

COST
Domain Committee "ICT"

COST Action 2101
Start Date 07/12/2006

Biometrics for Identity Documents and Smart Cards

**MONITORING
PROGRESS REPORT**

Reporting Period: from 1 July 2008 to 30 June 2009

This Report is presented to the relevant Domain Committee.
It contains three parts:

- I. Management Report prepared by the COST Office/Grant Holder***
- II. Scientific Report prepared by the Chair of the Management Committee of the Action***
- III. Previous versions of the Scientific Report; i.e., part II of past reporting periods***

The report is a "cumulative" report, i.e. it is updated annually and covers the entire period of the Action.

Confidentiality: the documents will be made available to the public via the COST Action web page except for chapter *II.D. Self evaluation*.

Based on the monitoring results, the COST Office will decide on the following year's budget allocation.

Executive summary:

The main objective of the COST 2101 Action is to investigate novel technologies for unsupervised multimodal biometric authentication systems using a new generation of biometrics-enabled identity documents and smart cards, while exploring the added-value of these technologies for large-scale applications with respect to European requirements in relation to the storage, transmission, and protection of personal data. During the report period, the Action has been successful in achieving its technical and non-technical objectives. These include establishing links with other projects, setting up and running a website, holding its four focused workshops, the First European Workshop on "Biometrics and Identity Management" and the 3rd International Conference on Biometrics (ICB 2009), publishing their proceedings, and running a number of other dissemination activities. Moreover, members of COST 2101 have teamed up with other European researchers to propose with success new European projects under FP7, e.g. MOBIO, TURBINE, HIDE, i3DPost. In the framework of European institutions (e.g. CEN, ESRI) their recommendations had strong impact on a common European approach and harmonisation policy by identifying challenges, threats and standardisation issues facing biometrics deployment in Europe. Another notable success of the Action has been large participation of young scientists attracted by the COST 2101 workshops and training schools.

I. Management Report prepared by the COST Office/Grant Holder

I.A. COST Action Fact Sheet

- **COST Action 2101** – *Biometrics for Identity Documents and Smart Cards*
- **Domain** *Information and Communication Technologies (ICT)*

- **Action details:**

CSO Approval: 27/06/2006
Entry into force: 21/09/2006

End date: 06/12/2010
Extension: None

- **Objectives**

The main objective of the Action is to investigate novel technologies for unsupervised multimodal biometric authentication systems using a new generation of biometrics-enabled identity documents and smart cards, while exploring the added-value of these technologies for large-scale applications with respect to European requirements in relation to the storage, transmission, and protection of personal data.

The Action will benefit the European community; individual European states; the providers of technology for biometrics, identity documents and smart cards; providers of public and private services; various security organisations wishing to use biometrics authentication for the provision of access to services and confidential information by authorised individuals. Either the challenges ahead are dealt with or the benefits of this aspect of information technology for European countries will be limited.

It has become obvious that a specific fundamental research effort is needed in the transdisciplinary domain of adaptation of the state-of-the-art biometric techniques to the real-world environmental conditions and to user behaviour when using identity documents and smart cards. This Action aims to fulfil these requirements. It will contribute to extending theoretical and applied experience in the very important area of statistical modelling and ambient intelligence and, in particular, provide evaluation of the practical feasibility of new interactive multimodal biometric techniques for unsupervised systems.

- **Parties:** *list of countries and date of acceptance*

Austria	Greece 22/09/2006	Poland 22/09/2006
Belgium	Hungary	Portugal
Bulgaria 27/06/2008	Iceland	Romania
Croatia 03/04/2007	Ireland 03/11/2008	Serbia
Cyprus 03/10/2006	Israel	Slovakia
Czech Rep.	Italy 16/02/2007	Slovenia 13/10/2006
Denmark 20/09/2006	Latvia	Spain 21/09/2006
Estonia	Lithuania	Sweden
Finland 03/11/2006	Luxembourg	Switzerland 02/10/2006
FYR of Macedonia	Malta	Turkey 20/04/2007
France 29/11/2006	Netherlands 20/09/2006	United Kingdom 20/09/2006
Germany 20/09/2006	Norway	

- **Intentions to accept:** Sweden, Norway
- **Other participants:**

Chair:

Dr. Andrzej Drygajlo
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Administrative Officer:

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Grant Holder Representative:

Dr. Niels Christian Juul,
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• Working Groups 4

- WG1: Biometric Data Quality and Multimodal Biometric Templates
Coordinator: Prof. Massimo Tistarelli (IT)
- WG2: Human Behaviour and Unsupervised Interactive Interfaces for Multimodal Biometrics
Coordinator: Prof. Slobodan Ribaric (HR)
- WG3: Biometric Security Challenges
Coordinator: Prof. Bulent Sankur (TR)
- WG4: Standards and Privacy Issues for Biometrics in Identity Documents and Smart Cards
Coordinator: Nicolas Delvaux (FR)

• STSM-granting committee:

- Prof. Michael Fairhurst (University of Kent, UK)
- Claus VIELHAUER (University of Magdeburg, D)
- Massimo TISTARELLI (University of Sassari, I)

with backup in case of conflict of interests or unavailability from Dr. Niels Christian Juul (Roskilde University, DK) and Dr. Andrzej Drygajlo (EPFL, CH).

I.B. Management Committee member list

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Dr. Aladdin ARIYAEENIA	United Kingdom (Member)	a.m.ariyaeenia@herts.ac.uk
Prof. Josef KITTLER	United Kingdom (Substitute)	J.Kittler@surrey.ac.uk

I.C. Overview activities and expenditure

1. Budget and Spending 1st half year

01 January 2007 to 31 May 2007	Budget	Spent
Meetings (travel): 1 meeting	€ 20 000.00	€ 18 833.35
STSM: None	€ 3 000.00	€ -
Workshops: 1 workshop	€ 3 000.00	€ 3 099.50
General Support Grants: None	€ -	€ -
Schools: 1 training school	€ 10 000.00	€ 12 022.56
Dissemination: None	€ 1 000.00	€ -
Others: none	€ -	€ -
Total spend on science	€ 37 000.00	€ 33 955.41
Secretarial support: (max 15%)	€ 3 700.00	€ -
Total Action Budget:	€ 40 700.00	€ 33 955.41

2. Budget and Spending 1st full year

01 July 2007 to 30 June 2008	Budget	Spent
Meetings (travel): 2 meetings	€ 58 000.00	€ 35 320.00
STSM: 1 STSM grant	€ 10 000.00	€ 2 400.00
Workshops: 2 workshops	€ 10 000.00	€ 16 000.00
General Support Grants: None	€ -	€ -
Schools: 1 training school	€ 10 000.00	€ 27 743.00
Dissemination: None	€ -	€ -
Others: none	€ -	€ -
Total spend on science	€ 88 000.00	€ 81 463.00
Secretarial support: (max 15%)	€ 12 000.00	€ 12 027.00
Total Action Budget:	€ 100 000.00	€ 93 490.00

3. Budget 2nd full year and Spending 1st half year

01 July 2008 to 31 December 2008	Budget (full year)	Spent
Meetings (travel): Budget 2 meetings (1 held)	€ 51 609.00	€ 20 218.52
STSM: 5 STSM grants (2 given)	€ 10 000.00	€ 4 300.00
Workshops: 2 workshops (1 held)	€ 7 000.00	€ 3 000.00
General Support Grants: website	€ -	€ -
Schools: 1 training school (none held)	€ 10 000.00	€ -
Dissemination: books, special issue (proceedings BIOD'08 Springer done)	€ 4 000.00	€ 1 294.80
Others: none	€ -	€ -
Total spend on science	€ 82 609.00	€ 28 813.32
Secretarial support: (max 15%)	€ 12 391.00	€ 4 322.00
Total Action Budget:	€ 95 000.00	€ 33 135.32

4. Remaining Action Commitment (based on adjustment of April 20th 2009):

1 January 2009 to 30 June 2009	Half year budget	Adjusted budget
Meetings (travel): Budget 2 meetings	€ 40 000.00	€ 40 000.00
STSM: 3 STSM grants left (adj. to 0)	€ 5 700.00	€ -
Workshops: 2 workshops	€ 13 000.00	€ 13 000.00
General Support Grants: website (adj from dissemination)		€ 2 000.00
Schools: 1 training school	€ 40 000.00	€ 40 000.00
Dissemination: books, special issue (adj.)	€ 6 000.00	€ 2 000.00
Others: none	€ -	€ -
Total spend on science	€ 104 700.00	€ 97 000.00
Secretarial support: (max 15%)	€ 15 705.00	€ 14 550.00
Total Action Budget:	€ 120 405.00	€ 111 550.00

**5. Summary of last two tables:
Budget and Estimated Spending 2nd full year**

01 July 2008 to 30 June 2009	Budget (full year)	Estimated spendings
Meetings (travel): Budget 2 meetings (1 held)	€ 60 218.52	€ 60 218.52
STSM: 5 STSM grants (2 given)	€ 10 000.00	€ 4 300.00
Workshops: 2 workshops (1 held)	€ 16 000.00	€ 16 000.00
General Support Grants: website	€ -	€ 2 000.00
Schools: 1 training school (none held)	€ 40 000.00	€ 40 000.00
Dissemination: books, special issue (proceedings BIOID'08 Springer done)	€ 7 294.80	€ 3 294.80
Others: none	€ -	€ -
Total spend on science	€ 133 513.32	€ 125 813.32
Secretarial support: (max 15%)	€ 20 027.00	€ 18 872.00
Total Action Budget:	€ 153 540.32	€ 144 685.32

Further details can be found in the Financial Reports.

II. Scientific Report prepared by the Chair of the Management Committee of the Action

II.A. Innovative networking

Objectives to achieve during first 30 months of the Action have been defined as follows:

- To improve biometric templates generation and their reading (e.g. contactless) for identity documents using single and multiple modalities and to enhance centralised and distributed approaches to template storage (smart card and server scenario).
- To improve techniques for measuring the quality of biometric data and reliability of classifiers, and to evaluate their relative effectiveness by parametric and statistical modelling of the theoretical limitations of biometric modalities.
- To design methodologies for the acquisition and maintenance of large-scale operational (multimodal) biometric databases of identities and biometric data.
- To enhance multimodal biometric verification techniques (identity document control) and identification techniques (enrolment and searching in a watch list) of persons using sequential and parallel biometric fusion.
- To improve universal combination of multiple modality models, selected among face, fingerprint, iris, hand palm/geometry, dynamic signature and voice recognition, using the quality and reliability measures of biometric modalities.
- To develop new data-driven probabilistic models and processing techniques for unimodal and multimodal robust biometrics-based recognition integrating quality and reliability measures.
- To enhance efficiency, robustness and reliability of unsupervised multimodal biometric authentication systems by combining biometric modalities and auxiliary data from identity documents in an interactive way.
- To work out the implementation of encryption schemes for identity documents and smart cards necessary to safeguard biometric information.

Although considerable research had been conducted into biometrics before the start of this COST 2101 Action in 2006, there had not been much evidence of any established knowledge about the implementation of such techniques into the identity documents and smart cards. As a result, it appeared from the beginning that the problems and issues associated specifically with the use of biometrics in identity documents and smart cards were not very well known.

The study conducted by COST 2101 in this area during the early part of the work included a review of biometric modalities and their templates, as well as an analysis of the operational conditions in the proposed technology. This study was of considerable value as it helped find appropriate focuses for the subsequent stages of work. One of the important points identified as a result of the above study was the need to gain detailed knowledge about the factors (e.g. quality of biometric data) which would unfavourably influence the accuracy of verification using templates of identity documents and smart cards, and about the extent of their effects. Gaining this knowledge has been a focus of work in more recent activities. To date, this has led to valuable contributions to knowledge in the field by COST 2101. The Action's investigations were concentrated on the robustness and reliability of multimodal biometric interfaces including quality and reliability measures of biometric modalities. It also has assessed current quality and reliability measurement capabilities and identified technologies, factors and operational paradigms that can measurably improve quality and reliability of multimodal biometrics. More details about the investigations and the results obtained can be found in the publications (listed below) produced by members for the purpose of dissemination. The research achievements in this domain have been internationally recognized by the EBF (European Biometrics Forum) European Biometric Research Award 2007 awarded in October 2007 to Mr Krzysztof Kryszczuk, member of the COST 2101 Management Committee. The main achievements will be published soon by IET (UK) in the special issue on "Biometric Recognition" (11 papers) and by Springer-Verlag in the book entitled "Quality and Reliability in Biometrics" by K. Kryszczuk, J. Richiardi, A. Drygajlo and J. Kittler. The

growing knowledge in this field is expected to gradually lead to the development of robust methods for minimising the adverse effects, on the biometric performance, of variation in operational conditions and large-scale implementation in identity documents and smart cards.

Another important aspect of the work within COST 2101 Action, since its start in December 2006, has been the provision of appropriate common databases for the purpose of assessment. Such databases are also important requirements for the purpose of the investigations undertaken within and without the Action. To this end attempts were made to acquire existing databases and create new ones for the said activities. This led to the choice of multi-scenario, multi-environment Multimodal Biometric Database (MBD) collected as the result of another European project BioSecure NoE. Majority of COST 2101 partners participated in the database collection and in the BioSecure Multimodal Evaluation Campaign (BMEC 2007). For managing and distributing the MBD the BioSecure Association has been founded, which includes majority of the COST 2101 partners (previously BioSecure partners). A General Assembly of the BioSecure Association has been organized during the fifth COST 2101 MCM in Limassol, Cyprus on 9th October 2009. Acquisition of other multimodal databases by the Action members has begun on national level. Two databases has been released in 2009: in Switzerland (MBioID – Multimodal Biometrics for Identity Documents) and Turkey (Bosphorus Database of 3D faces). Four databases for face, fingerprint, signature and multimodal recognition have been distributed and used for evaluations in the framework of ICB 2009 competitions.

COST 2101 is also concerned with the potential applications of the proposed technology and their requirements. In order to meet this objective, attempts have been initiated to establish close cooperation with potential end users and industry, such as Sagem, Tales, Gemalto and Precise-Biometrics. The early effort in this area have resulted in the first focused Workshop on “Smart Cards and Biometrics” organized jointly by the COST 2101 Action and the Industrial and End-User Committee of the BioSecure Network of Excellence (BIEC) in Lausanne, Switzerland on 26 March 2007. The second focused Workshop on “Signature and Handwriting Analysis for Person Identification” was organized in Canterbury, UK on 29th November 2007. The principal aim of the workshop was to bring together some of Europe’s foremost researchers in the area of automatic signature verification and the exploitation of all forms of handwriting for the purposes of establishing or verifying the identity of the writer. This workshop sought to identify the principal outstanding research issues which must be addressed if significant advances are to be made in this field, while also aiming to developing a better understanding of industry’s needs (e.g. in the credit cards area). Since Phase 2 of the COST 2101 Action has been initiated, coordinated scientific activities were concentrated on multimodal biometric recognition. The third focused Workshop on “Multibiometrics” was organized in Limassol, Cyprus on 9th October 2008, and the fourth focused Workshop on “Artificial Intelligence Approaches for Biometric Template Creation and Multibiometrics Fusion (ARTIBIO 2009),” was organized in Thessaloniki, Greece on 24th April 2009 in the framework of the 5th IFIP Conference on Artificial Intelligence Applications and Innovations (AIAI 2009).

SCIENTIFIC AND TECHNICAL COOPERATION (list)

Project/Organisation	Point of Contact
• BioSecure NoE (EU Framework Project)	Bernadette Dorizzi
• BioSecure Association	Bernadette Dorizzi
• EBF (European Biometrics Forum)	Ben Schouten
• EBP (European Biometric Portal)	Andrzej Drygajlo
• IET (The Institution of Engineering and Technology)	Aladdin Ariyaeinia
• EPI (European Privacy Institute)	Andrzej Drygajlo

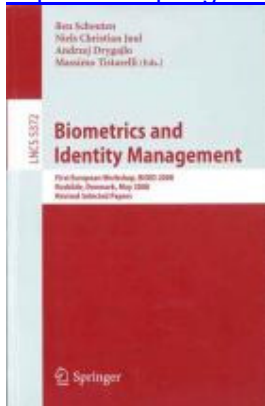
- MOBIO (EU Framework Project) Josef Kittler
- TURBINE (EU Framework Project) Nicolas Delvaux
- HIDE (EU Framework Project) Nicola Pavesic
- Institute for the Protection and Security of the Citizen,
Joint Research Centre – European Commission Klaus Keus
- Focus Group on Biometrics, European Committee
for Standardization (CEN/ISSS) Nicolas Delvaux
- ESRIFF (European Security Research and Innovation
Forum) Andrzej Drygajlo
- i3DPost (Intelligent 3D content extraction and manipulation
for film and games, FP7) Ioannis Pitas
- RISE (Rising pan-European and International Awareness
on Biometrics and Security Ethics, FP7) Andrzej Drygajlo
- ACTIBIO (Unobtrusive Authentication Using ACTivity Related
and Soft BIOmetrics, FP7) Albert Salah
- NEXTID (Next Generation Biometric Identification Strategies
for Enhancing Security, FP7 Proposal) Massimo Tistarelli
- BIOSTEP (Biometric Identification Systems for Police and
Healthcare, FP7 Proposal) Massimo Tistarelli
- BODIES & BORDERS (FP7 Proposal) Massimo Tistarelli
- MULTISAUND (FP7 Proposal) Massimo Tistarelli

National Project

- UK Biometrics Institute (National Project, UK) Point of Contact
Michel Fairhurst
- AREA: Analysis and Recognition of Audiovisual Events
for User Monitoring and Biometric Verification (Spain) Jose L. Alba
- Theory, modelling and application of autonomy-oriented
computational structures (Croatia) Slobodan Ribaric
- Extracting a good quality face image from a poor quality
surveillance video Thomas Moeslund
- Metrology and Biometric Systems (Slovenia) Jerneja Zganec Gros
- AVID - AudioVisual Identification (Slovenia) Jerneja Zganec Gros
- Vision techniques for computer aided living (Italy) Massimo Tistarelli
- Face recognition techniques and feature-based multimodal
Fusion (Italy) Massimo Tistarelli
- Tecniche di visione per sistemi CAL (Computer Aided Living)
Pervasivi (Italy) Massimo Tistarelli
- Sistemi biometrici adattivi: metodi e modelli per l'aggiornamento
automatico dei template (Italy) Massimo Tistarelli
- ABID2 - Applying Biometrics to Identity Documents: Investigation
of Security Issues and Elaboration of an Efficient Communication
Strategy (Switzerland) Andrzej Drygajlo
- Multimodal Biometric Person Identification with Reliability
Measures (Switzerland) Andrzej Drygajlo
- Temporal reliability of features and models for multimodal
person recognition (Switzerland) Andrzej Drygajlo

II.B. Inter-disciplinary networking

Over the last 30 months, COST 2101 operated as a valuable and effective platform for close collaboration of European researchers in Europe and with researchers all over the world in the field of investigation. A main outcome of this has been the continuous advances achieved in various classes of biometrics and their implementations in the identity management domain. These contributions to knowledge have been disseminated through the First European Workshop on “Biometrics and Identity Management” organized in Roskilde, Denmark on 7-9 May 2008. The scope of this first COST 2101 open workshop was wide and covered all the research aspects of the Action, from biometric data quality, through biometric templates and modalities, to biometric attacks and countermeasures, as well as biometric interfaces and standards. The most important contributions were published by Springer-Verlag in Proceedings of the First European Workshop on Biometrics and Identity Management (BIOID 2008), Revised Selected Papers, in the series of Lecture Notes in Computer Science (LNCS 5372) <http://www.springer.com/computer/computer+imaging/book/978-3-540-89990-7>.



The COST 2101 Action has also co-organised the biggest and most important conference in the field of investigation: 3rd International Conference on Biometrics (ICB 2009) to be held in Alghero, Italy on 2-5 June 2009. Prof. Massimo Tistarelli (Chair of WG1) is general chair of the conference, Prof. Ortega-Garcia its co-chair, and Prof. Dorizzi is responsible for the ICB competitions. This conference brings together leading biometric researchers, system designers, and end users from all over the world to promote the development of robust solutions to efficient and secure person authentication. More than 130 papers will be published in the conference proceedings by Springer Verlag LNCS series.

The COST 2101 Action has a key role in facilitating training and collaboration amongst European young and senior researchers and industrial partners, in particular early stage researchers. To strengthen this role, one part of STSMs has been included into the COST Training Schools. From 30th April to 3rd May 2007 the first COST 2101 Training School was organized in Lausanne, Switzerland, jointly by COST 2101, EPFL School of Continuing Education (SCE), Biometrics Centre Lausanne, Centre for Interdisciplinary Studies in Information Security (ISIS), and National Centre of Competence in Research on Interactive Multimodal Information Management and established close collaboration with professionals and industrials such as Deloitte, A4Vision, Lumidigm, TBS, BioTronic.

The second COST 2101 Training School was organized in Alghero, Italy on 9-13 June 2008. Each year, this Summer School for Advanced Studies on Biometrics for Secure Authentication aims at different target. In 2008 edition on “New Technologies for Security and Privacy”, the courses mainly focused on new and emerging issues in biometrics concerning security and privacy issues, new and emerging biometric technologies, as well as standardization issues and assessment techniques. The talks were delivered by 16 out

of the best internationally reputed experts, both from academia and industry. 48 students from 22 countries from PhD student, post-doc, young researcher and industrial professional candidates have been pre-selected to participate in the training school. The two best research contributions of participants (2 women) were awarded a special prize offered by Motorola Biometrics. During the school week two special meetings were also held: a special meeting to coordinate the organization of the ICB 2009 and a round table to discuss the future directions of standardization and research in biometric technologies, in particular as related to the implementation of these technologies in electronic travel documents.

The third COST 2101 Training School - Summer School for Advanced Studies on Biometrics for Secure Authentication: Multimodal Systems and Identity Management - will be organized in Alghero, Italy on 8-12 June 2009. The talks will be delivered by 20 lecturers both from academia and industry. 44 students, including 7 women, 28 PhD students and 7 early stage researchers, have been pre-selected to participate in the training school. The main topic of this year training school has been synchronised with the Phase 2 priority activities of the COST 2101 Action on multimodal biometric recognition.

The COST 2101 MC has found very positive that the formula of its successful training schools was adopted in 2009 by the COST Office to strengthen this type of activities.

WORKSHOPS, CONFERENCES AND TRAINING SCHOOLS (list)

- “Smart Cards and Biometrics”, Workshop organized jointly by the COST 2101 Action and the Industrial and End-User Committee of the BioSecure Network of Excellence (BIEC), Lausanne, Switzerland, 26 March 2007.
- Workshop on Signature and Handwriting Analysis for Person Identification, Canterbury, UK, 29 November 2007.
- The First European Workshop on Biometrics and Identity Management (BIOID 2008), Roskilde, Denmark, 7-9 May 2008. This is the first in the series of three planned workshops to be organized by the Action under that title. Next workshops will be organized in 2009 and 2010.
- Workshop on Multibiometrics, Limassol, Cyprus, 9 October 2008
- Workshop on Artificial Intelligence Approaches for Biometric Template Creation and Multibiometrics Fusion (ARTIBIO 2009), in 5th IFIP Conference on Artificial Intelligence Applications & Innovations (AIAI 2009) Thessaloniki, Greece, 22 April 2009
- Third International Conference on Biometrics (ICB 2009), Alghero, Italy, 2-5 June 2009, <http://icb09.uniss.it> .
- “Multimodal Biometrics and Smart Cards”, Special COST 2101 Session, European Signal Processing Conference (Eusipco 2007), Poznan, Poland, September 3-8, 2007.
- COST 2101 Training School “Biometric Identity Verification”, Lausanne, Switzerland, April 30 – May 3, 2007.
- COST 2101 Training School - Summer School for Advanced Studies on Biometrics for Secure Authentication: New Technologies for Security and Privacy, Alghero, Italy, 9-13 June 2008.
- COST 2101 Training School - Summer School for Advanced Studies on Biometrics for Secure Authentication: Multimodal Systems and Identity Management, Alghero, Italy, 8-12 June 2009, <http://biometrics.uniss.it> .

WEB SITE

The Action website is intended to serve the dissemination purposes and to facilitate communications. The URL for this site is: <http://www.cost2101.org> . The website URL was

set up in April 2007. This website served successfully during organization of the First European Workshop on Biometrics and Identity Management (BIOID 2008): <http://www.cost2101.org/BIOID2008>.

It is envisaged that as the work within COST 2101 progresses, the website will be re-developed and updated to become a valuable source of information in the area of investigation.

TRANSFER OF RESULTS

Currently, the COST 2101 Action collaboration with the European Biometrics Forum (EBF) and European Biometric Portal (EBP) websites is used as an effective means for this purpose. This is in addition to facilitating the transfer of results to all interested parties through various conference and journal publications.

This objective has been further supported by:

- publication of the updated report “Multimodal Biometrics for Identity Documents”, on the website of the European Biometrics Portal,
- organization of the Special Session “Multimodal Biometrics and Smart Cards” at the 15th European Signal Processing Conference to be held in Poznan, Poland on Sept. 4-8, 2007,
- participation of members in the multimodal biometric database collection and BMEC 2007: the BioSecure NoE Multimodal Evaluation Campaign, as well as in founding the BioSecure Association for managing and distributing resources (databases and software),
- successfully proposing the Special Issue on “Biometric Recognition” at the IET Signal Processing journal,
- working with other EU researchers to propose new successful European projects under FP7, e.g. MOBIO, TURBINE, HIDE, i3DPost.
- signing the publishing agreement for publication by Springer-Verlag a work entitled “Quality and Reliability in Biometrics” by K. Kryszczuk, J. Richiardi, A. Drygajlo and J. Kittler, which corresponds to the main research activities of WG1 as defined for the period January 2007 – June 2009.

It is envisaged that additional approaches will be adopted in due course, once the project has progressed to an appropriate level.

II.C. New networking

In 2008 the COST 2101 Action initialized a close cooperation (inter-action COST networking) with the COST 2102 Action “Cross-Modal Analysis of Verbal and Non-verbal Communication” and proposed to organise a new Joint COST 2101 & 2102 International Conference on Biometric ID Management and Multimodal Communication (BioID_MultiComm '09) <http://atvs.ii.uam.es/bioidmulticomm09>. The conference will be held in Madrid on 16-18 September 2009. While each Action supports its own individual topics, there are also potentially strong interactive links between them, and a number of topics of shared interest, e.g. on human behaviour and interaction, have been determined. BioID_MultiComm '09 will focus on both Action-specific and joint topics.

In 2007 members of the Action were invited to collaborate closely with the CEN/ISSS Focus Group on Biometrics. The purpose of this group is to offer a platform to European interests in Biometrics Standardization where European specific requirements in biometrics standardization work are addressed and to document the outcomes in a set of reports. Nicolas Delvaux has been nominated chair of the Focus Group and Ben Schouten chosen expert of the project team “A roadmap for short/medium follow-up activities in relation to European biometrics standardization needs”

In 2007 some members of the COST 2101 Action MC were nominated members of the European Security Research and Innovation Forum (ESRIF). ESRIF contributes to supporting civil security policy making with the appropriate technology and knowledge base by establishing and carrying forward a mid and long term Joint Security Research and Innovation Agenda that involves all European stakeholders. Nicolas Delvaux and Andrzej Drygajlo are members of the "Identification of people and assets" working group.

Members of the COST 2101 Action MC have been invited to serve as the European Science Foundation (ESF) peer reviews.

In 2008 the COST 2101 Action established a close collaboration with the HIDE Network on ethics of biometrics and personal detection technologies and its coordinator Prof. Emilio Mordini (invited speaker at BIOID 2008) and with recently launched RISE Network on rising pan-European and international awareness on biometrics and security ethics.

When MC member Klaus Keus moved for an interim period from the Federal Office for Information Security in Germany to the Institute for the Protection and Security of the Citizen, Joint Research Centre – European Commission (JRC-EU) Ispra in Italy in 2008, the COST 2101 Action will use this fact to look for and to initiate a close collaboration with the institute. Recently, the JRC-EU offered to COST 2101 a possibility for grants applications in the area of biometrics.

Two STSMs organized in 2008 initiated scientific collaboration with Ireland as a new COST 2101 member (Prof. M. Tistarelli) and direct cooperation with the FP7 project ACTIBIO (Dr. A. Salah). Traditionally, to facilitate training of early stage researchers, one part of STSMs has been included into the COST 2101 training school.

II.D. Self evaluation

The Management Committee conducted the preliminary review of the Action progress during its second meeting in March 2007, following the first focused workshop in Lausanne. Following the second focused workshop in Canterbury, at the fourth MC meeting, following the First European Workshop on "Biometrics and Identity Management", and also at the fifth MC meeting, following the focused Workshop on "Multibiometrics", the objectives and progress achieved were reviewed again. The outcomes of these indicated that, in general, the Action progress had been satisfactory and on schedule.

During the report period, the Action has also been successful in achieving its non-technical objectives. These include establishing links with other projects, setting up and running a website, holding its four focused workshops, the First European Workshop on "Biometrics and Identity Management" and the 3rd International Conference on Biometrics (ICB 2009), publishing their proceedings, and running a number of other dissemination activities. Moreover, members of COST 2101 have teamed up with other European researchers to propose with success new European projects under FP7, e.g. MOBIO, TURBINE, HIDE, RISE, i3DPost. In the framework of European institutions (CEN, ESRIF) their recommendations had strong impact on a common European approach and harmonisation policy by identifying challenges, threats and standardisation issues facing biometrics deployment in Europe.

It is felt that the Action is fortunate to have a number of young scientists working alongside the more senior researchers. They have been attracted by the COST 2101 workshops and training schools, mainly from the participating institutions and through the respective MC members. However, the First European Workshop on "Biometrics and Identity

Management” and the series of three Training Schools have also helped attract young researchers from institutions other than those of the MC members. It is believed that involving young scientists not only enhances the support for the activities undertaken within the Action, but also provides the young researchers with the opportunity to further their expertise, and gain valuable experience in teamwork and research methodology. This is envisaged to provide a continuous wave of research force in Europe for work in the area of investigation.

Another notable success of the Action has been that of effective dissemination of information and research outcomes. This was achieved through a number of achievements including the following:

- “Smart Cards and Biometrics”, Workshop organized jointly by the COST 2101 Action and the Industrial and End-User Committee of the BioSecure Network of Excellence (BIEC), Lausanne, Switzerland, 26 March 2007.
- Workshop on Signature and Handwriting Analysis for Person Identification, Canterbury, UK, 29 November 2007.
- The First European Workshop on Biometrics and Identity Management (BIOID 2008), Roskilde, Denmark, 7-9 May 2008.
- Workshop on Multibiometrics, Limassol, Cyprus, 9 October 2008.
- Workshop on Artificial Intelligence Approaches for Biometric Template Creation and Multibiometrics Fusion (ARTIBIO 2009), in 5th IFIP Conference on Artificial Intelligence Applications & Innovations (AIAI 2009) Thessaloniki, Greece, 22 April 2009.
- Third International Conference on Biometrics (ICB 2009), Alghero, Italy, 2-5 June 2009.
- “Multimodal Biometrics and Smart Cards”, Special COST 2101 Session, European Signal Processing Conference (Eusipco 2007), Poznan, Poland, September 3-8, 2007.
- COST 2101 Training School “Biometric Identity Verification”, Lausanne, Switzerland, April 30 – May 3, 2007.
- COST 2101 Training School - Summer School for Advanced Studies on Biometrics for Secure Authentication: New Technologies for Security and Privacy, Alghero, Italy, 9-13 June 2008.
- COST 2101 Training School - Summer School for Advanced Studies on Biometrics for Secure Authentication: Multimodal Systems and Identity Management, Alghero, Italy, 8-12 June 2009
- EBF (European Biometrics Forum) European Biometric Research Award 2007 awarded in October 2007 to Mr Krzysztof Kryszczuk, member of the COST 2101 Management Committee.

The above clearly indicate that COST 2101 has had a key role in facilitating collaboration amongst European researchers, accelerating advances in the field, disseminating research results and generating awareness in the field, facilitating future work and progress, and the formation of other European consortia.

ACTION RELATED PUBLICATIONS AND REPORTS

- Minutes of the first (kick-off) meeting, Brussels, Belgium, 7/12/2006
- Minutes of the second MC meeting, Lausanne, Switzerland, 26-27/03/2007
- Minutes of the third MC meeting, Canterbury, UK, 29-30/11/2007
- Minutes of the fourth MC meeting, Roskilde, Denmark, 7-9/05/2008
- Minutes of the fifth MC meeting, Limassol, Cyprus, 9-10/10/2008
- Minutes of the sixth MC meeting, Alghero, Italy, 5-6/06/2009
- Report of the Workshop on Smart Cards and Biometrics, Lausanne, Switzerland, 26/03/2007

- Report of the Workshop on Signature and Handwriting Analysis for Person Identification, Canterbury, UK, 29/11/2007
- Report of the First European Workshop on Biometrics and Identity Management (BIOID 2008), Roskilde, Denmark, 7-9/05/2008
- Report of the Workshop on Multibiometrics, Limassol, Cyprus, 9/10/2008
- Report of the Workshop on Artificial Intelligence Approaches for Biometric Template Creation and Multibiometrics Fusion (ARTIBIO 2009), in 5th IFIP Conference on Artificial Intelligence Applications & Innovations (AIAI 2009) Thessaloniki, Greece, 22/04/2009
- Report of the Third International Conference on Biometrics (ICB 2009), Alghero, Italy, 2-5/06/2009
- Report “Multimodal Biometrics for Identity Documents”, European Biometrics Portal, updated version 2007, <http://www.europeanbiometrics.info/> .
- Proceedings of the First European Workshop on Biometrics and Identity Management (BIOID 2008), Roskilde University, Computer Science Research Report No. 121, Roskilde, Denmark, April 2008
- Proceedings of the First European Workshop on Biometrics and Identity Management (BIOID 2008), Revised Selected Papers, Roskilde, Denmark, May 2008, Lecture Notes in Computer Science (LNCS 5372), Springer, Berlin-Heidelberg, 2008.
- Proceedings of the Third International Conference on Biometrics (ICB 2009), Alghero, Italy, 2-5 June 2009, Lecture Notes in Computer Science, Springer, Berlin-Heidelberg, 2009.
- Special issue on “Biometric Recognition” (11 papers) of the IET Signal Processing journal (UK) published by The Institution of Engineering and Technology, UK.

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III. Previous scientific report(s)

Part II of past periods' reports are to be found here.

COST Action 2101

Biometrics for Identity Documents and Smart Cards

PROGRESS REPORT

Period: from January 2007 to May 2007

5. RESULTS

Objectives to achieve during first 6 months of the Action have been defined as follows:

- To improve biometric templates generation and their reading (e.g. contactless) for identity documents using single and multiple modalities and to enhance centralised and distributed approaches to template storage (smart card and server scenario).
- To improve techniques for measuring the quality of biometric data and reliability of classifiers, and to evaluate their relative effectiveness by parametric and statistical modelling of the theoretical limitations of biometric modalities.

Although considerable research had been conducted into biometrics before the start of this COST 2101 Action in 2006, there had not been much evidence of any established knowledge about the implementation of such techniques into the identity documents and smart cards. As a result, it appeared from the beginning that the problems and issues associated specifically with the use of biometrics in identity documents and smart cards were not very well known.

The study conducted by COST 2101 in this area during the six month of the work included a review of biometric modalities and their templates, as well as an analysis of the operational conditions in the proposed technology. This study was of considerable value as it helped find appropriate focuses for the subsequent stages of work. One of the important points identified as a result of the above study was the need to gain detailed knowledge about the factors (e.g. quality of biometric data) which would unfavourably influence the accuracy of verification using templates of identity documents and smart cards, and about the extent of their effects. It is hoped that this growing knowledge will provide the required basis for developing methods to minimise the adverse effects, on the verification performance, of implementing biometric templates of identity documents and smart cards.

COST 2101 is also concerned with the potential applications of the proposed technology and their requirements. In order to meet this objective, attempts have been initiated to establish close cooperation with potential end users and industry, such as Sagem, Tales, Gemalto and Precise-Biometrics. The recent efforts in this area have resulted in the Workshop “Smart Cards and Biometrics” organized jointly by the COST 2101 Action and the Industrial and End-User Committee of the BioSecure Network of Excellence (BIEC) in Lausanne, Switzerland on 26 March 2007. Another event, the COST 2101 Training School organized jointly by COST 2101, EPFL School of Continuing Education (SCE), Biometrics Center Lausanne, Center for Interdisciplinary Studies in Information Security (ISIS), and National Center of Competence in Research on Interactive Multimodal Information Management established close collaboration with professionals and industrials such as Deloitte, A4Vision, Lumidigm, TBS, BioTronic.

The Management Committee conducted the preliminary review of the Action progress during

its first meeting in March 2007, following the Workshop. The outcome of this review indicated that, in general, the Action progress had been satisfactory and on schedule. During the report period, the Action has also been successful in achieving its non-technical objectives. These include setting up the Action website URL, establishing links with other projects, holding its first workshop and running a number of other dissemination activities. Moreover, members of COST 2101 have teamed up with other European researchers to propose new European projects under FP7, e.g. BioFEV and B4P.

It is felt that the Action is fortunate to have a number of young scientists working alongside the more senior researchers. They have been attracted by the COST 2101 Training School, mainly from the participating institutions and through the respective MC members. It is believed that involving young scientists not only enhances the support for the activities undertaken within the Action, but also provides the young researchers with the opportunity to further their expertise, and gain valuable experience in teamwork and research methodology.

6. DISSEMINATION OF RESULTS

6.1 Publications and Reports

- Minutes of the inaugural meeting, Brussels, Belgium, 7/12/2006
- Minutes of the first MC meeting, Lausanne, Switzerland, 26-27/03/2007
- “Multimodal Biometrics for Identity Documents”, European Biometrics Portal, updated report 2007.

6.2 Conferences, Workshops and Training Schools

- “Smart Cards and Biometrics”, Workshop organized jointly by the COST 2101 Action and the Industrial and End-User Committee of the BioSecure Network of Excellence (BIEC), Lausanne, Switzerland, 26 March 2007.
- COST 2101 Training School “Biometric Identity Verification”, Lausanne, Switzerland, April 30 – May 3, 2007.
- “Multimodal Biometrics and Smart Cards”, Special COST 2101 Session, European Signal Processing Conference (Eusipco 2007), Poznan, Poland, September 3-8, 2007.

6.3 Web site

The Action website is intended to serve the dissemination purposes and to facilitate communications. The URL for this site is: <http://www.cost2101.org> The website URL was set up in April 2007.

It is envisaged that as the work within COST 2101 progresses, the website will be developed and updated to become a valuable source of information in the area of investigation.

6.4 Scientific and Technical Cooperation

<u>Project/Organisation</u>	<u>Point of Contact</u>
• BioSecure NoE (EU Framework Project)	Bernadette Dorizzi
• EBF (European Biometrics Forum)	Ben Schouten
• EBP (European Biometric Portal)	Andrzej Drygajlo
• UK Biometrics Institute (National Project, UK)	Michel Fairhurst
• EPI (European Privacy Institute)	Niels Christian Juul
• BioFEV (EU Framework Project)	Bernadette Dorizzi
• B4P (EU Framework Project)	Michel Fairhurst
• ABID (National Project, Switzerland)	Andrzej Drygajlo

6.5 Transfer of results

Currently, the COST 2101 Action collaboration with the European Biometrics Forum (EBF) and European Biometric Portal (EBP) websites is used as an effective means for this purpose. This is in addition to facilitating the transfer of results to all interested parties through various conference and journal publications.

This objective has been further supported by:

- publication of the updated report “Multimodal Biometrics for Identity Documents”, on the website of the European Biometrics Portal,
- successfully proposing the Special Session “Multimodal Biometrics and Smart Cards” at the 15th European Signal Processing Conference to be held in Poznan, Poland on Sept. 4-8, 2007, and
- working with other EU researchers to propose new European projects under FP7, e.g. BioFEV and B4P.

It is envisaged that additional approaches will be adopted in due course, once the project has progressed to an appropriate level.

7. ECONOMIC DIMENSION

Currently, there are fifteen signatory countries in COST 2101, and the Action duration is expected to be four years.

Manpower involved per signatory per year.....0.6 person-years

Total manpower over the Action full duration of four years.....32.4 person-years

Funds received from the Commission

Period: 1 January 2007 – 31 May 2007: € 40700.00

Total: 2007 € 40700.00

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- [9] G. Goudelis, "Facial Pose and Expression Recognition for Face Verification", COST 2101 Technical Meeting, Lausanne, Switzerland, March 27, 2007.
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- [13] T. Bourlai, "Optimisation of the Pre-processing Stage of a Smart Card Face Verification System", Special Session "Multimodal Biometrics and Smart Cards", 15th European Signal Processing Conference, Poznan, Poland, Sept. 4-8, 2007.
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MONITORING PROGRESS REPORT

COST

Domain Committee "ICT"

COST Action 2101

*Biometrics for Identity Documents and Smart
Cards*

**MONITORING
PROGRESS REPORT**

***Period:** from January 2007 to June 2008*

This Report is presented to the relevant Domain Committee and contains two parts:

- I. Management Report** prepared by the COST Office/Grant Holder*
- II. Scientific Report** prepared by the Chair of the Management Committee of the Action*

The report is a "cumulative" report, i.e. it is updated annually and covers the entire period of the Action.

Confidentiality: the documents will be made available to the public via the COST Action web page except for chapter *II.C. Self evaluation*.

Based on the monitoring results, the COST Office will decide on the following year's budget allocation.

II. Scientific Report prepared by the Chair of the Management Committee of the Action

II.A. Results achieved during the period from January 2007 to June 2008

Objectives to achieve during first 18 months of the Action have been defined as follows:

- To improve biometric templates generation and their reading (e.g. contactless) for identity documents using single and multiple modalities and to enhance centralised and distributed approaches to template storage (smart card and server scenario).
- To improve techniques for measuring the quality of biometric data and reliability of classifiers, and to evaluate their relative effectiveness by parametric and statistical modelling of the theoretical limitations of biometric modalities.
- To design methodologies for the acquisition and maintenance of large-scale operational (multimodal) biometric databases of identities and biometric data.
- To enhance multimodal biometric verification techniques (identity document control) and identification techniques (enrolment and searching in a watch list) of persons using sequential and parallel biometric fusion.
- To improve universal combination of multiple modality models, selected among face, fingerprint, iris, hand palm/geometry, dynamic signature and voice recognition, using the quality and reliability measures of biometric modalities.

Although considerable research had been conducted into biometrics before the start of this COST 2101 Action in 2006, there had not been much evidence of any established knowledge about the implementation of such techniques into the identity documents and smart cards. As a result, it appeared from the beginning that the problems and issues associated specifically with the use of biometrics in identity documents and smart cards were not very well known.

The study conducted by COST 2101 in this area during the early part of the work included a review of biometric modalities and their templates, as well as an analysis of the operational conditions in the proposed technology. This study was of considerable value as it helped find appropriate focuses for the subsequent stages of work. One of the important points identified as a result of the above study was the need to gain detailed knowledge about the factors (e.g. quality of biometric data) which would unfavourably influence the accuracy of verification using templates of identity documents and smart cards, and about the extent of their effects. Gaining this knowledge has been a focus of work in more recent activities. To date, this has led to valuable contributions to knowledge in the field by COST 2101. The Action's investigations were concentrated on the robustness and reliability of multimodal biometric interfaces including quality and reliability measures of biometric modalities. It also has assessed current quality and reliability measurement capabilities and identified technologies, factors and operational paradigms that can measurably improve quality and reliability of multimodal biometrics. More details about the investigations and the results obtained can be found in the publications (listed below) produced by members for the purpose of dissemination. The research achievements in this domain have been internationally recognized by the EBF (European Biometrics Forum) European Biometric Research Award 2007 awarded in October 2007 to Mr Krzysztof Kryszczuk, member of the COST 2101 Management Committee. The main achievements will be published by Springer-Verlag in the book entitled "Quality and Reliability in Biometrics" by K. Kryszczuk, J. Richiardi, A. Drygajlo and J. Kittler. The growing knowledge in this field is expected to gradually lead to the development of robust methods for minimising the adverse effects, on the biometric performance, of variation in operational conditions and large-scale implementation in identity documents and smart cards.

Another important aspect of the work within COST 2101 Action, since its start in

December 2006, has been the provision of appropriate common databases for the purpose of assessment. Such databases are also important requirements for the purpose of the investigations undertaken within and without the Action. To this end attempts were made to acquire existing databases and create new ones for the said activities. This led to the choice of Multimodal Biometric Database (MBD) collected as the result of another European project BioSecure NoE. Majority of COST 2101 partners participated in the database collection and in the BioSecure Multimodal Evaluation Campaign (BMEC 2007). For managing and distributing the MBD the BioSecure Association has been founded which includes majority of the COST 2101 partners (previously BioSecure partners). Acquisition of other multimodal databases by the Action members has begun on national level, e.g. in Switzerland (MBioID – Multimodal Biometrics for Identity Documents) and Turkey (Bosphorus Database of 3D faces).

COST 2101 is also concerned with the potential applications of the proposed technology and their requirements. In order to meet this objective, attempts have been initiated to establish close cooperation with potential end users and industry, such as Sagem, Tales, Gemalto and Precise-Biometrics. The early effort in this area have resulted in the first focused Workshop on “Smart Cards and Biometrics” organized jointly by the COST 2101 Action and the Industrial and End-User Committee of the BioSecure Network of Excellence (BIEC) in Lausanne, Switzerland on 26 March 2007. The second focused Workshop on “Signature and Handwriting Analysis for Person Identification” was organized in Canterbury, UK on 29th November 2007. The principal aim of the workshop was to bring together some of Europe’s foremost researchers in the area of automatic signature verification and the exploitation of all forms of handwriting for the purposes of establishing or verifying the identity of the writer. This workshop sought to identify the principal outstanding research issues which must be addressed if significant advances are to be made in this field, while also aiming to developing a better understanding of industry’s needs (e.g. in the credit cards area).

Over the last 18 months, COST 2101 operated as a valuable and effective platform for close collaboration of European researchers in the field of investigation. A main outcome of this has been the continuous advances achieved in various classes of biometrics and their implementations in the identity management domain. These contributions to knowledge have been disseminated through the First European Workshop on “Biometrics and Identity Management” organized in Roskilde, Denmark on 7-9 May 2008. The scope of this first COST 2101 open workshop was wide and covered all the research aspects of the Action, from biometric data quality, through biometric templates and modalities, to biometric attacks and countermeasures, as well as biometric interfaces and standards.

The COST 2101 Action has a key role in facilitating training and collaboration amongst European young and senior researchers and industrial partners. To strengthen this role, one part of STSMs has been included into the COST Training Schools. From 30th April to 3rd May the first COST 2101 Training School was organized in Lausanne, Switzerland, jointly by COST 2101, EPFL School of Continuing Education (SCE), Biometrics Centre Lausanne, Centre for Interdisciplinary Studies in Information Security (ISIS), and National Centre of Competence in Research on Interactive Multimodal Information Management and established close collaboration with professionals and industrials such as Deloitte, A4Vision, Lumidigm, TBS, BioTronic.

The second COST 2101 Training School will be organized in Alghero, Italy on 9-13 June 2008. Each year, this Summer School for Advanced Studies on Biometrics for Secure Authentication aims at different target. In 2008 edition on “New Technologies for Security and Privacy”, the courses will mainly focus on new and emerging issues in biometrics concerning security and privacy issues, new and emerging biometric technologies, as well as standardization issues and assessment techniques. The talks

will be delivered by 18 out of the best internationally reputed experts, both from academia and industry. More than 40 students from PhD student, post-doc, young researcher and industrial professional candidates have been pre-selected to participate in the training school.

II.B. Dissemination of results

- *Action related Publications and Reports (list)*
 - Minutes of the first (kick-off) meeting, Brussels, Belgium, 7/12/2006
 - Minutes of the second MC meeting, Lausanne, Switzerland, 26-27/03/2007
 - Minutes of the third MC meeting, Canterbury, UK, 29-30/11/2007
 - Minutes of the fourth MC meeting, Roskilde, Denmark, 7-9/05/2008
 - Report of the Workshop on Signature and Handwriting Analysis for Person Identification, Canterbury, UK, 29/11/2007
 - Report “Multimodal Biometrics for Identity Documents”, European Biometrics Portal, updated version 2007, <http://www.europeanbiometrics.info/> .
 - Proceedings of the First European Workshop on Biometrics and Identity Management (BIOID 2008), Roskilde University, Computer Science Research Report No. 121, Roskilde, Denmark, April 2008

- *Conferences, Workshops and Training Schools (list and programme)*
 - “Smart Cards and Biometrics”, Workshop organized jointly by the COST 2101 Action and the Industrial and End-User Committee of the BioSecure Network of Excellence (BIEC), Lausanne, Switzerland, 26 March 2007.
 - Workshop on Signature and Handwriting Analysis for Person Identification, Canterbury, UK, 29 November 2007.
 - The First European Workshop on Biometrics and Identity Management (BIOID 2008), Roskilde, Denmark, 7-9 May 2008.
 - “Multimodal Biometrics and Smart Cards”, Special COST 2101 Session, European Signal Processing Conference (Eusipco 2007), Poznan, Poland, September 3-8, 2007.
 - COST 2101 Training School “Biometric Identity Verification”, Lausanne, Switzerland, April 30 – May 3, 2007.
 - COST 2101 Training School - Summer School for Advanced Studies on Biometrics for Secure Authentication: New Technologies for Security and Privacy, Alghero, Italy, 9-13 June 2008, <http://biometrics.uniss.it> .

- *Web site (description)*

The Action website is intended to serve the dissemination purposes and to facilitate communications. The URL for this site is: <http://www.cost2101.org> . The website URL was set up in April 2007. This website served successfully during organization of the First European Workshop on Biometrics and Identity Management (BIOID 2008): <http://www.cost2101.org/BIOID2008> .

It is envisaged that as the work within COST 2101 progresses, the website will be developed and updated to become a valuable source of information in the area of investigation.

- *Scientific and Technical Cooperation*

Project/Organisation

Point of Contact

- BioSecure NoE (EU Framework Project) Bernadette Dorizzi
 - BioSecure Association Bernadette Dorizzi
 - EBF (European Biometrics Forum) Ben Schouten
 - EBP (European Biometric Portal) Andrzej Drygajlo
 - UK Biometrics Institute (National Project, UK) Michel Fairhurst
 - IET (The Institution of Engineering and Technology) Aladdin Ariyaeenia
 - EPI (European Privacy Institute) Niels Christian Juul
 - MOBIO (EU Framework Project) Josef Kittler
 - TURBINE (EU Framework Project) Nicolas Delvaux
 - HIDE (EU Framework Project) Andrzej Drygajlo
 - Institute for the Protection and Security of the Citizen,
Joint Research Centre – European Commission Klaus Keus
 - Focus Group on Biometrics, European Committee
for Standardization (CEN) Nicolas Delvaux
 - ESIRIF (European Security Research and Innovation
Forum) Andrzej Drygajlo
 - ABID (Applying Biometrics to Identity Documents),
Biometrics Centre (National Project, Switzerland) Andrzej Drygajlo
- *Transfer of results*

Currently, the COST 2101 Action collaboration with the European Biometrics Forum (EBF) and European Biometric Portal (EBP) websites is used as an effective means for this purpose. This is in addition to facilitating the transfer of results to all interested parties through various conference and journal publications.

This objective has been further supported by:

- publication of the updated report “Multimodal Biometrics for Identity Documents”, on the website of the European Biometrics Portal,
- organization of the Special Session “Multimodal Biometrics and Smart Cards” at the 15th European Signal Processing Conference to be held in Poznan, Poland on Sept. 4-8, 2007,
- participation of members in the multimodal biometric database collection and BMEC 2007: the BioSecure NoE Multimodal Evaluation Campaign, as well as in founding the BioSecure Association for managing and distributing resources (databases and software),
- successfully proposing the Special Issue on “Biometric Recognition” at the IET Signal Processing journal,
- working with other EU researchers to propose new successful European projects under FP7, e.g. MOBIO and TURBINE,
- signing the publishing agreement for publication by Springer-Verlag a work entitled “Quality and Reliability in Biometrics” by K. Kryszczuk, J. Richiardi, A. Drygajlo and J. Kittler, which corresponds to the main research activities of WG1 as defined for the period January 2007 – June 2008.

The COST 2101 Action organized the First European Workshop on “Biometrics and Identity Management” in May 2008. This is the first in the series of three planned workshops to be organized by the Action under that title. Next workshops will be organized in 2009 and 2010. The post-conference proceedings will be published and disseminated world-widely by Springer-Verlag in the framework of the Lecture Notes in Computer Science (LNCS).

In 2007 members of the Action were invited to collaborate closely with the CEN/ISSS Focus Group on Biometrics. The purpose of this group is to offer a platform to European interests in Biometrics Standardization where European specific requirements in biometrics standardization work are addressed and to document the outcomes in a set of reports. Nicolas Delvaux has been nominated chair of the Focus Group and Ben Schouten chosen expert of the project team “A roadmap for short/medium follow-up activities in relation to European biometrics standardization needs”.

When MC member Klaus Keus moved for an interim period from the Federal Office for Information Security in Germany to the Institute for the Protection and Security of the Citizen, Joint Research Centre – European Commission (JRC-EU) Ispra in Italy in 2008, the COST 2101 Action will use this fact to look for and to initiate a close collaboration with the institute.

It is envisaged that additional approaches will be adopted in due course, once the project has progressed to an appropriate level.

- *Contacts in the ERA*

In 2007 some members of the COST 2101 Action MC were nominated members of the European Security Research and Innovation Forum (ESRIF). ESRIF contributes to supporting civil security policy making with the appropriate technology and knowledge base by establishing and carrying forward a mid and long term Joint Security Research and Innovation Agenda that involves all European stakeholders. Nicolas Delvaux and Andrzej Drygajlo are members of the “Identification of people and assets” working group.

In 2008 the COST 2101 Action established a close collaboration with the HIDE Network on ethics of biometrics and personal detection technologies and its coordinator Prof. Emilio Mordini (invited speaker at BIOID 2008).

Members of the COST 2101 Action MC have been invited to serve as the European Science Foundation (ESF) peer reviews.

II.C. Self evaluation

The Management Committee conducted the preliminary review of the Action progress during its second meeting in March 2007, following the first focused workshop in Lausanne. Following the second focused workshop in Canterbury and also at the fourth MC meeting, following the First European Workshop on “Biometrics and Identity Management”, the objectives and progress achieved were reviewed again. The outcomes of these indicated that, in general, the Action progress had been satisfactory and on schedule.

During the report period, the Action has also been successful in achieving its non-technical objectives. These include establishing links with other projects, setting up and running a website, holding its two focused workshops and the First European Workshop on “Biometrics and Identity Management”, publishing its proceedings, and running a number of other dissemination activities. Moreover, members of COST 2101 have teamed up with other European researchers to propose with success new European projects under FP7, e.g. MOBIO and TURBINE. In the framework of European institutions their recommendations had strong impact on a common European approach and harmonisation policy by identifying challenges, threats and

standardisation issues facing biometrics deployment in Europe.

It is felt that the Action is fortunate to have a number of young scientists working alongside the more senior researchers. They have been attracted by the COST 2101 workshops and training schools, mainly from the participating institutions and through the respective MC members. However, the First European Workshop on “Biometrics and Identity Management” and the Second Training School have also helped attract young researchers from institutions other than those of the MC members. It is believed that involving young scientists not only enhances the support for the activities undertaken within the Action, but also provides the young researchers with the opportunity to further their expertise, and gain valuable experience in teamwork and research methodology. This is envisaged to provide a continuous wave of research force in Europe for work in the area of investigation.

Another notable success of the Action has been that of effective dissemination of information and research outcomes. This was achieved through a number of achievements including the following:

- “Smart Cards and Biometrics”, Workshop organized jointly by the COST 2101 Action and the Industrial and End-User Committee of the BioSecure Network of Excellence (BIEC), Lausanne, Switzerland, 26 March 2007.
- Workshop on Signature and Handwriting Analysis for Person Identification, Canterbury, UK, 29 November 2007.
- The First European Workshop on Biometrics and Identity Management (BIOID 2008), Roskilde, Denmark, 7-9 May 2008.
- “Multimodal Biometrics and Smart Cards”, Special COST 2101 Session, European Signal Processing Conference (Eusipco 2007), Poznan, Poland, September 3-8, 2007.
- COST 2101 Training School “Biometric Identity Verification”, Lausanne, Switzerland, April 30 – May 3, 2007.
- COST 2101 Training School - Summer School for Advanced Studies on Biometrics for Secure Authentication: New Technologies for Security and Privacy, Alghero, Italy, 9-13 June 2008.
- EBF (European Biometrics Forum) European Biometric Research Award 2007 awarded in October 2007 to Mr Krzysztof Kryszczuk, member of the COST 2101 Management Committee.

The above clearly indicate that COST 2101 has had a key role in facilitating collaboration amongst European researchers, accelerating advances in the field, disseminating research results and generating awareness in the field, facilitating future work and progress, and the formation of other European consortia.

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 - [19] K. Franke, "Methodological Foundations for the Forensic Analysis of Signature", Workshop on Signature and Handwriting Analysis for Person Identification, Canterbury, November 29, 2007.
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 - [21] M. Fairhurst, R. Guest "Biometrics for secure documents: signature and handwriting analysis for person identification", Workshop on Signature and Handwriting Analysis for Person Identification, Canterbury, November 29, 2007.
 - [22] L. Heutte, T. Paquet, "A brief overview of Handwriting Research activities at the University of Rouen, France", Workshop on Signature and Handwriting Analysis for Person Identification, Canterbury, November 29, 2007.
 - [23] O. Henniger, "Position Statement on handwritten signature recognition for personal identification", Workshop on Signature and Handwriting Analysis for Person Identification, Canterbury, November 29, 2007.
 - [24] L. Akarun, "Hand motion analysis with application to signature and handwriting

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- [25] C. Vielhauer, “Current activity, future challenges and applications in signature/handwriting”, Workshop on Signature and Handwriting Analysis for Person Identification, Canterbury, November 29, 2007.
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