resputter after a defrost, I just pull the sample back into the sputter coater & airlock transfer unit, which is mounted directly onto the SEM chamber, so there is no further transfer in air involved.

Again, it is rare that I have to defrost now, on my current system. Before, on my old SEM, I had no cryo-prep unit at all, just a cold stage in the SEM, and I had to do transfers in air without any frost shroud protection (which my current Emitech 1150 has), so I had to do this nitrogen gas defrost more often back then.

The micrographs in this reference show an example of the results obtained: "Low-temperature low-voltage scanning electron microscopy of uncoated frozen biological materials: A simple alternative." 1996. Microscopy & Microanalysis. pp 918-19. (Minneapolis MSA meeting).

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Mousescope™

Those people who have recently bought a new computer have likely enjoyed the new optical mouse that came with it, especially the cordless variety. But how many have wondered exactly how it works? This isn't the old UNIX optical mouse that required a special mouse pad with a reflective surface and a grid of lines on it. These new mice work on most any surface.

Anyone sufficiently curious to vivisect such a mouse has discovered a cheap plastic lens, a LED light source, and a digital camera (aka "optical sensor," which sounds better to the Marketing types).

Well.

We at the Piltdown Research Institute are just such curious types, and among other things, we found that the camera isn't too bad. It operates at around 18 X 10^6 instructions per second and takes 800 dpi images at a rate of 1,500 to 2,500 images per second. Some of these mice have two cameras (a different genus no doubt, unless computers have developed homeobox mutants). The signal processor in such a mouse then uses the image to determine where the mouse is, and how much it's moved in what direction, sending the cursor flying across the screen to zap yet another bad guy ... oop, sorry, click on the FFT function. We are scientists here.

Well, again. And two cameras no less.

The next steps in our foray into microelectronics surgery were obvious. First, add a second LED light source to increase the available light on the surface upon which the mouse sits. Then, replace the cheap, plastic lens with a quality glass lens, cheaply acquired (note to Assistant Professors: lock up your compound microscopes when you go on holiday). Next, as we were using a two-camera mouse, slightly reposition the camera chips so that they are looking at the same spot from slightly different positions, and

add a second signal processor. Viola! Stereovision. With an appropriately chosen objective lenses, positioned correctly, we now have a 10X digital stereo Mousescope™. 20X and so on are equally doable.

Not being satisfied with this, we are currently working on replacing the single objective with a two element design, with a movable second lens in front of the first lens, acting to zoom the magnification.

Now we can not only zap the bad guys, but take rapid digital micrographs of reasonable quality of any surface on which we place the mouse. Very useful for following live cells, surface reactions and microcorrosion, on-chip micromachines, and just what those bloody dust mites in our pillows are up to anyway.

There is still some fiddling with software, perhaps Photoshop, to integrate the images from the two cameras and processors. These would then be shown on the computer monitor to produce stereo imaging. We admit that this isn't going as well as hoped. Color anaglyph images interfere with the hoped-for color imaging, and polarized images with polarized viewers don't cooperate well with LCD monitors.

But as soon as we link this issue to bioterrorism, we'll be able to get a multi-million dollar DARPA grant, hire a battery of programmers and monitor engineers, and solve the problem in no time. What's a few million dollars for software and monitor design, when with a few simple modifications of the ubiquitous computer mouse we have invented a cordless, go-anywhere $30 digital stereomicroscope? ☺

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A Quick Method for Safely Restraining Mouse Pups for Microscopy

I visualize green–fluorescent protein labeled mouse pups with a Leica stereoscope setup (not using confocal). On the stereo scope I often look at newborn pups or pups that are a few days old. I have used a piece of plastic wrap to hold them still (not too tight) and it holds the skin taut which helps. To do this without harm to the pups, I have been taping one edge of the plastic down and then holding the other side with my free hand. Light tension is all that is needed, and it never seemed to bother even one day old pups. By using tension the actual pressure is quite light. The pups seem to naturally stop wiggling with this pressure (like having mom sit on you in the nest?) and the light from the scope. To keep the pups warm we got a 37 degree heated mat from Harvard which warms the whole stage when placed underneath.

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A Simple Image Archive That's Cheap, Too!

Our group has many archived Kodachromes, EM micrographs and digital images, and continously produces new images in all formats. Primarily, these are light micrographs of hematoxylin & eosin stained tissue sections and immunohistochemistry slides, but they also include electron micrographs and confocal micrographs. It has been a continous problem to keep track of all these images, since