Work-shop and Brokerage Event

ICT and new integrated Processes – buildingSmart

Oslo, Norway, May 7 and 8, 2007

Results and analyses
1 Introduction

The 2\textsuperscript{nd} EurekaBuild workshop and brokerage event took place in Oslo, Norway on May 7-8 2007. The theme for this event: \textit{ICT and new integrated processes}.

This was one in a series of planned workshops aiming at launching Eureka projects within the European construction sector. EurekaBuild, \url{www.cetp.org/eurekabuild} is an umbrella under Eureka, \url{www.eureka.be} initiated by ECTP (The European Construction Technology Platform, \url{www.ectp.org}) as a complementary instrument to the EU FP7 programs. The purpose is to promote project initiatives of the more close-to-market, bottom-up kind with national funding and created through improved communication and cooperation between industry and researchers in the participating European countries.

The EurekaBuild workshops are organised by the National Technology Platforms within ECTP, and closely coordinated with the relevant Focus Areas.

The Oslo workshop was organised by the Norwegian Construction Technology Platform, \url{www.cetp-norway.no} in close cooperation with Innovation Norway, \url{www.invanor.no}, Nordic Innovation Centre, \url{www.nordicinnovation.net}, the ECTP Focus Area \#7 (Processes and ICT) and the National Technology Platforms in the other Nordic countries.

This report summarises the workshop, presenting the workshop program, the oral and written contributions, the list of participants, the project ideas discussed, and finally a summarising by the organisers as to the lessons learned.
2 Program

Unfortunately Astrid Severin and Jørn Lindstad were unable to attend the workshop. Jeffrey Wix and Åke Skarendahl kindly contributed with presentations.
# EUREKABUILD work-shop

"ICT and new integrated Processes - buildingSmart"

Oslo, Norway May 7 and 8, 2007

## Program

### Monday 7.05

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Presenter and Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1200</td>
<td>Registration and lunch</td>
<td></td>
</tr>
<tr>
<td>1300</td>
<td>Opening, welcome</td>
<td>Mr. Per Jæger, Norwegian Home Builders Association</td>
</tr>
<tr>
<td>1320</td>
<td>Eureka and Eurekabuild, opportunities and processes</td>
<td>Mr. Bjorn Henriksen, Norwegian Research Council (Norwegian NPC)</td>
</tr>
<tr>
<td>1340</td>
<td>European innovation agenda – including CIP</td>
<td>Ms. Astrid Severin, EU DG Enterprise, Competitiveness and Innovation Program (CIP)</td>
</tr>
<tr>
<td>1400</td>
<td>EraBuild initiative</td>
<td>Mr. Mika Lautanala, Tekes</td>
</tr>
<tr>
<td>1420</td>
<td>Coffee brake – visiting poster session</td>
<td></td>
</tr>
<tr>
<td>1500</td>
<td>Nordic innovation agenda</td>
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<tr>
<td></td>
<td>Creating a Nordic technology platform</td>
<td>Mr. Jørn Lindstad, Norwegian Research Council</td>
</tr>
<tr>
<td></td>
<td>Innovative building, a Nordic innovation initiative</td>
<td>Mr. Mika Rantakokko, Nordic Innovation Center</td>
</tr>
<tr>
<td></td>
<td>Funding schemes for Norwegian innovation projects</td>
<td>Mr. Helge Kildal, Innovation Norway</td>
</tr>
<tr>
<td>1615</td>
<td>Introduction of the brokerage event, open discussion</td>
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<tr>
<td>1830</td>
<td>Reception</td>
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<tr>
<td>1900</td>
<td>Dinner, guest speaker Mr. Diderik Haug, The Directory of Public Construction and Property</td>
<td></td>
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</tbody>
</table>

### Tuesday 8.05

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Presenter and Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>0900</td>
<td>ECTP Focus Area 7 (PICT)</td>
<td>Dr. Alain Zarli, CSTB</td>
</tr>
<tr>
<td>0920</td>
<td>buildingSmart, information and demonstration</td>
<td>Mr. Jøns Sjøagren, Norwegian Home Builders Association</td>
</tr>
<tr>
<td>0950</td>
<td>&quot;Babel reversed, the new semantic world&quot; - On buildingSMART technology and knowledge systems, with focus on IFD Library</td>
<td>Dr. Håvard Bell, SINTEF</td>
</tr>
<tr>
<td>1020</td>
<td>Coffee brake – visiting poster session</td>
<td></td>
</tr>
<tr>
<td>1100</td>
<td>Eureka project GeoSuite 2</td>
<td>Ms. Berit Raadim, ViaNova Systems</td>
</tr>
<tr>
<td>1120</td>
<td>The StandIn project</td>
<td>Dr. Svein E Haagenrud, SINTEF</td>
</tr>
<tr>
<td>1140</td>
<td>Brokerage event – open discussion</td>
<td></td>
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<tr>
<td>1240</td>
<td>Closure</td>
<td></td>
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<tr>
<td>1300</td>
<td>Lunch</td>
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</tr>
</tbody>
</table>
3 Presentations
Welcome to Oslo!

Per Jørgeen
CEO
Norwegian Homebuilders Association

European Construction Technology Platform
"Challenging and Changing Europe’s built Environment"

Vision for a sustainable and competitive construction sector in 2030
ECTP

Strategic Research Agenda
(Oct. 2005)

Research priorities
Meeting client/users requirements
Becoming sustainable
Transforming the construction sector

FAs' SRA

ECTP

EurekaBuild

HLG
(Bouygues)

AG
(clients & users)

AG
(SMEs)

SG
(Dragados)

Mirror Group

Secretariat
(CSTB)

National TPAs
(~25 countries)

>>1000 members

Plenary Assembly
Paris, Nov. 21-22, 2006

Focus Areas: Underground construction, cities & buildings, networks, cultural heritage, materials, quality of life, processes & ICT.
EurekaBuild initiative to improve the participation of NTPs and SMEs in research projects

Eureka is Europe's oldest joint research initiative (1985)
To enhance competitiveness
Flexible and decentralised networks
Eureka projects
Eureka umbrellas

www.eureka.be
www.eclp.org
www.eclp.org/eurekabuild.asp

Eurekabuild Partners

• Austria
• Belgium
• Croatia
• Czech Rep.
• Denmark
• Finland
• France
• Greece*
• Iceland*
• Lithuania
• Netherlands
• Norway
• Poland
• Portugal
• Slovenia
• Spain
• Sweden
• Switzerland
• UK

2006 - 2009
Norwegian Construction Technology Platform

- A tool for increasing the innovation and research activities in the Norwegian construction industry
- Linking the Norwegian construction industry to European research initiatives (FP7, CIP, EurekaBuild, EraBuild)
- Active in EurekaBuild and ECTP work
- Representing Norwegian partners in all ECTP FAs and organizing National FA groups
- Promoting and coordinating Norwegian participation in specific project initiatives
- Working in close connection with the Norwegian Research Council, Innovation Norway, Nordic Innovation Center
- Active in the coordination of Nordic co-operation between NTPs in the ECTP

Organisational structure, Norwegian platform (NCTP)

- NCTP board
- Secretariat, management
- SINTEF
- FA1, FA2, FA3, FA4, FA5, FA6, FA7
- Led by industry
  - "Resource group" of scientists
- Contact with ECTP and other platforms
- Chaired by the buildingSmart organization in Norway
Participants buildingSMART, Norway

- The Federation of Norwegian Construction Industries
- Association of Consulting Engineers
- Association of Architects
- Norwegian Homebuilders Association
- Norwegian Construction Products Association
- The Organization of Timber and Building Materials Merchants
- Association of Technical Entrepreneurs
- The Norwegian Joinery Manufacturers Association
- Norwegian Master Builder Association
- Standards Norway
- SINTEF Building and Infrastructure
- Stalsbygg - The Directorate of Public Construction and Property

- Funding partners
  - Innovation Norway
  - Building Cost program
Goals

- Set the standard for object-based data exchange and sharing of virtual buildings:

  - IFC model
    - create a comprehensive information specification
  - Dictionary
    - use standard names and definitions of properties for IFC extensions
  - Exchange Requirements
    - define information requirements and rules for particular business processes
  - Reference Processes
    - establish standard process descriptions that can be extended for projects
buildingSMART

Objectives

- Define structure and method for behavior for tomorrows building- and construction industry
  - nationally and internationally
- Make Norwegian industry competitive through optimised use of technology.
- Be the most important innovation pillar in the industry

The Norwegian buildingSMART - project

3. Business development
   - International business development
   - National business development
   Activities
     - Export of knowledge
     - Investigate new business models
     - The "Nordic model"

2. Implement/deploy buildingSMART
   - eCollaboration & eProcurement
   - Electronic collaboration
   - Product information
   - Changes in business processes
   - eGovernment
   Activities
     - Pilot projects
     - KYD
     - Pilot groups
     - User requirements

1. Develop buildingSMART
   - Semantic technologies
     - IFC-IDM (data model and information exchange requirements)
     - IFD (ontology project) International Framework for Dictionaries
   Activities
     - Standardisation
     - MI
     - ISO TC 59/ TC 184
     - EU's 7 Frame program

4. Knowledge based systems
   Active and Smart building knowledge platforms
   www.buildingsmart.no
Links and contacts

• Platform:
  – www.ecp.org
  – www.ecp-norway.no

• Secretariat NCTP:
  – Svein.haagenrud@sintef.no
  – Svein.danielsen@sintef.no

E13790 EurekaBuild
secretariat.ecp@cstb.fr
www.ecp.org/eurekabuild2.asp
Thank you for your attention!
Administration of EUREKA in Norway

- The Research Council of Norway
  - Division of Innovation
- No specific budget post for EUREKA projects in Norway
- Funding from all Norwegian schemes supporting R&D and innovation should be regarded as potential EUREKA financing
Norwegian Public Schemes Funding EUREKA Projects

- SkatteFUNN – tax reduction scheme
- Research Council programmes
- Innovation Norway – IFU
- The Franco-Norwegian Foundation
- Demo 2000
- Svensk-norsk næringslivssamarbeid

- Pre Project support

Pre Project Support -EUREKA-

- Who can apply?
  - Any company

- Purpose
  - Partner search
  - Cooperation agreements
  - Joint project proposal

- What can you get?
  - Max 50% of total expenses
  - Max NOK 100,000 ~ 12,000 Euro

- No deadline for applications
38 members

Austria
Belgium
Croatia
Cyprus
Czech Republic
Denmark
Estonia
European Union
Finland
France
Germany
Greece
Hungary
Iceland
Ireland
Israel
Italy
Latvia
Lithuania
Luxembourg
Malta
Monaco
The Netherlands
Norway
Poland
Portugal
Romania
Russia
San Marino
Serbia
Slovakia
Slovenia
Spain
Sweden
Switzerland
Turkey
Ukraine
United Kingdom

National Information Points (NIP)
Albania
Bulgaria

- EUREKA members
- EUREKA NIP countries
- EUREKA Chairmanship*
- EUREKA Associated Country

* Italy holds the Chairmanship of EUREKA from July 2000 to June 2001, followed by Slovenia

Associated Country
Morocco

www.forskningsradet.no/eureka
What is a EUREKA project?

**EUREKA projects are:**
- Bottom-up - proposed, defined and managed by its partners
- International - with partners from at least two of EUREKA’s 38 members
- Industry-led
- Market-oriented - Developing hi-tech products, processes and services for the market

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**Market oriented**

- EUREKA addresses applied - not fundamental - research projects
- The result of a EUREKA project must be a marketable product, process or service
Positioning of EUREKA on International R&D Scene

European Cooperation in R&D

**Precompetitive**

- Top down
- EC supervision
- Large central funding
- Results property of EC and partners

**Close to market**

- Bottom up
- Business agreements
- Smaller, coordinated national funding
- Results property of partners

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**Some statistics**

Since 1985, 25 billion euro of public-private investment has been mobilised to support some 2,800 EUREKA projects

*All figures correct June 2008*
EUREKA projects in figures

- Number of running projects: 700
- Total budget for these projects: 1.7 billion €
- Number of organisations involved in EUREKA projects: 2760

Who participates in EUREKA projects?

Nearly 13,000 partners from across Europe – and beyond

- Large companies: 30%
- Research Institutes: 11%
- Universities: 17%
- SMEs: 41%

All figures correct June 2006
EUREKA has developed in two different directions

- An effective and efficient tool for SMEs

- An arena for European strategic R&D initiatives, mainly in the ITC sector

The two pillars of EUREKA

- Strategic initiatives

- Individual projects
1. Strategic initiatives

- Two categories:
  - Clusters
  - Umbrellas

1a. Clusters

- Long-term, strategically-significant initiatives
- Large number of participants, many from Europe’s major companies (e.g., Philips, Infineon)
- Develop generic technologies of key importance for European competitiveness
1a. Clusters

- MEDEA+  Micro- and nano-electronics
- www.medaplus.org
- ITEA2  Software-intensive systems
- www.itea2.org
- CELTIC  Telecommunications
- www.celtic-initiative.org
- EUROGIA Sustainable and safe energy
- www.eurogia.com

1b. Umbrellas

- Thematic network of public authorities and sectoral experts
- Their objective is the generation of EUREKA projects
- Fields of activity: manufacturing, logistics, food & feed, digital content ...
1b. Umbrellas

<table>
<thead>
<tr>
<th>FACTORY</th>
<th>Production technologies</th>
</tr>
</thead>
<tbody>
<tr>
<td>EUROENVIRON</td>
<td>Environmental R&amp;D</td>
</tr>
<tr>
<td>EUROAGRI+</td>
<td>Agriculture, food and feed</td>
</tr>
<tr>
<td>EUREKA TOURISM</td>
<td>IT-Technologies for tourism</td>
</tr>
<tr>
<td>LOGCHAIN+</td>
<td>Freight chains and logistics</td>
</tr>
<tr>
<td>EULASNET II</td>
<td>Laser &amp; optics applications</td>
</tr>
<tr>
<td>ECONTEC</td>
<td>Digital content</td>
</tr>
<tr>
<td>INNOFISK</td>
<td>Innovative aquaculture</td>
</tr>
<tr>
<td>ENIWEP</td>
<td>Industrial wear prevention</td>
</tr>
<tr>
<td>EUREKABUILD</td>
<td>Construction technology</td>
</tr>
</tbody>
</table>

National spend on EUREKA projects in relation to GDP

All figures correct June 2005
www.eureka.be
www.forskningsradet.no/eureka
European innovation agenda-including CIP
Astrid Severin, DG Enterprise
(Jeffrey Wix)

For more information:
entr-europe-Innova@ec.europa.eu
http://ec.europa.eu/enterprise/funding
http://www.europe-innova.org

- Innovation policy is at the core of the European policy making
- German presidency places enormous emphasis on innovation
- 18 months program of three presidencies
  - Germany,
  - Portugal
  - Slovenia
- Builds on Finnish presidency
  - Aho report
  - Integrated Innovation Policy initiative

Sparka

German Presidency places specific emphasis on Innovation

- Competitiveness and growth through better regulation
- Innovation and growth
- Research and Development
- Education and Training
- Information Society
- Urban development
- Innovation and new business
- European Innovation Scoreboard
### The networks of Europe INNOVA

<table>
<thead>
<tr>
<th>Cluster Networks</th>
<th>Financing Networks</th>
<th>Standards Networks</th>
</tr>
</thead>
<tbody>
<tr>
<td>NetBioClo (biotech)</td>
<td>AFIBIO (biotech)</td>
<td></td>
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<tr>
<td>OMNI-NET (ICT)</td>
<td>ACHIEVE (ICT)</td>
<td></td>
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<tr>
<td>mClusters (ICT-wireless)</td>
<td>GATE2START (ICT)</td>
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<td>NICE (ICT)</td>
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<tr>
<td>ENOC (ICT – Optics)</td>
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<tr>
<td>CENCE (energy)</td>
<td>EIFN (energy)</td>
<td>DEPUIS (eco-innovation)</td>
</tr>
<tr>
<td>CASTLE (space)</td>
<td>FinancoSpace (space)</td>
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<tr>
<td>INNOTEX (textile)</td>
<td>NETFINTEX (textile)</td>
<td>INNOVAFUN (furniture)</td>
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<tr>
<td>BeLCAR (automotive)</td>
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<tr>
<td>TCAS (automotive)</td>
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<tr>
<td>ABC-Network (food)</td>
<td>ENFFI (food)</td>
<td>Bio-Health (e-Health)</td>
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<td></td>
<td>Injection (medical dev)</td>
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<td></td>
<td>BUILD-NOVA (building)</td>
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<tr>
<td></td>
<td>STAND-INN (building)</td>
<td>Euromind (maritime)</td>
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<td>STEPPIN (public proc.)</td>
</tr>
</tbody>
</table>

### The IMP3rove Self Assessment Tool

The benchmarking report provides a detailed understanding of an SME’s strengths and weaknesses

#### Score per dimension (Example)

<table>
<thead>
<tr>
<th>Innovation Strategy</th>
<th>Innovation Management Success</th>
<th>Innovation organization &amp; culture</th>
<th>Innovation lifecycle</th>
<th>Enabling factors</th>
<th>Innovation Management Success</th>
</tr>
</thead>
<tbody>
<tr>
<td>10%</td>
<td></td>
<td></td>
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</table>

#### Exemplary questions per dimension

- **Innovation Strategy**: Is your innovation strategy clearly linked to your business strategy?
- **Innovation Management Success**: How would you rate your company's readiness for innovation?
- **Innovation organization & culture**: What is the average time-to-market for your most important products/services?
- **Innovation lifecycle**: What percentage of your innovation projects have you completed within the defined time, budget and quality?
- **Enabling factors**: What is your estimation of profit share from innovations? (By innovation types)

[
Fostering Innovation in Services

FINAL

2017

A Report of the Expert Group on Innovation in Services
COMPETITIVENESS AND INNOVATION FRAMEWORK PROGRAMME (2007-2013)

- What is the Commission doing to tackle the Innovation agenda?
- How can EU funds be most effectively used in helping growth?

The new and forthcoming calls:

- Europe INNOVA (KIS) April 2007 5m€
- Europe INNOVA (new PPPs) Mid-2008 45m€
- PRO INNO Europe (INNO Nets) Mid-2008 19m€

Forthcoming calls

Will be launched this week
Towards a European Innovation Platform for Knowledge Intensive Services

1. Innovation in services matters

In 2004, business services contributed on average to
40% of total EU-25 employment
46% of EU-25 value added

2. All forms of innovation should be supported, not only technological innovation

<table>
<thead>
<tr>
<th>% of companies introducing non-technical innovations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>Industry</td>
</tr>
<tr>
<td>Manufacturing</td>
</tr>
<tr>
<td>Services</td>
</tr>
<tr>
<td>KIBS</td>
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<tr>
<td>Services (excl. KIBS)</td>
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</tbody>
</table>

* Statistics based on CIS-4 data
3. Innovative SMEs in the service sector receive less public support for innovation than in manufacturing

Reason?
1. Less market failure for innovative service companies?
2. Innovation support policies are less adapted to the specific needs of service companies?
   - Registered IP (patents as well as trademarks) for example, are less widely used by service firms than by manufacturing firms.
     - For patents, this might be considered normal, as service firms in the strict sense 'invent' less.
     - Trademarks however should be equally relevant
   - There are clear indications that service companies and especially knowledge intensive business services have more difficulties in accessing external financing

4. Service SMEs find public support crucial to improve the quality of their innovations

- Manufacturing firms emphasize the reduced innovation costs as the main benefit needed from public support programmes

   One size policy does not fit all!
Towards a European Innovation Platform for Knowledge Intensive Services (KIS)

- Exploitation of existing good practice tailored to the needs of service firms
- Young innovative service firms with high growth potential – gazelles!
- Pooled support packages – ‘one stop shops’
- Public Private Partnerships
- Closer links between research, incubation, finance, clusters

Facilitate the creation of more European innovation champions in the field of services
Foster KIS activities in highly innovative industry sectors

Exploratory action
Call for proposals – May 2007

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European Innovation Platform for knowledge intensive services
A Europe INNOVA Public Private Partnership establishing closer links between research, skills, entrepreneurship, finance and clusters

Main Activities

<table>
<thead>
<tr>
<th>Networking action Sector 1</th>
<th>Networking action Sector 2</th>
<th>Networking action Sector 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Assess specific research and skills needs of potential high growth KIS enterprises &amp; establish links with relevant research and business partners (e.g. Venture networks)</td>
<td></td>
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</tr>
<tr>
<td>• Design, test and validate improved support mechanisms for innovation intermediaries, KIS start-ups and young promising growth firms (e.g. screening &amp; selection methodologies, coaching and training modules, SATS, certification schemes, till the business stage)</td>
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</tr>
<tr>
<td>• Facilitate access to finance and networking with clusters and relevant partners</td>
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</tr>
<tr>
<td>• Offer info packages or tool boxes to other public and private innovation intermediaries</td>
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</tbody>
</table>

Horizontal activities

- Repository of technological and organisational/business model innovations in services
- Guide on the facilitation of organisational innovation in services
- Business community of potential high growth KIS enterprises
- Annual European Venture Contest and European service innovation award
- Commons marketing and communication tools for the platform
European Innovation Platform for knowledge intensive services
A Europe INNOVA Public Private Partnership establishing closer links between research, skills, entrepreneurship, finance and clusters

**Possible partners**

<table>
<thead>
<tr>
<th>Networking action Sector 1</th>
<th>Networking action Sector 2</th>
<th>Networking action Sector 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Possible partners</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>· Public organisations: Universities, research centres, regional development agencies</td>
<td></td>
<td></td>
</tr>
<tr>
<td>· Innovation intermediaries: Knowledge Transfer Offices, science parks, incubators, consultants, training &amp; coaching centres</td>
<td></td>
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</tr>
<tr>
<td>· Private-public entities: proving support to KIS enterprises (business organisations, chambers of commerce)</td>
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<tr>
<td>· Financing networks: (business angels, venture capitalists)</td>
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</tbody>
</table>

Horizontal activities carried out by service providers

Exit strategy!!
ERABUILD
Strategic cooperation between national programmes promoting sustainable construction and operation of buildings

Eurekabuild work shop
7.5.2007
Oslo
Mika Lautanala

Contents

- What is Erabuild?
  - Era-Net scheme
  - Network of funding bodies, programme owners and managers
- Why Erabuild?
  - Benefits to industry and research
  - Benefits to programme owners and managers
- How to get involved?
  - Partner
  - Joint calls
  - Trans-national programmes
National – European dimensions

European interest
- FP7
- Strengthen European competitiveness
- Global leadership in R&D

Eurabuild
- Increase networking and coordination
- Efficiency in research
- Sharing resources

National interest

Eurabuild - Eurekabuild

Project
Project
Project
Project
Project
Project

Eurekabuild

Project
Project
Project
Project
Project
Project
ETPs and Erabuild

"Where to go?"

ETPs → Vision → SRA → Implementation (JTI, IP, ...)

↓ Contents ↓
(Industry view)

↑ National funding

Erabuild → Transnational programme
(Platform for collaboration using national funding)

"How to get there?"

Tekes
Partners

Tekes – Finnish Funding Agency for Technology and Innovation, coordinator
1. BMVIT - Austrian Federal Ministry of Transport, Innovation and Technology
2. FFG - Austrian Research Promotion Agency
3. Öhut - Austrian Society for Environment and Technology
EBST - National Agency for Enterprise and Construction
1. Ministère de l’Équipement, des transports, du logement, du tourisme et de la mer
2. CSTE - Centre Scientifique et Technique du Bâtiment
BBF - German Federal Ministry of Education and Research
2. TÜV Rheinland Consulting GmbH

RCN – The Research Council of Norway
SenterNovem
1. MEC - The Education and Science Ministry
2. CDTI - Centro para el Desarrollo Tecnológico Industrial
1. Formas - The Swedish Research Council for Environment, Agricultural Sciences and Spatial Planning
2. RIF - Swedish Construction Sector Innovation Centre
SFDE – Swiss Federal Office of Energy
2. Basler & Hofmann
DTI - Department of Trade and Industry

Aim of the Erabuild project

○ Programme owners and managers co-operate and collaborate effectively

○ Scope: Operation and Construction of Buildings
Results from Joint Calls

- Joint Call for Proposals on “Managing Information in Construction”
  - Call opened April, closed July 2005
  - 8 proposals submitted
  - 4 projects selected in October 2005
  - Total volume 1.1 M€
  - Funding from Erabuild partners 0.72 M€
  - Sweden, Finland, Austria and France

- Joint Call for Proposals on “Industrialisation”
  - Call opened April, and closed July 2006
  - 15 proposals submitted
  - 8 projects selected in October 2006
  - Total volume 4.7 M€
  - Funding from Erabuild partners 2.6 M€
  - Denmark, Sweden, France, Finland, Austria

Open Joint Call for proposal

- Benchmarking and Performance Indicators in Real Estate and Construction
- Call launched March 2007, closes June 13, 2007
- Denmark, Finland, Sweden, NICE
- Funding available 2.4 M€
- More information available at www.erabuild.net/call//
Trans-national programmes

- Programmes with national funding
  - Common interest, common objectives
  - Strategy driven
  - Additional national activities
- Working on two themes
  - Sustainable renovation
  - Value driven process
    - Enhance the competitiveness of the leading actors of the sector by transforming the way of working
- Plans available at the end of 2007

Objective

Enhance the competitiveness of the leading actors of the sector, by:

- Transforming the way of working
  - Life cycle value creating rather than low cost focus
  - Meeting functional requirements and not detailed technical specifications
  - Meeting targets on cost, time and quality
  - Increasing knowledge about performance of buildings
  - Increasing value for money spent
  - Raising the ambition on sustainability
  - Creating innovation capacity
  - Developing the human capital
  - Improving working environment
Goals

- Reducing investment with 30%
- Reducing Life Cycle Cost with 50 %
- Reducing time of delivery with 50 %
- Raising the level of best practice in sustainability
- Raising the level of best practice in user satisfaction index
- Zero delays, cost overruns and faults
- Zero accidents

Benefits of Erabuild to industry and research

- A bridge between national and European research
- Joint calls - Easy and flexible funding for international collaboration
- Major break through activities on European level – Trans-national programmes
Benefits of Erabuild to national funding body

- Learning from each other's policies, practices, programmes, ...
- Increase the impact of research on construction
  - Avoid overlapping research - coordination of national programmes
  - Increase synergies of national activities
  - Focusing on key / world class competences
  - Involve also SMEs
- Increased overall research activities and quality of research in Construction
- An effort to transform the real estate and construction cluster
- Create competitive edge for European construction sector
  - European research is fragmented compared to e.g. U.S., China, Japan - a threat of losing competitiveness

How to get involved?

- Joint calls
- Trans-national programmes
- Partner
  - Funding bodies
  - Programme owners
  - Programme managers
Eurekabuild workshop – Oslo - 7.5.07

Innovative Construction and Nordic cooperation

Mika Rantakokko
Senior adviser
Nordic Innovation Centre

• Nordic Innovation Centre
• Innovative Construction
• New Call for proposals
Nordic Innovation Centre

- Stimulate increased innovation through increased cooperation between the innovation systems in Nordic countries.

- Establish Norden as one, inner market and a borderless region through removal of barriers and stimulating increased competition.

NICe’s overall mission and role

- Making it easier to develop and run business across the borders of the Nordic countries

- Nordic innovation Centre is the Nordic Council of Ministers single most important instrument for promoting an innovative and knowledge-intensive Nordic business sector
Nordic co-operation

- Ministers of trade & industry
- Committee of senior officials
- Ministers of Nordic co-operation, NSK
- Nordic council of Ministers secretariat
- Nordic Innovation Centre

Nordic Innovation Centre

- Geography
  - Nordics
  - The extended Nordic region, Baltic countries
- Organisation
  - 14 employees
- Project portfolio
  - Total value ~ 35 M€
  - NICE’s share ~ 10 M€
  - 50-100 new projects/year
**Innovation is**
- A new product
- A new process
- A new organisational structure
That creates **success** in the market

Research or inventions can only become interests through interaction with commercial interests.

**Focus areas**

A focus area is a thematically limited area, creating a frame around a bundle of related projects carried out in parallel with financial support from NICE.
Focus areas

- Food Safety/ SafeFoodEra
- Functional Food
- Creative Industries
- Innovative Building
- Innovation Policies
- Micro & Nano technology
- Borderless region

- 1-2 new focus areas changes every year

Nordic Innovation Centre and Innovative Building

- Long history in financing Nordic cooperation in the field of innovative construction
- European collaboration
  - **ERABUILD**: NICe is a partner, being involved in Calls for proposals.
  - **European/Nordic Construction Technology Platform**
- At the moment NICe finances projects in the field of construction worth 3 M€
- **Adaptable house** – model configuration. A feasibility study, coordinated by Teknologisk Institut, Denmark, is focusing on dialog in between users and market, as well as describing the possibilities in the field of construction.

- **Partnership in Nordic construction**, coordinated by Statens Byggeforskningsinstitut, Denmark, is focusing its activities to promote exchange of information between the players in Nordic countries via setting up a Nordic network.

- **Integrated energy planning (IEP)**, coordinated by KanEnergi AS, Norway, is focusing on reaching optimal solutions in construction process taking also into account the energy aspects.

- **Badeværelser** – user driven business model, coordinated by Statens Byggeforskningsinstitut, Denmark, is focusing on developing and testing a new method to build and renovate bathrooms.

- **Demand controlled ventilation systems for energy efficiency and good indoor climate**, coordinated by Chalmers University of Technology, Sweden, is focusing on developing ventilation technology which is also environmentally friendly.

- **Ljuddesign av storumskontor**, coordinated by Saint-Gobain Ecophon AB, Sweden, is focusing to identify critical parameters concerning development of open plan office taking into account the special needs related to acoustics.
Adaptable house project: Quality of life

Can spaces change your life
- Sensuality
- Tactility
- Diversity
- Light
- Beauty
- Softness

Built on, by, with and for
- Emotions
- Passion
- Enthusiasm
- Curiosity
- Adventurer
- Courage

Nordic think tank; some central findings

- The Nordic area has a common cultural basis, is situated in the same climatic zone, as well as similar economic bases and social structures – but there are sufficiently large differences to prevent the Nordic countries regarding themselves, or functioning, as a self-evident single construction market.
- The conditions for the housing industry will be radically changed through increased international exchange of trade and services.
- The Nordic countries can make a global contribution to a new industry that focuses on industrialised construction, based on future human needs of functions and experiences in and around the buildings.
Paradigm shift in construction

- 40% of all business involves construction
- It is faster to build an Airbus than a house; also less complaints in airplane building than in construction...
- Unclear roles of different players in construction
Construction for humans

There is a need for a consumer oriented approach which puts people in the centre, and where the approach is not what people shall have, but consideration of the personal needs.

For example:
- Integration of work and housing
- No installation of components which cannot be moved; it should be possible to alter dwellings for people who, for instance, do not want a kitchen.
- Mobile approach to houses
- Modularisation and component manufacturing to construction sector

Nordic focus for future development in construction

- Sustainable development
  - Life-cycle thinking
  - Energy efficiency
- The new role of construction players
  - Planners
  - Builders
- Building safety
- Full utilisation of ICT
- User driven innovation
  - Experiences
  - Lifestyle
  - Flexibility
  - Health/wellbeing
  - The public good – access for all
Nordic Call based on think tank recommendations

- Projects to be financed with help of NICe’s Innovative construction Call for proposals shall combine the human needs of experiences and functions in built environment with technical development in the field of construction. Both individual and community needs are included to this approach.

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- Long-term sustainable development
  - Commercialisation of sustainable construction products - “Turning sustainability into business”
  - Promotion of broader acceptance of sustainability in the field of construction
  - Life cycle value growth and life cycle cost (energy, maintenance, service, adaptability)
  - Energy efficiency, with special focus on how to get also old houses into today’s level – not just new technology solutions, but also business models, awareness raising etc.
• The new role of construction players
  - New focus for architecture – from building to human
  - New focus for contractor – from builder to developer
  - Development of new business models for construction sector

• Building safety
  - Strengthening the expert networks in the field of building safety to exchange information about safety problems in construction sector
  - Linking building safety to life cycle thinking - "20 year warranty"

• Full utilisation of ICT
  - Utilising the potential of home automation and Plug&Play components to enhance quality of life, exploit services, sustainability and reduce maintenance cost and trouble
  - Changing room/space more as an interface to services with basis in interactive communication
  - Utilising the potential of augmented reality, digital object models, e-business
  - Exploitation of how does the unlimited access to information (via Internet) changes the behaviour of the consumer; information asymmetry in the markets.
• **User driven innovation;** Adapting the construction business to the individual needs, lifestyles and life phases, quality of life and value judgments of people
  - *Experiences;* life among the buildings, individuality, enjoyment of nature and manmade environment
  - *Lifestyle;* people’s changes in life phases, freedom from worry, fulfilling the unsatisfied and unidentified needs, consumer co-design
  - *Flexibility;* multifunctionality, multiple use (different life phases, home, leisure time, work, child/childless)
  - *Health/wellbeing;* physical and mental comfort
  - *Public good – access to all;* viability, human sustainability, affordable price

• **Applicants and actors**
  - Nordic actors from national and regional public bodies, industry and industry federations, innovation institutes, and other call-relevant organisations are invited to apply.
  - A Nordic consortium may invite Baltic or other relevant international actors to join the project in order to add value and improve impact of the project. The international approach of the call is applicable to all measures as long as the Nordic synergy and focus is prevailing.
Application procedure

- As a first stage, the Nordic Innovation Centre requires the submission of an Expression of Interest describing the project idea.
- **Deadline** for sending in EOI is **25 May 2007**.
- The applicants meeting the criteria of the call and with EoIs of highest potential will be asked to develop full project proposals.
- Projects up and running during this year

Projects: Basic criteria

- Nordic relevance
- Innovativeness
- Spreading the results
- Min 3 Nordic countries (good if all 5)  
  + Baltic countries, Scotland...
- Min 50% own funding, including working hours and direct funding
- Project period max 36 months
For more information
www.nordicinnovation.net
Funding schemes for Norwegian innovation projects

Helge Kildal, Innovation Norway

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Innovation Norway

- Established 19 December 2003 and started up activities January 1, 2004
- It was a merger of four organisations: The Norwegian Industrial and Regional Development Fund (SND), the Norwegian Trade Council, the Norwegian Consultative Office for Inventors (SVO) and the Norwegian Tourist Board.
- 750 employees in Norway and abroad. The Head Office is located in Oslo.
Objective of Innovation Norway

"Promote private- and socio-economic profitable business development throughout Norway by encouraging innovation, internationalisation and profile-building."

Primary target groups:
Entrepreneurs and SMEs with ambitions and an international potential for growth.
Seamless service, based on customer needs

-- From idea to the international market place --

- Financing (grants, loans, stipends, equity capital, guarantees)
- Provide advice and consultancy
- Initiate network and contribute to knowledge dissemination
- Profiling (delegations, participation in trade fairs)

Eureka funding sources in Norway

- Main funding source in Innovation Norway is Industrial Research and Development Contracts (IFU). This requires that the projects are aligned with IFU strategy.
- Other funding sources:
  - SkatteFUNN (tax rebate)
  - Different user programmes organized by the Norwegian Research Council
  - Nordic Innovation Center
  - Other public support schemes
Drivers for innovation

- Research on new technology
- Unmet user demands
- New regulation or political decisions
- Price competition

Our focus is user driven innovation

- Time from idea to market is then shorter
- Return on invested capital is higher than for technology driven innovation

Objectives of Industrial Research and Development Contracts (IFU):

- Develop new products or services with a substantial market potential.
- Establish new partnerships.
- Strengthen internationalisation.
- IN support should be a trigger and the value added should take place in Norway.

No application deadlines and no limitation on subject fields.
Public and Industrial Research and Development Contracts (OFU and IFU)

Offer:
New products or solutions

Innovative Norwegian supplier

Technology
SME with ambitions to grow

Profitable partnership

Market driven innovation
Level of innovation
Market potential

Requirements:
Are not met by existing products in the market

Demanding customer

Public or private enterprise
Market knowledge/access
Specifications
Reference

OFU/IFU grant

Funding conditions: Normally 1/3 from each of the partners - the supplier and the demanding customer - and 1/3 from Innovation Norway.

- Innovation Norway sign a contract with the supplier who has a binding agreement with the customer.
- The local Innovation Norway offices are responsible for evaluating the OFU/IFU proposals and also for the final decisions on grants of less than 2 million NOK. Larger grants are decided by the head office.
Yearly OFU/IFU grants

2006 - Size of the supplier companies
2006 - OFU/IFU grant per project

155 projects

2006 - OFU/IFU grants to different sectors
Programme evaluation in 2006:

- In the 10 year span 1995-2005 1.4 milliard NOK has been spent. The projects have resulted in a total turnover of the supplier companies of about 1.4 milliard NOK in 2005.
- 44% of the companies reported that the projects have reached commercial success.
- Technological success is of the order of 75-95%.
- About 50% of the supplier companies are less than 5 years old.
- Close to 70% of the projects would not have been started or would have been carried out a slower pace without the grant from IN.
- The supplier companies that obtain the best results are characterized by: A large percentage of employees with higher education, a clear innovation strategy, cooperation with a foreign company and the demanding customer is active in the project.
Web-site with guidelines for Norwegian Industrial Research and Development Contracts

http://www.innovasjonnorge.no/templates/Page_Meta56138.aspx

Thank you for your attention!
Processes & ICT (FA7)

Alain ZARLI - CSTB
alain.zarli@cstb.fr

E13790 EurekaBuild Workshop
OSLO, Norway, May 7/8 2007

7th Framework Programme FP7

ICT
NMP
ENERGY
ENVIRONMENT
TRANSPORT

RTD projects on top-down topics

ERABUILD
Joint calls for international RTD projects in national programmes

EUREKA
RTD projects on bottom-up topics

Competitiveness and Innovation Framework Programme CIP

time & take-up actions
ECTP - Quick overview

- One out of ~36 European Technology Platforms
- Role: propose R&D priorities in the construction sector
- Membership: 1000 stakeholders
- Outputs:
  - Vision 2030
  - Strategic Research Agenda
  - RTD action plan (SRA-IAP)

ECTP - Implementation Action Plan

From the vision 2030... to the SRA-IAP

Vision 2030

Agenda

SRA

IAP

February 2006
November 2006
June 2007
FA PICT - From roadmaps to RTD ideas

Driver ➔ Driver ➔ Driver

Current state ➔ Short time to ind ➔ Medium time to ind ➔ Long time to ind ➔ Vision

Building blocks for future RTD projects

RTD idea ➔ RTD idea ➔ RTD idea

FA PICT - Roadmap
Example ➔ Digital models

- Business interfaces to product models, Domain specific functional product description
- Model-based decision support, Physics simulation & visualisation, LC & sustainable assessment, etc.
- Standardised API to digital models, objects right management, Process based access to product data
- Human aided design models, Domain specific models & context based views
- Merging of partial models, Model change management, Federated Model Servers, Real time model updating, Distributed model synchronisation, Building model knowledgebase
- Configurable building components, De-centralised product catalogues, Design and analysis automation...
ECTP – 9 RTD priorities

A. Technologies for Healthy, Safe, Accessible and Stimulating Indoor Environments for All (SRA 1.1)
B. Innovative Use of Underground Space (SRA 1.3)
C. New Technologies, Concepts and High-tech Materials for Efficient and Clean Buildings (SRA 2.1)
D. Reduce Environmental and Man-made Impacts of Built Environment and Cities (SRA 2.2-1.2)
E. Sustainable Management of Transports and Utilities Networks (SRA 2.3-1.4)
F. A Living Cultural Heritage for an Attractive Europe (SRA 2.4)
G. Improve Safety and Security within the Construction Sector (SRA 2.5)
H. New Integrated Processes for the Construction Sector (SRA 3.1-3.2-3.4)
I. High Added Value Construction Materials (SRA 3.3) (and Nanotechnologies for Materials in Construction)

+ 1 transversal topic for SMEs
  - Technologies and Engineering for Innovative Added-value offered by SMEs in the Construction Sector
FA PICT - Link with other ECTP focus area priorities

- Technologies for healthy, safe, accessible and stimulating indoor environment for all.
- Underground innovative construction technologies.
- Reduce environmental and man-made impacts of build environments and cities.
- Sustainable management of transport and utilities networks.
- A living cultural heritage for an attractive Europe.
- Improve safety and security within the construction sector.
- New integrated processes for the construction sector.
- High added value construction materials.
- Nanotechnologies for materials in construction.
- Technologies and engineering for innovative added-value services offered by SMEs in the Construction sector.

Scope of the SRA IAP

- How we plan to implement the ECTP R&D Priorities (9) and R&D items (60) in the period 2007-2013
- Information needed:
  - Research Items: what? when? how?
  - What has been done and what has to be done
  - Budget (7 years) and timing (roadmap)
  - Which instrument (kind of project: R&D, Infrastructure, dissemination, standardisation...?, EC/national ?,...)
  - Role of the stakeholders (especially SMEs)
  - ...
- No start from scratch, but go further from the work already done
- Vision / Agenda: 9 Selected Priorities --> IAP 2007-1013
Current version V0.4
- Will be presented during the next SG meeting (22 May)
- (should be) Endorsed by HLG 21 June
- ICTs are mentioned more or less in all research priorities.

Introduction
Vision - SRA - 9 Selected Priorities - IAP 2007-1013

SRA Summary
3 pillars and 13 Research Areas

Prioritization Process
Introducing the 9 major Priorities

Implementation of the R&D Priorities
- Priority A to I
  - Brief description of the Priority and rationale
  - Main development issues and targets
  - Expected impact
  - State of the art
  - Synergies with other Priorities and other ETPs
    - Research items: 1, 2, 3...
    - Involvement of SMEs
    - Planning and Budget needed
    - List of some major recent projects

Transversal Issues
- Clients and Users
- R&D Infrastructures
- Standards

Roadmap Summary

Conclusion
Projects proposed to E3790 EurekaBuild that are most relevant to PICT:

- ES15 - Integrated Platforms for Mass Housing Design and Construction
- NL04 - Virtual Construction
- PL03 - Knowledge Based Software for Geo and Transport Engineering

ES15 - Integrated Platforms for Mass Housing Design and Construction

- Create a platform to promote the interaction among all stakeholders participating in the design and construction of mass housing throughout the whole building lifecycle - facilitating:
  1. automatic generation of design solutions (housing layouts, housing aggregations) which will give rise to a knowledge-based system;
  2. integration of design & construction processes around a building integrated model (knowledge-specific data extraction; building as assembly of components);
  3. communication among the stakeholders taking part in the processes, from design to construction, and from maintenance to demolition:
     - customization of housing layouts with participation of users;
     - integration of industrialized building components accessible from digital repositories;
     - monitoring of building performance through computer model.

The platform will have a modular architecture, and it will be based on existing technologies (web services, .NET technology, XML schemes), and it will support standards being developed by IAI and IFC.

- Expected partnership: software developers, construction companies and public administrators.
NL04 - Virtual Construction

- Application of 3D-objects in combination with Product Data Management
  - widely used in many industrial sectors, with spectacular improvements
  - present building & construction process is not yet suited for this approach:
    - 3D-objects are being used in the design phase but not for communication in the design & construction process.
    - Processes are focused on 'roles' rather than focused on 'products'.
  - Proposition: change the construction process towards a process which is object oriented. Crucial information in a 3D-environment takes care for a continuous feedback to the various players. Uniform agreements on the process and the meaning of information are of decisive importance to reach process integration. Both 1 RTD-project and 1 demo-project
  - Expected partnership: All stakeholders in the field with both technological and financial contributions.

PL03 - Knowledge Based Software for Geo and Transport Engineering

- Knowledge based software for computer aided design and management of industrial projects with application in geo-engineering & transport infrastructure engineering.
  - Creation of a hybrid, hard-soft code for individual use by an engineer, contractor or enterprise, based on his own professional experience included in an intelligent data-base.
  - Final results should formulate a reasonable methodology of engineering computations taking into account local, non-technical (social, economical) core of the engineering activity.
  - The new tool of computer aided design and management will help in more credible and very fast estimation of costs and resources in the local social and economical context of the engineering activity thus it will support the competitiveness of the user.
  - Potential customers are individual engineers or enterprises all over the world.

Other EurekaBuild ideas in the ICT field (1/2)

- ES03 - Human Safety in Industrial & Construction Activities and Complex Environments
- ES08 - Intelligent Building Energy Efficient Management System
- ES10 - New systems to Monitor the Long Term Behaviour of Historic Buildings
- ES11 - Decision Support System (DSS) for the Agenda 21 Deployment
- FL01 - Alternative Solutions for Community Energy Supply
- PL04 - Networked Quality Management System For Concrete

Other EurekaBuild ideas in the ICT field (2/2)

- BE01 - TELINSPEX ~ virtual inspection kit for detection of major problems in structures.
- ES01 - 3D View of Structural Discontinuities on Dimensional Stones
- ES18 - HOME-MONITOR Monitorisation of Energy Performance in Housing
- FR04 - Design and Rehabilitation of Sustainable Buildings and Cities
- NL07 - General Expert Knowledge and E-learning
- NL08 - General Flood Risk Assessment System
- NL10 - Knowledge Framework for Road Construction
- NL12 - Sensor and Remote Sensing Technology for Early Warning of Flooding
Cooperation between 20 European partners

4 years, Sept 2006 / Aug 2010 - 13 million euro budget

Project Coordinator: NCC Construction in cooperation with Bouygues, Hochtief, Max Bögl, Bögl & Krysl & YIT
Technical coordinator: TNO

"Integrated project" - co-funded by the European Commission within FP6 - www.inpro-project.eu

Main Objectives:

- Introduce & generalise 3D-design and Building Information Models in the European construction sector
- Develop strategies and business models for a new building design process which
  - enforce open cooperation of project partners
  - consider the building's whole lifecycle
- Transform the Early Design phase of a building

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An InPro tool to get the whole industry moving!

- Aiming at grouping up to 75 members (Max), representing both industry & research
  - A "not-too-big" efficient set of partners to improve breakthrough
- Requirements in order to join
  - Identification of mutual benefit for InPro & Cluster members
  - Member willing to participate actively
  - Approved by all InPro partners
- Possible involvement
  - Workshops, news, virtual forum, etc
  - Deliverable reviews
  - Participation in tasks
- No membership fee
  - No InPro-funding for participation
Cluster members: possibility to co-ordinate own "short-term" industry initiatives
- Based on InPro outcomes and deliverables...
- Aligned with European priorities: EC, ECTP, EurekaBuild, ...

Set up of applicative project(s) - trial/evaluation/best practices/other? - based on InPro results (software platform), centered on the early design phase of a construction process and possibly linked with one of these uses cases:
- Coordination of architectural & building services design
- Approval workflow
- Energy analysis – link with efficient buildings
- Construction scheduling
- Model based reference description
- Client requirements processing & assessment
- Cost Management...
buildingSMART-standards
"information and demonstration"

Jøns Sjøgren
Norwegian Homebuilders Association
Program Manager buildingSMART-Norway
Chairman IAI Nordic Chapter

Ole Kristian Kvarsvik
Senior Engineer R&D, Statsbygg

• Challenges in AEC-FM industry
• The buildingSMART prescription
• Demonstration
• Wrap up

EUREKABUILD Workshop May 8 2007
Today’s “document centric” situation

Some of the challenges with this model

- Within the same domain there is often significant communication errors and loss of project information
- 25-30% of the construction cost is caused by splitting up of processes and lousy communication
- The same information is re-entered on average 7 times in different systems before the building is handed over to owner organization
- Same information is re-created several times by different software
Tomorrows “information centric” model

buildingSMART in Norway
- “develop eCollaboration based on buildingSMART”

buildingSMART Board

IFC in The AEC industry
BIT-Bygg

Logos of various organizations related to buildingSMART and its initiatives.
Participants

- The Federation of Norwegian Construction Industries
- Association of Consulting Engineers
- Association of Architects
- Norwegian Homebuilders Association
- Norwegian Construction Products Association
- The Organization of Timber and Building Materials Merchants
- Association of Technical Entrepreneurs
- The Norwegian Joinery Manufacturers Association
- Norwegian Master Builder Association
- Standards Norway
- SINTEF/Byggforsk - Norwegian Building Research Institute
- Statsbygg - The Directorate of Public Construction and Property

- Funding partners
  - Innovation Norway
  - Building Cost program

buildingSMART

Objectives

- Define **structure and method** for behavior for tomorrows building- and construction industry
  - nationally and internationally
- Make Norwegian industry **competitive** through optimalised use of technology.
- Be the most important **innovation pillar** in the industry
The Norwegian buildingSMART - project

3. Business development
   - International business development
   - National business development
   Activities
     - Export of knowledge
     - Investigate new business models
     - The "Nordic model"

2. Implement/deploy buildingSMART
   eCollaboration & eProcurement
     - Electronic collaboration
     - Product information
     - Changes in business processes
     - eGovernment
   Activities
     - Pilot projects
     - HITOS
     - AFIUS
     - Pilot groups
     - User requirements

1. Develop buildingSMART
   Semantic technologies
     - IFC-IDM (data model and information exchange requirements)
     - IFD (ontology project) International Framework for Dictionaries
   Activities
     - Standardisation
     - IAI
     - ISO TC 59/ TC 184
     - EU's 7 Frame program

4. Knowledge based systems
   Active and Smart building Knowledge platforms
   www.buildingsmart.no

...we are not alone

buildingSMART is the brand of IAI (International Alliance for Interoperability)

Nordic
  German
  UK
  France
  Iberian
  BeNeLux

North America

China
Japan
Korea

Singapore

13 Chapters
~40 Countries
>600 Organisations
Demonstration

- Ole Kristian Kvarsvik
  – Statsbygg - The Directorate of Public
    Construction

buildingSMART is about exchange and sharing of information
Statsbygg's tasks

Statsbygg is the Norwegian Directorate of Public Construction and Property. Organized as a government corporation, Statsbygg's tasks include:

- construction
- property management
- property development
- buying and selling

Statsbygg's focus on BIM and IFC

- Statement 2007

- Statsbygg aims to increase the utility value of its buildings for tenants and users, and aims to significantly reduce construction and operating costs and building damage through use of BIM, based on open, international standards (IFC).
Demonstration

Ole Kristian Kvarsvik, **Statsbygg** - The Directorate of **Public** Construction

Wrap up
We need funding for new projects!

Is Eurekabuild something for us?

buildingSMART-challenges ahead
Project Ideas:

- Enterprise understanding
  - Change in business processes
  - Enterprise models
  - Enterprise architectures
  - Develop IDM (Information Delivery Manual)
  - Legal issues
- Implementation in the industry
- Active knowledge systems
buildingSMART-challenges ahead
Project Ideas:

• Develop good ICT-Tools
  – shared data models
  – shared interfaces
  – software
• Digital libraries
  – IFD-Library
  – Object Libraries
  – Product Library

Thank you!

• More info:
  http://www.buildingsmart.com/
  http://www.buildingsmart.no/
  http://www.iai-international.org/
  http://iai.no/
  http://www.ifcwiki.org/
  http://idm.buildingsmart.no/
  http://www.ifd-library.com/

• FTP-Site:
  ftp://ftp.buildingsmart.no/pub/
Project Model

- An Exchange requirement describes the information that must be passed from one business process to enable another to happen.
Why we need IDM

- Contracted data interchange
  - Describes the flow of information in the process
  - Between designers and client
  - Between ModelServer and application (partial models)
- Validation of data (acc. contract)
- Certification (process based)
  - Enables certification also for minor processes
  - Information, not only geometry
  - Coherent implementations
Babel reversed, the new semantic world

buildingSMART technology in knowledge systems
EUREKABUILD Workshop, 8th of May 2007
Håvard Bøll, PhD & Lars Bjørkhaug, PhD Candidate
buildingSMART

- IFC – HOW to share data
- IFD – WHAT you are sharing
- IDM – WHICH data and WHEN to share it
- £¢£ – WHY...

Before noon...

Interlinking concepts through IFD

In building documents
In product catalogues
In classification systems
In building specifications
In IFC

In CAD systems
In calculation systems
In Facility management systems

IFD dictionary/ontology

Properties
What can IFD do?

- give one concept multiple names in multiple languages

  - IFD captures what dictionaries normally don’t.

  - In IFD a concept can have multiple names in the same language

  - ... or one name can refer to multiple concepts

---

- Wife
- Husband
- Son
- Daughter
- Dog

---
Think IFD, not propertysets

- Translations
- Long term maintenance
- Uniqueness
- Availability
- Localized needs
- Rich storage
challenge:

help IFD team get content into library

challenge:

help the industry to join in and shape the future
http://ifd-library.org

Questions?

havard.bell@sintef.no
What is GeoSuite?

- Develops geotechnical software and data management system
- Also name of the commercial products
- GeoSuite phase1:
  - Project period 2003-2006
  - Collaboration Sweden – Norway
  - Eureka project, sponsored by the Norwegian Research Council and seven partners
  - Goal: merge Norwegian and Swedish programs and knowledge into common solutions
What is GeoSuite?

- developed a toolbox of software for daily geotechnical consulting practice
- based on existing methods and codes
- Today the GeoSuite Toolbox comprises five modules; four more or less stand-alone calculation modules and one presentation module integrated with Novapoint civil design software

GeoSuite Toolbox modules

Stability:

Settlement:

Excavations:

Presentation:
GeoSuite2. Purpose

- Include a standardised system for management and presentation of geotechnical data
- Improve and further develop the geotechnical solutions to solve geotechnical design problems
- The R&D focus is twopronged, the first on the Information Communication Technology, the second on the Geotechnical front

GeoSuite2. Goal

The ultimate goal is:

- Provide safer and more cost-efficient solutions to the public
- Integrate infrastructure design based on standardised and accepted solutions
- Provide reliable data from geographical retrieval databases
Project organisation

- Consortium of eight Norwegian and two Swedish partners
- Project period 2006 – 2009
- Client / user driven project. Assembles:
  - private organisations
  - research organisations
  - universities
  - one public organisation

Project organisation

- Divided into five subprojects, reflecting the modules developed
- Subproject managers are from client / user organisations
- All partners represented in reference groups
- Common programming team serving all subprojects
Partners

- GeoVita
- Multiconsult
- SINTEF Byggforsk
- Norwegina Geotechnical Institute (NGI)
- Norwegian University of Science and Technology (NTNU)
- University of Oslo (UiO)
- Norwegian Public Roads Administration (Veddirektoratet)
- ViaNova Systems
- ViaNova GeoSuite AB, Sweden
- AGEF, Sweden

Funding

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Total: knOK 24 700
Achievements

Research-based innovation project for the benefit of geotechnical engineering practice. Includes:

- Unique management of data
- Multidisciplinary infrastructure integration
- Flexible and interoperable model for data exchange, based on ISO standards
- Improved and new solutions for calculation

Unique data management

Exchange of soil parameters between modules
Multidisciplinary integration

- Achieve multidisciplinary integration by using Novapoint software
- Novapoint is a module-based Civil Engineering software using Autodesk CAD platform
- Retrieve data directly from Novapoint Terrain, Road and other infrastructure modules of interest
- Store geotechnical data in Novapoint database for easy access to other modules
- A comparable product is not commercially available today

Multidisciplinary integration. Novapoint
**Fully integrated data exchange**

**Today:**
- One-to-one mapping
- Standardised data exchange

- GeoSuite Toolbox
- Interoperability based on ISO std (SCSI/XML)
- User1
- Internal database
- User2
- Internal database
- User...
- Internal database

**Ultimate goal**
- Safer and more cost efficient solutions
- Retrieval of reliable data using GIS
- Efficient management and storage of geotechnical info
- Improved risk management
Welcome

Welcome to the first issue of STAND-INN News, a newsletter for those who are involved in construction and FM in Europe. STAND-INN is a network of private companies and public organisations from 15 countries in Europe that aims to create value for building owners and operators over the life cycle of their buildings.

Things are changing in the building and construction industry. Buildings are no longer seen simply as capital assets, building products are not just physical objects. All of us are part of a supply chain. In this issue, we are concentrating on the life cycle performance and sustainability of the building so that the real value of the project is increased for the customers and profitability and opportunities are increased in the industry.

Construction is a major industry in Europe. Around 24 million workers in 15 EU countries are involved. STAND-INN is supported by the European Commission under the Europe INNOVA initiative.

Vision/mission

👀 Vision:
- Sustainable Value creation for customers over the life-cycle of buildings using information models.

👀 Mission:
- To provide guidance on how standardisation supports innovation and "Building Smart".
- To disseminate information about sustainability - and IFC/BIM standards.
The Consortium

- 2 partners from China and 1 from Australia
- 5 European (World) wide networks providers
  - IAI (13 chapters), CIB, ECCREDI, ENBRI, CEN
- Entailing major stakeholders from
- Industry including SMEs, users, R&D and national Standardisation organisations
- 30 members from 11 European countries
  - Norway, Finland, France, UK, Sweden, Italy, Lithuania, Spain, Portugal, Germany, Belgium

Construction industry is:

- The 40% Industry (environmental)
  - 40% of all emissions
  - 40% of material & energy consumption
  - Needs to become "sustainable"
- The 30/30 Industry
  - 30% of any Country's GDP is "construction" related (26 million EU)
  - 30% is waste (non-value transactions)
- Lack of Communication (Interoperability) is a key problem
  - Needs to "change-transform"
Today's "document-centric" model:

- The same information is re-entered on average 7 times in different systems.
- Significant communication errors and loss of project information, building damages (5% of investment).
- 25-30% of the construction cost is caused by splitting up of processes and lousy communication.

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Tomorrow's "information-centric" model

Driven by IAI

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ICF is all about exchange and sharing of information

Ifc + IFD - Product Unif.  

Series of ISO standards:
- IFC = HOW to share data
- IFD = WHAT you are sharing
- IDM = WHICH data and WHEN to share it
- £24m - WHY...

STAND-NN

IFC has capabilities to support sustainability
- Service life planning according to ISO 15686
- Objective (measured) and subjective (viewed) condition assessment
- Lifecycle and whole life costing
- Environmental impact
- Energy performance declaration (labelling according to EU directive)

STAND-NN will refine and extend capabilities
Work Package Structure

WP1: Guidance on IFC\Sustainability in business processes
WP Leader: 1-SBM
C: 1,4,11,14,18,21-22,27-31

WP2: Guidance on IFC\Sustainability in products/services
WP Leader: 25-Tritana
C: 1,5,6,11,13,15,18,21,22,23,27,31

WP3: Guidance on IFC\Sustainability in housing
WP Leader: 77-TTE
C: 1,5,13,11,13,15,21,22,23,27,31

WP4: Guidance on IFC\Sustainability in public procurement
WP Leader: 31-LABEIN
C: 1,3,4,11,13,16,21,22,23,27,31

WP5: Awareness, Dissemination, Feed-back, and Exploitation
WP Leader: 28-IA1
Partners: 1-21 (all)

WP6: Methodology on improving business process design through standards
WP Leader: 11-CSTB
Partners: 1,6,7,11,13,18,21,22,23,27,31

WP7: Policy recommendation on "Standards" and business processes
WP Leader: 13-AEC3
Partners: 1,4,7,11,13,15,18,21,22,23,27,31

Mapping and analysis of IFC standards and their capabilities
Best practices

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STAND-INN

Looking at BIM/IFC use of standards/guidelines
- Life Cycle Assessment (LCA) √
- Environment prod Declaration (EPD) √
- Life Cycle Costing (LCC) ↑↓↑↓↑↓
- Energy PerformanceDeclaration ↑↓↑↓↑↓↑↓
- Environmental Impact ↑↓↑↓↑↓
- Adaptability to change in use ↑↓
- Reusability / Recycling √
- Service Life Planning √
- Social Impact ↑↓
- Energy Efficiency ↑↓

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**IFC can improve energy performance assessment**

According to national calculation methods (NCM) implementing the European Building Performance Directive.

**Designer options:**
- Use a thermal analysis software application.
- Use the basic SBEEM (simple BuildingEvaluation method).
- Interface to SBEEM from a BIM application using IFC.

*Requirement at April 2008 is that the carbon cost of the building assessed in kgCO₂/m² shall be at least 20% lower than the equivalent existing building.*

Application developed by the IAEE UK, BREMA Part L2 Working Party including Nick Nielsen (AES Ltd), Brendan MacFarlane (U25 UK Ltd), Christoph Mordi-Zoe (HLM Architects) February-March 2006.

---

**Building Monthly Energy by End Use (kWh/m²)**

- Classrooms
- Laboratories
- Atrium
- Other
- Staffroom
- WC's

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STAND-1NN

SBEM BRIULK Output Document: Compliance with ADL2A

Date: Mar 21 15:26:49 2008
Building address: TwoSisters Building, Tynemouth
Project Details: Certification Tool Interface to Calculation Engine Compliance checker

Conclusion:
the IFC/BIM based calculation
- took less than a minute compared to two weeks for the conventional methods
- showed non-compliance for the building
- easily repeated simulations

WP3 Guidance report
Possibilities for innovative sustainable housing using IFC and sustainability standards

Objectives
- Analyse possibilities to improve the innovative sustainable housing with use of the existing sustainability standards.
- Find and document good practice examples of using the standards.
- Check that the IFC use is optimal, reflects the wanted level for the user on description level of product and meet these advanced users needs on requirements. Study the feasibility of IFC and its use for innovative sustainable housing as described in the examples.
- Check the relevance of IFD for these examples, in regard to relevance for different markets, how time consuming the work will be, and impact on market penetration.

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D9 Good practice examples
Innovative sustainable housing

Released for QA process 16 March:
- 17 examples from eight countries (Austria 1, China 1, Finland 4, Norway 2, Portugal 2, Spain 1, United Kingdom 1)
- covers well different dimensions and aspects
  - North vs. South + Central
  - new vs. refurbished
  - detached houses vs. blocks of flats
  - individual building vs. neighbourhood
  - ownership from rented to tenant right and owner occupied
  - performance + environmental (& social) impacts
  - standards & guidelines, concepts
- slightly smaller number of cases than desired (< 20)
- difficulties to obtain all requested information, especially in time

D9 Good practice examples
Innovative sustainable housing

Conclusion

- Substantial improvements can be achieved by use of existing/best technologies, and standards/guidelines
  - down to 15% of today's energy consumption with 1-2% increase in cost/3-5 years payback time
- There is no market demand-just pilot projects!
D9 Good practice examples
Innovative sustainable housing

Recommendations
1. Create standards (and adapt to meet local needs)
2. Raise awareness (disseminate information)
3. Clarify the concept (sustainability, terminology)
4. Influence in market mechanisms (new business models)
5. Quantify the benefits (life cycle costing, value)
6. Develop methods and tools (requirement mgmt, operation)
7. Study the human behaviour (decision mechanisms)
8. Education for all (customers, professionals)
9. Attention to impacts at a large scale (refurbishment, neighbourhood, mainstream practice – in addition to individual showcases)
10. Develop models for sustainable value creation (see 1…9)

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Conclusion on Role of Government

Key drivers for change/innovation
- As "adopters"
- As "influencers"
- As "implementers"
- Become "educated buyers" (what, when and how to buy)

Governments mandate IFC/BIM
- Norwegian Government (Bygningsteknikk Eiendom and Statsbygg) mandated IFC in
- Singapore Government deployed CONNET e-Plan Check System in 2006.
- US: Public Building Services' requires GSA to use IFC by 2006
  - New York City will run a Singapore e-PlanCheck Prototype
- Shanghai plan for a "Singapore Prototype" in 2007
- Denmark and Finland from 1.09.2007
- Etc

When will we see EU requiring IFC/BIM & sustainability standards in building projects?

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Thank you for listening!

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ECTP Priorities

1. Technologies for Healthy, Safe, Accessible and Stimulating Indoor Environments for All
2. Innovative Use of Underground Space
4. Reduce Environmental and Man-made Impacts of Built Environment and Cities
5. Sustainable Management of Transports and Utilities Networks
6. A Living Cultural Heritage for an Attractive Europe
7. Improve Safety and Security within the Construction Sector
8. New Integrated Processes for the Construction Sector
9. High Added Value Construction Materials
10. Nanotechnologies for Materials in Construction
11. Technologies and Engineering for Innovative Added-value Services Offered by SMEs in the Construction Sector

Challenge

Create and maintain momentum to real Research, Development and Innovation

- Involving all groups of stakeholders
- Focus on SMEs
Tools

- To implement R&D&I projects to achieve the vision 2030 by
- Exploiting all existing mechanisms and instruments
  - EU FP7 (European level and European funding)
  - ERANET (coordination of national programmes in international cooperation)
  - COST
  - CIP
  - Eureka (European level, national funding)

Eureka Programme

"Bottom-up" approach

Projects
- Attractive administrative procedures
- Fast (proposal > project)
- Close to the market
- Attractive to SME involvement
- Funding on national basis

Umbrella
- To generate ideas and to facilitate proposals
Approach

- Brokerage Events
  - To connect people
  - To generate ideas
  - To find people to endorse ideas
- Information
  - Eureka: how to....
  - ECTP:
- Content
  - Based upon the ECTP SRA framework of....
- Procedure
  - How to ....

Project Portfolio Preparation

1. Define main Topic areas
2. Collect RDI Project ideas
3. Integrate & make complementary
4. Form consortium Define scope
5. Prepare and submit proposal
6. Application to EUREKA And for National Funding
Core Activities

Brokerage events
- To connect people for ideas, proposals and projects

Crucial elements in a brokerage event
- Market for match making, including a poster exhibition
- Opportunity for brief dedicated workshops, round table discussions
- Presentations with visions. Starting point societal needs leading to technological solutions, providing the audience a perspective to the future but also enthusiasm.
- General information on the processes and platforms.
What happens in a brokerage event?

- Present ideas
- Connect people with similar and/or complementary ideas
- Support by Eureka officers
- Submit the idea format
- By seeing each other and talking together

Turn the SRA into Action

Results in 2009
- 15 International events
- Each leading to 10 proposals

Conclusion
- The EurekaBuild umbrella delivers the ECTP 150 proposals for R&D&I with massive SME participation
4 Participants
List of participants of the EUREKABUILD work-shop in Oslo, Norway, 7. and 8. May 2007

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<td>Ivar</td>
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<td>Nijman</td>
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<td>+31 30 6598528</td>
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<td>Norway</td>
<td><a href="mailto:M.Rantakokko@nordicinnovation.net">M.Rantakokko@nordicinnovation.net</a></td>
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<td>Terje F.</td>
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<td>Norcem AS</td>
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<td>37</td>
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<td>38</td>
<td>Skarendahl</td>
<td>Åke</td>
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<td>BIC-Swedish Construction Sector Innovation Centre</td>
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<tr>
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<td>+46 48 222 78 45</td>
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<td>42</td>
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<td>Janne</td>
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<td><a href="mailto:jai@jolne.com">jai@jolne.com</a></td>
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5  Project ideas and posters
EurekaBuild (E13790) Project Idea Form

> **Title**
Future design of building design and manufacturing processes based on integration and activation of experience / knowledge supported by ICT systems (preliminary template).

> **Describe your project idea**
Current topic can be within: Knowledge growth in organizations; harvesting, analyze, validation, ontology, classification, development of IDM’s, use of BIM, future roles of knowledge workers – architects and engineers.

> **Please explain briefly your expertise**
Software development, BIM, IFC, IFD, IDM, methodology, systemizing, knowledge management; - processes and – representation.

Selvaag Blue Think is a R&D department (35 emp.) owned by the home-builder company Selvaag Group (520 emp.)

> **Please describe what your contribution will be to this project (financial, technological,...)**
Technological, software development, systemization, knowledge processes. Piloting, prototyping and practical use in AEC company.

> **Explain which type of contribution you are looking for (financial, technological,...)**
Financial
Technological

Contact information

<table>
<thead>
<tr>
<th>Full name</th>
<th>Eilif Hjelseth</th>
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<tbody>
<tr>
<td>Email address</td>
<td><a href="mailto:ehj@selvaag.no">ehj@selvaag.no</a></td>
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<tr>
<td>Organisation name</td>
<td>Selvaag Blue Think AS</td>
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EurekaBuild (E13790) Project Idea Form

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<tr>
<td>A Repository for life cycle design and construction for BAM</td>
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<th>&gt; Describe your project idea</th>
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<tr>
<td>Improve project insight &amp; communication to ensure client value and efficient management of risks. Efficiently process consistent product &amp; process data throughout the project life cycle and across the extended enterprise. To create more value efficiently and to be more competitive. Therefore companies like BAM needs to setup its Object repositories to start capturing data over projects and setup its catalogs. The main focus is: Capture functional demands and technical solutions during engineering, estimation and production planning so proper quantity reports can be generated, aspects can be compared between project stages and solutions can be re-used between projects. Explore how this repository, which is setup independently from software solutions, can be deployed in a commercial model server environment. Our approach is: Use what's available and learn by doing.</td>
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<tr>
<th>&gt; Please explain briefly your expertise</th>
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<tr>
<td>Royal BAM Group nv is one of the top ten construction companies in Europe and has a 10 year learning experience with Virtual Construction in real time building projects.</td>
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<tr>
<th>&gt; Please describe what your contribution will be to this project (financial, technological,...)</th>
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<tr>
<td>BAM can contribute its experiences and concepts regarding model based estimation and production planning</td>
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<th>&gt; Explain which type of contribution you are looking for (financial, technological,...)</th>
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<tr>
<td>Partners contribute with state of the art solutions regarding taxonomies, currently available content and proof of concepts which were developed in several R&amp;D projects so far.</td>
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Contact information

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<tr>
<th>Full name</th>
<th>Wim Nijman</th>
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<td><a href="mailto:w.nijman@bamgroep.nl">w.nijman@bamgroep.nl</a></td>
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<tr>
<td>Organisation name</td>
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<td>Address</td>
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Title

Development and diffusion of ICT innovations in the construction sector

Describe your project idea

There is a need to assess the potential non-technical barriers and enablers to achieving a better diffusion of ICT innovations in construction. The focus to this point has been on solving the technical issues, not on non-technical ones. The overall aim of the research is to map the non-technical factors influencing diffusion and further develop guidelines for the successful development, implementation and diffusion of ICT innovations in the construction sector.

Please explain briefly your expertise

My expertise is on sectoral competitiveness and development in construction and specifically on innovation and innovation diffusion in construction and project-based sectors. Significant in this regard is the criticality of communication vertically within the supply chain and laterally amongst suppliers with respect to specific innovations during the development phase, such that diffusion becomes normal and, therefore, integral feature of construction activity.

Please describe what your contribution will be to this project (financial, technological,...)

My contribution would be on the understanding of innovation and innovation diffusion in project-based sectors. This would enable new or ongoing developments on ICT in construction to better assess non-technical factors influencing the innovation and diffusion of new products or tools, and subsequently a more successful commercialisation of them.

Explain which type of contribution you are looking for (financial, technological,...)

I am mainly looking for projects on the development of ICT tools or products for the construction sector where I can map the innovation and innovation diffusion process.

Contact information

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<tr>
<th>Full name</th>
<th>Kristian Widén</th>
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EurekaBuild (E3790) Project Idea Form

> Title
Stakeholder management and communication in construction projects

> Describe your project idea
Any construction project involves a number of stakeholders with various, and sometimes diverging, claims upon project implementation and decisions processes. Thus, the issue at hand is for the project organisation to perform sufficiently in accordance when managing relationships with project stakeholders. An increased understanding is needed of the stakeholder management process during different stages of a construction project. An important aspect in stakeholder communication is to give the right kind of information, in the right way and at the right time. I this process various ICT solutions, correctly used, could be a successful way of obtaining a improved stakeholder communications process. The focus of this project idea will be stakeholder management processes during the construction stage on site.

> Please explain briefly your expertise
I have studied processes and method for analysing stakeholder impacts on project decision in the early planning stages of a property development process. These methods are, however, general for a variety of projects and can be used in different stages. The analysis of stakeholder impacts will act as an input to a stakeholder management process, and basically examines the need and extent of communication to stakeholders.

> Please describe what your contribution will be to this project (financial, technological,...)

> Explain which type of contribution you are looking for (financial, technological,...)

Contact information

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<tr>
<th>Full name</th>
<th>Stefan Olander</th>
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EurekaBuild (E!3790) Project Idea Form

> Title
DESIGNING FOR CONSTRUCTION SITE SAFETY

> Describe your project idea

Rigorous safety measures to improve construction site safety have been the subject of positive interest and support from the construction industry. These measures focus on both reactive and proactive steps. Despite the positive interest, fatalities’ figures continue to raise concern. Fatalities are due to the many obstacles that stand in the way of the full and proper implementation of safety measures. It is necessary to question whether or not more stringent safety measures are capable of being employed effectively and if the cost of doing so is realistic.

The industry needs to tackle these safety issues and barriers by adopting a ‘design for safety’ approach as the primary means for improving safety on construction sites. This concept entails addressing the nature of barriers and failures from the concept stage, through the detail design stage, procurement stage, construction stage and, finally, completion. By analysing the barriers at all these stages, it is hoped that a solution will be able to be implemented. Incorporating additional safety measures from the concept stage through to completion, perhaps with the aid of artificial intelligence (AI) and informational support to workers, might help to improve the implementation of these measures. It is anticipated that a ‘smart safety’ approach would be able to detect unsafe acts or unsafe conditions. Using the new Mercedes S class as an analogy, where the vehicle is able to detect a hazard and warn the driver approaching it, so too should it be possible to warn workers of impending hazards and danger.

It is hope this new approach to ‘design for safety’ will be able to determine risk before undertaking any task, and detect hazards – reducing or eventually eliminating them – before and during construction and, finally, be able to propose remedial actions.

> Please explain briefly your expertise

16 years of practical experience gained in construction provides a strong motivation for this research into safety issues. Previous (doctoral) research focused mainly on looking at proactive safety factors for construction sites and how they affect safety performance. A more recent focus is the correlation between construction accidents and the educational background of workers.

> Please describe what your contribution will be to this project (financial, technological, ...)

‘Smart safety’ design for construction
The primary interest is in producing pragmatic, reliable, ready-to-use systems that are able to determine risks from the point at which a hazard is identified and then, subsequently, taking steps to eliminate the hazard. The result is not seen in terms of a single computerised system, but more as a matter of focusing on the adoption of appropriate measures throughout the construction process in order to reduce as many unsafe acts and unsafe conditions as possible. It is anticipated that one of these measures might well be in the form of an AI approach, involving software design with some manual detection.
**Explain which type of contribution you are looking for** (financial, technological,...)

- Financial support
- Experts in AI, C++, Visual Basic 6

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Date: To be sent back to secretariat.eetp@csib.fr and ...
# EurekaBuild (E!3790) Project Idea Form

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<td>Building Analysis and Evaluation Tools</td>
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<tr>
<th>&gt; Describe your project idea</th>
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<tr>
<td><strong>Research problem</strong></td>
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<td>There are already some commercial applications that have been developed to work directly with building data from BIM applications, but these are restricted mostly to traditional analysis tasks such as structure, energy use, daylighting, and cost. A significant body of academic research can be devoted to developing analysis tools for other aspects of building design such as circulation, habitability, egress, emergency evacuation, ventilation, and so on, as well as &quot;softer&quot; criteria (those that are harder to quantify) such as aesthetics, cultural fit, the Chinese system of feng shui, etc.</td>
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<th><strong>Background</strong></th>
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<tr>
<td>The architectural profession has devoted substantial time, effort, and research to develop guidelines for good building design for varied aspects and criteria. All of these are currently captured in text form in numerous handbooks of architectural standards. However, adoption of these &quot;good design principles&quot; has been difficult to enforce, because the drawing- and CAD-based processes that were in place so far made it extremely difficult to check a proposed building design for the satisfaction of specified criteria. Even when the guidelines were captured in the form of software tools, the design information had to be input into the tools manually, which was an extremely tedious process in addition to being fraught with inaccuracies. This is why quality control has not yet become an integral part of the building design process.</td>
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<td>This scenario has changed radically with the advent of BIM. Since BIM applications capture the representation of the building design in an intelligent format, a BIM model of a building has the necessary semantics for it to be automatically evaluated and analyzed for the satisfaction of all criteria that can be captured algorithmically in a computer program. The proposed research problem is work that would not typically be undertaken by commercial software vendors, but it would be critical in making analysis and evaluation a more integral part of the design process and instituting better quality control than what we have in place today. It may not guarantee great architecture in the future, but it will at least ensure that bad designs don't get built.</td>
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<tr>
<th>&gt; Please explain briefly your expertise</th>
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<tbody>
<tr>
<td>Professor of architecture at the Faculty of Architecture and Fine Art of the Norwegian University of Science and Technology (NTNU).</td>
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<th>&gt; Please describe what your contribution will be to this project (financial, technological,...)</th>
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<tr>
<td>We are looking for collaboration parties from the industry as well as from research organizations. Providing we can establish the necessary funding, we intend to assign a PhD student to this research topic.</td>
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EurekaBuild (E!3790) Project Idea Form

> Explain which type of contribution you are looking for (financial, technological,...)

Cooperation partners and financial support

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Intelligent or Smart Objects for use in BIM

Research problem
What is the best way to connect BIM applications with real-world building products listed in manufacturers’ catalogs? Does the manufacturer have to develop BIM object libraries separately for every BIM application, or is there some common format for developing these that will allow them to be used by any BIM application? Where should these object libraries reside: within the application, within a shared server in a firm, or online on the manufacturers’ website?

Background
One aspect of BIM that still remains to be properly researched and resolved is that of the individual models of building elements that are needed to populate a BIM model of a building. Currently, each BIM application has its own library of generic content, and the BIM models being produced by these applications do not necessarily have real-world object attributes. Until issues such as these are resolved, product manufacturers will be reluctant to go about the task of developing BIM models of their products, which will remain a significant obstacle for widespread BIM implementation in the industry.

Please explain briefly your expertise
Professor of architecture at the Faculty of Architecture and Fine Art of the Norwegian University of Science and Technology (NTNU).

Please describe what your contribution will be to this project (financial, technological,...)
We are looking for collaboration parties from the industry as well as from research organizations. Providing we can establish the necessary funding, we intend to assign a PhD student to this research topic.

Which type of contribution you are looking for (financial, technological,...)
Cooperation partners and financial support

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<tr>
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## Integration versus Interoperability: Re-examining the Relevance of the IFC

### Research problem

In light of the increase in the number of solutions that directly integrate with the mainstream BIM applications, what impact does it have on the relevance of the IFC file format? What is the effectiveness of solutions that rely on the IFC to work with BIM applications or BIM data compared to solutions that integrate directly with BIM applications?

### Background

With BIM implementation gaining momentum in the AEC industry, this would be a good time to revisit the issue of integration—where applications working together using the same file format or through application programming interfaces (APIs)—versus interoperability—where applications are able to exchange information using an open file format like the IFC. Vendors such as Autodesk and Bentley have already developed integrated suites of BIM solutions for architectural, structural, and MEP design on the same platform (Revit and MicroStation respectively) and are busy expanding their “ecosystem” of solutions by encouraging third-party vendors to develop supporting applications that integrate with their BIM solutions using APIs. These are important topics that need to be researched in order to provide the industry with guidance on the best way forward. Considering the significant amount of resources that have already been invested in the IFC and are continuing to be invested, it is important to re-examine its importance and relevance so that the resources are not wasted.

### Please explain briefly your expertise

Professor of architecture at the Faculty of Architecture and Fine Art of the Norwegian University of Science and Technology (NTNU).

### Please describe what your contribution will be to this project (financial, technological,...)

We are looking for collaboration parties from the industry as well as from research organizations. Providing we can establish the necessary funding, we intend to assign a PhD student to this research topic.

### Explain which type of contribution you are looking for (financial, technological,...)

Cooperation partners and financial support

## Contact information

| Full name       | Knut Einar Larsen |
EurekaBuild (E!3790) Project Idea Form

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<tr>
<th>Email address</th>
<th><a href="mailto:knut.e.larsen@ntnu.no">knut.e.larsen@ntnu.no</a></th>
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<tr>
<td>Organisation name</td>
<td>Faculty of Architecture and Fine Art, NTNU</td>
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<tr>
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<tr>
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<tr>
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<td>+47 73595090</td>
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<tr>
<td>Fax.</td>
<td>+47 73595083</td>
</tr>
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Innovation in AEC industries?

Building as an inter-disciplinary Process

Building Performance or "building" performance

---

i4Ds Portrait:

The Institute for 4D Technologies and DataSpaces (i4Ds) is working in the German speaking region of Switzerland and is internationally active with focus on R&D for ICT solution for the AEC industry.

http://www.i4ds.ch
Strategic Objectives:

1. The i4Ds is an inter-disciplinary Institute with a high degree of Informationtechnology

2. Core Business of i4Ds are R&D for ICT Solutions for the AEC Industry

3. The competencies of the Virtual Environments and Data Spaces will be used for the Core Business but both fields may develop independently

Main Research:

4D Technology

R&D Fields:

4D Technologies
Process Modelling and Optimization
Virtual Environments
Data Spaces
Set up a Consortium to propose Research Projects within the (8th) EU Research Framework Programme

EurekaBuild Project Idea Form

Research Topics: Virtual Design and Construction

A.) Visualization of building processes (4D–Technology, Virtual environments, Animation, Videos, etc.)

B.) Modelling of Products, Organisation and Processes (POP–Models) supported by intelligent agents

C.) Development of metrics for the quantification of the efficiency of Products, Organisation and Processes and corresponding visualization methods

D.) Digital Models and applying Building Information Management systems (BIM)

Research Topics: Virtual Design and Construction

E.) Development of tools for the simulation and for the support of Lean Construction processes

F.) Development of Process Design Patterns

G.) Development of knowledge based models for automating processes

H.) Development of advanced working environments for performance predictions using 3D/4D models and design of integrated User Interfaces for VDC applications and communication platforms
Research Topics: Virtual Design and Construction

I.) Development of ICT systems to support integrated collaborative environments in AEC

J.) Development of advanced geometric, structural and semantic reasoning methods

K.) Real time monitoring and control throughout the construction process (whole life cycle)

L.) Social and cultural issues

M.) Augmented Reality visualization of the building process on site

Consortium for research in Virtual Design and Construction within FP7 or FP8:

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<th>Institutions</th>
<th>Coordinator</th>
<th>Status</th>
<th>Incentive Level</th>
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Letter of intent:

The Centre for Construction Innovation & Research (CCIR), University of Teesside, UK, and the Institute of 4D-Technologies & DataSpaces (4DS), University of Applied Sciences Northwestern Switzerland, plan to establish a consortium in order to propose a research project within the 7th (or possibly 8th) EU Research Framework Programme. The projects will address open problems in Virtual Design and Construction (VDC).

The procedure for establishing a consortium and submitting a proposal will be as follows:

1.) Research institutions and industry partners which might have a possible interest to participate in such a project are asked for their commitments. A commitment is expressed by designating a contact person, assigning a number of working days which will be allocated for the preparation of a proposal, listing research topics of particular interest and indicating if the institution would be willing to take the project lead.

Note that in the FP7 also partners from non-EU countries may participate in research projects, although partners from industrial countries (USA, Japan, etc.) generally are not eligible for funding.

2.) The proposed research topics will be discussed with the designated contacts and an aggregated research outline will be finalised. Subsequently, the consortium will be consolidated and first drafts of the proposal will be worked out.

3.) Possible Calls within FP7 or FP6 will be identified late which the projects might fit. A final proposal will be generated iteratively by the consortium partners — and submitted.


Please complete the following list of research topics, the commitment details (add your logo to the header) and return the document to n.n.dawood@tees.ac.uk or manfred.vogel@hsrw.ch

If you know any partner institutions which should be in the consortium, feel free to forward this document to them.

Research topics of interest:

(Please feel free to extend this list)

A.) Visualization of building processes (4D-Technology, Virtual environments, Animation, Videos, etc.)
B.) Modelling of Products, Organisation and Processes (POP-Models) supported by intelligent agents
C.) Development of metrics for the quantification of the efficiency of Products, Organisation and Processes and corresponding visualization methods
D.) Digital Models and applying Building Information Management systems (BIM)
E.) Development of tools for the simulation and for the support of Lean Construction processes
F.) Development of Process Design Patterns
G.) Development of knowledge-based models for automating processes
H.) Development of advanced working environments for performance predictions using 3D/4D models and design of integrated User Interfaces for VDC applications and communication platforms
I.) Development of ICT systems to support integrated collaborative environments in AEC
J.) Development of advanced geometric, structural and semantic reasoning methods
K.) Real-time monitoring and control throughout the construction process (whole life cycle)
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Reasons for BAM to deploy Virtual Design & Construction

- Improve project insight & communication to ensure client’s value and efficient management of risks
- Efficiently process consistent product & process data throughout the project lifecycle & across the extended enterprise
- Reduce failure costs - improve efficiency, quality, project control
- To create more value efficiently and to be more COMPETITIVE

A 10 year learning by doing approach paid off, but BAM needs to explore longer-term solutions.

BAM EurekaBuild Project Idea
Companies such as BAM need to setup its Object Repositories to start capturing data over projects and setup its catalogues.

Explore

For model based engineering, estimation, production planning purposes object definitions, properties and taxonomies are setup PER PROJECT. Specialisation trees are inconsistent, definitions vary, so data cannot be re-used over project. The lack of inconsistent property sets causes even problems to compare within 1 project.

To be:
An object repository, setup independently from software solutions, in line with standardization efforts, should enable BAM to design a consistent data flow through different disciplines.
A consistent process of decomposition and specialisation should be supported.
Flexible but structured object libraries should be build up, based on several projects.

Main focus:
Capture functional demands and technical solutions during engineering, estimation and production planning so proper quantity reports can be generated, aspects can be compared between project stages and solutions can be re-used between projects.
Explore how this repository can be deployed in a commercial model server environment
Define short and long term steps for usage in house - how to maintain links to standardisation efforts

BAM Contribution:
BAM can contribute its experiences and concepts regarding model based estimation and production planning.

Partner Contribution:
Partners contribute with state-of-the-art solutions regarding taxonomies, currently available content, and proof of concepts which were developed in several R&D projects so far.

Approach:
Use what’s available and learn by doing.
Selvaag BlueThink develops methodologies and IT-applications that dramatically improve product and project development capabilities of home builders. CASA™ Knowledge Suite supports the development of flexible housing products which are quality assured through automated use of corporate knowledge. The digitally represented housing products are used in projects to automatically create detailed documentation and visualization.

Knowledge based automated design
The building industry is on a quest for improving quality and at the same time reducing waste and cost. One approach is knowledge based automated design. Automated design increases quality and reduces the time spent in design and engineering documentation by activating and managing corporate knowledge.

Applications and services
CASA™ Knowledge Suite organizes experience and knowledge by the collection and categorization provided by Experience. The knowledge is automatically applied by House Designer to support design, engineering and detailed analysis of housing products. Master Planner puts the knowledge together for complete projects, and Supervisor brings the knowledge back to the construction site as digital models and quality documentation for each house.

Experience
Experience supports the collection and refinement process of experiences made in product development and construction sites. The application supports a number of workflows for deviation reporting and error handling, technical clarification, customer issues, etc. The methodologies and tools ensure a unified knowledge management process and makes the knowledge searchable and accessible as part of the available analysis tool.

House Designer
House Designer supports product developers by automating knowledge and actively presenting best practice solutions and enabling mandatory rules to be used. The applications suggest and validate solutions based on the organizational knowledge using “Knowledge Based Engineering” technology. The technology supports automated reasoning over multiple parameters supporting the developers in their decision-making.

Master Planner
Master Planner supports project developers with a workbench enabling him to drag and drop type functionality to edit a complete project. The project scenario is immediately validated and visualized. At the same time, the developer will be presented with cost and revenue estimates including building, infrastructure and landscaping.

Supervisor
Supervisor represents different housing products with base configurations and available, predefined options allowing customization for both projects and end customers. The easy-to-use graphical interface enables the user to explore the different variations allowed for each house and supports project and end customers by immediately available 2D and 3D presentation of the complete house. Production of required project and technical documentation is also automated. The application allows mass customization without losing quality.

Customers
Selvaagbygg and SelvaagbyggPlus launched a 3 year project in 2005 to realize efficiency effects from using Selvaag BlueThink's applications through re-industrialization and automation of design, engineering and documentation. The first housing project utilizing the tools was the low budget housing project Tuwevelen in Fet municipality, close to Oslo, built in 2004.

Selvaag BlueThink AS is a wholly owned subsidiary of the Selvaag Group and develops methodologies and IT-based tools for knowledge based industrialized house building. We believe that long term plans, innovation and pioneering efforts lay the foundation for a high value creation and a long term, solid earnings.
Improved design process

- Ability to impact cost and functional capabilities
- Preferred design process (BIM)
- Traditional design process
- CASA™ Knowledge based design process

PD: Pre Design
SD: Schematic Design
DD: Design Development
CD: Construction Documentation
PR: Procurement
CA: Construction Administration
OP: Operation

Cost of design change

Graphic originated by Patrick MacLeamy, AIA
SEAMLESS INTEGRATION OF DATA FOR DESIGN, CONSTRUCTION AND MAINTENANCE OF INFRASTRUCTURE INSTALLATIONS

BASED ON THE NORWEGIAN NATIONAL ROAD DATABANK (NVDB) TECHNOLOGY

ViaNova will make use of the technology developed in the NVDB-project for integration of data for all phases of an infrastructure project.

ViaNova seeks foundings, partners and pilot projects to realize this goal.

Ongoing pilot project: Planwork - "Sydhavna"

Statens vegvesen
Norwegian Road Authorities

VIANOVVA
**STAND-INN BuildingSMART: Smart standards for the building life**

**Objectives**

- Investigating, testing and promoting innovative approaches and best practices based on open standards
- Setting up practical guiding services for stakeholders
- Establishing Pan European innovation networks for the integrated life-cycle and management of the building environment

**Actors**

**Companies**
- EnviChina, Norway
- EPM Technology, Norway
- Senate Properties, Finland
- LjusTech Konsult AB, Sweden

**Innovation Consultancies**
- AEC3 Ltd, United Kingdom
- Faithful & Gould Ltd, United Kingdom
- Ingenieurbüro Dr.-Ing. Wolfram Trinius, Germany

**Standardisation Bodies**
- Standards Norway, Norway
- Swedish Standards Institute (SIS), Sweden
- Ente Nazionale Italiano di Unificazione, Italy

**Clusters**
- IAI, Norway
- IAI, Italy
- CIB, The Netherlands
- International Alliance for Interoperability, International Council, United Kingdom
- IAI International Council Ltd, United Kingdom

**Information Service**
- The Building Information Foundation, Finland

**Research Centres**
- SINTEF Byggeforsk - Building and Infrastructure, Norway
- VTT - Technical Research Centre of Finland, Finland
- CSTB, France
- Fundación LABEIN, Spain
- UNINOV, Portugal
- Belgian Building Research Institute, Belgium
- China Academy of Building Research, China
- China Institute of Building Standard Design & Research, China

**Universities**
- Centre for Built Environment - University of Gävle, Sweden
- Vilnius Gediminas Technical University (VGTU), Lithuania

**Coordinator**
SINTEF Byggeforsk
Prof. Dr. Ing. Svein E. Haagenrud
Phone: +47 22 96 5843
e-mail: svein.haagenrud@sintef.no

www.europe-innova.org
**Vision:** Sustainable value creation for customers over the lifecycle of buildings using information models

**BuildingSMART Vision:**
- Laws and regulations
- Building regulations
- Building specifications
- Knowledge databases
- Simulation tools
- Digital twins
- Construction management
- Procurement
- Specification
- CAD software
- VRML

**IFC + IFD Building Information Model**

**IFC:** How to store and exchange information
- Industry Foundation Classes

**IFD:** Uniquely define what information you are storing and exchanging
- International Framework for Dictionaries

**IDM:** Which information to exchange and share, and **when**
- Information Delivery Manual

**Sector:** Construction

**STAND-INN**

**Highlights of challenges**

**Mission:** To provide guidance on how standardisation supports innovation and "building smart", by actively disseminate information about sustainability and BIM standards.

**Support:**
STAND-INN is supported by the European Commission under the Europe INNOVA initiative.

**Website:** www.europe-innova.org
6 Lessons learned

The organisers of the first EurekaBuild workshop (in Rotterdam – www.deltaneith.nl) made a list of success factors and recommended improvements. These are quoted below, and supplemented with experience from the 2nd workshop:

Success factors
1. The commitment of the FA leaders is very important to get international people involved in participating in the workshop and brokerage event, and also in linking the brokerage event/match making to the FA groups and their research background and priorities.

2. The location: It is a big advantage to have both the lectures and the posters in the same room. This way we can connect the lectures with the posters by discussing the posters that are in relation to a particular lecture immediately after that lecture. Also, it was good to have the dinner at the same place to keep all participants assembled and focussed.

3. Both NUS and NUP should preferably be members of the organising and match making committee. This guarantees that both the public agencies and the industry will be involved. This committee has an important match making role during the event: they know the background of the participants and know the ideas presented on the posters/in the templates, therefore they can be active in connecting participants with one another.

4. The role of the NTPs – individually and as a network within ECTP – is also crucial and should be further developed as a basis for information, trans-national contact making and generating of ideas. EurekaBuild as an umbrella will not have the capacity to work proactively in all Focus areas and countries, and will have to rely on the initiatives and enthusiasm of the NTPs.

Advised improvements
1. We should emphasize the simplicity of the process of combined research more. During the events it became clear that the participants are unaware of the process of combined research so we elaborated on:
   a. Clarity of your needs; what is necessary to develop?
   b. Do I do this development alone or in combination with others?
   e. Who will by my partners?
   d. What is our common goal?
   e. What is our action plan?
   f. What are the resources?
   g. What is the appropriate funding scheme?
   h. And how can we submit proposals?

2. We should involve clients in the event.
3. We could possibly add a prize for the best poster to stimulate participants.

4. We could end each morning and afternoon session by inviting participants to choose a poster that attracts them the most, to go sit around that poster and discuss with other participants who have chosen the same poster, about possible cooperation.

5. How can we support the more cross border participation of these workshops and brokerage events?

6. Many participants are confused on the big differences when it comes to National funding schemes, different deadlines and timing etc. We should elaborate a kind of easy-to-read guidance on how to launch projects, whom to talk to and how to handle the cross-European differences. The NPC/NUS/NUP/NTP in the different countries must know, and know, how to guide proposers, and where on the net to find the most essential information.

7. So far (the two workshops and Versailles) it has been quite easy to have a lot of project ideas presented. But we need to improve the process from idea to project. We also need to have a better marketing of the web site presenting “Project ideas looking for partners”.