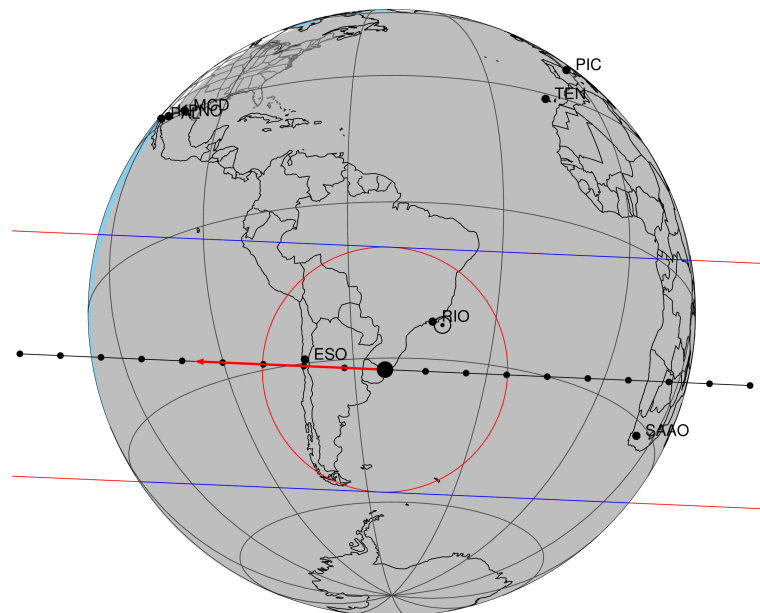


target : Titan  
 target radius (km) : 2575.15  
 C/A epoch : 2046-06-20T02:46:03.180  
 Event type : Pgt  
 : Titan occs: geocentric, topocentric  
 : Not a ringed target  
 Gaia source ID : 4115635957405315584  
 2Mass ID (if available) : 17105595-2123179

ICRS Star Coord at Epoch: 17h 10m 55.93174s -21:23:18.00647s  
 RUWE (>1.4 is poor) : 0.97  
 K magnitude : 14.044  
 G magnitude : 16.270  
 RP magnitude : 15.551  
 BP magnitude : 16.817  
 DUPflag : 0  
 Distance (au) : 9.039  
 f0 (km) : 0.00  
 g0 (km) : 0.00  
 skyplane vel. (km/s) : -14.22  
 Sun-Target sep (deg) : 170.12  
 Sun-Moon sep (deg) : 28.95  
 B (ring opening deg) : 26.49  
 PA of pole (deg) : 4.54  
 Pole direction: RA (deg): 39.48270  
 Dec (deg): 83.42790  
 C/A sky separation (") : 0.183  
 C/A sky separation (km) : 1201.8  
 NAIF SPICE kernels : RAJobs\_U111+rgf16.spk  
 URKALLv1.spk  
 naif0012.tls  
 nep097.bsp  
 nep101.bsp  
 sat4401.bsp

Titan 2046-06-20T02:46:03 K14.04 G16.27 dots 60.0 sec  
 Pgt

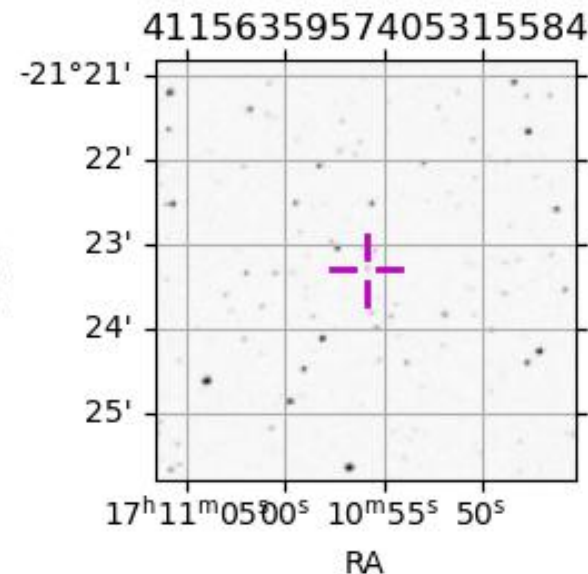


2046-06-20T02:46:03.1800 cc: 17 10 55.9317 & -21 23 18.006 C/A 0.183" PA 182.50 deg v\_sky -14.21 km/s D 09.04 AU

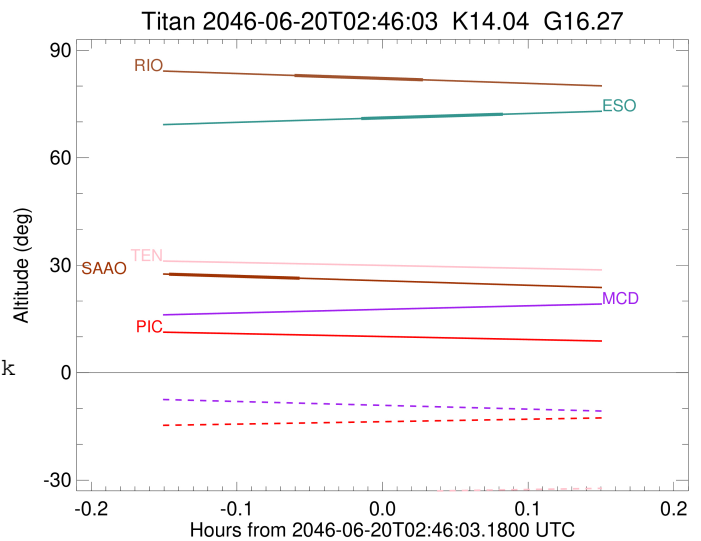
Credit: Styled after SORA/Lucky Star

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			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	+ +	JUN 20 02:42 - JUN 20 02:47	Pie
ESO	European Southern Obs. (3.6m)	-29.3	289.3	+ +	JUN 20 02:45 - JUN 20 02:51	Pie
AAT	Siding Spring (AAT)	-31.3	149.1			Pnn
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8	+ +	JUN 20 02:37 - JUN 20 02:42	Pie
MSO	Mt. Stromlo Observatory	-35.3	149.0			Pnn



target : Titan  
 target radius (km) : 2575.15  
 C/A epoch : 2046-06-20T02:45:04.290  
 Event type : Pgt  
 : Titan 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 : 4115635957405315584  
 2Mass ID (if available) : 17105595-2123179  
 ICRS Star Coord at Epoch: 17h 10m 55.93174s -21:23:18.00647s  
 RUWE (>1.4 is poor) : 0.97  
 K magnitude : 14.044  
 G magnitude : 16.270  
 RP magnitude : 15.551  
 BP magnitude : 16.817  
 DUPflag : 0  
 Distance (au) : 9.039  
 f0 (km) : 0.00  
 g0 (km) : 0.00  
 skyplane vel. (km/s) : -14.22  
 Sun-Target sep (deg) : 170.12  
 Sun-Moon sep (deg) : 29.29  
 B (ring opening deg) : 26.49  
 PA of pole (deg) : 4.54  
 Pole direction: RA (deg): 39.48270  
 Dec (deg): 83.42790  
 C/A sky separation (") : 0.163  
 C/A sky separation (km) : 1066.4  
 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	2046-06-20T02:42:24.119	82.96	-87.16	2575.1	19.97	19.98
Titan	E	2046-06-20T02:47:44.460	81.74	-88.32	2575.1	23.53	23.54

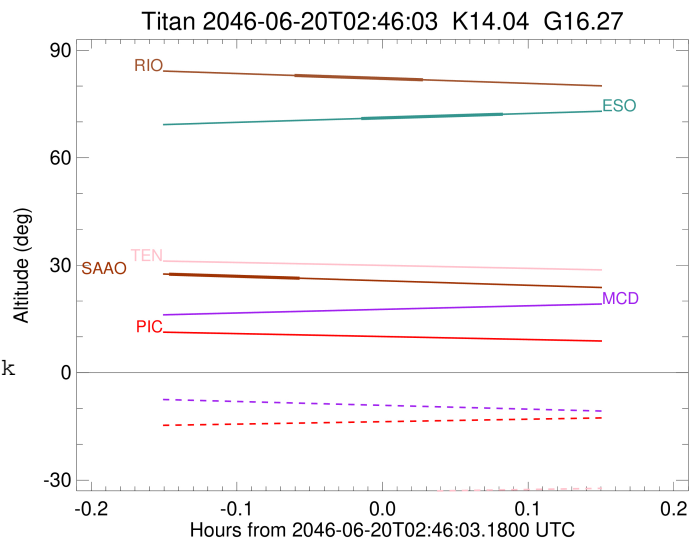
```

target                : Titan
target radius (km)   : 2575.15
C/A epoch            : 2046-06-20T02:48:05.620
Event type           : Pgt
: Titan 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       : 4115635957405315584
2Mass ID (if available) : 17105595-2123179
ICRS Star Coord at Epoch: 17h 10m 55.93174s -21:23:18.00647s
RUWE (>1.4 is poor) : 0.97
K magnitude          : 14.044
G magnitude          : 16.270
RP magnitude         : 15.551
BP magnitude         : 16.817
DUPflag             : 0
Distance (au)        : 9.039
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -14.22
Sun-Target sep (deg) : 170.12
Sun-Moon sep (deg)   : 29.60
B (ring opening deg) : 26.49
PA of pole (deg)     : 4.54
Pole direction: RA (deg): 39.48270
Dec (deg): 83.42790
C/A sky separation ("): 0.027
C/A sky separation (km): 178.3
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

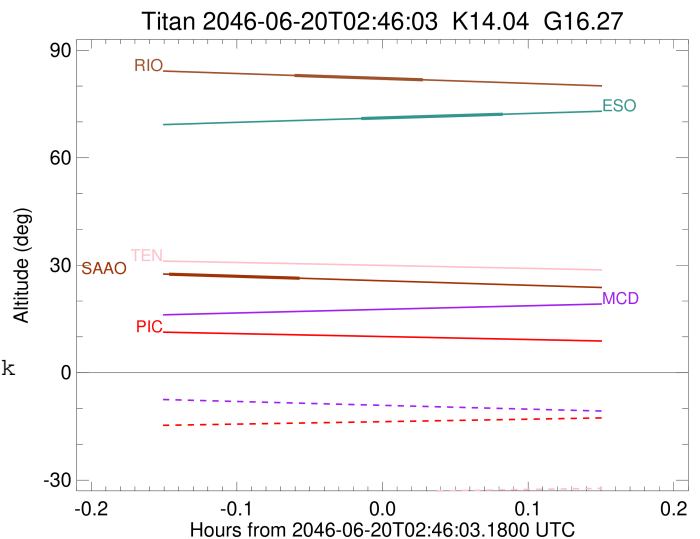
```

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	2046-06-20T02:45:09.558	70.93	-62.74	2575.2	1.49	1.49
Titan	E	2046-06-20T02:51:01.652	72.14	-64.02	2575.1	5.61	5.62



target : Titan  
 target radius (km) : 2575.15  
 C/A epoch : 2046-06-20T02:39:57.260  
 Event type : Pgt  
 : Titan occs: geocentric, topocentric  
 : 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 : 4115635957405315584  
 2Mass ID (if available) : 17105595-2123179  
 ICRS Star Coord at Epoch: 17h 10m 55.93174s -21:23:18.00647s  
 RUWE (>1.4 is poor) : 0.97  
 K magnitude : 14.044  
 G magnitude : 16.270  
 RP magnitude : 15.551  
 BP magnitude : 16.817  
 DUPflag : 0  
 Distance (au) : 9.039  
 f0 (km) : 0.00  
 g0 (km) : 0.00  
 skyplane vel. (km/s) : -14.22  
 Sun-Target sep (deg) : 170.12  
 Sun-Moon sep (deg) : 28.43  
 B (ring opening deg) : 26.49  
 PA of pole (deg) : 4.54  
 Pole direction: RA (deg): 39.48270  
 Dec (deg): 83.42790  
 C/A sky separation (") : 0.170  
 C/A sky separation (km) : 1115.1  
 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	2046-06-20T02:37:15.464	27.48	-37.09	2575.1	-24.13	-24.14
Titan	E	2046-06-20T02:42:39.114	26.36	-35.96	2575.1	-21.47	-21.48