

Low-Profile Self-Contained Breathing Apparatus



Homeland Security

Science and Technology

PROJECT OVERVIEW

Currently, structural firefighters use large, bulky Self-Contained Breathing Apparatus (SCBA) that extend far off the back of the firefighter. In addition to causing changes to the firefighter's center of gravity, this can cause accessibility and safety issues in some of the work environments that firefighters encounter. Therefore, there is a need for a lower profile, lighter weight SCBA for structural firefighters.

DEVELOPMENT APPROACH

Avon is developing a high-pressure, low-profile SCBA, created under the Department of Defense's Combating Terrorism Technical Support Office (CTTSO) Technical Support Working Group (TSWG) that will meet National Fire Protection Association (NFPA) 1986 standards. This design includes developing a high-pressure composite air cylinder that will be certified to U.S Department of Transportation (DOT) standards.

Avon will leverage this design and create the structural firefighting low-profile SCBA that will be a more compact system design, with improved weight distribution of the cylinders across the user's back. The program will include the design of additional components needed to meet flame resistance, decontamination, and increased robustness.

The Low-Profile SCBA for the structural firefighter will be certified to the most current edition of NFPA 1981: "Standard on Open Circuit Self Contained Breathing Apparatus (SCBA) for Emergency Services" and NFPA 1982: "Standard on Personal Alert Safety Systems (PASS)."

PROJECT IMPACT

By reducing the size and increasing the pressure of the cylinders, along with integrating multiple components into a single manifold, Avon is able to deliver a lower burdened, lighter weight and better-balanced product. This design will improve the comfort and increase safety of first responders.

STATUS OF PROJECT

Avon has completed the Kick-Off meeting with Department of Homeland Security Science and Technology Directorate but plans for on-site user evaluations have been postponed due to the COVID 19 pandemic.

User feedback is essential in understanding the critical needs of product performance, allowing the team to make modifications based on this feedback. The delay has allowed the team to advance the prototype to represent a more manufactured product. Several of the component builds will now be off production tooling.

Avon has received DOT approval on the 6,500 pounds per square inch low-profile cylinders, which will be used in the initial prototype build. Obtaining DOT approval allows for the team to do full system validation testing.

Development of the carrier harness is moving towards completion. All plastic components are completed and ready to be sewn into the harness.



Firefighter Low Profile SCBA Prototype

UPCOMING MILESTONES

Phase 1: Define User Requirements

- 1.2 Feedback to Evaluate End User Needs
- 1.3 Upgrade Unit Design
- 1.4 Revise Prototype and User Evaluation
- 1.5 Preliminary Design Review

