PRECISION FLIGHT CONTROLS

CR12 PROPANEL

Advanced Aviation Training Device

Qualification and Approval Guide (QAG)

Advanced Aviation Training Device

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Version 1.1

CR12 PROPANEL

Table of Contents

Log of Revisions

Revision Number	Date	Page Numbers	Initials
Original 1.0	5/9/2012	ALL	MA
1.1	12/11/2021	ALL	MA

List of Effective Pages

This listing contains all current pages, with effective dates, of the Qualification and Approval Guide. It should be used after posting changes to ensure the manual is complete and up-to-date.

Page	**Status**	**Date**	**Page**	**Status**	**Date**
1	1.1	12/11/2021	**14**	1.1 Added Cessna Master Starter Panel	12/11/2021
2	1.1	12/11/2021	**15**	1.1	12/11/2021
3	1.1	12/11/2021	**16**	1.1	12/11/2021
4	1.1	12/11/2021	**17**	1.1	12/11/2021
5	1.1	12/11/2021	**18**	1.1	12/11/2021
6	1.1	12/11/2021	**19**	1.1	12/11/2021
7	1.1	12/11/2021	**20**	1.1	12/11/2021
8	1.1	12/11/2021	**21**	1.1	12/11/2021
9	1.1	12/11/2021	**22**	1.1	12/11/2021
10	1.1	12/11/2021	**23**	1.1	12/11/2021
11	1.1	12/11/2021	**24**	1.1	12/11/2021
12	1.1 Added 750/650 Avionics	12/11/2021	**25**	1.1	12/11/2021
13	1.1 Added Two New Rudder Pedals Configurations	12/11/2021	**26**	1.1	12/11/2021

Page	Status	Date	Page	Status	Date
27	1.1	12/11/2021	**50**	1.1	12/11/2021
28	1.1	12/11/2021	**51**	1.1	12/11/2021
29	1.1	12/11/2021	**52**	1.1	12/11/2021
30	1.1	12/11/2021	**53**	1.1	12/11/2021
31	1.1	12/11/2021	**54**	1.1	12/11/2021
32	1.1	12/11/2021	**55**	1.1 Added Curved Visual Screen	12/11/2021
33	1.1	12/11/2021	**56**	1.1	12/11/2021
34	1.1	12/11/2021	**57**	1.1	12/11/2021
35	1.1	12/11/2021	**FAA APPROVED QAG Signature and Date**		
36	1.1	12/11/2021	EVERETTE C ROCHON JR Digitally signed by EVERETTE C ROCHON JR Date: 2022.03.31 07:26:59 -04'00'		
37	1.1	12/11/2021			
38	1.1	12/11/2021	**Everette C. Rochon, Jr Manager, Training and Certification Group**		
39	1.1	12/11/2021			
40	1.1	12/11/2021			
41	1.1	12/11/2021			
42	1.1	12/11/2021			
43	1.1	12/11/2021			
44	1.1	12/11/2021			
45	1.1	12/11/2021			
46	1.1	12/11/2021			
47	1.1	12/11/2021			
48	1.1	12/11/2021			
49	1.1	12/11/2021			

Compliance Statement

This Qualification and Approval Guide (QAG) provides a detailed description of all the required components, features, functions, and capabilities for the Precision Flight Controls CR-12 Propanel aviation training device. This includes any optional airplane configurations with quality color pictures and diagrams. This QAG is provided by Precision Flight Controls to clearly describe and verify the required functionality of this aviation training device platform confirming its suitability for airman training and experience. The information as described in advisory circular AC 61-136B, FAA Approval of Aviation Training Devices (ATD) and their use for training and experience is provided within this document. This includes listing all of the required qualifying items, functions, and capabilities. A valid FAA Letter of Authorization (LOA) specifying the credit allowances must accompany the training device when utilized for satisfying airman training or experience requirements specified in 14 CFR §61 or 141. Additionally, FAA Order 8900.1 Volume 11 Chapter 10 Section 1 provides guidance to aviation safety inspectors facilitating ATD evaluations, approvals and oversite.

Precision Flight Controls provides a detailed operations manual with each aviation training device model produced. This includes how to properly start, operate, and shut down each trainer. This also includes how to operate and maintain the trainer as originally designed and tested. Precision Flight Controls will ensure that the operator of this training device is familiar and proficient with all the features and capabilities of this trainer, and how to correct any malfunctions that may occur.

The operator of these aviation training devices is expected to become proficient in it operation before using it to satisfy any pilot experience requirements specified in the code of federal regulations. This includes maintaining its condition and functionally. This ATD must be maintained to its original performance and functionality, as demonstrated during the original FAA functional evaluation. This device cannot be used to log pilot time unless all the components of the trainer are in normal working order.

Only the airplane configuration approved for this model can be utilized when satisfying FAA experience or training requirements. Any additions, changes, or modifications to this model, or the associated configurations, must be evaluated and approved in writing by the General Aviation and Commercial Division. This does not prohibit software updates that do not otherwise change the appearance of the systems operation. Operators who use these trainers to satisfy FAA pilot training or experience requirements specified in part 61 or 141 are obligated to allow FAA inspection ensuring acceptable function and compliance. Any questions concerning FAA approval or use of ATDs should be directed to the General Aviation and Commercial Division.

Aviation Training Device ATD Description and Pictures

The Precision Flight Controls CR12 Propanel is based on the dimensions and layout of a category and class production general aviation airplanes. This trainer closely represents the overall functionality, performance, and instrumentation for SEL and MEL aircraft . The platform consists of a flight console, enclosure, instrument panel, avionics panel, rudder pedals and associated flight and instrument controls. A combination of hardware and software components are assembled and functionally checked by Precision Flight Controls. All hardware components are designed and installed so the flight deck has the appearance and feel of an actual airplane.

The CR12 Propanel model provides a realistic flight deck design, avionics interface, and reliable hardware/software performance. This platform provides an effective training environment for students and pilots in training. This includes the ability to accomplish scenario based flight training activities, instrument procedures and experience, pilot proficiency evaluations, simulated equipment failure, emergency procedures, and facilitates increased pilot competency.

Airplane Single and Multi Engine Land representing Beechcraft, Cessna, Diamond, Piper, and Mooney.

CR12 Propanel Shown with Standard Avionics and Curved LCD Monitor

CR12 Propanel Shown with Curved Screen Monitor
and (optional) PFC750/650

CR12 Propanel Shown with Curved Screen Monitor
and (optional) PFC530w and PFC430w

CR12 Propanel Shown with Curved Screen Monitor and (optional) PFC430w and optional Circuit Breaker Panel

CR12 Shown with 3 LCD Monitors, Instrument Screen, Avionics, IOS Monitor, KVM, Keyboard and Mouse

CR12 Shown with 1 LCD Monitor, Instrument Screen and Avionics,

RIC Panel

(Remote Instrument Control)

Airspeed Correction, Radar Altimeter, ADF, HDG, Course, Aircraft Attitude, BARO (Altimeter) OBS Selector

Aviation Training Device ATD Description and Pictures

Avionics

All flight instruments are controlled by rotary encoders located just below the instrument panel or may be controlled with an instrument bezel include: Heading, Altimeter, Course, RMI, ADF, Radar Altimeter, OBS1, OBS2, DG, ADF and RMI.

Audio Panel Close up

Standard Avionics Configuration Includes:

1- PFC Altitude Preselect (modeled after Bendix King KAS 297B)

1- PFC Marker Beacon/ Audio Panel (modeled after Garmin GMA 350)

2- PFC NAV/COM (modeled after Bendix King KX 155)

1- PFC GPS Control Head (modeled after Garmin's 430w)

1- PFC Autopilot (modeled after Bendix King KFC 150)

1- PFC Transponder (modeled after Bendix King KT-76)

1- PFC ADF (modeled after Bendix King KR-87)

1- PFC DME (modeled after Bendix King 62-A)

1- PFC GPS Control Head (modeled after Garmin's 430w)

Aviation Training Device ATD Description and Pictures

Avionics

Standard Avionics Shown Above with (optional) PFC530w)

Standard Avionics Shown Above with (optional) PFC530w and (optional) Circuit Breaker Panel

PFC750/650 is a fully integrated

GPS/NAV/COM/MFD

The PFC750/650

Is a modular touch screen panel that can be

interchanged with our

PFC530w and PFC430w

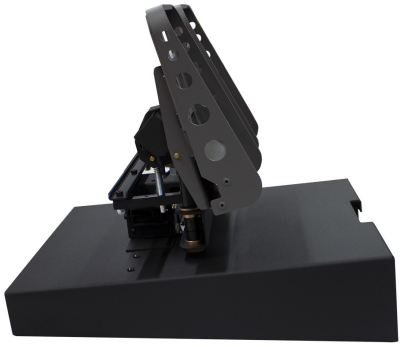
Or

The PFC750/650 can

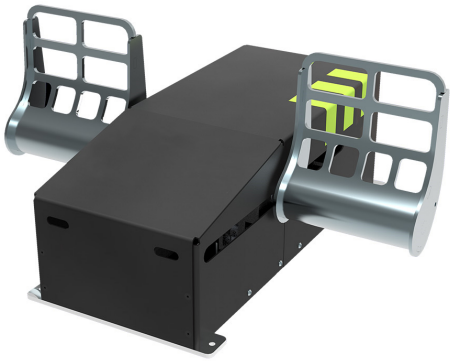
be the primary avionics in liu of the

PFC530w and PFC430w

Standard GA Style Rudder Pedals with Proportional Toe Braking
Must be secured to a floor or Seat Track System



(Optional) GA (Bucket Pedal Style) Rudder Pedals with Proportional Toe Braking
Must be secured to a floor or Seat Track System

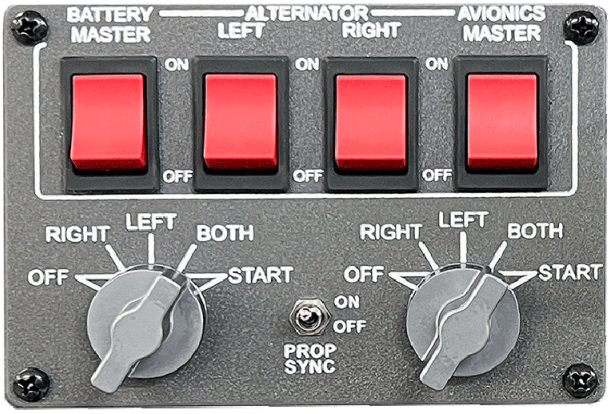


(Optional) PFC-CL Rudder Pedals with Proportional Toe Braking
Must be secured to a floor or Seat Track System

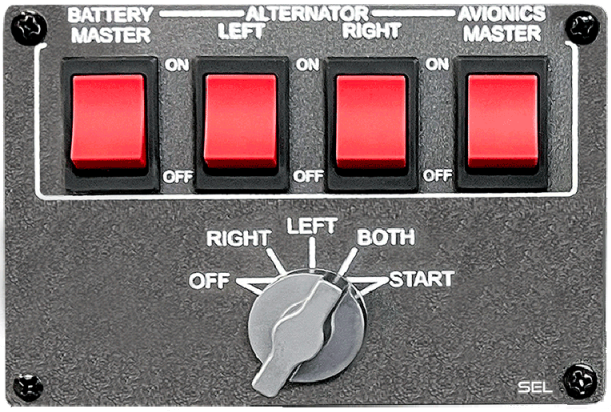
Interchangeable Master Starter Panels

Single Engine

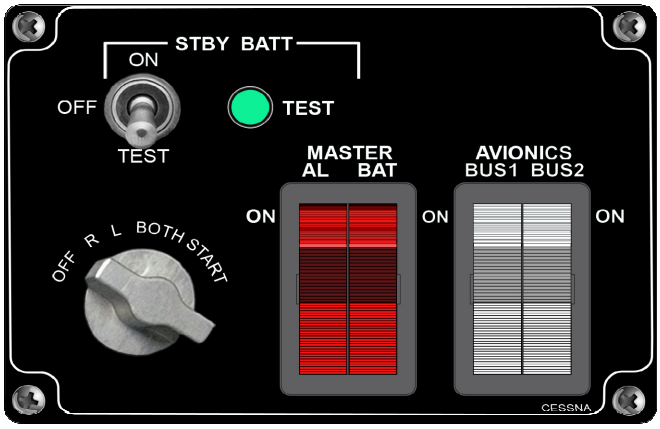
Multi-Engine



Single Engine



Multi-Engine



Cessna SEL (optional)

Flight Console

Sub Panels

Elevator Trim Wheel, Flaps Switch, Cowl Flaps and Digital Clock

Landing Gear Switch with Gear Position Lights

Aileron and Rudder Trim

Parking Brake Lights, Alt Air, Anti-Ice, Pitot Heat, Fuel Boost Pumps and Fuel Tank Selectors

(Optional) Circuit Breaker Panel (Circuit Breakers can be manually pulled or controlled by the Instructor's Station Software for failing components and systems

Seating

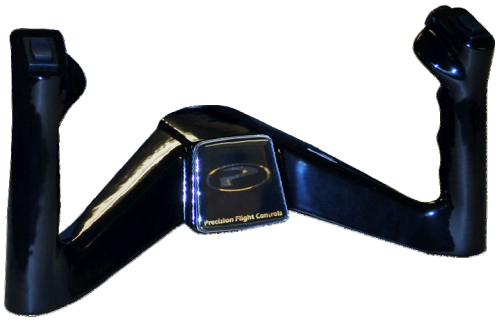
Seats have Fwd/Aft Tilt, Up and Down Movement
and must be secured to a Floor or Seat Track System

Aviation Training Device ATD Description and Pictures

Engine Controls	Used With	Optional
 **Throttle, Prop and Mixture**	**MEL** **Beechcraft Baron** **Cessna 414** **Cessna 421** **Cessna 310** **Piper Seminole** **Piper Seneca** **Piper Navajo**	**TO/GA Button**
 **Throttle, Prop and Mixture**	**SEL** **Beechcraft Bonanza** **Cessna 206** **Cessna 210** **Piper Arrow** **Piper Malibu Mirage**	**TO/GA Button**
 **Throttle and Mixture**	**SEL** **Diamond DA20** **Piper Archer** **Piper Warrior**	
 **Carb Heat, Throttle and Mixture**	**SEL Carbureted** **(Can be used in lieu of Vernier controls)**	

 **Prop, Throttle and Mixture**	**MEL** Beechcraft Travelair	
 **Throttle, Prop and Mixture**	**SEL** **Cessna 182** **Cessna 210** **Cessna 206** **Mooney**	
 **Carb Heat, Throttle and Mixture**	**SEL Carbureted** **Cessna 152** **Cessna 172**	
 **Throttle and Mixture**	**SEL** **Cessna 172**	

Control Yokes



Mooney Yoke

Beech Yoke

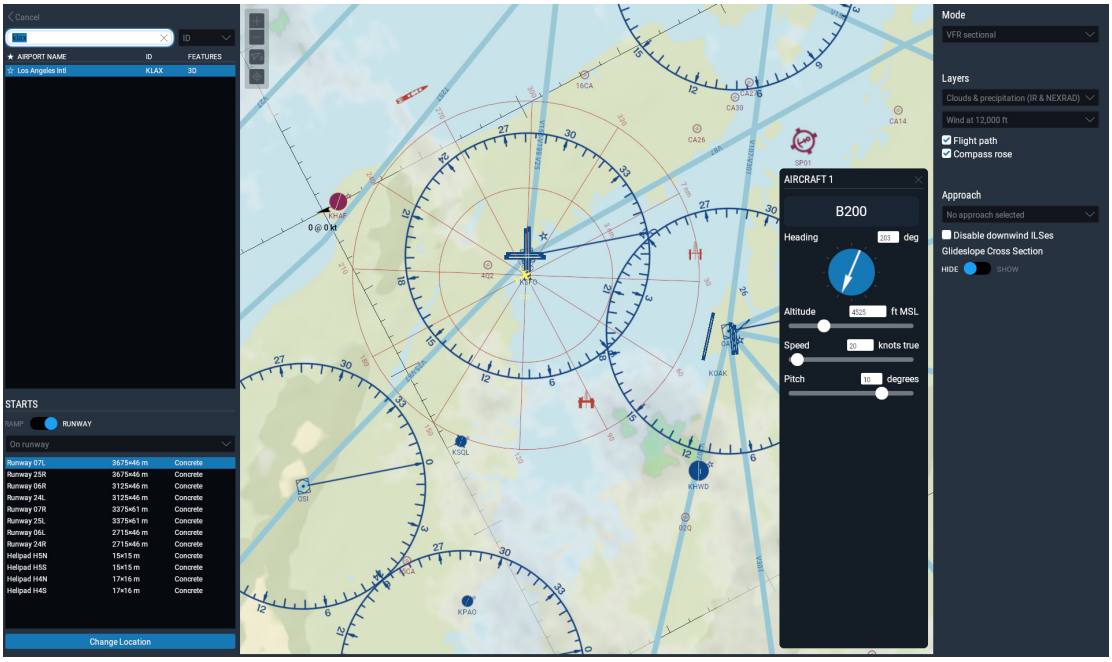
Cessna Yoke

Each Yoke is Equipped with PTT, Elevator Trim, A/P Disconnect and CWS Switches

Aviation Training Device ATD Description and Pictures

Instructor's Operating System (IOS)

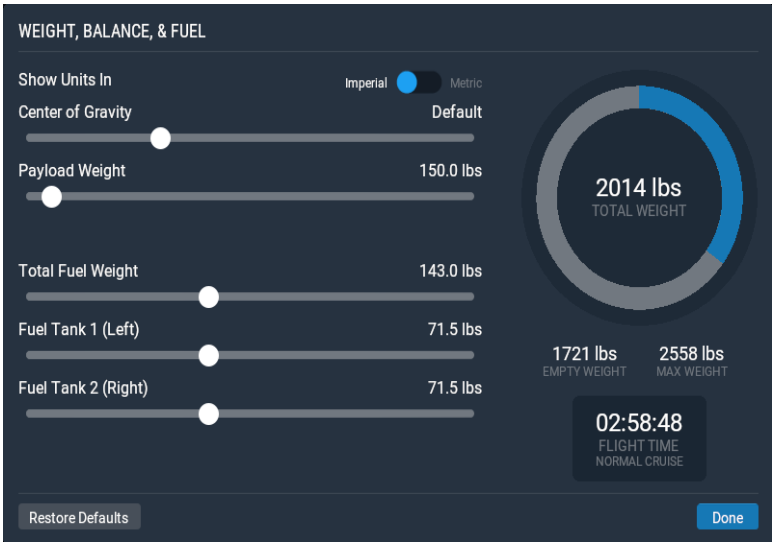
Standard Configuraton Instructor's Station
Monitor, Keyboard and Mouse

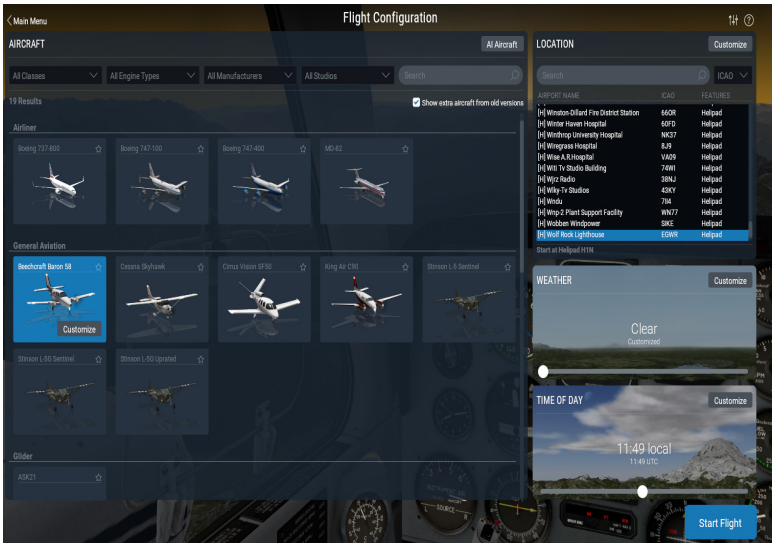


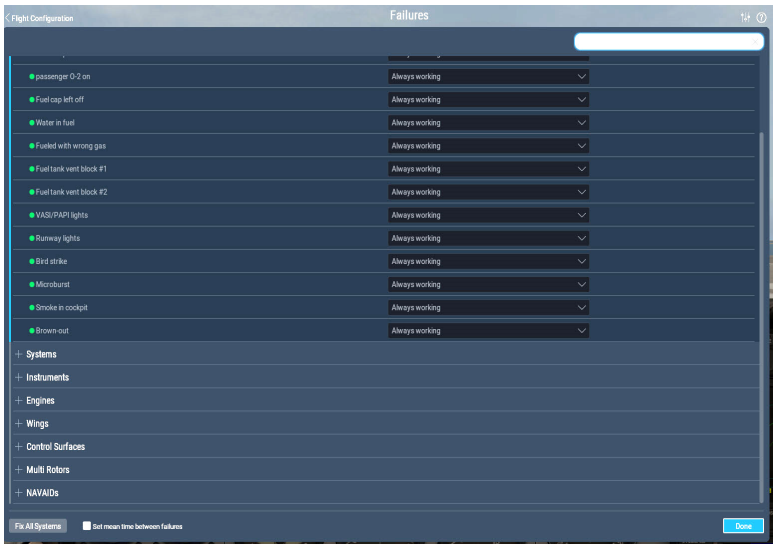
A "Bird's Eye View" showing airports, nav aids, high and low navigational tracking, traffic and compass,

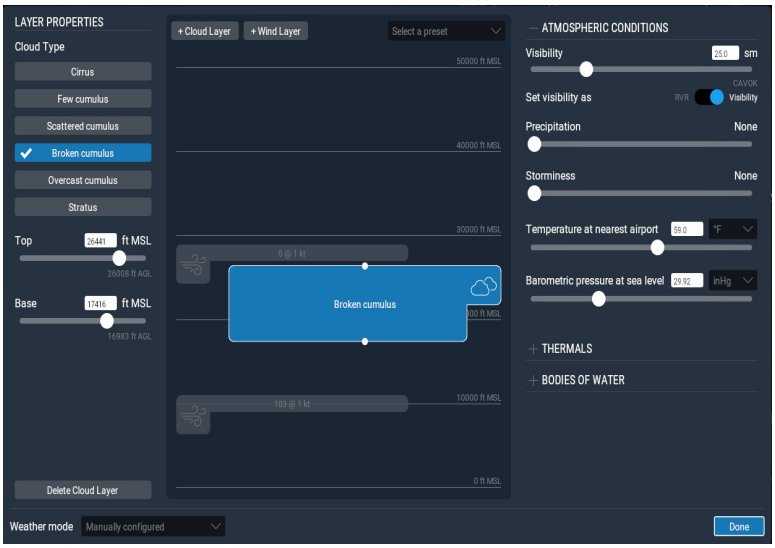
Select Aircraft, Location, Weather Selection
Change Cloud Types, Visibility, Winds, Turbulence,
Temperature and Failures

Aviation Training Device ATD Description and Pictures









Instructor's Screens

Hardware and Software Components List

Item	Component Name	Manufacturer	Model #	Version	Qty	Details
1	Flight Console	PFC	CR12 Propanel	Ver 1 or Higher	1	Panels/Switches Master Start Panels, Magneto Switches, Battery Switches, Alternator Switches, Parking brake. Landing Gear, Flaps, Pitot, Heat, Anti-Ice, Nav Light, Strobe Light, Landing Light, Taxi light, Aileron Trim, Elevator Trim, Rudder Trim, Cowl Flaps, Carb heat ,Fuel Boost Pump Switches, Fuel Tank Selectors
2	Control Yoke	PFC	Beech, Mooney, or Cessna	Ver 1 or Higher	1	Cast aluminum control yokes, elevator, A/P disconnect, CWS, push to talk
3	Rudder pedals with toe brakes	PFC	PFC	Ver 1 or Higher	1	Cast Aluminum/Steel construction spring dampening or dynamic control loading
4	Avionics Suite: Alt Pre-Select, Audio Panel, Marker Beacons, Dual Nav/Coms, DME, Transponder, ADF, Autopilot and GPS	PFC	DAVI-ENH	Ver 1 or Higher	1	Simulated Digital Avionics
5	750/650 **Software** (optional)	Reality XP	RXP 750/650	Ver 1 or Higher	1	G750/650 Software
6	GPS 530w or 430w **Software**	Reality XP	RXP 530/430	Ver 1 or Higher	1	RXP 530w/430w Software
7	GPSW 530w or 430w (optional)	PFC	PFC 430W/530W or Garmin's GNS 430W/530W	Ver 1 or Higher	1	Real or simulated Garmin GNS 430W/530W or PFC 430W/PFC 530W
8	PFC 750/650 (Optional)	PFC	750/650	Ver 1 or Higher	1	Real or simulated Garmin GTN 750/650 or PFC 750/650
9	TO/GA switches	PFC	N/A	N/A	1	Panel or throttle quadrant mounted
10	RIC (Remote Instrument Controls)	PFC	RIC 8	Ver 1 or Higher	1	Instrument Controls for: RMI, OBS, HDG, CRS, ALT, BARO, A/S, DG and Radar Altimeter
11	Digital Clock / Stopwatch	Davtron	MA77	N/A	1	Digital Clock/Timer
12	Engine Controls	PFC	PFCTQ	Ver 1 or Higher	2	SEL, MEL Included
13	Seating (Pilot)	PFC	PFC PSEAT	N/A	1	Full Adjustable, Tilt, Fwd, Aft and Vertical movement
14	Post lamp panel lighting	PFC	PFC	N/A	4	Panel Lighting
15	4 way intercom	PFC	N/A	N/A	1	Pilot, Co-Pilot, Instructor and Observer Inputs
16	Speaker system(s) internal sounds and external sounds 2 speakers 2.1	PFC	PFC	N/A	1	Cockpit sounds, ATC, ATIS, MKR Beacon, Morse Code External Sounds, Engine, Flaps, Landing Gear, Runway, Braking and Skidding

Item	Component Name	Manufacturer	Model #	Version	Qty	Details
17	Instructor's station	Laminar Research	X-Plane Professional	Version 8.0 or Higher	1	24"-30" LCD Mouse and Keyboard or Touchpad
18	Navdata (worldwide)	Jeppesen or Garmin	N/A	N/A	1	Can Be Updated On a 28 Day Cycle
19	Core simulation software	Laminar Research	X-Plane Professional	Version 9.0 or Higher	1	Visual and Navigational Database
20	Computers (2), or as required	PFC	PFC	Intel I7, I9 Solid State	1	Custom High Performance
21	Instrument Procedures Data Base	Jeppesen or Garmin		N/A	1	Provides for FAA Published instrument Navigation Procedures, Data Base Per 14 CFR 97 (en-Route and Approach)
22	Hobbs Meter	DACTON	Mini	102033	1	Hobbs Meter
23	Digital Clock Timer	Davtron	N/A	M800	1	Digital Clock Timer
24	Magnetic Compass	PFC	PFC	PFC DC	1	Displayed on Visual Screen
25	Operating System	Microsoft	Windows	7-10	1	Main Operating System
26	Operating System	Linux	Ubuntu	14-22	1	Used for Visuals
27	External Visual (Standard)	Samsung or Equal	49" Curved Screen	N/A	1	Used for Visuals
28	External Visual (Optional)	Samsung or Equal	24"	N/A	3	Used for Visuals
29	External Visual (Optional)	Samsung or Equal	24"	N/A	1	Used for Visuals

Design Criteria List

The following section provides a detailed “word for word” listing and design criteria of each of the required items, functions, and capabilities listed in AC 61-136B, (See Appendix B for BATD and Appendix C for AATD items “if applicable”) and the operational performance (as applicable) for each of the functions described for the CR12 Propanel airplane ATD.

Basic ATD Requirements

All configurations for this model meet all AC 61-136, Appendix B requirements.

The Precision Flight Controls CR12 Propanel model meets the following Control Input requirements.

(1) The airplane physical flight and associated control systems are recognizable as to their function and how they are manipulated solely from their appearance. These physical flight control systems do not use interfaces such as a keyboard, mouse, or gaming joystick to control the airplane in simulated flight.

(2) Virtual controls are those controls used to set up certain aspects of the simulation (such as selecting the airplane configuration, location, weather conditions, etc.) and otherwise program, effect, or pause the training device. These controls are part of the instructor station or independent computer interface.

(3) Except for the initial setup, a keyboard or mouse is not 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 airplane model represented. The pilot is able to operate the controls in the same manner as it would be in the actual airplane. This includes the landing gear, wing flaps, cowl flaps, carburetor heat, mixture, propeller, and throttle controls appropriate to the airplane model represented.

(4) The physical arrangement, appearance, and operation of controls, instruments, and switches closely models the airplane represented. This trainer recreates the appearance, arrangement, operation, and function of realistically placed physical switches and other required controls representative of an airplane instrument panel that includes the following:

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

(5) Only the software evaluated by the FAA is available for use on this computer system. Note: This does not prohibit software updates that do not otherwise change the appearance of the systems operation.

The Precision Flight Controls CR12 Propanel model meets the following additional airplane physical flight and airplane systems controls:

(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 make and model of airplane represented.

(5) Controls for the following items, as applicable to the category and class of airplane 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).

The Precision Flight Controls CR12 Propanel model meets the following Control Input Functionality and Response Criteria:

(1) Time from control input to recognizable system response is without delay and does not appear to lag in any way. Precision Flight Controls verifies that the CR12 Propanel meets this performance requirement.

(2) The control inputs are tested by the computer software at each session startup, and displayed as a confirmation message of normal operation, or a warning message if the transport delay time or any design parameter is out of tolerance. It is not possible to continue the training session unless the problem is resolved and all components are functioning properly. This test considers all the items listed in the display and control requirements.

The CR12 Propanel model meets the following Display Requirements:

(1) The following instruments and indicators are replicated and properly located in the instrument panel, as appropriate to the airplane represented:

• Flight instruments are in a standard configuration, represented as traditional “round dial” flight instruments, or as an electronic primary flight instrument display (PFD) and multi-function display (MFD) with reversionary and back-up flight instruments.

• A sensitive **altimeter** with incremental markings each 20 feet or less, operable throughout the

normal operating range for the make and model of airplane represented.

• A **magnetic direction indicator**

• A **heading indicator** with incremental markings each 5 degrees or less, displayed on a 360 degree circle. Arc segments of less than 360 degrees are selectively displayed as applicable to the M/M of airplane represented.

• An **airspeed indicator** with incremental markings as shown for the M/M airplane represented; airspeed markings of less than 20 knots need not be displayed.

• A **vertical speed indicato**r (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 ±2,000 fpm total display, or as applicable to the M/M of airplane represented.

• 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.

• 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 or as appropriate for a PFD configuration is used.

• 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 airplane represented. Bank angles are 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.

• **Engine instruments** as applicable to the M/M of airplane represented, providing markings for the normal ranges including the minimum and maximum limits.

• A **suction gauge** or instrument pressure gauge, if applicable, with a display appropriate to the airplane represented.

• A **flap setting indicator** that displays the current flap setting. Setting indications should be typical of that found in an actual airplane.

• A **pitch trim indicator** with a display that shows zero trim and appropriate indices of airplane nose down and nose up trim, as would be found in the actual airplane.

• **Communication radio(s)** with a full range of selectable frequencies displaying the radio frequency in use.

• **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. Examples include, 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 are present on each course deviation indicator (CDI) as applicable. The markings 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), if installed.
- If equipped with a Primary Flight Display (PFD) and/or Multifunction Flight Display (MFD), the flight and navigation information and guidance replicates the avionics manufactures same scales and navigation information presentation.

• A **clock** with incremental markings for each minute and second, or a timer with a display of minutes and seconds.

• A **transponder** that displays the current transponder code.

• F**uel quantity indicator(s)** that displays the fuel remaining, either in analog or digital format, as appropriate for the make and model of airplane represented.

(2) All instrument displays listed above are visible during all flight operations. All of the displays provide an image of the instrument that is clear and:

(a) Does not appear to be out of focus or illegible

(b) Does not appear to “jump” or “step” during operation.

(c) Does not appear with distracting jagged lines or edges.

(d) Does not appear to lag relative to the action and use of the flight controls.

(3) Control inputs are properly reflected by the flight instruments in real time and without a perceived delay in action. Display updates or actions show all changes (within the total range of the replicated instrument) that are equal to or greater than the following values:

(a) Airspeed indicator: change of 5 knots.

(b) Attitude indicator: change of 2 degrees in pitch and bank.

(c) Altimeter: change of 10 feet.

(d) Turn and bank: change of ¼ standard rate turn.

(e) Heading indicator: change of 2 degrees.

(f) Vertical speed indicator (VSI): change of 100 fpm.

(g) Tachometer: change of 25 rpm or 2 percent of turbine speed.

(h) VOR/ILS: change of 1 degree for VOR or ¼ of 1 degree for ILS.

(i) ADF: change of 2 degrees.

(j) GPS: change as appropriate for the model of GPS based navigator represented.

(k) Clock or timer: change of 1 second.

Note: Airplane configurations with PFD and/or MFD displays are representative of those avionics systems and the associated instrument display information.

(4) Flight Displays reflect proper dynamic behavior of the airplane represented. Examples: a VSI reading of 500 fpm reflects a corresponding movement in altitude, and an increase in power reflects an increase in the rpm indication or power indicator.

The CR12 Propanel model meets the following Flight Dynamics requirements:

(1) Flight dynamics are comparable to the way the airplane represented performs and handles.

(2) Airplane performance parameters (such as maximum speed, cruise speed, stall speed, and maximum climb rate) are comparable to the airplane represented. A performance table is provided for each airplane configuration for sea level and 5,000 feet, to verify the appropriate performance. (or 6,000 feet can be used. 25,000 feet will be used for turboprop or turbojet altitude performance)

(3) Airplane vertical lift component changes as a function of bank comparable to the way the airplane represented performs and handles.

(4) Changes in flap setting, slat setting, or gear position is accompanied by the appropriate changes in flight dynamics comparable to the way the make and model of airplane represented performs and handles.

(5) The presence and intensity of wind and turbulence is reflected in the handling and performance qualities of the simulated airplane and is comparable to the way the airplane represented performs and handles.

The CR12 Propanel model meets the following Instructional Management Requirements:

(1) The instructor is able to pause the system at any time during the training simulation for the purpose of administering instruction or procedural recommendations.

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

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

(3) The **system is capable of recording** both a horizontal and vertical track of airplane movement for the entire training session for later playback and review.

(4) The instructor can disable any of the instruments prior to or during a training session and is 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 airplane systems failures: alternator or generator, vacuum or pressure pump, pitot static, electronic flight displays, or landing gear or flaps, as appropriate.

(5) This ATD has an available **navigational database** that is local (within 25NM) to the training facility location. All navigational data is based on **procedures as published per 14 CFR part 97.** This device uses Jeppesen or Garmin's NavData, to support the instrument approach and navigation capabilities.

Advanced ATD Requirements

All configurations**,** as noted in AC 61-136, Appendix C meet the following *additional* AATD design criteria. The CR12 Propanel model has the following additional AATD features and components.

(1) A realistic shrouded (enclosed) or unshrouded (open) flight deck design with a singular and uniform instrument panel design representing a specific model airplane flight deck.

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

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

(4) A **digital avionics** panel.

(5) A Global Positioning System **(GPS) navigator** with moving map display.

(6) A **Two-axis autopilot** is installed, and, as appropriate, a flight director (FD). (If standard equipment)

(7) Pitch trim (manual or electric pitch trim) is available permitting indicator movement either electrically or analog in an acceptable trim ratio.

(8) Has 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.

(9) A fixed pilot seat appropriate to the airplane configuration, including an adjustable height and an adjustable forward and aft seat position. The pilot should be oriented so that the pilots line of sight is at approximately at the same height of the top edge of the instrument panel.

(10) Rudder pedals secured to the cockpit floor structure or to the floor beneath the device in proper relation to cockpit orientation.

(11) A **push-to-talk switch** on the control yoke.

(12) A **separate instructor station** permitting effective interaction without interrupting the flight in overseeing the pilot's horizontal and vertical flight profiles in real time and space. This includes the ability to:

(a) Oversee tracks along published airways, holding entries and patterns, and Localizer (LOC) and glideslope (GS) alignment/deviation (or other approaches with a horizontal and vertical track).

(b) Function as air traffic control in providing vectors, etc., change the weather conditions, ceilings, visibilities, wind speed and direction, create light/moderate/ or severe turbulence, and icing conditions.

(c) Invoke failures in navigation and instruments, radio receivers, landing gear and flaps, engine power (partial and total), and other airplane systems (pitot static, electric, vacuum pump, etc).

(5) The presence and intensity of wind and turbulence is reflected in the handling and performance qualities of the simulated airplane and is comparable to the way the airplane represented performs and handles.

The **CR12 Propanel** model meets the following **Instructional Management Requirements:**

(1) The instructor is able to pause the system at any time during the training simulation for the purpose of administering instruction or procedural recommendations.

(2) If a training session begins with the "airplane in the air" and ready for the performance of a particular procedural task, the instructor can manipulate the following system parameters independently of the simulation:

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

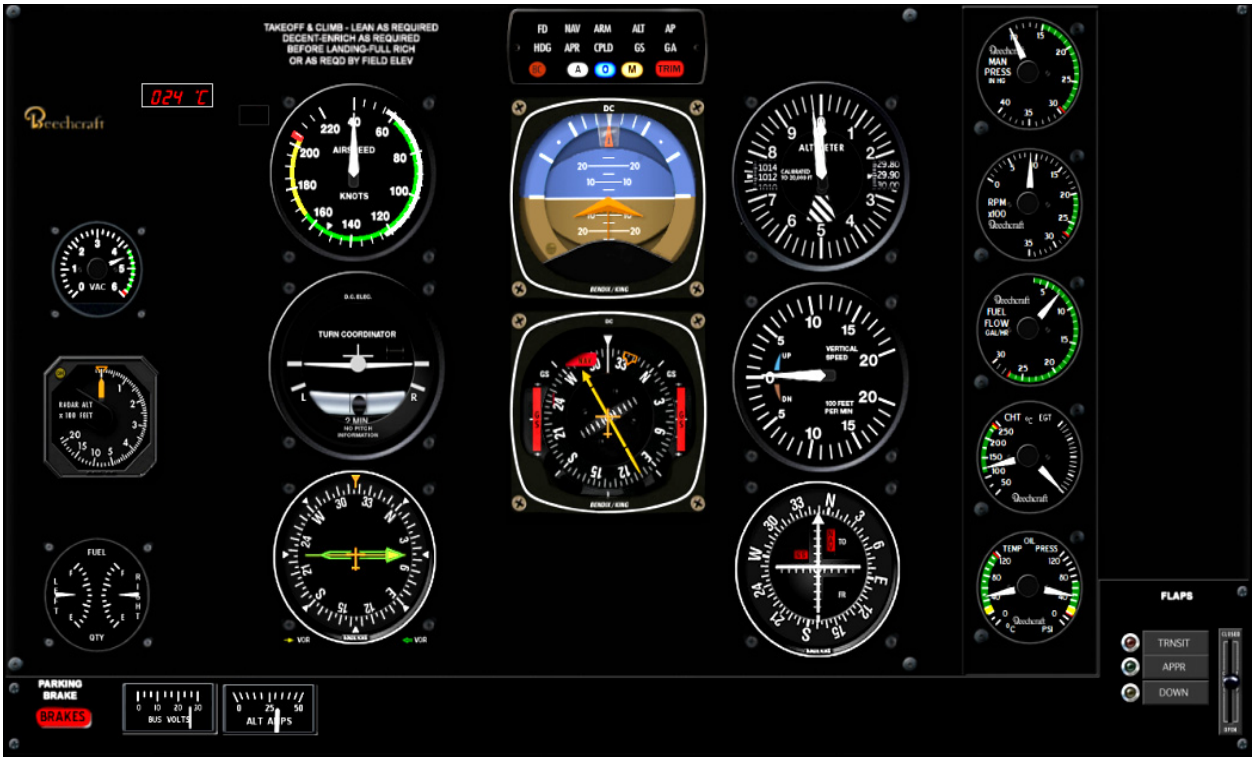
(3) The **system is capable of recording** both a horizontal and vertical track of airplane movement for the entire training session for later playback and review.

(4) The instructor can disable any of the instruments prior to or during a training session and is 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 airplane systems failures: alternator or generator, vacuum or pressure pump, pitot static, electronic flight displays, or landing gear or flaps, as appropriate.

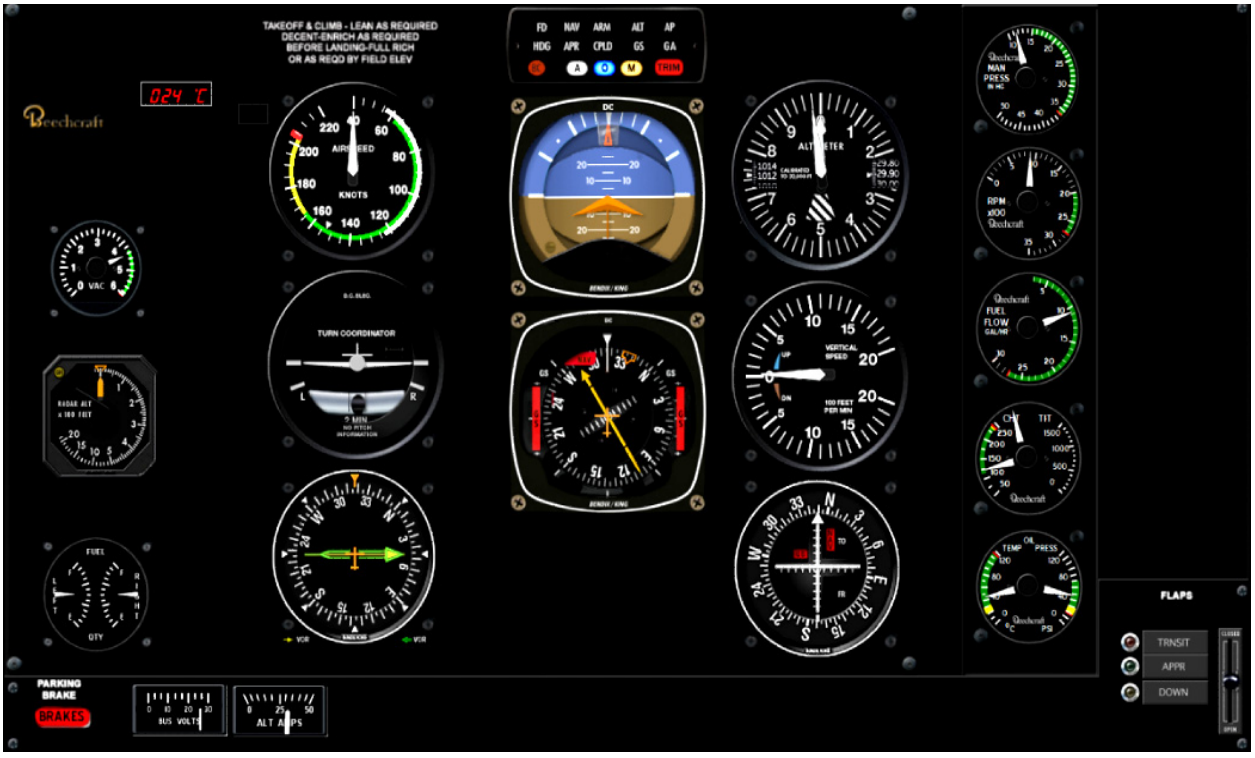
(**5)** This ATD has an available **navigational database** that is local (within 25NM) to the training facility location. All navigational data is based on **procedures as published per 14 CFR part 97.** This device uses Jeppesen, Garmin or Dafif database to support the instrument approach and navigation capabilities.

List of Airplane Configurations

Available airplane configuration “instrument panel” pictures and any optional instrument or avionics panels for each airplane are shown here. The components list identifies any optional displays, controls, or avionics equipment.



Beech Bonanza A36



Beech Bonanza A36TC

Beechcraft Baron B55

Beechcraft Duchess B76

Beechcraft Baron 58

Beechcraft Baron 58TC

Beechcraft Travel Air B95

Cessna 152

Cessna 172P

Cessna 172S

Cessna 172R

Cessna 182T

Cessna T182T

Cessna R182

List of Airplane Configurations

Cessna TR182

Cessna 206H

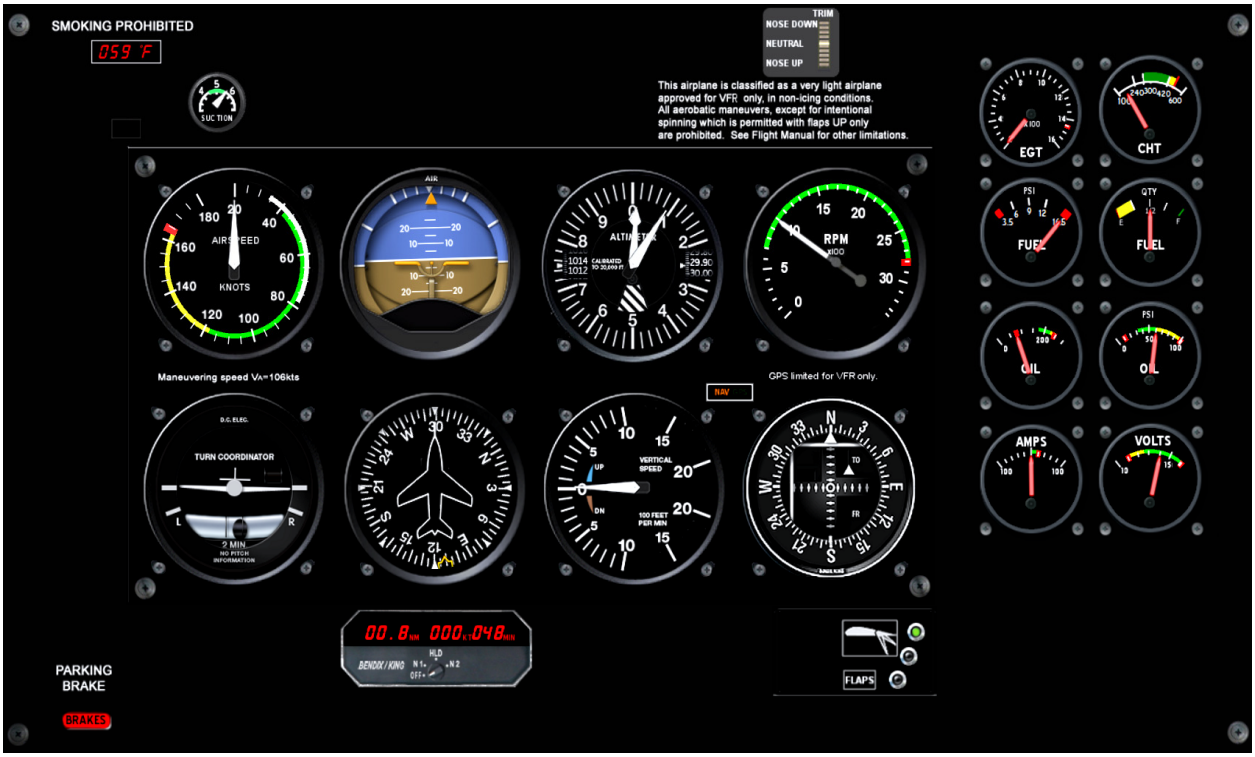
CESSNA 210M

Cessna T210

Cessna 310R

Cessna 414A

Cessna 421C



Diamond DA20

Mooney M20J

Piper Warrior II PA28

Piper Arrow III PA28

Piper Arrow IV PA28

Piper Archer III PA28

Piper Malibu Mirage PA46

Piper Seneca I PA34

Piper Seneca V PA34

List of Airplane Configurations

Piper Seminole PA44

Piper Navajo Chieftan PA31

A/C Performance Table

Performance References for Validation

NOTE: Standard atmosphere and gross weight is used for performance.

Airplane performance table for sea level *and* 6,000 feet

12,000 feet for turbo-charged

#	Manufacturer	Model Number	Acft Type	Vso	Vs1	Vx Best Angle	Vy Best Rate	Vglide	Va	Vne Never Exceed	Vmca Minimum Control Speed	KTAS at Cruise @ 75% Power Setting	Rate of climb (fpm) at best rate (Vy), at full power or as recommended	Single Engine Climb Rate (at Vyse)
1	**Beechcraft**	**A36**	SEL	61	68	78	96	110	140	204	N/A	SL 159	1200	N/A
											6000 -----ft	167	650	N/A
2	**Beechcraft**	**A36TC**	SEL TC	62	68	77	100	105	141	206	N/A	SL 160	1000	N/A
											12000 -----ft	180	650	N/A
3	**Beechcraft**	**B55**	MEL	69	75	84	107	120	157	224	78	SL 176	1750	400
											6000 -----ft	188	1100	60
4	**Beechcraft**	**B76**	MEL	60	70	71	85	95	157	194	65	SL 152	1300	220
											6000 -----ft	166	850	50
5	**Beechcraft**	**B58**	MEL	75	84	92	105	122	156	223	84	SL 188	1700	380
											6000 -----ft	202	1250	180
6	**Beechcraft**	**B58TC**	MEL TC	78	84	91	96	120	169	235	80	SL 184	1475	460
											12000 -----ft	216	1200	120
7	**Beechcraft**	**B95**	MEL	67	75	73	95	103	139	208	71	SL 154	1005	200
											6000 -----ft	149	705	-10
8	**Cessna**	**152**	SEL	31	36	55	67	60	104	149	N/A	SL 101	715	N/A
											6000 -----ft	105	465	N/A
6	**Cessna**	**172P**	SEL	46	51	60	76	65	99	158	N/A	SL 112	700	N/A
											6000 -----ft	118	388	N/A
10	**Cessna**	**172S**	SEL	48	51	62	74	68	105	163	N/A	SL 114	730	N/A
											6000 -----ft	121	550	N/A
11	**Cessna**	**172R**	SEL	47	51	60	75	68	99	163	N/A	SL 110	740	N/A
											6000 -----ft	119	465	N/A
12	**Cessna**	**182T**	SEL	45	50	58	80	75	110	170	N/A	SL 135	1040	N/A
											6000 -----ft	145	945	N/A
13	**Cessna**	**T182T**	SEL	49	54	64	84	75	110	175	N/A	SL 139	1050	N/A
											12000 -----ft	149	820	N/A
14	**Cessna**	**182RG**	SEL	37	42	65	81	70	101	182	N/A	SL 148	1150	N/A
											6000 -----ft	154	670	N/A
15	**Cessna**	**T182RG**	SEL	50	54	75	90	83	112	178	N/A	SL 152	1040	N/A
											12000 -----ft	165	965	N/A
16	**Cessna**	**206H**	SEL	47	59	69	89	80	125	182	N/A	SL 135	1150	N/A
											6000 -----ft	145	955	N/A

A/C Performance Table

Performance References for Validation

#	Manufacturer	Model Number	Acft Type	Vso	Vs1	Vx Best Angle	Vy Best Rate	Vglide	Va	Vne Never Exceed	Vmca Minimum Control Speed	KTAS at Cruise @ 75% Power Setting	Rate of climb (fpm) at best rate (Vy), at full power or as recommended	Single Engine Climb Rate (at Vyse)
17	**Cessna**	**210M**	SEL	50	64	79	96	85	119	199	N/A	SL 164	860	N/A
											6000 -----ft	170	615	N/A
18	**Cessna**	**T210**	SEL	58	67	79	96	85	119	203	N/A	SL 164	975	N/A
											12000 -----ft	179	640	N/A
19	**Cessna**	**310R**	MEL	75	84	86	107	96	147	223	75	182	1540	330
											6000 -----ft	187	1150	101
20	**Cessna**	**414A**	MEL	71	81	85	112	107	145	237	79	SL 175	1500	250
											22	180	980	150
21	**Cessna**	**421C**	MEL	77	86	88	111	109	151	238	80	SL 185	1210	270
											6000 -----ft	195	1120	150
22	**Diamond**	**DA20**	SEL	36	44	60	75	73	106	164	N/A	SL 122	750	N/A
											6000 -----ft	126	560	N/A
23	**Mooney**	**M20J**	SEL	55	62	77	88	91	120	198	N/A	SL 158	1000	N/A
											21	167	720	N/A
24	**Piper Warrior II**	**PA28**	SEL	44	50	79	63	73	111	160	N/A	SL 112	700	N/A
											6000 -----ft	121	450	N/A
25	**Piper Arrow III**	**PA28**	SEL	45	50	78	90	79	118	183	N/A	SL 140	950	N/A
											6000 -----ft	145	500	N/A
26	**Piper Arrow IV**	**PA28**	SEL TC	60	65	79	97	79	124	186	N/A	SL 150	950	N/A
											12000 -----ft	160	550	N/A
27	**Piper Archer III**	**PA28**	SEL	45	50	64	76	76	113	154	N/A	SL 120	680	N/A
											6000 -----ft	125	400	N/A
28	**Piper Malibu Mirage**	**PA46**	SEL TC	58	69	81	110	90	133	200	N/A	SL 160	1300	N/A
											12000 -----ft	185	1000	N/A
29	**Piper Seneca I**	**PA34**	MEL	60	67	78	91	105	127	189	70	SL 150	1360	180
											6000 -----ft	168	950	-40
30	**Piper Seneca V**	**PA34**	MEL	61	67	83	88	105	139	204	66	SL 180	1460	253
											6000 -----ft	195	750	172
31	**Piper Seminole**	**PA44**	MEL	58	62	82	88	104	135	202	63	SL 153	1350	220
											32	163	800	-50
32	**Piper Navajo Cheiftan**	**PA31**	MEL	75	80	90	94	97	159	236	80	175	1390	150
											6000 -----ft	185	1000	130

Visual System Description Section

Visual system comes with one or three monitors that provides 120° (wide) x 40° (vertical) view capability. Single screen is 90° (wide) x 40° (vertical) view

CR12 Shown with 3 LCD Monitors
IOS Monitor, KVM, Keyboard and Mouse

CR12 Shown with One LCD Monitor

Shown with Curved Screen Visual Display (Standard)

CR12 Shown with 3 LCD Monitors (Standard)

The **visual system** 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, to include the ability to adjust the visibility and ceiling conditions permitting the simulation of various meteorological weather conditions.

AIRPLANE ATD FUNCTION VERIFICATION CHECKLIST

Functions and Maneuvers	Yes, No, or N/A
a. Pre-Takeoff	
(1) Engine start	Yes
(2) Taxi and brake operation	Yes
b. Takeoff	
(1) Run-up and powerplant checks	Yes
(2) Acceleration characteristics	Yes
(3) Nose wheel and rudder steering	Yes
(4) Effect of crosswind	Yes
(5) Instrument	Yes
(6) Flap operation	Yes
(7) Landing gear operation (if retractable)	Yes
c. In-Flight Operations	
(1) **Climb**	
(i) Normal and max. performance	Yes
(ii) One engine inoperative procedures (Multiengine only)	Yes
(2) **Cruise**	
(i) Correct performance characteristics (speed vs. power)	Yes
(ii) Normal and steep turns	Yes
(iii) Approach to stalls, (i.e. stall warning), stalls. Execute from takeoff, cruise, and approach and landing configurations.	Yes
(vi) In flight engine shutdown (multi-engine only)	Yes

(v) In flight engine start (multi-engine only)	Yes
(vi) Fuel selector function	Yes
(3) **Approach**	
(i) Normal (with & without flaps) Check gear horn warning if applicable	Yes
(ii) Single engine approach and landing (multi-engine)	Yes
(iii) Best glide no power	Yes
(iv) Landings	Yes
d. Instrument Approaches	
(1) **Nonprecision**	
(i) GPS and LPV	Yes
(ii) GPS - WAAS (optional)	Yes
(iii) All engines operating	Yes
(iv) One engine inoperative (Multi-engine only)	Yes
(v) Approach procedures (VOR, VOR/DME, LOC procedures on an ILS, LDA, RNAV (RNP) or RNAV (GPS) to LNAV, LNAV/VNAV or LPV)	Yes
Functions and Maneuvers	**Yes, No, or N/A**
(2) **Precision**	
(i) ILS	Yes
(ii) GLS (optional)	No
(iii) Effects of Crosswind	Yes
(iv) One Engine Inoperative (Multi-engine only)	Yes
(v) Missed Approach	Yes
(A) Normal	Yes
(B) With One Engine inoperative (Multi-engine only)	Yes

e. Surface Operations (Post Landing)	
(1) Approach and landing roll	Yes
(2) Braking operation	Yes
(3) Reverse thrust operation, if applicable	Yes
f. Any Flight Phase	
(1) **Airplane and Power Plant Systems**	
(i) Electrical, mechanical, or hydraulic	Yes
(ii) Flaps	Yes
(iii) Fuel selector and oil temp/pressure	Yes
(iv) Landing gear (if applicable)	Yes
(2) **Flight Management and Guidance Systems**	
(i) Two axis auto pilot (if standard equipment)	Yes
(ii) Flight director (AATD only) and system displays (if installed)	Yes
(iii) Navigation systems and optional display configurations	Yes
(iv) Stall warning systems avoidance	Yes
(v) Multi-function displays (PFD/MFD) if applicable	Yes
(3) **Airborne Procedures**	
(i) Holding	Yes
(ii) Uncoordinated turns – slipping and skidding demo	Yes
(iii) Configuration and power changes and resulting pitch changes	Yes
(iv) Compass turns and appropriate errors (if installed)	Yes
(4) Simulated Turbulence in Flight (light, moderate, severe)	Yes

(**5**) **Parking and Engine Shutdown**	
(i) Systems operation	Yes
(ii) Parking brake operation (if installed)	Yes
g. Can simulate engine failure, including failures due to simulated loss of oil pressure or fuel starvation.	Yes
h. Can simulate the following equipment or system failures:	
(1) Alternator or generator failure.	Yes
(2) Vacuum pump/pressure failure and associated flight instrument failures.	Yes
(3) Gyroscopic flight instrument failures.	Yes
(4) Pitot/static system malfunction and associated flight instrument failures.	Yes
(5) Electronic flight deck display malfunctions.	Yes
(6) Landing gear (if retractable) or flap malfunctions	Yes
i. Independent Instructor Station Requirements (AATD only)	
(1) Displays published airways and holding patterns.	Yes
(2) Displays airplane position and track.	Yes
(3) Displays airplane altitude and speed.	Yes
(4) Displays NAVAIDs and airports.	Yes
(5) Can record and replay airplane ground track history for entire training session.	Yes
(6) Can invoke instrument or equipment failures.	Yes

During the initial start of the trainer, the computer component "self-check" program verifies that all the features of the trainer are in working order. It is not possible to continue the training session unless the problem is resolved, and all the components are functioning properly.

During the initial start-up the ATD has the following **Screen Statement** is displayed on the instructor station or visual display before the trainer is used for training.

"*All the flight instruments required for visual and instrument flight rules listed in part 91.205 must be functional at the start of the simulated flight session. Temporary instrument or equipment failures are permitted when practicing emergency procedures. If this simulated flight session will be used for instrument experience or currency requirements, the visual component must be configured to Instrument Meteorological Conditions [IMC] during the simulated flight session, including execution of instrument approaches from the final approach fix until reaching Decision Height [DH], Decision Altitude [DA], or Minimum Decent Altitude [MDA] as appropriate*."

Notice: Any changes or modifications to this training device that have not been reviewed, evaluated, and approved in writing by General Aviation and Commercial Division will terminate FAA approval.