

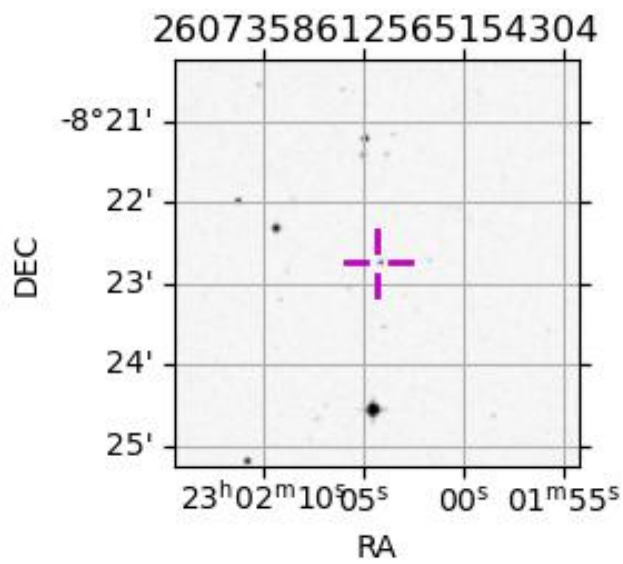
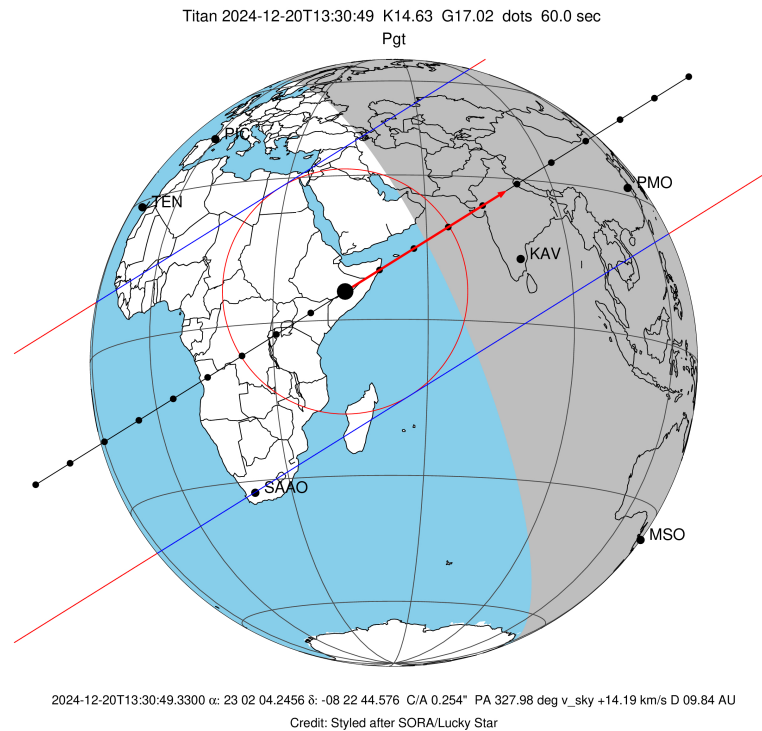
target : Titan  
 target radius (km) : 2575.15  
 C/A epoch : 2024-12-20T13:30:49.330  
 Event type : Pgt  
 : Titan occs: geocentric, topocentric  
 : Not a ringed target  
 Gaia source ID : 2607358612565154304  
 2Mass ID (if available) : 23020425-0822444

ICRS Star Coord at Epoch: 23h 02m 04.24555s -08:22:44.57646s  
 RUWE (>1.4 is poor) : 0.94  
 K magnitude : 14.634  
 G magnitude : 17.020  
 RP magnitude : 16.243  
 BP magnitude : 17.715  
 DUPflag : 0  
 Distance (au) : 9.842  
 f0 (km) : 0.00  
 g0 (km) : 0.00  
 skyplane vel. (km/s) : 14.19  
 Sun-Target sep (deg) : 74.63  
 Sun-Moon sep (deg) : 169.26  
 B (ring opening deg) : 4.48  
 PA of pole (deg) : 5.33  
 Pole direction: RA (deg): 39.48270  
 Dec (deg): 83.42790  
 C/A sky separation (") : 0.251  
 C/A sky separation (km) : 1792.6  
 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 |        |                             | Pnn    |
| PMO  | Purple Mtn Obs. Nanking           | 32.1  | 118.8 | + +    | DEC 20 13:35 - DEC 20 13:40 | Pie    |
| KPNO | Kitt Peak Natl Obs                | 32.0  | 248.4 |        |                             | Pnn    |
| 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 |        |                             | Pnn    |
| KAV  | Kavalur Observatory               | 12.6  | 78.8  | + +    | DEC 20 13:32 - DEC 20 13:37 | Pie    |
| 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    |



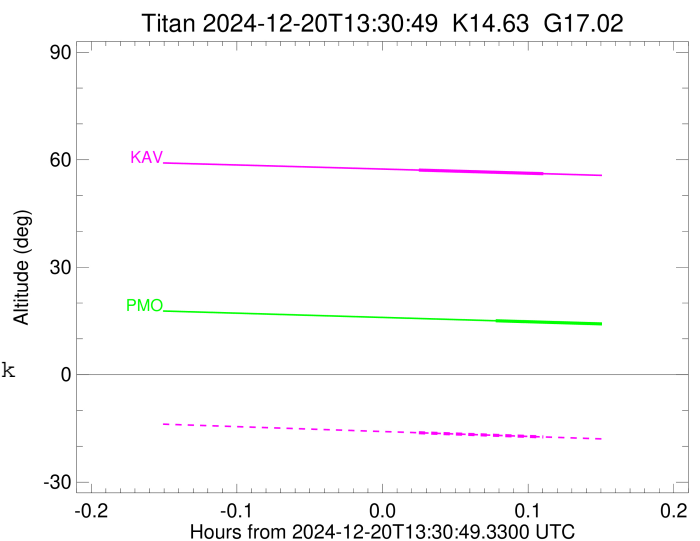
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target                : Titan
target radius (km)   : 2575.15
C/A epoch             : 2024-12-20T13:38:02.240
Event type            : Pgt
: Titan occs: geocentric, topocentric
: Not a ringed target
Observer code         : PMO
Location              : Purple Mtn Obs. Nanking
Latitude (deg)       : 32.06667
E. Longitude (deg)   : 118.82089
Altitude (km)        : 0.364
Gaia source ID       : 2607358612565154304
2Mass ID (if available) : 23020425-0822444
ICRS Star Coord at Epoch: 23h 02m 04.24555s -08:22:44.57646s
RUWE (>1.4 is poor) : 0.94
K magnitude           : 14.634
G magnitude           : 17.020
RP magnitude          : 16.243
BP magnitude          : 17.715
DUPflag              : 0
Distance (au)        : 9.842
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : 14.19
Sun-Target sep (deg) : 74.63
Sun-Moon sep (deg)   : 170.16
B (ring opening deg) : 4.48
PA of pole (deg)     : 5.33
Pole direction: RA (deg): 39.48270
Dec (deg): 83.42790
C/A sky separation (") : 0.190
C/A sky separation (km) : 1359.0
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   | 2024-12-20T13:35:26.887 | 15.05 | -56.52  | 2575.2 | 6.00    | 6.00         |
| Titan  | E   | 2024-12-20T13:40:37.559 | 14.01 | -57.61  | 2575.2 | -69.25  | -69.26       |



```

target                : Titan
target radius (km)   : 2575.15
C/A epoch             : 2024-12-20T13:34:53.670
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       : 2607358612565154304
2Mass ID (if available) : 23020425-0822444
ICRS Star Coord at Epoch: 23h 02m 04.24555s -08:22:44.57646s
RUWE (>1.4 is poor) : 0.94
K magnitude           : 14.634
G magnitude           : 17.020
RP magnitude          : 16.243
BP magnitude          : 17.715
DUPflag              : 0
Distance (au)        : 9.842
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : 14.19
Sun-Target sep (deg) : 74.63
Sun-Moon sep (deg)   : 169.87
B (ring opening deg) : 4.48
PA of pole (deg)     : 5.33
Pole direction: RA (deg): 39.48270
Dec (deg): 83.42790
C/A sky separation (") : 0.199
C/A sky separation (km) : 1423.8
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   | 2024-12-20T13:32:18.821 | 57.10 | -16.21  | 2575.2 | 4.76    | 4.77         |
| Titan  | E   | 2024-12-20T13:37:28.511 | 56.10 | -17.39  | 2575.2 | -71.38  | -71.39       |

