SECURE DYNAMIC CLOUD FOR
INFORMATION, COMMUNICATION AND RESOURCE INTEROPERABILITY
BASED ON PAN-EUROPEAN DISASTER INVENTORY

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**Deliverable 5.5**

# Evaluation and Validation Report for SecInCoRe Stakeholders

Final Version

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Work Package 5

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## Executive summary

This deliverable provides the final report and the general conclusion of all activities performed within WP5. Recalling the methodology developed and implemented until the end of the project and in parallel reporting all the activities performed through Demonstration Cases, the aim of the deliverable is to provide a broad picture of what happened in SecInCoRe describing the main impact that has been possible to assess thanks to the stakeholder engagement and end users feedback.

In line with this, the deliverable starts summarising the state of the project after the pilot Demonstration Cases and after the first validation case that was performed in Paderborn in October 2016. Once recalled the kind of suggestions gathered for further implementation, the deliverable contains a description of all the conceptual and technical implementations that have been integrated or developed to run the additional Demonstration Cases as well as the evaluation activities. In detail are reported all the reference implementation that have been integrated in the collaborative platform from the project team to improve the state of the demonstrator according to the feedback of the users.

It is fair to say that both validation and evaluation activities have been performed according to the timeline provided in D5.4.

The Chapter dedicated to the validation starts with a summary of the strategy in order to deliver conceptual elements that can be used by the reader to better understand the activities performed. Then, the description of the activities performed is reported together with main results.

In the same way, also the chapter on the evaluation strategy starts with a description and a recall of the SEQUOIA methodology adopted for running the impact assessment. Then the reports on three activities aimed at the evaluation of ELSI guidance and the CIS concept are provided.

Thanks to the work of reporting on the two previous chapters, it has been possible to derive general conclusions on the entire feedback on the SecInCoRe project from a WP5 perspective. In addition to the results on impact assessment and on the validation of project's outcomes, also a reflection on the methodology has been inserted in order to provide some hints to researchers that would like to face with the validation and evaluation of a socio-technical system in the future.

Then, a final chapter is dedicated to a final reflection provided by the partners in charge of the stakeholder engagement. This task, indeed, has been crucial for the development of the project as well as for the performance of the activities foreseen in WP5. In this sense, the report wants to underline positive and challenging aspects in order to provide insights for future work on the topics.

To conclude, the entire deliverable reports all the issues and results gathered within WP5 from validation and evaluation perspective. The deliverable puts in evidence the importance of a collaborative work to validate, or evaluate, project components. Collaboration is indeed crucial within the consortium, in order to perform activities that are shared and organised by all the partners as well as with the exterior in order to build a network of stakeholders that attend the meeting and is available to follow project's development.

In line with this the deliverable is the result of a strong and solid collaboration within the partners that have worked together to achieve all the activities scheduled. Thanks to the

common effort, validation and evaluation strategy has been implemented and also adapted in several Demonstration Cases, this has produced several results that have been reported in the next pages.

**Table of contents**

# 1 Introduction

During the project lifetime, SecInCoRe has designed a Common Information Space (CIS) for enhancing cooperation and collaboration among relevant stakeholders and practitioners engaged in crisis management, focusing above all on the phases of preparedness and planning. The design and implementation of a Validation and Evaluation Strategy (VES) tailored to the aims and characteristics of SecInCoRe has been an integral part of the project since its early stages. The SecInCoRe VES uses a mixed-methods (quantitative and qualitative) approach based on scenario-driven Demonstration Cases. In each Demonstration Case, end-users and stakeholders have been introduced to different elements of the SecInCoRe CIS concept and, whenever possible given the state of the project, have been asked to interact with its conceptual and technical implementations. During and after each Demonstration Case, the validation and evaluation team collected quantitative and qualitative data from participants for validation and evaluation purposes, and gathered end-users' feedback that was then shared and discussed with all project partners to further refine the technical and conceptual implementations that were used in subsequent demonstration activities.

All validation and evaluation tasks were performed in Work Package 5 (WP5). As the final output of WP5, this deliverable briefly summarises the purpose and approach of SecInCoRe's VES, describes all the activities performed under WP5 and reports the conclusions reached from a validation and evaluation perspective. Further details on the methodological aspects of the VES can be found in previous deliverables produced within WP5, specifically in D5.2, D5.3 and D5.4. The deliverable is organised as follows:

Chapter 2 explains how different elements of the SecInCoRe concept were presented to users in Demonstration Cases. The chapter describes the technical implementations (Reference and Demonstrator Implementations) used in Demonstration Cases, as well as the conceptual tools (such as videos and presentations) prepared to introduce end-users to those elements of the CIS concept for which technical implementations were not available. The chapter also reports on the progress of Reference Implementations, describing the final technical stage reached by SecInCoRe demonstrators.

Chapter 3 presents the activities performed for the validation and evaluation strategy since the submission of D5.4 in December 2016. Starting from a summary of the VES, the chapter describes the two validation cases performed with a representative of the Italian fire Brigades and with a representative of the Italian Civil Protection. Validation results from both meetings are reported, and provide further details on the feedback and recommendations gathered from participants that contributed to the identification of needs and priorities for the technical changes described in Chapter 2.

Chapters 4 summarises the methodology adopted for evaluation purposes, as described in all previous deliverables, to then focus on the results of the three evaluation activities performed to evaluate the overall CIS concept and the ELSI guidance.

Chapter 5 integrates the results from all validation and evaluation activities, and derives the conclusions on the potentialities of the CIS concept and on the potential impacts that the project's outputs will have at the end of the project. In addition, the chapter summarises the lessons learned during the project lifetime that could be used to improve validation and evaluation strategies for future implementations of socio-technical CIS based on the SecInCoRe concept.

Chapter 6 contains final reflections on stakeholder engagement and provides inputs for future stakeholder engagement in relation to validation activities.

### *1.1 Purpose of this document*

This deliverable documents all the activities performed until the end of the project according to the validation and evaluation strategy (according to the DoW, T5.4).

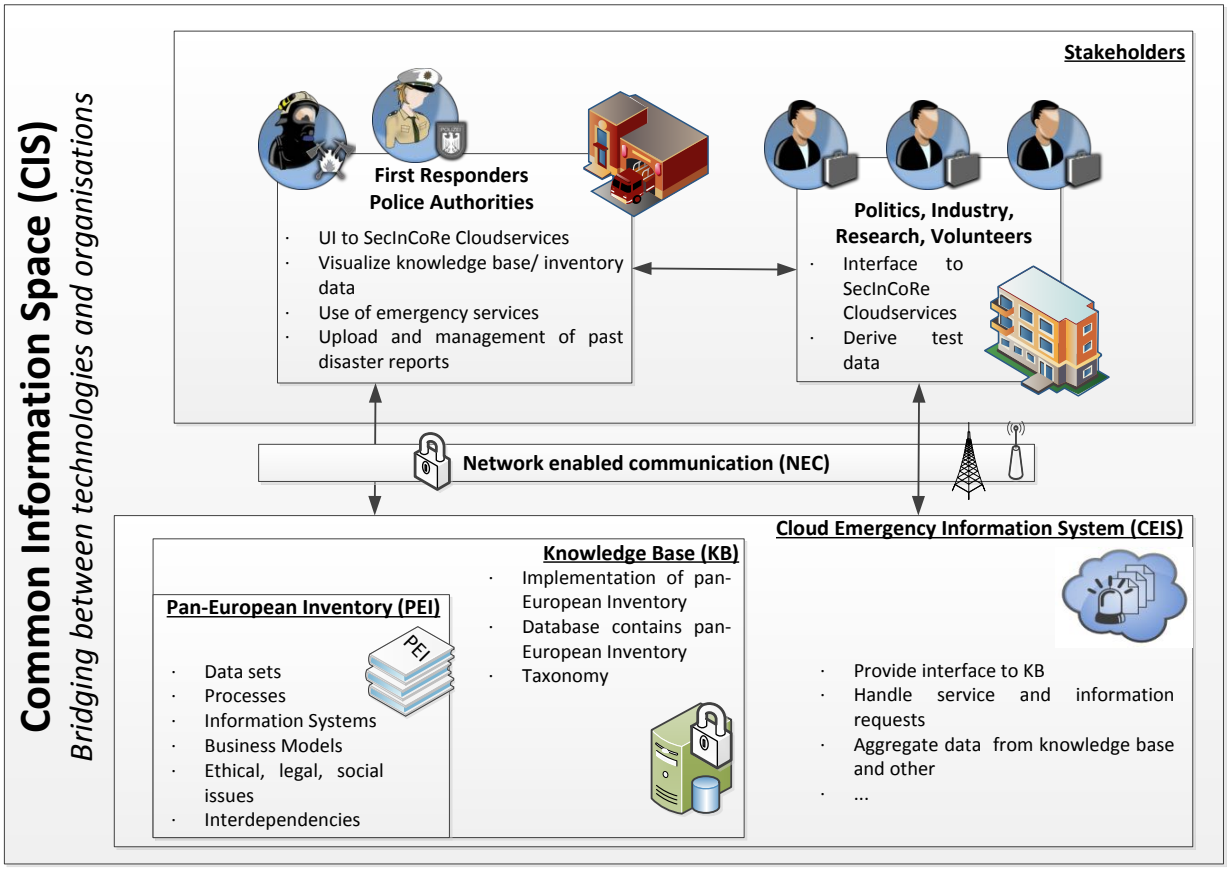


*Figure 1. SecInCoRe Overview*

### *1.2 Validity of this document*

This deliverable summarises all the activities performed in WP5. It contains a description of the methodology for both validation and evaluation and a detailed report for each activity that has been conducted. The validity of the document has been verified through the quality monitoring process established by the project.

### *1.3 Relation to other documents*

This deliverable relates to the following foreground documents in the project:

[ 1 ] Grant Agreement (no. 607832) and Annex 1. - Description of Work
[ 2 ] Consortium Agreement
[ 3 ] D2.1 (WP-2) 'Overview of disaster events, crisis management models and stakeholders'
[ 4 ] D3.1 (WP-3) – 'Setup Inventory Framework and specification of Research Requirements'
[ 5 ] D4.1 (WP-4) – 'Requirements Report'

[ 6 ] D4.2 (WP4)- Concept of Operation
[ 7 ] D5.2 (WP5)- Validation
[ 8 ] D5.3 (WP5)- Validation Strategy
[ 9 ] D5.4 (WP5)- Validation Report
[ 10 ] D6.3 (WP-6) – 'Report and Evaluation on new Business Models' [in the form of T3.4/T3.3 input to T6.4]

### *1.4 Contribution of this document*

This deliverable delivers final results on the impact of the SecInCoRe project and it is based on the entire work performed both at a conceptual and technical level by the entire consortium. For these reasons, this deliverable is linked transversally to all the Work Packages.

### *1.5 Target audience*

D5.5 is a public deliverable and so it will be generally available. In addition, the main targets of the document are external stakeholders engaged in the Security field at European level. In this sense, the aim of the document is to be easily understandable by all potential readers not being too technical but giving all the references to previous deliverables if the reader will be interested in more methodological and theoretical details. In addition, the deliverable intends to provide a wide picture about what has been accomplished during the project lifetime.

### *1.6 Glossary*

| Abbreviation | Expression | Explanation |
|---|---|---|
| AB | Advisory Board | Advisory Board defined within the consortium |
| CBRN | Chemical, Biological, Radiological, Nuclear | Protective measures taken in situations in which chemical, biological, radiological Or nuclear warfare (including terrorism) hazards may be present |
| CECIS | Common Emergency Communication Information Systems | A web-based alert and notification application enabling real time exchange of information between participating states and the ERCC |
| CIS | Common Information Space | Service-oriented software framework facilitating complex systems |
| CISSP | Certified Information Systems Security Professional | Independent information security certification governed by the not-for-profit International Information Systems Security Certification Consortium |
| CMF | Crisis Management Framework | Framework for content management |
| CMS | Content Management Software | System for content management |
| COncORDE | Coordination Mechanism for Medical Response | Project financed by FP7 |
| CPDP | Computers, Privacy and Data Protection | Multidisciplinary conference on Computers, Privacy and Data Protection |
| DCP | Demonstration Case Protocol | Protocol for designing and planning Demonstration Cases for validation and evaluation purposes |
| DCT | Demonstration Case Templates | Standard Template designed as part of the validation and evaluation strategy for gathering information and to |

| | | |
|---|---|---|
| | | structure demo cases |
| DG ECHO | Directorate General for European Civil Protection and Humanitarian Aid Operations | DG in charge of civil protection and humanitarian aids |
| DG HOME | Directorate General for Migration and Home Affaires | DG in charge of migration and external affaires |
| DoW | Description of Work | The description of SecInCoRe project as it has been approved by the EC. |
| E-OCVM | European Operational Control Validation Methodology | Methodology provided by an European project for validation activities |
| ELSI | Ethical legal social issues | Ethical and social challenges and opportunities that arise in emergency situations, especially with a view to the use of ICT. Legal issues arising, particularly around data protection, liability, and responder safety |
| EPISECC | Establish a Pan-European Information Space to Enhance seCurity of Citizens | European project funded by FP7 Security |
| ERCC | Emergency Response coordination Centre | European centre for coordination of emergency response |
| EU | European Union | Supranational Institution |
| IAIA | International Association for Impact Assessment | Organisation aimed at bringing together researchers, practitioners, and users of various types of impact assessments worldwide to improve impact assessment |
| IMPRESS | Improving preparedness and response of health services in major crises | European project financed by FP7 |
| INSPIRE | Infrastructure for Spatial Information in Europe | Commission's directive |
| IT | Information Technologies | Application of computers and internet to store, retrieve, |

| | | |
|---|---|---|
| | | transmit, and manipulate data or information |
| JRC | Joint Research Centre | The European Commission's in-house science service |
| KB | Knowledge Base | A knowledge base (KB) is a technology used to store complex structured and unstructured information used by a computer system. In the SecInCoRe context the knowledge Base is the technical representation of the inventory |
| LDAP | Lightweight Directory Access Protocol | Server for identity management solutions |
| MSDS | Material Safety Data Sheets | Component of product stewardship, occupational safety and health, and spill-handling procedures |
| NEC | Network enabled Communication | Abbreviation is used as a description of a concept component and contains everything dealing with communication infrastructure and technical solutions in this field |
| OA | Open Atrium | Platform for enhancing sharing and collaboration |
| PPDR | Public Protection and Disaster Relief | Practices and standard definition in regard to the PPDR |
| PSCE | Public Safety Communications Europe | European body |
| REDIRNECT | Redirenect | European project funded by FP7 Security |
| RESCUEROAM | RescueRoam | Authentication mechanism based on Network Enabled Communication |
| SEQUOIA | Socio-Economic Impact Assessment for Research Projects | Methodology for impact assessment provided by the Sequoia European project |
| VES | Validation and Evaluation strategy | The strategy designed and implemented to validate |

| | | |
|---|---|---|
| | | SecInCoRe's outcomes and evaluate its expected impacts. |
| VOST | Virtual Operation Support Team | A VOST is one way for emergency managers to help harness the power of social media for emergency management |
| WP | Work Package | Work packages are defined steps in the DoW (see above) in order to achieve the project objectives |
| WYSIWYG | What you see is what you get | WYSIWYG is a term used in computer programs. It implies a user interface that allows the user to view something very similar to the end result while the document is being created. In general, WYSIWYG implies the ability to directly manipulate the layout of a document without having to type or remember names of layout commands. |

## *1.7 List of figures*



## *1.8 List of tables*

## 2 Common Information Space Demonstrator: Third Version

The methodology for the validation and evaluation of SecInCoRe outcomes and impacts has been designed within WP5 during the early stages of the project. It has been implemented throughout the project life-cycle to systematically collect and analyse feedback from end-users on the system's conceptual and technical representations, and to gather structured stakeholders' views on the impact project outputs could have on current crisis management procedures.

Just to summarise the work performed in the previous deliverables of WP5, which will be recalled in the following chapters, the SecInCoRe Validation and Evaluation Strategy (VES) combines elements of the E-OCVM methodology (Eurocontrol, 2010) for the validation of outcomes, with elements inspired to the SEQUOIA methodology (Passani et al., 2014) for the evaluation of impacts (Figure 2).

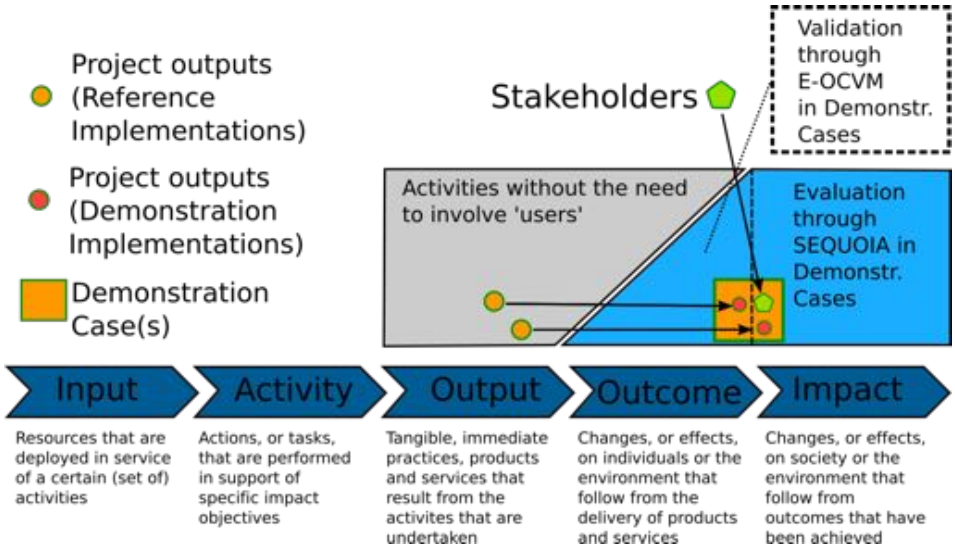


*Figure 2. The Impact Value Chain, Demonstration Cases and validation / evaluation strategy (Source D5.3)*

The two methodologies, described in D5.3, have been respectively used to guide validation (see Chapter 3) and evaluation (Chapter 4) activities.

For the part related to validation, since SecInCoRe is conceptualised as a socio-technical system, the VES is based on the crucial interaction between project outputs and end-users' practices. This strategy is inspired to the E-OCVM Case-Based approach to validation. For this reason, the SecInCoRe VES is centred on scenario-driven Demonstration Cases.

During a Demonstration Case, end-users are introduced to and (to the extent made possible by the status of technical implementations) interact with selected elements of the SecInCoRe concept in a structured manner that permits the systematic collection of data and their comparison and aggregation across different Demonstration Cases. The methods for data collection are mainly based on structured observation, semi-structured interviews and semi-structured questionnaires. The methods, however, are flexible and they can be applied according to the demonstration case. In preparation for a Demonstration Case, different SecInCoRe Reference Implementations are adapted to the needs of the scenario developed for the Demonstration Case. Depending on the specific organisational requirements of each Demonstration Case (e.g., time constraints, availability of end-users and stakeholders, other activities beyond validation and evaluation in workshops and events etc.), two overall

principles were used to define, in collaboration with all involved project partners, the activities and needs of each Demonstration Case:

- Identifying validation requirements according to the overall validation strategy;
- Maximising the coherence and integration between validation needs and the focus of planned events that offered the possibility to disseminate SecInCoRe outputs to relevant stakeholders' or end-users' groups.

Before being implemented in Demonstration Cases, the validation strategy was tested in three pilot cases. The Pilot Cases have been performed in Lancaster in May 2016, in Dortmund in June 2016 and in Lancaster in October 2016. All results have been reported in D5.4 (Chapter 5, Pages 56-77). Beyond providing an occasion to collect data for validation purposes, Pilot cases have been crucial to understand how Demonstration Cases should be organised to better communicate SecInCoRe's novelty, value and potentialities to end-users and stakeholders. Feedback gathered during the Pilot Cases has in fact been used to refine the design and presentation of conceptual and technical implementations for demonstration purposes, through a structured process of knowledge sharing and management among team members working on different aspects of the project (ELSI, technical aspects, validation and evaluation methodology) centred on the use of the Demonstration Case Templates described in D5.4. After the Pilot Cases, three Demonstration Cases have been organised and performed according to the timeline provided in D5.4; their results are reported in Chapter 3.

The criteria used, jointly with other project partners, for identifying the required changes were the following:

- Faults in implementations: existing faults in the concepts or implementations need to be fixed, to provide end-users with a better experience that allows them to more accurately judge the potentialities of SecInCoRe, focusing on the underlying concept rather than on the status of its technical implementations;
- Severity of user recommendation: the feedback collected from end-users in Pilot Cases, as well as in earlier Demonstration Cases, was classified according to the severity of the recommendation. This enabled the SecInCoRe team to focus on the most important recommendations.
- Relevance of the improvement to other Demonstration Cases: if a Demonstrator Implementation or a specific conceptual component was needed in several Demonstration Cases, its modifications were prioritised since these improvements could transferred in other contexts
- Efforts needed for the implementation: the implementing team was required to estimate the efforts needed for implementing the required changes and to provide a realistic plans for the adjustments of Demonstrator Implementations, to facilitate the planning of future Demonstration Cases on the basis of what would be available.

### *2.1 Feedback from previous validation activities*

Throughout the project life-cycle, the VES has adopted a self-reflective approach. Starting from the results of Pilot Cases and through the systematic analysis of feedback collected from end-users, the validation and evaluation team identified the aspects of the Demonstrators that had to be improved to better validate concepts and outputs in the planned Demonstration Cases. The points, fully reported in D5.4 in Chapter 7 (pages 80-83) and extensively discussed with other members of the project consortium, are here summarised.

In particular, as reported in D5.4, Chapter 7 (page 80), the experience gained in Pilot Cases showed that "Using a technical demonstrator that can be adapted to the scope of the validation increases end-users' understanding of the aims of the validation and their capacity to relate the demonstrated activities to their current practices, in this way providing concrete and relevant feedbacks". This general comment applies, as emerged from end-users' reactions and suggestions, to specific aspects of the Demonstrators.

First, end-users suggested to improve the graph view and the storage of documents. At the time the Pilot Cases were performed, the graph view was still at an early technical stage. Although generally interested in its potentialities, end-users noted that it was not possible to really assess the value of the graph view for the types of searches they perform in their current work practices.

Second, end-users suggested to strengthen the connection between the ELSI / collaboration principles underlying the SecInCoRe concept (presented mainly through conceptual tools), and the practices performed by end-users in their interactions with technical demonstrators. The fact that ELSI were not integrated with the demonstrators used in Pilot Cases posed in fact several obstacles to their validation. D5.4 therefore recommended project partners to include examples of collaboration practices in future Demonstration Cases, and to make ELSI guidance and principles more visible to end-users through the integrated Open Atrium platform.

These and other elements of the recommendations derived from Pilot Cases have been jointly discussed within the consortium and the required changes have been implemented by project partners in charge of the related tasks. In this way, the validation activities performed in Demonstration Cases have been aligned to the requirements of the SecInCoRe VES.

The following sections describe the conceptual and technical implementations that were used in Demonstration Cases, starting from conceptual tools (the video and 'scrolly-telling') to then focus on the technical implementations.

## *2.2 Implementation of the conceptual tools*

### 2.2.1 SecInCoRe Video

The video emerged from the need to create a SecInCoRe dissemination story to offer a quick, inviting, picture of the entire SecInCoRe conceptual system. The aim is to highlight how all SecInCoRe components could be of value and should be of interest to our audience.

The video aims to engage potential users, CIS hosts, disaster IT managers, and follow-on researchers or funders in SecInCoRe's concepts and the potential of our solutions. Its purpose is to motivate its audience into looking up more information about SecInCoRe as a whole, inquiring into the designed components, or engaging further with the concepts or project partners. In other words, the video aims to get viewers to look further, not to convey information. It is meant not to stand alone but act as an entry point into our overall range of marketing, research, and exploitation material.

The video focuses primarily on the 'why' of SecInCoRe, rather than the what.

- Why should I care?;
- How does it make my job easier and better?;
- How does it help me save lives and money?;
- Why does it matter to me/what's in it for me?.

Enough detail is provided to create credibility in the narrator (and by proxy, us as researchers), and thus validity to our results for our audience, but not enough to fully explain what SecInCoRe does or how.

In this sense, the first SecInCoRe video was produced mainly for dissemination purposes with the aim of giving a brief introduction about the key elements of the project and explaining the project outcomes in an understandable way. In line with this, the video was used as one part in the beginning of Demonstration Cases to highlight aims and objectives of SecInCoRe project and providing end users an overview of the whole project before starting using specific demonstrator implementations.

One example for the use of the video were the Demonstration Cases in Rome and then in the following Demonstration case performed with the Civil Protection. In both case the use of the video as general introduction to the big SecInCoRe concept has been appreciated by the users.

### 2.2.2 Other conceptual tools

In addition to the video, SecInCoRe has also developed a graphic animation for dissemination purposes.

The term "scroll-telling" is a combination of the words "scrolling" and "storytelling". In online or multimedia journalism it describes a story that unfolds by scrolling on the website. Scrolly-telling stories usually refer to one certain topic, they are "longreads" offering readers to choose the interesting parts of the coverage. By integrating videos/photos or scrolling animation, the authors can design the coverage more vividly than plain text.

In this way, the ‘scrolly-telling’ is another aspect of the marketing/explanation of SecInCoRe for the same audience as the video, one that explains the problems SecInCoRe can help address and provides initial information about SecInCoRe’s components (a framework of the scrolly-telling is provided in Figure 3).

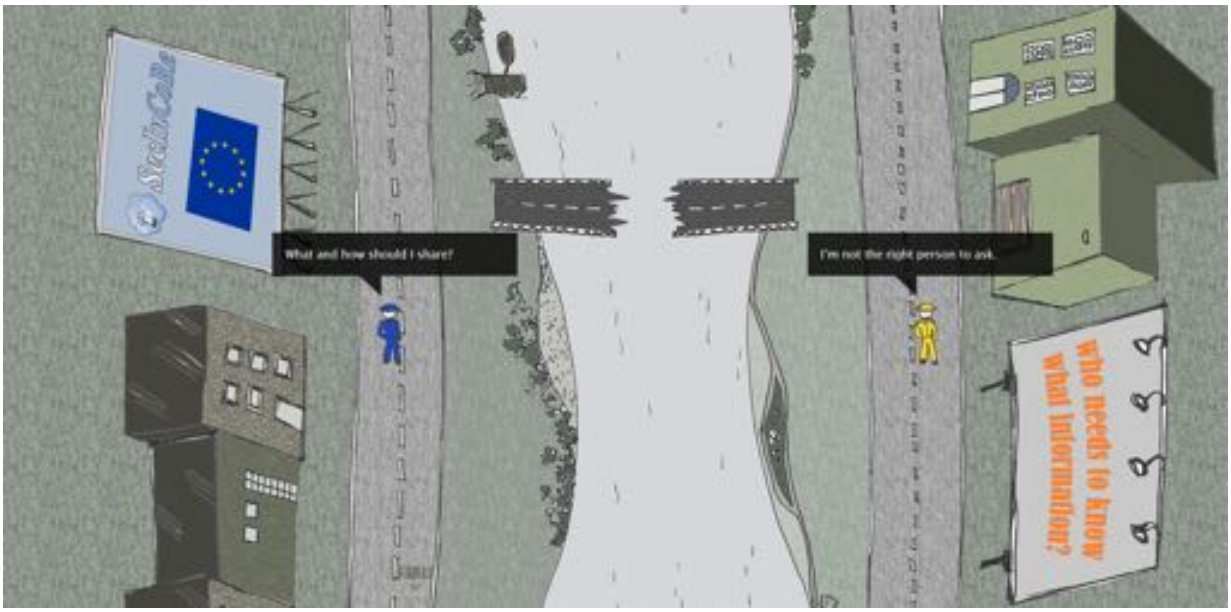

*Figure 3. Image of the SecInCoRe scrolly-telling*

It also intends to offer a rudimentary case for how all the components could be engaged together into a CIS. There are some fundamental differences between the video and the scrolly: 1) the scrolly is more interactive; 2) the scrolly is more geared towards setting a scene and providing information than the video which is more focused on simply peaking interest and demonstrating credibility; 3) whereas a video requires follow up after-the-fact, the scroll-telling can encourage exploration of further information throughout the 'scroll'.

Various elements of the images throughout are links or pop-ups, making it easier to seek further information about how SecInCoRe's components and concepts could help provide solutions to problems that had just been described without having to wait for the scene to complete. The audience needs to choose to continue going down the path, and can do so at their own pace, exploring the links on the issues that interest them the most, customising their experience of SecInCoRe information.

While the video offers why/how SecInCoRe can make life easier, the scrolly defines the problems – sets the scene – for what challenges in pan-European disaster information sharing using collaborating IT that SecInCoRe focuses on. Drawing on a case to demonstrate a meso-scale of use (not all EU, not a single country but more an intermediate size), but down a multi-national river for which many countries need to coordinate CBRN plans. This is problem acknowledged by the EU[2] and one that requires both pro-active planning but also security and ELSI challenges that are still very prominent. It enacts[3] specific problems, including:

- Identifying the right person to talk to/counterpart in other regions;
- Finding useful and relevant information from other organisations/regions/nations;
- Translating different forms of risk assessment/different goals for data gathering;
- Providing secure connections between otherwise isolated individuals.

As the characters wander down the paths on both sides of the river, that represent different countries along the flood-basin, they encounter these problems of communication and information sharing. As each problem is encountered a billboard or rooftop advertisement states a tagline for a problem related to the scene that to which SecInCoRe could provide a solution. It ends with SecInCoRe's four major innovative components on their own buildings, in the same icons as on the CIS demonstrator:

- Connect (NEC/Rescueroam);
- Inquire (Semantic Search);
- Contribute (Provide Documents);
- Reflect (ELSI Guidance).

Each of these buildings is a link to further information about the specific component.

### *2.3 Description of the technical demonstrator implementations*

The current paragraph provides an update about the Demonstrator Implementations utilised in Demonstration Cases. The aim of the following sections is to describe what achieved so far as well to report the final stage of the Reference Implementations on the following elements:

- Knowledge Base;

[2] European Commission (2012). Progress report on the implementation of the EU CBRN action plan.
[3] Council Of European Union. (2012). Draft Council conclusions on the new CBRNE Agenda

- Semantic Search and Graph View;
- ELSI guidance;
- Collaborative platform and components integrated in Open Atrium.

### 2.3.1 Knowledge Base

The general structure of the Knowledge Base is described in D3.4 and its connection to the Demonstration Cases in D5.4.

**Data layer**

*Reference implementation:*

The SecInCoRe inventory as the underlying concept of the Knowledge Base (final version described in D3.4) is addressed in a twofold way:

- First from a WP 2 perspective - gathering past disaster and existing crisis management models. Here, a comprehensive overview about past incidents are documented especially in D2.1 and gaps of existing databases of past disaster are shown in D2.5, e.g. the need to include lessons learned in the description of past disaster.
- The WP 3 perspective aims to collect knowledge about data sets, processes, information systems and business models used by first responders and Police authorities. For each item, separated databases are developed and included in the Knowledge Base. They are accessed in the Demonstration Cases mainly using the Semantic Search, which offers a consolidated view on all Knowledge Base contents.

*Demonstrator implementation:*

Additionally to the approaches described in D5.4, data for several Demonstration Cases was added into the Knowledge Base.

CBRNE was one main topic for Demonstration Cases in the last period. For the Demonstration case in Paderborn, data concerning the training for CBRNE exercises were reviewed and inserted. Further, for the Advisory Board Meeting and the Joint Event of Common Information Space – Cluster of European Projects for Enhanced Interoperability in Brussels targeting planning issues for future cross boarder CBRNE incidents. Therefore, data concerning the preparation of an emergency plan for CBRNE incidents was added in the Knowledge Base. In addition, data concerning earthquakes was reviewed for the Demonstration Cases in Rome.

Finally, about 240 Datasets, 150 Information Systems, 70 Business Models and 1000 domain specific files are in the Knowledge Base in March 2017.

**Semantic Layer**

*Reference implementation:*

To use the taxonomy (described in D4.3 and D4.4) in reference implementations, parts of it are realised in the ontology and e.g. used in the semantic search. The ontology is part of the Knowledge Base. Its conceptual background is given by the Taxonomy. The Taxonomy in SecInCoRe manner is a non-technical conceptualisation of different PPDR domain relevant items and terms.

*Demonstrator implementation:*

Additionally to the approaches described in D5.4, the amount of connections between the different ontologies has been increased in specific thematic ranges of the Demonstration Cases.

Details are described in D4.4. After that, the whole SecInCoRe ontology was made easily accessible within the Graph View in the Semantic Search (See chapter below).

### 2.3.2 Semantic Search and Graph-View

The general structure of the Semantic Search is described in D3.4 and it's connection to the Demonstration Cases in D5.4.

*Reference implementation:*

The Semantic Search is the reference implementation to access the Knowledge Base and all content stored within, using the Semantic Framework concepts. The search uses the ontology to refine search results in accordance to the respective user. A detailed description is provided in D3.4.

*Demonstrator implementation:*

Additionally to the approaches described in D5.4, the Semantic Search was again modified for the Demonstration Cases, using the input of the Demonstration Cases before in relation to the criteria described in **Error! Reference source not found.**. The modifications at the conceptual level and especially concerning the hosting authority are described in D3.4. On the technical level, minor changes took place. Besides improvements in some usability respects, a simple display of the topics in the results list was implemented, a field, containing the origin country of a document was added (See Figure 4) (based on remarks of the AB meeting) and further reflexive connections to isitethical.eu were integrated.

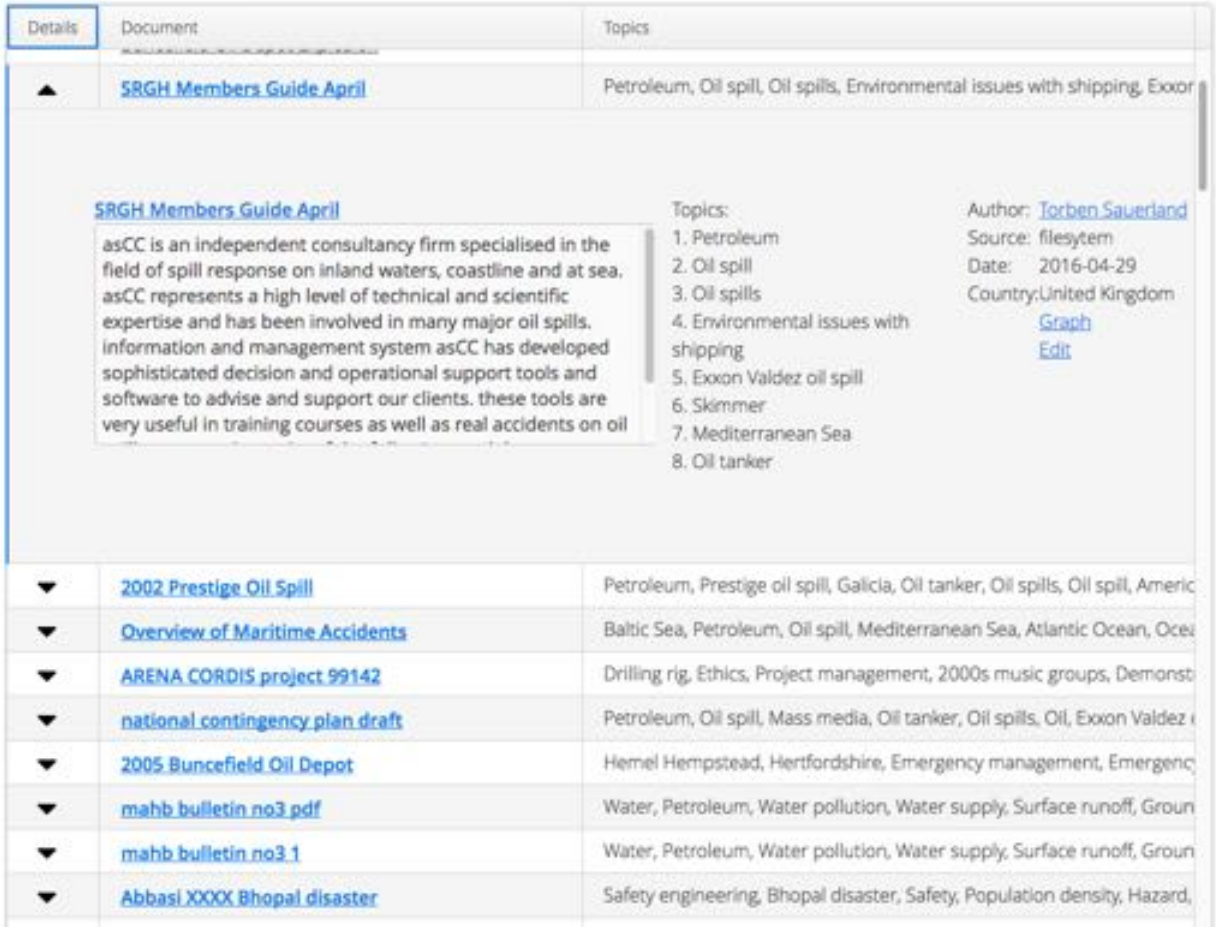


*Figure 4. Changes in demonstrator implementation*

Another improvement in the demonstrator implementations was done concerning the 'Graph-View'. It has been enhanced and the navigation from one topic with associated documents to another one has been enabled (Figure 5).

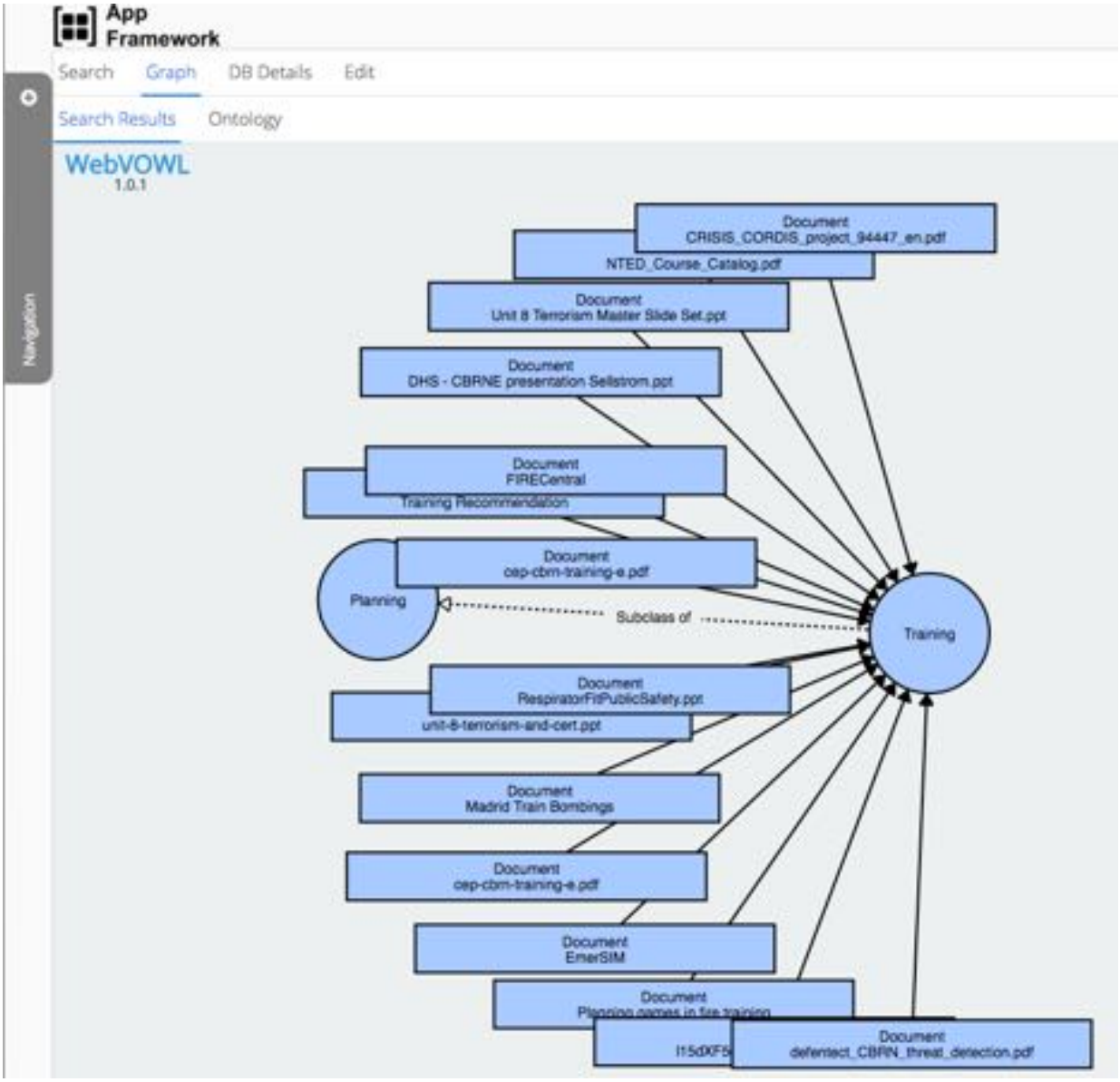


*Figure 5. Graph-View*

### 2.3.3 Collaborative practices

For a conceptual point of view, CISs rely on a range of mechanisms for interaction (such as maps, schedules, dialogues, interactive spreadsheets) that support the often conflicting politics of information, of control and sharing that make collaboration and coordination possible. These forms of interaction can, and should, be both live and staggered over time. The other components of SecInCoRe are either staggered (e.g. in the semantic search the users are not directly interacting, but interacting with their actions of uploading and searching that could be done at very different times for different reasons) or acts as conduits for collaboration (e.g. the NEC helps build trust and security, but does not tell people how to understand each other).

Aided greatly by more direct interaction that brings different users into the same ‘space’ at the same time are a few fundamental collaboration practices that make common information spaces work:

- Negotiations and discussions are difficult if scattered via emails, staggered over time, or if it is not possible to have all the conversation in a single space. In other words, the face-to-face-style aspects of collaboration are still necessary and cannot be replaced by these other technologies for information sharing.
- Articulation work: in which people dovetail the work: divide, allocate, coordinate, schedule, interrelate; these are extraneous to the specific tasks being accomplished by the collaboration but necessary for the collaboration to work. This can be done partly in different spaces over time (e.g. dividing, allocating, scheduling). But having an opportunity to directly interact allows for deeper coordination and interrelation.
- Configuring awareness (managing where others attention is focused in a way that it might be possible to affect where the others focus is for the sake of sharing information);
- Active and peripheral awareness of others' activities.

This is especially important when dealing with communities that are spread across different countries with different politics, structures, and practices of risk assessment. These mechanisms for interaction help users know how another community of practice fits in with yours.

The technical implementation of functions that foster collaboration are reported in the paragraph dedicated to the reference implementation of the collaboration platform.

### 2.3.4 ELSI guidance

Those involved in public protection, disaster response, and risk management need tools to facilitate collaboration and interoperability. A proliferation of digital, networked, and cloud-based tools is being developed to address these needs. Among these are CISs, aiming to support people in constructing a shared sense of a given situation without requiring everyone to have the same understanding, goals, or details. CISs are produced in and through collaboration practices, such as sharing data/information, cooperating, negotiation, discussion, finding new partners, and are enabled by digital and organisational infrastructures.

These new tools hold considerable potential for collaborative disaster management, including opportunities to enable broader and more effective collaborations, more inclusive risk governance, enhanced security, and better ways of exercising solidarity. However, because they require the negotiation of a variety of perspectives, they also come with new ethical, legal, and social risks that go beyond the guidance of any individual agency or organisation. For example, they come with potential challenges to existing practices of establishing trust, legitimacy, privacy, and power. They can exacerbate internal politics between organisations, aggravate sensitive cultural problems, and interfere with the ability to support humanitarian values.

To best govern and manage the implementation of these tools, ethical, legal, and social guidance is needed. Consequently, ULANC (with the support of the ELSI Task Force) assembled a set of ELSI guidance: www.isitethical.eu.

This guidance is intended to help those that are establishing, managing, and governing CISs for disaster risk management to proactively identify, understand, and address ELSI. They support constructive strategies for those both facing and aiming to proactively mitigate ELSI challenges, as well as aimed to support those who want to start to consider ELSI as opportunities for better design.

The challenge is that ELSI arise in specific contexts: there are no tried-and-true rules or one-size-fits-all solutions. As a result, this platform cannot provide definitive answers or step-by-step instructions. However, it can guide you on what to consider in relation to ELSI. To this aim, the guidance at hand is structured around the development of ELSI reflexivity: providing reflexive questions, research, and examples that help see how decisions around CIS adoption, management, and use shape other decisions and actions within larger societal contexts. The guidance offers advice on why specific issues are important to address. It is informed through summaries of research, lessons learnt, and examples of good practice derived from the disaster management community. On each issue, the platform provides guidance by posing questions that direct reflection of ELSI.

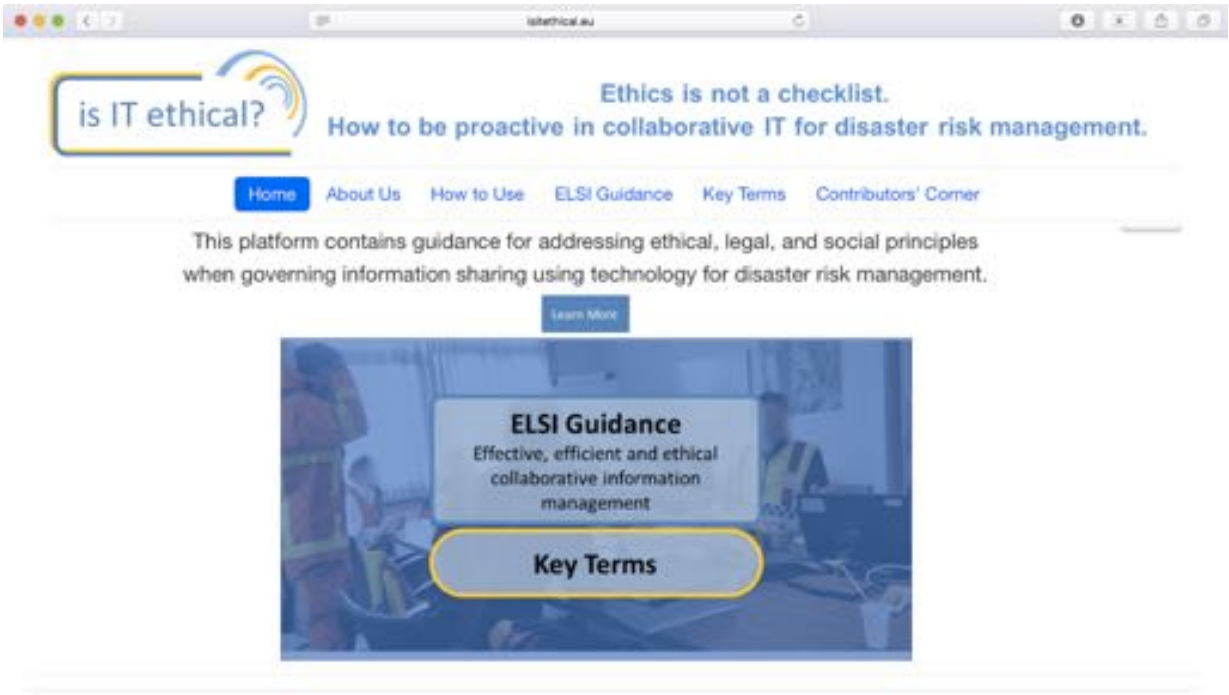


*Figure 6. ELSI platform.*

As you land on the website, you encounter the option to explore ELSI guidance or ELSI Key Terms. They two sections are interlinked through the website. The Guidance supports users approaching the resource by asking more practice based questions such as “how can I initiate a collaborative CIS in a way that avoids building more silos of action?”. The Principles is starting place for users who know they want to, for instance, better manage data protection across borders, but are not yet sure what questions to be asking. Each section provides links back to relevant pages of the other.

When landing on the Guidance page, initially, you will arrive to a short explanation of what is included (Figure 7).

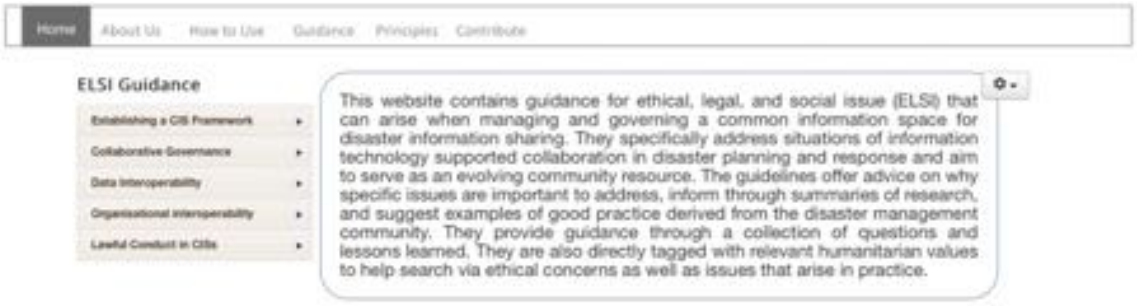


*Figure 7. The Guidance landing page*

The guidance is separated into 5 chapters, each covering different aspects of collaborative IT practice: initial considerations before getting started, governance as the CIS gets going, data interoperability considerations, organisational interoperability considerations, and legal considerations. You can select from a menu to explore the various guidance within each chapter (Figure 8).

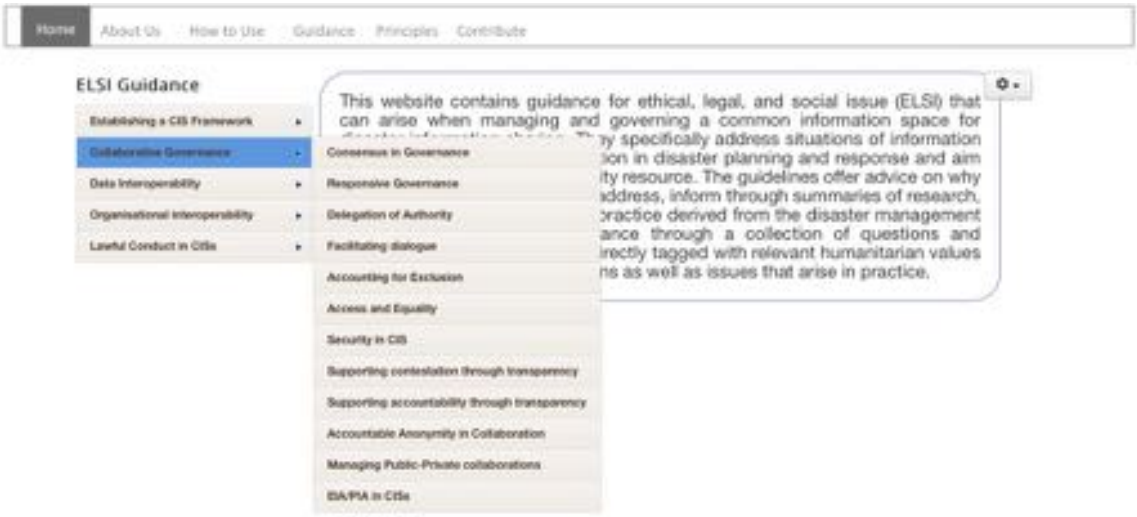


*Figure 8. Guidance menu example*

Once a guidance page is selected, a paragraph describing the consideration appears at the top along with some guiding, reflexive, questions that have no single correct answer, but can help address the ELSI that could arise (Figure 9).

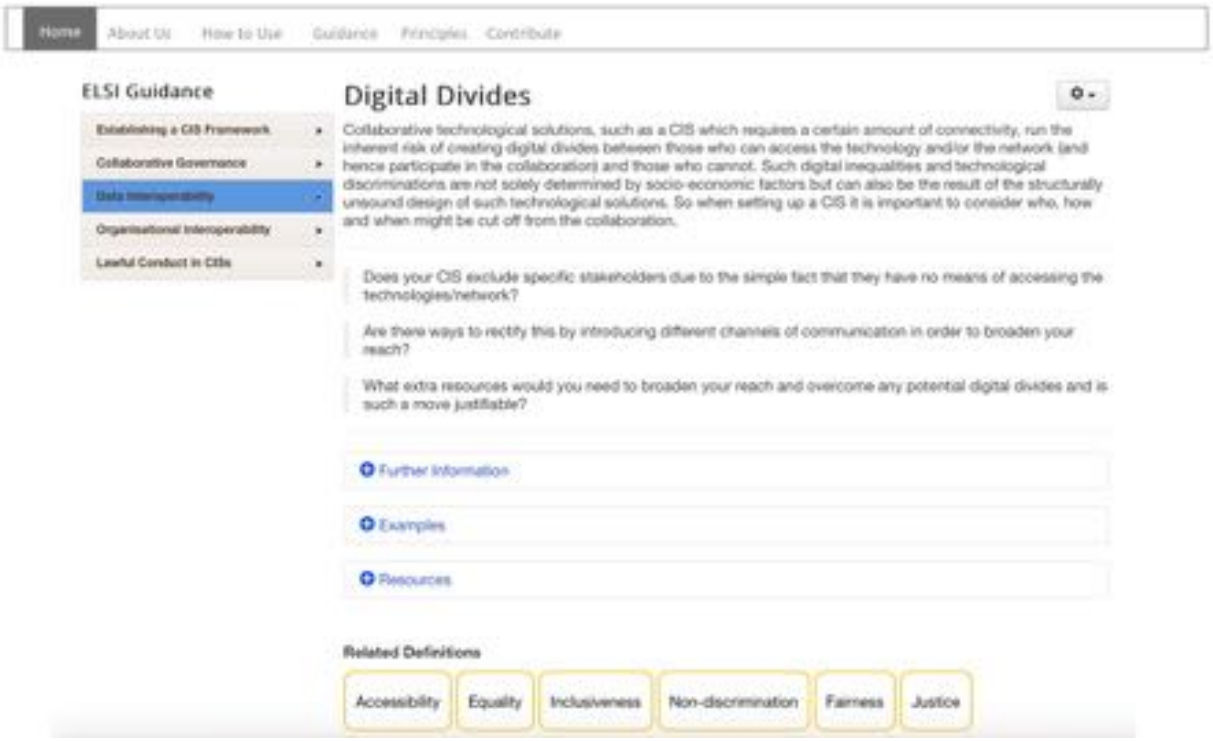


*Figure 9. Example Guidance*

Further information, examples, of good practice, and resources can be made visible. Also, links to related ELSI Key Terms are found along with each guidance. These links allow users to understand how this issue connects to ethical, legal, and social issues, in action, but also allow for a more detailed exploration down a single path. If, as in Figure 3, a person was interested in considering digital divides as a equality issue, they could click on the link to equality in order to explore both that principles but also find further guidance on equality for greater, more in-depth, consideration of that issue.

The reverse is true for users starting from the Key Terms. They will arrive at a list of ELSI related to collaboration in CIS's, and can explore how they are defined when dealing with them as collaborative, rather than simply intra-institutional, issues (Figure 10).

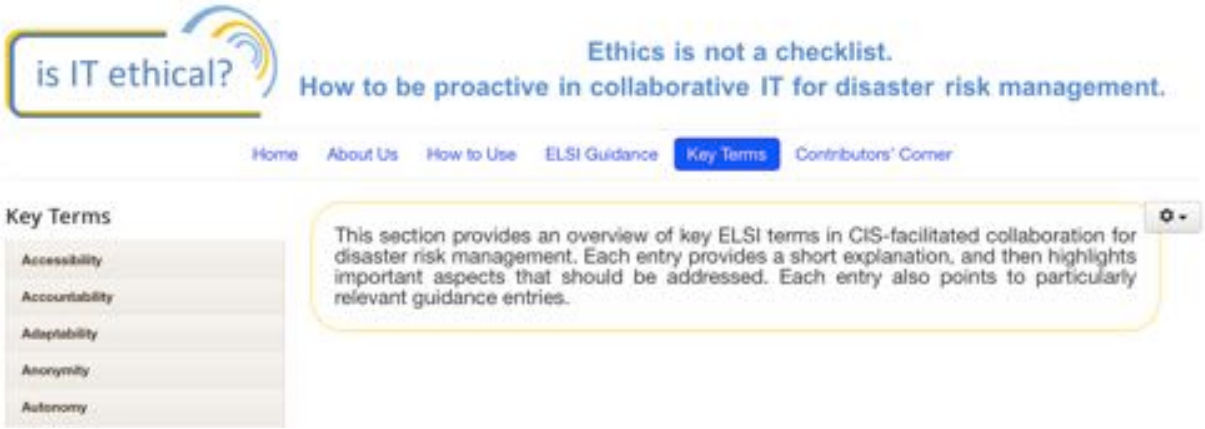


*Figure 10. ELSI key term page*

Within each Key Term page, there is a short explanation and a bullet list of indicative goals that should be achieved) in relation to collaborative disaster IT. It then links to related guidance

pages that offer insights/reflexive questions as to how to potentially achieve those 'shoulds' (Figure 11).


*Figure 11. Specific ELSI Key Term example.*

It is a living community resource, meant to support reflexivity around ELSI as well as grow and expand based on the experience of those that use it. They specifically address situations of information technology supported collaboration in disaster planning and response and aim to serve as an evolving community resource. There is a specific page for governed and moderated contribution being designed to support this, acknowledging that this collection of research is just a starting point and that users will have insights, examples, even further chapters that should be included. This purpose of such contributions is (1) for the website to address the ever-changing crisis management models and (2) for the website to draw on expert knowledge from practice.

### 2.3.5 Collaboration platform

As a direct result of the feedback received from the Advisory Board members at the demonstrations held in Rome and in Manchester, and internal discussions between the consortium members, a number of changes were made relating to the functionality and usability of the Open Atrium CIS demonstration space. These changes are documented in the following subsections. Additionally, the evaluation of new business models and updated exploitation plans, both undertaken in WP6, have made a positive impact on decisions made to help refine the CIS and make the proposition more attractive for commercial exploitation beyond the duration of the project. In relation to this, some final consideration on the use of Open Atrium as a tool for creating a collaborative space for emergency services will be presented, outlining the features that would require further investment of developer time to improve. The main paid and open source alternative platforms that have recently emerged are also discussed, to show how the CIS concept that has been demonstrated using Open Atrium can be adapted.

#### *Consolidation of the Demonstration Space concepts*

The titles for each section were changed to reflect more accurately the four main concepts of use, using a verb to better describe the purpose of each section rather than merely state the

practical function. For example: Discussion Board and Chat were merged and became 'Discuss'; Document Share became 'Contribute'; Semantic Search became 'Inquire'; and ELSI Guidance became 'Reflect'. Both the Space Home and Admin Support remain the same as these pages have much more practical uses.

Some changes were made to the individual space pages according to neutral or negative criticism from the AB members. These changes are listed below:

***Landing Page -*** One criticism received about the CIS demonstration space was that, while it is functional, it had no real landing page and was not visually inviting on its own. Advisory Board members commented that it was not immediately clear from the beginning what the CIS was capable of. They also commented on the lack of reassurance regarding the level of security and privacy available. To solve this, a more appealing landing page was created to present SecInCoRe's key value propositions and to give potential users a reason to want to find out more. This is described in more detail in the subsection below 'Discovery, Registration and Evaluation'.

***Discuss -*** The Discussion Board and the Chat facilities were consolidated into one page. The reason was that they present users with short and long form versions of the same thing; a forum for immediate discussion on defined topics. The discussion board was kept as a forum style messaging board where users can define topics and discuss. Initially the Chat was reduced to one general chat room called 'Quick Chat', but eventually it was decided to remove the chat facility altogether in favour of an integrated live chat This is a pop-up window positioned at the bottom-right of the page and is visible to authenticated users across the space rather than on one single page. This upgrade addresses a number of comments made by AB members about the practical use of the chat facility. The live chat is now available across the entire space, regardless of what page the user is on and it indicates who is online. Users have the option to conduct both public and private chat sessions.

***Contribute -*** This page combines the Document Share and File Share pages into one convenient page allowing users to add documents or files in the same pain. All the most common media file types are supported. Users can choose to view within the Demonstration Space or download onto their local machines. The documents created and saved to the document store module are indexed, processed and made accessible via the Semantic Search. This is described in more detail in the following section on the integration of CIS components.

***Inquire -*** This page has changed very little since the last deliverable except for the inclusion of a summary description and the Step-by-step how-to guide panel. Some minor adjustments were made to the layout to make the iFrame larger to accommodate the graph view of the Semantic Search.

***Reflect -*** Much like the Inquire page, an iFrame is used to encapsulate the ELSI Guidance website "Is IT Ethical?" (https://www.isitethical.eu). The previous version of the Demonstration Space had the ELSI guidelines incorporated as content. Having the Is IT Ethical website accessible direct provides authenticated users with the most complete set of resources.

**Page description and how-to-guides -** A short summary describing the purpose of each page has been included at the top of each page respectively, as the purpose of each page should be immediately obvious to new users. Simple step-by-step how-to-guides were also included in a panel on the right hand side of the Discuss and Contribute pages, since space members visiting the demonstration space for the first time might need some guidance on how to use the specific functionality.

***Multilingual support -*** Location detection and automatic language translation is considered important for cross-border communication. However, the modules that enable this functionality in OA are not currently stable so it has not been possible to implement this as planned. As a temporary measure, a collection of modules were enabled to extend the core multilingual capabilities and provide manual language selection. So far, libraries were included for the official languages of the SecInCoRe consortium partners, German, Greek and French. There are two basic components to the translation system, which provide translation of the interface and the content respectively. It has been tested and works to a certain degree, but some greater investment in developer time is required to extend functionality.

***User Profiles -*** The user profile module was upgraded allowing administrators and authenticated users to edit their profile. Users can now add a short bio and upload a profile image. This image displays next to the username and improves identification across the site. Users can also configure their email settings and enable a personal contact form so their email address remains hidden. They can also select their time zone and set their language preferences.

**New user experience**

With the addition of a landing page and key site improvements, it is now possible to describe the end-to-end process for a new user, from discovery of the CIS (landing page), to registration of a CIS account, to the evaluation of the CIS and creation of a custom space. This work has had an influence on activities in WP6 in relation to the updated exploitation plans.

***Landing Page***

In reference to the feedback collected from the Advisory Board members, it was determined that a landing page was required to show how potential users would be directed to the CIS. The landing page was created outside OA in a popular web development platform. The reason for this is that it was possible to create a more aesthetically pleasing page leading to a higher conversion rate. The landing page has been designed as a simple scrolling page with three main sections, Home (which carries the message and the intent), Services (which provides a conceptual overview of the core capabilities), and Project (a section that provided context by acknowledging the FP7 project).

It should be noted that, the landing page is intended to be visited by potential users pre-registration so the site doesn't require the same level of security that the components of the CIS do.

The home section (see Figure 12) presents SecInCoRe's unique value proposition, with a main headline and reinforcement statement. A 'Try now!' button is positioned in the middle of the home section. The button clicks through to the CIS registration page, which is described in more detail below.


*Figure 12: SecInCoRe CIS landing page - Home*

The Services section (see Figure 13) presents the four key service concepts, Discuss, Contribute, Inquire and Reflect, with short taglines describing the practical implications of each one. This is delivered in practical terms in the Demonstration Space.

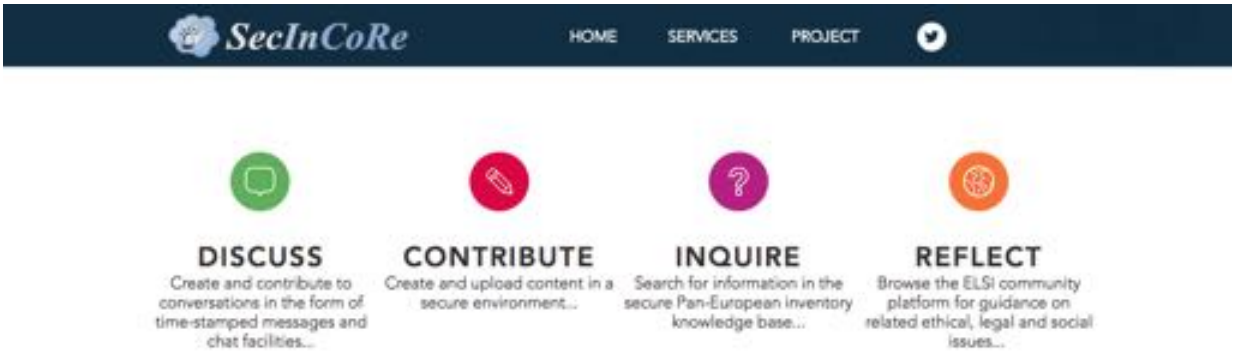


*Figure 13: SecInCoRe CIS landing page - Service*

The Project section (see Figure 14) provides context by referencing the SecInCoRe project. It briefly describes the high-level objectives of the project and have the explanatory video embed on the same page. It also includes a button that clicks through to the SecInCoRe website.


*Figure 14: SecInCoRe CIS landing page - Project*

Finally, the footer of the web page includes an acknowledgment of the funding received under the FP7 funding framework.

***Registration***

Once the user has clicked the 'Try Now!' button in the home section, they are directed to the SecInCoRe CIS registration page (Figure 15). To create an account the user fills in the required fields (Username, Email Address, Display Name), agrees to the terms of use by checking a check-box and clicks 'Create new account'.

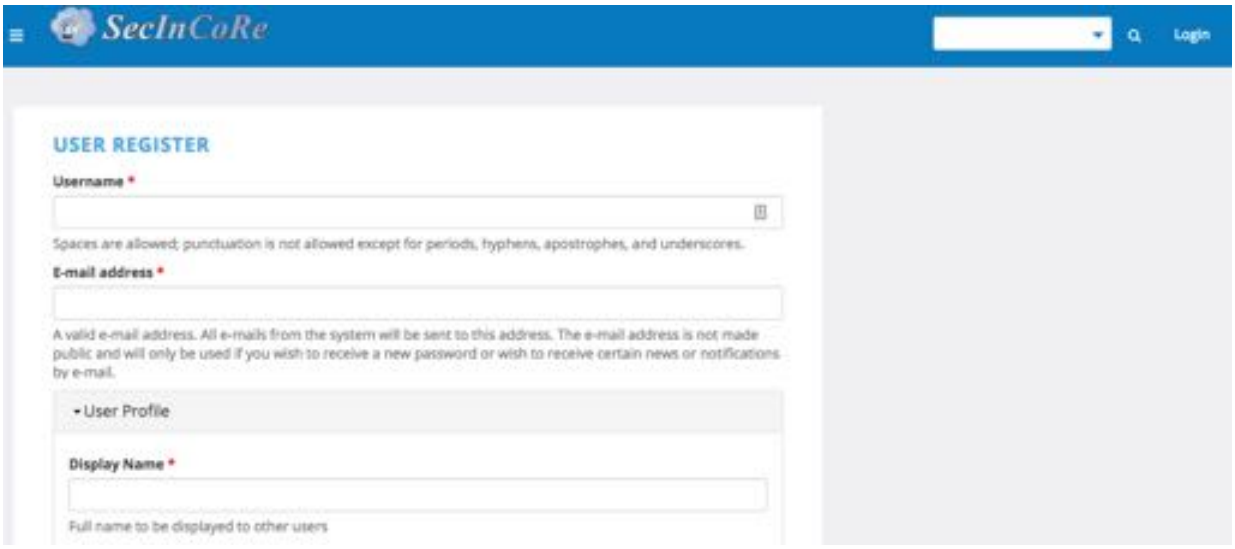


*Figure 15: SecInCoRe CIS registration page*

The user is then automatically directed to the SecInCoRe Common Information Space welcome page.

### SecInCoRe CIS Welcome page

The welcome page[4] reminds the new user of the four core concepts of use that the CIS offers and some brief descriptions of the three main ways they can interact with it once they are signed in to their account (Figure 16).


*Figure 16: Welcome page*

In the middle of the page there is a 'Let's Get Started' button. Once clicked the user is directed to the Site Map, or Site Home.

### CIS Site Map / Site Home

On this page the user is presented with three options, described previously on the Welcome Page.

They can, (1) browse the SecInCoRe Common Information Space Concept Documentation to get an understanding of the underlying concepts, (2) experiment with the pre-configured Demonstration Space, allowing them to explore the possibilities or even clone this space and use it as a foundation for further customisation, and (3) create their own custom space from scratch (Figure 17).

[4] The home page is available here http://185.12.5.114/welcome-page

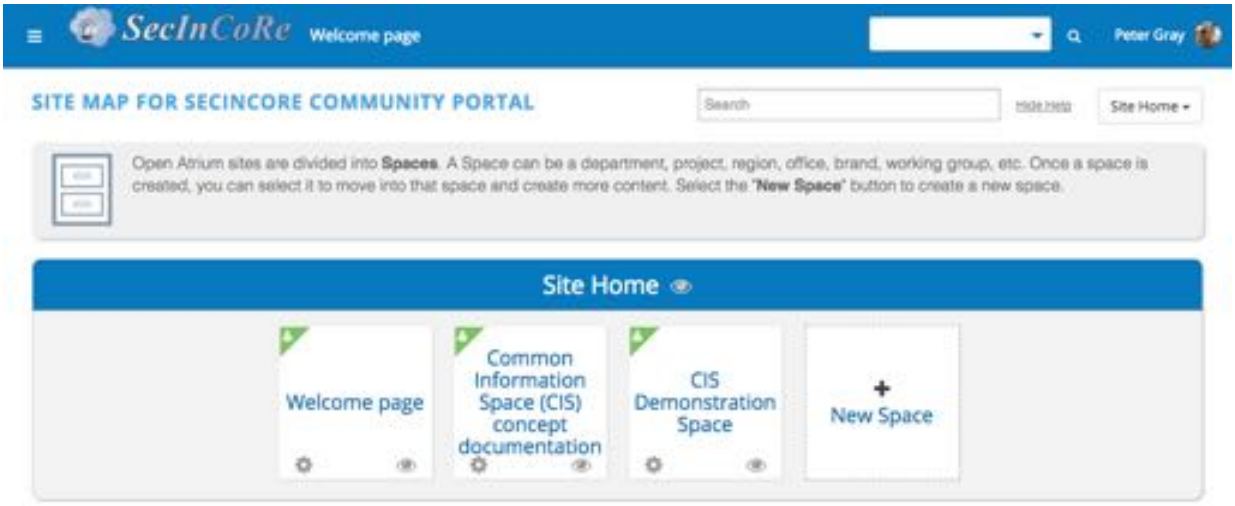


*Figure 17: SecInCoRe CIS Site Map*

Open Atrium has quite a steep learning curve, so when a user is ready to create their own space they will need some guidance on a number of core functions. For this reason, it is important to provide continued access to the Concept Documentation Space and the CIS Demonstration Space. Site administrators can refer to the concept documentation for matters relating to the key concepts behind the Common Information Space and the Cloud Emergency Information System. The Demonstration Space will provide a more practical reference for building and customising the OA component and of their CIS. They will be able to clone spaces, make use of pre-installed modules and widgets, or even copy code to do this. They will also be able to refer to the Admin Support page for step-by-step how to guides on topics such as access control and space membership.

**Alternative Content Management Systems**

In previous deliverables we have explained our reasons for choosing Open Atrium as a platform for building the user-facing component of the Common Information Space. These include, but are not limited to, the ability for administrators of a space to organise content into different sections and subsections and to control access to this content via flexible groups, teams and user permissions, as well as the ability to integrate with other components of the CIS such as the Semantic Framework and Knowledge Base.

While we have been committed to making Open Atrium work for this purpose, we have been monitoring a number of competing Content Management Systems during the course of the project. As mentioned in previous deliverables, Open Atrium is based on Drupal. Technically speaking Drupal is a Content Management Framework (CMF) rather than a Content Management System (CMS) like WordPress or Joomla. The difference lies in the level of complexity versus user experience. Put simply, a CMS will typically provide a better user experience at the expense of technical flexibility and a CMF will provide more technical flexibility, but can result in difficult content editing experience. While Open Atrium does blur the lines between these two concepts, our final evaluation of the Open Atrium platform as an appropriate platform for building as a collaborative content management platform is mixed. On one hand, it provides solid core functionality and robust access controls for data privacy. On the other hand, administrators face a steep learning curve to implement these controls successfully. Open Atrium also lacks the finesse and simplicity of other CMSs in terms of customisable layouts, use of simple drag and drop functionality and What You See is What You GET (WYSIWYG), and manageable site hierarchy.

Despite the established products such as WordPress, Joomla and Drupal taking approximately 70% of market share (with WordPress taking 58.8% alone), there has been a steady rise in new open source and closed source solutions in the last couple of years, making this a very crowded market. Capterra.com lists over 300 solutions in their 'Top Content Management Software (CMS)' list for 2017. As the CIS concept can easily translate to other CMS solutions, other options could be explored.

***Integration of the components***

***OA > Semantic Search***

As previously reported in D5.4, an iFrames module was installed allowing for the integration of the Semantic Search within the Demonstration Space, greatly improving the workflow for users by eliminating the need to subscribe to multiple platforms in order to use the full capabilities of the system, while providing an additional layer of security when accessing the contents of the knowledge base via the semantic search. As mentioned in Section 2.4, the iFrame was resized to full-screen to provide a better representation of the 'graph view'.

***Knowledge base < > OA***

Apache ManifoldCF, an open source framework for connecting source content repositories, is currently working in combination with the Semantic Search as reported in D3.4. A ManifoldCF Crawler has now been installed on the OA server for indexing all documents which are stored in OA within the document share facility on the Contribute page of the CIS Demonstration Space. The documents are then processed and made accessible from the Semantic Search facility. The OA essentially becomes another data source alongside the internal file system and the SecInCoRe databases. At the time of writing this deliverable, the crawler is running, but some further configuration is required to avoid it crawling system generated files. This will be done before the end of the project.

***RescueRoam < > OA***

Since setting up the RescueRoam, numerous attempts were made to integrate Lightweight Directory Access Protocol (LDAP) within Open Atrium. The first approach was to use the default modules that OA offers for LDAP integration. This proved unsuccessful due to a number of reasons. Drupal in general is lacking documentation on some components and especially modules, which are often developed by third parties with dubious quality standards. Thus even though the proper configuration was done to the Open Atrium modules, no connection between the platform and the LDAP server seems to be established. Other configuration sets were also tested unsuccessfully.

Other LDAP modules were also installed, however they appeared to be broken. Upon enabling them for our installation of Open Atrium, they created conflicts which eventually took down the whole site. This took some extra effort to resolve and revert back to the original state.

As a demonstration of the integration concept, the user experience was replicated without the actual technological integration within the Open Atrium. To do this, the user accounts from Open Atrium were recreated inside the RescueRoam. This provides a seamless user experience, where users can use just one set of credentials to access all SecInCoRe components.

***OA > Is IT Ethical (ELSI guidance)***

Since the last deliverable, the iFrame module was again used, this time to embed the 'Is IT Ethical' community platform containing guidance for ethical, legal, and social issues (ELSI) that can arise when implementing, managing and governing common information spaces for

information sharing in disaster risk management. As stated in the description of the Reflect page, Is IT Ethical addresses information technology supported collaboration in disaster planning and response. To offer advice on why specific ELSI are important to address, the guidance is structured around the development of ELSI reflexivity: providing questions to consider, summaries of research, and examples that help see how decisions around CIS adoption, management, and use shape other decisions and actions within larger societal contexts.

# 3 Reports on the validation cases

## *3.1 VES strategy and the Demonstration case approach*

As recalled in Chapter 2, the validation strategy has been based on the organisation of Demonstration Cases. The adoption of a case-based approach implies that the scope, design and organisation of a Demonstration Case ultimately depend upon:

a) the availability of concrete technical and conceptual tools that provide the means through which different elements the SecInCoRe concept can be communicated to or experienced by end-users;
b) the willingness of stakeholders to take part in workshops and other activities organised around a Demonstration Case, and the degree of connection between what is demonstrated and their specific practices, needs and competences.

As already reported in D5.4, 'it must be noted that the aim of Demonstration Cases (and of the associated Demonstrator Implementations) is not to present end-users with a finalised, integrated and fully functional system. In all the pilot and Demonstration Cases performed to date, the exposure of end-users to crucial elements of the SecInCoRe concept has been based on the integration of technical (interactive) implementations showcasing a limited sub-set of SecInCoRe functionalities with conceptual tools that provided them with the context and overall picture in which such implementations should be framed. Assessing whether the technical infrastructures and conceptual apparatus developed by SecInCoRe can be appropriated by end-users (and more generally stakeholders) to produce a CIS that provides a significant added value over current practices would require a medium- to long-term Demonstration Case, ideally in a real-life setting that would enable the observation and analysis of the interactions between the social, organisational and technical aspects of the CIS'.

Although these considerations remain valid, thanks to the continuous collaboration and exchange between the validation team other consortium members and external stakeholders it was possible to identify the main points that would enable end-users to gain a more holistic understanding of how a CIS, designed according to SecInCoRe principles and specifications, could operate in a real-life setting. The modular design of the SecInCoRe VES has helped maximise the contribution of this greater technical integration to the overall validation objectives.

The range of activities performed in a Demonstration Case depends in fact on the degree of maturity reached by the conceptual and technological expressions of different elements of the SecInCoRe concept. Progress on Reference and Demonstration Implementations, as well as the development of non-technical representations of elements of the CIS concept, do not however proceed in isolation from Demonstration activities. To guide the process and to ensure that Demonstration Cases are coherent with the SecInCoRe VES, a Demonstration Case Protocol (DCP) was developed with the following aims:

- coordinate the activities of different teams and facilitate the flow of information between them;
- guide the design of preparatory activities;
- check the alignment of Demonstration Cases with SecInCoRe's VES objectives;
- ensure the collection of background data according to a standardised format.

The DCP involves the use of standardised Demonstration Case Templates (DCT) for the preliminary and final phases of the organisation of a Demonstration Case. The collected DCTs,

being the formal documentation of all Demonstration Cases organised during the project, form an integral part of the CIS concept documentation are stored and available in Open Atrium. The collected Templates transparently show how validation activities were organised, and provide examples and blueprints to future users of SecInCoRe interested in setting up a monitoring and evaluation strategy.

This procedure, based on DCP and DCTs as a basis for coordination and information exchange between consortium partners involved in different aspects of Demonstration Cases, has been used to address the limitations that had emerged in previous Pilot Cases. The resulting targeted improvements to Demonstration Implementations (described in the previous section) have ensured that end-users participating in the two final Demonstration Cases could interact with a more integrated Demonstrator designed to permit the validation of the following elements:

- CIS concept;
- Collaborative practices;
- Taxonomy and Search Function;
- Knowledge Base.

Compared to the validation performed in Paderborn in October 2016 (see results in D5.4), additional elements were therefore included in the two Demonstration Cases. Given the state of Demonstration Implementations at the time of the Paderborn Demonstration Case, it had only been possible to validate the CIS concept, the taxonomy and search function, and the knowledge base. Following the suggestions provided in D5.4, the changes implemented in Demonstrator Implementations (particularly the higher level of integration between components achieved in the OA platform) have also permitted the validation of collaborative practices in at least two Demonstration Cases.

The elements listed above were validated in both Demonstration Cases. The reason to focus on their validation is twofold. First, considering that these are the most important project's outcomes and that they have reached a maturity stage, their validation was of paramount importance for the overall assessment of the project. Second, experiences gained in previous Pilot and Demonstration Cases showed that these elements are highly relevant to practitioners involved in crisis management systems. End-users can directly relate the activities performed in Demonstration Cases to their daily practices, in this way comparing SecInCoRe to the systems they currently use to assess its value and potential contribution in a real-life setting.

### 3.1.1 Tools and methods used for data collection

To permit the comparability of results with previous Demonstration Cases, the elements listed above were validated using the same data collection methods used in previous Demonstration Cases. As described in D5.4, the tools used to collect data and feedback from users included structured observation, focus groups discussions and semi-structured interviews. Information on end-users' background and characteristics was collected through a semi-structured self-administered questionnaire. Data collection instruments and observation frames were adapted, when needed, to the characteristics of the new Demonstration Cases as described below. The main elements of the methodology and data collection tools are briefly summarised; more details are available in D5.4.

Structured observation was needed to consistently collect feedback on the activities performed by end-users during Demonstration Cases, with the aim of supplementing (through a structured record of the interactions between end-users and Demonstration Implementations) the verbal information collected from end-users themselves through interviews and focus groups. To

ensure consistency between observations collected by different members of the validation team in different occasions, an observation frame was established. The observation frame provides a series of questions and issues that should guide the observation, complemented by a list of codes that should be used when writing the observation report.

A structured questionnaire was developed to collect standardised information on the background of each end-user participating in Demonstration Cases through closed- and open-ended questions. Information was collected about their current job and their previous experiences with CIS in the PPDR domain.

Semi-structured interviews were conducted with end-users to collect their impressions and feedback on the different elements of the CIS concept selected for validation during or immediately after a Demonstration Case. A standardised interview frame, designed prior to the Demonstration Case, included a list of topics, questions and probes to ensure that all relevant aspects were covered during the interview. In some cases, the interview frame also detailed a practical activity (such as a search, a document assessment and analysis, a simulation of a typical situation or task end-users may perform in their professional activities etc.) to be performed by end-users using the SecInCoRe Demonstrator together with the interviewer. In this way, it was possible to identify specific issues or positive points that may arise in the personal use of the system, discuss them with the end-user as they were happening, and observe the solutions or opportunities that end-users were able to come up with during the practice.

Finally, at the end of each Case, a validation focus group was held with the end-users. A protocol was designed to guide the discussion and to ensure that all relevant topics were covered.

## *3.2 Results from validation activities with an expert from Italian Fire Brigades*

### 3.2.1 Introduction about participants and aims

On December 15th, the SecInCoRe's validation team organised a validation activity with a representative of the Italian Fire Brigades. The meeting took place in Rome, hosted by T6ECO.

### 3.2.2 Participant background information

The participant was selected due his valuable experience and direct engagement in the whole process of the crisis management cycle, from preparedness and training activities, to the crisis response until to the recovery and evaluation of the emergency.

According to the methodology already used in previous Pilots Cases and in Demonstration Case, background information on the following points was collected:

- previous experience in disaster management (e.g. in mitigation, preparedness, response, recovery, and/or business continuity).
- previous experience in the use of technologies for information exchange and multi-agency collaboration.
- previous experience in cross border operations, planning and training activities.
- previous experience in operation with multi-agency collaboration.

The Demonstration Case participant is a Fire Officer from the Italian Fire Brigade. He has previous experience in disaster management and during his carrier he performed activities in relation to the direct management of the emergency, as well as training and preparing activities; in addition he is also in charge of prevention and assessment's tasks. Regarding the use of

technologies for information exchange and multi-agency collaboration, he declared familiarity with several kinds of technologies, even if the use of such technologies is not regular and depends very much on the releant circumstances. Some of them are listed here: internet browsers (Chrome, Mozilla etc.) to look for chemical hazards or MSDS (Material Safety Data Sheets), US Chemical Board, Chemdata, Ergo 2002, Virtual Osocc, and tools provided by the United Nations. In addition, he is used to working with tools that are relevant to find documents and information to manage incidents or to get clues on how to handle specific emergencies. The participant has also a relevant experience in international exercises and training based on cross-border operations. He participated in several missions in Jordan, Lebanon, Mozambique and in different European countries. Furthermore, he was involved in several multi-agency collaborations as in the case of international and national exercises and training, or more specifically in the CBRN monitoring activity during the last Jubilee held in Rome (2016) or civil defence planning in line with, for instance, the Seveso III European Directive or, during earthquakes as happened in L'Aquila, in 2009, Emilia Romagna region, in 2012, and recently in 2016 in the cities of Rieti and Ascoli Piceno.

### 3.2.3 Meeting organisation and performed activities

The aim of the workshop was to show SecInCoRe concepts and outputs through conceptual presentation and through concrete interactions between the user and the SecInCoRe demonstrator.

The session lasted two hours and it was organised according to the agenda presented in Table 1 below.

| Activity Code | Topic | Demonstrator |
|---|---|---|
| Activity 1 | Introduction "What is SecInCoRe" | Video of the project |
| Activity 2 | CIS concept definition | Open Atrium |
| Activity 3 | Experience SecInCoRe demonstrator | Technical demonstrator |
| Activity 4 | Validation activity | Technical demonstrator |

*Table 1. Activities description and typology of demonstrator*

The activities were organised to validate the following elements:

- CIS concept;
- Collaborative practices;
- Taxonomy / Ontology and Semantic Search;
- Knowledge Base / Inventory.

### 3.2.4 Main results from the validation activity

This section reports results from the validation activity. Data were collected through three different activities conducted during Demonstration Case:

- Structured participant observations;
- Semi-structured questionnaire;

- Semi- structured interview.

### 3.2.5 CIS concept

On the base of the information gathered from the participant, it was possible to retrieve a very positive feedback in terms of the general structure of the CIS and its design. The different elements that made the CIS, following his thoughts and feedback, could be really a value for stakeholders working in the emergency; the user stressed in particular the relevance of a such CIS for hospitals, Civil Protection and researchers.

Even in the case of his current working routines, such tool could concretely and significantly improve his tasks on fire prevention and planning reducing the time to access the information and connection with authors of the source. On a scale from 1 to 10 (where 1 is the lowest rate and 10 the highest), the user scored at 8 the value of SecInCoRe in changing his working routine.

Through dedicated questions in the questionnaire, it the participant was asked to share his impression on the CIS as presented and designed by SecInCoRe. Particularly, it was asked whether a CIS built according to SecInCoRe concepts and specification would improve his working routines compared to other systems that he is currently using or he has used in the past. The participant strongly agreed with this statement.

In regards to the capacity of a CIS built according to SecInCoRe concepts and specifications to make the work more time-efficient, by helping users find relevant information in less time, the feedback was also strongly positive. The user was really interested in the functionalities and possibilities created by the CIS reducing the time of document retrieved and document sharing. The only exception that was made in terms of time-efficiency is related to the common templates used for past disasters. The idea to process information already collected in the past to structure it order to the sections included in the template is seen as an additional effort in terms of time.

The critical elements that were pointed out from the user are related to the fact that the system would be a valid tool for people working in the emergency only if the preliminary conditions of security and trust are adequately respected. The security of the system must ensure to the users that the information is stored and exchanged in a protected manner. Only by satisfying this condition will the system be effectively adopted by emergency services and used by end-users. Furthermore, discussing about the condition that the CIS is cloud-based, the user does not see this as a negative point but highlights the need for an approved secure system from the SecInCoRe side and as well as from the user side, to prevent cyber security attacks.

The general perception about the concept and design of the CIS was very positive. The attendee positively welcomed the concept of the CIS and its functions in order to enhance the access to information, particularly in relation to the lessons learned that are a relevant information for preparing and planning.

### 3.2.6 Collaborative practices

During the Demonstration Case, it was possible to dedicate specific questions on collaboration practices supported by the CIS. Firstly, it was asked whether a CIS built according to SecInCoRe concepts and specifications could help increase collaboration and establish new partnerships. Looking at the general presentation of SecInCoRe and to the concept documentation stored in the Open Atrium, the feedback assigned by the user on the possibility of the CIS to improve collaboration and also create new opportunities, was the highest possible.

The user was particularly interested in the concept of a CIS as a space of collaboration between people that are already in touch, as well as a tool to establish contact with people they do not know. The chance to contact the author of a document stored in the Inventory was particularly appreciated. In this sense, the added value of this function is to allow a fast and easy way to communicate with people that could be very difficult to search out, in this way having access to their knowledge.

Thanks to improvements in Open Atrium, it was also possible to experiment dedicated functions envisaged to increase collaboration among the users of the CIS:

- discussion board;
- chat room;
- document sharing.

The user judged very positively the three functions; above all it was asserted that the functions are heterogeneous because they can cover different needs and aims during the emergency. The chat room is a relevant tool for discussion that could improve instant communication; as such, it is extremely useful for first responders even during the emergency. The discussion board, on the other side, could be most relevant for preparing activities; for example, it could be of help when discussing a plan among several people. The document share function, on the other side, can really support the collaboration enhanced by the previous elements, so it could be important to share document during the emergency, as well as during other moments of the crisis.

More broadly speaking, the user found the CIS concept and its functionalities very relevant to create new collaboration but also to reduce the distance among actors that are already working together. An example is that a plan preparation could be performed using the CIS, avoiding the need for face-to-face meeting.

One remark that was advanced regarding the collaboration practices is that even a CIS with dedicated spaces for discussions should be managed by a moderator, so it should be clear who is the managing authority of the CIS. In relation to this topic, the participant also highlighted the need to further clarify ELSI issues, above all regarding the privacy and security of the system. It was suggested that users entering the CIS for the first time should sign a formal document, a kind of Code of Conduct, accepting the main legal and ethical issues, declaring their responsibility for the quality of information stored in the Knowledge Base, and committing to a correct and proper use of the documentation retrieved by the Inventory or received by other users on the chat room or discussion board.

### 3.2.7 Taxonomy and Search Function

In order to experiment with the taxonomy and the search function, the user was asked to perform directly some searches accordingly to topics of his interest in order to test the utility of the implementation in relation to his concrete needs.

The activity was performed looking for topics relevant to the daily practices of the user. The participant found the tool useful to retrieve significant information. The list of results coming from the search was generally of interest to the user and he discovered documents that he was interested in reading. Then, it was also judged as positive the chance to use both the summary of the document and the list of key words to better understand the topic before downloading it. In this regard, in one search the topics listed as keywords were aligned with the general content of the document but it was not possible to identify that the document was business oriented. For this reason, it would be appreciated also a kind of indication on the nature of the document to

better address the need of the user that performs the search. Regarding further actions performed on the search, it was judged positively that some of the documents are restricted and can be accessed only by contacting the author. This option seems particularly relevant in order to ensure a high level of protection for sensible information stored in the CIS.

To gather feedback comparable with previous Demonstration Cases, the participant was asked to answer a short questionnaire on the Taxonomy and on the Search Function. The results are here reported.

In the questionnaire, the participant was asked to think about the different types of search that were used during the day (search based on keywords; filters based on categories; graph-based search), and consider how useful they would be in his standard work practice[5].

| | Attendee |
|---|---|
| Keywords-based search | 1 |
| Filtering based on categories | 3 |
| Graph-based view | 2 |

*Table 2. Ranking the Search Functions*

As it is possible to see from Table 2, the keywords-based search was preferred in order to get a complete list of information; the graph-based view was appreciated thanks to the capability to link topics from different perspective. Finally, the filtering based on categories was ranked last in terms of usefulness.

The participant was also requested to rank the different types of search according to how useful would they be when exploring a topic with which they are not familiar[6] (Table 3). In this case, the user was very clear on the relevance of the Graph-based view. This function was particularly appreciated because it was recognised as an innovation, compared to similar systems, allowing the user to see the connections between different topics that were not taken into account previously. Following this were selected the keywords-based search and the filtering based on categories.

| | Attendee |
|---|---|
| Keywords-based search | 2 |
| Filtering based on categories | 3 |
| Graph-based view | 1 |

[5] The rank is in order of usefulness from 1 to 3, where 1 is the most useful and 3 is the least useful.
[6] The rank is in order of usefulness from 1 to 3, where 1 is the most useful and 3 is the least useful.

*Table 3. Ranking Search Functions to explore new topics*

In both grids, it is possible to notice that the filtering based on categories is judged as the less useful, while the other two functions can be considered as relevant for different scopes and aims when performing a search. From a general perspective, the graph view was identified as the most interesting and innovative function related to the search.

The comprehensive feedback on the taxonomy and search function was positive even if the visualisation of the results from the search was not user friendly and it should be improved to allow an easier navigation of results. In addition, the user also asked about the insurance that the information stored is trustable and qualitative verified.

### 3.2.8 Knowledge Base

Another activity performed during the Demonstration Case was dedicated to the visualisation and navigation of the Knowledge Base (KB) where, particularly, the user went through the Knowledge Base looking at different sections dedicated to Information Systems, Datasets, Business Models and Past Disasters. According to the feedback received by the user, the database that was evaluated as the most useful is the one dedicated to Past Disasters.

However, observing the user looking at the lists of documents it was possible to notice that he was familiar with most of the sources stored in the KB. At the end of the activity, he judged the overall collections of data as good.

The critical points emerged during this activity highlights, firstly an issue regarding the effort of providing documentation on the KB. So, it should be clear who will be in charge of the sustainability of the documentation because it is not very realistic that officers inside operative structures will spend part of their work to insert input in the KB because this task will be very time consuming. In addition, even the translation of lesson learned in the template stored in the past disaster KB is it useful but it is time consuming for the user if he has to do it.

For these reason, the KB is judged positively but is should be constantly updated from someone in charge of it rather than depend on the individual will of the single user.

Finally, it has also to be reported that the visualisation of the interface of the KB, due to the size of the screen, was not friendly and the user had some difficulty in reading all the results.

### 3.2.9 Final consideration from the Rome Demonstration Case

The Demonstration Case reached its aim to validate CIS concept through a dedicated demonstrator.

Through the description of the concept and its visualisation in the demonstrator, the user asserted that such a CIS could be useful in all the phases of the emergency. The CIS, indeed, can be used in preparedness phase as well as in debriefing or assessment of the emergency thanks to access to the information and to functions foreseen to improve collaboration. However, such CIS can be valuable even in real time in a response phase. If several actors engaged in the crisis are already registered to the CIS, this could be a relevant support when the crisis happens saving time in exchanging information using the instant messaging function in the chat room.

The user appreciated the general concept of the CIS and the related functionalities, asserting that such tool could really improve and change his working routing providing an essential added value on the collaboration with colleagues or other actors involved in all the phases of the emergency.

However, from a validation point of view the most relevant issues emerged during the Demonstration Case that we want to submit to the attention of the partners in charge of the conceptual and technical development. The issues are related to the following topics:

- security of the system;
- managing authority;
- ELSI issues and quality of data.

Security system did not emerge as a real problem during this Demonstration Case. However, further information should be given to the users to explain how the CIS (the documentation stored in it and the exchanges that will take place in the system) is protected and secure.

Regarding the managing authority, it was requested to better clarify how different roles will be managed and by whom; this would help clarify the process of access to the CIS and access to the information.

Regarding the collaborative practices, it was possible during this Demonstration Case to go more in deep on this topic and better explain to the user the relation between CIS and collaboration thanks to the CIS documentation and, above all, thanks to the functions inserted in the updated Open Atrium platform. However, legal and ethical issues remain unclear. The request of the user to have some document (or guideline) that clarify responsibilities and duties accessing the CIS makes clear that ELSI issue are not easy to identify in the general description of the project and neither in the demonstrator. The suggestion is to translate the ELSI issue in something that is visible from the users and show it through a Demonstrator. In addition, it still remains to be clarified how the system ensures a sufficient quality of data and trusted information.

Finally, some improvement on the interface could be of help in order to allow user to easily interact with the system.

### 3.2.10 Suggestion for further implementation

Regarding further implementation, some suggestions were provided by the user. They are here reported to give further inputs to the teams in charge of the conceptual development as well as to technical development for Demonstration purposes.

First, the participant suggested to provide a translation of the toolbar of Open Atrium from English to other European languages (e.g., Italian, German) in order to allow the use of the CIS also to the people working in national institutions that are not familiar with English. In addition, it was also suggested to allow a translation in Chinese because relevant best practices to consult are made by Chinese institutions and it would be a value to find them it in the KB.

Second, regarding document sharing, it is suggested to foresee an additional function that allows CIS members to share information with a specific deadline for the download. In this way, after the selected period the document will be destroyed encouraging the use of the CIS even for sharing classified information avoiding that it will remains on the cloud. This could be extremely relevant to allow the use of the CIS even in the case of restricted events such as the one related to civil defence or Critical Infrastructure Protection.

As already said, the user also suggests to insert a specific document that users should sign when accessing the CIS to be aware of their responsibility on the quality of the information uploaded or shared with other users and on the responsibility to correctly use the information retrieved or shared through the CIS.

Then, another suggestion was given in relation to the Knowledge Base. In this sense, the suggestion is to add also information based on geo-referenced sensors. Using also alarm systems providing indication based on sensors, the systems could be used not only for the current purposes but it could be also enlarged to the monitoring and response activities.

Finally, regarding the Past Disaster database it is suggest that each case should be linked to a map in order to identify connections with neighbouring countries.

## *3.3 Results from validation activities with an expert from the Italian Civil Protection*

### 3.3.1 Introduction about participants and aims

On 3 January 2017, the SecInCoRe validation team organised a dedicated Demonstration Case with a representative of the Italian Civil Protection located in Torre del Greco, Naples.

### 3.3.2 Participant background information

The participant is a member of the SecInCoRe Advisory Board. The decision to involve him in the validation of conceptual and technical outputs is however primarily based on his experience as a practitioner.

As already done in the previous Pilot Cases and in the Demonstration Case, background information on the following standard points was collected:

- previous experience in disaster management (e.g. in mitigation, preparedness, response, recovery, and / or business continuity);
- previous experience in the use of technologies for information exchange and multi-agency collaboration;
- previous experience in cross border operations, planning and training activities;
- previous experience in operation with multi-agency collaboration.

The participant is a Police Officer working in the office of the Italian Civil Protection in the city of Torre del Greco, Italy. He has experience in preparedness, response and recovery within the Civil Protection agency. In particular, he recently worked with the Red Cross for recovering people after the earthquake that affected the Abruzzo region in Central Italy. According to his current position and role, the core duty of his work is risk management. At the time of the interview, the participant had had no previous experience in the use of technology and platforms for information exchange and multi-agency collaboration. On the other side, he has previous experience in cross borders operations; for example, he was involved in a training exercise called ’Mesimex’, that was performed in 2006 with the collaboration of France, Spain, Portugal and Sweden. In addition, he took part to another training in 2010 with the title ’Terex 2010’ that involved France, Slovenia, Croatia, Austria and Russia.

### 3.3.3 Organisation and activities scheduled

Following SecInCoRe validation methodology and replicating the approach already adopted in previous Demonstration Cases, the participant was introduced to SecInCoRe concepts and outputs through a combination of conceptual presentations and practical interactions with the SecInCoRe demonstrator.

The validation session lasted two hours and was organised according the agenda presented in Table 4.

| Activity Code | Topic | Demonstrator |
|---|---|---|
| Activity 1 | Introduction "What is SecInCoRe" | Video of the project |
| Activity 2 | CIS concept definition | Open Atrium |
| Activity 3 | Experience SecInCoRe demonstrator | Technical demonstrator |
| Activity 4 | Validation activity | Technical demonstrator |

*Table 4. Activities description and typology of demonstrator*

The following concepts and elements had been identified as targets for validation activities:

- CIS concept;
- Collaborative practices;
- Taxonomy/Ontology and Semantic Search;
- Knowledge Base/Inventory.

### 3.3.4 Main results from the validation activity

#### *3.3.4.1 CIS concept*

After being shown the conceptual video of the project (described in Chapter 2) and the CIS concept documentation stored in Open Atrium, the participant was invited to discuss the CIS concept and design. According to the participant, the video effectively communicates the CIS concept and clearly explains the interactions among the different elements that create the collaborative space. Furthermore, the user highlighted that the CIS seemed to be a novelty compared to the current tools that practitioners use to perform their work.

Conversely, the participant found that the CIS documentation was not easy to navigate and interpret, so it could be hard for external users to build their own CIS on the basis of the CIS documentation alone.

In order to analyse in greater detail the participants' perspective, a questionnaire with specific points on the CIS was submitted. First, the participant was asked whether a CIS built according to SecInCoRe concepts and specification would improve his working routines compared to other systems that he is currently using or he has used in the past. The participant neither agreed nor disagreed with this statement. The user did not entirely perceive the CIS as an added value for his current working routine, even if he recognised it as an innovation. This point was stressed out in relation to a question foreseen by the questionnaire.

After experimenting all the available functions, including the semantic search, the participant was requested to score to the capacity of a CIS built according to SecInCoRe concepts and specifications to make his work more time-efficient, by helping users to find relevant information in less time. In this case, the user was not able to reply since he could not quantify the time that he could save using SecInCoRe.

In both cases the CIS was perceived as a potentially innovative tool but the user could not estimate a real change in his current work in emergency services.

In addition, the critical element that emerged during the discussion with the user was related to the fact that such instrument should be promoted and adopted by several emergency services and not only by few actors. Indeed, a limited usage could limit the capacity of actors to interact and collaborate. Another point to enhance is that the adoption from emergency services would require that the CIS and the technical functionalities should be certified according to security and quality controls, to encourage individual institutions in its adoption.

#### *3.3.4.2 Collaborative practices*

A specific point of the validation was dedicated to the collaboration practices foreseen by the CIS. The participant was asked to comment on the capacity of the CIS to favour collaborations and new partnerships. This validation was made on a conceptual base, since at the time of the validation it was not possible to really test a collaborative function in practice. However, from a conceptual perspective, the feedback was positive: the user thought that it could be possible to effectively increase collaborations and partnerships thanks to the added value provided by the possibility to share documents and create connections with experts and practitioners that are not already in the network of personal contacts. In this sense, the user found the collaborative functions offered by SecInCoRe very interesting.

Particularly, the user looked at the dedicated functions envisaged to increase collaboration among the users of the CIS:

- the discussion board;
- the chat room;
- the document sharing.

The three functions were perceived by the user as effective in the enhancement of collaboration. Particularly, in his opinion the chat room and the discussion board are the most useful instruments. The function dedicated to document sharing is also relevant but probably, due to time restriction, he could use more the CIS to retrieve documents instead of uploading materials and share them with others.

However, in this regard the user suggested to integrate an additional functionality that could allow users to perform conference calls, in this way facilitating fast and easy communication with other users, both in the preparation as well as in the response phases.

#### *3.3.4.3 Taxonomy and Search Function*

As in previous Demonstration Cases, a search was performed to retrieve documents and information based on the user's interests (terms such as 'explosion' and 'earthquake' were searched). The results from the search showed in some cases documents that were of interest to the user, while in other cases they were not. In some of the cases, the user was already familiar with some of the documents.

Regarding the navigation of the search function, he stated that the documents in blue were more attractive than the ones in black (the blue ones are the document uploaded, while the black sources are related to information stored in KB). In addition, the user was not convinced about the order of presentation of the retrieved documents. As stated by other participants, he would prefer the list of documents to be ranked according to their relevance for the topic, while at the moment the systems does not explain why the order of the documents is the one that appears after having performed the search.

The participant was then asked to answer the short questionnaire on the Taxonomy and the Search Function already utilised in the Paderborn and Rome case.

The first question asked the participant to think about the different types of search functions that were used during the day (search based on keywords; filters based on categories; graph-based search), and to rank them according to how useful they would be in standard work practice. The results are reported in Table 5 below[7].

| Function | Rank |
|---|---|
| Keywords-based search | 1 |
| Filtering based on categories | 2 |
| Graph-based view | 3 |

*Table 5. Ranking the Search Functions*

The keywords-based search was the most useful option according to the participant, followed by the filtering based on categories. As often emerged in previous Demonstration Cases, the graph-based view was considered the least useful approach to the search.

In the next question, the participant was asked to rank the different types of search according to how useful they would be when exploring an unfamiliar topic (Table 6). The ranking was the same as the previous one.

| Function | Rank |
|---|---|
| Keywords-based search | 1 |
| Filtering based on categories | 2 |
| Graph-based view | 3 |

*Table 6. Ranking Search Functions for the exploration of new topics*

In both cases, the keywords based search is perceived as the most useful and the graph view as the least useful. The reason given by the participant is that he feels more familiar with the keyword search and finds it easier. In his opinion, the keyword search is the most common tool to use in daily routine as well as when the user is searching for topics that he does not know. It is however important to mention that the graph-based view was perceived by the user as an interesting tool but it was not possible, through the performed search, to fully understand its value.

Regarding the navigation of the list of documents retrieved during the search, the user suggested to add a function to show if the document is restricted or publicly available before opening it.

[7] For this and the following questions, the rank is in order of usefulness from 1 to 3, where 1 is the most useful and 3 is the least useful.

#### *3.3.4.4 Knowledge Base*

Finally, the user had the chance to go through the Knowledge Base (KB). The user only knew few of the sources enlisted in the datasets. He was interested in some of the sources stored in the Knowledge Base about Information Systems, but he stated that most probably he would use the KB to retrieve information, whereas it would not be realistic that he could contribute to it due to time restrictions in his daily working routine.

Two major critical issues emerged. First, the navigation of the KB was judged inadequate. The user stated that information was stored in the KB in a chaotic way: above all, sources were too many and of difficult comprehension due to difficult and not understandable titles. Second, all stored sources were in English, so the language issue would have to be considered when such system would be used by national emergency services that are not familiar with English.

### 3.3.5 Final consideration

This section summarises the major positive and critical points emerged from the Demonstration Case.

First, it was very difficult to perform the Demonstration due to the issues related to access to Open Atrium. Due to internet restrictions operating in the Italian Civil Protection Office, the link where the Demonstration is hosted was not accessible. At the end, it was only possible to access Open Atrium using an internet connection that was not related to the Civil Protection Office. This issue did not help to start in a prompt way the validation and created the sensation of a difficult tool to use; all further questions and activities were however not influenced by this initial issue. This problem greatly limits the potentiality of the tool and shows that it would be necessary to create a connection that could be secure but at the same time easily accessible also by emergency services that often have restrictions on internet navigation.

Second, it is important to stress that the video helped the comprehension of SecInCoRe aims and of the CIS. On the other side, the CIS concept documentation was not easy to understand for the user and it would not be so easy for the user in case he would like to build his own CIS.

The improvement and enhancement of collaboration practices was the area in which the participant saw the greatest added value for SecInCoRe. The functions directly related to collaborative practices (chat room and discussion board) were perceived as the most relevant among those shown to the user during the Demonstration Case.

Topics related to Ethical, Legal and Social Issues did not emerge clearly during the discussion. On the other hand, the process through which the documentation is maintained as a live system in the KB was touched as a key point for future implementation. A crucial point is related to need to provide the tool of a standard certification that could encourage emergency services to adopt it.

### 3.3.6 Suggestion for further implementation

The suggestions made by the participant on possible improvements of the Demonstrator are here summarised for the benefit of the teams in charge of the development of conceptual and technical demonstrators.

First, to further improve collaboration practices, the user suggested to add a collaborative function to perform conference calls.

About the Knowledge Base, the user suggested to present the sources stored in the KB differently because there is too much information and they are often not comprehensible if presented in the current way due to difficult titles.

Regarding each single document stored in the inventory, the participant suggest to add a detail that shows which is the level of sharing of the document, namely if it is public or private. Then, it was suggested to order the documents in the search results page according to a rank related to the relevance of the document.

### *3.4 Final results from the validation*

Summarising, validation has been foreseen to match the needs and feedbacks from the users according to what was presented and developed by SecInCoRe during the project lifetime.

The final results from validation activities are based on the three Demonstration Cases that were performed in Paderborn (D5.4), in Rome and in Naples, according to the timeline presented in D5.4.

As said, the activities aimed to validate the following main project components:

- CIS concept and derived principles informing the design of the demonstrator;
- Taxonomy / ontology and semantic search;
- KB/Inventory;
- Collaboration practices.

The approach used after each Demonstration case has been self-reflective: after each Demonstration case, the report produced by the validation team was shared with technical partners to integrate, when possible, feedback and suggestion gathered during the validation in enhanced versions of Demonstrator Implementations. In line with this, collaborative practices functions were not ready to be discussed during the Paderborn case but they were later implemented and partially shown during the Demonstration cases in Rome and Naples.

Following the process, even though after the Naples case a validation case with other users was not performed, the technical team has implemented suggestions and has modified the demonstrator as described in Chapter 2. The new version was show at the Advisory Board meeting, at the Joint event and will be used during the final review.

Regarding the validation, the first point to be stressed is that, based on the feedback collected from users in different Demonstration Cases, a Demonstrator should be able to clearly explain and show the complexity of the design of the CIS to end-users. The complexity of the issue needs to be supported with a sort of blueprint that could help the user in understanding the concept behind it. On the other side, users had some difficulties in understanding that the Demonstrator was only a way to show a process, and so the final judgment on the potential contribution of SecInCoRe should be based more on the envisioned functionalities, design principles and underlying concepts rather than on their current level of technological development.

Having clarified this point, it is possible to say that the most important result from validation is the positive feedback received by the users on the need to have a CIS that could harmonise procedures for preparedness and planning around Europe. Having a common CIS that could help standardise practices for sharing documents and enhancing collaboration is useful and

needed according to the users' comments. The CIS has also been confirmed as a powerful tool to keep in touch with practitioners in other countries, thanks to the chance to contact directly the author of the information. This facilitates the establishment of new partnership at the European level, enlarging the source of information as well as the network of people that is possible to reach. Collaborative functions have been validated by users, that are apparently not familiar with the use of dedicated tools to collaborate with other practitioners. In line with this, the collaborative functions presented during Demonstration Cases have been positively judged as tools that could be useful for the working routine.

Another major aspect relates to the graph view developed by the project. The graph view has been perceived by the users as a new way to approach the search of topics when looking for documents to prepare a plan or an exercise. Although users recognised the potentiality of the function, they still preferred traditional ways to perform searches, such as the keyword based search.

The Taxonomy behind the search has been the most difficult outcome for users to validate, and it has been possible to collect only limited feedback to this point. In addition, the design of the Knowledge Base and the Inventory has been judged as positive development to overcome the problems related to the fact that practitioners in Europe are using several different inventories, which do not allow users to have a homogeneous reference to common documents. At a closer level, modifications on the way in which documents are stored and classified have been suggested but the concept behind the Inventory has been positively validated.

# 4 Report on the evaluation cases

## *4.1 SecInCoRe evaluation strategy at a glance*

As said at the beginning of the document, the VES is the foundation of activities performed in WP5. The current chapter integrates the validation strategy presented in Chapter 3 with a dedicated discussion of the main activities and results related to the evaluation strategy.

According to the definition provided by the International Association for Impact Assessment (IAIA), impact is "*the difference between what would happen with the action and what would happen without it*[8]". The evaluation strategy proposed for SecInCoRe (D5.2, pp. 25) intends to estimate the socio-economic impact of the project responding to questions such as:

- What is the difference SecInCoRe project makes?
- Why is SecInCoRe relevant and for whom?
- How much difference does SecInCoRe make?

As already stated in D5.3, the general definition of impact clearly implies that "the actual impact of the project is only to a very limited extent directly observable in the course of the project lifecycle, and at the same time only to a partial extent quantifiable in terms of purely economic indicators. [Consequently], any attempt at answering these questions requires a focus on *expected impacts assessed on multiple dimensions*." To identify the areas in which SecInCoRe could produce an impact, the SEQUOIA methodology (Passani et al., 2014) has been adopted. The foundation of the methodology is the assessment of the impact of a project through the adoption of counterfactual methods based on the comparison of so-called *zero scenarios* (the current practice) with a future scenario in which SecInCoRe has been adopted. Potential project impacts are estimated by combining multiple quantifiable and non-quantifiable dimensions.

In the case of SecInCoRe, the possibility to perform a counterfactual analysis was however limited by the fact that, during the project life-cycle, it was not possible to deploy a full system based on SecInCoRe principles and concept in a real-life setting. This would have required users from different organisations, potentially located in different countries, to set up and run their own CIS using the concepts and technical implementations developed by the project.

Consequently, the assessment has been based on three subsequent phases:

- The development of narratives (*Evaluation Scenarios*) co-generated with end-users, aimed at identifying a hypothetical (but realistic) operational situation that provides the background for the challenges end-users involved in a Demonstration Case must face;
- Understanding with end-users how SecInCoRe could help addressing the challenges posed by the Evaluation Scenario. In this sense, the Evaluation Scenario sets the stage for a future situation in which the SecInCoRe concept has been fully developed and integrated into crisis management practices;
- Stakeholders then compare the Evaluation Scenario *with* SecInCoRe (i.e., how they would respond to the challenges with SecInCoRe) to the Evaluation Scenario *without* SecInCoRe (i.e., how they would respond to the challenges using their current tools and practices), and assess the perceived benefits of SecInCoRe across a series of relevant impact areas and dimensions identified on the basis of the SEQUOIA methodology.

[8] Available at http://www.iaia.org/uploads/pdf/What_is_IA_web.pdf

Following the methodology described in D5.3 and according to project's development, the main areas of impact have been selected and categorised (Appendix 1, D5.3). Accordingly, dedicated variables and indicators have been identified in order to perform a qualitative analysis based on content analysis of the materials collected and so measure the impact on the selected areas.

A full list of indicators and variables that it has been possible to evaluate is given in 8.1 in short, the areas for which is has been possible to identify an impact are the following:

- Technological impact;
- Social impact.

Results from the observable dimensions are reported in the next Chapter.

## *4.2 SecInCoRe evaluation: elements for the evaluation and methods used*

According to the elements identified for evaluation purposes, it was stated in D5.4 that the evaluation would be based on the following elements:

- CIS concept;
- Collaborative practices and ELSI.

To evaluate the CIS concept and the work done on the ELSI guidance, dedicated meetings with high-level stakeholders were identified. The evaluation of the ELSI guidance was performed during a meeting dedicated to ELSI issues in which experts on the field took part. The CIS concept evaluation was performed in two meetings. The first one has been run with AB members, the second at the joint event of the project financed by the call Security (SEC-2013.5.1-1). Details on both meeting are provided below.

The evaluation was based on qualitative methodology, whose details are reported in the following sections. The methods used for data gathering were:

- Structured observation;
- Focus groups.

Each activity was analysed separately according to the data collected and results achieved. However, a comprehensive analysis of the VES strategy, based on the integration of the results from the validation and evaluation is reported in Chapter 5.

## *4.3 Evaluating ELSI*

On 26 January 2017, in relation to the 10th International Conference on Computers, Privacy and Data Protection (CPDP), the workshop "Information Infrastructuring for Disaster Risk Management. Addressing Ethical, Legal and Social Issues in Information Sharing" was organised by ULANC, the SecInCoRe partner in charge of the ELSI issues. The conference took place in Brussels, Belgium. Aim of the meeting was to foster a discussion on infrastructuring information in order to improve information sharing in disaster management. Due to the high level stakeholders and their expertise on ELSI issues in crisis management the evaluation of ELSI has been performed.

### 4.3.1 Description of the activity: aims and purposes

As previously said, stakeholders invited to the event were all aware of ELSI issues and are experts on the topic. They included:

- Barnard-Wills, David - SATORI, Trilateral, UK
- Baur-Ahrens, Andreas – Tübingen University – SECTOR project
- Bonnamour, Marie-Christine - PSCE
- Calvert-Lee, Caroline - Civil Contingencies Unit, Portsmouth City Council, UK ResilienceDirect
- Créton-Cazanave, Laurence - UMR Pacte Institut d'études politiques, Grenoble
- Delprato, Uberto , IES Solutions, Italy
- Heyman, Rob - imec-SMIT, Vrije Universiteit Brussel
- Hildebrandt, Mireille - Professor, Science Faculty, Radboud University Nijmegen and Faculty Law & Criminology, Vrije Universiteit Brussel
- Huysmans, Kristof - Centre for IT & IP Law, KU Leuven – EPISECC project
- Lund, David - PSCE & BROADMAP project
- Penman, Dr James I. - CISSP Open Geospatial Consortium
- Sofia Tsekeridou, Intrasoft – IMPRESS project
- Staykova, Toni - FRACP – COncORDE project
- Tomas, Robert - Joint Research Centre – INSPIRE project

The meeting started with several presentations from experiences at European level engaged in the use of platforms for information sharing (e.g. Inspire, XchangeCore, Resilience Direct, Open GeoSpatial Consortium) and from European projects (e.g, SecInCoRe, EPISECC, SECTOR, COncORDE, IMPRESS , PSCE and BROADMAP). Then, the meeting was followed by a discussion aimed at investigating ELSI challenges and opportunities from an academic and theoretical point of view. After this session, a session dedicated to addressing ELSI in information sharing according to the approach developed by SecInCoRe took place. In line with this, three parallel groups were set up to discuss how ELSI guidance could support existing issues faced by the stakeholders. The session was based on the consultation of the ELSI prototype developed within SecInCoRe and hosted on the PSCE platform. Each group had the chance to choose individually one issue as example for using the ELSI guidance.

Following the discussions of the three groups, observing the activities and asking questions to the participants, an evaluation activity on ELSI has been conducted by T6 ECO.

### 4.3.2 Methodology and variables used for the evaluation

According to D5.3, "the Sequoia methodology has been applied to SecInCoRe project allowing to map the main areas of impact and to tailor related indicators to estimate the socio-economic impact of SecInCoRe". Regarding the evaluation of ELSI, the most relevant areas of impact that can be traced are: technological and social. As explained in the methodology (see D5.3) each area can also be divided in several subsets.

| **SecInCoRe requirements and identified variables** | |
|---|---|
| **Technological impact** | |
| *Accessibility* | |
| SICR 84<br>SICR 118 | • Usability. The extent to which information is clear and easily used |

| | |
|---|---|
| SICR 143 | |
| SICR 75 | • Understanding. The extent to which data are clear without ambiguity and easily comprehended |
| SICR 42<br>SICR 164 | • Navigation of the guidance. The extent to which data are easily found |
| *Effectiveness* | |
| SICR 73<br>SICR 92<br>SICR 104<br>SICR 105 | • Relevance. The extent to which information is applicable and helpful for the task at hand |
| **Social Impact** | |
| *Knowledge production and sharing* | |
| SICR 68 | • Assess the quality of ELSI guidance presented |
| *Support of ICT usage for all and democratic participants* | |
| SICR 182 | • Assess privacy and restrictions using ELSI guidance |
| SICR117<br>SICR 119<br>SICR 120<br>SICR 163 | • Assess the improvement of collaboration across nations, etc. using SecInCoRe in the respecting of differences using ELSI's guidance |
| *Social capital* | |
| *Social capital increment for users and participants* | |
| SICR 140<br>SICR 156<br>SICR 181 | • Assess the level of trust in creating a CIS using SecInCoRe guidance |
| SICR 157<br>SICT 158<br>SICR 159 | • Assess how SecInCoRe's ELSI guidance make users' duty of care regarding technology maintenance known |
| SICR 120<br>SICR 121<br>SICR 124<br>SICR 125<br>SICR 188 | • Assess the increasing of collaboration network using ELSI guidance |

*Table 7. Relation between SecInCoRe requirements and subsets of variables identified*

Starting from the above-mentioned dimensions the evaluation has been performed. Results are reported in the following paragraph.

### 4.3.3 Main results from the ELSI workshop meeting

As said, through different working groups, several issues related to ELSI have been identified (see below in the group descriptions). Then, in order to solve these issues, stakeholders were asked to look at the ELSI guidance and discuss them in relation to the issue to face. The evaluation was performed through structured observation. For each table a member of SecInCoRe took part to the discussion observing which ELSI where more related to the above mentioned dimensions. Then during the final focus group it was possible to observe in which way ELSI were perceived by stakeholders and then collect the direct feedback from the participants on their interaction with ELSI. Noted from observations were then collected and analysed jointly.

The stories developed by the three tables were heterogeneous and related to different emergency's issues:

Group 1- Sensitive information available for Virtual Operation Support Teams (VOST) and how to deal with it. During an incident with a car from a fire department all fire fighters died. Due to related incidents where VOST are involved, also they know about the dead fire fighters through Social Media. The group tries to address this story using ELSI guidance from two perspectives. From one side, how to be sure just needed information will be used by VOST without hindering their work. From the other side, how to protect VOST even if they are in contact with sensitive data.

Group 2: Sharing and disclosure of information. Several different chemical companies with just below the threshold hazardous materials are located in a mixed industrial estate, close to a residential area. The companies are invited into a common information space. They are happy to share information about the chemicals they store with the Category I responder organisations. However, they do not wish to disclose this information to their competitors. A multi-chemical spill occurs, the exact mix is unknown. The fire service responds but washes some hazardous chemicals into the water supply. It is unclear how hazardous this is. The public is informed after a period of time, the water system is flushed, no harm done. Main ELSI issues investigated through the use of guidance were: transparency, disclosure, privacy, data protection, cooperation and supporting partnership.

Group 3: Personal data management and how to deal with sensitive information during and after the emergency. Aim of the story was to deal with what happens to sensitive and personal data of victims (mainly pictures captured by first responders) and of people affected by an emergency. How much do these types of data need to be protected during the emergency and after that?

Given the stories selected by participants and their relation to ELSI issues, it was not possible to derive conclusions on all the impact dimensions originally foreseen (reported in D5.3). For example, the only feedback received on financial impact was produced by one stakeholder who stated that applying ELSI guidance could reduce insurance premiums of companies that are compliant with them.

Therefore, the following section only discusses the dimensions for which it was possible to collect elements for impact assessment in the discussions held in the different groups.

### 4.3.4 Technological impact

*Accessibility*

**Usability. The extent to which information is clear and easily used**

Observing how stakeholders interacted with the ELSI guidance, it is possible to state that information stored in the guidance was easy to manage and to use. All the stakeholders seemed very comfortable in exploring the guidance in order to address the issues emerged in the story. Information in the guidance was easy to use for almost all the stakeholders.

**Understanding. The extent to which information is clear without ambiguity and easily comprehended**

The stakeholders had the possibility to explore several and different ELSI definitions in the guidance. It was observed that, in most cases, information was clear and easy to comprehend (e.g. on ten ELSI topics searched, just for two of them further explanations were needed). On the other side, the identification of the source was not very clear and stakeholders asked for a clarification.

**Navigation of the guidance. The extent to which data is easily found**

Although the exercises were not performed on the web platform, stakeholders were asked to navigate the ELSI guidance looking at the printed version at their disposal and give their feedback on the list of topics and on the general ELSI structure. In this sense, the stakeholders that were interviewed on this point gave a positive feedback on how the ELSI are organised and structured. They also expressed appreciation of the definitions used to explain the topic and of the links and connections among different ELSI issues.

*Effectiveness*

**Relevancy. The extent to which information is applicable and helpful for the task at hand**

This dimension was assessed observing to which extent the ELSI matched the needs of the stakeholders to solve the selected issue. Stakeholders found the information very useful to solve the problem at hand. In all groups it was possible to find at least one ELSI to solve the case. In the case of the third story, for example, the ELSI on Data Protection was judged as very relevant by the entire group. Even the possibility to consult the examples provided in the guidance was judged as very helpful to solve concrete issues. However, at the same table it was stated that in most cases information is useful for dedicated categories of practitioners and not for everybody that might wish to use the system (e.g. citizens). In this sense, stakeholders suggested to make clear that the ELSI platform intends to be a tool for practitioners. In this sense, the relevancy of the information depends on the category to which the user belongs to and is not necessarily relevant for all potential users.

### 4.3.5 Social impact

*Knowledge production*

**Assess the quality of ELSI guidance presented**

The three groups judged the quality of the presented ELSI as good in terms of the information stored and the connections with other topics. In addition, the ELSI guidance were judged comprehensive with regard to the main issues that should be taken into consideration when setting up a CIS.

*Support of ICT usage for all and democratic participants*
**Assess privacy and restrictions using ELSI guidance**

Within the group working on the third story, it emerged clearly that thanks to the ELSI guidance it was possible for the stakeholders to be more aware about privacy issues and deal with restrictions in the use of personal data.

### 4.3.6 Social capital

*Social capital increment for users and participants*
**Assess the level of trust in creating a CIS using SecInCoRe guidance**

In the discussions in the second group, it emerged that creating a CIS following ELSI guidance could improve the level of trust of the stakeholders because this would enhance the awareness of who designs the system on the major issues that need to be faced, also addressing how to do it. A CIS created on such bases will be more trustable and secure for the users that need and want access to it than the information systems created without following guidance.

**Assess how SecInCoRe's ELSI guidance make users' duty of care regarding technology maintenance known**

It was derived from the conversations in the three groups that the duty of care regarding technology is something that is directly supported by ELSI guidance. Looking at the ELSI guidance it was possible for some of the stakeholders to identify some technological issue that was not considered before. Using the words of one of the participants, the guidance "provides a checklist for agencies to validate their approach/systems used" encouraging a correct design of the CIS even in different organisations, in this way "bringing consistency among the designs adopted by the stakeholders".

**Assess the increasing of collaboration network using ELSI guidance**

The extent of increasing the collaboration network through the use of ELSI guidance did not emerge clearly, however it is possible to report from the conversations that, using the guidance, it is possible to encourage information sharing. The second group discussed mostly on data sharing between first responders and other actors, even in relation to data protection and cooperation among different actors. In this sense ELSI guidance were helpful in order to better define cooperation and data sharing (e.g. they explored the Managing Public-Private collaborations).

Finally, it is possible to state that the stakeholders judged the ELSI as interesting and also very relevant in order to build a CIS according to ELSI issues. From an evaluation perspective, it is fair to say that general feedback from stakeholders who are engaged in the field and familiar with ELSI issues suggested that an ELSI platform implemented in a public website could really produce an impact due to the way in which a CIS could be built, improving the capability of people engaged in the emergency or of CIS designer to follow proper guidance. Indeed, in most of the cases the questions that stakeholders had in mind were addressed in the ELSI guidance, which gave inputs for solving the issue. The positive feedback was also confirmed by the availability of the stakeholders to contribute personally to the platform. They agreed on providing comments and examples from an external point of view in order to improve the platform; they also agreed to advertise the platform in order to increase the visibility and the possibility to gather feedback for further implementation.

## *4.4 Evaluating the Common Information Space with the Advisory Board*

On 20 and 21 February 2017, the final SecInCoRe Advisory Board meeting took place in Manchester, UK[9]. Aim of the meeting was to show to the SecInCoRe Advisory Board the final outputs of the project and evaluate with them the project results.

### 4.4.1 Description of the activity: aims and purposes

The meeting started with several presentations of project's outputs; then, a concrete Demonstration of the CIS was made possible through the use of the SecInCoRe Demonstrator. Participants had the chance to experiment the SecInCoRe Demonstrator by performing searches and exploring all the functions implemented in the system in order to get the complete picture of the CIS, from both a functional and a theoretical perspective.

In this sense, the SecInCoRe team has provided a comprehensive picture of the project outputs through presentations and the Demonstration in order to let participants see how a Common Information Space (CIS) based on SecInCoRe could potentially work.

Main components presented and discussed during the meeting were:

- Semantic search and graph view;
- Network Enabled Communication;
- Collaborative functions (chat room and discussion board);
- Inventory;
- ELSI guidance.

The integration of all components allowed to show the functioning of the CIS.

Following the Demonstration and discussion, an evaluation activity was organised and conducted by T6 ECO. The evaluation of the CIS was organised in the form of a Focus Group to allow an open discussion among all Advisory Board members and collecting their feedback. five members (out of the six who took part in the meeting) participated to the discussion. The one that could not attend the focus group replied to a structured questionnaire. All replies have been considered and integrated in the results reported in the next paragraph.

### 4.4.2 Methodology and variables used for the evaluation

As already reported in D5.2 and D5.3, the "Sequoia methodology has been applied to SecInCoRe project allowing to map the main areas of impact and to tailor related indicators to estimate the socio-economic impact of SecInCoRe". During the first stage of the project life-cycles, areas of impact and related indicators have been identified (Annex 1, D5.3) as potentially useful to map the impact of the project outputs. At the moment of writing, however, and according to the kind of activities that were performed at the meeting and to the outputs shown, it was decided that Social Impact was the most relevant category for the evaluation of the CIS.

In line with this, to map the Social Impact, the most useful dimensions selected for investigation during the focus group were:

- Impact on working routine;
- Impact on knowledge and information sharing;

[9] Addittional information about the event, such as the participant list, is available the D1.9.

- Impact on social capital increment for users and participants;
- Impact on networking and on establishing new partnerships.

To assess the impact of the CIS on the above-mentioned dimensions, specific questions were addressed to the Advisory Board members during the Focus Group. Their replies have been aggregated according to the different dimensions of the impact analysis.

### 4.4.3 Main results from the AB meeting

Through the collaborative work performed by the SecInCoRe team and the AB members, it was possible for the participants to get the complete picture of what a CIS can do and how this might have an impact on current practices in the emergency sector, in particular for the preparedness and planning phase. In this way, it was possible to collect feedback from the participants, gathering both positive and challenging aspects that need to be taken into account when assessing the impact of the CIS.

- Impact on working routine

Impact on working routines was investigated by asking participants to consider several dimensions of their work, from processes followed and implemented during their tasks to the tools and instruments used for it.

The first point discussed was the extent in which the CIS could improve working routines in the planning phase by changing current processes and procedures. From a general perspective, stakeholders agreed on the positive effects that a CIS used daily could produce on work routines. In detail, the major impact that has been traced during the discussion was in relation to the quality and typology of plans produced. It was stressed that the preparation of plans is a task which is strongly related to the contents and information to which the planner has access. In this sense, the opportunity offered by a CIS for different stakeholders in different locations to access the same typology of documents is an added value to produce more homogeneous plans, in this way solving heterogeneity issues linked to differential access to data and information. In this sense, the CIS could have a great impact on how plans are produced.

Then, the impact of SecInCoRe tools if adopted in daily practices was discussed, focusing on the collaborative functions (e.g., chat room and discussion board). All stakeholders agreed on the importance to integrate new tools and functions with traditional methods. However, the use of traditional methods (such as mail or phone call) seems still very relevant to perform the work. In addition, it was stated that similar tools or the entire CIS are relevant means but they cannot entirely replace face-to-face meetings. In this sense, personal contacts seem to have huge importance when working on the preparatory phase. This leads to the fact that the impact produced by the CIS on tools used during working routines did not emerge as a relevant element so far. On the other side, collaborative functions are widely recognised as tools that could have an impact and make the difference for fostering information exchange. This point is further elaborated in the next point.

- Impact on knowledge access and information sharing

A crucial point of the impact assessment was the investigation of the impact of the CIS on knowledge and information sharing. The feedback in relation to the impact of the CIS on this dimension was mainly positive.

The CIS, indeed, has been recognised by the stakeholders as an innovative way to foster access to information thanks to the search engine and to the graph view. These two functions have

been identified as the core of the project, strengthening the access to knowledge. In addition, thanks to the search function directly based on the taxonomy and ontology implemented by the project, the CIS has also been understood as something that goes beyond a share point and has been defined as "very useful and interesting" from different perspectives. Some of the stakeholders commented positively on the possibility to use a search engine directly related to a specific sector, namely the emergency sector. Being the CIS only related to emergency issues, this could provide a great added value compared to other general search engines where it is possible to access a massive quantity of data there are not necessarily related to the primary scope of the search. In line with this, one of the added values of the system is to have a dedicated space where to look for information, in order to always find information relevant to the specific subject of the search. Some stakeholders, on the other hand, stated that the search function was not the main improvement of the project since the main advantage provided by the system is to have a CIS where information could be stored without being accessible to everybody, guaranteeing to find also restricted information. The CIS was therefore identified as something useful directly for practitioners, guaranteeing information dedicated to them, providing a service that goes beyond what Google or other search engine systems can do.

Further discussed was the impact that the graph view could have in enhancing the level of information arriving to the users. According to the replies, the graph view was judged by one stakeholder as an excellent output and a great innovation; the graph view can easily link the search performed to different information and documents improving the capacity of who performs the search to gather unexpected information, with this having a broader connection between topics. Then, it was suggested to add the chance to look for other contents (e.g. videos, pictures, coordinates) in order to expand the scope of the search to different kinds of contents.

In addition to the impact of SecInCoRe's tools on current working routines, the collaborative functions (chat room, discussion board, contribute) were also stressed in order to assess the extent to which they can have an impact on information and knowledge sharing. The discussion board was indicated as a relevant tool for information sharing because this could also improve the knowledge of other organisations or users on topics that are of wider interest, supporting also the learning on different ways to deal with similar issues. The example that was made in the focus group was in relation to the possibility to follow discussions led by other groups on training, to observe others' good practices and take some hints. On the other side, the chat room as a real-time function seems less relevant for information exchange, because this implies the use of the system in real time and participants agree that this is not a tool to be used for this purpose. However, it was suggested to add an alarm to the chat room, so when a message arrives, the user knows that he needs to enter in the system to promptly reply and go in the discussion in real time. This follows the feeling that a chat room is useful only if the system is used on a daily basis.

- Impact on social capital increment for users and participants

The main dimension that was investigated to assess the impact on the social capital increment was in relation to the capability of the CIS to create and foster trust among stakeholders and users. In this sense, stakeholders agreed that if all people that access the CIS were authorised users they would not pose any issue on trust and would just use the system as trustable and secure. Going more in depth from a technical perspective, participants were asked if they would trust to use a cloud-based system. Even in this case, replies were positive. Contradicting the results that emerged in the second Advisory Board meeting (reported in D5.2), participants would trust the use of the Cloud to share and store information if the system was approved by a trustable organisation. In line with this, participants agreed that if an authority approves the

system they would not be interested in having technical details and they would not have any problem in using a CIS based on a cloud.

The only issue that emerged on trust is about the kind of stakeholders that could access the system. Participants would not be pleased if the system would be accessible to actors from the media. If so, trust issues could arise. Otherwise, a system made properly for the relations among first responders and emergency organisations was more than welcome.

- Impact on networking and on establishing new partnerships

To assess the impact of the CIS in fostering new partnerships and collaborations, stakeholders were asked to evaluate the CIS as a process to build up new contacts, going beyond the network of personal contacts. In this sense, the chance to get a document stored in the Inventory together with the direct contact of the author of the information was positively evaluated. This would allow users to improve their network and overcome the issue of being always related to their personal contacts, by reaching sources of information outside of their personal networks. This was estimated as a relevant impact on the current practices.

- Transversals points

The major transversal issue emerged in relation to the use of the CIS in real practice was the kind of authority and management structure of the system. Broadly speaking, participants could see the potential value of the SecInCoRe's CIS but they had some difficulty in evaluating the CIS without receiving a clear definition and information on the authority that could manage the CIS. This issue, indeed, was very much related to several questions. For example, participants argued that trust issues were not very much related to the kind of infrastructure used, but would depend on the leading authority that would manage the system. Once defined the authority, several points such as the trust on the kind of documentation stored in the Inventory or to the people that would be involved in the CIS were automatically solved. In this sense, it was discussed which kind of authority could build this trust. Participants agreed with a statement already emerged in all previous activities with stakeholders, which was the need to have a European organisation (e.g., ERCC, DG ECHO, DG HOME) at the top of the structure that approves the system and manages it from a high-level perspective. Then, the system should have several levels of access managed by national organisations. Having a European body at the top of the structure would also provide a stronger motivation to individual organisations to join and use the system, with this solving the issue of sustainability and feeding documents into the system.

Another major point that was raised by one of the stakeholders was in relation to how first responders and organisations could be incentivised to contribute and to use the system. Using the CIS has been perceived by the stakeholders as an additional effort to their daily work. In this sense, the capability and the utility of the system would depend on the work on a volunteer basis for feeding it with content. In this sense, political willingness to sustain and promote the system at the European level would encourage national organisation and other stakeholders to contribute to it, and not only using it.

To conclude, the main impact evaluation of the CIS was based on the information and knowledge access and sharing. This dimension emerged clearly as the most relevant for the stakeholders who took part in the meeting. The search engine dedicated to emergency topics and to practitioners, together with the chance to explore topics in different ways using different types of search, was identified as something that, if really implemented, could have a strong positive impact on the way in which practitioners look for information and gather data and

contents. On the other side, the impact of the CIS on the collaboration practices was quite visible but could not be properly estimated so far because stakeholders seemed still very much related to traditional methods to keep contacts and to collaborate.

However, it emerged clearly that the real impact of the project depends on the engagement of the people and their work of uploading contents. In this sense, this is an issue related to management and authority issues and to the political willingness to sustain and promote a CIS. Stakeholders agreed on the usefulness and need of almost all the functions of the CIS. The question is how to create a proper structure that will allow organisations at all levels to use it daily to foster collaboration, in this way promoting the harmonisation of procedures in the planning and preparatory phase.

## *4.5 Evaluating the Common Information Space at the Joint Event*

On 28 February 2017, SecInCoRe, EPISECC, SECTOR and REDIRNECT, which are all projects financed by the call FP7-SEC-5.1.1, organised a Joint Event in Brussels, Belgium. The main aim of the Joint Event was to show to external stakeholders, to the representatives of the different Directorate Generals of the European Commission and to the four consortiums engaged, the activities and results of the projects. Due to the presence of high-level representatives of different DGs and relevant stakeholders at the meeting, it was the occasion to perform an evaluation activitiy in order to evaluate the overall SecInCoRe concept and design.

### 4.5.1 Description of the activity: aims and purposes

The intention of the day was to present the commonalities of the projects requested by the above-mentioned call for proposal and the different ways in which they have been addressed and implemented by the four consortia. The first part of the session was dedicated to the joint presentation of the main elements addressed by the projects: Pan European Inventory, Network Enabled Communication, Taxonomy and ELSI. In addition, the common efforts through a dedicated Task Force on Standardisation were presented and discussed.

After having received a common overview of the objectives and achievements reached by the four projects, the meeting was continued with booths of the still on-going projects (SecInCoRe, EPISECC and SECTOR) in order to properly explain to the audience the single project's characteristics and outputs. The audience was divided in three groups; each group attended the booths in three different times to have the possibility to explore them all.

The SecInCoRe booth was organised with posters explaining the conceptual background of the project (e.g. posters on NEC, ELSI and Taxonomy) and with a functioning Demonstrator that was used to show the linkage among the different components, performing a search and showing all major functions implemented.

The evaluation of the CIS was then made by T6 ECO by interviewing each group at the end of their participation at the SecInCoRe booth. This strategy allowed to receive a prompt feedback from all the participants of the Joint Event according to what was shown at the booth in relation to project's impact.

### 4.5.2 Methodology and variables used for the evaluation

The evaluation of the CIS with high-level stakeholders at the Joint Event was performed according to the methodology established by SEQUOIA and already applied in previous evaluation activities (e.g., evaluation of CIS with the AB and evaluation of ELSI). Even in this event, the major area of impact that was possible to assess was the Social Impact. However,

comparing the evaluation performed at this event and the evaluation run with the Advisory Board, different dimensions were taken into consideration. Due to the high-level discussion and to the kind of stakeholders present at the event, the most relevant dimensions that were investigated through interviews were:

- Impact of the CIS on working routines and on current procedures;
- Impact on knowledge and information sharing.

At the end of each presentation, all three groups were asked to reply to a set of questions. The aim was to identify the most relevant components, or conceptual elements, developed by SecInCoRe that could produce an impact on emergency management in comparison to current procedures and methods.

### 4.5.3 Main results from the evaluation at the Joint Event

Aggregating all the results coming from the interviews at the Join Event, some crucial elements emerged when talking about the impact of the project. The stakeholders agreed on the two major elements presented by SecInCoRe that could create an impact on the above-mentioned dimensions. These were: the use of a CIS in the crisis management; and the use of a search function and of the graph view for reaching the information stored in the inventory. Such elements have been identified by the stakeholders as the most important ones and as the ones that could concretely produce an impact on the current ways emergency phases are managed.

The first element emerged in relation to the project's impact was the use of the CIS for managing crisis. The stakeholders agreed that the use of the CIS during an emergency could allow a fast access and sharing of information going beyond the current procedures and current systems. In relation to SecInCoRe, however, it was noticed that a CIS could be even more relevant in the planning and training phases, helping organisations to use new tools to create and share exercises before the crisis. This would help in going beyond the single resilience of organisations in the field in the moment of an emergency, being better prepared in the moment in which the crisis starts. In this sense, the impact that could have a CIS really implemented in working routines would be to reduce the time for accessing and sharing knowledge, giving the chance to practitioners to respond better and faster in the response phase of the emergency. Regarding the use of CIS in the planning phase, a major impact in enhancing the chance to access and share information with other organisations was estimated by the stakeholders, going beyond some barriers related to the information exchange, for example by creating joint exercises at the national level. However, it was stated that the implementation of a CIS in national and European practices could happen only with the concrete support of European institutions.

The second point identified by the stakeholders as an element of impact was the inventory and its relation with the search engine. It was stated that the possibility to access a tool for gathering specific knowledge for emergency services would be extremely useful to have better access to the information and could save time when looking for information. In line with this, a full inventory that combines different sources, interfaces and depositories was seen by the stakeholders as an added value compared to the current strategy to access the information, which foresees the use of several and different means, producing an impact in improving current practices on information access. In addition, the semantic search and the graph view were particularly appreciated as ways to reach specific information on past incidents and lessons learned, providing a different way to access it for training purposes.

On the other side, during the discussion with the stakeholders some issues emerged in relation to the general approach of the project. The first topic faced by stakeholders was to better understand who could contribute to the inventory and this linked the discussion to the authority management issue. In this sense, the need emerged to better clarify the authority behind the system to give a better idea of the entire process and to clarify engagements issues. Indeed, the engagement of practitioners and decision makers at a national or regional level arose as a crucial element that should be defined but could be only be promoted at the European level. Finally, it was stated that the system is not very much seen as a tool used for first responders in the emergency phase but more for decisions makers that could use it for the training and preparedness phases as well as for the post crisis reflections. From a technical perspective, stakeholders suggested to add the possibility to look for additional contents (e.g., signals from cameras) and not only documents. Furthermore, it was suggested to better customise the ELSI page to have a clear definition of the target and the categories that could be interested in the ELSI reflection and its layers.

# 5 Conclusions from the evaluation: SecInCoRe's impact

The aim of the current chapter is to provide a final analysis based on all the results of the activities performed from the evaluation perspective. All the feedback and data gathered have been considered, to derive a qualitative assessment of the impact that project can have on the crisis management process.

## *5.1 Analysis of the results*

Based on the data collected from all the evaluation activities presented in Chapter 4, this section derives a final impact assessment for SecInCoRe. After three years of project implementation and after dedicated meetings in which data and opinions were collected from stakeholders engaged in evaluation activities, it is possible to answer, at least partially, the main questions related to impact assessment:

- Why is SecInCoRe relevant and for whom?
- What is the difference the SecInCoRe project makes?
- How much difference does SecInCoRe make?

The first question is related to the main scope of SecInCoRe and to the kind of stakeholders that can benefit from the innovation introduced by the project. In this sense, SecInCoRe is relevant because it has produced the design of a CIS that, according to the stakeholders, can improve current practices on preparedness and planning in the emergency services, effectively addressing some of the major issues that still emerge from current practises such as: the lack of information exchange, the difficulties in creating new partnership and the obstacles to collaborate in an easy and effective way. For these reasons, the project is relevant mainly for practitioners and first responders who regularly work in the planning and preparedness phase of the emergency at the European as well as at the national level.

The second and third questions are related to understanding the difference that the project outcomes can produce and to its quantification. In this sense, the difference that SecInCoRe can make is observable according to the variables and dimensions derived from the methodology and emerged during the discussions with the stakeholders. The quantification, on the other side, is not possible to assess since the SecInCoRe's aim and intention is to do not produce a fully functional system that could be tested in an operational setting as a basis for a counterfactual analysis. It is however possible to estimate the difference using a qualitative approach.

Even if the original methodology (described in D5.2 and in D5.3) considers several potential areas of impact and related dimensions, the most relevant area to assess the impact of the CIS designed by SecInCoRe is its Social Impact. The social impact is assessable looking at the potential consequences, as assessed by stakeholders, on the following variables:

- Impact of the CIS on working routine and on current procedures

It emerged from the stakeholders that the use of a CIS designed according to SecInCoRe principles could improve the current procedures used for crisis management. The first issue is related to the fact that stakeholders from all around Europe do not use a unique tool for accessing and exchanging information or to collaborative produce a plan. In line with this, establishing a CIS with access for the practitioners will allow to get access to the same critical

mass of information, having access to documents and material and contextually using the collaborative functions to set up collaborative groups. Even if it is not possible to quantify the time saved, stakeholders agree that such system could really help in saving time to access and share the information. The main benefit is however related to the potentiality that a SecInCoRe CIS could really harmonise the tools and methods used at European level by supporting the use of the same functionalities and fostering collaboration at a wider level among emergency services.

- Impact on knowledge and information sharing

As already stressed, one of the major elements that has been identified to produce an impact is related to knowledge and information sharing. It emerged clearly that there are currently no tools or repositories at the European level that can help the practitioners in finding information during the planning phase. In this sense, most of the stakeholders appreciated the opportunity to have access to the same critical mass of information contributed by different emergency services across Europe. The positive feedback is related to the fact that having a common repository could improve the knowledge of sources used by other practitioners and promote the standardisation of the documentation, stimulating the standardisation of the produced plans. However, it is fair to say that the impact is observed not only in relation to the inventory itself but in relation to the fact that the inventory is embedded within the CIS system and so the information is not just accessible but it is also easy to share or to discuss thanks to the functionalities provided by the CIS to foster collaboration among stakeholders.

- Impact on networking and on establishing new partnerships

In addition to what has been stated so far, an additional dimension related to the impact of the CIS is linked to the opportunity offered by the system to establish new partnerships, fostering a network at the European level among practitioners engaged in the emergency services. As emerged from stakeholders, even during the planning phase the network of people contacted to receive additional information is generally limited to the personal contacts that each practitioner has. A system based on a network of practitioners from all around Europe would offer the opportunity to build new relations with colleagues from other countries even if no personal contact is already established. The possibility to contact the author of the information stored in the inventory would also be extremely helpful for establishing new partnerships by directly accessing the sources of relevant information. This was judged as an extremely positive opportunity to foster collaboration in a world that is very much based on fragmented contacts.

- Impact on social capital increment for users and participants

Finally, in relation to the impact on social capital among users of the same CIS, the most important element that emerged is about trust. People engaged in emergency services, due to high sensitive work performed, are very focused on the trust established within the networks in which they are engaged. In this sense, a CIS with a high-level managing authority that could guarantee the process and the management of the system would be extremely important to guarantee the establishment of a trusted network. On such bases, stakeholders would be inclined to trust the system, the information stored in it as well as the security infrastructure behind it. These points would encourage subscriptions to the system and its use on a daily basis.

In addition to all the dimensions identified, it is important to report that an additional major impact has been identified in relation to the work performed on the ELSI guidance. Even if

ELSI are formally part of the CIS because they are reflected in the system, they also constitute a stand-alone project outcome. As described in the dedicated paragraph on ELSI evaluation, it is possible to state that the ELSI have been analysed according to their potential impact in the technology area and social area. In relation to the design of the CIS, which is the major aim of the SecInCoRe project, it is possible to state that the production of the ELSI platform has helped the stakeholders in the understanding of the ELSI's behind the construction of the CIS, making clearer which are the questions that need to be answered when setting up a CIS. In this sense, it is possible to derive that ELSI has also produced an impact on the users' duty of care by making technology maintenance known.

To conclude, although it is not possible to quantify the difference that SecInCoRe could produce, it is possible to say that stakeholders have recognised the capacity of SecInCoRe to address some major limitations of the systems currently used for crisis management. If implemented and adopted at European level, the SecInCoRe CIS could greatly improve collaboration practices in Europe.

## *5.2 Limits and issues faced during the project*

Concluding the work on impact assessment, some reflections are needed to calibrate the work performed. Impact assessment is always a complex task, the complexity is mainly related to the impossibility to perform a counterfactual analysis.

As explained in D5.2, the counterfactual scenario is based on the analysis of a situation before the introduction of the innovation and then, on the investigation of how the original situation changed according to the innovation introduced. This approach cannot really be used in emergency field, because this would mean having an assessment of the situation before and after the crisis. This is of course not feasible, given that emergencies are by definition unpredictable events.

An additional element of the complexity faced during SecInCoRe evaluation has been that the main project's output is the design of the CIS concept. The aim of the evaluation was not to assess the impact of a final product, but rather the potentialities of a conceptual process and principles partially shown by the demonstrator.

According to what said so far, it has not been possible to quantify or monetise the impact using a quantitative methodology. The evaluation strategy has however helped the project understand the values and the critical issues emerged during its implementation. The conclusion reached by SecInCoRe also emerged during the Join Event organised by the all projects financed by the call. Indeed, at the end of the event all projects were asked to state whether it was possible to quantify the impact of their outputs. The shared reply from the projects was in line with our results, and stated that it is possible to foresee the impact only according to the small scenarios and small demonstration cases achieved during the project lifetime but it is not possible to derive real numbers.

As to the final results of the evaluation, the aim of the work is to inform potential actors that could develop the CIS and host the system that SecInCoRe could have a positive impact on crisis management for emergency services and practitioners. The methodology, the evaluation activities and the results reported in the Deliverables produced in WP5 strongly support this conclusion.

### *5.3 Lessons learned for further work on the VES strategy for socio-technical systems*

During the three project years, lessons learned on the strategy used for validation and evaluation are several. Main points of reflection are here reported in order to provide insights or guidance for future validation and evaluation on similar socio-technical systems. A summary of the validated and evaluated components is available in the Appendix 8.2.

The first lesson regards the timing for the definition of the methodological approach for validation and valuation. The definition of the methodological approach, indeed, is a difficult task to perform due to the fact that, generally, the methodology needs to be set up at the beginning of the project lifetime. However, in the early stage of the project, in most of the cases, it is not clear what the project outcome will be. In this sense, the suggestion is to start the development of the methodology not necessarily at the beginning of the project but when the main components are almost defined.

In the meantime, it is important for the partner in charge of the VES strategy to start following very closely he conceptual development since the beginning in order to start thinking to the most relevant methodology to apply and also influencing the conceptual development according to the VES's needs.

According to the methodology, during the SecInCoRe experience the main results have been derived from the matching of two different approaches, namely the E-OCVM methodology for the validation and the SEQUOIA for the evaluation. The combination of the two approaches allows to have a different perspective adopting, from one side, a more operational approach, on the other, a more conceptual level. The matching of the two allows to cover the work on technical development as well to investigate a broader perspective of the project's achievement. However, an additional step could be done finding an approach that could allow a proper quantification of the project outcome to derive an economic impact, which is an issue that was not possible to solve during the SecInCoRe lifetime.

Another point of reflection coming from the SecInCoRe experience is related to the fact that such project is generally the result of an interdisciplinary approach where different experiences and skills are combined. Of course this is an incredible resource but it can also create a risk situation when organising activities such as Demonstration Cases. In this sense, the Demonstration Case method based on protocols helped a lot in the common understanding among the partners and the structure of the activities, supporting the partners in the activities to better understand each other and to final derive a common result. In line with this, such an approach is highly suggested for future activities.

Then, it also needed to be stressed the relation between validation and evaluation activities with other elements of the SecInCoRe project. The work performed through Demonstration Cases, indeed, has also allowed to gather feedback not only related to the components defined for validation purposes but also to get a broader vision of the stakeholders regarding the entire project. This aspect has been clear regarding crucial issues such as business models for the project sustainability and the governance and authority issues behind the system. As it is possible to derive from the reports of the demonstration cases several times issues as the above mentioned emerged from the discussions with the stakeholders. In this sense, even if business models or authority issues were not the focus of the validation, these were taken into account as important points and reflected into the project in the proper sections. The work of integration between validation and other activities is evident on the work on Business Models and project exploitation developed in D6.3. In this sense, T6 ECO, as partner in charge of both validation and evaluation activities as well as business models analysis, has reflected, during the project

lifetime, the issues emerged during the discussions with the stakeholders in the parallel work of business models definition. The comments and suggestions received by the stakeholders in the validation and evaluation cases have been relevant since the beginning of the project until the final stages for defining the most applicable approach of business models definition. Indeed, starting from the opinion of the stakeholders on exploitation and sustainability T6 ECO faced with the analysis of similar solutions and defined the most proper business model to use. All results on this topic are available on D6.3.

The final point is related to the stakeholder engagement. The participation of the stakeholders, and the users, has been a crucial aspect for SecInCoRe. The topic is discussed in detail in the next Chapter, Regarding the VES strategy it is fair to say that in order to achieve good results from validation and evaluation activities, the engagement of the right kind of people is needed. In this sense, it is strongly recommend since the beginning of the project to identify the proper stakeholder for each activity.

# 6 Final report on stakeholder engagement

## 6.1 Introduction

In SecInCoRe, the engagement of the stakeholders was defined within WP1 as having roles in domain analysis, design and development workshops throughout the project. This has proved invaluable in terms of identifying the current issues affecting responder organisations throughout Europe and expanding the research into why and how these organisations exchange information currently and how they might wish to do so in the future. Their feedback through the processes of questionnaires and interviews, was determinant in the formation of the fundamentals of the SecInCoRe project, literally transforming the conceptual to an existing system.

SecInCoRe has employed a core group of advisors (details are contained in D1.04, D1.06 and D1.09 submitted in M9, M18 and M34, respectively), together with larger groups within two specific organisations: the Dortmund Fire and Rescue Service (Germany) and the Lancaster Local Resilience Forum (UK). The latter being one of many locally-structured organisations formed under a national structure and legislation. Collectively, they represent a wide spread of experience in the field of PPDR: police, fire, rescue, civil protection, health, coastguard, volunteer agencies (Red Cross) and military organisations (counter-terrorism and explosive ordnance disposal). A total of three principal workshops have been held during the project with several other meetings and interviews taking place in addition.

## 6.2 Challenges in Stakeholder Engagement

As has been stated previously in this project (D5.4), stakeholder management is both something of an art-form and a double-edged sword: stakeholders want to see results, want to now timescales and want to know costs. It is becoming increasingly difficult to engage successfully with stakeholders on subjects where the benefits to their 'day-job' are not immediately obvious and capable of being delivered in a form beyond the 'proof-of-concept'.

A further obstacle is the fact that these advisors are engaged in normal daily duties and this can sometimes prevent their participation in project activities: the final workshop for SecInCoRe (Manchester, February 2017) was a case in point, where only seven of the original twenty five invitees were able to attend. Only two failed to respond; the rest were otherwise committed and unable to attend, despite expressing their keenness and interest in the activity.

## 6.3 Results from Stakeholder Engagement

For details of activities which have taken place since M18, please see D1.09 (M34), the Third and Final Report on Advisory Board Activities.

It has been universally agreed by the consortium that the involvement of the external end-users and advisors has been essential to the progress of the SecInCoRe project.

In the final project workshop held in February 2017, attendees were asked about their views of the SecInCoRe Common Information Space. The overall feedback for the concept was positive. Significant comments were:

- "*there's a need to match the good ideas with a political willingness to set up and run a system such as this*";

- *"You can't make people co-operate with a technical system. If you want[10] to collaborate, you will use the system, but how do you persuade people and organisations to use it?*
- *It's important to brief and engage European-level organisations like the ERCC and so on.*[11]
- *What is the added value of the platform of SecInCoRe compared to existing systems?*
- It was interesting to note that, when asked about their thoughts on the security of 'cloud-based' systems and whether it was still a concern, views seemed to have moderated somewhat since the last time members were asked. An example and representative comment was:
- "*If it's an authorised use of an accepted system, then no issues.*"
- Asked about the value of the ELSI Guidance, the following comments were received:
- "*It focuses people's minds on ensuring relevant obligations are covered."*
- *"very important in terms of current and future harmonisation of approaches".*
- In terms of the overall impact of the project, the following comments were received:
- "*There tends to be a 'reinvention of the wheel feel about these projects, with most of them ending up in the 'great project graveyard'".*
- *"In contrast to the EU-level, there are many local-level structures dedicated to the development and delivery of a project".*

## 6.4 Lessons for the future

The project has been fortunate in attracting members at an appropriate level for its needs throughout the project. An issue which should, be highlighted for the future is that the level of stakeholder engagement required for a project to deliver a commercial solution would need to be much higher. In almost no case does the role of operational or tactical practitioner fall under the same hat as the strategic purchaser or finance controller. Nor do the requirements necessarily coincide: no matter how useful a product might be, unless it replaces one already in existence (and which it is considered essential to replace), then it may not be considered a 'must-have' by those who would be responsible for approving its purchase

[10] Author's emphasis
[11] This was in fact addressed the following week during a joint projects presentation in Brussels.

# 7 Literature review

Council Of European Union. (2012). Draft Council conclusions on the new CBRNE Agenda

Eurocontrol. (2010). European Operational Concept Validation Methodology Version 3.9. Volume I

European Commission (2012). Progress report on the implementation of the EU CBRN action plan.

Passani, A., Monacciani, F., Van Der Graaf, S., Spagnoli, F., Bellini, F., Debicki, M., & Dini, P. (2014). SEQUOIA: A methodology for the socio-economic impact assessment of Software-as-a-Service and Internet of Services research projects. Research Evaluation, 23(2), 133-149.

# 8 Appendices

## *8.1 Indicators and variables selected for the evaluation strategy*

According to D5.3, "the Sequoia methodology has been applied to SecInCoRe project allowing to map the main areas of impact and to tailor related indicators to estimate the socio-economic impact of SecInCoRe".

Regarding the evaluation we have assembled a series of areas of impact that can be related to the entire SecInCoRe, and they are: economic, technological, environmental and social. Each area can also be declined in several subsets.

Regarding ELSI guidance and the CIS concept have been selected only indicators that could be applied to run the evaluation of what was developed at the moment of the activity performed. Indicators that are useful for the evaluation have been translated in questions.

**Economic Impact**

**Financial impact**

- Working time to adapt SecInCoRe' guidance to an existing tool or to an existing website
- Need of hardware/software to imake visibile and implement SecInCoRe 'guidance and its cost (Does SecInCoRe's ELSI guidance need hardware/software to be implement?)

**Technological impact**

Accessibility

- Usability. The extent to which information is clear and easily used
- Understanding. The extent to which data are clear without ambiguity and easily comprehended
- Navigation of the guidance. The extent to which data are easily found and linked to.

Effectiveness

- Relevancy. The extent to which information is applicable and helpful for the task at hand

**Social Impact**

**Impact on employment and working routine**

- Improvement on working routines (Please describe how does your working routines change using SecInCoRe's ELSI guidance)
- Improvement on employment (Please describe how does SecInCoRe's ELSI guidance could impact employment in your organisation/institution)
- Time saved in the working routine SecInCoRe's ELSI guidance (Please describe how does your working time change using SecInCoRe's guidance)

**Knowledge production and sharing**

Knowledge sharing

- Assess the quality of ELSI guidance presented

Support of ICT usage for all and democratic participants

- Extent of the support informational self-determination using ELSI guideline
- Extent of the support non-discriminatory practices using ELSI guidance
- Assess privacy and restrictions using ELSI guidance
- Assess the improvement of collaboration across nations, etc. using SecInCoRe in the respecting of differences using ELSI's guidance

**Social capital**

Social capital increment for users and participants

- Assess the level of trust in creating a CIS using SecInCoRe guidance
- Assess how SecInCoRe's ELSI guidance make users' duty of care regarding technology maintenance known
- Assess the increasing of collaboration network using ELSI guidance

### *8.2 Components validated and evaluated during the project lifetime*

| **SecInCoRe Components validated / evaluated** | **Number of participants** | **Tools for validation / evaluation** | **Participants' profiles** |
|---|---|---|---|
| Semantic search and graph view | 5---3 (Paderborn) 1 (Naples) 1 (Rome) | Questionnaire | 4 practitioners engaged in preparedness and planning and 1 Researcher engaged in preparedness and planning |
| Taxonomy/Ontology | 5---3 (Paderborn) 1 (Naples) 1 (Rome) | Interviews | 4 practitioners engaged in preparedness and planning and 1 Researcher engaged in preparedness and planning |
| Collaborative functions | 8--- (1 Naples, 1 Rome and 6 AB meeting) | Interviews | 7 practitioners engaged in preparedness and planning and 1 Researcher engaged |

| | | | |
|---|---|---|---|
| | | | in preparedness and planning |
| Knowledge Base and Inventory | 11---3 (Paderborn) 1 (Naples) 1 (Rome) 6(AB meeting) | Questionnaire | 9 practitioners engaged in preparedness and planning and 2 Researchers engaged in preparedness and planning |
| ELSI guidance | 14---(ELSI workshop) | Participant observation | Scholars and manager working on ethical and legal issues |
| CIS concept | 25---3 (Paderborn1 (Naples) 1 (Rome) 6 (AB meeting) 14 (Joint Event) | Focus group and interviews | 9 practitioners engaged in preparedness and planning and 2 Researchers engaged in preparedness and planning and 14 high level stakeholders engaged in Security field |

*Table 8. Overview of the validation and evaluation activities.*

### *8.3 Evaluation activity –Focus Group Script for the CIS Evaluation*

Adopted in Manchester, 21 February 2017. Advisory Board Meeting.

According to what was shown during the Advisory Board meeting, AB got a picture of the overview of the project and also get the chance to see in practice how SecInCoRe could potentially works.

Through both conceptual presentations and a connected demonstration of all technical components. The following components have been shown:

- Semantic search and graph view;
- CIS concept;
- NEC;
- Collaborative function;
- Inventory and knowledge;
- ELSI guidance.

The aim of the focus group is to link the CIS concept with AB's work, experience and competencies in order to evaluate the impact of the CIS concept as designed by SecInCoRe.

**Impact on employment and working routine**

- How does your working routines could change using SecInCoRe?
- How does SecInCoRe could impact employment in your organisation/institution?
- How does your working time could change using SecInCoRe?
- Can you see other positive effects potentially deriving from the use of a SecInCoRe CIS? If yes, please describe it.
- Do you think that the Semantic Search could be an added value? why and how.

**Impact on knowledge**

- According to the documentation stored in the Inventory, do you think that the use of the such documents give you an added value to your knowledge?
- Does the CIS can also improve the access to information?
- Do you think that SecInCoRe could change the way in which information is embedded in crisis management models? what do you think is the most relevant added value for crisis mananegem model from secInCoRe?

**Impact on Trust and ELSI issues** (Please think to the best possible Authority managing the system)

Trust emerged clearly as an issue when sharing information and document.

- What's your feeling on the capacity to build trust in a CIS at the moment? Did you get more information on the CIS building that can solve your mistrust?
- Would you trust the SecInCoRe's CIS to share information and documents?
- Is it improved in the last month the level of trust using the Cloud to support (CEIS)?
- We looked at the ELSI guidance, do you think that you could use during your work? why and which main points are most relevant for you?

**Impact on networking**

- According to the collaboration practices shown do you think that SecInCoRe could improve network opportunities and partnership? Do you think that such functions could impact the way in which you use IT for data management and for plan and organise your activities?

**Questions on business models (connection with D6.3)**

It emerged from previous discussion your preference to have the SecInCore output as a publically sustained by an European organisation (e.g., ERCC). Your preference was to do not

have a private system because this could be a problem for trust issue. Arriving at the end I would like to investigate if you changed your perspective.

Could you suggest what is at the moment the best option for project's sustainability from you rpoint if view, if you want to suggest some example?. We are working on the resilience Direct model, do you think that this could work? o y do ou have other perspective?

### *8.4 Evaluation activity – Observation frame ELSI Guidance*

Adopted in Brussels, 27 February 2017. ELSI workshop at the CPDP Conference.

According to D5.3, "the Sequoia methodology has been applied to SecInCoRe project allowing to map the main areas of impact and to tailor related indicators to estimate the socio-economic impact of SecInCoRe".

Regarding the evaluation we have assembled a series of areas of impact that can be related to the entire SecInCoRe, and they are: economic, technological, environmental and social. Each area can also be declined in several subsets.

Regarding ELSI guidelines it has been selected only indicators that could be applied to run the evaluation of what was developed at the moment of the activity performed.

Such areas of impact and related indicators will be mapped during the ELSI workshop in order to perform the Evaluation of ELSI guidance through participatory observation and dedicated questions, when possible.

**Economic Impact**

**Financial impact**

- Working time to adapt SecInCoRe' guidelines to an existing tool or to an existing website
- Need of hardware/software to make visibile and implement SecInCoRe 'guidelines and its cost (Does SecInCoRe's ELSI guidelines need hardware/software to be implement?)

**Technological impact**

Accessibility

- Usability. The extent to which information is clear and easily used
- Understanding. The extent to which data are clear without ambiguity and easily comprehended
- Navigation of the guidelines. The extent to which data are easily found and linked to.

Effectiveness

- Relevancy. The extent to which information is applicable and helpful for the task at hand

**Social Impact**

**Impact on employment and working routine**

- Improvement on working routines (Please describe how does your working routines change using SecInCoRe's ELSI guidelines)

- Improvement on employment (Please describe how does SecInCoRe's ELSI guidelines could impact employment in your organisation/institution)
- Time saved in the working routine SecInCoRe's ELSI guidelines (Please describe how does your working time change using SecInCoRe's guidelines)
-

**Knowledge production and sharing**

Knowledge sharing

- Assess the quality of ELSI guidelines presented

Support of ICT usage for all and democratic participants

- Extent of the support informational self-determination using ELSI guidelines
- Extent of the support non-discriminatory practices using ELSI guidelines
- Assess privacy and restrictions using ELSI guidelines
- Assess the improvement of collaboration across nations, etc. using SecInCoRe in the respecting of differences using ELSI's guidelines

**Social capital**

Social capital increment for users and participants

- Assess the level of trust in creating a CIS using SecInCoRe guidelines
- Assess how SecInCoRe's ELSI guidelines make users' duty of care regarding technology maintenance known
- Assess the increasing of collaboration network using ELSI guidelines
- Do you think the system has helped bridge some differences in understanding between you and the other participants? Can you give us an example in which you think this happened during the day?
- Could you instead give as an example of a situation in which you think you and the other participants had a different understanding of some concepts or where looking for different things in a document?
- Why has the system (including the demonstrator AND the activities) not helped bridge this difference? [To be decided according to how the workshop develops)

### *8.5 Validation activity- Semi-structured questionnaire*

The questionnaire has been submitted in the following Demonstration cases: Paderborn (October 2016) Rome (December 2016) and Naples (January 2017).

# SECURE DYNAMIC CLOUD FOR INFORMATION, COMMUNICATION AND RESOURCE INTEROPERABILITY BASED ON PAN-EUROPEAN DISASTER INVENTORY

## Validation Activity

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T6 Ecosystems

Work Package 5

Project Coordinator

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7th Framework Programme

for Research and Technological Development

COOPERATION

SEC-2012.5.1-1 Analysis and identification of security systems and data set used by first responders and police authorities

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## Introduction to the survey

As part of SecInCoRe, T6 Ecosystems is conducting a survey addressed to the SecInCoRe's stakeholders in order to validate projects' concepts and outputs shown during the activity organised in Rome.

We estimate that the survey will take about 15 minutes to be completed.

Please answer all questions from your viewpoint, ticking the appropriate answer(s) or providing your answer in the designated space.

In case some questions are not clear, or show aspects you think are not relevant, please list us your suggestions/opinions to help us improving the questionnaire. Feel free to add comments after the text of the question where you think they need to be improved.

Thank you for the time you dedicate to this survey!

In case you need any support or clarification please ask to Ivan Cucco and Simona De Rosa during the interview that will follow shortly.

### Workshop Participant Background Information

*Please fill out the questions below to help us gather some information about you, your experience, and background knowledge, both in your expertise and about collaborative design. Such information helps us better evaluate the results of the workshop.*

Name and Surname_____

Institution/Organisation_____

Position_____

1. What is your previous experience in disaster management (e.g. in mitigation, preparedness, response, recovery, and/or business continuity)? Is risk management a core duty for your current position?

_____

_____

_____

2. Do you have any previous experience in the use of technologies for information exchange and multi-agency collaboration? If so, please describe:

- what collaborative IT systems you have previously used;
- for what purposes you have used them (e.g., to find/share documents; to communicate with other agencies / colleagues / experts; to identify good practices …);
- how frequently you use them (e.g., they are part of your regular work routine; they are used only in special occasions…)?

_____

_____

_____

3. What kind of experience do you have in cross borders operations, planning and training activities? Could you please list the countries with which you have previously collaborated?

_____

_____

_____

4. What kind of previous experience do you have in operation with multi-agency collaboration?

_____

_____

_____

For each of the questions below, please tick the box that best characterizes how you feel about the statement:

| | Strongly disagree | Disagree | Neither agree nor disagree | Agree | Strongly agree | Do not know |
|---|---|---|---|---|---|---|
| A CIS built according to SecInCoRe concepts and specification would improve my working routines compared to other systems that you are currently using or you have used in the past | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| A CIS built according to SecInCoRe concepts and specification would help you increase your collaborations and establish new partnerships | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| A CIS built according to SecInCoRe concepts and specification would make your work more time-efficient by helping you find relevant information more quickly (the only exception is the template) | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

*Taxonomy and ontology*

Please think about the different types of search you used during the day (search based on keywords; filters based on categories; graph-based search), and consider how useful they would be in your standard work practice. The rank them in order of usefulness from 1 to 3, where 1 is the most useful to you and 3 is the least useful to you.

| | Rank |
|---|---|
| Keywords-based search | |

| | |
|---|---|
| Filtering based on categories | |
| Graph-based view | |

Now please rank the different types of search according to how useful they would be to you when you are exploring a topic with which you are not familiar. Rank them in order of usefulness from 1 to 3, where 1 is the most useful to you and 3 is the least useful.

| | Rank |
|---|---|
| Keywords-based search | |
| Filtering based on categories | |
| Graph-based view | |

### *8.6 Validation and Evaluation activities- Workshop Participant Background Questionnaire*

Adopted in all the meetings performed.

*Please fill out the questions below to help us gather some information about you, your experience, and background knowledge, both in your expertise and about collaborative design. Such information helps us better evaluate the results of the workshop.*

Name and Surname_____

1. What is your previous experience in pandemic risk management (e.g. in mitigation, preparedness, response, recovery, and/or business continuity)? Is pandemic risk management a core duty for your current position?

_____
_____
_____

_____

2. Do you have any previous experience in the use of technologies for information exchange and multi-agency collaboration (e.g. Resilience Direct)? If so, please describe:

- what collaborative IT systems you have used;
- for what purposes you have used them (e.g., to find/share documents; to communicate with other agencies / colleagues / experts; to identify good practices …);
- how frequently you use them (e.g., they are part of your regular work routine; they are used only in special occasions…)?

_____
_____
_____

3. What kind of previous experience do you have in cross borders operations, planning and training activities? Could you please list the countries with which you have previously collaborated?

_____
_____

_____

4. What kind of previous experience do you have in operation with multi-agency collaboration?

_____
_____

### *8.7 Validation activity – Structured scheme for Internal notes*

Template for the structured collection of internal notes.

Participants

| Name | Organization | Department / Position |
|---|---|---|

| | | |
|---|---|---|
| | | |
| | | |
| | | |
| | | |

**Overall strategy**

To run the first validation activity, T6 will employ different instruments including:

- Structured observation of demonstration and related activities
- Participation in focus groups / discussions taking place during the day
- Dedicated semi-structured interviews with end-users
- Recording or logs of users' interactions with the demonstrator

The focus of this round validation will be on the Taxonomy and the Knowledge Base (including the use of the search function and the graph view now available in demonstrator implementation). The general CIS concept will also be validated, although in this case the basis for validation will be the conceptual presentation and any design principles that are already visible in the demonstrator.

Summing up, the main elements for validation will be:

- CIS concept and any derived principles informing the design of the demonstrator
- KB/Inventory
- Taxonomy/ontology
- CIS concept

**Continuity with previous validation activities.**

The comparability with previous (pilot) case will be ensured by:

- Collecting comparable data on the background of participants
- Using or adapting the same observation categories identified in previous validation rounds
- Including, whenever possible, questions or interviewing / focus group frames already utilized in previous cases

**CIS concept presentation**

*State of demonstrator*: presentation performed by UPB during the morning session

*Instrument*: focus group / free discussion; observation

*Questions* (to be added to those already asked by the UPB team if needed):

- Ask (or observe) whether the presentation in its current form is clear
- Try to assess the kind of expectations related to the status of the demonstrator
- If the OA is introduced, try to collect participants' impressions about its clarity, and check whether they open or use it during the workshop

**KB – Past disasters, lessons learned**

*State of demonstrator*: demonstrator implementation of search function; free search with possible backup to guide the search towards a specific document

*Instrument*: focus group / free discussion; observation

*Questions* (to be added to those already asked by the UPB team if needed):

- It is not clear (from the synthetic formulation in the document) whether 'useful' refers to the types of documents that come out of the search, or to the way in which the search is structured. We suggest we should be very clear about this from the very start
- Would you add past disasters: in this case, we would try to differentiate between two different aspects (a) if there are past disasters that they think are relevant for this case but are not included in the KB; (b) under which conditions they would feel encouraged to contribute 'past disasters' to a CIS based on the SecInCoRe concept
- In case there is the need to use the backup plan, de-brief users on 'what went wrong' with the free search

**Semantic analysis – topic, abstract, translation**

*State of demonstrator*: search function; free search and use of contact tools; possible backup to guide the search towards a specific document

*Instrument*: focus group / free discussion; observation

*Questions* (to be added to those already asked by the UPB team if needed):

- On the meaning to convey for the questions about 'useful', please see not above (try to differentiate between the usefulness of documents and the usefulness of the semantic search)
- How do they filter / skim documents in their current practice?
- Do they think the possibility to access abstracts and translations is useful for their practice?
- We should always check whether they are already familiar with the documents they found. If so, we should probe if they are satisfied with the abstracting (and possibly translation) of the document
- Do they often come across restricted documents in their current practice? In that case, how do they identify and contact authors?
- What do they think of the possibility of seeing at least a summary / abstract and title of restricted access documents (is knowing that they are there useful)?
- Would they be willing to share abstracts / metadata of their restricted documents?

**Semantic analysis – ontology, filters, graph view**

*State of demonstrator*: search function; free search and use of contact tools; possible backup to guide the search towards a specific document

*Instrument*: focus group / free discussion; observation

- *Questions* (to be added to those already asked by the UPB team if needed):
- Do they find the categories similar to the ones they use (or think about) for classifying documents and events?
- Are they familiar with the notion of 'taxonomy'?

- Do they use any specific taxonomy in their work (used by their organization or any umbrella body etc.)?
- If they tried to navigate the KB through the taxonomy-based filters, did they think the results go in the expected direction?
- **Graph view**: I would not at any point suggest that the graph view is for 'research reasons' only. This would set the terms of the debate (the implicit question is: do you agree or not that this is too abstract and not really useful etc.) rather than encourage people to experiment with it and express their views.

**ELSI – restricted document and trust**

*State of demonstrator*: search function; free search and use of contact tools; possible backup to guide the search towards a specific document

*Instrument*: focus group / free discussion during the morning session

*Questions* (to be added to those already asked by the UPB team if needed):

- Access to a restricted document could have already happened earlier (as part of the Semantic Analysis activity)
- As a second possible area of interest related to the ELSI-informed design, attention should be given to disagreements on the usefulness of abstract and categories; does looking at a document categorized according to a shared taxonomy help the participants construct a shared understanding of what the document is about?

**KB - IS**

*State of demonstrator*: search function; free search and use of contact tools; possible backup to guide the search towards a specific document

*Instrument*: focus group / free discussion; observation

*Questions* (to be added to those already asked by the UPB team if needed):

- If other 'areas' of the KB – IS are shown to the users, we could ask them for their impressions about the usefulness of product-related information not only for themselves but possibly for others in their organizations

**Final semi-structured interviews**

One-to-one interviews with end-users will take 30 minutes each. Simona and Ivan, separately, will look again at the search function and the graph view with participants and will collect their feedback and impressions on the ontology / taxonomy / KB / semantic search nexus. The main aim of the interview will be to look beyond the actual usefulness of the documents / results obtained, by focusing instead on the potentialities of the concepts mobilized behind the search function and its collaborative aspects. This will also be done by referring to events occurred during the day (for example, recalling the tagging of a document during the workshop).

**Logs or screen recordings**

Recordings of users' activities will be analysed to understand the ways in which participants use the tools available during the demonstration and to see how they interact with members of the SecInCoRe team. Guiding questions will be the following:

- Are users at ease with the types of searches offered in the demonstrator?
- Which strategies do they use to refine or improve their searches? Do they try and experiment with the different approaches explained by the SecInCoRe team?

- If users move between documents, do they move along a specific branch of the taxonomy or do they 'jump' across weakly connected paths? [only if possible on the basis of the recordings]
- Do users appear satisfied with the performance of the search (time, number of hits, etc.)
- Do users find (or seek to use) any form of help available in the demonstrator? Or do they always ask for help from members of the SecInCoRe team?

### *8.8 Validation activity- Table for the dimension observed and methodological*

| **Concept or area of investigation** | **Methods of investigation** | **Issues to be explored** | **How to explore** |
|---|---|---|---|
| CIS Concept | Semi-structured interview based on a common script and open-ended questions<br><br>Self-administered questionnaire (closed-ended questions) | Utility of the concept for improving working routine:<br>• utility of the concept in saving time in their working routine<br>• Utility of the concept to find out new partnership<br>• utility of the concept in finding new/interesting material to use during their work<br>• trustability of the system<br>• difference between existing technology and SecinCore | **Self-administred Questionnaire**<br>• Extent of the utility of SecInCoRe in improving your working routines compared to existing systems (Likert scale)<br>• Extent of the utility of the concept in making your work more time-efficient (Likert scale)<br>• SecInCoRe can help me increase my collaborations and establish new partnerships (strongly disagree / disagree / etc.)<br><br>**Interview**<br>• Extent of the clarity of the process about who and how release credentials<br>• Assess the level of trust in exchanging information using SecInCoRe CIS<br>• Assess how SecInCoRe support integration of existing technologies [*TBA depending on topics discussed during the workshop*] |

***notes***

| | | | |
|---|---|---|---|
| Taxonomy<br>Ontology | Self-administered questionnaire<br><br>Semi-structured interview | • relation between topics<br>• utility of key words<br>• access to new information thanks to the graph view | **Self-Administred Questionnaire**<br>• How would you rank the different search functions on the basis of their usefulness for your standard work? [keywords-based search; filters based on categories / topics; graph view] [Choose 1, 2, 3]<br>• How much do you think each of the different search functions can be useful when you are exploring a topic with which you are not familiar?<br>• How do you assess the utility of the graph view from 1 to 6?<br>• Do you think you would routinely use the graph view in your standard activities? |
| | | | **Interview**<br>• [*Perform a search with the user on a topic of their own interest or on a topic that has emerged during the day (to be decided)*]<br>• Assess your satisfaction about the relations between topics that emerged when searching for a word/document<br>• Assess your satisfaction with key words<br>• Assess the utility of the filters<br>• To what extent you are able to access to new |

| | | | |
|---|---|---|---|
| | | | information using the graph view? And how about the filters?<br>• Did you find any surprising or unexpected connections during your interaction with the search function? |
| Knowledge base<br>Inventory | Self-administered questionnaire<br><br>Semi-structured interview | • usability of the KB<br>• utility of the contents stored<br>• relevancy of the contents stored<br>• understandability of the contents<br>• understandability of the structure | **QUESTIONNAIRE**<br>• Usability. The extent to which information is clear and easily used<br>• Understanding. The extent to which data are clear without ambiguity and easily comprehended<br>• Relevancy: to what extent information are an added value to your work |
| | | | **INTERVIEW**<br>• Relevancy. The extent to which information is applicable and helpful for the task at hand<br>• Number of source are sufficient or not for your work? Y/N.<br>• Number of sources in the KB are sufficient or not for your work? Y/N.<br>• Navigation of the KB. The extent to which data are easily found |
| General functioning of the demonstrator | Mapping activities on demonstrator; log or screen record | • time for running the search | • Time to get in the system.<br>• Time to access to the information<br>• Presence of a how to guide and assessment of the tool (Y/N)<br>• Time to upload an |

| | | | |
|---|---|---|---|
| | | | information<br>• Time to retrieve an information<br>• Time to receive results of the search |
| ELSI | interview based on a common script and open-ended questions<br><br>Structured observation | | **INTERVIEW**<br>• Do you think the system has helped bridge some differences in understanding between you and the other participants? Can you **give *us an example*** in which you think this happened during the day?<br>• Could you instead give as an example of a situation in which you think you and the other participants had a different understanding of some concepts or where looking for different things in a document?<br>• Why has the system (including the demonstrator AND the activities) not helped bridge this difference? [*To be decided according to how the workshop develops*]<br><br>**OBSERVATION**<br>• Signal any events that suggest a lack of shared understanding and trace their evolution, paying particular attention to ways in which the possibilities offered by the |

| | | | |
|---|---|---|---|
| | | | system support mediation |