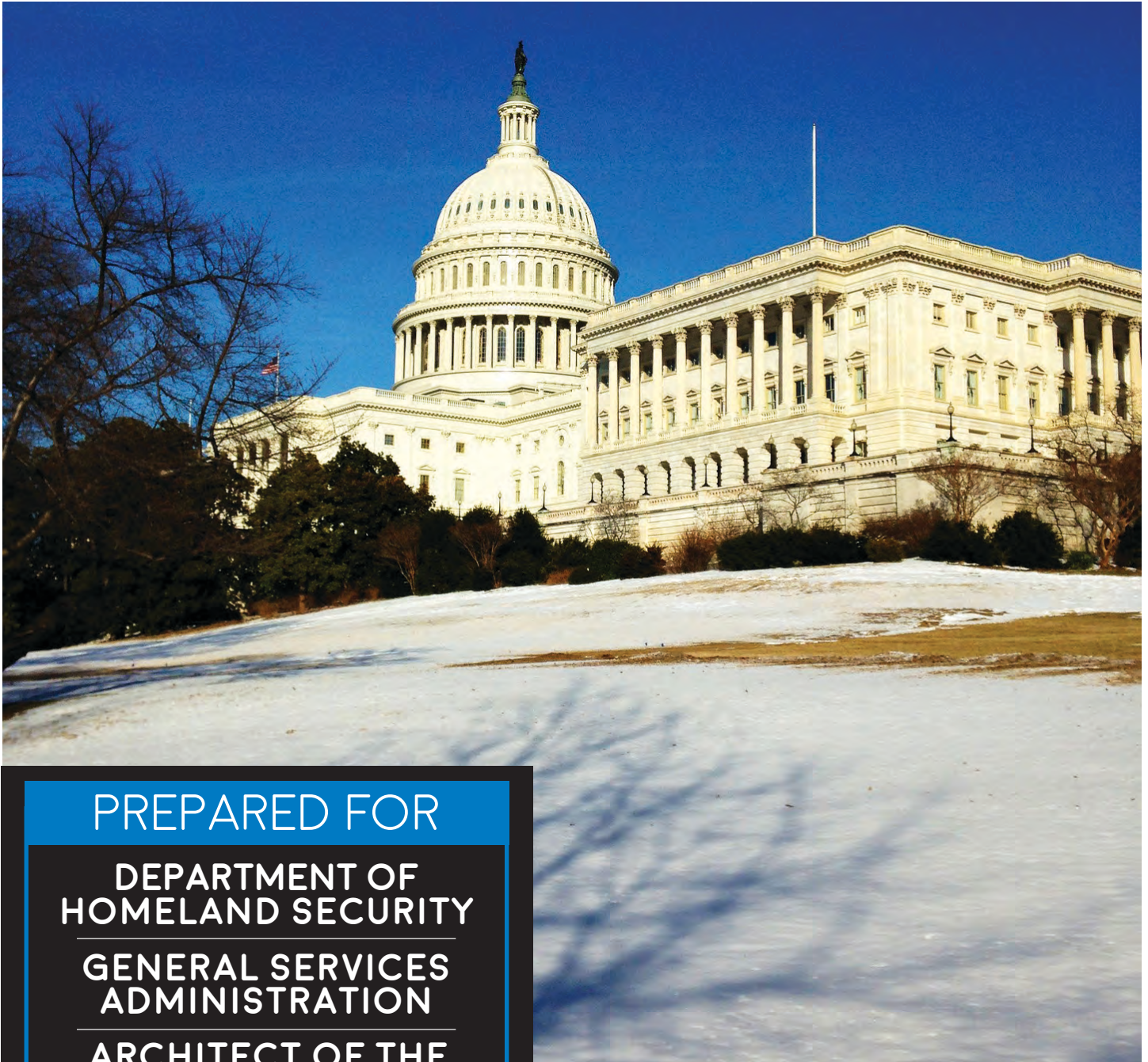


A LOW-COST SOLUTION TO A SECURITY VULNERABILITY IN FEDERAL BUILDINGS



PREPARED FOR

DEPARTMENT OF
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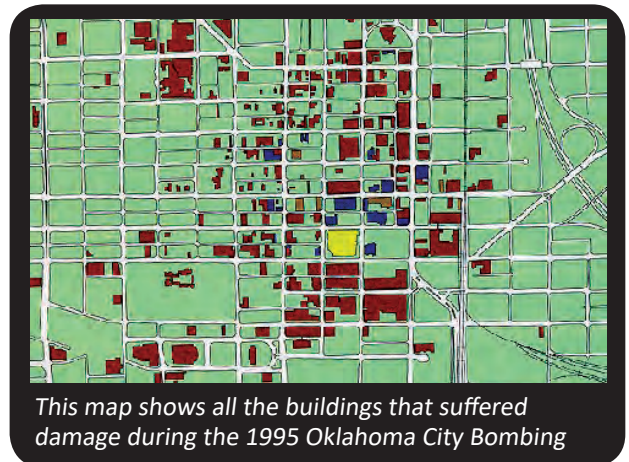
THE PROBLEM:

1 THE MAJORITY OF FEDERAL BUILDINGS DO NOT HAVE BOMB BLAST WINDOWS

THE House Committee on Homeland Security released a report in December that concluded the U.S. faces its highest terror threat level since 9/11¹. This should be alarming news for the 1.4 million government employees who work 40 hours a week inside a federal facility that offers little to no protection against a bomb blast. While some newer buildings feature blast resistant windows, most federal facilities are older buildings that were constructed without any bomb protection whatsoever. With the elevated terror threat level expected to remain high indefinitely, the U.S. government should consider improving security standards at its facilities to help keep federal employees safe.

2 BOMB EXPLOSIONS CAN DAMAGE BUILDINGS UP TO ONE MILE AWAY FROM THE INITIAL DETONATION

WHILE the initial impact of an explosion is dangerous, data shows that the majority of injuries and fatalities during bomb explosions result from flying glass². Upon detonation, glass and debris from windows and doors become high-speed projectiles and pose a grave threat to people both inside and outside the target building. In addition, the pressure wave caused by the initial detonation can propagate for great distances and impact neighboring buildings. The 1995 bombing of the Alfred P. Murrah Federal Building in Oklahoma City, for example, shattered glass in 258 *additional* buildings, some as far as one mile away³.



3 MANY FEDERAL BUILDINGS TREATED WITH BLAST FILM ARE NO LONGER PROTECTED

AFTER the 9/11 attacks, many military and federal building managers installed a simple blast film over the existing windows in government facilities to offer protection in the event of a terrorist explosion. Although inexpensive to install, the overall life-cycle cost of the film proved substantially greater than the cost of replacement windows. UV light causes blast film to deteriorate over time, so it must be reapplied every 10-15 years. To make matters worse, the blast film applied to federal buildings in the 2000s was never date-stamped, so there's no way to tell how much it has deteriorated. In response to these shortcomings, the Department of Defense prohibited the use of blast film on windows and doors in most DoD buildings in 2007⁴. Despite this improvement to anti-terrorism standards, many federal buildings have not added any window security measures since the first blast film treatment, leaving building occupants vulnerable.

¹ December 2016 Terror Snapshot

² Centre for Protection of National Infrastructure

³ Sandia National Laboratories

⁴ UFC 4-010-01

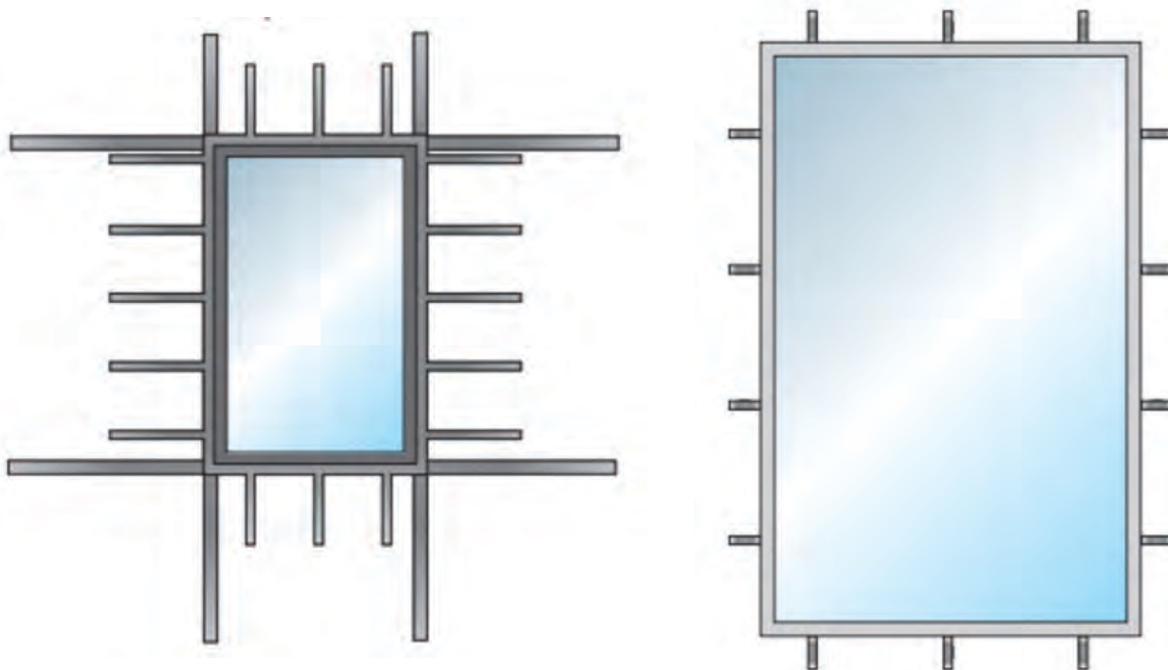
THE SOLUTION (AND PROOF):

1 COST-EFFECTIVE INTERIOR BOMB BLAST WINDOWS THAT PROTECT OCCUPANTS AND LAST A LIFETIME

AS previously outlined, most federal buildings have little to no bomb blast protection. Some were treated with blast film in the early 2000s, but the film has since deteriorated. With the terror threat level at its highest since 9/11, hundreds of thousands of federal employees are currently vulnerable to glass fragment injuries in the event of a bomb blast. The solution to this problem is laminated retrofit bomb blast windows – the most *cost-effective* window security upgrade that meets and exceeds DoD security standards.

Thermolite offers the only bomb blast window system made in the U.S. that uses dynamic loading to *absorb* a blast impact and prevent glass from shattering into the building. Traditional replacement windows require costly, labor-intensive structural steel reinforcements that serve to withstand the impact of an explosion via resistance. Thermolite blast windows, on the other hand, feature compression release technology and a balanced design that controls how blast energy is *transferred* from the glass to the frame, the frame to the wall, and the wall to the building. Thermolite blast windows utilize a patented frame design that absorbs the last pressure transfer until the negative phase of the pressure wave occurs.

Thermolite's unique retrofit blast window system is installed on the interior of a building's existing windows, allowing for the preservation of all historic building features. Unlike traditional blast windows (which require heavy, conspicuous construction), Thermolite blast windows can be discreetly installed during evening hours to minimize office downtime and conceal the building's security upgrade to any prying eyes.



The image on the left shows a traditional blast window with heavy steel support beams. Thermolite's unique blast window system utilizes a specially designed flexible frame that absorbs blast pressure and eliminates the need for steel reinforcement.

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The Department of Interior Headquarters was the first building in Washington, D.C. that was authorized, designed and built by the Franklin D. Roosevelt administration. Thermolite provided interior blast windows for more than 4,000 openings at the DOI between 2012 and 2017.

2 COMPREHENSIVE BLAST TEST REPORT FOR THE U.S. DEPARTMENT OF INTERIOR

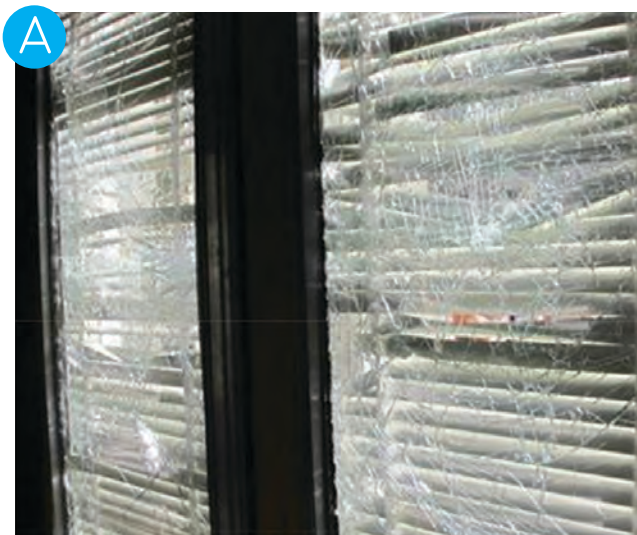
IN August of 2011, Thermolite contracted with Energetic Materials Research and Testing Center (EMRTC) to conduct an official blast test for the U.S. Department of Interior¹. Prior to the test, EMRTC constructed a historical replica using the same building materials that were used to construct the DOI facility, including identical ratios of brick to mortar. The only difference was that the replica site featured only masonry anchors and no structural steel reinforcement, making it even more vulnerable to a bomb blast than the actual facility's windows.

The blast test took place in Socorro, New Mexico. A 600lb ANFO explosive charge was detonated outside the replica, which had been fitted with Thermolite's interior blast window system. EMRTC reported that the internal window cracked, but retained in the frame and emitted no glass inside the structure other than a slight dusting. There were no indentations, penetrations or marks on the witness panel, and no glass fragments were found inside the structure with a united dimension of 1-inch or greater.

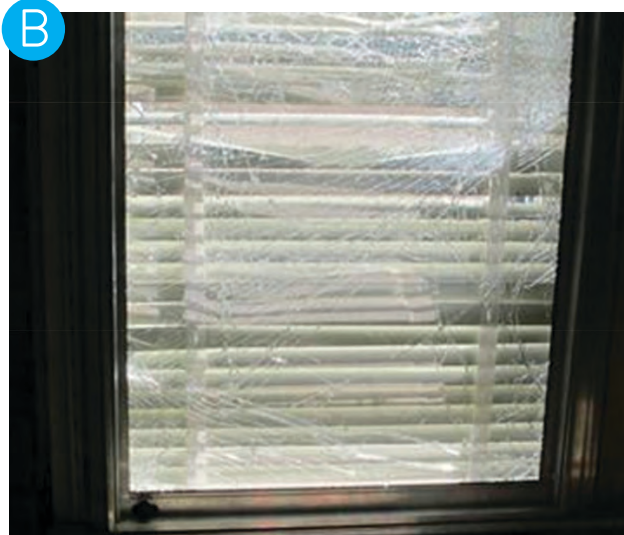
Thermolite's blast window system performed at Condition 2 — the second highest performance standard for blast windows set by the U.S. General Services Administration.

**VIEW BEFORE AND AFTER IMAGES
OF THE 2011 BLAST TEST**

¹ Arena Window Test Report EMRTC 2012



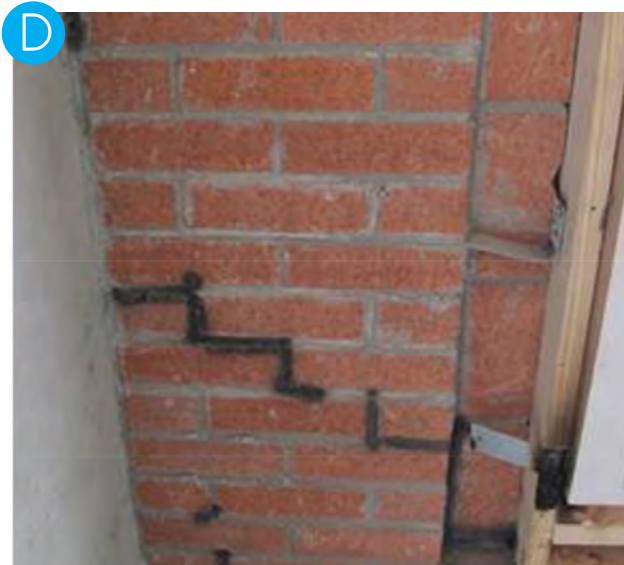
The Thermolite blast window remained intact after the test explosion



Another image showing the Thermolite window after the test explosion



This image shows the exterior post-test window unit



The test blast caused visible cracks in the masonry of the wall unit

23%
UTILITY
SAVINGS

In addition to providing bomb blast protection at a fraction of the cost of traditional replacement windows, Thermolite's blast window system also significantly reduces annual utility expenses. A 2014 baseline utility report from the GSA concluded that Thermolite's blast window system will reduce annual energy costs at the Sidney Yates Building by at least 23%, including a 33% steam reduction, 8% electricity reduction and 185 metric ton CO₂ reduction. In a separate report for the Foley Federal Building in Las Vegas, the GSA again estimated that Thermolite windows will cut utility expenses by 23%.

3

FEDERAL BUILDINGS CURRENTLY PROTECTED BY THERMOLITE'S RETROFIT BLAST WINDOW SYSTEM

Boston State House Boston, MA
 Defense Contract Management Agency Chantilly, VA
 Defense Logistics Agency Fort Belvoir, VA
 Department of Homeland Security (St. Elizabeth's) Washington, D.C.
 Department of Interior Washington, D.C.
 Federal Reserve Bank Annex Washington, D.C.
 Federal Reserve Bank of Philadelphia Philadelphia, PA
 Federal Trade Commission Building Washington, D.C.
 Foley Federal Building Las Vegas, NV
 Fort Sill, Building 455 Lawton, OK
 General Services Administration Headquarters Washington, D.C.
 Lafayette Building Washington, D.C.
 Marriner S. Eccles Federal Reserve Board Building Washington, D.C.
 National Defense University Washington, D.C.
 Naval Station Great Lakes Great Lakes, IL
 U.S.D.A. Yates Building Washington, D.C.
 U.S. Naval Academy Museum (Preble Hall) Annapolis, MD
 White House Visitor Center Washington, D.C.

NOTABLE FEDERAL AGENCY CLIENTS



FEDERAL RESERVE



ARMY



NAVY



G.S.A.



E.P.A.



F.B.I.



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