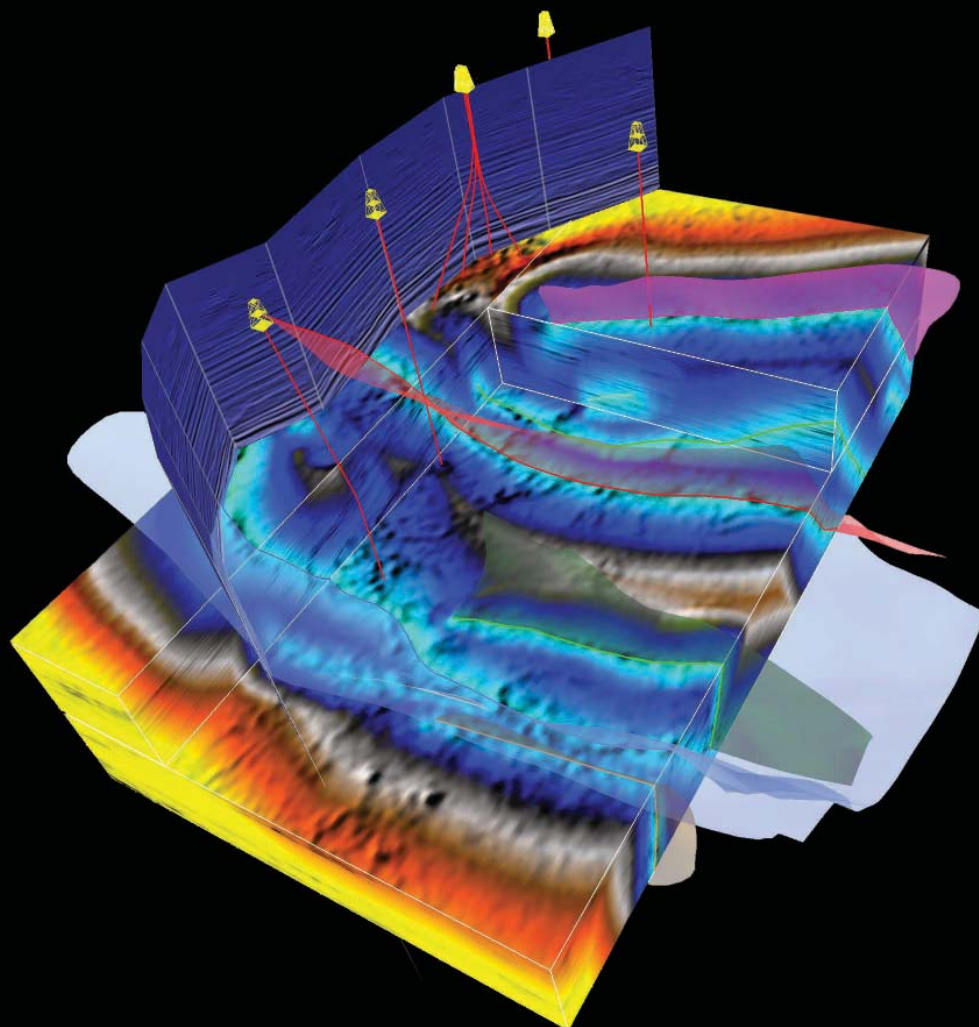


UPSTREAM TECHNOLOGY



**Honeywell's SmartCET
Tackles Corrosion in Real Time**

**Honeywell Recognized for
Pioneering Innovations**

A Focus on the Full Spectrum of IT Solutions for Oil & Gas

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Honeywell's SmartCET Tackles Corrosion in Real Time



In July 2005, Honeywell acquired InterCorr International of Houston, integrating InterCorr's proprietary SmartCET technology with Honeywell's Experion™ Process Knowledge System (PKS) to provide online, real-time corrosion monitoring data. The technology helps facility and pipeline operators reduce maintenance costs, increase unit productivity, minimize failures, avoid unplanned downtime and increase run time.

"Global process industries spend an average of \$50 billion a year on corrosion problems, which can hinder their abilities to operate at optimal levels," said Jack Bolick, president, Honeywell Process Solutions. "It has been estimated that the cost of corrosion can be reduced by up to 20% through the paradigm shift gained by going from offline monitoring to what is now Honeywell's new online, real-time capability."

Unlike "smart pigs" that monitor mechanical damage and loss of metal due to corrosion after the damage has occurred along a pipeline, SmartCET probes (Figure 1) use three different electrochemical techniques to obtain both qualitative and quantitative measurements of corrosion activity before substantial damage has occurred:

- Linear polarization resistance (LPR) – conventionally measures only qualitative corrosion because the device's "B value" cannot be re-calibrated once installed and this value changes from the factory default depending on the fluids;
- Harmonic distortion analysis (HDA) – measures the B value directly to yield a more quantitative corrosion rate measurement (breakthrough #1); and
- Electrochemical noise (ECN) – measures the electrochemical signal noise created by the corrosion. This measurement is used to determine the Pitting Factor, which allows differentiation of general and localized corrosion (breakthrough #2).

"We refer to these combined techniques as 'Super LPR' technology since it overcomes the many limitations of the more conventional techniques or the reliance on LPR solely," the company said on its website.

The SmartCET transmitters feature a two-wire loop powered 4-20 mA signal with HART protocol for accurate real-time monitoring. The probe runs through all three techniques in a seven-minute measurement cycle, and the microprocessor uses proprietary mathematical algorithms to calculate corrosion values. Data from the probes are sent by hard wire or radio transmitters to the central control system, which features the Honeywell Experion PKS system. SmartCET units can utilize mains power and solar-power and are robust enough to withstand the elements on a pipeline easement.

"Historically, corrosion has been handled, well, historically," said Dr. Russell Kane, now director of corrosion services, Honeywell Process Solutions, who founded InterCorr. Metal coupons are exposed to the process fluids for 30 to 90 days, and the amount of corrosion is measured by weight loss and reported as an average (general) corrosion rate. "The problem with that method," Kane said, "is that it does not tell you if there are spikes in the corrosion rate so you can remedy the situation right away. Corrosion is not an 'always on' process. It usually correlates with specific process conditions of temperature, pressure, flow or water content in many systems."

Honeywell's SmartCET solution can calculate both general corrosion rate and localized pitting, which is usually a discontinuous process leading to high Pitting Factor readings. This means it can tell operators what the peak corrosion rates are and when these excursions occur so operators can make adjustments. Kane told

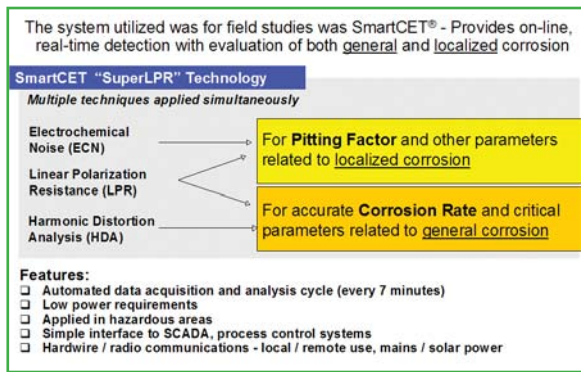


SmartCET® Multivariable Transmitter

Upstream Technology that he has seen cases of corrosion upsets of 1-2 orders of magnitude increase in corrosion rate that happen up to 20 times over a period of two months, a typical coupon test cycle. This data can be correlated to real-time process conditions.

“Using coupons to measure corrosion is like driving a car while looking only through the rear-view mirror,” Kane said. “We have done things manually for too long. It’s about time we got the corrosion people and the process people together so we can transmit real-time corrosion data to the SCADA or DCS system and engineers can monitor corrosion along with all the other process variables like pressure, temperature and flow.”

The US Department of Energy conducted a two-part study (laboratory and field testing) of a wide variety of corrosion monitoring methods to see which was the best. The various



technologies, including SmartCET, along with other electrochemical and electrical resistance methods, were tested in gas transmission lines, oil and water pipelines, processed natural gas lines and three-phase (oil, gas and water) pipelines.

“The DOE said the SmartCET method was the most accurate and the most sophisticated,” Kane told *Upstream Technology*. “It was so quick to respond, we could even see the

process changes as they happened, and it didn’t require a specialist onsite like some of the other methods. The processed signal was not only accurate, but it also pointed out whether the corrosion was local or general. Localized corrosion is responsible for 70% to 90% of corrosion-related equipment failures.”

www.intercorr.com
www.honeywell.com

Honeywell Recognized for Pioneering Innovations

Honeywell was honored with the 2006 Pioneering Innovation Award at the Governor’s Celebration of Innovation (GCOI) in Arizona. The technology-excellence award is presented each year to a company that has gone to great lengths in contributing to Arizona’s technology industry through sustained business presence, corporate citizenship, community involvement and business success.

“Honeywell has been a fabulous partner to both the state’s technology community, and to the Arizona Technology Council,” said Donna Kent, president, Arizona Technology Council, which hosts event along with the Arizona Department of Commerce. “It is critical to our state’s economy that all of our technology companies, large and small, continually enhance their offerings. Honeywell’s growth and success in Arizona is a result of its commitment to that philosophy of innovation.”

Three of Honeywell’s businesses employ a total of 12,500 people in Arizona: Honeywell Process Solutions, Honeywell Aerospace and Honeywell Electronic Materials. Jack Bolick, president, Honeywell Process Solutions, accepted the award on behalf of the company at the Governor’s Celebration of Innovation ceremony.

Honeywell’s recent high-profile successes include

the global launch of Experion® Process Knowledge System (PKS) Release 300, the latest release of Honeywell’s automation platform for process industries that ensures manufacturing plants improve efficiency. Honeywell employed a global team to develop and test Experion, with the main engineering team located in Phoenix.

Celebration of Innovation Award entrants are also judged on integrity and ethics. Honeywell was recognized for an initiative to provide clear and consistent direction to employees of the company’s top priorities. The program has dramatically changed Honeywell’s business culture and integrated its many business units into a single entity driven by customers and performance.

“Having a clear set of objectives and standards sets a business on a path to becoming an industry leader,” Bolick said. “Honeywell is focused on advancing technology to meet customer needs. Our partnerships with

Arizona’s technology communities have been, and will continue to be, instrumental in our success in those areas. Arizona’s wealth of related businesses and experienced professionals has allowed Honeywell to recruit employees who generate solutions to meet the most demanding customer needs.”

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Jack Bolick, president,
Honeywell Process Solutions