

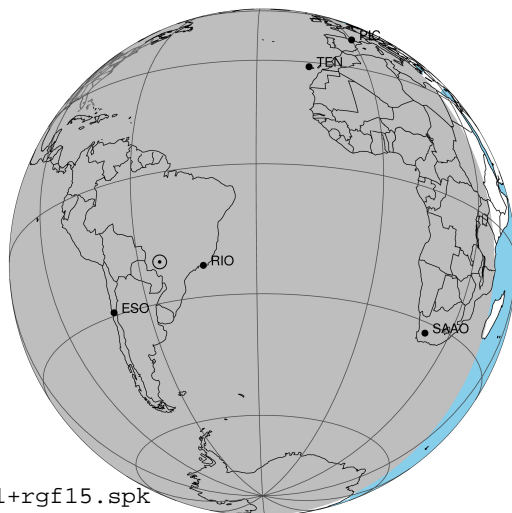
target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2031-05-24T03:33:49.680
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 4116892871061764224
 2Mass ID (if available) : 17440567-2252576

Jupiter 2031-05-24T03:33:49 K7.69 G14.91 Pgt

ICRS Star Coord at Epoch: 17h 44m 05.67041s -22:52:57.77072s

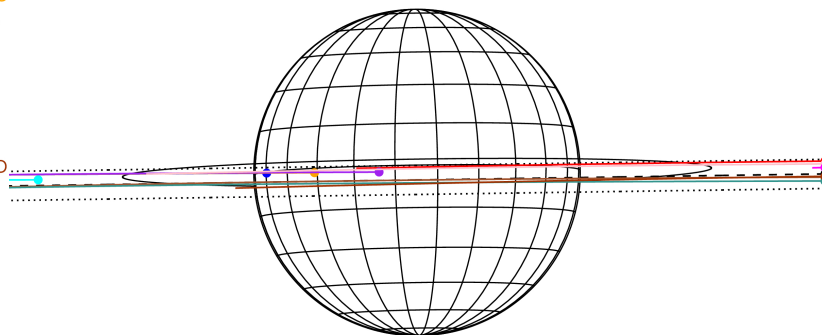
RUWE (>1.4 is poor) : 0.94
 K magnitude : 7.689
 G magnitude : 14.912
 RP magnitude : 13.275
 BP magnitude : 19.222
 DUPflag : 0
 Distance (au) : 4.347
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -13.91
 Sun-Target sep (deg) : 156.03
 Sun-Moon sep (deg) : 172.18
 B (ring opening deg) : -2.61
 PA of pole (deg) : 0.88
 Pole direction: RA (deg): 268.05694
 Dec (deg): 64.49651
 C/A sky separation (") : 1.032
 C/A sky separation (km) : 3254.8
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk

Jupiter 2031-05-24T03:33:49 K7.69 G14.91
 Pgt



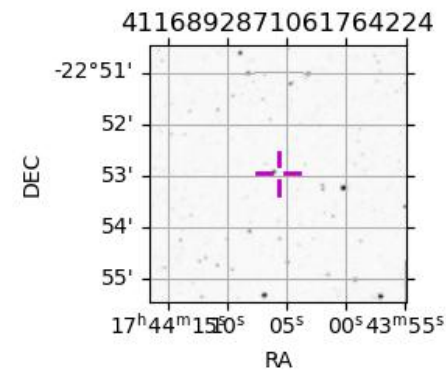
2031-05-24T03:33:49.6800 a: 17 44 05.6704 s -22 52 57.771 C/A 1.045 PA 0.85 deg v_sky -13.91 km/s D 04.35 AU
 Credit: Styled after SORA/Lucky Star

Earth
 PIC
 PAL
 KPNO
 MCD
 TEN
 IRTF
 KAV
 RIO
 ESO
 SAAO



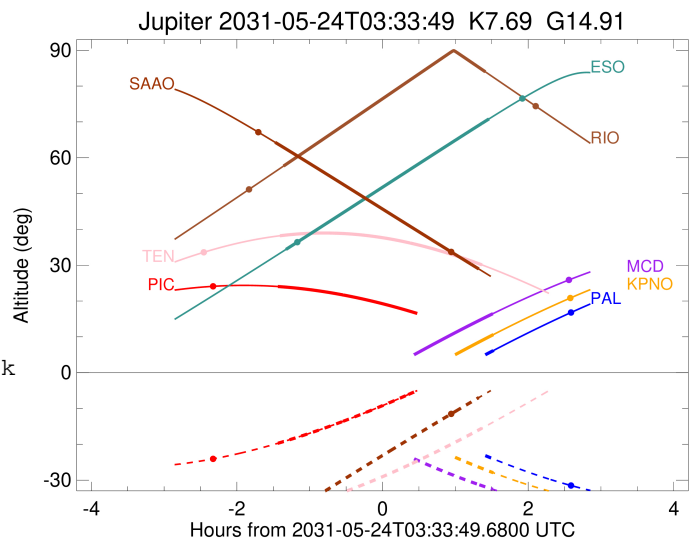
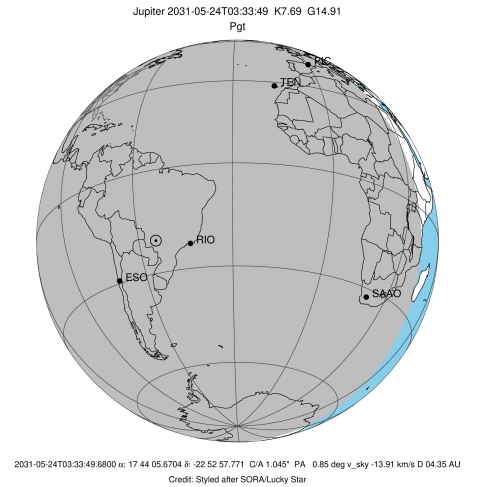
Observable events with sun below -5 deg and altitude above 5 deg

Obs	Location	lat	Elon	Target	Observed Events Interval	OCode
PIC	Pic du Midi	42.9	0.1	+	MAY 24 02:07 - MAY 24 02:07	Pin
PAL	Palomar Mt (200")	33.4	243.1	+	MAY 24 05:05 - MAY 24 05:05	Pne
PMO	Purple Mtn Obs. Nanking	32.1	118.8			Pnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+	MAY 24 05:05 - MAY 24 05:05	Pne
MCD	McDonald Obs. 2.7m	30.7	256.0	+	MAY 24 05:04 - MAY 24 05:04	Pne
TEN	Teide Obs./Tenerife	28.3	343.5	+	MAY 24 02:09 - MAY 24 04:55	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 24 02:12 - MAY 24 04:58	Pie
ESO	European Southern Obs. (3.6m)	-29.3	289.3	+	MAY 24 02:14 - MAY 24 05:01	Pie
AAT	Siding Spring (AAT)	-31.3	149.1			Pnn
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8	+	MAY 24 02:05 - MAY 24 04:53	Pie
MSO	Mt. Stromlo Observatory	-35.3	149.0			Pnn



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-24T03:31:17.040
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      : 4116892871061764224
2Mass ID (if available) : 17440567-2252576
ICRS Star Coord at Epoch: 17h 44m 05.67041s -22:52:57.77072s
RUWE (>1.4 is poor) : 0.94
K magnitude          : 7.689
G magnitude          : 14.912
RP magnitude         : 13.275
BP magnitude         : 19.222
DUPflag             : 0
Distance (au)       : 4.347
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -13.91
Sun-Target sep (deg) : 156.03
Sun-Moon sep (deg)  : 171.66
B (ring opening deg) : -2.61
PA of pole (deg)    : 0.88
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation ("): 0.749
C/A sky separation (km): 2360.7
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
    
```

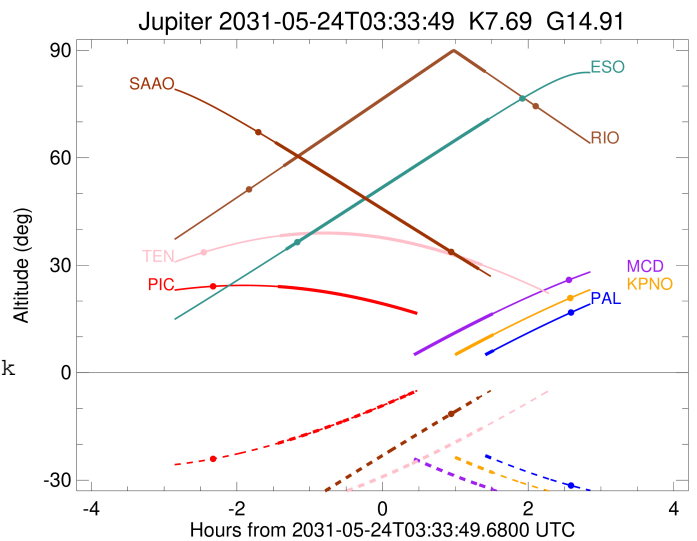
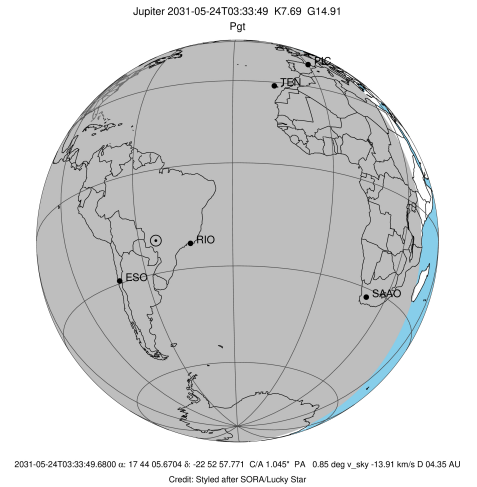


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-24T02:07:35.758	24.04	-19.71	71492.0	2.00	2.29
Jupiter	E	2031-05-24T04:55:14.552	10.32	3.41x	71492.0	1.60	1.83

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-24T03:40:15.150
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        : 4116892871061764224
2Mass ID (if available) : 17440567-2252576
ICRS Star Coord at Epoch: 17h 44m 05.67041s -22:52:57.77072s
RUWE (>1.4 is poor) : 0.94
K magnitude           : 7.689
G magnitude           : 14.912
RP magnitude          : 13.275
BP magnitude          : 19.222
DUPflag              : 0
Distance (au)         : 4.347
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -13.91
Sun-Target sep (deg)  : 156.03
Sun-Moon sep (deg)   : 172.70
B (ring opening deg) : -2.61
PA of pole (deg)     : 0.88
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 0.008
C/A sky separation (km) : 26.1
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
    
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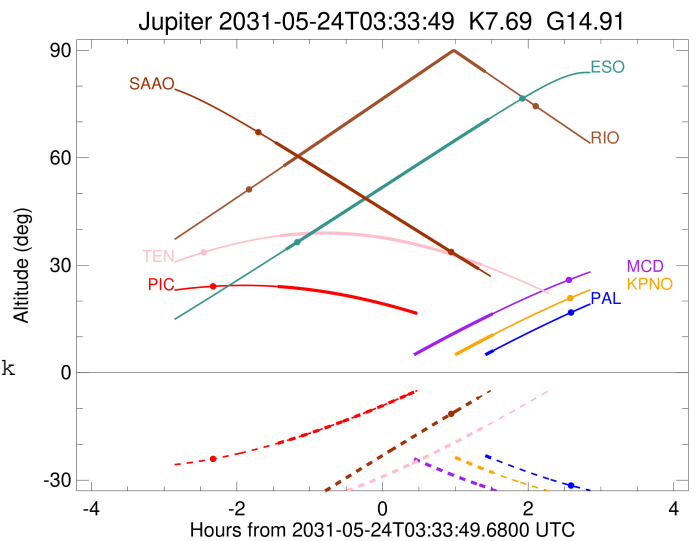
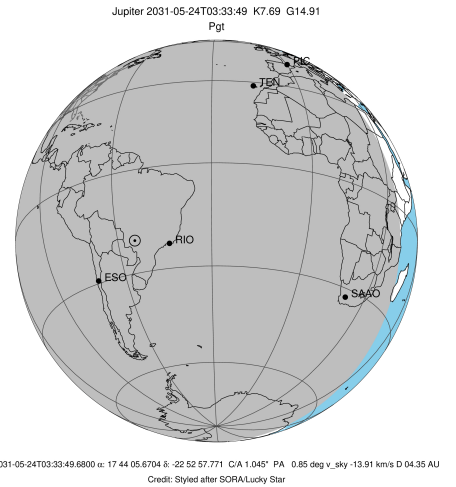


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-24T02:14:15.629	-27.07x	5.24x	71492.0	-0.63	-0.72
Jupiter	E	2031-05-24T05:05:17.451	6.19	-24.09	71492.0	0.64	0.73

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-24T03:40:17.490
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       : 4116892871061764224
2Mass ID (if available) : 17440567-2252576
ICRS Star Coord at Epoch: 17h 44m 05.67041s -22:52:57.77072s
RUWE (>1.4 is poor) : 0.94
K magnitude           : 7.689
G magnitude           : 14.912
RP magnitude         : 13.275
BP magnitude         : 19.222
DUPflag              : 0
Distance (au)        : 4.347
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -13.91
Sun-Target sep (deg) : 156.03
Sun-Moon sep (deg)   : 172.71
B (ring opening deg) : -2.61
PA of pole (deg)     : 0.88
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 0.029
C/A sky separation (km) : 90.6
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
    
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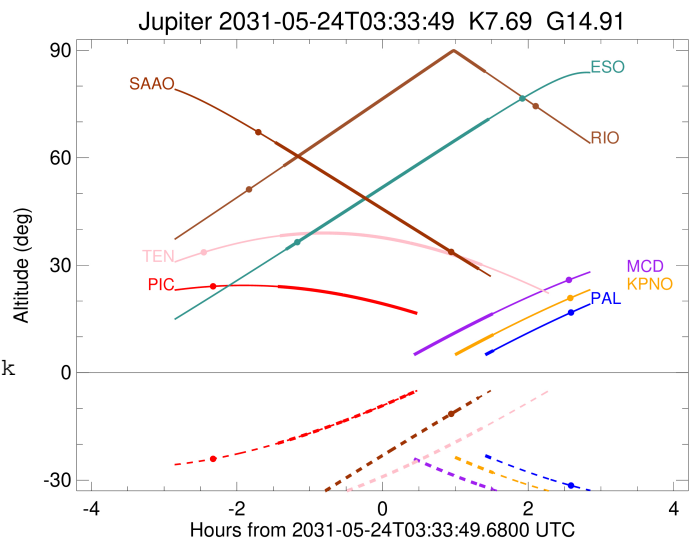
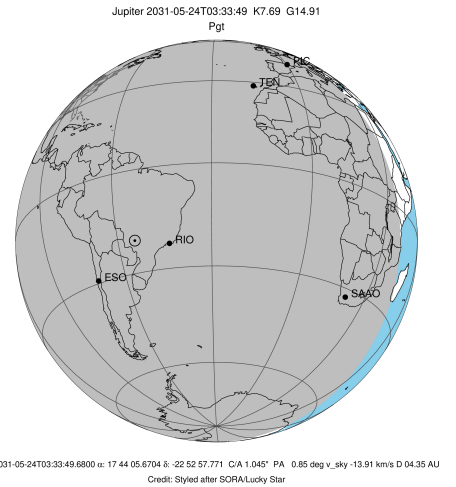


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-24T02:14:31.121	-22.38x	0.56x	71492.0	-0.59	-0.67
Jupiter	E	2031-05-24T05:05:06.736	10.61	-27.94	71492.0	0.69	0.79

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-24T03:40:11.700
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       : 4116892871061764224
2Mass ID (if available) : 17440567-2252576
ICRS Star Coord at Epoch: 17h 44m 05.67041s -22:52:57.77072s
RUWE (>1.4 is poor) : 0.94
K magnitude           : 7.689
G magnitude           : 14.912
RP magnitude          : 13.275
BP magnitude          : 19.222
DUPflag              : 0
Distance (au)         : 4.347
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -13.91
Sun-Target sep (deg) : 156.03
Sun-Moon sep (deg)   : 172.70
B (ring opening deg) : -2.61
PA of pole (deg)     : 0.88
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation ("): 0.082
C/A sky separation (km): 257.5
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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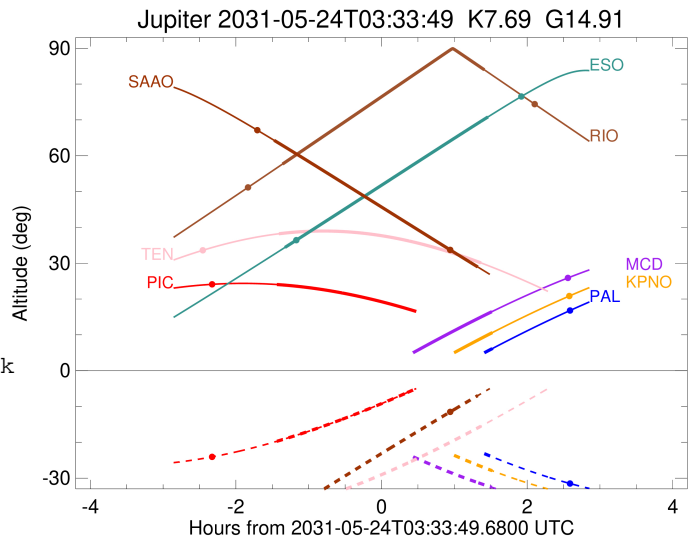
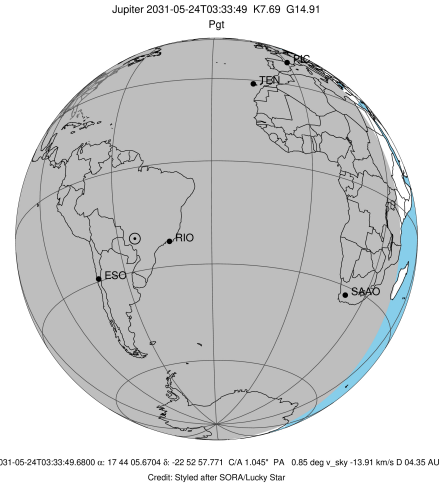


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-24T02:14:44.744	-15.75x	-5.87	71492.0	-0.46	-0.53
Jupiter	E	2031-05-24T05:04:42.943	16.46	-32.55	71492.0	0.80	0.92

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-24T03:32:32.090
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       : 4116892871061764224
2Mass ID (if available) : 17440567-2252576
ICRS Star Coord at Epoch: 17h 44m 05.67041s -22:52:57.77072s
RUWE (>1.4 is poor) : 0.94
K magnitude           : 7.689
G magnitude           : 14.912
RP magnitude         : 13.275
BP magnitude         : 19.222
DUPflag              : 0
Distance (au)        : 4.347
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -13.91
Sun-Target sep (deg) : 156.03
Sun-Moon sep (deg)   : 171.87
B (ring opening deg) : -2.61
PA of pole (deg)     : 0.88
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 0.529
C/A sky separation (km) : 1669.1
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
    
```

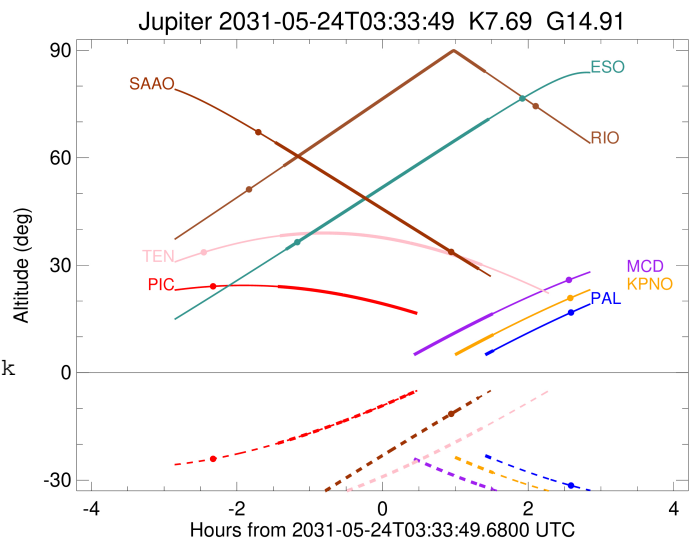
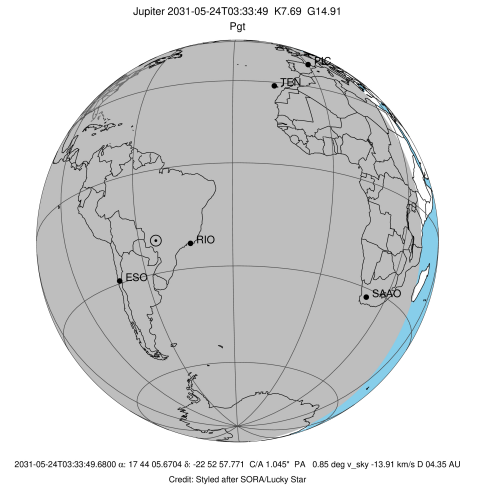


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-24T02:09:18.892	38.21	-38.59	71492.0	1.30	1.49
Jupiter	E	2031-05-24T04:55:51.473	30.07	-15.49	71492.0	1.14	1.31

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-24T03:35:34.600
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        : 4116892871061764224
2Mass ID (if available) : 17440567-2252576
ICRS Star Coord at Epoch: 17h 44m 05.67041s -22:52:57.77072s
RUWE (>1.4 is poor) : 0.94
K magnitude           : 7.689
G magnitude           : 14.912
RP magnitude          : 13.275
BP magnitude          : 19.222
DUPflag              : 0
Distance (au)         : 4.347
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -13.91
Sun-Target sep (deg) : 156.03
Sun-Moon sep (deg)   : 172.50
B (ring opening deg) : -2.61
PA of pole (deg)     : 0.88
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 1.055
C/A sky separation (km) : 3327.0
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
    
```

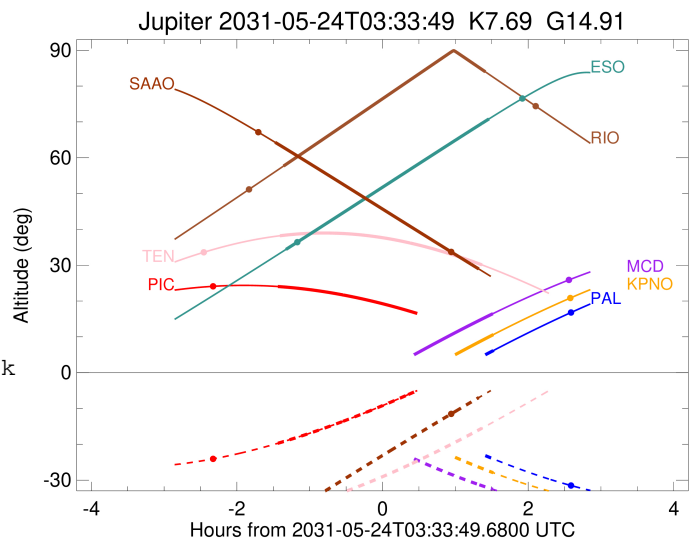
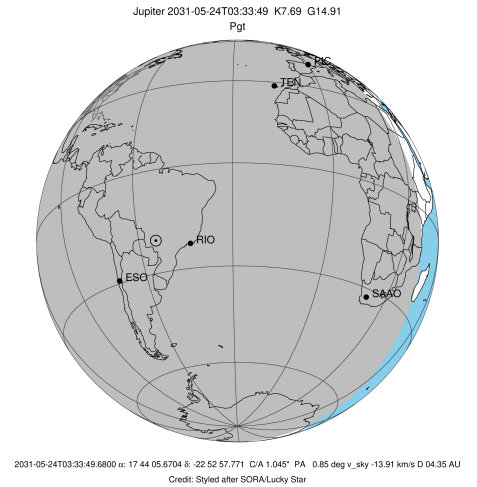


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-24T02:12:18.957	57.68	-81.08	71492.0	-2.99	-3.42
Jupiter	E	2031-05-24T04:58:32.794	83.98	-60.08	71492.0	-2.57	-2.94

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-24T03:38:14.430
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      : 4116892871061764224
2Mass ID (if available) : 17440567-2252576
ICRS Star Coord at Epoch: 17h 44m 05.67041s -22:52:57.77072s
RUWE (>1.4 is poor) : 0.94
K magnitude          : 7.689
G magnitude          : 14.912
RP magnitude         : 13.275
BP magnitude         : 19.222
DUPflag             : 0
Distance (au)       : 4.347
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -13.91
Sun-Target sep (deg) : 156.03
Sun-Moon sep (deg)  : 172.83
B (ring opening deg) : -2.61
PA of pole (deg)    : 0.88
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 1.434
C/A sky separation (km) : 4520.3
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
    
```

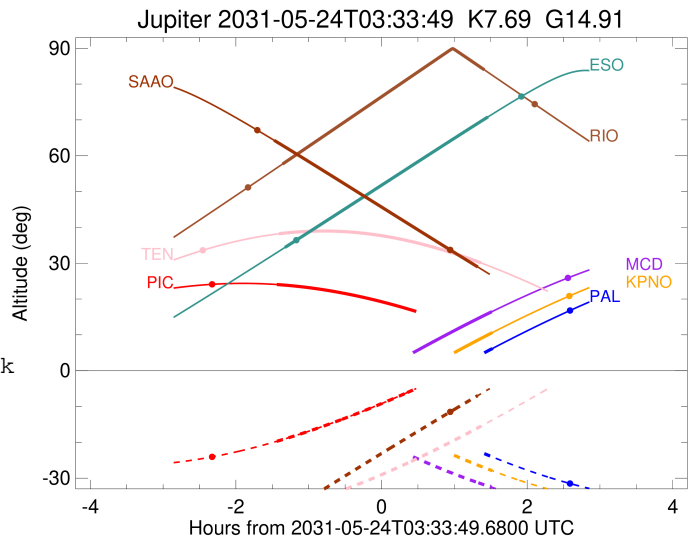
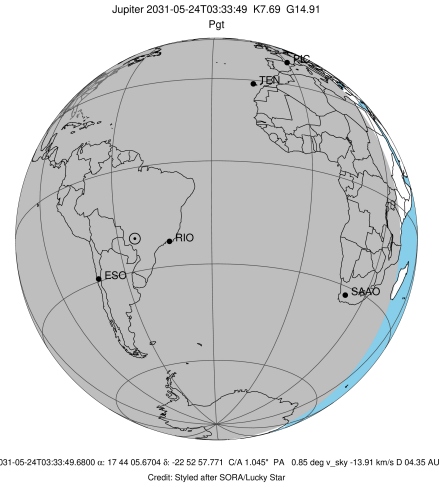


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-24T02:14:15.218	34.39	-56.11	71491.9	-4.16	-4.76
Jupiter	E	2031-05-24T05:01:35.211	70.83	-80.28	71492.0	-3.26	-3.72


```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-24T03:28:57.000
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      : 4116892871061764224
2Mass ID (if available) : 17440567-2252576
ICRS Star Coord at Epoch: 17h 44m 05.67041s -22:52:57.77072s
RUWE (>1.4 is poor) : 0.94
K magnitude          : 7.689
G magnitude          : 14.912
RP magnitude         : 13.275
BP magnitude         : 19.222
DUPflag             : 0
Distance (au)       : 4.347
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -13.91
Sun-Target sep (deg) : 156.03
Sun-Moon sep (deg)  : 171.80
B (ring opening deg) : -2.61
PA of pole (deg)    : 0.88
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 1.566
C/A sky separation (km) : 4937.2
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	2031-05-24T02:05:21.125	64.29	-41.71	71492.0	-3.63	-4.15
Jupiter	E	2031-05-24T04:53:06.375	28.95	-6.97	71491.9	-4.44	-5.08