Report Guidelines

01/12/09

Flow Visualization: The Physics and Art of Fluid Flow

All work must be submitted by email or on CULearn to hertzberg@colorado.edu, with the exception of the self-assessment document, which can be hardcopy.

The baseline goal of the report is to provide context for the image, and enough documentation that the image could be recreated. Arts students are expected to meet this goal. Undergraduate engineering students will be expected to write the report in a professional fashion, and graduate engineering students are expected to produce a document of publishable quality. The report is expected to be 1 page in length at a minimum, four pages maximum. Use a descriptive narrative, rather than a list of items.

First Paragraph: Give the context and purpose for the image. For example, second project, group working on flume. Describe the intent of the image, what phenomenon you were trying to see. OK to mention false starts here, but the rest of the report should only deal with the final image. Assume the report will be read by strangers who know nothing of the course.

Second Paragraph: Describe flow apparatus used in the image, and refer to a sketch. Engineering students should do the sketch in Powerpoint or equivalent. Describe the basic flow, i.e. flow over a submerged obstacle, flame impinging on an orange, turbulent boundary layer on a wing, etc. Give size or scale of object, width of channel, etc. Engineering students should estimate appropriate nondimensional scales: Reynolds number, Grashof number, etc., as well as the required time and spatial resolution based on flow speed and field of view. Expectations for flow discussion vary with student category. Engineering students should research the phenomenon a least at the web level. Graduate ME students are expected to discuss additional context for the flow physics and give at least one reference to the archival (refereed) technical literature. Arts students are expected to describe what they did in enough detail that somebody else could repeat it for a similar result.

Third Paragraph: Describe the visualization technique used: Dye, smoke etc. Specify details such as exact source of materials, any relevant evironmental conditions. Give dilutions if appropriate. In second part of paragraph, describe the lighting used: flash on camera, bright sunshine, etc.

Fourth Paragraph: Describe the photographic technique

- Size of the field of view
- Distance from object to lens
- Lens focal length and other lens specs.
- Type of camera: film or digital, including original and final image width and height in pixels, then give make and model.
- Exposure specs: Aperture, shutter speed, and ISO setting

- Photoshop processing. Describe manipulations, settings. If used, provide a "before" image too.

Most digital cameras automatically record the exposure and lens specs in the image file. Info can be viewed in Photoshop: File menu, File Info, Section:EXIF.

Fifth Paragraph: Describe what the image reveals. What do you like and dislike about the image? How well are fluid physics are shown? What questions do you have? Did you fulfill your intent? What aspect would you like to improve? What direction could you go in developing this idea further?

Complete a self assessment of the image and report, and attach to the report. Assessment forms can be downloaded from the class website.

Cloud Image Reports

First Paragraph: Give the context and purpose for the image. For example, second project, group working on flume. Describe the intent of the image, what phenomenon you were trying to see. OK to mention false starts here, but the rest of the report should only deal with the final image. Assume the report will be read by strangers who know nothing of the course.

Second Paragraph: Describe the circumstances of the image:
Location
Direction and elevation (angle from horizontal) camera was facing
Date and time of day

Third Paragraph.
Statement of what clouds are in the image.
Appearance of the rest of the sky.
Discussion of the stability of the atmosphere. Include the closest skew-T plot.
Estimate the elevation of the clouds. Describe winds aloft if appropriate.
Discussion of the physics leading to the imaged clouds

Fourth Paragraph: Describe the photographic technique

- Estimate the size of the field of view
- Distance from object to lens
- Lens focal length and other lens specs.
- Type of camera: film or digital, including original and final image width and height in pixels, then give make and model.
- Exposure specs: Aperture, shutter speed, and ISO setting
- Photoshop processing. Describe manipulations, settings. If used, provide a "before" image too.

Most digital cameras automatically record the exposure and lens specs in the image file. Info can be viewed in Photoshop: File menu, File Info, Section:EXIF.

Fifth Paragraph: Describe what the image reveals. What do you like and dislike about the image? How well are fluid physics are shown? What questions do you have? Did you fulfill your intent? What aspect would you like to improve? What direction could you go in developing this idea further?

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