Scenario-based Security Foresight

Edited by
Alexander Siedschlag

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"FOCUS":
FORESIGHT SECURITY SCENARIOS TO PLAN FOR RESEARCH TO SUPPORT THE "EU 2035" AS A COMPREHENSIVE SECURITY PROVIDER

Alexander SIEDSCHLAG

Abstract: This special issue of *Information & Security* presents selected results from the EU security research project *FOCUS ("Foresight Security Scenarios – Mapping Research to a Comprehensive Approach to Exogenous EU Roles").* This project aims to define the most plausible threat scenarios that affect the "border-line" between the EU's external and internal dimensions to security – and to derive guidance for the Union's future possible security roles and decisions to plan research in support of those roles. Scenario foresight in the FOCUS project was done on the level of critical and creative – yet methodologically guided – forward thinking at strategic level in order to increase the EU's ability to cope with relevant alternative futures from the near future until 2035. A first group of articles discusses methods and techniques in scenario-based foresight as integrated and applied within FOCUS. A second group of articles presents selected empirical results from FOCUS scenario foresight on threats, risk management needs, and future EU roles as a comprehensive security provider. A third group of articles introduces research planning implications from selected FOCUS security scenarios. A final set of articles addresses the way ahead: How FOCUS methods and results could be useful beyond the immediate mission and scope of the project to guide policy development and industry strategies.

Keywords: Security research, scenario foresight, comprehensive approach, FOCUS project

1.   Introduction

During the times of manifest Cold War threat scenarios, Arnold Wolfers complained that "national security" was a symbol that left too much room for confusion to serve as a guiding principle for political advice or a concept for scientific analysis.[1] He suggested that, as a first step in developing an analytical concept of the term, *security*

should be considered "the lack of threats to established values."[2] After the end of the Cold War, security policy continued to be mainly understood as a normative practice, namely as defending values.[3] However, this included defending more common societal values (e.g. an "independent identity"[4]). This societal dimension of security was new and led to increasing understanding that security is not a state but a process.

The notion of security as a value-laden concept and its essential link to society has been taken up by the new field of *security research,* including the focus on "societal security", in addition to – or beyond – the security of infrastructures, utilities, etc. *Security research* as a new field of research, studies and emerging academic discipline aims for a *comprehensive approach* to delivering security (including civil protection) to the citizens – by civil means and without infringing individual rights and freedoms.[5] The main focus of security research, however, has been on technological solutions for security problems and their thorough check for social and ethics issues, such as the acceptability and impact on citizens' perception of (in)security. This must be an integrated part of the research process, and not merely a parallel track. What has been termed *new security studies* [6] aims to integrate concepts and approaches from classical, strategic security studies and civil security research.

As an essentially practical endeavour, *security research* evolves along public funding lines, both at national level and within the "Security" theme in the EU's Seventh Framework Programme (FP7) for research.[7] Embracing academic perspectives within the spectrum of *new security studies* and those from industry and end-users, the FP7 security research project *FOCUS ("Foresight Security Scenarios – Mapping Research to a Comprehensive Approach to Exogenous EU Roles")*[8] is a contribution toward shaping European *security research* to enable the EU to effectively address tomorrow's challenges that stem from the globalization of risks, threats, and vulnerabilities. It accomplished this via multiple foresight efforts in the 2035 time-frame, i.e. not duplicating, but reaching beyond planning for *security research* in *Horizon 2020,* FP7's successor programme for 2014-2020.

2.   The FOCUS foresight project and its reference scenarios

This special issue of *Information & Security* presents selected results from the FOCUS project, including addressing of possible fields beyond the immediate scope of the project to which its results can be relevant. FOCUS aims to define the most plausible threat scenarios that affect the "borderline" between the EU's external and internal dimensions to security – and to derive guidance for the Union's future possible security roles and decisions to plan research in support of those roles. This publication of course reflects only the authors' views.

The topics revolve around the following:

- Methods and techniques in scenario-based foresight as integrated and applied within FOCUS;

- Selected empirical results from FOCUS scenario foresight on threats, risk management needs, and future EU roles as a comprehensive security provider;

- Research planning implications from selected FOCUS security scenarios;

- The way ahead: How FOCUS methods and results could be useful beyond the immediate mission and scope of the project to guide policy development and industry strategies.

Scenario foresight in the FOCUS project was done on the level of critical and creative – yet methodologically guided – forward thinking at strategic level in order to increase the EU's ability to cope with relevant alternative futures from the near future until 2035. The FOCUS approach will present the results of the performed foresight on three scenario levels, as illustrated in Figure 1:

- First, *scenarios for EU security roles* in the up to 2035 time-frame.

- Second, within those context scenarios for EU roles, *scenarios for alternative futures of security research 2035* will contribute toward an enabling of those roles.

- Third, validated *reference scenarios* will lead to a roadmap proposal for *security research 2035*.

FOCUS concentrated on alternative roles of a future *"EU 2035"* to prevent or respond to incidents situated on the "borderline" between the internal and external dimensions of the security affecting the Union and its citizens. It did so by elaborating a syllabus of scenarios, based on IT-supported foresight, and deriving five reference scenarios that fed into a roadmap planning proposal for *"Security Research 2035."* This was performed along the following five "Big Themes" generated by horizon scanning and study work in the development phase of the project:
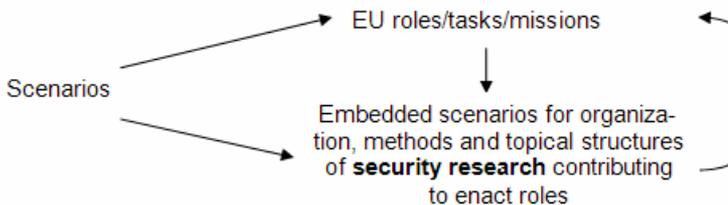

Figure 1: The "embedded scenario" method of the FOCUS project.

- Alternative future concepts of the comprehensive approach and resulting role requirements for the EU;

- Natural disasters and global environmental change;

- Critical infrastructure and supply chain protection;

- The EU as a global actor based on the wider Petersberg tasks;

- The EU's internal framework (and the emerging system of EU Homeland Security).

FOCUS content (such as studies) and results (such as extensive scenario syllabi) have been implemented on the project website and on an IT-based Knowledge Platform developed by the project.[9]

The reference scenarios were based on threat integration and a comprehensive approach to future missions to provide security to the Union and its citizens. They present alternative futures of a *"security research 2035"* landscape to support roles of the *"EU 2035"* in security. Table 1 lists these reference scenarios, along with a brief explanation.

The reference scenarios provide various insights into what future European *security research* may require. This includes respect for human and societal needs, citizens being the ultimate end-users of *security research.* The reference scenarios also assume that security missions of the *"EU 2035"* will increasingly stretch along the internal–external security continuum and that full integration of emergency management and civil protection within the scope of *security research* will be vital, along with its elevation to the European level. Coordinated investment in preparedness is expected to play a major role here.

The EU should look for ways in which technologies and capabilities can support a stronger comprehensive approach for emerging and future security threats commonly faced. FOCUS insights on cross-cutting aspects speak in favor of a future European security research system that better accommodates social sciences and humanities in order to propose ways to more strongly link civil security authorities to citizenry, and citizenry to technologies.

Among further conclusions for *"security research 2035"* drawn by FOCUS is that that future European *security research* should meet the challenge to develop a new concept of (civil) security from research, rather than deriving it from events, technologies or existing policies. It should also clearly address the risk of an uneven distribution of security across European society, for example by using technologies that

Table 1: Reference scenarios for "European security research 2035" as developed in the FOCUS project.

Name of scenario	Explanation of scenario
"No Land is an Island" – A protected EU homeland with external responsibilities	Mainly rests on results from the "Big Theme" on *"Comprehensive approach."* In this scenario, the EU and its Member States have developed a common "securitization model" that guides security policy along the internal-external continuum. It rests on a much closer integration of national security research programmes with that of the EU to help Europe deal with the broadest spectrum of security incidents.
"Policy Drives All in a Have/Have-Not World" – Security Research on natural disasters and the global environment	Mainly rests on results from the "Big Theme" on *"Natural disasters and global environmental change."* In this scenario, there is growing awareness across decisions-makers in the EU that competing national and regional policies beyond their borders are producing an increasingly fragmented world, split into tiny privileged elites versus the teeming masses of "have-nots." The rapidly evolving risk for everyone is a disastrous collapse of society and civilization. The EU wants realignment toward a consensual international policy designed to confront this divergence.
"Security as Societal Science" – Critical infrastructure and supply chain research driven by societal factors	Mainly rests on results from the "Big Theme" on *"Critical infrastructure and supply chain protection."* In this scenario, harmonized risk management approach at EU and Member States' level has been established, covering both preparedness and response. Still, the EU 2035 faces strong demands for critical infrastructure by politics, industry, and society. The general expectation is that the design of critical infrastructures and supply chains should be adaptable to social

	change and evolving citizens' security needs and resilient to the negative effects of interdependencies within Europe and with the critical infrastructures of third countries.
"Borderless Threats = Mission Creep" – The EU's forced march toward a stronger Common Security and Defence Policy	Mainly rests on results from the "Big Theme" on *"EU as a global actor."* In this scenario, the EU's policy to counter cyber-attacks is paramount since this form of societal defence has become all-encompassing for Europe's economic, industrial and scientific development. A strong transatlantic framework of home-land cooperation has emerged, though it is geared towards joint pragmatic/ operational action, but not necessarily towards joint technology development.
"Inside Out" – Inward coherence and governance opens the door to external policy	Mainly rests on results from the "Big Theme" on *"EU internal framework"*. In this scenario, the EU has become the governing authority of scientific and technological innovations related to security of the citizen. A major policy imperative in 2035 has seen capability development lead to a convergence of research in the fields of civil security, policing needs, emergency response and disaster management. This convergence has opened the way to linking the EU's internal decision-making structures and processes to its external strategic environment. Research supports needs such as collaborative technologies for inter-agency work and intelligence sharing.

only add to the security of the wealthy, or by deploying security solutions that even may harm certain parts of society. At the same time, future research planning should more comprehensively address social media communications technologies for their ability to better connect policymakers and civil security end-users to public/civil society audiences and to enable policymakers to communicate to the latter.

3. Overview of contributions

As mentioned earlier, a first group of articles discusses methods and techniques in scenario-based foresight as integrated and applied within FOCUS. A second group of articles presents selected empirical results from FOCUS scenario foresight on threats, risk management needs, and future EU roles as a comprehensive security provider. A third group of articles introduces research planning implications from selected FOCUS security scenarios. A final set of articles addresses the way ahead: How FOCUS methods and results could be useful beyond the immediate mission and scope of the project to guide policy development and industry strategies.

Methods & Techniques in Scenario-based Foresight

Todor Tagarev and Petya Ivanova report on their experience with *"Analytical tools in Support of Foresighting EU Roles as a Global Security Actor"* gained in the FOCUS project. They concentrate on support for decisions about major investments, including investments in security research, which require a good grasp of the future and all its uncertainties. They present the analytical process, methods, and tools, including the DSTO Scenario Analysis Tool Suite, used in FOCUS to elaborate and select a set of context scenarios and possible new roles for EU as a global actor based on the wider Petersberg tasks. The conclusion is that future EU security research planning should consider the critical importance of providing rigorous analytical support, in particular when security foresight involves subject-matter experts who are not part of a dedicated research team.

Todor Tagarev, Venelin Georgiev and Juha Ahokas present an approach used in the FOCUS project for *"Evaluating the Cross-impact of EU Functions as a Global Actor and Protector of Critical Infrastructures and Supply Chains."* The article presents the main results of their analysis of the cross-impact between two of the "Big Themes" in the FOCUS project: "EU as a global actor based on the wider Petersberg Tasks" and "Critical infrastructure & supply chain protection." The cross-impact was evaluated by experts from both EU and non-EU countries. For each theme the latter were asked to estimate the significance and interrelation of trends, thus identifying centres of gravity within each theme. Then they estimated the linkage between pairs of trends from the two themes.

The study led to the identification of key linkages among trends, to be further explored in the analysis of respective contexts, mission roles, and *security research* scenarios. One particularly important insight from cross-impact analysis is that definition of future *security research* themes should, among other things, address combined developments and requirements. This, for example, relates to cross-cutting futuristic mission scenarios of the European Union as a global actor based on new or expanded Petersberg tasks and as a protector of critical infrastructures and supply chains.

Threats, Scenarios, Roles

Building on their FOCUS work identifying future track for *security research* in critical infrastructure, Luca Urciuoli, Toni Männistö, Juha Hintsa, Tamanna Khan *("Supply Chain Cyber Security – Potential Threats")* explore how cybercrime and terrorism could disrupt relevant supply chain flows (such as for pharmaceuticals), or establish unwanted supply chains (such as for weapons). Their findings investigate the required future security roles of the EU to counteract these actions. Based on literature review and experts' assessments, their article outlines three futuristic scenarios for future supply-chain related security challenges for the EU to meet: weapon trafficking in sea containers, pharmaceuticals sabotage, and cargo theft and distribution. These scenarios imply harmful effects on European communities. The authors conclude that one approach the EU should adopt to increase preparedness is to develop specific training, aids and regulations to secure the information layer of supply chain companies.

David López and Oscar Pastor address FOCUS' results regarding alternative futures of the *"Comprehensive Approach to Security Risk Management in Critical Infrastructures and Supply Chain."* In this sector, the ability to assess and react to risk exposure greatly contributes to suitable protection levels and incident response capacities. Growing infrastructure interdependencies will increase the risks of cascading effects of disruptions, with severe impact on the concept and legitimacy of the welfare state, making unified risk management a common concern. The *comprehensive risk management* approach gathers information from a broad range of disciplines and takes into account the interdependencies of different layers of critical infrastructures and supply chains from critical infrastructure operators' point of view to sectoral, national and European levels.

This article proposes future fields of action, as supported by the conclusions drawn from the FOCUS project. Among others, the fields of action include addressing the legal implications of cross-border agreements at different levels (countries, national agencies, companies, etc.); mechanisms for sensitive information exchange about security and risks; and capabilities to promptly adapt risk assessment to unexpected changes.

Uwe Nerlich (*"Challenges in a 2035 perspective: Roles for the EU as a Global Security Provider?"*) takes a strategic look at possible role sets for the EU in the year 2035 as a global security provider, another aspect addressed in FOCUS foresight. Concluding that 'everything will remain different', Nerlich argues that civil *security research* as known today should be reconciled with the field of strategic studies and be able to make a tangible contribution to reducing uncertainties. One particular role in such an expanded type of *security research* would be to help meet the main require-

ment for a global security role of the EU: a matching of its security posture (i.e., strategic orientation plus capabilities) with its internal structures for collective decision-making.

Nerlich concludes that we are bound to see an upcoming mission profile of the EU that essentially combines the internal and the external dimension, thus reaching far beyond current Petersberg tasks for the EU as a global actor in the external security and defence sector. One of Nerlich's policy conclusions is that a globally acting EU should still be a 'smart' enough actor to meet emerging and dynamic strategic threats and challenges of new kind, such as those in the cyber field. At the same time, Nerlich argues, it will be true that "[w]hile the term 'defence' may no longer be useful to describe the future kinds of threat aversion, future requirements may turn out to be even more demanding and certainly are different from soft requirements for traditional crisis management."

Dana Procházková addresses *"EU Civil Protection Upgrading Needs,"* based on the tenet that civil protection has two pillars: supporting citizens' daily lives and ensuring citizens' protection in emergencies and critical situations. Both pillars include aspects of human security, welfare and critical infrastructure protection. Procházková shares multiple conclusions from her FOCUS contribution for future *security research* to meet the requirement set by the EU civil protection upgrading needs that she identified. While needing to meeting the specific challenges post by each single disaster and emergency, future *security research* will have to be designed to yield new technologies and infrastructures that enhance resilience and sustainability, as well as to contribute to comprehensive risk management a strategic level. A further need is output from research that can be used to educate citizens, thus contributing to an all-of-societal approach and to societal resilience.

Scenarios and Security Research Planning

Thomas Benesch, Johannes Goellner, Andreas Peer, Johann Hoechtl and Walter Seboeck present FOCUS results on a *"Scenario Space for Alternative Futures of Security Research"* in support of the EU's comprehensive approach as a security provider to its citizens. Scenario foresight results indicate that we may see sectoral confinements of the comprehensive approach by 2035, depending on the evolution of challenges. It may be that the concept of comprehensiveness guiding the *"EU 2035"* as a security actor will be centred on sectors such as critical infrastructure protection or public health, with multidisciplinary security research reduced to such sectors. The main conclusion therefore is that future European security research in the 2035 timeframe should by planned to contribute to the creation of a suitable concept of comprehensive security, thus leading to the security of individual Member States and the Union as a whole. Future security research should propose ways to manage specific

factors, vulnerabilities, risks and possibilities to common aims, which will contribute to the security and development of the EU as a Union.

In his article on *"Referencing the Future: The EU's Projected Security Roles and Their R&D Implications,"* Brooks Tigner reports on recently concluded work on one of the culminating efforts of the FOCUS project's foresight work, namely to construct a final set of reference scenarios (REFs) to represent the range of possible security roles that the EU might play by the year 2035 – and to synthesize the kinds of R&D that might be needed between now and then to support those roles. This is an important input to the *roadmap proposal for "Security Research 2035,"* currently under finalization within the FOCUS project.[10]

Dana Procházková addresses *"Natural Disasters' Management and Detection of Priority Problems for Future Research,"* presenting results from her contribution to FOCUS scenario foresight work. The article centres on consequences from variants of disaster on human systems. From within the comprehensive-approach perspective, Procházková lists identified shortfalls in natural disaster management from the point of view of the concept of "safe community" that has been promoted by the EU since 2004. Future security research should be planned to strengthen a systematic approach towards citizen security vis-à-vis disasters of different kind, and their social consequences. FOCUS results as such could also inform policies of today, for example in the context of a core European approach to civil protection as comprised in the Lisbon Treaty.

The Way Ahead

In his article on *"Future Security Trends and Their Impact from an Industry Point of View,"* Ricard Munné sheds light on the impact of future security trends in the industry sector. His conclusions derive from the work performed in the scenario foresight for alternative futures, and for embedded scenarios of *security research* in the FOCUS project. His analysis shows the usefulness of scenario foresight for the planning and development of new technological research tracks or new products in industry. One of the prior examples of a sector strongly affected by the security trends identified in the FOCUS project is that of information and communication technologies: Information integration and fusion of large volumes of data (which will largely emanate from intelligent, knowledge-based monitoring of new social media and other open information sources) will require new strategies and technologies for information management in the security sector and require industry to come up with apt technological solutions.

In his outlook from a strategic studies point of view *("Towards Europe 2035 – In Search of the Archimedean Screw: FOCUS in Perspective")* Uwe Nerlich examines how the results of FOCUS' study work could be used to inform strategies and policies

beyond the immediate research-planning objectives of the project, formulating a response to global change beyond futuristic mission scenarios for EU roles. This could also be a possible future area of application of FOCUS tools and produced dynamic content, such as the FOCUS scenario wikis.[11]

4. Conclusion

The selection from FOCUS foresight results and its outlook presented in this volume illustrate, among other things, the drivers for the evolution of European *security research* in the 2035 time-frame as identified in FOCUS' overall results, within the evolution of the European Union's concept of security itself. In seeking policy relevance, such scenario foresight results need to follow clear avenues that calibrate policy and planning initiatives to the possible alternative evolving worlds of the future rather than today's futuristic normative visions. FOCUS has identified the following top-10 key drivers for the development of European *security research* in the EU in the 2035 time-frame:

- *Crises* resulting from scarcity of resources (e.g. energy-caused stress, most importantly the increasing scarcity of conventional oil; dependencies on supply chains).

- *Evolution of the need for societal resilience and preparedness:* Certain risks cannot be catered to, nor avoided - societies must prepare to face shocks and must have the ability to recover.

- *Changing borderlines between internal and external security*, including extent of relations with world leading countries.

- *Technological change,* including new technologies driving or changing security needs.

- *Mass migration flows,* e.g. due to economic disparity, global conflicts, natural catastrophes and climate change.

- *New potentials and profiles of international* conflicts with main leverages like cyber; energy; scarce resources; etc.

- *Diffusion of power* within and among nation-states, marked by the rise of population-rich and economically powerful China and India and the increased importance of energy-rich states and regions.

- *Dependency on information and communication technology, and technology in general* (with risk of cascading breakdown of systems).

- *Demographic shifts* with pressure on resources.

- *Increased reliance on critical infrastructures that are vulnerable* and have little spare capacity, operate at the edges of performance and loads, and are critically

depending on other infrastructures.

Considering its derived scenarios and identified drivers, the FOCUS project is currently finalizing its conclusions for multi-tier planning for European *"security research 2035"*. This will be mirrored by the roadmap planning proposal that the project will deliver, whose conclusions include, but are not limited to, the following:

- Security is a *collective good* which in the first place relates to citizens and society, and their needs and requirements.

- *Technology* not only can contribute to security or by itself create new vulnerabilities. Its practical use also has the potential to change human behaviour and to drive the evolution of security cultures – for the better or worse.

- A *comprehensive approach* to *civil security research and to security* in the EU needs to relate to citizens in an inclusive way, integrating their perspectives into the research process and into the programming of Security Research.

- There is more than a societal dimension to security: it includes the *societal creation of security.* There are no effective technological solutions without acceptance and public participation. *Security research* should consider significant social, cultural, ethical, legal, and political aspects of security from the very beginning; that is, not only in the implementation perspective and in terms of public acceptance and ascribed legitimacy.

- At the same time, the further development of Europe's civil security is inconceivable without *technology,* meaning the latter will contribute to increase *social resilience.*

- Not only a comprehensive approach that unifies efforts is needed in the future, but also a *holistic approach* that comprises technology, society, culture and change.

- As an *all-of-society enterprise,* future *security research* must be planned beyond traditional end-user satisfaction to anticipate and meet societal requirements and stimulate future demand, thus contributing to the setting of requirements instead of just meeting pre-set end-user requirements.

Security research should play a role in establishing institutionalized relations between those actors who are involved in carrying out societal security. By encouraging strategic dialogue and using internet-based opportunities to build communities of research and practice, including crowd-sourcing of scenario information, FOCUS also has a contribution to offer to the making of the European *security research* enterprise of the future.

Notes:

[1] Arnold Wolfers, "'National Security' as an Ambiguous Symbol," *Political Science Quarterly* 67:4 (December 1952): 481-502, quote on p. 483.

[2] Wolfers, "'National Security' as an Ambiguous Symbol."

[3] Barry Buzan, *People, States, and Fear* (Boulder, CO: Rienner, 1991).

[4] Buzan, *People, States, and Fear*, pp. 18-19.

[5] Cf. European Societal Security Research Group, www.societalsecurity.eu.

[6] Cf. J. Peter Burgess, ed., *The Routledge Handbook of New Security Studies* (Milton Park: Routledge, 2013).

[7] Cf. http://cordis.europa.eu/fp7/security/home_en.html.

[8] See www.focusproject.eu.

[9] For more information of the IT Platform and tools, see the FOCUS project website: www.focusproject.eu/web/focus/it-platform.

[10] The roadmap will be available via the FOCUS project's IT Platform at www.focusproject.eu/knowledgeplatform/workbench/controller.do?action=navigation&id=IT-based%20Knowledge%20Platform.

[11] See www.focusproject.eu/web/focus/wiki/-/wiki/Main/FrontPage.

Alexander SIEDSCHLAG is Professor for Security Research at Sigmund Freud Private University Vienna and head of the CEUSS | Center for European Security Studies. Master's degree in political science, sociology and psychology (1994). Dr. phil. in political science from University of Munich (1996), *venia legendi* in political science from Humboldt University Berlin (2000). Former appointments include the University of Innsbruck, where Prof. Siedschlag held the Endowed Chair for European Security Policy, and the chairmanship of the Bavarian branch of the German United Nations Association. Among various other assignments, Prof. Siedschlag is the coordinator of the multi-national security research foresight project FOCUS, co-funded by the European Commission. This project supports future planning for European security research by developing a set of EU security roles in a 2035 time frame, and alternative futures for security research to support those roles.
E-mail: siedschlag@european-security.info