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Foresighting Needs for Secure Societies "2035" – The Focus Roadmap and Its Implications for the Science and Practice of Politics in Civil Security

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ABSTRACT

There is more than the societal dimension of security: 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. Civil security is thus becoming an own sub-field of public policy analysis, addressing societal security from a governance perspective. While "security governance" as such is not a new concept, it so far has mainly been applied to international security and strategic studies. However, growing concern about "societal security," public acceptance of home affairs, internal security, or homeland security and related technologies, the "objective" (factual) vs. "subjective" (felt) security continuum, and the "internal"–"external" security continuum show the relevance of a governance approach to civil security. This need is contributed to by the increase in phenomena of "securitization," whereby issues are speech-acted as security concerns and thus removed from the normal policy and governmental process. The FOCUS project on "foresight security scenarios" and a comprehensive approach to civil security in the 2035 time frame had a two-year mission and was co-funded by the European Union. The project performed multiple foresight on the international scale, including collaboration with foresight initiatives and project in a couple of countries, including far beyond the EU. The project aimed to define the most plausible threat scenarios that affect the "borderline" between the external and internal dimensions to security – and to derive guidance for possible security roles of nations and organizations, 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 ability to cope with relevant alternative futures from the near future until 2035. The first part of the paper introduces the FOCUS scenario foresight approach. The second part presents selected results from FOCUS scenario foresight on future EU roles as a comprehensive security provider to its citizens, as they were used in roadmap development. The third part describes the reference scenarios towards which the roadmap was geared. The fourth part introduces the FOCUS roadmap. A brief fifth part provides an outlook on the way ahead: governing civil security and the research that contributes to it.

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 scientific analysis.[1] He suggested that, as a first step in developing an analytical concept of the term, security should be considered, "in an objective sense, […] the absence of threats to acquired values, [and] in a subjective sense, the absence of fear that such values will be attacked."[2]

After the end of the Cold War, security policy continued to be understood as a normative practice, namely as defending values.[3] 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,* which includes a focus on "societal security" in addition to – or beyond – the security of infrastructures, utilities, etc. *Security Research* aims for a *comprehensive approach* to delivering security (including civil protection) to the citizens – by civil means and without infringing individual rights and freedoms.[4]

Security Research is defined as

"research activities that aim at identifying, preventing, deterring, preparing and protecting against unlawful or intentional malicious acts harming European societies; human beings, organisations or structures, material and immaterial goods and infrastructures, including mitigation and operational continuity after such an attack (also applicable after natural/industrial disasters)."[5]

Overarching the state of the art split between strategic studies and civil security research, what has been termed *new security studies*[6] aims to integrate concepts and approaches from both fields.

Embracing academic perspectives within the spectrum of *new security studies* and those from industry and end-users, the Security Research project *FOCUS ("Foresight Security Scenarios – Mapping Research to a Comprehensive Approach to Exogenous EU Roles")* contributed toward shaping research to enable the EU to effectively address future challenges to comprehensive security. It was co-funded by the European Union under the 7th Framework Programme for research. The main idea of FOCUS was to develop multiple scenarios that function as common denominators for challenges (involving new tasks) whose causes are external to the territory of the Union, but whose consequences will be experienced on the territory of the Union and EU responses using tangible contributions from Security Research.

By extrapolating the European Union Member States' prerogative over security on the national scale, the Lisbon Treaty (2009) introduced the concept of the security of the European Union (EU) itself: Based on its new legal personality, the Union now aims "to promote peace, its values and the well-being of its peoples" (Article 3 Treaty on European Union). For the security of the Union and its citizens, it is the Union that "shall define and pursue common policies and actions, and shall work for a high degree of cooperation" (Article 21).

1 A. Wolfers: "'National Security' as an Ambiguous Symbol," *Political Science Quarterly* 67:4 (1952): 481-502, quote on p. 483.
2 Wolfers, "'National Security' as an Ambiguous Symbol," p. 485.
3 B. Buzan: *People, States, and Fear.* Boulder, CO: Rienner, 1991.
4 Cf. European Societal Security Research Group, http://www.societalsecurity.eu [last access: 2014-07-01].
5 European Security Research Advisory Board (ESRAB): *Meeting the Challenge: the European Security Research Agenda.* Luxembourg, September 2006, p. 20. Retrieved from: http://ec.europa.eu/enterprise/policies/security/files/esrab_report_en.pdf [last access: 2014-07-01].
6 Cf. J.P. Burgess (ed.): *The Routledge Handbook of New Security Studies*. Milton Park: Routledge, 2013.

The Lisbon Treaty also effected a significant transition towards harmonization in the field of civil protection against natural or anthropogenic (or "man-made") disasters: The Union now has the competence to support, coordinate, and/or complement the actions of the Member States (Article 196 Treaty on the Functioning of the European Union).

European developments are in large part driven by challenging global developments, reaching beyond external risks and threats to which the EU needs to respond.[7] Consequently, the Treaty on European Union in the Lisbon version established the Union as a whole as a security provider to its citizens, reaffirming its role as a global actor, based on collective European values and security interests: "In its relations with the wider world, the Union shall uphold and promote its values and interests and contribute to the protection of its citizens" (Article 3 Treaty on European Union).

Still mirroring the pre-Lisbon Treaty state of play, however, the current state of Security Research in Europe is characterized by national focuses on a limited number of pre-defined missions or parallel scenarios that typically result from an analysis of specific national incidents, requirements, or shortcomings. By contrast, FOCUS elaborated foresight-generated multiple scenarios for EU security roles and related Security Research topics, approaches and structures to introduce scenario planning from a European perspective, and to broaden the concept of Security Research.

FOCUS provided studies, security scenarios, roadmaps, and an IT-based Knowledge Platform for scenario foresight, with the latter offering a large number of practical tools such as scenario wikis, reference wikis, and a curriculum matrix for educating future security researchers.[8] FOCUS concentrated on alternative future EU roles 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 multiple scenarios, based on IT-supported foresight, in the form of alternative futures. These were rooted in threat integration and a comprehensive approach to future missions to provide security to the Union and its citizens. Embracing academic, industry, and end-user perspectives, the FOCUS project contributed toward shaping research to enable the EU to effectively address future challenges to comprehensive security and its governance.[9]

While "security governance" as such is not a new concept, it so far has mainly been applied to international security and strategic studies.[10] However, growing concern – interesting resonating with Wolfers' half-century old citation above – about "societal security," public acceptance of home affairs, internal security, or homeland security and related technologies, the "objective" (factual) vs. "subjective" (felt) security continuum, and the "internal"–"external" security continuum show the relevance of a governance approach to civil security.[11] This need is contributed to by the increase in phenomena of "securitization" also in internal security[12] (whereas the term was originally introduced to guide post-strategic, particularly constructivist studies in international relations after

7 See European Commission: *Global Europe 2050.* Luxembourg: Publications Office of the European Union, 2012, http://ec.europa.eu/research/social-sciences/pdf/global-europe-2050-report_en.pdf [last access 2014-07-01].

8 FOCUS methods, studies, deliverables, and IT-based products are available on the project website http://www.focusprojet.eu [last access: 2014-07-02].

9 On European Civil Security Research, see K. Thoma (ed.): *European Perspectives on Security Research.* Munich: acatech – Deutsche Akademie der Technikwissenschaften, 2011.

10 E.J. Kirchner & J. Sperling (eds): *Global Security Governance. Competing Perceptions of Security in the 21st Century.* London/New York: Routledge, 2007.

11 Burgess, *The Routledge Handbook of New Security Studies*.

12 Cf. K. Svedberg Helgesson & U. Mörth (eds.): *Securitization, Accountability and Risk Management. Transforming the Public Security Domain.* (PRIO New Security Studies.) London: Routledge, 2012.

the Cold War),[13] whereby issues are speech-acted as security concerns and thus removed from the normal policy and governmental process.

This paper uses a concept of security governance (focused on "secure societies"),[14] derived from approaches to security sector governance. Security governance then refers to structures, processes, values, and attitudes that shape decisions about security and their implementation across state and non-state actors which. The concept shares with the concept of human security a concern for the welfare and safety of the whole of community.[15] The first part of the paper introduces the FOCUS scenario foresight approach. The second part presents selected results from FOCUS scenario foresight on future EU roles as a comprehensive security provider to its citizens, as they were used in roadmap development. The third part describes the reference scenarios towards which the roadmap was geared. The fourth part introduces the FOCUS roadmap. A brief fifth part provides an outlook on the way ahead: governing civil security and the research that contributes to it.

The particular character of the FOCUS roadmap made this paper difficult to write. The present paper obviously cannot capture the very character and the dynamic features of the FOCUS roadmap, which set it apart from previous European Security Research roadmaps. The entry page representing the knowledge landscape of the full version of the roadmap and including not restricted information was added to this paper as an annex.

2 SCENARIO FORESIGHT APPROACH

2.1 FOCUS FORESIGHT

FOCUS was a scenario foresight project. *Foresight* is a participatory approach to strategic forward thinking to increase the requisite variety to cope with alternative futures in a world to come. The FOCUS project had a 2035 time frame. Foresight neither predicts the future, nor circumscribes normative desirable futures or "wishful thinking." Foresight is about describing different possible futures. It is calibrated to diversity, not to delimitation. Results and insights of foresight can be presented in different ways. One common way is to present foresight results in the form of scenarios. A *scenario* is

> "a 'story' illustrating visions of a possible future or aspects of a possible future. It is perhaps the most emblematic foresight or future studies method. Scenarios are not predictions about the future but rather similar to simulations of some possible futures. They are used both as an exploratory method and as a tool for decision-making, mainly to highlight the discontinuities from the present and to reveal the choices available and their potential consequences."[16]

13 B. Buzan, O. Wæver & J. de Wilde: *Security: A New Framework for Analysis*. Boulder, CO: Rienner, 1998.

14 *"Secure societies"* is the title under which Security Research is addressed in the European Union's *Horizon 2020* program, the successor of the 7th Framework Program for Research. See http://ec.europa.eu/programmes/horizon2020/en/h2020-section/secure-societies-%E2%80%93-protecting-freedom-and-security-europe-and-its-citizens [last access: 2014-07-01].

15 See H. Hänggi & T. H. Winkler (eds.): *Challenges of Security Sector Governance.* Münster: Lit, 2013. .

16 European Commission Joint Research Centre: "Scenario Building. Definition" (2006), http://forlearn.jrc.ec.europa.eu/guide/2_scoping/meth_scenario.htm#Definition [last access: 2014-07-02]. See also U.H. von Reibnitz: *Scenario Techniques.* Hamburg: McGraw-Hill, 1980.

As foresight itself, thus, the scenarios that it yields include thinking in extremes, low probability/high impact aspects, etc., and are not master plans, policy recommendations, or suggested normative trends.

The FOCUS foresight approach departed from institutional Europe as defined through the Lisbon Treaty. Within a 2035 time-horizon, a scenario-approach was chosen that allows the identification of threats and incidents that may affect Europe, required responses and eventually European futures. FOCUS concentrated on alternative future EU roles 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 multiple scenarios, based on IT-supported foresight, in the form of alternative futures. These were plausibility-probed versus mere threat scenarios.

Overall, FOCUS followed six objectives, each building upon each other, namely to:

- Identify alternative sets of future tracks for Security Research that supports EU roles to deal with exogenous threats, risks, and vulnerabilities.
- Elaborate on the concept of transversality in assessing evolving needs for research across traditional disciplines, presently defined mission areas and throughout the security continuum.
- Design and apply a specific scenario approach ("embedded scenarios"). This was based on foresight to ensure openness, participation, and inclusiveness (e.g. involvement of societal stake-holders), while explicitly addressing security perceptions and security in relation to other values.
- Produce an IT information infrastructure (by adapting existing information technologies) that will make material and tools for scenario planning of Security Research available to knowledge communities.
- Enhance transparency, improve understanding, and increase preparedness for the emerging challenges of the "external dimension" and the "external–internal continuum" of security and the evolution of Security Research.
- Contribute to the planning of Security Research, based on foreseen EU roles rather than on pre-defined missions.

2.2 FOCUS' FIVE "BIG THEMES"

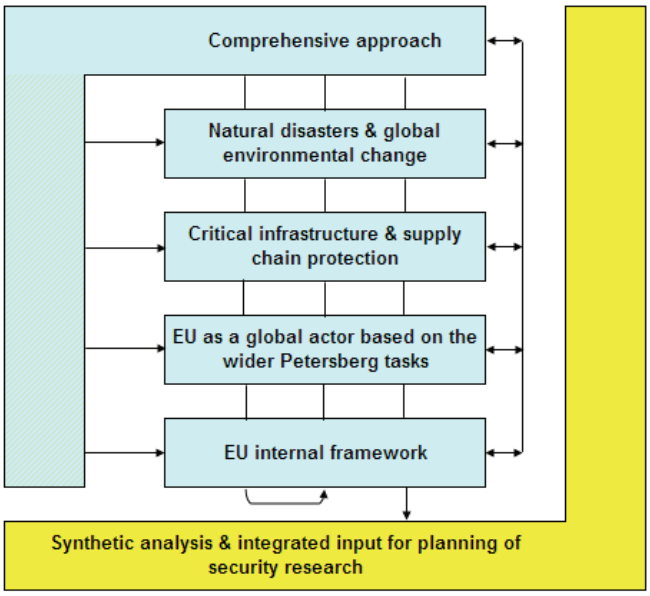
FOCUS conducted foresight on an inclusive basis, making maximum use of its IT support for integration of multiple stakeholders, experts from a broad range of fields and the interested public to address security in relation to other societal as well as ethical values. This approach was especially important in the context of scenario planning in order to ensure that the selected policies and security technologies were responsive to the needs of citizens and that they created security approaches rooted in acceptance.

Scenario foresight in the FOCUS project was carried out via critical and creative – yet methodologically guided – forward thinking at the strategic level, aiming to increase the EU's ability to cope with relevant alternative futures from the near future until 2035.

This task was performed along the following five "Big Themes" as derived from environmental scanning and research done in preparation of the project (see also *Figure 1*):

- *Comprehensive approach*: Alternative future tracks in further developing the comprehensive approach as followed by institutions and states, including links between the internal and external dimension of security.
- *Natural disasters and global environmental change*: Scenarios for future EU roles in preparing for and responding to natural disasters and environment-related hazards, focused on comprehensive crisis management.
- *Critical infrastructure and supply chain protection*: Scenarios for future EU roles centred on preventing, mitigating, and responding to exogenous threats that could have a significant impact on EU citizens.
- *EU as a global actor*: Alternative futures of the EU as a global actor based on the wider Petersberg tasks, building on EU and Member States instruments and capability processes.
- *EU internal framework (& EU homeland security)*: Scenarios for the evolution of the EU's internal framework and prerequisites for delivering a comprehensive approach, including Lisbon Treaty provisions and relevant strategies (e.g. for engagement with other international actors) as well as ethical acceptability and public acceptance.

Figure 1: **The five "Big Themes" of FOCUS scenario foresight.**



2.3 "EMBEDDED SCENARIO" METHOD

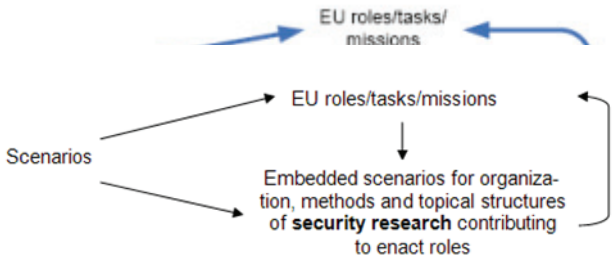
The FOCUS approach presented the results of the performed foresight on three scenario levels:

- 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"* that contribute toward an enabling of those roles;
- Third, validated reference scenarios that lead to the *FOCUS roadmap proposal for "Security Research 2035."*

FOCUS results were obtained by expert workshops, online questionnaires, analyses of related foresight projects, and large horizon scanning. This was based on a methodology process, which was also part of the project's work. In total, more than 600 experts contributed to the results by scenario information crowd-sourcing and assessments, representing more than 20 countries. Experts were identified in horizon scanning, in scanning of related projects, and by using partners' lists of experts. Further experts were added based on project-related communication and turnout for project events. Participating experts represented EU bodies; NATO bodies and institutions; national regional and federal bodies; international bodies; industry; first responder and emergency management organizations and agencies; think tanks; universities; NGOs; and other sectors.

To integrate its foresight results, FOCUS designed and applied an "embedded scenario" method (see *Figure 2*). This delineates options for future tracks and broadened concepts of Security Research within broader scenarios that involve EU roles for responding to transversal challenges (whose causes are external but whose effects are internal to the EU).

Figure 2: **The "embedded scenario" method.**



2.4 REFERENCE SCENARIO METHOD

At the end of the scenario work, a reference scenario for each of the five "Big Themes" was derived. Those resulting five reference scenarios for the planning of future Security Research in the overall 2035 time frame of the FOCUS project comprise the following and guided the development of the roadmap:[17]

Based on a broad plausibility probe and on online questionnaire work involving more than 100 experts, stakeholders and end-users from more than 20 countries from within and outside the EU, FOCUS developed the following reference scenarios. The FOCUS roadmap development towards "Security Research 2035" then built upon those reference scenarios.

The basis for deriving the reference scenarios were the 24 thematic scenarios previously developed by FOCUS, plus a comprehensive online questionnaire for the assessment of those scenarios by external experts, stakeholders, and interested parties, as well as cross-referencing and plausibility-probing analytical work and further supporting analyses.

While any number of methodologies could have been applied to the five sub-sets of syllabus scenarios, the most logical approaches choices boiled down to two: either (a) choosing one from

17 For full scenario descriptions, see FOCUS: *Deliverable 8.1: Thematic Scenario Portfolio with Reference Scenarios,* 2012. Retrieved from: http://www.focusproject.eu/documents/14976/78b744e5-9daa-432b-be3b-92316416aa65 [last access: 2014-07-01].

each of the sub-sets to represent the entire set or (b) fusing the most appropriate descriptor elements from each to produce a representative composite scenario. FOCUS rejected the former approach for its risk of skewing a scenario toward one extreme or the other (given the diversity of sub-scenarios within each "Big Theme") or excluding relevant descriptors. Instead, FOCUS opted for the composite approach. The task then became one of devising a methodology to produce composite reference scenarios for each of the "Big Theme" scenario sub-sets.

The approach centred on the creation of a standard "scenario generator" whereby the basic descriptive elements were extracted from each scenario within a given sub-set. The elements were then mapped against multiple relevant EU policies, working documents, and/or known political stances of the EU and its 27 Member States. Then they were "filtered" or analyzed to determine whether the descriptive element remained valid for the 2035 time frame as projected through the assumptions that underpin those EU policy/stances.

Thus, each reference scenario generator allowed for a broad analysis of all key elements in all of the scenarios to be established per "Big Theme" against the EU's wider policy environment. The filtering and selection task was enriched by parallel input from other FOCUS partners regarding their work on driver identification, expert questionnaires on selected "Big Theme" research, and other analysis. In total, reference scenario analysis included the following:

- Pre-validation (initial cross-reference) of sub-scenarios against each other and against general EU policy environment;
- Comprehensive assessment of the 24 thematic scenarios (EU roles as well as supporting Security Research) syllabus based on an online questionnaire;
- Identification of key drivers from the total set of FOCUS scenario drivers;
- Calibration of the draft scenarios with a compilation of future Security Research requirements resulting from alternative futures of the comprehensive approach.

Moreover, the reference scenarios were subjected to further analyses in order to support the FOCUS roadmap process. These analyses comprised the following:[18]

- Transversal analysis across the five reference scenarios concerning: external threats and their impact on EU security of citizens; the translation mechanisms these represent between external threats and their impact; and the identification of the impact of exogenous challenges on Member States and the limits to coherent EU roles – with the ultimate goal of identifying gaps in Security Research norms, standards and procedures.
- Assessment of differential impact of the "Security Research 2035" reference scenarios at national level.
- Identification of requirements for future Security Research from other projects and comparison against the reference scenarios.

18 All FOCUS scenarios and related proof of concept information are available as wikis for further use on the IT-based Knowledge Platform that was developed in the project: http://www.focusproject.eu/web/focus/wiki/-/wiki/Main/FrontPage [last access: 2014-07-01].

3 SELECTED FOCUS FORESIGHT RESULTS TOWARDS THE ROADMAP

Centred on security governance, this chapter presents some selected results from FOCUS scenario work that were steps in the development of the roadmap, which will be outlined in the subsequent chapter. The purpose is to illustrate some of the roadmap's building blocks and security governance aspects addressed.

3.1 TRANSVERSAL SCENARIO DRIVERS

FOCUS scenario foresight in its 2035 time frame was based on problem space descriptions per "Big Theme" that the project produced in the form of studies, taking into account the results of foresight and scenario work conducted in other European and international projects. In this context, the following seven transversal scenario drivers for the evolution of the European civil security policies (across FOCUS' five "Big Themes") were derived.

Based on the problem space descriptions and drivers, FOCUS then performed in-depth foresight processes. In the course of this, FOCUS at first identified future Security Research tracks. These were then reflected – along with broader foresight results from project work – in the development of the thematic scenarios for "Security Research 2035," as well as of the reference scenarios.

3.1.1 Globalization and international system change

Further effects of globalization may lead to an international shift in relative wealth, revival of geopolitics, enhancement of global disorder and a new form of multipolarity. This could produce a global redistribution of power, causing the EU to face increased friction when acting globally to provide security for its citizens. Increased friction means a transition from cooperation towards confrontation when making and enforcing decisions on the international level. Redistribution of power will also increase asymmetry (the relative difference between the capacities of states to influence international security affairs).

3.1.2 Changing modes of governance

Governance – the evolving informal system, short of hard sanctions and enforcement, for conforming to international legal and social norms – may adopt new and different characteristics following diversification and different forms of power, new sources of power, and different ways of using power on the global scene. This includes geopolitics as control over territorial space, not only borders. Public-private cooperation in security theatres will also be an important factor.

3.1.3 Changing values and norms

Partly related to evolving modes of governance, values and norms also are relevant drivers of the internal political and social cohesion of the European Union. These will determine the sense of collectiveness and readiness of taking responsibility, and sharing the burdens of a global role.

They will also strongly influence the EU's dedication to the protection of human rights and the fostering of human security on a global scale.

3.1.4 Economic and social change

Economic and social change will determine alternatives for protecting societies and infrastructures. Relative economic power and the EU's prevailing perception of its own economic and social conditions will affect its will and ability to increase collective efforts and strengthen the concept of the EU's security as a whole. Economic and financial crises will make it difficult to counter threats in a comprehensive way. European demographics will influence public attitudes, the political will, and the political agency of the EU to act as a security provider.

3.1.5 Technological change

This driver is multifaceted. It includes new technology-based capabilities of the Union and its Member States, as well as new critical (inter-)dependencies – such as on information and communication technologies – and vulnerabilities. Vulnerabilities could for example emerge from cross-dependencies of critical infrastructure on information technology systems. Technological change will also have impact on energy dependency, increasing or decreasing it.

3.1.6 Extent of common threat assessment

Future roles of the EU as a security provider will hinge upon the extent to which a common threat assessment can be reached on EU and national levels. This includes the evolution of current consensual threat drivers, which mainly are: CBNRe terrorism (chemical, biological, nuclear, radiological, and explosives); external political instability, poverty and resulting mass migration; cyber threats; climate change, including its effect as a threat multiplier.

3.1.7 Consistency and coherence of future Security Research

The thrust of the EU as a comprehensive security provider to its citizens will depend on the degree of consistency and coherence of Security Research at national and EU levels. Consistent Security Research accumulates knowledge across disciplines, sectors, and cases in order to timely identify most important gaps and needs for the further implementation of security strategies. Coherent Security Research is a cooperative intellectual effort at national and EU levels which contributes to the definition and implementation of a common European security agenda across different themes, funding lines, epistemic communities, and stakeholders.

3.2 DRIVERS FOR THE CONCEPT OF SECURITY IN THE EU OF 2035

Planning of future Security Research as supported by the FOCUS project needs to consider not only scenario drivers but also factors that drive the evolution of the concept of security itself in the 2035 time frame, among other things. The following are the top-10 drivers identified by FOCUS foresight that will determine what the "EU 2035" will understand to mean "security," with resources and resilience being the two most important aspects:

1. Crises resulting from scarcity of resources (e.g. energy-caused stress and, most importantly, increasing scarcity of conventional oil; dependencies on supply chains);
2. Societal resilience and preparedness: certain risks cannot be catered to or avoided, and societies must prepare for shocks and have the ability to recover;
3. Changing borderlines between internal and external security, including the extent of relations with the world's leading countries;
4. Technological change, including new technologies that drive or change security needs;
5. Mass migration flows, e.g. due to economic disparity, global conflicts, natural disasters, and climate change;
6. International conflicts that involve cyber-techniques and/or competition for energy and other scarce resources;
7. Diffusion of power within and among nation-states, marked by the rise of densely populated and economically powerful China and India, as well as the increased importance of energy-rich states and regions;
8. Dependency on information and communication technology, and technology in general (with a focus on a cascading breakdown of connected systems);
9. Demographic shifts with pressure on resources;
10. Increased reliance on critical infrastructures which are vulnerable, have little spare capacity, operate at the edges of performance and loads, and are critically dependent on other infrastructures.

3.3 COMPREHENSIVE APPROACH

Becoming both a more policy-informing and societally embedded enterprise, future Security Research will always face the problem of having to meet larger expectations with fewer resources. In the framework of evolving EU civil protection, Security Research could contribute to a doctrine for the use of military assets in home affairs (or an evolving system of EU homeland security), under an EU mandate. As an analogy to NATO's concept of "smart defence" for allied procurement, future Security Research may help develop a smart approach in terms of a hazard-driven policy and capability process, based on integrated assessment and decision-making that transcends the security–safety divide and broadens EU and Member States security strategies to encompass both. The lead strategy, however, will be a civil one: to link EU "coping capabilities" with citizen resilience. While EU homeland security and civil protection rapid deployment forces will remain national and have a specialization following national security cultures, policies, and legislations, there will be EU-wide unified training standards and standardized equipment. At the same time, this may lead to a risk of the EU developing over-sophisticated capabilities. Discussions of effects-based approaches to comprehensive security, as applied to home affairs, have resulted in a more politically than strategically defined level of ambition on the side of the EU and its Member States, with capabilities developed that sometimes have limited effects on the real security challenges at hand.

The *comprehensive approach* was originally used by NATO, both as an operational approach and a strategic concept. It involved the coordination of different actors and strategies, with all trying to achieve political objectives in an increasingly complex environment. The concept has since undergone significant extension of its scope. The EU originally referred to it as the harmonized use

of resources for the management of complex international crises. This would cover all phases of the crisis management cycle: mitigation – preparedness – response – recovery. Later, the EU also applied the term to the field of civil security and civil Security Research, among other things to describe methodological requirements for research projects to meet.

Analyses of the components of the concept of the *comprehensive approach* are rare and typically limited to the area of civil-military crisis management. For improved understanding of the prospective conceptual context where the EU may seek to deliver a *comprehensive approach* to security, FOCUS performed an analysis of forward-looking policy, strategy, and Security Research definitions of this concept.[19] Analyzed documents include the following:

- NATO Strategic concept 2010;
- EU Internal Security Strategy 2010;
- Final Report, European Security Research and Innovation Forum (ESRIF);
- Several selected national security strategies that concentrate on the *comprehensive approach;*
- FP7 Work Programme "Security" (2010 and 2011).

Tables 2 and *3* summarize some of the results. Future Security Research should increasingly consider the societal impact of comprehensiveness. This will mean bringing together and applying various disciplines. Future Security Research should aim to mainstream terminology in order to improve linguistic interoperability between different communities of practice and of knowledge, provide a better connection of the disciplines involved, establish networked expertise to provide rapid decision support for end users, and contribute to continuous evaluation of strategies of national and European civil security strategies from both a scientific and a societal security point of view. This includes aspects such as increasing societal resilience and the creation of a "whole-of-community"[20] system for mitigation, preparedness, response, and recovery. As such, Security Research should act as a socialization vector that builds resilience clusters comprised of technology/capability, first responders, and ordinary citizens wherever possible.

Investments in the field of big data information management and information integration will be needed to ensure sustainable cooperation between all actors involved. Moreover, additional investments in interoperability and coordination related to information and communication technology (ICT), between and within international organizations, will be required. Another necessary investment will be in EU-wide central equipment repository for emergency response, and to enhance the resilience of supply chains and domestic infrastructures and societies in case of interruption of supplies. Investments will be required in the sector of non-military instruments for EU power projection, such as financial instruments, as well as on industrial strategies and identification of vulnerabilities and gaps of resilience.

19 FOCUS: *Deliverable 3.2: Report on Alternative Future Models of Comprehensiveness,* 2011. Retrieved from: http://www.focusproject.eu/documents/14976/e3fe4a14-e7f6-4a98-9e66-70d5f1e4a028 [last access: 2014-07-01].

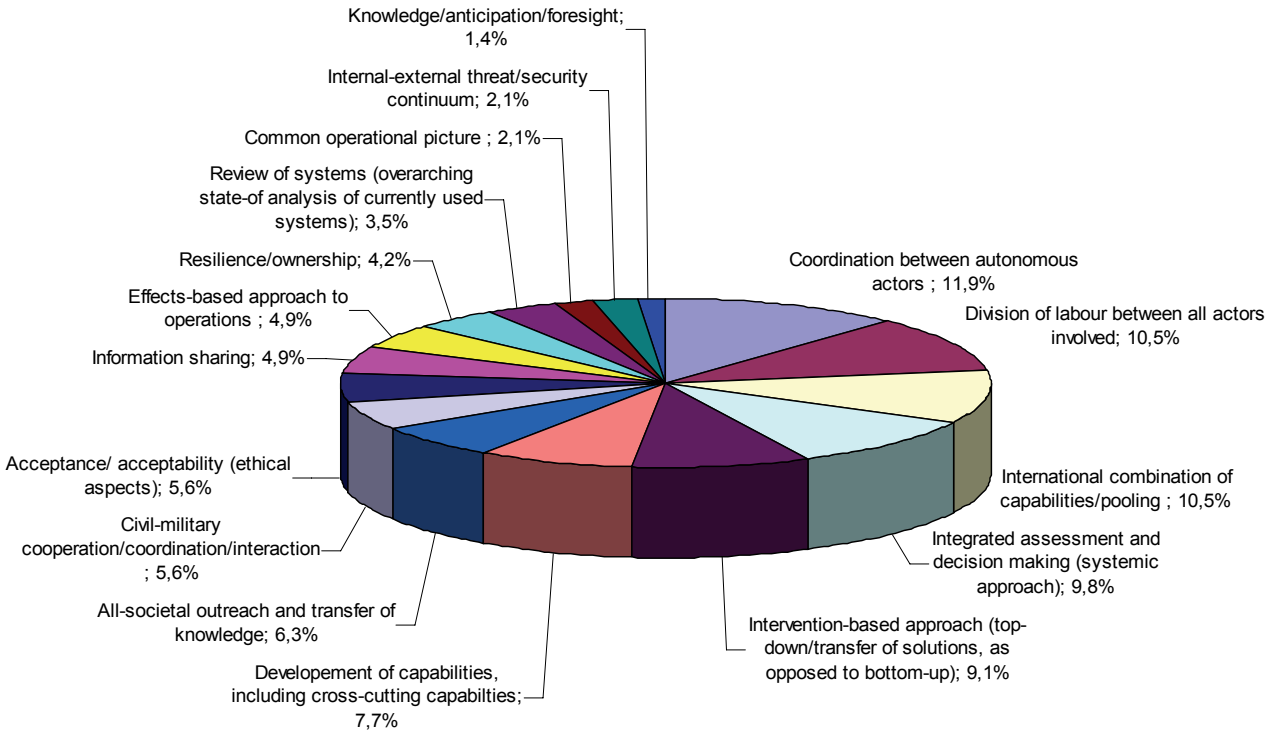
20 See article "Whole of community approach," *European Security (Research) Glossary (ESG),* http://www.focusproject.eu/web/focus/wiki/-/wiki/ESG/Whole-of-community+approach [last access: 2014-07-01]..

***Table 2:* Top-5 and bottom-5 conceptual elements of *"comprehensive approach"* in forward-looking policy, strategy, and Security Research documents.**

Top 5	
Coordination between autonomous actors	11.9%
Division of labour between all actors involved	10.5%
International combination of capabilities/pooling	10.5%
Integrated assessment/ decision making (systemic approach)	9.8%
Intervention-based approach (top-down/transfer of solutions, as opposed to bottom-up)	9.1%

Bottom 5	
Resilience/ownership	4.2%
Review of systems (overarching state-of analysis of currently used systems)	3.5%
Common operational picture	2.1%
Internal-external threat/security continuum	2.1%
Knowledge/anticipation/ foresight	1.4%

***Figure 4:* Core ingredients of conceptual definitions of *"comprehensive approach"* in forward-looking policy, strategy, and Security Research documents.**



4 REFERENCE SCENARIOS

4.1 DEVELOPMENT AND OVERVIEW OF THE REFERENCE SCENARIOS

The five reference scenarios, one per "Big Theme," to which the FOCUS roadmap proposal is geared comprise the following:[21]

- "*Alternative future concepts of the comprehensive approach and resulting role requirements for the EU* – Reference scenario: "No Land is an Island" – A protected EU homeland with external responsibilities;
- *Natural disasters and global environmental change* – Reference scenario: "Policy Drives All in a Have/Have-Not World" – Security Research on natural disasters and the global environment;
- *Critical infrastructure and supply chain protection* – Reference scenario: "Security as Societal Science" – Critical infrastructure and supply chain research driven by societal factors;
- *The EU as a global actor based on the wider Petersberg tasks* – Reference scenario: "Borderless Threats = Mission Creep" – The EU's forced march toward a stronger Common Security and Defence Policy;
- *The EU's internal framework (and EU Homeland Security)* – Reference scenario: "Inside Out" – Inward coherence and governance opens the door to external policy.

These reference scenarios depict alternative futures for Security Research in the 2035 time frame which support the EU's projected exogenous security roles described at the level of thematic scenarios. 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 European level. Coordinated investment in preparedness is expected to play a major role here.

Table 1 provides a brief description of the reference scenarios:

***Table 1:* Overview of FOCUS reference scenarios.**

Name of reference 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. There is close integration of national Security Research programmes with that of the EU to help Europe deal with the broadest spectrum of security incidents.

21 The reference scenarios are described in FOCUS, Deliverable 8.2, as well as implemented as wikis, along with accompanying information and analysis: http://www.focusproject.eu/web/focus/wiki/-/wiki/REFERENCE_SCENARIOS/FrontPage [last access: 2014-07-1]. Those wikis include full-length scenario descriptions.

"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 as well as 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 homeland 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 interagency work and intelligence sharing.

Table 2 on the next page lists the reference scenarios against the identified top cross-cutting scenario drivers.

***Table 2:* FOCUS reference scenarios and their main drivers.**

	"No Land is an Island" – A protected EU homeland with external responsibilities	**"Policy Drives All in a Have/Have-Not World" – Security Research on natural disasters and the global environment**	**"Security as Societal Science" – Research driven by societal factors**	**"Borderless Threats = Mission Creep" – The EU's forced march toward a stronger Common Security and Defence Policy**	**"Inside Out" – Inward coherence and governance opens the door to external policy"**
Main Big-Theme reference	*Future concept of comprehensive approach and future concept of EU homeland security*	*Natural disasters and global environmental change*	*Critical infrastructure and supply chain protection*	*EU as a global actor based on the wider Petersberg tasks*	*EU internal framework (as EU role determinant)*
Comprehensive (societal, economic, and institutional) resilience to crises and disasters					
Science and technology innovation					
Practical strength of the "European Security Model," as advocated in the EU Internal Security Strategy: addressing the causes of insecurity and not just the effects; prioritizing prevention and anticipation, and involving all sectors with a role to play in public protection					
Asymmetry of capabilities of Member States, the EU, and adversaries – including regionalization vs. globalization of security					
Convergence or divergence of security cultures					
Extent of information and intelligence sharing, and early warning capabilities – including policies for information exchange					
Decision-making tools based on joined-up situation analyses, including their use to secure public acceptance and support					
Changing national security capacities and levels of asymmetry (relative difference between the capacity of nations to influence security affairs)					
Whole of community approach based on technological facilitation and empowerment					
Extent of dependency on technology, as well as of critical (inter)dependencies between technologies					

While the reference scenarios have different loads on the drivers and a different thematic focus, the following cross-cutting scenario descriptors common to all reference scenarios were identified (*Table 3*). They describe the common mission space for security governance, and governance on Security Research in the "EU 2035."

***Table 3:* Cross-cutting reference scenario descriptors.**

- Monitoring/detection/surveillance instruments for external threats
- Comprehensive risk and vulnerability assessment
- EU as a comprehensive security provider, including the approach to resilience of systems, infrastructures and societies
- EU legislative frameworks evolve toward more inter-institutional and international cooperation
- Security Research merges with emergency management and disaster research
- EU role embraces coordination, data exchange, and early alert
- EU's security–safety continuum grows stronger
- EU's internal (homeland) security policy increases
- Ethical research rises to the top of EU research agenda, with increasing focus on influence of societal factors on security strategies
- Critical infrastructures and supply chains adapt to societal changes and security needs
- Societal awareness increases via citizen education and risk communication
- Advanced public-private partnerships for security technology development and implementation
- Harmonized risk management for preparedness and response at EU and Member State level
- Comprehensive risk assessment framework for critical infrastructures and supply chains
- EU has new public funding mechanisms for technologies aimed at closing security gaps
- Security Research is supporting policy and strategic studies for early warning purposes, with emphasis on CBRN mission scenarios

4.2 ETHICS ASPECTS

Many Security Research roadmaps so far have been technology driven or equated a comprehensive approach to societal security with available technology throughout the crisis management cycle (mitigation – preparedness – response – recovery).[22] However, the FOCUS roadmap assumes that technology not only contributes to security but can by itself create new vulnerabilities. It also has the potential to change human behaviour and to drive the evolution of security cultures. There are no effective technological solutions without acceptance and public participation. Ethics aspects addressed by FOCUS therefore are a part of good security governance and reach beyond ethical parallel research to assess and increase the chances of social acceptance of technology.

22 Such as Integrated Mission Group on Security (IMG-S) (ed.): *Security Research Roadmap. Version 1* (2011). Retrieved from: http://imgs.frascati.enea.it/index.php/public-documents?func=startdown&id=5 [last access: 2014-07-01]; V. Rouhiainen (ed.): *Technology Roadmap of Security Research.* VTT: VTT Technical Research Centre of Finland, 2007. Retrieved from: http://www.vtt.fi/inf/pdf/tiedotteet/2007/T2368.pdf [last access: 2014-07-01]; U.S. Department of Homeland Security: *A Roadmap for Cybersecurity Research* (2009). Retrieved from: http://www.cyber.st.dhs.gov/docs/DHS-Cybersecurity-Roadmap.pdf [last access: 20-03-2013].

The reference scenario analysis also yielded main expected ethics aspects, including the following, which as well point to security governance challenges to meet in the future:

- Need of development of technology for privacy and trusted data by design along with security-enhancing technology;
- Assessment of security technology opportunities/possibilities vs. citizens' needs;
- Creation of different levels of security in society;
- Ethics of security economics (e.g., unintended consequences of "smart" and effects-based approaches);
- Increasing infrastructure for capturing, storing, linking, merging, processing, and visualizing very large social media datasets with implications for fundamental citizens' rights, freedom of expression and data privacy issues;
- Major consideration of non-technological issues such as trust and resilience;
- Risk of developing over-sophisticated technology that does not respond well to security gaps and/or citizens' needs;
- Risk of departure from normal liberal democratic standards (such as protection of liberties, separation of powers, and endorsement of checks and balances), for example in measures to drive/compel social and individual change of behaviour to mitigate climate change, or limit cyber vulnerability;
- Possible divergence between ethical Security Research and socially acceptable research: There can be a social consensus in favour of security measures that violate human rights, and Security Research that supports those measures;
- Need to provide norms and standards beyond security technology frameworks.

5 THE FOCUS ROADMAP

The FOCUS roadmap proposal for a research-informed approach to civil security in the EU of the year 2035 was developed in implementation of requirements from the FOCUS reference scenarios, as well as from analysis of cross-cutting (cross-scenario) aspects and transversal issues that are scenario-independent. It identifies research tracks in a variety of relevant dimensions, reaching from reference scenario tracks to cross-cutting, including ethics, aspects. The roadmap also provides a structured knowledge space where various other content and results from FOCUS are accumulated and can be selected.

While the full-scale FOCUS dynamic roadmap has been designed for use by accredited experts (European Union dissemination level "PP"), a printout of the main page of the full version of the roadmap is included in an *Annex* to this paper. A navigable "light" version is available on the public front end of the FOCUS IT Platform.[23] This is supported by scenario and glossary wikis also accessible on platform. The resulting roadmap is geared towards cross-cutting aspects between scenarios and EU roles. These are based on a set of drivers determining what security may mean

23 Accessible via the FOCUS website at http://www.focusproject.eu, or directly on http://www.european-security.info/focus/focus_roadmap_light.htm [last access: 2014-07-01].

in a future "EU 2035". Resources and resilience, for example, figure among the most important of the drivers since crises can easily result from scarcity of resources or supply chain dependencies.

The FOCUS roadmap is based on the project's reference scenarios, results from thematic scenario work towards the references scenarios,[24] and on identified cross-cutting issues and emerging key-themes across reference scenarios. Further, Consultation and active participation of stakeholders is a central concern in a roadmap process.[25] Scenario foresight in FOCUS, leading to the roadmap, included a broad number of different types of experts and stakeholders, and a variety of scenario information (such as online and on-site questionnaires, new social media information, workshops, studies, related projects' results, etc.). In total (online and on site), FOCUS involved more than 600 external experts/stakeholders from more than 20 countries, both within and beyond the EU. Experts were identified in horizon scanning, in scanning of related projects, and by using partners' lists of experts. Further experts were added based on project-related communication and turnout for project events. Participating experts represented EU bodies, national federal bodies and international bodies, industry, first responder organizations, think tanks, universities, NGOs, and other sectors. As far as its on-site work is concerned, FOCUS held more than 40 external and more than 30 internal foresight workshops.

The roadmap is based on an overall integration of results from FOCUS scenario foresight work. To make the core roadmap a standalone document, major content from FOCUS deliverables has been included in the roadmap structure/sub-pages (and not just been hyperlinked). Further information has been included via hyperlinks to other parts of the FOCUS IT-based Knowledge Platform,[26] such as scenario wikis or the European Security (Research) Glossary wiki with definition of tracks and terms and concepts.

The FOCUS roadmap is structured along two dimensions, blending elements from classical technology roadmaps with elements of a balanced scorecard:

- *A horizontal dimension (time line – immediate action, short-term, mid-term, long-term, and scenario foresight tool repository)*
    - This section of the roadmap proposes analyses and steps to guide scenario-related planning of "Security Research 2035;"
    - While following the same structure, each planning path leads to different, tailored information per scenario;
    - While the Roadmap main page proposes a planning pattern similar in all five reference scenario tracks, the information on the sub-pages of the roadmap is tailored and scenario specific.
- *A vertical dimension.* The vertical dimension is divided into two parts:
    - Reference scenario aspects of the planning for "Security Research 2035" – these are "pull" factors, where futuristic scenarios require certain types and efforts of Security Research;
    - General aspects of the planning for "Security Research 2035" – these are "push" factors, where certain general requirements for and expectations from Security Research drive the future development of that field of research.

24 See http://www.focusproject.eu/web/focus/wiki/-/wiki/THEMATIC_SCENARIO_SYLLABI/FrontPage [last access: 2014-07-01].

25 Cf. United Nations Industrial Development Organization (UNIDO): *Foresight Methodologies: Training Module 2* (2004), p. 29. Retrieved from: http://www.strast.cz/dokums_raw/foresightmethodologies_1168269318.pdf [last access: 15-03-2013].

26 http://www.focusproject.eu/knowledgeplatform/workbench [last access: 15-03-2013].

For example, the roadmap can be read from left to right, or from an immediate to a long-term time frame, in the reference scenario dimension (upper vertical dimension). This provides information on proposed steps to plan towards one or several of the reference scenarios.

The roadmap links to static, dynamic, and living documents and sub-pages:

- *Static documents/sub-pages* contain fundamental information of value for the whole period covered by the roadmap. This for example includes criteria for "good Security Research."
- *Dynamic sub-pages* contain a static wealth of information but are programmed to highlight/display/structure this information differently, depending on from what part of the main roadmap it is navigated to. For example, emerging key themes for Security Research are selected for display based on the reference scenario from which they are navigated to. Another example is the selection of initial planning scenarios based on end-users rating of reference scenarios. These ratings can be changed to new scores resulting from subsequent end-user assessments, with changing selection of initial planning scenarios.
- *Living documents* are mainly Wiki pages on the IT-based Knowledge Platform that the roadmap links to. Examples include reference-scenario related main emerging security technologies, and related ethics aspects, etc. Abbreviations and concepts relevant for the roadmap are explained in the *European Security (Research) Glossary* compiled by FOCUS.

The FOCUS roadmap presents a systematic, multi-tiered and multi-tracked planning approach to meeting the EU's future requirements to act as a comprehensive security actor, with security delivered to citizens as the ultimate end-users. It offers ways to prioritise RTD requirements, plan for Security Research calls, derive mission scenarios for end-users and specific capability processes for investment, and to build future expertise.

For example, *Figures 3* and *4* below, extracts from the full version of the roadmap, depict how future security challenges addressed by the five FOCUS themes will have an impact on different sectors, and which types of technological solutions will be required to deliver security to the citizens of the European Union. This can provide a foundation for planning towards European Security Research governance across different mission spaces.

***Figure 3:* Cross-themes and required disciplines/themes for security in the EU.**

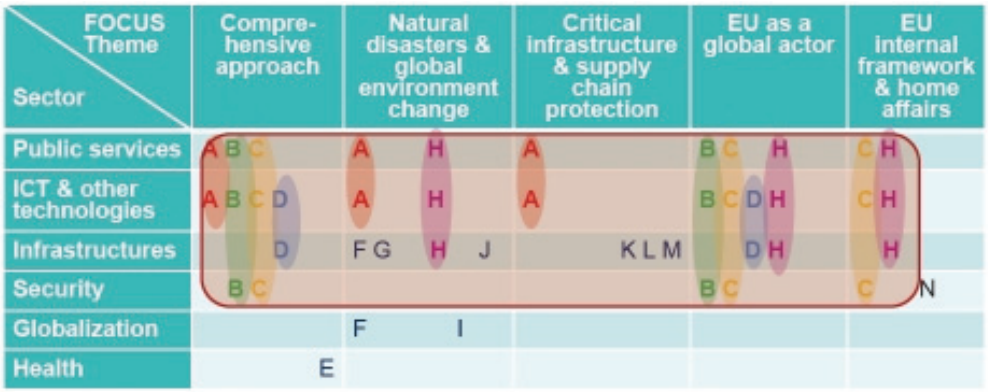
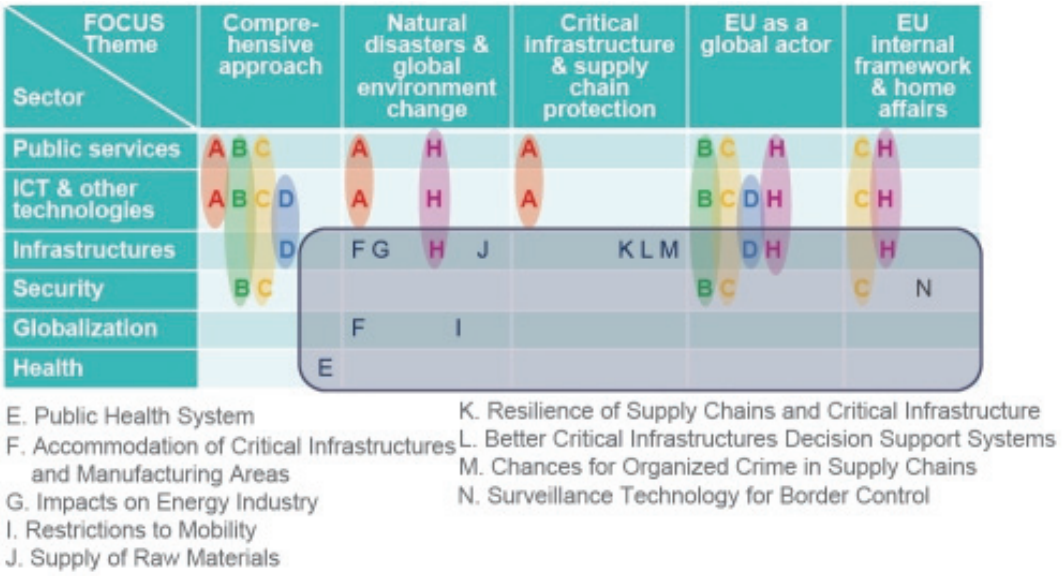


Figure 4: **Single-themes and required disciplines/themes for security in the EU.**



6 THE WAY AHEAD: GOVERNING CIVIL SECURITY AND THE RESEARCH THAT CONTRIBUTES TO IT

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 for example critical infrastructure protection or public health, with multidisciplinary Security Research reduced to such sectors. A major conclusion therefore is that future European Security Research in the 2035 time-frame 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.

FOCUS has concluded overall that the planning of "Security Research 2035" will be driven by a variety of factors that apply across different themes and scenarios identified in the project. To top-10 drivers, as listed in *Table 2* above, include the following:

1. Comprehensive (societal, economic, and institutional) resilience to crises and disasters;
2. Science and technology innovation;
3. Practical strength of the "European Security Model," as advocated in the EU Internal Security Strategy (2010): addressing the causes of insecurity and not just the effects; prioritizing prevention and anticipation, and involving all sectors with a role to play in public protection;
4. Asymmetry of capabilities of Member States, the EU, and adversaries – including regionalization vs. globalization of security;
5. Convergence or divergence of security cultures;
6. Extent of information and intelligence sharing, and early warning capabilities – including policies for information exchange;

7. Decision-making tools based on joined-up situation analyses, including their use to secure public acceptance and support;
8. Changing national security capacities and levels of asymmetry (relative difference between the capacity of nations to influence security affairs);
9. Whole-of-community approach based on technological facilitation and empowerment;
10. Extent of dependency on technology, as well as of critical (inter)dependencies between technologies.

Many Security Research roadmaps so far have been technology driven or equated a comprehensive approach to societal security with available technology throughout the crisis management cycle (mitigation – preparedness – response – recovery). However, the FOCUS roadmap assumes that technology not only contributes to security but can by itself create new vulnerabilities. It also has the potential to change human behaviour and to drive the evolution of security cultures. Security Research should increasingly include perspectives from the humanities and social sciences to provide practical criticism of the evolution of the concept of security in the EU and its impact on citizens and society. It should provide a better connection of the disciplines involved because there are no effective technological solutions without acceptance and public participation, and citizens will have to be better involved in security processes. At the same time, the further development of Europe's civil security cannot be conceived without technology – and technology will contribute to increase societal resilience. Not only a *comprehensive approach*[27] which unifies efforts will be needed in the future, but also a *holistic approach*[28] which comprises technology, society, culture and change.

From this postulate, two main challenges for policy relevant Security Research emerge, as mentioned above: Security Research "2035" needs to be *consistent* and *coherent.* Consistent Security Research accumulates knowledge across disciplines, sectors, and cases in order to timely identify most important gaps and needs for the further implementation of security strategies. Coherent Security Research is a cooperative intellectual effort at national and EU levels which contributes to the definition and implementation of a common European security agenda across different themes, funding lines, epistemic communities, and stakeholders.

FOCUS expects that Security Research will become a part of the equation of security policy, and as such become a societal enterprise. As part of that, Security Research should focus on solving needs of citizens, and not just on the impacts of security interventions. There is more than the societal dimension of security, and that is *the societal creation of security.* Citizens' perspectives should be integrated into the research process and the programming of Security Research.

Horizon 2020, the successor of the EUs Seventh Framework Programme (FP7), sees future Security Research mainly in the *"Inclusive, Innovative and Reflective Societies"* and in the *"Secure Societies"* parts. The objective is to meet complex, interacting challenges in an innovative way and to link research to EU policy objectives. With its emphasis on foresight (not prediction) and the transversal, ethical and broader societal implications of its scenarios, FOCUS points to the emerging Horizon 2020 programme. However, the time frame of the FOCUS project is 2035, thus reaching beyond Horizon 2020. Therefore, FOCUS is not dedicated towards Horizon 2020 itself but to longer-term planning for Security Research that supports the anticipated future roles of the EU as a comprehensive security provider.

27 See article "Comprehensive approach," in *FOCUS European Security (Research) Glossary,* http://www.focusproject.eu/web/focus/wiki/-/wiki/ESG/Comprehensive+Approach [last access: 2014-07-01].

28 See article "Holistic approach," in *FOCUS European Security (Research) Glossary,* http://www.focusproject.eu/web/focus/wiki/-/wiki/ESG/Holistic+approach [last access: 2014-07-01].

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ANNEX:

FOCUS FULL ROADMAP OVERVIEW PAGE

Press STRG-a at any time to return to this page

The roadmap includes internal hyperlinks as well as hyperlinks to the FOCUS website, other parts of the IT-based Knowledge Platform, and to FOCUS wikis.
Main hyperlinked content is marked blue (without hyphenation), but other text (boxes) may also have links to other parts of the roadmap and/or its sub-sheets

Examples of practical application of the roadmap

TRIGGER VALUES/SCORES		
End-user recommended initial scenario planning focus	>	5,5
		n/a

Select guiding information for scenario planning of "Security Research 2035"

FOCUS ROADMAP FOR THE PLANNING OF "SECURITY RESEARCH 2035"

Towards a trans-disciplinary Security Research Paradigm

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 do 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 **five "Big Themes"** generated by horizon scanning and study work in the development phase of the project.
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 providing security to its citizens.**
The reference scenarios were derived from a larger set of **thematic scenarios,** developed based on the FOCUS method ("embedded scenario approach").

Use of FOCUS IT-based Knowledge Platform with scenario foresight/planning support tools

Current call preparations	Short term (2013)	2018	Mid term	2028	Long term (2035)	Thematic scenarios 2035	Reference scenarios 2035 and further scenario information	Proof of concept	Main "Big Theme" reference	IT-based Knowledge Platform

REFERENCE SCENARIO ASPECTS OF "SECURITY RESEARCH 2035" PLANNING

End-user memorandum on/selection of reference scenarios (GOOD / MISSING)

FOCUS Big Theme: Comprehensive approach

Scenario drivers

FOCUS initial recommendation: Future tracks of Security Research should include the following: EU cohesion, decision-making and, more generally, governance; dependency on information and communication technology, and technology in general (address cascading breakdown of systems); new methodologies for collecting and integrating data from various different sources; decision-making tools based on joined-up situation analyses, including their use to secure public acceptance and support; advancement and integration of approaches to foresight, with special consideration of disruptors from normative (desired) end-states. Future tracks of Security Research should also lay emphasis on the implementation perspective, taking into account indicators for measuring the effectiveness of the comprehensive approach.

Initial scenario score (probability x impact): 7,1

GOOD:
• Presents good insight and helps broaden the perspective
• Quite comprehensive
• Does a nice job of envisioning what policy and technology changes could do to reshape EU activities in 2035

MISSING:
• Consider looking at what this scenario would mean on an individual level: How does it impact they way a person goes about their individual responsibilities?
• Picture a more volatile future, with more extreme roles for the EU
• It appears contradictory that programs would be closely integrated/linked, while critical infrastructure resilience across borders is weak

Current emerging key themes

Short term: Prioritize RTD requirements | Prioritize topics for calls | Create/update pool of experts for scenario (re)assessment on a regular basis | Open reference scenario wiki for crowdsourcing of additional scenario aspects/information proposed by end-users

Mid term: Reassess scenario in expert consultation | Calibrate planning of research to addressing main translation mechanisms of scenario relevant threats and challenges (from EU strategic environment to EU-internal) | Explore joint calls (cross-discipline) | Check scenario specific indicators | Calibrate scenario planning to main challenges for/functions of Security Research in this Big Theme | Implement scenario-specific higher education requirements | Tune IT-based Knowledge Platform to scenario-specific expectations and requirements

Long term: Optimize research capabilities to address scenario-specific configuration of drivers | Address main R&D aspects of the scenario | Address R&D-related and general ethics aspects of the scenario

Integration & multiple plausibility probe

"No Land is an Island" – A protected EU homeland with external responsibilities

In this scenario, the EU and its Member States have developed - by the year 2035 - 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.

REFERENCE SCENARIO

Expected impact of scenario at Member State level: MEDIUM

Scenario's implied threats, technologies, research needs and ethics aspects

Dedicated chapter on IT-based Knowledge Platform, with information on data, methods and proof of concept

FOCUS Big Theme: Comprehensive approach

FOCUS Big Theme: Natural disasters and global environmental change

Scenario drivers

FOCUS initial recommendation: A focus could be on meta-projects that integrate results from previously EU funded and other research projects on natural hazards and their security aspects. This requires enhanced accessibility and more comprehensive analysis of previous studies and their results. Additional topics are anthropogenic (or "man-made") natural disasters and multi-disciplinary scenarios of maximum credible natural events. Those scenarios could contribute to identifying maximum possible damage from a combination of primary (destruction by shockwave), secondary (e.g., fires), and tertiary (e.g., supply chain damage, loss of production) effects for a given region, nation, or the EU as a whole.

Initial scenario score (probability x impact): 5,0

GOOD:
• Realistic scenario that presents competing parochial interests and a focus on resiliency in the face of environmental change
• Can help to identify who the new players are
• Useful in terms of reflecting scarcity and threats that may bring
• Identifies valid expectations re the EU's role
• Helps policy makers consider the long-term impact of decisions on the EU security community

MISSING:
• You can cooperate without integration; most crisis are best solved at the local level
• Add analysis of what the rest of the world will look like
• Global interconnections (such as the supply chain) will become more important due to enhanced dependencies
• Media and dissemination use both for information and protection, and ethical implications, should be even more stressed

Current emerging key themes

Short term: Prioritize RTD requirements | Prioritize topics for calls | FOCUS project study: Disaster management in the EU – present and future: Challenges for research | Create/update pool of experts for scenario (re)assessment on a regular basis | Open reference scenario wiki for crowdsourcing of additional scenario aspects/information proposed by end-users

Mid term: Reassess scenario in expert consultation | Calibrate planning of research to addressing main translation mechanisms of scenario relevant threats and challenges (from EU strategic environment to EU-internal) | Explore joint calls (cross-discipline) | Check scenario specific indicators | Calibrate scenario planning to main functions of Security Research in this Big Theme | Implement scenario-specific higher education requirements | Tune IT-based Knowledge Platform to scenario-specific expectations and requirements

Long term: Optimize research capabilities to address scenario-specific configuration of drivers | Address main R&D aspects of the scenario | Address R&D-related and general ethics aspects of the scenario

Integration & multiple plausibility probe

"Policy Drives All in a Have/Have-Not World" – Security Research on natural disasters and the global environment

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. This world of 2035 is 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.

REFERENCE SCENARIO

Expected impact of scenario at Member State level: HIGH

Scenario's implied threats, technologies, research needs and ethics aspects

Dedicated chapter on IT-based Knowledge Platform, with information on data, methods and proof of concept

FOCUS Big Theme: Natural disasters and global environmental change

FOCUS Big Theme: Critical infrastructure and supply chain protection

Scenario drivers

FOCUS initial recommendation: Policy development in the fields of critical infrastructure protection, supply chain security and security of supply calls for support by well-focused research, centred on three main aspects: First, there is the need to conduct detailed assessment on interdependencies in the European Critical Infrastructure system. Special attention should be paid on linkages between European Critical Infrastructure and infrastructure located in third countries. Second, future research should compile a comprehensive catalogue of critical supplies for the European economy and investigate factors that could disrupt supply of these materials to the EU in detail. Third, more research is needed to analyze how the new mandate of the Lisbon Treaty together with enhanced capabilities of the EU could change the EU's role in foreign politics, and more interestingly, how the EU could use its growing political power to secure its interests in third countries.

Initial scenario score (probability x impact): 5,0

GOOD:
• Particularly useful regarding corporate public private interfaces and supply chain issues
• Nicely pulls in the role of the private sector, public-private partnerships, and a mutual support system, acknowledging the possible future limited role of governments
• Brings forward the concept of how complex the future will be
• Should be one of the pillars of R&D

MISSING:
• Viability of closer collaboration is politically questionable
• Some immediate benefits must be demonstrated to all – great & small – populations inhabitants
• Underscoring of the interaction of cyber and physical systems concerning resilience issues
• Addressing of how future Security Research planning will/could be opened for external experts to provide input on a regular basis

Current emerging key themes

Short term: Prioritize RTD requirements | Prioritize topics for calls | Create/update pool of experts for scenario (re)assessment on a regular basis | Open reference scenario wiki for crowdsourcing of additional scenario aspects/information proposed by end-users

Mid term: Reassess scenario in expert consultation | Calibrate planning of research to addressing main translation mechanisms of scenario relevant threats and challenges (from EU strategic environment to EU-internal) | Explore joint calls (cross-discipline) | Check scenario specific indicators | Calibrate scenario planning to main challenges for/functions of Security Research in the reference scenario | Implement scenario-specific higher education requirements | Tune IT-based Knowledge Platform to scenario-specific expectations and requirements

Long term: Optimize research capabilities to address scenario-specific configuration of drivers | Address main R&D aspects of the scenario | Address R&D-related and general ethics aspects of the scenario

Integration & multiple plausibility probe

"Security as Societal Science" – Critical infrastructure and supply chain research driven by societal factors

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: Critical infrastructures and supply chains are desired to be designed adaptable to social change and evolving citizens' security needs, and to be resilient to negative effects of interdependencies within Europe and with critical infrastructures in third countries.

REFERENCE SCENARIO

Expected impact of scenario at Member State level: LOW

Scenario's implied threats, technologies, research needs and ethics aspects

Dedicated chapter on IT-based Knowledge Platform, with information on data, methods and proof of concept

FOCUS Big Theme: Critical infrastructure and supply chain protection

FOCUS Big Theme: EU as a global actor

Scenario drivers

FOCUS initial recommendation: Future concepts of a global security role for the EU will require even more than present ones that the Unions' security posture (strategic orientation plus capabilities) and its internal decision-making framework match. Future Security Research should address corresponding capability-related challenges, such as the following: capabilities that can impact from any distance (advanced drones, other advanced robotics systems, strategic cyber capabilities, space capabilities, etc.); capabilities that can disrupt external EU lifelines (energy, communication, etc.); changing economic and financial leverage that can have negative or positive impacts on security challenges to the EU; challenges that result from differentials in the EU's wider neighbourhood (population, age, employment, competence, etc.).

Initial scenario score (probability x impact): 5,8

GOOD:
• Seems useful from our end-user viewpoint to address future security-related challenges and requirements
• Can give new insight to problems that you are not aware of
• Encourages the consideration of what issues (security, economic, etc.) will be handled on the national, EU, and transnational levels

MISSING:
• Cyber risks affect all transportation matters, so the emphasis on maritime is questionable
• Irrational fears must be appraised before any systems-infrastructure is put in place
• Scenario's effects on the private sector and on individuals
• This scenario throws out a lot of other future concerns to focus fairly exclusively on cyber threats

Current emerging key themes

Short term: Prioritize RTD requirements | Prioritize topics for calls | Create/update pool of experts for scenario (re)assessment on a regular basis | Open reference scenario wiki for crowdsourcing of additional scenario aspects/information proposed by end-users

Mid term: Reassess scenario in expert consultation | Calibrate planning of research to addressing main translation mechanisms of scenario relevant threats and challenges (from EU strategic environment to EU-internal) | Explore joint calls (cross-discipline) | Check scenario specific indicators | Calibrate scenario planning to main challenges for/functions of Security Research in this Big Theme | Implement scenario-specific higher education requirements | Tune IT-based Knowledge Platform to scenario-specific expectations and requirements

Long term: Optimize research capabilities to address scenario-specific configuration of drivers | Address main R&D aspects of the scenario | Address R&D-related and general ethics aspects of the scenario

Integration & multiple plausibility probe

"Borderless Threats = Mission Creep" – The EU's forced march toward a stronger Common Security and Defence Policy

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 homeland cooperation has emerged by 2035, though it is geared towards joint pragmatic/operational action, but not necessarily towards joint technology development.

REFERENCE SCENARIO

Expected impact of scenario at Member State level: MEDIUM

Scenario's implied threats, technologies, research needs and ethics aspects

Dedicated chapter on IT-based Knowledge Platform, with information on data, methods and proof of concept

FOCUS Big Theme: EU as a global actor

FOCUS Big Theme: EU internal framework (& EU homeland security)

Scenario drivers

FOCUS initial recommendation: New tracks of Security Research comprise the need for the EU to support Member States in times of crisis, including for example possible increased roles of dual-use capabilities in home affairs. Another aspect is to identify most important research gaps and needs for the further implementation of EU security strategies. The role of the internet (in particular of the new social media such as Facebook) is a further relevant aspect that follows the need for differentiated analyses of such as emergence of networks combining factions, future strategies, and technologies to interfere with riot communication, future police capabilities, and oversight mechanisms.

Initial scenario score (probability x impact): 5,1

GOOD:
• Scenario represents a better blend of internal and external considerations, along with an "all-of-community" approach
• Scenario will not drive the will to improve your own capability
• Future innovation will have to consider that the individual will have a greater role in security and communications
• Creating a common security culture is one major aspect that should inform policy

MISSING:
• If citizens play a stronger role in decision making processes and public perceptions of citizens' security needs are important, needs for public communication and education could be included
• Give the local level more power in the scenario and hope to improve their own future
• More addressing of the relevance and consequences of citizens' perception and expectations

Current emerging key themes

Short term: Prioritize RTD requirements | Prioritize topics for calls | Analytical chart of the first annual report on the implementation of the EU Internal Security Strategy (ISS) | Create/update pool of experts for scenario (re)assessment on a regular basis | Open reference scenario wiki for crowdsourcing of additional scenario aspects/information proposed by end-users

Mid term: Reassess scenario in expert consultation | Calibrate planning of research to addressing main translation mechanisms of scenario relevant threats and challenges (from EU strategic environment to EU-internal) | Explore joint calls (cross-discipline) | Check scenario specific indicators | Calibrate scenario planning to main challenges for/functions of Security Research in this Big Theme | Implement scenario-specific higher education requirements | Tune IT-based Knowledge Platform to scenario-specific expectations and requirements

Long term: Optimize research capabilities to address scenario-specific configuration of drivers | Address main R&D aspects of the scenario | Address R&D-related and general ethics aspects of the scenario

Integration & multiple plausibility probe

"Inside Out" – Inward coherence and governance opens the door to external policy

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 contributes to meeting related technology needs, such as collaborative technologies for interagency work and intelligence sharing.

REFERENCE SCENARIO

Expected impact of scenario at Member State level: LOW

Scenario's implied threats, technologies, research needs and ethics aspects

Dedicated chapter on IT-based Knowledge Platform, with information on data, methods and proof of concept

FOCUS Big Theme: EU internal framework (& EU homeland security)

Futuristic requirements for Security Research as identified from related projects

Futuristic requirements for Security Research from EU Directorates General and Agencies

Comprehensive scenario indicator check

Comprehensive scenario drivers check

EU role scenario syllabus

European Security Research scenario syllabus

Explanation of relevant reference terms: European Security Research Glossary (ESG)

Scenario foresight process descriptions

Scenario foresight tool repertory

Scenario questionnaire repository

GENERAL ASPECTS OF "SECURITY RESEARCH 2035" PLANNING

FOCUS conclusions for future Security Research

Aspect	Key themes	Short term	Mid term	Long term
Concept of security in/of the EU	Emerging key themes	Create competence to address cross-cutting aspects of EU roles as a comprehensive security provider to its citizens	Reassess transversal drivers for future EU roles as a comprehensive security actor; Re-assess and address drivers of change to the concept of security by focused planning of the transversal dimension of Security Research	
Comprehensive approach, including security governance	Emerging key themes	Explore drivers for "EU 2035" security roles; Explore drivers for Security Research to support "EU 2035" security roles	Accord research planning with evolving concept of comprehensiveness (for the EU as a security provider), calibrated across scenarios	Accord research planning with evolving concept of comprehensiveness (for the EU as a security provider), calibrated according to expected realization of scenario(s)
Cross-cutting aspects	Emerging key themes	Address security continua in next calls; Establish competence to cover cross-cutting topics & scenario requirements aspects	Implement transversal Security Research topics, with suggested contributions from additional/new disciplines, for joint calls	Address more futuristic transversal Security Research fields, their disciplines, and needed expertise
Technology aspects	Emerging key themes	Identify key equipment platforms that remain relevant in 2035 – and what type of technical involvement may be necessary in 2035 (based on information from reference scenarios)	Plan research to make usable offerings to future providers, users and stakeholders across the scenarios: Amend existing platforms to include capability to address emerging technological challenges	
Ethics aspects	Emerging key themes	Establish basic competence to comprehensively address identified future fundamental ethics aspects in Security Research	Propose – and subsequently implement – guidelines to address ethics aspects of emerging security technologies, capabilities and factors	Take steps to increase ethics competences according to expected realization of scenario(s)
Education & training curriculum aspects	Emerging key themes	Implement cross-cutting teaching requirements; Start executive training programme; Short-term higher education requirements	Mid-term higher education requirements	Long-term higher education requirements
Usable Security Research and use of foresight technology beyond foresighting		Expand IT-based Knowledge Platform based on cross-scenario expectations and requirements	Calibrate cross-scenario planning to proposed main functions/contributions of Security Research with a FOCUS on technology needs; Calibrate planning to current loads of cross-cutting indicators for the future direction of Security Research	Adapt IT-based Knowledge Platform to requirements following expected realization of scenario(s)
Good Security Research		Establish basic competence to comprehensively meet the criteria for good Security Research	Implement FOCUS conclusions for "Security Research 2035", reaching beyond "Horizon 2020," checked against scenario indicators	Calibrate research planning with current list of criteria for good Security Research, in the context of the foreseen system for "Security Research 2035"
Systems of "Security Research 2035"		Initial reference scenario survivability check	Establish concept to appropriately fuse "Security" and "Social Sciences and Humanities" themes in future planning for European research, as required by indications of realizing reference scenarios	Selection/calibration of planning scenario according to emerging/expected system of "Security Research 2035"
EU-U.S. research collaboration: Security Research and RTD in the Homeland Security Enterprise	Emerging key themes	Hold transnational conference: Evolving role of new social media in security; Establish transnational repository of relevant research	Explore topics for EU–U.S. co-ordinated calls; Hold transatlantic scenario 2035 exercise(s) (annual basis) plus student virtual working groups between exercises	Explore co-financed research/transnational grants and EU–U.S. joint calls

General aspects of Security Research 2035 planning

Current call preparations	Short term (2013)	2018	Mid term	2028	Long term (2035)	Reference scenarios	Proof of concept	Main "Big Theme" reference	IT-based Knowledge Platform