



Commander Scott Fuller

Simulators have been an integral part of naval aviation since such flight operations began and seem certain to play an important role for the foreseeable future. As you can see from Figure 1, naval

Commander Scott Fuller, a native of Lockport, New York, graduated from the University of Rochester and was commissioned an Ensign in 1991. Following Flight Training, he was designated a Naval Flight Officer in 1993. Upon completion of Fleet Replacement Training at VP 30, Commander Fuller reported for his first operational tour with the War Eagles of VP 16 at Naval Air Station Jacksonville, Florida. In 1997, Commander Fuller returned to VP-30 to serve as a Fleet Replacement Squadron Instructor. In 1999, Commander Fuller was accepted into the Training and Administration of Reserve (TAR) Program and reported to the Reserve Anti-Submarine Warfare (ASW) Training Center (RATCEN) at Naval Air Station Joint Reserve Base Willow Grove, Pennsylvania, where he served as the Training Officer and Director of Training. After a tour at RATCEN, Commander Fuller reported back to Jacksonville, Florida, where he served as the Training Officer and Maintenance Officer for the VP-62 Broadarrows. He served as the Officer-in-Charge of VP-92 in Brunswick, Maine, from 2005 to 2006. After completion of his Officer-in-Charge tour he reported to CPRW-11, where he served as the Operational Support Officer and Wing-11 Operations Officer. Screening for Commander Aviation Command in the spring of 2007, Commander Fuller reported back to the Broadarrows of VP-62 and served as their Executive Officer and Commanding Officer. Following his command tour he reported to Office of the Chief of Naval Operations Staff in Washington, D.C., where he currently serves as the Aviation Training Resources Section Head, overseeing Chief of Naval Air Training Training and Simulation Programs for Naval Aviation. Commander Fuller's decorations include the Meritorious Service Medal (three awards), the Navy Commendation Medal (three awards), and the Navy Achievement Medal (three awards), as well as other awards.

aviation's use of training simulators—or just “trainers” in the Navy vernacular—continues to evolve. Trainers were initially developed for use by aviators going through our undergraduate training programs. Because of technological limitations, those systems were used primarily to review basic aviation fundamentals and to reinforce basic procedures to maximize actual flight training events.

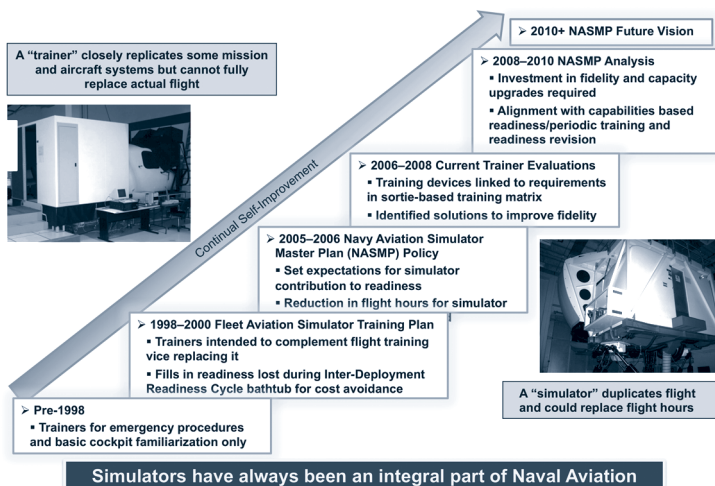


Figure 1. Evolution of Naval Aviation Simulation

As Commander Daniel Orchard-Hays indicated, the Navy has been looking into incorporating additional simulation into its overall fleet training plan to ensure that naval aviators receive the right mix of training while preserving fuel, reducing the flight hours accumulated on our aircraft, and reducing non-combat expenditures for air-delivered ordnance. We have just completed a thorough analysis of aviation simulators, which we have been briefing up the command chain within the Pentagon. The overall objective of the study was to understand the current fidelity of our simulators today and then look into the future and see what simulators we need to invest in to gain additional training benefits.

As part of that study, we reviewed the entire training system selection process that the Navy uses to analyze the skill set required by our aviators. The bottom line is that we want to make sure our simulators are developed from the basics—from when a

prospective aviator enters flight school to start his training, all the way to when he gets to his fleet aircraft. We use the phrase “street to fleet” to characterize this entire training continuum. We begin by literally taking the person off the street and, through the appropriate training regimen, get him or her into a fleet aircraft. It is a very long process that is supported by a rigorous analysis program to ensure that we are meeting training objectives.

Figure 2 depicts the flight training program for the young pilot. As you can see, it is a mix of aircraft hours and simulator hours. During the early phases of naval aviator training, you see more flight hours than you see simulator hours because the trainee has to get that basic air worthiness, that basic air sense that you just cannot fully replicate in the trainer. The right mix is something that we look at frequently. What is that right balance between aircraft, simulator, and the classroom? Of course, when I say classroom, I am talking not just stand-up lectures, but computer-based training as well.

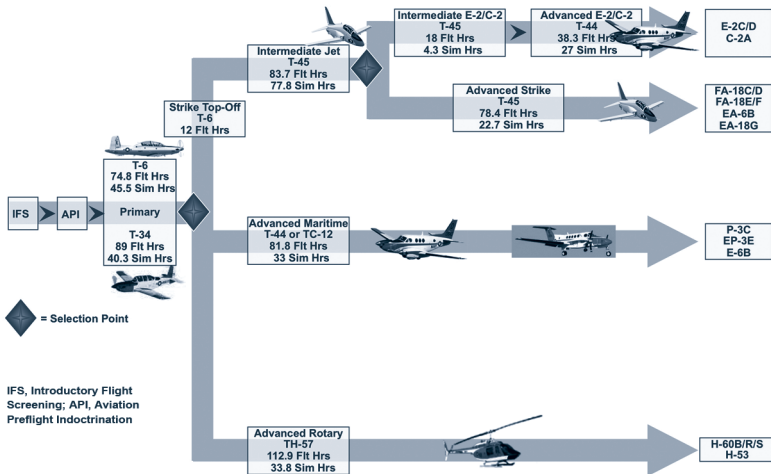


Figure 2. Undergraduate Pilot Training

In the early phase of pilot training, the curriculum focuses on air worthiness and air sense. During this phase, the prospective pilot spends more training time in the aircraft than in simulators. However, simulators are used to teach basic procedures so that

when the aviator gets into the plane for the first time, they know where the buttons are, which allows them to focus on flying the plane.

Because the undergraduate military flight officer, i.e., the back-seat guy, or officially, the radar intercept officer (RIO), is far more concerned with learning how to employ the various electronic systems that he will be using, his training can include more simulation (Figure 3). So you will see we have more simulation in the pipeline for these aviators, but again, balanced with classroom training and flying the actual aircraft to produce the overall aviator.

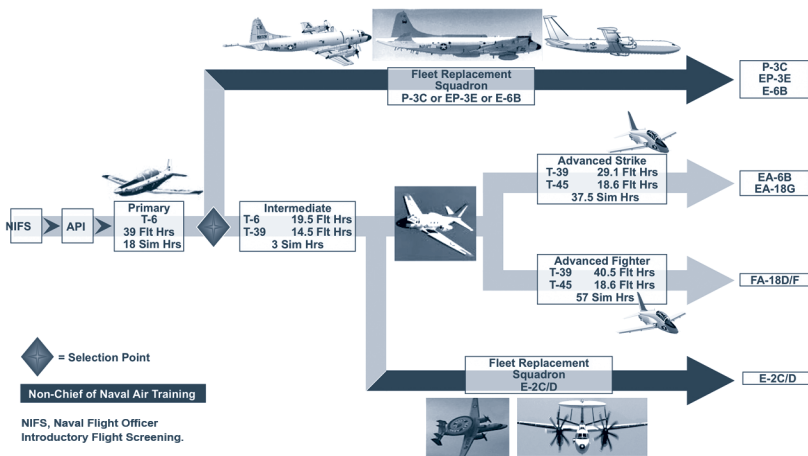


Figure 3. Undergraduate Military Flight Officer Training

Once the aviator gets his wings, we take him to the fleet replacement squadron, where, for the first time, the prospective aviator gets to fly the type/model/series aircraft that he or she is going to be operating in the fleet, whether it is the F/A-18, the H-60R or H-60S helicopters, or the P-3, which we are changing to the P-8. While in the fleet replacement squadron (Figure 4), future pilots get substantial platform-specific training. And, because they already have the basic flight skills, more of that training can be conducted using simulators.

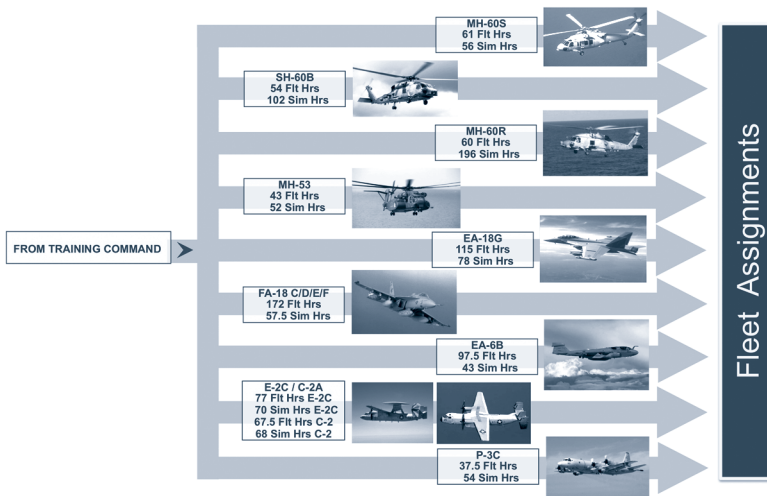


Figure 4. Fleet Replacement Squadron Training

Now we are trying to perfect the aviator’s ability to employ the aircraft tactically. As a result, you see more weapon system trainers and more crew coordination elements because you are not just focusing on flying the plane, but you want to employ it as a weapon system and take all the people that are on that platform with you and combine them into a total crew. Thus, we see more simulators as we move through our pipeline.

Once an aviator graduates and gets through the fleet replacement squadron, he or she goes to the fleet. The fleet uses simulation as part of what is called the training and readiness (T&R) matrix. The T&R matrix is the set of tasks that an aircrew must learn in order to be combat ready for deployment anywhere in the world. On the left-hand side of Figure 5, I have identified the current percentages of training time that must be done in the aircraft compared to what we can do with simulators. In looking at these numbers, it is helpful to remember that most of our existing simulators were built as procedural trainers to train undergraduate aviators going through the basic pipeline. Since the focus was procedures, really high fidelity was not needed. Moreover, the underlying technology was not nearly as sophisticated as it is now. As a result, only a relatively small fraction of training is accomplished

using simulators. As you can see from the data on the right-hand side of Figure 5, we hope to increase the simulation percentages substantially in the future.

	Current Ratio (FY2010)			Trainer Limitations	Future Ratio per POR (FY2015)		
	Must do Live	Live + Simulator	Must do with Simulator		Must do Live	Live + Simulator	Must do with Simulator
F/A-18A-F	81.9%	12.5%	5.6%	<ul style="list-style-type: none"> • Visual and motion fidelity • Aero model • Mission concurrency 	68.1%	23.6%	8.3%
EA-18G	73.5%	23.5%	2.9%	<ul style="list-style-type: none"> • Visual and motion fidelity • Inadequate sensors • CVN Model 	55.9%	38.2%	5.9%
E-2C	4.2%	87.5%	8.3%	<ul style="list-style-type: none"> • Visual fidelity • External links (A/C to control) inadequate 	4.2%	87.5%	8.3%
P-3C	50.0%	33.3%	16.7%	<ul style="list-style-type: none"> • Visual fidelity • External links (other A/C) inadequate 	33.3%	50.0%	16.7%
MH-60S	81.8%	6.4%	11.8%	<ul style="list-style-type: none"> • Visual fidelity • CSAR model issues • VERTREP environment 	57.6%	30.6%	11.8%
MH-60R	73.3%	23.4%	3.3%	<ul style="list-style-type: none"> • Visual fidelity • External Links (CIC) inadequate 	56.7%	40.0%	3.3%
Chief of Naval Air Forces Average	60.8%	31.1%	8.1%		43.9%	45.0%	11.1%

POR, program of record; CVN, aircraft carrier; A/C, aircraft; CSAR, combat search and rescue; VERTREP, vertical replenishment; CIC, combat information center.

Addressing challenges to translate skills to flight hours

Figure 5. Fleet Training Accomplished in Simulators

But what we are doing now is we have completed a thorough analysis and have challenged ourselves to do more simulation and enhance the simulation experience with upgraded visual displays and communications capabilities. Now we can ask questions such as: What is an improved simulation capability going to do for us? Is it going to save fuel? Is it going to save wear and tear on the aircraft and help us become more efficient overall?

As the Navy’s Air Boss—the commander of Naval Air Forces—has pointed out, the skills required of naval aviators differ markedly from those needed by commercial airline pilots. The fact that airline pilots spend a lot of time flying simulators to maintain their skills does not mean that naval aviators should be trained in the same way. The skill set required to fly a modern, high-speed fighter aircraft is quite complex. Landing on a pitching and rolling aircraft carrier deck at night is a lot more difficult than landing on

10,000 feet of hard runway at Dulles International Airport. Naval aviators require substantial flight time to become proficient. It is important to remember, too, that the pilot flying for United or American Airlines probably received his basic aviation training in the military and thus can now concentrate on becoming proficient with the systems he will use when airborne.

So we have a different mix there that we are constantly evaluating to ensure that we have the right balance. A naval aviator must be proficient at flying his or her aircraft and getting it back on the ship even in the most austere conditions. At the same time, an aircrew can use a simulator to improve their ability to conduct mission planning, so that when they go and fly, the crew only has to practice the mission once in the air because they rehearsed it 10 times in the simulator. Thus, they are much more efficient. So that is what we are trying to do. We are trying to see what we can do with our trainers to get more bang for the buck.

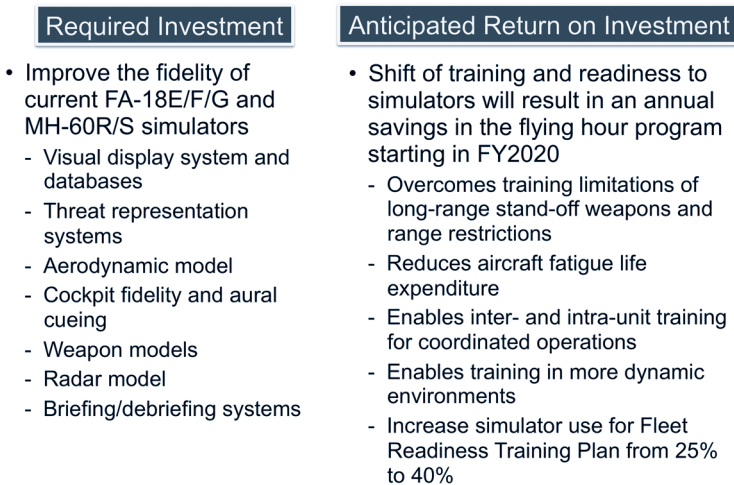


Figure 6. Anticipated Return on Investment by Investing in Simulation

So far, we have focused on the F/A-18E, F, and G models and the MH-60 R and S model helicopters. For the near future, these platforms are going to take up about 78% of our flight hours. And, because they are going to be around for a considerable amount of

time, we have taken a look at the trainers—the procedural trainers—that we use for these aircraft. We have asked the fleet—the people who use them daily—what they wanted us to invest in so that we can accomplish additional training in our simulators. Some of the things that they came up with are listed on the right-hand side of Figure 6.

In summary, the Director of Air Warfare is working with Task Force Energy to see whether additional investments in simulators can enhance aircrew training while reducing flight hours and wear and tear on our aircraft. That is pretty much the bottom line of what we are trying to do with simulation. We want to be more efficient; at the same time, we recognize that doing so will involve some cultural changes. So, we are working on that as well.