

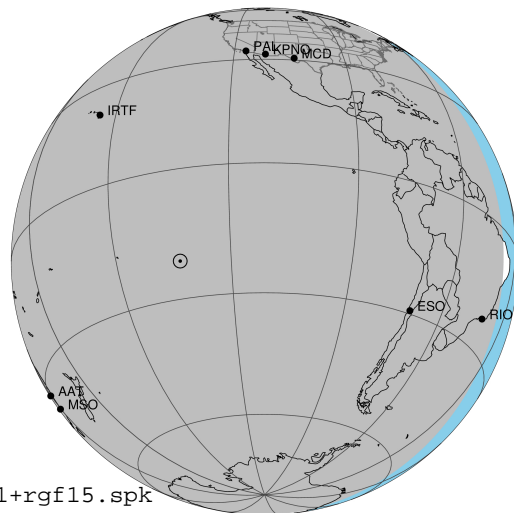
target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2031-05-28T08:48:22.040
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 4116925684619292288
 2Mass ID (if available) : 17420519-2252506

Jupiter 2031-05-28T08:48:22 K8.74 G13.87 Pgt

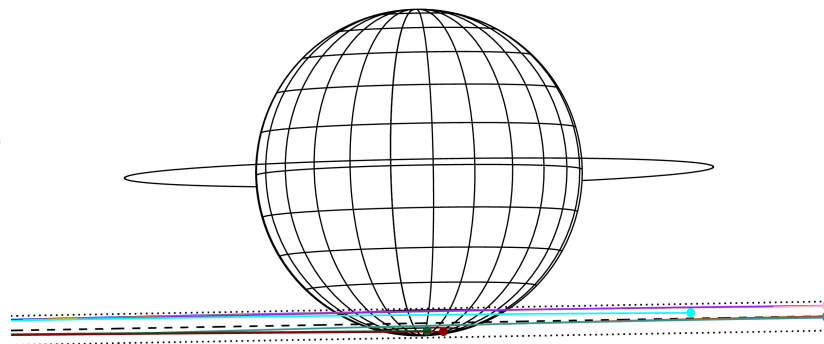
ICRS Star Coord at Epoch: 17h 42m 05.18408s -22:52:50.71168s

RUWE (>1.4 is poor) : 0.94
 K magnitude : 8.736
 G magnitude : 13.872
 RP magnitude : 12.548
 BP magnitude : 15.917
 DUPflag : 0
 Distance (au) : 4.320
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -14.77
 Sun-Target sep (deg) : 160.55
 Sun-Moon sep (deg) : 121.86
 B (ring opening deg) : -2.60
 PA of pole (deg) : 1.09
 Pole direction: RA (deg): 268.05693
 Dec (deg): 64.49651
 C/A sky separation (") : 21.072
 C/A sky separation (km) : 66028.5
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk

Jupiter 2031-05-28T08:48:22 K8.74 G13.87
 Pgt



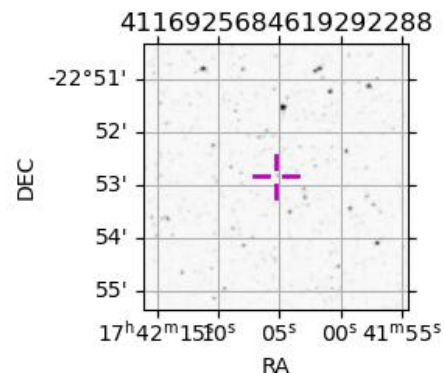
Earth
 PAL
 KPNO
 MCD
 TEN
 IRTF
 RIO
 ESO
 AAT
 MSO



2031-05-28T08:48:22.0400 α: 17 42 05.1841 δ: -22 52 50.712 C/A ***** PA 1.01 deg v_sky -14.77 km/s D 04.32 AU
 Credit: Styled after SORA/Lucky Star

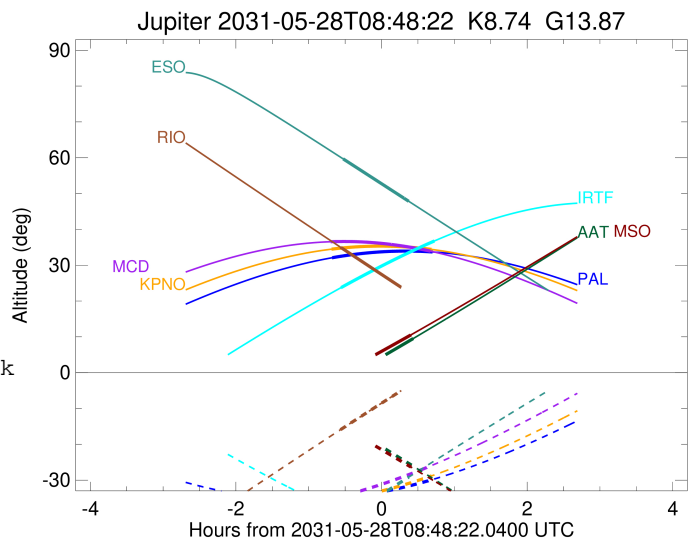
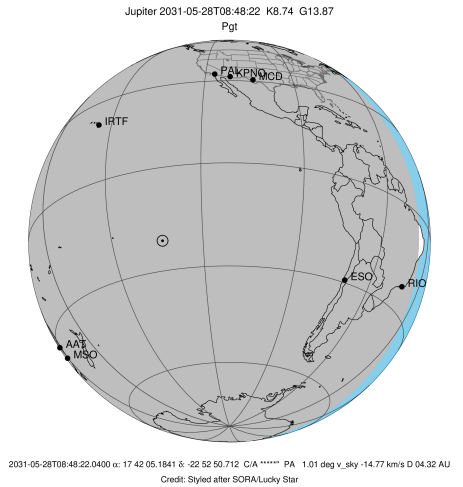
Observable events with sun below -5 deg and altitude above 5 deg

Obs	Location	lat	Elon	Target	Observed Events Interval	OCode
PIC	Pic du Midi	42.9	0.1			Pnn
PAL	Palomar Mt (200")	33.4	243.1	+ +	MAY 28 08:07 - MAY 28 09:30	Pie
PMO	Purple Mtn Obs. Nanking	32.1	118.8			Pnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+ +	MAY 28 08:07 - MAY 28 09:29	Pie
MCD	McDonald Obs. 2.7m	30.7	256.0	+ +	MAY 28 08:06 - MAY 28 09:28	Pie
TEN	Teide Obs./Tenerife	28.3	343.5			Pnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+ +	MAY 28 08:14 - MAY 28 09:31	Pie
KAV	Kavalur Observatory	12.6	78.8			Pnn
RIO	Rio de Janeiro	-22.9	316.8	+	MAY 28 08:14 - MAY 28 08:14	Pin
ESO	European Southern Obs. (3.6m)	-29.3	289.3	+ +	MAY 28 08:16 - MAY 28 09:10	Pie
AAT	Siding Spring (AAT)	-31.3	149.1	+	MAY 28 09:14 - MAY 28 09:14	Pne
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8			Pnn
MSO	Mt. Stromlo Observatory	-35.3	149.0	+	MAY 28 09:12 - MAY 28 09:12	Pne



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-28T08:49:02.970
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      : 4116925684619292288
2Mass ID (if available) : 17420519-2252506
ICRS Star Coord at Epoch: 17h 42m 05.18408s -22:52:50.71168s
RUWE (>1.4 is poor) : 0.94
K magnitude          : 8.736
G magnitude          : 13.872
RP magnitude         : 12.548
BP magnitude         : 15.917
DUPflag             : 0
Distance (au)       : 4.320
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -14.77
Sun-Target sep (deg) : 160.55
Sun-Moon sep (deg)  : 122.29
B (ring opening deg) : -2.60
PA of pole (deg)    : 1.09
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation ("): 19.389
C/A sky separation (km): 60754.9
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
    
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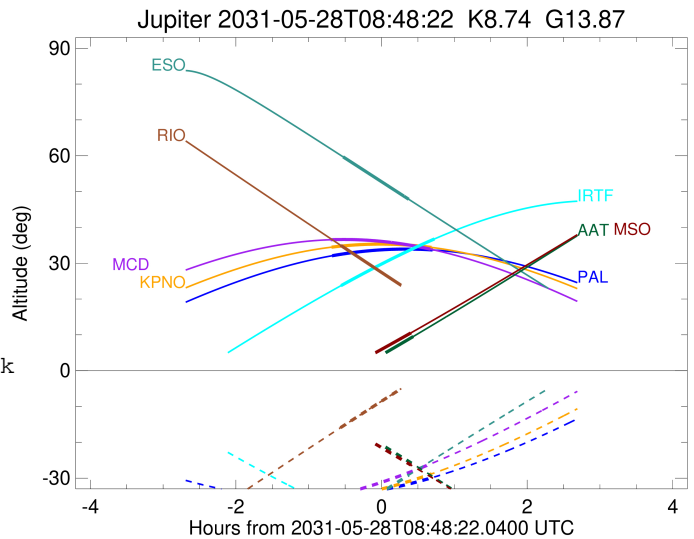
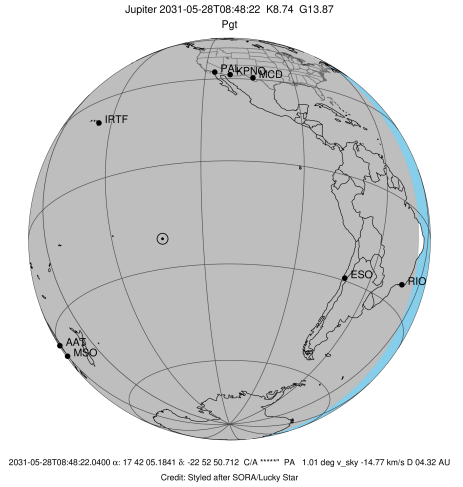


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-28T08:07:40.069	32.07	-35.10	71485.3	-58.30	-61.48
Jupiter	E	2031-05-28T09:30:24.007	33.69	-29.83	71485.3	-58.01	-61.20

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-28T08:48:27.050
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       : 4116925684619292288
2Mass ID (if available) : 17420519-2252506
ICRS Star Coord at Epoch: 17h 42m 05.18408s -22:52:50.71168s
RUWE (>1.4 is poor) : 0.94
K magnitude           : 8.736
G magnitude           : 13.872
RP magnitude          : 12.548
BP magnitude          : 15.917
DUPflag              : 0
Distance (au)         : 4.320
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -14.77
Sun-Target sep (deg) : 160.55
Sun-Moon sep (deg)   : 122.27
B (ring opening deg) : -2.60
PA of pole (deg)     : 1.09
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (") : 19.413
C/A sky separation (km) : 60827.5
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
    
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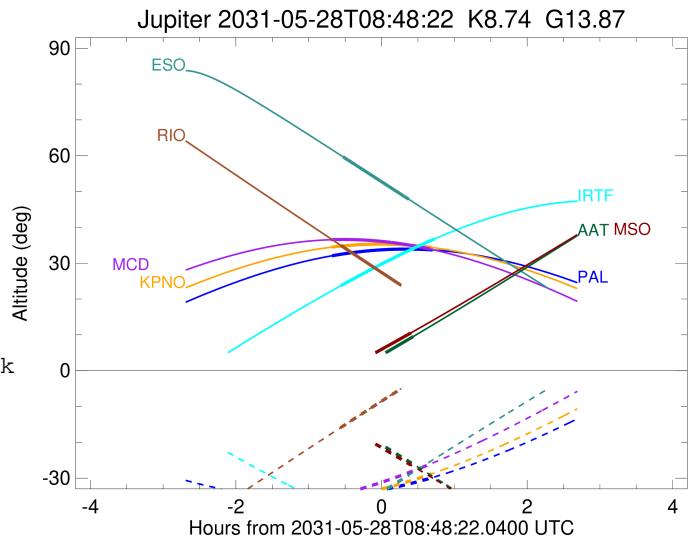
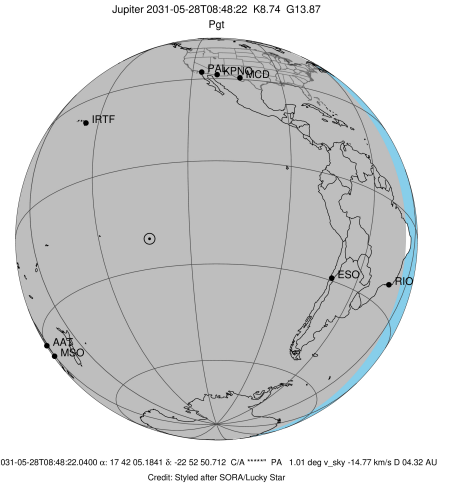


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-28T08:07:13.733	34.47	-35.75	71485.3	-58.36	-61.54
Jupiter	E	2031-05-28T09:29:39.550	34.40	-28.81	71485.3	-58.17	-61.35

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-28T08:47:33.910
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      : 4116925684619292288
2Mass ID (if available) : 17420519-2252506
ICRS Star Coord at Epoch: 17h 42m 05.18408s -22:52:50.71168s
RUWE (>1.4 is poor) : 0.94
K magnitude          : 8.736
G magnitude          : 13.872
RP magnitude         : 12.548
BP magnitude         : 15.917
DUPflag             : 0
Distance (au)       : 4.320
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -14.77
Sun-Target sep (deg) : 160.55
Sun-Moon sep (deg)  : 122.22
B (ring opening deg) : -2.60
PA of pole (deg)    : 1.09
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (") : 19.442
C/A sky separation (km) : 60919.9
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
    
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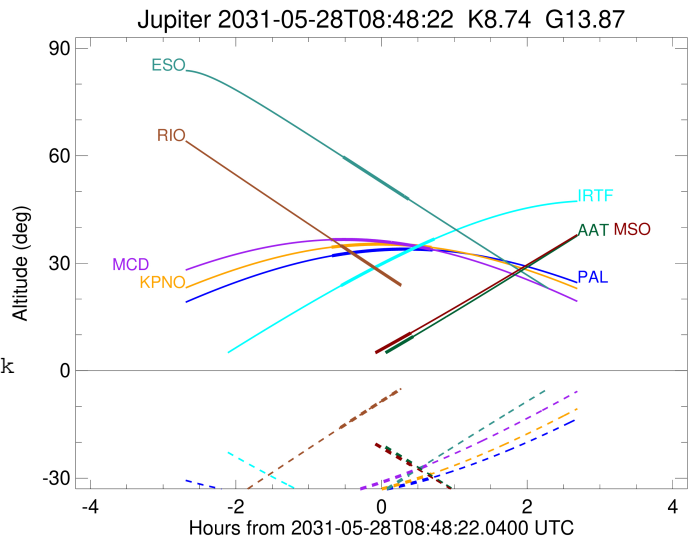
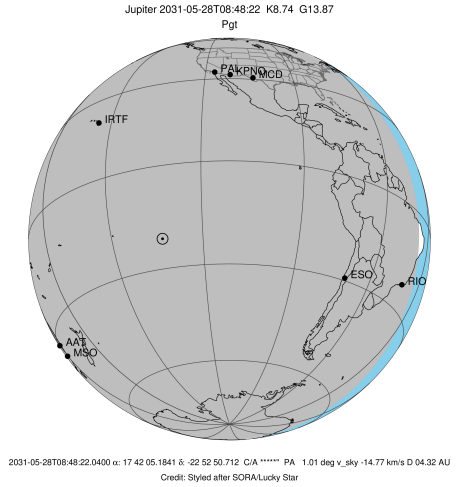


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-28T08:06:31.642	36.55	-35.16	71485.3	-58.43	-61.60
Jupiter	E	2031-05-28T09:28:36.915	33.92	-26.05	71485.3	-58.39	-61.56

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-28T08:53:33.090
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      : 4116925684619292288
2Mass ID (if available) : 17420519-2252506
ICRS Star Coord at Epoch: 17h 42m 05.18408s -22:52:50.71168s
RUWE (>1.4 is poor) : 0.94
K magnitude          : 8.736
G magnitude          : 13.872
RP magnitude         : 12.548
BP magnitude         : 15.917
DUPflag             : 0
Distance (au)       : 4.320
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -14.77
Sun-Target sep (deg) : 160.55
Sun-Moon sep (deg)  : 122.54
B (ring opening deg) : -2.60
PA of pole (deg)    : 1.09
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation ("): 19.908
C/A sky separation (km): 62381.1
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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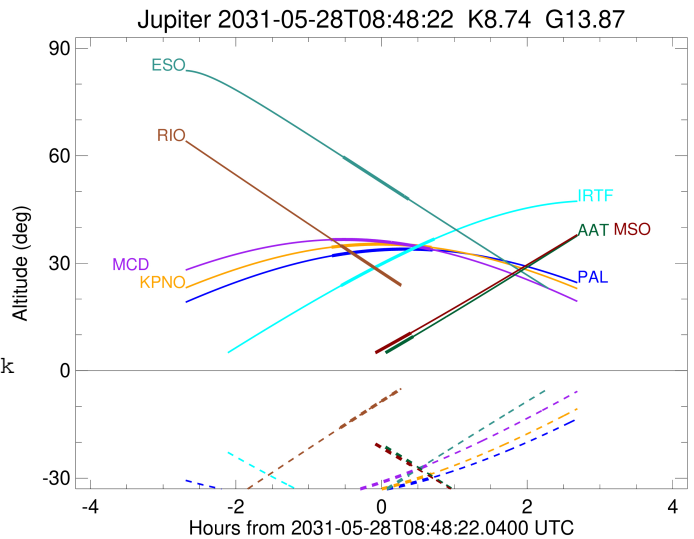
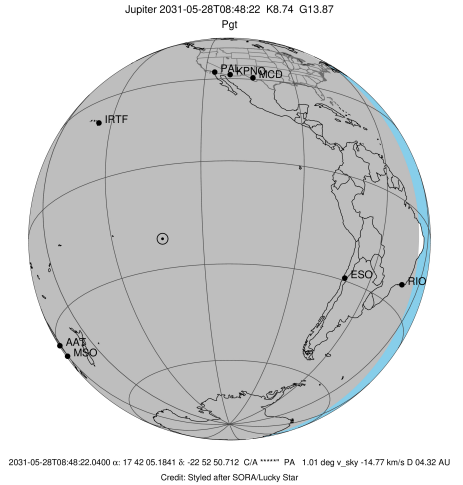


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-28T08:14:58.448	23.73	-38.86	71484.9	-61.23	-64.20
Jupiter	E	2031-05-28T09:31:59.180	36.76	-47.26	71485.0	-60.17	-63.22

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-28T08:41:28.710
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       : 4116925684619292288
2Mass ID (if available) : 17420519-2252506
ICRS Star Coord at Epoch: 17h 42m 05.18408s -22:52:50.71168s
RUWE (>1.4 is poor) : 0.94
K magnitude          : 8.736
G magnitude          : 13.872
RP magnitude         : 12.548
BP magnitude         : 15.917
DUPflag             : 0
Distance (au)        : 4.320
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -14.77
Sun-Target sep (deg) : 160.55
Sun-Moon sep (deg)   : 121.81
B (ring opening deg) : -2.60
PA of pole (deg)     : 1.09
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (") : 21.487
C/A sky separation (km) : 67327.1
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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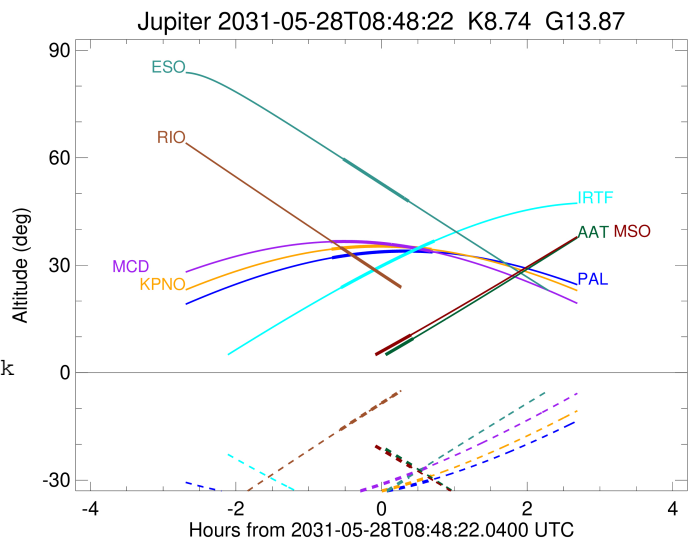
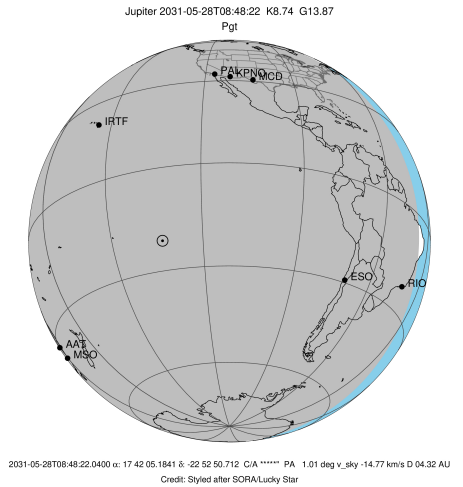


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-28T08:14:44.650	34.98	-15.88	71483.8	-69.72	-71.97
Jupiter	E	2031-05-28T09:08:17.563	22.99	-4.23x	71483.7	-70.71	-72.86

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-28T08:43:49.570
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       : 4116925684619292288
2Mass ID (if available) : 17420519-2252506
ICRS Star Coord at Epoch: 17h 42m 05.18408s -22:52:50.71168s
RUWE (>1.4 is poor) : 0.94
K magnitude          : 8.736
G magnitude          : 13.872
RP magnitude         : 12.548
BP magnitude         : 15.917
DUPflag             : 0
Distance (au)        : 4.320
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -14.77
Sun-Target sep (deg) : 160.55
Sun-Moon sep (deg)   : 122.20
B (ring opening deg) : -2.60
PA of pole (deg)     : 1.09
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (") : 21.437
C/A sky separation (km) : 67172.9
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
    
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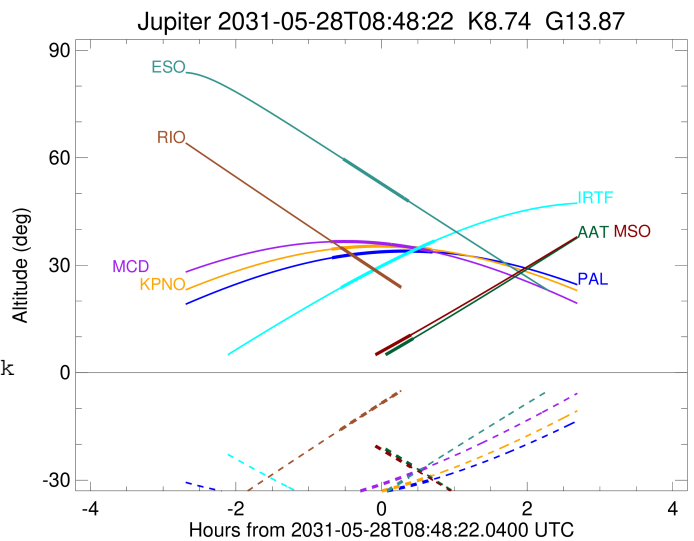
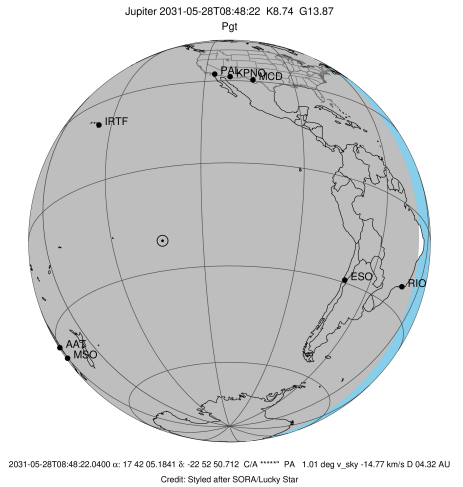


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-28T08:16:52.239	59.65	-40.84	71483.8	-69.58	-71.84
Jupiter	E	2031-05-28T09:10:49.931	47.83	-29.15	71483.8	-70.15	-72.36

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-28T08:55:13.950
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       : 4116925684619292288
2Mass ID (if available) : 17420519-2252506
ICRS Star Coord at Epoch: 17h 42m 05.18408s -22:52:50.71168s
RUWE (>1.4 is poor) : 0.94
K magnitude          : 8.736
G magnitude          : 13.872
RP magnitude         : 12.548
BP magnitude         : 15.917
DUPflag             : 0
Distance (au)        : 4.320
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -14.77
Sun-Target sep (deg) : 160.55
Sun-Moon sep (deg)   : 122.35
B (ring opening deg) : -2.60
PA of pole (deg)     : 1.09
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (") : 22.154
C/A sky separation (km) : 69416.8
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
    
```

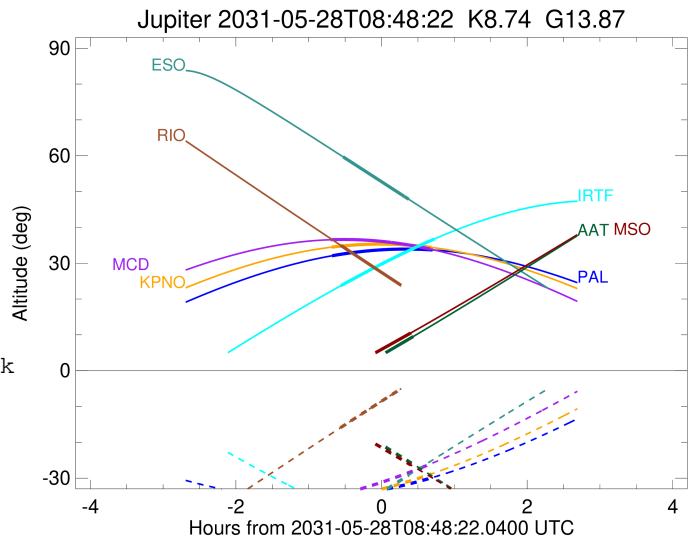
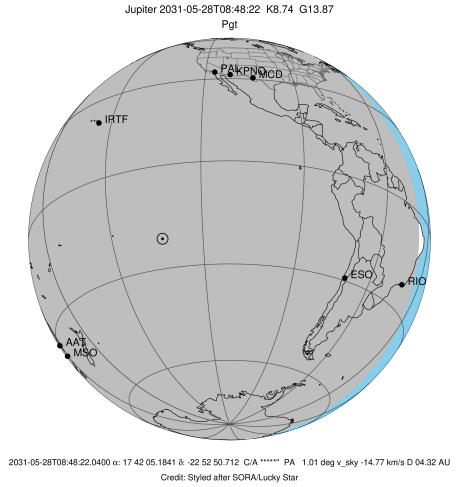


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-28T08:35:52.863	1.91x	-18.04	71483.2	-76.61	-78.15
Jupiter	E	2031-05-28T09:14:32.143	9.53	-26.12	71483.3	-75.29	-76.97


```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-28T08:54:54.960
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        : 4116925684619292288
2Mass ID (if available) : 17420519-2252506
ICRS Star Coord at Epoch: 17h 42m 05.18408s -22:52:50.71168s
RUWE (>1.4 is poor) : 0.94
K magnitude           : 8.736
G magnitude           : 13.872
RP magnitude          : 12.548
BP magnitude          : 15.917
DUPflag              : 0
Distance (au)         : 4.320
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -14.77
Sun-Target sep (deg)  : 160.55
Sun-Moon sep (deg)   : 122.35
B (ring opening deg) : -2.60
PA of pole (deg)     : 1.09
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (") : 22.260
C/A sky separation (km) : 69750.4
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	2031-05-28T08:37:10.759	3.86x	-19.23	71483.1	-77.73	-79.14
Jupiter	E	2031-05-28T09:12:36.842	10.54	-26.34	71483.2	-76.46	-78.02