

Testing the Limits

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As the sun sets behind the hangar bay at the U.S. Naval Test Pilot School (TPS), Patuxent River, Md., more than 12 different types of aircraft are put to bed. Since TPS students get to experience flying a diverse mix, it's easy to understand why pilots, flight officers and engineers are drawn here. But being allowed to fly these aircraft requires a unique commitment. Students must undergo a rigorous 11-month program of academics and practical flight evaluation, during which they are required to complete 550 classroom hours and a minimum of 150 flight hours.

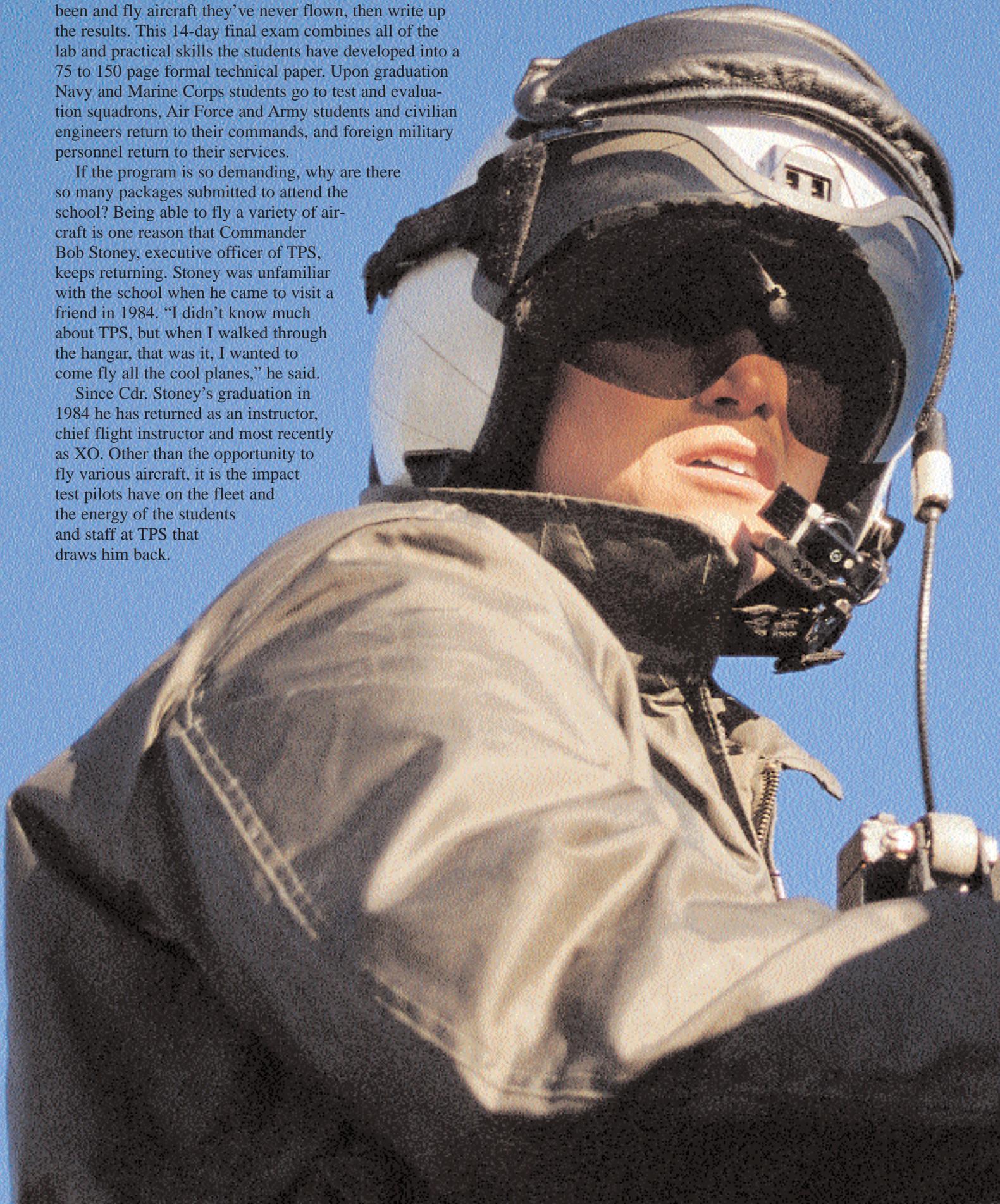


A pilot runs through the checklist as he prepares for an early morning flight in a T-38 *Talon*.

After months of catnaps and endless lines at the coffee machine, students travel to somewhere they've never been and fly aircraft they've never flown, then write up the results. This 14-day final exam combines all of the lab and practical skills the students have developed into a 75 to 150 page formal technical paper. Upon graduation Navy and Marine Corps students go to test and evaluation squadrons, Air Force and Army students and civilian engineers return to their commands, and foreign military personnel return to their services.

If the program is so demanding, why are there so many packages submitted to attend the school? Being able to fly a variety of aircraft is one reason that Commander Bob Stoney, executive officer of TPS, keeps returning. Stoney was unfamiliar with the school when he came to visit a friend in 1984. "I didn't know much about TPS, but when I walked through the hangar, that was it, I wanted to come fly all the cool planes," he said.

Since Cdr. Stoney's graduation in 1984 he has returned as an instructor, chief flight instructor and most recently as XO. Other than the opportunity to fly various aircraft, it is the impact test pilots have on the fleet and the energy of the students and staff at TPS that draws him back.





“The professionalism and sense of mission, and everyone’s desire to do the right thing is incredible. For the testers I guess it’s the pride of knowing your job affects the safety of the entire fleet. This is a unique opportunity to belong to something important,” Cdr. Stoney stated.

A safety-conscious pilot may seem to conflict with the movie image of a white-scarfed, tire-kicking daredevil, but the spirit and love for the job are still there. TPS students must have the passion and skills for flying that are necessary to shoulder the immense responsibility of testing aircraft.

The students’ dedication is challenged at TPS. They attend 11 months of training within one of three curriculums. The Fixed and Rotary Wing curriculums train pilots and engineers to evaluate aircraft performance and flying quality. The Airborne Systems curriculum instructs flight officers and engineers in airborne mission systems test and evaluation. Each provides instruction in academics, flight test preparation, flight test conduct, data collection, data reduction and test report preparation. All curriculums teach students to think beyond the skin of their aircraft.

Testing aircraft requires time and meticulous attention to detail. Students work long days with few breaks. They typically spend the first half of the day in academic labs, developing the technical background that will support the flight program. The second half of the day is devoted to flying. Then the student goes on to what some call

Safety is of critical concern at TPS. This pilot is preparing to flight test an OH-58 Kiowa after repairs to see if it is flight worthy for the students. Increasingly, these jobs are performed by permanent contracted staff.

Classroom to Cockpit

Students spend half of their day in classrooms and labs learning the skills to plan and evaluate their tests from instructors like J. J. McCue, right. Below, sometimes getting ready for a flight takes longer than the flight itself. For USAF pilot Maj. Nils Larson, an instructor, donning a dry suit is only one of many steps to be completed before strapping in for flight testing.



the “third half of the day.” Students work late writing reports, studying and filing paperwork. Success demands that students be very interested in what they’re doing. Student Lieutenant

Commander Michelle Guidry said, “They throw a lot at you in a very short time period; its kind of like survival swimming—they throw you in the water and you either tread or sink. You have to really like what you do, otherwise you get frustrated with it and don’t want to do it anymore.”

The typical student at TPS has a Bachelor of Science degree in engineering, mathematics or physical science, and at least 1,000 flight hours. All military aviators (in grades 02 to 05) are eligible to apply to the school. A selection board evaluates applicants based on academic background, piloting skills and the needs of the service. Qualities such as the applicant’s professionalism and motivation are also considered.

The school receives 120 to 140 applications for each class and accepts about 36 students per class for this





Training to Testing

TPS maintains and operates 40 aircraft of 12 different types. Above, an NU-1B *Otter* prepares to take flight while a T-38A *Talon* and a T-2C *Buckeye* look on. Right, the NP-3D *Orion* is used to teach general techniques for systems testing and evaluation. The Army OH-58 *Kiowa*, below, introduces fixed-wing students to vertical takeoff and landing, and teaches students in the rotary-wing curriculum to evaluate helicopter flying qualities and performance.

highly competitive program. Each class convenes every six months with a variety of students from the U.S. Navy, Marine Corps, Air Force and Army, as well as civil service engineers and students from other countries.

Becoming a TPS instructor is also a challenge. Before instructors are accepted to TPS they have to demonstrate their abilities to their test squadron and to the school. There are basically two types of instructors: junior, or pit, instructors and senior instructors. A pit instructor is typically less than two years out of TPS.

Navy Lieutenant Ronald Bishop graduated from TPS in 1997 and never thought he would be on the staff. "The longer I was away from the school the more appreciation I had for what goes on here, and the more I wanted to affect the product that goes into the testing community. Testing aircraft is becoming more technically complex.



USNTPS file photo



Randy Hepp

The school focuses a lot on how to be a tester, but there is a lot of other stuff you're responsible for as a project officer. I was hoping to incorporate some of that into the students' experience," Bishop emphasized.

Before becoming a TPS instructor, Bishop was working with developmental testing in the E-2 *Hawkeye* with the Force Aircraft Test Squadron at Patuxent River. He cut his tour short to become an instructor, in order to make what he considers a great impact on the future of developmental testing. "It all starts with the testers who are trained to test and evaluate things efficiently and safely. It's our job to train



TPS F/A-18 Hornets show their colors over NAS Patuxent River, Md.
Photo by Vernon Pugh



testers so they can get a product out to the fleet that is capable of defending the United States,” Bishop said.

As a pit instructor, Bishop said he deals with the nitty-gritty details of exercises along with the students. The students’ routine begins with being assigned a mission during the academic portion of the day. They prepare for the mission, fly the mission and then come back to write a report evaluating it. More complicated, however, is the planning involved in the whole process. It starts the moment students are assigned an exercise. They must define mission-relatable tasks and how hard it is to do those tasks in order to write a report afterwards. “If students can define exactly what they are going to do before they go up, they can come back and talk intelligently about the mission in their reports,” Bishop explained.

Reports are paramount in learning the testing process. LCdr. Guidry explained that “there’s a process behind

everything you analyze. In the report you can’t just say there’s something wrong with the system or aircraft, or that something could be better. You have to explain in great detail *how* it can be better. Now I tend to do that in everyday life, and it drives people crazy.”

Testers are trained to look at the smallest details of many different aircraft.

The testing process taught at TPS makes this possible. With all the different technologies and aircraft, testers need common testing methods. Instructor Bob Miller quoted a friend describing how the process works: “If we can teach students to properly test a toaster, for example, and how to report on it, the fact that it’s an F/A-18 instead of a toaster is incidental.” Miller said that although the analogy oversimplifies the process, the truth remains that once students understand the technology, testing is as simple as the method.

The diversity of aircraft at TPS makes a student’s

experience more difficult, but also more interesting. "You're at the forefront of any type of new systems or aircraft. Any change to an existing aircraft has to be tested, so you get to see the new stuff and get an idea of where things are going," Guidry pointed out.

The TPS process is also part of the reason testing aircraft has become less risky. Everything is so well planned that there is less chance for surprises in the air.

The use of simulators also contributes to the safety of testing aircraft. Although simulators can't always predict what will happen in the real world, they do help reduce the risk of flight testing. They work well in the middle of the envelope, but it's out at the ragged edges, where spins and catapult tests push the edge of the envelope, that simulators typically can't replicate the aircraft. Even with increased development for simulators in the future, there will still be a great need for flight testing.

As systems become more complicated and harder to test on simulation equipment, testers must ensure everything is safe for fleet use. Lt. Bishop emphasized, "Testers respect the danger in their jobs and go through the appropriate steps to ensure their safety and the safety of the aircraft. It's not like the Chuck Yeager days where you go out and kick the tires and light the fires."

According to Miller, it's not just technology that has increased testing safety. Students are much safer and more professional today. He recalls that in his student days there were fewer safety rules. Now, as an instructor he feels it's part of his job to tell the stories of how accidents happened because of the lack of rules. It's about teaching students to avoid the old mistakes, and encouraging them to follow the rules that have been developed for safety. But, he warned, "Don't think that the rules mean no challenge or danger. There are always challenges with-

in the perimeter the systems dictate, so even the most mundane test can be dangerous."

The experience of testing aircraft isn't just about responsibility and risk, it also affords the opportunity to fly and have a rewarding career. Cdr. Stoney stated, "It's a tough job, but where else can you have this kind of impact on the fleet. The tremendous responsibility I had as a young lieutenant and the opportunity to do some pretty cool things with aircraft during and after TPS was great. Now, as an instructor I get to see students doing those same things. It's great because we start with the best pilots, flight officers and flight test engineers and just polish them, and we get to see 36 new testers walk out the door every six months."

As LCdr. Guidry nears her graduation, she feels she has gained a new confidence from her experiences. "I

will soon be leaving here with my certificate saying that I am a test pilot. Those don't come easy. And then there's the flight time. I came here having only flown four aircraft, but now I've flown over 20 different types. From as slow as they go to as fast as they go, we get to do it all here and that's what being a pilot is about."

Guidry is hoping to follow other TPS graduates and become an astronaut. Upon graduation from TPS she will earn her Master's degree through the U.S. Naval Postgraduate School. "It's great to know you belong to an elite group of pilots," she said, "but what is important is the unique experience I've had at TPS."

TPS provides a one-of-a-kind opportunity for students to become masters of their profession. And by testing the limits while evaluating a wide variety of aircraft, students gain knowledge that translates to safer aircraft and systems for the fleet. ✈

