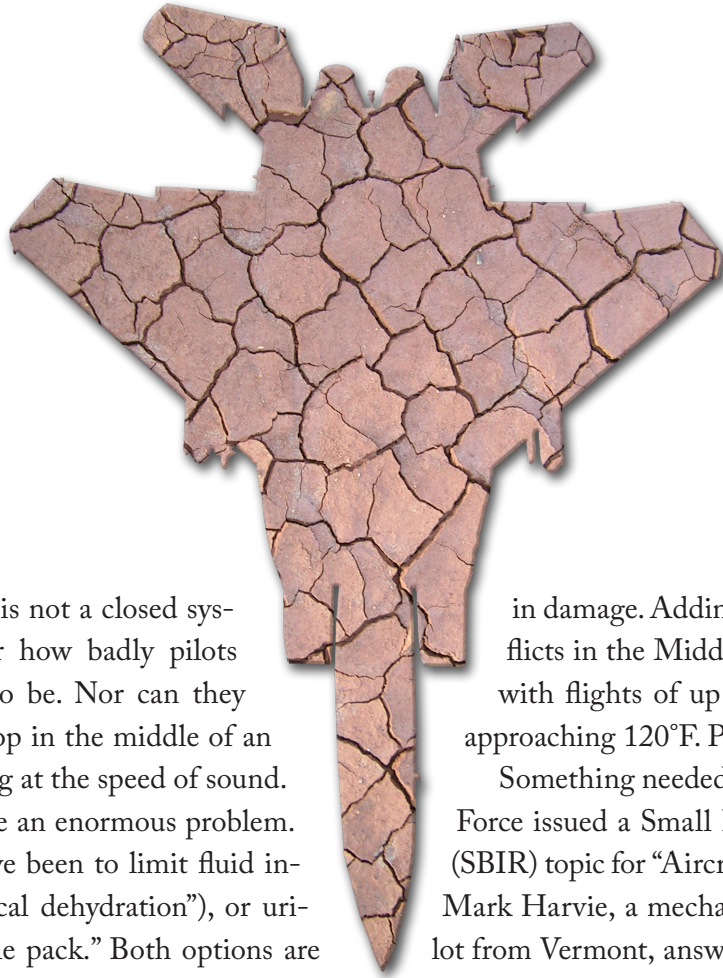


DRY FLY

THE NEED FOR TACTICAL DEHYDRATION IS A THING OF THE PAST.



The human body is not a closed system—no matter how badly pilots might want it to be. Nor can they just pull over for a pit stop in the middle of an eight-hour sortie traveling at the speed of sound. Bladder relief can thus be an enormous problem. Typical workarounds have been to limit fluid intake before flight (“tactical dehydration”), or urinate into a special “piddle pack.” Both options are equally, and seriously, dangerous. As little as three percent dehydration can lead to fifty-seven percent reduction in flight performance, with decreased hand-eye coordination, impaired vision, spatial disorientation, and compromised G-Force tolerance. And beyond the immediate consequences, habitual dehydration can lead to kidney stones, chronic kidney trouble, and life-long bladder dysfunction. But using piddle packs is more than merely awkward. By 2001, the Air Force had linked their use with nine Class A mishaps, which are accidents resulting in the loss of life or more than \$1 million

in damage. Adding to the sense of urgency, conflicts in the Middle East brought longer sorties, with flights of up to ten hours in temperatures approaching 120°F. Pilots had to hydrate.

Something needed to change, so in 2002 the Air Force issued a Small Business Innovation Research (SBIR) topic for “Aircrew Bladder Relief Capability.” Mark Harvie, a mechanical engineer and private pilot from Vermont, answered the call.

“We didn’t pick an easy one,” Harvie said of his decision to pursue the project. “It’s one of those subjects that nobody really wants to talk about. But when you do get people talking, it changes the way they think.”

Working closely with the Human Systems Division at Brooks Air Force Base, Harvie and his team at Omni Measurement Systems, Inc. interviewed male and female pilots to pin down exactly what they needed. The system Harvie developed under the SBIR, called the AMXD (Advanced Mission Extender Device), utilized a special cup for men and pad for women that was

donned preflight along with the flight suit. Both systems had a detachable collection pouch situated outside the flight suit, and incorporated a battery operated pump that pilots could activate to draw urine away from the body. By 2006, the AMXD had been field tested in F-15, F-16, F-22, and A-10 aircraft by male and female pilots, who returned overwhelmingly positive reviews. The system received FDA approval and a “Safe to Fly” certification on U.S. Air Force aircraft.

Harvie sold his other commercial product lines and spun-off Omni Medical Systems Inc., refining the AMXD based on continued pilot feedback. The updated version, the AMXDmax, had a sensor-driven pump to detect moisture and pull urine away. The result was a fully automatic, heads-up and hands-free system.

“I was able to stay heads up during a climbing, banking turn without taking myself out of the mission,” reported a male A-10 pilot.

A female pilot wrote, “I’ve used the AMXDmax now for 43 combat missions, equating to slightly over 332 hours of flight. The system has seriously made a huge difference in my flying comfort and ability to fly these long missions.”

In 2014, the Air Force declared the AMXDmax “Cockpit Essential Equipment,” and in 2015, the Air Force Aircrew Education Training Command (AETC), which is in charge of all pilot training, was authorized to purchase the system for trainees. This will go far in helping create a fundamental, institutional shift away from the damaging practice of tactical dehydration. Today, the AMXDmax is being used by aircrews in the U.S. Air Force, Navy, and Army, and the system is also being sold to the British Royal Air Force, Australian Royal Air Force, Swedish Air Force, and French Department of Defense.

From the earliest days of the SBIR work, Harvie believed that his system might also improve the quality of life for disabled veterans and the estimated 25 million Americans being treated for incontinence. In 2011, Omni began




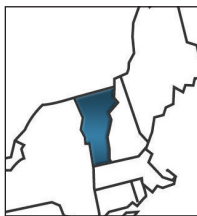
delivering systems to veterans with spinal cord injuries. Soon, veterans with incontinence stemming from other conditions were asking for and receiving the system. Letters arrived at the Omni offices from deeply appreciative users, like the veteran who felt newly confident walking his daughter down the aisle at her wedding, and the woman who wrote that her husband’s incontinence due to multiple sclerosis had gotten so problematic that he had to enter a state-run VA nursing home, where he developed extremely painful incontinence-related skin ulcers and pressure sores. They came across the Omni bladder management system, and within six weeks the man’s skin had healed and he was able to return home.

In 2015, Omni received Medicare reimbursement codes for its products, opening the way to helping potentially millions of incontinent civilians improve their quality of care, health, and life.

“We couldn’t have done it without the Air Force SBIR program,” Harvie said. Working under the SBIR, he explained, facilitated invaluable access to the various commands, including the opportunity to brief military aviation commanders at the 2015 WEPTAC (Weapons and Tactics Conference).

Today, about fifty percent of Omni’s customers are active military, and fifty percent are veterans. Harvie predicts the active military sales will grow significantly as the product is integrated into pilot training. Omni is also now fielding the system for use in protective CBRN (Chem-Bio) and immersion suits, and is working under a NASA SBIR contract to develop Space Suit Waste Management Technologies for the ORION long-duration mission to Mars.

Wherever the system finds use, now or in the future, said Harvie, “We will be putting everything back into improving our products to support our active military and getting more products to our veterans and the other millions of people who are suffering miserably, quitting their jobs, and isolating themselves because of bladder control issues. That’s our mission.” 



Omni Medical Systems, Inc. • Burlington, VT

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