



flair v1 → v2

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flair 1.2-4

Flair (most important) functionality that added since the last report (Oct 12):

- **Dicom:** (thanks to Andrea, Nicolini, ...)
 - CT file conversion to enhanced **FLUKA voxel** format
 - PET-CT importing custom source.f
- Material importing to library
- PET geometry generator (thanks to **Pablo Ortega**)
- Enhanced MCNP importing (lattices, transformations)
- Importing of GDML geometries
- Copy&Paste through standard clipboard
- Spawn jobs / Processed files use new file syntax
- Spawn jobs can run in subdirectories
- Filtering listboxes

...

From version 1.2-0 no more functionality was added apart bug fixes

flair-geoviewer 1.2-4

Geometry viewer:

- Parallelization of the code / Code refactoring (thanks to D. Sinuela)
- Projection/Layers/Errors dialogs are docked
- Layers (global/local) saved in .ini or .flair
- Paste/Cloning of regions clones bodies
- Automatic generation of repetitive bodies
- optimized CSG expansion using body-body intersection location and arbitrary oriented bounding boxes
- edge detection in 3D
- support of multiple palettes
- region names
- show dimensions on screen of edited body
- ...
- Easily portable: able to compile/run on Mac and Android tablets



7 years of flair

2007 First public version released

Since then flair has been constantly enhanced with functionality

2010 geometry-viewer and debugger module

2011 v1 released with geometry-editor

Currently:

- 170'000 lines of code (flair + geoviewer + libraries)
- ~2000 unique IP downloads on every release

The interface has reached its limits

The code needed serious cleaning

V1 Problems [1/2]

- Multiple places to access information, e.g. toolbar, tree, menu
- Common menu for all frames. Necessary to disable/enable functions
- Toolbar with small icons
 - not obvious meaning (just from the image)
 - hard to click on new high resolution screens
 - equal weight on important and less important functions
- some functionality was split in multiple frames (Run/Files/Data)
- Tree not offering a multiple selection → No multiple editing of plots etc.

V1 Problems [2/2]

- Many features there but not discoverable e.g. Geometry Editor, Automatic scanning of detectors, advanced filtering, region optimization, ...
Features hidden in the menu that nobody looks (out of site by default!)
- Too much information was appearing on the main page, tree with all applications, toolbar with all applications etc...
- Some frames too complex with a lot of information for a novice or even the advanced user do not always need!
e.g. Plots like Geometry
- Window layout management non-existent. Two frames where hard to manage.
- Geometry editor was external app and hard to synchronize.
- xterm was confusing for the beginners + mixing output

V1 Statistics

Percentage	Frame
20.2%	Input
18.5%	Run
17.4%	Geometry Editor
12.5%	Flair Project
9.7%	Calculator
3.5%	Data
2.3%	Plot
1.6%	Compile
1.5%	USR-1D
0.9%	USRBIN Plot
0.9%	Files
0.8%	Viewer
0.7%	FLUKA Debugger
9.7%	Other

V1 Statistics [2/2]

Python version

Percentage	Version	Distribution
7%	2.3	SLC4, RH4, Centos4
40%	2.4	SLC5, RH5, Centos5
7%	2.5	
17%	2.6	SLC6, RH6, Centos6
28%	2.7	FC17+, Ubuntu12+

V2 Interface redesign (or so) [1/2]

- Kernel not touched!
- Common interface for all frames/pages
- Dockable windows + Possibility to open as external window
- Fully User customizable
- Nicer graphics
- Provide only basic tabs as default choice
- Menu/toolbar replaced by extended toolbar/ribbon with descriptions. (Penalty vertical space)
 - easiness of pointing a button is proportional to it's surface / distance
 - minimise mouse movements
 - bigger buttons for more important functions

Thanks to
Thanasis Manousos,

V2 Interface redesign (or so) [2/2]

- each page show only most frequent used fields. Rest are hidden as advanced options
- more intelligent functionality on each page
- split functionality from interface
- all process run in background

Plots:

- multiple editing of plots
- plot abstraction layer to support other engines: matplotlib, root
- embed images to notes

flair2 - main page

Tabs drag to rearrange or to undock

Ribbon with commands
Can be hidden

The screenshot displays the Flair2 software interface. At the top, a ribbon menu contains various command groups: Clipboard (Cut, Copy, Paste), Project (New, Open, Save), Input (Load, Save, Save As, Import), Publish (Export, Document, Print), and Tools (Config, Report, Updates, About). Below the ribbon, the main window title is 'Flair' and the current document title is 'n_TOF lead target'. The main content area shows a plot titled 'nTOF Target geometry'. The plot has a coordinate system with X (cm) on the horizontal axis and Y (cm) on the vertical axis, both ranging from -100 to 100. The plot shows a green rectangular area representing the target geometry, with a cyan border. The geometry is centered around X=0 and Y=0, with a width of approximately 40 cm and a height of approximately 40 cm. The status bar at the bottom indicates 'Input: ntof33.inp' and 'Card:1 Displayed:80 Total:82'.

flair2 - multi docking

The screenshot displays the Flair2 software interface with three docked windows:

- Input:** Shows simulation parameters such as `#define ang 10`, `TITLE: nTOF lead target`, `GLOBAL` settings, `DEFAULTS`, `BEAM` (Energy: 0.3), `BEAMPOS`, `GEOBEGIN`, `SPH BLKBODY`, `$start_translat`, `SPH VOID`, `$end_translat`, `RPP WATERCNT`, and `Lead Target`.
- Run:** A table showing the execution of multiple detector runs.
- Output:** A table showing the status of various processes.

Run	Spawn	Run	Detector	Type	Unit
<ntof33>		<ntof33>	ntof33_usrbin_50	usrbin	50
1/ntof33		<ntof33>	ntof33_resnuclei_51	resnuclei	51
		<ntof33>	ntof33_usrbdx_52	usrbdx	52
		<ntof33>	ntof33_usrroll_53	usrroll	53
		<ntof33>	ntof33_usrtrack_54	usrtrack	54
		<ntof33>	ntof33_usrtrack_55	usrtrack	55
		<ntof33>	ntof33_usrbin_56	usrbin	56

Type	Process	Status
flair	flair	Idle
Data	Merge	Finished
Geometry	ntof_geom	Idle
Geometry	ntof_geom2	Idle
USRBIN	enedep	Idle
USRBIN	ntof_smallbin	Idle
	ntof33_usrbin_50	
	1	
	100	

flair2 - input

Import commands are bigger

Intelligent filtering

The screenshot shows the 'flair2' software interface. The main window is titled '+ ntof33.flair - flair'. The menu bar includes 'Flair', 'Input', 'Geometry', 'Run', and 'Plot'. The toolbar contains icons for 'Show', 'Move Up', 'Move Down', 'Preprocessor', 'Material', 'Delete', 'Change', and 'Close'. A search box is located in the top right corner. The main text area displays the following input commands:

```
#define ang 10
#define test2 :
#define test3 : 1
TITLE n_TOF lead target
#define test4 : 2
#define CUT :
GLOBAL Max #reg: Analogue: DNear:
Input: Names Geometry: Free
DEFAULTS NEW-DEFAULT
BEAM Beam: Energy E: 0.3 Part: PROTON
Delta p: Gauss Delta p(FWHM): 0.082425 Delta phi: Gauss Delta phi: 1.7
Shape(X): Rectangular Delta x: =2*fwhm Shape(Y): Rectangular Delta y:
BEAMPOS x: 2.2632 y: -0.5 z: -10.0
cosx: .017364818 cosy: Type: POSITIVE
GEOBEGIN Log: Acc: Opt:
Inp: Out: Fmt: COMBNAME
Title: implied nTOF geometry
Black body
SPH BLKBODY x: 0.0 y: 0.0 z: 0.0
R: 10000000.0
$start_translat dx: =5*2 dy: 3.0 dz: 2.0
Void sphere
SPH VOID x: 0.0 y: 0.0 z: 0.0
R: 1000000.0
$end_translat
Water container
RPP WATERCNT Xmin: -43.0 Xmax: 43.0
Ymin: -53.6 Ymax: 53.6
Zmin: -32.5 Zmax: 35.0
Lead Target
*...+...1...+...2...+...3...+...4...+...5...+...6...+...7...+...
#define ang 10
```

At the bottom of the window, the status bar shows 'Input: ntof33.inp', 'Card:1', 'Displayed:80', and 'Total:82'. The footer of the slide contains the email 'Vasilis.Vlachoudis@cern.ch' and the page number '13'.

Buttons for every action

flair2 - geometry editor

The screenshot displays the 'flair2 - geometry editor' interface. The main window is titled '+ ntof33.flair - flair'. The top menu bar includes 'Flair', 'Input', 'Geometry', 'Run', and 'Plot'. Below the menu is a toolbar with various tools like 'Cut', 'Copy', 'Paste', 'Select', 'Pan', 'Paint', 'Orbit', 'Info', 'Snap', 'Body', 'Zone', 'Region', 'Delete', 'Wireframe', 'Lock', 'Layer', 'Layout', 'Reload', and 'Visibility'. The central area is divided into four viewports: 'Front', 'Top', 'Left', and 'U/V'. Each viewport shows a 3D model of a detector component with a green 'TARGET' region and a blue 'WATERCNT' region. The 'Front' view shows the component from the front, the 'Top' view from the top, the 'Left' view from the left, and the 'U/V' view from the U and V directions. The 'U/V' view shows a complex, multi-faceted shape. The 'Geometry' panel on the left lists various objects and their types, including 'BLKBODY', 'VOID', 'WATERCNT', 'PBTARGET', 'NICHE', 'CUT', 'body1', and 'test'. The 'Properties' and 'Attributes' panels are also visible. The status bar at the bottom shows 'Input: ntof33.inp', 'Card:1', 'Displayed:80', and 'Total:82'. The coordinates at the bottom are x: -16.60544718, y: 27.69628235, and z: -9.13970379.

Type	Name
SPH	BLKBODY
SPH	VOID
RPP	WATERCNT
RPP	PBTARGET
RPP	NICHE
RPP	CUT
RCC	body1
REGION	BLKBODY
REGION	VOID
REGION	WATERCNT
REGION	TARGET
ROT-DEFI	test

flair2 - run / files / data

The screenshot shows the Flair2 software interface. The main window is titled '+ ntof33.flair - flair'. The top menu bar includes 'Flair', 'Input', 'Geometry', 'Run', and 'Plot'. The top toolbar contains various icons for file operations (Cut, Copy, Paste, Run, Files, Data), editing (Add, Delete, Move Up, Move Down, Clone, Loop, Rename), and job control (Nohup, Attach, Refresh, Clean, Stop, Run). The 'Run' dialog box is open, showing a list of runs in the 'Run' column and a 'Spawn' column. The first run is '<ntof33> 1/ntof33'. The 'Run or Files or Data frame' is visible, showing a table of defines with columns 'Name' and 'Value'. The table contains the following data:

Name	Value
ang	10
test2	
test3	1
test4	2
CUT	

The progress bar at the bottom of the dialog shows 'Status: Finished OK', 'Input: ntof33', and 'Dir:'. The status bar at the bottom of the window indicates 'Input: ntof33.inp' and 'Running 0 out of 2'.

Common
Run listbox

Run or
Files or
Data frame

flair2 - compile

The screenshot shows the 'ntof33.flair - flair' application window. The toolbar contains various icons for file operations (Cut, Copy, Paste, Save As, Remove), database management (Add, Database, Move Up, Move Down), and execution (Run, Plot, Compile). A red arrow points to the toolbar with the text 'Commands go from left to right'. Below the toolbar is a table listing files in the 'Executable:' section.

File	Type	Size	Date
source.f	Fortran	6946	2008.05.19 16:35

Input: ntof33.inp Files: 1

flair2 - plot

Push plots to notes

Simplified dialogs

Multiple editing of plots

Plot	Type
ntof geom	Geometry
ntof_geom2	Geometry
enedep	USRBIN
ntof_smallbin	USRBIN
ntof_resnuc	RESNUCLE
ntof_fluence	USR-1D
ntof_usrbdx	USR-2D
nFlux	USRBIN
nFluxR	USRBIN
ntof_fluence01	RESNUCLE
ntof_region	USRBIN
enedepmax	USRBIN
Red	Geometry
Green	Geometry
Blue	Geometry
Magenta	Geometry
ntof33_plot17	USERDUMP

Title: nTOF Target geometry Display: 0 Options ▾

Axes

Label	Log	Min	Max	Opt
x: X (cm)	<input type="checkbox"/>			▾
y: Y (cm)	<input type="checkbox"/>			▾

Center

x: 0.0 y: 0.0 z: 0.0

Basis

Axes ▾ X:Y

x-y	y-z	-u
x-z	swap	-v

Extends

Δu: 100.0 Δv: 100.0 Get

Plot

Type: Material ▾

Run: ▾

Advanced ▾

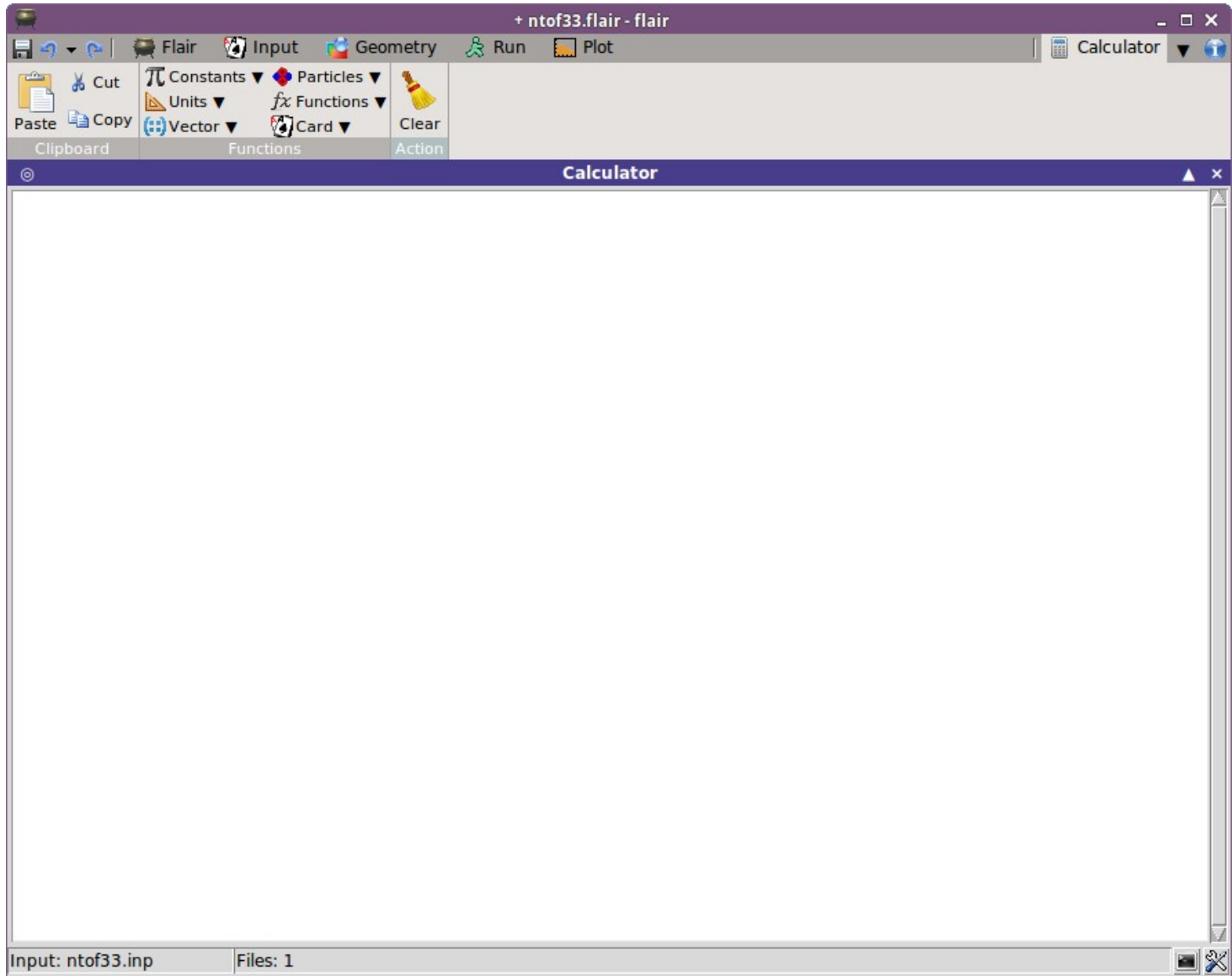
Input: ntof33.inp Running 0 out of 2

flair2 - viewer

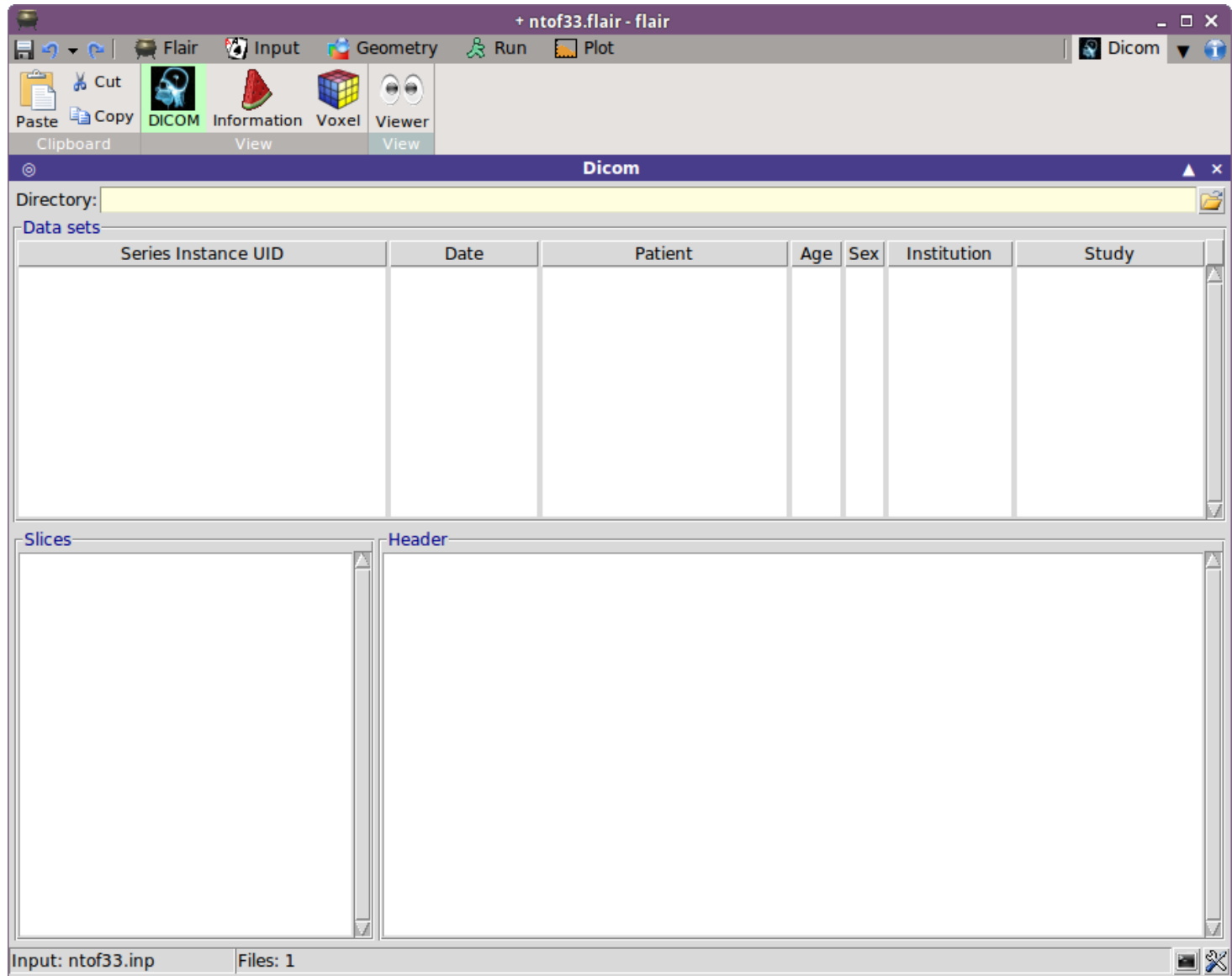
```
#define ang 10
*define test2
#define test3 1
TITLE
n_TOF lead target
#define test4 2
#define CUT
GLOBAL                               1.      1.0
DEFAULTS                               NEW-DEFAULT
!@what.4=2*fwhm
BEAM      -0.3 -0.082425   -1.74.70964009   1.0PROTON
BEAMPOS   2.2632   -0.5   -10.0.017364818
GEOBEGIN
      0      0      implied nTOF geometry
* Black body
SPH BLKBODY  0.0 0.0 0.0 10000000.0
!@what.1=5*2
$start_translat 10 3.0 2.0
* Void sphere
SPH VOID  0.0 0.0 0.0 1000000.0
$end_translat
* Water container
RPP WATERCNT  -43.0 43.0 -53.6 53.6 -32.5 35.0
* Lead Target
RPP PBTARGET  -40.0 40.0 -40.0 40.0 -30.0 30.0
RPP NICHE     -15.0 15.0 -40.1 15.0 -30.1 -10.0
#if CUT
!@what.1=(-250-250)*mm
!@what.5=b(PBTARGET,5)-10
!@what.6=-w(5)
RPP CUT      -50. 0.0 0.0 70. -40. 40.
#endif
RCC body1    -52.5 0.0 15.0 49.463414634146 0.0 22.829268292683
              17.635364968182
END
* Black hole
```

Input: ntof33.inp Card:1 Displayed:80 Total:82

flair2 - calculator



flair2 - dicom



flair2 - output / cockpit

The screenshot displays the 'ntof33.flair - flair' application window. The top toolbar includes icons for Flair, Input, Geometry, Run, Plot, and Output. Below the toolbar is a menu bar with 'Clipboard' (Paste, Copy) and 'Process' (Run, Stop, Files, Output). A red text overlay reads 'Allow to re-execute the commands'. The main area is titled 'Output' and contains a table with the following data:

Type	Process	Status
flair	flair	Idle
Data	Merge	Finished
Geometry	ntof_geom	Idle
Geometry	ntof_geom2	Idle
USRBIN	enedep	Idle
USRBIN	ntof_smallbin	Idle

Below the table is a terminal window showing the following output:

```
ntof33_usrbin_50  
  
1  
100  
100  
1  
EOF  
set style line 1 lt -1 lw 1  
set cbrange [1e-06:10000.0]  
set colorbox vertical  
set pm3d map explicit corners2color c1  
set palette defined ( 1. 1.0 1.0 1.0, 2. 0.9 0.6 0.9, 3. 1.0 0.4 1.0, 4. 0.9 0.0 1.0, 5. 0.7 0.0 1.0, 6. 0.5 0.0 0.8, 7  
. 0.0 0.0 0.8, 8. 0.0 0.0 1.0, 9. 0.0 0.6 1.0,10. 0.0 0.8 1.0, 11. 0.0 0.7 0.5, 12. 0.0 0.9 0.2,13. 0.5 1.0 0.0, 14. 0.8  
1.0 0.0, 15. 1.0 1.0 0.0,16. 1.0 0.8 0.0, 17. 1.0 0.5 0.0, 18. 1.0 0.0 0.0,19. 0.8 0.0 0.0, 20. 0.6 0.0 0.0, 21. 0.0 0.0 0.  
0 )  
set palette maxcolors 30  
set logscale cb  
set logscale z  
splot 'ntof_smallbin.dat' us 2:1:3 notitle
```

A red text overlay reads 'Output classified per command'. The bottom status bar shows 'Input: ntof33.inp' and 'Files: 45'.

V2 still to do

- Dedicated status bar for each page
- cockpit for managing process
- make like dependence of processes
- Plots graph wizard
- automatic documentation (openoffice, latex)
- FLUKA geometry debugger to be integrated with geometry editor
- Additional faster 3D graphics with **opencsg** (to be checked)
- improved ray tracing
- Paint tool for geometry
- **Integrate:**
 - FLUKA element database
 - Line builder

svn co <http://svnweb.cern.ch/guest/flair/branches/flair2>