



U.S. Department
of Transportation
Federal Aviation
Administration

Advisory Circular

Subject: FAA Approval of Aviation Training
Devices and Their Use for Training
and Experience

Date: 11/17/14

AC No: 61-136A

Initiated by: AFS-800

Change:

1. PURPOSE. This advisory circular (AC) provides information and guidance for Aviation Training Device (ATD) manufacturers seeking Federal Aviation Administration (FAA) approval of basic aviation training devices (BATD) or advanced aviation training devices (AATD) under Title 14 of the Code of Federal Regulations (14 CFR) part 61, § 61.4(c). This AC also provides information and guidance for those persons who intend to use a BATD or AATD for activities involving pilot training and experience, other than for practical tests, aircraft-type-specific training, or an aircraft type rating. This AC contains specific procedures regarding the evaluation, approval, and use of an ATD under 14 CFR parts 61 and 141. The criteria specified in this AC are used by the FAA to determine whether an ATD is qualified for approval as a BATD or an AATD. These guidelines have developed from extensive FAA and industry experience in determining methods of compliance with the pertinent 14 CFR regulations. Applicable regulations are noted only for reference. This AC does not change regulatory requirements; therefore, the provisions of the current regulation always control. This AC applies only to the evaluation and use of BATDs and AATDs. This notice does not apply to full flight simulators (FFS) and flight training devices (FTD) that are regulated under 14 CFR part 60.

2. CANCELLATION. AC 61-136, FAA Approval of Basic Aviation Training Devices (BATD) and Advanced Aviation Training Devices (AATD), dated July 14, 2008, is canceled.

3. RELATED 14 CFR REFERENCES (current editions).

- Part 61, §§ 61.4, 61.51, 61.57, 61.65, 61.109, 61.129, and 61.159.
- Part 141, §§ 141.41, 141.55, and 141.57, and appendices B, C, D, E, F, G, I, K, and M.

4. AUDIENCE. ATD manufacturers, authorized instructors, flight training providers, pilots, and others involved in flight training and operations under part 61 or 141 should be familiar with the content of this AC.

a. ATD Assessment. A new ATD must be satisfactorily assessed in the areas essential to airman training fundamentals to the extent described in:

- Appendix 1, General Information,
 - Appendix 2, Basic Aviation Training Device (BATD) Requirements,
 - Appendix 3, Advanced Aviation Training Device (AATD) Requirements,
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- Appendix 4, Training Content and Logging Provisions, and
- Appendix 5, Evaluation and Subjective Test Criteria.

b. Required Function, Performance, and Effective Use of ATDs. This AC provides information and guidance for the required function, performance, and effective use of ATDs for pilot training and aeronautical experience (including currency). ATDs cannot be used for practical tests, aircraft type specific training, or for an aircraft type rating. Manufacturers of these devices meeting the guidance and standards provided in this AC will receive a letter of authorization (LOA) from the FAA Flight Standards Service's (AFS) General Aviation and Commercial Division (AFS-800) approving them as either a BATD or AATD. The LOA will be valid for a 5-year period with a specific expiration.

5. RELATED READING MATERIAL (current editions).

- FAA-S-8081-14, Private Pilot Practical Test Standards for Airplane.
- FAA-S-8081-4, Instrument Rating Practical Test Standards for Airplane, Helicopter, and Powered Lift.
- FAA-S-8081-12, Commercial Pilot Practical Test Standards for Airplane.
- FAA-S-8081-5, Airline Transport Pilot and Aircraft Type Rating Practical Test Standards for Airplane.
- FAA Order 8900.1, Flight Standards Information Management System (FSIMS), Volume 11, Chapter 10, Section 1, Approval and Authorized Use under 14 CFR Parts 61 and 141.

6. BACKGROUND. Significant developments in computer flight simulation and visual graphics capability have led to the increased use of advanced flight simulation training devices in General Aviation (GA). The GA community is using this evolving simulation technology to provide increasingly effective training capabilities at reduced cost. This AC reflects the FAA's experience with simulation technology used to meet specific regulatory flight training and experience requirements of parts 61 and 141.

a. Flight Task Procedures and Operational Skills. Instructors have typically taught flight task procedural skills almost exclusively during in-flight training. However, the FAA has determined that instructors can successfully teach these procedural skills (such as performing a before landing checklist) during ground training using ATDs. In addition, the FAA recognizes that flight instructors can effectively teach operational skills (such as flying a proper traffic pattern or a stabilized approach) using ATDs. These procedural and operational skills can then be positively transferred to appropriate actions in the aircraft. Information on integrating ground training using an ATD with flight training can be found in Appendix 4, Training Content and Logging Provisions.

b. Evaluations of ATDs. The FAA has evaluated many computer hardware and software applications for ATDs. These evaluations determine whether the elements of pilot training, experience, and other requirements within part 61 or 141 can be provided using ATDs. Pilots and instructors may use ATDs in accordance with the LOA to meet the training and aeronautical experience requirements in part 61 or 141.

7. ACTION. Manufacturers will use this AC as a method of compliance to satisfy the requirements to obtain approval of their ATD. Appendix 2 is exclusively for BATDs and Appendix 3 is for additional items required for AATDs. When the FAA determines that an ATD is satisfactory, an LOA will provide the applicable level of approval. All approvals for use in pilot training and experience, including approvals for use under parts 61 and 141, must be in accordance with this AC.

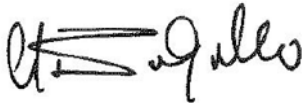
8. AUTHORIZATIONS FOR PREVIOUSLY APPROVED DEVICES.

a. Training Devices Not Approved by the National Simulator Program (NSP).

All FAA-approved training devices not evaluated or approved by the National Simulator Program in Atlanta, GA (AFS-205, under part 60) come under the evaluation, approval, and policy of AFS-800. All devices will require reauthorization on a 5-year schedule. This evaluation ensures current standards required by this AC continue to be met.

b. Authorizations Not Issued by AFS-800 or that Do Not Contain an Expiration Date.

All approvals for ground trainers, simulators (except Level A, B, C, and D), Level 1-3 FTDs, PCATDs, and ATDs with authorizations that were either not issued by AFS-800, or do not contain an expiration date, will terminate as described in FAA Notice of Policy Change for the Use of FAA Approved Training Devices in the Federal Register (Docket No.: FAA-2013-0809). The manufacturer or operator must submit a request letter as described in this AC and the notice in order to ensure the FAA has time to evaluate the request for a new LOA. See Appendix 1, paragraph 9, of this AC for additional information.



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Acting Deputy Director, Flight Standards Service

APPENDIX 1. GENERAL INFORMATION**1. DEFINITIONS.**

a. Aviation Training Device (ATD). An ATD is a training device, other than a full flight simulator (FFS) or flight training device (FTD), that has been evaluated, qualified, and approved by the Administrator. In general, this includes a replica of aircraft instruments, equipment, panels, and controls in an open flight deck area or an enclosed aircraft cockpit. It includes the hardware and software necessary to represent a category and class of aircraft (or set of aircraft) operations in ground and flight conditions having the appropriate range of capabilities and systems installed in the device as described within this advisory circular (AC) for the specific basic or advanced qualification level.

b. Basic Aviation Training Device (BATD). A BATD is a device that:

(1) Meets or exceeds the criteria outlined in Appendix 2, Basic Aviation Training Device (BATD) Requirements.

(2) Provides an adequate training platform and design for both procedural and operational performance tasks specific to the ground and flight training requirements for Private Pilot Certificate and instrument rating per Title 14 of the Code of Federal Regulations (14 CFR) parts 61 and 141.

(3) Provides an adequate platform for both procedural and operational performance tasks required for instrument experience and pilot time.

(4) The FAA finds acceptable in a manner described in this AC.

c. Advanced Aviation Training Device (AATD). An AATD is a device that:

(1) Meets or exceeds the criteria outlined in Appendix 2.

(2) Meets or exceeds the criteria outlined in Appendix 3, Advanced Aviation Training Device (AATD) Requirements.

(3) Provides an adequate training platform for both procedural and operational performance tasks specific to the ground and flight training requirements for Private Pilot Certificate, instrument rating, Commercial Pilot Certificate, and Airline Transport Pilot (ATP) Certificate, and Flight Instructor Certificate per parts 61 and 141.

(4) Provides an adequate platform and design for both procedural and operational performance tasks required for instrument experience, the instrument proficiency check, and pilot time.

(5) The FAA finds acceptable in a manner described in this AC.

d. Qualification and Approval Guide (QAG). The QAG is a required detailed description of the systems and design criteria for a BATD or AATD. The required design criteria for a

BATD are described in Appendix 2, paragraph 3. The additional design criteria for an AATD are described in Appendix 3, paragraph 3. This will include all the required elements of design and functionality.

e. Revised QAG Requirement.

(1) A manufacturer or operator who modifies an ATD in any manner must submit a revised QAG to the FAA in order for the letter of authorization (LOA) to remain valid. This requirement ensures that the standards of the initial approval are maintained, including model identification, design, system integrity, aerodynamic modeling, and other essential characteristics of the hardware/software components.

(2) The requirement to submit a revised QAG does not preclude minor changes that have only minimal effect on the functional capability of the ATD. The manufacturer should contact AFS-800 if there is any question as to what constitutes a minor change. Further, it does not preclude changes limited to specific hardware/software “mix and match” elements that are clearly identified in an approved revision to a QAG for the specific device developed by the manufacturer that provides an optional ATD model configuration.

2. PROCESS OVERVIEW. The manufacturers of a BATD or AATD are encouraged to incorporate the most advanced simulation technology and design available to represent a make, model, category, and class of aircraft. Manufacturers must provide the General Aviation and Commercial Division (AFS-800) with a suitable QAG describing the design and capability of the ATD.

a. Each manufacturer ensures that all ground and flight performance attributes required by this publication are met by performing the maneuvers, procedures, and operational training tasks applicable to the ATD in advance of any requests for evaluation and approval. The ATD should be fully functional prior to the initial application for approval.

b. The manufacturer first provides the QAG and separate letter requesting FAA evaluation and approval of their ATD at least 90 days in advance of proposed use for pilot training or experience requirements (see Figure 2, Example Letter Requesting Approval). A video of the ATD performing all of the required training device checklist items will be required to be submitted to AFS-800 in advance of the operational evaluation (see Figure 1, Aviation Training Device Checklist). This will provide the FAA and the manufacturer an opportunity to verify all of the functionality criteria of the ATD before the evaluation.

c. AFS-800 will conduct a review of the required QAG document and video, and the FAA will conduct an operational evaluation of the ATD for consideration and approval. If the evaluation is successful, AFS-800 will provide specific (LOA) approval of the ATD for use under the applicable rules in parts 61 and 141.

3. INFORMATION. Direct all inquiries regarding the evaluation, approval, and use of ATDs to FAA Flight Standards Service, General Aviation and Commercial Division, Airmen Training and Certification Branch, AFS-810, 800 Independence Avenue, S.W., Washington, DC 20591, or email to atdrecords@faa.gov. Contact information can be found at http://www.faa.gov/about/office_org/headquarters_offices/avs/offices/afs/afs800/afs810/.

4. CRITERIA FOR APPROVAL AND ACCEPTANCE OF AN ATD.

- a. The FAA approves each configuration of an ATD. The approval will be valid for all aircraft that are listed in the QAG for that configuration.
- b. The FAA may provide a new approval based on a previously issued LOA if the device meets the criteria for a basic or advanced ATD.
- c. To request FAA approval of an ATD, manufacturers should send a letter (Figure 2) with an accompanying QAG requesting approval to:

(1) FAA Flight Standards Service, General Aviation and Commercial Division, Airmen Training and Certification Branch, AFS-810, 800 Independence Avenue, S.W., Washington, DC 20591; or

(2) By email: 9-AFS-800-Correspondence@faa.gov.

NOTE: Email, with attached word text format documents, is the preferred correspondence method.

- d. The request for approval must include a separate QAG that:

(1) Contains a detailed list and description of all the hardware and software components that comprise the device configuration presented for approval. A detailed description should be submitted for each device configuration if approval for more than one device configuration is available. The description of the hardware and software components must include the manufacturer and model or version number of each component, or other such information necessary to correctly identify each component in the particular configuration.

(2) Contain a word-for-word listing of each title, number, and letter item listed in Appendix 2 for a BATD and Appendix 3 for an AATD and state the following information for each item.

(a) The operation or role of the item as appropriate to the aircraft or family of aircraft being represented.

(b) The value for each requirement that either meets or exceeds the minimum specified by that paragraph.

(c) If the aircraft or family of aircraft represented by the device does not have the referenced item, report it as in the following examples: “Carburetor Heat-N/A,” “Cowl Flaps-N/A,” or “Retractable Landing Gear-N/A.”.

(d) Performance chart for each aircraft configuration (make and model) that specifies: max takeoff weight, max speed, cruise speed, stall speed (V_{SO}), and best climb rate (V_Y) (feet per minute (fpm) at knots indicated airspeed (KIAS)). These should be specified for sea level performance and gross weight as appropriate. A center of gravity (CG) range allowed by the manufacturer for the specific make and model must also be included.

(3) Contain color photographs of the assembled unit in the intended device configuration. The photographs should be of a quality that clearly shows the overall component arrangement, features, ergonomics, and operation of each hardware control item listed for the aircraft or family of aircraft being represented.

(4) The QAG must include a cover page with the company name, address, and contact phone number with the device picture, model name and number. The page following the cover page should include a table of contents. The following is an example of a QAG outline and contents:

(a) Detailed device description. Include what overall aircraft is represented and make/model details.

(b) Listed components (hardware, software, and capability statement) and color pictures. List any hardware that makes the device function (computer processors, projectors, screens, LCD screens, etc.)

(c) Design criteria. Word-for-word listing of required qualifying items (BATD items as described in Appendix 2 plus additional AATD items as described in Appendix 3, if applicable.)

(d) Aircraft configurations, performance table(s), and CG range.

(e) Visual system.

(f) ATD checklist (Figure 1). Indicating applicable items.

NOTE: Please include footers for each page to reflect when the page was last revised or is the original version of the document. This document should be formatted as one document and book-like in nature, with numbered pages.

(5) Provide operating instructions or manual including a detailed explanation of the device operating system, installation of components and/or modules, all commands and menus, system setup, operation, troubleshooting suggestions, and appropriate aircraft operating information. The device operating manual and installation materials may be sent separately. Please include a checklist that a student and instructor would use from start to finish for the training session (aircraft make- and model-specific).

e. The requirements defined for the QAG are necessary so the FAA can determine the acceptability of a device as an ATD by conducting a comprehensive in-office evaluation and review. The FAA will evaluate the configuration and function. The ATD must appropriately represent the aircraft cockpit instrument panel design flight controls, radio and navigation equipment, panels, switches, systems, and other controls.

f. If the review is acceptable, AFS-800 will approve the QAG and schedule an operational evaluation. The FAA may conduct the operational evaluation at the manufacturer's facility or at another location agreeable to the manufacturer and the FAA. The evaluation will stress typical flight training scenarios, verify adherence to criteria stated for each item required by this

document, determine the acceptability of the device's use for flight instruction in the procedural tasks listed in Appendix 4, and establish the acceptability of operating instructions for use of the device.

NOTE: Approval of the QAG in itself is not an authorization to use the device for pilot training or experience.

(1) If the operational evaluation is acceptable, the FAA will approve the QAG for the ATD configuration presented and provide a LOA to the manufacturer.

(2) If the operational evaluation is unacceptable, the FAA will advise the applicant of the changes or corrections necessary for the FAA's reconsideration. If deemed necessary, the FAA will conduct a followup evaluation.

(3) If the FAA evaluates a revision to the QAG that was previously found acceptable and validated by an operational evaluation, the FAA may conduct another evaluation of the revised ATD configuration.

g. Once the FAA finds the QAG acceptable and issues an LOA that approves use of the device as an ATD, the manufacturer must ensure that all ATDs manufactured in that configuration continue to meet the criteria stated in the associated QAG or in an FAA-approved revision to that QAG. The device then qualifies for use in pilot training and experience as provided in the LOA.

h. The ATD manufacturer must include copies of the following documents with each ATD manufactured and delivered under an approved QAG:

- A copy of the FAA LOA for authorized use of the ATD;
- A copy of the ATD QAG for all aircraft configuration(s) represented;
- Performance information for the aircraft configurations being represented; and
- A copy or reference to this AC (recommended).

i. As noted in the contingencies of the LOA, an ATD may not be used for training and experience unless the LOA and QAG are accessible for viewing. It is acceptable for these documents to be available electronically.

j. A manufacturer or operator who changes an ATD design must send a revised QAG to the FAA for new approval. As noted in the contingencies of the LOA, any changes made to the ATD without FAA review may terminate the approval.

k. ATDs may be used without further approval per the contingencies specified in the LOA for pilot training that is not conducted under part 141. However, such pilot training operations should follow the information provided in Appendix 4 when using an ATD. The FAA may approve an ATD in a training course outline for use by a part 141 certificated pilot school as outlined in paragraph 8. The FAA may withdraw its acceptance and approval of any device for any type of pilot training or experience if the device no longer maintains the ATD criteria specified in this AC.

5. COMPATIBILITY OF SOFTWARE AND HARDWARE COMPONENTS.

a. An approved ATD consists primarily of two components: software (programming) and hardware (central processor, monitor or display, appropriate flight and power controls, and avionics). The software and hardware components must be compatible. Hardware and software compatibility is assured when the hardware manufacturer and the software developer work in close cooperation to develop the correct union of inputs for the ATD.

b. In some cases, the hardware manufacturer and the software developer do not work together in developing the ATD. Instead, the software is “licensed for use” to the ATD manufacturer and incorporated into the device. In these cases, the manufacturer must attest in writing (in the QAG) that all hardware technical requirements are compatible with the software used in the ATD. The manufacturer should obtain a compatibility statement from the software developer, which may, at the FAA’s discretion, be used to satisfy this requirement. The following is an example compatibility statement:

“This is to certify that [Name of Software Company or Developer] has demonstrated that the operating system software [Software part number and version/revision] is compatible with [Name of ATD Manufacturer, Make and Model] and can assure that the communications/transport data latency is not greater than 200 milliseconds and all analog and digital input signals meet the performance criteria established for software performance by the ATD manufacturer.”

c. Only the owner or co-developer can validate certification of the transport delay time stated in Appendix 2 and the correct analog and digital inputs necessary to ensure that the software performs adequately. Similarly, the software developer must determine the minimum computer requirements to effectively run the software.

6. MANUFACTURER RESPONSIBILITIES. Manufacturers of ATDs are responsible for providing all the required FAA documentation for each device model authorizing their use for airmen training and experience. This would include any revised LOA that may apply to the approved device. The manufacturer should provide a copy of this AC to the person or persons that purchase and use their ATD for pilot training and experience. This would also include informing the user of the request to notify AFS-800 of the intended use as specified in Appendix 4, paragraph 4.

7. APPROVAL OF ATD FOR USE UNDER PART 61. To be approved for use for pilot training and experience requirements under part 61, an ATD should:

a. Be capable of providing procedural training in all areas of operation for which it is to be used. Those tasks should be specified in an acceptable training curriculum or as specifically authorized by the FAA and meet the description and suggested criteria outlined in Appendix 4.

b. Have the following documents available for review by the student and instructor (being able to retrieve these documents electronically is acceptable):

- (1) The LOA for authorized use of the ATD.
- (2) The approved QAG for the ATD being used.
- (3) Performance information for the aircraft configurations being represented.

c. Successfully pass the startup self-test described in Appendix 2. If the device is being used in a course of training for a pilot certificate, experience, or rating, a person authorized by the FAA to provide ground or flight instruction should observe this test. The FAA expects that after the ATD self-test is complete, no software other than that necessary for the operation of the ATD will be utilized on the computer running the ATD software.

d. Remain in the approved configuration during the training session. Authorized ATD instruction should not proceed after a malfunction of the ATD system has occurred (e.g., failure of the visuals, flight controls, instruments, etc.). The operator should correct the ATD malfunction and repeat the startup test described in subparagraph 7c before resuming authorized instruction.

8. APPROVAL OF ATD FOR USE UNDER PART 141. Notwithstanding the part 61 criteria listed above, the jurisdictional Flight Standards District Office (FSDO) may approve an ATD as part of an overall part 141 school curriculum approval and certification process. Pilot schools that want to use an ATD as part of their training curriculum must notify their principal operations inspector (POI). The POI is responsible for approving how the ATD will be used in the certificate holder's part 141 curriculum and training course outline (TCO).

9. PREVIOUSLY APPROVED DEVICES. All previous approvals for ground trainers, simulators (except Level A, B, C, and D), Level 1-3 FTDs, PCATDs, and ATDs with authorizations that were either not issued by AFS-800 or do not contain an expiration date will terminate as described in FAA Notice of Policy Change for the Use of FAA Approved Training Devices in the Federal Register (Docket No.: FAA-2013-0809). The manufacturer or operator must submit a request letter as described in this AC in order to ensure the FAA has time to evaluate the new LOA request.

a. The FAA expects that in most cases the manufacturer of a previously approved device will submit the request for device approval, and that the request contains all of the supporting data required by the appropriate appendix in this AC. However, it is understood that in some cases an operator (other than the manufacturer) will seek approval for a device, and may not be able to obtain all of the technical information pertaining to the device.

b. In all instances, the applicant should provide as much data as is possible and should include a copy of the previous LOA(s). The FAA will make a determination as to whether or not the device can be approved as either a BATD or an AATD based on the information submitted by the applicant. The application will be evaluated under the current criteria listed in this AC. The FAA will have the discretion to deny approval of a training device if insufficient data is received, or if the training device qualifications significantly deviate from the standards listed in this AC.

APPENDIX 2. BASIC AVIATION TRAINING DEVICE (BATD) REQUIREMENTS

1. PURPOSE. This appendix describes how the Federal Aviation Administration (FAA) will evaluate a BATD for approval and authorized use. A BATD incorporating specific design criteria will be evaluated for approval as a BATD on the basis of meeting or exceeding the criteria outlined in this appendix.

2. AUTHORIZED USE. Except for specific aircraft type training and testing, a BATD may be approved and authorized for use in accomplishing certain required tasks, maneuvers, or procedures as applicable under Title 14 of the Code of Federal Regulations (14 CFR) parts 61 and 141. The FAA will specify the allowable credit in the BATD LOA for private pilot, instrument rating, and instrument recency of experience.

NOTE: The flight experience allowance for the use of a BATD and the flight experience allowance for an advanced aviation training device (AATD), a flight training device (FTD), or a full flight simulator (FFS) towards obtaining an instrument rating may be combined. However, that combination may not exceed that allowed under part 61, § 61.65 and may not exceed that allowed under part 141 appendix C, paragraph 4(b)(4) (50 percent maximum) of the required training.

NOTE: Part 141 certificated pilot schools must obtain a specific authorization for the use of the BATD as part of that pilot school's approved training course outline (TCO). This authorization must come from the FAA Flight Standards District Office (FSDO) assigned to that pilot school.

3. BATD DESIGN CRITERIA. The Qualification and Approval Guide (QAG) is the initial means for determining whether a BATD is acceptable for use in part 61 pilot training or approved part 141 pilot school training curricula. The QAG will be used to determine that a BATD meets or exceeds minimum FAA design criteria outlined in this appendix. A BATD found acceptable for use will typically be limited to training procedural tasks only. However, they may also be used to meet instrument experience requirements when specifically authorized. Each QAG submitted to the FAA for evaluation must state the make and model of aircraft or family of aircraft being represented and used as the basis for the following criteria:

a. Controls. A BATD must provide certain physical controls and may provide some virtual controls.

(1) Physical flight and aircraft system controls should be recognizable as to their function and how they are to be manipulated solely from their appearance. Physical flight and aircraft system controls eliminate the use of interfaces such as a keyboard, mouse, or gaming joystick to control the represented aircraft model in simulated flight.

(2) For the purpose of this advisory circular (AC), virtual control is any input device to control aspects of the simulation (such as setting aircraft configuration, location, and weather) and to program, pause, or freeze the device.

(3) Except for setup and/or fault mode entry, neither the keyboard nor the mouse may be used to set or position any feature of the BATD in the represented aircraft for the maneuvers or flight training to be accomplished. See the control requirements listed below for necessary equipment as applicable to the aircraft model represented. The pilot must operate the additional equipment needed in order to accomplish a training procedure as listed in this appendix in the same manner in which it would be operated in the actual aircraft. This would include the landing gear, wing flaps, cowl flaps, and carburetor heat, mixture, propeller, and throttle controls.

(4) The physical arrangement, appearance, and operation of controls, instruments, and switches required by this appendix should closely model the aircraft in the family of aircraft represented. Manufacturers are expected to recreate the appearance, arrangement, operation, and function of realistically placed physical switches and other required controls representative of an aircraft instrument panel that includes at least the following:

- Master/battery;
- Magnetos for each engine (as applicable);
- Alternators or generators for each engine;
- Auxiliary power unit (APU) (if applicable);
- Fuel boost pumps/prime boost pumps for each engine;
- Avionics master;
- Pitot heat; and
- Rotating beacon/strobe, navigation, taxi, and landing lights.

(5) When an FAA-approved BATD is in use, only the software package evaluated and approved by the FAA may be loaded for use on that system to avoid negative impact on available system resources.

b. Control Requirements. Physical flight and aircraft system controls must be provided as follows:

(1) Airplane.

(a) A self-centering displacement yoke or control stick that allows continuous adjustment of pitch and bank.

(b) Self-centering rudder pedals that allow continuous adjustment of yaw and corresponding reaction in heading and roll.

(c) Throttle or power control(s) that allows continuous movement from idle to full-power settings and corresponding changes in pitch and yaw, as applicable.

(d) Mixture/condition, propeller, and throttle/power control(s) as applicable to the aircraft or family of aircraft represented.

(e) Controls for the following items, as applicable to the category and class of aircraft represented:

- Wing flaps,
- Pitch trim,
- Communication and navigation radios,
- Clock or timer,
- Gear handle (if applicable),
- Transponder,
- Altimeter,
- Carburetor heat (if applicable), and
- Cowl flaps (if applicable).

(2) Helicopter.

(a) A cyclic control stick that tilts the main rotor disk by changing the pitch angle of the rotor blades in their cycle of rotation.

(b) A collective pitch control that changes the pitch angle of all main rotor blades simultaneously.

(c) Throttle/power control that allows continuous movement from idle to full power settings and which controls engine (rotor) revolutions per minute (rpm).

(d) Anti-torque pedals used to control the pitch of the tail rotor that allows continuous adjustment of the helicopter heading.

(e) Mixture/condition control applicable to the helicopter or family of helicopter represented.

(f) Controls for the following items, as applicable to the helicopter or family of helicopters represented:

- Communication and navigation radios,
- Clock or timer,
- Transponder,
- Altimeter, and
- Carburetor heat (if applicable).

c. Control Inputs: Airplane and Helicopter.

(1) Time from control input to recognizable system response must be without delay (i.e., not appear to lag in any way). The manufacturer listed in the qualification and approval guide submitted for FAA approval must verify this performance and capability.

(2) The control inputs must be tested by the computer and software at each startup and displayed as a confirmation message or a warning message that the transport delay time or any design parameter is out of original tolerances. It should not be possible to continue the training session unless the problem is resolved and all components are functioning properly. This test should consider the items listed under “Display Requirements” in subparagraph 3d below.

d. Display Requirements.

(1) Instruments and indicators replicated and properly located as appropriate to the aircraft represented:

(a) Flight instruments in a standard configuration representing the traditional “round” flight instruments. An electronic primary flight display (PFD) with reversionary and backup flight instruments will also be acceptable.

(b) A sensitive altimeter with incremental markings each 20 feet or less, operable throughout the normal operating range of the aircraft or family of aircraft represented.

(c) A magnetic direction indicator.

(d) A heading indicator with incremental markings each 5 degrees or less, displayed on a 360 degree circle. Arc segments of less than 360 degrees may be selectively displayed if desired or required, as applicable to the aircraft or family of aircraft represented.

(e) An airspeed indicator with incremental markings as shown on the aircraft or family of aircraft represented; airspeed markings of less than 40 knots need not be displayed.

(f) A vertical speed indicator with incremental markings each 100 fpm for both climb and descent, for the first 1,000 feet per minute (fpm) of climb and descent, and at each 500 fpm climb and descent for the remainder of a minimum $\pm 2,000$ fpm total display, or as applicable to the aircraft or family of aircraft being represented.

(g) A gyroscopic rate-of-turn indicator or equivalent with appropriate markings for a rate of 3 degrees per second turn for left and right turns. If a turn and bank indicator is used, the 3 degrees per second rate index must be inside of the maximum deflection of the indicator.

(h) A slip and skid indicator with coordination information displayed in the conventional skid ball format where a coordinated flight condition is indicated with the ball in the center position. A split image triangle indication may be used if applicable to the aircraft or family of aircraft being represented.

(i) An attitude indicator with incremental markings each 5 degrees of pitch or less, from 20 degree pitch up to 40 degree pitch down or as applicable to the aircraft or family of aircraft represented. Bank angles must be identified at “wings level” and at 10, 20, 30, and 60 degrees of bank (with an optional additional identification at 45 degrees) in left and right banks.

(j) Engine instruments as applicable to the aircraft or family of aircraft being represented, providing markings for normal ranges and minimum and maximum limits.

(k) A suction gauge or instrument pressure gauge with a display applicable to the aircraft represented.

(l) A flap setting indicator that displays the current flap setting. Setting indications should be typical of that found in an actual aircraft.

(m) A pitch trim indicator with a display that shows zero trim and appropriate indices of airplane nose down and airplane nose up trim, as would be found in an aircraft.

(n) Communication radio(s) with display(s) of the radio frequency in use.

(o) Navigation radio(s) capable of replicating both precision and nonprecision instruments, including approach procedures (each with an aural identification feature), and a marker beacon receiver. For example, an instrument landing system (ILS), non-directional radio beacon (NDB), Global Positioning System (GPS), Localizer (LOC) or Very high frequency Omnidirectional Range (VOR). Graduated markings as indicated below must be present on each course deviation indicator (CDI) as applicable. The marking should include:

- One-half dot or less for course/glideslope (GS) deviation (i.e., VOR, LOC, or ILS), and
- Five degrees or less for bearing deviation for automatic direction finder (ADF) and radio magnetic indicator (RMI), as applicable.

(p) A clock with incremental markings for each minute and second, or a timer with a display of minutes and seconds.

(q) A transponder that displays the current transponder setting.

(r) A fuel quantity indicator(s) that displays the fuel remaining, either in analog or digital format, appropriate for the aircraft or family of aircraft represented.

NOTE: The minimum instrument and equipment requirements specified under 14 CFR part 91, § 91.205 for day visual flights rules (VFR) and instrument flight rules (IFR) must be functional during the training session.

(2) All instrument displays listed above must be visible during all flight operations. Allowances can be made for multifunction electronic displays that may not display all instruments simultaneously. The update rate of all displays must provide an image of the instrument that:

- (a) Does not appear to be out of focus or illegible.
- (b) Does not appear to “jump” or “step” to a distracting degree during operation.
- (c) Does not appear with distracting jagged lines or edges.
- (d) Does not appear to lag relative to the action and use of the flight controls.

(3) Control inputs should be reflected by the flight instruments in real time and without a perceived delay in action. Display updates must display all changes (within the total range of the replicated instrument) that are equal to or greater than the values stated below:

- (a) Airspeed indicator: change of 5 knots.
- (b) Attitude indicator: change of 2 degrees in pitch and bank.
- (c) Altimeter: change of 10 feet.
- (d) Turn and bank: change of $\frac{1}{4}$ standard rate turn.
- (e) Heading indicator: change of 2 degrees.
- (f) Vertical speed indicator (VSI): change of 100 fpm.
- (g) Tachometer: change of 25 rpm or 2 percent of turbine speed.
- (h) VOR/ILS: change of 1 degree for VOR or $\frac{1}{4}$ of 1 degree for ILS.
- (i) ADF: change of 2 degrees.
- (j) GPS: change as appropriate for the model of GPS based navigator represented.
- (k) Clock or timer: change of 1 second.

(4) Displays must reflect dynamic behavior of an actual aircraft display (e.g., a VSI reading of 500 fpm must reflect a corresponding movement in altimeter and an increase in power must reflect an increase in the rpm indication or power indicator.)

e. Flight Dynamics Requirements.

(1) Flight dynamics of the ATD should be comparable to the way the represented training aircraft performs and handles. However, there is no requirement for an ATD to have control loading to exactly replicate any particular aircraft. An air data-handling package is not required for determination of forces to simulate during the manufacturing process.

(2) Aircraft performance parameters (such as maximum speed, cruise speed, stall speed, maximum climb rate, and hovering/sideward/forward/rearward flight) should be comparable to the aircraft or family of aircraft being represented. A performance table will need to be included in the QAG for each aircraft configuration for sea level and 5,000 feet.

TABLE 1. SAMPLE PERFORMANCE TABLE FOR SEA LEVEL

Sample	Max. T/O Weight	Max. Speed (V _{NE})	Cruise Speed	Stall Speed	Max Climb Rate
Cessna 172S Skyhawk	2550 lbs.	163 KIAS	100 KIAS @ 2400 rpm	44 KIAS (Flaps 30, power off)	480 fpm @ 73 KIAS
Piper PA-28R Arrow	2650 lbs.	183 KIAS	139 TAS @ 75% (2400 rpm, 24.4 MAP)	50 KIAS (Flaps 40, power off)	795 fpm @ 87 KIAS
Bell 206	3200 lbs.	130 KIAS	122 KIAS @ 75%	N/A	750 fpm

NOTE: Include a center of gravity range (CG) chart allowed for the make and model.

NOTE: Use standard atmosphere and gross weight conditions for these performance speeds.

(3) Aircraft vertical lift component must change as a function of bank comparable to the way the aircraft or family of aircraft being represented performs and handles.

(4) Changes in flap setting, slat setting, gear position, collective control, or cyclic control must be accompanied by changes in flight dynamics comparable to the way the aircraft or family of aircraft represented performs and handles.

(5) The presence and intensity of wind and turbulence must be reflected in the handling and performance qualities of the simulated aircraft and should be comparable to the way the aircraft or family of aircraft represented performs and handles.

f. Instructional Management Requirements.

(1) The instructor must be able to pause the system at any point for the purpose of administering instruction regarding the task.

(2) If a training session begins with the “aircraft in the air” and ready for the performance of a particular procedural task, the instructor must be able to manipulate the following system parameters independently of the simulation:

- Aircraft geographic location,
- Aircraft heading,
- Aircraft airspeed,
- Aircraft altitude, and
- Wind direction, speed, and turbulence.

(3) The system must be capable of recording both a horizontal and vertical track of aircraft movement during the entire training session for later playback and review.

(4) The instructor must be able to disable any of the instruments prior to or during a training session and be able to simulate failure of any of the instruments without stopping or freezing the simulation to affect the failure.

(5) The ATD must have at least a navigational area database that is local to the training facility to allow reinforcement of procedures learned during actual flight in that area. All navigational data must be based on procedures as published per 14 CFR part 97.

APPENDIX 3. ADVANCED AVIATION TRAINING DEVICE (AATD) REQUIREMENTS

1. PURPOSE. This appendix describes how the Federal Aviation Administration (FAA) will evaluate an AATD for approval and authorized use. A basic aviation training device (BATD) incorporating the additional specific advanced design simulation criteria will be evaluated for approval as an AATD on the basis of meeting or exceeding the additional criteria outlined in this appendix.

2. AUTHORIZED USE. Except for specific aircraft type training and testing, an AATD may be approved and authorized for use in accomplishing certain required tasks, maneuvers, or procedures as applicable under Title 14 of the Code of Federal Regulations (14 CFR) parts 61 and 141. The FAA will specify the allowable credit in the AATD LOA for private pilot, instrument rating, instrument recency of experience, instrument proficiency check, commercial pilot, and airline transport pilot (ATP).

NOTE: The flight experience allowance for the use of an AATD and the flight experience allowance for a flight training device (FTD) or a flight simulator towards obtaining an instrument rating may be combined. However, that combination may not exceed that allowed under part 61, § 61.65 and may not exceed that allowed under part 141 appendix C, paragraph 4(b)(4) (50 percent maximum) of the required training.

NOTE: A part 141 certificated pilot school must obtain a specific authorization for the use of the ATD as part of that pilot school's approved training course outline (TCO). This authorization must come from the FAA Flight Standards District Office (FSDO) assigned to that pilot school.

3. AATD DESIGN CRITERIA. Devices presented for approval as an AATD must first meet or exceed the requirements for BATD approval criteria contained in Appendix 2. An AATD must display sufficient aircraft cockpit design, ergonomic features, and performance characteristics beyond that of the BATD approval criteria to qualify for the authorized uses appropriate for the AATD simulation devices. Since it is highly desirable for the pilot to be mentally immersed in a realistic aircraft cockpit when using an AATD, design features must significantly exceed those of a BATD cockpit layout.

a. An AATD must include the following features and components:

(1) A realistic shrouded (enclosed) or unshrouded (open) cockpit design and instrument panel arrangement representing a specific model aircraft cockpit.

(2) Cockpit knobs, system controls, switches, and/or switch panels in realistic sizes and design appropriate to each intended functions, in the proper position and distance from the pilot's seated position, and representative of the category and class of aircraft being represented.

(3) Primary flight and navigation instruments appropriately sized and properly arranged that exhibit neither stepping nor excessive transport delay.

- (4) Digital avionics panel.
- (5) Global Positioning System (GPS) navigator with moving map display.
- (6) Two-axis autopilot, and, as appropriate, a flight director (FD). This is not required for an ATD representing a helicopter.
- (7) Pitch trim (manual or electric pitch trim) permitting indicator movement either electrically or analog in an acceptable trim ratio.
- (8) An independent visual system, panel, or screen that provides realistic cues in both day and night visual flight rules (VFR) and instrument flight rules (IFR) meteorological conditions to enhance a pilot's visual orientation in the vicinity of an airport including:
 - Adjustable visibility parameters; and
 - Adjustable ceiling parameters.
- (9) A pilot seat appropriate to the aircraft configuration.
- (10) Rudder pedals secured to the cockpit floor structure, or that can be physically secured to the floor beneath the device in proper relation to cockpit orientation.
- (11) Push-to-talk switch on the control yoke.
- (12) A separate instructor station to permit effective interaction without interrupting the flight in overseeing the pilot's horizontal and vertical flight profiles in real time and space. This must include the ability to:
 - (a) Oversee tracks along airways, holding entries and patterns, and Localizer (LOC) and glideslope (GS) alignment/deviation (or other approaches with a horizontal and vertical track).
 - (b) Function as air traffic control (ATC) in providing vectors, etc., change in weather conditions, ceilings, visibilities, wind speed and direction, light/moderate/severe turbulence, and icing conditions.
 - (c) Invoke failures in navigation and instruments, radio receivers, landing gear and flaps, engine power (partial and total), and other aircraft systems (pitot, electric, static, etc.) by using either a keyboard or mouse.
- (13) Capable of simulating all of the emergency procedures for which a checklist is prescribed in the aircraft pilot's operating handbook (POH) or flight manual.
 - b. The following features and components are not required for the FAA's approval of an AATD, but are encouraged:
 - (1) Automated ATC communications, scenario-based training, or line-oriented type training in which the instructor can evaluate pilot performance without having to act as ATC;

- (2) Motion capability with simulated bank, yaw, and pitch cues;
- (3) Loss of performance and aerodynamic changes from ice accretion; and
- (4) Realistic aircraft engine sound appropriate to the aircraft configuration, power settings, and speed.
- (5) A magnetic compass with incremental markings each 5 degrees, that displays the proper lead or lag during turns, and displays incremental markings typical of that shown in the aircraft.

APPENDIX 4. TRAINING CONTENT AND LOGGING PROVISIONS

1. INTEGRATED TRAINING CURRICULUM.

a. This is a curriculum that can use an Aviation Training Device (ATD) for flight tasks where an instructor teaches the required knowledge in the classroom and then follows with procedural training. For example, in an integrated ground and flight instrument training curriculum, an authorized instructor teaches the required knowledge for an instrument landing system (ILS) approach through ground and classroom training. The instructor adds flight procedures in the ground-training environment. After the student has gained the required knowledge and understands the procedures, the instructor then adds practicing the psychomotor skills of the task. The instructor may do this by providing a simulated flight environment in a specifically approved ATD, flight training device (FTD), or full flight simulator (FFS). When the student becomes proficient in the training device then the instruction would transition to the aircraft.

b. The Federal Aviation Administration (FAA) recommends that an instructor who intends to use an ATD for training pilot candidates obtain documented advanced training from the manufacturer (or person proficient with its use) on all aspects of the training device operation. This indoctrination should include a complete review of the available databases, aircraft configurations, systems review (avionics and aircraft systems and performance), weather simulations, systems failure capabilities, instructor station use, and support available from the manufacturer. This would be similar to someone becoming familiar and proficient in a new aircraft as described for transition or differences training.

NOTE: The FAA recommends that instructors use an ATD in an integrated training curriculum because of the benefits that a structured training course provides.

2. COURSE CONTENT. The FAA expects the instrument tasks below to be incorporated into an integrated ground and flight training curriculum in which an ATD is used. Procedural training for visual flight rules (VFR) operations can also be included in a syllabus or training course outline (TCO) for primary flight training. Procedural tasks might include traffic pattern operations, navigation, slow flight and stalls, control and maneuvering of an aircraft solely by reference to instruments, and emergency operations. Preparation for a flight review could also be incorporated. Training should include FAA-approved TCOs for Title 14 of the Code of Federal Regulations (14 CFR) part 141 flight schools and FAA/Industry Training Standards (FITS). These training tasks would be taught to the proficiency requirements of the certification standards appropriate for the pilot certificate or privilege sought.

a. Flight by Reference to Instruments.

- Basic attitude flying,
- Straight and level flight,
- Change of airspeed,
- Constant airspeed climbs,
- Constant airspeed descents,

- Constant rate climbs,
- Constant rate descents,
- Level turns, including standard rate turns,
- Climbing turns,
- Descending turns, and
- Steep turns.

b. Abnormal and Emergency Procedures.

- Partial panel;
- Timed turns;
- Compass turns and associated errors (if installed);
- Instrument failures;
- Automation failures (primary flight display, Global Positioning System (GPS) navigation, systems management, etc.);
- Flight automation failures (such as autopilot failure) including recovery from potential loss of control;
- Encountering unexpected weather conditions;
- Electrical, systems or equipment failures;
- Procedures for turbulence;
- Loss of control procedures (due to weather radar (WX) conditions, equipment failure, flight automation, etc.);
- Unusual attitude recovery;
- Engine failure(s) (partial or complete); and
- Hydraulic or boost failures.

c. Radio Navigation Procedures.

- Use of Very high frequency Omnidirectional Range (VOR), Localizer (LOC), instrument landing system (ILS), and Area Navigation (RNAV) including GPS;
- Holding patterns (VOR, ILS, LOC, GPS, Intersection, and Waypoints);
- Use of distance measuring equipment (DME);
- Use of automatic direction finder (ADF)/non-directional radio beacon (NDB) (optional); and
- Use of autopilot/flight director (FD) (optional).

d. Instrument Approach Procedures (IAP).

(1) Precision:

- ILS, and
- Wide area augmentation system (WAAS) with vertical navigation (VNAV) (optional).

(2) Nonprecision:

- VOR,
- LOC,
- RNAV (including GPS),
- WAAS (optional),
- ADF/NDB (optional),
- ILS/LOC back course (LOC BC), and
- Missed Approach Procedures (MAP) for all of the procedures above.

e. Communications Procedures.

- Air traffic control (ATC) clearances;
- Taxi clearance and instructions (emphasis on runway incursion prevention);
- Departure clearance;
- En route clearances;
- Holding instructions;
- Arrival clearances;
- Missed approach instructions and clearances;
- Radio advisories and warnings;
- Automated terminal information service (ATIS) and common traffic advisory frequency (CTAF); and
- Significant meteorological information (SIGMET), Airmen's Meteorological Information (AIRMET), Notices to Airmen (NOTAM), Flight Service Station (FSS), communications, and flight plan changes.

f. Cross-Country Procedures.

- Departure,
- En route,
- Diversion to alternate,
- Arrival, and
- MAPs.

NOTE: Training requirements for pilot certification that require cross-country, solo, night, or takeoff and landings cannot be accomplished in ATDs. Some training requirements specify that they must be accomplished in an aircraft. For example, the three hours of control and maneuvering of an airplane solely by reference to instruments described in § 61.109(a)(3) for a private pilot must be accomplished in a single-engine airplane. Authorized instructors may teach such maneuvers and tasks in an FAA-approved training device (to the airman certification standards), and then transition to the aircraft for those same maneuvers and tasks necessary to meet the aeronautical experience requirements required for pilot certification.

3. LOGGING TRAINING TIME AND EXPERIENCE. Authorized instructors utilizing an FAA-approved ATD for airmen training, pilot time, and experience requirements are required to log the time as dual instruction and as basic aviation training device (BATD) or advanced aviation training device (AATD) time appropriately. Any columns that reference flight time should remain blank when logging ATD time. Simulated instrument time can be logged in an ATD, but only during the time when the visual component of the training session is configured for instrument meteorological conditions (IMC) and the pilot is maintaining control solely by reference to the flight instruments. Logging time in this fashion will allow a pilot to credit this time towards the aeronautical experience and recent experience requirements as specified in 14 CFR part 61 or 141. It is required under part 61, § 61.51(b)(1)(iv) that the type and identification of the ATD be included in the logging of pilot time as described in the letter of authorization (LOA). It is the responsibility of the flight instructor, student, or certificated pilot to verify the device is qualified and approved for training or experience requirements. It would be appropriate for the person using the ATD to retain a copy of the LOA.

NOTE: There are no restrictions on the amount of training accomplished and logged in training devices. However, the regulatory limitations on maximum credit allowed for the minimum pilot certification requirements are specified by parts 61 and 141 and in the LOA. No approvals or authorizations are provided for aircraft type ratings using ATDs.

4. REPORTING ATD USE AND TRAINING DATA. Pilot schools, flight instructors, and owners using an FAA-approved ATD for airmen training or experience requirements are requested to notify the General Aviation and Commercial Division (AFS-800) annually that would include the information listed below. This information is voluntary and will be used to continually validate the authorized use of the ATD and to determine whether additional uses or regulatory amendments are necessary. The information provided should be sent to the email address: atdrecords@faa.gov. The letter should contain:

- The name, address, and phone number of the individual, organization, and pilot school certificate number (if applicable) providing the training or experience;
- Address and location of the ATD;
- The courses for pilot certification in which the ATD will be used;
- The make and model of the ATD being used for training and the LOA expiration date,
- Notice of sale, change of location, or discontinued use of the ATD; and
- Any information considered helpful in determining the level of effectiveness of the device.

APPENDIX 5. EVALUATION AND SUBJECTIVE TEST CRITERIA**1. GENERAL REQUIREMENTS AND EVALUATION.**

a. Devices eligible as an Aviation Training Device (ATD) must conform to an acceptable aircraft cockpit configuration and instrument panel design. (See Appendices 2 and 3) The simulated systems and subsystems should be able to perform operational functions and performance maneuvers that closely mimic the represented aircraft. Specific attention should be given to ergonomic and human factors.

b. These training devices must clearly show eligibility in advance to receive consideration. The design and function should mentally and physically challenge the student piloting skills. This should include both procedural and operational performance items specified in the practical test standards (PTS). The criteria listed in Appendices 2 and 3 and the checklist shown in Figure 1 below will be used to determine whether the design and performance of the training device qualifies for Federal Aviation Administration (FAA) approval as an ATD. The FAA will use the following checklist during the evaluation of an ATD and must be included in the Qualification and Approval Guide (QAG):

FIGURE 1. AVIATION TRAINING DEVICE CHECKLIST

Functions and Maneuvers	Satisfactory? Yes/No
a) Preparation for Flight	
1) Preflight	
b) Pretakeoff	
1) Engine start	
2) Brake operation	
c) Takeoff	
1) AIRPLANE Takeoff	
i) Powerplant checks	
ii) Acceleration characteristics	
iii) Nose wheel and rudder steering	
iv) Effect of crosswind	
v) Instrument	
vi) Landing gear, wing flap operation	
2) HELICOPTER Takeoff	
i) Powerplant checks	
ii) From hover	
iii) From ground	
iv) Vertical	
v) Running	
d) In-Flight Operation	
1) AIRPLANE In-Flight Operation	
i) Climb	
(a) Normal	
(b) One engine inoperative procedures	

Functions and Maneuvers	Satisfactory? Yes/No
ii) Cruise	
(a) Performance characteristics (speed vs. power)	
(b) Normal and steep turns	
(c) Performance turns	
(d) Approach to stalls (i.e., stall warning) Cruise, takeoff & approach, and landing configurations	
(e) High angle of attack maneuvers Cruise, takeoff & approach, and landing configurations	
(f) In-flight engine shutdown	
(g) In-flight engine start	
2) HELICOPTER In-Flight Operation	
i) Hovering	
(a) Forward	
(b) Rearward	
(c) Sideward	
(d) Turns	
ii) Climb	
iii) Cruise	
(a) Performance characteristics	
(b) Turns	
(i) Recovery	
(ii) Skidding	
(iii) Slipping	
(c) In-flight engine shutdown	
(d) In-flight engine start	
iv) Descent	
e) Approaches	
1) Non-Precision	
i) GPS-WAAS (optional)	
ii) GPS-LAAS (optional)	
iii) All engines operating	
iv) One or more engines inoperative	
v) Approach procedures (NDB, VOR, DME Arc, LOC BC, LOC, LDA, SDF, ASR, LNAV/VNAV, GPS and LPV)	
2) Precision	
i) ILS	
ii) GLS	
iii) Effects of crosswind	
iv) With engine(s) inoperative	
v) Missed approach	
(a) Normal	
(b) With engine(s) inoperative	
(c) From steep glide slope	

Functions and Maneuvers	Satisfactory? Yes/No
f) Surface Operations (AIRPLANE-Post Landing)	
1) Landing roll	
2) Braking operation	
3) Reverse thrust operation, if applicable	
g) Any Flight Phase	
1) Aircraft and Power Plant Systems	
i) Electrical	
ii) Flaps (Airplane)	
iii) Fuel and oil	
iv) Landing gear (Airplane)	
2) Flight Management and Guidance Systems	
i) Autopilot (AATD only)	
ii) Flight director (AATD only)/system displays	
iii) Navigation systems	
iv) Stall warning avoidance (Airplane)	
v) Multi-function displays	
3) Airborne Procedures	
i) Holding	
ii) Uncoordinated turns – slipping and skidding turns	
iii) Configuration and power changes, and resulting pitch changes	
iv) Compass turns with proper errors (if installed)	
v) Normal flight maneuvers with the center of gravity (CG) beyond the rear limit and associated instability	
4) Engine Shutdown and Parking	
i) Systems operation	
ii) Parking brake operation (Airplane)	

2. REQUESTING FAA APPROVAL OF ATD. The manufacturer of an ATD must include this completed checklist in the QAG. The letter of application signed by the manufacturer must be submitted to the General Aviation and Commercial Division (AFS-800) (per Appendix 1), along with a complete QAG describing how the training device meets basic aviation training device (BATD) approval criteria listed in Appendix 2, and if applicable the additional advanced aviation training device (AATD) approval criteria listed in Appendix 3.

FIGURE 2. EXAMPLE LETTER REQUESTING APPROVAL

Dear [NAME]: Date:

[Name of manufacturer/developer] requests an evaluation of its [make, model, serial number] proposed basic or advanced aviation training device (BATD or AATD) for approval by the Federal Aviation Administration (FAA) at:

[Location where the evaluation is requested].

This device is fully described in the accompanying Qualification and Approval Guide (QAG). This device is fully functional and has been evaluated and tested by the manufacturer and is believed to adequately meet the applicable requirements for approval as a (BATD or AATD). Appropriate hardware and software configuration control procedures have been established and are listed for your review and approval.

The following [manufacturer's/developer's name] personnel have assessed this device:

Name _____ Qualification & Title _____

Name _____ Qualification & Title _____

Who attest that:

It conforms to [the specific make, model, category and class of aircraft] and that the simulated systems and subsystems function equivalently to those found in that aircraft;

The performance and handling qualities have been assessed and have been determined to adequately represent the designated category and class of aircraft; and

The device contains the design features required for a basic aviation training device (BATD) or advanced aviation training device (AATD).

Sincerely,

[Signature of Manufacturer or Authorized Representative]

[Printed Name of Signatory and contact information, including address, phone number, and email]

Enclosure – QAG for [make and model name of training device]

3. ATD APPROVAL PROCESS SUMMARY.

a. Manufacturer sends QAG and request (letter) for evaluation and approval via regular mail or as text files attached to an email to the FAA (AFS-800) at least 90 days in advance. Email is the preferred correspondence method. Contact AFS-800 at 9-AFS-800-Correspondence@faa.gov.

b. The FAA (AFS-800) receives a QAG and formal letter requesting evaluation and approval of manufacturers ATD.

c. If request for approval and QAG are found to be complete, then skip Step d and go to Step e.

d. If request letter for approval or QAG is found to be initially unacceptable, then the FAA will contact the manufacturer to discuss the needed changes to the document. Go back to Step a.

e. AFS-800 conducts “desk” audit of QAG. If “desk” audit results are found acceptable, then skip Step f and go to Step g.

f. If the “desk” audit results are found unacceptable, then the FAA will contact the manufacturer to discuss the needed changes to the QAG. Go back to Step e.

g. An FAA aviation safety inspector (ASI) schedules and conducts an operational evaluation of the device.

h. If the evaluation results are found acceptable, then skip Step i and go to Step j.

i. If the evaluation results are found unacceptable, then the FAA evaluator will contact the manufacturer to discuss the issues that need to be resolved. Go back to Step g.

j. AFS-800 will issue a letter of authorization (LOA) along with the approved QAG to the manufacturer via regular mail and/or by email.

4. PREVIOUSLY APPROVED TRAINING DEVICES SEEKING A NEW LOA.

a. The manufacturer sends a QAG and a separate formal letter requesting evaluation and approval via regular mail or as text word files attached to an email to the FAA (AFS-800) using the general request procedures described by this AC. The request should include a copy of the previous LOA, as well as a contact phone number and email address.

(1) Email is the preferred correspondence method. Contact AFS-800 at 9-AFS-800-Correspondence@faa.gov.

(2) See Appendix 1, paragraph 9 for information concerning devices that have not previously been approved as either an AATD or BATD.

b. The FAA (AFS-800) receives the LOA, QAG, and letter requesting evaluation and approval of the manufacturer's previously approved training device. The general procedures listed in paragraph 3 of this appendix will apply.

NOTE: The FAA will consider previous applications and reviews conducted for the device in determining whether an additional operational evaluation is necessary.