

Deliverable Report D.2.1.2 (C - threats)
D.2.2.2 (B - threats)
D.2.3.2 (RN - threats)
D.2.4.2 (E - threats)

CREATIF – Stakeholder Workshop: „Testing CBRNE detection equipment“

held at Brussels (Center Albert Borschette and Charlemagne Building) November 4-5th 2009

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Summary

One easy way to build strong links and an open trustful atmosphere between individuals is to bring them together and make them exchange opinions in personal communication. Therefore, the first CREATIF workshop was given high priority in order to attract relevant stakeholders of the CBRNE community and start the networking activities.

The workshop took place at the Albert Borschette Conference Centre in Brussels (first day) and in the Charlemagne Building (second day).

The main objective was to discuss topics related to the testing of CBRNE detection equipment. While the first day focused on the needs and views of different stakeholders like end-users, manufacturers, testing experts and policy makers, the second day has dealt with more technical aspects of testing and the role of testing centres in the process of standardization of testing and quality assurance. The results of discussions should serve as input for some of the CREATIF work-packages and shape the future work of the project towards the needs identified by participants.

Finally, CREATIF could welcome 69 participants from 14 European countries, with strongest participation from Germany, France and the United Kingdom.

The presentations of the first session illustrated the diversity of stakeholder needs toward testing of equipment. It was concluded that testing the performance of detection equipment is necessary, because all stakeholders need such information for decision making (e.g. manufacturers to improve detection systems, end-users to find right equipment for their applications). Standardization of methods to measure performance of detection systems is needed to make results comparable. The sharing of testing results could be easier, if only technical data are reported rather than interpretations like pass/fail tests for thresholds related to specific scenarios. Nevertheless, testing procedures should take into account some common realistic detection scenarios typical for a wide range of realistic threats. A manufacturer in his presentation outlined the many technical issues to be addressed in order to produce reliable testing results and stressed the need of producing common testing procedures. This would help to move forward detection technology development and support end-users in the selection of the appropriate equipment for their needs.

In the second session, the end-user perspective and certification strategies for Aviation Security were presented: here, over the last years an elaborated system of equipment testing and certification has been developed and implemented. Although CBRNE detection equipment represents only a small sector within the considered security technologies, we could take advantage of the experiences made in aviation and possibly transfer some of the concepts for the certification of equipment to the CBRNE detection domain.

In session 3, representatives of DG-Enterprise and the European Defence Agency gave an overview on research activities in the field of CBRNE. There are quite some initiatives on the way, and efforts are made to coordinate programmes in order to have synergies rather than duplication of funded projects/ideas. CBRNE is a good example, where the border between civilian and military applications is difficult to define, so communication between players from both domains is very important. The last presentation of the Joint Research Centre in Ispra informed about a new networking project for Critical Infrastructure Protection (ERN-CIP). It

will assess needs of all EU-27 member states and collect information on available testing facilities, which can provide experimental data from realistic scenarios of CI failure in order to improve protection strategies and countermeasures.

A poster exhibition, where testing centres could present their capabilities and manufacturers reported on new products, was available on both days.

The second day started with a plenary session, where state of the art of detection and specifics of testing has been presented for biological, chemical, radiological and explosives threats. Afterwards, the audience formed four groups (C / B / RN / E) and started technical discussions on practical problems of detector testing, quality assurance and standardization issues.

After five hours (incl. lunch break) groups returned to the plenum and reported on their findings. Although technical challenges are quite different due to the differences of detection technologies and their technological readiness, in the final summary of discussions all the four groups identified some common points:

Conclusions of discussion groups

- Standards are needed (and/or compilation of available protocols is needed)
- Agree on reference materials for testing
- Laboratory tests AND field testing (in a second stage) is necessary
- Develop intercomparison exercises for testing centres
- CIRCA web-service to share information on testing data (open information); establish electronic discussion groups

Workshop presentations and posters as well as the conclusions from discussion groups are also available at the CREATIF web-site: <http://www.creatif-network.eu/workshop1.html>

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1 Introduction

1.1 Background and motivation

The build-up of a network can be mediated by many different tools including electronic communication channels, but still today we believe that the best way to build strong links and an open trustful atmosphere between individuals is to bring them physically together and make them exchange opinions in one room. Therefore, this first CREATIF workshop was given high priority in order to attract relevant stakeholders of the CBRNE detection community and start the networking activities.

The workshop was dedicated to discussing topics related to the testing of CBRNE detection equipment. While the first day focused on the needs and views of stakeholders (end-users, manufacturers, testing experts, and policy makers), the second day dealt with technical aspects of testing and the role of testing centres in the process of detection procurement and standardization of testing. The results of these discussions will serve as input for some of the CREATIF work-packages (WPs) and focus the future work of the project towards the needs identified by participants.

Most input is expected to WP2, where CREATIF wants to collect information on testing centres, suggest new standards, and develop round robin exercises for testing facilities. But also WP3 (Human factors and operational testing) and WP4 (Certification strategies) will take into account the results of discussions during the workshop, as these topics are addressed explicitly in one of the sessions of day 1, or in the technical discussions of day 2.

1.2 Organization and venue



The coordinator (SL) took over responsibility to carry out all the administrative duties of the workshop organization, like reservation of venue, provisions for catering, participant administration, and production of print materials to be distributed to participants before and during the workshop.

Nearly all consortium members were actively involved in the definition of the technical content of the workshop and contributed their personal contacts for the invitation of participants. Moreover, during the workshop, consortium members acted as rapporteurs and session chairs and supported the organization, wherever necessary.

1.3 Chronology of planning and organization of the workshop

In the following a chronological list of the activities is presented to illustrate the development of the workshop programme and all other necessary planning steps.

- Already at the kick-off meeting of the CREATIF project in March 2009, the consortium spent half a day for the planning of the first “big” workshop and the date was fixed to early November 2009.
- Between April - May 2009 all consortium members contributed to build up a so-called “Stakeholder Contact List”, which contained names of relevant stakeholders and their contact details (organization, name of expert, email, phone number, address, type of stakeholder, threat portfolio). In parallel, a first draft of the workshop agenda (two days, content for different sessions) was developed via email communication between all project partners.
- During the WP2.3 meeting in Berlin, June 3rd 2009 (BAM, COT, SL) in a thorough discussion the final content of day 1 was drafted and details for session 2 (Airport session) defined.
- The second draft of the workshop agenda was discussed and finalized in a teleconference on June 9th (CEB, ETBS, FOI, TNO, SL). All partners agreed on the workshop agenda and a final “First announcement” was produced.
- The first announcement of the workshop was sent out in June 2009 to about 200 people, nominated by consortium members to the “Stakeholder Contact List”. Each consortium member sent out personal emails to his/her nominees, in order to take advantage of personal contacts, which may have increased the response rate.
- The search for speakers was performed and finalized in September. In addition, a reminder was sent out to all invited experts, who had not responded yet, to consider participation in the workshop.
- The final programme (second announcement), containing the full list of speakers, a registration form, information for rules of reimbursement of travel expenses (see below) was sent out on Sept. 27th 2009.
- A detailed plan for the technical discussions, especially a list of questions to be discussed in the working groups was developed during the CREATIF consortium meeting (WP1 and WP2 meeting) in Stockholm on Oct. 1st, 2009 (FOI, ETBS, TNO, COT, SL). Moreover, session chair persons and rapporteurs were nominated, as well as last tasks distributed (preparation of “State-of-art of detection testing” presentations for day 2).
- On Nov. 3rd, colleagues from TNO and SL met at the conference venue to have a final look on facilities and a rehearsal on the final workshop agenda.

1.3.1 Workshop venue

For the venue of the workshop the consortium decided to select a central point in Europe to allow easy travelling for participants from all over the EU-27. So, the logical choice was

Brussels. In order to support a vivid discussion and avoid academic “frontal” presentations, we managed to get meeting rooms in the EU premises with perfect workshop equipment (microphone on each place, face-to-face arrangement of the audience).

for Nov. 4th 2009: **Centre Albert Borschette**, (Rue Froissart 36), Room 2A

for Nov. 5th 2009: **Charlemagne Building**, (Rue de la Loi 170), Salle Lord JENKINS.

At the second day a very big room was used, because this offered the opportunity to form four individual groups (C / B / RN / E) within the venue for the technical discussions but allowed participants to change easily between groups if wanted.

The organization of the workshop venue at EC premises was initiated by colleagues from the Joint Research Centre Ispra. Ms. Laura Bianchi, JRC, carried out all the necessary administrative duties like reservation of rooms in the EC-internal electronic system and correspondence with European Commission facility management (submission of participant lists, ordering of poster panels etc.). She helped with providing all the practical information necessary to arrange the meeting in Brussels.

Ms. Dolors Bofarull-Buñuel (DG-Enterprise) assisted with the registration of the participants in Charlemagne building and acted as “emergency backup” - which finally turned out to be unnecessary because no unexpected complications occurred.

Thanks to the well-organized technical assistance for involved EC services it was possible to make all arrangements over the far distance between Vienna and Brussels via email and phone contact without travelling efforts.

1.3.2 Workshop dinner



In the evening of Nov. 4th, an invited workshop dinner was organized in Hotel Leopold (Rue du Luxembourg 35), which is in walking distance from the workshop venue. This social event allowed to bring into contact participants in a casual atmosphere and hopefully helped to intensify personal communication between experts of the CBRNE community.

1.4 Target audience and participants

A broad audience, covering all the stakeholder groups (end-users, decision makers for procurement of equipment, testing experts, policy makers, researchers, manufacturers / vendors) has been invited to join the workshop for both days to learn about the different aspects of CBRNE detection testing and contribute to the discussions. Nevertheless, the program of both days did not depend on each other, so participation for one day has been

encouraged as well. This seemed necessary, because it turned out that a number of other high-ranking events (e.g. a NATO workshop in Paris) took place in the same week.

Especially the participation of end-users from first-responder organizations has to be supported, because of time constraints and lack of travel money. Therefore, the possibility of travel reimbursement has been offered to speakers, participants coming from non-profit organizations and testing experts (the core group for the CREATIF network).

Finally, CREATIF could welcome 69 participants from 14 European countries, with strongest participation from Germany, France and the United Kingdom. Details are given in Table 1.

Tab. 1: Country distribution of participants of the CREATIF workshop

Country	Number	Country	Number	Country	Number
Austria	5	France	14	Spain	2
Cyprus	2	Germany	17	Sweden	6
Czech Republic	1	Lithuania	1	Switzerland	1
Belgium	2	Netherlands	3	United Kingdom	7
EU (EC, JRC)	5	Norway	1		
Finland	1	Poland	1		

The distribution of participants over the main stakeholder groups was surprisingly equilibrated, although it was not a big surprise and well intended that testing experts turned out to be the largest group, while end-users were a little under-represented. As many of the participants in their practical work cover more than one role (e.g. testing expert and manufacturer; policy maker and researcher (JRC)), this allocation is only indicative. Details are shown in Table 2.

Tab. 2: Representation of different stakeholder groups at CREATIF workshop

Stakeholder group	number of participants
End-users	9
Testing experts	28
Policy makers / Decision makers	9
Researcher / Consultant	8
Manufacturer / Vendor	15

The final participant list, including late registrations and excluding last-minute cancellations is given in Table 3.

Tab. 3: Final participant list of the CREATIF workshop

Name	Surname	Organization	Country
Anttalainen	Osmo	Environics Oy	FI
Beckmann	Jörg	BAM - Federal Institute for Materials Research and Testing	DE
Berthou	Veronique	DG Joint Research Center, IPSC	EU

Name	Surname	Organization	Country
Bourliaud	Regis	ETBS - Etablissement Technique de Bourges	FR
Brinek	Josef	SUJCHBO - National Institute for NBC Protection	CZ
Broekhuijsen	Martien	TNO Defence, Security and Safety	NL
Bry	Alain	CEA - French Atomic Energy Commission	FR
Bunte	Gudrun	Fraunhofer ICT (Institut für Chemische Technologie)	DE
Butchins	Laura	Home Office UK, Scientific Development Branch	UK
Chmel	Sebastian	Fraunhofer Institute for Technological Trend Analysis - INT	DE
Cornier	Jean	VDL Consult, Germany	DE
Craik	Thomas	London Metropolitan Police	UK
Davies	Hilary	EDA - European Defence Agency	EU
Dhyser	Jean-Charles	Ministère de la défense, DGA	FR
Dietz	Patrick	EC - DG JLS	EU
Ewert	Uwe	BAM - Federal Institute for Materials Research and Testing	DE
Foghelin	Jan	Swedish Defence Research Agency, FOI	SE
Gärtner	Christian	Austrian Red Cross	AT
Gaubert	Yves	THALES Security Solutions & Services	FR
Gotthardt	Cordula	EADS Deutschland	DE
Harrison	Patrick	Home Office UK	UK
Hecker	Torben	National Competence Center Aviation Security Research - NCAS	DE
Hernandez	Javier, F.	INDRA, Sistemas de Seguridad. Sensores EC	ES
Herrero	Michel	HTDS - Hi-Tech Detection Systems	FR
Ho	Jim	Defence R&D Canada (DRDC) / Dycor (representation in CY!)	CY
Johansson	Erik	Swedish Defence Research Agency, FOI	SE
Jonuscheit	Joachim	Fraunhofer Inst. for Physical Measurement Techniques -IPM	DE
Judd	Rowena	SecEur, Security Europe Consultancy	BE
Kieboom	Jasper	TNO Defence, Security and Safety	NL
Koch	Cornelius	Smiths Heimann GmbH	DE
Kochansky	Ted	Sensors Signals Systems (USA)	observer
Krajewsky	Pawel	Central Laboratory for Radiological Protection Poland	PL
Krause	Horst	Fraunhofer ICT (Institut für Chemische Technologie)	DE
Krippendorf	Alfred	Hazard Control GmbH	DE
Lewis	Adam	EC-DG JRC, Humanitarian Security Unit, IPSC	EU
Louat	Jérôme	THALES Security Systems	FR

Name	Surname	Organization	Country
Martinez Candela	Vicente	SEDET (Sociedad europea de deteccion), Military Applications	ES
Martinsson	Örjan	Swedish Coast Guard Headquarters	SE
Mattmann	Oliver	Hot Zone Solutions / OPCW	AT
May	Iain	Smiths Detection	UK
Mercier	Philippe	HTDS Hi-Tech Detection Systems	FR
Meurer	Heinrich	GeoTec Exploration mineralischer Rohstoffe GmbH	DE
Miller	Mark	Cotecna SA	CH
Mitterecker	Gerd-Peter	Seibersdorf Labor GmbH	AT
Munoz	Dominique	ETBS - Etablissement Technique de Bourges	FR
Nyholm	Sune	FOI, Swedish Defence Research Agency	SE
Olivier	Rene	TNO Defence, Security and Safety	NL
Osterloh	Kurt	BAM - Federal Institute for Materials Research and Testing	DE
Pashby	Paul	Smiths Detection	UK
Plecis	Adrien	Centre d'étude du Bouchet - CEB	FR
Rehak	Wolfgang	OUT e.V.	DE
Rieunier	Fanny	Laboratoire Central de la Préfecture de Police	FR
Rizzo	Carmine	ETSI, European Telecommunication Standardization Inst.	FR
Röhrbacher	Friedrich	Seibersdorf Labor GmbH	AT
Rosenstock	Wolfgang	Fraunhofer Institute for Technological Trend Analysis - INT	DE
Sheldon	Timothy	XDTEC Technical Services Ltd.	UK
Simonet	Francoise	CEA - French Atomic Energy Commission	FR
Skogan	Gunnar	FFI avd Beskyttelse	NO
Soudani	Karim	EADS – SODERN	FR
Strebl	Friederike	Seibersdorf Labor GmbH	AT
Tigner	Brooks	Security Europe Consultancy	BE
Tjärnhage	Torbjörn	Swedish Defence Research Agency, FOI	SE
Töpfer	Hans	Kärcher Futuretech GmbH	DE
Touret	Olivier	SAGEM Securite	FR
Traylor	Alan	Dycor (European Bureau)	CY
Vardulakis	George	UK Home Office Scientific Development Branch	UK
Vinciene	Vyta	EPC for Security & Defence Lithuania	LT
Wästerby	Pär	Swedish Defence Research Agency, FOI	SE
Weinzierl	Rainer	German Federal Police Technology Center	DE
Williamson	Clement	EC - DG Enterprise	EU

1.5 Final workshop programme

While the first day of the workshop consisted of three sessions with presentations followed by discussions, the second day offered much more space for active involvement of the participants, who were asked to contribute to one of the four topical discussion groups.

Over the full duration of the workshop there was a poster exhibition, where testing facilities and manufacturers had the possibility to show their capabilities or recent developments in the field of CBRNE detection.

Thanks to the efforts of some consortium members (mainly TNO, BAM, FOI) the first day of the workshop could present very relevant representatives of different stakeholder groups, who gave well-focused presentations. The names and affiliations of speakers can be found in the final programme below.

Day 1: Stakeholder views: end-user needs, improve market conditions, foster communication between end-users and testers

09:00 – 10:00: Registration

10:00 – 10:10: Welcome from organizers, Agenda of Day 1

10:10 – 10:30 CREATIF – why do we need a network? (F. Strebl)

Session 1: Stakeholders' views and needs on testing of CBRNE detection equipment. (Moderator: Broekhuijsen, Rapporteur: Kieboom)

10:30 – 10:40 Introduction of speakers on panel

10:30 – 11:30 End-User: London Metropolitan Police, T. Craik

End-User: Austrian Red Cross, C. Gärtner

Swedish First Responders – Summary from FOI, T. Tjärnhage

11:30 – 11:50 "A manufacturer's view". Smiths Detection, P. Pashby

11:50 – 12:30 Panel discussion (Stakeholder needs and views on testing of equipment and standardization)

12:30 – 13:45: *LUNCH BREAK*

Session 2: Typical scenarios for application of CBRNE detection systems. Example– Airport CBRNE security (Moderator: Ewert, Rapporteur: Beckmann)

13:45 – 13:55 Introduction of Session 2

13:55 – 14:45 Presentations of Airport Security Stakeholders' point of view

"CBRNE detection - An end-user perspective".

European Center for Aviation Development, T. Hecker

	<i>"Test and Evaluation of Aviation Security Equipment in Germany". German Federal Police Technology Center, R. Weinzierl</i>
14:45 – 15:00	Messages from the CREATIF advisory committee of stakeholders (Questionnaire Results – Strebl)
15:00 – 15:20	Panel discussion on the role of testing centres to mediate between different stakeholders, certification of equipment
15:20 – 15:45	<i>COFFEE BREAK</i>

Session 3:	The European perspective: CBRNE detection equipment testing and standardization (Moderator: Foghelin; Rapporteur: Röhrbacher)
15:45 – 15:55	Introduction of Session 3
15:55 – 17:00	The European view-point on the future of testing. <i>"Security research related to CBRNE and testing/certification"</i> DG-Enterprise, C. Williamson <i>"Relevant EDA activities in the area of CBRN T&E standardization"</i> EDA - European Defence Agency, H. Davies <i>"European Reference Network for Infrastructure Protection"</i> JRC, Institute for the Protection of the Citizens, A. Lewis
17:00 – 17:30	Panel Discussion
17:30	<i>Close session</i>

Day 2: Testing experts workshop – detection systems testing

Session 1: Overview about state of the art of testing CBRNE detection equipment

09:00 – 09:15	Plenary session to explain agenda of Day 2
09:15 – 10:00	State of the art and specifics of testing detection systems for Chemicals / Biological agents / Radiation / Explosives (TNO/FOI/ETBS/SL)

split in parallel sessions (C / B / RN / E)

Session 2: Practical experiences with testing of detectors and future developments

10:00 – 10:20	Short introduction of participants in the session (by themselves)
10:20 – 12:30	Technical discussion <ul style="list-style-type: none">• Specific issues of testing related to the threat• Availability of standard protocols for testing (incl. operational tests)

- Where you get the agents necessary for testing detectors
- Comparability of testing results
- Lab tests vs. operational tests
- False positive/False negative alarms
- Do we need harmonization / standardization of testing, how could it work?
- Are intercomparison exercises for testing centres an option?
- For an intercomparison, which scenarios/substances would you consider?
- Do we need new – European standard protocols?
- How to test future detection systems? Is there a need to develop new protocols, new techniques to perform detector tests?
- Expectations to the CREATIF Network

12:30 – 14:00 *LUNCH BREAK incl. Poster session to present testing facilities*

Session 2: continued to summarize and draw conclusions

14:00 – 14:45 Agree on conclusions to be presented to the plenum

14:45 – 15:00 *Coffee break and afterwards meet again in plenary session*

Session 3: Results and Conclusions (in Plenum)

15:00 – 16:00 Presentation of results from the four working groups

16:00 – 16:30 Final discussion

16:30 – 16.45 *Conclusions of the workshop, Adjourn*

1.6 Acknowledgement

During the long period of workshop organization we have received support from many different people; so, the final success is the result of a collaborative effort.

The CREATIF consortium wants to express their gratitude to JRC for offering hands-on support to our project by providing administrative help with the organization of the meeting rooms in Brussels.

We highly appreciate the commitment of all speakers, session chairs and rapporteurs.

Finally, the success of the workshop has been produced by the active participation and support of all attendees, who contributed to fruitful discussions and provided a communicative and open-minded atmosphere throughout all the two days.

1.7 List of abbreviations

ANSI:	American National Standards Institute
AVSEC:	Aviation Security
BAM	Bundesanstalt für Materialforschung und –prüfung; Federal Institute for Materials Research and Testing
BG:	Bacillus globigii, now called Bacillus atrophaeus
CBRNE:	Chemical, biological, radiological, nuclear, explosives threats
CEB	Centre d'études du Bouchet (part of Ministry of Defence France)
CI:	Critical Infrastructure
CIP:	Critical Infrastructure Protection
COT:	Cotecna Inspection SA
CWA:	Chemical Warfare Agent
DG Ent	Directorate General Enterprise and Industry
DG JLS:	Directorate General Justice Law Security
DIM:	Detection, Identification, Measurement
EC:	European Commission
ECAC:	European Civil Aviation Conference
EDA:	European Defence Agency
EOD:	Explosives Ordnance Disposal
DCU:	Decontamination Unit
ESRIF:	European Security Research and Information Forum
ETBS:	Etablissement Technique de Bourges (part of the Ministry of Defense France)
FOI:	Swedish Defence Research Agency; Totalforsvarets Forskningsinstitut
FP7:	Seventh Framework Programme of the European Community for Research, Technological Development and Demonstration Activities
IEC:	International Electrotechnical Commission
IMS:	Ion Mobility Spectroscopy
ISO:	International Standards Organization
IWPC:	Industry Wireless Packaging Consortium
JRC:	Joint Research Centres (of the European Commission)
LoD:	Limit of Detection
MPS:	Metropolitan Police Service
NADH:	Nicotinamid-adenin-dinucleotid (a specific enzyme involved in cell respiration)
NATO:	North Atlantic Treaty Organization
NBC:	Nuclear, Biological, Chemical (warfare agents) threats
NCAS:	National Competence Centre for Aviation Security
PASR:	Preparatory Action for Security Research
PCR:	Polymerase Chain Reaction (a method to analyse DNA sequences)
PPE:	Personal Protection Equipment
Q&A:	Questions and Answers
R&D:	Research and Development
SL:	Seibersdorf Labor GmbH
SNM:	Specific Nuclear Material
T&E:	Testing and Evaluation
TICs:	Toxic Industrial Chemical(s)
TNO:	Nederlandse Organisatie voor Toegepast Natuurwetenschappelijk Onderzoek
WP:	Work package

2 Workshop report – presentations and results

In the following, presentations and conclusions from discussions are shortly summarized, without repeating the information given in the overhead slides. In Annex 1 all the presentations can be found. Our thanks go to the speakers, who supplied the overhead presentations for this publication.

2.1 Day 1 - Presentations and discussions

2.1.1 Session 1: Stakeholders' views and needs on testing of CBRNE detection equipment

(Moderator: M. Broekhuijsen, Rapporteur: J. Kieboom)

London Metropolitan Police, Thomas Craik:

“The MPS CBRN response - DIM procurement and testing”

Metropolitan Police Service (MPS) faces a lot of threats. Operators need to know PPE (personal protection equipment) is appropriate. Portability of detectors into transport systems is necessary. A main goal is to eradicate false positives, which is very difficult. The police are making up training themselves; we need training regimes post to the procurement process.

Scene assessment is done by army and fire department. In the City of London the army is not used for assistance in CBRNE incidents, this is different in the country-side. Two units EOD and DCU (responsible for decontamination) are active in London.



Procurement process:

London Metropolitan Police has a very good system. The Home Office Scientific Development Branch is always used in procurement to provide information on suitable equipment, dependent on defined user needs. A so-called “Blue Book” for detection equipment has been developed containing all tested equipment. If equipment is not listed in the blue book, it is not bought by police. This is a restricted document, but selected information

could be made available to interested organizations. Within police, own technicians carry out the equipment testing to prevent expertise leaving the organization. Senior police officers think detection equipment is produced very fast or available in large quantities from the shelf, this is not the case, and this can cause problems for the planning of procurement processes (normally takes longer than expected).

Stand-alone equipment is selected for Olympic Games in London.

Q&A:

Is there concern for shielded threats (opaque attacks)? Yes, but at the moment this point is not easy to address.

Austrian Red Cross, Christian Gärtner:
“Requirements for CBRN detection equipment”

Nice to have features are the miscellaneous ones (system of systems to detect more than one threat). Verification of radiation detection equipment is mandatory in Austria every other year. Therefore, only equipment accredited for verification by the Austrian Metrology Institute is considered in the procurement process.

Q&A:

Did you have real live agent training? Yes, with radiological sources, not with other threats since we do not have equipment for other threats.

In UK Police, only approximately 10 people have such training, not more due to risk assessment. Live agent training is needed for confidence building; it is very important, but federation does not allow it.

How many people do have experience with detection equipment? In Austria there are two CBRN decontamination units with 17 and 30 members with experience in detectors.

Is there a strategy for triage? What is the capacity of the two units? Emergency doctors take the decision on triage. Fire brigade brings people from the scene of event and we do the decon. Our mobile decon facility is set up between the incident and the hospital. 5 to 6 minutes per person are needed for decontamination. 20 to 25 people per hour are decontaminated; to treat more people per hour is possible, if they can walk by themselves.

Is there requirement for sensitivity of detectors; sensitivity versus resolution? Most important for our mission is to have quick results (e.g. for checking the effectiveness / success of the decontamination). For the identification of radionuclides and the quantification we rely on results from other emergency units. It takes 2-3 hours to set up the decontamination unit on site. Within this time-period, other units will perform measurements and provide this information to us (on the extent of contamination, nature of the threat, quantities to be expected per m²).

Swedish First Responders, Summary from Torbjörn Tjärnhage (FOI):
“Swedish First Responder views and needs - CBRN detection equipment”

This presentation is based on telephone interviews with selected Swedish first responders. Recently CBRN experts from different organizations have been collected in the so-called Swedish Civil Contingencies Agency. Initial detection capability of first responders has to produce results in minutes. Reinforced detection equipment can be provided within hours. Special resources, labs, need many hours to days for the production of final results. This concept is the basis for all agencies. Maintenance routines are important.

Purchase takes place combined with military. Testing is done after procurement. There is support from testing centres (e.g. testing of dosimeters after purchase).

Detection equipment is used to answer questions like "Is there a leakage of a container?" monitor, if / where / when there occurs an event. After detection of a leakage event: locate the leak → solve the problem.

Q&A:

"Swine" Flu: there is a mess in crisis management. Do agencies learn from this? Bird flu in DE was a good example. We have to deal with the whole problem. How do we decontaminate cars? We need that all parts of the chain are strong enough.

Blue book is UK restricted. Equipments are tested. Not only bio-detection is in use, but e.g. infrared cameras can be used for detecting infected persons (screening body temperature).

No good biodetectors are available at the moment, especially concerning sensitivity - the available systems are behind user-needs.

Smiths Detection, Paul Pashby:

"A Manufacturer's view on the needs of testing CBRNE detection equipment"

Fixed installations are more difficult to test than hand-held equipment, which you can put into a chamber and challenge under controlled conditions. How do you test a whole vehicle or fixed installation?

We (industry) pay for tests, but we are sometimes restricted in sharing information. Army do not tell if equipment has been used or whether it has worked in the real world, the manufacturer only gets back the equipment for service, but does not get information on the proper functioning of the device in a given scenario (which would be very helpful...).

Test results are often restricted.

What are true interferences? A sensitive chlorine detector will not work in a swimming pool accident, so tune detector for its purpose.

How do we do reliability tests? Test centres, user, manufacturer? Whole system needs to be tested. Cost sharing with other detector vendors is desirable.

Training is a problem. NBC Unit trains the end-users; the vendor is not involved in this process, but could provide valuable information and get feedback for the improvement of the systems.

Q&A:

Scenarios are important (specific events, incidents), sensitivity versus reliability, training of real end-users.

How do we compare probability of detection tests? ISO standard, round robin? Standards need to be revised to real world conditions, need to be tailored to the real applications. Besides technical issues other factors like usability and e.g. cost of ownership should be evaluated. Harmonization of test houses would be desirable to make results comparable and

reduce variances. NATO standards have 7 levels of lethality. What do we apply for civilian applications?

Panel discussion of session 1

Different views on application of standards. There is a need to write down what standards are available, at the moment, there is no overview of standards.

We need standards in training. How I'm going to detect and how to teach this. Summarize, what are the limitations of all detection strategies and then make a standard.

Police wants to know what the agent is not (exclude threats).

Is there communication between different countries? How do they manage to get useful requirements? EU security label has been proposed by an ESRIF working-group. It has the potential to address a number of these issues. Also, testing under the European Security Label could support mutual recognition with the US.

There is disconnection between different communities concerning requirements, e.g. between agencies, who write down requirements and actual end-users, who will apply equipment after the procurement process.

The UK Home Office is preparing standards for hand-held RN devices, it will be published on the website of the UK Home Office Scientific Development Branch soon. Standards are based on performance, usability; and also test the methodology. This will become a UK national standard.

Do manufacturers get real feedback from end-users? We are always connected, but mostly only after purchase. Need contact before development. End-users are more critical and harder, but may offer practical solutions. Testing can save money of end-users!

Summarizing Comment on Session 1 by Tim Sheldon

(Independent technical consultant, specialising mostly in explosives and weapons detection)

What this project is attempting is very ambitious but it is necessary because there is currently a lack of information on equipment performance which is useful to users. There is also little guidance for industry on what they should be aiming for in terms of performance.

There are a very large number of systems to test and, as the speaker from Smiths (Paul Pashby) pointed out, testing even one instrument thoroughly is very complex, so the work needs to be shared between as many organizations as possible.

There is also a perceived need for integrated detection systems incorporating multiple sensors. To design these integrated systems it is necessary to understand how each of the components perform, in a way that can be related to real threats.

However, standardization of testing has been under discussion for about twenty years and it has not been achieved yet. There are several difficulties involved:

1. User's requirements are very diverse – equipment that is suitable for aviation security, for example, will not necessarily be suitable for the police – and different police forces may also have different needs
2. The technologies used, and the information they give, are also very diverse
3. It can be difficult relating test results to practical capability – for example, when we detect explosives traces we are actually trying to infer the presence or absence of a bomb and the relationship between the presence of traces and the presence of a bomb is not simple
4. Security – many government organizations cannot, for good reasons, share their test results or test methods, although this secrecy is more related to detection priorities and to interpretation of results in real scenarios than it is to simple measurements of instrument performance

How can we get around these difficulties? Here are some suggestions:

- A. We need to recognise that technical instrument performance is different to interpretation of results in the real world and it is helpful to separate these two things
- B. Standardising methods of measurement of performance is easier and less controversial than introducing pass/fail tests with performance thresholds on which different end users are unlikely to agree
- C. Instead of performance thresholds we could have graded performance figures which users can match against their own requirements, knowing that they have been measured in a standardized way. Compare this with choosing a car: manufacturers can supply figures of top speed, power, and fuel consumption. The buyer will have his own preferences about which of these aspects of performance is important to him, but he can use the figures to fairly compare vehicles, because they have been measured in a standardized way.
- D. The parameters measured should preferably be linked back to a common set of realistic threats and scenarios which encompass a wide range of known and potential threats. This is vital if the data produced is to be useful to the designers of multi-technology systems.

2.1.2 Session 2: Typical scenarios for application of CBRNE detection systems. Example– Airport CBRNE security

(Moderator: U. Ewert, Rapporteur: J. Beckmann)

The session offered two presentations related to the Airport Security

European Centre for Aviation Development, T. Hecker:

“CBRNE detection - An end-user perspective”

The first presentation was given by T. Hecker, a representative of the National Competence Centre of Aviation Security Research (NCAS). This is an association of end users (authorities, airlines and airport) within the aviation security research sector.

One part of its activity is the implementation of the “Tunnel of Truth (ToT)”, were “...passenger stand on a conveyor belt moving under an archway as various sensors scan them for weapons bombs and other prohibit items”. Although still considered to be a vision, it describes the philosophy and definition of security practiced on German airports. Security implies both safety and security in Germany. While safety aspects are mainly based on the technical state of art, the question of security is more diverse. Internal and national safety standards, governmental and European requirements and internal procedures can be collected and summarized. A definition of safety standards on the airports will be possible on this basis and can be provided easily.



In contrast, the security aspects, which “shall rule out dangers as far as possible by assuring a positive travel experience during the journey”, are governed by many internal and external aspects. An important task of the airport security deals with of the personnel and merchandise screening. Still new technologies are required for it. The existing productivity should be improved, a higher security level should be reached by the optimization of the detection facilities and last not least the

passenger experience should be enhanced by the introduction of less invasive detection methods. Additionally, the new technologies must be still harmless and ethically acceptable for the passenger screening. Future technology must provide technical solutions for the detection of liquids and non-metallic, forbidden items on carry on baggage and have to ensure passengers convenience by higher throughput. For economical reasons, developed technologies must exclude single solutions on a specific airport but be applicable at many places.

German Federal Police Technology Center, R. Weinzierl:

"Test and Evaluation of Aviation Security Equipment in Germany".

Mr. Weinzierl from the German Federal Police Technology Centre gave a presentation entitled “Test and Evaluation of Aviation Security Equipment in Germany”.

The duties and structures of the German Federal Policy were presented first. The Federal Police has special tasks in the field of aviation security, such as screening of passengers and luggage, tendering and operating security equipment, launching countermeasures when forbidden or harmful objects are identified, and finally, the surveillance of the entire airport premises. There is a “Technology Centre for Police Equipment” available which is split into two units, the “Testing and Development” unit for police equipment and “Screening and Detection Technology” unit. The last one is in charge of market monitoring, technology assessment, testing and evaluation, development of standards, design of test protocols and test samples (dummies, mock up systems) and quality assurance. It also provides end user know-how and process description for the European security research and represents one of four existing ECAC (European Civil Aviation Conference) centres.

Development of a EU certification process has been initiated by the AVSEC Committee to standardize technical EU requirements for security applications. The definition and a harmonized description of fundamental technical specifications such as detection rate, type of explosives, mixing ratios, false alarms and design of test objects are under development in the EU. Nevertheless, the Federal Police treats EU requirements as a minimum level which is usually embedded in a much higher national security level. The national level is realized by higher technical specifications, influenced by the national threat assessment policy and specifically required conditions on German airports. The presentation gave also a short description on the Common Evaluation Process (CEP) which is performed at the National ECAC Test Center to assist manufacturers and stakeholders to assure that the security equipment used at EC airports meet EC specifications. The process is based on a common methodology for testing security equipment which is developed within the ECAC Technical Task Force and adopted at Directors General level. Six ongoing test projects were shortly described to inform the auditorium about the state of art within the security research.

CREATIF Co-ordinator, Seibersdorf Labor GmbH, F. Strebl:

“Messages from the CREATIF advisory committee of stakeholders – Preliminary questionnaire results”

Ms. F. Strebl summarized the feedback from the advisory committee of stakeholders based on questionnaire lists initially designed by the CREATIF consortium. It was shown that standards and protocols are more or less available for testing of C, RN, and E detection systems, while B detection is still under development and no testing standards available. Most standards are national ones, not European. The partially existing military protocols and requirements or other recommendations are confidential and don't belong to the public domain.

Standardization and test protocols have been considered to be necessary, to provide the stakeholders with reference points of acceptance, to ensure test procedures, which are available and well known in the public domain and to gain reliable information about detectors' capabilities. Additionally, standardized testing materials and methods could help end users to follow comparative studies with similar test equipment working on different producers and with various technically implemented designs. Stakeholders also feel confident to have European independent test centres.

Panel discussion Session 2

Following statements, questions and ideas were issued during the discussion:

- The European Civil Aviation Conference set up a security system which is considered to have a high level of harmonization and testing.
- Can the Creatif Network learn from the AVSEC / ECAC system and adopt some of the basic ideas and principles to make use from it for its own purpose instead of reinventing the wheel?
- Can CREATIF test centre contribute to the existing EU wide already established evaluation and test centre network?

Answers:

ECAC testing and evaluation procedures on security related objects are confidential. Basically, the evaluation process is separated in three levels, technical questions, scenarios and country specific requirements. The technical performance of new equipment can probably be tested by future European test centres. The test can be performed on existing technical safety standards.

The nondisclosure of armament facilities is the precondition for an efficient counter-terrorism. Subsequently, the scenario test can only be performed at security related test centres, which must operate on a high level of secrecy. Usually, police, custom service and intelligence service units deliver the input information for the scenarios. The scenario itself is a result of collected knowledge deduced from the analysis of real existing crime and other illegal scenes. The gathered information on counter terrorism defines the boundary conditions for the tests, requires the specific test pieces and procedures and sets the thresholds for the alarm.

A test matrix can be very large and very specific. The report and feedback to manufacturers about the test results is very short. It is only the information about “failed” or “passed”, which is issued by the test centre to the vendor. The test centre itself evaluates the scenario by means of test protocols. The protocols are confidential and not European unified. European police or Home Office units are considered to be eligible as security test centres. More test centres could be established in the future, which then will be approved as European Security Centres operating within a European Security Network. The harmonization of protocols and procedures between the centres is expected to take place in certain cases. Generally, the restriction of the harmonization process originates from the specific nationally defined requirements which influence tremendously existing scenarios. The scenarios can be very different in each country for a basically similar case. The scenarios themselves change from time to time or will be updated according to the newest state of information in the crime scene. Up to now, the test results of the centres are not mutually recognized mainly because of the specific national requirements and the existing rules of concealment.

ECAC centre can provide only open knowledge to the CREATIF consortium (no confidential information). A comprehensive knowledge transfer to CREATIF is highly unlikely. Aviation standards on security might also not be valid for the land and border security systems.

2.1.3 Session 3: The European perspective: CBRNE detection equipment testing and standardization

(Moderator: J. Foghelin, Rapporteur F. Röhrbacher)

Jan Foghelin gave a short introduction mentioning military – civilian overlaps, which definitely exist for the topic of CBRNE detection. A broad approach and the usage of scenarios is needed to improve testing, also financing of testing work is necessary. Testing centres could be used as “honest brokers” for stakeholders using detection equipment.

**European Commission DG Enterprise, Clement Williamson:
“FP7 Security research with focus to CBRNE”**

C. Williamson gave a short overview on FP7 security research, the main topics and its funding schemes. Total budget: 50.5 x 10⁶ Euros. Most money goes to technology development, but a part is spent on knowledge dissemination and coordination. CREATIF is such a coordination action under FP7. The simulation of cooperation between providers and end-users is an explicit issue.

FP7 is purely civilian; nevertheless CBRNE is a good example, where the border of these two domains is difficult to define.

Security research has grown over the years (PASR 39 projects; FP7-2007-1: 50; FP-2009-1: 32 under negotiation). Projects related to CBRNE are numerous, see list on the slides in Annex 1.

Q&A:

Are there funding sources available in EC to fund a round-robin exercise of CBRNE detection testing centres across Europe? A: even if the funding scheme of coordination actions is mainly focused to organization and dissemination of information exchange, other work is possible to be funded, if justified. If there is a need for activities, a suitable way of funding can be found; contact with the Commission is encouraged.

**European Defence Agency, Hillary Davies:
“EDA project proposal for standardization of T&E for Bio DIM”**

Ms. Davies gave a short description on the structure and mission of EDA (help maintain & improve military capabilities; customers are the defence ministries of EDA member states). CBRN protection is one of 4 priority areas; an expert group on “PT-CBRNE Counter-measures” has been established. Research on CBRN is coordinated on a regular basis with both NATO and FP7/EC to avoid duplication of research funding (rather find complementary topics). A BioDIM standardization project was presented, which will start in 2010. Standardization is needed, because most R&D on equipment & techniques is carried out on national basis. A lack of interoperability has been observed, performance testing is needed. “Standardization of testing methods for BioDIM” was started with a workshop in June 2009. A detailed project work plan will be developed in 2010 and then the project will be started, if funding from the Member States is provided.

Q&A:

Creatif produces standards, BioDIM will produce standards; non-participating countries can ignore both initiatives? A: Results of EDA projects are shared as much as possible, but this depends on the decisions of Member States. The approach of CEN is too open for EDA, concerning confidentiality issues. There are different ways of coordination between EDA and FP7 activities; the participant lists of relevant events are very similar – the CBRNE community is not very big. You can get both (civilian and military) sides, if both Ministries of Defence and Interior are involved in discussions.

**Joint Research Centre Ispra, Inst. Protection and Security of the Citizens, Adam Lewis:
“ERN-CIP European Reference Network for Critical Infrastructure Protection - a
proposed network for experimental security in support of CIP policy in Europe”**

Adam Lewis gave an overview about a new JRC project funded by DG JLS to improve critical infrastructure protection in Europe. In the pilot phase testing facilities are identified in EU-27, where experimental data for possible impact of threats on critical infrastructures and its failure can be produced. These data are necessary for the validation of models and simulations, such tools are helpful for assessment of CI protection measurements. Data are collected to get an idea on outcomes of extreme scenarios incl. total destruction of CI.

A European approach is needed because many critical infrastructure items (e.g. electrical power supply, IT networks) have a transboundary impact, if failure occurs. Nations have a policy on protection, but European coordination is not yet fully developed. There is a need for experimental data and information on vulnerability of CI and typical threats.

Q&A: no questions

Panel discussion:

Statement: There is a need for certification of equipment to

- help users to shape bids.
- provide help for industries to have EU requirements
- standards are useful to reduce cost of equipment (once evaluated, it can be purchased in the whole EU).

Clear message from ESRIF to increase certification & standards for security products.

No other issues for panel discussion – end of session at 17:20 h.

2.2 Day 2 - Technical discussions on testing of CBRNE detection equipment

2.2.1 Plenary introductory session

The second day was opened with a series of presentations from consortium members, who summarized briefly the state of the art and specifics of testing of detection systems for chemical, biological, radiological and explosives threats, respectively.

Presentations given by the speakers named below can be found in Annex 1.

C-detection: René Olivier, TNO

B-detection: Pär Wästerby, FOI

RN-detection: Friedrich Röhrbacher, SL

E-detection: Dominique Munoz, ETBS

It becomes evident that for each of the threats (C / B / RN / E) there are many different technologies available for detection systems. The design of the detector depends on the operational use and detection scenarios: portable devices for detection / warning; mobile laboratories for identification, verification of threats, quantification; stand-off systems for continuous monitoring; portal systems for the scanning of moving persons or crowds or vehicles passing a fixed portal.

For C, B, and E detectors' testing, challenging of detectors is dependent on the production of well-defined test substances (e.g. vapours, cultures, aerosols). In contrast, testing of RN detectors mostly is carried out with sealed sources, so the testing environment is much easier to produce. Common issues are the testing under rough environmental conditions incl. extreme humidity and temperatures.

After the plenary presentation of the state of the art of detection testing, smaller groups gathered to discuss special details about the C, B, RN and E, respectively. The basic idea was to discuss the basic requirements necessary to create a testing standardization procedure.

2.2.2 C-detection discussion group

Moderator: René Olivier, Rapporteur: René Olivier and Yves Gaubert



Attendants: Osmo Anttalainen (Environics Oy, Finland), Josef Brinek (SUJCHBO, CZ), Tom Craik (Metropolitan Police, UK), Yves Gaubert (Thales, F), Alfred Krippendorf (HCG-Hazard Control, DE), Orjan Martinsson (Swedish Coast Guard Headquarters, SE), Iain May (Smiths Detection, UK), Sune Nyholm (FOI, SE), Hans-Joachim Töpfler (Kärcher Furutech, DE)

Introduction

The target was to discuss the basic testing requirements that would be needed to create a testing standardization procedure for C detection equipment. The "C-group" consisted of several stakeholders, with representatives from manufacturers, test experts, end-users and safety experts. Similar to other groups, the the general conclusion from the discussions is that a standardization effort would be useful for all stakeholders (end-users, manufacturers, and test houses). We have started to address the most basic questions in the process of standardization. As CREATIF is mainly a networking project, the available work-power is

limited and will be focused to collect available information on testing protocols, and to create a platform for future standardization work.

After a short introduction of the participants of the group, discussions started.

Discussion topics and conclusions

Chemical threats are complex and changing; there is a large variety of chemical substances

- First develop test and methodology based on military standards
- Starting point could be CWA (chemical warfare agents); add TICs (toxic industrial chemicals) in a second step
- Need for comparability of testing:
 - Procedures
 - Protocols
 - Facilities
- Advantages of intercomparison exercises for testing are underlined
- Reduce costs : international testing cooperation on regular basis (round Robin)
- Need to agree on reference agents and interferent substances for testing
- Have laboratory testing and outdoor testing (in a later stage)

The group agreed on some next steps to be carried out within the CREATIF project:

- Follow on workshop to agree on workload within CREATIF project
- Creation of an information sharing network for partners
- Provide an roadmap with a set of smart measurable building blocks

2.2.3 B-detection discussion group

Moderator: Torbjörn Tjärnhage, Rapporteur: Pär Wästerby

Attendants: Paul Pashby (Smiths Detection, UK), Jim Ho (DRDC Suffield, Canada), Adrien Plecis (CEB, F), Martien Broekhuijsen (TNO, NL), Jasper Kieboom (TNO, NL), Jérôme Louat (Thales, F), Patrick Harrison (Home Office, UK), Laura Butchins (Home Office, UK), Alan Traylor (Dycor, Cyprus), Jan Foghelin (FOI, SE), Jean Cornier (VDL Consult, DE)

Introduction

The “B-group” consisted of several stakeholders: manufacturers, test experts, end-users and safety experts. The discussions in the group were very active, although the task seemed overwhelming, realising all obstacles that have to be solved before a good standard can be created. The general conclusion from the discussions is that a standardization effort would be good for all stakeholders (end-users, manufacturers, and test houses). We can also conclude that we have barely started to address the very most basic questions in the process. CREATIF is mainly a networking project and its resources to actually carry out work in a standardization creation process are limited. Mainly it is intended to collect information and create a platform for future work.

After a short introduction of the participants of the group, discussions started. This paragraph is meant as a short summary of these discussions.



Discussion topics

Standardization / certification

An early point of discussion was the distinction between standardization and certification. Certification procedures is certainly a final goal, but as the group concluded that this has to rely on an underlying set of standards, and those standards have yet to be developed first, the group therefore decided to focus on standardization.

What is a biodetector?

When CREATIF was formed we had the discussion within the consortium what is meant by a biodetector. The tentative conclusion was that we were NOT considering standard laboratory analytical systems (such as a normal PCR instrument), but we were rather referring to more mobile systems that are supposed to be operated in the field by a first responder for instance. We were also considering that the biodetector would be a biological aerosol detector. With the primary CREATIF objective, to create a network of facilities that can test biodetectors, we were, therefore, focusing on mapping test facilities that could do biological detector tests using an aerosol exposure system (chamber, wind tunnel, etc.).

Of course, there is a wider set of biodetectors available than our initial reduced definition and a short discussion in the beginning of the session illustrated this by the fact that some of us mentioned “an instrument giving an indication of an aerosol with characteristics similar to a bioaerosol” as our biodetector in mind. Others mentioned “an instrument giving alarms of a threat mainly from a found powder or sampled liquid (or sampled aerosol)”.

We continued the discussion, with the former definition (aerosol detector) primarily as a guideline, even though the “white powder” was brought up in the examples later on.

Reference material

One of the main discussions in the group was the use of a common reference material in the testing procedures. Such a material would most likely be required to establish a standard.

Requirements for a reference material are that it should have some physical, biological and chemical properties similar to a relevant threat agent (at least in properties that can be measured by a detector under test), be readily available at a fair cost, and that it is well characterized. There must also be some kind of analytical reference method to determine its concentration.

Artificial material

The concept of creating an artificial substance with biological characteristics was discussed. Latex particles are, for instance, already used as reference material when calibrating aerosol

particle counters and sizers. Such particles in a suitable size range could be coated with chemical and biochemical functional groups that mimic bacteria or virus particles.

The advantages would be that the material could be physically and chemically well defined and it could be very stable.

The problem that may arise when designing an artificial reference particle is that it may be difficult to predict what possible target molecules a future biodetector will use in their detection principle. For instance, fluorescence based biodetectors are aimed at specific molecules associated with life processes (certain amino acids, NADH, and flavines for instance). Other detectors, such as the flame photometric based detectors, depend on the characteristic ratio of the elementary composition of the particle, while mass-spectrometric based detectors use the molecular fragmentation pattern. Immunologically based detectors will, on the other hand require a particle with a specific antigen expressed on the surface.

To create an artificial particle with all possible similarities with a real microorganism would probably be very difficult and expensive. Realistically, it would be possible only to create a limited reference material suitable only for a certain technology in biodetectors.

Simili substances

An obvious alternative is to select a suitable “simulant” microorganism that has great similarities to the real, dangerous microorganism but without its pathogenic effect. Such material contains the “real mix” of amino acids, metabolic molecules, and surface proteins and therefore it will work for any possible technology used in the detection procedure.

Biological matter is by nature diverse, and a simulant microorganism may not be identical if it has been prepared in one lab compared to another lab, even if they have followed the same protocol.

Within the group there were many different opinions about the “plus and minus aspects” of different simili substances. However, one of the most widely used simili substances in this area are spores of *Bacillus atrophaeus*, formerly known as *Bacillus globigii* or just “BG”, which is a simili substance for *Bacillus anthracis* (the microorganism that causes Anthrax).

The group decided to use BG as a model reference material specifically to focus the discussion on the next step of questions rather than arguing what reference material is best.

There were two different approaches on how to provide the reference BG mentioned. One way is to specify a standard protocol for the production of BG spores, i.e. how to grow and to prepare the material. In this case it is important to carefully characterize the material so that it complies with a set of quality criteria.

Another approach is to make a huge batch of BG by one organization, characterize its properties and then package the material in smaller aliquots and distribute to the different users. In this case the absolute characteristics of the material are less important; as all users are using the same batch the test results can be compared.

Development of test standards

In the end of the discussion a structure for the standardization was proposed. It is composed of three topics; to enable standard test conditions, standard methods to get comparable measures on detector performance, and operational testing. Under each topic there will be sets of standards and presented here is just an example.

- standard test condition
 - standard BG
 - standard dissemination equipment and procedures
 - standard reference techniques and procedures
- standard tests methods
 - standard of obtaining Limit of Detection
 - standard of obtaining false positive/negative rate
 - standard of obtaining detection sensitivity
 - standard of obtaining detection response time
- Operational testing

Conclusion

All experts agreed that standardization of B-detector testing is very difficult and a long way to go. The difficulties are caused for a large part by the complexity and instability of biological materials and the great variety of technologies used to detect them. During the discussion, it was often difficult to stop summing up and describing all kinds of hurdles and instead to focus on finding the first small steps for improving the situation. However, all agreed that standardization would be good for all stakeholders. The group was able to spend part of the discussion to suggestions for better standardization, mainly focussing on the use of one example of a simulant (BG spores, the least controversial of the list) and a way to define the common elements of a standard test. All agreed that exchange of knowledge and materials would be helpful in achieving the goal.

The following comment has been submitted by one participant (testing expert) of the B-group as a personal view.

Comment on Bio-Detection Discussion by A. Plecis, Head of the bio-aerosol department, CEB, DGA, France

“Testing standardization of biological detection systems: What is to be standardized? What can be standardized? How to standardize?”

Who needs standardization? End users do, because they need to be able to compare the systems and to trust the results of the evaluation tests. As a consequence, the manufacturers have a strong need for this standardization process, because they want the end user to be convinced by their products and to show the potentialities of their systems. As a final consequence, testing centres will have to offer standardized evaluation, but it is not a fundamental need for the testing centres. Standardization is a good way to increase their protocol reliability, to share knowledge, to rapidly evaluate the cost of an evaluation.

What seems essential, in this CREATIF Network, is that testing centres listen attentively to end-users and manufacturers. From this first workshop, a number of needs have been expressed:

1. Standardization of laboratory testing methods is necessary

2. The standardization should focus on the method of description (typology of specifications and testing protocols) but should not define the system specifications themselves (e.g. no standardization of the acceptable threshold).
3. The whole system should be tested “as a black box”. The testing of the different elements of the system or the theoretical evaluation of the Limit Of Detection (LOD) is a matter of expertise (useful for R&T purposes) and is not a matter of unbiased testing.
4. All available simulants (bacteria, spores, viruses, and toxins) should be taken into account as the threat is diverse (according to the needs of the end user).

A number of basic questions have not been addressed in detail during this first workshop, such as the suitability of specific simulants for testing detection systems (BG, E. coli etc.). Other questions to be addressed refer to the purity of the testing agents and other parameters related to the production of reference materials; particle sizes of testing agents; how to treat problems like background and interferents in testing procedures; concentration ranges in testing protocols etc.

All these questions finally lead to a main, still unanswered, one: **What is the list of measurable capabilities that should be tested in a standardized evaluation process?**

This question could be postponed, and we could preferably debate on the technical ways to obtain the most reproducible protocols (from one testing centre to another). But do testing centres need the end-users and manufacturers to answer these questions of “how to”? The priority today should be to take profit from the presence of end users and manufacturers so that their need is (i) well understood, (ii) redefined if not relevant (from an expert point of view) or realistic (from a tester point of view). The standardized description of biodetection systems will necessarily be a compromise between what end-users and manufacturers would like to know and what testing centres can tell about the systems. If we manage at least to answer the questions “what is to be standardized?” and “What can be standardized?” during this CREATIF network, it would be a strong basis to answer the final question of “how to standardize”, which could necessitate a second round of discussions between testing centres only.

2.2.4 RN-detection discussion group

Moderator: Friederike Strebl, Rapporteur: Friedrich Röhrbacher

Participants: Laura Butchins (UK Home Office Scientific Branch, testing expert); Pawel Krajewsky (PL, Central Laboratory for Radiological Protection Poland, testing expert); Veronique Berthou (EC; JRC, Inst. Protection & Security of the Citizen, Perla Laboratory, testing expert); Heinrich Meurer (DE, GeoTec Exploration mineralischer Rohstoffe GmbH, researcher); Wolfgang Rehak (DE, OUT e.V. = Aviation security consulting; researcher); Erik Johansson (SE, FOI, end-user/testing expert); Wolfgang Rostenstock, Sebastian Chmel (DE, Fraunhofer INT, testing expert, researcher); Mark Miller (CH, Cotecna SA; end-user consultant), Ted Kochansky (US observer, testing expert), Friederike Strebl and Friedrich Röhrmoser (AT, Seibersdorf Laboratories, testing experts).

Introduction

After a short introduction of participants, we started the discussion. It soon turned out that the

complexity of the topic needs a very well-structured plan to discuss different aspects separated from each other; otherwise it is difficult to come to any conclusions. General agreement was found that oversimplification is also not the way forward to address the topic. The discussion is shortly summarized below. Finally, the group restricted the discussion to the question of defining an intercomparison exercise for RN detection testing facilities, which resulted in several common conclusions.



Discussion topics

Should scenarios be taken into account for testing of detection equipment?

Possible scenarios for RN detection systems are numerous (e.g. vehicle on a road carrying a hidden source; dispersion of a “dirty bomb”; cargo containers (containing a well-shielded RN source)). Also the possible list of end-users is long, and respective detection needs are different: inspection

staff at the border (prevent illicit trafficking of RN material); fire-man at a CBRNE event scene, etc.

The scenario approach can give criteria, to determine what a good detector is – but these criteria are scenario-dependent, and therefore cannot be generalized. Therefore, scenarios can be used for the definition of a specific test, but rather not included in standards.

Concerning testing, normally limitations are given by physics (detection limits under given conditions) and technology (the specific equipment tested – a simple dose rate meter cannot be used for identification of an unknown specific radionuclide).

Is standardization needed?

There are already standards available for testing of equipment from IAEA IEC and several national standardization bodies. UK is just now drafting a national standard for hand-held RN detection equipment, based on IAEA procedures, operational aspects are included.

Is an intercomparison-exercise of testing centres a benefit, and if yes, how could it look like?

Intercomparison of testing centres is necessary to provide information on the comparability of results; an objective evaluation of the quality of testing results carried out under comparable conditions is very helpful for end-users.

JRC will start a big project on the testing of RN detection very soon. Tests will be performed according to international standards (IEC) and IAEA standards. Aim of the project is to provide data on different RN detection systems already on the market and allow comparison of capabilities of detectors. The project will cover hand-held and stationary detection systems. Testing experts can participate as individual experts.

→ in CREATIF “intercomparison” means ‘testing of testing centres’, not ‘testing of equipment’

Availability of testing results is very limited at the moment, sharing of information would be desirable. This depends on the customer (results can only be published by the customer, not the testing centre – rules for accredited laboratories on confidentiality of produced data). A sponsored round-robin exercise for testing centres would produce publishable testing data.

Some important points for the definition of a round-robin exercise could be identified

- An intercomparison exercise funded with public money should produce valuable information – so no need to test already well-defined equipment, rather concentrate on newer, more sophisticated technologies (spectroscopic devices).
- include more than one piece of equipment (e.g. from different vendors) to stay “neutral” in the exercise
- Two possible set-ups:
 - send around standardized container with standardized shielding of a source
 - send around one piece of equipment
- Test the library of RN-detection systems (use a variety of different sources to produce more information on the capability of the tested instrument)
- Use of Specific Nuclear Material
in many standards the use of SNM is part of the testing procedures. SNM is strictly controlled and not all laboratories have access to fissile material. For an intercomparison exercise, a core set of tests could be defined, which have to be reported, and additional tests (like with SNM) are possible, but not mandatory. Every other test beyond available standards can be reported and will be evaluated in the comparison.

If you want to test the performance of testing centres, you need to agree on a given protocol (e.g. published standard), make experiments to define the measurement variability of a group of “identical” detection devices, which then will be sent out to participating laboratories (i.e. have more than one piece of equipment to save time, but keep control on factors for data variability). Reference sources have to be produced / selected by the laboratory (this is part of the testing procedure).

- Field testing vs. laboratory testing
Tests should be carried out according to agreed standards. Additional tests (based on internal protocols), e.g. to cover more operational issues in the field, can be reported by the laboratories.

Conclusions

- Huge complexity - this meeting is a starting point → a structured discussion is needed
 - Not attempt to find global solutions on testing
 - Testing the laboratories is our topic (not testing equipment!)
- A quality assurance system for testing centres and harmonization of protocols is suggested

- Produce added value for end-users with round-robin exercises (test new technologies, test different brands of the same device, test the RN library of devices by using different test sources)
- for round robin exercise: use available standards suited to the selected detection equipment
- layered approach: list of minimum testing parameters to be covered, more effort (tests with alternative radionuclide sources, SNM) is welcome
- field testing vs. laboratory testing (address field tests in a second phase)
- use CIRCA web-service
 - to share testing results as far as available
 - offer discussion groups on selected topics

2.2.5 E-detection discussion group

Moderator: Dominique Munoz (ETBS), Rapporteur: Regis Bourliaud

Participants: 6 manufacturers, 2 end-users, 8 testing experts

From the long list of possible questions, only a few could be discussed in detail. Following conclusions were drawn at the end of the discussion.



Discussion topics and conclusions:

Are there specific issues of testing related to the threat?

- Link scenarios with tests protocols
 - Manufacturers need adapted facilities to assess their equipment, with real explosives (not only simulants)
 - Focus on liquid explosives and their components (duty free products, cosmetics, ...); tests are needed to identify / characterize them.
- Difficulty to characterize new explosives (lot of tests are necessary, few facilities are able to do that)

Availability of standard protocols for testing (incl. operational tests)

It was agreed to share work of information collection among the group members. Following tasks were identified:

- Establish the list of available standards and protocols, send it around to be upgraded by participants

- Identify who can do what (list of the laboratories and their capabilities) and which standards to follow or to create.
- Necessity to have graduated tests (e.g. A : threshold level, B : statistical tests, C : field tests) related to the detection capability of equipments
- explore possibilities to make available ECAC protocols and threat list (restricted information) (at least meta-information describing the content of these documents could be provided)
- Manufactures have difficulties to obtain these protocols, threat list, test results.

Where you get the agents necessary for testing detectors?

- Simulants are good for early stages of tests but at a later stage we need real explosives for testing detection systems
- Simulants used for a technology are not appropriate for another one (e.g. x-ray, IMS, neutron activation...)
- It is more complicated for home made explosives
- A list of “recommended” simulants would be helpful for each family of detectors (or technology)

Do we need harmonization / standardization of testing, how could it work?

Yes we need (e.g. intercomparison exercises). One example is the standard for mm wave imaging systems; it was published by the Industry Wireless Packaging Consortium (IWPC)

According to the group, a harmonized protocol should include:

- Manufacturing of samples (reference materials)
- Testing procedures:
 - 1st level : need for standard for laboratory tests
 - 2nd level : no need for a formal standard, just a check-list to be sure that the requirements are reached (environment parameters, performances, handling, human factors)

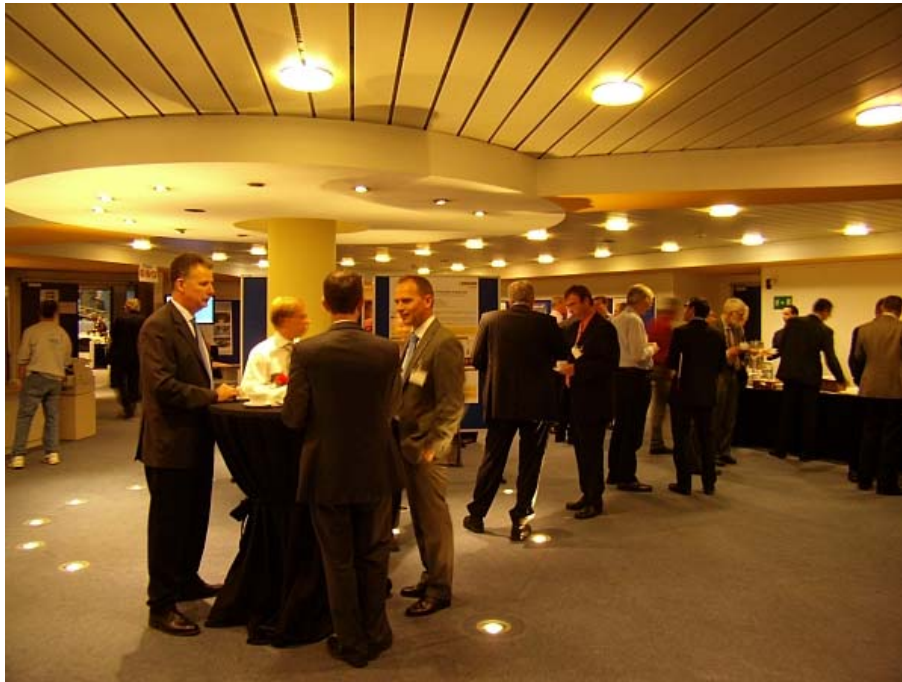
For intercomparison exercises we need to consider:

- Definition of reference basic samples
- Start tests with simulants and then, if good results are produced, continue on real explosives
- Difficulties related to an intercomparison exercise: cost of transportation, security, regulations

2.2.6 Final general conclusions from all the four discussion groups

Although technologies and technological readiness of detection systems is different for the four threat groups, some general conclusions could be drawn based on the report from the groups.

- Standards are needed (and/or compilation of available protocols is needed)
- Agree on well-defined reference materials for testing
- Laboratory tests AND field testing (in a second stage) is necessary
- Develop intercomparison exercises for testing centres
- CIRCA web-service
 - to share information on testing data (open information);
 - establish electronic discussion groups



2.3 Poster presentation

Following posters were presented at the workshop and were made available in electronic form. Please refer to Annex 1 to see the pdf-documents.

CBRN Decontaminability of Detection equipment.

Toepfer H., Kärcher Futuretech GmbH

DGA Land technical unit capabilities related to explosive detection.

Bourliaud R., ETBS, Ministère de la defense

Biodetection field trial and aerosol chamber capacity in Sweden.

Tjärnhage T. et al., FOI-Swedish Defence Research Agency

Testing and improving the detection capability of portal monitoring systems at high transit speeds.

Schroettner T. et al., Seibersdorf Labor GmbH

Sensor testing at CLOR - Central Laboratory for Radiological Protection.

Krajewski, P.

Bioaerosols testing facilities at CEB.

Plecis A. et al., CEB France

Development of a Method for Conducting Outdoor Field Trials Using a Compact Aerosol Test System.

Nicol, S. et al., DYCOR

Fraunhofer Institute for Chemical Technology - ICT - core competencies in security and safety research.

Bunte G., Krause H., Schnuerer F.

BiosparQ – Bio aerosol detector developed at TNO.

Bruggeman J., TNO

Testing your Bio-detector at the TNO bioaerosol test chamber.

Broekhuijsen M., TNO

Detector Systems for Fast Search and Identification of R&N Material in situ.

Berky W. et al., Fraunhofer INT

2.4 Electronic documentation of the workshop

Starting with the first announcement of the workshop, all available information has been made available on the project web-site.

There you can find all the presentations (as far as agreement from authors was given to publish their work electronically) as well as slides with conclusions of discussions.

If interested, go to: <http://www.creatif-network.eu/workshop1.html>

3 Conclusions

The number of participants to the workshop exceeded the expectations, given the limited size of the stakeholder groups related to CBRNE detection. This is interpreted as high interest of stakeholders in the work and objectives of the CREATIF project.

Some final conclusions drawn by the CREATIF consortium are:

- Testing of CBRNE detection equipment is a relevant topic, which can attract a relevant number of stakeholders, who want to be involved in the further development of the topic.
- Testing of CBRNE detection equipment is very important – this was stressed by both end-users and manufacturers, who see the clear benefit of testing for the development of better products and efficient use of money to better cover user-needs.
- Standardization of testing is needed to increase comparability of testing results and the time to start this process seems to be now.
- The European Commission and EDA will support the process of standardization as it matches with their priorities.
- Testing experts are very motivated to exchange knowledge and start discussion on the process of improvement of testing protocols → there is the wish for follow-up events.
- Intercomparison exercises are welcomed by most experts; this would be a practical way to exchange experiences on testing.
- Standardization should focus on laboratory testing, not become too broad, complementary testing (field tests, operational aspects) can be defined in “check-lists” or protocols rather than in standards – it should be possible to define these issues specifically according to end-user needs.

Already during the workshop and also afterwards we received very positive feedback. Many participants expressed the wish for further events to carry on the discussion process. One participant (not a consortium member and not affiliated to the project up to now) sent a very short and friendly note, which could serve as a final statement:

*...What was your overall experience of Creatif?
I think it was one of the most useful EU-project meetings I have participated. The goals are well defined and there is a strong common will to make things happen. The topic is far from easy, but I think that the discussions will converge because the benefits are obvious...*