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US ARMED FORCES FLIGHT TRAINING REQUIREMENTS

OVERVIEW

An essential aspect of the Armed Forces, military flight training includes everything from basic airmanship, bespoke mission skill sets, specialism on operational aircraft and operational readiness.

As new aircraft are procured, new skill sets and technological capabilities need to be learned and mastered in order to use state-of-the-art operational assets to their full potential. The main goal of flight training is to reduce the gap in skills and capabilities when moving from training aircraft to operational aircraft in the most efficient and cost-effective manner possible.

The imminent need for international armed forces will be for training on how to fly the F-35 specifically. The F-35 is the most advanced aircraft anywhere in the world. Advancing from standard training to piloting an F-35 – without doing a 'half-way' training course on

the F-22 would be preferable, as the cost of live flight per hour is very expensive.

Another challenge the US Armed Forces faces is that pilot training has traditionally taken a back seat to procurement, a skills gap now exists when it comes to delivering combat-ready pilots. In many instances, the USAF procures new operational aircraft without realistically considering how they are going to cost effectively train pilots to use the equipment. For example, the current training jet used by the USAF is 40 years old. Naturally this has produced relatively ineffective pilots and expensive training budgets.

As the **US Military Flight Training community is engaging on a mass modernization strategy due to the recent procurements of equipment like the F-35 and various rotary assets**, the USAF wants to contract-out a record number of flying hours, starting in 2019. In an effort to keep pilots fully trained – in the US and internationally - and to close the skills gap, several

procurement and upgrade initiatives are being put into play:

- The T-X Program
- Additional planned or anticipated US armed forces procurements
- International procurements
- Red air requirements
- Replacement training system for the TH-57
- Virtual simulator solutions
- Improved mission readiness through test equipment

T-X TRAINING PROGRAM

The purpose of the T-X Family of Systems is to get pilots ready for the F-35. The T-X aims to be more cost-efficient by reducing the need for the "in-between" F-22 stage.

In late 2016, the USAF a request for proposal (RFP) to industry to replace the USAF trainer fleet of T38C Talon aircraft and associated ground-based training systems.

With the introduction of the F-35, the **USAF intends to buy 350 Advanced Pilot Training (APT T-X) aircraft and 46 ground-based training systems (GBTS), a contract valued at roughly \$1.5 billion for the Research, Design, Test, and Evaluation phase** of the program and estimated \$18 billion in future procurement.¹

The final bidders for the T-X Family of Systems are:

- Boeing's clean-sheet T-X design
- The Lockheed Martin-Korean Aerospace Industries' T-50A, the US derivative of a trainer flown by the South Korean, Iraqi, Philippine and Indonesian militaries, with current proven operational capabilities.

The T-X program is being specifically designed to **train pilots to be ready to fly the F-35 and therefore other F-35 nations are likely to invest in a similar training system.** This could mean the T-X winner becomes the market leader and is in line for significant revenue.

UPCOMING US REQUIREMENTS

In addition to the T-X program, there are other training measures either anticipated or in development:

- In 2018 the Navy plans to procure:
 - 2 Training Devices (Cargo Load Trainer/ Maintenance Part-Task Trainer)
 - 3 Training Device technical updates (CH-53K Containerized Flight Trainer/ Maintenance Training Device Suite/ Helicopter Emulation Maintenance Trainer)
 - Pilot/maintainer coursewareCost: \$26.693 million
- The **Air Force will be jointly acquiring the JPATS Quantity of 295 at \$1.980 billion in Joint Primary**

Aircraft Training System (JPATS) with the Navy (USN). The USAF is the program executor.

The principal JPATS mission is primary training for entry-level Navy/Air Force student pilots, associated instructor pilots, and primary/intermediate training for USN Naval Flight Officers. **JPATS includes the T-6 Texan II (a single turboprop engine, stepped tandem seat, commercially derived aircraft),** ground based training system (aircrew training devices, development courses, conversion courses, and operational support), systems engineering, contractor logistics support and production related shutdown and procurement.

The Training Integration Management System is a major information management system used to manage all student administrative and training requirements.

- With the purchase of 66 UAS systems (at a cost of \$10.902 billion), remotely Piloted Aircraft (RPA) training is needed and understanding the challenges and course work for RPA pilots will be crucial.
- The Navy is replacing old fleet of 113 Bell Helicopter TH-57 Sea Ranger trainers with 105 new aircrafts. Production will begin in fiscal year 2020 or 2021, according to a RFP published on the Federal Business Opportunities website.

INTERNATIONAL REQUIREMENTS

Flying military jets is an expensive business—up to \$70,000 per hour for the latest fighters. This has prompted an increasing number of air arms to **examine the potential savings by outsourcing some training tasks to private companies.**

UNITED KINGDOM

The UK outsources all of its military air training programs to reduce overhead costs. The UK is holding a competition for an expanded requirement that could reach 15,000 hours per year.

- The new Fixed Wing flying training system will provide modern training aircraft as well as up-to-date ground based training devices such as simulators and classroom learning for aircrew across the Royal Air Force, Royal Navy Fleet Air Arm and Army Air Corps.
- A £1.1 billion contract has been placed with Ascent Flight Training to design, deliver and manage the Fixed Wing training service until 2033



FRANCE

France's Director General of Armaments (DGA) has awarded Babcock France with the FOMEDEC contract to provide and maintain a training platform and related services for the French Air Force. This 11-year contract will provide new training aircraft (Pilatus PC 21), related simulators (CAE) and modernized training facilities for the training of fighter jet crews to be performed by the Air Force itself at the Cognac Air Base. The first aircraft will be delivered in March 2018.

SWEDEN

SAAB manufactures the Swedish Gripen JAS-39 used by Swedish Air Force, South African Air Force Czech Air Force Hungarian Air Force.

Military Flying Training System (MFTS) "The Swedish air force wishes to secure a long-term training design in which development risk is contained to an acceptable low level, and capability is cost-effectively weighted against procurement and support costs," the FMV says. "Logistic support can be fully outsourced if showed to be cost effective," Military release to service for the Grob Aircraft G120TP was achieved on 11 July, and the elementary trainer will be followed into use by the Embraer Phenom 100 and Beechcraft T-6C. The Elbit Systems/KBR joint venture company Affinity Flying Training Services is responsible for acquiring, introducing and supporting an eventual combined fleet of at least 38 aircraft.

CROATIA

The Ministry of Defence of the Republic of Croatia is planning to float a request for proposal (RFP) for purchasing fighter aircraft. Croatia wishes to obtain the fighter aircraft from five countries, including Sweden, the US, South Korea, Israel, and Greece. The RFP involves the Swedish Gripen JAS-39, the US F-16, South Korean FA-50, Israeli F-16, and Greece F-16 fighter jets.

OTHER COUNTRIES

Leonardo has based the T-X offering on its Aermacchi M-346 trainer jet already flown by Italy, Singapore and Israel.

Canada & Spain do not yet have the F-35 but looking into new training programs



RED AIR REQUIREMENTS

As the USAF looks to solve a growing pilot shortage, the service is increasingly looking to 'contractor owned, contractor operated' (COCO) Red Air contracts to fulfill almost 40,000 hours of contracted aggressor support training at 12 different bases. This solicitation to industry comes following a year-long experiment in 2016 at Nellis AFB, Nevada for Draken International².

The Air Force wants to hire out for 36,231 hours of Red Air, which would cover 27,234 sorties per year with an average sortie duration of 1.3 hours. Here's the breakdown the service provided to industry in mid-February.³

The multi-award contract (expected in January 2019) includes:

- 11,250 hours per year; 7,500 sorties per year - Nellis AFB, Nev.
- 3,885 hours per year; 2,590 sorties - Seymour Johnson AFB, N.C.
- 3,809 hours; 2,930 sorties - JB Pearl Harbor-Hickam, Hawaii
- 3,802 hours; 3,168 sorties - Holloman AFB, N.M.
- 2,568 hours; 2,140 sorties - Eglin AFB, Fla.
- 2,400 hours; 2,000 sorties - JB Langley-Eustis, Va.
- 2,304 hours; 1,920 sorties - Tyndall AFB, Fla.
- 2,074 hours; 1,728 sorties - Kingsley Field, Ore.
- 1,766 hours; 1,472 sorties - Luke AFB, Ariz.
- 1,152 hours; 768 sorties - Hill AFB, Utah
- 1,152 hours; 960 sorties - Tucson Arpt.

As this is a tremendous undertaking (with a substantial budget), there is potential for several companies to share the load. The contract is expected to be signed in January, 2019. The USAF would expect the winning companies to be operational by May, 2019.⁴

Russ Bartlett, President and CEO of Textron Airborne Solutions – a US Navy contractor - announced in a press release³ that the requirement has the potential to "consume the entire industry several times over." Tom Tyson, Vice President of Textron Airborne Solutions said, "Nellis needs this really bad right now. Other bases that are just starting to get the F-35, their need will grow over time."

Once awarded a contract, Red Air companies would be responsible for procuring everything from airplanes, training, maintenance crews, and support.

Some of the training would be on base, while other parts will be at remote locations, said Bartlett.

REPLACING THE TH-57

The Navy's TH-57s, derivatives of the 206B-3 JetRanger III, are 35 years old with at least 25,000 hours per aircraft. The fleet's age makes for rising maintenance costs. The Navy will eventually replace these aircraft

with new single-engine IFR aircraft, the Advanced Helicopter Training System (ATS), but that could be years in the offing. The Navy trains 500 primary helicopter pilots per year for itself, the Marines, the Coast Guard and foreign services from Whiting Field in Pensacola, Fla.⁵

Like the T-X program, the US Navy is not just looking for a helicopter but an **entire training system including aircraft and ground instruction for rotary-wing student naval aviators that would cover aircraft-specific systems training** and the use of flight simulation training devices such as full-flight simulators, flight training devices and aviation training devices.

After the T-X, this is the US Armed Force's second largest training procurement with bidding teams still being formed. It is likely that Bell, Leonardo Helicopters and Boeing are going to be leading the teams and are looking for tier 2's to support them.

Textron's TRU Simulation & Training is preparing to bid on a forthcoming US Navy request for proposal (RFP) that seeks to stretch the service life of the service's Bell TH-57 Sea Hawk trainers by shifting 9% of the in-aircraft training to simulators, or about 7,000 flight hours per year. Contract awards for the simulators could come by early next year, according to Eric Buer, TRU's capture lead for the contract competition and a former Marine Corps helicopter pilot. The Navy is looking to acquire 14 flight-training devices (FTDs), a mix of static Level 6s and full-motion Level 7s.

LIVE VIRTUAL CONSTRUCTIVE

While **live training is paramount for an effective air force, another avenue for preparation lies in live virtual constructive (LVC) training technology. LVC has the potential to revolutionize the way air forces train – especially for aviators who fly 5th generation aircraft like the F-22 Raptor, and the F-35.**

While currently USAF, US Navy and US Marine Corps pilots fly their aircraft against other friendly jets, often there are not enough "adversaries" for pilots to train against.

"There are not enough airborne resources that we can go fly and fight against that would give us the maximum training benefit for all the JP-8 [jet fuel] that we're burning," says Robert McCutchen, Lockheed's F-16 training expert at the Luke AFB Networked Training Centre. "To be able to go out and fly a four-

ship against two adversaries doesn't really maximize your ability to employ that airplane as a four-ship."⁶

LVC would produce computer-generated adversaries and have realistic flight characteristics, McCutchen says. The adversaries would be managed by instructors who would control virtual enemies and manage their tactics. They would also make sure the virtual adversaries do not get into visual range.

"We'll have individuals on the ground who will be manipulating and managing the scenario and making sure these computer-generated little guys stay outside the visual range of the live fighters," says the retired 5000+ hour F-16 weapons school graduate.

The addition of so many virtual enemy forces in the air and on the ground greatly increases the complexity of training missions.

"We'll be able to robust their scenarios," McCutchen says.

The limitation, of course, is that LVC cannot simulate a visual-range opponent. The targets are virtual, but it should still be a useful training tool.

The service's Air Education and Training Command will use LVC to "create environments that we can't replicate in reality," said its commander, Lt. Gen. Darryl Roberson.

"When you're trying to integrate space and air and cyber in the real world, you're limited on what you can do," he said.

The constructive simulation component is particularly helpful for analysis, said Acting Air Force Secretary Lisa Disbrow. "Analysis drives [concept of operations], it can drive investments, it can uptake our force," she said.

LVC technology could be beneficial as the Air Force looks to conduct more experiments ahead of procurement processes, Air Force Chief of Staff Gen. David Goldfein told reports at the Air Force Association's annual Air Warfare Symposium. ⁷

IN SUMMARY

The task to overhaul current military flight requirements is a massive undertaking that has innumerable moving parts. The effort to find relevant, flexible, effective and cost-effective means of updating the existing infrastructure will take years and span across the armed forces service branches, and many countries.

As contractors bid and compete for contracts, and the players fall into place, the shape of the future of military flight training emerges, not only for the US, but across the globe.



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Although a live-virtual-constructive training architecture will become increasingly important as the F-35 force grows and the Defense Department looks for ways to train crews without exposing the fighter's secrets, Bartlett said the February industry day focused primarily on the live-flying portion of the training.

http://www.atacusa.com/press_releases/press_release_44.html

Gripen Saab: <https://www.flightglobal.com/news/articles/gripen-aggressor-enters-the-fray-in-us-red-air-comp-441330/>

RPA: <https://www.mstmagazine.com/air/rpa-pilot-training-pipeline/>

Join us at Military Flight Training this December 6-8, Omni San Antonio Hotel at the Colonnade.

This summit will have critical discussions on live virtual constructive technology, developing pilot's capabilities by downloading and the challenges around offloading. Key themes will focus on red air and aggressor training, 5th generation aircraft, advancing rotary and multi-engine training and developing the skill-sets for RPA pilots.

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