

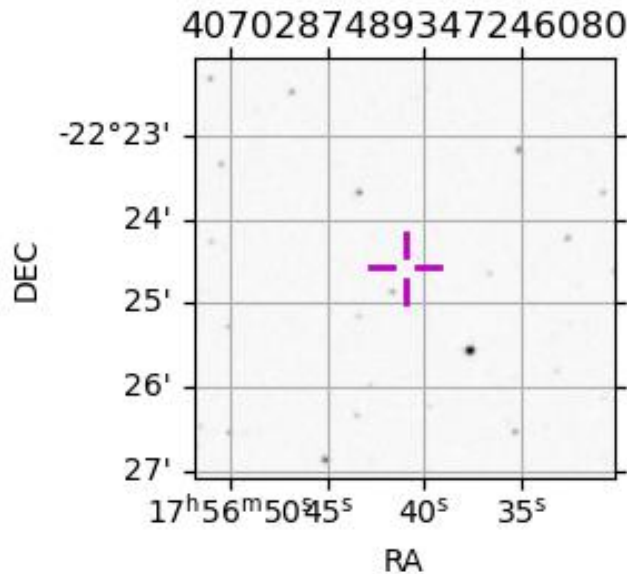
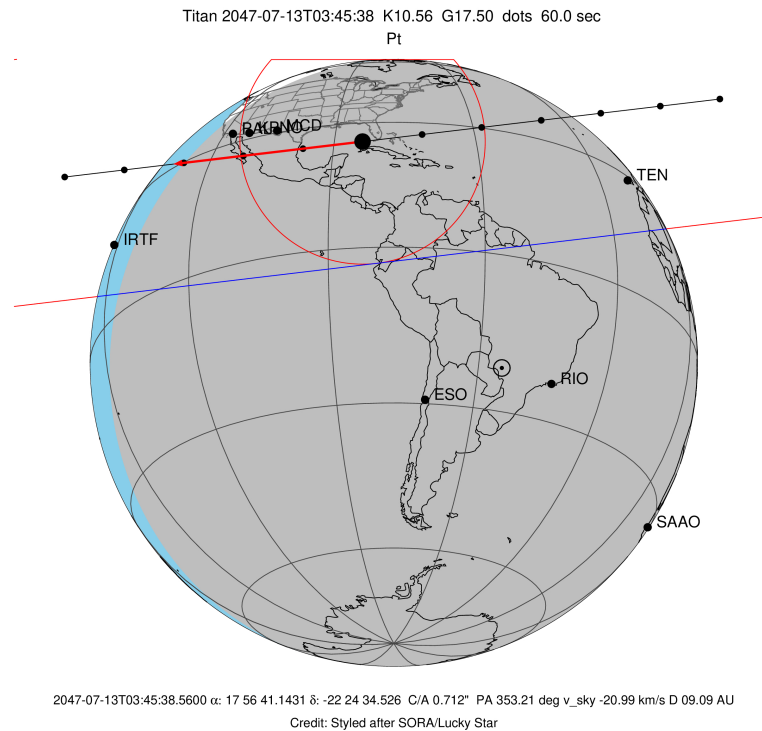
target : Titan  
 target radius (km) : 2575.15  
 C/A epoch : 2047-07-13T03:45:38.560  
 Event type : Pt  
 : Titan occs: topocentric, not geocentric  
 : Not a ringed target  
 Gaia source ID : 4070287489347246080  
 2Mass ID (if available) : 17564114-2224344

ICRS Star Coord at Epoch: 17h 56m 41.14310s -22:24:34.52643s  
 RUWE (>1.4 is poor) : 1.03  
 K magnitude : 10.558  
 G magnitude : 17.503  
 RP magnitude : 15.973  
 BP magnitude : 20.557  
 DUPflag : 0  
 Distance (au) : 9.087  
 f0 (km) : 0.00  
 g0 (km) : 0.00  
 skyplane vel. (km/s) : -20.99  
 Sun-Target sep (deg) : 159.14  
 Sun-Moon sep (deg) : 90.19  
 B (ring opening deg) : 26.56  
 PA of pole (deg) : 5.60  
 Pole direction: RA (deg): 39.48270  
 Dec (deg): 83.42790  
 C/A sky separation (") : 0.710  
 C/A sky separation (km) : 4680.4  
 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	OCode
PIC	Pic du Midi	42.9	0.1			Pnn
PAL	Palomar Mt (200")	33.4	243.1	+ +	JUL 13 03:45 - JUL 13 03:49	Pie
PMO	Purple Mtn Obs. Nanking	32.1	118.8			Pnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+ +	JUL 13 03:45 - JUL 13 03:49	Pie
MCD	McDonald Obs. 2.7m	30.7	256.0	+ +	JUL 13 03:45 - JUL 13 03:49	Pie
TEN	Teide Obs./Tenerife	28.3	343.5	+ +	JUL 13 03:39 - JUL 13 03:43	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



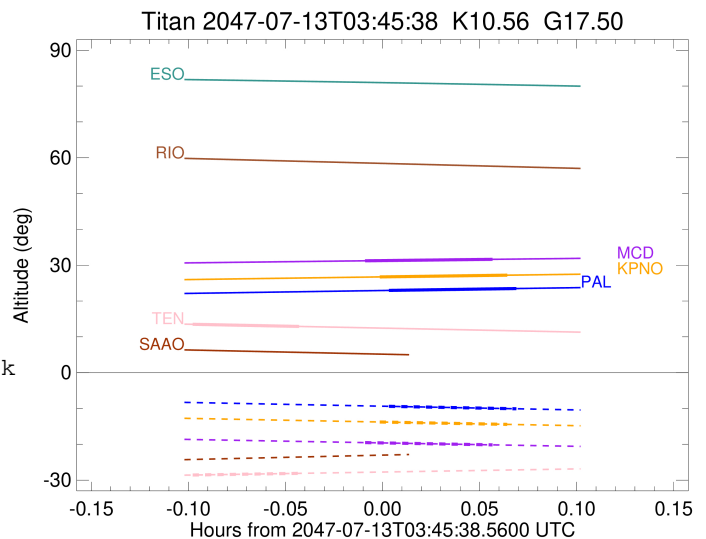
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target                : Titan
target radius (km)   : 2575.15
C/A epoch            : 2047-07-13T03:47:48.310
Event type           : Pt
: Titan occs: topocentric, not geocentric
: Not a ringed target
Observer code        : PAL
Location             : Palomar Mt (200")
Latitude (deg)       : 33.35622
E. Longitude (deg)  : 243.13601
Altitude (km)        : 1.706
Gaia source ID       : 4070287489347246080
2Mass ID (if available) : 17564114-2224344
ICRS Star Coord at Epoch: 17h 56m 41.14310s -22:24:34.52643s
RUWE (>1.4 is poor) : 1.03
K magnitude          : 10.558
G magnitude          : 17.503
RP magnitude         : 15.973
BP magnitude         : 20.557
DUPflag             : 0
Distance (au)        : 9.087
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -20.99
Sun-Target sep (deg) : 159.14
Sun-Moon sep (deg)  : 90.54
B (ring opening deg) : 26.56
PA of pole (deg)    : 5.60
Pole direction: RA (deg): 39.48270
Dec (deg): 83.42790
C/A sky separation ("): 0.077
C/A sky separation (km): 504.4
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

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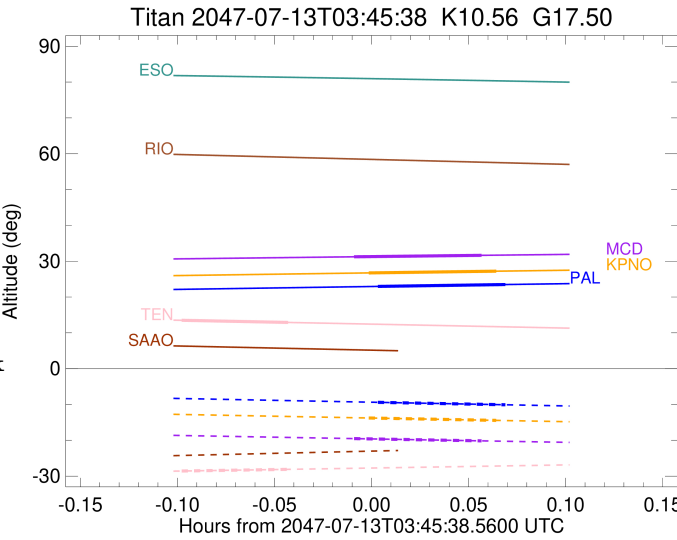
x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Titan	I	2047-07-13T03:45:49.768	22.96	-9.40	2575.2	-1.12	-1.12
Titan	E	2047-07-13T03:49:46.834	23.48	-10.08	2575.1	21.18	21.19



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target                : Titan
target radius (km)   : 2575.15
C/A epoch            : 2047-07-13T03:47:31.990
Event type           : Pt
: Titan occs: topocentric, not geocentric
: 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       : 4070287489347246080
2Mass ID (if available) : 17564114-2224344
ICRS Star Coord at Epoch: 17h 56m 41.14310s -22:24:34.52643s
RUWE (>1.4 is poor) : 1.03
K magnitude           : 10.558
G magnitude           : 17.503
RP magnitude         : 15.973
BP magnitude         : 20.557
DUPflag              : 0
Distance (au)        : 9.087
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -20.99
Sun-Target sep (deg) : 159.14
Sun-Moon sep (deg)   : 90.60
B (ring opening deg) : 26.56
PA of pole (deg)     : 5.60
Pole direction: RA (deg): 39.48270
Dec (deg): 83.42790
C/A sky separation (") : 0.072
C/A sky separation (km) : 477.4
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
    
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x: target alt < 5.0 deg or sun > -5.0 deg

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Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Titan	I	2047-07-13T03:45:33.330	26.73	-13.77	2575.1	-1.63	-1.63
Titan	E	2047-07-13T03:49:30.620	27.21	-14.44	2575.1	20.61	20.62

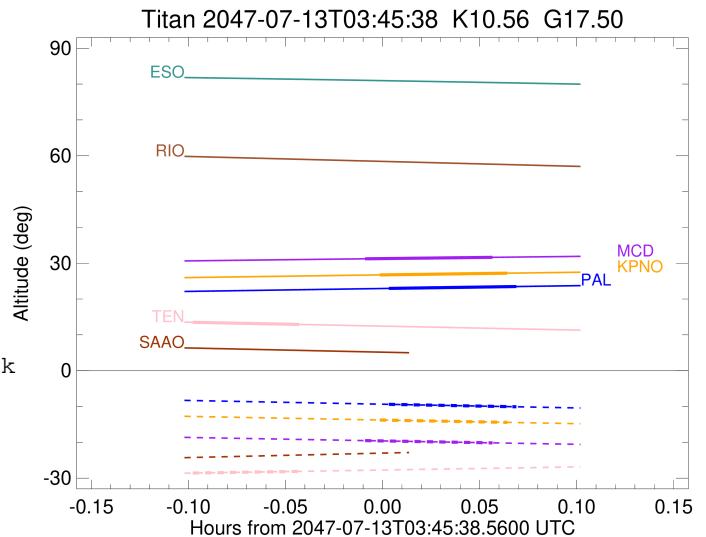
```

target                : Titan
target radius (km)   : 2575.15
C/A epoch            : 2047-07-13T03:47:04.380
Event type           : Pt
: Titan occs: topocentric, not geocentric
: 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       : 4070287489347246080
2Mass ID (if available) : 17564114-2224344
ICRS Star Coord at Epoch: 17h 56m 41.14310s -22:24:34.52643s
RUWE (>1.4 is poor) : 1.03
K magnitude           : 10.558
G magnitude           : 17.503
RP magnitude          : 15.973
BP magnitude          : 20.557
DUPflag              : 0
Distance (au)         : 9.087
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -20.99
Sun-Target sep (deg) : 159.14
Sun-Moon sep (deg)   : 90.66
B (ring opening deg) : 26.56
PA of pole (deg)     : 5.60
Pole direction: RA (deg): 39.48270
Dec (deg): 83.42790
C/A sky separation (") : 0.069
C/A sky separation (km) : 452.2
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	2047-07-13T03:45:05.662	31.22	-19.52	2575.2	-2.10	-2.10
Titan	E	2047-07-13T03:49:03.080	31.63	-20.15	2575.1	20.06	20.07



```

target                : Titan
target radius (km)   : 2575.15
C/A epoch            : 2047-07-13T03:41:25.280
Event type           : Pt
: Titan occs: topocentric, not geocentric
: 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       : 4070287489347246080
2Mass ID (if available) : 17564114-2224344
ICRS Star Coord at Epoch: 17h 56m 41.14310s -22:24:34.52643s
RUWE (>1.4 is poor) : 1.03
K magnitude           : 10.558
G magnitude           : 17.503
RP magnitude          : 15.973
BP magnitude          : 20.557
DUPflag              : 0
Distance (au)         : 9.087
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -20.99
Sun-Target sep (deg) : 159.14
Sun-Moon sep (deg)   : 90.39
B (ring opening deg) : 26.56
PA of pole (deg)     : 5.60
Pole direction: RA (deg): 39.48270
Dec (deg): 83.42790
C/A sky separation (") : 0.221
C/A sky separation (km) : 1457.8
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	2047-07-13T03:39:45.019	13.51	-28.57	2575.1	-40.41	-40.43
Titan	E	2047-07-13T03:43:05.537	12.90	-28.10	2575.1	-20.03	-20.04

