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Abstract : This document presents preliminary investigations made to evaluate aerodynamic model for Prithvi missile using first flight test data during both ascent and descent phase of the trajectory. During first flight test no planned inputs to the control surfaces are implemented as suggested by NAL for the purpose of parameter estimation and only lateral modalities of the missile are excited by the gust induced disturbances. Hence only lateral model is fitted to the flight data and relevant aerodynamic derivatives are estimated. A study of the estimated aerodynamic derivatives and the modes indicate that the results are consistent with the physics of flight of the missile. However, a comparison of NAL estimates with DRDL nominal values show wide difference. The estimated derivatives are presented in tabular form as well as bar graph form. Also time history match of flight response and estimated response is presented.