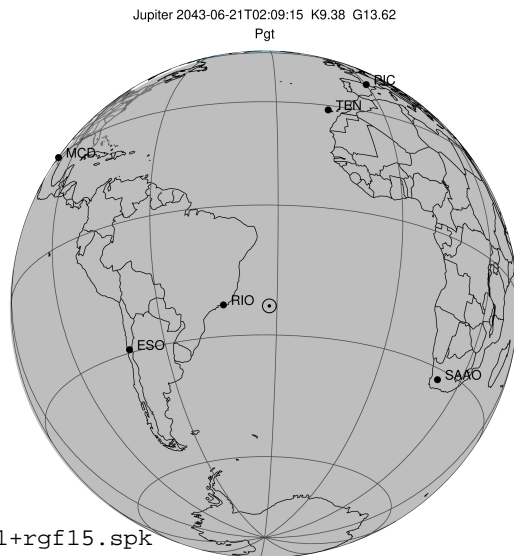


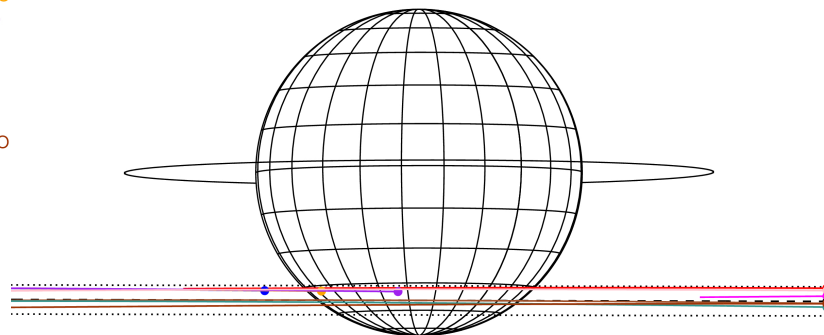
target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2043-06-21T02:09:15.550
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 4068692166697124096
 2Mass ID (if available) : 17511183-2304595

Jupiter 2043-06-21T02:09:15 K9.38 G13.62 Pgt

ICRS Star Coord at Epoch: 17h 51m 11.83272s -23:04:59.54648s
 RUWE (>1.4 is poor) : 0.98
 K magnitude : 9.379
 G magnitude : 13.623
 RP magnitude : 12.497
 BP magnitude : 14.915
 DUPflag : 0
 Distance (au) : 4.250
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -16.41
 Sun-Target sep (deg) : 178.87
 Sun-Moon sep (deg) : 16.52
 B (ring opening deg) : -2.42
 PA of pole (deg) : 0.11
 Pole direction: RA (deg): 268.05669
 Dec (deg): 64.49732
 C/A sky separation (") : 18.179
 C/A sky separation (km) : 56038.0
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk



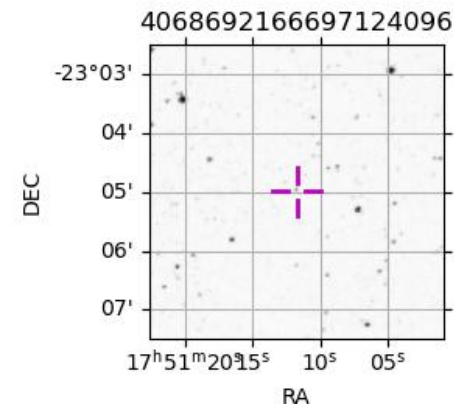
Earth
 PIC
 PAL
 KPNO
 MCD
 TEN
 KAV
 RIO
 ESO
 SAAO



2043-06-21T02:09:15.5500 a: 17 51 11.83272 s: -23 04 59.546 C/A ***** PA 359.87 deg v_sky -16.41 km/s D 04.25 AU
 Credit: Styled after SORA/Lucky Star

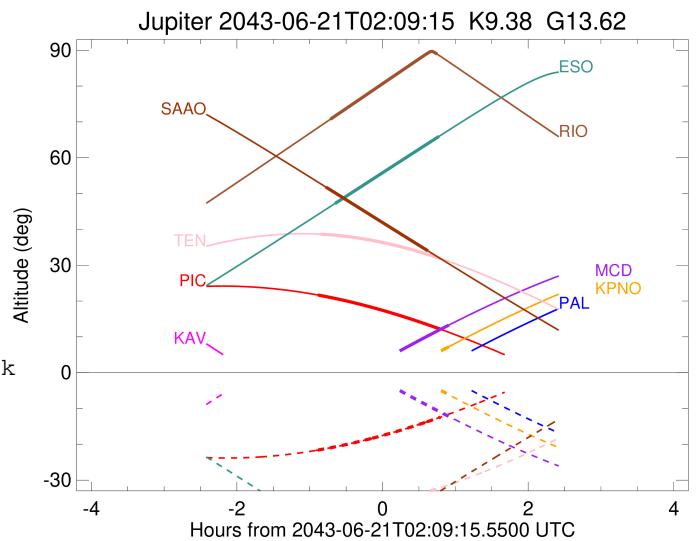
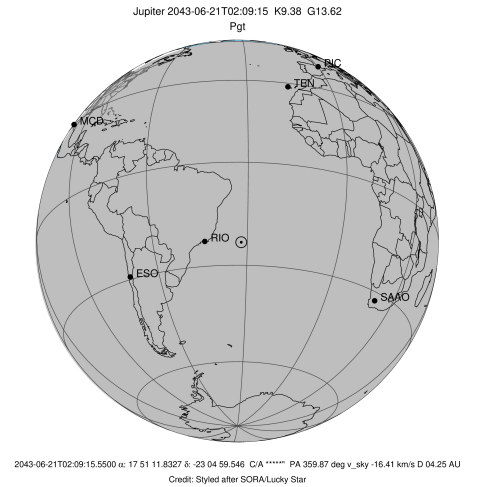
Observable events with sun below -5 deg and altitude above 5 deg

Obs	Location	lat	Elon	Target	Observed Events Interval	OCode
PIC	Pic du Midi	42.9	0.1	+ +	JUN 21 01:16 - JUN 21 02:56	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	+ +	JUN 21 03:04 - JUN 21 03:04	Pne
MCD	McDonald Obs. 2.7m	30.7	256.0	+ +	JUN 21 03:03 - JUN 21 03:03	Pne
TEN	Teide Obs./Tenerife	28.3	343.5	+ +	JUN 21 01:18 - JUN 21 02:57	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 01:26 - JUN 21 02:54	Pie
ESO	European Southern Obs. (3.6m)	-29.3	289.3	+ +	JUN 21 01:30 - JUN 21 02:55	Pie
AAT	Siding Spring (AAT)	-31.3	149.1			Pnn
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8	+ +	JUN 21 01:22 - JUN 21 02:46	Pie
MSO	Mt. Stromlo Observatory	-35.3	149.0			Pnn



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2043-06-21T02:06:26.420
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        : 4068692166697124096
2Mass ID (if available) : 17511183-2304595
ICRS Star Coord at Epoch: 17h 51m 11.83272s -23:04:59.54648s
RUWE (>1.4 is poor) : 0.98
K magnitude           : 9.379
G magnitude           : 13.623
RP magnitude          : 12.497
BP magnitude          : 14.915
DUPflag              : 0
Distance (au)         : 4.250
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.41
Sun-Target sep (deg) : 178.87
Sun-Moon sep (deg)   : 17.16
B (ring opening deg) : -2.42
PA of pole (deg)     : 0.11
Pole direction: RA (deg): 268.05669
Dec (deg): 64.49732
C/A sky separation ("): 16.392
C/A sky separation (km): 50530.2
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
    
```

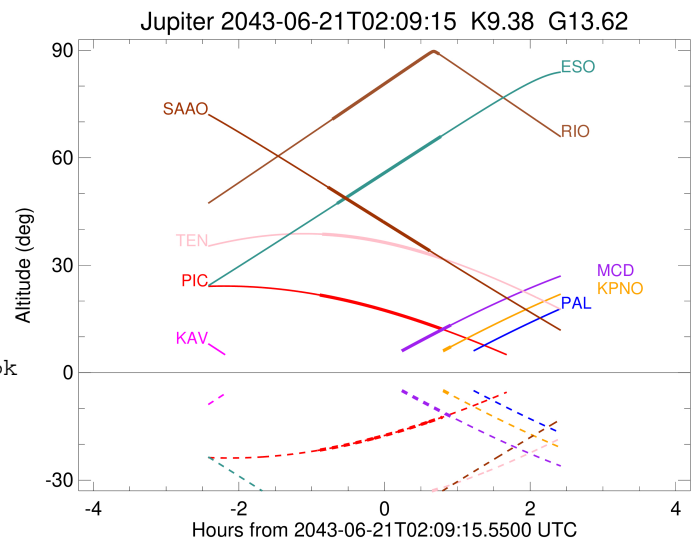
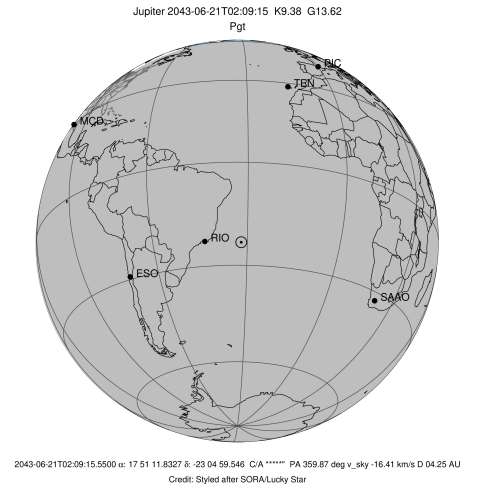


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-06-21T01:16:02.999	21.67	-21.60	71488.0	-44.96	-48.66
Jupiter	E	2043-06-21T02:56:57.423	12.13	-12.42	71488.0	-44.98	-48.68

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2043-06-21T02:15:05.060
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        : 4068692166697124096
2Mass ID (if available) : 17511183-2304595
ICRS Star Coord at Epoch: 17h 51m 11.83272s -23:04:59.54648s
RUWE (>1.4 is poor) : 0.98
K magnitude           : 9.379
G magnitude           : 13.623
RP magnitude          : 12.497
BP magnitude          : 14.915
DUPflag              : 0
Distance (au)         : 4.250
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.41
Sun-Target sep (deg) : 178.87
Sun-Moon sep (deg)   : 15.97
B (ring opening deg) : -2.42
PA of pole (deg)     : 0.11
Pole direction: RA (deg): 268.05669
Dec (deg): 64.49732
C/A sky separation (") : 17.012
C/A sky separation (km) : 52439.8
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
    
```

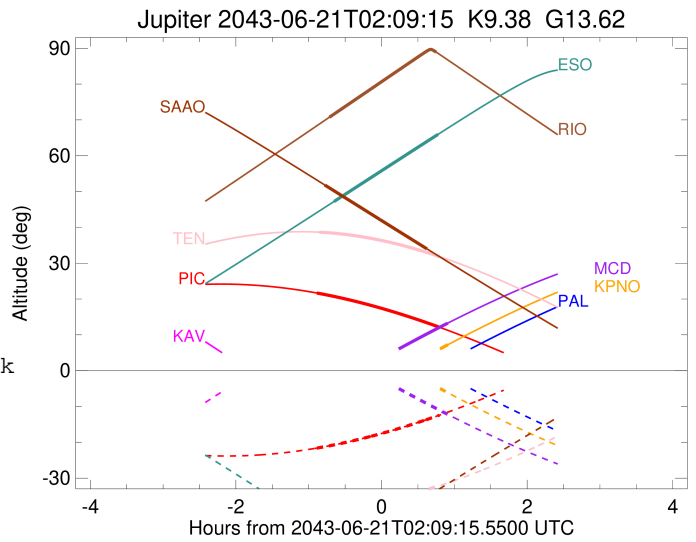
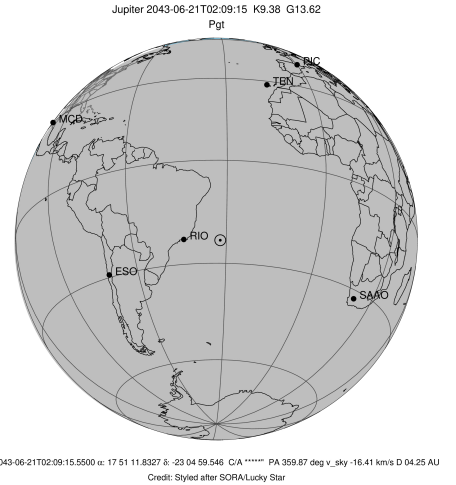


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-06-21T01:25:53.179	-11.46x	12.53x	71487.6	-47.90	-51.55
Jupiter	E	2043-06-21T03:04:01.911	7.25	-6.17	71487.8	-46.39	-50.07

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2043-06-21T02:14:55.780
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       : 4068692166697124096
2Mass ID (if available) : 17511183-2304595
ICRS Star Coord at Epoch: 17h 51m 11.83272s -23:04:59.54648s
RUWE (>1.4 is poor) : 0.98
K magnitude           : 9.379
G magnitude           : 13.623
RP magnitude          : 12.497
BP magnitude          : 14.915
DUPflag              : 0
Distance (au)         : 4.250
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.41
Sun-Target sep (deg) : 178.87
Sun-Moon sep (deg)   : 16.02
B (ring opening deg) : -2.42
PA of pole (deg)     : 0.11
Pole direction: RA (deg): 268.05669
Dec (deg): 64.49732
C/A sky separation ("): 16.958
C/A sky separation (km): 52275.3
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
    
```

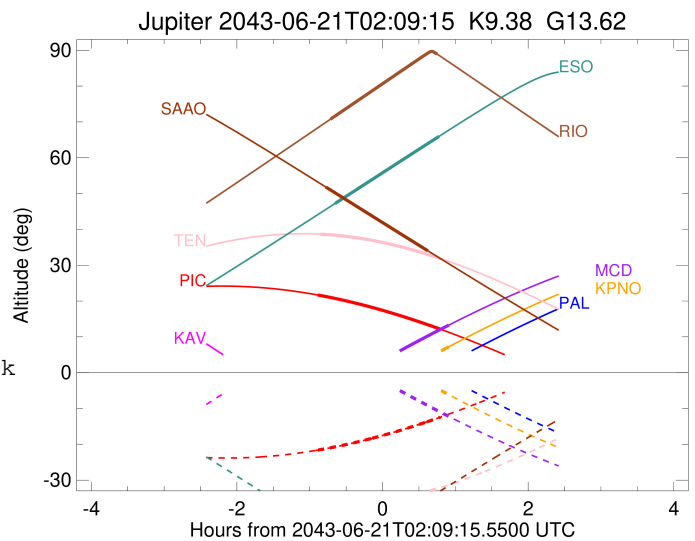
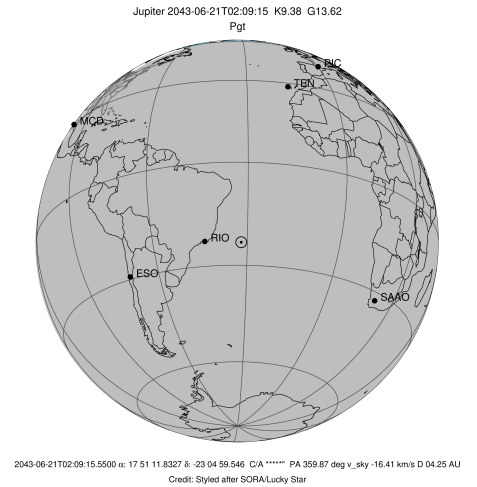


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-06-21T01:25:42.940	-5.00x	6.06x	71487.6	-47.70	-51.36
Jupiter	E	2043-06-21T03:03:54.029	13.27	-12.21	71487.8	-46.22	-49.90

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2043-06-21T02:07:29.590
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        : 4068692166697124096
2Mass ID (if available) : 17511183-2304595
ICRS Star Coord at Epoch: 17h 51m 11.83272s -23:04:59.54648s
RUWE (>1.4 is poor) : 0.98
K magnitude           : 9.379
G magnitude           : 13.623
RP magnitude          : 12.497
BP magnitude          : 14.915
DUPflag              : 0
Distance (au)         : 4.250
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.41
Sun-Target sep (deg)  : 178.87
Sun-Moon sep (deg)   : 17.09
B (ring opening deg) : -2.42
PA of pole (deg)     : 0.11
Pole direction: RA (deg): 268.05669
Dec (deg): 64.49732
C/A sky separation (") : 16.598
C/A sky separation (km) : 51165.1
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
    
```

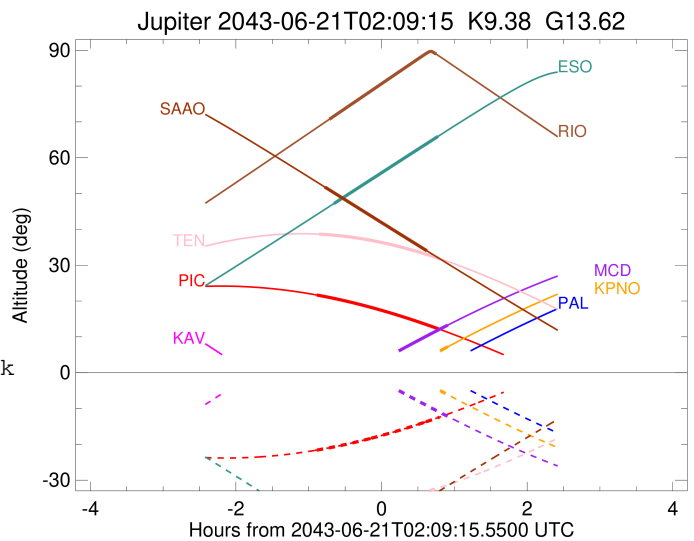
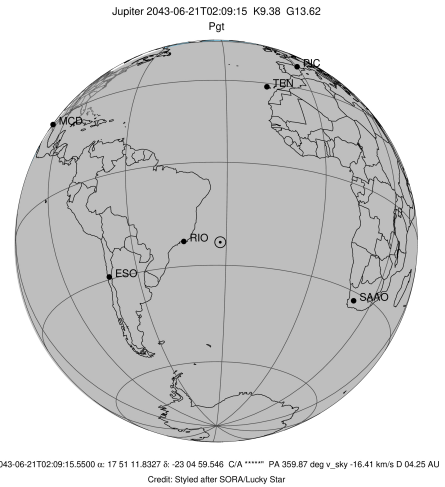


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-06-21T01:18:02.698	38.65	-38.37	71487.9	-45.79	-49.48
Jupiter	E	2043-06-21T02:57:01.017	31.85	-32.09	71487.9	-45.63	-49.32

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2043-06-21T02:10:22.350
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        : 4068692166697124096
2Mass ID (if available) : 17511183-2304595
ICRS Star Coord at Epoch: 17h 51m 11.83272s -23:04:59.54648s
RUWE (>1.4 is poor) : 0.98
K magnitude           : 9.379
G magnitude           : 13.623
RP magnitude          : 12.497
BP magnitude          : 14.915
DUPflag              : 0
Distance (au)         : 4.250
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.41
Sun-Target sep (deg) : 178.87
Sun-Moon sep (deg)   : 16.64
B (ring opening deg) : -2.42
PA of pole (deg)     : 0.11
Pole direction: RA (deg): 268.05669
Dec (deg): 64.49732
C/A sky separation ("): 18.176
C/A sky separation (km): 56027.9
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
    
```

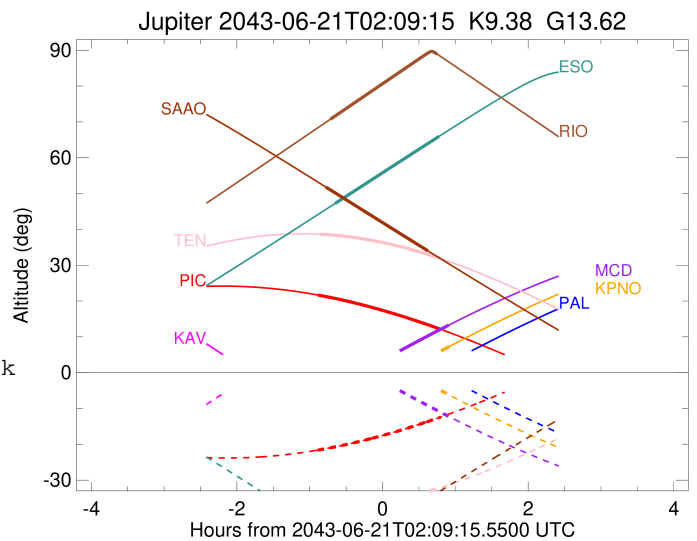
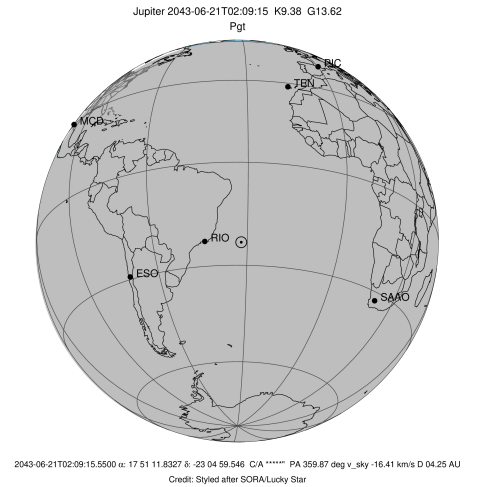


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-06-21T01:26:25.908	70.76	-69.74	71487.0	-51.92	-55.44
Jupiter	E	2043-06-21T02:54:16.615	88.91	-89.32	71487.1	-51.27	-54.81

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2043-06-21T02:12:58.500
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      : 4068692166697124096
2Mass ID (if available) : 17511183-2304595
ICRS Star Coord at Epoch: 17h 51m 11.83272s -23:04:59.54648s
RUWE (>1.4 is poor) : 0.98
K magnitude          : 9.379
G magnitude          : 13.623
RP magnitude         : 12.497
BP magnitude         : 14.915
DUPflag             : 0
Distance (au)       : 4.250
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.41
Sun-Target sep (deg) : 178.87
Sun-Moon sep (deg)  : 16.24
B (ring opening deg) : -2.42
PA of pole (deg)    : 0.11
Pole direction: RA (deg): 268.05669
Dec (deg): 64.49732
C/A sky separation ("): 18.529
C/A sky separation (km): 57116.8
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
    
```

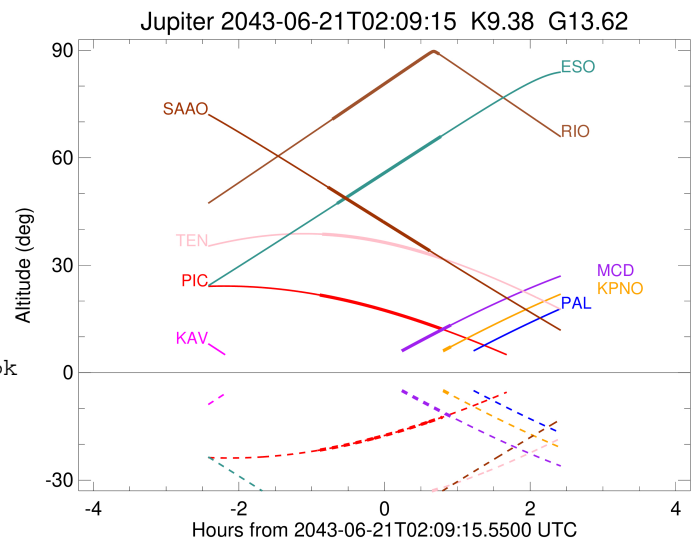
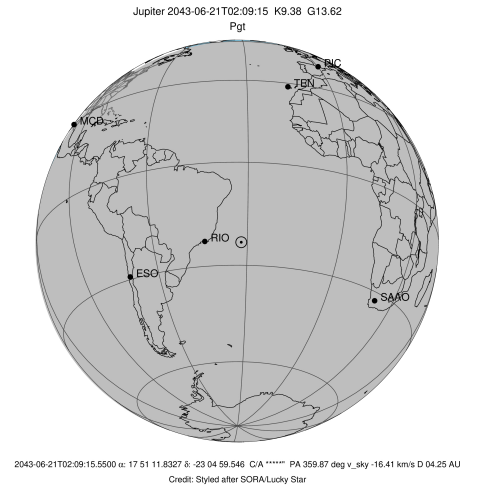


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-06-21T01:30:08.181	47.21	-46.34	71486.8	-53.57	-57.01
Jupiter	E	2043-06-21T02:55:41.767	65.92	-65.00	71486.9	-52.45	-55.94


```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2043-06-21T02:04:28.610
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      : 4068692166697124096
2Mass ID (if available) : 17511183-2304595
ICRS Star Coord at Epoch: 17h 51m 11.83272s -23:04:59.54648s
RUWE (>1.4 is poor) : 0.98
K magnitude         : 9.379
G magnitude         : 13.623
RP magnitude        : 12.497
BP magnitude        : 14.915
DUPflag            : 0
Distance (au)       : 4.250
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -16.41
Sun-Target sep (deg) : 178.87
Sun-Moon sep (deg)  : 17.19
B (ring opening deg) : -2.42
PA of pole (deg)    : 0.11
Pole direction: RA (deg): 268.05669
Dec (deg): 64.49732
C/A sky separation ("): 18.787
C/A sky separation (km) : 57911.1
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	2043-06-21T01:22:36.728	51.80	-52.89	71486.8	-53.88	-57.31
Jupiter	E	2043-06-21T02:46:29.459	34.05	-35.19	71486.7	-54.25	-57.66