

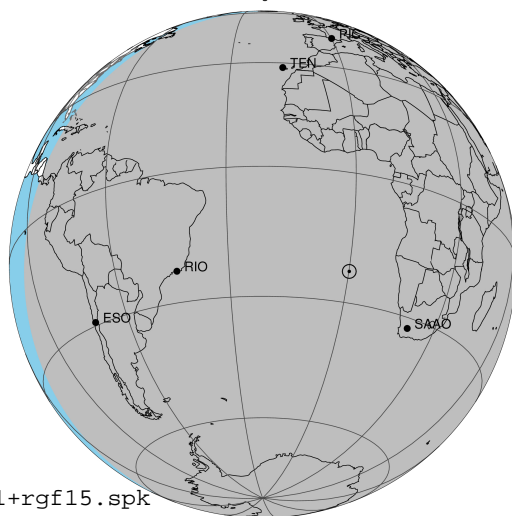
target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2031-07-04T00:03:54.470
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 4114646706210028672
 2Mass ID (if available) : 17223430-2244097

Jupiter 2031-07-04T00:03:54 K8.61 G13.99 Pgt

ICRS Star Coord at Epoch: 17h 22m 34.30323s -22:44:09.73675s

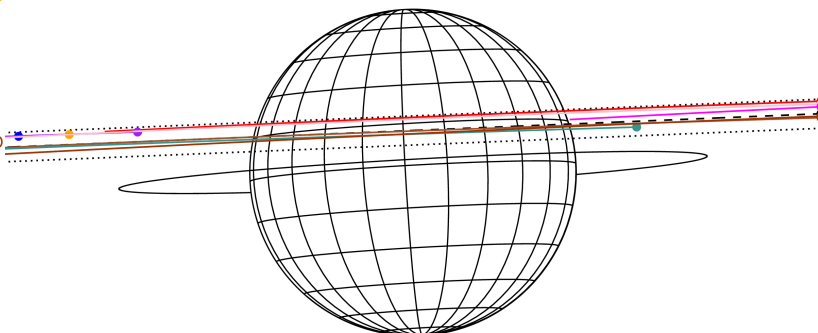
RUWE (>1.4 is poor) : 0.98
 K magnitude : 8.610
 G magnitude : 13.991
 RP magnitude : 12.591
 BP magnitude : 16.458
 DUPflag : 0
 Distance (au) : 4.308
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -14.71
 Sun-Target sep (deg) : 159.94
 Sun-Moon sep (deg) : 9.08
 B (ring opening deg) : -2.58
 PA of pole (deg) : 3.19
 Pole direction: RA (deg): 268.05690
 Dec (deg): 64.49651
 C/A sky separation (") : 5.887
 C/A sky separation (km) : 18392.1
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk

Jupiter 2031-07-04T00:03:54 K8.61 G13.99
 Pgt



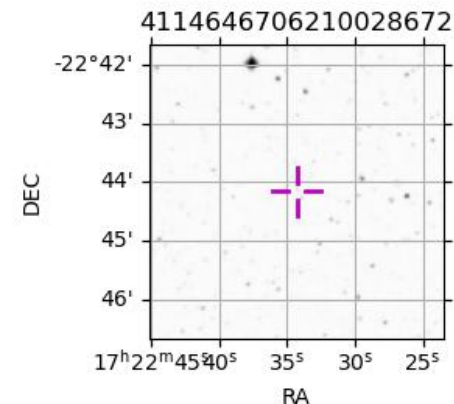
2031-07-04T00:03:54.4700 at: 17 22 34.3032 s: -22 44 09.737 C/A 5.875" PA 182.35 deg v_sky -14.71 km/s D 04.31 AU
 Credit: Styled after SORA/Lucky Star

Earth
 PIC
 PAL
 KPNO
 MCD
 TEN
 KAV
 RIO
 ESO
 SAAO



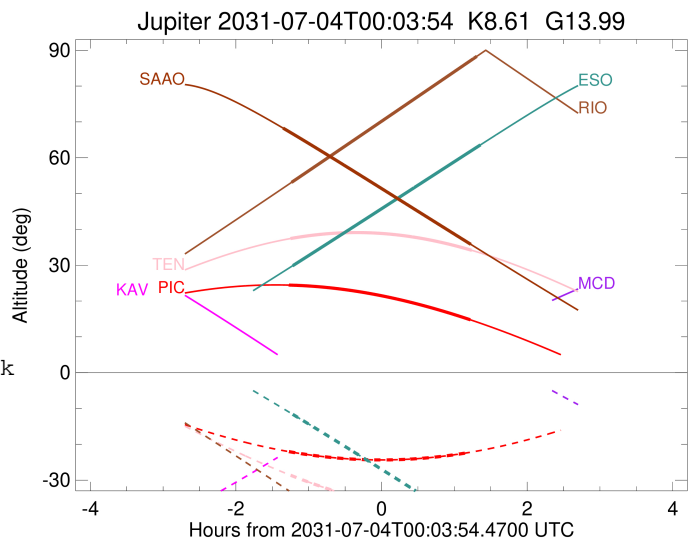
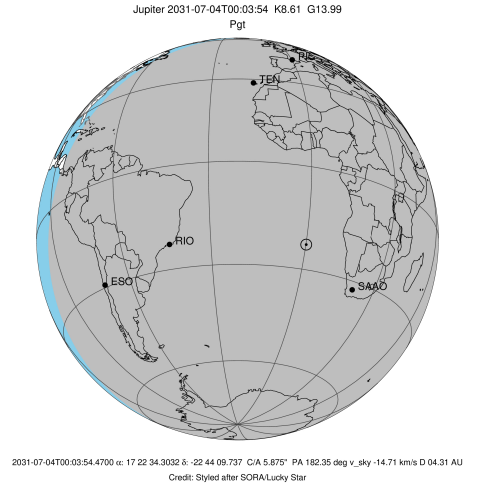
Observable events with sun below -5 deg and altitude above 5 deg

Obs	Location	lat	Elon	Target	Observed Events Interval	OCode
PIC	Pic du Midi	42.9	0.1	+ +	JUL 03 22:47 - JUL 04 01:17	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			Pnn
TEN	Teide Obs./Tenerife	28.3	343.5	+ +	JUL 03 22:49 - JUL 04 01:18	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	+ +	JUL 03 22:49 - JUL 04 01:22	Pie
ESO	European Southern Obs. (3.6m)	-29.3	289.3	+ +	JUL 03 22:50 - JUL 04 01:25	Pie
AAT	Siding Spring (AAT)	-31.3	149.1			Pnn
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8	+ +	JUL 03 22:42 - JUL 04 01:17	Pie
MSO	Mt. Stromlo Observatory	-35.3	149.0			Pnn



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-07-04T00:02:16.940
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        : 4114646706210028672
2Mass ID (if available) : 17223430-2244097
ICRS Star Coord at Epoch: 17h 22m 34.30323s -22:44:09.73675s
RUWE (>1.4 is poor) : 0.98
K magnitude           : 8.610
G magnitude           : 13.991
RP magnitude          : 12.591
BP magnitude          : 16.458
DUPflag              : 0
Distance (au)         : 4.308
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -14.71
Sun-Target sep (deg)  : 159.94
Sun-Moon sep (deg)    : 8.72
B (ring opening deg) : -2.58
PA of pole (deg)      : 3.19
Pole direction: RA (deg): 268.05690
Dec (deg): 64.49651
C/A sky separation (") : 7.722
C/A sky separation (km) : 24125.5
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
    
```

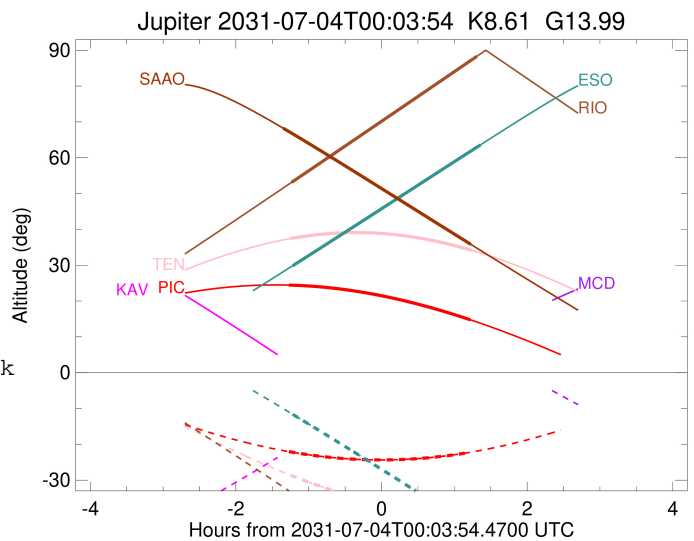
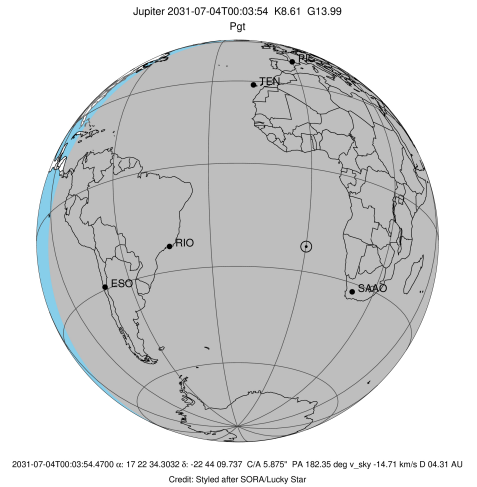


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-07-03T22:47:42.127	24.44	-22.05	71491.0	18.92	21.39
Jupiter	E	2031-07-04T01:17:05.821	14.76	-22.22	71490.9	20.32	22.93

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-07-04T00:03:33.110
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        : 4114646706210028672
2Mass ID (if available) : 17223430-2244097
ICRS Star Coord at Epoch: 17h 22m 34.30323s -22:44:09.73675s
RUWE (>1.4 is poor) : 0.98
K magnitude           : 8.610
G magnitude           : 13.991
RP magnitude          : 12.591
BP magnitude          : 16.458
DUPflag              : 0
Distance (au)         : 4.308
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -14.71
Sun-Target sep (deg)  : 159.94
Sun-Moon sep (deg)   : 8.97
B (ring opening deg) : -2.58
PA of pole (deg)     : 3.19
Pole direction: RA (deg): 268.05690
Dec (deg): 64.49651
C/A sky separation ("): 7.473
C/A sky separation (km): 23346.3
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
    
```

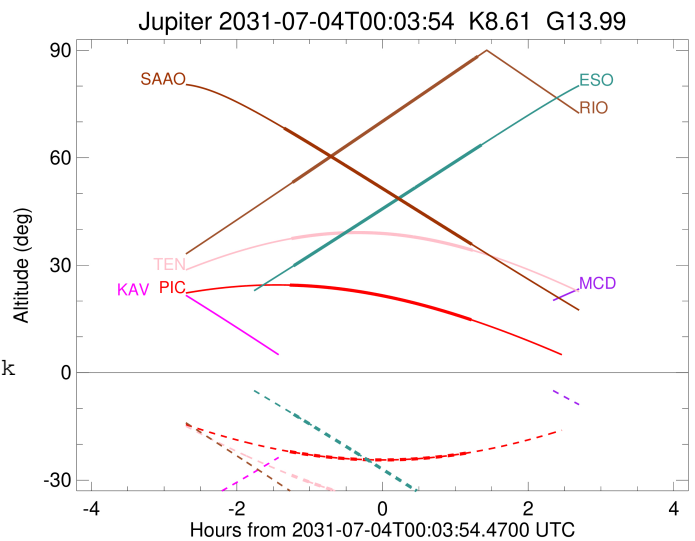
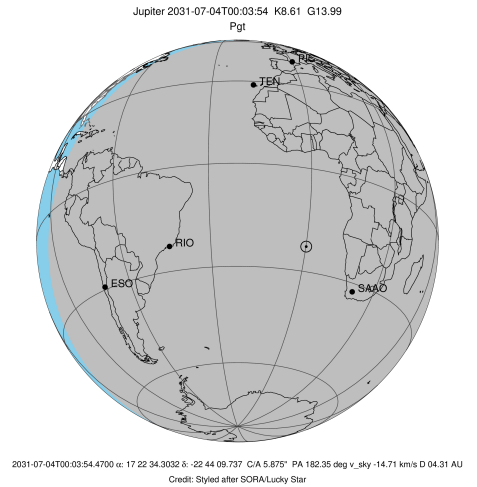


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-07-03T22:49:01.462	37.44	-28.64	71491.1	18.10	20.48
Jupiter	E	2031-07-04T01:18:10.300	34.16	-38.94	71491.0	19.78	22.33

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-07-04T00:06:10.980
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     : 4114646706210028672
2Mass ID (if available) : 17223430-2244097
ICRS Star Coord at Epoch: 17h 22m 34.30323s -22:44:09.73675s
RUWE (>1.4 is poor) : 0.98
K magnitude        : 8.610
G magnitude        : 13.991
RP magnitude       : 12.591
BP magnitude       : 16.458
DUPflag           : 0
Distance (au)     : 4.308
f0 (km)           : 0.00
g0 (km)           : 0.00
skyplane vel. (km/s) : -14.71
Sun-Target sep (deg) : 159.94
Sun-Moon sep (deg) : 9.58
B (ring opening deg) : -2.58
PA of pole (deg)  : 3.19
Pole direction: RA (deg): 268.05690
Dec (deg): 64.49651
C/A sky separation (") : 5.814
C/A sky separation (km) : 18162.9
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
    
```

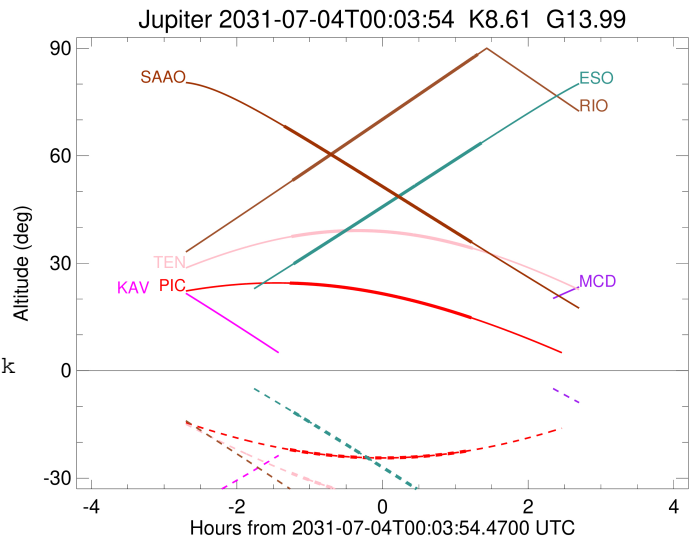
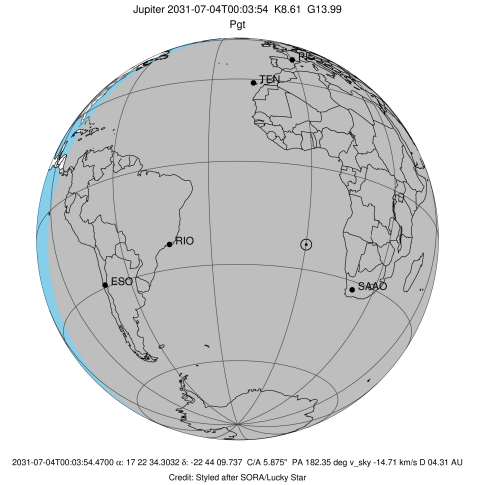


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-07-03T22:49:43.155	53.09	-33.43	71491.5	13.50	15.34
Jupiter	E	2031-07-04T01:22:25.816	88.29	-68.18	71491.3	15.72	17.83

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-07-04T00:08:22.140
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        : 4114646706210028672
2Mass ID (if available) : 17223430-2244097
ICRS Star Coord at Epoch: 17h 22m 34.30323s -22:44:09.73675s
RUWE (>1.4 is poor)  : 0.98
K magnitude           : 8.610
G magnitude           : 13.991
RP magnitude          : 12.591
BP magnitude          : 16.458
DUPflag               : 0
Distance (au)         : 4.308
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -14.71
Sun-Target sep (deg)  : 159.94
Sun-Moon sep (deg)    : 9.90
B (ring opening deg)  : -2.58
PA of pole (deg)      : 3.19
Pole direction: RA (deg): 268.05690
Dec (deg): 64.49651
C/A sky separation (") : 5.385
C/A sky separation (km) : 16822.9
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
    
```

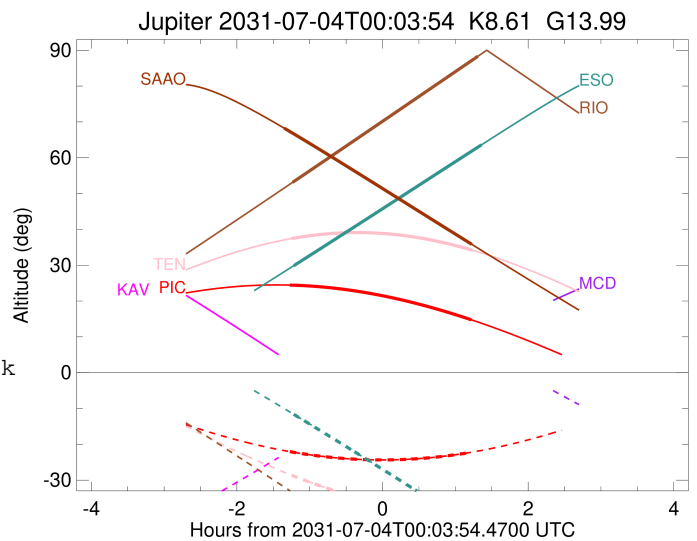
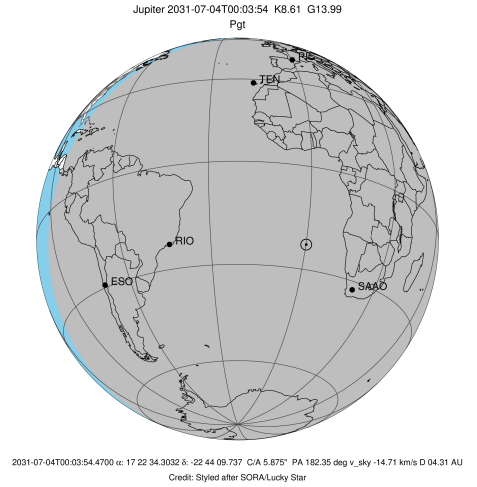


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-07-03T22:50:45.549	29.86	-11.63	71491.6	12.22	13.91
Jupiter	E	2031-07-04T01:25:30.214	63.59	-44.57	71491.4	14.84	16.85

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-07-03T23:59:54.640
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       : 4114646706210028672
2Mass ID (if available) : 17223430-2244097
ICRS Star Coord at Epoch: 17h 22m 34.30323s -22:44:09.73675s
RUWE (>1.4 is poor) : 0.98
K magnitude           : 8.610
G magnitude           : 13.991
RP magnitude          : 12.591
BP magnitude          : 16.458
DUPflag              : 0
Distance (au)        : 4.308
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -14.71
Sun-Target sep (deg) : 159.94
Sun-Moon sep (deg)   : 8.69
B (ring opening deg) : -2.58
PA of pole (deg)     : 3.19
Pole direction: RA (deg): 268.05690
Dec (deg): 64.49651
C/A sky separation ("): 5.428
C/A sky separation (km): 16959.1
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	2031-07-03T22:42:58.173	68.23	-80.69	71491.5	13.13	14.93
Jupiter	E	2031-07-04T01:17:20.075	35.85	-54.36	71491.5	14.13	16.05