

Topic: N06-016

Kennon Products, Inc.

Anti-Ballistic Cabin Liner System for V-22

Kennon's aircraft armor system is built on patented technology that greatly increases damage tolerance and multi-hit capability, as verified through prototype testing. The armor's damage isolation allows it to retain the majority of its structural integrity after impact - permitting its use as a load-bearing structure that can both line cabin walls and be integrated into flooring panels. Low weight and intrusion profile allow the armor to be used for nearly all missions. While the initial target platform is the V-22, core armor structures can easily be adapted to other air, land, and sea vehicles. Kennon is a research, design, and manufacturing company dedicated to protecting high-value assets. Our goal is to provide armor systems for all aircraft and vehicles operating in contested areas/hostile environments.

### Technology Category Alignment:

Rotary Wing Vehicles

Survivability

Manufacturing Technology for Affordability

Structures and Protection

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**SYSCOM:** NAVAIR

**Contract:** N68335-17-C-0572

 Corporate Brochure: [https://navystp.com/vtm/open\\_file?type=brochure&id=N68335-17-C-0572](https://navystp.com/vtm/open_file?type=brochure&id=N68335-17-C-0572)

Department of the Navy SBIR/STTR Transition Program

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WHO

**SYSCOM:** NAVAIR

**Sponsoring Program:** PMA-275

**Transition Target:** V-22

**TPOC:**

(301)757-5586

**Other transition opportunities:** H-1, H-47, H-53, H-60

**Notes:** Kennon Products, Inc. (Kennon) is currently engaged in a SBIR Phase II.5 project to develop conformable wall armor kits, and a Navy Rapid Innovation Fund (RIF) project to develop integral floor armor kits for the V-22 Osprey. These projects are outgrowths of a SBIR Phase I project that led to the development of vastly improved aircraft insulation and attachment systems.



Photo courtesy of U.S. Marine Corps, [http://www.dodlive.mil/files/2014/06/14396929922\\_fc04bc3d62\\_o.jpg](http://www.dodlive.mil/files/2014/06/14396929922_fc04bc3d62_o.jpg)

WHAT

**Operational Need and Improvement:** The V-22 Osprey has proven itself to be a highly versatile, multi-role aircraft. Incorporating advanced, next generation armor systems will allow the V-22 to be used for an even wider array of missions. The lightweight and low-profile nature of Kennon's armor will enable the aircraft to carry more personnel, more fuel, and larger equipment into contested areas.

**Specifications Required:** At a minimum, the armor system will meet the specifications set forth in Navy Solicitation Number N68335-18-R-0102, Ballistic Protection for V-22. Kennon's armor designs will reduce total system weight, cabin intrusion, and installation/removal time compared to the armor called for in the previously mentioned solicitation.

**Technology Developed:** Kennon's armor structures utilize patented technology to greatly improve armor damage tolerance and multi-hit capability. The composite nature of Kennon's armor will allow it to retain significant structural properties, even after multiple impacts. Incorporating these advanced structures into new, space-efficient panel designs will reduce cabin intrusion to levels approaching those of cabins without armor installed.

**Warfighter Value:** Use of Kennon's armor system results in significant increases in personnel protection, damage tolerance and multi-hit capability. The armor's damage isolation characteristics enable retention of structural integrity after impact - permitting its use as a load-bearing structure that can be used to line cabin walls and integrated into floor panels. It does not interfere with cargo loading or unloading operations and can be used with standard cabin troop seats - negating the need to reconfigure the aircraft from mission-to-mission, greatly reducing "Mission Notification-to-Launch" times. The integral nature of the floor armor reduces total system weight - increasing payload. In addition, it satisfies all flightworthiness requirements (e.g. flame, smoke, toxicity, fluid compatibility, vibration and shock resistance). If enhanced protection is needed, it can be scaled to counter armor piercing threats.

WHEN

**Contract Number:** N68335-17-C-0572 **Ending on:** December 15, 2018

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Proof of Concept (Previous Phase II project)	N/A	Qualitative and quantitative ballistic testing	3	November 2010
Ballistic Qualification Testing (Wall Armor - Phase II.5 project)	Med	V0 and weight values that meet N68335-18-R-0102 requirements	4	September 2018
Ballistic Qualification Testing (Floor Armor - RIF project)	Med	V0 and weight values that meet N68335-18-R-0102 requirements	5	July 2019
Flightworthiness Qualification Testing (System - RIF project)	Med	Environmental, vibration/shock, and load test results that meet N68335-18-R-0102 requirements	6	March 2020
Prototype Shipset Production and Testing (PMA-275 sponsored Phase III effort)	High	Successful flight qualification tests	7	April 2021

HOW

**Projected Business Model:** Kennon's business model is to sell armor kits and spares directly to the DoD, program office, and/or individual units as necessary. The kits being developed build upon Kennon's existing patented armor technology, as well as our experience developing, producing, and delivering executive level VIP cabin liners for the V-22 Osprey.

**Company Objectives:** Our company has a long and successful history of producing products for the DoD that protect high-value assets, particularly aircraft. Armor systems are a new product line for Kennon that is expected to become a core business unit in the near future. The current SBIR Phase II.5 and RIF efforts are geared towards developing armor kits for the V-22, however, Kennon plans to use the SBIR/STTR Transition Program (STP) and Forum for SBIR/STTR Transition (FST) to establish connections with other potential air platform customers.

**Potential Commercial Applications:** The armor technology being developed by Kennon is specifically geared towards DoD applications. The lightweight, compact nature of the armor structures, however, could be adapted towards such commercial applications as shrapnel containment barriers for commercial aircraft engine cowlings.

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