

# DAMASK GR-1 first test on Land Range a success

NEARLY MATCHES  
PRE-FLIGHT IBAR  
VPF SIMULATION



**DAMASK team** members fit the guidance package onto the nose of the guided weapon. At left is the frame-grab of the actual launch of the weapon from an F/A-18.

In its first ever guided flight, a Direct Attack Muniton Affordable Seeker (DAMASK) guided a 2,000-pound bomb to a direct hit on a Land Range target.

A DAMASK-equipped guided weapon, punched cleanly through the sea-container target within three meters of the aimpoint, meeting the accuracy-design goal for the NAWCWD-developed seeker.

### Narrowing the CEP

Air-to-surface weapon accuracy is defined by circular error probable, or CEP. That is the radius of a circle within which 50 percent of the weapons will strike. The smaller the CEP, the greater the weapon's accuracy. Without DAMASK, the weapon's CEP is 13 meters. That is, the weapon's combination of global positioning system (GPS) and inertial navigation system (INS) will guide the weapon to within 13 meters of the desired aimpoint. With the simple DAMASK kit added, the CEP is dramatically reduced from 13 to three meters.

Although three-meter accuracy is possible with laser-guided bombs, those weapons are relatively expensive, can only be used in clear weather with direct line-of-sight to the target, and require a dedicated designator to remain on the target until impact.

DAMASK, by contrast, is inexpensive; through-the-weather; and is a "drop and forget" weapon, which enhances survivability for strike pilots.



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**Direct hit**— Inert weapon punched a neat hole in the top of the target. Below, DAMASK team member Steve Johnson observes evidence of DAMASK-equipped weapon's passage through the sea-container target.



### The Test

The weapon was launched from an F/A-18 at 28,000 feet MSL, about five miles downrange from the target (six sea-containers stacked two high). The GPS/INS coordinates that had been programmed into the WEAPON were for a surveyed point on the ground exactly 13 meters away from the center of the target.

Prior to launch an image template of the target had been loaded into DAMASK. In a tactical operation, this template could be generated from a variety of available intelligence sources, ranging from satellite imagery to the launch aircraft's own on-board sensors.

At 1,800 meters before impact, DAMASK IR seeker operation was initiated. DAMASK compared the image in the seeker field of view with the target template and sent a correcting signal to the weapon's control surfaces. The weapon altered course away from the GPS/INS surveyed point and impacted on the sea-containers just eight feet from the actual target point.

The flight almost exactly matched a preflight simulation conducted by John Auburn in the Virtual Prototyping Facility at NAWCWD's Integrated Battlespace ARena (IBAR).

### Teamwork pays off

"My hat's off to all of you," said RAdm. Bert Johnston, NAWCWD commander, in a congratulatory message to the DAMASK team. He not only noted the "magnificent job" the team had done with the technology, but also lauded the local program management under the direction of Howard McCauley, NAWCWD technical direction agent. Pete Morrison, program Manager for Weapons Technology at the Office of Naval Research, was also impressed by the results of GR-I: "A sub-3-meter hit with a weapon image-guided bomb on the first try! Outstanding!" ONR has sponsored the DAMASK Advanced Technology Demonstration, which will conclude in December.

Praise for the achievement came from many quarters: RAdm. Joe Dyer and NAVAIR senior leadership; NAWCWD Executive Director Dr. Karen Higgins; RAdm. John Johnson, European Command; and VAdm. Dennis McGinn, commander, Third Fleet.

"The China Lake DAMASK team has made 'better, faster, cheaper' a reality for this critical Naval Aviation mission," said McGinn. "When you change the assumptions and move to a new paradigm, as this great group of visionaries has, the performance possibilities are tremendous. Thanks from all of the fleet."

McCauley attributes the success of DAMASK both to his immediate team and to a wide group of supporters. "The help we've received from the program offices here and at Eglin as well as from the contractor has been just super," he said.



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