AST
AVIONICS SYSTEMS TRAINER

The Avionics Systems Trainer (AST) developed by Selex ES, provides a unique diagnostic and corrective maintenance training platform for first line avionics systems mechanics and technicians. Users are provided with an environment that simulates the cognitive processes involved with operating or maintaining any military fast jet or rotary wing aircraft such as Typhoon, F-16, Apache, Tornado or Hawk. AST is designed to enable students to completely familiarise themselves with aircraft systems and associated maintenance procedures and test equipment, in a safe classroom environment under controlled conditions of instruction, timescales and course management.

SCENARIO-BASED EXERCISES

Using AST, each student is presented with their own virtual "aircraft" on which to practise the execution of maintenance procedures and to exercise fault finding techniques. Thanks to AST's underlying innovative architecture, very complex systems can be modelled, offering an emulated "freeplay" environment, which allows trainees to make mistakes, emulating the impact of these and enabling them to learn to diagnose and correct their own errors.

Trainees are therefore better prepared for using Part Task Trainers (PTTs) or real aircraft; dramatically reducing the training time required on these expensive and in-demand facilities. Aside from this platform delivering significantly more value to students than by using traditional procedural trainers, the system accelerates the transition from classroom-based instruction to semi-immersed cockpit training and LRU replacement.

As a result, trainees experience the same start up and system procedures as the real aircraft, allowing for quicker transition to subsequent training facilities as they progress through an overall avionics training course.
Students are able to:
• Exercise understanding of the systems and their operation
• Practise running maintenance procedures
• Exercise and develop fault finding techniques
• Practice the utilisation of ground equipment

REPLICATING AN AIRCRAFT'S LOOK, FEEL AND OPERATION

AST technology can generate the same 'look, feel and operation' of the generic aircraft emulation in either the classroom or cockpit environment. Through the Windowsbased software, the trainee gains high-level navigation around the emulated system, including cockpit view; external view showing flying control surfaces and providing access to equipment bays; and external view of the underside of the aircraft allowing access to equipment bays.

To support the aircraft further, systems models of ground equipment are provided to allow the systems to be simulated during maintenance procedures.

Control panels and other views appear within the navigation window, enabling users to interact with the emulated aircraft using point and click actions with the computer mouse in a manner intuitive to Windows users. These include:

- Clicking on a hotspot on an aircraft view to open a cockpit panel or access an LRU in a bay
- Left clicking to activate buttons on control panels
- Left and right mouse clicks to rotate knobs anticlockwise or clockwise
- Clicking and dragging to manipulate slider controls or throttles
- Selecting test equipment from a menu

Additionally, the fast-forward feature allows students to speed up the emulation to avoid waiting for systems to initialise in real time.

COCKPIT PROCEDURES

Through AST, trainees can experience the realities of a real cockpit. If trainees make incorrect decisions when performing maintenance procedures, AST emulation will respond in the same way as a real cockpit. The classroom management system will identify this and warn the instructor, who can consequently correct the trainee or let them continue, so learning by their mistakes.

Additionally, AST has a database of simulated faults – in four categories (Simple, Complex, Compound and Compound-Complex) – which can be applied to the aircraft models. This will enable the trainees to learn and practice diagnostic tasks under fault conditions that they are likely to encounter on the real equipment. Skills acquired through such processes include the appropriate use of the technical publications and the ability to diagnose simulated vehicle faults using representative tools and test equipment. Instructors can monitor any workstation and observe what the trainee is doing, as well as inject faults on an ad hoc basis. All these actions can be recorded and logged against the trainee's report.

COMPUTER-AIDED INSTRUCTION

The contents of the Instructor Operating Station (IOS) monitors can be displayed on the projector screens so that the instructor can display combinations of emulation views, electronic maintenance procedures, and other available training media. As a result, the instructor can:

- Demonstrate the system's function and operation
- Demonstrate the positions of the system components within the generic aircraft
- Demonstrate how to run maintenance procedures
- Demonstrate the use of ground equipment
- Introduce students to fault finding techniques
- Replay previously recorded maintenance procedures to the class

SYSTEMS COVERED BY AST

AST covers the following aircraft systems:

- Aircraft Safety
- Autoflight
- Communications
- Electrical Power
- Hydraulic Power
- Instruments
- Aircraft Lighting
- Navigation
- On-board maintenance
- Forward looking sensors
- Electronic Warfare and Defensive Aids
- Weapons Electrical
- Gunnery
- APU and Engines
- Head up display
- Databus systems
- Multi-function displays
- DAS (2012)