From space weapons to basic human needs – technology and the security agenda

Dave Webb argues that the huge imbalance between the resources available to the military and those devoted to meeting basic human needs urgently has to change. As an illustration of the misdirection of scientific and technological effort, he discusses some of the latest military technologies such as space weapons.

"We need an essentially new way of thinking if mankind is to survive. Men must radically change their attitudes towards each other and their views of the future. Force must no longer be an instrument of politics... Today, we do not have much time left; it is up to our generation to succeed in thinking differently. If we fail, the days of civilised humanity are numbered."

Albert Einstein, 1954[1]

This comment, made some 50 years ago in response to the start of the nuclear age, is more important today than it was then. Einstein realised that when you have developed technologies that threaten your own existence, you need to develop new ways of settling arguments and differences that do not lead to conflict. The world's continuing inequalities lead to tensions and potential conflict but new ways of resolving conflict have not been found, the gap between the richest and poorest on the planet continues to grow, and efforts in science and technology are being diverted away from the relief of suffering.

Weapons proliferation and war, climate change, and the environmental impacts of agriculture and urban society are major concerns. Technology has played a significant role in the steep increase in deaths due to war and violence[2]. The direction of weapons development – from spears and bows and arrows to guided missiles and lasers – has been to increase the distance between combatants, the speed of delivery and the deadly effects. Technological developments are usually aimed at aiding and protecting the perpetrators, not their victims, and it is not surprising that increases in the rates of deaths and injuries come increasingly from the civilian population.

According to figures from the UN Development Fund for Women, 15% of wartime casualties in World War I were civilians but this rose to 65% for World War II. By the mid-1990s, over 75% of wartime casualties were civilians[3] and it has been estimated that 4.5% of all human deaths during the 20th century have been caused by people killing each other[4]. Any use of nuclear weapons would extend this trend dramatically – there could be tens, perhaps hundreds of millions of civilian deaths in the event of a nuclear war. Yet the current thinking in Britain and the US includes the possible first use of nuclear weapons – even against a non-nuclear weapon state. This is not the 'new way of thinking' that Einstein envisaged.

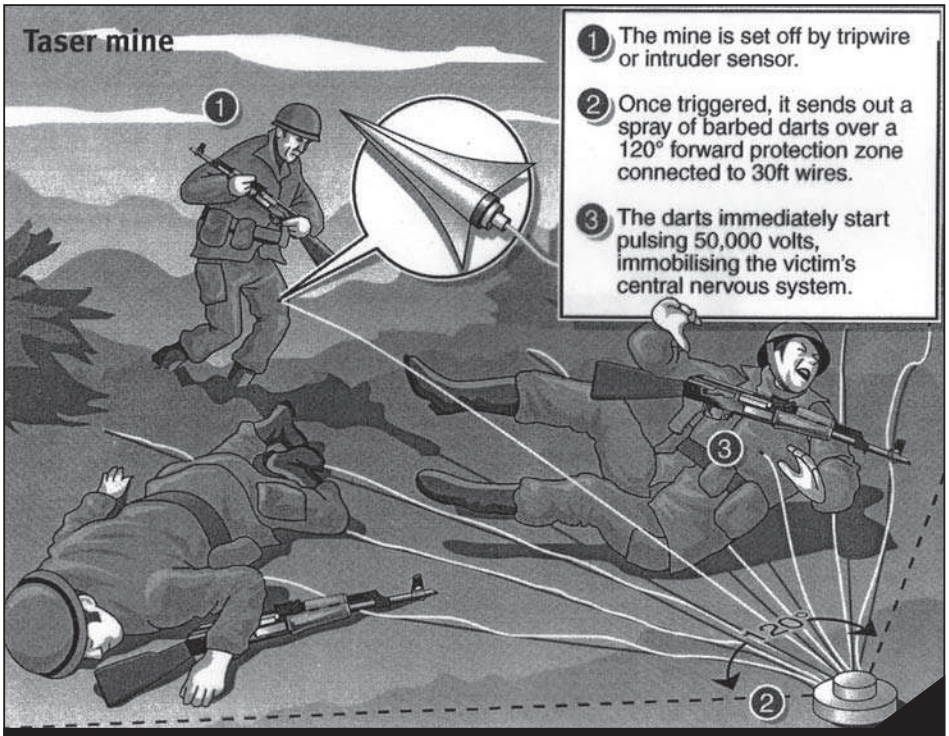


Image: Steve Wright

New military technologies such as the taser mine are well-funded while areas which support basic human needs are under-resourced.

There also seems to be little change in the way most countries think about arms spending. The world's annual military spending topped $1 trillion in 2004. The increase was mostly due to the massive US defence expenditure of $455 billion which accounted for almost half the global figure and was more than the combined total of the 32 next most powerful nations. The top five – the United States, Britain, France, Japan and China – spent 64% of the world total[5]. Russia, the US, France, Britain and Canada were the top five exporters of arms with 85% of the world total[6]. Arms exports continue to be a major source of income for corporations and governments.

Now look at the figures for international aid: $78.6 billion in 2004. This is less than 8% of the global military spend. Figures from the respected Stockholm International Peace Research Institute (SIPRI) show that Britain, Canada, France and Japan spent around five times more on arms than on foreign aid. This ratio was over 11 for Italy and nearly 24 for the United States, and of course many 'aid' packages involve commitments to purchase arms from the 'donor'. Trading in high technology weapons systems by some denies others their basic human needs. In the words of the late President Eisenhower:

"Every gun that is made, every warship launched, every rocket fired signifies, in the final sense, a theft from those who hunger and are not fed, those who are cold and not clothed. This world in arms is not spending money alone. It is spending the sweat of its laborers, the genius of its scientists, the hopes of its children."[7]

Box 1 highlights how some of the most fundamental human needs – water, food and shelter – are failing to be met across the world.

Box 1 – Basic Human Needs

Water.

In 2000 there were an estimated 1.1 billion people without access to a safe water supply (nearly 1 billion of these in Asia and Africa)[8]. The recommended basic water requirement per person is 50 litres per day but people can generally get by with about 30 litres: 5 litres for drinking and cooking and another 25 to maintain hygiene. However, people in Gambia use only 4.5 litres per day on average[9].

Food.

In 1997-99 there were 815 million undernourished people in the world – 777 million of these were in developing nations. 53% of US citizens are overweight or obese, with 3.5% malnourished – while 50% of Indians are malnourished and 5% are overweight or obese[10]. Since the mid-1960s the number of undernourished people in developing countries (other than China), increased by about 40 million. Predictions are that the number of hungry people in developing countries will decline to about 440 million in 2030 – the target of the 1996 World Food Summit to halve the number by 2015 will not be met – and world population is projected to grow to 8.3 billion by 2030, requiring a 40-45% increase in food production. Food production may not be the problem however; 'Food First' suggest that:

"enough wheat, rice and other grains are produced to provide every human being with 3,500 calories a day. ...The problem is that many people are too poor to buy readily available food. Even most 'hungry countries' have enough food for all their people right now. Many are net exporters of food and other agricultural products" [11].

Shelter.

Estimates of the number of street children around the world vary from 30 to 170 million. Warfare, deteriorating economies and natural disasters have led to large increases in the numbers of street children. For example, in 1991 there were no reported street children in Iraq – but homelessness was becoming a major problem even before the Iraq War. In Kingston, Jamaica over 90% of homeless children come from single mother families and in the US most of the 750,000 to 1 million street children have fled from physical or sexual abuse[12].

New ways of thinking may be required here to alleviate poverty rather than simply relying on technological fixes, such as genetic modification for producing more crops.

Climate Change, Crowd Control and Homeland Security

In 2003, at a cost of $100,000, another apparently 'new way of thinking' produced a 'worst case scenario' report for the Pentagon, predicting that abrupt climate change could bring the world to near-anarchy as countries develop ways of defending dwindling food, water and energy supplies against millions of displaced and dispossessed refugees[13]. The authors sketched out various conflict scenarios between 2010 and 2020, estimating that up to 100 million people could be on the move due to climate change. Despite claiming that the report is mere speculation and that the events investigated are highly unlikely, the US government is looking at new ways to control crowds and border movements by developing a new breed of weapons[14].

New technologies are being created to monitor and control boundaries. Ground-based weapons such as 'Metal Storm' (which uses electronic rather than mechanical triggering mechanisms to fire 500,000 rounds per minute) or networks of intelligent mines that can detect gaps and are able to move to fill them, would be linked to surveillance satellites and operated automatically or remotely. Other types of weapons classified as 'sub-lethal' (including tasers, sonic, chemical, gas and microwave 'aerial denial' systems) are also being developed for controlling large crowds of people in an urban environment and are gradually being introduced into military and police arsenals. Some are being made so that they can be switched from 'non-lethal' to 'lethal' – depending on how a situation develops.

The consequences of these particular ways of thinking are of growing importance to the US. Similar technologies can be deployed to control populations in the homeland in the 'War on Terror' or for fighting in urban environments in foreign countries. In recent years the projection of US military power has been transformed through the so-called 'Revolution in Military Affairs', which concentrates on technologies of 'stealth', 'precision' targeting and satellite positioning connected through computer-based systems described as 'network centric warfare'. The resulting reduced risk to US forces will make military interventions more likely and more aggressive.

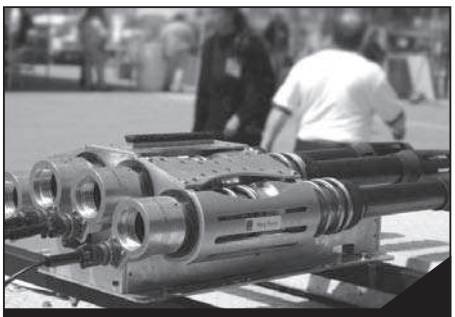


Image: Steve Wright

Metal storm 'sub-lethal' mortar

Space Security

October 2007 will be the 50th anniversary of the launch of Sputnik 1 by the Soviet Union – the first satellite to orbit the Earth. This event generated panic in the West because of the possible development of weapons systems with a global reach. For many scientists, however, it was also an exciting time – with much anticipation of the scientific discoveries that would be made from the exploration of the solar system and beyond. The US developed a twin approach to space technology, establishing both military[15] and civilian[16] organisations to develop separately. More recently, other ways of thinking (e.g. from the Department of Homeland Security) have prevailed. 'Dual use' programmes (where military, commercial and scientific interests are combined) are the new norm[17].

Modern Warfare and Space Security

Supposedly new military ways of thinking such as 'net-centric warfare'[18] and 'full spectrum dominance'[19] are just extensions of traditional methods and not what Einstein had in mind. These new very aggressive policies rely heavily on space components, the significance of which was highlighted in the recent conflicts in Afghanistan and Iraq. However, space systems are extremely vulnerable to attack and the US military wish to ensure that their space assets are secure. This has resulted in policies to maintain their dominance in space, to "*pursue superiority in space through robust ... defensive and offensive capabilities*", maintain a fully integrated "*land, sea, air and space war-fighting system*" and integrate civil and commercial space operations with military ones[20]. To achieve this the US Air Force has adopted a doctrine of 'Counterspace Operations' – "*the ways and means by which the Air Force achieves and maintains space superiority*" – the "*freedom to attack as well as the freedom from attack*"[21]. The US is developing space weapons technologies and significant government funding requests have been made for 2007. Some of these are being pursued under the guise of 'Missile Defense' (e.g. space-based interceptors, airborne

lasers, micro-satellites etc.)[22] while others involve spacecraft protection and defensive and offensive 'counterspace' technologies for space control and anti-satellite programmes[23].

Space Weapons of the Future?

Other thoughts for possible future development have included:

- 'Rods from God' – the storing of rods of tungsten on an orbiting platform to be released to strike buried targets on Earth;
- high-powered lasers based in space or on the ground, coupled with airborne mirrors to deflect onto long range targets;
- cheap and manoeuvrable micro-satellites to rendezvous with and disrupt target satellites;
- a robotic hypersonic aircraft that could carry large amounts of conventional explosives to terrestrial targets[24].

Some of these ideas are limited by constraints imposed by cost, technology or physics. The US organisation Union of Concerned Scientists has pointed out that:

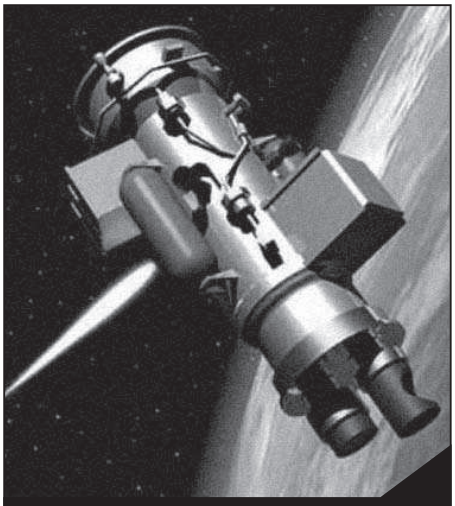
"The cost of operating in space is often high relative to the cost of operating in the air or on the ground. Physics places fundamental limits on space operations which must be taken into account when assessing uses of space." [25]

Financial or technical feasibility does not seem to prevent enormous amounts of money being procured by the aerospace companies, however. They are very effective political lobbyists – politicians may not understand the physics but they understand the arguments of large campaign donations and jobs for their constituents. President Eisenhower saw this possibility over 40 years ago and predicted:

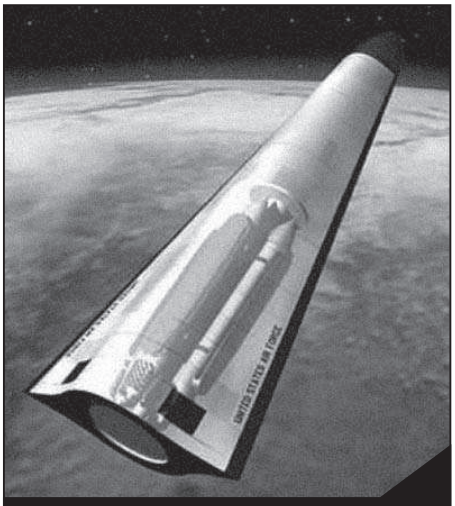
"*In the councils of government, we must guard against the acquisition of unwarranted influence, whether sought or unsought, by the military-industrial complex. The potential for the disastrous rise of misplaced power exists and will persist.*" [26]

Human Security

Old non-constructive ways of thinking appear to dominate: narrow military and economic concerns continue to determine the priorities for scientific and technological work in countries such as the UK and the USA. This is illustrated, for example, in the excellent SGR report *Soldiers in the Laboratory*. Even on occasions when social or environmental priorities do take precedence, we are often simply presented with 'technical fixes' which fail to get to the root of the problems (e.g. more sophisticated military technology, expansion of nuclear power, new surveillance technologies, GM crops, etc).



Space-based mines are currently being researched



...as are orbital bombers

Real security – protection against chronic threats such as hunger, disease and repression, and prevention of human catastrophes caused by earthquakes or hurricanes – must be developed using radically different ways of thinking that put people and the environment first. We are stuck with traditional ways of thinking in which technologies are developed to deal with the aftermath and keep control for those in authority. We need to look much more closely and seriously at alternatives that prioritise prevention and avoidance.

Conclusion

The world spends so much on weapons and warfare but it spends very little on technologies that address real human needs. Now, more than ever, people need to critically consider the technological paths we are taking and develop new ways of thinking about security. However, despite the increasing applications of science and technology in our society and growing understanding of the systems that we depend on and/or threaten our existence, knowledge of science and technology is often lacking (due to the decreasing number of students studying science and engineering[27]), too specialised (due to the failure of many science-based courses to teach an understanding of broader issues), or too guided by vested interests and short-term goals.

It is not surprising that science is not a popular subject for young people if they see it as associated with negative behaviour. If society were to emphasise the life-enhancing aspects of science and engineering by supporting research and development in these areas, perhaps there would be more interest in studying these subjects at school and university? There is an urgent need to raise awareness of scientific and technological issues among the general public. Civic society needs to be able to make rigorous assessments of science and technology projects. In addition, scientists and engineers should be trained to think of the wider outcomes and implications of their work.

Scientists for Global Responsibility are playing an important role in helping to inform, educate, advise and criticise at all levels. The production of important reports such as *Soldiers in the Laboratory*, the ethical careers programme and work with Government, NGOs and schools and universities are some of the best methods of developing the new ways of thinking that are desperately needed to ensure that we survive the new century.

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This article is an expansion of a presentation by the author at SGR's 2005 conference.

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Challenging the nuclear future

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On nuclear power, a formal decision is imminent on whether to opt for a new generation of power stations. With the failure to cut carbon dioxide emissions since Labour came to power and the gradual decommissioning of current nuclear and coal plants over the next two decades, the government has carried out another energy review (the second in less than four years). However, it seems that even before the formal review period began, Tony Blair had decided that new nuclear power would make up a major part of the UK's future energy mix[4].

While many of the professional scientific and engineering institutions have come out in support of new nuclear power, there have been notable dissenters. The government advisory body, the Sustainable Development Commission, published a comprehensive report in March[5] which argued not only that new nuclear power was not needed to tackle climate change, but also that it could actually undermine more promising alternatives. In particular, it highlighted that large nuclear power stations could undermine the shift towards more decentralised and more efficient energy generation and use. A report by Warwick Business School[6], released in April, came to similar conclusions, pointing out that nuclear power stations require a whole series of special financial and legal supports – in effect, major public subsidies. Other dissenters, including SGR (see p.3), have pointed out concerns over radioactive waste, plant security, economics, availability of uranium ore, and the inflexibility of nuclear power generation.

April also saw the 20th anniversary of the Chernobyl nuclear disaster, the world's worst industrial accident. The anniversary was marked by intense debate over the human and environmental impacts, in particular the number of deaths caused by the accident[7]. The Chernobyl Forum (an international body led by the IAEA) initially claimed only 4,000 deaths would result, although this figure was later revised to 9,000. Other studies argued the figures were much higher. For example, the International Agency for Research on Cancer estimated 16,000 while Greenpeace claimed that it was in the region of 93,000[8].

The debate on nuclear issues will continue to intensify and SGR will continue to add its voice.

Dr Philip Webber is Chair of SGR. Dr Stuart Parkinson is Director of SGR.

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