

# RealSimGear

## SFx Pro



## Qualification and Approval Guide (QAG)

### Advanced Aviation Training Device

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## Log of Revisions

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## List of Effective Pages

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

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**FAA APPROVED QAG**  
**Signature and Date**

**for Daniel Kelman, Acting Manager**  
**Training and Simulation Group**

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# Compliance Statement

This Qualification and Approval Guide (QAG) provides a detailed description of all the required components, features, functions, and capabilities for the RealSimGear model Cirrus SFx Pro aviation training device. This includes any optional airplane configurations with quality color pictures and diagrams. This QAG is provided by RealSimGear 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 61-136, *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 oversight.

RealSimGear must provide a detailed operations manual with each aviation training device model produced. This will include how to properly start, operate, and shut down the trainer. This must include how to operate and maintain the trainer as originally designed and tested. RealSimGear 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 this aviation training device is expected to become proficient in its operation before using it to satisfy any pilot experience requirements specified in the code of federal regulations. This includes maintaining its condition and functionality. This ATD must be maintained to its original performance and functionality, as demonstrated during the original FAA functional evaluation. This trainer cannot be used to log pilot time unless all the components of the trainer are in normal working order.

Only the airplane configurations 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 system's 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 this FAA approval or use of ATDs should be directed to the General Aviation and Commercial Division.

# Aviation Training Device (ATD) Description and Pictures

The RealSimGear model SFx Pro is based on the dimensions and layout of a production single engine land airplane. This trainer closely represents the overall functionality, performance, and instrumentation for the airplane. The platform consists of a flight deck, instrument panel, avionics panel, and associated flight and instrument controls. A combination of hardware and software components are assembled and functionally checked by RealSimGear. All hardware components are designed and installed so the flight deck has the appearance and feel of an actual airplane.

The SFx Pro 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.

The SFx Pro represents a Cirrus SF50 airplane.

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**Image 1.** Interior showing the overall flight deck configuration.

SFx Pro



**Image 2.** Detail view of flight instruments and avionics panel

SFx Pro Main Console Detail



**Image 3.** General Switch panel



**Image 4.** Engine start panel



**Image 5.** View of autopilot system.



Image 6. Pilot side of instrument panel showing full screen PFD



Two options for split screen



Image 7. Co-Pilot side of instrument panel showing full screen MFD



Two options for split screen



## Image 8. GTC Touchscreen Input devices

GTC configured as PFD control



GTC configured for MFD control



GTC configured as Radio Panel



GTC configured as backup gauge



**Image 9.** Control yoke/stick showing yoke mounted switches.



**Image 10.** Rudder pedals



**Image 11.** Engine control lever, flap selector - mixture, fuel pump and selectors



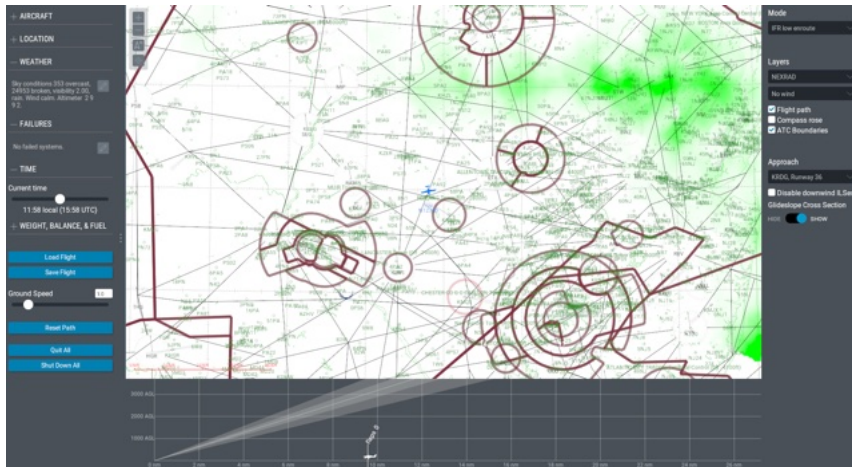
**Image 12. CAPS Handle**



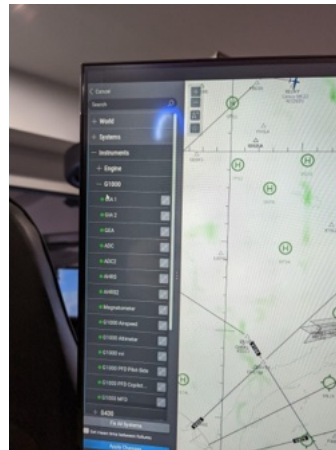
**Image 13.** Instructor station stand and monitor



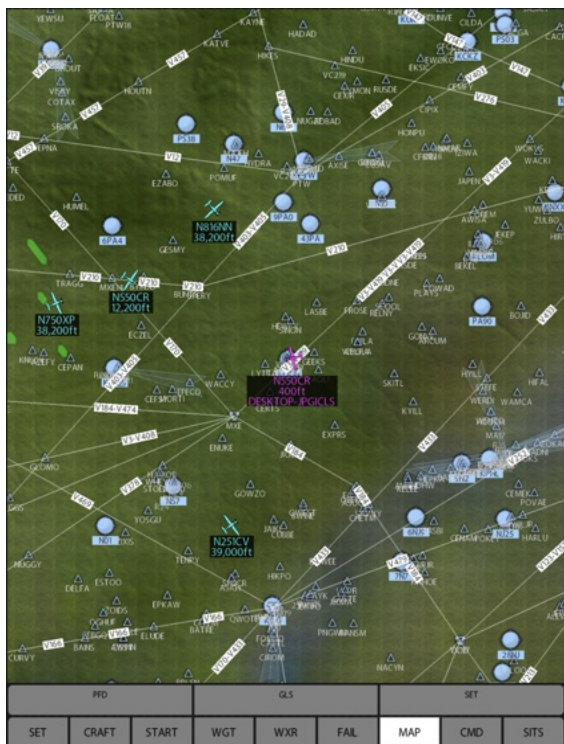
**Image 14.** Instructor station showing moving map, vector airways and current airplane position.



**Image 15.** Instructor station displaying weather controls and systems malfunction controls interface.



**Image 16.** iPad Instructor Station option showing moving maps, victor airways and current airplane position.



**Image 17.** iPad Instructor Station option displaying weather controls interface

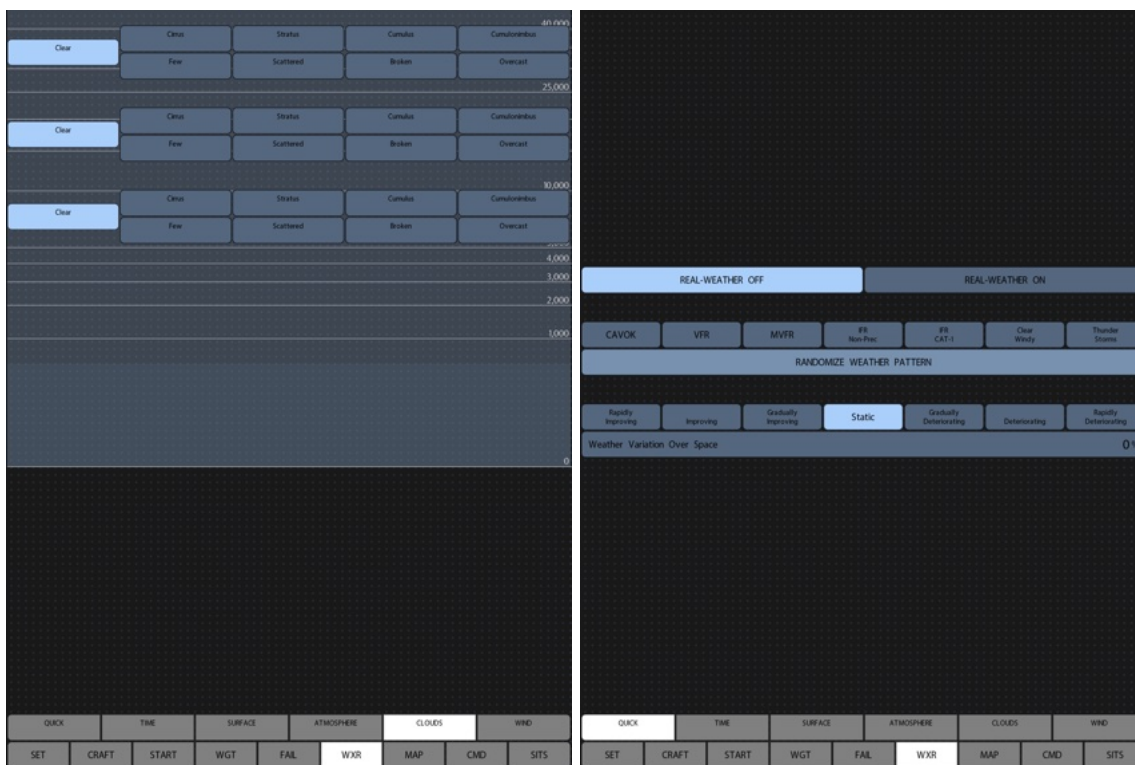


Image 18. iPad Instructor Station option displaying the failures interface



**Image 19.** Optional Elgato StreamDeck Simulator Control Unit



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# Hardware and Software Components List - SFX Pro - AATD

Detailed equipment list with description of hardware *and* software components installed or available.

| Item | Component Name                          | Manufacturer     | Model #                                             | Quantity | Details                                                                                                                                                                                                                                                                                                            |
|------|-----------------------------------------|------------------|-----------------------------------------------------|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 01   | Enclosure Assembly                      | RealSimGear      | SFx Console                                         | 1        | This component houses all the avionics and controls and provides the basic physical structure of the system                                                                                                                                                                                                        |
| 02   | Flight Controls (elevator and ailerons) | RealSimGear      | SFx Yoke                                            | 1        | Control yoke for controlling pitch and roll with force feedback capabilities providing realistic stick forces.                                                                                                                                                                                                     |
| 03   | Rudder Pedals/Brakes                    | Virtual Fly      | Ruddo+                                              | 1        | Standard rudder pedals with yaw and toe brake action                                                                                                                                                                                                                                                               |
| 04   | Flap control and indicator              | RealSimGear      | SFx Flap                                            | 1        | Flap selector and indicator                                                                                                                                                                                                                                                                                        |
| 05   | Engine start panel & switches           | RealSimGear      | SFx Start Switch                                    | 1        | Starter switch panel                                                                                                                                                                                                                                                                                               |
| 06   | Engine controls Single                  | RealSimGear      | SFx Throttle Console                                | 1        | Throttle console that contains throttle and trim controls. Auto-throttle and auto-trim supported.                                                                                                                                                                                                                  |
| 07   | Electrical switches                     | RealSimGear      | SFx Switch Panel                                    | 1        | Provides all electrical switching functions                                                                                                                                                                                                                                                                        |
| 08   | Flight Instrumentation                  | RealSimGear      | G3000                                               | 2        | Two G3000 panels, designed mimic the functionality of the Cirrus Perspective Touch + avionics                                                                                                                                                                                                                      |
| 09   | FMS Interface                           | RealSimGear      | GTC580                                              | 3        | Three standard touch enabled input interfaces found in Cirrus SF50 aircraft.                                                                                                                                                                                                                                       |
| 10   | Autopilot/Flight Director               | RealSimGear      | GFC500                                              | 1        | Standard autopilot interface found in Cirrus SF50 aircraft.                                                                                                                                                                                                                                                        |
| 11   | CAPS System                             | RealSimGear      | Cirrus SFX CAPS                                     | 1        | This provides for a physical CAPS handle mechanism positioned to the right and above the pilot position as found in an actual Cirrus aircraft. This handle simulates cover placement, pin placement and handle pull. Handle pull closely matches the 45lbs found in an actual Cirrus and can be reset once pulled. |
| 12   | Simulator Control                       | Elagato          | StreamDeck                                          | *1       | Optional button box with definable functions to allow the pilot to control the sim without using a keyboard and mouse. For example, start the sim in a pre-defined situation, control parking brakes, set weight and balance.                                                                                      |
| 13   | Primary Flight Computer                 | RealSimGear      | RSG-SFx-PC                                          | 1        | Computer specifications to <b>meet or exceed</b> the following:<br>* CPU - AMD 9800X3D<br>* GPU - nVidia RTX4070ti<br>* Memory - 32GB DDR5<br>* Hard Disk - 2GB Nvme SSD                                                                                                                                           |
| 14a  | Visual display monitors                 | LG or equivalent | 65UQ9000PUD or equivalent                           | 3        | Standard visual setup using 3x 65" 4K TV's to provide for 200+ degrees of field of view                                                                                                                                                                                                                            |
| 14b  | Visual display monitors                 | LG or equivalent | 65UQ9000PUD, 55UR9000PUA, 50UR9000PUA or equivalent | * 1      | Optional visual setup includes a single 50", 55", or 65" 4K TV set to provide 90 degrees of forward field of view                                                                                                                                                                                                  |
| 15   | Display Stand                           | RealSimGear      | Single screen adjustable stand                      | 1-3      | Used for all visual configurations                                                                                                                                                                                                                                                                                 |

|     |                                                       |                  |                                                              |    |                                                                                                                                                                                                                                                                |
|-----|-------------------------------------------------------|------------------|--------------------------------------------------------------|----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 16a | Audio system                                          | LG or equivalent | 65UQ9000PUD,<br>55UR9000PUA,<br>50UR9000PUA or<br>equivalent | *1 | Optionally audio is provided via the integrated speakers found in the above 4K TV's                                                                                                                                                                            |
| 16b | Audio system                                          | RealSimGear      | RSG-AUDIO-1                                                  | 1  | RealSimGear integrated audio system                                                                                                                                                                                                                            |
| 17  | Operating system                                      | Microsoft        | Windows 11                                                   | 1  | This system will only support Windows operating systems. While Windows 11 is current, RealSimGear may also use whatever the next version may be such as Windows 12.                                                                                            |
| 18  | Simulation Software                                   | Laminar Research | X-Plane 12 PRO                                               | 1  | The underlying simulation software.                                                                                                                                                                                                                            |
| 19  | Instructor Station Monitor                            | ASUS             | VT229H or<br>equivalent                                      | 1  | 22" touchscreen monitor                                                                                                                                                                                                                                        |
| 20a | Instructor Operating System (IOS)                     | Laminar Research | Included Instructor<br>Station                               | 1  | Provides for moving map that can be configured to show VFR or IFR conditions, shows traffic, weather, approaches and glide slope/path. Also allows instructors to select aircraft, location, set/change weather conditions, trigger and reset system failures. |
| 20b | Instructor Operating Station                          | Laminar Research | Instructor Station                                           | *1 | Optional iPad app provided by Laminar Research which provides all instructor station functionality without the need for a physically separate screen and stand.                                                                                                |
| 21a | Instrument Procedures and Navigational data Base used | Laminar Research | X-Plane 12 PRO                                               | 1  | Base Jeppesen database included with X-Plane 12                                                                                                                                                                                                                |
| 21b | Instrument Procedures and Navigational data Base used | Navigraph        | FMS Data                                                     | *1 | Optional navigation database update subscription to allow monthly AIRAC updates as performed in a real aircraft.                                                                                                                                               |
| 21c | Instrument Procedures and Navigational database used  | Jeppesen         | Navigation Data/Charts                                       | *1 | Optional subscription provided monthly AIRAC database updates                                                                                                                                                                                                  |
| 21d | Instrument Procedures and Navigational database used  | KeyVan           | Navigation Data                                              | *1 | Optional subscription provided monthly AIRAC database updates                                                                                                                                                                                                  |
| 22  | Simulated Aircraft Model                              | RealSimGear      | SF50                                                         | 1  | Aircraft model used to simulate the actual flight characteristics of a Cirrus SF50 aircraft                                                                                                                                                                    |
| 23a | ATC Services                                          | PilotEdge        |                                                              | *1 | Optional plugin to allow live ATC communications via PilotEdge                                                                                                                                                                                                 |
| 22b | ATC Services                                          | SayIntentions.AI |                                                              | *1 | Optional plugin to allow simulated ATC communications via AI generated ATC                                                                                                                                                                                     |
| 24  | Mounting Platform                                     | RealSimGear      | SFx Pro Base                                                 | 1  | Mounting platform that has adjustable seat integrated, mounting points for the CAPS console, cabinetry for the side yoke, and supporting cabinets for the avionics console.                                                                                    |

# 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 61-136, (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 Cirrus SFx Pro airplane ATD.

## Basic ATD Requirements

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

The RealSimGear SFx Pro models meet the following Control Input requirements.

- (1) The airplane's 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 system's operation.

The RealSimGear SFx Pro 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 the 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 RealSimGear SFX Pro 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. RealSimGear verifies that the SFX Pro 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 RealSimGear SFX Pro 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 the 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 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 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 the 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 the 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 non-precision 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 Multi Function 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.
  - Fuel quantity indicator(s) that displays the fuel remaining, either in analog or digital format, as appropriate for the make and model of the 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 RealSimGear SFX Pro 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 should 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 are 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 RealSimGear SFX Pro 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 database, with optional updates via Navigraph 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 RealSimGear SFx Pro 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 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

# 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.

## A) Cirrus SF50

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**A/C PERFORMANCE TABLE** (for the airplane configurations available)

| Airplane Model | V <sub>so</sub> | V <sub>s1</sub> | V <sub>x</sub> | V <sub>y</sub> | Best Glide Speed | V <sub>a</sub> | V <sub>ne</sub> | V <sub>mc</sub> | KTAS at Cruise @ 75% power setting. | Rate of climb (fpm) at best rate (V <sub>y</sub> ), at full power or as recommended. | Single Engine Climb rate (at V <sub>yse</sub> ) |
|----------------|-----------------|-----------------|----------------|----------------|------------------|----------------|-----------------|-----------------|-------------------------------------|--------------------------------------------------------------------------------------|-------------------------------------------------|
| <b>(1)SF50</b> | 85              | 95              | 91             | 120            | 100              | 150            | 250             | N/A             | 250                                 | SL - 2500                                                                            | SL N/A                                          |
|                | 25,000 feet→    |                 |                |                |                  |                |                 |                 | 315                                 | 1400                                                                                 | N/A                                             |

**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, 25,000 feet for turboprop/turbojet).

# Visual System Description and Configurations

The standard visual system used by the RealSimGear SFx Pro model includes 3 (three) 65" 4K TV monitors arranged with one forward facing, and one to each side of the pilot position at approximately 80 degrees from the forward monitor. This provides for greater than 200 degrees of visuals meaning the pilot can look over his shoulder and see the runway at the 45 degree point.

Optional for the SFx Pro model is a single 50", 55", or 65" 4K TV arranged as a forward facing view with 85 degree field of view.

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.

Visual Display Setup (3x 65" 4K TVs) (standard configuration for SFx Pro)



Optional Visual Display Setup (1x 50", 55", or 65" 4K TV)



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# Functions and Maneuvers Checklist

**FIGURE 1. AIRPLANE ATD FUNCTION VERIFICATION CHECKLIST**

| Functions and Maneuvers                                                                                                        | Yes, No, or N/A |
|--------------------------------------------------------------------------------------------------------------------------------|-----------------|
| <b>a. Pre-Takeoff</b>                                                                                                          |                 |
| (1) Engine start                                                                                                               | Yes             |
| (2) Taxi and brake operation                                                                                                   | Yes             |
|                                                                                                                                |                 |
| <b>b. Takeoff</b>                                                                                                              |                 |
| (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             |
|                                                                                                                                |                 |
| <b>c. In-Flight Operations</b>                                                                                                 |                 |
| <b>(1) Climb</b>                                                                                                               |                 |
| (i) Normal and max. performance                                                                                                | Yes             |
| (ii) One engine inoperative procedures (Multiengine only)                                                                      | N/A             |
|                                                                                                                                |                 |
| <b>(2) Cruise</b>                                                                                                              |                 |
| (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)                                                                             | N/A             |

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

|                                                                     |     |
|---------------------------------------------------------------------|-----|
|                                                                     |     |
| <b>e. Surface Operations (Post Landing)</b>                         |     |
| (1) Approach and landing roll                                       | Yes |
| (2) Braking operation                                               | Yes |
| (3) Reverse thrust operation, if applicable                         | N/A |
|                                                                     |     |
| <b>f. Any Flight Phase</b>                                          |     |
| <b>(1) Airplane and Power Plant Systems</b>                         |     |
| (i) Electrical, mechanical, or hydraulic                            | Yes |
| (ii) Flaps                                                          | Yes |
| (iii) Fuel selector and oil temp/pressure                           | Yes |
| (iv) Landing gear (if applicable)                                   | Yes |
|                                                                     |     |
| <b>(2) Flight Management and Guidance Systems</b>                   |     |
| (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 |
|                                                                     |     |
| <b>(3) Airborne Procedures</b>                                      |     |
| (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 |
|                                                                     |     |
| <b>(4) Simulated Turbulence in Flight</b> (light, moderate, severe) | Yes |

|                                                                                                                     |     |
|---------------------------------------------------------------------------------------------------------------------|-----|
|                                                                                                                     |     |
| <b>(5) Parking and Engine Shutdown</b>                                                                              |     |
| (i) Systems operation                                                                                               | Yes |
| (ii) Parking brake operation (if installed)                                                                         | Yes |
|                                                                                                                     |     |
| <b>g. Can simulate engine failure, including failures due to simulated loss of oil pressure or fuel starvation.</b> | Yes |
|                                                                                                                     |     |
| <b>h. Can simulate the following equipment or system failures:</b>                                                  |     |
| (1) Alternator or generator failure.                                                                                | Yes |
| (2) Vacuum pump/pressure failure and associated flight instrument failures.                                         | N/A |
| (3) Gyroscopic flight instrument failures.                                                                          | N/A |
| (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 |
|                                                                                                                     |     |
| <b>i. Independent Instructor Station Requirements (AATD only)</b>                                                   |     |
| (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 the 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 Descent Altitude [MDA] as appropriate.”*

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