

# Engine Starting System Trainer (ESST)



# Introduction

The Engine Starting System Trainer (ESST) is a bolt-on option to Pennant's Integrated Avionics Maintenance Trainer (IAMT). The enhancement provides an interactive training aid that focusses on a typical engine starting system.

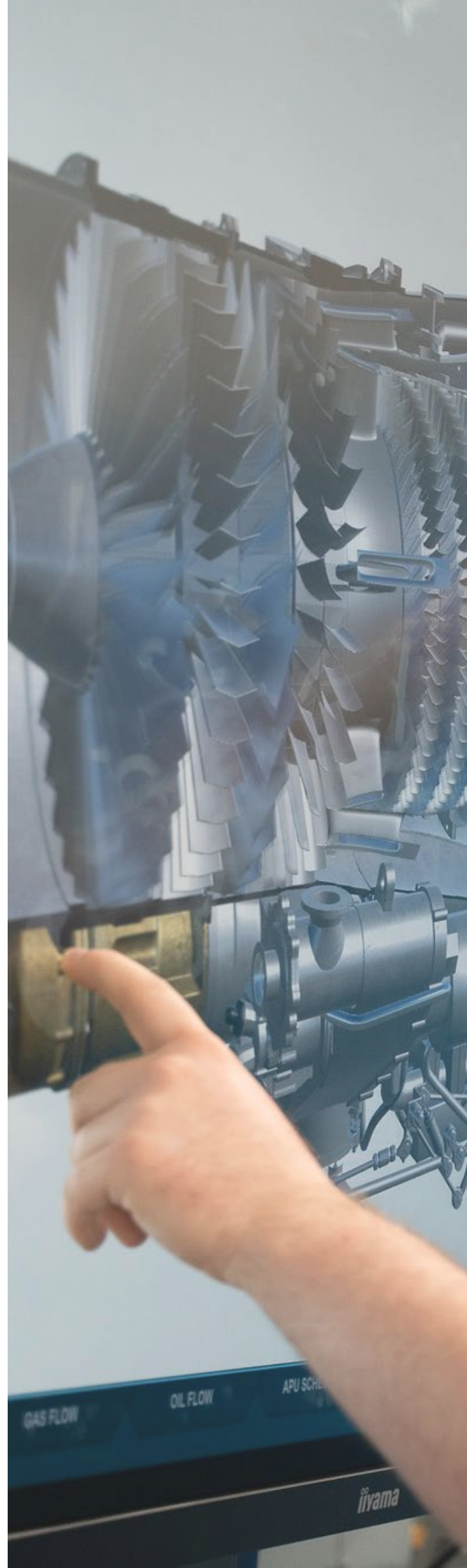
Extending the existing IAMT functionality, the ESST drives a large display device external to the airframe to present a representative full and working 3d cutaway model of the engine supplemented by detailed electrical, fuel, air and oil schematics

The ESST provides a full working picture of the complete engine starting cycle, enabling the seamless instruction in part or full-cycle along with relevant faults consolidating student learning electrically and mechanically in engine starting and indication, pressures and temperatures and basic gas turbine theory.



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# External Display Hardware

The 65" external touchscreen display system will run the ESST software to display the engine model. It connects neatly into the IAMT Instructor Operating Station network with no need for hardware changes.

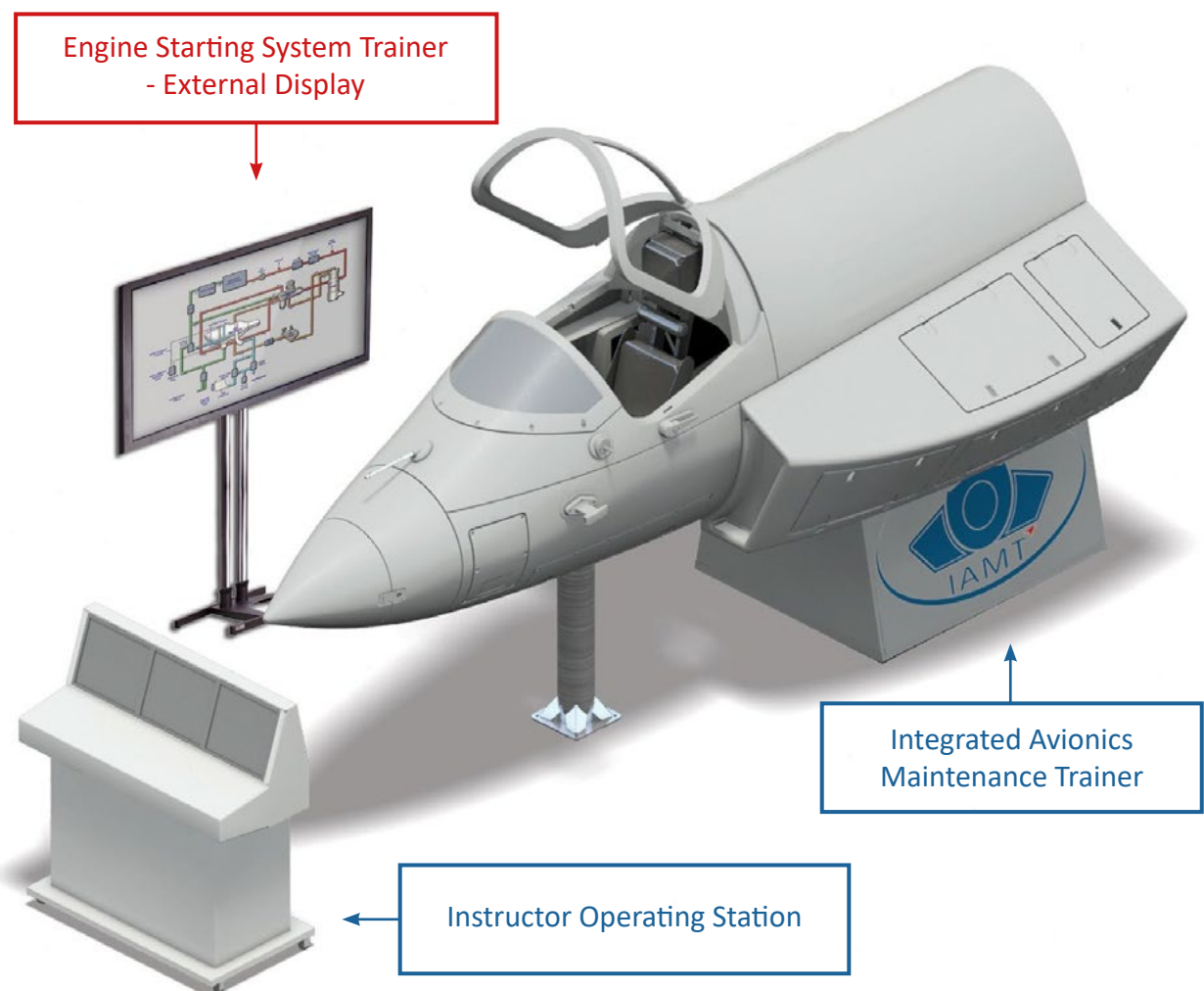
## External Display Graphics

The external displays show a full and working 3d cut away model of the engine supplemented by detailed electrical, fuel, air and oil schematics.

The schematics will update in real time to reflect the status of the system as the user in the IAMT cockpit operates the controls to start the engine.

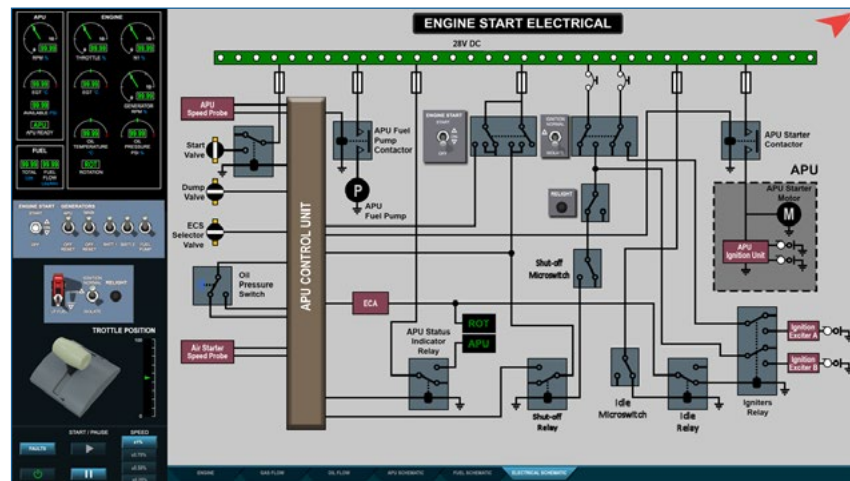
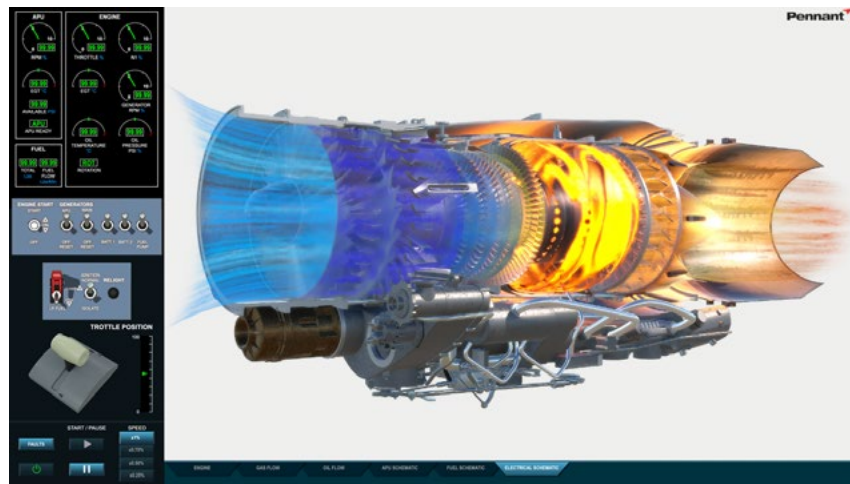
All major engine components are detailed, and the instructor can feed the labels so that the student can name components during the starting cycle or as a specific teaching point.

The APU schematics detail in real-time the APU starting up to on speed and as demand for air is placed by the engine starting cycle.



ESST GENERAL ASSEMBLY





TYPICAL EXTERNAL DISPLAY LAYOUT

Alongside the schematics, it is possible to show information or graphics of engine related cockpit controls and indications. This can include:

- Throttle (including the relight switch)
- Navigation pane containing the following switches:
 

- LP FUEL SHUT-OFF	- GENERATORS APU	- BATT 2
- IGNITION	- GENERATORS MAIN	- FUEL PUMP
- ENG START	- BATT 1	

## Faults

The trainer provides representative faults associated with a typical engine starting system and gas turbine engine starting cycle.

When coupled with the engine 3D model and schematics, faults represent in real-time. A pause function enables the showing and discussion of how and why they occur.



# Teaching points

## STARTING

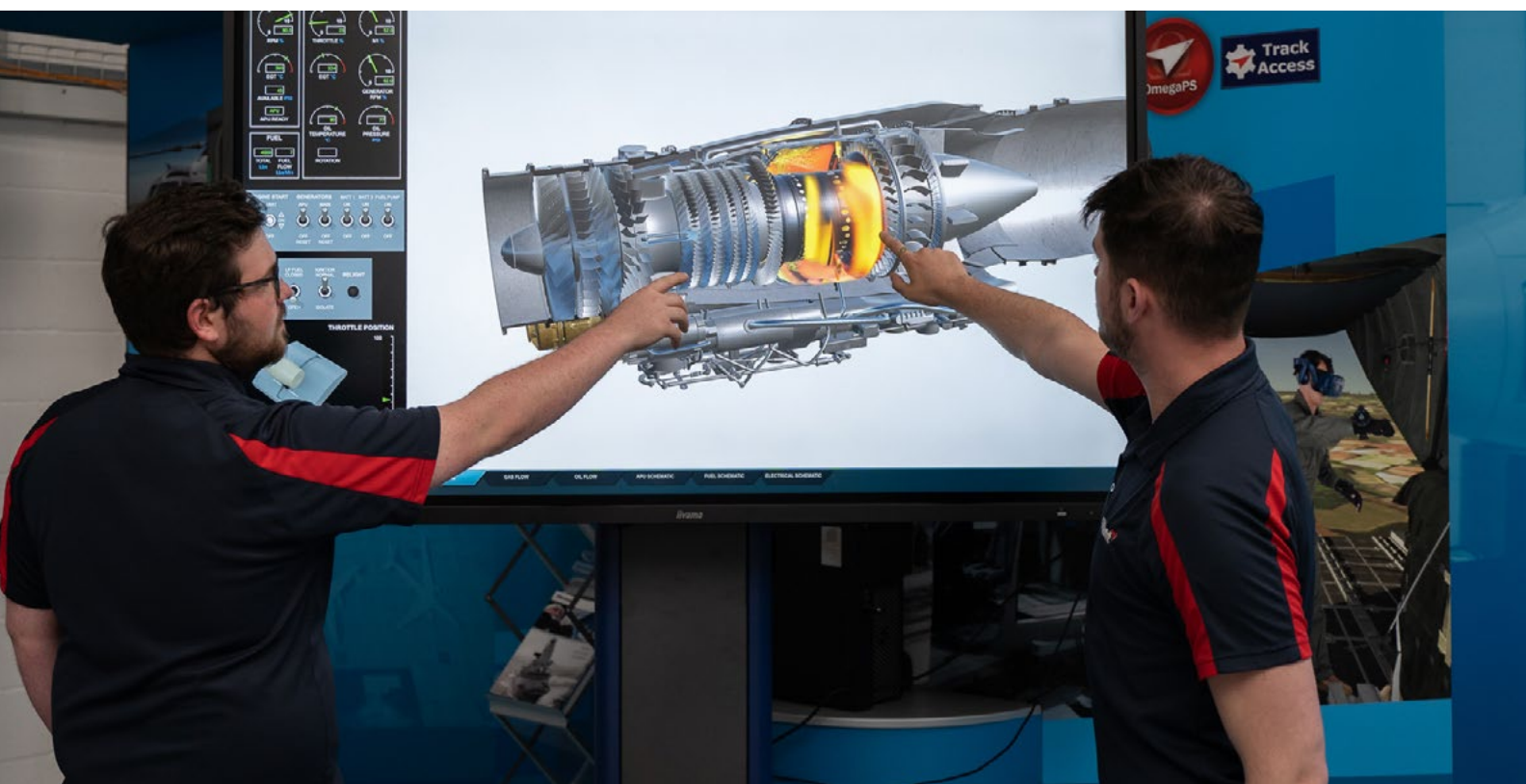
- Explain the design and components of starting systems APU and engine
- Explain the operation of a gas turbine engine starter
- Explain the inspection and servicing procedures for starting systems
- Explain the operation of an auto-start system.

## IGNITION

- Explain the types of operation of turbine engine ignition systems and their components
- Explain turbine engine ignition system safety precautions.

## INDICATION

- Explain the principles and operation of engine indicating systems
- Explain inlet air flow pressure and temperatures
- Explain Interstage compressor pressure and temperature
- Explain exhaust gas temperature and Interstage turbine temperature
- Explain oil pressure and flow
- Explain Fuel pressure and flow
- Explain Engine speed
- Explain fault detection.



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