

# Shipbuilder Minimizes Obsolescence Risk with Network Attached Storage

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DEFENSE SOLUTIONS

## Challenge

- Common system for both networked and directly attached storage
- Mitigate obsolescence issues encountered with optical drives
- Encryption capability and other security features

## Solution

- 12 TB Rugged network file server configured as NAS or DAS
- Qualified SSDs from multiple vendors
- FIPS 140-2 capability and write protection on both the SSD and device Flash

## Results

- Obsolescence risk significantly reduced
- Money and time saved compared to traditional solution
- Development units supplied, qualification units ordered

## Challenge

There are multiple reasons a submarine would need on-board storage. The fire control system alone requires storage for all stages of a mission. Prior to launch, direct attached storage (DAS) is used to pre-load data onto a drive that can be transported and inserted into the on-board systems. A tactical storage system typically requires network storage (NAS) to load waypoints or share maps across the internal network, for example, and as a mission is being performed. Additionally, data capture is required for post mission analysis and debrief.

A large shipbuilding company performed a trade study to determine what available DAS and/or NAS would be best suited to replace existing optical disc drives on-board a well-established fleet of submarines. At over a decade old, the

ageing 5.25" optical drives represented an obsolescence risk and no longer provided the capacities the ships newer technologies required to maximize mission effectiveness. In addition to evaluating DAS and NAS, the study also evaluated the benefits of moving from optical drives to SSDs, enabling the necessary capacities.

The results of the study formed the basis of a tech insertion program that required the upgrade of all of the optical drives on-board the fleet. Due to previous experience with multiple vendors, the ship manufacturer required a single hardware system and media type to be used across multiple applications. For example, on-board a ship there were multiple optical drives, each attached to a different computer, where each computer was performing a different function.



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DTS3 with RMCs

Each function then required custom development of each drive if, for example, different levels of security were required or if one required direct storage vs network. For the upgrade, the manufacturer was interested in having a single system that could be modified for each application, reducing the total cost of ownership.

Though the existing optical drives did not provide encryption, the manufacturer wanted to ensure that if in the future, encryption was required, the new system would have the facility to support it. Additionally, the shipbuilder wanted to maintain the existing write protection functionality to ensure that, especially in the case of network storage, crew could read the data but not modify it.

## **Solution**

The study identified the Data Transport System 3-Slot (DTS3) as the best available solution, chosen primarily for its flexibility. The device's ability to be configured as either NAS or DAS and still use the same removable memory, enables a single hardware and media solution to be used for different purposes. The device is also flexible in terms of encryption in that off the shelf, it is capable of accepting a FIPS 140-2 validated encryption module. This module allows the user to create a different encryption key for each drive and each drive can be keyed to a specific device. The ability to easily add tailored encryption to each device further future proofs the program and ensures that if a drive is misplaced the data will be inaccessible. Additionally, adding encryption is merely a case of screwing in a module; the device doesn't need to get sent back to the shop, reducing cost over time.

As previously mentioned, reducing obsolescence risk was a key program driver. Though moving from optical disks to industry standard SSDs cuts down on risk it doesn't eliminate it. To further mitigate risk, multiple SSDs required qualification. Typically, the device comes with a single qualified drive, tying it to the SSD vendor through the life of the program. Uniquely, at no additional cost, Curtiss-Wright qualified three different SSDs from three different vendors, thus future proofing the system over the long life of the submarine. The qualified SSDs needed to be low power so that when stacked in the DTS3 the power dissipation didn't over heat the system. Additionally, the drives needed to provide write protection. Due to the limited number of available SSDs with this security function, as well as low power and high performance, identifying three appropriate

drives was a challenge, but one Curtiss-Wright was quickly able to overcome.

Off the shelf, the DTS3 has three removable memory cartridges capable of storing a total of 3 TB of data, thus fulfilling the storage requirements of the program, and has 4x 1GbE ports, ensuring the device is network enabled. This program required minimal custom development, primarily in the form of Internet Small Computer System Interface (iSCSI) protocol support. Past experience with this protocol enabled Curtiss-Wright to implement support without incurring NRE fees.

In addition to SSD write protection and encryption capabilities, the Flash on-board the device also needed to be write protected. Combined, these features ensure the security of the device and data at rest, whether networked or directly attached.

## **Results**

The optical disc drives were in use for over a decade and in that time the discs themselves must have been changed, on average, every 2 to 5 years. SSDs, on the other hand will last between 5 to 10 years, depending on the write cycle, so the drives will need to be replaced less frequently. Qualifying multiple SSDs from different vendors ensures that over the life of the program, a suitable SSD will always be available.

Traditionally, optical disc drives would be replaced with a rackmount hard drive solution. Significant development investment would be required to add encryption, specific to each drive as well as to configure the system to be attached to the network and/or directly attached to a computer. The DTS3 saves both time and money by eliminating the need for this custom development. With the three SSDs, the DTS3 can act as both a NAS or DAS and adding encryption keys to each drive is as simple as adding a module, future proofing the device for future encryption requirements.

Once the shipbuilder contacted Curtiss-Wright in things began moving quickly. The shipbuilders' customer visited Curtiss-Wright for a live system demo which reinforced the results of the study that NAS and SSDs are the way forward to mitigate obsolescence. Shortly after, demo units were provided and an order was placed.

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