

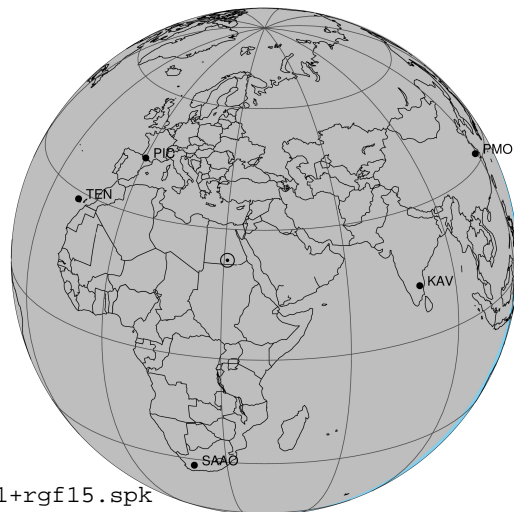
target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2048-12-09T21:49:23.350
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 3403571027268369664
 2Mass ID (if available) : 05434193+2256416

Jupiter 2048-12-09T21:49:23 K9.88 G14.51 Pgt

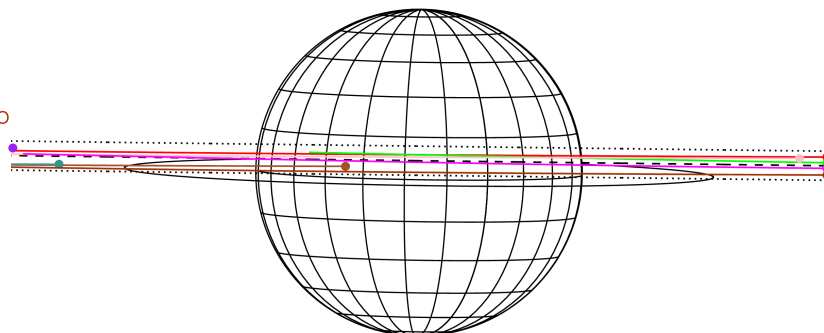
ICRS Star Coord at Epoch: 05h 43m 41.93345s +22:56:41.57351s

RUWE (>1.4 is poor) : 1.06
 K magnitude : 9.882
 G magnitude : 14.513
 RP magnitude : 13.332
 BP magnitude : 16.021
 DUPflag : 0
 Distance (au) : 4.127
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -16.68
 Sun-Target sep (deg) : 171.56
 Sun-Moon sep (deg) : 129.09
 B (ring opening deg) : 2.54
 PA of pole (deg) : -0.92
 Pole direction: RA (deg): 268.05737
 Dec (deg): 64.49721
 C/A sky separation (") : 1.726
 C/A sky separation (km) : 5167.8
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk

Jupiter 2048-12-09T21:49:23 K9.88 G14.51
 Pgt



Earth
 PIC
 PMO
 MCD
 TEN
 KAV
 RIO
 ESO
 SAAO

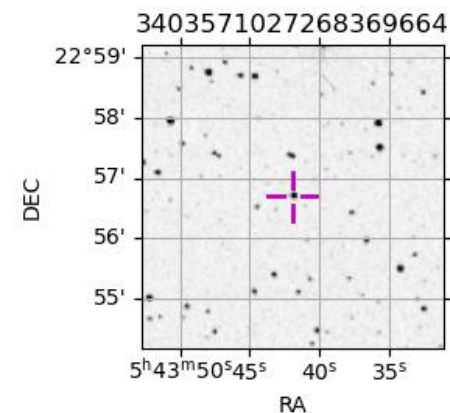


2048-12-09T21:49:23.3500 ex: 05 43 41.9334 s: +22 56 41.574 C/A 1.738" PA 179.29 deg v_sky -16.68 km/s D 04.13 AU

Credit: Styled after SORA/Lucky Star

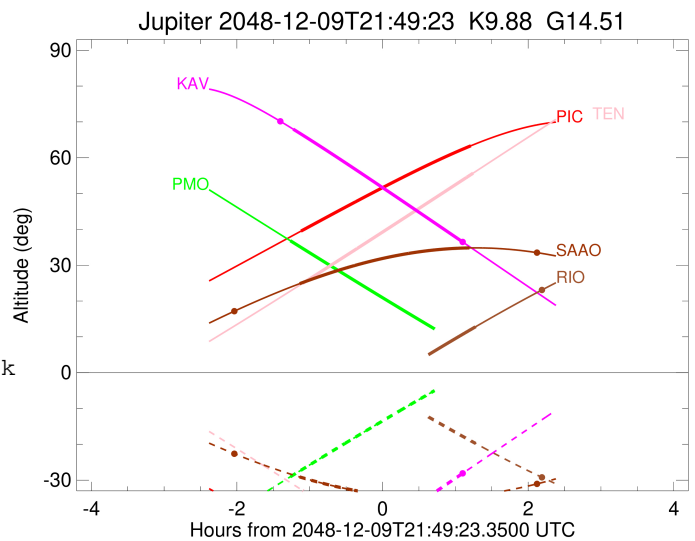
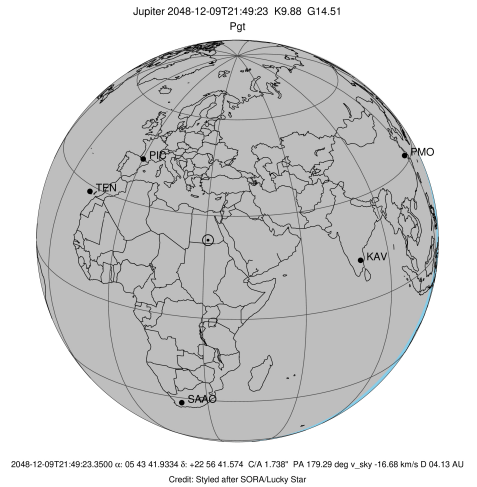
Observable events with sun below -5 deg and altitude above 5 deg

Obs	Location	lat	Elon	Target	Observed Events Interval	OCode
PIC	Pic du Midi	42.9	0.1	+ +	DEC 09 20:42 - DEC 09 23:02	Pie
PAL	Palomar Mt (200")	33.4	243.1			Pnn
PMO	Purple Mtn Obs. Nanking	32.1	118.8	+	DEC 09 20:33 - DEC 09 20:33	Pin
KPNO	Kitt Peak Natl Obs	32.0	248.4			Pnn
MCD	McDonald Obs. 2.7m	30.7	256.0			Pnn
TEN	Teide Obs./Tenerife	28.3	343.5	+ +	DEC 09 20:43 - DEC 09 23:03	Pie
IRTF	Mauna Kea/IRTF	19.8	204.5			Pnn
KAV	Kavalur Observatory	12.6	78.8	+ +	DEC 09 20:35 - DEC 09 22:55	Pie
RIO	Rio de Janeiro	-22.9	316.8	+	DEC 09 23:06 - DEC 09 23:06	Pne
ESO	European Southern Obs. (3.6m)	-29.3	289.3			Pnn
AAT	Siding Spring (AAT)	-31.3	149.1			Pnn
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8	+ +	DEC 09 20:41 - DEC 09 23:00	Pie
MSO	Mt. Stromlo Observatory	-35.3	149.0			Pnn



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2048-12-09T21:52:21.490
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        : 3403571027268369664
2Mass ID (if available) : 05434193+2256416
ICRS Star Coord at Epoch: 05h 43m 41.93345s +22:56:41.57351s
RUWE (>1.4 is poor) : 1.06
K magnitude           : 9.882
G magnitude           : 14.513
RP magnitude          : 13.332
BP magnitude          : 16.021
DUPflag              : 0
Distance (au)         : 4.127
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.68
Sun-Target sep (deg)  : 171.56
Sun-Moon sep (deg)    : 130.01
B (ring opening deg) : 2.54
PA of pole (deg)      : -0.92
Pole direction: RA (deg): 268.05737
Dec (deg): 64.49721
C/A sky separation (") : 2.591
C/A sky separation (km) : 7754.3
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
    
```

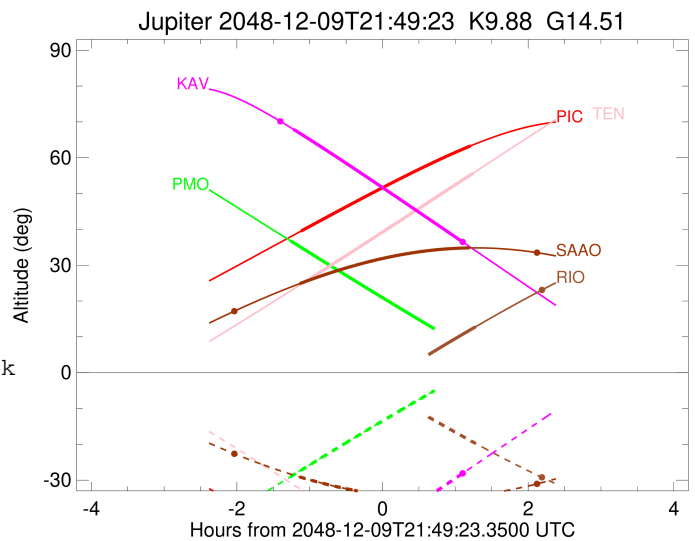
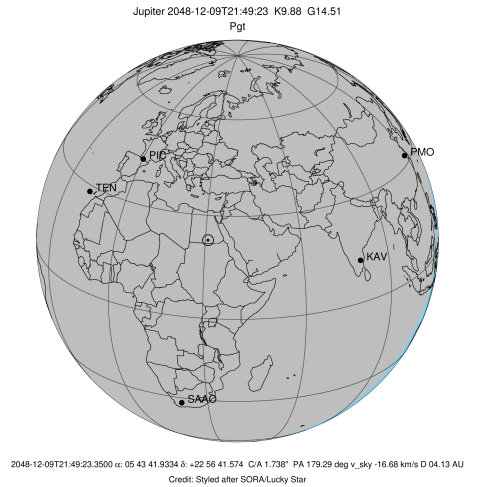


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2048-12-09T20:42:17.216	39.52	-46.21	71491.9	6.76	7.72
Jupiter	E	2048-12-09T23:02:08.565	63.32	-67.65	71491.9	5.79	6.61

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2048-12-09T21:44:01.300
Event type          : Pgt
: Jupiter occs: geocentric, topocentric
: Not a ringed target
Observer code       : PMO
Location            : Purple Mtn Obs. Nanking
Latitude (deg)      : 32.06667
E. Longitude (deg)  : 118.82089
Altitude (km)       : 0.364
Gaia source ID      : 3403571027268369664
2Mass ID (if available) : 05434193+2256416
ICRS Star Coord at Epoch: 05h 43m 41.93345s +22:56:41.57351s
RUWE (>1.4 is poor) : 1.06
K magnitude          : 9.882
G magnitude          : 14.513
RP magnitude         : 13.332
BP magnitude         : 16.021
DUPflag             : 0
Distance (au)       : 4.127
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -16.68
Sun-Target sep (deg) : 171.56
Sun-Moon sep (deg)  : 128.87
B (ring opening deg) : 2.54
PA of pole (deg)    : -0.92
Pole direction: RA (deg): 268.05737
Dec (deg): 64.49721
C/A sky separation (") : 2.597
C/A sky separation (km) : 7772.7
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
    
```

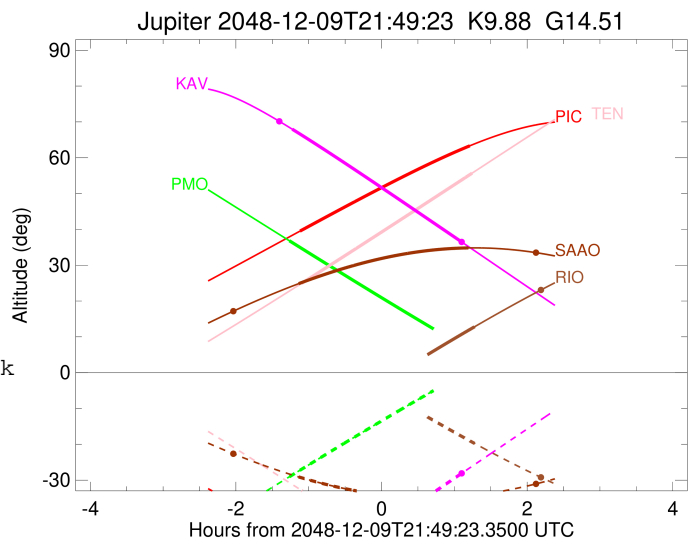
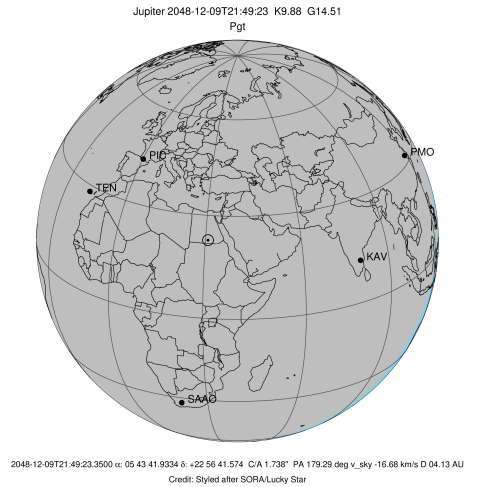


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2048-12-09T20:33:36.132	36.79	-29.03	71491.9	5.96	6.80
Jupiter	E	2048-12-09T22:54:55.476	7.71	-0.67x	71491.9	6.56	7.49

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2048-12-09T21:54:03.060
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      : 3403571027268369664
2Mass ID (if available) : 05434193+2256416
ICRS Star Coord at Epoch: 05h 43m 41.93345s +22:56:41.57351s
RUWE (>1.4 is poor) : 1.06
K magnitude          : 9.882
G magnitude          : 14.513
RP magnitude         : 13.332
BP magnitude         : 16.021
DUPflag             : 0
Distance (au)       : 4.127
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -16.68
Sun-Target sep (deg) : 171.56
Sun-Moon sep (deg)  : 130.05
B (ring opening deg) : 2.54
PA of pole (deg)    : -0.92
Pole direction: RA (deg): 268.05737
Dec (deg): 64.49721
C/A sky separation (") : 2.245
C/A sky separation (km) : 6721.1
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
    
```

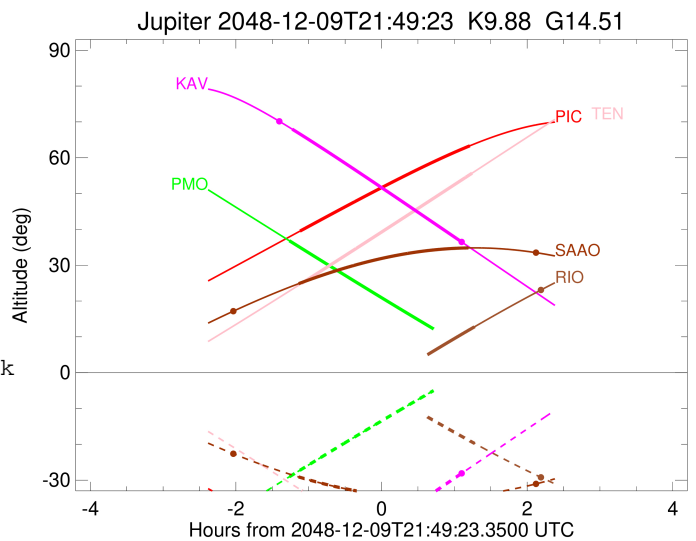
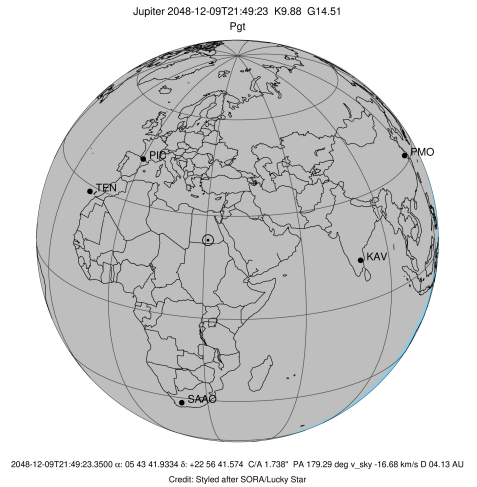


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2048-12-09T20:43:40.039	24.96	-32.90	71491.9	6.08	6.95
Jupiter	E	2048-12-09T23:03:59.472	55.67	-63.68	71491.9	4.79	5.47

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2048-12-09T21:45:32.650
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        : 3403571027268369664
2Mass ID (if available) : 05434193+2256416
ICRS Star Coord at Epoch: 05h 43m 41.93345s +22:56:41.57351s
RUWE (>1.4 is poor) : 1.06
K magnitude           : 9.882
G magnitude           : 14.513
RP magnitude          : 13.332
BP magnitude          : 16.021
DUPflag              : 0
Distance (au)         : 4.127
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.68
Sun-Target sep (deg) : 171.56
Sun-Moon sep (deg)   : 129.31
B (ring opening deg) : 2.54
PA of pole (deg)     : -0.92
Pole direction: RA (deg): 268.05737
Dec (deg): 64.49721
C/A sky separation (") : 1.501
C/A sky separation (km) : 4493.3
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
    
```

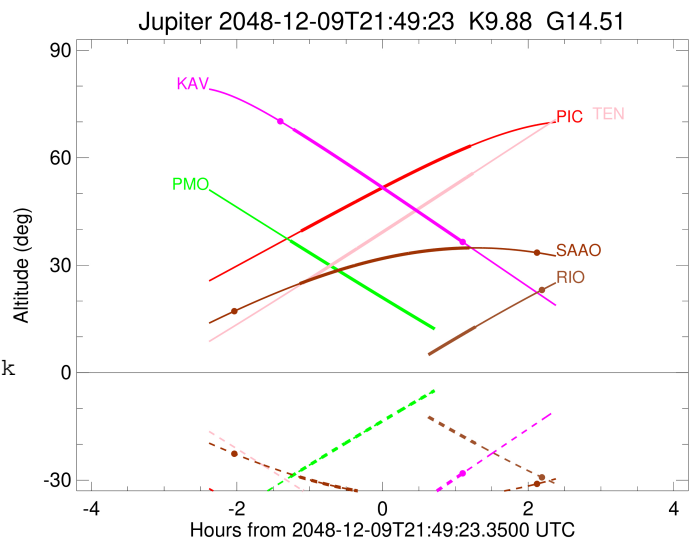
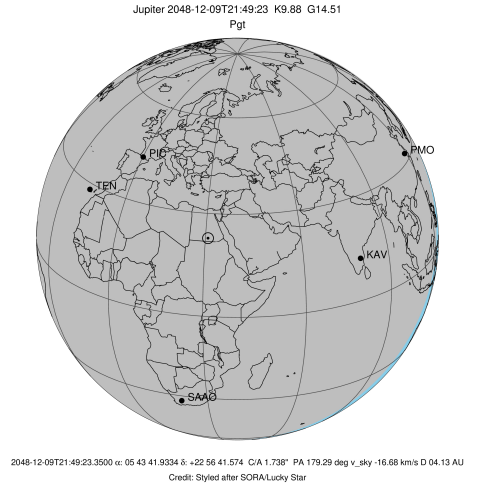


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2048-12-09T20:35:53.268	67.95	-59.97	71492.0	3.53	4.03
Jupiter	E	2048-12-09T22:55:31.814	36.46	-28.08	71492.0	3.82	4.37

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2048-12-09T21:55:14.870
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     : 3403571027268369664
2Mass ID (if available) : 05434193+2256416
ICRS Star Coord at Epoch: 05h 43m 41.93345s +22:56:41.57351s
RUWE (>1.4 is poor) : 1.06
K magnitude        : 9.882
G magnitude        : 14.513
RP magnitude       : 13.332
BP magnitude       : 16.021
DUPflag           : 0
Distance (au)     : 4.127
f0 (km)           : 0.00
g0 (km)           : 0.00
skyplane vel. (km/s) : -16.68
Sun-Target sep (deg) : 171.56
Sun-Moon sep (deg) : 129.61
B (ring opening deg) : 2.54
PA of pole (deg)  : -0.92
Pole direction: RA (deg): 268.05737
Dec (deg): 64.49721
C/A sky separation (") : 0.872
C/A sky separation (km) : 2610.1
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
    
```

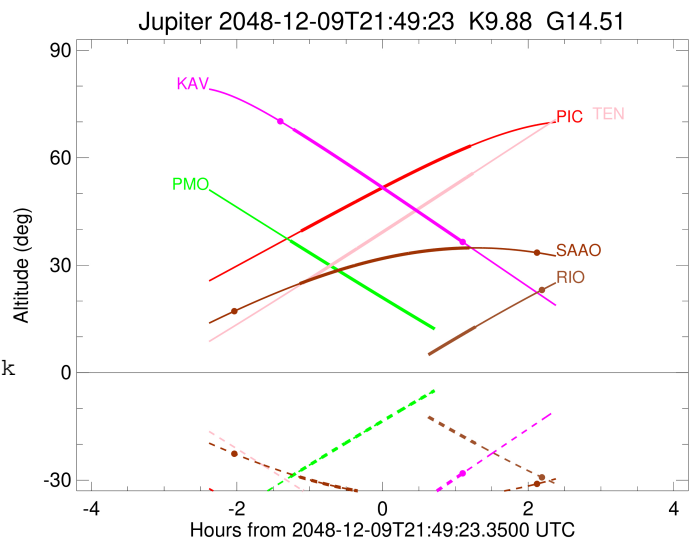
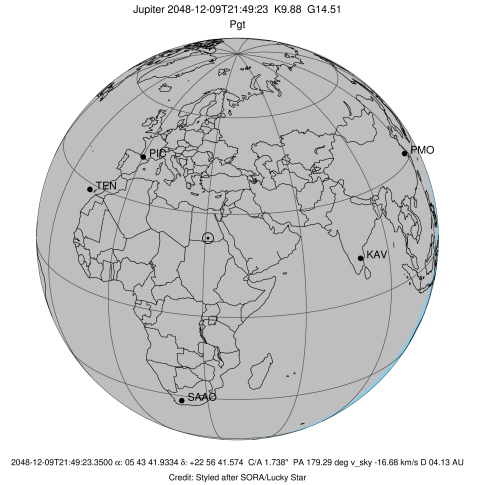


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2048-12-09T20:43:49.008	-17.05x	9.03x	71492.0	2.87	3.28
Jupiter	E	2048-12-09T23:06:06.289	12.82	-19.76	71492.0	1.34	1.54

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2048-12-09T21:51:09.410
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       : 3403571027268369664
2Mass ID (if available) : 05434193+2256416
ICRS Star Coord at Epoch: 05h 43m 41.93345s +22:56:41.57351s
RUWE (>1.4 is poor) : 1.06
K magnitude           : 9.882
G magnitude           : 14.513
RP magnitude          : 13.332
BP magnitude          : 16.021
DUPflag              : 0
Distance (au)        : 4.127
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.68
Sun-Target sep (deg) : 171.56
Sun-Moon sep (deg)   : 129.63
B (ring opening deg) : 2.54
PA of pole (deg)     : -0.92
Pole direction: RA (deg): 268.05737
Dec (deg): 64.49721
C/A sky separation ("): 0.022
C/A sky separation (km): 66.5
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	2048-12-09T20:41:09.478	24.84	-29.10	71492.0	0.50	0.57
Jupiter	E	2048-12-09T23:00:58.928	34.82	-34.34	71492.0	-0.25	-0.29