

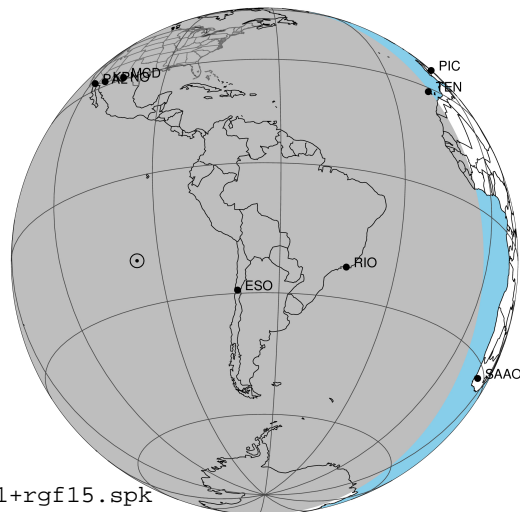
target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2031-05-18T06:20:19.760
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 4068843383911110400
 2Mass ID (if available) : 17463898-2253440

Jupiter 2031-05-18T06:20:19 K7.19 G12.69 Pgt

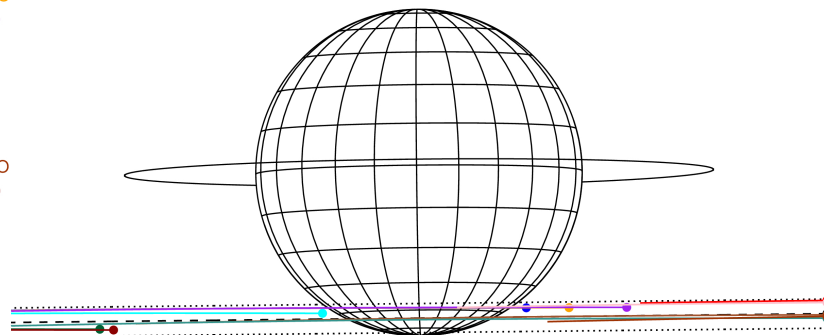
ICRS Star Coord at Epoch: 17h 46m 38.98809s -22:53:43.99537s

RUWE (>1.4 is poor) : 0.69
 K magnitude : 7.188
 G magnitude : 12.688
 RP magnitude : 11.280
 BP magnitude : 15.185
 DUPflag : 0
 Distance (au) : 4.391
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -12.44
 Sun-Target sep (deg) : 149.78
 Sun-Moon sep (deg) : 114.87
 B (ring opening deg) : -2.60
 PA of pole (deg) : 0.60
 Pole direction: RA (deg): 268.05694
 Dec (deg): 64.49651
 C/A sky separation (") : 20.021
 C/A sky separation (km) : 63767.8
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk

Jupiter 2031-05-18T06:20:19 K7.19 G12.69
 Pgt



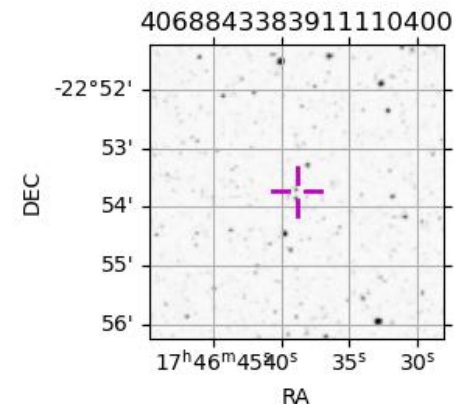
Earth
 PIC
 PAL
 KPNO
 MCD
 TEN
 IRTF
 RIO
 ESO
 AAT
 SAAO
 MSO



2031-05-18T06:20:19.7600 α: 17 46 38.9881 δ: -22 53 43.995 C/A ***** PA 0.62 deg v_sky -12.44 km/s D 04.39 AU
 Credit: Styled after SORA/Lucky Star

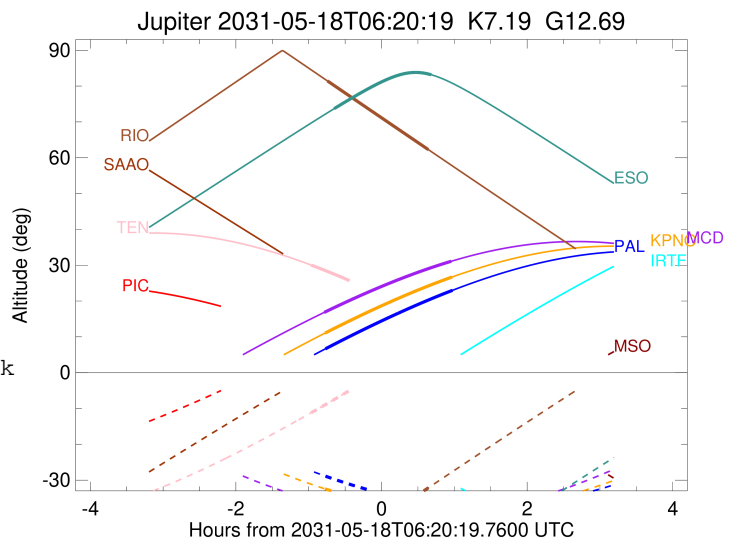
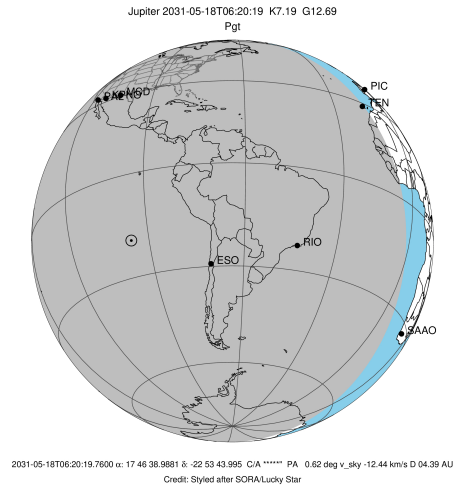
Observable events with sun below -5 deg and altitude above 5 deg

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 18 05:34 - MAY 18 07:18	Pie
PMO	Purple Mtn Obs. Nanking	32.1	118.8			Pnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+ +	MAY 18 05:33 - MAY 18 07:18	Pie
MCD	McDonald Obs. 2.7m	30.7	256.0	+ +	MAY 18 05:33 - MAY 18 07:17	Pie
TEN	Teide Obs./Tenerife	28.3	343.5	+	MAY 18 05:22 - MAY 18 05:22	Pin
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 18 05:35 - MAY 18 06:58	Pie
ESO	European Southern Obs. (3.6m)	-29.3	289.3	+ +	MAY 18 05:41 - MAY 18 07:01	Pie
AAT	Siding Spring (AAT)	-31.3	149.1			Pnn
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8			Pnn
MSO	Mt. Stromlo Observatory	-35.3	149.0			Pnn



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-18T06:26:43.520
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      : 4068843383911110400
2Mass ID (if available) : 17463898-2253440
ICRS Star Coord at Epoch: 17h 46m 38.98809s -22:53:43.99537s
RUWE (>1.4 is poor) : 0.69
K magnitude          : 7.188
G magnitude          : 12.688
RP magnitude         : 11.280
BP magnitude         : 15.185
DUPflag             : 0
Distance (au)       : 4.391
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -12.44
Sun-Target sep (deg) : 149.78
Sun-Moon sep (deg)  : 114.83
B (ring opening deg) : -2.60
PA of pole (deg)    : 0.60
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (" ) : 18.618
C/A sky separation (km) : 59298.4
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
    
```

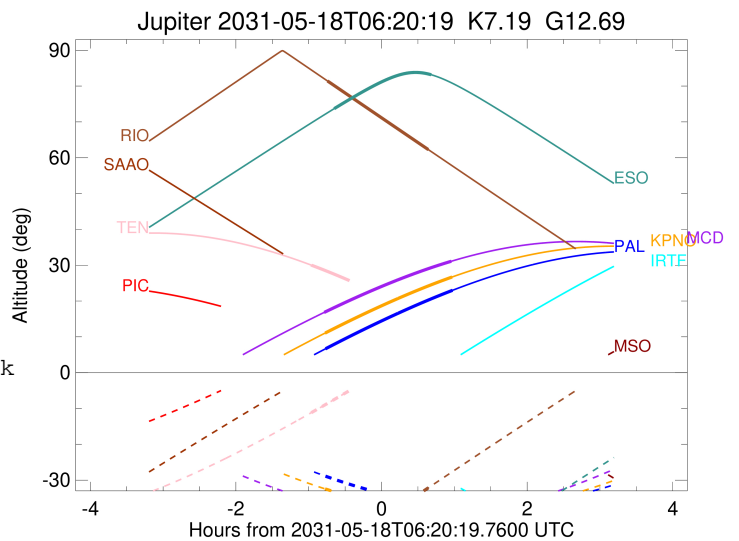
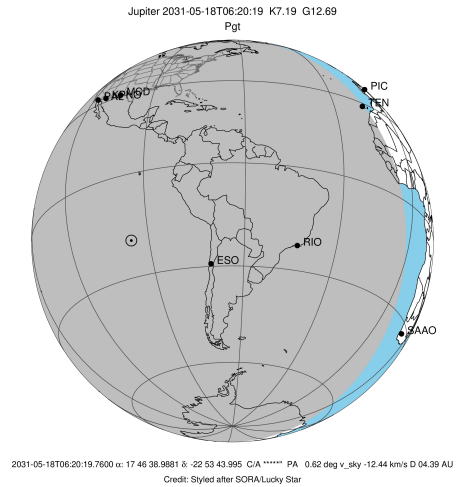


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-18T05:34:09.392	6.66	-28.89	71485.5	-56.53	-59.81
Jupiter	E	2031-05-18T07:18:57.417	23.00	-36.96	71485.7	-55.49	-58.83

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-18T06:26:20.290
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       : 4068843383911110400
2Mass ID (if available) : 17463898-2253440
ICRS Star Coord at Epoch: 17h 46m 38.98809s -22:53:43.99537s
RUWE (>1.4 is poor) : 0.69
K magnitude           : 7.188
G magnitude           : 12.688
RP magnitude          : 11.280
BP magnitude          : 15.185
DUPflag              : 0
Distance (au)        : 4.391
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -12.44
Sun-Target sep (deg) : 149.78
Sun-Moon sep (deg)   : 114.90
B (ring opening deg) : -2.60
PA of pole (deg)     : 0.60
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation ("): 18.604
C/A sky separation (km): 59252.1
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
    
```

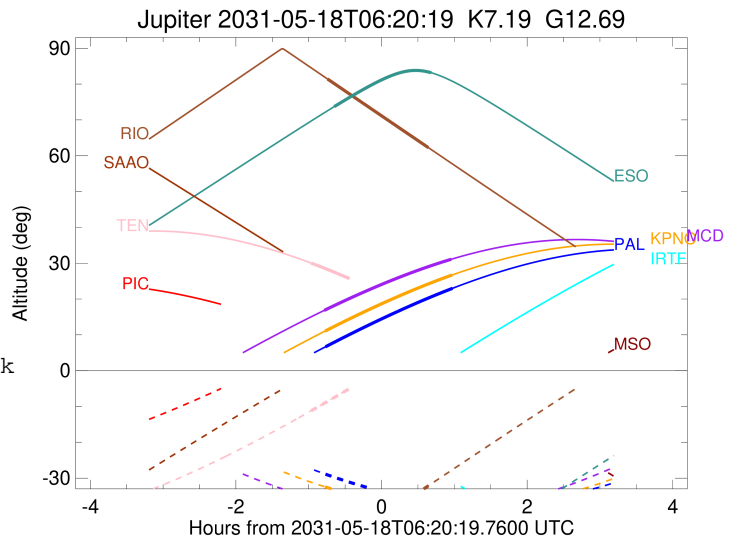
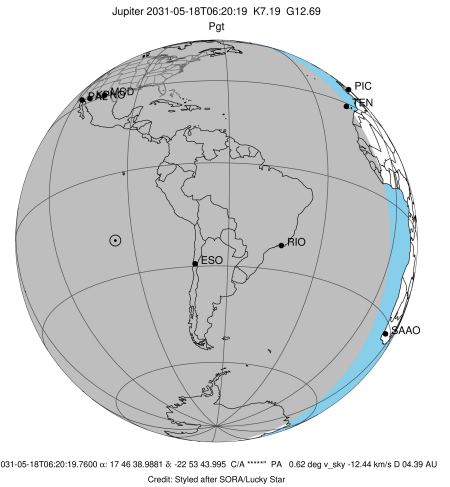


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-18T05:33:49.327	11.05	-32.43	71485.5	-56.44	-59.73
Jupiter	E	2031-05-18T07:18:32.195	26.70	-38.67	71485.7	-55.46	-58.81

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-18T06:25:37.770
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        : 4068843383911110400
2Mass ID (if available) : 17463898-2253440
ICRS Star Coord at Epoch: 17h 46m 38.98809s -22:53:43.99537s
RUWE (>1.4 is poor) : 0.69
K magnitude           : 7.188
G magnitude           : 12.688
RP magnitude          : 11.280
BP magnitude          : 15.185
DUPflag              : 0
Distance (au)         : 4.391
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -12.44
Sun-Target sep (deg) : 149.78
Sun-Moon sep (deg)   : 115.00
B (ring opening deg) : -2.60
PA of pole (deg)     : 0.60
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation ("): 18.573
C/A sky separation (km): 59153.8
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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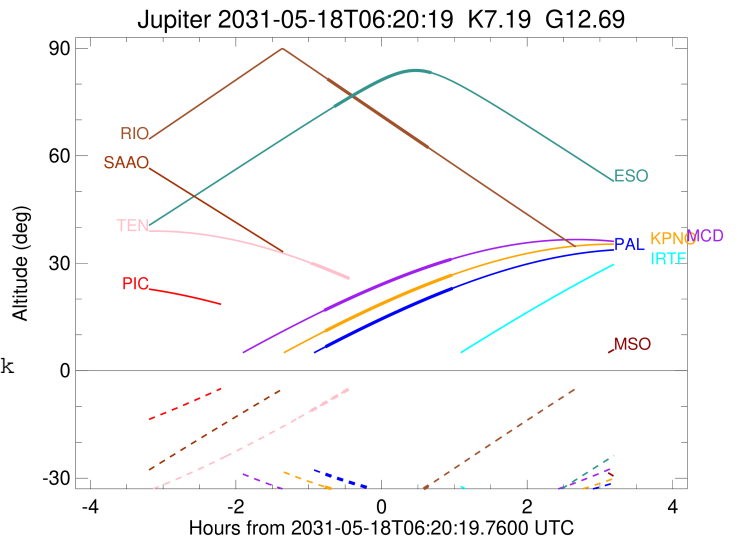
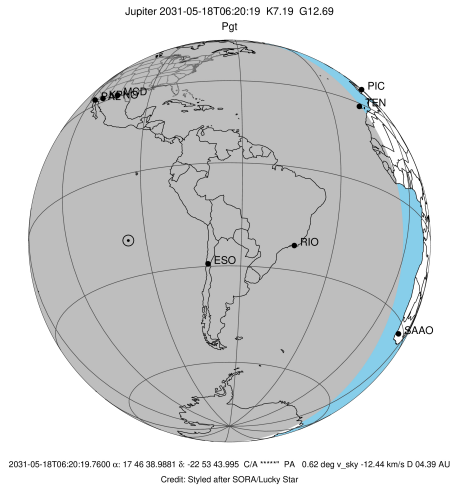


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-18T05:33:06.476	16.82	-36.47	71485.6	-56.24	-59.55
Jupiter	E	2031-05-18T07:17:52.046	31.10	-39.60	71485.7	-55.39	-58.74

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-18T06:14:16.960
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       : 4068843383911110400
2Mass ID (if available) : 17463898-2253440
ICRS Star Coord at Epoch: 17h 46m 38.98809s -22:53:43.99537s
RUWE (>1.4 is poor) : 0.69
K magnitude          : 7.188
G magnitude           : 12.688
RP magnitude         : 11.280
BP magnitude         : 15.185
DUPflag             : 0
Distance (au)        : 4.392
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -12.44
Sun-Target sep (deg) : 149.78
Sun-Moon sep (deg)   : 115.45
B (ring opening deg) : -2.60
PA of pole (deg)     : 0.60
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 18.663
C/A sky separation (km) : 59442.3
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
    
```

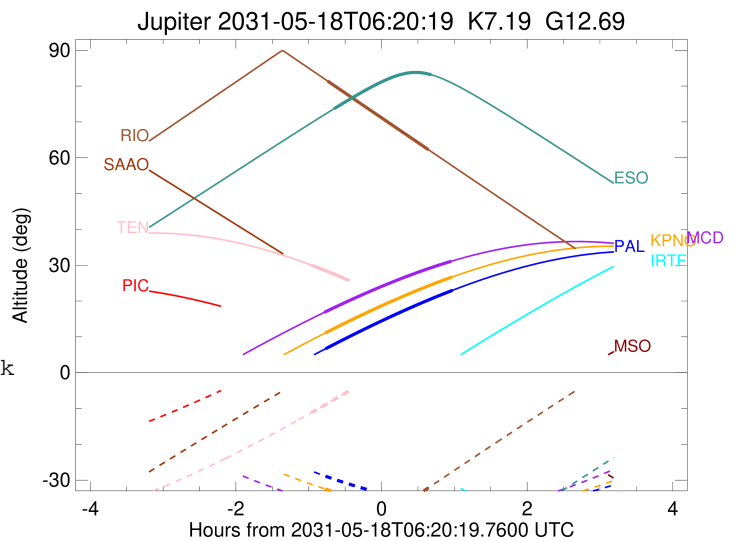
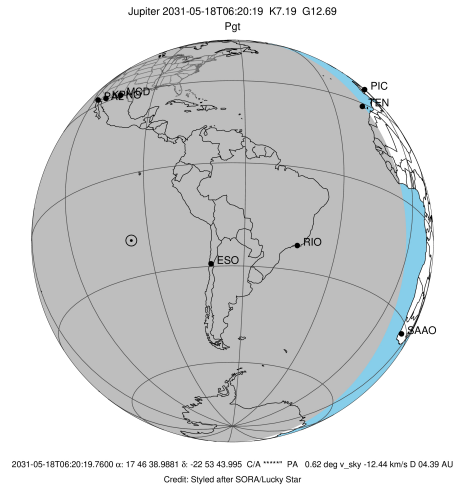


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-18T05:22:28.732	30.01	-11.17	71485.6	-55.71	-59.04
Jupiter	E	2031-05-18T07:06:19.697	13.78	9.89x	71485.5	-56.74	-60.02

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-18T06:17:19.010
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       : 4068843383911110400
2Mass ID (if available) : 17463898-2253440
ICRS Star Coord at Epoch: 17h 46m 38.98809s -22:53:43.99537s
RUWE (>1.4 is poor) : 0.69
K magnitude          : 7.188
G magnitude          : 12.688
RP magnitude         : 11.280
BP magnitude         : 15.185
DUPflag             : 0
Distance (au)        : 4.391
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -12.44
Sun-Target sep (deg) : 149.78
Sun-Moon sep (deg)   : 115.80
B (ring opening deg) : -2.60
PA of pole (deg)     : 0.60
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 20.054
C/A sky separation (km) : 63871.4
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
    
```

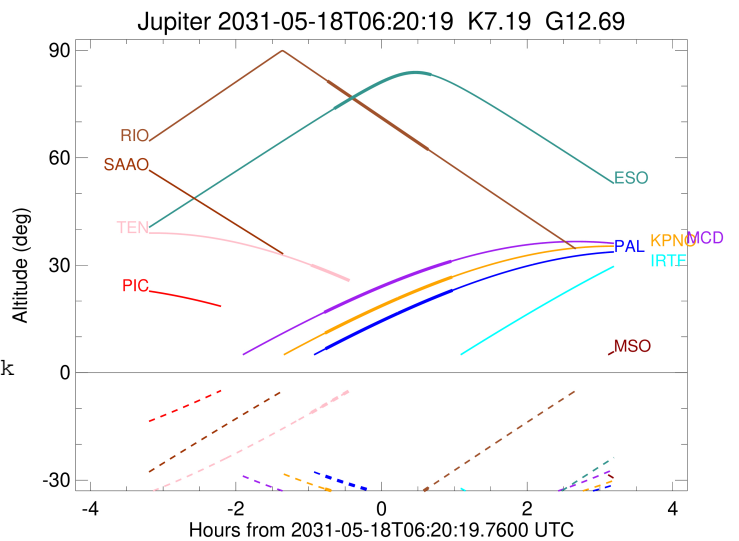
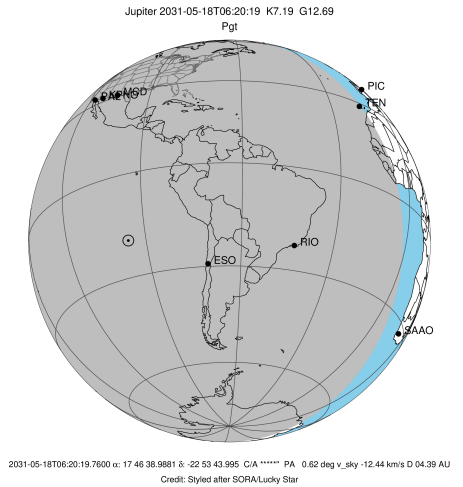


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-18T05:35:47.003	81.43	-51.17	71484.6	-63.01	-65.85
Jupiter	E	2031-05-18T06:58:54.800	62.26	-32.14	71484.6	-63.52	-66.31

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-18T06:21:20.970
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       : 4068843383911110400
2Mass ID (if available) : 17463898-2253440
ICRS Star Coord at Epoch: 17h 46m 38.98809s -22:53:43.99537s
RUWE (>1.4 is poor) : 0.69
K magnitude          : 7.188
G magnitude          : 12.688
RP magnitude         : 11.280
BP magnitude         : 15.185
DUPflag             : 0
Distance (au)        : 4.391
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -12.44
Sun-Target sep (deg) : 149.78
Sun-Moon sep (deg)   : 115.66
B (ring opening deg) : -2.60
PA of pole (deg)     : 0.60
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation ("): 20.244
C/A sky separation (km): 64475.8
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	2031-05-18T05:41:21.309	73.69	-72.96	71484.4	-64.43	-67.15
Jupiter	E	2031-05-18T07:01:17.638	83.15	-56.42	71484.5	-64.28	-67.01