

ctools - Bug #1967

ctbin throws error for far-away events

03/16/2017 04:29 PM - Kelley-Hoskins Nathan

Status:	Closed	Start date:	03/16/2017
Priority:	High	Due date:	
Assigned To:	Knödseder Jürgen	% Done:	100%
Category:		Estimated time:	0.00 hour
Target version:	1.5.0		

Description

I'm running ctbin in python, but its throwing an error. My ctbin setup:

```
=== GApplication ===
Name .....: ctbin
Version .....: 1.2.0
inobs .....: events.fits
outcube .....: cube.fits
ebinalg .....: LIN
emin .....: 0.085
emax .....: 200
enumbins .....: 1
ebinfile .....: NONE
usepnt .....: no
nxpix .....: 30
nypix .....: 30
binsz .....: 0.2
coordsys .....: GAL
xref .....: 184.557600325371
yref .....: -5.78418071496058
proj .....: TAN
publish .....: no
chatter .....: 2
clobber .....: yes
debug .....: no
mode .....: ql
logfile .....: ctbin.log
```

but in the function ctbin::fill_cube(), on the first event in the first observation

```
obs:=== GCTAObservation ===
Name .....:
Identifier .....: VR73991_CH1
Instrument .....: VERITAS
Event file .....:
```

```
Event type .....: EventList
Statistics .....: Poisson
Ontime .....: 304 s
Livetime .....: 276.230424 s
Deadtime correction .....: 0.908652710526316
User energy range .....: undefined
=== GCTAPointing ===
Pointing direction .....: (RA,Dec)=(265.84495543,-29.005751976)
=== GCTAResponseIrf ===
Caldb mission .....:
Caldb instrument .....:
```

Response name:
Energy dispersion: Not used
Save energy range: undefined
=== GCTAEventList ===
Number of events: 165 (loaded)
Time interval: 56833.2768518518 - 56833.2803703704 days
Energy interval: 0.85 - 70 TeV
Region of interest: RA=265.844955432731, DEC=-29.0057519755548 [0,0] Radius=2.24999914622635 deg

event:Dir=RA=266.897430419922, DEC=-29.9585800170898 [0.0112254320541442,-0.0174205200340758]
Energy=6.10820293426514 TeV Time=257236727.350771 s (TT)

it throws this error:

Traceback (most recent call last):

```
File "/test.py", line 12, in <module>
    veripy.model_counts_profile_2( obs, center, temp_dir=proftemp )
File "/nv/hp11/nkelleyh3/data/software/veripy/src/obs.py", line 1160, in model_counts_profile_2
    cb.run()
File "/nv/hp11/nkelleyh3/data/software/ctools/lib/python3.5/site-packages/ctools/tools.py", line 1358, in run
    return _tools.ctbin_run(self)
RuntimeError: *** ERROR in GWcsTAN::prj_s2x(int, int, int, int, double*, double*, double*, double*, int*): 1 (phi,theta) coordinates were invalid.
```

By inserting couts into ctbin.cpp, I can see that it comes from the line:

```
GSkyPixel pixel = m_counts.dir2pix(dir);
```

```
in ctbin::fill_cube(GCTAObservation* obs).
```

After poking around, it turns out that observation is a galactic center observation and ctbin is centered on the crab, so the event it was trying to bin was more than a few degrees outside the counts cube. But, this situation seems like it should result in an empty counts cube, not a (difficult to diagnose) error message. Is this working as expected?

History

#1 - 04/05/2017 08:01 AM - Knödseder Jürgen

- Status changed from New to In Progress
- Assigned To set to Knödseder Jürgen
- Priority changed from Normal to High
- Target version set to 1.3.0
- % Done changed from 0 to 10

I agree that the error message is a bit cryptic and that type of error could be caught and translated into a more understandable message.

The exception comes from the WCS classes which convert sky positions into pixel numbers. An exception occurs if the conversion cannot be done, which can happen when a position very far off the centre of the projection is requested.

I will try to make this more explicit.

#2 - 06/07/2017 05:45 PM - Knödseder Jürgen

- Target version changed from 1.3.0 to 1.4.0

#3 - 08/01/2017 09:49 AM - Knödseder Jürgen

- Target version changed from 1.4.0 to 1.5.0

#4 - 01/22/2018 04:44 PM - Knödseder Jürgen

- Status changed from *In Progress* to *Closed*

- % Done changed from 10 to 100

This bug is corrected since some time using the following code:

```
GSkyPixel pixel;
try {
    pixel = m_counts.dir2pix(dir);
}
catch (std::exception &e) {
    num_invalid_wcs++;
    continue;
}
```