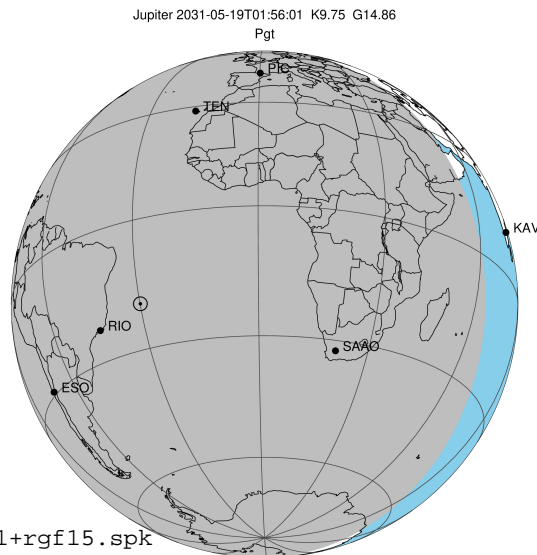


target : Jupiter  
 target radius (km) : 71492.00  
 C/A epoch : 2031-05-19T01:56:01.710  
 Event type : Pgt  
 : Jupiter occs: geocentric, topocentric  
 : Not a ringed target  
 Gaia source ID : 4068855031862470272  
 2Mass ID (if available) : 17461888-2253006

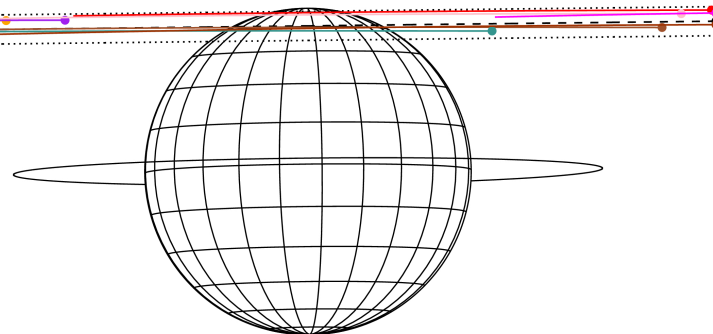
Jupiter 2031-05-19T01:56:01 K9.75 G14.86 Pgt

ICRS Star Coord at Epoch: 17h 46m 18.88580s -22:53:00.80772s  
 RUWE (>1.4 is poor) : 1.06  
 K magnitude : 9.751  
 G magnitude : 14.857  
 RP magnitude : 13.552  
 BP magnitude : 16.782  
 DUPflag : 0  
 Distance (au) : 4.385  
 f0 (km) : 0.00  
 g0 (km) : 0.00  
 skyplane vel. (km/s) : -12.66  
 Sun-Target sep (deg) : 150.64  
 Sun-Moon sep (deg) : 125.28  
 B (ring opening deg) : -2.61  
 PA of pole (deg) : 0.64  
 Pole direction: RA (deg): 268.05694  
 Dec (deg): 64.49651  
 C/A sky separation (") : 20.059  
 C/A sky separation (km) : 63790.0  
 NAIF SPICE kernels : RAJobs\_U111+rgf15.spk



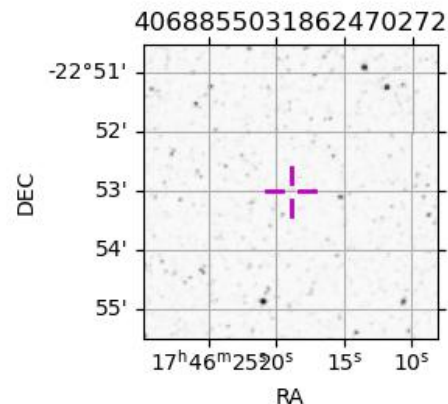
2031-05-19T01:56:01.7100 a: 17 46 18.8858 s: -22 53 00.808 C/A \*\*\*\*\* PA 180.66 deg v\_sky -12.66 km/s D 04.38 AU  
 Credit: Styled after SORA/Lucky Star

Earth  
 PIC  
 PAL  
 KPNO  
 MCD  
 TEN  
 KAV  
 RIO  
 ESO  
 SAAO



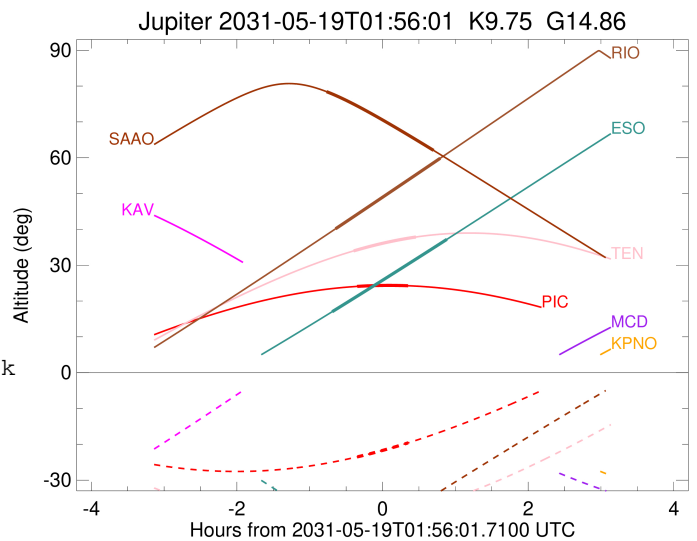
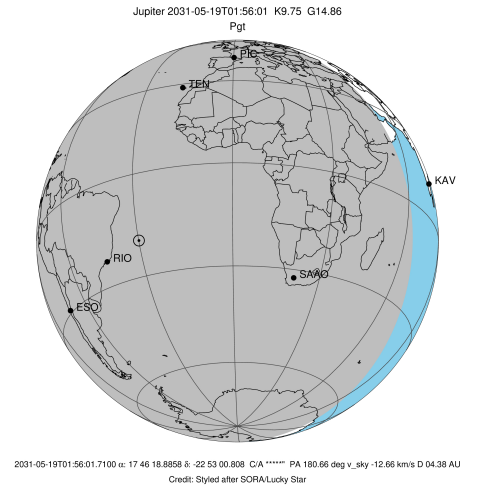
Observable events with sun below -5 deg and altitude above 5 deg

Obs	Location	lat	Elon	Target	Observed Events Interval	OCode
PIC	Pic du Midi	42.9	0.1	+ +	MAY 19 01:35 - MAY 19 02:17	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	+ +	MAY 19 01:32 - MAY 19 02:23	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	+ +	MAY 19 01:17 - MAY 19 02:43	Pie
ESO	European Southern Obs. (3.6m)	-29.3	289.3	+ +	MAY 19 01:14 - MAY 19 02:49	Pie
AAT	Siding Spring (AAT)	-31.3	149.1			Pnn
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8	+ +	MAY 19 01:09 - MAY 19 02:38	Pie
MSO	Mt. Stromlo Observatory	-35.3	149.0			Pnn



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-19T01:56:11.440
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        : 4068855031862470272
2Mass ID (if available) : 17461888-2253006
ICRS Star Coord at Epoch: 17h 46m 18.88580s -22:53:00.80772s
RUWE (>1.4 is poor)  : 1.06
K magnitude           : 9.751
G magnitude           : 14.857
RP magnitude          : 13.552
BP magnitude          : 16.782
DUPflag              : 0
Distance (au)         : 4.385
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -12.66
Sun-Target sep (deg)  : 150.64
Sun-Moon sep (deg)    : 125.60
B (ring opening deg)  : -2.61
PA of pole (deg)      : 0.64
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 21.884
C/A sky separation (km) : 69592.2
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
    
```

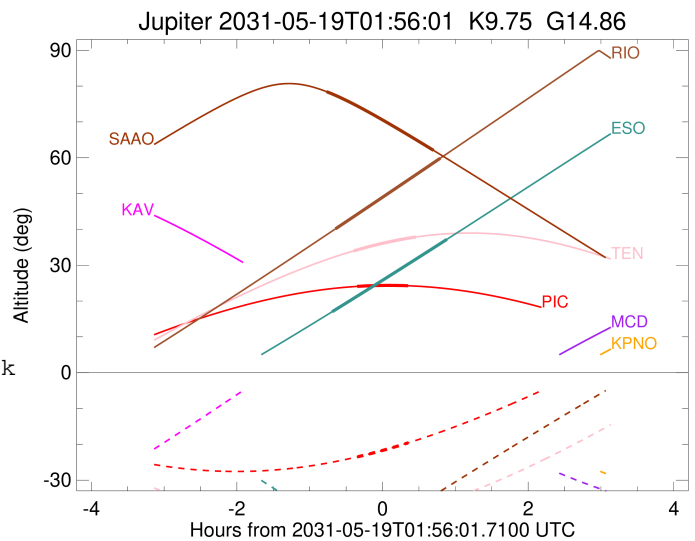
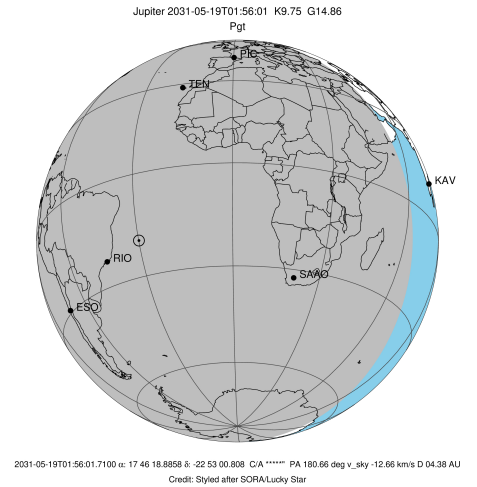


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-19T01:35:12.760	24.08	-23.51	71483.2	76.51	78.07
Jupiter	E	2031-05-19T02:17:09.704	24.26	-19.60	71483.2	76.52	78.07

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-19T01:57:57.150
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       : 4068855031862470272
2Mass ID (if available) : 17461888-2253006
ICRS Star Coord at Epoch: 17h 46m 18.88580s -22:53:00.80772s
RUWE (>1.4 is poor) : 1.06
K magnitude           : 9.751
G magnitude           : 14.857
RP magnitude         : 13.552
BP magnitude         : 16.782
DUPflag              : 0
Distance (au)        : 4.385
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -12.66
Sun-Target sep (deg) : 150.64
Sun-Moon sep (deg)   : 125.59
B (ring opening deg) : -2.61
PA of pole (deg)     : 0.64
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 21.582
C/A sky separation (km) : 68631.7
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
    
```

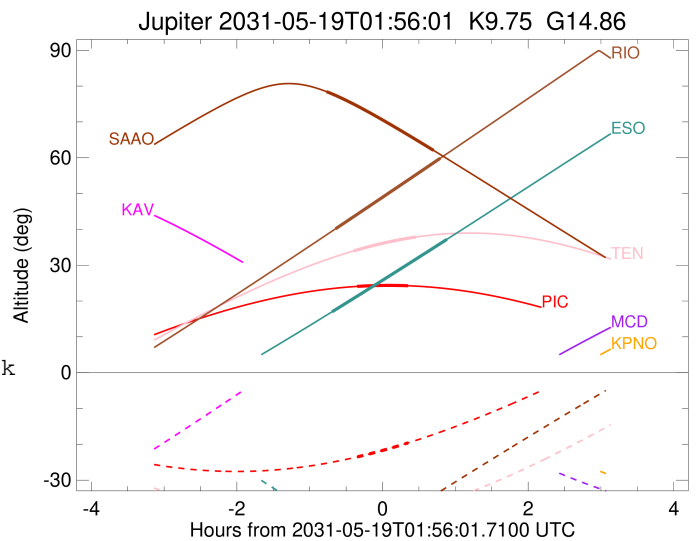
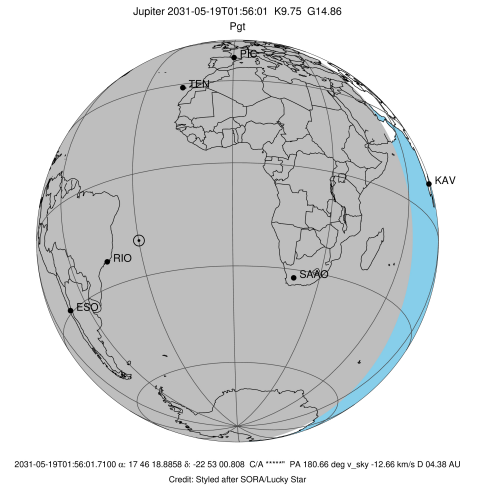


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-19T01:32:21.420	34.00	-41.63	71483.5	73.32	75.21
Jupiter	E	2031-05-19T02:23:30.813	37.86	-38.31	71483.4	73.72	75.57

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-19T02:00:36.090
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      : 4068855031862470272
2Mass ID (if available) : 17461888-2253006
ICRS Star Coord at Epoch: 17h 46m 18.88580s -22:53:00.80772s
RUWE (>1.4 is poor) : 1.06
K magnitude         : 9.751
G magnitude         : 14.857
RP magnitude        : 13.552
BP magnitude        : 16.782
DUPflag            : 0
Distance (au)       : 4.385
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -12.66
Sun-Target sep (deg) : 150.64
Sun-Moon sep (deg)  : 125.50
B (ring opening deg) : -2.61
PA of pole (deg)    : 0.64
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 19.856
C/A sky separation (km) : 63144.5
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
    
```

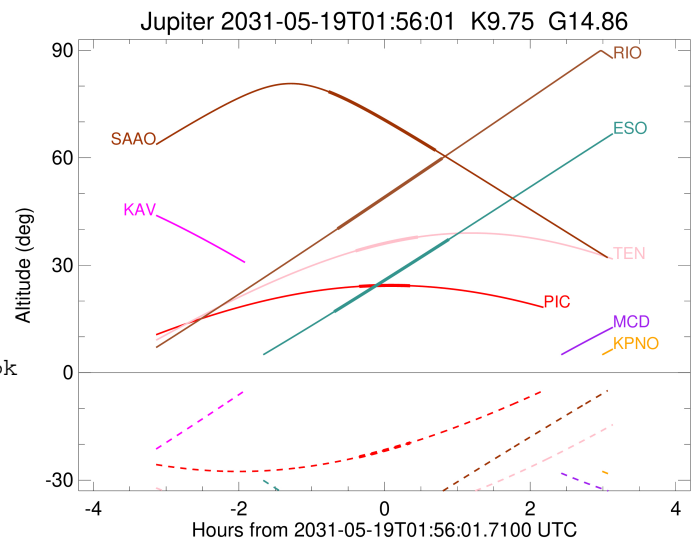
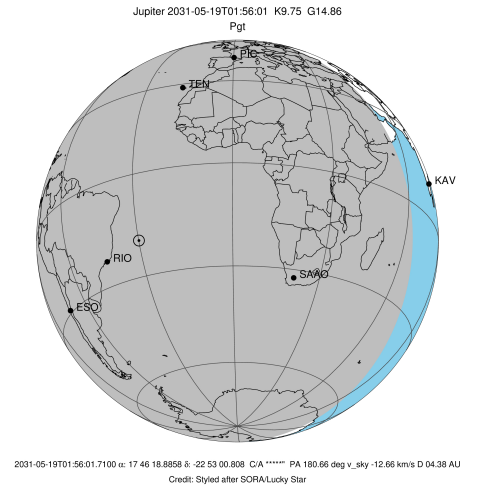


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-19T01:17:22.724	40.16	-68.37	71484.8	61.39	64.36
Jupiter	E	2031-05-19T02:43:37.358	59.85	-86.67	71484.7	62.37	65.26

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-19T02:01:58.430
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      : 4068855031862470272
2Mass ID (if available) : 17461888-2253006
ICRS Star Coord at Epoch: 17h 46m 18.88580s -22:53:00.80772s
RUWE (>1.4 is poor) : 1.06
K magnitude          : 9.751
G magnitude          : 14.857
RP magnitude         : 13.552
BP magnitude         : 16.782
DUPflag             : 0
Distance (au)        : 4.385
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -12.66
Sun-Target sep (deg) : 150.64
Sun-Moon sep (deg)  : 125.16
B (ring opening deg) : -2.61
PA of pole (deg)    : 0.64
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 19.374
C/A sky separation (km) : 61610.1
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
    
```

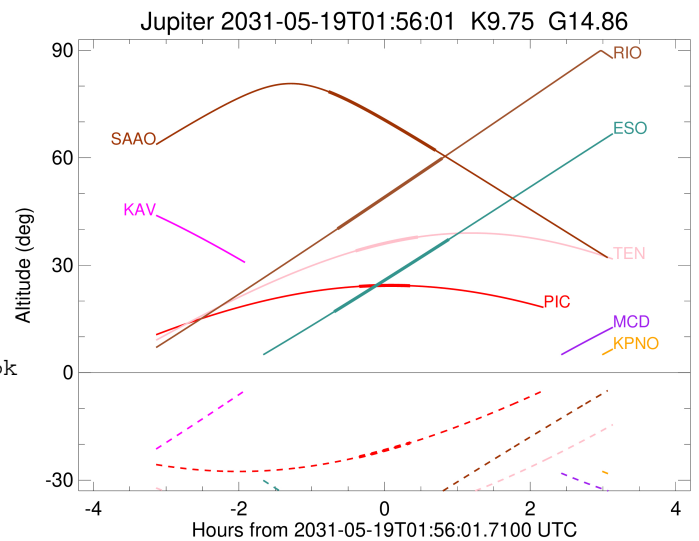
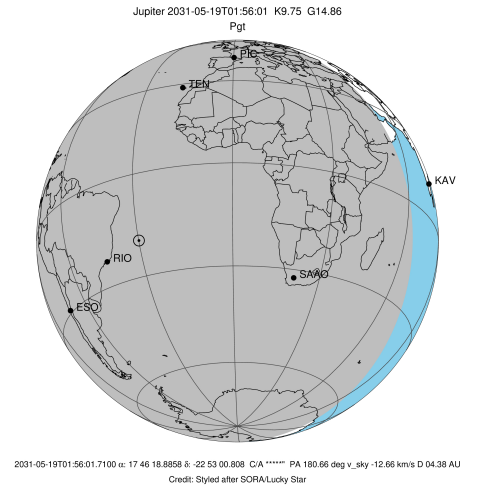


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-19T01:14:34.161	17.01	-42.79	71485.2	58.76	61.91
Jupiter	E	2031-05-19T02:49:04.178	37.21	-63.27	71485.0	60.04	63.10

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-19T01:54:01.200
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        : 4068855031862470272
2Mass ID (if available) : 17461888-2253006
ICRS Star Coord at Epoch: 17h 46m 18.88580s -22:53:00.80772s
RUWE (>1.4 is poor) : 1.06
K magnitude           : 9.751
G magnitude           : 14.857
RP magnitude          : 13.552
BP magnitude          : 16.782
DUPflag              : 0
Distance (au)         : 4.385
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -12.66
Sun-Target sep (deg)  : 150.64
Sun-Moon sep (deg)   : 126.14
B (ring opening deg) : -2.61
PA of pole (deg)     : 0.64
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 19.704
C/A sky separation (km) : 62661.0
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
    
```



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	2031-05-19T01:09:57.955	78.43	-52.85	71484.8	61.29	64.26
Jupiter	E	2031-05-19T02:38:07.623	62.04	-34.28	71484.9	60.84	63.84