

AVIATION SECURITY THROUGH TECHNOLOGY

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Introduction

The Army's Aberdeen Test Center (ATC), Aberdeen Proving Ground, MD, is a key player on an interagency team working to enhance U.S. airport security through technology. ATC's Maritime and Experimental Fabrication Teams have been working with DOD and other government agencies to produce a device to secure luggage that contains an explosive threat.

When the Federal Aviation Administration (FAA) began installing explosive detection systems in U.S. airports in 1995, it faced a problem: What should be done with luggage identified as a possible threat? The FAA tasked the Naval Surface Warfare Center's Carderock Division with finding a container that could isolate any luggage identified as suspicious by the newly installed system. The FAA specified that the protective containers would need to accept luggage up to 20 by 28 by 48 inches, contain an explosive detonation, and be easy for one or two people to move throughout an airport. The units would also be required to pass through 36-inch doors.

Containment Unit

The Navy's research found several commercially available units that met some but not all of these requirements. In January 1997, the FAA asked the Carderock Division to develop a container that would comply with all of its requirements. Using their expertise in blast containment, the Navy team designed its Threat Containment Unit. ATC then fabricated and explosively tested three prototype units. The first

Threat Containment Unit to complete testing was sent to Hartsfield Airport, Atlanta, GA, in April 1997, where it has been used twice to transport a suspect bag to a remote site.

The Threat Containment Unit is a 78 by 48 by 34-inch steel box. Because sharp corners would likely fail under an explosive load, the unit's corners and edges are smooth. All welds in the unit were subject to 100-percent radiological inspection. Any flaws found during inspections were repaired and re-inspected. The unit weighs 1,600 pounds but can easily be transported by two people using a wheeled cart, which was also fabricated by the ATC's Experimental Fabrication Team.

Because ATC has had a relationship with the Navy's test sponsor for more than 20 years, the Navy was confident of ATC's expertise in fabricating the unit as well as in its ability to rapidly and thoroughly inspect the device using X-rays and to explosively test it. Each unit successfully contained all blast effects except for some minor venting of gases around the door seal.

The unit has gone through several design changes since it was first developed, and the most significant design changes involved the unit's door. Designers developed a bell-crank mechanism to make it easier for both humans and robots to open. They also modified the door to open a full 180 degrees instead of 90 degrees. During robot operations, testers discovered that the olive drab interior of the unit caused poor depth perception on remote video displays, so the designers changed the interior color scheme to provide better

contrast. They also added more hand-holds to aid in opening the door and removing the suspicious contents.

Fabrication

ATC has fabricated 30 of the units to date and expects more requests in the near future. ATC's Engineering Unit is also reviewing costs and ways to optimize fabrication techniques. An Engineering Unit was recently established within the Experimental Fabrication Team to give the team a greater project management capability and to enhance their work. To support the project, ATC will also use computer-aided design and computer-aided machining, as well as an enhanced quality assessment and quality control program. The test center will also electronically archive project files, which will include cost estimates, drawings, project notes, notes on the machinery required, labor hours, and similar information.

Summary

The Navy's Carderock Division is responsible for the Threat Containment Unit's design, modifications, and installation, as well as for training personnel in its use. ATC is responsible for fabricating the unit, including forming, welding, and inspecting the steel shells and doors; fabricating the wheeled equipment needed to move the units within an airport terminal; and explosive testing. The Navy is also responsible for the unit's plastic liner and bag sled, foaming the unit's interior, painting it, and developing equipment to transport it by road.



Threat Containment Unit

LORRINDA RETROSSA is the Lead on the Threat Containment Unit Program. She was responsible for coordinating, fabricating, scheduling, and testing of the prototype unit. She is also a Senior Project Manager on several high-level naval ship programs.

BRUCE THOMSON is the Engineering Unit Leader within the ATC's Experimental Fabrication Team. He began his career with the U.S. Army as a Test Director with the Combat Systems Test Activity (now ATC) and previously worked for the Cold Regions Test Center at Fort Greely, AK.
