

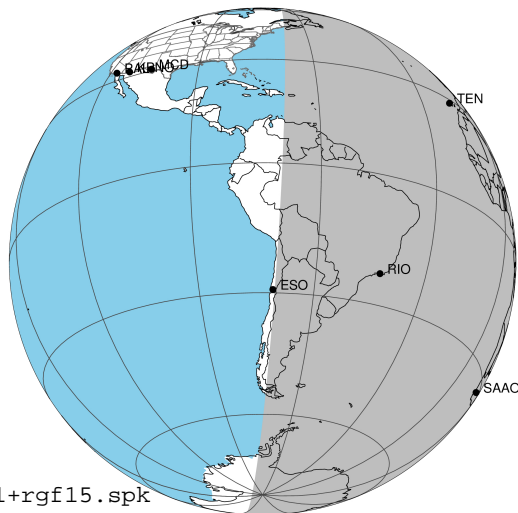
target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2031-09-16T22:30:16.530
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 4114315542696485632
 2Mass ID (if available) : 17173024-2252048

Jupiter 2031-09-16T22:30:16 K9.31 G13.90 Pgt

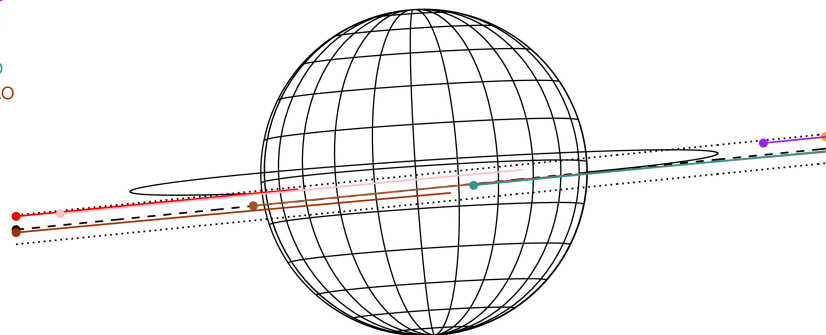
ICRS Star Coord at Epoch: 17h 17m 30.24540s -22:52:04.87682s

RUWE (>1.4 is poor) : 1.01
 K magnitude : 9.315
 G magnitude : 13.899
 RP magnitude : 12.732
 BP magnitude : 15.371
 DUPflag : 0
 Distance (au) : 5.207
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : 14.71
 Sun-Target sep (deg) : 86.80
 Sun-Moon sep (deg) : 85.01
 B (ring opening deg) : -2.37
 PA of pole (deg) : 3.73
 Pole direction: RA (deg): 268.05684
 Dec (deg): 64.49652
 C/A sky separation (") : 1.887
 C/A sky separation (km) : 7124.7
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk

Jupiter 2031-09-16T22:30:16 K9.31 G13.90
 Pgt



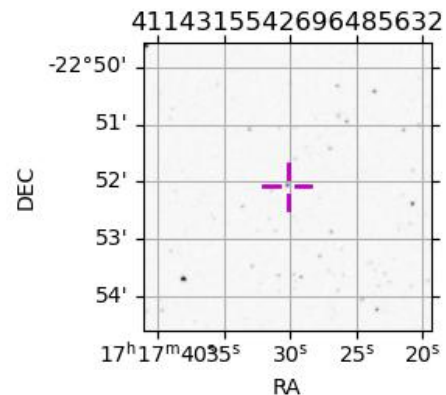
Earth
 PIC
 KPNO
 MCD
 TEN
 RIO
 ESO
 SAAO



2031-09-16T22:30:16.5300 a: 17 17 30.2454 s: -22 52 04.877 C/A 1.896" PA 5.71 deg v_sky +14.71 km/s D 05.21 AU
 Credit: Styled after SORA/Lucky Star

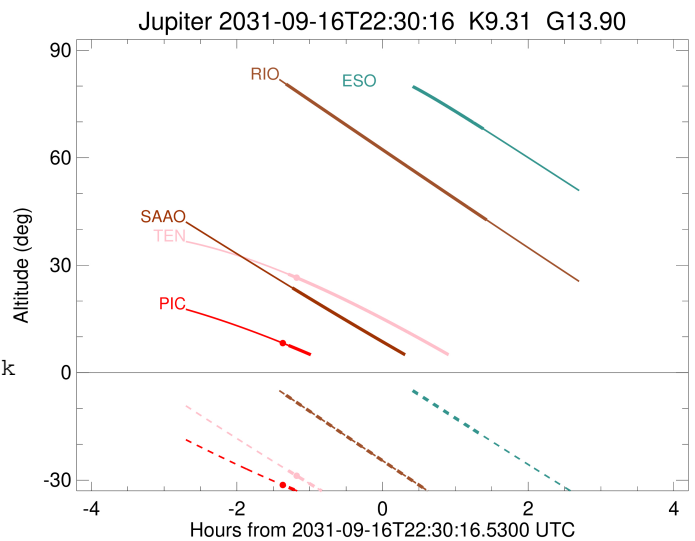
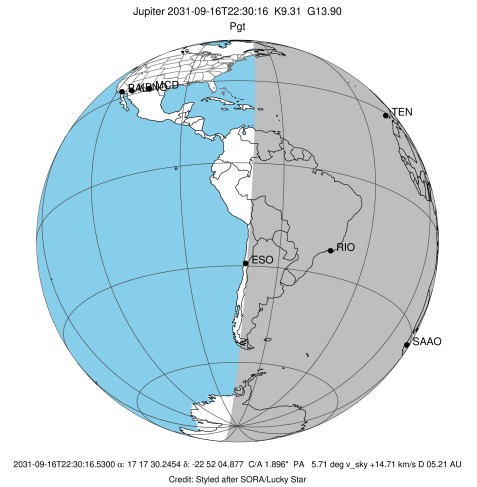
Observable events with sun below -5 deg and altitude above 5 deg

Obs	Location	lat	Elon	Target	Observed Events Interval	OCode
PIC	Pic du Midi	42.9	0.1	+	SEP 16 21:12 - SEP 16 21:12	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			Pnn
MCD	McDonald Obs. 2.7m	30.7	256.0			Pnn
TEN	Teide Obs./Tenerife	28.3	343.5	+	SEP 16 21:12 - SEP 16 21:12	Pin
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	+	SEP 16 21:10 - SEP 16 23:56	Pie
ESO	European Southern Obs. (3.6m)	-29.3	289.3	+	SEP 16 23:53 - SEP 16 23:53	Pne
AAT	Siding Spring (AAT)	-31.3	149.1			Pnn
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8	+	SEP 16 21:16 - SEP 16 21:16	Pin
MSO	Mt. Stromlo Observatory	-35.3	149.0			Pnn



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-09-16T22:34:51.430
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       : 4114315542696485632
2Mass ID (if available) : 17173024-2252048
ICRS Star Coord at Epoch: 17h 17m 30.24540s -22:52:04.87682s
RUWE (>1.4 is poor) : 1.01
K magnitude           : 9.315
G magnitude           : 13.899
RP magnitude         : 12.732
BP magnitude         : 15.371
DUPflag              : 0
Distance (au)        : 5.207
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : 14.71
Sun-Target sep (deg) : 86.80
Sun-Moon sep (deg)   : 85.00
B (ring opening deg) : -2.37
PA of pole (deg)     : 3.73
Pole direction: RA (deg): 268.05684
Dec (deg): 64.49652
C/A sky separation (") : 0.595
C/A sky separation (km) : 2246.6
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
    
```

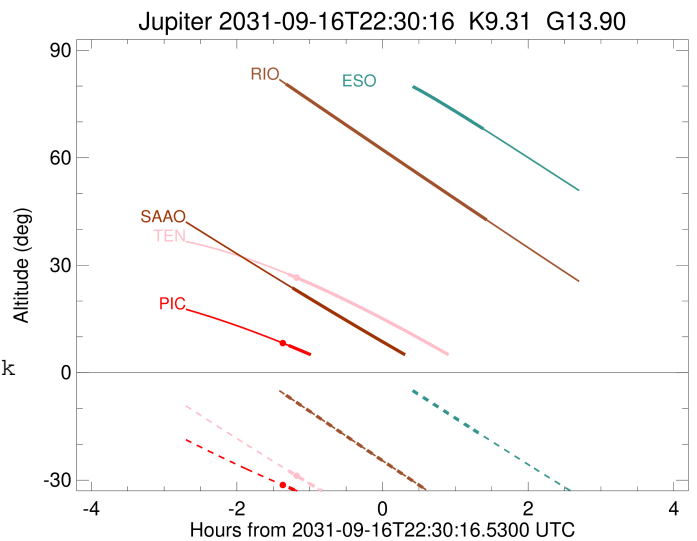
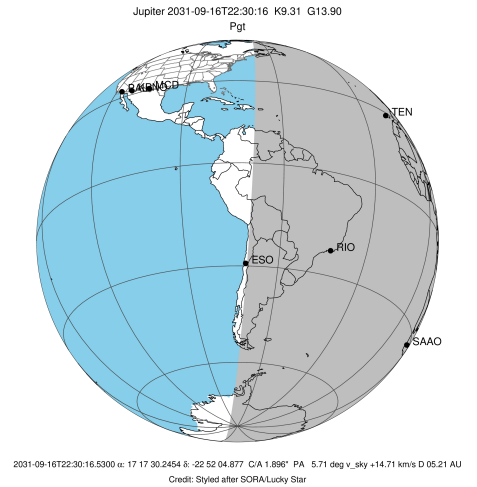


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-09-16T21:12:56.729	7.59	-32.03	71492.0	-3.37	-3.86
Jupiter	E	2031-09-16T23:55:58.354	-18.86x	-44.84	71492.0	-0.32	-0.36

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-09-16T22:35:12.480
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      : 4114315542696485632
2Mass ID (if available) : 17173024-2252048
ICRS Star Coord at Epoch: 17h 17m 30.24540s -22:52:04.87682s
RUWE (>1.4 is poor) : 1.01
K magnitude          : 9.315
G magnitude          : 13.899
RP magnitude         : 12.732
BP magnitude         : 15.371
DUPflag             : 0
Distance (au)        : 5.207
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : 14.71
Sun-Target sep (deg) : 86.80
Sun-Moon sep (deg)   : 85.31
B (ring opening deg) : -2.37
PA of pole (deg)     : 3.73
Pole direction: RA (deg): 268.05684
Dec (deg): 64.49652
C/A sky separation ("): 0.731
C/A sky separation (km): 2759.0
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
    
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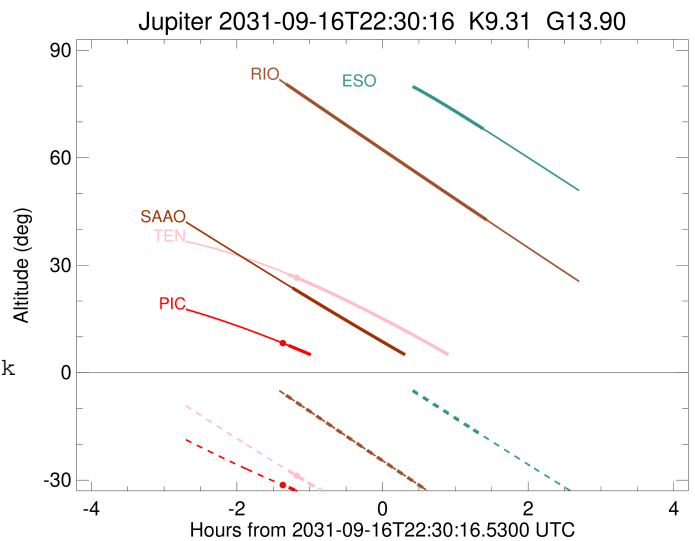
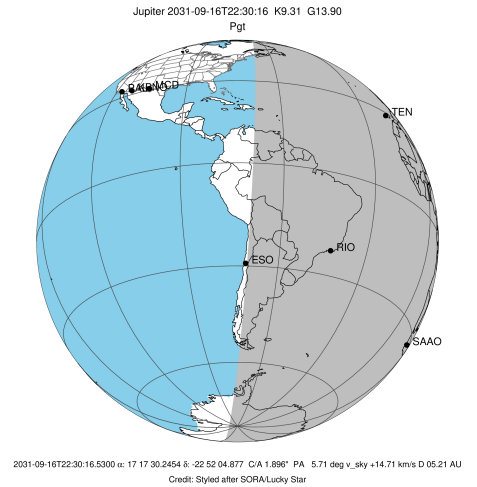


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-09-16T21:12:35.935	27.49	-27.33	71492.0	-3.84	-4.39
Jupiter	E	2031-09-16T23:56:58.305	-1.33x	-55.83	71492.0	-0.75	-0.86

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-09-16T22:33:41.900
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        : 4114315542696485632
2Mass ID (if available) : 17173024-2252048
ICRS Star Coord at Epoch: 17h 17m 30.24540s -22:52:04.87682s
RUWE (>1.4 is poor)  : 1.01
K magnitude           : 9.315
G magnitude           : 13.899
RP magnitude          : 12.732
BP magnitude          : 15.371
DUPflag               : 0
Distance (au)         : 5.207
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : 14.71
Sun-Target sep (deg)  : 86.80
Sun-Moon sep (deg)    : 85.86
B (ring opening deg)  : -2.37
PA of pole (deg)      : 3.73
Pole direction: RA (deg): 268.05684
Dec (deg): 64.49652
C/A sky separation (") : 1.891
C/A sky separation (km) : 7143.1
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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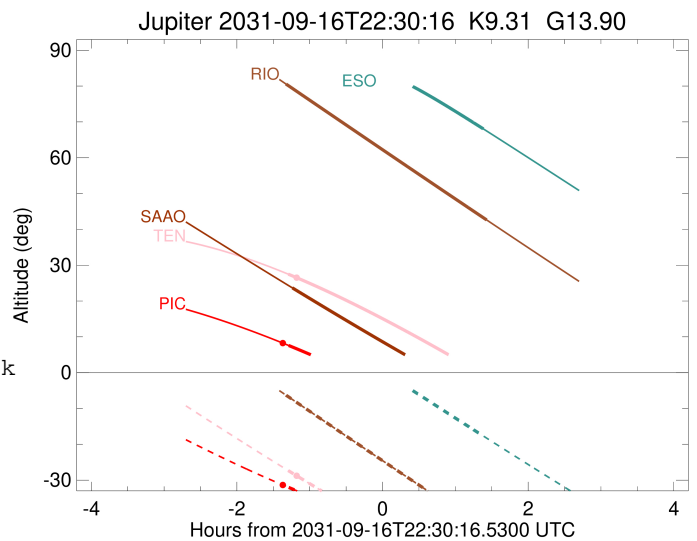
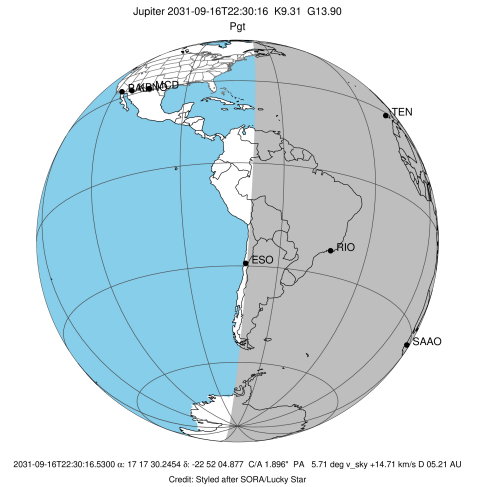


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-09-16T21:10:45.975	80.56	-6.28	71491.9	-7.64	-8.72
Jupiter	E	2031-09-16T23:56:02.466	42.64	-43.73	71492.0	-4.06	-4.64

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-09-16T22:30:40.360
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        : 4114315542696485632
2Mass ID (if available) : 17173024-2252048
ICRS Star Coord at Epoch: 17h 17m 30.24540s -22:52:04.87682s
RUWE (>1.4 is poor) : 1.01
K magnitude           : 9.315
G magnitude           : 13.899
RP magnitude          : 12.732
BP magnitude          : 15.371
DUPflag              : 0
Distance (au)         : 5.207
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : 14.71
Sun-Target sep (deg)  : 86.80
Sun-Moon sep (deg)   : 85.94
B (ring opening deg) : -2.37
PA of pole (deg)     : 3.73
Pole direction: RA (deg): 268.05684
Dec (deg): 64.49652
C/A sky separation ("): 2.062
C/A sky separation (km): 7786.5
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
    
```

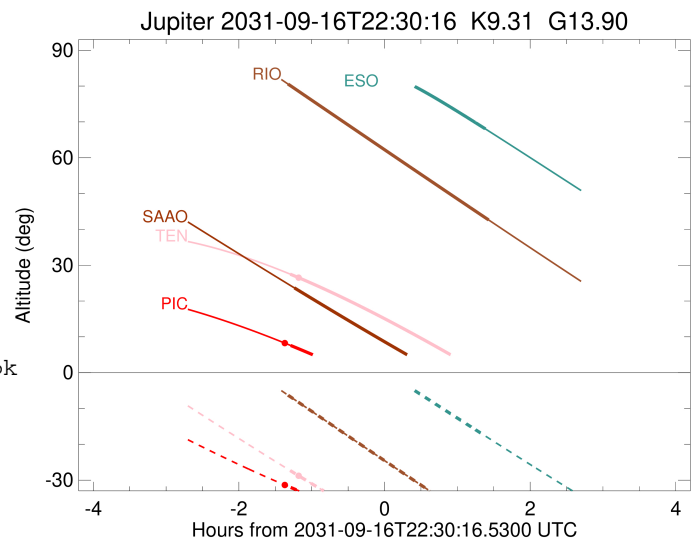
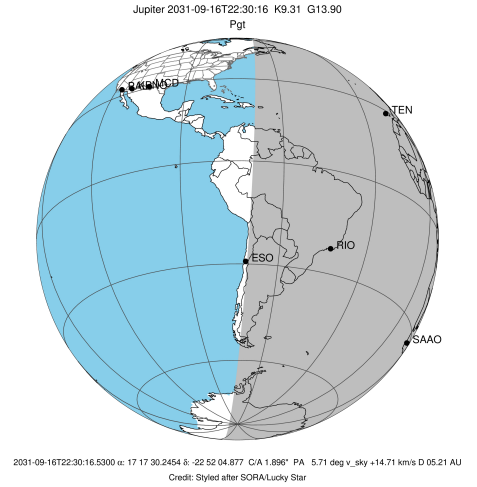


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-09-16T21:07:50.992	72.70	18.22x	71491.8	-8.47	-9.66
Jupiter	E	2031-09-16T23:53:19.219	68.05	-17.67	71492.0	-4.26	-4.86

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-09-16T22:36:34.350
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      : 4114315542696485632
2Mass ID (if available) : 17173024-2252048
ICRS Star Coord at Epoch: 17h 17m 30.24540s -22:52:04.87682s
RUWE (>1.4 is poor) : 1.01
K magnitude          : 9.315
G magnitude          : 13.899
RP magnitude         : 12.732
BP magnitude         : 15.371
DUPflag             : 0
Distance (au)       : 5.207
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : 14.71
Sun-Target sep (deg) : 86.80
Sun-Moon sep (deg)  : 85.22
B (ring opening deg) : -2.37
PA of pole (deg)    : 3.73
Pole direction: RA (deg): 268.05684
Dec (deg): 64.49652
C/A sky separation ("): 2.630
C/A sky separation (km) : 9933.9
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
    
```



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	2031-09-16T21:16:03.197	23.65	-55.36	71491.8	-9.39	-10.70
Jupiter	E	2031-09-16T23:56:12.477	-7.53x	-54.17	71491.9	-6.60	-7.54