

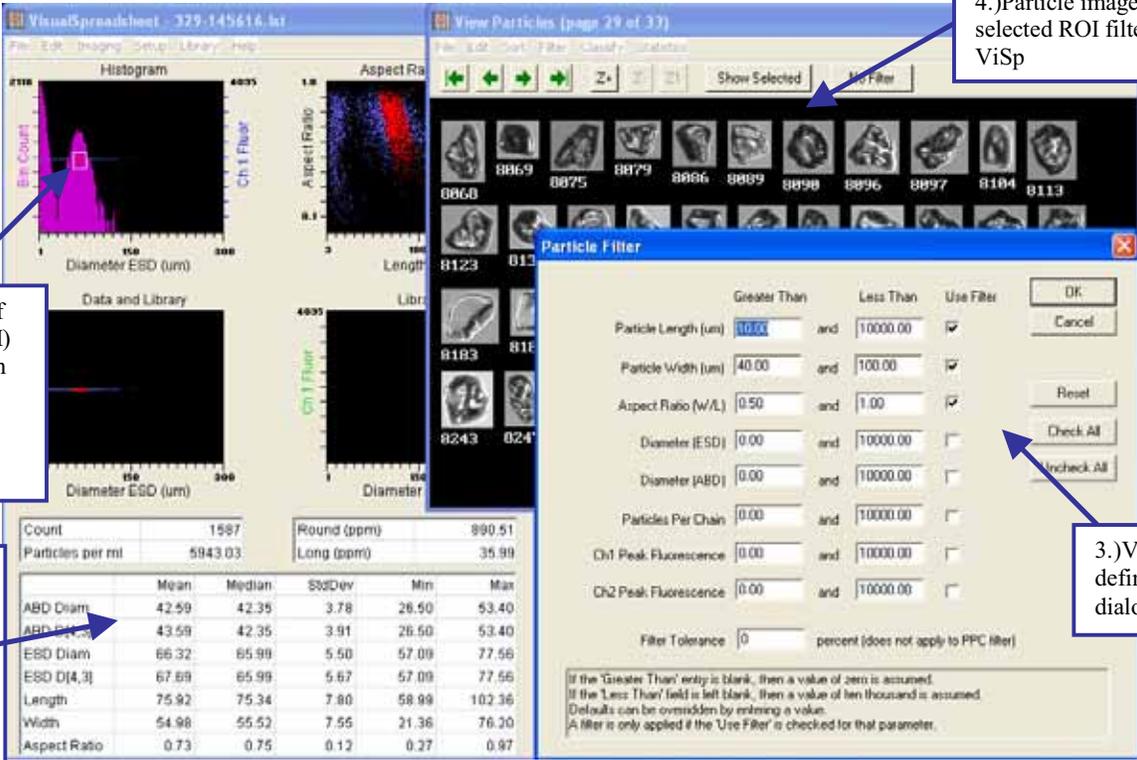
FlowCAM[®]

VisualSpreadsheet[®]

Interactive, Intuitive Particle Analysis Software

See the difference!

The FlowCAM[®] has always been unique as a particle analyzer in its ability to allow analysis of particles by visual inspection using the IMS Interactive Scattergram[™] feature. With the release of VisualSpreadsheet[®] (ViSp[®]), Fluid Imaging has supplied a powerful, unique new method for post processing of particle data. Visual Spreadsheet enables the FlowCAM user to *visually* post-process particle data in the same way that other particle analysis systems usually do in a tabular spreadsheet!



1.) Region of Interest (ROI) selected from scattergram using Interactive Scattergram

2.) Particle statistics updated for selected ROI only

3.) ViSp filter definition dialog box

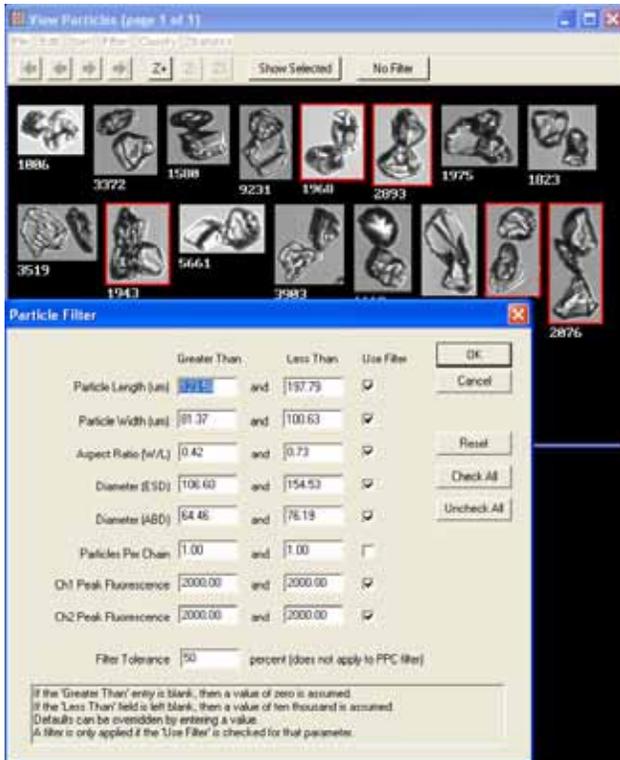
4.) Particle images from selected ROI filtered using ViSp

	Mean	Median	StdDev	Min	Max
ABD Diam	42.59	42.35	3.78	26.50	53.40
ABD Diam	43.59	42.35	3.91	26.50	53.40
ESD Diam	66.32	65.99	5.50	57.09	77.56
ESD D[4,3]	67.69	65.99	5.67	57.09	77.56
Length	75.92	75.34	7.80	58.99	102.36
Width	54.98	55.52	7.55	21.36	76.30
Aspect Ratio	0.73	0.75	0.12	0.27	0.97

As can be seen from the example above, ViSp gives the user an extremely powerful and intuitive methodology for analysis of particle data acquired by the FlowCAM. The first operation was to define a region of interest (ROI) within the scattergram using the Interactive Scattergram feature (1). In this instance, a region of interest of particles between 43 and 65 microns in Equivalent Spherical Diameter (ESD) was defined with the cursor in the histogram (represented by the white box). As soon as this is done, the Interactive Scattergram finds all particle images meeting that criterion within the entire run and displays those particle images in the View Images window on the right hand side of the screen. Note that the particle statistics in the lower left hand box of the main window are updated to represent the statistics for the particles selected in the ROI only (2). In this case, 1587 particles out of a total of 5,000 total acquired particles were found meeting the criteria of the ROI.



At this point, the ViSp filtering feature was used to further refine the results within the ROI. As seen from the ViSp filter dialog box (3), the particles in the ROI were filtered to find only those particles that met the defined filter parameters (4), which in this case were: 1.) particle length between 10 and 1,000 μ , 2.) particle width between 40 and 100 μ and 3.) Aspect Ratio (width/length) between 0.50 and 1.00. By default, the selected and filtered particle images are displayed in the order in which they were acquired (Sort on ID). The ViSp Sort menu allows for the particle images to be sorted in a variety of different ways. In the example at right, ViSp has been told to sort the particle images in ascending order based upon the particle aspect ratio. As an additional aid in the analysis process, ViSp displays an Image Properties dialog, which shows all of the particle measurements for the particle the cursor is placed over in the display.



In the above example, ViSp was used to define the particle filter based upon user supplied parameters entered into the define filter dialog. An even more powerful feature of ViSp is to allow the define filter dialog to be filled in based upon an image or set of images defined by the user simply by selecting them via a mouse click. A “target image” (or set of images) is defined in the View Images window merely by clicking on that particle image(s), which displays a red box around each image selected. At this point, if the Define Filter dialog is invoked, the values from the “target image(s)” are used to populate the filter parameters. When the filter is run at this point, only particles similar to the “target particles” are found and displayed. The example at left shows a typical result of such an operation. The five particles outlined in red are the “target particles”

Particle Properties	
ID	1302
Length	79.57
Width	71.66
Aspect Ratio	0.90
Diameter (ESD)	75.45
Diameter (ABD)	46.88
Particles/Chain	1
Ch1 Peak Fluor	2000
Ch2 Peak Fluor	2000

which were used to automatically search for similar particles, in this case we were interested in finding agglomerated particles.

At any point in the analysis, the filtered particles can be saved as a new “list file” or “library file”. A library file can be used as input to the Pattern Recognition software to look for similar particles in any saved FlowCAM run. As an example, different libraries can be stored for different species in a water sample, and later be used to automatically find particles of the same species in other acquired data!

VisualSpreadsheets[®] is the most powerful and intuitive particle analysis available. Contact us today to arrange for a demonstration and *See the difference!* www.fluidimaging.com