



MAGNET *and related* ***TECHNOLOGIES***

Companies attending the
workshop

7.6.2006

Antti Heikkilä

AB Ångpanneföreningen – ÅF Group

The ÅF Group is a leading name in technical consulting. We offer highly qualified services and solutions for process industries, infrastructure projects and the development of products and IT systems. We also carry out certified third-party testing and inspection work



Goals

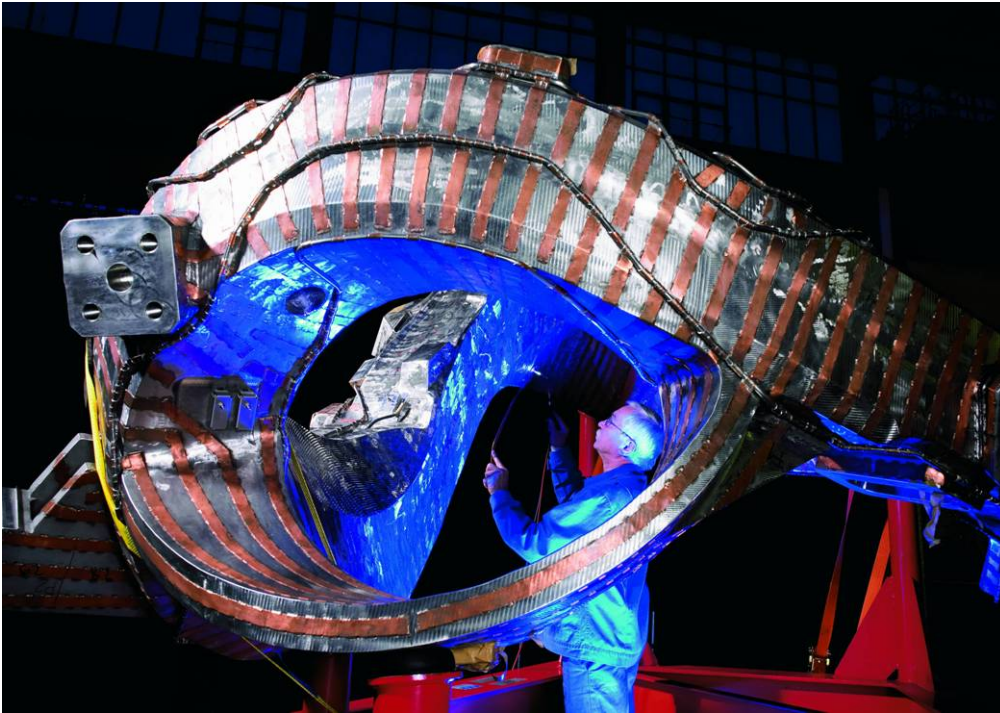
Gain knowledge and understanding about the electromagnetic challenge for the ITER project.

What must be achieved and what is the strategy to reach the goal.

Make contact with company and people involved in the challenge.



Magnet Technology- Fields of activity



Non-planar modular field coils for Wendelstein 7-X, Germany.
Other references: CERN dipole magnets; Superconducting model coil TFMC, ITER; Cryostats and corrector magnets, HERA; Studies regarding the industrial fabrication of superconductive cavities for the TESLA -Project.

- Magnets and components for fusion experiments and accelerators
- Development and fabrication of superconducting magnets and magnet systems, e.g. dipoles and quadrupoles
- Cryostats and vacuum vessels
- Special-purpose tools for fabrication of magnets
- Manipulator systems for magnets
- Feasibility and fabrication studies
- Design and calculation of magnetic systems

GOALS

First hand information on new and ongoing projects, future trends in magnet and related technology

Contact with research institutes and potential industrial partners

Stimulations of know-how and technology transfer between institutes and EU industry

Coordinated actions of institutes and industry towards international projects, Combined effort for conservation and extension of know-how



BGM Cryogenic Engineering Limited manufactures assemblies, sub-assemblies and machined components for the cryogenic technology sector. The primary markets served include superconducting magnets used in the healthcare sector (eg MRI body scanners), spectroscopy and NMR equipment for numerous R & D and technology applications, high vacuum applications and particle physics research. BGM has specialist assembly capability including stainless steel and aluminium welding, vacuum testing, electromechanical assembly and metal finishing. BGM offers a 'one stop shop' facility to satisfy any customer requirement. Through our design partner we can offer a full design and modelling service, including 3D modelling and production of 2D drawings on your own borders. We can conduct heat load and force calculations and advise on the best materials for construction, generate assembly work instructions and provide advice on test methodologies. With our own in-house machine shop, welding, assembly, vacuum test and bake-out facilities we can provide rapid prototyping capabilities. Through close association with sub-contract partners we can offer most forms of surface treatment, as well as specialised services such as vacuum brazing and E-beam welding

Our interest in the workshop is to network with CERN personnel and other companies operating in the magnet technology sector and to keep up to date with the latest developments within the industry

Bruker Biospin - Magnets



Bruker Biospin offers products encompassing platforms for Nuclear Magnetic Resonance (NMR), Electron Paramagnetic Resonance (ESR), Magnetic Resonance Imaging (MRI), and Fourier Transform Mass Spectr. (FTMS)

Lately also high field laboratory magnet prototypes

2000 empl. worldwide,
500 in Switzerland
Development : 30%
Product.&Test: 58%
Admin.&Sale : 12%



700 WB US Plus
NMR Magnet

21 T Laboratory
Magnet
installed at
Geneva Univ.



- ***What we do & Goals:***

- **Engineering Services:**

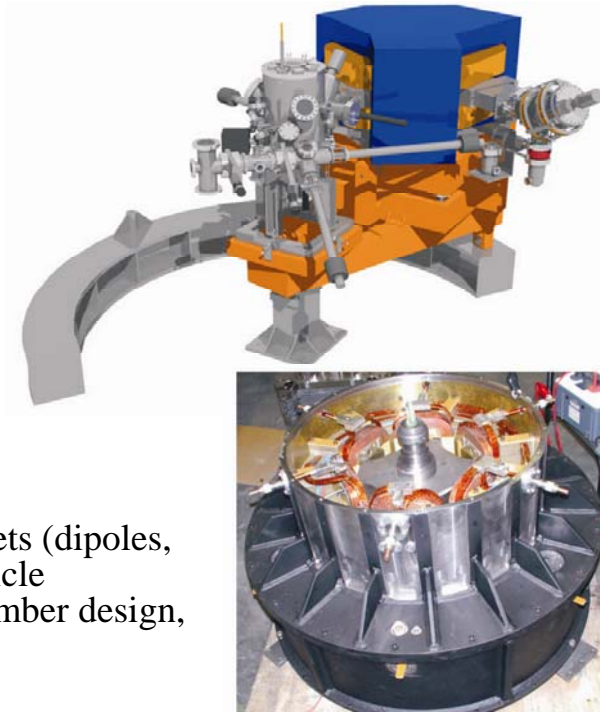
- 2D and 3D FEM and analytical electromagnetic calculations.
- 2D and 3D FEM and analytical stress calculations.
- 2D and 3D FEM and analytical thermal calculations.
- Ray tracing.
- Vacuum, cryogenics, coil cooling calculations..

- **Manufacturing & Engineering:**

- Accelerators & Scientific investigation.
 - ***Design and manufacturing*** of warm and superconducting magnets (dipoles, quadrupoles, sextupoles, octupoles, undulators, septa...) for particle accelerators, spectrographs, magnet support frames, vacuum chamber design, cryogenics...
- Fusion Reactor.
 - ***Design*** of fusion reactor structural systems, design of superconducting magnets for material characterization...
- Ultra High Vacuum (UHV) Systems.
 - Goniometer and transfer system design. ***Design and manufacturing.***
- Electrical Machines.
 - Complete electrical machine design. ***Design and manufacturing.***

- **Goals:**

- Event: Magnet technology Transfer & Future Projects.
- Collaboration: looking for machining companies, vacuum companies, cryostat companies.



Company presentation

Greenfox is a tool factory of 30 persons.

We are located in Joensuu, Finland.

Our turnover in 2005 was 3,2 M€.

We produce injection molds and plastic parts.

Our areas of expertise are project management, mechanical designing, high precision machining.

Goals for event

Meet contact and research persons in CERN to make collaboration easier.

To get overall picture of collaboration, find out what kind of expertise are needed and evaluate business opportunities.

Expectations for collaboration

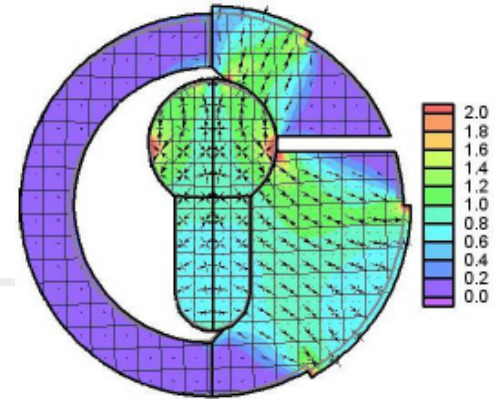
We would like to give our knowledge of machining available for your process at early stage.

We are interested in manufacturing your components, from prototypes to larger volumes, suitable for our machines.

We believe that partnership with CERN would give us good opportunity to develop our expertise, processes and machines.

Fulfilling CERNs demands would be a very good reference for us.

IJSPEERT Innovative Products



Offers product development in

- **Electro- Magnetics** speciality superconducting magnets
- **Mechanical Engineering** speciality thermal stresses

Produces in agreement with the firms

- imaginative concepts
 - finite element calculations
 - prototype design
 - prototype testing
- that can be completed with a patent submission

Examples

- Machine industry - development of X-Y adjustment device
- Machine industry - applications of the new Diaphragm technology
- Machine industry - innovative use of magnetic holding
- Bicycle industry - new ways of electricity generation on bicycles

-
- ISQ is a privately owned and independently run technological entity, founded in 1965 which offers:

- Inspection Services
- Testing and Calibration
- Vocational Training
- Certification
- Engineering and Consultancy Services
- Research and Development

- ISQ headquarters is in Oeiras, Portugal, and has offices, branches and associated companies in over 10 countries worldwide

- ***Collaboration Interests:***

- Develop contacts and identify opportunities for future collaborations in the field of Research & Development
- Inspection and Quality Control on the fields of Materials Engineering, Structural Integrity Assessment,
- Non-destructive Inspection Techniques and Maintenance.



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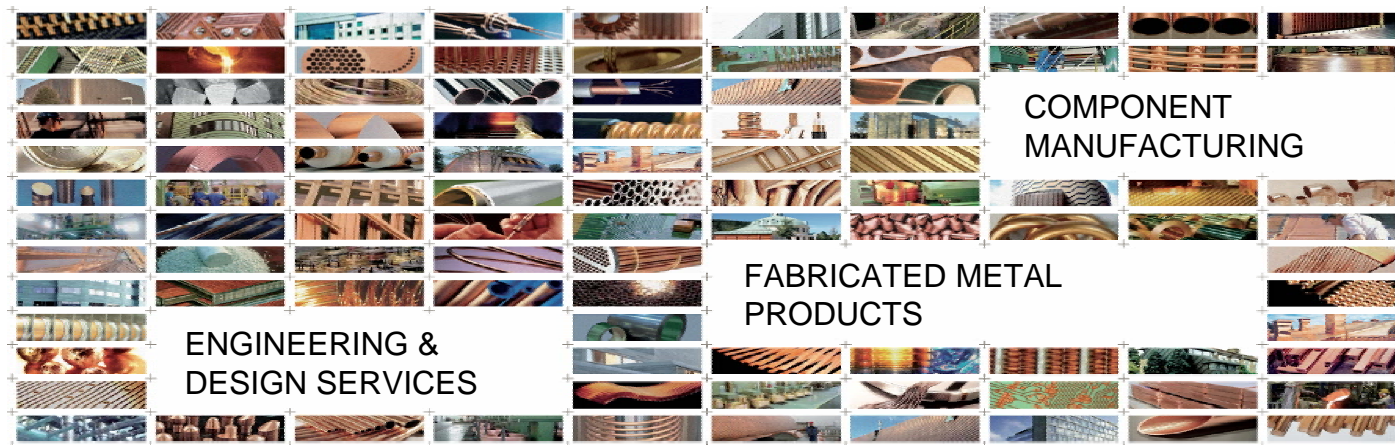
LOVAL OY

Founded In 1960
228 employees in 2005
Turnover 17,1 Million €/2005
70% of sales exported
Tube welding & Mgo filling
Conveyor belt ovens
Vacuum Brazing ovens
System & Special products
Since 1995 part of
Nibe Industrier Ab

**Loval is seeking for co-
operation / networking in
vacuum brazing
products in various materials.**

LUVATA GROUP

- Who are we? = The former Outokumpu Copper Products Group
- 6,300 employees, 27 production facilities, 13 countries
- Sales to customers in more than 80 countries on four continents
- Our products and services add value to our customers' businesses



- LTS Superconductors is one focus area
- Our goal is to build partnerships with our customers, partnerships beyond metals

Metso Powdermet Oy, Finland

Metso Powdermet is an expert company providing solutions of advanced materials and problem solving with maximum flexibility. Metso Powdermet supplies materials technology and component solutions based on powder metallurgy and complementary technologies.

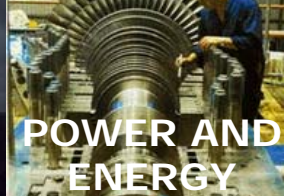
Metso Powdermet has supplied more than 2800 P/M HIPed (hot isostatic pressing) dipole magnet end covers for the CERN Large Hadron Collider.

Goals for the event:

- Continuing R&D collaboration and partnership with CERN in new science projects
- Contacts to companies involved in CERN LHC deliveries, Big Science and other demanding industrial projects
- Find new applications to P/M NNS (near net shape)- technology and advanced materials technology

Collaboration expectations

- R&D collaboration with CERN
- industrial collaboration



The Company

Puls-Plasmatechnik GmbH has been founded in 1986 and is specialized in the field of pulsed high power systems for scientific and industrial applications. Based on its well trained and experienced staff of 22 employees Puls-Plasmatechnik was able to handle many complex projects in the past.

Activities

Magnet Pulse Driver Systems

Septum and kicker driver Systems switched by thyratrons or solid state switches.

Klystron Modulators

“Line Type”- or “Hard-switched”- Pulsers.

Pulser Systems for Thermionic Electron Guns

including high voltage systems and controls.

Interlock / Control Systems for Linacs

CPLD/FPGAs-, PLC or VME technologies with EPICS implementation.

High Power Switch Assemblies

based on thyratrons or solid state switches.

Pulsed Power System Integration

especially in accelerator installations.

References

DESY, BESSY, FZ Jülich, Fraunhofer-Gesellschaft, MAXLab, INFN, LAL, PSI, RAL, ASP etc.

PPT` s goal for this workshop is

- *to present PPT` s activities in the field of accelerator technologies.*
- *to get actual information about CERN` s facilities and near-future projects.*
- *to get in to personal contact to participants of the workshop.*



SIGMAPHI

- SIGMAPHI HAS BEEN SPECIALIZED FOR 25 YEARS IN THE DESIGN, MANUFACTURE AND MEASURES OF MAGNET SYSTEMS FOR PARTICLE ACCELERATORS
- ANNUAL SALES IN 2005 6.2 M€ (80% EXPORT) TO MOST MAJOR LABS IN THE WORLD, AND ABOUT 50 EMPLOYEES
- WANTS TO DEVELOP ITS CAPACITY TO PROPOSE COMPLETE SYSTEMS AND LOOKS FOR COLLABORATIONS IN THE FIELDS OF
 - MAGNET SYSTEMS
 - MAGNETS
 - VACUUM TECHNOLOGIES
 - CRYOGENICS
 - MECHANICAL ENGINEERING
 - ACCELERATORS

- **General presentation:**

Founded in 1995, incorporating all engineering and consulting activities within the IBERDROLA group. Today, IBERINCO has a turnover above 475 million euros with a staff of more than 900 high qualified engineers.

IBERINCO is capable of providing integrated solutions for the whole areas of the energy business and have a wide international experience with projects in more than 30 countries.

- **Goals of the event:**

Make contacts with companies involved in the development of Magnets technologies

- Technology center
 - Founded 2004, 5 persons
- Research Topics
 - Permanent magnets and systems based on PM
 - LTS & HTS materials and magnets
 - Magnetic simulations and measurements
- Goals for the event
 - Overview of CERN activities & opportunities



Siemens Medical Solutions

Magnetic Resonance Div. Advanced Projects

Goals for Event

- Overview of CERN activities

- Recent advances in:
 - High Stability PSU Development
 - LTS Superconductor behaviour
 - Magnet Materials

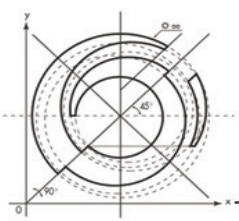
- Networking with Industry Peers

Company Description

- Tylite International Ltd;
- Network management,
several partners in Europe;
welding-, surface treatment-, coating-, precision machining technologies
- titanium component production in Russia/Finland
- R&D new titanium alloys
- R&D titanium engine components
- Goals for the event;
 - get more info of technologies required in Cern projects
 - volumes and time schedules

ABB AG

- Klaus Fricke
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+491713367060



Magnets and Superconductors, SA (MSA) **ALSTOM**

240 persons - Sales 2004-2005: 45M€

Very long past experience in magnets (high energy physics, fusion and MRI): 1st magnet for CEA end of years fifties, today deliveries of LHC Dipole cold masses

Very long past experience in superconducting wire and cable: ALSTOM has produced 50% of BEBC conductor, today deliveries of NbTi, Nb₃Sn wires & cables for LHC, MRI and RMN magnets

Goals/Expectations:

- Be aware of the expectations of our potential Customers
- Be aware of the next technologies
- Be listed in the “Magnet Industry Directory”



1988: Poloidal Model Coil tested at FzK



CERN Golden Hadron Award 2004

ACCEL Instruments GmbH

- ACCEL Instruments GmbH is a leading equipment supplier for Research, Health care, and Industry worldwide developing and delivering components and systems in rf and magnet technology, nc and sc rf cavities and modules, nc, pm and sc magnet systems and ID's, linear and circular accelerators, particle therapy systems, synchrotron beamlines, cryogenic and vacuum systems, special manufacturing incl. fusion components
- Diverse
- Dr Hans-Udo Klein
klein@accel.de
+49 171 818 7170

ANSALDO SUPERCONDUTTORI S.P.A.

- Ansaldo Superconduttori (a Company of Castel Group property of Malacalza family) deals with: design, manufacturing, test and assembling of conventional and superconducting magnets for applications in the High Energy Physics domain and in thermonuclear fusion projects. Certified according to ISO 9001, EN 729 standards, Ansaldo Superconduttori strongly focuses on the industrialisation of R&D concepts covering all the projects phases (from design up to commissioning). It is presently in charge of the manufacturing of one third of the LHC magnets.
- Magnet assembly projects, Fusion and Plasma technologies, Networking with start-up facilitators
- ENZO CARRONE
carrone.enzo@as-g.it
+39 347 5243029

Metis Instruments: Pulsed Magnet Technology and Magnetic Measurement Systems



- Key products:
 - Pulsed field magnets (B up to 50 T) and pulsed power supplies
 - CryoPulse-BI measurement platform:
innovative system for characterisation of superconducting wires and tapes
- Goals for the event:
 - Gather information on the application of pulsed magnets and power supplies for accelerator physics
 - Introduce the CryoPulse-BI to the scientific and industrial community
- Collaboration expectations:
 - Find potential partners for technical and/or commercial co-operation, i.e. co-development, licensing, distribution...

EEI introduction

E.E.I. starts the activity in 1978 with the consolidated experience in electronics power of its founders.

Today EEI is a Leader Company in the field of motors control and customized energy conversion systems.

EEI strong points:

flexibility and customized solutions

State of Art in inverter product range

Innovation and high technical solutions.



OCEM SpA

- Depuis 1946 O.C.E.M. S.p.A. est présente au projet, développement, et à la réalisation d'alimentations de puissance dans le domaine de la physique de particules, physique du plasma et de l'industrie. Parmi les caractéristiques des convertisseurs, nous proposons: · Tension de mV au 100kV · Courant de mA au 30kA · Précision à 1 ppm · Technologie avec MOSFET, IGBT, IGCT/GTO, SCR, BJT, tube à vide · Régulation: linéaire, PWM, MPWM, SWM, Double Résonance · Contrôle: analogique, numérique avec microprocesseur et DSP Une expertise alimentée par une R&D flexible et dynamique, et les nouvelles frontières de la science, assurent une innovation constante pour tous les prochains objectifs de OCEM. OCEM est aussi présente aux Etats Unis avec Multielectric Mfg. (www.multielectric.com) et en France avec Augier (www.augier.com)
- [power electronics](#)
- Miguel Pretelli, miguel.pretelli@ocem.com, +39 335 810 22 34

Oxford Instruments nanoScience

- Manufacturer of scientific instrumentation with a particular focus on superconducting magnets and the production of ultra low temperatures
- Materials development, magnet and cryogenic technology, systemisation
- Chris Friend
Chris.friend@oxinst.co.uk

Scanditronix Magnet AB

Magnets for Accelerators

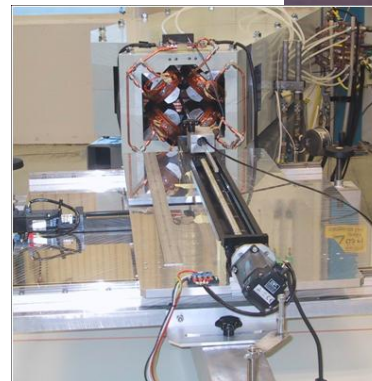
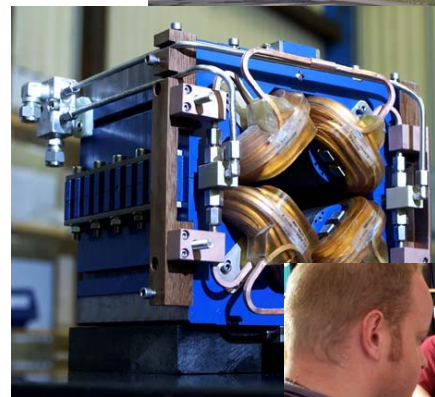
Market: Research, Medicine, Industry

Products: Dipoles, Quadrupoles etc. Coils

Activities: Field calculations, design, manufacturing, assembly, test, field mapping

Goals and expectations for the CERN workshop:

- To receive information on coming CERN projects that could be interesting to us
- To learn more about new technologies in the field of magnets for accelerators
- To discuss and compare different field calculation programs



Tesla Engineering Ltd.

- Builder of magnets for accelerators and fusion community
- cryotechnology, niobium tin
- MICHAEL BEGG
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