

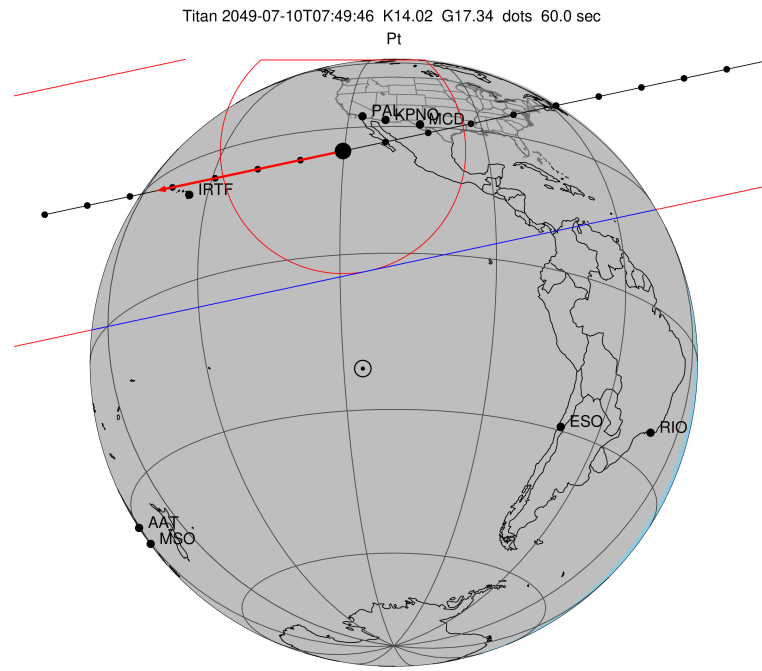
target : Titan
 target radius (km) : 2575.15
 C/A epoch : 2049-07-10T07:49:46.000
 Event type : Pt
 : Titan occs: topocentric, not geocentric
 : Not a ringed target
 Gaia source ID : 6868052275704516224
 2Mass ID (if available) : 19423769-2118267

ICRS Star Coord at Epoch: 19h 42m 37.73107s -21:18:27.07561s
 RUWE (>1.4 is poor) : 2.38
 K magnitude : 14.019
 G magnitude : 17.342
 RP magnitude : 16.225
 BP magnitude : 18.266
 DUPflag : 0
 Distance (au) : 9.001
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -15.26
 Sun-Target sep (deg) : 174.04
 Sun-Moon sep (deg) : 71.17
 B (ring opening deg) : 22.73
 PA of pole (deg) : 6.92
 Pole direction: RA (deg): 39.48270
 Dec (deg): 83.42790
 C/A sky separation (") : 0.700
 C/A sky separation (km) : 4570.4
 NAIF SPICE kernels : RAJobs_U111+rgf16.spk

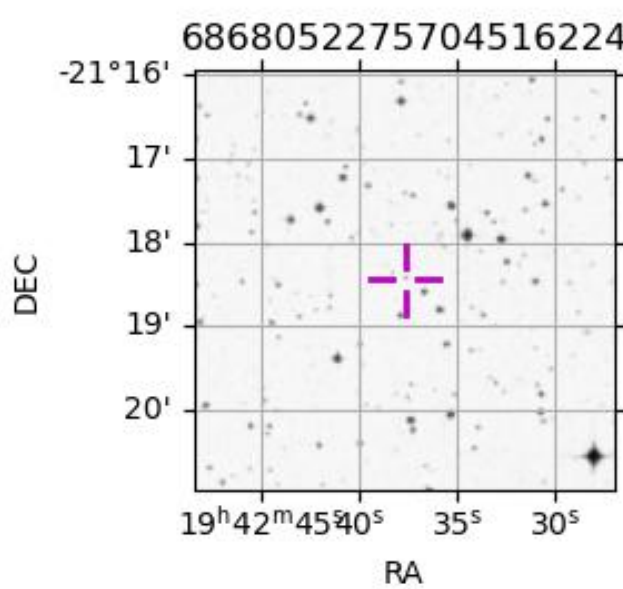
URKALLv1.spk
 naif0012.tls
 nep097.bsp
 nep101.bsp
 sat4401.bsp

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

Obs	Location	lat	Elon	Target	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1			Pnn
PAL	Palomar Mt (200")	33.4	243.1	+ +	JUL 10 07:46 - JUL 10 07:51	Pie
PMO	Purple Mtn Obs. Nanking	32.1	118.8			Pnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+ +	JUL 10 07:46 - JUL 10 07:51	Pie
MCD	McDonald Obs. 2.7m	30.7	256.0	+ +	JUL 10 07:45 - JUL 10 07:50	Pie
TEN	Teide Obs./Tenerife	28.3	343.5			Pnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+ +	JUL 10 07:50 - JUL 10 07:56	Pie
KAV	Kavalur Observatory	12.6	78.8			Pnn
RIO	Rio de Janeiro	-22.9	316.8			Pnn
ESO	European Southern Obs. (3.6m)	-29.3	289.3			Pnn
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



2049-07-10T07:49:46.0000 cc: 19 42 37.7311 & -21 18 27.076 C/A 0.701" PA 347.95 deg v_sky -15.25 km/s D 09.00 AU
 Credit: Styled after SORA/Lucky Star



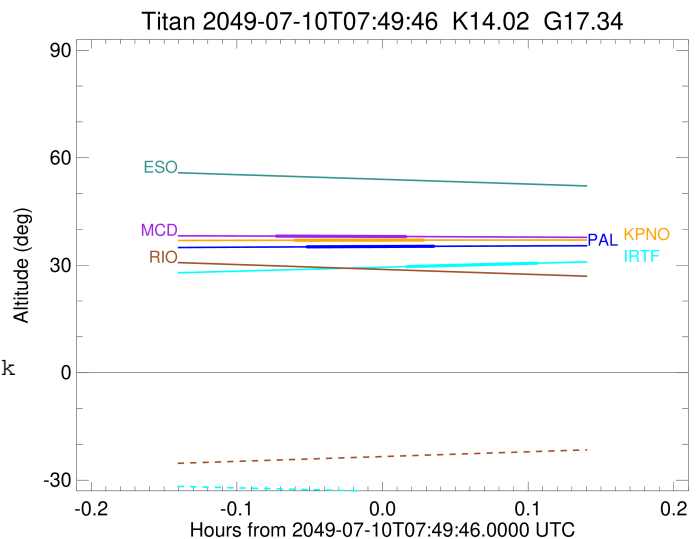
```

target                : Titan
target radius (km)   : 2575.15
C/A epoch            : 2049-07-10T07:49:16.920
Event type           : Pt
: Titan occs: topocentric, not geocentric
: 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       : 6868052275704516224
2Mass ID (if available) : 19423769-2118267
ICRS Star Coord at Epoch: 19h 42m 37.73107s -21:18:27.07561s
RUWE (>1.4 is poor) : 2.38
K magnitude           : 14.019
G magnitude           : 17.342
RP magnitude          : 16.225
BP magnitude          : 18.266
DUPflag              : 0
Distance (au)        : 9.001
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -15.26
Sun-Target sep (deg) : 174.04
Sun-Moon sep (deg)   : 71.73
B (ring opening deg) : 22.73
PA of pole (deg)     : 6.92
Pole direction: RA (deg): 39.48270
Dec (deg): 83.42790
C/A sky separation ("): 0.095
C/A sky separation (km): 618.6
NAIF SPICE kernels   : RAJobs_U111+rgf16.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
IAU_NEPTUNE_for_RINGFIT.tpc.BECAREFUL
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
Titan	I	2049-07-10T07:46:37.022	35.12	-34.65	2575.1	-4.45	-4.46
Titan	E	2049-07-10T07:51:56.831	35.28	-34.67	2575.1	29.82	29.83



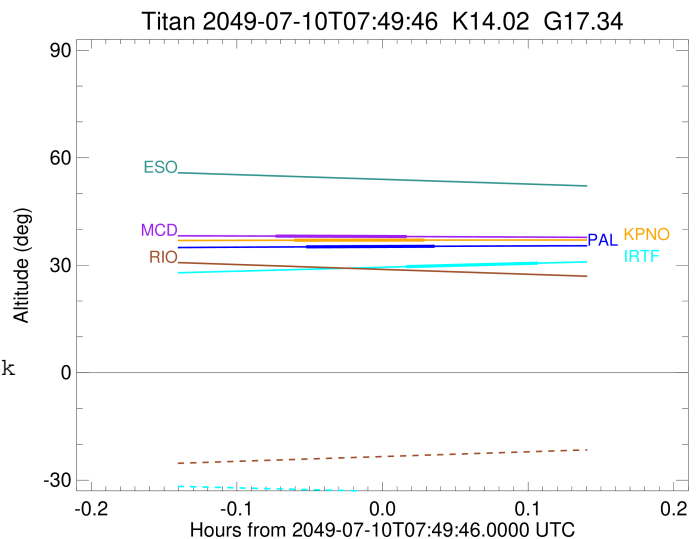
```

target                : Titan
target radius (km)   : 2575.15
C/A epoch            : 2049-07-10T07:48:47.620
Event type           : Pt
: Titan occs: topocentric, not geocentric
: 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       : 6868052275704516224
2Mass ID (if available) : 19423769-2118267
ICRS Star Coord at Epoch: 19h 42m 37.73107s -21:18:27.07561s
RUWE (>1.4 is poor) : 2.38
K magnitude          : 14.019
G magnitude          : 17.342
RP magnitude         : 16.225
BP magnitude         : 18.266
DUPflag             : 0
Distance (au)        : 9.001
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -15.26
Sun-Target sep (deg) : 174.04
Sun-Moon sep (deg)   : 71.77
B (ring opening deg) : 22.73
PA of pole (deg)     : 6.92
Pole direction: RA (deg): 39.48270
Dec (deg): 83.42790
C/A sky separation (") : 0.068
C/A sky separation (km) : 442.6
NAIF SPICE kernels   : RAJobs_U111+rgf16.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
IAU_NEPTUNE_for_RINGFIT.tpc.BECAREFUL
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
Titan	I	2049-07-10T07:46:05.415	36.96	-35.95	2575.1	-8.09	-8.10
Titan	E	2049-07-10T07:51:29.835	37.01	-35.85	2575.1	26.17	26.18



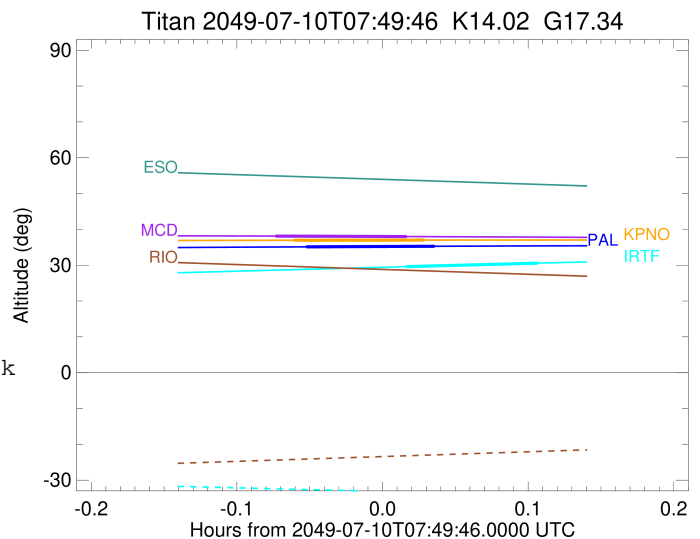
```

target                : Titan
target radius (km)   : 2575.15
C/A epoch            : 2049-07-10T07:48:03.690
Event type           : Pt
: Titan occs: topocentric, not geocentric
: 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       : 6868052275704516224
2Mass ID (if available) : 19423769-2118267
ICRS Star Coord at Epoch: 19h 42m 37.73107s -21:18:27.07561s
RUWE (>1.4 is poor) : 2.38
K magnitude          : 14.019
G magnitude          : 17.342
RP magnitude         : 16.225
BP magnitude         : 18.266
DUPflag             : 0
Distance (au)        : 9.001
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -15.26
Sun-Target sep (deg) : 174.04
Sun-Moon sep (deg)   : 71.82
B (ring opening deg) : 22.73
PA of pole (deg)     : 6.92
Pole direction: RA (deg): 39.48270
Dec (deg): 83.42790
C/A sky separation ("): 0.031
C/A sky separation (km): 200.4
NAIF SPICE kernels  : RAJobs_U111+rgf16.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
IAU_NEPTUNE_for_RINGFIT.tpc.BECAREFUL
uranus_ringframes_rfrench20220627_v1.tf
neptune_ringframes_rfrench20220702a_v1.tf
earth_flat_IAU.spk

```

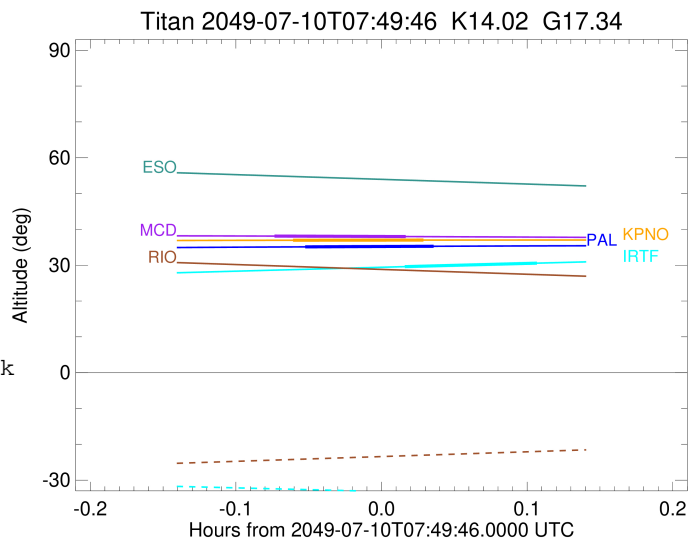
x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Titan	I	2049-07-10T07:45:19.543	38.12	-36.31	2575.1	-13.03	-13.04
Titan	E	2049-07-10T07:50:47.857	37.99	-36.03	2575.1	21.17	21.18



```

target                : Titan
target radius (km)   : 2575.15
C/A epoch            : 2049-07-10T07:53:27.510
Event type           : Pt
: Titan occs: topocentric, not geocentric
: Not a ringed target
Observer code        : IRTF
Location             : Mauna Kea/IRTF
Latitude (deg)       : 19.82622
E. Longitude (deg)   : 204.52800
Altitude (km)        : 4.168
Gaia source ID       : 6868052275704516224
2Mass ID (if available) : 19423769-2118267
ICRS Star Coord at Epoch: 19h 42m 37.73107s -21:18:27.07561s
RUWE (>1.4 is poor) : 2.38
K magnitude           : 14.019
G magnitude           : 17.342
RP magnitude          : 16.225
BP magnitude          : 18.266
DUPflag              : 0
Distance (au)         : 9.001
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -15.26
Sun-Target sep (deg) : 174.04
Sun-Moon sep (deg)   : 71.46
B (ring opening deg) : 22.73
PA of pole (deg)     : 6.92
Pole direction: RA (deg): 39.48270
Dec (deg): 83.42790
C/A sky separation (") : 0.031
C/A sky separation (km) : 203.5
NAIF SPICE kernels   : RAJobs_U111+rgf16.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
IAU_NEPTUNE_for_RINGFIT.tpc.BECAREFUL
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
Titan	I	2049-07-10T07:50:42.697	29.59	-33.31	2575.1	-21.72	-21.73
Titan	E	2049-07-10T07:56:12.304	30.57	-34.21	2575.1	13.45	13.46