Water Loss Management Solutions

Advanced Digital Leak Detection Overview Session
Pipeline Assessment Management

- The Hidden/Aware/Locate/Repair cycle of a leak can cause extensive water loss

**The Conventional Approach:**
- Infrequent water audits (Every 1-3 years, Manual)

**The New Approach:**
- Continuous leak surveys (Daily, Automated)

- Close interval monitoring is critical to maximize water supply availability and minimize system costs
Enterprise Pipeline Management Tools

• Practical leak detection and pinpointing systems fit for purpose at optimal cost
  – Promote flexibility to meet needs of end user
  – Support varied implementation plans, with expert support, maintenance and training
  – Recommend guidelines for system performance
  – Aid in selection of the appropriate methodology

• Offer simple, affordable and technically superior leak survey and detection method
  1. Maximize recovery of lost water
  2. Increase time-efficiency
  3. Accessible to utilities and non-expert users
Itron Approach to Water Loss Management

<table>
<thead>
<tr>
<th>ADVANCED DIGITAL LEAK DETECTION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Itron Water Loss Management Solutions</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Equipment Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MLOG – <em>Intelligent Network Leak Monitoring</em></td>
<td>Maximize revenue recovery with a smart grid of innovative acoustical sensors</td>
</tr>
<tr>
<td>UNILOG – <em>Light-Activated Digital Sound Logger</em></td>
<td>Leak-detecting logger for deployment in underground valve chambers</td>
</tr>
<tr>
<td>ZCORR – <em>Advanced Digital Leak Detection</em></td>
<td>Pinpoint leaks through strategic deployment of innovative leak sensors in a single overnight surveillance</td>
</tr>
<tr>
<td>DigiCorr III – <em>Digital Noise Leak Detection</em></td>
<td>Effective long-range integrity testing with state-of-the-art digital correlation</td>
</tr>
<tr>
<td>DLD – <em>Digital Leak Detector</em></td>
<td>Rugged, lightweight digital audio processing for buried water pipelines</td>
</tr>
</tbody>
</table>

Leak detecting equipment

Leak detection and pinpointing equipment

Field services
What’s So Great About Digital Leak Gear?

Digital (state-of-the-art)
• Senses leak noise significantly below the threshold of human hearing
  – Sensitivity is approximately 30 times greater than analog
• True digital recording and radio transmission preserves the fine detail of the leak sound, enabling pinpointing of even the quietest, most difficult-to-find leaks

Analog (conventional)
• Annual surveys are labor-intensive and allow leakage to run for extended periods
• Leak noise quality is subject to degradation as the signal is processed through sensors
MLOG – Intelligent Network Leak Monitoring

- Solves the problem of real loss between the treatment plant and the consumer, reducing the production of non-revenue water
  - Analyze sound patterns in their environment, detecting new, evolving, and pre-existing leaks automatically
- Proactive leak survey conserves water
  - Fully integrated Fixed Network leak monitoring system
  - Automated data gathering with minimal attention by operators
  - Targeted leak location data
  - Focused, efficient operation of water utility resources
- Significantly improves a utilities ability to maintain critical water infrastructure
**MLOG – Intelligent Network Leak Monitoring**

- Clamps onto the service connection exterior using O-rings/cable ties
- 1 MLOG per 10 service connections, or every 500’ of distribution main
- Offers advanced capabilities not served by conventional systems
- Leverages the investment in AMR, paying for itself within a few years of a specified 15-year operating life
- Helps facilitate sound asset management best practices
**MLOG – Intelligent Network Leak Monitoring**

1.4GHz WFN AMR System

- Readings are delivered each day as part of the meter reading process.
- Communicates data through a Sensus register protocol over four data messages within each 24-hour period.
- Read multiple times each day to capture the entire 4-message data string.
- The readings are delivered each day by Fixed Network Applications Software (FNAS).

[Diagram of the MLOG system with labels for Water Fixed Network, CCU v5.1, Fixed Network Application Server, MLOG-AMR Leak Detecting Sensor, Water meters equipped with 200WP Endpoints, and MLOG computer with acoustic leak data.]
MLOG – Intelligent Network Leak Monitoring

MLOG Radio Controller

- A 900-MHz, 5-channel, frequency-hopping/spread-spectrum radio
- Communicates from the street at a distance of 50 to 200 feet
- Read every 30 days, and sends readings for the previous 11 days
- User invokes the transfer of readings from the “Controller” via mlogonline

Receiving Data from an MLOG Radio Controller
mlogonline™ – A Suite of Web Applications

- System Architecture
  - Microsoft .NET Framework

- Three principal web applications define the platform:
  1. The Analyze Process
  2. The Web Browser Application
  3. The Reporting Module

- Google Maps API
  - Manages on-screen visual maps and satellite images
**Zcorr – Advanced Digital Leak Detection**

- A tool for surveying and pinpointing multiple leaks in water distribution pipes in one surveillance

- **ZCorr Features:**
  - Auto-power management
  - Flexible deployment modes
  - Expandable docking station
  - Upgradeable through software

- **ZCorr Benefits:**
  - Run structured leak detection programs
  - Integrated data, maps, database tools
  - Automatic digital correlation analysis among all loggers

### ZCorr vs. OTHER CORRELATING LOGGER SYSTEMS

<table>
<thead>
<tr>
<th>Feature</th>
<th>Zcorr</th>
<th>Conventional Noise Loggers</th>
<th>Permanent Noise Loggers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pinpoints leak</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Actual audio recording</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Upgradeable/Reprogrammable</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Digital mapping</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Identifies multiple leaks</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Communication mode</td>
<td>Internet/Docking Station</td>
<td>Docking Station</td>
<td>Drive-by Radio</td>
</tr>
</tbody>
</table>
**DigiCorr** – Digital Leak Noise Correlator

- A computerized leak management system that accurately pinpoints water pipeline leaks of all sizes

- **DigiCorr Features:**
  - Fast & Accurate Leak Pinpointing
  - Flexible Water Leak Sound Analysis
  - Systematic Leak Surveying
  - Powerful Leakage Management Tools

- **DigiCorr Benefits:**
  - Works on all sizes of pipe carrying any liquid or gas under pressure
  - No disruption to normal operations
  - Assesses up to one mile at a time
  - Detects extremely small leaks

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### ADVANTAGES OF *DigiCorr*

<table>
<thead>
<tr>
<th>Feature</th>
<th>DigiCorr</th>
<th>Analog Correlators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Automatic Leak Frequency Analysis</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Data Analysis in the Office</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>1-button Operation</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>High Resolution Correlation Display</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Expensive Periodic Calibration</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Interpretation</td>
<td>Easy</td>
<td>Difficult</td>
</tr>
<tr>
<td>Reprogrammable</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Upgradeable</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>License-free Digital Radio Transmission</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Supports Any Language</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>
DLD – Digital Leak Detector

• A simple listening device used to easily detect and pinpoint leaks in buried water pipelines

• DLD Features:
  – Smart volume limiting
  – Dynamic range compression
  – Automatic water leak location
  – High-resolution, waterproof accelerometer

• DLD Benefits:
  – Pinpoint leaks anywhere in the system day or night
  – Simplifies pipeline repair and maintenance
  – Improve water conservation efforts

<table>
<thead>
<tr>
<th>Setting</th>
<th>Display</th>
<th>Access Point</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ground</td>
<td>Gnd</td>
<td>Hard surfaces, soil, plastic pipe</td>
</tr>
<tr>
<td>Service</td>
<td>SEr</td>
<td>Service pipes</td>
</tr>
<tr>
<td>Contact</td>
<td>Con</td>
<td>Valve, hydrant, service connections</td>
</tr>
<tr>
<td>Survey</td>
<td>SUr</td>
<td>Surveying</td>
</tr>
<tr>
<td>Open</td>
<td>OPn</td>
<td>Full listening range</td>
</tr>
</tbody>
</table>
Thank You!