

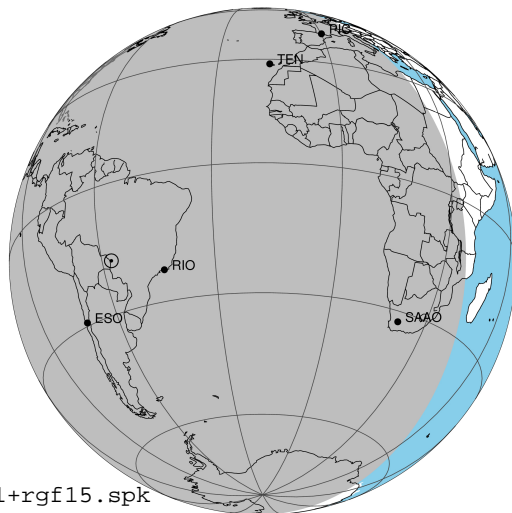
target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2031-05-12T03:45:14.900
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 4068888880551248256
 2Mass ID (if available) : 17485662-2253536

Jupiter 2031-05-12T03:45:14 K9.74 G14.94 Pgt

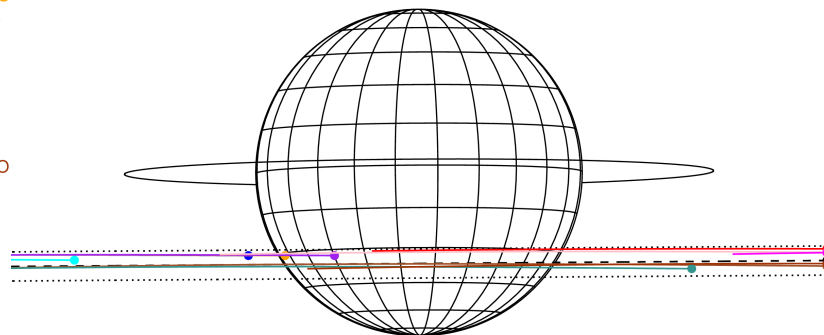
ICRS Star Coord at Epoch: 17h 48m 56.61520s -22:53:53.74426s

RUWE (>1.4 is poor) : 0.90
 K magnitude : 9.739
 G magnitude : 14.937
 RP magnitude : 13.653
 BP magnitude : 16.788
 DUPflag : 0
 Distance (au) : 4.447
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -10.60
 Sun-Target sep (deg) : 143.36
 Sun-Moon sep (deg) : 31.95
 B (ring opening deg) : -2.60
 PA of pole (deg) : 0.35
 Pole direction: RA (deg): 268.05695
 Dec (deg): 64.49651
 C/A sky separation (") : 12.355
 C/A sky separation (km) : 39850.9
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk

Jupiter 2031-05-12T03:45:14 K9.74 G14.94
 Pgt



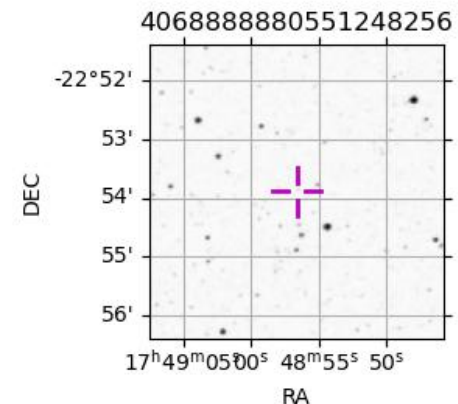
Earth
 PIC
 PAL
 KPNO
 MCD
 TEN
 IRTF
 KAV
 RIO
 ESO
 SAAO



2031-05-12T03:45:14.9000 α: 17 48 56.6152 δ: -22 53 53.744 C/A ***** PA 0.42 deg v_sky -10.60 km/s D 04.45 AU
 Credit: Styled after SORA/Lucky Star

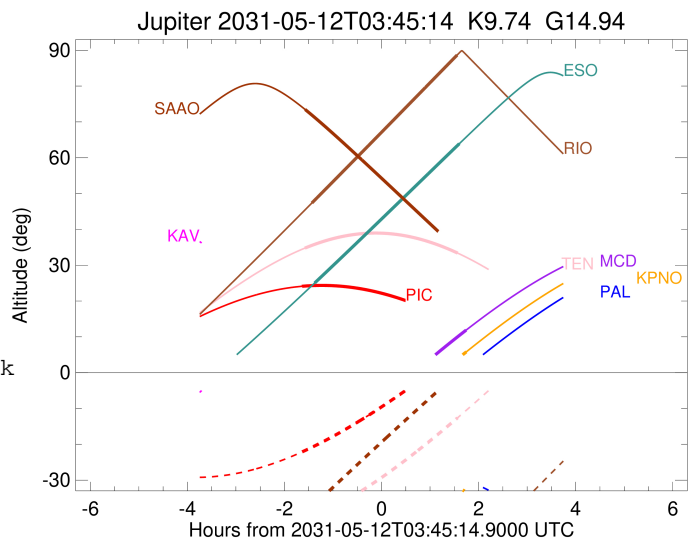
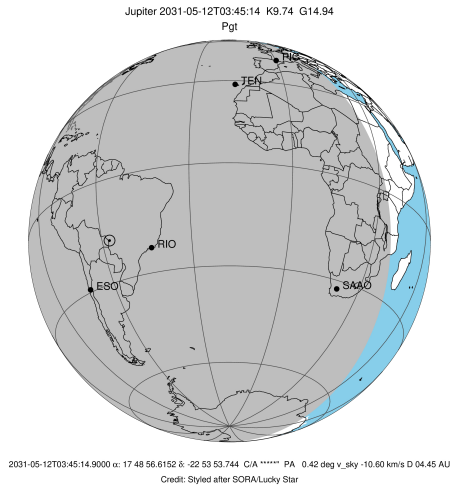
Observable events with sun below -5 deg and altitude above 5 deg

Obs	Location	lat	Elon	Target	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1	+	MAY 12 02:07 - MAY 12 02:07	Pin
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	+	MAY 12 05:30 - MAY 12 05:30	Pne
MCD	McDonald Obs. 2.7m	30.7	256.0	+	MAY 12 05:29 - MAY 12 05:29	Pne
TEN	Teide Obs./Tenerife	28.3	343.5	+ +	MAY 12 02:10 - MAY 12 05:19	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 12 02:19 - MAY 12 05:18	Pie
ESO	European Southern Obs. (3.6m)	-29.3	289.3	+ +	MAY 12 02:22 - MAY 12 05:21	Pie
AAT	Siding Spring (AAT)	-31.3	149.1			Pnn
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8	+	MAY 12 02:10 - MAY 12 02:10	Pin
MSO	Mt. Stromlo Observatory	-35.3	149.0			Pnn



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-12T03:42:50.020
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        : 4068888880551248256
2Mass ID (if available) : 17485662-2253536
ICRS Star Coord at Epoch: 17h 48m 56.61520s -22:53:53.74426s
RUWE (>1.4 is poor) : 0.90
K magnitude           : 9.739
G magnitude           : 14.937
RP magnitude          : 13.653
BP magnitude          : 16.788
DUPflag               : 0
Distance (au)         : 4.447
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -10.60
Sun-Target sep (deg) : 143.36
Sun-Moon sep (deg)   : 31.88
B (ring opening deg) : -2.60
PA of pole (deg)     : 0.35
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation ("): 10.581
C/A sky separation (km): 34129.0
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
    
```

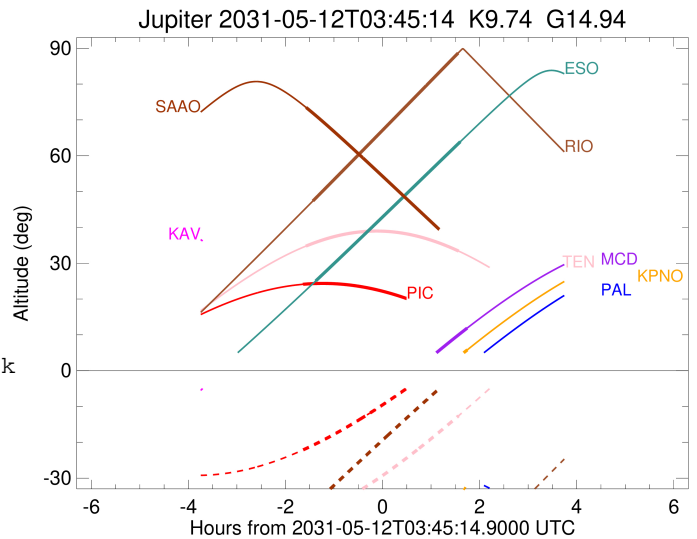
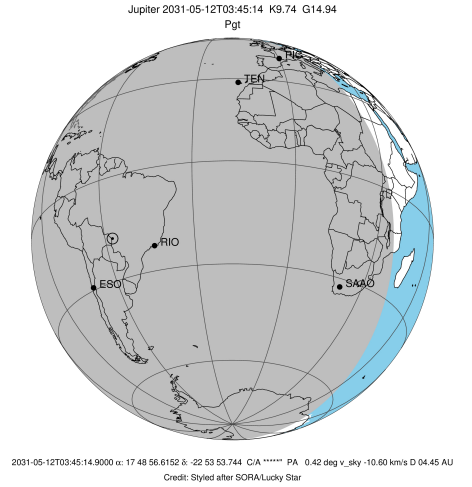


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-12T02:07:11.181	24.11	-22.11	71489.9	-28.36	-31.63
Jupiter	E	2031-05-12T05:18:41.553	13.85	5.63x	71489.8	-28.89	-32.19

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-12T03:54:37.170
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        : 4068888880551248256
2Mass ID (if available) : 17485662-2253536
ICRS Star Coord at Epoch: 17h 48m 56.61520s -22:53:53.74426s
RUWE (>1.4 is poor) : 0.90
K magnitude           : 9.739
G magnitude           : 14.937
RP magnitude          : 13.653
BP magnitude          : 16.788
DUPflag              : 0
Distance (au)         : 4.447
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -10.60
Sun-Target sep (deg)  : 143.36
Sun-Moon sep (deg)    : 32.48
B (ring opening deg) : -2.60
PA of pole (deg)      : 0.35
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation (") : 11.415
C/A sky separation (km) : 36816.5
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
    
```

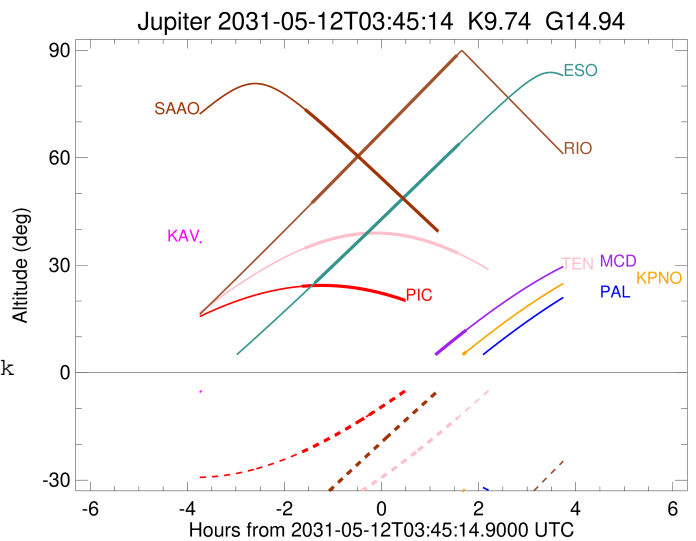
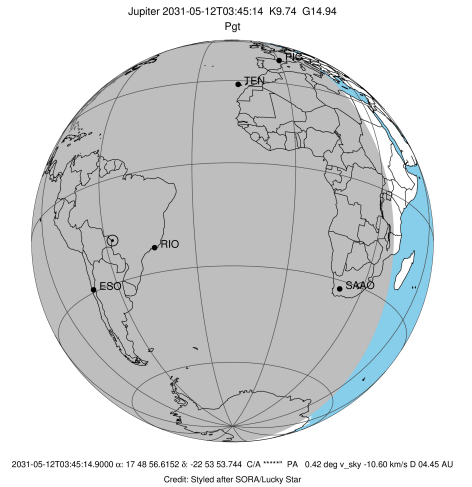


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-12T02:17:24.039	-32.65x	-1.58x	71489.4	-31.71	-35.17
Jupiter	E	2031-05-12T05:30:06.975	5.81	-33.28	71489.6	-30.22	-33.60

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-12T03:54:40.740
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        : 4068888880551248256
2Mass ID (if available) : 17485662-2253536
ICRS Star Coord at Epoch: 17h 48m 56.61520s -22:53:53.74426s
RUWE (>1.4 is poor) : 0.90
K magnitude           : 9.739
G magnitude           : 14.937
RP magnitude          : 13.653
BP magnitude          : 16.788
DUPflag              : 0
Distance (au)         : 4.447
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -10.60
Sun-Target sep (deg)  : 143.36
Sun-Moon sep (deg)   : 32.55
B (ring opening deg) : -2.60
PA of pole (deg)     : 0.35
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation (") : 11.362
C/A sky separation (km) : 36647.1
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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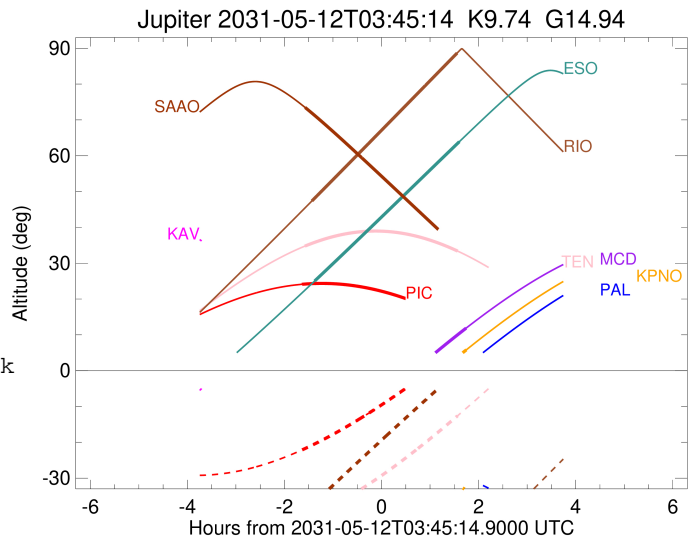
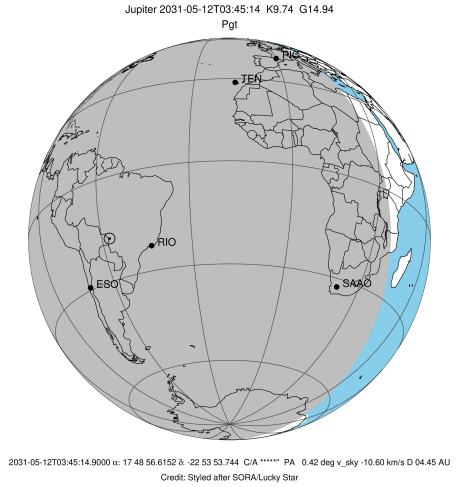


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-12T02:17:47.676	-25.96x	-8.09	71489.4	-31.58	-35.03
Jupiter	E	2031-05-12T05:29:51.140	11.87	-37.50	71489.7	-30.08	-33.46

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-12T03:44:59.370
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        : 4068888880551248256
2Mass ID (if available) : 17485662-2253536
ICRS Star Coord at Epoch: 17h 48m 56.61520s -22:53:53.74426s
RUWE (>1.4 is poor) : 0.90
K magnitude           : 9.739
G magnitude           : 14.937
RP magnitude          : 13.653
BP magnitude          : 16.788
DUPflag              : 0
Distance (au)         : 4.447
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -10.60
Sun-Target sep (deg)  : 143.36
Sun-Moon sep (deg)   : 32.19
B (ring opening deg) : -2.60
PA of pole (deg)     : 0.35
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation (") : 10.819
C/A sky separation (km) : 34893.8
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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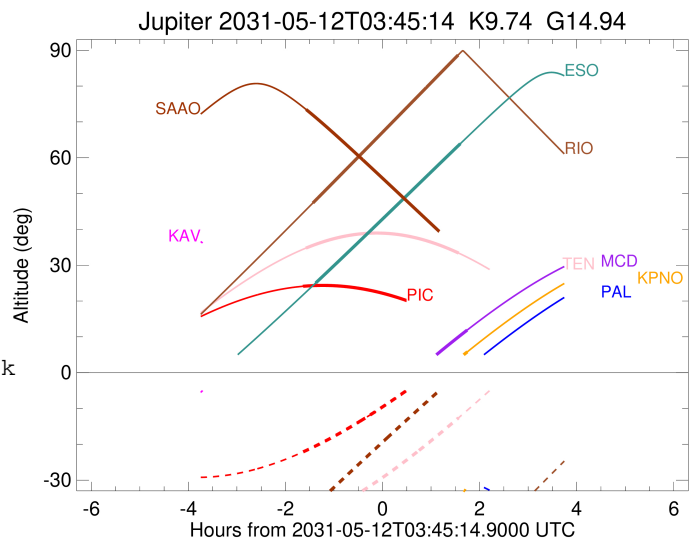
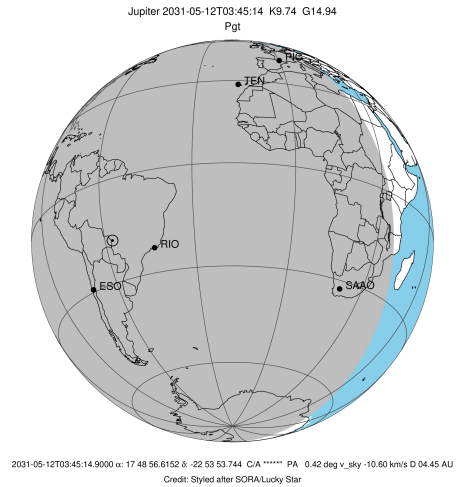


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-12T02:10:34.136	34.77	-40.96	71489.8	-29.27	-32.60
Jupiter	E	2031-05-12T05:19:17.112	33.38	-12.60	71489.8	-29.43	-32.77

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-12T03:49:22.740
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       : 4068888880551248256
2Mass ID (if available) : 17485662-2253536
ICRS Star Coord at Epoch: 17h 48m 56.61520s -22:53:53.74426s
RUWE (>1.4 is poor) : 0.90
K magnitude          : 9.739
G magnitude           : 14.937
RP magnitude          : 13.653
BP magnitude          : 16.788
DUPflag              : 0
Distance (au)        : 4.447
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -10.60
Sun-Target sep (deg) : 143.36
Sun-Moon sep (deg)   : 32.77
B (ring opening deg) : -2.60
PA of pole (deg)     : 0.35
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation (") : 12.414
C/A sky separation (km) : 40040.0
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
    
```

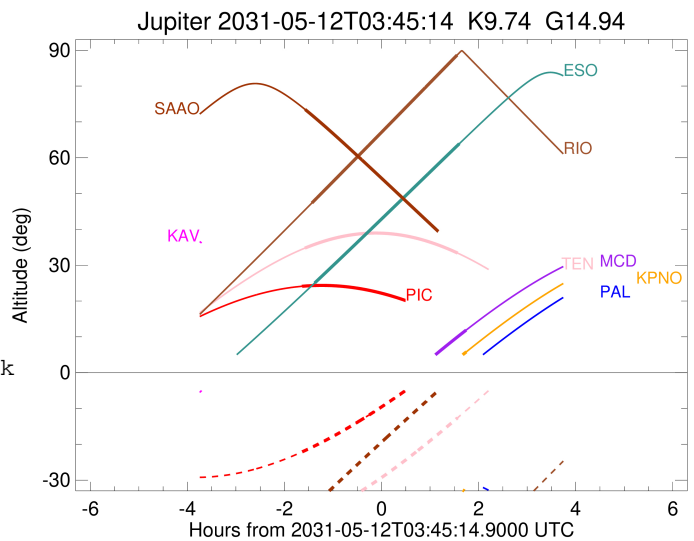
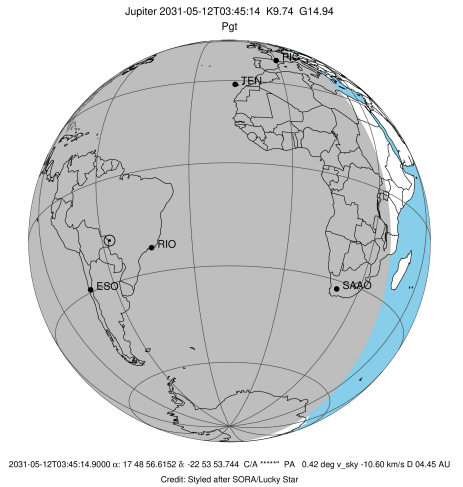


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-12T02:19:20.815	47.39	-81.56	71489.0	-34.47	-38.05
Jupiter	E	2031-05-12T05:18:41.688	88.65	-54.77	71489.1	-33.89	-37.45

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-12T03:52:43.990
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        : 4068888880551248256
2Mass ID (if available) : 17485662-2253536
ICRS Star Coord at Epoch: 17h 48m 56.61520s -22:53:53.74426s
RUWE (>1.4 is poor) : 0.90
K magnitude           : 9.739
G magnitude           : 14.937
RP magnitude          : 13.653
BP magnitude          : 16.788
DUPflag              : 0
Distance (au)         : 4.447
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -10.60
Sun-Target sep (deg) : 143.36
Sun-Moon sep (deg)   : 32.92
B (ring opening deg) : -2.60
PA of pole (deg)     : 0.35
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation (") : 12.820
C/A sky separation (km) : 41347.8
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
    
```

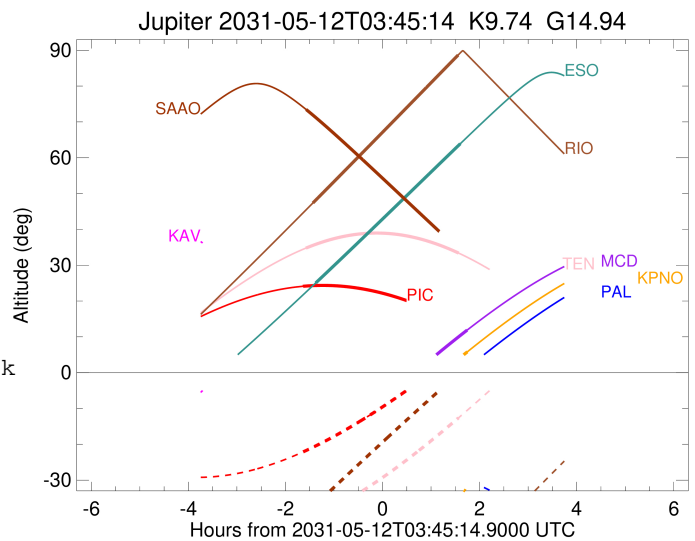
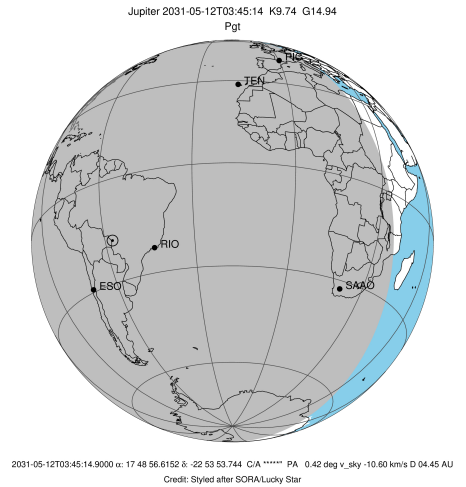


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-12T02:22:44.144	25.05	-56.96	71488.8	-35.97	-39.60
Jupiter	E	2031-05-12T05:21:32.957	63.93	-75.36	71489.0	-34.83	-38.42

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-12T03:39:30.360
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      : 4068888880551248256
2Mass ID (if available) : 17485662-2253536
ICRS Star Coord at Epoch: 17h 48m 56.61520s -22:53:53.74426s
RUWE (>1.4 is poor) : 0.90
K magnitude          : 9.739
G magnitude          : 14.937
RP magnitude         : 13.653
BP magnitude         : 16.788
DUPflag             : 0
Distance (au)       : 4.447
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -10.60
Sun-Target sep (deg) : 143.36
Sun-Moon sep (deg)  : 31.96
B (ring opening deg) : -2.60
PA of pole (deg)    : 0.35
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation ("): 12.807
C/A sky separation (km): 41307.8
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	2031-05-12T02:10:48.014	73.46	-39.30	71489.0	-34.85	-38.44
Jupiter	E	2031-05-12T05:08:50.162	36.58	-2.33x	71488.8	-35.92	-39.54