

STOA-NEWS

During October and November a whole set of interim reports on running STOA projects carried out by ETAG have been completed and forwarded to the STOA Panel. Abstracts of the reports are given below.

The monitoring report “Making Perfect Life” was the preparatory document for a Conference held at the European Parliament on 10 November 10. An impression of the debates and the outcome of the conference was given in a press release by the Rathenau Institute after the Conference.

Conference “Making Perfect Life”

EU needs to regulate new body and brain interventions and life-like technologies

Bio-engineering is changing our lives fast

by Robert Slagter, journalist, Enschede

Bio-engineering is developing at such a pace that the EU needs to reconsider and possibly reform its current regulatory frameworks to prevent many new ethical and political dilemmas. Also, scientists need to take more responsibility for the political and social consequences of discoveries such as synthetic living cells and smart implants. With scientific barriers falling away rapidly between material and life sciences, it is hard to predict where bio-engineering will take humanity in the 21st century.

The conference *Making Perfect Life* held in Brussels on 10 November 10, organized by the Rathenau Institute on behalf of STOA with the support of the ETAG partners ITAS, ITA and ISI, was both an inspiring and dazzling experience for the 120 policy makers, natural and social scientists who participated. “It is clear we have an abundance of scientific and political challenges ahead,” MEP and STOA Panel Member Vittorio Prodi said in his concluding remarks. “We are living in an era of change where we really need to think ahead in order to protect human dignity.”

The picture emerging from the panel discussions and presentations was that of a wave of

new bio-engineering developments in the coming decades, which will have serious impact on European states and its citizens. “The bio-debate used to be about biotechnical developments such as cloning and genetic modification. But the research for the Making Perfect Life project shows we now see revolutionary steps being taken in four bio-engineering domains: the body, the brain, intelligent artifacts and living artifacts, which each raise many bio-ethical questions,” Rinie van Est of the Rathenau Instituut said in his introductory statement.

In this new millennium, the boundaries between biology and technology are disappearing quickly, van Est indicated. “We are living in an age where we can produce living artifacts through synthetic biology. We can make artificial heart valves, and we can stimulate the brain to reduce the tremor of Parkinson disease or even relieve patients from their obsessive compulsive behavior.”

1 Technology more Intimate

The regulatory and moral consequences of these new interventions in the human body need to be addressed, as well as the creation of life through artifacts. What will be the effect on human dignity? And shouldn't European regulations be updated? Van Est: “Do we have the right safety rules for interventions in the brain which are not pharmaceuticals? How will robots, such as the current remote use of armed Unmanned Military Aerial Vehicles, influence the ethics of war? And what about our genetic and mental privacy? Technology is becoming very intimate: these issues need to be addressed by the European Commission.”

And policy makers should act soon, as bio-engineering is expanding quickly and the possibilities seem to be limitless. The amount of stem cell trials for regenerative medicine has exploded over the last decade: from 50 in 2003 to over 2250 in 2010. Especially in China and the United States the commercialization of the sector has gone quickly.

“It is difficult to keep up with all the developments, as the pace is very high. We are in a very elastic space,” Stephen Minger of GE Healthcare said. “The technology is there to grow cells on a large scale in the future. This means we will be able to replace all human cells affected by

disease. The question then is: where to draw the line? Do we have ‘quality of life’ when we can become 120 or 150 years old?”

Another serious issue connected to new bio-engineering possibilities, is the lack of knowledge of the long term consequences of transplanting stem cells, as the behavior of these cells is still very unpredictable. “We should put a question mark behind ‘Making Perfect Life’, as we don’t know yet if medicine is able to translate the new inventions into perfect products,” social scientist Andrew Webster warned. “Pharmaceutical companies don’t know yet in which innovation they should invest.”

2 Gap between Experts and Public

The conference discussions made clear that European policy makers need to monitor the diverse set of bio-engineering developments more closely to timely develop effective regulation policies. They need to look beyond established forms of bio-engineering such as genetic modification and stem-cell research, and focus on the engineering of the brain and intelligent artifacts. The convergence of emerging technologies demand a more anticipatory type of governance.

Also, the general public needs to be informed much better. The gap between the experts and the civil society is too big. “Our personal privacy is very much affected by modern technology,” law expert Judit Sandor said. “People feel they lose control over information that belongs to them. The public trust here is very fragile.”

Philosopher Roger Strand pointed out there are great issues at stake, as synthetic biology and robotics pose huge safety threats to both the individual and the global community. “We are sitting here calmly and having a casual discussion, but we may have robot wars taking place in the near future. We think we can regulate and control these scientific developments, but the question is: who will decide on the European future? Bio-engineering is part of a wider mega trend on a global level. We need to realize that the purpose of science is not for the sake of knowledge itself, but for maintaining the economic system. We need to think over the risks and uncertainties which are involved here.”

Malcolm Harbour, MEP and STOA vice chairman, reiterated the many challenges which lie ahead for European policy makers. “I have never been to a session with so many uncertainties for the future on the table. Clearly, there is much work to do. It will take another decade of monitoring the long term effects of stem cell use in new pharmaceutical products before we know more. At the same time, when we discuss the issues of prolonging human life, the question remains: how far do we want to go?”

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New STOA Project Reports

Monitoring Report: “Making Perfect Life - Bio-engineering (in) the 21st Century”

The monitoring report *Making Perfect Life: Bio-engineering (in) the 21st Century* is the result of the second phase of the STOA-project “Making Perfect Life”. The document provided input for a conference which involved both Members of the European Parliament (MEPs) as well as other experts and was held on 10 November 2010 at the European Parliament in Brussels (see above). The report focusses on the literature review and preliminary research that was done during the first phase of the project, which ran from September to November 2009 and led to an interim study, which was instrumental in defining the research focus of the monitoring phase. The Monitoring report presents the state of the art of four domains of bio-engineering: engineering of living artefacts, engineering of the body, engineering of the brain, and engineering of intelligent artefacts. Moreover, the study depicts the relevance of each of these four engineering fields within the European Framework Programme, and it provides an overview of the various social and ethical issues that relate to the further development of these fields.

ETAG partners involved: Rathenau Institute, The Hague (lead), Fraunhofer-ISI, Karlsruhe, Institute for Technology Assessment, Vienna, ITAS, Karlsruhe

Contact: Rinie van Est, Rathenau Institute (q.vanest@rathenau.nl)

Technology Options in Urban Transport: Changing Paradigms and Promising Innovation Pathways

The interim report of the STOA-project “Technology Options in Urban Transport: Changing Paradigms and Promising Innovation Pathways” describes technology options and mobility services, which are, or might become, relevant for urban transport systems and, thus, will become relevant for a transition to more sustainable urban transport. The report also looks at impacts, challenges and visions related to these technologies and concepts. In doing so, it is setting the focus on the supply side of the transport system.

The report gives an overview on alternative fuels (biofuels, battery electric vehicles, hybrids, natural gas, autogas and hydrogen with fuel cells). It touches upon the controversies related to availability and efficiency of the different fuel-propulsion systems and it will try to contribute to transparency in this field. A second field under consideration is Information and Communication (ICT) infrastructure, namely the network that connects electronic devices such as phones and computers to the internet and each other, which has become of utmost importance for the design of transport systems. In addition to these technological developments, new emerging business concepts that are both enabled by new technologies and are themselves enablers for technological advancement are in the focus of the report. In particular, the development of ICT technologies supports new concepts and business models for “individualised collective” forms of transport, such as car sharing, car-pooling or bike-sharing.

Visions, paradigms (or “Leitbilder”) are a central element of transport planning and play a significant role for the improvement of urban transport systems. They present the strategic direction for future developments by providing principles and guidelines. The report illustrates some examples on how European cities anticipate and plan future developments in transport.

ETAG Partners involved: ITAS, Karlsruhe (lead), Danish Board of Technology, Copenhagen

Contact: Jens Schippl, ITAS
(jens.schippl@kit.edu)

E-Democracy in Europe – Prospects of Internet-based Political Participation

In-depth Examination of three selected Areas

The second interim report of the STOA-project “E-Democracy – Technical possibilities of the use of electronic voting and other Internet tools in Europe” addresses three central dimensions of E-Democracy, which are E-Public, E-Participation, and E-Voting. In the E-public part of this report it is argued that the internet can help to generate a European public although the issues discussed on the internet show a strong specialisation. This specialisation goes hand in hand with a fragmented rather than a uniform and broadly informed audience. However, this fragmented audience is a transnational audience nonetheless. It can be said that issues emerging on or supported by the internet can in many respects be regarded as elements of a European public opinion.

In the E-participation part of the report it is shown that there are many examples of how the internet can be used to enhance participation in political processes, including E-consultations and E-petitions. The examples included top-down initiatives to enhance participation as well as bottom-up approaches, where citizens were mobilised and have organised their request over the Internet. Especially for the different forms of bottom-up initiated E-participation it remains unclear, whether and how these forms become relevant for political decision-making.

In the E-Voting paper technical, legal and procedural prerequisites which need to be fulfilled before elections over the internet become possible are analysed. The expectation that E-voting increases voter turnout because the process of voting is more convenient could not be confirmed. Instead, the new technology builds up new barriers for voting. The development of an adequate technical infrastructure for E-voting as well as the generation of trust in E-voting by the population seem to be tasks which need political dedication and require a longer time-horizon.

ETAG Partners involved: Fraunhofer-ISI, Karlsruhe (lead), Institute for Technology Assessment, Vienna, ITAS, Karlsruhe

Contact: Bernd Beckert, ISI (bernd.beckert@isi.fraunhofer.de)

NanoSafety – Risk Governance of Manufactured Nanoparticles

The Nano*Safety* project deals with the governance of the potential environmental, health and safety (EHS) risks of manufactured nanoparticles. Because of great uncertainties regarding their actual health and environmental effects and numerous methodological challenges to established risk assessment procedures (definitions, toxicology, exposure and hazard assessments, life cycle assessment, analytics, and others), risk appraisal and risk management of manufactured particulate nanomaterials (MPN) are confronted with serious challenges. At the same time, precautionary regulatory action with regard to MPN is demanded by a number of stakeholders and parts of the general public. Regulation under uncertainty raises fundamental political questions of how lawmakers should regulate risk in the face of such uncertainty. To explore this issue in greater detail, the project focuses on two important perspectives of regulation: Risk management strategies for MPN as discussed or proposed for the EU or its member states, and risk communication problems and needs for EHS risks of MPN. The interim report concludes phase two of the project. It provides an executive overview of the state of research on potential EHS risks of manufactured particulate nanomaterials, including risk assessment for MPN and the limitations it is currently facing. It also discusses the role of definitions in regulatory debates, delivers a cursory synopsis of the relevant definition proposals in policy papers and pieces of legislation in the EU context and elaborates on an appropriate legal definition of MPN. The report gives a brief review of regulatory activities regarding MPN at the European level, discusses advantages and limitation of selected regulatory instruments and presents first ideas for options for parliamentary action.

Contact: Torsten Fleischer, ITAS
(torsten.fleischer@kit.edu)

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Informationen zum ITAS

Das Institut für Technikfolgenabschätzung und Systemanalyse (ITAS) im Karlsruher Institut für Technologie erarbeitet und vermittelt Wissen über die Folgen menschlichen Handelns und ihre Bewertung in Bezug auf die Entwicklung und den Einsatz von neuen Technologien. Alternative Handlungs- und Gestaltungsoptionen werden entworfen und bewertet. ITAS unterstützt dadurch Politik, Wissenschaft, Wirtschaft und die Öffentlichkeit, Zukunftsentscheidungen auf der Basis des besten verfügbaren Wissens und rationaler Bewertungen zu treffen. Zu diesem Zweck wendet ITAS Methoden der Technikfolgenabschätzung und Systemanalyse an und entwickelt diese weiter. Untersuchungsgegenstände sind in der Regel übergreifende systemische Zusammenhänge von gesellschaftlichen Wandlungsprozessen und Entwicklungen in Wissenschaft, Technik und Umwelt. Das Institut erarbeitet sein Wissen vor dem Hintergrund gesellschaftlicher Probleme und Diskurse sowie anstehender Entscheidungen über Technik. Relevante gesellschaftliche Akteure werden in den Forschungs- und Vermittlungsprozess einbezogen. Außerdem greift das ITAS die Problematik der Bewertung von Technik und Technikfolgen mit wissenschaftlichen Mitteln auf. Die Forschungsarbeiten des Instituts haben grundsätzlich einen prospektiven Anteil. Es geht – im Sinne der Vorsorgeforschung – um Vorausschau der Folgen menschlichen Handelns, sowohl als Vorausschau soziotechnischer Entwicklungen (Foresight) als auch als Abschätzung künftiger Folgen heutiger Entscheidungen. Als Richtschnur gilt, dass die Forschungsergebnisse in unterschiedlichen, alternativen Handlungs- und Gestaltungsoptionen gebündelt und in Bezug auf ihre Folgen und Implikationen rational bewertet werden. Das Internetangebot des Instituts finden Sie unter <http://www.itas.fzk.de>.