

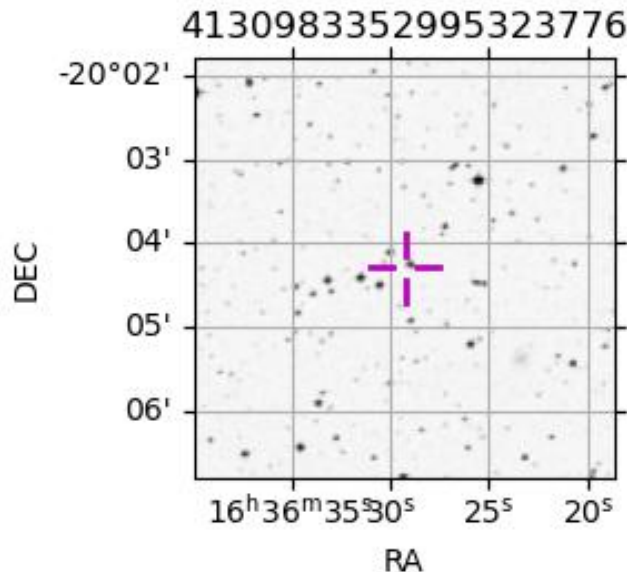
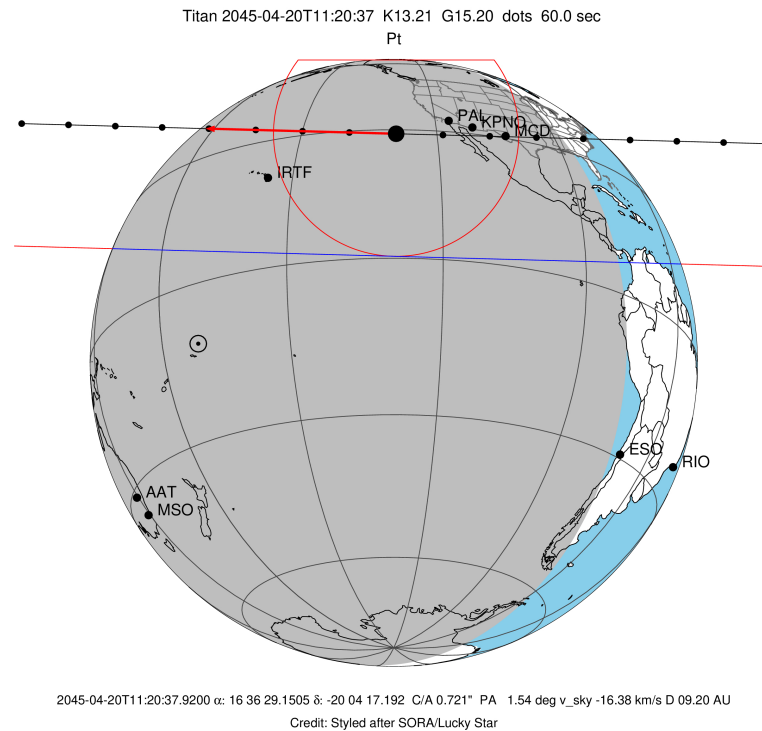
target : Titan  
 target radius (km) : 2575.15  
 C/A epoch : 2045-04-20T11:20:37.920  
 Event type : Pt  
 : Titan occs: topocentric, not geocentric  
 : Not a ringed target  
 Gaia source ID : 4130983352995323776  
 2Mass ID (if available) : 16362916-2004173

ICRS Star Coord at Epoch: 16h 36m 29.15055s -20:04:17.19223s  
 RUWE (>1.4 is poor) : 1.01  
 K magnitude : 13.210  
 G magnitude : 15.196  
 RP magnitude : 14.543  
 BP magnitude : 15.678  
 DUPflag : 0  
 Distance (au) : 9.204  
 f0 (km) : 0.00  
 g0 (km) : 0.00  
 skyplane vel. (km/s) : -16.38  
 Sun-Target sep (deg) : 139.69  
 Sun-Moon sep (deg) : 173.06  
 B (ring opening deg) : 25.75  
 PA of pole (deg) : 3.60  
 Pole direction: RA (deg): 39.48270  
 Dec (deg): 83.42790  
 C/A sky separation (") : 0.720  
 C/A sky separation (km) : 4804.2  
 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			Pnn
PAL	Palomar Mt (200")	33.4	243.1	+ +	APR 20 11:17 - APR 20 11:22	Pie
PMO	Purple Mtn Obs. Nanking	32.1	118.8			Pnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+ +	APR 20 11:16 - APR 20 11:21	Pie
MCD	McDonald Obs. 2.7m	30.7	256.0	+ +	APR 20 11:15 - APR 20 11:20	Pie
TEN	Teide Obs./Tenerife	28.3	343.5			Pnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+ +	APR 20 11:20 - APR 20 11:25	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



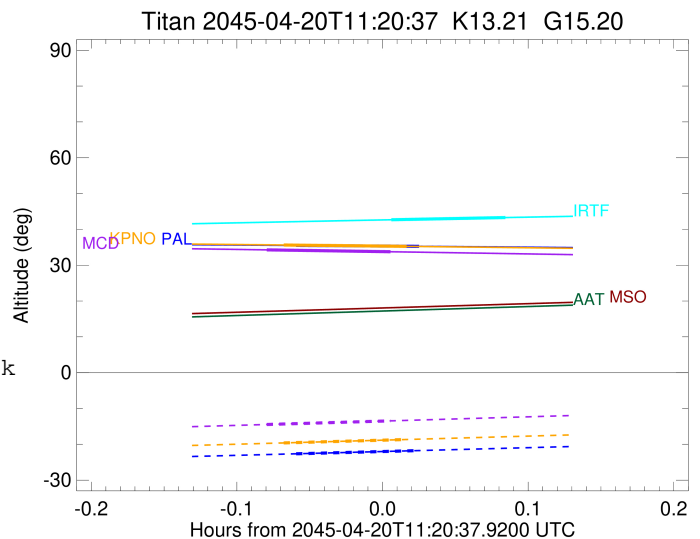
```

target                : Titan
target radius (km)   : 2575.15
C/A epoch            : 2045-04-20T11:19:35.970
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       : 4130983352995323776
2Mass ID (if available) : 16362916-2004173
ICRS Star Coord at Epoch: 16h 36m 29.15055s -20:04:17.19223s
RUWE (>1.4 is poor) : 1.01
K magnitude           : 13.210
G magnitude           : 15.196
RP magnitude         : 14.543
BP magnitude         : 15.678
DUPflag              : 0
Distance (au)        : 9.204
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.38
Sun-Target sep (deg) : 139.69
Sun-Moon sep (deg)  : 173.91
B (ring opening deg) : 25.75
PA of pole (deg)    : 3.60
Pole direction: RA (deg): 39.48270
Dec (deg): 83.42790
C/A sky separation ("): 0.044
C/A sky separation (km): 291.3
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	2045-04-20T11:17:03.280	35.52	-22.65	2575.2	4.05	4.05
Titan	E	2045-04-20T11:22:08.624	35.26	-21.74	2575.1	7.63	7.64



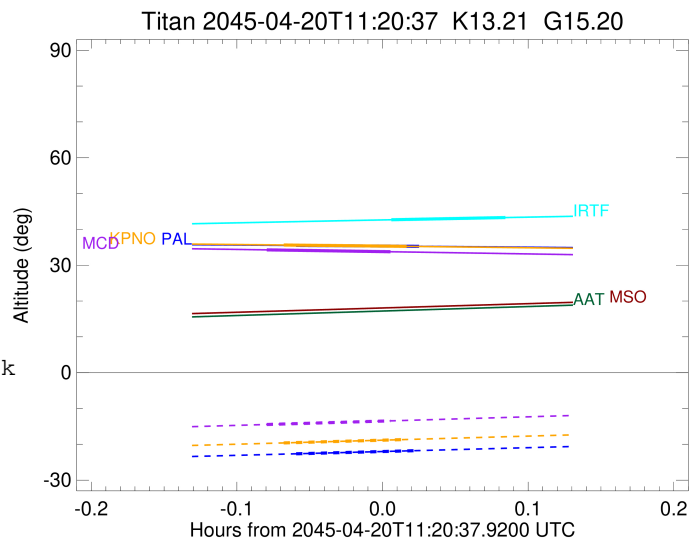
```

target                : Titan
target radius (km)   : 2575.15
C/A epoch             : 2045-04-20T11:19:06.020
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        : 4130983352995323776
2Mass ID (if available) : 16362916-2004173
ICRS Star Coord at Epoch: 16h 36m 29.15055s -20:04:17.19223s
RUWE (>1.4 is poor) : 1.01
K magnitude           : 13.210
G magnitude           : 15.196
RP magnitude          : 14.543
BP magnitude          : 15.678
DUPflag              : 0
Distance (au)         : 9.204
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.38
Sun-Target sep (deg) : 139.69
Sun-Moon sep (deg)   : 173.90
B (ring opening deg) : 25.75
PA of pole (deg)     : 3.60
Pole direction: RA (deg): 39.48270
Dec (deg): 83.42790
C/A sky separation (") : 0.025
C/A sky separation (km) : 166.0
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	2045-04-20T11:16:32.642	35.63	-19.61	2575.2	1.56	1.56
Titan	E	2045-04-20T11:21:39.383	35.26	-18.65	2575.1	5.08	5.08



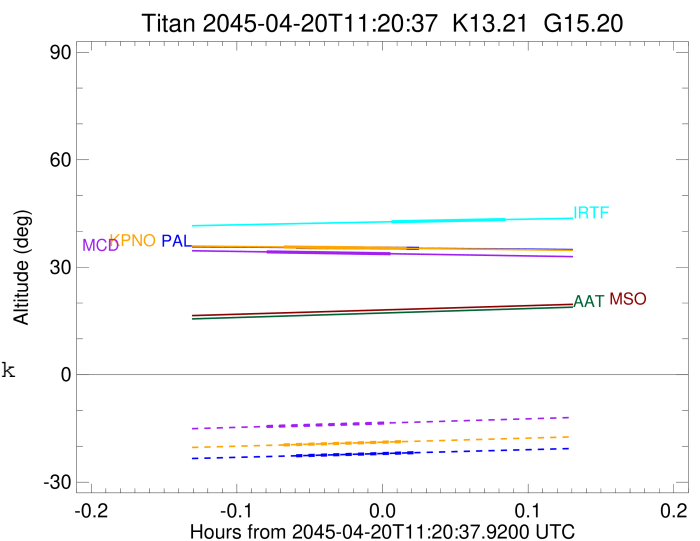
```

target                : Titan
target radius (km)   : 2575.15
C/A epoch             : 2045-04-20T11:18:24.010
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        : 4130983352995323776
2Mass ID (if available) : 16362916-2004173
ICRS Star Coord at Epoch: 16h 36m 29.15055s -20:04:17.19223s
RUWE (>1.4 is poor) : 1.01
K magnitude           : 13.210
G magnitude           : 15.196
RP magnitude          : 14.543
BP magnitude          : 15.678
DUPflag              : 0
Distance (au)         : 9.204
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.38
Sun-Target sep (deg) : 139.69
Sun-Moon sep (deg)   : 173.89
B (ring opening deg) : 25.75
PA of pole (deg)     : 3.60
Pole direction: RA (deg): 39.48270
Dec (deg): 83.42790
C/A sky separation (") : 0.001
C/A sky separation (km) : 5.6
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	2045-04-20T11:15:50.180	34.28	-14.47	2575.1	-1.65	-1.65
Titan	E	2045-04-20T11:20:57.816	33.75	-13.45	2575.1	1.76	1.76



```

target                : Titan
target radius (km)   : 2575.15
C/A epoch            : 2045-04-20T11:23:20.990
Event type           : Pt
: Titan occs: topocentric, not geocentric
: 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       : 4130983352995323776
2Mass ID (if available) : 16362916-2004173
ICRS Star Coord at Epoch: 16h 36m 29.15055s -20:04:17.19223s
RUWE (>1.4 is poor) : 1.01
K magnitude           : 13.210
G magnitude           : 15.196
RP magnitude          : 14.543
BP magnitude          : 15.678
DUPflag              : 0
Distance (au)        : 9.204
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.38
Sun-Target sep (deg) : 139.69
Sun-Moon sep (deg)   : 173.61
B (ring opening deg) : 25.75
PA of pole (deg)     : 3.60
Pole direction: RA (deg): 39.48270
Dec (deg): 83.42790
C/A sky separation ("): 0.146
C/A sky separation (km): 974.7
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	2045-04-20T11:20:58.908	42.68	-55.22	2575.1	-21.98	-21.99
Titan	E	2045-04-20T11:25:43.021	43.29	-54.70	2575.1	-17.89	-17.90

