



Dstl was formed on 1 July 2001 but we can trace the origins of our organisation back to 1664.

The following is a quick glance over that history.

Dstl is fully open about its current work and seeks to publish the results wherever possible; when it comes to our pre-history more information on the organisations and their work that became Dstl can be found in the National Archives.

**2014:** In May, Dstl presents a number of research projects at the 'Quantum Timing, Navigation and Sensing Showcase' at the National Physical Laboratory to bring to market the science behind the world's most accurate atomic clocks. James Kirby is appointed as Chief Executive Officer to Ploughshare Innovation Limited, Dstl's technology transfer company. Dstl signed up to the 5% club in January 2014, meaning that we commit to having at least 5 per cent of our workforce in graduate or apprenticeship schemes within the next 5 years.

**2013:** Piers White, MBE, is appointed as new Chairman to Dstl's technology transfer company, Ploughshare Innovations Limited. Dstl signs a strategic relationship charter with Research Councils UK, to work together in priority areas to maximise the benefits delivered by public investment in research, innovation and technology.

**2012:** Jonathan Lyle is appointed Chief Executive at Dstl, and Dame Wendy Hall and Dr. David Grant are appointed new non-executive members of the Dstl Board. Dstl analysts provide advice to officials at the Port of Dover to improve its ability to meet security requirements during the busy Olympic period. Working with the Natural Environment Research Council and the UK Hydrographic Office, Dstl prepares data collected by Royal Navy vessels to provide clues on climate change for environmental researchers. ProKyma, a spin-out from Dstl, announces a £482k award from the National Institute for Health Research Invention for Innovation programme to apply its technology to improve the detection of cancer and monitor its change during treatment. Scientists across the laboratory receive medals for their work on the front line. Dstl launches its PhD programme for 2013.

**2011:** Dstl staff enable the production of new protection systems, including protection against pirates for Royal Navy personnel and the final phase of the pelvic protection system, designed to mitigate the effects of improvised explosive devices on front line troops. Under a new agreement, Indian and British scientists combine their expertise on projects such as Unmanned Aerial Vehicles and factors affecting human performance on the battlefield. Dstl names new Chief Executive, Jonathan Lyle, and wins award for the best collaboration in the field of defence and security with Cambridge Design Partnership.

# Dstl's history



**2010:** Dstl becomes the focus for science and technology within the Ministry of Defence, from 1 April 2010, working with industry and academia to create battle-winning technologies - responsible for leading the defence science and technology research programme - designing, formulating and commissioning programmes with industry (large and small), academia and other research organisations. This change follows a review and consultation process.

**2009:** Dstl staff test and trial new multi-terrain pattern camouflage clothing, the first time in 40 years the Armed Forces changes its camouflage pattern. New Dstl headquarters, Minerva Building, opened by HRH Earl of Wessex at Porton Down. HRH The Princess Royal opens the newly-refurbished Grenville Building at Portsmouth West.

**2008:** Dstl works on a way to diagnose those likely to develop sepsis before showing symptoms, greatly increasing chances of survival. Scientists improve the accuracy of global navigation satellite systems (GNSS) such as the US Global Positioning System (GPS) using accurate weather reports.

**2007:** Dr Frances Saunders is appointed Chief Executive. The Chief Scientific Adviser opens the new Counter-Terrorism Science and Technology centre at Porton Down. Dstl Scientists devise a method to improve the accuracy of global navigation satellite systems (GNSS) by taking into account weather systems in the lower atmosphere, and then applying the latest compression technology to transmit this information to the GNSS from the satellite. Thanks to defence technology MRSA can now be diagnosed within 5 hours, instead of the conventional 48 hours.

**2006:** Dstl scientists produce a mouth spray that counters the plague. The spray works via inhalation supplying the body with antibodies which helps the infected treat themselves rapidly and effectively.

**2005:** Ploughshare Innovations is established with responsibility for sharing and exploiting Dstl's wealth of intellectual property outside MOD. 58 Dstl scientists and analysts are awarded with the Iraq Campaign medal. The award recognised the challenging and often dangerous work they completed. Dstl scientists publicise the entire genome sequence of Francisella Tularensis. This biological warfare agent is one of nature's most infectious killer bugs. The discovery will hopefully lead to defensive countermeasures against the pathogen. The expertise of the Forensic Explosive Laboratory is used immediately after the London bombing attacks in support of the Metropolitan Police.

**2004:** P2i (Porton Plasma Innovations) Limited is set up as a joint venture between Circus Capital investment fund and Dstl. This venture commercialises a plasma coating, originally designed to protect soldiers against chemical and biological attack.

**2003:** Operation Telic, in Iraq, was the biggest deployment of military scientists since WWII. Hundreds of Dstl's experts from 13 different departments in operational challenges were engaged during the conflict and more than 30 individuals were deployed to theatre in the Middle East. A conservation centre is opened at Porton Down, displaying wildlife that can be found on the range and also historical artefacts from the pre-chemical defence period that have been found on the site. Dstl rationalises its operating sites to four core locations; Fort Halstead, Porton Down, Portsmouth West and Alverstoke. This includes the closure of a Glasgow office.

**2002:** The Applied Research Technology Centre opens at Portsmouth West. The unit tests and evaluates new, up-and-coming technology in a safe, enclosed environment. Dstl develops revolutionary 'electric armour' that can resist rocket propelled grenades (RPGs) while remaining a practical size and weight for armoured vehicles to carry.

**2001:** Dstl is formed. The Defence Evaluation Research Agency is split in to two separate organisations: the Defence Science and Technology Laboratory (Dstl) and Qinetiq. DERA sites at Alverstoke, Bedford, Bingley, Chertsey, Christchurch, Farnborough, Fort Halstead, Glasgow, Haslar, Hurn, Malvern, Rosyth and Winfrith come under control of QinetiQ. 'Foot and Mouth' hits the UK. Dstl staff provide immediate expertise which helps reduce the effect of the catastrophe. Terrorist attacks in the US create extensive activity in Dstl laboratories. British troops are deployed to Afghanistan. Dstl analysts conduct tasks to help operations in casualty analysis, historical analysis, measures of effectiveness and combat assessments.

**1998:** F1 and V recombinant sub-units are patented as a vaccine against the plague thanks to scientists at Porton Down. The Non- Proliferation (Detection) team provides crucial technical support and advice to policy makers and implementers within the MOD and other government departments working on chemical and biological arms control.

**1997:** Thrust SSC is developed by staff at Farnborough. It breaks the land-speed record (763mph, 1.02mach) driven by a DERA military adviser.

**1995:** DRA becomes a division of Defence Evaluation and Research Establishment (DERA) made up of DRA, CBDE, DTEO (Defence Testing & Evaluation Organisation, formed from Boscombe Down and all the Test & Evaluation Establishments, such as Pendine and Shoeburyness), APRE and CDA (formed from DOAC and the analysis divisions from the former DRA).

**1992:** Staff at Malvern wins the Queen's Award for Technological achievement for the Multiplexing Mixture Liquid Crystal material enabling complex designs for LCD displays – its 13th in 14 years.

**1991:** The first NAMAS accreditation in the UK is given to the Health Physics Gamma Calibration Lab at Winfrith. A team at Malvern wins the Queen's Award for Technological achievement for High Precision Epitaxial Crystal Growth for advanced optoelectronic components, and a compact VLSI Distributed Array computer Processor for real-time applications. RSRE (Malvern), RAE (Farnborough and Bedford), RARDE (Fort Halstead and Chertsey) and ARE (Portsmouth, Portland, Rosyth and Haslar) become the founding members of Defence Research Agency (DRA). CDE becomes the Chemical and Biological Defence Establishment (CBDE). DOAE renamed Defence Operational Analysis Centre (DOAC).

# Dstl's history



**1990:** Teams at Malvern win the Queen's Award for Technological achievement for High-purity Metalorganic Precursors for Semiconductor and Optical Materials. Weapons Systems department develops an anti-landmine device called FireAnt which destroys a landmine without detonating it.

1990s Malvern Developments:

- Ferroelectric LCDS
- Zenith bistable displays (ZBD), the basis for modern LCD screens.
- Nanotechnology
- Mobile radio
- Information warfare
- Information forensics
- C4I (Command, Control, Communications, Computers & Intelligence), leading to 21st Century ISTAR (Intelligence, Surveillance, Target Acquisition and Reconnaissance).
- UWB (Ultra-wideband) radar, as demonstrated in the Mineseeker project.

**1989:** Scientists at Malvern win the Queen's Award for Technological achievement for the ELLA VLSI (Very Large Scale Integrated Circuits) design system and the SAW (Surface Acoustic Wave) device as used in modern communication and radar systems, such as mobile telephones.

**1988:** RAE is renamed Royal Aerospace Establishment, following its previous absorption of NGTE Pyestock.

**1987:** Staff at Malvern win the Queen's Award for Technological achievement for Gallium Arsenide Photocathodes. It is used in image intensifiers and the Pyroelectric Vidicon tube, with special emphasis on its application for use in the Fire Service's thermal imaging cameras.

**1985:** 'Super' RARDE formed from merger of RARDE (Fort Halstead), MVEE (Chertsey/ Christchurch) and PERME (Waltham Abbey/ Westcott).

**1984:** The Admiralty Research Establishment (ARE) formed from ASWE, AUWE and AMTE. The first drop tests on flasks and packages used to transport radioactive waste are carried out at Winfrith. Vehicles Department of the Royal Armaments Research and Development Establishment (RARDE) is formed at Chertsey from an amalgamation of MVEE and the Propellants, Explosives and Rocket Motor Establishment (PERME) at Waltham Abbey and Westcott, with the existing establishment based at Fort Halstead.

**1983:** Scientists at Malvern win the Queen's Award for Technological achievement for the Invention of the SPRITE (Signal Processing in the Element), CMT (Cadmium Mercury Telluride), IR detector and High Resolution X-Ray detector crystals for applications in body and brain scanners.

**1982:** Malvern wins the Queen's Award for Technological achievement for discovering the Pyroelectric infrared detector.

**1980:** Christchurch and Baldock establishments complete their move to Malvern. CDE Nancekuke closes. ELLA VLSI (Very Large Scale Integrated Circuits) design system is developed at Malvern.

**1979:** Staff at Malvern win the Queen's Award for Technological achievement for Biphenyl Liquid Crystal and the Malvern crystal growth equipment. MRE's biological work is transferred to CDE, becoming the Centre for Applied Microbiological Research (CAMR) of the Public Health Laboratory Service.

**1978:** Georgi Markov is killed from Ricin being injected into his thigh from the tip of an umbrella. Defence scientists at Porton Down are involved in this case and identified the toxin.

**1977:** The MacRobert Award is won jointly by RSRE Malvern and Malvern Instruments for the Photon Corelator. They also won the Queen's Award for Technological achievement. The Admiralty Marine Technology Establishment (AMTE) is set up from the amalgamation of ARL Teddington, NCRE Rosyth, RNPL Alverstoke, AML Holton Heath and AEW Haslar. The Propellants, Explosives and Rocket Motor Establishment (PERME) is formed from merger of RPE and ERDE.

**1976:** Queen Elizabeth II visits Malvern to celebrate RRE's merger with SRDE and SERL, and renamed it Royal Signals and Radar Establishment (RSRE).

**1973:** The Defence White Paper announces proposed merger of RRE, SRDE and SERL, all to be based in the Malvern area.

**1971:** Britain's first satellite 'Prospero' is launched thanks to work done at Farnborough.

**1970:** FVRDE amalgamates with the Military Engineering Experimental Establishment (MEXE) at Christchurch. The Military Vehicles and Engineering Establishment (MVEE) is established. Engine intake design and proving tests are carried out at neighbouring Pyestock site. The Military Vehicles and Engineering Establishment (MVEE) is formed from merger of FVRDE, Chertsey and MEXE at Christchurch. Queen Elizabeth II and the Duke of Edinburg visit Winfrith with the Minister of Technology and the Authority Chairman. They also visit Fort Halstead in November 1972.

**1970s:** SRDE starts work on Ptarmigan, the Forces' rear tactical communications system, where major elements are still in service.

1970s Malvern Developments:

- Neural networks
- Image recognition and analysis
- Blindfire and LASERFIRE surveillance systems for Rapier groundto-air missile system
- MASCOT and ADA software systems
- With USA, the ARPANET network, laying foundation for the Internet
- Information Warfare techniques

SERL Baldock Developments prior to merger with Malvern:

- Atmospheric pressure CO2 laser rangefinder, with Malvern
- Microwave GaAs-based Field Effect Transistor (FETs) Electron beam high power CO2 lasers
- Waveguide lasers
- Growth of semiconductors by the alkyl system, especially GaAs photocathodes.

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**1969:** CDEE is renamed Chemical Defence Establishment (CDE). Porton Down opens its doors to the public to try to drive out the misconception that secret work was being carried out on offensive matters. The open days also demonstrated the research involved in evaluating the hazards and effective methods of defence.

**1966:** AFES Haslar is renamed the Admiralty Marine Engineering Establishment (AMEE), before being taken over by NGTE in 1965, and then AMTE in 1979. Duke of Edinburgh visits the CDEE and MRE at Porton Down.

**1965:** AORE becomes the Defence Operational Analysis Establishment (DOAE). The Army Personnel Research Establishment (APRE) is formed at Queen's Gate site, Farnborough, from CEPRE and the Human Factors Division of AORE, West Byfleet. Clansman radio system begins development work. (SRDE). SERL begins work on photo-emitters that leads to the 1970s' GaAs:CsO photocathodes for the later generation image intensifiers.

**1964:** SERL starts work on the low-noise parametric amplifier, which became widely used in satellite communication and radar systems. Also, work began on pulsed excitation of gas lasers, leading to the discovery of the high efficiency CO<sub>2</sub> laser.

**1963:** Carbon Fibre is developed at Farnborough.

**1962:** AORG is renamed Army Operational Research Establishment (AORE). SERL begins work on 'Optical Masers', later Lasers, initially leading to the He-Ne ring laser proposed for inertial navigation systems.

**1961:** ARDE receives Royal Charter and is renamed Royal Armament Research & development Establishment (RARDE).

**1960:** The Admiralty Underwater Weapons Establishment (AUWE) is set up at Portland from an amalgamation of UDE and UWE. CSEE, West Byfleet, is renamed Clothing and Experimental Physiological Research Establishment, and rebased at Farnborough.

**1960s:** RAE's post-war contribution to the first ballistic missile Blue Streak at Farnborough leads to first stage rocket booster technology. RAE's Black Knight rocket fired from Woomera, Australia, tests ICBM design characteristics during re-entry. SRDE/RAE develops satellite communications, which leads to project SKYNET, and the very successful SKYNET 2. SRDE's work on passive viewing systems, especially image converters and then image intensifiers, comes to fruition with in-service equipment. It is declared that the UK Services has the best chemical defence equipment in the world.

The 105cm Light Howitzer (LH70) is developed at Fort Halstead.

1960s Malvern Developments:

- Liquid crystal materials and displays, in conjunction with Hull University and BDH.
- Lasers, particularly Carbon Dioxide, leading to LIDAR (Laser radar)
- Coral 66 software
- Algol 68 software
- Speech recognition

**1959:** Admiralty Surface Weapons Establishment (ASWE) is formed out of ASRE and Admiralty Gunnery Establishment (AGE).  
The Underwater Weapons Establishment (UWE) is established at Portland from an amalgamation of UCWE, TEE and UWLE.  
RRE proposes the First Integrated Circuit.

**1958:** RPD/RAE spins-off to establish The Rocket Propulsion Establishment (RPE) Westcott. MOD scientists at Porton Down work on finding ways to treat nerve gas poisoning in humans. The New Service respirator 'S6' is produced at Porton Down. Discovery of cadmium mercury telluride's potential as a thermal detection material revived interest in thermal imaging as a practical proposition with RRW taking the lead.

**1957:** RRE receives Royal Charter during Royal visit by Queen Elizabeth II, and is renamed the Royal Radar Establishment.  
MRD becomes Microbiological Research Establishment (MRE).  
The X-band CW travelling wave tube for GPO transmitter is developed at Goonhilly for the Telstar project, resulting in the world's first satellite communications project. (SERL).

**1956:** Concorde is put through aerodynamic wing tests of high and low speeds at Farnborough.

**1955:** The Armament Research & Development Establishment (ARDE) is formed from the merger of ADE and ARE, both based at Fort Halstead.  
CSTE and CEPRE merge to form Clothing and Stores Experiment Establishment (CSEE) at West Byfleet.

**1954:** Rain erosion testing creates leading edge material development at Farnborough.  
The Admiralty Gunnery Establishment (AGE) is formed at Portland.

**1953:** TRE merges with RRDE to form Radar Research Establishment (RRE).  
The Admiralty Oil Laboratory (AOL) is set-up at Cobham, Surrey, before being absorbed into NGTE Pyestock in 1977.

**1952:** FVPE and FVDE amalgamate to form the Fighting Vehicles research and Development Establishment at Chertsey (FVRDE).

**1951:** The facility at Nancekuke in Cornwall is opened. Sutton Oak closes.  
AME becomes Admiralty's Underwater Countermeasures & Weapons Establishment (UCWE), Havant, before later moving to Portland.

**1950:** HERE is renamed the Atomic Weapons Research Establishment (AWRE), initially based at Fort Halstead before a final move to Aldermaston in 1955.

**1950s:** The Larkspur radio series is set up. It is the Army's first VHF/FM radio set series (SRDE).

Malvern developments:

- Surveillance radar, leading to the modern development of the UKADR (UK Air Defence Region)
- Meteorological radar, as now used by the Met Office
- Infantry radars, leading to ZB298 and Super Shrimp
- Mortar location radars, highlighted by Cymbeline
- Air traffic control radar, leading to SSR (Secondary Surveillance Radar) and Collision Avoidance
- Electronic Warfare, as a consequence of the WWII's 'radio war'.

SERL Baldock developments:

- Two-and-a-half megawatt S-band magnetron transmitter for ASRE's Type 981 radar and TRE's Type 80
- 'Squeak'/'Chirp' radar built and demonstrated, leads to wide application modern radar systems
- Organometallic semiconductor, such as Indium Antimonide and Gallium Arsenide, work begins
- High Power 1MW/1kW X-band magnetron for missile guidance and tracking radars, such as 'Yellow River'
- High Power Multi-Cavity Klystron for frequency variable radar systems research at ASWE and RRE
- The Q-band continuous wave Doppler auto-follow radar built for evaluation of mm-wave missile guidance systems
- The pulsed neutron source for UKAEA to start the fission chain reaction, which later expanded into many civil applications.

**1945/50:** SERI concentrates on:

- Q-band magnetron (8.6 mm wavelength)
- Q-band Local oscillator
- Z-band wide bandwidth TR and ATR cell
- Ruggedised miniature valves for VT fuzes.

**Late 1940s:** TRE takes over ARL's post-war and wartime developments in infrared devices and equipments that leads to the development of the modern thermal imager and spin-off technologies.

**1948:** CDES is renamed Chemical Defence Experimental Establishment (CDEE). The Army Operational Research Group (AORG) is formed at West Byfleet from MORU and ORG (W&E).

ASE becomes Admiralty Signals and Radar Establishment (ASRE) and begins its move to Portsmouth site.

CRDD Waltham Abbey becomes the Explosives Research & Development Establishment (ERDE).

FVDD is renamed The Fighting Vehicle Design Department (FVDE).

The High Explosive Research Establishment (HERE) is formed at Fort Halstead.

The Clothing and Stores Trials Establishment (CSTE) is formed at West Byfleet.

The Clothing and Equipment Physiological Research Establishment (CEPRE) is formed at Farnborough.



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**1947:** The Admiralty Materials Laboratory (AML) is established at Holton Heath, out of the Control Laboratory of the RNCF, Holton Heath. The Underwater Detection Establishment (UDE) is formed at Portland from HMA/SEE.

ADD and ARD (Fort Halstead) are renamed Armament Design Establishment (ADE) and Armament Research Establishment (ARE).

**1946:** BDP becomes Microbiological Research Department (MRD) at Porton Down. It amalgamated out of AORG (WWII original), the Military Operations Research Group (MORG) and Operations Research Group (Weapons & Equipment) (ORG (W&E)). The Naval Construction Research Establishment (NCRE) is formed at Rosyth and Dunfermline out of AUW.

The National Gas Turbine Establishment (NGTE) is established at Pyestock, replacing Power Jets Ltd.

RAE absorbs GPE Westcott, as the Rocket Propulsion Department (RPD/RAE).

The Military Experimental Engineering Establishment (MEXE) is formed from the merger of EBE, EDE and ETE at Christchurch.

The Fighting Vehicle Design Department (FVDD) is formed at Chertsey out of The Department of Tank Design, MoS, alongside FVPE and WVEE.

MOD scientists at Porton Down conduct further investigations into war gases and nerve agents after Tabun was discovered in Germany at the end of the war.

W B Lewis, TRE's post-war Superintendent, establishes The Research Division, which begins the work on semiconductor research. It specialises in single crystals, computer development and work in infrared; the precursor to Malvern's post-war development.

ASWE (Admiralty Surface Weapons Establishment) at Portsdown Hill opens. ASWE had five out-stations in the Portsmouth area; Portsdown West, Eastney, Funtington, Alverstoke, Haslar and Ditton Park near Slough.

Portsdown West was always classed as part of Portsdown Main rather than an outstation. It housed the Electronic Warfare Division and the Communications Division. The Comms Division was responsible for the provision of robust communications for submarines and improving the utilisation of SATCOM assets. It also worked on Polaris and SSBN.

**October 1946:** Harry S Truman, President of the United States, awards A P Rowe, TRE's wartime Superintendent, the Medal of Honour "for exceptionally meritorious conduct" in promoting the development of electronics in wartime.

**1945:** World War Two ends.

The Services Electronics Research Laboratory (SERL) is established at Harlow and Baldock, as the research department for CVD.

The Underwater Weapons Launching Establishment (UWLE) is set-up in Bournemouth.

The Admiralty's MDD reforms as Admiralty Mining Department (AME) at Havant.

The National Aeronautical Establishment (NAE) is formed at Bedford; the following year it becomes Royal Aircraft Establishment (RAE) Bedford.

BDE is renamed Ministry of Supply Research & Development Establishment (MoS RDE), before being absorbed into RAE in 1949 and closure in 1986.

The Guided Projectile Establishment (GPE) is formed at Westcott.

Transonic & Supersonic aerodynamic research leads to English Electric Lightning (Farnborough).

BABS (Beam Approach Beacon System) is the first radar-controlled aircraft instrument landing. It is the forerunner of the system installed at Heathrow post-war. (TRE).

# Dstl's history



## Wartime discoveries at FHD:

SR 365 incendiary filling for ammunition – used by spitfires and Hurricanes in the Battle of Britain

Hollow-charge projectiles and demolition stores

Sub-calibre armour-penetrating projectiles

Evolution of explosives such as 'minols' range and Torpex (a mixture of TNT and RDX with aluminium)- used in the destruction of Tirpitz and the Ruhr dams

Devised the fillings for the 22,000 pound 'earthquake' bombs.

17 pounder gun with special ammunition

The famous 25 pounder anti-tank gun

Wombat Battalion anti-tank recoilless gun

ADEN 30mm gun

Range of anti-aircraft guns

**1944:** ADRDE is renamed Radar Research and Development Establishment (RRDE).

The Research Department, Royal Arsenal, based at Fort Halstead since 1942 is renamed the Armament Research Department (ARD).

Due to work analysing the debris from V1 and V2 weapons, the RAE is able to establish accident-investigation methods that limit the threat of weapons at Farnborough. ADRDE is renamed Radar Research and Development Establishment (RRDE).

No.10 Downing Street introduces the Army's first multi-channel microwave radio-relay system into service by SRDE just before D-Day.

Oboe and Gee make invaluable contributions to the successful navigation of the invasion forces to Normandy's beaches. (TRE).

**1943:** The threat of bacteriological warfare from Germany, leads to anthrax trials on Gruinard Island, an island off the coast of northwest Scotland.) The Admiralty Under Works (AUW) established at Rosyth starts work on the effects of underwater explosions on ships. The Torpedo Experimental Establishment (TEE) is established at Greenock, Scotland, before moving to Portland in 1959. A new 11ft by 8ft wind tunnel, which reaches speeds of up to 270 mph, is opened at Farnborough. Mine detector, no.3 is developed. It is the first hand-held mine detector using miniature radio techniques (SRDE). The first operational use of H2S, an airborne radar navigation and bombing aid and the first ground mapping radar (TRE). The first use of centimetric ASV by Coastal Command, leading to the demise of the U-boat threat (TRE).

**1942:** A new high-speed wind tunnel opens in Farnborough. It is used to test prototypes of early jets (Meteor) and the later marks of Spitfire at wind speeds up to 600mph. Following the Bruneval raid and fears of reprisal, TRE moves to Malvern College, ADRDE moves to Malvern Pale Manor (North Site), and SDRE moves to Christchurch. The Experimental Demolition Establishment (EDE) moves to Christchurch from Bovington and the Experimental Tunnelling Establishment (ETE) to Christchurch from Yorkshire. From the founding work of PMS Blackett and JS Hey on operational research, the Army Operational Research Group (AORG) is created. The Royal Naval Physiological Laboratory (RNPL) is set up at Alverstoke. The Fighting Vehicle Proving Establishment (FVPE) is established at Chertsey. The Wheeled Vehicles Experimental Establishment (WVEE) is formed initially at Farnborough, before moving to Chertsey in 1943. It is formed out of the Department of Tank Design, MoS.

The first operational use of Gee aircraft navigation system with Bomber Command. (TRE).

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The first operational use of Oboe, a precision ground-controlled blind bombing system. (TRE).

Fort Halstead once again becomes habitable after the bomb threat reduced. Roads are re-laid and buildings built around the site.

The Chertsey site in Surrey (originally called RAF Chobham) tests tanks on Chobham Heath. A section of the experimental wing in the Department of Tank Design moves from Farnborough to a new purpose-built camp at Chobham. This section is named FVPE (Fighting Vehicles Proving Establishment).

**1941:** The Farnborough site becomes an 800-acre modern airfield that holds new hangars, a runway and workshops.

SEE moves to Warnham Court, Horsham, and is renamed the Signals Research and Development Establishment (SRDE).

Admiralty Signals Establishment (ASE) is formed at Haslemere mainly from the Experimental Department of HM Signal School, Whale Island.

HM Anti-Submarine Experimental Establishment (HMA/SEE) is formed at Fairlee, Scotland, from the ARDU, Portland, before moving back to Portland in 1946.

The Admiralty Signals Establishment (ASE) develops the Type 271 radar, the Navy's first microwave radar.

50-cm Naval fire-control radar based on GL Mk1 is used by HMS Suffolk in tracking the Bismarck. (HM Signal School/ ASE).

**1940:** Decontamination method operations in tropical areas leads to research into the insecticide DDT at Porton Down and in Africa.

Research into biological warfare also starts at Porton Down.

AMRE moves to Swanage, renamed firstly Ministry of Aircraft Production Research Establishment (MAPRE) in May and then Telecommunications Research Establishment (TRE) in November.

Biology Department, Porton (BDP) is set up.

The Royal Ordnance Factory is renamed Chemical Research & Development Department (CRDD), War Office.

The Department of Tank Design and Ministry of supply formed at Woolwich from the Design Department, Royal Arsenal, Woolwich.

MEE becomes part of Department of Tank Design, MoS.

The first working Magnetron (E1189) is developed by Boot and Randall at Birmingham University (under Admiralty's Coordination of Valve Department (CVD) contract) and allows radiolocation to operate at 10cm. This kicks off the 'centimetric revolution' in radiolocation.

The first 10cm RDF echoes received from an aircraft. (MAPRE).

The first IA Night fighter operation is conducted by Ground Controlled Interception (GCI). (MAPRE).

ASE Valve Division develops the first microwave reflex Klystron, later used in Type 271 naval radar (ASE) and the airborne H2S equipment. (TRE).

PPI (Plan Position Indicator) is now a 'working-weapon' (Watson- Watt's term). (ADRDE/TRE).

**1939:** World War Two starts.

BRS moves to Dundee and becomes Air Ministry Research Establishment (AMRE) in September.

ADEE moves from Biggin Hill to Christchurch and becomes Air Defence Research and Development Establishment. (ADRDE).

AI (Airborne Interception, ie aircraft-to-aircraft radiolocation used in night-fighting aircraft) is implemented in a Blenheim night fighter at Bawdsey Research Station. (BRS).

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One-and-half metre ASV (Air-to-Surface Vessel, ie Ship/submarine detection by aircraft) radiolocation is fitted in a Coastal Command Hudson aircraft. (BRS).

First practical IFF (Identification Friend-or-Foe) system is developed at BRS.

One-and-half metre ship-locating radiolocation for coastal artillery is developed, which is then adapted for detection of low-flying aircraft. (ADEE).

Army gun-laying radiolocator, GL Mk1, enters service allowing radiolocation control of Anti-Aircraft fire. (ADEE).

After the evacuation of Dunkirk, Fort Halstead site is deemed vulnerable to air attack and any invading armies, so the Rocket team is moved to Aberporth, Wales.

**1938:** The first ship-borne radiolocation is fitted in HMS Rodney and HMS Sheffield (HM Signal School).

RAW Cardington is renamed Balloon Development Establishment (BDE).

**1937/8:** Brigadier McNair (Chief Superintendent, Research department – dealing with explosives) chooses Fort Halstead to be the location for experimenting with large cordite charges. As a result of this, elements of the Rocket section of the Ballistics Branch are moved to Kent.

**1936:** The Aircraft acoustic location system is made operational for the RAF (ADEE).

Gyro Gunsight is developed that improves lethality of air-to-air combat.

Staff at Farnborough provide the research and evaluation of Hurricane, Spitfire, Wellington, Lancaster and many other aircrafts.

ORS moves to Bawdsey Manor and is renamed Bawdsey Research Station (BRS).

The RDF range is extended to 75 miles.

**1935:** The Daventry experiment confirms the Watson-Watt's theory that aircraft could be detected using radio waves.

Staff at Farnborough satisfy the need for larger, more modern wind tunnels by producing a 24ft wind tunnel.

Orfordness Research Station (ORS) is set up to develop radiodirection finding (RDF) as a means of long-range aircraft detection. (RDF was the term used for 'radar' by the UK until c.1943, when common nomenclature was agreed with USA).

**1934:** The Radio Direction Finding (RDF) Tizard Committee (Committee for the Scientific Study of Air Defence) is proposed.

MWEE is renamed the Mechanisation Experimental Establishment (MEE).

**1930:** The Chemical Defence Experimental Station (CDES) takes over at Porton Down from the Royal Engineers.

**1928:** The Mechanical Warfare Experimental Establishment (MWEE) is formed at Farnborough out of TTTEE.

**1926:** Jet engine axial flow experimental compressor experiments begin at Farnborough. The General Service Respirator is produced at Porton Down, a vast improvement on previous designs. They were in service until 1942.

The Research and Development Unit (ARDU) is formed at Portland to further the nascent work on ASDIC, the forerunner of sonar.

**1925:** The Experimental Bridging Establishment (EBE) is formed at Christchurch out of the Experimental Bridging Company, which had been established on the same site in 1919.

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The Tank and Tracked Transport Experiment Establishment (TTTEE) is formed at Farnborough.

The Marine Aircraft Experimental Establishment (MAEE) is formed at Felixstowe for work on seaplanes and flying boats. It merges with A&AEE in 1956.

**1924:** SLEE is renamed the Air Defence Experimental Establishment (ADEE) and moves from Woolwich to Biggin Hill. Catapult and cable arrestors are developed at Farnborough for carrier use.

The Aeroplane and Armament Experimental Establishment (A&AEE) is formed at Martlesham Heath, Suffolk, before moving to Boscombe Down in 1939.

**1920:** Research is started at Porton Down into whole-body protection against mustard gas. Detectors and equipment are developed for decontamination.

**1919:** SLEE takes over sound ranging and location research, and develops the acoustic mirror air defence system.  
Admiralty sets up the Mining Design Department (MDD) at Portsmouth to improve naval mines, and later depth charges.

**1918:** King George V visits Porton Down.  
Following the creation of Royal Air Force, RAF Farnborough is renamed the Royal Aircraft Establishment (RAE) to avoid name confusions.  
The Royal Airship Works (RAW) established at RAF Cardington for the development of airships and balloons for the RAF.

**1917/18:** Two 7ft wind tunnels are built at Farnborough.

**1917:** The Searchlight Experimental Establishment (SLEE) is founded on Woolwich Common to conduct anti-aircraft weapons and searchlight research.  
The Admiralty Research Laboratory (ARL) is founded at Teddington.  
HM Signal School, Experimental Department and Portsmouth Dockyard take over wireless and signals work of TEE's Wireless Section.  
The Admiralty Engineering Laboratory (AEL) is established at West Drayton, which later becomes part of National Gas Turbine Establishment (NGTE), Pyestock, in 1972.

**1916:** Signals Experimental Establishment (SEE) is founded on Woolwich Common. The remit was Army communications research, including gun sound ranging and aircraft sound location.  
A facility at Porton Down site is established.  
The first hydrogen sulphide field trial at Porton Down takes place.

**1915:** RGF becomes the Royal Ordnance Factory, Waltham Abbey.  
A laboratory is built in the Old Fort at Fort Halstead, which belongs to The War Office.  
Winston Churchill's famous Admiralty Landship Committee is formed, which begins the development of the tank.  
The Design Department, Royal Arsenal, Woolwich, is created.

**1914:** World War One starts.

**1912:** Farnborough receives the Royal Warrant and is renamed the Royal Aircraft Factory (RAF). The High Explosive Research department formed from the Research Department at Royal Arsenal, Woolwich, which was the progenitor of the Atomic Weapons Establishment, Aldermaston.

## Dstl's history



**1911:** HM Balloon Factory at Farnborough is renamed HM Aircraft Factory.

**1910/13:** Several balloons are built and tested at Farnborough.

**1908:** The Royal Engineers Balloon Factory is renamed the HM Balloon Factory, at Farnborough. Samuel F Cody takes his first manned flight on Laffins Plain, Farnborough.

**1907:** The Chemical Research Department is formed at Royal Arsenal, Woolwich. It is renamed the Research Department in 1908, before moving to Fort Halstead in 1942. The first UK airship flight takes place at Farnborough. The airship is a non-rigid design powered by a 50bhp V8 engine – known as Nulli Secundus. As a result of high winds, the flight is forced to land prematurely.

**1902:** The Admiralty Liquid Fuel Experimentation Station (ALFES) is set up at Haslar. It is soon to become Admiralty Fuel Experimentation Station (AFES).

**1896:** The Wireless Section, Torpedo School, HMS Defiance, Plymouth, is established to develop radio and signals equipment for the Royal Navy.

**1872:** The Admiralty Experiment Works (AEW) is established at Torquay to work on hydrodynamics moving to its permanent home in Haslar in 1887.

**1783:** The Royal Gunpowder Factory (RGF) is formally established at Waltham Abbey, having been in existence since 1545.

**1716:** The Royal Gun Factory, Woolwich, – formerly Royal Brass Foundry – is established. It is the forerunner of the modern Royal Arsenal, Woolwich, which will lead to work at Dstl's Fort Halstead site.

**1695:** The Royal Laboratory, Woolwich, is established.

**1664:** The Royal Carriage works, Woolwich, is established.