

Militarisation of Science & Technology: Lessons from the UK

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<http://www.sgr.org.uk/>

Presentation at the workshop, 'Militarization of Science 1914 and Today', at the Sarajevo Peace Event, Bosnia, 6 June 2014

Scientists for Global Responsibility research

- ‘Soldiers in the Laboratory’ (2005)
 - Detailed report on military sci/tech, especially in UK (and links to US), incl. funding, lobbying, ethical & political issues
- ‘Scientists or Soldiers?’ (2006)
 - Ethical issues and potential for alternative careers
- ‘More Soldiers in the Laboratory’ (2007)
 - Assessed new UK government/ industry military programmes
- ‘Behind Closed Doors’ (2008)
 - Examined growing military involvement in UK university sector
- ‘Science and the Corporate Agenda’ (2009)
 - In-depth report including chapters on military corporate sector and fossil fuel industry
- ‘Offensive Insecurity’ (2013)
 - Detailed new data on UK R&D military and that tackling the roots of conflict, incl. assessment of shifts in national security policy



Other SGR activities include education work – including presentations to academics, peace campaigners, and students; articles in specialists media etc – and advocacy work with SGR members and other campaign groups on issues related to military involvement in R&D

References: Langley (2005; 2006); Langley et al (2007; 2008); Langley and Parkinson (2009); Parkinson et al (2013)

Early 1900s: military technology

- UK played a key role in the development of many World War I technologies, including:
 - High explosives
 - Warships
 - Tanks
 - Submarines
 - Torpedoes

- The British invented cordite – an important new explosive
- UK was a leader in naval technologies, e.g. deployed the groundbreaking Dreadnought battleship, invented the torpedo, and played a key role in submarine development
- UK invented and deployed the first modern tanks

Reference: Williams (1999)

UK is major military power

- UK military budget is world's 6th largest
- UK is one of 5 'declared' nuclear weapons states
- UK forces active in recent major conflicts
 - e.g. Afghanistan (2001-14), Iraq (2003-7), Libya (2011)
- UK is home to world's 3rd largest arms company
 - BAE Systems
- UK is 6th largest arms exporter
 - Recent recipients include Algeria, Bahrain, Libya, Saudi Arabia, Tunisia, Yemen

- UK military budget was \$58 bn in 2012 – world's 6th largest behind USA, China, Russia, Saudi Arabia, France
- UK military spending per person: more than 6 times that of China
- UK spending per person/ per unit GDP is much larger than EU average
- UK nuclear weapons stockpile being reduced to 180 warheads, each with the explosive power 8 times that of a Hiroshima bomb
- UK is home to world's 3rd largest arms company – BAE Systems
- UK is 6th largest arms exporter behind USA, Russia, Germany, France, China

Main references: Stockholm International Peace Research Institute (2014a; 2014b); Committees on Arms Export Controls (2011).

Defence Equipment Plan 2013

	10 year budget (£ bn)
Submarines & nuclear weapons - incl. Trident replacement nuclear-armed subs; 5 more Astute Class conventionally-armed subs	38.0
Combat planes - incl. Lightning II & Typhoon fast jets; UAVs (drones)	18.8
Warships - incl. 2 Queen Elizabeth Class aircraft carriers; Type-45 destroyers; Type-26 Global Combat Ship	17.4
Long-range support aircraft - incl. Voyager & A400M for heavy lift, air-to-air refuelling	13.4
Armoured fighting vehicles - incl. Warrior, Scout	13.1
Weapons - incl. missiles, torpedoes and bombs	11.6
Helicopters - incl. Chinook, Apache, Puma and Wildcat	11.2
Contingency funds	8.4
Other programmes	32.4
Total	164.3

- Military equipment budget is ring-fenced from spending cuts while other military (and most civilian) spending is falling
Ministry of Defence (2014)

Some observations...

- Government military/ defence strategy based on:
 - High technology, especially 'networked' technologies
 - Prominent role for 'offensive' weapons systems
 - Capability for 'force projection' over long-range
- Major role of military corporations
 - Often monopoly suppliers
- Involvement of scientists/ engineers essential
 - Large budgets for Research and Development

Parkinson et al (2013)

UK Military R&D

- Recent Government spending: £1.8 bn per year
 - Approx 1/6 of UK Gov R&D spending
 - One of the world's largest funders of military R&D
 - Main research arm is Defence Science and Technology Laboratory (DSTL)
- But most military R&D work takes place in private industry

- Spending figures from DASA (2013) & BIS (2012) – R&D figures are 2008-11 average

UK Military R&D: Top 4 areas

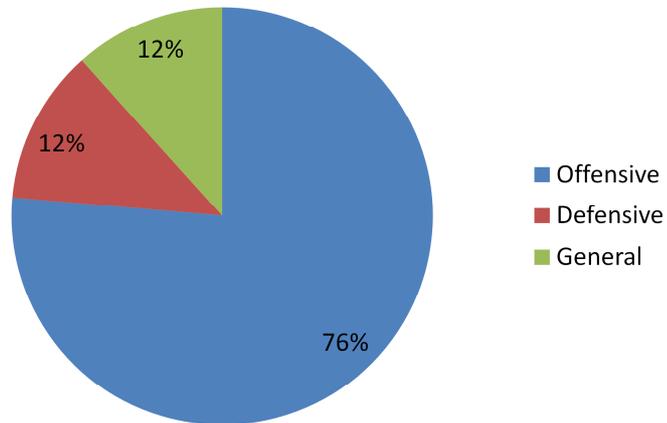
		Public R&D spending 2008-11
1.	Nuclear weapons systems <i>Warheads; 'Successor' submarines; Nuclear propulsion for submarines</i>	£980m
2.	Strike planes <i>Typhoon, F-35 Lightning II, Tornado</i>	£771m
3.	Attack helicopters <i>Mainly Future Lynx/ Wildcat</i>	£599m
4.	Unmanned aerial vehicles <i>'Drones', including Mantis, Taranis</i>	£195m

Parkinson (2013; 2014)

- All have major role in 'force projection', i.e. offensive
- These are minimum figures due to incomplete Ministry of Defence data

- Other areas of interest include missile systems, communications systems, warships, cyber-security, body armour, chemical/biological/radiological/nuclear defence, emerging technologies etc
- These are minimum figures – 1/4 of MoD R&D spending not clearly documented at programme level
- In public relations, the 'life-saving' contribution of military R&D projects is often emphasised, e.g. soldier armour, although in practice this is a small proportion.

UK military R&D: main roles



Parkinson et al (2013)

Total military R&D spending, 2008-11: £5.4 billion

- Classifications based on military/ academic literature – discussed further in Parkinson et al (2013)

UK nuclear warhead R&D

- Atomic Weapons Establishment (AWE), Aldermaston
- Major expansion, involving new research facilities
 - Supercomputers; Orion Laser etc
- Collaboration with USA and France
 - New joint research centre with France
- Concern that these undermine nuclear weapons treaties
- R&D spending £100m per year
 - from total budget of £1 bn+



New facilities installed in recent years – details:

- 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
- New joint research centres with France – as part of 2010 Teutates agreement
- Joint radiographic/ hydrodynamics facilities – Teutates EPURE at Valduc, France, and Teutates Technological Development Centre at AWE, UK
 - Claimed not to be connected to development of new nuclear warheads, but major doubts remain, especially regarding whether they undermine the Nuclear Non-proliferation Treaty and Comprehensive Test Ban Treaty.

Sources:

AWE annual reports and other related documents. <http://www.awe.co.uk/>
Parkinson et al (2013); Nicholls (2011)

Robotic aircraft/ Drones R&D

- Rapidly developing technology globally
- UK situation:
 - Armed drones first deployed in 2007
 - Collaboration with Israel to develop and deploy
 - BAE Systems: Mantis, Taranis
 - FLAVIIR: R&D involving 10 UK universities
- Numerous concerns
 - e.g. proliferation, civilian casualties

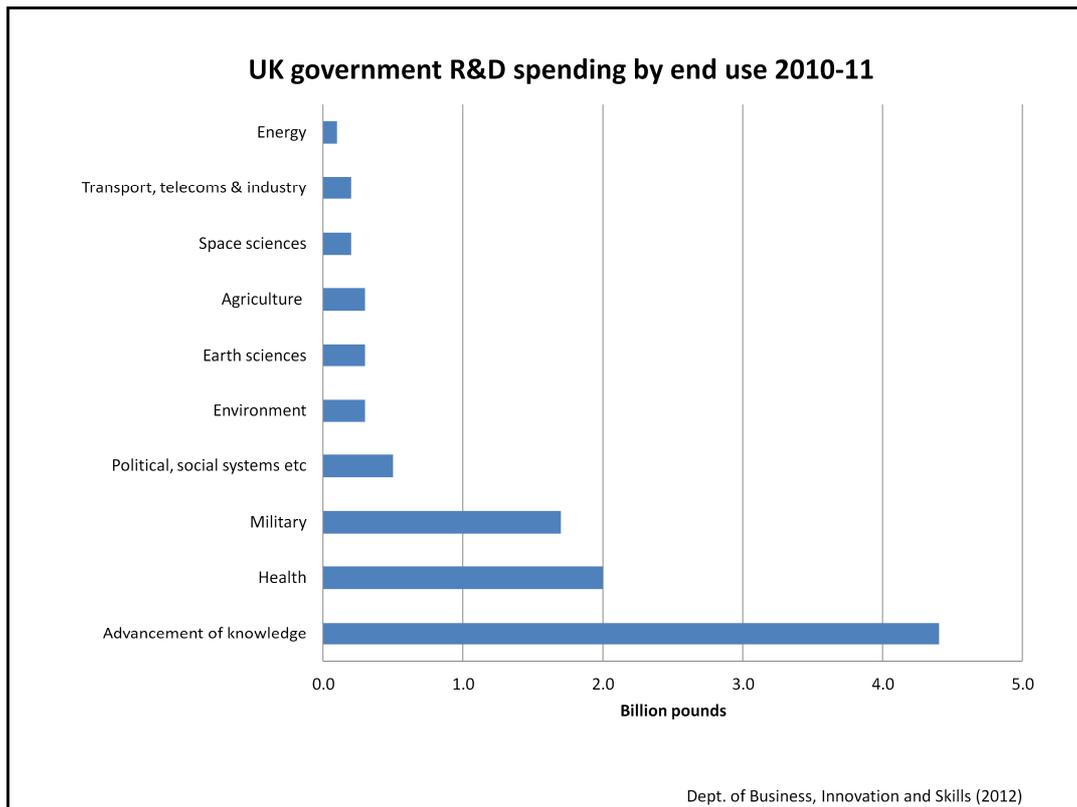


UK situation

- Drones initially deployed for reconnaissance, but from 2007 the UK began deploying (US-made) armed 'Predator' drones in Afghanistan. By 31 October 2012, the RAF had carried out 349 drone strikes.
- UK collaboration with Israeli military and arms industry to deploy and develop drones
- BAE Systems developing two armed drones: Mantis and Taranis
- 10 UK universities, inc. York, involved in R&D on drones (FLAVIIR programme) – ran from 2001-06 leading to test flight in 2010
- Ethical issues – see later

Sources: Drone Wars UK (2012, 2012b); Langley et al (2008)

Photo: BAE Mantis (Mike Young)



- Military R&D is spending by Ministry of Defence.
 - In the last year, health R&D spending has risen above military R&D for the first time on record.
 - Private R&D spending (by arms companies) is smaller and less certain – around a few hundred million pounds (Langley, 2005)
 - Further analysis is given later
- BIS (2012). Tables 2.4 & 2.2.

International comparison of military R&D

Country	Proportion of total public R&D spending for military purposes	Public R&D spending for military purposes (\$bn)
USA	57%	76.7
<i>UK</i>	<i>17%</i>	<i>2.2</i>
South Korea	16%	2.1
France	15%	2.4
Japan	5%	1.4
Germany	5%	1.3

OECD (2012)

Public funding of military R&D in 2010: comparison of six major nations in the OECD (OECD, 2012)

Base year of 2005, purchasing power parity

Military & UK universities

- Numerous paths for military funding of R&D in universities
 - About £200 million a year
 - Military labs, arms industry and joint funding with civilian research organisations
- All universities involved?
 - 4 studies on dozens of universities found widespread military funding
 - 53 universities with funding from Atomic Weapons Establishment
 - New proposals to expand military involvement

- Figures for total funding levels are very uncertain
- 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); Street and Beale (2007); Langley (2014)

Key issue: civilian casualties

Conflict	Percentage civilian
World War I (1914-18)	45%
World War II (1939-45)	70%
Iraq War (2003-11)	At least 79%

Key factors leading to high civilian casualties:

- destructiveness of modern weapons
- targeting of civilians and infrastructure
- low tech responses, e.g. hiding among civilians

Use of modern technology in war has **not** reduced proportion of civilian casualties

A range of different factors have

Total number of deaths:

- World War I – about 15 million (including indirect deaths)
- World War II – about 66 million (including indirect deaths)
- Iraq War – 162,000 (violent death only)

Sources: White (2010); IBC (2012).

Key issue: failure of 'precision' weapons

- Academic study of 14,000+ violent incidents during Iraq War
 - Suicide bombs: 16 civilian deaths per incident
 - Air-strikes: 17 civilian deaths per incident
- Study by US military-linked think-tank in Afghanistan
 - Drone strikes 10 times more deadly than conventional military jets

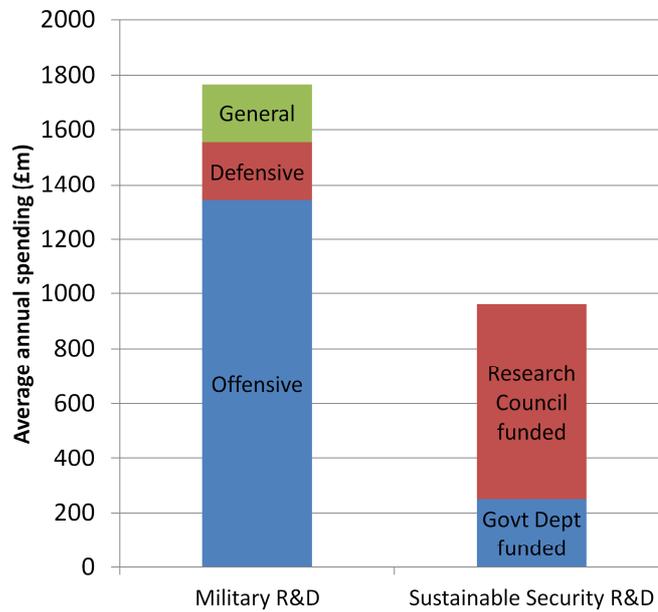
- Kings College London study: analysis of 14,196 incidents involving 60,481 civilian deaths in Iraq 2003-08 (Hicks et al, 2009)
- Center for Naval Analyses study: analysis of air strikes in Afghanistan from mid-2010 to mid-2011, using classified military data (The Guardian, 2013)

Alternative: sustainable security

- Focus on tackling the roots causes of major security threats

Problem	Key factors	Prevention
Competition over resources	Overconsumption of water, land, minerals	Increased efficiency, use of renewable sources
Global militarisation	Proliferation of conventional and nuclear weapons	Arms control agreements, disarmament programmes
Marginalisation of majority world	Very high levels of inequality and poverty	Economic development and reform
Climate change	Dangerously high emissions of greenhouse gases	Energy conservation, renewable energy, forest protection

Comparing UK security R&D (2008-11)



Parkinson et al (2013)

- Sustainable security R&D spending includes: international development and poverty alleviation, climate change impacts, sustainable energy technologies, food security, international relations, natural resource management, biodiversity, environmental risks and hazards, sustainable consumption and other measures to mitigate and adapt to climate change.

A change in R&D priorities

- UK public R&D spending 2008-11
 - 2 to 7 times more spent on military than on 'sustainable security'
 - New R&D priorities should be:
 - Arms control/ disarmament
 - Tackling environmental problems
 - Economic reform
 - Energy security
 - Food/ water security etc
- **A major spending shift towards sustainable security is urgently needed**

Parkinson et al (2013)

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