

## LeakfinderRT

**What the innovation is:**

LeakfinderRT is a new-generation acoustic noise correlator for detecting and pinpointing leaks in underground municipal water distribution and transmission pipes. It's easy to learn, affordable, and works for small leaks in all types of pipes, thanks to its low-noise hardware and patented advanced signal processing algorithms.

**Why it is innovative:**

The most important innovation of LeakfinderRT is its patented "enhanced" correlation function. Unlike traditional functions, the enhanced function does not require the usual processing of leak signals to filter out interfering noise. This eliminates a highly specialized part of the leak noise correlation process, making it simple to use by non-experts. Also, LeakfinderRT's enhanced correlation function dramatically improves the definition of correlation peaks that correspond to leak positions. This is important for plastic pipes, multiple leak situations, and in settings where leak sensors have to be closely spaced. Finally, the enhanced function is more effective than traditional functions for small leaks or for situations of high background noise (e.g., roads with heavy traffic).

LeakfinderRT is the first truly PC based system to employ the leak noise correlation technique. It's fully realized in software for PCs running under Microsoft Windows. The soundcard and other multimedia components of personal computers (PCs) are used to record and playback leak sounds. LeakfinderRT also uses the computational resources of the PC to perform the computationally intensive correlation operation and associated signal processing. Modern PCs incorporate high-resolution soundcards and powerful computational resources and therefore offer several advantages over traditional hardware implementations of the leak noise correlation technique.

The use of PCs as a platform eliminates the need for a major component of the usual hardware of leak noise correlators and this significantly reduces the cost of the LeakfinderRT system. Also, the use of Microsoft's Windows environment makes LeakfinderRT familiar and simple to use. Most water utilities are all set to use the LeakfinderRT system as they already have PCs in their vehicles, which they use as part of maintenance and asset management operations. Finally, since LeakfinderRT is realized in software, it will be easy and inexpensive to modify and upgrade to incorporate future developments. This helps to protect the user's investment in the system.

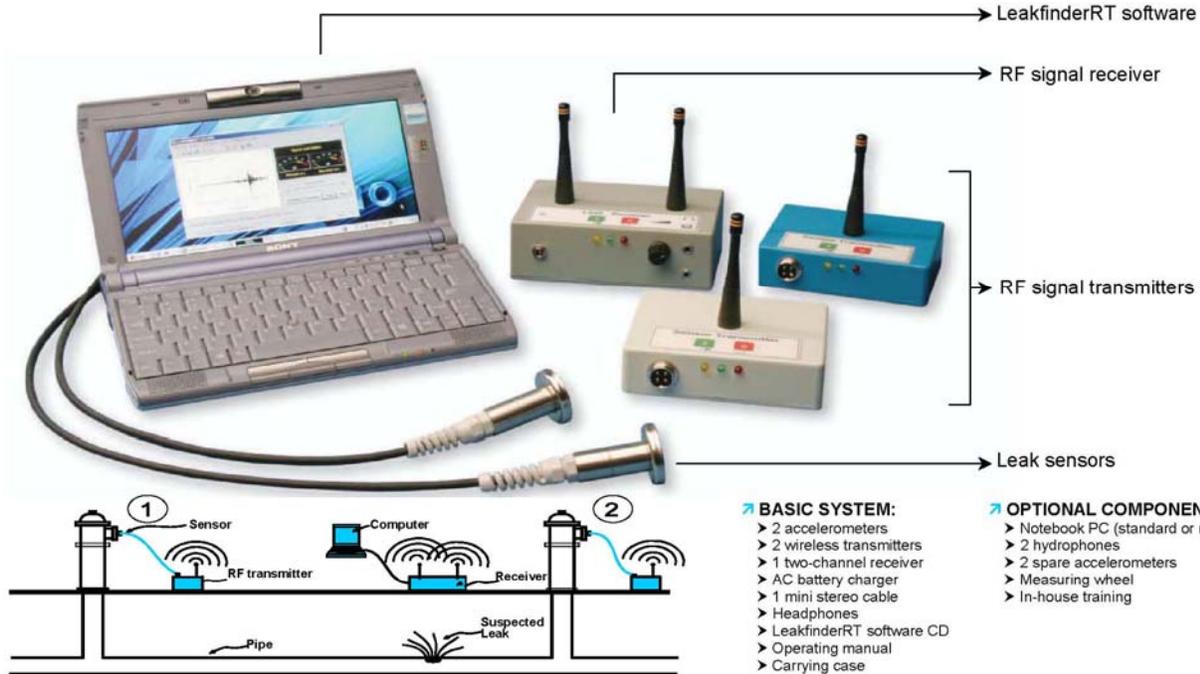
**What it changed or replaced:**

LeakfinderRT has fundamentally changed the way water utilities view leak detection as a highly specialized and expensive process, by greatly simplifying the process and improving its efficiency and by dramatically reducing the cost of the equipment. This was achieved while significantly lowering the threshold of detectable leaks and improving the pinpointing accuracy. LeakfinderRT can easily detect leaks as small as 0.5 and 0.85 litres per minute (~1/8th and 1/5th of a gallon per minute) in metal and plastic pipes, respectively, over a typical sensors spacing of 100 metres (~325 feet).

**Where and when it originated, has been used, and is expected to be used in the future:**

The LeakfinderRT technology originated at the Institute for Research in Construction of the National Research Council of Canada. The technology was further developed and commercialized by Echologics Engineering Inc. ([www.echologics.com](http://www.echologics.com)), a startup company founded in 2003 and based in Toronto. Echologics has gained instant recognition by the industry and is emerging as a leading developer of acoustic leak detection systems. LeakfinderRT's ease of use, superior performance and low cost has opened the door widely to the North American market of more than 50,000 water distribution operators, the majority being small and medium in size with limited financial and technical resources. Many water utilities already use LeakfinderRT, including small and medium-sized ones that have acquired this kind of technology for the first time (for example, Guelph/Ontario and Folsom/California). The future for LeakfinderRT looks very bright due to the high leakage levels in most distribution systems and the increasing water demand worldwide. In Canada and the U.S., typically 20% of the water produced is lost as a result of distribution system leakage and in the case of older systems the loss may reach 50%. Canadians and Americans are the world highest users of water. According to the U.S. EPA, more than 36 states expect to experience water shortages over the next 10 years. Even Canada, with all its lakes and rivers, suffers from water shortages. According to Environment Canada, 26% of municipalities suffered from shortages in the late 1990s due to droughts, infrastructure problems and high demand.

**Contact: Marc Bracken • Echologics Engineering Inc • 50 Ronson Rd, Suite 165  
Toronto, Ontario M9W 1B3 • Canada • 416-249-6124 • Fax 416-249-8833  
[marc@echologics.com](mailto:marc@echologics.com) • [www.echologics.com](http://www.echologics.com)**



➤ The LeakfinderRT system is a new-generation pipeline leak noise correlator

The screenshot shows the LeakfinderRT software interface. The main window displays a 'Correlation Function' graph with 'Magnitude' on the y-axis (ranging from -1.0 to 1.0) and 'Time (seconds)' on the x-axis (ranging from -0.1 to 0.1). A sharp peak is visible at approximately 0.08 seconds. To the right of the graph are 'Signal Level Meters' for 'White (Left ch.)' and 'Blue (Right ch.)', both showing levels around -40 dB. Below the meters is a 'Volume Control' slider and buttons for 'PreView', 'Correlate', 'Stop', and 'Play'.

Below the graph, the text reads: 'Leak position is 40.4 m from Blue station and 150.3 m from White station, Time Delay = 0.08834 s'.

The 'Input Form' window on the right shows 'Pipe Properties' with 'Pipe type' set to 'Ductile Iron', 'Pipe diameter (mm)' set to '250', and 'Sensor spacing (m)' set to '190.7'. There are checkboxes for 'Re-correlate saved signals' (unchecked) and 'Save Signals' (checked). The 'Duration (sec)' is set to '60'. A 'Start' button is at the bottom.

➤ The LeakfinderRT interface is user-friendly



➤ Examples of the significant damage that can be caused by leaks when left undetected and unrepaired