>1.4 is poor) : 1.00
K magnitude           : 8.850
G magnitude           : 14.652
RP magnitude          : 13.260
BP magnitude          : 17.072
DUPflag              : 0
Distance (au)         : 4.264
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.47
Sun-Target sep (deg) : 178.02
Sun-Moon sep (deg)   : 151.94
B (ring opening deg) : -2.60
PA of pole (deg)     : 2.23
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 8.780
C/A sky separation (km) : 27155.5
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
    
```

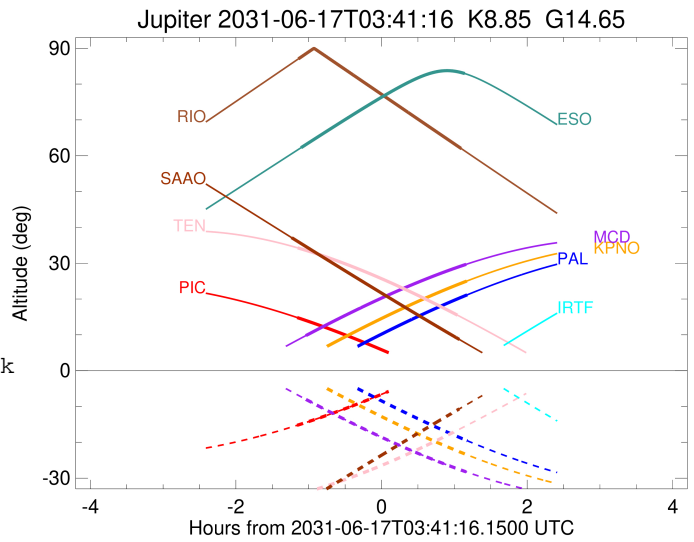
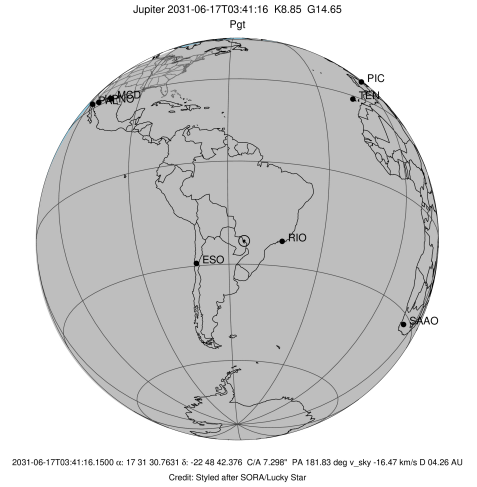


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-17T02:32:19.648	34.26	-34.53	71490.7	22.15	24.93
Jupiter	E	2031-06-17T04:43:46.306	15.51	-16.63	71490.7	22.32	25.12

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-17T03:39:54.300
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      : 4117448467994574720
2Mass ID (if available) : 17313078-2248421
ICRS Star Coord at Epoch: 17h 31m 30.76307s -22:48:42.37585s
RUWE (>1.4 is poor) : 1.00
K magnitude          : 8.850
G magnitude          : 14.652
RP magnitude         : 13.260
BP magnitude         : 17.072
DUPflag             : 0
Distance (au)        : 4.264
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.47
Sun-Target sep (deg) : 178.02
Sun-Moon sep (deg)  : 151.91
B (ring opening deg) : -2.60
PA of pole (deg)    : 2.23
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 7.304
C/A sky separation (km) : 22591.8
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
    
```

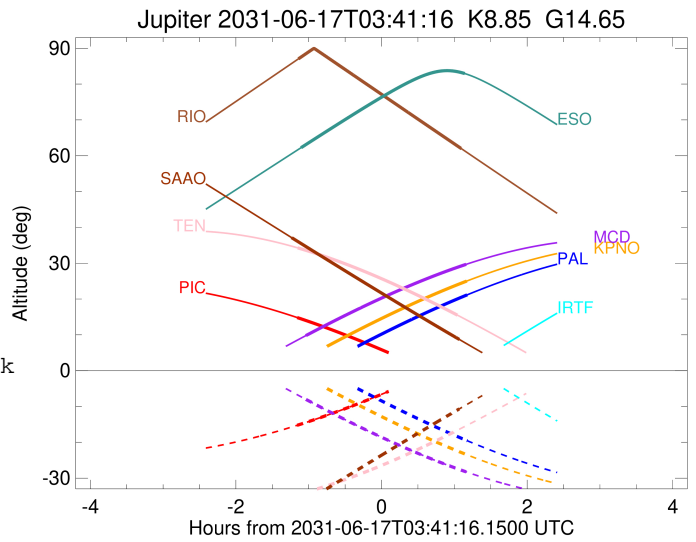
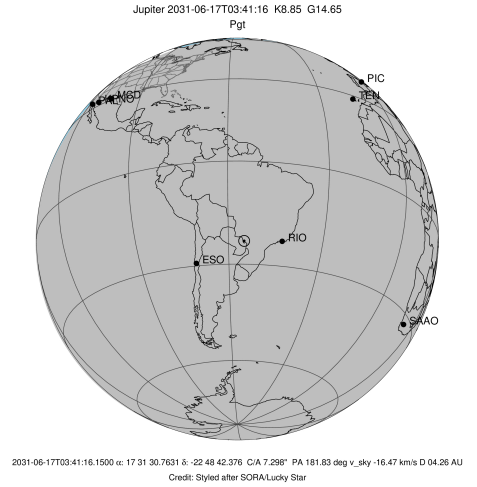


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-17T02:32:56.746	87.07	-85.18	71491.1	18.01	20.38
Jupiter	E	2031-06-17T04:46:58.587	62.00	-63.99	71491.1	18.63	21.06


```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-17T03:42:28.670
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       : 4117448467994574720
2Mass ID (if available) : 17313078-2248421
ICRS Star Coord at Epoch: 17h 31m 30.76307s -22:48:42.37585s
RUWE (>1.4 is poor) : 1.00
K magnitude          : 8.850
G magnitude          : 14.652
RP magnitude         : 13.260
BP magnitude         : 17.072
DUPflag             : 0
Distance (au)        : 4.264
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.47
Sun-Target sep (deg) : 178.02
Sun-Moon sep (deg)   : 151.57
B (ring opening deg) : -2.60
PA of pole (deg)     : 2.23
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 7.054
C/A sky separation (km) : 21818.4
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
    
```

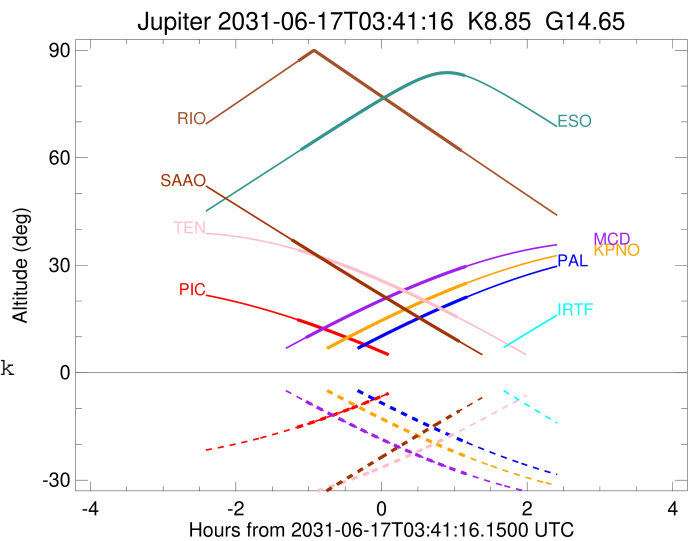
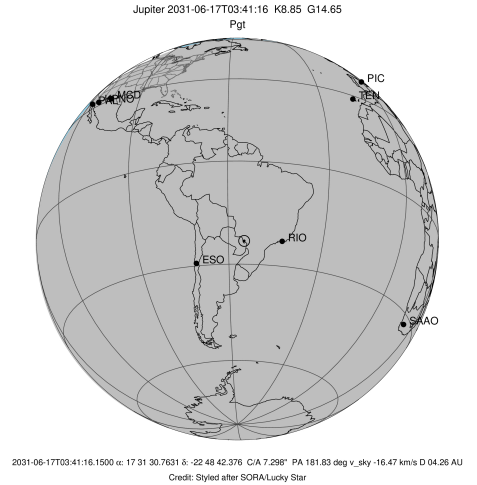


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-17T02:35:04.155	62.25	-60.67	71491.2	17.12	19.39
Jupiter	E	2031-06-17T04:49:46.590	82.94	-84.12	71491.1	18.23	20.62


```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-17T03:36:03.710
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        : 4117448467994574720
2Mass ID (if available) : 17313078-2248421
ICRS Star Coord at Epoch: 17h 31m 30.76307s -22:48:42.37585s
RUWE (>1.4 is poor) : 1.00
K magnitude           : 8.850
G magnitude           : 14.652
RP magnitude          : 13.260
BP magnitude          : 17.072
DUPflag              : 0
Distance (au)         : 4.264
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.47
Sun-Target sep (deg)  : 178.02
Sun-Moon sep (deg)   : 152.14
B (ring opening deg) : -2.60
PA of pole (deg)     : 2.23
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 6.502
C/A sky separation (km) : 20111.3
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	2031-06-17T02:27:14.282	37.12	-39.03	71491.3	16.39	18.58
Jupiter	E	2031-06-17T04:45:21.561	8.72	-10.67	71491.3	16.20	18.36