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**PROJECT DTPH56-06-T-000003**

Pipeline failures from stress corrosion cracking (SCC) remain a major safety concern among pipeline operators. To manage the safety threat from SCC, the operators require key information to: assist in identifying the potential, and the location(s) on the pipeline system, for this threat; assess and characterize the threat; and determine the appropriate mitigation measures.

In spite of many efforts at developing reliable sizing techniques for stress corrosion cracks, current methods are either very expensive and time consuming, or are unreliable. The development of a reliable nondestructive technique would be very desirable.

The objective of this project is to apply the proven technologies of laser ultrasonics and finite difference modeling to the important problem of the depth measurement of stress corrosion cracks. Laser ultrasonics offers a number of significant benefits for the sizing of SCCs, including small footprint on the pipe, rapid scanning, and high bandwidth. Laser generation produces a rich admixture of ultrasonic waves, covering many wave types, directions, and frequencies. Finite difference modeling offers a very promising pathway to harnessing these waves for effective crack depth measurement. Team members for this project are Intelligent Optical Systems, Inc., and RTD Quality Services (QS) LLP. Cost share is provided by RTD QS through its affiliated companies, the Pipeline Research Council International (PRCI), and individual pipeline companies.

In the eighth quarter, we completed the optical and mechanical design of the scanning platform and sensor head.

**Submitted by:**

Marvin Klein  
Intelligent Optical Systems  
Phone: 424-263-6361  
Fax: 310-530-7417  
Electronic mail: mklein@intopsys.com