

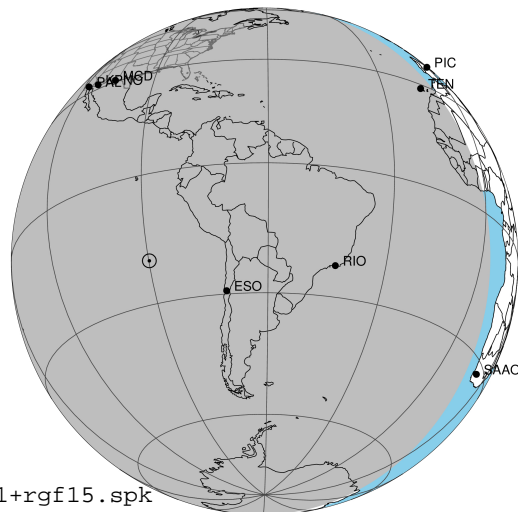
target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2031-05-21T05:55:54.550
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 4068851565923431808
 2Mass ID (if available) : 17452358-2253310

Jupiter 2031-05-21T05:55:54 K9.86 G13.91 Pgt

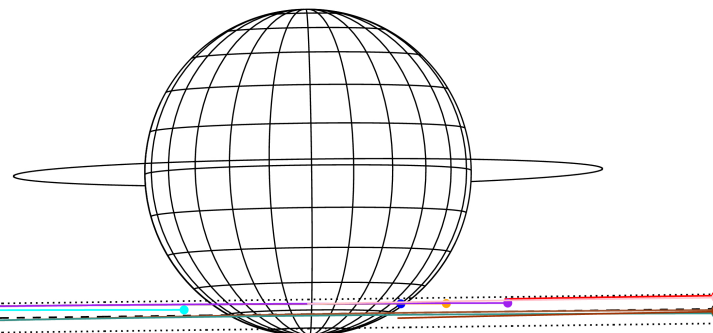
ICRS Star Coord at Epoch: 17h 45m 23.58568s -22:53:31.17463s

RUWE (>1.4 is poor) : 0.94
 K magnitude : 9.856
 G magnitude : 13.912
 RP magnitude : 12.811
 BP magnitude : 15.187
 DUPflag : 0
 Distance (au) : 4.368
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -13.23
 Sun-Target sep (deg) : 152.94
 Sun-Moon sep (deg) : 152.31
 B (ring opening deg) : -2.60
 PA of pole (deg) : 0.74
 Pole direction: RA (deg): 268.05694
 Dec (deg): 64.49651
 C/A sky separation (") : 19.574
 C/A sky separation (km) : 62006.4
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk

Jupiter 2031-05-21T05:55:54 K9.86 G13.91
 Pgt



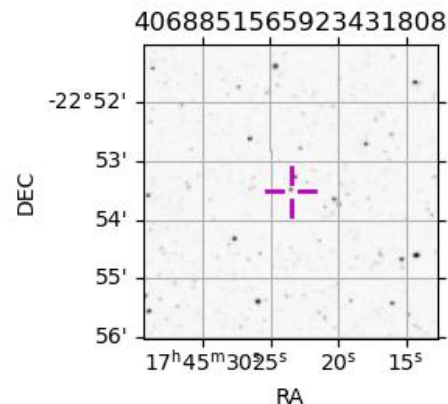
Earth
 PIC
 PAL
 KPNO
 MCD
 TEN
 IRTF
 RIO
 ESO
 AAT
 SAAO
 MSO



2031-05-21T05:55:54.5500 α: 17 45 23.5857 δ: -22 53 31.175 C/A ***** PA 0.73 deg v_sky -13.23 km/s D 04.37 AU
 Credit: Styled after SORA/Lucky Star

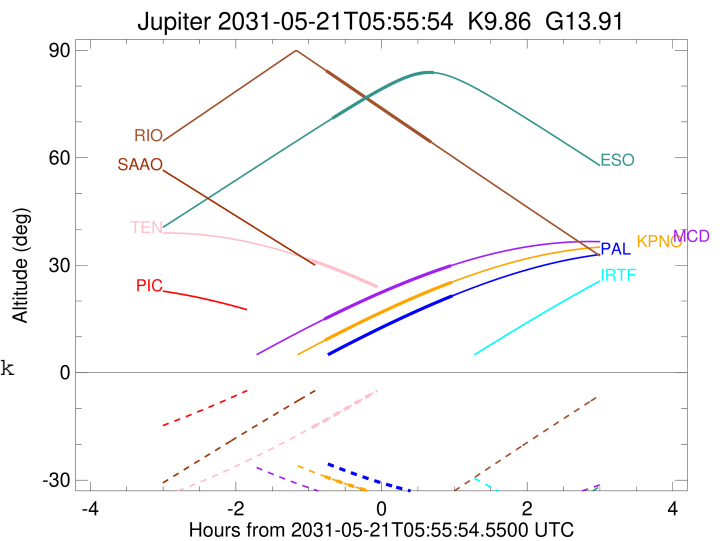
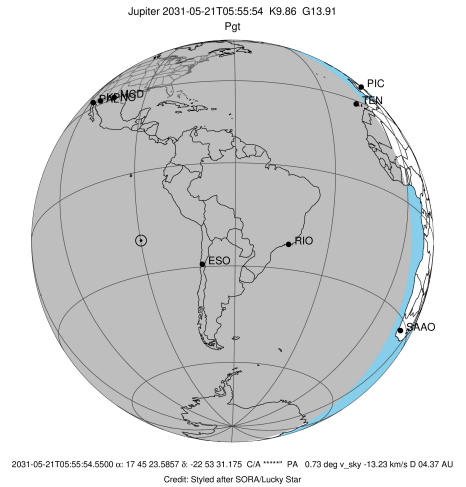
Observable events with sun below -5 deg and altitude above 5 deg

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 21 06:54 - MAY 21 06:54	Pne
PMO	Purple Mtn Obs. Nanking	32.1	118.8			Pnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+ +	MAY 21 05:09 - MAY 21 06:53	Pie
MCD	McDonald Obs. 2.7m	30.7	256.0	+ +	MAY 21 05:08 - MAY 21 06:53	Pie
TEN	Teide Obs./Tenerife	28.3	343.5	+	MAY 21 04:58 - MAY 21 04:58	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 21 05:10 - MAY 21 06:36	Pie
ESO	European Southern Obs. (3.6m)	-29.3	289.3	+ +	MAY 21 05:15 - MAY 21 06:39	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            : 2031-05-21T06:02:06.410
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      : 4068851565923431808
2Mass ID (if available) : 17452358-2253310
ICRS Star Coord at Epoch: 17h 45m 23.58568s -22:53:31.17463s
RUWE (>1.4 is poor) : 0.94
K magnitude          : 9.856
G magnitude          : 13.912
RP magnitude         : 12.811
BP magnitude         : 15.187
DUPflag             : 0
Distance (au)       : 4.368
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -13.23
Sun-Target sep (deg) : 152.94
Sun-Moon sep (deg)  : 151.84
B (ring opening deg) : -2.60
PA of pole (deg)    : 0.74
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 18.193
C/A sky separation (km) : 57630.4
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
    
```

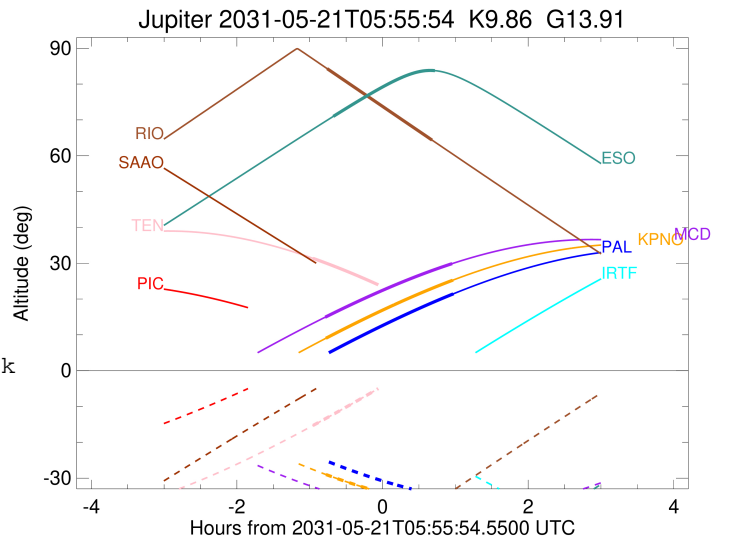
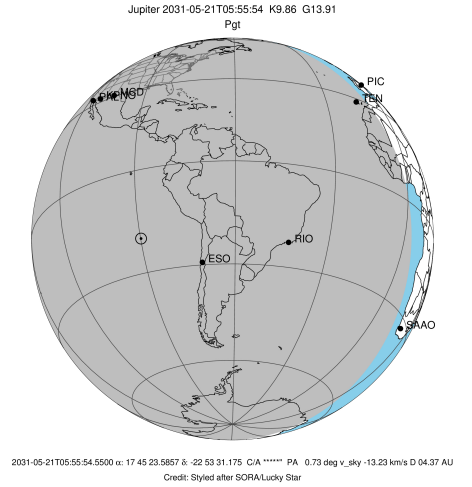


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-21T05:09:35.591	4.62x	-25.18	71485.9	-54.22	-57.63
Jupiter	E	2031-05-21T06:54:17.811	21.45	-35.36	71486.0	-53.15	-56.61

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-21T06:01:46.570
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        : 4068851565923431808
2Mass ID (if available) : 17452358-2253310
ICRS Star Coord at Epoch: 17h 45m 23.58568s -22:53:31.17463s
RUWE (>1.4 is poor) : 0.94
K magnitude           : 9.856
G magnitude           : 13.912
RP magnitude          : 12.811
BP magnitude          : 15.187
DUPflag              : 0
Distance (au)         : 4.368
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -13.23
Sun-Target sep (deg)  : 152.94
Sun-Moon sep (deg)    : 151.89
B (ring opening deg) : -2.60
PA of pole (deg)      : 0.74
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 18.177
C/A sky separation (km) : 57578.7
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
    
```

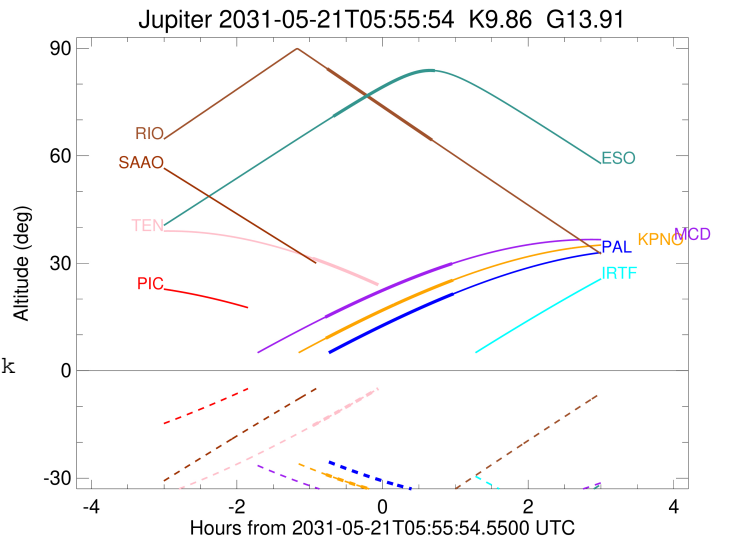
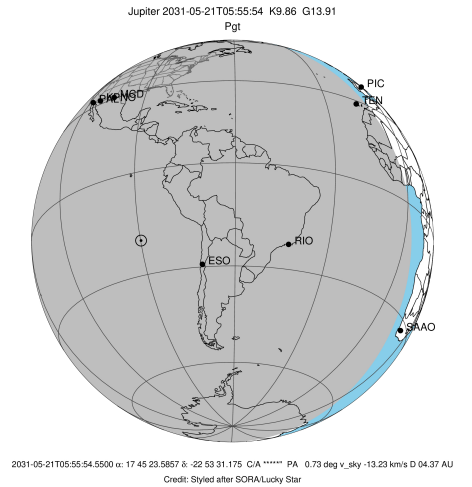


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-21T05:09:18.759	9.05	-28.99	71485.9	-54.13	-57.54
Jupiter	E	2031-05-21T06:53:55.960	25.27	-37.59	71486.1	-53.12	-56.58

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-21T06:01:09.200
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        : 4068851565923431808
2Mass ID (if available) : 17452358-2253310
ICRS Star Coord at Epoch: 17h 45m 23.58568s -22:53:31.17463s
RUWE (>1.4 is poor) : 0.94
K magnitude           : 9.856
G magnitude           : 13.912
RP magnitude          : 12.811
BP magnitude          : 15.187
DUPflag              : 0
Distance (au)         : 4.368
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -13.23
Sun-Target sep (deg)  : 152.94
Sun-Moon sep (deg)    : 151.99
B (ring opening deg) : -2.60
PA of pole (deg)      : 0.74
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 18.143
C/A sky separation (km) : 57470.3
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
    
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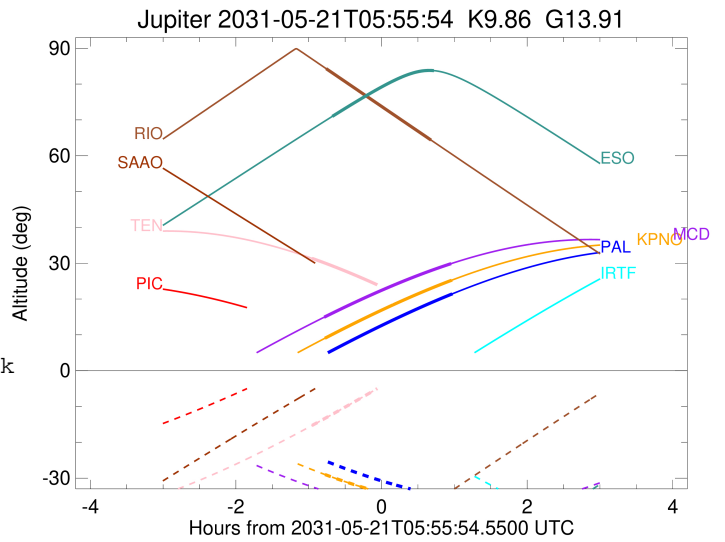
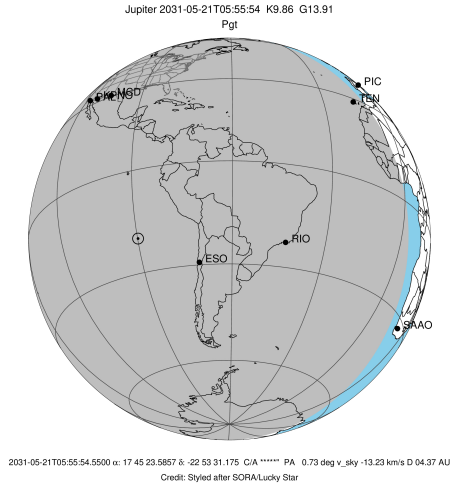


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-21T05:08:41.297	14.93	-33.52	71485.9	-53.94	-57.36
Jupiter	E	2031-05-21T06:53:20.490	29.88	-39.34	71486.1	-53.03	-56.50

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-21T05:50:33.600
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       : 4068851565923431808
2Mass ID (if available) : 17452358-2253310
ICRS Star Coord at Epoch: 17h 45m 23.58568s -22:53:31.17463s
RUWE (>1.4 is poor) : 0.94
K magnitude           : 9.856
G magnitude           : 13.912
RP magnitude         : 12.811
BP magnitude         : 15.187
DUPflag              : 0
Distance (au)        : 4.368
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -13.23
Sun-Target sep (deg) : 152.94
Sun-Moon sep (deg)   : 152.97
B (ring opening deg) : -2.60
PA of pole (deg)     : 0.74
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation ("): 18.184
C/A sky separation (km): 57603.1
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
    
```

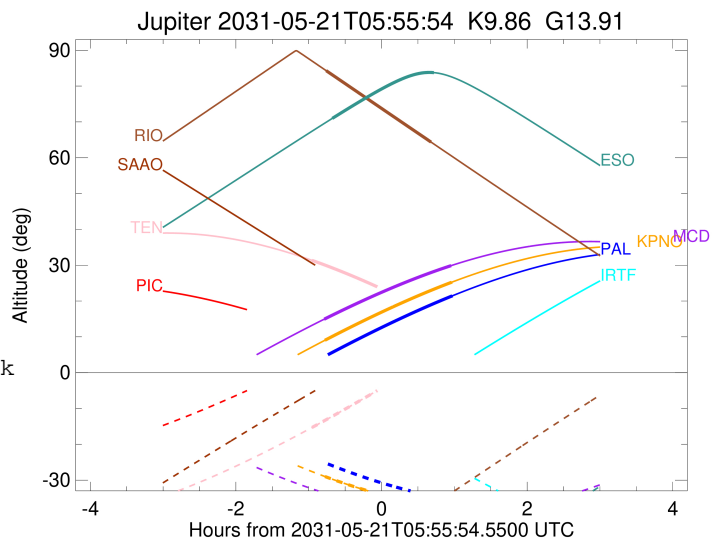
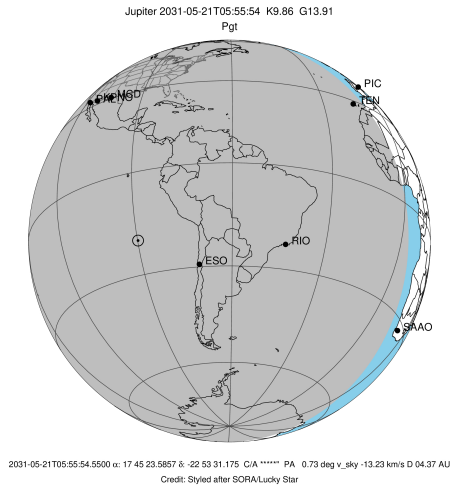


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-21T04:58:34.520	31.35	-15.31	71486.0	-53.23	-56.69
Jupiter	E	2031-05-21T06:42:45.831	15.65	5.22x	71485.9	-54.10	-57.52

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-21T05:53:29.000
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      : 4068851565923431808
2Mass ID (if available) : 17452358-2253310
ICRS Star Coord at Epoch: 17h 45m 23.58568s -22:53:31.17463s
RUWE (>1.4 is poor) : 0.94
K magnitude          : 9.856
G magnitude          : 13.912
RP magnitude         : 12.811
BP magnitude         : 15.187
DUPflag             : 0
Distance (au)       : 4.368
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -13.23
Sun-Target sep (deg) : 152.94
Sun-Moon sep (deg)  : 152.94
B (ring opening deg) : -2.60
PA of pole (deg)    : 0.74
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 19.596
C/A sky separation (km) : 62074.7
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
    
```

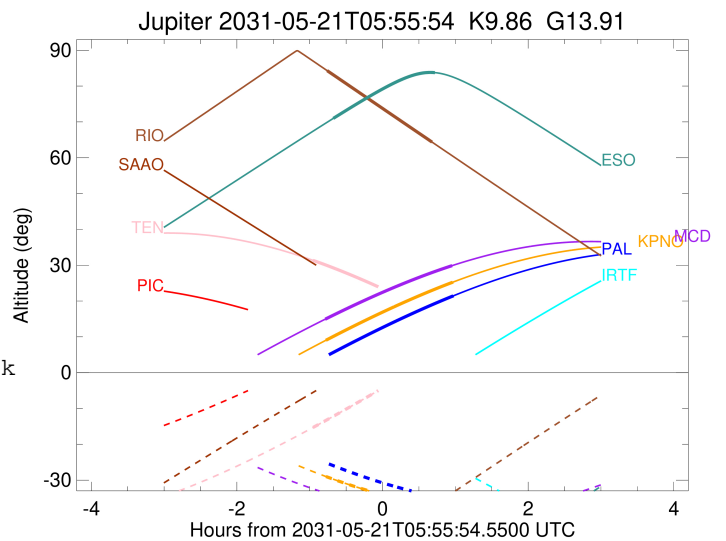
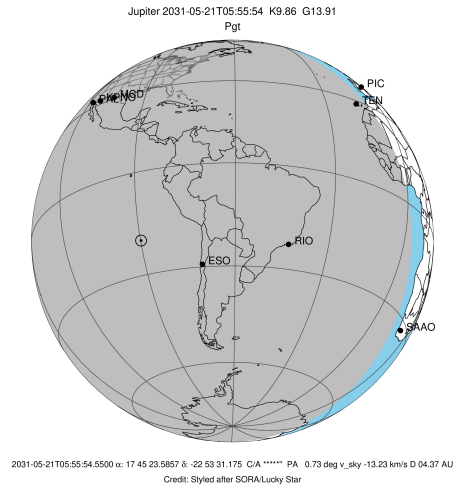


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-21T05:10:15.647	84.31	-57.22	71485.0	-60.05	-63.11
Jupiter	E	2031-05-21T06:36:45.620	64.35	-37.38	71485.0	-60.41	-63.44

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-21T05:57:14.390
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      : 4068851565923431808
2Mass ID (if available) : 17452358-2253310
ICRS Star Coord at Epoch: 17h 45m 23.58568s -22:53:31.17463s
RUWE (>1.4 is poor) : 0.94
K magnitude          : 9.856
G magnitude          : 13.912
RP magnitude         : 12.811
BP magnitude         : 15.187
DUPflag             : 0
Distance (au)       : 4.368
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -13.23
Sun-Target sep (deg) : 152.94
Sun-Moon sep (deg)  : 152.60
B (ring opening deg) : -2.60
PA of pole (deg)    : 0.74
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 19.804
C/A sky separation (km) : 62733.3
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	2031-05-21T05:15:22.103	70.97	-77.91	71484.8	-61.43	-64.39
Jupiter	E	2031-05-21T06:39:03.056	83.74	-61.50	71484.9	-61.17	-64.15