JPEO CBD's Rapid Obscuration Systems (ROS) — Not Just Smoke and Mirrors

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Magicians use the art of illusion to distract and deceive their audience, making the impossible appear possible. The Joint Program Executive Office Chemical and Biological Defense's (JPEO CBD's) ROS team at Aberdeen Proving Ground (APG), MD, is putting the illusory "smoke and mirrors" to a very different use in the global war on terrorism — saving lives.

U.S. Army Soldiers from 1st Platoon, Alpha Co., 3rd Battalion, 187th Infantry Regiment, 101st Airborne Division (Air Assault), run toward a Black Hawk helicopter after conducting a search for weapons caches in Albu Issa, Iraq. The new XM106's TiDi fill will minimize the smoke inhalation hazard associated with current smoke materials used by the Army. (U.S. Army photo by SPC Luke Thornberry, Joint Combat Camera Center.)

Part of JPEO CBD's Joint Program Manager Nuclear, Biological, and Chemical Contamination Avoidance (JPM NBCCA), this diverse team of engineers and scientists develops smoke grenades and grenade launchers for the Army's Family of Tactical Obscuration Devices (FOTOD) program. Delivering enhanced capabilities to warfighters is the ROS team's number one priority.

The first increment of the FOTOD program will deliver a new hand-tossed smoke grenade, the XM106. Officially designated "Grenade, Hand; smoke, visual, restricted terrain, XM106," this grenade will provide not only a new capability to the warfighter, but it will also greatly expand the tactical use of smoke in urban warfare, counter-sniper, and close combat operations.

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What makes the XM106 smoke grenade a leap-ahead development in tactical obscurant devices are its titanium dioxide fill material and fiberboard body design. Titanium dioxide, nicknamed "TiDi," is a noncombustible, nonburning, nontoxic powder with numerous household and commercial applications. The XM106 explosively disperses the powdery TiDi fill to form a dense, white obscurant cloud that lasts for several seconds. The TiDi smoke obscures the visual and near-infrared ranges of the electromagnetic spectrum. Because it is a nontoxic particulate smoke, rather than a "burning" smoke, the TiDi fill minimizes the smoke inhalation hazard associated with current smoke materials.

Comparable in size and weight to the current AN-M8 HC grenade, the XM106 grenade's body is constructed of a mylar-coated fiberboard material with aluminum end caps to securely hold the fuze in place when the grenade is detonated. Long screws complete the "frame" of the body by securing the end caps together.

The XM106 is also designed with safety in mind. When the grenade "functions," the fiberboard body ruptures, dispersing the TiDi fill, while the frame and fuse remain intact. This design minimizes the fragmentation hazard associated with current smoke grenades. In addition, a "pull-safe" device has been incorporated into the fuze design to reduce the risk of the grenade accidentally detonating. The new pull-safe device securely holds the pull ring in place until the Soldier is ready to use the grenade. Similar pull-safe devices are being incorporated into the fuze designs for use on other smoke and lethal grenades.

Together, the new TiDi fill material and fiberboard body design allow the XM106 grenade to be used near friendly forces and in restricted terrain, including inside buildings, caves, and

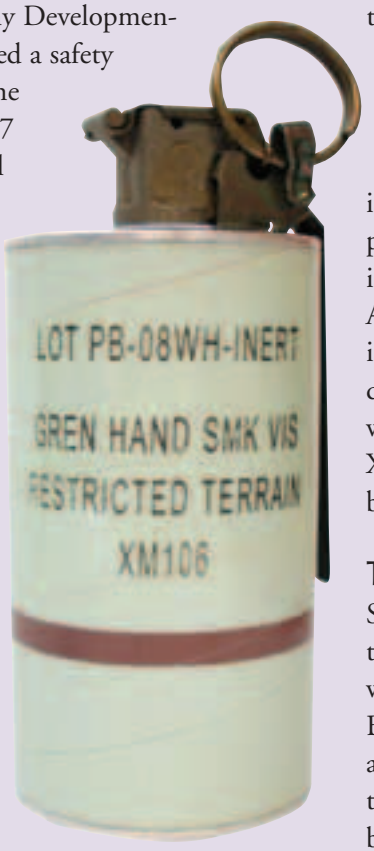
Emerging smoke technologies and hardware offer new and critical capabilities to protect warfighters. Here, LCPL Timothy Hughes, Combat Engineer Co., Combat Assault Battalion, 3rd Marine Division (Div.), fires an M249 squad automatic weapon under the concealment of a green smoke grenade during platoon-sized simulated combat in Japan on March 8, 2008. (U.S. Marine Corps photo by CPL Eric Arndt, III Marine Expeditionary Force Public Affairs.)

other enclosures. This design also increases survivability during operations by giving warfighters a critical few seconds of virtual invisibility from the enemy.

The Fast Obscurant Grenade (FOG)

The XM106 grenade design originated in 2003, with a requirement for a new smoke grenade to support two Advanced Concept Technology Demonstrations (ACTDs) conducted by the Project Manager Night Vision Cave and Urban Assault. To meet that requirement, an accelerated development effort for the FOG resulted in the now-familiar fiberboard body design with the TiDi fill material.

Based on its successful performance in the ACTDs, PM Direct Support Asymmetric Warfare Group (DS AWG) requested 2,000 FOGs to train and equip warfighters deployed to *Operation Iraqi Freedom*. The FOGs were produced at Pine Bluff Arsenal, AR. The U.S. Army Developmental Command issued a safety confirmation for the FOGs in June 2007 based on successful safety testing. Select units from the 10th Mountain Div. were trained on use of the FOG last summer at Fort Drum, NY, and the remaining FOGs were deployed to theater in September 2007. Warfighter feedback on the FOG has been very positive and new tactical uses for the grenade are being proposed. As a result, the PM DS AWG has also incorporated the pull-safe device into the design for production and fielding of additional FOG quantities this year.



The XM106 grenade represents a new and vital capability for force protection. (Photo courtesy of JPEO CBD.)

The FOG served as the basis of the XM106 grenade design. Other than its official designation, the addition of the pull-safe device on the fuze is the only distinguishing feature of the XM106 grenade from the original FOG design.

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The XM106 grenade is nearing completion of its Product Qualification Testing and Initial Operational Test and Evaluation at various sites across the United States. Once the XM106 grenade successfully completes its testing program, a decision to proceed to full-rate production is expected in February 2009, with production beginning in March 2009 at Pine Bluff Arsenal and fielding beginning in summer 2009. Because their designs are identical, the FOG will ultimately merge with the XM106 grenade and no longer be produced.

The Road Ahead

So, what's next for the ROS team? Working in collaboration with the Edgewood Chemical Biological Center's Research and Technology Directorate, the ROS team is pursuing bi-spectral smoke fill materials that will provide obscuration in the visual and infrared spectral regions. Successful implementation of the bi-spectral material will transition as the next increment of grenades in the FOTOD. Another future increment in the FOTOD program will provide a new articulated grenade launcher and grenade to project smoke at greater distances. Collaborative efforts are underway to develop this technology for both smoke and nonlethal grenade applications.

Today's Army acquisition environment is fast-paced and challenging, but the members of the ROS team never lose sight of why their work is so important. Emerging smoke technologies and hardware offer new and critical capabilities to protect warfighters conducting their missions. These capabilities are not just smoke and mirrors. They can make a difference in bringing warfighters home safely to their families.

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