

USES AND BENEFITS OF LOW COST WATER SENSORS

The provision of low cost sensors to organisations involved in water monitoring is a growing challenge to sensor manufacturers, and has been for a number of years. Both the Water industry and Environmental Agencies are starting to apply smart monitoring networks, but it would be fair to say that they are behind the curve when compared to other industries involved in the built environment and transport.

The real benefits of low cost water sensors can be seen when they are used at large regional scales. For example monitoring of streams & rivers in a catchment, e.g. the catchment sensor network the Environment Agency in England operate. Another useful large scale application for low cost water sensors is in pipe networks, both for water supply and recovery.

Probably the most advanced application for low cost sensors within the water industry would be in domestic and industrial water metering, as most water companies are already in the process of rolling these out within their networks. Another key driver within the water industry includes the monitoring of pipe networks for leak prevention and detection, where low cost pressure sensors and hydrophones are commonly used. From a sensor perspective, the key to these types of networks is that they use relatively simple, traditional sensors which do not require expensive transduction methods, and do not incur significantly increased costs for maintenance. It is therefore prudent to first see where simple inexpensive sensors can be adopted when considering other sensor based solutions for monitoring key parameters within the water industry.

There is an important distinction between sensors required to monitor regulatory parameters and those that are fitted to provide information for improving efficiencies with processes. Often, the former will require high cost transducers or chemical sensors or will incur significantly greater costs to maintain and calibrate than the latter. Ultimately, the whole life cost of ownership may render what appears initially to be a low cost sensor a significant cost over its lifetime, but the industry is aware of such issues today in their focus on TOTEX in their procurement practices.

The cost of the sensors themselves can be a barrier to the proliferation of such systems, as the cost of the hardware required for the system architecture and telemetry does not increase significantly in relation to the size of the network. Further challenges are in the form of programmes to build such networks, which commonly require an initial pilot scheme and then a phased implementation. This can inhibit sensor manufacturers to offer volume prices for sensors, but can fortunately sometimes be addressed by framework type arrangements.

However, reduction in costs of sensors can only go so far in economies of scale. To realise a quantity shift in sensor network adoption can be assisted by reducing costs by use of disruptive technologies within sensor and transduction design. Academic organisations such as the Sensors Development Group at the National Oceanography Centre Southampton, and the Dublin City University Water Institute, have demonstrated the ability to develop new techniques for monitoring key parameters within water bodies at lower cost.

Many sensor manufacturers who provide specialist sensors offering high value to the water sector may decide not to enter the low cost sensor market, as their business models may not work on high volume low margin sensor sales. Others may look to adding value to low cost sensor sales in the form of support in installation and maintenance services, as well as data interpretation services. There is currently a move within international markets where organisations, rather than paying for sensors, pay for the data provided, which is ultimately the 'end product'. The trend for such arrangements for large networked systems is likely to continue over the coming years.

A steady increase in global sensor sales over the next 3 years is projected by market research but then a doubling of sensor sales thereafter. There is little doubt that water sensors will also follow this trend, with the increasing importance placed on supply and recovery of water and protection of natural water supplies. The years ahead for those working within the industry are set to be challenging, exciting and potentially lucrative.

SWIG will be holding a workshop on Low Cost Sensors on 5th July at the University of Southampton. The programme will take the usual form of SWIG workshops with presentations from academia, industry and end users. The programme includes presentations from the host, Southampton University, as well as Dublin City University who will both provide details on a current sensor development programme within their organisations. The day will also include presentations from sensor providers Radio Data Networks and TE Labs and other end user organisations and will provide a useful update on the state of play of low cost sensors within the Water and Environmental Sectors. Further details are available on www.swig.org.uk



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