big science sweden

2019

The **Swedish** Guide

High-tech Swedish suppliers to Big Science, 2019

BIG SCIENCE SWEDEN BUSINESS AND INNOVATION

Vision: Sweden is a leading international driver of Big Science technology.

CERN
FAIR
ITER
ESS
ILL
ISIS
MAXIV
ESRF
DESY
XFEL
ESO
EISCAT
SKA

big science sweden

Sweden's Official ILO

Arenas of expertise:
Swedish universities, institutes and other resources

SWEDISH INDUSTRY

Big Science Sweden is funded by:

VINNOVA Sweden's Innovation Agency
Swedish Research Council
Swedish Agency for Economic and Regional Growth

Big Science Sweden is led by a consortium of leading universities, institutes and industrial network organisations:

Teknikföretagen
RI.SE
Industriella Utvecklingscentra IUC Syd
Region Skåne
Chalmers
Uppsala Universitet
Lunds Universitet
Luleå Tekniska Universitet

EDITORIAL

Big Science Sweden – an arena for business, high-tech development and innovation

At the Big Science Business Forum 2018, investments worth EUR 10 billion for the next five years were presented by nine different research facilities. The Big Science market certainly offers an exciting business opportunity for Swedish companies.

Big Science promotes high-tech development and innovation, and forms an arena where scientists and engineers can get together and stimulate one another to explore new frontiers and create tomorrow's technology. Curiosity, creativity and thinking in new ways are vital components in the process. The World Wide Web was created at CERN. CERN has also played a key role in developing technology that can be used in MedTech, e.g. for treating cancer. Key components for quantum computing technology and hardware for providing Internet access in Africa with satellite solutions were developed in collaboration with land-based space research centres. Big Science is, and will remain, an essential and important innovation arena in solving global challenges.

You are holding the second edition of The Swedish Guide – High-tech Swedish suppliers for Big Science. The number of companies presented in the guide has grown to more than 140, and we also include descriptions of a number of front-end projects involving Swedish universities and research institutes. Sweden delivers, and will continue to deliver, high-tech solutions to Big Science facilities around the world.

Sweden has a rich industrial heritage and, at the same time, has an innovative climate with a long-standing reputation for pushing back the boundaries. Swedish inventions that have made a global impact include dynamite, ball bearings, and other innovations in automation, ICT, materials science and autonomous systems. Sweden is ranked one of the world's top three most innovative countries every year – number one in the EU – and has the second highest R&D expenditure in Europe expressed as a percentage of GDP, 40% higher than the OECD average.

So, with this booklet we would like to bring some of our Swedish high-tech suppliers to you in a structured way. The companies are presented according to technology and expertise sectors, so you can easily find areas you are particularly interested in.

We hope you enjoy reading the guide. Please do not hesitate to contact me or any of our team members if you have any questions.

Best wishes,

Anna Hall
Programme Director, Big Science Sweden

CONTENTS

Photo: Kennet Ruona

SWEDEN AS A KNOWLEDGE NATION

The first Swedish university was founded as long ago as 1477, and Sweden introduced universal, compulsory schooling already in the 1840s. Today, Sweden spends more than 1.5 percent of its GDP on tertiary education and 3.3 percent of its GDP on R&D. Sweden has a long tradition of innovation, and science and technology has always had high status. The Nobel Prize Award is a testament to Sweden's long-standing commitment to excellence in research.

Photo: Ola Ericson

SWEDEN IS BIG IN RESEARCH

The MAX Laboratory has been in operation for more than 30 years, and construction of the new synchrotron facility was completed in 2016. MAX IV is hosted by Lund University, and is now the brightest source of x-rays in the world.

Currently under construction beside the MAX facility is ESS, The European Spallation Source. This will be a unique research facility based on the world's most powerful neutron source. Sweden and Denmark are host countries for ESS, which is a project run by a European consortium with member countries throughout Europe.

Photo: Per Pixel Petersson

SWEDEN INVESTS IN SCIENCE VILLAGE

Science Village Scandinavia is an area under construction on the outskirts of Lund, between the MAX IV and ESS research facilities. Science Village will grow into a dynamic, creative and sustainable city district that not only stimulates world-class research but also provides a forum for collaboration with industry and interaction with society.

Photo: White

SWEDEN OFFERS UNIQUE OPPORTUNITIES

Sweden has major research facilities spread throughout the country, from particle accelerators such as ESS and MAX IV in Lund in the south, to ground-based space research facilities such as the Onsala Space Observatory near Göteborg and EISCAT, based in Kiruna in the far north.

Photo: Lars-Göran Vanhainen

OUR MISSION AND VISION

Big Science Sweden strengthens Big Science with Swedish high-tech solutions. This involves supplying Swedish technology, services and engagement for the mutual benefit of research facilities and Swedish universities, institutes and industry.

The focus is on Big Science facilities where Sweden is a member, and in fields important for Swedish science, innovation, technology and business. Big Science Sweden is a national and international arena for high-tech development.

Our vision: Sweden is a leading international driver of Big Science technology.

BIG SCIENCE SWEDEN – A NATIONAL MISSION

Funding bodies

Big Science Sweden is funded by Sweden's largest and most important organisations for supporting and funding Swedish research and high-tech research and growth: Vinnova (Sweden's Innovation Agency), The Swedish Research Council (Vetenskapsrådet) and The Swedish Agency for Economic and Regional Growth (Tillväxtverket).

Natasa Pahlm, Strategic Project Manager, International Cooperation, Vinnova:

"It's vital that Swedish companies have the necessary expertise and skills to deliver services and products to research facilities, both nationally and globally. Big Science Sweden opens doors and creates new contacts, enabling us to establish Swedish innovation on a global market.

Management

Big Science Sweden is led by a consortium comprising the Association of Swedish Engineering Industries (Teknikföretagen), the industrial development centre (Industrikluster IUC Syd), Chalmers University of Technology, Lund University, Luleå University of Technology, Uppsala University, RISE and Region Skåne.

Jonas Wallberg, representative from the Association of Swedish Engineering Industries:

"A company may feel that entering the Big Science market, and contacting research facilities, would be too big a step. But many Swedish companies definitely have both the expertise and the capacity to meet the requirements of the facilities. Big Science Sweden provides guidance, and facilitates the first important contacts that can initiate a business relationship."

The Big Science Sweden national team at the ESS site in Lund.

ILO

Big Science Sweden is Sweden's official ILO (Industry Liaison Officer), which means it has the national responsibility for facilitating contacts and business between Swedish companies and the European research facilities that Sweden is involved in funding. An important part of the ILO work is to build networks between Swedish companies and relevant contacts at the research facilities. Big Science Sweden works actively to match Swedish companies with tangible needs and current procurements at the facilities.

A designated member of the Big Science Sweden team is responsible for each facility, maintaining contacts, building relationships, and getting to know the facility's organisation and needs.

Fredrik Engelmark, Business Development and Project Management, Big Science Sweden, is responsible for contacts with CERN:

"By networking with representatives at the research facilities, I can match a facility with a relevant Swedish company, and with researchers who can complement the company's existing expertise. In this way, we put together a team that can run high-tech innovation projects.

Industrial Liaison Officers and Purchasing Advisors – Support and Contact Points

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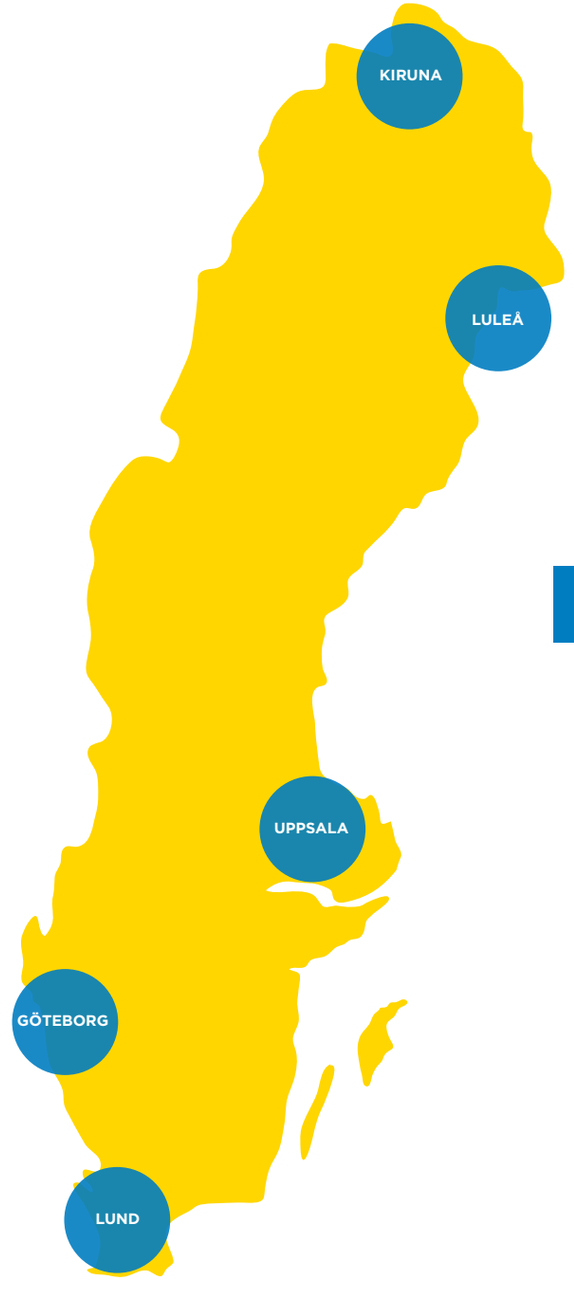
ILO: CERN, ESS, MAX IV, FAIR
Purchasing advisor: ESRF, ILL
Contact point: ISIS, DESY, XFEL
Fredrik Engelmark
ILO: CERN
Patrik Carlsson
ILO: ITER, ESO, SKA
Johanna Bergström-Roos
Contact point: EISCAT

Big Science Sweden works from a national perspective and has four nodes around the country, with offices in Lund, Uppsala, Göteborg and Kiruna/Luleå.



CONTACT INFORMATION

Big Science Sweden works from a national perspective, and has four nodes. Several of our part-time staff are shared with universities and institutes, which gives us a broad national coverage.

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EUROPEAN RESEARCH FACILITIES

Big Science Sweden is Sweden's official ILO organisation, serving 13 European research facilities.

CERN

Geneva, on the border between Switzerland and France

CERN (Conseil Européen pour la Recherche Nucléaire) is a European research facility set up in 1954 by 12 founder states, one of which was Sweden. CERN now has 22 Member States and a number of Associate Member States.
At CERN, 2,500 staff and some 15,000 external scientists advance the boundaries of knowledge regarding the origins of our universe and its smallest building blocks, subatomic particles. The heart of the CERN facility is the Large Hadron Collider (LHC), a 27-kilometre circular particle accelerator.
The High Luminosity project, due to come into operation in 2025, will increase the luminosity of the LHC by a power of ten. The materials budget of the High Luminosity project is nearly CHF 950 million.

FAIR

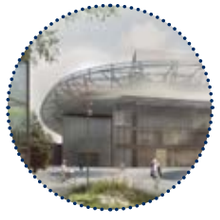
Darmstadt, Germany

FAIR (The Facility for Antiproton and Ion Research) is currently under construction in Darmstadt at a cost of EUR 1.7 billion. At the facility, matter that only exists in outer space will be produced in a lab for research, and it will be possible to accelerate ions of all the natural elements in the periodic table, as well as antiprotons. Ten countries are shareholders of FAIR and more countries are partners. Three thousand scientists will visit and use FAIR each year.

ITER

Cadarache, France; European procurement organisation F4E in Barcelona, Spain

ITER (International Thermonuclear Experimental Reactor) is a global cooperation project, funded by 35 nations, to build the world's largest Tokamak reactor for research into fusion energy. The facility will be the largest fusion experiment facility in the world and the first to produce net energy, producing 500 MW of power from an input of 50 MW. It will be the first plant that integrates all the various technologies needed to operate a fusion reactor. Experiments at ITER are scheduled to begin in 2025, and the construction budget is EUR 20 billion. F4E (Fusion for Energy) is the EU organisation responsible for the EU contribution to ITER.



ESS

Lund, Sweden

ESS (European Spallation Source) will be a neutron spallation source, a user facility for research into the properties of materials, structural chemistry, and biomass. ESS will be the world's most powerful spallation source. The project is a collaboration between 13 European countries, with a construction budget of EUR 1.8 billion. The first experiments will be carried out in 2022 and at least 22 instruments can be housed in the facility.

ILL

Grenoble, France

The Institut Laue-Langevin (ILL) is an existing spallation facility that has been in operation for more than 45 years. ILL was founded in 1972 by France, Germany, and the UK, and there are ten further Scientific Member countries. Sixty percent of the capacity of ILL is dedicated to fundamental research and 40% is dedicated to research into societal challenges. The facility is undergoing a modernisation programme that has increased the detection rate of the instruments by a factor of 25, and the programme is about to move into its second phase.

ISIS

Harwell, UK

ISIS Neutron and Muon Source is a national spallation source financed by the Science and Technology Facilities Council, and is based at the Rutherford Appleton Laboratory in Harwell, near Oxford.
Research at ISIS spans a wide range of disciplines, from magnetism to cultural heritage, engineering to food science, and from chemistry to environmental science. The facility houses 32 instruments. At ISIS there are world-leading research programmes in fields as diverse as physics, chemistry, materials science, earth science, engineering, and biology.

MAX IV

Lund, Sweden

MAX IV is a synchrotron light facility that began operations in 2016. Operated by Lund University, it is the world's most powerful synchrotron light source, capable of viewing material structures atom by atom. MAX IV will facilitate discoveries of new structures at nanolevel, and scientists will be able to monitor chemical processes in real time. The facility can house up to 28 beamlines. At full capacity, between 2,000 and 3,000 scientists are expected to conduct experiments at MAX IV every year.

ESRF

Grenoble, France

ESRF (European Synchrotron Radiation Facility), opened in 1989, is operated as a partnership between 22 countries. The facility welcomes almost 9,000 visiting scientists every year, conducting research using the X-ray beams that are 100 billion times more powerful than the X-rays used in hospitals. An extensive upgrade, the Extremely Brilliant Source, is under way, with a budget of EUR 330 billion. This will provide new storage rings that can produce more intense, coherent, and stable X-ray beams.

DESY

Hamburg, Germany

DESY (Deutsches Elektronen Synchrotron), set up in 1959, is a national research centre in Germany, operating particle accelerators used to investigate the structure of matter. Three thousand guest scientists from 40 countries conduct research at the facility each year. Three large accelerators dominate the DESY site: PETRA III, Flash and XFEL. Research ranges from nanomaterials and semi-conductors to pharmaceuticals and materials for solar panels. Technologies developed at DESY can also be used for detailed diagnosis of tumours and for developing less invasive cancer therapies.

European XFEL

Hamburg, Germany

European XFEL (X-ray Free Electron Laser) is the world's most powerful X-ray laser facility, opened in 2017. The project is funded by 12 European countries. The facility is powered by a 3.4-km linear accelerator, which can generate 27,000 flashes of light per second, each of a duration of less than 100 quadrillionths of a second.

ESO

HQ Munich, Germany and telescopes in Chile

ESO (The European Southern Observatory) consists of telescopes at three sites in the Atacama Desert in Chile. The Very Large Telescope can view objects at the edge of our universe and help answer fundamental questions, such as whether we are alone here. A new Extremely Large Telescope (ELT) with a 39-m mirror is coromaticunder construction, with a budget of EUR 1.2 billion. It will be the world's largest telescope and will address some of the most pressing unresolved issues in astronomy.

EISCAT

Kiruna, Sweden

EISCAT (European Incoherent SCATter) is a facility for astronomy research using radar. A new facility, EISCAT 3D, is under development. This will comprise three sites in the north of Sweden, Norway, and Finland, each consisting of 10,000 antenna elements.
The facility will be used for research, for example, into how the earth's upper atmosphere is connected to space, and also for forecasting space weather and for detecting and tracking space debris. The EISCAT system will use several different measurement techniques that have never before been combined in one system.

SKA

Co-located in South Africa and Australia

SKA, The Square Kilometre Array radio telescope, will have a total collecting area of over one square kilometre. The project is being funded by 11 countries, and the budget of Phase 1 of the construction is EUR 650 million. This initial phase will provide ten percent of the capacity of the finished facility. The telescope will be able to scan the sky ten thousand times faster than before, and will provide the highest-resolution astronomical images. The first observations are expected in the mid-2020s.

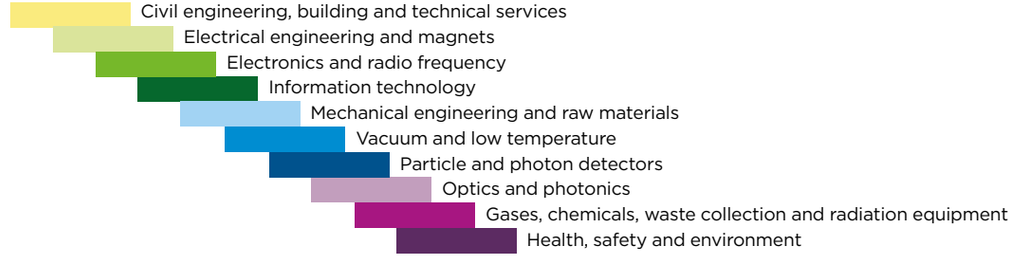
HIGH-TECH SWEDISH SUPPLIERS TO BIG SCIENCE

INDEX ALPHABETICAL

Company size definitions
Small >49 employees
Medium 50-249 employees
Large <250 employees

INDEX PROCUREMENT CODES

To facilitate and make it easier to find right supplier we are using procurement codes according to CERN.



Civil engineering, building and technical services

2B Best Business
ACP
Air Liquide Gas
AirSon Engineering
Axis Communications
BLUEWAVE microsytems
Boliden Electro
Brogren Industries
Bumax
Conex Engineering
Coromatic
Element Metech
Emv Holding
Fagerström Industrikonsult
Flir Systems
Glenair Nordic
Herrströms Mekaniska Verkstads
In Situ Instrument
Jobsab
Kungsörs Mekaniska Verkstad
MCT Brattberg
Mikroverktyg
Note
Nuvia Nordic
Pilz Scandinavia K/S
Rejlers Sverige
Rowaco
Sandvik
Scanmast
Schneider Electric Sverige
Sigma
Studsvik Nuclear
TechniaTranscat
Uponor
ÅF

Electrical engineering and magnets

ABB
Advanced Integration Technology Umeå
Aliaxis Utilities & Industry
APR Technologies
AQ Elautomatik
ASSO Produkter
Beckhoff Automation
Bergdahls
Boliden Electro
CCS Group
Cervitrol
Conex Engineering
DVel
Element Metech
Flir Systems
Glenair Nordic
Habia Cable
JOIN Business & Technology
Low Noise Factory
MP bolagen
Nelson Created
Note
nVent Nordic (tidigare Pentair)
Pilz Scandinavia
Polyamp
Produktionsteknik i Lund
Qamcom Research and Technology
Rejlers Sverige
ReQuTech
Rowaco
Scanditronix Magnet
Schneider Electric Sverige
Semcon
Sigma
Sigma Lundinova
Solectro
Swedish Microwave
Svennes Verktygsmekaniska
Teledyne SP Devices
ÅF

Electronics and radio frequency

APR Technologies
AQ Elautomatik
BLUEWAVE microsytems
Cervitrol
DVel
Element Metech
Epiluvac
Exir Broadcasting
Gammadata Instrument
Glenair Nordic
Habia Cable
HMS Industrial Networks
In Situ Instrument
JOIN Business & Technology

Low Noise Factory
Mikroponent
Nanovac
Nelson Created
Note
nVent Nordic (tidigare Pentair)
Omnisys Instruments
Polyamp
Produktionsteknik i Lund
Promech Lab Holding
Qamcom Research and Technology
Recab
ReQuTech
Rowaco
ScandiNova Systems
Schneider Electric Sverige
Semcon
Sigma
Sigma Lundinova
Solectro
Swedish Microwave
Svep Design Center
Teledyne SP Devices
ÅF

Information technology

3NW Datacenter Sweden
ABB
Aisle Systems
Axis Communications
Boliden Electro
Carlsson & Möller
Elastisys
GoalArt
Hamamatsu Photonics Norden
HMS Industrial Networks
JOIN Business & Technology
Note
Proact IT Group
Recab
Schneider Electric Sverige
Sigma
Svep Design Center
TechniaTranscat
Vibration IT
ÅF

Mechanical engineering and raw materials

2B Best Business
AB LARSSON & KJELLBERG
ABB
Additive Composite Uppsala
Advanced Integration Technology Umeå
Airec
Aliaxis Utilities & Industry
Bodycote Hot Isostatic Pressing
Brogren Industries
Bumax
Carlsson & Möller
Carpenter Powder Products
Cejn
Cervitrol
Conex Engineering
Damaskus Maskinskydd
Digital Mechanics
Element Metech
Emv Holding
Examec Maskinmontage
Fagerström Industrikonsult
Finverko
Flir Systems
Fredriksons Verkstad
Furhoffs Rostfria
Fårbo Mekaniska
Gränges
Hagema
Hamek
Harald Pihl
Herrströms Mekaniska Verkstads
HGF (AB Halmstads Gummifabrik)
Höganäs
Jobsab
JOIN Business & Technology
KG Fridman
Kisab (Kristianstad Industriservice)
Kungsörs Mekaniska Verkstad
Laser Nova
Liedholms Maskinteknik
Maskinteknik i Oskarshamn
Merx Svenska
Microbas Precision
Mikroponent
Mikroverktyg
Modellteknik i Eskilstuna
MP bolagen
Nanovac
Nordbergs Tekniska
Nuvia Nordic
nVent Nordic (tidigare Pentair)
Ovako Sweden (fd Ovako Tube & Ring)
Produktionsteknik i Lund
Promech Lab Holding
Qtech Group
Raps - Resurs Applikation
Process System i Skåne
Resinit
RFR Solutions
Rowaco
Sandvik
Scanmast
Semcon
Sigma
Silver Weibull
SKF Sverige
Solectro
SpecialTeknik i Sverige
Stavanger Steel
Studsvik Nuclear
Sundbybergs mekaniska verkstads (Sunmek)
Svennes Verktygsmekaniska
SvetsMekano
Svetstjänst i Höganäs
Texor
Tre-Mek i Trelleborg
Unnaryd Modell
VBN Components
Ventana Hackås
Viflow group
Wallins Mekaniska
WM Press
VTT
ÅF
Österby Gjuteri

Vacuum and low temperature

Advanced Vacuum Distribution
Air Liquide Gas
Airec
Aliaxis Utilities & Industry
APR Technologies
Bodycote Hot Isostatic Pressing
Bumax
Carlsson & Möller
Cejn
Element Metech
Epiluvac
Glenair Nordic
Jobsab
KG Fridman
Low2High Vacuum
Löwener Vakuumservice
Nanovac
Omnisys Instruments
Pfeiffer Vacuum Scandinavia
Produktionsteknik i Lund
Promech Lab Holding
Qmt Science
RFR Solutions
Rowaco
Scienta Omicron
Semcon
Viflow group
ÅF

Particle and photon detectors

APR Technologies
Aspect Photonics
Azpect Photonics
BLUEWAVE microsytems
DVel
Gammadata Instrument
Hamamatsu Photonics Norden
KG Fridman
Neonest (Buyisotope)
Note
Promech Lab Holding
Scienta Omicron
ÅF

Optics and photonics

Aspect Photonics
Azpect Photonics
Crystopt X
DVel
Flir Systems
Gammadata Instrument
Glenair Nordic
Hamamatsu Photonics Norden
Microbas Precision
Mikroponent
Note
Omnisys Instruments
Qamcom Research and Technology
Scienta Omicron
Swedish Microwave
ÅF

Gases, chemicals, waste collection and radiation equipment

Additive Composite Uppsala
Air Liquide Gas
Airec
Airwatergreen
Bodycote Hot Isostatic Pressing
Bumax
Carlsson & Möller
Cejn
Epiluvac
Gammadata Instrument
Jobsab
Liedholms Maskinteknik
Neonest (Buyisotope)
Nuvia Nordic
Qmt Science
Rowaco
Schneider Electric Sverige
Studsvik Nuclear
ÅF

Health, safety and environment

ABB
ACP
Additive Composite Uppsala
Air Liquide Gas
Airwatergreen
Aisle Systems
Axis Communications
Cejn
Conex Engineering
Coromatic
Gammadata Instrument
GoalArt
Hamamatsu Photonics Norden
In Situ Instrument
MCT Brattberg
Nanovac
Neonest (Buyisotope)
Nuvia Nordic
Schneider Electric Sverige
Sigma
ÅF

ABB

Company profile
ABB is a pioneering technology leader in electrification products, robotics and motion, industrial automation and power grids. Continuing a history of innovation spanning more than 130 years, ABB today is writing the future of industrial digitalization with two clear value propositions: bringing electricity from any power plant to any plug and automating industries from natural resources to finished products. As title partner of Formula E, the fully electric international FIA motorsport class, ABB is pushing the boundaries of e-mobility to contribute to a sustainable future. ABB operates in more than 100 countries with about 147,000 employees.

Core competences
ABB is a pioneering technology leader in electrification products, robotics and motion, industrial automation and power grids serving customers in utilities, industry and transport and infrastructure globally.

Industry sectors
Power generation, oil & gas, marine, pulp & paper, mining, metals.

References
- CERN – SVC for voltage support of a large pulsating load.
- More references to be found here: www.new.abb.com/facts

Company size
Large

www.abb.com

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Procurement codes
- Electrical engineering and magnets
- Information technology
- Mechanical engineering and raw materials
- Health, safety and environment

ACP

Company profile
ACP AB has been supplying textile based ventilation in Sweden from Danish manufacturer KE Fibertec for over 25 years. We do all the calculations and technical consultation in close dialogue with our clients and every installation is custom made for each case and demand. We deliver over 10 000 orders all over Sweden in all applications of schools, offices, stores, supermarkets, shopping centers, gyms, sports arenas, warehouses. Our textile ducts and high impulse nozzles can provide draft-free, even air distribution in isothermic, cooling and heating applications.

Core competences
- Custom made solutions for each project to ensure optimal ventilation
- Superior air distribution for draft-free, even indoor climate
- Capable of heating large facilities from ceiling over 25 meters height with less than 1°C difference floor to ceiling
- Unbeatable performance for even distribution of cooled air in condensation resistant ducts
- Available in all diameters and lengths
- Low noise, low weight, high performance.

Industry sectors
- Ventilation
- Cooling
- Heating

References
- Max IV, Accelerator/Microscope and science lab
- Astra Zeneca, Medical labs
- Medicon Village, Medical labs
- Arrhenius Lab, Science lab
- Forsmark Nuclear Power plant, Control room
- Oskarshamn Nuclear Power plant, Control room

Company size
Small

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Procurement codes
- Civil engineering, building and technical services
- Health, safety and environment

ADDITIVE COMPOSITE UPPSALA

Company profile
Additive Composite Uppsala AB exploits the latest technologies in 3D-printing with composite materials and plastics. We work with customers to optimise design and to exploit new materials in high technology sectors. There is specific expertise in radiation absorbers (X-rays, neutrons, gamma) for shielding, masks, etc. We are the World's only supplier of components printed in composites with a high load of boron carbide. Our new materials can replace toxic or environmentally damaging alternatives.

Core competences
- Additive manufacturing with plastics and composites
- Design for additive manufacturing
- Development and production of novel composites as functional materials
- Development and use of apparatus for neutron and X-ray studies

Industry sectors
- Research equipment
- Nuclear
- Plastics and composites

References
Supplied custom neutron absorbing electrical insulators to European Spallation Source

Company size
Small

Additive Composite

www.additivecomposite.com

Additive Composite Uppsala AB
c/o Olle Eriksson, Flogstavägen 89B,
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Adam Engberg
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adam@additivecomposite.com

Procurement codes
- Gases, chemicals, waste collection and radiation equipment
- Health, safety and environment
- Mechanical engineering and raw materials

ADVANCED INTEGRATION TECHNOLOGY UMEÅ

Company profile
AIT develops automated and custom made mobile solutions for material handling in aerospace sector and other industries with high demand for precision and high load capacity.
Our products are designed to transport and position precision tools, equipment used for assembly, operators and whole airplane structures during manufacturing.
We can also offer custom made automation solutions as robot cells, fixtures and welded constructions.
All necessary skills under the same roof, we design, project manage,manufacture, assemble and install and commission on customer's sites.

Core competences
- Mechanical engineering
- Electrical engineering
- Software development
- Project management
- Machining
- Welding
- Assembly

Industry sectors
- Aerospace industry
- Automotive industry

References
- Aerospace industry – AGV:s (Automated Gauided Vehicles), MGV:s (Manually Guided Vehicles), tools to move aircraft during manufacturing. Totally more than 200 machines delivered.
- Automotive industry – Complete automation solutions, custom made >50.

Company size
Small

AIT

www.aitumea.se

Advanced Integration Technology Umeå AB
Kabelvägen 1J, SE-90133 Umeå, Sweden
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Procurement codes
- Electrical engineering and magnets
- Mechanical engineering and raw materials

ADVANCED VACUUM DISTRIBUTION

Company profile
Advanced Vacuum is a Swedish distributor of Edwards Vacuum, and seven other well-known manufacturers within the vacuum area. Since 1993 we have delivered products and services in vacuum and thin films. Continuously, we have built up a network of world-leading suppliers that complement each other. With a solid range, we can cater to our customers' needs from the food industry to space research. We have expertise in all processes and applications where vacuum is used. Most of our suppliers have been working for over 15 years. We know how important it is to minimize production stoppages, whether in research or production. Since its inception, we have learned that better technology produces better results.

Core competences
- High precision and large mechanical components – manufacturing and assembly
- Diagnostics, detectors and instruments
- Vacuum and leak detection technologies

Industry sectors
Industries from food industry to space research

Company size
Small

ADVANCED VACUUM
A Plasma-Therm Company

www.advancedvacuum.se

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Dan Ertsas
Technical Sales
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dan@advancedvacuum.se

Procurement code
Vacuum and low temperature

AIR LIQUIDE GAS

Company profile
One of the leading companies world wide in more than 60 countries.

Core competences
Gas related products and services.

Industry sectors
- Pharma
- Food
- Welding
- Laboratories

References
- Nuclear
- Oil & Gas
- Laboratories
- Manufacturing sites

Company size
Large

Air Liquide
creative oxygen

www.airliquide.se

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Procurement codes
- Civil engineering, building and technical services
- Vacuum and low temperature
- Gases, chemicals, waste collection and radiation equipment
- Health, safety and environment

AIREC

Company profile
Airec develops, manufactures, and markets innovative heat exchangers for gas to liquid heat transfer. With a unique, patented, asymmetrical plate design, Airec offers compact, highly efficient and optimized heat exchangers for applications where traditional plate heat exchangers do not work.

Airec BPHEs provide improvements such as higher efficiency and condensation rates, lower pressure drop, increased compactness, wider operating temperature ranges, and reduced cost.

Core competences
Airec has in-house expertise in designing, tool making, prototyping, production and testing of heat exchanger solutions. Besides the existing range of products, Airec is also involved in several joint development projects with customers who are seeking new solutions based on the unique Airec technology.

Industry sectors
- Cryogenic systems for high tech research facilities.
- CHP (Combined heat and power)
- Compressors
- Gas fired heating appliances
- Heat pumps/refrigeration
- High-pressure systems (such as intercoolers)
- Heat recovery

References
- Helium re-liquefaction to JINR (Joint Institute for nuclear research, Dubna Russia) via our partner ILK, Dresden. Secondary heat exchangers for CHP units to large German OEM suppliers.
- Heat recovery from exhaust gas systems for large aluminum plants.
- Charge air coolers for combustion engine OEM suppliers.
- Combined burner chamber, primary heat exchanger and condensing unit in gas fired heating applications to global OEM's.

Company size
Small

AIREC

www.airec.com

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Procurement codes
- Mechanical engineering and raw materials
- Vacuum and low temperature
- Gases, chemicals, waste collection and radiation

AIRSON ENGINEERING

Company profile
AirSon Engineering AB provides contracting and consulting services in energy, building technology and controlled indoor climate. AirSon's focus is mainly on installation-intensive projects with high demands and tight tolerances in e.g. microelectronics, medical technology, injection moulding and food industry. By promoting a creative engineering culture and to be in the forefront of technological development, the company has become a textbookexample for good engineers and rethinking innovation. The company has over the years produced an impressive number of patents, new products and commercial ramifications alongside the primary business.

Core competences
- Cleanroom construction and installation
- Controlled indoor climate
- Applications for controlled microclimate
- Aerosol and air movement
- HVAC engineering and installation
- Digitalization and energy optimization

Industry sectors
- Research and laboratory
- Facilities
- Microelectronics
- Pharmaceutical Industry
  Food Industry
- Injection moulding

References
- We develop the framework, specify the requirements for the HVAC installation of the ESS facility.
- We validate the HVAC engineering work at the ESS facility.
- Multiple installations and solutions for well known companies in the industry sector with high demands and tight tolerances.
- We have three air laboratories at our HQ in Ängelholm where we develop tailor made applications and solutions.

Company size
Small

AirSon ENGINEERING

www.airson.se

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Procurement code
- Civil engineering, building and technical services

AIRWATERGREEN

Company profile

Airwatergreen AB is a Swedish air treatment company that offers energy-efficient dehumidification in all climates. We design and manufacture products that effectively remove moisture and odor, which prolongs the life of buildings, goods and equipment, and creates a healthier workplace environment to stay in. The products are designed with a patented technology called warm condensation, a technology that gives the products a number of unique advantages. Advantages are half the energy needed, easy to install and the same efficiency in all temperatures. We have installations in 8 countries.

Core competences

Our air dehumidifiers are developed and manufactured in Sweden and based on patented technology called warm condensation. This technology was innovated in 2009 and has proved to be a game changer in the dehumidifier industry. Airwatergreen participated in a Uppsala Innovation Centre (UIC) program for start up and are now a UIC Alumni member.
When we say simple installation, this applies especially to underground installations because we do not need ventilation pipes to remove moisture. We produce dry air and water directly at the machine. Water can easily be led through a floor well or pipe connection, which drastically reduces installation costs.

Industry sectors

We have installations in buildings and infrastructure. In distributed heating, commercial buildings, water & sewage infrastructure, cultural buildings, schools etc. To protect from corrosion and mold but also to create good working conditions.

References

- Stockholm water
- Swedish church
- Göteborgs kretslopp och vatten
- Akademiska hus
- Kraftringen

Company size

Small

AIRWATERGREEN
Air Technology Sweden

www.airwatergreen.com

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Procurement codes
- Gases, chemicals, waste collection and radiation equipment
- Health, safety and environment

AISLE SYSTEMS SWEDEN

Company profile

- Focus on security-related and quality assuring systems
- System supplier (investigation, development, delivery/operation, training, support)
- Main product lines
  – Rule based central access management system
  – Anti-tamper authoring system

Core competences

- Systems development
- Problem solving
- Breaking down complex problems to simple user interfaces
- Integrate with feeding and receiving systems

Industry sectors

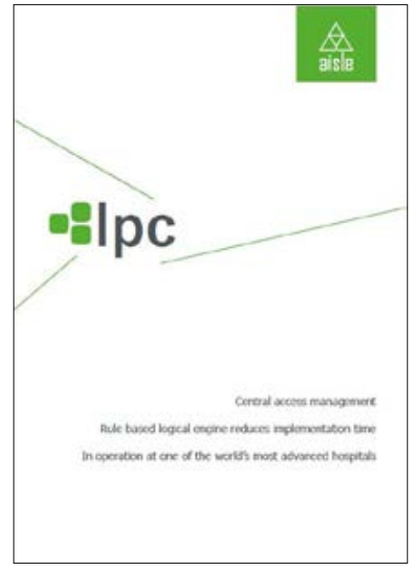
- Health care, pharmaceutical, nuclear and process industry
- Sites with a large property stock

References

- Karolinska University Hospital
- Region Stockholm (one of Europe's largest healthcare providers)
- Malmö City
- RISE, Research Institutes of Sweden

Company size

Small/Medium



aisle

www.aisle.se

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Procurement codes
- Information technology
- Health, safety and environment

ALIAXIS UTILITIES & INDUSTRY

Company profile

Aliaxis Utilities & Industry is a part of the Aliaxis conglomerate along with FRIATEC. Aliaxis Utilities & Industry has a wide range of ceramic products and solutions together with a wealth of know-how and experience to support the big science, oil & gas industry, nuclear, chemical and process industry. At your disposal is our vast experience of customer specific manufacturing for these industries, including choice of materials and product design. This makes us an excellent partner already in the development and design phase of a new product or application. If you have the idea, we will find the right ceramic solution for your purpose. Aliaxis and FRIATEC have many years of experience in ceramic products for engineering applications.

Core competences

Custom-made high-performance ceramic components and ceramic-to-metal assemblies. Our products are manufactured from high purity ceramic materials: alumina, zirconia, silicon carbide and silicon nitride. Whether you have problems with a highly corrosive environment, high vacuum, high pressure, high voltage, high abrasion, extreme erosion, high temperature or steep temperature changes our FRIALIT-DEGUSSIT ceramics can be the solution. We have vast experience and know-how in components like: electrical feedthroughs, insulators, high-vacuum tubes/chambers, sensor components, pistons and plungers for high-pressure pumps, valve components, impellers, precision balls for valves or bearing applications, slide bearings, full ceramic or hybrid ball and roller bearings, seal rings, bushings and axial sleeves, nozzles and much more.

Industry sectors

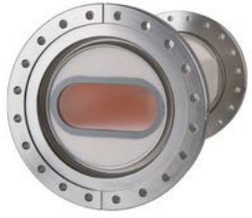
Big Science, oil & gas, nuclear, chemical and process, R&D institutes, pharmaceutical, food and automotive industries.

References

- Big science: electrical feedthroughs, insulators, high-vacuum tubes/chambers, sensor components, high temperature tubes, rods, etc.
- Oil & gas: high-pressure electrical feedthroughs, insulators, sensor components, pistons and plungers for high-pressure pumps, valve components, impellers, precision balls, slide bearings, full ceramic or hybrid ball and roller bearings, seal rings, bushings and axial sleeves, nozzles.
- Nuclear and R&D institutes: high-pressure feedthroughs, insulators, sensor components, seals, high-vacuum tubes/chambers, high-vacuum feedthroughs.
- Chemical and process: sensor components for level and flow metering systems.
- Pharmaceutical and food: bearings, valve components, pistons and cylinders, sensors.

Company size

Small



Procurement codes

- Electrical engineering and magnets
- Mechanical engineering and raw materials
- Vacuum and low temperature

www.aliaxis-ui.se

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APR TECHNOLOGIES

Company Profile

APR Technologies is a high-tech hardware engineering company developing and selling new products for thermal management for various demanding applications. This include liquid cooling based on own-developed pumps without moving parts, for dielectric liquids including liquid nitrogen.
Typical customers are from space, medtech, electronics and other industries.
APR Technologies has own cleanroom facilities and design/build vacuum equipment including chambers, thermal vacuum test chamber and process chambers.

Core competences

Vibration free and silent liquid thermal management for equipment, sensors, computing, batteries, electronics and power electronics.
Either for heat removal or for exact temperature control. Or actively controlled thermal conductance/resistance between two areas.
Regulation and switching of heat, cooling, temperature regulation.
Dielectric immersion cooling of electronics etc.
Other applications are high volt/low current power supplies. RF, LNA, low noise applications.
Other typical advantages with our systems are vibration-free, silent, long lifetime, radiation tolerance.
APR has also developed "Fireworm" sensor cables for temperature monitoring over long distances, with wired as well as wireless sensor nodes.

Industry sectors

Space, medtech, automotive, electronics, bioenergy, researchers and research organisations.

References

Currently qualifying our thermal regulation solution for large telecoms satellites ARTES, with Airbus and ESA.
Recently sold thermal management solution for an instrument to be used on the International Space Station (order from NASA).
To other industries we have delivered consultancy services as well as custom made products.

Company size

Small

Procurement codes

- Electrical engineering and magnets
- Electronics and radio frequency
- Mechanical engineering and raw materials
- Vacuum and low temperature

www.aprtec.com

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AQ ELAUTOMATIK

Company profile

AQ Elautomatik specialises in the design and production of electrical equipment, electric cabinets, control equipment, control desks, and control systems for demanding industrial customers. We have more than 30 years experience of collaborating with customers with the highest requirements for quality and delivery reliability. Our products are delivered world wide. This has given us solid expertise on local as well as global industry requirements on the products design.
AQ Elautomatik wants to be the complete partner that develops our customers' electrical systems. With our commitment to total quality our customers become long-term partners. We have broad and long experience of the design and assembly of electrical cabinets and in helping customers develop a cost effective product.

Core competences

AQ Elautomatik is characterised by high flexibility and quality, we offer our customers the following:

- Series produced products/electrical cabinets
- Project produced products/electrical cabinets
- Product development
- Design using E-plan P8 and Elprocad
- Prototype development, where the focus is on cost & lead-time
- Assembly & design according to UL standard
- Review of the product, where we supply the customer with proposals for how we can lower the cost for material and processing.
- Global production: Sweden, Bulgaria, India and China
- Our own manufactured special enclosures, painted and stainless

Industry sectors

AQ Group consists of about 20 operational subsidiaries divided in 7 business areas. The business areas can deliver entire projects from the initial idea to engineering, purchasing of materials and components, production, assembly and testing. Each subsidiary has an engineering department in close co-operation with the customers and the production. In addition, AQ Group has a number of sites dedicated to engineering services.
Electric cabinets, wiring systems, injection molding, sheet metal processing, System products, inductive components, special tech. & engineering

References

- Transportation: electric, telecom
- Automotive: power, general industry & engineering
- Commercial vehicles: automation, defence industry
- Railway: food & drug

Company size

Medium

Procurement codes
Electrical engineering and magnets
Electronics and radio frequency

www.aqg.se

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ASSO PRODUKTER

Company profile

We are professionals in the cabling harness industry with 40 years of experience and with guiding principles such as flexibility and quality.
We manufacture all cabling harness management, like battery cables, wire harnesses, cables, switchboards, control panels, box building, soldering etc.
We are located in Malmö with up-to-date modern equipment and we also have an assembly plant in Poland, which makes us very flexible and can maintain high quality at low cost with short lead times.
We are ISO9001:2008 certified and our suppliers are in turn certified in a variety of areas and follows the RoHS and REACH directives.

Core competences

Customized cabling for manufacturing industry.

Industry sectors

Electronics, construction machinery, vehicle, solar panels, energy, PCB, boxbuilding applications, cable harnesses

References

ABB, Atlas Copco, Axis, Dynapac, Enics, Foss Analytical, Inission, Orbit One, Rottne Industri, Scanfil, Swegon, Tetra Pak, Wayne Fueling System.

Company size

Small

Procurement code
Electrical engineering and magnets

www.asso.se

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AXIS COMMUNICATIONS

Company profile
Axis is the market leader in network video. We invented the world's first network camera back in 1996 and we've been innovators in video surveillance ever since, increasing the security of millions of people worldwide and helping to meet the growing need for a smarter, safer world. With the help of 90,000 partners, spanning 179 countries, we've delivered a series of groundbreaking products and many industry firsts. And, we look forward to pioneering many more.

Core competences
Network surveillance cameras, network audio, physical access control etc.
When you are responsible for a critical facility, you need to be prepared for all sorts of threats. Everything from incidents and theft to terrorism and natural disasters can cause process disruption and safety hazard. With Axis surveillance solutions, you can manage these challenging situations – and make sure your facility runs as smoothly as possible.

Industry sectors
Big Science, oil & gas, nuclear, critical infrastructure, manufacturing plants etc.

References
Big science, oil & gas, nuclear, critical infrastructure, manufacturing plants etc.

Company size
Large

www.axis.com

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Procurement codes
- Civil engineering, building and technical services
- Information technology
- Health, safety and environment

AZPECT PHOTONICS

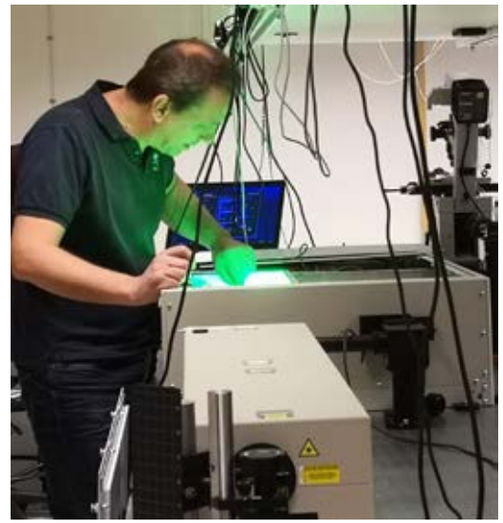
Company profile
Azpect Photonics AB is a distributor acting in the market segment traditionally labelled Photonics, e.g. in the area of lasers, optics and electro-optics, including motion control. We are serving all the Nordic countries: Sweden, Denmark, Finland, Norway and Iceland. Azpect is representing more than 20 specialist suppliers that cover a full spectrum of photonic products. Among our main suppliers are: Newport Corporation, Spectra Physics, Andor Technology, LabSphere, Excelitas, Avantes etc. Azpect Photonics AB was founded in 1994 and is today the largest and leading supplier of photonics equipment to the Nordic market. Since January 2012, Azpect is 100% owned by the pan-European distributor AMS Technologies, with headquarters in Munich, Germany.

Core competences
The policy of Azpect Photonics is to help our customers in a quick and efficient way. Our sales engineers are highly experienced in their area of responsibility. The service department has extensive experience in photonics, for both scientific and industrial applications. Our service engineers are also trained and certified by our suppliers.

Industry sectors
Academic research facilities and a variety of high-tech markets, including renewable energies, medical, defence & aerospace etc.

References
Azpect Photonics continuously delivers equipment to research and science customers, as well as industry. On a component level as well as complete larger turnkey systems, all depending on the customer's needs. Among our customers you find all the major Nordic universities and research facilities, such as MAX IV and ESS. For more detailed references, please contact us.

Company size
Small



www.azpect-photonics.com

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Sofia Fahlvik
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Procurement codes
- Optics and photonics
- Particle and photon detectors

BECKHOFF AUTOMATION

Company profile
Beckhoff implements open automation systems based on PC Control technology. The product range covers industrial PCs, I/O and fieldbus components, drive technology and automation software. Products that can be used as separate components or integrated into a complete and seamless control system are available for all industries. The Beckhoff "New Automation Technology" philosophy represents universal and open control and automation solutions that are used worldwide in a wide variety of different applications, ranging from CNC-controlled machine tools to intelligent building automation.

Core competences
Motion control, PLC, C++ Real time control, electrical motors, industrial networks, embedded control. Industrial PC, Industrial Displays, vision camera systems, scientific measurements, human machine interfface software.

Industry sectors
- General machine building
- Scientific Engineering
- Discrete manufacturing
- Process industry
- Building Automation

References
High-precision, ultra-dynamic drive control for European XFEL X-ray laser
www.pc-control.net/pdf/032015/solutions/pcc_0315_xfel_e.pdf

Company size
Large

BECKHOFF

www.beckhoff.com

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Procurement code
Electrical engineering and magnets

BERGDAHLS

Company profile
- Emergency Lighting – developer and manufacturer.
- Industrial and office Lighting – developer and manufacturer.

Core competences
- Emergency Lighting
- Office Lighting
- Industrial Lighting
- Tunnel Lighting
- Light planning
- Regulatory consulting

Industry sectors
Lighting

References
- Gothenburg Opera
- Vattenfall Ringhals
- Norra Länken

Company size
Small


LOKE Design: Fredrik Öhlin


LYRA Design: Ronnie Bergdahl

BERGDAHLS AB
BELYSNING & NÖDBELYSNING

www.bergdahls.com

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Procurement codes
Electrical engineering and magnets

BOLIDEN ELECTRO

Company profile
Intelligent products for an intelligent world! By supplying reliable solutions with cutting-edge technology, we're offering our customers efficiency, safety and increased competitiveness.

Core competences
- E-Houses
- Substations
- HMI (front end/back end)
- High voltage
- Low voltage
- Switchgear
- Advanced solutions with cuttingedge solutions
- Augmented reality solutions for phones, tablets, PC and HoloLens

Industry sectors
- Mining industry
- Heavy industry

References
- LKAB
- Boliden Mineral
- Lundin Mining
- Skellefteå Kraft

Company size
Small/Medium

www.bolidenelectro.se

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Procurement codes
- Civil engineering, building and technical services,
- Electrical engineering and magnets
- Information technology

BLUEWAVE

Company profile
BLUEWAVE microsystem AB is an engineering design company. We have over 20 years of experience in controlling and commanding electrons and photons (and occasionally other particles) to do useful work or to reveal their secrets. We are experts in NIR, NMR and RF (dielectric) spectroscopic machines as well as pulse analyzers and high voltage electronics (switches). We have also good knowledge and a keen interest in QMR, XRF and SPR machines.

Core competences
Our specific skills include RF, microwave, graphical (PC) software, embedded software, DSP, FPGA, MMIC and optoelectronics.

Industry sectors
- Academic Research facilities
- Telecom Industry.

References
Pulse height analyzer delivered to DESIREE facility at Stockholm University

Company size
Small

www.bluewave.se

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Borgarfjordsgatan 13A, SE-16440 Kista, Sweden
+46 8 633 76 40

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Procurement codes
- Civil engineering, building and technical services
- Electronics and radio frequency
- Particle and photon detectors

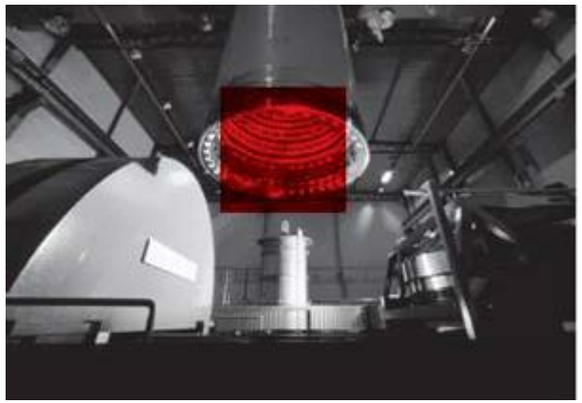
BODYCOTE HOT ISOSTATIC PRESSING

Company profile
World leading provider of HIP service (densification of castings), and near-net-shape components based on powder metallurgy. Freedom in design, excellent material properties, wide range of material grades and short production times are some advantages.

Core competences
- Hot Isostatic Pressing
- Powder metallurgy
- Material knowledge
- Design capabilities

Industry sectors
- Oil & Gas
- Nuclear
- Aerospace

Company size
Medium



Bodycote

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Procurement codes
- Gases, chemicals, waste collection and radiation equipment
- Mechanical engineering and raw materials

BROGREN INDUSTRIES

Company profile
Brogren Industries should be the obvious option in selecting partners to develop processes or produce high-tech products.
We will work to have long-term relationships with our customers and be able to assist in an early stage. Our work is characterized by quality and continuous improvement.
Carefully developed processes and competent personnel will lead and operate cost-effectively using modern equipment.
We are certified according to the following: AS9100 Revision D, ISO9001:2015, ISO14001:2015, ISO3834-2:2005, ISO3834-2 Scope of Activity.

Core competences
- A complete expert supplier in machining (turning and milling 5-axis machining), TIG and Laser welding
- AS 9100, ISO 9001, ISO 14001 and ISO 3834-2 certified
- NDT
- Assembling
- Marking
- PPAP/FMEA
- Construction
- CMM and Traceability
- and more

Industry sectors
- Aerospace
- Gas Turbine
- Parts / Environment

References
- GKN
- SAAB
- Siemens
- Azelio (Cleanergy)
- Emerson

Company size
Medium

brogren industries

www.brogrenindustries.com

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Procurement codes
- Civil engineering, building and technical services
- Mechanical engineering and raw materials

BUMAX

Company profile
BUMAX is the world-leading specialist manufacturer of high-quality stainless-steel fasteners through hot and cold forming as well as through machining. Our fasteners are manufactured at our plant in Åshammar in the heart of Sweden's steel district.

Core competences
We provide customers with the optimal fastener and material for their specific application, including unique fasteners not found anywhere else on the market. This may involve drawing on our extensive fastener expertise and material science knowledge to develop innovative fastener solutions together with our customers.

Industry sectors
- Stainless steel
- Fastener manufacturer

References
- CERN
- MAXIV
- ESS
- Max Planck Institute

Company size
Medium

BUMAX®
A BUFAB COMPANY

www.bumax-fasteners.com

BUMAX AB
Bultvägen 1, SE-812 94 Åshammar, Sweden
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Anders Söderman
Technical Director
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Procurement codes
- Civil engineering, building and technical services
- Gases, chemicals, waste collection and radiation equipment
- Mechanical engineering and raw materials
- Vacuum and low temperature

CARLSSON & MÖLLER

Company profile
Thermoplastics /Thermosets /Composite
Engineering plastics produced after drawing in our own factory in Helsingborg, Sweden
Advice – manufacturing – know how = best solution.
Founded 70 years ago. Today 71 employed.
Turnover EUR 13 million.
Flexibility in material, and order quantity from one piece to many pieces.
Together we create new possibilities.

Core competences
- Temperature range from + 250 C to – 180 C
- Low and high friction
- Dimensions stability
- Radiation resistant materials
- Magnetic materials
- Electrical isolation and conductive materials
- Termic isolation and conductive materials
- Composite Plastic – within fillers as steel, ceramic, boron, MoS2, bronz, glass, carbon

Industry dectors
- Accelerators/Spallation/Nuclear Plants
- Medical
- Chemical
- Foodstuff

References
- Big Science, oil/gas, nuclear. Electrical & Termic isolation to Accelerators & instruments
- Dimension stable materials within Carbon to accelerator instruments
- Epoxy and glass epoxy materials to accelerator instruments
- Thermoplastic parts for packing Machines.

All produced in own factory in Helsingborg.

Company size
Medium

CARLSSON & MÖLLER

www.c-m.se

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Procurement codes
- Information technology
- Mechanical engineering and raw materials
- Vacuum and low temperature
- Gases, chemicals, waste collection and radiation equipment

CARPENTER POWDER PRODUCTS

Company profile
Carpenter Powder Products is a leading supplier of gas-atomized metal powder and in some cases products thereof. Applications are additive manufacturing, welding & spraying, HIP-near net shape, metal injection moulding, tool steels, brazing and others.
Carpenter Powder Products is fully owned by Carpenter Technologies Corporation, an American company active in specialty metals for niche applications.

Core competences
Specialty metals, gas-atomized, gas-atomised, powder, hot istostatic pressing, near net shape, metal injection moulding, MIM, NNS, HIP, tool steel, additive manufacturing, AM, 3D-printing.

Industry sectors
Energy, Nuclear, Automotive, Transportation, Consumer, Industrial, Aerospace and Medical.

References
CERN, ITER, Sub-sea and Oil & Gas applications.

Company size
In Sweden; small. Carpenter Technologies Corp. in total about 4500 employees.

Courtesy of Metso

CARPENTER
Powder Products

www.cartech.com

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Procurement Code
Mechanical engineering and raw materials

CIM CONSULT SOLUTION SWEDEN

Company profile
Delivering IT-solutions for electromechanical industry since 1988.

Core competences
E^3-series, E-CAE tool developed specifically for companies using any type of design; electrical, automation, hydraulic or pneumatic.

Industry sectors
Electrical industry

Company size
Small

CCS
www.ccsgroup.com

www.ccsgroup.se

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Procurement code
Electrical engineering and magnets

CEJN

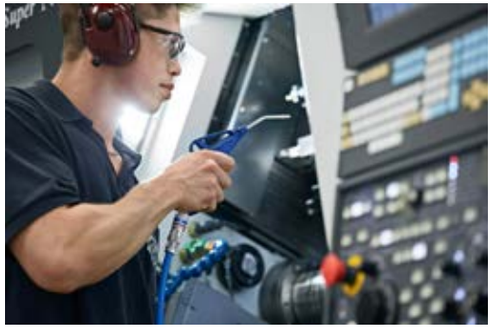
Company profile
CEJN is a leading global niche company with local presence providing innovative quick connect solutions, adding value and productivity to customer applications and processes.
CEJN is committed to high-quality products with a focus on performance, safety and environment, secured through own development and production in a spirit of continuous improvements of processes, technologies and products.
CEJN is an independent family owned business with its roots in Sweden since its start in 1955. CEJN is committed to maintaining its high standards of responsibility towards our customers, employees and the environment.

Core competences
Our core competence is to develop, manufacture and service Quick connect solutions within different media as: fluids, gases, hydraulics and pneumatics in pressures from vacuum to 400 MPa.

Industry sectors
- Manufacturing industry
- Thermal control of Electronics
- Marine, Agriculture
- Oil & Gas
- Mining
- Fire and Rescue

References
CEJN has for more than 40 years delivered quick connect solutions to the Oil & Gas industry, our high pressure quick connect couplings are used within the nuclear industries, our Thermal control couplings are used to cool the high performance data centres.

Company size
Large



CEJN The Quick Connect Solution Provider

www.cejn.com

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Procurement codes
- Mechanical engineering and raw materials
- Vacuum and low temperature
- Gases, chemicals, waste collection and radiation equipment
- Health, safety and environment

CERVITROL

Company profile
Cervitrol, your innovation partner. Cervitrol has a long and solid experience in developing high precision mechanics, electronics and mechatronics for demanding customers. We have under the same roof an experienced R&D team, prototype lab, mechanical workshop for mechanical prototyping and an assembly line for serial production of electronics. In our flexible workshop we also do “box build”, racks and integrat mechatronic products in different kinds of enclosures, custom made or from the shelf.
Cervitrol is a “one stop shop” and can shorten your time from idea to complete product as we are flexible and fast.
Cervitrol is always close, we are located in Lund 40 minutes away from Kastrup airport and 30 minutes away from Sturup airport.

Core competences
- Mechanical engineering, mechanical prototyping, mechanical small serial manufacturing,
- Electronics engineering, electronics prototyping, electronics serial manufacturing,
- Mechatronics engineering, mechatronics prototyping, mechatronics serial manufacturing

Industry sectors
We work with all kind of customers from aircraft industry to subsea industry.

References
ESS

Company size
Small

CERVITROL®

www.cervitrol.se

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Procurement Codes
- Electrical engineering and magnets
- Electronics and radio frequency
- Mechanical engineering and raw materials

CONEX ENGINEERING

Company profile
Engineering and manufacturing company. Simulation competence using state of the art software like LS-Dyna plus machine design, project management, and advanced machining with 3 and 5 ax machines. Major business areas, automotive, industrial automation and technical calculations. Close cooperation with Luleå University.

Core competences
- Simulation technology, sheet metal forming
- Strength and stiffness calculations
- Product development
- Heat treatment
- Automotive die technology

Industry sectors
- Automotive
- Industrial automation

References
- Big science, Oil & Gas, nuclear or similar
- Industrial automation, turn key delivery for automated house building factory
- Product development, wheel suspension, automotive industry
- Prototype parts for new car models, including geometrical and material evaluation, automotive industry
- Turn key deliveries of hot forming dies for automotive industry
- Flow simulations and product development for flow metering systems
- Flat-table and gentry for satellite orbit testing, space industry

www.conex.se

Conex Engineering
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Procurement codes
- Civil engineering, building and technical services
- Electrical engineering and magnets
- Mechanical engineering and raw materials
- Health, safety and environment

COROMATIC

Company profile
Coromatic secures availability of power and data communications for mission critical functions. We are here 24/7 for our customers to ensure high availability and productivity in facilities, to save lives by securing operations without disruptions and to protect the environment by optimizing energy consumption.
Customers include the financial sector, IT providers, telecom operators, hospitals, national defence and many other highly connected organizations. Coromatic provides advisory, operations and maintenance services. We design, build and operate energy efficient technical infrastructure.
Coromatic has more than 500 employees in the Nordics. Coromatic has delivered solutions and services to more than 5000 companies in the Nordics. EQT is the main shareholder of Coromatic.

Core competences
Datacenter, power, emergency power, service, operations, advisory, energy optimazation

Industry Sectors
- IT
- Healthcare
- Finance
- Telecom
- National defence

References
https://coromatic.se/ladda-ner/referenser-och-case-studies/

Company size
Large

Coromatic

www.cormatic.com

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Procurement codes
- Civil engineering, building and technical services
- Health, safety and environment

CRYSTOPT-X

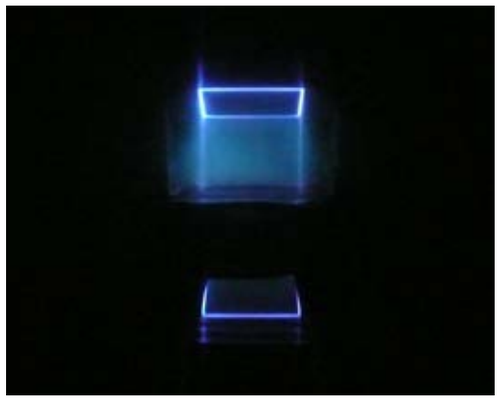
Company profile
CrystOpt-X AB, the main activity is the production of diffraction elements and reflective optics used in the X-ray and neutron beams.
The first developed diffraction element was the very much desired double side machined Johansson crystal in single crystal silicon (main orientations) up to 300 millimeters in length, and bendable down to 500 millimeters radius.
Other diffraction elements as single blocks or channel cut and many different geometries are also included in this group. With the same functionality, the multilayers, constitute also an offered product of CrystOpt-X AB.
A second range of products which CrystOpt-X is manufacturing are the very high precision surface shapes, starting with simple flat, for deflection, ending with ellipsoidal or toroidal for both, vertical and horizontal simultaneous focusing.
The materials used are mainly silicon, fused silica and zerodur® with a maximum length of 1.2 meters, and all can also be coated with materials like gold, rhodium, palladium and other high-density materials, on request. Surface quality as micro-roughness is now down to 3 Ångström and improving, and the level of surface shape can get down to 0.1 micro-radian of slope error.
Expected in May 2019 (work is in progress on a prototype), long effective life time of optical elements for neutron guides will become another product which CrystOpt-X will proudly offer. Being an R&D oriented facility, CrystOpt-X AB is looking forward to improve and innovate, undertaking challenges in both, the field of surface shape metrology and the fabrication technologies of new desired optical shapes or functionalities.

Core competences
Manufacturing very precise surface shapes, super-polishing of shaped surfaces, ion beam figuring, coating and multilayer depositions as also surface shape characterization by means of interferometry and deflectometry are the main competences needed for the manufacturing of the all above offered products.

Industry sectors
Facilities in the field of research and characterization by means of X-ray and neutron beams, including large observatories.

References
- Danmarks Tekniske Universitet
- MAX IV Laboratory

Company size
Small



www.crystopt-x.se

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iulian.preda@crystopt-x.se

Procurement code
Optics and photonics

DAMASKUS MASKINSKYDD

Company profile
We supply customized solutions of products for machinery protection. Our specialty is applications with a linear movement.

Core competences
- Customized machinery protection
- Bellows
- Roll-up covers
- Wipers
- Brusches

Industry sectors
Mainly industrial

References
- Sandvik
- Scania

Company size
Small

www.damaskus.se

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Procurement codes
Health, safety and environment
Mechanical engineering and raw materials

DIGITAL MECHANICS SWEDEN

Company profile
Digital Mechanics is a leading innovator in smart additive 3D production. As experienced problem solvers we offer customers access to our digital factory for fast 3D printing of complex plastic and metal details both in prototyping and production ready parts. We always strive for long term customer relationships for the best possible quality and delivery precision. We have global delivery capacity.

Core competences
- 3D printing in plastic
- 3D printing in metal
- Silicon tools
- Prototype tools
- Rotary casting
- Lost wax casting
- Sand casting
- Precision casting
- Machining

Industry sectors
- Automotive
- Aerospace
- Medical
- Manufacturing
- Construction
- Engineering
- Energy
- Mining

Company size
Small

DIGITAL® MECHANICS
RAPID PRODUCTION SERVICES

www.digitalmechanics.se

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Procurement code
Mechanical engineering and raw materials

DVEL

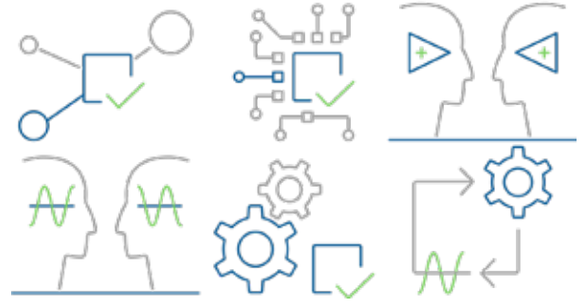
Company profile
We specialize in providing competence and building systems within test, measurement, and control. Our highly skilled experts take you from prototypes through requirements definition, development of measurement techniques and definition of processes to implementation, delivery and education. From our office in Lund, we deliver systems for the most challenging measurement tasks as well as on-site consulting to various industries. One of the industries we focus on is Big Science, as this area is something that lies very close to our hearts.

Core competences
Our engineers combine theoretical knowledge and the ability to quickly grasp technical challenges with the know-how of creating scaleable and stable systems. We combine science, computer science and vast experiences from test development to bridge gaps that are common in most organizations.
About half of our consultants holds PhD's in laser based measurement techniques, electical measurement techniques, material science, nuclear physics and similar areas, whereas the rest are MSc's in fields ranging from physics through electrical engineering to mechanics.
If you need help with National Instruments software or hardware we can help you with that as well. We are an Alliance Partner with National Instrument and have gathered the largest and sharpest set of LabVIEW and NI hardware competence in the Öresund region.

Industry sectors
- Big Science
- Medical Technology
- Industrial Production
- Power
- IoT

References
Since DVel started in 2012 we have delivered numerous systems including:
- Control system for an ion accelerator
- Control system for a DC/DC converter
- Measurement system for nuclear fuel rods
- Verification of radio ASICs
- Test rig for hydronic actuators
- Hardware and software development for the biogas industry
- Development of test departments and test activities.
- Measurement system for nuclear fuel rods.

Company size
Small



DVEL

www.dvel.se

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Procurement codes
- Electrical engineering and magnets
- Electronics and radio frequency
- Particle and photon detectors
- Optics and photons

ELASTISYS

Company profile
Elastisys is a advanced cloud solution provider, delivering availability, performance and cost-effiency to IT operations using our own open-source solutions or best of breed third party tools.
Building on a decade of world-renowned cloud research, our vision is self-driving IT operations. Projects range from pure R&D to work in the trenches on hard problems in cloud architecture, DevOps, Kubernetes, AWS or OpenStack projects.

Core competences
- Cloud
- DevOps
- Kubernetes
- OpenStack
- AWS
- Machine learning
- Energy efficiency, application reliability/ performance/cost-efficiency

Industry sectors
IT organizations over all kinds of industries.

References
- Swedish BankID
- Statistics Sweden
- Ericsson
- Stockholm Exergi
- Klarna
- Paradox
- Cinnober
- CGI

Company size
Small

www.elastisys.com

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robert.winter@elastisys.com

Procurement Code
Information technology

ELEMENT METECH

Company profile
Delivering metrological confidence! Element Metech is a leading, independent full service provider of measurement and calibration services. With over 60 years of experience, we provide one of the broadest and most reliable ranges of calibration, accredited calibration and measurement technology services in Europe.
In June 2018 Element Metech became a part of Element able to offer 6200 engaged experts in 200 locations in over 30 countries across five continents. With this, we are one of the global leaders in the field of measurement and calibration services.

Core competences
- Material testing, calibration, measuring assignments, product qualification testing, certification, consultancy.
- Instrument calibration: As a full-service provider, Element Metec is the single point of contact for all your instrument calibration, service and administration needs.
- Leading measurement service provider.
- We are experts in interpreting quality requirements and standards from many industry sectors. We will help you to identify and implement the right quality level throughout the organisation.

Industry sectors
- Processing Industry
- Mechanical Industry
- Aerospace
- Fire and Building products
- Infrastructure and Environmental
- Oil & Gas
- Transportation and Industrials.

References
We are continuously delivering our service to the leading global industries around the world.

Company size
Medium

www.elementmetech.com

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Procurement codes
- Civil engineering, building and technical services
- Electrical engineering and magnets
- Electronics and radio frequency
- Mechanical engineering and raw materials
- Vacuum and low temperature

EMV HOLDING

Company profile
We offer our customers the whole scope within manufacturing of process equipment in stainless steel - from laser cutting of single parts to assembly of complex modules. If the customer needs help with installation, we can offer a group of skilled field service engineers (including plumbing). We work as one organisation within three companies (with two factories) and in close cooperation with third party organisation. Our company group consists of Ekeby Rostfria, EMV Stainless and EMV Pipe Solutions.

Core competences
- Welding in stainless steel with high precision
- Welding of high alloy steel
- Installation of modules for processing industry
- Plumbing

Industry sectors
- Pharmaceutical industry
- Food processing industry
- Manufacturing of stainless steel
- Construction industry

References
- Tanks and vessels to pharmaceutical and food processing industry
- Installation and rebuilding of food processing equipment
- Installations and rebuilding of boilers and heat exchanger
- Manufacturing of food processing equipment
- Manufacturing of CIP units to food processing industry

Company size
Medium

EMV HOLDING AB

www.emvholding.se

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Procurement codes
- Civil engineering, building and technical services
- Mechanical engineering and raw materials

EPILUVAC

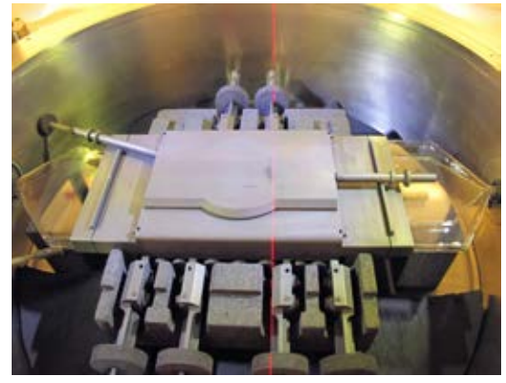
Company profile
Epiluvac AB builds equipment for material research. This includes advanced gas mixing systems, vacuum chambers, high temperature cells and customized design solutions. More than 30 years of experience from the semiconductor industry.

Core competences
- Gas mixing systems
- Vacuum
- High temperature cells
- Chemical vapour deposition
- Epitaxy, corrosive gases
- Ultra-high clean gas systems

Industry sectors
- Material research
- Semiconductor
- High temperature processes

References
Different kinds of epitaxial equipment for semiconductor industry (CVD, UHV-CVD, sublimation, HTCVD, graphene), customized equipment for different process steps.

Company size
Small



epiluvac

www.epiluvac.com

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Procurement codes
- Electronics and radio frequency
- Vacuum and low temperature
- Gases, chemicals, waste collection and radiation equipment

EXAMEC MASKINMONTAGE

Company profile
Fully integrated company, from raw materials to functional instruments/machines.
Competence in cutting, welding, machine tooling, surface treatment, metrology, electrics and automation, assembly and final testing.

Core competences
Building of complete instruments/machines, machine tooling of larger components, assembly and testing

Industry sectors
- Big Science
- Education/Research
- Automotive
- Packaging
- Manufacturing

References
- CERN
- ESS
- Max IV
- Tetra Pak
- Koenigsegg
- Borg Warner
- AR Carton
- Mastec
- UFAB

Company size
Small

examec

www.examec.com

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Procurement code
Mechanical engineering and raw materials

EXIR BROADCASTING

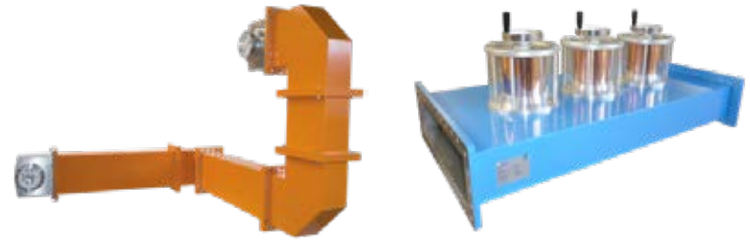
Company profile
Develop and manufacture innovative passive RF components with 10-year guarantee.
We are specialized in customized solutions to meet your specific needs.

Core competences
Design and production of passive RF components and on site support.

Industry sectors
- Transmission lines and wave guides
- Customized Solutions
- Research and Development

References
- Transmission line to Maxlab
- Solaris
- ESS and Freia including installation support and supervision (Big Science).
- Custom designed passive components, i.e. adapters, directionally coupler etc to CERN, Maxlab, Solaris, ESS and Freia (Big Science).
- Other components delivery to various Big Science plants around the world.

Company size
Small



Exir Broadcasting

www.exirbroadcasting.com

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Procurement code
Electronics and radio frequency

FAGERSTRÖM INDUSTRIKONSULT

Company profile

”Designs and solutions that no one else thought of”. We are not industry specific so we can offer technical improvements in most types of processes and within all sectors of the industry. We are frequently commissioned for developing unique specialized machines.
For others, we realize long-term development project. An example is the cooperation with the Swedish nuclear industry and ESS, where we interact with their organizations and conduct joint projects.
Fagerström has since many years close cooperation with various subcontractors who meet the same high level of quality standards as our own.
Naturally, we are quality and environmentally certified according to ISO 9001:2015 and ISO 14001:2015.

Core competences

- Technical solutions: Technical consulting activities such as machine design, pipe and steel structures with associated calculations and project management.
- Remote handling systems: Deco Systems
- Development, manufacturing and decontamination system, to clean components from radioactive particles.
- Production systems: Project responsibilities, development, design, delivery and commissioning of complete production lines and plants.
- Pharma systems: Feasibility studies, development and validation with rigorous control and high standards of analysis and manufacturing.

Industry sectors

- Nuclear
- Research facilities
- Spallation source

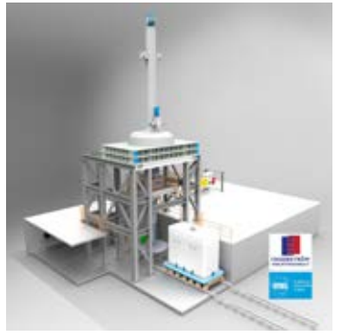
References

ESS, European Spallation Source:

- Active cell, design, documentation and inspection plans.
- Hot cell facility for handling of radioactive waste
- Proton Beam Window, component separating ultra-high vacuum in accelerator beam pipe from rough vacuum in monolith vessel
- Chopper group, design of different choppers for the instruments.
- Design of remote handling tools for the installation of the choppers
- Casks and associated handling devices, design and documentation.
- Equipment for transport of used radioactive and contaminated and 200 more projects.

Company size

Small



Procurement codes

Civil engineering, building and technical services
Mechanical engineering and raw materials

www.fagerstrom.se

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Per Fagerström
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FINVERKO

Company profile

Finverko designs and manufactures mechanical products after the client’s requests or own initiative. One part manufacturing, or small series of products in various material, eg. tooling steel, stainless steel, but also aluminium, copper and plastic. Finverko performs experiments and manufactures models and prototypes, complete confidentiality is guaranteed. We also manufacture advanced spare parts to all frequent machines. Finverko has quality system ISO 9001 and environment system ISO 14001.

Core competences

Mechanical design, 5-axis Milling, 3-axis milling, turning, sparking, tools, moulds, fixtures, prototype, wire machining, EDM, advanced spare parts, workshop. Quality ISO 9001, environment ISO 14001.

Industry sectors

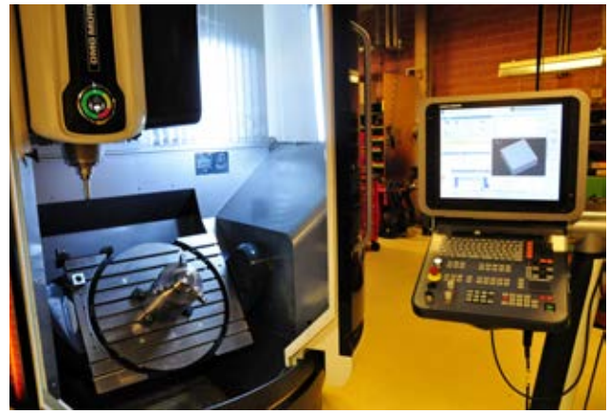
- Development company
- Manufacturing company
- Medical company
- Injection molding company
- Punch and die company

References

- ESS: Products for vacuum euipment.
- Höganäs: Powder steel prototypes and test equipment.
- Trelleborg: Moulds for rubber parts.
- Airec: Tools for heat changes.
- Solvoltaics: Products for reactors for manufacturing of nano particles.
- Ripasso: Motor parts for Sterlingmotor.
- Lindab: Form and punch tools.

Company size

Small



Procurement code

Mechanical engineering and raw materials

www.finverko.se

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Håkan Persson
Managing director
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hakan@finverko.se

FLIR SYSTEMS

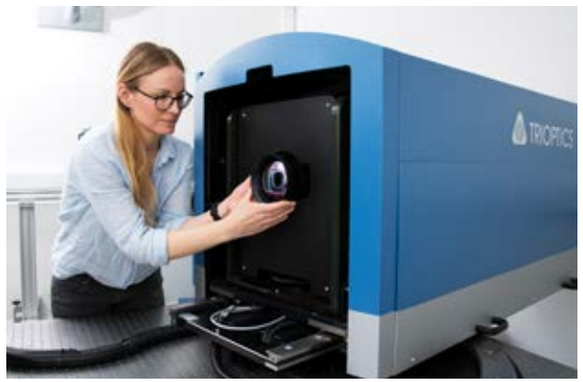
Company profile
FLIR Systems designs, develops, manufactures, markets, and distributes technologies that enhance perception and awareness. We bring innovative sensing solutions into daily life through our thermal imaging, visible-light imaging, video analytics, measurement and diagnostic, and advanced threat detection systems.
FLIR offers a diversified portfolio that serves a number of applications in government & defense, industrial, and commercial markets. Our products help first responders and military personnel protect and save lives, promote efficiency within the trades, and innovate consumer-facing technologies. FLIR strives to strengthen public safety and well-being, increase energy and time efficiency, and contribute to healthy and intelligent communities.

Core competences
- Thermal imaging
- Thermography
- Optical gas imaging
- IR
- Optics

Industry sectors
- Electrical industry
- Manufacturing industry
- Building industry
- Research & Development

References
- Utility
- R&D
- Manufacturing
- Oil & Gas
- Facilities
- Fire

Company size
Large



www.flir.se

FLIR Systems AB
Antennvägen 6, Box 7376, SE-187 15 Täby, Sweden

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erika.goransson@flir.se

Procurement codes
- Civil engineering, building and technical services;
- Electrical engineering and magnets
- Mechanical engineering and raw materials
- Optics and photonics

FREDRIKSONS

Company profile
Fredriksons Verkstads AB is a first-class contract manufacturer offering manufacturing and assembling of advanced industrial products in small and medium series. Within high knowledge of sheet metal and machine processing of mainly stainless steel, aluminium and other metals together with advanced mechanical and electronic assembly we are convinced that we can be used as a one shop partner for both details and also complex products.
We have deep experience in manufacturing and assembling systems in complex products. Within medtech, food and general industries we manufacture systems including final testing. High standards of quality, delivery reliability and cost-effective solutions are demands we place on ourselves.

Core competences
- Contract manufacturing
- High standards of quality demands
- Delivery reliability
- Small series
- Medium series
- Final testing sheet-metal work
- CNC machining
- Mechanical assembling
- Electronic assembling
- Automatic processes
- Cost effective production

Industry sectors
- Medtech
- Food industry
- General industry

Company Size
Large

www.fredriksons.se

Fredriksons Verkstads AB
Kronängsgatan 4SE-592 30 Vadstena, Sweden
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Reine Eriksson
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Procurement code
- Mechanical engineering and raw materials

FURHOFFS ROSTFRIA

Company profile
Production of subcontracted parts in stainless steel. Sheet metal and machined parts.

Core competences
Laser cutting, bending, welding, turning, milling, surface treatment and assembling.

Company size
Medium

www.furhoffs.com

Furhoffs Rostfria
Box 93, SE-541 22 Skövde, Sweden
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Procurement code
Mechanical engineering and raw materials

FÅRBO MEKANISKA

Company profile
Fårbo Mekaniska is a subcontractor that can deliver everything from the simplest parts to advanced precision engineering, whether you need large runs or one-off parts. Our production process is characterised by short lead times, flexibility and commitment. Our machines turn, mill, cut and rotate around the clock, and our highly skilled staff are always ready to deliver world-class products!

Core competences
- Turning and milling in multi-axis-machines
- EDM-machining
- Toolmaking

Industry sectors
Manufacturing industry

References
- Epiroc/Atlas Copco AB (mining products)
- Seco-Tools AB (cutting tools)
- Sandvik AB (tools)

Company size
Small

www.farbomek.se

Fårbo Mekaniska AB
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Mats Sandberg
Quotes, environment
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mats.sandberg@farbomek.se

Procurement code
Mechanical engineering and raw materials

GAMMADATA INSTRUMENT

Company profile
In the Scandinavian region, Gammadata Instrument AB, founded in 1987, is the leading supplier of equipment and tailor-made solutions for analytical instrumentation, optical spectroscopy, radiation analysis and protection, material characterisation, laser science, optoelectronics as well as for natural science education.

Core competences
- Radiation Detection
- Laser Solution & Light Detection
- Microscopy & Spectroscopy
- Material Characterization
- Elemental Analysis.

Industry sjosabectors
- Nuclear Power
- Hospital Physics
- Steel
- Recycling & Mineral
- Military & Security
- Radon & Geophysics
- Oil & Gas
- Material Processing
- Thermal Analysis
- Life Science.

References
- ESS
- MaxLab
- All universities
- All nuclear power plants

Company size
Small

gammadata

www.gammadata.se

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Box 15120, SE-750 02 Uppsala
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Stefan Isaksson
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Procurement codes
- Electronics and radio frequency
- Gases, chemicals, waste collection and radiation equipment
- Health, safety and environment; Information technology
- Optics and photonics
- Particle and photon detectors

GLENAIR NORDIC

Company profile
Focus on high end applications/markets in military, science, marine, space and energy sector. We offer a dozen, full-spectrum product lines designed to meet every interconnect requirement, including a broad range of military qualified and commercial connectors, hermetic opto (active) and fiber solutions, including the MIL-DTL-38999 Series III and our ultralight Series 80 Mighty Mouse.

Core competences
Photonics, Fiber interconnect technology, Interconnect miniatyrization, lightweight, high speed.
High level of service both commercial and technical. Big inventory. No moq policy!

Industry sectors
- Science
- MIL/Aero/Defence/Marine
- Space
- Oil & Gas

References
- All universities in Europe
- SAAB Group
- Kongsberg Group
- Bluefors/Finland
- RUAG
- ÅAC

Company size
Small (large globally)

Glenair

www.glenair.com

Glenair Nordic AB
Gustav III:s Boulevard 42
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Procurement codes
- Civil engineering, building and technical services;
- Electrical engineering and magnets
- Electronics and radio frequency
- Optics and photonics
- Vacuum and low temperature

GOALART

Company profile
GoalArt provides software systems, which help operators and service technicians to understand fault situations and handle these quickly and correctly. This increases both productivity and safety, and speeds up fault diagnosis and repair. We reduce the number of alarms in a control system drastically, through alarm cleanup, state-based alarm priority, and root cause analysis.

Core competences
- Alarm management
- Artificial intelligence
- Availability
- Control systems
- Fault diagnosis
- Reliability
- Safety

Industry sectors
Airport ground systems, aviation and airplanes, blood components, dialysis, ventilators, and heart-lung machines, cars, buses, trucks, and vehicles, power grids, Internet communication, nuclear power plants, power plants, chemical and petrochemical, pulp and paper, food processing, metallurgy, mining, and steel.

References
- Swedish National Grid (Svenska kraftnät)
- Croatian National Grid (HOPS)
- ESS

Company size
Small

GoalArt

www.goalart.com

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Procurement codes
- Health, safety and environment
- Information technology

GRÄNGES

Company profile
Gränges is a leading global supplier of rolled aluminium products for heat exchanger applications and other niche markets. In materials for brazed heat exchangers Gränges is the global leader with a market share of approximately 20 per cent. The company's geographical markets are Europe, Asia and the Americas. Its production facilities are located in Sweden, China and the United States, and have a combined annual capacity of 420,000 metric tonnes. Gränges has some 1,600 employees and net sales of more than SEK 11 billion. The share is listed on Nasdaq Stockholm.

Core competences
- The spray forming process of metal matrix composites
- The casting, rolling and slitting processes of aluminium clad material
- The brazing process of aluminium clad material
- Mechanical properties and microstructure
- Corrosion
- Lubrication, chemistry and surfaces

Industry sectors
- The automotive industry
- The stationary heat exchanger industry (HVAC)

References
Automotive heat exchanger manufacturers

Company size
Large

GRÄNGES

www.granges.com

Gränges AB
Linnégatan 18
Box 5505, SE-114 85, Stockholm, Sweden
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Procurement code
- Mechanical engineering and raw materials

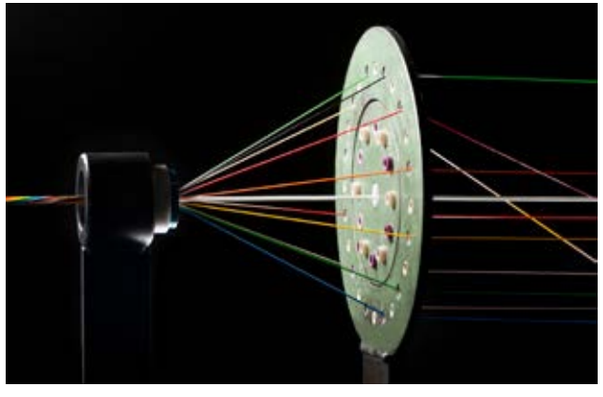
HABIA CABLE

Company profile
Habia Cable offers standard and custom designed cables and harnesses for demanding applications. Our customers are found in the telecommunications, nuclear power generation, defence, offshore and industrial sectors. In its markets, Habia Cable is today one of Europe´s leading wire and cable manufacturers. The company has a global presence and customers in more than 50 countries worldwide. Habia Cable has production facilities in Sweden, Germany, Poland, and China.

Core competences
- Custom design cables
- Custom design harness
- Cables for harsh environments
- High temperature cables

References
- CERN
- Defence Industry
- Nuclear Industry.

Company size
Large



Habia Cable

www.habia.com

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Thorbjörn Gustafsson
VP Sales & Marketing
thorbjorn.gustafsson@habia.com

Procurement code
Electrical engineering and magnets

HAGEMA

Company profile
Hagema is a contract manufacturing company with focus on CNC-machining for High-Tech customers. We can provide manufacturing of prototypes and smaller series production.

Core competences
High precisions machining in 3 and 5-axis milling machines in various materials such as aluminum, copper, brass, titanium, stainless-steel and plastics.
For extreme precision we also have a 5-axis ultra precision milling machine in a temperature-stable environment with tolerances down to +/- 0.5 µm. Customers for this type of products are often found in the space industry and technical universities.

Industry sectors:
- High-Tech Industries
- Space Industry
- Telecom Industry
- Medical Industry
- Research and Development Labs
- Technical Universities

References
- Parts for ALMA Telescope, Chile
- Parts for Various Spaceprojects in both Sweden and Europe.
- Parts for Microwave Instruments, Radiometer Systems and GHz Products

Company size
Small

Hagema

www.hagema.se

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Production/Sales
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Procurement code
Mechanical Engineering and raw materials

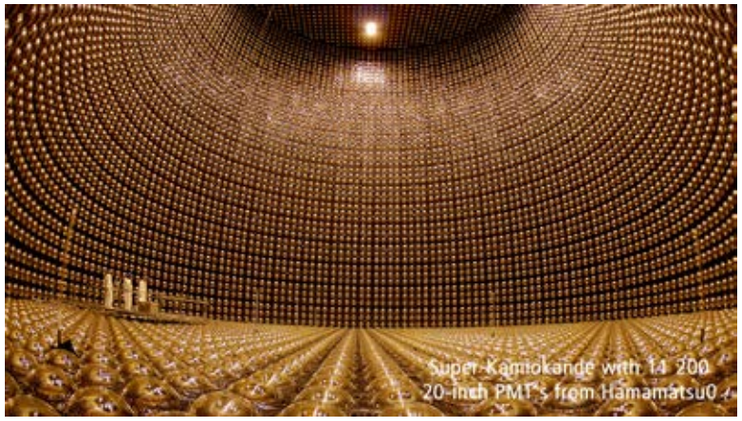
HAMAMATSU PHOTONICS NORDEN

Company profile
Hamamatsu is a world leader in optoelectronics. We offer the widest product range of components, modules and systems on the market for science and research and for a broad range of applications within medicine, biotechnology, industry, automation and consumer electronics. Our worldwide organisation with headquarter in Japan has sales and technical support offices around the world. Hamamatsu Photonics Norden AB is supporting our customers in the Nordic and Baltic countries, Russia and CIS.

Core competences
- Optoelectronics
- Photoics

Industry sectors
- Biotechnology
- Medical & Life science
- Daily life
- Industry, IT & Optical communication
- Analytical & Environment

Company size
Small company



HAMAMATSU
PHOTON IS OUR BUSINESS

www.hamamatsu.com

Hamamatsu Photonics Norden AB
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Procurement codes
- Health, safety and environment
- Information technology
- Optics and photonics
- Particle and photon detectors

HAMEK

Company profile
HAMEK AB is a well-established mechanical workshop specialising in the series production of aluminium and steel components with tight tolerances and high precision. The company is located in Stockholm and currently comprises of 20 employees. We work in accordance to ISO/ TS 16949 with control plans and screening processes for many of our components. This ensures optimal production and enables us to create the conditions whereby we maintain the constant high quality of our deliveries.

Core competences
We distinguish ourselves by delivering consistently high quality, precision pieces. We have developed an inspection process that we use to control production and that helps us to maintain a stable quality. We often use computer-based measurement systems both for measuring and to later be able to do analysis. With this we have the basis for the further quality development of the individual articles and their control plans.

In order to keep control of our processes' capabilities, we apply Statistical Process Control as an active tool. Usually we measure our PPK and CPK values against a 12 sigma requirement.

References
Hamek has been a supplier to CERN since 2007

Company size
Small

HAMEK
premium supplier

www.hamek.se

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Adam Dahlberg
President
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Procurement code
- Mechanical engineering and raw materials

HARALD PIHL

Company profile
Europe's largest stockholder of titanium and special alloys. We supply alloys with unique characteristics – alloys that meet specific demands in extreme environments.
HARALD PIHL was founded in 1912 and is now managed by the fourth generation of the family. We currently have offices in 13 different countries but customers all over the world. Our longstanding experience also guarantees a vast knowledge of metallurgy.

Core competences
- Stock holder
- Nickel alloys
- Titanium
- Titanium alloys
- Copper alloys
- Welding material
- Plate
- Sheet
- Round bar
- Tube
- Pipe
- Wire
- ISO 9001 as well as AS9120 (aerospace)

Industry sectors
- Aerospace
- Space
- Oil and Gas
- Medical
- Turbines
- Nuclear
- Defence
- Motorsport

References
- CERN
- Formula 1 teams
- Alfa Laval
- GKN
- SAAB
- Siemens
- Emerson

Company size
Small

HARALD PIHL
SPECIAL ALLOYS AND TITANIUM
WWW.HARALDPIHL.COM

www.haraldpihl.com

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Jonas Pihl
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jonas.pihl@haraldpihl.com

Procurement Code
Mechanical engineering and raw materials

HERRSTRÖMS MEKANISKA

Company profile
Family owned company in Trelleborg started 1972. 4500 square meters fully equipped with 40 employees and long experience of work at MAX Laboratory from the beginning of 1980.

Core competences
Mechanical workshop with turning, milling, grinding, service, assembly, cutting and construction.

References
- ESS Lund
- SKB (Nuclear fuel handling)
- SAAB Kockums
- Trelleborg Industries
- Tetra Pak

Company size
Small

HERRSTRÖMS MEKANISKA

www.herrstroms.se

Herrströms Mekaniska Verkstads AB
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Managing Director
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Procurement codes
Civil engineering, building and technical services
Mechanical engineering and raw materials

HALMSTADS GUMMIFABRIK

Company profile
HGF is a manufacturer of advanced moulded products in rubber and TPE often combining different components or sub-assemblies. We specialise in more complex product development projects together with our customers to find the optimum solution. Examples of such products are: three-component membranes for hydrogen electrolysers used for fuelling hydrogen fuel-cell trucks, fire-proof rubber sealings used in nuclear plants and marine vessels, silicon cooling plates for hospital intensive care situations, etc.

Core competences
- Rubber
- Polymer development project
- Sealing
- Gasket
- Membrane
- Polymer material
- High performance rubber

Industry sectors
- Automotive
- Mining and Construction
- Industry
- Sports
- Marine
- Medical

References
- NEL
- Hydrogen
- Sandvik
- Volvo Cars
- Braincool
- Eleiko
- Roxtec

Company size
Medium

www.hgf.se

AB Halmstads Gummifabrik
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Procurement Code
Mechanical engineering and raw materials

HMS INDUSTRIAL NETWORKS

Company profile
HMS Industrial Networks is a leading independent supplier of products for industrial communication and the industrial Internet of Things. Our products enable industrial devices to get connected and communicate in different ways. Head quartered in Halmstad, Sweden, HMS has Technology centers in Germany, Belgium and Spain. Local sales and support are handled by branch offices in 14 countries, plus distributors in more than 50.
HMS employs 500 people and is listed on the OMX Nasdaq Nordic Stock Exchange.

Core competences
- Industrial communication
- Industrial Internet of Things

Industry sectors
- Industrial automation
- Building automation
- Power and energy
- Life sciences
- Transport

References
Our customers range from large automation vendors, to manufacturers of devices and machines as well as system integrators and end users, research centers and universities. Most major automation companies such as ABB, Rockwell Automation, Schneider Electric, Siemens and many more use HMS technology to get connected.

Company size
Large

www.hms-networks.com

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Procurement codes
Electronics and radio frequency
Information technology

HÖGANÄS

Company Profile
Höganäs AB produces metal powders for powder metallurgy. These include iron and iron based powders, stainless steel powders, and nickel based powders including super alloys and brazing powders. Other powders include ceramic powders such as amorphous and crystalline boron powders, metal carbides, nitrides and borides.

Core competences
Pressing and sintering, additive manufacturing, surface coating, brazing.

Industry sectors
- Automotive,
- Aerospace
- Industrial

References
Major OEM's to the automotive and aerospace industry

Company size
Large

Höganäs

www.hoganas.com

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Procurement code
Mechanical engineering and raw materials

IN SITU INSTRUMENT

Company profile
In Situs' business concept is to provide its customers with qualified systems for measurements in soil, water and air.
We supply everything from individual parts in a measuring system to turnkey measurement solutions, where the customer gets ready-data: installation, service, repairs, monitoring of equipment and retrieval/storage of measurement data.
We have special expertise in measuring technology, software, design, construction and production of measuring systems and can therefore meet different types of special requirements in the area of environmental measurement.
One of our foremost specialist knowledge is power supply systems - which can be adapted to different requirements and conditions where measuring systems must be operated outside the grid. We deliver these systems to both wind energy measurements and various types of research systems.

Core competences
- Experts in environmental measurement systems. Renewable energy
- Power solutions
- Dam safety
- Wind Power Meteorology
- Hydrology
- Greenhouse gas measurements

Industry sectors
- Hydropower
- Meteorology
- Renewables
- Instruments
- Sensors
- Hydrology.

References
- ICOS (Integrated Carbon Observation Systems)
- Vattenfall
- Campbell Scientific
- SLU (Swedish University of Agricultural Sciences), University of Stockholm
- University of Stockholm, Gothenburg, Uppsala and Lund
- Polar research Institute
- SMHI (Swedish Meteorological institute)
- IVL (Swedish Environmental Research Institute).

Company Size
Small

IN SITU
environmental measurements
ground • water • air

www.insitu.se

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Procurement Codes
Civil engineering, building and technical services,
Electrical engineering and magnets
Health, safety and environment

JOBSAB INTERPIPING SYSTEM

Company profile
Since 1981 JOBSAB has installed and delivered pipe installations within gas, hydraulics and industrial installations. We have a workshop where we can perform prefabrications. Our main installations are for customers within special gas requirements, hydraulics, and traditional industry. We take responsibility for the entire installation cycle from the purchased products to documentations. JOBSAB is certificated ISO 3834-2

Core competences
- High quality installations
- Clean installations
- Installations delivered on time
- Open, clear and direct communication
- Personnel with certificates
- Accurate documentation

Industry sectors
- Big Science
- Oil and gas
- Nuclear
- Automotive
- Process industry

References
- Big Science: ESS – Installation of cryogenics and process water
- Gas industry: Air Liquide – Industry- and gas installation for new production and plant upgrading
- Process/Gas industry: SSAB – Pipe-, pumps and valves installation.
- Automotive: Volvo – Industry- and hydraulic installation for new production and plant upgrading
- Nuclear: Ringhals – Industry- and gas installation for new production and plant upgrading
- Oil industry: Rolls Royce – Hydraulic installation, plant upgrading

Company size
Small

JOBSAB AB
RÖRINSTALLATIONER
GAS HYDRAULIK INDUSTRI

www.jobsab.se

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www.jobsab.se

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Procurement codes
- Civil engineering, building and technical services
- Gases, chemicals, waste collection and radiation equipment
- Mechanical engineering and raw materials
- Vacuum and low temperature

JOIN BUSINESS & TECHNOLOGY

Company profile
We deliver and support strategic research development in most technology areas. We help develop products, processes and business. We deliver custom-designed products for industry and research. We offer expert resource in technology, skilled technical problem solvers and prototype builders.

Core competences
- Development department
- Prototype
- Instrument
- Trouble shooting
- Measurement systems

Company size
Small

JOIN
Business & Technology

www.join.se

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IDEON Science Park, Alfahuset
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Procurement codes
- Electrical engineering and magnets
- Electronics and radio frequency
- Mechanical engineering and raw materials
- Information technology

KG FRIDMAN

Company profile

KG Fridman AB, suppliers of advanced materials as well as high precision mechanics and sub-assemblies thereof. Machining and assembly of large and small, tightly toleranced mechanical components. We also offer components made of technical ceramics, ceramic/metal-composites with extreme properties, Molybdenum-graphite developed and used by CERN, heat-sink materials such as copper-diamond plus our own material developments within technical ceramics.

Core competencesnuv

- Tightly toleranced mechanical components and sub-assemblies - large and small
- Technical ceramics
- Ceramic/metal-composite materials, conductive materials for EDM
- Ceramic nozzles
- Spark plasma sintering
- Graphite-Molybdenum
- Copper-Diamond

Industry sectors

- Defense
- Medical
- Metrology
- Big-science

References

- CERN
- GE Healthcare
- SAAB
- Hexagon

Company size

Small

Graphite-molybdenum for use in collimators

Copper-Diamond material for heat-sinks

KG Fridman AB
PRECISIONSMEKANIK

www.fridman.com

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Alain Lennquist
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alain@fridman.com

Procurement codes

- Mechanical engineering and raw materials
- Particle and photon detectors
- Vacuum and low temperature

KISAB

Company profile

KISAB constructs, builds and produces single units or small series of equipment and parts in steel and aluminium, such as heat exchangers, pressure vessels and vacuum chambers, to order. We also offer installation on site and turn-key solutions.

Core competences

- Welding
- Turning
- Milling,
- Assembly
- Project management
- ISO3834 and EN1090 certified

Industry sectors

- Pulp and paper
- Food industry
- Water and sewage
- Infrastructure
- Energy

References

- NKT – underwater joints in stainless steel for high-voltage cables
- Öresund Bridge Consortium - evacuation doors (emergency exits) in the tunnel
- Max IV Laboratory – various equipment supports
- Stora Enso – heat exchangers
- Purac – stainless steel pipes for waterworks and pumping stations

Company size

Small

KISAB

www.kisab.eu

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Claes Andersson
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Procurement code

- Mechanical engineering and raw materials

KUNGSÖRS MEKANISKA VERKSTAD

Company profile
Kungsörs is specializing in machining parts up to 13 meters length, through deep-hole drilling, honing, turning and milling. We are a complete partner in advanced machining for many different types of industries, all the way from raw material to a finished product.

Core competences
- Deep hole drilling
- Honing
- Turning
- Milling
- Supplying includes material, heat treatment, surface treatment

Industry sectors
- Hydraulic industry
- Medicine industry
- Mining industry

References
- Emhart Glass
- Kaller
- LKAB

Company size
Small

KMV

www.kmv.se

Kungsörs Mekaniska Verkstad AB
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Procurement codes
- Civil engineering, building and technical services
- Mechanical engineering and raw materials

LARSSON & KJELLBERG

Company profile
Our company works with welding and machining. We can lift up to 100 ton in our cranes. Our workshop is 7000 square meters. We can produce products from 1 kilo up to 100 ton.

Core competences
- Welding
- Boring
- Lathe
- CNC
- Heavy

Industry sectors
- Heavy industry
- Shipping

References
- SSAB
- Metso
- Akers International
- Sjöfartsverket

Company size
Small

LK
AB LARSSON & KJELLBERG

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Procurement Code
- Mechanical engineering and raw materials

LASER NOVA

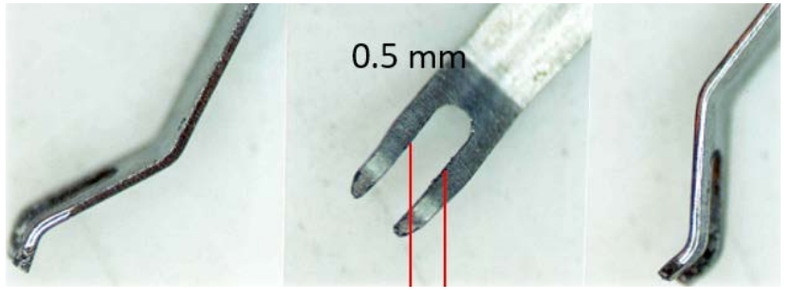
Company profile
Expertise in micro machining using low to medium power lasers. Precise cutting in thickness 15 um <= 3mm.
Precise welding 20 um foils, up to 3 mm in thickness. Stainless, titanium, copper, covar, inconel.
Basic material analysis, internal Zeiss SEM.

Core competences
Laser processes, micro welding, micro cutting, surface structuring, pre-studies using NdYAG and fibre lasers. Several systems available for production.

Industry sectors
Space, micro machining, surgical and medical devices, dental devices, R&D organizations, off shore and subsea applications e.g. encapsuling of sensors for deep sea applications.

References
- CERN
- Alcatel Subsea Networks
- DOVER
- Integrum
- Max IV

Company size
Small



LASER NOVA AB

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Procurement code
Mechanical engineering and raw materials

LIEDHOLMS MASKINTEKNIK

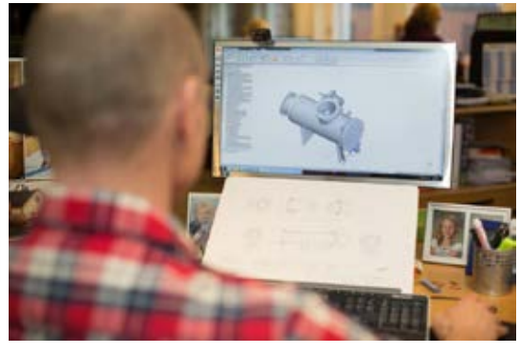
Company profile
Liedholms Maskinteknik AB manufactures welded constructions, such as ASME U and EN 13445 (PED) classified pressure vessels in carbon and different kinds of stainless steel. We work in high alloy material and are used to complex specifications and high demands. We help our customers with design, calculations and project management. We work with third party inspectors on a weekly basis.

Core competences
Welding in high alloy material. Manufacturing of pressure vessels including design, calculations and project management.

Industry sectors
- Energy
- Big Science
- Marine
- Nuclear
- Food & Beverage
- Oil & Gas
- Submarine

References
- Big science: ESS – Drain tanks (with ÅF)
- Nuclear: Water filters/Strainers
- Oil and Gas: Water filters/Strainers
- Food & Beverage: Tanks
- Marine: Scrubber towers in high alloy material
- Marine: Ballast water treatment units in high alloy material.

Company size
Small



LIEDHOLMS Maskinteknik

www.liedholms.se

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Esbjörn Säiner
Key Account Manager
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Procurement codes
Mechanical engineering and raw materials
Gases, chemicals, waste collection and radiation equipment

LOW NOISE FACTORY

Company profile
Low Noise Factory (LNF) offers the lowest noise, highest performance low noise amplifiers in the world. Our cryogenic models have become the de-facto standard in physics related research throughout the world thanks to their unprecedented sensitivity. Our lowest noise model offers a noise figure of less than 0.03 dB. LNF provides its customers with state-of-the-art LNAs for radio astronomy, physics research and telecom applications.

Core competences
When Low Noise Factory was founded it was the first commercial company offering true state-of-the-art LNAs. Today, more than a decade later, LNF is still the only company in the world offering these products commercially. Our engineers have more than 35 years of experience in designing LNAs from California Institute of Technology, Jet Propulsion Laboratory and Chalmers University of Technology.

Industry sectors
- Physics research
- Quantum computers
- Radio astronomy
- Telecom

References
LNF manufactures, tests and delivers about 1000 cryogenic Low Noise Amplifiers annually. The big markets are quantum computer related research and radio astronomy.

Company size
Small

LOW NOISE FACTORY
www.lownoisefactory.com

www.lownoisefactory.com

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Procurement codes
- Electrical engineering and magnets
- Electronics and radio frequency

LOW2HIGH VACUUM

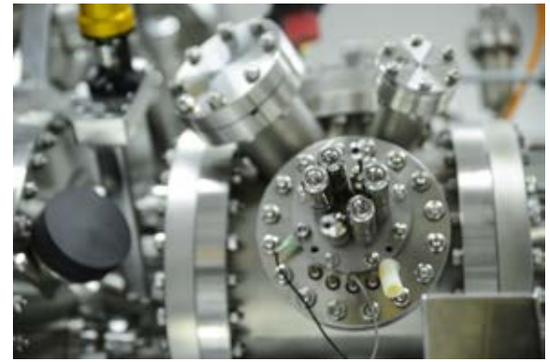
Company profile
As the name suggests, Low2High Vacuum operates with everything from low vacuum to ultra high vacuum. Low2High vacuum specializes in vacuum technology and our core business is about the sale of products and the provision of services related to vacuum technology and its peripheral areas.
Our employees have a long experience and have supplied vacuum technology to the Swedish market for over 50 years.
In addition to providing products such as: vacuum pumps, gauges, instrumentation and aftermarket solutions to these, we also have the ability to test (leak detect) products with helium on our customer's behalf. We can do this in our own premises or at customer location. Here too, we have long experience and knowledge of tests of this type and we are flexible and meet the customer's needs.
We also offer courses to companies and students in vacuum technology/theory at both basic and advanced levels.

Core competences
- Helium leak detection tasks
- Provider of vacuum chambers
- Provider of vacuum equipment

Industry sectors
- Automotive
- Pharmacy
- R&D
- Food and packaging
- Science

References
Our list of references is very long and contains, in addition to all major industrial manufacturing companies in Sweden, all technical colleges and universities in Scandinavia.
A small selection: Lund University (and Max IV), European Spallation Source and DESY.

Company size
Small



Low2High vacuum

www.low2high.se

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Datavägen 57B, SE-436 32 Askim, Sweden

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Procurement code
- Vacuum and low temperature

LÖWENER VACUUMSERVICE

Company profile

Löwener Vacuumservice AB designs and manufactures vacuum assisted systems for leak testing, tightness control, degassing, drying, flight altitude simulation, residual gas analysis, vacuum gauge calibration, central vacuum and much more. We have a long experience from designing and building customer specific vacuum solutions.
We also offer various service solutions, from pump renovation to custom defined service agreements.

Core competences

- Vacuum systems
- High vacuum
- Ultra high vacuum
- Leak detection
- Tightness control
- Calibration
- Vacuum pumps
- Rotary vane pump
- Cryo pump
- Turbo molecular pump
- Molecular drag pump
- Central vacuum system
- Scroll pump
- Claw pump
- Vacuum measurement instruments
- Mass spectrometer
- Leak detector

Industry sectors

- Companies producing components related to electrical infrastructure
- Automotive industry
- Defence industry
- Biotech
- Research laboratories

References

- ABB Composite
- ABB High Voltage Products
- Electrolux
- FLIR, SAAB Dynamic
- Westinghouse
- Astra Zeneca
- Ericsson Radar
- Sub supplier to Automotive manufacturers such as Volvo, Mercedes, Jaguar, sub supplier to Alstom and General Electric, etc.

Company size

Small

LÖWENER VACUUMSERVICE

www.lowener.se

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Procurement code

Vacuum and low temperature

MASKINTEKNIK I OSKARSHAMN

Company profile

Maskinteknik i Oskarshamn is a consulting and engineering company focusing on prototyping and manufacturing. The company has extensive knowledge and experience in designing and manufacturing components, tools, instruments, equipment, and machines for the manufacturing industry as well as for research, development and innovation purposes.
Maskinteknik offers solutions combining mechanics, hydraulics, pneumatics, electronics and intelligent control systems.
Our strength is to manage technical development projects for product development, prototyping, 0-series and short series, most of which that can be manufactured in-house.
The company has an extensive range of conventional, NC-controlled machines, and highly specialized machines, making it possible to do most types of machining in-house, such as milling, turning, drilling, spark-erosion machining, welding, water cutting, 3D-scanning and 3D-printing.
We have 30 years of experience developing and manufacturing technical solutions for the nuclear fuel and waste management sector and a wide variety of other industries and sectors.

Core competences

- Technical development, technical consulting
- Prototyping, 0-series
- Design and manufacturing of components, tools, instruments, equipment, machines and machine systems
- High precision machining and manufacturing in copper, nimonic, steel and plastic materials

Industry sectors

- Nuclear fuel and waste management
- Nuclear industry
- Manufacturing industry
- Energy
- Automotive
- Wood processing, paper and pulp
- Marine
- Water
- Research facilities
- Machine building

References

- Swedish Nuclear Fuel and Waste Management Company

Company size

Small

MASKINTEKNIK

www.maskinteknikab.se

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Procurement code

Mechanical engineering and raw materials

MCT BRATTBERG

Company profile
We protect buildings and equipment to keep your business run smoothly.

Core competences
Production of fire and pressure proof cable and pipetransits.

References
We deliver cable and pipetransits to ESS, ITER nuclear powerplants, oil & gas worldwide.

Company size
Medium

www.mctbrattberg.se

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Lyckeåborg SE-371 92 Karlskrona, Sweden
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Mats Åfeldt
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Procurement codes
- Civil engineering, building and technical services
- Health, safety and environment

MERX SVENSKA

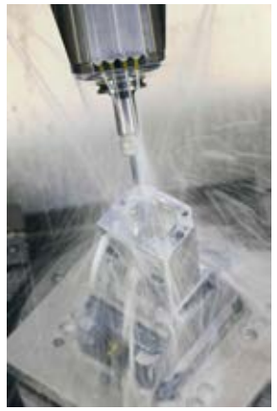
Company profile
Merx Svenska AB is a leading player in the turning and milling sector, characterised with a high level of skills and competence.
Within the technical subcontracting sector, Merx Svenska AB represents an important partner as supplier for the Global Production Industry.
We are certified according to ISO 9001:2015, ISO 14001:2015, Achilles, Sellihca, and handle documentations according to TS 16949.

Core competences
- Milling
- Turning
- Assembly – all metals and plastic materials.

Industry sectors
Gas turbines, nuclear industry, heat transfer, engine cooling, industry ovens, inline stitching industry, nanotechnology, transmission system.

References
Brackets, bolts, nuts camera holders, transmission parts, gas turbines, nuclear industry, heat transfer, engine cooling, industry ovens, inline stitching industry, nanotechnology

Company size
Small



www.merx.se

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Thomas Smedberg
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Procurement code
- Mechanical engineering and raw materials

MICROBAS PRECISION

Company profile
Microbas provides precision components and customized solutions in granite, glass ceramics, glass, aluminum, steel or other bespoke materials for the global high-tech industry and research institutions.

Core competences
- Precision granite
- Optical glass grinding and machining
- Invar machining
- Precision lapping
- Zerodur machining
- Clearceram machining
- Fused silica machining
- Precision metals machining

Industry sectors
- Electronics manufacturing equipment
- Advanced machines
- Thin film technology
- Astronomy
- Space optics
- Research institutions and projects
- Metrology and calibration

References
- ESO: precision machining of glass ceramics
- Max IV: precision granite
- ESS: mirror assembly
- Mycronic: machine bases, stages, beams and other ultra-precision components
- Carl Zeiss Jena: light weighting and precision grinding of mirrors
- Safran REOSC: light weighting and precision grinding of mirrors. Lens grinding
- University of Leiden (Astron/Nova): precision grinding of mirrors and lenses
- Eldim SA: lens grinding
- Coherent: precision granite

Company size
Small

www.microbas.se

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Procurement codes
- Mechanical engineering and raw materials
- Optics and photonics

MIKROPONENT

Company profile
Mikroponent was founded in 1973, a well-known supplier, principally to the Scandinavian telecom, electronic and fine mechanical industries.
Together we have a high level of expertise within product adaptation and manufacture of outline-cut thin metal products made from materials ranging from hardened steel to soft copper alloys with or without flexible supporting materials.

Core competences
We manufacture high precision customer designed parts of thin metal foils or laminated flex films. The technique is well developed after more than 45 years of experience.
We are partners to and deliver to electronics and fine mechanical industries.
Our products are found in mobile phones and systems, cameras, flexible circuits, Blue Tooth, antenna elements for wireless communication, EMC-shieldings on PCB, instrumentation, sensors and camera video technology, medical equipment and aviation – space and defence industry.

Industry sectors
- Electronics
- Design
- Telecom
- Precision-engineering
- Optics
- Food
- Medicine
- Space
- Aviation
- Defence
- Dental
- Home care
- Automotive
- Maritime
- Nuclear

References
- SAAB AB, high precision metal parts
- Kongsberg AS, high precision metal parts
- CERN, high precision metal parts
- GE Healthcare, high precision metal parts
- RUAG Space, high precision metal parts
- Hasselblad, high precision metal parts
- 3M, high precision metal parts
- Ericsson, high precision metal parts

Company size
Small

www.mikroponent.se

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Procurement codes
- Mechanical engineering and raw materials
- Electronics and radio frequency
- Optics and photonics
- Particle and photon detectors

MIKROVERKTYG

Company profile
Mikroverktyg is a leading supplier of tools, high-quality transmission components and advanced mechanical components incorporating Mikro-quality.

Core competences
- Gears & Transmissions
- High precision mechanics
- Tools, Power Skiving

Industry sectors
Technology company with manufacturing/ development services for industrial products and automation equipment.

References
We work on assignments from customers within the aerospace, defence, energy, industry, automotive and medical engineering sectors, all of which impose stringent demands and high expectations.

Company size
Medium

MIKROVERKTYG

www.mikroverktyg.se

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Procurement codes
Civil engineering, building and technical services
Mechanical engineering and raw materials

MODELLTEKNIK

Company profile
We are an engineering company with cutting-edge expertise in CAD/CAM, industrial engineering and mold manufacturing.
Our business areas include contract manufacturing in short runs, machining, 3-D design, product development, special projects, prototypes and precision measuring.
Manufacturing is primarily within advanced 5-axis machining, model manufacturing, fixture manufacturing, tool manufacturing and prototype manufacturing.

Core competences
- Advanced machining
- Solid machining
- Milling/Turning
- Wide range of materials
- 3D-scan
- 5-axis machining
- CMM
- Reversed engineering
- Expertise in product development
- Expertise in metallurgy and castings

Industry sectors
- Automotive
- Defense
- Aerospace
- Medical
- Mining
- Electronics

References
- ABB
- Aker Solutions
- Alfa Laval
- CERN
- Flir
- Nobel Biocare
- Minesto
- Orexplore
- Philips
- Rolls Royce
- Saab
- Scania
- Stille
- Volvo.

Company size
Small

MODELLTEKNIK

www.modellteknik.se

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Procurement code
Mechanical engineering and raw materials

MP BOLAGEN INDUSTRI

Company profile
Producer of cable management system based on cable ladders, cable trays or mesh trays.
Material: Pre-galvanized, Hot dipped galvanized, aluzinc, aluminum, stainless steel, acid proof stainless steel.

Core competences
- Cable ladder
- Cable tray
- Cable mesh tray
- Wall trunkings
- Mechanical profiles

Industry sectors
Electrical installations

References
- Nuclear power plants in Sweden
- Ericsson mobile sites worldwide
- Paper mills worldwide
- ABB high voltage stations
- Most industries in Nordic countries

Company size
Medium

MP bolagen

www.mpbolagen.se

MP bolagen Industri AB
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Procurement codes
- Electrical engineering and magnets
- Mechanical engineering and raw materials

NANOVAC

Company profile
We are specialized in vacuum technology solutions, providing equipment and know-how for various vacuum system solutions. We have extensive experience in providing automation and mechanical solutions for advanced vacuum systems, ranging from small test systems to large complex vacuum chamber/system solutions.

Core competences
- Vacuum technology
- Vacuum system automation
- Automation
- Risk analysis

Industry sectors
- Research & Development
- Solar Industry
- Medical Industry
- Electrical Industry
- Aeronautics

References
- Vacuum pumps
- Vacuum technology

Company size
Small

Nanovac AB

www.nanovac.se

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Procurement codes
- Electronics and radio frequency
- Health, safety and environment
- Mechanical engineering and raw materials
- Vacuum and low temperature

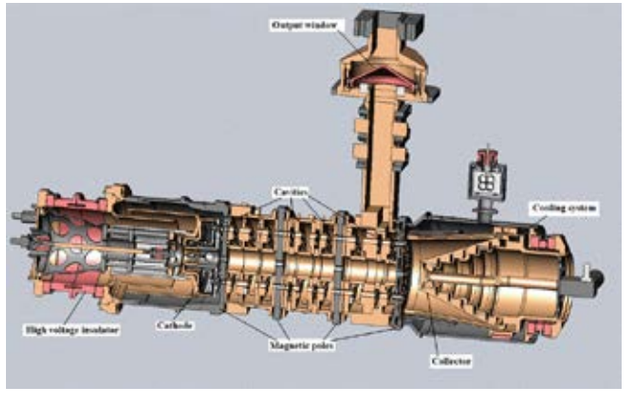
NELSON CREATED

Company profile
Our mission is to provide high quality RF and microwave components/systems manufactured and created in China and Russia for the European market.
We work with two categories of companies in China and Russia, those are widely chosen by domestic OEM's and those who will be in the front edge of development.

Core competences
- Electrical
- Electronics
- Electromechanical
- RF systems

Referenses
- Microwave
- Magnetron
- Klystron
- RF systems

Company size
Small



NELSON CREATED AB

www.nelsoncreated.com

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Daniel Lundberg
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Procurement codes
- Electrical engineering and magnets
- Electronics and radio frequency

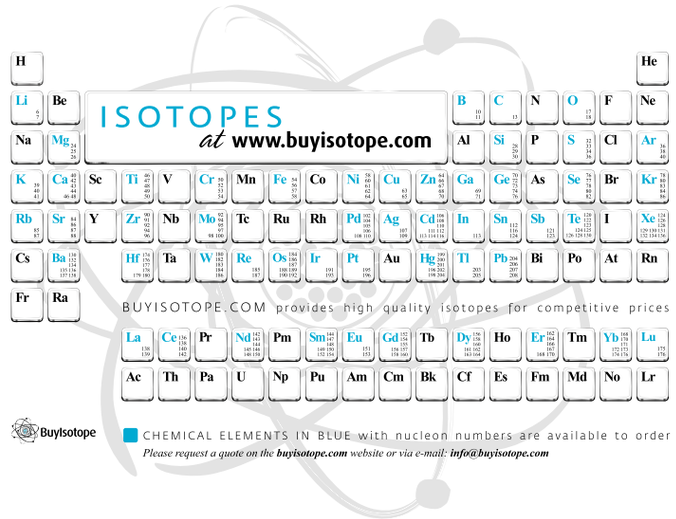
NEONEST

Company profile
Buyisotope (Neonest AB) provides a range of high quality enriched isotopes e.g. in oxide, metal, carbonate chemical forms and enriched isotopic gases. On requests, we produce isotopically modified organic and inorganic compounds and different structured forms of enriched isotopes e.g. foils, rods, targets.

Core competences
Enriched Isotope powders, particles, crystals, rods, foils, discs, isotopically modified organic and inorganic compounds.

Industry sectors
- Big Science
- NMR science
- Research and development of new products
- Medical, health and food industries

References
Enriched isotopes in different chemical forms, isotopically modified organic and inorganic compounds and different structured forms of enriched isotopes e.g. foils, rods, targets.



Buyisotope

www.buyisotope.com

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Petr Vasiliev
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info@buyisotope.com

Procurement codes
- Particle and photon detectors
- Gases, chemicals, waste collection and radiation equipment
- Health, safety and environment

NORDBERGS TEKNISKA

Company profile
Nordbergs Tekniska is a distributor of semi-finished engineering plastics in rods, sheets, tubes and films. In our workshop we have 5-, 4- and 3-axis CNC milling machines as well as CNC lathes.
We also manage cold or heat form covers of polycarbonate and cast acrylic.

Core competences
- Material knowledge
- Engineering plastics
- Thermosets
- Film
- 5-axis machining

Industry sectors
- Medical and Life Science
- Aerospace and Defense
- Chemical Processing
- Electronics
- Industrial Equipment

References
GE

Company size
Small

www.nordbergstekniska.se

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Procurement code
- Mechanical engineering and raw materials

NOTE

Company profile
NOTE is a global leader within the EMS industry. We manufacture electronics for various customers with high demands. NOTE has factories in Sweden, Estonia, Finland, UK and China. Our customers come mainly from high end industrial and medical, research and high-end consumer segments. NOTE is a publicly traded company listed on the First North list at Nasdaq Stockholm exchange.

Core competences
NOTE's core competence is development of viable manufacturing methods for PCBA:s or full products with different partners. We have factories with different competences that can solve almost any problem related to product manufacturing/development

Industry sectors
- Medical
- High Level Industry
- High Level Consumer
- Defence

References
- SPECT: Swedish Research Program for development of a portable GammaRay dosimeter. NOTE manufactures prototypes for the project with various counterparts. The project is supported by Vinnova Sweden.
- Big science. COGNA: Swedish Research Program for development of intelligent PCB:s with built in sensors. NOTE manufactures prototypes for the project with various counterparts. Project is supported by Vinnova Sweden and Swerea Sweden.
- Cross discipline project. CERN: NOTE has manufactured PCBA:s for CERN through Uppsala University.

Company size
Large

www.note.eu

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Procurement codes
- Civil engineering, building and technical services
- Electrical engineering and magnets
- Electronics and radio frequency
- Information technology
- Optics and photonics
- Particle and photon detectors

NUVIA NORDIC

Company profile
Nuvia offers highly specialized services and products to demanding environments focusing on nuclear and science applications. Our service offering includes all parts of a facilitie's lifecylce, from new build to maintenance and decommissioning. We deliver highly specialized engineering capabilities in engineering, technical maintenance and installation as well as radiation protection services. We also develop our own radiation protection products sold worldwide to nuclear facilities.

Core competences
- Radiation protection
- Engineering
- Major big projects
- New builds
- Decommissioning
- Waste management
- Radiation monitoring equipment
- Fire protection

References
ESS

Company size
Medium

www.nuvia-nordic.com

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Tobias Gustavsson
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Procurement codes
- Civil engineering, building and technical services
- Gases, chemicals, waste collection and radiation equipment
- Health, safety and environment
- Mechanical engineering and raw materials

NVENT NORDIC

Company profile
At nVent, former Pentair, we believe that safer systems ensure a more secure world. We connect and protect our customers with inventive electrical and electronic solutions. nVent is a $2.1 billion global company that provides enclosures, electric heat tracing solutions, complete heat management systems, and electrical and fastening solutions. nVent employs 9,000 people worldwide.

Core competences
The nVent SCHROFF brand contains a broad product portfolio from printed circuit board (PCB) accessories, such as card retainers and extractors, front panels and handles to subracks, cases, backplanes, power supplies, cabinets and pre-assembled chassis for embedded computing systems. As a pioneer and trendsetter, the SCHROFF name is synonymous with expertise in the areas of mechanics, electronics, climate control and system management and has been for over 50 years.

Industry sectors
SCHROFF provides a comprehensive range of standard, modified, and custom-engineered solutions for the energy, industrial, infrastructure, commercial, communications, medical, security, and defence markets. For the test and measurement market SCHROFF systems are ideal in a 19" control cabinet or as a scalable and flexible system that can be adapted to specific aesthetic concepts.

References
nVent provides support to several research facilities, such as the European XFEL X-ray laser from the DESY research center (Deutsches Elektronen-Synchrotron) and ESS (European Spallation Source). Area of application for the SCHROFF MTCA system is the "beam control". In addition, there are systems located in the experiment chamber where researchers carry out their measurements.

Company size
Large

https://schroff.nvent.com

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Procurement codes
- Electrical engineering and magnets
- Electronics and radio frequency
- Mechanical engineering and raw materials

OMNISYS INSTRUMENTS

Company profile
Omnisys develops and manufactures customized scientific instruments for advanced science applications. We are a private company, operating profitably since 1992 and with 30 employees. Omnisys main experience comes from space projects were we successfully delivered several satellite subsystems and scientific payloads. Important products are power systems, (PCDU:s), microwave radiometer payloads, optical instruments and electrochemical instruments. Omnisys also has significant experience from delivering radiometer equipment for ground based radio astronomy, e.g. for the ALMA telescope in Chile.

Core competences
Omnisys has a world leading experience in high frequency micro- and millimetre wave instruments. Other fields of expertise are electronics design, instrument control, power electronics, optical measurement systems, measurement software and optomechanical structures. Since we develop and manufacture complete instrument systems we have extensive experience from working together with the scientific user community and we have a unique understanding of scientific instruments on system level.

Industry sectors
- Space
- Big Science

References
- Microwave instruments to the Odin satellite (customer: Swedish Space Corporation)
- PCDU:s for the SMART-1 moon probe (customer: ESA) and PRISMA satellites (customer: Swedish Space Corporation)
- Phase lock system to the japanese SMILES mission (customer: JAXA)
- Water Vapour Radiometers for the ALMA telescope in Chile (customer: ESO)
- Cryogenic front end feeds for VLBI/VGOS radio telescopes (customer: Wettzell telescope and Toyo Corporation)
- Front-end receivers for METOP SG, weather satellites (customer: Airbus Defence and Space)
- Front-end components and Spectrometer for the Sub Millimetre Wave Instrument (SWI) on JUICE (customer: ESA)
- Complete optical payload for the MATS satellite (customer: Swedish National Space Board)
- Complete payload for the HABIT instrument on Exomars (customer: Swedish National Space Board)

Company size
Small

Procurement codes
- Electronics and radio frequency
- Vacuum and low temperature
- Optics and photonics

www.omnisys.se

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OVAKO

Company profile
Ovako produces high-strength low alloy bar steel in all executions. Round, square, flat or as hot-rolled profiles. We cut, machine, grind and heat treat our products into many types of delivery conditions – from basic forms to almost completed components. Ovako also produces tube, ring and wire, and supplies an industry leading range of hard-chromed, long products. Ovako products serve a broad array of industries and advanced applications. Our customers are generally leading premium manufacturers in their segments that place intense demands on the mechanical properties of the steel.

Core competences
- Engineering steel
- Specialty steel
- Long products
- Bar
- Tube
- Ring

Industry sectors
- Agricultural parts & attachments
- Forgings, bearings
- Hydraulics
- Chassis components
- Powertrain
- Fasteners
- Rock drilling tools
- Lifting devices

References
- SKF
- Volvo
- Sandvik
- Scania
- Bosch
- Atlas-Copco
- Epiroc

Company size
Large

Procurement Code
- Mechanical engineering and raw materials

www.ovako.com

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Göran Nyström
EVP Marketing and Technology
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PFEIFFER VACUUM SCANDINAVIA

Company profile
For more than 125 years, Pfeiffer Vacuum has served as a guarantee for advanced vacuum technology, high quality comprehensive vacuum solutions, and first-class service.

Core competences
Advanced vacuum technology

Industry sectors
- Research & development
- Solar industry,
- Medical industry
- Electrical industry

References
UHV Vacuum pumps, Flourine free multi roots pumps, leak detectors, rotary vane pumps.

Company size
Large

PFEIFFER VACUUM

www.pfeiffer-vacuum.com

Pfeiffer Vacuum Scandinavia AB
Johanneslundsvägen 3, SE-194 61 Upplands Väsby, Sweden
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Stefan Brun
Managing Director
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sales@pfeiffer-vacuum.se

Procurement code
Vacuum and low temperature

PILZ SKANDINAVIEN

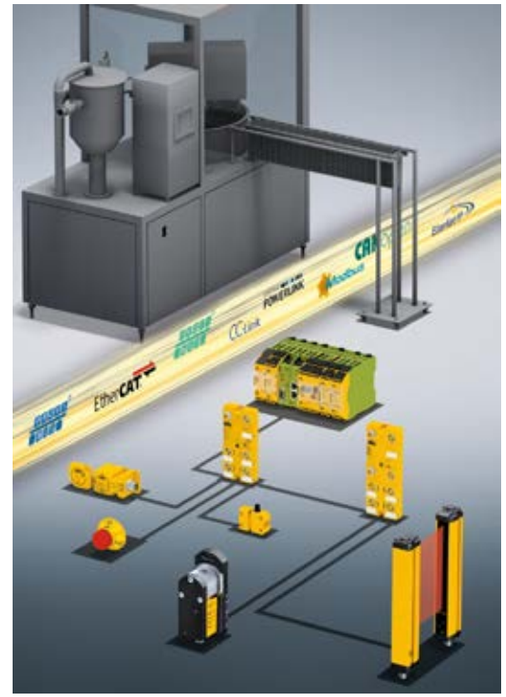
Company profile
Today, Pilz is a global supplier of automation products, systems and services. We want to make the world safer and plants and machines more reliable with everything we do. This is evident: In every product, every service and every idea generated at Pilz. Pilz is the first port of call for anyone who refuses to compromise where automation is concerned.

Core competences
- Automation
- Safety
- Safe automation
- CE-mark
- Machinery Directive
- SIL
- Performance Level
- E-stop
- Safety PLC
- PLC
- Sensors
- Safe sensors

Industry sectors
- Automotive
- Energy
- Robot
- Paper & pulp
- Wood
- Metals & mining
- Packaging

References
Pilz has delivered to several projects with in the Big Science family, like MAX IV, ESS, ESO and CERN.

Company size
Large



PILZ
THE SPIRIT OF SAFETY

www.pilz.se

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Procurement code
Electrical engineering and magnets

POLYAMP

Company profile

Polyamp has more than 50 years' experience in design for switch mode power supplies, embedded and software design and is also manufacturer with a project organisation.
In a MAX IV project we used table standard power supplies from Delta Elektronika, Netherlands. In this project some magnets were designed with a stabilizing equipment for paralleling of several such units with 100 ppm accuracy. We also added knowledge with our project administration.
Our main business today is producing degaussing system for naval ships and submarines, which is based on controlled bipolar with continuous zero crossing power supplies that are distributed around such vessel, using magnetic sensors and control systems. This gives us knowledge of magnetics in large structures as well as multi sensor systems.
We can deliver power units or systems from 150 W to 300 kW and stable reliable low noise DC/DC converters 100 W to 2000 W, in one unit and then parallelable.

Core compences

- Design in power, embedded and software manufacturer with a project organisation
- Power supplies, low noise, high accuracy with many types of interfaces
- Software for large structure
- Magnetic analyses using Biot-Savart law

Company size

Small

www.polyamp.com

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Eric Östlund
CEO
eric.ostlund@polyamp.se

Procurement codes

- Electrical engineering and magnets
- Electronics and radio frequency

PROACT IT GROUP

Company profile

Proact is Europe's leading independent data centre and cloud services provider. By delivering flexible, accessible and secure IT solutions and services, we help companies and authorities reduce risk and costs, whilst increasing agility, productivity and efficiency. We've completed over 5,000 successful projects around the world, have more than 3,500 customers and currently manage in excess of 100 petabytes of information in the cloud.
We employ over 800 people in 15 countries across Europe and North America. Founded in 1994, our parent company, Proact IT Group AB (publ), was listed on Nasdaq Stockholm in 1999 (under the symbol PACT).

Core competences

Proact is Europe's leading independent integrator of data storage solutions.

- Data storage
- Networking
- Supercomputing
- Unified computing
- Virtualisation
- Security
- Cloud computing

Industry sectors

Manufacturing, medical, university, finance, science, governmental.

References

- Octapharma (Medical ,Science): storage solutions and backup to Octapharma, focusing on their high availability and data security requirements.
- Spotify (high-tech): hardware and services to Spotify globally.
- ThermoFisher (scientific developing: supplier for storage for approx. 8-9 years to a company who help their customers accelerate life sciences research, solve complex analytical challenges, improve patient diagnostics, deliver medicines to market and increase laboratory productivity.
- Swedish Orphan Biovitrum (life science): a new storage platform that resulted in a more efficient environment, high automated backup and restore that uses snap-shot for space saving, high availability with cluster design.
- Synchrotron source (high-tech, science): design and implementation of server, virtualization, high performance storage for both control and data ingest and supercomputing.

Company size

Large

www.proact.se

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Mattias Keijsner
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Procurement codes

- Civil engineering, building and technical services
- Information technology
- Particle and photon detectors
- Optics and photonics

PRODUKTIONSTEKNIK I LUND

Company profile
Produktionsteknik i Lund has two different facilities with total ten 5-axis high precision Swiss milling machines.
We have two well equipped measuring labs.
Manufacturing is our main business but we also perform the whole chain from designing, manufacturing assembling and testing.

Core competences
High precisions manufacturing in different materials e.g. stainless steel, copper, aluminium, ceramics.

Industry sectors
- Particle accelerators
- Vehicle
- Medical
- Packaging and processing-sector

References
We have delivered diod stacks to CERN.

Company size
Small

PRODTEK
Produktionsteknik i Lund AB

www.prodtek.se

Produktionsteknik i Lund AB
Traktorvägen 19, SE-Lund, Sweden
+46 46 33 51 80

Jakob Fornander
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Procurement codes
- Electrical engineering and magnets
- Electronics and radio frequency
- Mechanical engineering and raw materials
- Vacuum and low temperature

PROMECH LAB HOLDING

Company profile
We have specially designed research equipment since 1986. Simplicity, function and reliability are our signum. We learn new things every day.

Core competences
Building and assembling research instruments, prototypes, practical knowledge. Cross-border knowledge. To solve problems and not create new ones and of course CAD/CAM, 3D printing, prototype workshop etc.

Industry sectors
- Mechanics, big as small
- Electronics
- Programming

References
- Medimunne Inc., USA
- Glenmarks Pharma, India
- Bracco Img., Italy
- AstraZeneca, Sweden
- Several universities around the globe

Company size
Small

promech lab
SCIENTIFIC EQUIPMENT DESIGN & MANUFACTURING

www.promech.se

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Procurement codes
- Electronics and radio frequency
- Mechanical Engineering and raw materials
- Particle and photon detectors
- Vacuum and low temperature

QAMCOM RESEARCH AND TECHNOLOGY

Company profile
Qamcom is a technology application expert. We provide solutions, products and services within wireless connectivity (5G), autonomous systems and industrial IoT. By working with stimulating, challenging and state-of-the-art technology and incorporating it into our solutions and products, we add value to our customers' operations and ultimately improve infrastructure for the benefit of all society.
We do product development in partnership with our customers and offer specialist services within eight defined domains.
We are domain specialists within a holistic system view. As system experts, we create robust, scalable solutions within our domains.
To be able to do this, we have created an organisation that, in addition to world-class domain expertise, offers qualified, cross-genre expertise in certification, products and supply, product and system development and precision mechanics.

Core competences
Advanced Signal Processing/Algorithms/ Advanced Embedded Systems/Power Electronics/ASIC and FPGA Design/Schematics and PCB Layout/High Frequency Electronics/ Radar Systems/Wireless Communication Systems/Packet Networks, Mesh and Routing/ Ultra Low Latency Communication/Augmented Reality/Object Identification and Tracking/ Functional and Systems Safety/Safety Management and Engineering/Research in Autonomous and Cooperative/Vehicle Technology/AI/Deep/Machine Learning/Object Detection and Classification/Computer Vision/ Optics and Optical Filtering/Camera Electronic Platforms/Image Processing/Object Identification and Tracking

Industry sectors
- Telecommunications
- Automotive
- Space and military
- Consumer electronics

References
- Telecom systems to world leading companies
- Developed radar systems for obstacle detection
- Developed sensor systems and full camera for leading high end camera company
- Conducted research in advanced 4G and 5G algorithm development and standardization
- Developed signal processing algorithms for world leading car manufacturer

Company size
Medium

qamcom

www.qamcom.se

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Procurement codes
- Electrical engineering and magnets
- Electronics and radio frequency
- Optics and photonics

QMT SCIENCE

Company Profile
Qmt Science supplies the manufacturing, process and pharmaceutical industry with qualified products. These meet specified requirements for purity, surface fineness and density. We provide our customers with appliances, regulators, filters, valves, couplings, pipes and fittings that support qualified process requirements. We are the Swedish and Danish distributors for clutch couplings and valves from DK-Lok. Our specialty is to compose components and adaptations to customer order-driven concepts. Our strength is specialist expertise in advanced manufacturing, protective gas welding and orbital welding, as well as our special skills deriving from being part of the QMT-companies.

Core competences
- Pipes
- Fittings
- Valves
- Filters
- Customized solutions
- Stainless steal

Industry sectors
- Manufacturing
- Process and medical

References
Gambro/Baxter, Getinge, Metso, Alstom, Valutec, ABB, GasProducts, AstraZeneca, Hydroscand, Purac Puregas, E.on Biofor, Breatheus Regional, Max Lab, Swep International, Höganäs, Arcam

Company size
Small

Qmt science

www.qmtscience.se

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Procurement codes
- Gases, chemicals, waste collection and radiation equipment
- Vacuum and low temperature

QTECH GROUP

Company profile

Qtech Group simplifies our customers' purchase of mechanical subcontracted products via our wide network of local suppliers in the famous subcontractor nest of Gnosjö.
We supply components, low amount such as pre-serie-orders and high volume.
We supply assembled products. Pre-assembled or complete assembled.
In our own prototype workshop for machined products we can supply pre-series and low volume production.

Company size

Small

QTECH GROUP

www.qtechgroup.se

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Glenn Wilander
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glenn@qtechgroup.se

Procurement code
Mechanical engineering and raw materials

R.A.P.S

Company profile

We are a supplier of machine and services within additive manufacturing.
We have various number of 3D-printers either to sell or to use in different projects both for plastics and metal.
We can offer 3D-scanning and 3D-modelling for additive manufacturing on a high level among product development with complex geometries.
We can offer topology optimization for a number of manufacturing methods. We also train people in 3D-CAD and 3D-printing.

Core competences

- Additive Manufacturing
- 3D-modelling
- Topology Optimization
- Training

r.a.p.s

www.raps.se

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Pär Nobring
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pno@raps.se

Procurement code
Mechanical engineering and raw materials

RECAB

Company profile
Recab is a Scandinavian specialist company and part of Addtech, a 7.5 billion SEK technology group, listed on the Swedish stock trading market. With expertise and experience Recab provides embedded computer and sensor hardware solutions for demanding applications.

Core competences
Recab focus on ”Embedded Computers Systems”, ”Industrial Communication” and ”Vision & Sensors” for demanding applications and deliver hardware products and customised solutions. In-house development combined with standard embedded products from world leading companies provides our customers with tailor made solutions.

Industry sectors
Recab has customers in all kinds of industry sectors where the requirements are demanding.

Where some customers require rugged, robust or redundant others requires an extended product life cycle or ultra high performance compatible with already installed legacy technology. Recab enables world class applications for demanding applications.

References
To our customers within the science sector, Recab provides high-end standard embedded computers and communication products and custom off-the-shelf solutions. We enhance existing platforms and building blocks to perfectly fit our customers’ applications and requirements. This reduces risk and time-to-market, and saves development and consultancy costs for our customers.

Company size
Medium

RECAB
YOUR EMBEDDED TEAM PLAYER

www.recab.com

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Procurement codes
- Electronics and radio frequency
- Information technology

REJLERS SVERIGE

Company profile
Rejlers is a Nordic group offering technical consultancy services and IT solutions to customers in the areas of: energy, buildings, industry, telecom and infrastructure. Rejlers puts together teams of consultants with different skills who collaborate to carry out projects all the way from preliminary studies and planning to design, engineering design, project planning, project management and programming.

Core competences
- Building and property
- Energy
- Industry and technology
- Transport infrastructure
- ICT and telecom

Company size
Large

REJLERS

www.rejlers.se

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Procurement codes
- Civil engineering, building and technical services
- Electrical engineering and magnets

REQUTECH

Company profile
Satellite antenna specialist which develops both internal and customer requested antenna systems. The latest developed antenna systems are communication-on-the-move system which is used for satellite communication for moving platforms such as trains and airplanes.

Core competences
- Microwave engineering
- Antenna engineering
- Satellite communications

Industry sectors
- Satellite Communications
- Telecommunications

References
ReQuTech with team of antenna, mechanical, software and electrical engineers has designed and delivered more than 20 antenna systems and components to various international customers and projects.

Company size
Small

requtech

www.requtech.com

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Omid Sotoudeh
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omid.sotoudeh@requtech.se

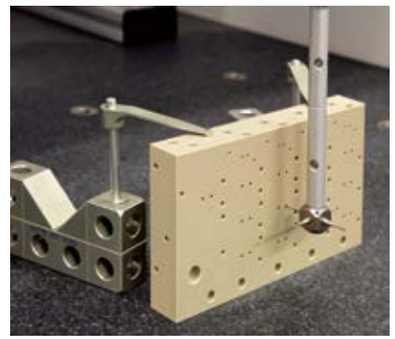
Procurement codes
- Electrical engineering and magnets
- Electronics and radio frequency

RESINIT

Company profile
Resinit AB is a high-quality supplier of components machined in plastics and thermosettings. We specialise in plastic materials that are challenging to machine, with high demands on quality and delivery reliability. Our primary target is the manufacturing industry and we closely monitor the development of new materials and methods. The goal at Resinit is to achieve long-term, mutually satisfying cooperation with our customers.

Core competences
- High quality
- On time deliveries
- High service grade
- High knowledge of machining plastics
- Plastic material knowledge

Company size
Medium



RESINIT

www.Resinit.se

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Andreas Hellman
Key Account Manager
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Procurement code
- Mechanical engineering and raw materials

RFR SOLUTIONS

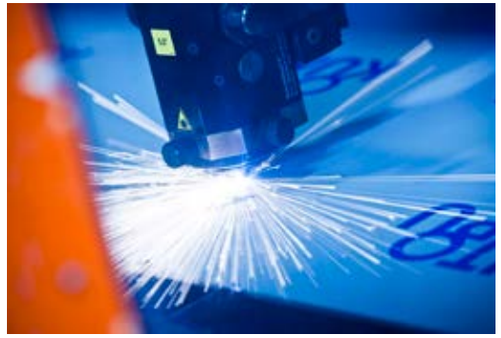
Company profile
Our focus is on stainless steel solutions. RFR Solutions develops, manufactures and sells first-rate stainless steel solutions. We offer the whole chain from design support and prototyping to production, assembly and verification. In addition we provide material-technical expertise, design review, drawing support and production optimization, preferably within your project group.

Core competences
We believe in partnership. Working closely together from the start gives us a better understanding for your specific problems and challenges. Simply put – you provide the product knowledge and we provide the material, construction and production expertise for the solution you need.
Always being one step ahead when it comes to stainless steel solutions is our way to create reliable, first-rate and high-performance products. Our goal is to surpass your expectations and as your partner contribute to your success.
You can always count on quality and expertise in everything we do, because we are constantly developing our know-how. For stainless steel excellence, for you and for your business.

Industry sectors
Our expertise is well known and proven in many different applications within the fields of medtech, energy, cleantech and food.

References
Due to confidentiality agreement with all our customers and with our key suppliers we are not allowed to publish any information concerning our customers and reference objects. When it comes to Big Science we are today working actively with CERN, ESS and MAX IV. Since some years ago we also have a close cooperation with the universities in Lund, Uppsala and Luleå regarding different areas of competencies.

Company size
Small



RFR SOLUTIONS
Stainless Steel Excellence

www.rfrsolutions.se

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Procurement codes
- Mechanical engineering and raw materials
- Vacuum and low temperature

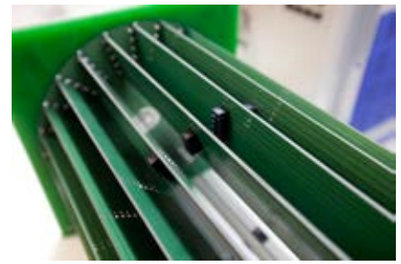
RISE RESEARCH INSTITUTES OF SWEDEN

Company profile
RISE Research Institutes of Sweden, with more than 2700 employees, develops and transfer technology for improving competitiveness and quality in society and industry. RISE works actively for the advancement of safety, conservation of resources and production of a sustainable environment with Sweden's broadest and most sophisticated range of laboratory resources. RISE performs applied research and innovation in close liaison with industry, universities and international partners. In addition, RISE is hosting the Swedish National Metrology Institute (NMI) with responsibility for national primary measurement references. We perform research within metrological areas – developing new measurement standards and measurement techniques – combining emerging scientific or industrial needs with RISE's highest metrology expertise. The activities include development of measuring methods and instruments on behalf of customers.

Core competences
RISE has interest and skills in several technology fields such as
- Extensive experience and laboratory resources for electrical metrology at room temperature as well as at cryogenic temperatures. Both low and high voltage at DC AC and pulses. At high voltage unique capabilities for onsite measurements.
- Optical metrology including refraction and spectroscopy with application in e.g. measurements of low pressure and vacuum
- Dimensional metrology ranging from nano- to global scales
- Developing equipment and methods for dissemination and synchronization of time and frequency
- Sensor development and methods for Positioning, Navigation and Time (PNT) including GNSS
- Extensive experience and laboratory resources within high-frequency and microwaves . This includes both wired and radiated microwaves, including world-leading resources for antenna measurements and testing.
- Long experience in signal processing with applications in remote sensing and sensor fusion including modelling and simulation with applications

References
High voltage reference divider to CERN. Various measurement systems to more than fifteen metrology institutes around the world. National system for robust and correct time for the Swedish Internet infrastructure.

Company size
Large



RI.SE
Research Institutes of Sweden

www.ri.se/en

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Measurement Science and Technology
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Procurement codes
- Electrical engineering and magnets,
- Electronics and radio frequency,
- Optics and photonics,
- Information technology,
- Vacuum and low temperature

ROWACO

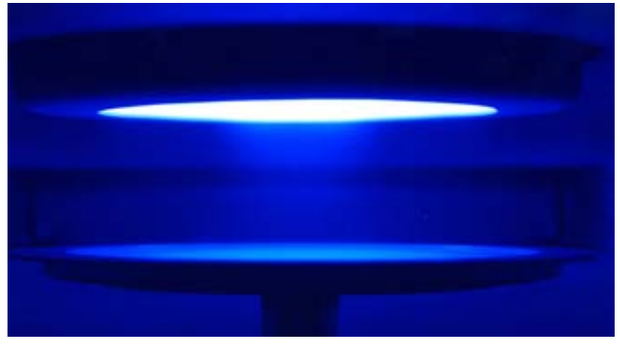
Company profile
We are suppliers of anything from single components to turn-key systems within vacuum technology, Gas analysis and surface analysis, deposition, high energy physics, for development and research within the industry and higher education. Rowaco provides competitive products and services developed in close co-operation with our customers and suppliers.

Core competences
- Vacuum technology
- Gas analysis
- Surface analysis
- Cryogenics
- Microscopy
- Process Technology

Industry sectors
- Semiconductor
- Nuclear
- Space
- Cryogenic
- Automotive
- Turbine manufacturing

References
- Semiconductor: El-Seed, Norstel
- Nuclear: Westinghouse Elektrik, Sandvik
- Space: Swedish Space Agency, Nanospace, OHB
- Cryogenic: Linde AG, AGA Cryo
- Automotive: Scania, Volvo Car Company, Volvo Technology, Volvo Powertrain, Johnson and Matthey, Cummins, Wärtsilä, SAAB
- Turbine: SIEMENS

Company size
Small



ROWACO

www.rowaco.se

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Procurement codes
- Civil engineering, building and technical services
- Electrical engineering and magnets
- Electronics and radio frequency
- Gases, chemicals, waste collection and radiation equipment
- Mechanical engineering and raw materials
- Vacuum and low temperature

SANDVIK

Company profile
In addition to a comprehensive portfolio of premium products in advanced materials to the most demanding industries, Sandvik can now provide services and solutions within:
- Materials consulting and testing
- New product and process development
- Supply chain, fabrication and customized products
- Sentusys™ intelligent tube system for material monitoring

With more than 150 years of experience from developing and manufacturing products in steel, stainless steel, nickel, zirconium and titanium-based materials, you can trust us for support regarding all material related questions and problems. Turn to us when your material fails or when you want a second opinion on what material to use in your applications.

Core competences
- Metallurgy and metallography
- Material characterization
- Process simulation
- Corrosion (wet and high temperature)
- Electrical resistance heating
- Powder technologies
- Surface coating technologies (CVD and PVD)
- Welding and production technology

Industry sectors
- Big science
- Oil and gas
- Automotive
- Nuclear
- Process industry

References
- Big science: CERN – non-magnetic material for accelerators to run at 4K
- Big science: ESS – Material consultancy at the construction of the facility
- Process industry: Stora Enso – Material consultancy and selection of material for corrosive environments
- Process industry: Analysis and material recommendation for a corrosion exposed ventilation system
- Nuclear: GE: Design and industrialization of a production method for thin-walled APTM tubes in cladding dimensions

Company size
Large

SANDVIK

www.materials.sandvik/services

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Procurement codes
- Civil engineering, building and technical services
- Mechanical engineering and raw materials

SCANDINOVA SYSTEMS

Company profile
ScandiNova is by its break-through technology a world leader in development and production of pulsed power systems with high power levels. The product range covers pulse modulators, generators, turnkey radio frequency (RF) systems and e-gun modulators, all using solid-state technology. Thanks to our modular design we can offer systems that handle a wide range of loads and needs all the way to RF peak power of 100 MW. As one of the few players in the market ScandiNova has the capability to take care of everything, including integrating the magnetron/klystron, cooling system and low-level RF. Reliable and high precision pulses lead to improved control, performance, significantly decreased power consumption and lower maintenance costs. ScandiNova has clients in 40 countries, mainly in Europe, Asia and North America. The company was founded in 2001, has its head-office in Uppsala, Sweden with 65 employees and sales representatives over the world.

Core competences
- Pulsed power Systems
- Pulse modulators
- Pulse generators
- E-gun modulators
- RF-units

Industry sectors
- Science: Free electron lasers, synchrotron light sources, compact light sources, collidors proton booster research, isotop production research, gamma sources
- Medtech: Radiotherapy, proton therapy
- Industry: Cargo scanning, radar, industrial X-ray, sterilization, electroporation

References
- CERN: Pulse modulators for CLIC test stand
- PSI/SwissFEL: Pulse modulators for the accelerator and for the injector.
- MAX IV: Turn-key RF Systems, including pulse modulators, klystrons and other RF parts.
- DESY/European XFEL: Pulse modulators to be used for diagnostic.
- ELI-NP: Pulse modulators for the gamma source
- ENEA: Pulse modulators
- Eindhoven University of Technology: RF system for a compact and portable X-ray source

Company size
Medium

ScandiNova

www.scandinovasystems.com

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Procurement code
Electronics and radio frequency

SCANDITRONIX MAGNET

Company profile
Scanditronix is focused on production of magnets for accelerators and our long experience makes us strong when it comes to finding the best possible ways of realizing the customers' needs. Scanditronix Magnet uses its long experience and professional engineering know-how to design and manufacture magnets for accelerators and other applications. We work closely with our customers in order to tailor magnets to suit each specific application.

Core competences
- Magnet field simulations
- Magnet design
- Coil and yoke manufacturing
- Magnet field measurements
- Project management

Industry sectors
Manufacturing of electro magnets

References
We have delivered normal conducting magnets and coils for particle accelerators to:
- Major accelerator laboratories; CERN, Rutherford, FERMI, SLAC, MAX IV, DESY, PSI, GANIL and more,
- Major medical companies in the field of cancer treatment,
- Other industry

Company size
Small

SCANDITRONIX

www.scanditronix-magnet.se

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Procurement code
Electrical engineering and magnets

SCANMAST

Company profile
We build our masts, towers, pipe bridges, portals and sign supports out of truss structures, making them lightweight while also maintaining plenty of load-bearing capacity. This makes them superb carriers of technology for telecommunications, lighting, cameras, signs and various types of measuring equipment.
One thing all our products have in common is the neat design that lets through a lot of the things you don't want to obscure; the sky, greenery or an arena at full capacity.
Quality and safety are important to us, which is why we never supply a mast or tower without knowing exactly where it's going to go, what kind of climate it'll be subjected to and what's going to be placed inside it. All our structures are dimensioned in accordance with the Eurocodes with national supplements.

Core competences
- Mast
- Tower
- CCTV
- Telecommunication
- Civil Works
- Floodlights
- Camera
- Air2Fiber
- Lattice Tower
- Camera mast

Industry sectors
- Infrastructure
- Airports
- Harbor
- Defense
- Industry
- Oil & Gas
- Arena
- Telecommunication
- Power companies
- Power utilities
- Security
- Substations

References
Swedavia, Safe gate, Avinor, Swedish Defense, NATO, Statoil, Equinor, Statnett, Statkraft, E-on, Siemens, ABB, ESS, Teracom, Telia, Telenor, Tele2, Hi3G

Company size
Medium

www.scanmast.com

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Procurement codes
- Civil engineering, building and technical services
- Mechanical engineering and raw materials

SCHNEIDER ELECTRIC

Company profile
Schneider Electric is leading the digital transformation of energy management and automation in homes, buildings, data centers, infrastructure and industries.
With global presence in over 100 countries, Schneider is the undisputable leader in power management – medium voltage, low voltage and secure power, and in automation systems.
We provide integrated efficiency solutions, combining energy, automation and software.
In our global ecosystem, we collaborate with the largest partner, integrator and developer community on our open platform to deliver real-time control and operational efficiency.
We believe that great people and partners make Schneider a great company and that our commitment to innovation, diversity and sustainability ensures that life is on everywhere, for everyone and at every moment.

Core competences
We are leading the digital transformation of energy management and automation.
We make it possible for IoT-enabled solutions to seamlessly connect, collect, analyze and act on data in real-time delivering enhanced safety, efficiency, reliability, and sustainability.
Discover EcoStruxure™: the next generation of active energy management and automation architecture.

Industry sectors
Schneider Electric automation and control products and solutions cover the breadth of the industrial, infrastructure and building sectors -- from programmable relays to motion controllers and interface modules, for applications from simple machines to complex process systems.

References
https://www.schneider-electric.com/en/work/campaign/life-is-on/case-study/arcelormittal.jsp

Company size
Large

www. schneider-electric.se

Schneider Electric AB
Frösundaviks Alle 1, SE-169 70 Solna, Sweden
+46 10-478 20 00

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Procurement codes
- Gases, chemicals, waste collection and radiation equipment
- Health, safety and environment
- Information technology

SCIENTA OMICRON

Company profil
Scienta Omicron is the leading innovator in surface science. The company provides top capabilities for the research community through its technology leadership in electron spectroscopy, scanning probe microscopy and thin film deposition. These capabilities are available in custom tailored solutions from one source with worldwide sales and service groups.

Core competences
Scienta Omicron provides high service levels. Our aim is to be a partner for customer success in research and analysis. Our knowledge and experience are vast. We offer support for more than 30 different experimental techniques, and for each one you will find a number of specialists who can support project planning, assessment of technique suitability, system design, equipment training, applications support and system upgrades.
The main operations are based in Uppsala, Sweden and Taunusstein, Germany, with sales and service representation in all major markets around the globe.

Industry sectors
Surface science and vacuum technology

References
MAX IV laboratory

Company size
Medium

scientaomicron

www.scientaomicron.com

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Danmarksgatan 22, SE-75323 Uppsala, Sweden
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Procurement codes
- Optics and photonics
- Particle and photon detectors
- Vacuum and low temperature

SEMCON SWEDEN

Company profile
Semcon is an international technology company with over 30 years of experience in a vast area of technologies. Semcon offers expertise in the very front edge of product development. With over 1000 employees worldwide Semcon offers a wide range of competences, and missions in both small and big companies and institutions, national and international.

Core competences
- Development
- Simulation
- Calculation
- Information
- Project Management
- Innovation
- Construction
- Methods
- Design
- Production and manufacturing

Industry sectors
- Automotive
- Energy
- Industry
- Life-Science
- Telecom

References
- Volvo
- AstraZeneca
- Ericsson
- ABB
- Siemens
- Essity
- Mölnlycke

Company size
Large

semcon

www.semcon.com

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Procurement codes
- Electrical engineering and magnets
- Electronics and radio frequency
- Information technology
- Mechanical engineering and raw materials
- Vacuum and low temperature

SIGMA

Company profile
Sigma is a group of leading consulting companies with the objective to make our customers more competitive. Our means are technological know-how and a passion for constantly finding better solutions.
Our services are provided by Sigma IT Consulting, Sigma Technology, Sigma Connectivity, Sigma Industry, Sigma Civil, and Sigma Software.
Sigma Group is the parent company, developing and building the Sigma brand and our many framework agreements. Sigma Group is owned by Danir, a private investment company held by the Dan Olofsson family.

Core competences
- Civil engineering - mechanical design, electronics, automation, radio frequences research, design, prototypes, production and testing of physical and digital solutions
- Technology strategy
- Design strategy
- Digital design
- Product design
- Service design
- Interaction design engineering

Industry sectors
- Automotive
- Defense
- Medical device
- Pharmaceutical
- Process industry

References
- Scania
- Doro
- Volvo
- Siemens
- Vattenfall
- IKEA

Company size
Large

www.sigma.se

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Procurement codes
- Civil engineering, building and technical services
- Electrical engineering and magnets
- Electronics and radio frequency
- Health, safety and environment
- Information technology
- Mechanical engineering and raw materials

SIGMA LUNDINOVA

Company profile
Sigma Lundinova is a product development company, specialized in electronics, software, and project management. Combined our engineers have 500 years experience of product development in the forefront of technology.
We take responsibility for the entire product cycle from design to production. We have been involved in the development of many successful products in medical technology, environmental technology, electrical vehicles, industrial and mobile telephony.

Core competences
- Electronics
- Schematics
- PCB layout (CAD)
- Firmware
- Software
- RTOS

Industry sectors
Medical technology, environmental technology, electrical vehicles industrial and mobile telephony.

References
- Sencors at target – ESS
- Power electronics to ozone generator - Primozone
- Power and control electronics – Orbital Systems
- Electronics and software – Neurescue

Company size
Small

www.lundinova.se

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Procurement codes
- Electrical engineering and magnets
- Electronics and radio frequency

SILVER WEIBULL PRODUCTION

Company profile
We are a mechanical workshop in Hässleholm, Skåne, specialist in mechanical manufacturing such as welding in stainless and carbon steel. Machining in larger bore machines and carusel lathes. ISO 9001:2015, ISO 14001:2015, ISO 3834-2:2005, EN 1090-1:2009 + A1:2011 certified. Our welders are approved according to EN ISO 9606-1.

Core competences
Medium and heavy welding and machining

Industry sectors
Mining, food, manufacturing industry

Company size
Small

SILVER WEIBULL ®

www.silver-weibull.se

Silver Weibull Production AB
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Procurement code
Mechanical engineering and raw materials

SKF SVERIGE

Company profile
A world of reliable rotation, established 1907, leading player in bearing industry, Gothenburg Sweden Head office, rolling element bearings, service, lubrication, sealings and linear motion. All industries. Hydrostatic shoe bearings with oil system, all manufactured in Sweden. Special bearings for telescopes, additional stiffness properties

Core competences
- Bearings and related services,
- Rotating equipment performance,
- Lubrication
- Seals and condition monitoring .
- Linear motion products.

For Big Science hydrostatic shoe bearings are in many cases very interesting.

Industry sectors
All industrial sectors with rotating equipment, automotive, astronomy, defence, metals, pulp & paper, marine, energy and wind.

References
Hydrostatical bearings and engineering for ten telescopes. Linear actuators for telescopes. Bearings of any type to almost all industries. Knowledge engineering, simulations.

Company size
Large

SKF

www.skf.com

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Hans Norrman
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Procurement code
Mechanical engineering and raw materials

SOLECTRO

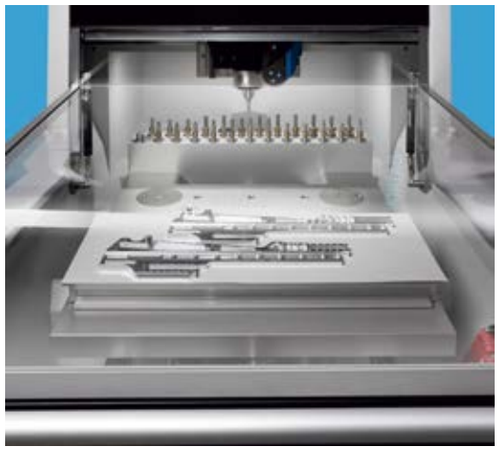
Company profile
From products to system solutions under one roof! Supplier of CNC machines for manufacturing of panels, prototypes, components in areas for high-tech, electronics, aerospace, automobile etc. Supplier of components for industrial automation, linear units, aluminium profiles, controllers motors, CNC machines, CNC-milling tools, Circuit board plotters, PCB tools, customized machines etc.

Core competences
With our wide spectra of products and competence we cover a lot of complete individual needs and economic framework for the technological area within the automotive industry, aerospace, medical and communication technology.

Industry sectors
- High-Tech
- Electronics
- Automotive
- Aerospace
- Medical
- Communication

References
- High speed milling machines for science, medical, aerospace, automotive
- Circuit milling machines for electronics
- Laser machines for electronics
- Custom specific machines for science, medical, electronics

Company size
Small



SOLECTRO

www.solectro.se

SolectroAB
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Procurement codes
- Electrical engineering and magnets
- Electronics and radio frequency
- Mechanical engineering and raw materials

SPECIALTEKNIK I SVERIGE

Company profile
From concept to customized machines, modification of existing equipment, mechanical manufacturing, industrial maintenance and CE marking.

Core competences
- Concepts
- Customized machines
- Modification
- Mechanical manufacturing

Industry sectors
Mechanical manufacturing to the automotive, food, and pharmaceutical industry.

References
- ESS
- Pågen
- Volvo
- Atlas Copco
- Recipharm
- Santa Maria,

Company size
Small

SpecialTeknik

www.specialteknik.se

Specialteknik i Sverige AB
Olof Asklunds gata 18, SE-421 30 Västra Frölunda, Sweden

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Procurement code
- Mechanical engineering and raw materials

STAVANGER STEEL

Company profile
Steel foundry that produces complex high alloyed steel in combination with advanced geometries. We also take care of the following machining and finishing operations.
We can contribute with a flexible product, using the correct material in applications. We take a natural seat early in development projects to reap the benefits of using castings.
Forged stainless/high alloyed material through our sister company is also possible to supply.

Core competences
- Material Knowhow
- Steel
- Stainless steel
- High alloyed steel
- Metallurgy
- Heat Treatment

Industry sectors
- Marine
- Process
- Defence
- Oil & Gas
- Hydropower

References
- Rolls Royce
- Somas
- National Oilwell Varco
- Andritz

Company size
Small

www.stavangersteel.se

Stavanger Steel AB
Box 43, SE- 364 04 Norrhult

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Procurement code
Mechanical engineering and raw materials

STUDSVIK NUCLEAR

Company profile
Studsvik Nuclear has 70 years' experience of developing and constructing customized laboratory equipment to be used in demanding environment. We always strive to offer our customers the best solution to their problems by understanding their individual need before starting any design process. Besides designing and constructing complex equipment, Studsvik also can offer verification tests in dry or wet conditions and with external irradiation of varied dose rates.
In our hot cell laboratories we perform advanced testing of highly radioactive materials such as reactor fuel, reactor core components and structural materials. Our customers come to us for e.g. tailored mechanical testing, chemical isotopic analysis and microstructural analysis.
With our highly experienced staff and our flexible laboratories we have unique capability to serve the industry with novel technology and methods.
To enable testing programs of radioactive materials, international class 7 transportation and final storage are often critical. Studsvik has a long experience of handling such tasks and can offer project management and efficient solutions for these crucial challenges. In addition, Studsvik has a large library of irradiated fuel rods, core components and structural materials from commercial nuclear reactors.
Studsvik also offers a wide range of consultancy and engineering services and solutions to help customers enhance their operations. Our position at the heart of some of the world's foremost radioactive waste projects means we have industry-leading expertise in fields such as radioactive waste management, radiation safety and protection, safety analysis and licensing, radiological inventory, characterization and clearance. Our experience and leading methodology save customer's time and money and enhance their reputation for delivering world class operations.

Core competences
Mechanical design, construction, verification tests, irradiation, testing equipment, laboratory equipment, test rigs, materials testing, development, research, reactor components, high dose environment.
Class 7 transportation, radioactive waste management, radiation safety and protection, safety analysis and licensing, radiological inventory, characterization and clearance

Industry sectors
Nuclear, Energy, Research, Engineering,

References
For references visit www.studvik.com

Company size
Medium

www.studsvik.com

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Procurement codes
Civil engineering, building and technical services
Gases, chemicals, waste collection and radiation equipment
Mechanical engineering and raw materials

SUNDBYBERGS MEKANISKA VERKSTAD

Company profile
We are a subcontract company specialized in advanced CNC milling and turning for aviation and space customers. We are certified according to ISO9001:2015. Among our customers is the Swedish defence manufacturer SAAB AB and also CERN.

Core competences
Advanced CNC milling and turning.

Industry sectors
Aviation, space and defence customers.

References
- Mechanical parts for aviation and defence systems
- Mechanical parts to CERN
- Antenna systems for space satellites,
- Various housing components for nuclear and oil industry

Company size
Small

www.sunmek.se

Sundbybergs mekaniska verkstads AB
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Procurement code
Mechanical engineering and raw materials

SVENNES VERKTYGSMEKANISKA

Company profile
We are a machining company that are specialized in milling and turning field. We have a total of 27 employees, 20 persons in production and 7 persons in office/engineering. Besides milling and turning we can also offer welding and hardening. Svennes was founded in 1993 and is a family owned company. Our strength is our staff with know-how, and a huge range of long-term customers that have never left us.

Core competences
We are one of the leading companies within machining in Blekinge area, and have a long experience within machining parts for science and nuclear research area. We have through the last seven years delivered parts to different science plants as CERN and MAXIV through our customer Scanditronix Magnet AB. We have a machine capacity of 25 CNC machines that can handle parts from 10 mm up to 6000 mm. We also have a long-time experience within the marine area.

Industry sectors
- Marine
- Water
- Manufacturing Industry
- Automotive
- Energy, Mining
- Wood processing
- Machine building Industry
- Science, Medicine

References
- SAAB Kockums
- Xylem
- NKT
- ABB
- Scanditronix,
- Modig Machine

Company size
Small

www.svennes-verktygsmek.se

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Procurement codes
Electrical engineering and magnets
Mechanical engineering and raw materials

SVEP DESIGN CENTER

Company profile
Svep Design Center develops bespoke hardware and software combined with mechanical design. We specialize in embedded products as well as connected IOT devices, and are experts at investigating and solving complicated technical problems.
Our experience goes all the way back to the 70's and the Z80 processor of the time. Today we work with everything from small M0's right through to large dedicated servers. This wide range of processors requires an extensive knowledge-base of different operating systems such as multiple RTOS variants, Linux and Windows IoT.

Core competences
Embedded products, IOT devices, electrical design, firmware development, antenna design, wireless technologies, batteries, turn-key projects, technical investigations, sensors, ultrasonics, problem solving, AR solutions.

Industry sectors
- Medical
- Industrial,
- Consumer

References
- Tunstall
- IKEA
- Mobill
- HMS

Company size
Small

svep

www.svep.se

Svep Design Center AB
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Procurement codes
- Electronics and radio frequency
- Information technology

SVETSMEKANO

Company profile
The company started in 1985 and is specialized in welding. We also have CNC milling and turning machines.

Core competences
- Welding
- CNC milling
- CNC turning
- Pipebending

Industry sectors
Manufacturing industry

References
- Teracom
- MAX IV
- ArjoHuntleigh
- Granuldisk

Company size
Small

SVETS MEKANO AB
Tel: 0413-175 50 Eslöv

www.svetsmekanoab.se

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Procurement code
- Mechanical engineering and raw materials

SVETSTJÄNST I HÖGANÄS

Company profile
Installation in stainless steel pipes.
Installation takes place, for example, in nuclear power plants and food companies and biogas, which means that the work is carried out with high accuracy and quality. We work according to the various ISO criteria, for example. 5817 and 3834.
We own our WPQR, who has IWS education. Employee welding staff has licenses: EN 287-1 141 T BW FM5 S s1-2 D10, wall thickness 1.0-4.0mm H-L045 ss gb. We also rent staff to the industry with different competencies.

Core competences
Quality, Expertise, Cost Relevant

Industry sectors
- Process industry
- Food & pharmaceutical industry
- Biochemistry
- Nuclear power

References
- Tetra Pak
- Alfa Laval

Company size
Small

www.svetstjanst.com

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Procurement code
Mechanical engineering and raw materials

SWEDISH MICROWAVE

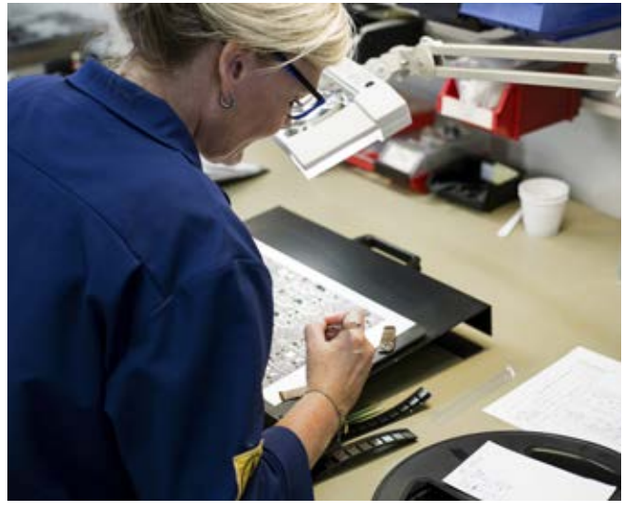
Company profile
Swedish Microwave (SMW) is since 1986 a leading manufacturer of professional Low Noise Blockdownconverters (LNB) for the ground segments in the satellite market.
All work is in-house allowing custom-design products, short delivery times, high flexibility, quick service and support. Swedish Microwave designs and manufactures its products in Motala, SWEDEN, and has shipped to more than 134 countries.
Today we are Europe's oldest manufacturer of Low Noise Block converters (LNBs), serving a global market.

Core competences
- RF-Design for in-/outdoor use
- RF-Production
- Satellite communications
- Telecommunications
- Lab and tests up to 43 GHz
- Production of custom protypes
- RF over fiber

Industry sectors
- Satellite Communications
- Electronics and radio frequency
- Telecommunications
- Research facilities

References
World leading telecommunication customers in 134 countries.

Company size
Small



www.smw.se

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Procurement codes
Electrical engineering and magnets
Electronics and radio frequency
Optics and photonics

TECHNIA TRANSCAT

Company profile
TechniaTranscat is a leading global supplier of Product Life cycle Management (PLM) solutions for creating and managing product information throughout the entire product life cycle, from product planning, development and design to production, sales, training and support.

Core competences
TechniaTranscat offers PLM services based on the customers' needs and our experiences.

Industry sectors
- Energy, process and utility industry
- Industrial equipment
- Oil & Gas
- Marine and offshore

References
- Oil & Gas
- Energy
- Process
- Utility
- Nuclear industry

Company size
Medium

TECHNIA TRANSCAT
ADDNODE GROUP

www.techniatranscat.com

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Procurement codes
- Civil engineering, building and technical services
- Information technology

TELEDYNE SIGNAL PROCESSING DEVICES

Company profile
Teledyne SP Devices designs and manufactures world-leading modular data acquisition and signal generation instruments. Our products utilize patented calibration logic, the latest data converters, and state-of-the-art FPGA technology resulting in an unrivalled combination of high sampling rate and resolution. Products are available with a range of application-specific features and embedded, real-time signal processing. This helps our customers to overcome performance bottlenecks, shortens time-to-market, and provides system-level advantages within a wide range of application areas. SP Devices' products are employed across a wide variety of industries, including analytical instruments, remote sensing, scientific instrumentation, medical imaging, and more.

Core competences
- Test and measurement
- Data acquisition and signal generation
- Hardware, firmware, and software design and implementation
- System-level design and implementation

Industry sectors
- Particle physics
- Radio astronomy
- Free-electron lasers
- Medical
- Fusion

References
Teledyne SP Devices is a trusted supplier to a wide range of industries and applications. Our data acquisition and signal generation products are deployed in industrial and research facilities across the world and examples include the neutron time-of-flight (nTOF) facility at CERN, multiple synchrotron, free-electron laser, and fusion facilities world-wide as well as airborne radar systems for Saab and the German Aerospace Center (DLR). Our products are also integrated in system-level solutions by major original equipment manufacturers (OEMs) from multiple industry sectors.

Company size
Large

TELEDYNE SP DEVICES
Everywhereyoulook™

www.spdevices.com

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Procurement codes
- Electrical engineering and magnets
- Electronics and radio frequency

TEXOR

Company profile
Texor is a subcontractor of mainly machines and sub-assemblies for the life science and food industry. Our customers and end users are, above all, global biotech and biopharma companies worldwide. We offer the best experience of machining, welding and surface treatment of stainless steel materials such as 316L, 904L and Hastelloy. We are very often involved in our customers R&D projects with our +50 years of experience of production and assembly of stainless steel components. Texor has a word wide supplier base in terms of elastomers, plastic and stainles steel components and they all meet the highest quality from the biopharma industry.

Core competences
- Traceability
- Documentation
- Narrow tolerances
- Stainless steel
- CNC
- Welding (TIG, MIG, MAG, orbital)
- Grinding/polish
- Electro-polish
- Certification (PED, ASME, FDA, USP, etc)
- 3:rd party inspections (Inspecta, ASME, Force, etc)
- Projects and customization with very short leadtimes

Industry sectors
- Pharmaceutical industry
- Food industry

References
- GE Healthcare,
- Merck Millipore
- Tetra Pak
- Alfa Laval

Company size
Medium

www.texor.se

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Alfavägen 1, SE-921 33 Lycksele, Sweden
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Procurement code
Mechanical engineering and raw materials

2B BEST BUSINESS

Company profile
2B was founded 2005 and has since then grown organically to a turnover of SEK 119 million. 2B is a company with a wide range of production methods to offer such as high tech machining for medical industry, casting parts in all materials and methods with high demands of tightness, complete assembled units etc.

We are used to handle all types of material like tungsten, molybden, titan, magnesium and everything you can come up with. The higher demands the better. Sizes from diameter 0,1 mm to parts with weight of several tons.

Core competences
- Mechanical components for vacuum environment
- High demands casting
- Production methods
- Best method for each part

Industry sectors
- Medical
- High power
- Low power
- Automotive
- General industry

References
- ABB
- NKT
- Parker

Company size
Small

www.2bab.se

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Procurement codes
Civil engineering, building and technical services,
Mechanical Engineering and raw materials

TRE-MEK I TRELLEBORG

Company profile
Tre-Mek is a high-tech lego supplier specialized in turning, milling and welding. We are located in southern Sweden with customers all over the world. At Tre-Mek we have dedicated and flexible professionals with high skills and our team delivers to satisfied customers every day.

Core competences
- Milling
- Turning
- Welding
- IWS Measuring Service
- EdgeCam
- CNC

Industry sectors
- Food Industry
- Medical Industry
- Packaging Industry

References
- Tetra Pak AB
- Ecolean AB
- Trelleborg Industry
- Mastec

Company size
Small

TRE-MEK

www.tremek.se

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Procurement code
Mechanical engineering and raw materials

3NW DATACENTER SWEDEN

Company profile
Flexible co-location and storage solutions in several different locations and countries. All from budget hosting to enterprise solutions with full redundancy and carrier neutral facilities.

Core competences
- Co-locations
- Redundancy
- Flexibility
- Storage
- Enterprise solutions

Industry sector
- Datacenters

References
- Trilogy (www.trilogycorp.com)
- S&S Power Engineering (www.sspwr.com)

Company size
Small

www.3nwired.com

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Procurement code
Information Technology

UNITEAM

Company profile
Uniteam AB, based in Gothenburg, is an international supplier of containers and module solutions for industrial and construction industry, offshore and defense industry.
Through a close cooperation with a large and competitive supplier base, we are able to offer efficient contract implementation and high quality products worldwide. Our assembly lines are located in regions with a long tradition within international ship building and we use skilled labor with relevant experience from maritime industry in order to meet specific needs of our international customers.

Core competences
ISO Container, customized container, special container, steel module, wood module, sales and rental.

Industry sector
- Construction

References
- NKT
- SAAB
- ABB,
- ENWA
- PEAB
- FMV
- SVEVIA

Company size
Small

UniTeam

www.uniteam.com

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Procurement codes
Civil engineering, building and technical services
Mechanical engineering and raw materials

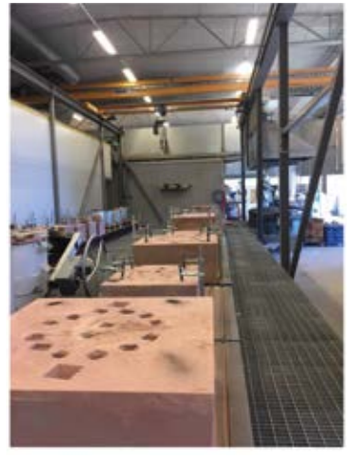
UNNARYD MODELL

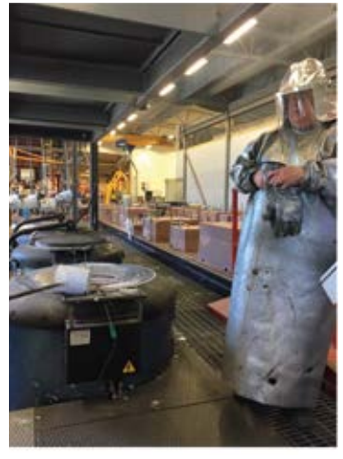
Company profile
We produce prototypes and low volume products by milling or casting in aluminum and iron.
Complete manufacturing process from design engineering and manufacturing of tools to casting, machining and verification.

Core competences
High precision and large mechanical components – manufacturing and assembly

References
CERN

Company size
Small





UNNARYD MODELL

www.unnarydmodell.se

Unnaryd Modell AB
Österlånggatan 14, SE- 314 51 Unnaryd, Sweden
+46 371 22 28 06

Stefan Larsson
Marketing Manager
stefan.larsson@unnarydmodell.se

Procurement Code
Mechanical engineering and raw materials

UPONOR

Company profile

Uponor is a leading global provider of systems and solutions in the fields of hygienic drinking water delivery, energy-efficient heating and cooling and reliable infrastructure. The company is active in a variety of markets in the construction sector, from residential and commercial construction to industry and civil engineering. Uponor products are available to customers in over 100 countries. We provide hygienically safe drinking water as well as energy-efficient heating and cooling. The company has committed itself to sustainability and the goal of making people's lives more pleasant.

Company size

Large

uponor

www.uponor.se

Uponor
Hackstavägen 1, SE-721 32 Västerås, Sweden
+46 223 380 00

Suleyman Dag
Director, Innovation Management
suleyman.dag@uponor.com

Procurement code

Civil engineering, building and technical services

VBN COMPONENTS

Company profile

VBN Components delivers patented, near net shape metal tools and components with unique properties, manufactured through a specific 3D-printing process developed in-house. The materials, branded Vibenite®, have exceptional wear resistance, high heat resistance and are pore free. Small and well-dispersed carbides contribute to the characteristics of the materials. No other company can 3D-print with such high carbide content. Within the range of materials is the hardest commercially available steel in the world, Vibenite® 290, as well as a unique cemented carbide – Vibenite® 480.

Core competences

- Patented alloys
- High speed steel
- Cemented carbide
- 3D-printing
- Additive manufacturing
- Cutting tools
- Wear resistant components
- High-temperature stable materials

Industry sectors

- Aerospace
- Nuclear
- Automotive
- Mining
- Plastic processing
- Food

References

Most clients are confidential. However, a very successful project with VOLVO Construction Equipment can be mentioned. Gear hobs from VBN Components have proved to run twice as fast and cut twice as deep as regular gear hobs in a top, traditional material.

Company size

Small

VBN COMPONENTS

www.vbncomponents.com

VBN Components AB
Libro Ringväg 51, SE-752 28 Uppsala, Sweden
+46 18 240 760

Isabelle Bodén
Customer Relations
+46 702 36 22 81
isabelle.boden@vbncomponents.com

Procurement code

Mechanical engineering and raw materials

VENTANA HACKÅS

Company profile
Casting and machining of parts with demands for close tolerances and high finish.
Aluminium, magnesium and other special alloys.
Welding and mounting.

Core competences
- Casting
- Machining
- Welding
- Mounting

Industry sectors
- Aerospace
- Energy
- Maritime
- Vehicles
- Communications
- Defence

References
- SKA
- Chalmers Onsala: The ”Space Funnel”

VENTANA
Foundry Division
HACKÅS

www.hpgab.se

Ventana Hackås AB
Industrivägen 6, SE-845 94 Hackås, Sweden
+46 (0)63-770415

Jörgen Eriksson
Key Account Manager
+46 (0)70-3661660
jorgen.eriksson@ventana-group.eu

Procurement code
Mechanical engineering and raw materials

VIBE IT

Company profile
We are an IT consultancy agency with great focus on IT management, IT operations and infrastructure solutions.
Our mission is to provide accessibility, reliability, discretion and personal commitment. We offer strategic approaches to technology, combining innovative solutions with established ones.

Core competences
- IT operations
- IT infrastructure
- Cloud solutions
- PC/Mac
- Hardware and software integration
- Operating systems
- Interfaces and computer networks
- Web Solutions
- Hosting, VPS and DNS

Industry sectors
- Big science
- Pharmaceutical
- MedTech
- Science
- Laboratory
- Chemistry
- Research facilities
- Finance
- Manufacturing
- Cleantech

References
- Certego
- Solina
- Skånefågel
- Polaris Management
- Friends of Executive
- K Z Bevakning och Säkerhetstjänst
- Schneider Electric
- Unilabs
- Sol Voltaics
- Chromalytica
- Gordiam Key
- Serstech
- IT-Relation.

Company size
Small

vibe IT

www.vibeit.se

Vibration IT AB
Firmagatan 8, SE-213 76 Malm, Sweden

Robert Putica
CEO
+46 722 00 77 21
robert@vibeit.se

Procurement code
Information technology

VIFLOW GROUP

Company profile
ViFlow is a group of companies that specializes in application based thermal and mechanical design, manufacturing and installation of tube heat exchangers, pressure vessels, piping systems and other process equipment to a number of industry sectors. Our manufacturing facilities are located in Örnsköldsvik (Örnalp Unozon AB) and in Kristianstad (Ekström and Son AB). With around 100 employees and 10 000 m^2 manufacturing area we are staffed to take on almost any project.

Core competences
Design and manufacturing of process equipment in materials such as titanium alloys and various types of stainless-steel grades.

Industry sectors
- Nuclear
- Oil & Gas
- Power plants
- Marine
- Chemical
- Pulp & Paper
- Mining
- Life Science

References
Heat exchangers, reactors, columns and pressure vessels to all industry sectors. Please feel free to ask for detailed references.

Company size
Medium

VI|FLOW GROUP

www.viflow.se

Viflow Group
Sjögatan 7, SE-891 60 Örnsköldsvik, Sweden
+46 660 29 21 00

Peter Lindberg
Head of Sales & Marketing
+46 660 2921 55
peter.lindberg@viflow.se

Procurement codes
- Mechanical engineering and raw materials
- Vacuum and low temperature

VTT

Company profile
VTT is expert at manufacturing high quality components, tools, prototypes and machining of all kinds of materials. Our clients turn to us to develop ideas and produce a single or a small number of units. What's more, VTT has extensive human resources and leading-edge expertise in contract manufacturing, machine building and positioners.

Core competences
- Construction
- Tool makers
- Processing
- High quality components
- Series manufacturing

Industry sectors
- Mining industry
- Automotive industry
- Space sector

References
- Atlas Copco
- Epiroc
- Boliden
- Esrange

Company size
Small

VTT

www.vtt.se

VTT i Skellefteå AB
Uppfinnarvägen 56, SE-931 42 Skellefteå, Sweden
+46 9103 31 80

Ulf Kristoffersson
CEO
+46 706 99 86 82
ulf.kristoffersson@vtt.se

Procurement code
- Mechanical engineering and raw materials

WALLINS MEKANISKA

Company profile
Wallins is a subcontractor with the competence to take care of the entire chain from design, welding, machining, surface treatment, assembly and final testing of machine equipment and advanced components. Our production is reflected by short lead times, flexibility and competent staff.

Core competences
- Advanced 5-axis milling and CNC turning with rotating tools in various materials e.g. copper, stainless steel, alloy steel, aluminum, tungsten etc.
- Project management of the entire value chain.

Industry sectors
- Packaging
- Automotive
- Mining Industry
- Accelerators
- Research
- Manufacturing

References
- ESS
- MAX IV
- Tetra Pak
- Metso
- Sandvik
- Koenigsegg
- A&R Carton

Company size
Small

Wallins Mekaniska

www. wallinsmekaniska.se

Wallins Mekaniska
Grävmaskinvägen 3D, SE-24138 Eslöv, Sweden
+46 413 143 56

Stefan Persson
Managing Director
stefan@wallinsmekaniska.se
+46 708 55 44 07

Procurement code
Mechanical engineering and raw materials

WM PRESS

Company profile
WM Press AB provides complete solutions including design and tool manufacturing.
We have specialized expertise in sheet metal processing and welding in terms of both prototype and volume production. With skilled and experienced employees who know the process from idea to finished products, we can offer a complete manufacturing process.

Core competences
- Design
- Development
- Sheet metal forming
- Deep drawing
- 3D-laser cutting
- Roll forming
- Punching- and laser cutting
- 3D-printing
- CNC machining
- Stainless steel

Industry sectors
- Medical
- Environment
- Automotive

References
- Water and wastewater treatment
- Train brakes
- Houshold appliances

Company size
Small

WM PRESS AB
SHEET METAL FORMING

www.wmpress.se

WM Press AB
Svanhallsgatan 17, SE-256 57 Helsingborg, Sweden
+46 42 32 58 30

Anders Gleerup
Technical Sales
+46 70 232 58 30
anders.gleerup@vmpress.se

Procurement code
Mechanical engineering and raw materials

ÅF

Company profile
ÅF is an engineering and design company within the fields of energy, industry and infrastructure. We create sustainable solutions for the next generation through talented people and technology. We are based in Europe and our business and clients are found all over the world.
ÅF – Making Future.

Core competences
Engineering and design

Industry sectors
- Energy
- Industry
- Infrastructure

References
- Automotive
- Defence
- Energy & Power
- Infrastructure
- Architecture & Design
- Life Science
- Food & Pharma
- Manufacturing
- Process
- Real Estate
- Telecom & IT

Company size
Large

www.afconsult.com

ÅF
Frösundaleden 2, SE-169 99, Stockholm, Sweden
+46 10 505 00 00

Jonas Larsson
Executive Vice President and Head of M&A and Business development
+46 10 505 00 00
jonas.larsson@afconsult.com

Procurement codes
- Civil engineering, building and technical services
- Electrical engineering and magnets
- Electronics and radio frequency
- Gases, chemicals, waste collection and radiation equipment
- Health, safety and environment; Information technology
- Mechanical engineering and raw materials
- Optics and photonics
- Particle and photon detectors
- Vacuum and low temperature

ÖSTERBY GJUTERI

Company profile
Österby Gjuteri produces steel casting in short and medium batch sizes. The alloys that are casted are everything from un alloyed steel up to stainless steel and super alloys such as cobolt and nickel based alloys. Österby Gjuteri is specialized in manufacturing finished products so the operation consists of a foundry with a modern machining workshop and with the possibility of assembling the components to deliver a complete equipment. The casting weights are from 50 kg up to 7000 kg.

Core competences
- Steel castings
- Stainless steel castings
- Machining
- Heat treatment
- 3D-scanning

Industry sectors
- Maritime
- Pulp & Paper
- Offshore
- Energy
- Mining
- Heavy industry
- Chemical industry

References
- Valmet
- Marine Jet Power
- Vattenfall
- Alfa Laval
- Kemira

Company size
Medium

ÖSTERBY GJUTERI

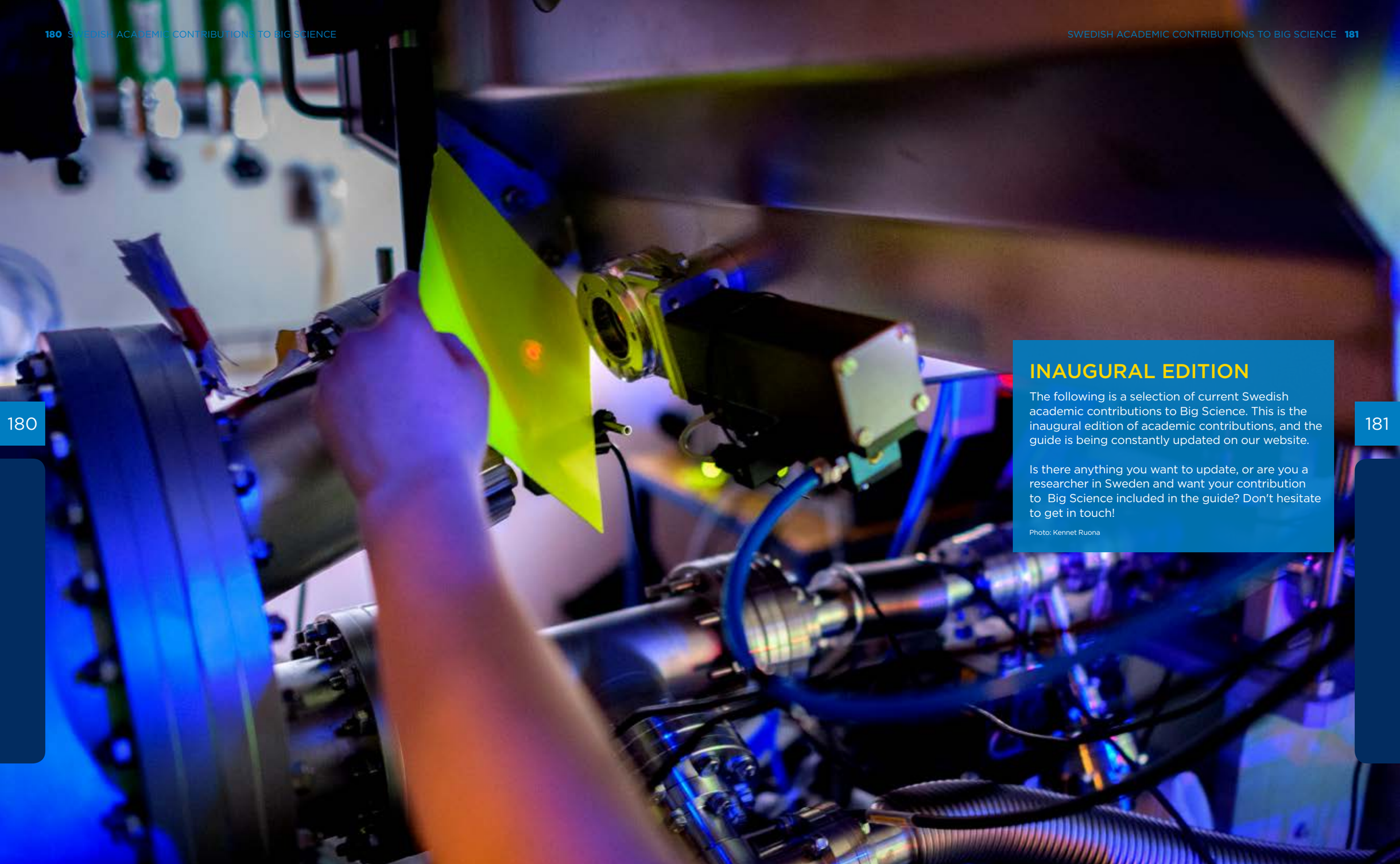
www.ogab.se

Österby Gjuteri AB
Martinvägen 8, SE-748 32 Österbybruk, Sweden.

Erik Stark
Sales Manager
+46 295 24 42 00
sales@ogab.se

Procurement code
- Mechanical engineering and raw materials

SWEDISH ACADEMIC CONTRIBUTIONS TO BIG SCIENCE



INAUGURAL EDITION

The following is a selection of current Swedish academic contributions to Big Science. This is the inaugural edition of academic contributions, and the guide is being constantly updated on our website.

Is there anything you want to update, or are you a researcher in Sweden and want your contribution to Big Science included in the guide? Don't hesitate to get in touch!

Photo: Kennet Ruona

Index academic contributions per Big Science facility

XFEL

SKA

OTHER

Index academic contributions sorted by coordinating university

CHALMERS UNIVERSITY OF TECHNOLOGY

KTH ROYAL INSTITUTE OF TECHNOLOGY

LINDKÖPING UNIVERSITY

LULEÅ UNIVERSITY

LUND UNIVERSITY

MID SWEDEN UNIVERSITY

RISE, RESEARCH INSTITUTES OF SWEDEN

UPPSALA UNIVERSITY

CERN

ADVANCED RESOURCE CONNECTOR SOFTWARE FOR ATLAS AND LHC COMPUTING

LUNDS UNIVERSITET

Coordinating university: Lund University, www.lu.se

Project description
ATLAS is the biggest instrument at the biggest machine on Earth, the Large Hadron Collider (LHC). It is 46 meters long and weighs 7000 tonnes, working like a huge camera, taking very detailed “pictures” of particle collisions. With a spacial resolution of microns, the raw size of one “picture” is 1.6 Mbytes, and with data taking rates of Megahertzs, it collects several Petabytes of raw data a year. The challenge is to store this data, process it to create samples ready for analysis, and to make it available to physicists around the world in real-time. No single supercomputer exists meet this challenge, so the solution is to use the global network of supercomputers, for which our team develops software.

Team
Lund University:
- Oxana Smirnova, Doctor, team leader, specialist in scientific computing
- Balazs Konya, Doctor, specialist in distributing computing
- Florido Paganelli, systems expert, computer scientist

Core deliverables
Advanced Resource Connector (ARC) software

Industry involvement
Industry involvement in the distributed computing project comes indirectly, through high-performance computing and storage hardware, and partially through open source software.

Year
2001 –

Total budget
EUR 2 million

Collaboration
- Lund University
- Uppsala University
- University of Oslo
- University of Copenhagen
- Jozef Stefan Institut
- University of Bern
- Taras Shevchenko National University of Kyiv

Hyperlink
www.nordugrid.org

Procurement Code
- Information technology

CERN

CERN SUPERCONDUCTING CABLES CONNECTION CRYOSTATS (COLD BOXES)

UPPSALA UNIVERSITET

Coordinating university: Uppsala University, www.uu.se

Project description
The High Luminosity Large Hadron Collider (HL-LHC) at CERN is an upgrade of the LHC to achieve instantaneous luminosities a factor of five larger than the LHC nominal value. More powerful superconducting magnets are needed and their powering relies on essential and critical connections between MgB2 cable and a high temperature superconductor current lead. These connections need to be cooled by cryogens and must be able to carry an unprecedented current capacity of up to 100 kA each. The devices where these connections are made have to be cryogenic and high current compatible as well as compact.

Team
Uppsala University:
- R. Santiago Kern, Research Engineer, cryogenics and vacuum
- Roger Ruber, Researcher, cryogenics and superconductivity
- Tord Ekelöf, Professor, project leader

CERN:
- Vittorio Parma, Research Engineer, project engineer

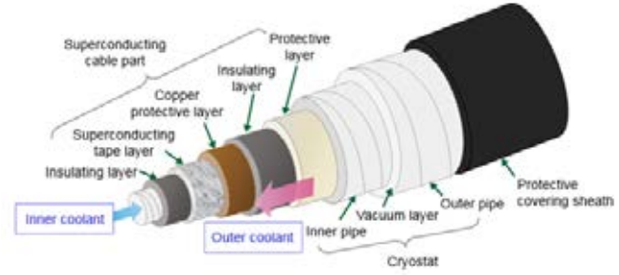
Core deliverables
- Design of the different components of the cryostats
- Manufacturing
- Assembly
- Qualification testing
- All documentation pertaining to the project, such as manufacturing drawings and test reports

Year
2018–2023

Total budget
EUR 2 million

Industry involvement
RFR Solutions

Hyperlink
http://hilumilhc.web.cern.ch



Procurement codes
- Electrical engineering and magnets
- Electronics and radio frequency
- Vacuum and low temperature

CERN

COLD SPARK SYSTEM FOR CLIC

Coordinating university: Uppsala University, www.uu.se

UPPSALA UNIVERSITET

Project description

A particle accelerator is an important tool of modern science and medicine. The use of the accelerators is limited to bigger research centers and larger hospitals due to their often large size and cost. The size is limited by phenomena of vacuum breakdowns where significant increase of the accelerating voltage inside the accelerator will cause an electric discharge which can destroy the machine. For safe operation we keep the accelerator longer and stay at lower voltages. Uppsala University is building a system with large planar electrodes for studies of the fundamental physics of high-fields in vacuum, important for development of accelerating technologies. The system is cooled to cryogenic temperatures and operated in a wide range of temperatures.

Core deliverables

- System design and requirement gathering
- Acquisition of hardware
- Manufacturing of components
- System integration and commissioning

Year

2018–

Total budget

EUR 150,000

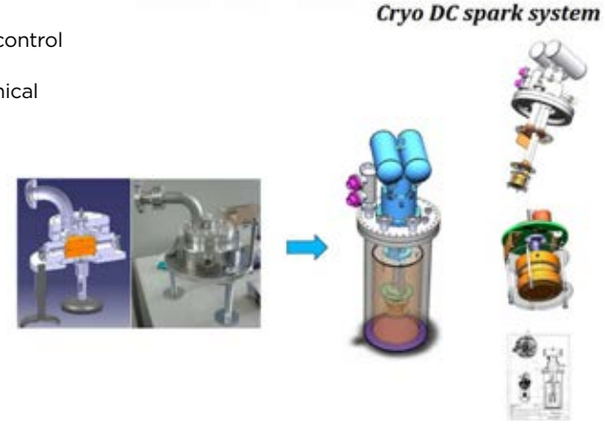
Industry involvement

- Innovatec Ceramics
- VAQTEC
- Omega Engineering

Team

Uppsala University:

- Marek Jacewicz, Doctor, detectors and control systems
- Johan Eriksson, Senior Lecturer, mechanical engineering
- Roger Ruber, Docent, cryogenics.



Procurement codes

Mechanical engineering and raw materials
Vacuum and low temperature

CERN

CONSTRUCTION OF THE TIME PROJECTION CHAMBER IN ALICE AT LHC

Coordinating university: Lund University, www.lu.se

LUNDS UNIVERSITET

Project description

The ALICE Experiment (see figure) at LHC at CERN is designed to study collisions between Heavy nuclei at extremely high energy, a new state of matter named Quark Gluon Plasma is created where protons and neutrons do not exist but their constituents, quarks and gluons form a large volume system like in the first millionth of a second of the Big Bang. Several thousand particles are produced when the plasma expands and cools off. The ALICE experiment with its ca 1000 collaborators is designed to measure these. The main subdetector is the TPC, which records the track of ionized atoms due to passing charged particles. The TPC is read out with about 500 000 electronic channels. Each channel is a preamp/shaper 10 bit sampling ADC and 1000 samples memory. Half a million channels of digital oscilloscope in simple words. The Lund group covered prototyping and fabrication of the digital ASIC, performed robotic testing and calibration of 100000 ASICs and Manufactured 5000 circuit boards together with NOTE AB in Lund.

Team

Lund University:

- Hans Åke Gustafsson, Professor, physicist, project leader, detector expert
- Anders Oskarsson, Professor, physicist, deputy project leader, detector expert
- Lennart Österman, Research engineer, electronics, specification, circuit board design and board layout, CAD, R&D, robotic ASIC testing, quality control

Core deliverables

- Prototyping and fabrication of ALTRO ASIC (ST microelectronics)
- Robotic testing of 50000 ALTRO ADC chips (in house)
- Robotic testing of 50000 PASA (preamp-shaping amplifier ASIC) (in house)
- Assembly of 5000 Front End boards (NOTE)

Industry involvement

Note

Year

2003–2005

Total budget

EUR 2,1 million

Collaborations

- Lund University
- CERN
- GSI Darmstadt
- University Frankfurt
- University of Heidelberg

Hyperlinks

- http://alice-collaboration.web.cern.ch/
- http://alice-tpc.web.cern.ch/content/tpc-frond-end-electronics
- http://cdsweb.cern.ch/record/940643

Procurement codes

Electronics and radio frequency
Particle and photon detectors

CERN

CONTRIBUTION TO THE ISOLDE-EXPERIMENT AT CERN

LUNDS UNIVERSITET

Coordinating university: Lund University, www.lu.se

Project description

The project concerns the Swedish membership in the ISOLDE collaboration at CERN. ISOLDE, CERN:s radioactive beam facility, provides beams for experiments in nuclear physics and atomic physics, including applications in nuclear astrophysics and fundamental physics, as well as in solid-state physics, biophysics and medical physics. The experimental activities at ISOLDE are governed by a memorandum of understanding between CERN and the members of the ISOLDE collaboration represented by the respective funding agencies. The collaboration currently includes 15 countries and CERN. Sweden has been member of ISOLDE since it inception in 1967. ISOLDE is a part of CERNs general organization. It includes a user group of ca 500 university physicists with research activities at the facility. The contribution delivers support for the optimization of the daily operation of the accelerator and separator infrastructure of the facility. The Collaboration also provides support to assist approved experiments.

Core deliverables

- Research infrastructure optimization
- Infrastructure assistance
- Collaboration Organisation

Team

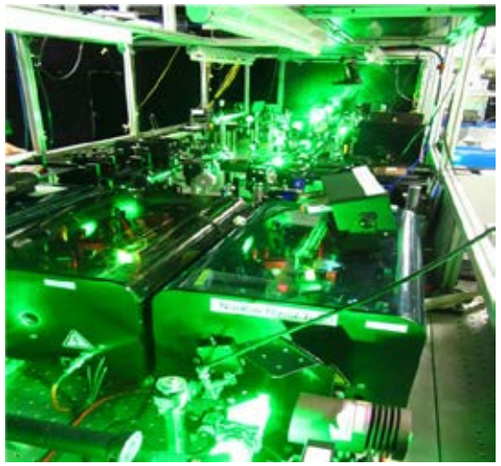
Lund University:
Joakim Cederkäll, Professor, Nuclear physics, Faculty of science, Department of physics

Year

2018-2022

Budget

EUR 270,000



Procurement codes

Particle and photon detectors
Optics and photons

CERN

DARKJETS

LUNDS UNIVERSITET

Coordinating university: Lund University, www.lu.se

Project description

For experiments at the Large Hadron Collider (LHC) at CERN, proton-proton collisions occur up to 30 million times per second. One cannot record all information related to each of these collisions, since the size of each "event" can surpass 1 MB. Experiment therefore select only a subset of these collision events, record them to storage and then analyze them afterwards.

Novel techniques are needed in order to make the most of data that is not selected and would otherwise be discarded. The DARKJETS project delivers such a technique for the ATLAS experiment, called Trigger-object Level Analysis (TLA). In this technique, higher-level insight is obtained from a fast data analysis done in milliseconds, so that only a small subset of the information can be stored for each event. This greatly reduces the event size and allows for a much larger dataset to be recorded for e.g. searches for new physics phenomena. This project has received funding from the European Research Council (ERC) under the European Union's Horizon 2020 research and innovation programme (grant agreement No GA679305)"

Team

Lund University, Faculty of Sciences:

- Caterina Doglioni, Associate Senior Lecturer, specialist in data selection and data analysis, particle physics
- William Kalderon, Postdoc, specialist in data selection and data analysis, particle physics
- Oxana Smirnova, Associate Senior Lecture, specialist in scientific computing and data processing
- Florido Paganelli, Researcher, computer scientist, system expert
- Eva Hansen, Eric Corrigan, PhD students

Core deliverables

- Novel technique for the ATLAS detector to record
- Commissioning of FPGA-based board for event selection in the upcoming LHC Run
- Scientific and technical peer-reviewed publications

Year

2016–2021

Total budget

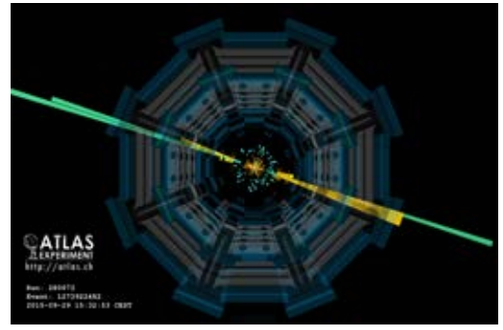
EUR 1,27 million

Collaboration

- Lund University
- Ohio State University
- Heidelberg University
- University of Oregon
- University of Geneva
- CERN

Hyperlink

http://www.hep.lu.se/staff/doglioni/darkjets.html



© CERN

Procurement code

Information technology

CERN

DEVELOPMENT OF CERN SUPERCONDUCTING CANTED COSINE THETA MAGNET PROTOTYPE

UPPSALA UNIVERSITET

Coordinating university: Uppsala University, www.uu.se

Project description

CERN is currently upgrading its Large Hadron Collider to increase its collision frequency (luminosity) by an order of magnitude. To do so a new type of superconducting orbit corrector dipole magnet based on the Canted Cosine Theta (CCT) design is being developed. FREIA Laboratory is aiming at signing a so called K-contract with CERN for the fabrication of a series such magnets.

Team

Uppsala University, Department of Physics and Astronomy, FREIA:

- Tord Ekelöf, Professor, project manager
- Roger Ruber, Docent, accelerator systems
- Kevin Pepitone, Research engineer

Scanditronix:

- Mikael Vieweg

CERN:

Glyn Kirby

Core deliverables

- Design of the CCT magnet
- Fabrication of the prototype
- Tests of the prototype
- Report on the test results

Year

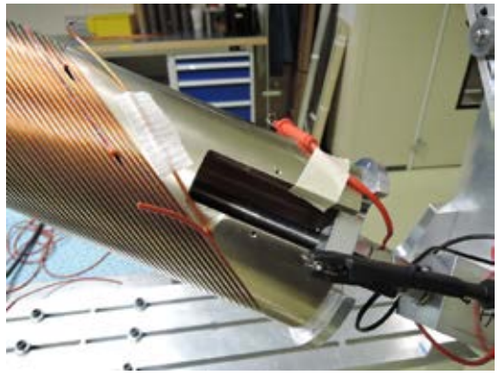
2017-2019

Total budget

EUR 500,000

Industry involvement

- Uppsala university
- Scanditronix



Procurement codes

- Electrical engineering and magnets
- Mechanical engineering and raw materials
- Vacuum and low temperature

CERN

DEVELOPMENT OF THE RILIS/LARIS-ISOLDE LABORATORIES AT CERN

LUNDS UNIVERSITET

Coordinating university: Lund University, www.lu.se

Project description

Today ISOLDE is a major CERN installation with a user community of about 300 researchers from 80 institutions in 21countries. The scientific program is broad and includes experiments in low-energy nuclear physics, nuclear solid-state physics, atomic-and molecular physics, nuclear astrophysics, particle physics and nuclear medicine. The research program focuses on further development of the RILIS (Resonance Ionization Laser Ion Source)-ISOLDE ionization laboratory. The RILIS-ISOLDE facility produces radioactive isotopes using the Isotope Separator On Line (ISOL) technique whereby a driver beam impinges upon a fixed target. The reaction products are ionized, extracted and then mass separated during their flight towards the experimental setup. On account of its high efficiency, speed and unmatched selectivity, the preferred method for ionizing the nuclear reaction products at the ISOLDE on-line isotope separator facility. By exploiting the unique electronic energy level fingerprint of a chosen element, the RILIS process of laser step-wise resonance ionization enables an ion beam of high chemical purity to be sent through the mass selective separator magnet. The isobaric purity of a beam of a chosen isotope is therefore greatly increased. We developed the RILIS facility further to a "state-of-the-art" system together with the newly developed pre-RILIS laboratory in order to make a reliable, ion producing CERN facility for the ISOLDE community.

Team

Lund University:

- Joakim Cederkäll, Professor, Nuclear physics, Faculty of science, Department of physics
- Claes Falander, Professor, Nuclear physics, Faculty of science, Department of physics

Core deliverables

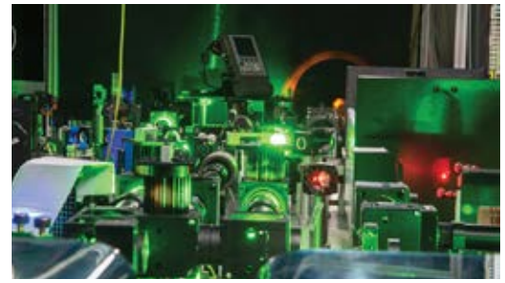
Electronic energy level “fingerprinting”
RILIS (Resonance Ionization Laser Ion Source)

Year

2011-2015

Budget

EUR 200,000



Procurement codes

- Particle and photon detectors
- Optics and photons

CERN

HIGH VOLTAGE REFERENCE DIVIDER

Coordinating institute: RISE Research Institutes of Sweden, www.ri.se

Project description

The large Hadron Collider at (CERN, was upgraded in 2014 with a new linear accelerator Linac4. Radio-frequency (RF) power requirements for the new accelerator translated into new requirements for the high-voltage measurements at the level of the klystron power supplies: Cathode and anode voltages are pulsed at –110 and –50 kV, respectively, with a repetition rate of 1.1 Hz. Voltage rise and fall times are in the range of 150 μs, and pulse width is approximately 1700 μs. The new reference system built by SP Technical Research Institute of Sweden proved to be able to calibrate the measurement of the flat-top voltage with an uncertainty of 0.05 %, thus ensuring that DUT performance requirement of 0.5 % could be fulfilled.
Since 2017 SP Technical Research Institute of Sweden is a part of Research Institutes of Sweden, RISE.

Team

RISE:
- Anders Bergman, Doctor, senior researcher in High-voltage Metrology
- Maria Hammarquist, Researcher in high-voltage metrology

CERN:
- M.C. Bastos, Calibration Specialist

Core deliverables

- Define the principle and modelling of the measurement system
- Purchase components
- Building a complete measuring system incl software
- Characterise the measuring system in-house at RISE´s high voltage lab
- Deliver and perform final calibration of reference system at CERN

Year

2009–2010

Total budget

EUR 55,000

Collaboration

- RISE
- CERN

Hyperlink

https://ieeexplore.ieee.org/document/5682402

Procurement codes
- Civil engineering, building and technical services
- Electrical engineering and magnets

CERN

QUENCH STUDY AND RF CHARACTERIZATION OF CRAB CAVITIES

Coordinating university: Uppsala University, www.uu.se

Project description

The High Luminosity LHC (HL-LHC) is an upgrade of the LHC to achieve instantaneous luminosities a factor of five larger than the LHC nominal value, thereby enabling the experiments to enlarge their data sample by one order of magnitude compared with the LHC baseline programme. The HL-LHC will rely on a number of key innovative technologies, including cutting-edge compact superconducting crab cavities with ultra-precise phase control for beam rotation.

The FREIA Laboratory will be responsible for studying the quench characteristics at full RF power of a string of two crab cavities in a horizontal cryostat. In addition the FREIA laboratory shall study the RF characteristics of several other crab cavities at low RF power in a vertical cryostat.

Team

Uppsala University:
- Roger Ruber, Docent, accelerator systems
- Han Li, Doctor, superconducting cavities

Core deliverables

- Test system integration and commissioning
- High and low power RF generator and LLRF control
- Electronic acquisition hardware
- Data analysis

Year

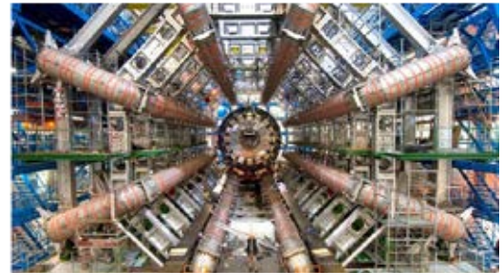
2016–2020

Total budget

EUR 2 million

Hyper links

http://hilumilhc.web.cern.ch/



Procurement codes
- Electronics and radio frequency
- Information technology
- Particle and photon detectors

CERN

SILICON DETECTOR MODULES FOR ATLAS EXPERIMENT

UPPSALA UNIVERSITET

Coordinating university: Uppsala University, www.uu.se

Project description

Production of ~1000 silicon semiconductor detector modules/hybrids in Sweden. A module consist of silicon strip sensors readout electronics and data transmission. The sensor module is assembled with high precision (<10 micrometer) using UV and chemical curing glue. Electronics is wire bonded to sensor and readout with 25 micrometer wires. Each module has in total about 4000 wire connections.

The Swedish production is an in-kind contribution to an international collaboration with several partners. The Scandinavian contribution is done together with groups from Denmark and Norway. The assembly and testing is done in clean room facilities. The work is done in collaboration between industry and academia.
Expertise and production tooling is produced by university. Assembly of modules are done in industry. Wire bonding both in industry and university. Testing done at university.

Team

Uppsala University:
- Richard Brenner, Professor specialist in: particle physics instrumentation
- Lars-Erik Lindquist, Maintenance superintendent, specialist in micro-mechanics and micro-electronics, department of physics and astronomy, high energy physics

Lund University, :
- Geoffrey Mullier. Postdoc at particle physics specialist in particle physics instrumentation, Faculty of Engineering

NOTE
- Johnny Goncalves, Senior technical project manager, specialist in microelectronics production

Core deliverables

Silicon detector modules

Year

2017-

Total budget

EUR 2 million

Industry involvement

NOTE

Collaborations

- Uppsala University
- Lund university
- Note

Procurement code

Electronics and radio frequency

CERN

TESTING OF SUPERCONDUCTING ORBIT CORRECTOR DIPOLE MAGNETS

UPPSALA UNIVERSITET

Coordinating university: Uppsala University, www.uu.se

Project description

Between 2023-2024, the LHC will be upgraded to increase the beam luminosity by a factor of five. Many new magnets will have to be installed. Before going to the tunnel, each magnet must be trained. The training consists of powering the superconducting magnet to an ultimate current which corresponds to 110% of the nominal current. To save space, magnets consist of two perpendicularly and coaxially arranged dipole coils. FREIA's task is to train single aperture superconducting dipoles with a length of 2.5 and 1.5 m and an internal magnetic field of 2.5 and 4.5 T.m, They will be tested in the new vertical cryostat currently being installed at FREIA.

Team

Uppsala University, FREIA:
- Kévin Pepitone, Research Engineer, Department of Physics and Astronomy
- Roger Ruber, Researcher, Department of Physics and Astronomy

Core deliverables

- Training superconducting orbit corrector dipoles to the ultimate current
- Ramp rate test studies
- Thermal cycle and memory verification
- Simultaneous powering of vertical and horizontal coils

Year

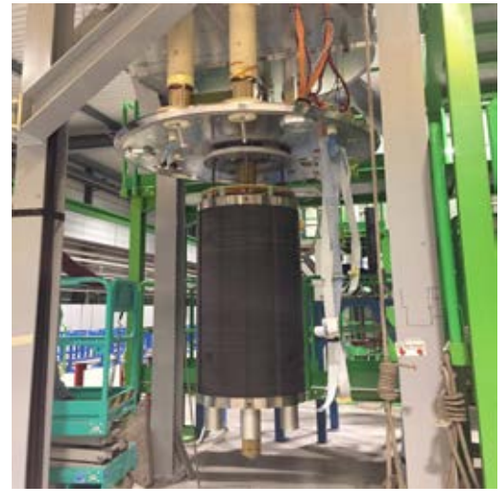
2018–

Total budget

EUR 2 million

Hyper links

https://espace.cern.ch/HiLumi/wp3/



Procurement codes

Electrical engineering and magnets
Electronics and radio frequency
Mechanical engineering and raw materials
Vacuum and low temperature

CERN

THE MEDIPIX COLLABORATION

Coordinating university: Mid Sweden University, www.miun.se

Project description

The MEDIPIX collaboration, coordinated by CERN, is developing readout electronics for single photon processing pixel detectors. The objective is to make detectors for spectral X-ray imaging as well as for particle tracking. Applications outside of high-energy physics can for example be found in medical imaging and material science. Current resolution is in the keV and ns range.

Team

Mid Sweden University:

- Christer Fröjdh, Professor, radiation detection and imaging
- David Krapohl, Doctor, radiation detection and imaging
- Göran Thungström, Docent, semiconductor and radiation physics
- Börje Norlin, Doctor, spectral X-ray imaging

Core deliverables

- Detector electronics and readout systems
- Sensors for different types of radiation
- Theory for spectral imaging and tracking

Year

1999–

Hyperlink

www.cern.ch/MEDIPIX

Procurement codes

- Civil engineering, building and technical services
- Information technology
- Particle and photon detectors
- Optics and photons
- Health, safety and environment

CERN

UPGRADE OF THE ALICE TPC, THE GEM UPGRADE, STEP 2

Coordinating university: Lund University, www.lu.se

Project description

The exploratory phase of Quark Gluon Plasma Studies with nuclear collisions at LHC is over and focused studies on specific aspects can commence with an upgraded detector with about 100 times higher sensitivity than the baseline ALICE. Step 1 of the upgrade was made in 2015 resulting in a factor 3 larger data rate which allowed to finish the science program planned for the baseline detector 6 years earlier and to take the large upgrade step with another factor 30 increase in sensitivity to be installed 2019-2020. This Involves a major change in the TPC detector technology and all readout electronics has to be replaced. All functionality of a readout chain both analog and digital is now in the same 32 channel ASIC named SAMPA. All circuit boards are new and the readout architecture is changed to have 10000 bidirectional optical links operating at 4.8Gbit/s. Lund University is involved in the SAMPA development and performs robotic testing and calibration of 90000 SAMPA chips for the final circuit board production (which has just started in the US).

Team

Lund University, Physics Department

- David Silvermyr, Doctor, Associate Professor, Physicist, detector expert, project leader, software development
- Anders Oskarsson, Professor, Physicist, detector expert, project leader
- Lennart Österman, Research Engineer, electronics, electronics design, CAD, quality assurance robotics and automation expert
- Ulf Mjörnmark, Doctor, Research Engineer, software and data acquisition expert

Core deliverables

- Characterization and evaluation of SAMPA chip prototypes.
- Robotic testing and calibration of 90 000 SAMPA chips.
- Installation and commissioning in ALICE.

Year

2014–2020

Total budget

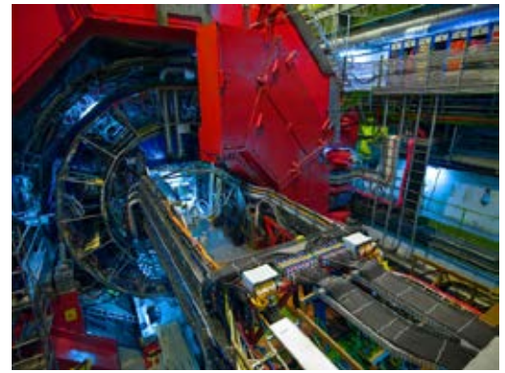
EUR 450,000

Collaboration

- Lund University
- Bergen University
- Oslo University
- Sao Paolo University
- Knoxville University
- Houston University
- Orsay University
- CERN
- GSI
- Oak Ridge National Laboratory
- Saclay

Hyperlink

http://alice-collaboration.web.cern.ch/
https://youtu.be/3tnqPbMWzqQ



Procurement Code

- Electronics and radio frequency
- Particle and photon detectors

CERN

UPGRADE OF THE ALICE TPC DETECTOR, RCU2 STEP

Coordinating university: Lund University, www.lu.se

Project description
Experiments in High energy physics run for several decades. Electronic components of higher performance become available over time. This motivated an upgrade of the readout electronics of the TPC detector in ALICE improving the data collection rate by a factor of 3. The figure shows reconstructed tracks in the TPC which produces huge data volumes. A science program expected to take 9 years could thus be finished in 2018 after 3 years, which translates to a saving of 600 person years just in operation of the experiment, not counting the 1000 collaborators who can complete their studies much earlier. The modernization involved new Field Programmable Gate Arrays (FPGA) for data collection which were replaced by the latest version and the readout architecture was made more parallel. The changes included massive firmware engineering and circuit board design/fabrication.

Team
Lund University:
- Anders Oskarsson, Professor, physicist, project leader, detector expert
- Lennart Österman, Research engineer, electronics lead engineer, specification, quality control, electronics design
- Mohammad Khorramnejadi, CAD engineer. PCB layout

Core deliverables
Halogen free circuit boards housing the 40 bit wide data bus for data readout.

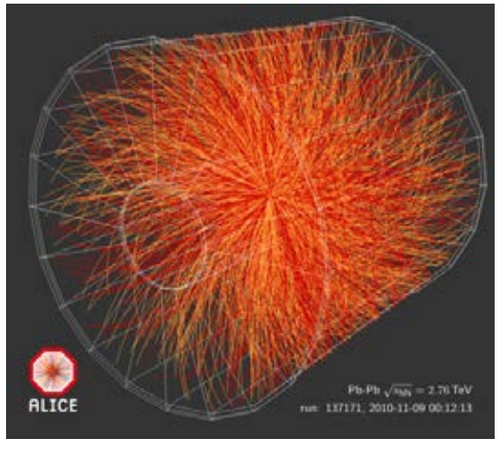
Industry involvement
- Cervitrol
- MEPCB

Year
2013–2015

Total budget
EUR 220,000

Collaboration
- Lund University
- Bergen Technical High School
- KFI
- GSI
- CERN

Hyperlink
http://alice-collaboration.web.cern.ch/



Procurement codes
- Electronics and radio frequency
- Particle and photon detectors

DESY

CENTER FOR X-RAYS IN SWEDISH MATERIALS SCIENCE (CEXS)

Partner universities: KTH Royal Institute of Technology and Linköping University

Project description
Sweden has invested in a materials science beamline at PETRA III, DESY, Hamburg – the Swedish Materials Science beamline (SMS). A center with the name Center for X-rays in Swedish Materials Science (CeXS) is set up to take responsibility for the academic hosting of the SMS. The aim of CeXS is to: i) Increase the awareness and usage of high-energy x-ray characterization in materials science in the Swedish research community, ii) train the Swedish materials research community in the use of high-energy x-rays, iii) develop scientific scope and experimental environments for the SMS, iv) disseminate the Swedish research at PETRA III to stakeholders, etc. Through SMS' contribution to DESY's capabilities, Swedish scientists and industrial collaborators will be able to take advantage of a system for privileged access to all DESY-operated beamlines.

Team
KTH Royal Institute of Technology:
- Peter Hedström, Associate Professor in Materials Science, Department Materials Science and Engineering, specialist in high-energy x-rays for metals

Linköping University:
- Jens Birch, Professor, Department of Physics, Chemistry and Biology, specialist in high-energy x-ray instrumentation and in situ and in operando characterization of thin film

Core deliverables
- Workshops
- Training
- Reporting of SMS activities
- Web portal to SMS

Industry involvement
Swedish companies and research institutes working within the area of Materials Science Engineering are the primary non-academic stakeholders.

Year
2019-2024

DESY

MICRO ACCELERATOR STRUCTURE CENTER MAS IN UPPSALA

UPPSALA UNIVERSITET

Coordinating university: Uppsala University, www.uu.se

Project description

To meet new demands from accelerator physics strategies on the rise the Micro Accelerator Structure center (MAS) in Uppsala was founded. It will aid Big Science facilities around the world in constructing microfabricated devices utilizing e.g. lithography methods in clean room environments. The first collaboration for delivering such hardware are with DESY in Germany which currently are constructing a test accelerator setup, Sinbad where the centre will play a vital part in producing micro machined structures, sample holders, controllers and setups.

Team

Uppsala University:

- Mathias Hamberg, Researcher, Department of Physics and Astronomy, FREIA
- Mikael Karlsson, Senior Lecturer, Department of Engineering Sciences, Applied Materials Science
- Pontus Forsberg, Researcher, Department of Engineering Sciences, Applied Materials Science
- Anders Rydberg, Professor at Department of Engineering Sciences, Solid State Electronics

DESY:

- Ulrich Dorda

Core deliverables

- Micro fabricated structures of various nature
- Sample mounts
- Test and evaluation setup
- Laser routing system
- Vacuum chamber design
- Hexapod implementation
- PLC control systems design
- Design of system
- Fabrication in Cleanroom environment
- Installation of setup
- Tests and Improvements

Year

2015-2025

Total budget

EUR 1 million

Collaborations

- Uppsala University
- FAU
- PECS
- DESY Research Centre

Procurement codes

- Electronics and radio frequency
- Information technology
- Mechanical engineering and raw materials
- Vacuum and low temperature
- Particle and photon detectors
- Optics and photons

EISCAT

EISCAT 3D DESIGN OF ANTENNA ELEMENTS

LULEÅ TEKNISKA UNIVERSITET

Coordinating University: Luleå University of Technology, www.ltu.se

Project description

EISCAT 3D is a radar system that will consist of five phased-array antenna fields located in the northernmost areas of Finland, Norway and Sweden. It will be operated by EISCAT Scientific Association. LTU also worked on possible configurations of the antenna array with respect to the hardware and electromagnetic properties. The work also led to electrical and mechanical front end design, and included an investigation of timing solutions and antenna calibration methods.

Team

Luleå Technical University, Industrial Electronics:

- Jonny Johansson, Associate Professor
- Johan Borg, Senior lecturer
- Gunnar Isaksson, Research engineer
- Tore Lindgren, Research assistant

Core deliverables

- Antenna element specifications
- Antenna array configurations
- Front end electronics
- Antenna timing and calibration

Industry involvement

- National Instruments
- WSI
- Gäddede Elektronik
- Gelab
- Microbit

Year

2010–2014

Total budget

EUR 1 million

EISCAT 3D test array on the EISCAT site in Tromsø.
Photo: Craig Heinselman Heinselman

Procurement codes

- Electrical engineering and magnets
- Electronics and radio frequency
- Information technology

ESO

ALMA BAND5 RECEIVERS

Coordinating university: Chalmers University of Technology, www.chalmers.se

CHALMERS

Project description

The ALMA (Atacama Large Millimeter/ SubMillimeter Array) Observatory is the world's largest radio-astronomy observatory consisting of 66 radio telescopes, with a 12-metre diameter, working as an interferometer with largest baseline of 16 km. All telescopes are placed at approximately 5000 m altitude, at Chajnanto Plato in the Chilean Andes. For optimal performance of the observatory, each telescope is equipped with an identical receiver system with ultimate sensitivity. To meet the expectations of the astronomers, especially in their search for water in the universe and understanding of the origins of life in the Solar system, the consortium led by the Chalmers Group of Advanced Receiver Development, developed and deployed the most sensitive radio-astronomy receiver system operating between 158 and 211 GHz also known as ALMA Band 5. The Band 5 receivers operate at cryogenic temperatures of around 4 K using superconducting components as well as advanced circuits and systems, resulting in a sensitivity close to the quantum limit (35 K, SSB noise temperature). The Band 5 receiver has the lowest noise temperature out of all other ALMA bands to date.

Team

Chalmers University of Technology, GARD, Onsala Space Observatory:

- V. Belitsky, Professor, Department of Space, Earth and Environment, advanced receiver development
- V. Desmaris, Associate Professor, Department of Space, Earth and Environment, advanced receiver development
- A.Pavolotsky, Senior Research Engineer, Department of Space, Earth and Environment, advanced receiver development

Core deliverables

- 6 prototype receivers after Phase I (2012)
- 70 receivers + 10 spares after Phase II (2018)

Year

2006-2018

Total budget

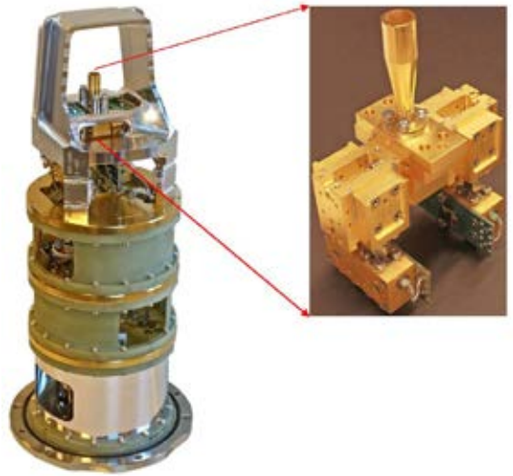
EUR 10,7 million

Collaborations

- Chalmers University of Technology
- Netherlands Research School for Astronomy, (NOVA),
- National Radio Astronomy Observatory,
- European Southern Observatory (ESO)

Hyperlink

https://www.aanda.org/articles/aa/abs/2018/03/aa31883-17/aa31883-17.html



Procurement Code

Electronics and radio frequency

ESO

EXTREMELY LARGE TELESCOPE INSTRUMENTATION: HIRES AND MOSAIC

UPPSALA UNIVERSITET

Coordinating university: Uppsala University, www.uu.se

Project description

The 39m ELT will be the largest astronomical telescope ever built. For spectroscopic analysis, the light collected by the ELT will be carried by optical fibers to the spectrometers called HIRES and MOSAIC. Three major Swedish universities (Lund, Stockholm and Uppsala) take active parts in design and construction of these instruments. The coupling of fibers with other optical elements is crucial for efficiency and stability. The new instruments will measure the values of fundamental physical constants back in time, the expansion rate of the Universe etc. They will also search for atmospheres around Earth, -such as exoplanets, and make chemical analysis in order to detect signatures of life.

The project also involved the developement of a unique technology for CO2 laser fusion of fiber cores with other optical components that matches high requirements of astronomical instrumentation and repeatedly delivers excellent quality.

Team

Uppsala University:
Nikolai Piskunov, professor, specialist in stars and exoplanets, astronomical spectroscopy

Core deliverables

- For HIRES: 32 optical bundles with 64 or 96 fibers each coupled to microlens arrays on both sides.
- For MOSAIC: 2000 bundles with 7 fibers each coupled to re-imaging optics on one side and to image slicer on the other.

Year

2018–2027

Total budget

EUR 4,5 million

Industry involvement

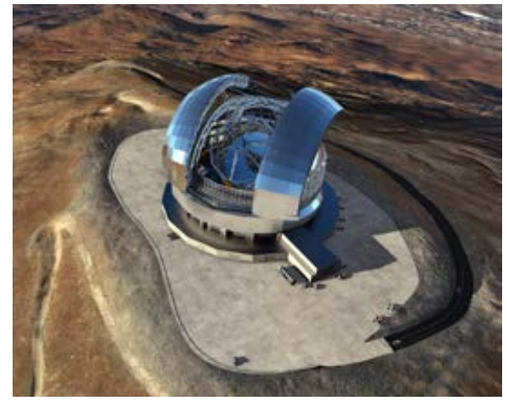
- Nyfors
- ELT instruments

Collaborations

- Uppsala University
- Stockholm University
- Lund Universitiy

Hyper links

http://www.arcetri.astro.it/-hires



Procurement codes

Information technology
Mechanical engineering and raw materials
Optics and photons

ESS

ACCEPTANCE TESTS OF CRYO-MODULES

Coordinating university: Uppsala University, www.uu.se

UPPSALA UNIVERSITET

Project description

A part of the linear accelerator for the European Spallation Source being built in Lund will contain thirteen cryo-modules that host two superconducting spoke cavities each. Before lowering them into the tunnel for the final assembly, they need to be fully tested and validated under cryogenic conditions and at high power to ensure they will meet the requirements once they are in operation.

Team

Uppsala University:

- R. Santiago Kern, Research engineer, cryogenics and vacuum
- Han Li, Researcher, radio-frequency and cavity testing
- Rolf Wedberg, Research engineer, radio-frequency power amplifiers
- Roger Ruber, Researcher, project leader

Core deliverables

- Definition of a test plan
- Procedure for formal acceptance of a cryo-module
- Mechanical, electrical and vacuum checks of each cryo-module after arrival
- Cryogenic cooldown
- High power radio-frequency tests
- Radiation monitoring
- All pertaining documentation such as test reports

Year

2018–2020

Total budget

EUR 5 million

Hyperlink

https://europeanspallationsource.se/accelerator

Procurement codes

- Civil engineering, building and technical services
- Electrical engineering and magnets
- Electronics and radio frequency
- Information technology
- Mechanical engineering and raw materials
- Vacuum and low temperature
- Particle and photon detectors
- Gases, chemicals, waste collection and radiation equipment
- Health, safety and environment

ESS

ANALYSIS TOOLS FOR ANALYSIS OF IN-SITU TIME-RESOLVED NEUTRON DIFFRACTION

Coordinating university: Chalmers University of Technology, www.chalmers.se

CHALMERS

Project description

The unprecedented neutron flux at the engineering diffractometer BEER at ESS will enable in-situ diffraction to be performed during thermomechanical loading approaching industrial processes and/or service conditions. In order to fully exploit this possibility, computational tools capable of reverse modelling of competing deformation mechanisms in complex materials are required. Such models are not publicly available. The project will develop and implement a state-of-the-art elastic-viscoplastic self-consistent (EVPSC) crystal plasticity model for analysis and prediction of grain scale response in complex engineering materials during conditions of simultaneously varying load and temperature. In a separate project, this will be made publicly available as a user friendly web application through the ESS data management center. Notably, the models are equally applicable for experiments carried out at constant wavelength neutron sources and monochromatic or energy dispersive X-ray diffraction stations at synchrotrons.

Team

Chalmers University of Technology:

- Magnus Hörnqvist Colliander, Docent, senior researcher, Department of Physics
- Hongjia Li, Doctor, Postdoc
- Magnus Ekh, Professor, Industrial and Materials Sciences
- Fredrik Larsson, Professor, Industrial and Materials Sciences

Core deliverables

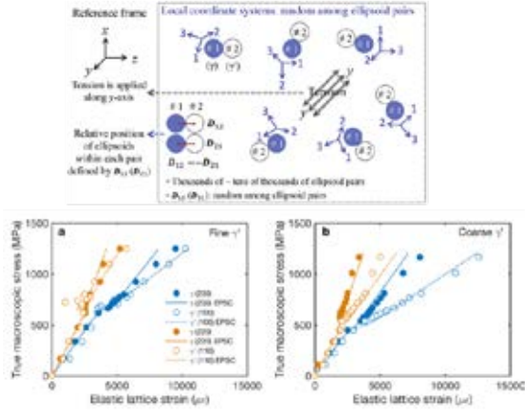
Development and implementation of a finite strain elastic-viscoplastic self-consistent crystal plasticity model for temperature dependent simulation of multiphase materials with or without crystallographic relationships and lattice coherency, including optimization engine for calibration against in-situ neutron scattering data.

Year

2017–2019

Total budget

EUR 200,000



Procurement code

- Information technology

ESS

BRIGHTNESS

Coordinating university: Mid Sweden University, www.miun.se

Project description

BrightnESS is a large infrastructure project within HORIZON2020. Part of the project concerned addressing the resolution challenge. In this activity, we developed neutron detectors based on MEIXPIX-type readout electronics using silicon sensors coated with a suitable neutron converter. Resolutions below 100 um can then be achieved.

Team

Mid Sweden University:

- Christer Fröjdh, Professor, radiation detection and imaging
- David Krapohl, Doctor. radiation detection and imaging

Core deliverables

Pixel detectors for high resolution neutron imaging.

Year

2016–2019

Procurement code

- Information technology
- Particle and photon detectors

ESS

COST-EFFECTIVE AND VERSATILE TESTBED FOR NOVEL NEUTRON DETECTORS

Coordinating university: Lund University, www.lu.se

Project description

ESS aspires to be the world's brightest neutron source. With this ambition comes the need for novel, highly sophisticated instrumentation able to handle record-breaking neutron fluxes. Such development, however, requires frequent and affordable access to neutrons.
This need is addressed by the Source Testing Facility (STF) at Lund University. Operated by the SONNIG group, the STF is a fully functioning user facility. It boasts a complete range of gamma-ray and neutron sources and is equipped with advanced nuclear physics infrastructure for characterizations of detectors. As there are no reactors or accelerators involved, the STF provides a round-the-clock available locale for prototype development and commissioning to its ESS users.

Team

Lund University, Division of Nuclear Physics:

- Kevin Fissum, Doctor, senior lecturer in nuclear physics
- Francesco Messi, Doctor, researcher in neutron instrumentation
- Hanno Perrey, Doctor, researcher in neutron metrology

Core deliverables

- Provide laboratory space
- Design and construction of the facility
- Purchasing of equipment
- Commissioning of infrastructure
- User support

Year

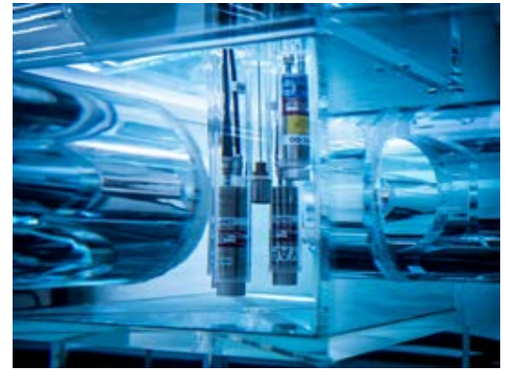
2015–

Total budget

EUR 400,000

Hyperlink

www.nuclear.lu.se/forskning/neutronfysik



Procurement codes

- Civil engineering, building and technical services
- Information technology
- Particle and photon detectors
- Optics and photons
- Gases, chemicals, waste collection and radiation equipment

ESS

DESIGN STUDY OF ACCUMULATOR RING

Coordinating university: Uppsala University, www.uu.se

UPPSALA UNIVERSITET

Project description

An EU/H2020 supported Design Study is being carried out with the objective to use the powerful ESS linear accelerator to generate a very intense neutrino beam, for the study of neutrino oscillations using a very large underground water Cherenkov neutrino detector. For this a ca 400 m circumference accumulator ring will be needed, with the purpose to compress the ESS linac pulse from 3 ms to 1.3 microsecond duration. The FREIA laboratory is leading the work to design this ring, which will contain magnets, vacuum chambers, collimators and other beam transport equipment. The design work, which will be based on computer simulations, is made particularly challenging by the exceptionally high beam charge to be stored in the accumulator ring.

Team

Uppsala University, Department of Physics and Astronomy, FREIA:

- Maja Olvegård, Researcher
- Tord Ekelöf, Project Manager
- Ye Zou, Postdoc

CERN:

- Elena Wildner
- Horst Schönauer

IPHC Strasbourg:

- Elian Bouquerel

Core deliverables

- Formulation of the ESSnuSB accumulator requirements
- Elaboration of the ESSnuSB accumulator design using different computer codes to simulate the performance iteratively
- Written report on the optimized ESSnuSB accumulator design

Potential industry involvement

Scanditronix

Year

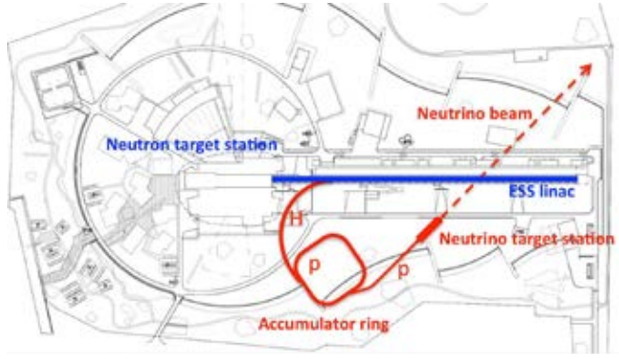
2017–2021

Total budget

EUR 500,000

Hyperlink

http://essnusb.eu/site/wp3



Procurement codes

- Electrical engineering and magnets
- Vacuum and low temperature
- Particle and photon detectors

ESS

GRID AND APERTURE MONITOR ELECTRONICS

Coordinating university: Lund University, Faculty of Engineering, www.lth.se

LUNDS UNIVERSITET
Lunds Tekniska Högskola

Project description

The European Spallation Source (ESS) is generating neutrons by hitting a tungsten target with proton beam pulses. The energy of the pulses needs to be spread out in order not to destroy the target. This is done by a rastering system. Crucial components are the measurement devices used to make sure that the beam is spread out sufficiently and that it is still in the right place. The task of Lund University is to design the electronic part of these measurement systems, including the algorithms that analyze the position of the beam and reports the results to the ESS control and protection systems. This places high demand on accuracy and reliability on the system developed.

Team

Lund University: Faculty of Engineering:

- Anders J Johansson, Docent, RF and accelerator systems, communications engineering,
- Markus Törmänen, Docent, RF electronincs, electrical engineering,
- Liang Liu, Docent, high speed signal processing, communications engineering

Core deliverables

- System design and requirement gathering
- Electronic acquisition hardware design
- High speed data analysis in FPGA hardware
- System integration and commissioning

Years

2018–

Total budget

EUR 130,000

Collaborations

- Lund University
- ESS (ERIC)
- Institute of Modern Physics, China
- Japan Proton Accelerator Research Complex, Japan

Procurement code

- Electronics and radio frequency Information technology

ESS

HIGH-RATE READ-OUT ELECTRONICS AND DATA ACQUISITION SYSTEM

LUNDS UNIVERSITET

Coordinating university: Lund University, www.lu.se

Project description

The novel neutron detectors developed for reflectometry at ESS require dedicated high-speed electronics as well as custom-made data-acquisition (DAQ) software to process and store the record-breaking amount of data produced at such instruments. The SONNIG group of Lund University, in collaboration with the Detector Group of ESS and the Data Management and Software Centre of ESS, have been assigned the task of designing and commissioning a high-performing DAQ system.
Lund University has delivered front-end electronics capable of high rates as well as a scalable and modular DAQ software to acquire and save data almost one thousand times faster than the state-of-the-art in the field.

Team

Lund University, Division of Nuclear Physics:
- Francesco Messi, Doctor, Researcher
- Hanno Perrey, Doctor, Researcher

ESS:
- Francesco Piscitelli, Doctor, Detector Scientist

Niels Bohr Institute
- Troels Blum, Doctor, Researcher

Core deliverables

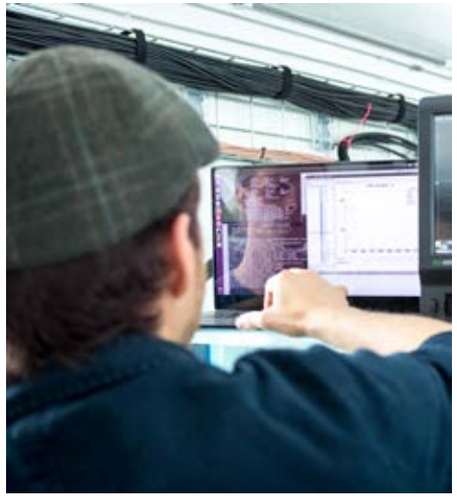
- Design, production and commissioning of electronics cards
- Conceptualization and implementation of software
- Providing development resources
- Integration and commissioning of complete systems

Year

2018

Total budget

EUR 500,000



Procurement Code
- Electronics and radio frequency
- Information technology

ESS

LOW-LEVEL RF SYSTEM

LUNDS UNIVERSITET
Lunds Tekniska Högskola

Coordinating university: Lund University, Faculty of Engineering, www.lth.se

Project description

We have designed and developed the low-level RF system for ESS, which is the system that controls the acceleration of the particles. It is a very sensitive process, which requires the highest precision in all parts of the design, both electronics and software. After an in-depth analysis of the requirements and the solutions used at other facilities, we designed a tailored solution for ESS. To fulfill all requirements, including availability, we required newly developed hardware. This was developed in collaboration with our partners in Poland, Germany and Spain, thanks to the in-kind form of the ESS project. During the whole process, the distributed development process has been coordinated by LU. Today the system is in production and will be installed in 2019.

Team

Lund University, Faculty of Engineering,
- Anders J Johansson, Docent, RF system design, LLRF systems
- Bo Bernhardsson, Professor, automation control
- Markus Törmänen, Docent, RF design
- Anders Svensson, M.Sc., RF electronics
- Olof Troäng, M.Sc., control for LLRF systems

Core deliverables

- System design
- Automatic control algorithms
- Test benches
- LLRF test systems
- Project coordination

Industry involvement

Struck

Years

2011–2019

Total budget

EUR 4 million

Collaborations

- Lund University:
- The Polish Electronics Group
- DESY
- ESS Bilbao

Procurement codes
- Electronics and radio frequency
- Information technology

ESS

MASTER OSCILLATOR FOR ESS

Coordinating university: Lund University, Faculty of Engineering, www.lth.se

LUNDS UNIVERSITET
Lunds Tekniska Högskola

Project description

To work properly the European Spallation Source is dependent on accurate timing and synchronization. The accelerator is pulsed 14 times a second, and every part of the 600 meter machine must work in pico-second synchronization with the internal structure of the pulses. In addition, the target wheel and the scientific experimental stations must also be synchronized to the pulses. Lund University developed the timing strategy for ESS, and have designed the master oscillator that will drive all the different timing systems utilized. This includes a specially designed dielectric resonator housed in a cavity delivered by the local industry, and the electronic circuitry needed to run it and to distribute the signals to the facility.

Team

Lunds universitet, Faculty of Engineering:

- Anders J Johansson, Docent, RF system design
- Anders Svensson, Master of science, RF electronics

Core deliverables

- Design of master oscillator
- Protoype and tests

Industry involvement

Cervitrol

Year

2012-2018

Total budget

EUR 50,000

Procurement Code

Electronics and radio frequency

ESS

MODULATOR DESIGN AND DEVELOPMENT

Coordinating university: Lund University, Faculty of Engineering, www.lth.se

LUNDS UNIVERSITET
Lunds Tekniska Högskola

Project description

ESS will be the world's most powerful neutron source. This source has at its heart a linear accelerator which fires protons at a tungsten target, producing the powerful neutron beam. The linear accelerator is fed, at the first stage of the powering chain, by 33 modulators which have to deliver, each one, 11,5 megawatts peak and 600 kilowatts average power, at a rate of 14 pulses per second. While this should be possible by scaling up standard technology, it quickly became clear that there was not enough budget and space. Furthermore, the impact of such huge amount of pulse power in the local electrical power network in Lund municipality would have been seriously affected by flicker and harmonic distortions.

The research group, led by Carlos Martins, performed critical work together with the power converter team at ESS, designing, testing and commissioning critical parts for the ESS modulator following a novel topology. The final engineered solution reduced budgeted costs of modulator components by 70% and the space requirements by 80%, while factors like reliability, the quality of both the output pulse and of the power absorbed from the electrical network reached unprecedented performance.

Team

Lund University, Faculty of Engineering:

- Carlos Martins, Senior lecturer, power converters high-voltage modulator design, Industrial electrical engineering and automation
- Mats Alaküla, Professor, power converters high-voltage modulator design, industrial electrical engineering and automation
- Max Collins, Doctoral student, Industrial electrical engineering and automation
- Avo Reinap, Assistant professor, power converters high-voltage modulator design, Industrial electrical engineering and automation

Core deliverables

- High voltage power electronics
- Power converters for physics applications
- New solid state high power modulator system design
- High voltage pulse transformer design
- Complete prototype system design and construction
- Test, commissioning and verification
- Full system design specifications, build-to-print instructions, procurement documentation, follow up of series production contract

Industry involvement

AQ Elautomatik, Herman Anderssons Plåt, Plåtmekano, Carlsson & Möller

Year

2013–2018

Total budget

EUR 1.2 million

Hyperlink:

https://europeanspallationsource.se/article/how-do-you-power-worlds-most-powerful-linacs

Procurement codes

Electrical engineering and magnets
Electronics and radio frequency
Mechanical engineering and raw materials

ESS

NEUTRON REFLECTOMETRY DETECTORS

Coordinating university: Lund University, www.lu.se

LUNDS UNIVERSITET

Project description

ESS will be the most powerful neutron source in the world. The unprecedented neutron flux has made the development of new detector technology necessary. In particular, Neutron Reflectometry is facing a huge challenge: the required instantaneous rate capability is on the order of one thousand times higher than what current state-of-the-art detectors can achieve, and the spatial resolution needs to improve fourfold.

After three years of intense development, the Multi-Blade detector fulfills all the above requirements and has been accepted to be the detector used on the two reflectometry instruments built at ESS: ESTIA and FREIA.

Team

Lund University, Division of Nuclear Physics:
- Francesco Messi, Doctor, Researcher

ESS:
- Francesco Piscitelli, Doctor, Detector Scientist

University of Perugia:
- Giacomo Mauri, Master of Science

Core deliverables

Neutron detector for cold and thermal neutrons

Year

2016-2020

Total budget

EUR 400,000

Hyperlinks

- Journal of Instrumentation, vol. 13, no. 03, p. P05009, 2018. doi:10.1088/1748-0221/13/05/P05009
- Journal of Instrumentation, vol. 13, no. 03, p. P03004 2018. doi:10.1088/1748-0221/13/03/P03004

Procurement code
- Particle and photon detectors

ESS

PHASE REFERENCE LINE

Coordinating university: Lund University, Faculty of Engineering, www.lth.se

LUNDS UNIVERSITET
Lunds Tekniska Högskola

Project description

The linear accelerator at ESS is dependent on high precision synchronization between the different acceleration stages. The stages have to be within 0.1 degree of each other at 704 MHz, which equals sub-picoseconds accuracy. One important part of achieving this is to have a highly stable time, or in this case phase, reference distribution. This is done by a thermally controlled coaxial cable where we have designed the algorithms and thermal system that keeps it to within 0.1 degree Celsius for a length of 600 meters.

Team

Lund University, Faculty of Engineering:
- Bo Bernhardsson, Professor
- Björn Olofsson, Professor
- Pontus Andersson, Master of Science
- Rolf Johansson, Professor

ESS:
- Rihua Zeng

Core deliverables

- Design of thermal system
- Design of automatic control algorithms
- Test bench and tests

Industry involvement

- Eurotherm
- Beckhoff
- Pentronic AB
- KIMA

Years

2015–2017

Total budget

EUR 65,000

Procurement codes
- Electronics and radio frequency
- Mechanical engineering and raw materials

ESS

SAMPLE ENVIRONMENT FOR IN-SITU ULTRA-HIGH TEMPERATURE MECHANICAL TESTING

CHALMERS

Coordinating university: Chalmers University of Technology, www.chalmers.se

Project description

There is a large societal need for structural materials capable of withstanding temperatures in the ultra-high temperature (UHT) range, here defined as temperatures above 1100°C. Development of such materials poses significant scientific and technological challenges and in order to address these challenges, it is vital to understand the deformation mechanisms at the operating temperatures. The unprecedented neutron flux and intended detector combination at the engineering diffractometer BEER at ESS will provide a unique tool for this purpose. Within the project, a sample environment, in the form of a furnace adapted for mounting on the BEER stress rig, will be developed. The furnace will allow in-situ mechanical testing during neutron diffraction experiments to be performed at temperatures up to at least 1600°C, and will be a part of the standard sample environment pool for BEER.

Team

Chalmers University of Technology:
- Magnus Hörnqvist Colliander, Docent, senior researcher in physics

Linköping University:
- Ru Lin Peng, Professor, Engineering Materials

KTH Royal Institute of Technology:
- Peter Hedström, Docent, Materials Science and Engineering

Nucelar Physics institute Prague:
- Premysl Beran, Doctor, Instrument Scientist at BEER at ESS

Year

2017–2020

Total budget

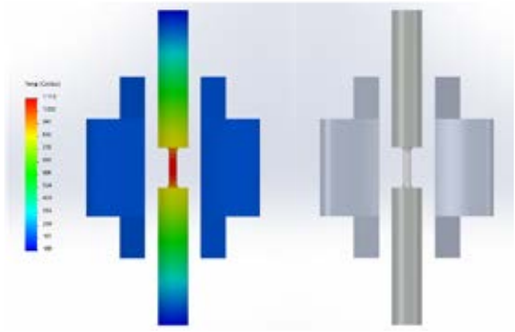
EUR 940,000

Collaborations

- Conceptual and detailed design of sample environment
- Manufacturing and testing of sample environment prototype
- Delivery of final hardware to BEER at ESS

Universities involved

- Chalmers University of Technology
- Linköping University
- KTH Royal Institute of Technology
- Nucelar Physics Institute Prague



Procurement code

Mechanical engineering and raw materials

ESS

TEST OF THE ESS HIGH VOLTAGE PULSE MODULATOR

UPPSALA UNIVERSITET

Coordinating university: Uppsala University, www.uu.se

Project description

The high beta cavities of ESS use Klystrons as power sources. The klystrons are powered by HV modulators. We will work towards improving the overall reliability of the system.

Team

Uppsala University, FREIA:
- Rolf Wedberg, Research engineer, Department of Physics and Astronomy
- Dragos Dancila, Docent, Department of Engineering Sciences, Solid State Electronics
- Tord Peterson, Research engineer, Department of Physics and Astronomy
- Long Huang Duc, PhD student, Department of Engineering Sciences, Solid State Electronics
- Han Li, Researcher Department of Physics and Astronomy

Core deliverables

- System design
- System characterization

Industry involvement

Ampegon

Year

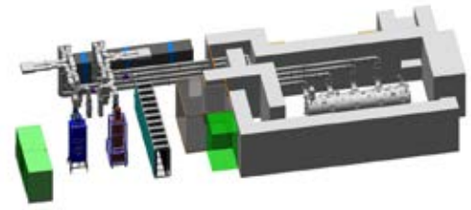
2017–

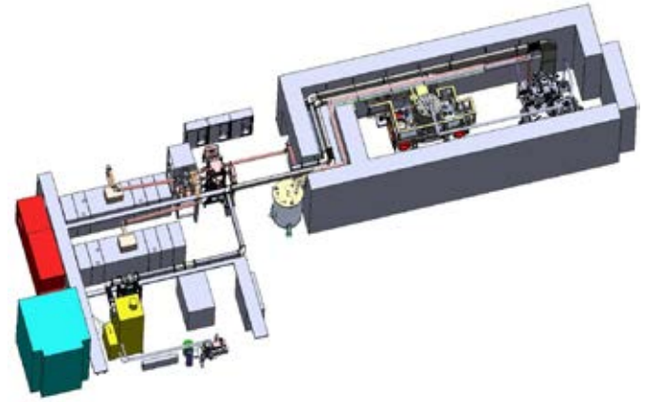
Total budget

EUR 1 million

Collaboration

- Uppsala University
- Lund University





Procurement code

Electronics and radio frequency

ESS

TEST OF THE FAST-NEUTRON ATTENUATION OF NOVEL SHIELDING MATERIALS

LUNDS UNIVERSITET

Coordinating university: Lund University, www.lu.se

Project description

The process of neutron creation at ESS results in an intensive radiation field consisting of many different types of particles. Therefore, effective shielding is absolutely essential at such facilities for both radiation safety and for minimizing unwanted background noise in the scientific instruments.

Specialized bulk shielding concretes have been developed at ESS for this purpose. The materials were then tested at the Source Testing Facility at Lund University. The specialized infrastructure present there allowed to characterize the energy-dependent attenuation of fast neutrons by the different concretes as well as by reference samples. The results were then used to successfully validate simulations of the materials.

Team

Lund University, Division of Nuclear Physics:

- Kevin Fissum, Doctor, Senior Lecturer in Nuclear Physics
- Hanno Perrey, Doctor, Researcher in Neutron Metrology

ESS:

- Douglas DiJulio, Doctor, Radiation Physicist

Core deliverables

- Design and tuning of the experimental setup
- Performing the measurement
- Data analysis

Year

2016

Total budget

EUR 3,500

Hyperlink

https://doi.org/10.1016/j.nima.2017.03.064

Procurement codes

- Information technology
- Particle and photon detectors

ESS

TESTING OF THE ESS SUPERCONDUCTING ELLIPTICAL CAVITY

UPPSALA UNIVERSITET

Coordinating university: Uppsala University, www.uu.se

Project description

ESS will adopt elliptical multi-cell superconducting cavities with a beta value of 0.86 to accelerate the proton beam up to 2 GeV at the last section of the linac. A 5-cell high-beta cavity for the ESS project was tested with high power at FREIA Laboratory. A pulse mode test stand based on a self-excited loop was used in this test. The qualification of the cavity package involved a 5-cell elliptical cavity, a fundamental power coupler, a cold tuning system, LLRF system and an RF station. These tests represented an important verification before the series production. Fruitful studies of the test chain, RF conditioning, high power performance and experience of this cavity have been done in this test.

Team

Uppsala University:

- Han Li, researcher RF and accelerator systems
- Rolf Wedberg, Researcher high power RF system
- Rocio Santiago-Kern, Engineer researcher cryogenic system
- Tor Lofnes, Engineer LLRF system

Core deliverables

- Test stand based on self-excited loop development
- Test method and algorithm design
- Data acquisition and control software development
- Coupler RF conditioning
- RF test in high vacuum and cryogenic system
- Data analysis
- Test result report

Year

2018

Total budget

EUR 50,000

Collaborations

- Uppsala University
- Saclay

Procurement code

- Electrical engineering and magnets
- Electronics and radio frequency

ESS

TESTING OF THE ESS TETRODE 352 MHZ RADIOFREQUENCY POWER SOURCE

UPPSALA UNIVERSITET

Coordinating university: Uppsala University, www.uu.se

Project description

The 26 spoke cavities of ESS are powered by tetrode amplifiers at 352 MHz.
In Freia Laboratory we have two prototypes from different manufacturers to work with.
We will describe the modifications which had to be made and what the consequence it will make.

Team

Uppsala University, FREIA:

- Rolf Wedberg, Research engineer Department of Physics and Astronomy
- Dragos Dancila Docent, Department of Engineering Sciences, Solid State Electronics
- Tord Peterson, Research engineer, Department of Physics and Astronomy
- Long Huang Duc, PhD student Department of Engineering Sciences, Solid State Electronics
- Han Li, Researcher, Department of Physics and Astronomy

Core deliverables

System design

Industry involvement

- Thales
- Itelco
- DB Elletronica

Year

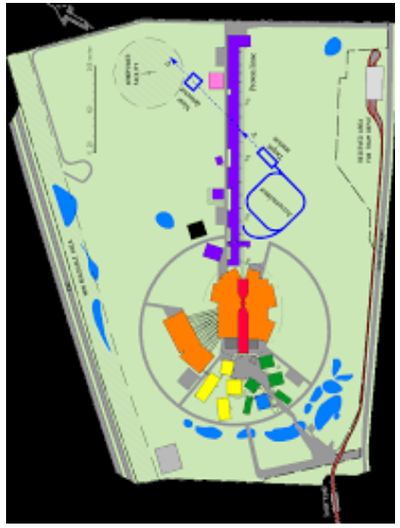
2017–

Total budget

EUR 1 million

Collaboration

- Uppsala University
- Lund University



Procurement code

Electronics and radio frequency

ESS

TESTING OF THE ESS SUPERCONDUCTING SPOKE CAVITY PROTOTYPE

UPPSALA UNIVERSITET

Coordinating university: Uppsala University, www.uu.se

Project description

ESS is an accelerator-driven neutron spallation source, which will use spoke cavities in its superconducting linac. Since this type of cavity is new and the study of its performance is still ongoing, it becomes the key challenge of the whole project. The testing of the double-spoke prototype cavity for the ESS project at high power has been conceded to Uppsala University, Sweden. The qualification of the prototype cavity, involving a superconducting spoke cavity, a fundamental power coupler, cryogenic system, LLRF system and RF station, represents an important verification before the module assembly. The study of the test configuration, RF conditioning history and first high power performance of this cavity provides an important input for ESS.

Team

Uppsala University:

- Han Li, Researcher RF and accelerator systems
- Rolf Wedberg, researcher high power RF system,
- Rocio Santiago-kern, Engineer researcher cryogenic system
- Tor Lofnes, Engineer LLRF system

Core deliverables

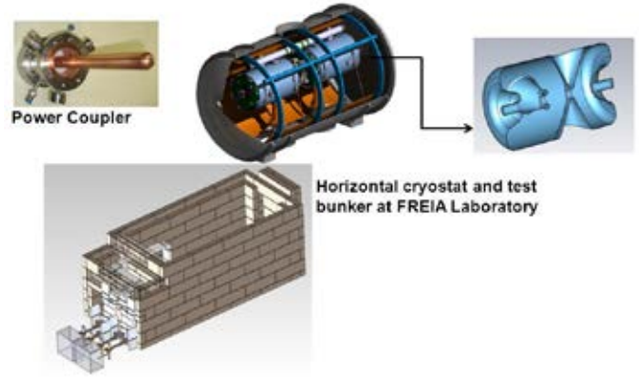
- Test stand design and building up
- Test method and algorithm design
- Data acquisition and control software development
- Coupler RF conditioning
- RF test in high vacuum and cryogenic system
- Data analysis
- Test result report

Year

2017

Total budget

EUR 70,000



Procurement codes

Electronics and radio frequency
Mechanical engineering and raw materials

FAIR

CONTRIBUTION TO THE CALIFA BARREL R3B EXPERIMENT AT FAIR

LUNDS UNIVERSITET

Coordinating university: Lund University, www.lu.se

Project description

This project concerns investment for the CALIFA barrel detector of the R3B experiment at FAIR (the Facility for Antiproton and Ion Research) in Darmstadt, Germany. In 2010 Sweden signed the FAIR agreement and thereby became member of the new facility. The laboratory is planned to be the main user laboratory for Swedish nuclear physics for the coming 15-20 years. This specific application comes as part of the in-kind contributions to detector systems at FAIR that has been developed in dialogue between the Swedish FAIR consortium (SFAIR) and the research council. It consists of a contribution to scintillator crystals and readout devices to the barrel part of the calorimeter for the R3B experiment. The technical design report (TDR) for the detector was completed in 2011 following a period of R&D on detector design. The Lund, Chalmers and KTH groups are the main Swedish participants in this detector development program where the Lund group has the responsibility in Sweden for scintillator and readout devices for the CALIFA barrel. The main purpose of CALIFA is to detect charged particles and gamma-rays from reactions with exotic ion beams at relativistic energies. The CALIFA barrel consists of CsI(Tl) crystals of varying geometry coupled to readout devices. The funding requested in this application will be dedicated to purchase of detector units as described in the TDR. FAIR is currently under construction and this investment is part of the Swedish contribution to FAIR.

Team

Lund University:
- Joakim Cederkäll, Professor, Nuclear physics, Faculty of science, Department of physics,
- Bo Jakobsson, Professor, Nuclear physics, Faculty of science, Department of physics,
- Pavel Golubev, Senior Lecturer, Nuclear physics, Faculty of science, Department of physics

KTH Royal Institute of Technology:
- Torbjörn Bäck, Associate professor, nuclear physics

Chalmers University of Technology:
- Thomas Nilsson, Professor, subatomic and plasma physics, Department of physics

Year

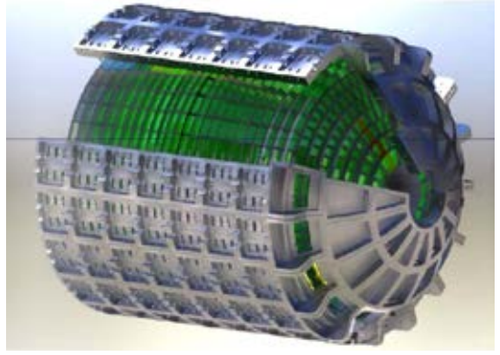
2013-2017

Total budget

EUR 340,000

Collaboration

- Lund University
- KTH Royal Institute of Technology
- Chalmers University of Technology



Procurment Codes

Particle and photon detectors
Optics and photons

FAIR

ELECTROMAGNETIC CALORIMETER FOR THE PANDA EXPERIMENT

UPPSALA UNIVERSITET

Coordinating university: Uppsala University, www.uu.se

Project description

PANDA is an experiment at FAIR, Darmstadt, Germany, which uses a beam of antiprotons to study the strong force. A key element of the PANDA detector is its electromagnetic calorimeter (EMC) consisting of about 16 000 PWO crystals to measure photons from antiproton induced interactions. Uppsala is responsible for developing and producing read out electronics for the EMC:
- Sampling analog-to-digital converters (SADCs) with built-in intelligence for feature extraction from the signals (time and energy) using FPGAs.
- Data Concentrators that synchronize the data from the SADCs, build events and perform first level analysis. These units are also based on FPGAs

Team

Uppsala University:
Pawel Marcienewski, Doctor, digital electronics design

Core deliverables

- Electronics hardware design, testing and production.
- Radiation resistance tests of electronics
- Electronic acquisition hardware design
- High speed data analysis in FPGA hardware
- System integration and commissioning

Industry involvement

- Semicon
- Crytur

Year

2016–

Total budget

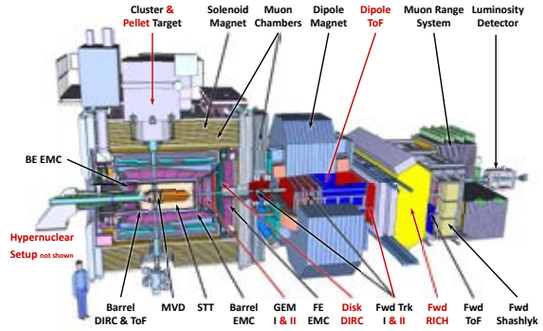
EUR 2,6 million

Collaboration

- Uppsala University
- Stockholm University

Hyper link

https://panda.gsi.de/article/electromagnetic-calorimetry



Procurement codes

Electronics and radio frequency
Information technology
Particle and photon detectors

FAIR

PHOTON- AND PARTICLE CALORIMETER CALIFA – FRONT END SYSTEM

CHALMERS

Coordinating university: Chalmers University of Technology, www.chalmers.se

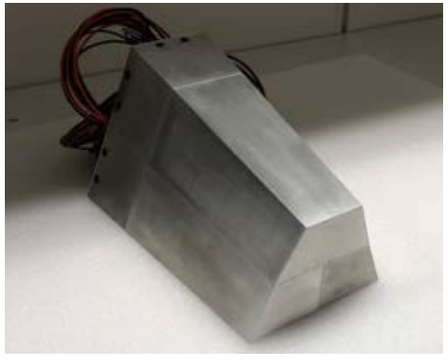
Project description

The CALIFA photon and particle calorimeter is a part of the experimental set up for Reactions with Relativistic Radioactive Beams (R3B) at the FAIR facility. It is one of the key detectors and will detect gamma rays and light charged particles. Chalmers is contributing R&D on the forward end-cap of the CALIFA – including the hybrid LaBr3-LaCl3 phoswich detector and the associated slow control and readout electronics. The work included the technical design, prototyping, pre-series, procurement and delivery of the system.

Team

Chalmers University of Technology:

- Thomas Nilsson, Professor, experimental subatomic physics
- Håkan T. Johansson, Research engineer, advanced software and computing hardware
- Andreas Martin Heinz, Associate professor subatomic physics



Core deliverables

- Research and Development of detector system in line with scientific requirements
- Detector specification and design
- System integration
- Detector system production
- DAQ and controls, signal processing computers/FPGAs
- Integration, prototyping, pre-series, procurement and delivery of system

Industry involvement

Saint-Gobain Cristeaux et Detecteurs

Year

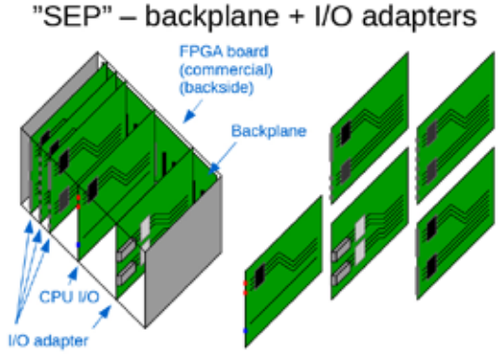
2010-2023

Total budget

EUR 850,000

Collaborations

- Chalmers University of Technology
- SFAIR consortium



Procurement codes

- Electronics and radio frequency
- Information technology
- Particle and photon detectors

ILL

SUPER ADAM @ ILL

UPPSALA UNIVERSITET

Coordinating university: Uppsala University, www.uu.se

Project description

The Super ADAM instrument is a state of the art neutron reflectometer located at the highest neutron flux research reactor worldwide. At the facility scientists conduct both cutting edge fundamental science and applied research for industrial projects.
Super ADAM offers unique information not available by any other research tool in such areas as:

- magnetic layers, superlattices, heterostructures and magnetic meta-materials
- self-assembly of surfactants, polymers, lipids and proteins at solid and liquid interfacets
- rearrangement processes in thin films (e.g. diffusion, annealing, exchange, swelling etc.)
- encapsulation in and release from thin films e.g. drug delivery materials
- chemical and biochemical surface interactions and reactions
- hydrogen in metals
- ionic and magnetic liquids

Team

Uppsala University:

- Alexei Vorobiev, Doctor. infrastructure manager,
- Björgvin Hjörvarsson, Professor, magnetism, hydrogen in metals, AM,

Lund University, Faculty of Engineering:

- Tommy Nylander, Professor, soft matter and bio-science

Linköping University:

- Jens Birch, Professor, advanced materials, thin films

Core deliverables

Unique information on structure (e.g. composition, thickness and roughness, density, interfusion, crystalline state, magnetic state) and properties (e.g. phase transitions, reactivity, durability) of:

- solid-state and soft-matter ultrathin films and multilayers
- bared solid-liquid and solid-solid interfaces
- 2D artificially patterned and self-ordered structures

Year

2013–

Total budget

EUR 10 million

Collaborations

- Uppsala University
- Lund University
- Linköping University

Hyperlinks

- https://www.ill.eu/users/instruments/instruments-list/superadam/description/instrument-layout/
- http://www.physics.uu.se/research/materials-physics+/super-adam/

Procurement codes

- Electrical engineering and magnets
- Mechanical engineering and raw materials

ITER

ADDITIVE MANUFACTURING FOR FABRICATION OF 316L- GRADE COMPONENTS

CHALMERS

Coordinating university: Chalmers University of Technology, www.chalmers.se

Project description

The main objective is to demonstrate how a subdivision of a final structure could be produced in stainless steel 316L(N)-IG-grade with electron beam melting (EBM) followed by post-EBM hot isostatic pressing (HIP). As alternative way, selective melting (LS/SLM) has also been explored. The characteristics of raw materials and processing have been explored in detail and the quality control of the powder material, process and optimized parameters to achieve a fully dense material have been clarified. A large number of block specimens have been fabricated and delivered for testing. The approach to manufacture a large section by sub-division and subsequent joining using hot isostatic pressing (HIP) has been explored. The surface preparation and optimization of post-EBM joining of parts by HIP has been addressed and parameters to achieve successful joints with good metallurgical bonding have been developed.

Team

Chalmers University of Technology:
- Lars Nyborg, Professor, specialist in materials design, powder technology and additive manufacturing, surface technology
- Eduard Hryha, Professor, specialist in materials design, powder technology and additive manufacturing, divison of materials and manufacturing, industrial and materials science

Mid-Sweden University:
- Lars-Erik Rännar, Docent, specialist in EBM technology, additive manufacturing, Quality management and mechanical engineering

Stockholm University:
- Zhijian James Shen, Professsor, specialist in SLM technology, department of materials and environmental chemistry

Swerim:
- Hans Magnusson, Specialist in HIP and powder technology, materials modelling

Core deliverables

- Certification and assessment of high quality metal powder for intended application
- Development and delivery of test specimens for mechanical testing and radiation testing
- Development of design for AM-fabrication of intended product for ITER
- Process development and process optimization for material by AM
- HIP process and surface preparation for optimized HIP-joining of AM-fabricated specimens developed
- Scientific publications
- Patent application

Industry involvement

- Carpenter Powder Products
- Sandvik Materials Technology

Year

2015-2017

Total budget

EUR 510,000

Collaborations

- Chalmers University of Technology
- Mid Sweden University
- Stockholm University
- Swerim

Procurement code

Mechanical engineering and raw materials

ITER

ITERIS – DESIGN AND IMPLEMENTATION OF AN INTEGRATED MODELLING INFRASTRUCTURE

CHALMERS

Coordinating university: Chalmers University of Technology, www.chalmers.se

Project description

ITER is the next generation of fusion experiments and is aimed at demonstrating the feasibility of fusion energy as a viable energy source for the future. It is currently under construction with a first plasma expected 2025. The ITERIS consortium was set up to bring the long-term European activity on simulation and modeling as a basis for the future ITER analysis environment. The project defines the data model for ITER, the related access tools and implements a workflow orchestration tool for developing simulations on the modelling platform.
The prototype installation has now been adopted by the ITER organization and is promoting this for developments and use of the global fusion community with the continued support from the consortium.

Team

Chalmers University of Technology:
Pär Strand, Professor, specialist in plasma physics and fusion, plasma physics and fusion energy group, astronomy and plasma physics, space earth and environment

Core deliverables

- Schema for data dictionary
- Database structure and access tools
- Workflow orchestration and workflow components
- Physics modules

Industry involvement

Areva

Year

2011-

Total budget

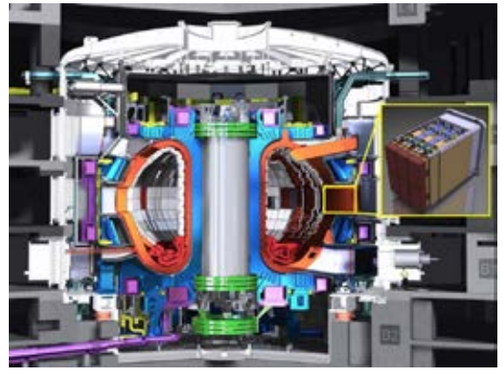
EUR 1,7 million

Collaborations

- CEA
- Chalmers
- EPFL

Hyperlink

http://iopscience.iop.org/article/10.1088/0029-5515/55/12/123006



Procurement codes

Information technology

MAX IV Laboratory

DETECTOR FOR SIMULTANEOUS X-RAY DIFFRACTION AND ABSORPTION SPECTROSCOPY

Coordinating university: Chalmers University of Technology, www.chalmers.se

Project description

The Balder beamline is designed for X-ray absorption and emission spectroscopy in the medium and hard X-ray energy range, i.e., 2.4-40 keV. The high brilliance from the 3 GeV storage ring in combination with the beamline construction allows for time resolved measurements down to sub-second time resolution to be performed in operando conditions. The implementation of an additional two-dimensional detector on a robotic arm will provide diffraction (long-range ordering) information truly simultaneous with chemical state and fine structure information for many different materials. The scattered intensity is monitored when the energy is scanned over an absorption edge such that the diffraction becomes anomalous. It is thus possible to determine which of the elements in a material that contribute to certain diffraction peaks. Knowledge about the long-range order also paves the way for more thorough analysis of chemical state and fine structure of complex materials.

Team

Chalmers University of Technology:

• Per-Anders Carlsson, Professor, Materials and Surface Science, Department of Chemistry and Chemical Engineering

Lund University:

- Konstantin Klementiev, Doctor, Beamline Manager at Balder, MAX IV
- Justus Just, Doctor, postdoc at Balder, MAX IV

Core deliverables

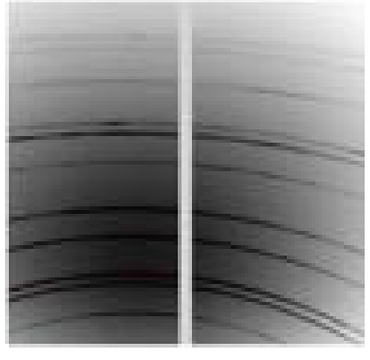
- Specification and purchasing of 2D detector
- Assembling of 2D detector and robotic arm incl. software control
- Software development for synchronous control and acquisition
- Demonstration of synchronous measurements on catalytic materials

Year

2018–2020

Total budget

EUR 500,000



First diffraction image of a Cu-block measured at Balder.

Procurement code

Particle and photon detectors

MAX IV Laboratory

HIGH FIELD/HIGH GRADIENT MAGNETS

Coordinating university: Lund University, www.lu.se

Project description

The MAX IV 3 GeV electron storage ring in Lund, Sweden, represents the new generation of light sources that uses a 20-fold 7-bend achromat lattice to achieve a bare lattice emittance of 330 pm in a relatively short circumference of 528 m. The large number of strong bending magnets per achromat requires a compact magnet design that is achieved by use of small aperture (Ø 25 mm) magnets integrated into one common block i.e. each achromat has 7 magnet blocks.

The project aims at demonstrating the feasibility of use small aperture (Ø 11 mm) and high field/high gradient permanent/hybrid magnets in frame of the upgrade concept for a future diffraction-limited light sources within the constraints of the existing MAX IV 3 GeV ring tunnel.

Team

Lund University, MAX IV Laboratory:

- Alexey Vorozhtsov, Magnet engineer

Core deliverables

Electromagnetic & mechanical design, manufacturing and magnetic measurements of the following hybrid magnet prototypes:

- Gradient dipole: aperture H ≥ 15 mm, yoke length ≤ 300 mm, field strength B_0=(0.5-0.6) T, gradient up to 70 T/m
- Quadrupole: aperture ø=(11/12) mm, yoke length ≤ 100 mm, gradient up to 250 T/m
- Sextupole: aperture ø ≥ 15 mm, yoke length ≤ 150 mm, gradient B″/2 up to 20 kT/mm2
- Magnet block containing the magnets listed above.

Potential industry involvement

- Scanditronix
- Danfysik

Year

2019-2021

Total budget

EUR 300,000

Potential collaborations

Synchrotron SOLEIL, France

ISA, Centre for Storage Ring Facilities, Denmark

Hyperlinks

https://www.maxiv.lu.se/about-us/governance/vision-goals-values/

Procurement codes

Electrical engineering and magnets

Mechanical engineering and raw materials

Max IV Laboratory

SAMPLE ENVIRONMENT FOR COMBINED NANO-MECHANICAL TESTING AND NANODIFFRACTION

CHALMERS

Coordinating university: Chalmers University of Technology, www.chalmers.se

Project description

The purpose of the project is to develop and implement a sample environment for in-situ nanomechanical testing at MAX IV. The set-up will be based on a nanoindenter instrument intended for in-situ operation in scanning electron microscopes (SEMs), which will be adapted for use on synchrotron beam lines. The sample environment can be transferred to SEMs in order to verify experimental setups before attempts at synchrotron beamlines, and to perform correlative experiments. The setup will be flexible to allow testing of different materials (metals, ceramics, polymers and biological materials such as bone and wood), and the modular design will allow upgrades to accommodate e.g. tensile testing as well as high-temperature, cryogenic and dynamic deformation conditions. The instrument will be part of the standard sample environment pool at MAX IV.

Team

Chalmers University of Technology:

- Magnus Hörnqvist Colliander, Docent, senior researcher in physics

Lund University, MAX IV Laboratory:

- Gudrun Lotze, Doctor, Postdoc sample environment and detector systems
- Stefan Carlson, Doctor, group manager sample environment and detector systems
- Gerardina Carbone, Doctor, instrument scientist at Nano MAX beamline

Core deliverables

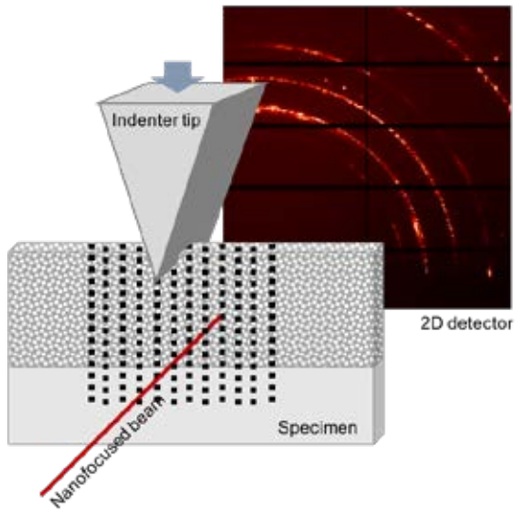
- Definition of requirements and specifications of in-situ nanoindenter equipment.
- Definition and development of approach for integration into MAX IV control and data management system
- Acquisition and installation of nanoindenter, including commissioning at both NanoMAX beamline and Chalmers SEMs.
- Demonstration of correlated tests at MAX IV and Chalmers.

Year

2017–2019

Total budget

EUR 370,000



Procurement codes

Mechanical engineering and raw materials

MAX IV Laboratory

THE VACUUM SYSTEM OF MAX IV 3 GEV STORAGE RING

LUNDS UNIVERSITET

Coordinating university: Lund University, www.lu.se

Project description

Some of the characteristics of recent ultra-low-emittance (fourth generation) storage-ring designs and possibly future diffraction-limited storage rings are a compact lattice combined with small magnet apertures. Such requirements present a challenge for the design and performance of the vacuum system. The vacuum system should provide the required vacuum pressure for machine operation and be able to handle the heat load from synchrotron radiation. Small magnet apertures result in the conductance of the chamber being low. One way to provide the required vacuum level via distributed pumping, which can be realized by the use of a non-evaporable getter (NEG) coating of the chamber walls. In addition, the chamber walls can work as distributed absorbers if they are made of a material with good thermal conductivity, and distributed cooling is used at the location where the synchrotron radiation hits the wall. The vacuum system of the 3 GeV storage ring of MAX IV is unique, it is has a very small aperture, combined with being 100% NEG coated, a feature which is the first to be implemented in fourth generation storage rings.

Team

Lund University, MAX IV Laboratory:

- Eshraq Al-Dmour, Vacuum engineer
- Marek Grabski, Vacuum engineer

Core deliverables

- Implementation of small vacuum aperture all over the storage ring.
- 100% NEG coating as source of pumping down.
- Realizing the technique for the power removal from synchrotron radiation on the chambers wall.

Industry involvement

FMB Berlin

Year

2012-2014

Total budget

EUR 6 million

Collaborations

- Lund University
- CERN
- ESRF
- ALBA

Hyperlinks

www.maxiv.lu.se

Procurement Code

Mechanical engineering and raw materials

Vacuum and low temperature

Max IV Laboratory

VERITAS

Coordinating university: Uppsala University, www.uu.se

UPPSALA UNIVERSITET

Project description

The project concerns the design and construction of a high resolution soft x-ray emission beamline for material science at MAX IV. Key parts of the project concern development of components for improved performance, both in collaboration with vendors but also as University in-house development and manufacturing.

The beamline consists of a 57 m +10 m long stretch of vacuum and optical components to shape and transmit soft x-ray photons to a sample where they will interact with the electronic structure of the material being studied.

Team

Uppsala University:

- Marcus Agåker, Project leader, procurement, instrument design
- Carl-Johan Englund, Senior research engineer, mechanical design
- Pierre Fredriksson, Shop engineer, mechanical manufacturing
- Nial Wassdahl, Researcher, assembly and testing
- Joseph Nordgren, Senior Professor, instrumentation design

Core deliverables

Project management, design, mechanical part procuction and installation.

Year

2011–2019

Budget

EUR 8,7 million

Industry involvement

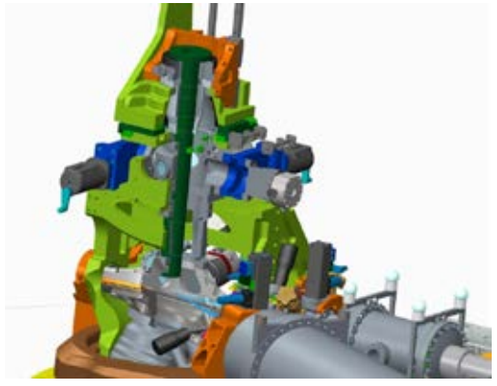
- FMB Berlin
- Toyama
- Jtec
- Piltz Optics
- SKS
- EWCON
- Surface Concepts
- Englund Engineering
- Pfeiffer Vacuum
- Österby Gjuteri

Collaboration

- Uppsala University
- Lund University
- Linköping University

Hyperlink

www.maxiv.lu.se/accelerators-beamlines/beamlines/veritas/



Procurement codes

- Mechanical engineering and raw materials
- Vacuum and low temperature
- Particle and photon detectors
- Optics and photons

XFEL

LASER HEATERS

Coordinating university: Uppsala University, www.uu.se

UPPSALA UNIVERSITET

Project description

The European XFEL is the world's largest and most brilliant free electron laser. It is located at DESY, Hamburg, Germany and produces high intensity x-ray light pulses used for various state of the art synchrotron light investigations. It consist of a 3,4km long electron accelerator utilizing magnet structures for light creation. XFEL is used an enormous microscope.
To overcome potential problems with the distributions of the electrons travelling in bunches a laser heater was implemented. The laser heater is Sweden's largest in-kind contribution into the XFEL project.

Team

Uppsala University:

- Mathias Hamberg, Researcher, Department of Physics and Astronomy, FREIA

DESY:

- Frank Brinker
- Christopher Gerth
- Evgeny Schneidmiller
- Lutz Winkelmann

Core deliverables

- Ultra high vacuum (UHV) electron vacuum chambers, with extreme tolerances regarding magnetic permeability, surface roughness, oxide thickness layering and copper coating.
- Laser transport vacuum system (~40 m).
- Laser routing and stabilization system with micrometer precision.
- PLC control systems.
- Undulator magnet.
- Design of system.
- Installation of setup
- Commissioning
- Improvements and tests

Year

2007-2018

Total budget

EUR 1 million

Industry involvement

- KYMA
- TEM Messtechnik GmBH
- FMB Berlin
- Pfeiffer Vacuum
- VACOM
- Newport optics
- Thorlabs
- Altechna
- PLX
- Owis
- Smaract
- Beckhoff
- UMB
- Edstraco
- Sala Bly

Procurement codes

- Civil engineering, building and technical services
- Electrical engineering and magnets
- Electronics and radio frequency
- Information technology
- Mechanical engineering and raw materials
- Vacuum and low temperature
- Particle and photon detectors
- Optics and photons
- Gases, chemicals, waste collection and radiation equipment
- Health, safety and environment

XFEL

MASS SPECTROMETER AND CELL SORTER FOR BIOLOGY INFRASTRUCTURE

UPPSALA UNIVERSITET

Coordinating university: Uppsala University, www.uu.se

Project description

The stability of biological samples is limited, and optimal use of beam time at XFEL requires a biological sample infrastructure to provide: (i) support to the Swedish life-science community in generation and handling of challenging samples in the immediate proximity to XFEL instruments; (ii) appropriate selection, quality control and evaluation of samples, including correlative imaging, immediately prior to XFEL experiments; (iii) standardised technology for data interpretation, including computation and validation of structural models. We proposed to establish a collaborative infrastructure, integrated within XFEL, providing open-access facilities for preparation and
sample handling. The Swedish contribution was essential for the realisation of the project at the European XFEL.The XBI facility that was built from this IKC is up and running at XFEL.

Team
Uppsala University, Laboratory of Molecular Biophysics:
Janos Hajdu, Professor molecular biophysics, specialist in extreme photon science, ultra-fast diffractive imaging, biophysics, structural sciences

Core deliverables

Construction of the XBI infrastructure at XFEL
Successful user operation of the XBI infrastructure at XFEL

Year

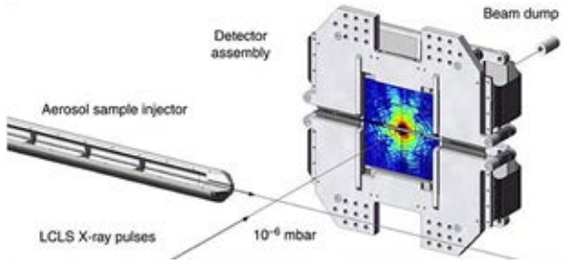
2013-

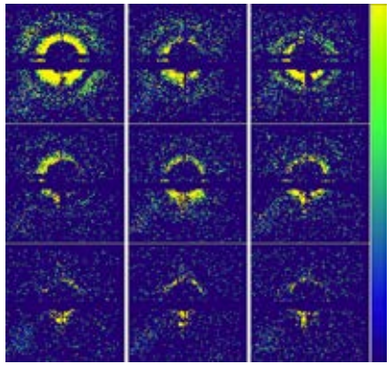
Total budget

EUR 1,6 million

Hyper link

www.xfel.eu/users/experiment_support/user_labs/the_xfel_biology_infrastructure_xbi_user_consortium/index_eng.html





Procurement codes
Optics and photonics

XFEL

NIR SPECTROMETER FOR EUROPEAN XFEL

UPPSALA UNIVERSITET

Coordinating university: Uppsala University, www.uu.se

Project description

The European XFEL is the world's largest and most brilliant free electron laser. It is located at DESY, Hamburg, Germany and produces high intensity x-ray light pulses used for various state of the art synchrotron light investigations. It consist of a 3,4km long electron accelerator utilizing magnet structures for light creation. XFEL is used an enormous microscope. Potential problems with the electron bunches can arise in turn affecting the overall outcome of the performance.
In order to better understand the nature of the electron bunches it was decided to implement a continuous shot-to-shot NIR spectrometer who will be sensitive to radiation emitted by upstream pinhole screen. The spectral signature will be a key feature to understand electron bunch behavior and changes. To be able to read out with continuous shot-to-shot ratio of 4.5MHz the KALYPSO detector system is used which enables this to be the world´s fastest NIR spectrometer of such type.

Team

Uppsala University:
- Mathias Hamberg, Researcher, Department of Physics and Astronomy, FREIA
- Simon Fahlström, Department of Physics and Astronomy, The Svedberg Laboratory

DESY:
- Christopher Gerth
- Nils Lockmann

Core deliverables

- Optics setup
- Electronics setup for readout including the KALYPSO system

Year

2018-2019

Total budget

EUR 50,000

Collaboration:

- Uppsala University
- DESY

Procurement code
Electronics and radio frequency
Information technology
Mechanical engineering and raw materials
Particle and photon detectors
Optics and photons
Gases, chemicals, waste collection and radiation equipment
Health, safety and environment

XFEL

SAMPLE INJECTOR AND DIAGNOSTIC SYSTEM

Coordinating university: Uppsala University, www.uu.se

UPPSALA UNIVERSITET

Project description

The Laboratory of Molecular Biophysics at Uppsala University provided parts of the bio-imaging instrumentation as a Swedish in-kind contribution to the European XFEL. The instrumentation will permit ultra-fast coherent diffraction studies on non-crystalline objects, such as single virus particles or biomolecuies. The project included tests of prototypes at FLASH in Hamburg and at the LCLS at Stanford.

Core deliverables

Uppsala developed a sample injector and diagnostic instrumentation for the European XFEL.

Year

2011–2015

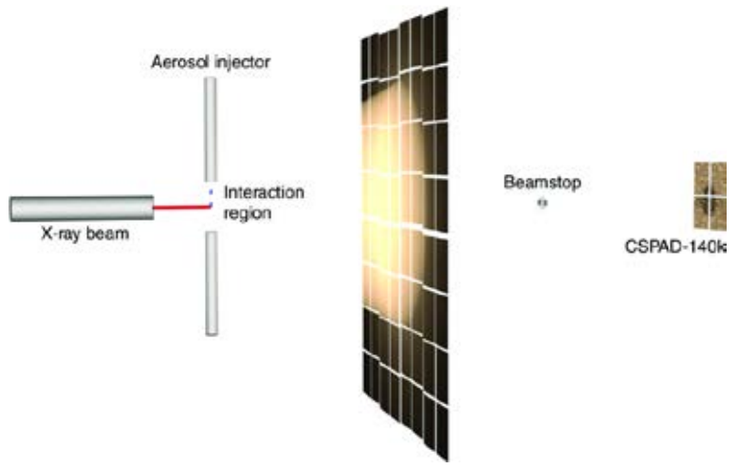
Total budget

EUR 520,000

Team

Uppsala University

- Janos Hajdu, Professor, molecular biophysics, specialist in extreme photon science, ultra-fast diffractive imaging, biophysics, structural sciences
- Jakob Andreasson, Specialist in AMO and laser science



Procurement Code

Optics and photons

SKA

BAND 1 RECEIVER FOR THE SQUARE KILOMETRE ARRAY

Coordinating university: Chalmers University of Technology, www.chalmers.se

CHALMERS

Project description

The Square Kilometre Array (SKA) will be the world's largest and most sensitive radio telescope, capable of transforming our understanding of the universe and our place in it. The dish antennas to be built at the SKA site in South Africa need to be sensitive to a broad range of radio frequencies. The Band 1 receiver developed at Onsala Space Observatory, Chalmers, for 350-1050 MHz (wavelengths 30-85 cm) is composed of a specially-designed quad-ridge flared horn (QRFH) and room-temperature low noise amplifiers from Low Noise Factory to minimise noise and maximise sensitivity over the required range. Each of the initial 133 dishes of the SKA will be equipped with one Band 1 receiver.

Team

Chalmers University of Technology:

- John Conway, Director, Onsala Space Observatory, Department of Space, Earth and Environment
- Jonas Flygare, feed design and testing,
- Magnus Dahlgren, microwave instrument design and testing
- Leif Helldner, mechanical design and testing
- Ulf Kylenfall, microwave instrument layout and circuitry

Core deliverables

- Pre-study and design of individual RF components for high performance receiver design
- Development and test of demonstration receiver model for proof of concept
- Development and test of receiver design
- Successful qualification tests of the final receiver design on the SKA precursor telescope MeerKAT in South Africa

Industry involvement

Leax Arkivator, Ventana Group, MegaMeta, Low Noise Factory, Omnisys.

Year

2013-2018

Total budget

EUR 6 Million

Collaborations

- Chalmers University of Technology
- EMSS, South Africa
- EMSS Antennas, South Africa
- South African Radio Astronomy Observatory (SARAO)
- Chalmers Nanofabrication Laboratory

The project is part of the SKA DISH consortium.

Hyper link

https://research.chalmers.se/person/flygarej

One of the 64 antennas in the telescope MeerKAT in the Karoo Desert in South Africa, with a Band 1 receiver installed. Photo: SARAO

Procurement codes

Electronics and radio frequency

Mechanical engineering and raw materials

Brookhaven National Laboratory

PIXEL-PAD DETECTORS

Coordinating university: Lund University, Faculty of Engineering, www.lu.se

LUNDS UNIVERSITET
Lunds Tekniska Högskola

Project description

By the start of the Relativistic Heavy Ion Collider (RHIC) in year 2000 at Brookhaven National Laboratory in New York the energy for collision of heavy nucleiincreased by a factor 10. The Lund group participates in the PHENIX experiment at RHIC which is designed to study the Quark Gluon Plasma, a very hot (100000 times hotter than the sun) and dense state of matter prevailing in the first microseconds of the Big Bang. This state can be produced by nuclear collisions at high energy and it was found for the first time by PHENIX (and others) at RHIC. The studies continue now at LHC atCERN. The Lund group, invented a new type of detector (named pixel-pad detector) for the trackingof charged particlesand,thanks to close cooperation with Swedish industry,provided a unique solution for electronics construction in extremely thin format. Together with Swedish industrial partners 2integrated circuits (ASICs) were designed and produced. The circuit board consisting of 4 bare silicon diebonded by CHIP ON BOARD technique on 100 micron thin KAPTON. In total 80 square meters of detector was constructed. One part is shown in the picture. Development and construction took place 1995-2000. The system was running until 2016. The techniques used are still unique and competitive.

Team

Lund University, Faculty of Engineering:

- Anders Oskarsson, Professor, physicist, project leader, detector expert, integration of equipment in PHENIX
- Hans Åke Gustafsson, Professor, physicist, deputy project leader, detector expert, integration of equipment in PHENIX
- Lennart Österman, Research engineer, electronics, specification, circuit board design and board layout, CAD, R&D, quality control

Core deliverables

- System design
- Design and construction of Digital ASIC for TEC detector
- Design and construction of Digital ASIC for pixel-pad detector
- Design and assembly of 5000 readout cards with Chip on Board on KAPTON
- Test and burn-in of front end electronics
- Assembly and integration in PHENIX at BNL

Industry involvement

- SiCon
- XiCON

Year

1995–2000

Total budget

EUR 900,000

Collaboration

- Lund University
- Vanderbilt University,
- Stony Brook University
- Oak ridge National Laboratory
- Brookhaven National Laboratory
- Weizman Institute

Hyperlink

www.phenix.bnl.gov

Procurement codes

- Electronics and radio frequency
- Particle and photon detectors

IceCube, South Pole Neutrino Observatory

THE ICECUBE UPGRADE

Coordinating university: Uppsala University, www.uu.se

UPPSALA UNIVERSITET

Project description

IceCube is the world's largest telescope for high energy neutrinos. It is built at the South Pole, where 1 km3 of the glacial ice between 1500 m and 2500 m depth has been instrumented with over 5000 optical sensors. These sensors are installed on 86 cables lowered in holes drilled with hot water technique, and then refrozen. The digital optical modules are read out with a timing precision of a few ns.

The upgrade will install 7 new strings, each with about 110 optical modules in the central region of the IceCube array. The quad-cables used for IceCube were produced by Ericsson. The infrastructure used for that production has been dismantled.

We are looking for a new provider of this cable, which has technical specifications that cannot be meet by most companies.
We will also be looking for companies that can provide 3-d printed holding structures for photomultipliers inside a spherical glass vessel and electronics production for the new optical modules.

Team

Uppsala University:
Allan Hallgren, Professor, high energy physics, physics and astronomy

Core deliverables

- Cables, with excellent transmission properties over 3 km.
- 3-D printed plastic holder
- Electronics cards.

Year

2018–2022

Total budget

EUR 18 million

Industry involvement

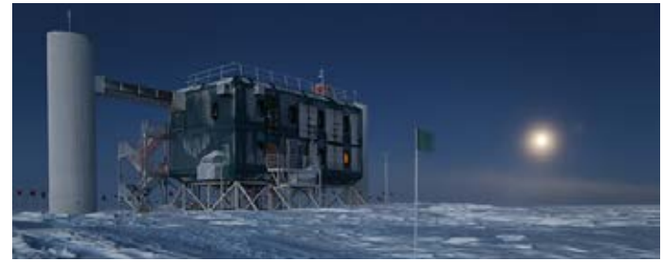
- Ericsson
- Hudiksvall

Collaborations

- Uppsala University
- Stockholm university
- Michigan State University
- Munster University
- 40 collaborating institutions worldwide

Hyperlink

Icecube.wisc.edu



Procurement codes

- Electrical engineering and magnets
- Electronics and radio frequency
- Mechanical engineering and raw materials

SWEDISH SUCCESS STORIES

Photo: Mikael Wallersted

AQ ELAUTOMATIK

One of the world's most complex modulators

In 2014, AQ Elautomatik won an attractive and challenging contract with ESS that really put the company on the map, impressing both the client and collaboration partners at the Faculty of Engineering, Lund University. The project, which involved several companies from the AQ Group, was coordinated by Project Manager Patrik Olsson and Managing Director Ola Olsson.

The contract involved manufacture of the very advanced klystron modulator, the system that controls the acceleration of protons by the particle accelerator. The system achieved steady acceleration, no mean feat considering that the accelerator in question will be part of the world's most powerful spallation source. No standardised systems could accomplish this. The innovative solution reduced the cost of the device by 70% and the space needed for the power packs by 80%, compared with the baseline set for the project at the beginning in 2010.

Technical Director of ESS, Roland Garoby, explains.

"The modulator is known to be a difficult piece of equipment in our kind of machines – not specifically due to the individual components or the technology in itself – but because of its electro-technics. The sheer power involved, the peak power, the voltage, the amps – all energy units in fact – are immense. The stress on the equipment when we have to cycle at the rate of 14 Hz, delivering 11.5 MW of electrical power, is tremendous. So this really is a tremendous challenge and I'm glad that we've now got it under control, because other facilities have issues with this."

It was the leader of the technical team, Carlos Martins, together with AQ Elautomatik and leading researchers from the Faculty of Engineering at Lund University, who made the visionary solutions a reality.

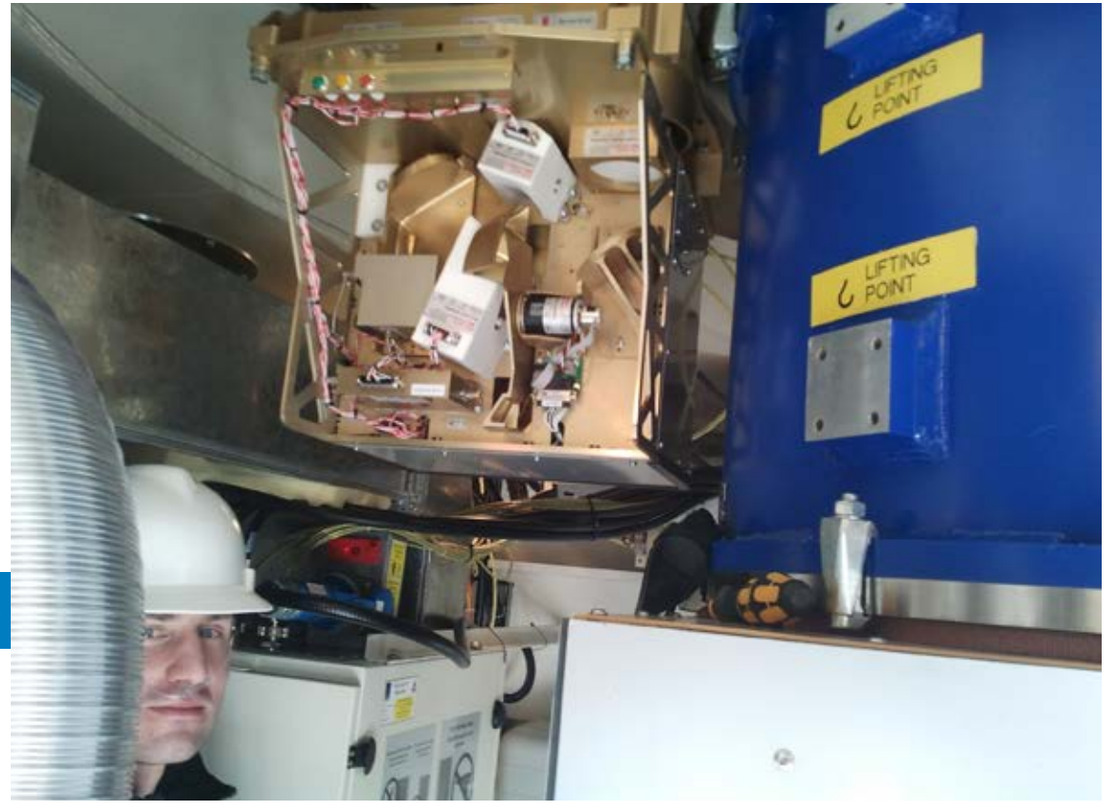
Entrepreneurial partner

ESS was looking for an entrepreneurial partner to assemble a complex unit with tough specifications, and a local partner that could help meet the complex challenges. Patrik Olsson took on the challenge with the AQ Group, together with sub-suppliers that supplied key components, such as inductive components, sheet metal and copper production, systems and power integration.

When Carlos Martins found a local partner, an intense period of collaboration began. This was in 2014, and the first step and prototype were delivered in 2015. The rapid production methods of AQ Elautomatik were crucial to the development. The company played a leading role in the build to print manufacturing and assembly.

"The ESS SML Modulator has attained a very clean curve: less than 1 % voltage drop, less than 0.17 % flat-top ripple, and about 120μs rise time. But this is not the only difficult part. We want constant power from the grid," explains Roland Garobi. "It's like we're flipping this light switch on and off 14 times a second. But this is not a light bulb... this is something like 115,000 100-watt bulbs for each modulator. We have many of them, which means a lot of megawatts."

"The accelerator in question will be part of the world's most powerful spallation source. No standardised systems could accomplish this."



OMNISYS

27 years as a Big Science supplier

Omnisys has been a supplier to Big Science facilities since 1992. The company was founded by Dr Anders Emrich and Stefan Andersson, who worked at the Onsala Space Observatory. The first major assignment for Omnisys involved supplying sensors to the Swedish research satellite Odin, microwave THz sensors being Anders' area of expertise. The next major projects concerned power electronics, supplying power systems for the Swedish satellites Smart 1 and Prisma, this time reflecting Stefan's specialist area.

Breakthrough order from ESO

In 2007, Omnisys was awarded the contract for detailed design and production of the Water Vapour Radiometers for the ALMA telescope that was being constructed by ESO in Chile. This was a very important system, since the vapour sensors monitor the amount of water vapour in the atmosphere above the telescope, which affects the diffraction of signals from space. Omnisys had to design the systems almost from scratch, to make them suitable for serial production and to ensure the systems could endure the harsh desert environment at an altitude of 2600 metres.

Early-phase development with SKA

"We were recently awarded a grant from Vinnova that will enable us to participate in the early stages of the development of Band 1 of the SKA (Square Kilometre Array) observatory," says Martin Kores, Managing Director of Omnisys. The band will be developed in collaboration with the Onsala observatory.

This type of early-phase collaboration is critical to the success of Omnisys, and enables Swedish companies to expand in the area of advanced research systems for Big Science. With government funding, companies can participate in early stages and build up expertise that will put them in a good position to bid for production contracts at later stages.

At present the microwave area is dominated by research clients. However, looking one or two decades into the future, THz technologies will have become so mature that a market for commercial products integrating microwave technologies is likely to open up. The opportunities for Swedish companies to win shares in these volume markets will largely be determined by the level of engagement in development over the next few years.

"Omnisys had to design the systems almost from scratch, to make them suitable for serial production and to ensure the systems could endure the harsh desert environment at an altitude of 2600 metres."

RECAB

New market opportunities in Big Science

RECAB, a supplier of advanced modularised computer systems, has seen collaboration with ESS as both a challenge and a learning opportunity, but also as a source of profitable business. Working with ESS has not been like supplying to an industrial client. Technical demands have been higher, system requirements have been more complex, and public procurement processes have been more demanding than industrial purchasing, but the work put in has been worthwhile in many ways.

"Working with clients is all about matching expectations. Working with ESS is no exception. The system owners and users at ESS come from research backgrounds, so their expectations are sometimes different to those of industrial clients. Once you understand this, and adapt accordingly, the collaboration becomes very rewarding," explains Engineering Director Brian Ulskov Sørensen.

Many different clients

RECAB supplies the mTCA.4 equipment used in automation. The company had already supplied equipment to the earlier MAX I, II, and III laboratories at Lund University and, more recently, the company has supplied the framework for the control system for MAX IV. These earlier projects gave valuable experience of public procurements.

The first meetings between RECAB and ESS were held in 2012. Once RECAB had been awarded a contract, they could start activities together with users of the mTCA.4 systems. The system owners are the Integrated Control Systems Group, which is responsible for the system infrastructure and functionality. They also handle support and maintenance of the system.

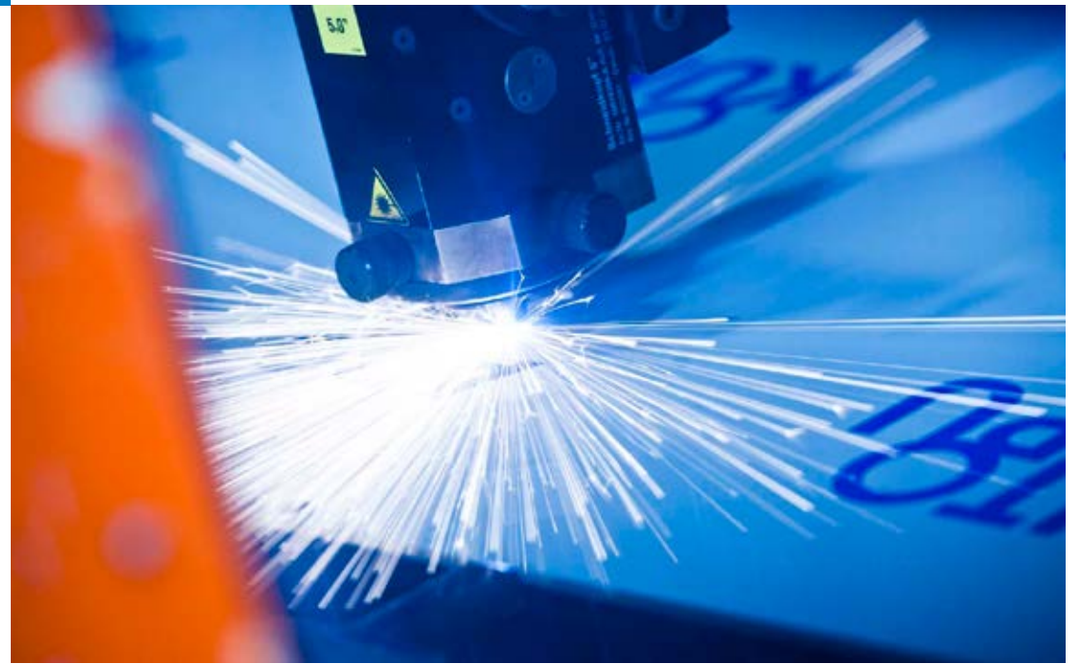
"One of the big differences in working with ESS compared to industrial clients, is that at ESS we work with many different clients. We've not only been working with both users and owners, Lund University has also been involved, which has added complexity to the project," says Sørensen.

Expansion opportunities

Big Science offers interesting opportunities for expansion. The projects are often challenging and complex. Every new client whose demands are as high and complex as those of MAX IV and ESS brings interesting challenges and learning opportunities. Working with MAX IV and ESS has entailed excellent learning experiences that open up market opportunities with other facilities in Europe.

"I think that MAX IV and ESS are just the start of our business with Big Science. Now that we have more experience, we're ready to compete for contracts at more European facilities," says Sørensen.

"Working with clients is all about matching expectations. Working with ESS is no exception."



RFR SOLUTIONS

Strategic approach brings major Big Science orders

Mats Orup, Managing Director of RFR Solutions, saw the potential afforded by two major investments in Big Science facilities in Lund, and decided to aim for MAX IV and ESS contracts as a supplier. To do this, Mats needed to develop expertise and skills within the company in fields relevant for particle accelerators. RFR Solutions offers development and production of large stainless steel systems, often of a size and complexity that few other companies can deliver.

"An opportunity to experience something like this only pops up once in a lifetime," says Mats, reflecting on the company's development over nearly ten years. By working strategically, RFR Solutions has now won big orders from both ESS and CERN.

Strategic investments now paying off

"We spent the first years building up our expertise, and we won some small orders from MAX IV and ESS. We've now got a much stronger expertise base, but we've also built relationships and confidence in our capacity with both ESS and CERN. This has enabled us to win a number of very large and complex contracts from both these facilities."

In one project, RFR Solutions, together with the FREIA laboratory at Uppsala University, is developing a new and unique system solution in cryogenics. The system, currently under development, will be delivered to CERN in a few years.

The strategic goal to become an established supplier to Big Science facilities has opened up an important new market for RFR Solutions, a market with long-term growth potential and where expertise and precision are in great demand. The projects involving research facilities provide important experience and references when RFR Solutions approaches prospective clients in other sectors. Experiences from Big Science, and the expertise that has developed, can open doors to other high-tech markets. If RFR Solutions is to grow as a supplier to this market, the company needs to develop further projects in collaboration with universities and research institutes.

"An opportunity to experience something like this only pops up once in a lifetime. By working strategically, RFR Solutions has now won big orders from both ESS and CERN."

SANDVIK MATERIALS TECHNOLOGY

Major order to keep particle beam in place

Sweden invests heavily each year in large-scale research facilities such as ESS, CERN, ESO and ITER. A large upgrade project is currently under way at CERN, involving the High Luminosity Large Hadron Collider (HL-LHC or HiLumi). The project is an upgrade of the existing accelerator (LHC) and instruments, and will be the biggest project at CERN in the coming decade, with an investment close to EUR 1 billion.

Material from Sandvik will be used to keep the particle beam in place in the accelerator. Here, the magnetic and physical characteristics at four degrees Kelvin (approximately -269 degrees Celsius) are of great importance.

"Very few companies have the capability to deliver material with these characteristics, and we're pleased to announce that Sandvik is now supplying material to CERN," says Björn Mogard, Global Product Manager, Cold Rolled Precision Strip, Sandvik Materials Technology.

Long experience of demanding applications

"Sandvik has extensive experience of delivering specialty steels for complex applications, but our experience of working with research facilities as clients is limited. Supplying CERN with material with low permeability is an interesting challenge for us. Big Science Sweden has been invaluable in guiding us and helping us understand how to work with Big Science facilities, says Marie Vennström, Manager Engineering Solutions, Stainless Service at Sandvik Materials Technology.

International large-scale research facilities in Big Science comprise a massive market, offering great business opportunities for Swedish companies supplying products and services. There are also great opportunities to be part of collaborations that promote high-tech development in areas such as superconducting magnets, material development and big data.

About Sandvik Materials Technology

Sandvik Materials Technology is a world-leading developer and manufacturer of advanced stainless steels and special alloys for demanding environments, along with products and systems for industrial heating. Products and services make industrial processes more productive, cost efficient, profitable and safer, while reducing the environmental footprint in a number of different industry segments. Together with their customers, they develop products and material that meet the demands of tomorrow.

"Material from Sandvik will be used to keep the particle beam in place in the accelerator. Here, the magnetic and physical characteristics at four degrees Kelvin (approximately -269 degrees Celsius) are of great importance."

VENTANA HACKÅS

Cast aluminium parts to SKA and CERN

Ventana Hackås supplies cast aluminium in large sizes with very fine tolerances and high surface finish, including complex and challenging casts with an extraordinary surface finish of RA 3.2 or better. This is enabled by the company's unusual process of casting in moulds made of plaster. The process not only makes it possible to routinely produce goods with extraordinary surface properties, it also enables the company to add significant functionality. This reduces the total production cost of a product that would otherwise have had to be machined and assembled from a number of separate parts.

Dialogue important

It is sometimes a challenge for Ventana Hackås to convince clients about the significant potential for reducing costs by casting in plaster. It benefits both client and company when a close dialogue is initiated that helps the client see all opportunities and gives Ventana Hackås enough information to offer an optimal solution. Another strength is the company's ability to cast and machine parts of large sizes. Ventana Hackås also has collaboration around 3D Printing, enabling them to deliver parts with geometries that are even more complex than ones that can be made through casting. 3D printed parts can be offered in other materials than aluminium, such as titanium, stainless steel and plastics.

Big Science – a promising market

Ventana Hackås sees the market potential of Big Science. The first order was for the SKA space research facility under construction in South Africa. The order, which came through the Onsala Observatory Department at Chalmers University of Technology, was for a large aluminium part with very narrow tolerances and high surface finish. CERN also contacted the company directly with a request for a cast aluminium part with a specific surface finish.

The best business opportunities for Ventana Hackås can be found in prototyping and in short to medium-size runs, the areas where the company has its biggest strengths. Casting the Ventana Hackås way offers scope for cost reductions, by adding functionality and reducing the need for machining and finishing of surfaces.

"Ventana Hackås sees the market potential of Big Science. The first order was for the SKA space research facility under construction in South Africa."

ÖSTERBY GJUTERI

Moulding large half-shells for fusion power reactor

"You seem to enjoy a challenge – if you didn't, you'd never have put in a bid for this project!" The words of the project manager at Babcock Noell, the German company that commissioned Österby Gjuteri (Österby Foundry) to produce 100 sizeable half-shell casings of ten different designs. The solid-steel half-shells were to be used in the construction of a fusion power reactor, a research facility that was to be built by the German Institute for Plasma Physics, with head office in Munich. The reactor is to be built in Greifswald on the Baltic coast, and will be operating at a temperature of no less than 100 million degrees Celsius.

Cutting-edge technology

The project presented challenges from start to finish. It turned out that the high level of computerisation at Österby Gjuteri paid off, as the demands set by the project could only be met by a company equipped with the most modern technology, highly sophisticated machinery, and highly skilled, fearless employees who love a challenge. The order total was equivalent to the entire annual turnover of the company at the time, almost EUR 9 million.

A series of challenges

The challenges mounted up from the beginning of the project, because the design and production of the moulds involved very narrow tolerances. The minute detail required skilled programmers and hours of 5-axis milling to produce the mould. The casting was a challenge in itself, due to the very narrow tolerances for the chemical content needed to achieve the necessary strength and the non-magnetic properties in the final result. After casting, the material was heat treated at 1100 degrees, then the finishing of the half-shells required 30,000 hours of 5-axis milling, another production step that involved very narrow tolerances and very skilled operators.

Some of the milling was done by Österby in their own facilities and some was outsourced to suppliers carefully selected for the task. The finished products were tested for strength at minus 269 degrees Celsius, then scanned using scanners and software purchased especially for the purpose. This proved to be a stroke of genius. It provided a set of measurements that were second to none in terms of precision and capacity to handle data. The same equipment and methods are now used to validate much of the production volume at Österby Foundry.

In addition to the German project, Österby Foundry has also supplied cast components for research facilities at MAX IV, The Svedberg Laboratory at Uppsala University, and Tesla Engineering in the UK.

"The casting was a challenge in itself, due to the very narrow tolerances for the chemical content needed to achieve the necessary strength and the non-magnetic properties in the final result."

TRADE FAIRS GENERATE CONTACTS

At the large, strategically important trade fairs within Big Science, we build Swedish pavillions. These form a convenient meeting place for representatives from research facilities and the Swedish suppliers participating in the event.

Left: *The Big Science Sweden pavillion at BSBF 2018 was a popular meeting place.*

BIG SCIENCE SWEDEN GENERATES MEETINGS, NETWORKS AND BUSINESS

Big Science Sweden is the link between Swedish industry and Big Science. We connect Swedish high-tech companies with research facilities, enabling facilities all over the world to find the best suppliers.

We have built up a broad bank of knowledge about the companies, their expertise and skills, and their ability to deliver. We establish contacts with procurement officers and other personnel who work with technological development or purchasing at the European research facilities.

Important success factors for development and innovation are access to new knowledge and exchange of professional experience. All the activities arranged by Big Science Sweden offer opportunities to make valuable contacts and acquire new, strategic knowledge that will promote business and development within Big Science.

Industry, academia and research facilities

Developing the cutting-edge technology demanded by Big Science requires continual exchange between industry, academia and research facilities. Collaboration helps to identify common challenges, and activities are directed towards relevant areas. This accelerates the development of new products and services.

These three key actors – industry, academia and research facilities – regularly participate in our various events. Personal meetings generate confidence and mutual understanding, which leads to long-term, constructive relationships.

Big Science Business Trip

Big Science Sweden arranges Business Trips where Swedish companies visit research facilities around Europe. The companies get valuable information about the facilities' upcoming projects and procurements, make contacts with key personnel at the facility, and get the opportunity to present the company's unique expertise, skills and resources.

Mats Orup, Managing Director of RFR Solutions, which manufactures sophisticated stainless steel solutions:

"These trips are good for making new contacts and learning new things. We've previously supplied solutions to ESS, CERN and MAX IV, and by visiting other facilities and talking with their contact persons, we can form an impression about whether we could supply similar projects to them."

Conferences and other networking events

Large, international trade fairs and conferences within Big Science are also important meeting places for research facilities and Swedish companies. Representatives from the facilities can form an overall impression of Swedish high-tech capacity, and important contacts are made through personal meetings.

Knowledge is also exchanged, and contacts made, when representatives of research facilities come to Sweden and take part in road trips, where they visit Swedish companies with the specialist expertise and skills that the facilities are looking for.

Big Science Morning

At a Big Science Morning event – an informal breakfast meeting – companies that are, or that are interested in becoming, suppliers to research facilities, are brought up to date about current developments within the Big Science field, and can discuss opportunities for collaboration. These morning meetings are held in the offices of Big Science Sweden (Luleå/Kiruna, Uppsala, Göteborg, Lund) or at one of the supplier companies.

Right: *A study visit to DESY och European XFEL in Hamburg, involving high-tech Swedish suppliers from the Big Science Sweden network.*

Johanna Bergström Roos, Business Development and Project Management, at Big Science Sweden in Luleå/Kiruna:

"A morning meeting is a good way for us to discuss how to open up business opportunities with research facilities focusing on, for example, space research. Up here in the north of Sweden, there are companies that have already had some contact with the Big Science sector, but we need more. There's so much going on, such as the extension of the atmospheric radar system that EISCAT is building in northern Sweden, Norway and Finland."

Big Science Technology Workshop

Big Science Technology Workshop is a combination of seminar and workshop, where the focus is on a specific field of technology, such as AI, advanced 3D printing, or other areas that strengthen the expertise and skills of supplier companies and their abilities to deliver advanced technology. World-class speakers and experts participate in these workshops.

Anna Hall, Programme Director for Big Science Sweden:

"Technology Workshops have a tremendously important function in driving the development of new advanced technology in the companies. The workshops enable suppliers, researchers from academia and representatives of research facilities to sit down at the same table and discuss current issues, directly with one another."

Big Science By Sweden

Big Science By Sweden is a 'meeting place for meetings' – a two-day conference for research facilities, companies and academia. Participants meet to discuss challenging issues within Big Science and the opportunities in different fields of technology. In a number of parallel round-table discussions, current issues are raised and discussed, and participants identify ways in which researchers, facilities and companies could collaborate.

Presentations and discussions give the companies new information and knowledge that will enable them to tailor their developmental work to current needs in the research facilities around the world.

Big Science Academy

Suppliers to research facilities need to continually raise their level of expertise, to ensure they remain at the cutting edge in the technological fields where suppliers are needed. Big Science Academy offers continual training in the fields that reflect the facilities' requirements and needs, such as accelerator technology, future AI, and ultra-high vacuums. The Academy also covers procurement regulations and business processes.

Seminars, trade fairs, workshops, business trips – Big Science Sweden offers many different ways to generate contacts and exchange knowledge.

BUSINESS TRIP

On a Business Trip, we take Swedish company representatives to visit various research facilities, where we match their companies with the right personnel at the facility. The visits include one-to-one meetings and guided tours that give an insight into current research and development.

BIG SCIENCE MORNING

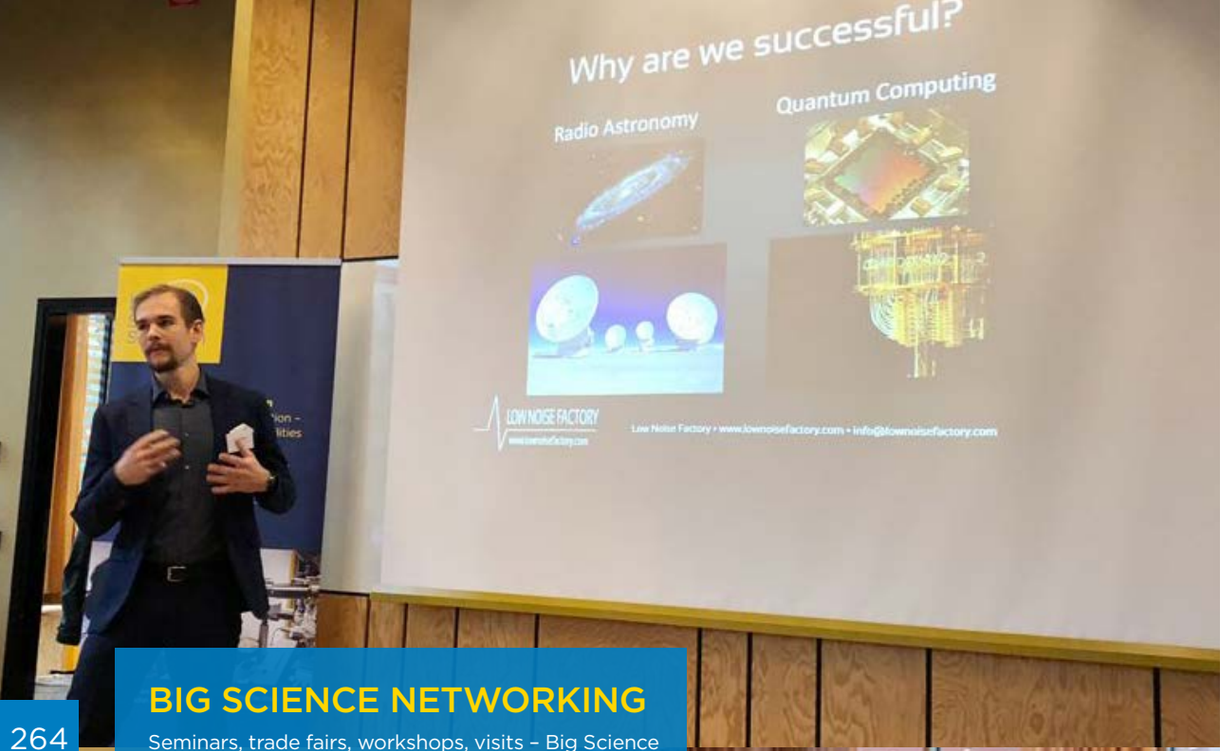
Big Science Morning – our forum where business representatives meet each other over breakfast and learn more about what generates business on the Big Science market.

Left:
Big Science Morning on location at Carlsson & Möller in Helsingborg. In the photo, Michael Andersson, Jonas Stålhandske, Leif Gjerlöv and Marie Rimmenstedt.
Lower photo:
Per Fagerstöm from Fagerström Industrikonsult describes the company's work with ESS and presents an exciting opportunity at ESO.

Right, from the top:
A group of eager business representatives learn more about business opportunities at a Big Science Morning meeting in Lund.

Håkan Persson and Patrik Wantzin from Finnverko, here together with Frida Tibblin Citron, Big Science Sweden.

Full house at Ideon in Lund when purchasing managers from MAX IV and ESS described the current situation for each facility and presented current procurements. Mirko Menninga, Group Leader Procurement Administration at ESS, brings everyone up to date.



BIG SCIENCE NETWORKING

Seminars, trade fairs, workshops, visits – Big Science Sweden offers many different ways to build contacts and acquire knowledge.

Left:
An inspiring afternoon at Chalmers University of Technology, with researchers and innovative companies within RF technology. Joel Schleeh, Low Noise Factory – a Swedish success story, showing how a company can diversify from radioastronomy and take technology into new areas. Today, their main area is Quanting Computing.

Right, from the top:
Seminar in Uppsala about new materials and challenges relating to materials within Big Science. Representatives from Sandvik Materials Technology, VBN Components, Österby Gjuteri, researchers and innovators meet and share experiences.

Middle and bottom: A Big Science meeting in Luleå, with an interesting panel discussion on how the region can conduct business with international research facilities.

Pia Kinhult, Head of Host States Relations at ESS, talks about the opportunities afforded by ESS for companies in Norrland.

TECHNOLOGY WORKSHOP

In these workshops, we disseminate knowledge and create a forum for innovation and development. Big Science Technology Workshop is a combination of seminar and workshop.

Left:
How can organisations use artificial intelligence to improve productivity? At Big Science Technology Workshops, new research is presented, here about future applications of artificial intelligence (AI) in advanced production systems, with examples of research and projects at production companies.

Right, from the top:
Henrik Carling, Head of Integrated Controls System Division, ESS gives a presentation, Applying Machine Learning to the ESS Control System.

Per-Lage Götvall from Volvo gives a presentation, AB Volvo – A Generic Vision-Based System Using AI for Control of a Robot Fleet.

Filippo Maria Tilaro, Open Labs at CERN, during the presentation: CERN Control Systems Through Anomaly Detection and Machine Learning.

The participants discussed how to harness the potential of AI to maximise the full benefits of automation.

ROAD TRIPS

Representatives of research facilities take part in road trips, where they visit Swedish companies.

Left:
CERN representatives visiting Sweden, here at Elmia Subcontractor. The visit ended with a road trip where CERN visited Swedish companies. Anna Hall, Big Science Sweden, Jérôme Pierlot, CERN with Johan Rutfors Isaksson at Siemens.
Lower photo:
Pierre Moyret, Laurent Deparis, Björn Jenssen, and Jérôme Pierlot, all from CERN.

Right, from the top:
Examec Maskinmontage in Tomelilla supplies lead end bars and magnet tie rods in special material for the cryomagnets at CERN.

Together with a Swedish consortium in 3D printing, ITER has opened up new opportunities for Big Science. The high-quality powder was produced by Carpenter Powder Products in Torshälla.

A visit to Liedholms Maskinteknik, a mechanical supplier in machining, surface treatment, welding and assembly. Liedholms Maskinteknik is a mechanical workshop, involving materials such as the stainless steel alloy, 316LN, and titanium.

STUDY VISIT TO CERN

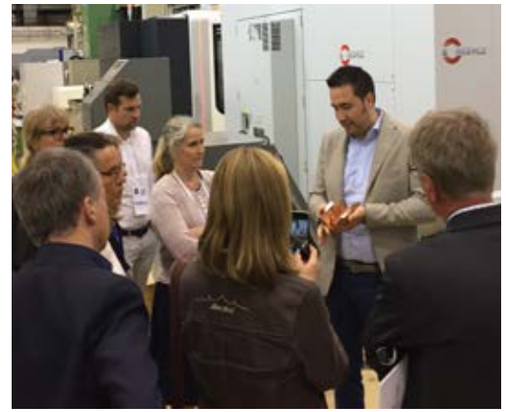
As Sweden's ILO, we visit research facilities to learn about their needs and establish valuable contacts.

Left:
Big Science Sweden well-represented in the visit to CERN: Frida Tibblin Citron, Anna Hall, Jeanette Nilsson, Bernd Ketzler, Johanna Bergström-Roos, Håkan Nilsson, Natasa Pahlm and Mats Larsson.
Lower photo:
Glyn Kirby, who has worked at CERN for over 25 years, talks about superconducting magnets. Anna Hall wonders what expertise they need.

Right, from the top:
When visiting CERN, we met with a group of Swedish employees at CERN over an informal lunch. They gave us valuable information and useful leads.

Anders Unnervik, Head of Procurements and Industrial Services at CERN – a Swede who has worked at CERN for over 30 years.

Alessandro Dallocchio is head of the CERN Mechanical Workshop. He is keen to get into contact with more Swedish companies.



ILO MEETINGS

Big Science Sweden represents Sweden as the official Industrial Liaison Officers and Purchasing Advisors at the research facilities co-financed by Sweden. International collaboration is firmly established through the pan-European network of ILOs.

Left:
ILO network meeting at Big Science Business Forum 2018 in Copenhagen, involving 50 ILOs from around 25 countries.
Lower photo:
ILO meeting at CERN in Council Chamber. Juliette Forneris, Big Science.dk sitting chair.

Right, from the top:
The Swedish ILOs, Patrik Carlsson, Anna Hall and Fredrik Engelmark, discussing collaborations between the Swedish company Studsvik and various research facilities.

Mats Lindroos, Head of Accelerator Division at ESS, describing the high-tech equipment in the accelerator tunnel.

The Swedish ILOs, Anna Hall and Fredrik Engelmark, deeply engrossed in discussions about future research projects at CERN with researchers Richard Jacobsson and Richard Brenner.

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Big Science Sweden is the official Swedish ILO-organisation, helping Big Science facilities across the world finding Swedish suppliers. We work with companies offering a wide range of technical specialities, providing different types of solutions and resources. We support them in developing their knowledge and skills to solve critical challenges within the Big Science spectrum. Together we build successful Big Science facilities.

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