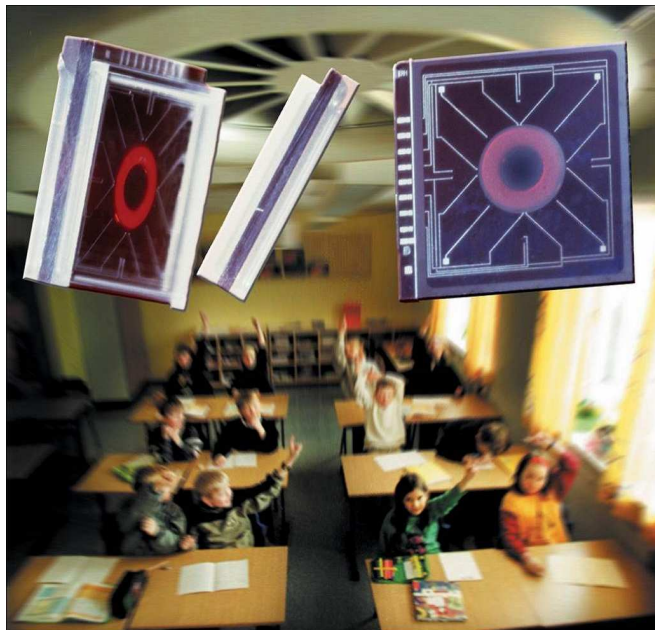


# Innovations in HVAC



## MONTIE Workshop in Helsinki

Tuesday 7 November 2006

Hotel Radisson SAS, Espoo

MONTIE workshop  
Espoo, Finland, 7 November 2006



# Workshop agenda

## Welcome and introduction (and a little background about the MONTIE initiative)

*Jorma Säteri, FiSIAQ*

## Trends and drivers for innovating HVAC installations and control techniques

*Andy Drysdale, Danish Technological Institute*

## Future requirements for the energy efficient indoor environment

*Olli Seppänen, Helsinki University of Technology*

## HVAC installation in the future. Possibilities, methods and trends.

*Jens Møller Jensen, Danfoss A/S*

## Metrology research trends related to temperature and humidity sensing

*Jan Nielsen, Danish Technological Institute*

## IAQ (indoor air quality) sensorics today and tomorrow

*Bertil Hök, Hök Instrument AB, Peter Østbø, SINTEF and Per Gløersen, Infineon Technologies SensoNor AS*

## Questions, discussion – and lunch

A little background about the MONTIE initiative



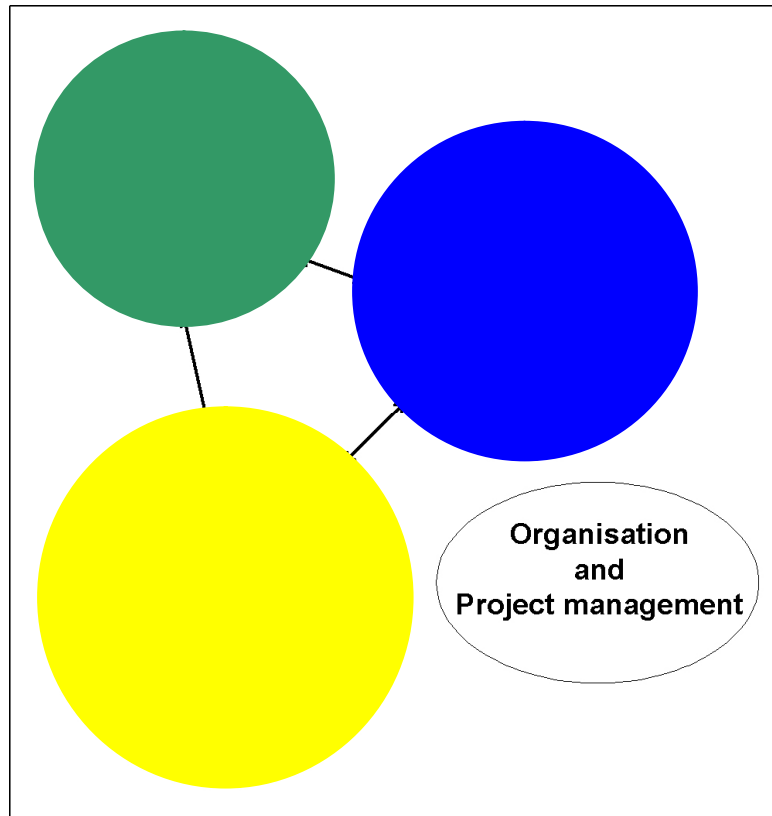
# What is the MONTIE initiative?



**M**ulti-sensors and **O**ther  
**N**ew **T**echnology for  
**I**mproved indoor  
**E**nvironment in buildings

- A consortium of Nordic partners
- Funding from the Nordic Innovation Centre 2004 - 2006
- Increase focus on Indoor Air Quality (IAQ). Spread knowledge about its importance
- Address the current, and future uses, of advanced multi-sensors
- Initiate technological developments to support improved HVAC systems
- Encourage the conversion of expert academic knowledge into practical applications and use.

# What are the goals of the MONTIE initiative?



## Main activities


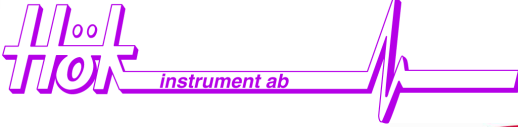







Information dissemination about:

- The importance of IAQ
- The advantages gained from using micro-sensors and other new technology

Increased information/awareness will:

- Initiate coherent efforts to increase the level of knowledge about IAQ
- Initiate and boost the number of IAQ – and IAQ related - development activities
- Increase business and commercial export opportunities

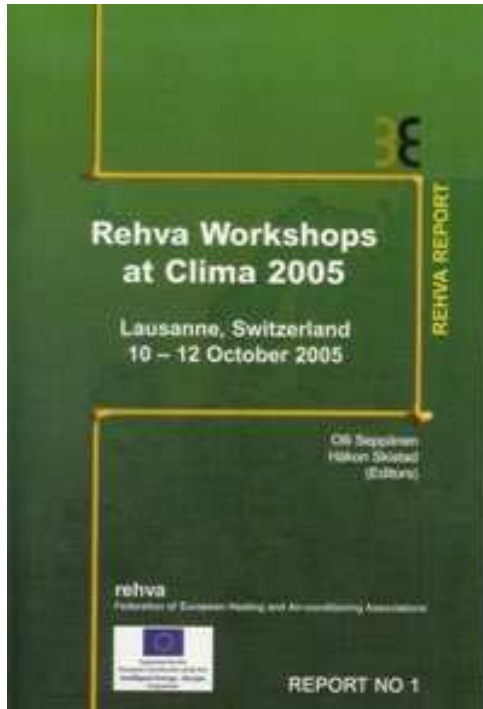
# The partners in MONTIE

- Danfoss A/S (DK) 
- Hök Instrument AB (SE) 
- Infineon Technologies SensoNor A/S (NO) 
- The Finnish Association of HVAC Societies (FINVAC) (FIN) 
- Finnish Society of Indoor Air Quality and Climate (FiSIAQ) (FIN) 
- SINTEF IKT (NO) 
- The Technical University of Denmark International Centre for Indoor Environment and Energy (DK) 
- Danish Technological Institute (DK) 
- Nordic Innovation Centre 





# Main activities so far



## Technological advances for controlling indoor environment

A TWO-DAY INTERNATIONAL WORKSHOP ON STATE-OF-THE-ART TECHNOLOGY, WORLD-CLASS RESEARCH AND NEW BUSINESS OPPORTUNITIES



Danish Technological Institute, Taastrup, Denmark

Thursday 24 – Friday 25 November 2005

- Key note and technical presentations
- Combined poster session and exhibition
- Networking



Micro Structure Workshop · 9-10 May · Västerås · Sweden

### General information

Log on to our website  
[www.minst.nu/msw2006](http://www.minst.nu/msw2006)  
 for more details on:

- Registration
- Call for papers
- Practical details

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MSW is a forum for those interested in MEMS and MST. Our mission is that MSW will be a creative catalyser and a place to meet for industry, suppliers, financiers and researchers, and that it will be the seed to a network between the most important national actors. An informal atmosphere and many opportunities for discussions and to form new contacts characterize MSW.

MSW will show the dynamics and width in applications of the MEMS area. Innovators can show their new ideas, SMEs can demonstrate their new products, applications and processes, and researchers can present their interesting new results.

MSW is intended not only for those working actively in the area, but equally well for those in both industry and academy that have a general interest in MEMS/ MST. We expect that more than half the participants will come from industry. Participants from all countries are welcome.

MSW's programme will have a strengthened industrial profile in order to represent the general trends and maturity of the area. Welcome to MSW 2006!



## EUROSENSORS XX

Second call for papers  
**Final announcement**

Welcome to  
**20th Anniversary of Euroensors**  
 17-20 September 2006  
**Göteborg, Sweden**

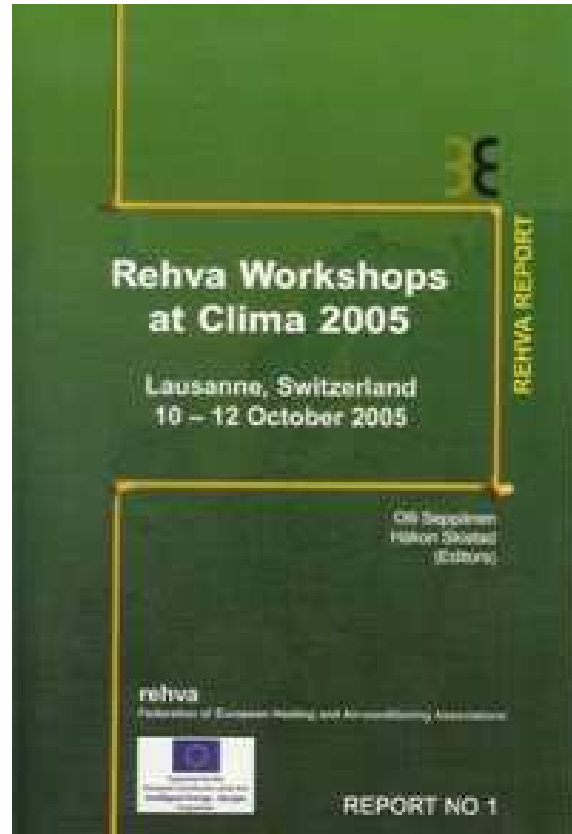
[www.euroensors2006.com](http://www.euroensors2006.com)



MONTIE workshop  
 Espoo, Finland, 7 November 2006



# Main activities so far - 1



## Clima 2005

- Key-note and short presentations, poster sessions and workshops on scientific trends and practical developments in HVAC technologies
- Included a MONTIE workshop presenting MONTIE ideas and ambitions

## MONTIE workshop programme

- Summaries of state-of-the-art (Nordic) technology on sensors
- Applications of these sensors for the measurement and demand based control of IAQ
- Discussion forum (more than 40 participants) to discuss the future needs for development and dissemination.

[www.rehva.com/workshops/index.html](http://www.rehva.com/workshops/index.html)



## Main activities so far - 2

 **norden**  
Nordic Innovation Centre

 **MONTIE**  
Multisensors and Other New Technology for Improved indoor Environment in buildings

**Technological advances for controlling indoor environment**

A TWO-DAY INTERNATIONAL WORKSHOP ON STATE-OF-THE-ART TECHNOLOGY, WORLD-CLASS RESEARCH AND NEW BUSINESS OPPORTUNITIES



Danish Technological Institute, Taastrup, Denmark  
Thursday 24 – Friday 25 November 2005

- Key note and technical presentations
- Combined poster session and exhibition
- Networking

### “MONTIE” conference on Technological advances for controlling indoor environment

- Focus on "State-of-the-art" technology
- Key-note presentations on user-driven issues and invited presentations on technology-driven issues

### Programme

- IAQ, sensors and measurements, wireless communication and other new technology
- Intelligent HVAC installations and installation technology, including the use of sensors and coupling with Facility Management issues and security aspects
- New business opportunities and challenges
- Innovative solutions

[www.teknologisk.dk/montie](http://www.teknologisk.dk/montie)

# Main activities so far - 3



## MSW 2006

Micro Structure Workshop · 9-10 May · Västerås · Sweden

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## Micro Structure Workshop

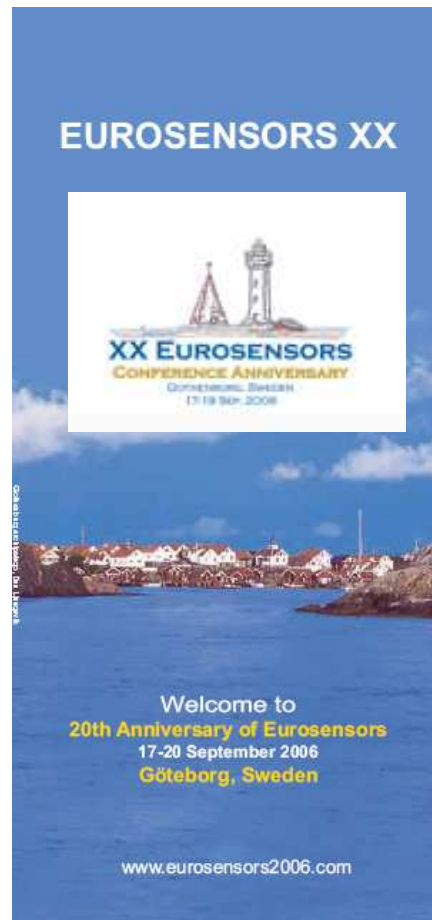
- A forum for those interested in MEMS and MST. Aimed at acting as a catalyst and a place to meet for industry, suppliers, financiers and researchers.
- Key-note presentations and invited presentations on a wide range of topics. Posters and exhibition.
- Strong industrial participation.

## Programme

- MEMS and MST
- A “thematic overview” during a session on “industrialisation” aimed at presenting the current status for the MONTIE initiative, and to inspire innovative thoughts for possible new applications for (MEMS) sensors!

[www.minst.nu/msw2006](http://www.minst.nu/msw2006)

# Main activities so far - 4



## Euroensors 2006

- Major European conference – the only one covering the entire field of sensors, actuators and microsystems. Aimed at scientists and engineers from academy, national research institutes and industry
- Key-note presentations and invited presentations on a wide range of topics. Comprehensive poster session.
- Included a MONTIE workshop

## MONTIE workshop programme

- Future sensorics for indoor environment measurement and control applications
- Presentations focusing on “the user perspective” to discuss with the “sensor research community” representatives present at the workshop.
- Discussion forum with about 40 participants
- [www.mc2.chalmers.se/conferences/EUROSENSORS2006/](http://www.mc2.chalmers.se/conferences/EUROSENSORS2006/)

## Main activities so far - 5



### Eurosensors 2006

- Major HVAC Exhibition in Norway with strong representation from HVAC suppliers, manufacturers, contractors and consultants
- A number of seminars and courses held parallel to the exhibition
- Included a MONTIE workshop

### MONTIE workshop programme

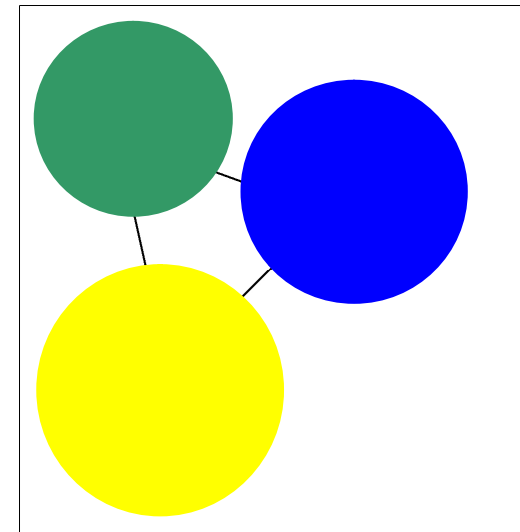
- Future sensorics for indoor environment measurement and control applications
- Presentations focusing on “the sensor user perspective” to discuss with the “HVAC user community” representatives present at the workshop.
- Discussion forum
- [www.vvs-dagene.no](http://www.vvs-dagene.no)

## Background

- The importance of indoor air quality (IAQ) in buildings is indisputable
- IAQ significantly impacts occupants' comfort, health and productivity
- Potential savings and productivity gains are enormous
- Traditional building HVAC control strategies are often insufficient

# New control strategies for indoor environment

- New, promising control strategies are emerging
  - reliable, accurate and inexpensive sensors to measure key IAQ parameters are becoming widely available
  - Processes such as “Constant Commissioning”, an ongoing process to resolve operating problems, improve comfort, optimize energy use and identify retrofits
- They need to be combined with methods of using these measurements in HVAC control strategies.





## The goal of this workshop

- To summarise state-of-the-art technology on sensors and their application for the objective measurement and demand based control of indoor air quality.
- Speakers will focus on presenting **“the user perspective”** to the representatives from the HVAC industry
- To initiate discussions about the future needs for development work and information dissemination activities.