

Training Centers & Pilot Schools Section
BASIC AVIATION TRAINING DEVICE (BATD) REQUIREMENTS
GACAR-60
eBOOK V4, FAA AC61-136-B

• Organization Name			
• Organization Address		• Contact Number	
• Representative Name		• Position	
• Representative Contact Number		• Email Address	

APPENDIX B. BASIC AVIATION TRAINING DEVICE (BATD) REQUIREMENTS

	Maneuvers and Tasks	GACAR Reference	COMPLIANCE		
			YES	NO	NA
B.1	Purpose. This appendix describes how the GACA 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.	V4 CHP 30 (AC) 61-136B			
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 GACAR parts 61 and 141. GACA will specify the allowable credit in the BATD letter of authorization (LOA) for private pilot, instrument rating, and instrument recency of experience.	V4 CHP 30 (AC) 61-136B			
	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, § 61.89 and may not exceed that allowed under part 141 appendix B (50 percent maximum of the required training).	V4 CHP 30 (AC) 61-136B			
	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 GACA to that pilot school.	V4 CHP 30 (AC) 61-136B			
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 GACA 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 GACA for evaluation must state the make and model (M/M) of aircraft being represented and is the basis for the following requirements:	V4 CHP 30 (AC) 61-136B			

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			COMPLIANCE		
	Maneuvers and Tasks	GACAR Reference	YES	NO	NA
B.3.1	General Control Requirements. The following items are required for all ATD approvals.	V4 CHP 30 (AC) 61-136B			
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.	V4 CHP 30 (AC) 61-136B			
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.	V4 CHP 30 (AC) 61-136B			
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.	V4 CHP 30 (AC) 61-136B			
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:	V4 CHP 30 (AC) 61-136B			
a.	• Master/battery;				
b.	• Magnetos for each engine (as applicable);				
c.	• Alternators or generators for each engine;				
d.	• Auxiliary power unit (APU) (if applicable);				
e.	• Fuel boost pumps/prime boost pumps for each engine;				
f.	• Avionics master;				
g.	• Pitot heat; and				
h.	• Rotating beacon/strobe, navigation, taxi, and landing lights.				
B.3.1.5	When an GACA-approved ATD is in use, only the software evaluated by the GACA 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.	V4 CHP 30 (AC) 61-136B			
B.3.2	Additional Controls and Functional Requirements. Physical flight and aircraft system controls must be provided as follows:	V4 CHP 30 (AC) 61-136B			

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	Maneuvers and Tasks	GACAR Reference	YES	NO	NA
B.3.2.1	For Airplane:	V4 CHP 30 (AC) 61-136B			
1.	A self-centering displacement yoke or control stick that allows continuous adjustment of pitch and bank.	V4 CHP 30 (AC) 61-136B			
2.	Self-centering rudder pedals that allow continuous adjustment of yaw and corresponding reaction in heading and roll.	V4 CHP 30 (AC) 61-136B			
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.	V4 CHP 30 (AC) 61-136B			
4.	Mixture/condition, propeller, and throttle/power control(s) as applicable to the M/M of aircraft represented.	V4 CHP 30 (AC) 61-136B			
5.	Controls for the following items, as applicable to the category and class of aircraft represented:	V4 CHP 30 (AC) 61-136B			
a.	• Wing flaps,				
b.	• Pitch trim,				
c.	• Communication and navigation radios,				
d.	• Clock or timer,				
e.	• Gear handle (if applicable),				
f.	• Transponder,				
g.	• Altimeter,				
h.	• Carburetor heat (if applicable), and				
i.	• Cowl flaps (if applicable).				
B.3.2.2	For Helicopter:	V4 CHP 30 (AC) 61-136B			
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.	V4 CHP 30 (AC) 61-136B			
3.	Throttle/power control that allows continuous movement from idle to full power settings and which controls engine (rotor) revolutions per minute (rpm).	V4 CHP 30 (AC) 61-136B			
4.	Anti-torque pedals used to control the pitch of the tail rotor that allows continuous adjustment of the helicopter heading.	V4 CHP 30 (AC) 61-136B			
5.	Mixture/condition control applicable to the helicopter model represented.	V4 CHP 30 (AC) 61-136B			
6.	Controls for the following items, as applicable to the helicopter represented:	V4 CHP 30 (AC) 61-136B			
a.	• Communication and navigation radios,	V4 CHP 30 (AC) 61-136B			
b.	• Clock or timer,	V4 CHP 30 (AC) 61-136B			

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	Maneuvers and Tasks	GACAR Reference	YES	NO	NA
c.	<ul style="list-style-type: none"> • Transponder, • Altimeter, and 	V4 CHP 30 (AC) 61-136B			
d.	<ul style="list-style-type: none"> • Carburetor heat (if applicable). 				
B.3.3	Control Input Functionality and Response Criteria.	V4 CHP 30 (AC) 61-136B			
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 GACA approval.	V4 CHP 30 (AC) 61-136B			
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.	V4 CHP 30 (AC) 61-136B			
B.3.4	Display Requirements.	V4 CHP 30 (AC) 61-136B			
B.3.4.1	The following instruments and indicators must be replicated and properly located as appropriate to the aircraft represented:	V4 CHP 30 (AC) 61-136B			
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.	V4 CHP 30 (AC) 61-136B			
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.	V4 CHP 30 (AC) 61-136B			
3.	A magnetic direction indicator.	V4 CHP 30 (AC) 61-136B			
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.	V4 CHP 30 (AC) 61-136B			
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.	V4 CHP 30 (AC) 61-136B			
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.	V4 CHP 30 (AC) 61-136B			
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	V4 CHP 30 (AC) 61-136B			

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	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.	V4 CHP 30 (AC) 61-136B			
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.	V4 CHP 30 (AC) 61-136B			
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.	V4 CHP 30 (AC) 61-136B			
11.	A suction gauge or instrument pressure gauge with a display applicable to the aircraft represented.	V4 CHP 30 (AC) 61-136B			
12.	A flap setting indicator that displays the current flap setting. Setting indications should be typical of that found in an actual aircraft.	V4 CHP 30 (AC) 61-136B			
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.	V4 CHP 30 (AC) 61-136B			
14.	Communication radio(s) with a full range of selectable frequencies displaying the radio frequency in use.	V4 CHP 30 (AC) 61-136B			
15.	Navigation radio(s) with a full range of selectable frequencies displaying the frequency in use and capable of replicating both precision and non-precision 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:	V4 CHP 30 (AC) 61-136B			
a.	• One-half dot or less for course/glideslope (GS) deviation (i.e., VOR, LOC, or ILS), and	V4 CHP 30 (AC) 61-136B			
b.	• Five degrees or less for bearing deviation for automatic direction finder (ADF) and radio magnetic indicator (RMI), as applicable.	V4 CHP 30 (AC) 61-136B			
16.	A clock with incremental markings for each minute and second, or a timer with a display of minutes and seconds.	V4 CHP 30 (AC) 61-136B			

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17.	A transponder that displays the current transponder code.	V4 CHP 30 (AC) 61-136B			
18.	A fuel quantity indicator(s) that displays the fuel remaining, either in analog or digital format, appropriate for M/M of aircraft represented.	V4 CHP 30 (AC) 61-136B			
	Note: The minimum instrument and equipment requirements specified under GACAR part 91 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.	V4 CHP 30 (AC) 61-136B			
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:	V4 CHP 30 (AC) 61-136B			
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:	V4 CHP 30 (AC) 61-136B			
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.)	V4 CHP 30 (AC) 61-136B			
B.3.5	Flight Dynamics Requirements.	V4 CHP 30 (AC) 61-136B			

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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.	V4 CHP 30 (AC) 61-136B			
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.	V4 CHP 30 (AC) 61-136B			

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.

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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.	V4 CHP 30 (AC) 61-136B			
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.	V4 CHP 30 (AC) 61-136B			
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.	V4 CHP 30 (AC) 61-136B			
B.3.6	<u>Instructor Management Requirements.</u>	V4 CHP 30 (AC) 61-136B			
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.	V4 CHP 30 (AC) 61-136B			
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:	V4 CHP 30 (AC) 61-136B			
a.	• Aircraft geographic location,	V4 CHP 30 (AC) 61-136B			
b.	• Aircraft heading,	V4 CHP 30 (AC) 61-136B			
c.	• Aircraft airspeed,	V4 CHP 30 (AC) 61-136B			
d.	• Aircraft altitude, and	V4 CHP 30 (AC) 61-136B			
e.	• Wind direction, speed, and turbulence.	V4 CHP 30 (AC) 61-136B			
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.	V4 CHP 30 (AC) 61-136B			
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.	V4 CHP 30 (AC) 61-136B			
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 GACAR part 97.	V4 CHP 30 (AC) 61-136B			

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•	Remarks

•	Inspection Result
<input type="checkbox"/> Satisfactory	<input type="checkbox"/> Unsatisfactory

No.	Inspector Name	Signature	Date (dd/mm/yy)