

# How to Train Your Pilot

## *Rethinking Early Pilot Training in an Age of Live, Virtual, Constructive*

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There is a memorable moment in the DreamWorks animated film 'How to Train Your Dragon', where the young protagonist, Hiccup, realises that no number of books or lectures can teach him to fly a dragon. Instead, he must climb onto its back and learn through execution. Light-hearted as it is, the idea rings true for anyone who has strapped into an aircraft cockpit. Aviation competence is not only knowing what to do; it requires developing a level of instinct for how and when to do it: manage risk, motion, stress, and consequence in real time.



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*A full-mission simulator delivers striking realism; however, the terrain below is still projected, not felt.*

Simulator technology did not impact the world of Hiccup, but NATO has firmly established simulator technology in Allied nations' pilot training systems. NATO air forces have invested heavily in modernisation: more capable aircraft, better simulators, and more coherent multinational coordination. The live, virtual, and constructive (LVC) environment is a powerful complement to live flying – not a replacement. NATO nations cannot afford to sacrifice the proficiency gained in live-fly training. If we reduce foundational flying experience in favour of synthetic efficiency, we risk producing pilots well-versed in tactical theory yet vulnerable in the basics that keep them alive.

Despite modern trainers, sophisticated simulation environments, and strong multinational training programmes, the most common causes of military aviation fatalities have not changed. Pilots are seldom lost in combat. Instead, mishaps most commonly occur due to spatial disorientation, loss of situational awareness, misapplied emergency procedures, and Controlled Flight Into Terrain (CFIT). These are not tactical failures; they are failures of airmanship, judgement, and embodied skill. As we examine NATO's training

future, we must modernise without losing sight of a foundational truth: before a pilot can fight, they must first learn how to fly.

## Modernising Flight Training

Nations must solve several conflicting problems: growing and retaining a proficient pilot force, upgrading and expanding their fleets, and doing both within tight budgets. Across NATO, annual flying hours per pilot vary widely, but many nations suffer from underfunding flying hours for pilots once they leave initial training, letting their hard-earned skills wither.<sup>1</sup> To compound the problem, NATO fleets are growing either older or smaller, as legacy aircraft age out and many nations convert to smaller numbers of exquisite, high-cost systems like the F-35 Lightning II. This leaves NATO's military leaders to decide how best to allocate limited resources across growing, training, and equipping their pilot forces.

Given these factors, the prospect of trading live flight hours for simulation is a topic of serious discussion.



*An ENJJPT student pilot flies a T-6A Texan II during a training sortie near Sheppard Air Force Base, Texas. About 200 student pilots earn their wings at ENJJPT annually after a 55-week, three-phased training regimen.*

Air forces acquire and operate simulators at significantly lower cost, and they can provide training for basic tasks without the burden of bad weather, airspace coordination, or the maintenance and logistics footprint that aircraft require. They provide a valuable supplement to live-fly training, and Allied pilot training schools have accordingly begun modernising both aircraft and simulator capabilities to improve the integrated LVC training environment. Several nations have replaced legacy trainers with digitally compatible platforms. The US Air Force (USAF) is introducing the Boeing–Saab T-7 to replace the T-38C, aligning training with fifth-generation combat aviation. Italy built a pipeline around Leonardo's M-345 and M-346 and established the International Flight Training School (IFTS), a partnership between Aeronautica Militare and Leonardo. France re-centred its system around the Pilatus PC-7 and PC-21; Greece uses a mix of Beechcraft T-6A and Leonardo M-346.<sup>2</sup> These modern trainers normalise glass cockpits and support constructive simulation, allowing air forces to download enhanced software for advanced syllabi. This includes instruction in Basic Fighter Manoeuvres (BFM), Advanced Combat Manoeuvring (ACM), and

basic Beyond Visual Range (BVR) tactics. These enhancements represent genuine progress. But the risk is subtle and significant: efficiency can become a substitute for experience, and digital proficiency can be mistaken for airmanship.

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Nations have made substantial advances in simulation and LVC technologies, transforming how air forces prepare pilots for increasingly complex operational environments. Modern full-mission simulators now replicate high-fidelity cockpits with realistic sensor, weapon, and threat models, allowing aircrew to



*NATO air forces are investing heavily in modern trainers and multinational programmes. The harder question is whether the pipeline behind them still teaches pilots to fly first.*

rehearse scenarios that would be unsafe or prohibitively expensive to conduct in live flight. Concurrently, LVC creates scalable and repeatable tactical environments across geographic borders. These systems expand capacity, improve tactical training quality, and reduce strain on aircraft fleets. They have become indispensable for advanced mission training, particularly in dense threat scenarios. Yet none of this changes what pilots still must learn in a real cockpit, in the earliest phases of a pilot's career.

At the Alliance level, several multinational training enterprises are emerging. NATO Flight Training Europe (NFTE), established in 2021, coordinates an ever-growing network of training campuses to provide cost-effective, standardised instruction for jet, helicopter, and remotely piloted systems. NFTE matches national demand with available capacity, optimising throughput and reducing duplication across a resilient multinational ecosystem.<sup>3,4</sup> Among the campuses feeding this network, Italy's IFTS now trains pilots from multiple Allies, and in some ways is becoming similar to NATO's long-established Euro-NATO Joint Jet Pilot Training Programme (ENJJPT) in the USA. Additionally, the Hellenic International

Flight Training Centre (HIFTC), also featured in this journal edition, serves as a training hub for NATO and international air forces. Impressive as this growth is, it answers a narrower question than it appears to. These programmes solve for capacity and standardisation. They say nothing about whether the pipeline is teaching pilots the right things in the right order, which is the question the accident data actually answers.

### **The Core Issue: Back to Basics**

The uncomfortable truth is that enhanced capabilities are coming at the cost of basic airmanship. Early phases exist to build habits that keep pilots alive when the cockpit becomes busy, an emergency interrupts departure, or weather closes in. Students must face spatial disorientation, unusual attitudes, and workload saturation under supervision while piloting a real aircraft before encountering them tactically. They must make decisions under stress, manage fear, and trust instruments when senses lie. These skills cannot be replicated in a simulator-heavy syllabus – and assuming they can is precisely where airmanship is lost.



*The water soaking that marks a first solo at IFTS – a small, universal ritual across Allied flight lines, and a reminder of what all the hours of training are ultimately for.*

Simulators remain essential for replicating emergencies and reducing risk and cost, but they cannot fully reproduce the physiological and psychological stresses of real flight: compounding factors of g-forces, airsickness onset, sensory cues, or the pressure of manoeuvring over real terrain with genuine consequences. In a simulator, students know an instructor can freeze or reset the scenario; in an aircraft, there is no reset. Junior pilots, in particular, learn differently when errors carry genuine risk.

The pressure to produce aviators faster is real. But efficiency cannot come at the expense of survivability. Data on fatal accidents point to fundamentals, not advanced tactics, as the killers of young pilots; these fundamental skills are built through early, frequent, live flying.

## Fly Early, Fly Often

If most fatal accidents stem from foundational weaknesses rather than tactical gaps, the implication is straightforward: keep early phases rich in real-world

experience. Simulation should support those phases, not replace them.

The phased approach NATO uses in pilot development is deliberate, from initial screening through operational conversion and post-combat ready training. In practice, these three phases steadily build core skills: visual manoeuvring, instrument procedures, formation flying, edge-of-envelope handling, and disciplined cockpit management. These are the skills that keep a pilot alive during every departure, area manoeuvring, recovery, and diversion. Teach them early; practise often; reinforce relentlessly – in real aircraft. Frequency matters. Long gaps between flights erode confidence and slow learning. A reasonable target to build momentum without overwhelming the student is approximately three to four training events per week, sorties or simulators. Quality suffers when we cram too many complex events together, just as it suffers when weeks pass between flights.

Aircraft progression matters too. Reducing aircraft types and moving students quickly onto advanced

trainers only works if performance steps are manageable. Moving a student with only 100 hours in a basic single-engine propeller aircraft straight to a high-performance jet, such as an M-346 or T-7, may look efficient on paper, but it ignores the psychological and cognitive leap involved. Proper risk management is necessary for success. There is a reason driving schools do not train new drivers in supercars: the platform itself can become the problem before the student is ready to exploit it. An alternative path uses a basic propeller aircraft for screening and fundamentals, then a basic jet or advanced turboprop with similar systems, and then an advanced jet. Where possible, staying within the same manufacturer family can reduce transition costs and cognitive load through cockpit commonality. NATO nations offer several examples of these paths. They each work, but how deliberately nations implement them is what makes the difference.

Finally, we must defend solo sorties. Solo flight is the first time a student truly accepts responsibility for the aircraft. Until then, many students unconsciously assume the instructor is a safety net who can always fix any problem. That illusion disappears when the student taxis out, lines up, and takes off alone. Airmanship accelerates dramatically in those moments. Cutting solo time may shorten a syllabus on paper, but it removes our most potent tool for building confidence and effective pilot skills.

If safety and readiness are serious aims, the non-negotiables are clear: early phases rich in live flying, sensible airframe progression, sustained tempo, and sufficient solo opportunities. Everything else, including LVC, advanced tactics, and synthetic sophistication, should be built atop that bedrock, not substituted for it. None of it works, though, without the people who teach it.

### **The Human Factor: Passion, Judgement, and the Instructor's Role**

Flying is a human performance discipline. Aircraft, simulators, and syllabi provide structure, but instructors shape pilots into professionals capable of handling

stress, managing risk, and making sound decisions when the unexpected occurs. The human element – and traits like judgement, temperament, and motivation – remains central to producing safe, capable aviators. A simulator can run a scenario script; it cannot replicate an instructor's real-time judgement, or the trust a student learns to place in another human being when the risk is real.

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*'The pressure to produce aviators faster is real. But efficiency cannot come at the expense of survivability.'*

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Instructor pilots are the custodians of airmanship, transmitting habits and attitudes that manuals and videos cannot capture. Students rarely appreciate how much the instructor is compensating, anticipating, and protecting them. Good instructors let students make mistakes and test their limits, withdrawing supervision progressively until the student's own judgement and confidence are what keep them safe.

Young pilots often feel immense pressure: to perform, not to fail, to meet the standard. Human-centred moments help balance that pressure and sustain the motivation needed to progress through a demanding pipeline. In an era of metrics, digital tools, and expanding simulation, maintaining this human connection is not a luxury; it is part of the job.

Many experienced instructors use simple techniques to keep students motivated and connected to the joy of flying. One example is giving a student a few minutes at the end of a sortie, when objectives are complete and the aircraft is safely configured, to simply fly. No tasks; no scripts; no evaluation. This free time is not formal policy, nor universal practice, but it reminds students why they chose this profession. A few minutes of unstructured flight can provide a psychological boost that carries them through the toughest stretches of training.

## Conclusion

NATO's pilot training is modernising rapidly. But modernisation that displaces foundational airmanship trades one vulnerability for another. The accidents that claim pilots' lives overwhelmingly stem from gaps in basic flying skills, not tactical shortcomings. LVC will continue to expand, and it should. But modernisation must not erode the foundation on which survivability depends. Early training should be rich in live flying, steady in tempo, progressive in challenge. It must build the judgement,

confidence, and airmanship that later phases rely upon – all guided by instructors whose real-time judgement no simulator can replace. Before NATO trains pilots to fight and win, it must ensure they learn to fly and live. ●

1. Bronk, J. (February, 2025). The case for greater mission specialisation by NATO's European air forces (RUSI Occasional Paper). Royal United Services Institute for Defence and Security Studies. <https://static.rusi.org/nato-air-mission-specialisation.pdf>, (accessed 12 February 2026).
2. (International Flight Training School, n.d.).
3. (Ten Allies Start New Era in Pilot Training, 2021).
4. (NATO Allies Strengthen Cooperation on Military Aviation Training, 2024).



## ABOUT THE AUTHORS

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Colonel Vito Cracas is a senior Italian Air Force officer with extensive experience in fighter operations, training, and international cooperation. He joined the Air Force Academy in 1988 and graduated ENJJPT in 1993. He flew F104s and Tornado ADV F3s, serving as an Instructor Pilot with both Italian and RAF squadrons. He transitioned to the Eurofighter Typhoon and commanded the ITAF XII (F) Squadron in 2007. After Staff College, he managed the Eurofighter Programme and later commanded the 36<sup>th</sup> Fighter Wing and Gioia del Colle Airbase, supporting

NATO operations and Italy's first air detachment to Iceland. His subsequent roles included commanding the ITA Task Force Air in Lithuania as part of NATO Baltic Air Policing, and serving as Defence Attaché in Kuwait. Before becoming the JAPCC Assistant Director, he directed training and operational coordination for all Italian fighter units and led Italy's Fighter Detachment at Red Flag Alaska 24-1. Colonel Cracas has a total of more than 3,900 flight hours and holds a bachelor's degree in military science and a master's degree in management.

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