

target : Titan  
 target radius (km) : 2575.15  
 C/A epoch : 2031-11-10T10:16:24.710  
 Event type : Pgt  
 : Titan occs: geocentric, topocentric  
 : Not a ringed target  
 Gaia source ID : 3414437908705633920  
 2Mass ID (if available) : 05225894+2132359

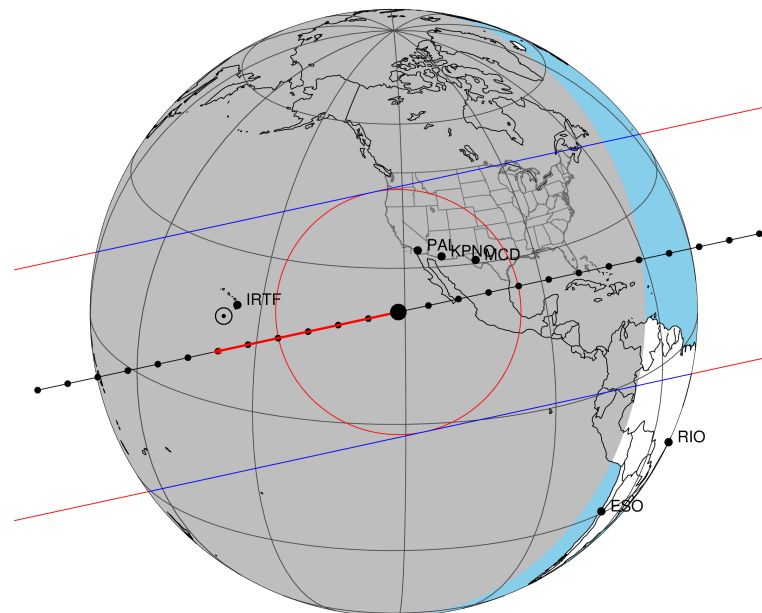
ICRS Star Coord at Epoch: 05h 22m 58.94963s +21:32:35.80429s  
 RUWE (>1.4 is poor) : 0.96  
 K magnitude : 14.755  
 G magnitude : 17.984  
 RP magnitude : 17.030  
 BP magnitude : 18.885  
 DUPflag : 0  
 Distance (au) : 8.198  
 f0 (km) : 0.00  
 g0 (km) : 0.00  
 skyplane vel. (km/s) : -10.77  
 Sun-Target sep (deg) : 145.94  
 Sun-Moon sep (deg) : 90.91  
 B (ring opening deg) : -26.41  
 PA of pole (deg) : -4.83  
 Pole direction: RA (deg): 39.48270  
 Dec (deg): 83.42790  
 C/A sky separation (") : 0.001  
 C/A sky separation (km) : 3.4  
 NAIF SPICE kernels : RAJobs\_U111+rgf16.spk

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

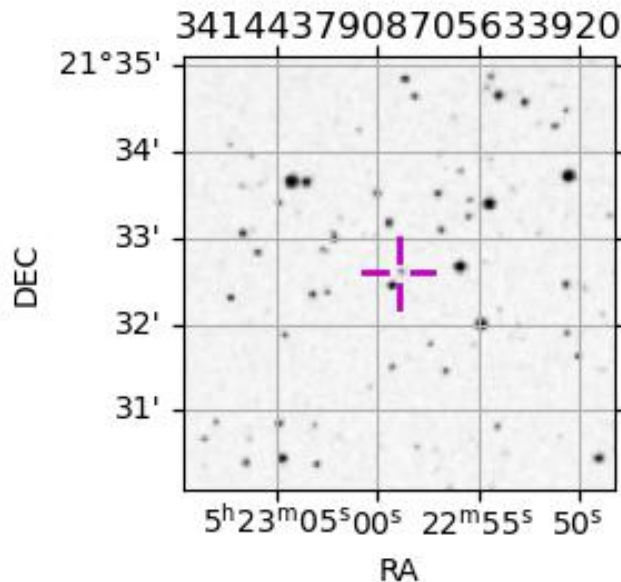
Observable events with sun below -5 deg and altitude above 5 deg

Obs	Location	lat	Elon	Target	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1			Pnn
PAL	Palomar Mt (200")	33.4	243.1	+ +	NOV 10 10:11 - NOV 10 10:18	Pie
PMO	Purple Mtn Obs. Nanking	32.1	118.8			Pnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+ +	NOV 10 10:11 - NOV 10 10:18	Pie
MCD	McDonald Obs. 2.7m	30.7	256.0	+ +	NOV 10 10:09 - NOV 10 10:17	Pie
TEN	Teide Obs./Tenerife	28.3	343.5			Pnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+ +	NOV 10 10:17 - NOV 10 10:24	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

Titan 2031-11-10T10:16:24 K14.76 G17.98 dots 60.0 sec  
 Pgt



2031-11-10T10:16:24.7100 α: 05 22 58.9496 δ: +21 32 35.804 C/A 0.001" PA 164.00 deg v\_sky -10.77 km/s D 08.20 AU  
 Credit: Styled after SORA/Lucky Star



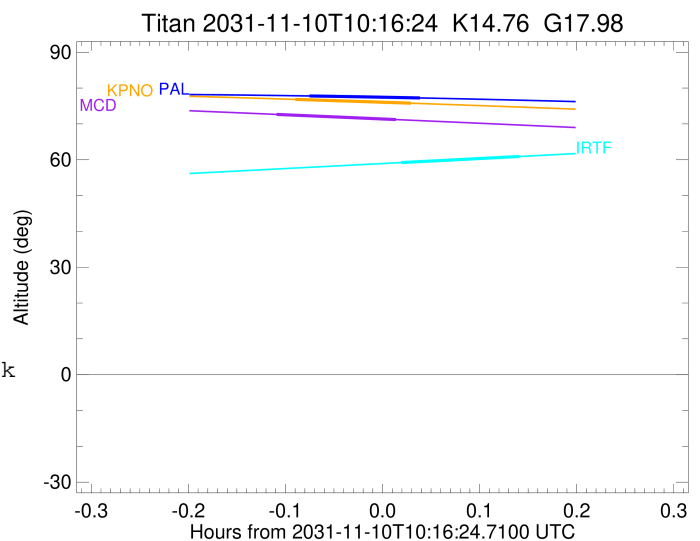
```

target                : Titan
target radius (km)   : 2575.15
C/A epoch            : 2031-11-10T10:15:17.120
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       : 3414437908705633920
2Mass ID (if available) : 05225894+2132359
ICRS Star Coord at Epoch: 05h 22m 58.94963s +21:32:35.80429s
RUWE (>1.4 is poor) : 0.96
K magnitude           : 14.755
G magnitude           : 17.984
RP magnitude          : 17.030
BP magnitude          : 18.885
DUPflag              : 0
Distance (au)         : 8.198
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -10.77
Sun-Target sep (deg) : 145.94
Sun-Moon sep (deg)   : 91.82
B (ring opening deg) : -26.41
PA of pole (deg)     : -4.83
Pole direction: RA (deg): 39.48270
Dec (deg): 83.42790
C/A sky separation ("): 0.195
C/A sky separation (km): 1159.4
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

```

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	2031-11-10T10:11:50.936	77.79	-50.60	2575.1	17.57	17.58
Titan	E	2031-11-10T10:18:43.364	77.24	-49.20	2575.1	29.90	29.91



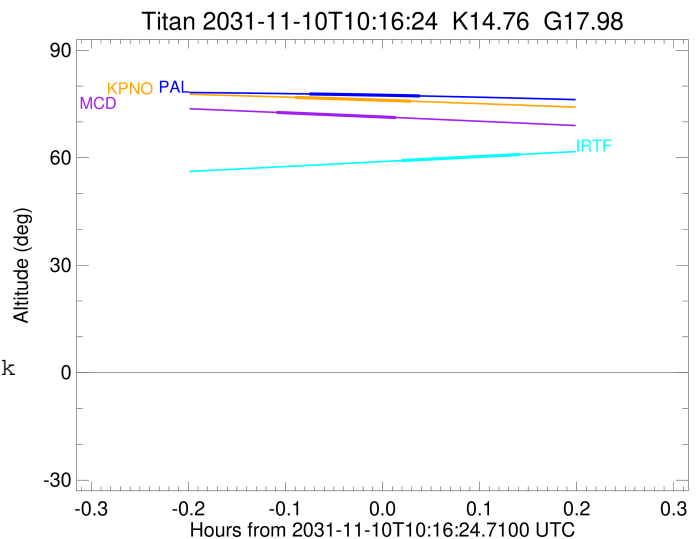
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target                : Titan
target radius (km)   : 2575.15
C/A epoch            : 2031-11-10T10:14:35.390
Event type          : Pgt
: Titan occs: geocentric, topocentric
: Not a ringed target
Observer code       : KPNO
Location            : Kitt Peak Natl Obs
Latitude (deg)      : 31.96333
E. Longitude (deg)  : 248.40000
Altitude (km)       : 2.120
Gaia source ID      : 3414437908705633920
2Mass ID (if available) : 05225894+2132359
ICRS Star Coord at Epoch: 05h 22m 58.94963s +21:32:35.80429s
RUWE (>1.4 is poor) : 0.96
K magnitude         : 14.755
G magnitude         : 17.984
RP magnitude        : 17.030
BP magnitude        : 18.885
DUPflag            : 0
Distance (au)       : 8.198
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -10.77
Sun-Target sep (deg) : 145.94
Sun-Moon sep (deg)  : 91.81
B (ring opening deg) : -26.41
PA of pole (deg)    : -4.83
Pole direction: RA (deg): 39.48270
Dec (deg): 83.42790
C/A sky separation (") : 0.157
C/A sky separation (km) : 933.1
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	2031-11-10T10:11:00.273	76.83	-46.69	2575.1	12.62	12.63
Titan	E	2031-11-10T10:18:10.586	75.77	-45.19	2575.1	25.19	25.20



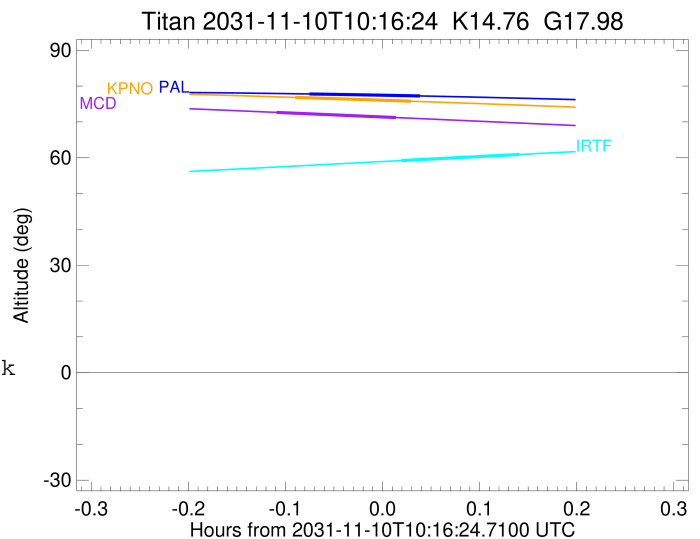
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target                : Titan
target radius (km)   : 2575.15
C/A epoch             : 2031-11-10T10:13:33.680
Event type            : Pgt
: Titan occs: geocentric, topocentric
: Not a ringed target
Observer code         : MCD
Location              : McDonald Obs. 2.7m
Latitude (deg)        : 30.67158
E. Longitude (deg)    : 255.97844
Altitude (km)         : 2.075
Gaia source ID        : 3414437908705633920
2Mass ID (if available) : 05225894+2132359
ICRS Star Coord at Epoch: 05h 22m 58.94963s +21:32:35.80429s
RUWE (>1.4 is poor) : 0.96
K magnitude           : 14.755
G magnitude           : 17.984
RP magnitude          : 17.030
BP magnitude          : 18.885
DUPflag              : 0
Distance (au)         : 8.198
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -10.77
Sun-Target sep (deg)  : 145.94
Sun-Moon sep (deg)    : 91.80
B (ring opening deg) : -26.41
PA of pole (deg)      : -4.83
Pole direction: RA (deg): 39.48270
Dec (deg): 83.42790
C/A sky separation (") : 0.120
C/A sky separation (km) : 710.9
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	2031-11-10T10:09:51.813	72.64	-40.62	2575.1	7.87	7.88
Titan	E	2031-11-10T10:17:15.644	71.20	-39.03	2575.1	20.71	20.72



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target                : Titan
target radius (km)   : 2575.15
C/A epoch            : 2031-11-10T10:21:12.470
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       : 3414437908705633920
2Mass ID (if available) : 05225894+2132359
ICRS Star Coord at Epoch: 05h 22m 58.94963s +21:32:35.80429s
RUWE (>1.4 is poor) : 0.96
K magnitude          : 14.755
G magnitude          : 17.984
RP magnitude         : 17.030
BP magnitude         : 18.885
DUPflag             : 0
Distance (au)        : 8.198
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -10.77
Sun-Target sep (deg) : 145.94
Sun-Moon sep (deg)   : 91.69
B (ring opening deg) : -26.41
PA of pole (deg)     : -4.83
Pole direction: RA (deg): 39.48270
Dec (deg): 83.42790
C/A sky separation (") : 0.132
C/A sky separation (km) : 786.1
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	2031-11-10T10:17:31.743	59.19	-86.21	2575.2	10.02	10.03
Titan	E	2031-11-10T10:24:53.175	60.90	-84.79	2575.1	21.66	21.67

