Next Generation Smart Water* Leak Detection & Water Loss Services


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.

Services Exclusively Available From Electro Scan Inc.
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 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.

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

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.
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.

Why We Can’t Hear A LEAK

The Early Days...

Not much has changed in 100 Years.

... and Earlier Today!

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.

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.

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-McRCXbmzXMhLHrGadjTSyy/videos

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%.

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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

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

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.
How Does Electro Scan Services Compare To Industry Competitors?

Electro Scan’s low voltage conductivity services do 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 provide unbiased, unambiguous pipe condition assessment and leak detection data unlike anything used by water utilities in the past – like comparing an iPhol 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.

Case Study

4.15 GPM 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 42 ft of the pipe, measures the height of its defect grade (i.e. Small, Medium, Large), Defect Start (ft), Defect End (ft), Defect Length (ft), 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.
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.

Bottom-Up Water Main Water Loss Assessment
By Diameter, Material, Age, and Number of Service Connections

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Bottom-Up Water Main Water Loss Assessment
By Diameter, Material, Age, and Number of Service Connections

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 H₂O 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.

Field-to-Office Premium Streaming

Low Voltage
HD CCTV
Pressure
Acoustic*

In-Vehicle Data Warehousing, Video Processing, and Mobile Command Center

VIDEO DATA

* To automatically compare what you’re missing.
Electro Scan’s Next Generation Smart Water Tools Include Cloud-Based Platform for Decision Support

Electro Scan’s cloud-based CriticalH2O 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 Quadrant analysis for cloud vendors.

Electro Scan’s CriticalH2O 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 electromagnetic 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.”

“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.”

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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 CriticalH2O 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 H2O 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 H2O 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.
Pipe Specifications  Especially Designed For Advanced Pipe Materials.

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Pressure Range</td>
<td>0-90 PSI</td>
</tr>
<tr>
<td>Location Accuracy</td>
<td>0.4 inches (1cm)</td>
</tr>
<tr>
<td>Conveyance Type</td>
<td>Pressurized or gravity mains.</td>
</tr>
<tr>
<td>Insertion Tube Launch</td>
<td>Fire Hydrants, Air Valves, Gate Valves, Flow Meters, Hot Taps, Pressure Fittings.</td>
</tr>
<tr>
<td>Required Flow</td>
<td>1 ft (305mm) per second (fps).</td>
</tr>
<tr>
<td>Transport</td>
<td>Parachute.</td>
</tr>
<tr>
<td>Pipe Materials</td>
<td>Asbestos Cement (AC), Cement-Mortar Lined and Coated 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).</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Probe Length</td>
<td>6.25 inches (158.75mm).</td>
</tr>
<tr>
<td>Rigid Length</td>
<td>10 inches (254mm).</td>
</tr>
<tr>
<td>Cable</td>
<td>Neutral buoyant.</td>
</tr>
<tr>
<td>Cable Type</td>
<td>Fiber optic and copper.</td>
</tr>
<tr>
<td>Single Point Access Range</td>
<td>1,000ft (305m) range or 2,000ft (610m) range from since point of access.</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage</td>
<td>11 volts, AC, RMS.</td>
</tr>
<tr>
<td>Current (max)</td>
<td>40 mA.</td>
</tr>
<tr>
<td>Electrical Array</td>
<td>Focused tri-electrode array.</td>
</tr>
<tr>
<td>Defect Flow Calculation</td>
<td>Gallons per minute (gpm) or Liters per second (lps).</td>
</tr>
<tr>
<td>ASTM F2550-13</td>
<td>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.</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resolution</td>
<td>1920 x 1080, 30 fps, H.264 compressed stream.</td>
</tr>
<tr>
<td>Minimum Illumination</td>
<td>6 Lux at F2.8.</td>
</tr>
<tr>
<td>Output Compressed Video Formats</td>
<td>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.</td>
</tr>
<tr>
<td>Focus</td>
<td>Fixed position, autofocus, auto white balance, and image stabilization.</td>
</tr>
<tr>
<td>Focal Length</td>
<td>5.3mm.</td>
</tr>
<tr>
<td>Video Streams</td>
<td>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 &amp; bit rate streaming that can be output to specific network addresses.</td>
</tr>
<tr>
<td>Text Overlay</td>
<td>Built-in overlay generators allow up to 160 text characters to be positioned anywhere in the video frame.</td>
</tr>
<tr>
<td>Snapshot</td>
<td>Capture and store hi-res jpg 4096 x 3096.</td>
</tr>
<tr>
<td>Lighting</td>
<td>8 LEDs, 4500 Lumens.</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Feature</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Media compatible piezoresistive silicon pressure sensor.</td>
</tr>
<tr>
<td>Digital Output</td>
<td>24-bit ΔΔ ADC pressure sensor.</td>
</tr>
<tr>
<td>Temperature Monitoring</td>
<td>Integrated for accurate pressure calculation compensation.</td>
</tr>
</tbody>
</table>

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

<table>
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<tr>
<th>Feature</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Frequency Range</td>
<td>1Hz to 170 kHz, omnidirectional.</td>
</tr>
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</table>

“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)