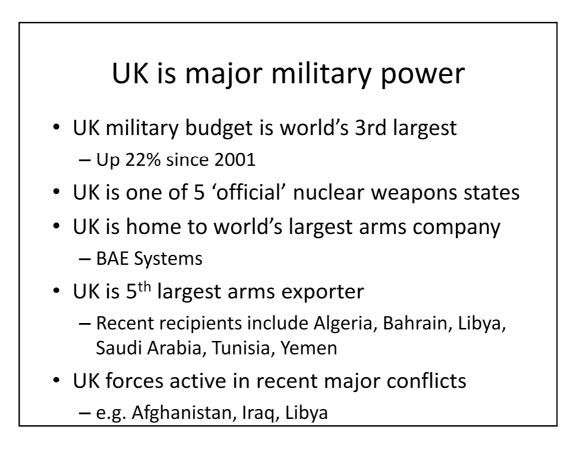


Presentation given at the INES conference 'Experiences and know-how in opposing military research at universities' in Braunschweig, Germany on 27 May 2011

We will discuss...

- Background on UK military R&D
- Ethical arguments against military R&D
- Activities of Scientists for Global Responsibility (SGR)





• UK military budget was £38.6 bn (\$59.6 bn) in 2010 – world's 3rd largest behind USA and China; ahead of Russia

• UK military spending per person: more than 2 times that of Russia; more than 10 times that of China

• UK spending per person/ per unit GDP is much larger than EU average

• UK is home to world's largest arms company – BAE Systems (has become largest following further takeovers of US companies)

• UK is 5th largest arms exporter behind USA, Russia, Germany and France

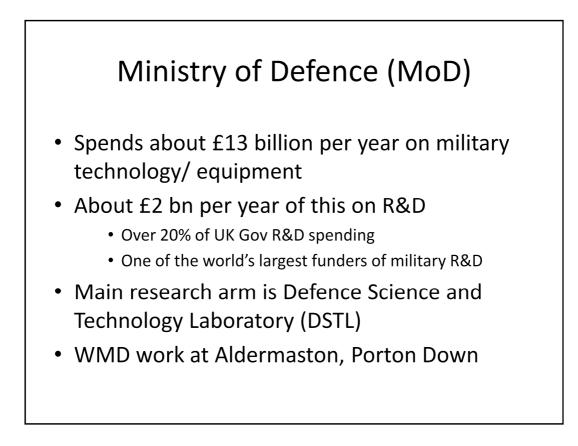
Main references: Stockholm International Peace Research Institute (2010, 2011a, 2011b); Committees on Arms Export Controls (2011).



Current strategy in USA, UK and elsewhere is based on concept known as Revolution in Military Affairs (RMA)



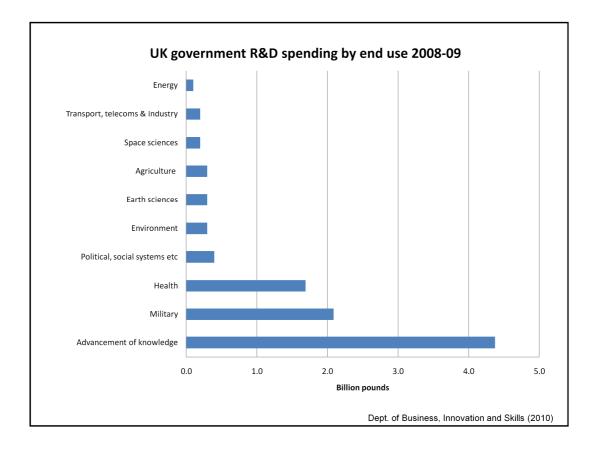
Ministry of Defence (2010); Cameron (2010); HM Government (2010)



• Spending figures from DASA (2010), Table 1.4

• Atomic Weapons Establishment at Aldermaston is currently expanding – possibly to prepare itself for development of next generation of UK nuclear weapons

• Porton Down – chemical and biological weapons research – defence only as laid down in CW and BW treaties, but there is thin line between offence and defence work

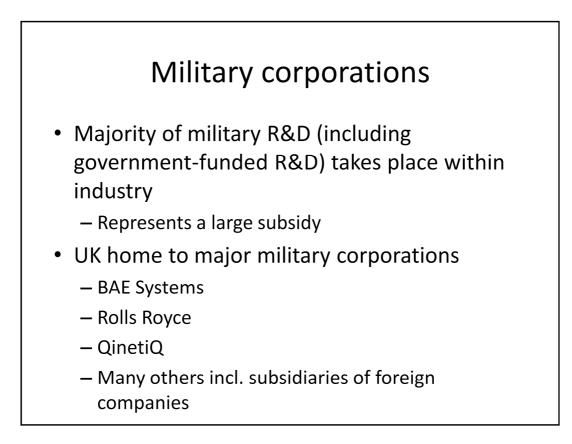


• Military R&D is spending by Ministry of Defence – however it is claimed that a large fraction of Ministry of Defence R&D spending is on civilian projects. Nevertheless, these projects will complement priorities of MoD.

• Approx. 30% fall in military R&D over previous 10y (real terms)

 \bullet As a percentage of total gov R&D, military R&D has fallen from 35% to 20% over previous 10y

• BIS (2010). Tables 2.4 & 2.2.



• Often, government funds military R&D within industry and then purchases the resulting technology – effectively paying twice (Langley, 2005)

• BAE Systems – world's largest arms company following takeover of several US contractors

• Rolls Royce – specialises in engines for ships, aircraft (2nd largest in UK)

• QinetiQ – privatised government military labs (3rd in UK)

• Aggressive lobbying - sit on many influential advisory committees



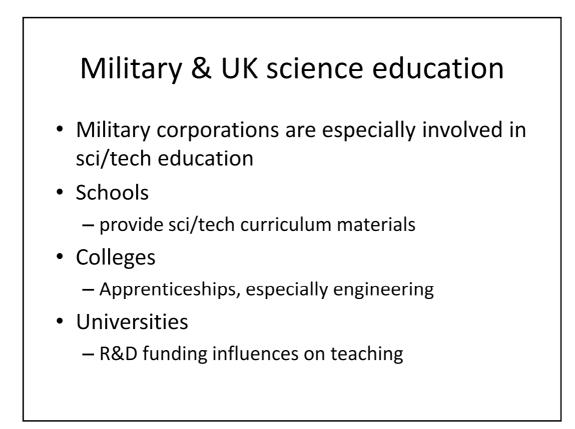
• Government schemes run in conjunction with: Defence Science and Technology Labs (DSTL); Engineering and Physical Sciences Research Council (EPSRC)

• References: Langley (2005); Langley et al (2007, 2008)

	UTC	DTC	DARP	ToE	
Bath				*	
Birmingham	*	**	*	*	
Bristol		*	***		
Brunel		*			
Cambridge	***	*	***		
Cardiff		*			
City			*		
Cranfield	*	**	***	***	
De Montfort		*			
Edinburgh		*			
Glasgow		*	**		
Glasgow Caledonian			*		
Heriot Watt		*			
Imperial College	*	*	****	***	
Leeds		*			
Leicester			*		
Loughborough	*		**	*	
Manchester	*		***		
Nottingham	**				
Oxford	**		**		
Sheffield	***	*		*	
Southampton	**	**	***	*	
St Andrews		*			
Strathclyde	*	*			
Surrey	*	*	*	*	
Sussex	*		*		
Swansea	*		*		
University College		*		**	
York	*		*		

• Data from Langley (2005)

• Research by SGR and others has yet to identify a UK university which does not receive any military funding (Langley et al, 2008)



• Leading arms companies have school education programmes, including Atomic Weapons Establishment

• BAE Systems is leading provider of UK engineering apprenticeships

• Langley et al (2007)

Main areas of UK Military R&D

- From Defence Technology Strategy...
 - General munitions and explosives
 - Cross-cutting technologies, e.g. sensors
 - Command systems, e.g. computing
 - Close combat support
 - Counter terrorism
 - Robotic/fixed wing aircraft and helicopters
 - Maritime weapons and vessels
 - Complex weapons
 - Emerging technologies, e.g. nanotechnologies
 - Chemical, biological, radiological and nuclear (CBRN)

These categories are from the Defence Technology Strategy (Ministry of Defence, 2006) More detail:

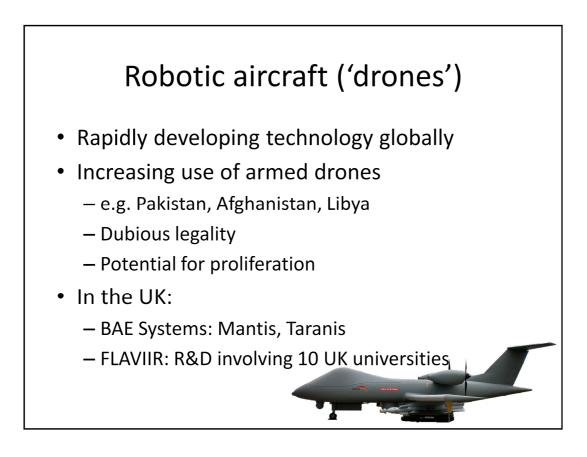
- Cross-cutting technologies includes sensors, platforms, radar
- Command systems includes telecommunications and information gathering networks
- Close combat support includes protective clothing and vehicles able to withstand explosives more robustly
- Maritime weapons and vessels includes submarines
- Emerging technologies includes nanotechnologies and devices which interface people and machines
- CBRN methods to detect and disable weapons



Purposes:

- Supercomputers (Blue Oak, Larch etc) simulation of nuclear explosion
- Orion Laser small-scale simulation of nuclear detonation, e.g. fusion and boosting
- Materials testing laboratory to study behaviour of nuclear weapons components

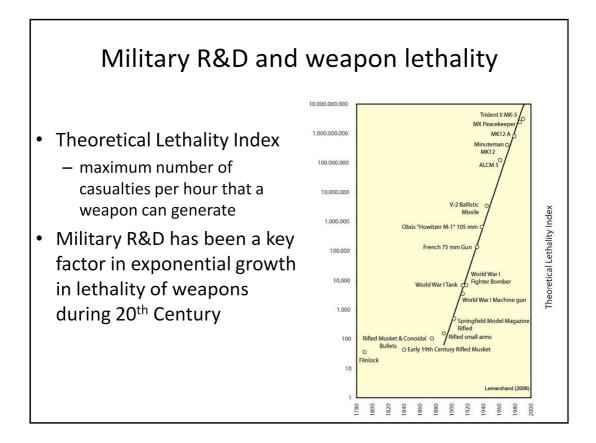
Sources: AWE annual reports and other related documents. http://www.awe.co.uk/ Photo: Trident nuclear missile



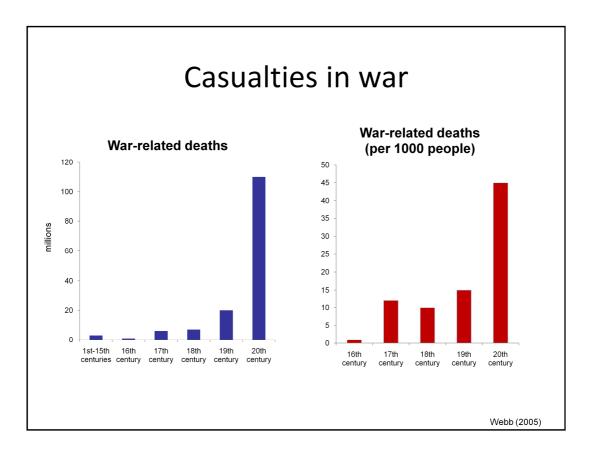
Hookes (2011); Langley et al (2008) Photo: BAE Mantis Ethical criticisms of military involvement in research and development

Main arguments against military R&D

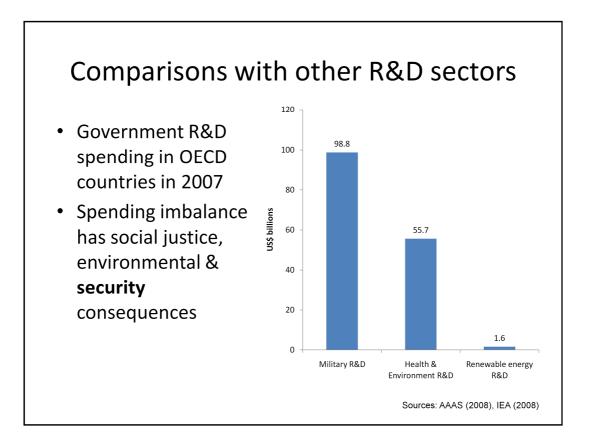
- 1. Fuels current and future arms races, increasing the risk of conflict
- Diverts resources from important civilian R&D, including that which has major security benefits
- 3. Reduces openness in scientific research



Theoretical 'Lethality Index' includes consideration of: rate of fire, number of targets, relative effectiveness, range effects, muzzle effects, accuracy, reliability, etc. Graph from Lemarchand (2007).



Webb (2005).

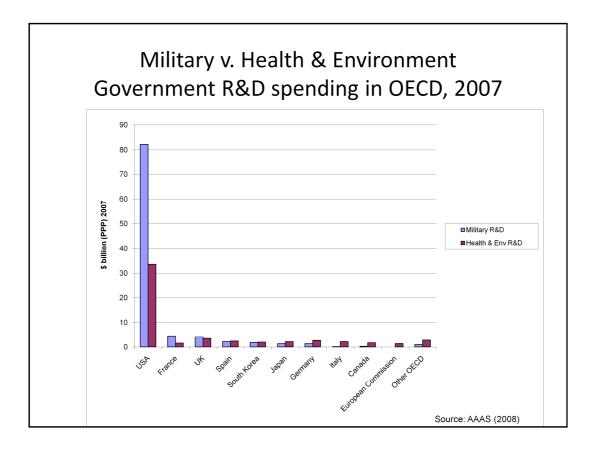


Figures in US\$ (purchasing power parity)

Military spend – Organisation for Economic Co-operation and Development (OECD) countries (AAAS, 2008)

Health & environment (mainly health) – OECD countries (AAAS, 2008)

Renewable energy – International Energy Agency (IEA) countries (IEA, 2008) – i.e. OECD minus 4 countries



Some currents drivers of military R&D 'Full spectrum dominance' US doctrine for military superiority on land, sea, air & space Control of information Monitoring & surveillance; telecommunications; networked computer systems 'Refinement' of weapons 'Smart' weapons; robotic delivery Attempting to reduce/ remove need for soldiers Further development of nuclear weapons Spiralled during 'War on Terror'

• US sets operational objectives 20y ahead and this drives R&D programmes

• Researchers are identified and funded worldwide which can contribute to the R&D to meet the 20y operational objectives

Sources: Langley (2005); Lemarchand (2007); Langley et al (2007)

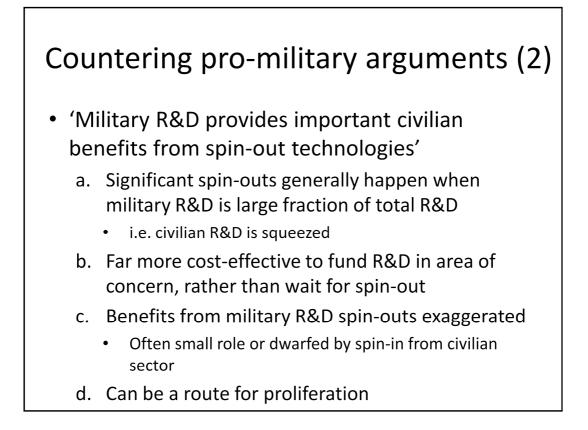
Further concerns

- Prolonged threat of nuclear war
- Weaponisation of space
- Shifting of risk from 'our' soldiers to others
 - Increased risk of civilian casualties
 - War becomes 'more acceptable'?
- Shift from 'threat-driven' defence to 'capability-based' defence

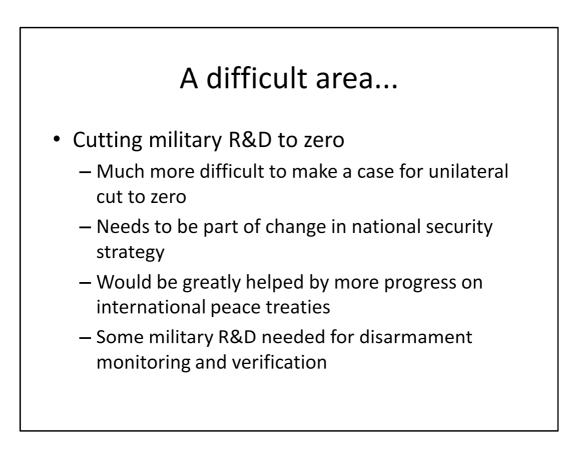
- Military corporations driving defence policy

Countering pro-military arguments (1)

- 'We need more military R&D to develop technologies to keep us secure'
 - a. Current size of military R&D is huge (especially US)
 - b. New military technologies lead to proliferation
 - through arms trade (legal/illegal)
 - c. Trust-building measures are more effective at keeping the peace between nations
 - e.g. peace agreements, diplomacy, trade, cultural exchange
 - d. Military R&D irrelevant for broader security issues
 - e.g. environmental hazards, disease, accidents



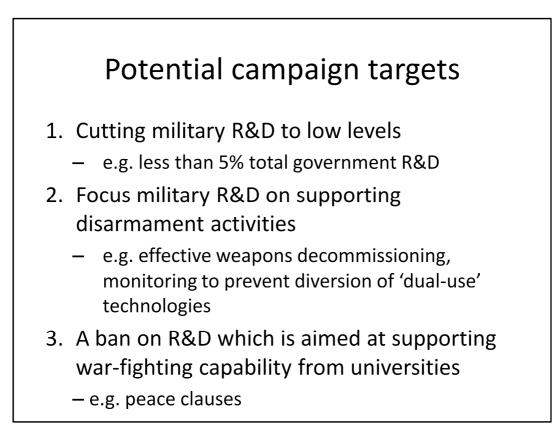
- a. e.g. in USA currently, or in UK in post-war period.
- b. Spin-out can happen from any sector to any other sector there is nothing about military R&D which makes it special in this respect. Indeed, the innovation pathway from military to civilian technologies is generally costly.
- c. For example, the military played a small role in the early development of the internet, but the vast majority of the subsequent development occurred in civilian sector, from which the military now benefits greatly.
- d. Nuclear power is obvious example.



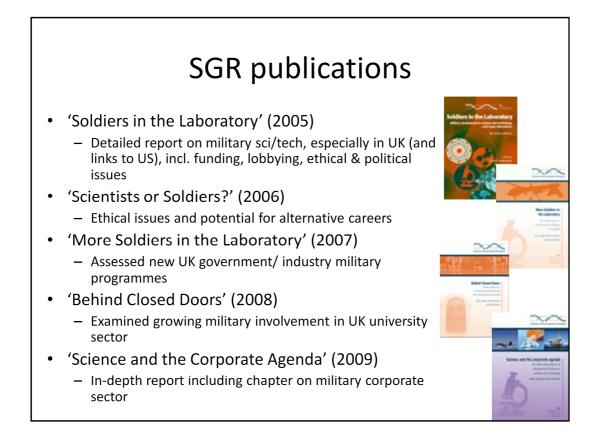


• Non-Offensive Defence – focus on narrowly-defined defence (national territory, peacekeeping); decommission weapons systems that can be used for large-scale attack, eg nuclear weapons, aircraft carriers, long-range bombers/ missiles/ warships (Civilisation 3000, 2010)

• Sustainable Security – focus on tackling the roots of conflict such as resource depletion, militarisation, climate change (Abbott et al, 2006)



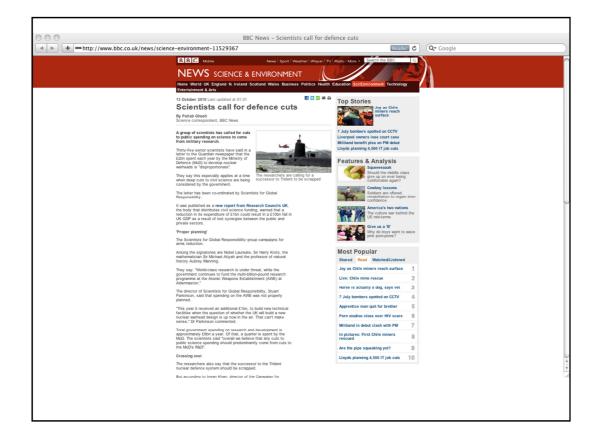




Listed in references

Other SGR activities

- Numerous lectures and workshops for students, academics and campaigners
- Work with campaign groups, e.g.
 - Campaign Against Arms Trade
 - Campaign for Nuclear Disarmament
- Media work
 - Open letters to policy-makers
- Web
 - Publicise our reports and activities via our website



BBC News online (2010)

References (p1)

AAAS (2008). Health/Environment and Defense Government R&D by Nation, 2007. August 2008. American Association for Advancement of Science. http://www.aaas.org/spp/rd

Abbott C, Rogers P, Sloboda J (2006). Global Responses to global threats: Sustainable security for the 21st century. Oxford Research Group.

http://www.oxfordresearchgroup.org.uk/publications/briefing_papers/global_responses_global_threats_sustainable_security_21st_century

- BBC News online (2010). Scientists call for defence cuts. 13 October. http://www.bbc.co.uk/news/science-environment-11529367
- BIS (2010). SET Statistics: Science, Engineering and Technology Indicators 2010. Dept. of Business, Innovation and Skills. http://www.bis.gov.uk/policies/science/science-funding/set-stats
- Committees on Arms Export Controls (2011). Scrutiny of Arms Export Controls (2011). First Joint Report of Session 2010–11. House of Commons.
- Cameron D (2010). Statement on Strategic Defence and Security Review. 19 October. http://www.number10.gov.uk/news/statements-and-articles/2010/10/sdsr-55912
- Civilisation 3000 (2010). http://civilisation3000.wordpress.com/some-relevant-articles-and-reports-1982-2007/
- DASA (2010). UK Defence Statistics 2010. Defence Analytical Services and Advice. http://www.dasa.mod.uk/modintranet/UKDS/UKDS2010/ukds.php
- HM Government (2010). A Strong Britain in an Age of Uncertainty: The National Security Strategy. http://www.direct.gov.uk/nationalsecuritystrategy
- Hookes D (2011). Armed drones: how remote-controlled, high-tech weapons are used against the poor. SGR Newsletter, no.39, p20-21. http://www.sgr.org.uk/publications/sgr-newsletters

References (p2)

IEA (International Energy Agency) (2007). IEA online energy database. http://www.iea.org/Textbase/stats/rd.asp

Langley C (2005). Soldiers in the Laboratory: military involvement in science and technology – and some alternatives. Scientists for Global Responsibility. http://www.sgr.org.uk/publications/soldiers-laboratory

Langley C, Parkinson S, Webber P (2007). More Soldiers in the Laboratory: the militarisation of science and technology – an update. Scientists for Global Responsibility. http://www.sgr.org.uk/publications/more-soldiers-laboratory

Langley C, Parkinson S, Webber P (2008). Behind Closed Doors: military influence, commercial pressures and the compromised university. Scientists for Global Responsibility. http://www.sgr.org.uk/publications/behind-closed-doors

Langley C, Parkinson S (2009). Science and the Corporate Agenda: the detrimental effects of the commercial influence on science and technology. Scientists for Global Responsibility. http://www.sgr.org.uk/publications/science-and-corporate-agenda

Lemarchand G (2007). Defense R&D policies: fifty years of history. Presentation to INES Council Meeting, Berlin, 4 June. http://www.inesglobal.com/education.phtml#cpid356

Ministry of Defence (2006). Defence Technology Strategy. http://www.mod.uk/DefenceInternet/AboutDefence/CorporatePublications/ScienceandTech nologyPublications/SITDocuments/DefenceTechnologyStrategy2006.htm

Ministry of Defence (2010). Securing Britain in an Age of Uncertainty: The Strategic Defence and Security Review. http://www.direct.gov.uk/sdsr

References (p3)

Stockholm International Peace Research Institute (2010). SIPRI Yearbook 2010: Armaments, Disarmament and International Security. http://www.sipri.org/yearbook/2010

Stockholm International Peace Research Institute (2011a). Background paper on SIPRI military expenditure data 2010. April 11.

http://www.sipri.org/research/armaments/milex/factsheet2010

Stockholm International Peace Research Institute (2011b). SIPRI Military expenditure database. http://milexdata.sipri.org/

Webb D (2005). From space weapons to basic human needs – technology and the security agenda. Presentation at Scientists for Global Responsibility conference. http://www.sgr.org.uk/Conferences/Webb2005.swf