



DoubleSShot

Standard Atmosphere Properties

Rev. 2010/09/30

Introduction

This document provides atmospheric properties pertinent to the *DoubleSShot* project. Three graphs are provided which plot the air pressure ratio, air density ratio and temperature as a function of altitude. The altitude considered encompasses the range from ground level to 100 km, which is the goal of the *ExSShot* vehicle. Both this altitude goal, and the 33 km goal of the *DoubleSShot* project, are indicated on the two former graphs, including the ratio value at these key altitudes.

Altitude is given in terms of geopotential altitude, which is the altitude that would be recorded in a standard atmosphere by a pressure altimeter set to read zero at ground level ($P/P_0=0$).

Reference

ESDU Data Sheet 77021 "Properties of a Standard Atmosphere"

Synopsis

Traveling upward to an altitude of 33 km, 99.1% of the earth's atmosphere has been traversed. The air pressure at this altitude is 0.74% that of ground level. On the journey through the atmosphere, temperatures vary from as low as -56°C . to a somewhat milder -36°C at the 33 km mark.

At an altitude of 100 km, 99.99995% of the earth's atmosphere has been traversed. The air pressure at this altitude is 0.000032% that of ground level. On the journey through the atmosphere, temperatures vary from as low as -86°C . (at 90 km) to a slightly milder -78°C at the 100 km mark. Interestingly, after a steady drop in air temperature beginning at ground level, temperature begins to rise at the 15 km mark and reaches a secondary peak at 50 km altitude before once again dropping.



