

A SIMPLE AND LOW COST SYSTEM TO MEASURE DELAY TIMES IN PNEUMATIC SYSTEMS

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ABSTRACT

It is often necessary to correct for delay times in the units of a measurement channel, especially in the case of flight tests. In a pressure measurement channel the sensing orifice is connected to the transducer by a pressure line which may be several meters in length. In this case the pneumatic delay time might well be the major contribution to the total delay time of the pressure measurement channel. Therefore a methodology to measure pneumatic delay times has been developed at the National Aerospace Laboratory NLR of the Netherlands.

The methodology is based on the determination of the complex transfer function of the pressure line in the frequency range of interest. From the transfer function the delay time as a function of the frequency can be calculated.

The transfer function is established by measuring the amplitude and phase response of the pressure system at a number of discrete frequencies. In this paper the equipment to generate a pneumatic stimulus and the equipment to determine the amplitude and phase response is described.