

target : Titan
 target radius (km) : 2575.15
 C/A epoch : 2031-01-05T07:09:39.440
 Event type : Pgt
 : Titan occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 50132065167194368
 2Mass ID (if available) : 04021893+1841026

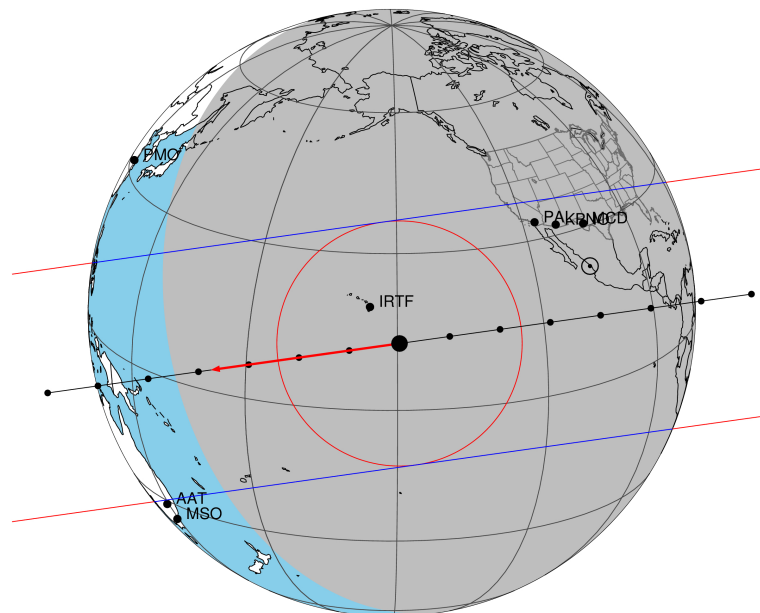
ICRS Star Coord at Epoch: 04h 02m 18.97330s +18:41:02.59780s
 RUWE (>1.4 is poor) : 1.02
 K magnitude : 12.865
 G magnitude : 15.551
 RP magnitude : 14.717
 BP magnitude : 16.278
 DUPflag : 0
 Distance (au) : 8.301
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -17.76
 Sun-Target sep (deg) : 137.91
 Sun-Moon sep (deg) : 4.92
 B (ring opening deg) : -24.80
 PA of pole (deg) : -2.60
 Pole direction: RA (deg): 39.48270
 Dec (deg): 83.42790
 C/A sky separation (") : 0.111
 C/A sky separation (km) : 670.0
 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

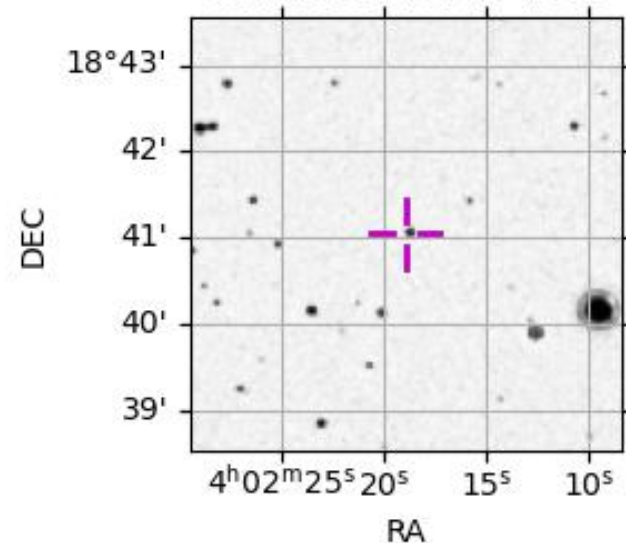
Obs	Location	lat	Elon	Target	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1			Pnn
PAL	Palomar Mt (200")	33.4	243.1	+ +	JAN 05 07:05 - JAN 05 07:08	Pie
PMO	Purple Mtn Obs. Nanking	32.1	118.8			Pnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+ +	JAN 05 07:04 - JAN 05 07:07	Pie
MCD	McDonald Obs. 2.7m	30.7	256.0	+ +	JAN 05 07:04 - JAN 05 07:07	Pie
TEN	Teide Obs./Tenerife	28.3	343.5			Pnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+ +	JAN 05 07:07 - JAN 05 07:12	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 2031-01-05T07:09:39 K12.87 G15.55 dots 60.0 sec
 Pgt



2031-01-05T07:09:39.4400 α: 04 02 18.9733 δ: +18 41 02.598 C/A 0.110" PA 171.98 deg v_sky -17.76 km/s D 08.30 AU
 Credit: Styled after SORA/Lucky Star

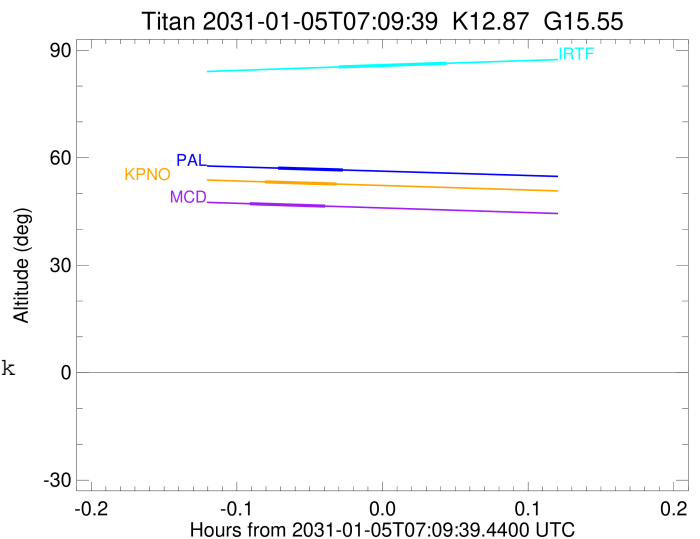
50132065167194368



target : Titan
 target radius (km) : 2575.15
 C/A epoch : 2031-01-05T07:06:40.880
 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 : 50132065167194368
 2Mass ID (if available) : 04021893+1841026
 ICRS Star Coord at Epoch: 04h 02m 18.97330s +18:41:02.59780s
 RUWE (>1.4 is poor) : 1.02
 K magnitude : 12.865
 G magnitude : 15.551
 RP magnitude : 14.717
 BP magnitude : 16.278
 DUPflag : 0
 Distance (au) : 8.301
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -17.76
 Sun-Target sep (deg) : 137.91
 Sun-Moon sep (deg) : 4.49
 B (ring opening deg) : -24.80
 PA of pole (deg) : -2.60
 Pole direction: RA (deg): 39.48270
 Dec (deg): 83.42790
 C/A sky separation (") : 0.353
 C/A sky separation (km) : 2122.4
 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

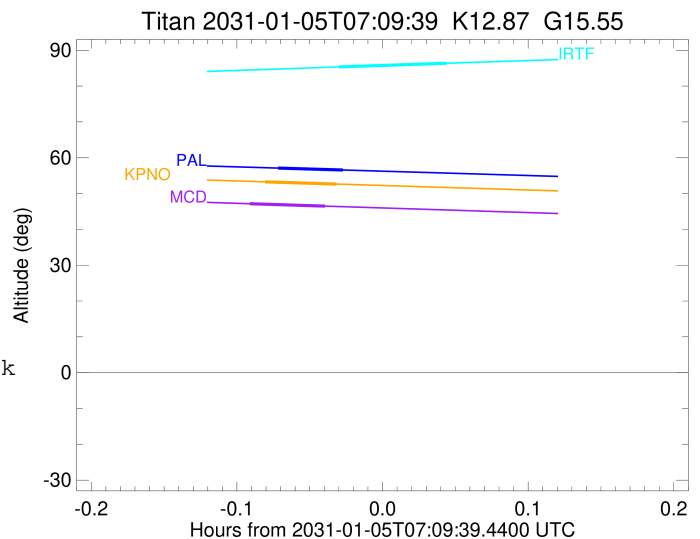
Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Titan	I	2031-01-05T07:05:20.307	57.11	-75.16	2575.1	44.09	44.11
Titan	E	2031-01-05T07:08:01.455	56.57	-75.57	2575.1	52.54	52.56



target : Titan
 target radius (km) : 2575.15
 C/A epoch : 2031-01-05T07:06:16.640
 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 : 50132065167194368
 2Mass ID (if available) : 04021893+1841026
 ICRS Star Coord at Epoch: 04h 02m 18.97330s +18:41:02.59780s
 RUWE (>1.4 is poor) : 1.02
 K magnitude : 12.865
 G magnitude : 15.551
 RP magnitude : 14.717
 BP magnitude : 16.278
 DUPflag : 0
 Distance (au) : 8.301
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -17.76
 Sun-Target sep (deg) : 137.91
 Sun-Moon sep (deg) : 4.43
 B (ring opening deg) : -24.80
 PA of pole (deg) : -2.60
 Pole direction: RA (deg): 39.48270
 Dec (deg): 83.42790
 C/A sky separation (") : 0.334
 C/A sky separation (km) : 2009.9
 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	2031-01-05T07:04:47.624	53.26	-79.07	2575.1	40.60	40.62
Titan	E	2031-01-05T07:07:45.667	52.64	-79.41	2575.1	49.44	49.46



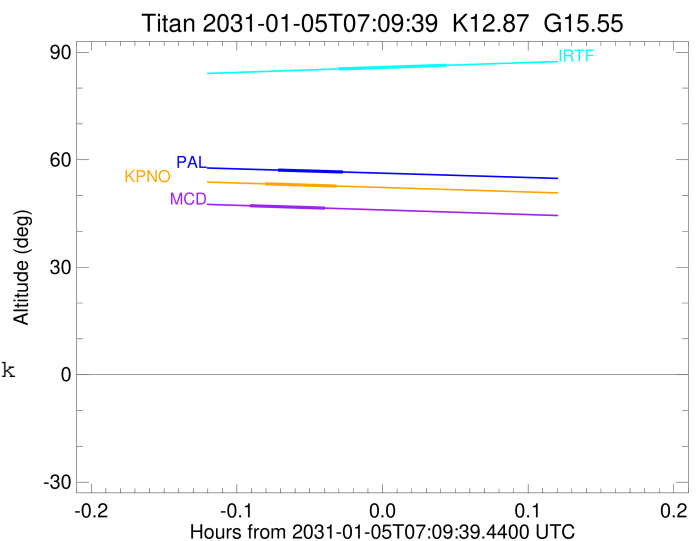
```

target                : Titan
target radius (km)   : 2575.15
C/A epoch            : 2031-01-05T07:05:44.410
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       : 50132065167194368
2Mass ID (if available) : 04021893+1841026
ICRS Star Coord at Epoch: 04h 02m 18.97330s +18:41:02.59780s
RUWE (>1.4 is poor) : 1.02
K magnitude          : 12.865
G magnitude          : 15.551
RP magnitude         : 14.717
BP magnitude         : 16.278
DUPflag             : 0
Distance (au)        : 8.301
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -17.76
Sun-Target sep (deg) : 137.91
Sun-Moon sep (deg)  : 4.36
B (ring opening deg) : -24.80
PA of pole (deg)    : -2.60
Pole direction: RA (deg): 39.48270
Dec (deg): 83.42790
C/A sky separation (") : 0.324
C/A sky separation (km) : 1951.5
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	2031-01-05T07:04:11.372	47.15	-82.09	2575.1	38.85	38.87
Titan	E	2031-01-05T07:07:17.474	46.49	-82.00	2575.1	47.92	47.93



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target                : Titan
target radius (km)   : 2575.15
C/A epoch             : 2031-01-05T07:10:03.830
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       : 50132065167194368
2Mass ID (if available) : 04021893+1841026
ICRS Star Coord at Epoch: 04h 02m 18.97330s +18:41:02.59780s
RUWE (>1.4 is poor) : 1.02
K magnitude           : 12.865
G magnitude           : 15.551
RP magnitude          : 14.717
BP magnitude          : 16.278
DUPflag              : 0
Distance (au)        : 8.301
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -17.76
Sun-Target sep (deg) : 137.91
Sun-Moon sep (deg)   : 5.05
B (ring opening deg) : -24.80
PA of pole (deg)     : -2.60
Pole direction: RA (deg): 39.48270
Dec (deg): 83.42790
C/A sky separation (") : 0.139
C/A sky separation (km) : 839.9
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	2031-01-05T07:07:50.050	85.33	-43.66	2575.1	12.56	12.57
Titan	E	2031-01-05T07:12:17.620	86.36	-44.69	2575.1	21.86	21.87

