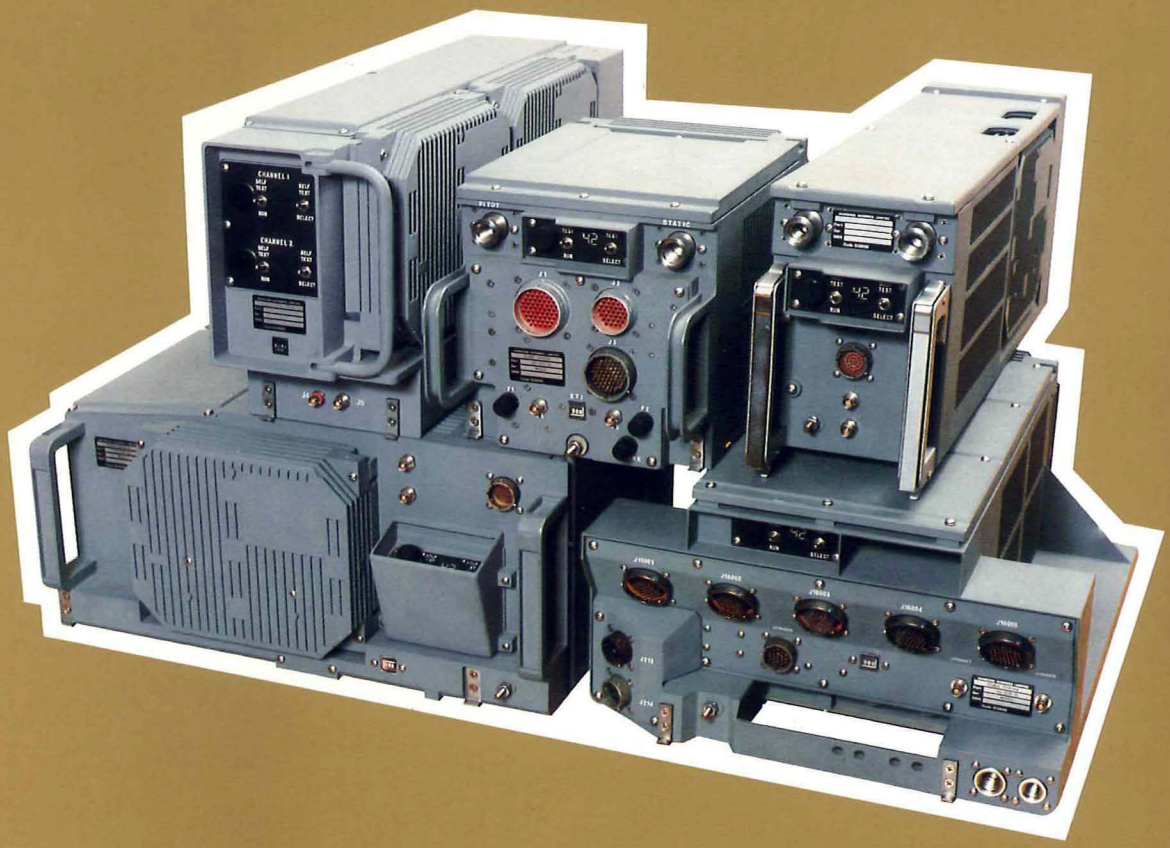
Standard Central Air Data Computer

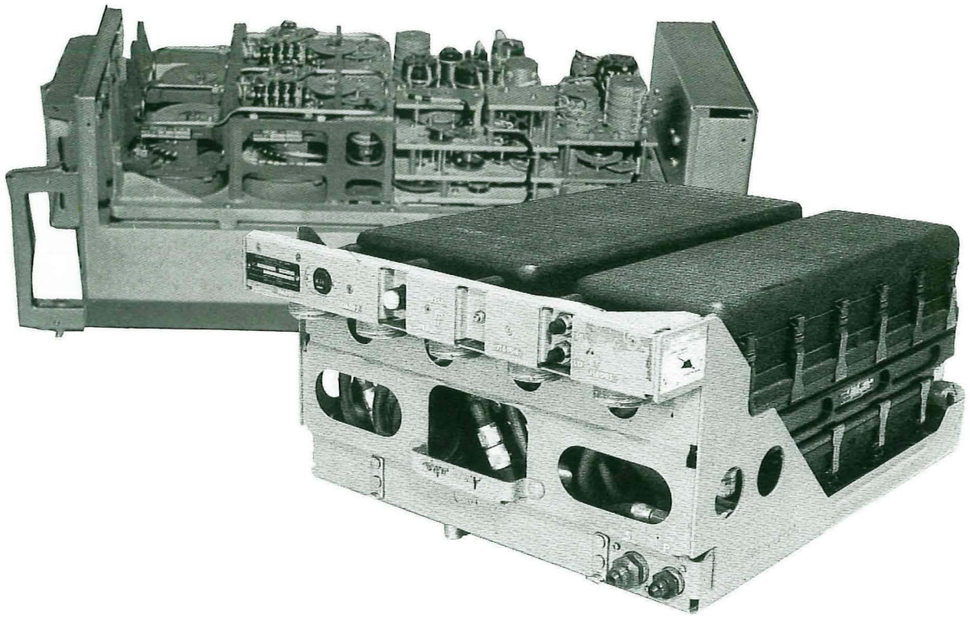
GEC AVIONICS



- SCADC is a reconfigurable Air Data Computer made from a set of standard modules
- SCADC is fully qualified and in quantity production
- SCADC can fit or retrofit entire aircraft fleets
  - as an all digital ADC
  - as a plug-in replacement for an analog ADC

GEC Avionics has qualified a major new generation of Air Data Computers designed for the combined USAF and USN Standard Central Air Data Computer (SCADC) program, and is undertaking the current production program of 2847 SCADC units.

This well co-ordinated avionics update program for mature aircraft, enhances airborne performance and creates substantial cost savings. Obsolete avionics inherently cause degraded reliability, and require high cost spares and continual maintenance activity. This in turn results in totally unacceptable life cycle costs, and poor aircraft availability.

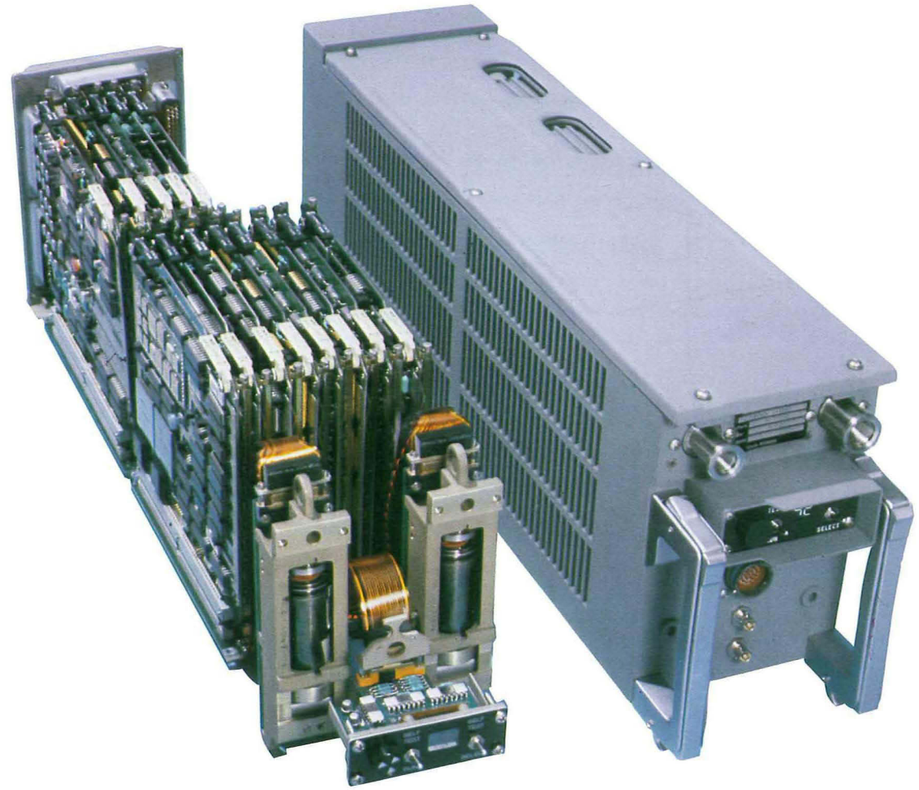


GEC Avionics is now manufacturing the SCADC in quantity to provide high performance, low cost maintainability and outstanding reliability in a simple plug-in retrofit package.

In addition to solving the problems of obsolete equipment on more than 35 aircraft variants, SCADC provides an ideal basis for standardization on new aircraft. It is a unique combination of advanced technology, design standardization, and logistics science.

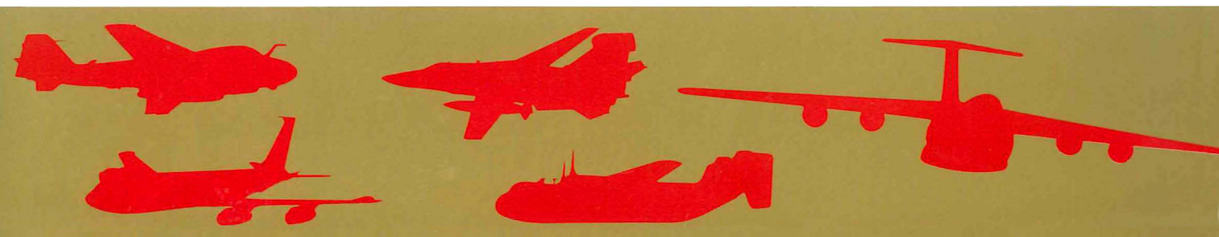
SCADC Benefits

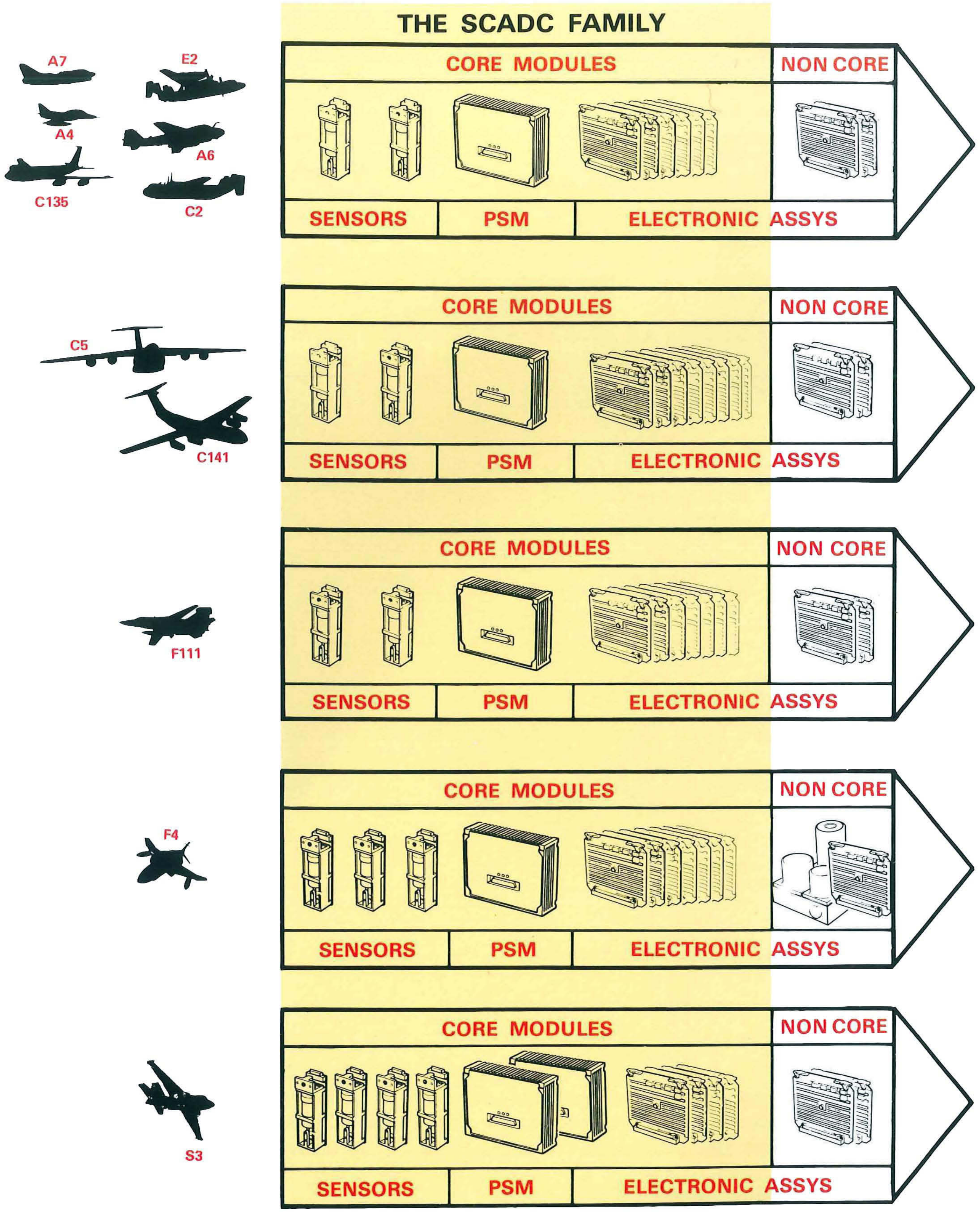
Life cycle cost savings in excess of 50% even on limited life aircraft, are achieved by SCADC.



Major retrofit cost saving factors:

- ★ Up to 70% equipment purchase cost savings.
- ★ Typically 50 fold increases in reliability.
- ★ Mean Time To Repair reduction of around 90%.
- ★ Hardware and maintenance commonality between aircraft types of over 80%.
- ★ Simple, plug-in, retrofit for any aircraft.





SCADC Concept

SCADC is a core set of standard Air Data Computer modules which can be packaged to satisfy air data computing requirements for any aircraft.

The 35 plus aircraft variants being updated by the USAF and USN in the SCADC program are retrofitted by 5 different SCADC configurations.

The SCADC core hardware set provides over 80% of the hardware in every Air Data Computer application.

The remaining hardware comprises one or two special-to-type modules per configuration, which accommodate any unique aircraft interfaces. Each configuration has its own tailored mechanical package.

Simple passive adaptor trays enable particular configurations of SCADC to meet the installation requirements of a variety of aircraft.

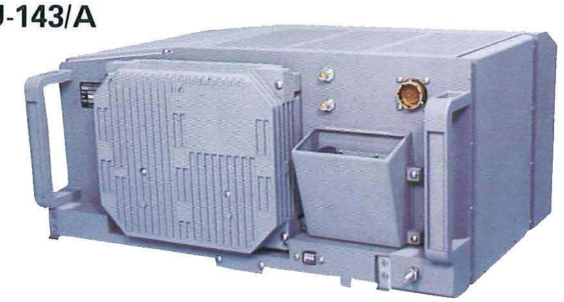
All SCADC variants include a MIL-STD-1553B data bus for future avionic systems modernization.

CPU-140/A

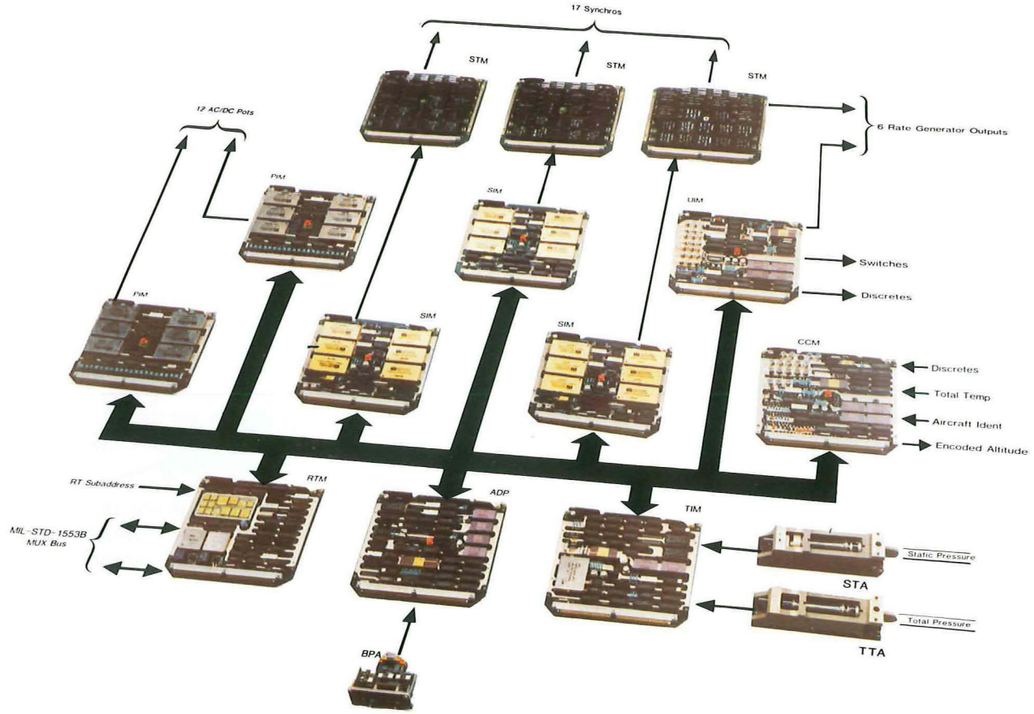
CPU-141/A

CPU-142/A

CPU-143/A



CPU-152/A



CPU-141/A System

SCADC System Design

To achieve the very high commonality across aircraft types a unique software re-configurable systems design has been engineered for the GEC Avionics SCADC.

Output parameters, ranges, and scalings are selected for each aircraft type by the software, which recognises the host aircraft type from a code wired into the aircraft connector pins.

Totally isolated analog signals, which duplicate existing interfaces, are generated on the Synchro Interface (SIM), Synchro Transformer (STM), and Potentiometer Interface (PIM) Modules. Any special interfaces, if required, are handled by one special-to-type Unique Interface Module (UIM). Use of the circuits on all the output modules is governed by aircraft-dependent data held on the Configuration Control Module (CCM).

MIL-STD-1553B interfaces are processed by the Remote Terminal Module (RTM) which features a GEC Avionics developed LSI chip set. The Air Data Processor centres on the Z8002 microprocessor.

Precision pressure measurement is provided by Solartron oscillating cylinder transducers on the Static Transducer Assembly (STA) and Total Transducer Assembly (TTA). The inherent vibration immunity of this type of transducer makes it an ideal choice for rigorous aircraft environments. Many thousands of these transducers have been produced for military aircraft programs over the past decade. Transducer frequency output measurement is accurately performed on the Transducer Interface Module (TIM).

The GEC Avionics SCADC system design has been optimized to ensure that the conflicting requirements of low module count and low non-core content are both satisfied.

Software

The level of adaptability essential to meet the multi-aircraft requirement is achieved through the modularity of the software.

Maximum commonality of functions is an inherent feature of the design with any special operational requirements being readily incorporated by the addition of unique modules. Operation of these modules when required is achieved by the SCADC concept of aircraft identification codes and a catalog calling system.

Optimum in-flight performance is ensured by the fully integrated system approach and the efficient use of a structured software environment.

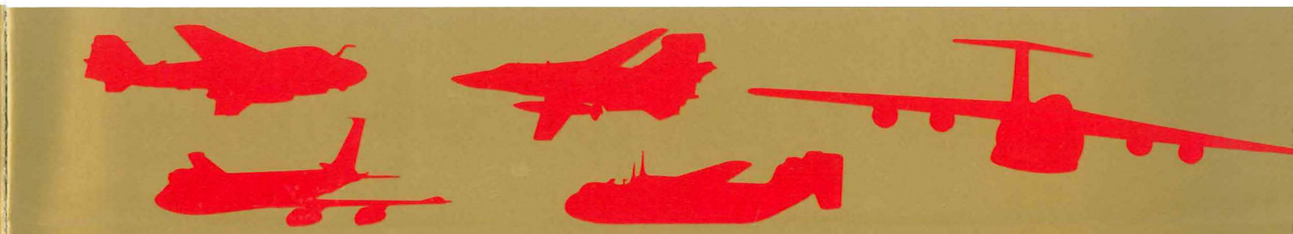
The methods and procedures applicable to the development and continued support of the systems are fully compliant with MIL standards encompassing verification and validation at all stages of design, testing and documentation.

Built-In Test

Extensive Built-In Test (BIT) is provided in the innovative GEC Avionics SCADC design, and has been proven by Maintainability Demonstrations. The automatic BIT identifies and collects failures either from the dedicated BIT hardware, or from the many other checks performed as a continuous background task, such as memory sumchecks, RAM read/write checks, and output wraparound checks. Failures identified by BIT are retained, together with information on the flight conditions at the time of failure, in a Non-Volatile Store ensuring the isolation of intermittant faults in the SCADC or aircraft interfaces.

Failure analysis is performed during ground crew initiated BIT to confirm the fault location. A key feature of this initiated BIT is the extensive level of aircraft interface checking, ensuring the maximum possible test of the SCADC and all associated aircraft systems.

Each Shop Replaceable Assembly (SRA) within the SCADC contains its own BIT hardware. A failure in an SRA, or in the associated BIT circuits, will result in the appropriate failure code being displayed.



CPU-140/A

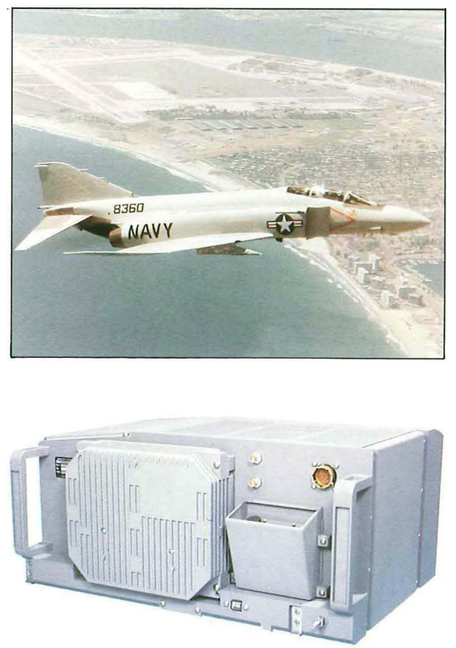
Aircraft Capability
A-4M, OA-4M, TA-4J, A-6E, KA-6D, EA-6A, EA-6B, A-7D, A-7E, A-7K, TA-7C, C-2A, E-2C, C-135, KC-135
Size
(in) 7.5 × 7.5 × 9.5 (mm) 191 × 191 × 242
Weight
(lb) 24.5 (kg) 11.1
Power Consumption (Watts)
Max 72W — Normal 61W

CPU-141/A

Aircraft Capability
C-5A, C-141A, C-141B
Size
(in) 7.5 × 5.0 × 19.5 (mm) 191 × 127 × 496
Weight
(lb) 33.8 (kg) 15.3
Power Consumption (Watts)
Max 100W — Normal 79W

CPU-142/A

Aircraft Capability
F-111A, F-111D, F-111E, FB-111A, EF-111A, F-111F
Size
(in) 7.5 × 14.0 × 19.0 (mm) 191 × 356 × 483
Weight
(lb) 40 (kg) 18.1
Power Consumption (Watts)
Max 98W — Normal 64W

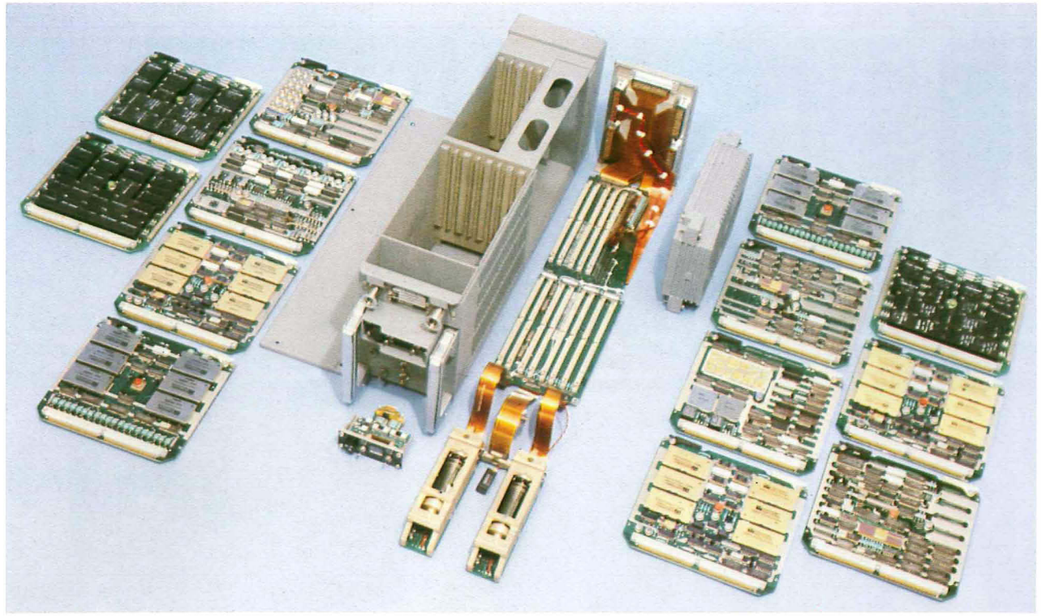


CPU-143/A

Aircraft Capability
F-4C, F-4D, F-4E, F-4J, F-4N, F-4S, RF-4B, RF-4C
Size
(in) 7.5 × 17.0 × 12.0 (mm) 191 × 432 × 305
Weight
(lb) 43 (kg) 19.5
Power Consumption (Watts)
Max 80W — Normal 47W

CPU-152/A

Aircraft Capability
S-3A, S-3B KS-3A, US-3A
Size
(in) 8.75 × 5.6 × 17.4 (mm) 222 × 142 × 442
Weight
(lb) 33 (kg) 15
Power Consumption (Watts)
Max 108W (Dual Channel) — Normal 76W

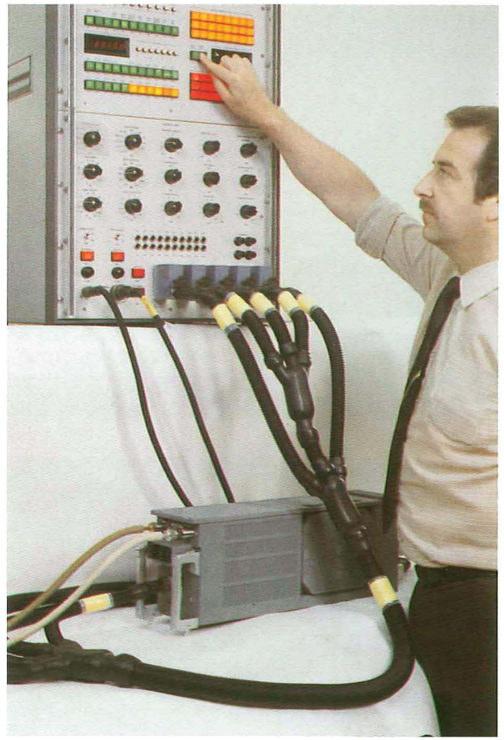


Product Support

GEC Avionics has extensive Logistics and Support experience for the US Military. This includes major programs for all three services; carrier-borne equipment in support of the A-7 for the Navy, the F-16 HUD depot for the Air Force; the fully integrated Logistic support program and depot establishment for the Army AH-1S Air Data Subsystem.

These activities include Logistic Support Analysis, Tech Manuals, and Training programs. All of this experience reflects the requirements for the SCADC production and support program.

The SCADC Integrated Logistic Support package optimizes Product Data, Logistic Support Analysis Records, Training Courses, and Spares Provisioning. This ILS package in conjunction with thorough Life Cycle Cost analysis, ensures maximum aircraft availability for all SCADC applications, at minimum cost.



GEC Avionics has applied advanced technology, reliability engineering and maintenance experience to enable two level maintenance to be a viable consideration for SCADC. This concept has been proven by hours of environmental testing under all operating conditions on 60 production SCADC units.

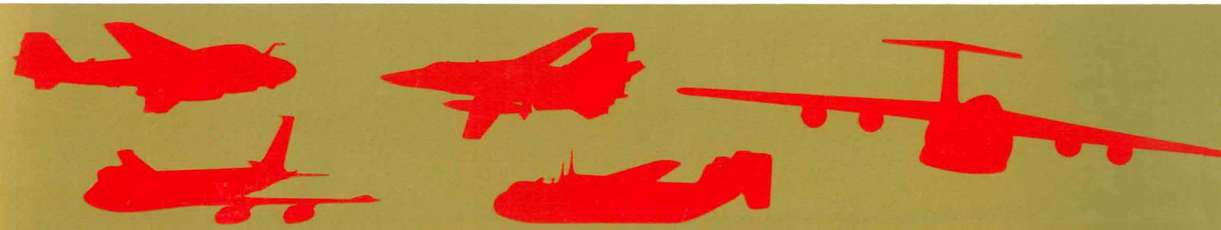
All SCADC units and modules are interface compatible with Automatic Test Equipment systems.

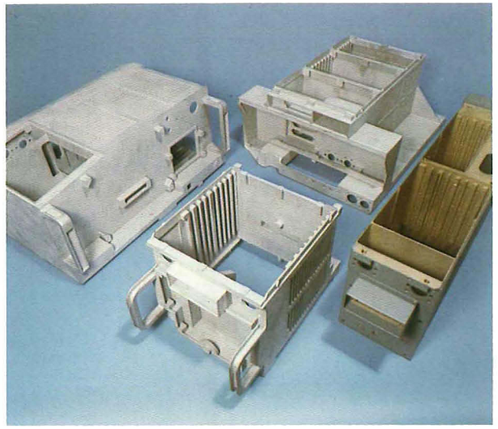
Ground Support Equipment for SCADC unit testing is also available. This test equipment has been operationally evaluated at 25 different SCADC maintenance and test stations, and provides a very low cost support equipment option where operational scenarios require GSE at unit level.

Existing LRU test equipment is available for the production phase.

Well proven off-the-shelf ATE will be used for SRU test in the production process.

An identical system is used at the SCADC Interim Support facility at GEC Avionics Inc, Atlanta, and offers the important benefit of relevant experience before transition to Organic Support.





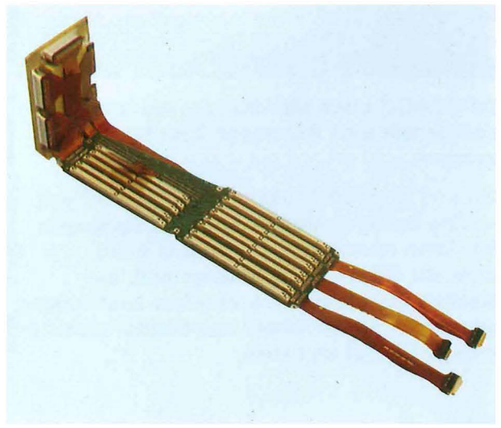
Producibility

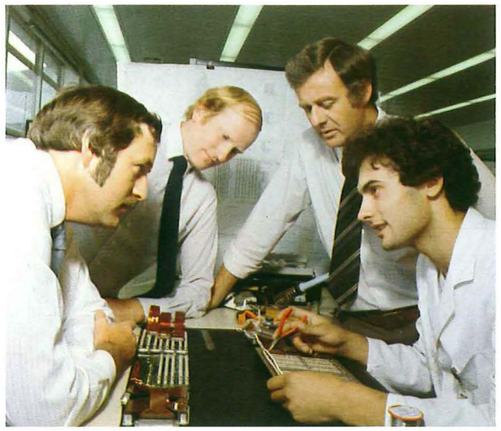
To ensure that SCADC production proceeds at minimum cost and at maximum throughput, highly qualified and experienced production engineers are designated as key members of the design team.

Extensive Computer Aided Design resources have been used to enhance every design development process of SCADC, generating carefully value engineered equipment with the traditional reliability and quality of all the products of GEC Avionics.

Typical results of this design-for-production process were the immediate application to SCADC of precision chassis castings, high reliability repairable flexi-circuit interconnect assemblies, and the intense use of LSI technology.

Confidence in producibility and value engineering enabled GEC Avionics to manufacture all 60 of the initial SCADC units to full production standards. This ensured that SCADC aircraft compatibility and qualification test processes are truly representative of each of the thousands of SCADCs produced. This guarantees very low risk procurement with minimum lead times.





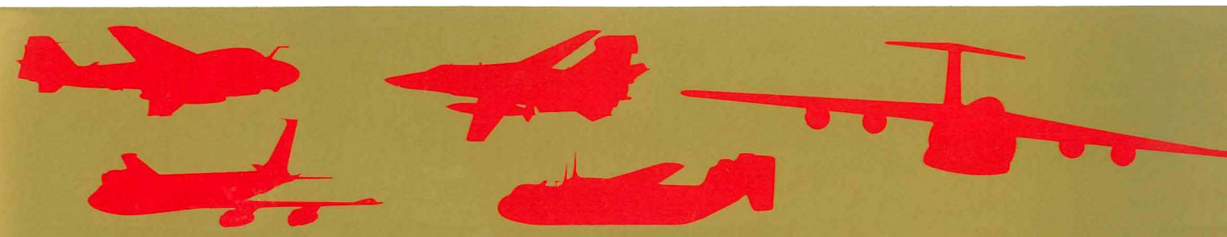
Manufacture

Highly automated production processes are in place to enable the GEC Avionics Air Data Computer manufacturing facility readily to produce SCADC units at the rate of over 100/month for rapid retrofit.

Production engineers, totally dedicated to the program, have optimized all assembly and test procedures for the SCADC modules and units.

Each unit produced undergoes extensive Manufacturers Acceptance Screening Testing to ensure that equipment is fielded with maximum possible reliability. Quality assurance engineers work closely with resident on-site US Government Source Inspectors to ensure that peak manufacturing quality is maintained throughout the procurement program.

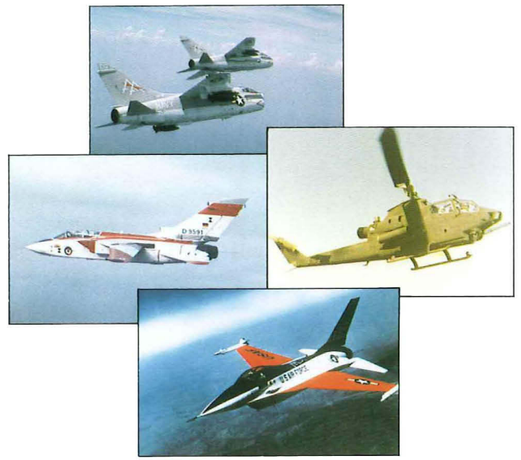
Extensive Computer Aided Management facilities provide the precise Stock Control, Process Management, and Sub-Contract Control essential for on cost and on schedule production.



Company Background

GEC Avionics has a history of completing military avionic equipment contracts in the USA on schedule and on cost. The company, working closely with GEC Avionics Inc. in Atlanta, has supplied digital avionic equipment for the A-4, A-7, F-16, AH-1S and YC-14 and is now producing new Head-Up Displays for the F-16 and A-10. These contracts alone represent over 4600 digital systems currently in service with the US Forces.

Within Europe GEC Avionics is the largest supplier of avionic equipment, with systems designed and manufactured for aircraft as widely ranged as the Concorde SST and the Tornado combat aircraft.



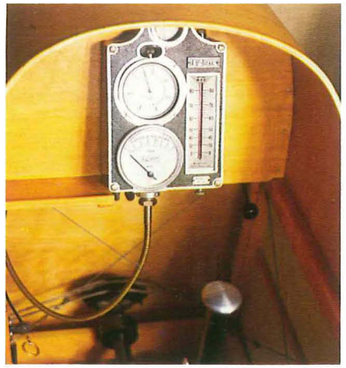
Part of the head office plant, Airport Works, Rochester, Kent.

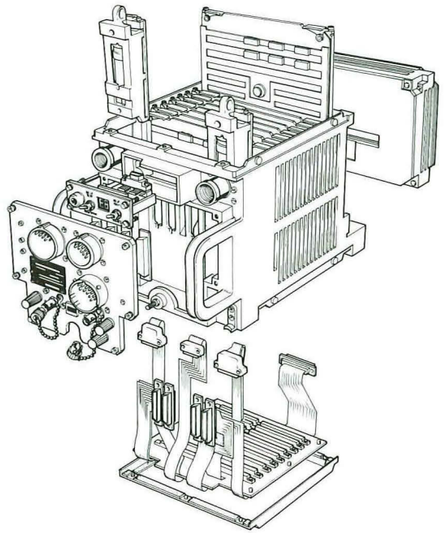
Aerial view of the plant at Christopher Martin Road, Basildon, Essex.

Principal factory at Elstree Way, Borehamwood, Herts.

GEC Avionics Inc. factory at Atlanta, Georgia, USA.

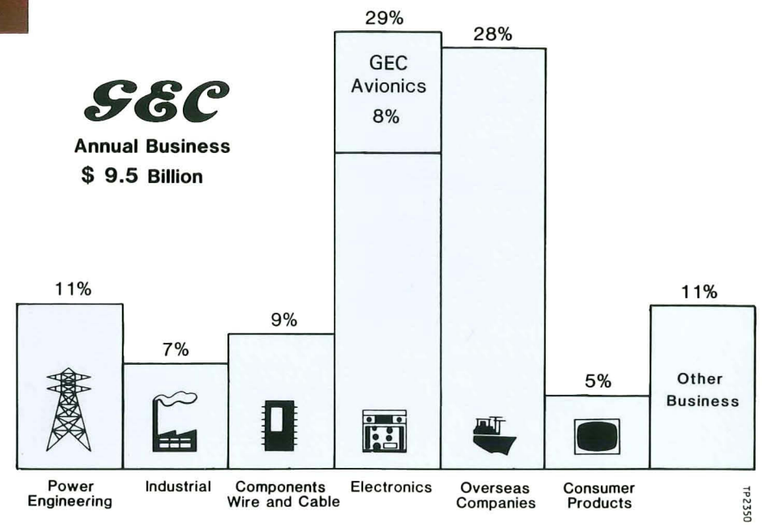
The 23 GEC Avionics trading divisions, located at four major sites, manufacture Automatic Flight Control Systems, Navigation Systems, Radar Systems, Airborne Radio Equipment, Airborne Surveillance Equipment, Head-Up Displays, CRT Displays, Weapons Management Systems and Automatic Test Equipment, as well as Air Data Computers. This widespread avionic systems experience has enabled a wealth of expertise to be applied to SCADC development, which ensures correct systems performance for the varied user systems across all SCADC aircraft installations.





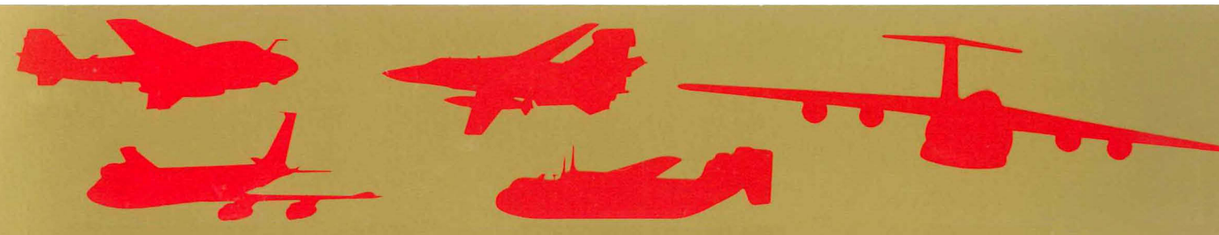
Instrument Systems Division, the SCADC product division, based at the headquarters of GEC Avionics in Rochester, Kent, has produced more than 4000 Central Air Data Computers over the past 2 decades.

The tradition of Air Data measurement runs deep in GEC Avionics. Balloonists in the 1880's were using pocket altimeters manufactured by Elliott Brothers, the GEC Avionics founding company, and many World War One pilots flew with the company's early instrument panels.



The massive resources of the GEC Avionics British parent company, GEC, the General Electric Company, provide a totally secure SCADC procurement and support foundation. GEC is Britain's largest engineering company with annual business of over 9 billion dollars.

The SCADC production program is being realized by the unique GEC Avionics combination of high technology, product support, program management, company resources, and experience. This guarantees that SCADC manufacture will be on time and on cost for all aircraft applications.



GEC Avionics Limited
Airport Works, Rochester,
Kent ME1 2XX, England

Instrument Systems Division

Telephone: England, Medway (0634) 44400
Telegrams: Elliauto Rochester
Telex: 96333
Facsimile: (0634) 401748

GEC Avionics Inc.
2975 Northwoods Parkway/Norcross,
PO Box 81999,
Atlanta, Georgia 30366

Telephone: (404)-448-1947
Telex: 708447

GEC Avionics Inc.
Suite 1375,
Kettering Tower,
Dayton,
Ohio 45423

Telephone: (513)-224-1110
Telex: 288350

GEC AVIONICS

Designed and Printed by Buckland Press Ltd., London and Dover, England