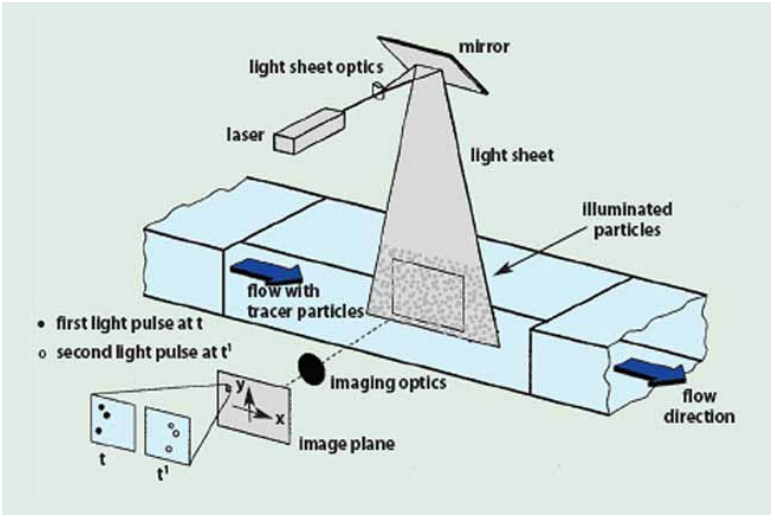
Flow Visualization

Dryden Flight Research Center EC89-0096-206 Photographed 1989
F-18 HARV smoke and tuft flow visualization. Angle of Attack = 20 deg. NASA photo.

Flow Visualization

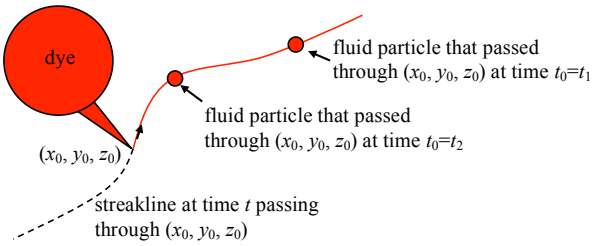
Streamlines



https://www.photonics.com/Articles/Particle_Image_Velocimetry_Basics_Developments/a25121

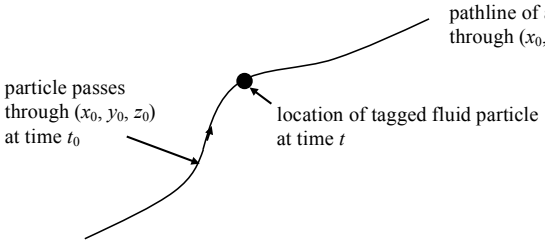
Flow Visualization

Streaklines



https://en.wikipedia.org/wiki/Streamlines,_streaklines,_and_pathlines#/media/File:Aeroakustik-Windkanal-Messhalle.JPG

Pathlines



https://en.wikipedia.org/wiki/Streamlines,_streaklines,_and_pathlines#/media/File:Kaberneeme_campfire_site.jpg

Flow Visualization

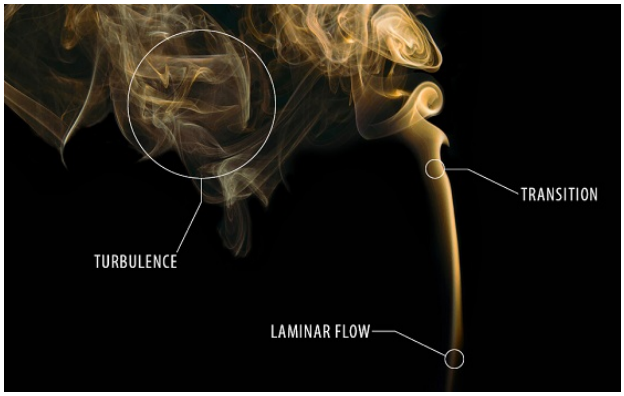
Some Definitions

steady vs. unsteady

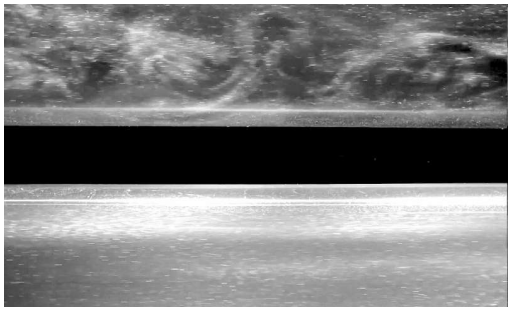
flow dimension

uniform vs. non-uniform

laminar vs. turbulent flow



https://www.bronkhorst.com/int/blog-1/what-is-the-difference-between-laminar-flow-and-turbulent-flow/



https://phys.org/news/2018-01-approach-percent-energy-pipelines.html