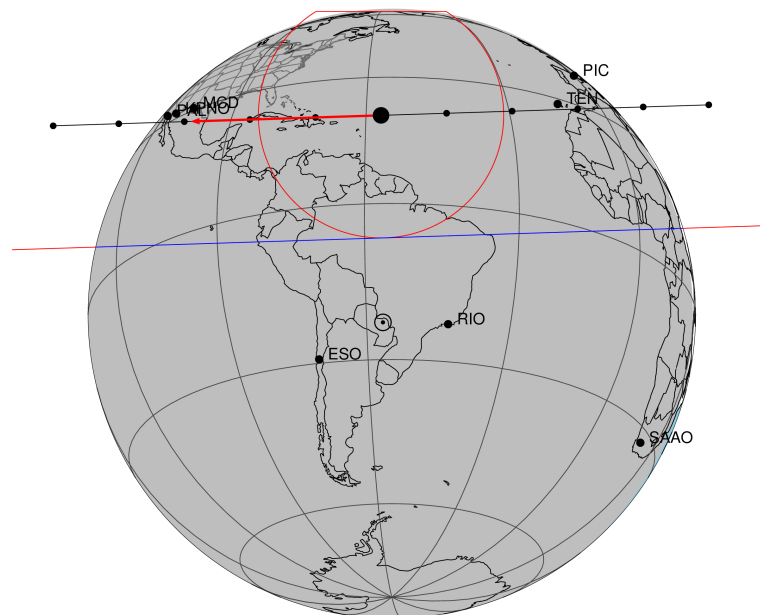


target : Titan  
 target radius (km) : 2575.15  
 C/A epoch : 2046-06-09T03:45:48.450  
 Event type : Pt  
 : Titan occs: topocentric, not geocentric  
 : Not a ringed target  
 Gaia source ID : 4115806965827779200  
 2Mass ID (if available) : 17143370-2128326

ICRS Star Coord at Epoch: 17h 14m 33.69473s -21:28:32.82386s  
 RUWE (>1.4 is poor) : 1.07  
 K magnitude : 12.896  
 G magnitude : 16.487  
 RP magnitude : 15.474  
 BP magnitude : 17.506  
 DUPflag : 0  
 Distance (au) : 9.016  
 f0 (km) : 0.00  
 g0 (km) : 0.00  
 skyplane vel. (km/s) : -22.95  
 Sun-Target sep (deg) : 177.81  
 Sun-Moon sep (deg) : 124.26  
 B (ring opening deg) : 26.51  
 PA of pole (deg) : 4.63  
 Pole direction: RA (deg): 39.48270  
 Dec (deg): 83.42790  
 C/A sky separation (") : 0.640  
 C/A sky separation (km) : 4186.1  
 NAIF SPICE kernels : RAJobs\_U111+rgf16.spk

Titan 2046-06-09T03:45:48 K12.90 G16.49 dots 60.0 sec  
Pt

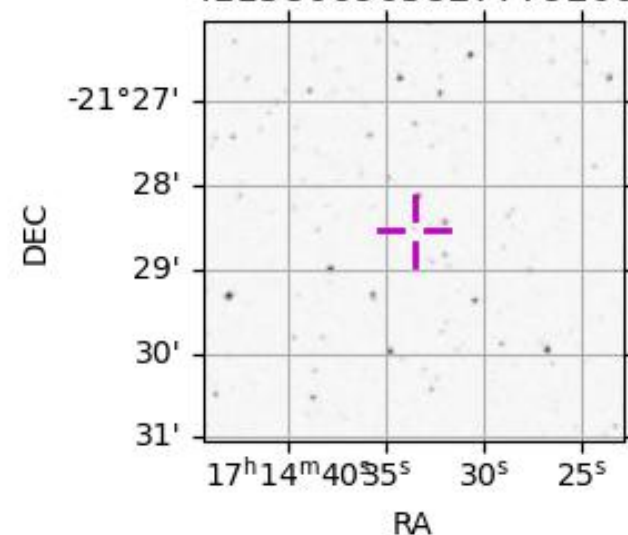


2046-06-09T03:45:48.45000 α: 17 14 33.6947 δ: -21 28 32.824 C/A 0.642" PA 358.17 deg v\_sky -22.95 km/s D 09.02 AU  
Credit: Styled after SORA/Lucky Star

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	+ +	JUN 09 03:41 - JUN 09 03:44	Pie
PAL	Palomar Mt (200")	33.4	243.1	+ +	JUN 09 03:47 - JUN 09 03:50	Pie
PMO	Purple Mtn Obs. Nanking	32.1	118.8			Pnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+ +	JUN 09 03:47 - JUN 09 03:50	Pie
MCD	McDonald Obs. 2.7m	30.7	256.0	+ +	JUN 09 03:46 - JUN 09 03:50	Pie
TEN	Teide Obs./Tenerife	28.3	343.5	+ +	JUN 09 03:41 - JUN 09 03:45	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			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

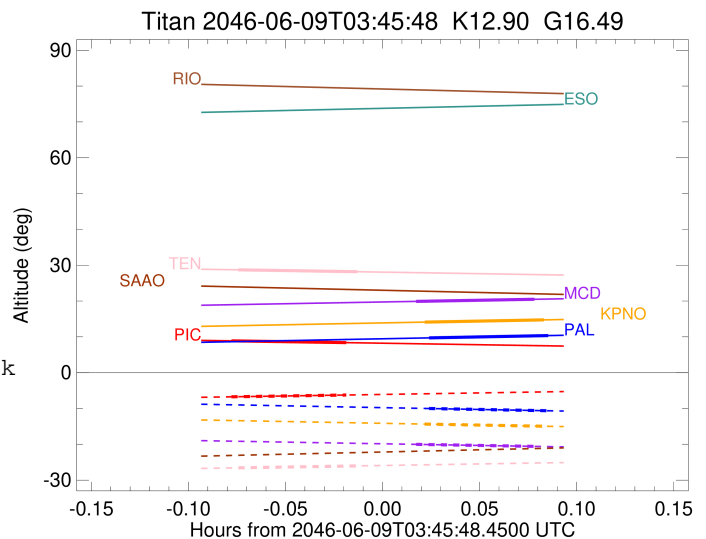
4115806965827779200



target : Titan  
 target radius (km) : 2575.15  
 C/A epoch : 2046-06-09T03:42:55.190  
 Event type : Pt  
 : Titan occs: topocentric, not geocentric  
 : 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 : 4115806965827779200  
 2Mass ID (if available) : 17143370-2128326  
 ICRS Star Coord at Epoch: 17h 14m 33.69473s -21:28:32.82386s  
 RUWE (>1.4 is poor) : 1.07  
 K magnitude : 12.896  
 G magnitude : 16.487  
 RP magnitude : 15.474  
 BP magnitude : 17.506  
 DUPflag : 0  
 Distance (au) : 9.016  
 f0 (km) : 0.00  
 g0 (km) : 0.00  
 skyplane vel. (km/s) : -22.95  
 Sun-Target sep (deg) : 177.81  
 Sun-Moon sep (deg) : 124.07  
 B (ring opening deg) : 26.51  
 PA of pole (deg) : 4.63  
 Pole direction: RA (deg): 39.48270  
 Dec (deg): 83.42790  
 C/A sky separation (") : 0.107  
 C/A sky separation (km) : 696.5  
 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

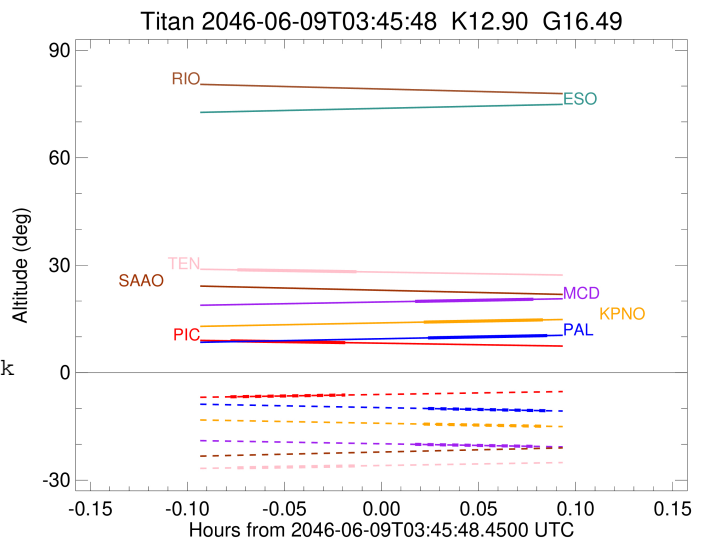
x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Titan	I	2046-06-09T03:41:08.069	8.88	-6.74	2575.1	8.48	8.49
Titan	E	2046-06-09T03:44:42.307	8.38	-6.24	2575.1	19.49	19.50



```

target                : Titan
target radius (km)   : 2575.15
C/A epoch            : 2046-06-09T03:49:05.220
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       : 4115806965827779200
2Mass ID (if available) : 17143370-2128326
ICRS Star Coord at Epoch: 17h 14m 33.69473s -21:28:32.82386s
RUWE (>1.4 is poor) : 1.07
K magnitude           : 12.896
G magnitude           : 16.487
RP magnitude         : 15.474
BP magnitude         : 17.506
DUPflag              : 0
Distance (au)        : 9.016
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -22.95
Sun-Target sep (deg) : 177.81
Sun-Moon sep (deg)  : 124.83
B (ring opening deg) : 26.51
PA of pole (deg)    : 4.63
Pole direction: RA (deg): 39.48270
Dec (deg): 83.42790
C/A sky separation ("): 0.026
C/A sky separation (km): 170.2
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

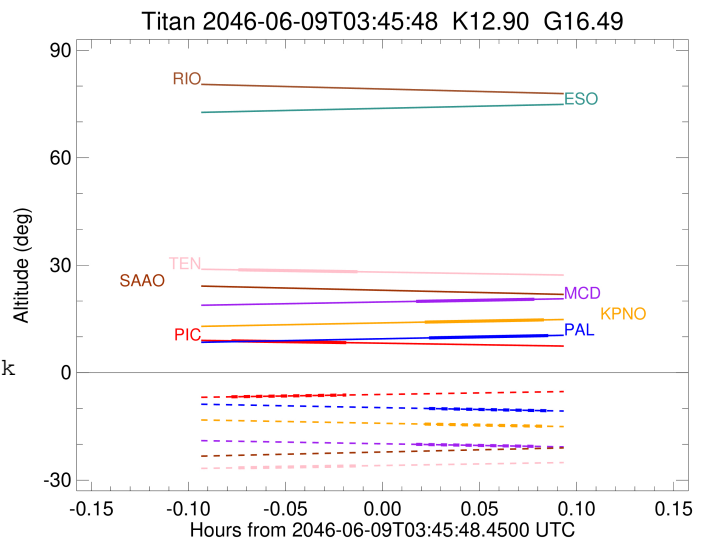
```

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Titan	I	2046-06-09T03:47:14.206	9.71	-10.01	2575.1	-2.66	-2.66
Titan	E	2046-06-09T03:50:56.203	10.35	-10.63	2575.1	9.42	9.43

target : Titan  
 target radius (km) : 2575.15  
 C/A epoch : 2046-06-09T03:48:57.110  
 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 : 4115806965827779200  
 2Mass ID (if available) : 17143370-2128326  
 ICRS Star Coord at Epoch: 17h 14m 33.69473s -21:28:32.82386s  
 RUWE (>1.4 is poor) : 1.07  
 K magnitude : 12.896  
 G magnitude : 16.487  
 RP magnitude : 15.474  
 BP magnitude : 17.506  
 DUPflag : 0  
 Distance (au) : 9.016  
 f0 (km) : 0.00  
 g0 (km) : 0.00  
 skyplane vel. (km/s) : -22.95  
 Sun-Target sep (deg) : 177.81  
 Sun-Moon sep (deg) : 124.88  
 B (ring opening deg) : 26.51  
 PA of pole (deg) : 4.63  
 Pole direction: RA (deg): 39.48270  
 Dec (deg): 83.42790  
 C/A sky separation (") : 0.032  
 C/A sky separation (km) : 212.3  
 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

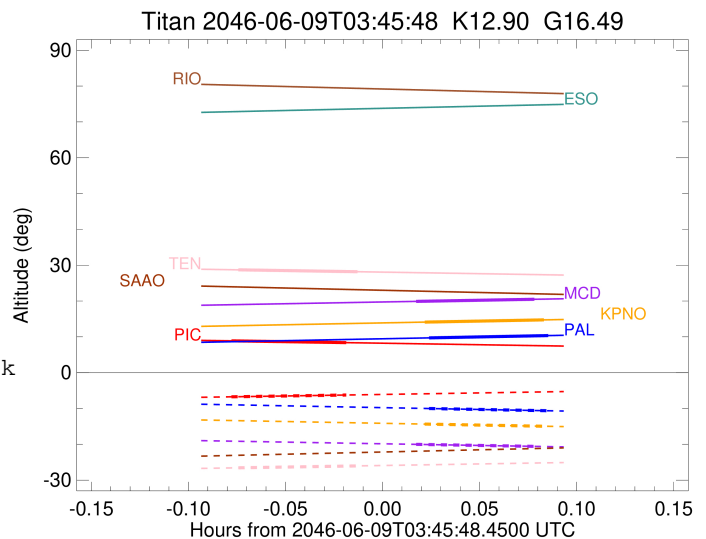
Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Titan	I	2046-06-09T03:47:06.396	14.11	-14.35	2575.2	-1.80	-1.80
Titan	E	2046-06-09T03:50:47.804	14.73	-14.95	2575.1	10.25	10.25



target : Titan  
 target radius (km) : 2575.15  
 C/A epoch : 2046-06-09T03:48:40.430  
 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 : 4115806965827779200  
 2Mass ID (if available) : 17143370-2128326  
 ICRS Star Coord at Epoch: 17h 14m 33.69473s -21:28:32.82386s  
 RUWE (>1.4 is poor) : 1.07  
 K magnitude : 12.896  
 G magnitude : 16.487  
 RP magnitude : 15.474  
 BP magnitude : 17.506  
 DUPflag : 0  
 Distance (au) : 9.016  
 f0 (km) : 0.00  
 g0 (km) : 0.00  
 skyplane vel. (km/s) : -22.95  
 Sun-Target sep (deg) : 177.81  
 Sun-Moon sep (deg) : 124.92  
 B (ring opening deg) : 26.51  
 PA of pole (deg) : 4.63  
 Pole direction: RA (deg): 39.48270  
 Dec (deg): 83.42790  
 C/A sky separation (") : 0.047  
 C/A sky separation (km) : 308.8  
 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	2046-06-09T03:46:50.341	19.90	-20.01	2575.2	0.15	0.15
Titan	E	2046-06-09T03:50:30.493	20.48	-20.57	2575.1	12.13	12.14



```

target                : Titan
target radius (km)   : 2575.15
C/A epoch            : 2046-06-09T03:43:11.720
Event type           : Pt
: Titan occs: topocentric, not geocentric
: 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       : 4115806965827779200
2Mass ID (if available) : 17143370-2128326
ICRS Star Coord at Epoch: 17h 14m 33.69473s -21:28:32.82386s
RUWE (>1.4 is poor) : 1.07
K magnitude           : 12.896
G magnitude           : 16.487
RP magnitude          : 15.474
BP magnitude          : 17.506
DUPflag              : 0
Distance (au)         : 9.016
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -22.95
Sun-Target sep (deg) : 177.81
Sun-Moon sep (deg)   : 124.36
B (ring opening deg) : 26.51
PA of pole (deg)     : 4.63
Pole direction: RA (deg): 39.48270
Dec (deg): 83.42790
C/A sky separation (") : 0.017
C/A sky separation (km) : 113.7
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	2046-06-09T03:41:21.165	28.70	-26.56	2575.1	-3.30	-3.30
Titan	E	2046-06-09T03:45:02.277	28.18	-26.03	2575.1	7.82	7.82

