

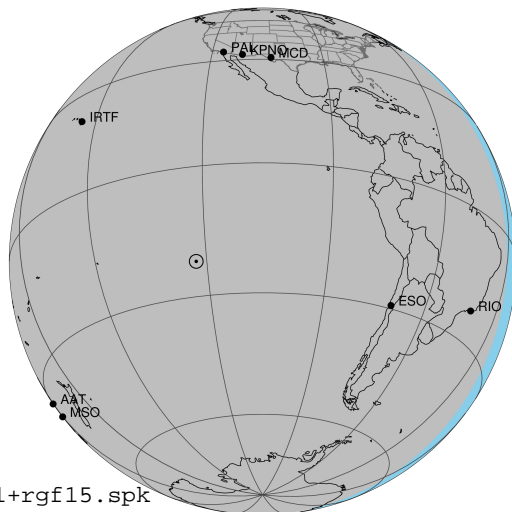
target : Jupiter  
 target radius (km) : 71492.00  
 C/A epoch : 2031-06-01T08:08:21.500  
 Event type : Pgt  
 : Jupiter occs: geocentric, topocentric  
 : Not a ringed target  
 Gaia source ID : 4116567308156305920  
 2Mass ID (if available) : 17400524-2251495

Jupiter 2031-06-01T08:08:21 K9.37 G14.27 Pgt

ICRS Star Coord at Epoch: 17h 40m 05.23893s -22:51:49.77040s

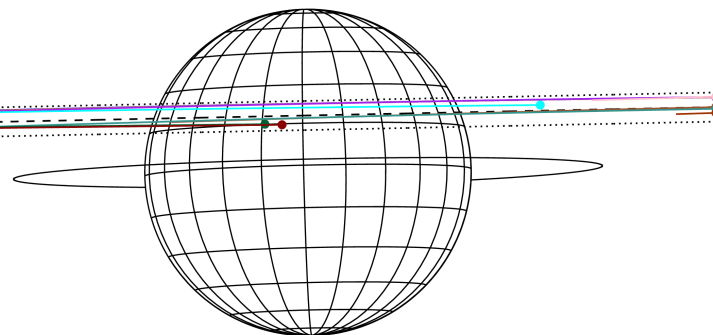
RUWE (>1.4 is poor) : 1.09  
 K magnitude : 9.366  
 G magnitude : 14.266  
 RP magnitude : 13.016  
 BP magnitude : 15.932  
 DUPflag : 0  
 Distance (au) : 4.300  
 f0 (km) : 0.00  
 g0 (km) : 0.00  
 skyplane vel. (km/s) : -15.42  
 Sun-Target sep (deg) : 164.81  
 Sun-Moon sep (deg) : 70.96  
 B (ring opening deg) : -2.61  
 PA of pole (deg) : 1.31  
 Pole direction: RA (deg): 268.05693  
 Dec (deg): 64.49651  
 C/A sky separation (") : 8.009  
 C/A sky separation (km) : 24976.9  
 NAIF SPICE kernels : RAJobs\_U111+rgf15.spk

Jupiter 2031-06-01T08:08:21 K9.37 G14.27  
 Pgt



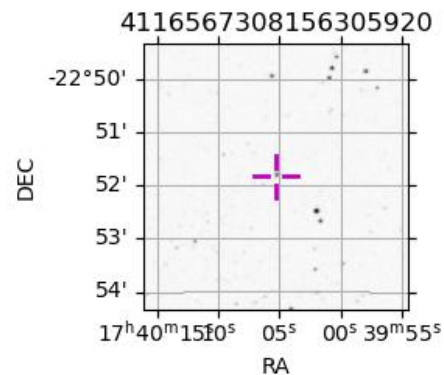
2031-06-01T08:08:21.5000 at: 17 40 05.2389 6: -22 51 49.770 4 C/A 7.997" PA 181.19 deg v\_sky -15.42 km/s D 04.30 AU  
 Credit: Styled after SORA/Lucky Star

Earth  
 PAL  
 KPNO  
 MCD  
 TEN  
 IRTF  
 RIO  
 ESO  
 AAT  
 SAAO  
 MSO



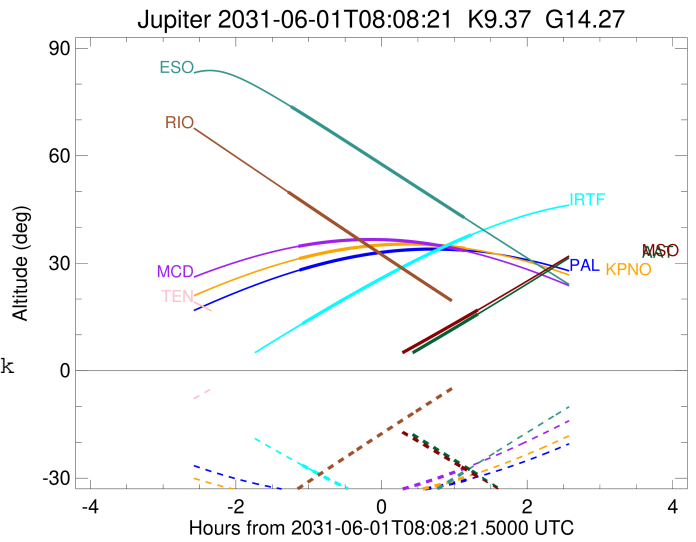
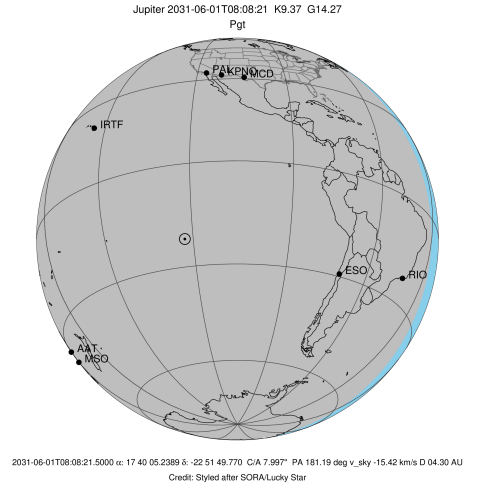
Observable events with sun below -5 deg and altitude above 5 deg

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	+ +	JUN 01 07:00 - JUN 01 09:17	Pie
PMO	Purple Mtn Obs. Nanking	32.1	118.8			Pnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+ +	JUN 01 07:00 - JUN 01 09:17	Pie
MCD	McDonald Obs. 2.7m	30.7	256.0	+ +	JUN 01 06:59 - JUN 01 09:16	Pie
TEN	Teide Obs./Tenerife	28.3	343.5			Pnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+ +	JUN 01 07:03 - JUN 01 09:22	Pie
KAV	Kavalur Observatory	12.6	78.8			Pnn
RIO	Rio de Janeiro	-22.9	316.8	+	JUN 01 06:51 - JUN 01 06:51	Pin
ESO	European Southern Obs. (3.6m)	-29.3	289.3	+ +	JUN 01 06:53 - JUN 01 09:16	Pie
AAT	Siding Spring (AAT)	-31.3	149.1	+	JUN 01 09:27 - JUN 01 09:27	Pne
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8			Pnn
MSO	Mt. Stromlo Observatory	-35.3	149.0	+	JUN 01 09:27 - JUN 01 09:27	Pne



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-01T08:09:25.550
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      : 4116567308156305920
2Mass ID (if available) : 17400524-2251495
ICRS Star Coord at Epoch: 17h 40m 05.23893s -22:51:49.77040s
RUWE (>1.4 is poor) : 1.09
K magnitude          : 9.366
G magnitude          : 14.266
RP magnitude         : 13.016
BP magnitude         : 15.932
DUPflag             : 0
Distance (au)       : 4.300
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -15.42
Sun-Target sep (deg) : 164.81
Sun-Moon sep (deg)  : 71.42
B (ring opening deg) : -2.61
PA of pole (deg)    : 1.31
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (") : 9.688
C/A sky separation (km) : 30212.9
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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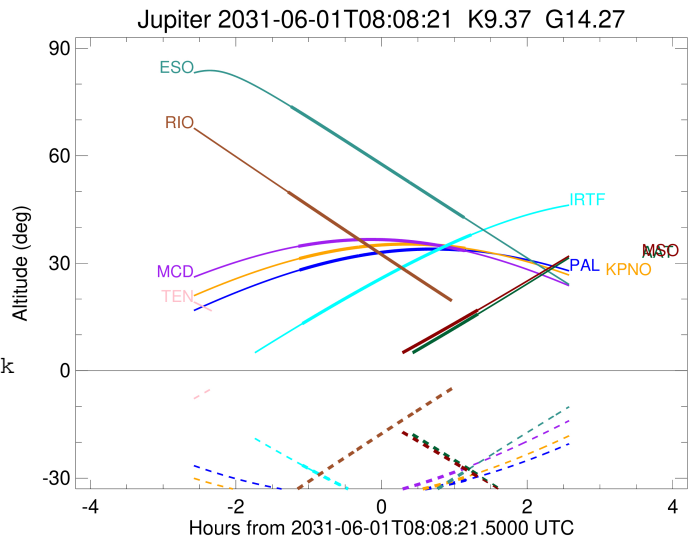
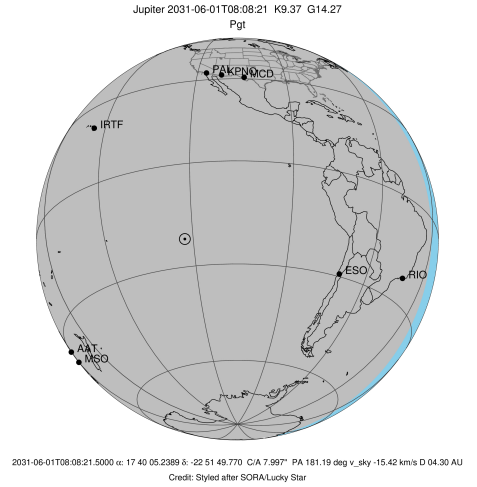


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-01T07:00:56.601	28.09	-33.78	71490.4	24.65	27.65
Jupiter	E	2031-06-01T09:17:47.405	33.57	-30.53	71490.3	25.14	28.17

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-01T08:08:56.840
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      : 4116567308156305920
2Mass ID (if available) : 17400524-2251495
ICRS Star Coord at Epoch: 17h 40m 05.23893s -22:51:49.77040s
RUWE (>1.4 is poor) : 1.09
K magnitude          : 9.366
G magnitude          : 14.266
RP magnitude         : 13.016
BP magnitude         : 15.932
DUPflag             : 0
Distance (au)       : 4.300
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -15.42
Sun-Target sep (deg) : 164.81
Sun-Moon sep (deg)  : 71.47
B (ring opening deg) : -2.61
PA of pole (deg)    : 1.31
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (") : 9.670
C/A sky separation (km) : 30159.0
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
    
```

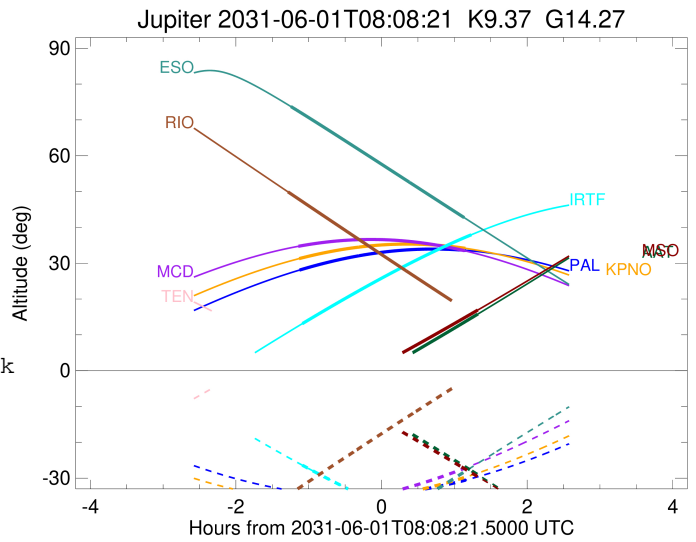
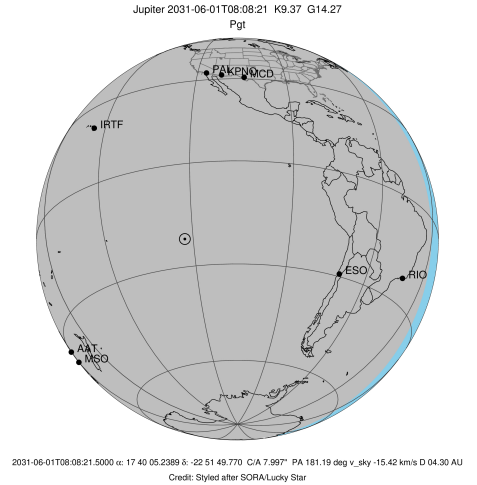


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-01T07:00:30.329	31.28	-35.88	71490.4	24.64	27.64
Jupiter	E	2031-06-01T09:17:18.832	34.15	-29.74	71490.3	25.04	28.07

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-01T08:08:13.690
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       : 4116567308156305920
2Mass ID (if available) : 17400524-2251495
ICRS Star Coord at Epoch: 17h 40m 05.23893s -22:51:49.77040s
RUWE (>1.4 is poor) : 1.09
K magnitude           : 9.366
G magnitude           : 14.266
RP magnitude          : 13.016
BP magnitude          : 15.932
DUPflag              : 0
Distance (au)        : 4.300
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -15.42
Sun-Target sep (deg) : 164.81
Sun-Moon sep (deg)  : 71.52
B (ring opening deg) : -2.61
PA of pole (deg)    : 1.31
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (") : 9.650
C/A sky separation (km) : 30094.6
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
    
```

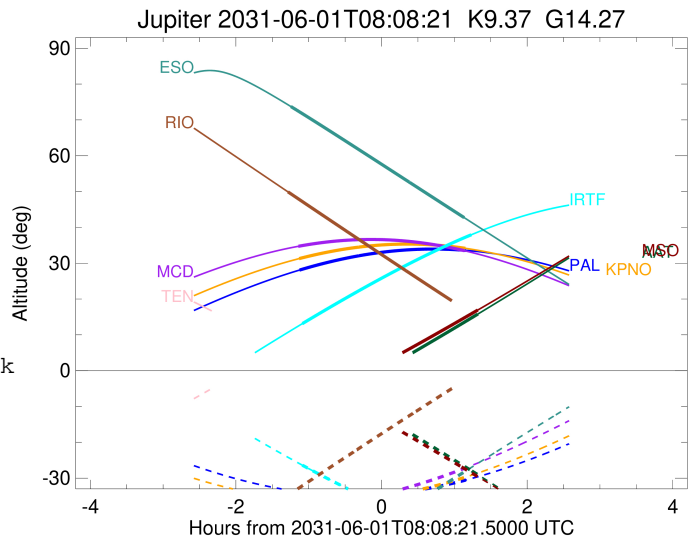
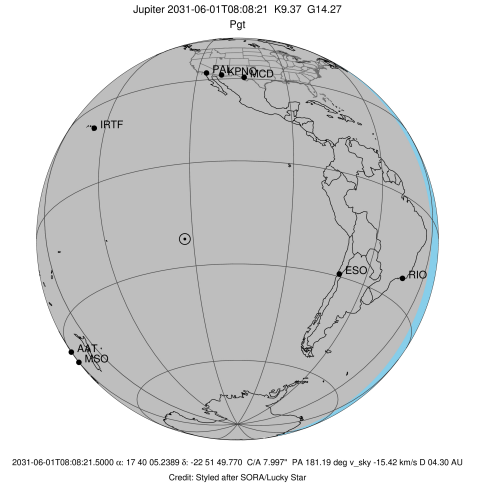


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-01T06:59:48.976	34.71	-37.44	71490.4	24.66	27.66
Jupiter	E	2031-06-01T09:16:37.761	33.49	-27.27	71490.4	24.91	27.93

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-01T08:12:59.920
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      : 4116567308156305920
2Mass ID (if available) : 17400524-2251495
ICRS Star Coord at Epoch: 17h 40m 05.23893s -22:51:49.77040s
RUWE (>1.4 is poor) : 1.09
K magnitude          : 9.366
G magnitude          : 14.266
RP magnitude         : 13.016
BP magnitude         : 15.932
DUPflag             : 0
Distance (au)       : 4.300
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -15.42
Sun-Target sep (deg) : 164.81
Sun-Moon sep (deg)  : 71.14
B (ring opening deg) : -2.61
PA of pole (deg)    : 1.31
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation ("): 9.120
C/A sky separation (km): 28441.2
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
    
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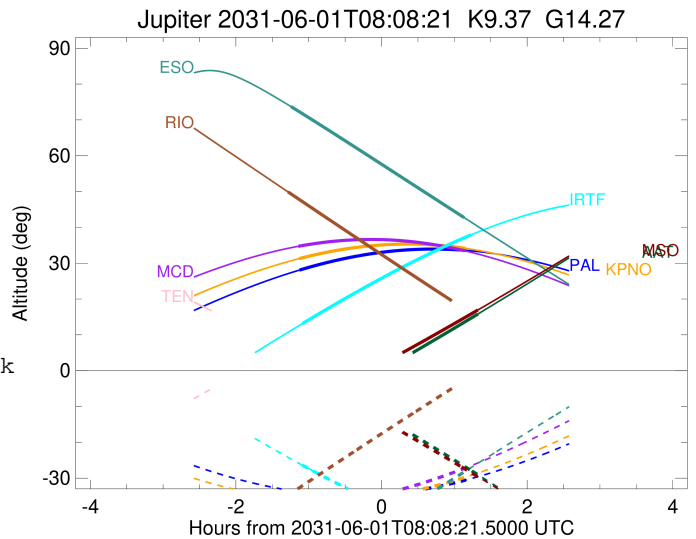
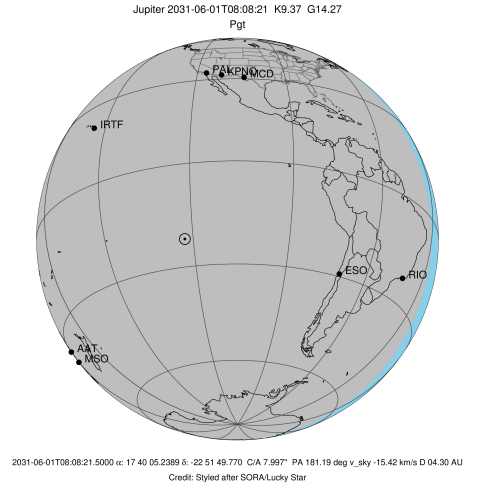


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-01T07:03:07.154	13.12	-26.38	71490.6	22.76	25.60
Jupiter	E	2031-06-01T09:22:25.116	37.94	-45.96	71490.5	23.95	26.89

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-01T08:02:58.830
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      : 4116567308156305920
2Mass ID (if available) : 17400524-2251495
ICRS Star Coord at Epoch: 17h 40m 05.23893s -22:51:49.77040s
RUWE (>1.4 is poor) : 1.09
K magnitude          : 9.366
G magnitude          : 14.266
RP magnitude         : 13.016
BP magnitude         : 15.932
DUPflag             : 0
Distance (au)       : 4.300
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -15.42
Sun-Target sep (deg) : 164.81
Sun-Moon sep (deg)  : 71.69
B (ring opening deg) : -2.61
PA of pole (deg)    : 1.31
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (") : 7.657
C/A sky separation (km) : 23881.1
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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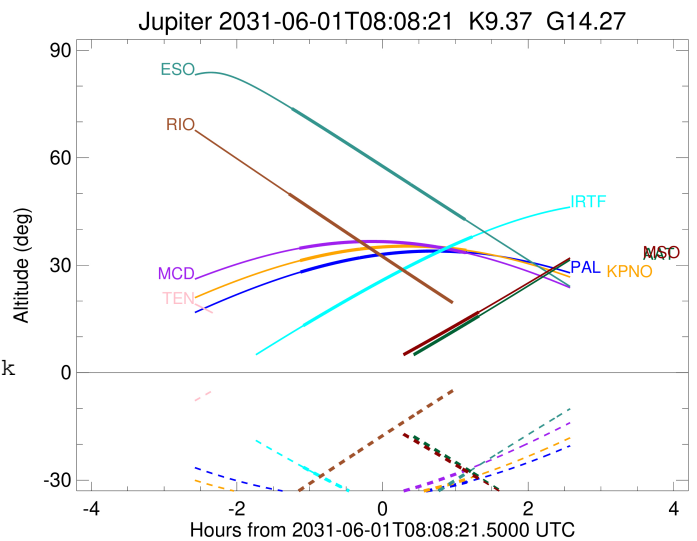
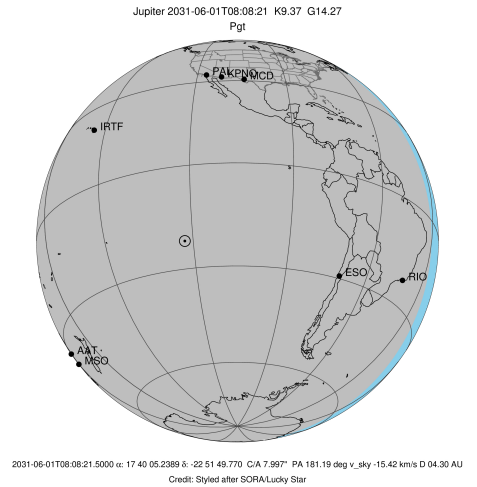


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-01T06:51:18.131	49.90	-34.80	71490.9	19.83	22.39
Jupiter	E	2031-06-01T09:15:09.650	17.56	-3.11x	71491.0	19.05	21.53

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-01T08:05:03.130
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      : 4116567308156305920
2Mass ID (if available) : 17400524-2251495
ICRS Star Coord at Epoch: 17h 40m 05.23893s -22:51:49.77040s
RUWE (>1.4 is poor) : 1.09
K magnitude          : 9.366
G magnitude          : 14.266
RP magnitude         : 13.016
BP magnitude         : 15.932
DUPflag             : 0
Distance (au)       : 4.300
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -15.42
Sun-Target sep (deg) : 164.81
Sun-Moon sep (deg)  : 71.88
B (ring opening deg) : -2.61
PA of pole (deg)    : 1.31
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (") : 7.682
C/A sky separation (km) : 23957.3
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
    
```



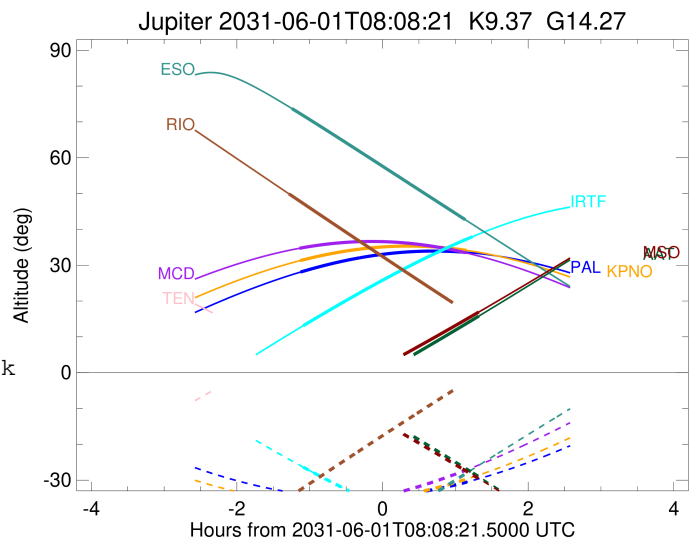
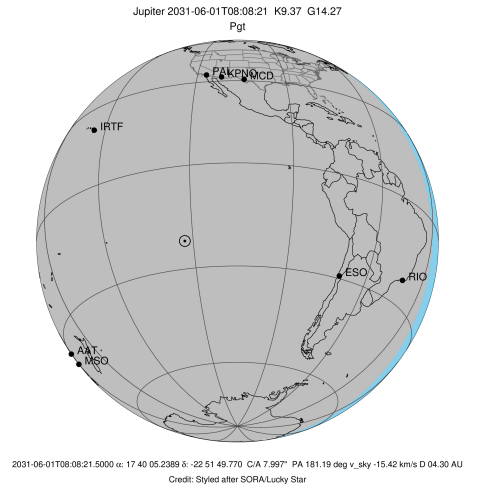
x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-01T06:53:51.976	73.69	-59.27	71490.9	19.66	22.20
Jupiter	E	2031-06-01T09:16:31.486	42.71	-28.27	71491.0	19.30	21.81



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-01T08:13:48.430
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      : 4116567308156305920
2Mass ID (if available) : 17400524-2251495
ICRS Star Coord at Epoch: 17h 40m 05.23893s -22:51:49.77040s
RUWE (>1.4 is poor) : 1.09
K magnitude          : 9.366
G magnitude          : 14.266
RP magnitude         : 13.016
BP magnitude         : 15.932
DUPflag             : 0
Distance (au)       : 4.300
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -15.42
Sun-Target sep (deg) : 164.81
Sun-Moon sep (deg)  : 70.69
B (ring opening deg) : -2.61
PA of pole (deg)    : 1.31
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (") : 6.850
C/A sky separation (km) : 21362.6
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
    
```



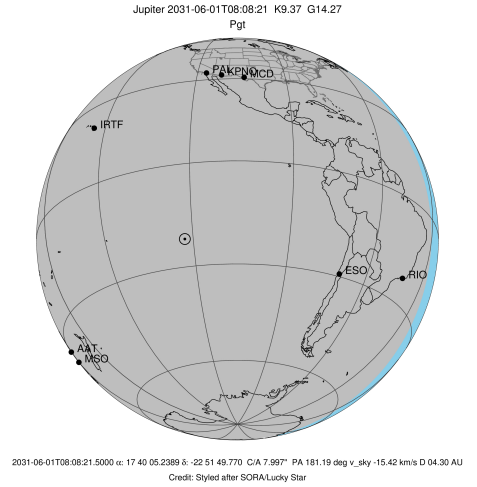
x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-01T06:59:17.961	-12.57x	1.09x	71491.2	16.72	18.95
Jupiter	E	2031-06-01T09:27:41.276	15.78	-29.03	71491.1	18.06	20.43

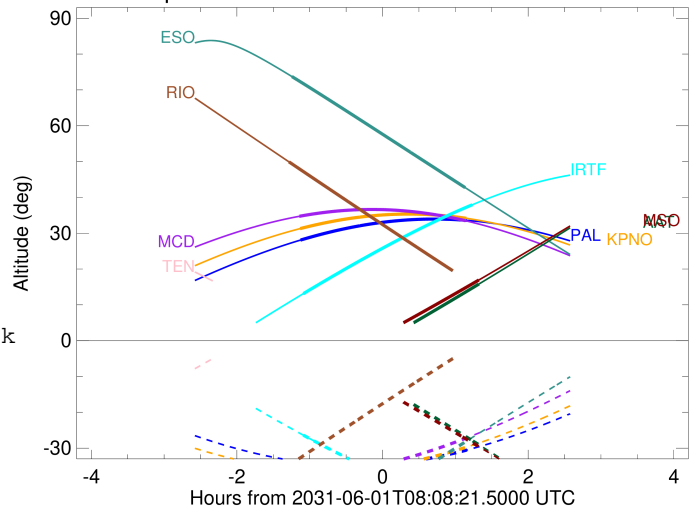


```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-01T08:13:33.160
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        : 4116567308156305920
2Mass ID (if available) : 17400524-2251495
ICRS Star Coord at Epoch: 17h 40m 05.23893s -22:51:49.77040s
RUWE (>1.4 is poor) : 1.09
K magnitude           : 9.366
G magnitude           : 14.266
RP magnitude          : 13.016
BP magnitude          : 15.932
DUPflag              : 0
Distance (au)         : 4.300
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -15.42
Sun-Target sep (deg)  : 164.81
Sun-Moon sep (deg)    : 70.73
B (ring opening deg) : -2.61
PA of pole (deg)      : 1.31
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (") : 6.746
C/A sky separation (km) : 21039.6
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
    
```



Jupiter 2031-06-01T08:08:21 K9.37 G14.27



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	2031-06-01T06:58:57.869	-10.22x	-0.62x	71491.3	16.47	18.67
Jupiter	E	2031-06-01T09:27:32.359	16.89	-29.54	71491.1	17.76	20.10