

Military use of consumer technology

War games

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Consumer products and video-gaming technology are boosting the performance and reducing the price of military equipment

Courtesy Vcom 3D



VIDEO games have become increasingly realistic, especially those involving armed combat. America's armed forces have even used video games as recruitment and training tools. But the desire to play games is not the reason why the United States Air Force recently issued a procurement request for 2,200 Sony PlayStation 3 (PS3) video-game consoles. It intends to link them up to build a supercomputer that will run Linux, a free, open-source operating system. It will be used for research, including the development of high-definition imaging systems for radar, and will cost around one-tenth as much as a conventional supercomputer. The air force has already built a smaller computer from a cluster of 336 PS3s.

This is merely the latest example of an unusual trend. There is a long tradition of technology developed for military use filtering through to consumer markets: satellite-navigation systems designed to guide missiles can also help hikers find their way, and head-up displays have moved from jet fighters to family cars. But technology is increasingly moving in the other direction, too, as consumer products are appropriated for military use.

Traditionally the military has preferred to develop and control its own technology, not just for tactical advantage but also to ensure that equipment was tough and reliable enough for those whose lives would depend on it. That began to change after the cold war as defence budgets became constrained and the development of sophisticated industrial and consumer products accelerated. As some of these technologies have become commoditised products which are available to everyone—friend and foe alike—there seems less reason not to buy them and use the savings for more critical equipment that needs to be built-to-order. And consumer products can often be tweaked to make them more rugged or secure when necessary.

Hands off the Xbox

A new piece of military kit can take years to specify, test and acquire using a traditional procurement process, only to arrive already outdated. So, where possible, it is quicker and cheaper to buy commercial off-the-shelf items. These range from industry-standard components, like processor chips incorporated into military equipment, to products that consumers would recognise. Sometimes these are made more rugged, like Panasonic Toughbook computers, or converted for other uses, like Xbox 360 video-game controllers adapted to operate small robotic ground vehicles used for reconnaissance.

Apple's iPod and iPhone are among the latest additions to a soldier's kit. American forces in Afghanistan and Iraq are using them for translation (one such device is pictured above) and to view intelligence information, such as pictures transmitted from unmanned reconnaissance drones. An iPhone app called Bullet Flight enables snipers to calculate range and trajectory for their shots, and built-in satellite-positioning allows local weather conditions to be taken into account. The basic version costs \$3.99 and the full military one—which even calculates how the Coriolis effect from the rotation of the Earth will influence a bullet's flight—costs \$29.99.

In the fast-moving consumer-electronics industry, where some products are lucky to have a shelf life of more than a year, companies can spread their research-and-development costs across a global mass market. Defence contractors, however, usually supply only a limited amount of equipment designed to meet the specific requirements of a particular customer. Exports can help spread costs, but different countries demand different specifications, which pushes costs back up. Consumer-electronics companies also adopt aggressive pricing strategies to grab market share. The PS3, which now costs \$300 in America, was initially sold at a loss by Sony in order to boost its popularity. (The company hopes to recoup its losses by taking a cut from the sale of each game for the console.)

In many cases it is probably now impossible for companies outside the consumer-electronics industry to match the price and performance of mass-market components. BAE Systems, a British aerospace and defence contractor, has calculated that a £300 (\$500) video card from NVIDIA, a Californian company which is a leader in gaming graphics, can replace £30,000 worth of other computing equipment used for engineering simulation.

What has changed in the past two years, says David Standingford, group leader of electromagnetic modelling at BAE, is that products such as the PS3 and NVIDIA graphics cards have become immensely powerful computers in their own right. He adds that the emergence of new industry standards and a leap in power from the use of multi-core processors, which contain several number-crunching engines working in parallel, has made it easier to incorporate and link up such devices to tackle much bigger tasks.

Last year an IBM supercomputer called Roadrunner, based at the Los Alamos National Laboratory in New Mexico, established a new record by operating at more than one petaflop (1,000 trillion calculations a second). Roadrunner is the world's first "hybrid" supercomputer, having been assembled in part from off-the-shelf equipment, including 12,960 Cell processor chips like those found inside the PS3. It will be used to simulate the behaviour of nuclear weapons.

In Britain, BAE Systems, Airbus, Rolls-Royce, Williams (a Formula 1 racing team) and others have set up a not-for-profit laboratory based in Bristol called CFMS to evaluate consumer products and components that could reduce the cost of engineering simulations. Jamil Appa of BAE, who is involved in the project, says one aim is to see how easily the internal architecture of video-games consoles can handle the complex algorithms used in simulations. The lab will provide feedback to consumer-product suppliers, he adds.

NVIDIA already recognises that it is not just gamers who are interested in its products. In September, when Jen-Hsun Huang, NVIDIA's CEO, unveiled the company's latest graphics technology, he described it as the "soul of a supercomputer" with applications beyond gaming.

Nor is it just the military that is keen to employ consumer technology in sophisticated applications. The Swedish police are already using a virtual autopsy system based on gaming technology to help solve crimes (see box). And Siemens, a German electronics and engineering giant, recently launched an ultrasound scanner which allows expectant mothers to see their unborn child in 3-D. It uses an NVIDIA graphics card and 3-D glasses devised for gaming. Soldiers have also been spotted wearing 3-D glasses, which will add another dimension to modern warfare.

