

# Flow over moving surfaces

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December 21, 2018

## **Project description**

Significantly improving the maneuverability of aircraft could allow for technologies akin to flying cars, delivery drones flying through cities, and improved transportation to remote and complex environments. One of the challenges preventing engineers from making planes significantly more maneuverable is understanding how a complex motion carried out by a plane translates to unsteadiness and dynamics in the flow around it. This project will enable the study of flow past a moving surface in a wind tunnel with the ultimate goal of improving unsteady maneuvering of aircraft.

In particular, this project will focus on creating a translating stage that can move the measurement equipment in sequence with the moving surface, so that measurements of the air velocity near the surface can be taken continuously throughout the surface motion. The work will require the use of CAD software (SolidWorks) and will involve purchasing and building equipment to create a moving measurement system. Some simple coding will also be involved to program the actuation of the system. This project will provide the student with the opportunity to work on the study of turbulence and maneuverability.

## **Student background and expected student outcomes**

We are looking for someone who is excited, motivated, and eager to learn about fluid dynamics and experimental work. The student should ideally have some familiarity with CAD software, and it is ideal but not required that the student have some familiarity with LabView and Matlab. The student will get exposure to the experimental study of fluid mechanics and turbulent boundary layers, measurement systems such as particle image velocimetry (PIV) and hotwire anemometry, and basic coding in Matlab and LabView. The student will also gain skills in designing and building experiments, thinking through research plans, and presenting research outcomes.