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# Convergent Technologies, Dual-Use Weaponry and the Global Balance of Power

Convergent and dual-use technologies could match or surpass the capabilities of existing nuclear and conventional arsenals within the next 20 years. For Robert McCreight, the dangers these technologies pose must be taken seriously, especially since states are almost sure to use them.

By Robert McCreight for ISN

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As the complexity of advanced technologies continues to increase, hard questions need to be asked about the possibility of dual-use risks that could jeopardize the stability and security of the planet. States with weapons systems that are already highly developed could gain significant advantages from the advent of novel weaponry. Indeed, it is not inconceivable that in 15-20 years advanced dual-use technologies could match, nullify or surpass the capabilities of existing nuclear and conventional arsenals. What implications does this have for international security?

## **A new age of advanced technology**

Advanced dual-use technologies entail significant risks of weaponization over the next 15-20 years. Likewise, the residual risks involved in so-called 'convergent technologies' could be even more lethal. Convergent technologies reflect a deliberate mixture of two or more advanced technologies to create a meta-technology of enhanced strategic significance. An example might be the explicit blending of cyber-science with robotics and artificial intelligence to produce a new kind of warrior-android. Other advanced dual-use technologies include robotics, genomics, nanotechnology, neuro-technologies, photonics, and lasers. Technologies such as these are no longer confined to the realm of science fiction. More precisely, the period between 2025 and 2030 is likely to see scientific and technological advances of this type become both attractive and prevalent.

The dawning of a new age of sophisticated dual-use technology, with profound strategic consequences, is not without precedent. In 1945, the implications of the new atomic era were only dimly understood. Nevertheless, a number of states actively sought new missiles, satellites, attack aircraft, and other technologies to ramp up their offensive capabilities and attain some semblance of parity with each other. Like great powers before them, these states wanted concrete evidence that they could either deter their adversaries or demonstrate a strategic defensive edge. The nuclear arms race also led non-nuclear states to appreciate the strategic advantages of acquiring advanced weapons systems.

In the first decades of the 21st century, the global appetite for the most technologically sophisticated

weaponry continues to grow. In addition to several EU nations, high-tech states in East Asia and the Middle East along with obvious competitors like Russia and China are vying for dominance in science and technology and may be pursuing a 'great equalizer' to offset or deter states with nuclear weaponry. As throughout the 20th century, states are scrambling to diminish any suspected shortcomings in their own arsenals and to narrow any apparent strategic gaps.

Of course, advances in science and technology also benefit society, enhance public health, help eradicate hunger, and much else. This means that pursuing advanced dual-use technologies has virtually unlimited value. However, this calculation assumes that the insidious side of these technologies never appears. This is why anticipating the misuse of science and technology for destructive and nefarious purposes is of critical importance. Advanced dual-use technologies can upgrade the military arsenals of marginal states and non-state actors, subsequently reshaping their security environments - as well as those of their neighbors and rivals.

Over the next decade, states that already have access to or that are in the process of acquiring advanced systems that rival today's array of existing global armaments will sooner or later be tempted to use them. This is why the short and long-term consequences of advanced technologies for the global balance of power need to be seriously estimated and fully appreciated.

### **What is to be done?**

First, we should examine what our courses of action would be if advanced technologies do open the door to powerful new weapons systems. It is unlikely that the UN system can stem global proliferation of these new technologies and adequately monitor such activities. Some states may see this as an opportunity to acquire a strategic upgrade - seeking newer weapons systems that could ultimately rival nuclear weapons.

Second, we should ask how the proliferation of advanced technologies and the attendant risks for eventual convergence could change the global balance of power. If proliferation and technology transfer controls are absent or weak, it will be easier for states to acquire these advanced technologies to enhance their arsenals. Unexpected shifts in the global balance of power are costly, risky and contain strategic implications for many nations. New alliances may arise while others weaken or dissolve. If terror groups somehow acquire these technologies, the global security dilemma would be redefined for the worse.

Third, we should ask whether the community of nations is able and willing to actually delay, redirect or rein in downstream development of the most threatening forms of convergent technology. International mechanisms, while far from perfect, require daily and persistent monitoring by a collegial and cooperative alliance in order to prevent diversion, proliferation and theft. Moreover: what incentives can motivate like-minded states to create and sustain such a system? And would it be inherently unfair to disadvantaged states? Of course, dual use technologies of an advanced nature might still escape such a dragnet. Just as we have seen missile, satellite, UAV and nuclear technology spread via proliferation and covert technical assistance over the last 15 years, we should expect that some nations will share convergent technologies that convey some form of strategic advantage.

Fourth, we should identify what can and should be done today to prevent, delay or redirect the emergence of novel lethal weapons systems. If extraordinary international measures could be implemented now to halt the development and proliferation of advanced dual-use technologies, there would still be no guarantee that these would be effective. The key question is whether such measures should be pursued now as a matter of urgency in international security policy. The risk is that, amid the chorus of competing global ideas and interests, a remedy that is acceptable to all parties will not be found soon enough.

Avoiding the worst consequences of convergent technology is of critical importance. However, given the worldwide sharing of scientific data, cross-border collaboration, and the unrestricted exchange of scientific and technical data in robotics, nanotechnology, neuroscience and other fields, a reliable mechanism for restricting and controlling the proliferation of advanced dual-use weaponry may not be possible. There is no genuine consensus on what to do and the best way forward. Given the overwhelming global support for open scientific discourse and collaborative research, however, this is not surprising. Indeed, scientists and political leaders can hardly agree on the nature and urgency of the problem itself.

Finally, if the emergence of newly adapted and convergent technologies with significant weaponization risks during the next 10-15 years cannot be stopped, what are the implications for global peace and security? At minimum, some states could orchestrate dramatic shifts in their relative power. On the whole, the leveling of the international playing field seems the most likely outcome.

Without question, the geostrategic position of many states will change by 2025 and the influence of advanced dual-use technologies will be an important factor in this. Whether this results in a better, more peaceful and more secure world, however, is anyone's guess. More attention must be paid to the phenomenon of dual-use technology so that its worst downstream effects and consequences are clearly understood.

Over the last 65 years we have learned that reining in the appetites of the most developed nations for the most modern weapons systems can be extremely challenging. The central dilemma is this: to what extent will progressively more complex and problematic dual-use technologies be encouraged and allowed to proliferate if they contain significant risks to global and regional security?

Worryingly, the malevolent dimensions of dual-use technology are often not examined until their capabilities have ripened. And regulation poses difficult question in practice as well as in principle. Which types of advanced technology, for instance, can go forward unfettered by global review and regulation? Which cannot? What criteria should apply?

These are some of the most important unanswered questions of our new century. It is up to us to determine whether advanced technologies, and breakthroughs in science that unalterably contain dual use risks, will be largely regulated and monitored via some global system or not. Avoiding this question risks encouraging the development of weapons whose destructive capacity we cannot yet imagine. Evolving, meta-, and convergent technologies may one day require some degree of government oversight (rendered objectively on behalf of a disinterested public). This is not likely to happen, however, if our fascination with and enthusiasm for modern technology combines to leave us open to a more dangerous and uncertain future.

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