

target : Titan  
 target radius (km) : 2575.15  
 C/A epoch : 2030-12-04T00:42:14.430  
 Event type : Pgt  
 : Titan occs: geocentric, topocentric  
 : Not a ringed target  
 Gaia source ID : 48515645634144384  
 2Mass ID (if available) : 04113812+1900411

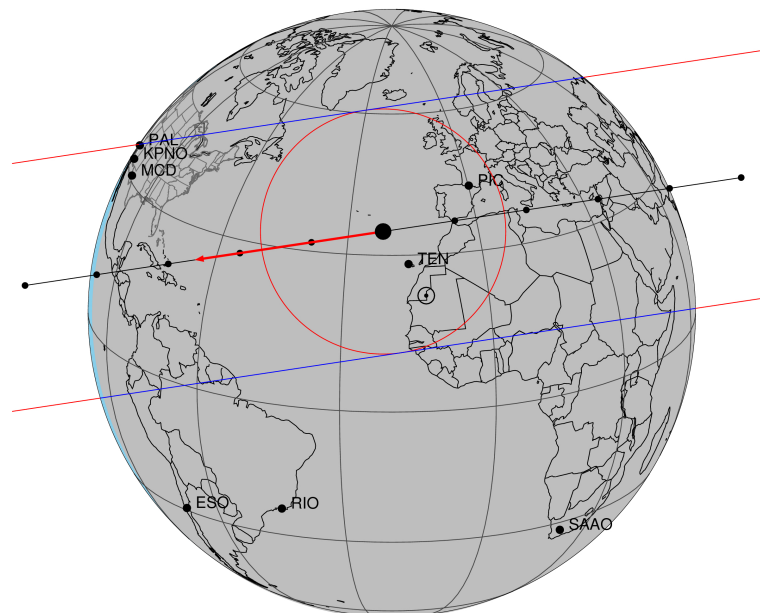
ICRS Star Coord at Epoch: 04h 11m 38.12678s +19:00:40.41809s  
 RUWE (>1.4 is poor) : 1.04  
 K magnitude : 11.384  
 G magnitude : 14.536  
 RP magnitude : 13.567  
 BP magnitude : 15.513  
 DUPflag : 0  
 Distance (au) : 8.081  
 f0 (km) : 0.00  
 g0 (km) : 0.00  
 skyplane vel. (km/s) : -25.34  
 Sun-Target sep (deg) : 172.72  
 Sun-Moon sep (deg) : 58.68  
 B (ring opening deg) : -25.02  
 PA of pole (deg) : -2.88  
 Pole direction: RA (deg): 39.48270  
 Dec (deg): 83.42790  
 C/A sky separation (") : 0.292  
 C/A sky separation (km) : 1708.7  
 NAIF SPICE kernels : RAJobs\_U111+rgf16.spk

URKALLv1.spk  
 naif0012.tls  
 nep097.bsp  
 nep101.bsp  
 sat4401.bsp

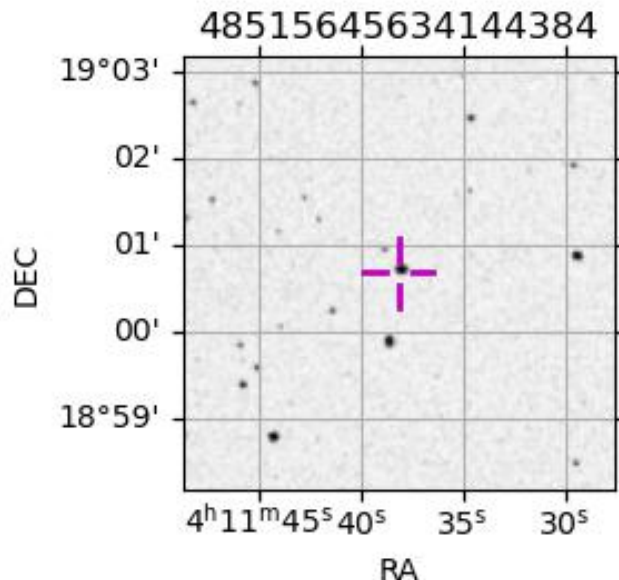
Observable events with sun below -5 deg and altitude above 5 deg

Obs	Location	lat	Elon	Target	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1	+ +	DEC 04 00:39 - DEC 04 00:42	Pie
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	+ +	DEC 04 00:44 - DEC 04 00:46	Pie
MCD	McDonald Obs. 2.7m	30.7	256.0	+ +	DEC 04 00:44 - DEC 04 00:46	Pie
TEN	Teide Obs./Tenerife	28.3	343.5	+ +	DEC 04 00:40 - DEC 04 00:43	Pie
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			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

Titan 2030-12-04T00:42:14 K11.38 G14.54 dots 60.0 sec  
 Pgt



2030-12-04T00:42:14.4300 α: 04 11 38.1268 δ: +19 00 40.418 C/A 0.293" PA 351.41 deg v\_sky -25.34 km/s D 08.08 AU  
 Credit: Styled after SORA/Lucky Star



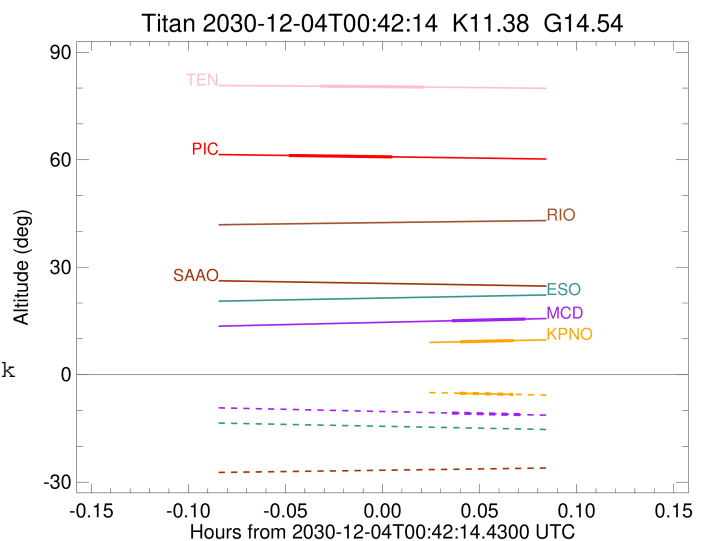
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target                : Titan
target radius (km)   : 2575.15
C/A epoch            : 2030-12-04T00:40:56.970
Event type          : Pgt
: Titan occs: geocentric, topocentric
: Not a ringed target
Observer code       : PIC
Location           : Pic du Midi
Latitude (deg)     : 42.93656
E. Longitude (deg) : 0.14231
Altitude (km)     : 2.890
Gaia source ID     : 48515645634144384
2Mass ID (if available) : 04113812+1900411
ICRS Star Coord at Epoch: 04h 11m 38.12678s +19:00:40.41809s
RUWE (>1.4 is poor) : 1.04
K magnitude        : 11.384
G magnitude        : 14.536
RP magnitude       : 13.567
BP magnitude       : 15.513
DUPflag           : 0
Distance (au)     : 8.081
f0 (km)          : 0.00
g0 (km)          : 0.00
skyplane vel. (km/s) : -25.34
Sun-Target sep (deg) : 172.72
Sun-Moon sep (deg)  : 59.51
B (ring opening deg) : -25.02
PA of pole (deg)   : -2.88
Pole direction: RA (deg): 39.48270
Dec (deg): 83.42790
C/A sky separation (") : 0.116
C/A sky separation (km) : 677.6
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

```

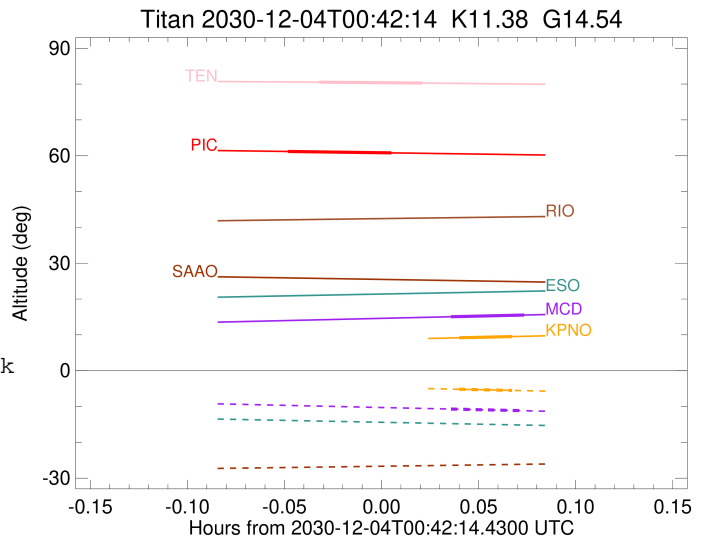
x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Titan	I	2030-12-04T00:39:20.171	61.18	-66.99	2575.2	8.67	8.68
Titan	E	2030-12-04T00:42:33.762	60.79	-66.68	2575.1	18.89	18.90



```

target                : Titan
target radius (km)   : 2575.15
C/A epoch            : 2030-12-04T00:45:27.890
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      : 48515645634144384
2Mass ID (if available) : 04113812+1900411
ICRS Star Coord at Epoch: 04h 11m 38.12678s +19:00:40.41809s
RUWE (>1.4 is poor) : 1.04
K magnitude          : 11.384
G magnitude          : 14.536
RP magnitude         : 13.567
BP magnitude         : 15.513
DUPflag             : 0
Distance (au)       : 8.081
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -25.34
Sun-Target sep (deg) : 172.72
Sun-Moon sep (deg)  : 58.40
B (ring opening deg) : -25.02
PA of pole (deg)    : -2.88
Pole direction: RA (deg): 39.48270
Dec (deg): 83.42790
C/A sky separation (") : 0.383
C/A sky separation (km) : 2244.9
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
    
```



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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 2030-12-04T00:44:38.065 9.18 -5.19 2575.1 48.12 48.14
Titan E 2030-12-04T00:46:17.716 9.52 -5.51 2575.1 55.93 55.94
    
```

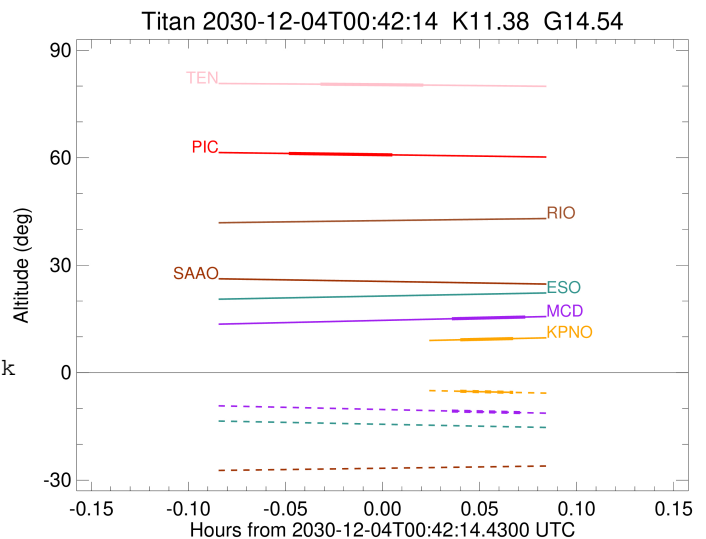
```

target                : Titan
target radius (km)   : 2575.15
C/A epoch             : 2030-12-04T00:45:31.260
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       : 48515645634144384
2Mass ID (if available) : 04113812+1900411
ICRS Star Coord at Epoch: 04h 11m 38.12678s +19:00:40.41809s
RUWE (>1.4 is poor) : 1.04
K magnitude           : 11.384
G magnitude           : 14.536
RP magnitude          : 13.567
BP magnitude          : 15.513
DUPflag              : 0
Distance (au)        : 8.081
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -25.34
Sun-Target sep (deg) : 172.72
Sun-Moon sep (deg)   : 58.48
B (ring opening deg) : -25.02
PA of pole (deg)     : -2.88
Pole direction: RA (deg): 39.48270
Dec (deg): 83.42790
C/A sky separation (") : 0.324
C/A sky separation (km) : 1901.0
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	2030-12-04T00:44:22.791	15.05	-10.72	2575.1	37.48	37.49
Titan	E	2030-12-04T00:46:39.723	15.53	-11.18	2575.1	46.34	46.36



target : Titan  
 target radius (km) : 2575.15  
 C/A epoch : 2030-12-04T00:41:55.120  
 Event type : Pgt  
 : Titan occs: geocentric, topocentric  
 : Not a ringed target  
 Observer code : TEN  
 Location : Teide Obs./Tenerife  
 Latitude (deg) : 28.30050  
 E. Longitude (deg) : 343.48909  
 Altitude (km) : 2.395  
 Gaia source ID : 48515645634144384  
 2Mass ID (if available) : 04113812+1900411  
 ICRS Star Coord at Epoch: 04h 11m 38.12678s +19:00:40.41809s  
 RUWE (>1.4 is poor) : 1.04  
 K magnitude : 11.384  
 G magnitude : 14.536  
 RP magnitude : 13.567  
 BP magnitude : 15.513  
 DUPflag : 0  
 Distance (au) : 8.081  
 f0 (km) : 0.00  
 g0 (km) : 0.00  
 skyplane vel. (km/s) : -25.34  
 Sun-Target sep (deg) : 172.72  
 Sun-Moon sep (deg) : 59.50  
 B (ring opening deg) : -25.02  
 PA of pole (deg) : -2.88  
 Pole direction: RA (deg): 39.48270  
 Dec (deg): 83.42790  
 C/A sky separation (") : 0.130  
 C/A sky separation (km) : 764.5  
 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	2030-12-04T00:40:19.619	80.52	-83.10	2575.1	-20.60	-20.61
Titan	E	2030-12-04T00:43:30.620	80.27	-83.44	2575.2	-10.57	-10.58

