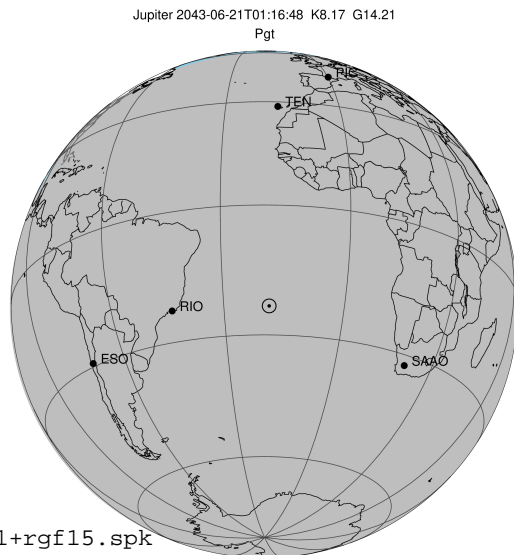


target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2043-06-21T01:16:48.620
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 4068692171107465728
 2Mass ID (if available) : 17511305-2304384

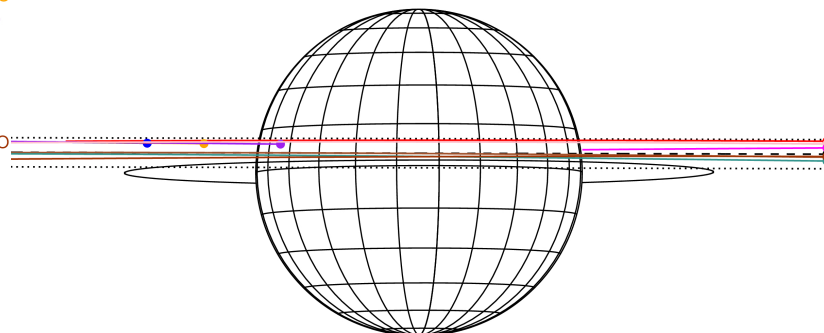
Jupiter 2043-06-21T01:16:48 K8.17 G14.21 Pgt

ICRS Star Coord at Epoch: 17h 51m 13.04304s -23:04:38.58848s
 RUWE (>1.4 is poor) : 0.87
 K magnitude : 8.172
 G magnitude : 14.211
 RP magnitude : 12.745
 BP magnitude : 17.215
 DUPflag : 0
 Distance (au) : 4.250
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -16.41
 Sun-Target sep (deg) : 178.91
 Sun-Moon sep (deg) : 16.94
 B (ring opening deg) : -2.43
 PA of pole (deg) : 0.11
 Pole direction: RA (deg): 268.05669
 Dec (deg): 64.49732
 C/A sky separation (") : 2.740
 C/A sky separation (km) : 8447.4
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk



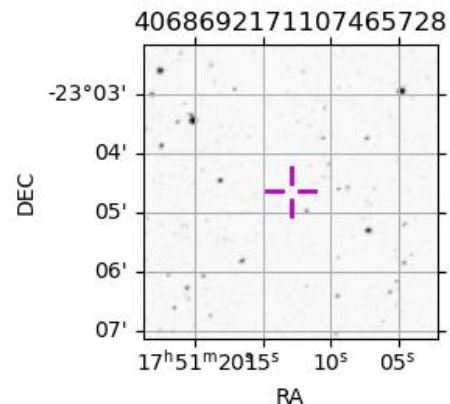
2043-06-21T01:16:48.6200 at: 17 51 13.0430 s: -23 04 38.588 C/A 2.729" PA 179.87 deg v_sky -16.41 km/s D 04.25 AU
 Credit: Styled after SORA/Lucky Star

Earth
 PIC
 PAL
 KPNO
 MCD
 TEN
 KAV
 RIO
 ESO
 SAAO



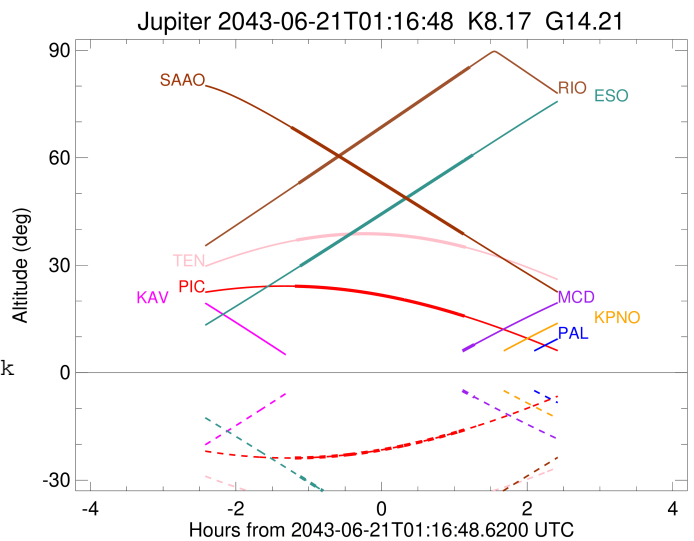
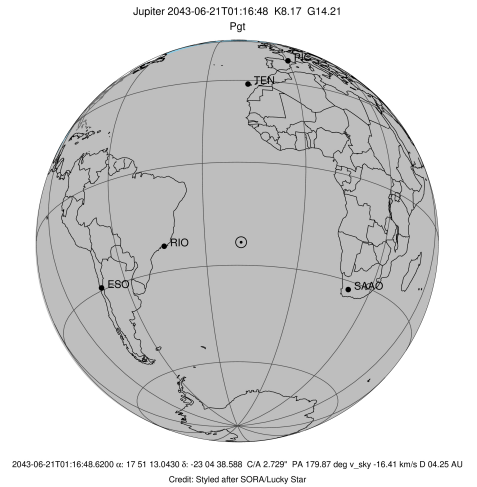
Observable events with sun below -5 deg and altitude above 5 deg

Obs	Location	lat	Elon	Target	Observed Events Interval	OCode
PIC	Pic du Midi	42.9	0.1	+ +	JUN 21 00:05 - JUN 21 02:25	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	+ +	JUN 21 02:33 - JUN 21 02:33	Pne
TEN	Teide Obs./Tenerife	28.3	343.5	+ +	JUN 21 00:06 - JUN 21 02:26	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 21 00:08 - JUN 21 02:29	Pie
ESO	European Southern Obs. (3.6m)	-29.3	289.3	+ +	JUN 21 00:09 - JUN 21 02:32	Pie
AAT	Siding Spring (AAT)	-31.3	149.1			Pnn
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8	+ +	JUN 21 00:02 - JUN 21 02:24	Pie
MSO	Mt. Stromlo Observatory	-35.3	149.0			Pnn



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2043-06-21T01:15:12.780
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      : 4068692171107465728
2Mass ID (if available) : 17511305-2304384
ICRS Star Coord at Epoch: 17h 51m 13.04304s -23:04:38.58848s
RUWE (>1.4 is poor) : 0.87
K magnitude          : 8.172
G magnitude          : 14.211
RP magnitude         : 12.745
BP magnitude         : 17.215
DUPflag             : 0
Distance (au)       : 4.250
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -16.41
Sun-Target sep (deg) : 178.91
Sun-Moon sep (deg)  : 17.48
B (ring opening deg) : -2.43
PA of pole (deg)    : 0.11
Pole direction: RA (deg): 268.05669
Dec (deg): 64.49732
C/A sky separation (" ) : 4.588
C/A sky separation (km) : 14142.4
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
    
```

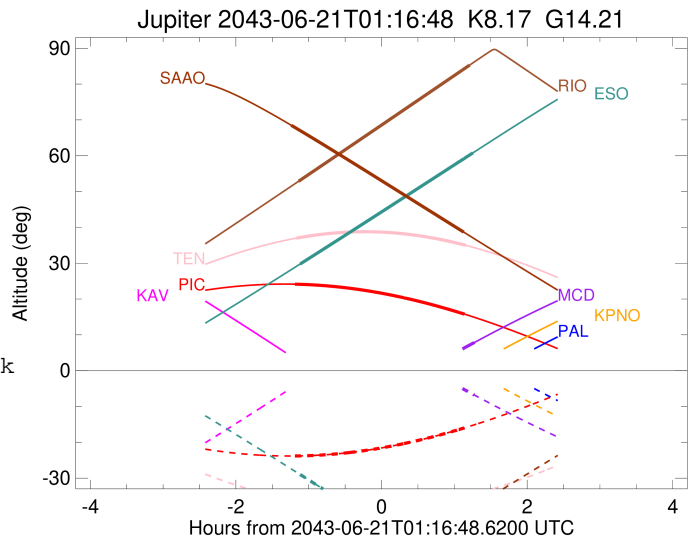
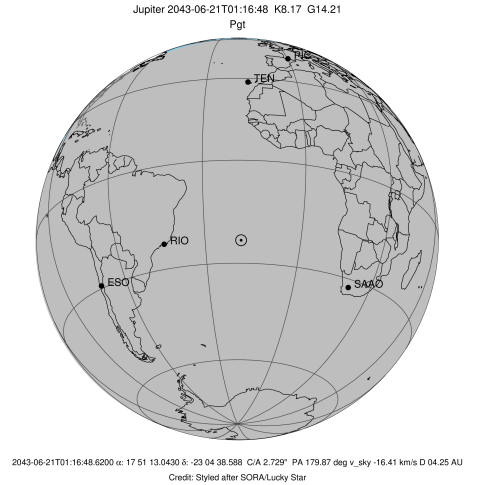


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-06-21T00:05:25.771	24.14	-23.81	71491.7	11.25	12.81
Jupiter	E	2043-06-21T02:25:08.590	15.79	-15.97	71491.7	11.42	13.00

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2043-06-21T01:22:12.580
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       : 4068692171107465728
2Mass ID (if available) : 17511305-2304384
ICRS Star Coord at Epoch: 17h 51m 13.04304s -23:04:38.58848s
RUWE (>1.4 is poor) : 0.87
K magnitude           : 8.172
G magnitude           : 14.211
RP magnitude         : 12.745
BP magnitude         : 17.215
DUPflag              : 0
Distance (au)        : 4.250
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.41
Sun-Target sep (deg) : 178.91
Sun-Moon sep (deg)   : 16.33
B (ring opening deg) : -2.43
PA of pole (deg)     : 0.11
Pole direction: RA (deg): 268.05669
Dec (deg): 64.49732
C/A sky separation (") : 3.806
C/A sky separation (km) : 11733.4
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
    
```

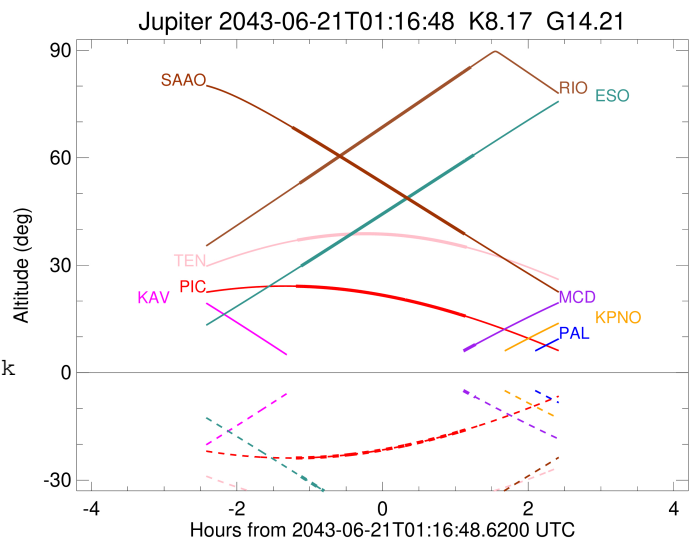
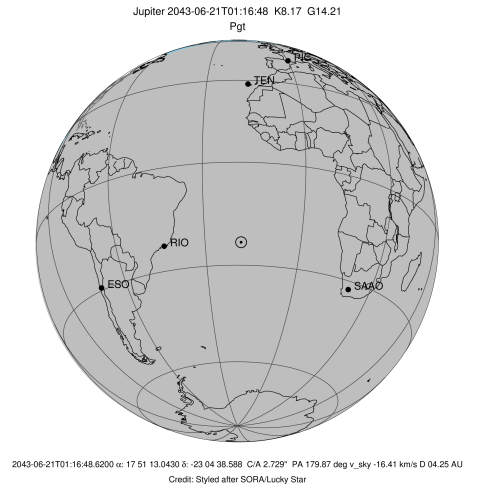


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-06-21T00:10:31.645	-20.29x	21.32x	71491.8	8.65	9.87
Jupiter	E	2043-06-21T02:33:21.802	7.87	-6.80	71491.7	10.20	11.62

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2043-06-21T01:16:27.290
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       : 4068692171107465728
2Mass ID (if available) : 17511305-2304384
ICRS Star Coord at Epoch: 17h 51m 13.04304s -23:04:38.58848s
RUWE (>1.4 is poor) : 0.87
K magnitude          : 8.172
G magnitude          : 14.211
RP magnitude         : 12.745
BP magnitude         : 17.215
DUPflag             : 0
Distance (au)        : 4.250
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.41
Sun-Target sep (deg) : 178.91
Sun-Moon sep (deg)   : 17.35
B (ring opening deg) : -2.43
PA of pole (deg)     : 0.11
Pole direction: RA (deg): 268.05669
Dec (deg): 64.49732
C/A sky separation ("): 4.351
C/A sky separation (km): 13411.6
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
    
```

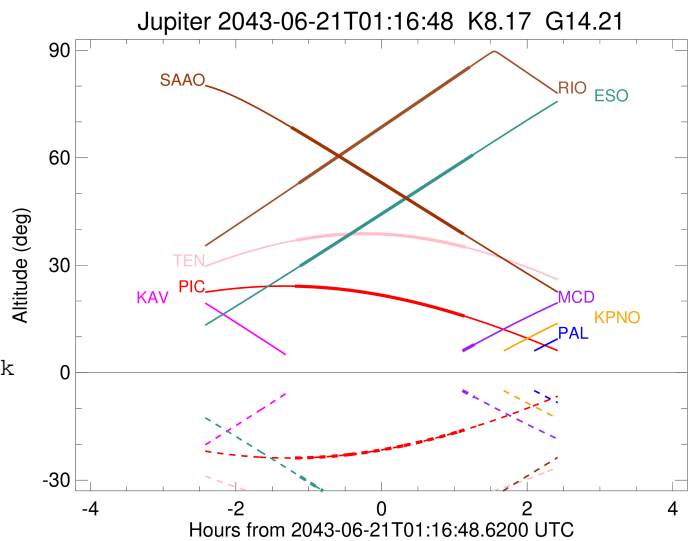
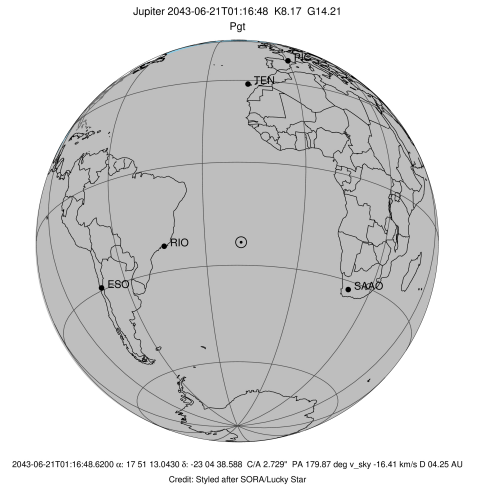


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-06-21T00:06:49.783	37.00	-36.39	71491.7	10.52	11.98
Jupiter	E	2043-06-21T02:26:06.743	35.00	-35.08	71491.7	10.92	12.44

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2043-06-21T01:19:05.350
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        : 4068692171107465728
2Mass ID (if available) : 17511305-2304384
ICRS Star Coord at Epoch: 17h 51m 13.04304s -23:04:38.58848s
RUWE (>1.4 is poor) : 0.87
K magnitude           : 8.172
G magnitude           : 14.211
RP magnitude          : 12.745
BP magnitude          : 17.215
DUPflag              : 0
Distance (au)         : 4.250
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.41
Sun-Target sep (deg) : 178.91
Sun-Moon sep (deg)   : 16.87
B (ring opening deg) : -2.43
PA of pole (deg)     : 0.11
Pole direction: RA (deg): 268.05669
Dec (deg): 64.49732
C/A sky separation ("): 2.699
C/A sky separation (km): 8320.7
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
    
```

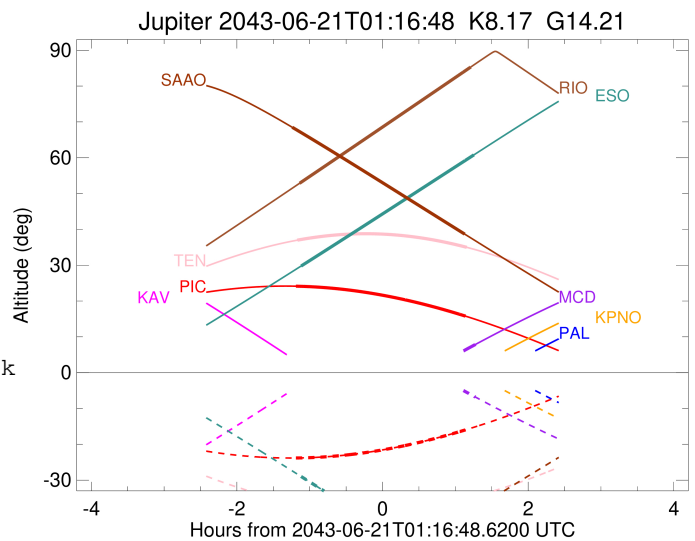
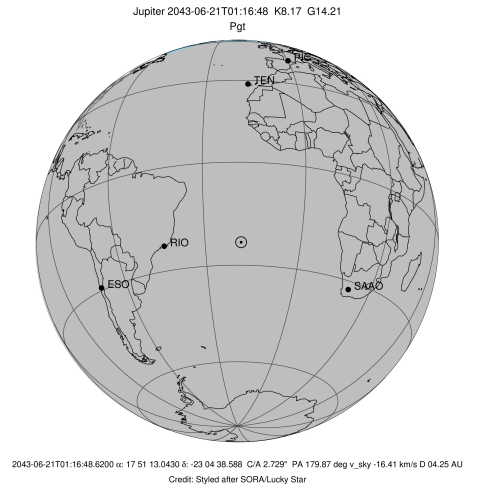


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-06-21T00:08:31.097	52.87	-51.95	71491.9	6.14	7.02
Jupiter	E	2043-06-21T02:29:27.116	85.29	-84.18	71491.9	7.05	8.04

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2043-06-21T01:21:05.310
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        : 4068692171107465728
2Mass ID (if available) : 17511305-2304384
ICRS Star Coord at Epoch: 17h 51m 13.04304s -23:04:38.58848s
RUWE (>1.4 is poor) : 0.87
K magnitude           : 8.172
G magnitude           : 14.211
RP magnitude          : 12.745
BP magnitude          : 17.215
DUPflag              : 0
Distance (au)         : 4.250
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.41
Sun-Target sep (deg) : 178.91
Sun-Moon sep (deg)   : 16.50
B (ring opening deg) : -2.43
PA of pole (deg)     : 0.11
Pole direction: RA (deg): 268.05669
Dec (deg): 64.49732
C/A sky separation (") : 2.283
C/A sky separation (km) : 7036.4
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
    
```

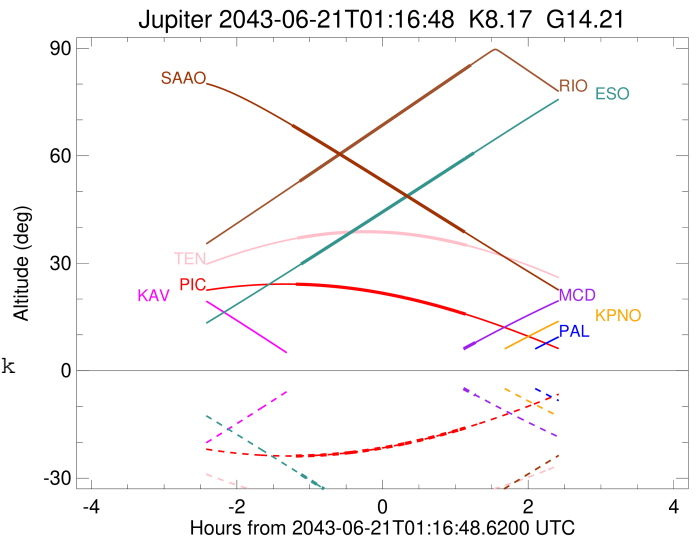
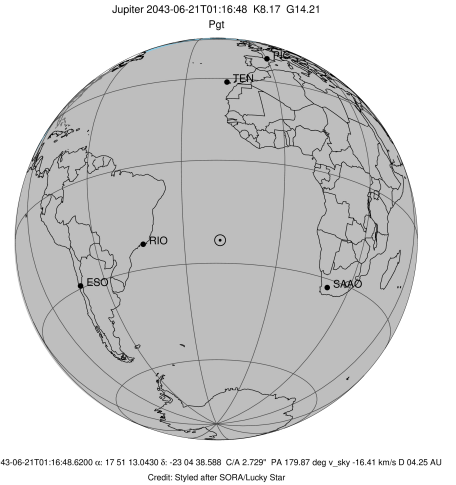


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-06-21T00:09:44.079	29.76	-28.98	71491.9	4.94	5.64
Jupiter	E	2043-06-21T02:32:02.319	60.77	-59.85	71491.9	6.23	7.12

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2043-06-21T01:13:21.200
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      : 4068692171107465728
2Mass ID (if available) : 17511305-2304384
ICRS Star Coord at Epoch: 17h 51m 13.04304s -23:04:38.58848s
RUWE (>1.4 is poor) : 0.87
K magnitude          : 8.172
G magnitude          : 14.211
RP magnitude         : 12.745
BP magnitude         : 17.215
DUPflag             : 0
Distance (au)       : 4.250
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -16.41
Sun-Target sep (deg) : 178.91
Sun-Moon sep (deg)  : 17.55
B (ring opening deg) : -2.43
PA of pole (deg)    : 0.11
Pole direction: RA (deg): 268.05669
Dec (deg): 64.49732
C/A sky separation (" ) : 2.246
C/A sky separation (km) : 6922.5
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	2043-06-21T00:02:30.865	68.47	-69.49	71491.9	5.59	6.38
Jupiter	E	2043-06-21T02:24:31.395	38.68	-39.81	71491.9	5.39	6.16