Staying ahead: the US and future technologies

by Jan Joel Andersson

The US is determined to remain the world leader in defence technology. After several years of procurement and research cuts (a 14% reduction to $168 billion in fiscal year 2013 and a further 4% to $162 billion in 2014), the US is now planning to stabilise spending levels in this field. To ensure that it stays ahead in the technology game even in times of tighter budgets, the Pentagon will shift more money to basic research and early stage developments – the level where concepts are turned into prototypes. The trade-off is that the budget for system development and demonstration is being reduced, meaning that many promising new technologies may never materialise or enter production. Meanwhile, the US will continue producing systems of incrementally improved levels of technology so as to ensure that its military keeps its edge until new breakthrough technology can be fielded.

Knowledge is power

New technologies are game changers in war and peace. By exploiting its advantage in science and technology during the Cold War, the US was able to counter the Soviet Union's superior numbers of soldiers, tanks and aircraft. Technologies such as smart bombs, stealth aircraft, remote surveillance, command and control networks and other high-tech systems were all developed during the Cold War and provide the basis for US conventional military dominance today.

However, the spread of technological know-how and aggressive efforts of other countries to catch up in the fields of natural sciences and engineering means that the US may soon face technologically equal (if not superior) competitors and opponents. Technology superiority remains a priority for all the major powers in the world. Though the US is adamant that it should retain its lead in defence technology, Russia has embarked on an ambitious technological modernisation process of its own. Elsewhere, China is investing heavily in new technologies able to destroy satellites and new weapons able to evade missile defences while India recently demonstrated its ambitions by successfully sending a space probe to Mars.

To ensure it remains the undisputed leader in defence technology, even in an age of austerity, Washington plans to 'leap-frog' a generation of technologies. This strategy has been proposed before but never fully implemented. Then presidential candidate George W. Bush proposed moving beyond marginal improvements to skip a generation of technology in 1999. Once in office, however, the pressing needs of two major land wars in Central Asia and the Middle East made procurement of existing gear more important than future research needs.

This time around, it may be different. While money remains tight, the Pentagon will ring-fence its spending on research, development, test and evaluation (RDT&E) programmes for future gear at

the expense of current procurement. A shift is also planned within the RDT&E budget itself. Since spending on RDT&E will remain relatively flat, the Pentagon wants to further cut its spending on system development and demonstration (reducing it from $20 billion in 2009 to $10 billion in 2018) to protect basic research and early stage development: the level at which real technology breakthroughs take place.

The drawback of this focus on future technologies is that many promising projects still in the pipeline may never be fielded. With this approach, the US is expected to produce more prototypes but not put them into production. To compensate the military for these 'gap-years' of slower modernisation in the medium term, the Pentagon will receive more resources to allow the military to finalise and field short-term technological advances and upgrades.

Cuts in discretionary spending required by the Budget Control Act of 2011 have reduced or slowed down planned purchases over the last three budgets of a variety of weapons systems and equipment – such as manned and unmanned aircraft, helicopters, ships, ground vehicles, and communication systems. Once current ongoing major programs (like the replacement of the current Ohio-class ballistic missile submarines for the US Navy, the Space Fence for the Air Force, the WIN-T battlefield network for the US Army, and the Advanced Air and Missile Defence Radar) are completed, the expectation is that many newly developed technologies will be shelved.

This push for leap-frogging ahead requires an element of risk-taking and a willingness to tolerate failure. While the US is increasing funding for Pentagon and Defense Advanced Research Projects Agency (DARPA) research, private industry is also expected to increase its own investment in defence R&D. Between 1999 and 2012, top US defence industry companies cut their internal R&D spending by a third. And while some US defence companies are now slowly reversing this trend, the majority of companies have yet to do so.

Mind the (transatlantic) gap

A major challenge for the future is the US' ability to protect R&D funding in a worsening economic climate. Unfortunately, not much extra funding can be expected from Washington's closest partners, the member states of the EU and NATO, since they consistently underspend in the fields of research, technology and development (RTD).

That Washington is increasingly frustrated by what it perceives to be European unwillingness to provide enough investment in military capabilities and defence research is well known – and has long been a sore point of contention across the Atlantic. Over the past ten years, the aggregate defence expenditures of the 26 members of the European Defence Agency (EDA) has been about half of the US total. In GDP terms, this translates to a 1.6% of GDP spent on defence in the EU compared to 4.8% in the US. There is also a significant difference in how money is allocated. While EU member states spend about 20% of their defence budgets on investments in new capabilities, the US share is around 30%. The difference is even more pronounced when it comes to research and development. In 2010, EU governments spent a total of €9 billion on defence R&D – the US €58 billion.

There is a risk that Europe may not only lose its competitive advantage *vis-à-vis* other actors but also lose its ability to collaborate with its most important partner and ally. The difference between Europe and the US is not only how money is spent but also on how to approach future technologies. There is growing concern that Europe is focusing more on bringing today's or even yesterday's technologies and capabilities to the field then on developing tomorrow's potential game-changing technologies – meaning that transatlantic security and defence cooperation could become increasingly difficult.

A major reason for this concern is that new technologies and capabilities take a very long time to develop, are costly to field and, once in place, are to be around for decades. Any new capabilities must therefore be able to adapt to various types of future scenarios. Some capabilities, such as air-to-air refuelling, drones and strategic transport, are generic capabilities necessary for almost any future scenario – while others are not.

However, many new technologies in areas of vital importance to security and defence – such as satellites, communications networks and cybersecurity – are increasingly driven by commercial innovators and not traditional defence industry companies. The relationship between high-tech, civil security and military defence have become increasingly blurred. Given that European industry is quite advanced and competitive in some of these areas, there are still opportunities for Europe to remain in the race to stay ahead in technology.

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