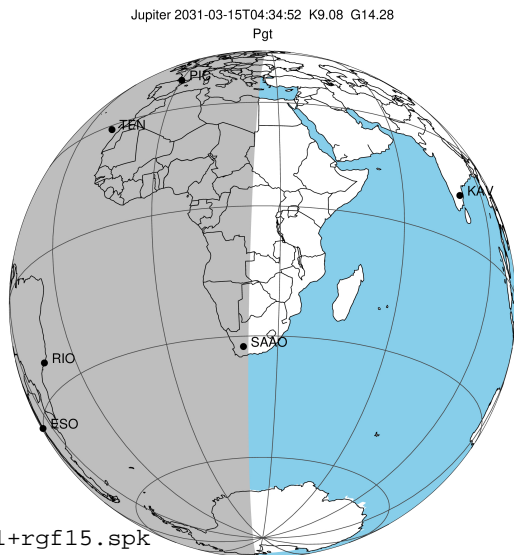


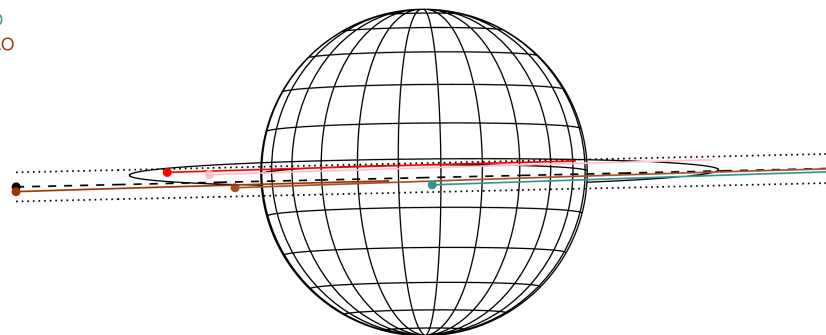
target : Jupiter  
 target radius (km) : 71492.00  
 C/A epoch : 2031-03-15T04:34:52.580  
 Event type : Pgt  
 : Jupiter occs: geocentric, topocentric  
 : Not a ringed target  
 Gaia source ID : 4068933891823245440  
 2Mass ID (if available) : 17471291-2252019

Jupiter 2031-03-15T04:34:52 K9.08 G14.28 Pgt

ICRS Star Coord at Epoch: 17h 47m 12.96466s -22:52:02.38890s  
 RUWE (>1.4 is poor) : 3.18  
 K magnitude : 9.081  
 G magnitude : 14.281  
 RP magnitude : 12.860  
 BP magnitude : 15.605  
 DUPflag : 0  
 Distance (au) : 5.271  
 f0 (km) : 0.00  
 g0 (km) : 0.00  
 skyplane vel. (km/s) : 14.76  
 Sun-Target sep (deg) : 86.91  
 Sun-Moon sep (deg) : 17.26  
 B (ring opening deg) : -2.63  
 PA of pole (deg) : 0.54  
 Pole direction: RA (deg): 268.05700  
 Dec (deg): 64.49651  
 C/A sky separation (") : 0.589  
 C/A sky separation (km) : 2251.9  
 NAIF SPICE kernels : RAJobs\_U111+rgf15.spk



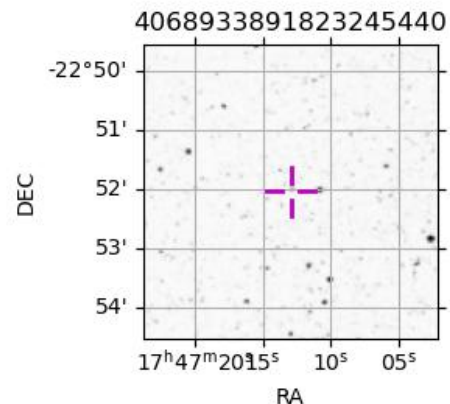
Earth  
 PIC  
 TEN  
 RIO  
 ESO  
 SAAO



2031-03-15T04:34:52.5800 az: 17 47 12.9647 & -22 52 02.3889 C/A 0.599° PA 1.30 deg v\_sky +14.76 km/s D 05.27 AU  
 Credit: Styled after SORA/Lucky Star

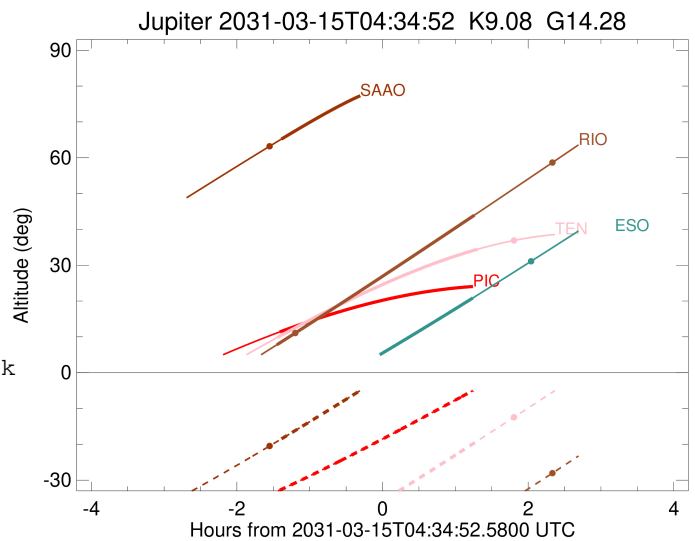
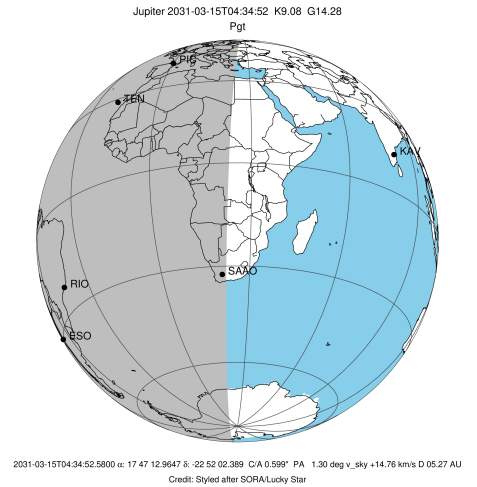
Observable events with sun below -5 deg and altitude above 5 deg

Obs	Location	lat	Elon	Target	Observed Events Interval	OCode
PIC	Pic du Midi	42.9	0.1	+	MAR 15 03:10 - MAR 15 03:10	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	+ +	MAR 15 03:08 - MAR 15 05:53	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	+ +	MAR 15 03:07 - MAR 15 05:50	Pie
ESO	European Southern Obs. (3.6m)	-29.3	289.3	+	MAR 15 05:49 - MAR 15 05:49	Pne
AAT	Siding Spring (AAT)	-31.3	149.1			Pnn
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8	+	MAR 15 03:11 - MAR 15 03:11	Pin
MSO	Mt. Stromlo Observatory	-35.3	149.0			Pnn



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-03-15T04:32:23.060
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       : 4068933891823245440
2Mass ID (if available) : 17471291-2252019
ICRS Star Coord at Epoch: 17h 47m 12.96466s -22:52:02.38890s
RUWE (>1.4 is poor) : 3.18
K magnitude           : 9.081
G magnitude           : 14.281
RP magnitude          : 12.860
BP magnitude          : 15.605
DUPflag              : 0
Distance (au)         : 5.271
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : 14.76
Sun-Target sep (deg) : 86.91
Sun-Moon sep (deg)   : 17.05
B (ring opening deg) : -2.63
PA of pole (deg)     : 0.54
Pole direction: RA (deg): 268.05700
Dec (deg): 64.49651
C/A sky separation (") : 0.868
C/A sky separation (km) : 3319.6
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
    
```

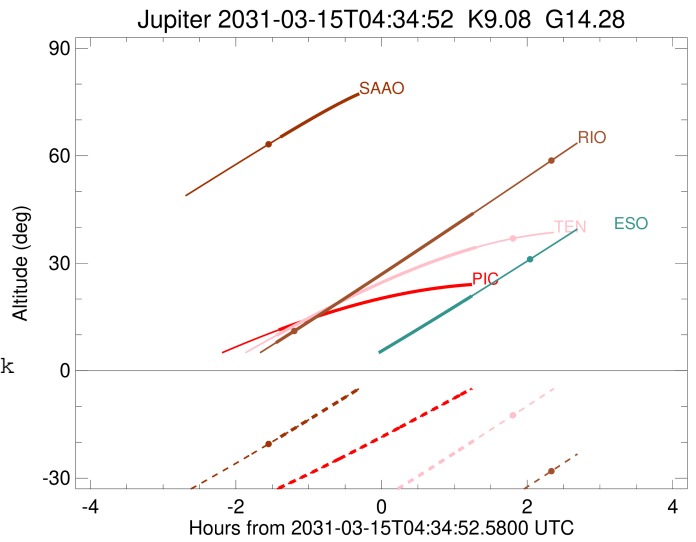
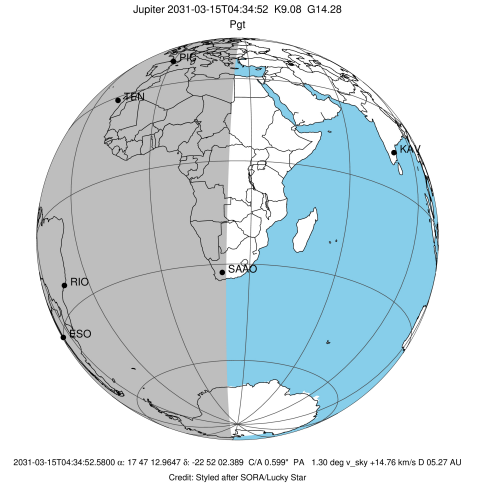


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-03-15T03:10:18.861	11.39	-32.78	71492.0	1.57	1.79
Jupiter	E	2031-03-15T05:54:56.190	24.17	-3.98x	71492.0	3.59	4.10

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-03-15T04:30:23.190
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        : 4068933891823245440
2Mass ID (if available) : 17471291-2252019
ICRS Star Coord at Epoch: 17h 47m 12.96466s -22:52:02.38890s
RUWE (>1.4 is poor) : 3.18
K magnitude           : 9.081
G magnitude           : 14.281
RP magnitude          : 12.860
BP magnitude          : 15.605
DUPflag              : 0
Distance (au)         : 5.271
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : 14.76
Sun-Target sep (deg)  : 86.91
Sun-Moon sep (deg)   : 16.81
B (ring opening deg) : -2.63
PA of pole (deg)     : 0.54
Pole direction: RA (deg): 268.05700
Dec (deg): 64.49651
C/A sky separation (") : 0.530
C/A sky separation (km) : 2025.4
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
    
```

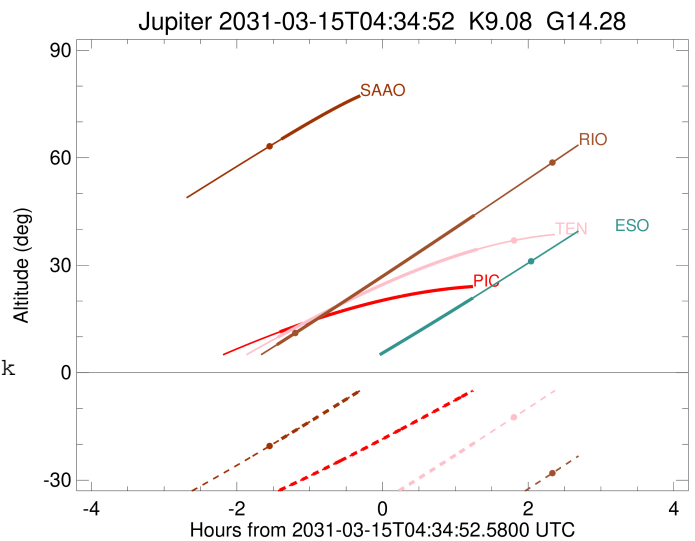
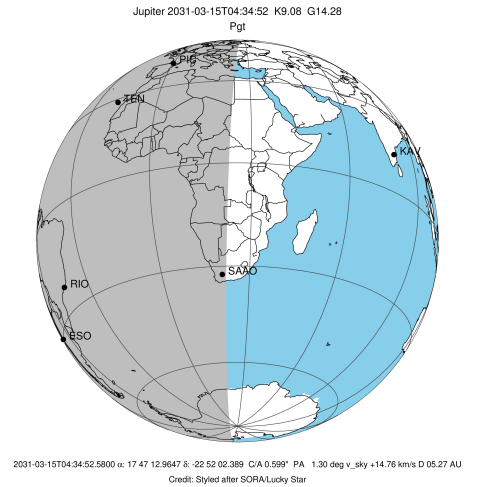


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-03-15T03:08:27.126	9.87	-52.56	71492.0	0.34	0.39
Jupiter	E	2031-03-15T05:53:04.075	34.43	-19.06	71492.0	2.75	3.14

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-03-15T04:28:41.520
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       : 4068933891823245440
2Mass ID (if available) : 17471291-2252019
ICRS Star Coord at Epoch: 17h 47m 12.96466s -22:52:02.38890s
RUWE (>1.4 is poor) : 3.18
K magnitude           : 9.081
G magnitude           : 14.281
RP magnitude         : 12.860
BP magnitude         : 15.605
DUPflag              : 0
Distance (au)        : 5.271
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : 14.76
Sun-Target sep (deg) : 86.91
Sun-Moon sep (deg)   : 16.59
B (ring opening deg) : -2.63
PA of pole (deg)     : 0.54
Pole direction: RA (deg): 268.05700
Dec (deg): 64.49651
C/A sky separation (") : 1.014
C/A sky separation (km) : 3877.3
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
    
```

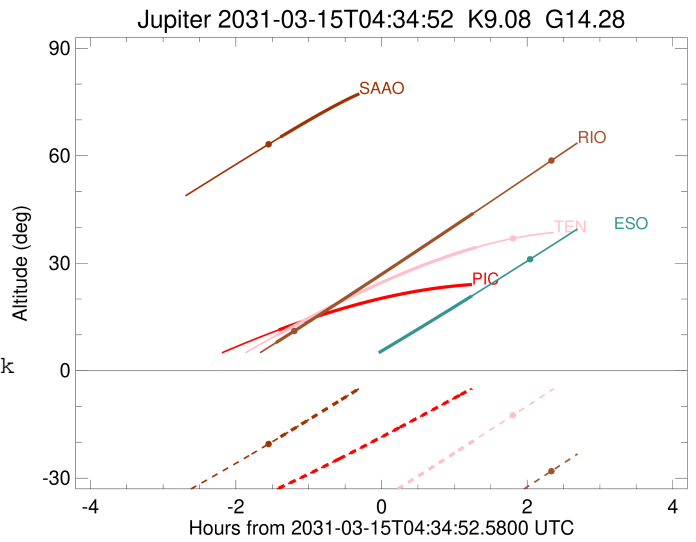
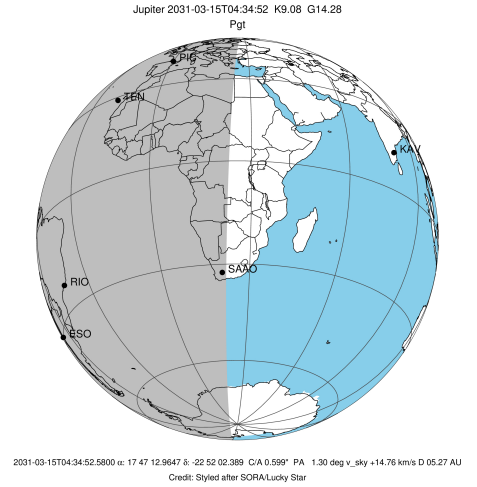


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-03-15T03:07:49.139	7.79	-64.96	71491.9	-4.51	-5.15
Jupiter	E	2031-03-15T05:50:31.235	43.94	-41.94	71492.0	-1.76	-2.02

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-03-15T04:28:47.150
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       : 4068933891823245440
2Mass ID (if available) : 17471291-2252019
ICRS Star Coord at Epoch: 17h 47m 12.96466s -22:52:02.38890s
RUWE (>1.4 is poor) : 3.18
K magnitude          : 9.081
G magnitude          : 14.281
RP magnitude         : 12.860
BP magnitude         : 15.605
DUPflag             : 0
Distance (au)        : 5.271
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : 14.76
Sun-Target sep (deg) : 86.91
Sun-Moon sep (deg)  : 16.50
B (ring opening deg) : -2.63
PA of pole (deg)    : 0.54
Pole direction: RA (deg): 268.05700
Dec (deg): 64.49651
C/A sky separation (") : 1.445
C/A sky separation (km) : 5524.5
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
    
```

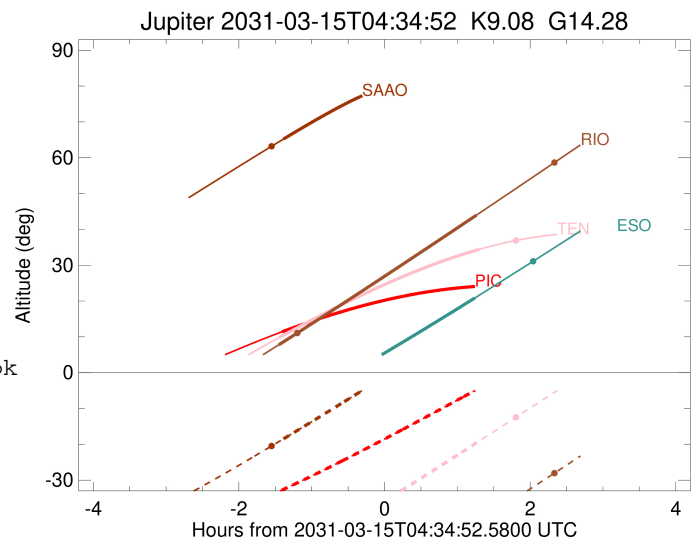
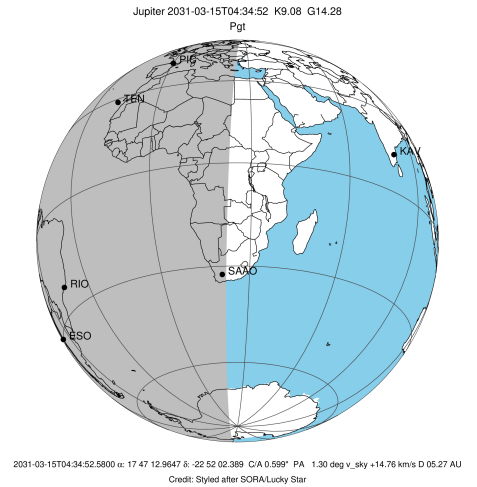


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-03-15T03:09:04.661	-11.03x	-50.13	71491.9	-5.75	-6.57
Jupiter	E	2031-03-15T05:49:24.040	20.87	-55.81	71492.0	-3.06	-3.50

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-03-15T04:34:20.630
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      : 4068933891823245440
2Mass ID (if available) : 17471291-2252019
ICRS Star Coord at Epoch: 17h 47m 12.96466s -22:52:02.38890s
RUWE (>1.4 is poor) : 3.18
K magnitude          : 9.081
G magnitude          : 14.281
RP magnitude         : 12.860
BP magnitude         : 15.605
DUPflag             : 0
Distance (au)       : 5.271
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : 14.76
Sun-Target sep (deg) : 86.91
Sun-Moon sep (deg)  : 17.49
B (ring opening deg) : -2.63
PA of pole (deg)    : 0.54
Pole direction: RA (deg): 268.05700
Dec (deg): 64.49651
C/A sky separation (") : 0.864
C/A sky separation (km) : 3303.6
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	2031-03-15T03:11:40.817	65.21	-18.46	71492.0	-3.60	-4.11
Jupiter	E	2031-03-15T05:57:15.552	73.42	16.25x	71492.0	-1.91	-2.19