

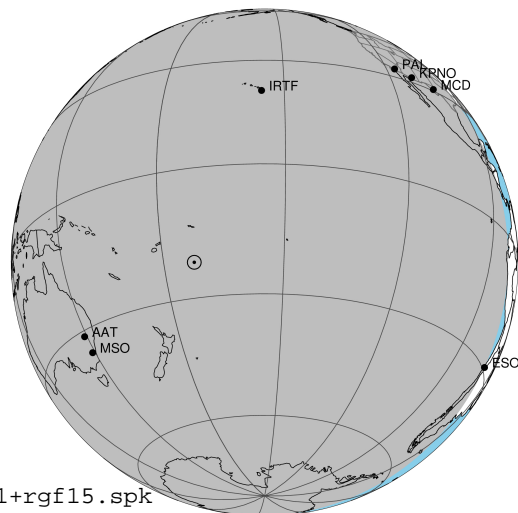
target : Jupiter  
 target radius (km) : 71492.00  
 C/A epoch : 2031-05-31T11:26:13.820  
 Event type : Pgt  
 : Jupiter occs: geocentric, topocentric  
 : Not a ringed target  
 Gaia source ID : 4116565285372027264  
 2Mass ID (if available) : 17403173-2252271

Jupiter 2031-05-31T11:26:13 K9.12 G14.84 Pgt

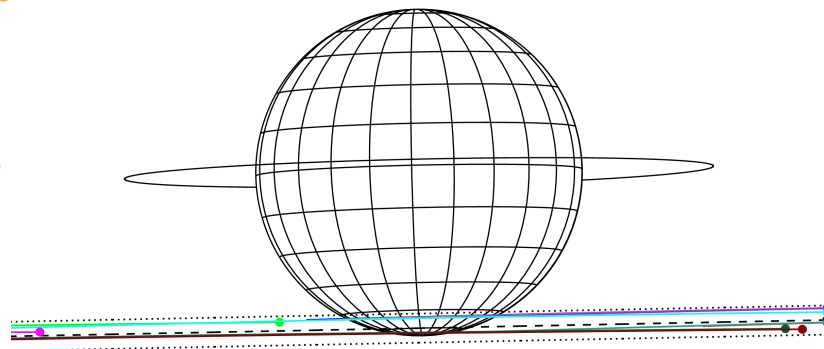
ICRS Star Coord at Epoch: 17h 40m 31.72140s -22:52:27.07057s

RUWE (>1.4 is poor) : 0.96  
 K magnitude : 9.119  
 G magnitude : 14.841  
 RP magnitude : 13.446  
 BP magnitude : 17.283  
 DUPflag : 0  
 Distance (au) : 4.304  
 f0 (km) : 0.00  
 g0 (km) : 0.00  
 skyplane vel. (km/s) : -15.29  
 Sun-Target sep (deg) : 163.89  
 Sun-Moon sep (deg) : 82.53  
 B (ring opening deg) : -2.60  
 PA of pole (deg) : 1.26  
 Pole direction: RA (deg): 268.05693  
 Dec (deg): 64.49651  
 C/A sky separation (") : 21.839  
 C/A sky separation (km) : 68171.8  
 NAIF SPICE kernels : RAJobs\_U111+rgf15.spk

Jupiter 2031-05-31T11:26:13 K9.12 G14.84  
 Pgt



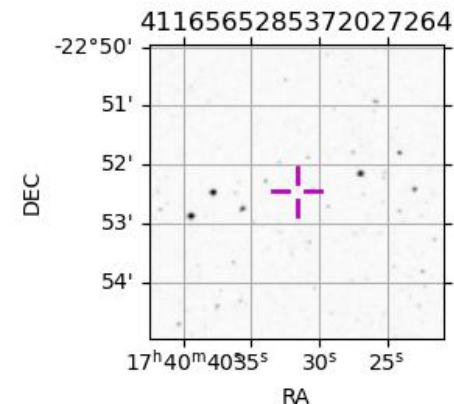
Earth  
 PAL  
 PMO  
 KPNO  
 MCD  
 IRTF  
 KAV  
 RIO  
 ESO  
 AAT  
 MSO



2031-05-31T11:26:13.8200 α: 17 40 31.7214 δ: -22 52 27.071 C/A \*\*\*\*\* PA 1.14 deg v\_sky -15.29 km/s D 04.30 AU  
 Credit: Styled after SORA/Lucky Star

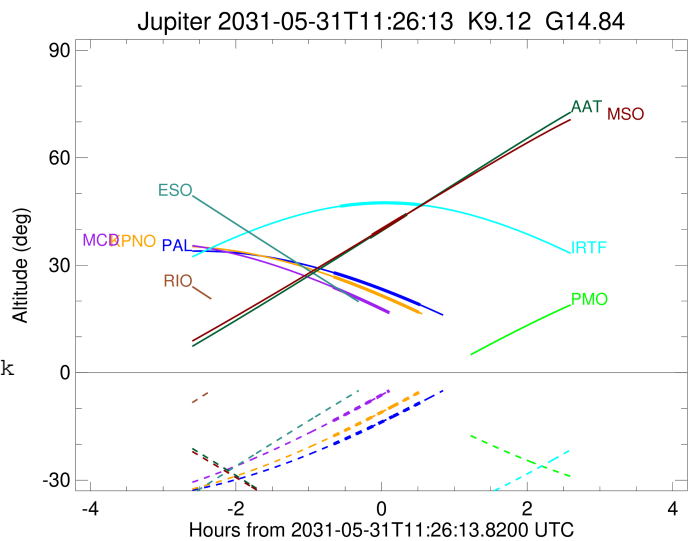
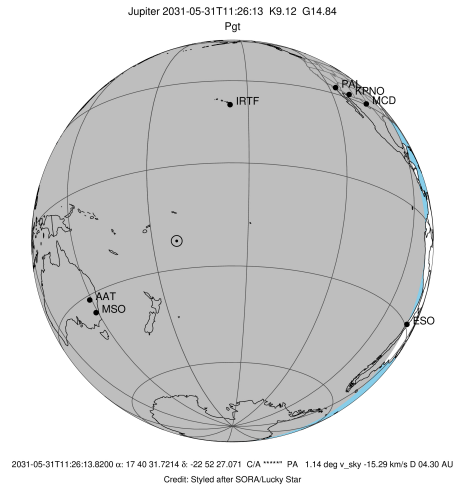
Observable events with sun below -5 deg and altitude above 5 deg

Obs	Location	lat	Elon	Target	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1			Pnn
PAL	Palomar Mt (200")	33.4	243.1	+ +	MAY 31 10:46 - MAY 31 11:58	Pie
PMO	Purple Mtn Obs. Nanking	32.1	118.8			Pnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+ +	MAY 31 10:46 - MAY 31 11:57	Pie
MCD	McDonald Obs. 2.7m	30.7	256.0	+	MAY 31 10:46 - MAY 31 10:46	Pin
TEN	Teide Obs./Tenerife	28.3	343.5			Pnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+ +	MAY 31 10:52 - MAY 31 12:00	Pie
KAV	Kavalur Observatory	12.6	78.8			Pnn
RIO	Rio de Janeiro	-22.9	316.8			Pnn
ESO	European Southern Obs. (3.6m)	-29.3	289.3			Pnn
AAT	Siding Spring (AAT)	-31.3	149.1	+ +	MAY 31 11:16 - MAY 31 11:46	Pie
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8			Pnn
MSO	Mt. Stromlo Observatory	-35.3	149.0	+ +	MAY 31 11:18 - MAY 31 11:44	Pie



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-31T11:22:26.860
Event type            : Pgt
: Jupiter occs: geocentric, topocentric
: Not a ringed target
Observer code         : PAL
Location              : Palomar Mt (200")
Latitude (deg)        : 33.35622
E. Longitude (deg)    : 243.13601
Altitude (km)         : 1.706
Gaia source ID        : 4116565285372027264
2Mass ID (if available) : 17403173-2252271
ICRS Star Coord at Epoch: 17h 40m 31.72140s -22:52:27.07057s
RUWE (>1.4 is poor) : 0.96
K magnitude           : 9.119
G magnitude           : 14.841
RP magnitude          : 13.446
BP magnitude          : 17.283
DUPflag              : 0
Distance (au)         : 4.304
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -15.29
Sun-Target sep (deg)  : 163.89
Sun-Moon sep (deg)   : 82.96
B (ring opening deg) : -2.60
PA of pole (deg)      : 1.26
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (") : 20.261
C/A sky separation (km) : 63248.0
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
    
```

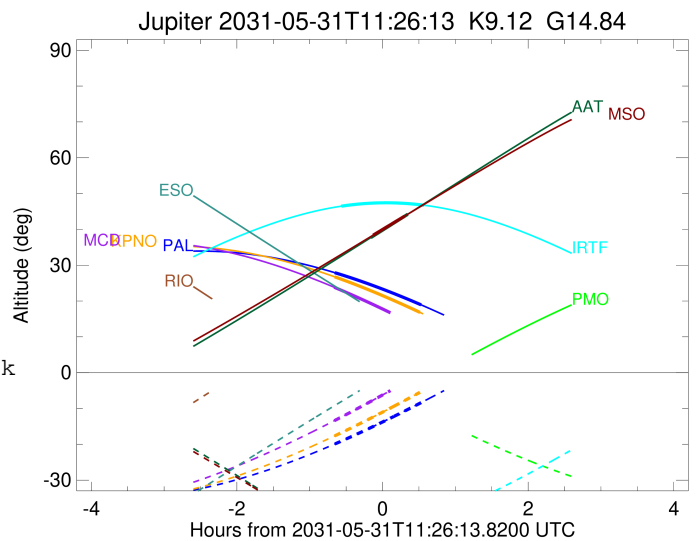
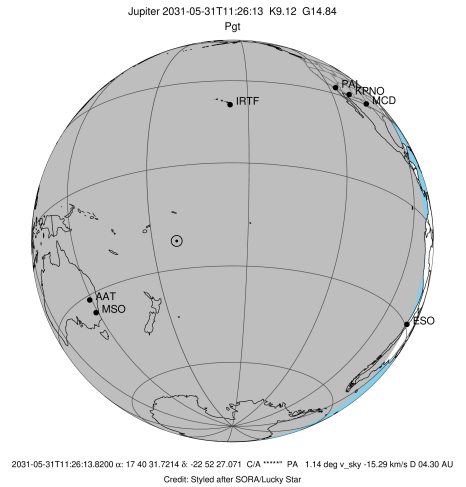


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-31T10:46:56.075	27.91	-19.91	71484.8	-61.95	-64.87
Jupiter	E	2031-05-31T11:58:02.260	18.93	-8.37	71484.7	-62.34	-65.23

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-31T11:21:55.460
Event type           : Pgt
: Jupiter occs: geocentric, topocentric
: Not a ringed target
Observer code        : KPNO
Location             : Kitt Peak Natl Obs
Latitude (deg)      : 31.96333
E. Longitude (deg)  : 248.40000
Altitude (km)       : 2.120
Gaia source ID      : 4116565285372027264
2Mass ID (if available) : 17403173-2252271
ICRS Star Coord at Epoch: 17h 40m 31.72140s -22:52:27.07057s
RUWE (>1.4 is poor) : 0.96
K magnitude          : 9.119
G magnitude          : 14.841
RP magnitude        : 13.446
BP magnitude        : 17.283
DUPflag            : 0
Distance (au)       : 4.304
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -15.29
Sun-Target sep (deg) : 163.89
Sun-Moon sep (deg)  : 82.95
B (ring opening deg) : -2.60
PA of pole (deg)    : 1.26
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (" ) : 20.327
C/A sky separation (km) : 63454.8
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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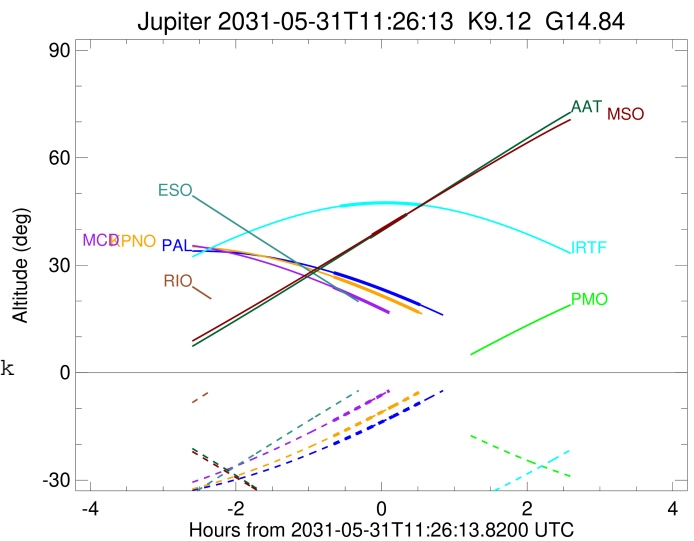
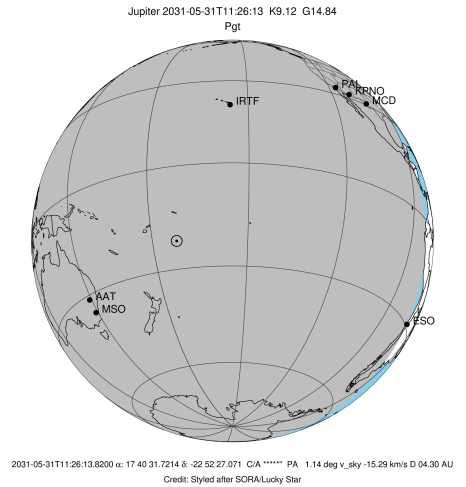


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-31T10:46:47.848	26.75	-17.64	71484.7	-62.26	-65.16
Jupiter	E	2031-05-31T11:57:08.252	16.82	-5.47	71484.7	-62.74	-65.60

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-31T11:21:15.020
Event type          : Pgt
                    : Jupiter occs: geocentric, topocentric
                    : Not a ringed target
Observer code       : MCD
Location            : McDonald Obs. 2.7m
Latitude (deg)      : 30.67158
E. Longitude (deg)  : 255.97844
Altitude (km)       : 2.075
Gaia source ID      : 4116565285372027264
2Mass ID (if available) : 17403173-2252271
ICRS Star Coord at Epoch: 17h 40m 31.72140s -22:52:27.07057s
RUWE (>1.4 is poor) : 0.96
K magnitude          : 9.119
G magnitude          : 14.841
RP magnitude         : 13.446
BP magnitude         : 17.283
DUPflag             : 0
Distance (au)       : 4.304
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -15.29
Sun-Target sep (deg) : 163.89
Sun-Moon sep (deg)  : 82.90
B (ring opening deg) : -2.60
PA of pole (deg)    : 1.26
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation ("): 20.417
C/A sky separation (km): 63735.1
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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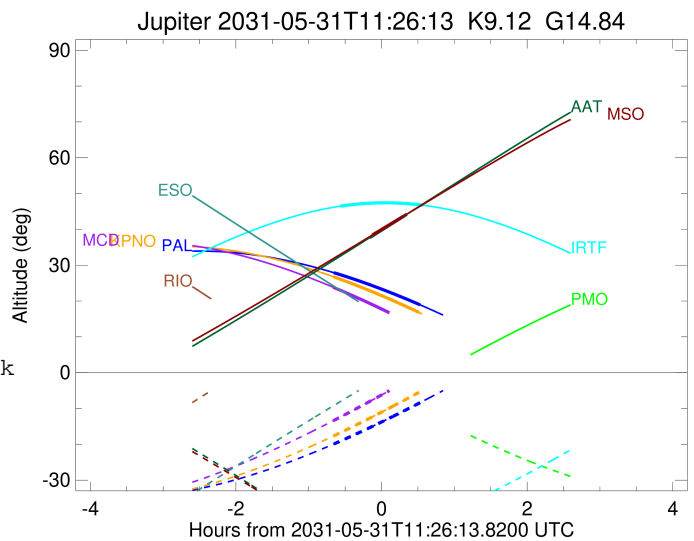
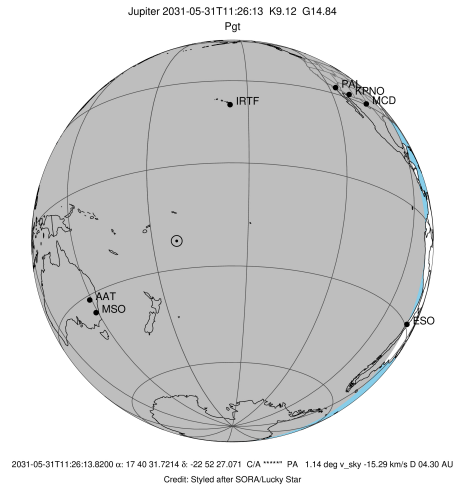


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-31T10:46:38.228	23.81	-13.39	71484.7	-62.69	-65.55
Jupiter	E	2031-05-31T11:55:57.707	12.79	-0.58x	71484.6	-63.29	-66.11

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-31T11:26:25.790
Event type           : Pgt
: Jupiter occs: geocentric, topocentric
: Not a ringed target
Observer code        : IRTF
Location             : Mauna Kea/IRTF
Latitude (deg)      : 19.82622
E. Longitude (deg)  : 204.52800
Altitude (km)       : 4.168
Gaia source ID      : 4116565285372027264
2Mass ID (if available) : 17403173-2252271
ICRS Star Coord at Epoch: 17h 40m 31.72140s -22:52:27.07057s
RUWE (>1.4 is poor) : 0.96
K magnitude          : 9.119
G magnitude          : 14.841
RP magnitude         : 13.446
BP magnitude         : 17.283
DUPflag             : 0
Distance (au)       : 4.304
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -15.29
Sun-Target sep (deg) : 163.89
Sun-Moon sep (deg)  : 83.23
B (ring opening deg) : -2.60
PA of pole (deg)    : 1.26
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (") : 20.456
C/A sky separation (km) : 63856.1
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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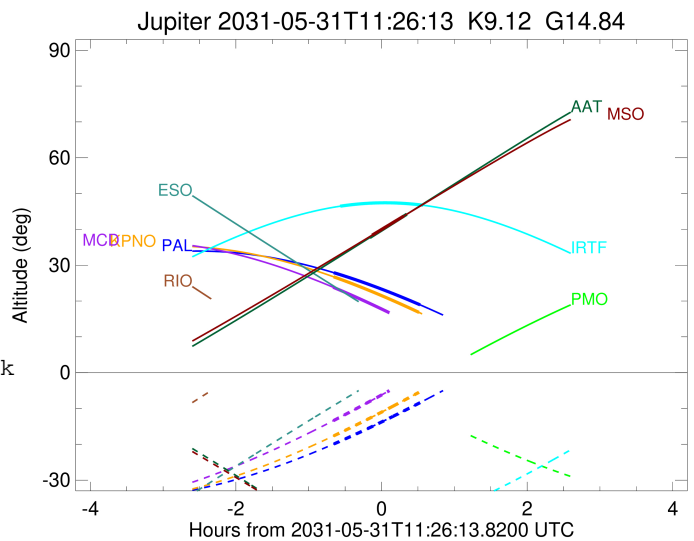
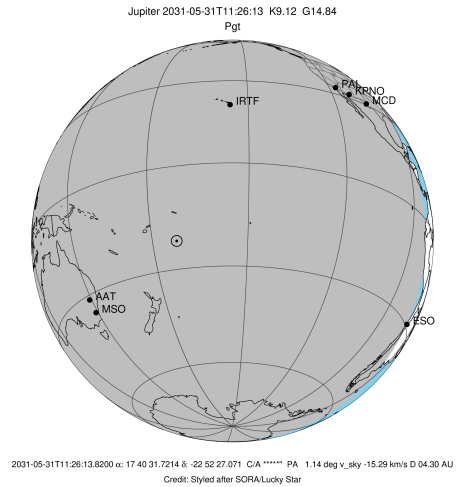


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-31T10:52:25.279	46.47	-47.61	71484.6	-63.37	-66.18
Jupiter	E	2031-05-31T12:00:25.739	46.73	-41.63	71484.6	-63.07	-65.90

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-31T11:31:42.140
Event type           : Pgt
: Jupiter occs: geocentric, topocentric
: Not a ringed target
Observer code        : AAT
Location             : Siding Spring (AAT)
Latitude (deg)       : -31.27703
E. Longitude (deg)   : 149.06608
Altitude (km)        : 1.164
Gaia source ID       : 4116565285372027264
2Mass ID (if available) : 17403173-2252271
ICRS Star Coord at Epoch: 17h 40m 31.72140s -22:52:27.07057s
RUWE (>1.4 is poor) : 0.96
K magnitude           : 9.119
G magnitude           : 14.841
RP magnitude         : 13.446
BP magnitude         : 17.283
DUPflag              : 0
Distance (au)        : 4.304
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -15.29
Sun-Target sep (deg) : 163.89
Sun-Moon sep (deg)   : 83.05
B (ring opening deg) : -2.60
PA of pole (deg)     : 1.26
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (") : 22.443
C/A sky separation (km) : 70059.5
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
    
```

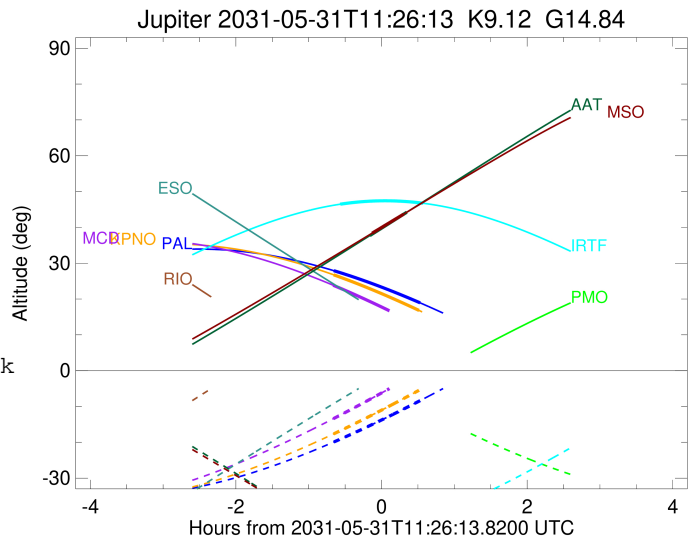
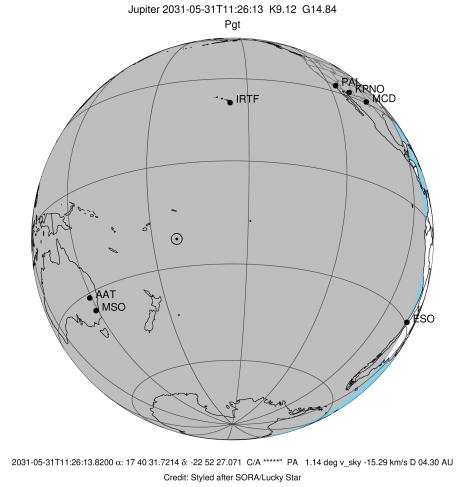


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-31T11:16:27.389	37.67	-52.20	71483.1	-78.85	-80.14
Jupiter	E	2031-05-31T11:46:55.493	44.19	-58.68	71483.1	-77.69	-79.11

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-31T11:31:27.470
Event type           : Pgt
: Jupiter occs: geocentric, topocentric
: Not a ringed target
Observer code        : MSO
Location             : Mt. Stromlo Observatory
Latitude (deg)       : -35.32000
E. Longitude (deg)   : 149.00833
Altitude (km)        : 0.770
Gaia source ID       : 4116565285372027264
2Mass ID (if available) : 17403173-2252271
ICRS Star Coord at Epoch: 17h 40m 31.72140s -22:52:27.07057s
RUWE (>1.4 is poor) : 0.96
K magnitude           : 9.119
G magnitude           : 14.841
RP magnitude          : 13.446
BP magnitude          : 17.283
DUPflag              : 0
Distance (au)         : 4.304
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -15.29
Sun-Target sep (deg) : 163.89
Sun-Moon sep (deg)   : 83.05
B (ring opening deg) : -2.60
PA of pole (deg)     : 1.26
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (") : 22.572
C/A sky separation (km) : 70459.7
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	2031-05-31T11:18:30.369	38.37	-52.12	71483.0	-80.52	-81.62
Jupiter	E	2031-05-31T11:44:23.615	43.68	-57.30	71483.0	-79.40	-80.64