

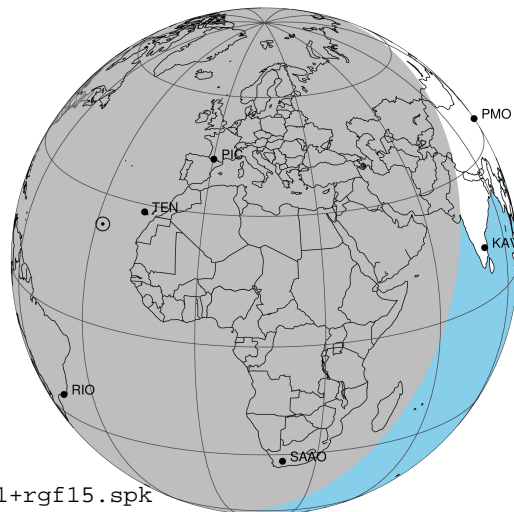
target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2049-12-14T01:46:31.180
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 663608735413666176
 2Mass ID (if available) : 08203186+1955474

Jupiter 2049-12-14T01:46:31 K9.13 G11.49 Pgt

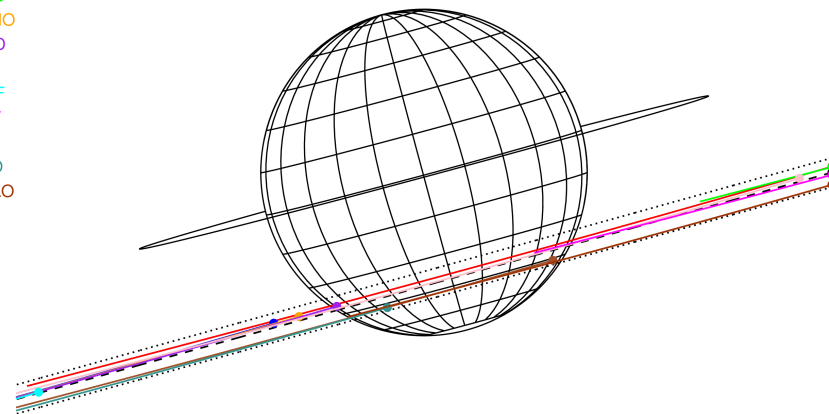
ICRS Star Coord at Epoch: 08h 20m 31.85405s +19:55:47.35053s

RUWE (>1.4 is poor) : 0.92
 K magnitude : 9.132
 G magnitude : 11.490
 RP magnitude : 10.766
 BP magnitude : 12.080
 DUPflag : 0
 Distance (au) : 4.452
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -10.17
 Sun-Target sep (deg) : 139.04
 Sun-Moon sep (deg) : 13.18
 B (ring opening deg) : 0.88
 PA of pole (deg) : 15.05
 Pole direction: RA (deg): 268.05754
 Dec (deg): 64.49714
 C/A sky separation (") : 14.839
 C/A sky separation (km) : 47910.0
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk

Jupiter 2049-12-14T01:46:31 K9.13 G11.49 Pgt



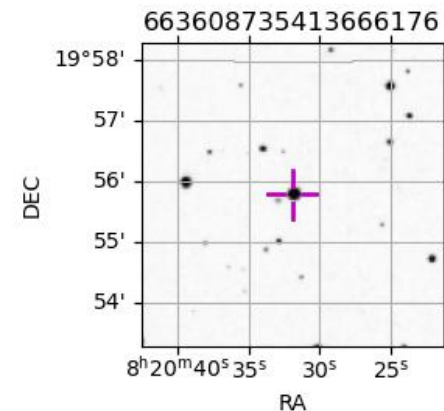
Earth
 PIC
 PAL
 PMO
 KPNO
 MCD
 TEN
 IRTF
 KAV
 RIO
 ESO
 SAAO



2049-12-14T01:46:31.1800 α: 08 20 31.8541 δ: +19 55 47.351 C/A ***** PA 15.54 deg v_sky -10.17 km/s D 04.45 AU
 Credit: Styled after SORA/Lucky Star

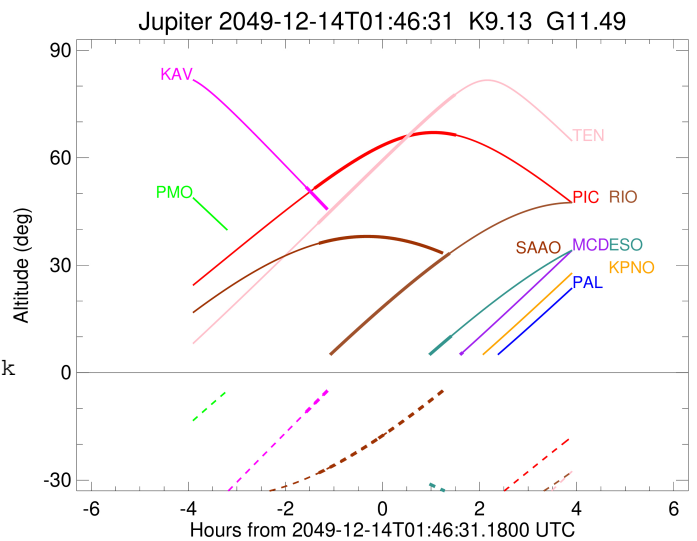
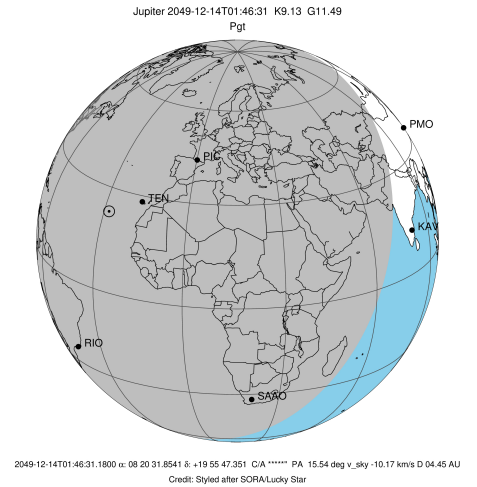
Observable events with sun below -5 deg and altitude above 5 deg

Obs	Location	lat	Elon	Target	Observed Events Interval	OCode
PIC	Pic du Midi	42.9	0.1	+ +	DEC 14 00:22 - DEC 14 03:17	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	+ +	DEC 14 03:25 - DEC 14 03:25	Pne
TEN	Teide Obs./Tenerife	28.3	343.5	+ +	DEC 14 00:26 - DEC 14 03:16	Pie
IRTF	Mauna Kea/IRTF	19.8	204.5			Pnn
KAV	Kavalur Observatory	12.6	78.8	+ +	DEC 14 00:12 - DEC 14 00:12	Pin
RIO	Rio de Janeiro	-22.9	316.8	+ +	DEC 14 03:09 - DEC 14 03:09	Pne
ESO	European Southern Obs. (3.6m)	-29.3	289.3	+ +	DEC 14 03:11 - DEC 14 03:11	Pne
AAT	Siding Spring (AAT)	-31.3	149.1			Pnn
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8	+ +	DEC 14 00:27 - DEC 14 03:01	Pie
MSO	Mt. Stromlo Observatory	-35.3	149.0			Pnn



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2049-12-14T01:49:59.900
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        : 663608735413666176
2Mass ID (if available) : 08203186+1955474
ICRS Star Coord at Epoch: 08h 20m 31.85405s +19:55:47.35053s
RUWE (>1.4 is poor)  : 0.92
K magnitude           : 9.132
G magnitude           : 11.490
RP magnitude          : 10.766
BP magnitude          : 12.080
DUPflag              : 0
Distance (au)         : 4.452
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -10.17
Sun-Target sep (deg)  : 139.04
Sun-Moon sep (deg)    : 13.72
B (ring opening deg) : 0.88
PA of pole (deg)     : 15.05
Pole direction: RA (deg): 268.05754
Dec (deg): 64.49714
C/A sky separation (") : 14.184
C/A sky separation (km) : 45794.7
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
    
```

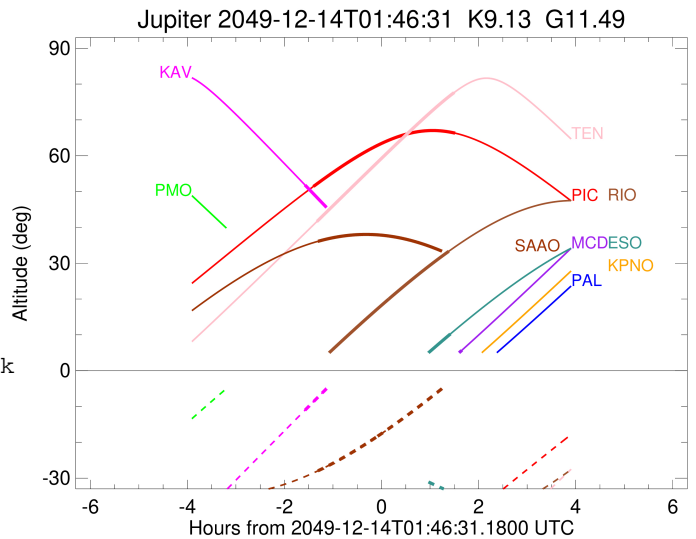
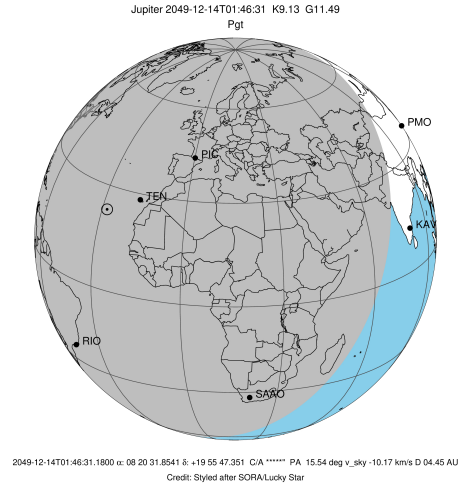


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2049-12-14T00:22:23.179	51.42	-69.60	71491.6	-39.52	-43.22
Jupiter	E	2049-12-14T03:17:14.487	66.31	-43.94	71491.6	-39.86	-43.57

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2049-12-14T01:54:40.780
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        : 663608735413666176
2Mass ID (if available) : 08203186+1955474
ICRS Star Coord at Epoch: 08h 20m 31.85405s +19:55:47.35053s
RUWE (>1.4 is poor) : 0.92
K magnitude           : 9.132
G magnitude           : 11.490
RP magnitude          : 10.766
BP magnitude          : 12.080
DUPflag              : 0
Distance (au)         : 4.452
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -10.17
Sun-Target sep (deg)  : 139.04
Sun-Moon sep (deg)    : 13.98
B (ring opening deg) : 0.88
PA of pole (deg)     : 15.05
Pole direction: RA (deg): 268.05754
Dec (deg): 64.49714
C/A sky separation (") : 14.082
C/A sky separation (km) : 45466.1
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
    
```

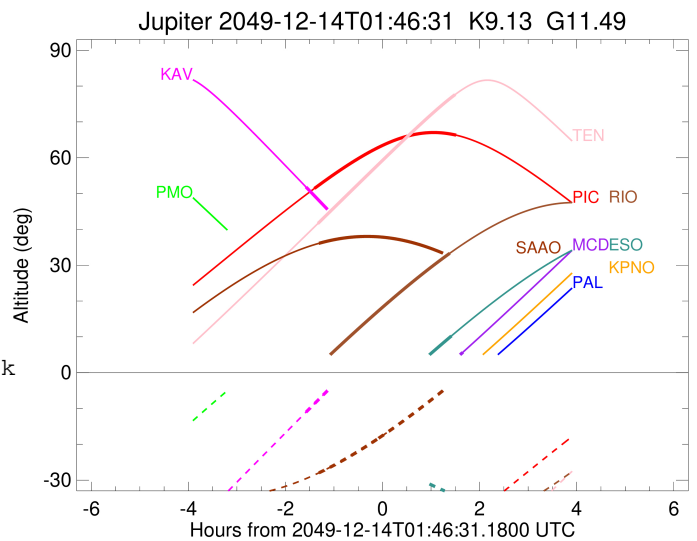
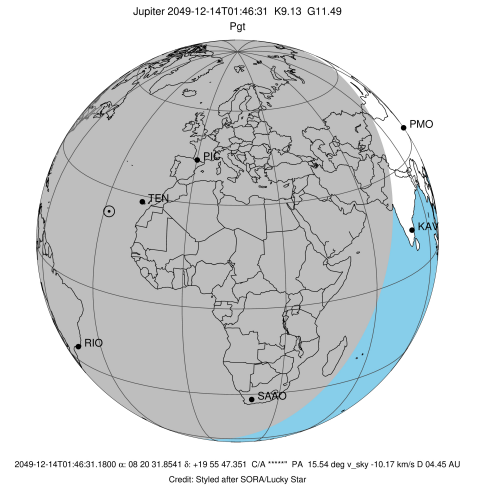


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2049-12-14T00:22:11.125	-27.39x	-5.88	71491.6	-38.02	-41.70
Jupiter	E	2049-12-14T03:25:44.820	5.67	-44.12	71491.6	-40.85	-44.57

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2049-12-14T01:51:50.510
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        : 663608735413666176
2Mass ID (if available) : 08203186+1955474
ICRS Star Coord at Epoch: 08h 20m 31.85405s +19:55:47.35053s
RUWE (>1.4 is poor) : 0.92
K magnitude           : 9.132
G magnitude           : 11.490
RP magnitude          : 10.766
BP magnitude          : 12.080
DUPflag              : 0
Distance (au)         : 4.452
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -10.17
Sun-Target sep (deg)  : 139.04
Sun-Moon sep (deg)    : 13.79
B (ring opening deg) : 0.88
PA of pole (deg)     : 15.05
Pole direction: RA (deg): 268.05754
Dec (deg): 64.49714
C/A sky separation (") : 14.726
C/A sky separation (km) : 47544.9
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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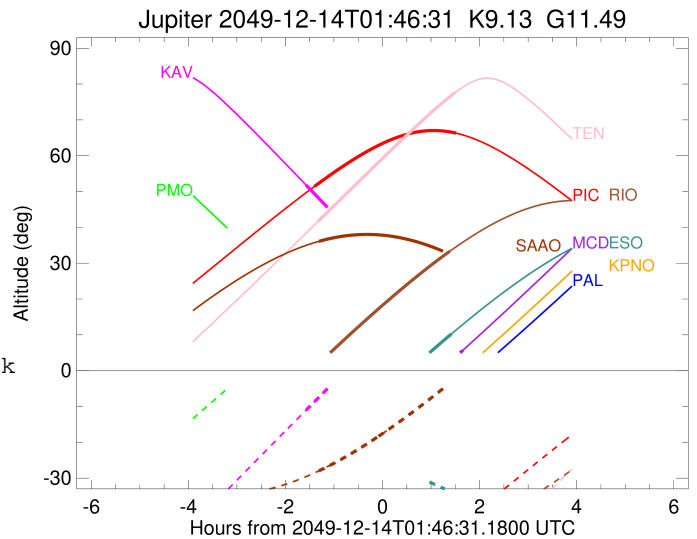
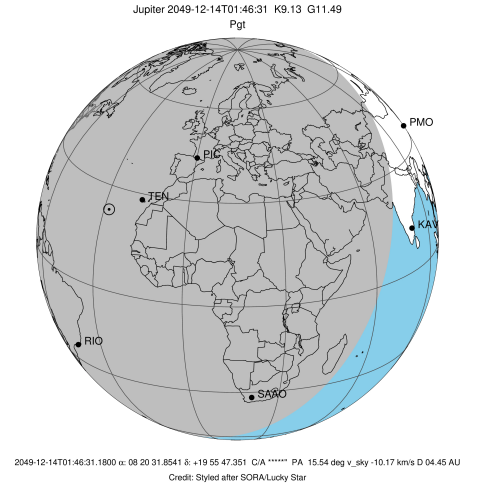


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2049-12-14T00:26:40.228	41.63	-80.95	71491.6	-41.15	-44.87
Jupiter	E	2049-12-14T03:16:19.679	77.63	-59.10	71491.5	-41.86	-45.58

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2049-12-14T01:39:25.970
Event type            : Pgt
: Jupiter occs: geocentric, topocentric
: Not a ringed target
Observer code         : KAV
Location              : Kavalur Observatory
Latitude (deg)        : 12.57556
E. Longitude (deg)    : 78.83167
Altitude (km)         : 0.722
Gaia source ID        : 663608735413666176
2Mass ID (if available) : 08203186+1955474
ICRS Star Coord at Epoch: 08h 20m 31.85405s +19:55:47.35053s
RUWE (>1.4 is poor) : 0.92
K magnitude           : 9.132
G magnitude           : 11.490
RP magnitude          : 10.766
BP magnitude          : 12.080
DUPflag              : 0
Distance (au)         : 4.452
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -10.17
Sun-Target sep (deg)  : 139.04
Sun-Moon sep (deg)    : 12.72
B (ring opening deg) : 0.88
PA of pole (deg)     : 15.05
Pole direction: RA (deg): 268.05754
Dec (deg): 64.49714
C/A sky separation (") : 14.299
C/A sky separation (km) : 46167.5
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
    
```

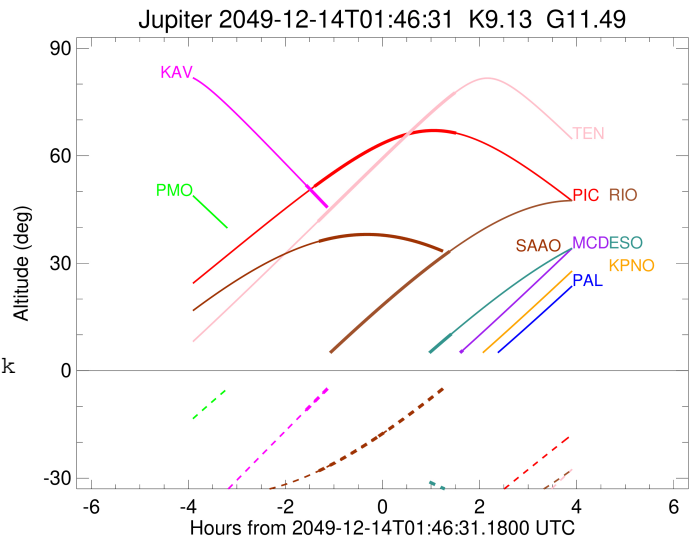
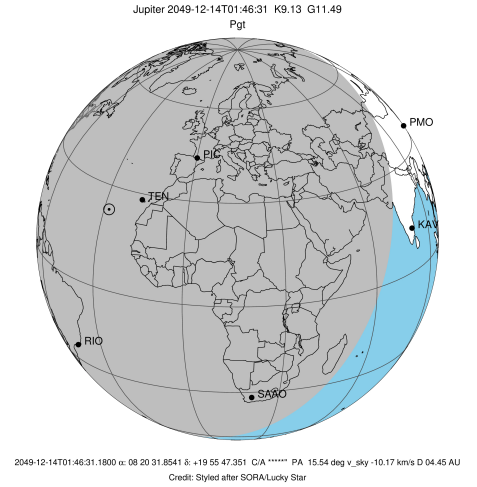


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2049-12-14T00:12:00.074	51.81	-11.02	71491.6	-40.77	-44.49
Jupiter	E	2049-12-14T03:07:55.520	10.46	27.19x	71491.6	-39.72	-43.42

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2049-12-14T01:52:23.690
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      : 663608735413666176
2Mass ID (if available) : 08203186+1955474
ICRS Star Coord at Epoch: 08h 20m 31.85405s +19:55:47.35053s
RUWE (>1.4 is poor) : 0.92
K magnitude          : 9.132
G magnitude          : 11.490
RP magnitude         : 10.766
BP magnitude         : 12.080
DUPflag             : 0
Distance (au)       : 4.452
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -10.17
Sun-Target sep (deg) : 139.04
Sun-Moon sep (deg)  : 13.53
B (ring opening deg) : 0.88
PA of pole (deg)    : 15.05
Pole direction: RA (deg): 268.05754
Dec (deg): 64.49714
C/A sky separation (") : 16.266
C/A sky separation (km) : 52516.8
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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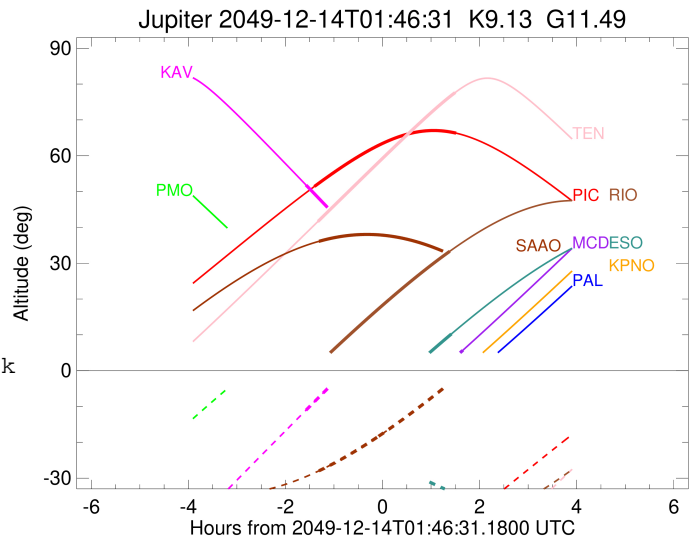
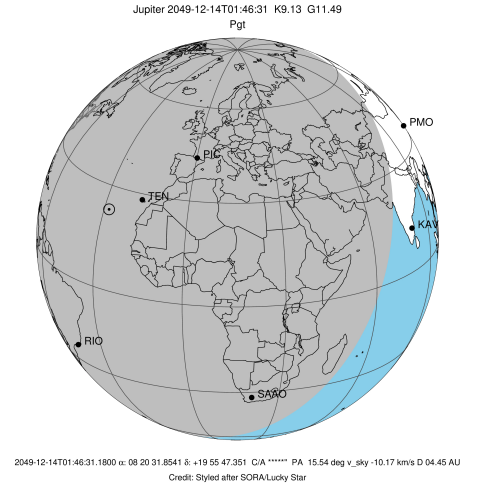


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2049-12-14T00:34:04.259	3.35x	-33.76	71491.5	-46.30	-49.99
Jupiter	E	2049-12-14T03:09:46.000	33.34	-43.70	71491.4	-47.90	-51.54

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2049-12-14T01:52:52.630
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       : 663608735413666176
2Mass ID (if available) : 08203186+1955474
ICRS Star Coord at Epoch: 08h 20m 31.85405s +19:55:47.35053s
RUWE (>1.4 is poor) : 0.92
K magnitude           : 9.132
G magnitude           : 11.490
RP magnitude          : 10.766
BP magnitude          : 12.080
DUPflag              : 0
Distance (au)        : 4.452
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -10.17
Sun-Target sep (deg) : 139.04
Sun-Moon sep (deg)  : 13.52
B (ring opening deg) : 0.88
PA of pole (deg)    : 15.05
Pole direction: RA (deg): 268.05754
Dec (deg): 64.49714
C/A sky separation ("): 16.225
C/A sky separation (km): 52384.3
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
    
```

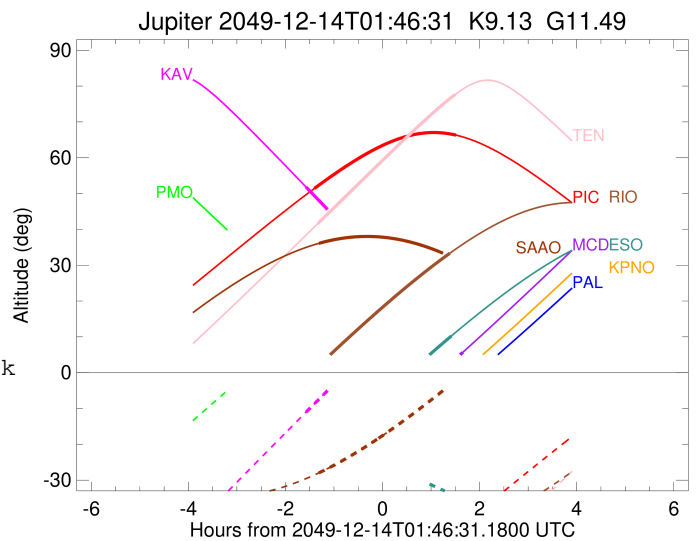
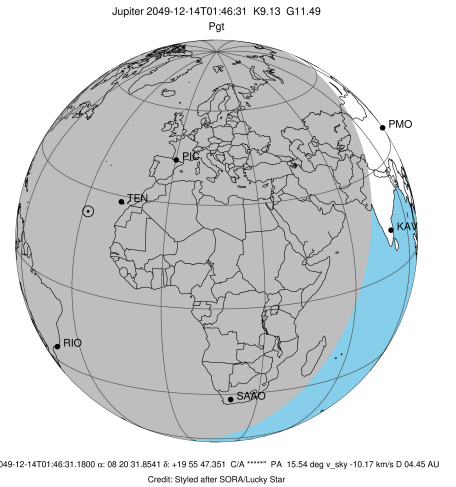


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2049-12-14T00:32:55.578	-22.34x	-11.32	71491.5	-45.82	-49.51
Jupiter	E	2049-12-14T03:11:41.486	10.25	-33.76	71491.4	-48.15	-51.79

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2049-12-14T01:44:35.720
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       : 663608735413666176
2Mass ID (if available) : 08203186+1955474
ICRS Star Coord at Epoch: 08h 20m 31.85405s +19:55:47.35053s
RUWE (>1.4 is poor) : 0.92
K magnitude           : 9.132
G magnitude           : 11.490
RP magnitude         : 10.766
BP magnitude         : 12.080
DUPflag              : 0
Distance (au)        : 4.452
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -10.17
Sun-Target sep (deg) : 139.04
Sun-Moon sep (deg)   : 12.84
B (ring opening deg) : 0.88
PA of pole (deg)     : 15.05
Pole direction: RA (deg): 268.05754
Dec (deg): 64.49714
C/A sky separation (") : 16.301
C/A sky separation (km) : 52629.3
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	2049-12-14T00:27:53.308	36.10	-27.96	71491.4	-47.41	-51.07
Jupiter	E	2049-12-14T03:01:17.374	33.35	-5.01	71491.4	-47.16	-50.83