

## Public Page

This project is focusing on the design, construction and testing of a prototype segmented MFL sensor system for ultimate integration into a robotic platform for the inspection of unpiggable transmission pipelines. The effort was initiated in December 2004 and at the conclusion of this first quarter in March 2005, the project has progressed well.

The major issue facing the concept development phase, is the requirement that the sensor and entire robotic platform are able to pass through a plug valve in a transmission pipeline. The restrictions imposed on the sensor in such a case are severe, necessitating the use of segmented sensor elements, each able to fit through the plug valve. Once the elements have passed through the plug valve, they can be potentially arranged in different ways to accomplish that task in hand.

Seven different concepts were developed and underwent an initial broad and systematic evaluation. Four of them were selected for further evaluation using a stricter set of criteria. Detailed FEM analysis of the magnetic fields generated, evaluation of operational issues, and evaluations of issues related to power requirements, forces and impact on the platform were thoroughly conducted. As expected, each concept presents its own advantages and disadvantages, the ultimate selection expected to be a compromise aimed at achieving the optimum satisfaction of system specifications.

The analysis up to date has demonstrated that a number of designs are feasible, however one design seems to be emerging as the preferred one. Further analysis will be conducted leading to the selection of the final concept by mid-April 2005. Issues pertaining to flow blockage, power demand from the robotic platform, forces needed to propel the robot, accuracy and sensitivity of the MFL sensor, and operational issues of the robot under real life conditions are paramount in this selection process.