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US military: the reel story

The US military, and in particular the US Army Signal Corps, has been deploying communications cables since before the Civil War. Since then, the cables have gone from heavy and large diameter copper wire to today's lightweight and small diameter fibre-optic cables. Here, Bob Schmucker, Senior Manager Corporate Programs and Contracts, Optical Cable Corporation, reflects on a major success story in making life easier for the troops – the Modular Advanced Reel System (MARS).

Fibre-optic cable can carry hundreds of times more information including audio, video and data, at far greater distances and speeds, than older communications cables. The reels that are used to store and transport the cable have largely remained unchanged though, essentially consisting of a centre drum and two outer flanges. The same basic reel design that has been in use since the Second World War is what the US Army has used in Korea, Vietnam, Iraq and today in Afghanistan. They're made of steel, they're heavy, they have no handles, and they can't be stacked. And since the days of the Civil War, soldiers have lived with them – and haven't much liked them.

Around 2005, Optical Cable Corporation (OCC, then known as Applied Optical Systems) came up with an idea. They designed a new kind of tactical military reel – one that was light, durable and, unlike the steel reels, designed for fibre-optic cable. The new design used lightweight moulded plastic components and featured a foldable crank handle, flanges which allowed users to grip and carry the reel, cushioned connector storage spaces, integrated cleaning kits, vertical stacking capability and an outer cable tether that provided a means for storing the inside cable end without severe bends or kinks. The Modular Advanced Reel System (MARS) was born.

In early 2010, US Army Communications-Electronics Command (CECOM) contacted Optical Cable Corporation and advised that they were interested in developing a specification for a new lighter weight alternative to the existing steel reels. Working together with CECOM, a specification was developed which included severe environmental and mechanical test requirements to ensure the new reels would be durable enough to survive battlefield conditions. The new specification, identified as CECOM specification A336463, was released in July 2010.

In June 2011, OCC submitted a detailed qualification test report to CECOM which documented testing and compliance with the new specification, but full qualification could not be granted until the new reel underwent a rigorous user evaluation at the Army Signal School located at Fort Gordon, Georgia. The reels were used over the span of four different signal classes and abused in ways far exceeding specification requirements. As Signal School training NCOs explained their evaluation methods, they had some doubts about the reels' durability when they first arrived. The new lightweight plastic reels did not look as durable, but the features were attractive. The NCOs soon discovered that the new reels were much stronger and more durable than they imagined. The evaluation evolved from 'is this reel up to the job?' to 'what does it take to break it?'.

NCOs can be quite imaginative when it comes to testing new equipment. In this case, they decided to see how high they could drop the largest, heaviest, fully loaded reel without destroying it. Designed to withstand a three-foot drop when fully loaded with cable, it was taken up to the top of a 35-foot telephone pole and dropped onto the hard Georgia clay. To the NCOs' amazement, it did not break, crack or deform. They did it again – still no damage. Then, they took the very same reel and threw it out of the back of a Humvee onto unpaved surface at around 35mph. It bounced and rolled, but was still undamaged. In their final test, they again threw the same reel out of the back of the Humvee – this time onto paved road at approximately 45mph. It bounced end over end and rolled 70 feet, finally coming to rest in a ditch. While the outer flanges suffered some minor abrasions, it still retained full functionality. When debriefing CECOM and OCC personnel, the evaluation team unanimously proclaimed it the best reel they had ever seen. A video of the reel drop test performed at Fort Gordon can be viewed at **www.youtube.com/watch?v=9crM4lQ9is0**

The US Army and Marines Corps currently have over 2500 MARS reels deployed worldwide supporting critical programmes like WIN-T, THAAD, MEADS and others.

Further Information

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