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Austrian Safety and Security Research 2011

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Type: A national foresight to develop a proposal for an Austrian Safety/Security research system
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Motivation

Austria intends to launch a national research programme on safety and security that is complimentary to PASR – an EU funded Preparatory Action on Security Research as well as the upcoming Seventh Framework Programme of the European Union. To prepare the ground for this new national research funding initiative, a foresight process was started to investigate conceptual issues concerning safety and security research and to identify Austrian priorities for research in this area. This initiative was coordinated by the Federal Ministry for Transportation, Innovation and Technology of Austria.

International Frameworks and National Contexts for Research on Safety & Security

The first aim of the project 'Safety/Security Research – Idea and Procedures for Austria' was to complete a comprehensive conceptual investigation of this research area. The second was to employ a bottom-up foresight approach for the identification of research priorities for safety and security research from an Austrian point of view.

The terms safety/security refer to a broad set of themes ranging from personal safety to collective safety and security. However safety/security research should be approached from within an international framework that remains open to news ideas, concepts and needs while respecting the national context.

Twenty half-day workshops were organised with the involvement of representatives of relevant public authorities and national research domains, stakeholders from the Austrian provinces and federal ministries. This campaign marked the start of the foresight process.

The Project Schedule

The project was organized as a sequence of five phases.

Phase 1 – Investigation of the Status Quo and Further Requirements: In this project phase the most relevant national policy actors and public authorities were involved along with representatives of research organisations, representatives from industry and trade unions as well as business councils and international organizations such as OPEC and the UN. More than 150 experts contributed about 1,300 statements in 20 half-day workshops to provide a broad cross sectional database of opinion on security and safety issues.

Phase 2 – Data Structuring and Ordering: The plethora of data from the first phase was structured and ordered by a list of keywords extracted mainly from the gathered statements. Topics of Safety/Security research were extracted by means of a multi-level content analysis method.

Phase 3 – Prioritization of Safety/Security Research Topics: A process of gradual information clustering or pooling provided 99 main statements as subtopics. The subtopics were prioritized by a working group comprising participants from different research organisations, the Austrian research promotion agency and the federal ministries.

Phase 4 – Determination of Research Promotion and Funding Thresholds for Prioritized Research Topics: The same workgroup involving federal ministry representatives, the Austrian research promotion agency and experts of research organisations determined the thresholds for the minimum amount of funding resources for the prioritized safety/security research topics identified in phase 3.

Phase 5 – Proposal of an Accumulated Financial Budget Frame for an Austrian Safety/Security Research Funding Programme: Based on a European Safety/Security research programme with more than €1Billion a year and an Austrian annual financial contribution of around 2.3% to this programme, an Austrian safety/security research funding programme with an annual budget volume of more than €20Million considered necessary to promote Safety/Security research in Austria.

Social Stability & Technological Support

The underlying foresight based approach to research priority setting resulted in 35 Safety/Security research themes being discussed during 20 half-day workshops and further supplementary meetings. Moreover a further 35 Safety/Security research topics were suggested in personal interviews with experts familiar with Safety/Security research.

To prioritize research topics of particularly importance for Austria, they were first re-grouped under eleven thematic categories. Finally these were bundled into four Safety/Security areas for research. Labelled from A to D these are described below.

A. The Fundamentals of Safety/Security Research

It was necessary to distinguish four main aspects of fundamental research on safety/security:

- Theoretical aspects,
- Empirical questions, and
- Scenario exercises.

The *theoretical aspects* consider the development of political cultures in Europe, whereas the main *empirical questions* deal with issues such as how to 'export' economic and social stability for example to new member states with a view to preventing a political crisis. Issues to be addressed through research on Safety/Security include:

- Stability enhancing measures,
- Alternative Safety/ Security concepts,
- The protection of minorities and civil rights,
- The proper handling of asylum,
- Migration and the protection of immigrants.

Finally there is also a need to continuously update our understanding and assessments of the status quo on the basis of future *scenario exercises* to explicitly assess possible threats to Austria originating from both within and without Austrian society.

B. Safety/Security Related Research and Risk Analysis

The thematic category of Risk Analysis was split into four sections:

- Risk analysis concerning Terrorism and War,
- Human risk factors,
- Trust building capabilities,
- Risk analysis regarding societal development and scientific-technological progress.

Terrorism and War was identified as one of the most significant Safety/Security threats today. Non-proliferation strategies and advanced detection technologies to provide protection against atomic, biological, chemical and radiological threats represent the heart of Safety/Security research in this area.

An important *risk factor* which has not been given due attention until now refers to the capabilities and limits of *human beings*. This reveals itself especially in fields such as aviation where there could be issues of pilot reliability or in road transport where fatigue, recreational drug use or medication can impair the performance of the driver, putting them, their passengers and the public at risk. Human error is another area. Error avoidance and fault tolerance are therefore important research fields in safety research. *Trust building* is important to reduce this risk factor because it improves communication and enhances cooperation and collaboration of human beings.

Unemployment and the future of the welfare system are of constant concerns in modern societies. Social security, domestic peace and democracy are intimately connected to Safety/Security issues. It has to be considered that both ideologies and values can shape and destroy societies. In a societal context ethical issues and human rights are also key issues for Safety/Security research.

Safety/Security research regarding *scientific-technological progress* includes understanding the impact of non-intended and un-foreseeable risks and their consequences. The investigation and assessment of risks and their consequences in environmental, social and economic terms is especially important for new technology fields that have a security dimension such as converging technologies.

C. Safety/Security Research on Crisis Prevention

In prevention-of-danger research is focused on *Safety/Security building structures*, as well as the *detection of threats* and *areas that need special protection.*

Education and training is an essential basis for *building up Safety/Security structures*. One goal of such research is to identify remaining opportunities for using education and training at all levels of human organisation – individual, family, commune, the region, state, the European Union and global society – to prevent crises, identify threats and manage risks.

The *detection of threats* implies the identification of threats and the downstream application of instruments for crisis prevention. Anthropogenic causes of threats can be anticipated using tools such as scenario planning and can be used to develop strategies for handling emergency cases.

The concentration of populations in urban areas, as well as the economic importance of these areas implies a high level of risk in cities. Safety/Security research on critical infrastructure, addresses issues such as the reliability, vulnerability, robustness and security of transport, energy or water supply infrastructure. This is a key theme for research on areas that require *special protection.*

D. Safety/Security Research Regarding Civil Defence and Crisis Management

Civil defence and crisis management depends among other things on regional structures and topography.

The optimization of strategies for coordinating non-governmental and governmental action forces at national or international level, as well as crisis management techniques and the development of emergency scenarios are crucial security research concerns.

Technological and Management Capabilities as Austrian Strengths

One of the first steps in this initiative was to survey the Austrian research landscape in the Safety/Security research and get an overview of what was being done, identify active Austrian expertise and capacities in Safety/Security research at universities and applied research organizations as well as Austrian industry and in the Austrian small and medium-sized enterprise sector.

The most relevant research organisations and industry actors in prioritized Safety/Security research topics were identified. The survey gathered data on more than 200 Austrian companies and 150 research organisations highlighting Austrian excellence and expertise in Safety/Security research. A number of areas stand out in which Austria has specific strength as well as a critical mass of research activity.

Tunnel Safety: Quite a number of Austrian small and medium sized companies are highly specialized in tunnel construction and safety.

Vehicle Design for Crisis Management: There is a steady increase in the trans-European road transport of hazardous goods. Research organisations such as ARC Seibersdorf Research Ltd are specialized in areas such as monitoring the transport of radioactive substances. Another example is the 'Via Donau' research organization that operates positioning technologies for seamless tracking and tracing of hazardous goods. Both of these possess unique expertise of considerable importance for research on road transport related Safety/Security.

The Prevention of Manmade and Natural Hazards: In response to its natural topography Austria has developed considerable experience dealing with the risk of flooding and protection against avalanches. It has developed considerable research expertise in these and related areas of research.

Relevant Fields in Humanities and Social Science: Austria has a research tradition in conflict management, crisis prevention and counter-proliferation due to its neutral status and its role as host to international organisations such as the UN and the IAEA. It also has well developed research capabilities in human rights and ethical issues as well as political integration.

The reporting team suggested drafting a national Safety/Security research funding programme that focused on some of these prioritized Safety/Security topics. A first call for proposals has been launched for research on critical infrastructure issues.

The team also recommended the establishment of a 'National Agency for Safety/Security Research and Coordination'. The role of this agency would be to develop and maintain intelligence and know-how on medium to long-term Safety/security issues, handle confidential information, prepare and carry out

campaigns to increase public awareness on Safety/Security concerns and be continuously involved in the advancement of national Safety/Security strategies. Eventually this agency should provide easy access to up to date information about national capabilities in the field of Safety/Security research for members of specialists as well as for members of the general public.

They estimated that this would require a budget of about €20Million on an annual basis to support a programme of competitive research on Safety/Security issues as well as the running of a 'National Agency for Safety/Security Research and Coordination'.

Potential Applications of Biometric Technologies, Protective Clothing and Cryptography

There exist quite a number of highly specialized companies and applied research organizations in Austria that carry out leading edge research in technologies intended for the Safety/Security related applications. Companies in sectors such as cybernetics or communications engineering, working with research organisations have developed a high level of expertise in applied biometrics. In other sectors such as vehicle design, construction and textiles there is a strong presence of small and medium sized companies specialised in the design of vehicles for crisis management and tunnel construction. Others are involved in the development of protective clothing.

In the tertiary sector data processing and business services related to software safety and interoperability, as well as the development of model simulations for technological failure management all have a role to play in the area of safety/Security and should be involved in national research in this domain.

Austrian research organisations have played an important role internationally in the development of *proprietary conditional access systems*. For example they have developed gateway technologies using *quantum cryptography* or mathematical algorithms which could lead to pioneering innovations in the area of Information and Communication Technologies. Medicine and biotechnology also has a contribution to make to Safety/Security related research. There is a need to explore the consequences and risks of new technologies through techniques such as 'technology assessment' but inter-disciplinary work on the prevention of natural, chemical and biological hazards needs to be further encouraged, supported and coordinated.

Some well-known research institutes in Austria work in fields such as political integration, conflict management and crisis prevention. Although there is extensive disciplinary know-how and experience, there is limited inter-disciplinary and trans-disciplinary networking on Safety/Security related issues and no systematic coordination of efforts. An organization is required to play this role and to raise the profile of the Safety/Security research sector not only in Austria in Europe and the rest of the world.

Meeting the Public Interest

The project 'Safety/Security Research – Idea and Procedure for Austria' demonstrates the urgent need for continuous strategically coordinated Safety/Security research. There is increased public interest in Safety/Security issues at European Union level. The public authorities in Austria have a responsibility towards their own population on Safety/Security issues, as well as towards their neighbours in European Union. It is therefore important to take action without delay.

Immediate steps include the establishment of a national programme for Safety/Security related research to enable full Austrian participation in the upcoming Seventh Framework Programme of the European Union under the thematic priority for 'space and security research'.

This would help Austria to adequately respond to Safety/Security incidents such as terror attacks, natural hazard or large-scale technical failure. Answers and solutions to Safety/Security challenges developed in the context of a successful Austrian Safety/Security research programme will certainly be acknowledged by the public as a substantial contribution to the safety, security and well-being of its citizens.

Sources and References

http://hw.oeaw.ac.at/3469-X