

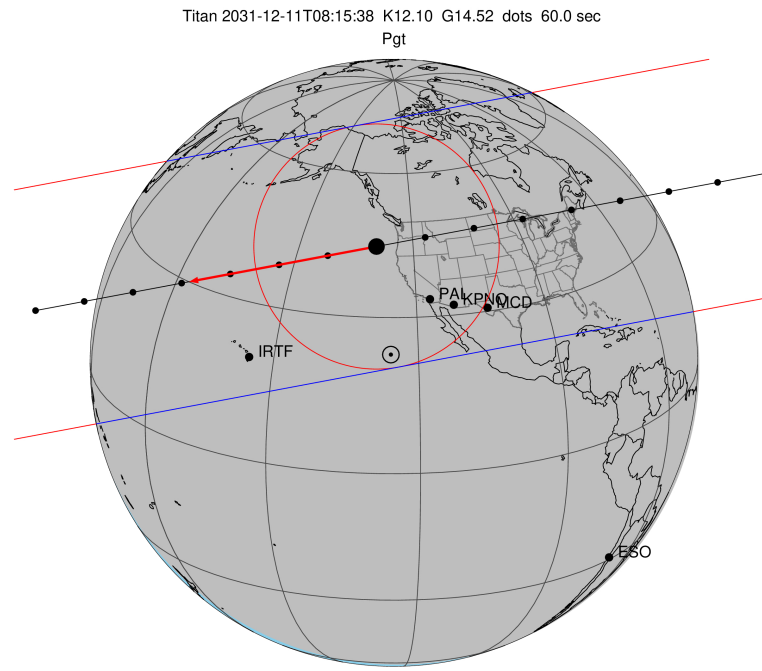
target : Titan  
 target radius (km) : 2575.15  
 C/A epoch : 2031-12-11T08:15:38.170  
 Event type : Pgt  
 : Titan occs: geocentric, topocentric  
 : Not a ringed target  
 Gaia source ID : 3414242371731554304  
 2Mass ID (if available) : 05125861+2123527

ICRS Star Coord at Epoch: 05h 12m 58.64159s +21:23:52.08454s  
 RUWE (>1.4 is poor) : 0.98  
 K magnitude : 12.104  
 G magnitude : 14.525  
 RP magnitude : 13.745  
 BP magnitude : 15.164  
 DUPflag : 0  
 Distance (au) : 8.047  
 f0 (km) : 0.00  
 g0 (km) : 0.00  
 skyplane vel. (km/s) : -17.35  
 Sun-Target sep (deg) : 178.35  
 Sun-Moon sep (deg) : 139.18  
 B (ring opening deg) : -26.46  
 PA of pole (deg) : -4.59  
 Pole direction: RA (deg): 39.48270  
 Dec (deg): 83.42790  
 C/A sky separation (") : 0.424  
 C/A sky separation (km) : 2472.5  
 NAIF SPICE kernels : RAJobs\_U111+rgf16.spk

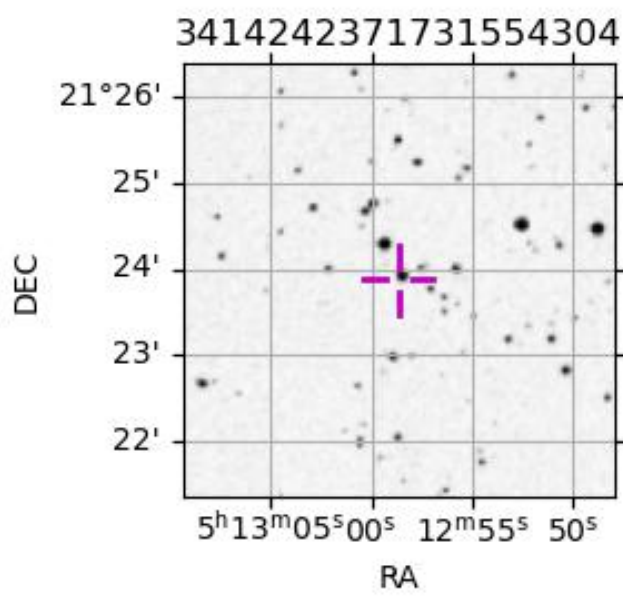
URKALLv1.spk  
 naif0012.tls  
 nep097.bsp  
 nep101.bsp  
 sat4401.bsp

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	+ +	DEC 11 08:12 - DEC 11 08:16	Pie
PMO	Purple Mtn Obs. Nanking	32.1	118.8			Pnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+ +	DEC 11 08:12 - DEC 11 08:16	Pie
MCD	McDonald Obs. 2.7m	30.7	256.0	+ +	DEC 11 08:11 - DEC 11 08:15	Pie
TEN	Teide Obs./Tenerife	28.3	343.5			Pnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+ +	DEC 11 08:16 - DEC 11 08:20	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 2031-12-11T08:15:38 K12.10 G14.52 dots 60.0 sec  
 2031-12-11T08:15:38.1700 α: 05 12 58.6416 δ: +21 23 52.085 C/A 0.423" PA 349.36 deg v\_sky -17.35 km/s D 08.05 AU  
 Credit: Styled after SORA/Lucky Star



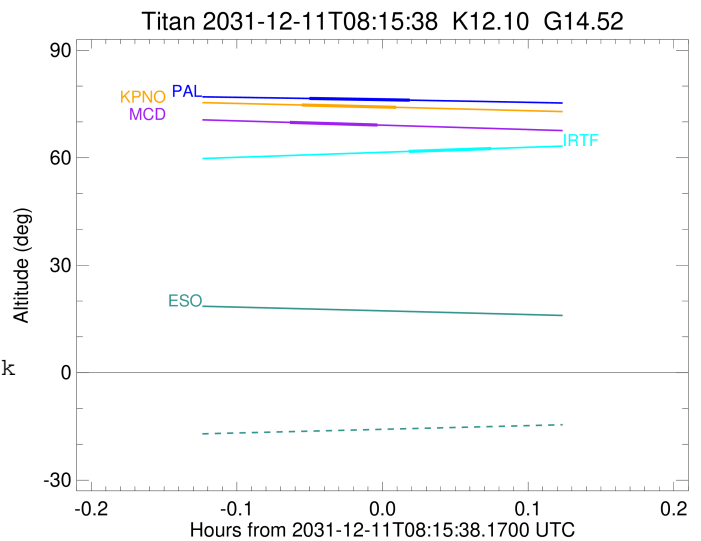
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target                : Titan
target radius (km)   : 2575.15
C/A epoch             : 2031-12-11T08:14:42.370
Event type            : Pgt
: Titan occs: geocentric, topocentric
: Not a ringed target
Observer code         : PAL
Location              : Palomar Mt (200")
Latitude (deg)        : 33.35622
E. Longitude (deg)   : 243.13601
Altitude (km)         : 1.706
Gaia source ID        : 3414242371731554304
2Mass ID (if available) : 05125861+2123527
ICRS Star Coord at Epoch: 05h 12m 58.64159s +21:23:52.08454s
RUWE (>1.4 is poor) : 0.98
K magnitude           : 12.104
G magnitude           : 14.525
RP magnitude          : 13.745
BP magnitude          : 15.164
DUPflag              : 0
Distance (au)         : 8.047
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -17.35
Sun-Target sep (deg) : 178.35
Sun-Moon sep (deg)   : 139.88
B (ring opening deg) : -26.46
PA of pole (deg)     : -4.59
Pole direction: RA (deg): 39.48270
Dec (deg): 83.42790
C/A sky separation ("): 0.225
C/A sky separation (km): 1312.0
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	2031-12-11T08:12:37.407	76.54	-77.59	2575.1	-32.20	-32.21
Titan	E	2031-12-11T08:16:47.357	76.06	-77.05	2575.1	-21.99	-22.00



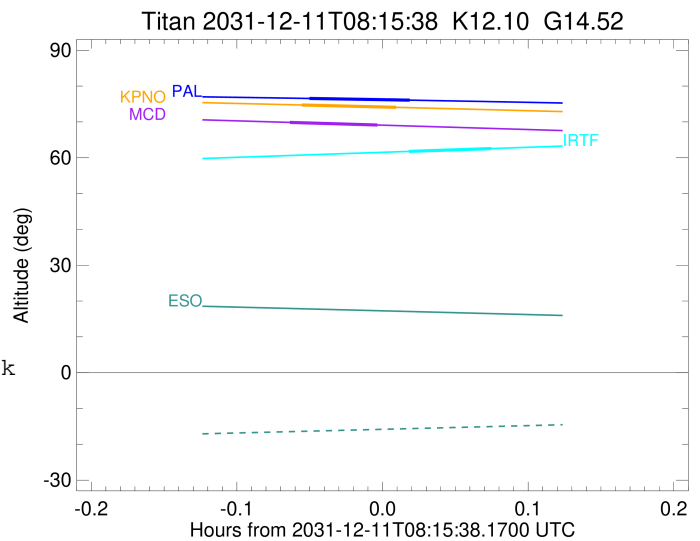
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target                : Titan
target radius (km)   : 2575.15
C/A epoch             : 2031-12-11T08:14:15.840
Event type           : Pgt
: Titan occs: geocentric, topocentric
: Not a ringed target
Observer code        : KPNO
Location             : Kitt Peak Natl Obs
Latitude (deg)       : 31.96333
E. Longitude (deg)   : 248.40000
Altitude (km)        : 2.120
Gaia source ID       : 3414242371731554304
2Mass ID (if available) : 05125861+2123527
ICRS Star Coord at Epoch: 05h 12m 58.64159s +21:23:52.08454s
RUWE (>1.4 is poor) : 0.98
K magnitude           : 12.104
G magnitude           : 14.525
RP magnitude         : 13.745
BP magnitude         : 15.164
DUPflag              : 0
Distance (au)        : 8.047
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -17.35
Sun-Target sep (deg) : 178.35
Sun-Moon sep (deg)   : 139.93
B (ring opening deg) : -26.46
PA of pole (deg)     : -4.59
Pole direction: RA (deg): 39.48270
Dec (deg): 83.42790
C/A sky separation ("): 0.260
C/A sky separation (km): 1517.7
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	2031-12-11T08:12:18.537	74.71	-75.35	2575.1	-36.84	-36.86
Titan	E	2031-12-11T08:16:13.166	74.06	-74.65	2575.1	-26.74	-26.75



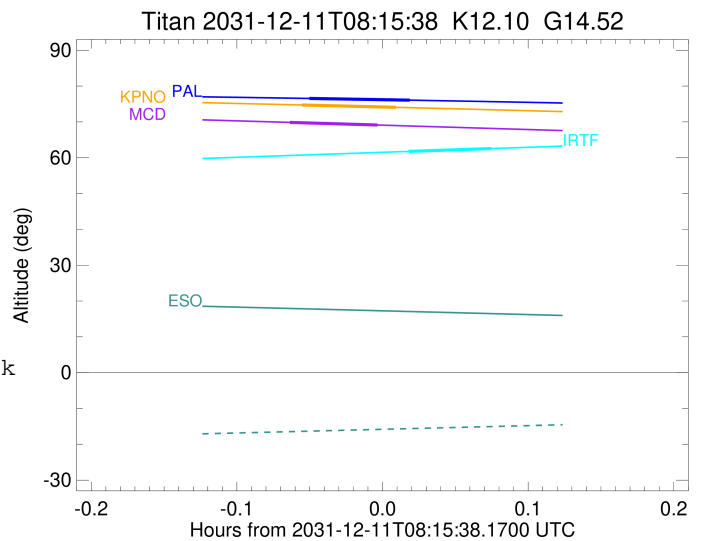
```

target                : Titan
target radius (km)   : 2575.15
C/A epoch             : 2031-12-11T08:13:37.110
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       : 3414242371731554304
2Mass ID (if available) : 05125861+2123527
ICRS Star Coord at Epoch: 05h 12m 58.64159s +21:23:52.08454s
RUWE (>1.4 is poor) : 0.98
K magnitude          : 12.104
G magnitude          : 14.525
RP magnitude         : 13.745
BP magnitude         : 15.164
DUPflag             : 0
Distance (au)        : 8.047
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -17.35
Sun-Target sep (deg) : 178.35
Sun-Moon sep (deg)   : 140.00
B (ring opening deg) : -26.46
PA of pole (deg)     : -4.59
Pole direction: RA (deg): 39.48270
Dec (deg): 83.42790
C/A sky separation (") : 0.293
C/A sky separation (km) : 1708.5
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	2031-12-11T08:11:48.435	69.85	-70.11	2575.1	-41.36	-41.37
Titan	E	2031-12-11T08:15:25.801	69.12	-69.36	2575.1	-31.37	-31.39



```

target                : Titan
target radius (km)   : 2575.15
C/A epoch            : 2031-12-11T08:18:25.150
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       : 3414242371731554304
2Mass ID (if available) : 05125861+2123527
ICRS Star Coord at Epoch: 05h 12m 58.64159s +21:23:52.08454s
RUWE (>1.4 is poor) : 0.98
K magnitude           : 12.104
G magnitude           : 14.525
RP magnitude          : 13.745
BP magnitude          : 15.164
DUPflag              : 0
Distance (au)         : 8.047
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -17.35
Sun-Target sep (deg) : 178.35
Sun-Moon sep (deg)   : 139.39
B (ring opening deg) : -26.46
PA of pole (deg)     : -4.59
Pole direction: RA (deg): 39.48270
Dec (deg): 83.42790
C/A sky separation (") : 0.315
C/A sky separation (km) : 1837.0
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	2031-12-11T08:16:43.211	61.76	-62.33	2575.0	-44.16	-44.17
Titan	E	2031-12-11T08:20:07.090	62.55	-63.11	2575.1	-35.07	-35.08

