Status of international standard ISO/IEC 30107

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EAB European Biometric Symposium

Martigny
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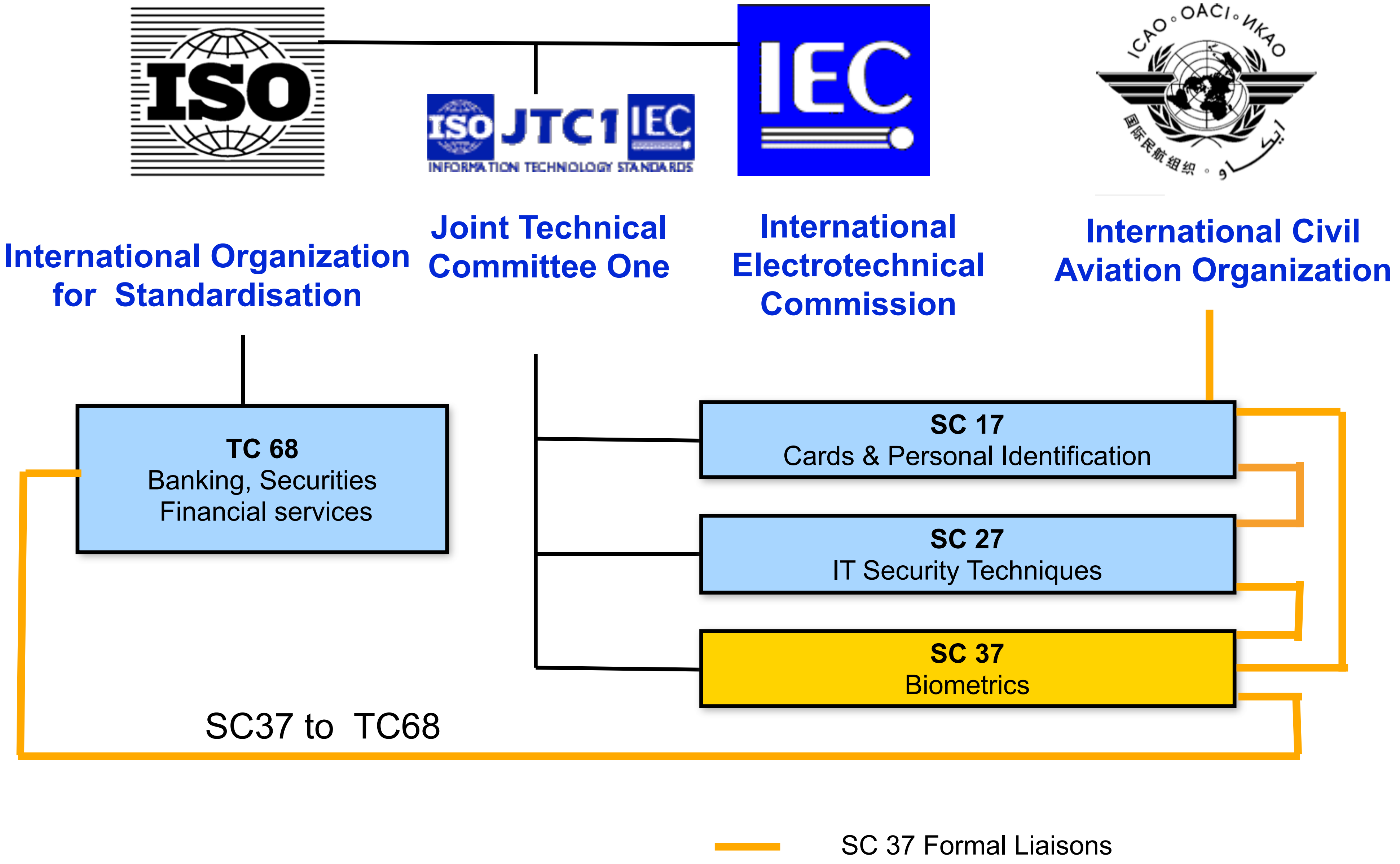
Biometric Standardisation



International Organization for Standardisation

Joint Technical Committee One

International Electrotechnical Commission

International Civil Aviation Organization

TC 68
Banking, Securities
Financial services

SC 17
Cards & Personal Identification

SC 27
IT Security Techniques

SC 37
Biometrics

SC37 to TC68

▬ SC 37 Formal Liaisons

ISO/IEC SC37 Biometrics

Established by JTC 1 in June 2002 to ensure

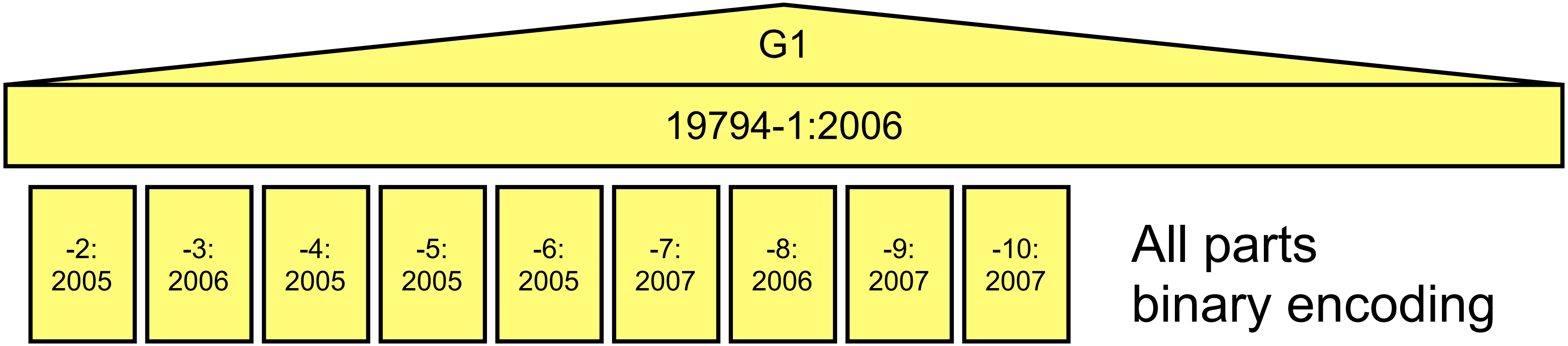
- a high-priority, focused and comprehensive approach worldwide for the rapid development of formal generic biometric standards

Scope of SC37

- *"Standardization of generic biometric technologies pertaining to human beings to support interoperability and data interchange among applications and systems. Generic human biometric standards include: common file frameworks; biometric application programming interfaces; biometric data interchange formats; related biometric profiles; application of evaluation criteria to biometric technologies; methodologies for performance testing and reporting and cross jurisdictional and societal aspects"*
- http://www.jtc1.org

Next meeting: July, 2016

First Generation Format Standards



G1

19794-1:2006

-2: 2005

-3: 2006

-4: 2005

-5: 2005

-6: 2005

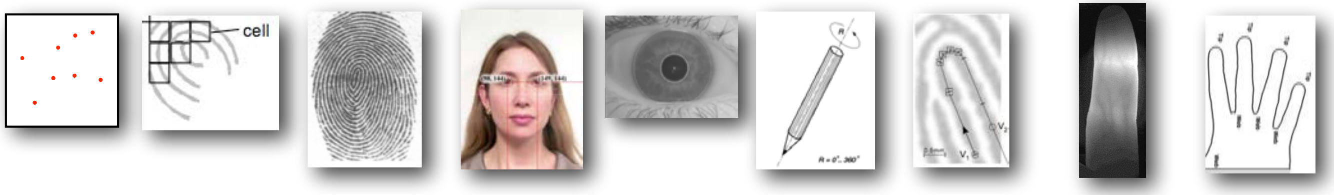
-7: 2007

-8: 2006

-9: 2007

-10: 2007

All parts
binary encoding

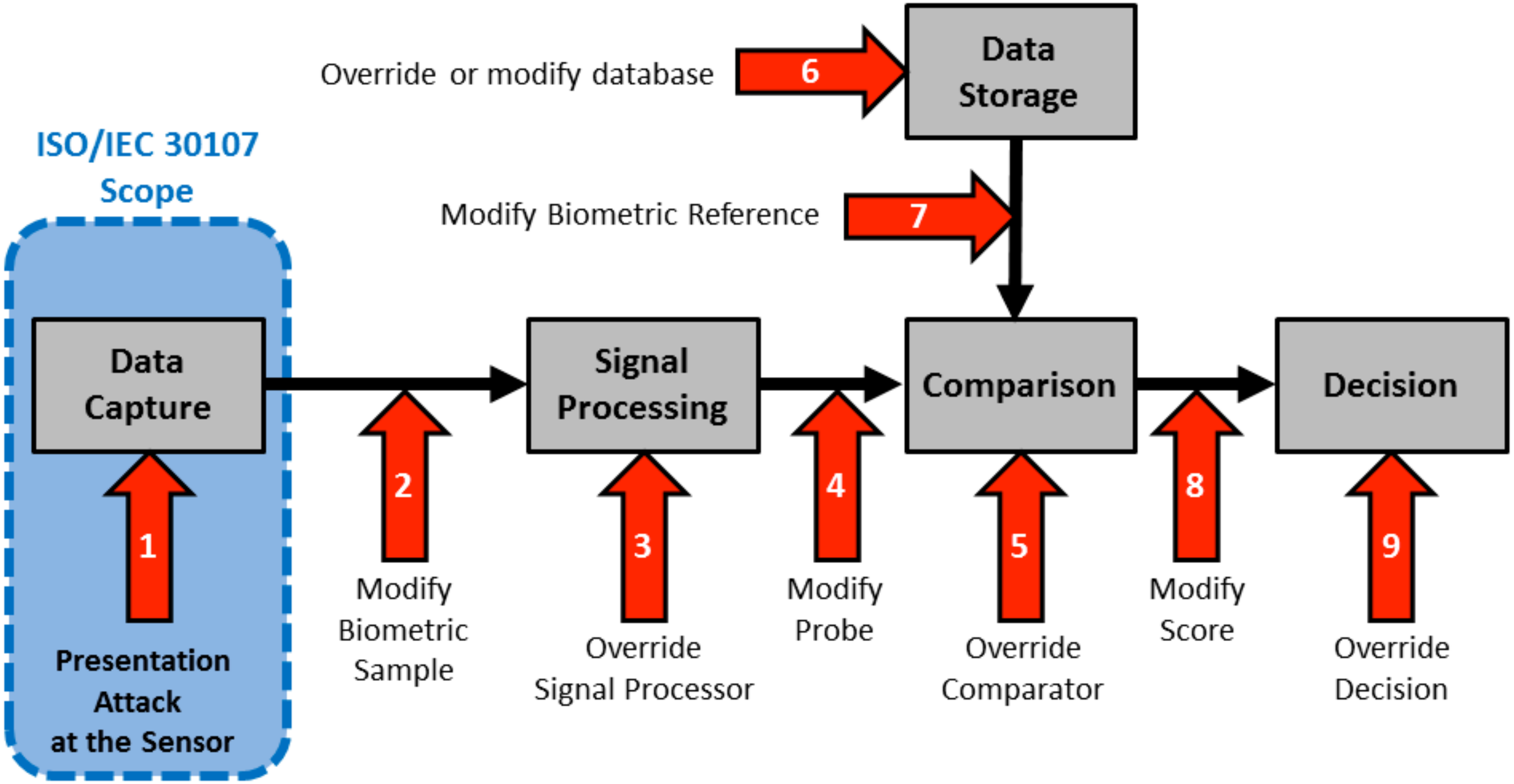


The 19794-Family: Biometric data interchange formats

Liveness Detection

ISO/IEC 30107-1:2016 Presentation Attack Detection

- Attacks on Biometric Systems



Source: ISO/IEC 30107-1
nspired by N.K. Ratha, J.H. Connell, R.M. Bolle, “Enhancing security and privacy in biometrics-based authentication systems,” IBM Systems Journal, Vol 40. NO 3, 2001.

Presentation Attack Detection

ISO/IEC 30107 - Scope

- terms and definitions that are useful in the specification, characterization and evaluation of presentation attack detection methods;
- a common data format for conveying the type of approach used and the assessment of presentation attack in data formats;
- principles and methods for performance assessment of presentation attack detection algorithms or mechanisms; and
- a classification of known attacks types (in an informative annex).

Outside the scope are

- standardization of specific PAD detection methods;
- detailed information about countermeasures (i.e. anti-spoofing techniques), algorithms, or sensors;
- overall system-level security or vulnerability assessment.

Presentation Attack Detection

Definitions in ISO/IEC 30107 PAD - Part 1: Framework

- **presentation attack**
  presentation to the biometric capture subsystem with the goal of interfering with the operation of the biometric system
- **presentation attack detection (PAD)**
  automated determination of a presentation attack

Definitions in ISO/IEC 2382-37: Vocabulary
http://www.christoph-busch.de/standards.html

- **impostor**
  subversive biometric capture subject who attempts to being matched to someone else's biometric reference
- **identity concealer**
  subversive biometric capture subject who attempts to avoid being matched to their own biometric reference

Presentation Attack Detection

ISO/IEC 30107 - Definitions

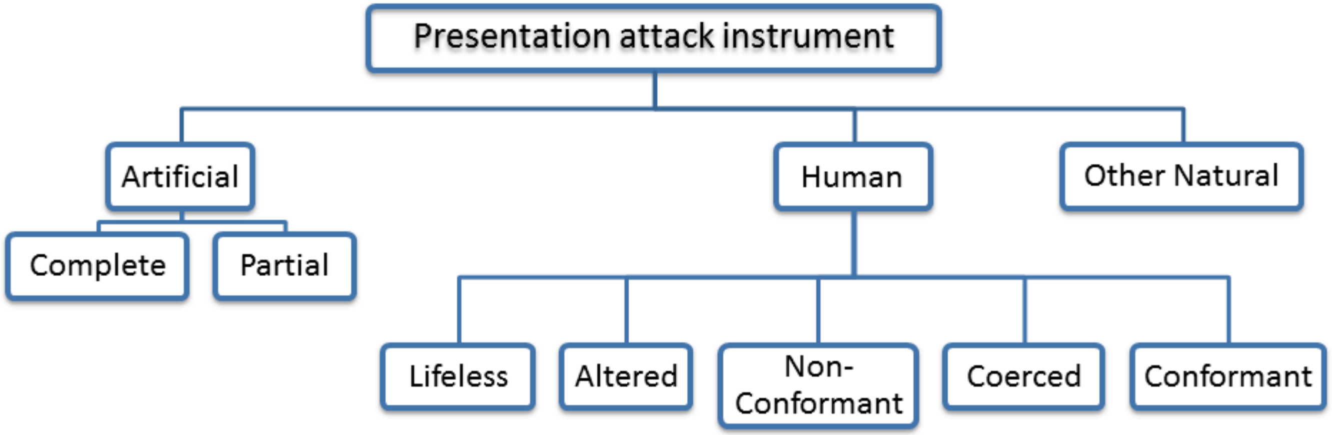
- **presentation attack instrument (PAI)**
  biometric characteristic or object used in a presentation attack
- **artefact**
  artificial object or representation presenting a copy of biometric characteristics or synthetic biometric patterns

Types of presentation attacks

(General Noun)

(Adjectives describing categories)

(Qualifying adjectives)



Presentation attack instrument

Artificial

Human

Other Natural

Complete

Partial

Lifeless

Altered

Non-Conformant

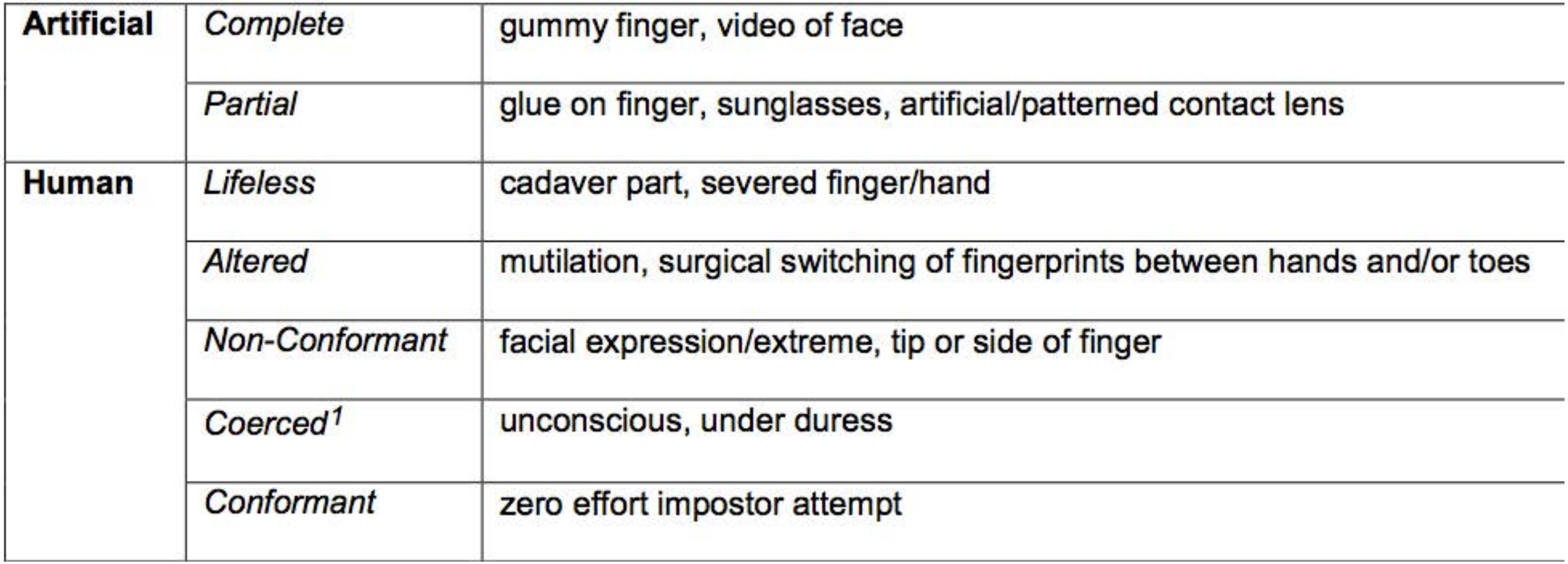
Coerced

Conformant

Source: ISO/IEC 30107-1

Presentation Attack Detection

ISO/IEC 30107-1: Examples of Artificial and Human Presentation Attack Instruments

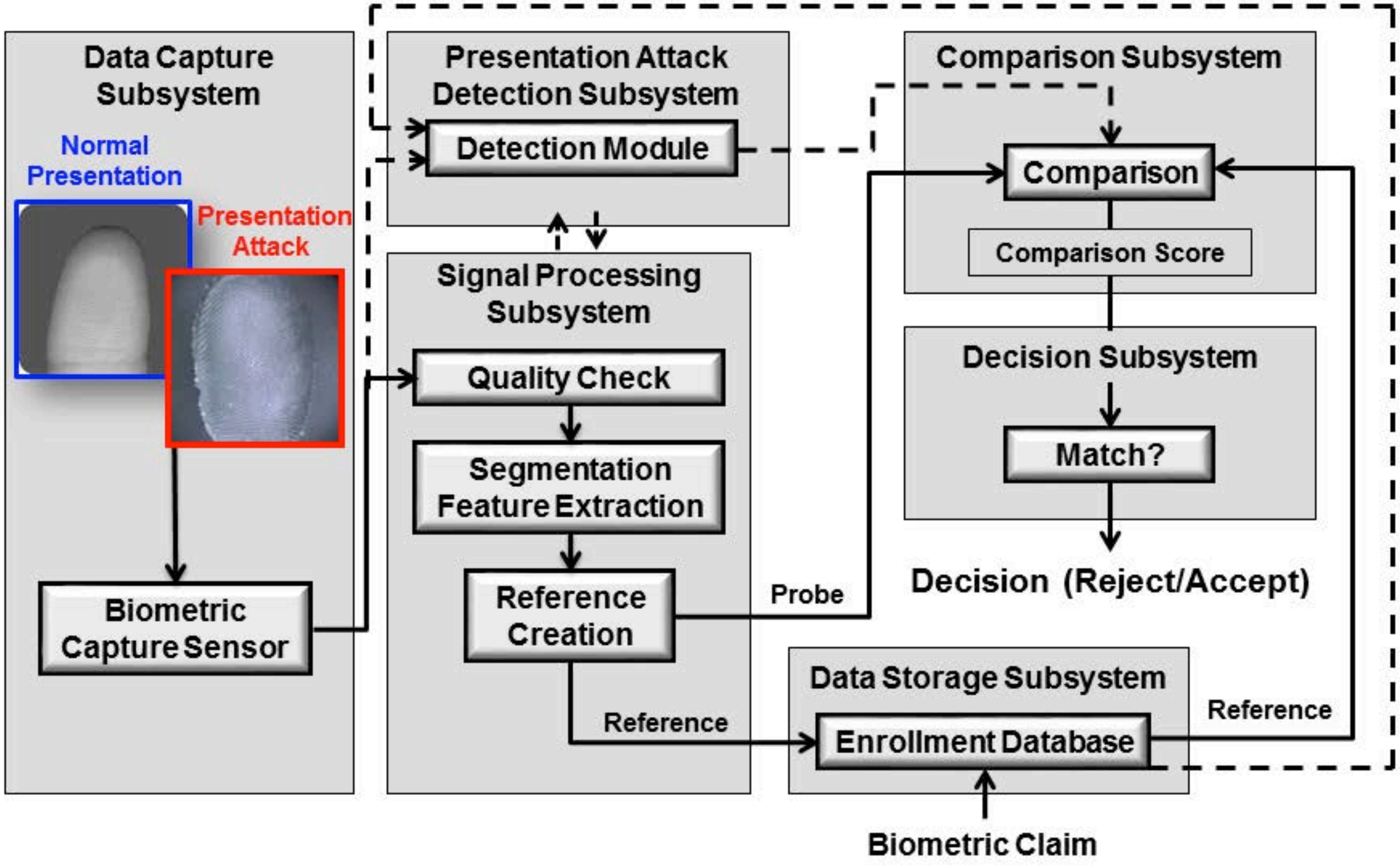


Artificial	*Complete*	gummy finger, video of face
	Partial	glue on finger, sunglasses, artificial/patterned contact lens
Human	*Lifeless*	cadaver part, severed finger/hand
	Altered	mutilation, surgical switching of fingerprints between hands and/or toes
	Non-Conformant	facial expression/extreme, tip or side of finger
	Coerced[1]	unconscious, under duress
	Conformant	zero effort impostor attempt

Source: ISO/IEC 30107-1

Presentation Attack Detection

Biometric framework with PAD

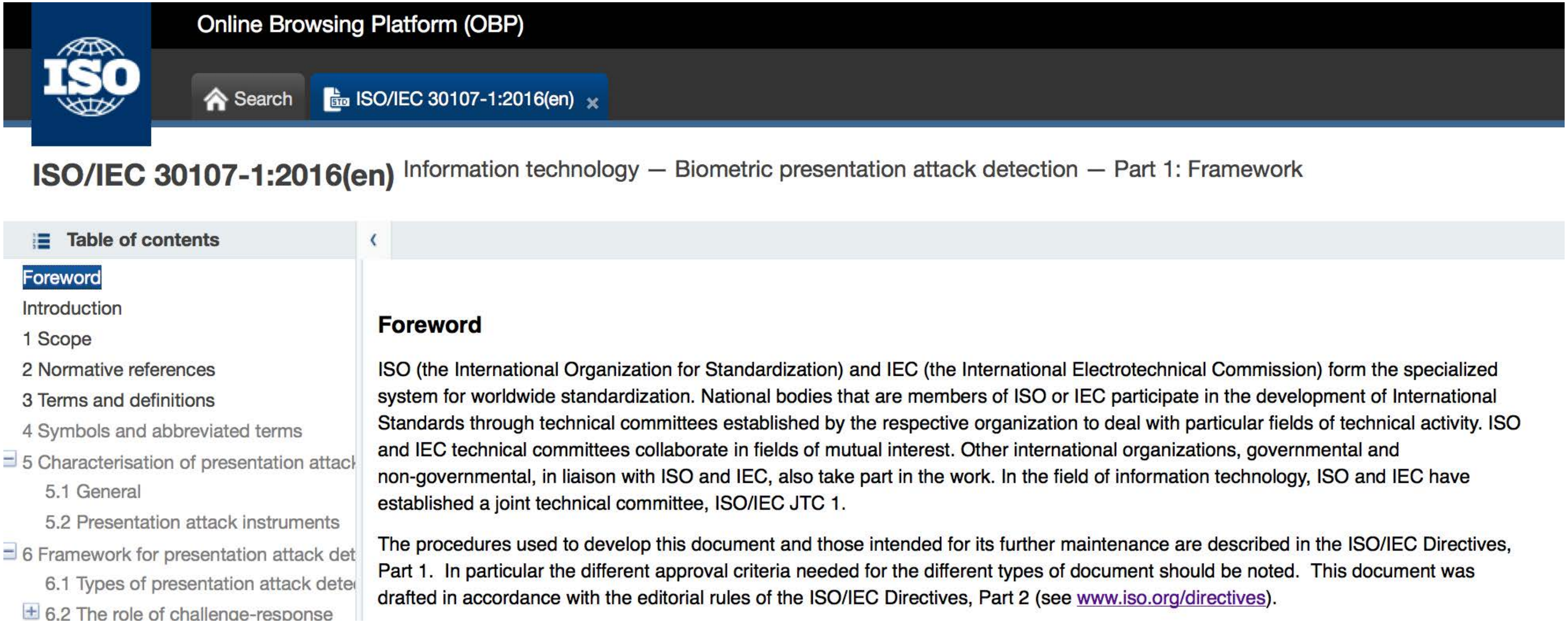


Source: ISO/IEC 30107-1

Presentation Attack Detection

ISO/IEC IS 30107-1 Standard

- **now available in the ISO-Portal**
  http://www.iso.org/iso/home/store/catalogue_tc/catalogue_detail.htm?csnumber=53227
- SC37 has initiated to make this standard freely available



ISO/IEC 30107-1:2016(en) Information technology — Biometric presentation attack detection — Part 1: Framework

Table of contents

Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Presentation Attack Detection - Testing

Methodology in ISO/IEC 30107 Presentation Attack Detection - Part 3: Testing and reporting

- Security Evaluation
  - for evaluations using the Common Criteria Framework
  - Protection Profile (PP) (e.g. from German BSI)
  - Security Target (ST)
  - Evaluation Assurance Level (EAL)
  - Assessment of the attack potential
  - *„if there is at least one artefact that can reproducibly successful attack the PAD-component - then the PAD failed the test“*
- Other approaches
  - for evaluations in academic and technology development
  - tolerating the fact that statistical distribution for small tests is unknown and for sure not normal
  - *„ a score based metric can tell us, if the method improved“*

Presentation Attack Detection - Testing

Definition of PAD metrics in ISO/IEC 30107-3

- **Attack presentation classification error rate (APCER)**
  proportion of attack presentations incorrectly classified as Bona Fide presentations at the component level
  in a specific scenario

- **Bona Fide presentation classification error rate (BPCER)**
  proportion of Bona Fide presentations incorrectly classified as attack presentations at the component level
  in a specific scenario

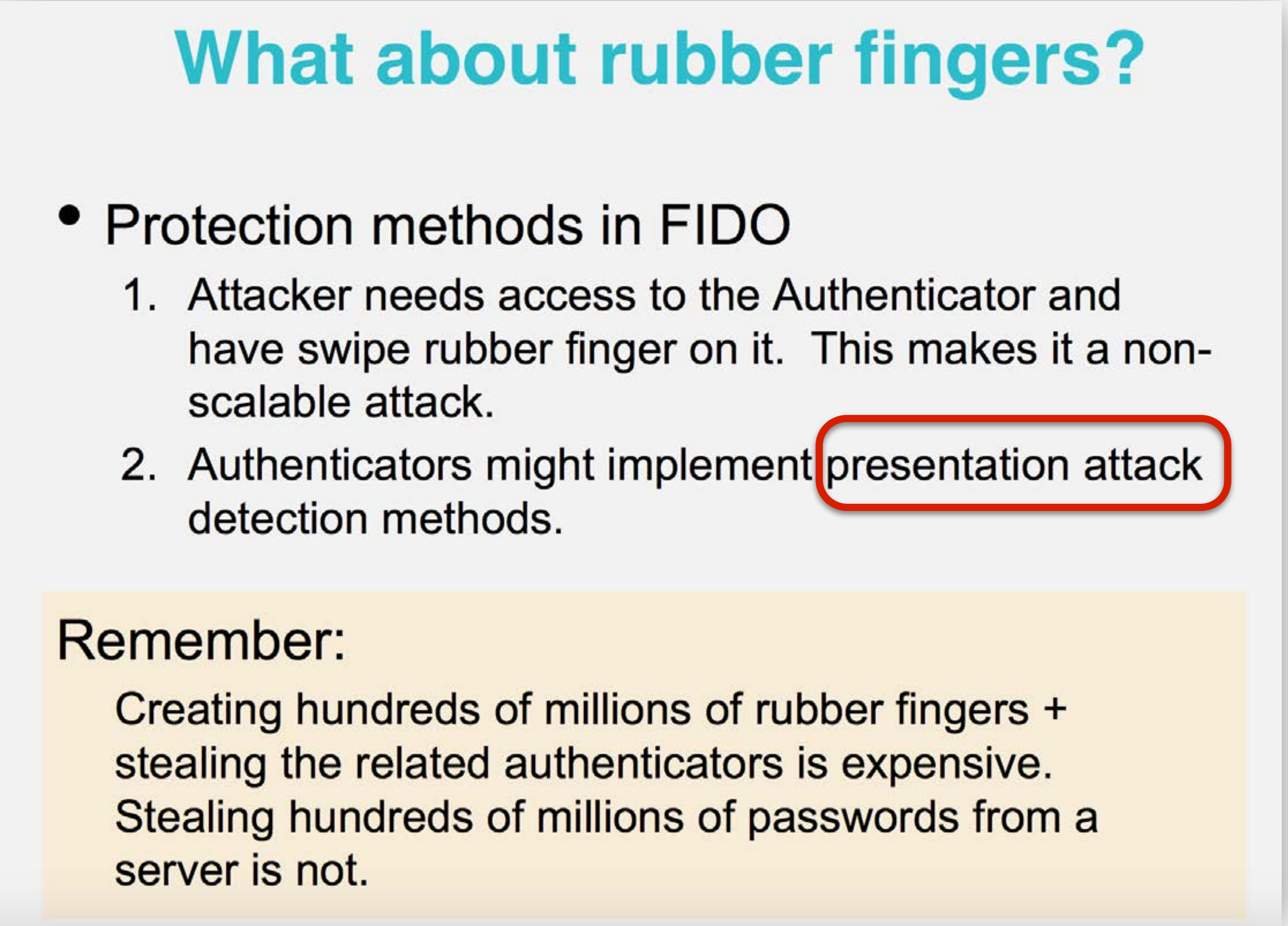
Presentation Attack Detection

30107 parts

- Part 1 - Framework
  - Elaine Newton
  - status: IS - published
- Part 2 - Data formats
  - Olaf Henniger
  - status: 3rd CD
- Part 3 - Testing and Reporting
  - Michael Thieme
  - status: 2nd CD

PAD-Standard and FIDO

FIDO - on 9th September 2015



What about rubber fingers?

- Protection methods in FIDO
  1. Attacker needs access to the Authenticator and have swipe rubber finger on it. This makes it a non-scalable attack.
  2. Authenticators might implement presentation attack detection methods.

Remember:

Creating hundreds of millions of rubber fingers + stealing the related authenticators is expensive. Stealing hundreds of millions of passwords from a server is not.

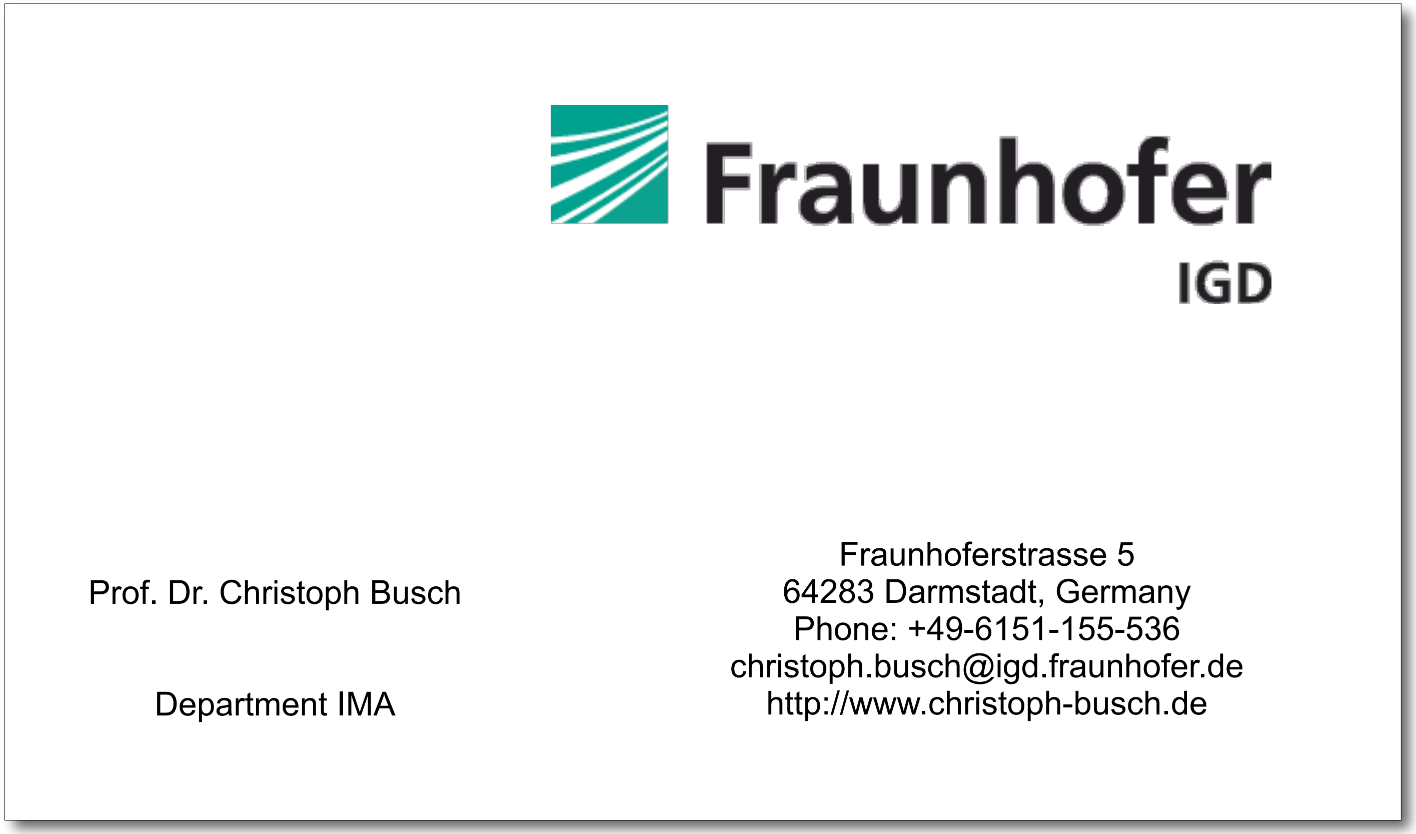
Source: R. Lindemann (NokNok) - 2015

References

Web

- Convenors website with latest news and slides
  http://www.christoph-busch.de/standards-sc37wg3.html
- ISO/IEC JTC SC37
  http://isotc.iso.org/livelink/livelink?func=ll&objId=2262372&objAction=browse&sort=name
- Published ISO/IEC Standards
  http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_tc_browse.htm?commid=313770&published=on

Contact



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