New receiver board gets all the right signals

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UNSW researchers have developed the first Australian receiver that can pick up both the L1 and L2C GPS frequencies, as well as the signal from the first prototype Galileo satellite.

"We are the first people in Australia to design hardware and software that will pick up the Galileo signal," explains Associate Professor Andrew Dempster, Director of Research in the School of Surveying and Spatial Information Systems.

"In addition to that our board also allows us to pick up both the L1 and L2C GPS signals. Developing technology that picks up all three signals will enable researchers to make satellite navigation more accurate – rather than metre-level accuracy, this will mean centimetre-level accuracy should be available in inexpensive receivers."

The board has an analogue component, tuned to the "old" GPS L1 frequency, which was used to receive the Galileo signal. Extra circuitry allowed the same front end to receive the L2C frequency. What makes the receiver different is its use of a Field Programmable Gate Array (FPGA) that can be reprogrammed to allow the board to process the L1, L2 and Galileo signals. It is this chip that makes the board so unique and effective.

"For us this is research infrastructure. This board is a platform on which we can conduct many kinds of satellite navigation research," Andrew explains.

The team have now started work on a version of the board that would have two front ends, enabling it to tune in to L1 and L2C at the same time. It will also have a USB port for data logging.

Among other applications, the research could lead to more efficient in-car GPS.

The board, the FPGA design and the on-board software have been made open source and are available on the Internet.

"We will sell the made up boards but if people want to make their own, well the information is there," Andrew says.

Source: University of New South Wales