

Battle hardened

Computer gear made to withstand the rigors of war

By Ross Kerber
GLOBE STAFF

TAUNTON — Before computer parts leave General Dynamics' factory here they must battle their way through tests tougher than basic training.

Using metal test chambers the size of refrigerators, managers bake circuit boards to see whether they function at more than 100 degrees. They also fry the boards with electrical signals, place them in vacuum chambers to simulate altitudes above 30,000 feet, and bathe them in salty fogs.

The goal is to weed out faulty chips

and connections before they're built into devices for military users not known for babying their equipment.

"You've basically voided the warranty just by selling it to us," said Andy Taylor, a systems engineer at the Army's Natick Soldier Center, which advises units such as the 82d Airborne Division, now experimenting with laptop and handheld computers in Afghanistan.

"In the battlefield you're taking on dirt, sand, and dust," where commercial products don't stand a chance, Taylor said. In recent years the Army and Marines have bought tens of thousands of heavy-duty laptops, which can weigh 15 pounds or more. Lately soldiers have been testing armored personal digital assistants, or PDAs, using Microsoft's PocketPC operating system, running programs that allow them to find their positions using sat-

ellite signals or to control artillery fire. With powerful new chips and software, the Army is scheduled to deploy significant numbers of these rugged PDAs this year, though perhaps too late for them to play a role in an attack on Iraq.

Most of these computers use extra seals, bigger batteries, and heavy shells to survive falls from a Humvee, in environments where commercial models wouldn't last a day.

"If you can buy it at the store, it will probably fall apart in two hours," Taylor said.

Making computers more robust is a major goal for the armed services as they adopt more precision weapons and tactics. Upgrading the hardware is known as "ruggedizing" it to meet various US and foreign standards. General Dynamics' C4 Systems is among the largest suppliers of such hardware under a 1995 Army contract, worth \$800 million, to supply systems that are also used by the Marine Corps, Navy, and Air Force.

These sales represent about two-thirds of the Army's total rugged-gear procurements, and about half of that figure is built in Taunton. Often these devices are repackaged civilian products, such as versions of the popular iPaq PDA made by Hewlett-Packard that General Dynamics resells to military customers in configurations such as its "Mission Data Tool," starting at around \$2,000.

In Taunton, workers encase standard office printers and



HP iPAQ Pocket PC h3900m

Price: \$499.

Weight: 6.5 oz.

Rain: "Limited" *

Sand & dust: "Limited" *

Drops: Tested to 30 inches.

Operating temperature: 68F to 104F.

(* HP says optional case meets industry standards to withstand heavy showers and wind.)
SOURCE: The companies



General Dynamics "Mission Data Tool"

Price: Around \$2,000 for basic unit.

Weight: About 1.5 pounds.

Sand and dust: Operates exposed to sand and dust for 30 minutes at 20 mph

Rain: Operates in 1.8 inches/hour rain in 40 mph wind for 40 minutes.

Drops: Survives three drops in soft carrying case from 3 feet on each face

Operating temperature: -25F to 125F

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