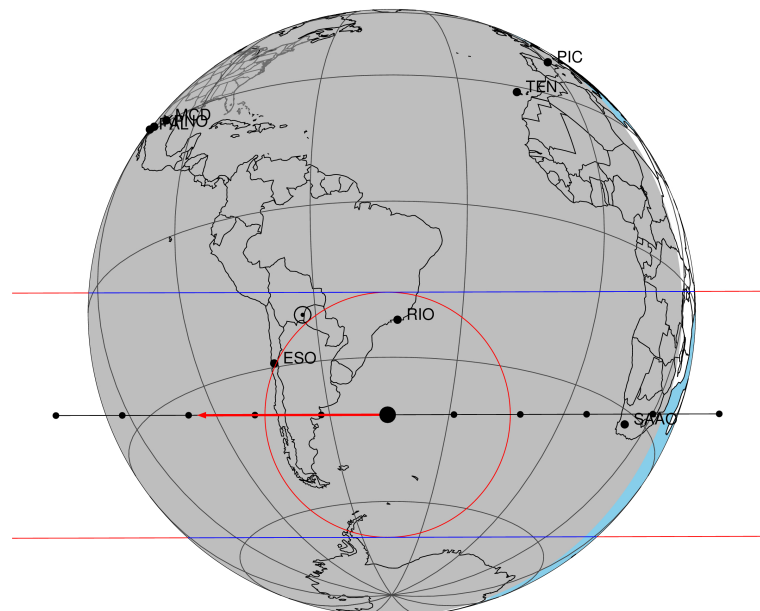


target : Titan  
 target radius (km) : 2575.15  
 C/A epoch : 2046-05-25T04:07:42.370  
 Event type : Pgt  
 : Titan occs: geocentric, topocentric  
 : Not a ringed target  
 Gaia source ID : 4115098876011598080  
 2Mass ID (if available) : 17190905-2133039

Titan 2046-05-25T04:07:42 K12.99 G17.34 dots 60.0 sec  
 Pgt

ICRS Star Coord at Epoch: 17h 19m 09.04306s -21:33:04.25497s  
 RUWE (>1.4 is poor) : 1.02  
 K magnitude : 12.988  
 G magnitude : 17.337  
 RP magnitude : 16.193  
 BP magnitude : 18.749  
 DUPflag : 0  
 Distance (au) : 9.055  
 f0 (km) : 0.00  
 g0 (km) : 0.00  
 skyplane vel. (km/s) : -23.21  
 Sun-Target sep (deg) : 162.93  
 Sun-Moon sep (deg) : 44.84  
 B (ring opening deg) : 26.49  
 PA of pole (deg) : 4.75  
 Pole direction: RA (deg): 39.48270  
 Dec (deg): 83.42790  
 C/A sky separation (") : 0.327  
 C/A sky separation (km) : 2148.2  
 NAIF SPICE kernels : RAJobs\_U111+rgf16.spk  
 URKALLv1.spk  
 naif0012.tls  
 nep097.bsp  
 nep101.bsp  
 sat4401.bsp

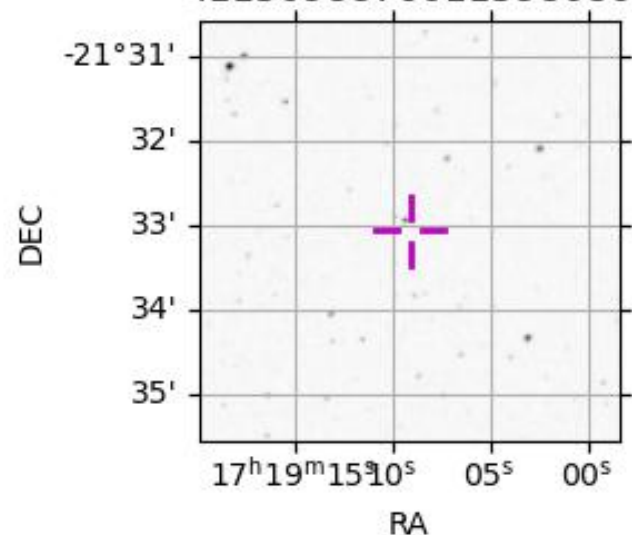


2046-05-25T04:07:42.3700 cc: 17 19 09.0431 & -21 33 04.255 C/A 0.326" PA 179.86 deg v\_sky -23.21 km/s D 09.05 AU  
 Credit: Styled after SORA/Lucky Star

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

Obs	Location	lat	Elon	Target	Observed Events Interval	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	+ +	MAY 25 04:06 - MAY 25 04:08	Pie
ESO	European Southern Obs. (3.6m)	-29.3	289.3	+ +	MAY 25 04:07 - MAY 25 04:11	Pie
AAT	Siding Spring (AAT)	-31.3	149.1			Pnn
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8	+ +	MAY 25 04:02 - MAY 25 04:06	Pie
MSO	Mt. Stromlo Observatory	-35.3	149.0			Pnn

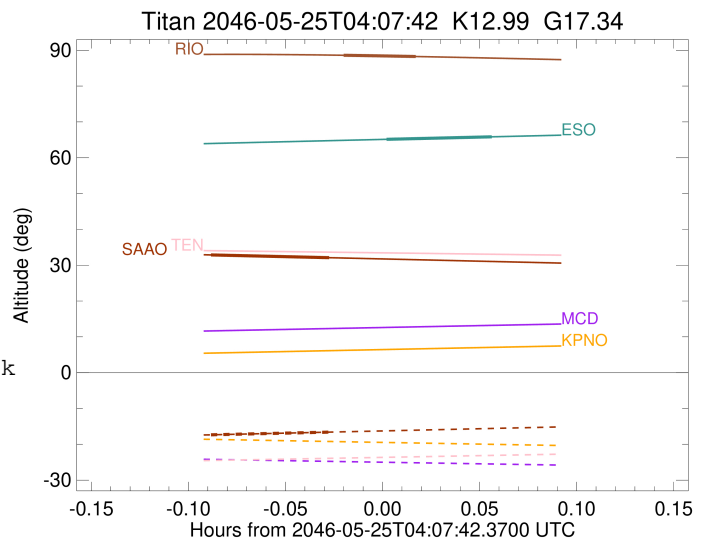
4115098876011598080



```

target                : Titan
target radius (km)   : 2575.15
C/A epoch             : 2046-05-25T04:07:37.380
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       : 4115098876011598080
2Mass ID (if available) : 17190905-2133039
ICRS Star Coord at Epoch: 17h 19m 09.04306s -21:33:04.25497s
RUWE (>1.4 is poor) : 1.02
K magnitude           : 12.988
G magnitude           : 17.337
RP magnitude          : 16.193
BP magnitude          : 18.749
DUPflag              : 0
Distance (au)         : 9.055
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -23.21
Sun-Target sep (deg) : 162.93
Sun-Moon sep (deg)   : 45.48
B (ring opening deg) : 26.49
PA of pole (deg)     : 4.75
Pole direction: RA (deg): 39.48270
Dec (deg): 83.42790
C/A sky separation (") : 0.307
C/A sky separation (km) : 2017.9
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

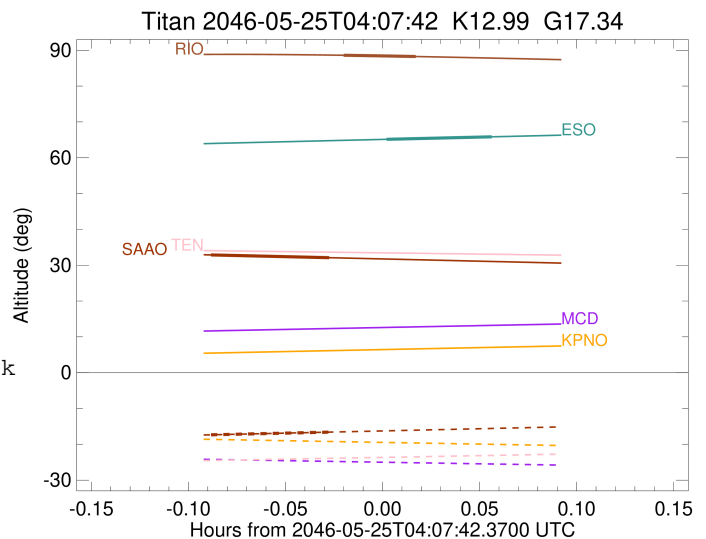
```



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	2046-05-25T04:06:29.699	88.59	-72.12	2575.1	40.65	40.67
Titan	E	2046-05-25T04:08:45.047	88.24	-71.61	2575.1	48.25	48.26

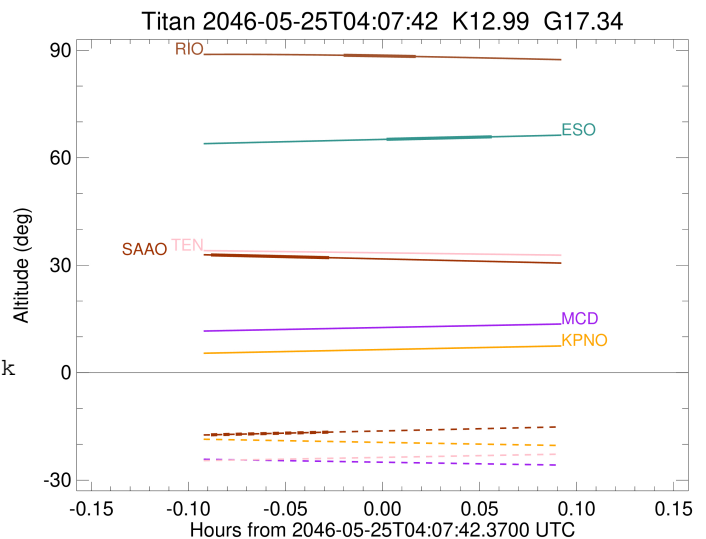
target : Titan  
 target radius (km) : 2575.15  
 C/A epoch : 2046-05-25T04:09:27.420  
 Event type : Pgt  
 : Titan occs: geocentric, topocentric  
 : Not a ringed target  
 Observer code : ESO  
 Location : European Southern Obs. (3.6m)  
 Latitude (deg) : -29.26097  
 E. Longitude (deg) : 289.26831  
 Altitude (km) : 2.400  
 Gaia source ID : 4115098876011598080  
 2Mass ID (if available) : 17190905-2133039  
 ICRS Star Coord at Epoch: 17h 19m 09.04306s -21:33:04.25497s  
 RUWE (>1.4 is poor) : 1.02  
 K magnitude : 12.988  
 G magnitude : 17.337  
 RP magnitude : 16.193  
 BP magnitude : 18.749  
 DUPflag : 0  
 Distance (au) : 9.055  
 f0 (km) : 0.00  
 g0 (km) : 0.00  
 skyplane vel. (km/s) : -23.21  
 Sun-Target sep (deg) : 162.93  
 Sun-Moon sep (deg) : 45.68  
 B (ring opening deg) : 26.49  
 PA of pole (deg) : 4.75  
 Pole direction: RA (deg): 39.48270  
 Dec (deg): 83.42790  
 C/A sky separation (") : 0.172  
 C/A sky separation (km) : 1128.0  
 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	2046-05-25T04:07:49.232	65.13	-79.12	2575.1	18.65	18.66
Titan	E	2046-05-25T04:11:05.586	65.83	-79.60	2575.1	27.46	27.48

target : Titan  
 target radius (km) : 2575.15  
 C/A epoch : 2046-05-25T04:04:13.640  
 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 : 4115098876011598080  
 2Mass ID (if available) : 17190905-2133039  
 ICRS Star Coord at Epoch: 17h 19m 09.04306s -21:33:04.25497s  
 RUWE (>1.4 is poor) : 1.02  
 K magnitude : 12.988  
 G magnitude : 17.337  
 RP magnitude : 16.193  
 BP magnitude : 18.749  
 DUPflag : 0  
 Distance (au) : 9.055  
 f0 (km) : 0.00  
 g0 (km) : 0.00  
 skyplane vel. (km/s) : -23.21  
 Sun-Target sep (deg) : 162.93  
 Sun-Moon sep (deg) : 44.66  
 B (ring opening deg) : 26.49  
 PA of pole (deg) : 4.75  
 Pole direction: RA (deg): 39.48270  
 Dec (deg): 83.42790  
 C/A sky separation (") : 0.028  
 C/A sky separation (km) : 186.4  
 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	2046-05-25T04:02:23.776	32.87	-17.35	2575.1	-7.80	-7.81
Titan	E	2046-05-25T04:06:03.505	32.09	-16.60	2575.2	0.38	0.38