KITARA RESEARCH PROGRAMME

PROJECTS TO BE FUNDED

Transportation data acquisition by means of ICT-derived 3D modelling
Ernvall Timo, Helsinki University of Technology
Chen Ruizhi, Finnish Geodetic Institute
Haggrén Henrik, Helsinki University of Technology
Hyyppä Juha, Finnish Geodetic Institute

Data model automation in reparation and construction of the paved road network
Heikkilä Rauno, Oulu University
Sallinen Mikko, Technical Research Center of Finland
Kilpeläinen Pekka, Technical Research Center of Finland
Nevala Kalervo, Technical Research Center of Finland

Data management and exploitation during the use of a facility
Pakanen Jouko, Helsinki University of Technology
Jokela Timo, Oulu University
Vähä Pentti, Technical Research Center of Finland

ICT as an enabler for conversion of real estate business to customer focused workplace industry
Sulonen Reijo, Helsinki University of Technology
Järvenpää Eila, Helsinki University of Technology
Kankainen Jouko, Helsinki University of Technology

Potentials of networking in the application of ICT solutions for life cycle designs of buildings
Häkkinen Tarja, Technical Research Center of Finland
Malinen Pekka, Helsinki University of Technology
Siltanen Pekka, Technical Research Center of Finland

Use of ICT 3D measuring techniques for high quality construction
Jokinen Olli, Helsinki University of Technology
Hyyppä Juha, Finnish Geodetic Institute
Kanerva Pekka, Helsinki University of Technology
Vermeer Martin, Helsinki University of Technology

Introduction of internet-based cooperation techniques in construction
Kiviniemi Arto, Technical Research Center of Finland
Björk Bo-Christer, Hanken
Savioja Lauri, Helsinki University of Technology
Weck Tor-Ulf, Helsinki University of Technology
Kiiras Juhani, Helsinki University of Technology

Virtual camera systems in 4D modelling in construction
Kähkönen Kalle, Technical Research Center of Finland
Woodward Charles, Technical Research Center of Finland

MRI-combatible surgical robot
Heikkilä Janne, Oulu University
Myllylä Risto, Oulu University
Nevala Kalervo, Oulu University
Sallinen Mikko, Technical Research Center of Finland

Development process for networked control systems in a mobile working machine
Juhala Matti, Helsinki University of Technology
Koskinen Kari O., Helsinki University of Technology
Pulkkinen Urho, Technical Research Center of Finland

Embedded control and monitoring systems in production machine networks
Jämsä-Jounela Sirkka-Liisa, Helsinki University of Technology
Kortela Urpo, Oulu University
Lautala Pentti, Tampere University of Technology

Water hydraulic mobile machines with intelligent condition control
Koskinen Kari T., Tampere University of Technology
Mäntylä Tapio, Tampere University of Technology
Pietola Matti, Helsinki University of Technology

ICT Support for the renewing business and service concepts of foundry industry
Orkas Juhani, Helsinki University of Technology
Ekman Kalevi, Helsinki University of Technology
Nieminen Marko, Helsinki University of Technology

Transients and efficiency control in digital hydraulics
Pietola Matti, Helsinki University of Technology
Linjama Matti, Tampere University of Technology
Walden Marina, Åbo Akademi University

Combining image and touch data in robotics
Handroos Heikki, Lappeenranta University of Technology
Kälviäinen Heikki, Lappeenranta University of Technology

Further information

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Other funding agencies:

Tekes

YMPÄRISTÖMINISTERIÖ
MILJÖMINISTERIET
MINISTRY OF THE ENVIRONMENT

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Academy of Finland
Research funding and expertise

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The Application of Information Technology in Mechanical, Civil and Automation Engineering

Research Programme
of the Academy of Finland
KITARA 2005 – 2009

Academy of Finland
Research funding and expertise

The Application of Information Technology in Mechanical, Civil and Automation Engineering (KITARA) 2005-2009

KITARA in brief

The mechanical engineering and construction cluster makes a major contribution to the Finnish national economy. There exists internationally competitive applied know-how in these fields, but the extent and coverage of basic research should be expanded and the infrastructure of scientific research strengthened. However, Finland has world-leading know-how in ICTs, and the incorporation of that expertise in mechanical, civil and automation engineering would give a strong competitive edge in the global marketplace. The new knowledge generated in the research programme will provide a platform for the industry's applied research and innovative solutions.

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AIMS OF THE RESEARCH PROGRAMME

The aim of the research programme is to strengthen basic research expertise in the fields of mechanical, civil and automation engineering through the application of information and communications technologies. The programme will support the development of new multidisciplinary research groups and national and international networks of cooperation. In keeping with the strategies of different actors within the mechanical engineering and construction cluster and the funding bodies involved, cooperation will be aimed at strengthening and diversifying basic research and tying it in more closely with these branches' development visions.

SUBJECT AREAS:

- information and communications technologies that support design, manufacture and use
- information and communications technologies incorporated in the product
- life-cycle management and its networking in business companies and systems information and communications technologies that support interaction between users and building/machine and the changing environment of use

1. Information and communications technologies that support design, manufacture and use:

Information technology has become an important tool in the design of products, processes and services. Product modelling, process simulation and the

Development Process for Networked Control Systems in a Mobile Working Machine

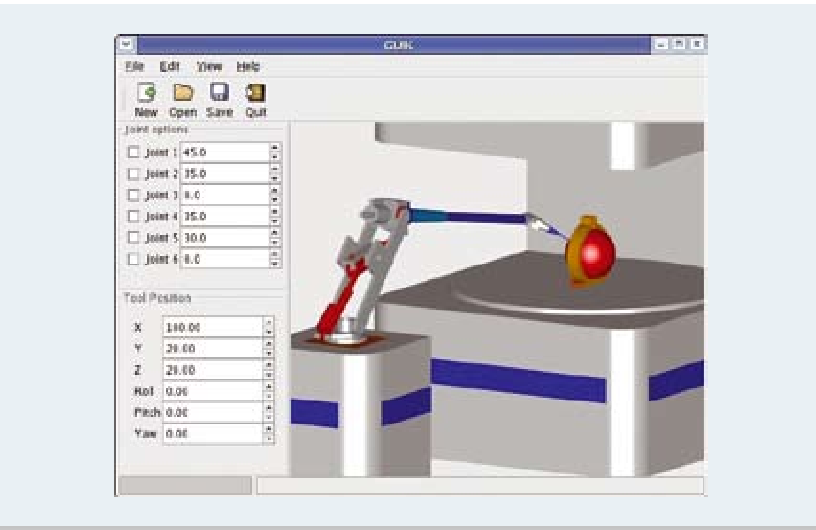
incorporation of life-cycle factors in the design process help to create greater coherence between design, process and maintenance and by the same token to improve overall manageability. Information technology can help to improve both the quality and speed of design. Virtual prototypes can be used to test various application scenarios without needing to build mechanical prototypes or scale models. The information network allows for geographically decentralised design. The joint online use of simulation models describing different aspects of a machine or building opens up new opportunities, but is also very challenging.

2. Information and communications technologies incorporated in the product:

In the future, information technology will be incorporated as an integral part of the product, adding new features and uses and making the product easier to use. More and more, users will require of machines and production systems an ability to adapt to variable, rapidly changing, unpredictable situations. Diagnostics and prognostics are key features of products and systems that have the capacity to learn and adapt to variable situations. Measurement data can be translated in real-time into corrective action in order to eliminate or prevent faults and malfunctions.

3. Life-cycle management and its networking in business companies and systems:

Information and communications technologies have a key role to play in life-cycle management. Management of the life-cycle of buildings is a real estate business that is undertaken in practice by an extensive network of business companies and systems. Features can be incorporated in products and services that through their life-cycle efficiency add significantly to productivity and create completely new innovations. Information and communications technologies make it



MRI-combatible Surgical Robot

Use of ICT 3D Measuring Techniques for High Quality Construction

possible to modify a product or production system during its life-cycle, to improve its properties or add or activate new features by means of software modifications or plug-ins that can be supplied online. The changes required and opportunities offered by the information and service society in the life-cycle management of the existing built environment will be even greater than those seen in the construction process.

Information and communications technologies will also allow for the integration of the data contents concerning building production and building use and thereby pave the way to trading based on life-cycle features.

4. Information and communications technologies that support interaction between users and building/machine and the changing environment of use:

In the interaction between man and building and between man, machine and the changing use environment, information and communications technologies have a crucial role to play in processing and representing information to users in a readily intelligible format. Interaction aims at user-friendly design and an interface that adapts according to the end-use or user characteristics. The interaction can take place either in situ or via a remote connection. The main emphasis in interaction is on diverse user interfaces.

Photos:
projects of KITARA research programme, futureimagebank.com, photobankers.fi

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