EXPERIMENTAL STUDY AND FREQUENCY RESPONSE OPTIMIZATION OF INFINITE LINE PRESSURE PROBES FOR APPLICATIONS IN AEROENGINE TESTING

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In turbomachinery flow research, the measurement of pressure fluctuations is very important. Indeed, to further improve the performance of a turbomachine, it is necessary to quantify and understand the state of the flow through the machine. Two important problems are identified for these measurements: the temperature range of the probes and the unsteady characteristics of the pressure. When the temperature at the measurement point is too high for the sensor, an infinite line pressure probe is used. This system is composed of two capillary tubes and enables to put off the sensor from the measurement point.

The presence of capillary tubes is responsible for a decrease in frequency response of the measurement system. This variation is depending on the geometrical parameters of the infinite line pressure probe. The establishment of correlations between the geometrical parameters and the bandwidth of infinite line pressure probes enables to avoid some costly experimental tests for the choice of the geometry ensuring an acceptable bandwidth.

The infinite line pressure probes have been studied through different steps. The shock tube used for their investigation has been completely characterized and the data acquisition and processing chains have been improved and validated. The Premesys program has been modified and validated to numerically simulate their behaviour. Finally, some preliminary experimental tests for the establishment of a bandwidth data base have been done.

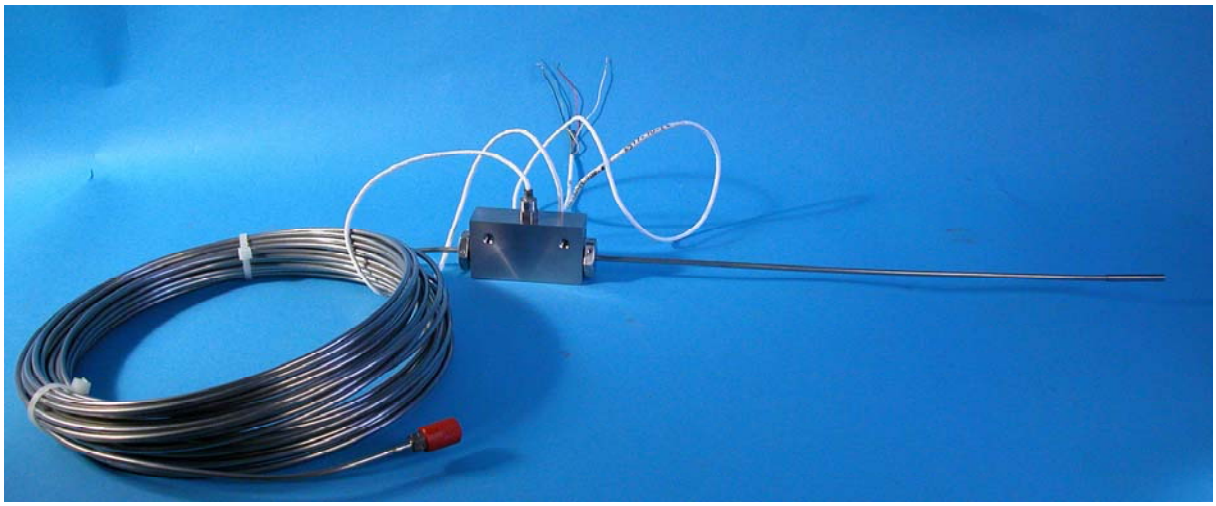

Figure 1: Infinite Line Pressure Probe