

target : Titan  
 target radius (km) : 2575.15  
 C/A epoch : 2048-07-15T03:00:50.360  
 Event type : Pt  
 : Titan occs: topocentric, not geocentric  
 : Not a ringed target  
 Gaia source ID : 4078863134611454976  
 2Mass ID (if available) : 18483428-2227132

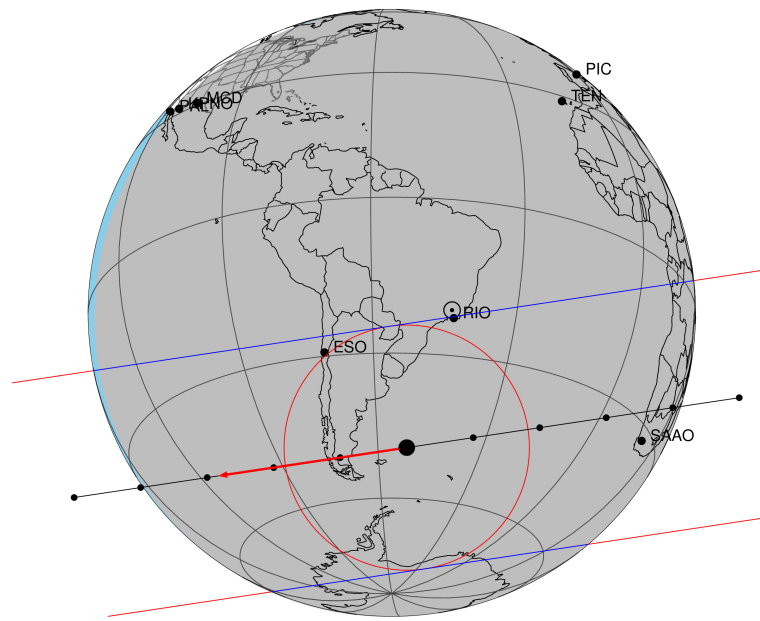
ICRS Star Coord at Epoch: 18h 48m 34.27920s -22:27:13.62143s  
 RUWE (>1.4 is poor) : 0.95  
 K magnitude : 12.304  
 G magnitude : 15.130  
 RP magnitude : 14.280  
 BP magnitude : 15.888  
 DUPflag : 0  
 Distance (au) : 9.033  
 f0 (km) : 0.00  
 g0 (km) : 0.00  
 skyplane vel. (km/s) : -23.53  
 Sun-Target sep (deg) : 168.55  
 Sun-Moon sep (deg) : 123.31  
 B (ring opening deg) : 25.34  
 PA of pole (deg) : 6.46  
 Pole direction: RA (deg): 39.48270  
 Dec (deg): 83.42790  
 C/A sky separation (") : 0.436  
 C/A sky separation (km) : 2855.4  
 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			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	+ +	JUL 15 02:59 - JUL 15 03:00	Pie
ESO	European Southern Obs. (3.6m)	-29.3	289.3	+ +	JUL 15 03:01 - JUL 15 03:02	Pie
AAT	Siding Spring (AAT)	-31.3	149.1			Pnn
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8	+ +	JUL 15 02:55 - JUL 15 02:59	Pie
MSO	Mt. Stromlo Observatory	-35.3	149.0			Pnn

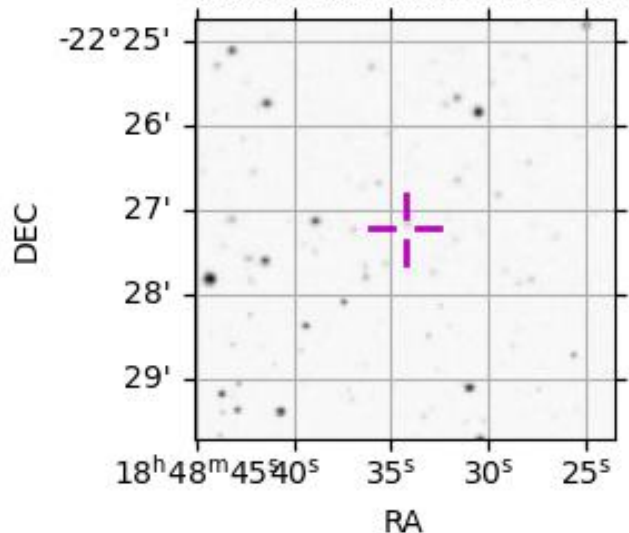
Titan 2048-07-15T03:00:50 K12.30 G15.13 dots 60.0 sec  
 Pt



2048-07-15T03:00:50.3600 cc: 18 48 34.2792 d: -22 27 13.621 C/A 0.435" PA 171.44 deg v\_sky -23.54 km/s D 09.03 AU

Credit: Styled after SORA/Lucky Star

4078863134611454976



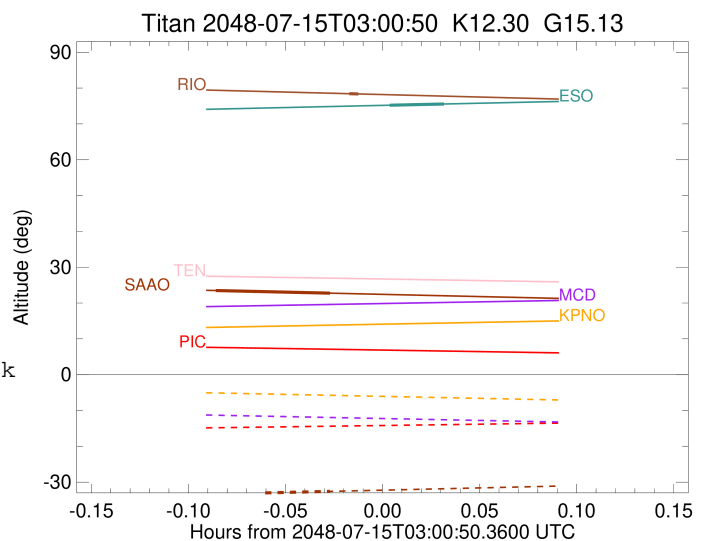
```

target                : Titan
target radius (km)   : 2575.15
C/A epoch             : 2048-07-15T02:59:57.700
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        : 4078863134611454976
2Mass ID (if available) : 18483428-2227132
ICRS Star Coord at Epoch: 18h 48m 34.27920s -22:27:13.62143s
RUWE (>1.4 is poor)  : 0.95
K magnitude           : 12.304
G magnitude           : 15.130
RP magnitude          : 14.280
BP magnitude          : 15.888
DUPflag              : 0
Distance (au)         : 9.033
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -23.53
Sun-Target sep (deg)  : 168.55
Sun-Moon sep (deg)   : 123.97
B (ring opening deg) : 25.34
PA of pole (deg)     : 6.46
Pole direction: RA (deg): 39.48270
Dec (deg): 83.42790
C/A sky separation (") : 0.392
C/A sky separation (km) : 2566.0
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

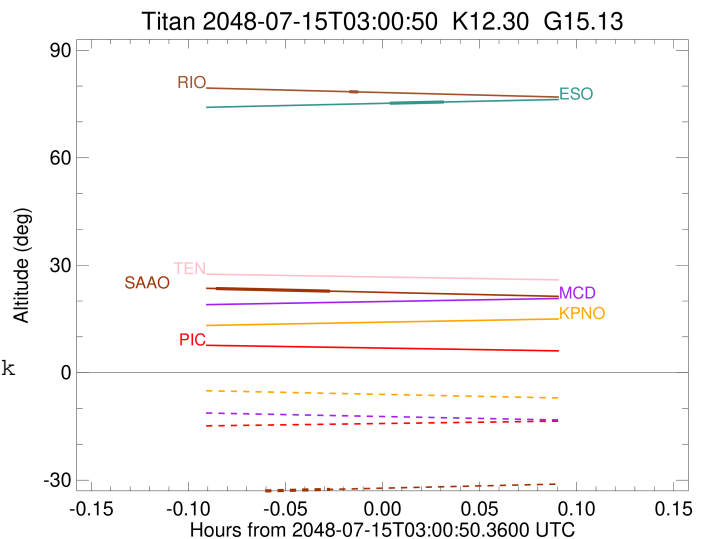
Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Titan	I	2048-07-15T02:59:48.706	78.42	-88.64	2575.1	58.39	58.40
Titan	E	2048-07-15T03:00:06.674	78.35	-88.63	2575.1	62.89	62.90



```

target                : Titan
target radius (km)   : 2575.15
C/A epoch            : 2048-07-15T03:01:54.100
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       : 4078863134611454976
2Mass ID (if available) : 18483428-2227132
ICRS Star Coord at Epoch: 18h 48m 34.27920s -22:27:13.62143s
RUWE (>1.4 is poor) : 0.95
K magnitude           : 12.304
G magnitude           : 15.130
RP magnitude          : 14.280
BP magnitude          : 15.888
DUPflag              : 0
Distance (au)        : 9.033
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -23.53
Sun-Target sep (deg) : 168.55
Sun-Moon sep (deg)   : 124.19
B (ring opening deg) : 25.34
PA of pole (deg)     : 6.46
Pole direction: RA (deg): 39.48270
Dec (deg): 83.42790
C/A sky separation (") : 0.346
C/A sky separation (km) : 2267.1
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

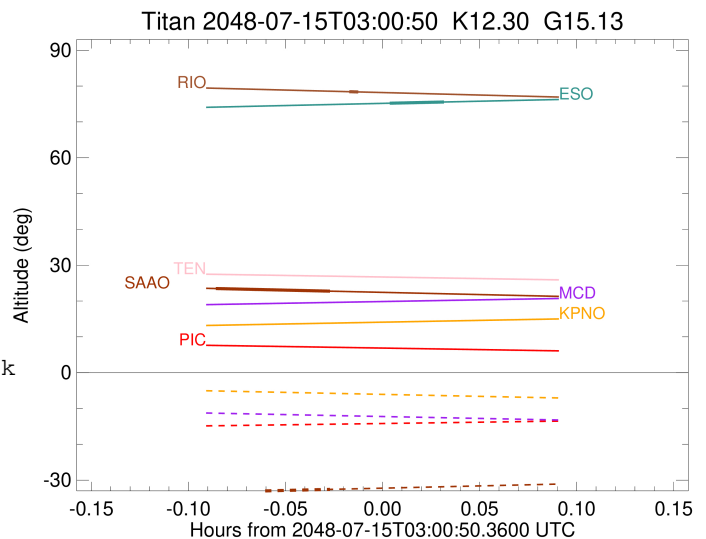
```



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	2048-07-15T03:01:03.069	75.21	-64.50	2575.1	41.16	41.18
Titan	E	2048-07-15T03:02:45.134	75.55	-64.87	2575.1	61.56	61.57

target : Titan  
 target radius (km) : 2575.15  
 C/A epoch : 2048-07-15T02:57:27.740  
 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 : 4078863134611454976  
 2Mass ID (if available) : 18483428-2227132  
 ICRS Star Coord at Epoch: 18h 48m 34.27920s -22:27:13.62143s  
 RUWE (>1.4 is poor) : 0.95  
 K magnitude : 12.304  
 G magnitude : 15.130  
 RP magnitude : 14.280  
 BP magnitude : 15.888  
 DUPflag : 0  
 Distance (au) : 9.033  
 f0 (km) : 0.00  
 g0 (km) : 0.00  
 skyplane vel. (km/s) : -23.53  
 Sun-Target sep (deg) : 168.55  
 Sun-Moon sep (deg) : 123.24  
 B (ring opening deg) : 25.34  
 PA of pole (deg) : 6.46  
 Pole direction: RA (deg): 39.48270  
 Dec (deg): 83.42790  
 C/A sky separation (") : 0.085  
 C/A sky separation (km) : 559.6  
 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	2048-07-15T02:55:41.253	23.48	-33.32	2575.1	-24.38	-24.39
Titan	E	2048-07-15T02:59:14.225	22.75	-32.58	2575.2	1.87	1.87