Publishable summary

Project context and objectives

Security experts believe that the probability of terrorist attacks using CBRN material is increasing. Recent history shows that terrorists no will longer hesitate to launch attacks that can lead to hundreds or even thousands of civilian casualties and that they are increasingly attracted to the usage of unconventional weapons - biological, chemical and radiological. Furthermore, whilst it seems improbable that in the near future there will be attacks using nuclear weapons, the risk of attacks on chemical plants, biological and pharmaceutical research laboratories is significant.

The CATO project addresses the key CBRN incident management challenge - fragmentation: of doctrines, of knowledge, of processes, of systems. CATO brings an innovative and comprehensive answer to the diversity of organisational set-ups and of legacy systems for emergency preparedness and management (ICT, equipment, sensors, etc.).

The CATO project is developing a comprehensive **Open Toolbox** for dealing with CBRN crises due to terrorist attacks using non-conventional weapons or on facilities with CBRN material.

The CATO Toolbox will address the needs of the five major **categories of stakeholders** – Policy Makers, Incident Managers; Health Services, Responders and the Population.

For each of these CATO will address the entire disaster life cycle: **preparedness** (taking a long term view), monitoring and **detection** (alerts and early assessment), **response** and **recovery**.

CATO will allow countries which adopt it, to develop plans and responses and put them into operational use in case of a CBRN incident, by combining **holistic assessment** capabilities, integrated **decision support** and **CBRN expertise**.

Work performed and main results achieved

SP1: Planning, Response & Ethics

SP1 exploits the stakeholders' expertise to provide guidelines and Standard Operating Procedures for use by the different "players" in the event of a CBRN crisis. These are maintained in the CATO Knowledge Base, accessible to the relevant end users as needed. The first draft of these guidelines was delivered at M12 by each of the WPs, and based on user feedback, work has begun on the second draft (planned delivery M28)

The first CATO user workshop enabled partners to engage with specific groups of end-users and to establish their requirements for the CATO toolbox, providing an opportunity to test and exercise the CBRNEmap products and evaluate their suitability as a framework for producing guidelines.

SP1 has utilized the contribution of SP2 to develop a set of C, B and R incident scenarios that will outline the different capabilities of the CATO toolbox and its prototype the CATO Lab

SP2: CBRN Expertise

All WPs in SP2 support the rest of the project with advice in their respective areas of CBRN expertise, and systematically collect and provide best practice material (knowledge, guidelines, models, algorithms etc.), in particular in view of formalising it for addition to the CATO Knowledge Base.

SP2 has been collecting technical expertise, tools, procedures, algorithms, handbooks and guidelines to support the construction of a CBRN knowledgebase, assisting and providing SP1 partners with information on specific issues. Chemical, biological and

radiological/nuclear data sheets containing a few representative agents and elaborating on detection, response and recovery issues associated with these agents. It is obvious that the information provided is neither complete nor exhaustive in contents, but it describes the concept of operations adopted to populate the knowledgebase.

SP3: CATO Core & Knowledge Base

CATO Core provides the infrastructure for integration of the CATO Toolbox components and common services utilized by these components. Tools are being developed as part of the CATO Toolbox for use at the various phases of the CATO "life cycle" (planning, response, recovery), including the ability to maintain and search the Knowledge Base for information provided by other SPs.

During period 1 SP3 developed and coordinated the first version of the Interface Control Description document and implemented these interfaces. Information format conversion and routing between the interface components and processing components are implemented in the Microsoft BizTalk Server. The first release of the business logics and testing of the interfaces developed in SP4 and SP5 has been completed and is available to all partners. The toolbox functionality (services) can be accessed via web browser.

SP4: CATO Algorithms

The major goal of SP4 was to come up with a first version of a set of cooperating algorithms which improve situation awareness by providing a timely and proper situation picture and to give support to decision making and resource management in a CBRN incident. Therefore a first set of algorithms has been developed for exploiting data and information relevant for understanding the nature and evolution of a CBRN incident. These algorithms have been implemented as web services as a part of the first version of the CATO Toolbox.

For a detected CBRN incident, either deduced by SP4 algorithms or directly reported to the system, the dispersion of the related plume, its propagation and a prognosis of its behaviour is calculated based on appropriate physical models. This result is presented e.g. to incident commanders or other users and as well fed to another SP4 algorithm. The decision support module will calculate a security area (cordon) around the location of a CBRN incident. This output either can be triggered by the result of the plume propagation and prognosis module or based on a request from a human operator by manually drawing an area to be secured on a map. Additionally the module will give recommendations on optimised deployment of resources in response and recovery of a CBRN incident.

SP5: CATO Interfaces

Driven by the analysis of requirements published by SP1, SP5 has built on the foreground IPR it brought to the project, to extend the user and system interfaces to deliver:

- Integrated Plume prediction and modelling with the ARGOS product from consortium member PDC-ARGOS.
- Integrated Cordon optimisation from consortium member FRAUN IVI.
- Integrated Algorithm support with FRAUN FKIE for decision support.
- Service bus connection with Ness CATO Core.
- Enhancement of the Operational User Interface.
- A real world end user system interface connection with Cumbria Fire and Rescue Service Dispatch and mobilisation system.
- A real world end user base with the deployment of a specific configuration of the user interface for UK Ambulance.
- Integration with the CATO Knowledgebase via a dedicated user interface module.

- Integration with the VoTeKK training and support online web site via a dedicated user interface module.
- Integrated the TMT handbook into a set of standard operating procedures supported within the user interface.
- Live Forms module for the support of Hospital ER status board, aggregation of the information to support Ambulance dispatch and strategic manager decision support.
- Live Forms support for Strategic Senior Manager reporting

This first set of integrated CATO Tool Box capability has been be published and made available in the CATO Lab for trialling and demonstration. Finally, initial demonstrations using this laboratory and this software have already been performed.

SP6: Integration

This sub-project is based upon two important activities: the CATO Lab and proof-of-concept field exercises.

The CATO Laboratory is both a physical location to provide a meeting facility with simulation support, and a virtual place where it is possible to work remotely with experts. During the period a prototype has been released and is now in the process of being reviewed by the CATO community, which is expected to provide significant feedback on the overall concept of operations, features, mechanisms to store and retrieve information, look and feel of the user interface, etc.

The proof-of-concept is focused on the organization of field experiments during which essential features of the CATO lab prototype will be assessed and evaluated as if it were during the response to a real incident. During the period a few tasks have been completed and the most relevant ones, which are classified, are available to those holding appropriate security clearance.

Expected final results and their potential impact and use

Beginning with the current situation of many “puzzle pieces” (fragmentation in the handling of CBRN-related issues), and working within existing organisational limitations, CATO will enable a comprehensive and integrated approach to CBRN preparedness and resilience, to be used throughout the European Community.

The CATO project expects to deliver a complete set of tools (the “CATO Toolbox”) containing methods, guidelines, procedures, computer applications, scenarios, algorithms, pharmaceutical tools, etc. These are contributed by the CATO Consortium’s partners, representing expertise in a very wide range of CBRN aspects. The toolbox is to be organized to allow convenient and intuitive use of the tools by a well-defined set of CATO end user types (Policy and Decision Makers, Incident Managers, Health Services Personnel, First Responders, and the general population) throughout the CBRN life cycle (preparedness, detection, response, recovery).

By addressing through its open and flexible approach the essential principle of subsidiarity, CATO will allow for European member states to exercise effective and pragmatic cooperation in this field. A major consequence of the learning cycle encouraged by CATO is that it is expected to act as a catalyst for international knowledge exchange on CBRN issues not only during the preparation phase, but will also lead to greater international collaboration and cooperation in the time of an actual CBRN crisis.

Project public website

www.cato-project.eu