

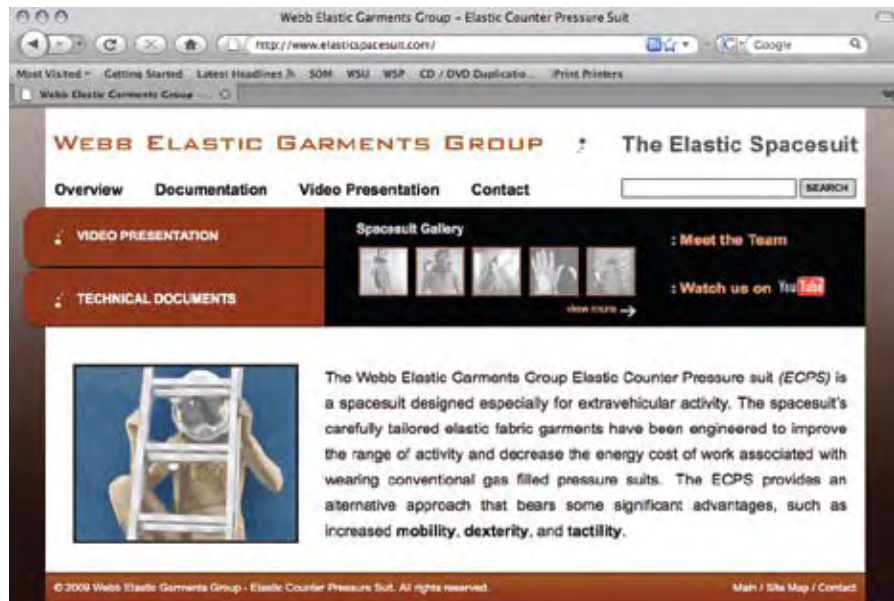
An old idea for a new era of space exploration

For Paul Webb, M.D., clinical professor of aerospace medicine, the future has finally caught up to the past. The dawn of an exciting new era in space exploration—with NASA planning missions to the moon and Mars, and international and private-sector space programs flourishing—means the time may be right for a revolutionary concept he first proposed in the 1960s.

The Elastic Counter Pressure Suit (ECPS) Webb developed provides an alternative to the bulky, awkward, and expensive spacesuits astronauts wear today. Rather than surrounding the body with a fully pressurized “gas bag,” the ECPS uses a high-tech fabric to create a skintight bodysuit that is lighter, more flexible, and more comfortable.

In addition to oxygen, pressure and temperature regulation are crucial to ensure survival in the vacuum of space. Traditional suits accomplish this with a whole-body enclosure full of oxygen and elaborate cooling systems. In contrast, the form-fitting fabric of the ECPS would prevent blood pooling and gas buildup while allowing sweat to wick away and evaporate, cooling the body naturally.

The inspiration for the idea came to Webb in the mid-1960s, when he considered ways to improve on the partial-pressure suits worn by high-altitude military pilots. The suits, which were tightened imperfectly by rows of tape, often enabled pilots to survive long enough to reach lower altitude in an emergency, but they could cause fainting within a matter of minutes. Webb wondered if an elastic fabric might provide more uniform pressure and support normal body functions longer.



Webb's site (elasticspacesuit.com) provides detailed information on the project's history and next steps, as well as photos and video from testing of early prototypes.

“I made a prototype,” Webb said, “and in fact, it worked wonderfully well. All the problems were immediately solved.”

Despite elaborate testing, including sessions in an altitude chamber, Webb wasn't able to convince NASA to shift gears and invest in further development of the concept. Now, though, a number of factors may make the ECPS a more appealing option.

“Textile technology has changed enormously in 40 years,” Webb said. New materials and manufacturing processes enable the rapid, relatively inexpensive creation of suits that are incredibly strong and supple, easy to put on, and custom-tailored to each wearer.

Perhaps more importantly, current full-pressure suits simply aren't well-suited to the demands of extended activity on the lunar or Martian surface.

With the ECPS, in contrast, “You have good arm reach. You have good dexterity,” Webb said. “Think about run, hop,

skip, scaling a cliff, crawling into a small cave.” All are perfectly feasible with an elastic suit.

The ECPS provides safety benefits as well, because a tear or puncture would no longer mean a catastrophic loss of oxygen. In addition, the suit is lighter and less expensive than current models. Webb projects that each ECPS, including oxygen tank and helmet, will weigh 85 pounds and cost around \$50,000, versus more than 300 pounds and nearly \$1 million for a full-pressure suit.

Webb has assembled a team, including physiologists and a textile expert, and is seeking funding to create and test a new prototype, which he believes could be ready in as little as two years.

To learn more and see videos about the project, visit elasticspacesuit.com. **VS**