

IFF/SSR A.L.T.F.

Automatic Localised Test Facility

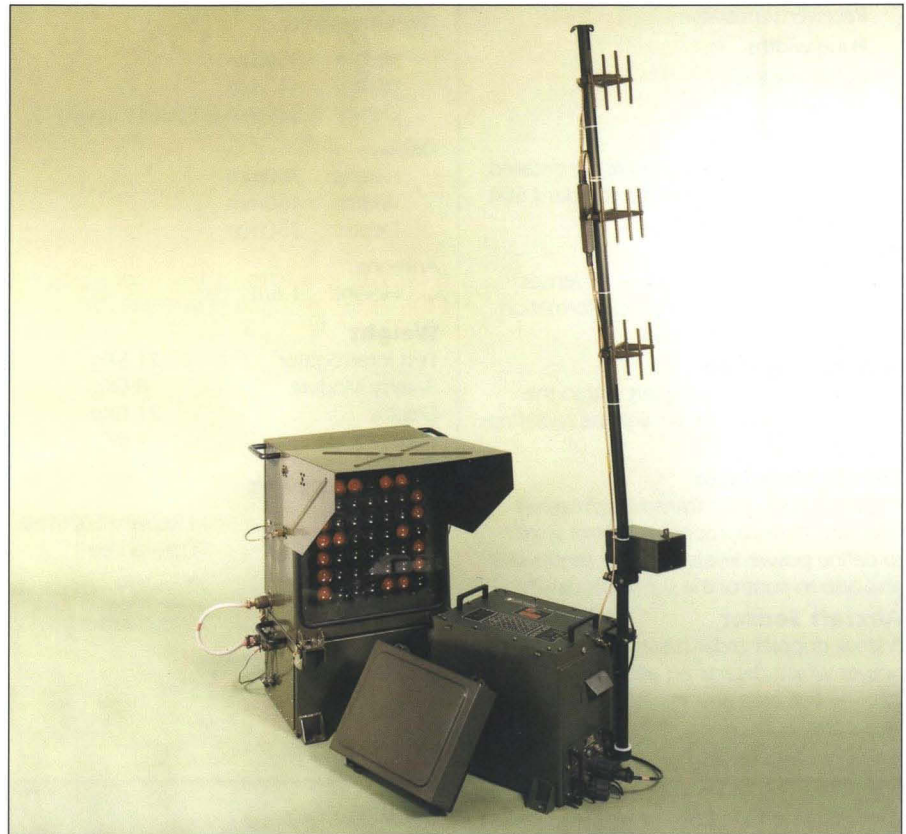
■
Full automatic testing covering all military and civil modes

■
Full system performance checks

■
No aircraft modification necessary

■
Transponder degradation displayed

■
Continual self test facility



ALTF enables a pre-flight test to be completed as the aircraft approaches the runway for take off. Details relating to the performance are made available to the pilot on a lamp matrix display system.

The test interrogator is a programmable low power system incorporating a solid state transmitter and logarithmic receiver. The transmission of interrogations is controlled by an interlaced mode encoder. Modes 1, 2, 3/A, 4 and C may be selected for check during each test sequence and will be priority assigned to suit operational needs. Replies from the transponder under test are detected by the logarithmic receiver and decoded in a synchronous decoder. Since the range of the aircraft under test is known, replies from that aircraft can be decoded and all others rejected.

Facilities on the test interrogator include a mimic of the pilot display and a 4 digit LED display for MKXA reply codes. The amplitude information in the reply train will assist in the evaluation of the aircraft antenna system.

By reducing the test interrogator power output the performance of the transponder receiver can be established and by measuring the amplitude of the received reply from the transponder, the power output of that unit may be determined. The decoding provisions include All Mode facility and the provision of a Mode 4 interface to STANAG 4193 is made together with an internal space allocation for a Mode 4 memory module.

The antenna system is a three track broadside array designed to minimise radiation outside the test zone.

Aircraft antenna having heights from 2ft to 30ft above the ground are illuminated. The design offers a combination of low weight and size with the ability to withstand a high wind loading.

An equally important use for the Test Interrogator is for bench testing of transponder units. By connecting to the transponder, via a variable attenuator, a full unit functional test can be carried out. The results of the test can be down loaded via the RS232 interface.

PA 6660

Electronic Systems Division

(A Division of GEC-Marconi Defence Systems Limited)

PA 6660 ALTF Installation

A full free space check is initiated measuring transponder parameters such as:

- Transmitter power
- Receiver sensitivity
- Pulse widths
- Pulse spacings
- Frequency
- Message content.

The ALTF system is designed to be installed 35m from the centreline of a standard 50ft wide taxiway and comprises:

Display

A 300mm x 300mm matrix of 49 lenses which enables alpha-numeric information to be displayed for the pilot.

Antenna System

Designed to equalise signals within the defined test area and to minimise radiation outside.

Test Interrogator

A specially designed transmitter/receiver unit with a microprocessor control system to define power levels, receiver sensitivities and also to control the signal processing.

Aircraft Sensor

A small doppler radar having a low radiated power which detects an aircraft moving into the test area and initiates the test sequence.

Data Summary

Mechanical Construction

Dimensions

Test Interrogator

- Height: 309mm
- Width: 442mm
- Depth: 329mm (+100mm cover)

Display

- Height: 700mm
- Width: 450mm
- Depth: 350mm

Antenna

- Height: 1.6m

Weight

- Test Interrogator 21.5Kg
- Battery Module 8.0Kg
- Display 21.0Kg
- Base Module 7.0Kg

Power Supplies

- AC Supplies 115/240V 50/60Hz
Single phase
- DC Supplies 22 to 32V
- External Batteries Sealed lead-acid

Temperature Range

- Operating -25°C to +55°C

Altitude Limits

- Operating 3000 metres
- Transportation 15000 metres

Test Interrogator

Transmitter

- Frequency 1030 ± 0.2MHz
- Power Output Programmable over range -5 to -26dBm

Receiver

- Centre Frequency 1090MHz
- Characteristic Logarithmic
- Dynamic Range 30dB

Processing

Checks include:

- Full mode capability i.e.
M1, 2, 3/A, 4 and C
- Full code capability 4096 codes
- Transponder power output greater than 21dBw
- Transponder sensitivity better than -69dBm
- Transponder reply frequency 1090 ± 3MHz
- Transponder pulse interval Nominal ± 0.15µs
- Transponder SLS performance
P2=P1+3dB
P2=P1-9dB

Antenna System

- Beamwidth Azimuth 60°
Elevation 15°

Moving Aircraft Sensor

- Frequency 24.2GHz ± 10MHz
- Power output @ Waveguide 5mW nominal

Display

7x7 dot matrix providing:

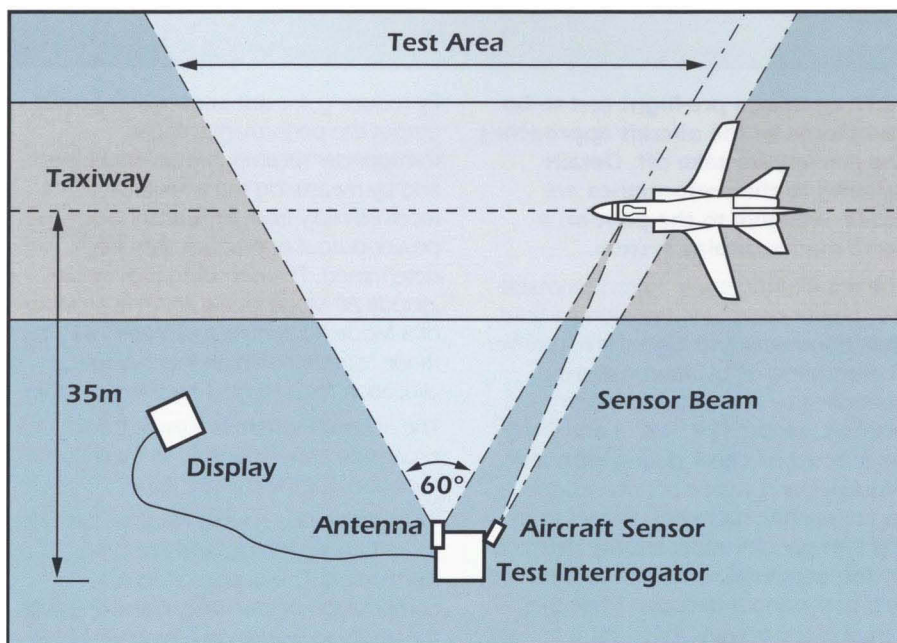
Fully operational transponder

- Confidence level 1 (high) White 10
- Confidence level 2 White 9
- Confidence level 3 White 8
- Confidence level 4 (low) White 7

Unserviceable Transponder

- Fail Transponder Red FT
- Fail Mode 1 Red F1
- Fail Mode 2 Red F2
- Fail Mode 3/A Red F3
- Fail Mode 4 Red F4
- Fail Mode C Red FC
- Fail Antenna Red A
- ALTF unserviceable (BITE fail) Red X

Automatic night dimming incorporated.



ALTF Installation