

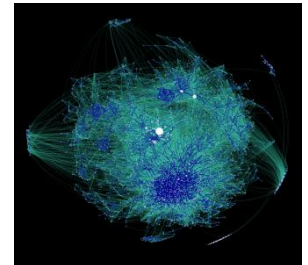
Interdisciplinary Centre for Security, Reliability and Trust

SnT, University of Luxembourg

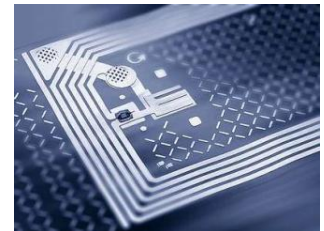
Björn Ottersten, Director
Thomas Engel, Vice-director

Security, Reliability and Trust

- *Security and Trust* 1 of 4 priorities at University of Luxembourg
- SnT created in 2009
- Head count > 90, 15 faculty members
- Interdisciplinary research approach to



*Secure, Reliable, and Trustworthy
ICT Systems and Services*



- Platform for collaboration with industrial and governmental partners, EU & ESA projects

Luxembourg An environment for ICT?

Security and Trust a Key Element!

- Part of Government's strategy coupled to the *Digital Agenda for Europe*
- Investments in
 - High bandwidth connectivity to major hubs
 - Data centres with competitive offers
 - Commercial internet exchanges
 - Cloud computing and services
- Investment in competence and research
- EU strategic research programs
- Luxembourg an ideal European and vendor neutral “test bed”



Part of Luxembourg Innovation System

SnT instrument to attract and create R&D in the region!



Not only tax and VAT legislation!

Strategic Research Areas

Research Platforms

- Enterprise Security
 - Financial and banking industry (Ministry of Economy, BCEE, ABBL, CASES, FEDIL)
- Services, Content and e-Government
 - Service and content providers, government agencies (iTrust, RTL, BCE, LuxTrust)
- Communication and Network Infrastructure
 - Network providers and operators (SES, EPT, Telindus, IEE S.A., LuxConnect)



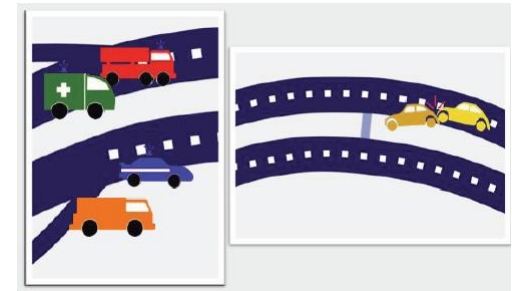
Demonstrations, Proof-of-concept, Test-beds, Prototypes



u2010 Project Demonstration – *Fire in a Tunnel*

Grouft tunnel under construction in Luxembourg

- Enabling rescue forces to act in time in case of accident, incident, catastrophe or crisis
- Rescue teams have to be assembled quickly and flexibly
- Rescue teams need access to information



Partnership Program

Partners

Entreprise P&T

SES

Telindus

Ministry of Economy and Trade

CETREL

BCEE

IEE S.A

RedDog

itrust

LuxInnovation

FEDIL

Ville de Luxembourg

Data Protection Agency

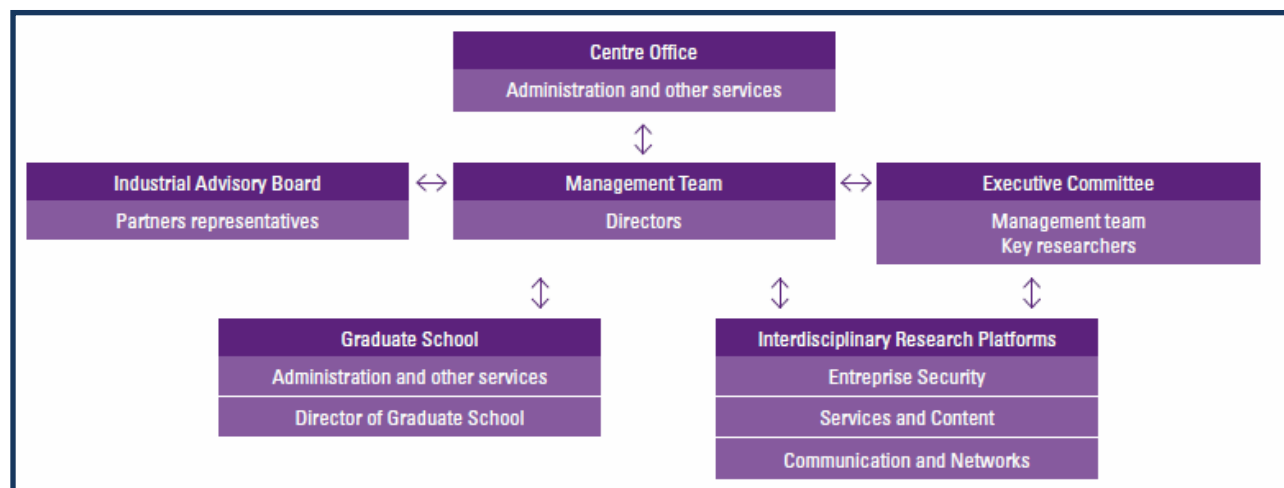
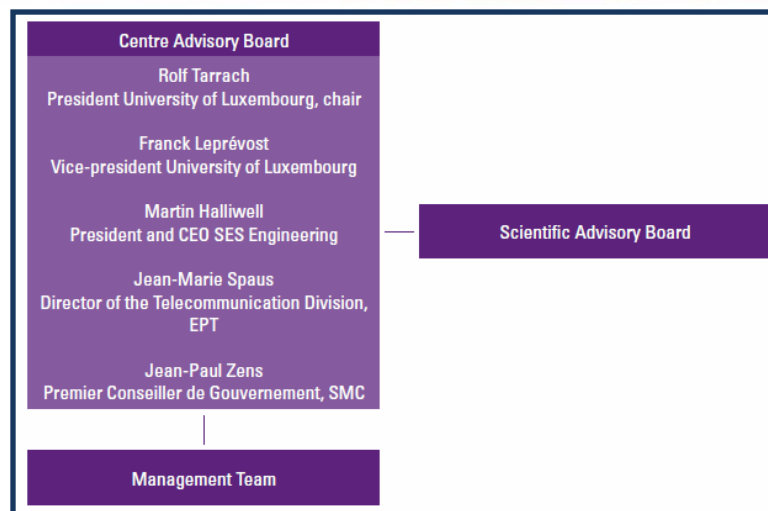


Partnership Program

Platform for interaction and cooperation with industrial and government partners

- Membership on SnT Industrial Advisory Board
- Nominate Partner representatives to Governing Board – *Shape the future of SnT!*
- Leverage contributions with project funding from EU framework programs, ESA, FNR, public-private-partnership, etc.
- Ensures future availability of researchers with competence in “industry-relevant” areas

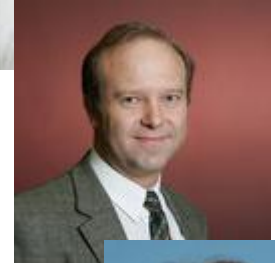
Governance and Operations



Participating Professors @ uni.lu



Mark Cole
Romain Martin
Pascal Bouvry
Leon van der Torre
Yves Le Traon
Jürgen Sachau
Christoph Schommer
Charles Max



Mahulena Hofmann
Alex Biryukov
Sjouke Mauw
Peter Ryan
Thomas Engel
Pierre Kelsen
Holger Voos

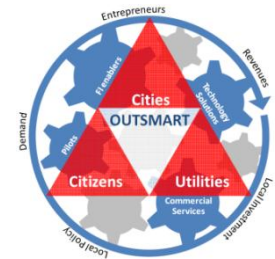


SnT Participation FP7



OUTSMART – Provisioning of urban/regional smart services and business models

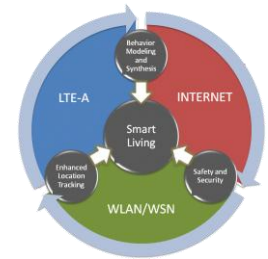
IP FI Program, usage case, start 1 April, 2011



BUTLER – uBiquitous, secUre inTernet-of-things with Location and contExt-awaReness

Pervasiveness, context-awareness and security for IoT

ICT-2011-7, IP, start 1 October, 2011



UIoT6 – Universal Integration of the Internet of Things through an IPv6-based Service Oriented Architecture enabling heterogeneous components interoperability

ICT-2011-7, STREP, 1 October, 2011



SnT Participation FP7

FREESIC – Free Secure Interoperable Communications

Highly secure and cost effective interoperability between communication infrastructures

SEC-2011-1, FP, start 1 November, 2011

GEN6 – IPv6 for Governments

IPv6 upgrade of eGovernment Network Infrastructures

CIP-ICT-PSP-2011-5, start 1 November, 2011

LiveCity – Video to video over the internet

CIP-ICT-PSP-2011-5, start 1 November 2011

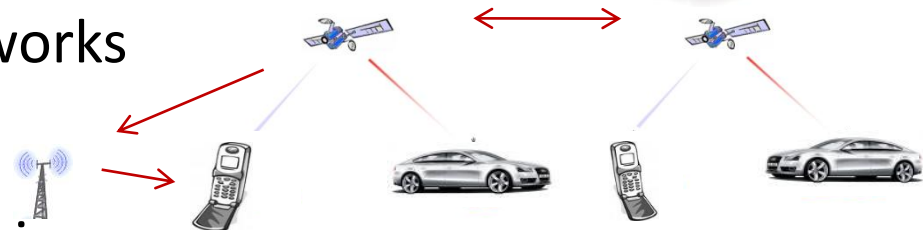
Web2LLP – Improving web strategies and social media presence of LLP projects, EACEA/15/2011, start late 2011

Research Program in Satellite Systems

Partnership



1. Legal and Regulatory Challenges
SES Chair on Satellite Comm and Media Law!
2. Applications and Services
3. Satellite Hybrid Networks
4. Transmission and Reception Technologies



Structure of SES – SnT Research Program

Program Steering Committee:

Gerhard Bethscheider

Martin Halliwell

Pierre Margue

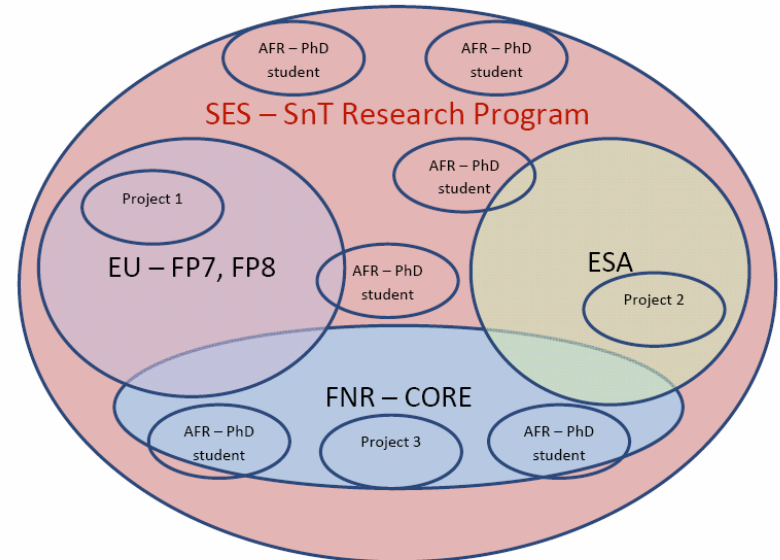
Björn Ottersten

Thomas Engel

SES represented on:

SnT Board representation

SnT Industrial Advisory Board



Satellite Systems Overview of Projects

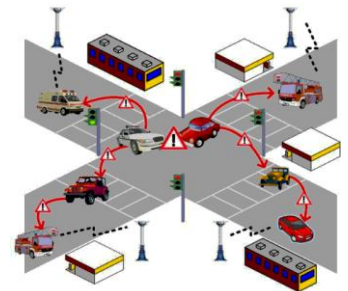
Activity	Funding	Duration	Body	Partners
Cooperative and Cognitive Satellite Networks	773 K€	3 years	FNR	SES
Satellite MIMO Demonstrator	1.2 M€	2 years	ESA	SES, Electrobit, Oulu
Spread Spectrum IOT Measurements	97 K€	6 months	LuxLaunch	SES
Flexible Multibeam Satellites	280 K€	15 months	ESA	SES, EADS Astrium
Location Assurance Service Provider	240 K€	24 months	ESA	iTrust
PIL to SPELL Conversion Pilot project	SES/SnT	9 months	SES	SES

Research Program in Vehicular Networks

Partnership



1. Sensor and Mobile Ad Hoc Networks
2. Embedded Systems
3. Applications and Services – Distributed Traffic Management



Vehicular Networks

- Vehicular networks:
 - Vehicle to Vehicle / Vehicle to Infrastructure Communication
 - Applications:
 - Road traffic management: real-time, smart navigation
 - Road Safety: accident avoidance and mitigation
 - Road-Side Assistance: automatic emergency call, eDiagnostic, repair service notification
 - Infotainment: VoD, Internet, parking/tourist info



Concept: From simulator to real world driving studies



4 Person collaborative driving simulator



Simulator connected to Tablet PC with new services



Eye-tracker to detect attention on road vs tablet task for use in the simulator and real environment

Network Security – Combating Cyber Crime

Partnership



LE GOUVERNEMENT
DU GRAND-DUCHÉ DE LUXEMBOURG
Ministère de l'Économie
et du Commerce extérieur



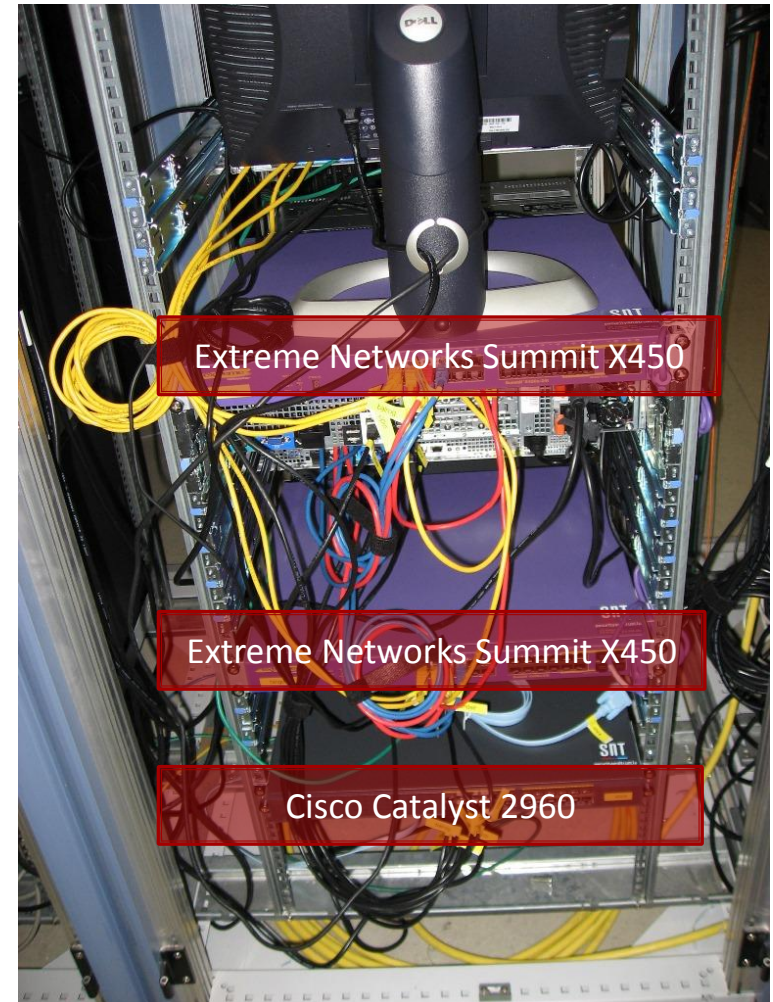
Intrusion/Malware Detection, Early Warning Systems

- Cyber crime can disrupt the entire financial system as we know it
- Attacks becoming increasingly sophisticated
- Combating cyber crime requires proactive measures
- The user (weak link) is often targeted – not encryption, firewalls, security protocols etc.



Network Security Lab

4
switches
9 servers
~30k
EUR



Partnership with CETREL

Resilient Infrastructures for Financial Transactions

Partnership



Software Testing and Validation

- From daily test traffic to a minimum subset of dissimilar test cases
- Product differential testing from a product line

Network and Service Security

- Smart Honeypots for Tracking Fraudulent Malware

Fraud Detection

- Statistical Manifold Learning for Fraud Detection

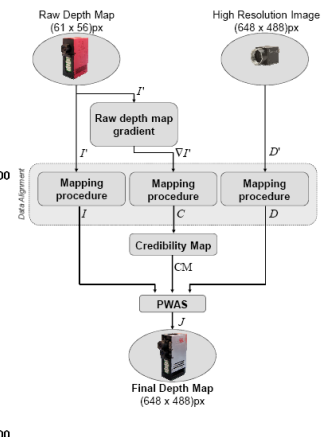
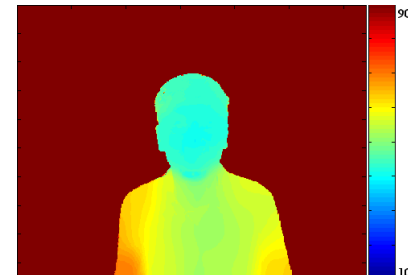
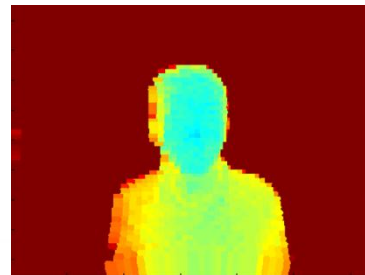
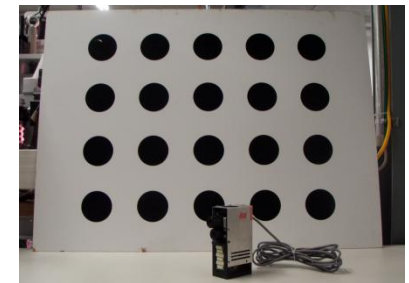
Multi-Sensor Fusion Laboratory

Automotive and Surveillance Applications

- Patient monitoring
- People sensing
- Biometrics
- Monitoring, classification



a sense for **IEE**
innovation





2D Cameras

- Point Grey Flea 2, VGA at 80fps.
- Various lenses, including distortion parameters.
- IEE Multi-camera capture software (up to 4 cams).



Time-of-Flight (ToF) Cameras

- 3D MLI sensor from IEE S.A., Modular 2, FOV 90°,
 - (56x61)px at 11fps.
- Communication and pre-processing DLLs from IEE.
- IEE "C3BReadWrite" function for data capture.



Passive Stereo Camera

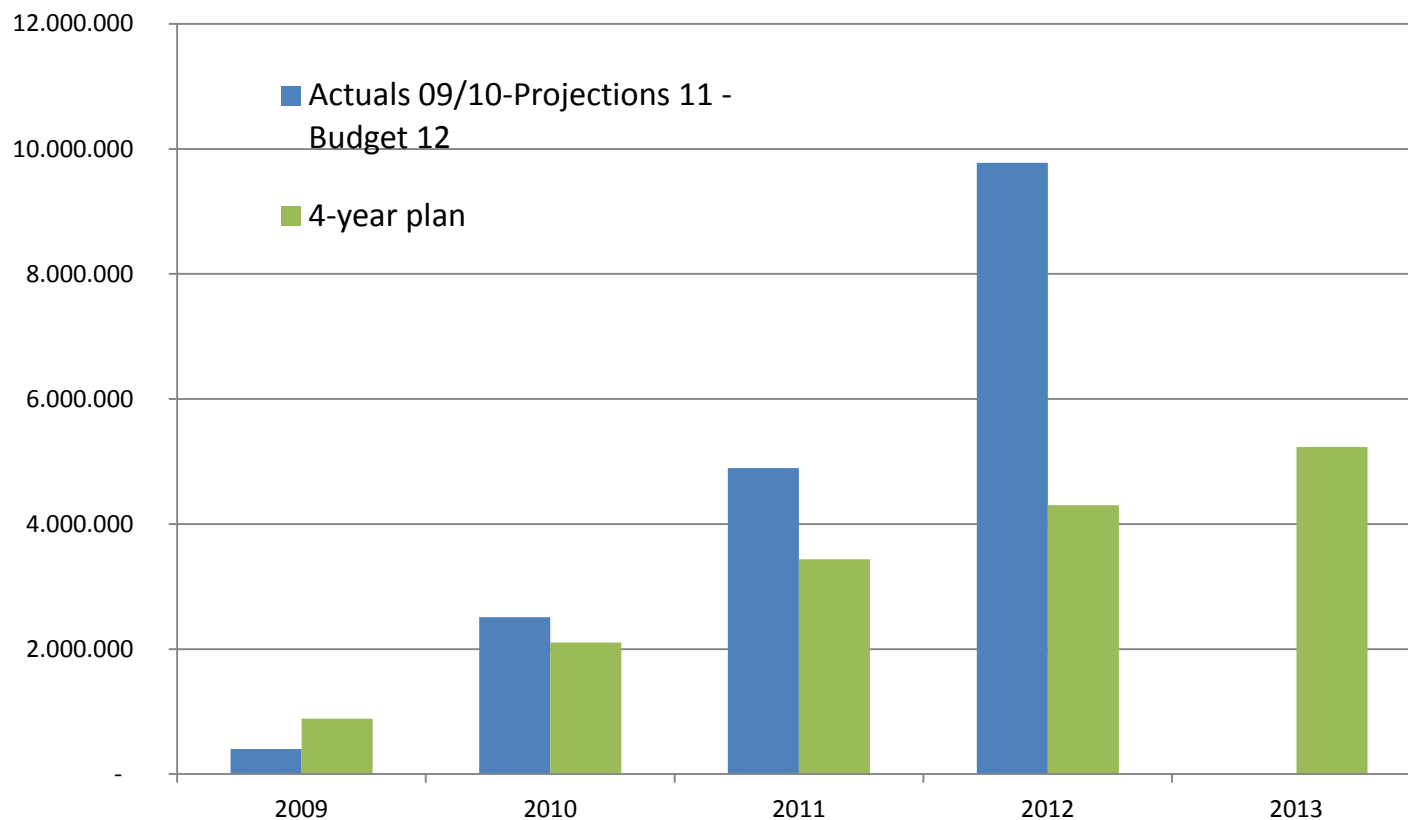
- Bumblebee from Point Grey.
- (640x480)px at 48fps or (1024x768)px at 20fps.
- Point Grey SDK + fly capture software.



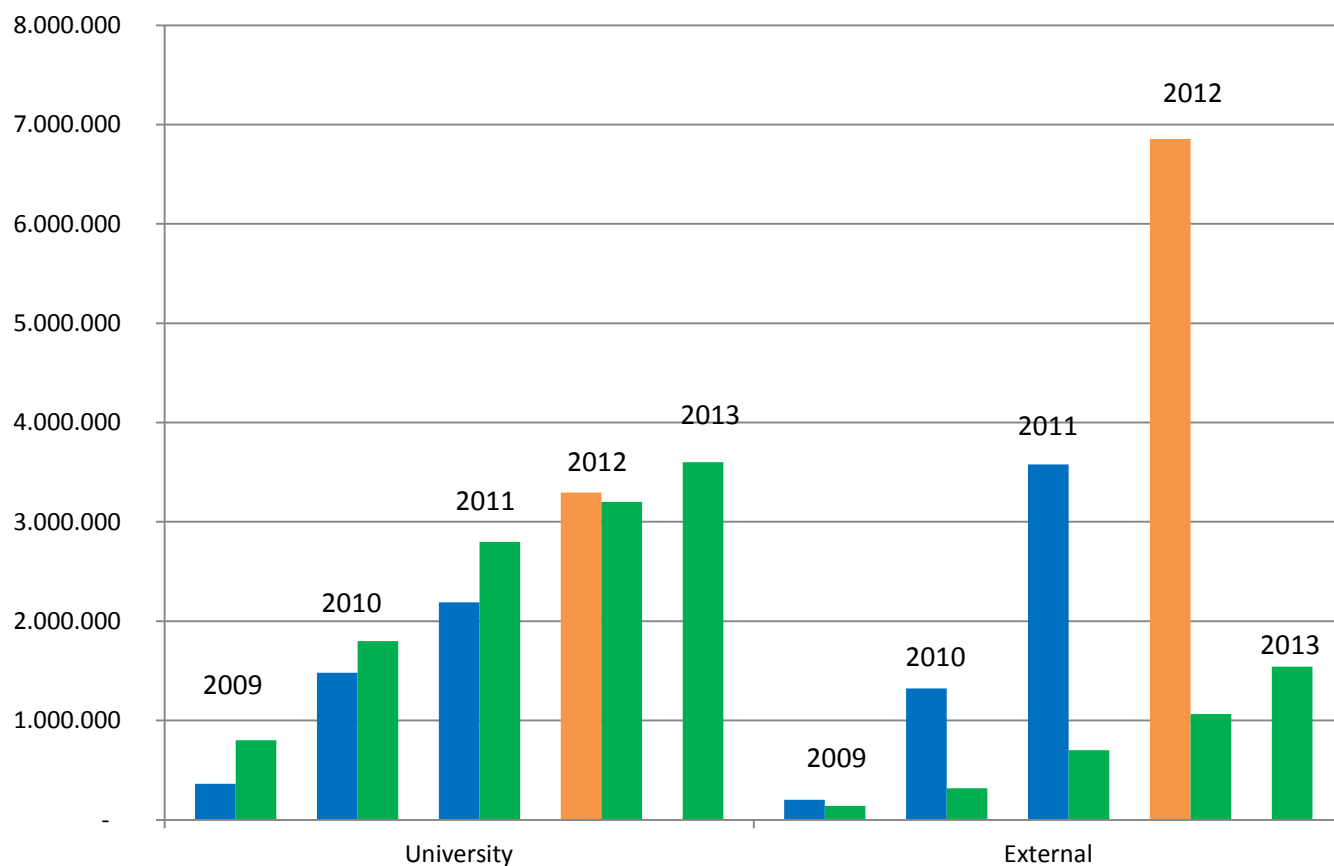
Active Stereo + Color Camera

- Microsoft Kinect camera.
- VGA at 60fps.
- Prime Sense's technology.

Expenses 2009-2013

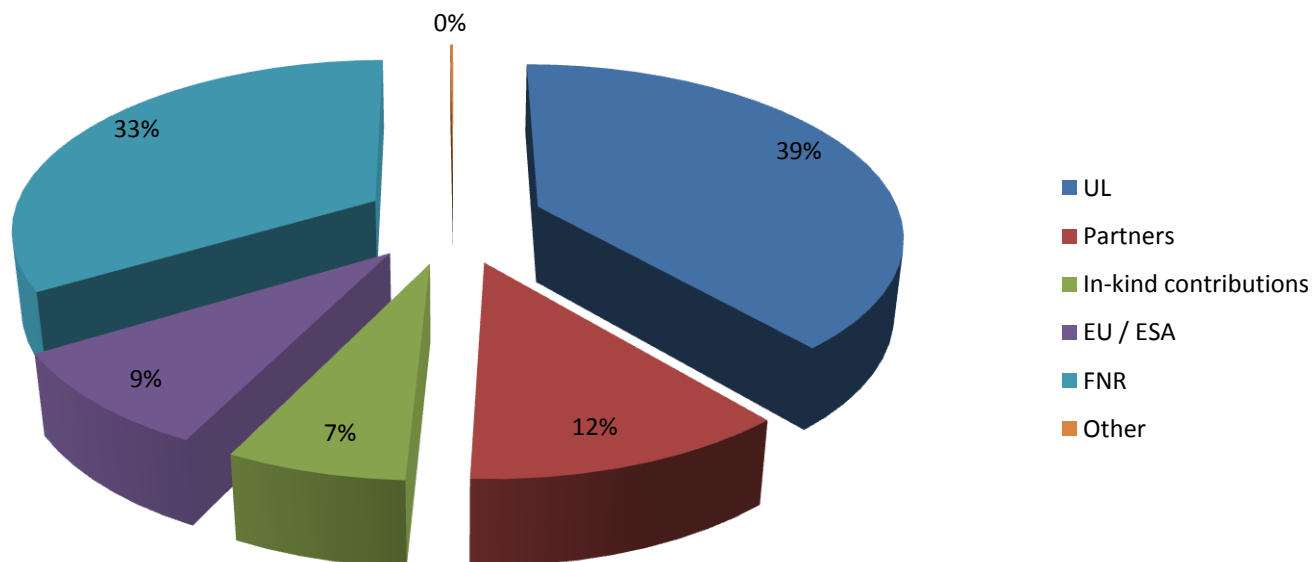


Income 2009-2013

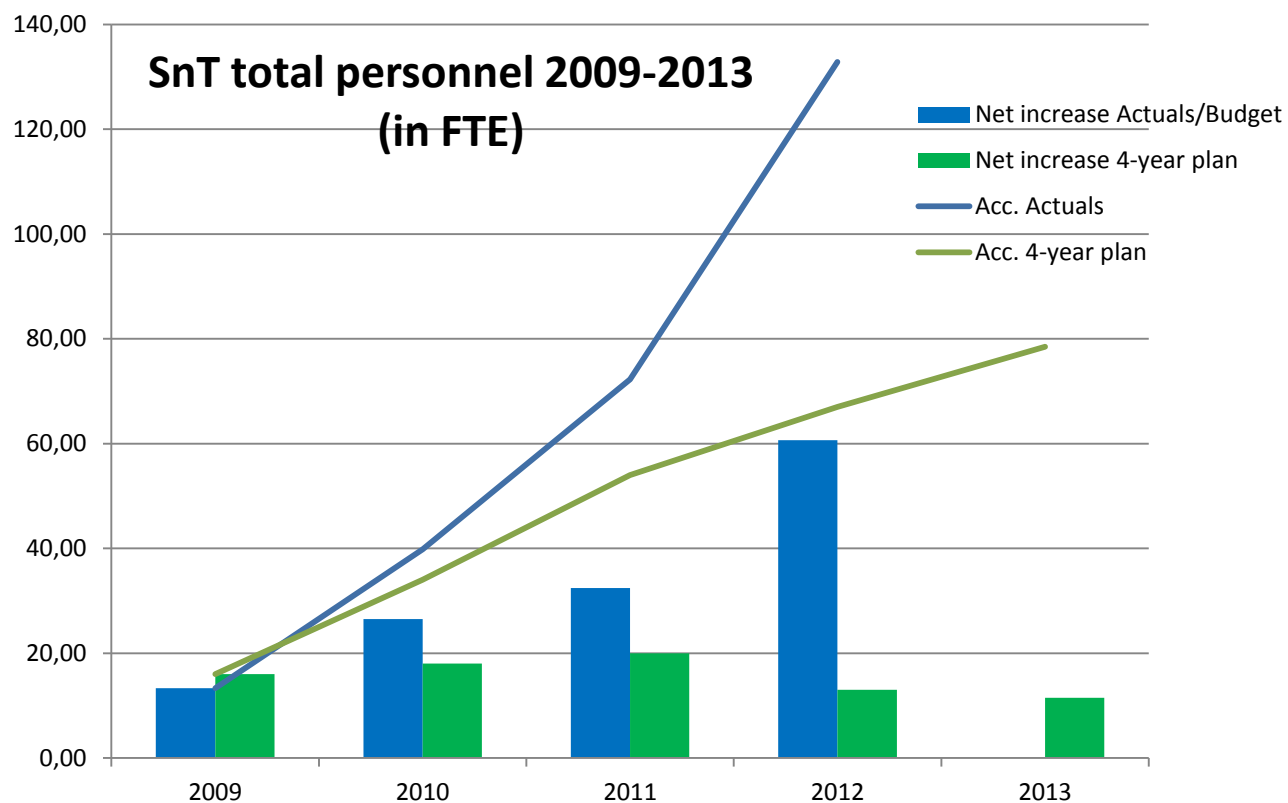


Income – 2011 Breakdown

Projections
Income breakdown



Personnel 2009-2013



SnT – Contacts

Visiting address

[Campus Kirchberg](#)

6, rue Richard Coudenhove-Kalergi

L-1359 Luxembourg

Email: snt@uni.lu

Web: <http://www.securityandtrust.lu>

