

Vortex Entrainment and Separation Using Flow Superposition

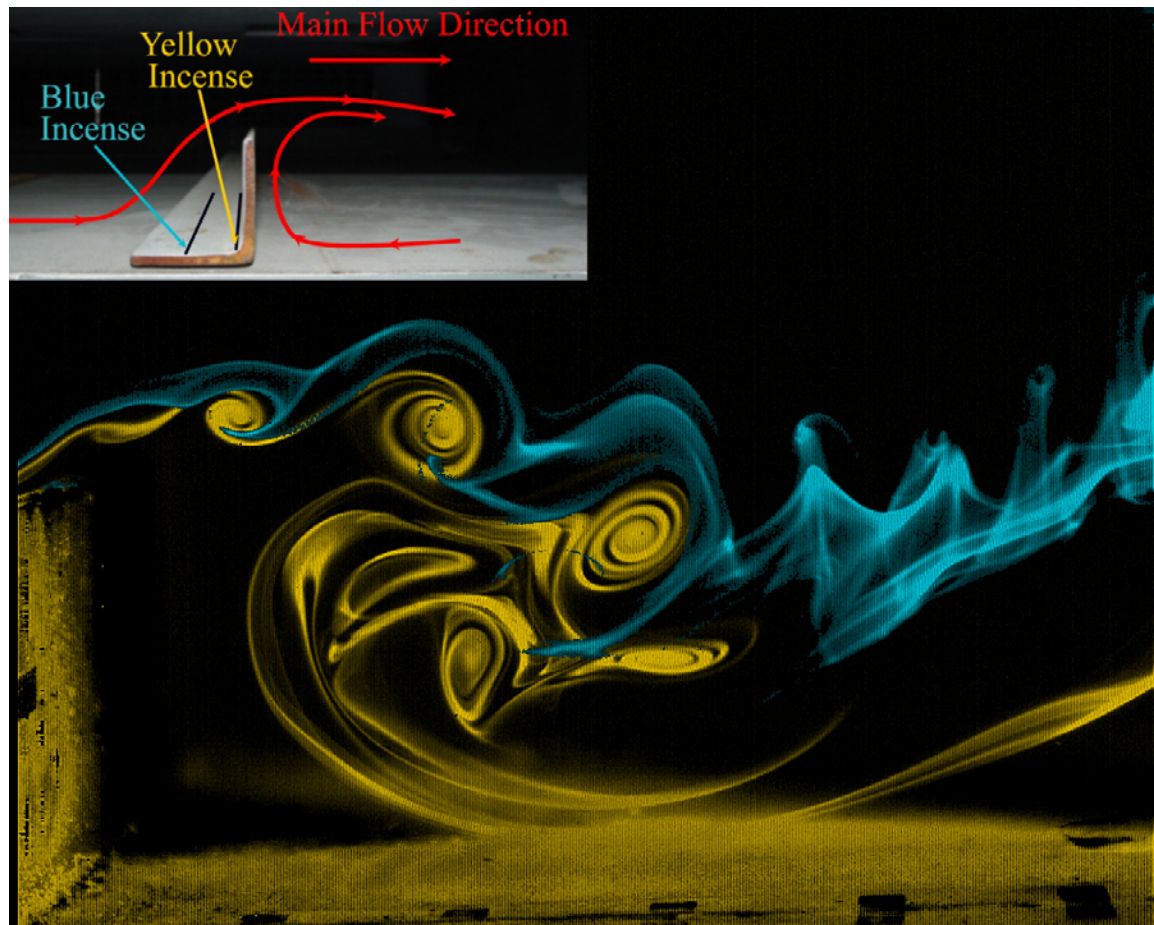
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The photograph illustrates transient airflow over a fence. The flow was acquired within a two-dimensional aircraft nacelle simulator. This simulator is 0.23 m high and 1.83 m wide (0.75 ft and 6.00 ft respectively). Smoke was produced from burning incense sticks and illuminated with a 1000 W tungsten light. Images were acquired at 240 frames per second using a high-speed digital camera. The image is a combination of two synchronized visualizations taken at two different times and superimposed. The color was added using video editing software in order to differentiate the two separate visualizations. The yellow colored smoke was generated using incense sticks placed at the upstream corner of the fence. The blue colored smoke originated from incense sticks placed approximately 1.27 cm (0.50 in) upstream of the fence.

The two superimposed images show entrainment of outside fluid (blue) into the shear layer vortices, which form in the recirculation region.