BREAKING DEFENSE | PROGRAM REPORT

AHTS and TH-73: A New Era for Navy Helicopter Training

An editorial brief sponsored by Leonardo Helicopters

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SITREP:

AHTS AND TH-73: A NEW ERA FOR NAVY HELICOPTER TRAINING

The Navy's venerable TH-57B/C Sea Ranger helicopters have served for decades as the undergraduate trainer for student helicopter and tiltrotor pilots. But the platform's first flight dates all the way back to the 1960s. The design has been showing its age for some time now.

The Sea Rangers are increasingly difficult to maintain due to obsolescence and material failure. They lack advanced cockpit avionics and aircraft performance capabilities needed to develop transferable skills for today's Navy, Marine Corps, and Coast Guard helicopter and tiltrotor pilots. The Sea Ranger's older engines are underpowered, leading to over-torquing on some maneuvers. That, in turn, leads to increased maintenance costs and down time. Heavy depot maintenance that once cost the Navy several hundred thousand dollars for each helicopter in five-year intervals now costs upwards of $1 million per helicopter in that same time frame.

Those realities make it difficult for the 115 TH-57's in the trainer fleet to meet expected pilot training needs going forward as they have no room to grow. The Navy forecasts an annual requirement for more than 600 rotary wing and tiltrotor pilots—a quantity expected to increase through at least 2040. Helicopter and tiltrotor pilots already make up more than 50 percent of all naval aviators.

For these reasons, the Navy launched the Advanced Helicopter Training System (AHTS) program earlier this year, which includes replacing the legacy TH-57 fleet. The new undergraduate training helicopter, designated the TH-73A, will serve as the platform for training pilots in the maritime services.

"AHTS will improve pilot training and skills by using current cockpit technologies and modernized training curriculum that reflect the capabilities in the current Navy, Marine Corps, and Coast Guard inventory," said Captain Todd St. Laurent, program manager for the Naval Undergraduate Flight Training Systems Program Office (PMA-273), Patuxent River, MD, with responsibility for the AHTS program. "Using a skills-based approach to training, with just-in-time methodology, (and) incorporating modern technology, AHTS will ensure rotary wing aviators are produced at a higher quality, more efficiently, (and are) ready to meet the challenges faced in the fleet."

- Barry Rosenberg
  Contributing Editor, Breaking Defense

AHTS AND TH-73

In addition to specific combat roles, helicopters are the work horses of the fleet. Here, sailors direct an MH-60S Sea Hawk as it transfers ammunition between aircraft carriers. Earlier in the year, the Navy's Deputy Director of Air Warfare Angie Knappenberger said that as it moves toward its goal of 355 ships, the Navy will be "going towards a more distributed force" that will "put more emphasis on our helicopter fleet." However, like all the military services, the Navy is experiencing a shortage of pilots. Modernized helicopter training as provided by AHTS and the TH-73 will be essential.

PMA-273: THE SOURCE FOR MARITIME AVIATION TRAINING

PMA-273 is responsible for acquiring, developing, and maintaining all undergraduate Navy training aircraft for its customer, the Chief of Naval Aviation Training (CNATRA) at Naval Air Station Corpus Christi, TX. The trainers now in its portfolio include the TH-57 Sea Ranger and several fixed-wing aircraft:

TH-57 Sea Ranger: B and C models of the Sea Ranger are used for rotary and intermediate tiltrotor training. PMA-273's rotary aircraft fleet provides fundamental and advanced rotary skills for student naval aviators selected for fleet service in the AH-1 Cobra, UH-1 Huey, H-53 Sea Stallion, H-60 Seahawk series, HH-65 Dolphin, and MH-68 Stingray, as well as Marine Corps students designated for the MV-22 Osprey tiltrotor.

The fixed wing aircraft include both single- and twin-engine platforms, including:

- T-45 Goshawk [strike training for the F/A-18C/D Hornet and E/F Super Hornet, EA-18G Growler, AV-8B Harrier, EA-6B Prowler, and F-35B/C Lightning II];
- T-6/JPATS Texan II [for basic skills that lead to more sophisticated follow-on training];
- T-44 Pegasus [multi-engine and digital/glass cockpit training for P-8 Poseidon, MV-22 Osprey, E6-B Mercury, and C-130aJ Hercules].
- The near-retired T-39 Sabreliner are also part of PMA-273's portfolio.

The aircraft training programs of PMA-273 (with the TH-73 to come) include related simulators, academic materials, computer-based training integration systems, and contractor logistics support.

Serving since the 1980s as the Navy's undergraduate vertical flight trainer, the TH-57B/C Sea Ranger has over time become inadequate and inefficient for training today's pilots.

TRANSITIONING FROM THE TH-57 TO THE TH-73

The TH-57 Sea Ranger is a derivative of the commercial Bell 206 Jet Ranger. The Bell 206 platform was initially designed to compete in an Army light observation helicopter competition, and its first flight was in 1961. Bell lost that competition, but the 206 went on to find long-term commercial success. The platform ultimately became the Navy's TH-57 trainer in the 1980s.

The TH-57 is powered by a single Allison 250-C20BJ turbofan engine, has a range of 368 nautical miles, a ceiling of 18,900 feet, and a maximum speed of 138 miles per hour. Designed for a crew of one pilot and four students, the Sea Ranger provides advanced IFR (instrument flight rules) training to several hundred aviation students a year at Naval Air Station Whiting Field in Milton, FL. Although primarily used for training, these aircraft are also used for photo, chase, and utility missions.

"Since 1981, CNATRA has utilized a fleet of more than 100 TH-57B and TH-57C aircraft, corresponding ground based training system, and classroom and computer-assisted instruction and interactive courseware to conduct undergraduate advanced helicopter training," states the AHTS request for proposal released in early 2019. "Military instructors utilize the aircraft, and civilian instructors utilize the fleet introduction teams and academic testing, to evaluate student naval aviators in the skills required to qualify for designation as helicopter pilots and assignment to fleet replacement squadrons with a standard instrument rating."

As the replacement for the TH-57 SeaRanger in a basic training role, the TH-73 of the AHTS program won't need or employ cutting edge technologies like some other new helicopter competitions (such as the use of dual-coaxial rotors for speed and maneuverability in some of the candidates vying to produce the Army's Future Attack Reconnaissance Aircraft). It is basically a production, non-developmental acquisition with a requirement to use existing commercial aircraft with current FAA Airworthiness Type Certificates and applicable Supplemental Type Certificates.

PREPARING THE NEXT GENERATION OF PILOTS: THE TH-73

The Navy's RFP was "engine agnostic" without specification as to powerplant or whether the TH-73 should be single or twin engined. But it required a full FAA IFR certification that enables the aircraft to fly in poor weather or at night by instrumentation alone.

The TH-73 RFP requirement is for two pilots in side-by-side seating with interconnected, hydro-mechanical flight controls (so the instructor pilot can take over command from the student pilot). The TH-73 will also include a glass (digital) cockpit with the latest in avionics technology. It calls for the newest safety equipment such as a mid-air collision avoidance capability, terrain avoidance warning system, and crash data recorder, in addition to meeting the latest airframe safety standards.

Captain Todd St. Laurent, program manager for the Naval Undergraduate Flight Training Systems Program Office (PMA-273)

To improve maintenance and supply chain operations, the TH-73 will also feature a health and usage monitoring system, commonly known by its acronym HUMS. This provides real-time data on component status that can be analyzed on the ground. HUMS is already a common feature on all newer military and commercial helicopters, facilitating what is known as condition-based maintenance—where parts are fixed or replaced only when performance degrades rather than on a fixed schedule. This wrings the most value out of every component on the platform while enhancing the level of operational safety.

"The new helicopter will bring: modern avionics with integrated flight management systems; enhanced night vision training capability including an IR searchlight, IR position lights and formation lighting; and greater performance in both speed and power margins that are more comparable to fleet aircraft," said St. Laurent. "The combination of these capabilities open a door for enhanced training opportunities that will ensure

Leonardo's bid for the TH-73 program is its TH-119, powered by a 1,000 shp Pratt & Whitney Canada PT6-B engine. This is the same engine that powers the Navy T-6B primary trainer, providing some commonality and maintenance efficiency for the training fleet.

the fleet replacement squadrons can spend less time on foundational skills and focus on the mission requirements for today's Navy, Marine Corps, and Coast Guard pilots."

The Navy is looking to leverage established commercial sector scale with the TH-73 program by making it a non-development acquisition, meaning it will pick an existing commercial helicopter as the base platform for the TH-73. A key benefit and cost savings from this is aircraft maintenance, which will follow existing FAA original equipment manufacturer maintenance instructions, supplemented as needed by government procedures. The Navy will also utilize the existing commercial supply chain to maintain the helicopter, and benefit by procuring a single type/model/series, said St. Laurent.

He added that upgrading/retrofitting the aged TH-57 with new avionics and other systems, rather than buying new rotorcraft, is simply not an option. "The cost and time to upgrade/retrofit is cost prohibitive, and the TH-57 airframe cannot accommodate the required systems.

The time to develop and test the new system would not meet current training requirements and would place a strain on the already challenged aircraft availability."

The AHTS program will include a Ground Based Training System (GBTS) that will consist of a modernized curriculum, contract instructor services, flight training device availability, academic instruction using electronic classrooms, and improved training tools including part-task training devices.

Under AHTS, it is both the new TH-73 trainer and the GBTS that will prepare pilots for different flight scenarios they'll face, such as brownouts in the Middle East and region-specific challenges in Europe and Asia.

"Energy management, flight planning, navigation, night-vision device training, critical thinking, crew resource management, and aerodynamic principle application will be focused to ensure that rotary wing aviators can perform successfully in any future environment," said St. Laurent. St. Laurent added "issues such as brownout, high-altitude performance, spatial disorientation, and flight planning in an unfamiliar environment, among others, will be introduced and trained sooner and will lead to a higher level of performance in the fleet no matter the area of operation."

The TH-73 platform will serve as the basic platform to train all Navy, Marine Corps, and Coast Guard rotary wing aircraft, including the MH-60R/S Seahawk/Knighthawk, UH-1/AH-1 Iroquois/Super Cobra, and CH-53E/K Super Stallion/King

Power for the Bell's 407GXi entry in the TH-73 competition comes from a single Rolls-Royce M250-C47E/4 turbine engine. It is based on one of the most successful commercial rotorcraft engines, with more than 250 million hours of operation. The original M250-C47E model powers the US Navy's Fire Scout MQ-8C rotorcraft, an unmanned variant of the Bell 407.

Stallion. It will also provide the rotary wing portion of training for all Navy and Marine Corps tiltrotor aviators transitioning to the MV-22 Osprey.

COMPETING FOR THE TH-73 PROGRAM

Leonardo, Bell Textron, and Airbus each responded to the Navy's RFP with commercially available helicopters.

LEONARDO HELICOPTERS: The company is offering the Navy the TH-119 single-engine IFR helicopter, based on the Leonardo AW119 in proven service around the world in 40 countries. A wide variety of AW119 customers include the Portuguese Air Force, the South Korean National Police, and the New York City Department of Environmental Protection Police. In February 2019, Israel's Air Force announced the selection of the AW119 as its trainer helicopter.

The Leonardo helicopter is powered by a 1,000 shp Pratt & Whitney Canada PT6-B engine, the same one that powers the Navy T-6B primary trainer. It is built with a metal airframe and reinforced shock-stabilized skids for fundamental touchdown maneuver training. Leonardo calls their TH-119 offering a full-spectrum training helicopter, meaning that this single variant configuration can accomplish all fundamental training scenarios like sliding landings, hovering, and full autorotations (a flying/gliding technique that keeps the rotor turning during an engine failure so some control is possible for emergency landing)—without having to offload any of these baseline skills to ground simulation. To minimize time on the ground and maximize operational flexibility the TH-119 can hot pressure refuel, meaning it can be refueled while the engine is running.

The TH-119's quad-display Genesys Aerosystems glass cockpit allows instruction from either pilot seat with full IFR capabilities, a flight director, three-axis full autopilot, and essential redundant flight systems like hydraulics and a second generator that can handle the full electrical load. The aircraft's training configuration includes a 180-degree adjustable observer seat that offers student pilots full view of the cockpit so they can learn while riding as a passenger.

If selected by the Navy, Leonardo will construct an approximately 100,000-square-foot facility in Whiting Aviation Park, a 269-acre planned development adjacent to Naval Air Station Whiting Field where all helicopter pilots for the Navy, Marine Corps, and Coast Guard are trained. Developed in partnership with the Santa Rosa County Economic Development Office and Space Florida, the facility will be a Part 145 Repair Station providing 24/7 service including spare parts, warranty processing and renewal, technical and product engineering, and component and airframe repair. Through a limited-access use agreement between Santa Rosa County and the Navy, tenants of Whiting Aviation Park will be able to use the Navy's airfield facilities for efficient aircraft transfers that will reduce service time.

Leonardo's TH-119 will be manufactured and supported at its existing FAA Part 21 production facility in Philadelphia.

Airbus will power its TH-73 twin engine offering with a pair of Pratt & Whitney PW206B3 engines, which are utilized on a large portion of the commercial H135 fleet flying in North America.

The trainer helicopter will be manufactured and supported at Leonardo's existing FAA Part 21 production facility in Philadelphia that produces all AW119 variants worldwide. Of the three entrants in the AHTS/TH-73 program, all based on an existing civil helicopter platforms, Leonardo's is the only one currently manufactured in the U.S.

BELL: The 407GXi shares its lineage with the current TH-57 Sea Ranger, which was based on the Bell Jet Ranger 206. The 407GXi bid is based on the Bell 407 platform, a four-blade, single-engine civil helicopter that is derivative of the commercial Bell 206L-4 Long Ranger. The Bell 407 utilizes a soft-in-plane design rotor with composite hub first developed for the Army's OH-58D Kiowa Warrior, which was retired from service in 2017. The Bell 407GXi entry has normal and emergency procedures similar to that of the TH-57 and a comparable powertrain, airframe, and support equipment. In training for emergency landings, the aircraft can perform practice autorotations to the deck.

Power is provided by a single Rolls-Royce M250-C47E/4 dual channel Full Authority Digital Engine Control (FAdEC) turbine engine. The 407GXi's rotor system allows tactical maneuvering and slope takeoffs without exceeding rotor system limits. Bell says that the rotor system is simpler and requires less maintenance than fully-articulated designs.

A Garmin G1000H NXi Integrated Flight deck features a moving map, synthetic vision for situational awareness, and traffic advisory system, as well as pre-programmed pilot-configurable search and rescue patterns. For safety, it includes a helicopter terrain avoidance warning system.

The current commercial Bell 407 helicopter is manufactured in Quebec, Canada. If awarded, Bell indicates that final assembly for the 407GXi would take place at Bell's Ozark, AL facility.

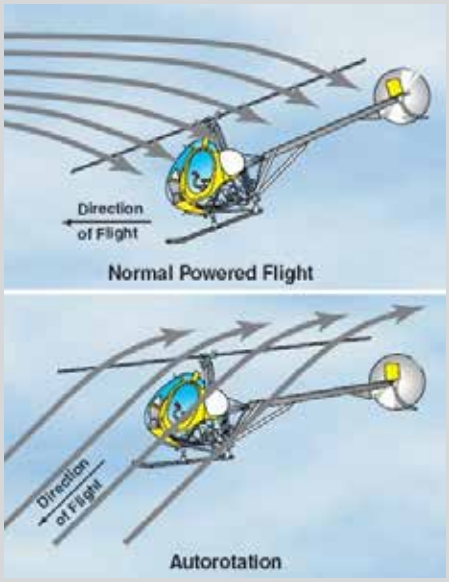
AIRBUS HELICOPTERS: The Airbus bid is based on its twin-engine H135 helicopter, a light utility civil platform in use throughout the world. In addition to core use in transport, law enforcement and medical evacuation, the basic H135 platform provides training for military pilots in 12 countries, including Germany, Switzerland, the UK, Australia, and Japan. A H135M variant is the current military version of the H135, in roles of troop and cargo transport, surveillance and reconnaissance, medical evacuation, and light combat support. Iraq, Switzerland and Jordan have operated the H135M.

As a twin-engine helicopter, the Airbus H135 is heavier and would require more complex and costly maintenance. Airbus counters, though, by saying the airframe wouldn't be stressed as much because autorotations to the deck would be unnecessary given the second engine. Airbus contends that a twin-engine helicopter eliminates the need for autorotational training outside of a simulator, and that Navy curriculum should change based on the H135's dual-engine capacity.

For the AHTS competition, Airbus will power the H135 with a pair of Pratt & Whitney PW206B3 FAdEC engines. The Airbus design is recognizable by its Fenestron tail rotor system, which seats the tail rotor in a shroud for protection and sound dampening.

The Airbus helicopter is fitted with a crash-resistant fuel system, energy absorbing seats, fuselage, and landing gear. The glass cockpit is an Airbus-developed Helionix avionics system with color digital multi-function displays, a four-axis autopilot, and integrated flight management system.

The Airbus H135 is manufactured in Europe, but should Airbus win the TH-73 competition they indicate they'll set up a line at their Columbus, MO, plant, where Airbus produces both the UH-72A Lakota, the Army's light utility helicopter, and the H125 civil helicopter for the North American market.



Training to Fly Autorotations for Emergency Landings

Autorotation is a fundamental pilot skill taught to control, descend, and land a helicopter when the aircraft has an emergency with power loss, tail rotor control or fuel, regardless of numbers of engines a helicopter may have.

As in an airplane with a power loss, a helicopter can't keep flying at the same airspeed or altitude; it must start a descent, which is what keeps the rotors turning.

Upon losing power, a pilot must immediately take all the pitch (angle) off the rotor blades by lowering the thrust lever, known as the collective. As long as the helicopter is descending, the up flow of air although the rotor blades keep it turning. The rotor speed (Nr) can even grow above 100 percent and actually overspeed (+100% RPM) during autorotation, but the helicopter is still maneuverable and controllable even if in rapid descent.

At the bottom of the descent, a helicopter pilot must execute the same maneuver an airplane does when landing — nose up and flare to decelerate. A pilot levels off in the flare, arresting the rate of descent while decelerating and maintaining zero pitch on the rotor blades. The flare also accelerates the rotor head, which must be controlled, too. The flare is the transition to the landing maneuver. The pilot must execute all three elements simultaneously: arrest descent, deceleration, and maintaining proper rotor speed.

Once the helicopter decelerates to 20 knots or less, a pilot levels the nose of the aircraft and lets it descend towards the ground. At five-to-eight feet above the ground, the pilot has one attempt to cushion the landing by pulling the collective and trading rotor speed (Nr) for collective pitch at touchdown. A good full autorotation will range from 0 knots to 10-15 knots.

The autorotation maneuver is essential to learn how to execute a power loss landing in helicopters. Undergraduate helicopter training is the only place in a pilot's career that teaches this maneuver to touchdown.

THE VIEW FORWARD

In the summer of 2019, both the Leonardo TH-119 and Bell 407GXi achieved FAA IFR certification. This is remarkable because a 1999 FAA policy shift to stricter regulation made meeting IFR requirements cost prohibitive for civil single-engine helicopters; no single engine helicopter had been certified since. Twin-engine aircraft typically have inherent redundant systems enabling IFR operations but command a higher price and have different roles in commercial markets. The twin-engine Airbus H135 achieved IFR status almost a decade ago.

IFR certification allows the pilot to fly through adverse weather and in low visibility, using only avionics and navigational instrumentation. This is obviously a key criteria for the Navy pilot training mission. But regardless of which company finally wins the TH-73 competition, the program has spurred milestones in single-engine helicopter IFR certification that open the commercial helicopter market to a new entry point for IFR operations.

The Navy plans to buy up to 130 TH-73's under a single firm-fixed-price contract that will include a base year plus three options (FY-20-23). It's the Navy's intention to procure 32 aircraft in 2020, 31 in 2021, 31 in 2022, and 15 in 2023.

However, the AHTS program is a temporary victim of the FY20 budget bill as the DoD (and the entire U.S. government) is presently funded under a stopgap funding bill known as a Continuing Resolution (CR), rather than a regular annual defense authorization spending bill. New start programs such as AHTS are curtailed or delayed when the DoD is operating under a CR.

Used as a political device to maneuver around partisan divide in Congress while funding basic operations, CR's are indicative of the short-term approach that hampers critical defense modernization and readiness, such as the Navy's AHTS program. The Navy needs to train its pilots in contemporary technology and under conditions they will face in their vertical flight mission and cannot be expected to do so with aging platforms that originated over 40 years ago.

Whatever the outcome of an ongoing reliance by Congress on CRs, the Navy's requirement and urgent need to train new pilots remains, as does its requirement for a modern, rotary wing aviation training platform.

VIEWPOINT FROM LEONARDO HELICOPTERS

THE NAVY NEEDS A FULL-SPECTRUM TRAINER THAT OFFERS SAFETY, POWER, INSTRUMENTATION, AND SUPPORTABILITY

Andrew Gappy is the director of Navy, Marine Corps, and Federal Programs for Leonardo Helicopters.

His 27-year career in aviation included assignment to Marine Helicopter Squadron One (HMX-1), the Presidential Helicopter Squadron in Quantico, VA, where he was an aircraft commander in CH-53E, VH-3D, and VH-60N helicopters. He also earned designation as a presidential command pilot with the responsibility of flying foreign heads of state, as well as presidential and vice-presidential support missions worldwide. Following his tour at HMX-1, he was a program manager at the White House Military Office–Office of Plans, Programs and Requirements, where he planned and coordinated aviation assets in support of White House operations.

1 You've been an undergraduate student in the Navy's pilot training program. What's the philosophy behind it?

Undergraduate pilot training, especially for naval aviation, is viewed as the foundation for your entire career as an aviator. What you learn at undergraduate-level training is the basic skill set that makes you a good pilot. I give the Navy all the credit in the world for doing an excellent job at that. They turn out some of the best pilots in the world, in the shortest period of time possible.

And they do it by teaching you to be a fundamentally good all-around pilot first. Not just a systems manager and not just teach individual skill sets but a holistic approach to making a fundamentally good all-around pilot. This means that you've got to learn a broad range of pilot skills like instrument navigation, crew coordination, formation flying, confined area landing, and search and rescue, in addition to learning the basics of hovering an emergency procedures.

Autorotations are another vital survival skill that teaches you to control the helicopter, descend, and land during multiple emergency situations that could occur regardless of the number of engines. In fact, the CH-53E has three engines and its Naval Air Training and Operating Procedures Standardization (NATOPS) Manual includes multiple emergency situations all resulting in an autorotative landing.

There's a debate today about the continuing need to execute full touchdown autorotations as a training maneuver. In my view it's as simple as this: if you buy a helicopter that can't do them then you're stuck with that decision for the next 30 years and be wholly dependent on simulator training to teach this vital pilot survival skill. However, procure a helicopter that can do full autorotations as a daily training maneuver then you retain the initiative should you choose to do them.

Undergraduate training is the one place in your entire career that you actually go out and do these full autorotations to the deck, and it's designed to build confidence in the student. The only time I had and emergency that required me to initiate an actual autorotation I was very glad I learned this essential survival skill early in my flying career because a lot happens in a very short period of time.

Undergraduate training is all about flying the aircraft and building confidence so that when the Navy puts gold wings on your chest and you go to the next phase of training those fleet units that ultimately receive you as a new helicopter pilot are confident in your fundamental skill set.

VIEWPOINT FROM LEONARDO HELICOPTERS

THE NAVY NEEDS A FULL-SPECTRUM TRAINER THAT OFFERS SAFETY, POWER, INSTRUMENTATION, AND SUPPORTABILITY

2 What role does the new TH-73 trainer play in that developing solid fundamental rotary wing pilots?

If developing fundamentally good pilots is your objective then you need an aircraft that's equally fundamentally good, right? We call that full spectrum training where the helicopter doesn't compromise one area of training for another. You don't want a trainer that's a good instrument trainer but not very good at VFR contact training. Especially at the undergraduate level, you want to avoid having to relegate some of the fundamental skill set training to simulators alone. Undergraduate training is about being in the aircraft, learning those skills firsthand, and building confidence. I don't care how good the simulation is, it is not the same as sitting in that seat and doing the maneuvers firsthand. Simply, your decision-making process is different in a simulator because you can always hit the reset button.

So you need an aircraft that is uncompromising on capability and unrestricted in training. Selecting a training helicopter that actually does less than what the legacy TH-57 can already do today and force training skills to the simulator would be, in my opinion, a step backwards.

3 What are the elements of a good training helicopter?

There are several elements. One of the things the Navy suffers with on the TH-57 is a lack of power margin. It's because the aircraft is tired and underpowered. An underpowered aircraft doesn't have the power available to execute some of the desired training, causing the aircraft to break frequently.

As such, it's fundamental to have an aircraft with a power margin that enables students, especially early on in training, to make a mistake and not jeopardize themselves or the well being of the aircraft. Leonardo's TH-119 is powered by a PT6 engine, a powerplant that the Navy knows well and flies hundreds of them. It provides 1,000 horsepower compared to the 320 horsepower they have today with the TH-57. The aircraft has the margin to do whatever needs to be done, enabling students to make mistakes and not jeopardize themselves or the aircraft. At the same time, the TH-119 still has room to grow for future training requirements.

Another element is maintainability and reliability. Undergraduate Helicopter Training Squadrons (HTs) train day after day, and often fly more (70,000+ hours annually) than entire combat wings in the Navy and the Marine Corps. The Navy has done and does an amazing job keeping the TH-57's flying, but you shouldn't be rebuilding the aircraft every time they go through depot maintenance.

For the TH-73 program, the Navy needs an aircraft that can stand up to the daily beating with a necessary level of reliability. That means they need an aircraft that's easy to maintain and easy to support on site, as well. In my view, that requires an airframe that can be repaired right on the flight line--as opposed to composite body components that need specialized equipment and be very difficult to maintain. Leonardo's TH-119 has mostly a metal airframe, which means that all repairs can be done on site.

Regarding supportability, I'll add that all or our Leonardo TH-119s are fully produced here in the United States. Our FAA certified Part 21 production line and delivery facilities have been located in Philadelphia for many years, and it's engineering and the customer service support is a huge asset to our customers. There's no reach back to Canada, there's no reach back to Europe required for the TH-119. Everything can be done right here in the United States.

We're also taking it one step further by establishing fleet support facilities near our fleet operators, and we'll be doing the same thing for the Navy. We understand that the AHTS program (TH-73) demands that level of attention, and we'll build a large support facility in Whiting Aviation Park adjacent to Naval Air Station Whiting Field where all undergraduate helicopter training takes place. The Navy won't have to wait for parts to come from Philadelphia, they will literally come from across the airfield.

Safety, power, instrumentation, and supportability are the things you're looking for in a new training helicopter. We've developed the TH-119 as a full-spectrum trainer and that's exactly what it is. This is an enhancement in capability that's significant for the Navy.

I went through the Navy's undergraduate helicopter training in the early nineties, and I'm excited to see what they will do with a fleet of TH-119s. I think the pilots they will produce in terms of fundamental skills are going to be significantly more capable than when I graduated. It's going to also be a huge benefit to the Navy, Marines and USCG fleet as they'll have more capable pilots transitioning into their combat systems.

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