



# Trenchless Technology Center *Newsletter*

S E P T E M B E R 2 0 1 2

## FutureScan – Through the Pipe Wall and Beyond

During Hurricane Katrina, the surge of water in Lake Pontchartrain caused flooding at depths of 12 to 16 ft along the northeastern shoreline, where the City of Slidell, La., is situated. Selected sections of the city along the lakeshore were submerged in up to 5 ft of water for nearly two weeks following the storm. Damage to the buried infrastructure networks was caused in part by mechanisms such as uprooting of trees, ground subsidence, loss of bedding support, soil swelling and corrosion due to saltwater intrusion.

In August 2012 — seven years following Hurricane Katrina — a TTC/CUES research team returned to Slidell to test a new technology: a high-frequency, electromagnetic-based radar system mounted atop a robotic transporter that was designed to locate soil voids and other anomalies around buried pipes while traveling inside the pipeline. As the need for such a technology was realized in the aftermath of hurricanes Katrina and Rita, it was felt that Slidell would be the right place for the inaugural testing of the technology, closing the circle.

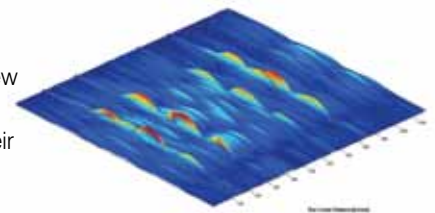
FutureScan is an innovative, in-pipe radar system that utilizes state-of-the-art electronics to generate extremely short, electromagnetic pulses over a range of frequencies in the GHz range, enabling us to image through solid surfaces, such as concrete and clay pipe-walls. Mounted on a robotic transporter, this in-pipe penetrating radar sends out signals in near real-time that pass through the pipe-wall and into the soil surrounding it. The reflections of these radar signals are then used to dimensionalize the pipe (i.e., to paint a picture of the pipe's conditions similar to the way a MRI can depict the human body). The data captured can then be processed to provide information about anomalies within and outside of the pipe wall, including the potential presence of soil voids, external corrosion, defective joints, and more.

In early August 2012, following years of intensive research and development efforts, funded partially by the National Institute for Science and Technology (NIST) and performed by a dedicated research team consisting of CUES and TTC technical staff members, the FutureScan technology undertook its first full-scale field demonstrations. A total of 1,500 lf of pipes were inspected in the City of Slidell, and an additional 500 lf of pipe was inspected in the City of Shreveport, La. The demonstrations covered a range of pipe materials and geometries from 18-in. circular VCP, through 24-, 30-, and 42-in. circular reinforced concrete pipes, to a 32-in by 60-in. reinforced concrete arch pipe. Data can be collected at a speed of 30 ft per minute, and radar images can be viewed both in real-time as well as in a post-processing mode. CCTV images are collected during the inspection in order to confirm the interpretation of the radar data. The raw radar data is exported into signal processing algorithms that extract the desired information and present it as a 3D image for the benefit of the end user.

The emergence of the FutureScan technology provides municipal engineers, consultants and city administrators with a new tool to assess the structural integrity of their buried infrastructure networks and to protect public safety. The FutureScan technology could also assist in detecting boulders or other objects that might apply point loads onto the wall of a buried structure, as well as detect concrete encasement zones prior to pipe bursting operations. Equipped with the ability to 'see' into the pipe-wall and beyond, it will enable practicing professionals to make more informed decisions and reduce the risks associated with the operation and rehabilitation of underground infrastructure systems.



To the left: FutureScan technology provides municipal engineers, consultants and city administrators with a new tool to assess the structural integrity of their buried infrastructure networks. To the right: Here is an image of FutureScan.



## Municipal Forum Updates

The TTC will begin its Fall Municipal Forum series in late September. Forums will be held in Long Beach, Calif., and Portland, Ore., during late September/early October; Boston, on Oct. 9; Springfield, Mass., on October 16; Dallas on Oct. 22; and Aurora, Colo., on Nov. 29. We are waiting for confirmation for a few other possible locations. Please visit our website for updates and more details.

The Municipal Users' Forum for Trenchless Technology provides municipalities with high-caliber technical seminars focusing on local trenchless technology issues to help solve regional water and sewer problems. The TTC works with a local municipal representative along with national and international industry experts to organize a one-day workshop in numerous locations across North America to review and discuss specific trenchless technologies that are of regional interest. The industry experts address each topic through a vetted presentation that addresses the technology in a non-product specific presentation. The forums are non-profit and participant fees are targeted to keep municipality costs reasonable and help offset most of the direct forum expenses.

Municipalities and industry experts interested in hosting or participating in a forum can learn more about the program by visiting our website at [www.ttcmf.com](http://www.ttcmf.com) or by contacting Teresa Fletcher [fletcher@latech.edu](mailto:fletcher@latech.edu) or Dr. Robert McKim [mckim@latech.edu](mailto:mckim@latech.edu).

## TTC Visits China

A trenchless technology forum was conducted in Kunming, China, by TTC director Dr. Erez Allouche and Dr. Chenguang Yang on March 5-6, 2012, at the invitation of Bojun Shang, Chairman of the Board of Yunnan Kunlun Gas Co., Ltd. Dr. Allouche began with a presentation that introduced the TTC facility and its Research and Development history. He included an overview of the field of trenchless technology and its application in the petro/gas system, as



well as future educational training and technology transfer opportunities. Given the technical issues with trenchless technology Yunnan Gas was experiencing, Dr. Allouche also taught an advanced class that covered trenchless installation/rehabilitation methods for petro/gas pipelines and asset management in petro/gas distributions. Following the class, Dr. Allouche responded to additional questions from the attendees via email. The attendees were impressed with the wealth of knowledge they received, and felt that the knowledge they gained would provide new solutions and ideas for technical problems, as well as improved safety and operations for the company. During the forum, Bojun Shang and Dr. Allouche negotiated a preliminary Memorandum of Understanding to set a foundation for future cooperation between Yunnan Kunlun Gas Co., Ltd. and the Trenchless Technology Center, which they feel will help both organizations in the future.

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