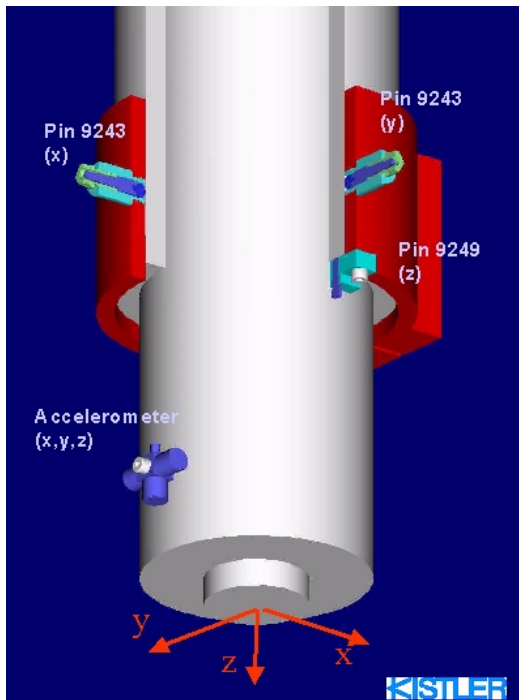# SIMON
# Sensor Fused Intelligent Monitoring System for Machining
**IMS Project No. 96001**

◾ Developed on-line calibration and optimization of machining process during prototype machining.

◾ Developed in-process detection of tool wear and breakage to reduce down time and scrap rate.

◾ Developed in-process compensation of work-piece and tool deformations for precision machining.

This project developed a practical monitoring system that reliably identifies machining process conditions based on information obtained with multiple sensors. Based on the knowledge of the machine, process, tooling, and machining task, the monitoring system provides the machine tool control system with information to optimize the machining process. The SIMON solutions cover a broad range of machining tasks such as milling, drilling, grinding, and hard turning. The introduction of user knowledge based approach and autonomous intelligent algorithms into machine tool control systems enables machining systems to achieve higher accuracy, higher productivity, and minimum malfunctions.



After production process planning is developed to maximum efficiency, it is optimized for machining productivity through the integration of sensors and the implementation of intelligent machining strategies on the machine tool. The developmental processes include:

- identification of sensor requirements,
- limitations of the sensor in a production environment,
- interfaces of monitoring system to CNC and machine tool, and
- modular, portable monitoring systems that can be easily reconfigured by machine tool end-users.

There were ten (10) industrial partners, two (2) research organizations, and eight (8) universities involved in this research. Notable participants were Mitsubishi (ICP), Bosch, Hitachi, NIST, and NRCC.