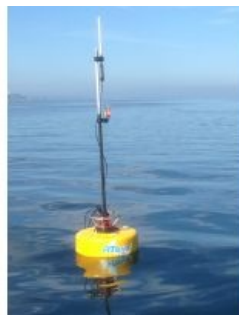


# Transferring up to Three Times More Data under Water



The RTsys teams, in association with the Higher Institute for Electronics and Digital Training (ISEN) in Brest, France, took it upon themselves to improve underwater communication. In order to do so they adapted the multiple input/multiple output (MIMO) technology, which involves multiplying the number of transmitters and receivers. Tested in the harbour of Brest in April 2016, the system demonstrated a

300% improvement of throughput compared to conventional single input/single output (SISO) technology.

The RTsys MIMO system is equipped with 4 transmitters and 8 receivers distributed over a surface area of a few dozen square centimetres. Each transmitter simultaneously sends different data to its neighbouring transmitter and signal processing is necessary to collect good-quality data. This is an achievement made possible by the algorithm developed with ISEN Brest.

## Low Energy Consumption

Energy consumption can also be reduced by over 75% when SISO-equivalent throughput is used. Furthermore, these positive results were obtained in a shallow and noisy environment, therefore confirming the quality of the transmission and the processing of data collected using MIMO technology.

Lastly, the MIMO system, developed by RTsys, enables more data to be sent over a reduced bandwidth; another advantage of this technology. Designed to integrate various communication systems, this technology (which is in the process of being developed) could lead to the improvement of underwater communication in a variety of situations. Data quality, throughput, distance, and energy efficiency are all improved by MIMO technology without increasing the spectrum occupancy, which can nonetheless be increased in situations where one of the parameters is limited. Data of satisfactory quality can be sent over large distances between a submarine and a ship despite the limited bandwidth availability. It will also be possible to reduce the throughput of monitoring sensors, on an offshore platform for example, in order to improve transmission reliability. Lastly, in situations where energy availability is limited, such as in an underwater scientific observatory, it may also be possible to reduce throughput in order to further improve the observatory's battery life.