

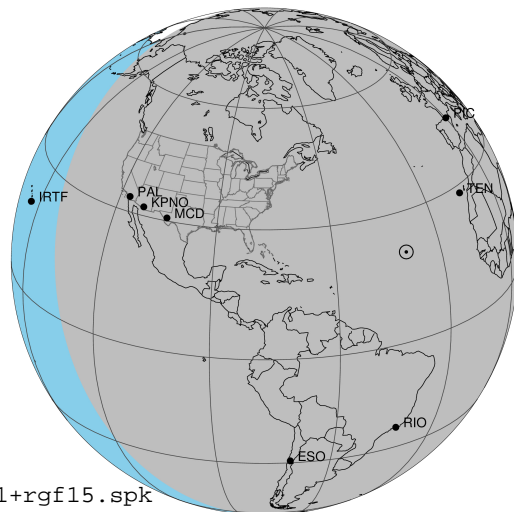
target : Jupiter  
 target radius (km) : 71492.00  
 C/A epoch : 2049-01-16T02:52:13.010  
 Event type : Pgt  
 : Jupiter occs: geocentric, topocentric  
 : Not a ringed target  
 Gaia source ID : 3416265262671321472  
 2Mass ID (if available) : 05234283+2249438

Jupiter 2049-01-16T02:52:13 K8.09 G12.25 Pgt

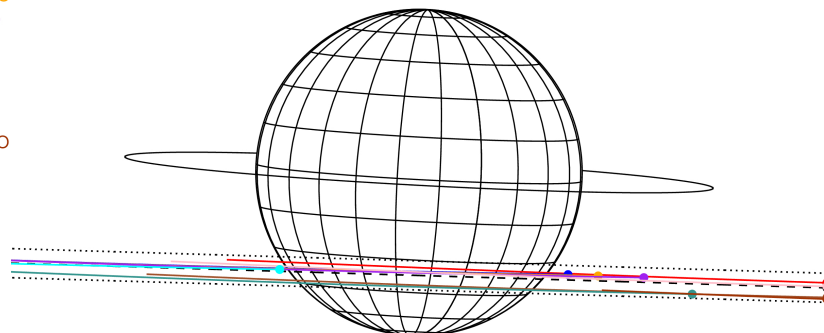
ICRS Star Coord at Epoch: 05h 23m 42.85190s +22:49:43.76093s

RUWE (>1.4 is poor) : 1.02  
 K magnitude : 8.090  
 G magnitude : 12.248  
 RP magnitude : 11.141  
 BP magnitude : 13.539  
 DUPflag : 0  
 Distance (au) : 4.271  
 f0 (km) : 0.00  
 g0 (km) : 0.00  
 skyplane vel. (km/s) : -11.88  
 Sun-Target sep (deg) : 145.92  
 Sun-Moon sep (deg) : 1.82  
 B (ring opening deg) : 2.50  
 PA of pole (deg) : -3.07  
 Pole direction: RA (deg): 268.05738  
 Dec (deg): 64.49721  
 C/A sky separation (") : 14.554  
 C/A sky separation (km) : 45087.3  
 NAIF SPICE kernels : RAJobs\_U111+rgf15.spk

Jupiter 2049-01-16T02:52:13 K8.09 G12.25  
 Pgt



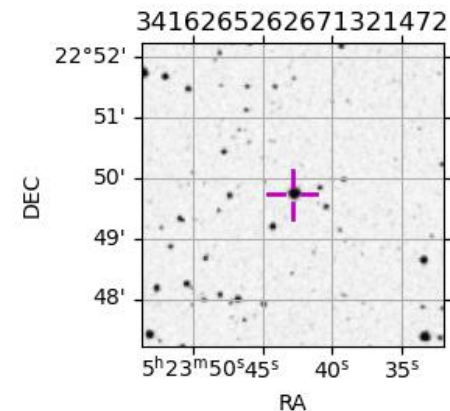
Earth  
 PIC  
 PAL  
 KPNO  
 MCD  
 TEN  
 IRTF  
 RIO  
 ESO  
 SAAO



2049-01-16T02:52:13.0100 a: 05 23 42.8519 s: +22 49 43.761 C/A \*\*\*\*\* PA 358.27 deg v\_sky -11.88 km/s D 04.27 AU  
 Credit: Styled after SORA/Lucky Star

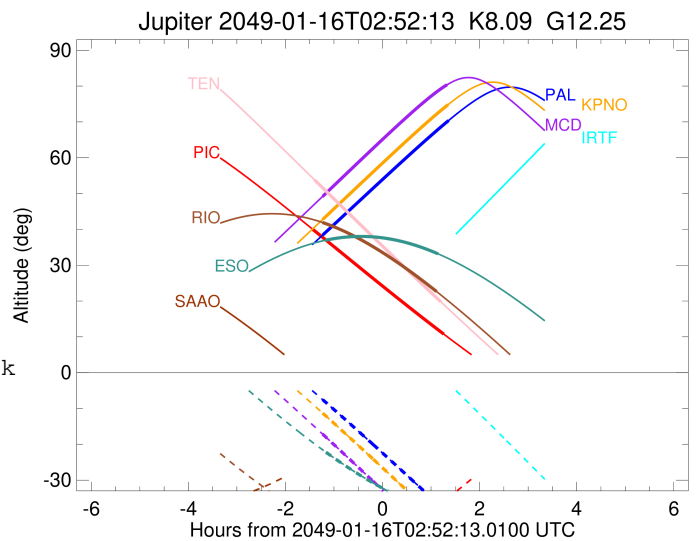
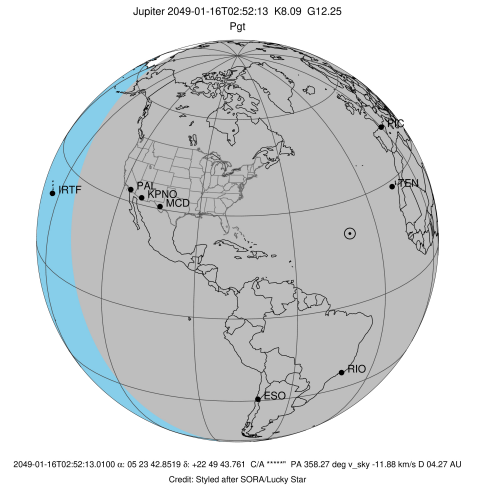
Observable events with sun below -5 deg and altitude above 5 deg

Obs	Location	lat	Elon	Target	Observed Events Interval	OCode
PIC	Pic du Midi	42.9	0.1	+ +	JAN 16 01:25 - JAN 16 04:07	Pie
PAL	Palomar Mt (200")	33.4	243.1	+ +	JAN 16 01:38 - JAN 16 04:13	Pie
PMO	Purple Mtn Obs. Nanking	32.1	118.8			Pnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+ +	JAN 16 01:38 - JAN 16 04:13	Pie
MCD	McDonald Obs. 2.7m	30.7	256.0	+ +	JAN 16 01:38 - JAN 16 04:11	Pie
TEN	Teide Obs./Tenerife	28.3	343.5	+ +	JAN 16 01:28 - JAN 16 04:04	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	+ +	JAN 16 01:37 - JAN 16 03:59	Pie
ESO	European Southern Obs. (3.6m)	-29.3	289.3	+ +	JAN 16 01:42 - JAN 16 04:00	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             : 2049-01-16T02:46:20.470
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        : 3416265262671321472
2Mass ID (if available) : 05234283+2249438
ICRS Star Coord at Epoch: 05h 23m 42.85190s +22:49:43.76093s
RUWE (>1.4 is poor)  : 1.02
K magnitude           : 8.090
G magnitude           : 12.248
RP magnitude          : 11.141
BP magnitude          : 13.539
DUPflag              : 0
Distance (au)         : 4.271
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -11.88
Sun-Target sep (deg)  : 145.92
Sun-Moon sep (deg)    : 1.32
B (ring opening deg) : 2.50
PA of pole (deg)      : -3.07
Pole direction: RA (deg): 268.05738
Dec (deg): 64.49721
C/A sky separation (") : 13.447
C/A sky separation (km) : 41658.1
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
    
```

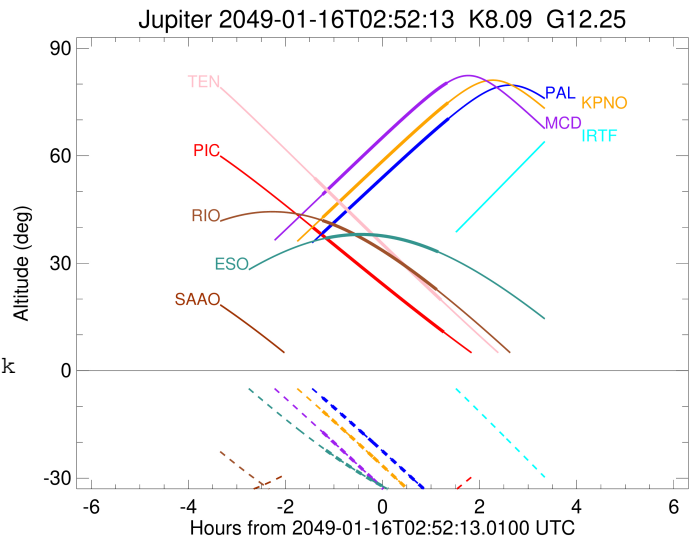
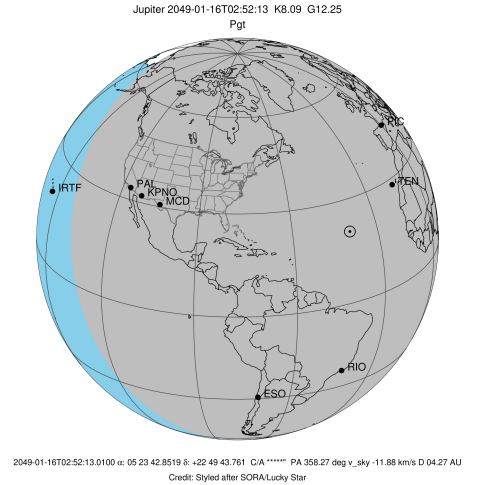


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2049-01-16T01:25:48.214	40.05	-62.86	71489.2	-34.83	-38.42
Jupiter	E	2049-01-16T04:07:44.889	10.80	-36.03	71489.0	-36.30	-39.94

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2049-01-16T02:56:18.240
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       : 3416265262671321472
2Mass ID (if available) : 05234283+2249438
ICRS Star Coord at Epoch: 05h 23m 42.85190s +22:49:43.76093s
RUWE (>1.4 is poor) : 1.02
K magnitude          : 8.090
G magnitude           : 12.248
RP magnitude         : 11.141
BP magnitude         : 13.539
DUPflag             : 0
Distance (au)        : 4.271
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -11.88
Sun-Target sep (deg) : 145.92
Sun-Moon sep (deg)   : 2.34
B (ring opening deg) : 2.50
PA of pole (deg)     : -3.07
Pole direction: RA (deg): 268.05738
Dec (deg): 64.49721
C/A sky separation ("): 14.014
C/A sky separation (km): 43416.1
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
    
```

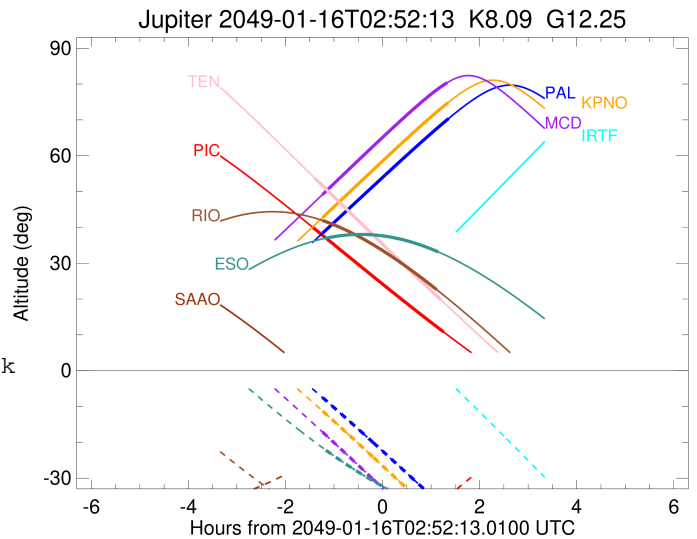
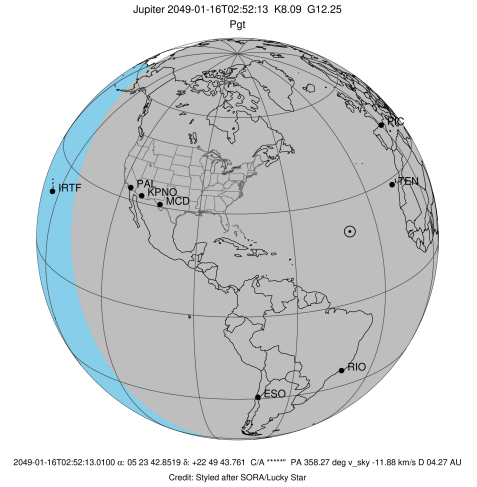


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2049-01-16T01:38:15.426	38.41	-7.53	71489.1	-35.47	-39.08
Jupiter	E	2049-01-16T04:13:56.553	70.39	-39.40	71488.6	-39.06	-42.76

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2049-01-16T02:55:52.530
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        : 3416265262671321472
2Mass ID (if available) : 05234283+2249438
ICRS Star Coord at Epoch: 05h 23m 42.85190s +22:49:43.76093s
RUWE (>1.4 is poor) : 1.02
K magnitude           : 8.090
G magnitude           : 12.248
RP magnitude          : 11.141
BP magnitude          : 13.539
DUPflag              : 0
Distance (au)         : 4.271
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -11.88
Sun-Target sep (deg) : 145.92
Sun-Moon sep (deg)   : 2.29
B (ring opening deg) : 2.50
PA of pole (deg)     : -3.07
Pole direction: RA (deg): 268.05738
Dec (deg): 64.49721
C/A sky separation (") : 14.100
C/A sky separation (km) : 43680.5
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
    
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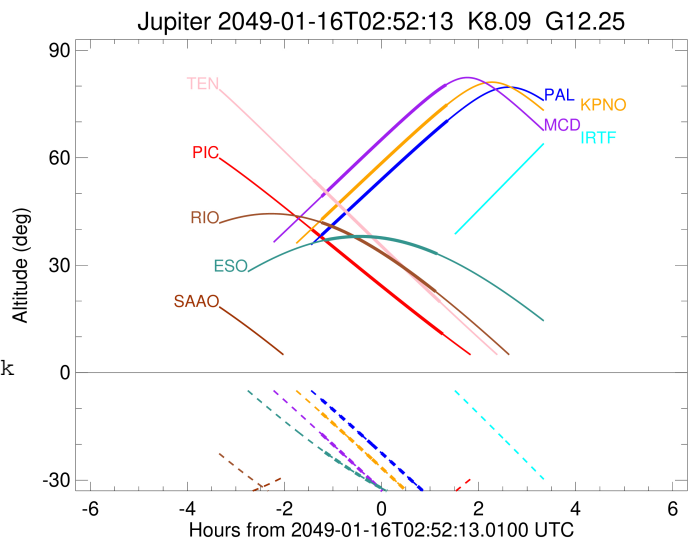
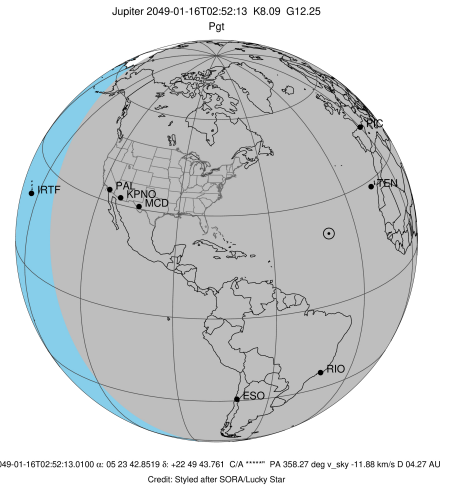


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2049-01-16T01:38:17.313	42.76	-11.29	71489.1	-35.77	-39.39
Jupiter	E	2049-01-16T04:13:06.630	74.78	-43.66	71488.6	-39.28	-42.98

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2049-01-16T02:55:09.270
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        : 3416265262671321472
2Mass ID (if available) : 05234283+2249438
ICRS Star Coord at Epoch: 05h 23m 42.85190s +22:49:43.76093s
RUWE (>1.4 is poor) : 1.02
K magnitude           : 8.090
G magnitude           : 12.248
RP magnitude          : 11.141
BP magnitude          : 13.539
DUPflag              : 0
Distance (au)         : 4.271
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -11.88
Sun-Target sep (deg)  : 145.92
Sun-Moon sep (deg)   : 2.21
B (ring opening deg) : 2.50
PA of pole (deg)     : -3.07
Pole direction: RA (deg): 268.05738
Dec (deg): 64.49721
C/A sky separation (") : 14.192
C/A sky separation (km) : 43967.4
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
    
```

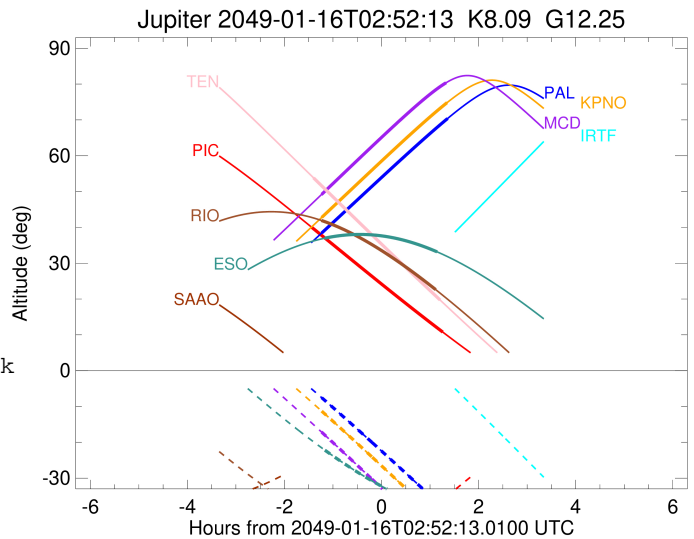
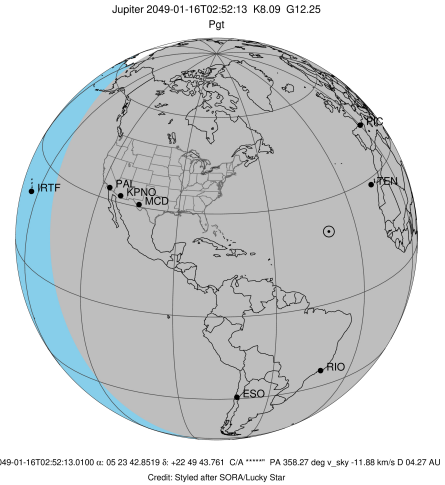


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2049-01-16T01:38:05.779	49.17	-17.13	71489.0	-36.12	-39.75
Jupiter	E	2049-01-16T04:11:57.035	80.35	-49.94	71488.6	-39.49	-43.19

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2049-01-16T02:46:02.420
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       : 3416265262671321472
2Mass ID (if available) : 05234283+2249438
ICRS Star Coord at Epoch: 05h 23m 42.85190s +22:49:43.76093s
RUWE (>1.4 is poor) : 1.02
K magnitude           : 8.090
G magnitude           : 12.248
RP magnitude         : 11.141
BP magnitude         : 13.539
DUPflag              : 0
Distance (au)        : 4.271
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -11.88
Sun-Target sep (deg) : 145.92
Sun-Moon sep (deg)  : 1.18
B (ring opening deg) : 2.50
PA of pole (deg)    : -3.07
Pole direction: RA (deg): 268.05738
Dec (deg): 64.49721
C/A sky separation ("): 14.060
C/A sky separation (km): 43555.7
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
    
```

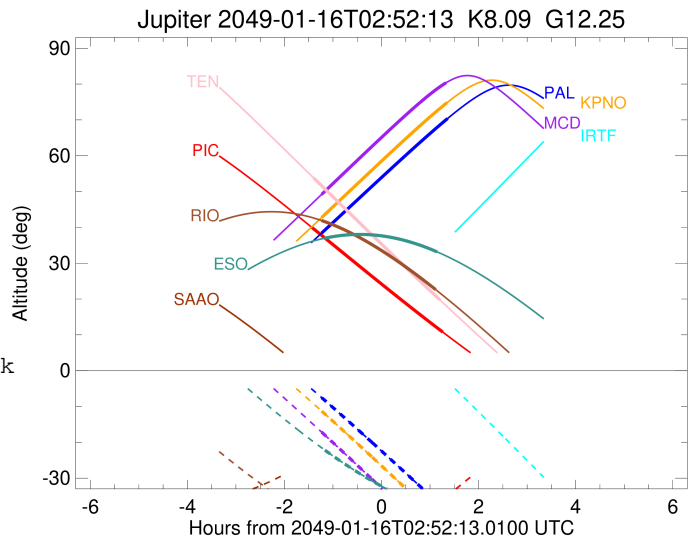
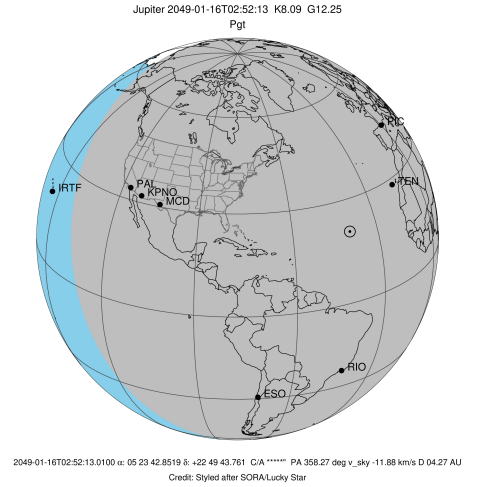


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2049-01-16T01:28:13.652	53.81	-82.19	71489.0	-36.70	-40.35
Jupiter	E	2049-01-16T04:04:41.982	19.70	-51.04	71488.8	-38.14	-41.82

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2049-01-16T02:48:18.880
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       : 3416265262671321472
2Mass ID (if available) : 05234283+2249438
ICRS Star Coord at Epoch: 05h 23m 42.85190s +22:49:43.76093s
RUWE (>1.4 is poor) : 1.02
K magnitude          : 8.090
G magnitude          : 12.248
RP magnitude         : 11.141
BP magnitude         : 13.539
DUPflag             : 0
Distance (au)        : 4.271
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -11.88
Sun-Target sep (deg) : 145.92
Sun-Moon sep (deg)   : 1.45
B (ring opening deg) : 2.50
PA of pole (deg)     : -3.07
Pole direction: RA (deg): 268.05738
Dec (deg): 64.49721
C/A sky separation ("): 15.931
C/A sky separation (km): 49351.8
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
    
```

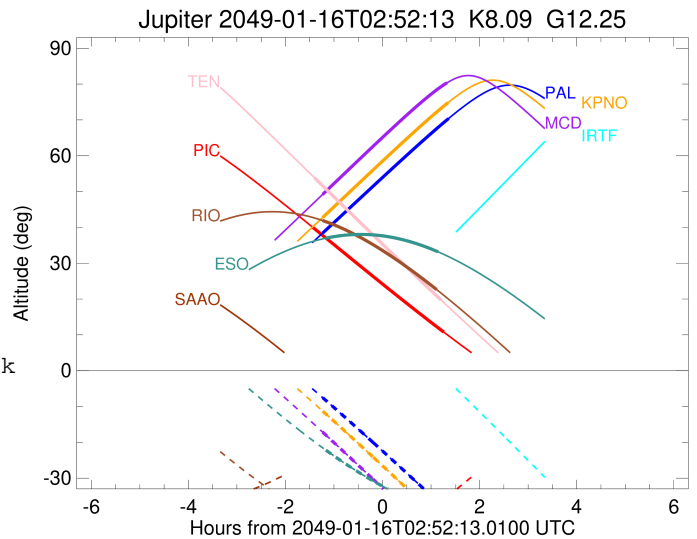
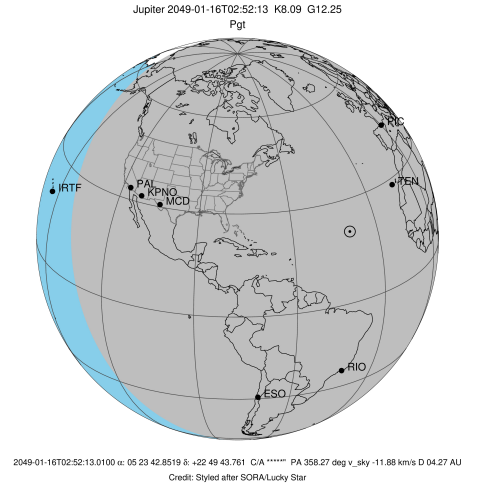


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2049-01-16T01:37:58.588	41.92	-41.75	71488.1	-42.55	-46.27
Jupiter	E	2049-01-16T03:59:07.790	22.63	-44.26	71487.8	-44.45	-48.16

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2049-01-16T02:51:33.160
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       : 3416265262671321472
2Mass ID (if available) : 05234283+2249438
ICRS Star Coord at Epoch: 05h 23m 42.85190s +22:49:43.76093s
RUWE (>1.4 is poor) : 1.02
K magnitude          : 8.090
G magnitude           : 12.248
RP magnitude         : 11.141
BP magnitude         : 13.539
DUPflag             : 0
Distance (au)        : 4.271
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -11.88
Sun-Target sep (deg) : 145.92
Sun-Moon sep (deg)   : 1.84
B (ring opening deg) : 2.50
PA of pole (deg)     : -3.07
Pole direction: RA (deg): 268.05738
Dec (deg): 64.49721
C/A sky separation ("): 16.175
C/A sky separation (km): 50109.3
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	2049-01-16T01:42:16.765	36.99	-22.19	71488.0	-43.05	-46.76
Jupiter	E	2049-01-16T04:00:58.529	33.16	-38.53	71487.6	-45.63	-49.33