

target : Titan
 target radius (km) : 2575.15
 C/A epoch : 2031-12-15T03:37:45.580
 Event type : Pt
 : Titan occs: topocentric, not geocentric
 : Not a ringed target
 Gaia source ID : 3414901455937161344
 2Mass ID (if available) : 05115759+2122275

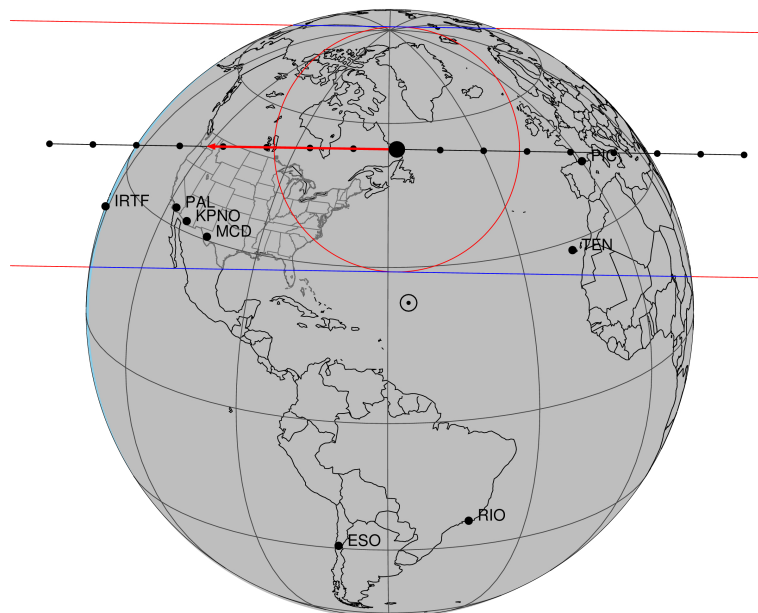
ICRS Star Coord at Epoch: 05h 11m 57.60710s +21:22:27.42312s
 RUWE (>1.4 is poor) : 1.02
 K magnitude : 14.566
 G magnitude : 16.890
 RP magnitude : 16.135
 BP magnitude : 17.497
 DUPflag : 0
 Distance (au) : 8.052
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -15.20
 Sun-Target sep (deg) : 175.99
 Sun-Moon sep (deg) : 165.47
 B (ring opening deg) : -26.45
 PA of pole (deg) : -4.57
 Pole direction: RA (deg): 39.48270
 Dec (deg): 83.42790
 C/A sky separation (") : 0.586
 C/A sky separation (km) : 3420.2
 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	+ +	DEC 15 03:30 - DEC 15 03:36	Pie
PAL	Palomar Mt (200")	33.4	243.1	+ +	DEC 15 03:40 - DEC 15 03:45	Pie
PMO	Purple Mtn Obs. Nanking	32.1	118.8			Pnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+ +	DEC 15 03:40 - DEC 15 03:44	Pie
MCD	McDonald Obs. 2.7m	30.7	256.0	+ +	DEC 15 03:40 - DEC 15 03:43	Pie
TEN	Teide Obs./Tenerife	28.3	343.5	+ +	DEC 15 03:32 - DEC 15 03:35	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

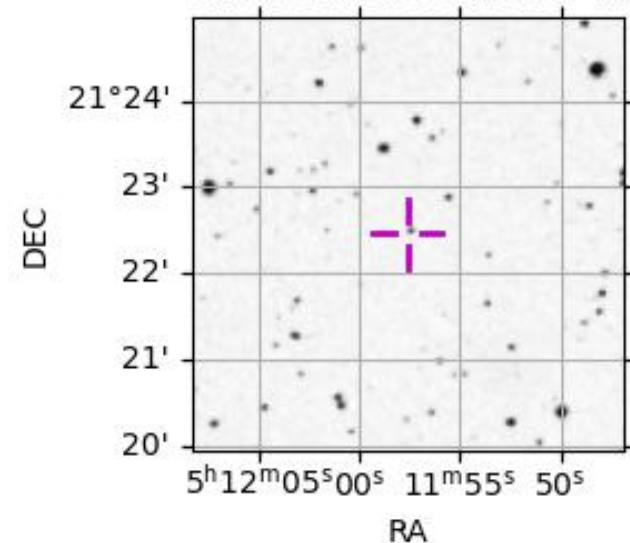
Titan 2031-12-15T03:37:45 K14.57 G16.89 dots 60.0 sec
 Pt



2031-12-15T03:37:45.5800 α: 05 11 57.6071 δ: +21 22 27.423 C/A 0.586" PA 0.93 deg v_sky -15.19 km/s D 08.05 AU

Credit: Styled after SORA/Lucky Star

3414901455937161344



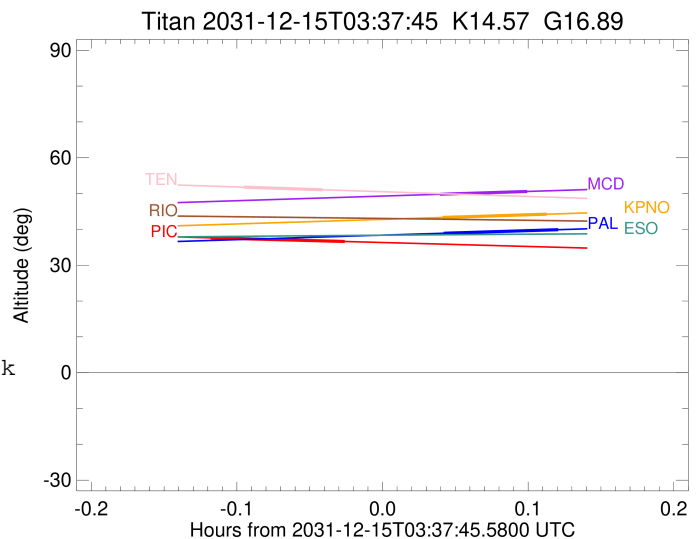
```

target                : Titan
target radius (km)   : 2575.15
C/A epoch            : 2031-12-15T03:33:26.720
Event type           : Pt
: Titan occs: topocentric, not geocentric
: Not a ringed target
Observer code        : PIC
Location             : Pic du Midi
Latitude (deg)       : 42.93656
E. Longitude (deg)   : 0.14231
Altitude (km)        : 2.890
Gaia source ID       : 3414901455937161344
2Mass ID (if available) : 05115759+2122275
ICRS Star Coord at Epoch: 05h 11m 57.60710s +21:22:27.42312s
RUWE (>1.4 is poor) : 1.02
K magnitude          : 14.566
G magnitude          : 16.890
RP magnitude         : 16.135
BP magnitude         : 17.497
DUPflag             : 0
Distance (au)        : 8.052
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -15.20
Sun-Target sep (deg) : 175.99
Sun-Moon sep (deg)   : 165.03
B (ring opening deg) : -26.45
PA of pole (deg)     : -4.57
Pole direction: RA (deg): 39.48270
Dec (deg): 83.42790
C/A sky separation (") : 0.035
C/A sky separation (km) : 206.7
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	2031-12-15T03:30:39.685	37.63	-41.57	2575.2	0.41	0.41
Titan	E	2031-12-15T03:36:13.773	36.61	-40.55	2575.1	-8.65	-8.65



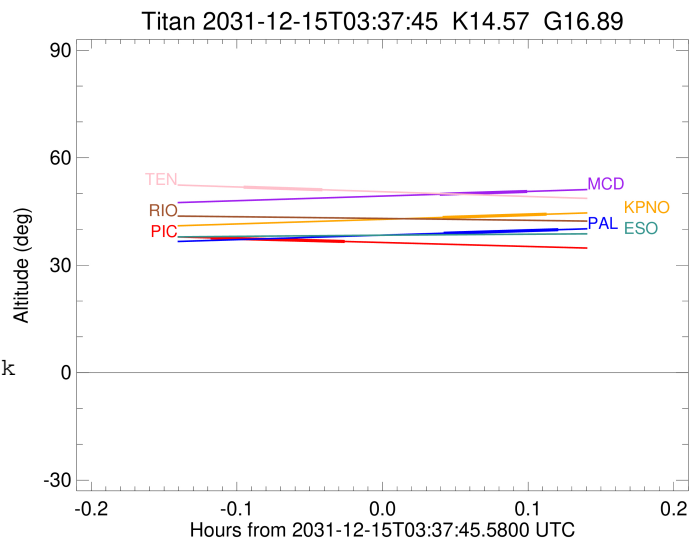
```

target                : Titan
target radius (km)   : 2575.15
C/A epoch            : 2031-12-15T03:42:38.830
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       : 3414901455937161344
2Mass ID (if available) : 05115759+2122275
ICRS Star Coord at Epoch: 05h 11m 57.60710s +21:22:27.42312s
RUWE (>1.4 is poor) : 1.02
K magnitude          : 14.566
G magnitude          : 16.890
RP magnitude         : 16.135
BP magnitude         : 17.497
DUPflag             : 0
Distance (au)        : 8.052
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -15.20
Sun-Target sep (deg) : 175.99
Sun-Moon sep (deg)   : 166.33
B (ring opening deg) : -26.45
PA of pole (deg)     : -4.57
Pole direction: RA (deg): 39.48270
Dec (deg): 83.42790
C/A sky separation ("): 0.231
C/A sky separation (km): 1346.6
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	2031-12-15T03:40:16.436	38.91	-36.49	2575.1	-22.77	-22.78
Titan	E	2031-12-15T03:45:01.180	39.91	-37.48	2575.1	-32.98	-32.99



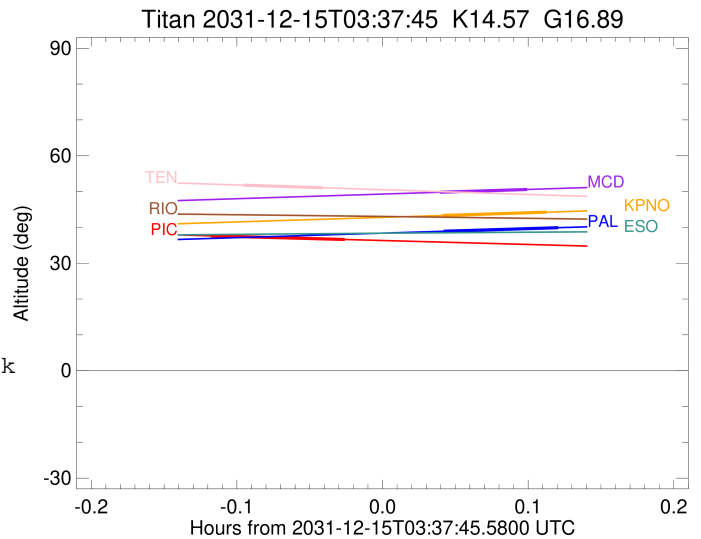
```

target                : Titan
target radius (km)   : 2575.15
C/A epoch            : 2031-12-15T03:42:23.690
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       : 3414901455937161344
2Mass ID (if available) : 05115759+2122275
ICRS Star Coord at Epoch: 05h 11m 57.60710s +21:22:27.42312s
RUWE (>1.4 is poor) : 1.02
K magnitude           : 14.566
G magnitude           : 16.890
RP magnitude         : 16.135
BP magnitude         : 17.497
DUPflag              : 0
Distance (au)        : 8.052
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -15.20
Sun-Target sep (deg) : 175.99
Sun-Moon sep (deg)  : 166.30
B (ring opening deg) : -26.45
PA of pole (deg)    : -4.57
Pole direction: RA (deg): 39.48270
Dec (deg): 83.42790
C/A sky separation (") : 0.278
C/A sky separation (km) : 1624.3
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	2031-12-15T03:40:14.336	43.32	-40.78	2575.1	-29.37	-29.39
Titan	E	2031-12-15T03:44:33.014	44.24	-41.69	2575.1	-39.28	-39.29



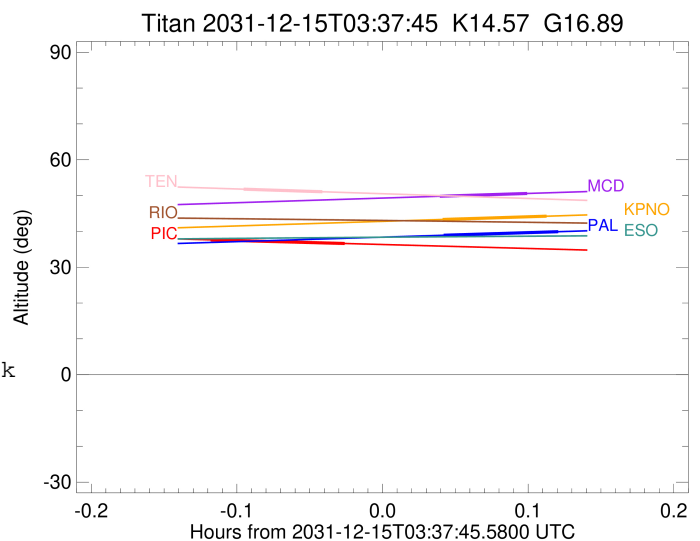
```

target                : Titan
target radius (km)   : 2575.15
C/A epoch            : 2031-12-15T03:41:55.060
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       : 3414901455937161344
2Mass ID (if available) : 05115759+2122275
ICRS Star Coord at Epoch: 05h 11m 57.60710s +21:22:27.42312s
RUWE (>1.4 is poor) : 1.02
K magnitude          : 14.566
G magnitude          : 16.890
RP magnitude         : 16.135
BP magnitude         : 17.497
DUPflag             : 0
Distance (au)        : 8.052
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -15.20
Sun-Target sep (deg) : 175.99
Sun-Moon sep (deg)  : 166.26
B (ring opening deg) : -26.45
PA of pole (deg)    : -4.57
Pole direction: RA (deg): 39.48270
Dec (deg): 83.42790
C/A sky separation (") : 0.332
C/A sky separation (km) : 1938.2
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	2031-12-15T03:40:05.588	49.80	-47.14	2575.1	-37.62	-37.63
Titan	E	2031-12-15T03:43:44.498	50.58	-47.93	2575.1	-46.92	-46.93



```

target                : Titan
target radius (km)   : 2575.15
C/A epoch             : 2031-12-15T03:33:40.260
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       : 3414901455937161344
2Mass ID (if available) : 05115759+2122275
ICRS Star Coord at Epoch: 05h 11m 57.60710s +21:22:27.42312s
RUWE (>1.4 is poor) : 1.02
K magnitude          : 14.566
G magnitude          : 16.890
RP magnitude         : 16.135
BP magnitude         : 17.497
DUPflag             : 0
Distance (au)        : 8.052
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -15.20
Sun-Target sep (deg) : 175.99
Sun-Moon sep (deg)   : 165.09
B (ring opening deg) : -26.45
PA of pole (deg)     : -4.57
Pole direction: RA (deg): 39.48270
Dec (deg): 83.42790
C/A sky separation (") : 0.355
C/A sky separation (km) : 2073.0
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	2031-12-15T03:32:01.669	51.77	-55.72	2575.1	-42.13	-42.15
Titan	E	2031-12-15T03:35:18.865	51.05	-55.00	2575.1	-49.90	-49.92

