

Re: A quickie

Jack Verneti <jackv@ssl.berkeley.edu>

Tue 3/31/2015 6:10 PM

To: Spencer M. Hatch <Spencer.M.Hatch.GR@dartmouth.edu>;

Hi Spencer,

Sorry for the delay in reporting what I found. I'm very, very poor with IDL (I'm probably no better with IDL than a person with one year of college Mandarin is in trying to get by in Beijing, without resorting to English).

In any case, I found that I can determine whether there is EES data in the current loaded SDT data with the following:

```
data=get_fa_ees(0.0, EN=1)
```

This returns the last EES distribution that SDT has in memory - it worked even for orbit 15011. The index of the last EES data is in "data.index". So, the total number of EES distributions is "data.index + 1", since indexing in IDL starts at "0".

Then, I can access all of the EES data by looping from 0 to "last_index", using the INDEX keyword in the call to "get_fa_ees". I found out that, to work, the INDEX value had to be a double float, not an integer, which seems very odd to me.

Here's a snippet of IDL code that accesses all of the EES data, currently in SDT memory:

```
last_index = 0L

didx = 0.0D

; Get the last EES data into "ldata" and set "last_index" as the
last index of EES
; data in SDT memory:
ldata = get_fa_ees(0.0, EN=1)

last_index = ldata.index

; loop through all of the EES distributions in SDT:

for I = 0L, last_index do begin

    didx = double(I)
```

```
data = get_fa_ees(0.0, INDEX=didx)
```

```
endfor
```

I also tried playing with "get_fa_ees(t,/st)" and it didn't work for me either. I tried the above based on what I read in the comments in the source file:

```
$FASTHOME/idl/get_fa_ees.pro
```

Let me know if this is useful to you. I hope that you can try this in your own code, and don't have to worry about how "get_fa_ees" is being used inside the pre-existing code in the IDL libraries (i.e. in the *.pro files in \$FASTHOME/idl).

Jack

Even in orbit 15011, this works and returns, in "data", the last EES distribution for the current SDT loaded data. You can get the total number

Spencer M. Hatch wrote:

> Jack,

>

> You got it. Attached are the batch file (named "alfven.batch"--I thought I'd send it along in case there's any other info you'd like from it) and the plot configuration file, chaston_survey_5 that I tried to slap together based on what I could read in the IDL routine we're running, alfven_stats_5.pro. I've also attached alfven_stats_5.pro and alfven_wrapper.pro; I know you didn't mention them, but I thought I'd spare you the trouble of asking for them in case they're helpful.

>

> As for an orbit or two that merit inspection, that's a good question. I haven't thought about the issues in terms of orbits from which I might expect more data (maybe I should be); I guess what I've noticed is that as the orbit number increases, there is a lower likelihood that we'll be able to process the orbit. In the course of writing this email, I've done some homework. Orbit 15011 is a very specific example; I've attached both plots that I managed to produce with the SDT interface, and the summary electron plots pulled from

<http://sprg.ssl.berkeley.edu/htbin/fastcgi/sumplotsNetscape/recentplot.pl>. It appears to me that electron survey data is definitely available for this orbit, but somehow when I pull fa_ees data from the SDT buffers, it reports that the data are invalid--that is, the following code produces an error and cuts the processing short:

>

> ;; If no data exists, return to main

> t=0

> dat = get_fa_ees(t,/st)

> if dat.valid eq 0 then begin

> print,' ERROR: No FAST electron survey data -- get_fa_ees(t,/st) returned invalid data'

> return

> endif
>
> I did a little study on orbits 15010-15029 and they all appear to have electron survey data available, at least that's what the online sumplots from Berkeley suggest. Yet they all return the "No FAST electron survey data" error.
>
> Thank you for looking into this; it's definitely not an urgent matter, but I'd be grateful for any feedback you might have.
>
> Spence
> _____
> From: Jack Verneti <jackv@ssl.berkeley.edu>
> Sent: Thursday, March 26, 2015 4:33 PM
> To: Spencer M. Hatch
> Subject: Re: A quickie
>
> Hi Spencer,
>
> Those are very useful descriptions of what your code is doing and I will
> try to look at this issue by early next week. Three things would
> really help me:
>
> 1. The "batch control file" that you are using, i.e. when you run:
>
> sdt_batch name_of_file
>
> send me a copy of "name_of_file".
>
> 2. The SDT "plot configuration file that the batch control file is
> using. In the batch control file (i.e. "name_of_file" in (1)), there
> are two lines like:
>
> PlotConfigurationDir: /disks/gpc2/home/sdt/sdt/jackv
> PlotConfigurationFile: jackv_plot_file
>
> That indicates there is a text file:
>
> /disks/gpc2/home/sdt/sdt/jackv/Ulcfg.jackv_plot_file
>
> Send me a copy of that. Note the prefix "Ulcfg." which is
> usually not included as part of the "PlotConfigurationFile" name
> (although maybe it can be, I don't remember).
>
> 3. What would be a good orbit or two where you don't see as much data
> as you originally expected? You mentioned orbits 10000 - 15000 earlier.
>
> I will definitely read the proposal that you sent, and all the best of
> luck on getting some funding!
>
> Jack
>
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>
> Spencer M. Hatch wrote:
>
>

>> Hi Jack,
>>
>> Thanks for the zippy response! All of what you wrote seems sensible; I've tried to produce a list of all data products that are being used for this batch job, which turns out to be much longer than I would have guessed. If electron survey data ("fa_ees"?) isn't available, the batch job skips the orbit. Provided it is available, the batch job divides the orbit into intervals where electron survey data is available (my experience is that there are often just one or two of these intervals per orbit).
>>
>> The batch job then enters a loop over each interval identified in the survey data. In order for an interval to qualify as "valid", it is necessary that the following data products be valid over the given interval (even if they are valid over only a fraction of the identified interval!):
>> MagDC
>> V5-V8_S
>> V8_S
>> either V1-V2_S or V1-V4_S
>> at least one of NE2_S, NE6_S, or NE2_S
>>
>> I've actually never tried to understand our batch job this way! Thank you for spurring me to that exercise. Many other data products are used, but these are the bare necessities. By way of curiosity, my latest attempt to process orbits 16000-18499 only produced batch output up to orbit 16360, and nothing after that; maybe that should be expected based on the lifetime of the FAST mission(?).
>>
>> We just submitted our proposal about two weeks ago, and I think we'll hear back sometime in May. Having the FAST data set readily available was, in fact, totally crucial to our proposal. I have no expectation that it will be interesting to you, but because your help was instrumental, I've attached a copy of the proposal just for kicks. If we were to get the award and I could cut you a slice of it, I would :).
>>
>> Regards,
>>
>> Spence
>>
>> _____
>> From: Jack Verneti <jackv@ssl.berkeley.edu>
>> Sent: Wednesday, March 25, 2015 2:03 PM
>> To: Spencer M. Hatch
>> Subject: Re: A quickie
>>
>> Hi Spencer,
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>> That's a very interesting question.
>>
>> There are three reasons why data volumes of certain types would be
>> decreased over time:
>>
>> 1. As you mentioned, instrument degradation can result in either bad
>> data or non-production of final data products.
>>
>> 2. As the mission progressed, various instrument modes were changed, for
>> various reasons, and that would usually result in the decrease of some
>> types of data and, probably, the increase of other types.
>>
>> 3. The loss (either by plan or otherwise) of available down-link
>> opportunities. Regrettably, I don't recall if this ever happened to FAST

>> or not. FAST was originally described as a "two-year" mission, but
>> lasted for over a decade. It may be the case that after two years, some
>> down-link availability was lost to newer missions.
>>
>> Regarding the mag data, I would be happy to try to determine why it
>> decreases in availability over time (or at least for certain ranges of
>> orbits). What mag quantities are you looking at in the batch job? I can
>> determine whether the data just "isn't there", or if it is not being
>> produced for some other ancillary reason. I will also ask Jim McFadden,
>> who I worked closely with on the FAST ESA data, if he remembers anything
>> about FAST mag data.
>>
>> Would orbits 15000 to 15499 be a good place to investigate?
>>
>> Also, have you been notified yet about getting funding for your FAST
>> project?
>>
>> All the best,
>>
>> Jack
>>
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>> Spencer M. Hatch wrote:
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>>
>>> Hello Jack,
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>>>
>>> I'm just popping in to ask a quick question: Do you know why some data
>>> products become decreasingly available as the FAST orbit number
>>> increases? As an illustrative example, when running this batch job
>>> over orbits 1000-1499, I am able to process 482 of them. In contrast,
>>> when I run over orbits 15000-15499 I only pick up processed data from
>>> 149 of them. This seems to be the general trend as orbit number
>>> increases, and I wonder—does it have anything to do with degradation
>>> of some of the instruments? The primary requirement of the batch job
>>> is availability of magnetometer data, but I confess I haven't checked
>>> in detail to see whether unavailability of some other ancillary data
>>> product, or some combination, is causing later orbits to be skipped.
>>>
>>>
>>> You should get a separate paycheck just for fielding my questions.
>>> I'll be happy to hear from you whenever you have time!
>>>
>>>
>>> Thank you as always,
>>>
>>>
>>> Spencer Hatch
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