

Mission Avionics Division

GEC-Marconi
Avionics

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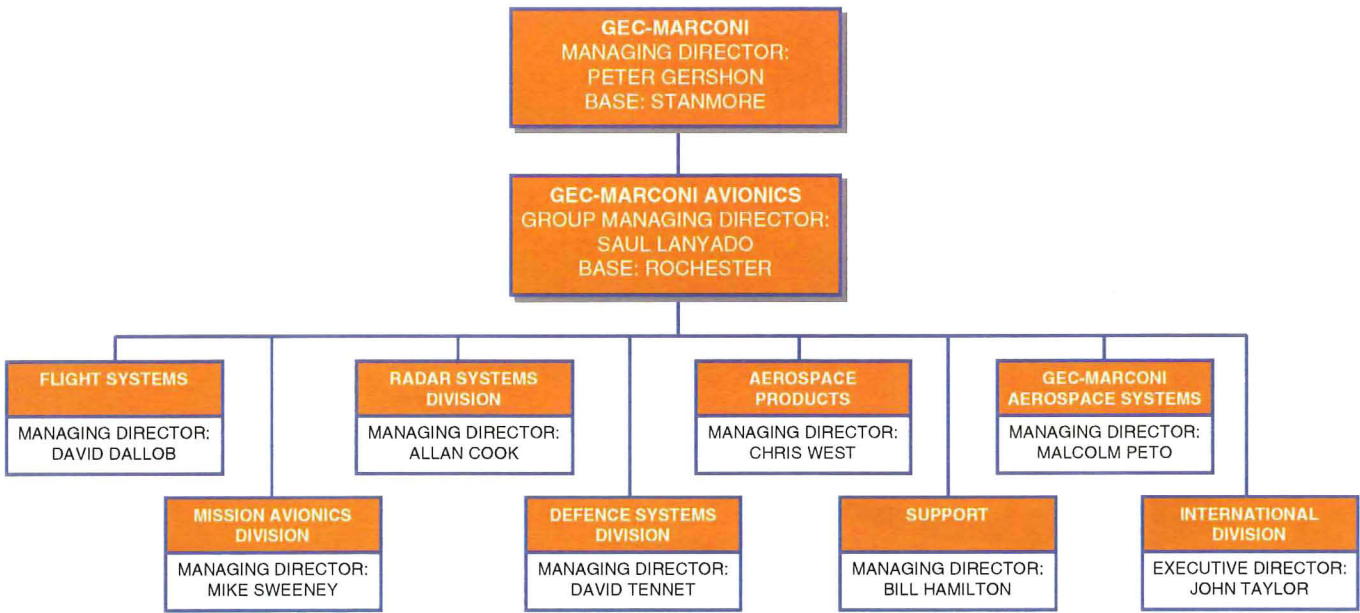
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Mission Avionics Division

Corporate / Divisional Structure

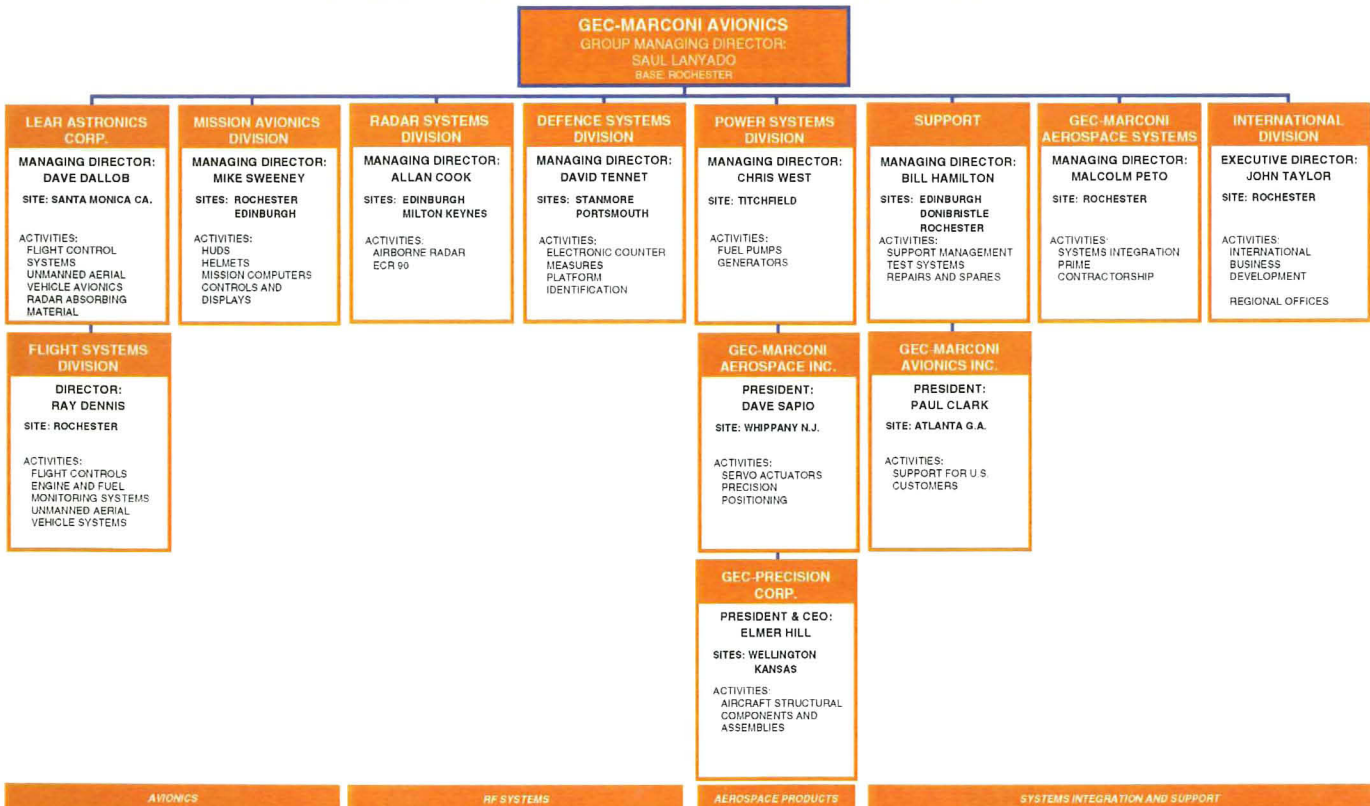
GEC-Marconi Avionics Structure



RS-97/IMAD - Slide No. 2 Sect. 1

GEC-Marconi
Avionics

GEC-Marconi Avionics Structure

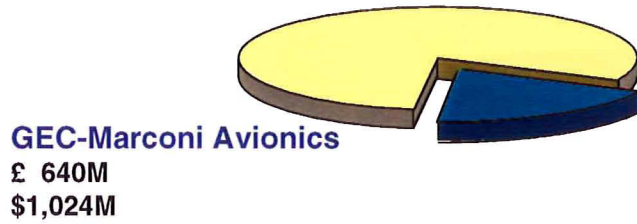
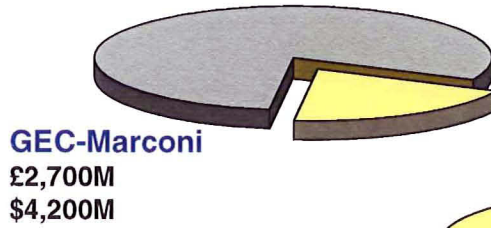
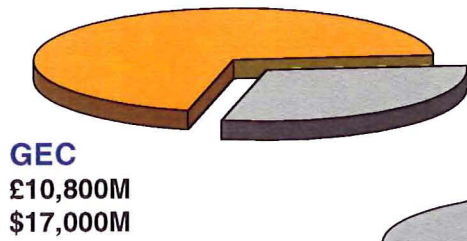


RS-97/IMAD - Slide No. 3 Sect. 1

GEC-Marconi
Avionics

GEC Sales / Turnover

Year Ending March 1996

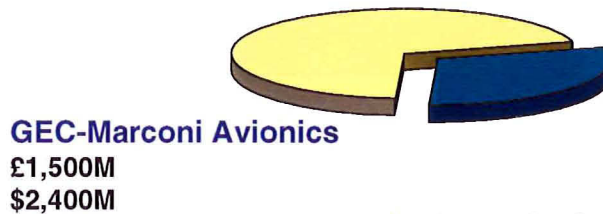
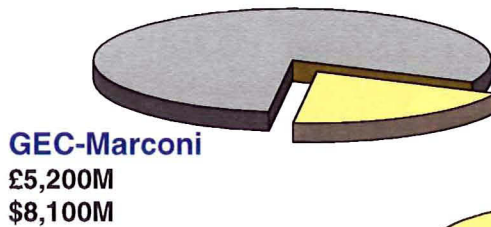
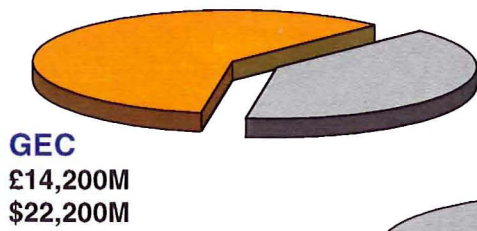


RS-97/1MAD - Slide No. 5 Sect 1

GEC-Marconi
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GEC Order Book

Year Ending March 1996

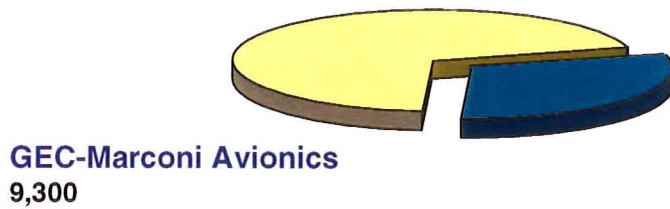
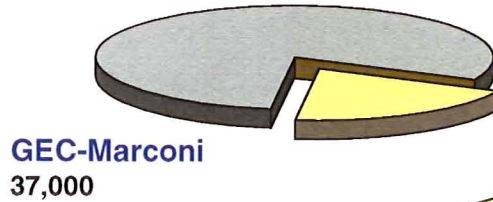
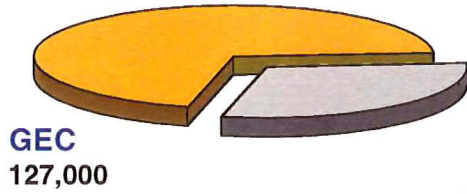


RS-97/1MAD - Slide No. 6 Sect 1

GEC-Marconi
Avionics

GEC Employees

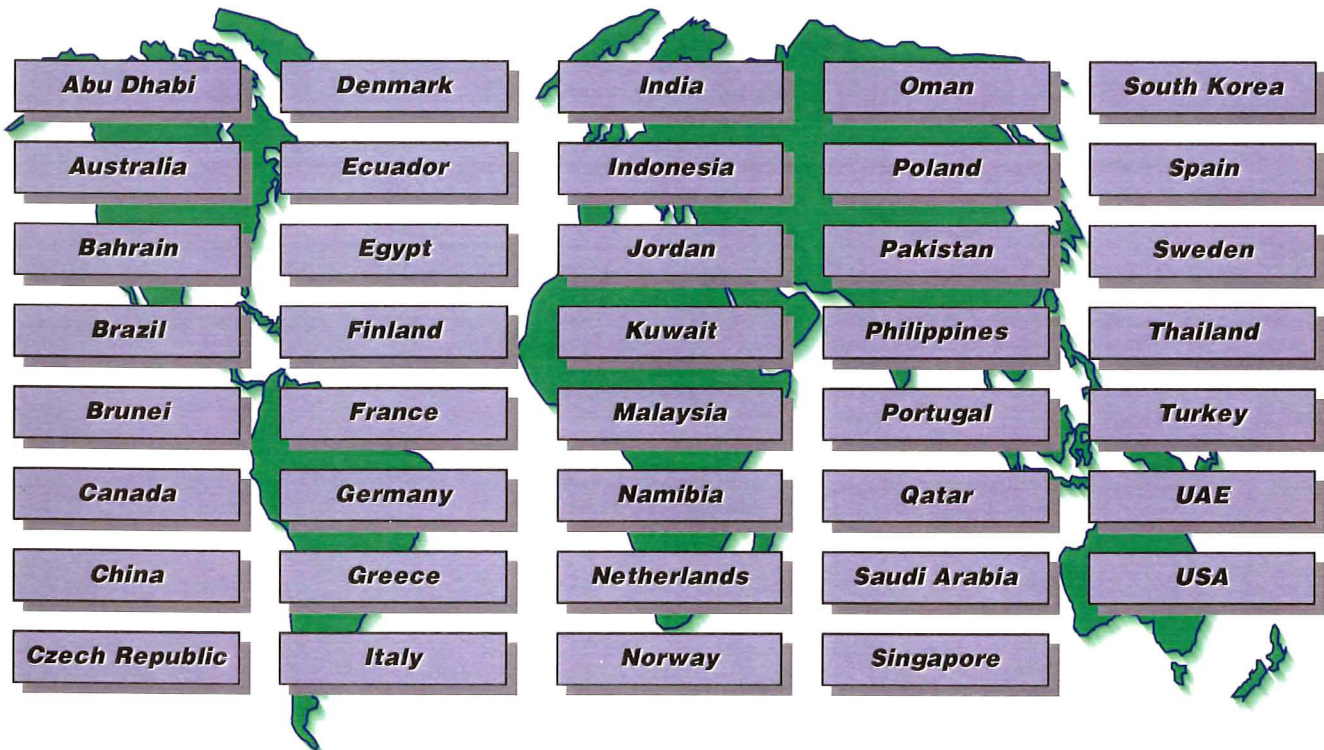
Year Ending March 1996



RS-971MAD - Slide No. 7 Sect. 1

GEC-Marconi
Avionics

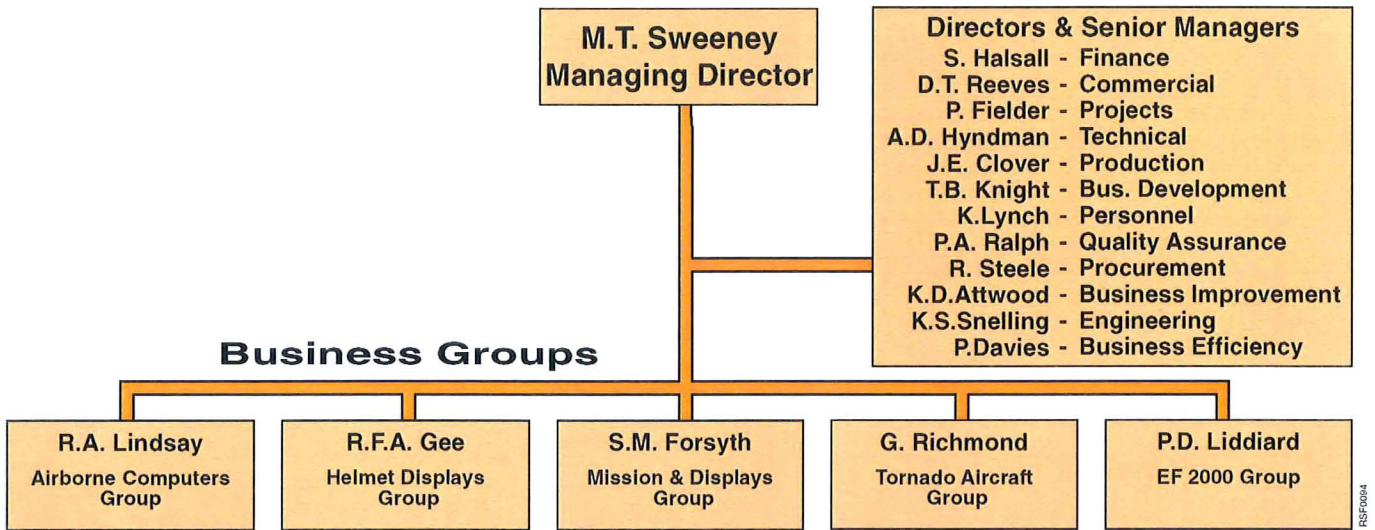
Europe's Largest Avionics Manufacturer



RS-971MAD - Slide No. 8 Sect. 1

GEC-Marconi
Avionics

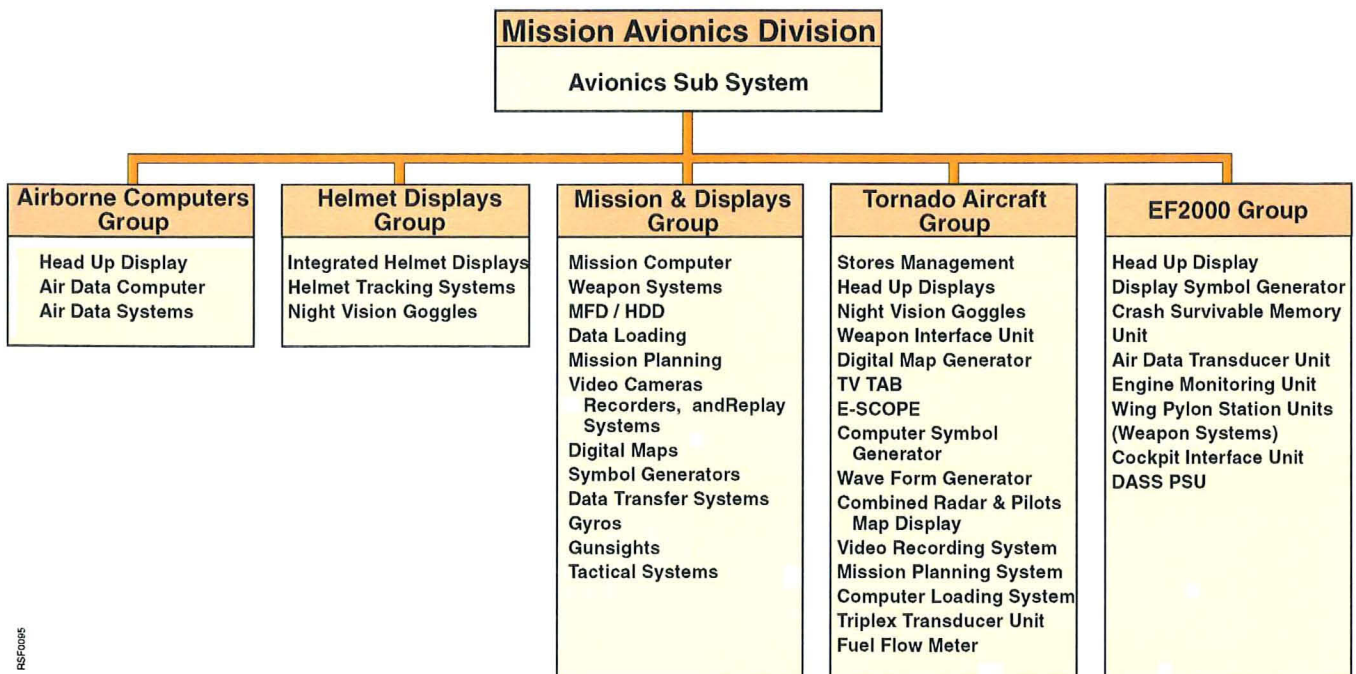
Mission Avionics Division Organisation



RS-97/IMAD - Slide No. 9 Sect. 1

GEC-Marconi
Avionics

Mission Avionics Division Products



RSF0005

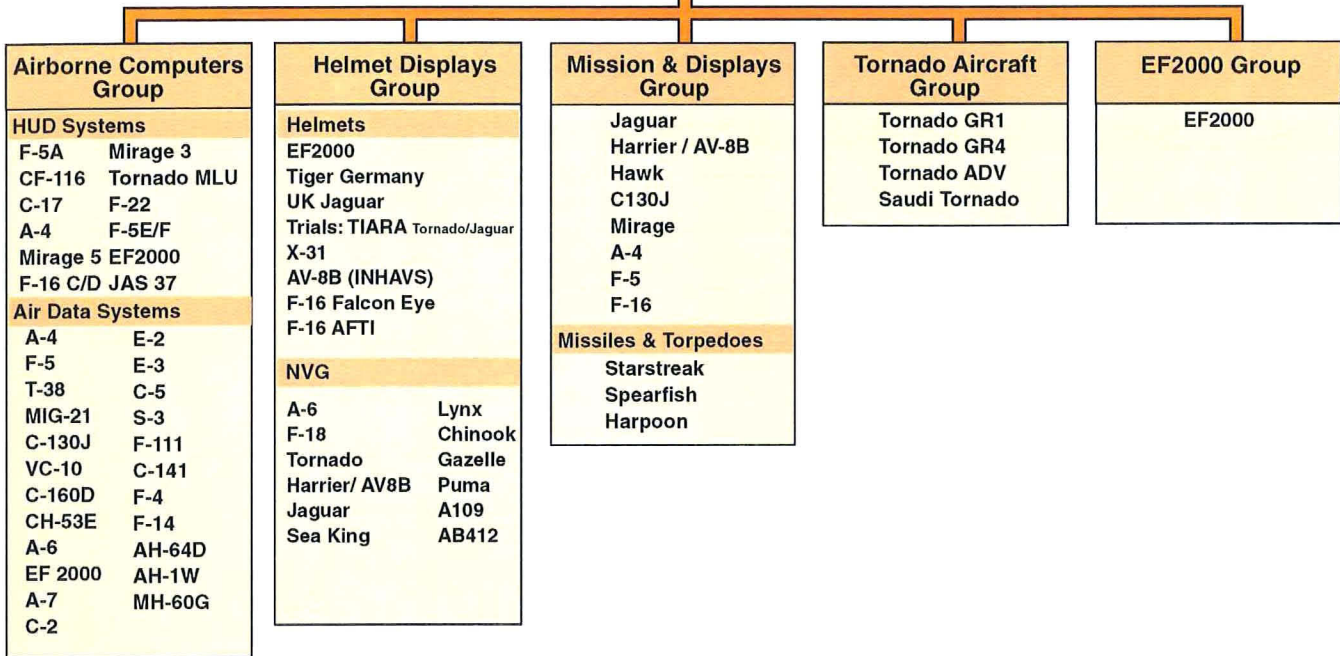
RS-97/IMAD - Slide No. 10 Sect. 1

GEC-Marconi
Avionics

Mission Avionics Division

Platforms

Mission Avionics Division



RSF0006

Mission Avionics Division

Product Applications

GEC-Marconi Avionics

Expertise

Mission Avionics Division Products



Tornado

- MAD**
- Stores Management
 - Head Up Displays
 - Video Camera
 - Night Vision Goggles
 - Weapon Interface Unit
 - Digital Map Generator
 - TV TAB
 - E-SCOPE
 - Computer Symbol Generator
 - Wave Form Generator
 - Combined Radar & Pilot's Map Display
 - Video Recording System
 - Mission Planning System
 - Triplex Transducer Unit
 - Fuel Flow Meter
 - TIALD Camera

- GM**
- Radar
 - Flight Controls
 - Fuel Pumps
 - Coolant Pumps
 - Pressure Reducing & Shut-off Valves
 - Pressure Sensor & Switches
 - Temperature Sensor & Switches
 - FLIR
 - TIALD
 - Defensive Aids

GEC-Marconi
Avionics

RS-977/MAD - Slide No. 2/Sec2

GEC-Marconi Avionics

Expertise

Mission Avionics Division Products

Sea Harrier

- MAD**
- HDD
 - Video Recording System
- GM**
- Navhars
 - Flight Controls
 - TACAN
 - Blue Vixen Radar
 - Fuel & Coolant Pumps
 - Single Air Motor Servo Unit
 - Water Injection Pumps

Harrier GR7 (UK)

- MAD**
- Digital Map
 - Nightbird NVGs
- GM**
- Defensive Aids
 - Single Air Motor Servo Unit
 - Communications
 - Fuel Pumps
 - Water Injection Pumps
 - Inertial Navigation

Harrier AV8B (USA)

- MAD**
- Cats Eyes NVGs
- GM**
- Single Air Motor Servo Units
 - Fuel Pumps
 - Fuel Flow Meters
 - Water Injection Pumps
 - FLIR



RS-977/MAD - Slide No. 3/Sec2

GEC-Marconi
Avionics

GEC-Marconi Avionics

Expertise

Mission Avionics Division Products



Hawk

- MAD ■ ISIS Gunsight
- Head Down Displays
- Video Cameras
- Video Recorders
- Data Transfer Systems
- CNI/Control & Display
- Engine Monitor Panel Display

GM ■ T45 - Yaw Damper

RS-97/1MAD - Slide No. 4/Set2

GEC-Marconi
Avionics

GEC-Marconi Avionics

Expertise

Mission Avionics Division Products



Jaguar

- MAD ■ Head Up Display
- Air Data System
- Mission Computer
- Digital Map Generator
- Night Vision Goggles
- Head Down Displays
- Helmet Mounted Display

RS-97/1MAD - Slide No. 5/Set2

GEC-Marconi
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GEC-Marconi Avionics

Expertise

Mission Avionics Division Products



EF 2000

- MAD**
- Head Up Display
 - Helmet Mounted Display
 - Display Symbol Generator
 - Crash Survivable Memory Unit
 - Air Data Transducer Unit
 - Engine Monitoring Unit
 - Wing Pylon Station Units
(Weapons Systems)
 - Cockpit Interface Unit
 - DASS PSU
- GM**
- Radar
 - Flight Controls
 - Fuel Pumps
 - Coolant Pumps

RS 4771MAD - Slide No. 6/Sec2

GEC-Marconi
Avionics

GEC-Marconi Avionics

Expertise

Mission Avionics Division Products



A-4

- MAD**
- Head Up Display
 - Air Data Systems
 - Head Down Display
 - Mission Computer
 - Display Processor
 - Weapons Management
 - Video Camera
 - Video Recorder

RS 4771MAD - Slide No. 7/Sec2

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GEC-Marconi Avionics

Expertise

Mission Avionics Division Products



F-5

- MAD*
- Head Up Display
 - Head Down Display
 - Air Data Systems
 - Mission Computer
 - Display Processor
 - Video Camera
 - Video Recorder

RS-971MAD - Slide No. 9/Se42

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GEC-Marconi Avionics

Expertise

Mission Avionics Division Products



F-16

- MAD*
- Head Up Display
 - Video Camera
 - Trials
 - Helmet Mounted Displays
 - Digital Mapping
- GM*
- Side Stick Controller
 - Flight Controls

RS-971MAD - Slide No. 9/Se42

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GEC-Marconi Avionics

Expertise

Mission Avionics Division Products



F-22

- MAD ■ Head Up Display
- HUD Camera
- Vehicle Management System
- GM ■ Pilot's Sidestick Controller

RS 47/1MAD - Slide No. 10/Sec12

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Expertise



C-17

Supply

- Head Up Display
- Symbol Generator
- Fuel Boost Pump
- Control Valves
- Cargo Ramp Floors
- Vertical Stabiliser Spars and Stringers

RS 47/1MAD - Slide No. 11/Sec12

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GEC-Marconi Avionics

Expertise



Attack Helicopters

- Integrated Avionic Suites
- Mission Computers
- Displays
- Helmet Mounted Displays
- Head Tracking Systems
- Night Vision Systems

ASW Helicopters - Merlin

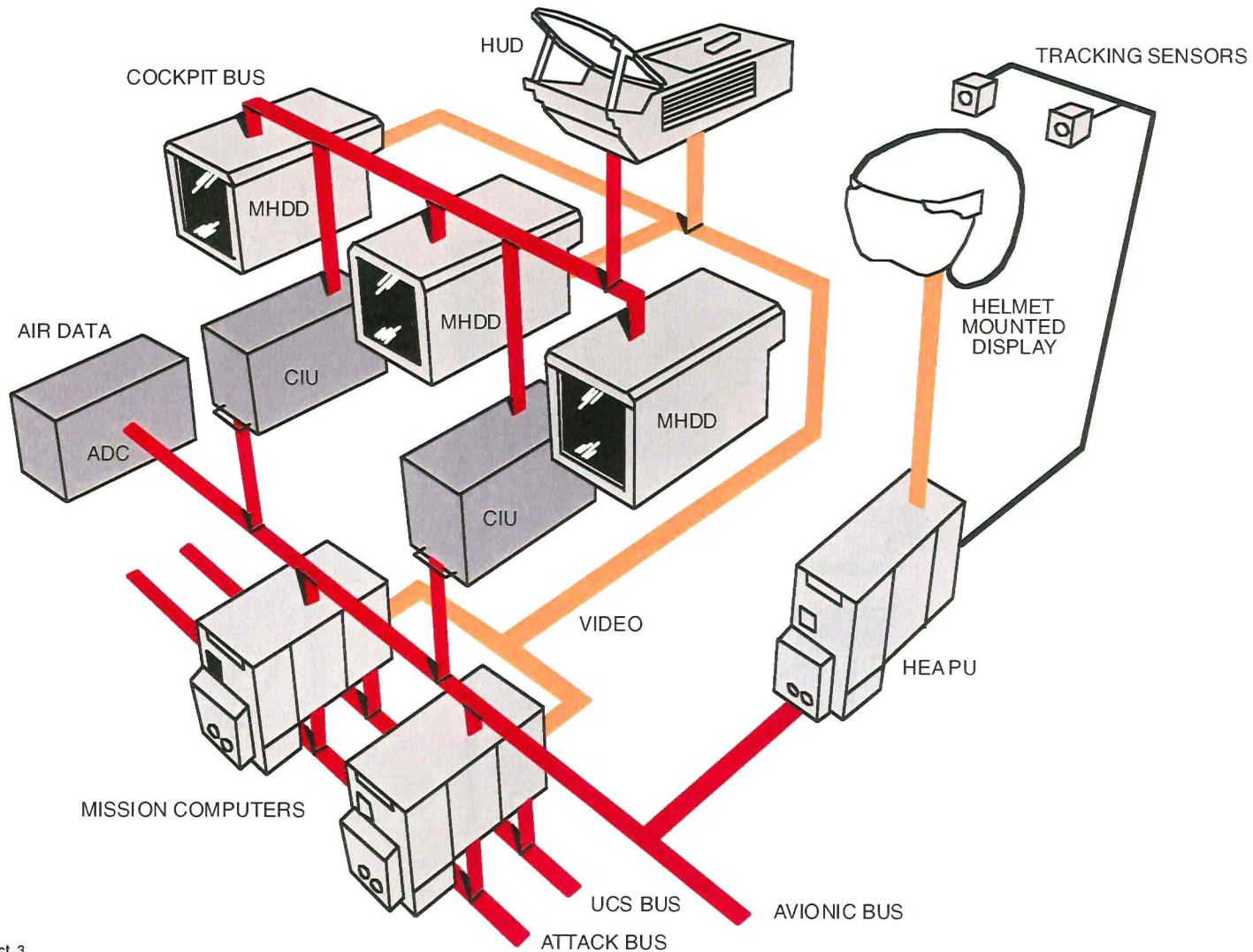
- Air Data Computers
- Flight Controls
- Radar
- Comms
- Sonobuoy Processing
- Fuel Boost Pumps
- Jettison Pumps

Mission Avionics Division

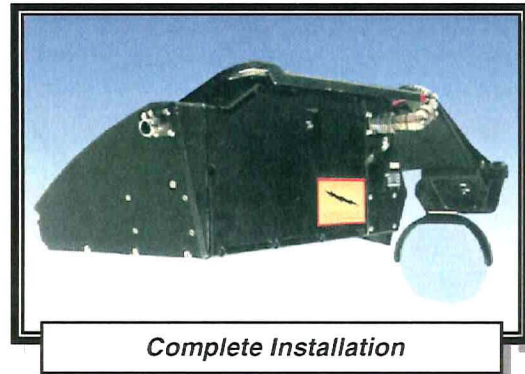
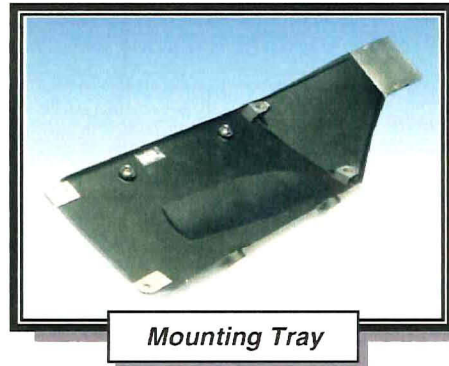
Products

Mission Avionics Division

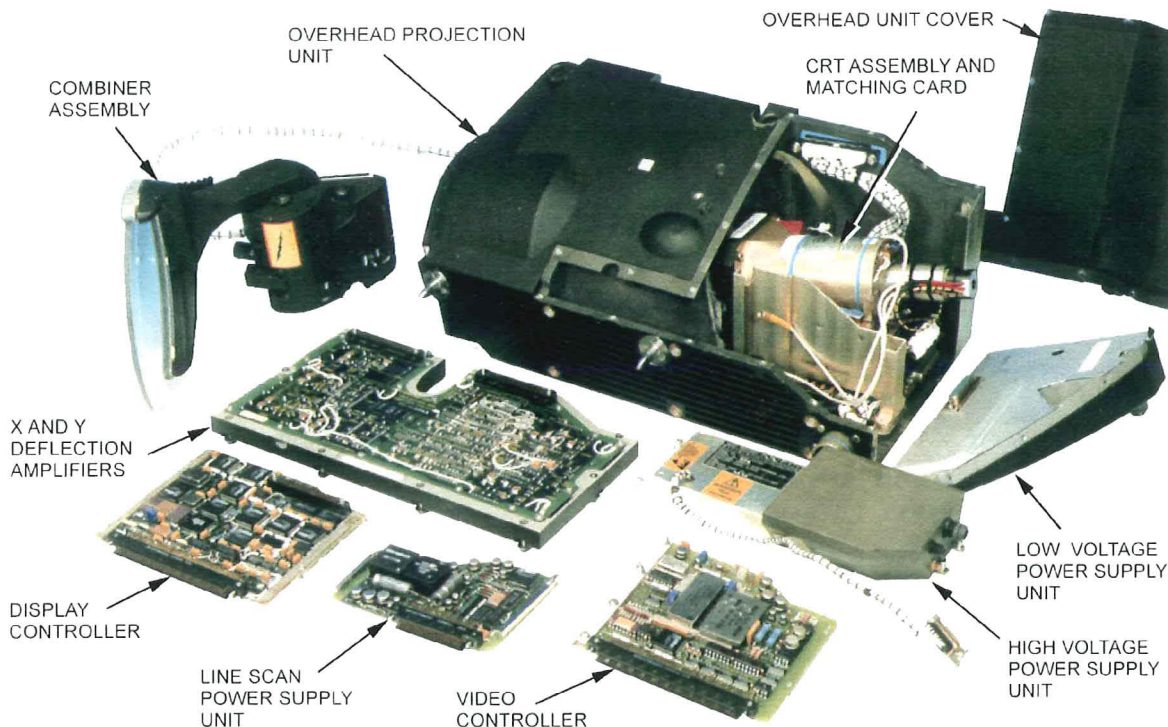
Business Scope - Display and Control Subsystems



Civil HUD Component Parts



Civil Head Up Display

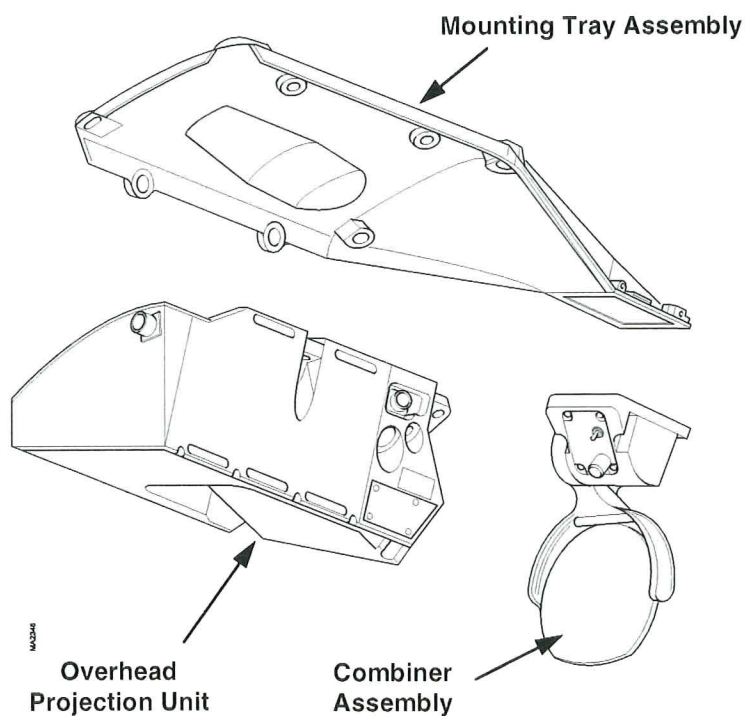


RS-97/1MAD - Slide No. 34 Sect. 3
4

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Civil HUD Installation

- Mounting Tray aligned to airframe on installation
- Overhead Projection Unit and Combiner Assembly aligned against master reference during manufacture.
- Overhead Projection Unit and/or Combiner assembly may be changed without re alignment
- Dimensions
 - Length = 35"
 - Width = 10"
 - Depth = 7.25"



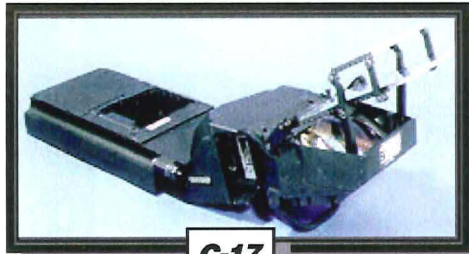
RS-97/1MAD - Slide No. 35 Sect. 3
5

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Head Up Displays Current Range



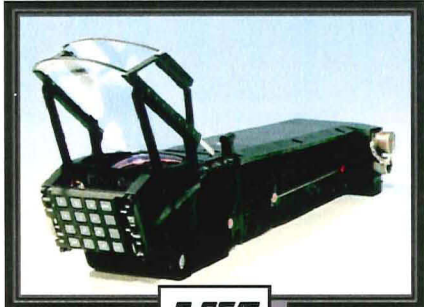
F-5A • CF-116*



C-17



A-4 • Mirage • CASA 101*



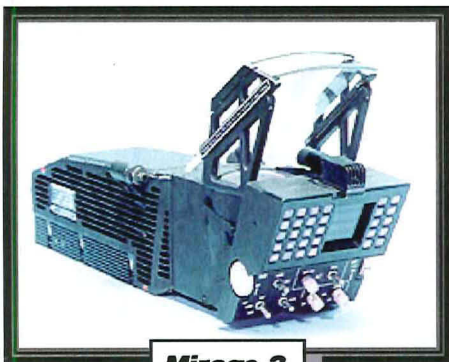
F-5E/F



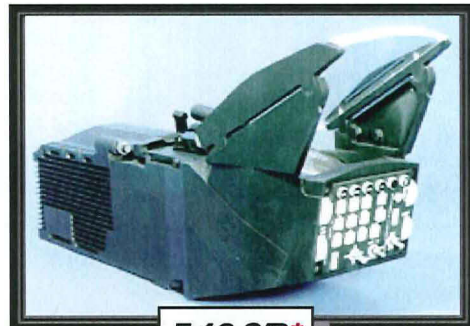
EF 2000*



F-16 C/D Diffractive*



Mirage 3



F-16 C/D*



Tornado MLU*



F-22

***Raster Capable**

Head Up Display

Key Features

- Range of >10 configurations
- Uncooled and cooled
- Stroke/Stroke on Raster
- Stroke only
- Conventional Optics
- Diffractive Optics
- Single & Dual Combiner
- Weapon Aiming Symbology/NAV
- Integrated UFCP's

Applications

- Fast Jet
- Military Air Transport
- Gunship
- Business Jet
- Civil Air Transport

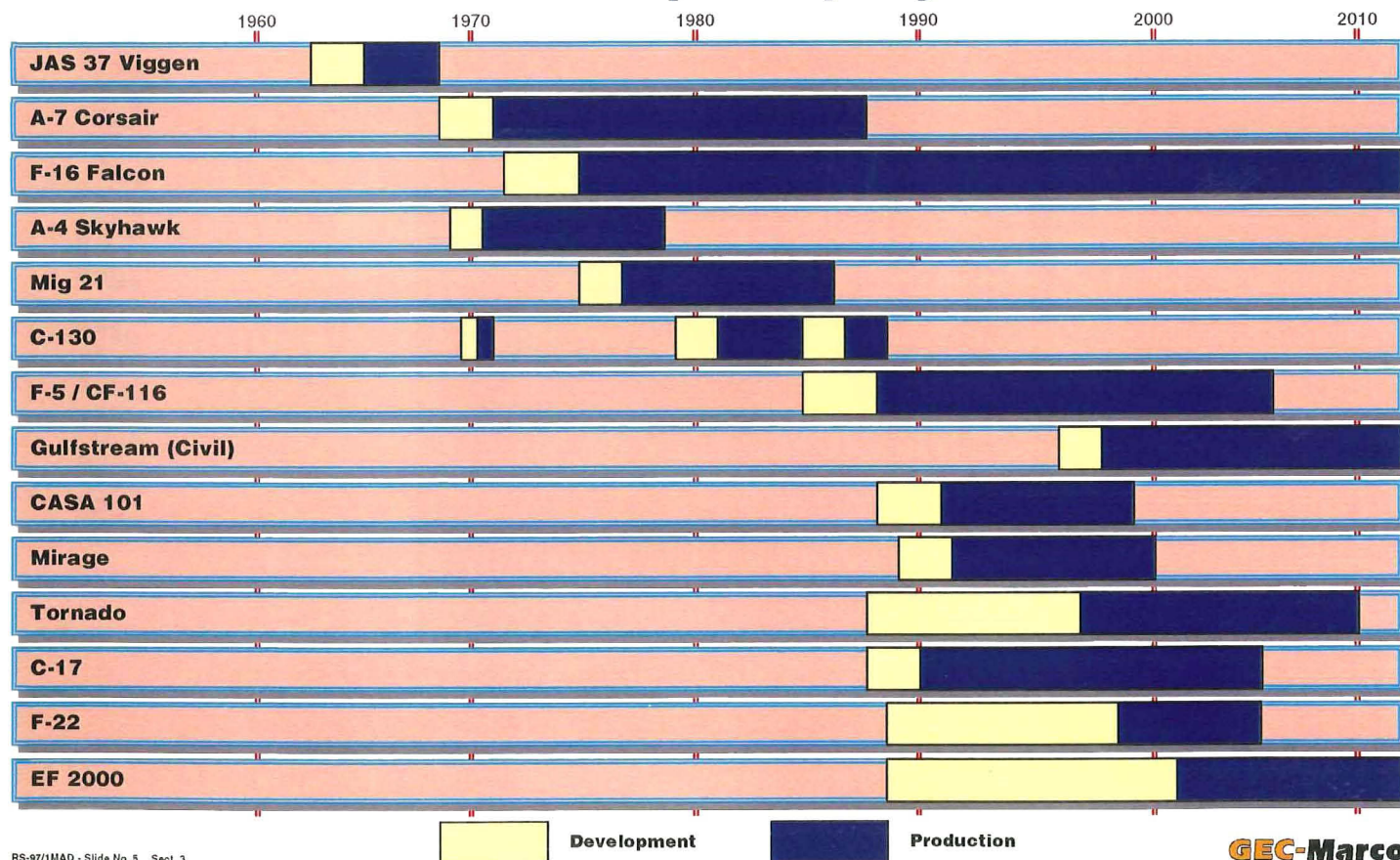
Outline Specification

- Up to 30°Az.IFOVx25°ER.IFOV
- Weight 26lb to 70lb (PDU only)
- Power 10VA to 86W (PDU only)
- MTBF - Up to 7000 hours
- 1750 processor available
- 1553 BUS available
- RS 422
- ARINC 429

RS-97/IMAD - Slide No. 4 Sect. 3

GEC-Marconi
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Head Up Displays



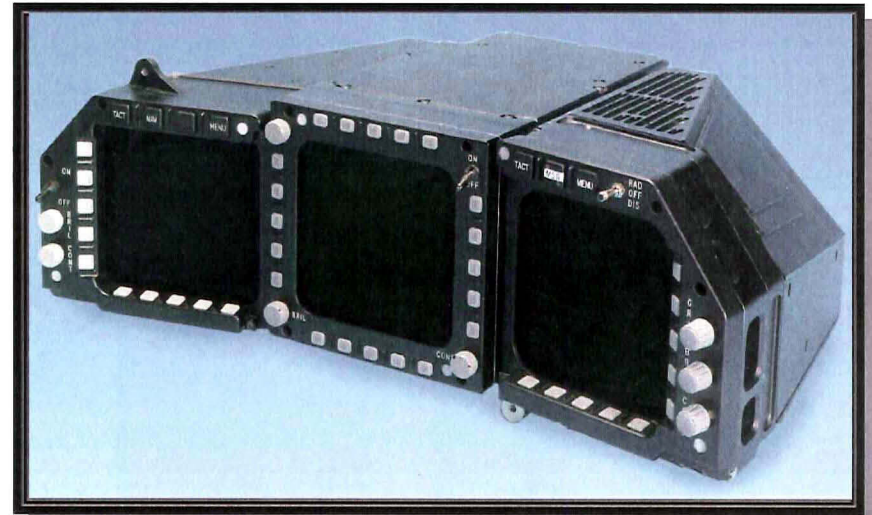
RS-97/IMAD - Slide No. 5 Sect. 3

GEC-Marconi
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Multi Function Displays - CRT



■ **TV TAB**



- **A-4**
- **Hawk**
- **S61**
- **CASA 101**
- **Mirage**
- **AMX**
- **Sea Harrier**

Multi Function Displays - CRT

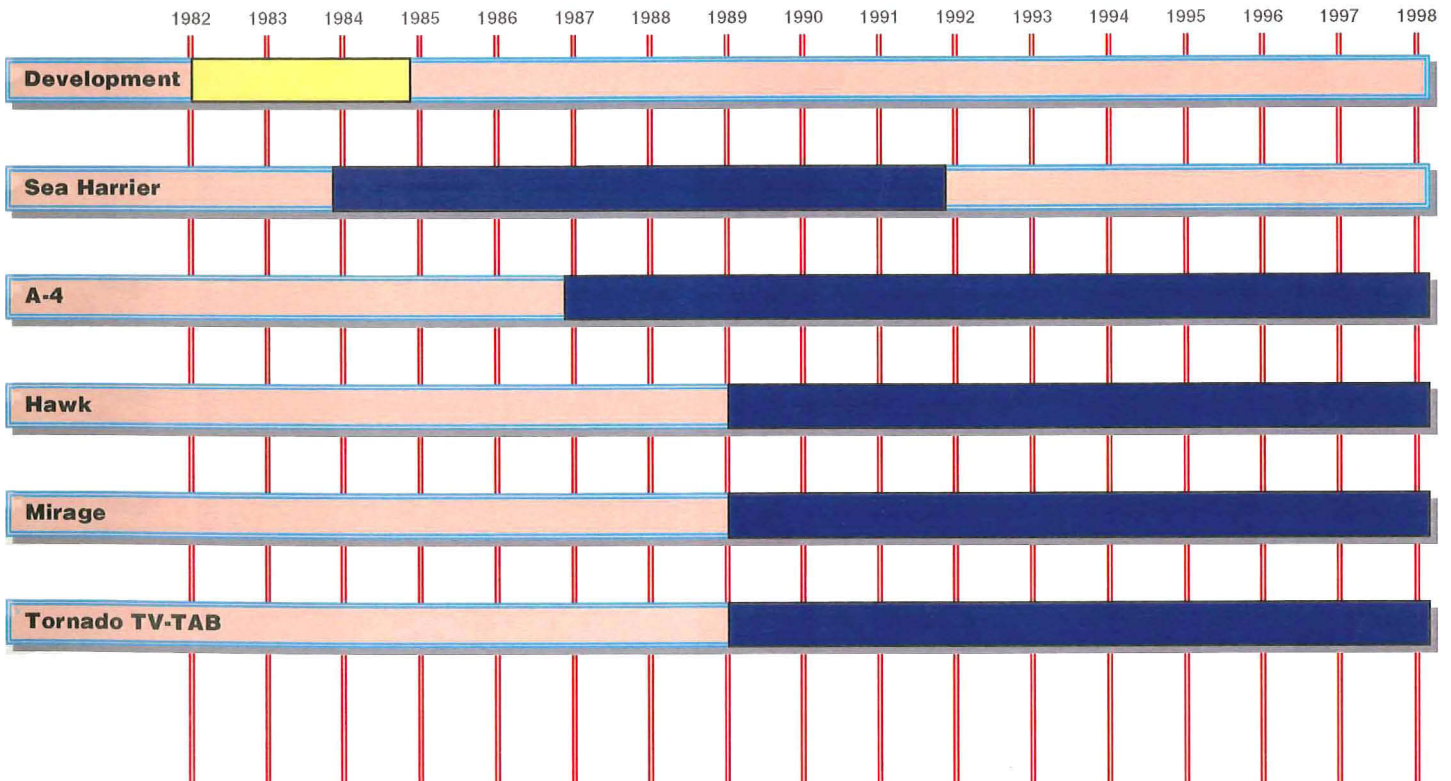
Product

Applications

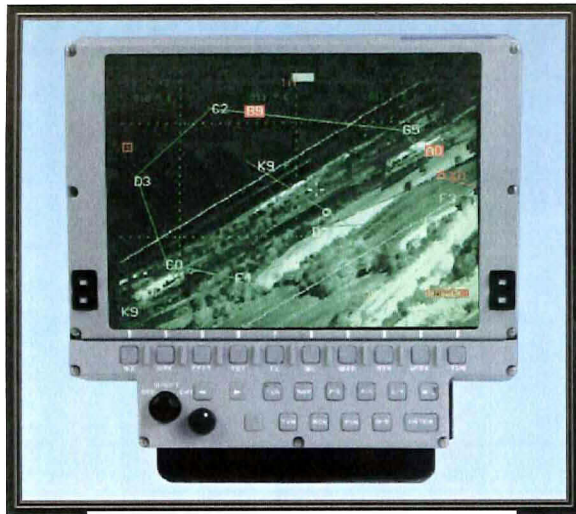
Outline Specification

- | | | |
|--|---------------------|-----------------------------|
| ■ Monochrome CRT | ■ Fast Jet | ■ 500 ft Lamberts |
| ■ High Brightness | ■ Helicopter | ■ 5.6:1 Contrast Ratio |
| ■ 115mmx115mm Active Area | ■ Radar Display | ■ 65 Watts |
| ■ Compatible with 1:1 Aspect Ratio
and 4:3 Aspect Ratio | ■ FLIR Display | ■ 625/525 Line Input |
| ■ Brightness and Contrast Controls | ■ HUD Monitor | ■ 8kg |
| ■ Soft Keys | ■ System Management | ■ - 40°C to +55°C Operating |
| ■ NVG Compatible | | |

Multi Function Displays - CRT



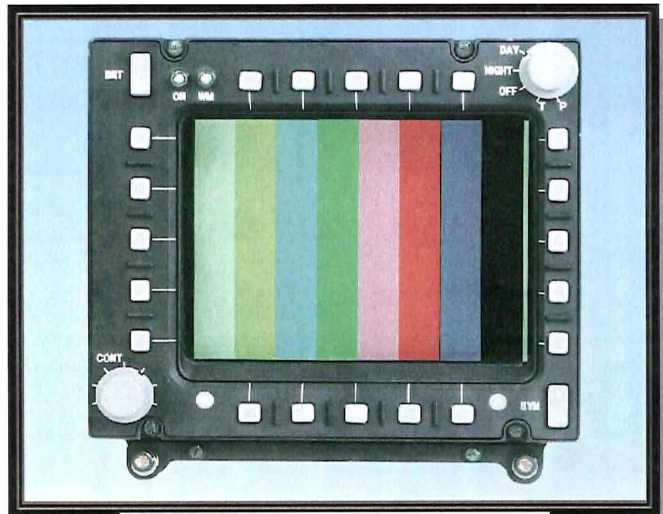
Multi Function Displays - AMLCD



Tornado TV - TABS



Hawk HUD Monitor



Light Attack A/C



Seaspray

Multi Function Displays - AMLCD

Key Features

- High Brightness
- Sunlight Readable
- Full Colour
- NVG Compatible
- Low Life Cycle Cost

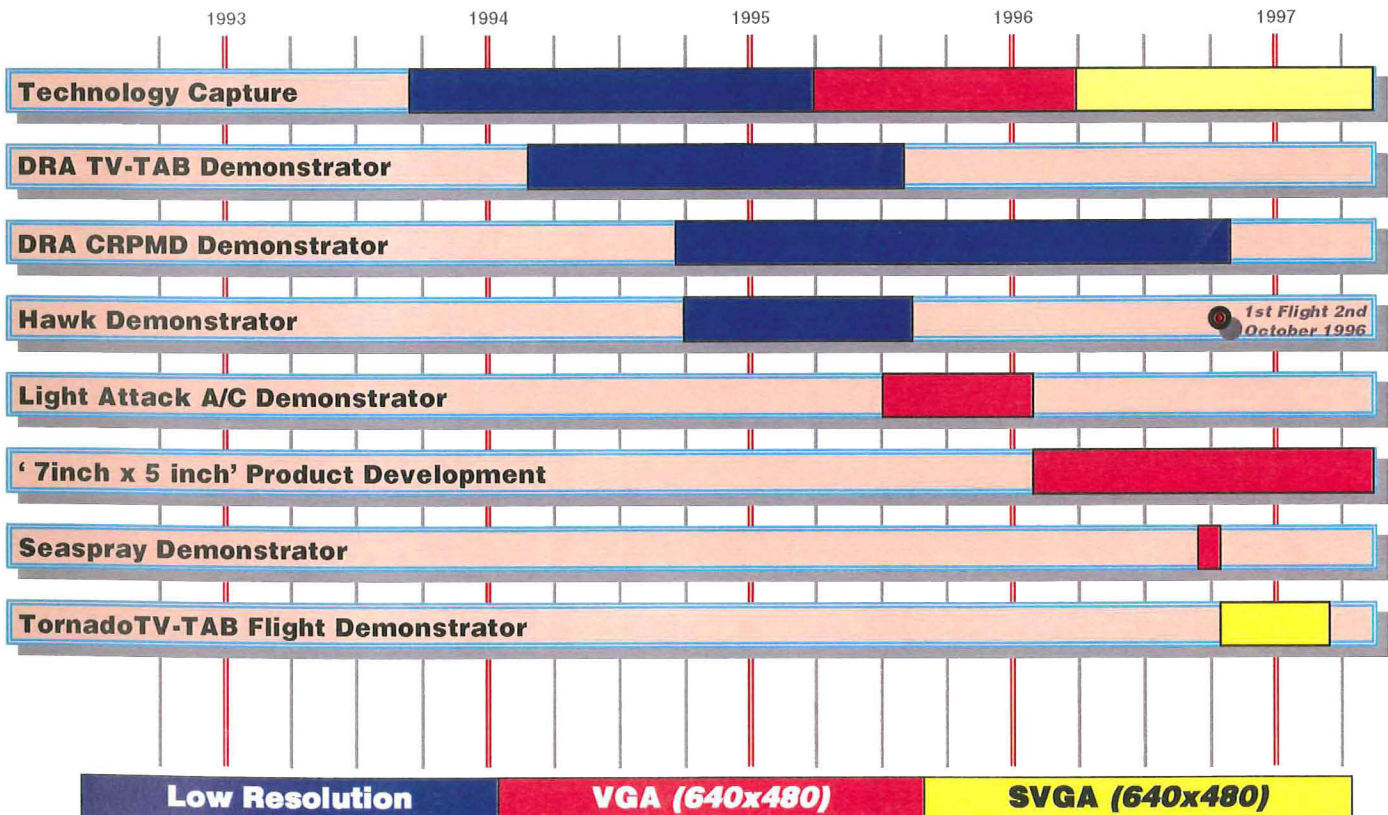
Applications

- Fast Jet
- Helicopter
- Radar Display
- FLIR
- HUD Monitor
- System Management

Outline Specification

- 800 ft Lamberts
- 800x600 Full Colour Pixels
- 64 Greyscale
- 10:1 Contrast Ratio
- Full Military Environment

Multi Function Displays - AMLCD



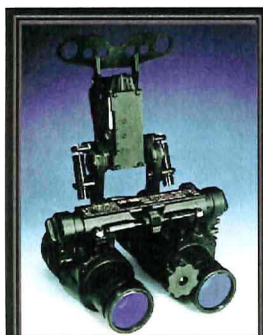
Helmet Displays



Viper
X-31A



Knighthelm
German Tiger



Nite-Op
Gazelle • Chinook • Sea King • Puma



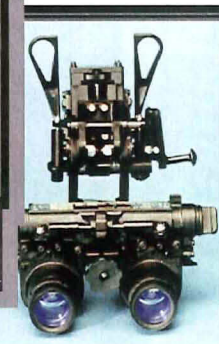
Viper II
F-16 • German Tornado • TAV-8B
U.K. Tornado (T.D.P.)



Crusader
U.S.N. TDP • EF 2000



Alpha Sight
UK Jaguar



Nightbird
Harrier • Jaguar • Tornado



Cats Eyes
F-16 • AV-8B • A-6 • F-18 • Viggen

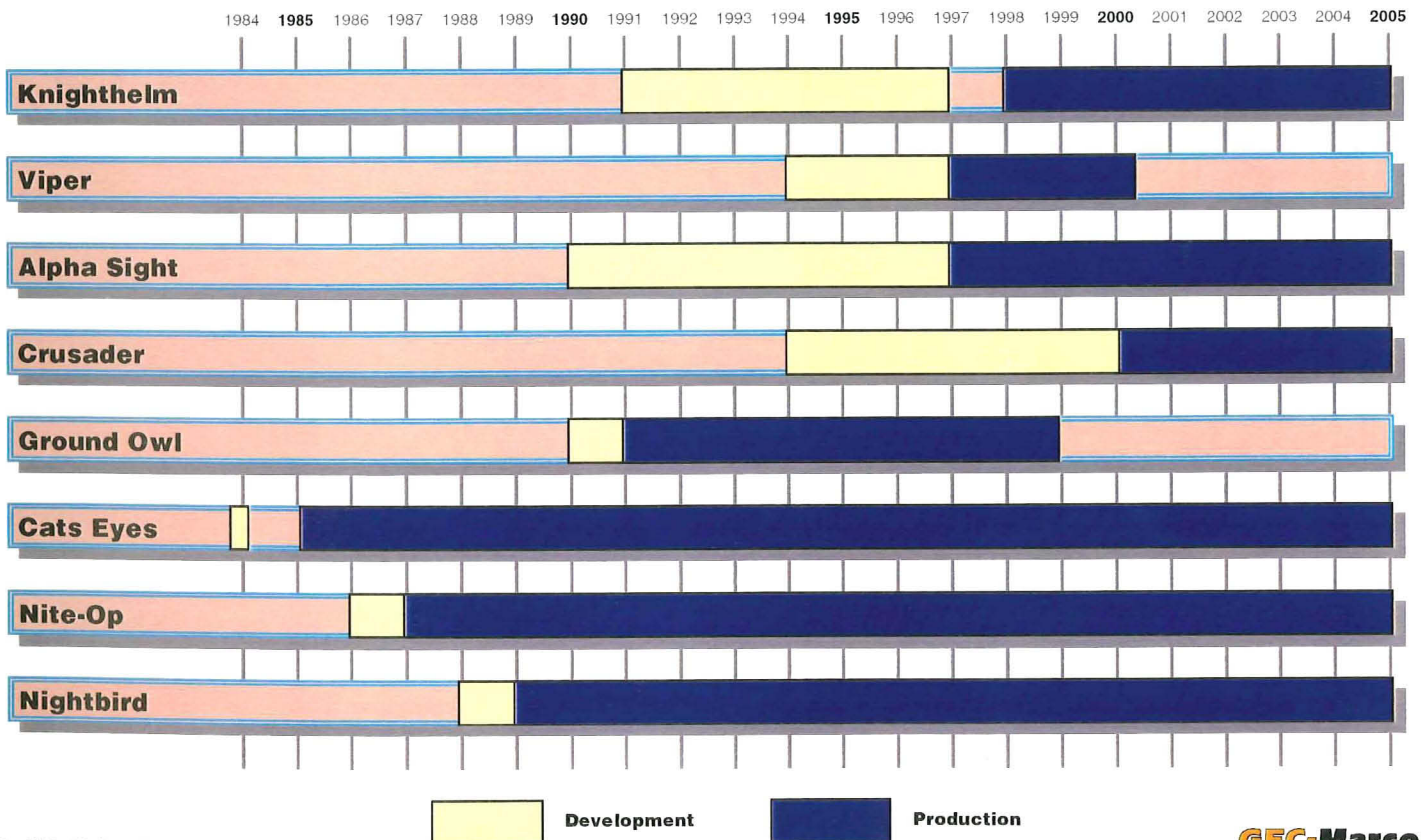


GroundOwl
U.K. Ground Forces

Helmet Displays Options

Product	Key Features	Applications	Outline Specification
Helmets	<ul style="list-style-type: none"> • High Performance 24 hr Display • Monocular & Binocular Combiner or Visor Projected Display • L.E.D. Sighting System • Head Tracking • Rotary & Fixed Wing Mission Adaptable 	<ul style="list-style-type: none"> • Fast Jet • Rotary Wing • Research 	<ul style="list-style-type: none"> • 20° and 40° F.O.V. • Low Weight • Modular System • NVG capable of independent operation from aircraft power supply
Night Vision Goggles/Sights	<ul style="list-style-type: none"> • Multi Applications Night Vision System (Ground Owl) • Unique Combiner N.V.G.(Cats Eyes) • High Performance Large F.O.V. Night Vision Goggle (Nightbird) • Raster Head Up Display (HUD) Compatible N.V.G.(Cats Eyes) • Automatic Detachment on Ejection(Night Op) 	<ul style="list-style-type: none"> • Fast Jet • Rotary Wing • Ground Forces 	<ul style="list-style-type: none"> • 30°, 40° and 45° F.O.V. • Independent power source for each binocular assembly.

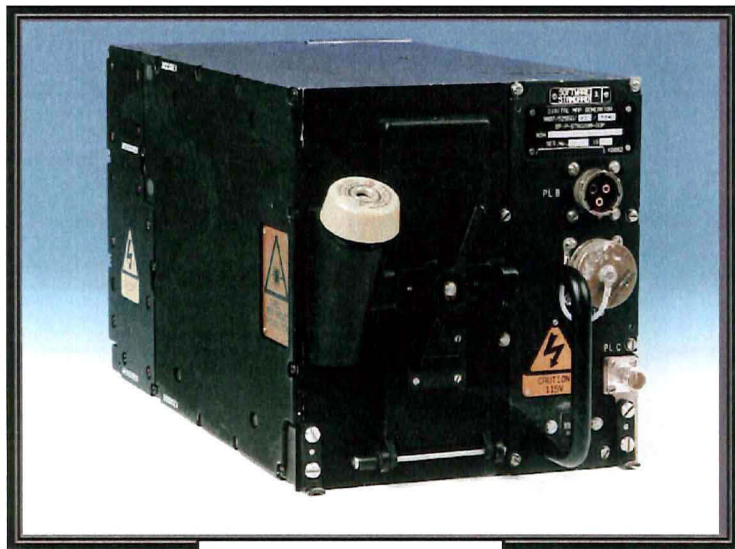
Helmet Displays



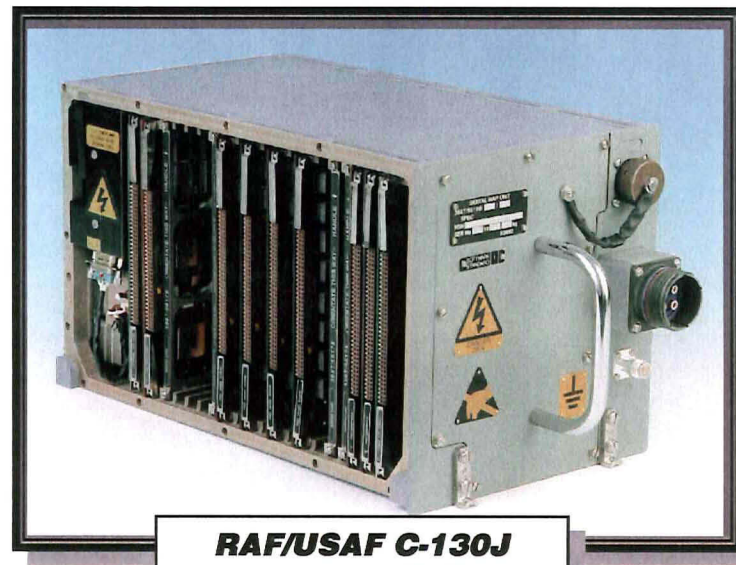
Digital Map



Digital Map Imagery



Tornado GR-4



**RAF/USAF C-130J
Jaguar MSG**

Digital Maps

Key Features

- Flexible Data Storage Medium
 - Optical Disk
 - Solid State
 - Hard Disk
 - PC card (PCMIA)
- ASRP/CADRG Data Standards
- Vector map Capable
- Analogue/Digital output

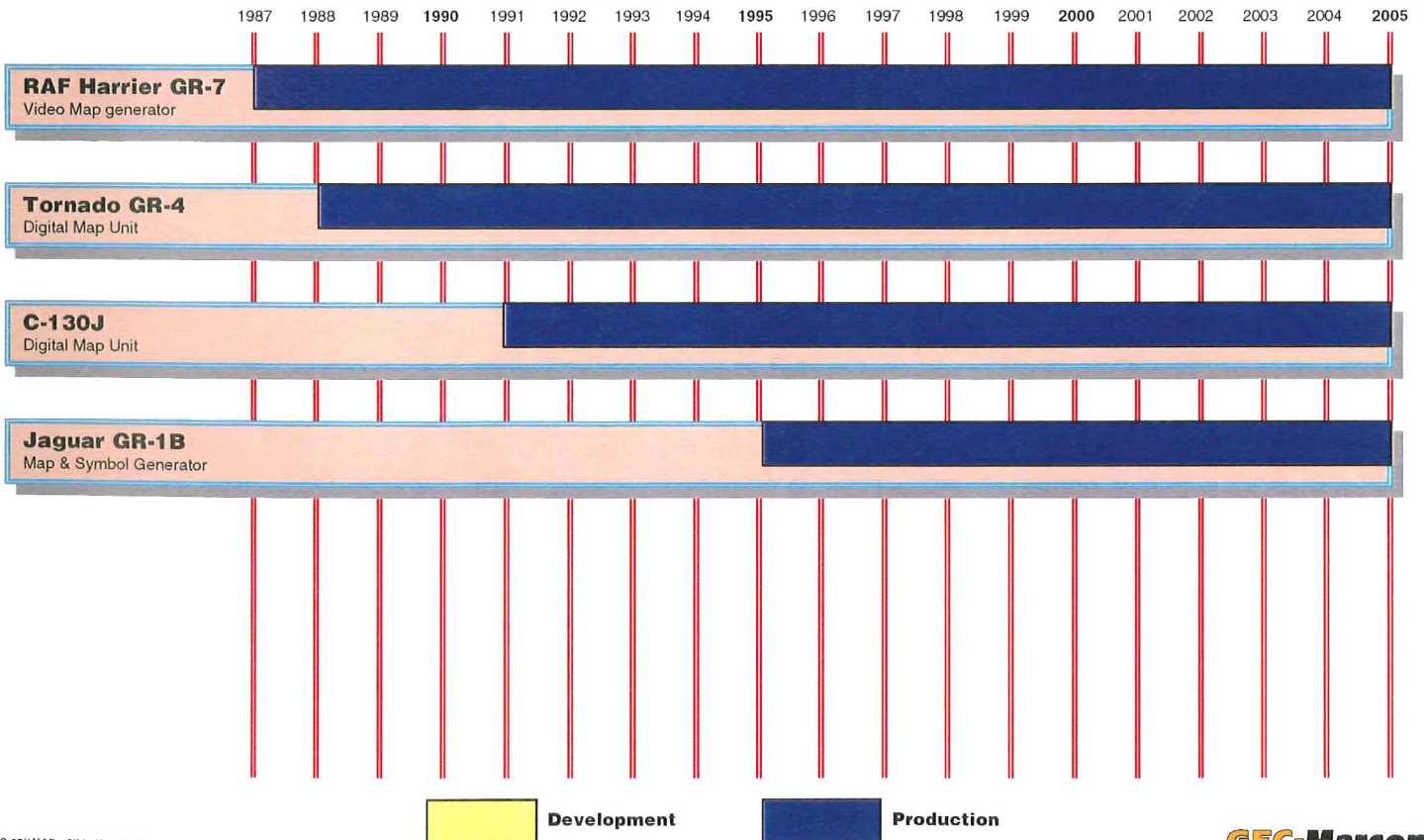
Applications

- Fast Jet
 - Tornado GR-4
 - Jaguar GRI-B
 - Harrier GR-7/T-10
- Transport
 - C-130J

Outline Specification

- 8 Map Scales
- 16 colours moving map
 - Smooth rotation
 - Zoom capability
- Additional 16 colours for overlays
 - Route
 - Tactical Information
- 1553B Interface
- Overlay De-clutter

Digital Map Units/Generator



Video Systems



F-22



Tornado

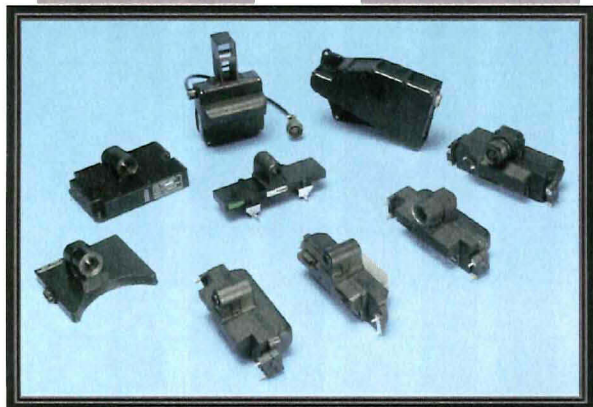


F-16



**Tornado
Harrier GR7
Skyhawk
T-45**

Video Recorders



Video Cameras

Video Cameras



**Harrier
Tornado**

Video Multiplexers



Tornado



Harrier GR7

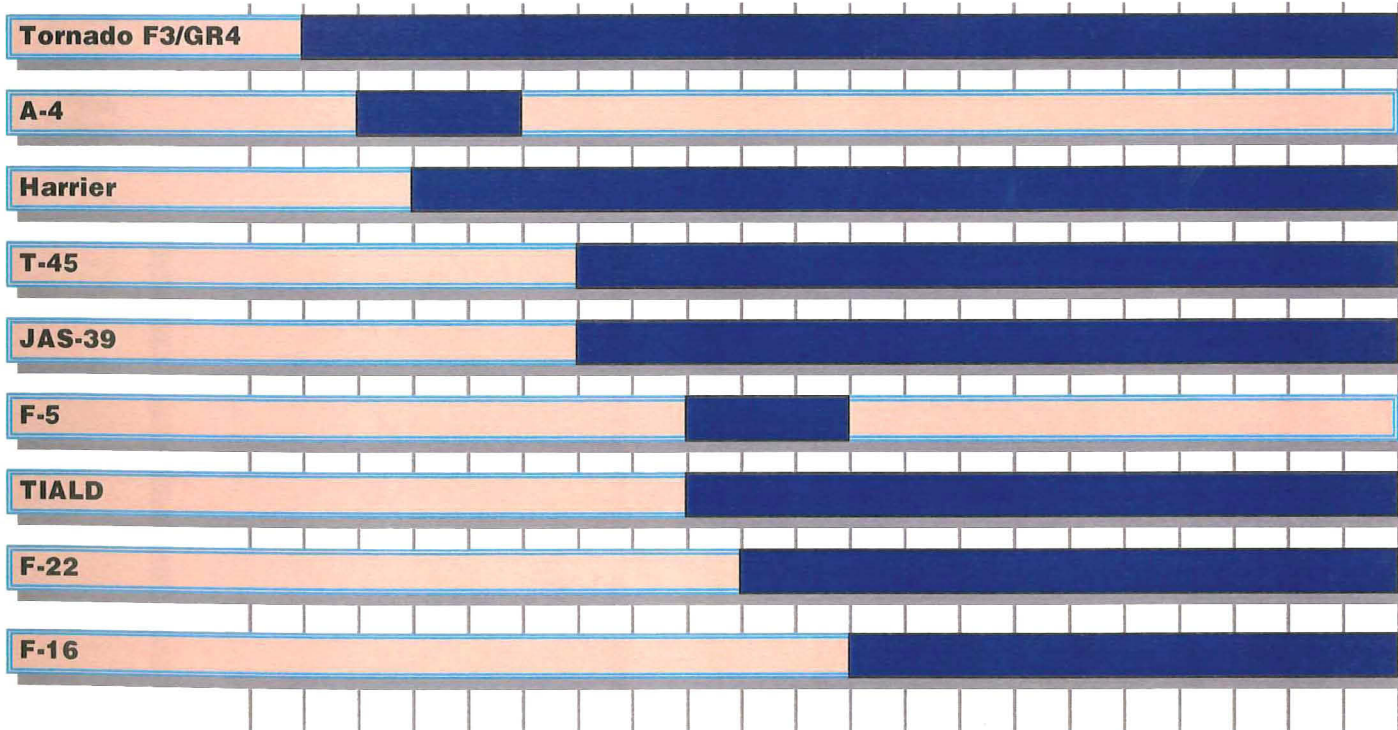
Video Replay

Video Systems Options

Product	Key Features	Applications	Outline Specification
Cameras	<ul style="list-style-type: none"> ■ COTS Single and two-piece ■ Latest technology solid state sensor with high resolution, sensitivity and accurate colour ■ Field of view matched to HUD 	<ul style="list-style-type: none"> ■ Head Up Displays ■ Cockpit ■ Pod 	<ul style="list-style-type: none"> ■ 1/2" CCD colour image sensor ■ 450 lines/picture height resolution ■ Full performance 3-3500Cd/m² ■ Available in 525 line NTSC or 625 PAL standard
Video Recorders and Multiplexers	<ul style="list-style-type: none"> ■ COTS (Commercial off the Shelf) ■ Complete colour multiplexing capability up to six channels ■ Four colour video recording ■ Cockpit voice continuously recorded 	<ul style="list-style-type: none"> ■ Video Systems 	<ul style="list-style-type: none"> ■ Video bandwidth >400TVL ■ Uses International 8mm format video cassettes ■ Recording duration up to 120 min. ■ Hi 8 format
Video Replay Facilities	<ul style="list-style-type: none"> ■ Video tape demultiplexing ■ Simultaneous repeat of up to six cameras ■ Complete flexibility of display configuration 	<ul style="list-style-type: none"> ■ Mission Debrief ■ Mission Analysis 	<ul style="list-style-type: none"> ■ Zoom and enhancement feature ■ On screen measurement ■ Automatic event search

Video Systems

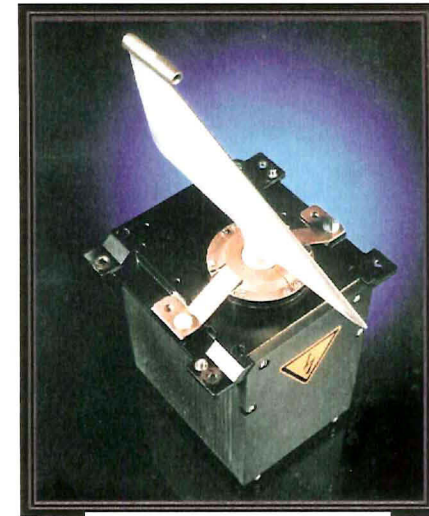
1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005



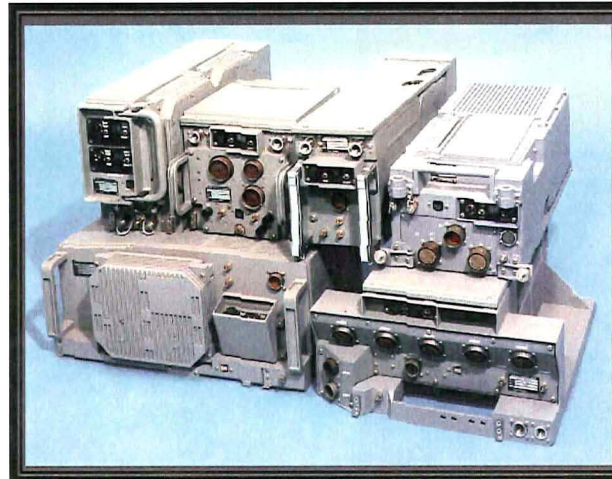
Air Data Systems



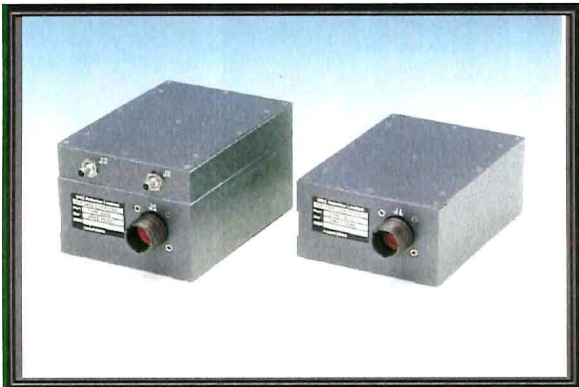
MSCADC
A-4 • F-5 • T-38



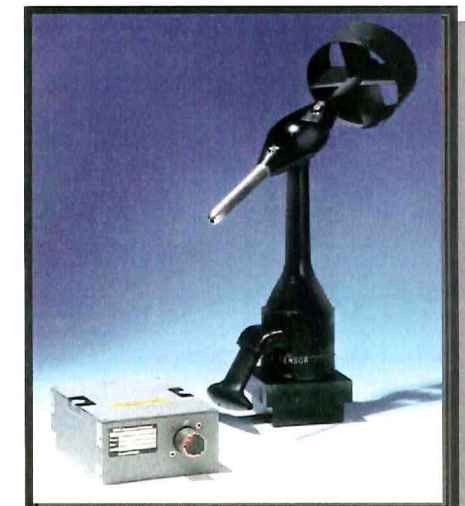
EF 2000



The SCADC Family
A-4 • A6 • A-7 • C-2 • E-2 • E-3 • C-5
S-3 • F-111 • F-4 • C-141 • F-14



HIADC
MIG-21 • C-130J
VC-10 • C-160D • CH-53E



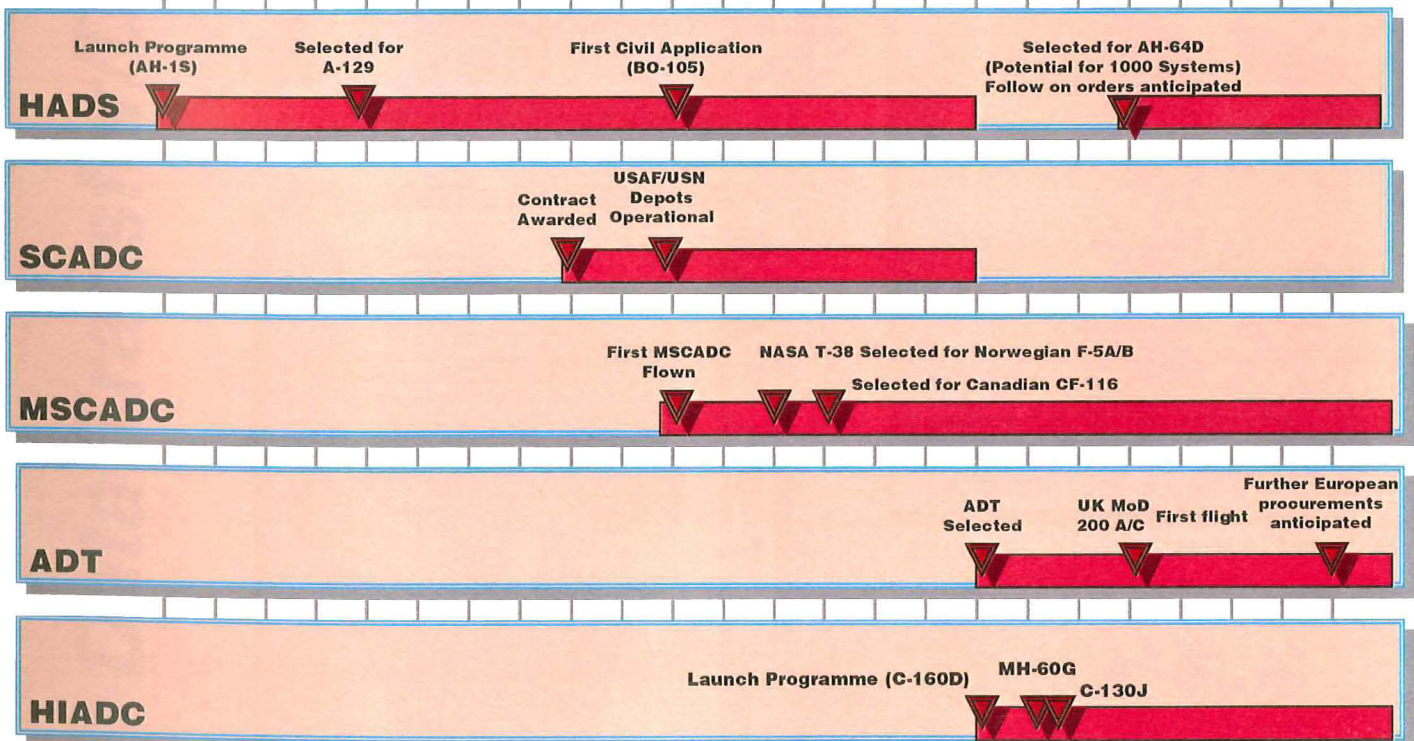
HADS
AH-64D • AH-1W • MH-60G

Air Data Systems

Product	Key Features	Applications	Outline Specification
HADS <i>Helicopter Air Data System</i>	<ul style="list-style-type: none"> • True 3 axis air data • High accuracy air data down to the hover • Enhanced weapon delivery accuracy • Built in Test 	Military Helicopters	<ul style="list-style-type: none"> • >10,000 hrs MTBF • MIL-STD-1553B • Anti-icing probe • Easy to retrofit to existing aircraft
SCADC <i>Standard Central Air Data Computer</i>	<ul style="list-style-type: none"> • Low cost of ownership • 6 configurations retrofit 46 aircraft variants with 80% parts commonality • Over 5,500 delivered • Exceeds guaranteed MTBF • Comprehensive Built in Test • Non-volatile memory 	Fast Jet Military Transport Combat Training	<ul style="list-style-type: none"> • Form, fit, functional replacement • Synchrosup to 18 • Potentiometers...up to 12 • Discrete I/F.....28V validity, relay IFF etc • Serial.....MIL-STD-1553B • Power115v 400Hz 100 VA
MSCADC <i>Miniature Standard Central Air Data Computer</i>	<ul style="list-style-type: none"> • Low Life Cycle Cost • Prime accuracy with excellent long term stability • Extensive Built in Test • Non-volatile memory 	Fast Jet Attack Training	<ul style="list-style-type: none"> • > 9000 hrs MTBF • Synchros.....typically 3 • Potentiometers...4 to 8 • Serial.....MIL-STD-1553B, ARINC-429 • Power115v 400Hz 30 VA
ADT <i>Air Data Transducer</i>	<ul style="list-style-type: none"> • Meets requirements of high performance agile aircraft • MIL-STD-1553B Mux Bus interfaced directly with Flight Control Computer 	EF2000	<ul style="list-style-type: none"> • 5000 hrs MTBF • Mobile multifunction vane enables complete air data function in one unit • 115v Anti/de-icing heater • MIL-STD-1553B output only
HIADC <i>High Integration Air Data Computer</i>	<ul style="list-style-type: none"> • Low cost of ownership - fit and forget • High reliability with no scheduled maintenance • Prime accuracy with excellent long term stability • Low weight, volume and power consumption 	Suitable for fixed & rotary wing aircraft Fast Jet Transport Helicopters	<ul style="list-style-type: none"> • >20,000 hrs MTBF • Serial MIL-STD-1553B, ARINC-429, RS-485 • Power 28v DC 6W • Weight 1.2kg (2.5lbs) max

Air Data Systems

1977 1978 1979 1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000

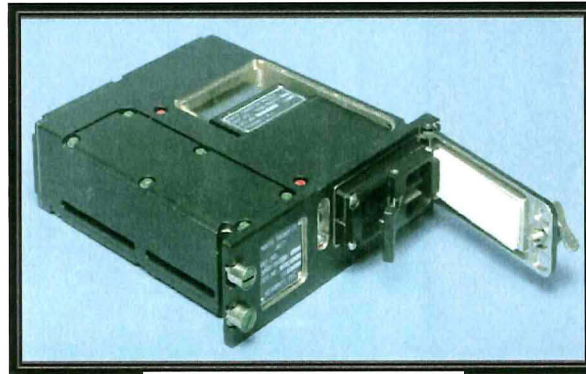


Data Transfer/Data Recording Systems

Data Transfer Units



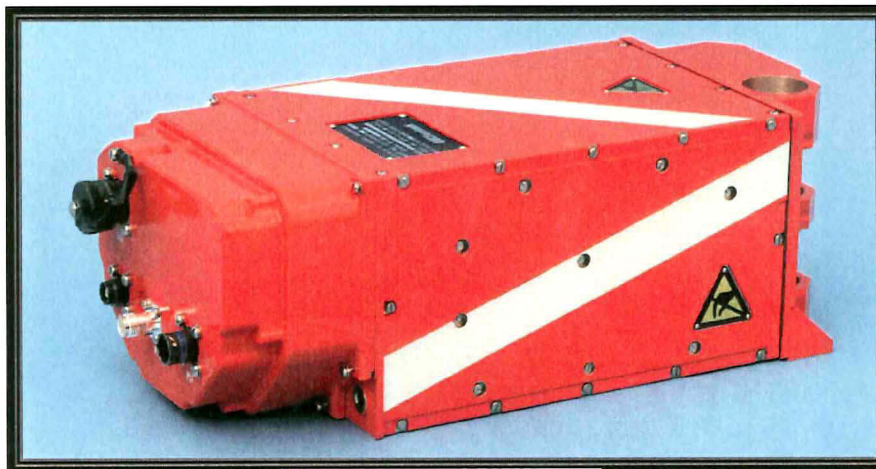
C-130J



A-4



Hawk



EF 2000

Data Recorders and Crash Survivable Memory Units

Data Transfer/Data Recording Systems

Product

Key Features

Applications

Outline Specification

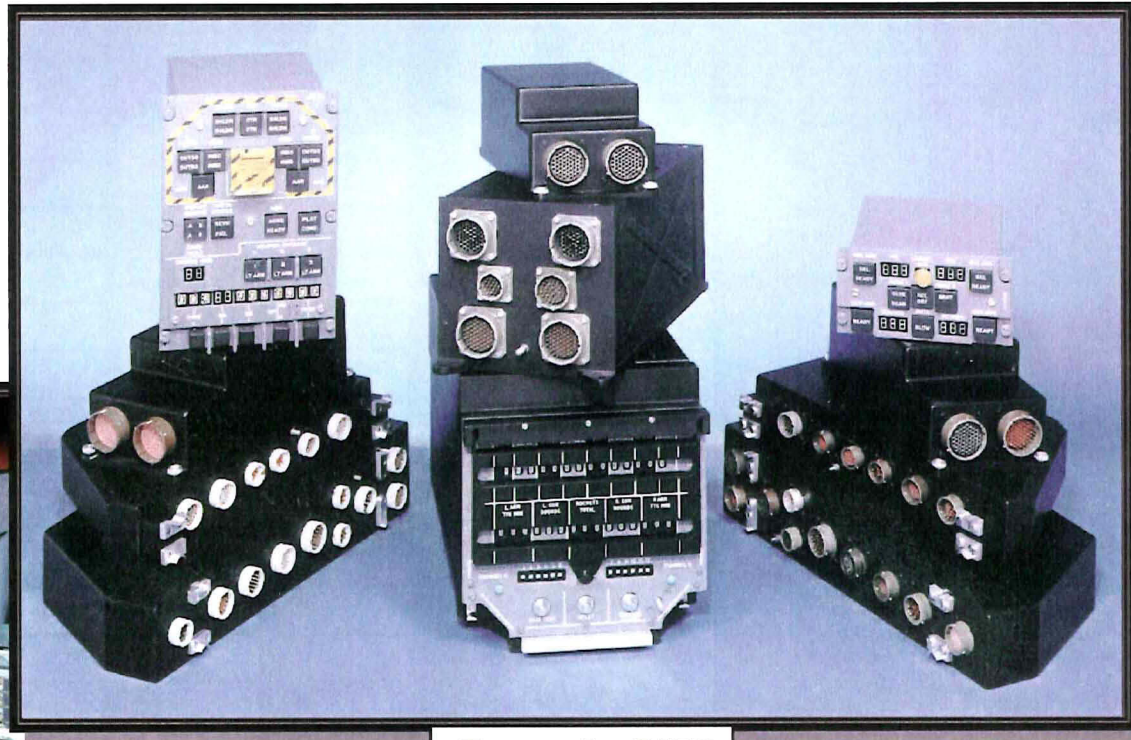
Data Transfer Unit

- Non volatile memory
- High data integrity
- Fast data transfer
- Low cost of ownership
- Solid state memory
- Fast jets
- Helicopters
- MPA
- Trainers
- Mission Planning
- Up to 4Mb E² PROM
- Solid state memory
- No battery back-up required
- High write/read/erase capability
- Full military environmental specification

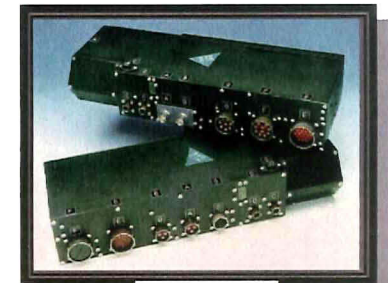
Data Recorder

- Unsurpassed crash survivability
- Memory expansion
- Extensive BIT
- Full military specification
- 1553 B interface
- EF 2000
- Future Aircraft
- Crash protection exceeds requirements of TSO-C 51a
- Weight < 6kg
- Environmental test conditions MIL-STD-810 D
- Memory capability 6 Mb
- Error rate < 1 bit in 10⁷

Stores Management



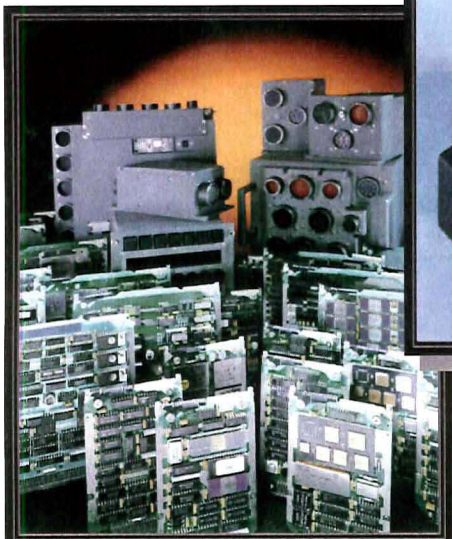
Tornado SMS



WIFU



HACLCS-II



STORMS
Standard Stores
Management System

Stores Management Options

Key Features

- Over 20 years of Stores Management experience
- Proven software reconfigurable, distributed system (FWE)
- ADA modular software experience
- High bandwidth switching units
- MIL-STD -1760 experience

Applications

Fast Jet
Trainer
Helicopter
Maritime Patrol Aircraft

Outline Specification

- Modular Construction
- Dual Redundant MIL-STD-1553 Data Bus
- MIL-STD-1760
- Full Military Environmental Specification

Stores Management Systems

1974 1975 1976 1977 1978 1979 1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997

Panavia Tornado GR1

Panavia Tornado MLU

Foreign Weapons Evaluation

EF 2000 RIW

Harpoon Airborne Command Launch Unit Control Set (HACLCS)

1974 1975 1976 1977 1978 1979 1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997

Engine Management Displays



**Engine Speed
Temperature
Indicator**



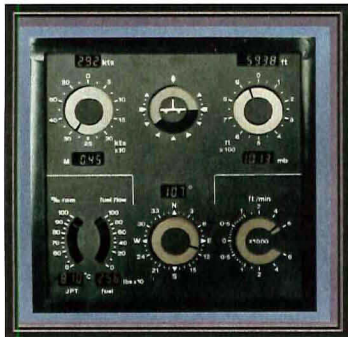
**Engine Monitor
Panel**



**CNI / Control &
Display Panel**



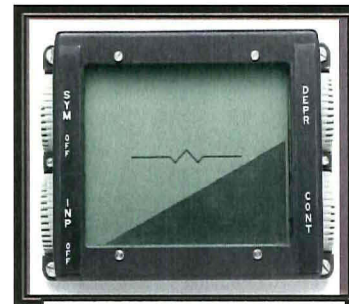
**Command &
Control Unit**



Get-U-Home Panel



**Reversionary
Instruments**

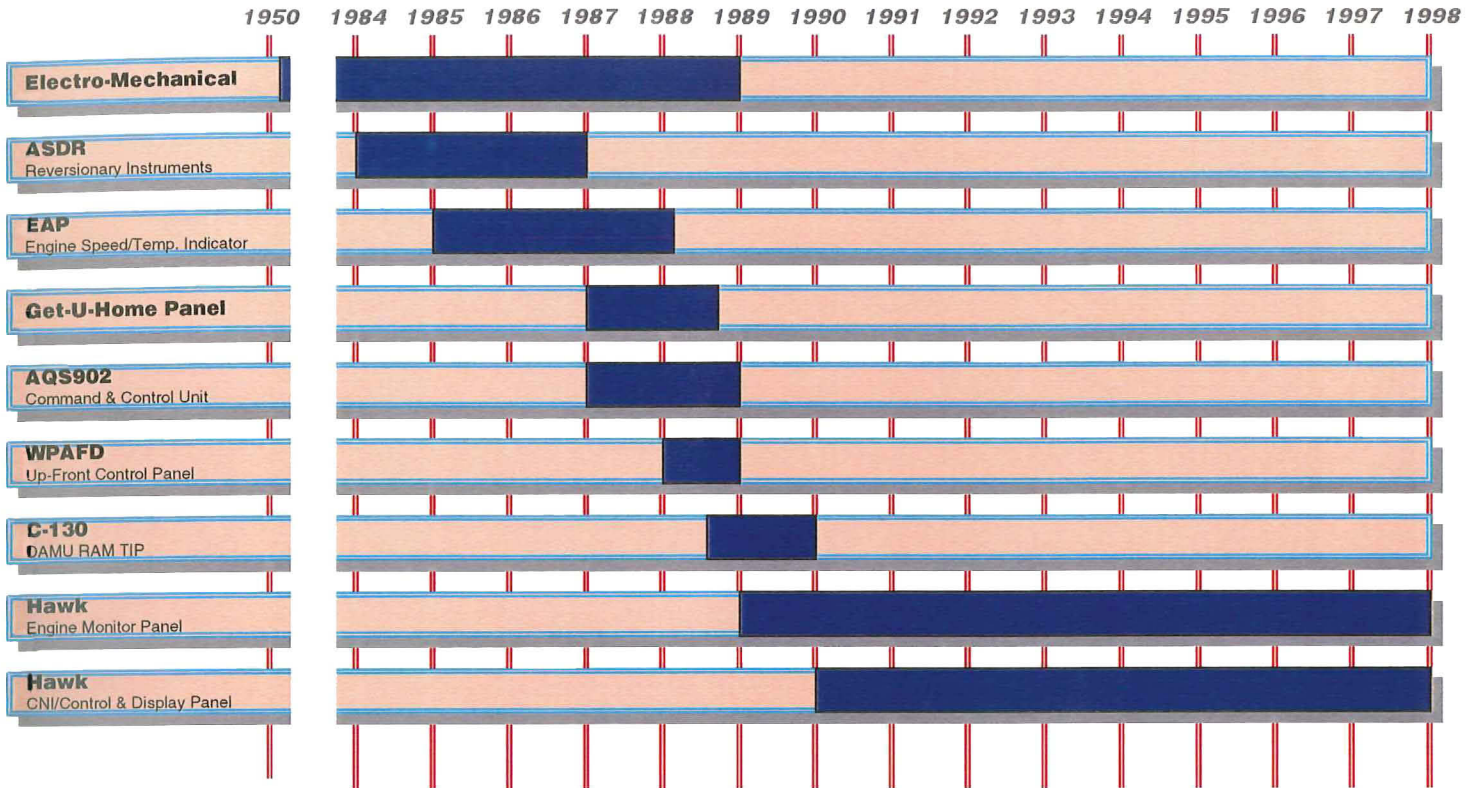


**Up Front Control
Panel**



**Display Avionics
Management
System**

Engine Management Displays




Engine Management

Product	Key Features	Applications	Outline Specification
EMP	<ul style="list-style-type: none"> Microprocessor based Liquid Crystal Display High readability in all lighting conditions High reliability Low power Reconfigurable software 	<ul style="list-style-type: none"> Fast Jet Trainer Transport Helicopter 	
CDU	<ul style="list-style-type: none"> Communications Navigation Control Unit Weapons Control Panel Reversionary Instruments Maintenance Data Panel 	<ul style="list-style-type: none"> Fast Jet Trainer Transport Helicopter 	<ul style="list-style-type: none"> 152 x 160 fully addressable LED matrix Dual redundant MIL-STD-1553 Data Bus 1553 remote terminal low power High contrast in all ambient light conditions

Mission Avionics Division

Business Scope/Products vs Platforms

	Head Up Displays	Air Data Systems	Helmet Mounted Displays	Night Vision Goggles	MFD/Head Down Displays	Mission Computer Display Processor	Digital Map Generator	Stores/Weapon Systems	Video Cameras & Recorders	Data Transfer Systems	Mission Planning
EF 2000	Contracted	Contracted	Contracted			Contracted		Contracted	Contracted		
Tornado	Contracted	Contracted	Demonstrator	Contracted	Contracted	Contracted	Contracted	Contracted	Contracted	Contracted	Contracted
Jaguar	Contracted	Contracted	Contracted	Contracted	Contracted	Contracted	Contracted				Contracted
Hawk	Contracted				Contracted				Contracted	Contracted	Contracted
A-4	Contracted	Contracted			Contracted	Contracted		Contracted	Contracted		
F-5	Contracted	Contracted			Contracted	Contracted			Contracted		
F-16	Contracted		Demonstrator						Contracted		
F-22	Contracted								Contracted		
C-130		Contracted					Contracted				
Harrier / AV8B			Demonstrator	Contracted	Contracted	Contracted	Contracted		Contracted		
F-7M	Contracted	Contracted				Contracted					
Mirage	Contracted				Contracted	Contracted					
Mig-21	Contracted	Contracted				Contracted					
JAS-37	Contracted					Contracted			Contracted		
C-17	Contracted										
Gulfstream	Contracted										
Apache		Contracted									
Cobra		Contracted									
Tiger			Contracted								

Contracted 

Demonstrator Programmes 