3.1 Publishable summary

Executive Summary

MOBILE REFRIGERATION SYSTEM REFRIGERANT LEAKAGE MONITORING

SUMMARY

LeakDetect is an International Research and Development Project that aims to deliver groundbreaking new technology for reliable & accurate refrigerant leak detection and monitoring systems for refrigerated transport.

The LeakDetect consortium brings together technical & scientific skills & experience from all over Europe. These are: Aarts Plastics (NL), Brain Bee (I), Data Optics Balkans (BUL), Dundalk Institute of Technology (IRL), Hubbard Products (GB), Primalec (GB), Sensor Technology (GB), UK Intelligent Systems Research Institute (GB). Primalec is the Project's Coordinator.

LeakDetect is focused on developing new analytical sensor technology, capable of detecting & monitoring the smallest refrigerant leaks in the demanding environment of road transport.

The project finished in September 2011, LeakDetect aims to reduce the release of Green House Gases by preventing refrigerant loss and reducing the resultant vehicle fuel inefficiencies. It has benefitted from substantial funding from the European Union under the Seventh Framework Programme.

PROBLEM BEING ADDRESSED

The European SME haulage industry is under unprecedented pressure due to fuel price increases and environmental pollution. If crude oil prices average $80 a barrel in 2008 as predicted, prices will have risen 154% since 2003. In real terms, fuel prices have risen 42%

in the last 4 years. Fuel constitutes 30% of the operating costs, therefore costs are increasing at nearly twice the rate of inflation.

The haulage industry in Europe emits over 922.6 M tons of pollutants every year which is not sustainable. The industry faces increased taxation and legislation, impacting on profitability. The average profit margin for a haulage firm is between 0% and 2%, down from over 3.5% in 2003. The problems above are worse for the refrigerated transport industry because refrigerated vehicles consume extra fuel to run the refrigeration plant. The industry is in desperate need of any technologies that can help reduce operating costs and restore profitability. This is important because 72.5% of freight in Europe is moved by road. Low-resistance tyres and aerodynamic packages are helping but technologies specifically directed at refrigerated vehicles are required.

This project is motivated by the fact that even correctly operating refrigeration systems leak refrigerant which causes a reduction in coefficient of performance (COP). This in turn raises the compressor duty cycle and further increases fuel consumption. Refrigerants are hydroflorourocarbons which have a high global warming potential and so contribute further pollutants.

PROJECT OBJECTIVES

The key objective was to develop a refrigerant leakage monitoring system based on a network of low-cost surface acoustic wave sensors. This will enable the refrigerant charge of a system to be maintained at the optimum level so that it operates at the design maximum COP. The benefit of this system will be a decrease in operating costs equivalent to approximately a 5% reduction in fuel consumption equating to a saving of 2250 per annum for a refrigerated trailer.

PROGRESS AND ACHIEVEMENTS

The LeakDetect consortium of partners worked and collaborated well together, attending all the project meetings and disseminating effectively at industry fairs and events, see figures 1 & 2 below. The partners are: Aarts Plastics (NL), Brain Bee (I), Data Optics Balkans (BUL), Dundalk Institute of Technology (IRL), Hubbard Products (GB), Primalec (GB), Sensor Technology (GB), UK Intelligent Systems Research Institute (GB), with Primalec acting as

the Project's Coordinator. The LeakDetect project has successfully reached the end of its second and final period and is now using the knowledge and experience gained from the start to ensure that they can begin to exploit the knowledge gained.

Figure 1; Hannover Messe 2011, SensTech stand

Figure 2 Sensing Technology-Birmingham, September 2010, SensTech stand

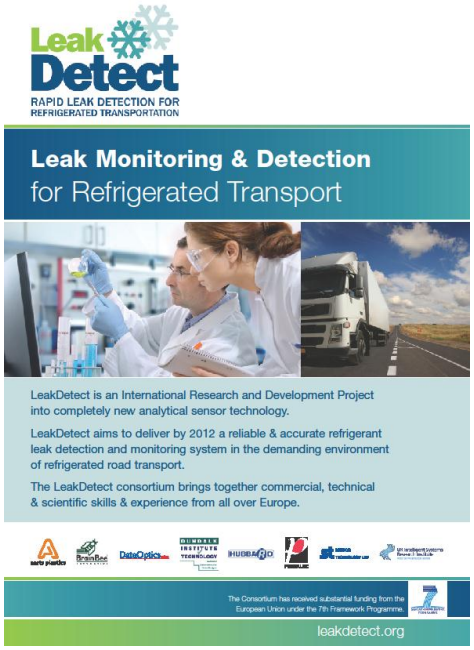

Figure 3 Poster/banner graphics Displayed at Dissemination Events

During the first project phase, significant effort was focused on some key technical areas, namely to establish the State of the Art, making the selection and testing of the sensoring and operational materials for the SAW then the completion of the prototype SAW design. The second and final phase of the project saw the build, development, integration then testing and validation of the SAW sensors.

FOR MORE INFORMATION

Please visit our public website : www.leakdetect.org

Figure 4; Website front page

PROJECT PARTNERS