

The most important thing we build is trust



ADVANCED ELECTRONIC SOLUTIONS

AVIATION SERVICES

COMMUNICATIONS AND CONNECTIVITY

MISSION SYSTEMS

Overview

Cobham RAD Solutions (Europe) January 2015

Presenter:

Commercial in Confidence

What we do

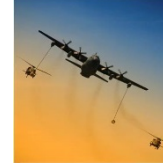
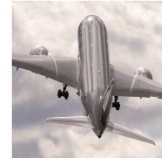
- Cobham protects lives and livelihoods with its differentiated technology and know-how, operating with a deep insight into customer needs and agility. The Group offers an innovative range of technologies and services to solve challenging problems in harsh environments across commercial, defence and security markets, from deep space to the depths of the ocean, specialising in meeting the growing demand for data, connectivity and bandwidth.
- Employing more than 12,000 people on five continents, the Group has customers and partners in over 100 countries, with market leading positions in: wireless, audio, video and data communications, including satellite communications; defence electronics; air-to-air refuelling; aviation services; life support and mission equipment.

Some numbers

- Annual revenue £1.8bn* in 2013
- £88m* company funded R&D in 2013 (6% revenue)
- Employ more 12,000 people on five continents



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Aviation Services

This Sector delivers outsourced aviation services for military and civil customers worldwide through military training, special mission flight operations, outsourced commercial aviation and aircraft engineering

Capabilities

- Air Traffic Display Systems
- Electronic Warfare Training
- Fly-In Fly-Out Services for the Natural Resource Industry
- Helicopter Services
- Maritime Surveillance and Border Protection
- Regional Airline Services for Qantas

Communications & Connectivity

This Sector provides: end-to-end avionics; law enforcement and national security solutions; wireless communication and test equipment for public safety and building infrastructure; and satellite communication equipment for land, sea and air applications

Capabilities

- Antenna Systems for Communication, Navigation, Electronic Warfare and Radar
- Cockpit and Cabin Communications
- Composite Technologies
- Public Safety and Wireless Communications for Infrastructure
- Satcom Equipment for Aerospace, Land and Maritime
- Wireless Surveillance Technology
- Wireless and Radio Test Solutions

Mission Systems

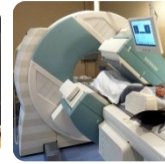
This Sector provides safety and survival systems for extreme environments, nose-to-tail refuelling systems and wing-tip to wing-tip mission systems for fast jets, transport aircraft and rotor craft, and remote controlled robots and fully-equipped bomb disposal vehicles for homeland security and military applications

Capabilities

- Advanced Restraint Systems
- Air-to-Air Refuelling Systems
- On Board Inert Gas Generation Systems (OBIGGS)
- On Board Oxygen Generation Systems (OBOGS)
- Unmanned Systems
- Weapons Carriage and Release

Five CAES Business Units

Sector Overview



Integrated Electronic Solutions

- Antenna and Radome Solutions for Airborne Communications, Navigation & Identification (CNI), Ground mobile, Launch vehicles & missiles/munitions
- Electronic Warfare (EW) / Electronic Support Measures (ESM)
- Multi-function Assemblies
- Precision Gimbals
- Microwave Components
- Waveguides
- Antennas
- Rotary joints
- Cables

Microelectronic Solutions

Integrated Microwave Assemblies (IMA) and Line-Replacable Units (LRU) for:

- Electronic Warfare and Electronic Support Measures
- Radar (Land, Sea, Air) including AESA panels and DREX
- Tactical Missile Systems
- Space (Launch, Bus, Payload)
- Force Protection
- Data Links
- Precision Guided Weapons

Motion Control Solutions

High reliability motion control products including:

- Slip Rings
- Twist Capsules
- Actuators
- Stabilized Platforms
- DC Motors
- Controllers

Applications:

- Spacecraft
- Aircraft
- UAV/RPV payloads
- Missiles
- Shipboard
- Ground Vehicles
- Homeland Defense

RFMW Solutions

Microwave & RF Devices, Components, Modules and Subsystems, including:

- Signal Attenuation products
- Microwave Diodes
- Integrated Microwave Assemblies
- JAN Military Discretes
- Synthesizers and Interconnect Subsystems

Product Brands:

- Cobham Inmet
- Cobham Metelics
- Cobham Weinschel
- Cobham Signal & Control Solutions

Semiconductor Solutions

- Standard HiRel ICs to include: Memory, μ Processor, Interconnect & Power
- Application Specific Integrated Circuits (ASIC) for Space, Commercial and Industrial Markets
- Application Specific Standard products (ASSP) & ASICs for Medical Market
- Electronic Manufacturing Services (EMS) to include: Build-To-Print (BTP) CCA & MCM; Build-To-Specification (BTS) MCM, Single Board Computer (SBC) & Microwave Filter; Systems Engineering; Supply Chain; Radiation Services

- The European office of Cobham RAD Solutions opened on 2 December 2013, then as Aeroflex RAD Europe Ltd
 - Located at Harwell, Oxfordshire, UK
 - The Harwell Enterprise Zone is a world-leading hub for technology transfer and innovative businesses as part of a joint venture by global property group Goodman, the United Kingdom Atomic Energy Authority and the Science and Technology Facilities Council
 - Organisations based on the same site include the STFC Rutherford Appleton Laboratory, ESA's UK office and ECSAT, Element 6's global innovation centre and around 150 others
- Cobham RAD Solutions
 - 168 Maxwell Avenue, Harwell, Oxfordshire, OX11 0QT, UK

- Engineering assessments and design advice for equipment operating in radiation environments
- Covering space, nuclear and industrial applications
- Materials and component testing
- Total integrated dose (TID) testing
- Single event effects (SEE) testing
- Irradiation with gamma rays, electrons, protons, neutrons, alpha particles and heavy ions
- Comprehensive test and measurement capabilities
- Detailed test reports with all measurement data

- Electronic components (ESA SCC/22900, Mil-Std-883 method 1019, RLAT and ELDRS)
- Polymeric and rubber materials (IEC544 and ASTM)
- Oils and greases (ISO 2137, IP50, IP32, ASTM)
- CCTV cameras
- Sensors and transducers

- Facilities include our own cobalt-60 cell at Harwell
 - dedicated to radiation testing, with in-situ monitoring and offering dose rates up to 100 Gy/hr (10 krad/hr)
- and access to other facilities as required
 - dose rates up to 50 kGy/hr (5 Mrad/hr), samples up to 2m³

Cobham RAD Solutions cobalt-60 cell



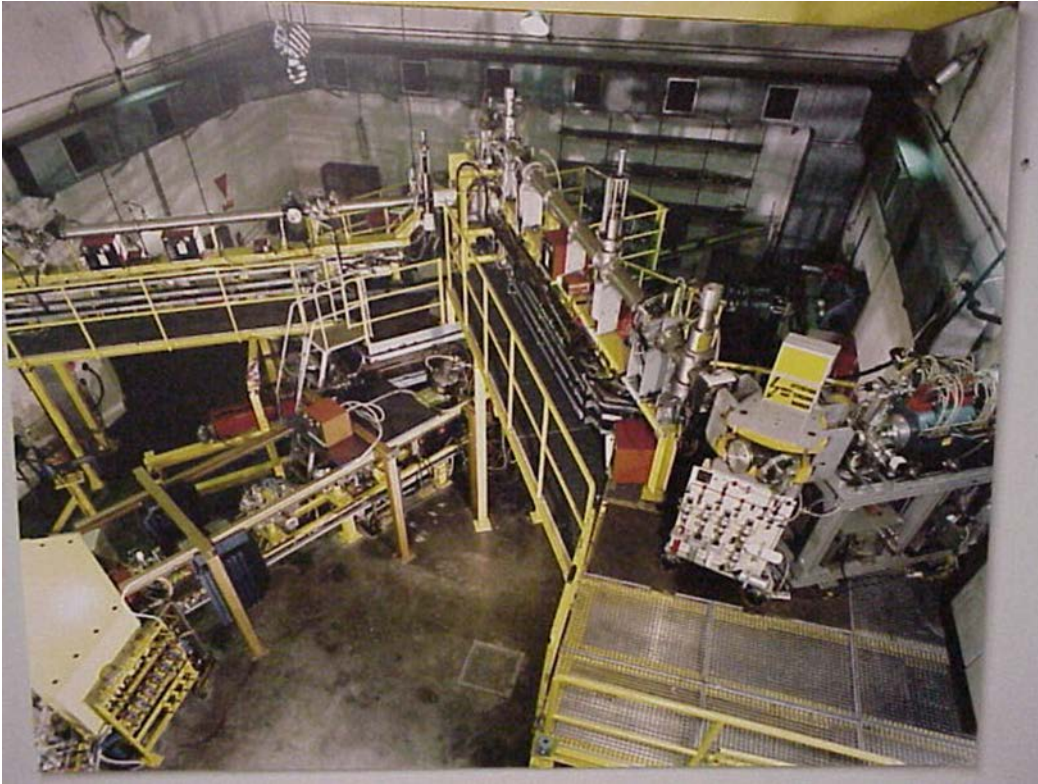
- Materials radiation testing

- Cobham RAD Solutions conducts numerous tests on materials for customers in the space, nuclear and industrial sectors



- Analogue and digital electronic components (ESA SCC/25100, Mil-Std-883 methods 1020 and 1021, JESD 57, ASTM F1192)
- Measurement of SEL, SEU, SET, SEB, SEFI, SEGR, etc.
- Protons and heavy ions
- Facilities available include :
 - PSI (Switzerland), UCL (Belgium), JYFL (Finland)
 - regular monthly access to TAMU and BNL (US) via Aeroflex RAD in Colorado Springs

European cyclotron testing facilities...



UCL, Belgium

RADEF, JYFL, Finland



- Electrons from 1 to 20 MeV
 - Dynamitron (1 to 4.5MeV), LINAC (10, 12 and 20 MeV)
- Low energy protons from 1 to 10 MeV
 - Materials on the exterior of satellites, solar cells, sensors
- Alpha particles from 2 to 15 MeV
 - Including matching the fission spectrum with no contamination of samples
- Neutrons
 - Accelerator beams (wide and narrow spectrum, 14 MeV, atmospheric spectrum)
 - Reactors (thermal and full fission spectrum)

- Full support offered for all radiation testing:
 - Pre-irradiation assessments
 - Sample batch/lot identification and sourcing
 - Procurement with full traceability
 - Test plan writing with customer/end-user approval
 - In-situ or stepwise test/measurement
 - Standard test routines or custom hardware and software development
 - Test boards, jigs and sample preparation
 - Irradiation in one or more facilities
 - Comprehensive data package, including a test report, data in spreadsheets and photographs, as appropriate

- The European office of Cobham RAD Solutions runs all electrical testing, performs all radiation exposures and writes all final reports without assistance from the US office, thereby keeping all radiation test reports “non-ITAR”
- Cobham RAD Solutions in Europe is able to leverage all non-ITAR electrical test packages previously developed at Cobham RAD in Colorado Springs. Cobham RAD currently has approximately 1000 test packages in place and validated for testing non-ITAR components to the manufacturer’s datasheet

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