Comparison between Fortran, FOAM and LWDAQ analysis results for images from the full run of Sept 29, 2007

For this comparison, the images from the above run were separated into three categories:

1) 'Good' images: the entire image is visible;
2) 'Cut' images: the image is partly obstructed;
3) 'Bad' images: the image is not visible at all.

Both the FOAM and LWDAQ analysis make use of the 'AutoBounds' routine. This means that if, on the first try, the image cannot be analysed, the routine randomly selects a sub-region of the image and tries again. The analysis will make 10 attempts, and if it fails all 10 reports a final analysis error.

'Good' images:

Total images in this category: 4727
Fortran analysis failure: 32
FOAM analysis failure: 4
LWDAQ analysis failure: 5
Wrongly entered code orientation values found: 38

Comparison between FOAM and Fortran analysis routines:

![Illustration 1] Top left: Histogram of difference between FOAM $x$ origin and Fortran $x$ origin
Top right: Histogram of difference between FOAM $y$ origin and Fortran $y$ origin
Bottom left: Histogram of ratio between FOAM and Fortran magnification
Bottom right: Histogram of difference between FOAM and Fortran rotation

RMS deviation in $x$: 4.2 µm
RMS deviation in $y$: 4.7 µm
RMS ratio in magnification: 0.0023
RMS deviation in rotation: 0.0010 rad

Comparison between FOAM and LWDAQ analysis routines:

Illustration 2: Top left: Histogram of difference between FOAM x origin and LWDAQ x origin
Top right: Histogram of difference between FOAM y origin and LWDAQ y origin
Bottom left: Histogram of ratio between FOAM and LWDAQ magnification
Bottom right: Histogram of difference between FOAM and LWDAQ rotation

RMS deviation in x: 3.7 µm
RMS deviation in y: 4.9 µm
RMS ratio in magnification: 0.0024
RMS deviation in rotation: 0.0011 rad
Comparison between Fortran and LWDAQ analysis routines:

Illustration 3: Top left: Histogram of difference between Fortran x origin and LWDAQ x origin
Top right: Histogram of difference between Fortran y origin and LWDAQ y origin
Bottom left: Histogram of ratio between Fortran and LWDAQ magnification
Bottom right: Histogram of difference between Fortran and LWDAQ rotation

RMS deviation in x: 1.9 µm
RMS deviation in y: 1.6 µm
RMS ratio in magnification: 0.0024
RMS deviation in rotation: 0.0003 rad
'Cut' images:

Total images in this category: 305
Fortran analysis failure: 12
FOAM analysis failure: 6
LWDAQ analysis failure: 16
Wrongly entered code orientation values found: 9

Comparison between FOAM and Fortran analysis routines:

Illustration 4: Top left: Histogram of difference between FOAM x origin and Fortran x origin
Top right: Histogram of difference between FOAM y origin and Fortran y origin
Bottom left: Histogram of ratio between FOAM and Fortran magnification
Bottom right: Histogram of difference between FOAM and Fortran rotation

RMS deviation in x: 25.7 µm
RMS deviation in y: 13.0 µm
RMS ratio in magnification: 0.0049
RMS deviation in rotation: 0.0016 rad
Comparison between FOAM and LWDAQ analysis routines:

Illustration 5: Top left: Histogram of difference between Fortran x origin and LWDAQ x origin
Top right: Histogram of difference between Fortran y origin and LWDAQ y origin
Bottom left: Histogram of ratio between Fortran and LWDAQ magnification
Bottom right: Histogram of difference between Fortran and LWDAQ rotation

RMS deviation in x: 23.5 µm
RMS deviation in y: 34.3 µm
RMS ratio in magnification: 0.0066
RMS deviation in rotation: 0.0029 rad
Comparison between Fortran and LWDAQ analysis routines:

Illustration 6: Top left: Histogram of difference between Fortran x origin and LWDAQ x origin
Top right: Histogram of difference between Fortran y origin and LWDAQ y origin
Bottom left: Histogram of ratio between Fortran and LWDAQ magnification
Bottom right: Histogram of difference between Fortran and LWDAQ rotation

RMS deviation in x: 26.6 µm
RMS deviation in y: 95.5 µm
RMS ratio in magnification: 0.0048
RMS deviation in rotation: 0.0027 rad

'Bad' images:
All three analyses fail all bad images: no false positives.