Context:
Our team split into two groups to study explosive reactions. Our sub-group traveled to an impact testing lab to record explosive gasses at liquid nitrogen temperatures.

Apparatus:
A metal rod is dropped from 43" onto a steel pin fixed in a steel cup 1" in dia. The cup is lined with a small strip (.5") flash paper and filled with liquid oxygen. The pin is held just barely above the flashpaper – such that when the rod drops onto the pin it will strike the flash paper and initiate a reaction. All components (except the metal rod) are chilled using liquid nitrogen just prior to the testing. The metal rod is held by an electro-magnet which when disabled allows the rod to freely fall onto the pin. The whole construction is enclosed in a steel cabinet with small (3") windows cut in the front to allow observation of the test. The size of the observation widows only afforded a single person to record images at a time.

Visualization Technique:
Using the Canon iSpeed camera, I recorded several of the drops (alternating with my team-member for still frames) at successively higher frame rates. (100, 150, 1000, 2000 & 8000). The camera was positioned to capture the cup and striking pin as viewed from the small observation windows

Photo Technique:
Field of View: 5" wide
Distance: 4'
Focal Length: 50mm
Camera: Canon iSpeed
Settings: F2.8, (Various fps)
Processing: The original 800x600 video frames were inserted into a video frame such that no loss of resolution would be incurred (the black edge of the image was cropped out of the video frame). The shots were edited together to see several frame rates in a row. The 8000fps was enhanced (brightened).

Summary:
I was interested in seeing how the reaction would be seen by our equipment. The increasingly fast frame rates were a fascinating breakdown of the explosive reaction. But the limited viewing angle (and our limited time) made it difficult to find the "art" in the project. The iSpeed is also disappointing in its range. The resolution is not as precise as one would hope and at high speeds (>3000 fps) the image quality is extremely poor. In considering this again I'd look to see if we could construct a process that has a slower reaction time that could allow a slower frame rate to observe the stages. Most fascinating was the progression of the gas as it expands out in the 8000fps images. Watching a wavefront or some sort of conversion (e.g. water to ice) across an edge would be similar and might be more photogenic.
Seeing the lab facility was also intriguing, it made the possibility of constructing an impact tester for CU plausible. (The construction is very simple – it just needs to be able to withstand small-scale blasts, so therefore, heavy steel.)