World Class Standards

QKD in ETSI

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Strategy and New Initiatives

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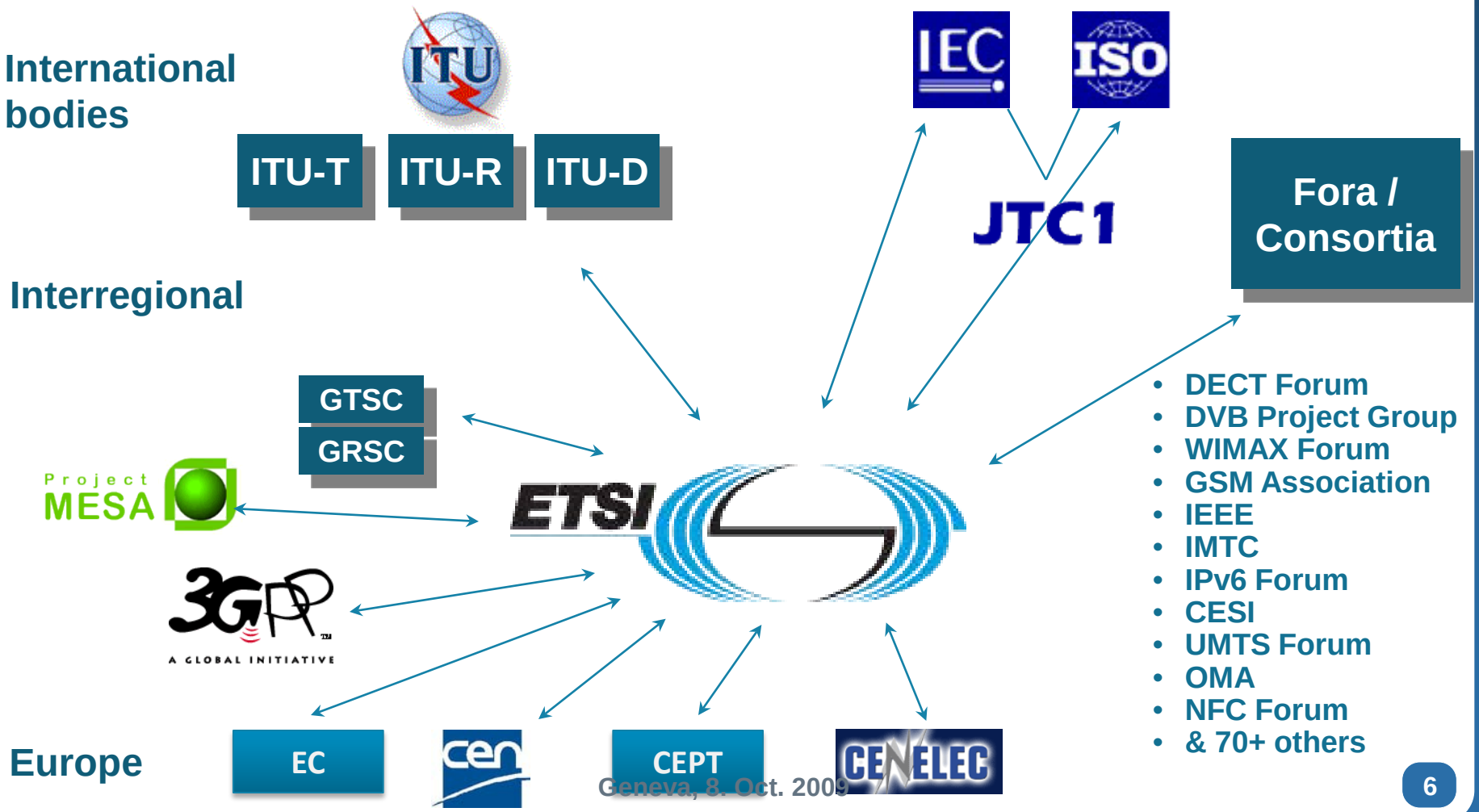
About ETSI


Arctic Ocean
Greenland Sea
Arctic
Ocean
Beaufort Sea
Baffin Bay
Greenland
Barents Sea
Kara Sea
Laptev Sea
Chukchi Sea
Norwegian Sea
Iceland
Bering Sea
Gulf of Alaska
Hudson Bay
North Sea
Sea of Okhotsk
Pacific
Atlantic
Mediterranean Sea
Black Sea
Caspian Sea
Arabian Sea
Caribbean Sea
Gulf of Mexico
Ocean
Indian
Ocean
Ocean
Ocean
Pacific
Tasman Sea

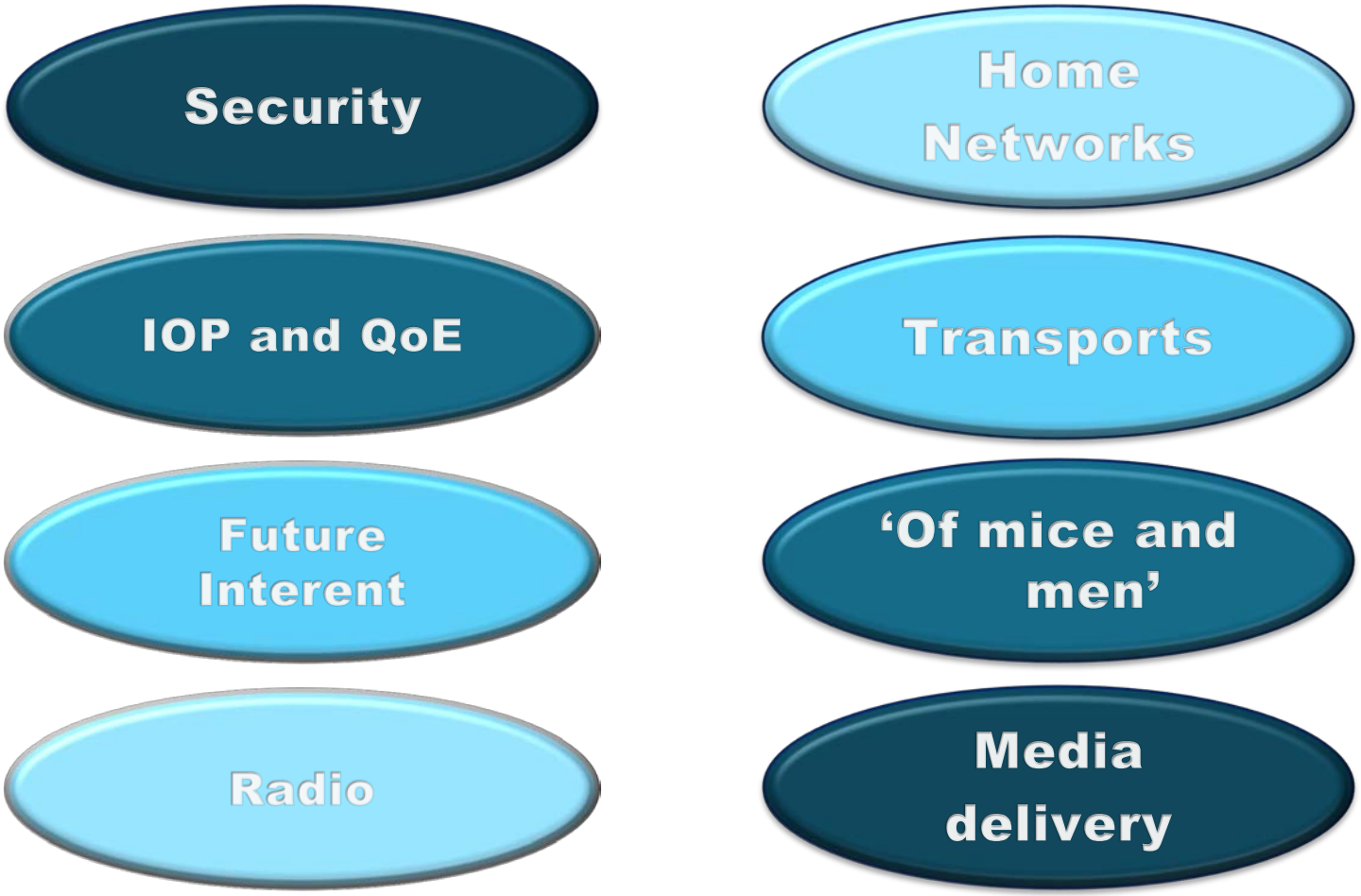
ETSI – A Global Player

- Standards for ICT
- Global membership (700+ Members EU and overseas, 80% industry)
- Officially recognised European Standards Organization
- Independent, Not-for-profit
- Direct member participation
- 20,000+ publications available for free
- ISO 9001 : 2000 Certified
- Enabler of some worldwide industrial hits
- Staff of 120, supporting av. 6000 industry experts/year
- Global network of alliances (regional/technical)
- Major focus on Interoperability/Architecture
  - IOP engineering & testing for ETSI and others (CTI)
  - “Classic and light”, i.e. access/transport layers and application/service layers

Nobody does it all alone



Clusters


Security
Home Networks
IOP and QoE
Transports
Future Interent
'Of mice and men'
Radio
Media delivery

Current Use of QKD

QKD already in use I

- 11. October 2007 – Swiss Federal Elections (http://www.idquantique.com/news/news-elections2008.htm)
  - QKD used to secure a gigabit ethernet link connecting the central counting station located in downtown Geneva and the data center where all the results were stored and processed
  - following this successful pilot project, the Chancellery of the Canton of Geneva decided to on QKD for all future elections
- 2009 first metropolitan QKD network in Durban (http://www.secoqc.net/downloads/abstracts/SECOQC-Pettruccione.pdf)
  - based on the QuantumCity project from 2005 consisting of four nodes in a Municipal Area Network star configuration linking municipal buildings in Pinetown, Westville and Cato Manor
- 2010 QKD to be used by 3 Japanese ministries
  - this was officially announced by high ranked representants of these ministries on slide presentations during the UQC 2008 meeting organized by NICT in Tokyo, but unfortunately these slides are not publicly available
  - funding for proceedings on QKD for the next 10 years currently under government review

QKD already in use II

- 2010 first European metropolitan QKD network in Madrid (http://www.secoqc.net/downloads/abstracts/SECOQC-Fernandez.pdf)
  - UPM project focuses on sharing as much infrastructure as possible between the quantum and conventional parts and manage services and network in an integrated way to allow for the network to grow o demand

- 2010 first metropolitan QKD network in London (http://www.qinetiq.com/home/newsroom/news_releases_homepage/2009/2nd_quarter/02.html)
  - Operating QinetiQ's quantum-based security over AboveNet's dedicated fibre optic network in London will offer an extremely secure way for governments, financial institutions and organisations with high security requirements, to transfer confidential information and sensitive data

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ETSI ISG on QKD

Background

- Europe is currently in the technology lead in QKD
- A strong need for standardization of QKD identified worldwide
  - Telcordia proposed to form an industry forum asked $ 50 000.- from each interested company → not very successful since the technical knowhow mostly comes from universities, research centers and small start-ups (SMEs)
  - Japan has standardization efforts ongoing → 2007 SECOQC members where invited to a workshop, but collaboration was hindered by lack of knowledge how to practically form an international standardization body and by presentations mostly written in Japanese
- Only Europe has yet succeeded in systematically get a standardization group formed (ETSI ISG on QKD)

Organization

- Chair:
  - Thomas Laenger (AIT)
- Vice Chairs:
  - Brian Lowens (Qinetiq)
  - Gregoire Ribordy (id Quantique)
- Secretary:
  - Mercedes Soto Rodriguez (Telefonica)
- Support Coordinator:
  - Estelle Mancini (ETSI)
- STFs:
  - 367 (financed by EC)

Terms of Reference

- Analysing the cryptographic implications of Quantum Key Distribution
- Securing confidentiality and privacy of communication in the future ICT
- Specify a system for QKD and its environment
- Transferring quantum cryptography out of the controlled and trusted environment of experimental laboratories into the real world with business requirements, malevolent attackers, and societal and legal norms to be respected

Members of ISG QKD

- AIT
- Arche Finanz
- HP
- id Quantique
- Instiut telecom
- INRiM
- MIMOS Behard
- NICT
- QinetiQ
- QuantumWorks
- Smart Quantum
- Swisscom
- Telcordia
- Telefonica
- Thales
- Toshiba
- Uni Politechnica de Madrid

there are several more candidates to signing contracts with this ISG on QKD, some contracts are currently on their way to ETSI

ISG tailoring - ISG QKD specifics

- **Budget**
  - no budget needed for 2009
- **Participation**
  - open to non members under the following conditions:
    - valid participant agreement
    - € 700,- participation fee per person/per meeting
    - right to participate expires, if 2 subsequent meetings are not attended
- **Decision making**
  - 1 vote per member

Current Work Items

- **Security assurance requirements**
  http://webapp.etsi.org/WorkProgram/Report_WorkItem.asp?WKI_ID=28890
- **User requirements**
  http://webapp.etsi.org/WorkProgram/Report_WorkItem.asp?WKI_ID=29096
- **Components' interfaces**
  http://webapp.etsi.org/WorkProgram/Report_WorkItem.asp?WKI_ID=29099
- **Application interfaces**
  http://webapp.etsi.org/WorkProgram/Report_WorkItem.asp?WKI_ID=29097
- **Security proofs**
  http://webapp.etsi.org/WorkProgram/Report_WorkItem.asp?WKI_ID=29098
- **Integration within optical networks**
  http://webapp.etsi.org/WorkProgram/Report_WorkItem.asp?WKI_ID=29100
- **Ontology**
  http://webapp.etsi.org/WorkProgram/Report_WorkItem.asp?WKI_ID=30486
- **Security specification**
  http://webapp.etsi.org/WorkProgram/Report_WorkItem.asp?WKI_ID=30487

What's next

- Necessary steps beyond the development of QKD basic technology to transfer QKD from lab to commercial environment
  - development of networked structures (network types): mixed networks, hierarchical networks,…
  - improve key-generation rates
  - system management
  - connectivity
  - trusted repeaters
  - access for end-users
- ETSI's doors are wide open towards other Quantum Technologies
  - hardware components for QKD networks
  - several groups speak about enormous bandwidth needed for future generation IPTV
  - see, if there is a need for Quantum Compression

Degrees of success

Real success: Specifications are used & implemented

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