

**SCIENCE AND  
TECHNOLOGY**

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**NATO Parliamentary Assembly**

**SUB-COMMITTEE ON THE PROLIFERATION OF  
MILITARY TECHNOLOGY**

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**VISIT TO LONDON, UNITED KINGDOM**

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**SECRETARIAT REPORT**

***19-20 MARCH 2007***

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1. Members of the Science and Technology Committee's Subcommittee on Proliferation of Military Technology visited London, UK, from 19-20 March 2007. The delegation of 23 legislators from member and associate countries, led by Committee Chairman Michael Mates (UK) and Subcommittee Vice Chairwoman Baroness Ramsay of Cartvale (UK), met with representatives of the Foreign and Defence Ministries and political scientists from Royal United Services Institute for Defence & Security Studies (RUSI) and International Institute for Security Studies (IISS). The delegation also received briefings from BAE Systems, the premier defence company in Europe.

## **I. PROLIFERATION OF WMD**

2. **Paul Arkwright**, Head of Counter-Proliferation Department, Foreign & Commonwealth Office, presented the position of the United Kingdom on the most acute issues in weapons of mass destruction (WMD) non-proliferation. The UK's policy rests on 4 D's:

- *Dissuade* states from acquiring or proliferating WMD. The UK Foreign Office focuses on diplomatic means to achieve this, particularly via reinvigorating international regimes such as the Nuclear Non-Proliferation Treaty (NPT), Biological and Toxin Weapons Convention (BTWC), Comprehensive Nuclear Test Ban Treaty (CTBT), etc. The Foreign Office is also concerned about the proliferation of conventional weapons: for example, the UK is lobbying for the international Arms Trade Treaty, designed to curb import, export and transfer of such weapons.
- *Detect* WMD-related activities by supporting international watchdogs, such as the International Atomic Energy Agency (IAEA), the Organisation for the Prohibition of Chemical Weapons (OPCW) and the Comprehensive Nuclear Test Ban Treaty Organisation (CTBTO).
- *Deny* access to deadly weapons and materials through intensive co-operation with international partners. Dual-use technology is an issue that requires particular attention.
- *Defend* against an attack using WMD. The Foreign Office is not the lead institution in this regard, but it has a role to play, for example, in engaging in contingency planning. Mr. Arkwright emphasized that the diplomatic track is the one the UK prefers, considering military response to be the last resort.

3. The speaker singled out three WMD programmes that cause particular concern:

- Iran's nuclear programme. The international community must continue efforts to dissuade Iran from developing nuclear-weapon (NW) capabilities by offering substantial incentives. Otherwise, Iran will have to face international sanctions.
- North Korea's WMD programme. Sanctions, imposed by UN Resolution 1718, and international pressure induced Pyongyang to come back to the Six Party Talks and agree to halt its nuclear weapon programme. The main challenge is to ensure the implementation of this agreement.
- Libya's WMD programme was developed through extensive help from the clandestine network of A.Q. Khan. The international pressure, followed by an attractive package of incentives, succeeded in persuading Libya to relinquish its WMD capabilities. The UK's assessment is that Libyan authorities revealed all of the country's nuclear capabilities and fulfilled their promise. The UK believes that the "Libyan model" could be implemented elsewhere as well.

4. Members of the delegation asked Mr. Arkwright to comment on other countries that are believed to have nuclear weapons programmes, such as India, Pakistan and Israel. The speaker stated that the UK supports the decision of the United States to engage in nuclear co-operation with India, since this co-operation will make India's nuclear programme more transparent. He admitted, however, that the US-India deal does have some "uncomfortable" aspects to it, such as India not being a member of the NPT. As for Pakistan, Mr. Arkwright felt that the country is moving in the right direction but it takes time to repair the damage caused by the case of A.Q. Khan. With

regard to Israel, it is understandable that this country feels insecure, especially following the remarks of the President Ahmadinejad of Iran. However, Mr. Arkwright stressed that the UK is wholeheartedly supporting the universalisation of the NPT.

5. Asked about the proliferation of WMD means of delivery, the speaker emphasised that the Missile Technology Control Regime (MTCR) needs to be reinforced. He doubted if there is a necessity to strengthen the legal basis of missile non-proliferation efforts. The main task is to ensure rigorous implementation of the existing regime, Mr. Arkwright stressed.

6. In his presentation, **Mark Fitzpatrick**, Senior Fellow for Non-Proliferation, IISS, focused mostly on the case of Iran. His assessment was that Iran is pursuing nuclear weapon capability (not necessarily NW themselves, but rather the ability to produce them quickly when necessary). Iran's ambitious plan to build an enrichment facility with 54,000 centrifuges does not seem to be realistic. Iran will probably concentrate on finishing its current 3,000-centrifuge pilot-scale facility.

7. With regard to the ways to deal with Tehran, Mr. Fitzpatrick opposed endorsing limited enrichment capability for Iran. He believed that legitimisation of enrichment would make it very difficult to control proliferation of sensitive materials and technologies to Iran.

8. Mr Holmas (Norway) asked if denuclearisation of the Middle East is feasible. Mr Fitzpatrick was pessimistic and claimed that even Israel's unilateral renunciation of nuclear weapons would not dissuade Iran from developing NW capability. However, he agreed that certain steps on Israel's part could reduce the tension, for example, cutting off production of fissile material. Mr. Fomenko (Russia) said one should not exaggerate the threats to Israel posed by Iran: Jerusalem is a sacred city for Muslims as well, and Tehran would never launch an attack on it.

9. Commenting on the question from Mr Tagarinski (Bulgaria) on Iran, **Professor Sir Lawrence Freedman**, one of the most prominent British scholars, said that this country's nuclear programme is obviously facing serious technological challenges. The international community has still time to give diplomacy another chance. The military option may be kept in the background, but other sanctions have to be exhausted first.

10. **Dr Dana Allin**, Senior Fellow for Transatlantic Affairs and Editor, Survival, IISS, was worried that the desperate desire to achieve a unified position of the UN Security Council on Iran may be counterproductive. He questioned whether this unity would be flexible enough to reach a workable deal with Iranian authorities.

11. Committee Chairman Mr Mates (UK) was interested in whether Iran's ballistic missile programme posed a serious enough threat to justify the US plans to install missile defence elements in Poland and the Czech Republic. Mr. Fitzpatrick replied that Iran is working on missile designs that would allow the mounting of a nuclear warhead. The Shahab-3 missile is capable of reaching Turkey, but Iran is also reportedly developing longer-range missiles as well. Thus, it is safe to assume that a missile defence installation in Central Europe would indeed be helpful to counter the Iranian missile threat. In the longer run, however, these installations might be useful against other, currently unknown threats. Dr. Giegerich added that the bilateral format seems suitable for this plan, and NATO's involvement might be useful but not necessary.

## **II. TRANSFORMATION, TECHNOLOGY AND NETWORK-ENABLED CAPABILITY**

12. In his presentation, **Sir Lawrence Freedman** discussed the issue of transformation of military affairs. He argued that one could currently witness the emergence of a new dimension of military transformation. Until now, the high-tech end of military transformation was a clear priority.

Accuracy, speed, real-time communication and situational awareness are the key elements of the Revolution in Military Affairs (RMA), the concept that began to take shape after the 1991 Gulf War. RMA emphasises the advantages that armed forces acquire in the Information Age. Modern technologies enable a military to defeat the enemy much more quickly and with minimal losses.

13. However, since approximately 2003, strategic thinking began to change. The experience in Iraq and Afghanistan showed that the US military must make a greater effort to come to terms with irregular warfare. It became obvious that modern military technology is not particularly efficient in dealing with asymmetric threats in failed states. For example, existing technology cannot tell civilians from insurgents. However, some indications suggest that there is an increasing understanding that the process of military transformation should incorporate not only cutting-edge technologies but also focus on counter-insurgency and peacekeeping capabilities. This understanding is expressed in the latest US 2006 Quadrennial Defense Review.

14. The Committee Chairman Mr Mates (UK) noted that it might be relatively easy to introduce new technological solutions, but is often more difficult to change mindsets of national decision-makers. Sir Freedman pointed out that one could detect certain changes in the US attitude towards its allies. The US still wants to remain in the lead, but its leaders realise that they need allies to achieve their foreign and security policy objectives. Mr Bilgic (Turkey) questioned whether NATO should be dealing with asymmetric threats at all. Since one's 'terrorist' is another man's 'freedom fighter', NATO's involvement in fighting the insurgents in some countries might send a wrong signal. Sir Freedman was of a different opinion since NATO has valuable experience in this field and represents an impressive group of democratic countries. However, he agreed that Islamic countries could be more actively engaged in joint efforts to promote stability in countries such as Iraq and Afghanistan.

15. **Dr Bastian Giegerich**, Research Fellow for European Security, IISS, discussed the issue of military transformation and the role of technology. He noted that transformation in Europe takes place in the context of steadily decreasing defence budgets. Many European countries are also not paying enough attention to information and networking technologies, thereby hindering interoperability with the increasingly networked American forces. NATO has to be more active in setting standards that would link military networks of coalition partners. On the other hand, Dr. Giegerich pointed out that NEC is yet to prove its worth. Employing NEC has already brought certain results, but they are not as spectacular as originally anticipated.

16. Mr. Bilgic (Turkey) and Mr. Fomenko (Russia) noted that the Western countries seem to be preoccupied merely with stepping up their military capacity in order to achieve their defence and security policy goals. However, one needs to understand that modern conflicts are more about ideological and cultural differences, and hence the main focus should be on winning the hearts and minds of local population.

17. **The Brigadier Neil Couch**, Director, Command and Battlespace Management (CBM) and Defence Joint 6, Ministry of Defence, briefed the members on the UK Network-Enabled Capability (NEC) programme. Net-centricity is said to be a revolution in warfare and it is the way military will operate in the world, which is increasingly networked. The UK defence planners consider NEC to be a priority. Evidence from studies, experiments, exercises and operations confirms that NEC has the potential to allow UK forces to achieve mission success more effectively and efficiently. NEC will be implemented through the development of necessary equipments, software, processes, structures and individual and collective training, underpinned by the development of a secure, robust and extensive network of networks.

18. Brigadier Couch also named several NEC-related challenges such as:

- Heavy reliance on the network

- Information overload
- Benefits can be lost through inadequate investment
- Sometimes it is extremely difficult to network coalition partners
- Potential for interfering: NEC technologies allow strategic leaders to interfere at the tactical level.

19. The speaker also stressed that net-centricity is not all about communication networks, the human domain (cultural change, training, doctrine, confidence in partners) is just as important for NEC. For NEC to succeed, it should not be regarded as a purely military programme. There is a need for a comprehensive approach, and a number of agencies need to be involved as well as international partners and even NGOs.

20. Asked by Mr Nolin to specify what are the challenges that NEC presents to coalitions, Brigadier Couch said that interconnection even between the UK Foreign Office and MoD are not great, to say nothing about multinational missions. Allied forces in Afghanistan had serious communication problems, but the speaker believed these problems were caused not by the lack or incompatibility of technologies, but by inflexible information protection and exchange rules. It is critical to ensure that these problems are dealt with in future missions and that new standards are developed. Unfortunately, decision-makers, including those of NATO, do not always understand the importance of NEC, and progress is not very visible. Procurement policies need to be revised to meet the challenge of net-centricity.

21. The presentation of **Mr. Graham Jordan**, Senior Science and Technology Advisor, RUSI, addressed the issue of technology policies across the Atlantic and the asymmetries in American, British and French mechanisms of R&D and the NATO role. He noted that European defence expenditure, while significant in aggregate, is highly fragmented and comes mostly from only six nations. Europe's GDP is slightly bigger than that of the US, but the US spends 5 times more on defence R&D than Europe. NATO's Research and Technology Organisation (RTO) is good at providing dialogue about technology priorities, but it has rarely facilitated joint research between nations and made no major direct contribution to generating the technology that the Alliance needs.

22. To improve the situation, NATO should lead the trend towards joint technology development, rather than standing aside. Also, the US government should review its technology-sharing policies. Nations with small or no defence R&D budgets can provide a valuable reservoir of scientific talent. Therefore, it would be helpful if NATO had a small budget to fund R&D in "intellect rich, budget poor" nations.

23. Asked by Mr. Holmas (Norway) about NATO's Science Programme (SP), the speaker said that SP focuses on projects in partner countries, for instance, funding redirection of former Soviet weapon scientists. The threat of proliferation of expertise has diminished in recent years, causing calls for cutting SP's budget. However, it would be more appropriate to redirect that money to NATO's own technology projects. Mr. Bilgic (Turkey) was interested in the causes of such a dramatic technology gap between the US and Europe. Mr. Jordan responded that if one spends 1 Euro in research, it takes 10 Euro to produce a technology demonstrator and 100 Euro to make the actual product. Due to budgetary constraints, European investment is limited to the research/laboratory level only. It is cheaper for Europe to buy an American strike fighter than to develop its own. As a solution, Mr Jordan suggested that Europe focus only on equipment that is necessary to implement the 'Petersburg tasks'. Europe could achieve more if member states would integrate their defence R&D to avoid duplication of efforts, but co-operation is hindered by the fact that nations consider the field of defence to be very sensitive and inalienably related to their sovereignty.

### **III. NUCLEAR WEAPON CAPABILITIES OF THE UNITED KINGDOM**

24. **Tom McKane**, Director, General Strategic Requirements, Ministry of Defence, discussed the future of the UK's nuclear forces. He stressed that, since the Cold War, UK nuclear forces were subject to substantial reductions. The UK retains only a "minimum deterrent" capability, having moved exclusively to submarine-based NW. Currently, the country has 4 submarines, with only one being on patrol. The UK's stockpile of NW (up to 16 Trident missiles with 48 warheads) comprises less than 1% of the world's total. Missiles are detargeted. The UK is committed to refraining from conducting nuclear weapon tests and producing weapons-grade fissile material.

25. The ultimate goal for the UK is nuclear-free world, but this can only be achieved by multilateral action, and unilateral disarmament by the UK would not be instrumental. The ongoing proliferation of WMD and the potential risks from state-sponsored terrorists armed with NW are the factors that caused the British authorities to opt for maintaining and upgrading its nuclear deterrent. Critics of the decision to upgrade Trident missiles usually refer to the political/moral side of the issue as well as the cost of the programme (£15-20 billion). Mr. McKane, however, believed the decision was a right one, because defence of the country is state's main duty.

26. Mr. Nolin (Canada) questioned if Britain's modest NW capabilities actually contribute to its security. Canada, for example, does not feel insecure being non-NW state. At least one of the NW States could show wisdom by unilaterally disarming, and the UK could set such a precedent. Mr. McKane replied that the UK and Canada have different historical contexts. The UK's NW capability is inherited from the Cold War era. However, although the strategic situation has changed dramatically after the fall of the Berlin Wall, there are still too many uncertainties in today's world and too few positive developments to justify unilateral disarmament.

### **IV. CLIMATE CHANGE**

27. The next topic – the UK's strategy with regard to climate change and the Kyoto Protocol – was addressed by **Mr Eliot Morley MP**, the Government's Special Representative on the Gleneagles Dialogue on Climate Change, Clean Energy and Sustainability. He stressed that the environment is a topic that must be on NATO's agenda. Climate security is an integral element of overall security. There is no doubt that temperatures are rising, and our infrastructure, including military equipment, is often not prepared to deal with it. Water shortages, caused by global warming, could lead to competition for water and the build-up of geopolitical tensions in already vulnerable regions, such as Palestine, India-Pakistan or Northeast Africa. The US and Mexico are already competing for the waters of Rio Grande. The opening of the Northwest Passage has also instigated a sovereignty debate between the US and Canada.

28. In the last 10 years, the number of extreme weather events has doubled in the UK. The latest report of the Intergovernmental Panel on Climate Change (IPCC) confirmed that global warming is happening faster than originally predicted. The Arctic sea lost 8% of its ice in last decade, and sea levels are rising at 1-2 cm per decade. If no action is taken, temperatures would rise by up to 5.8C this century, causing irreversible melting of Greenland and even the Antarctic ice sheet. This would result in a sea level rise of up to 12m, significant slowing of the Gulf Stream, oceans becoming more acidic and threatening the food chain. Melting permafrost is already damaging roads in the North. In addition, the global warming might accelerate as melting permafrost releases methane, as oceans warm and as biosphere ceases to absorb excess CO<sub>2</sub>.

29. The human and economic losses caused by global warming are tremendous. The floods in the UK in autumn 2000 cost £1bn, whereas Hurricane Katrina took more than 1300 lives and

caused \$200 bn in total losses. According to the estimations of the “Stern report”, if temperatures rise by five degrees Celsius, up to 10% of global output could be lost. The poorest countries would lose more than 10% of their output. However, stabilising global warming at manageable levels in the next 20 years would cost only 1% of GDP.

30. Industrial nations have to take a greater responsibility in global mitigation efforts (the UK, for example, aims to reduce its CO2 emissions by 60 % by 2050), but the developing world also needs to be involved. China will become the world’s major polluter by 2025. It would be unwise for the developing countries to go through the same ‘dirty phase’ as the industrial nations did. Urgent action on climate change is required across all countries, and the delay would be dangerous and much more costly.

31. Mr. Holmas (Norway) asked to what extent the UK intends to use the Clean Development Mechanism (CDM) to achieve its ambitious goals. Mr. Morley replied that earning carbon credits by implementing projects in the developing countries is not enough. Industrial countries need to reduce their greenhouse gas emissions domestically as well. Mr. Tagarinski (Bulgaria) wondered if nuclear energy might be a solution. Mr. Morley said that, at least for the UK, the cost of launching a nuclear energy programme from the scratch would be massive. Besides, the problem of nuclear waste is yet to be resolved. Nuclear energy might become cost-effective sometime in the future, but currently low-carbon technologies should be a priority.

## **V. ENERGY SECURITY**

32. **Dr. Jonathan Eyal**, Director of International Security Studies, RUSI, spoke about the acute issue of energy security and the role of Russia. He noted that Kremlin seeks to maintain complete state control over energy companies while disguising them as independent commercial entities (for example, Gazprom is nothing but Russia’s Ministry of Energy). The state has an open monopoly over pipelines, thus seeking to control oligarchs and its neighbouring states. Russian authorities also are attempting to create a circle of “privileged customers”, including Germany, France and maybe even the UK. The goal of Russia’s energy policy is to eliminate the ability of Central European countries to have a say in energy matters and thereby make them completely irrelevant. Russia also seeks to block alternative projects such as EU’s Nabucco pipeline.

33. However, Dr. Eyal predicted that Russia itself would be the ultimate victim of such policy. The country does not have sufficient funds and technology to sustain its ambitious plans, and the Gazprom will not be able to fulfil its generous supply commitments. In fact, Dr. Eyal asserted, Russia will itself face gas shortages as of 2010. Besides, Russia will spoil its relationships with its neighbours. Thus, Russia’s energy policy is counter-productive in the longer run and it is destined to fail.

34. Dr. Eyal also touched upon the recent debate on missile defence systems that the United States plans to field in Poland and the Czech Republic. He regretted that the Russian leaders still think in terms of ‘spheres of influence’, although the Cold War is long over. It is also characteristic that Moscow prefers to discuss the missile defence issue with Washington directly, ignoring the Central European countries involved. He urged the Allied nations not to be frightened and stand for what they believe is right.

35. Mr. Nowak (Poland) shared the speaker’s views and stressed that Europe needs a Musketeer Pact on energy to avoid Russia’s blackmail. Mr. Nolin (Canada) questioned whether the portrayal of Russia as an unreliable partner is always applicable. For instance, Canada enjoys constructive co-operation with Russia in the field of energy. Dr. Eyal replied that it was precisely Russia’s policy to keep some countries happy, while exerting pressure on the others. For example,

Lithuanian authorities chose to sell their large oil refinery plant to the Polish company PK Orlen instead of Russia's Lukoil. The reaction was immediate: the supply of Russian oil to the plant was cut off due to "technical problems".

36. The Russian members of the delegation, Mr. Voitenko and Mr. Zhukov, completely disagreed with the speaker and believed that his speech represented certain irritation that the West feels witnessing the revival of Russia as a world power. They asserted that Russia's oil and gas sector is transparent and pursues purely commercial goals. It is true that the substantial part of Russia's budget comes from oil and gas, but the country's leadership is also aware of the need to diversify its energy sector and is determined to do that in near future.

37. With regard to the missile defence debate, Mr. Voitenko said Russia feels threatened by new installation very close to its borders. Moscow will be forced to react by deploying additional missile forces. However, he stressed that Russia does not want this new arms race.

## **VI. BAE SYSTEMS**

38. The NATO PA delegation visited the London headquarters of BAE Systems, Europe's premier defence company, ranking at No. 4 in the world. BAE Systems is engaged in the development, delivery and support of advanced defence and aerospace systems in the air, on land and at sea. With 88,000 employees worldwide, BAE Systems' sales exceeded £13.7 billion in 2006. BAE Systems mostly sells to the US and British markets (36 and 38 % respectively) as well as to Saudi Arabia (12%). The rest of the world accounts for 14% of its sales. The company produces a wide variety of equipment, including armoured combat vehicles, warships, submarines, aircraft, C4ISR systems and homeland defence infrastructure.

39. **Simon Jewell, Strategic Business Development Director**, spoke about the advantages of autonomous systems (AS), one of the priority areas for the company. AS is a rapidly developing technology that is expected to significantly increase surveillance, reconnaissance and possibly even attack capabilities. AS is often associated with unmanned aerial vehicles (UAVs), but it can also include ground, naval or underwater systems. Unmanned systems are being developed at an incredible pace, making an essential breakthrough in a mere 6 years. Members of the NATO PA were shown videos demonstrating various types of unmanned systems developed by BAE Systems.

40. Mr. Jewell stressed that it is important to distinguish AS from remotely-piloted systems. While every move of the remotely-piloted (or "uninhabited") vehicle is remotely controlled and guided by a trained officer, autonomous systems (or "drones") are able to perform various tasks, including obstacle avoidance and situation assessment, with minimal or no intervention from a remote human operator. AS have clear advantages over remotely-piloted systems, as they better react to changing environment and never get tired or bored. Therefore, AS could be very helpful in dealing with asymmetric threats, such as hostile insurgent or guerrilla groups in countries like Afghanistan or Iraq. The challenge is, however, how to programme an autonomous vehicle in a way that it would change its course when confronted with unforeseen obstacles, but would still continue to execute its mission. One of the solutions is defining an aerial 'corridor' within which a drone could have liberty to alter its trajectory. The United States is clearly in the lead when it comes to developing and especially fielding the remotely-piloted vehicles, while in R&D of autonomous systems, Europe is rapidly catching up. BAE Systems' Corax UAV, for example, is fully autonomous and has demonstrated its reliability.

41. NATO has to be engaged in regulation and integration of unmanned and autonomous systems. A framework has to be established to co-ordinate flights and enhance communication of



UAVs to avoid collision. Also, there has to be a new code of behaviour for the situation when a pilot is removed from the cabin (it is a serious cultural shock).

42. Mr. Ellingsen (Norway) asked what are major challenges of developing such systems. Mr. Jewell replied that sense-and-avoid technologies, mounted on an autonomous UAV, need to be extremely sophisticated. Networking UAVs is another critical challenge. Lord Jopling (UK) was interested in the cost of AS. Mr. Jewell said that it depends on a system. The American Global Hawk is very expensive, but smaller tactical UAVs are much cheaper. On the average, however, a system of 3 UAVs with a ground station would approximately cost £10 million. The lion's share of the cost comes from software and sensors, not platforms.

43. **Kevin Porter, Capability Director**, discussed the contribution of BAE Systems to the UK's Network-Enabled Capability Programme (NEC). NEC is very much about relevant information exchange and management. Information needs to be delivered quickly, to the right people and in the right format. One of the most acute problems, experience by coalition troops in Iraq, is the overload of information. BAE's experts are developing capabilities to separate critical information from that which is redundant. BAE Systems is also providing technology that allows the British military to connect to the major American military network – SIPRNET. The speaker also stressed that, in order to avoid unnecessary duplication, NEC has to be based on commercial off-the-shelf technology (COTS). NATO needs to expand its co-ordination and standardisation efforts.

44. **Cris Courtaux, Theme Director**, introduced the project called NITeworks (Network Integration Test and Experimentation Works), an experimental environment that allows the UK Ministry of Defence to assess the benefits of Network Enabled Capability (NEC). This unique partnership allows the UK to pursue more effective defence procurement policy. The industry benefits as well, as it has a better understanding of what the government needs. Experimentation within the framework of NITeworks enables the government to assess products well before it is procured, thus saving money. For example, the procurement of unmanned underwater vehicles for the British armed forces was based on the results of NITeworks experiments.

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