



Advisory Circular

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

Date: 9/12/18

AC No: 61-136B

Initiated by: AFS-800

Change:

- 1 PURPOSE OF THIS ADVISORY CIRCULAR (AC).** This AC provides information and guidance for Aviation Training Device (ATD) manufacturers seeking Federal Aviation Administration (FAA) approval of a basic aviation training device (BATD) or advanced aviation training device (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 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.
 - 2.1 ATD Assessment.** A new ATD must be satisfactorily assessed in the areas essential to airman training fundamentals to the extent described in:
 - Appendix [A](#), General Information;
 - Appendix [B](#), Basic Aviation Training Device (BATD) Requirements;
 - Appendix [C](#), Advanced Aviation Training Device (AATD) Requirements;
 - Appendix [D](#), Training Content and Logging Provisions; and
 - Appendix [E](#), Evaluation and Subjective Test Criteria.
 - 2.2 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 instrument 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 (FS) General Aviation and Commercial Division approving them as either a BATD or an AATD. The LOA will be valid for a 5-year period with a specific expiration.

3 WHERE YOU CAN FIND THIS AC. You can find this AC on the FAA's website at http://www.faa.gov/regulations_policies/advisory_circulars.

4 WHAT THIS AC CANCELS. AC 61-136A, FAA Approval of Aviation Training Devices and Their Use for Training and Experience, dated November 17, 2014, is canceled.

5 RELATED 14 CFR PARTS.

- 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](#).

6 RELATED READING MATERIAL (current editions).

- [FAA-S-ACS-6](#), Private Pilot – Airplane Airman Certification Standards.
- [FAA-S-ACS-7](#), Commercial Pilot – Airplane Airman Certification Standards.
- [FAA-S-ACS-8](#), Instrument Rating – Airplane Airman Certification Standards.
- [FAA-S-8081-4](#), Instrument Rating Practical Test Standards for Airplane, Helicopter, and Powered Lift.
- [FAA-S-8081-5](#), Airline Transport Pilot and Aircraft Type Rating Practical Test Standards for Airplane.
- [FAA-S-8081-15](#), Private Pilot Practical Test Standards for Rotorcraft.
- [FAA-S-8081-16](#), Commercial Pilot Practical Test Standards for Rotorcraft.
- [FAA-S-8081-20](#), Airline Transport Pilot and Aircraft Type Rating Practical Test Standards for Helicopter.
- FAA Order 8900.1, [Volume 11, Chapter 10, Section 1](#), Approval, Oversight, and Authorized Use Under 14 CFR Parts 61 and 141.

7 BACKGROUND. Continuing development in computer flight simulation and visual displays have led to popular use of flight simulation training devices (FSTDs) and ATDs in General Aviation (GA). The GA community is using this evolving simulation technology to provide increasingly effective pilot training at reduced cost. This AC reflects the FAA's experience with ATD flight simulation technology used to meet specific regulatory flight training and experience requirements of parts 61 and 141.

7.1 Flight Procedures, Tasks, and Operational Skills. Flight instructors have typically taught procedural skills and tasks during in-flight training. However, the FAA has

determined that instructors can successfully teach many of these procedural skills and tasks during ground training using ATD simulation. The FAA recognizes that flight instructors can effectively teach many operational skills (e.g., instrument flying, traffic patterns, stabilized approaches, emergency procedures, etc.) using ATDs. These procedural and operational skills can then be positively transferred to successful operations in aircraft. Information on integrating ground training using an ATD with flight training can be found in Appendix [D](#).

7.2 Evaluations of ATDs. The FAA has evaluated many flight simulation systems and applications for ATDs. These evaluations determine whether the elements and tasks of pilot training and other experience requirements described within part 61 or part 141 can be successfully accomplished using ATDs. Pilots and instructors may use ATDs in accordance with the LOA to meet certain training and aeronautical experience requirements listed in part 61 or part 141.

8 ACTION. Manufacturers can use this AC as a method of compliance to satisfy the requirements to obtain FAA approval of their ATD. The criteria listed in Appendix [B](#) is exclusively for BATDs and the criteria listed in Appendix [C](#) is for additional items required for AATDs. When the FAA determines that an ATD qualifies, an LOA will be provided to the manufacturer specifying the training credit allowances. All approvals for pilot training and experience, including approvals for use under parts 61 and 141, must be in accordance with criteria specified in this AC and the LOA.

9 AUTHORIZATIONS FOR PREVIOUSLY APPROVED DEVICES.

9.1 Training Devices Not Approved by the National Simulator Program (NSP) Branch. All FAA-approved training devices not evaluated or approved by the NSP Branch in Atlanta, GA (under part 60) come under the evaluation, approval, and policy of the General Aviation and Commercial Division. All ATDs will require reauthorization on a 5-year schedule. This evaluation ensures that current standards and criteria identified by this AC continue to be met.

9.2 Previous Authorizations Not Issued by the General Aviation and Commercial Division or That Do Not Contain an Expiration Date. All approvals for ground trainers, simulators (except for FFS Level A–D and FTD Levels 4–7), FTDs Level 1–3, personal computer-based aviation training devices (PCATD), and ATDs with authorizations that were either not issued by the General Aviation and Commercial Division, or do not contain an expiration date, terminated on December 31, 2015 as described in Federal Register (FR) Docket No. [FAA-2013-0809](#), Notice of Policy Change for the Use of FAA Approved Training Devices. A manufacturer or operator may submit an application letter as described in this AC in pursuit of a new LOA. See Appendix [A](#), paragraph [A.5](#), Previously Approved Devices, for additional information.

10 AC FEEDBACK FORM. For your convenience, the AC Feedback Form is the last page of this AC. Note any deficiencies found, clarifications needed, or suggested improvements regarding the contents of this AC on the Feedback Form.

A handwritten signature in blue ink, appearing to read "Michael Zenkovich".

Michael Zenkovich
Deputy Executive Director, Flight Standards Service

APPENDIX A. GENERAL INFORMATION

A.1 Information Requests. Inquiries regarding the evaluation, approval, and use of ATDs should be directed to FAA Flight Standards Service, General Aviation and Commercial Division, Airmen Certification and Training Branch (AFS-810), 800 Independence Avenue, S.W., Washington, DC 20591. Contact information can be found at https://www.faa.gov/about/office_org/headquarters_offices/avs/offices/afx/afs/afs800/afs810/.

A.2 Definitions.

A.2.1 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 as a basic or advanced ATD (refer to 14 CFR part [61](#), § [61.1](#)). 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 AC for the specific basic or advanced qualification level.

A.2.2 Basic Aviation Training Device (BATD). A BATD is a device that:

1. Meets or exceeds the criteria outlined in Appendix [B](#), 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 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.

A.2.3 Advanced Aviation Training Device (AATD). An AATD is a device that:

1. Meets or exceeds the criteria outlined in Appendix B.
2. Meets or exceeds the criteria outlined in Appendix [C](#), 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 (IPC), and pilot time.
5. The FAA finds acceptable in a manner described in this AC.

A.2.4 Qualification and Approval Guide (QAG). The QAG is a detailed description of the simulated aircraft systems, design criteria, and functionality for a BATD or AATD trainer. The required design criteria for a BATD are described in Appendix [B](#), paragraph [B.3](#). The additional design criteria for an AATD are described in Appendix [C](#), paragraph [C.3](#). The QAG must include and verify all the required elements of design and functionality identified in these appendices to facilitate FAA approval.

A.2.4.1 The QAG document must include a cover page with the company name, address, and contact phone number with the training device picture, model name, and number. The following page should include the table of contents. The following is an example of the appropriate QAG contents:

1. **Trainer Description.** Include a detailed description of what aircraft are represented and the model details. This is where quality pictures of the trainer should be located. This will permit easy identification of the approved trainer configuration(s).
2. **Components List.** List any hardware or software components that make the device function (flight deck panels, avionics components, computer processors, projectors, screens, LCD screens, operating systems software, etc.).
3. **Design Criteria.** Word-for-word listing identifying the applicable qualifying items (BATD criteria as described in Appendix B, plus the additional AATD criteria as described in Appendix C, if applicable.)
4. **Aircraft Configurations.** Provide a picture of the instrument panel for each configuration. The performance table for all aircraft available should be provided in this section.
5. **Visual System(s).** Provide pictures and descriptions of the visual systems available for the trainer.
6. **ATD Checklist** (see Appendix [E](#), Evaluation and Subjective Test Criteria, Table [E-1](#), Procedures and Tasks Test Checklist). Identify the functions and tasks that can be accomplished in this trainer.

A.2.4.2 Please include footers for each page to reflect when the page was last revised, or if it is the original version of the document. This document should be formatted as one document and book-like in nature, with numbered pages. Each content section should start at the top of a new page.

A.2.5 Revised QAG Requirement.

A.2.5.1 A manufacturer or operator who modifies an ATD in any manner must submit a revised QAG to the General Aviation and Commercial Division for evaluation and approval. The manufacturer must also submit a new application letter summarizing the changes that are reflected in the revised QAG. This ensures that the standards of the approval are maintained, including model identification, design, system integrity, aerodynamic modeling, and other essential characteristics of the hardware/software components.

A.2.5.2 The requirement to submit a revised QAG does not preclude minor changes that have only minimal effect on the functional capability of the ATD, such as new processors, new visual panels, software updates, etc. However, if the change affects the interface with the operator such as new avionics equipment or a physical panel change, that would require FAA evaluation and approval. The manufacturer should contact the General Aviation and Commercial Division 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.

A.3 Process Overview. The manufacturers of a BATD or AATD are encouraged to incorporate the most advanced simulation technology and design available to represent category, class, and make and model (M/M) of aircraft. Manufacturers must provide the General Aviation and Commercial Division with a detailed QAG describing the design and capability of the ATD.

A.3.1 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 requesting an evaluation.

A.3.2 The manufacturer then provides the QAG, an operations manual, and application letter requesting FAA evaluation and approval of their ATD at least 90 days (120 days is recommended) in advance of any proposed use for pilot training or experience requirements (see Appendix E, Figure E-1, Example Application Letter Requesting Evaluation). A video of the ATD performing all of the required training device checklist items will also be required and submitted to General Aviation and Commercial Division in advance of the operational evaluation (see Table E-1). This will provide the FAA and the manufacturer an opportunity to verify all of the functional criteria of the ATD before the official evaluation.

A.3.3 The General Aviation and Commercial Division 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, the General Aviation and Commercial Division will provide a letter of authorization (LOA) approval of the ATD model for use under the applicable rules in parts 61 and 141.

A.4 Approval and Acceptance of an ATD.

A.4.1 The FAA approves each configuration of an ATD. The approval will be valid for all aircraft configurations that are listed in the QAG for that specific model.

A.4.2 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.

A.4.3 To request FAA approval of an ATD, manufacturers should send the application letter (see Figure [E-1](#)) with an accompanying QAG and operations manual requesting evaluation to:

- 9-AFS-800-Correspondence@faa.gov. Send request with documents attached in word text format (preferred), or
- FAA Flight Standards Service, General Aviation and Commercial Division, Airmen Certification and Training Branch (AFS-810), 800 Independence Avenue, S.W., Washington, DC 20591.

A.4.4 The request for approval must include a separate QAG that:

A.4.4.1 Contains a detailed list and description of all the hardware and software components that makes up the training device presented for approval. This list must include any optional equipment or features. The description of the hardware and software components must include the manufacturer, model, and version number of each component, or any other information necessary to correctly identify each component or feature.

A.4.4.2 Contain a word-for-word listing of each title, number, and letter item listed in Appendix [B](#) for a BATD, and additionally the items listed in Appendix [C](#) for an AATD approval, and state the following information for each item.

1. The operation or role of the item as appropriate to the aircraft being represented.
2. The value for each requirement that either meets or exceeds the minimum specified for that item or criteria.
3. If the aircraft represented does not have the referenced item by design, report it as follows: “Carburetor Heat-N/A, Cowl Flaps-N/A,” or “Retractable Landing Gear-N/A.”
4. A performance chart for the aircraft configurations (M/M) represented must be included in the QAG, appropriate to the airplane or helicopter configuration. Performance should be specified for sea level and 6,000 ft mean sea level (MSL) at

gross weight. The QAG must contain color photographs of the assembled unit in any of the configurations available.

The photographs must clearly show the overall component arrangement, features, ergonomics, and operational role of each hardware control or display item listed for the aircraft being represented.

- A.4.5** The requirements specified 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 of the QAG. The ATD must appropriately represent the aircraft cockpit instrument panel design, flight controls, radio and navigation equipment, panels, switches, systems, and other controls and be readily identifiable in the QAG.
- A.4.6** If the review is acceptable, the Airman Certification and Training Branch will preliminarily approve the QAG and schedule an operational evaluation. Approval of the QAG in itself is not an authorization to use the device for pilot training or experience. The operational evaluation can be conducted at the manufacturer's facility or at any location agreeable to the manufacturer and the FAA. The evaluation will stress typical flight training scenarios and tasks, 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 [D](#), Training Content and Logging Provisions, and determine if the operating instructions for the trainer are adequate.
- A.4.6.1** If the operational evaluation is acceptable, the FAA will approve the QAG for the ATD configurations listed, and provide a LOA to the manufacturer.
- A.4.6.2** If the operational evaluation is unacceptable, the FAA will advise the applicant of the changes or corrections necessary for the FAA's reconsideration. If necessary, the FAA will conduct a followup functional evaluation.
- A.4.6.3** If the FAA evaluates a revision to the QAG that was previously approved, the FAA may require another functional evaluation of the ATD trainer.
- A.4.7** When 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 are identical and otherwise continue to meet the criteria stated in the associated FAA-approved QAG, or approved revision to that QAG.
- A.4.8** 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 approving use of the ATD;
 - A copy of the FAA-approved QAG for all aircraft configuration(s) represented;
 - Performance information for the aircraft configurations being represented; and
 - A copy or reference to this AC (recommended).

- A.4.9** As noted in the contingencies of the LOA, an ATD may not be used for training and experience unless the LOA and QAG accompany the trainer and are accessible for viewing. It is acceptable for these documents to be available electronically.
- A.4.10** A manufacturer or operator who changes an ATD design must send a revised QAG to the FAA for a new approval. As noted in the contingencies of the LOA, any changes made to the ATD without FAA review may terminate the approval.
- A.4.11** ATDs may be used without further approval per the allowances 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 [D](#) when using an ATD. The FAA may approve an ATD in a training course outline (TCO) for use by a part 141 certificated pilot school as outlined in paragraph [A.9](#). 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.
- A.4.12** For those trainers with an LOA that will expire within 120 days, the manufacturer can apply for a new LOA. The manufacturer will need to reapply for FAA approval, to include the submission of an application letter and QAG verifying that the trainer model still meets the current criteria identified in this AC for ATD approvals.
- A.5 Previously Approved Devices.** All previous approvals for ground trainers, simulators (except for FFS Level A–D and FTD Levels 4–7), FTDs Level 1–3, personal computer-based aviation training devices (PCATD), and ATDs with authorizations that were either not issued by the General Aviation and Commercial Division or do not contain an expiration date have been terminated as described in Federal Register (FR) Docket No. [FAA-2013-0809](#). The manufacturer or operator can submit for a new approval as described in this AC.
- A.5.1** The FAA expects that in most cases the manufacturer of a previously approved device will submit a request for a new approval, and that the request should contain all of the information required by the appropriate appendixes 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.
- A.5.2** In this instance, the applicant should provide as much data as 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 any training device if insufficient data is received, or if the training device significantly deviates from the standards listed in this AC.
- A.6 Compatibility of Software and Hardware Components.**
- A.6.1** An approved ATD consists primarily of two major components: software (programming) and hardware (central processor, monitor or display, appropriate aircraft systems, flight

and power controls, avionics, etc.). 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.

- A.6.2** 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 training device. In these cases, the manufacturer must identify the software used and attest in the QAG that all hardware components are compatible with the software used for the ATD construction.
- A.7 Manufacturer Responsibilities.** Manufacturers of ATDs are responsible for assuring acceptable design and providing all the required FAA documentation for each model they produce when authorized for airmen training and experience requirements. This would include any new or revised LOAs and QAGs that apply to the approved training device. The manufacturer should provide the current LOA, the FAA-approved QAG, and 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 the General Aviation and Commercial Division of the intended use as specified in Appendix [D](#), paragraph [D.4](#).
- A.8 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.8.1** 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 D.
- A.8.2** 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 FAA-approved QAG for the ATD being used.
 3. Performance information for the aircraft configurations being represented.
- A.8.3** Successfully pass the startup self-test described in Appendix [B](#). If the device is being used in a course of training for a pilot certificate, experience requirement, 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.
- A.8.4** 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 paragraph [A.8.3](#) before resuming authorized instruction.

- A.9 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) and otherwise receive FAA approval of their TCO identifying the use of an FAA-approved ATD. The POI is responsible for approving how the ATD will be used in the certificate holder's part 141 curriculum and TCO.

APPENDIX B. BASIC AVIATION TRAINING DEVICE (BATD) REQUIREMENTS

B.1 Purpose. This appendix describes how the 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.

B.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 14 CFR parts [61](#) and [141](#). The FAA will specify the allowable credit in the BATD letter of authorization (LOA) for private pilot, instrument rating, and instrument recency of experience.

Note 1: 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 2: 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.

B.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 if a BATD meets or exceeds minimum FAA design criteria outlined in this appendix. A BATD found acceptable for use will typically be used to train procedural tasks and 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 (M/M) of aircraft being represented and is the basis for the following requirements:

B.3.1 General Control Requirements. The following items are required for all ATD approvals.

B.3.1.1 The aircraft physical flight and associated control systems must be recognizable as to their function and how they are to be manipulated solely from their appearance. These physical flight control systems cannot use interfaces such as a keyboard, mouse, or gaming joystick to control the aircraft in simulated flight.

B.3.1.2 Virtual controls are those controls used to set up certain aspects of the simulation (such as selecting the aircraft configuration, location, weather conditions, etc.) and otherwise program, effect, or pause the training device.

These controls are often part of the instructor station or independent computer interface.

- B.3.1.3** Except for the initial setup, a keyboard or mouse may not be used to set or position any feature of the ATD flight controls for the maneuvers or training tasks to be accomplished. See the control requirements listed below as applicable to the aircraft model represented. The pilot must be able to operate the controls in the same manner as it would be in the actual aircraft. This includes the landing gear, wing flaps, cowl flaps, carburetor heat, mixture, propeller, and throttle controls appropriate to the aircraft model represented.
- B.3.1.4** The physical arrangement, appearance, and operation of controls, instruments, and switches required by this appendix should closely model the 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.
- B.3.1.5** When an FAA-approved ATD is in use, only the software evaluated by the FAA may be loaded for use on that computer system. This does not preclude providing software updates that do not otherwise change the appearance of the systems operation.

B.3.2 Additional Controls and Functional Requirements. Physical flight and aircraft system controls must be provided as follows:

B.3.2.1 For Airplane:

1. A self-centering displacement yoke or control stick that allows continuous adjustment of pitch and bank.
2. Self-centering rudder pedals that allow continuous adjustment of yaw and corresponding reaction in heading and roll.

3. Throttle or power control(s) that allows continuous movement from idle to full-power settings and corresponding changes in pitch and yaw, as applicable.
4. Mixture/condition, propeller, and throttle/power control(s) as applicable to the M/M of aircraft represented.
5. 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).

B.3.2.2 For Helicopter:

1. A cyclic control stick that tilts the main rotor disk by changing the pitch angle of the rotor blades in their cycle of rotation.
2. A collective pitch control that changes the pitch angle of all main rotor blades simultaneously.
3. Throttle/power control that allows continuous movement from idle to full power settings and which controls engine (rotor) revolutions per minute (rpm).
4. Antitorque pedals used to control the pitch of the tail rotor that allows continuous adjustment of the helicopter heading.
5. Mixture/condition control applicable to the helicopter model represented.
6. Controls for the following items, as applicable to the helicopter represented:
 - Communication and navigation radios,
 - Clock or timer,
 - Transponder,
 - Altimeter, and
 - Carburetor heat (if applicable).

B.3.3 Control Input Functionality and Response Criteria.

B.3.3.1 Time from control input to recognizable system response must be without delay (i.e., not appear to lag in any way). The manufacturer must verify this performance criteria in the QAG submitted for FAA approval.

B.3.3.2 The control inputs must be tested by the computer and software program at each startup and displayed as a confirmation message of normal operation or a warning message that the transport delay time or any design parameter is out of tolerance. It should not be possible to continue the training session unless the problem is resolved and all components are functioning properly.

B.3.4 Display Requirements.

B.3.4.1 The following instruments and indicators must be replicated and properly located as appropriate to the aircraft represented:

1. Flight instruments in a standard configuration representing the traditional “round” dial flight instruments. An electronic primary flight display (PFD) with reversionary and backup flight instruments is also acceptable.
2. A sensitive altimeter with incremental markings each 20 feet or less, operable throughout the normal operating range of the M/M of aircraft represented.
3. A magnetic direction indicator.
4. 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 M/M of aircraft represented.
5. An airspeed indicator with incremental markings as shown for the M/M aircraft represented; airspeed markings of less than 20 knots need not be displayed.
6. A vertical speed indicator (VSI) with incremental markings each 100 feet per minute (fpm) for both climb and descent, for the first 1,000 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 M/M of aircraft being represented.
7. 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.
8. A slip and skid indicator with coordination information displayed in the conventional inclinometer format where a coordinated flight

condition is indicated with the ball in the center position. A split image triangle indication as appropriate for PFD configurations may be used.

9. 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 M/M 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.
10. Engine instruments as applicable to the M/M of aircraft being represented, providing markings for the normal ranges including the minimum and maximum limits.
11. A suction gauge or instrument pressure gauge with a display applicable to the aircraft represented.
12. A flap setting indicator that displays the current flap setting. Setting indications should be typical of that found in an actual aircraft.
13. 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.
14. Communication radio(s) with a full range of selectable frequencies displaying the radio frequency in use.
15. Navigation radio(s) with a full range of selectable frequencies displaying the frequency in use and 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 omni-directional 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.
16. A clock with incremental markings for each minute and second, or a timer with a display of minutes and seconds.

17. A transponder that displays the current transponder code.
18. A fuel quantity indicator(s) that displays the fuel remaining, either in analog or digital format, appropriate for M/M of aircraft represented.

Note: The minimum instrument and equipment requirements specified under 14 CFR part [91](#), § [91.205](#) for day visual flight rules (VFR) and instrument flight rules (IFR) must be functional during the training session. This does not prohibit simulating failures for training purposes.

B.3.4.2 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. All of the displays must provide an image of the instrument that is clear and:

1. Does not appear to be out of focus or illegible.
2. Does not appear to “jump” or “step” during operation.
3. Does not appear with distracting jagged lines or edges.
4. Does not appear to lag relative to the action and use of the flight controls.

B.3.4.3 Control inputs should be reflected by the flight instruments in real time and without a perceived delay in action. Display updates must show all changes (within the total range of the replicated instrument) that are equal to or greater than the values stated below:

1. Airspeed indicator: change of 5 knots.
2. Attitude indicator: change of 2 degrees in pitch and bank.
3. Altimeter: change of 10 feet.
4. Turn and bank: change of ¼ standard rate turn.
5. Heading indicator: change of 2 degrees.
6. VSI: change of 100 fpm.
7. Tachometer: change of 25 rpm or 2 percent of turbine speed.
8. VOR/ILS: change of 1 degree for VOR or ¼ of 1 degree for ILS.
9. ADF: change of 2 degrees.
10. GPS: change as appropriate for the model of GPS-based navigator represented.
11. Clock or timer: change of 1 second.

B.3.4.4 Displays must reflect the dynamic behavior of an actual aircraft (e.g., a VSI reading of 500 fpm must reflect a corresponding movement in altitude, and an increase in power must reflect an increase in the rpm indication or power indicator.)

B.3.5 Flight Dynamics Requirements.

B.3.5.1 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.

B.3.5.2 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 being represented. A performance table will need to be included in the QAG for each aircraft configuration for sea level and 5,000 feet using standard atmosphere and gross weight conditions. An alternate performance altitude for 6,000 feet can be used if the manufacturer of that aircraft has a performance chart reflecting that altitude; otherwise the ATD manufacturer will need to interpolate the performance for the chart. Performance at altitude for turboprop or turbojet configurations should reflect 18,000 ft.

Table B-1. Sample Airplane Performance Table

Aircraft Model	V _{so}	V _{s1}	V _x	V _y	V _a	V _{ne}	V _{mc}	KTAS at Cruise at 75% power setting	Rate of climb (fpm) at best rate (V _y), at full power or as recommended	Single Engine Climb rate (at V _{yse})
C172S							N/A	SL	SL	SL N/A
6,000 feet→										N/A
PA28							N/A	SL	SL	SL N/A
6,000 feet→										N/A
BE58								SL	SL	SL
6,000 feet→										

Table B-2. Sample Helicopter Performance Table

Helicopter Model	Power setting required to lift off, standard day at gross weight	KTAS at Cruise at 75% power setting	Rate of climb (fpm) at best rate at full power or as recommended	Single Engine Climb rate
R22	SL	SL	SL	SL N/A
	6K			N/A
R44	SL	SL	SL	SL N/A
	6K			N/A
EC135	SL	SL	SL	SL
	6K			

Note: Use standard atmosphere and gross weight conditions for these performance tables.

B.3.5.3 Aircraft vertical lift component must change as a function of bank comparable to the way the aircraft being represented performs and handles.

B.3.5.4 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 M/M of aircraft represented performs and handles.

B.3.5.5 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 represented performs and handles.

B.3.6 Instructor Management Requirements.

B.3.6.1 The instructor must be able to pause the system at any time during the training simulation for the purpose of administering instruction or procedural recommendations.

B.3.6.2 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.

- B.3.6.3** 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.
- B.3.6.4** 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. This includes simulated engine failures and the following aircraft systems failures: alternator or generator, vacuum or pressure pump, pitot static, electronic flight displays, or landing gear or flaps, as appropriate.
- B.3.6.5** The ATD must have at least a navigational area database that is local (25 nautical miles (NM)) 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 C. ADVANCED AVIATION TRAINING DEVICE (AATD) REQUIREMENTS

C.1 Purpose. This appendix describes how the FAA will evaluate an AATD for approval and authorized use. A 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.

C.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 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, IPC, commercial pilot, and ATP.

Note 1: 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 2: 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 TCO. This authorization must come from the FAA FSDO assigned to that pilot school.

C.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 [B](#), Basic Aviation Training Device (BATD) Requirements. 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.

C.3.1 An AATD must include the following additional features and components:

C.3.1.1 A realistic shrouded (enclosed) or unshrouded (open) cockpit design and instrument panel arrangement representing a specific model aircraft cockpit.

C.3.1.2 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.

C.3.1.3 Primary flight and navigation instruments appropriately sized and properly arranged that exhibit neither stepping nor excessive transport delay.

C.3.1.4 Digital avionics panel.

- C.3.1.5** GPS navigator with moving map display.
- C.3.1.6** Two-axis autopilot, and, as appropriate, a flight director (FD). This is only required when an autopilot is original standard equipment from the aircraft manufacturer.
- C.3.1.7** Pitch trim (manual or electric pitch trim) permitting indicator movement either electrically or analog in an acceptable trim ratio (airplane only).
- C.3.1.8** An independent visual system, panel, or screen that provides realistic cues in both day and night VFR and IFR meteorological conditions to enhance a pilot's visual orientation in the vicinity of an airport including:
- Adjustable visibility parameters; and
 - Adjustable ceiling parameters.
- C.3.1.9** A fixed pilot seat appropriate to the aircraft configuration, including an adjustable height and an adjustable forward and aft seat position.
- C.3.1.10** 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.
- C.3.1.11** Push-to-talk switch on the control yoke.
- C.3.1.12** 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:
1. Oversee tracks along published airways, holding entries and patterns, and LOC and GS alignment/deviation (or other approaches with a horizontal and vertical track).
 2. 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.
 3. 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.
- C.3.2** The following features and components are not required for the FAA's approval of an AATD, but are encouraged:
- C.3.2.1** Multi-panel or wrap-around visual system providing a 120 degrees or more of horizontal vision.

- C.3.2.2** Automated ATC communications, scenario-based training (SBT), or line-oriented type training in which the instructor can evaluate pilot performance without having to act as ATC.
- C.3.2.3** Simulated loss of performance and aerodynamic changes from ice accretion.
- C.3.2.4** Realistic aircraft engine sound appropriate to the aircraft configuration, power settings, and speed.
- C.3.2.5** 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.

Note: The FAA will allow touch screen functionality to be used in an ATD for those functions or tasks executed in an aircraft that are simple push-button actions (or similar) to replicate similar actions on the instrument panel or flight deck, to control aircraft systems or avionics. However, for actions that require a twisting or turning action of a physical knob, and/or require a gripping or pulling action of a physical lever or handle to actuate a system in the aircraft, the trainer must have a similar physical knob/lever/handle representation in the AATD.

APPENDIX D. TRAINING CONTENT AND LOGGING PROVISIONS

D.1 Integrated Training Curriculum.

D.1.1 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 with the instrument procedure in the training device, then the instruction would transition to the aircraft to verify proficiency.

D.1.2 The 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.

D.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 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.

D.2.1 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.

D.2.2 Abnormal and Emergency Procedures.

- Partial panel;
- Timed turns;
- Compass turns and associated errors (if installed);
- Instrument failures;
- Automation failures (primary flight display (PFD), 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.

D.2.3 Radio Navigation Procedures.

- Use of very high frequency omni-directional range (VOR), Localizer (LOC), ILS, and Area Navigation (RNAV) including GPS;
- Holding patterns (VOR, ILS, LOC, GPS, Intersection, and waypoints (WPT));
- 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.2.4 Instrument Approach Procedures (IAP).**D.2.4.1 Precision:**

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

D.2.4.2 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.

D.2.5 Communications Procedures.

- Air traffic control (ATC) clearances;
- Taxi clearance and instructions (emphasis on runway incursion prevention);
- Departure clearance (DCL);
- En route clearances;
- Holding instructions;
- Arrival clearances;
- Missed approach instructions and clearances;
- Radio advisories and warnings;
- Automatic 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.

D.2.6 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 3 hours of control and maneuvering of an airplane solely by reference to instruments described in 14 CFR part [61](#), § [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 (ACS)), and then transition to the aircraft for those same maneuvers and tasks necessary to meet the aeronautical experience requirements required for pilot certification.

D.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. ATD time can only be logged as Instruction Received (Dual), Instrument Time, or Total Time as reflected on the pilot time section of FAA Form [8710-1](#), Airman Certificate and/or Rating Application. 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 instrument experience requirements as specified in part 61 or part 141. It is required under § [61.51\(b\)\(1\)\(iv\)](#) that the type and identification of the ATD be included when logging 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. Evaluators such as Designated Pilot Examiners (DPE) are instructed to request a copy of the LOA from applicants logging ATD pilot time, to verify the time acquired in the trainer qualifies for the minimum experience requirements for a certificate or rating.

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.

D.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 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 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 (M/M) 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 E. EVALUATION AND SUBJECTIVE TEST CRITERIA

E.1 General Requirements and Evaluation.

E.1.1 Devices eligible as an Aviation Training Device (ATD) must conform to an acceptable aircraft cockpit configuration and instrument panel design. (See Appendix [B](#), Basic Aviation Training Device (BATD) Requirements, and Appendix [C](#), Advanced Aviation Training Device (AATD) Requirements.) 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.

E.1.2 ATDs must be designed to readily facilitate training, practice, and improving piloting skills. This should include both the procedural and operational performance tasks specified in the Airman Certification Standards (ACS). The criteria listed in Appendices B and C and the checklist shown in Table E-1 below will be used to determine whether the design and performance of the training device qualifies for 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):

Table E-1. Procedures and Tasks Test Checklist

Maneuvers and Tasks	Yes/No/NA
a) Pretakeoff	
1) Engine start	
2) Taxi and brake operation	
b) Takeoff	
1) AIRPLANE Takeoff	
i) Run-up and powerplant checks	
ii) Acceleration characteristics	
iii) Nosewheel 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	

Maneuvers and Tasks	Yes/No/NA
iv) Vertical	
v) Running	
c) In-Flight Operation	
1) AIRPLANE In-Flight Operation	
i) Climb	
(a) Normal and max. performance	
(b) One-engine-inoperative procedures (multiengine)	
ii) Cruise	
(a) Performance characteristics (speed vs. power)	
(b) Normal and steep turns	
(c) Approach to stalls (i.e., stall warning), stalls, and recovery. Execute from takeoff, cruise, and approach and landing configurations.	
(d) In-flight engine shutdown (multiengine)	
(e) Fuel selector function	
(f) In-flight engine start	
iii) Approach	
(a) Normal (with and without flaps) (check gear warning, if applicable)	
(b) Best glide no power	
iv) Landings	
2) HELICOPTER In-Flight Operation	
i) Hovering and air taxi	
(a) Forward	
(b) Rearward	
(c) Sideward	
(d) Turns	
ii) Climb	
iii) Cruise	
(a) Performance characteristics (speed vs. power)	

Maneuvers and Tasks	Yes/No/NA
(b) Turns	
(i) Recovery	
(ii) Skidding	
(iii) Slipping	
(iv) Steep turns	
(c) In-flight engine shutdown and start (multiengine)	
(d) Descents	
(e) Straight in and 180° autorotation	
(f) Landings	
d) Instrument Approaches	
1) Nonprecision	
i) GPS and LPV	
ii) GPS-WAAS (optional)	
iii) All engines operating	
iv) One or more engines inoperative	
v) Approach procedures (VOR, VOR/DME, LOC procedures on an ILS, LDA, RNAV (RDP) or RNAV (GPS) to LNAV, LNAV/VNAV or LPV)	
2) Precision	
i) ILS	
ii) GLS (optional)	
iii) Effects of crosswind	
iv) With engine inoperative (multiengine)	
v) Missed approach	
(a) Normal	
(b) With engine(s) inoperative (multiengine)	
e) Surface Operations	
1) AIRPLANE Surface Operations (Post Landing)	
i) Approach and landing roll	
ii) Braking operation	

Maneuvers and Tasks	Yes/No/NA
iii) Reverse thrust operation, if applicable	
2) HELICOPTER Surface Operations	
i) Landings	
ii) Landing area operations	
f) HELICOPTER Emergency Operations	
1) Power failure at hover	
2) Power failure at altitude	
3) System and equipment malfunctions	
4) Settling with power (optional)	
5) Low rotor RPM recovery (optional)	
6) Antitorque system failure	
7) Dynamic rollover (optional)	
g) Any Flight Phase	
1) Aircraft and Powerplant Systems	
i) Electrical, mechanical, or hydraulic	
ii) Flaps (airplane)	
iii) Fuel selector and oil temp/pressure	
iv) Landing gear (if applicable)	
2) Flight Management and Guidance Systems	
i) Autopilot (if standard equipment)	
ii) Flight director (AATD only)/system displays (if installed)	
iii) Navigation systems	
iv) Stall warning systems avoidance (airplane)	
v) Multi-function displays (if applicable)	
3) Airborne Procedures	
i) Holding	
ii) Uncoordinated turns – slipping and skidding demo	

Maneuvers and Tasks	Yes/No/NA
iii) Configuration and power changes and resulting pitch changes	
iv) Compass turns and appropriate errors (if installed)	
4) Engine Shutdown and Parking	
i) Systems operation	
ii) Parking brake operation (if installed) (airplane)	
h) Can simulate engine failure, including failures due to simulated loss of oil pressure or fuel starvation.	
i) Can simulate the following equipment or system failures:	
1) Alternator or generator failure.	
2) Vacuum pump/pressure failure and the associated flight instrument failures.	
3) Gyroscopic flight instrument failures.	
4) Pitot/static system malfunction and the associated flight instrument failures.	
5) Electronic flight deck display malfunctions.	
6) Landing gear (if retractable) or flap malfunctions.	
j) Independent Instructor Station Requirements (AATD Only)	
1) Displays published airways and holding patterns.	
2) Displays aircraft position and track.	
3) Displays aircraft altitude and speed.	
4) Displays NAVAIDs and airports.	
5) Can record and replay aircraft ground track history for entire training session.	
6) Can invoke instrument or equipment failures.	

E.2 Requesting FAA Approval of ATD. The manufacturer of an ATD must include this completed checklist in the QAG and indicate that maneuver or function is executable in the trainer. In some instances, it can be indicated as not applicable (NA) such as multiengine or helicopter requirements. The letter of application signed by the manufacturer must be submitted to the General Aviation and Commercial Division (per Appendix [A](#), General Information), along with a complete QAG describing how the training device meets basic aviation training device (BATD) approval criteria listed in Appendix [B](#), and if applicable the additional advanced aviation training device (AATD) approval criteria listed in Appendix [C](#). The manufacturer must also submit at the time of application an operations manual for the trainer.

Figure E-1. Example Application Letter Requesting Evaluation

Dear [Name of FAA ATD Program Manager]:

Date:

[Name of manufacturer] requests an evaluation of its [ATD model name] [basic or advanced] aviation training device for approval by the Federal Aviation Administration (FAA) at:

[Location and address where the functional evaluation is requested].

This training device is fully described in the accompanying Qualification and Approval Guide (QAG) and is completely operational and available for FAA evaluation. The [model name] has been evaluated and tested by [manufacturer name] and appears to meet the minimum criteria for approval as a (BATD or AATD).

The following [manufacturer’s name] personnel have assessed this training device as compliant:

Name _____

Qualification & Title _____

Pilot Name _____

Qualification & Title _____

And attest that:

This training device effectively represents a [category, class, and model aircraft] and the associated systems and subsystems found in that aircraft. Additionally, the performance and handling qualities have been evaluated and adequately represent the category, class, and model of aircraft. The [model name] contains the minimum design features required for a basic aviation training device (BATD), or advanced aviation training device (AATD), as described in Advisory Circular (AC) 61-136, FAA Approval of Aviation Training Devices and Their Use for Training and Experience.

Sincerely,

[Signature of Manufacturer or Authorized Representative]

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

Enclosures – QAG and Operations Manual for [manufacturer, model name of training device]

E.3 ATD Approval Process Summary.

- E.3.1** The manufacturer provides the General Aviation and Commercial Division an application letter, QAG, operations manual, and demonstration video for evaluation, via email with text files attached at least 90 days in advance (120 days recommended). Email is the preferred correspondence method. Videos should be provided via YouTube link. Send correspondence and documents to the General Aviation and Commercial Division at 9-AFS-800-Correspondence@faa.gov.
- E.3.2** If the application letter and QAG are found to be initially incomplete or inadequate, then the FAA will contact the manufacturer describing the needed revisions.
- E.3.3** When a qualifying QAG is submitted and found adequate, the FAA will request that a video be submitted to the FAA accomplishing tasks identified in the task table (see Table [E-1](#)). After FAA review of the demonstration video, if it appears that the trainer qualifies, an aviation safety inspector (ASI) will be scheduled to conduct an on-site functional evaluation of the training device.
- E.3.4** If the functional evaluation results are successful, the FAA will issue a letter of authorization (LOA) to manufacturer in approximately 30 days.
- E.3.5** If the evaluation results are found unacceptable, the FAA evaluator will notify the manufacturer of the discrepancies for correction, and will plan to accomplish a followup inspection when the manufacturer has resolved those discrepancies.
- E.3.6** When a successful functional evaluation is accomplished, the General Aviation and Commercial Division will issue an LOA along with the FAA-approved QAG to the manufacturer via FedEx envelope, regular mail, and/or email.

E.4 Previously Approved Training Devices Seeking a New LOA.

- E.4.1** 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 (General Aviation and Commercial Division) using the normal evaluation 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 at 9-AFS-800-Correspondence@faa.gov.
 2. See Appendix [A](#), paragraph [A.5](#), Previously Approved Devices, for information concerning devices that have not previously been approved as either an AATD or BATD.

E.4.2 The FAA receives the previous LOA, revised QAG, and application letter requesting evaluation and approval of the manufacturer's previously approved training device. The general procedures listed in paragraph [E.3](#) will apply. The FAA will consider previous applications, evaluations, and reviews conducted for the training device in determining whether an additional operational evaluation is necessary.

Advisory Circular Feedback Form

If you find an error in this AC, have recommendations for improving it, or have suggestions for new items/subjects to be added, you may let us know by contacting the General Aviation and Commercial Division at 9-AFS-800-Correspondence@faa.gov or the Flight Standards Directives Management Officer at 9-AWA-AFS-140-Directives@faa.gov.

Subject: AC 61-136B, FAA Approval of Aviation Training Devices and Their Use for Training and Experience

Date: _____

Please check all appropriate line items:

An error (procedural or typographical) has been noted in paragraph _____ on page _____.

Recommend paragraph _____ on page _____ be changed as follows:

In a future change to this AC, please cover the following subject:
(Briefly describe what you want added.)

Other comments:

I would like to discuss the above. Please contact me.

Submitted by: _____

Date: _____