

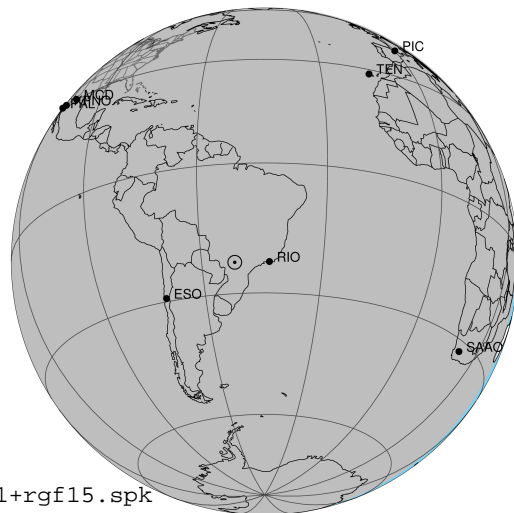
target : Jupiter  
 target radius (km) : 71492.00  
 C/A epoch : 2031-06-09T03:26:08.900  
 Event type : Pgt  
 : Jupiter occs: geocentric, topocentric  
 : Not a ringed target  
 Gaia source ID : 4116787695891447424  
 2Mass ID (if available) : 17355612-2250194

Jupiter 2031-06-09T03:26:08 K8.94 G14.13 Pgt

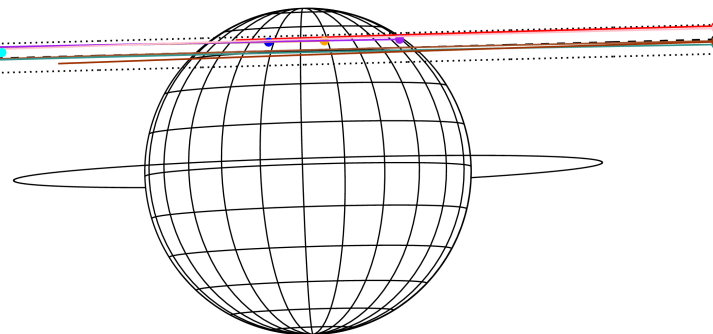
ICRS Star Coord at Epoch: 17h 35m 56.11262s -22:50:19.55273s

RUWE (>1.4 is poor) : 0.85  
 K magnitude : 8.938  
 G magnitude : 14.125  
 RP magnitude : 12.802  
 BP magnitude : 16.185  
 DUPflag : 0  
 Distance (au) : 4.273  
 f0 (km) : 0.00  
 g0 (km) : 0.00  
 skyplane vel. (km/s) : -16.24  
 Sun-Target sep (deg) : 173.23  
 Sun-Moon sep (deg) : 44.56  
 B (ring opening deg) : -2.61  
 PA of pole (deg) : 1.75  
 Pole direction: RA (deg): 268.05692  
 Dec (deg): 64.49651  
 C/A sky separation (") : 17.162  
 C/A sky separation (km) : 53191.1  
 NAIF SPICE kernels : RAJobs\_U111+rgf15.spk

Jupiter 2031-06-09T03:26:08 K8.94 G14.13  
 Pgt



Earth  
 PIC  
 PAL  
 KPNO  
 MCD  
 TEN  
 IRTF  
 RIO  
 ESO  
 SAAO

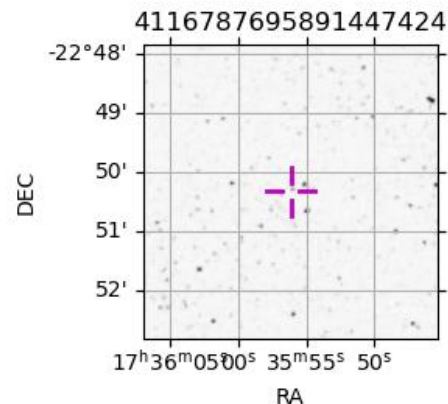


2031-06-09T03:26:08.9000 a: 17 35 56.11262 -22 50 19.553 C/A \*\*\*\*\* PA 181.51 deg v\_sky -16.24 km/s D 04.27 AU

Credit: Styled after SORA/Lucky Star

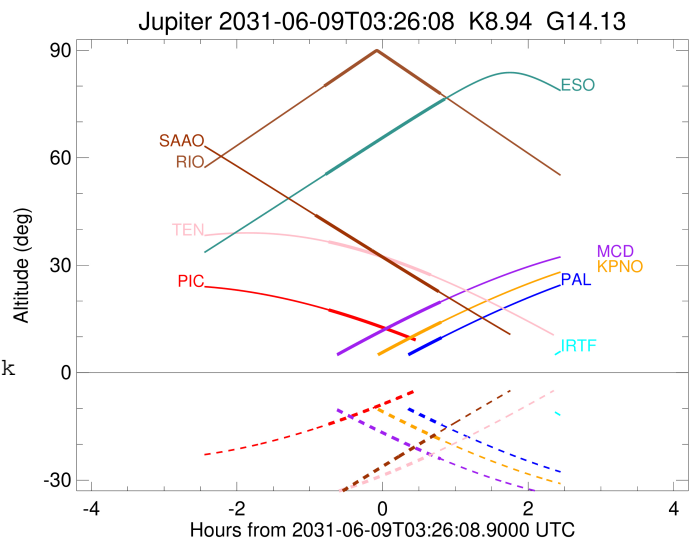
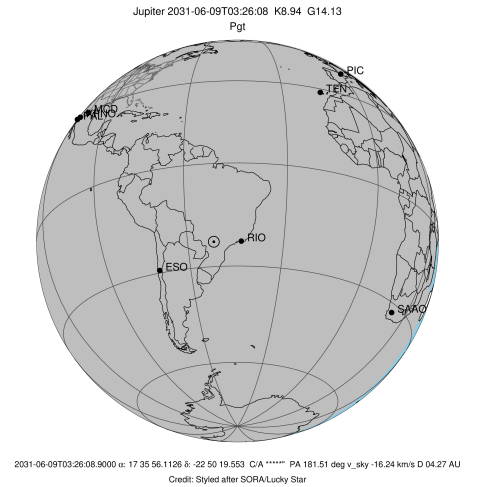
Observable events with sun below -5 deg and altitude above 5 deg

Obs	Location	lat	Elon	Target	Observed Events Interval	OCode
PIC	Pic du Midi	42.9	0.1	+	JUN 09 02:41 - JUN 09 02:41	Pin
PAL	Palomar Mt (200")	33.4	243.1	+	JUN 09 04:14 - JUN 09 04:14	Pne
PMO	Purple Mtn Obs. Nanking	32.1	118.8			Pnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+	JUN 09 04:14 - JUN 09 04:14	Pne
MCD	McDonald Obs. 2.7m	30.7	256.0	+	JUN 09 04:13 - JUN 09 04:13	Pne
TEN	Teide Obs./Tenerife	28.3	343.5	+	JUN 09 02:41 - JUN 09 04:05	Pie
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	+	JUN 09 02:38 - JUN 09 04:13	Pie
ESO	European Southern Obs. (3.6m)	-29.3	289.3	+	JUN 09 02:39 - JUN 09 04:17	Pie
AAT	Siding Spring (AAT)	-31.3	149.1			Pnn
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8	+	JUN 09 02:30 - JUN 09 04:12	Pie
MSO	Mt. Stromlo Observatory	-35.3	149.0			Pnn



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-09T03:23:15.850
Event type          : Pgt
                    : Jupiter occs: geocentric, topocentric
                    : Not a ringed target
Observer code       : PIC
Location            : Pic du Midi
Latitude (deg)      : 42.93656
E. Longitude (deg)  : 0.14231
Altitude (km)       : 2.890
Gaia source ID      : 4116787695891447424
2Mass ID (if available) : 17355612-2250194
ICRS Star Coord at Epoch: 17h 35m 56.11262s -22:50:19.55273s
RUWE (>1.4 is poor) : 0.85
K magnitude          : 8.938
G magnitude          : 14.125
RP magnitude         : 12.802
BP magnitude         : 16.185
DUPflag             : 0
Distance (au)       : 4.273
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.24
Sun-Target sep (deg) : 173.23
Sun-Moon sep (deg)  : 44.30
B (ring opening deg) : -2.61
PA of pole (deg)    : 1.75
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation ("): 18.895
C/A sky separation (km): 58561.2
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
    
```

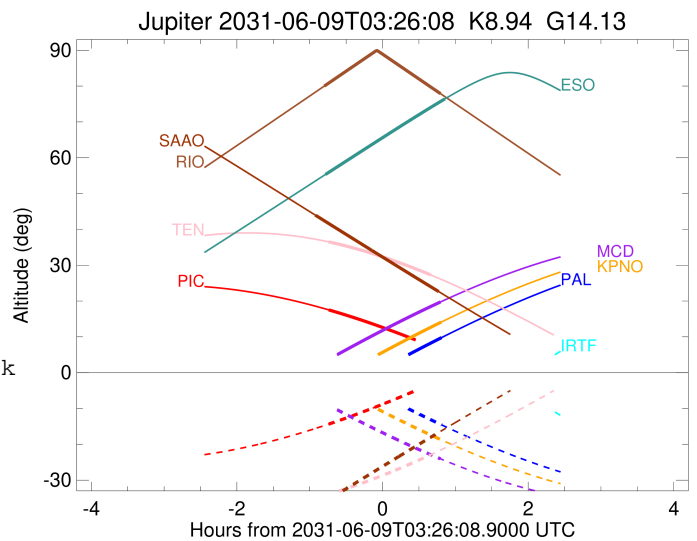
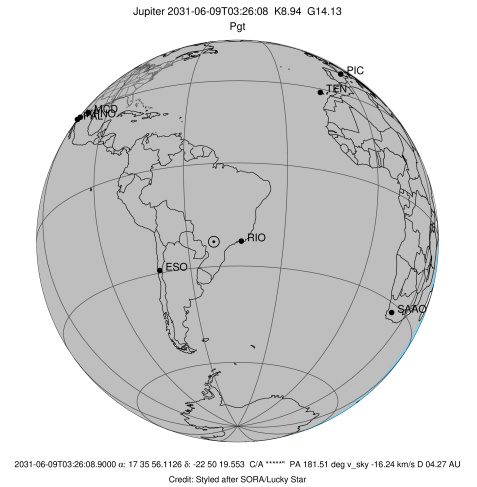


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-09T02:41:50.566	17.52	-14.35	71485.8	54.94	58.31
Jupiter	E	2031-06-09T04:04:47.069	7.58	-3.34x	71485.8	54.84	58.21

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-09T03:30:54.070
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      : 4116787695891447424
2Mass ID (if available) : 17355612-2250194
ICRS Star Coord at Epoch: 17h 35m 56.11262s -22:50:19.55273s
RUWE (>1.4 is poor) : 0.85
K magnitude          : 8.938
G magnitude          : 14.125
RP magnitude         : 12.802
BP magnitude         : 16.185
DUPflag             : 0
Distance (au)        : 4.273
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.24
Sun-Target sep (deg) : 173.23
Sun-Moon sep (deg)  : 45.10
B (ring opening deg) : -2.61
PA of pole (deg)    : 1.75
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (" ) : 18.377
C/A sky separation (km) : 56955.2
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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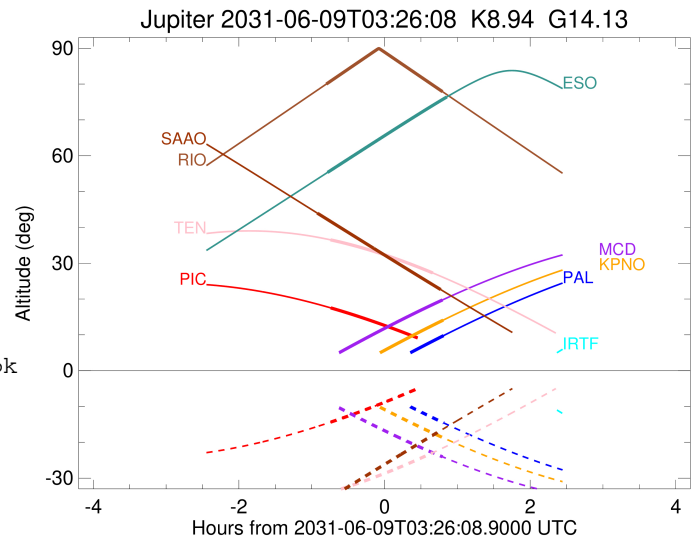
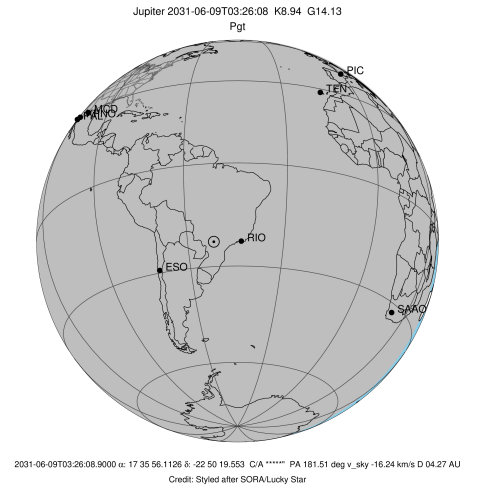


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-09T02:46:47.491	-6.30x	0.74x	71486.3	51.98	55.49
Jupiter	E	2031-06-09T04:14:49.284	9.78	-14.56	71486.0	53.48	56.92

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-09T03:30:48.430
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       : 4116787695891447424
2Mass ID (if available) : 17355612-2250194
ICRS Star Coord at Epoch: 17h 35m 56.11262s -22:50:19.55273s
RUWE (>1.4 is poor) : 0.85
K magnitude           : 8.938
G magnitude           : 14.125
RP magnitude          : 12.802
BP magnitude          : 16.185
DUPflag              : 0
Distance (au)         : 4.273
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.24
Sun-Target sep (deg) : 173.23
Sun-Moon sep (deg)   : 45.15
B (ring opening deg) : -2.61
PA of pole (deg)     : 1.75
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 18.400
C/A sky separation (km) : 57027.4
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
    
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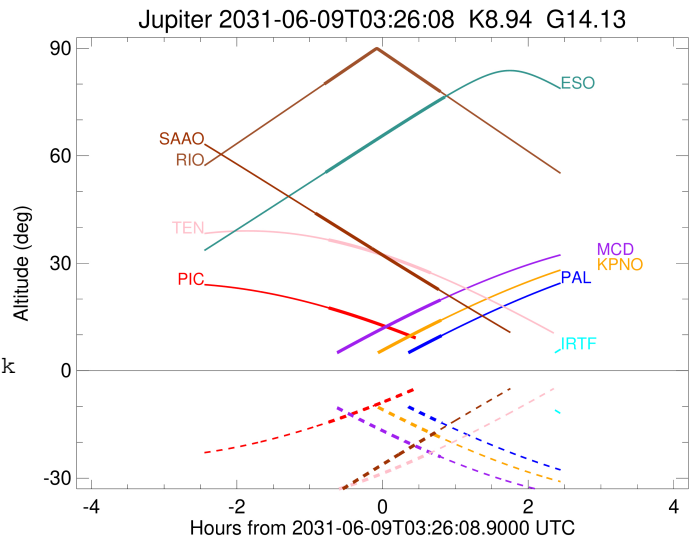
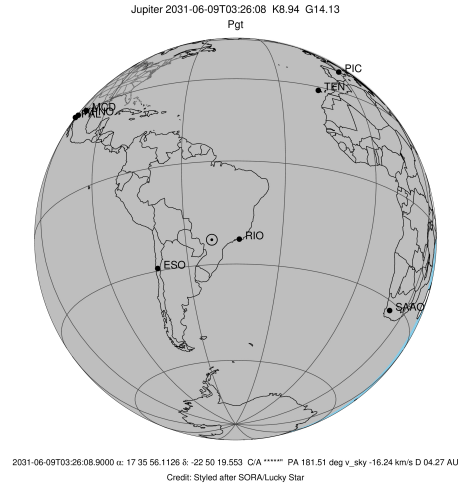


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-09T02:46:53.254	-1.67x	-3.84x	71486.2	52.08	55.58
Jupiter	E	2031-06-09T04:14:32.553	14.11	-18.74	71486.0	53.56	57.00

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-09T03:30:33.590
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       : 4116787695891447424
2Mass ID (if available) : 17355612-2250194
ICRS Star Coord at Epoch: 17h 35m 56.11262s -22:50:19.55273s
RUWE (>1.4 is poor) : 0.85
K magnitude           : 8.938
G magnitude           : 14.125
RP magnitude          : 12.802
BP magnitude          : 16.185
DUPflag              : 0
Distance (au)        : 4.273
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.24
Sun-Target sep (deg) : 173.23
Sun-Moon sep (deg)   : 45.19
B (ring opening deg) : -2.61
PA of pole (deg)     : 1.75
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 18.449
C/A sky separation (km) : 57179.8
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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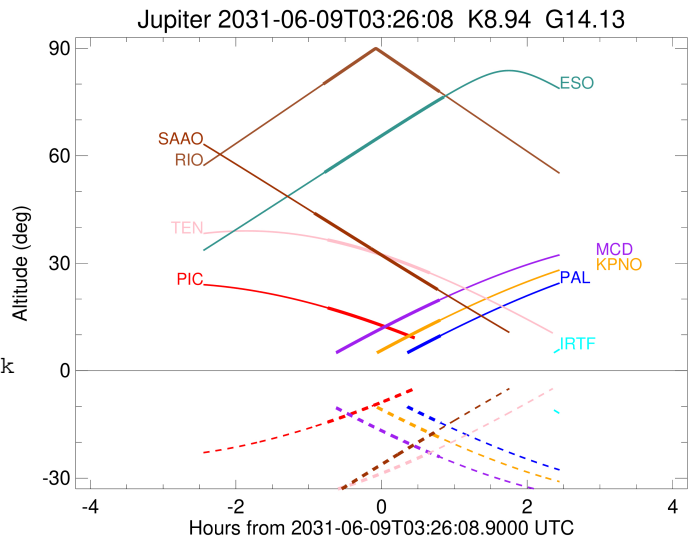
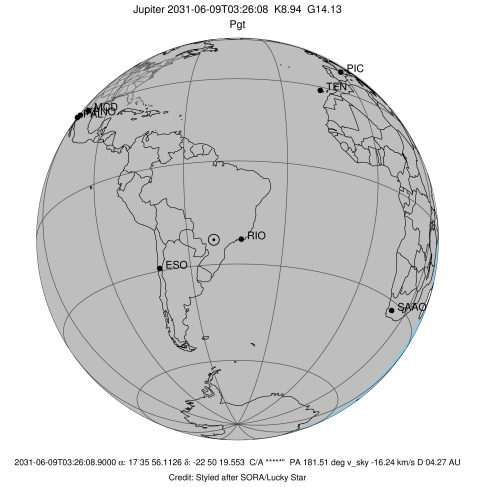


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-09T02:46:58.490	4.67x	-10.03	71486.2	52.30	55.79
Jupiter	E	2031-06-09T04:13:58.409	19.74	-24.05	71486.0	53.73	57.17

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-09T03:23:50.650
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       : 4116787695891447424
2Mass ID (if available) : 17355612-2250194
ICRS Star Coord at Epoch: 17h 35m 56.11262s -22:50:19.55273s
RUWE (>1.4 is poor) : 0.85
K magnitude           : 8.938
G magnitude           : 14.125
RP magnitude         : 12.802
BP magnitude         : 16.185
DUPflag              : 0
Distance (au)        : 4.273
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.24
Sun-Target sep (deg) : 173.23
Sun-Moon sep (deg)   : 44.60
B (ring opening deg) : -2.61
PA of pole (deg)     : 1.75
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation ("): 18.701
C/A sky separation (km): 57960.1
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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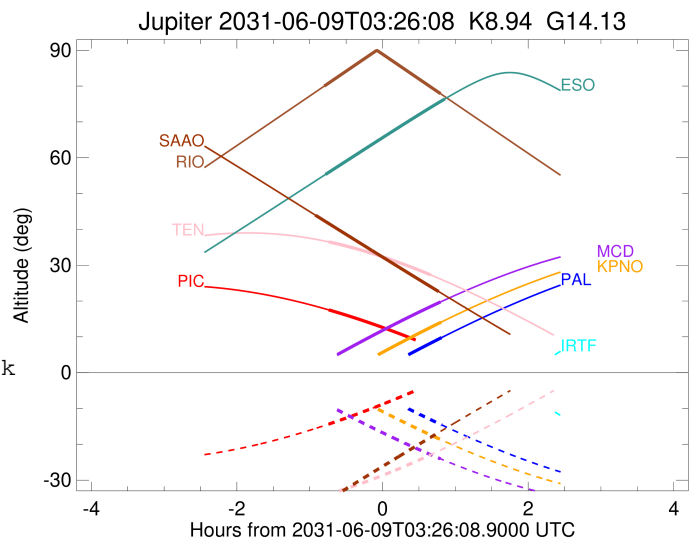
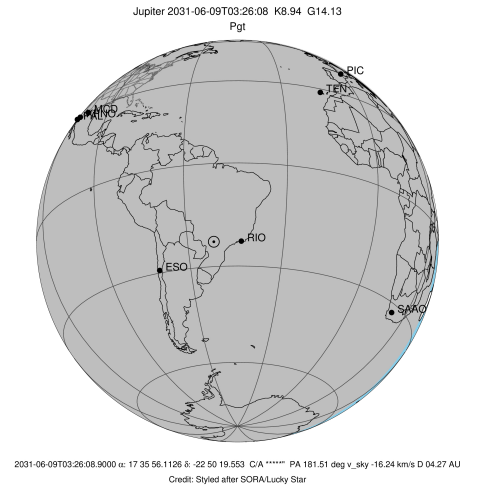


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-09T02:41:50.503	36.50	-33.89	71485.9	54.02	57.44
Jupiter	E	2031-06-09T04:05:55.542	27.28	-22.89	71485.9	54.07	57.48

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-09T03:26:00.470
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        : 4116787695891447424
2Mass ID (if available) : 17355612-2250194
ICRS Star Coord at Epoch: 17h 35m 56.11262s -22:50:19.55273s
RUWE (>1.4 is poor)  : 0.85
K magnitude           : 8.938
G magnitude           : 14.125
RP magnitude          : 12.802
BP magnitude          : 16.185
DUPflag              : 0
Distance (au)         : 4.273
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s)  : -16.24
Sun-Target sep (deg)  : 173.23
Sun-Moon sep (deg)    : 45.26
B (ring opening deg)  : -2.61
PA of pole (deg)      : 1.75
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 17.167
C/A sky separation (km) : 53204.2
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
    
```

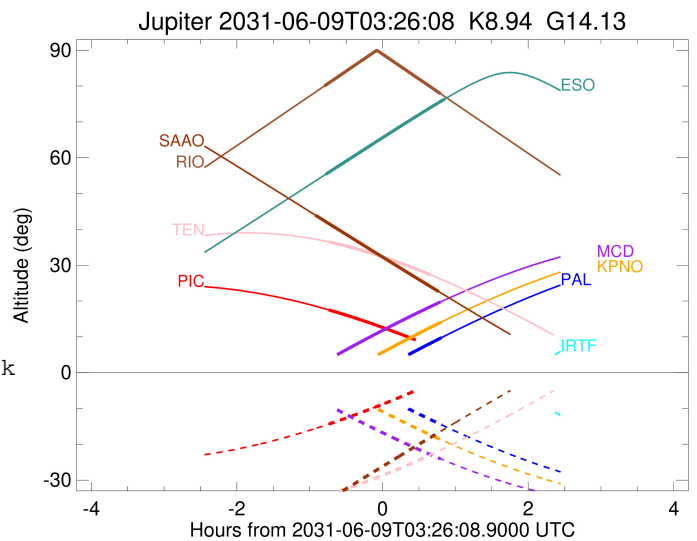
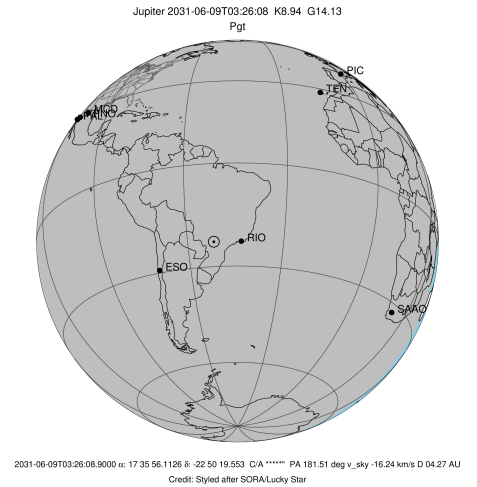


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-09T02:38:12.559	80.00	-86.80	71486.9	47.70	51.35
Jupiter	E	2031-06-09T04:13:48.222	77.91	-71.19	71486.8	48.24	51.87

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-09T03:28:21.850
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        : 4116787695891447424
2Mass ID (if available) : 17355612-2250194
ICRS Star Coord at Epoch: 17h 35m 56.11262s -22:50:19.55273s
RUWE (>1.4 is poor) : 0.85
K magnitude           : 8.938
G magnitude           : 14.125
RP magnitude          : 12.802
BP magnitude          : 16.185
DUPflag              : 0
Distance (au)         : 4.273
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.24
Sun-Target sep (deg) : 173.23
Sun-Moon sep (deg)   : 45.49
B (ring opening deg) : -2.61
PA of pole (deg)     : 1.75
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 16.851
C/A sky separation (km) : 52227.6
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
    
```



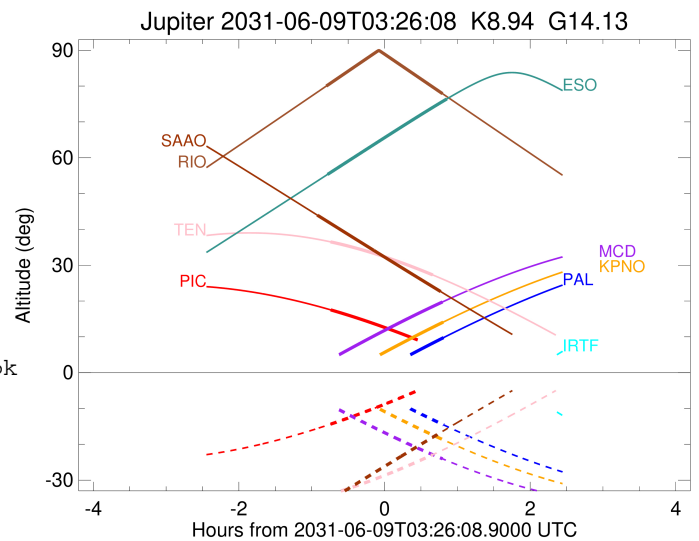
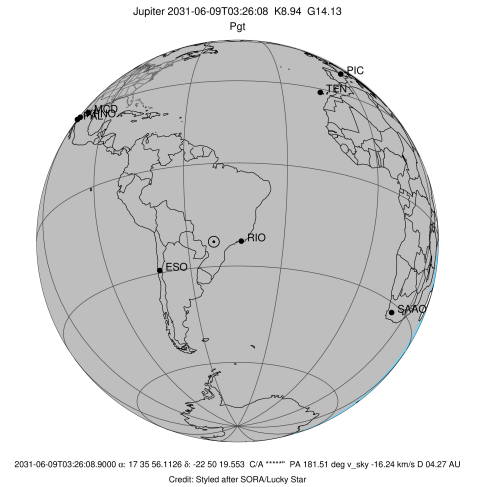
x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-09T02:39:15.788	55.34	-61.80	71487.2	46.31	50.00
Jupiter	E	2031-06-09T04:17:20.951	76.37	-81.68	71487.0	47.33	50.99



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-09T03:21:32.850
Event type          : Pgt
                    : Jupiter occs: geocentric, topocentric
                    : Not a ringed target
Observer code       : SAAO
Location            : So. Afr. Astro. Obs. (Sutherland)
Latitude (deg)      : -32.37953
E. Longitude (deg)  : 20.81070
Altitude (km)       : 1.768
Gaia source ID      : 4116787695891447424
2Mass ID (if available) : 17355612-2250194
ICRS Star Coord at Epoch: 17h 35m 56.11262s -22:50:19.55273s
RUWE (>1.4 is poor) : 0.85
K magnitude          : 8.938
G magnitude          : 14.125
RP magnitude         : 12.802
BP magnitude         : 16.185
DUPflag             : 0
Distance (au)       : 4.273
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.24
Sun-Target sep (deg) : 173.23
Sun-Moon sep (deg)  : 44.40
B (ring opening deg) : -2.61
PA of pole (deg)    : 1.75
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation ("): 16.485
C/A sky separation (km): 51091.3
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	2031-06-09T02:30:52.296	43.95	-37.73	71487.2	45.74	49.43
Jupiter	E	2031-06-09T04:12:27.053	22.63	-16.69	71487.3	45.31	49.01