

target : Titan  
 target radius (km) : 2575.15  
 C/A epoch : 2033-01-07T12:48:39.420  
 Event type : Pgt  
 : Titan occs: geocentric, topocentric  
 : Not a ringed target  
 Gaia source ID : 3425063662094576640  
 2Mass ID (if available) : 06091495+2230116

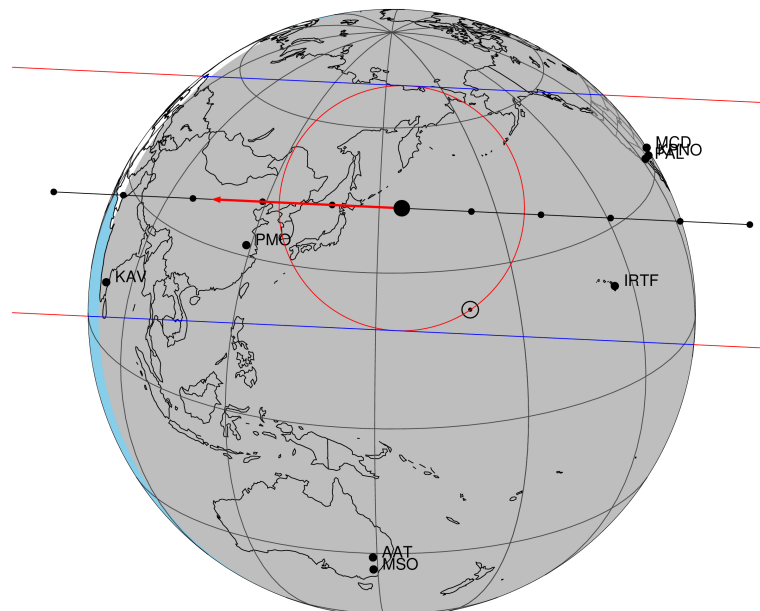
ICRS Star Coord at Epoch: 06h 09m 14.95718s +22:30:11.38583s  
 RUWE (>1.4 is poor) : 1.02  
 K magnitude : 14.141  
 G magnitude : 16.308  
 RP magnitude : 15.609  
 BP magnitude : 16.846  
 DUPflag : 0  
 Distance (au) : 8.055  
 f0 (km) : 0.00  
 g0 (km) : 0.00  
 skyplane vel. (km/s) : -24.38  
 Sun-Target sep (deg) : 165.03  
 Sun-Moon sep (deg) : 83.07  
 B (ring opening deg) : -26.37  
 PA of pole (deg) : -5.84  
 Pole direction: RA (deg): 39.48270  
 Dec (deg): 83.42790  
 C/A sky separation (") : 0.376  
 C/A sky separation (km) : 2194.7  
 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			Pnn
PAL	Palomar Mt (200")	33.4	243.1	+ +	JAN 07 12:43 - JAN 07 12:46	Pie
PMO	Purple Mtn Obs. Nanking	32.1	118.8	+ +	JAN 07 12:49 - JAN 07 12:52	Pie
KPNO	Kitt Peak Natl Obs	32.0	248.4	+ +	JAN 07 12:43 - JAN 07 12:46	Pie
MCD	McDonald Obs. 2.7m	30.7	256.0			Pnn
TEN	Teide Obs./Tenerife	28.3	343.5			Pnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+ +	JAN 07 12:44 - JAN 07 12:46	Pie
KAV	Kavalur Observatory	12.6	78.8		JAN 07 12:53 - JAN 07 12:53	Pne
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

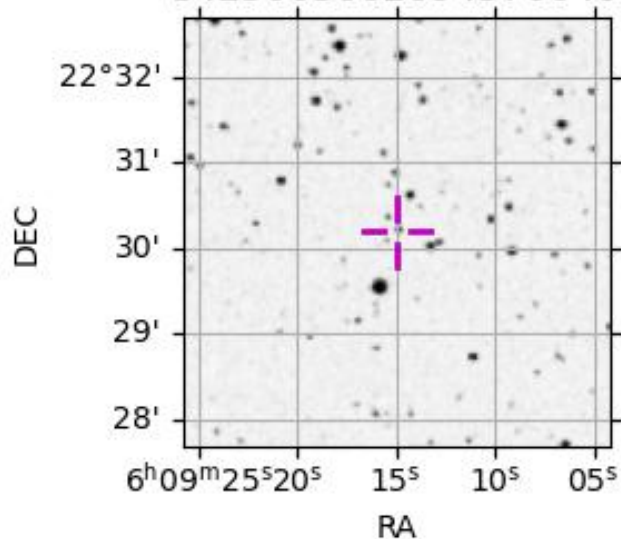
Titan 2033-01-07T12:48:39 K14.14 G16.31 dots 60.0 sec  
 Pgt



2033-01-07T12:48:39.4200 α: 06 09 14.9572 δ: +22 30 11.386 C/A 0.377" PA 2.67 deg v\_sky -24.39 km/s D 08.05 AU

Credit: Styled after SORA/Lucky Star

3425063662094576640



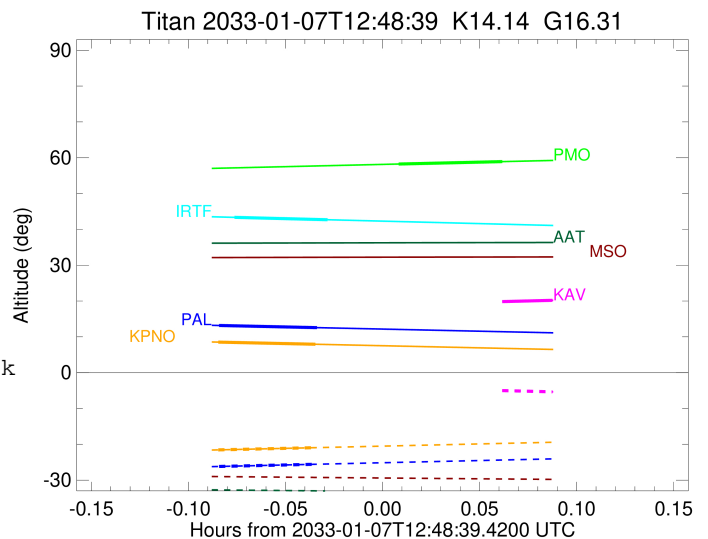
```

target                : Titan
target radius (km)   : 2575.15
C/A epoch            : 2033-01-07T12:45:07.260
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       : 3425063662094576640
2Mass ID (if available) : 06091495+2230116
ICRS Star Coord at Epoch: 06h 09m 14.95718s +22:30:11.38583s
RUWE (>1.4 is poor) : 1.02
K magnitude          : 14.141
G magnitude          : 16.308
RP magnitude         : 15.609
BP magnitude         : 16.846
DUPflag             : 0
Distance (au)        : 8.055
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -24.38
Sun-Target sep (deg) : 165.03
Sun-Moon sep (deg)   : 83.37
B (ring opening deg) : -26.37
PA of pole (deg)     : -5.84
Pole direction: RA (deg): 39.48270
Dec (deg): 83.42790
C/A sky separation ("): 0.215
C/A sky separation (km): 1258.1
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	2033-01-07T12:43:35.121	13.17	-26.18	2575.1	33.00	33.01
Titan	E	2033-01-07T12:46:39.414	12.56	-25.55	2575.1	18.78	18.79



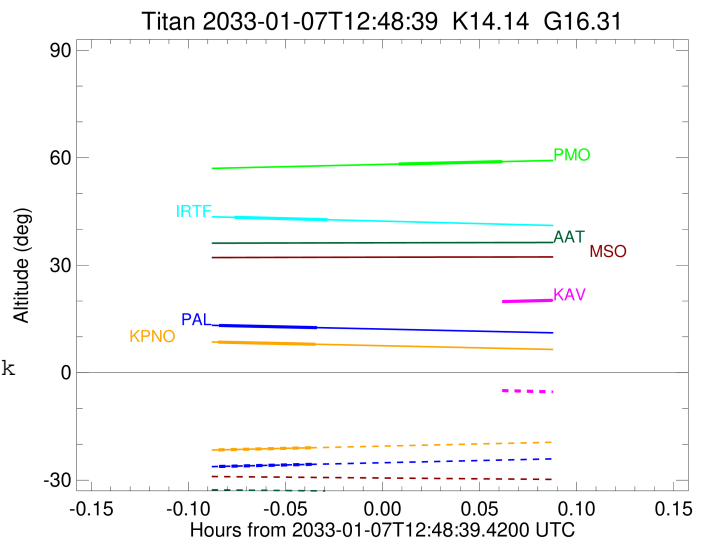
```

target                : Titan
target radius (km)   : 2575.15
C/A epoch             : 2033-01-07T12:50:45.750
Event type            : Pgt
: Titan occs: geocentric, topocentric
: Not a ringed target
Observer code         : PMO
Location              : Purple Mtn Obs. Nanking
Latitude (deg)        : 32.06667
E. Longitude (deg)    : 118.82089
Altitude (km)         : 0.364
Gaia source ID        : 3425063662094576640
2Mass ID (if available) : 06091495+2230116
ICRS Star Coord at Epoch: 06h 09m 14.95718s +22:30:11.38583s
RUWE (>1.4 is poor)  : 1.02
K magnitude           : 14.141
G magnitude           : 16.308
RP magnitude          : 15.609
BP magnitude          : 16.846
DUPflag              : 0
Distance (au)         : 8.055
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s)  : -24.38
Sun-Target sep (deg)  : 165.03
Sun-Moon sep (deg)    : 83.85
B (ring opening deg)  : -26.37
PA of pole (deg)      : -5.84
Pole direction: RA (deg): 39.48270
Dec (deg): 83.42790
C/A sky separation (") : 0.164
C/A sky separation (km) : 956.0
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

```

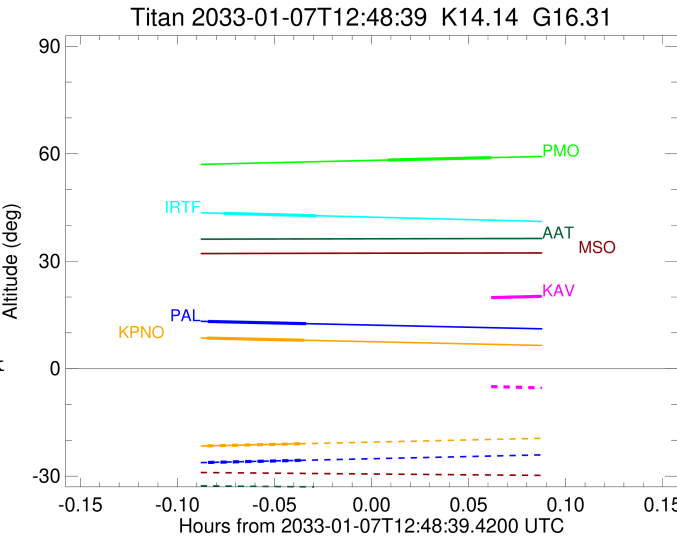
x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Titan	I	2033-01-07T12:49:09.012	58.23	-44.44	2575.1	-11.72	-11.72
Titan	E	2033-01-07T12:52:22.487	58.91	-45.13	2575.1	-27.03	-27.04



```

target                : Titan
target radius (km)   : 2575.15
C/A epoch             : 2033-01-07T12:45:04.540
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       : 3425063662094576640
2Mass ID (if available) : 06091495+2230116
ICRS Star Coord at Epoch: 06h 09m 14.95718s +22:30:11.38583s
RUWE (>1.4 is poor) : 1.02
K magnitude           : 14.141
G magnitude           : 16.308
RP magnitude          : 15.609
BP magnitude          : 16.846
DUPflag              : 0
Distance (au)        : 8.055
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -24.38
Sun-Target sep (deg) : 165.03
Sun-Moon sep (deg)   : 83.29
B (ring opening deg) : -26.37
PA of pole (deg)     : -5.84
Pole direction: RA (deg): 39.48270
Dec (deg): 83.42790
C/A sky separation ("): 0.228
C/A sky separation (km): 1330.8
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
    
```



```

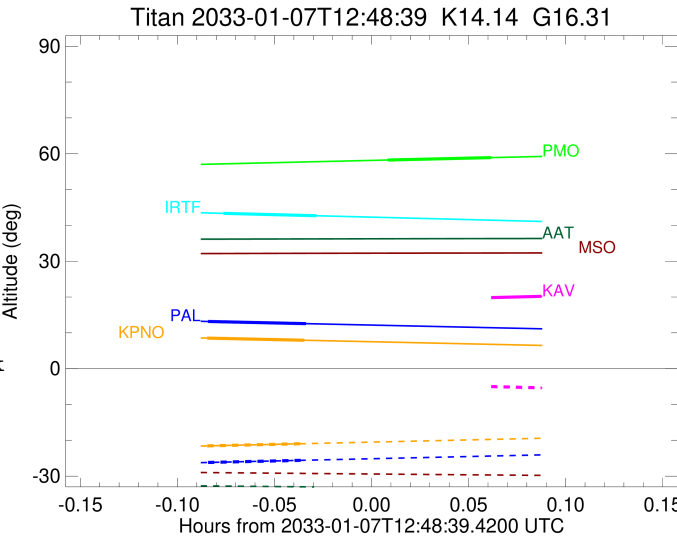
x: target alt < 5.0 deg or sun > -5.0 deg

```

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Titan	I	2033-01-07T12:43:33.999	8.53	-21.56	2575.1	34.58	34.60
Titan	E	2033-01-07T12:46:35.089	7.93	-20.93	2575.1	20.43	20.44

```

target                : Titan
target radius (km)   : 2575.15
C/A epoch            : 2033-01-07T12:45:31.020
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      : 3425063662094576640
2Mass ID (if available) : 06091495+2230116
ICRS Star Coord at Epoch: 06h 09m 14.95718s +22:30:11.38583s
RUWE (>1.4 is poor) : 1.02
K magnitude          : 14.141
G magnitude          : 16.308
RP magnitude         : 15.609
BP magnitude         : 16.846
DUPflag             : 0
Distance (au)       : 8.055
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -24.38
Sun-Target sep (deg) : 165.03
Sun-Moon sep (deg)  : 83.81
B (ring opening deg) : -26.37
PA of pole (deg)    : -5.84
Pole direction: RA (deg): 39.48270
Dec (deg): 83.42790
C/A sky separation (" ) : 0.246
C/A sky separation (km) : 1435.6
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
    
```

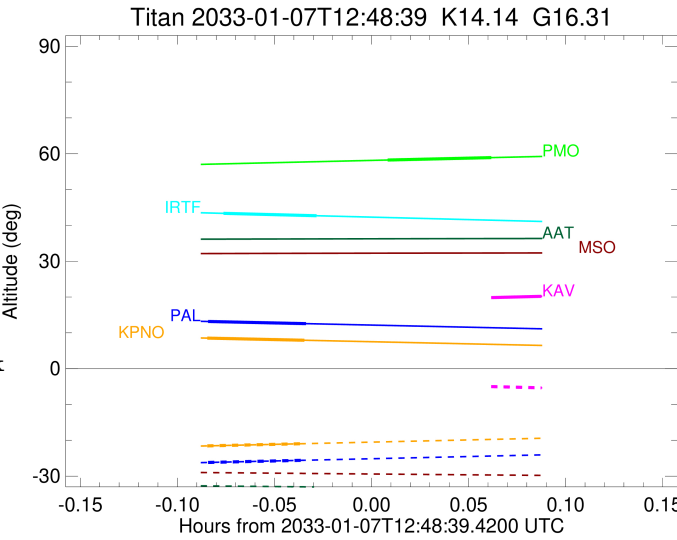


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Titan	I	2033-01-07T12:44:04.318	43.35	-58.27	2575.1	-22.84	-22.85
Titan	E	2033-01-07T12:46:57.733	42.69	-57.60	2575.1	-36.91	-36.92

```

target                : Titan
target radius (km)   : 2575.15
C/A epoch             : 2033-01-07T12:52:44.510
Event type            : Pgt
: Titan occs: geocentric, topocentric
: Not a ringed target
Observer code         : KAV
Location              : Kavalur Observatory
Latitude (deg)        : 12.57556
E. Longitude (deg)    : 78.83167
Altitude (km)         : 0.722
Gaia source ID        : 3425063662094576640
2Mass ID (if available) : 06091495+2230116
ICRS Star Coord at Epoch: 06h 09m 14.95718s +22:30:11.38583s
RUWE (>1.4 is poor)  : 1.02
K magnitude           : 14.141
G magnitude           : 16.308
RP magnitude          : 15.609
BP magnitude          : 16.846
DUPflag              : 0
Distance (au)         : 8.055
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -24.38
Sun-Target sep (deg) : 165.03
Sun-Moon sep (deg)   : 83.28
B (ring opening deg) : -26.37
PA of pole (deg)     : -5.84
Pole direction: RA (deg): 39.48270
Dec (deg): 83.42790
C/A sky separation (") : 0.326
C/A sky separation (km) : 1902.6
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	2033-01-07T12:51:33.751	19.65	-4.82x	2575.1	-34.09	-34.11
Titan	E	2033-01-07T12:53:55.267	20.19	-5.36	2575.1	-48.37	-48.38