

## **A Wireless Multichannel Pressure Measurement System for a Rotating Turbo machinery Rig**

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**Abstract:** In a rotating frame, making measurements and transferring data are highly complicated. Generally, signals from the rotating system to the stationary frame are routed through slip rings. While doing so, the signals are hampered by noise and drift arising from rotation and its allied effects. The Large Scale Rotating Rig (LSRR) at NAL is a turbo machinery research facility demanding multiple pressure measurements across a rotor in its wake flows and over its surface. A wireless system has been developed to cater this type of measurement in LSRR avoiding signal transfer through slip rings. The system also offers relief from complicated wiring and tubing across the rotating transducers in LSRR. The wireless system consists of a PIC microcontroller for acquisition and processing of data and a zigbee controller for transmitting the data in wireless mode. The system interacts with a 32 port electronic pressure scanner that senses the pressure data in the rotating frame. A Graphical User Interface software program was developed using LabVIEW to control the rig and receive the data from the scanner.

**Keywords:** Zigbee controller, wireless system, PIC microcontroller, pressure measurement, Electronic Pressure Scanner (ESP), LabVIEW, rotating turbo machinery, DI/DO (Digital input/Digital output), AI (Analog Input)