



High-speed 1553: a promising technology wasted by the military

Most would agree in this day and age that the U.S. government—particularly the Department of Defense (DOD)—no longer can afford to waste money. Hundred-dollar hammers and thousand-dollar toilet seats simply MUST become things of the past. With federal budgets and the global economy as tight as they are, every dollar has to count.

Nevertheless, over the past several years, the U.S. Air Force walked away from a high-speed avionics databus program after spending millions. Almost everyone concerned with this program thought it was a great idea, but the Air Force killed the program anyway because it didn't have high enough priority.

The project involved Air Force and U.S. Navy avionics researchers and avionics databus specialists at Edgewater Computer Systems in Ottawa. The idea was to develop a military-standard, high-speed version of the widely installed MIL-STD-1553 databus, which required little rewiring or other modifications to existing aircraft with 1553 already installed.

The program, called Extended 1553 (E1553), proposed to move data through existing 1553 wiring at speeds as fast as 200 megabits per second—a two-hundred-fold increase from 1553's 1-megabit-per-second speed. You probably haven't heard

much lately about E1553 because the Air Force has pulled the plug on the program after spending in the neighborhood of \$40 to \$50 million.

This program wasn't just sandbox research in its early stages. Scientists at Edgewater had flight-tested the technology with encouraging results aboard an Air Force F-16 jet fighter. The Navy also sponsored tests of E1553 aboard an F/A-18 fighter-bomber, also with encouraging results.

A competing high-speed 1553 technology from Data Device Corp. in Bohemia, N.Y., called HyPer-1553, had interest from the Pentagon, although it never received military backing as an official research program. DDC's HyPer-1553 technology was demonstrated on a Boeing F-15E Strike Eagle jet fighter-bomber in 2006, but never received the necessary government funding or program of record to make it a viable product.

The beauty of E1553 and HyPer-1553 lies in the ease of installation, ease of maintenance, and economical costs of installing high-speed networking on a wide variety of military platforms—not only aircraft, but also others that use 1553, like the M1A2 Abrams main battle tank and other vetronics programs.

These two modes of high-speed 1553 require no rewiring to upgrade from conventional 1553 to

high-speed 1553 because the data moves equally well over the same wiring. The high-speed databus on these platforms could function not only as a control bus, as 1553 was designed to be, but also as a high-speed data pipe carrying sensor data, imagery, and video.

This kind of technology potentially could lead to affordable sensor-fusion systems on legacy aircraft, such as the F-16, F/A-18, and F-15, similar to those in more modern aircraft, such as the F-22 and F-35. In armored combat vehicles, this technology could facilitate installing affordable self-protection systems to safeguard vehicles from threats, such as missiles and rocket-propelled grenades.

For the time being, it's all about upgrading existing systems economically. Let's face it, this is what the U.S. military faces over the next several years. There is very little money available for new starts like the F-35, and we've already seen the massive Future Combat Systems program cancelled due to budget issues and capability issues.

If the U.S. military is going to maintain itself as a viable fighting force over the next decade, technology insertion and systems upgrades to existing weapon systems will be crucial. ←