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SURVEILLE

Surveillance: Ethical Issues, Legal Limitations, and Efficiency

Collaborative Project

SURVEILLE Deliverable 2.1: Survey of surveillance technologies, including their specific identification for further work

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Dissemination Level		
PU	Public	**X**
PP	Restricted to other programme participants (including the Commission Services)	
RE	Restricted to a group specified by the consortium (including the Commission Services)	
CO	Confidential, only for members of the consortium (including the Commission Services)	

§1 Introduction

This document presents the results from the initial survey of surveillance technologies for the SURVEILLE project. After initial information gathering it was found to be very difficult to describe surveillance technologies as a homogeneous group of technologies. Any technology that contributes to a surveillance task may be designated a surveillance technology. That makes it hard to construct a simple technical taxonomy system that describes surveillance technologies as a group of technologies.

Alternatively, a technical framework is constructed that combines technical concepts to judge the contribution that surveillance technologies have surveillance tasks in fighting serious crime and terrorism. This technical framework provides guidelines for both a taxonomy structure and basic technical principles for cost-benefit analysis. The framework reached its current form after discussions between several SURVEILLE project partners: the technical partners of the project (Fraunhofer Institute, Freiburg University and Delft University) and non-technical partners (European University Institute and University of Birmingham).

The survey does not include an extensive list of surveillance products and technologies. That list could reach thousands of entries but does not necessarily increase our understanding of the technologies. For this report 45 technology sheets were produced that illustrate the variety of technologies. The focus is on new surveillance technologies, since they provide discussions for the future. When the need arises, additional sheets may be added.

Paragraph 7 describes elements that are currently thought to be important for the development of a cost-benefit model for surveillance technologies. This framework may be changed as insights progress in the course of the SURVEILLE project.

§2 Technical description of surveillance technologies

In the security context, *surveillance* comprises the targeted or systematic monitoring, by governmental organizations and their partners, of persons, places, items, infrastructures (including means of transport) or flows of information, in order to identify hazards and manage risk and to enable, typically, a preventive, protective or reactive response, or the collection of data for preparing such a response in the future.

The added value of surveillance *technologies* is that they expand human capabilities. Some technologies observe what is hidden from human senses. Some reach points that are difficult or impossible to reach for humans. Some enable continuous monitoring. Some multiply the work that a single person can do.

Surveillance technologies for serious crime and terrorism serve a specific purpose. They contribute to effective and efficient observation and monitoring of crime and terrorism. Any technology that can contribute to that aim may become surveillance technology. That makes it hard to construct a simple technical taxonomy for surveillance technologies. Alternatively, a framework is constructed that combines technical theories to judge the contribution that surveillance technologies have on fighting serious crime and terrorism. The theories originate from generic risk management and information technology. Juridical, political and ethical concepts that present limitations of use and determine effectiveness in crime control are not part of this paper.

It is important for the framework that a whole risk management cycle is considered. Risk management cycles structure activities to control risks and include more activities than surveillance. Risk management cycles differ per risk area but contain similar building blocks. In technical risk control areas, risk management cycles are basic principles[34] and part of ISO standards for risk control (ISO 31000)[1].

§3 Technical determinants of surveillance technologies

In the SURVEILLE project surveillance technology should make a meaningful contribution to the control of serious crime and terrorism. Since surveillance technologies play part in a larger risk control system it is important to determine for which purpose surveillance technology is commissioned. The generic risk management cycle is the basic tool to determine its functionality within the larger scope of the risk control system. The simplest form of a risk management system is explained in paragraph 3.1.

Regardless of the risk system, any crime or incident can be represented schematically by a bow-tie structure[3]. The bow-tie clarifies whether surveillance takes place to prevent incidents, control them while events unfold, or assist in the recovery of an incident. This structure is explained in paragraph 3.2.

Risk control can be achieved through direct (or functional) control and side effects. The validity rules for risk control barriers help determine just how effective these controls are. They are explained in paragraph 3.3.

Observations through surveillance technology yield data or information. If that information is to be used in crime control settings there is a set of qualifications that determine how valuable, valid and secure that information is. These are the information security principles. They are explained in paragraph 3.4.

These four concepts form the backbone for the framework to describe security technologies. They contribute to the classification of surveillance technologies and contribute to the technical quality assessment of individual pieces of equipment.

§3.1 Risk management cycle

The risk management process is depicted as a cyclic figure. Figure 1 shows the simplest form of a risk management cycle.

The first step in the cycle is the identification of risk. This step involves the discovery of new risks. New risks don't actually have to be risks that never materialized before but they can also be risks that were not considered before or difficult to classify or control by the current risk system.

The second step is the analysis of risk, which is split into two parts. One part is the systematic quantification of the risk. In this part, the aim is to determine the objective risk based on enumeration of risk. This may materialize as a statistic counting exercise but could also be the calculation of damages through

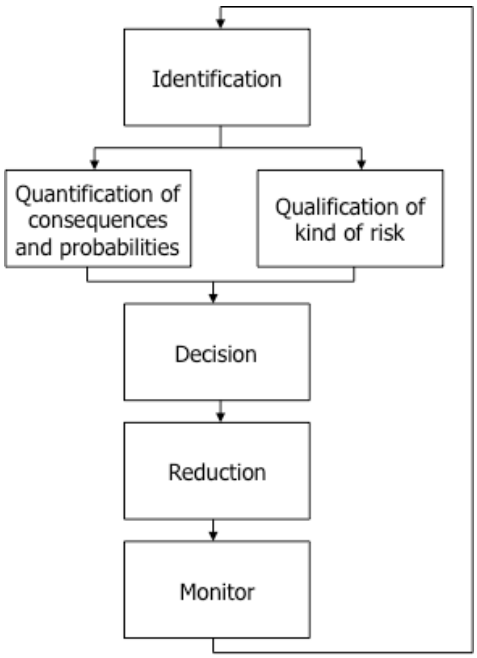

Figure 1: The risk management cycle (after ALE[4]).

mathematical models. The other part of the analysis is the qualification of risk. This part involves the subjective discussion about risk. This may be the public discussion about the societal acceptability of serious crime, the restrictions of the use of surveillance technology under human rights laws, or the amounts of funds policy makers are willing to spend on this new risk in relation to other risks. Note that one risk analysis step can differ very much from another. Some risks are more easily quantified through mathematical modeling (such as the dispersion of toxic clouds) and some risks are hard to quantify but create lively public discussions (such as the acceptability of millimeter wave security scanners that see through clothing).

The third step is a decision about further actions. This decision follows after the analysis, regardless whether the analysis was performed thoroughly or was virtually non-existent. A good decision is based on the objective, real risk, and our (subjective) opinion about them. In that case, we should have some inkling about whether reduction measures are needed, which reduction measures would be effective and how effective we want them to be.

The reduction of risks, the fourth step, is the logical follow-up to the decision to control risks. This step involves the development, installation and operation of the barriers in the bow-tie. Barriers may be any instrument, procedure, activity or law that influences the risk[2]. Surveillance technologies are amongst them.

The last step is inspection. It involves assessment methods to ensure that the barriers are still operational and functioning as desired.

The risk management process is usually depicted as a cycle. In figure 1, there is an arrow from inspection to identification but in real life, these processes are often parallel processes.

Note that the risk management cycle is a construct that can be used on various operational levels. It can be used to map a national crime control strategy but it can also be used for the control of one specific crime type such as drug trafficking in an airport through regular security checks.

Surveillance technologies are not *a priori* part of the identification of serious crime and terrorism. Though surveillance technologies may be used for reconnaissance or reveal new forms of crime or new *modi operandi*, they can also be used to support hypothesis testing or counting of incidents during an analysis step and they can be used routinely in crime control barriers as risk reduction instruments for known and repetitive crimes or forms of terrorism. In decision making and monitoring, however, they do not play a role. For the SURVEILLE project, it is important to determine for which purpose surveillance technology is commissioned and in which step of the risk management cycle it operates. This is an important factor in the cost-benefit analysis.

§3.2 Bow-Tie

The 'bow-tie'[3] is a scientifically validated method that describes the incident in the risk-system. The original model is a Quantitative Risk Analysis (QRA) method that couples Fault Trees (FT) and Evens Sequence Diagrams (ESD) or Consequence Tree (CT). Today, it is also used as a qualitative model to describe what actions can be taken before a certain risk materializes and what actions can be taken to mitigate the effects of the risk materializing.

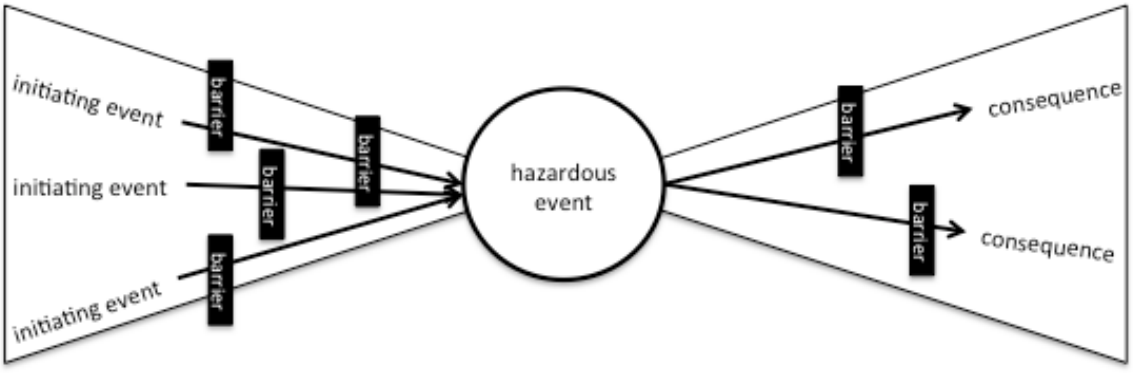

Figure 2: The bow-tie (after SRMbok[3]).

Figure 2 shows the Bow-Tie diagram. The centre of the bow-tie the 'hazardous event' is depicted. This is the moment when a crime is committed. In risk analysis literature the center is often 'accident' or 'incident'.[4] On the left hand side of the bow-tie threats are given that can lead to the hazardous event. Paths toward the event are scenario's or *modi operandi.* 'Barriers' prevent the hazardous event from materializing. On the right hand side, the consequences of the event occurring are given, paths from the event to the consequences are given and risk barriers to prevent the occurrence of these consequences or to lower the intensity of the consequences are given. Risk barriers in the right hand side are sometimes referred to as 'recoveries'.

For the application in SURVEILLE it is important to know that the bow-tie model can be compared to other sequencing models that are known from security technology, e.g. the PPRR sequence model, the DDDRR and the intelligence cycle[3]. In this work, the bow-tie is used to mark where a specific surveillance technology instrument is used: in the phase before a crime is committed (e.g. for intelligence gathering and security provision) during the crime (detection or observation of a crime in progress) and after the crime (incident response; or for juridical procedures following from the crime such as prosecution).

As the bow-tie shows risks are controlled by so called 'measures'. In the context of surveillance, measures consist of surveillance equipment and systems that contribute to the control of crime risks. That is to say, the equipment should have a meaningful contribution to the control of these risks. This can be achieved through direct (or functional) control and side effects.

§3.3 Validity rules for risk control barriers[5]

Risks can be controlled when barriers are valid. A barrier is valid if it is effective, independent and auditable.

A barrier is effective if it prevents damage or loss. An effective barrier has the following three elements: a detector, a logic processor, and an actuator[5]. The detector's function is to monitor risk-sensitive areas, processes or data - this is typically a surveillance task. The logic processor's function is to interpret the information coming from the detector and decide upon further action. The logic processor may be purely technical, such as an automated X-ray machine that separates suspect luggage from non-suspect luggage. But in many cases a human performs the logic process in a sense that he or she decides on an intervention. The actuator performs the intervention where the process is actively influenced. Table 1 gives some examples of the three elements.

Name: **Detector**	**Name:** **Logic processor**	**Name:** **Actuator**
Action: **Monitors risk factors**	**Action:** **Analyzes and decides**	**Action:** **Acts upon the decision**
Examples:	*Examples:*	*Examples:*
CCTV-camera	CCTV observer	Security guard intervention
X-ray detector	X-ray image processor	Automated luggage redirection
Vibration detector	Automated alarm logic	Police response
Internet search engines	Data fusing system + human analysis	Intervention by police forces
Dome camera in a stadium	Crisis management team	Crowd control actions by police and/or security guards

Table 1: 3 constituents of risk control 'measures' (after SHELL[5])

Surveillance technologies may include all three constituents in a single piece of equipment but often these constituents are split in pieces that are sold separately (sometimes by different vendors).

A barrier is independent if it functions independently of the threats it is to control and is separate from other barriers. The barriers cannot be considered independent from one another when there are common cause failures (e.g. when two control systems are handled by the same WI-FI network).

A barrier is auditable when an independent evaluation can take place to assure that it is operating correctly and within juridical limits. This links to accountability, responsibility and competence assurance of crime control measures.

§3.4 Information security principles

Information security applies to anyone who creates, distributes, manages, or otherwise handles information. There are six information security principles: availability, utility, integrity, authenticity, control and confidentiality. Figure 3 shows them schematically[3].

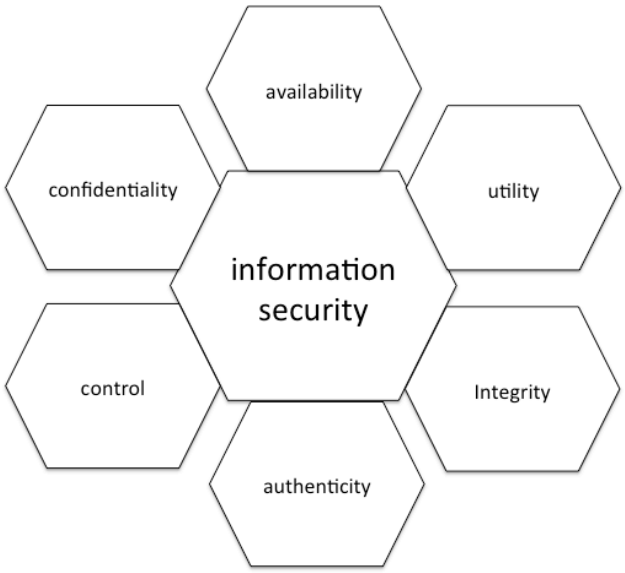

Figure 3: Information security principles (after SRMbok[3] pp 111).

Availability is the assurance that the information is available timely: when it is required without being outdated or outlived its juridical expiry date. Utility is the usefulness of the information: the information is in an accessible form that can be used to deal with the problem at hand. Integrity is the assurance that the data is not altered or distorted during transportation or handling by third parties. Authenticity is the assurance that the sender of the data is provided with proof of delivery and the receiver of information is provided with the proof of the sender's identity. Control is the assurance that nobody may access the information save the ones that have clearance to view parts or the whole of the information. Confidentiality is the assurance that the information is maintained in as secure manner with appropriate access controls.

In the SURVEILLE project, these elements are important in the cost-benefit analysis. Surveillance technologies should provide information or data (unprocessed information) that work according to these principles or embed these principles intrinsically through the technology they use.

§4 Technical determinants of observations by surveillance technologies

The object of any surveillance observation to identify, describe or quantify behaviors. In that sense, it is not different from any other kind of measurement. The definition of measurement assists the SURVEILLE project in the development of a cost-benefit analysis. The following definition is used here: measurement is a quantitatively expressed reduction of uncertainty based on one or more observations[6]. The observation is performed by surveillance technologies. The quantification lies in the use and usefulness of the information that it yields (also see paragraph 2.4). The quantification can take place in three ways: nominal (e.g. the identification or naming of a criminal); ordinal (e.g. identifying types of threats in a reconnaissance observation and determining their relative importance); and numeric (e.g. the number of offences in a certain timeframe).

The observations and the technologies used for that observation vary greatly for surveillance techniques. The first division that has to be made is between techniques for the observation of physical processes and digitized computer processes. In physical processes, objects, persons, situations or means of transport are observed. Physical observation can take place anywhere: in space, in an airport or in your house. Also, this kind of observation can take many forms: X-ray inspection of trucks, sound recording, chemical detection for explosives and CCTV systems. In computer processes digital information is monitored. This takes place exclusively in computer systems and networks and all require knowledge of computer systems and some form of computer programming.

In physical processes, there are two ways of observation: invasive and non-invasive. Invasive observation means that direct contact or a sample from the object under scrutiny is required. Examples include: DNA analysis, drugs identification, and a ‘pat down’. Non-invasive observations include: radar detection, CCTV observation and X-ray hold baggage screening.

Non-invasive methods are based on various forms of radiation. The radiation types include but are not limited to: daylight, laser light, X-rays, radio-waves, infra-red waves, UV light, sound waves and radar waves. The observation may be passive observation, where the subject is observed from naturally occurring radiation sources such as daylight, or active observation where the subject is irradiated with some form of radiation and the reflection, extinction or scatter radiation is detected. The technology survey that is part of this delivery shows the possibilities.

For computer processes, many forms of observation are possible. This has to be further developed later on in the SURVEILLE project.

Observation techniques perform measurements. If a measurement is to be successful, it has to reduce uncertainty in our knowledge[6]. This principle also

applies to the use of surveillance technologies. Surveillance technologies should reduce uncertainty by unraveling crime processes, identifying offenders or enabling effective interventions.

§5 Example: theft prevention

The technical principles in paragraph 3 and determinants in paragraph 4 are abstract technical concepts. At this stage of the SURVEILLE project, these concepts have not been translated into practical instruments. This is an exercise to be performed later in the project. This paragraph illustrates how the abstract concepts can be used in practice. For that purpose we treat a hypothetical case of theft on a construction site.

A construction site suffers from (repeated) property theft. In the night, perimeter fences were cut in a poorly lit part of the fence and costly tools and electrical equipment were stolen. This has happened a dozen times and something has to be done.

In the risk management cycle, the threat, in this case the illegal extraction of tools and equipment has already materialized. The threat is already identified. Since the thefts persist, some kind of cost analysis can be made: the cost estimate of replacing the stolen equipment, the cost of repairing the fence over and over again. That is a kind of quantitative risk assessment. Counting the number of thefts or estimating the time it takes to commit the thefts are other kinds of quantitative analyses. These quantitative analyses can contribute to the decision to take action. Parallel to the quantitative assessment a discussion takes place on whether action is justified, legal, and in what form action should be taken. For arguments sake let's say that a decision is reached to install and use passive infrared CCTV system to monitor the perimeter. When a security guard detects an intruder he or she alerts the police to intercept the thieves.

Passive infrared cameras detect heat sources such as people, animals and cars but cannot be used for the identification of individuals. That makes it a left-hand side barrier in the bow-tie: an instrument is installed to prevent the theft from happening.

For the camera system to function all constituents of a control measure have to be present. The detector is the infrared camera itself. The logic operator is split into two parts: one part is in the computer system that handles the digital signals, projects the images to the screen of a security guard. In this case, a logic decision is embedded in the computer system: only when a sufficiently strong infrared signal is detected the image appears on the screen. This automated detection algorithm saves time by focusing the attention of the security guard only when the situation calls for it. The second part of the logic operator is the human operator that sees the footage and decides whether to call the police or that there was a false alarm. The actuator is the intervention by the police. For SURVEILLE, only the detector and the automated logic operator are considered but they are only effective if the rest of the control cycle is completed. From a technical point of view, deterrence effects are side effects that are not under control. For the system to adhere to the validity rules, the entire cycle should be

auditable: all parts have to be validated by third parties. Also, the cycle should be independent from other controls. This is not difficult to achieve with the technical system since the cameras are dedicated instruments but the security guard and the police have other duties as well.

The information coming from the cameras have to obey information security principles. The information has to be available for the decision maker in time so he or she can react; it has to be useful information (e.g. the decision maker does not receive images of birds flying by). The information has to be integer in the sense that the signal is not tampered with; it has to be authenticated to know which camera (if there are more) produces the images. The information has to be in control (e.g. through encryption) and confidential so that hackers cannot view it.

Note that this is a non-invasive, passive, infrared observation of a physical process. The uncertainty about the thefts is lowered in the sense that more information is available to security personnel and the police: how many people are involved in the theft, how long it takes, whether they use a car and at what time exactly they strike.

§6 Technology data sheets

This section lists data technology sheets that were developed as part of deliverable D2.1. They are derived primarily from technologies mentioned in the ESRAB report of 2006[7]; the ESRIF report of 2009[8]; from an overview of EU-funded security research projects[9]; and research projects within the technical partners of the SURVEILLE project (Fraunhofer Institute, University of Freiburg, and TU Delft). The focus on novel and future technologies is deliberate: the results from the SURVEILLE project will be used in the future. The information was gathered from publicly available documentation. More information about surveillance technologies can easily be found through a web search. Useful search keys include: surveillance technology; surveillance techniques; surveillance products; names of surveillance technologies that you know of and names of equipment that you are familiar with.

The technology data sheets contain basic information to describe the technologies (name, description and a web-link to additional information); classification of the functionality (description of the function, and function in the bow-tie structure); elementary technical features (e.g. dimensions and weight); and operational features (such as personnel and maintenance requirements). The basic description provides a limited description of the individual technologies because in-depth scientific discussion about the underlying physical processes or technologies is of limited importance to the decision maker. Additional information can be found through the web links but much detailed information is not readily available through publicly available information.

Currently, the list of technologies is grouped in descriptors that identify a group of technologies, e.g. CCTV, RADAR, and X-RAY. The list is given below. The datasheets themselves are available as excel-sheets that enable further processing in the future. They are:

BIO - airborne ims BIO-PROTECT

BIO - continuous bio monitoring system TWOBIAS

CCTV - visual semi-automated camera Guppy_F036C

CCTV - visual spectrum dome - zoom tilt and rotate

CCTV - visual spectrum dome-fixed

CCTV - visual spectrum fixed

CCTV & ACTIVITY DETECTION - IPS Activity Detection

CCTV & INFRA RED - near field

CCTV & INFRA RED - wide area

CHEM - explosives detection by antibodies SALIENT

CHEM - explosives detection near harbours UNCOS

CHEM - gas chomatograph drugs detector DIRAC

CHEM - novel detection techniques COMMONSENSE

CHEM - precursor and drugs detection CUSTOM

CHEM - standoff explosives detection and identification OPTIX

DATA - mobile phone tap PTS

DATA ANALISIS - Omnifind

DATA ANALYSIS - detection of money landering HEMOLIA

DATA ANALYSIS - networked data analysis SCIIMS

DATA TRANSFER ANALYSIS - name recognition

DNA - rapid DNA analysis MiDAS

GPS - GPS tracker SN

IMAGE PROCESSING - crowd and riot

IMAGE PROCESSING - people counting and density

INFRA RED - motion detector

MM-WAVE - whole body scanner EQO

NETWORK - AIS ship location detection and identification

NETWORK - SIRIUS 3RK3

NETWORK - UGM 2040

NETWORK & INTERFACE - AMFIS data fusion for ground control

RADAR - acoustic sensor network

RADAR - array based concealed weapon detection radar

RADAR - array based through-wall radar

RADAR - marine Radar (ARPA, automatic radar plotting aid)

RADAR - MIMO array

RADAR - passive through-wall tracking

RADAR - short range radar for intrusion detection

RADIOACTIVE - Compton detector COCAE

SOUND - ECM8000 microphone

SOUND - sound processing FIREFACE400

SOUND - sound recording bug AU046

SPACE - spy sattelite

UAV - platform helikite balloon

UAV - platform micro helicopter

X-RAY - luggage screening

§7 Outlook for a taxonomy matrix

For the first technology scan in SURVEILLE the bow-tie is used as the basis for the taxonomy. The bow-tie model needs to be extended to capture an overview of the usage of surveillance technologies in a multidimensional matrix. During the development of taxonomy of surveillance technologies, the ethical dimension has to be included from the start. This way, we are able to organically develop an ethical perspective from this common framework of categorization, instead of producing a lose patchwork of different approaches. This section treats that extension.

1) Intelligence, security provision, incident response, *prosecution*

As has already been mentioned, the classification based on the bow-tie model allows the distinction phases and how the functionality of the equipment adds to those phases. This is suitable not only from a technical but also from an ethical point of view: Having a temporal and situational focus enables us to show that the ethical assessment of the use of surveillance technology is, in effect, ambiguous. As has become clear before (cf. Classification of surveillance technologies), it considerably depends on when and in which situation surveillance technology is used. Here four phases are suggested: intelligence, security provision, incident response and prosecution.

2) Technical details

The taxonomy needs to include key technical details about the technology. At this point it is difficult to define which technical details are the most important for SURVEILLE purposes. Taxonomy factors could include: functionality (e.g. irradiate with X-rays); size (e.g. 1,5 X 2 X 3 metres); energy consumption (e.g. 3.1 kW) and maintenance frequency (e.g. 6 weeks): operational handling (e.g. 2 people).

3) Financial details

A cost estimate is required as to project costs for the acquisition, placement, maintenance and manning is required. At this stage, it will be a coarse financial model but it is doubtless an important parameter in the taxonomy.

4) Relation to ethical discussions in the open society

In the ethical assessment of surveillance technologies, the normative benchmark will always be an open society where personal rights and freedoms and human dignity are guaranteed and respected. Adding this contextualization to the bow-tie model allows us to grasp ethical implications. Therefore the relation to ethical discussion themes is a taxonomy factor.

5) Impact on the openness of society

From an ethical perspective, it is crucial to consider the consequences as well as the unintended implications resulting from the use of surveillance technology. What impact may surveillance technology have on everyday life? For instance, will the use of surveillance technology influence individual and public perceptions (e.g. generate a new awareness of threats), feelings of people (e.g. making people feel safer or, in contrast, producing uncertainty or fear) or behaviour of people (i.e. when people are aware of being observed this will probably have an impact on their behaviour)? Furthermore, it is important to know whether the use of surveillance technology runs the risk of infringing the privacy of a person or other personal rights or freedoms. In the end, the implications must be in line with the principles of an open society. Therefore, the relation to the impact on the open society is a taxonomy factor.

6) Sustaining continual risk management cycle

It is important to note that different ‘events’ are not isolated from each other. In the aftermath of an ‘event’, new vulnerabilities will be perceived and security provision demanded. Thus, we should bear in mind that the four phases and their implications mentioned in the extended bow-tie model are part of the risk management model. Therefore, the contribution to this cyclic process is a taxonomy factor.

7) Political and cultural factors

For the initial stages of the taxonomy, the political and cultural factors will not be central. Later on, however, they will become relevant when we further conceptualize what we understand under an ‘open society’ and how it differs from, for example, authoritarian states. For the sake of completeness, we already mention some political and cultural factors.

These complications to the taxonomy complicate the bow-tie. Figure 3 illustrates this.

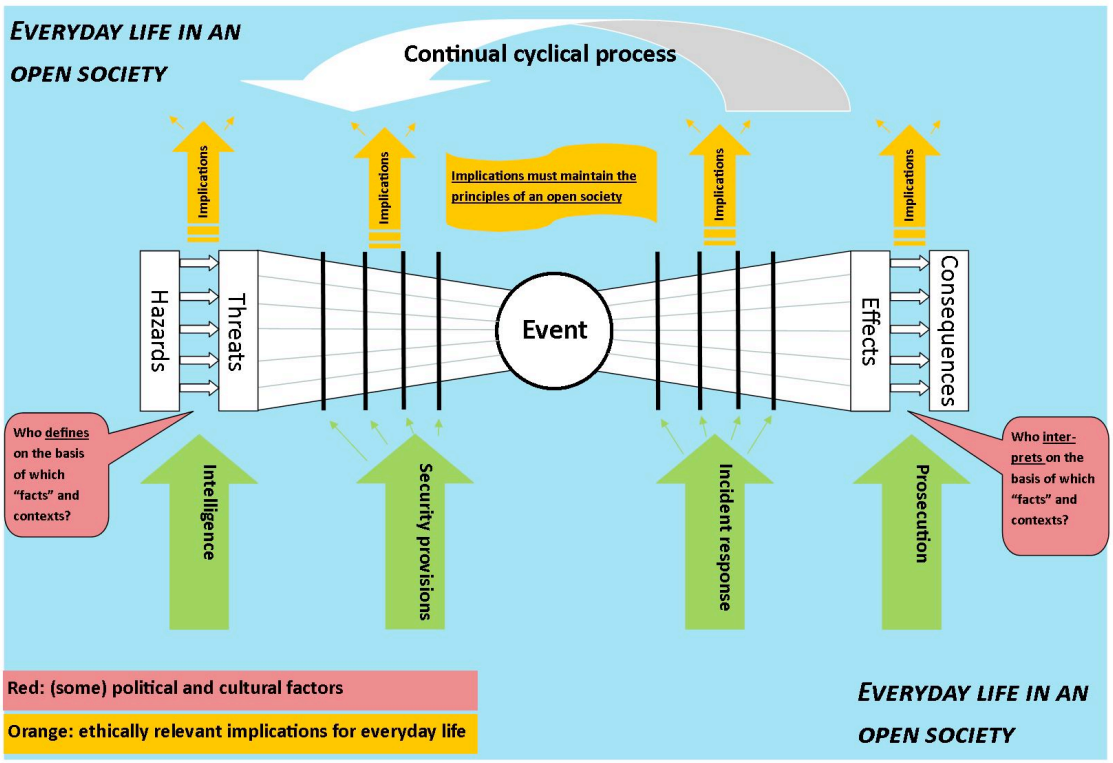

Figure 3: Multidimensional factors in the bow-tie (source: Freiburg University)

§8 References

[1] AS/NZS ISO 31000:2009 Risk management, principles and guidelines.
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[8] Mate D (2009) ESRIF final report, ESRIF project, Brussels.
[9]http://ec.europa.eu/enterprise/newsroom/cf/itemdetail.cfm?item_id=5405&lang=en&tpa_id=168&title=Investing%20into%20security%20research%20for%20the%20benefits%20of%20european%20citizens (accessed August 2012).

Annex 1: Equipment fact sheets.

EQUIPMENT FACT SHEET

Surveillance technology survey sheet
V1.1

EQUIPMENT IDENTIFICATION	
Name	BIO - airborne ims BIO-PROTECT
Description of equipment	Ionisation based mass spectroscpy for detecting ions
Group	BIO
Type	Bio-agent detector
Other	
Sources	fp7-bioprotect.eu

CLASSIFICATION OF FUNCTIONALITY	
Function description	Gas-chromatograph ion mass spectroscopy
Hazard (bow-tie left) **(to be controlled)**	
Events (bow-tie event) **(unwanted activities)**	Attack with airborn pathogens
Consequence (bow-tie rig **(of failure)**	Develop recovery plan after infection
Bow-tie functionality	Rapid biological threat detection

TECHNICAL FEATURES		
Dimensions	Car size	[m/m/m]
Weight	N/A	[Kg]
Power consumption	N/A	[W]
Control range (functional	Outside air	[m]
Autonomous operation	no	[yes/no]
Automated operation	yes	
System embedding	?	

OPERATIONAL FEATURES		
Personnel required	yes	[%]
Maintenance	N/A	[days/year]
Approximate market pric	N/A	[Eur]

EQUIPMENT FACT SHEET

Surveillance technology survey sheet
V1.1

EQUIPMENT IDENTIFICATION	
Name	BIO - continuous bio monitoring system TWOBIAS
Description of equipment	Unspecified detection technology, integrated system
Group	BIO
Type	Bio detectors and network
Other	
Sources	www.twobias.info

CLASSIFICATION OF FUNCTIONALITY	
Function description	Continuously operating Bio detector system
Hazard (bow-tie left) **(to be controlled)**	Early detection of pathogens Early identification of pathogens, possible prophylaxi
Events (bow-tie event) **(unwanted activities)**	Identification of pathogens
Consequence (bow-tie rig **(of failure)**	Identification of pathogens for medicine programme
Bow-tie functionality	Identification to prevent disease and help fight disea

TECHNICAL FEATURES		
Dimensions	Placed in car	[m/m/m]
Weight	N/A	[Kg]
Power consumption	N/A	[W]
Control range (functional	outside air	[m]
Autonomous operation	yes	[yes/no]
Automated operation	yes	
System embedding	system	

OPERATIONAL FEATURES		
Personnel required	N/A	[%]
Maintenance	N/A	[days/year]
Approximate market pric	N/A	[Eur]

EQUIPMENT FACT SHEET

Surveillance technology survey sheet
V1.1

EQUIPMENT IDENTIFICATION	
Name	CCTV - visual semi-automated camera Guppy_F036C
Description of equipment	High resolution digital camera with automatic trigger
Group	CCTV
Type	MARLIN F-146
Other	
Sources	http://www.alliedvisiontec.com/us/products/camera

CLASSIFICATION OF FUNCTIONALITY	
Function description	Image sensor for object detection
Hazard (bow-tie left) (to be controlled)	Area clearance control, object detection Detection of suspect objects
Events (bow-tie event) (unwanted activities)	Detection of area intrusion
Consequence (bow-tie right (of failure)	Record of event Data retrieving
Bow-tie functionality	Visual information of new threats Visual information about events unfolding Visual evidence of crime or terorism after the event

TECHNICAL FEATURES		
Dimensions	0.072/0.044/0.029	[m/m/m]
Weight	0.12	[Kg]
Power consumption	< 3	[W]
Control range (functional sp	Depends on mounted lens	[m]
Autonomous operation	no	[yes/no]
Automated operation	Partly: camera activation triggering	
System embedding	required	

OPERATIONAL FEATURES		
Personnel required	N/A	[%]
Maintenance	N/A	[days/year]
Approximate market price	N/A	[Eur]

EQUIPMENT FACT SHEET

Surveillance technology survey sheet
V1.1

EQUIPMENT IDENTIFICATION	
Name	CCTV - visual spectrum dome - zoom tilt and rotate
Description of equipment	Network camera
Group	CCTV
Type	Dome-ptz
Other	
Sources	http://www.axis.com/products/video/camera/ptz/in

CLASSIFICATION OF FUNCTIONALITY	
Function description	Detection of events in large and distant areas
Hazard (bow-tie left) **(to be controlled)**	Area clearance control, object detection Detection of suspect objects
Events (bow-tie event) **(unwanted activities)**	Detection of area intrusion
Consequence (bow-tie rig **(of failure)**	Record of event Data retrieving
Bow-tie functionality	Visual information of new threats Visual information about events unfolding Visual evidence of crime or terorism after the event

TECHNICAL FEATURES		
Dimensions	0,20 x 0,30	[m/m]
Weight	2 kg	[Kg]
Power consumption	20	[W]
Control range (functional	Pan/tilt and zoomable field of view (cone-shaped)	[m * m]
Autonomous operation	no	[yes/no]
Automated operation	no	
System embedding	Part of modular system	

OPERATIONAL FEATURES		
Personnel required	yes	[%]
Maintenance	N/A	[days/year]
Approximate market pric	900€/instance	[Eur]

EQUIPMENT FACT SHEET

Surveillance technology survey sheet
V1.1

EQUIPMENT IDENTIFICATION	
Name	CCTV - visual spectrum dome-fixed
Description of equipment	Network camera
Group	CCTV
Type	Dome-fixed
Other	
Sources	http://www.axis.com/products/video/camera/fixed

CLASSIFICATION OF FUNCTIONALITY	
Function description	Detection of events in large and distant areas
Hazard (bow-tie left) **(to be controlled)**	Area clearance control, object detection Detection of suspect objects
Events (bow-tie event) **(unwanted activities)**	Detection of area intrusion
Consequence (bow-tie rig **(of failure)**	Record of event Data retrieving
Bow-tie functionality	Visual information of new threats Visual information about events unfolding Visual evidence of crime or terorism after the event

TECHNICAL FEATURES		
Dimensions	0,1 x 0,04	[m/m]
Weight	1 kg	[Kg]
Power consumption	10	[W]
Control range (functional	Fixed field of view (cone-shaped)	[m * m]
Autonomous operation	no	[yes/no]
Automated operation	no	
System embedding	Part of modular system	

OPERATIONAL FEATURES		
Personnel required	yes	[%]
Maintenance	N/A	[days/year]
Approximate market pric	500€/instance	[Eur]

EQUIPMENT FACT SHEET

Surveillance technology survey sheet
V1.1

EQUIPMENT IDENTIFICATION	
Name	CCTV - visual spectrum fixed
Description of equipment	Network camera
Group	CCTV
Type	Fixed
Other	
Sources	http://www.axis.com/products/video/camera/fixed/

CLASSIFICATION OF FUNCTIONALITY	
Function description	Detection of events in large and distant areas
Hazard (bow-tie left) **(to be controlled)**	Area clearance control, object detection Detection of suspect objects
Events (bow-tie event) **(unwanted activities)**	Detection of area intrusion
Consequence (bow-tie rig **(of failure)**	Record of event Data retrieving
Bow-tie functionality	Visual information of new threats Visual information about events unfolding Visual evidence of crime or terorism after the event

TECHNICAL FEATURES		
Dimensions	0,30 x 0,1 x 0,05	[m/m/m]
Weight	1 kg	[Kg]
Power consumption	10	[W]
Control range (functional	Fixed field of view (cone-shaped)	[m * m]
Autonomous operation	no	[yes/no]
Automated operation	no	
System embedding	Part of modular system	

OPERATIONAL FEATURES		
Personnel required	yes	[%]
Maintenance	N/A	[days/year]
Approximate market pric	500€/instance	[Eur]

EQUIPMENT FACT SHEET

Surveillance technology survey sheet
V1.1

EQUIPMENT IDENTIFICATION	
Name	CCTV & ACTIVITY DETECTION - IPS activity detection
Description of equipment	Single functionality motion detecor
Group	CCTV
Type	Motion detector
Other	
Sources	http://www.ips-analytics.com/produkte/ips-videoan

CLASSIFICATION OF FUNCTIONALITY	
Function description	Detection of motion in video scenes
Hazard (bow-tie left) **(to be controlled)**	Identification of motion in wrong areas Motion out of wrong areas
Events (bow-tie event) **(unwanted activities)**	Evidence of events unfolding
Consequence (bow-tie rig **(of failure)**	Record of event Data retrieving
Bow-tie functionality	Visual information of new threats Visual information about events unfolding Visual evidence of crime or terorism after the event

TECHNICAL FEATURES		
Dimensions	s/w	[m/m/m]
Weight	N/A	[Kg]
Power consumption	N/A	[W]
Control range (functional	na	[m]
Autonomous operation	no	[yes/no]
Automated operation	Yes, automated motion detection software	
System embedding	Part of modular system	

OPERATIONAL FEATURES		
Personnel required	N/A	[%]
Maintenance	N/A	[days/year]
Approximate market pric	N/A	[Eur]

EQUIPMENT FACT SHEET

Surveillance technology survey sheet
V1.1

EQUIPMENT IDENTIFICATION	
Name	CCTV & INFRA RED - near-field
Description of equipment	IR-Cam
Group	CCTV & INFRA RED
Type	Near-field
Other	
Sources	http://www.axis.com/products/video/camera/therm http://www.drs.com/Products/RSTA/WatchMasterIF

CLASSIFICATION OF FUNCTIONALITY	
Function description	Detection of events in large and distant areas
Hazard (bow-tie left) **(to be controlled)**	Area clearance control, object detection Detection of suspect objects
Events (bow-tie event) **(unwanted activities)**	Detection of area intrusion
Consequence (bow-tie rig **(of failure)**	Record of event
Bow-tie functionality	Visual information of new threats Visual information about events unfolding

TECHNICAL FEATURES		
Dimensions	0,20 x 0,30	[m/m]
Weight	2 kg	[Kg]
Power consumption	15	[W]
Control range (functional	Pan/tilt and zoomable field of view (cone-shaped) ne	[m * m]
Autonomous operation	no	[yes/no]
Automated operation	no	
System embedding	Part of modular system	

OPERATIONAL FEATURES		
Personnel required	yes	[%]
Maintenance	N/A	[days/year]
Approximate market pric	2500€/instance	[Eur]

EQUIPMENT FACT SHEET

Surveillance technology survey sheet
V1.1

EQUIPMENT IDENTIFICATION	
Name	CCTV & INFRA RED - wide-area
Description of equipment	IR-Cam
Group	CCTV & INFRA RED
Type	Wide-area
Other	
Sources	http://www.zeiss.de/C1257088004A3F3C/EmbedTite http://www.flir.com/cs/emea/de/view/?id=42061

CLASSIFICATION OF FUNCTIONALITY	
Function description	Detection of person in wide area (border control)
Hazard (bow-tie left) **(to be controlled)**	Area clearance control, object detection Detection of suspect objects
Events (bow-tie event) **(unwanted activities)**	Detection of area intrusion
Consequence (bow-tie rig **(of failure)**	
Bow-tie functionality	Visual information of new threats Visual information about events unfolding

TECHNICAL FEATURES		
Dimensions	0,50 x 0,30	[m/m]
Weight	10 kg	[Kg]
Power consumption	40 (<125 when max. heating is requiered)	[W]
Control range (functional	Pan/tilt and zoomable field of view (cone-shaped) wi	[m * m]
Autonomous operation	no	[yes/no]
Automated operation	no	
System embedding	Part of modular system	

OPERATIONAL FEATURES		
Personnel required	yes	[%]
Maintenance	N/A	[days/year]
Approximate market pric	20000€/instance	[Eur]

EQUIPMENT FACT SHEET

Surveillance technology survey sheet
V1.1

EQUIPMENT IDENTIFICATION	
Name	CHEM - explosives detection by antibody SALIENT
Description of equipment	Hand-held device to analyze explosives, toxic chemicals
Group	CHEM
Type	Explosives, chemicals and drugs detector
Other	
Sources	www.saliant.eu

CLASSIFICATION OF FUNCTIONALITY	
Function description	Selective antibodies detection of chemicals
Hazard (bow-tie left) **(to be controlled)**	Trace detection of illegal goods
Events (bow-tie event) **(unwanted activities)**	Rapid identification of illegal goods Rapid identification of explosives
Consequence (bow-tie rig **(of failure)**	
Bow-tie functionality	First Responders at crime scenes and terrorist incidents Crime prevention and community safety

TECHNICAL FEATURES		
Dimensions	10cm*10cm	[m/m/m]
Weight	<1kg	[Kg]
Power consumption	N/A	[W]
Control range (functional	N/A	[m]
Autonomous operation	no	[yes/no]
Automated operation	no	
System embedding	no	

OPERATIONAL FEATURES		
Personnel required	yes	[%]
Maintenance	yes	[days/year]
Approximate market pric	N/A	[Eur]

EQUIPMENT FACT SHEET

Surveillance technology survey sheet
V1.1

EQUIPMENT IDENTIFICATION	
Name	CHEM - explosives detection near harbours UNCOS
Description of equipment	Unmanned ROV explosive detection by neutron dete
Group	CHEM
Type	ROV
Other	
Sources	www.uncoss-project.org

CLASSIFICATION OF FUNCTIONALITY	
Function description	Detection of explosives and IEDs in harbors
Hazard (bow-tie left) **(to be controlled)**	Detection of explosives and IED's
Events (bow-tie event) **(unwanted activities)**	
Consequence (bow-tie rig **(of failure)**	
Bow-tie functionality	Prevention of IED attack on harbor.

TECHNICAL FEATURES		
Dimensions	2 x 0,85 x 1,3 m	[m/m/m]
Weight	N/A	[Kg]
Power consumption	N/A	[W]
Control range (functional	N/A	[m]
Autonomous operation	no	[yes/no]
Automated operation	no	
System embedding	Part of modular system	

OPERATIONAL FEATURES		
Personnel required	N/A	[%]
Maintenance	N/A	[days/year]
Approximate market pric	N/A	[Eur]

EQUIPMENT FACT SHEET

Surveillance technology survey sheet
V1.1

EQUIPMENT IDENTIFICATION	
Name	CHEM - gas chromatography drugs detector DIRAC
Description of equipment	IR absorption spectroscopy and gas chromatography
Group	CHEM
Type	Hand held rapid detector
Other	
Sources	http://www.consorziocreo.it http://www.fp7-dirac.eu

CLASSIFICATION OF FUNCTIONALITY	
Function description	Rapidly recognize and detect illicit drugs and precursors
Hazard (bow-tie left) **(to be controlled)**	
Events (bow-tie event) **(unwanted activities)**	Capture drug traffickers in the act
Consequence (bow-tie righ **(of failure)**	
Bow-tie functionality	Detection of drug traffickers

TECHNICAL FEATURES		
Dimensions	N/A	[m/m/m]
Weight	N/A	[Kg]
Power consumption	N/A	[W]
Control range (functional s	person	[m]
Autonomous operation	no	[yes/no]
Automated operation	no	
System embedding	no	

OPERATIONAL FEATURES		
Personnel required	yes	[%]
Maintenance	N/A	[days/year]
Approximate market price	N/A	[Eur]

EQUIPMENT FACT SHEET

Surveillance technology survey sheet
V1.1

EQUIPMENT IDENTIFICATION	
Name	CHEM - novel detection techniques COMMONSENSE
Description of equipment	Water phase sensor for explosives detection
Group	CHEM
Type	Water phase decector
Other	
Sources	http://www.fp7projectcommonsense.eu

CLASSIFICATION OF FUNCTIONALITY	
Function description	Sensor for explosives in waste water outlets
Hazard (bow-tie left) **(to be controlled)**	Explosives in water phase to capture bomb-makers be Radionucleides in water phase to capture dirty bomb makers
Events (bow-tie event) **(unwanted activities)**	Chemical trace detection to find drugs laboratories
Consequence (bow-tie righ **(of failure)**	
Bow-tie functionality	Prevention of deployment of explosives Identifying drugs labs in operation

TECHNICAL FEATURES		
Dimensions	N/A	[m/m/m]
Weight	N/A	[Kg]
Power consumption	N/A	[W]
Control range (functional s	In sewer flows	[m]
Autonomous operation	yes	[yes/no]
Automated operation	yes	
System embedding	yes	

OPERATIONAL FEATURES		
Personnel required	yes	[%]
Maintenance	N/A	[days/year]
Approximate market price	N/A	[Eur]

EQUIPMENT FACT SHEET

Surveillance technology survey sheet
V1.1

EQUIPMENT IDENTIFICATION	
Name	CHEM - precursor and drugs detection CUSTOM
Description of equipment	Laser photo acoustic spectroscopy and UV fluoresce
Group	CHEM
Type	Drugs and precursors for drugs
Other	
Sources	www.custom-project.eu

CLASSIFICATION OF FUNCTIONALITY	
Function description	Detection of motion in video scenes
Hazard (bow-tie left) **(to be controlled)**	Detection of precursors for drug production
Events (bow-tie event) **(unwanted activities)**	Detection of drug production Detection of drug trafficking
Consequence (bow-tie rig **(of failure)**	
Bow-tie functionality	Prevention of drug prevention Identificatio of drug production

TECHNICAL FEATURES		
Dimensions	N/A	[m/m/m]
Weight	N/A	[Kg]
Power consumption	N/A	[W]
Control range (functional	meters	[m]
Autonomous operation	no	[yes/no]
Automated operation	no	
System embedding	yes	

OPERATIONAL FEATURES		
Personnel required	N/A	[%]
Maintenance	N/A	[days/year]
Approximate market pric	N/A	[Eur]

EQUIPMENT FACT SHEET

Surveillance technology survey sheet
V1.1

EQUIPMENT IDENTIFICATION	
Name	CHEM - standoff optical detection of explosives OPTIX
Description of equipment	Optical sensor (LIBS, RAMAN, IR absorption)
Group	CHEM
Type	Car-transportable
Other	
Sources	www.fp7-optix.eu http://www.fotonica-evenement.nl/assets/Fotonica-2(

CLASSIFICATION OF FUNCTIONALITY	
Function description	Stand off detection and identification of explosives in r
Hazard (bow-tie left) **(to be controlled)**	Detection/identification of explosives in the vicinity
Events (bow-tie event) **(unwanted activities)**	
Consequence (bow-tie righ **(of failure)**	
Bow-tie functionality	Prevention of explosion damage

TECHNICAL FEATURES		
Dimensions	car-size	[m/m/m]
Weight	N/A	[Kg]
Power consumption	N/A	[W]
Control range (functional s	20meter	[m]
Autonomous operation	no	[yes/no]
Automated operation	yes	
System embedding	yes	

OPERATIONAL FEATURES		
Personnel required	yes	[%]
Maintenance	yes	[days/year]
Approximate market price	N/A	[Eur]

EQUIPMENT FACT SHEET

Surveillance technology survey sheet
V1.1

EQUIPMENT IDENTIFICATION	
Name	DATA - mobile phone tap PTS
Description of equipment	Software to record phone use and data
Group	DATA
Type	Phone-based software
Other	
Sources	http://phonetappingsoftware.net/iphone-tapping/

CLASSIFICATION OF FUNCTIONALITY	
Function description	Data gathering from mobile phone
Hazard (bow-tie left) **(to be controlled)**	Identification of criminal plans or networks
Events (bow-tie event) **(unwanted activities)**	Intercept signals for commencing crimes
Consequence (bow-tie rigl **(of failure)**	evidence gathering
Bow-tie functionality	Evidence of crime to prevent crime Evidence for conviction Intercept crimes in action

TECHNICAL FEATURES		
	Embedded in phone	
Dimensions	Computer software	[m/m/m]
Weight	N/A	[Kg]
Power consumption	N/A	[W]
Control range (functional s	Phone	[m]
Autonomous operation	no	[yes/no]
Automated operation	yes	
System embedding	In mobile phone	

OPERATIONAL FEATURES		
Personnel required	1	[%]
Maintenance	N/A	[days/year]
Approximate market price	N/A	[Eur]

EQUIPMENT FACT SHEET

Surveillance technology survey sheet
V1.1

EQUIPMENT IDENTIFICATION	
Name	DATA ANALYSIS - Omnifind
Description of equipment	Computer program searching for identifying entities and their sync
Group	DATA ANALYSIS
Type	Data Fusion/Data Information Management
Other	
Sources	Fraunhofer

CLASSIFICATION OF FUNCTIONALITY	
Function description	Mapping synonyms and different terms to the real physical entities
Hazard (bow-tie left) **(to be controlled)**	Identification of relevant entities in huge databases Intelligence gathering Identification of entities is missing/incorrect
Events (bow-tie event) **(unwanted activities)**	Attackers not detected due to scattered information sources
Consequence (bow-tie rig **(of failure)**	Any consequence an attack might have
Bow-tie functionality	Left-hand side: intelligence gathering And control of current event After event: localisation of victims and aggressors

TECHNICAL FEATURES		
Dimensions	computer program	[m/m/m]
Weight	N/A	[Kg]
Power consumption	N/A	[W]
Control range (functional	huge databases	[m]
Autonomous operation	partly: in producing alerts	[yes/no]
Automated operation	yes	
System embedding	N/A	

OPERATIONAL FEATURES		
Personnel required	N/A	[%]
Maintenance	N/A	[days/year]
Approximate market pric	N/A	[Eur]

EQUIPMENT FACT SHEET

Surveillance technology survey sheet
V1.1

EQUIPMENT IDENTIFICATION		
Name	DATA ANALYSIS - detection of money laundering HEMOLIA	
Description of equipment	Searching, analyzing and fusing financial data	
Group	DATA ANALYSIS	
Type	Financial and telecom multi-agent alert and investigati(	
Other		
Sources	www.hemolia.eu	

CLASSIFICATION OF FUNCTIONALITY		
Function description	Detect, and dismantle criminal financing networks and financing of te	
Hazard (bow-tie left) **(to be controlled)**	Detect criminal/terrorist financing	
Events (bow-tie event) **(unwanted activities)**	Impede criminal/terrorist activity	
Consequence (bow-tie righ **(of failure)**		
Bow-tie functionality	Money laundering prevention Detection of financing of crime & terrorism	

TECHNICAL FEATURES		
	Networked datasystem	
Dimensions	Computer program	[m/m/m]
Weight	N/A	[Kg]
Power consumption	N/A	[W]
Control range (functional s	N/A	[m]
Autonomous operation	?	[yes/no]
Automated operation	yes	
System embedding	yes	

OPERATIONAL FEATURES		
Personnel required	N/A	[%]
Maintenance	N/A	[days/year]
Approximate market price	N/A	[Eur]

EQUIPMENT FACT SHEET

Surveillance technology survey sheet
V1.1

EQUIPMENT IDENTIFICATION	
Name	DATA ANALYSIS - networked data analysis SCIIMS
Description of equipment	Strategic crime and immigration information management system
Group	DATA ANALYSIS
Type	Informtaion management for combating immigration crime
Other	
Sources	www.sciims.co.uk/index.html

CLASSIFICATION OF FUNCTIONALITY	
Function description	Predict and analyse likely people trafficking and people smuggling sou
Hazard (bow-tie left) **(to be controlled)**	Detect organized crime Detect individuals that perform crimes
Events (bow-tie event) **(unwanted activities)**	Capture suspects in the act
Consequence (bow-tie righ **(of failure)**	Trace victims of crime
Bow-tie functionality	Primarily identification of crime and criminals (left hand

TECHNICAL FEATURES		
Dimensions	Computer system	[m/m/m]
Weight	N/A	[Kg]
Power consumption	N/A	[W]
Control range (functional s	Data systems	[m]
Autonomous operation	yes	[yes/no]
Automated operation	yes	
System embedding	Computer system	

OPERATIONAL FEATURES		
Personnel required	yes	[%]
Maintenance	yes	[days/year]
Approximate market price	N/A	[Eur]

EQUIPMENT FACT SHEET

Surveillance technology survey sheet
V1.1

EQUIPMENT IDENTIFICATION	
Name	DATA TRANSFER ANALYSIS - name recognition
Description of equipment	Computer program identifying people according to th
Group	DATA TRANSFER ANALYSIS
Type	Intelligence gathering
Other	
Sources	Fraunhofer

CLASSIFICATION OF FUNCTIONALITY	
Function description	Resolution of different transcription schemes and evaluation of pr
Hazard (bow-tie left) **(to be controlled)**	Known attackers not identified
Events (bow-tie event) **(unwanted activities)**	Attack by known malicious people
Consequence (bow-tie rig **(of failure)**	Any consequence an attack might have
Bow-tie functionality	Left-hand side: barrier And control of current event

TECHNICAL FEATURES		
Dimensions	N/A	[m/m/m]
Weight	N/A	[Kg]
Power consumption	N/A	[W]
Control range (functional	Data flows through digital networks	[m]
Autonomous operation	Partly: in producing alerts	[yes/no]
Automated operation	yes	
System embedding	N/A	

OPERATIONAL FEATURES		
Personnel required	N/A	[%]
Maintenance	N/A	[days/year]
Approximate market pric	N/A	[Eur]

EQUIPMENT FACT SHEET

Surveillance technology survey sheet
V1.1

EQUIPMENT IDENTIFICATION	
Name	DNA - rapid dna analysis MiDAS
Description of equipment	Rapid millifludic DNA analysis sytsem
Group	DNA
Type	Portable instrument
Other	
Sources	http://www.forensic.gov.uk/html/company/partnersh

CLASSIFICATION OF FUNCTIONALITY	
Function description	Produce DNA database compatible results from crime
Hazard (bow-tie left) **(to be controlled)**	
Events (bow-tie event) **(unwanted activities)**	
Consequence (bow-tie righ **(of failure)**	Identify DNA from crime scenes to capture offenders
Bow-tie functionality	Provide information about offenders from DNA found

TECHNICAL FEATURES		
Dimensions	0.3 x 0.3 x 0.3 (?)	[m/m/m]
Weight	N/A	[Kg]
Power consumption	N/A	[W]
Control range (functional s	DNA sample	[m]
Autonomous operation	no	[yes/no]
Automated operation	yes	
System embedding	no	

OPERATIONAL FEATURES		
Personnel required	yes	[%]
Maintenance	N/A	[days/year]
Approximate market price	N/A	[Eur]

EQUIPMENT FACT SHEET

Surveillance technology survey sheet
V1.1

EQUIPMENT IDENTIFICATION	
Name	GPS - car tracker SN
Description of equipment	GPS locator
Group	GPS
Type	Candy-bar size device for inside cars
Other	
Sources	www.skymall.com/shopping/detail.htm?pid=204198015&c=102002

CLASSIFICATION OF FUNCTIONALITY	
Function description	GPS tracking device
Hazard (bow-tie left) **(to be controlled)**	Track whereabouts of cars
Events (bow-tie event) **(unwanted activities)**	
Consequence (bow-tie righ **(of failure)**	Localisation of suspect cars after event Localisation of stolen cars
Bow-tie functionality	Follow suspect cars

TECHNICAL FEATURES		
	Palm-size device for GPS tracking	
Dimensions	Palm size	[m/m/m]
Weight	N/A	[Kg]
Power consumption	N/A	[W]
Control range (functional s	Earth surface	[m]
Autonomous operation	yes	[yes/no]
Automated operation	yes	
System embedding	Depends on phone network	

OPERATIONAL FEATURES		
Personnel required	1	[%]
Maintenance	recharging	[days/year]
Approximate market price	200 E	[Eur]

EQUIPMENT FACT SHEET

Surveillance technology survey sheet
V1.1

EQUIPMENT IDENTIFICATION	
Name	IMAGE PROCESSING - crowd and riot
Description of equipment	Software module (Windows); from VGA
Group	IMAGE PROCESSING
Type	People tracking
Other	
Sources	Developed by IOSB

CLASSIFICATION OF FUNCTIONALITY	
Function description	
Hazard (bow-tie left) **(to be controlled)**	Identification of crowd movement that poses threat
Events (bow-tie event) **(unwanted activities)**	Info about events during crowd movement
Consequence (bow-tie rig **(of failure)**	Regaining control Develop recovery plan
Bow-tie functionality	Early threat warning Regaining control after intial loss of control

TECHNICAL FEATURES		
Dimensions	Computer program	[m/m/m]
Weight	N/A	[Kg]
Power consumption	N/A	[W]
Control range (functional	N/A	[m]
Autonomous operation	yes	[yes/no]
Automated operation	yes	
System embedding	no	

OPERATIONAL FEATURES		
Personnel required	N/A	[%]
Mantenance	N/A	[days/year]
Approximate market pric	N/A	[Eur]

EQUIPMENT FACT SHEET

Surveillance technology survey sheet
V1.1

EQUIPMENT IDENTIFICATION	
Name	IMAGE PROCESSING - people counting_and_density
Description of equipment	Crowd density analisis
Group	IMAGE PROCESSING
Type	Crowd analysis/people counting
Other	
Sources	Developed by OSB

CLASSIFICATION OF FUNCTIONALITY	
Function description	Image processing
Hazard (bow-tie left)	Determinatin of crowd density
(to be controlled)	Determining threats and hazards from crowd density
Events (bow-tie event)	Study unwanted activites of crowds during mass evei
(unwanted activities)	
Consequence (bow-tie rig	Regain control over the crowd
(of failure)	Identifiy spots where injuries took place
Bow-tie functionality	Early warning, coordinate precautions
	Event control
	Assisting first responders after the event

TECHNICAL FEATURES		
Dimensions	Computer program	[m/m/m]
Weight	N/A	[Kg]
Power consumption	N/A	[W]
Control range (functional	N/A	[m]
Autonomous operation	no	[yes/no]
Automated operation	yes	
System embedding	no	

OPERATIONAL FEATURES		
Personnel required	1	[%]
Maintenance	N/A	[days/year]
Approximate market pric	N/A	[Eur]

EQUIPMENT FACT SHEET

Surveillance technology survey sheet
V1.1

EQUIPMENT IDENTIFICATION	
Name	INFRA RED - motion detector
Description of equipment	Infra red motion detector
Group	INFRA-RED
Type	Motion sensor for alarm systems
Other	
Sources	www.ladyada.net/learn/sensors/pir.html

CLASSIFICATION OF FUNCTIONALITY	
Function description	Detect people
Hazard (bow-tie left) (to be controlled)	Illicit entry detection
Events (bow-tie event) (unwanted activities)	
Consequence (bow-tie righ (of failure)	
Bow-tie functionality	Illicit entry

TECHNICAL FEATURES		
	infrared detector	
Dimensions	0,1 x 0.05 x 0,05	[m/m/m]
Weight	0,005	[Kg]
Power consumption	N/A	[W]
Control range (functional s	room	[m]
Autonomous operation	no	[yes/no]
Automated operation	yes	
System embedding	possible	

OPERATIONAL FEATURES		
Personnel required	0	[%]
Maintenance	N/A	[days/year]
Approximate market price	10 E	[Eur]

EQUIPMENT FACT SHEET

Surveillance technology survey sheet
V1.1

EQUIPMENT IDENTIFICATION	
Name	MM-WAVE - whole body scanner EQO
Description of equipment	Whole body scanner for security
Group	MM - WAVE
Type	Body scanner
Other	
Sources	www.smithisdetection.com/eqo.php

CLASSIFICATION OF FUNCTIONALITY	
Function description	Body scan to reveal weapons
Hazard (bow-tie left) **(to be controlled)**	Detect illegal weapons on person Detect illegal goods on person
Events (bow-tie event) **(unwanted activities)**	
Consequence (bow-tie rig **(of failure)**	
Bow-tie functionality	Detect illegal weapons before entering secure space

TECHNICAL FEATURES		
	Body scanner	
Dimensions	1,1 x 1 x 2	[m/m/m]
Weight	N/A	[Kg]
Power consumption	N/A	[W]
Control range (functional	Person	[m]
Autonomous operation	yes	[yes/no]
Automated operation	yes	
System embedding	Possible	

OPERATIONAL FEATURES		
Personnel required	1	[%]
Maintenance	N/A	[days/year]
Approximate market price	N/A	[Eur]

EQUIPMENT FACT SHEET

Surveillance technology survey sheet
V1.1

EQUIPMENT IDENTIFICATION	
Name	NETWORK - AIS ship location detection and identification
Number	
Description of equipment	AIS VHF antenna/receiver (active System)
Group	NETWORK
Type	Ship localisation and database
Other	
Sources	http://www.imo.org/ourwork/safety/navigation/pag http://www.imo.org/OurWork/Safety/Navigation/Dc http://www.profilant.net/de/maritim/44070250

CLASSIFICATION OF FUNCTIONALITY	
Function description	Providing information about the whearbouts of ships to other ship
Hazard (bow-tie left) **(to be controlled)**	Proximity detection Illegal crossing of territorial waters
Events (bow-tie event) **(unwanted activities)**	Interception of illigal shipping
Consequence (bow-tie rig **(of failure)**	Evidence gathering of illegal shipping
Bow-tie functionality	Identification of ships Interception of illegal shipping

TECHNICAL FEATURES		
Dimensions	0,1 x 0,1 x 1,35 m	[m/m/m]
Weight	400 kg	[Kg]
Power consumption	N/A	[W]
Control range (functional		[m]
Autonomous operation	yes	[yes/no]
Automated operation	yes	
System embedding	AIS system sends only the own information to next sy No routing of received information	

OPERATIONAL FEATURES		
Personnel required	N/A	[%]
Maintenance	N/A	[days/year]
Approximate market pric	N/A	[Eur]

EQUIPMENT FACT SHEET

Surveillance technology survey sheet
V1.1

EQUIPMENT IDENTIFICATION	
Name	NETWORK - SIRIUS 3RK3
Description of equipment	Multi functional circuitry for safety and security
Group	NETWORK
Type	Digital network system
Other	
Sources	www.automation.siemens.com/mcms/industrial-con

CLASSIFICATION OF FUNCTIONALITY	
Function description	Detection of intrusion & fire
Hazard (bow-tie left) **(to be controlled)**	Early warning of intrusion or fire
Events (bow-tie event) **(unwanted activities)**	Localisation of intrusion or fire during event
Consequence (bow-tie rig **(of failure)**	
Bow-tie functionality	Detection, alarm, activation of barriers cameras or ot

TECHNICAL FEATURES		
Dimensions	s/w	[m/m/m]
Weight	N/A	[Kg]
Power consumption	N/A	[W]
Control range (functional	N/A	[m]
Autonomous operation	Enabler for autonomous operation	[yes/no]
Automated operation	Enabler of autmation	
System embedding	Part of modular system	

OPERATIONAL FEATURES		
Personnel required	N/A	[%]
Maintenance	N/A	[days/year]
Approximate market pric	N/A	[Eur]

EQUIPMENT FACT SHEET

Surveillance technology survey sheet
V1.1

EQUIPMENT IDENTIFICATION	
Name	NETWORK - UGM 2040
Description of equipment	Multi functional circuitry for safety and security
Group	NETWORK
Type	Network system
Other	
Sources	www.bosch-sicherheitssysteme.de/UGM2040/

CLASSIFICATION OF FUNCTIONALITY	
Function description	Detection of intrusion & fire
Hazard (bow-tie left) **(to be controlled)**	Early detedtion of intrusion and fire
Events (bow-tie event) **(unwanted activities)**	Localisation of intrusion or fire during event
Consequence (bow-tie rig **(of failure)**	Development of intervention plan
Bow-tie functionality	Detection, alarm, activation of barriers cameras or ot

TECHNICAL FEATURES		
Dimensions	s/w	[m/m/m]
Weight	N/A	[Kg]
Power consumption	N/A	[W]
Control range (functional	N/A	[m]
Autonomous operation	Enabler for autonomous operation	[yes/no]
Automated operation	Enabler for automated operation	
System embedding	Part of modular system	

OPERATIONAL FEATURES		
Personnel requred	N/A	[%]
Maintenance	N/A	[days/year]
Approximate market pric	N/A	[Eur]

EQUIPMENT FACT SHEET

Surveillance technology survey sheet
V1.1

EQUIPMENT IDENTIFICATION	
Name	NETWORK & INTERFACE - AMFIS data fusion for ground control
Description of equipment	Heterogeneous ground control station
Group	NETWORK & INTERFACE
Type	Ground control station fir data analysis
Other	
Sources	http://www.iosb.fraunhofer.de/servlet/is/5045/

CLASSIFICATION OF FUNCTIONALITY	
Function description	Monitor data from heterogeneous sensor carriers / Control of het
Hazard (bow-tie left) (to be controlled)	Reconaissance for threat detection Status analysis of barriers
Events (bow-tie event) (unwanted activities)	Aquire intelligence about events unfolding Attaching new stationary or mobile detectors to increase coverage
Consequence (bow-tie rig (of failure)	Evidence gathering Damage assesment
bow-tie functionality	Detection/intelligence

TECHNICAL FEATURES		
	Computer system/data fusion system	
Dimensions	N/A	[m/m/m]
Weight	N/A	[Kg]
Power consumption	N/A	[W]
Control range (functional	N/A	[m]
Autonomous operation	N/A	[yes/no]
Automated operation	yes	
System embedding	N/A	

OPERATIONAL FEATURES		
Personnel required	N/A	[%]
Maintenance	N/A	[days/year]
Approximate market pric	N/A	[Eur]

EQUIPMENT FACT SHEET

Surveillance technology survey sheet
V1.1

EQUIPMENT IDENTIFICATION	
Name	RADAR - acoustic sensor network
Description of equipment	Trespassing detection/crowd unrest detection
Group	RADAR
Type	Active radar standoff-detection
Other	Typically used in defence and security field
Sources	T. H. de Groot, "Localization and Classification using a

CLASSIFICATION OF FUNCTIONALITY	
Function description	Exploit the received sound signal (emitted by the object) in order to See objects within the coverage and determine their position and cl
Hazard (bow-tie left) **(to be controlled)**	Trespassing detection
Events (bow-tie event) **(unwanted activities)**	Position of people during event
Consequence (bow-tie rig **(of failure)**	Development of intervention plan
Bow-tie functionality	Left hand: early detection Event: position of people After: development of intervention plan

TECHNICAL FEATURES		
Dimensions	0,1/0,1/0,1(for a single sensor)	[m/m/m]
Weight	0.1(for a single sensor)	[Kg]
Power consumption	N/A	[W]
Control range (functional	Depends on the size of the sensor network (one sensc	[m]
Autonomous operation	no	[yes/no]
Automated operation	no	
System embedding	yes	

OPERATIONAL FEATURES		
Personnel required	N/A	[%]
Maintenance	N/A	[days/year]
Approximate market price	N/A	[Eur]

EQUIPMENT FACT SHEET

Surveillance technology survey sheet
V1.1

EQUIPMENT IDENTIFICATION	
Name	RADAR - array-based concealed weapon detection rac
Description of equipment	Monostatic radar using antenna array
Group	RADAR
Type	Active radar detection for items like weapons (knife, gun, etc.)
Other	
Sources	http://www.vdcomlb.com/Whole_Body_Imager.pdf

CLASSIFICATION OF FUNCTIONALITY	
Function description	Uses electromagnetic wave to detect and image concealed weapon Typically used for airport security
Hazard (bow-tie left) **(to be controlled)**	Concealed weapons detection (gun, knife, etc.)
Events (bow-tie event) **(unwanted activities)**	
Consequence (bow-tie rigl **(of failure)**	
Bow-tie functionality	Concealed weapons detection (gun, knife, etc.)

TECHNICAL FEATURES		
Dimensions	2,7 x 2.0 x 2,7	[m/m/m]
Weight	816 kg	[Kg]
Power consumption	1900 (peak)	[W]
Control range (functional	1 m	[m]
Autonomous operation	no	[yes/no]
Automated operation	yes	
System embedding	yes	

OPERATIONAL FEATURES		
Personnel required	N/A	[%]
Maintenance	N/A	[days/year]
Approximate market price	N/A	[Eur]

EQUIPMENT FACT SHEET

Surveillance technology survey sheet
V1.1

EQUIPMENT IDENTIFICATION	
Name	RADAR - array-based through-wall radar
Description of equipment	Multiple human target imaging and tracking
Group	RADAR
Type	Portable
Other	
Sources	http://www.camero-tech.com/files/files/Xaver800.pd

CLASSIFICATION OF FUNCTIONALITY	
Function description	Uses electromagnetic wave to image and track human targets inside Typically used for anti-terrorism
Hazard (bow-tie left) **(to be controlled)**	Detection of suspects in a room without entering it
Events (bow-tie event) **(unwanted activities)**	Counting individuals in crisis/hostage situations
Consequence (bow-tie rigl **(of failure)**	Development of interventin plan
Bow-tie functionality	Identification of suspects in crisis situations

TECHNICAL FEATURES		
Dimensions	0,84 x 0,84	[m/m/m]
Weight	14,5 kg	[Kg]
Power consumption	N/A	[W]
Control range (functional	20	[m]
Autonomous operation	no	[yes/no]
Automated operation	yes	
System embedding	integrated	

OPERATIONAL FEATURES		
Personnel required	N/A	[%]
Maintenance	N/A	[days/year]
Approximate market price	N/A	[Eur]

EQUIPMENT FACT SHEET

Surveillance technology survey sheet
V1.1

EQUIPMENT IDENTIFICATION	
Name	RADAR - marine radar
Description of equipment	Transceiver/Scanner/Console
Group	RADAR
Type	X-band (10GHz) and S-band (3GHz)
Other	
Sources	http://www.riceelectronics.com/marine-radar.html http://www.km.kongsberg.com/ks/web/nokbg0240. http://www.jrc.co.jp/eng/product/marine/product/j http://www.furuno.com/en/business_product/merc

CLASSIFICATION OF FUNCTIONALITY	
Function description	Acquisition and tracking of ships
Hazard (bow-tie left) **(to be controlled)**	Collision detection Intrusion detection
Events (bow-tie event) **(unwanted activities)**	Direct action to stop intrusion or collision
Consequence (bow-tie rig **(of failure)**	Timely interception of ship
Bow-tie functionality	Acquitition and tracking of illegal ships

TECHNICAL FEATURES		
Dimensions	0,65 x 1,1 x 1,2 m	[m/m/m]
Weight	65 kg	[Kg]
Power consumption	N/A	[W]
Control range (functional	10.000 x 10.000	[m]
Autonomous operation	yes	[yes/no]
Automated operation	yes	
System embedding	Standalone/integrated	

OPERATIONAL FEATURES		
Personnel required	N/A	[%]
Maintenance	N/A	[days/year]
Approximate market pric	N/A	[Eur]

EQUIPMENT FACT SHEET

Surveillance technology survey sheet
V1.1

EQUIPMENT IDENTIFICATION	
Name	RADAR - MIMO array
Description of equipment	Human target imaging
Group	RADAR
Type	Human target
Other	Active radar for human targets
Sources	X. Zhuge, A. G. Yarovoy, T. Savelyev et al., “Modified K

CLASSIFICATION OF FUNCTIONALITY	
Function description	Uses MIMO array to image human targets behind a wall. Typically used for anti-terrorism
Hazard (bow-tie left) **(to be controlled)**	
Events (bow-tie event) **(unwanted activities)**	Detection of hold hostages Detection of suspects
Consequence (bow-tie rigl **(of failure)**	Development of intervention plan
Bow-tie functionality	Detection of indivuduals in hostage situations

TECHNICAL FEATURES		
Dimensions	1.0 x 1.0 m array	[m/m/m]
Weight	N/A	[Kg]
Power consumption	N/A	[W]
Control range (functional	Typically 0.5-2m, depends on the transmission power	[m]
Autonomous operation	no	[yes/no]
Automated operation	no	
System embedding	no	

OPERATIONAL FEATURES		
Personnel required	N/A	[%]
Maintenance	N/A	[days/year]
Approximate market price	N/A	[Eur]

EQUIPMENT FACT SHEET

Surveillance technology survey sheet
V1.1

EQUIPMENT IDENTIFICATION	
Name	RADAR - passive through-wall human tracking
Description of equipment	Use GSM or wifi signal as transmitting signal to track human targets
Group	RADAR
Type	Portable
Other	
Sources	K. Chetty, G. E. Smith, and K. Woodbridge, "Through-T

CLASSIFICATION OF FUNCTIONALITY	
Function description	Uses electromagnetic wave (WIFI,GSM or TVB-G signal) to locate hu Typically used for anti-terrorism
Hazard (bow-tie left) **(to be controlled)**	
Events (bow-tie event) **(unwanted activities)**	Identification of hostages Identification of suspects
Consequence (bow-tie rigl **(of failure)**	intervention strategy development
Bow-tie functionality	Identification of people in hostage crisis

TECHNICAL FEATURES		
Dimensions	N/A	[m/m/m]
Weight	N/A	[Kg]
Power consumption	N/A	[W]
Control range (functional	Typically 5-100m	[m]
Autonomous operation	no	[yes/no]
Automated operation	no	
System embedding	no	

OPERATIONAL FEATURES		
Personnel required	N/A	[%]
Maintenance	N/A	[days/year]
Approximate market price	N/A	[Eur]

EQUIPMENT FACT SHEET

Surveillance technology survey sheet
V1.1

EQUIPMENT IDENTIFICATION	
Name	RADAR - short range for intrusion detection
Description of equipment	Perimiter security
Group	RADAR
Type	Intusion detection radar
Other	
Sources	http://www.smartmicro.de/index.php?option=com

CLASSIFICATION OF FUNCTIONALITY	
Function description	Detection, position tracking and classification of hum
Hazard (bow-tie left) (to be controlled)	Early identification of perimiter intrusion
Events (bow-tie event) (unwanted activities)	Localisation of intruder during event
Consequence (bow-tie rig (of failure)	Evidence of intrusion
Bow-tie functionality	Identification of intrusion

TECHNICAL FEATURES		
Dimensions	Sensor: 10 x 20 x 20	[m/m/m]
Weight	N/A	[Kg]
Power consumption	N/A	[W]
Control range (functional	Depends on environment	[m]
Autonomous operation	Partly, automous identification possible	[yes/no]
Automated operation	N/A	
System embedding	N/A	

OPERATIONAL FEATURES		
Personnel requred	none	[%]
Maintenance	low	[days/year]
Approximate market pric	low	[Eur]

EQUIPMENT FACT SHEET

Surveillance technology survey sheet
V1.1

EQUIPMENT IDENTIFICATION	
Name	RADIOACTIVE - compton detector COCAE
Description of equipment	Radiation strength and source detection
Group	RADIOACTIVE
Type	Detector
Other	
Sources	www.cocae.eu

CLASSIFICATION OF FUNCTIONALITY	
Function description	Radioactive radiation detection by compton effect in Cd(Te)Zn crys
Hazard (bow-tie left) (to be controlled)	Identification of radioactive radiation
Events (bow-tie event) (unwanted activities)	Rapid detection of radioactive radiation
Consequence (bow-tie rig (of failure)	
Bow-tie functionality	Detection of preparation actions or deployment of Radioactie sources.

TECHNICAL FEATURES		
Dimensions	N/A	[m/m/m]
Weight	N/A	[Kg]
Power consumption	N/A	[W]
Control range (functional	Box-size volume	[m]
Autonomous operation	no	[yes/no]
Automated operation	yes	
System embedding	no	

OPERATIONAL FEATURES		
Personnel requred	N/A	[%]
Maintenance	N/A	[days/year]
Approximate market pric	N/A	[Eur]

EQUIPMENT FACT SHEET

Surveillance technology survey sheet
V1.1

EQUIPMENT IDENTIFICATION	
Name	SOUND - ECM8000 microphone
Description of equipment	Audible sound microphone
Group	SOUND
Type	Microphone
Other	
Sources	http://www.behringer.com/de/Products/ECM8000.aspx

CLASSIFICATION OF FUNCTIONALITY	
Function description	Acoustic sensor for shot detection and bearing
Hazard (bow-tie left) **(to be controlled)**	
Events (bow-tie event) **(unwanted activities)**	Sniper attack Threat detection via acoustic signal analysis
Consequence (bow-tie righ **(of failure)**	
Bow-tie functionality	Event recording, prompt reaction

TECHNICAL FEATURES		
Dimensions	app. 0.2/0.01/0.01	[m/m/m]
Weight	0.12	[Kg]
Power consumption	N/A	[W]
Control range (functional s	Depends on environment	[m]
Autonomous operation	N/A	[yes/no]
Automated operation	N/A	
System embedding	N/A	

OPERATIONAL FEATURES		
Personnel requred	N/A	[%]
Maintenance	N/A	[days/year]
Approximate market price	N/A	[Eur]

EQUIPMENT FACT SHEET

Surveillance technology survey sheet
V1.1

EQUIPMENT IDENTIFICATION	
Name	SOUND - sound processing FIREFACE400
Description of equipment	FireWire Audio Interface
Group	SOUND
Type	Processing and interpreting sound recordings
Other	
Sources	www.rme-audio.de/products_fireface_400.php

CLASSIFICATION OF FUNCTIONALITY	
Function description	Audio AD-DA interface
Hazard (bow-tie left) **(to be controlled)**	
Events (bow-tie event) **(unwanted activities)**	Sniper attack Threat detection via acoustic signal analysis
Consequence (bow-tie rig **(of failure)**	
Bow-tie functionality	Event recording, prompt reaction

TECHNICAL FEATURES		
Dimensions	App. 0.2/0.05/0.1 and computer program	[m/m/m]
Weight	0.4	[Kg]
Power consumption	N/A	[W]
Control range (functional	Depends on environment	[m]
Autonomous operation	N/A	[yes/no]
Automated operation	yes	
System embedding	Sound system enabler	

OPERATIONAL FEATURES		
Personnel required	N/A	[%]
Maintenance	N/A	[days/year]
Approximate market pric	N/A	[Eur]

EQUIPMENT FACT SHEET

Surveillance technology survey sheet
V1.1

EQUIPMENT IDENTIFICATION	
Name	SOUND - sound recording bug AU046
Description of equipmen	Sound recorder
Group	SOUND
Type	Mini-integrated microphone
Other	
Sources	http://www.spy.th.com/audio.html#!au046

CLASSIFICATION OF FUNCTIONALITY	
Function description	Sound recording
Hazard (bow-tie left) **(to be controlled)**	Identification of criminals Identification and description of plans
Events (bow-tie event) **(unwanted activities)**	Information about events unfolding
Consequence (bow-tie rig **(of failure)**	Evidence gathering Information about events unfolding
Bow-tie functionality	Evidence of crime to prevent crime Evidence for conviction

TECHNICAL FEATURES		
Dimensions	0,01 x 0,015 x 0,025	[m/m/m]
Weight	0,001	[Kg]
Power consumption	N/A	[W]
Control range (functional	Room	[m]
utonomous operation	no	[yes/no]
Automated operation	no	
System embedding	Telephone network	

OPERATIONAL FEATURES		
Personnel required	1	[%]
Maintenance	Recharghe 48 hours	[days/year]
Approximate market pric	300 E	[Eur]

EQUIPMENT FACT SHEET

Surveillance technology survey sheet
V1.1

EQUIPMENT IDENTIFICATION	
Name	SPACE - spy sattelites
Description of equipment	Earth observing sattelites based on photographs
Group	SPACE
Type	Processing and interpreting sound recordings
Other	
Sources	http://www.mscbc.msn.com/id/44568418/ns/technology_and_science-space/t/declassified-us-spy-sattelites-reveal-rare-look-cold-war-space-program/#.UDiI5UJLfcA

CLASSIFICATION OF FUNCTIONALITY	
Function description	Monitoring surface activites
Hazard (bow-tie left) **(to be controlled)**	Detection of training camps Detection of surface conditions
Events (bow-tie event) **(unwanted activities)**	
Consequence (bow-tie rig **(of failure)**	
Bow-tie functionality	Detection of large-scale illegal activities

TECHNICAL FEATURES		
Dimensions	1 x 1 x 5	[m/m/m]
Weight	500-3000 kg	[Kg]
Power consumption	N/A	[W]
Control range (functional	Earth surface	[m]
Autonomous operation	yes	[yes/no]
Automated operation	yes	
System embedding	Ground station and launch site	

OPERATIONAL FEATURES		
Personnel requred	Vast number of people involved	[%]
Maintenance	N/A	[days/year]
Approximate market pric	N/A	[Eur]

EQUIPMENT FACT SHEET

Surveillance technology survey sheet
V1.1

EQUIPMENT IDENTIFICATION	
Name	UAV - platform helikite balloon
Description of equipment	Helium Balloon – Aerostate
Group	UAV
Type	Sensor-carrier
Other	
Sources	http://www.iosb.fraunhofer.de/servlet/is/5045/

CLASSIFICATION OF FUNCTIONALITY	
Function description	Long-time surveillance of large area
Hazard (bow-tie left)	Detect critical situation in big open-air events
(to be controlled)	Prevent communication loss with relay functionality
	Detect intrusion
Events (bow-tie event)	Intrusion in security areas
(unwanted activities)	Mass panic
Consequence (bow-tie rig	Disruption of operation
(of failure)	Loss of life
	Loss of communication
Bow-tie functionality	Observation before, during and after events

TECHNICAL FEATURES		
Dimensions	N/A	[m/m/m]
Weight	5 – 8kg	[Kg]
Power consumption	N/A	[W]
Control range (functional	N/A	[m]
Autonomous operation	no	[yes/no]
Automated operation	no	
System embedding	Part of modular system	

OPERATIONAL FEATURES		
Personnel required	N/A	[%]
Maintenance	N/A	[days/year]
Approximate market pric	N/A	[Eur]

EQUIPMENT FACT SHEET

Surveillance technology survey sheet
V1.1

EQUIPMENT IDENTIFICATION	
Name	UAV - platform micro helicpter
Description of equipment	Small VTOL UAV for close range
Group	UAV
Type	Sensor carrier
Other	
Sources	http://www.iosb.fraunhofer.de/servlet/is/5045/

CLASSIFICATION OF FUNCTIONALITY	
Function description	Reconnoissance of complex / urban terrain
Hazard (bow-tie left)	Reconnaissance of large areas
(to be controlled)	Detect crtitical gas concentrations in the air e.g. after detect unwanted movement
Events (bow-tie event)	Ambush of tactical teams
(unwanted activities)	Harm to civil population from fire gases
Consequence (bow-tie rig	Disruption of operation
(of failure)	
Bow-tie functionality	Mostly identification of threats

TECHNICAL FEATURES		
Dimensions	N/A	[m/m/m]
Weight	1.5 – 5.0 kg	[Kg]
Power consumption	N/A	[W]
Control range (functional	Approx 1 km²	[m]
Autonomous operation	No (legal reasons)	[yes/no]
Automated operation	yes	
System embedding	Part of modular system	

OPERATIONAL FEATURES		
Personnel requred	N/A	[%]
Maintenance	N/A	[days/year]
Approximate market pric	N/A	[Eur]

EQUIPMENT FACT SHEET

Surveillance technology survey sheet
V1.1

EQUIPMENT IDENTIFICATION	
Name	X-RAY - luggage screening
Description of equipment	Single functionality luggage/parcel x-ray scanner
Group	X-RAY - luggage screening
Type	Parcel/hand luggage
Other	
Sources	http://www.smithsdetection.com/HI-SCAN_6040i.ph

CLASSIFICATION OF FUNCTIONALITY	
Function description	Detection of illicit goods without opening parcels/hand luggage
Hazard (bow-tie left) **(to be controlled)**	Detection of illicit weapons in parcels/hand luggage Detection of illicit goods in parcels/hand luggage
Events (bow-tie event) **(unwanted activities)**	Prevent access to weapon while processed
Consequence (bow-tie rig **(of failure)**	After the event: evidence
Bow-tie functionality	Primarily prevention: left hand side

TECHNICAL FEATURES		
Dimensions	2 x 0,85 x 1,3 m	[m/m/m]
Weight	400 kg	[Kg]
Power consumption	N/A	[W]
Control range (functional	0,62 x 0,41 m tunnel opening	[m]
Autonomous operation	no	[yes/no]
Automated operation	no	
System embedding	Part of modular system	

OPERATIONAL FEATURES		
Personnel requred	N/A	[%]
Maintenance	N/A	[days/year]
Approximate market pric	N/A	[Eur]