

FlashDisk® Ruggedized RAID Transforms Humvee into Terrain Analysis Center



The importance of terrain in military operations has been recognized since the earliest known treatise on warfare, “The Art of War” by Sun-Tzu, written 2400 years ago. Knowledge of terrain is no less important today and has been the driving force behind the Army’s decision to develop and deploy the Digital Topographic Support System (DTSS), a mobile digital terrain analysis system for use in the battlefield. This system combines storage intensive digital maps, provided by the National Imagery and Mapping Agency (NIMA), with ancillary data from a number of sources to display real-time map updates and other topographic products that allow combat units to respond rapidly to changing battlefield conditions.

“For us, for the soldier, it is the amount of data he can store and how quickly he can access it. That is why we go with technologies that provide us with the highest reliability and with the ability to store as much data as we can and access it as quickly as possible,” said Mark Hainsey, acting project director, Army Topographic Engineering Center in Arlington, Virginia.

“While the DTSS has been increasing its capability, it has also shrunk in size,” continued Hainsey. “We require larger and larger data storage capability as we get higher and higher resolution data as well as larger data sets from satellites, aircraft and other sources. Using FlashDisk OpenRAID devices is part of our latest configuration. We chose these disk arrays instead of tape libraries because data access speed is extremely important in the field. We obviously never had the ability to store and quickly access the magnitude of data that we have right now. And that is the big coup here. We have two Winchester Systems rack-mounted units in the DTSS shelter on the back of a Humvee and are now able to provide the soldier with a significant amount of readily accessible digital terrain intelligence information.”

Supporting Unix and NT, SCSI and Fibre Channel

The Army chose FlashDisk from Winchester Systems after an extensive market survey to determine the commercial availability of large storage arrays to meet its requirements.



FlashDisk is an integral part of this Humvee mobile digital terrain analysis system for use in the battlefield.

As the DTSS has evolved and continues to evolve, the data storage system needs to support both a legacy system that is using Unix as well as the newer systems using NT. The FlashDisk OpenRAID system met these requirements because it utilizes a true open architecture that emulates standard SCSI disks. In addition, the storage system has to accept multiple inputs, from the standard dual LVD SCSI connections to Fibre Channel and the Ultra 160 SCSI connections that are contemplated for the future.

Ruggedization: A Critical Requirement

While Winchester Systems had a ruggedized box, there were no com-

mercial off-the-shelf (COTS) data storage systems available that met all of these ruggedization requirements. As a result, TASC Inc. of Chantilly, Virginia, who is the prime contractor for the DTSS, contacted Michael W. Roberts, vice president of the Government Division of Winchester Systems, to see if Winchester Systems was interested in collaborating with TASC to modify the commercial FlashDisk for ruggedness. The military requirement for ruggedization is more than just dealing with shock and vibration. The hardware must also be lightweight to allow for mobility. It must operate over extremes in temperature as well as rapid changes in temperature. It has to deal with high humidity, rain, dust, fog, even fungus, mildew and bacteria. It must also comply with military standards for electromagnetic interference

“For us, for the soldier, it is the amount of data he can store and how quickly he can access it.”

Mark Hainsey, Army
Topographic Engineering Center

(EMI) and high-energy magnetic pulse (HEMP). “What especially pleased us about Winchester Systems was their willingness to do a complete new design to meet our stringent requirements. They actually had to develop a completely new version of their FlashDisk array to meet our requirements for ruggedization. They worked with us and produced a product that completely meets our requirements and is priced in the COTS price range,” said Bill

Foshay, the DTSS program manager at TASC.

Looking to the Future

As the Army looks at future applications such as streaming audio and video, the capacity and access speed of its storage devices become even more important. “FlashDisk RAID arrays are easily upgradable as our company continues to respond to the commercial marketplace,” said Roberts. “We are in the process of more than doubling our data storage capacity by replacing the 73 gigabyte drives with 181 gigabyte drives as they become available. This will give the Army 1.45 terabytes of storage per array or more than 2.9 terabytes within the DTSS-Light on a Humvee – a significant upgrade requiring no additional space.”