

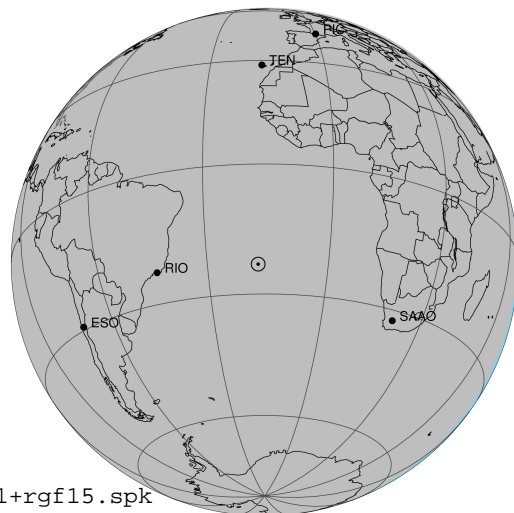
target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2031-06-14T01:09:43.390
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 4117456267668805760
 2Mass ID (if available) : 17331405-2249263

Jupiter 2031-06-14T01:09:43 K7.84 G14.14 Pgt

ICRS Star Coord at Epoch: 17h 33m 14.04162s -22:49:26.49993s

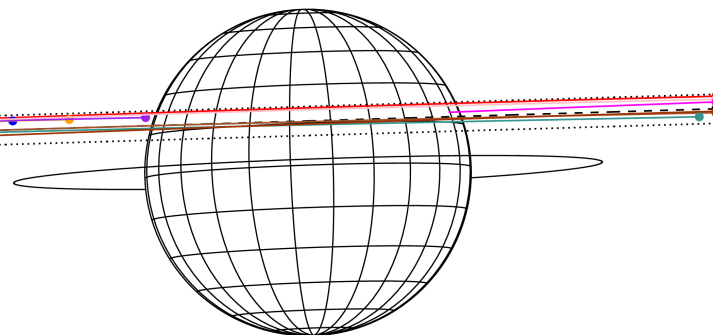
RUWE (>1.4 is poor) : 0.95
 K magnitude : 7.845
 G magnitude : 14.139
 RP magnitude : 12.602
 BP magnitude : 17.685
 DUPflag : 0
 Distance (au) : 4.266
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -16.46
 Sun-Target sep (deg) : 178.49
 Sun-Moon sep (deg) : 112.27
 B (ring opening deg) : -2.60
 PA of pole (deg) : 2.04
 Pole direction: RA (deg): 268.05692
 Dec (deg): 64.49651
 C/A sky separation (") : 7.292
 C/A sky separation (km) : 22558.5
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk

Jupiter 2031-06-14T01:09:43 K7.84 G14.14
 Pgt



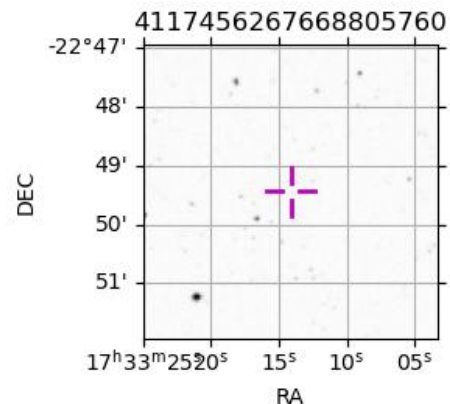
2031-06-14T01:09:43.3900 at: 17 33 14.0416 s: -22 49 26.500 C/A 7.280° PA 181.71 deg v_sky -16.46 km/s D 04.27 AU
 Credit: Styled after SORA/Lucky Star

Earth
 PIC
 PAL
 KPNO
 MCD
 TEN
 KAV
 RIO
 ESO
 SAAO



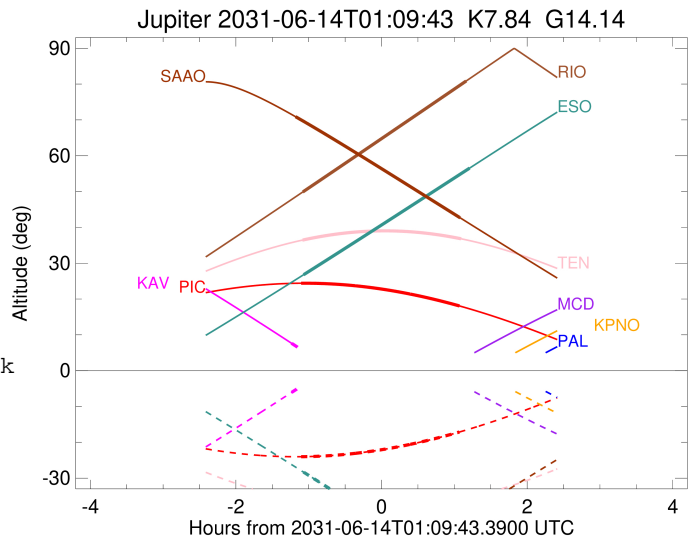
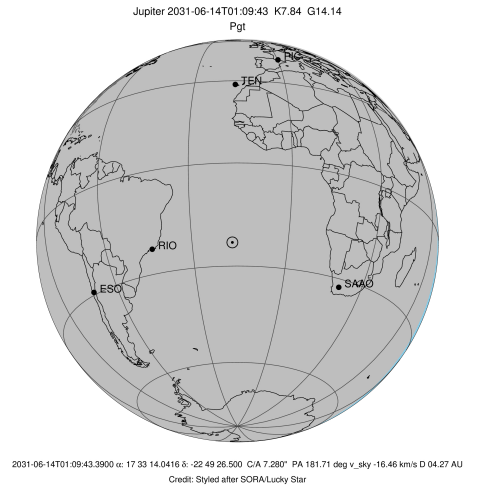
Observable events with sun below -5 deg and altitude above 5 deg

Obs	Location	lat	Elon	Target	Observed Events Interval	OCode
PIC	Pic du Midi	42.9	0.1	+ +	JUN 14 00:03 - JUN 14 02:13	Pie
PAL	Palomar Mt (200")	33.4	243.1			Pnn
PMO	Purple Mtn Obs. Nanking	32.1	118.8			Pnn
KPNO	Kitt Peak Natl Obs	32.0	248.4			Pnn
MCD	McDonald Obs. 2.7m	30.7	256.0			Pnn
TEN	Teide Obs./Tenerife	28.3	343.5	+ +	JUN 14 00:04 - JUN 14 02:15	Pie
IRTF	Mauna Kea/IRTF	19.8	204.5			Pnn
KAV	Kavalur Observatory	12.6	78.8	+	JUN 13 23:55 - JUN 13 23:55	Pin
RIO	Rio de Janeiro	-22.9	316.8	+ +	JUN 14 00:04 - JUN 14 02:19	Pie
ESO	European Southern Obs. (3.6m)	-29.3	289.3	+ +	JUN 14 00:05 - JUN 14 02:22	Pie
AAT	Siding Spring (AAT)	-31.3	149.1			Pnn
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8	+ +	JUN 13 23:58 - JUN 14 02:14	Pie
MSO	Mt. Stromlo Observatory	-35.3	149.0			Pnn



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target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-14T01:08:38.650
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        : 4117456267668805760
2Mass ID (if available) : 17331405-2249263
ICRS Star Coord at Epoch: 17h 33m 14.04162s -22:49:26.49993s
RUWE (>1.4 is poor)  : 0.95
K magnitude           : 7.845
G magnitude           : 14.139
RP magnitude          : 12.602
BP magnitude          : 17.685
DUPflag              : 0
Distance (au)         : 4.266
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.46
Sun-Target sep (deg)  : 178.49
Sun-Moon sep (deg)    : 112.69
B (ring opening deg)  : -2.60
PA of pole (deg)      : 2.04
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 9.155
C/A sky separation (km) : 28324.0
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
    
```

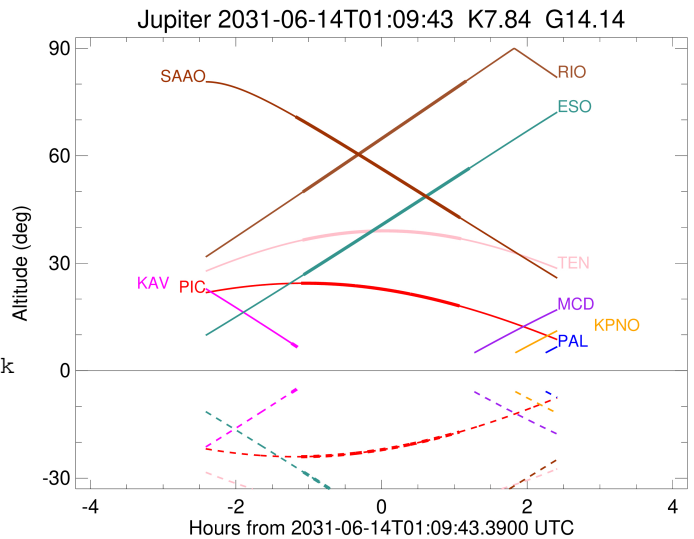
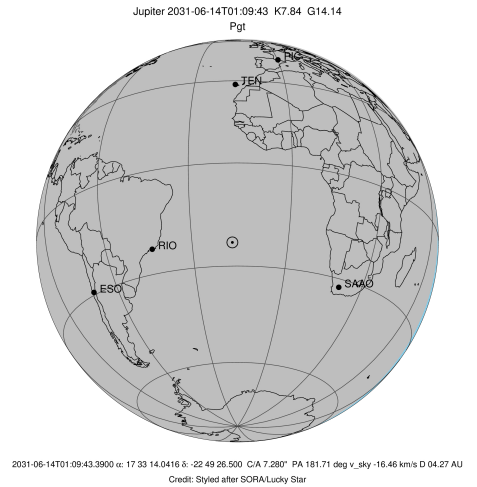


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-14T00:03:28.837	24.41	-24.01	71490.6	23.01	25.86
Jupiter	E	2031-06-14T02:13:54.089	18.07	-17.12	71490.5	23.50	26.40

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-14T01:09:54.020
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        : 4117456267668805760
2Mass ID (if available) : 17331405-2249263
ICRS Star Coord at Epoch: 17h 33m 14.04162s -22:49:26.49993s
RUWE (>1.4 is poor) : 0.95
K magnitude           : 7.845
G magnitude           : 14.139
RP magnitude          : 12.602
BP magnitude          : 17.685
DUPflag              : 0
Distance (au)         : 4.266
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.46
Sun-Target sep (deg) : 178.49
Sun-Moon sep (deg)   : 112.82
B (ring opening deg) : -2.60
PA of pole (deg)     : 2.04
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation ("): 8.892
C/A sky separation (km): 27508.0
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
    
```

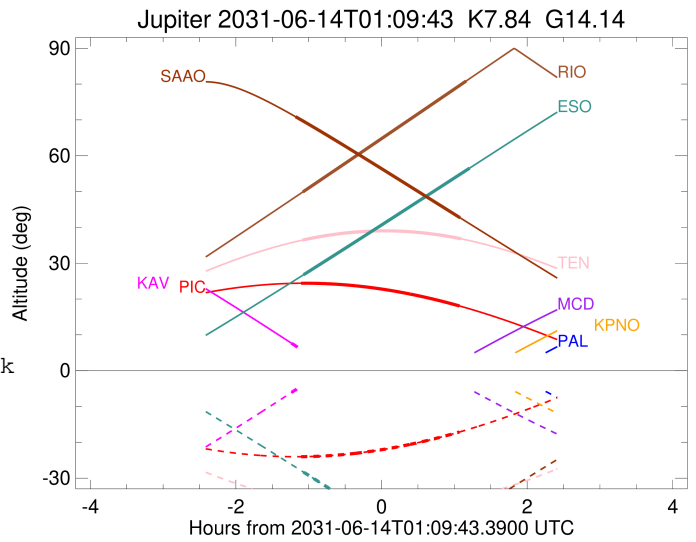
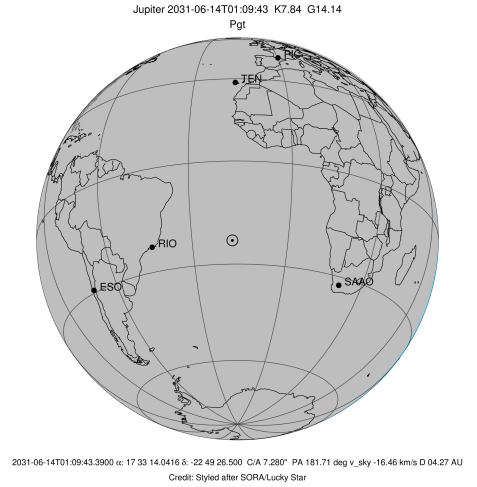


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-14T00:04:38.588	36.44	-36.53	71490.7	22.15	24.93
Jupiter	E	2031-06-14T02:15:08.742	36.82	-36.00	71490.6	22.91	25.76

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-14T01:03:43.190
Event type           : Pgt
: Jupiter occs: geocentric, topocentric
: Not a ringed target
Observer code        : KAV
Location             : Kavalur Observatory
Latitude (deg)       : 12.57556
E. Longitude (deg)  : 78.83167
Altitude (km)        : 0.722
Gaia source ID       : 4117456267668805760
2Mass ID (if available) : 17331405-2249263
ICRS Star Coord at Epoch: 17h 33m 14.04162s -22:49:26.49993s
RUWE (>1.4 is poor) : 0.95
K magnitude          : 7.845
G magnitude          : 14.139
RP magnitude         : 12.602
BP magnitude         : 17.685
DUPflag             : 0
Distance (au)        : 4.266
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.46
Sun-Target sep (deg) : 178.49
Sun-Moon sep (deg)  : 112.49
B (ring opening deg) : -2.60
PA of pole (deg)    : 2.04
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 7.714
C/A sky separation (km) : 23863.8
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
    
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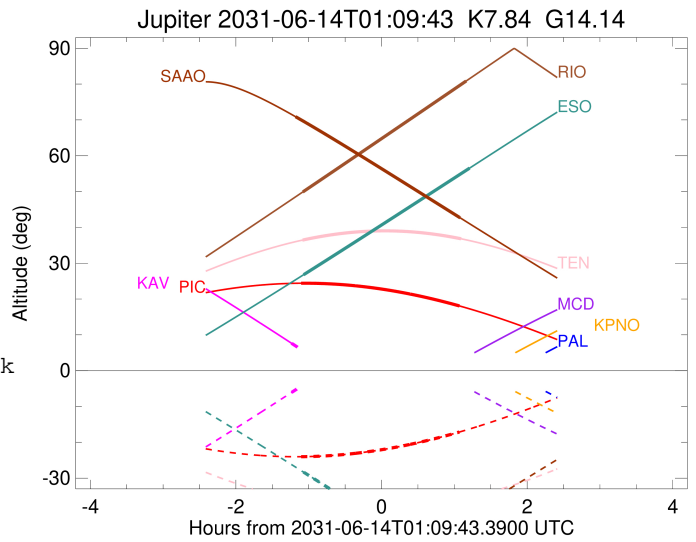
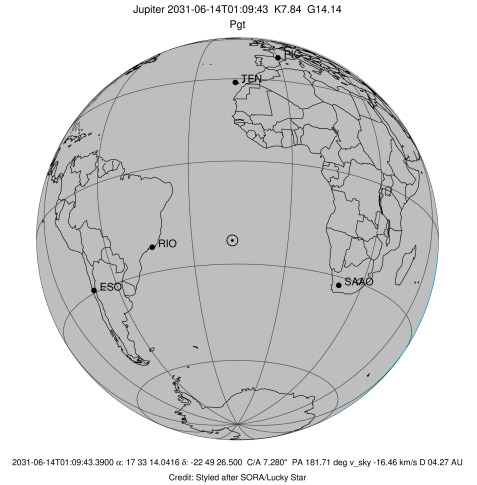


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-13T23:55:40.423	7.63	-6.07	71490.9	19.74	22.29
Jupiter	E	2031-06-14T02:12:18.872	-23.36x	24.80x	71491.0	19.21	21.70

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-14T01:12:17.080
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        : 4117456267668805760
2Mass ID (if available) : 17331405-2249263
ICRS Star Coord at Epoch: 17h 33m 14.04162s -22:49:26.49993s
RUWE (>1.4 is poor)  : 0.95
K magnitude           : 7.845
G magnitude           : 14.139
RP magnitude          : 12.602
BP magnitude          : 17.685
DUPflag              : 0
Distance (au)         : 4.266
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.46
Sun-Target sep (deg)  : 178.49
Sun-Moon sep (deg)    : 112.90
B (ring opening deg)  : -2.60
PA of pole (deg)      : 2.04
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 7.193
C/A sky separation (km) : 22253.4
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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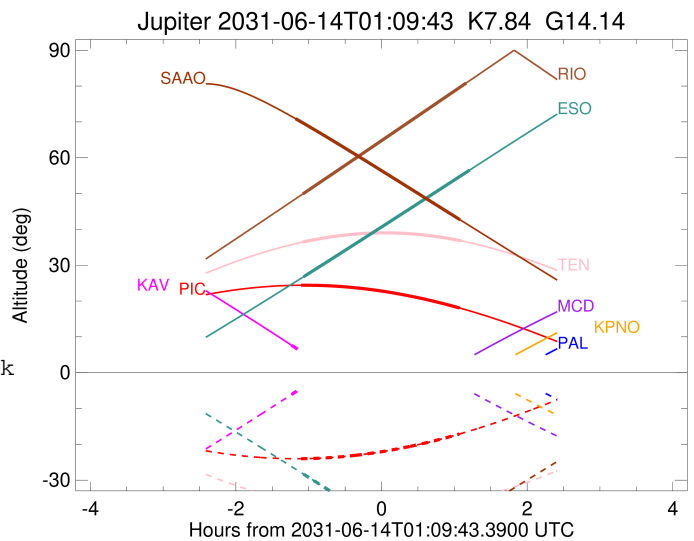
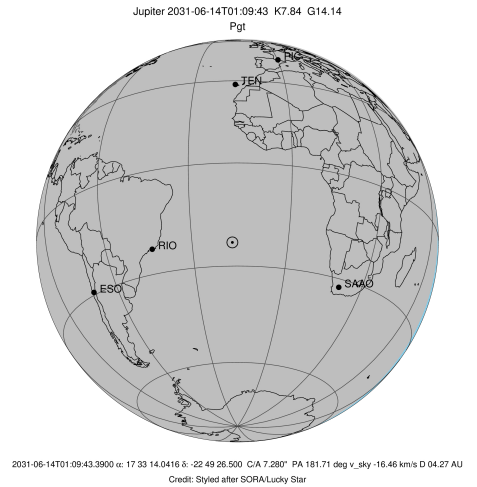


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-14T00:04:52.905	49.88	-51.43	71491.2	17.42	19.72
Jupiter	E	2031-06-14T02:19:27.500	80.84	-82.25	71491.1	18.67	21.10

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-14T01:14:03.900
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      : 4117456267668805760
2Mass ID (if available) : 17331405-2249263
ICRS Star Coord at Epoch: 17h 33m 14.04162s -22:49:26.49993s
RUWE (>1.4 is poor) : 0.95
K magnitude          : 7.845
G magnitude          : 14.139
RP magnitude         : 12.602
BP magnitude         : 17.685
DUPflag             : 0
Distance (au)       : 4.266
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.46
Sun-Target sep (deg) : 178.49
Sun-Moon sep (deg)  : 112.58
B (ring opening deg) : -2.60
PA of pole (deg)    : 2.04
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 6.742
C/A sky separation (km) : 20859.3
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
    
```

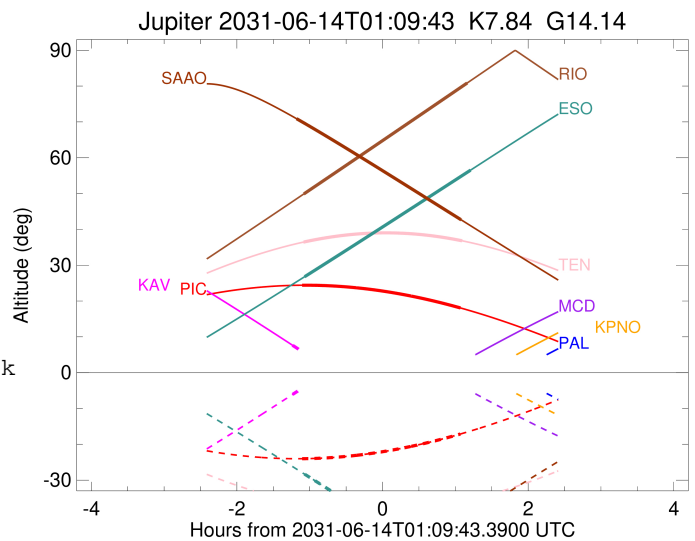
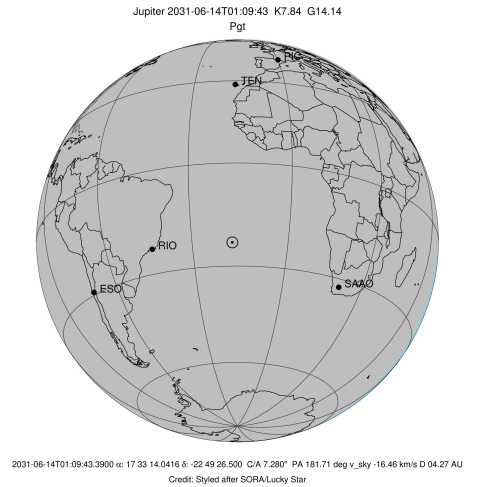


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-14T00:05:34.534	26.79	-28.34	71491.3	16.11	18.27
Jupiter	E	2031-06-14T02:22:09.365	56.50	-57.96	71491.1	17.69	20.02

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-14T01:06:35.610
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       : 4117456267668805760
2Mass ID (if available) : 17331405-2249263
ICRS Star Coord at Epoch: 17h 33m 14.04162s -22:49:26.49993s
RUWE (>1.4 is poor) : 0.95
K magnitude           : 7.845
G magnitude           : 14.139
RP magnitude          : 12.602
BP magnitude          : 17.685
DUPflag              : 0
Distance (au)        : 4.266
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.46
Sun-Target sep (deg) : 178.49
Sun-Moon sep (deg)   : 113.17
B (ring opening deg) : -2.60
PA of pole (deg)     : 2.04
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 6.856
C/A sky separation (km) : 21209.7
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	2031-06-13T23:58:52.453	70.89	-69.82	71491.2	17.11	19.38
Jupiter	E	2031-06-14T02:14:34.618	42.65	-41.52	71491.2	17.24	19.52