

# Harmonization of Insensitive Munitions and Final Hazard Classification Tests

## DoD Moving Toward Long-term Goals

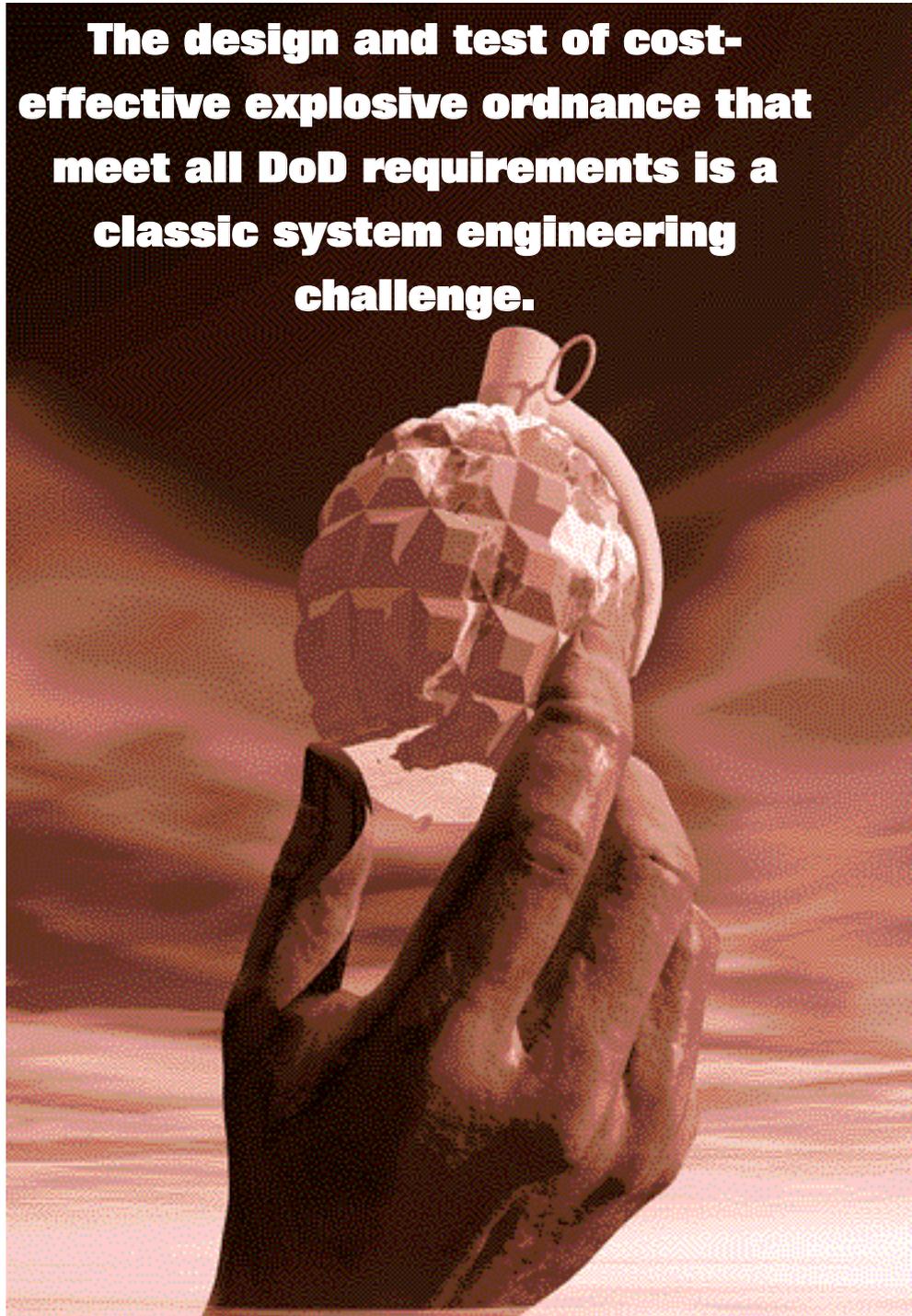
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**T**he design and test of cost-effective explosive ordnance that meet all DoD requirements is a classic system engineering challenge. However, in the case of munitions and weapons, the requirements to meet or exceed safety, survivability, and Insensitive Munitions (IM) thresholds make development of explosive ordnance much more difficult than developing commercial items.

Over the last 10 years, the DoD Ordnance community has witnessed significant technical breakthroughs in production of modern ammunition. Today's ammunition is much more resistant to destructive sympathetic reactions that can ensue from unplanned stimuli such as bullets, fragments, and fuel fires. However, the test procedures to evaluate such enhancements have not kept pace with these design advances.

For many years now, ordnance specialists have recognized that the IM tests and Final Hazard Classification (FHC) tests are quite similar. Historically, however, both sets of tests have been conducted independently, and still are today to a lesser degree. Program managers (PMs) have expressed interest in combining IM and FHC tests since 1992, when the PM Seek and Destroy Armor Office requested development of a harmonized test plan for their program. This task, completed by the U.S. Army Tank-automotive and Armaments Command-Armament Research, Development, and Engineering Center (TACOM-ARDEC), at Picatinny Arsenal, N.J., marked the

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first attempt to combine tests. The attempt was successful, saving the PM both time and money. Subsequently, many other PMs throughout DoD have requested development of combined IM/FHC test plans for their programs.

### Joint Subgroup

Recognizing the value of IM/FHC test harmonization, the DoD IM Integrated Product Team (IPT) recently established a Joint subgroup to develop harmonization guidelines. Providing data needed for both IM and FHC testing in a single coordinated test program, the guidelines can be used to structure harmonized test plans. To date, the team has identified four IM tests and four FHC tests that can be combined. The IM sympathetic reaction test can be combined with the FHC stack test; the IM fast cook-off test can be combined with the FHC external fire stack test; and finally, both IM and FHC require bullet impact and slow cook-off tests that can be combined.

Even though harmonizing these tests for various explosive ordnance items has proved highly successful, total integration is not always possible. The subgroup, comprised of both IM test experts and FHC authorities, encounters a number of difficulties. For example, the FHC authorities want the bullet impact test conducted by firing a three-round rapid burst of 50-caliber into the test item, whereas the IM members want just one bullet of a particular design fired one at a time, whether it be a 50-caliber, 7.62-caliber, or some other bullet identified as a potential combat threat.

Another difficulty for the subgroup is agreement on the heating rate for the slow cook-off test. The Safety Authorities want a heating rate of 6 degrees Fahrenheit per hour while the IM testers want 50 degrees Fahrenheit per hour. These differences of opinion can be linked directly to the differences between the goals of the IM and safety policies.

The IM policy is to design munitions that can withstand combat and peacetime operational threats. Since operational threats are determined by conducting item-specific Threat and Hazard

Assessments, the IM community places a high value on designing and testing to "real-world" threats. By comparison, the safety community recognizes that a very small number of full-scale tests are conducted—usually only two or three. Consequently, they place a high value on testing to extreme conditions, thereby increasing confidence in the test results and validity of the safety levels they ultimately assign each tested munition. Accordingly, program management offices that develop a harmonized test plan must work closely with both the safety and IM authorities to resolve competing priorities. While this requires extra effort, most PMs and IPTs consider it time well spent whereby IM and FHC test costs can be reduced by 40 percent or more.

### Work in Progress

The challenge of harmonizing IM and FHC has extended to the NATO arena, where various groups responsible for

writing IM and FHC NATO Standardization Agreements are building upon the U.S. knowledge base to establish international test procedures. U.S. representatives to these NATO groups continue to provide close support and guidance as member countries of the NATO alliance work together to realize the benefits from harmonization that have accrued in the U.S. defense arsenal.

Much work remains, but progress is steady. Soon DoD IPTs as well as members of the NATO alliance will acquire better skills to combine these tests. PMs interested in harmonizing tests or simply learning more about IM/FHC harmonization can contact their assigned IM, Safety Offices, or Safety Boards.

**Editor's Note:** The author welcomes questions or comments on this article. Contact him at [Bwilliam@pica.army.mil](mailto:Bwilliam@pica.army.mil).

## DAU Seeks Accreditation

Defense Acquisition University President Frank J. Anderson Jr., signed and submitted to the Council on Occupational Education an *Application for Candidacy* on April 9, thus initiating the process leading to the accreditation of the Defense Acquisition University (DAU)—one of DoD's largest educational organizations.

The impetus for DAU's application was [then] Secretary of Defense William Cohen's November 1997 report entitled, *Defense Reform Initiative (DRI)*, which noted that only one-fifth of OSD-sponsored educational institutions were accredited by a recognized academic accreditation association. And only five of 37 educational and professional development programs had at least some courses certified for college credit by the American Council on Education. As a result of the DRI findings, Cohen directed the following action:

**"The DoD Chancellor for Education and Professional Development will be charged with ensuring that by Jan. 1, 2000, every DoD institution will be accredited or actively pursuing accreditation and no educational program or course will be taught unless it is fully certified by recognized accreditation authorities for each respective field."**

For information or questions on DAU's accreditation, contact Evelyn Layton, DAU Accreditation Liaison Officer, at (703) 805-4574 or e-mail [evelyn.layton@dau.mil](mailto:evelyn.layton@dau.mil).