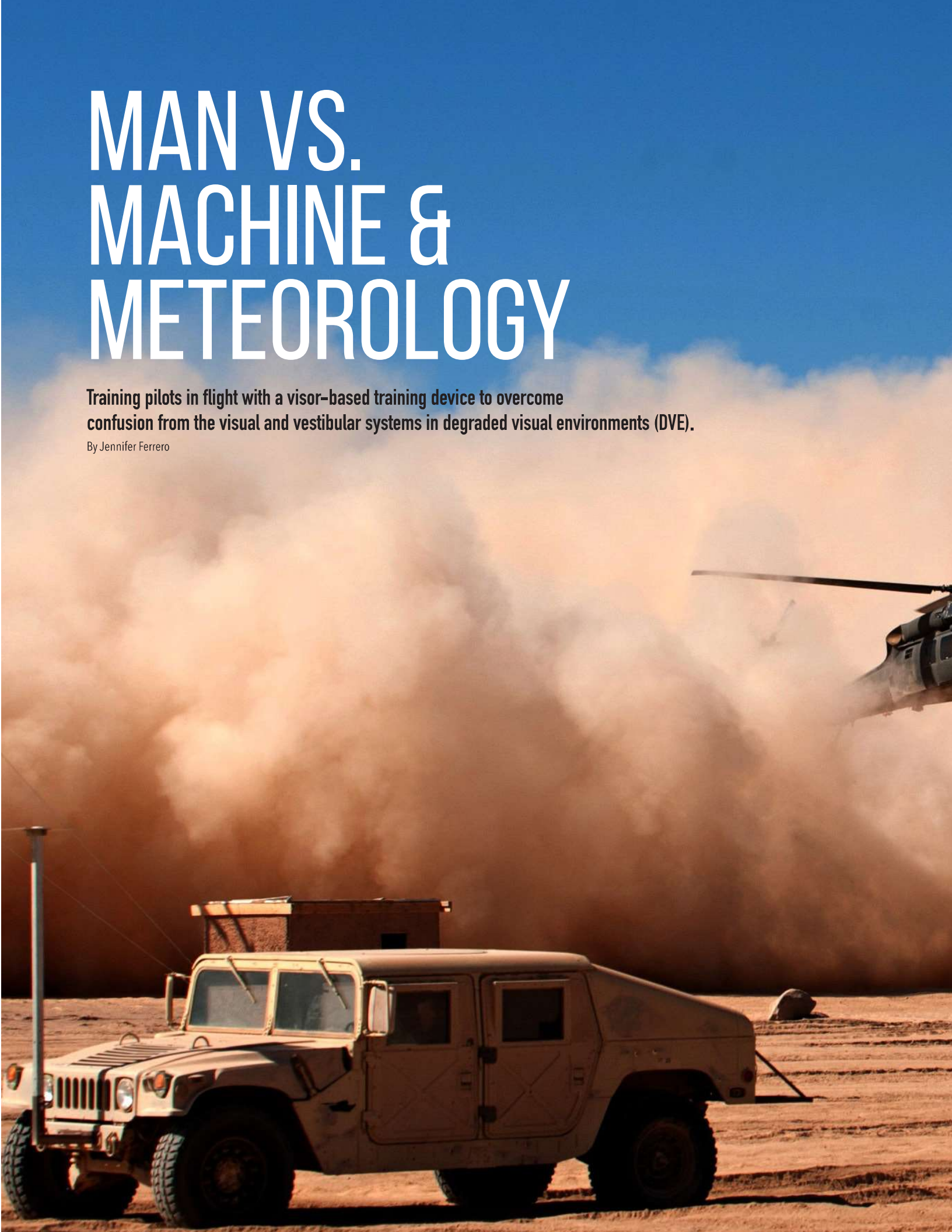


MAN VS. MACHINE & METEOROLOGY

Training pilots in flight with a visor-based training device to overcome confusion from the visual and vestibular systems in degraded visual environments (DVE).

By Jennifer Ferrero







Humans have overcome amazing odds in taking flight. Helicopters fly around 10,000 feet (about the height of Mount St. Helens), and commercial air flights hover around 30,000-40,000 feet. In addition to the altitude gain, other physiological factors are at play in taking flight. For pilots, the visual system (sight) is one method for understanding the world outside, the horizon, the instrument panels, and internal and external factors of the cockpit. The human vestibular system is commonly thought of as the auditory system, but has more to do with motion and balance — while the auditory system deals in hearing — the different human body systems are in play during flight. Additionally, meteorological systems are at play in nature, and weather can be severe at many places in the world.



For pilots like Tyson Phillips, concern is about spatial disorientation during flight, which is especially common during night flights and in degraded visual environments (sand, snow, low light, rain, fog, etc.) That is why Phillips, along with partner André Lavallée, created a pilot training tool called ATS Device. Per their website, <http://www.atsystemsllc.com>,

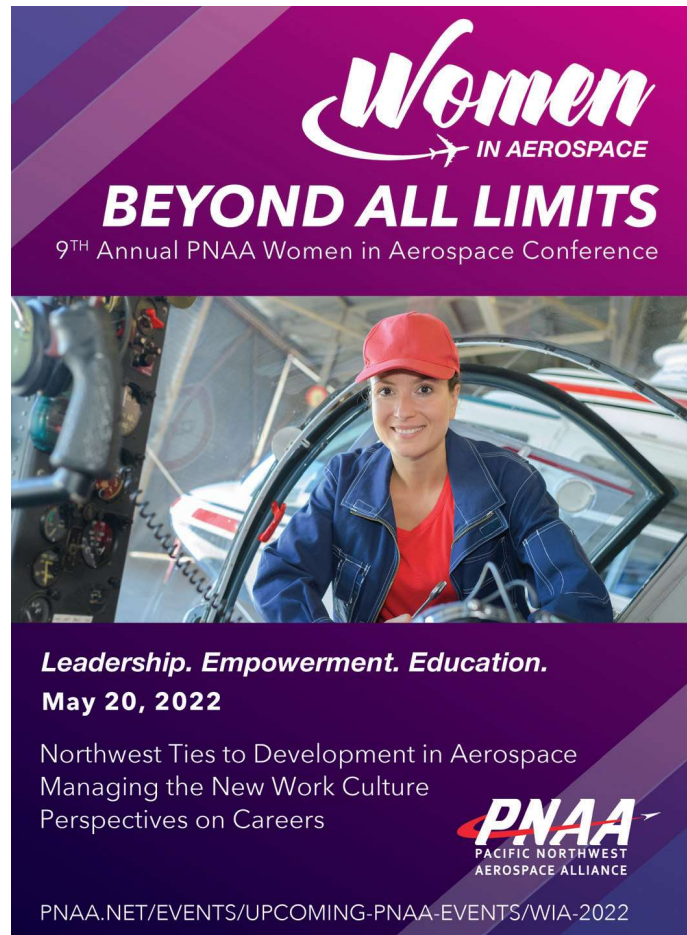
“The ATS Device is a patented in-aircraft training device that trains pilots for DVE, such as IIMC (inadvertent instrument and meteorological conditions) and brown/white out. Effective real-world training will reduce high accident rates occurring in these environments.”

Accidents like the 2020 Calabasas helicopter crash, which killed nine people including the pilot, retired basketball star Kobe Bryant, his daughter, and family friends, have been partially attributed to DVE and spatial disorientation. The National Transportation Safety Board (NTSB), following a review of that crash, has recommended better pilot training in this area to minimize future accidents.

AT Systems LLC has created the ATS Device and has partnered with Aviation Specialties Unlimited, Inc. (ASU, Inc.) of Boise, Idaho to supply in-flight training, with real-world DVE scenarios, using the ATS Device. This is a case of an innovative product in the aviation marketplace that is going to fit the need for more intensive in-flight training for pilots. The ATS Device is a helmet or head-mounted system that connects to both a visual gradually opaque visor (depending on the exercise), and an iPad with custom software programming to simulate DVE and IIMC flight issues. It teaches the pilot to strategize beyond spatial disorientation and make better decisions during DVE.

ASU, Inc. offers the AT Device with training at the Boise location or on site. Their experienced instructor pilots support companies who would like to train using the ATS Device.

According to the ASU, Inc. website, <http://www.asu-nvg.com>, “For more than 25 years, Aviation Specialties Unlimited Inc. (ASU) in Boise, Idaho, has proudly served those who protect and defend worldwide with Night Vision Solutions that Save Lives! The experienced team supports safe and sustainable aviation night vision programs with military-grade NVGs, specialized tools and test equipment, custom aircraft lighting, and a full array of training and Night Vision Imaging System integration services.”



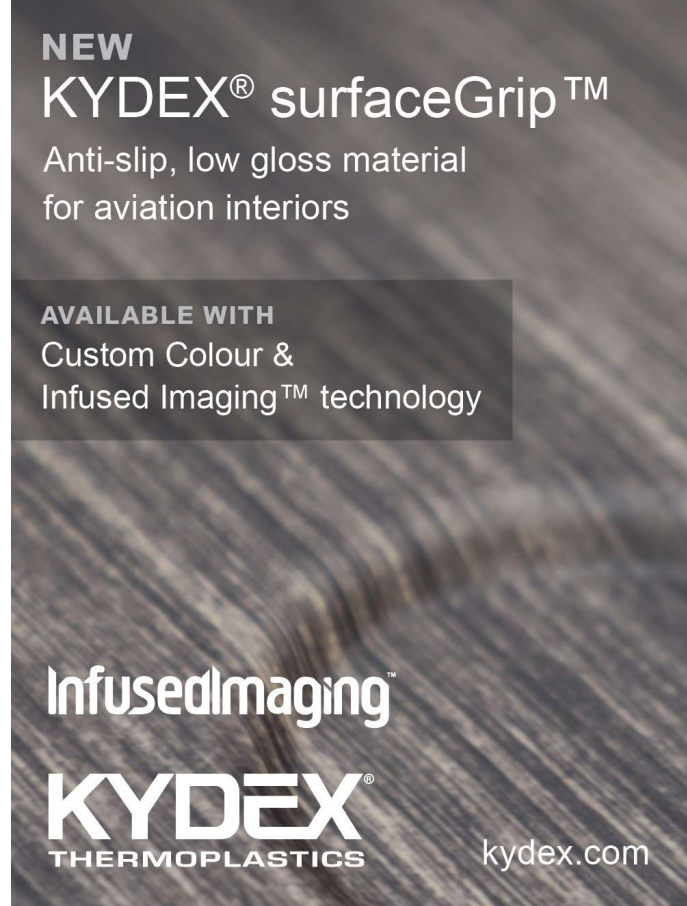
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ASU pilot and trainer, K Kirkendall has used the ATS Device in flight and was the first person introduced to the technology at ASU — following an Idaho National Guard crash on February 2, 2021, that killed three men from the Boise area. The cause of the accident was dangerous weather with fog and precipitation outside of the UH-60 Black Hawk helicopter. AT Systems, LLC, Phillips and Lavallée sent the ATS Device to Kirkendall’s unit post-accident. He said, “We thought it was generous,” that they sent the device.

Kirkendall said that they started testing with the device and, “We were able to simulate the same experience as what happened in the accident.” He said that with in-flight ATS Device training, instead of within a simulator, pilots can test out a variety of environments from flying through the back country, the mountains, in snow, sand, or fog. “You can be in your own backyard on a lot of missions, and this provides a unique way to train.” He added that in addition to the device’s safety features there is a safety/instructor pilot guiding the training to ensure safety.



Photos courtesy of Global Helicopter Service

In fact, Kirkendall has personally experienced both DVE and spatial disorientation. He said, “I was in Afghanistan, (it was) dark and dusty, (and I had a) pretty good case of spatial disorientation; instruments weren’t matching up with what I saw visually. (I) had to turn over the flight controls to a junior aviator.” He added that it was difficult to accept that he needed to turn over the flight controls to a less experienced aviator, but it needed to happen.



Photos courtesy of Global Helicopter Service

Phillips said that many pilots are “Type A personalities, who want to cross training off their list.” They want to have success with their training and missions and move on. He added that sometimes when training with the ATS Device, they may not get it right the first time. There are difficult, variable challenges that they will be presented with while wearing the ATS Device in flight.

“Simulators do not provide the vestibular illusions encountered during Degraded Visual Environment induced spatial disorientation, but this product does. Geography of flight and weather conditions – DVE is from bad weather, snow, or dust, or landing in snow or dust – what people miss most often is low contrast environments. When flying at night with goggles with no visible horizon in a low contrast environment, it is hard to see. Low contrast environments are difficult. If a pilot flies into the setting sun, that can be hard. Our system is designed to be a degraded, low visibility situation; this tool trains the decision making (of the pilot),” Phillips added.



Chad St. Francis, vice president of business development and marketing for ASU, Inc. said it is a good affiliation because, “You can sit in a simulator, but not have the same experience. Going from Visual Flight Rules (VFR) to instrument meteorological conditions (IMC) or instrument flight rules (IFR) conditions, it is good to do training in the aircraft with someone beside you.” St. Francis, who is also a pilot and instructor with deep military experience, added that the in-flight training is, “... familiar, a lot of us have been in this condition with dust, snow, degraded visibility; to do the (training) in the aircraft is much better.”

HOW IT WORKS

— The primary pilot is in training, wearing a flight helmet or head-mounted unit that contains a battery pack in the back, and an opaque visor on the front. (Note: The device attaches to currently used helmets, requiring no modifications, or head mounted without a helmet. The ATS Device is a stand-alone training system requiring no alteration to the aircraft for power or telemetry data.)

— There is a safety pilot sitting next to the primary pilot who is in control of the training program using an iPad with training software.

— In the visor, when power is applied to the film it affects the opacity, depending upon the program you set as the trainer.

— The iPad directs the power pack and is directed by the safety pilot to run a program.

— Once they start the scenario everything is controlled by the safety pilot through the helmet.

— Training can be run in a simulator on the ground like a dust or snow landing; however, the best application is while being used in the aircraft because of the movement of the aircraft.

— Regularly updated accident scenarios replicate real-world historical accident conditions.

— The ATS Device can simulate DVE conditions while incorporating available resources such as NVG's, HUD (heads up display) or synthetic vision. For proper training, pilots using these resources require a way to safely limit their vision, forcing them to rely on the information these technologies provide.

Visibility can be set between 0 to 6 miles in quarter-mile increments and ceilings set to any altitude in 100-foot increments.





Phillips said, “Our system creates a degraded visual environment and benefits from the full movement of the aircraft. They see through the screen; the visor film is changing the level of opacity; there is reduced visibility through the visor screen.”

He added that they are offering augmented reality, but it is a live flight with flight conditions. Phillips, along with ASU, Inc. believes that the in-flight testing will supply a better experience to pilots in DVE and meteorological conditions and better decision making because they have gone through the process while in flight, not in a simulator on the ground.



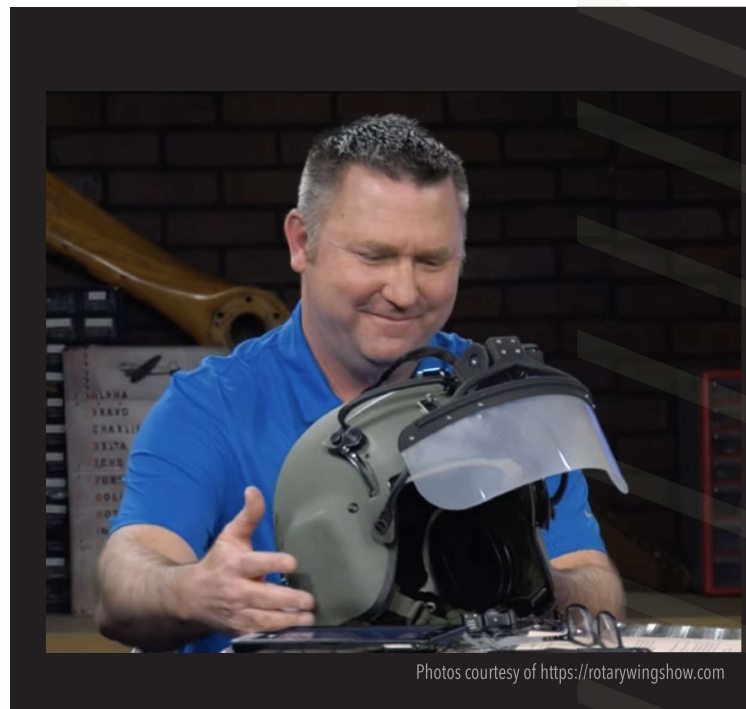
For training information using the ATS Device:

ASU, Inc.
4632 West Aeronca St.
Boise, Idaho 83705
Tel: +1 (208) 426-8117
<https://www.asu-nvg.com/>



For information on the device and how to get it:

AT Systems, LLC
Tel: +1 (918) 619-2141
<http://atsystemsllc.com/>



Photos courtesy of <https://rotarywingshow.com>