



**Pennant** 

# AVIONICS AND ELECTRICAL SYSTEMS EMULATOR

(AESE)

PRODUCT OVERVIEW

# INTRODUCTION

The Avionics and Electrical Systems Emulator (AESE) is a classroom-based desktop virtual aircraft simulation.

The AESE enables typical aircraft functional tests and fault-diagnosis procedures to be taught by either instructor demonstration or by student self-paced learning. Students can do a range of practical training exercises through interaction with a virtual rotary-wing aircraft, permitting a progressive understanding of aircraft systems. The AESE has the flexibility to allow instructors to construct new training exercises and present or assign those tasks to individuals or group of students in a classroom environment.

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**Contact:** sales@pennantplc.co.uk



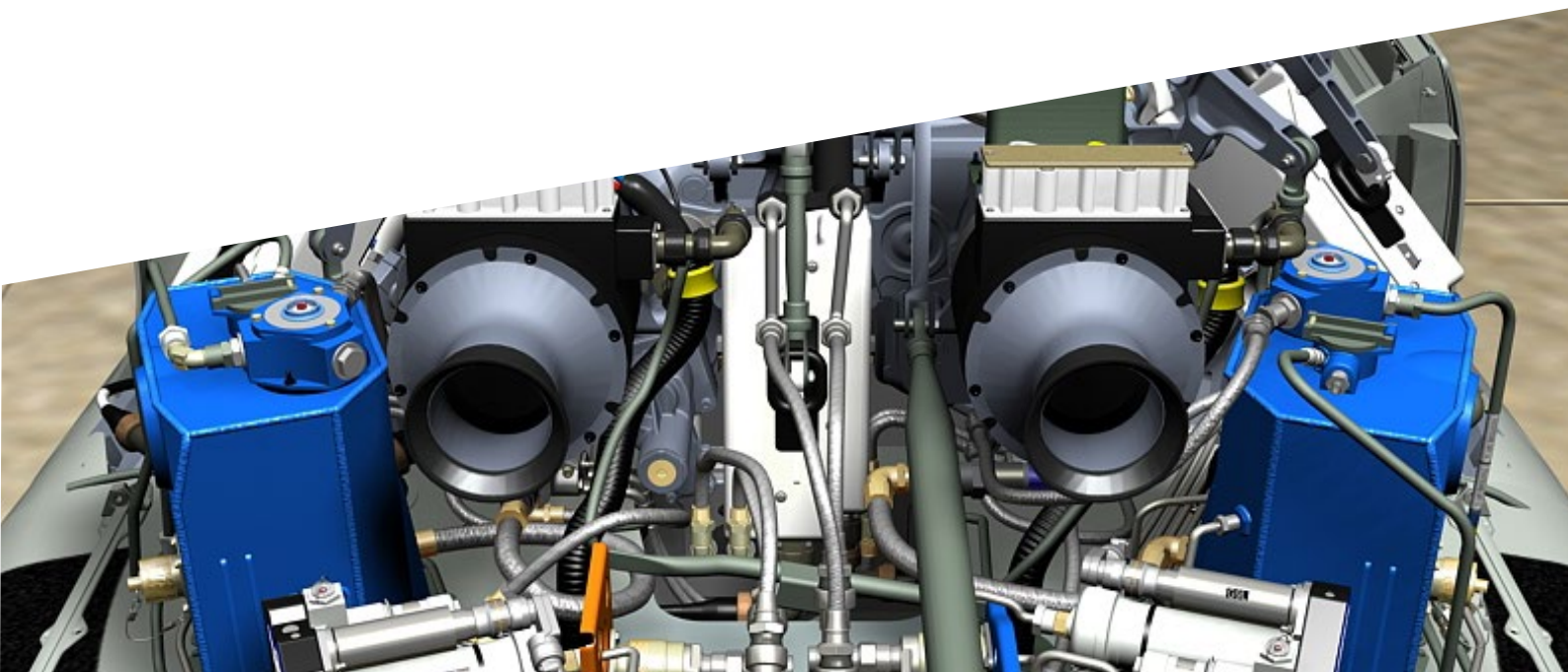
## KEY FEATURES:

- COTS PC equipment <sup>1</sup>
- Technical publications suite for the virtual aircraft
- Virtual aircraft with:
  - free play navigation and operation
  - detailed aircraft bays and LRUs
  - integrated aircraft systems simulation
  - realistic real-time aircraft responses.
- Classroom management system for:
  - creation of training scenario
  - real-time scenario monitoring
  - recording and playback of student performance.

*<sup>1</sup> Option to install on customer-provided equipment subject to minimum PC specifications*

The AESE provides practice in:

- use of aircraft technical publications
- locating aircraft assemblies and components
- functional testing of aircraft systems
- troubleshooting
- use of ground support and specialised test equipment.



# AVIATION REGULATIONS ALIGNMENT

EASA/EMAR PT 66	FAA
<p><b>Part 66 MoS:</b></p> <p><b>Module 5 Digital techniques electronic instrument systems</b> 5.15 Typical electronic and digital aircraft systems (ECAM)</p> <p><b>Module 7 Maintenance practices:</b> 1.17 Aircraft handling and storage</p> <p><b>Module 11 Aeroplane aerodynamics, structures &amp; systems:</b> 11.5.2 Avionic systems (ATA23, 24) 11.14 Lights (ATA33) 11.19 Integrated modular avionics (ATA42)</p> <p><b>Module 12 Helicopter aerodynamics, structures &amp; systems:</b> 12.2 Flight control systems (main rotors) 12.6 Air-conditioning (ATA21) 12.7.2 Avionic systems (ATA23, 24) 12.8 Electrical power (ATA24) 12.9 Equipment and furnishings (cargo retention) (ATA25) 12.11 Fuel systems (ATA28) 12.12 Hydraulic power (ATA29) 12.13 Ice and rain protection (ATA30) 12.14 Landing gear (ATA32) 12.15 Lights (ATA33) 12.17 Integrated modular avionics (ATA42)</p> <p><b>Module 13 Aircraft structures &amp; systems:</b> 13.3 Autoflight (ATA22) 13.5 Electrical power (ATA24) 13.8 Instrument systems (master warning systems and centralised warning panels) (ATA31) 13.9 Lights (ATA33) 13.11 Air-conditioning and cabin pressurisation (ATA21) 13.13 Fuel systems (ATA28) 13.14 Hydraulic power (ATA29) 13.15 Ice and rain protection (ATA30)</p> <p><b>Module 15 Gas turbine engine:</b> 15.12 Air systems 15.13 Starting and ignition systems 12.14 Landing gear (ATA32) (incl flotation system) 15.20 Fire protection systems (ATA26)</p>	<p><b>14 CFR Part 147:</b></p> <p><b>Appendix B - General Curriculum Subjects:</b> A. 3. DC electrical circuits 4. AC electrical circuits 20. Read and interpret aircraft electrical schematics including solid state devices and logic functions F. 3. Aviation fuels and fuel servicing procedures M. Alert, Caution, and Warning Indications</p> <p><b>Appendix C - Airframe Curriculum Subjects:</b> E. 3. Steering systems F. 1. Hydraulic system G. 1. Requirements for cabin environmental system 4. Vapor cycle systems H. 10. Warning systems H. 12. g. 1) Built in test equipment 2) Central Maintenance computer System I. Communication &amp; Navigation Systems J. Aircraft Fuel Systems K. 14. Aircraft lighting systems L. Ice and Rain Control Systems M. Airframe Fire Protection Systems N. Rotorcraft Fundamentals</p> <p><b>Appendix D - Powerplant Subjects:</b> D. 2. Fire detection and warning system operation H. Ignition &amp; Starting Systems (Turbine)</p>



# AVIATION REGULATIONS ALIGNMENT

## CITY & GUILDS

### 2675-02

#### Unit 010 Fundamentals of aircraft gas turbine engines:

##### Outcome 4:

1. describe the operation of a gas turbine starting system
2. describe the operation of a gas turbine ignition system
3. describe the operation of a gas turbine air system.

##### Outcome 5:

3. describe gas turbine fuel pressure/flow indications/ indicators

##### Outcome 7:

2. describe the procedure for starting & engine ground run-up
3. describe engine monitoring systems

#### Unit 102 Fundamentals of airframe construction and systems:

##### Outcome 2:

1. describe aircraft hydraulic power systems
3. describe in simple terms the indication & warning system used in a hydraulic system.

##### Outcome 4:

6. describe nosewheel steering systems

##### Outcome 5:

2. describe de-icing and anti icing systems
3. describe rain protection systems.

##### Outcome 6:

4. describe aircraft air conditioning systems

#### Unit 103 Fundamentals of aircraft electrical and avionics systems:

##### Outcome 2:

1. explain electrical fuses and holders
2. explain automatic circuit breakers
3. explain manually operated aircraft switches
4. explain system-operated aircraft switches
5. explain switch protection devices and guards
6. explain warning lamps and indicators

##### Outcome 3:

1. explain aircraft gas turbine starting and ignition systems
2. explain requirements of gas turbine engine starting systems
3. describe air-starting systems
4. describe the gas turbine engine start sequence
5. describe safety precautions required when working on aircraft gas turbine starting systems

##### Outcome 4:

1. explain the need for an aircraft fuel contents indicating system
2. explain the layout of aircraft fuel contents indicating systems
3. explain the need for calibration of fuel contents indicating systems

##### Outcome 6:

8. explain the need for aircraft instrumentation and display systems
9. describe the layout of aircraft instrument panels

##### Outcome 7:

1. explain the global references used in navigation
2. explain how navigation is achieved using a compass
3. explain how navigation is achieved through the use of radio
4. explain how navigation is achieved using an Inertial Navigation System
5. explain how navigation is achieved using a Global Positioning System
6. describe typical navigation system line-replaceable units (LRU).

##### Outcome 8:

1. describe aircraft communication systems
2. describe intercom systems
3. describe V/UHF radio systems
4. describe HF radio systems
5. describe the uses of secure communications
6. describe the main LRUs in an aircraft communication system
13. describe cockpit LRUs that use and display radar information.

##### Outcome 10:

4. describe the basic modes of autopilot operation
6. explain how the autopilot operates in each of the basic modes

##### Outcome 5:

1. explain the need for aircraft fire detection and suppression systems

### 2675-04

#### Unit 009 Fundamentals of helicopter aerodynamics, structures and systems:

##### Outcome 5:

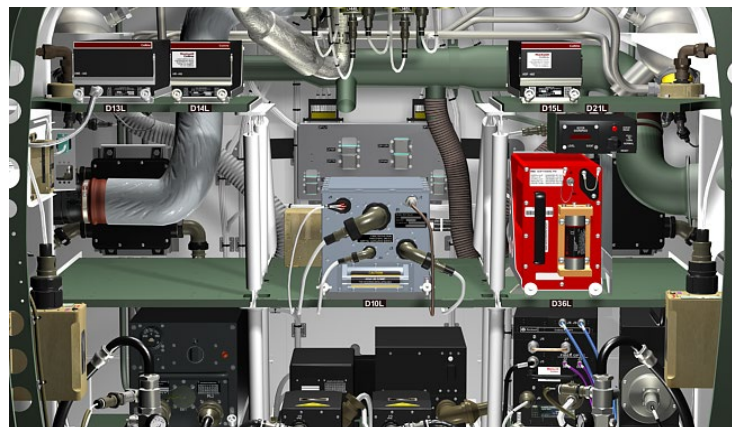
3. describe helicopter air distribution systems

Note. AESE provides a synthetic aircraft training environment to assist in developing practical competencies

# TECHNICAL SPECIFICATIONS

## RECOMMENDED MINIMUM PC EQUIPMENT SPECIFICATION

PARTICULAR	
Processor	3 <sup>rd</sup> Gen Intel Core i7
RAM	4GB
Disk Space	100GB (full install)
Graphics Card	Quad Output Nvidia Quadro NVS 450 or similar
Monitors	Instructor ideally three monitors, student ideally two
Operating System	Supports both Microsoft Windows 7 & 10



# AVIATION MODULES COVERAGE

## MODULE 5 DIGITAL TECHNIQUES ELECTRONIC INSTRUMENT SYSTEMS:

Typical electronic and digital aircraft systems (ECAM)

## MODULE 7 MAINTENANCE PRACTICES:

Aircraft handling and storage

## MODULE 11 AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS:

Avionics Management (ATA23, 24)

Lighting (ATA33)

Integrated modular avionics (ATA42)

Cockpit Displays

Communications

Central Warning System

Navigation

Surveillance (FLIR & Radar)

## MODULE 12 HELICOPTER AERODYNAMICS, STRUCTURES AND SYSTEMS:

Flight control systems (main rotors)

External Cargo Carrying (ATA25)

Main Rotor Drives

Flotation

Rotor Brake

Fuel (ATA28)

Transmission

Hydraulics (ATA29)

Environmental Control System (ATA21)

Ice and Rain Protection (ATA30)

Electrical (ATA24)

Landing Gear (ATA32)

## MODULE 13 AIRCRAFT STRUCTURES AND SYSTEMS:

Automatic Flying Control System (ATA22)

Hydraulics (ATA29)

Central Warning System (ATA42)

Ice and Rain Protection (ATA30)

Electrical (ATA24)

Landing Gear (ATA32)

Environmental Control System (ATA21)

Lighting (ATA33)

Fire Protection (ATA26)

## MODULE 15 GAS TURBINE ENGINE:

Engine Starting

Health and Usage Monitoring System



## SPECIAL TYPE TEST EQUIPMENT

Air Data Test Set

Automatic Flying Control System Crossover Leads

Dummy Load

Flow Meter Assembly

Multimeter

Multi-Voltage Insulation and Continuity Tester

NAV/COMM Test Set IFR 4000

No Volts Test Set Mk6

Oxley Test Probe

Rotor Brake Test Set

Search and rescue test set QB16D Signal Source

Shorting Plugs

Tele-brief Test Set

Test Lamps

Test/Shorting Leads

Variable RF Tap Wattmeter

Vapour Cycle Air Conditioning System computer test set

Vibration Rod

## SUPPLIED DOCUMENTATION

Operational Manual

Aircraft Technical Publications