



# Kevlar®

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## Missile test facility has unique application for DuPont Kevlar® aramid cable.

**Strung across a three-mile gap between mountaintops, cable made of super-strong DuPont Kevlar aramid fiber provides a novel way to deploy aerial targets for ground-to-air missiles.**

As part of an ongoing effort to cut operating costs and reduce the environmental impact of its weapons testing programs, the U.S. Department of Defense (DoD) is constructing a unique, cable-based aerial target delivery system at White Sands Missile Range, N.M. Known as the Aerial Cable Test Capability (ACTC), the facility will be located at the south end of the Oscura Mountains in the north-central area of the White Sands Missile Range.

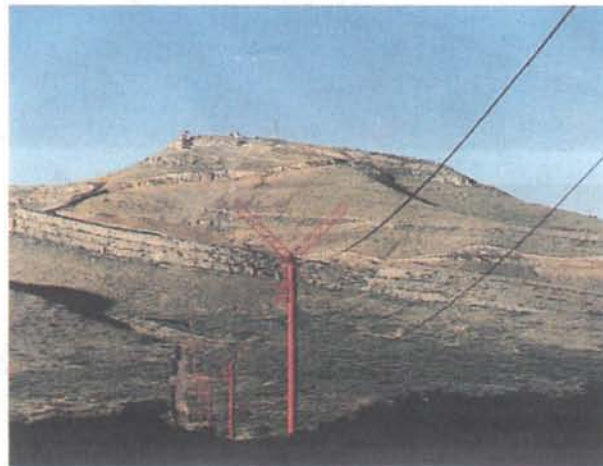
The main component of the system is a 2½-inch rope cable of DuPont Kevlar, a high-strength aramid fiber that is, pound for pound, five times as strong as steel. Because the Kevlar cable is one-fifth the weight of the equivalent strength steel cable, the cable sag can be established at the desired level with lower line tension. The lower tension leads to a higher operational safety factor. An additional benefit derived from the Kevlar cable is increased target speeds

of up to 1000 mph, vs. a 600 mph speed limitation imposed by the steel cable. Without the special properties of Kevlar, this unique and demanding application would not have been possible.

The exceptional strength of Kevlar was demonstrated in an earlier application at Sandia National Laboratories, one of the developers of the ACTC facility. At Sandia, aerial cables of Kevlar were used to hoist shipping containers of sensitive weapons to elevated positions for high-velocity impact tests.

With ends supported by winches anchored atop adjacent 8,500-foot and 6,000-foot mountains at White Sands, the cable spans more than 15,000 feet, making it the longest unsupported cable in the world. The cable will serve as a "rail" for moving trolleys from which targets, ordnance and experimental apparatus will be suspended.

Speeds and altitudes of targets can be controlled to simulate the realism of attacking aircraft. Trolleys will be able to attain a speed of 250 knots (288 mph) just from gravity; for higher speeds, rocket assists can be added. Altitude can be changed by raising or lowering the cable.



## A very cost-effective alternative.

By way of comparison, the DoD estimates that to duplicate the testing which will be done at the new ACTC facility using conventional range methods would require an annual expenditure of \$28.6 million to support the following activities:

- Launch of up to 65 drone targets, 33 of which would be destroyed.
- Flying of 15 manned aircraft missions to test a short-range air-to-ground missile.
- Mounting of more than 330 manned aircraft sorties, including those needed to test the short-range missile.

In sharp contrast, the new ACTC facility can be operated at an estimated annual cost of less than \$2 million. Including construction costs, the facility should save the DoD \$665 million over 25 years.

In addition to saving money, the cable system will have much less impact on the environment than a conventional target range—both during construction and in operation. Construction is being carefully managed to avoid or minimize disturbance to vegetation, wildlife and prehistoric sites. It is being conducted in accordance with federal and state guidelines and in consultation with appropriate authorities and organizations.

## A wide variety of testing will be conducted.

The White Sands complex will be used to test a variety of DoD weapons systems, including short-range missiles which will be launched from the ground at moving targets suspended from the cable. In a reverse procedure, ordnance will be launched from platforms attached to the cable at targets on the ground. An estimated 400 tests per year will be conducted using the new cable facility.

According to Chris Eastin, vice president of Marketing for Nielson's, Inc., ACTC construction contractor, "We believe the (ACTC) job will demonstrate how we can mesh the efforts of an experienced group of project supervisors and engineers with sophisticated construction management techniques to build a research facility that makes a singular contribution to our nation's security."

This is just one of many unique applications using DuPont Kevlar and Dacron fibers. For more information about special industrial ropes or cables, contact Whitehill manufacturing at 1-610-494-2378, or DuPont at 1-800-453-8527.

Cable of DuPont Kevlar aramid at White Sands is 2 1/4 inches in diameter, with 36-strand, right-lay construction. Kevlar is used as primary strength member overlaid with DuPont Dacron® polyester Multiplex™.



**Application:** DoD weapons testing system using a suspended cable of DuPont Kevlar® aramid.

**Key Benefit:** The unique strength-to-weight ratio of Kevlar (pound for pound, five times as strong as steel) makes the three-mile unsupported cable suspension possible.

**Cable Manufacturer:** Whitehill Manufacturing Co.

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