



THE CUSTOMER AND THE FUTURE



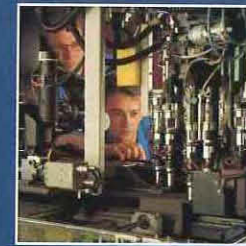
MARCONI
ELECTRONIC SYSTEMS



Tornado support rig



Solar panels for satellites



Surface-mounted components placement facility



Battlefield digitisation



Integrated defence solutions

THE CUSTOMER AND THE FUTURE

CUSTOMERS TODAY WANT TO DO BUSINESS WITH A NEW KIND OF DEFENCE ELECTRONICS AND AEROSPACE COMPANY

That company combines the ability to offer a strategic view of the customer's objectives with a detailed knowledge of the systems that will meet those objectives. It is a company which sees the battlefield, fighter plane, ship, submarine, satellite or air traffic management project as a complex 'system of systems'. It possesses the skills and experience to help customers to make sense of them all and put them together. It is a company which can demonstrate wide ranging capabilities in everything...

- from developing new stealthy materials for underwater reconnaissance craft to setting the standard in high frequency battlefield data communications
- from understanding advanced focal plane array in thermal imaging

- systems to producing 3D virtual reality training simulations for the maintenance of the complex electronics on a modern aircraft
- from leading the world in spacecraft launch guidance systems to redefining the software algorithms needed for airborne counter-measures
- from building some of the most advanced and successful naval vessels in the world to manufacturing the gallium arsenide chips which will be vital to the electronics solutions of tomorrow.

It is a company which spends millions each year in developing new technologies in those vital areas, and in keeping its software, hardware and project management skills up to

internationally accredited standards, so that the systems upon which its customers rely are the best they can be.

It is a company which has world-leading, specialist operations groups spread across the world. Between them, they cover all the major sectors of the defence electronics and aerospace industries including radar, electro-optics, avionics, command and control, simulation and training, marine and underwater technology, space, missiles, torpedoes, communications systems, data acquisition and processing, and systems integration. But it is a company for which those divisions are transparent, because today's customer wants to deal with one, whole, integrated company, drawing on its total strengths to deliver the best solution.





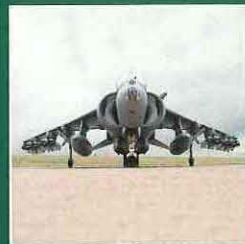
Astute class submarine for Royal Navy



Strategic command and control



Air defence command and control system



Harrier with Brimstone anti-armour missiles

Customers want to work with a company that knows how to forge and sustain lasting partnerships with the very best specialist sub-system and component suppliers, wherever they are in the world. It is a company which shares its development plans and its skills with those suppliers, so that what it delivers to the customer lacks nothing in quality or forethought. It is a company for which a contract with a customer does not begin on the first day of production, but with a painstaking process of working at the system engineering level, early on, to ensure that the real operational requirements will be met – on time and on budget. And it is a company which understands that a contract is not completed when a system is delivered, because today's customer wants to know that in-service support, advice, upgrades, refits and trouble-shooting are all part of a package which will make their investment futureproof.

understanding of the many complex components and sub-systems, and how they fit together. Thus, it can simultaneously be at work building an entire frigate or submarine while involved as a lead partner in a major multinational defence development. And it can offer a reassuringly long and detailed roll-call of successful in-service reference sites for systems and individual products in Australia, Brazil, Brunei, Canada, Germany, Greece, Italy, Kuwait, Malaysia, Sweden, Turkey, the UK, USA and dozens of other countries.

Above all, today's customers need a company they can rely on to be there, from year to year, from country to country. They look for a company that is among the biggest and best contractors in the world – inventing, absorbing, developing, adapting and integrating new technologies, and listening carefully to the marketplace, with but one aim: to satisfy customers.

THE MARCONI CUSTOMER CHARTER

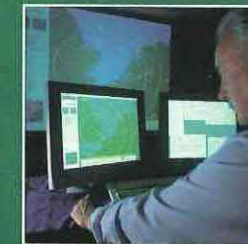
- * Make it easier for our customers to buy from us.
- * Only make commitments we fully understand and believe we can meet.
- * Meet all commitments to customers on time.
- * Satisfy customers' requirements with systems, products and services that are at world class standards of value for money, time-to-market and quality.
- * Ensure customers are treated professionally, promptly and courteously.
- * Build and maintain long-term, trouble-free relationships.
- * Promptly address and resolve customer complaints.

It is a company which is capable of playing either the leading role as prime contractor with the capacity to deliver an entire system; or as a major "sub-prime", on projects where it has unrivalled

THAT COMPANY IS
MARCONI ELECTRONIC SYSTEMS



Technology for helmet systems



Air defence radar systems



AS90 155mm self-propelled howitzer

The 1990s saw a revolution in military affairs, with increasing emphasis on flexible, fast-reacting armed forces which place great reliance on theatre information and battlefield digitisation. This knowledge is creating weaponry every bit as powerful in its way as long-range missiles and heavy artillery.

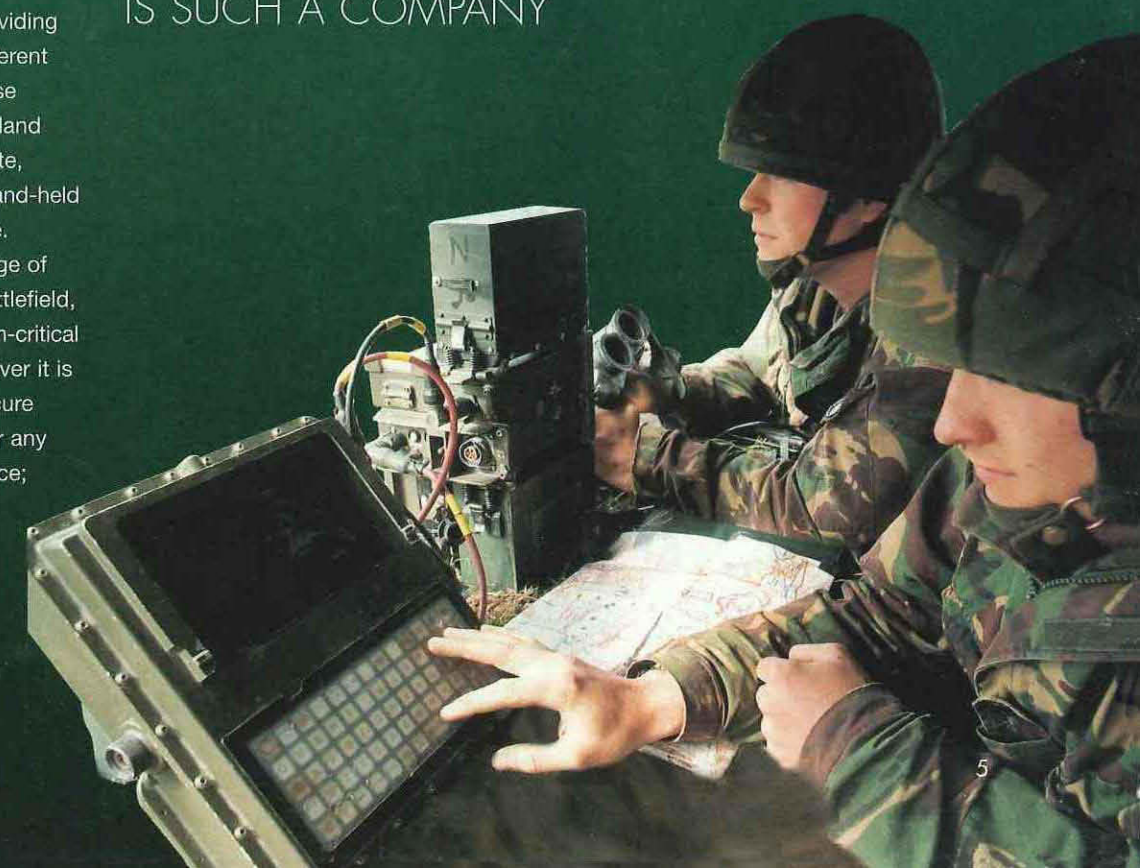
Among today's offerings for the digital battlefield, the wide range of custom-built command, control, communication, computer and intelligence (C⁴I) solutions typify the ways in which the many strands of Marconi's expertise can be pulled together to build world-leading systems. The development and integration skills of Marconi engineers are called upon to make best use of commercial-off-the-shelf (COTS) technology in constructing the applications themselves and providing the interfaces for the various different kinds of users. C⁴I solutions utilise crucial ever-changing air, sea or land battle data, gathered from satellite, airborne, vehicle-mounted and hand-held sources and updated in real time. Marconi's accumulated knowledge of the shape and dynamics of a battlefield, processing and delivering decision-critical information wherever and whenever it is needed; its understanding of secure communications techniques over any profile of distance and interference;

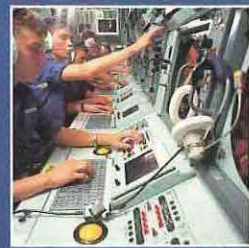
and its capability in design and manufacture to fulfil the hardware requirements of rugged and dangerous terrain – these are what make Marconi the systems of choice for many customers internationally.

But the new military reality requires more than the ability to produce systems that draw on a wide mix of skills. It also requires a new kind of approach to the customer. There are Ministries of Defence, on all five continents, which have large teams of Marconi experts working permanently alongside their own people at key

locations. The systems analysis and systems engineering elements have to be absolutely stable well before anything goes into production; the requirements have to be revisited constantly to ensure that expectations are continually met; and the relationship extends into the whole life of the project. Customers nowadays issue cardinal point specifications to their suppliers, and look to them to provide the best solution in terms of cost, time and effectiveness. Only companies which go out of their way to understand the operational objectives of the customer can claim to provide these answers.

MARCONI ELECTRONIC SYSTEMS
IS SUCH A COMPANY

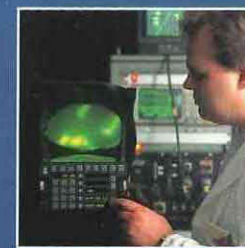




Naval training systems



Thermal imaging and TV airborne laser designator (TIALD)



Head-Up Display (HUD) for F22



Royal Navy Type 23 frigate



Ship's bridge simulator



Mine counter-measures

MARCONI ELECTRONIC SYSTEMS

DEFENCE – THE SECURITY OF NATIONS

Success in modern military engagement requires integrated systems and world class defence technology that works seamlessly – from weapons at the front line, back through battlefield communication equipment, right up to the highest level strategic systems.

Think of a front line, anywhere in the world, as crowded with electronic signals as it is with shell fire. A soldier sits at the front line, locating targets. To do so he uses a hand-held thermal imager from Marconi. Spotting the target, he can then communicate his findings to a variety of strike formations using the world's first HF mobile e-mail solution for armed forces, from Marconi. Over a Marconi portable satellite station, via a Marconi-made Skynet military communications satellite, he can talk to the highest command levels, who could then task a Marconi-made nuclear or

conventional submarine to fire a Marconi-supported cruise missile. Or, over a Marconi radio, made secure by advanced high speed voice and data encryption innovations from Marconi in Italy, the front line soldier can call up artillery support from Marconi-made 155mm AS-90 self-propelled or UFH towed howitzers. The fire mission is co-ordinated on a Marconi artillery command terminal. Using the same radio, he could call for naval fire support from a Marconi-built frigate, laden with Marconi radar, satellite communications systems and information systems, which will fire a 4.5 inch gun, made by Marconi.

The soldier can call for air cover, and as he does so, aircraft using mission planning systems built by Marconi, either in the UK or in America, can provide it, feeding flight plans directly into their aircraft via a Marconi data reader. The

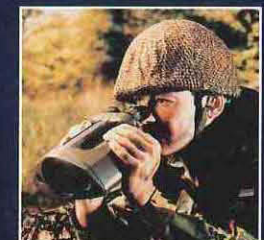


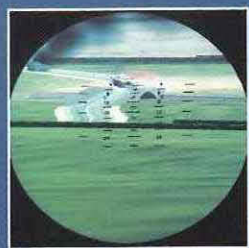
aircraft's Marconi stores management control system works out what is being carried on each pylon, and how best to use it. Then, the aircraft flies to its target using inertial navigation systems, or a forward-looking infrared system (in either case, from Marconi), the pilot co-ordinating his mission through a Marconi head-up or helmet-mounted display. At all times, the aircraft is controlled by a Marconi flight control system and protected by Marconi electronic warfare

systems. The target is then located, and engaged by firing a Marconi laser-guided munition directed by a Marconi TIALD pod, or air-to-ground missiles from among Marconi's PGM (Precision Guided Munitions) family.

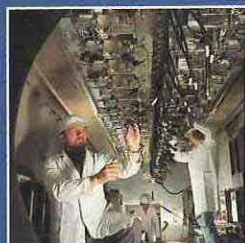
On land, in the air, or at sea – at the tactical, operational or strategic levels – Marconi Electronic Systems is a key provider of the vital tools that nations rely upon for their security.

LION night vision system

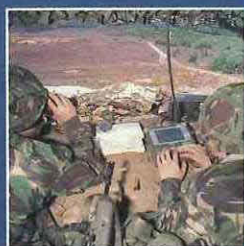




Tank gunnery simulator



Inside 3D Martello radar



Tactical command and control system



Naval missile and gunnery fire control system

INFORMATION IS SECURITY

In modern combat, data gathering and data application are the key differentiators – and it is here that Marconi's capabilities in information gathering, image processing, data assessment, and order distribution are the keys to the present and future battlefields. It is an area where Marconi is adding more and more capability through its product development, merger and joint venture strategy around the world.

Information warfare depends upon getting the data and then using it to the best effect – and Marconi provides the vital systems that make information warfare possible. For data gathering, Marconi produces unmanned aerial vehicles (UAVs), such as Phoenix, which is in front line service, and will be a key aspect of the UK's digitisation programme. UAVs can operate many tens of kilometres inside enemy territory, using thermal imaging cameras to locate, identify, and classify targets. Data is fed to a ground-based image processing centre. A sophisticated data link to one of the other key digitisation

systems, the Marconi Battlefield Artillery Target Engagement System (BATES), enables forces to process and evaluate the target priority, and to make up the wider battlefield intelligence picture. Marconi's experience in data handling and processing is also apparent in another key digitisation programme for air defence, the Air Defence Command Information System (ADCIS), which can control many of the world's surface-to-air missiles, (including, for example, the Patriot to which Marconi in Texas provides crucial support). This heritage in information gathering, processing, and distribution is now advanced in battlefield digitisation programmes in many NATO and other countries. Also of vital importance to the many national forces in NATO are the datalink programmes – such as JTIDS (Joint Tactical Information Distribution System) and MIDS (Multi-function Information Distribution System) – that make sense of the Babel-like electronic identification information specific to each of the fighting units, so as to allow interoperability, and avoid the perils of friendly fire.

A key example of the holistic approach to information warfare can be seen in Marconi's role in the TRACER/Future Cavalry and Scout vehicle. This involves a reconnaissance vehicle, equipped with the most modern of sensors, able to operate deep inside enemy territory, transmitting radio voice, data, and video images back, to build up a more complete battle picture. All this data can be handled by Marconi command and control systems, at tactical, operational and strategic levels, improving the efficiency and effectiveness of the ground force as a whole. And the CARESS de-mining initiative (an innovation which has benefits both for troops and for civilian populations) is an ingenious example of the marriage of advanced sensor capabilities (involving ground penetrating and HF radar), real-time data-handling skill, and application-building. This system complements other Marconi solutions in the field of mine-neutralisation and ordnance counter-measures, many of them developed by our teams in North America.



Directional infrared counter-measures system (DIRCM)



Helicopter Integrated Defensive Aids System (HIDAS) for WAH-64 Apache

SUCCESS IS IN THE AIR

In the air, Marconi Electronic Systems has an unrivalled pedigree in providing the enablers that are bringing the concept of "sensor-to-shooter" closer to active service. In mission planning, navigation, communications, air systems integration, aircraft and weapons management, targeting, and weapons delivery, Marconi is among the world leaders. Advanced combat aircraft such as today's US Navy F-14 Tomcat, tomorrow's US Air Force F-22, or the Eurofighter, rely upon Marconi's flight control systems to allow agile flight in combat. The company led the way in lifting the pilot's workload by becoming the world's leading designer and supplier of Head-Up Displays (HUDs). To date, over two thirds of the world's HUDs have come from Marconi. In tomorrow's advanced combat aircraft, the HUD will also be supplemented by the next generation display system to ease workload, the Helmet Mounted Display, selected for the Eurofighter and the German Tiger attack helicopter.

For navigation, Marconi provides internal or podded forward-looking infrared systems (FLIR) for strike aircraft such as the F-16 and the Tornado, and it is also a leading supplier of night vision goggles to dozens of air forces around the world. Other key systems for modern aircraft include electronic warfare, where Marconi produced the world's first fully integrated and automatic electronic warfare suite for the Harrier attack aircraft. This experience has come from a wealth of podded and internal EW fits, and is

progressing further through the advanced and comprehensive defensive aids system for the Eurofighter. Systems on the WAH-64 Apache helicopters further underline the range and depth of Marconi's involvement in electronic warfare programmes. Its Helicopter Integrated Defensive Aids System (HIDAS) will significantly improve survivability against a range of threats. As the HIDAS systems prime contractor, Marconi is responsible for the integration of all EW assets. Meanwhile, Marconi's antennae, receivers and electronic counter-measure systems serve, or will serve, on US armed forces' V-22 Ospreys, EA-6B aircraft and Super Hornet fighters, while Marconi's directional infrared counter-measures (DIRCM) transmitters will protect a wide range of helicopters and fixed-wing aircraft.

For targeting, Marconi radars, such as today's Blue Vixen in the Sea Harrier, or tomorrow's ECR-90 for the Eurofighter, represent the highest applications of technology in air combat. In weapons delivery, Marconi also has a major role: it can provide not only combat-proven laser targeting pods, but also advanced seeker-heads for missile terminal guidance. Combining these skills, Marconi also produces guided bombs and missiles, such as the successful PGM family of weapons, including the precision air-to-surface missile, Brimstone. Marconi provides a seamless web of capabilities and enabling technologies, which enhance the effectiveness of any combat air force.





Autonomous underwater vehicle



Underwater systems test facility



HMS Ocean



ADAWS 2000 naval command system



Spearfish advanced heavyweight torpedo



Naval electronics and weapons systems

SEA POWER

Marconi does not just build ships – it builds fleets. The company has a product range from aircraft carriers, submarines, and large auxiliary ships, to frigates, corvettes, and minesweepers. Surface combatant orders in Asia emphasise how successfully the company has adapted new engineering techniques to the shipbuilding arena, so as to be able to produce more sophisticated ships at ever less cost. Indeed, the UK Royal Navy's Type 23 frigates have fallen in cost whenever

ordered, and its amphibious warfare ships are substantially cheaper than their predecessors.

But Marconi does not just build ships – it supplies the critical electronics and weapons systems for those ships, and is a world leader in complex systems integration. Marconi has contracts for ongoing programme management, ship integration, test and evaluation, and configuration management support for the AEGIS air defence system being

fitted to all new US Navy cruisers and destroyers – as well as supplying the radio communications systems for the Arleigh Burke AEGIS destroyer. Today's Vanguard-class ballistic missile submarines, amphibious assault ships, and the new Astute nuclear attack submarines, establish Marconi as a genuine world class prime contractor in these areas, while naval command systems such as ADAWS 2000 are recognised as leaders in their field. With another leadership system, Marconi's

Seaspray family of radars will give the Kuwait Navy's Combattante patrol boats, and German and South Korean naval helicopters, anti-ship capability.

Marconi's mastery of the naval supply business is extended further by its position in the demanding sub-surface warfare environment. The underwater threat has not diminished with the end of the Cold War: rather, the proliferation of advanced conventional submarines, and of sophisticated mines, has underlined

its importance. Thomson Marconi Sonar is now Europe's number one sonar supplier, and is in the top rank of sonar companies world-wide. This Marconi joint venture produces all types of sonar, from helicopter dunking active sonar, to advanced passive towed array sets. In mine warfare sonar, Marconi has set the world standard, with current service in many European and Asian navies.

Complementary torpedo capabilities reinforce Marconi's status as a world leader in underwater systems. In terms of sophistication, a torpedo must be able to do everything an air-launched missile can, but in a much more demanding environment. Marconi has understood this, leveraging many years of accumulated research and experience from across the world in weapons homing, stealth and dynamics technology to design and produce an unequalled range of underwater weapons. From the proven operational stealth of Tigerfish, through the

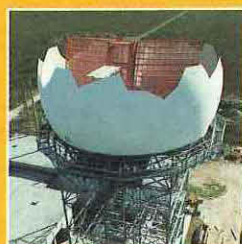
unsurpassed performance of the new generation Spearfish heavyweight torpedo, to the revolutionary Sting Ray Mod1 lightweight weapon of the next century, Marconi demonstrates know-how, capacity and engineering skill. It can design and integrate highly advanced weapons to meet underwater defence needs all over the world.

Indeed, there are few areas of today's defence where Marconi does not have a major or vital position. We produce whole weapons (with the through-life support and expertise which that phrase implies nowadays). Equally, we supply the crucial enabling systems that make the component parts of today's highly complex solutions work to their best effect. The company is able to exploit its wide-ranging technology base to produce the best equipment, for the most demanding customers, under the tightest guarantees, resulting in a high satisfaction rate. Where technology matters in defence, Marconi is in the vanguard.

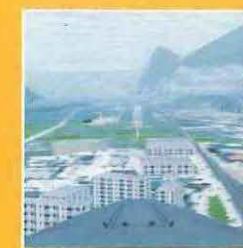




Hand-held thermal imaging camera for fire brigades



Air traffic control systems



Airport approach simulation



Hong Kong Airport information display unit



Economic Exclusion Zone monitoring solutions

TECHNOLOGY FOR SOCIETY

Marconi has acquired a vast range of systems capability by encompassing the commercial as well as the military marketplace. Many of the base technologies are common to both. Marconi's leadership in radar, for example, makes it a natural participant in the worldwide air traffic control business, enabling civil aviation authorities to maximise the safety, efficiency and profitability of their airspace management. Marconi radar technology also helps countries to protect their commercial interests as delineated by the UN-defined Economic Exclusion Zones. Not only does Marconi supply monitoring information and provide the radars and surveillance cameras used by coastguards and border authorities, it also builds many of the patrol vessels which uphold the zones.

Another example of the ever widening applications for Marconi technology involves its Intelligent Power Control System, which can serve not only armoured vehicles, but also trains, airliners and ambulances. The IPCS combines a databus-based utility control system with a power ring main to provide power distribution and management, load shedding, engine control, sensor monitoring and lighting.

Marconi leads the world in evolutionary fly-by-wire primary flight computers and in aircraft low pressure fuel pumps – and is the sole supplier of these vital components to the Boeing 777. Marconi Head-Up Displays, developed from world class military technology, are now being fitted to American Airlines 737-800 aircraft.

This position as a significant player in civil aviation is underscored by a distinguished history in the design and development of aircraft hush kits, such as that fitted to Learjet 20s, to enable them to comply with the US Federal Aviation Administration's stringent take-off and landing noise restrictions.

Marconi's airborne passenger communications systems, including the AirFAX and the cabin cordless telephone, are used by over 30 airlines around the world.





Medical imaging detectors



Boeing 777 uses Marconi primary flight computers



Transport simulation trainer

Before take-off, travellers in places such as the new Hong Kong International Airport benefit from Marconi's up-to-the-minute information display systems, which provide visible information generated by the airport's own complex flight scheduling systems. Displays of this kind also find application in train passenger and roadside information systems, such as the Arena project underway in Gothenburg, Sweden.

Much of the transcontinental communications and broadcasting capability that we increasingly take for granted today is due to the engineering skills of the Matra Marconi joint venture, along with other parts of Marconi. These teams have made Marconi a world leader in the design, manufacture and testing of satellites, spacecraft sub-systems and payloads for communications, remote sensing and scientific applications, together with earth station and ground support and control facilities. Marconi supplied the guidance system for the Ariane 4 satellite launcher. Marconi is also working with Loral on satellite orbit control, with Boeing to develop imaging satellites for agricultural, forestry and environmental applications, and with Alcatel to provide gallium arsenide solar power panels for microsatellites.

Marconi's sensor and data communication capabilities, so apparent in the military arena, have important applications in civilian life too, not least among the emergency services, where Marconi command and control systems help police and fire brigades to co-ordinate critical manoeuvres, thereby preserving lives. Fire-fighters also benefit from advanced electro-optic devices such as Marconi's lightweight thermal imaging cameras, which enable them to reduce risk to themselves in dense smoke, whilst increasing the rescue speed.

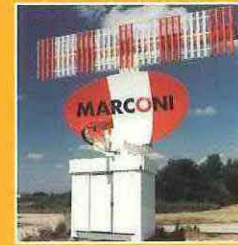
Protecting human life can often depend on longer-term, medical applications. Marconi is a world leader in providing key components for linear accelerators for cancer therapy, and lithotripsy machines for kidney stone destruction in hospitals around the world. Medical imaging and x-ray systems from Marconi are regarded as pre-eminent, particularly among dental and oncology specialists.

Heavy industry – manufacturing, oil and gas exploration and refining, power, steel fabrication – is still the engine of growth and prosperity for many advanced and advancing economies. Marconi offers technology which is central to the success of corporations

in these sectors. Pyro-electric and cooled detectors, for example, find applications in everything from gas emission detection, to early-warning for plant overheating, and pellistors for the detection of explosive vapours, thus ensuring public safety. In the fight against increasing pollution, Marconi has developed a diesel emission sensor, currently enjoying huge success around the world.

Software is a vital component in many of the solutions which Marconi provides to its customers. With such a sound base of skills in systems engineering and application development, it is natural that Marconi should have become deeply involved in those customers' important computing tasks. It can bring clear added value – irrespective of whether they are military or civil applications. The many IT projects undertaken by Marconi for the US Treasury Department illustrate this.

So much of today's hardware and software, and so many skill sets, cut across industry definitions. If Marconi has capabilities developed for one area but applicable to others, it will aim to deploy them to maximum effect. All that it requires to make that happen is a clear customer need.



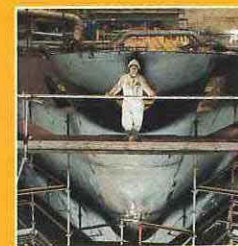
Co-mounted primary and secondary surveillance radars



View seen by student underground train driver

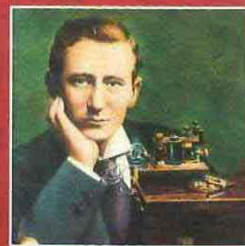


Cabin cordless telephone system

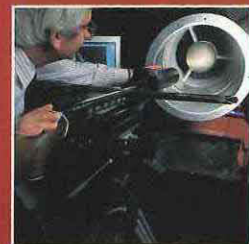


Specialised commercial ship building

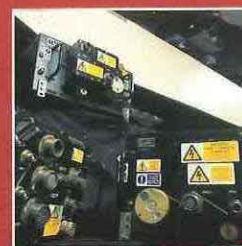




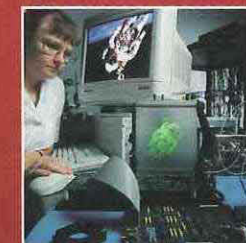
Guglielmo Marconi
1874-1937



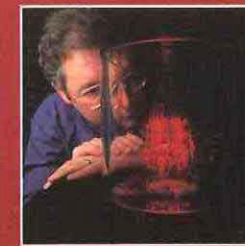
Jet engine monitoring
research



Blue Kestrel radar



Miniature displays research



Ground-breaking research
projects

A WORLD CLASS, WORLD BUSINESS: THE INGREDIENTS

How has Marconi arrived at this position of world leadership in so many of the dominant technologies of today?

It has done so through a complex and thorough process of examining its customers' requirements, around the world, and positioning itself to meet them. This involves major investments in technology and innovation, led by an understanding of what the market wants. It encompasses a major commitment to joint ventures, collaborations, and teaming with many of the most important companies in our sector, or adjacent sectors. And it all hinges on successfully developing and implementing practices and skills which encompass design, manufacture, electronic engineering, software quality, project management, commercial management and people management.

TECHNOLOGY, THE ROOTS OF TOMORROW'S HARVEST

The development of new technologies by Marconi is not an isolated, academic exercise. Innovation is a concept which only makes commercial sense if it is closely related to a clear understanding of what customers need to meet their real-world challenges – today and tomorrow.

That is a view which arises directly from a tradition beginning with Guglielmo Marconi, whose work began over a century ago. The invention of practical wireless communication is unquestionably among the most significant developments in the modern world.

Radar, mobile telephony and radio broadcasting are all key technologies which owe their heritage to Guglielmo Marconi, and where the company which bears his name still occupies leadership positions. It maintains those leading positions through investment in the

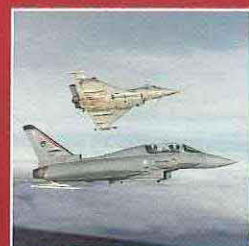
science which makes it happen.

Marconi can call on current work in its technology centres in, for example, the vital area of new radar development. This continues a tradition which dates back to 1937, when the Marconi Company set up the world's first national air defence radar network. Ever since, major events such as allied defence during the Second World War, the urgent operational radar requirement in the 1948 Berlin airlift, and dozens of major international wartime and peacetime emergencies, have set challenges which Marconi has met. Marconi's ground-breaking work continues today. Current research includes synthetic aperture radar instrument design, HF radar spectrum control, and receiving array design for over-the-horizon radar. The Jindalee Operational Radar Network (JORN) 24-hour monitoring system for the vast area of Australia's northern approaches is the kind of major, innovative project which exploits technological advances of this kind. Marconi's manufacturing

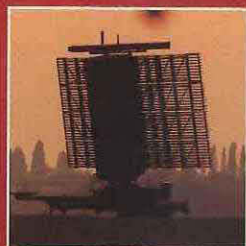




Vanguard class submarine



Eurofighter



Martello radar

facilities in Sydney, Australia, are responsible for producing many of the electronics and control sub-systems necessary to build such a complex network.

But radar is just one of many areas where the barriers of technology are breached to find answers for our customers.

In a joint venture with the UK Ministry of Defence, Marconi has flown what is believed to be the world's first uncooled Forward Looking Infrared System installed in a fast jet aircraft as a demonstrator to evaluate such technology for use as a future airborne navigation aid. Work on the development of stealth materials, on the creation of the "all-electric ship" concept, on underwater imaging, on navigational software algorithms, and on hundreds of other technologies for use in military and civil settings, are the fruits of many collaborations. The key participants in these are Marconi's highly qualified technical community, the system strategists in the Marconi customer-facing areas who interpret the developing needs of the market place and, often, research partners from outside Marconi. Collaborations with Carnegie Mellon University in Pittsburgh, USA, and York University in the UK, on various aspects of software development, are just two examples among many.

PARTNERSHIPS, FOR PROFIT AND DEVELOPMENT

This spirit of collaboration is not limited to the system development level. Marconi is constantly at work with a huge community of commercial partners on major implementation projects around the world.

The company's position as a trusted partner arises from its proven position as a leader in so many ways. Not only is it Europe's number one defence electronics business, but it is also the US's sixth largest defence electronics corporation, and the US's fourth largest systems integrator. Marconi's strength in the US and the UK comes from having been a domestic supplier for decades, and establishing a trusted relationship with the US Department of Defense and the UK Ministry of Defence. It has fostered similar relationships with defence establishments in the Middle East and in Asia. Furthermore, Marconi has manufacturing facilities in several European countries, in Malaysia, in Australia, and a major corporate base in Italy. This world footprint gives Marconi an excellent knowledge of many local markets, as well as local methods. It all adds up to making Marconi an excellent partner in a wide range of programmes, wherever they are based.

In the sonar industry, Marconi and Thomson-CSF have merged their activities to create a major force in world anti-submarine warfare and underwater vehicles. Marconi, Thomson-CSF, and DASA are teamed to develop the next generation of advanced fighter radars. Marconi and Alenia Difesa of Italy have formed a joint venture to leverage the maximum benefits from their respective capabilities in land-based and naval radar, command and control systems, missiles, simulation and training, and air traffic control. Matra Marconi is the joint venture which maintains Europe's participation in the highly competitive space satellite industry. Marconi and Northrop Grumman are teamed to provide the world's first infrared counter-measure systems, for the protection of aircraft against heat-seeking missiles.

MAJOR PROJECTS INVOLVING MARCONI ELECTRONIC SYSTEMS

- A SMALL SELECTION

Boeing 777 and 737, Airbus 320, JSF, Tornado, Jaguar, Harrier, Storm Shadow, F-14, F-16, F/A-18, F-22, Eurofighter, JAS-39 Gripen, Tiger UHU, EH-101 Merlin, B-1, B-2, METEOR, Mica, Brimstone, TRACER, Astute class SSN, Vanguard class SSBN, Gotland class SSK, Niteroi frigate, Type 23 frigate, Type 42 destroyer, Bruneian OPV, Horizon/PAAMS, CATT.



Satellite assembly and integration

Marconi collaborates in many technologies and programmes with corporations such as Lockheed Martin, Boeing, Raytheon and British Aerospace. These few examples give some idea of the breadth of Marconi's partnerships all over the world, and it is because Marconi possesses the best technology in so many areas that it is in demand as a partner in so many programmes including the new F-22, Joint Strike Fighter, and Eurofighter; on major naval projects such as Horizon; and in multinational land-based programmes such as TRACER.

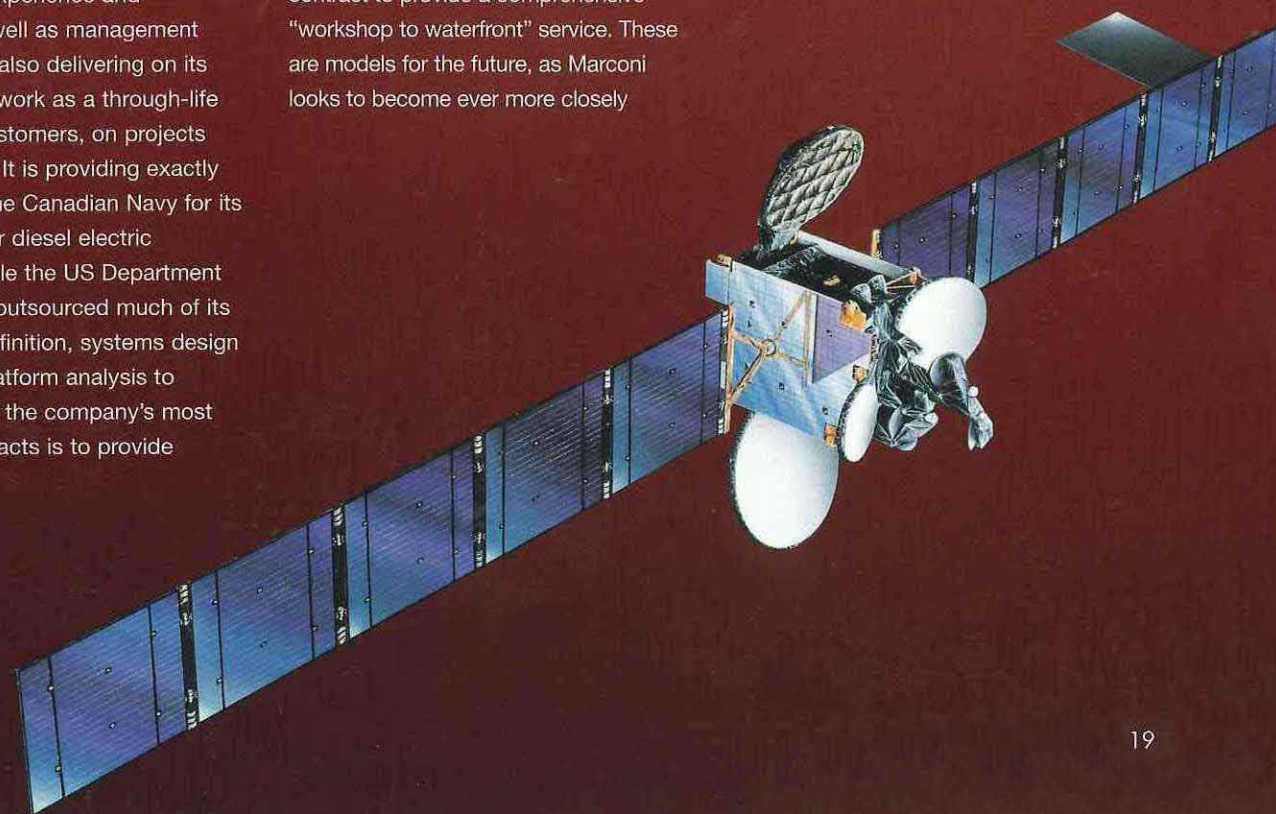
As a centre of experience and knowledge, as well as management skill, Marconi is also delivering on its commitment to work as a through-life partner to its customers, on projects large and small. It is providing exactly this service to the Canadian Navy for its fleet of Upholder diesel electric submarines, while the US Department of Defense has outsourced much of its requirements definition, systems design and strategic platform analysis to Marconi. One of the company's most significant contracts is to provide

ALLIANCES, JVs, AND TEAMINGS - A SMALL SELECTION

Alenia Difesa	radar, naval systems, missiles, flight control systems, electronic warfare
BAe	missiles, future aircraft technologies
Boeing	avionics for F/A-18, JSF, civil aircraft, agricultural satellites; missiles
DASA	electronic warfare, radar, flight control systems
Ericsson	ground radar; civilian telecommunications
Evans and Sutherland	visualisation system development
GKN Defence	advanced battlefield vehicles
Inisel	electronic warfare
Leica	digital terrain modelling
Lockheed Martin	avionics for F-16, F-22, JSF; synthetic environments
Loral	satellite navigation
Matra	space technology; missile components
MiG Mapo	aircraft technologies
Motorola	internet via satellite
Northrop Grumman	infrared counter measures
NovAtel Inc	global positioning system receivers
Raytheon	satellites, missiles, advanced battlefield vehicles, airborne targeting systems
Rockwell Collins	data links
Thomson-CSF	future radar, sonar
United Defence	advanced battlefield vehicles

operations and maintenance of test ranges and technical facilities at Eglin Air Force base in the USA. In the UK too, Marconi is market leader in adopting new, through-life contracting practices. Through its Spearfish torpedo programme, Marconi operates a fully integrated production and in-service support programme within a single contract to provide a comprehensive "workshop to waterfront" service. These are models for the future, as Marconi looks to become ever more closely

involved with the long-term aims of its customers in what are, invariably, massively complex programmes. In eastern Europe, many states look to Marconi for advice and needs analysis on everything from strategic defence planning and procurement, to training and support.





Naval command and control



Missile system prime contractor



Infrared counter-measures turret

A CULTURE OF SUCCESS

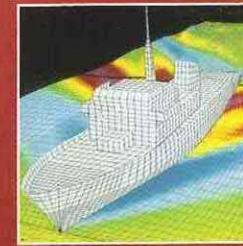
Marconi's internal practices and processes are geared to fulfilling its customer charter and bringing the best to market, in terms of innovation, application and quality. It has formed many cross-functional, integrated product teams to capitalise on the depth and breadth of expertise that runs across the many specialist divisions of the company. It is committed to using this knowledge to think clearly and laterally about the challenges set by customers. Proper planning and systems evaluation, as early as possible in the project process, are the best insurance against problems arising late in the project life-cycle, when they are more costly to correct.

This is the underlying logic for Marconi's substantial investment in the tools which tackle the fast-moving but critical area of integrated project management and engineering design. Just one example is the 'electronic audit trail' from system requirements, through detailed functional and implementation modelling at all levels, down to component level for Application Specific Integrated Circuits (ASICs) for missile seekers. In the Astute programme alone, the analysis and planning which underpin the project are based on the work of more than 350 highly-qualified systems engineering staff, with electronic links for real-time iterative design and "virtual manufacture" of critical sub-systems, making true teamwork possible across multiple sites around the world.

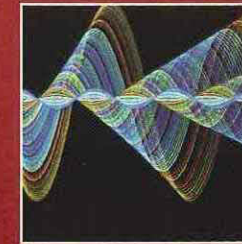
The team concept has transformed Marconi's manufacturing effort in many areas, and in the process has reduced lead times, increased machine utilisation and improved delivery performance.

Given the pivotal role of software engineering in virtually every corner of Marconi's business, the company is devoting time and resources to maintaining its skills in this area at world class standards. Led by the American Software Excellence Institute (SEI), all parts of Marconi are working towards the highest levels of the SEI's Capability Maturity Model.

This attention to detail and quality results from dedication to management best practice, without which no company can aspire to world class status. Marconi has adopted the Business Excellence Model (BEM), pioneered by the European Foundation for Quality Management, and based on benchmarking against the business practices of many of the world's most successful organisations. The BEM serves as a common driver for setting targets and judging achievements across all areas of a business's performance. It has instilled a culture of continuous improvement, in which today's performance, however good, can always be bettered tomorrow.



Computational fluid dynamics



Digital signal processing - acoustic

The success of initiatives of this kind and the atmosphere of team effort depend, above all, on people.

Many Marconi sites have won, or are working towards, accreditation by external standards bodies for people development, employee involvement and internal communication - standards such as *Investors in People* in the UK. And Marconi's own worldwide *People*

Achieving Together programme is a key tool for every one of its 50,000 employees to realise their career potential, maximise their learning opportunities, and ensure their well-being, as part of a successful and forward-looking organisation. Marconi Electronic Systems looks to obtain and retain the best people it can. It recruits more and more graduates each year from the world's major seats of scientific learning. It develops people through on-the-job training, mentoring, traditional classroom teaching and interactive initiatives such as *Matra*

Marconi's pioneering Space School. It is committed to giving its staff the maximum opportunity to move around, geographically and functionally, within the company. It undertakes to reward its people for their skills and their contribution, and to listen and act on their feedback and suggestions.

In doing all of these things, Marconi Electronic Systems is committed to fulfilling its Employee Charter and, in the process, to nurturing the men and women who can sustain the company's world-leading positions in so many areas.



MARCONI ELECTRONIC SYSTEMS: COMMITTED TO LEADERSHIP

- Marconi produced the world's first military digital fly-by-wire system (1981), the world's first civil fly-by-wire (1983) and the world's first fly-by-light system (1988).
- Marconi has supplied over 1000 Data Acquisition Systems for the US Air Force's C-141 Starlifter and C-130 Hercules fleets.
- Marconi holds the record for on-time delivery of US military HUDs – unsurpassed by any other Lockheed supplier.
- Marconi, now in joint venture with Thomson, is the largest sonar supplier in the world, having supplied nearly 50 of the world's navies with sonar, and designed and produced the world's first full military, damage-resistant FDDI highway for sonar systems.
- Matra Marconi Space satellites have been in orbit cumulatively for over 200 years.
- Matra Marconi is the builder of all Europe's earth observation satellites.
- Marconi designed and built the first operational Towed Radar Decoy in the world.
- Marconi's Brimstone is the first adverse weather day/night autonomous anti-armour weapon in the world.
- Marconi designed and implemented the largest command and information system so far supplied to the Asia Pacific region.
- Marconi developed the world's first airborne IFF (Identification Friend or Foe) system and invented encryption of IFF information.
- Marconi's JORN radar system in Australia sees 6% of the earth's structure.
- Marconi's ECR90 radar has 27 separate processors running 450,000 lines of real-time code.
- Marconi developed the first fuel system for supersonic aircraft.
- Marconi supplied the world's first Head-Up Display in 1962 and has now supplied more than 11,000 HUDs for over 50 aircraft types.
- Over 1,000 Marconi simulation and training systems have been supplied world-wide.
- Marconi's Spearfish torpedo is the same weight as a Rolls Royce car, but can do a full "U" turn in four seconds; has the same engine power as a Formula 1 racing car, but is quiet enough to detect a ticking clock; can search the equivalent of 100 million Olympic size swimming pools in one run; and its guide-wire length is equivalent to several times the height of Mount Everest.
- Marconi has designed, developed, produced and supported high technology seekers for every one of the UK's six radar guided missiles – Sea Dart, Sky Flash, Sea Skua, Sea Eagle, Alarm and Brimstone.



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Mr D V Golding
PROJECT CONTROL
560 TECHNICAL RESOURCE
Mission Avionics Division

970/AEC/SW/

November 1998

Dear Colleague

I am pleased to be able to provide you with a copy of the latest Marconi capability brochure, "The Customer and The Future".

The brochure provides a comprehensive overview of the wide ranging competencies of Marconi Electronic Systems, the markets that we serve and the products and services that we offer.

I hope that you will find the brochure a useful tool in keeping your own awareness of our Company's capabilities current and in assisting you in dealings with customers and potential new employees.

Best regards.

Yours sincerely
Marconi Electronic Systems Limited



Allan E Cook
Group Managing Director
GEC-Marconi Avionics Limited

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