

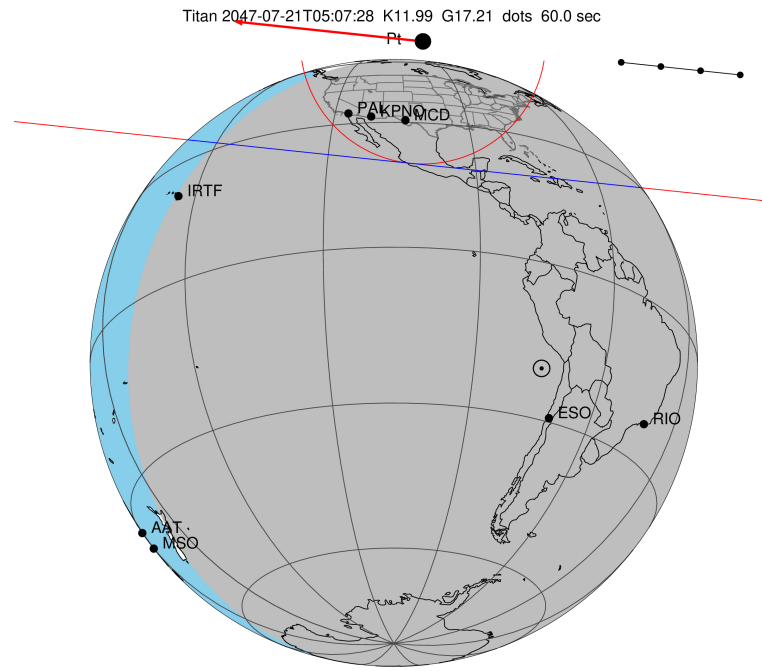
target : Titan  
 target radius (km) : 2575.15  
 C/A epoch : 2047-07-21T05:07:28.780  
 Event type : Pt  
 : Titan occs: topocentric, not geocentric  
 : Not a ringed target  
 Gaia source ID : 4070253645006801792  
 2Mass ID (if available) : 17540568-2223393

ICRS Star Coord at Epoch: 17h 54m 05.66133s -22:23:39.72973s  
 RUWE (>1.4 is poor) : 1.06  
 K magnitude : 11.987  
 G magnitude : 17.205  
 RP magnitude : 15.858  
 BP magnitude : 19.077  
 DUPflag : 0  
 Distance (au) : 9.149  
 f0 (km) : 0.00  
 g0 (km) : 0.00  
 skyplane vel. (km/s) : -13.95  
 Sun-Target sep (deg) : 150.87  
 Sun-Moon sep (deg) : 171.47  
 B (ring opening deg) : 26.61  
 PA of pole (deg) : 5.55  
 Pole direction: RA (deg): 39.48270  
 Dec (deg): 83.42790  
 C/A sky separation (") : 1.023  
 C/A sky separation (km) : 6789.8  
 NAIF SPICE kernels : RAJobs\_U111+rgf16.spk

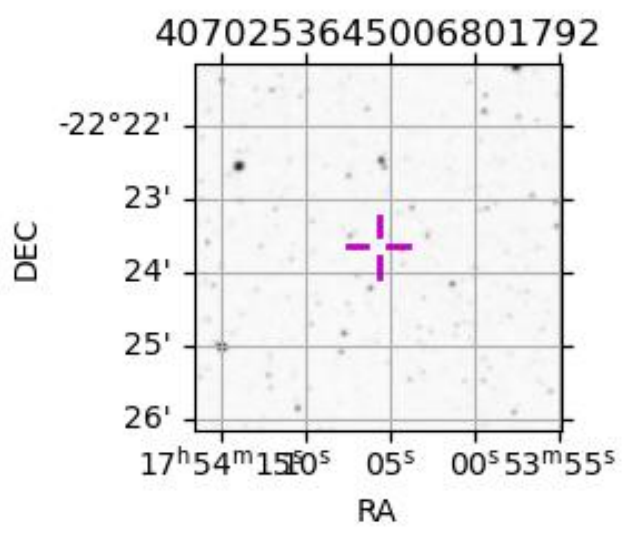
URKALLv1.spk  
 naif0012.tls  
 nep097.bsp  
 nep101.bsp  
 sat4401.bsp

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	+ +	JUL 21 05:06 - JUL 21 05:11	Pie
PMO	Purple Mtn Obs. Nanking	32.1	118.8			Pnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+ +	JUL 21 05:06 - JUL 21 05:10	Pie
MCD	McDonald Obs. 2.7m	30.7	256.0	+ +	JUL 21 05:05 - JUL 21 05:10	Pie
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			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



2047-07-21T05:07:28.7800 α: 17 54 05.6613 δ: -22 23 39.730 C/A 1.022" PA 6.04 deg v\_sky -13.95 km/s D 09.15 AU  
 Credit: Styled after SORA/Lucky Star



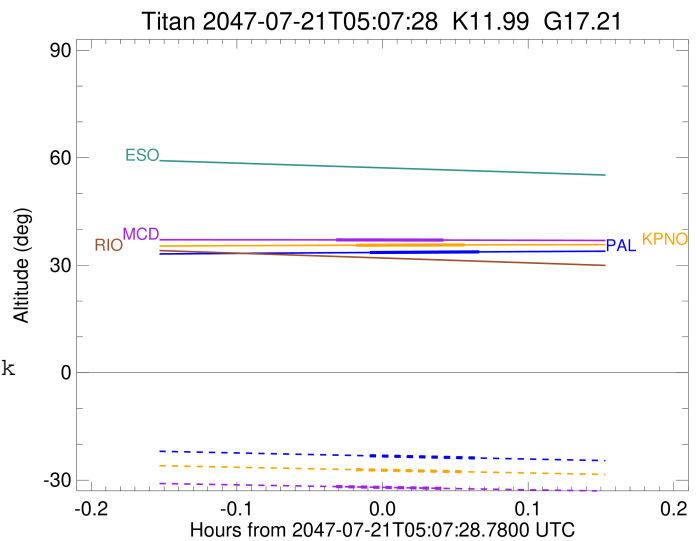
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target                : Titan
target radius (km)   : 2575.15
C/A epoch            : 2047-07-21T05:09:12.070
Event type           : Pt
: Titan occs: topocentric, not geocentric
: Not a ringed target
Observer code        : PAL
Location             : Palomar Mt (200")
Latitude (deg)       : 33.35622
E. Longitude (deg)  : 243.13601
Altitude (km)        : 1.706
Gaia source ID       : 4070253645006801792
2Mass ID (if available) : 17540568-2223393
ICRS Star Coord at Epoch: 17h 54m 05.66133s -22:23:39.72973s
RUWE (>1.4 is poor) : 1.06
K magnitude          : 11.987
G magnitude          : 17.205
RP magnitude         : 15.858
BP magnitude         : 19.077
DUPflag             : 0
Distance (au)        : 9.149
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -13.95
Sun-Target sep (deg) : 150.87
Sun-Moon sep (deg)  : 171.81
B (ring opening deg) : 26.61
PA of pole (deg)    : 5.55
Pole direction: RA (deg): 39.48270
Dec (deg): 83.42790
C/A sky separation ("): 0.253
C/A sky separation (km) : 1680.2
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

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

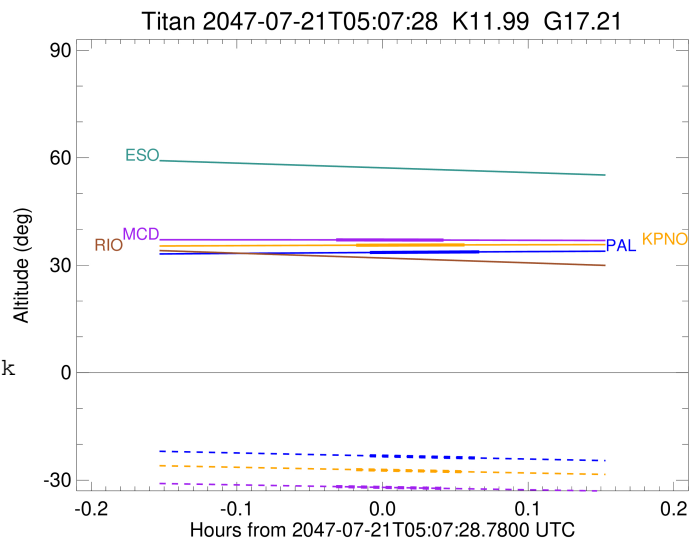
Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Titan	I	2047-07-21T05:06:55.873	33.53	-23.19	2575.1	-35.50	-35.51
Titan	E	2047-07-21T05:11:28.282	33.72	-23.83	2575.1	-35.88	-35.89



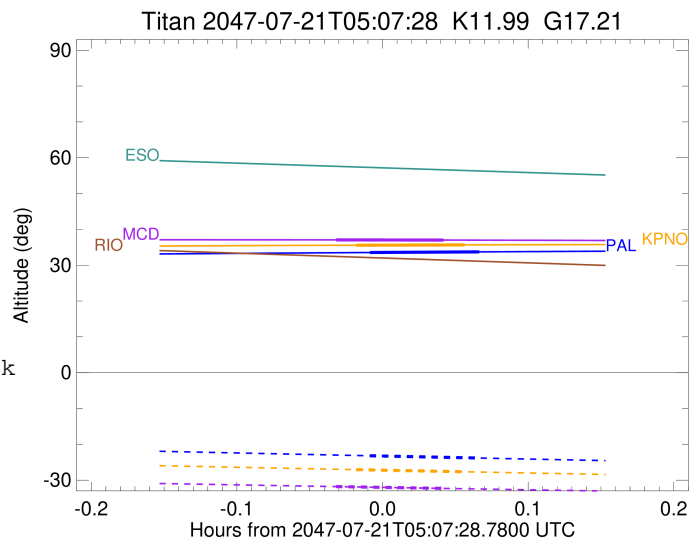
target : Titan  
 target radius (km) : 2575.15  
 C/A epoch : 2047-07-21T05:08:38.260  
 Event type : Pt  
 : Titan occs: topocentric, not geocentric  
 : Not a ringed target  
 Observer code : KPNO  
 Location : Kitt Peak Natl Obs  
 Latitude (deg) : 31.96333  
 E. Longitude (deg) : 248.40000  
 Altitude (km) : 2.120  
 Gaia source ID : 4070253645006801792  
 2Mass ID (if available) : 17540568-2223393  
 ICRS Star Coord at Epoch: 17h 54m 05.66133s -22:23:39.72973s  
 RUWE (>1.4 is poor) : 1.06  
 K magnitude : 11.987  
 G magnitude : 17.205  
 RP magnitude : 15.858  
 BP magnitude : 19.077  
 DUPflag : 0  
 Distance (au) : 9.149  
 f0 (km) : 0.00  
 g0 (km) : 0.00  
 skyplane vel. (km/s) : -13.95  
 Sun-Target sep (deg) : 150.87  
 Sun-Moon sep (deg) : 171.75  
 B (ring opening deg) : 26.61  
 PA of pole (deg) : 5.55  
 Pole direction: RA (deg): 39.48270  
 Dec (deg): 83.42790  
 C/A sky separation (") : 0.256  
 C/A sky separation (km) : 1698.3  
 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	2047-07-21T05:06:23.297	35.57	-27.07	2575.1	-35.91	-35.92
Titan	E	2047-07-21T05:10:53.261	35.66	-27.66	2575.1	-36.37	-36.38



target : Titan  
 target radius (km) : 2575.15  
 C/A epoch : 2047-07-21T05:07:47.640  
 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 : 4070253645006801792  
 2Mass ID (if available) : 17540568-2223393  
 ICRS Star Coord at Epoch: 17h 54m 05.66133s -22:23:39.72973s  
 RUWE (>1.4 is poor) : 1.06  
 K magnitude : 11.987  
 G magnitude : 17.205  
 RP magnitude : 15.858  
 BP magnitude : 19.077  
 DUPflag : 0  
 Distance (au) : 9.149  
 f0 (km) : 0.00  
 g0 (km) : 0.00  
 skyplane vel. (km/s) : -13.95  
 Sun-Target sep (deg) : 150.87  
 Sun-Moon sep (deg) : 171.65  
 B (ring opening deg) : 26.61  
 PA of pole (deg) : 5.55  
 Pole direction: RA (deg): 39.48270  
 Dec (deg): 83.42790  
 C/A sky separation (") : 0.257  
 C/A sky separation (km) : 1707.9  
 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



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	2047-07-21T05:05:33.352	37.06	-31.80	2575.1	-36.08	-36.09
Titan	E	2047-07-21T05:10:01.969	37.01	-32.31	2575.1	-36.66	-36.68