NEW

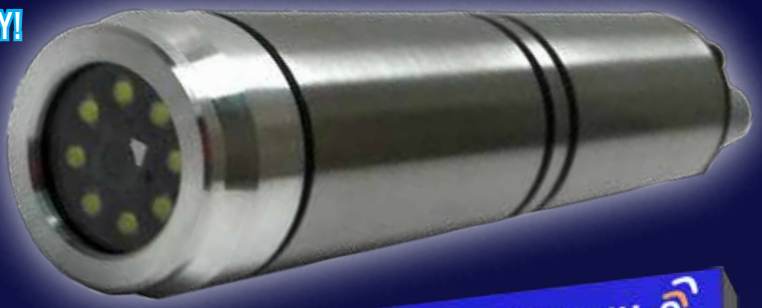
Next Generation Smart Water* Leak Detection & Water Loss Services

*Automatically Measures Leaks in Gallons Per Minute -- Repeatable & Reliable.
No Third-Party Interpretation. No Operator Judgement. No Guesswork. No Coding.

ADD TO YOUR WATER LOSS PREVENTION BUDGET TODAY!

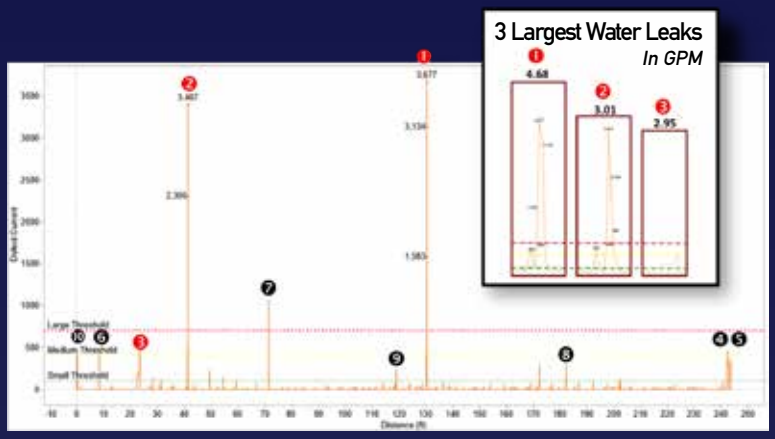
Electro Scan's Exclusive Services Helps Satisfy SB 555 Requirements

- Low Voltage Conductivity Sensor
- High Definition CCTV
- Pressure Sensor
- Acoustic Hydrophone



Low Voltage Conductivity Leak Detection is Here!

The water industry's first reliable & repeatable tool to locate & measure water leaks and water losses in pressurized water distribution & transmission mains.



Precisely locate all leaking cracks, pinholes, bad joints, & defective service connections, and calculate an estimated water loss in gallons per minute.

U.S. Patent # 9143740. Multiple U.S. and International Patents Pending.

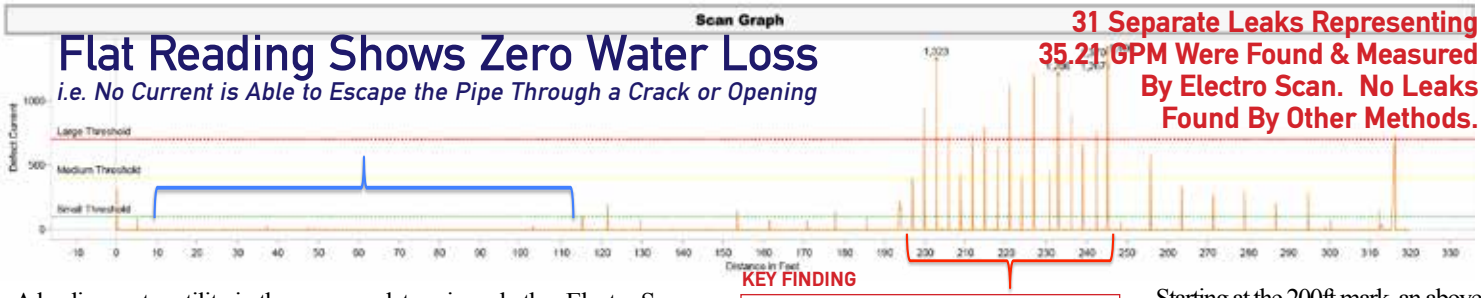
Services Exclusively Available From Electro Scan Inc.

electroscaninc.

1745 Markston Road, Sacramento, California 95825-4026, USA | 916.779.0660 | info@electroscan.com | www.electroscan.com

CASE STUDY

New 4-in-1 Probe Locates & Measures Water Losses



A leading water utility in the Western United States owns and operates four (4) reservoirs, delivering potable water and irrigation water to residential, commercial, and agricultural customers.

While the main function of its reservoirs serve as water storage for its rapidly growing municipal area, they also serve as important recreational centers.

A network of open channel canals also run throughout of much of the metropolitan area, helping distribute water.

With a reputation as a leader in innovation and an active leak detection program, the utility was one of the first in North America to trial low conductivity testing, working with Electro Scan, to conduct a test of a 315ft, 27in diameter water main.

Undergoing several previous inspections, using legacy survey techniques, the utility wanted to determine whether Electro Scan could identify specific defect locations. Results, were available in minutes, with Electro Scan finding a 50ft section with a dozen defects, showing leaks at each joint.

Acoustic-No Defects

Underwater CCTV-No Defects

Dewatered Dry CCTV-No Defects

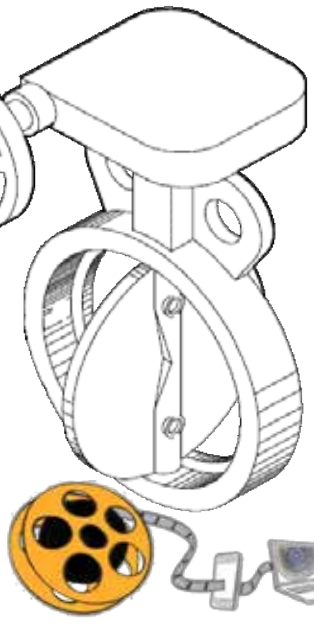
Starting at the 200ft mark, an above ground visual inspection quickly saw traces of water bubbling up through the ground as verification, but no specifics as to the number or severity of each defect flow in the pipe.

High Definition CCTV Camera Aids Navigation Through Main

A key component of Electro Scan's 4-in-1 water probe is a high definition closed-circuit television (CCTV) camera.

While CCTV cameras are relatively new to the internal assessment of water mains while in service, the biggest reason to have a camera integrated to its probe is to assist in the navigation through hydrant stubs, ensure that gate valves are open, not closed, and most importantly, to determine when the probe has actually entered a main.

Geographic information systems have allowed most utilities to improve the positional accuracy of valves, hydrants, meters, and mains. But, displayed distances between hydrants and mains, for example, tend to be simple straight line distances, instead of accurate pipe distances needed to correlate footage encoders on standardized CCTV reels necessary to precisely determine entry and exit points in a main.



Of course, water leaks in mains under pressure, will not tend to show on CCTV cameras, yet the addition of Electro Scan's low voltage conductivity sensor show operators and engineers exactly where to look, while also showing other important conditions inside the water main.

Why We Can't Hear A LEAK?

Pinpointing water losses using acoustic sensors may be coming to the end as Electro Scan introduces its international patent-pending low voltage conductivity tri-electrode pipe condition assessment technology.

Since the early days, water crews have been challenged to hear leaks in water mains.

Years later, the ability to measure sound vibrations to accurately locate and measure defect flows remain a challenge.

Drawbacks of Acoustic Sensors, Data Loggers, and Correlators

- Ambient noise interference.
- Variable water table heights.
- Pipe materials, especially PE & HDPE.
- Pipe diameter.
- Leak size.
- False-positive readings.
- Inability to quantify defect flows.
- Changes in backfill materials.
- Lengthy data processing & reporting times.
- Lack of repeatability, by crew, by equipment.
- Special training required for field crews.
- Need for third-party data interpretation.
- Silent or undetected leaks.

... and Earlier Today!

Not much has changed in 100 Years.

Pictured above a modern day (2015) acoustic leak detection conducted by a Great Lakes Region water utility. A contract worker attaches a hydrophone listening device for under 60 seconds to find leaks. At least it is fast, easy, and inexpensive. And, no leak was found.

The inaccurate, inconsistent, and incorrect condition assessment of our nation's water mains represents a key risk for water loss surveys. And, given similar drawbacks using electromagnetic, helium tracers, infrared thermography, and sonar, utilities have not had adequate assessment tools to support repair, renewal, and rehabilitation decisions -- until Electro Scan's new breed of smart water tools.

What Does Electro Scan Deliver?

For Each Defect That Leaks

- Location of Pipe Openings.*
- Starting Point, Ending Point, and Maximum Defect Current (Height).
- Classification as Large, Medium, Small.
- Classification as Large Moderate, or Severe Defect Flow.
- Total Estimated Defect Flow in GPM.**
- Total Pipe Segment Defect Flow in GPM.**

* Location accuracy of 0.4 inches or 1 cm.

** Volume accuracy ±30%.

WaterElectroScan YouTube Channel Leads Industry With 400,000 Views*

Unmatched in the Trenchless Technology industry, Electro Scan's Water Channel has become a social media darling, breaking records for YouTube views as compared to all other competitors in the leak detection market.

"Cut & Paste" the URL below to see why 'WaterElectroScan' is one of the most exciting innovations in water.

https://www.youtube.com/channel/UC-McRCXbnnZMhkHrxGdjTSyg/videos

YouTube™

*Total of seven videos 401,834 as of January 11, 2016.

2015 Electro Scan's New Leak Detection Technology
173,938 views

2015 WEFTEC Team Underwater HD CCTV Camera
57,367 views

2015 Electro Scan for Water Leak Detection
49,559 views

2015 Electro Scan Newsletter - Press Check
44,184 views

2015 Mark Grabowski Chief Disruption Officer
32,172 views

1989 UK Water Privatization Ads - Compilation
30,212 views

Low Voltage Conductivity Testing of New Construction, Lined Pipes & Point Repairs Represents New Level of Certification

Lately, Electro Scan has been seeing many point repairs that should never have been done or have been certified.

Relying on pressure testing or CCTV to inspect new construction and point repairs is a risky business, especially when (1) the a repair creates two larger defects at both ends, instead of fixing the original problem, and (2) finding out the the pipe had so many other defective joints or other problems, that were simply missed by other inspection techniques -- neither found acoustic sensors, data loggers, correlators, and CCTV. But low voltage conductivity overcomes the risk of misdiagnosing water mains, to eliminate unnecessary point repairs, or more importantly, confirm that a just completed point repair is done right.

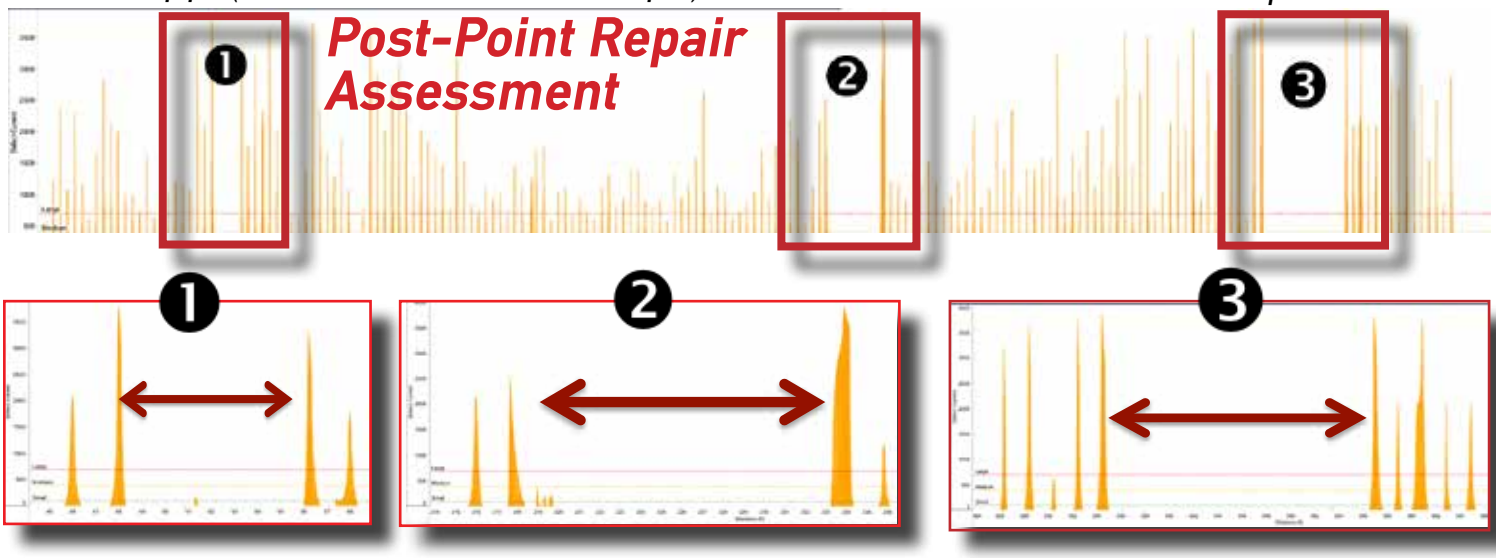
As a general rule, point repairs should never be done on a water main where more than 15% of the main has defects.

Neither should multiple point repairs be done on the same pipe, if 3 or more point repairs might seem warranted.

Let Electro Scan help certify that the right repair is done on the right pipe.

Good News:
Many point repairs repair the defect and enhance the useful life of the pipe. (i.e. no electrical current can escapes).

Bad News:
Most point repairs should never be done or may inadvertently create leaks on one or both ends of the repair.

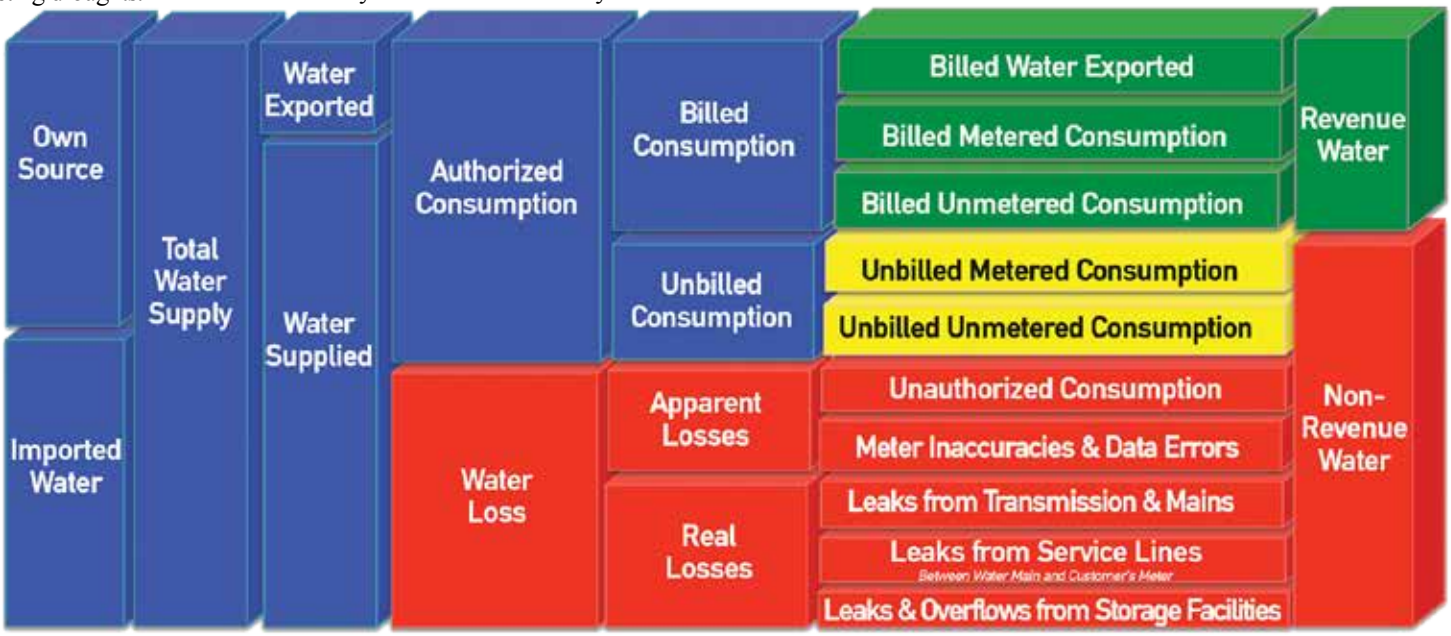


SB 555 Establishes Toughest Standard in the United States For Auditing, Identifying, Reporting & Reducing Water Losses

Rob Emanuel, Mayor, City of Chicago has famously said "Never let a good crisis go to waste." Seizing on the severe drought in the western states, and California in particular, legislators appear to have moved aggressively to prevent the impact of future, long lasting droughts.

SB 555, signed by Governor Brown in September 2015, represents the toughest standards in the United States, by mandating the measurement of Apparent Losses and Real Losses within five years. In fact, all 450 California water utilities must identify "steps taken in the preceding year to increase the validity of data entered into the final audit, reduce the volume of apparent losses, and reduce the volume of real losses" and meet performance standards for the volume of water losses.

Advantage: Low Voltage Conductivity to locate & measure leaks.



Source: AWWA Water Audits and Loss Control Programs, Manual of Water Supply Practices, M36, 2009

Electro Scan Water Loss Leak Detection Services Finds & Measures Leaks Missed by Acoustics

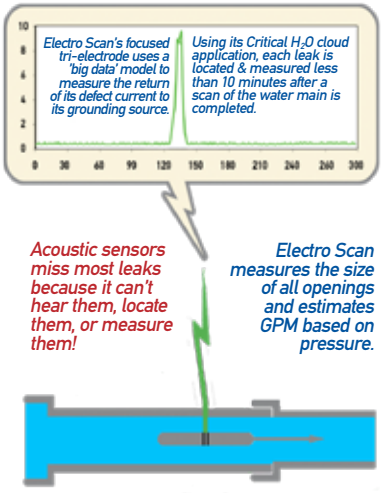
Low voltage conductivity – also referred to focused electrode leak location and electro scan – is a next generation smart water solution to locate and measure leaks.

Electro Scan is simple geo-physics -- if electrical current can pass through the wall of a pipe, water will too. Except with Electro Scan, not only can you locate every leak in a pipe, but you can estimate its defect flow in either gallons per minute or liters per second.

The power of using low voltage technology is that it finds every leak... for every pipe...every time; providing consistent, repeatable, and unambiguous results.

If a pipe has no leaks, an electric current will have no place to go and will remain flat. But, if there is a leak or any opening that allows water to leak out of a pipe, an electric current will spike with the ability to measure its area under the curve to estimate the rate of flow.

How Does Low Voltage Conductivity Find All Leaks?



New AWWA M77 'Manual of Practice' To Feature Low Voltage Leak Detection

In October 2015 AWWA's Condition Assessment Committee, M77 met at the Annual Infrastructure Conference in Bethesda, MD, to finalize the outline for its first edition Manual of Practice.

Ahmad Habibian, Ph.D., P.E., Black & Veatch, Buried Infrastructure & Conveyance Practice (Gaithersburg, MD), will head the leak detection chapter, while Dan Ellison, PE, SE, Senior Professional Associate, HDR (Ventura, Calif.) will be responsible for the overall delivery of the new Manual of Practice.

As part of the chapter on Leak Detection, a decision was made at the October meeting to include major techniques for detecting and measuring water losses, including:

- Acoustic inspection - external.
- Acoustic inspection - internal.
- Electromagnetic testing.
- Helium tracer testing.
- Low voltage conductivity testing.

Key steps to developing the new M77 Manual of Practice, discussed at the meeting, included finalizing key subcommittees, preliminary chapter assignments, and adherence to a rigorous manuscript review schedule.

Topics for the new manual include developing a condition assessment project or program, asset identification, spatial analysis of historical leaks & main breaks, choosing an assessment method, field work planning, desktop condition assessment, corrosion surveys, estimating asset life expectancy, and prioritizing pipes for assessment or renewal.

AWWA supports fifty (50) manuals of practice, previously relying on M36 Water Audits and Loss Control Programs (2009) 3rd Edition to help manage leaks.

The goal of M77 Committee on Condition Assessment is to circulate a draft manuscript of the new manual of practice at the AWWA Annual Conference & Exposition (ACE) June 19-22, 2016 at McCormick Center, Chicago, Ill.

Smart Water Technology Automatically Locates & Measures Defects in GPM

Advanced Software Automatically Captures Start, End, Length, and Volume of Each Defect Flow

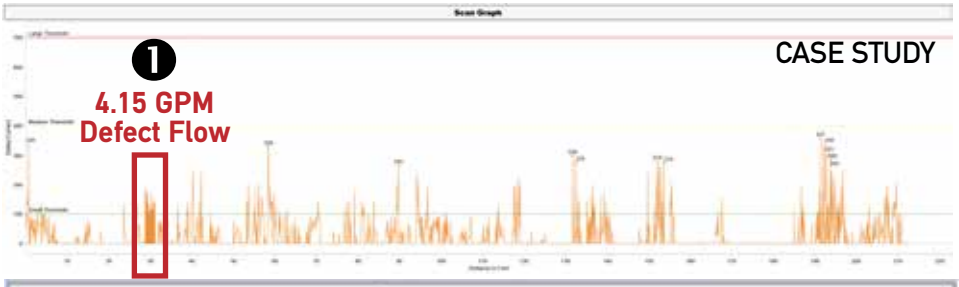
A high desert city in the Western United States is known for its water quality, sometimes having sources of water coming into its water treatment plant that is more pure than some urbanized treated and delivered water.

As a result, it is important to ensure that some of its most difficult to access water mains are inspected to determine current levels of water loss and help validate water audit information.

Using Electro Scan's low voltage conductivity leak detection technology, Electro Scan's field crew conducted a leak detection survey in less time than it took to arrive at the job site from the main road.

Individual defect locations shown in the Table (*Right*) and corresponding to the first 42ft of the pipe, measures the height of its defect grade (i.e. Small, Medium, Large), Defect Start (ft), Defect End (ft), Defect Length, and GPM Flow.

As shown in prior USEPA studies, consulting engineers and water utility professionals should not necessarily focus on the defect height or grade, but instead, focus on the area 'under the curve' determining the Total Gallons Per Minute (GPM) of defect flow.



Defect by Location in Pipe

Analysis Defect Grade	Defect Start (ft)	Defect End (ft)	Defect Length (ft)	GPM Flow
Small	26.653	27.044	0.390	0.860
Small	28.828	29.596	0.768	1.950
Small	29.760	29.914	0.154	0.470
Small	30.256	31.023	0.768	1.730
Small	33.510	33.510	0.000	0.130
Small	36.620	36.620	0.000	0.170
Small	38.697	38.697	0.000	0.150
Small	38.966	39.140	0.174	0.420
Small	40.275	40.715	0.440	1.300
Small	41.820	41.820	0.000	0.220

1 4.15 GPM

How Does Electro Scan Services Compare To Industry Competitors?

Electro Scan's low voltage conductivity services does not rely on your parent's hit or miss leak detection data logger. Representing a new breed of water loss leak detection solutions -- without the need for third party data interpretation or operator guesswork. Electro Scan Services provides unbiased, unambiguous pipe condition assessment and leak detection data unlike anything used by water utilities in the past -- like comparing an, iPhone to 8-track tape players.

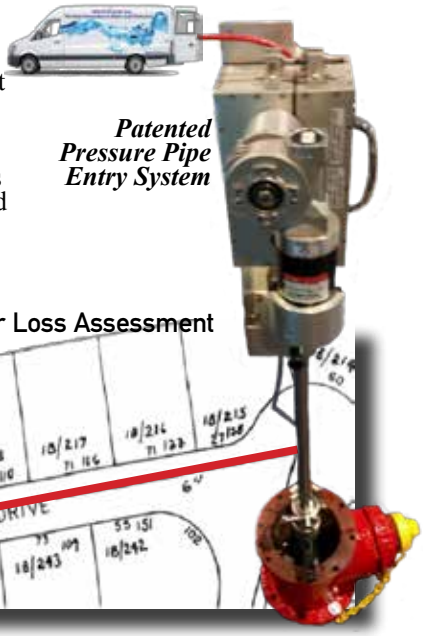
Adding a legacy acoustic hydrophone to show what water utilities are missing, Electro Scan is expected to amaze and disrupt suppliers of temporary and permanent devices used either internally or externally to assess pressurized water mains of distribution or transmission systems.

Electro Scan Partners with Industry Leader ULC Robotics For Customizable Entry Into Pressurized Water Mains

It is one thing to have a breakthrough technology, like Low Voltage Conductivity that has proven superior to older, less reliable leak detection tools. But if you can't access a pressurized water main, without interrupting the flow, you might not have a viable solution -- especially if other vendors have existing patents that cover the entry into water mains and other pipes.

Fortunately, Electro Scan found a partner with substantial experience and superior patents to help in this area, New York-based ULC Robotics! Adapting ULC's existing pipe entry products, Electro Scan is able to enter fire hydrants, air valve, flow meters, gate valves, pressure fittings, and direct pipe hot taps (not recommended or needed in most cases).

ULC Robotics designs and develops a comprehensive portfolio of advanced robotic tools and cameras capable of entering live pressurized gas mains to perform internal inspection and repair.



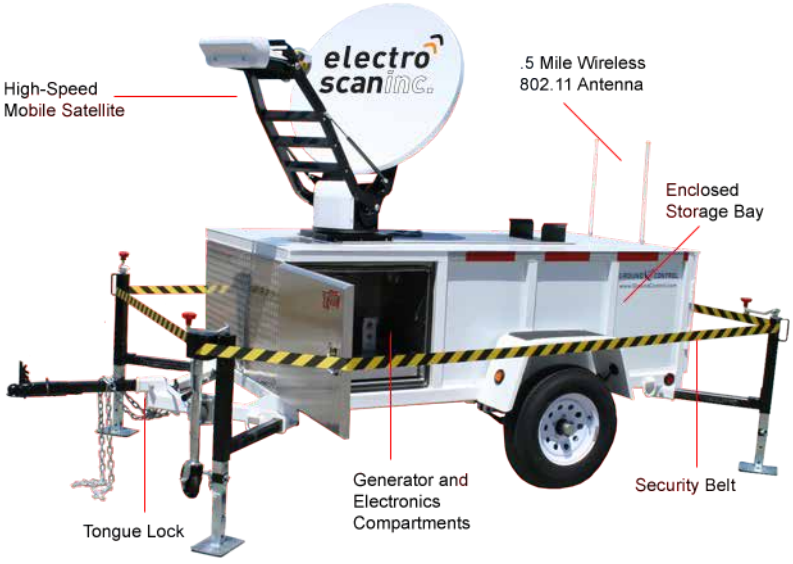
Patented Pressure Pipe Entry System

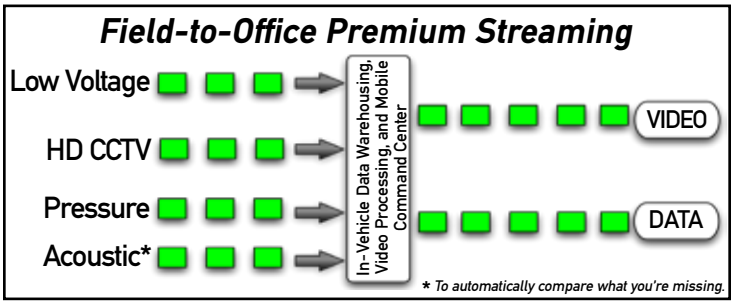
ULC Robotics
88 Arkay Drive
Hauppauge, NY 11788
Tel: 631-667-9200
Web: www.ulcrobotics.com

Sense of Urgency to 'Find & Fix' Water Losses Prompts Electro Scan to Access Any Pipe, Anytime, Anywhere

Whether Downtown NYC, on the banks of the Mississippi, somewhere in the Rocky Mountains, or working in Canada, Electro Scan customers want to be able to dispatch a repair crew if a significant leak is found during testing. They don't call it Non-Revenue Water for no reason.

That's why Electro Scan chose to specify its own customized ground control satellite to transmit video and/or data to its Critical H_2O cloud. Capable of creating a powerful ad hoc private wifi area, serving a half mile radius, let Electro Scan serve your critical infrastructure data like no other.





Chuck Hansen Comes Out of Retirement To Lead Electro Scan & Accelerate Growth

Selling a company for $100 million after turning 50 years old might make some people buy a house on a beach and never look back, but not Chuck Hansen. Founder & former Chairman of Hansen Information Technologies, and developer of some of the largest water & sewer asset management systems, Hansen founded Electro Scan Inc. in October 2011 to introduce low voltage conductivity testing instrumentation to water & sewer agencies.

"I was always disappointed to see our customers rely on incomplete or inaccurate information to prioritize their repairs & rehabilitation, especially using faulty CCTV reports and acoustic data," says Hansen. "By comparison, I saw earlier versions of low voltage technology, but knew they weren't managing the data right, not to mention making it user friendly for field crews."

Located in Sacramento in the original building where he started Hansen Software in 1983 with his Dad and older brother, Scott, Electro Scan is now a global juggernaut with offices in London, Melbourne, Toronto, Frankfurt, and Miami, FL.

Chuck Hansen
Founder
Electro Scan Inc.

Electro Scan's Next Generation Smart Water Tools Include Cloud-Based Platform for Decision Support

Electro Scan's cloud-based CriticalH_20 solution represents the centerpiece of its data management solution. Already deployed and activated around the world utilizing Amazon's AWS S3 architecture, 2015 winner of Gartner's Magic Quandrant analysis for cloud vendors.

Electro Scan's CriticalH_20 allows each low voltage conductivity scan -- anywhere in the world -- once completed and saved on its authorized local mobile computer, to be able to be accessed in minutes. "Leaks represent non-revenue water that must be fixed as soon as possible,"states Chuck Hansen.

Premium water customers are able to view streaming video, with tabular data stored, scrubbed, processed, calibrated, catalogued, and secured on a 24 hour x 7 day a week x 365 days a year basis -- with all information presented in a user-friendly web page without the need for third party data interpretation.

"By taking away the guesswork that surrounds acoustic sensors, data loggers, helium tracers, and electromagentic data, managers can now count on highly repeatable and reliable low voltage data," states Hansen. "Managers can now immediately find their biggest leaks and prioritize their work using Electro Scan as their decision support."

Electro Scan Expedites 'Finding & Fixing' Water Losses

Final Reports Available in Minutes. Not Hours, Days or Weeks.

1 New 4-in-1 Probe

Electro Scan patent-pending water probe combines low voltage conductivity, CCTV, pressure, and acoustic sensors for a 360-degree assessment of pipes.

2 Mobile Apps

Data is conveniently viewed by operators in the field using a specifically designed curb-side app that displays and stores all real-time data streams.

3 Live Video Streaming

Capturing video in both HD and low resolution formats, premium customers are able to view live streaming video from their office or home.

4 Video Cloud Storage

Like a live report from your evening news, all video transmissions, are also securely stored in the Electro Scan Critical H_2O cloud.

5 Raw Data Transfer

Raw data, such as low voltage, acoustic, pressure, temperature, distance, direction, time, and a number of other attributes, are stored in packets for transmission.

6 Amazon Cloud

Unsurpassed in its global reach, Amazon has made available its corporate servers to allow leading businesses to utilize its worldwide network of integrated servers.

7 Critical H_2O Cloud

Supporting over 500 clients and growing, Electro Scan's cloud represents a 24x7 off-site resource allowing all client data to be stored and secured in an advanced multi-tenant architecture.

8 Critical H_2O Interface

Developed using HTML 5 and Python, the Electro Scan development team releases new features on a quarterly basis.

9 Desktop Access

No software is required to download or store on your office or home desktop, just your User ID and Password and connection to the Internet.

10 Third Party Integration

Low voltage conductivity is fundamentally changing how water and sewer mains are prioritized for rehabilitation, and how pipes are certified before acceptance.

Asset Management, Citizen Relationship Management (CRM), Enterprise Resource Management (ERP), Hydraulic Modeling, Geographic Information Systems (GIS), and other third-party applications may utilize the data rich portability of the Electro Scan metadata.

Reliable, Repeatable, & Measurable Services for Water Loss Leak Detection

Pipe Specifications Especially Designed For Advanced Pipe Materials.

Operating Pressure Range	0-90 PSI.
Location Accuracy	0.4 inches (1cm).
Conveyance Type	Pressurized or gravity mains.
Insertion Tube Launch	Fire Hydrants, Air Valves, Gate Valves, Flow Meters, Hot Taps, Pressure Fittings.
Required Flow	1 ft (305mm) per second (fps).
Transport	Parachute.
Pipe Materials	Asbestos Cement (AC), Cement-Mortar Lined and Coated Steel Pipe (CMSP), Cured In-Place Pipe (CIPP), Fiberglass Reinforced Pipe (FRP), High-Density Polyethylene Pipe (HDPE), Prestressed Concrete Cylinder Pipe (PCCP), Polyethylene Pipe (PE), Polyvinyl Chloride (PVC), and Reinforced Concrete Pipe (RCP).

Multi-Sensor Probe Find Leaks Not Detected by Acoustic, Electromagnetic, Helium Tracers or CCTV.

Probe Length	6.25 inches (158.75mm).
Rigid Length	10 inches (254mm).
Cable	Neutral buoyant.
Cable Type	Fiber optic and copper.
Single Point Access Range	1,000ft (305m) range or 2,000ft (610m) range from since point of access.

Low Voltage Conductivity Next Generation Defect Location & Measurement (GPM or LPS).

Voltage	11 volts, AC, RMS.
Current (max)	40 mA.
Electrical Array	Focused tri-electrode array.
Defect Flow Calculation	Gallons per minute (gpm) or Liters per second (lps).
ASTM F2550-13	Yes. Able to automatically locate all cracks, fissures, broken joints, leaking service connections, by measuring the change in electrical current able to pass through the wall of a pipe.

High Definition CCTV In-Pipe Navigation for Documenting Location of Low Voltage Defects.

Resolution	1920 x 1080, 30 fps, H.264 compressed stream.
Minimum Illumination	6 Lux at F2.8.
Output Compressed Video Formats	Digital (.AVI and .MP4); High-sensitivity complementary metal–oxide–semiconductor (CMOS) image sensor combined with an advanced image processor superior video and still image quality.
Focus	Fixed position, autofocus, auto white balance, and image stabilization.
Focal Length	5.3mm.
Video Streams	Two simultaneous video streams, including a high quality stream for archiving and a low quality stream for live viewing on mobile devices, each with independently configurable resolution & bit rate streaming that can be output to specific network addresses.
Text Overlay	Built-in overlay generators allow up to 160 text characters to be positioned anywhere in the video frame.
Snapshot	Capture and store hi-res jpg 4096 x 3096.
Lighting	8 LEDs, 4500 Lumens.

Pressure Sensor In-Pipe PSI to Help Calculate Defect Flow Rate at Specific Leak Locations.

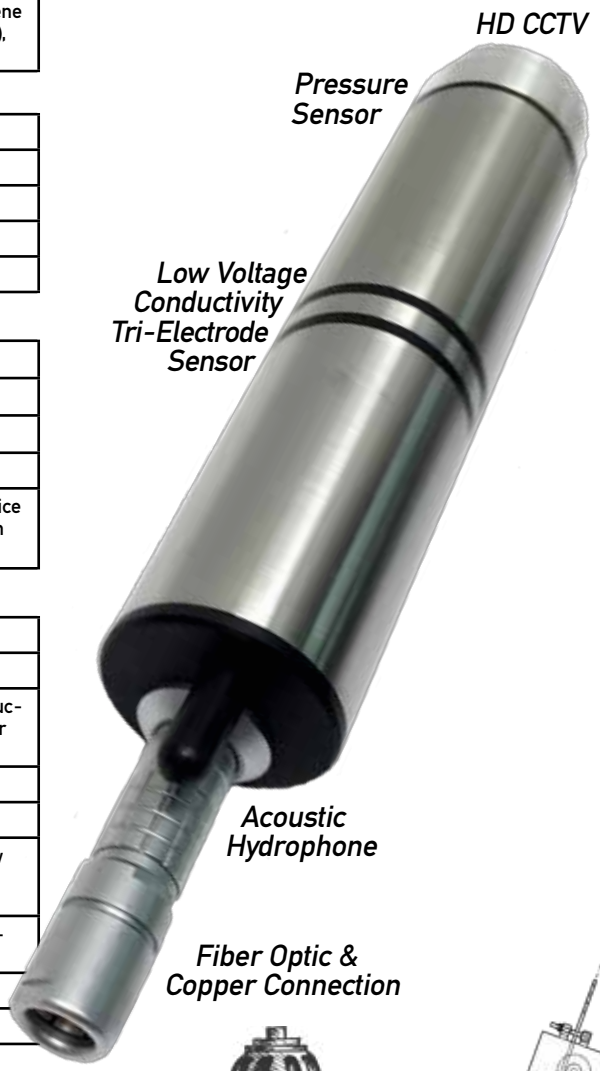
Type	Media compatible piezoresistive silicon pressure sensor.
Digital Output	24-bit ΔΣ ADC pressure sensor.
Temperature Monitoring	Integrated for accurate pressure calculation compensation.

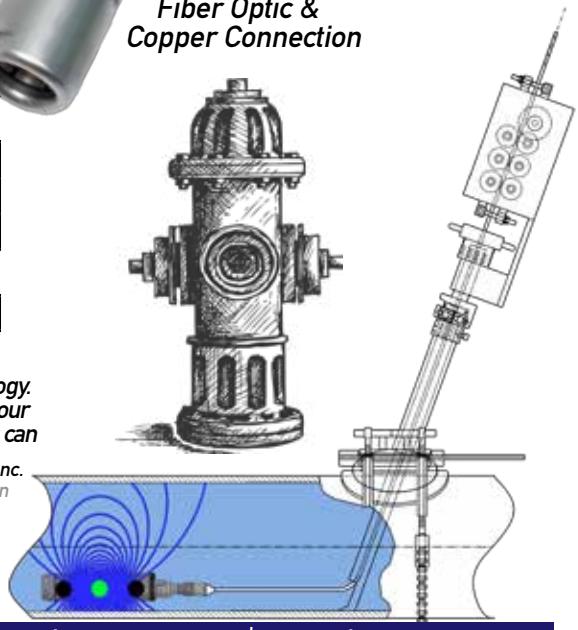
Acoustic Hydrophone Legacy Method to Assess Metallic Fittings & Benchmark to New Standards.

Frequency Range	1Hz to 170 kHz, omnidirectional.

Lean Product Design & Adoption of Low Voltage Conductivity Technology Overcomes Major Drawbacks of Legacy Leak Detection Methods

4-in-1 Smart Water Probe





"Electro Scan's Water Loss Leak Detection Services represents a new breed of Smart Water technology. By coupling legacy acoustic technology -- showing the limited data that utilities have been getting -- with our next generation low voltage technology -- showing what utilities have been missing -- Electro Scan Services can deliver unbiased & unambiguous pipe condition assessment data."

Chuck Hansen, Chairman, Electro Scan Inc.
Former Founder & CEO, Hansen Information Technologies Inc. (1983-2007)

electro scan inc.

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