

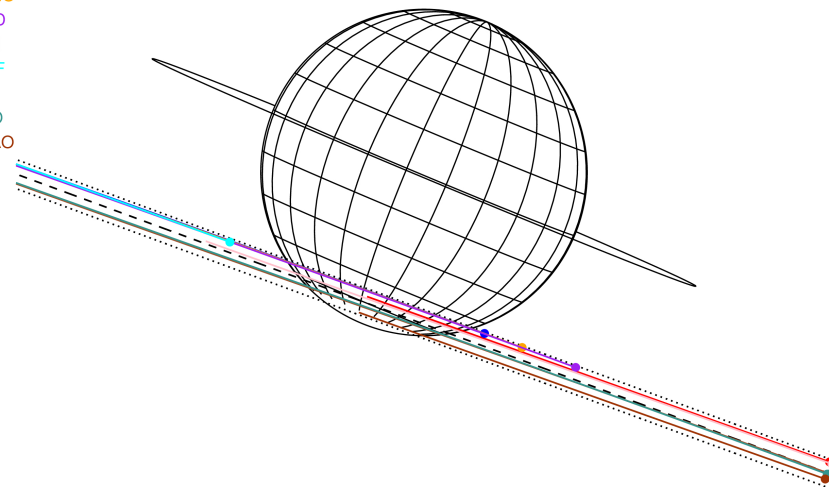
target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2033-09-16T03:10:29.630
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 2612530135442401024
 2Mass ID (if available) : 22070072-1258277

Jupiter 2033-09-16T03:10:29 K9.95 G12.22 Pgt

ICRS Star Coord at Epoch: 22h 07m 00.73061s -12:58:28.01744s
 RUWE (>1.4 is poor) : 1.01
 K magnitude : 9.952
 G magnitude : 12.223
 RP magnitude : 11.520
 BP magnitude : 12.784
 DUPflag : 0
 Distance (au) : 4.072
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -13.41
 Sun-Target sep (deg) : 156.02
 Sun-Moon sep (deg) : 118.66
 B (ring opening deg) : 0.96
 PA of pole (deg) : -22.71
 Pole direction: RA (deg): 268.05645
 Dec (deg): 64.49664
 C/A sky separation (") : 21.114
 C/A sky separation (km) : 62359.1
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk



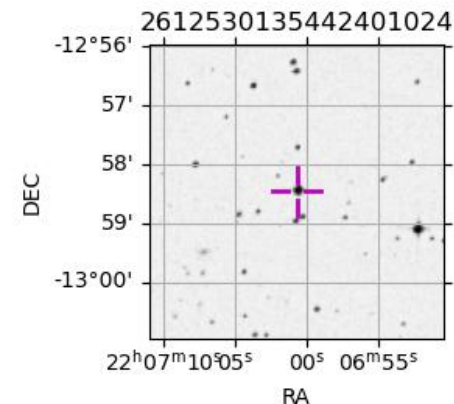
Earth
 PIC
 PAL
 KPNO
 MCD
 TEN
 IRTF
 RIO
 ESO
 SAAO



2033-09-16T03:10:29.6300 a: 22 07 00.73061 s: -12 58 28.017 C/A ***** PA 339.79 deg v_sky -13.41 km/s D 04.07 AU
 Credit: Styled after SORA/Lucky Star

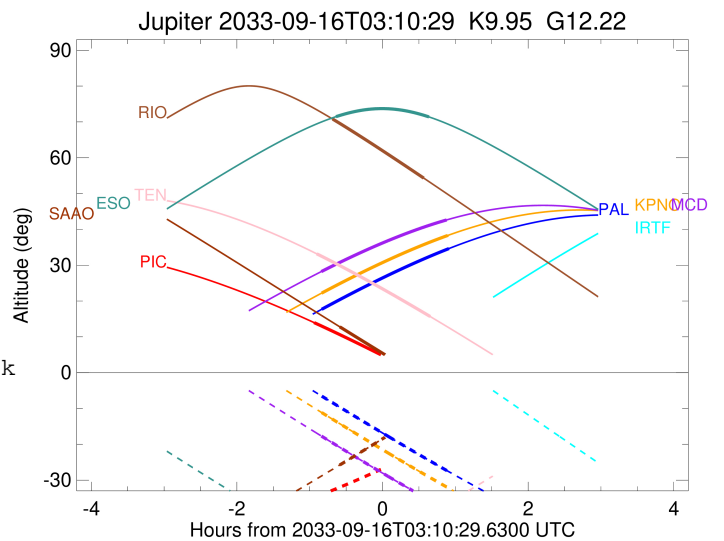
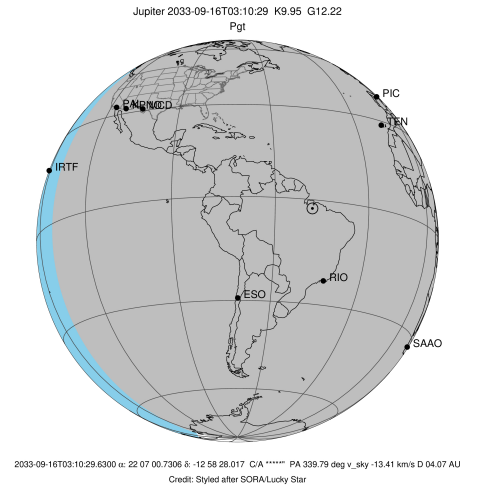
Observable events with sun below -5 deg and altitude above 5 deg

Obs	Location	lat	Elon	Target	Observed Events Interval	OCode
PIC	Pic du Midi	42.9	0.1	+	SEP 16 02:14 - SEP 16 02:14	Pin
PAL	Palomar Mt (200")	33.4	243.1	+ +	SEP 16 02:20 - SEP 16 04:05	Pie
PMO	Purple Mtn Obs. Nanking	32.1	118.8			Pnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+ +	SEP 16 02:20 - SEP 16 04:04	Pie
MCD	McDonald Obs. 2.7m	30.7	256.0	+ +	SEP 16 02:20 - SEP 16 04:03	Pie
TEN	Teide Obs./Tenerife	28.3	343.5	+ +	SEP 16 02:16 - SEP 16 03:49	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	+ +	SEP 16 02:29 - SEP 16 03:44	Pie
ESO	European Southern Obs. (3.6m)	-29.3	289.3	+ +	SEP 16 02:32 - SEP 16 03:48	Pie
AAT	Siding Spring (AAT)	-31.3	149.1			Pnn
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8	+	SEP 16 02:35 - SEP 16 02:35	Pin
MSO	Mt. Stromlo Observatory	-35.3	149.0			Pnn



```

target           : Jupiter
target radius (km) : 71492.00
C/A epoch       : 2033-09-16T03:02:49.560
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  : 2612530135442401024
2Mass ID (if available) : 22070072-1258277
ICRS Star Coord at Epoch: 22h 07m 00.73061s -12:58:28.01744s
RUWE (>1.4 is poor) : 1.01
K magnitude     : 9.952
G magnitude     : 12.223
RP magnitude    : 11.520
BP magnitude    : 12.784
DUPflag        : 0
Distance (au)   : 4.072
f0 (km)        : 0.00
g0 (km)        : 0.00
skyplane vel. (km/s) : -13.41
Sun-Target sep (deg) : 156.02
Sun-Moon sep (deg) : 119.13
B (ring opening deg) : 0.96
PA of pole (deg) : -22.71
Pole direction: RA (deg): 268.05645
Dec (deg): 64.49664
C/A sky separation (") : 20.171
C/A sky separation (km) : 59574.0
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
    
```

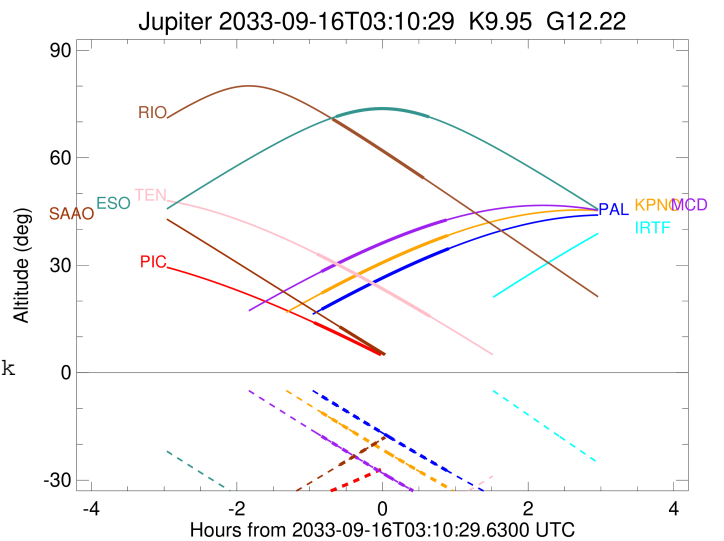
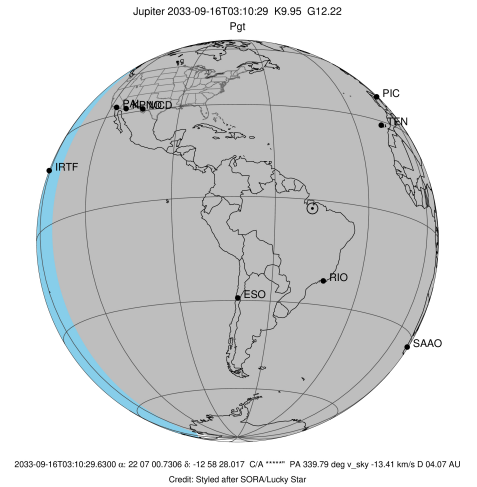


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2033-09-16T02:14:06.915	13.98	-34.82	71491.2	-53.44	-56.89
Jupiter	E	2033-09-16T03:51:48.551	-2.43x	-20.10	71491.1	-59.34	-62.45

```

target           : Jupiter
target radius (km) : 71492.00
C/A epoch       : 2033-09-16T03:12:54.520
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  : 2612530135442401024
2Mass ID (if available) : 22070072-1258277
ICRS Star Coord at Epoch: 22h 07m 00.73061s -12:58:28.01744s
RUWE (>1.4 is poor) : 1.01
K magnitude     : 9.952
G magnitude     : 12.223
RP magnitude    : 11.520
BP magnitude    : 12.784
DUPflag        : 0
Distance (au)   : 4.072
f0 (km)         : 0.00
g0 (km)         : 0.00
skyplane vel. (km/s) : -13.41
Sun-Target sep (deg) : 156.02
Sun-Moon sep (deg) : 118.84
B (ring opening deg) : 0.96
PA of pole (deg) : -22.71
Pole direction: RA (deg): 268.05645
Dec (deg): 64.49664
C/A sky separation (") : 19.324
C/A sky separation (km) : 57072.5
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
    
```

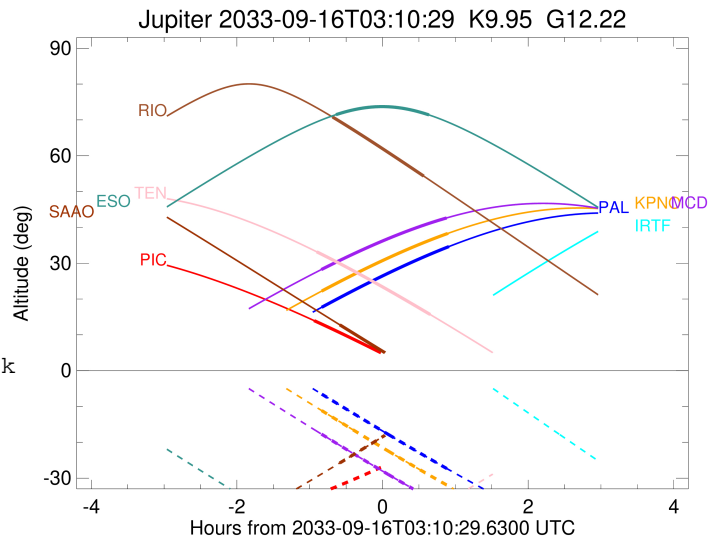
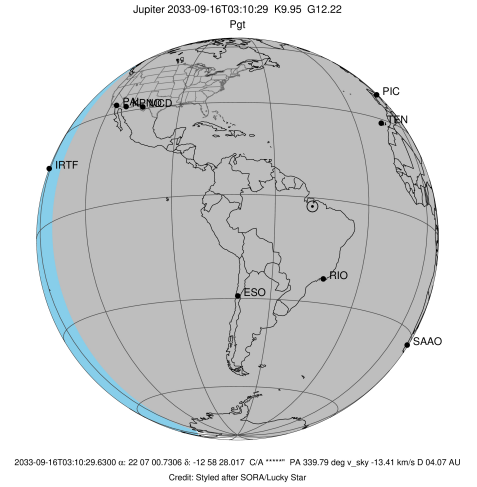


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2033-09-16T02:20:27.628	17.70	-6.55	71491.3	-50.38	-53.96
Jupiter	E	2033-09-16T04:05:10.813	34.63	-27.65	71491.2	-55.68	-59.01

```

target           : Jupiter
target radius (km) : 71492.00
C/A epoch       : 2033-09-16T03:12:30.220
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  : 2612530135442401024
2Mass ID (if available) : 22070072-1258277
ICRS Star Coord at Epoch: 22h 07m 00.73061s -12:58:28.01744s
RUWE (>1.4 is poor) : 1.01
K magnitude     : 9.952
G magnitude     : 12.223
RP magnitude    : 11.520
BP magnitude    : 12.784
DUPflag        : 0
Distance (au)   : 4.072
f0 (km)         : 0.00
g0 (km)         : 0.00
skyplane vel. (km/s) : -13.41
Sun-Target sep (deg) : 156.02
Sun-Moon sep (deg) : 118.91
B (ring opening deg) : 0.96
PA of pole (deg) : -22.71
Pole direction: RA (deg): 268.05645
Dec (deg): 64.49664
C/A sky separation (") : 19.371
C/A sky separation (km) : 57213.6
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
    
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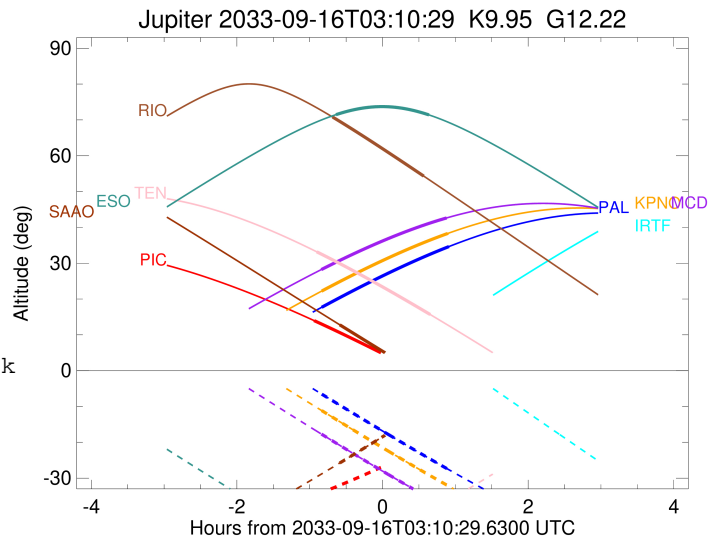
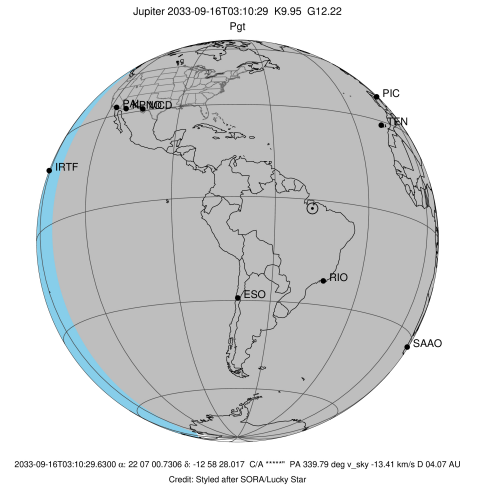


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2033-09-16T02:20:23.345	22.21	-11.14	71491.3	-50.51	-54.08
Jupiter	E	2033-09-16T04:04:27.863	38.32	-32.12	71491.2	-55.93	-59.25

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2033-09-16T03:11:47.840
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      : 2612530135442401024
2Mass ID (if available) : 22070072-1258277
ICRS Star Coord at Epoch: 22h 07m 00.73061s -12:58:28.01744s
RUWE (>1.4 is poor) : 1.01
K magnitude          : 9.952
G magnitude          : 12.223
RP magnitude         : 11.520
BP magnitude         : 12.784
DUPflag             : 0
Distance (au)        : 4.072
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -13.41
Sun-Target sep (deg) : 156.02
Sun-Moon sep (deg)  : 119.02
B (ring opening deg) : 0.96
PA of pole (deg)    : -22.71
Pole direction: RA (deg): 268.05645
Dec (deg): 64.49664
C/A sky separation (") : 19.437
C/A sky separation (km) : 57407.2
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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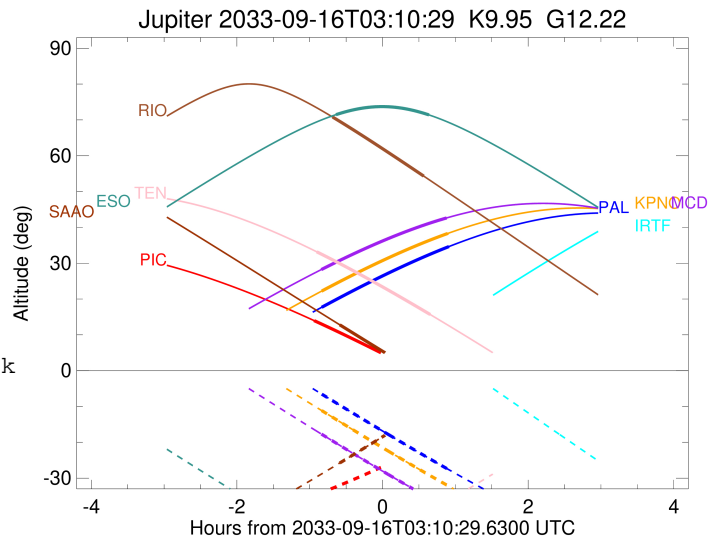
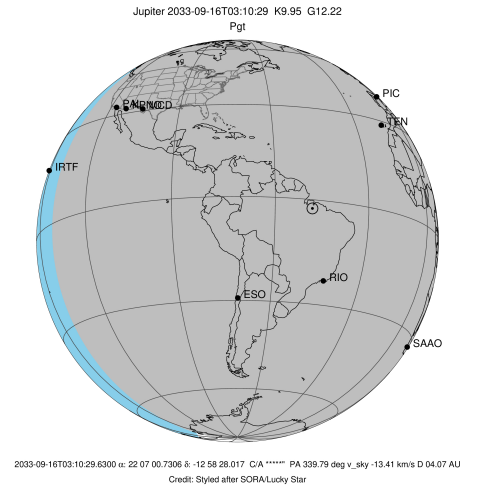


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2033-09-16T02:20:07.500	28.22	-17.69	71491.3	-50.68	-54.25
Jupiter	E	2033-09-16T04:03:21.139	42.63	-38.19	71491.1	-56.27	-59.57

```

target           : Jupiter
target radius (km) : 71492.00
C/A epoch       : 2033-09-16T03:02:51.400
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  : 2612530135442401024
2Mass ID (if available) : 22070072-1258277
ICRS Star Coord at Epoch: 22h 07m 00.73061s -12:58:28.01744s
RUWE (>1.4 is poor) : 1.01
K magnitude     : 9.952
G magnitude     : 12.223
RP magnitude    : 11.520
BP magnitude    : 12.784
DUPflag        : 0
Distance (au)   : 4.072
f0 (km)        : 0.00
g0 (km)        : 0.00
skyplane vel. (km/s) : -13.41
Sun-Target sep (deg) : 156.02
Sun-Moon sep (deg) : 119.39
B (ring opening deg) : 0.96
PA of pole (deg) : -22.71
Pole direction: RA (deg): 268.05645
Dec (deg): 64.49664
C/A sky separation (") : 20.466
C/A sky separation (km) : 60446.2
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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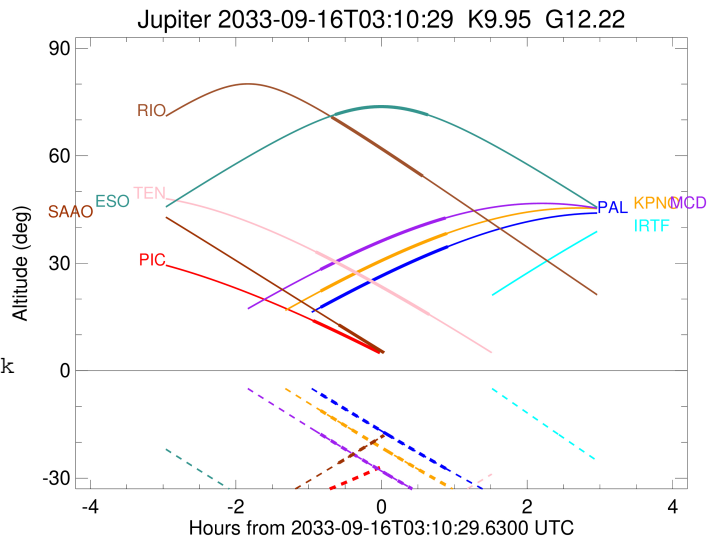
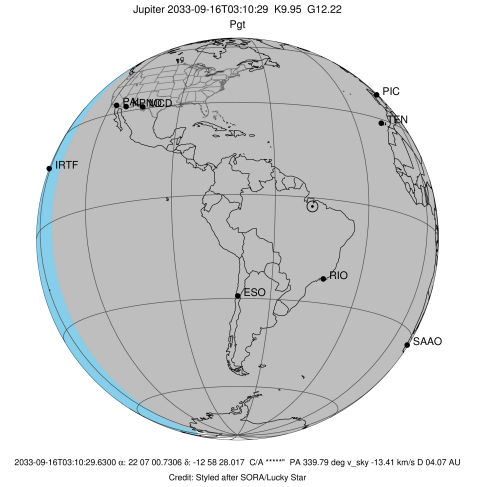


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2033-09-16T02:16:14.014	33.18	-54.36	71491.2	-54.55	-57.94
Jupiter	E	2033-09-16T03:49:44.499	15.68	-39.16	71491.1	-60.83	-63.83

```

target           : Jupiter
target radius (km) : 71492.00
C/A epoch       : 2033-09-16T03:06:56.530
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  : 2612530135442401024
2Mass ID (if available) : 22070072-1258277
ICRS Star Coord at Epoch: 22h 07m 00.73061s -12:58:28.01744s
RUWE (>1.4 is poor) : 1.01
K magnitude     : 9.952
G magnitude     : 12.223
RP magnitude    : 11.520
BP magnitude    : 12.784
DUPflag        : 0
Distance (au)   : 4.072
f0 (km)        : 0.00
g0 (km)        : 0.00
skyplane vel. (km/s) : -13.41
Sun-Target sep (deg) : 156.02
Sun-Moon sep (deg) : 119.57
B (ring opening deg) : 0.96
PA of pole (deg) : -22.71
Pole direction: RA (deg): 268.05645
Dec (deg): 64.49664
C/A sky separation (") : 21.820
C/A sky separation (km) : 64444.1
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
    
```

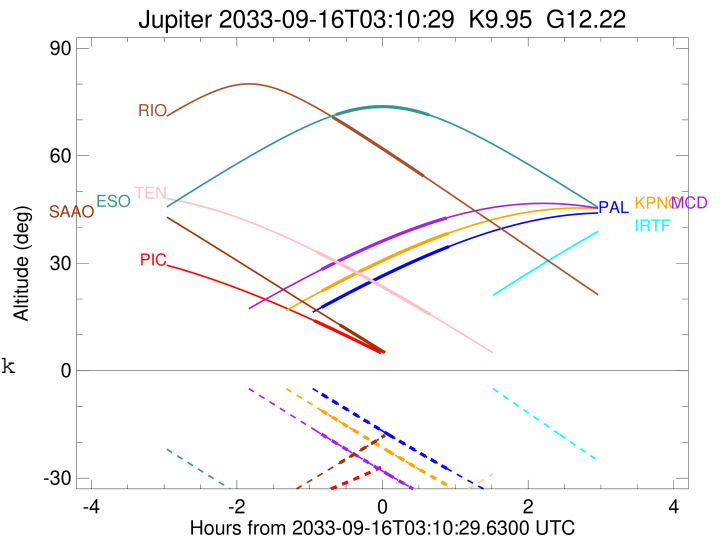
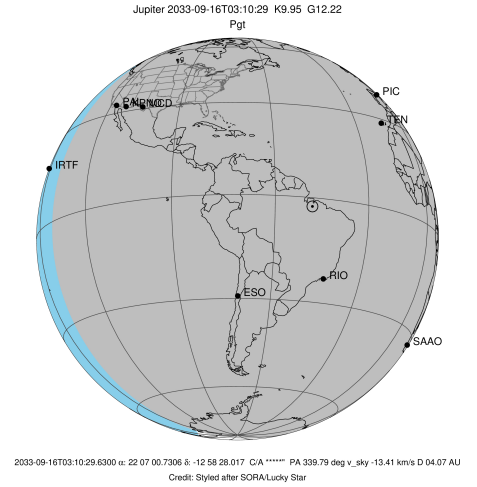


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2033-09-16T02:29:29.815	70.77	-69.32	71491.0	-61.13	-64.11
Jupiter	E	2033-09-16T03:44:30.248	54.30	-65.54	71490.9	-67.55	-70.00


```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2033-09-16T03:10:26.580
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        : 2612530135442401024
2Mass ID (if available) : 22070072-1258277
ICRS Star Coord at Epoch: 22h 07m 00.73061s -12:58:28.01744s
RUWE (>1.4 is poor) : 1.01
K magnitude           : 9.952
G magnitude           : 12.223
RP magnitude          : 11.520
BP magnitude          : 12.784
DUPflag              : 0
Distance (au)         : 4.072
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -13.41
Sun-Target sep (deg)  : 156.02
Sun-Moon sep (deg)    : 119.43
B (ring opening deg) : 0.96
PA of pole (deg)      : -22.71
Pole direction: RA (deg): 268.05645
Dec (deg): 64.49664
C/A sky separation (") : 21.683
C/A sky separation (km) : 64042.0
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
    
```

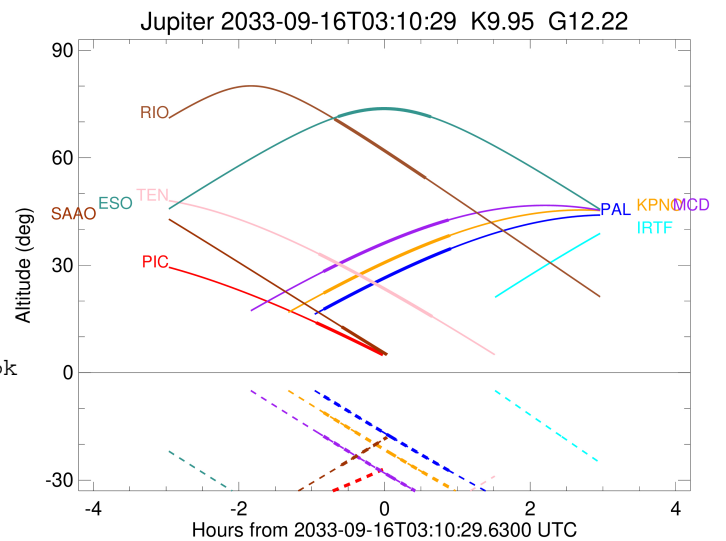
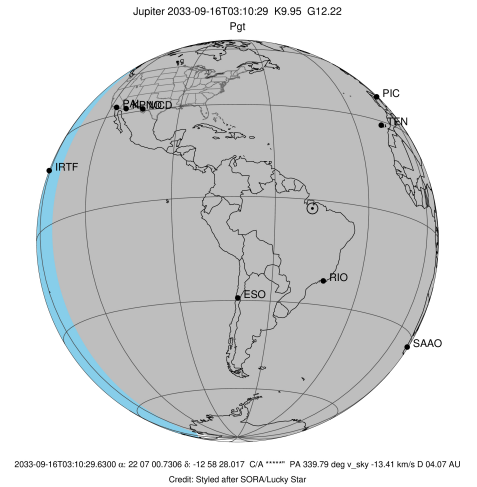


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2033-09-16T02:32:05.476	71.45	-50.05	71491.1	-60.55	-63.57
Jupiter	E	2033-09-16T03:48:49.878	71.38	-61.00	71491.0	-66.70	-69.23


```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2033-09-16T03:05:07.800
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      : 2612530135442401024
2Mass ID (if available) : 22070072-1258277
ICRS Star Coord at Epoch: 22h 07m 00.73061s -12:58:28.01744s
RUWE (>1.4 is poor) : 1.01
K magnitude          : 9.952
G magnitude          : 12.223
RP magnitude         : 11.520
BP magnitude         : 12.784
DUPflag             : 0
Distance (au)       : 4.072
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -13.41
Sun-Target sep (deg) : 156.02
Sun-Moon sep (deg)  : 119.06
B (ring opening deg) : 0.96
PA of pole (deg)    : -22.71
Pole direction: RA (deg): 268.05645
Dec (deg): 64.49664
C/A sky separation (") : 22.801
C/A sky separation (km) : 67343.7
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	2033-09-16T02:35:14.241	12.81	-25.78	71490.9	-67.49	-69.95
Jupiter	E	2033-09-16T03:35:08.622	0.34x	-13.29	71490.9	-73.17	-75.07