

Measuring up: ONR tech makes sure aviators and aircraft are a perfect fit

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Nick Sievert, a machine learning developer at Naval Surface Warfare Center Dahlgren, uses the computerized Anthropometric Measurement Device to measure a student naval aviator to gauge what type of aircraft cockpit will best accommodate the aviator's body. The device, developed through support from the Office of Naval Research Global TechSolutions program, features enhanced optical scanning and processing of subjects--which saves time, improves standardization and is less susceptible to human error than current measurement methods. Credit: US Navy photo by John F. Williams

The aspiring U.S. Navy pilot ran through a series of motions—sitting, kneeling, stretching out his arm—to gauge the type of aircraft cockpit his body would fit.

As the [pilot](#) completed each exercise, a technician hovered over him and recorded [measurements](#) using a tool called an anthropometer—consisting of several metal tubes formed into a large ruler-and-caliper set and spanning the height of a person. Total time: seven minutes.

Another pilot stood at attention while engineers connected a camera the size of a TV remote to a laptop and took a photo. Thirteen yellow-and-black

dots—representing limbs and joints—peppered the pilot's image on the computer screen. Specialized software calculated the distance between each joint to produce an accurate body measurement. Time elapsed: one minute.

A six-minute difference might not sound like much, but it enables more pilots to be measured in that time frame.

"The Anthropometric Measurement Device features enhanced optical scanning and processing of a person's measurements," said Jason Payne, director of the Office of Naval Research (ONR) Global TechSolutions program. "This saves time, improves standardization and assists with selecting the right aircraft for differently sized aviators."

The exercise was part of a demonstration of the computerized Anthropometric Measurement Device at the Naval Aviation Schools Command (NASC) in Pensacola, Florida. The device was developed through support from TechSolutions—which is ONR Global's rapid-response science and technology program that develops prototype technologies to address problems voiced by Sailors and Marines, within approximately 12 months.

The idea for the Anthropometric Measurement Device came from a naval officer at NASC, which also trains Marine Corps and Coast Guard pilots. The officer wanted to improve how pilots and naval flight officers are measured for cockpit compatibility.

Currently, technicians use metal anthropometers to determine if someone can fit in a cockpit, reach the controls inside and properly operate the ejection seat. The data gathered helps decide if someone will fly fighter jets or other aircraft—like helicopters, for example.

While anthropometers are reliable, their design hasn't changed since the 1960s. Their accuracy

also can vary due to [human factors](#) like the height of technicians conducting measurements, differences in chairs used for sitting-height tests and even technician fatigue related to screening large groups of people all day. Provided by Office of Naval Research

This can be problematic at the more than 12 sites nationwide that screen individuals applying to become naval aviators. Before attending the U.S. Naval Academy or officer candidate school, aspiring aviators are measured with anthropometers. After commissioning, these individuals report to flight school at NASC and are measured again. If they don't meet NASC measurement standards, regardless of their original results, the hopeful pilots might find their flight dreams grounded.

To address this and standardize the measurement process, TechSolutions partnered with researchers at Naval Surface Warfare Center (NSWC) Dahlgren Division to develop the computerized Anthropometric Measurement Device for greater accuracy and speed.

"The resulting measurement process will be faster, less susceptible to [human error](#), and provide data that can be transferred easily between locations and stored in a central repository," said Megan Kozub, software lead at NSWC Dahlgren.

Patricia Goolsby, an NASC anthropometrics technician, viewed the TechSolutions device as a valuable complement to current methods: "I like that you can essentially take a picture and the work is done. I think it will help streamline the evaluation process."

The device also earned praise from pilots measured at the Pensacola demonstration.

"Being on the cutting edge of technology is always good," said Ens. Nathan Largent. "Simple things like this will lead to bigger innovations later on."

Kozub said the Anthropometric Measurement Device will undergo more testing and hopefully be transitioned to the fleet within a year.

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