

# FP7 PROJECT ETCETERA

# Identification of Emerging Technologies and Critical Dependencies relevant to CBRN protection

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## BACKGROUND

Within the FP7-supported project "Evaluation of critical and emerging technologies for the elaboration of a security research agenda", October 2011 to September 2013) **two kinds of technology evaluation** have been carried out:

1. Technologies that are critical for security functions in Europe were checked for dependencies on extra-European sources.
2. Technologies that are now just emerging were assessed concerning their relevance for European security, with a focus on opportunities for enhanced security functions.

## EMERGING TECHNOLOGIES

**Definition:** Technologies that are relevant to European security and will reach maturity in 10 to 15 years

**Findings:** Through three different approaches, 127 Emerging Technologies were identified and sorted in 13 technology areas. Some findings related to CBRN issues are presented below. "Impact" refers to the expected influence on security issues, while the timeframe is an estimation of market availability.

### Technology Area 3 "CBRN Identification"

- Lab-on-chip (high impact, probably before 2020)
- Lasers for stand-off C&B detection (high impact, probably before 2020)

### Technology Area 12 "Sensors Technology"

- Terahertz (high impact, 2015 to 2025)
- Medical Tricorder (moderate impact, 2020 to 2030)
- Carbon Nanotube Sensors (high impact, 2020 to 2025)
- Explosive Traces Integrated Sensors (high impact, 2015 to 2025)
- Sensors on Unconventional Flexible Substrates (moderate to high impact, 2020 to 2025)
- Hyperspectral Sensors and Signal Processing (moderate impact, 2015 to 2025)
- Nano Particle Sensors (high impact, 2020 to 2025)
- OTFT Sensors (moderate impact, 2015 to 2030)
- Muon Tomography (high impact, 2015 to 2025)

Technology Area	NATURE OF THE DEPENDENCY				OBSTACLES TO CLOSING THE GAP					
	IPR & Trade Restrictions		Production Gaps		Capacities		Market Inadequacies		Ethical Issues	
	1	2	1	2	1	2	1	2	1	2
<p><b>110 Sensor Technology and Components</b></p> <p>110-1 Neutron detection technologies (neutron tubes)</p> <p>110-2 X-ray technologies</p> <p>110-3 Gamma technologies</p> <p>110-4 Ion Mobility Spectrometry technologies</p> <p>110-5 IR Spectroscopy</p> <p>110-6 CW/Visible wave sensor technologies</p> <p>110-7 UV-Vis Spectroscopy</p> <p>110-8 Raman technologies</p> <p>110-9 Raman Spectroscopy</p> <p>110-10 RF Sensor technologies</p> <p>110-11 Micro- and Millimeter Wave sensor technologies</p> <p>110-12 Hyperspectral technologies</p> <p>110-13 Multispectral technologies</p> <p>110-14 Acoustic sensor technologies</p> <p>110-15 Non-ferrous metal sensors</p> <p>110-16 Nail detectors</p> <p>110-17 RFID detection</p> <p>110-18 Cable detection</p> <p>110-19 Techniques for discrete surveillance</p> <p>110-20 Sensor based images and imaging technologies</p> <p>110-21 Microchemical Sensor Systems (MCS)</p> <p>110-22 Microchemical Sensor Systems (MCS)</p> <p><b>111 Information technologies</b></p> <p>111-1 Image pattern processing technology</p> <p>111-2 Pattern recognition</p> <p>111-3 Data collection and identification</p> <p>111-4 Data and information fusion technologies</p> <p><b>112 Biotechnology Science &amp; Medical technologies</b></p> <p>112-1 Medical products and materials</p> <p>112-2 Human survivability, protection and stress effects</p> <p>112-3 Biomedical Engineering</p> <p>112-4 Biomedical technologies</p> <p>112-5 Rapid diagnosis of infectious disease</p> <p>112-6 Telemedicine (diagnosis and surgery)</p> <p>112-7 Novel sensors, antibodies, vaccines, and drug development</p> <p>112-8 CBRN knowledge and related data bases</p> <p><b>113 Biotechnology</b></p> <p>113-1 Biological technologies</p> <p>113-2 Rapid analysis of biological agents and of human susceptibility to diseases and toxins</p> <p>113-3 Bioprocess technologies</p> <p>113-4 Contamination and poisoning of agriculture (water, soil, etc.)</p> <p>113-5 Food and animal viruses</p> <p>113-6 Food testing and control techniques</p> <p>113-7 Water testing and purification techniques</p> <p>113-8 Decontamination techniques</p> <p><b>200 Sensor Equipments</b></p> <p>200-1 Chemical</p> <p>200-2 Electrical and electro-chemical sensors</p> <p>200-3 Particle detection sensors</p> <p>200-4 Chemical and/or fluid substances detection</p> <p>200-5 Biological substances detectors</p> <p>200-6 Radiological and nuclear detectors</p> <p>200-7 Multi-sensor systems</p> <p>200-8 Visible sensors</p> <p>200-9 Chemical, Biological, Radiological and Nuclear (CBRN) protection and decontamination</p> <p><b>204 Equipment</b></p> <p>204-1 Chemical agent defence, precursors and related materials</p> <p>204-2 Biological agent defence, precursors and related materials</p> <p>204-3 CBV countermeasures - Medical</p> <p>204-4 Decontamination and public decontamination</p> <p><b>210 Explosives removal</b></p> <p>210-1 Explosives detection equipment</p>										

Table: Weighted-Bit Assessment Table of Critical Dependencies based on the STACCATO taxonomy (selection of technologies with high relevance to CBRN)

## CRITICAL DEPENDENCIES

**Definition:** Technologies that are indispensable for European security, but that rely on non-European sources or providers

**Findings:** An overview of first results concerning Critical Dependencies relevant to CBRN protection can be found in the Weighted-Bit Assessment Table of Critical Dependencies (WBAT-CD) depicted in the table above.