The Militarisation of Science and Technology in the UK

Dr Stuart Parkinson

Scientists for Global Responsibility
Scientists · Architects · Engineers · Technologists

SGR
Promoting ethical science, design and technology

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

Presentation at Medact/ IPPNW conference, 'Health Through Peace', York University, 5 September 2017

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

- New report will be published soon

References: SGR (2005; 2006; 2007; 2008; 2009; 2013)

UK military science and technology: key factors

UK military equipment spending

- £178bn over next ten years
  - New + maintenance of existing equipment
- Major programmes
  - Submarines & nuclear weapons (1/4 of budget)
  - Warships (incl. 2 huge aircraft carriers)
  - Combat aircraft
    - Incl. planes, drones & helicopters
  - Armoured fighting vehicles
  - Air support
  - Weapons

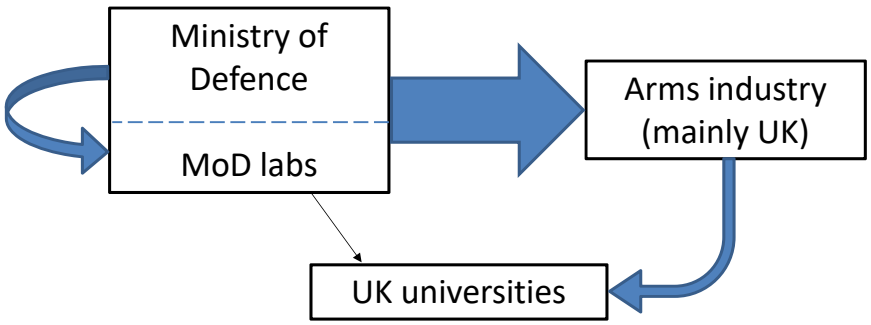
• Submarines & nuclear weapons - incl. Trident renewal (4 x nuclear-armed 'Dreadnought' subs + warheads etc); completion of 7 x Astute Class conventionally-armed subs – £44bn (approx ¼ of total equipment budget)
• Warships – incl. completion of 2 x Queen Elizabeth Class aircraft carriers; Type-26 Global Combat Ship
• Armoured fighting vehicles - incl. Warrior, Ajax
• Combat planes - incl. F-35 Lightning II fighter-bombers (accelerated introduction); Typhoon fighter-bombers (upgrade); more Reaper armed drones
• Air support - incl. A400M & Voyager for heavy lift, air-to-air refuelling; 9 new Boeing maritime patrol aircraft
• Weapons - incl. guided missiles, torpedoes and bombs
• Helicopters - incl. maintaining Chinook, Merlin, Apache, Wildcat and Puma
• Details in MoD (2017)
• [image: Reaper]

Engineering and science essential

- 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

SGR (2013)

UK military Research & Development funding relationships



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- Figures for 2015 from Office of National Statistics (2017)
  - MoD funding of arms industry: approx. £1.6bn (£0.1bn overseas)
  - MoD funding (net) of its own labs: approx. £0.1bn
  - MoD funding of universities: few million – but also Research Council co-funding
  - Arms industry funding of universities: approx. £0.2bn (no official figures: estimate from SGR, 2005; 2007; 2008)
  - Small amount of overseas military funding of UK universities – no figures available

Ministry of Defence Research & Development

- Recent R&D spending: £1.7 bn per year
  - Approx 1/6 of UK Gov R&D spending
  - One of the world's largest funders of military R&D
  - Rise since 2011
- Main research arm is Defence Science and Technology Laboratory (DSTL)

• Average spending figures for 2014 and 2015 (latest) from: Office of National Statistics (2017)

UK Military R&D: Top 4 areas

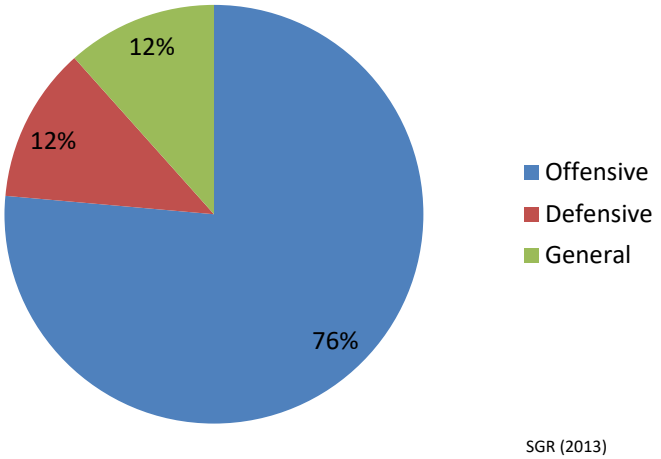
		Public R&D spending 2008-11
1.	Nuclear weapons systems *Warheads; Dreadnought submarines; Nuclear propulsion for submarines*	£980m
2.	Strike planes *Typhoon, F-35 Lightning II, Tornado*	£771m
3.	Attack helicopters *Mainly Wildcat*	£599m
4.	Unmanned aerial vehicles *'Drones', including Mantis, Taranis*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

SGR (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



SGR (2013)

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

- Classifications based on military/ academic literature – discussed further in SGR (2013)

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	52%	75.9
UK	17%	2.5
South Korea	13%	2.7
France	7%	1.2
Japan	4%	1.4
Germany	3%	1.0

OECD (2016)

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Public funding of military R&D in 2015: comparison of six major nations in the OECD (OECD, 2016)
2015 prices (purchasing power parity)

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
  - 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 or are in breach of the Nuclear Non-proliferation Treaty and Comprehensive Test Ban Treaty.

Sources:
AWE annual reports and other related documents. http://www.awe.co.uk/
SGR (2013); Nicholls (2011)

Corporations and military R&D

- Majority of military R&D (including gov-funded R&D) takes place within industry
- UK home to major arms companies
  - UK HQ: BAE Systems, Rolls Royce, Babcock, QinetiQ
  - Subsidiaries of US and other foreign companies
- Ethical issues especially significant
  - Arms exports to oppressive regimes, e.g. Saudi Arabia
  - Nuclear weapons/ drones development
  - 'Revolving door'/ Corruption investigations

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• Often, government funds military R&D within industry and then purchases the resulting technology – effectively paying twice
• BAE Systems – Europe's largest arms company (3rd in world) following takeover of several US contractors
• Rolls Royce – specialises in engines for ships, aircraft (2nd largest in UK)
• BAE Systems, Rolls-Royce, Babcock all part of the consortium building new nuclear-armed 'Successor' submarines
• QinetiQ – privatised government military labs
• Powerful lobby – reps sit on many influential advisory committees
• References: SGR (2005; 2013)

Military & UK universities

- Numerous paths for military funding of R&D in universities
  - About £200 million a year, but figures very uncertain
- Government schemes
  - Through military labs, civilian Research Councils etc
- Corporate schemes
  - Large programmes run by Rolls Royce, QinetiQ
- Joint government-industry schemes in recent years
  - e.g. Defence Technology Centres (DTC)

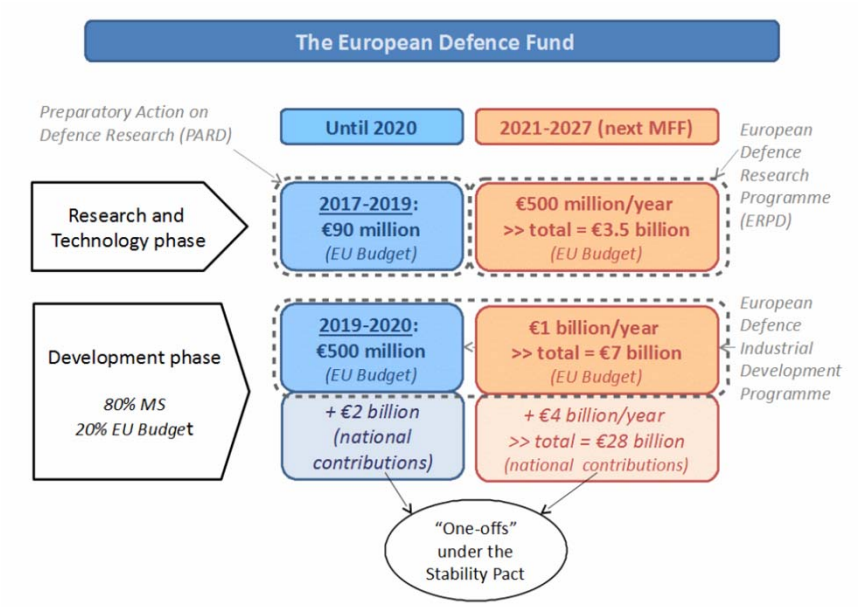
• Government schemes run in conjunction with: Defence Science and Technology Labs (DSTL); Engineering and Physical Sciences Research Council (EPSRC)
• References: SGR (2005; 2007; 2008); Parkinson (2015)

Which universities?

- Main studies
  - 29 universities, 4 national programmes (2005)
  - 26 universities, mainly Russell Group (2007)
  - 16 universities, random sample (2008)
  - 53 universities with AWE funding (2014)
  - Work mainly carried out by SGR, Campaign Against Arms Trade, Nuclear Information Service
- Universities receiving most military funding
  - Cambridge, Cranfield, Imperial College London, Oxford, Sheffield
- Are there any without military funding?

- A few other smaller studies have been carried out as well.
- A list of studies, with references, is provided in: Parkinson (2015).

New EU military R&D funding



ENAAT (2017) – summarised from EU documents

Comparing military and civilian R&D

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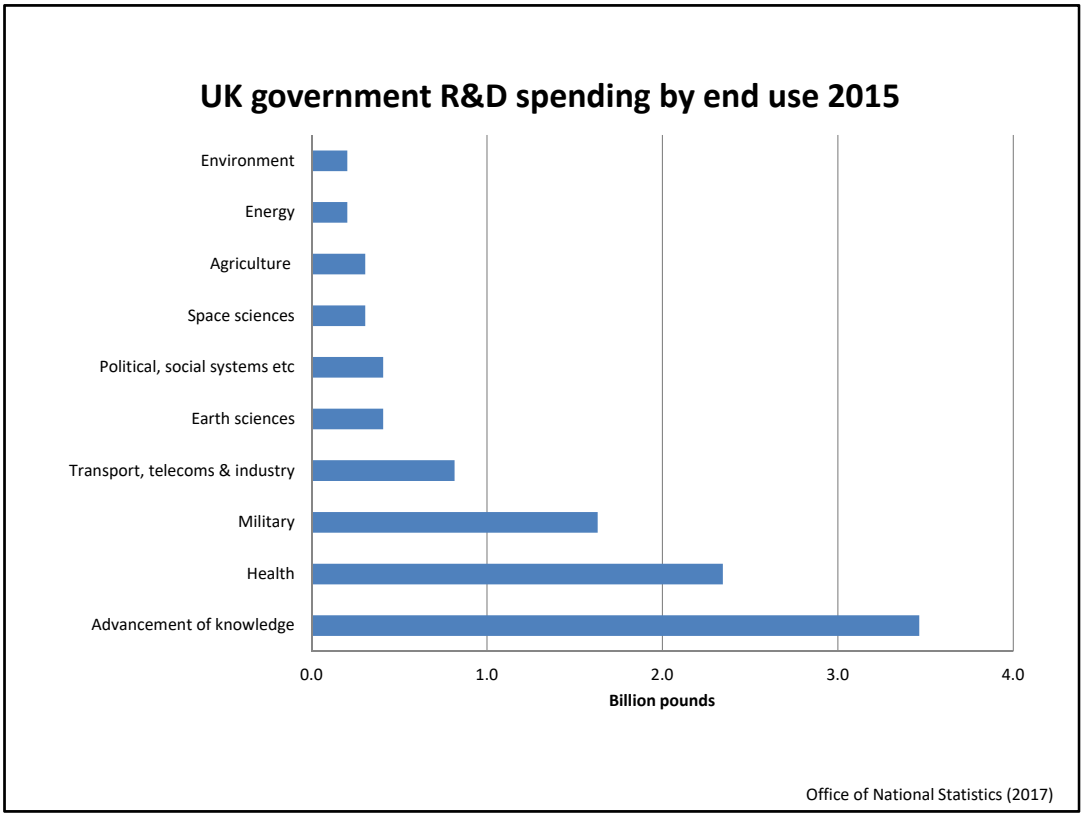
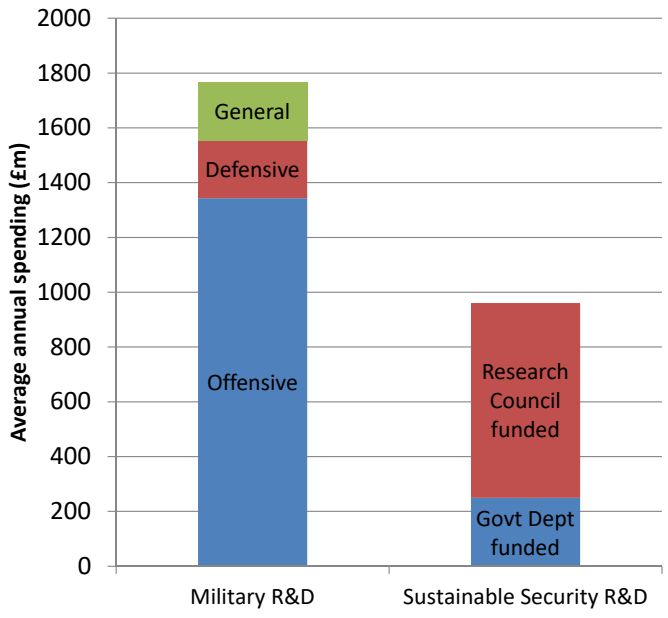


• Latest analysis by Office of National Statistics – Office of National Statistics (2017). Table 8.
• Military R&D is spending by Ministry of Defence.
• Earth sciences includes mining.
• Private R&D spending (by arms companies) is smaller and less certain – around a few hundred million pounds (SGR, 2005)

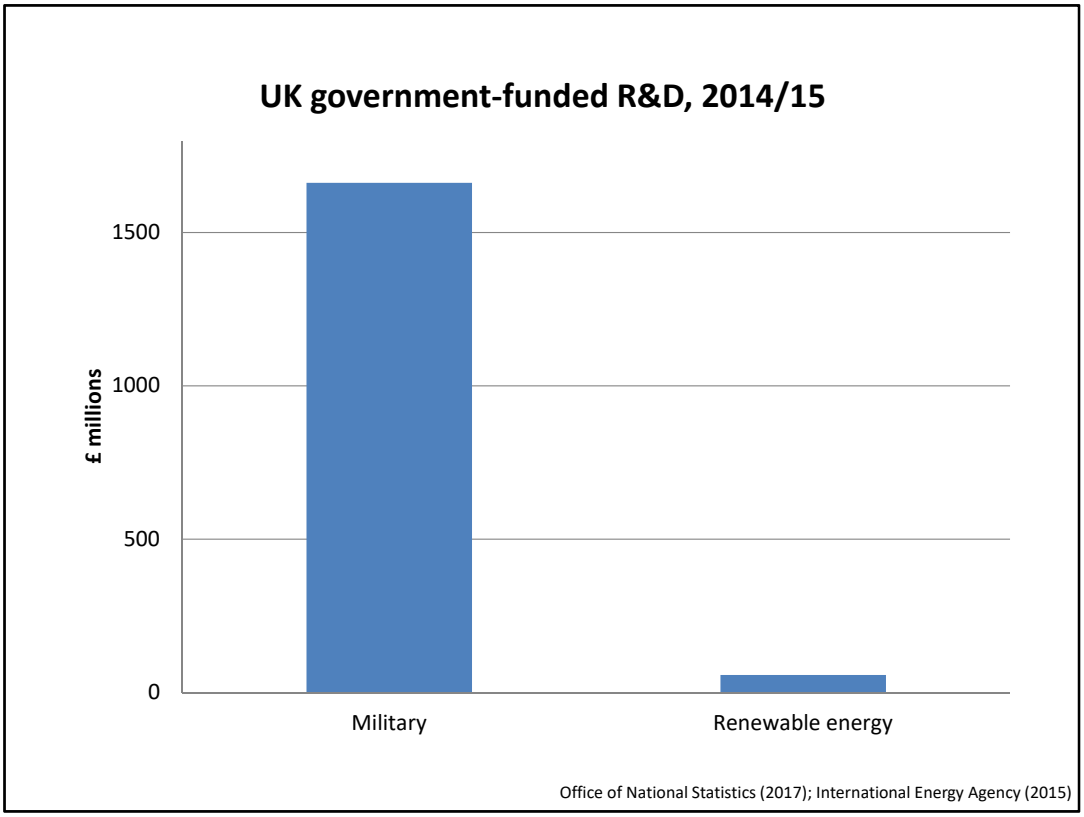
Comparing UK security R&D (2008-11)



SGR (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

• The concept of sustainable security was defined in Oxford Research Group (2006)



Military spending: 2015 figures (as in slide 16) – Office of National Statistics (2017)

Renewable energy spending: 2014 figures – International Energy Agency (2015)

Campaigning/ Education

- SGR programmes
  - Military influence on sci/tech – research/ campaigning
  - Ethical careers in sci/tech – with university students
  - Science4Society Week – with schools
- Other UK peace groups
  - Campaign Against Arms Trade, ForcesWatch, CND, ICAN-UK, Drones Campaign Network etc
- International
  - Campaigns: EU R&D, Commit Universities to Peace

- SGR activities include: presentations to academics, peace campaigners, and students; articles in specialists media etc; campaign/ advocacy work with SGR members and other groups on issues related to military influence in R&D/ arms conversion/ nuclear weapons etc; careers info for university students; resources for sci/ tech teachers; tours of eco-projects
- For more details, see:

http://www.sgr.org.uk/projects/military-influence-project-main-outputs

http://www.sgr.org.uk/projects/arms-conversion-main-outputs

http://www.sgr.org.uk/projects/nuclear-weapons-threat-main-outputs

http://www.sgr.org.uk/projects/ethical-careers

http://www.sgr.org.uk/projects/science4society-week

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