



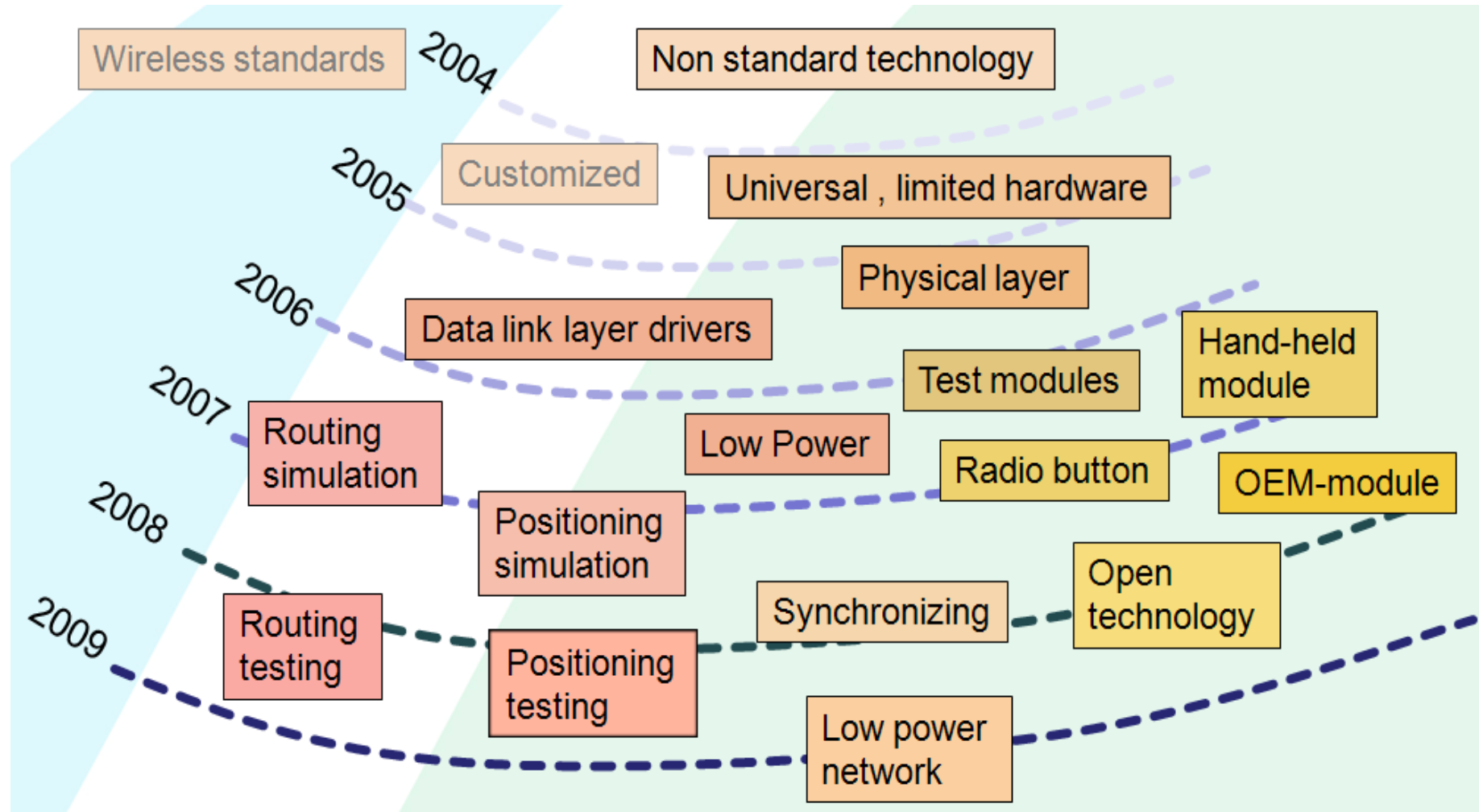
Seinäjoki University of Applied Sciences

The wireless research projects

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The flow of wireless research



Research resources

Fees:

Seinäjoki Science Park

The Centre of Smart Technology Expertise

Seinäjoki University of Applied Sciences

Research period for lecturer

Scientific research fees

Project courses

Student thesis

Manpower: lecturer(s) and students

(Very limited resource technology with very limited research resources)

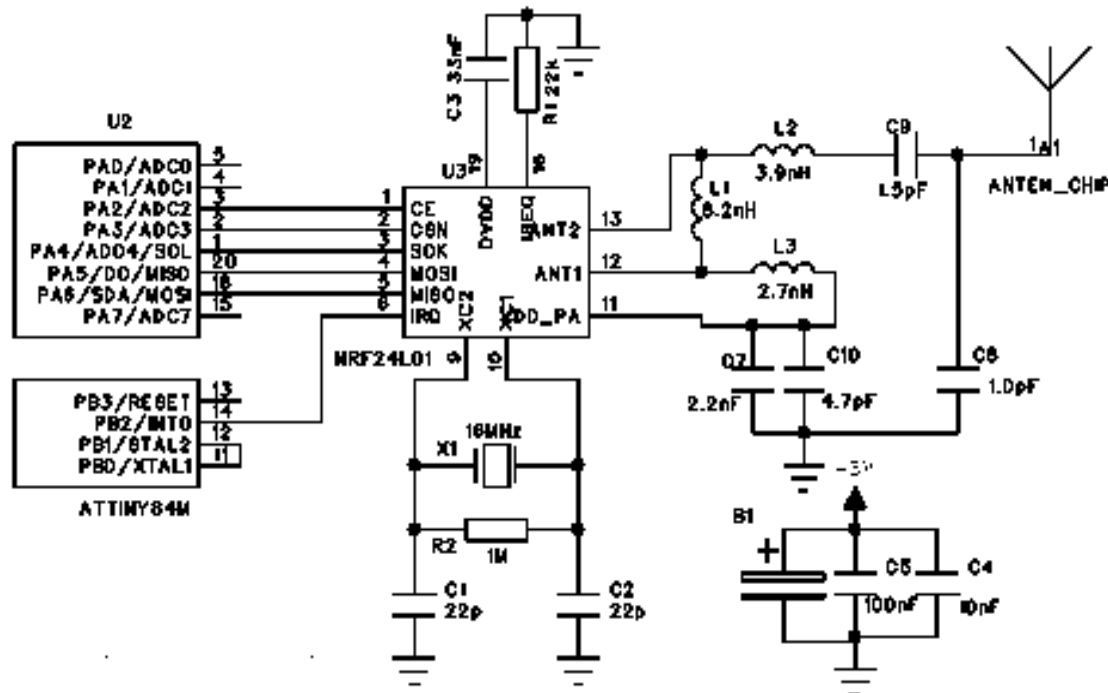
The comparison of chips

	Bluetooth STLC2500C	ZigBee AT86RF230	nRF24L01
Pin count	46	32	20
Size / mm	4.5 x 4.5	5 x 5	4 x 4
PowerDown current	1 μ A	0.1 μ A	0.9 μ A
Max. current	35.4 mA	17 mA	12.3 mA

Connection schema

ATtiny84

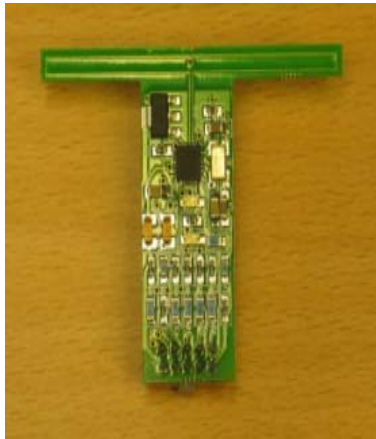
nRF24L01



Minimized layouts



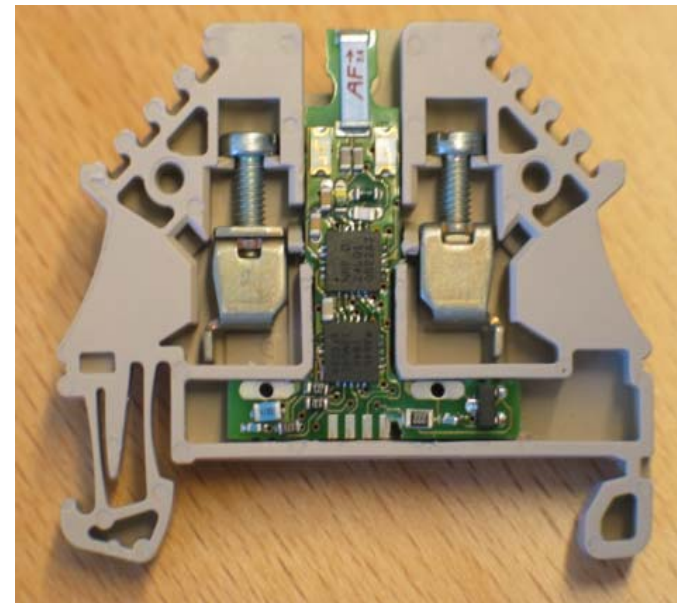
Software development kit



Key chain and hand-held module



USB interface and DIN-rail connector



Simple drivers

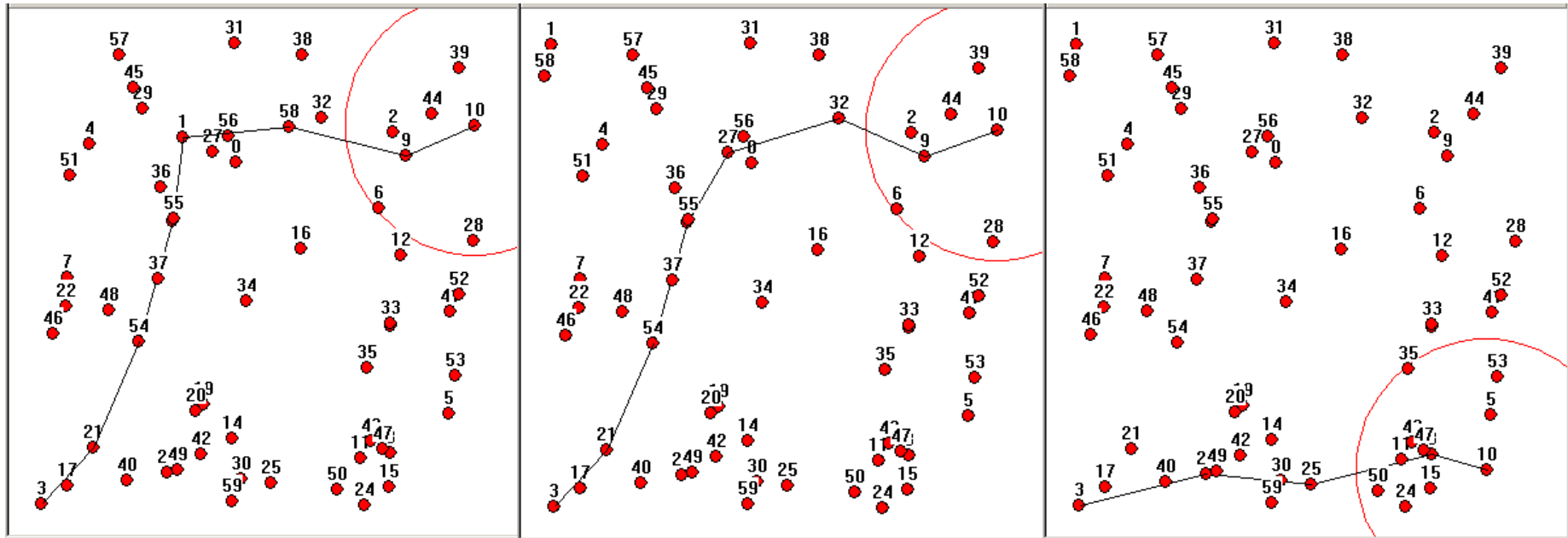
- `void initRF(unsigned char channel, unsigned int myaddr);`
- `unsigned char receiveON(void);`
- `signed char receiveRF(unsigned char *dat);`
- `unsigned char sendRF(unsigned int addr, unsigned char *data);`

Low power

	Power supply / Crystal	Average current	Battery capacity / 3 year
External triggered	2,0 V / 1 MHz	1.05 μ A	28 mAh
External triggered	3.0 V / 4 MHz	1.4 μ A	37 mAh
Internal timed	2,0 V / 1 MHz	6.4 μ A	165 mAh
Internal timed	3.0 V / 4 MHz	6.8 μ A	178 mAh
Synchronized	2.0 V / 1 MHz	164 μ A	4320 mAh
Synchronized	3,0 V / 4 MHz	516 μ A	13580 mAh

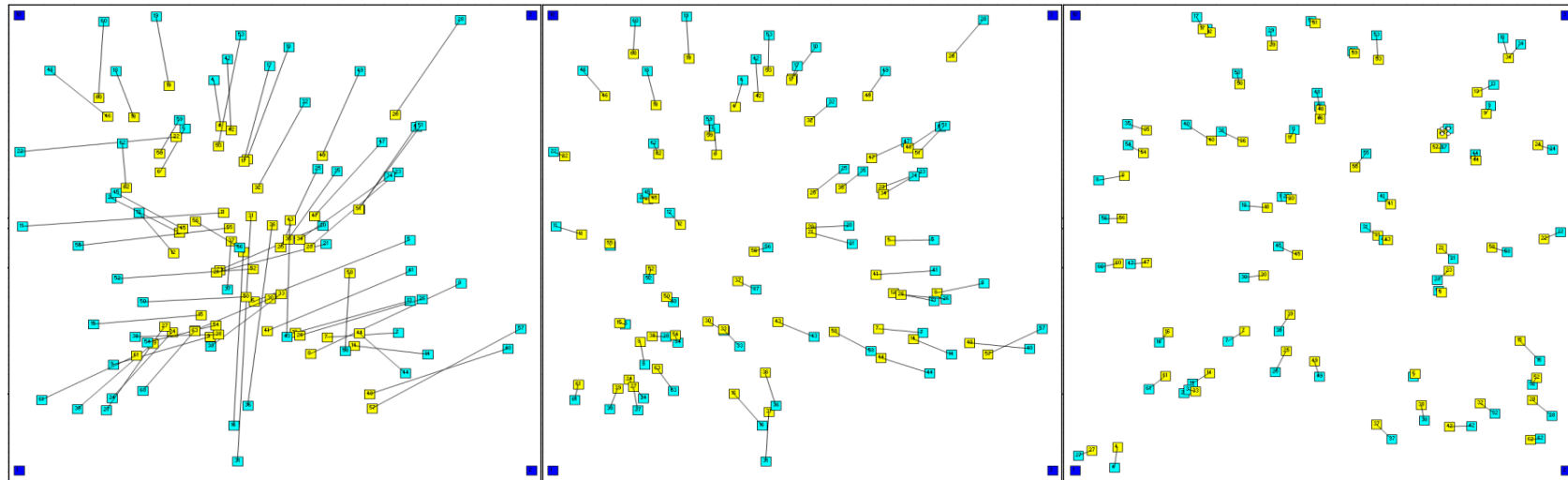
Routing simulation

Developed from Direct Diffusion method

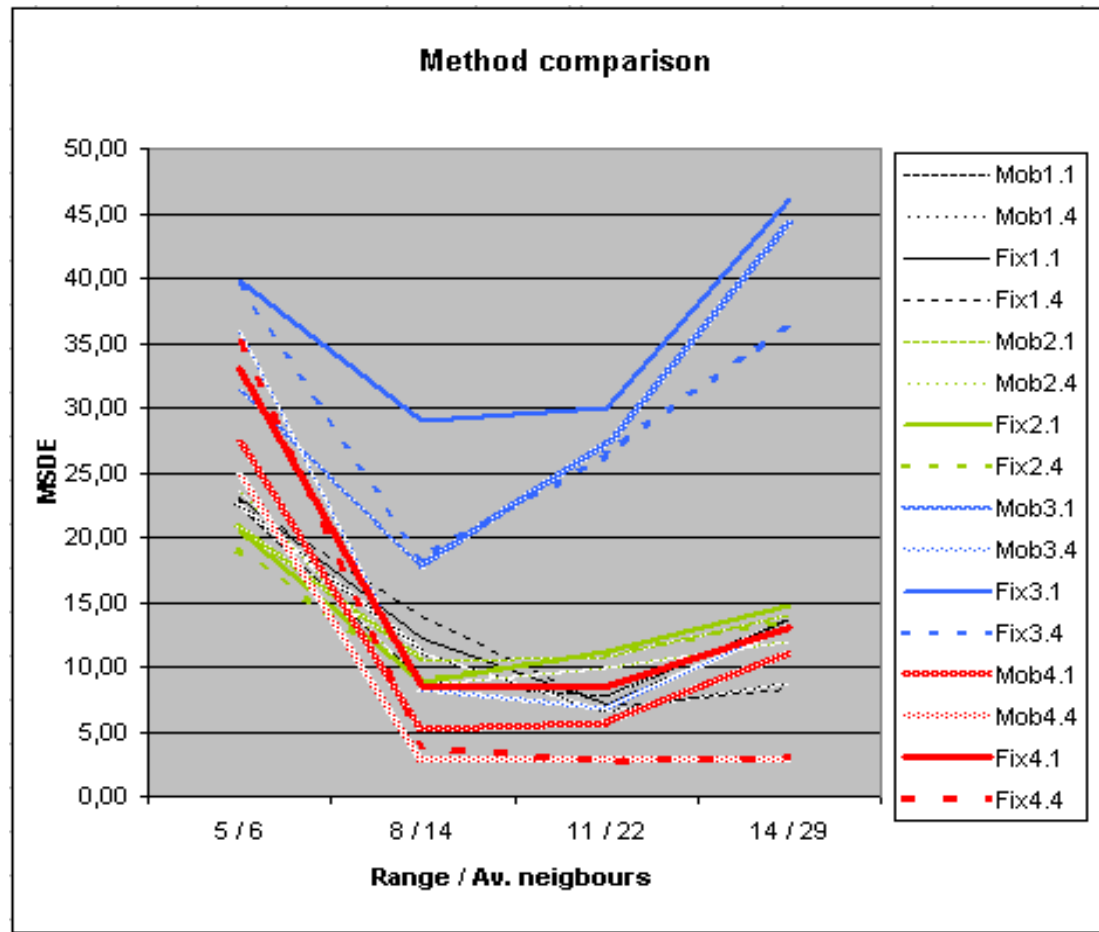


Positioning simulation

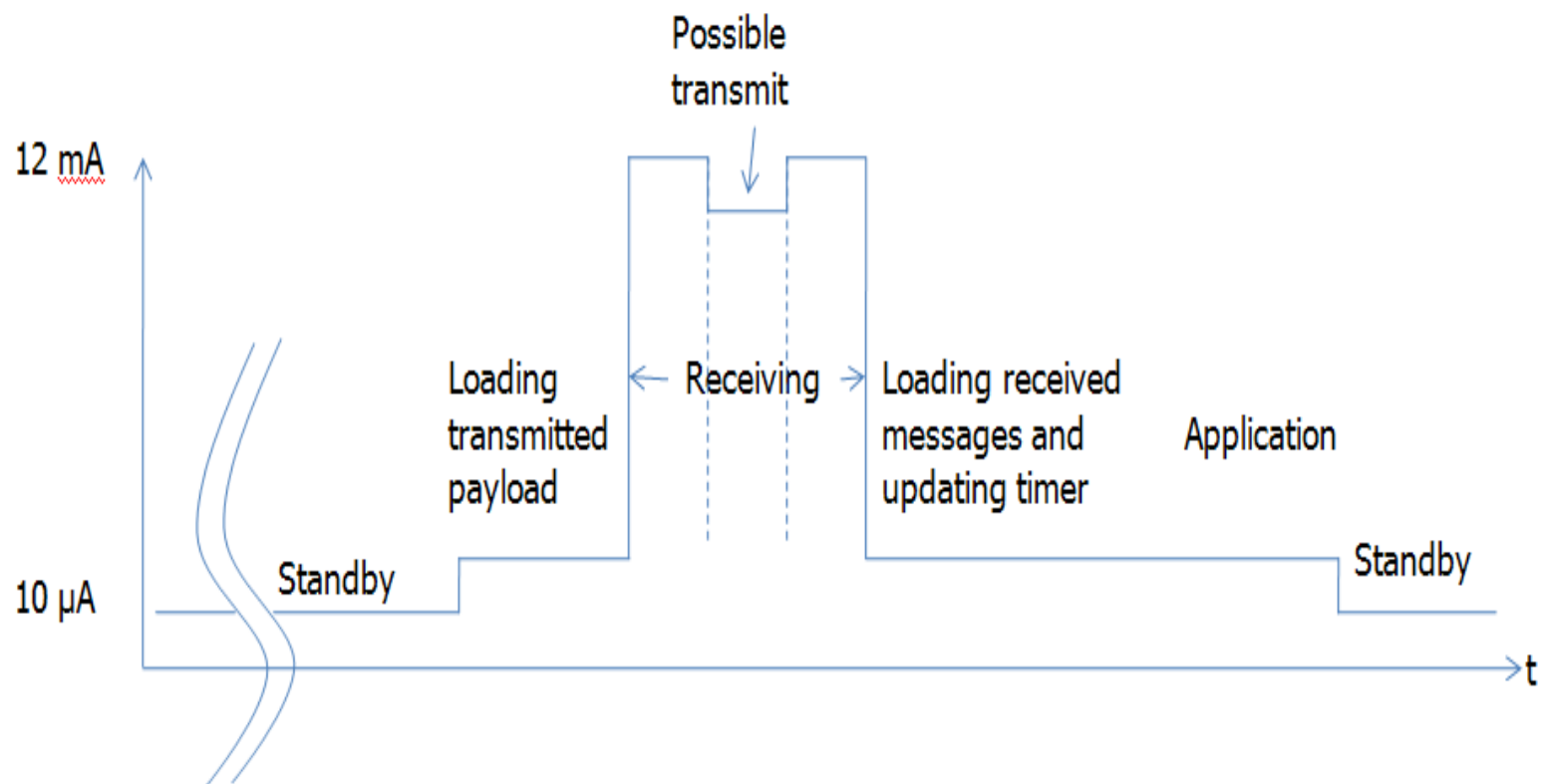
Mean value and incremental methods



Positioning method comparison



Synchronization



Current and pending wireless application projects

- Simple party game for children (demonstration done)
- Area control of demented old people
- Exercise strategy game
- Automatic tool rent storage
- Fee-paying area monitoring (Golf course etc.)

Future wireless application projects

- Children monitoring in day-care centre
- Animal monitoring with sensors
- Learning and orienteering routes
- Distributed automation
- Object positioning (storages, harbours)



More data ?

http://www.seamk.fi/in_english.iw3

_____ Main pages

<http://lompsa.seamk.fi/sulautetut/systems>

_____ R&D in embedded

Thank you for interest !

