

Chips are just what the doctor ordered

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Innovators

Every day countless medical procedures run the risk of interruption because of the wrong tools arriving at the surgery theatre. But Melbourne company Mems-ID is developing a type of radio frequency identification (RFID) tag that could mean surgeons need never worry about receiving the wrong tools.

The company hopes investors will share its enthusiasm as it seeks \$5 million to take the product from beta through to production.

Mems-ID is using microelectromechanical systems technology to develop radio tagging chips just half a millimetre in length but strong enough to be inserted into devices such as surgical implements.

Mems-ID chief executive Fraser Clayton likens the design of his company's chips to that of a xylophone. Each chip is comprised of microscopic beams tuned to different frequencies. When this array of beams is struck by a radio signal, the responses can be interpreted by a reader device. Beams can also be locked down to give no response.

These two different states correlate to the binary 1 and 0 state of regular electronic devices and enable the chip to act as a data-storage device.

"In principal, we're actually building a 256-bit blank memory device that you can write what you like on," Mr Clayton says.

MEMS-based RFID chips can also be set to measure changes in temperature. This makes it possible to determine whether a surgical device with a chip implanted has undergone high-temperature sterilisation, and how often, or whether a blood product has been warmed above its recommended temperature.

Mems-ID recently signed a deal with the world's largest specialised maker of orthopaedic parts and tools, Zimmer.

Mems-ID chips will be used to track equipment that is loaned to surgeons to complete specialised medical procedures such as knee and hip replacements. The kits, which can include hundreds of specialised parts and instruments, are loaned to surgeons for each operation and must be manually checked each time they are dispatched.

The operations director for Zimmer in Australia, Michael Schaffler, says at any moment he is tracking about \$10 million in assets between his company and surgeons.

"Right now we have human beings doing a check of what should be in each tray as compared to what physically is in each tray, and they can make mistakes," he says. "And I don't want the surgeon to discover the mistake when he is in the middle of the operation and not have the appropriate instrumentation to put in the implant."

Chips are just what the doctor ordered (Cont'd)

Mr Schaffler says his company already uses standard RFID tags to track delivery of orthopedic body parts, but these credit-card-sized tags are too big to use with surgical instruments and would not survive steam sterilisation.

He says the small size of the Mems-ID chip means they can be attached to an instrument. The goal is to be able to scan a tray of instruments to determine that all items are there and verify that they have been cleaned.

Mr Clayton says his company's chips can also be used in general medical practice, particularly for tracking instruments that may have come in contact with diseases that are not killed by regular sterilisation.

"There is an ultimate aim to have every surgical instrument - everything that touches a patient - traceable down to a single item," Mr Clayton says.

Mems-ID has completed a proof-of-concept design and is now creating the first beta devices that are packaged and suitable for field testing at client sites. This will allow the Zimmer trial to take place next year.

A commercial prototype is scheduled for delivery in June, with mass production starting at the end of next year.

Mr Clayton says Mems-ID has attracted interest from all of the world's large orthopedic companies and numerous blood products companies. Once Mems-ID has established itself in the health-care industry, the company will turn its attention to the security market, including access cards, document security devices and other identification systems.

Mr Clayton says a significant problem with standard RFID tags is that it is relatively easy to skim and copy a tag. But he says Mems-ID will protect components of its encryption system as trade secrets, as opposed to public patents, and so should remain more secure.

The cost of MEMS-based chips also compares favourably with other technologies. Mr Clayton says MEMS chips are no more expensive than regular RFID chips but involve a 10th of the number of steps involved in making a microprocessor-based RFID device.