

## Industrial Research Assistance Program (IRAP)

**Region:  
Ontario  
Stratford**

### Novatronics



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**Allan Rock, Industry Minister**

### New technology shows how pilots use their force

A Canadian company has created a force sensor that will not only make commercial flying safer, but for the first time could give jet fighter pilots power steering.

The force sensor technology—developed by Stratford, Ontario-based Novatronics with support from the National Research Council's Industrial Research Assistance Program (IRAP)—is the outgrowth of a series of fatal crashes in the 1990s involving Boeing 737 jet liners.

"One of the problems investigators had in analyzing the 737 crash data was how much pressure were the pilot and co-pilot applying to the flight controls. Were they fighting one another? Because they have no way of detecting how much force was being applied, they can't tell what was going on," says Peter Van Drunen, president of Novatronics. The company is a global leader in the development and manufacturing of precision motion control and sensing devices for the aircraft industry.

As a result of these crashes, the U.S. Federal Aviation Authority mandated that all 737 be fitted or retrofitted with cockpit force sensors on the steering controls. These force sensors will feed data to the plane's flight data recorder, the so-called 'black box.'

Designing just such a control was a natural extension of Novatronic's existing line of motion sensors. Known as linear variable differential transducers (LVDTs), these sensors are used on aircraft around the world to minutely monitor the movement of parts such as wing flaps and cabin pressure valves.

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### Web site:

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The hurdle was that without a contract in hand, the company didn't have the capital to undertake the intensive R&D required to capitalize on this emerging market. Boeing wasn't ready to consider a contract until Novatronics could demonstrate proof of concept. In May 2001 the company received a R&D financial shot in the arm from IRAP to do just that.

"Without IRAP support it's extremely unlikely this program would have gotten off the ground," says Van Drunen.

In the past 14 months, the company's technicians have developed a force sensor prototype that is now ready to go out to potential buyers. And just in time. The FAA's new 737 regulations come into effect at the start of 2003. The potential retrofit market alone is about nine million dollars (U.S.), involving three thousand 737s, with three of the \$1000 (U.S.) sensors required per aircraft.

"What the IRAP program gave us was the basic mechanical design model that allows us to determine whether or not the technology is suitable for other applications," explains Van Drunen.

One leading-edge potential application of the force sensor technology is to the stick control of what will be the world's most advanced military fighter jet, the U.S. Joint Strike Fighter (JSF). Current jet fighter controls operate like manual steering in a car—they're directly dependent on the amount of force the pilot can exert. At times, this means that pilots will actually stand-up to push on their flight stick. Novatronics is now in discussions with BAE, the company contracted to supply the JSF's flight controls, to adapt the new force sensor technology so that Top Guns will have what amounts to power steering.

Industry Minister Allan Rock congratulated the company on its cutting-edge innovations in announcing that Novatronics had been identified by NRC as one of Canada's Innovation Leaders to be promoted within the context of the NRC *Vision 2006* and *Canada's Innovation Strategy*.

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