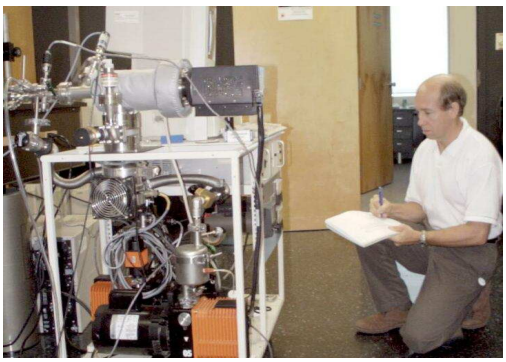
Sensors, Remote Data Acquisition, and Microelectromechanical Systems

Stennis Space Center (SSC) has many needs in the area of sensors, instrumentation and data acquisition. Several applications involve remote data acquisition of measured variables. Variables of interest include pressure, temperature and acceleration. To provide a method of analyzing and validating sensors for applications, a vacuum system was activated to provide a platform for testing.

Some applications require unconventional implementation of conventional sensors. For example, SSC has expressed the need for remote data acquisition for use in several applications. A remote data acquisition process consists of a sensor to provide a measurable indication of the process variable, a transmitter to transmit a signal to a remote location, a receiver to receive the transmitted signal, and a method of data display and/or storage. Applications include the cryogenic transfer line vacuum measurement and the engine vibration measurement processes. Various methods of remote data acquisition were examined and the results presented for review by NASA personnel.



Vacuum Sensor Test System

In order to address increasing demands of applications for automation and programmable control functions, SSC indicated a need for control test system test bed. Control needs common to engineering systems in general include remote data acquisition in both discrete and analog form, direct temperature transducer interfacing, remote video control and image transmission, and graphical user interfacing capabilities. A plan for a fundamental multipurpose control system was developed to accomplish these functions.

Advanced technology sensor development of interest to SSC is in the area of microelectromechanical systems (MEMS), also called micro machines. Considered to be the next step in the evolution of semiconductors, MEMS offers microchip functionality not previously possible. Not only will developed chips be able to process information, but they will be able to participate in process actuation as well. The intent of MEMS is to utilize the small scale of available microelectronics technology to create multifaceted mechanisms on a micron scale. Typical MEMS system processes were examined, and

recommendations made for entering the area of MEMS sensor development. Applications relevant to interests at SSC include vacuum and inertial sensors, as well as various aerospace, defense, scientific, and commercial applications.