

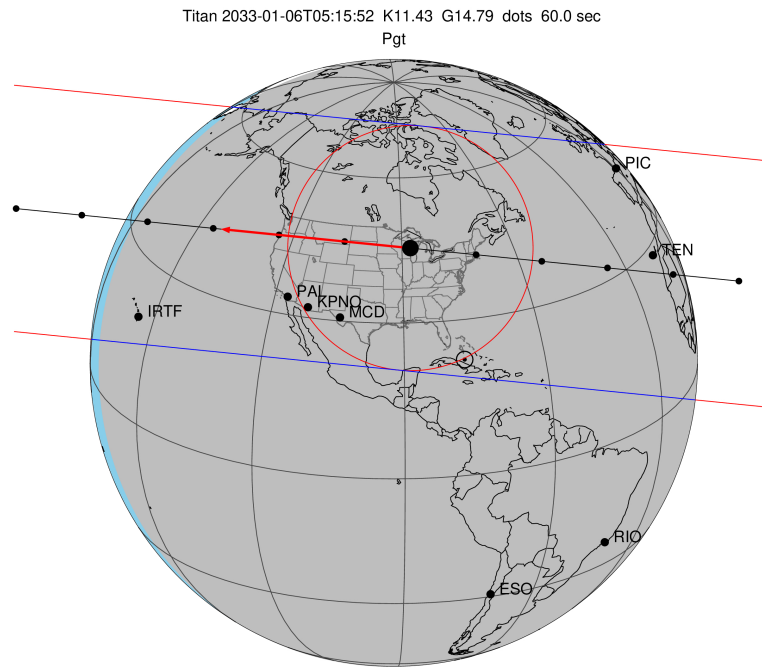
target : Titan
 target radius (km) : 2575.15
 C/A epoch : 2033-01-06T05:15:52.960
 Event type : Pgt
 : Titan occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 3425060019962276096
 2Mass ID (if available) : 06094830+2229373

ICRS Star Coord at Epoch: 06h 09m 48.31132s +22:29:37.30113s
 RUWE (>1.4 is poor) : 1.07
 K magnitude : 11.427
 G magnitude : 14.792
 RP magnitude : 13.821
 BP magnitude : 15.746
 DUPflag : 0
 Distance (au) : 8.051
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -23.10
 Sun-Target sep (deg) : 166.50
 Sun-Moon sep (deg) : 101.87
 B (ring opening deg) : -26.34
 PA of pole (deg) : -5.85
 Pole direction: RA (deg): 39.48270
 Dec (deg): 83.42790
 C/A sky separation (") : 0.414
 C/A sky separation (km) : 2417.2
 NAIF SPICE kernels : RAJobs_U111+rgf16.spk

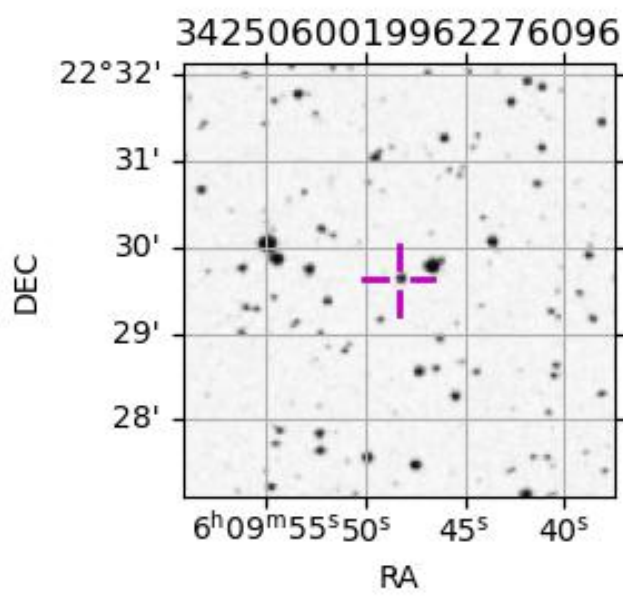
URKALLv1.spk
 naif0012.tls
 nep097.bsp
 nep101.bsp
 sat4401.bsp

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	+ +	JAN 06 05:11 - JAN 06 05:13	Pie
PAL	Palomar Mt (200")	33.4	243.1	+ +	JAN 06 05:15 - JAN 06 05:19	Pie
PMO	Purple Mtn Obs. Nanking	32.1	118.8			Pnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+ +	JAN 06 05:15 - JAN 06 05:18	Pie
MCD	McDonald Obs. 2.7m	30.7	256.0	+ +	JAN 06 05:15 - JAN 06 05:18	Pie
TEN	Teide Obs./Tenerife	28.3	343.5	+ +	JAN 06 05:10 - JAN 06 05:13	Pie
IRTF	Mauna Kea/IRTF	19.8	204.5	+ +	JAN 06 05:18 - JAN 06 05:20	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



2033-01-06T05:15:52.9600 α: 06 09 48.3113 δ: +22 29 37.301 C/A 0.417" PA 5.74 deg v_sky -23.11 km/s D 08.05 AU
 Credit: Styled after SORA/Lucky Star



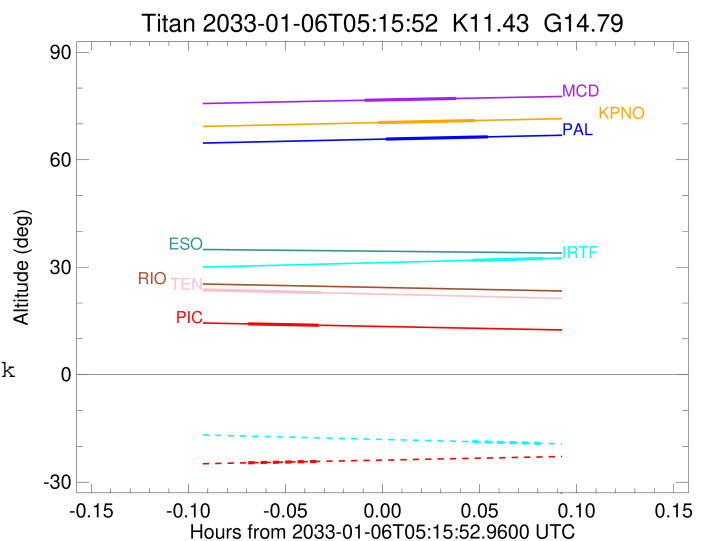
```

target                : Titan
target radius (km)   : 2575.15
C/A epoch            : 2033-01-06T05:12:49.230
Event type           : Pgt
: Titan occs: geocentric, topocentric
: 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      : 3425060019962276096
2Mass ID (if available) : 06094830+2229373
ICRS Star Coord at Epoch: 06h 09m 48.31132s +22:29:37.30113s
RUWE (>1.4 is poor) : 1.07
K magnitude          : 11.427
G magnitude          : 14.792
RP magnitude         : 13.821
BP magnitude         : 15.746
DUPflag             : 0
Distance (au)       : 8.051
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -23.10
Sun-Target sep (deg) : 166.50
Sun-Moon sep (deg)  : 101.96
B (ring opening deg) : -26.34
PA of pole (deg)    : -5.85
Pole direction: RA (deg): 39.48270
Dec (deg): 83.42790
C/A sky separation (" ) : 0.358
C/A sky separation (km) : 2087.7
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	2033-01-06T05:11:43.924	14.18	-24.60	2575.0	54.59	54.61
Titan	E	2033-01-06T05:13:54.538	13.80	-24.21	2575.1	37.59	37.60



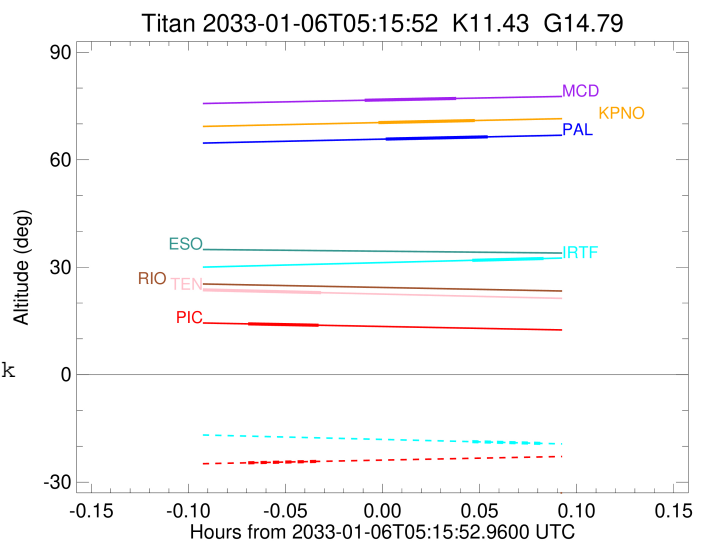
```

target                : Titan
target radius (km)   : 2575.15
C/A epoch            : 2033-01-06T05:17:33.530
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       : 3425060019962276096
2Mass ID (if available) : 06094830+2229373
ICRS Star Coord at Epoch: 06h 09m 48.31132s +22:29:37.30113s
RUWE (>1.4 is poor) : 1.07
K magnitude          : 11.427
G magnitude          : 14.792
RP magnitude         : 13.821
BP magnitude         : 15.746
DUPflag             : 0
Distance (au)        : 8.051
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -23.10
Sun-Target sep (deg) : 166.50
Sun-Moon sep (deg)  : 102.84
B (ring opening deg) : -26.34
PA of pole (deg)    : -5.85
Pole direction: RA (deg): 39.48270
Dec (deg): 83.42790
C/A sky separation ("): 0.221
C/A sky separation (km): 1287.7
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	2033-01-06T05:15:58.504	65.76	-53.84	2575.1	-16.39	-16.40
Titan	E	2033-01-06T05:19:08.550	66.38	-54.50	2575.1	-36.55	-36.56



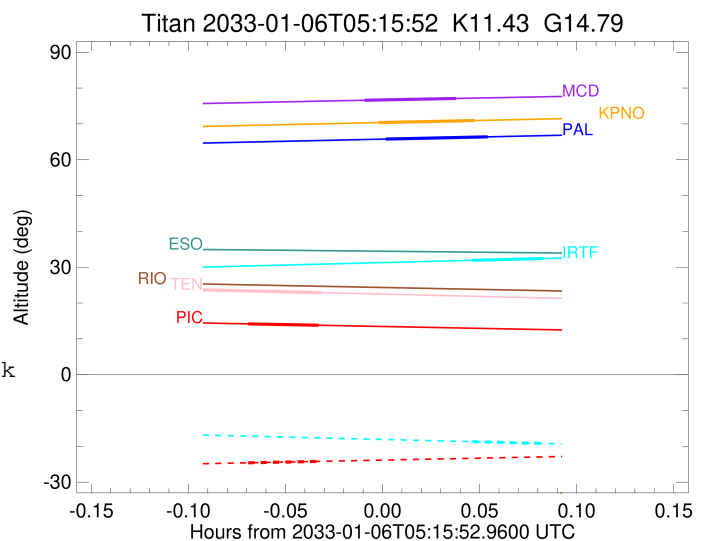
```

target                : Titan
target radius (km)   : 2575.15
C/A epoch            : 2033-01-06T05:17:14.470
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       : 3425060019962276096
2Mass ID (if available) : 06094830+2229373
ICRS Star Coord at Epoch: 06h 09m 48.31132s +22:29:37.30113s
RUWE (>1.4 is poor) : 1.07
K magnitude           : 11.427
G magnitude           : 14.792
RP magnitude          : 13.821
BP magnitude          : 15.746
DUPflag              : 0
Distance (au)         : 8.051
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -23.10
Sun-Target sep (deg) : 166.50
Sun-Moon sep (deg)   : 102.85
B (ring opening deg) : -26.34
PA of pole (deg)     : -5.85
Pole direction: RA (deg): 39.48270
Dec (deg): 83.42790
C/A sky separation (") : 0.250
C/A sky separation (km) : 1461.6
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	2033-01-06T05:15:44.192	70.35	-58.38	2575.1	-20.47	-20.48
Titan	E	2033-01-06T05:18:44.742	70.94	-59.01	2575.1	-40.29	-40.31



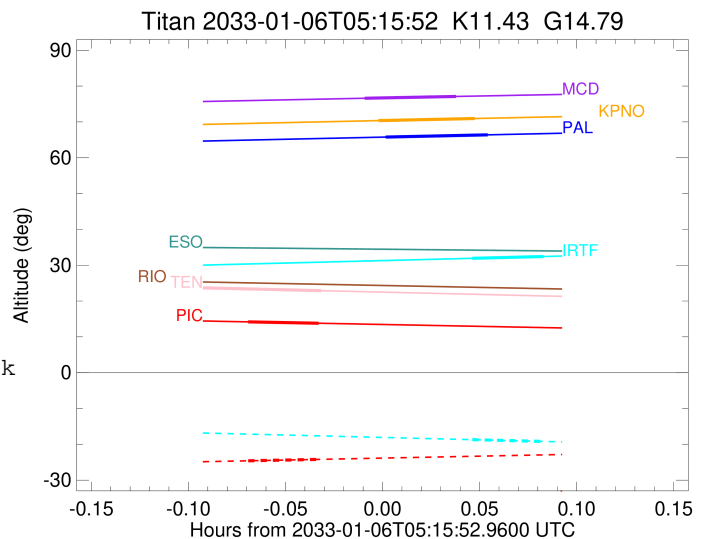
```

target                : Titan
target radius (km)   : 2575.15
C/A epoch             : 2033-01-06T05:16:44.990
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       : 3425060019962276096
2Mass ID (if available) : 06094830+2229373
ICRS Star Coord at Epoch: 06h 09m 48.31132s +22:29:37.30113s
RUWE (>1.4 is poor) : 1.07
K magnitude           : 11.427
G magnitude           : 14.792
RP magnitude          : 13.821
BP magnitude          : 15.746
DUPflag              : 0
Distance (au)        : 8.051
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -23.10
Sun-Target sep (deg) : 166.50
Sun-Moon sep (deg)  : 102.86
B (ring opening deg) : -26.34
PA of pole (deg)    : -5.85
Pole direction: RA (deg): 39.48270
Dec (deg): 83.42790
C/A sky separation (") : 0.275
C/A sky separation (km) : 1604.3
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	2033-01-06T05:15:19.282	76.59	-64.90	2575.1	-23.98	-23.99
Titan	E	2033-01-06T05:18:10.698	77.10	-65.50	2575.1	-43.43	-43.44



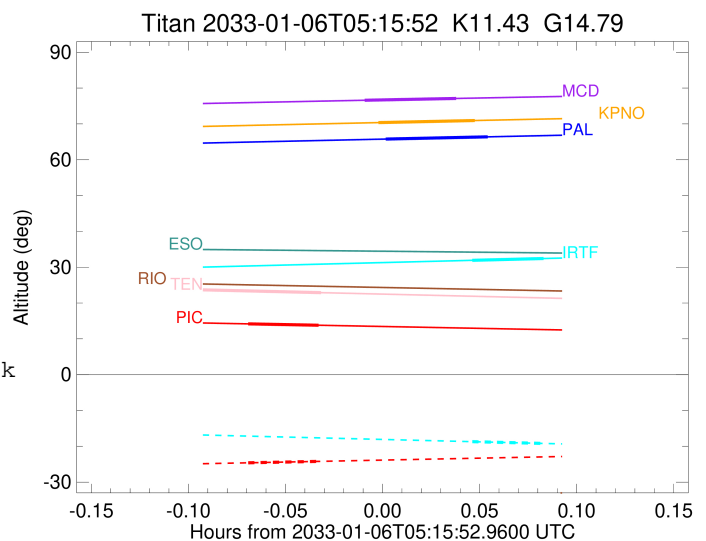
```

target                : Titan
target radius (km)   : 2575.15
C/A epoch            : 2033-01-06T05:12:09.310
Event type           : Pgt
: Titan occs: geocentric, topocentric
: 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       : 3425060019962276096
2Mass ID (if available) : 06094830+2229373
ICRS Star Coord at Epoch: 06h 09m 48.31132s +22:29:37.30113s
RUWE (>1.4 is poor) : 1.07
K magnitude           : 11.427
G magnitude           : 14.792
RP magnitude          : 13.821
BP magnitude          : 15.746
DUPflag              : 0
Distance (au)        : 8.051
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -23.10
Sun-Target sep (deg) : 166.50
Sun-Moon sep (deg)   : 102.07
B (ring opening deg) : -26.34
PA of pole (deg)     : -5.85
Pole direction: RA (deg): 39.48270
Dec (deg): 83.42790
C/A sky separation (") : 0.059
C/A sky separation (km) : 342.3
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

```

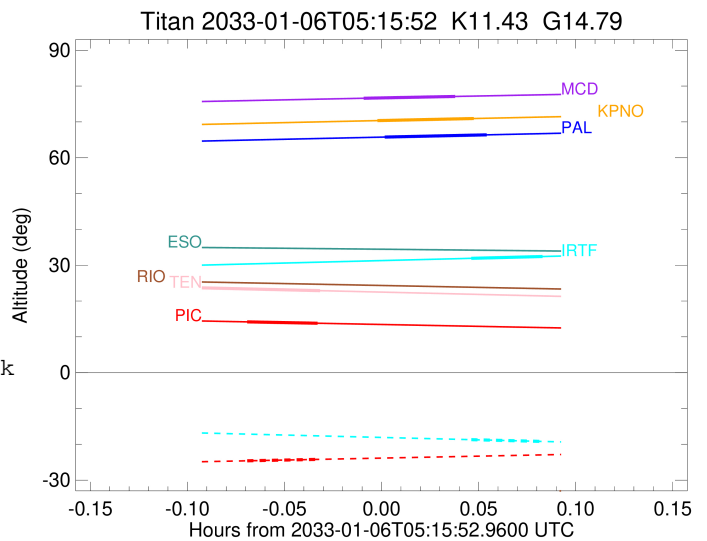
x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Titan	I	2033-01-06T05:10:19.286	23.68	-36.31	2575.1	16.82	16.82
Titan	E	2033-01-06T05:13:59.332	22.89	-35.51	2575.2	-3.18	-3.19



```

target                : Titan
target radius (km)   : 2575.15
C/A epoch             : 2033-01-06T05:19:45.640
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       : 3425060019962276096
2Mass ID (if available) : 06094830+2229373
ICRS Star Coord at Epoch: 06h 09m 48.31132s +22:29:37.30113s
RUWE (>1.4 is poor) : 1.07
K magnitude           : 11.427
G magnitude           : 14.792
RP magnitude          : 13.821
BP magnitude          : 15.746
DUPflag              : 0
Distance (au)        : 8.051
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -23.10
Sun-Target sep (deg) : 166.50
Sun-Moon sep (deg)   : 102.56
B (ring opening deg) : -26.34
PA of pole (deg)     : -5.85
Pole direction: RA (deg): 39.48270
Dec (deg): 83.42790
C/A sky separation (" ) : 0.351
C/A sky separation (km) : 2049.9
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	2033-01-06T05:18:38.823	31.91	-18.70	2575.1	-35.89	-35.91
Titan	E	2033-01-06T05:20:52.436	32.42	-19.20	2575.1	-54.08	-54.09