Notes:

LENAplot: locally developed processing and plotting software. Goal is to keep those plot formats common to LENAplot and UDFplot as similar as possible. There is only one version of the code to be used for all purposes. Consists of device independent C and IDL routines. For Unix, Mac, and Window use.

UDFplot: plotting software developed by Chris Gurgiola. Plotting enhancements will need to be suggested to Chris for implementation. Processing enhancements specific to LENA can be implemented via external algorithms. These must be passed on to Chris for inclusion in officially released UDFplot versions. Other instrument teams will use UDFplot to plot LENA data, not LENAplot.

Runtime files contain plot information that changes most often from run-to-run of LENAplot or UDFplot. Start/Stop Date/UT; name of template file; color scaling; data file names ...

Template files specify processing & plotting info: event or binned data; plot type (i.e., spectrogram, image); sorting options, masking options, etc. Templates for LENAplot are external, and internal for UDFplot.

Production Scripts: Daily Health and Safety plots and Summary plots are created from standard, or default, template files. These standard templates are provided as examples with releases of LENAplot. When creating Runtime files, must use LATEST data file.

Interactive use of LENAplot:
LENAplot should run interactively with the user answering a series of interrogatives. Given runtime and template files, LENAplot should also be able to run using the contents of those input files to drive the program. That is, the runtime and template files simply contain the answers to the interrogatives LENAplot normally asks.
Over time, advanced users will develop a collection of custom plot template files, changing only the runtime file from run-to-run of LENAplot or UDFplot.

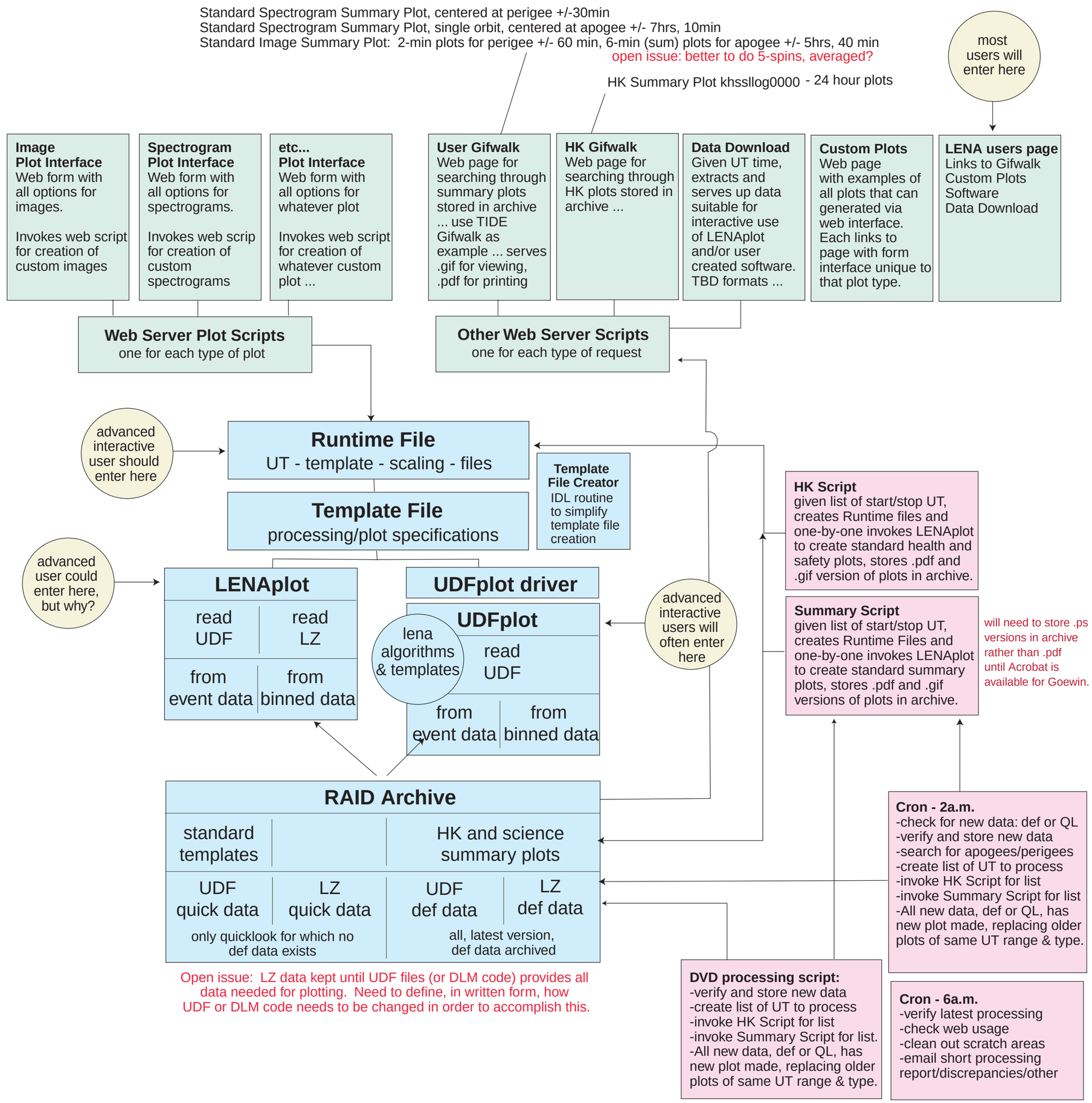
Custom Plot Web Scripts check web input for validity and volume; create Runtime and Template files; invokes LENAplot or UDFplot; serves created plots back to user. When creating Runtime files, must search for and use LATEST data file.

Archive
New def data replaces matching quick data
New def data replaces same, but older, def data
New plots replace same, but older, plots
Q: Does this quarantee use of latest data?

Codes have version numbers of format V.1.0.0
V1.0.1: iterate 3rd number for changes user won't notice.
V1.1.0: iterate 2nd number for changes user will want ... but does not affect data ... i.e. new plot capabilities.
V2.0.0: iterate 1st number for changes that affect the data ... i.e., calibration enhancements. Users must upgrade and abandon use of previous versions.
Main routine of any logical set has the change list.

LENAplot makes following types of plots:
Spectrograms
2D Spectrograms
Image plots of 1 to 3 panels
HK summary plots
Line plots of flux vs time

Goal is for UDFplot to make same or similar plots.
(except for HK)



Spectrograms

When using event data, need to apply scaling parameter to correct for the ratio of total binned coincidences to total event coincidences.

Add Documentation:
What masses, energies included, summed?
What is data source ... UDF, LZ
Event or binned data for valid events
Application of mask?
Zero spin angle at Earth (default) or Sun

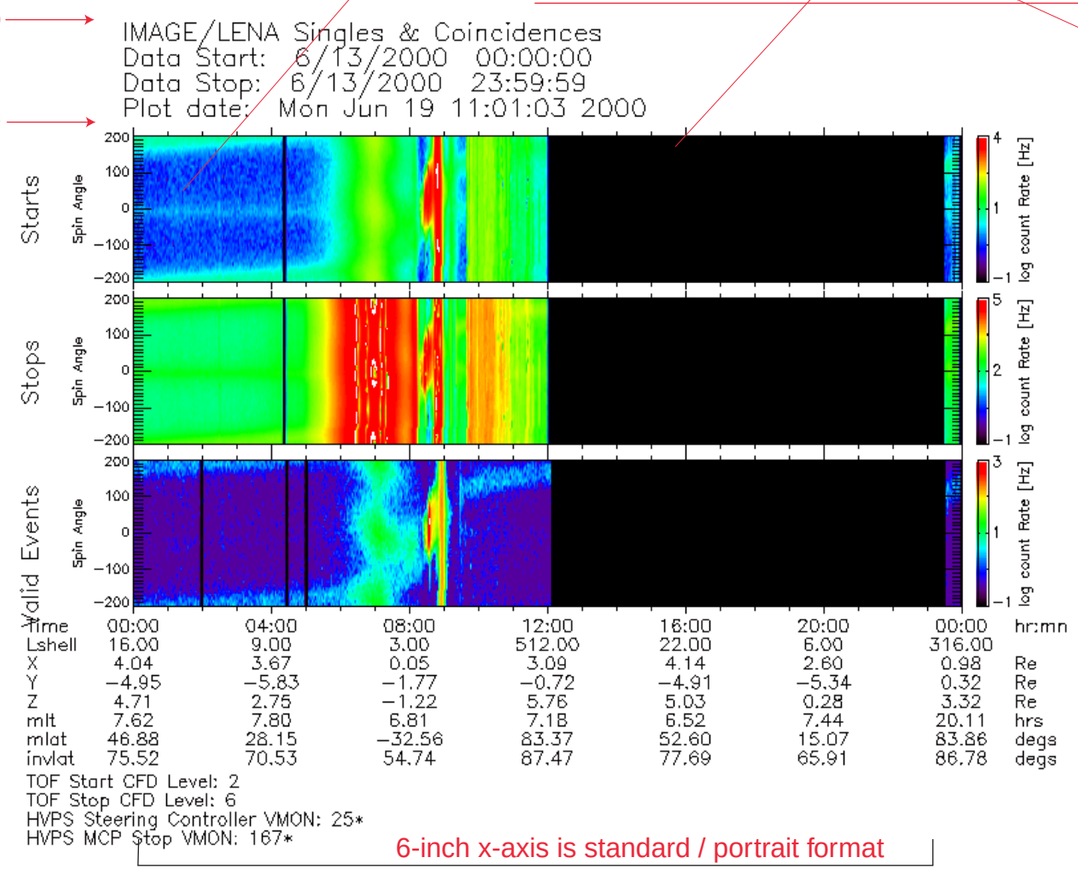
Add marks indicating size of Earth

Add bar a la TIDE with shading indicating number of events within the event data ... black indicates max of 64.

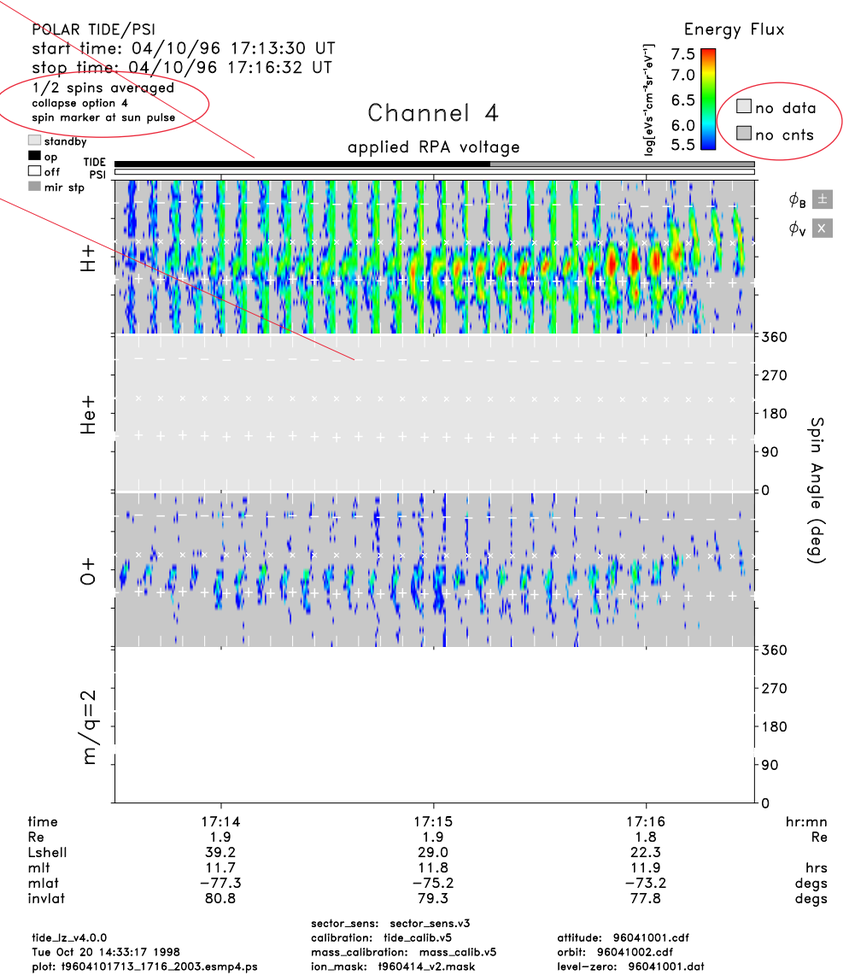
Evolve labeling toward TIDE style, although larger sizes are preferred

Data specific info at top

Plot specific info at bottom



6-inch x-axis is standard / portrait format

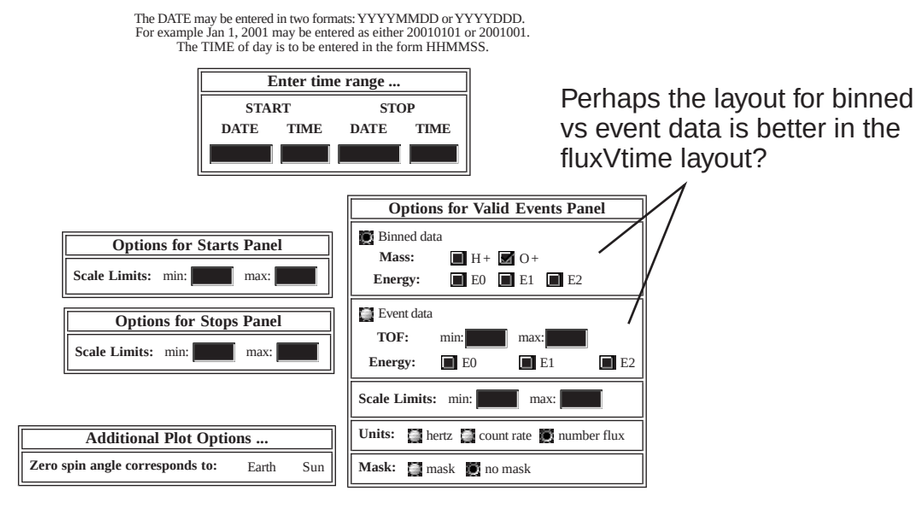


Regardless of time interval requested by user, program shifts the start/stop time to nearest spin boundary

For summary plots:
-use binned data for the valid events panel
-sum over all energies and all masses
-zero spin angle centered on Earth

For a 6-inch plot at 300 dpi, there are 1800 horizontal pixels available ... for a 14hr,20min plot only 430 single strips are needed for full resolution on the 2min spins. Program calculates 1800/430=4.186 ... 4 verticle strips are identically colored per spin plus we need an extra 20 min of data to fill the 6-inch plot. The program forces the plot to be 14hr,40min total, padding 10 min on either end of the requested time. Only a >60 hour plot will require spin averaging. (Similar calculations adjust the start/stop times for custom plots - users beware of unexpected results.)

For custom plots - what can be adjusted from web:
-use summary plot parameters for defaults
-allow user to choose:
start/stop time of plot - YYMMDD or YYDOY
binned data: check boxes for M0, M1 - sum if multiple
binned data: check boxes for E0, E1, E2 - sum if multiple
event data: enter ranges for TOF and energy
radio buttons for Valid events from binned or event data
UDF or LZ data source used as required by software
choose three ranges for the three color bars
radio buttons for unit plotted - count rate, flux, ???
radio button for application of sunpulse mask or not
zero spin angle corresponds to Earth or Sun



Perhaps the layout for binned vs event data is better in the fluxVtime layout?

For production plotting, always create .gif and .pdf versions ... one for view via web, one for printing
For interactive plotting, user has choice of screen (x,win,or mac), gif, or .ps versions

IMAGES

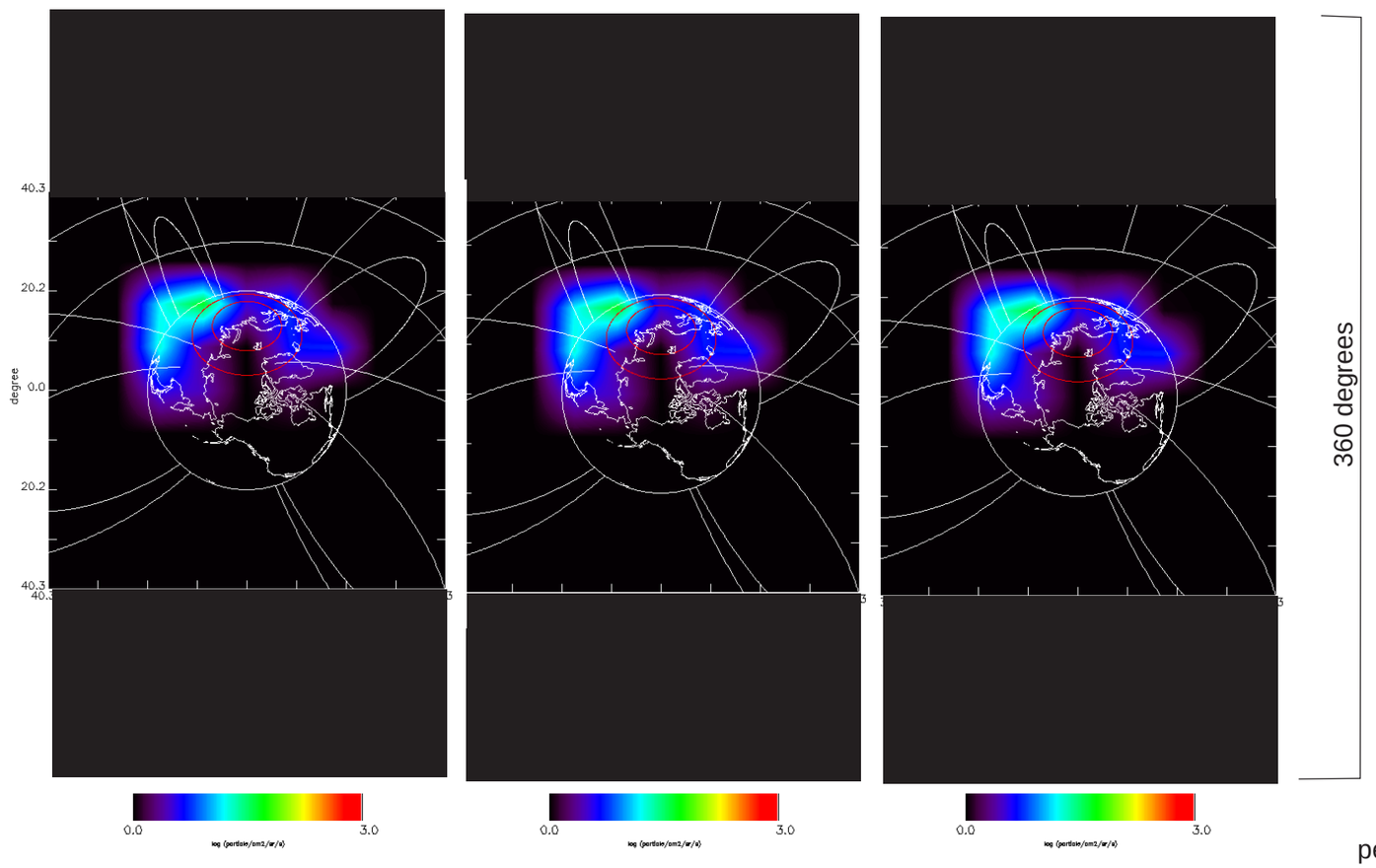
Have we fixed the Earth/Aurora alignment problem?
Mark the dawn/dusk terminator
Mark the field of view

When drawing Earth ... look to Petrinec PIXIE & SNOE plots
Lat/long lines make the earth look round ... lighter weight lines relative to continents.
http://pixie.spasci.com/PT/may11_movie_slow.gif
http://muir.spasci.com/pixie/homepage/img_dir/internal/image_of_the_day.html

For summary plots:
-one plot every two min for perigee +/- 60 min.
-one plot per 3 spins (sum) for apogee +/- 5hr 40min
-use binned data
-Frame 1: all masses, all energies
-Frame 2: H+, all energies
-Frame 3: O+, all energies
-Fixed earth, 360 degrees

For custom plots - what can be adjusted from web:
-use summary plot parameters for defaults
-allow user to choose:
start/stop time of plot - YYMMDD or YYDOY
per frame, check boxes for M0, M1 - sum if multiple
per frame, check boxes for E0, E1, E2 - sum if multiple
radio buttons for Valid events from binned or event data
UDF or LZ data source used as required by software
choose three ranges for the three color bars
radio buttons for unit plotted - count rate, flux, ???
radio button for application of sunpulse mask or not
radio button for fixed Earth, or not
magnetic field lines is an option

Data specific info at top →



On-the-fly Low Energy Neutral Atom Images

LENA Home | Summary plots | Custom plots | UDFplot | Queries | Download data | Find Files | QPS | Links

The DATE may be entered in two formats: YYYYMMDD or YYYYDDD.
For example Jan 1, 2001 may be entered as either 20010101 or 2001001.
The TIME of day is to be entered in the form HHMMSS.

perhaps the layout shown for fluxVtime plots is better?

Enter time range ...

START		STOP	
DATE	TIME	DATE	TIME

Options for Frame 1	Options for Frame 2	Options for Frame 3
Binned data	Binned data	Binned data
Mass: H+ O+	Mass: H+ O+	Mass: H+ O+
Energy: E0 E1 E2	Energy: E0 E1 E2	Energy: E0 E1 E2
Event data	Event data	Event data
TOF range: min: max:	TOF range: min: max:	TOF range: min: max:
Energy: E0 E1 E2	Energy: E0 E1 E2	Energy: E0 E1 E2
Scale Limits: min: 0.0 max: 3.0	Scale Limits: min: 0.0 max: 3.0	Scale Limits: min: 0.0 max: 3.0
Units: hertz count rate number flux	Units: hertz count rate number flux	Units: hertz count rate number flux
Mask: mask no mask	Mask: mask no mask	Mask: mask no mask

Interplanetary Physics Branch | Laboratory for Extraterrestrial Physics | Goddard Space Flight Center | NASA

In case of problems, contact: Curator Responsible Official

Last Updated: *Tues., March 09, 1999*

Plot specific info at bottom →

For production plotting, always create .gif and .pdf versions ... one for view via web, one for printing
For interactive plotting, user has choice of screen (x,win,or mac), gif, or .ps versions

Regardless of time interval requested by user, program shifts the start/stop time to nearest spin boundary

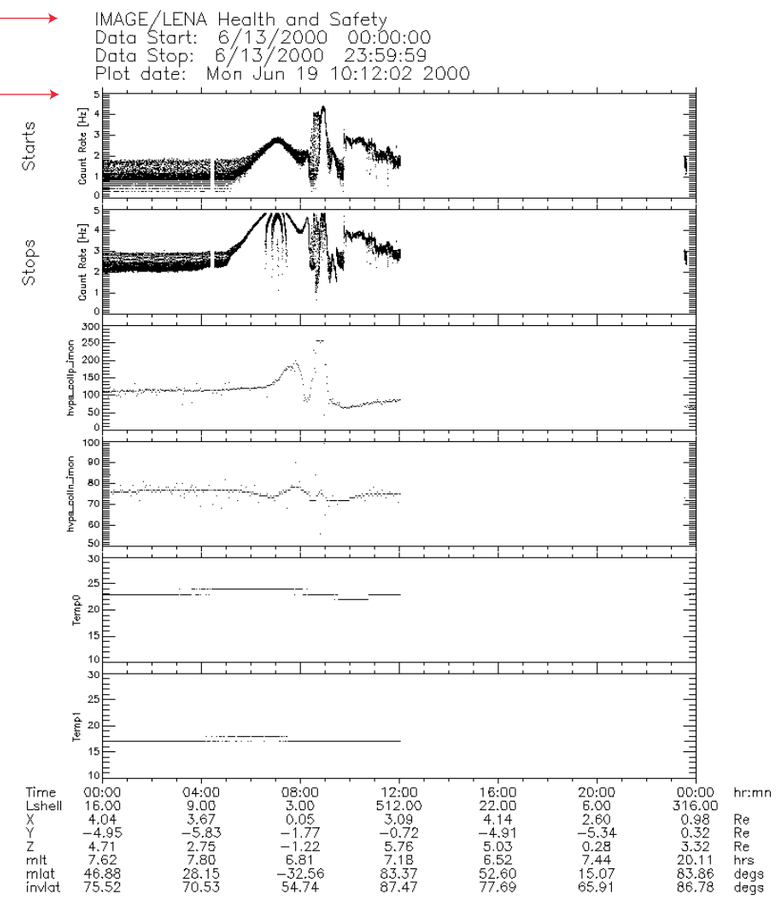
Add Documentation:
What masses, energies included, summed?
What is data source ... UDF, LZ
Event or binned data for valid events
#of events if using event data
Application of mask?

When using event data, need to apply scaling parameter to correct for the ratio of total binned coincidences to total event coincidences.

HK plots

Data specific info at top

Plot specific info at bottom



Indicate coordinate system ... GSM?

6-inch x-axis is standard / portrait format

Add Documentation:
What masses, energies included, summed?
What is data source ... UDF, LZ
Indicate event data

For summary plots:
- event data from UDF files

For custom plots -

none - not used in this way

2D Spectrograms (combine best of spectrogram and images)

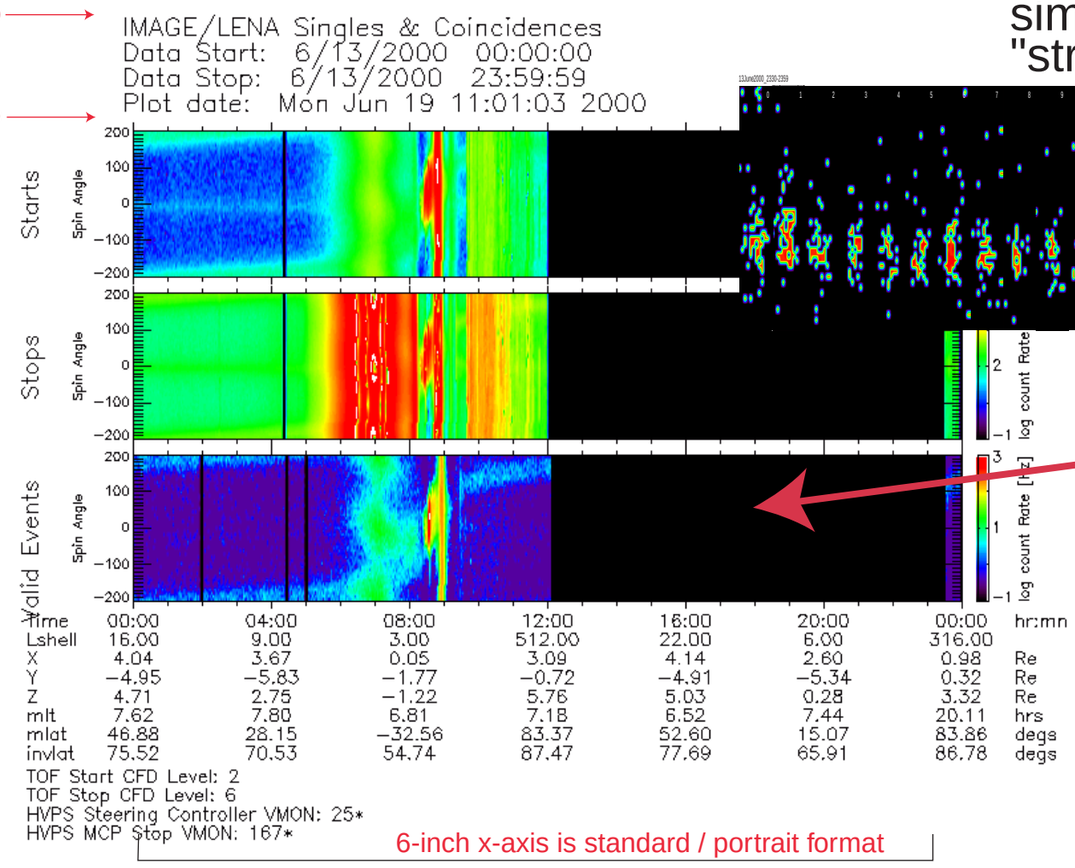
suitable for intermediate intervals of time

Add Documentation:
What masses, energies included, summed?
What is data source ... UDF, LZ
Event or binned data for valid events
Application of mask?
Zero spin angle at Earth (default) or Sun

Add bar at top a la TIDE with shading indicating number of events within the event data ... black indicates max of 64.

Data specific info at top

Plot specific info at bottom



similar to spectrograms but every vertical "stripe" is a narrow version of an image

When using event data, need to apply scaling parameter to correct for the ratio of total binned coincidences to total event coincidences.

Add marks indicating size of Earth or little Earths??

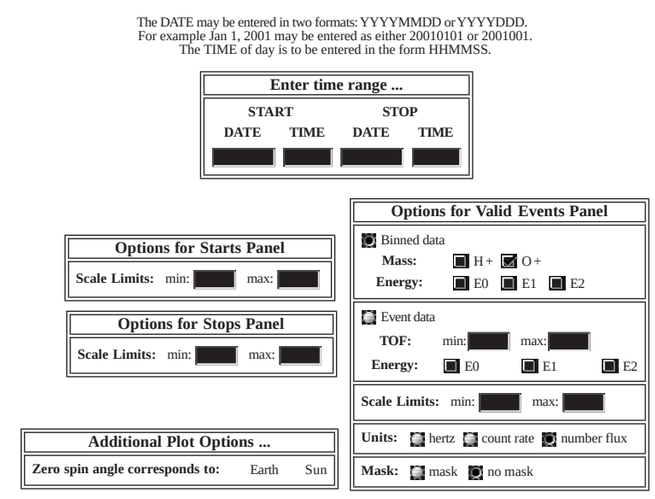
6-inch x-axis is standard / portrait format

Regardless of time interval requested by user, program shifts the start/stop time to nearest spin boundary

No summary plots defined:

For a 6-inch plot at 300 dpi, there are 1800 horizontal pixels available ... 150 spins (5 hours) can be represented at the full 2-min resolution using 1 horizontal pixel per polar sector. At 2 pixels per bin, 75 spins (2.5 hours), 3 pixels give 50 spins

For custom plots - what can be adjusted from web:
-use summary plot parameters for defaults
-allow user to choose:
start/stop time of plot - YYMMDD or YYDOY
binned data: check boxes for M0, M1 - sum if multiple
binned data: check boxes for E0, E1, E2 - sum if multiple
event data: enter ranges for TOF and energy
radio buttons for Valid events from binned or event data
UDF or LZ data source used as required by software
choose three ranges for the three color bars
radio buttons for unit plotted - count rate, flux, ???
radio button for application of sunpulse mask or not
zero spin angle corresponds to Earth or Sun



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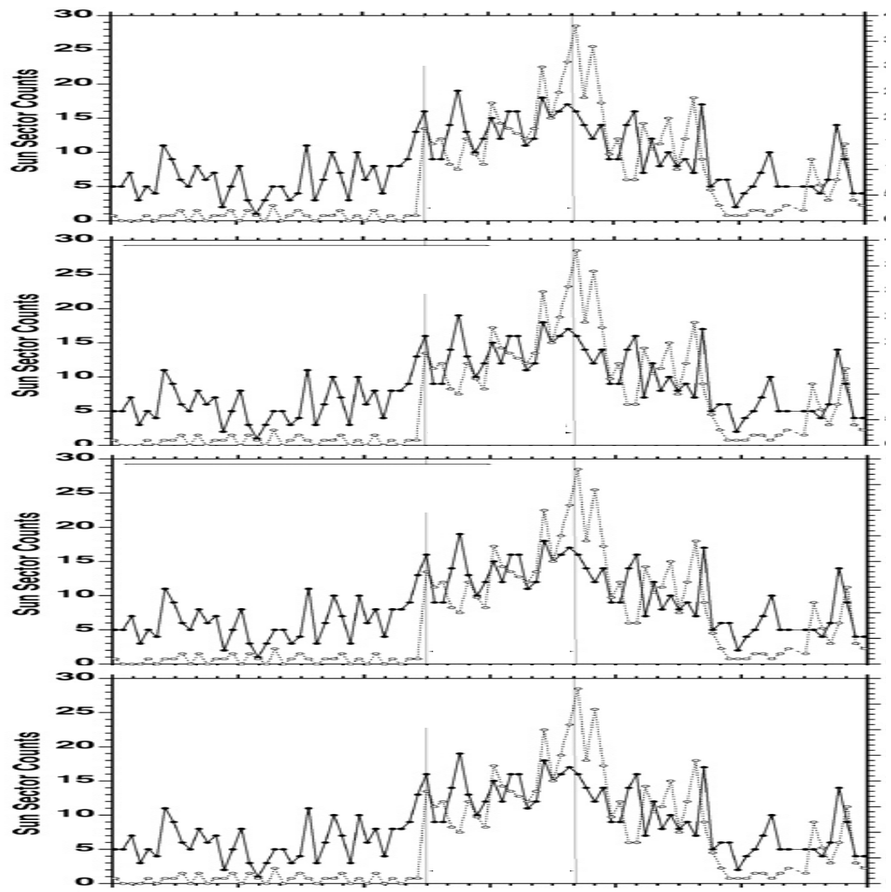
For interactive plotting, user has choice of screen (x,win,or mac), gif, or .ps versions

Flux vs Time plots - for specified atom/energy/polar ranges for specified range of time, from binned (or event) data.

Data specific documentation at top

If <100 data points, mark data points plus line.
If >100 data points, line plot only

Unit for vertical axis may be counts or flux



Time and orbit info across bottom as in spectrograms

Plot specific documentation at bottom

6-inch x-axis is standard / portrait format

Each panel gives values for specific spin/polar/energy/mass range:
Default is: TDB

On-the-fly Low Energy Neutral Atom Flux vs Time Plots

LENA Home | Summary plots | Custom plots | UDEplot | Queries | Download data | Find Files | QES | Links

The DATE may be entered in two formats: YYYYMMDD or YYYYDDD.
For example Jan 1, 2001 may be entered as either 20010101 or 2001001.
The TIME of day is to be entered in the form HHMMSS.

Enter time range ...

START		STOP	
DATE	TIME	DATE	TIME

Options for Frame 1

Binned data — Mass: H+ O+
Event data — TOF range 1: min 0 max 256
TOF range 2: min 0 max 256
TOF range 3: min 0 max 256

Energy: E0 E1 E2
Spin Bins: min 0.0 max 3.0
Polar Bins: min 0.0 max 3.0

Vertical Axis Limits: min 0.0 max 3.0

Units: hertz count rate number flux

Mask: mask no mask

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Responsible Official

Last Updated: *Tues., March 09, 1999*

file:///GilesPB/Software%20Plan/Web_example_fluxVtime2.html

For summary plots:
- no summary plot currently defined for this format

For custom plots -
Allow each panel to include/sort data as shown in html example

Each plot run also produces an ascii text file with data in format compatible with KaleidaGraph:
M/D/Y, H:M:S.S, Panel1flux1, Panel1flux2, Panel2flux1, Panel2flu2 etc