



Project Avenger: Modernizing Pilot Training through High Reliability Organization Principles

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GOAL: Deploy evidenced-based teaching methods and modern technologies into Naval Aviation training curricula to train aviators better, faster, and cheaper

Background

- Research indicates individualized competency-based learning approaches to training are superior to the “one-size-fits-all” learning objectives model that is ubiquitous in the Navy and most educational settings.
- The availability of low-cost, high-impact technologies (e.g., virtual reality, artificial intelligence; AI) has spurred mass adoption of Ready Relevant Learning (RRL) principles, which include changes related to learning:
 - WHEN:** Training is available throughout students’ careers with tailored approaches to their proficiency level
 - HOW:** A variety of training methods are available, from traditional publications to 360-videos to sophisticated virtual trainers, for students to choose preferred methods and target skills they need the most
 - WHERE:** Training is on-demand, making it available wherever and whenever students need it
- Naval Aviation Training Command (NATRACOM) is an early adopter of a new model of training that includes both competency-based learning approaches and technology-supported RRL principles to achieve its mission to train the world’s finest combat quality aviation professionals, delivering them at the right time, in the right numbers, and at the right cost to a Naval Force that is where it matters, when it matters.

Methods: Develop & Evaluate a New Undergraduate Flight Program

- Key tenets of a new undergraduate flight program—named Project Avenger—are grounded in scientific literature:
 - Updated Syllabus:** Progressive development focused on skill mastery across a variety of situations instead of maximizing performance for a single scenario prone to “data dumping”
 - Detachment Mentality:** Students assigned to close-knit cohorts, with their own spaces and OICs
 - Proficiency Advances:** Students who demonstrate competence in a skill graduate to the next skill set
 - Technology Update:** Modern tech (e.g., extended reality, iPads, AI-instruction) made available 24/7
 - Professional Aviator Model:** Students focus on mission planning and thinking flexibly in any situation, not just the technical skillsets of their current training platform



Virtual Reality Trainers at TRAWING-4



Electronic Kneeboards



T-6 Check Ride, Corpus Christi, TX

Results

Project Avenger students completed events in less time than traditional students, completed higher complexity events (e.g., formation & cross country), and achieved HIGHER grades than traditional students.

Initial Operating Capability

- 19 Flight Students (13 USN, 6 USMC; 17 male, 2 female) at NATRACOM Training Air Wing Four, Corpus Christi, completed “Project Avenger 1.0”
 - 14% fewer flights required
 - 25% faster progression to training milestones
 - 9% faster than traditional syllabus (~3 weeks)
 - Student/instructor feedback overwhelmingly positive

Full Operating Capability

- NATRACOM leadership currently scaling Project Avenger to replace all Primary Legacy training:
 - Classes 2-4 ongoing at Training Wings Four & Five (Corpus Christi, TX; Milton, FL)
- Avenger planned to fully replace Legacy approximately Fiscal Year 2024

Alignment to High Reliability Organization (HRO) Principles

- HROs operate in complex, high-hazard domains for extended periods without serious accidents or failures.
- The current effort demonstrates the value of modernizing training in order to produce the highest quality personnel using far fewer resources.
- These factors combine to ultimately enhance readiness & performance and reduce mishaps.

The Five HRO Principles Applied to Project Avenger

- Sensitivity to Operations**

 - DoN leaders recognize the requirement to modernize aviation training to meet new threats and endorsed this effort:
 - Chief, Naval Air Training
 - Chief, Naval Air Forces
 - NAVAIR PMA-205
 - Naval Air Warfare Center Training Systems Division
 - New syllabus designed to identify SNAs development needs and provide tailored approach to rectify

Commitment to Resilience

 - Modernizing training at NATRACOM serves as a model for all Naval Training for individual, adaptive training.
 - Limited, experimental rollout refines and improves each iteration as expands to full scale operation.
 - Continual evaluation of new tech capabilities identifies upgrades and improvements.
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- Reluctance to Simplify**

 - Naval Aviation Enterprise leadership is committed to improving BOTH quality and efficiency through modern education and training technologies.
 - Flexibility and agility in syllabus design is placed above finding “quick fixes.”
- Deference to Expertise**

 - Our team coordinated across the DoN, DoD, and with Academia and Industry to understand emerging tech capability to enhance training.
 - Naval Aviators are at the core of the redesign and partnered with Navy training experts (e.g., AEPs).
- Preoccupation with Failure**

 - Mirroring the Big Tech commercial sector, Project Avenger development uses an interactive process that encourages new approaches and technologies anchored in core philosophies.
 - Avenger re-engineers traditional system to improve effectiveness.

Impact and Future Work

- Using HRO principles, the Aerospace Experimental Psychology (AEP) team identified, published, and integrated key underlying philosophies for Project Avenger.
- Under the umbrella of the Naval Aviation Training Next Program, Project Avenger will serve as the basis for updating projects for Advanced Training Pipelines. The following programs are currently underway:
 - Project Hellcat: Introductory Jet Tactics in T-6 II Texan
 - Project Corsair: Advanced Jet Training in T-45 Goshawk
- Adjacent training commands (e.g., Naval Education Training Command, Fleet Replacement Squadron) will use this process to modernize their own training approaches.
- Project Avenger is one of the first full-scale Navy training approaches that integrates Artificial Intelligence and Extended Reality at the user-level, which will serve as a model for other DoD assets.

References

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