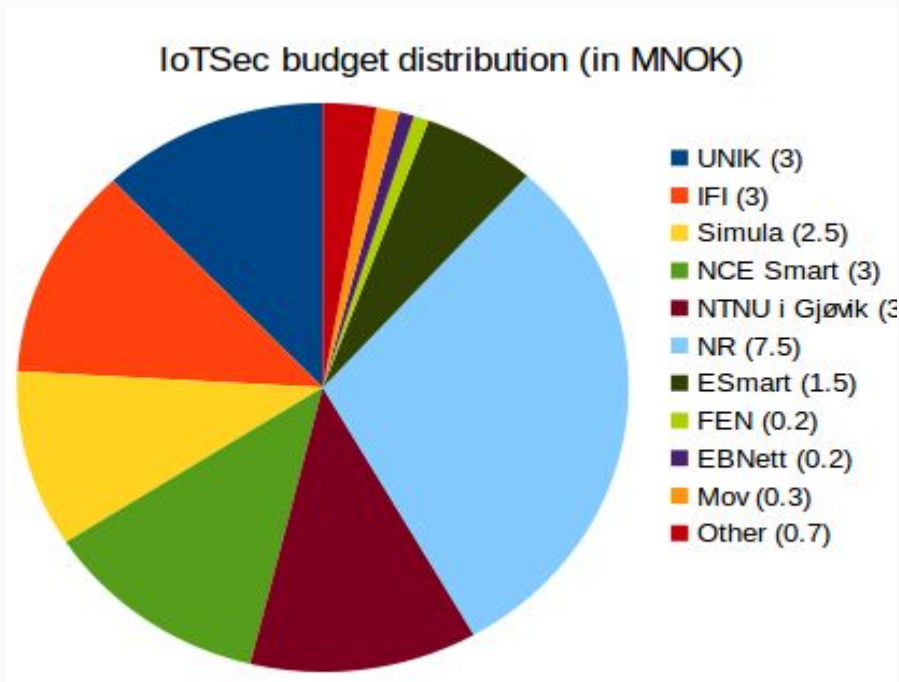# IoTSec

Major Achievements of Year 1

by Christian Johansen (COO)

Core Team and Resources

- UNIK@UiO (from 1Jan2017 Institutt for Teknologisystemer (Seraj Fayyad, Christian Johansen, Danica Radovanovic, MSc, ++)
- IFI@UiO (Olaf Owe, Josef Noll, Toktam Ramezani, Elahe Fazeldehkordi, MSc ++)
- Simula (Yan Zhang, Ming-Chang (Leo) Lee)
- NCE Smart (Dieter Hirdes, Heidi Tuiskula, Håkon Duus)
- NTNU (Einar Snekkenes, Adam Szekeres)
- Norwegian Computing Centre (NR) (Habtamu Abie, Ivar Rummelhoff, Sigurd Eskeland)
- eSmart Systems (Davide Roverso)
- Fredrikstad Energi (Vidar Kristoffersen)
- Glitre Energi Nett (Otto Andreas Rustand)
- Movation (Seraj Fayyad)

IoTSec budget distribution (in MNOK)

- UNIK (3)
- IFI (3)
- Simula (2.5)
- NCE Smart (3)
- NTNU i Gjøvik (3
- NR (7.5)
- ESmart (1.5)
- FEN (0.2)
- EBNett (0.2)
- Mov (0.3)
- Other (0.7)

Working together

- Public (and Admin) wiki with most of our work (a wiki can be edited by everyone, and the information is meaningfully managed)
  - Publications pages with links to all public documents, presentations, etc.
  - Research description of the project, with public deliverables available
  - Student corner, with MSc topics (open, ongoing, and finished)
  - Consortium and other collaborators descriptions and contact points
  - Meetings info with minutes and presentation materials, etc.
- Sharing platforms
  - Google Docs, OwnCloud server, mailing list,
- Disseminating together
  - Active Twitter account available to all members

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Project info - Y1 highlights

- 2 PhD and 3 PostDoc positions are filled, offer for the final PhD position was accepted
- Consolidated plans for Smart Grid Security Centre are established.
- Extended Collaboration with Groups and Initiatives, grown from 11 to 19 partners
  - UiA joined, and 6 external professors (UiA, UiO/Simula, Chalmers, Univ Copenhagen)
- EU Horizon 2020 project INVADE accepted
  - coordinated by IoTSec partner NCE Smart, with 3 partners from IoTSec
- JU ECSEL project proposal SCOTT submitted as IA,
  - UiO as Technology Leaders and Norwegian consortium coordinator
- Strategic Research Partnership of UiO with the Virtual Vehicle Research Centre (Austria) on security and digital systems
- Personal Awards
  - Dieter Hirdes got membership in the Advisory Board for EU Energy Group of H2020,
  - Josef is Research Fellow at the Virtual Vehicle Research Centre in Austria

Networking, Dissemination, Collaboration

- **Organized** meetings and workshops to collaborate inside the project, but also with externals.
  - 17 physical meetings including workshops and face-to-face consortium meetings
  - 6 phone consortium conferences, supporting the face-to-face meetings
  - Industrial forums, with externals invited to present results from their institutions, e.g.:
    - KraftCert,
    - Eidsiva Energi Nett,
    - Datatilsynet and
    - Chalmers University.
- We **participated** in a variety national and international forums relevant to the topics of IoTSec; these include both industrial forums as well as research ones.
  - 10+ presentations in relevant events (international or national)

    At e.g.: SmartGrid Conference, Nemko, Sintef, NCE partners forum, Energi Norge, LO IKT konferansen, 12th Int.Conf. Integrated Formal Methods, ACSAC Conference, NWPT.

Networking, Dissemination, Collaboration

- **Partners** overall increased to 19.
  - Ongoing discussions with NVE, Nkom, Oxford, TU Darmstadt.
- Dedicated face-to-face meetings organized with other actors :
  - Hafslund, Agder Energi, Eidsiva Energi, Kragerø Energi
- **Extended the collaboration**
  - Include 6 academic collaborators
  - Invited 6 associated international partners to strengthen our academic visibility
  - Extended IoTSec with 8 associated national partners to build the ecosystem
  - Great involvement of Public sector
    - Datatilsynet, Forbrukerrådet, and Norwegian SmartGrid Centre
- Teaching and Students
  - MSc (1 finished, 5+ ongoing, 10+ open topics) - see Student Corner on wiki
  - New courses : IoT Security (UNIK) and Energy Informatics (Ifi)
    plus existing courses on security, networking, modelling, (now geared towards IoT)

Y1 goals and focus

- First year allowed the partners a more exploratory work so to investigate various aspects of IoT, Security and Privacy, and the Electricity grid.
- Purpose was to
  - analyse problems from the various facets of the Grid and IoT
  - identify the most urgent and with most impact.
- Their conclusions were fuelling the Smart Grid Security Centre (SGSC) topics and initial agenda.
- The goal with immediate impact was
- Establish SGSC
  - as a knowledge centre for the (Smart) Electricity Grid industry
  - offering services that would help the industry with the most stringent problems
  - help with the transition to the future SmartGrid and the IoT
  - expertise on business opportunities and novel services in SmartGrid and SmartHome

Arena for students/industry

- **CPS Lab** at UiO (for Cyber Physical Systems) starting in 2017.
  - Applicants: Christian, Josef, Olaf, Josh (from IoTSec), and Frank Eliassen, Amir Tahercordi (close partners to IoTSec managing the Energy Informatics at UiO), and Gyorgy Kalman (from Mnemonic)
- Purpose: create a meeting point for Industry and Students, working on practical problems coming from IoTSec domain (i.e., IoT, Energy, Privacy, and Networks).
  - Students (MSc and BSc) get hands-on and practical problems, + the necessary lab material, e.g., IoT devices to hack, SmartMeters, software licences, etc
  - Industry get a point to meet (and select) students, to interact with experts (researchers) and to test their devices and ideas.
- Will be provided to the Smart Grid Security Centre.

Scientific achievements

- **Semantic system description**
  - Understanding the system and describing security through semantic modelling
  - Measurable security - the novel security concept
- **Security modelling**
  - Development of privacy-aware models and measures
  - Adopting and enhancing adaptive security for system of systems
  - Formal languages for semantically proving security/privacy
- **System versus Goal analysis**
  - Application-specific security/privacy, e.g. billing vs privacy and profiling
  - Human/technical interface, security usability
- **Operational security for IoT-based critical infrastructure**
  - IoTSec ecosystem -> extended network of collaborators
  - Roadmap for Smart Grid Security Centre (SGSC)
  - (Gap Analysis of security methods for critical infrastructures)

Challenges

- Scientific challenges
  - missing descriptions of distribution grid
  - "security by obscurity"
  - different security viewpoint
- Collaboration challenges
  - Academic versus industrial viewpoint
    - "language missmatch"
    - Academic: long term, open available information, e.g. Smart Home focus
    - Industry: current challenges, e.g. focus on grid
  - Focus on Smart Grid Security Centre (SGSC)
    - Different expectations about contributions into the SGSC
    - Academia wants focus on science

Increasing visibility through active participation in international proposals.
The accepted grants are:

- **INVADE** (Horizon 2020)
  - NCE Smart are Coordinators (Dieter and Heidi)
  - Budget ca. 16 M€ for 12 European partners (including eSmart Systems)
  - In the field of SmartGrid & Storage.
- **SCOTT**: Secure COnnected Trustable Things (ECSEL-Joint Undertaking)
  - VIF in Austria are overall coordinators for 56+ partners from 12 countries.
  - UiO (Josef and Christian) are overall Technology Leaders and coordinate the seven Norwegian partners.
  - Overall Requested funding ca. 34 M€ with Norwegian requested funding ca. 3 M€.

New Grants

- Excellent growth of scientific network
    - from 11 to 19 partners
    - extended both towards industry, public entities, and international collaborations
- Good Scientific outcome
    - PhD students hired
    - PostDocs in operation
    - Topics identified, future work addressed
    - Key concepts, a.o.
        - "Measurable Security" adapted in SCOTT (54 partners from 14 countries)
        - "Privacy labelling" suggested in collaboration with Consumer Services
- Good involvements of students
    - 5+ ongoing Master Students
- Excellent success rate of novel projects
    - H2020 Invade, JU ECSEL SCOTT

Summary of Y1 Major Achievements

More organization matters

Steering representatives:

- UiO: Olaf Owe
- UNIK: Stian Løvold
- NTNU: Nils Kalstad Svendsen, Sofie Nystrøm
- NR: Åsmund Skomedal
- Simula: Yan Zhang
- NCE Smart: Dieter Hirdes
- eSmart Systems: Davide Roverso
- Glitre Energi Nett: Otto Andreas Rustand
- Fredrikstad Energi Nett: Vidar Kistoffersen
- Movation: Bjarne Haugen

Project leadership:

- Josef Noll
- Christian Johansen, COO
- Stian Løvold, Project owner

Steering Board leader:

- Bjarne Haugen

Security Officer:

- Otto Rustand

Confidential and security-critical material

Information available on the wiki

http://cwi.unik.no/wiki/IoTSec:Secure_and_Confidential_information

Confidential and secure information

The steering board has decided on the Steering board meeting 27Oct2016 to adapt the following guidelines and continues work on these topics.

Confidential information

- Documents which are given to the project being confidential to the project shall be watermarked by *IoTSec confidential, shall not be distributed outside of the project without consent"*
- Deliverables being confidential shall be stored on the project server, e.g. owncloud.unik.no

Security-critical information

Each project participant is asked to not publish security-critical information. If a participant regards information as potentially security-critical, he shall ask IoTSec's security officer for