

Foundation for Science and Technology

Science supporting the Defence of the UK



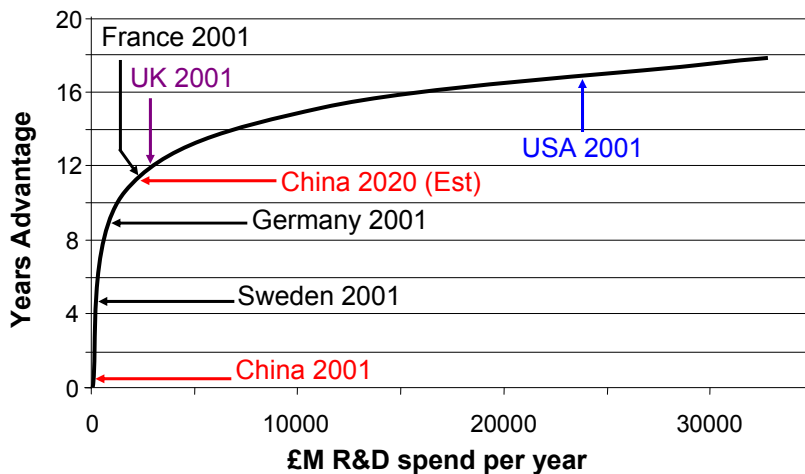
Paul Stein FREng

Science and Technology Director, Ministry of Defence

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Capability Advantage from R&D Investment



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The Historical Impact of Science and Technology On Warfare



Gyro-stabilised gun



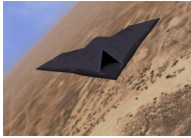
Radar



GPS



Chobham armour



Stealth, UCAS



Night vision



Sonar



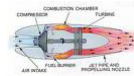
Information Technology



Precision guided munitions



Electronic warfare



Gas turbine



Nuclear Science

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Modern Equipment -Typhoon

- The Typhoon has been designed as a multi-role aircraft capable of operating in air interdiction, close air support, air defence suppression or maritime attack. The RAF currently has 50 of these aircraft in service equipping 4 squadrons. Science and technology plays a huge role in giving this machine a combat edge; for example, the turbine blades in the EJ200 turbojets which use state of art metallurgy.

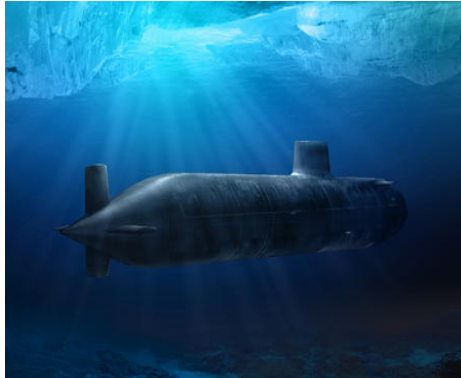


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Modern Equipment - Astute

- Astute is able to circumnavigate the globe submerged, carries 38 torpedoes or cruise missiles, and is three times more densely packed with machinery than a surface ship. Astute is the world's first nuclear submarine to be designed entirely by computer without physical models.



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EO Countermeasures

On countermeasures development we stay ahead of the game with the design of flare systems.



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UAVs and UCAVs

Unmanned targets, surveillance systems and combat air vehicles will play an increasing role in defence. These range from the Banshee sub-sonic aerial target currently undergoing first deployment in the Falklands and the Taranis stealthy UCAV prototype through to whatever our future capability visions for UAVs and UCAVs will bring us.



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Electric Drive Technology

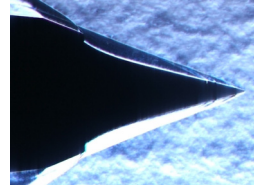
- Benefits of a hybrid electric drive system include:
 - Lower fuel consumption
 - Improved mobility
 - Reduced powertrain mass
 - Greater design flexibility
 - Improved stealth



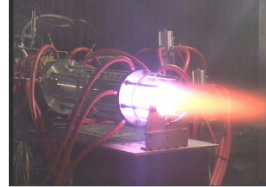
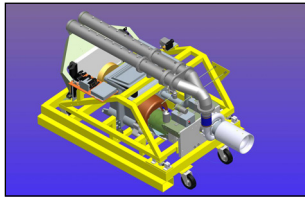
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Hypersonic Systems



SHyFE - Ramjet



Modern Firepower – British Infantry

The accurate weaponry carried by the modern soldier allows factors of ten or more in effective firepower compared with his second world war ancestors.

MoD are currently trialling a system of providing a map display to every soldier giving the location of his colleagues and any perceived enemy action.

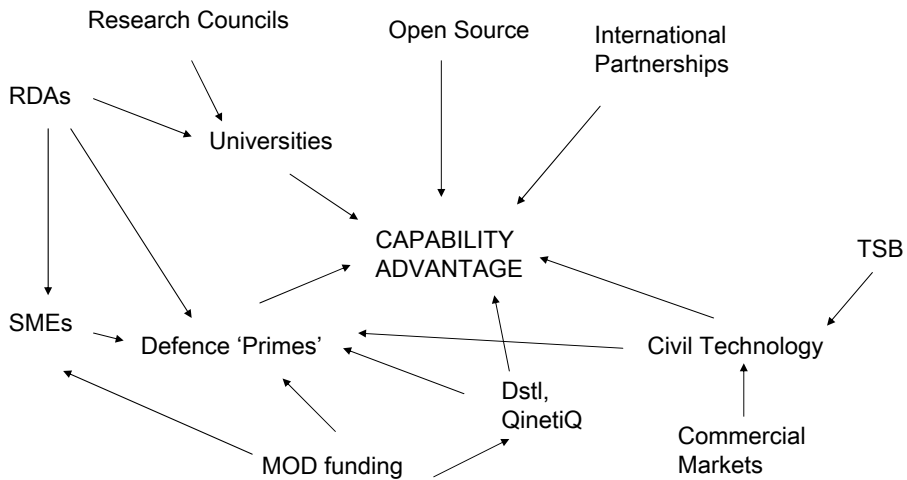
Body armour is an evolving science as we look at better systems which can stop high velocity rounds whilst decreasing weight.



The UK Osprey system



Where does the science come from?



Future Challenges include...

- Climate change
- Cyber security
- Globalisation trends
- Skills shortages
- Proliferation of new threats
- Development of existing threats



Maintaining our capability edge

- Publication of the Defence Technology Strategy
- Creation of the Defence Technology Plan
- Formation of Defence R&D Board
- Publication of the Innovation strategy
- Creation of 'capability visions'
- Engaging industry through NDIC RDG
- Development of new commercial models (e.g. CDE)
- Increasing emphasis on Systems Engineering
- Wish to increase the breadth of our supply chain
- Increasingly international outlook

