F-35B OPENS DOOR TO TRUE COOPERATION OF FORCES

EGLIN AIR FORCE BASE, Fla. - Since the 1950s, engineers worldwide have been trying to create the ideal airplane that possesses the ability to perform short takeoffs and vertical landings while maintain speed and missile capabilities.

The first generation of these aircraft only achieved advanced speed over previous airplanes, while the second reached supersonic speed and the ability to carry missiles.

The third generation, to include the BAE Harrier, was the first successful attempt at creating an airplane capable of short take offs and vertical landings, but such capabilities came with a cost. The airplane was unable to carry as many weapons or as much fuel as other aircraft and certainly couldn't travel as fast. Fourth generation aircraft brought significant improvements to range, sensors, accuracy and stealth, among other things. Even with these advancements in the world of STOVL aircraft and stealth, there was more that could be accomplished.

For more than a decade, engineers with Lockheed Martin have drawn upon the lessons learned over these five generations of technology to create the F-35B Lightning II, a single-seat aircraft with stealth capability, equipped with an enhanced computer technology system and capable of performing STOVL functions while maintaining the conventional operations of other airplanes. The F-35B is slated to replace the AV-8B Harrier, F/A 18A Hornet and the EA-6B Prowler for the Marine Corps.

The F-35B, a single-seat aircraft capable of stealthy operations, equipped with an enhanced computer technology system, and capable of performing short takeoff and vertical-landing capabilities while maintaining the conventional operations of other airplanes, awaits a flight at Eglin Air Force Base, Fla., June 27. (Photo by Cpl. Chelsea Anderson)

An Airman gives the go-ahead for take-off to the pilot of an F-35B at Eglin Air Force Base, Fla., June 27. (Photo by Cpl. Chelsea Anderson)

Col. Arthur Tomassetti, vice commander of the 33rd Fighter Wing, Air Education and Training Command at Eglin Air Force Base, Fla., and a seasoned pilot with more than 3,200 flight hours in 35 different aircraft, has been with the Joint Strike Fighter program since its inception. His knowledge and experience have helped shape the F-35B into the ideal STOVL aircraft for the Marine Corps.

"Whatever you want to believe about the F-35 today, we finally built the STOVL airplane we've been trying to build for 60 years," Tomassetti said.

Since he was a young boy, Tomassetti had dreams of becoming an astronaut. By high school, he learned that to achieve this goal he needed to become a military test pilot. After accepting a commission in the Marine Corps in 1986, Tomassetti applied to test pilot school seven times before finally getting accepted in 1997.

Tomassetti's acceptance to test pilot school came at just the right time because he was offered the position of working with Boeing and Lockheed Martin in the JSF program. Tomassetti jumped at the opportunity to develop something brand new for the Corps.

"When somebody becomes a test pilot, I would think in the back of their mind they're thinking, 'I want to be the first to do something; I want to fly something new and do something new,'" Tomassetti said. "New things don't happen as often today as they did in the 1950s and 1960s. They're very few and far between. But there I was at the threshold of something called the X-32 and this thing called the X-35. It was a very

neat place to be."

Boeing and Lockheed Martin were both commissioned to develop a STOVL aircraft, with the top prototype winning a contract with the U.S. Marine Corps, Air Force and Navy. Boeing's prototype aircraft was called the X-32 and Lockheed's was named the X-35.

Tomassetti's experience as a Harrier pilot and a combat veteran gave him insight into just what needed to be changed to make the new prototypes better. The engineers took the knowledge of Tomassetti and the other pilots and created their end-product aircraft.

For months, the pilots watched as the aircraft came alive on the factory floor below them. On July 20, 2001, Tomassetti was chosen to fly the Lockheed Martin X-35 for Mission X. The mission consisted of a never-been-done-before routine consisting of a short takeoff of a couple hundred feet, a supersonic dash at that altitude, a turn and finishing with a vertical landing.

"It was only a 50-minute flight," Tomassetti said. "But there was almost a lifetime of experience in those 50 minutes."

Tomassetti successfully completed the mission and a few months later, Lockheed Martin was awarded the contract.

The following year, Tomassetti began working at the Lockheed Martin factory at Fort Worth, Texas, for the creation of the F-35 for the Marine Corps.

"It was sort of right back to where I was four years before," Tomassetti said. "But now, it was real. It wasn't just for an airplane that would fly for a couple months to prove a concept. Now we had to build it right from the get-go. This would be the airplane people would take into combat. This was the flight manual they were going to use to learn to fly the airplane. This would be the simulator they would use to train in. All that stuff started to take on a whole new meaning because this was the way it was going to be forever."

Luckily, Tomassetti had become an expert in the last several years through his work with the X-35 program.

"Being on the ground floor of the X-35 and having all I learned from the X-35 to pull on as a resource of knowledge was a great thing for me personally and for the program overall," Tomassetti said. "We got to carry all those lessons we learned forward. The things that worked really well, we kept them. The things that we needed to improve, we now had time to get them fixed."

Over the next two years, Tomassetti worked with the engineers to create the ideal STOVL aircraft, equipped with cutting-edge technology.

The growth of computer technology became an integral part of the F-35. It features helmet-mounted and dash displays with centralized vehicle monitoring and multispectral sensors. Target locations are shown on the screens, as are the locations of other supporting aircraft. The computer generates exact coordinates of targets so the pilot can choose the proper weapon to engage.

"All of that is there in front of you on the screen," Tomassetti said. "You don't have to do any math or any calculations. It's all there for you."

The information isn't just for the pilot's use; it can be transferred to supporting aircraft as well.

"The strength of the F-35 isn't the one airplane and what it can do," Tomassetti said. "The strength of the F-35 is the group of airplanes and what they can do together."

The potential for cooperation among U.S. armed forces as well as coalition forces all using the F-35 variants is significant. In fact, the U.S. Navy and the U.S. Air Force are working on their own F-35 variants and eight other countries have agreed to join the program.

“In today’s environment, it’s usually not just the Marine Corps by itself,” Tomassetti said. “We’re operating with the Navy, Air Force and coalition partners. What happens when we’re all in F-35s? Now we can all share that information. In terms of coalition warfare, this airplane further increases everyone’s situational awareness to a greater extent than anything we have out there today.”

The F-35’s value is not only in the flying network it creates in the battle space. The F-35 is able to perform the missions of multiple current Marine Corps aircraft, all in one aircraft.

“This is where we talk about a fifth generation airplane versus a fourth generation airplane,” Tomassetti said. “Most of what people want to lock into with fifth generation is stealth, low observable, and the cool pieces of it. That’s great and you want as much of that as you can get. But the other piece of fifth generation is that data link and that networking capability. We used to have F/A 18s go in as the fighter cover and F/A 18s and Harriers go in as the ones that were dropping the bombs and EA-6Bs as support from an electronic attack. All those airplanes were needed to go after one target that was heavily defended. Now, we have four F-35s. They can do the fighter mission; they can do the bombing mission; they can do the electronic attack mission. They can go after that same target with a lot less airplanes.”

From his earliest days working with the X-35, Tomassetti was committed to making the new aircraft easier to handle.

“Anytime you have to spend a lot of time practicing for something, that means it’s hard,” Tomassetti said. “And things shouldn’t be hard. We should always be striving to make things easy. When you’re flying airplanes in combat, there’s enough hard things going on that you don’t want simple things like navigating from point A to point B, and your take off and landing to be the hardest things you do all day. You’ve got other stuff when you’re in the battle space that should be the hardest things you do each day.”

In keeping with this desire, the F-35B is equipped with only two joystick controls, instead of the three that the Harrier has. Also, the simulator designed to teach the pilot to fly is so similar to the airplane that the pilot can fly with confidence after mastering the simulator.

“If you ask anybody who has flown the airplane or anyone who’s flown the simulator – regardless of their aviation background – they all say, wow that’s easy; I thought it would be harder,” Tomassetti said.

The features of the F-35B aren’t just for today’s battle space. Unlike the legacy aircraft of the past, these aircraft are built to adapt to the ever-changing combat environments of future generations.

“The F-35 was built with the idea in mind that it would last 40-50 years,” Tomassetti said. “Great thought was put into how the world and technology would change. We built the airplane so it could incorporate some of those changes. It’s a software intensive airplane and software is easy to upgrade, as opposed to hardware. Also, things were built in modular format in the aircraft. If something doesn’t work, you take out the module, send it back to the factory, and put a new module in.”

In a world where technology is changing at a rapid rate, the F-35B will be able to adapt to support Marines, sailors, airmen and our international partners wherever and whenever they are needed.

Currently, the F-35B is undergoing constant testing of its competencies as well as testing of its operational capabilities by Marines. In the future, the Marine Corps plans to move F-35Bs to Marine Corps Air Station Yuma, Ariz., and begin transitioning squadrons Corps-wide.

“We’ve done this before,” Tomassetti said. “We’ve transitioned from an airplane to a newer airplane in the past. This time, though, we’re transitioning a lot of our legacy aircraft at the same time. We don’t normally do that. But it’s doable.”

As more U.S. and international partner pilots and maintainers become acquainted with the F-35 variants and its capabilities, a world of possibilities for future engagements opens up. The F-35 may be the key to unlocking true cooperation of forces between U.S. coalition forces, creating a united front against any world threat.