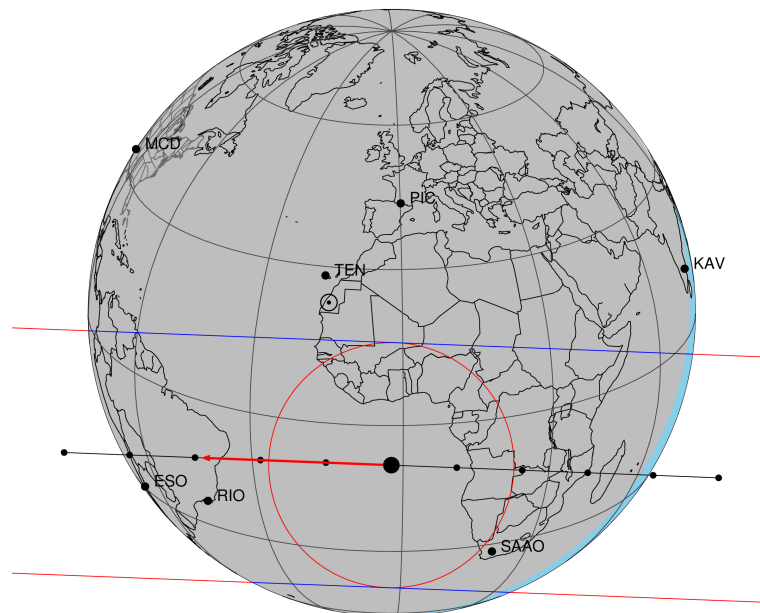


target : Titan  
 target radius (km) : 2575.15  
 C/A epoch : 2033-12-28T01:02:05.440  
 Event type : Pt  
 : Titan occs: topocentric, not geocentric  
 : Not a ringed target  
 Gaia source ID : 3364186761279367168  
 2Mass ID (if available) : 07184761+2153085

ICRS Star Coord at Epoch: 07h 18m 47.62281s +21:53:08.06978s  
 RUWE (>1.4 is poor) : 1.02  
 K magnitude : 14.211  
 G magnitude : 17.251  
 RP magnitude : 16.280  
 BP magnitude : 18.193  
 DUPflag : 0  
 Distance (au) : 8.062  
 f0 (km) : 0.00  
 g0 (km) : 0.00  
 skyplane vel. (km/s) : -22.92  
 Sun-Target sep (deg) : 167.89  
 Sun-Moon sep (deg) : 114.66  
 B (ring opening deg) : -23.97  
 PA of pole (deg) : -6.77  
 Pole direction: RA (deg): 39.48270  
 Dec (deg): 83.42790  
 C/A sky separation (") : 0.546  
 C/A sky separation (km) : 3194.8  
 NAIF SPICE kernels : RAJobs\_U111+rgf16.spk

Titan 2033-12-28T01:02:05 K14.21 G17.25 dots 60.0 sec  
 Pt



2033-12-28T01:02:05.4400 α: 07 18 47.6228 δ: +21 53 08.070 C/A 0.547" PA 182.22 deg v\_sky -22.92 km/s D 08.06 AU

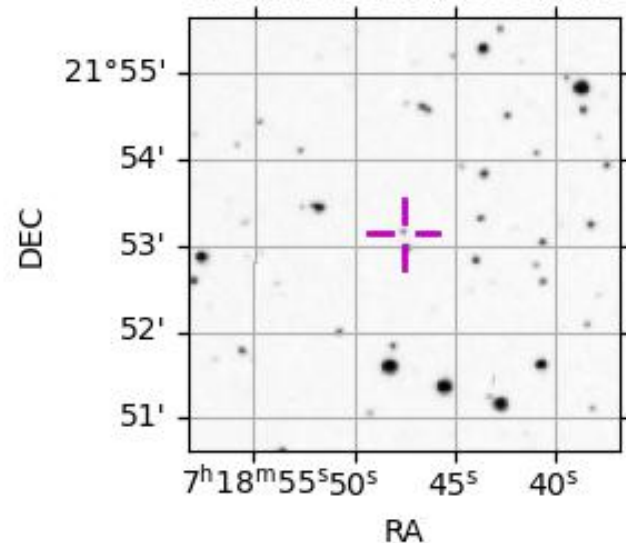
Credit: Styled after SORA/Lucky Star

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

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

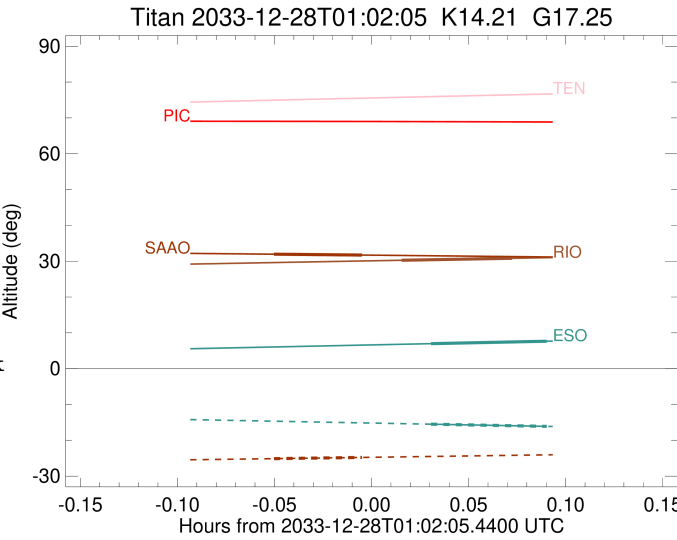
Obs	Location	lat	Elon	Target	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1			Pnn
PAL	Palomar Mt (200")	33.4	243.1			Pnn
PMO	Purple Mtn Obs. Nanking	32.1	118.8			Pnn
KPNO	Kitt Peak Natl Obs	32.0	248.4			Pnn
MCD	McDonald Obs. 2.7m	30.7	256.0			Pnn
TEN	Teide Obs./Tenerife	28.3	343.5			Pnn
IRTF	Mauna Kea/IRTF	19.8	204.5			Pnn
KAV	Kavalur Observatory	12.6	78.8			Pnn
RIO	Rio de Janeiro	-22.9	316.8	+ +	DEC 28 01:03 - DEC 28 01:06	Pie
ESO	European Southern Obs. (3.6m)	-29.3	289.3	+ +	DEC 28 01:03 - DEC 28 01:07	Pie
AAT	Siding Spring (AAT)	-31.3	149.1			Pnn
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8	+ +	DEC 28 00:59 - DEC 28 01:01	Pie
MSO	Mt. Stromlo Observatory	-35.3	149.0			Pnn

3364186761279367168



```

target                : Titan
target radius (km)   : 2575.15
C/A epoch             : 2033-12-28T01:04:44.170
Event type            : Pt
: Titan occs: topocentric, not geocentric
: 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        : 3364186761279367168
2Mass ID (if available) : 07184761+2153085
ICRS Star Coord at Epoch: 07h 18m 47.62281s +21:53:08.06978s
RUWE (>1.4 is poor) : 1.02
K magnitude           : 14.211
G magnitude           : 17.251
RP magnitude          : 16.280
BP magnitude          : 18.193
DUPflag              : 0
Distance (au)         : 8.062
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -22.92
Sun-Target sep (deg) : 167.89
Sun-Moon sep (deg)   : 115.31
B (ring opening deg) : -23.97
PA of pole (deg)     : -6.77
Pole direction: RA (deg): 39.48270
Dec (deg): 83.42790
C/A sky separation (") : 0.156
C/A sky separation (km) : 914.9
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  2033-12-28T01:03:00.623  30.26 -36.61  2575.2  -10.59  -10.59
Titan   E  2033-12-28T01:06:27.706  30.81 -37.03  2575.1  -27.20  -27.21
    
```

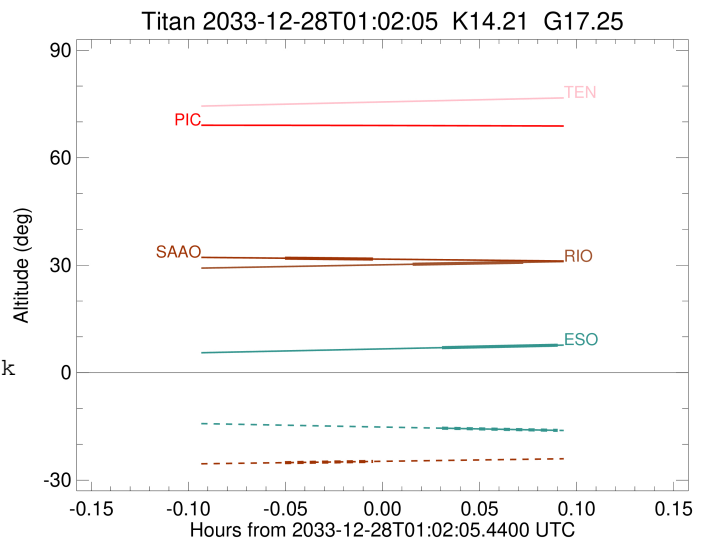
```

target                : Titan
target radius (km)   : 2575.15
C/A epoch             : 2033-12-28T01:05:43.190
Event type            : Pt
: Titan occs: topocentric, not geocentric
: 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        : 3364186761279367168
2Mass ID (if available) : 07184761+2153085
ICRS Star Coord at Epoch: 07h 18m 47.62281s +21:53:08.06978s
RUWE (>1.4 is poor) : 1.02
K magnitude           : 14.211
G magnitude           : 17.251
RP magnitude          : 16.280
BP magnitude          : 18.193
DUPflag              : 0
Distance (au)         : 8.062
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -22.92
Sun-Target sep (deg)  : 167.89
Sun-Moon sep (deg)    : 115.06
B (ring opening deg) : -23.97
PA of pole (deg)      : -6.77
Pole direction: RA (deg): 39.48270
Dec (deg): 83.42790
C/A sky separation (") : 0.117
C/A sky separation (km) : 683.3
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

```

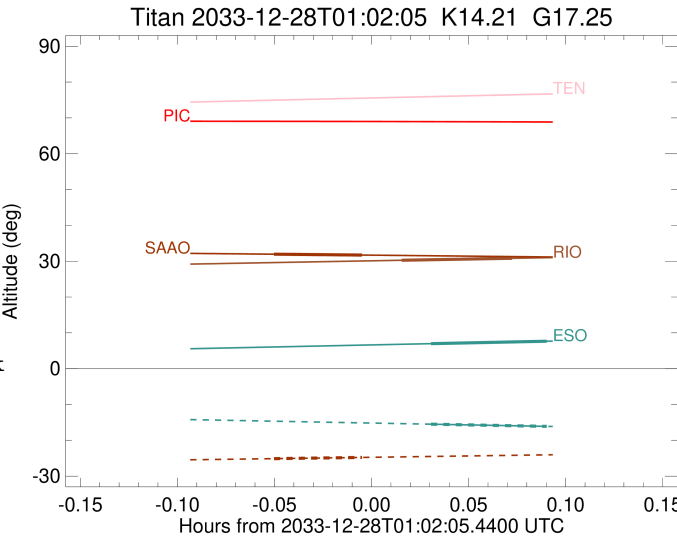
x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Titan	I	2033-12-28T01:03:55.602	6.98	-15.50	2575.1	-5.55	-5.55
Titan	E	2033-12-28T01:07:30.778	7.66	-16.11	2575.1	-22.45	-22.46



```

target                : Titan
target radius (km)   : 2575.15
C/A epoch             : 2033-12-28T01:00:26.360
Event type           : Pt
: Titan occs: topocentric, not geocentric
: 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       : 3364186761279367168
2Mass ID (if available) : 07184761+2153085
ICRS Star Coord at Epoch: 07h 18m 47.62281s +21:53:08.06978s
RUWE (>1.4 is poor) : 1.02
K magnitude           : 14.211
G magnitude           : 17.251
RP magnitude         : 16.280
BP magnitude         : 18.193
DUPflag              : 0
Distance (au)        : 8.062
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -22.92
Sun-Target sep (deg) : 167.89
Sun-Moon sep (deg)  : 114.94
B (ring opening deg) : -23.97
PA of pole (deg)    : -6.77
Pole direction: RA (deg): 39.48270
Dec (deg): 83.42790
C/A sky separation ("): 0.294
C/A sky separation (km): 1718.7
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	2033-12-28T00:59:04.002	31.95	-25.12	2575.1	-29.89	-29.91
Titan	E	2033-12-28T01:01:48.721	31.71	-24.78	2575.1	-44.98	-45.00