



MARCEL BERNARD

# Real Learning through Flight Simulation

## *The ABCs of ATDs*

Photo Courtesy of Frasca International

The dawn of flight training awakened more than pilots, instructors, and airplanes. It also brought to light a need for ground trainers that would enable the safe and effective practice of particular procedures. Industry has responded, and aviation ground trainers have evolved significantly over the years, along with their aerial counterparts.

The regulatory structure for aviation ground trainers has evolved as well. At present, the FAA assigns these devices into three main categories: *flight simulators, flight training devices, and aviation training devices*. From airline training and corporate flying to the private pilot in general aviation aircraft, almost every pilot will eventually use at least one of these devices to practice and improve pilot skills or to help transition to another aircraft. As most pilots will attest, flight simulation of any variety is often the quickest route for learning to fly.

### Today's Training Devices

**Full Flight Simulators (FFS)\*:** The more capable (and most expensive) aviation training devices fall in to this category. FFSs must include motion and

visual capability, and it is possible to earn a type rating (e.g., MD-80, B-737-800, BE-500) in the more sophisticated simulators without flying the actual aircraft. All levels of FFSs are objectively evaluated against airplane specific validation data (typically aircraft flight test data) to ensure that the FFS's aerodynamics, flight controls characteristics, and ground handling characteristics represent a specific make, model, and series of aircraft. A type rating is required for operating aircraft that are turbo jet powered or over 12,500 pounds maximum certified takeoff weight. Many FAA-approved Part 142 schools use simulators to train professional pilots for type ratings and to deliver the recurrency training required by regulation and insurance companies.

**Flight Training Devices (FTD)\*:** These devices are designed to represent a specific aircraft configuration and, depending upon the FTD's qualification level, may include an enclosed cockpit and realistic visual references. They are not always motion capable, but are sophisticated enough to provide training in preparation for commercial and airline transport pilot certificates, as well as other ratings. FTDs are extremely

popular with aviation-oriented universities and colleges. The airline industry also uses these devices extensively to train new hires or provide for upgrades (First Officer to Captain) and transition training (e.g., B-737 to B-747 aircraft), or for recurrency training.

*\*Note: Full Flight Simulators and FTDs (collectively called Flight Simulation Training Devices - FSTDs) come under the guidance, evaluation and approval of the FAA National Simulator Program in Atlanta and are regulated under 14 CFR part 60.*

### Aviation Training Devices (ATD)

ATDs are by far the most common option for general aviation flight training, and GA has benefited greatly from the development of these very capable devices. Many Part 141 and Part 61 flight schools use these devices to train students in preparation for private, multi-engine, instrument, and commercial certificates.

The FAA's General Aviation and Commercial Division (AFS-800) manages the evaluation and approval of ATDs, which are categorized into basic and advanced training devices. To do so, AFS-800 uses the requirements for performance and capability specified in Advisory Circular (AC) 61-136, which was published in July 2008. This document describes how the FAA approves ATDs, along with providing a summary of how pilots may use these devices. Let's take a look.

### Basic Aircraft Training Device (BATD)

A BATD generally has hardware and software features that allow the FAA to authorize it for certain training and proficiency credits. These credits include:

- Instrument rating - maximum of 10 hours under 14 CFR section 61.65(i) or 14 CFR part 141, appendix C
- Instrument Proficiency Check - per FAA-S-8081-4E (circle-to-land not authorized)
- Use in accomplishing instrument recency of experience requirements of 14 CFR section 61.57(c)(2)
- Not more than 2.5 hours of training under 14 CFR section 61.109(k)(1) on introduction to operation of flight instruments (except as limited by 14 CFR part 141 appendices)

### Advanced Aircraft Training Device (AATD)

An AATD must meet BATD-approval criteria, but it must also incorporate additional features and systems fidelity that provide ergonomics representa-

tive of a category and class of aircraft flight deck. The AATD does not need to replicate a specific aircraft make and model, although many devices do.

These features allow the FAA to authorize an AATD for the following training and proficiency credits.

- Private pilot certificate - maximum of 2.5 hours
- Instrument rating - maximum of 20 hours
- Instrument Proficiency Check - per FAA-S-8081-4E (circle-to-land not authorized)
- Commercial pilot certificate - maximum of 50 hours
- Airline Transport Pilot certificate - maximum of 25 hours
- 14 CFR part 141 as limited by the applicable appendices, or under a special curriculum approved under 14 CFR section 141.57

A quick way to remember the difference between *basic* and *advanced* is that the advanced version must be more representative of the aircraft cockpit design. It must also include a GPS and auto-pilot configuration.

### Real Training, Real Learning

If you are looking for a flight school, it might be worth your while to consider a flight school that has an FAA-approved aviation training device. Such a school will have an FAA letter of authorization (LOA) that accompanies the device. The FAA only allows credit for 2.5 hours towards the certification



Photo Courtesy of Frasca International

minimum required for private pilot certification, but there is no prohibition on additional use of these devices in training. On the contrary! According to recent FAA records, the national average to complete the private pilot certificate is approximately 75 hours of flight time. Some flight schools use FTDs and ATDs to practice the maneuvers and procedures in advance of the flight training portion of their curriculum. Doing so allows students to graduate sooner with less total flight time needed to complete their training.

Here's the bottom line: Even if you can't log every hour spent in an ATD to count toward your certificate or rating, training in an ATD can maximize your training time and minimize the money you spend by enabling you to learn basic procedures in the ATD, and then master them in the actual aircraft. Another advantage is the ability to train when the weather is not cooperating or if an aircraft is not available. This advantage prevents

undesirable breaks that can hamper your ability to practice and retain certain skills. Teaching is also much more productive in an ATD, where distractions such as noise and turbulence can be kept to a minimum. The ability to hit the pause button and then explain or review a certain training skill on the spot is another huge advantage. Last but not least, ATDs permit practice of emergencies and other demanding skills with a level of safety that might not be possible in actual aircraft.

Using aviation training devices will save time, money, and the environment, and allow everyone to fly more safely. ✈️

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*Marcel Bernard is an FAA Aviation Safety Inspector and the Aviation Training Device Manager with the General Aviation and Commercial Division in Washington, D.C. Marcel currently holds an ATP and Flight Instructor certificate with Multi-Engine and Instrument privileges. His experience includes managing an FAA-approved Part 141 flight school along with having conducted more than 20,000 hours of flight instruction.*

Photos (top 2) Courtesy of Frasca International, (bottom) Courtesy of Redbird Flight Simulations



**Full Flight Simulator (FFS)** – A replica of a specific type or make, model, and series aircraft cockpit. This includes the assemblage of equipment and computer programs necessary to represent aircraft operations in ground and flight conditions, a visual system providing an out-of-the-cockpit view, a system that provides cues at least equivalent to those of a three-degree-of-freedom motion system, and the full range of capabilities of the systems installed in the device as described in 14 CFR part 60 and the Qualification Performance Standards (QPS) for a specific FFS qualification level.

**Flight Training Device (FTD)** – A replica of aircraft instruments, equipment, panels, and controls in an open flight deck area or an enclosed aircraft cockpit. It includes the equipment and computer programs necessary to represent aircraft (or set of aircraft) operations in ground and flight conditions having the full range of capabilities of the systems installed in the device as described in 14 CFR part 60 and the Qualification Performance Standard (QPS) for a specific FTD qualification level.

**Aviation Training Device (ATD)** – A replica of aircraft instruments, equipment, panels, and controls in an open flight deck area or an enclosed aircraft cockpit. It includes the equipment and computer programs necessary to represent aircraft (or set of aircraft) operations in ground and flight conditions having the full range of capabilities of the systems installed in the device as described in AC 61-136 for a specific Basic or Advanced qualification level.