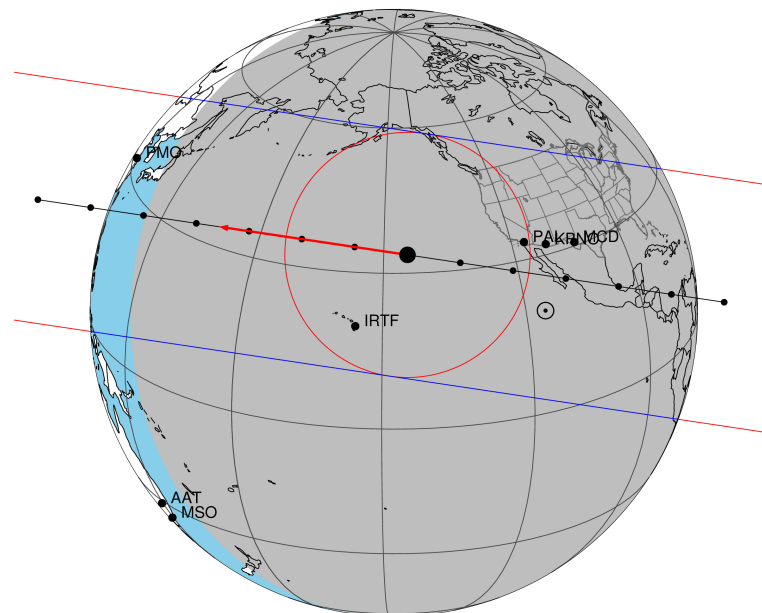


target : Titan  
 target radius (km) : 2575.15  
 C/A epoch : 2033-01-21T07:53:52.710  
 Event type : Pgt  
 : Titan occs: geocentric, topocentric  
 : Not a ringed target  
 Gaia source ID : 3423753280456077184  
 2Mass ID (if available) : 06050396+2232177

ICRS Star Coord at Epoch: 06h 05m 03.96488s +22:32:17.62869s  
 RUWE (>1.4 is poor) : 1.08  
 K magnitude : 11.551  
 G magnitude : 15.369  
 RP magnitude : 14.310  
 BP magnitude : 16.522  
 DUPflag : 0  
 Distance (au) : 8.147  
 f0 (km) : 0.00  
 g0 (km) : 0.00  
 skyplane vel. (km/s) : -18.68  
 Sun-Target sep (deg) : 150.03  
 Sun-Moon sep (deg) : 93.63  
 B (ring opening deg) : -26.50  
 PA of pole (deg) : -5.77  
 Pole direction: RA (deg): 39.48270  
 Dec (deg): 83.42790  
 C/A sky separation (") : 0.207  
 C/A sky separation (km) : 1225.0  
 NAIF SPICE kernels : RAJobs\_U111+rgf16.spk

Titan 2033-01-21T07:53:52 K11.55 G15.37 dots 60.0 sec  
 Pgt



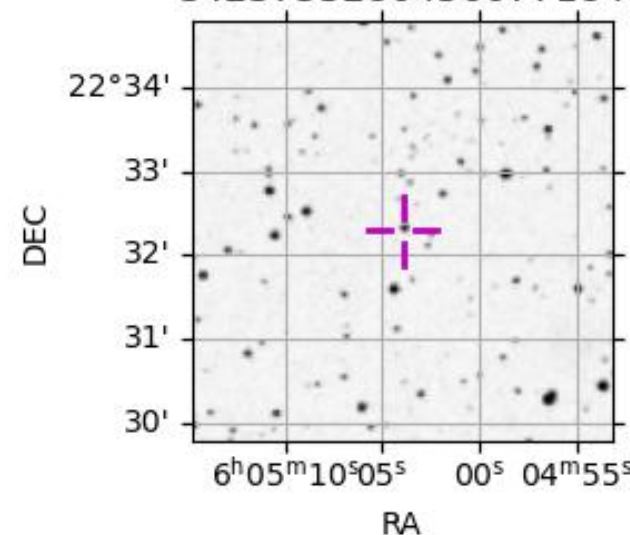
2033-01-21T07:53:52.7100 α: 06 05 03.9649 δ: +22 32 17.629 C/A 0.211" PA 8.48 deg v\_sky -18.68 km/s D 08.15 AU  
 Credit: Styled after SORA/Lucky Star

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	+ +	JAN 21 07:49 - JAN 21 07:53	Pie
PMO	Purple Mtn Obs. Nanking	32.1	118.8			Pnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+ +	JAN 21 07:49 - JAN 21 07:53	Pie
MCD	McDonald Obs. 2.7m	30.7	256.0	+ +	JAN 21 07:48 - JAN 21 07:52	Pie
TEN	Teide Obs./Tenerife	28.3	343.5			Pnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+ +	JAN 21 07:52 - JAN 21 07:56	Pie
KAV	Kavalur Observatory	12.6	78.8			Pnn
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			Pnn
MSO	Mt. Stromlo Observatory	-35.3	149.0			Pnn

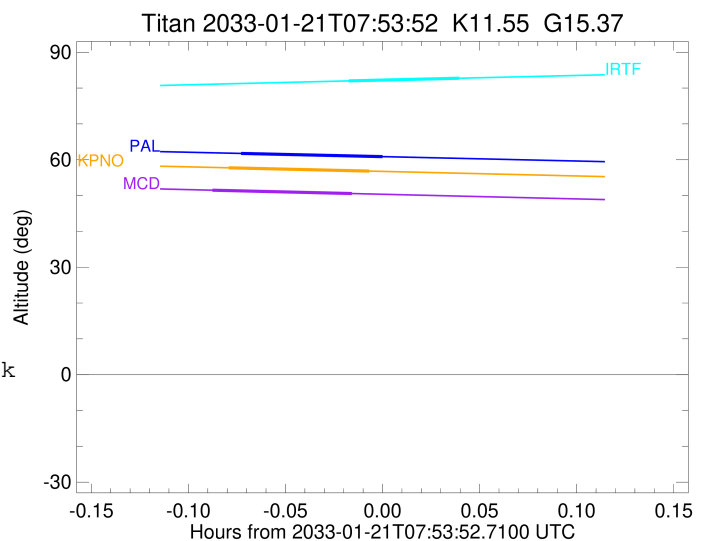
3423753280456077184



target : Titan  
 target radius (km) : 2575.15  
 C/A epoch : 2033-01-21T07:51:41.890  
 Event type : Pgt  
 : Titan occs: geocentric, topocentric  
 : Not a ringed target  
 Observer code : PAL  
 Location : Palomar Mt (200")  
 Latitude (deg) : 33.35622  
 E. Longitude (deg) : 243.13601  
 Altitude (km) : 1.706  
 Gaia source ID : 3423753280456077184  
 2Mass ID (if available) : 06050396+2232177  
 ICRS Star Coord at Epoch: 06h 05m 03.96488s +22:32:17.62869s  
 RUWE (>1.4 is poor) : 1.08  
 K magnitude : 11.551  
 G magnitude : 15.369  
 RP magnitude : 14.310  
 BP magnitude : 16.522  
 DUPflag : 0  
 Distance (au) : 8.147  
 f0 (km) : 0.00  
 g0 (km) : 0.00  
 skyplane vel. (km/s) : -18.68  
 Sun-Target sep (deg) : 150.03  
 Sun-Moon sep (deg) : 94.44  
 B (ring opening deg) : -26.50  
 PA of pole (deg) : -5.77  
 Pole direction: RA (deg): 39.48270  
 Dec (deg): 83.42790  
 C/A sky separation (") : 0.105  
 C/A sky separation (km) : 622.6  
 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	2033-01-21T07:49:30.359	61.75	-76.46	2575.1	24.75	24.76
Titan	E	2033-01-21T07:53:53.417	60.86	-76.58	2575.2	0.08	0.08



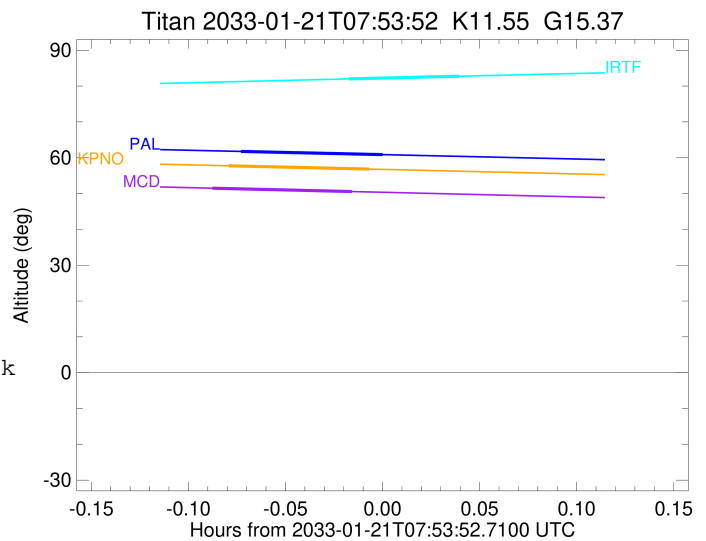
```

target                : Titan
target radius (km)   : 2575.15
C/A epoch             : 2033-01-21T07:51:17.560
Event type            : Pgt
: Titan occs: geocentric, topocentric
: Not a ringed target
Observer code         : KPNO
Location              : Kitt Peak Natl Obs
Latitude (deg)        : 31.96333
E. Longitude (deg)    : 248.40000
Altitude (km)         : 2.120
Gaia source ID        : 3423753280456077184
2Mass ID (if available) : 06050396+2232177
ICRS Star Coord at Epoch: 06h 05m 03.96488s +22:32:17.62869s
RUWE (>1.4 is poor)  : 1.08
K magnitude           : 11.551
G magnitude           : 15.369
RP magnitude          : 14.310
BP magnitude          : 16.522
DUPflag              : 0
Distance (au)         : 8.147
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s)  : -18.68
Sun-Target sep (deg)  : 150.03
Sun-Moon sep (deg)    : 94.41
B (ring opening deg)  : -26.50
PA of pole (deg)      : -5.77
Pole direction: RA (deg): 39.48270
Dec (deg): 83.42790
C/A sky separation (") : 0.109
C/A sky separation (km) : 645.6
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	2033-01-21T07:49:06.226	57.74	-77.74	2575.1	25.18	25.19
Titan	E	2033-01-21T07:53:28.896	56.82	-77.50	2575.2	0.58	0.58



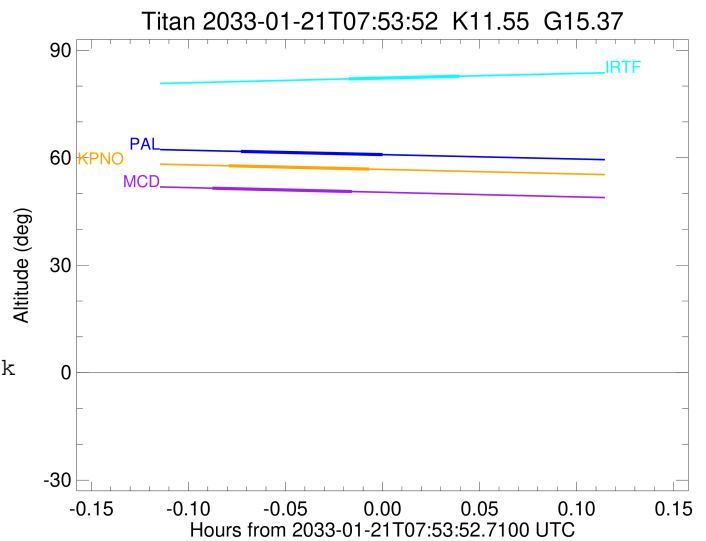
```

target                : Titan
target radius (km)   : 2575.15
C/A epoch            : 2033-01-21T07:50:46.230
Event type          : Pgt
: Titan occs: geocentric, topocentric
: Not a ringed target
Observer code       : MCD
Location           : McDonald Obs. 2.7m
Latitude (deg)     : 30.67158
E. Longitude (deg) : 255.97844
Altitude (km)      : 2.075
Gaia source ID     : 3423753280456077184
2Mass ID (if available) : 06050396+2232177
ICRS Star Coord at Epoch: 06h 05m 03.96488s +22:32:17.62869s
RUWE (>1.4 is poor) : 1.08
K magnitude         : 11.551
G magnitude         : 15.369
RP magnitude        : 14.310
BP magnitude        : 16.522
DUPflag            : 0
Distance (au)      : 8.147
f0 (km)            : 0.00
g0 (km)            : 0.00
skyplane vel. (km/s) : -18.68
Sun-Target sep (deg) : 150.03
Sun-Moon sep (deg)  : 94.36
B (ring opening deg) : -26.50
PA of pole (deg)    : -5.77
Pole direction: RA (deg): 39.48270
Dec (deg): 83.42790
C/A sky separation (") : 0.131
C/A sky separation (km) : 771.8
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

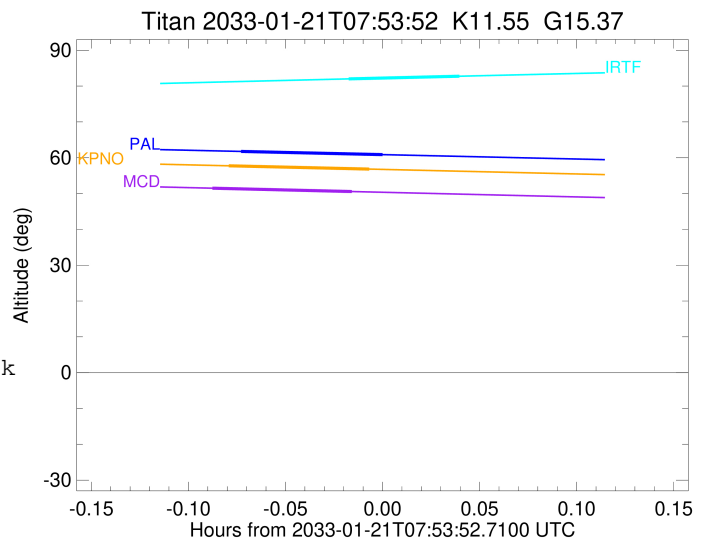
Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Titan	I	2033-01-21T07:48:36.587	51.49	-75.82	2575.1	27.68	27.70
Titan	E	2033-01-21T07:52:55.871	50.56	-75.16	2575.2	3.23	3.23



```

target                : Titan
target radius (km)   : 2575.15
C/A epoch            : 2033-01-21T07:54:32.560
Event type           : Pgt
: Titan occs: geocentric, topocentric
: Not a ringed target
Observer code        : IRTF
Location             : Mauna Kea/IRTF
Latitude (deg)       : 19.82622
E. Longitude (deg)   : 204.52800
Altitude (km)        : 4.168
Gaia source ID       : 3423753280456077184
2Mass ID (if available) : 06050396+2232177
ICRS Star Coord at Epoch: 06h 05m 03.96488s +22:32:17.62869s
RUWE (>1.4 is poor) : 1.08
K magnitude          : 11.551
G magnitude          : 15.369
RP magnitude         : 14.310
BP magnitude         : 16.522
DUPflag             : 0
Distance (au)        : 8.147
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -18.68
Sun-Target sep (deg) : 150.03
Sun-Moon sep (deg)   : 94.51
B (ring opening deg) : -26.50
PA of pole (deg)     : -5.77
Pole direction: RA (deg): 39.48270
Dec (deg): 83.42790
C/A sky separation (") : 0.277
C/A sky separation (km) : 1636.3
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	2033-01-21T07:52:48.507	81.99	-52.36	2575.1	-22.49	-22.50
Titan	E	2033-01-21T07:56:16.592	82.75	-53.17	2575.1	-46.08	-46.09