



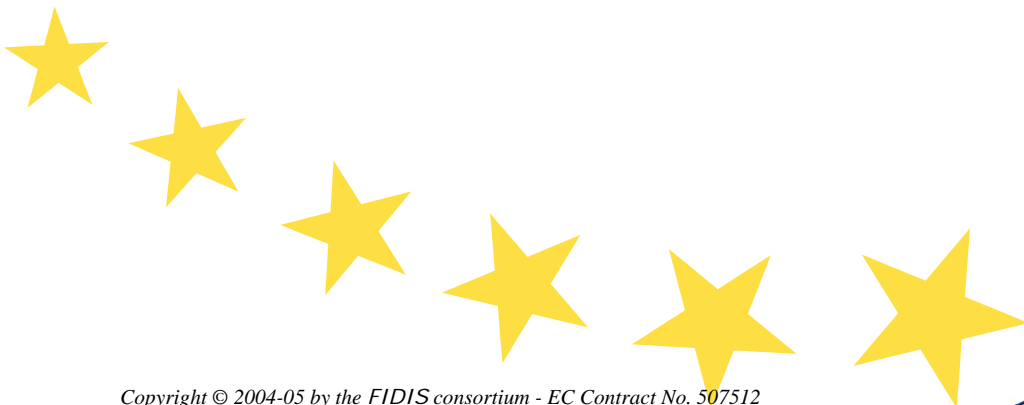
# FIDIS

Future of Identity in the Information Society

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## *Summary*

The fourth workshop of WP 7 (D7.11) was organized on 21.02.2008 at the Vrije Universiteit Brussel to prepare deliverable D7.12 on Biometric Behavioural Profiling (BBP) and Transparency Enhancing Tools (TETs).



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<b>22. Institute of Communication and Computer Systems (ICCS)</b>	Greece
<b>23. AXSionics AG</b>	Switzerland
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## **Versions**

<b><i>Version</i></b>	<b><i>Date</i></b>	<b><i>Description (Editor)</i></b>
<b>0.1</b>	22.02.2008	<ul style="list-style-type: none"><li>• First version (Els Soenens)</li></ul>
<b>0.2</b>	25.02.2008	<ul style="list-style-type: none"><li>• Elaborations (Mireille Hildebrandt)</li></ul>
<b>0.3</b>	12.03.2008	<ul style="list-style-type: none"><li>• Internal Review ( Denis Royer)</li></ul>

**Foreword**

FIDIS partners from various disciplines have contributed as authors to this document. The following list names the main contributors for the chapters of this document:

<b>Chapter</b>	<b>Contributor(s)</b>
<b>All</b>	Els Soenens (VUB)
<b>2</b>	Mireille Hildebrandt (VUB)

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## **1 Executive Summary**

This is the report of the Kick-off Workshop on Behavioural Biometric Profiling and Transparency Enhancing Tools, held at the Vrije Universiteit Brussel at 21.02.2008. This fourth workshop of WP 7 was organized as a kick off meeting to prepare for the report D7.12 on Behavioural Biometric Profiling, to be submitted in month 54 of the project (November 2008).

<p><b>Note:</b> This section is mandatory for all deliverable and should help to get an overview of the topics covered in the document.</p>
---

## 2 Preparation of Deliverable D7.12

In the following sections we give an overview of the subjects discussed during the workshop , of the suggested structure of the report, the timetable, editors and internal review.

### 2.1 *Important issues discussed during the workshop*

- First of all, an adequate working definition of Behavioural Biometric Profiling is needed. Especially the difference between BBP and physical biometrics must be clarified as well as the difference between BBP and non-biometric behavioural profiling (e.g. transactional profiling). A Wiki page is created<sup>1</sup> to discuss and to define suitable definition(s) of Behavioural Biometric Profiling and to develop further relevant distinctions.

A similar wiki is created to clarify the concept of TETs (which refers to both legal and to technological transparency enhancing tools). Both wikis can inform the Identity WIKI of WP2.

- Second, it would be interesting to include in the deliverable cases that function as examples of potential BBPs (like driver fatigue detection, key stroke analysis etc.), and to develop scenarios for these examples of BBP which demonstrate the potential implications of BBP. This should also clarify the need for TETs.
- Third, the social implications of the usage of BBP needs to be assessed, building on the scenarios, existing literature and further exploration of the findings of workpackage 7. Vulnerabilities must be detected as well as the way in which BBProfiling differs from other types of profiling.
- Fourth, the existing legal framework must be assessed in terms of its adequacy to deal with specific threats of BBP usage.
- Fifth, an analysis must be made of the extent to which present legal and technological TETs can provide an adequate response to increased reliance on BBP in online and AmI environments. For this we can partly rely on work done within other FIDIS deliverables, notably D7.9.

### 2.2 *Proposal for a structure of the report*

Based on the discussions of the workshop the following general outline is proposed, to be further elaborated in the coming months.

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<sup>1</sup> [http://internal.fidis.net/workpackage-main/wp7/wiki-workpad/wiki/Defining%20BBP/?tx\\_drwiki\\_pi1%5Breferer%5D=HomePage](http://internal.fidis.net/workpackage-main/wp7/wiki-workpad/wiki/Defining%20BBP/?tx_drwiki_pi1%5Breferer%5D=HomePage)  
[Final], Version: 1.0  
File: WP\_7\_Del\_7.11-18.03.2008.doc

**Chapter 1: Introducing BBP and TETs (All partners)**

What is BBP? (working definition; difference with physical biometric profiling and with non-biometric behavioural profiling; enabling technologies, like online profiling and sensor technologies; BBP as a species of profiling and data mining; role of interpretation; measures for reliability; objective of BBP either identification in broad or narrow sense; applications online and offline; relevance for AmI and the Internet of Things; potential threats)

What are TETs? (working definition; relationship to PETs; relationship between legal and technological TETs; Ambient Law; examples)

What is the link between BBP and TETs? (first assessment of

**Chapter 2: BBP cases & scenarios (ICCS, VIP, VUB)**

Driver Fatigue Detection System (Hildebrandt, VUB) [reference to technical description including reliability; scenario highlighting potential threats]

Web Proiling (Benoist, VIP) [reference to technical description including reliability; scenario highlighting potential threats]

Gait? Emotion-detection? (Andronikou, ICCS) [reference to technical description including reliability; scenario highlighting potential threats]

**Chapter 3: Vulnerabilities generated by the usage of BBP (TILT, VUB)**

Autonomy threats

Social sorting

Privacy

Security

Relationship with invisible visibility, impact of group profiling

**Chapter 4: Vulnerabilities of the present legal framework regarding BBP (ICRI, VUB)**

Summary of findings within D7.3/7/9.

Privacy

Data Protection

Anti-Discrimination

Issues: consent, conflict with intellectual property rights and trade secrets

## **Chapter 5: The role of TETs in the case of BBP (KAU, ICPP, TUD, ICRI, VUB)**

Existing technological TETs, a subset of PETs (reference to D7.9 and other deliverables, PRIME) (KAU, ICPP, TUD)

Existing legal TETs, within the framework of data protection (reference to chapter 3) (ICRI, VUB)

Envisioned technological TETs, not focused on transparency of the processing of ones personal data but on access to applicable profiles (ICCS?VUB? KAU?ICCP?TUD?)

Envisioned legal TETs, not focused on transparency of the processing of personal data but on access to applicable profiles (VUB, ICRI).

## **Chapter 6: Conclusions**

### **2.3 Editors, internal reviewers and time table**

The report will be edited by Mireille Hildebrandt (VUB). Claudia Diaz (ICRI) will be invited to take care of the internal FIDIS review; the second reviewer will be invited at a later stage.

The following time table is proposed (dates are dealines):

- April 1, 2008           elaboration on the wiki – to be continued during whole writing process, agreement on structure and respective contributions
- May 1, 2008           first version contributors
- June 1, 2008           comments editor
- July 1, 2008           final version contributors
- August 1, 2008       final version report; internal review
- September 1, 2008   comments internal reviewers
- October 1, 2008      off to the Commission

### **3 Participants**

#### Participants

- |                           |      |
|---------------------------|------|
| 1. Hans Hedbom            | KAU  |
| 2. Simone Fischer-Huebner | KAU  |
| 3. Els Kindt              | ICRI |
| 4. Stefan Berthold        | TUD  |
| 5. Emmanuel Benoist       | VIP  |
| 6. Hildebrandt Mireille   | VUB  |
| 7. Niels Van Dijk         | VUB  |
| 8. Els Soenens            | VUB  |

#### Absent

- |                          |      |
|--------------------------|------|
| 1. Vassiliki Andronoukou | ICCS |
| 2. Bart Custers          | TILT |
| 3. Marit Hansen          | ICCP |

## **4 Program**

**8.45:** Welcome and Coffee in room 4B302

**9.00:** Session 1: introduction and general discussions

- 9.00-10.30: 'BBP and TETs'. Introduction by Mireille Hildebrandt (VUB)
- 10.30-12.00: Discussion of definitions, applications, reliability and risks of BBP and TETs, as well as the relationship between the two.

**12.00:** Lunch at 'Quartier Latin'

**13.30:** Start Session 2: Presentations and discussions about the presentations

- 13.30-14.15: 'Transparency and Privacy' by Simone Fischer-Huebner and Hans Hedbom (KAU)
- 14.15-15.00: 'Technological aspects of BBP and TETs' by Stefan Berthold (TUD)
- 15.00-15.45: 'Behavioural Biometrics for identification on the Web' by Emmanuel Benoist (VIP)
- 15.45-16.00: Coffee Break
- 16.00-16.45: 'Legal aspects of Behavioural Biometric Profiling' by Els Kindt (ICRI)

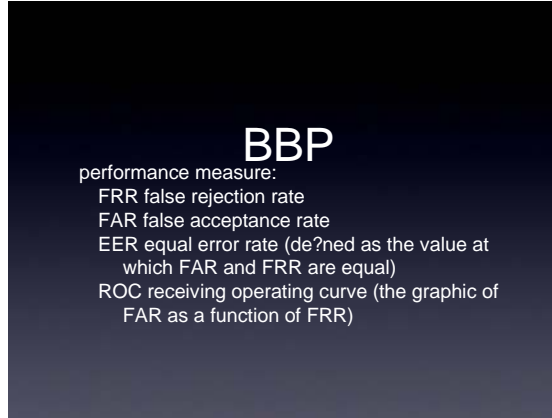
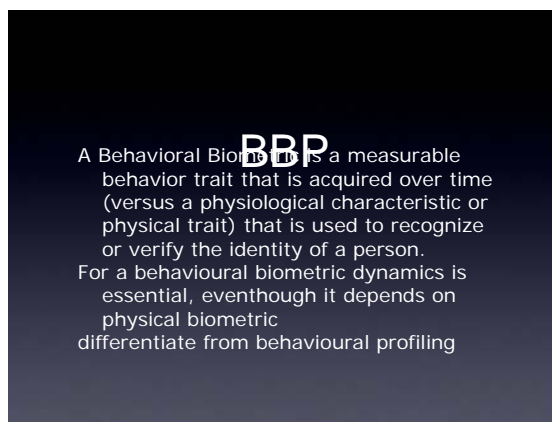
**17.30:** End of the workshop

## 5 Annex I: Slides of the presentations

All slides are available on the internal portal, WP 7 section of the filemanager.<sup>2</sup>

### 5.1 Slides of the presentations

#### 5.1.1 'BBP and TETs'. Introduction. Presentation by Mireille Hildebrandt (VUB)<sup>3</sup>



<sup>2</sup> [http://internal.fidis.net/workpackage-main/wp7/filemanager/files/workpackages/?dir=wp7%2FWorkshop\\_on\\_BBP\\_and\\_TETs](http://internal.fidis.net/workpackage-main/wp7/filemanager/files/workpackages/?dir=wp7%2FWorkshop_on_BBP_and_TETs)

<sup>3</sup> Some of the slides suffer from the export of the presentation from Apple's Keynote to Microsoft's Powerpoint, apologies for the inconvenience.

**BBP**

- keystroke (typing rhythms)
- mouse movements and click behaviour
- writing (signature)
- voice
- gait
- driver fatigue detection

**BBP**

driver fatigue detection:

- based on computer vision of pupil shape, eye blinking frequency, and yawn frequency (weight different and non-linear)
- back-propagation learning genetic algorithm
- feed-forward neural network

**BBP**

- fatigue warning system or autonomic proactive interventions?
- conditional for car insurance?
- redundancy of alcohol or other tests?

**BBP**

technologies involved:

- sensor technologies
- online profiling (click stroke signature)

**BBP**

link to profiling:

- BBP *is* a specific type of profiling:
  - direct individual profiling
  - indirect individual profiling (personalised group profiling)
- BBP *enables* profiling

**BBP**

identification in broad sense:

- identification (who is this)
- verification (is this who she claims to be)
- authentication (is the ID valid)
- re-recognition (are you the same person, WITHOUT KNOWING WHICH PERSON)

**BBP**

link to identification in broad sense:  
 by what you have (card)  
 by what you know (password)  
 by what you are (physical biometric)  
 by what you do (behavioural biometric)

**BBP**

criminal investigation  
 online profiling  
 smart applications  
 ambient intelligence

**BBP**

links to identity & identification:  
 usage for (re)recognition  
 impact on identity construction  
 emotion detection  
 disclosure of health risks  
 manipulation of self & social sorting

**BBP**

legal issues:  
 applicability of D46/95/EC  
 does re-recognition produce personal data?  
 consent (invisible visibility)  
 masking of sensitive data (correlation with trivial data)

**TETs**

transparency enhancing tools.  
 legal and technological instruments that provide access to data processing  
 legal and technological instruments that provide access to profiles that may affect the risks and opportunities of an individual person

**TETs**

PETs build on data minimisation  
 TETs build on minimisation of information and knowledge asymmetries

**TETs**

how am I being profiled?  
 which behaviours cause which categorisations?  
 which are the potential consequences?  
 precondition for countering undesirable social sorting, privacy invasion  
 empowering citizens to interact with their proactive environment

**TETs**

legal TETs (art. 15 and 12 D46/95/EC, clash with intellectual property and trade secrets)  
 technological TETs (open source software, counterprofiling, see 5.4 in D7.9)  
 relationship with AML

**linkage of BBP and TETs**

Aml environments:  
 BBP allows re-recognition  
 BBP allows proactive adaptation  
 this raises the need for TETs

**5.1.2 ‘Transparency and Privacy’. Presentation by Simone Fischer-Huebner and Hans Hedbom (KAU)**

Transparency & Privacy



Outline

- Work in Prime
- Issues to be addressed by user side
- Issues to be addressed by service side
- Transparency vs. Privacy
  - Example: MinSide

Future of Identity in the Information Society (No. 507512)

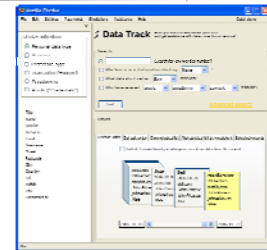
**Work in PRIME: Representation of Mechanisms for Enhancing Trust**

- Data Track
- Trust and Policy Negotiation
- Obligations Management
- Reputation /Functionality Check
- Security Feed, ...



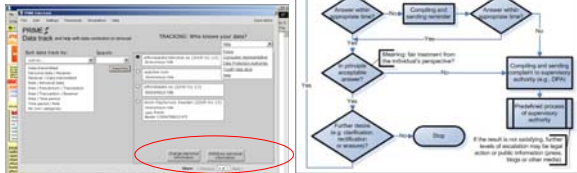
**Data Track in PRIME**

- **Transparency: "Data Track"** providing:
  - User side-DB with user-friendly search function for transaction records (incl. data, pseudonyms, credentials, timestamp, policy)
  - Online-Functions for exercising rights
  - Help for "worried users"



**Online Functions for Exercising Rights**

- **Problem:** Users do not know their privacy rights and do not exercise them
- Can Online Functions help to overcome this threshold and raise trust ?



**Issues to be addressed at the user side**

- Authentication for digital identity – not straight forward if pseudonyms were used
- Access request should not reveal more than known by service provider

**Issues to be addressed by service side**

- Service side automated response support needed
- Laws might need to be updated to allow Online requests (e.g. in Sweden the PUL only provides the right to access data once in a year)
- Service side automated response support needed
- Service side transparency and accountability tools need to be privacy-enhanced

**Example: E-Government Transparency Service: MyPage/MinSide**



- Provides full Transparency, but could also be used as a perfect profiling tool



### Accountability vs. Privacy

- For transparency of data use/accountability: "Policy-aware" transaction logs needed, which however contain personal data about users and data subjects
- Appropriate protection schemes for logs needed (access control, pseudonymisation,...)



### Outlook

More work on user/service side transparency tools in PrimeLife



### 5.1.3 'Technological aspects of BBP and TETs'. Presentation by Stefan Berthold (TUD)

We refer to the internal portal filemanager section:

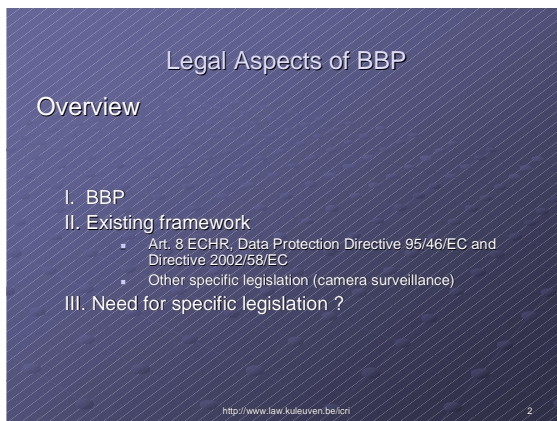
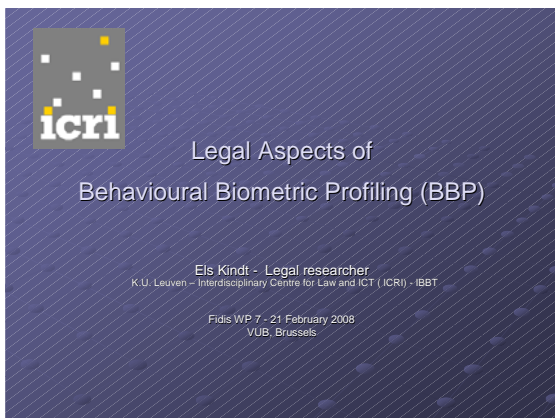
[http://internal.fidis.net/fileadmin/fidis/workpackages/wp7/Workshop\\_on\\_BBP\\_and\\_TETs/TUD\\_S\\_Berthold.pdf](http://internal.fidis.net/fileadmin/fidis/workpackages/wp7/Workshop_on_BBP_and_TETs/TUD_S_Berthold.pdf)

### 5.1.4 'Behavioural Biometrics for identification on the Web'. Presentation by Emmanuel Benoist (VIP)

We refer to the internal portal filemanager section:

[http://internal.fidis.net/fileadmin/fidis/workpackages/wp7/Workshop\\_on\\_BBP\\_and\\_TETs/VIP\\_slides/Emmanuel.pdf](http://internal.fidis.net/fileadmin/fidis/workpackages/wp7/Workshop_on_BBP_and_TETs/VIP_slides/Emmanuel.pdf)

### 5.1.5 'Legal aspects of Behavioural Biometric Profiling'. Presentation by Els Kindt (ICRI)



### Legal Aspects of BBP

I. Behavioural Biometric Profiling

- Definition ?
  - 'scientific measurement of [unique] physical or behavioural characteristics of individuals and teams' and 'comparing the pattern of behaviours to a template by which an extremely accurate profile can be produced'
- Where ?
  - Employment relationship/hiring
  - Visitors of events
  - Private clubs
  - Airports ?
  - Public places ?
- Purpose ?
  - Efficiency, business, fun
  - Public safety, anti-terrorism, prevention and detection of crimes, security, supervision,

<http://www.law.kuleuven.be/ici> 3

### Legal Aspects of BBP

in conflict with  
the fundamental right to privacy ?

- Covert
- Unclear or multiple purposes
- Storage in database, linking with other data bases
- Term of storage and retention
- Moore's law
- Application of (group) profile

<http://www.law.kuleuven.be/ici> 4

### Legal Aspects of BBP

II. Existing Legal & Regulatory Framework

- Fundamental rights and freedoms

Right to respect for private and family life

- International treaties, e.g., Art. 8 ECHR
- Constitution of Member States
  - Art. 22 Constitution (Belgium)
  - Art. 10 Constitution (the Netherlands)

Data protection rights

- E.g., Treaty of Lisbon (2007)
- E.g., Constitution of Member States

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### Legal Aspects of BBP

II. Existing Legal & Regulatory Framework

- Directive 95/46/EC, as implemented by national laws of Member States
  - Act of 8 December 1992 (Belgium)
  - Act of 1998 amended in 2000 (WBP) (the Netherlands)

Directive 2002/58/EC, as implemented

<http://www.law.kuleuven.be/ici> 6

### Legal Aspects of BBP

II. Existing Legal & Regulatory Framework

- Specific legislation in EU Member States regulate camera surveillance, e.g., in The Netherlands, Belgium

BELGIUM

- Act of 21 March 2007 regulating the installation and the use of surveillance camera's
- On the work floor : 'CAO' 68
- Case law, opinions Belgian Privacy Commission

transparency, purpose limitation, access to police

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### Legal Aspects of BBP

III. Existing Legal & Regulatory Framework

THE NETHERLANDS

- Article 441b & 139f Penal Code (2004)
- Act camera surveillance in public places (2006)
- Case law (HR 27 April 2001)
- Opinions Dutch Privacy Commission

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### Legal Aspects of BBP

II. EU Legal & Regulatory Framework

Directive 95/46/EC:

- Recit.38 : '... fair ... in a position to learn...'
- Recit. 41 : '... lawfulness ... know the logic involved' but : 'not affect trade secrets, intellectual property and copyright'
- Legal basis ?
- Information to the data subject (art. 10,11,12)
- Data minimisation
- Finality principle
- Proportionality principle : 'adequate, relevant and not excessive'

Also Article 29 WP : Opinion on biometrics (2003)

<http://www.law.kuleuven.be/ici> 9

### Legal Aspects of BBP

II. EU Legal & Regulatory Framework

Directive 2002/58/EC (e-privacy) :

- 'communication ...between a finite number of parties .. a publicly available electronic communications service ...'
- Unsolicited communications (direct marketing) (art. 13)
- Use of location data (art. 9)

<http://www.law.kuleuven.be/ici> 10

### Legal Aspects of BBP

**IV. Critical analysis**

- Specific legislation : camera surveillance legislation : legal basis for specific limited purposes
  - not sufficient for BBP
  - fine for not handing over images to police (B)
  - notice sign equals consent ? (N)

http://www.law.kuleuven.be/ict 11

### Legal Aspects of BBP

**IV. Critical analysis**

- Data protection legislation & e-privacy legislation :
  - limited field of application : restrictions possible to safeguard national security, public security, prosecution of criminal offences ...
  - Proportionality principle unclear
  - International transfer of data problematic

http://www.law.kuleuven.be/ict 12

### Legal Aspects of BBP

**IV. Critical analysis**

Art. 8 ECHR :

- Proportionality principle unclear
  - 'in accordance with the law'
  - 'necessary in a democratic society'
  - in the interests of (1) national security, (2) public safety or (3) (...), (4) for the prevention of disorder or crime, (5) (...), (6) or for the protection of the rights and freedoms of others
- 4 Q test ?

http://www.law.kuleuven.be/ict 13

### Legal Aspects of BBP

**Conclusion**

Need to properly balance the conflicting rights of privacy and security/business interest/commercial interest

BBP should be subject to further detailed regulation and requirements

http://www.law.kuleuven.be/ict 14

### Legal Aspects of BBP

Discussion ?

Any Questions ?

Thank you for your attention !

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http://www.law.kuleuven.be/ict 15

## 5.2 Slides of participants who could not attend the workshop

### 5.2.1 Proposed contribution of TILT. Slides of Bart Custers (TILT)



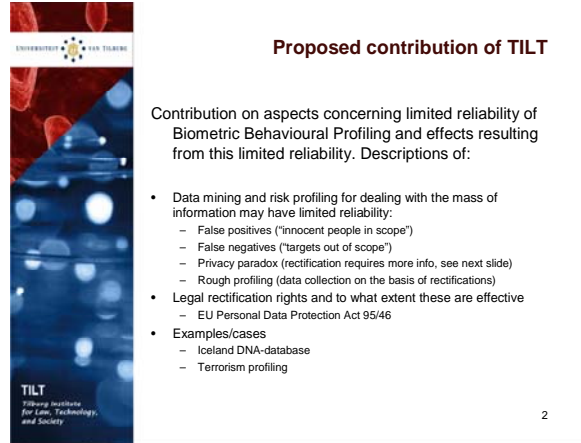
**Kick-off Workshop on  
Biometric Behavioural Profiling and TETs**

**21st February 2008  
Proposed Contribution of TILT**

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TILT  
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1



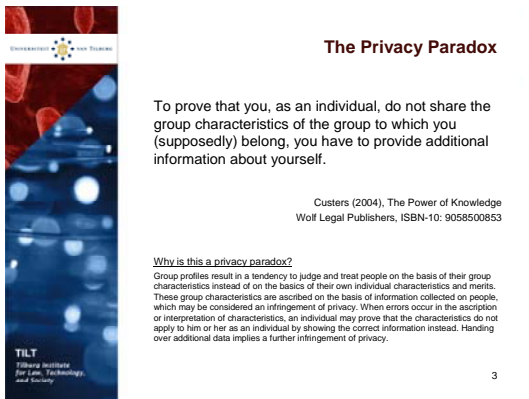
**Proposed contribution of TILT**

Contribution on aspects concerning limited reliability of Biometric Behavioural Profiling and effects resulting from this limited reliability. Descriptions of:

- Data mining and risk profiling for dealing with the mass of information may have limited reliability;
  - False positives ("innocent people in scope")
  - False negatives ("targets out of scope")
  - Privacy paradox (rectification requires more info, see next slide)
  - Rough profiling (data collection on the basis of rectifications)
- Legal rectification rights and to what extent these are effective
  - EU Personal Data Protection Act 95/46
- Examples/cases
  - Iceland DNA-database
  - Terrorism profiling

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**The Privacy Paradox**

To prove that you, as an individual, do not share the group characteristics of the group to which you (supposedly) belong, you have to provide additional information about yourself.

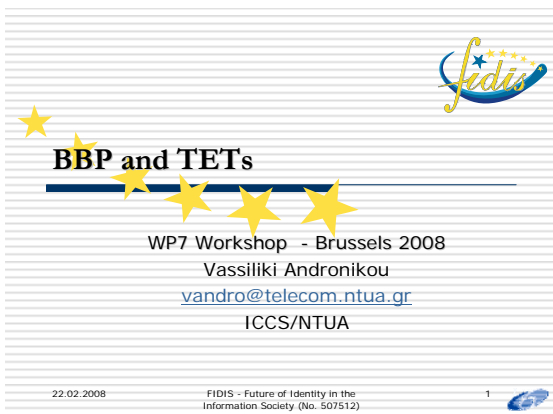
Custers (2004), The Power of Knowledge  
Wolf Legal Publishers, ISBN-10: 9058500853

Why is this a privacy paradox?  
Group profiles result in a tendency to judge and treat people on the basis of their group characteristics instead of on the basis of their own individual characteristics and merits. These group characteristics are ascribed on the basis of information collected on people, which may be considered an infringement of privacy. When errors occur in the ascription or interpretation of characteristics, an individual may prove that the characteristics do not apply to him or her as an individual by showing the correct information instead. Handing over additional data implies a further infringement of privacy.

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### 5.2.2 BBP and TETS. Slides of Vassiliki Andronoukou (ICCS)



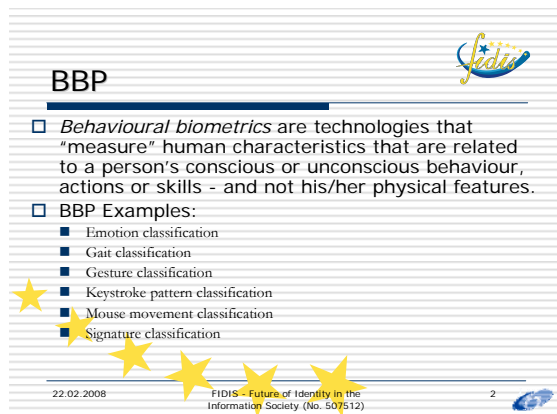
**BBP and TETs**

WP7 Workshop - Brussels 2008  
Vassiliki Andronikou  
[vandro@telecom.ntua.gr](mailto:vandro@telecom.ntua.gr)  
ICCS/NTUA

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**BBP**

- *Behavioural biometrics* are technologies that "measure" human characteristics that are related to a person's conscious or unconscious behaviour, actions or skills - and not his/her physical features.
- BBP Examples:
  - Emotion classification
  - Gait classification
  - Gesture classification
  - Keystroke pattern classification
  - Mouse movement classification
  - Signature classification

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### BBP : Applications

- Restaurant
- Hotels
- Shopping
- Insurance companies
- Credit card companies
- E-commerce
- Smart Surveillance systems (Elderly/Students/Kids)

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### BBP Direct Threats

- BBP involves biometric data which can –through further processing- reveal more information than initially intended to
- Data exposure to 3<sup>rd</sup> parties *without the person's consensus*
  - Use of BBP results in other applications
  - Reprocessing of BBP data for extraction of more info

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### BBP-Specific TETs

- Citizen knows how much detailed their stored data is (if any):
  - Raw data
  - Features
  - Cancellable biometrics
  - None??

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### BBP and TETs

- Trust establishment through SLAs (Service Level Agreements)
- Service Level Agreement:
  - A contract between end user and service provider or between service providers.
  - Formally negotiated agreement for services, priorities, responsibilities, authorisation including QoS parameters related to availability, performance, reliability, security as well as actions to be taken when SLA term violation occurs and billing

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### SLA Management lifecycle

- Templates**
- Publishment and discovery**
- Negotiation**
- Provider Resource Optimisation**
- Monitoring**
- Re-negotiation**
- Evaluation**
- Accounting**

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### What about ...

profiling the reaction of each person when becoming aware of their profiling information?

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### BBP and TETs

**Thank you!!!**

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