

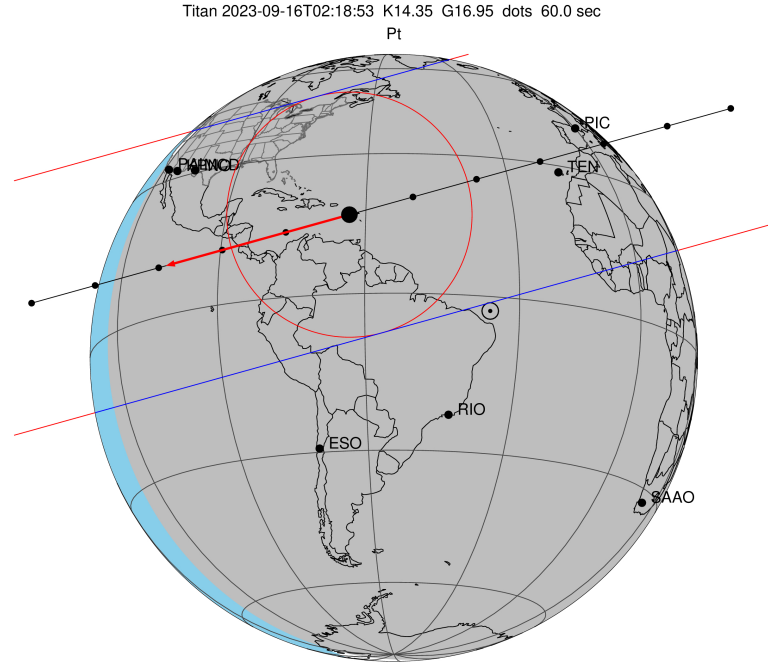
target : Titan
 target radius (km) : 2575.15
 C/A epoch : 2023-09-16T02:18:53.140
 Event type : Pt
 : Titan occs: topocentric, not geocentric
 : Not a ringed target
 Gaia source ID : 2600800815979716352
 2Mass ID (if available) : 22185134-1225278

ICRS Star Coord at Epoch: 22h 18m 51.34839s -12:25:28.08884s
 RUWE (>1.4 is poor) : 0.99
 K magnitude : 14.346
 G magnitude : 16.949
 RP magnitude : 16.140
 BP magnitude : 17.631
 DUPflag : 0
 Distance (au) : 8.812
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -23.09
 Sun-Target sep (deg) : 159.33
 Sun-Moon sep (deg) : 148.11
 B (ring opening deg) : 9.56
 PA of pole (deg) : 6.03
 Pole direction: RA (deg): 39.48270
 Dec (deg): 83.42790
 C/A sky separation (") : 0.492
 C/A sky separation (km) : 3147.0
 NAIF SPICE kernels : RAJobs_U111+rgf16.spk

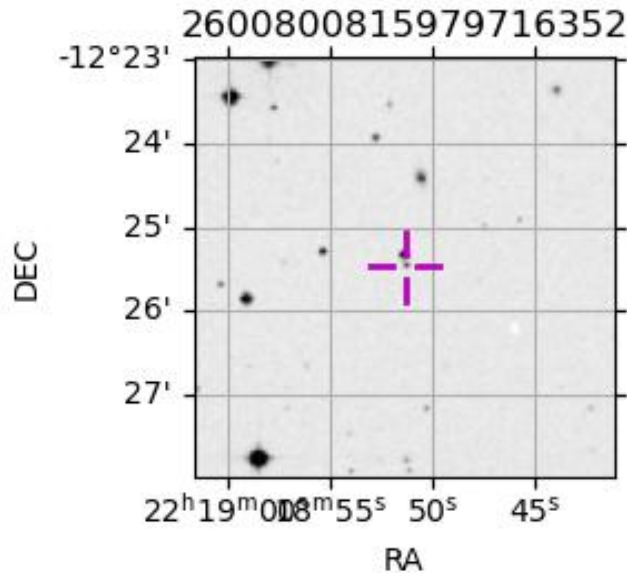
URKALLv1.spk
 naif0012.tls
 nep097.bsp
 nep101.bsp
 sat4401.bsp

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	+ +	SEP 16 02:13 - SEP 16 02:17	Pie
PAL	Palomar Mt (200")	33.4	243.1	+ +	SEP 16 02:20 - SEP 16 02:22	Pie
PMO	Purple Mtn Obs. Nanking	32.1	118.8			Pnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+ +	SEP 16 02:19 - SEP 16 02:22	Pie
MCD	McDonald Obs. 2.7m	30.7	256.0	+ +	SEP 16 02:19 - SEP 16 02:22	Pie
TEN	Teide Obs./Tenerife	28.3	343.5	+ +	SEP 16 02:13 - SEP 16 02:17	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

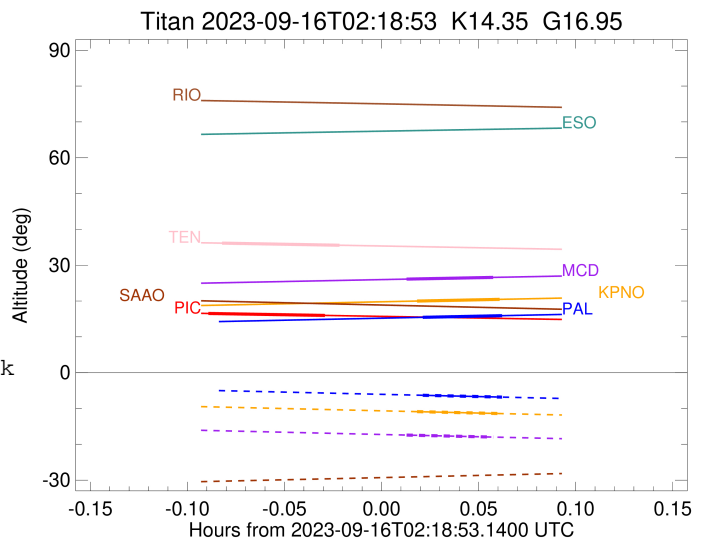


2023-09-16T02:18:53.1400 cc: 22 18 51.3484 s: -12 25 28.0889 C/A 0.493" PA 344.42 deg v_sky -23.09 km/s D 08.81 AU
 Credit: Styled after SORA/Lucky Star



```

target                : Titan
target radius (km)   : 2575.15
C/A epoch            : 2023-09-16T02:15:19.730
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       : 2600800815979716352
2Mass ID (if available) : 22185134-1225278
ICRS Star Coord at Epoch: 22h 18m 51.34839s -12:25:28.08884s
RUWE (>1.4 is poor) : 0.99
K magnitude          : 14.346
G magnitude          : 16.949
RP magnitude         : 16.140
BP magnitude         : 17.631
DUPflag             : 0
Distance (au)        : 8.812
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -23.09
Sun-Target sep (deg) : 159.33
Sun-Moon sep (deg)  : 147.60
B (ring opening deg) : 9.56
PA of pole (deg)    : 6.03
Pole direction: RA (deg): 39.48270
Dec (deg): 83.42790
C/A sky separation (") : 0.074
C/A sky separation (km) : 473.4
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
    
```



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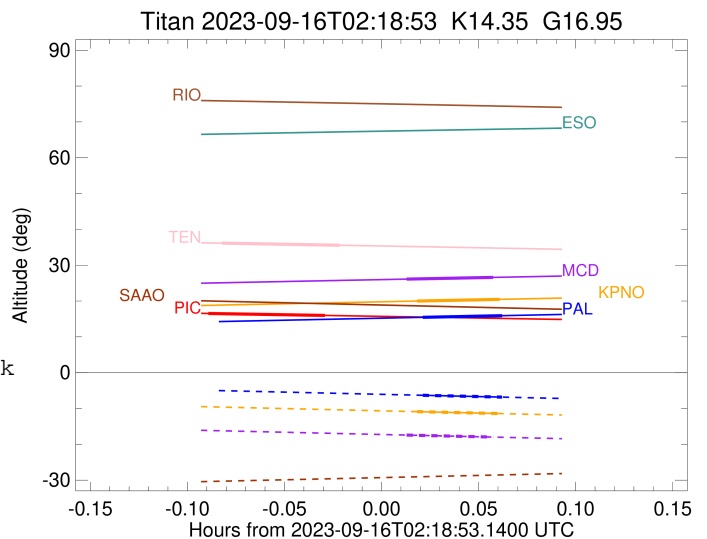
x: target alt < 5.0 deg or sun > -5.0 deg

```

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Titan	I	2023-09-16T02:13:30.948	16.52	-34.73	2575.2	-10.59	-10.59
Titan	E	2023-09-16T02:17:08.516	15.98	-34.27	2575.1	31.43	31.44

```

target                : Titan
target radius (km)   : 2575.15
C/A epoch             : 2023-09-16T02:21:23.020
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        : 2600800815979716352
2Mass ID (if available) : 22185134-1225278
ICRS Star Coord at Epoch: 22h 18m 51.34839s -12:25:28.08884s
RUWE (>1.4 is poor) : 0.99
K magnitude           : 14.346
G magnitude           : 16.949
RP magnitude          : 16.140
BP magnitude          : 17.631
DUPflag              : 0
Distance (au)         : 8.812
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -23.09
Sun-Target sep (deg) : 159.33
Sun-Moon sep (deg)   : 148.59
B (ring opening deg) : 9.56
PA of pole (deg)     : 6.03
Pole direction: RA (deg): 39.48270
Dec (deg): 83.42790
C/A sky separation (") : 0.300
C/A sky separation (km) : 1919.1
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
    
```

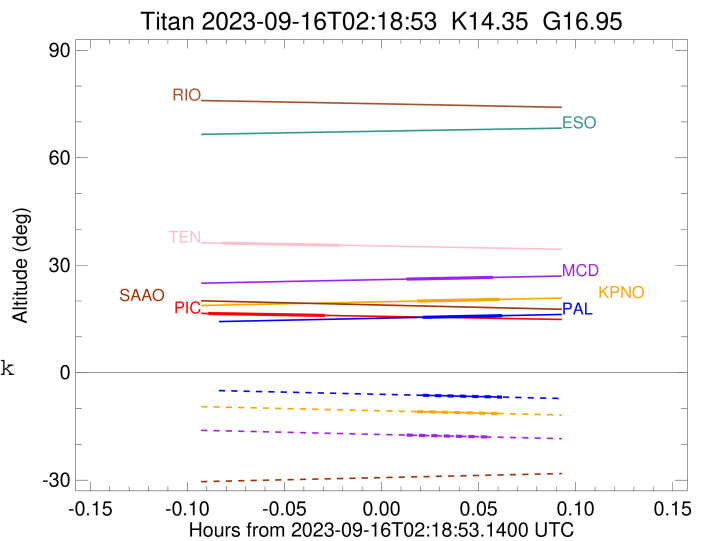


```

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 2023-09-16T02:20:09.282 15.45 -6.31 2575.2 26.13 26.14
Titan E 2023-09-16T02:22:36.756 15.91 -6.82 2575.1 67.76 67.77
    
```

```

target                : Titan
target radius (km)   : 2575.15
C/A epoch             : 2023-09-16T02:21:15.880
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        : 2600800815979716352
2Mass ID (if available) : 22185134-1225278
ICRS Star Coord at Epoch: 22h 18m 51.34839s -12:25:28.08884s
RUWE (>1.4 is poor) : 0.99
K magnitude           : 14.346
G magnitude           : 16.949
RP magnitude          : 16.140
BP magnitude          : 17.631
DUPflag              : 0
Distance (au)         : 8.812
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -23.09
Sun-Target sep (deg)  : 159.33
Sun-Moon sep (deg)    : 148.61
B (ring opening deg) : 9.56
PA of pole (deg)      : 6.03
Pole direction: RA (deg): 39.48270
Dec (deg): 83.42790
C/A sky separation (") : 0.288
C/A sky separation (km) : 1843.7
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
    
```

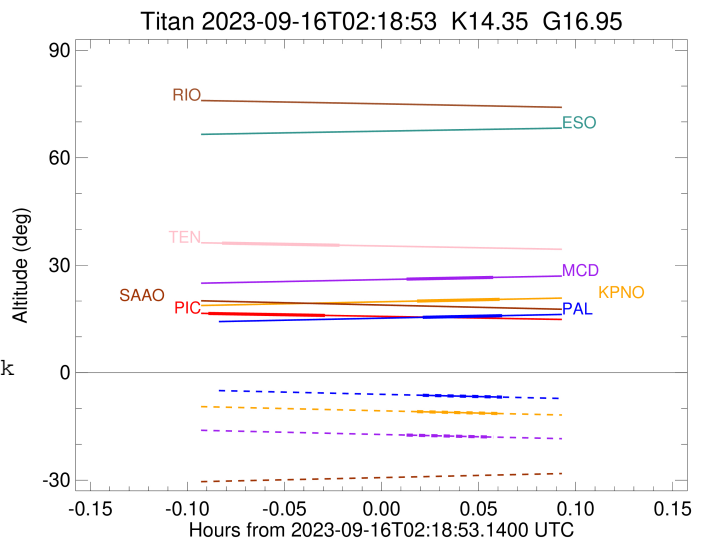


```

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   2023-09-16T02:19:58.786  19.99 -10.88  2575.2  23.75  23.76
Titan   E   2023-09-16T02:22:32.978  20.46 -11.41  2575.2  65.50  65.52
    
```

```

target                : Titan
target radius (km)   : 2575.15
C/A epoch            : 2023-09-16T02:21:00.240
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       : 2600800815979716352
2Mass ID (if available) : 22185134-1225278
ICRS Star Coord at Epoch: 22h 18m 51.34839s -12:25:28.08884s
RUWE (>1.4 is poor) : 0.99
K magnitude          : 14.346
G magnitude          : 16.949
RP magnitude         : 16.140
BP magnitude         : 17.631
DUPflag             : 0
Distance (au)        : 8.812
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -23.09
Sun-Target sep (deg) : 159.33
Sun-Moon sep (deg)  : 148.62
B (ring opening deg) : 9.56
PA of pole (deg)    : 6.03
Pole direction: RA (deg): 39.48270
Dec (deg): 83.42790
C/A sky separation (") : 0.274
C/A sky separation (km) : 1754.0
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
    
```



```

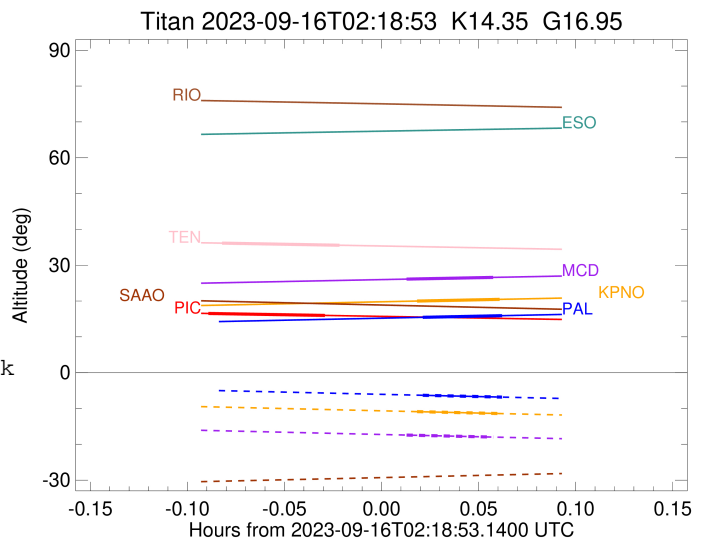
x: target alt < 5.0 deg or sun > -5.0 deg

```

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Titan	I	2023-09-16T02:19:39.530	26.11	-17.42	2575.1	21.04	21.05
Titan	E	2023-09-16T02:22:20.950	26.59	-17.98	2575.2	62.89	62.90

```

target                : Titan
target radius (km)   : 2575.15
C/A epoch            : 2023-09-16T02:15:45.880
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       : 2600800815979716352
2Mass ID (if available) : 22185134-1225278
ICRS Star Coord at Epoch: 22h 18m 51.34839s -12:25:28.08884s
RUWE (>1.4 is poor) : 0.99
K magnitude           : 14.346
G magnitude           : 16.949
RP magnitude          : 16.140
BP magnitude          : 17.631
DUPflag              : 0
Distance (au)         : 8.812
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -23.09
Sun-Target sep (deg) : 159.33
Sun-Moon sep (deg)   : 147.83
B (ring opening deg) : 9.56
PA of pole (deg)     : 6.03
Pole direction: RA (deg): 39.48270
Dec (deg): 83.42790
C/A sky separation (") : 0.049
C/A sky separation (km) : 315.3
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	2023-09-16T02:13:56.624	36.15	-54.47	2575.1	-27.87	-27.88
Titan	E	2023-09-16T02:17:35.153	35.57	-54.03	2575.1	14.03	14.03