



Statewatch Analysis

The German Security Research Programme: Transferring military technology - securitising civil research

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The German government is spending more than 123 million euros on security research, probably the largest national initiative complementing the European Commission's European Security Research Programme.

On 4 July 2006 Annette Schavan, the conservative German Minister of Education and Research, launched a national programme on "research for civil security" worth more than 100 million euros. Her justification for the initiative was twofold. Firstly, she invoked "new threats", warning of the vulnerability of "society's central nervous system" and explained her understanding of security: "We have to search for innovative solutions to meet the new challenges... because security is dependant on the advantages achieved through research and science and on its implementation through organisation and technology." Secondly, she complained about the "fragmented research landscape", the lack of a "strategy focussing on opportunities for marketing and export" and the inadequate "involvement of end-users in a joint innovation process". The security research programme, Schavan said, is a "platform" for close cooperation between the state and business. Private corporations, in particular those operating the privatised utilities, are described by the Minister both as end-users of security technologies for whom "cost-efficient solutions" need to be developed and as suppliers whose "competitiveness" needs to be improved to avoid them missing out on "great opportunities in future markets". [1]

South German networks and high-tech strategists

Although Schavan's initiative fits neatly with visions of a "new security architecture" and neo-liberal economic policies it is more than the simple and self-evident execution of *Zeitgeist*. It was driven by an influential network of homeland security officials, military research institutions and the arms industry that were able to exploit national innovation policy and funding.

Edelgard Bulmahn, Schavan's Social Democratic predecessor, had rejected the targeted funding of security research and, informed by participatory dialogue for a future research policy, addressed only issues of IT security and biometric identification. [2] This situation abruptly changed when Angela Merkel became Chancellor after national elections in September 2005. The coalition agreement between the Conservatives and the Social Democrats only vaguely stated under the chapter heading "research funding for sustainability" that the new government will fund "technology for environmental protection, remote sensing and renewable energy technologies as well as research in

security and fusion technology".[3] Decisive steps were rapidly taken after Schavan took up her chair at the Federal Ministry of Education and Research (*Bundesministerium für Bildung und Forschung* - BMBF). In December 2005 Schavan informed parliament that security research would become a priority during her term in office. Between April and June 2006 three workshops were organised to set the agenda for a national security research strategy, involving, as the BMBF reports, around 250 "experts from all relevant areas of security research".[4] Thus, the ministry "created a nationwide research programme in record time," as BMBF State Secretary Thomas Rachel noted.[5]

The criteria which guided the selection of the agenda-setters are unknown, but Rachel reported that the BMBF was advised by the Ministries of Interior and Defence. Most of the workshop participants were from the federal and *Länder* ministries, in particular those from the BMBF, the Federal Ministry of Interior and the Ministry of Defence. There were also representatives from the police forces and disaster control agencies; the arms and IT industry such as EADS, Diehl, Siemens or T-Systems; the large utility network operators such as Deutsche Bahn or Vodafone and of major applied research and engineering bodies such as the Fraunhofer Society for the Promotion of Applied Research, the German Aerospace Centre (DLR) and the Association of German Engineers (VDI).[6]

It is significant that influential interests involved in the security research agenda-setting processes, both at the national and the European levels, are located in the southern German *Land* Baden-Württemberg, which is Schavan's political homeland. The Diehl Corporation, which has a major branch producing arms in Überlingen at Lake Constance, was previously represented in the "Group of Personalities" (GoP) who prepared the European Security Research Programme in 2003/2004 in Brussels.[7] Another GoP member was Karl von Wogau, a Christian Democrat from South Baden and ex-MEP, who was chairman of the European Parliament's Subcommittee for Security and Defence until 2009. As secretary general of the European Security Foundation and the informal Kangaroo Group von Wogau remains an important link between the political arena and the arms industry. Finally, four out of five military research institutes which founded the Fraunhofer Society's Network for Defence and Security Research (*Fraunhofer Verbund Verteidigungs- und Sicherheitsforschung*, VVS) "to strengthen the position of military research" are located in Baden-Württemberg.

The five VVS institutes, which employ a staff of around 1,150 people and were funded with more than 130 million euros by the Federal Ministry of Defence between 2000 and 2007,[8] play a key role for German security research which can be traced back to 2002-2003. In 2003 the Ministry of Defence contracted a VVS member, the Institute for Technological Trend Analysis (INT), to draft a study, *Technological Aspects of Asymmetric Threats*, which was published on 25 January 2005. One day later the report was discussed at a joint consultation between Ministry of Defence agencies mainly engaged in ABC [atomic, biological, or chemical] warfare on one side and Ministry of Interior agencies in charge of civil protection issues on the other. It was agreed to continue the information exchange and use the results of the INT study for the post-9/11 revision of the *Report on Threats* drafted by the Protection Commission, a Federal Ministry of Interior advisory body on issues of civil protection and related research since Cold War times.[9]

The same year, the INT began to organise a series of workshops, *New Technologies - Perspectives on the Future of Military Research*, on behalf of the Ministry of Defence aiming "to bring together research institutions, universities, companies and the armed forces and the arms industry" to discuss unmanned aerial vehicles, autonomous sensor-networks, robotics etc.[10] These workshops bolstered the struggle against shrinking military research budgets and were the backdrop to the formation of the Fraunhofer VVS network, established in November 2002. Military research, once the backbone of the

Fraunhofer Society,[11] became a problem for the scientists at the Society's headquarters in Munich as federal money spent on this area of research and development decreased from 1.6 billion euro to 984 million euro between 1991 and 2005.[12]

The VVS institutes were led in their efforts to generate research funding by Klaus Thoma, director of the Ernst-Mach-Institute for High Speed Dynamics in Freiburg, who is said to be the "architect" of the German security research programme.[13] Thoma, who was director of a department for research and development at Messerschmitt-Bölkow-Blohm (today EADS) in the 1980s and a professor at the University of the German Armed Forces in Munich from 1994 until 1996, seems to be a top research manager. "Where no networks exist, he is initiating them," said Baden-Württemberg's Minister of Economics when Thoma received the Federal Cross of Merit for his role in "technology transfer" and security research in 2007.[14] With his contacts in regional politics, the Ministry of Defence and the industry Thoma became - besides being a representative of EADS, Diehl, Siemens and the Vice Director of the Federal Criminal Police Office (BKA) - the fifth German member of the European Security Research Advisory Board (ESRAB) in July 2005. ESRAB was responsible for the preparation of the security research programme within the EU's 7th Framework Programme but also recommended the initiation of complementary national programmes.

When Research Minister Schavan announced her plans for the security research programme in 2006, her forum was the "Future Security" conference held in Karlsruhe. This "first security research conference" was organised by the VVS network and was intended to be a "communication platform for all stakeholders, executive agencies, corporations and developers" for "mapping the position of the key players in Germany".[15] Nonetheless, Schavan stressed that the new programme was "only dedicated to civil areas of application". However, she admitted that security research was indeed benefiting from military research, a statement which was underlined by the constitution of the conference programme board. Among its 30 members were all of the directors of the five VVS-Institutes as well the director of the Institute for Communication, Information Processing and Ergonomics of the Research Society for Applied Science (FGAN) ("50 years of research for defence and security"),[16] two officers from the Federal Ministry of Defence and representatives of the arms companies EADS, Diehl, Rheinmetall W & M as well as the European Defence Agency.

Parallel to this initiative, VVS-president Thoma was supported by the President of the Fraunhofer Society, Hans-Jörg Bullinger. As chairman of the "Research Union Economy-Research", (which advises the Federal Government on the development of the so-called "High-tech Strategy", a six billion euro investment programme by the Merkel government to increase competitiveness of German industries), since June 2006, Bullinger set security research on the agenda of this body from the very beginning.[17]

Mobilisation of research

The security research programme was officially decided by the German government on 24 January 2007, and was budgeted with 123 million euros for the period until 2010. "We mobilise research for the protection of citizens," claimed Minister Schavan. The research programme is an integral part of the High-tech Strategy for economic innovation which was decided only a few months before. The stated objective of the programme is to fund "research projects for the development of security technology". To this aim the "strengths of engineers and science and the potential of humanities and social research" will be combined and "end-users of new security solutions" will be involved in the development process from the very beginning in order to anticipate "innovation barriers which could occur later in the context of data protection, costs or practical implementation".[18]

Funding is organised along two programme lines. Firstly, “scenario-based security research” aims to develop “system solutions” for the security and control of major events, transport systems, other utilities and supply chains. This programme line’s priority is not “the individual technological result but the formation of a community of actors” because the “improvement of cooperation between public authorities and operators of privatised security-relevant utilities” is seen as important. Secondly, “technology networks” will develop “cross-scenario technologies”, such as, for example, detection systems and technologies for pattern recognition or person identification. In sum, the BMBF expects “innovative solutions for improving the security of citizens without compromising their freedom”. [19]

To supervise if and how these expectations are met is outsourced to others. Although in summer 2007 the BMBF established a security research unit within its “Key Technologies - Research for Innovation” branch, the day-to-day administration of the research programme has been contracted to the VDI Technology Centre (VDITZ), an Association of German Engineers (VDI) enterprise, which had already organised the agenda-setting workshops for security research on behalf of the BMBF. The VDITZ remit encompasses “the professional and conceptual formation of research funding as well as evaluation, assistance and management of research projects”. [20] In addition, the VDITZ was assigned by the BMBF as a “National Contact Point” for the European Security Research Programme, and is supporting and advising German research institutions and companies which consider EU applications.

Apart from the VDITZ, German security research is “assisted and steered” by a Scientific Programme Board. [21] Chair of the 18-member group is Klaus Thoma, speaker of the Fraunhofer VVS institutes. The other executives are four representatives from the Federal Agencies (*inter alia* officers from the Federal Criminal Police Office (BKA) and the Federal Office for Information Security (BSI)), one criminologist from Freiburg, a theologian from Tübingen, an expert on biological security, an expert on technical standardisation and nine private sector representatives (from Diehl BGT Defence, Siemens Building Technologies, Bosch Security Systems, the Frankfurt airport corporation Fraport AG and the German postal service Deutsche Post, among others). [22] As members of the European Security Research and Innovation Forum (ESRIF), which continued the work of ESRAB until 2009, the representatives of the Federal Criminal Police Office and Deutsche Post also acted as personal interfaces on the Programme Board at the European level.

In March 2007 Research Minister Schavan presented her programme at the “European Conference for Security Research” in Berlin on the occasion of the German EU Presidency. The event, organised in collaboration with EU Commissioner Günter Verheugen and his Directorate General for Enterprise and Industry, not only kicked-off the European Security Research Programme but also was used to publish the first calls for national programme proposals. [23] The first German security research project started three months later, in June.

Projects for “swarm vigilance” and integrated information platforms

Up to October 2010 the BMBF granted 91 research projects (the latest to be completed in summer 2013) with an overall budget of 209 million euros. [24] 183 million euros of the total was contributed by the BMBF itself, [25] while additional money came from private sector contractors and federal ministries to fund the involvement of agencies and research institutions, such as the Federal Criminal Police Office (BKA), the Federal Police, the Federal Office of Civil Protection and Disaster Assistance (BBK), and the Armed Forces’ Institute for Microbiology.

The most important programme area so far is the research and development of technologies for the "detection of hazardous substances". Nineteen projects with an overall budget of 43.6 million euros were funded. One focus is the development of Terahertz [electromagnetic radiation] technology that is used, for instance, in "body scanners". Five Terahertz projects are funded with around 11 million euro, plus an ethical evaluation of the technology worth 300,000 euro. Other foci are the development of biochips to detect various biohazards and mass spectrometry sensors that can "smell" chemicals.[26]

Fifteen projects worth 37.6 million euros are funded under the category of the "rescue and protection of people". Most projects in this area address the high-tech management of major events and mass casualties. They envisage camera-supported automated assessment of crowds and computer simulations of their evacuation, RFID-tagged disaster victims, vitality-sensor-networks and swarms of unmanned aerial vehicles integrated into overarching information architectures and decision support systems, interoperable communication platforms networking rescue personnel etc.[27]

Eleven projects address "the protection of transport infrastructure" at a cost of 37.5 million euros, and six projects are funded within the "security and emergency services protection systems" programme with 21 million euro. These two programme areas include the two largest German security research projects, each with more than 8 million euros: The I-LOV project aims to develop an "intelligent safeguarding localisation system for rescuing people trapped or buried under rubble" combining semi-autonomous snake-like search robots, precision tracking of mobile phones and radar technology. Although addressing issues of disaster assistance, a project partner is the Federal Criminal Police Office, precisely its KI 24 unit, which is in charge of technologies for operation and protection, obviously sharing the interest in sophisticated tools for the location of persons.[28]

The other project is SinoVE for "security on open transport systems and railway management". Its description vaguely states:

The aim of the project is to actively support the various security forces by means of an intelligent security management system which takes various sources of data such as video recordings into account and simulates the scenarios recorded to produce an incident-based control system using system references. Data protection regulations will also be checked parallel to these studies.[29]

In plain English, the project will develop a sophisticated video surveillance system, including technologies for person tracking and object recognition, integrated into a decision support system tailored to the needs of the German railway corporation Deutsche Bahn and the Federal Police, as reported by the Interior Ministry's liaison officer at Deutsche Bahn during a seminar organised by the Institute for Police Technology in 2008.[30] The project involves key suppliers of German CCTV technology such as Siemens, the Bosch subsidiary VCS Video Communication Systems and Funkwerk plettac electronics. The crucial assessment of public acceptance and data protection issues are left to the end-user Deutsche Bahn.

Police forces are involved directly or as associated partners in at least ten German security research projects. The Federal Armed Forces are participating in three more projects worth 3.2 million euros. Two study the detection of biological and hazardous chemical substances, the other focuses on "enhanced-performance, permeable protective clothing using new absorbents and vital sign sensors". Here the "dual use" character of some of the

projects becomes obvious when technologies for ABC warfare and for the infantrymen of the 21st century are developed under the label of "civil security". The relation with the military and arms industry is less obvious in other projects. The 3 million euro AirShield project, for instance, aims to research and develop drone swarm applications for "airborne remote sensing for hazard inspection". Project partner, Microdrones, has been developing so-called Quadrocopter drones in collaboration with Diehl BGT Defence since 2004; they are now used by German police forces in the Saxonia and Lower Saxony regions and were recently deployed against an anti-nuclear protest. Moreover, a researcher in charge of studying the social aspects and public acceptance of drones is a member of the German Atlantic Society, a network of officials from the Ministry of Defence, security policy people and high ranking German soldiers such as ex-NATO general Klaus Naumann.[31] Hailing drones as "rescuers from the sky", his study predictably concludes that 95 per cent of citizens interviewed welcomed the AirShield system.[32] In this case it is clear that "civil protection" is used as a vehicle to open civil markets and the public mind for technologies with military origins, while implicitly enhancing their capabilities for warfare operation.

A series of six projects funded with 9.4 million euro is dedicated to protection against the failure of critical infrastructure - mainly focussing on the security of energy supplies and drinking water by improving inter-organisational risk management and crisis communication. In 2010 several projects aiming to develop pattern recognition technologies were started, among others for automated and predictive video-tracking of persons in large-scale camera networks, for the automation of fingerprint detection at crime scenes, or for computerised image analysis to detect victims, offenders and scenes of child pornography when mining large amounts of online data and confiscated hard drives. As in the field of Terahertz technology this research is also consulted by a project on the ethical and social dimensions of pattern recognition.

Recently, seven projects were granted in the area "protection of supply chains". In addition, the assessment and selection of proposals submitted to a call on biometrics is expected in winter 2010. International cooperation is also encouraged and calls for collaboration with Israeli and French partners were published. Seven projects were selected for funding, such as the RETISS project that aims to develop sensor-network-based "real-time security management" on Germany's and Israel's roads. A future call for cooperation with partners in the USA is in preparation.[33]

To underline the declared commitment of the research programme to frame security not only as a technical problem but also to understand its social aspects, additional projects are funded in the "societal dimensions of security research" programme area which makes up 6 per cent of the total security research budget. While some of these projects address very practical issues such as information exchange to prevent school shootings or drug control in "failed states", others have a more theoretical focus and aim to understand policy-making in the field of internal security, urban experiences of (in)security or the interplay between processes of "radicalisation" and external policy. However, all eventually aim to devise "solutions" and policy recommendations.

Apart from this dedicated area for social research, scholars with backgrounds in law, social research or the humanities were involved in around 35 of the technology-oriented projects.[34] However, most of them were concerned with understanding and improving human-machine interaction and inter-organisational communication or with standardisation issues. Only around a dozen of the techno-system-projects encompass some kind of technology assessment. To expect all of them to meet professional standards is doubtful, given the above mentioned example of the AirShield project.[35]

To summarise, funded is large-scale and automated surveillance through networks of cameras and other sensors, biometric access control systems, the operation of robots and drones, bomb-resistant buildings, sophisticated command-and-control centres, networked operations and computerised crowd management but also research in public relations and inter-organisation communication during emergency situations and in the responsibilities of citizens to be prepared for future crises. Independent assessment of the broader ethical, societal and political implications of these projects for “swarm vigilance”[36] only takes place at the margins of the programme. Where an assessment of the massive threats to civil liberties posed by large-scale and ever intrusive surveillance or platforms for seamless information flows and data sharing is seriously incorporated into technology development it seems that the proposed remedies are limited to so-called privacy-enhancing technologies, for instance, the pixellation of faces caught on camera or the computerised modification of body shapes displayed by Terahertz scanners. That such techno-solutions to privacy problems add an additional layer to the systems’ complexity and might obscure their actual function even more, while social control over anonymised masses it tightened in the name of security, seem to be issues immune against critical discussion. Defending the Western life-style from any form of disruption is the overall rationale. Questioning the socio-economic and political roots of insecurities is far beyond the imagination of the security research programme.

And the winners are.....

Two hundred and seventy-six research institutions, companies, public bodies and non-profit organisations have benefited from the German security research programme so far. Thirty of these bodies have accumulated more than 50 per cent of BMBF’s funding.

The main beneficiary is the Fraunhofer Society which is the most successful of the German security research applicants. Eighteen of its 60 research institutes participate in 22 projects, getting more than 18 million euro. Almost 50 per cent of this money flows to the institutes of the Fraunhofer Network for Defence and Security Research (VVS). Thus, a key player in setting up and steering the programme also became its top grantee. In addition, the Fraunhofer Society is also among the major contractors of the European Security Research Programme in which it participates in 18 out of 90 funded projects.[37]

Technical universities are also among the programme’s winners: first the Albert-Ludwigs-University, Freiburg, and particularly its Institute for Microsystem Technology (IMTEK), which is the core of a regional cluster of autonomous micro-systems that also involve Fraunhofer VVS institutes and several other spin-offs. [38]

For the private sector it is difficult to get the complete picture as it is hardly possible to disentangle relations between subsidiaries and their umbrella corporations. However, it seems that Siemens is the top contractor among private corporations, getting 5.1 million euro shared among at least three individual Siemens companies. Other major winners are SAP, a German enterprise software house, Smith Heimann, known for its airport scanners, and the Bosch Group’s security system unit. Well-known military contractors such as the arms and aerospace giant EADS, Rohde & Schwarz, a company developing and marketing electronics for military signal intelligence and the biometrics corporation L-1 Identity Solutions, recently sold to the Safran Group and BAE Systems, are among the top 40 of German security research.

In terms of geographical distribution most security research money is spent in Germany’s largest *Land*, North Rhine Westphalia, closely followed by Baden Württemberg, Research Minister Schavan’s political homeland. Contractors in both *Länder* won more than 38 million euro funding. The other major winners are Bavaria and Berlin, each with around 25

million euro. Next are Lower Saxony and Hesse, which receive 10 million euro each, and, surprisingly, the East German *Land* Thuringia receiving 8 million Euro. The geographical picture clearly shows the overwhelming dominance of regional security research clusters in the German capital Berlin, around the cities of Freiburg and Karlsruhe in Baden-Württemberg, around the Bavarian capital of Munich and in the Thuringian city of Jena. With the exception of Berlin where most security research money flows to the University Hospital Charité and the Technical University, these clusters are centred around old-established entities of military research and development, i.e. the Fraunhofer VVS institutes in Freiburg and Karlsruhe, EADS, the German Aerospace Centre DLR and Rohde & Schwarz in Munich and its suburb Ottobrunn, and the Jenoptik AG in Jena, generating around 30 per cent of its annual turnover by contracts of the Ministry of Defence.

Militarised techno-structures for “networked security”

German security research originates in the emerging civil-military cooperation that has been blurring the line between the armed forces, the police and disaster control agencies for the last decade. The transformation of the Armed Forces launched in 1999 not only aims to optimise global military power projection but also to expand the mission at home. The Defence Policy Guidelines 2003 call for an increasing cooperation between the military and homeland security officials justified by the “protection of the population and vital infrastructure against terrorist and asymmetric threats”, [39] and the national security strategy published in 2006 established the new paradigm of “networked security”. [40]

The creation of the Armed Forces Base (*Streitkräftebasis*) in 2000 that integrated military command, reconnaissance and intelligence, logistics and training for all three services was guided by visions of network-centric warfare. In addition, it established a “new territorial network” for civil-military cooperation under the Armed Forces Support Command (*Streitkräfteunterstützungskommando*) which meant the territorial reorganisation of regional command structures according to the geographies of civil administration. As an important counterpart for the armed forces within civil-military cooperation evolved the Federal Office for Civil Protection and Disaster Assistance (*Bundesamt für Bevölkerungsschutz und Katastrophenhilfe* - BBK) that was installed by the Federal Ministry of Interior in 2004. The BBK institutionally underpinned the new concept of “population protection” fusing traditional “civil protection” against (Cold War) ABC strikes and “disaster protection” against natural hazards and major man-made accidents.

These interfaces between the military and internal security agencies provided the arena for promoting military-style techno-solutions for “new security”. Serving as incubator for the proliferation of “dual use” thinking they facilitated the spill-over of “innovations” developed for network-centric warfare and full-spectrum reconnaissance into areas of civil application. Thus, civil-military cooperation unlocked the window of opportunity which was pushed open by the security research advocacy coalition of homeland security officials, military research institutions and the high-tech arms industry. Disentangling the dynamics between pulling and pushing technology in this process is impossible. However, it is clear that the tempting promises of savvy engineers in search for new research resources significantly influenced policy concepts for sensor-networked security at all levels of operation.

To conclude, in the context of security research the civil realm is not only colonised by military logic but also by a mentality that frames security as technical problem that can be fixed by engineers. The actual marginalisation of serious assessment of the ethical and social implications of these new technologies is unmasking the political assurance for sensitive research as lip service aimed to appease critique.

Footnotes

1. Schavan, A.: *Sicherheitsforschung – Herausforderung und Notwendigkeit zum Schutz der Gesellschaft*. Speech held at the 1st Future Security Symposium in Karlsruhe on 4 July 2006. http://www.bmbf.de/pub/mr_20060704.pdf
2. BMBF (2003): *Eine erste Bilanz – Futur: Der deutsche Forschungsdialog*, Bonn, p. 34ff. http://www.bmbf.de/pub/futur_eine_erste_bilanz.pdf
3. *Gemeinsam für Deutschland. Mit Mut und Menschlichkeit*. Coalition Agreement of CDU, CSU and SPD, 11.11.05, p. 47f.
4. BMBF (2007): *Forschung für die zivile Sicherheit*. Programm der Bundesregierung, Bonn/Berlin, p. 20. http://www.bmbf.de/pub/forschung_fuer_zivile_sicherheit.pdf
5. Rachel, T.: *Sicherheit – eine Frage der Technologie?* Speech held on 10.10.06. http://www.bmbf.de/pub/pstr_20061010.pdf
6. List of participants are part of the documents received through a Freedom of Information request from the BMBF on 16.3.10.
7. Hayes, B. (2006): *Arming Big Brother: The EU's Security Research Programme*, Amsterdam.
8. Federal Parliament Document BT-Drs. 16/10156, 21.8.2008
9. Engelhard, N. (2005): *Bericht über die Ergebnisse der Konsultationsrunde mit dem BMVg*. Presentation held at the 54th Annual Conference of the Protection Commission of the Federal Ministry of Interior BMI on 5.5.05. http://www.bkk.bund.de/nn_536770/Schutzkommission/SharedDocs/Vortrag_C3_A4ge_20Jahrestagung/Vortrag_20Engelhard_202005,templateId=raw,property=publicationFile.pdf/Vortrag_20Engelhard%202005.pdf
10. INT (2005): *Jahresbericht 2005*. Euskirchen, p. 64f.
11. Hohn, H.W. / Schimank, U. (1990): *Konflikt und Gleichgewicht im Forschungssystem*. Frankfurt/Main, pp. 171-232.
12. BMBF (2005): *Forschung und Innovation in Deutschland 2005*, Bonn/Berlin, p. 45ff. http://www.bmbf.de/pub/forschung_und_innovation_05-07.pdf
13. <http://www.zeit.de/2008/50/N-Sicherheit-Klaus-Thoma>
14. Baden-Württemberg Ministry of Economics Press release 6.9.07.
15. http://www.emi.fraunhofer.de/Dokumente/PDFs/future_security_program_06.pdf
16. This was the motto of the 50th anniversary of the FGAN which was meanwhile incorporated by the Fraunhofer Society. http://www.fgan.de/fgan/fgan_c43_de.html
17. <http://www.forschungsunion.de>
18. BMBF press release 010/2007, 24.1.07
19. BMBF (2007): *Forschung für die zivile Sicherheit*. Programm der Bundesregierung, Bonn/Berlin, p.8
20. <http://www.vditz.de/home/kompetenzen/forschungsfoerderung/forschung-fuer-die-zivile-sicherheit/index.html>
21. BMBF: *Forschung für die zivile Sicherheit*, a.a.O., S. 47
22. <http://www.bmbf.de/de/11781.php>
23. BMBF press release 059/2007, 26.3.2007; <http://www.src07.de>
24. BMBF: *Nationale Förderung in der Sicherheitsforschung*. <http://www.bmbf.de/de/11770.php>
25. Author's calculations on the basis of the Federal Funding Catalogue: <http://foerderportal.bund.de/foekat/jsp/StartAction.do?actionMode=list>

26. BMBF: Bewilligte Verbundprojekte aus dem Themenfeld "Detektion von Gefahrstoffen". <http://www.bmbf.de/de/12917.php>
27. BMBF: Bewilligte Projekte aus dem Themenfeld "Schutz und Rettung von Menschen". <http://www.bmbf.de/de/13091.php>
28. <http://www.i-lov.org>
29. BMBF (2009): *Research for Civil Security. The Protection of Transport Infrastructures*. Bonn, p. 14. http://www.bmbf.de/pub/bmbf_verkehrssicherheit_en.pdf
30. http://www.pfa.nrw.de/PTI_Internet/pti-intern.dhpol.local/TagSem/Seminar/Nr32_08/CD-Beitraege/06-Paulmann/Vortrag_SinoVE-DHPol.pdf.html
31. http://www.inno.tu-berlin.de/menue/ueber_uns/team/andre_hermanns
32. This claim is based on interviews with techno-interested people at the annual Hannover Trade Fair rather than on a representative survey. http://www.bmbf.de/pub/AirShield_Daniel_Auftakt_IPF_SuRvM.pdf
33. BMBF: *Internationale Kooperationen in der zivilen Sicherheitsforschung*. <http://www.bmbf.de/de/13409.php>
34. The judgement on the disciplinary background of the researchers is made on the basis of information on the sub-projects' title and the research institution drawn from the Federal Funding Catalogue. Thus, it might not be correct in each case, but at least it indicates the extent of non-engineers involved in the programme.
35. Author's survey on the basis of data drawn from the Federal Government's funding catalogue: <http://foerderportal.bund.de/foekat>
36. The term is borrowed from the event "Aufmerksam im Schwarm" on sensor networks organised by Fraunhofer Society in November 2010. https://forum.fraunhofer-events.de/files/Flyer_Forum_Sensornetzwerke.pdf
37. Data in November 2010 according to the CORDIS project database: <http://cordis.europa.eu/search/index.cfm?fuseaction=proj.advSearch>
38. <http://www.imtek.de>
39. Bundesministerium der Verteidigung (2003): *Verteidigungspolitische Richtlinien*. Berlin, pp. 28-29
40. Bundesministerium der Verteidigung (2006): *Weißbuch Sicherheit und Zukunft*. Berlin, pp. 25-27.

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