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Abstract of lecture:

Military Nanotechnology and Preventive Arms Control

Expecting revolutionary changes in many areas, many countries and the EU have made Nanotechnology (NT) a major focus of research and development (R&D). Most programmes are directed to civilian applications – however, there are also military R&D. In particular, the U.S. National Nanotechnology Initiative spends more than ¼ for military work. While technology assessment for civilian NT is beginning, military uses are up to now largely ignored. In 10-20 years, these uses may include much faster but much smaller computers, miniature sensors, lighter and stronger materials in vehicles and weapons, autonomous systems of many sizes.

For judging potential new military technologies from a viewpoint of international security (as opposed to a narrow concept of national security through military strength), one can consider the criteria of dangers to arms control and the international law of warfare, dangers for stability (military situation, arms race, proliferation) and dangers for humans, society, and the environment.

Some potential military NT applications (e.g. computers) will be so close to civilian uses that limits are impractical. Others (e.g. sensors for biological-warfare agents) could contribute to better protection against terrorist attacks or to better verification of compliance with arms-control treaties. However, there are several potential uses that raise strong concerns: new chemical or biological warfare agents, autonomous fighting systems (land, water, air, outer space), mini/micro robots, body manipulation including implants. (Molecular NT – universal molecular assemblers and self-replicating nanorobots – would entail much higher dangers mainly by a race in autonomous military production and pressures for pre-emptive attack.)

Containing such dangers, including avoidance of a technological arms race between partners, needs preventive arms control – general as well as specific rules with adequate verification of compliance. Europe may be in a good position to involve the USA and its potential opponents (Russia, China, maybe some threshold countries) into discussions about such limitations.

Text of lecture:
not available, contents similar to Security-Dialogue article in reference material

Reference material:

J. Altmann, Military Uses of Nanotechnology: Perspectives and Concerns, Security Dialogue **35** (1), 61-79, March 2004

R. Asher et al., 'E. National Security – Theme E Summary', in M. C. Roco & W. S. Bainbridge (eds.), *Converging Technologies for Improving Human Performance – Nanotechnology, Biotechnology, Information Technology and Cognitive Science* (NSF/DOC-sponsored report) (Arlington VA, 2002); available at http://wtec.org/ConvergingTechnologies/Report/NBIC_report.pdf

CV:

Jürgen Altmann studied physics and did a doctoral dissertation on laser radar (University of Hamburg, Germany, 1980). After research work in computer pattern recognition, since 1985 he has studied scientific-technical problems of disarmament, first concerning high-energy laser weapons, then European ballistic-missile defence. In 1988 he founded the Bochum Verification Project (Ruhr-University Bochum, Germany) that does research into the potential of automatic sensor systems for co-operative verification of disarmament and peace agreements. Experiments and evaluations dealt with acoustic, seismic, and magnetic signals from tanks, trucks, and military aircraft. Prospective assessment of new military technologies and analysis of preventive-arms-control measures form another focus of his work. One area is non-lethal weapons, with a major study of acoustic weapons. Another project looked at the interactions between civilian and military technologies in aviation research and development. In recent years, he has studied military uses of, first, microsystems technologies and then nanotechnology, with a view towards preventive arms control (both at University of Dortmund, Germany). At present, he has started a project analysing potential new, physics-based technologies for non-lethal weapons (also at University of Dortmund). He is a co-founder of the German Research Association Science, Disarmament and International Security FONAS, and currently is a deputy speaker of the Committee Physics and Disarmament of the German Physical Society DPG.

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