

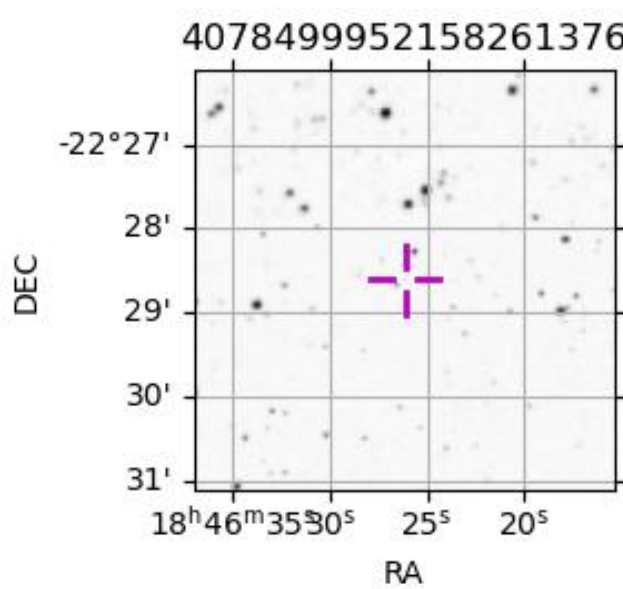
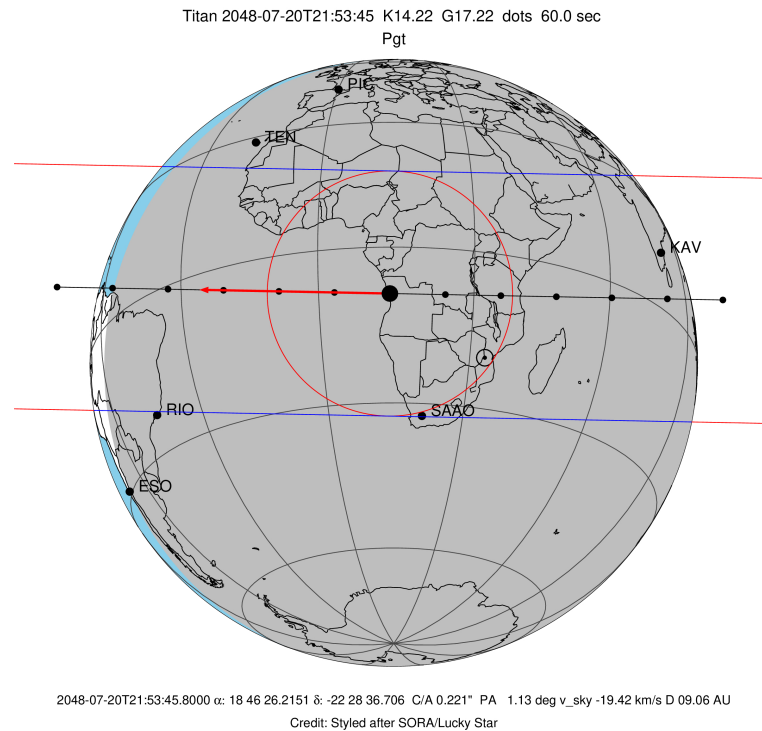
target : Titan  
 target radius (km) : 2575.15  
 C/A epoch : 2048-07-20T21:53:45.800  
 Event type : Pgt  
 : Titan occs: geocentric, topocentric  
 : Not a ringed target  
 Gaia source ID : 4078499952158261376  
 2Mass ID (if available) : 18462621-2228365

ICRS Star Coord at Epoch: 18h 46m 26.21513s -22:28:36.70582s  
 RUWE (>1.4 is poor) : 0.98  
 K magnitude : 14.217  
 G magnitude : 17.221  
 RP magnitude : 16.146  
 BP magnitude : 17.648  
 DUPflag : 0  
 Distance (au) : 9.060  
 f0 (km) : 0.00  
 g0 (km) : 0.00  
 skyplane vel. (km/s) : -19.42  
 Sun-Target sep (deg) : 162.54  
 Sun-Moon sep (deg) : 44.52  
 B (ring opening deg) : 25.42  
 PA of pole (deg) : 6.43  
 Pole direction: RA (deg): 39.48270  
 Dec (deg): 83.42790  
 C/A sky separation (") : 0.223  
 C/A sky separation (km) : 1464.8  
 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	+ +	JUL 20 21:47 - JUL 20 21:51	Pie
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	+ +	JUL 20 21:52 - JUL 20 21:53	Pie
MSO	Mt. Stromlo Observatory	-35.3	149.0			Pnn



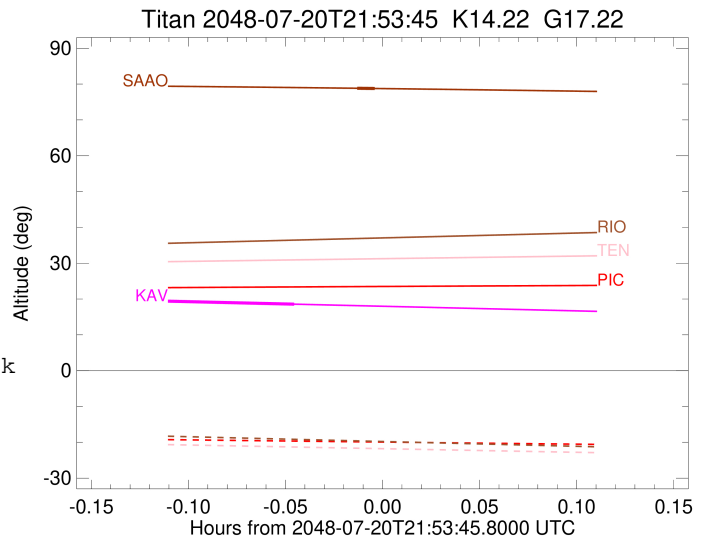
```

target                : Titan
target radius (km)   : 2575.15
C/A epoch             : 2048-07-20T21:49:01.960
Event type            : Pgt
: Titan occs: geocentric, topocentric
: Not a ringed target
Observer code         : KAV
Location              : Kavalur Observatory
Latitude (deg)        : 12.57556
E. Longitude (deg)    : 78.83167
Altitude (km)         : 0.722
Gaia source ID        : 4078499952158261376
2Mass ID (if available) : 18462621-2228365
ICRS Star Coord at Epoch: 18h 46m 26.21513s -22:28:36.70582s
RUWE (>1.4 is poor)  : 0.98
K magnitude           : 14.217
G magnitude           : 17.221
RP magnitude          : 16.146
BP magnitude          : 17.648
DUPflag              : 0
Distance (au)         : 9.060
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -19.42
Sun-Target sep (deg)  : 162.54
Sun-Moon sep (deg)    : 45.39
B (ring opening deg)  : 25.42
PA of pole (deg)      : 6.43
Pole direction: RA (deg): 39.48270
Dec (deg): 83.42790
C/A sky separation (") : 0.147
C/A sky separation (km) : 963.7
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

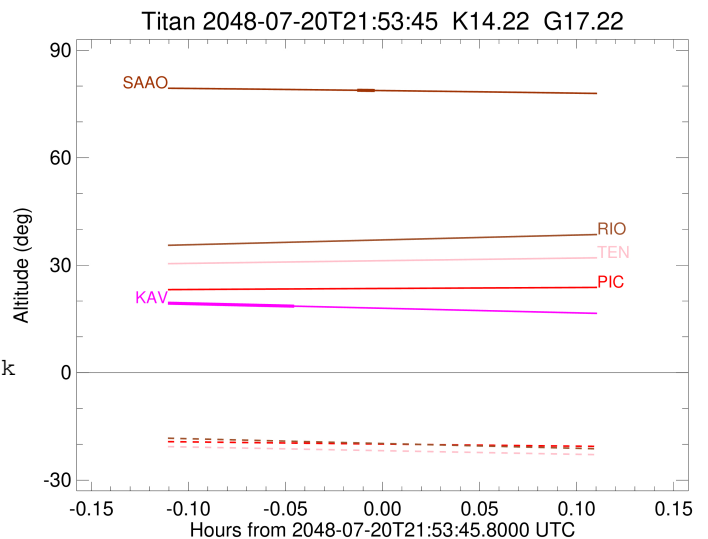
Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Titan	I	2048-07-20T21:47:00.353	19.42	-35.67	2575.1	15.40	15.41
Titan	E	2048-07-20T21:51:03.615	18.56	-34.88	2575.1	24.08	24.09



```

target                : Titan
target radius (km)   : 2575.15
C/A epoch             : 2048-07-20T21:53:15.100
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       : 4078499952158261376
2Mass ID (if available) : 18462621-2228365
ICRS Star Coord at Epoch: 18h 46m 26.21513s -22:28:36.70582s
RUWE (>1.4 is poor) : 0.98
K magnitude           : 14.217
G magnitude           : 17.221
RP magnitude          : 16.146
BP magnitude          : 17.648
DUPflag              : 0
Distance (au)        : 9.060
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -19.42
Sun-Target sep (deg) : 162.54
Sun-Moon sep (deg)   : 45.26
B (ring opening deg) : 25.42
PA of pole (deg)     : 6.43
Pole direction: RA (deg): 39.48270
Dec (deg): 83.42790
C/A sky separation ("): 0.388
C/A sky separation (km): 2551.6
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	2048-07-20T21:52:57.623	78.82	-73.71	2575.1	-64.47	-64.48
Titan	E	2048-07-20T21:53:32.585	78.76	-73.80	2575.1	-61.64	-61.65