The Ultra Electronics Group manages a portfolio of specialist capabilities, generating highly-differentiated solutions and products in the DEFENCE & AEROSPACE, SECURITY & CYBER, TRANSPORT and ENERGY markets, by applying electronic and software technologies in demanding and critical environments to meet customer needs.

Ultra businesses constantly innovate to create solutions to customer requirements that are different from and better than those of the Group’s competitors. By applying these differentiated solutions to a wide range of international platforms and programmes, Ultra has built an exceptionally broad range of specialist capability areas. Where the Group has a number of complementary capabilities it can also combine these to offer wider solutions. Furthermore, the products, capabilities and the associated domain expertise uniquely position Ultra to be able to provide system and sub-system solutions. These solutions are underpinned by through-life management support offerings that ensure the capabilities are delivered and sustained in service. The Group has an active programme of reinvestment of funds to strengthen its capabilities in its specialist markets.

Ultra offers solutions to its customers through the design, delivery and support phases of a programme. Ultra’s businesses have a high degree of operational autonomy so that they can provide exceptionally agile and responsive support to customers and partners normally associated with a smaller business. These benefits of customer focus and agility are augmented by the access to wider and complementary technology and expertise that lie elsewhere in the Group and by Ultra’s strong financial position.

Ultra is an international provider and integrator of critical systems and software to operate, optimise and secure both today and tomorrow’s transport and energy infrastructure.

Ultra’s broad range of specialist capabilities

Ultra focuses on developing specialist capabilities that provide highly-differentiated solutions to customers’ requirements. Eight clearly defined market segments allow Ultra to provide more complex offerings from across the full range of the Group’s capabilities. The eight capability segments are:

Underwater warfare
- Capabilities related to underwater warfare covering military, paramilitary and civil domains. These include transducers, hydrophones, sonobuoys, sonobuoy receivers, towed arrays, periscope detecting radars, torpedo defence systems, acoustic countermeasures, and surface ship sonar systems.

Maritime
- Capabilities related to signal and power management, operating, controlling, supporting and maintaining maritime (surface and sub-surface) military platforms, both manned and unmanned.

Land
- Capabilities related to operating, controlling, supporting and maintaining land military platforms, both manned and unmanned, and the dismounted soldier.

Aerospace
- Capabilities related to the design, manufacture, production, operation, support and maintenance of commercial and military aircraft, both manned and unmanned.

C2ISR*
- Capabilities related to C2, Security and Surveillance solutions, covering both military and civil domains as well as military Electronic Warfare, reconnaissance and targeting systems, and forensic solutions for law enforcement.

Communications
- Capabilities related to the secure communication and timely exchange of data, voice and video information providing some of the most capable communication systems, platforms and integration support in the world.

Nuclear
- Capabilities related to nuclear, covering both civil energy, national radiation monitoring systems through defence to radiation monitoring on technical platforms.

Infrastructure
- Capabilities related to airport and airline information systems, rail transit power conversion and control, as well as non-nuclear civil energy related capabilities.

2016 revenue by segment

2016 revenue by market segment

Did you know?

Ultra’s broad range of specialist capabilities are positioned on over 350 platforms and programmes worldwide, often in high integrity or safety critical applications.

To see how Ultra’s capability segments map to each business, see pages 13-14.
Ultra provides the only FIPS 140-2 Level 4 Hardware Security Module for high assurance digital signing and key storage mechanisms.

SECURE WIRELESS MESH NETWORKS
Ultra’s AirGuard wireless solutions securely connect enterprise infrastructure and sensor systems by leveraging an innovative, self-forming, self-healing, route-optimised mesh structure. The non-proprietary technology can be quickly integrated, enabling “plug and play” implementations that are highly secure – improving communication reliability while cutting costs.

Key features:
- Certified secure
- High-levels of data protection
- Rugged form factor
- Designed to withstand harsh environmental conditions
- Self-organising
- Requires no manual configuration
- Simply power up access points
- Self-healing
- Re-routing is automatic, ensuring always-on availability
- Interoperable

Quick and inexpensive systems adapt readily to custom requirements.

HOLDERS OF UK SMART INFRASTRUCTURE CAPABILITY
Ultra has extensive infrastructure domain knowledge across energy and transportation sectors combined with world class expertise in secure network solutions and key management capabilities for the protection of military, public sector and enterprise systems. Capabilities include:
- Extensive infrastructure domain knowledge
- Integrated information management systems
- Smart building and energy management
- Resilient power management, power dense motors, control and energy storage
- Secure localised network communications for measurement and control
- Protection of critical energy and transport infrastructure

This leads to differentiated offerings in areas such as cyber-secure airport operational systems, resilient trackside power and smart signalling and smart grid security, power resilience & management. In addition, Ultra has a track record in the provision of certified End Cryptographic Units with key capabilities to secure information at the highest level of classification within government. This includes the only FIPS 140-2 Level 4 Hardware Security Module for high assurance digital signing and key storage mechanisms.

SMART GRID CONTROL SYSTEMS
Ultra provides solutions which support delivery of the evolving Smart Grid sector including resilient power systems and simple encryption modules. Ultra additionally supports the North American Electric Reliability Corporation Critical Infrastructure Protection (NERC-CIP) plan. Ultra’s products meet all applicable standards to ensure secure interoperability with devices and applications. Validated encryption and authentication protocols with hardware accelerators ensure critical national operations, requiring high levels of security and high throughput, are protected. Ultra’s physical security solutions make compliance with CIP standards affordable and easy, without having to hire excess network security professionals or station monitors.

TRANSIT INFRASTRUCTURE SYSTEMS
Ultra has designed and developed radio leading-edge services for the transportation industry, and behind every key radio system supplier, an Ultra wireless product is the communication engine. The Group’s solutions cover a diverse range of applications from intelligent traffic signalling and prioritisation systems to wireless video applications, ensuring passenger safety on board both trains and within the platforms.

Ultra supplies a range of high performance wireless video and telemetry transmission systems to support digital CCTV monitoring for security within the station and data transport for the public information boards, as well as train-to-platform safety monitoring solutions. In addition, Ultra has also supplied communication solutions which enable Network Rail passenger information systems. These consist of fully-configurable radio modem supporting synthesised VHF and UHF options and a choice of over air protocols to balance throughput and data link integrity. Ultra also supplies road traffic light monitoring and prioritisation systems. These systems enable the sequence of the traffic lights to change as a bus approaches.

In this way a city’s transport authorities are able to ensure its bus fleet is given priority over other traffic and provided with clear passage through congested routes. This system was successfully deployed by Transport for London to support the delivery of the London 2012 Olympic Games. As part of this solution, over 17,000 units were manufactured, all compliant with the RTGS standard and fitted to buses and traffic lights across London.

ENERGYGUARD™
Ultra’s EnergyGuard™ solution provides organisations with the ability to securely protect building automation systems against physical and cyber intrusions and allows for more efficient management of facility systems and utilities. It utilises industrial control and communication technologies to provide secure monitoring and control of designated equipment such as HVAC systems, generators, and water treatment pumps. EnergyGuard™ integrates SCADA/DDC systems into a local monitoring, control and reporting architecture.

Ultra has designed, developed and manufactured energy-management solutions that help energy managers meet their demanding budget and efficiency goals.

EnergyGuard™ utilises an array of control communication technologies to provide secure monitoring and control of designated infrastructure equipment, such as HVAC systems.
Rail transit power

Ultra is a UK leader in the design and supply of high-quality DC power products for traction applications, offering sub-station equipment and complete turnkey systems.

DC SUB-STATION PRODUCTS

At the forefront of new developments in power conversion, Ultra continues to offer new ideas and implement best practice to achieve unrivalled performance and value for money. Equipment has been supplied to many high-profile UK and overseas transit authorities. Ultra’s long experience in electrical and mechanical design is supported by the latest software design tools. Designs are simple, based on decades of refinement and are commercially competitive. Ultra is the UK’s leading supplier of Transformer Rectifier Units (TRUs) and peripheral equipment for DC sub-stations.

TRANSFORMER RECTIFIER UNITS (TRUs)

Ultra has supplied TRUs to the traction markets for over 50 years. Ultra have been supplied to North America, Australia, the Philippines, Canada, Mexico, Greece and many other countries worldwide. More recently Ultra has supplied in excess of 600 TRUs to numerous main line, metro and tramway systems worldwide. Whilst the majority of requirements tend to lie within similar parameters, Ultra designs its products to meet the client’s specific electrical and mechanical requirements. Ultra’s engineers are conversant with a wide range of national and international standards. Ultra’s in-house engineering capability keeps it at the forefront of technology. Utilising these skills, Ultra provides its customers with highly reliable, efficient, proven, low-risk solutions.

TRACTION RECTIFIERS

Ultra’s new Kestrel range of traction rectifiers represents a standardised, modular design, low-cost solution, without compromise in quality or reliability. The environmentally-friendly Kestrel rectifiers, which are up to 40% smaller than equivalent-rated units, complement the bespoke range of traction power supply equipment manufactured by Ultra.

OPEN CIRCUIT ARM DETECTOR (OCAD)

Ultra has supplied TRUs to the traction markets for over 50 years. The possibility of electrical interference causing railway electronic signalling systems malfunction has always existed. One source of interference, to which low frequency signalling systems are particularly prone, is as a result of imbalance in traction rectifier bridge electrical performance. Such an occurrence may not have an impact from an energy point of view. However the resultant electrical interference could cause signalling system failure.

Ultra’s OCAD product has the ability to tolerate such interference without generating spurious alarm signals. OCAD has a proven operational track record and is specified by many of its clients.

AUXILIARY SUB-STATION EQUIPMENT

In addition to TRUs, Ultra also designs and manufactures a wide range of peripheral equipment such as control and protection panels, essential to the design of modern DC traction power sub-stations. Many products are designed specific to project requirements. These include drainage diode cubicles, mimic panels, earthing contactor cubicles, HV control and protection panels, marshalling boxes, pilot boxes, transfer panels, contactor cubicles, HVD systems, AC, DC and LV switchboards, SCADA, marshalling panels and other auxiliary equipment.

Ultra continues to offer new ideas and implement best practice to achieve economy and unrivalled performance.
Fuel cells keep traffic systems, from signs to cameras to lights, working continuously in any weather.

Energy management and storage

Ultra’s resilient power conversion and control systems combined with innovative energy storage solutions are the ultimate reliable power source for remote locations.

FUEL CELLS
Ultra’s Solid Oxide Fuel Cells (SOFC’s) provide clean, reliable power for remote sensors and communication systems and for backing up critical infrastructure such as railway crossings, traffic light systems and security systems. Lightweight models are designed to provide portable power in the field or be integrated into a user’s UAV platform for extended missions. The P250 is the ideal back-up power source for critical applications. It integrates seamlessly with grid, generator, battery, wind or solar power to deliver the assurance needed that critical applications will run, uninterrupted, when other power sources fail. It extends the functionality and reliability of remote applications so that cameras, sensors and surveillance equipment perform reliably, for longer periods of time.

The D350 is a lightweight portable power system developed for powering unmanned (UxV) systems and for providing portable power to soldiers. It delivers lightweight, portable power in the most austere and dangerous locations and enables longer flight times, longer missions and reduced weight burden. All of Ultra’s fuel cells operate on globally available propane or natural gas, a significant advantage for users.

POWER SYSTEMS
Ultra is an established supplier of innovative, high-technology electrical power conversion and control systems. Ultra specialises in compact, power-dense, low voltage sub-systems for renewable energy applications, where space is at a premium. Having provided high-integrity solutions to the mass transit and defence industry for over 50 years, Ultra brings the same level of integrity, assurance and compact design to customers in this sector. Products include a range of inverters and converters, solid-state frequency converters, variable-speed drives and bespoke power supplies, as well as specialist control consoles. Ultra also offers a range of power-dense motors and motor drives which use commercially available components, while delivering military levels of performance.

Ultra offers systems and sub-systems which provide value for money at initial acquisition, and offer significantly reduced through-life costs compared to the alternatives.

GAS TURBINE ELECTRIC START
Ultra is a pioneer and world leader in the design and supply of electric starting systems for industrial and marine gas turbines for both oil and gas installations and power generation. The Group’s Gas Turbine Electric Start (GTEC) systems replace the traditional hydraulic or pneumatic start systems and deliver significant improvements in efficiency and reliability as well as reduced through life costs. It is a simple, clutch-less system inducts motor that spins constantly with the engine, therefore can generate power as required for remote locations in ‘black start’ scenarios. Proven over hundreds of thousands of installed running hours all over the globe, Ultra’s GTEC is compact and light, providing a much lower design and installation burden.

POWER CONVERSION
Ultra’s solid-state electrical power supplies are more flexible and tolerant of damage than hydraulic systems, as well as being more reliable, smaller and lighter than rotary converters. Ultra has excelled in its ability to package power-dense static converters, whilst at the same time maintaining the required structural integrity, thermal performance and ease of maintenance. The rugged reliability of Ultra’s range of power converters, originally designed for the harsh military environment, is now available for renewable energy applications. Key aspects of this fit-for-purpose, highly modular design include EMC compliance, climatic rating and mechanical construction to withstand severe shock and vibration, operational reliability and a greater flexibility to meet non-standard requirements.

MULTI-CHANNEL ANALOGUE/DIGITAL MULTIPLEXERS
Ultra manufactures high performance DC stable-electric field sensor with low self noise levels. Application for these specialist sensors include the sea bed receivers that are used for imaging deep hydrocarbon targets using controlled source electromagnetic (CSEM) or Marine Magnetotellurics (MMT) techniques.

ELECTRIC FIELD SENSORS
Ultra offers systems and sub-systems which provide value for money at initial acquisition, and offer significantly reduced through-life costs compared to the alternatives.

Ultra brings high-integrity, compact design solutions in power conversion and control to the renewable energy sector.

visit: ultra-electronics.com
Infrastructure

Airport operational systems

Ultra is a leading provider of airport operational systems, passenger processing systems and ground handling and baggage management systems, delivered as integrated solutions or managed services, to meet the key business drivers of airports, airlines and ground handling agents.

Ultra has identified the key goals of airport operational performance improvement.

In a world where passenger numbers are rapidly increasing, Ultra offers a new vision of the airport: one that entails the highest possible responsiveness to customer needs. Passenger-orientation; entertainment-availability; the customised provision of information and assistance; the spontaneous modification of procedures and locations, according to changes in demand; all such aspects of a modern airport must now go through a qualitative revolution: this is only being possible only through a massive efficiency-increase in terms of basic operational execution.

Ultra has designed technologies for deployment across the entire airport; thereby encompassing its five constituent Spheres of Efficiency:

OPERATIONAL DATA
All air transport operational data is continuously gathered, maintained, and accurately updated with absolute reliability; and is thus available for instantaneous access at any time. This is achieved through UltraDB, which provides secure data-retention with complete reliability, availability, and serviceability; and through the Ultra Integration Broker, which gathers data-elements originating from other sources. Additionally, business-logic routines allow new data-elements to be derived from old, so that operationally interrelated values can be kept in synchronicity.

SITUATIONAL AWARENESS
The state of the entire airport is made comprehensively clear, moment by moment, and with fine granularity. The structured, tabular representation provided by data viewers allows relationships between key elements to be recognised at a glance; while ground-radar enabled, animated airport maps enable the visual pinpointing of physical resources and their current status. Milestone Dashboards track the timeliness of flights, as they pass through the stages of their airport-visit.

BUSINESS AND OPERATIONAL ADMINISTRATION
Accounts, privileges, and resource allocations are ascertained and modified without error; through purposed, interactive, graphical utilities. This gives each employee an appropriate degree of authorised access, while the current deployment characteristics of resources such as gates, stands, and check-in desks can be instantly determined and, where necessary, adjusted. Meanwhile, charge-calculation is managed with the highest accuracy and visibility of detail.

CUSTOMER SERVICE
Passengers’ well-being is supported through a consistent attentiveness to their persons, possessions, and dispositions. Thus, passenger experience is improved: through the effective management of check-in; of baggage-handling; and of flight status communication, through accurate, up-to-date information-displays.

BUSINESS INTELLIGENCE
Historic levels of operational efficiency are clearly identifiable; by means of comprehensive, detailed, interactive charts and strategic dashboards. Thus, efficiency-shortfalls are quickly determined and programmes of improvement more easily targeted and designed.

Users can create flights on the fly and immediately produce an invoice to be remitted to the pilot for payment before the flight departs; improving cash flow.

Passengers’ well-being is supported through a consistent attentiveness to their persons, possessions, and dispositions.

Accounts, privileges, and resource allocations are ascertained and modified without error; through purposed, interactive, graphical utilities.
Infrastructure

Baggage management systems

Deployed at over 50 airports around the globe, UltraTrak Baggage Management suite is an essential part of the baggage handling process for any airport. It provides class-leading segregation, reconciliation tracking, security and reporting capabilities helping to improve the passenger experience.

One Ultra customer saves more than £11m every year just in avoiding the repatriation costs of avoidable mishandled bags alone.

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Ultra's advanced passenger systems maximise efficient use of airport resources through common-use shared workstations and peripherals, offer full desk and self-service passenger and baggage check-in and provide an integrated airport operational and ground handling solution.

Ultra’s rigorous certification process tests the conformity of an application with its platform, to ensure a stable experience for end-users.

UltraCUSE allows many airlines to share the same workstations and peripherals, maximising efficient use of airport resources.

Hub airport differentiation via smooth and efficient bag reflighting
Mishandled baggage has been estimated to cost airports, their airlines, and ground handlers over $3bn each year. Furthermore, the reputational damage from passengers who suffer mishandled bags is huge, and widely voiced causing further detriment to airports and airlines. Resolving the operational issues caused by mishandled bags is very complex and costly. The UltraTrak Reflight module enables hub airports to truly differentiate themselves through the provision of smooth and efficient bag reflighting services.

The passenger then has the choice of waiting at the airport to collect their bags, which can reduce repatriation costs, or having their bag delivered to them when it arrives. This speed and efficiency both impresses the passenger and protects the airlines reputation. At one European hub, up to 70% of bags are reflighted automatically or via a remote reflighting screen without ever requiring extra handling.

Improved passenger experience at less cost to the operator
Customer studies have shown that the UltraTrak Reflight module reduced process time by more than 90% for bag reflighting, improving efficiency and saving money by minimising the number of process steps needed to reflight a bag. Customers using UltraTrak Reflight are finding their reputation is enhanced following direct feedback from passengers who are delighted to find their bags have made it with them following very short transfers. A customer who had previously processed all their refights at the end of the shift has found that UltraTrak Reflight enables them to process bags continuously throughout the day. Consequently when passengers reach their destination they find that whilst their bag had missed its connection it is already on its way.

Passenger processing systems

UltraCUSE is a robust and reliable solution, providing a secure environment and deployed using industry-standard technologies, it offers easy access to all airline and airport applications and easy migration onto the platform. As such, it delivers improved levels of service across airports, whilst reducing airport and airline operational costs. UltraCUSE provides a low-cost platform for supporting such systems as passenger processing applications, back-office airline and airport applications, such as baggage tracking, resource management, catering, flight operations, maintenance and weather, are all supported by UltraCUSE, as are security and government agencies, logistics and cargo businesses, as well as point of sale applications used by airport tenants. Ultra is innovating delivery of common-use solutions by using thin-client devices and VMware technology via UltraCUSEEnterprise. UltraCUSEEnterprise represents a move for common-use into a Saas (Software as a Service) model, allowing rapid deployment of new platforms at entire airports.

Complete common-use solutions
Ultra provides complete common-use solutions to airlines and airports with UltraCUSE, incorporating an agent-facing platform and fully supporting customer-facing applications, such as CUPS, enables which enable internet check-in. UltraCUSE allows many airlines to share the same workstations and peripherals, optimising use of airport resources and offering greater flexibility. It is scalable to any number of workstations and peripherals, distributed over local or wide-area networks, and includes quick and easy remote deployment at locations such as downtown check-in, hotels and rail stations.
Ultra has a broad portfolio of specialist capabilities which can be combined flexibly to generate innovative, highly-differentiated solutions, which are delivered in close collaboration with customers, partners and suppliers. Ultra is well positioned to support customers and provide solutions to complex needs across the Defence & Aerospace, Security & Cyber, Transport and Energy markets.

The matrix on the left shows how Ultra’s core capabilities map to each Ultra business.

**Underwater warfare**
Capabilities related to underwater warfare covering military, paramilitary and civil domains. These include transducers, hydrophones, sonobuoys, sonobuoy receivers, towed arrays, ptelesecope detecting radars, torpedo defence systems, acoustic countermeasures, and surface ship sonar systems.

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**Land**
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*Command & Control, Intelligence Surveillance and Reconnaissance*