ADVANCED AVIATION TRAINING DEVICE
APPROVAL QUALIFICATION GUIDE
FOR AZURE COMPUTING, INC (d.b.a. ***ELITE*** Simulation Solutions)
. ***ELITE***® ATD SYSTEMS

MODEL: ELITE AATD RC-1

The purpose of this guide is to provide information to the FAA for evaluation of the ***ELITE***® PCATD systems. The ***ELITE***® software and the various hardware controls have many possible combinations. Only the specified aircraft modules and hardware systems listed in this qualification guide are being submitted for approval.

B. CONTROL REQUIREMENTS: PHYSICAL CONTROLS

Physical and virtual control requirements can be met for the following items using the hardware components listed in the appendix A of this qualification guide.

1. A physical, self-centering, displacement yoke.

2. Physical, self-centering rudder pedals.

3. A Physical, throttle lever or power lever.

4. Mixture, propeller, and throttle control(s) as applicable to the family of airplanes replicated.

5. Physical controls applicable to the aircraft for the following:
   a. Flaps
   b. Propellers
   c. Mixtures
   d. Pitch Trim
   e. Communication and Navigation Radios
   f. Clock or Timer
   g. Gear Handle
   h. Transponder
   i. Altimeter
   j. Microphone with push to talk switch:
      Compatible devices: Standard Microphone or Headsets with push to talk switch
   k. Carburetor heat if applicable
   l. Cowl Flaps

6. Control Inputs: ELITE Simulation Solutions AG, a.k.a. Initiative Computing AG, Switzerland, has certified that the transport delay between the control inputs to recognizable system response is less than 300 milliseconds for all controls listed in appendix A of this Qualification Guide. Calculated transport delay is approximately 25 milliseconds or less.

6a. At each startup ***ELITE*** software runs a series of test and will display a conformation message if all controls are working properly or appropriate warning messages if any design parameter is out of tolerance.

C. DISPLAY REQUIREMENTS

All aircraft modules listed in this qualification guided meet or exceed the display requirements of FAA/FS-I-8700-3 (draft). Pictures of each aircraft module suitable for the Model RC-1 are shown in Appendix B:

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1. Instruments and indicators:
   a. Flight instruments are in a Standard Configuration, represented as separate traditional round flight instruments or as an electronic primary flight instrument display with reversionary/backup flight instruments.

   b. All aircraft modules have an adjustable altimeter that operates throughout the normal operating range of the aircraft being replicated which is incremental markings of 20 feet.

   c. A magnetic compass which displays incremental markings typical of that shown in the family of airplanes represented

   d. All aircraft modules have a heading indicator with incremental markings of 5 degrees and display on a 360 circle (for Standard Configuration)

   e. All aircraft modules have an airspeed indicator with incremental markings appropriate to the aircraft being replicated.

   f. All aircraft modules have vertical speed indicators with incremental markings of 100 feet for the range of ± 1000 feet and incremental markings of 500 feet for the remaining ± 2000 feet or appropriate to the aircraft being replicated.

   g. All aircraft modules have a turn and bank indicator with incremental markings of 3 degrees per second turn for left and right turns and the 3-degree index is inside the maximum deflection of the indicator.

   h. All aircraft modules have a skid and slip indicator with coordination information displayed in the conventional skid ball format with markings for the center position.

   i. All aircraft modules have attitude indicators appropriate to the aircraft being replicated with incremental markings for each 5 degrees of pitch, from 25 degrees pitch up to 25 degrees pitch down. Except C172R, C182S and C182RG has pitch up of 10 degrees to pitch down of 15degrees, which is appropriate to the attitude indicator being replicated. Left and right bank angles are marked at 10, 20, 30, and 60 of bank.

   j. All aircraft modules have engine instruments and markings for normal ranges and minimum and maximum limits applicable to the aircraft being replicated.

   k. All aircraft modules have suction gauges and/or indicators appropriate to the aircraft being replicated, which indicate the vacuum pressure for the instruments requiring vacuum.

   l. All aircraft modules have a flap setting indicator, which displays the current flap setting with appropriate markings as to the aircraft being replicated.

   m. All aircraft modules have pitch trim indicators with markings for zero trim and appropriately induce the aircraft nose up and nose down trim, as would be found in an aircraft.

   n. All aircraft modules have two communication radio displays of the radio frequency in use.

   o. All aircraft modules have two navigation radios displays for VOR/ILS frequency in use, and one radio display for the NDB frequency in use. Each navigation radio is equipped with an aural identification feature and all aircraft modules have a marker beacon receiver with appropriate graduated markings.

   p. All aircraft modules have clocks and timers that display minutes and seconds.

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q. All aircraft modules have magnetic compasses with incremental markings of 5 degrees and display proper lead and lag during turns.

r. All aircraft modules have transponders, which display the current transponder setting.

s. All aircraft modules have fuel quantity indicators, which display the fuel remaining for each fuel tank appropriate to the aircraft being replicated.

2. All instrument displays listed above are visible during all flight operations for all aircraft modules being replicated. The update rate of all displays provide an image that:
   a. Does not appear to be out of focus.
   b. Does not appear to jump or step to a distracting degree during operation.
   c. Does not appear with distracting jagged lines or edges.

3. The display update varies with the speed of the computer processor, memory, and graphics card. If the computer system being used meets or exceeds the programs minimum system requirements, then the refresh rate will be faster than 10 Hz (approximate refresh rate will be 20 Hz or faster). Minimum IBM-compatible system requirements 2.6Ghz processor, 512 Mb RAM, 80 GB HD, 128 Mb nVidia or open GL compatible video card; USB, DVD drive, LAN connection (10/100) and Windows 2000 or XP operating system.

"Display updates" display all changes that meet or exceed the values FAA/FS-I-8700-3 (draft). The "display updates" display the following changes for each of the instruments listed below.

a. Airspeed indicator: Displays ½ to 1 knot of change.
b. Attitude indicator: Displays 1/3 to ½ degree of pitch change and ½ to 1 degree of bank change.
c. Altimeter: Displays 2.78 feet of change.
d. Turn and Bank: Displays 1/20 of standard rate turn changes.
e. Heading Indicator: Displays ½ degree of change.
f. VSI: Displays 10 fpm of change.
g. Tachometer: Displays 20 RPM of change.
h. VOR/ILS: Displays ½ degree of change for VOR or 1/8 degree of change for ILS.
i. ADF: Displays 1/2 degree of change.
j. Timer: Displays 1 second of change.

4. All displays reflect the dynamic behavior of an actual aircraft display.

D. FLIGHT DYNAMICS

1. The flight dynamics for each aircraft module are comparable to the aircraft being replicated.
2. For all aircraft modules, the aircraft performance parameters are comparable to the aircraft being replicated.
3. For all aircraft modules, the vertical lift component changes as a function of bank comparable to the aircraft being replicated.
4. Changes of flap settings for all aircraft modules and changes of gear settings (as applicable) cause changes in flight dynamics comparable to the aircraft being replicated.
5. The presence and intensity of wind and turbulence are reflected in the handling and performance qualities of all the aircraft modules and are comparable to the aircraft being replicated.

E. INSTRUCTIONAL MANAGEMENT

1. The instructor has the ability to freeze the simulation at any point using the following controls listed: keyboard, mouse, and avionics panel.

2. The instructor can manipulate the following system parameters independently of the simulation with the following methods or devices.
   a. Aircraft geographic location: mouse
   b. Aircraft heading: mouse
   c. Aircraft airspeed: mouse
   d. Aircraft altitude: mouse
   e. Wind direction and speed: mouse
   f. Turbulence: mouse

3. The system is capable of recording both horizontal and vertical tracks of the aircraft movement and can be stored and played back for review using: mouse and primary monitor or secondary monitor.

4. The instructor can disable any of the instruments prior to the beginning of a training session and can simulate failure during a training session without stopping or freezing the simulation to effect the failure using: mouse and secondary monitor, or keyboard.

5. The software has navigational databases, obtained and compiled from the FAA National Flight Data Center and/or Jeppesen, for the entire United States. All navigational data is based on procedures as published in 14 CFR Part 97 and is updated and maintained by ELITE Simulation Solutions AG.

F. TASK REQUIREMENT LIST

Using the ***ELITE***® ATD configurations in this guide a flight school could incorporate all of the items listed in FAA/FS-I-8700-3 (draft) under the Task Requirement List into an integrated ground and flight instrument training curriculum. Course syllabuses developed companies such as AOPA's Air Safety Foundation, ASA, Jeppesen, or by the school its self, should be acceptable, as long as it incorporates the items listed under the Task Requirement List FAA/FS-I-8700-3 (draft), Table 3-1.

G. ADVANCED ATD DESIGN CRITERIA

The **ELITE® Model AATD RC-1** exceeds the requirements for Basic ATD approval criteria appropriate for Advanced ATD simulation technology:

1. A realistic cockpit design and instrument panel arrangement representing a generic model airplane cockpit;
2. Cockpit knobs/system controls/switches/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 class of airplane being represented;
3. Primary flight and navigation instruments approximately life sized that exhibit neither stepping nor excessive transport delay and arranged so as to observe trends and provide a realistic scan pattern;
4. Digital avionics panel (Optional OEM PFD and MFD which may provide functions of the digital avionics panel);
5. Three axis autopilot, and, as appropriate, a flight director;
6. GPS navigator;
7. Electric pitch trim with an acceptable trim ratio;
8. A visual system that provides acceptable cues in both day and night VFR/IFR conditions to enhance a pilot's visual orientation in the vicinity of an airport;
9. A separate instructor station to permit effective interaction without interrupting the flight in overseeing the pilot's horizontal and vertical flight profiles in real time and space, change

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weather conditions (ceilings, visibilities, wind speed, direction, turbulence and icing conditions) and invoke failures in navigation, instruments, radio receivers, landing gear and flaps, engine power (partial and total) and other airplane systems;

10. Instrument Approach Scenarios allow instructors to evaluate pilot performance without having to act as ATC;
11. Cockpit seating accommodates proper ergonomics and spatial orientation for the pilot in relation to the cockpit, instruments and glare shield;
12. Rudder pedals are secured to the cockpit floor structure in proper relation to cockpit orientation

H. FUNCTION AND SUBJECTIVE TEST CRITERIA

The ELITE Model RC-1 AATD meets the criteria established for Basic and Advanced ATD status and complies with the checklist performance regulatory tasks/maneuvers and /or procedures as outlined in Table 3-1, FS-I-8700-3 as applicable under 14 CFR parts 61 and 141.

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APPENDIX A – Components, Model ELITE AATD RC-1

Cockpit Enclosure Model RC-1

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AP3000 Digital Radio

ELITE Rudder Pedals

ELITE Flight Controls Console (Pro Panel II)

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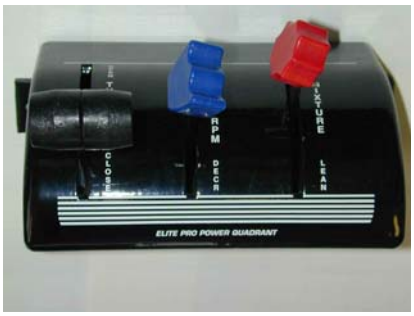
Model RC-1 Options



3 Lever Piper-style Throttle

2 or 3 Lever Vernier Throttles

Garmin 430 or 530

Cessna 182 Single Instrument Panel

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Bonanza A36 Single Instrument Panel

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Baron Single Instrument Panel

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C182 S (Dual Instrument Panels)

Archer III (Dual Instrument Panels)

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Arrow IV (Dual Instrument Panels)

Bonanza (Dual Instrument Panels)

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Baron (Dual Instrument Panels)

Seneca III (Dual Instrument Panels

C172 R (Dual Instrument Panels)

C172RG (Dual Instrument Panels)

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