



Master Studies @ UNIK

Performing your Master Studies in Wireless Networks and Information Security

Josef Noll, Audun Jøsang, Øivind Kure, Leif Nilsen, Pål Orten, Abul
Kaosher, Torleiv Maseng, Paal Engelstad, Terje Tjelta, Lars
Bråten.....

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<http://cwi.unik.no> - <http://WNIS.unik.no>

Opportunities



- Tight collaboration with industry and Research Institutes

- ABB, Thales, Telenor, Akershus Energi
- FFI, Ife, NILU, Kjeller Innovasjon,



**ABB,
Akershus Energi**



FFI

- Applied cross-domain research

- Security for the Internet of People, Things and Services
- Wireless Industrial Sensors in Oil & Gas
- Smart Grid and renewable energy
- Autonomous systems

Torleiv Maseng, Lars Bråten, ...

FFI

Pål Orten, Judith Rossebø,
Mushfiq Chowdhury

ABB

Paal Engelstad

HiOA

Josef Noll, Audun Jøsang

Ifi

Terje Tjelta

Telenor

Abul Kaosher

NSN

Øivind Kure

NTNU

Leif Nilsen

Thales

- Excellent job opportunities

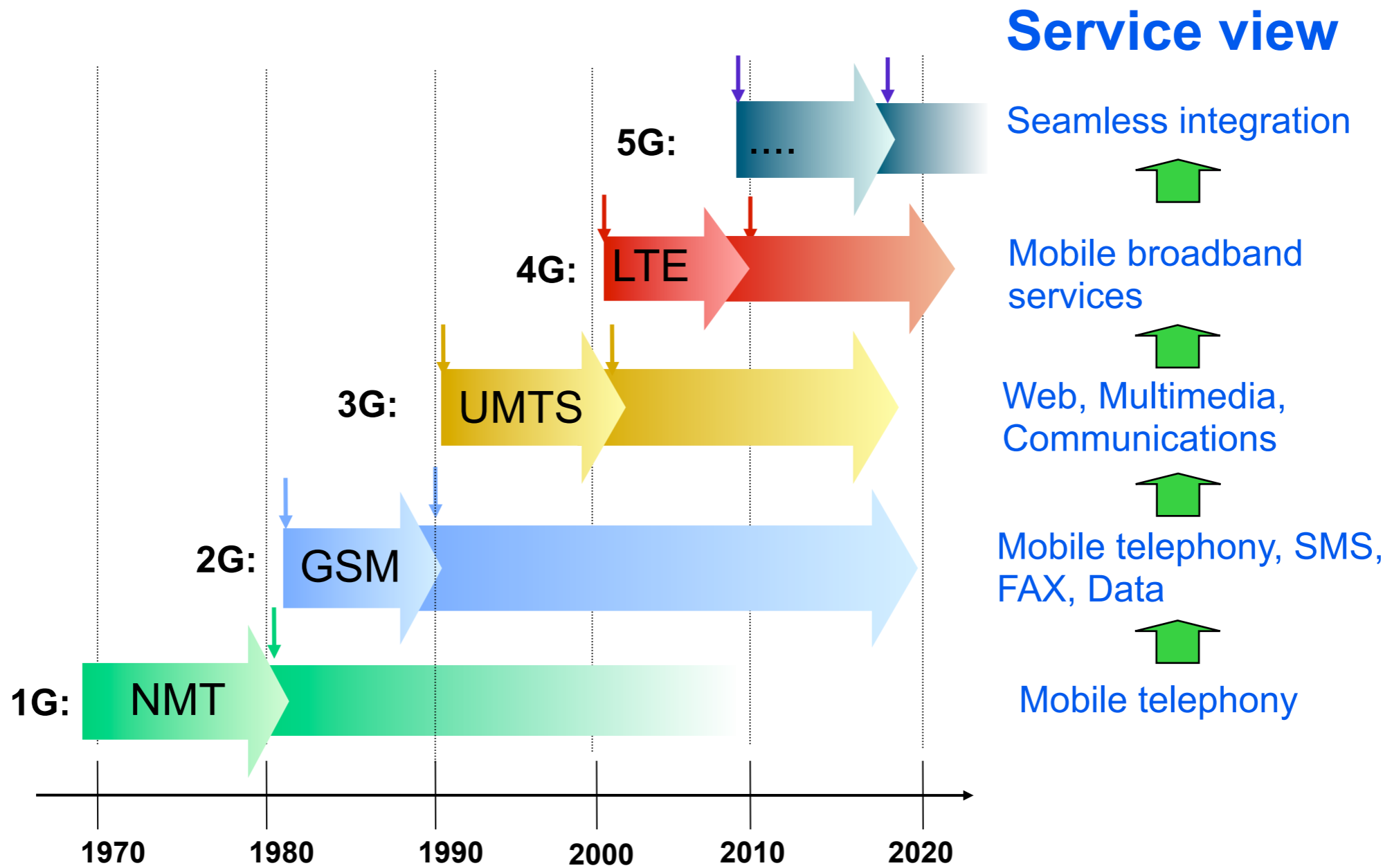
- UNIK alumni in industry
- Industrial track record of lecturers

Research Areas



Mobile Networks evolution

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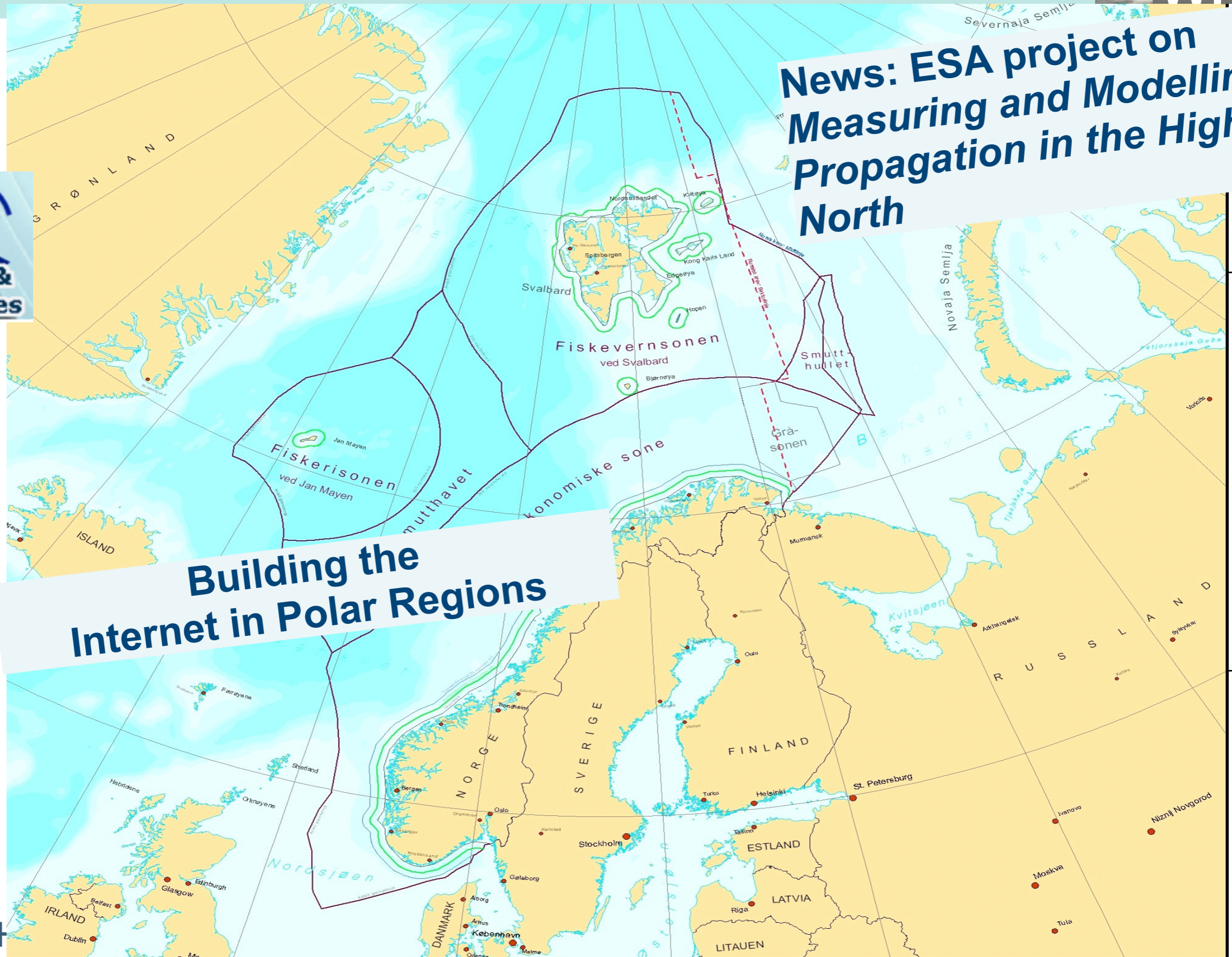
[adapted from Per Hjalmar Lehne, Telenor, 2000]

Communication in the North

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News: ESA project on Measuring and Modelling Propagation in the High North

Building the Internet in Polar Regions



Internet for Emerging Economies

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- “Internet is a social right”
- “The user owns the network”
- Network planning under new considerations:
 - WiMAX, LTE
 - Wifi
 - AdHoc
- Challenges
 - coverage
 - education

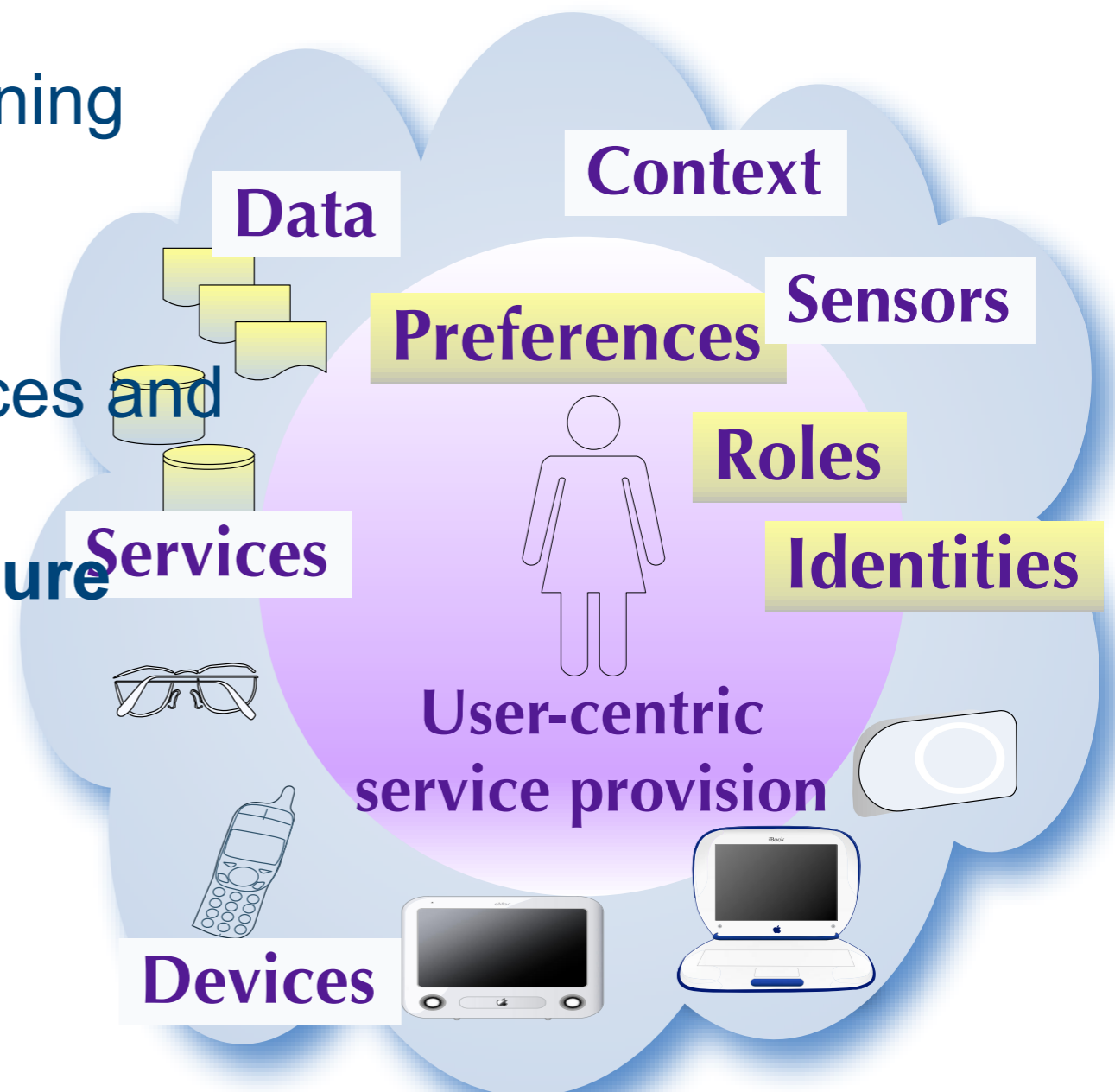


3rd wave of Internet

The Internet of People, Things and Services

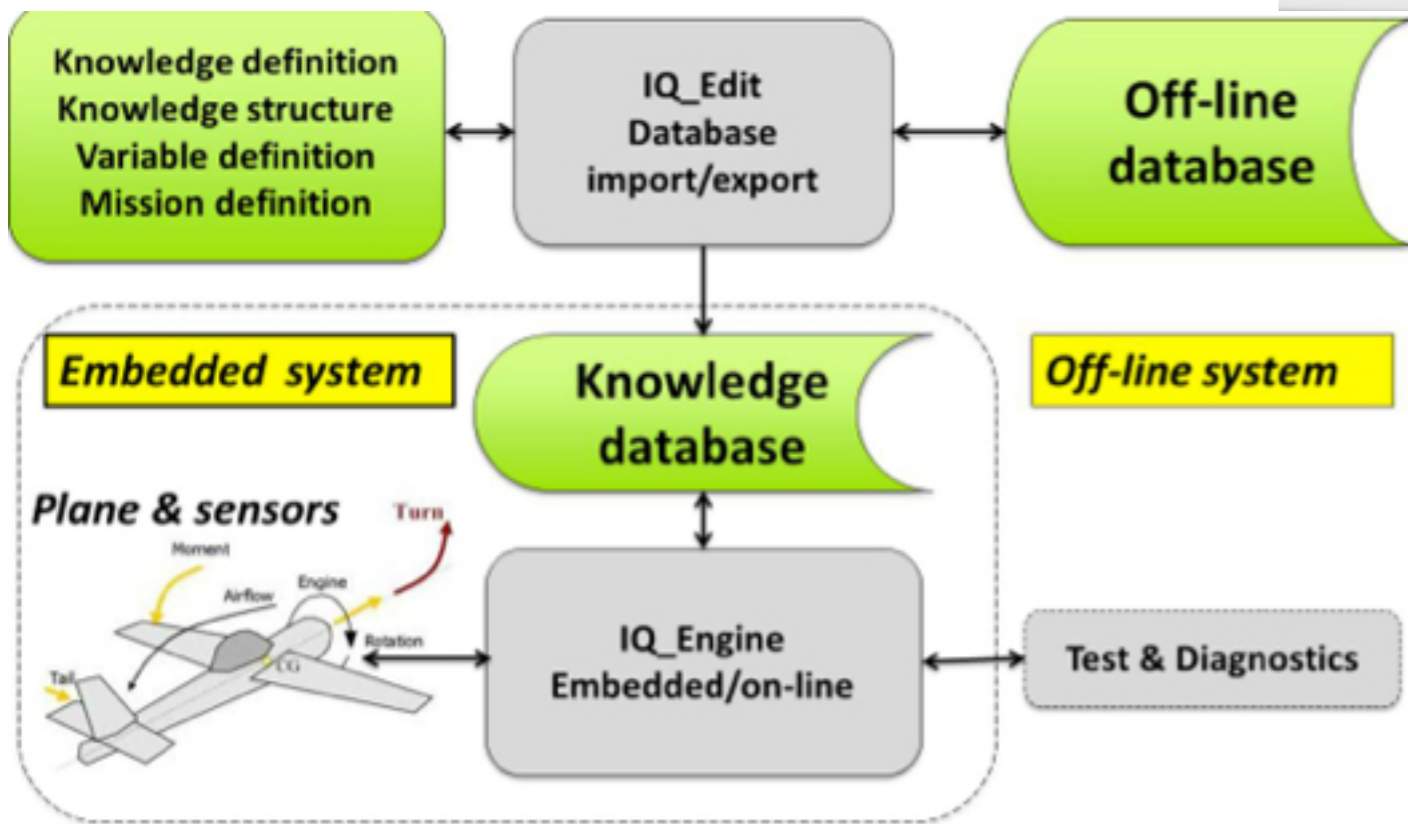
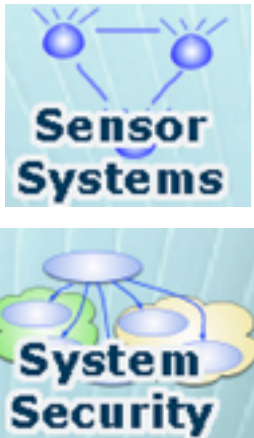


- An ever increasing complexity in the digital environment
-> **Hiding the complexity from the user**
- User-centric service provisioning
-> **Representing the user adequately**
- Connecting to sensors, devices and services
-> **Provide privacy and ensure trust relations**



Light-weight software for autonomous operations

- The challenge of UAV reconfigurability: certifying software
- Software certification: 50 US\$/line
- The novel concept: from **algorithms to search**



Local Presence context-aware information



- Information, Advertisement and Entertainment
- Context-aware and personalised

Transfer Information		
09:10 Oslo	DF1303	Cancelled
09:10 Athens	EZ7569	Cancelled
09:20 St Lucia	V8211	Cancelled
09:30 Sharm El Sheikh	TCX49K	Cancelled
09:30 Sharm El Sheikh	MOH408	Cancelled
09:30 Madrid	EZ75477	Cancelled
09:40 Hongkong	TCX44K	Cancelled
09:40 Charlotte	US733	Cancelled
09:40 Florence	62836	Cancelled
09:40 Toronto	TCX48K	Cancelled
10:00 Sharm El Sheikh	WQ121	Cancelled
10:00 Dublin	FR113	Cancelled
10:10 Atlanta	FR993	Cancelled
10:10 Madrid	AEX1014	Cancelled
10:20 Palermo	EZ75241	Cancelled
10:20 Chania	MOH402	Cancelled
10:40 Houston	TCX501K	Cancelled
10:40 Dublin	62835	Cancelled
10:50 Prag	EZ75233	Cancelled
11:00 Malaga	61954	Cancelled
11:10 Barcelona	EZ75133	Cancelled
11:15 Orlando	V8207	Cancelled
11:15 Budapest	EZ75443	Cancelled
11:20 Las Vegas	V8242	Cancelled
11:30 Montreal	EZ75323	Cancelled
11:30 Hongkong	AEX450	Cancelled
11:30 Innsbruck	EZ75181	Cancelled
12:00 Paris	EZ75211	Cancelled
12:00 Rome	EZ75255	Cancelled
12:10 Shannon	FR1183	Cancelled
12:20 Frankfurt	DF1341	Cancelled
12:30 Caye Caulk	TCX128K	Cancelled
12:30 Tripoli	61813	Cancelled
12:30 Montpellier	EZ75255	Cancelled
12:40 Athens	EZ75287	Cancelled
12:40 Munich	EZ75197	Cancelled
12:45 Montego Bay	V8268	Cancelled
13:00 St West-Keok	61918	Cancelled
13:00 Milan-Malpensa	EZ75259	Cancelled
13:10 Alga	61962	Cancelled
13:10 Venice	EZ75257	Cancelled
13:10 Dublin	FR115	Cancelled
13:20 Milan-Linate	EZ75255	Cancelled
14:00 Düsseldorf	61105	Cancelled
14:00 Munich	EZ75363	Cancelled
14:00 Edinburgh	EZ75255	Cancelled
14:10 Toulouse	EZ75227	Cancelled
14:15 Oslo	DF1305	Cancelled
14:10 Atlanta	28152	Cancelled
14:10 New	EZ75268	Cancelled
14:30 Queensry	60311	Cancelled
14:30 Cork	FR993	Cancelled
14:30 Innsbruck	62725	Cancelled
14:40 Chicago	EZ7567	Cancelled
14:40 Dublin	EG43	Cancelled
14:50 Amsterdam	62704	Cancelled
15:10 Geneva	FR928	Cancelled
15:20 Isle of Man	62176	Cancelled
15:40 Barcelona	EZ75136	Cancelled
15:50 Cologne	EZ75217	Cancelled
16:10 Jersey	60347	Cancelled
16:20 Newcastle	60488	Cancelled
16:20 London-Heathrow	60353	Cancelled
16:20 Belfast City	60349	Cancelled
16:20 Malaga	28142	Cancelled
16:30 Queensry	60312	Cancelled
16:30 Hongkong	61904	Cancelled
16:40 Lisbon	EZ75458	Cancelled
16:50 Madrid	EZ75479	Cancelled
17:10 Rome	EZ75257	Cancelled
17:20 Chicago	V8478	Empire state

Oslo: gate 51 (on time), boarding in 30 min, 5 min walk
Zürich: gate 89 (on time), boarding in 2 hours, 10 min walk

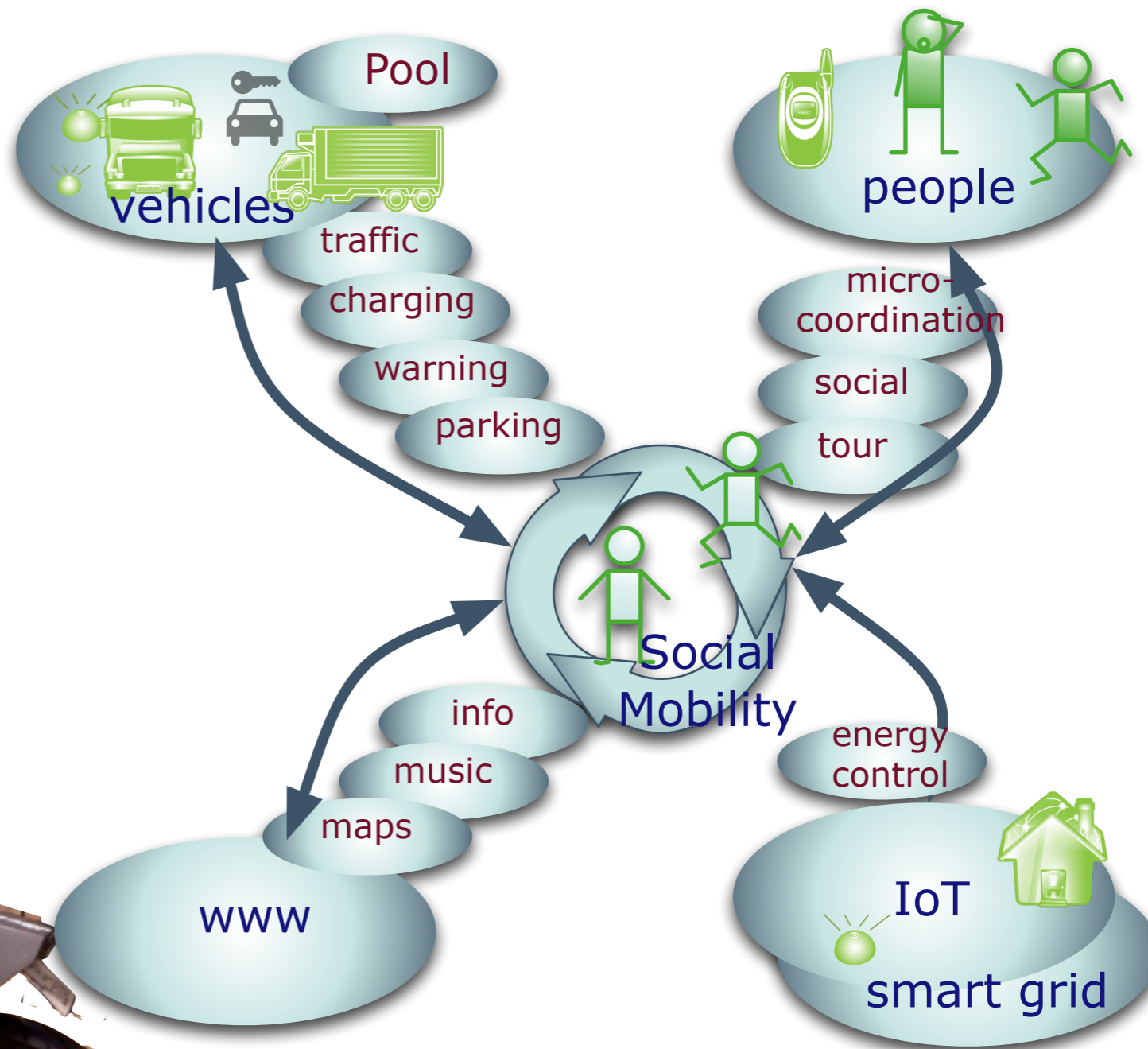
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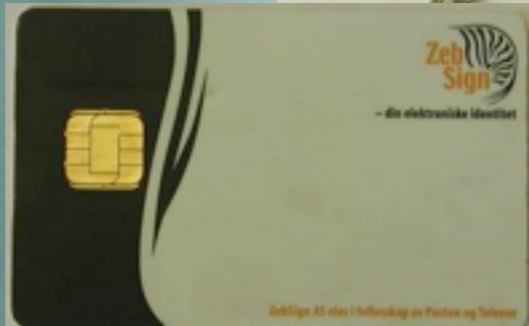
Socialtainment



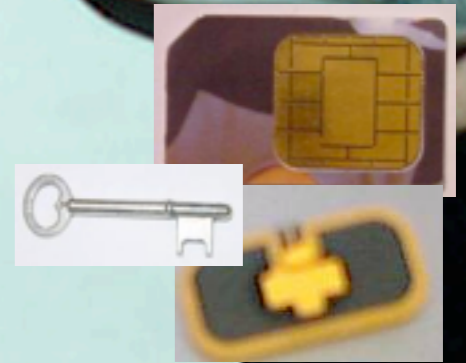
- Entertainment
- Infotainment
- Socialtainment



My phone is my digital identifier



the mobile phone as a gateway and integrator



SIM with NFC & PKI

Monitoring Air Quality

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- Measuring particles/molecules
- Model for air pollution
- phone based health information

EU project on Mobile Monitoring of Air Quality **NILU**

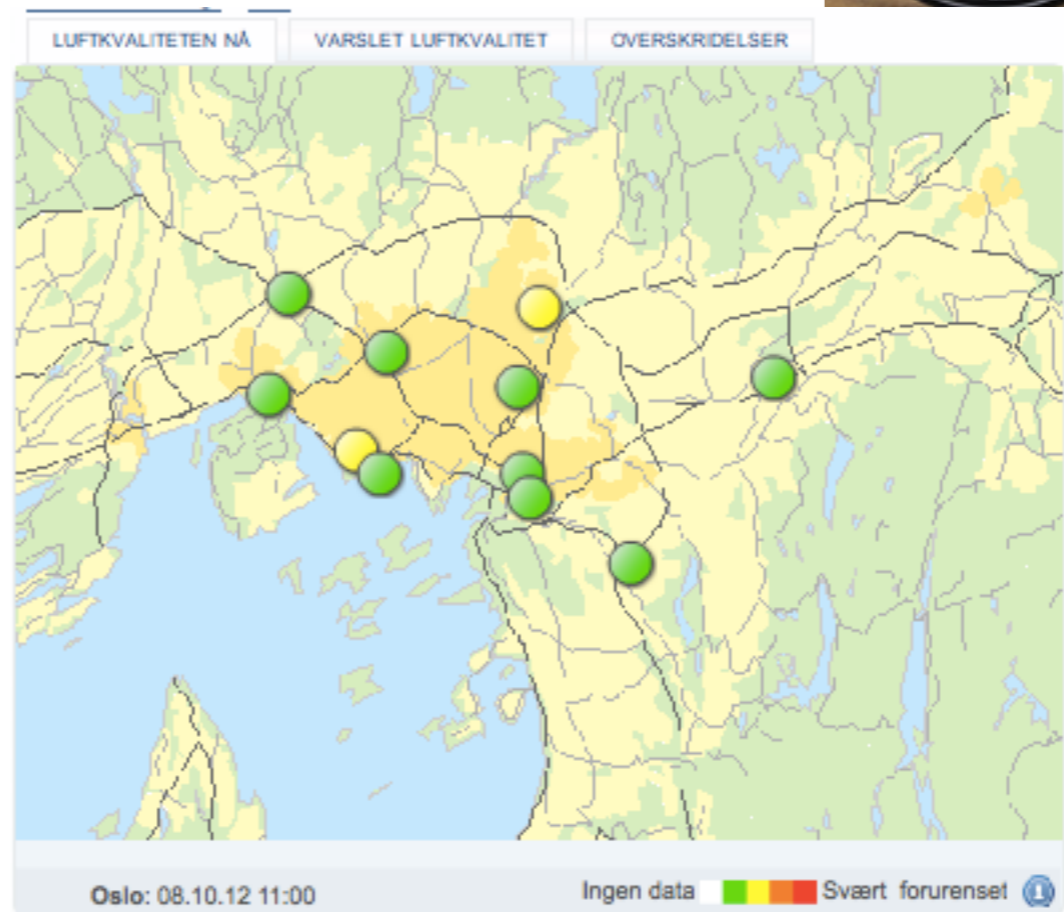


Luftkvalitet

Her kan du finne informasjon om luftkvalitetet.

Helseeffekter

Forurensning kan skape negative helseeffekter, spesielt hos sårbare grupper.





App on mobile phone



Wireless Networks Courses

The logo for the Wireless Networks Institute of Science (WNIS) is located in the top right corner. It consists of the letters 'WNIS' in a bold, white, sans-serif font, set against a dark grey rectangular background. The background image of the logo is a scenic view of a canal in Venice, Italy, with buildings and a bridge in the distance.

	Focus on Network technologies 
UNIK4100	Satellite Communications
UNIK4170	Digital Communications
UNIK4190	Information theory and error control
UNIK4200	Multicasting, routing and service quality
UNIK4230	Mobile Communications
UNIK4290	Mobility in the Internet
UNIK4730	Service-oriented Architecture Implementation
UNIK4740	Information Security in industrial Sensor and Mobile Systems

<http://WNIS.unik.no>
for further info

	Focus on Radio technologies 
UNIK4100	Satellite Communications
UNIK4150	Antennas and radiowave propagation
UNIK4170	Digital Communications
UNIK4230	Mobile Communications
UNIK4700	Radio and Mobility
UNIK4710	Mobile Service Delivery
UNIK4740	Information Security in industrial Sensor and Mobile Systems

Examples of study plans



Example of a study plan with a long thesis for a focus on **Radio Technologies**

4. semester	Master thesis		
3. semester	Master thesis		
2. semester	UNIK4150 Antennas, Propagation	UNIK4230 Mobile Communications	UNIK4710 Mobile, Context-aware
1. semester	UNIK4700 Radio, Mobility	UNIK4100 Satellite Communications	UNIK4740 Security, Sensor
	10 ECTS credits	10 ECTS credits	10 ECTS credits

Example of a study plan with a long thesis for a focus on **Network Technologies**

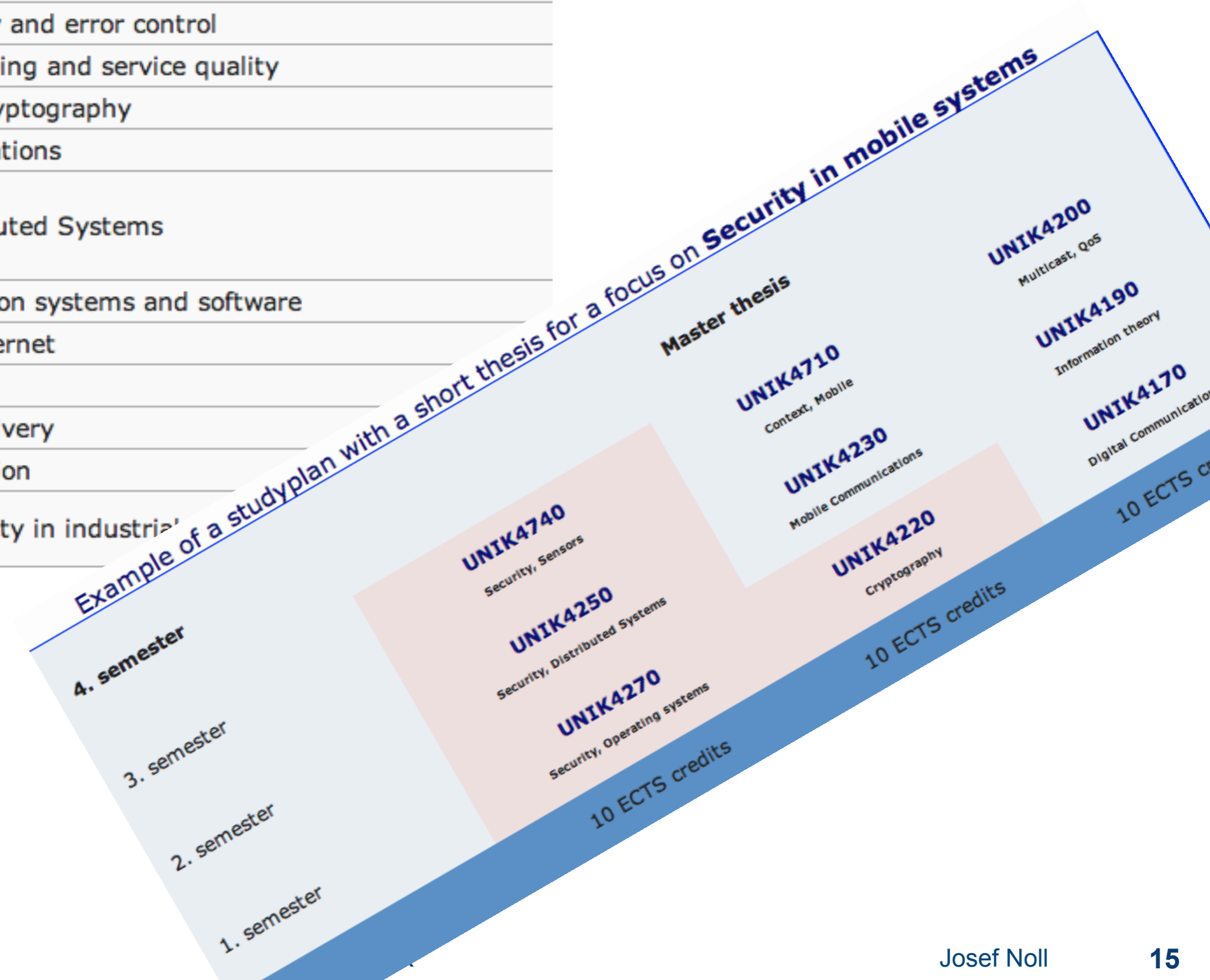
4. semester	Master thesis		
3. semester	Master thesis		
2. semester	UNIK4190 Information theory	UNIK4230 Mobile Communications	UNIK4290 Mobility, Internet
1. semester	UNIK4200 Multicasting, Service Quality	UNIK4100 Satellite Communications	UNIK4170 Digital Communications
	10 ECTS credits	10 ECTS credits	10 ECTS credits

Information Security Courses



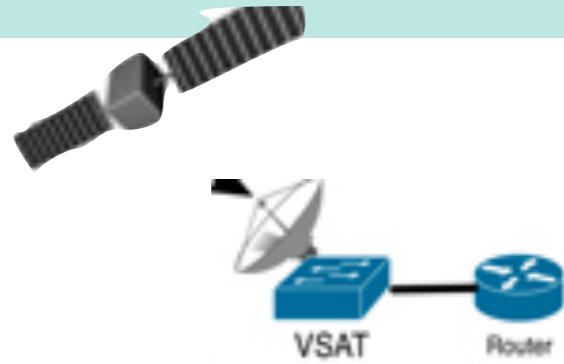
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☒	Information Security related courses ☒
UNIK4170	Digital Communications
UNIK4190	Information theory and error control
UNIK4200	Multicasting, routing and service quality
UNIK4220	Introduction to Cryptography
UNIK4230	Mobile Communications
UNIK4250	Security in Distributed Systems
UNIK4270	Security in operation systems and software
UNIK4290	Mobility in the Internet
UNIK4700	Radio and Mobility
UNIK4710	Mobile Service Delivery
UNIK4720	Trust and Reputation
UNIK4740	Information Security in industrial

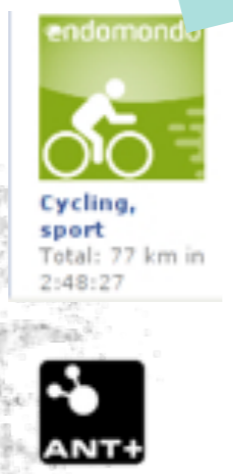
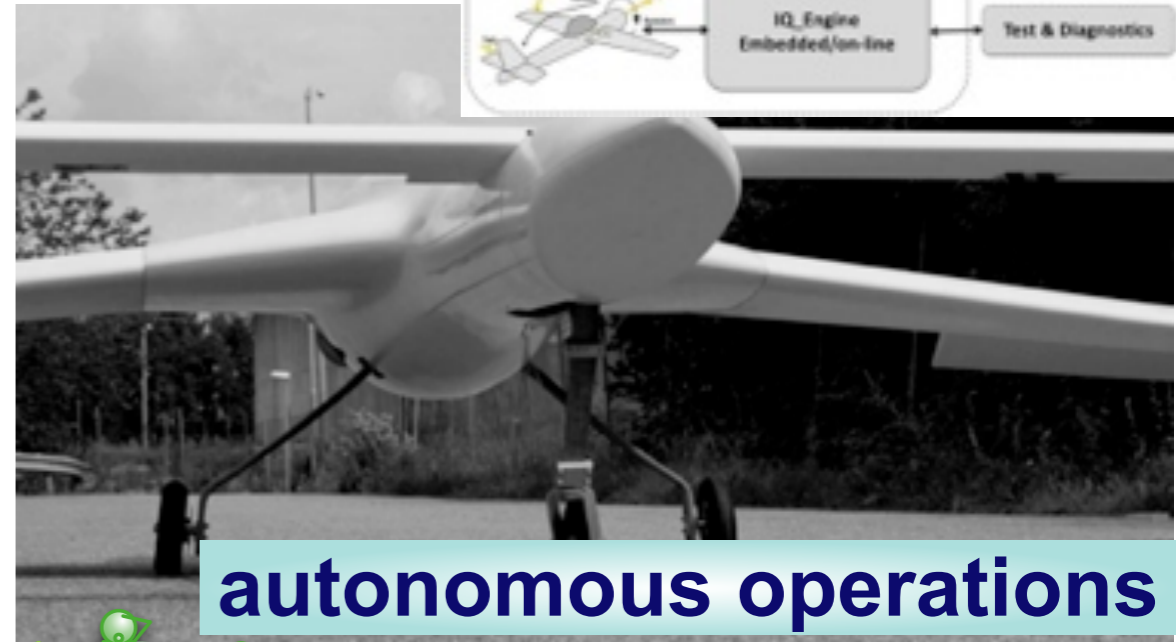


Opportunities

WNIS



see more at:
<http://WNIS.unik.no>





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Wireless Networks & Information Security



<http://WNIS.unik.no> - <http://www.unik.no>