

## Abstract

The whole world is aiming to travel to the stars and beyond. SpaceX recently launched their Falcon Heavy with the Dragon Capsule in it. Many more companies are turning up for the same cause. Hence the space-industry is at a boom and since it is a flying object, the computational fluid dynamics of the structure is very crucial.

This report aims to describe, study and visualise the flow around a **space-capsule** at supersonic speed and the study of flow around a **parachute** at subsonic speed. The softwares used are Gmsh and OpenFOAM. This report tries to describe the practical features of a space-capsule in the aerospace industry.

## Problem Statement

A space capsule is flying at supersonic speed (**Mach No. = 2.5**). The pressure is **76 Pascal** and the temperature is **270 K**. Design a space capsule (2-D) on your own and analyse the flow around it when the vehicle is entering the Earth's atmosphere.

After a certain time, the speed of the vehicle has dropped to **80 m/sec** and the parachute has been deployed. Analyse the flow around the parachute and determine the coefficient of drag

Use a suitable turbulence model and refer the internet to refer the properties of air at the atmosphere and the dimensions of the capsule and the parachute.

Verify your results using manual calculations or Matlab.

Ratio of specific heat = 1.4

$\nu : 1e-5$