

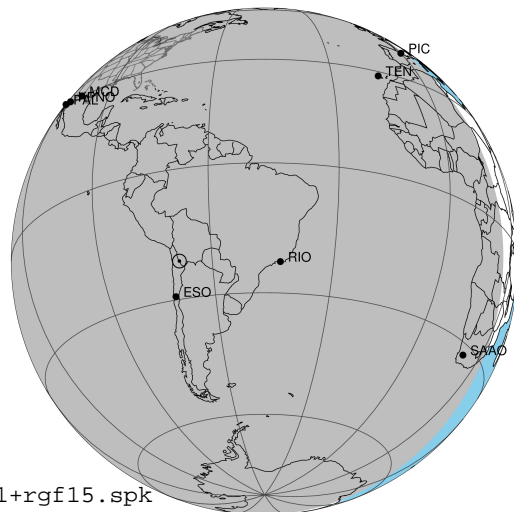
target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2031-05-28T04:30:18.950
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 4116925753338733056
 2Mass ID (if available) : 17421051-2252165

Jupiter 2031-05-28T04:30:18 K8.93 G13.69 Pgt

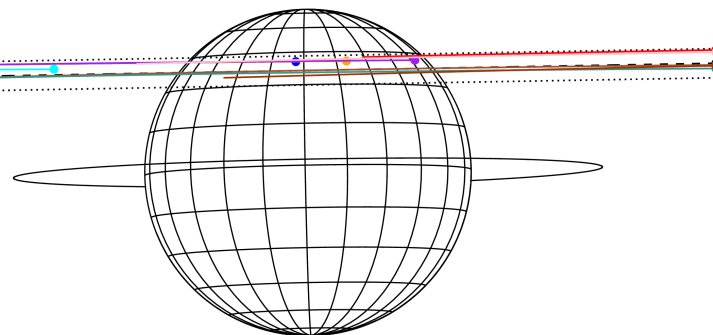
ICRS Star Coord at Epoch: 17h 42m 10.50268s -22:52:16.67154s

RUWE (>1.4 is poor) : 1.00
 K magnitude : 8.927
 G magnitude : 13.692
 RP magnitude : 12.481
 BP magnitude : 15.317
 DUPflag : 0
 Distance (au) : 4.321
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -14.74
 Sun-Target sep (deg) : 160.35
 Sun-Moon sep (deg) : 124.04
 B (ring opening deg) : -2.61
 PA of pole (deg) : 1.08
 Pole direction: RA (deg): 268.05693
 Dec (deg): 64.49651
 C/A sky separation (") : 14.263
 C/A sky separation (km) : 44702.8
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk

Jupiter 2031-05-28T04:30:18 K8.93 G13.69
 Pgt



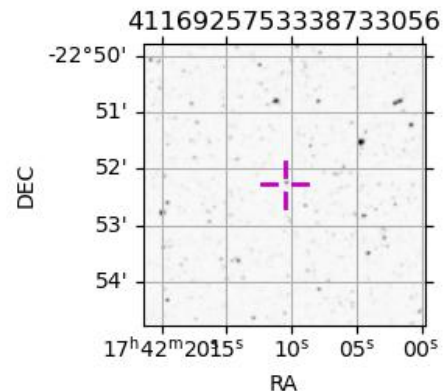
Earth
 PIC
 PAL
 KPNO
 MCD
 TEN
 IRTF
 RIO
 ESO
 SAAO



2031-05-28T04:30:18.9500 a: 17 42 10.5027 d: -22 52 16.672 C/A ***** PA 181.01 deg v_sky -14.74 km/s D 04.32 AU
 Credit: Styled after SORA/Lucky Star

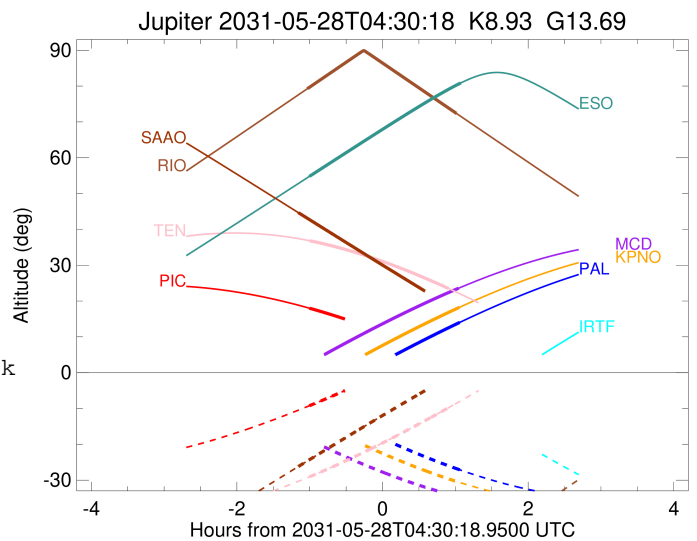
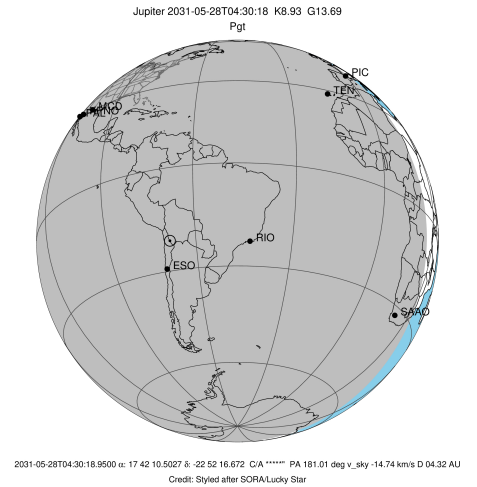
Observable events with sun below -5 deg and altitude above 5 deg

Obs	Location	lat	Elon	Target	Observed Events Interval	OCode
PIC	Pic du Midi	42.9	0.1	+	MAY 28 03:30 - MAY 28 03:30	Pin
PAL	Palomar Mt (200")	33.4	243.1	+	MAY 28 05:34 - MAY 28 05:34	Pne
PMO	Purple Mtn Obs. Nanking	32.1	118.8			Pnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+	MAY 28 05:33 - MAY 28 05:33	Pne
MCD	McDonald Obs. 2.7m	30.7	256.0	+	MAY 28 05:33 - MAY 28 05:33	Pne
TEN	Teide Obs./Tenerife	28.3	343.5	+	MAY 28 03:30 - MAY 28 05:24	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	+	MAY 28 03:28 - MAY 28 05:31	Pie
ESO	European Southern Obs. (3.6m)	-29.3	289.3	+	MAY 28 03:30 - MAY 28 05:34	Pie
AAT	Siding Spring (AAT)	-31.3	149.1			Pnn
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8	+	MAY 28 03:20 - MAY 28 03:20	Pin
MSO	Mt. Stromlo Observatory	-35.3	149.0			Pnn



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-28T04:26:55.210
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        : 4116925753338733056
2Mass ID (if available) : 17421051-2252165
ICRS Star Coord at Epoch: 17h 42m 10.50268s -22:52:16.67154s
RUWE (>1.4 is poor) : 1.00
K magnitude           : 8.927
G magnitude           : 13.692
RP magnitude          : 12.481
BP magnitude          : 15.317
DUPflag              : 0
Distance (au)         : 4.321
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -14.74
Sun-Target sep (deg) : 160.35
Sun-Moon sep (deg)   : 123.88
B (ring opening deg) : -2.61
PA of pole (deg)     : 1.08
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (") : 15.950
C/A sky separation (km) : 49990.9
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
    
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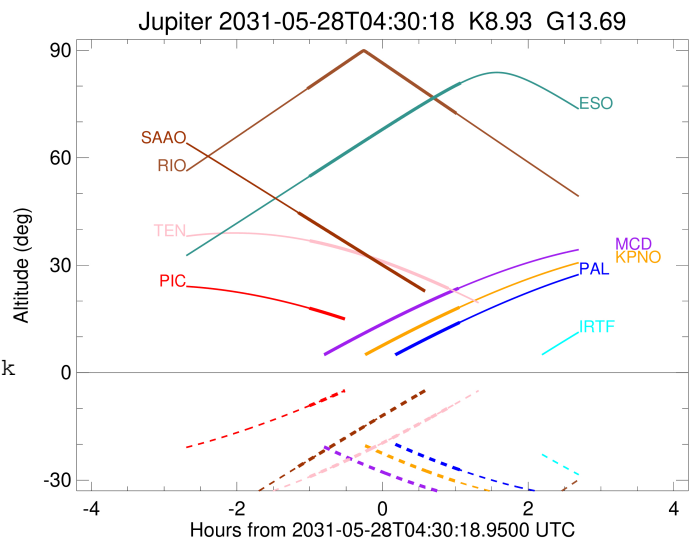
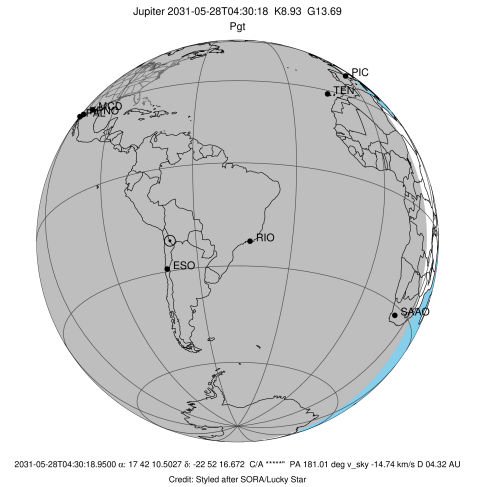


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-28T03:30:05.063	18.00	-9.23	71487.4	44.55	48.25
Jupiter	E	2031-05-28T05:23:57.340	3.86x	8.66x	71487.5	43.99	47.70

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-28T04:35:27.880
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      : 4116925753338733056
2Mass ID (if available) : 17421051-2252165
ICRS Star Coord at Epoch: 17h 42m 10.50268s -22:52:16.67154s
RUWE (>1.4 is poor) : 1.00
K magnitude         : 8.927
G magnitude         : 13.692
RP magnitude        : 12.481
BP magnitude        : 15.317
DUPflag            : 0
Distance (au)       : 4.321
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -14.74
Sun-Target sep (deg) : 160.35
Sun-Moon sep (deg)  : 124.46
B (ring opening deg) : -2.61
PA of pole (deg)    : 1.08
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (") : 15.509
C/A sky separation (km) : 48607.8
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
    
```

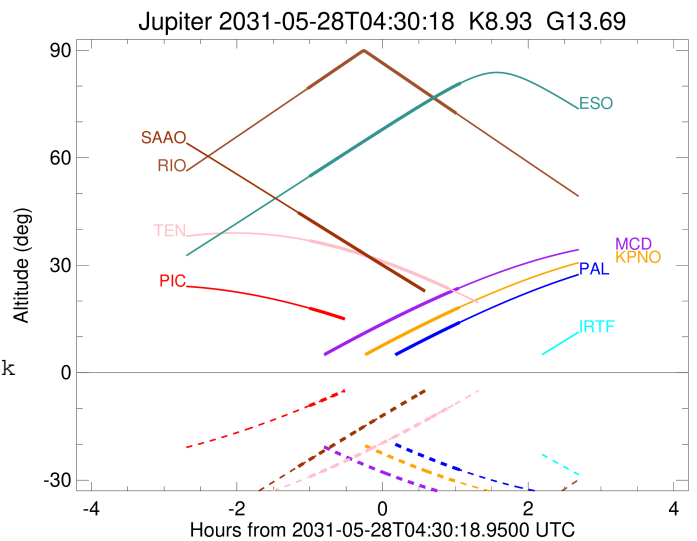
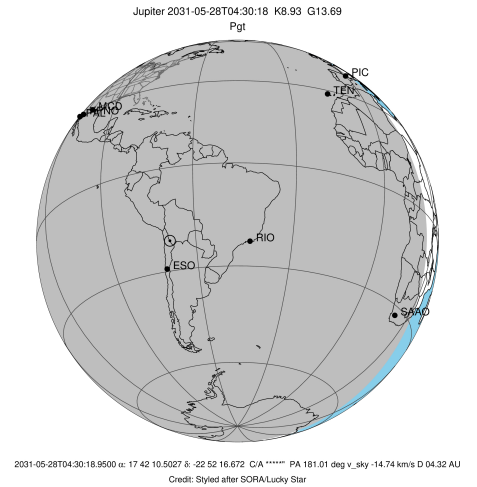


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-28T03:36:31.291	-7.03x	-9.52	71487.8	42.14	45.86
Jupiter	E	2031-05-28T05:34:01.569	14.04	-27.12	71487.6	43.37	47.09

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-28T04:35:20.210
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       : 4116925753338733056
2Mass ID (if available) : 17421051-2252165
ICRS Star Coord at Epoch: 17h 42m 10.50268s -22:52:16.67154s
RUWE (>1.4 is poor) : 1.00
K magnitude           : 8.927
G magnitude           : 13.692
RP magnitude         : 12.481
BP magnitude         : 15.317
DUPflag              : 0
Distance (au)        : 4.321
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -14.74
Sun-Target sep (deg) : 160.35
Sun-Moon sep (deg)   : 124.51
B (ring opening deg) : -2.61
PA of pole (deg)     : 1.08
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (") : 15.531
C/A sky separation (km) : 48677.3
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
    
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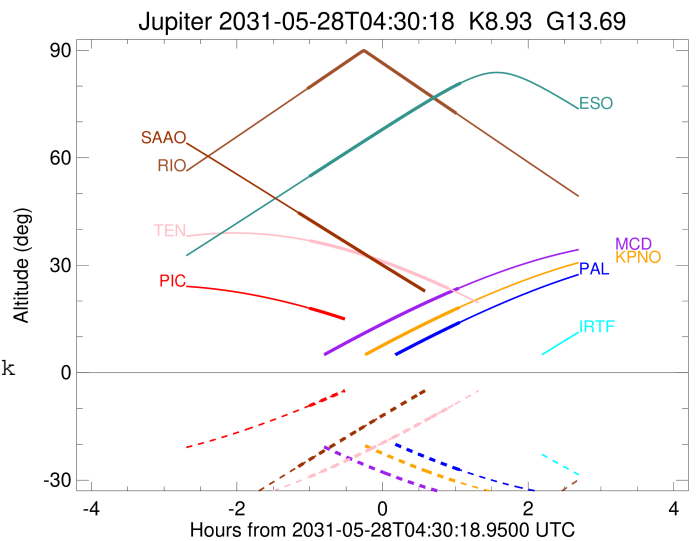
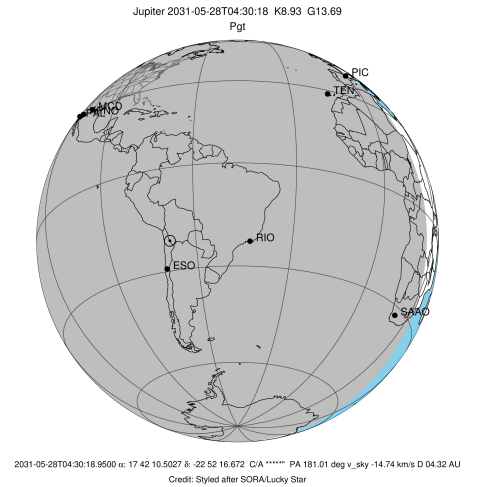


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-28T03:36:36.166	-2.39x	-13.97	71487.8	42.23	45.95
Jupiter	E	2031-05-28T05:33:42.083	18.23	-30.63	71487.6	43.43	47.14

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-28T04:35:01.840
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        : 4116925753338733056
2Mass ID (if available) : 17421051-2252165
ICRS Star Coord at Epoch: 17h 42m 10.50268s -22:52:16.67154s
RUWE (>1.4 is poor) : 1.00
K magnitude           : 8.927
G magnitude           : 13.692
RP magnitude          : 12.481
BP magnitude          : 15.317
DUPflag              : 0
Distance (au)         : 4.321
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -14.74
Sun-Target sep (deg) : 160.35
Sun-Moon sep (deg)   : 124.56
B (ring opening deg) : -2.61
PA of pole (deg)     : 1.08
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (" ) : 15.578
C/A sky separation (km) : 48822.3
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
    
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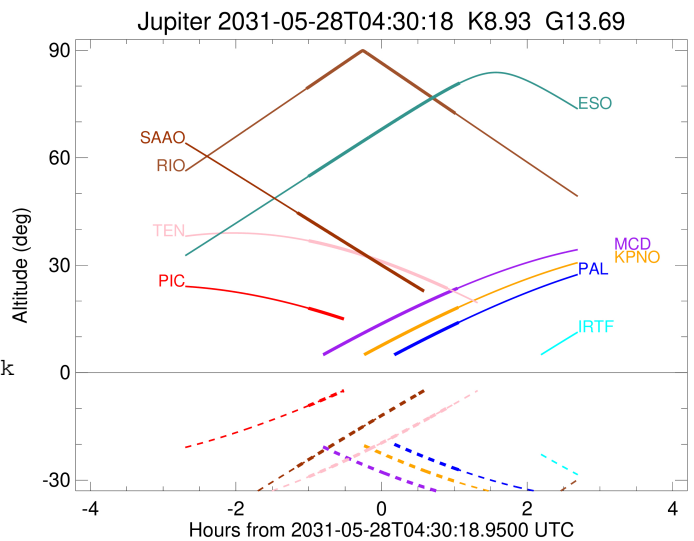
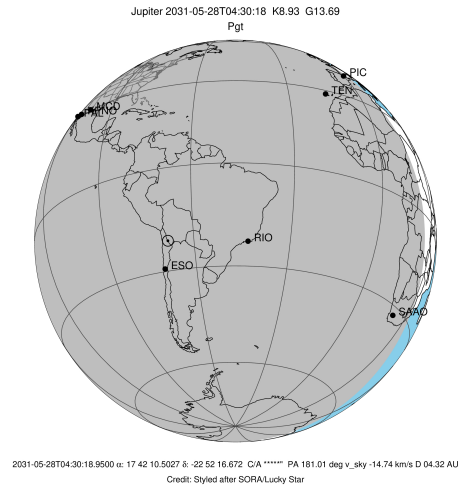


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-28T03:36:38.186	3.96x	-19.82	71487.8	42.41	46.13
Jupiter	E	2031-05-28T05:33:04.871	23.57	-34.61	71487.6	43.55	47.26

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-28T04:27:29.910
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        : 4116925753338733056
2Mass ID (if available) : 17421051-2252165
ICRS Star Coord at Epoch: 17h 42m 10.50268s -22:52:16.67154s
RUWE (>1.4 is poor) : 1.00
K magnitude           : 8.927
G magnitude           : 13.692
RP magnitude          : 12.481
BP magnitude          : 15.317
DUPflag              : 0
Distance (au)         : 4.321
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -14.74
Sun-Target sep (deg) : 160.35
Sun-Moon sep (deg)   : 124.17
B (ring opening deg) : -2.61
PA of pole (deg)     : 1.08
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (") : 15.764
C/A sky separation (km) : 49408.2
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
    
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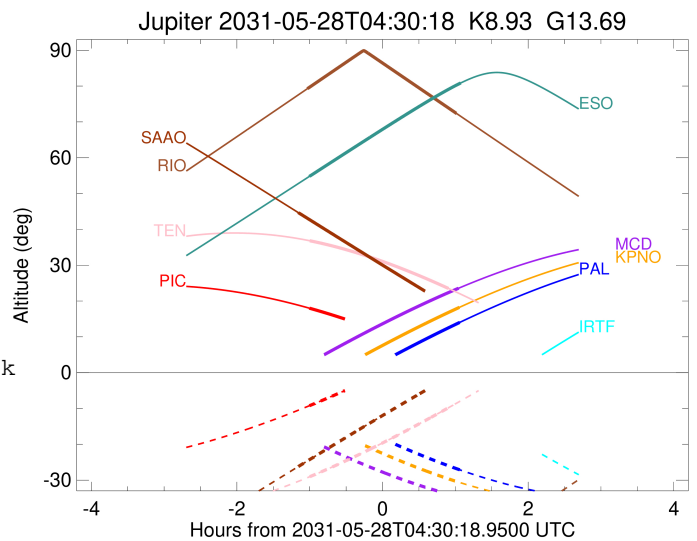
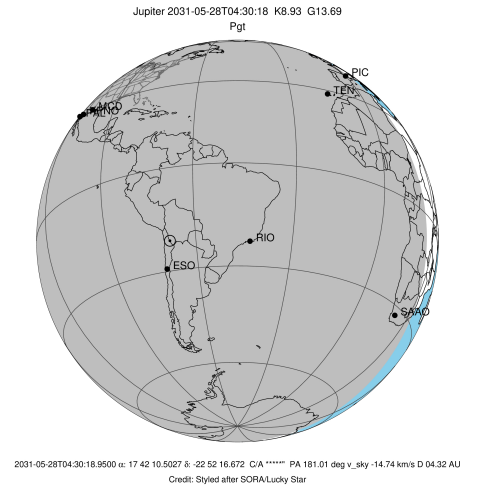


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-28T03:30:26.872	36.81	-29.03	71487.5	43.81	47.52
Jupiter	E	2031-05-28T05:24:42.544	23.50	-9.79	71487.6	43.39	47.10

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-28T04:29:53.760
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        : 4116925753338733056
2Mass ID (if available) : 17421051-2252165
ICRS Star Coord at Epoch: 17h 42m 10.50268s -22:52:16.67154s
RUWE (>1.4 is poor) : 1.00
K magnitude           : 8.927
G magnitude           : 13.692
RP magnitude          : 12.481
BP magnitude          : 15.317
DUPflag              : 0
Distance (au)         : 4.321
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -14.74
Sun-Target sep (deg)  : 160.35
Sun-Moon sep (deg)   : 124.75
B (ring opening deg) : -2.61
PA of pole (deg)     : 1.08
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (") : 14.268
C/A sky separation (km) : 44717.4
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
    
```

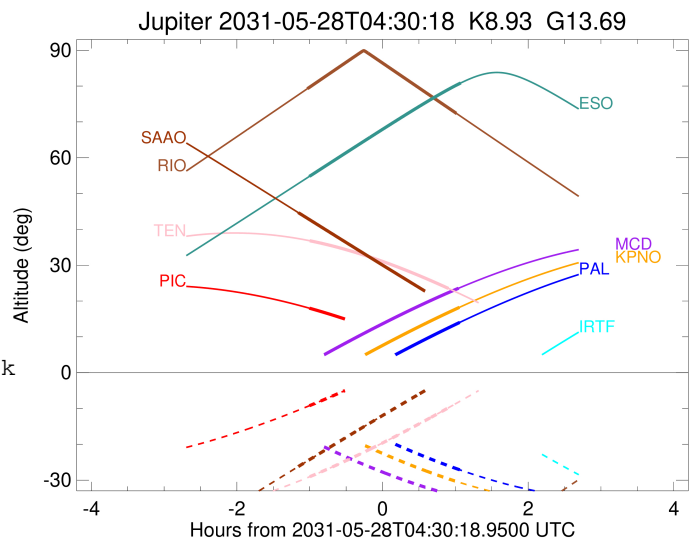
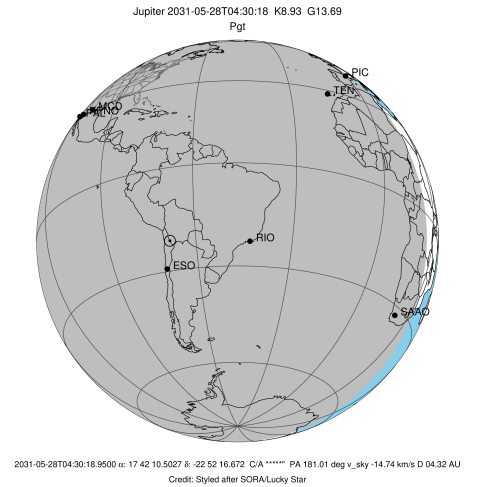


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-28T03:28:30.048	79.28	-81.02	71488.4	38.54	42.22
Jupiter	E	2031-05-28T05:31:17.396	72.35	-52.77	71488.4	38.64	42.33

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-28T04:32:33.060
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      : 4116925753338733056
2Mass ID (if available) : 17421051-2252165
ICRS Star Coord at Epoch: 17h 42m 10.50268s -22:52:16.67154s
RUWE (>1.4 is poor) : 1.00
K magnitude          : 8.927
G magnitude          : 13.692
RP magnitude         : 12.481
BP magnitude         : 15.317
DUPflag             : 0
Distance (au)       : 4.321
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -14.74
Sun-Target sep (deg) : 160.35
Sun-Moon sep (deg)  : 124.92
B (ring opening deg) : -2.61
PA of pole (deg)    : 1.08
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (" ) : 13.978
C/A sky separation (km) : 43808.5
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
    
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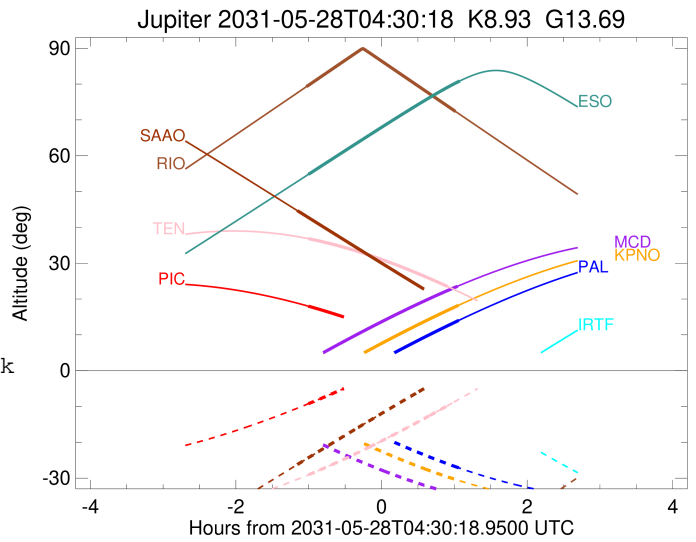
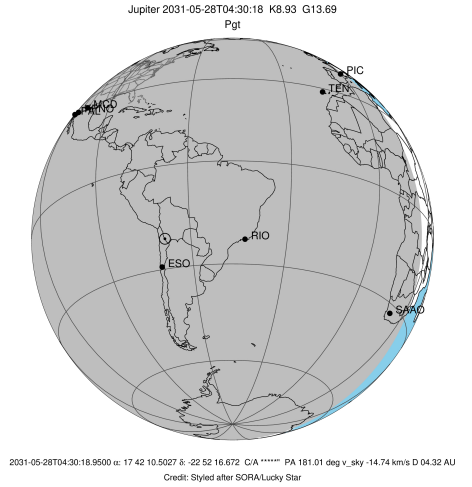


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-28T03:30:03.161	54.78	-72.41	71488.6	37.35	41.01
Jupiter	E	2031-05-28T05:34:50.657	80.87	-75.48	71488.5	37.99	41.67


```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-28T04:25:07.610
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      : 4116925753338733056
2Mass ID (if available) : 17421051-2252165
ICRS Star Coord at Epoch: 17h 42m 10.50268s -22:52:16.67154s
RUWE (>1.4 is poor) : 1.00
K magnitude          : 8.927
G magnitude          : 13.692
RP magnitude         : 12.481
BP magnitude         : 15.317
DUPflag             : 0
Distance (au)       : 4.321
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -14.74
Sun-Target sep (deg) : 160.35
Sun-Moon sep (deg)  : 124.03
B (ring opening deg) : -2.61
PA of pole (deg)    : 1.08
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (") : 13.553
C/A sky separation (km) : 42479.0
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	2031-05-28T03:20:56.524	44.67	-26.20	71488.7	36.83	40.48
Jupiter	E	2031-05-28T05:29:42.214	17.76	-0.30x	71488.8	35.92	39.55