

# ARMOR CLAD

FOUNDED BY A WARFIGHTER, THE COMPANY BEHIND UNIVERSAL BODY ARMOR,  
PROTECTIVE SEATING, HAS SBIR ROOTS



**B**ill Perciballi likes to downplay his role in saving the lives of countless U.S. military service members.

His company, ArmorWorks, Inc., developed and built the attenuating seats and body armor plates that have revolutionized the landscape of protective technologies, greatly increasing the safety of thousands of active duty military.

But none of it might have happened if, back in the 1990s, Perciballi hadn't taken a break.

An Army reservist and engineer at the U.S. Army's Materials Technology Lab in Massachusetts and then

the Army Ballistic Research Lab at Aberdeen Proving Ground, Maryland, Perciballi spent years bettering the performance of body and vehicle armor systems by helping develop and improve upon new materials. In 1991, during the First Gulf War, his national guard unit was mobilized. It was during this mobilization that he saw the need for better equipment.

His return stateside represented the perfect chance to take a step back and rest. But Perciballi's break was different than most. Rather than a trip to Cabo or a few weeks in the woods, in 1996 he decided to start his own company. More than 20 years and dozens of successful

SBIR contracts later, ArmorWorks has grown into one of the most successful protective technologies companies in the industry, providing the blast-resistant seats utilized in most vehicles in the U.S. military, as well as lightweight armor for vehicles, aircraft and ships.

“I had a friend of mine who started his own business who said that it’s not that hard, and that what you don’t know, you’ll learn,” Perciballi said of the transition. “He told me: ‘If you don’t start your own business you’re going to be unhappy and move from job to job.’ So I took the plunge.”

While his entrepreneurial resume may have been a bit short at the time, Perciballi had a wealth of practical experience through his time within the Army’s research laboratories, where he was exposed to the needs of the military as both a user and as an engineer.

And the founder had another ace up his sleeve: During a brief stint with a crash safety product development company in Arizona, Perciballi had been introduced to the SBIR program, which he calls “the perfect program.”

In 1999, ArmorWorks scored its first SBIR contract developing new lighter weight composite armor for the U.S. Marine Corps’ advanced amphibious assault vehicle, or AAV.

Three years earlier, the company had been awarded a production contract, separate from the SBIR program, to supply armor for Chinook helicopters using blueprints from the 1960’s. That work, along with the subsequent AAV SBIR contract, highlighted to Perciballi the need for updated armor technology across many sectors of the military.

“In the armor business, everything is about weight. The baseline is steel, so everyone wants the properties of steel: easy to form, durable, reliable, economical, but not the weight.”

To solve this quandary, ArmorWorks turned to a ceramic composite



armor technology that had the strength and functionality of steel, while shedding some of the heft that bogged down military vehicles and aircraft in particular. As soon as he ensured the success of that first SBIR, Perciballi was back to work, this time with a larger vision: production.

“In order to do research and development in this industry, you have to be able to do both the science part and the fabrication part,” he said. “That way you can make the armor and test it by actually shooting it to gather live fire test data.”

With its newfound production capabilities, the company was able to keep up with the quickly shifting world of bullets, ballistics, and bombs. As Perciballi put it, “The minute you have a new gun, you have a new bullet, and then you have to have a way to stop it.”

This forward-thinking approach secured ArmorWorks several more

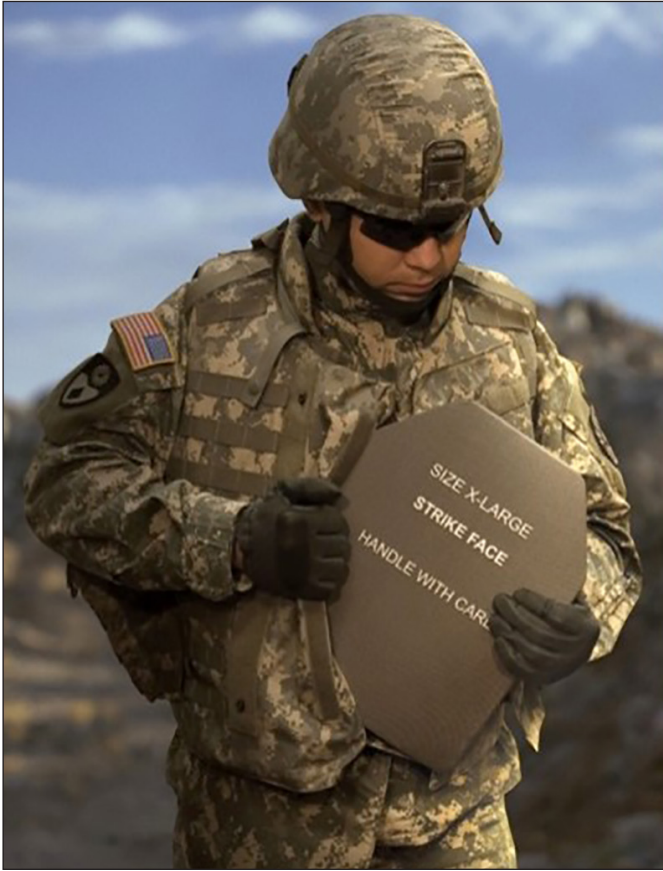
SBIR contracts around the turn of the millennium. About the same time, according to Perciballi, the military was beginning to view body armor as a necessary part of infantry equipment. Here, again through the SBIR program, the company saw an opportunity to take what it had learned and modify it for individual use, creating body armor plates that used the same high-tech materials and systems it had built for vehicles. These new plates were so successful that, at its peak, the company produced some 50,000 per month.

In the mid-2000s, the “new guns” were the Improvised Explosive Devices (IED) that could tear their way through most armored vehicles. ArmorWorks’ solution this time was both armor and blast protection using advanced materials. It commercialized technology from another SBIR program to create mine blast energy attenuating (EA) seats that would help absorb the impact of the blast and protect the occupant. Installed in MRAP, Bradley, Stryker, and other vehicles, the seats were so

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A rendering of an “operator seat” produced by ArmorWorks.



From a start supplying armor for Chinook helicopters, ArmorWorks eventually transitioned into providing protection for boots-on-the-ground warfighters as well.

effective that the company has produced more than 250,000 worldwide since 2007.

Overall, Perciballi said, much of the company's drive to develop and create protective solutions were born from the SBIR program. And as a testament, in 2006, ArmorWorks was named to the Tibbets Awards Hall of Fame for its work with the program. In reflecting on the company's long history, the SBIR framework played an undeniably large role in helping it grow, the founder said.

"Much of our underlying work, the modelling, simulation and basic understanding of the response of materials and systems, was done through Phase I and Phase II SBIRs, and that was critical," he said. "You cannot buy your way out of understanding a science problem. It takes time and brainwork, and the structure of the SBIR program, for the

industry we're in, is exactly the right format."

By 2013, ArmorWorks was among the primary armor producers for the US Department of Defense and one of the largest privately held armor companies in the world. The company commercialized its SBIR technologies into separate subsidiaries, each of which focused on a specific market, and eventually sold its seating and armor production businesses. Today, ArmorWorks Enterprises, Inc. and its ShockRide seating subsidiary are leading producers of advanced armor and mineblast protective seating, selling their products internationally.

Every once in a while a veteran will come up to Perciballi and thank him and the company for building a product that saved them from serious injury. And that, the founder said, makes the years of research and development, the long nights and countless hours all worth it. 🌟



ArmorWorks, Inc.  
Chandler, AZ

Modernization Priority: General Warfighting Requirements (GWR)

SBIR contract: M67854-03-C-0007 • Agency: Navy • Topic: N01-004, AAV Composite Armor Systems SBIR contract: M67854-00-C-0030 • Agency: Navy • Topic: N99-039, AAV Multi-Threat Armor System SBIR contract: M67854-01-C-0003 • Agency: Navy • Topic: N99-223, AAV Mineblast Attenuating Seat