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Title : INSTRUMENTATION AND DATA ACQUISITION SYSTEM FOR
LARGE SCALE ROTATING RIG

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Abstract : Pratt & Whitney, USA of United Technologies Research Center (UTRC) designed the Large Scale Rotating Rig (LSRR) to perform experimental research on axial flow turbomachinery. After executing numerous aerodynamic research activities on several compressor and turbine modules, the rig was transferred to National Aerospace Laboratories (NAL) under a collaborative project in the year 2004. This rig is now installed, commissioned and benchmarked at NAL for future research activities. The rig currently incorporates a single stage reaction turbine module which was earlier used by Pratt & Whitney, USA to carry out few aerodynamic investigations. A sophisticated indigenous data acquisition system has been designed and developed to aid the experimental tasks in the rig. It is a fully automatic PC based data acquisition system, incorporating hardware such as ZOC pressure scanners, individual pressure-transducers, Scanivalve mechanical multiplexers, National Instruments cards, wafer switches, thermocouples, digital temperature scanner, DC motors, control actuators, dead weight testers and other accessories. The various hardware units are monitored and controlled by a GUI based software program developed using National Instruments Labview. The instrumentation and data acquisition system is designed to cater various requirements of the rig. These requirements include vane, blade, casing / hub platform surface pressure measurement, vane / blade exit wake flow measurement, temperature measurements and online calibration of pressure transducers.