

# 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.





Swedish universities, institutes

and other resources





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

















### **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.

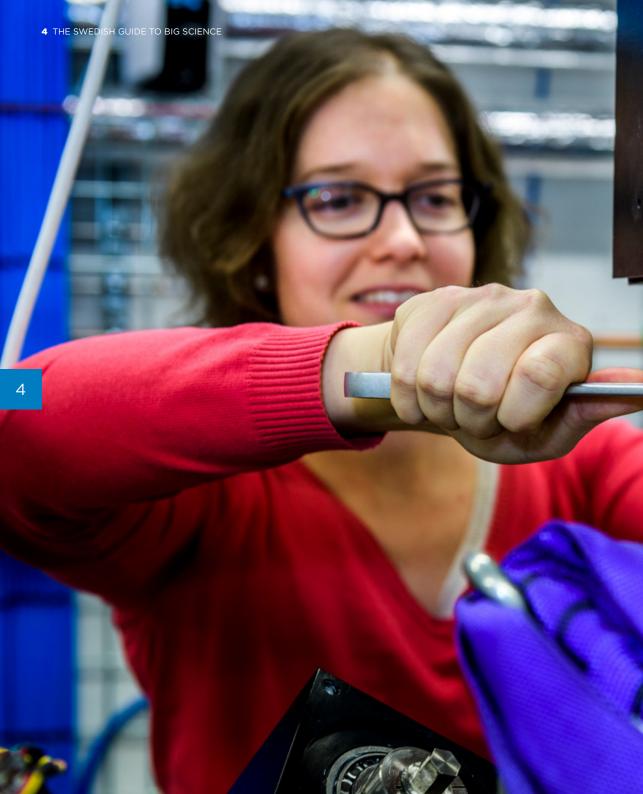
So, with this booklet we would like to bring some of our Swedish high-tech suppliers to you in a structured way. The companies are presented according to technology and expertise sectors, so you can easily find areas you are particularly interested in.

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























### **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.

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### **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

#### Anna Hall

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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Big Science Sweden LTU Business Aurorum 1A 975 55 Luleå

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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,

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.

#### ESC

### **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

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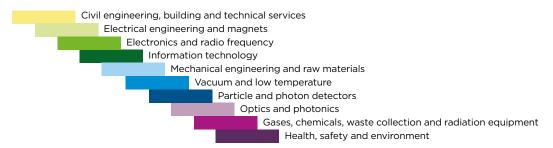
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### Company size definitions

Small >49 employees Medium 50-249 employees Large <250 employees

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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 Broaren 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 Mikroverktva

Note

Nuvia Nordic Pilz Scandinavia K/S

Reilers Sverige Rowaco

Sandvik Scanmast

Schneider Electric Sverige

Siama

Studsvik Nuclear Technia Transcat

Uponor ÅF

### Electrical engineering and magnets

ABB

Advanced Integration Technology Umeå Aliaxis Utilities & Industry **APR Technologies** AQ Flautomatik

ASSO Produkter **Beckhoff Automation** 

Beradahls 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

Polyamp

nVent Nordic (tidigare Pentair)

Pilz Scandinavia

Produktionsteknik i Lund Qamcom Research and

Technology Reilers Sverige ReQuTech Rowaco

Scanditronix Magnet Schneider Electric Sverige

Semcon Siama

Siama Lundinova

Solectro

Swedish Microwave

Svennes Verktvasmekaniska

Teledyne SP Devices

ÅF

### Electronics and radio frequency

APR Technologies AQ Flautomatik

BLUEWAVE microsytems

Cervitrol D\/el

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)

**Omnisvs Instruments** 

Polyamp

Produktionsteknik i Lund

Promech Lab Holding

Qamcom Research and

Technology Recab

ReQuTech

Rowaco

ScandiNova Systems

Schneider Electric Sverige

Semcon Siama

Sigma Lundinova

Solectro

Swedish Microwave

Svep Design Center Teledyne SP Devices

ÅF

### Information technology

3NW Datacenter Sweden

ABB

Aisle Systems

**Axis Communications** 

Boliden Flectro Carlsson & Möller

Elastisvs

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

Cein

Cervitrol

Conex Engineering

Damaskus Maskinskydd

Digital Mechanics Element Metech

Emy 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

Mikroverktva

Modellteknik i Eskilstuna

MP bolagen

Nanovac

Nordbergs Tekniska

Nuvia Nordic

nVent Nordic (tidigare Pentair)

Ovako Sweden (fd Ovako Tube

& Rina)

Produktionsteknik i Lund

Promech Lab Holding

**Qtech Group** 

Raps - Resurs Applikation

Process System i Skåne

Resinit

**RFR Solutions** 

Rowaco

Sandvik

Scanmast

Semcon

Siama

Silver Weibull SKF Sverige

Solectro

SpecialTeknik i Sverige

Stavanger Steel

Studsvik Nuclear

Sundbybergs mekaniska

verkstads (Sunmek)

Svennes Verktvasmekaniska

SvetsMekano

Svetstjänst i Höganäs

Texor

Tre-Mek i Trelleborg

Unnaryd Modell

**VBN** Components

Ventana Hackås

Viflow group

Wallins Mekaniska

WM Press VTT

ÅΕ

Österby Gjuteri

### Vacuum and low temperature

Advanced Vacuum Distribution

Air Liquide Gas

Airec

Aliaxis Utilities & Industry

**APR Technologies** 

**Bodycote Hot Isostatic** 

Pressina

Bumax

Carlsson & Möller

Cein

Element Metech

Epiluvac

Glenair Nordic

.Jobsab

KG Fridman

Low2High Vacuum

Löwener Vakuumservice

Nanovac

**Omnisvs 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

Pressina

Bumax

Carlsson & Möller

Cein

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** Cein

Conex Engineering

Coromatic

Gammadata Instrument

GoalArt

Hamamatsu Photonics Norden

In Situ Instrument MCT Brattberg

Nanovac

Neonest (Buyisotope)

Nuvia Nordic

Schneider Electric Sverige

Siama

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

### **ABB AB**

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### Patricia Kempff

Head of Public Affairs +46 21 32 50 10 patricia.kempff@se.abb.com

#### 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





### www.acp.se

### ACP AB

Gravörgatan 12, SE-253 60 Ramlösa, Sweden +46 42 29 34 00

### **Axel Edman**

Marketing Manager +46 42 499 01 22 axel@acp.se

### 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, SE - 752 72 Uppsala, Sweden

### Adam Engberg

CEO

+46 73 579 80 56 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







# www.aitumea.se

# Advanced Integration Technology Umeå AB

Kabelvägen 1J, SE-90133 Umeå, Sweden +46 90 201 00 00

### Mikael Nensén

General Manager +46 703 33 03 59 mikael.nensen@aint.com

- 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





### www.advancedvacuum.se

#### **Advanced Vacuum**

Järngatan 12, SE-234 35 Lomma, Sweden +46 703 41 21 54

#### Dan Ertsas

**Technical Sales** +46 703 41 21 54 dan@advancedvacuum.se

# 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







# www.airliquide.se

#### Air Liquide Gas AB

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### Peter Stjernberg

Account Manager +46 31 338 26 37 (office) +46 70 215 10 06 peter.stjernberg@airliquide.com

- 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.

- 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

# **Industry sectors**

- Cryogenic systems for high tech research facilities.
- CHP (Combined heat and power)
- Compressors
- Gas fired heating appliances





# www.airec.com

#### Airec AB

Hanögatan 5, SE-211 24 Malmö, Sweden +46 40 643 49 44

#### Staffan Nordström

Sales and Marketing Manager +46 725 35 92 88 staffan.nordstrom@airec.com

- 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





#### www.airson.se

# AirSon Engineering AB

Metallgatan 33, SE-262 72 Ängelholm, Sweden +46 431 40 25 80

#### Dan Kristensson

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# **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



# www.airwatergreen.com

#### Airwatergreen AB

Lastbilsgatan 9, SE-754 54 Uppsala, Sweden +47 88 800 44 00

### **Bo Tiderman**

CEO

+46 70 581 82 72 bo.tiderman@airwatergreen.com

#### 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





### www.aisle.se

#### Aisle Systems Sweden AB

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# Leiph Berggren

CSO

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leiph.berggren@aisle.se

### 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, highvacuum 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

# **O**Aliaxis

#### www.aliaxis-ui.se

#### **Aliaxis Utilities & Industry AB**

Stormbyvägen 6, SE-163 54 Spånga, Sweden +46 8 446 69 10

#### **Hans Svensson**

Technical Support and Sales Support +46 8 446 69 23 hans.svensson@aliaxis-ui.se



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

# **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



# www.aprtec.com

# **APR Technologies AB**

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+46 18 444 10 85

### **Peter Nilsson**

CEO

+46 707 23 42 81 peter.nilsson@aprtec.com



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

# **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.



#### www.agg.se

#### AQ Elautomatik AB

Kalkstensvägen 25, SE-224 78 Lund, Sweden

#### **Patrik Olsson**

Marketing Coordinator +46 46-16 25 11 patrik.olsson@agg.se

- Global production: Sweden, Bulgaria, India and
- 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 & enaineerina
- · Commercial vehicles: automation, defence
- Railway: food & drug

# Company size

Medium



- Electrical engineering and magnets
- Electronics and radio frequency

# **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





#### www.asso.se

#### **ASSO Produkter AB**

Sångleksgatan 5, SE-215 79 Malmö, Sweden +46 40 143550

### **Roberth Andersson**

Manager ra@asso.se +46 40 14 35 54

#### Procurement code

Electrical engineering and magnets

48

# **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







#### **Axis Communications AB**

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### **Andrea Sorri**

Director Business development Critical infrastructure +39 338 509 38 66 andrea.sorri@axis.com



- 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.



# www.azpect-photonics.com

# **Azpect Photonics AB**

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### Sofia Fahlvik

Sales Engineer + 46 8 55 44 24 98 sofia.fahlvik@azpect.com

#### Industry sectors

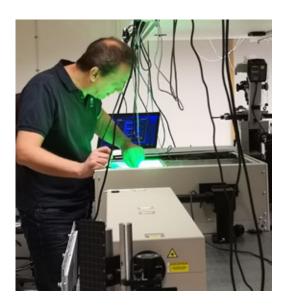
Academic research facilities and a variety of high-tech markets, including renewable energies, medical, defence & aerospace etc.

#### 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



- 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

#### **Beckhoff Automation AB**

Stenåldersgatan 2A, SE-213 76 Malmö, Sweden +46 40 680 81 60

#### Krister Danielsson

Key Account Manager +46 40 680 81 70 k.danielsson@beckhoff.com

#### 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







LYRA Design: Ronnie Bergdahl

# **BERGDAHLS AB**

# www.bergdahls.com

### **Bergdahls AB**

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### Ronnie Bergdahl

Managing Director +46 13 36 44 63 ronnie.bergdahl@bergdahls.com

# **BOLIDEN ELECTRO**

### Company profile

Intelligent products for an intelligent world! By supplying reliable solutions with cuttingedge 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

### **Boliden Electro AB**

Finnforsvägen 57, SE-936 32 Boliden, Sweden +46 91 069 94 00

### Jens Holmqvist

CEO

+46 910 69 94 01 jens.holmqvist@bolidenelectro.se

- 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

# **BLUEWAVE** microsytems AB

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

# Afshin Fardi

+46 70 770 42 79 afshin.fardi@bluewave.se

- 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

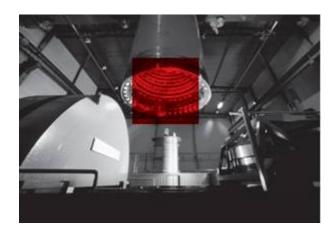
- · Hot Isostatic Pressing
- Powder metallurgy
- · Material knowledge
- · Design capabilities

# **Industry sectors**

- · Oil & Gas
- Nuclear
- Aerospace

# Company size

Medium



# 

# www.bodycote.com

# **Bodycote HIP AB**

Box 209 SE-735 23 Surahammar, Sweden +46 220 348 00

### Oscar Karlsson

Sales Project Manager +46 739 61 32 89 oscar.karlsson@bodycote.com

#### **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





# www.brogrenindustries.com

# **Brogren Industries**

Hålstensvägen 24 SE-446 37 Älvängen, Sweden +46 303 33 39 40

### **Daniel Corneliusson**

Key Account Manager +46 730 72 36 00 daniel.corneliusson@brogrenindustries.com

- 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
- FSS
- Max Planck Institute

### Company size

Medium





# www.bumax-fasteners.com

#### **BUMAX AB**

Bultvägen 1, SE-812 94 Åshammar, Sweden +46 10 478 44 00

### **Anders Söderman**

Technical Director +46 72 204 70 38 anders.soderman@bufab.com

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

# **CARLSSON & MÖLLFR**

#### 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

# **CARLSSON & MÖLLER**



# www.c-m.se

#### Carlsson & Möller

Garnisonsgatan 45, Box 22161 SE 25023 Helsingborg, Sweden +46 42 25 38 00

#### Leif Gierlöv

Technical Sales Engineer +45 23 70 78 42 lg@c-m.se

#### 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





- 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.



Courtesy of Metso



#### www.cartech.com

### **Carpenter Powder Products AB**

Nybyvägen 10, Box 45, SE-64421 Torshälla, Sweden +46 16 15 10 00

#### Per Ingo

Managing Director +46 16 15 01 04 pingo@cartech.com

#### **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.



#### **Procurement Code**

Mechanical engineering and raw materials

# **CIM CONSULT SOLUTION SWEDEN**

# Company profile

Delivering IT-solutions for electromechanical industry since 1988.

# **Core competences**

E<sup>3</sup>-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





# www.ccsgroup.se

# **CIM Consult Solution Sweden AB**

Kopparbergsvägen 10, SE-722 13 Västerås, Sweden +46 21 448 08 40

### Fredrik Carlsson

Country Manager +46 21 448 08 42 fredrik.carlsson@ccsgroup.se

# **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



# www.cejn.com

#### **CEJN AB**

Rattvägen 1, SE-541 34 Skövde, Sweden +46 500 47 75 00

#### Kenneth Kiellberg

Manager Engineering Divison +46 500 47 75 36 kenneth.kjellberg@cejn.com

#### 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





- 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

#### Cervitrol AB

Skiffervägen 48, SE-224 78 Lund, Sweden +46 4 631 16 00

### **Magnus Bredberg**

CEO

+46 46 31 16 02 mbg@cervitrol.se

- 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**

Laboratoriegränd 11, SE-977 53 Luleå +46 10 490 71 00

#### Jan Larsson

CEO

+46 10 490 71 48 jan.larsson@conex.se

- 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-ochcase-studies/

### Company size

Large







### www.cormatic.com

### Coromatic AB

Ranhammarsvägen 20, SE 168 67 Bromma, Sweden +46 8 564 605 90

### **Charlotte Geeber**

Marketing Manager +46 732 75 38 00 charlotte.geeber@coromatic.se

- 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 multilavers, 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 highdensity 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**

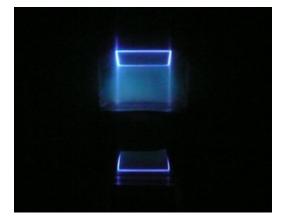
Facilities in the field of research and characterization by means of X-ray and neutron beams, including large observatories.

#### References

- · Danmarks Tekniske Universitet
- MAX IV Laboratory

# Company size

Small





#### www.crystopt-x.se

#### CrystOpt-X AB

Verkstadsgatan 15, 26135, Landskrona, Sweden

#### **Iulian Preda**

+46 704 82 56 92 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

# Damaskus Maskinskydd AB

Anläggarvägen 2, SE-136 44 Handen, Sweden

# **Peter Almqvist**

Managing Director +46 70 927 95 22 peter.almqvist@damaskus.se

- 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





# www.digitalmechanics.se

#### **Digital Mechanics Sweden AB**

Tallmätargatan 1C, SE-721 34 Västerås, Sweden

### Andreas Södergren

Sales

+46 21 475 53 21 andreas.sodergren@digitalmechanics.se

#### 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



#### www.dvel.se

#### **DVel AB**

Scheelevägen 32, SE-223 63 Lund, Sweden +46 733 85 69 10

### Riki Virc

CEO

+46 733 85 69 10 riki.virc@dvel.se

- 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 costeffiency to IT operations using our own opensource 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

#### Elastisys AB

Tvistevägen 47, SE-907 29 Umeå, Sweden +46 72 353 23 23

### **Robert Winter**

CEO

+46 72 353 23 23 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

#### **Element Metech**

Box 73. SE-241 21 Eslöv. Sweden Åkermansväg 10, SE-241 38 Eslöv, Sweden

#### Jens Bergendorff

Regional Manager +46 72 391 62 18 jens.bergendorff@element.com

- 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<sup>AB</sup>

# www.emvholding.se

# **EMV Holding AB**

Everlövsvägen 136-40, SE-275 63 Blentarp, Sweden +46 416 77 22 00

### Patrik Malmström

Managing Director +46 708 85 64 94 patrik@emvstainless.se

- 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

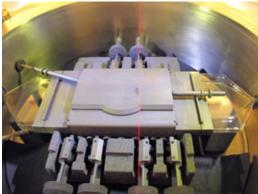
### References

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

#### **Epiluvac AB**

Science Park Ideon, SE-223 70 Lund, Sweden +46 46 288 02 20

### Roger Nilsson

CTO

+46 708 63 08 46 info@epiluvac.com

- 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





# www.examec.com

#### **Examec Group AB**

Hannelundsgatan 12, SE-273 35 Tomelilla, Sweden +46 417 788 80

### **Mats Ohlsson**

CEO

+46 417 788 81 mats.ohlsson@examec.com

#### 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 vour 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







# www.exirbroadcasting.com

#### **Exir Broadcasting AB**

Industrigatan 17, SE-242 31 Hörby, Sweden +46 415 30 14 00

#### Magnus Wiberg

Technical Area Sales Manager +46 415 30 14 05 magnus.wiberg@exirbroadcasting.com

#### 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.



# www.fagerstrom.se

#### Fagerström Industrikonsult AB

La Cours Gata 4, SE-252 31 Helsingborg, Sweden +46 771 21 88 00

#### Per Fagerström

CEO +46 705 94 86 16 per.fagerstrom@fagerstrom.se  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



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

# **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, eq. 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





# www.finverko.se

## Finverko AB

Mogatan 1, SE 254 64 Helsingborg, Sweden +46 42 16 11 00 or +46 733 16 11 00

# Håkan Persson

Managing director +46 733 16 11 00 hakan@finverko.se

#### Procurement code

# **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.

#### **Industry sectors**

- · Electrical industry
- Manufacturing industry
- Building industry
- Research & Development

# References

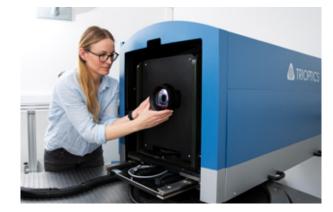
- Utility
- R&D
- Manufacturing
- · Oil & Gas
- Facilities
- Fire

# Company size

Large

# **Core competences**

- Thermal imaging
- Thermography
- · Optical gas imaging
- IR
- Optics





# www.flir.se

#### **FLIR Systems AB**

Antennvägen 6, Box 7376, SE-187 15 Täby, Sweden

#### Erika Göransson

**Director Lens Systems** +46 70 856 27 69 erika.goransson@flir.se

- 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.

- 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

# Core competences

- · Contract manufacturing
- High standards of quality demands
- · Delivery reliability
- · Small series
- Medium series



# \* FREDRIKSONS

# www.fredriksons.se

#### Fredriksons Verkstads AB

Kronängsgatan 4SE-592 30 Vadstena, Sweden +46 143 296 00

# **Reine Eriksson**

Key Account Manager +46 143 296 68 reine.eriksson@fredriksons.se

#### Procurement code

# **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 +46 500 44 45 46

# Lars Ryefalk

Marketing Manager +46 500 44 45 32 lars.ryefalk@furhoffs.se

# 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





# FÅRBO MEKANISKA AB

# www.farbomek.se

# Fårbo Mekaniska AB

Fårbovägen 19, SE-737 32 Fagersta, Sweden +46 223 109 11

#### Mats Sandberg

Quotes, environment +46 223 105 52 mats.sandberg@farbomek.se

#### Procurement code

# **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

- FSS
- MaxLab
- All universities
- All nuclear power plants

# Company size

Small



# www.gammadata.se

#### **Gammadata Instrument AB**

Box 15120, SE-750 02 Uppsala +46 18 56 68 00

Stefan Isaksson **Business Unit Manager** +46705926356 stefan.isaksson@gammadata.se

- 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 mog 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)







# www.glenair.com

## Glenair Nordic AB

Gustav III:s Boulevard 42 Box 726, SE-169 27 Solna, Sweden

# **Mats Nielsen**

CEO

+46 708 30 55 80 mats@glenair.se

- Civil engineering, building and technical services;
- Electrical engineering and magnets
- Electronics and radio frequency
- Optics and photonics
- Vacuum and low temperature

# 82

# **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, statebased 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)
- FSS

# Company size

Small





# www.goalart.com

#### GoalArt

Scheelevägen 17 SE-223 70 Lund. Sweden +46 46 286 4880

# Jan Eric Larsson

President and CEO +46 46 286 4880 janeric@goalart.com

- 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 Nasdag 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





#### www.granges.com

#### Gränges AB

Linnégatan 18 Box 5505, SE-114 85, Stockholm, Sweden +46 122 838 00

#### Torbjörn Sternsjö

Senior Vice President Technology & Business Development +46 732 01 49 21 torbjorn.sternsjo@granges.com

# Procurement code

# 84

# 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.

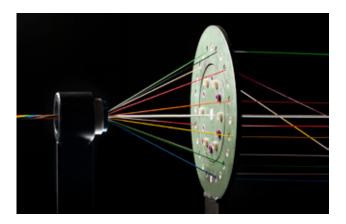
### Core competences

- · 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

#### **Habia Cable**

Kanalvägen 18 Box 5076 SE-194 05 Upplands Väsby, Sweden +46 8 630 74 40

# 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  $\pm$  0.5  $\mu$ m. 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





# www.hagema.se

#### Hagema AB

Bolshedensindustriväg 26, SE-427 50 Billdal, Sweden +46 31 910410

# Fredrik Thorlin

Production/Sales +46 729 76 97 64 fredrik@hagema.se

# Procurement code

# 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

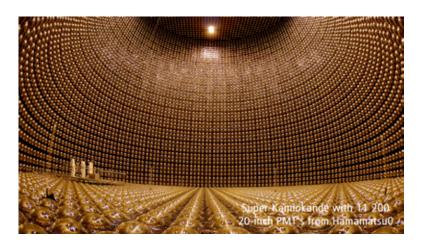
- Optoelectronics
- Photoics

# **Industry sectors**

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

# Company size

Small company





#### www.hamamatsu.com

#### **Hamamatsu Photonics Norden AB**

Torshamnsgatan 35, SE-16440 Kista, Sweden +46 8 50 90 31 00

# Anna Mårtensson

Marketing Coordinator +46 8 50 90 31 16 anna.martensson@hamamatsu.se

- 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







# www.hamek.se

#### Hamek AB

Åkervägen 13, 175 26 SE-Järfälla, Sweden +46 8 58 41 06 70

#### Adam Dahlberg

President +46 8 58 41 06 71 adam.dahlberg@hamek.se

#### Procurement code

# 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 allovs
- 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





# www.haraldpihl.com

## **Harald Pihl**

Mätslingan 19, SE 187 15 Täby, Sweden +46 8 731 56 00

# Jonas Pihl

Managing Director +46 8 731 56 00 jonas.pihl@haraldpihl.com

# 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





# www.herrstroms.se

# Herrströms Mekaniska Verkstads AB

Dalaslingan 10, SE-231 32 Trelleborg, Sweden +46 410 527 00

# Christer Herrström

Managing Director +46 410 527 06 chh@herrstroms.se

- 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



# www.hgf.se

## **AB Halmstads Gummifabrik**

Knäredsgatan 27, SE-30250 Halmstad, Sweden +46 35 180646

# **Christian Kiks**

CEO

+46 765 250646 christian.kiks@hgf.se

#### References

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

# Company size Medium



#### **Procurement Code**

# 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 guartered 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 Nasdag 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

#### **HMS Industrial Networks**

Stationsgatan 37, SE-300 04 Halmstad, Sweden +46 35 17 29 00

# Michela Nalin

Marketing Coordinator +46 35 17 29 93 min@hms.se

- 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 **H**

# www.hoganas.com

#### Höganäs AB

Bruksgatan 35, SE-263 83 Höganäs, Sweden +46 42 33 80 00

# **Hilmar Vidarsson**

Specialist Chemistry +46 42 33 83 22 hilmar.vidarsson@hoganas.com

# 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



# www.insitu.se

#### In Situ Instrument AB

Herrgårdsvägen 2SE-81630 Ockelbo, Sweden

# Ulf Mäkitalo

Sales and marketing manager +46 725 52 76 39 ulf@insitu.se

- Wind Power Meteorology
- Hydrology
- · Greenhouse gas measurements

### Industry sectors

- Hydropower
- Meteorology
- Renewables
- Instruments
- Sensors
- Hvdrologv.

#### 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



- 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**

- · Bia Science
- · Oil and gas
- Nuclear
- Automotive
- · Process industry



# www.jobsab.se

JOBSAB Interpiping System AB Järvgatan 8, SE-261 44 Landskrona, Sweden +46 418 289 30 www.jobsab.se

#### Magnus Jönsson

Manager Director +46 73 7751279 magnus.jonsson@jobsab.se

#### 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



- 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





# www.join.se

# **JOIN Business & Technology AB**

IDEON Science Park, Alfahuset Scheelevägen 15, SE-223 70 Lund, Sweden +46 46 286 34 00

# Göran Nybom

CEO

+46 708 75 19 25 goran.nybom@join.se

- 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 subassemblies 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**

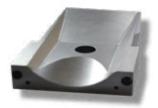
- Defense
- Medical
- Metrology
- Big-science

# References

- CFRN
- · GE Healthcare
- SAAB
- Hexagon

# Company size

Small



Graphite-molybdenum for use in collimators



Copper-Diamond material for heat-sinks



# www.fridman.com

#### KG Fridman AB

Box 496, SE-651 11 Karlstad, Sweden +46 (0)54 18 52 15

# **Alain Lennquist**

+ 46 703 17 67 62 alain@fridman.com

- 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







# www.kisab.eu

## **KISAB**

Industrigatan 64, SE-291 36 Kristianstad, Sweden +46 44 590 11 09

# **Claes Andersson**

CEO

+46 44 590 11 09 claes@kisab.eu

# Procurement code

# 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







# www.kmv.se

# Kungsörs Mekaniska Verkstad AB

Malmbergavägen 21, SE-73632 Kungsör

# **Anders Karlsson**

CEO +46 227 61 65 03 anders.karlsson@kmv.se

- 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





# www.larssonkjellberg.se

# Larsson & Kjellberg AB

Verkstadsgatan 9, SE- 613 41 Oxelösund, Sweden +46 155 29 29 90

# **Lars Erlandsson**

MD/Sales +46 155 29 29 92 lars@larssonkjellberg.se

#### **Procurement Code**

# 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**

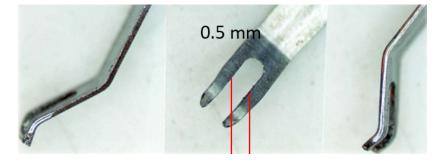
Space, micro machining, surgical and medical devices, dental devices, R&D organizations, off shore and subsea applications e.g. encapsuling of sensors for deep sea applications.

#### References

- CFRN
- · Alcatel Subsea Networks
- DOVFR
- Integrum
- Max IV

# Company size

Small





#### www.lasernova.se

# Laser Nova AB

Odenskogsvägen 1A SE-831 48 Östersund, Sweden

# **Rickard Olsson**

CTO

+46 63 18 08 80 rickard.olsson@lasernova.se

# Procurement code

# 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
- · Bia 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







# www.liedholms.se

## Liedholms Maskinteknik AB

Ingenjörsgatan 2, SE-25227 Helsingborg, Sweden +46 42 19 98 50

#### Esbiörn Säiner

Key Account Manager +46 739 78 98 64 esbjorn.sainer@liedholms.se

- 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





# www.lownoisefactory.com

#### Low Noise Factory AB

Nellickevägen 22, SE-412 63 Gothenburg, Sweden +46 31 27 70 17

# Niklas Wadefalk

CEO +46 31 27 70 17 wadefalk@lownoisefactory.com

# **Procurement codes**

Electrical engineering and magnetsElectronics 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
- Pharmacv
- R&D
- · Food and packaging
- Science

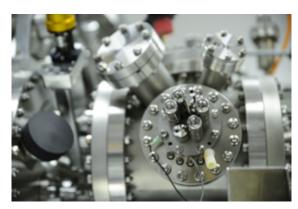
#### References

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





# www.low2high.se

# Low2High Vacuum AB

Datavägen 57B, SE-436 32 Askim, Sweden

# Mickael Sörensson

Regional Sales Manager +46 31 68 82 86 mickael.sorensson@low2high.se

#### 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.



# www.lowener.se

#### Löwener Vacuumservice AB

Box 42137, SE-126 15 Stockholm, Sweden +46 8 505 980 00 info@lowener.se

#### **Anders Holm**

Managing Director +46 8 505 980 02 anders.holm@lowener.se

#### **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
- Fricsson Radar
- Sub supplier to Automotive manufacturers such as Volvo, Mercedes, Jaguar, sub supplier to Alstom and General Electric. etc.

## Company size

Small



#### 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, O-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, O-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

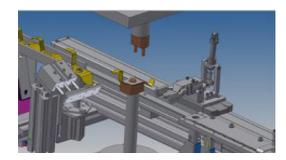
- · Nuclear fuel and waste management
- Nuclear industry
- Manufacturing industry
- Energy
- Automotive
- · Wood processing, paper and pulp
- Marine
- Water
- Research facilities
- Machine building

#### References

• Swedish Nuclear Fuel and Waste Management Company

#### Company size

Small



# www.maskinteknikab.se

#### Maskinteknik i Oskarshamn AB

Bilgatan 9, SE-572 51 Oskarshamn, Sweden +46 491 382 820

### **Linda Sharp**

+46 491 38 28 27 linda@maskinteknikab.se

#### Procurement code

# 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

# **MCT Brattberg AB**

Lyckeåborg SE-371 92 Karlskrona, Sweden +46 455 37 52 00

# Mats Åfeldt

Area Sales Manager +46 455 37 52 01 mats.afeldt@mctbrattberg.se

- 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**

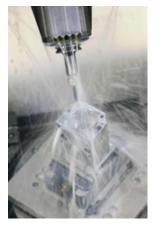
Gas turbines, nuclear industry, heat transfer, engine cooling, industry ovens, inline stitching industry, nanotechnology, transmission system.

#### 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

#### Merx Svenska AB

Lindåkersgatan 1A, SE-602 23 Norrköping, Sweden +46 11 19 19 90

#### **Thomas Smedberg**

Sales Manager +46 11 19 19 95 thomas@merx.se

#### Procurement code

# 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 arindina
- · Coherent: precision granite

# Company size

Small





# www.microbas.se

#### **Microbas Precision AB**

Tippvägen 4, SE-281 41 Hässleholm, Sweden +46 451 152 00

#### **Magnus Lindvall**

Managing Director magnus.lindvall@microbas.se +46 708 33 52 06

- 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 outlinecut 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.

- 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

#### **Industry sectors**

- Flectronics
- Design
- Telecom
- · Precision-engineering
- Optics
- Food
- Medicine
- Space



# www.mikroponent.se

#### Mikroponent AB

Postgatan 5, SE-331 30 Värnamo, Sweden +46 370 69 39 70

#### Örian Dahlstedt

Sales Manager +46 370 69 39 77 orjan.dahlstedt@mikroponent.se



- 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, highquality transmission components and advanced mechanical components incorporating Mikroquality.

#### 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

#### Mikroverktyg AB

Box 281, SE-151 23 Södertälje, Sweden Hantverksvägen 5, SE- 151 65 Södertälje, Sweden +46 8 550 268 00

#### **Lars Bohman**

Sales manager +46 705 50 64 39 lars.bohman@mikroverktyg.se

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

# MODELLTEKNIK

#### Company profile

We are an engineering company with cuttingedge 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
- CFRN
- Flir
- Nobel Biocare
- Minesto
- Orexplore
- Philips
- Rolls Rovce
- Saab
- Scania
- Stille
- Volvo.

#### Company size

Small



# **MODELLTEKNIK**

#### www.modellteknik.se

#### Modellteknik AB

Fröslundavägen 5, SE- 632 32, Eskilstuna, Sweden

#### Johan Tegnemo

Technical Sales Manager +46 16 10 76 72 iohan@modellteknik.se

#### 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







# www.mpbolagen.se

#### MP bolagen Industri AB

Box 3, SE-574 36 Vetlanda, Sweden

#### **Ulf Birath**

Export manager +46 708 303 303, +46 383 763 613 ulf.birath@mpbolagen.se

- 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





#### www.nanovac.se

#### Nanovac AB

Järngatan 8, SE-234 35 Lomma, Sweden +46 70 7284692

#### **Thomas Engstedt**

+46 707 28 46 92 thomas.engstedt@nanovac.se

- 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**

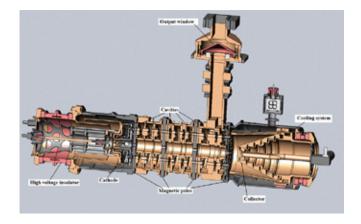
- Electrical
- Electronics
- · Electromechanical
- · RF systems

#### Referenses

- Microwave
- Magnetron
- Klystron
- · RF systems

# Company size

Small





#### www.nelsoncreated.com

#### **Nelson Created AB**

Luthagsesplanaden 9B SE-752 25 Uppsala, Sweden

#### **Daniel Lundberg**

CEO

+46 737 20 77 66 daniel.lundberg@nelsoncreated.com

#### **Procurement codes**

Electrical engineering and magnetsElectronics 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

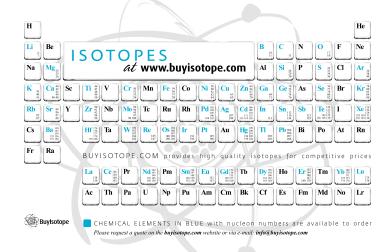
Enriched Isotope powders, particles, crystals, rods, foils, discs, isotopically modified organic and inorganic compounds.

#### **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.





# www.buyisotope.com

#### **Neonest AB**

Storgatan 70C Solna, SE-10691, Sweden +46 762 19 97 31

#### **Petr Vasiliev**

CEO +46 762 19 97 31 info@buyisotope.com

- 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

GΕ

#### Company size

Small



# www.nordbergstekniska.se

### Nordbergs Tekniska AB

Skyttevägen 15, SE-186 91 Vallentuna, Sweden

#### Oskar Nordberg

Material Specialist +46-8-290240 oskar@nordbergstekniska.se

# 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 Nasdag 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

#### **NOTE AB**

Borgarfjordssgatan 7, 5TR, SE-164 40 Kista, Stockholm

+ 46 8 56 89 90 00

#### Jonas Alexander Söderlund

**Business Development Manager** +46 70 375 10 83 ionas.soderlund@note.eu

- 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.

- · Decommissioning
- Waste management
- · Radiation monitoring equipment
- Fire protection

#### References

**ESS** 

#### Company size

Medium

#### **Core competences**

- · Radiation protection
- Engineering
- · Major big projects
- · New builds





#### www.nuvia-nordic.com

#### **Nuvia Nordic AB**

Fallhammargatan 3b, SE-721 33 Västerås, Sweden +46 21 13 34 13

#### **Tobias Gustavsson**

CEO

tobias.gustavsson@nuvia-nordic.com

- 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

#### **nVent Nordic AB**

Flöjelbergsgatan 20B, SE-431 37 Mölndal, Sweden +46 31 335 58 00

#### **Ulf Broomé**

Regional Sales Manager +46 70 604 40 31 ulf.broome@nvent.com

- 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



www.omnisys.se

#### **Omnisys instruments AB**

August Barks Gata 6B SE-421 32 Västra Frölunda, Sweden +46 31 734 34 00

#### **Martin Kores**

CEO +46 732 30 55 60 martin.kores@omnisys.se

#### 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



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

## 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





#### www.ovako.com

Ovako AB

SE-81382 Hofors, Sweden

#### Göran Nyström

**EVP Marketing and Technology** +46 706 67 85 42 goran.nystrom@ovako.com

#### **Procurement Code**

Mechanical engineering and raw materials

# 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







# www.pfeiffer-vacuum.com

#### Pfeiffer Vacuum Scandinavia AB

Johanneslundsvägen 3, SE-194 61 Upplands Väsby, Sweden

+46 8 590 748 10

#### Stefan Brun

Managing Director +46 8 590 748 10 sales@pfeiffer-vacuum.se

# 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



# www.pilz.se

# Pilz Skandinavien K/S

Smörhålevägen 3, SE-434 42 Kungsbacka +46 300 139 90

#### Patrik Frivold

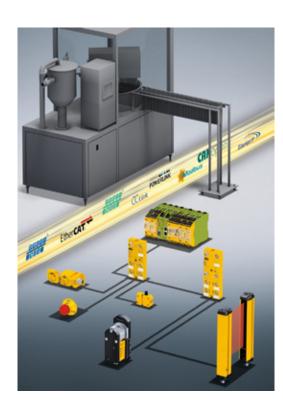
Country Manager +46 300 139 90 p.frivold@pilz.dk

#### References

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

#### Company size

Large



#### 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

### Polyamp AB

Bäckgatan 10, SE-597 53 Åtvidaberg, Sweden +46 120 85 400

#### 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.

# PROACT

#### www.proact.se

# **Proact IT Group AB**

Kistagången 2, SE-164 28 Kista, Sweden +46 8 410 666 00

#### **Mattias Keiisner**

**Technical Sales** +46 733 56 68 86 mattias.keijsner@proact.se

#### 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



- 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**

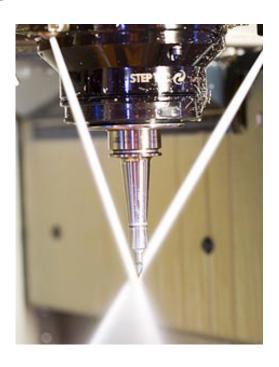
- · Particle accelerators
- Vehicle
- Medical
- · Packaging and processing-sector

#### References

We have delivered diod stacks to CERN.

#### Company size

Small





# www.prodtek.se

#### Produktionsteknik i Lund AB

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

#### Jakob Fornander

General Manager jakob@prodtek.se +46 46 33 51 80

- 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





# www.promech.se

#### **Promech Lab Holding AB**

Almviksvägen 41, B25, SE-21845 Vintrie, Sweden

#### Jürgen Persson

Founder, CEO, Mechanical engineer +46 704604391 Jup@promech.se

- 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/



#### www.qamcom.se

#### **Qamcom Research and Technology AB**

Teknikringen 1F, SE-58330 Linköping, Sweden +46 736 61 90 91

#### **Omid Sotoudeh**

Office manager +46 736 61 90 91 omid.sotoudeh@gamcom.se 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



- 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.

#### 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

#### Core competences

- Pipes
- Fittings
- Valves
- Filters
- · Customized solutions
- · Stainless steal





# www.qmtscience.se

#### **QMT Science AB**

Amerikavägen 6, SE-393 56 Kalmar, Sweden +46 480 44 26 51

#### Martin Lagström

Sales

+46 70 369 48 92 martin.lagstrom@gmt3.com

- 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 preserie-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







### www.qtechgroup.se

#### **Qtech Group AB**

Grand Prixgatan 4, SE-334 33 Anderstorp, Sweden +46 370 51 10 00

#### Glenn Wilander

CEO +46 70 911 17 28 glenn@qtechgroup.se

# R.A.P.S

#### Company profile

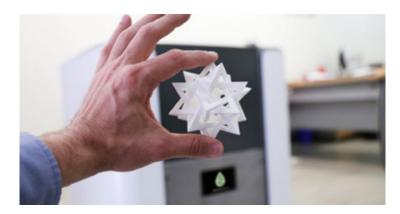
We are a supplier of machine and services within additive manufacturing.

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

#### r.a.p.s

Spegelgatan 1, SE-261 47 Landskrona, Sweden +46 70 814 74 00

#### Pär Nobring

CEO +46 70 814 74 00 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-tomarket, and saves development and consultancy costs for our customers.

#### Company size

Medium





#### www.recab.com

#### Recab AB (HQ)

Västberga Allé 5, SE-126 30 Hägersten, Sweden +46 8 683 03 00

#### Brian Ulskov Sørensen

**Engineering Director** +45 20 20 85 85 brian.ulskov.sorensen@recab.com

- 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

#### **Reilers Sverige AB**

Lindhagensgatan 126 Box 302 33, SE-104 25 Stockholm, Sweden

#### **Johan Linterius**

Group Manager Energy +46 70 313 78 98 johan.linterius@rejlers.se

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

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# 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





### www.requtech.com

#### ReQuTech AB

Teknikringen 1F, SE-58330 Linköping, Sweden +46 722 30 33 80

#### **Omid Sotoudeh**

CEO +46 722 30 33 80 omid.sotoudeh@regutech.se

- Electrical engineering and magnets
- Electronics and radio frequency

# **RESINIT**

#### Company profile

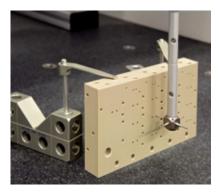
Resinit AB is a high-quality supplier of components machined in plastics and thermosettings. We specialise in plastic materials that are challenging to machine, with high demands on quality and delivery reliability. Our primary target is the manufacturing industry and we closely monitor the development 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

#### Resinit AB

Polymergatan 7, SE-593 50 Västervik, Sweden +46 490 82 320

#### **Andreas Hellman**

Key Account Manager andreas.hellman@resinit.se

#### Procurement code

Mechanical engineering and raw materials

# **RFR SOLUTIONS**

#### **Company profile**

Our focus is on stainless steel solutions. RFR Solutions develops, manufactures and sells firstrate 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 vou 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 vour 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 vears ago we also have a close cooperation with the universities in Lund, Uppsala and Luleå regarding different areas of competencies.

#### Company size

Small





#### www.rfrsolutions.se

#### **RFR Solutions AB**

Förrådsgatan 3, SE-261 35 Landskrona, Sweden +46 418 48 55 00

#### **Mats Orup**

Managing Director +46 418 48 55 72 mats.orup@rfrsolutions.se

- 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.



# www.ri.se/en

#### RISE, Research Institutes of Sweden

Measurement Science and Technology P O Box 857, SE-501 15 Borås, Sweden

#### Jan Johansson

+46 70 517 67 22 jan.johansson@ri.se

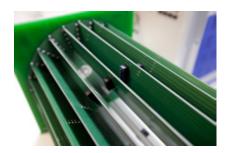
- Optical metrology including refraction and spectroscopy with application in e.g. measurements of low pressure and vacuum
- Dimensional metrology ranging from nano- to alobal scales
- Developing equipment and methods for dissemination and synchronization of time and
- Sensor development and methods 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



- 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**

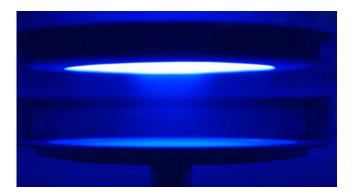
- Semiconductor
- Nuclear
- Space
- Cryogenic
- · Automotive
- · Turbine manufacturing

#### 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: SIFMENS

#### Company size

Small





#### www.rowaco.se

#### Rowaco AB

Gamla Tanneforsvägen 16, SE-582 54 Linköping, Sweden

+46 10 155 03 10

#### Kristian Flodström

Sales Manager +46 10 1550311 kristian@rowaco.se

- 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<sup>™</sup> intelligent tube system for material monitorina

With more than 150 years of experience from developing and manufacturing products in steel, stainless steel, nickel, zirconium and titaniumbased 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



## www.materials.sandvik/services

#### Sandvik Materials Technology AB

Jernverksleden 8, SE-811 34 Sandviken, Sweden +46 26 26 00 00

#### Marie Vennström

Manager Engineering Solutions, Stainless Service +46 70 240 66 54 marie.vennstrom@sandvik.com

#### 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



- 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

# ScandiNova

## www.scandinovasystems.com

#### ScandiNova Systems AB

Ultunaallén 2A, SE-756 51 Uppsala, Sweden +46 18 480 59 00

#### Mikael Lindholm

Senior Vice President Sales & Marketing +46 70 323 34 07 mikael.lindholm@scandinovasystems.com

#### **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



#### 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







# www.scanditronix-magnet.se

#### **Scanditronix Magnet AB**

Olvägen 28, SE-342 50 Vislanda, Sweden +46 472 486 80

#### Mikael Vieweg

CEO

+46 472 486 81 mikael.vieweg@scxmagnet.se

#### 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

# **Å** scanmast

#### www.scanmast.com

#### Scanmast AB

Landsvägen 98, SE-79295 Mora, Sweden +46 25 02 92 00

#### Stefan Mvhr

Business Manager Material +46 70 576 88 87 stefan.mvhr@scanmast.com

#### **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



- 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 realtime 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

#### Josef Christoffersson

Product Manager +46 705 88 89 18 josef.christoffersson@schneider-electric.com

- 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

#### Scienta Omicron AB

Danmarksgatan 22, SE-75323 Uppsala, Sweden +46 707 69 44 91

#### Susanna Eriksson

Director, Electron spectroscopy +46 707 69 44 91 susanna.eriksson@scientaomicron.com

- 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
- Fricsson
- ABB
- Siemens
- Essity
- Mölnlycke

### Company size

Large





#### www.semcon.com

#### Semcon Sweden AB

Lindholmsallén 2, SE-417 80 Göteborg, Sweden +46 31 721 00 00

### **Mats Fredrikson**

Group Manager +46 73 682 76 00 mats.fredrikson@semcon.com

- 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 knowhow 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

### Sigma

Södra Kungsgatan 5A, SE 9763 Luleå, Sweden +46 703 61 76 16

### Karin Sjöö Åkeblom

Department Manager +46 703 61 76 16 karin.sjoo.akeblom@sigma.se

- 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

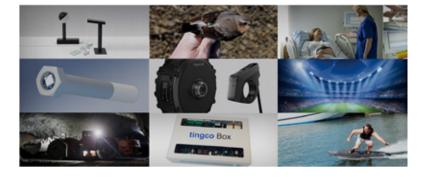
Medical technology, environmental technology, electrical vehicles industrial and mobile telephony.

### 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

### Sigma Lundinova AB

Dalbyvägen 1, SE-224 60 Lund, Sweden +46 46 590 05 00

### Marcus Weibull

CEO

+46 46 590 05 65 marcus.weibull@lundinova.se

#### 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





### www.silver-weibull.se

### Silver Weibull Production AB

Industrigatan 15, SE-28143, Hässleholm, Sweden +46 451 384800

### Jonas Rolandsson

Managing Director +46 451 384825 jonas.rolandsson@silver-weibull.se

### 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





### www.skf.com

### SKF Sverige AB

Von Utfallsgatan 2, SE-415 50 Göteborg, Sweden +46 31 337 10 00

### **Hans Norrman**

Business Manager, Hydrostatic Bearing Solutions +46 702 35 99 61 hans.norrman@skf.com

#### Procurement code

### **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**

Tenngatan 6-8, SE-234 35 Lomma, Sweden +46 40 536 60 0

### Karoline Liung

Sales/Logistics +46 40 53 66 23 karoline.ljung@solectro.se

- 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**

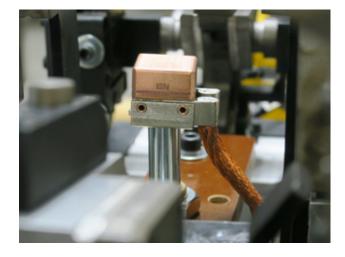
Mechanical manufacturing to the automotive, food, and pharmaceutical industry.

### References

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

### Company size

Small





### www.specialteknik.se

### Specialteknik i Sverige AB

Olof Asklunds gata 18, SE-421 30 Västra Frölunda, Sweden

### Per Lundgren

Project manager +46 313 50 40 51 per.lundgren@specialteknik.se

#### Procurement code

### 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

### **Andreas Korzonek**

Head of Sales +46 70 553 0919 andreas@stavangersteel.se

### Procurement code

### 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

# **Studsvik**

www.studsvik.com

#### Studsvik Nuclear AB

SE-61182 Nyköping, Sweden +46 155 22 10 00

### Carolina Losin

Key Account Manager +46 760021478 carolina.losin@studsvik.com

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



- 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

c/o SAAB AB, Nettovägen 6, SE-17541 Järfälla, Sweden +46 8 58 03 11 40

### Håkan Ekstedt

CEO

+46 708 58 03 16 hakan.ekstedt@sunmek.se

### 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**

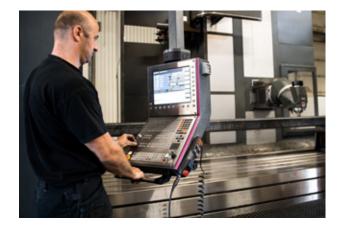
- Marine
- Water
- Manufacturing Industry
- Automotive
- Energy, Mining
- Wood processing
- Machine building Industry
- · Science. Medicine

#### References

- SAAB Kockums
- Xvlem
- NKT
- ABB
- · Scanditronix.
- Modig Machine

### Company size

Small





### www.svennes-verktygsmek.se

### Svennes Verktygsmekaniska AB

Tennvägen 15, SE-371 50 Karlskrona, Sweden

### **Elvis Nazdraiic**

Site Manager +46 455 615 791, +46 705 88 23 20 elvis@svennes-verktygsmek.se

- 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
- IKFA
- Mobill
- HMS

### Company size

Small





### www.svep.se

### **Svep Design Center AB**

St. Lars väg 42A, SE 222 70 Lund, Sweden +46 46 19 27 00

### Mikael Hegardt

Business developer +46 46 19 27 03 mikael.hegardt@svep.se

### **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





### www.svetsmekanoab.se

### SvetsMekano AB

Grävmaskinsvägen 3A, SE-241 38 Eslöv, Sweden

### Ola Jönsson

Owner +46 413 175 50 info@svetsmekanoab.se

### Procurement code

### 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 287-1141 T BW FM5 S s1-2 D10, wall thickness 1.0-4.0mm H-LO45 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

### Svetstjänst in Höganäs AB

Box 721, SE 220 07 Lund Företagshusvägen 3, SE-244 93 Kävlinge, Sweden +46 70 610 61 63

### **Ronny Nilsson**

Marketing and HR Director +46 70 610 61 63 ronny@svetstjanst.com

### **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

### Swedish Microwave AB

Dynamovägen 5, SE-59161 Motala, Sweden

Mats Holm CTO +46 141 216136 mats.holm@smw.se

- 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

### www.techniatranscat.com

### TechniaTranscat AB

Isafjordsgatan 15, SE-164 40 Kista, Sweden +46 8 599 204 00

### Jens Rylander

Business Area Director +46 8 599 204 00 jens.rylander@techniatranscat.com

- 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 applicationspecific 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





### www.spdevices.com

### **Teledyne Signal Processing Devices**

Teknikringen 6, SE-583 30 Linköping, Sweden +46 13 465 06 00

### **Carsten Watolla**

Global Sales and Marketing Director +46 70 140 4747 carsten.watolla@teledyne.com

#### 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

#### Texor

Alfavägen 1, SE-921 33 Lycksele, Sweden +46 95 02 75 40

### **Josef Alenius**

CEO+46 705 88 23 78 josef.alenius@texor.se

#### Procurement code

### **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

- ARR
- NKT
- Parker

### Company size Small





### www.2bab.se

### 2B Best Business AB

Hyvelgatan 2, SE-334 32 Anderstorp, Sweden

### Samuel Axklo

Technical Manager +46 371 58 70 87 samuel.axklo@2bab.se

- 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





### www.tremek.se

### Tre-Mek i Trelleborg AB

Genvägen 9, SE-23162 Trelleborg, Sweden +46 410 598 90

### Camilla Forsberg

Administrator +46 410 598 91 camilla@tremek.se

### Procurement code

### **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

### **3NW Datacenters Sweden AB**

Hällstigen 41, SE-912 33 Vilhelmina, Sweden +46 768 15 71 64

### **Christian Svanlund**

CIO +46 768 15 71 64 christian@3nwired.com

### 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





## **Unileam**

### www.uniteam.com

### **Uniteam AB**

Flygfältsgatan 7, SE-423 37 Torslanda, Sweden

### **Thomas Hansson**

Försäljningsingenjör +46 31 92 36 04 sweden@uniteam.com

- 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

### **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

### **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 allovs
- 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



### 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

### 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





#### Procurement code

### 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"







### 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

### **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**

- Bia 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





### 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<sup>2</sup> 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







### 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

- 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





### 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

### 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

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

### Company size

Small





### 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

### **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



### 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

## 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

- 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 I aval
- Kemira

### Company size

Medium





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

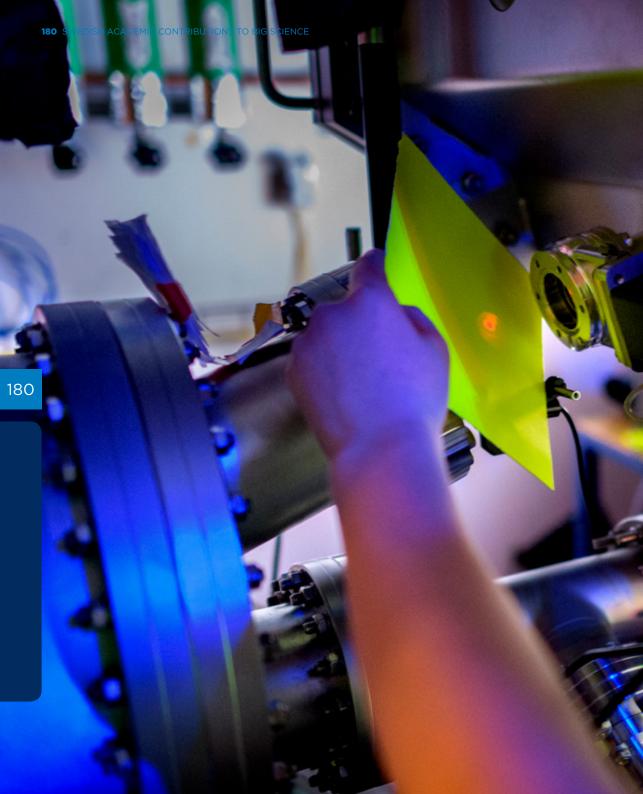
### **Erik Stark**

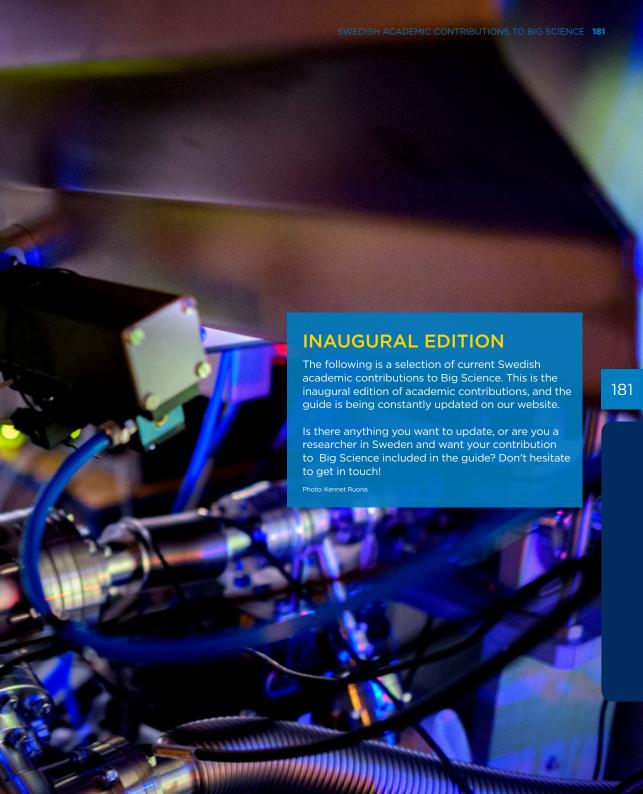
Sales Manager +46 295 24 42 00 sales@ogab.se

#### Procurement code









technical services

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- Alma Band 5 Receivers
- Analysis tools for analysis of in-situ time-resolved neutron diffraction
- Band 1 Receiver for SKA
- Detector for Simultaneous X-Ray Diffraction and Absorption Spectroscopy
- · ITERIS Design and Implementation of an Intgrated Modelling Infrastructure
- · Photon and Particle CALORIMETER CALIFA frontend system
- · Sample environment for combined nanomechancial testing and nanodiffraction
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# KTH ROYAL INSTITUTE OF **TECHNOLOGY**

 Center for X-rays in Swedish Materials Science (CeXS)

#### LINDKÖPING UNIVERSITY

• Center for X-rays in Swedish Materials Science (CeXS)

#### LULEÅ UNIVERSITY

• Eiscat 3D Design of Antenna elements

## LUND UNIVERSITY

- · Advanced Resource Connector Software for ATLAS and LHC computing
- · Construction of the time projecion chamber in ALICE at LHC
- · Contribution to the CALIFA barrel R3B experiment at FAIR

- · Contribution to the ISOLDEexperiment at CERN
- Cost-effective and versatile testbed for novel neutron detectors
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- Grid and Aperture Monitor Electronics
- · High Field High Gradient Magnets
- · High-rate Read-Out Electronics and Data Acquisition System
- · Low-level RF system
- · Master Oscillator for ESS
- · Modulator Design and Development
- Neutron Reflectometry Detectors
- · Phase Reference Line
- Pixel Pad Detectors
- Test of the Fast Neutron Attenuation of Novel Shielding Materials
- The Vacuum System of Max IV 3 GeV Storage Ring
- Upgrade of the ALICE TPC
- Upgrade of the Alice TCP detector RCU2 step

# MID SWEDEN UNIVERSITY

- The MEDIPIX Collaboration
- BrightnESS

# RISE, RESEARCH INSTITUTES OF SWEDEN

· High Voltage Reference Divider

# UPPSALA UNIVERSITY

- Acceptance Tests of Cryo Modules
- CERN Superconducting Cables Connection Cryostats (Cold Boxes)
- Cold Spark System for CLIC

- Design Study of Accumulator
- · Development of CERN superconducting Canted Cosine Theta magnet prototype
- Electromagnetic Calorimeter for the PANDA Experiment
- Extremely Large Telescope Instrumentation: Hires and Mosaic
- Laser Heaters
- Mass spectrometer and cell sorter for biology infrastructure
- · Micro Accelerator Structure center MAS
- NIR Spectrometer for European XFEL
- · Quench Study and RF Characterization of Crab Cavities
- Sample injector and diagnostic system
- · Silicon Detector Modules for ATLAS Experiment
- Super ADAM @ ILL
- · Test of The ESS High Voltage Pulse Modulators
- Testing of Superconducting **Orbit Corrector Dipole** Magnets
- Testing of the ESS superconducting elliptical
- Testing of the ESS tetrode 352 MHz radiofrequency power source
- · Testing of the Superconducting Spoke Cavity Prototype
- The IceCube Upgrade
- Veritas

# ADVANCED RESOURCE CONNECTOR SOFT-WARE FOR ATLAS AND LHC COMPUTING



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



# CERN SUPERCONDUCTING CABLES **CONNECTION CRYOSTATS (COLD BOXES)**



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
- · 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**

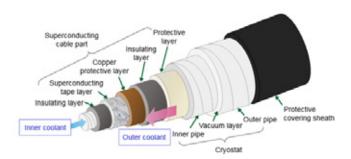
EUR 2 million

# Industry involvement

RFR Solutions

# Hyperlink

http://hilumilhc.web.cern.ch



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

# COLD SPARK SYSTEM FOR CLIC

Coordinating university: Uppsala University, www.uu.se



# **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

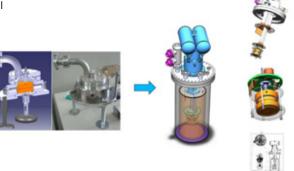
- Innovatec Ceramics
- VAQTEC.
- Omega Engineering

#### Team

Uppsala University:

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

# Cryo DC spark system



- Mechanical engineering and raw materials
- Vacuum and low temperature

# CONSTRUCTION OF THE TIME PROJECTION CHAMBER IN ALICE AT LHC



Coordinating university: Lund University, www.lu.se

## **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 (preampshaping 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
- CFRN
- GSI Darmstadt
- University Frankfurt
- University of Heidelberg

### Hyperlinks

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



- Electronics and radio frequency
- Particle and photon detectors

# CONTRIBUTION TO THE ISOLDE-**EXPERIMENT AT CERN**



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:

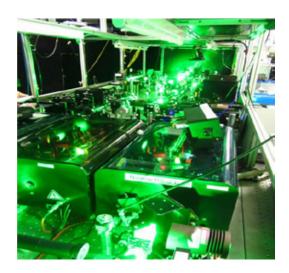
Joakim Cederkäll, Professor, Nuclear physics, Faculty of science, Department of physics

#### Year

2018-2022

# **Budget**

EUR 270,000



- Particle and photon detectors
- Optics and photons

# DARKJETS

#### 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
- Commissioning of FPGA-based board for event selection in the upcoming LHC Run
- · Scientific and technical peer-reviewed publications

#### Year

2016-2021

# **Total budget**

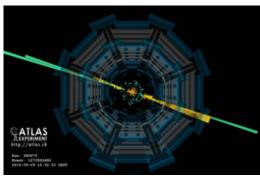
EUR 1,27 million

# 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

# **DEVELOPMENT OF CERN SUPERCONDUCTING** CANTED COSINE THETA MAGNET PROTOTYPE



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

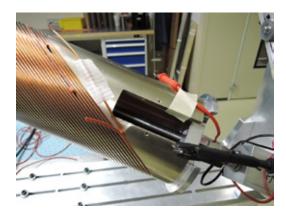
2017-2019

# **Total budget**

EUR 500,000

# Industry involvement

- Uppsala university
- Scanditronix



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

# **DEVELOPMENT OF THE RILIS/LARIS-ISOLDE** LABORATORIES AT CERN



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



- Particle and photon detectors
- Optics and photons

# 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 us, 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 flattop 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

## RISF:

- 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
- 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



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

# QUENCH STUDY AND RE 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 crvostat.

# **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
- Electronic acquisition hardware
- · Data analysis

#### Year

2016-2020

## **Total budget**

FUR 2 million

# **Hyper links**

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



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

# SILICON DETECTOR MODULES FOR ATLAS **EXPERIMENT**



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

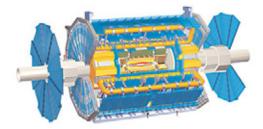
EUR 2 million

# Industry involvement

NOTE

#### Collaborations

- Uppsala University
- Lund university
- Note



# **TESTING OF SUPERCONDUCTING ORBIT CORRECTOR DIPOLE MAGNETS**



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

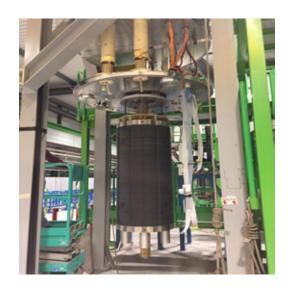
2018-

# Total budget

EUR 2 million

# **Hyper links**

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



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

# 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

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

# 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 iust 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 Miörnmark, 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
- Saclav

# Hyperlink

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



#### **Procurement Code**

Electronics and radio frequency

Particle and photon detectors

# 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

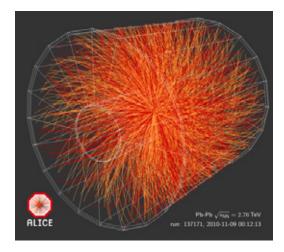
# Total budget EUR 220,000

# Collaboration

- Lund University
- · Bergen Technical High School
- KFI
- GSI
- CFRN

# Hyperlink

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



- Electronics and radio frequency
- Particle and photon detectors

# 201

#### **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 highenergy 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



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



- 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



Coordinating University: Lulea 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

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

#### **ESO**

# **ALMA BAND5 RECEIVERS**





# Core deliverables

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

#### Voar

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



# **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

## **ESO**

# **EXTREMELY LARGE TELESCOPE** INSTRUMENTATION: HIRES AND MOSAIC



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
- 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

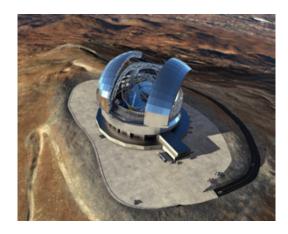
- Nvfors
- ELT instruments

#### Collaborations

- Uppsala University
- Stockholm University
- Lund Universitiy

# **Hyper links**

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



- Information technology
- Mechanical engineering and raw materials
- Optics and photons

# **ACCEPTANCE TESTS OF CRYO-MODULES**

Coordinating university: Uppsala University, www.uu.se



# **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 cryomodule
- 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



- 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

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



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

# **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 selfconsistent (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

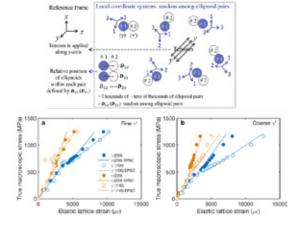
Development and implementation of a finite strain elastic-viscoplastic self-consistent crystal plasticity model for temperature dependent simulation of multiphase materials with or without crystallographic relationships and lattice coherency, including optimization engine for calibration against in-situ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

#### Year

2017-2019

# Total budget

EUR 200,000



# **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

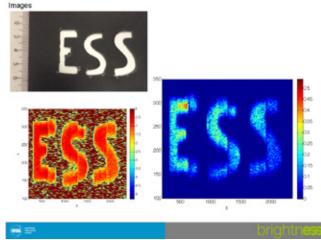
Pixel detectors for high resolution neutron imaging.

#### Year

2016-2019



208



- Information technology
- Particle and photon detectors

# COST-FFFFCTIVE 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

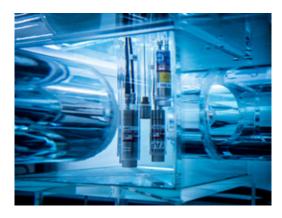
2015-

# Total budget

EUR 400.000

## Hyperlink

www.nuclear.lu.se/forskning/neutronfysik



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

# DESIGN STUDY OF ACCUMULATOR RING

Coordinating university: Uppsala University, www.uu.se



# **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



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

# GRID AND APERTURE MONITOR ELECTRONICS



Lunds Tekniska Högskola

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

# **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**

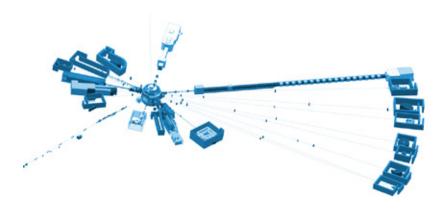
2018-

### Total budget

EUR 130.000

#### Collaborations

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



# HIGH-RATE READ-OUT ELECTRONICS AND DATA ACQUISITION SYSTEM



Coordinating university: Lund University, www.lu.se

# **Project description**

The novel neutron detectors developed for reflectometry at ESS require dedicated highspeed electronics as well as custom-made dataacquisition (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 highperforming 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
- 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



- Electronics and radio frequency
- Information technology

# LOW-LEVEL RF SYSTEM

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
- 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

FUR 4 million

## Collaborations

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

# Procurement codes

Electronics and radio frequency

Information technology

# MASTER OSCILLATOR FOR ESS

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



# **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



# MODULATOR DESIGN AND DEVELOPMENT

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



## **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.

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 highvoltage 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
- 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

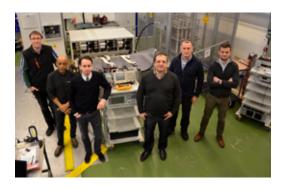
2013-2018

# Total budget

EUR 1.2 million

#### Hyperlink:

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



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

# NEUTRON REFLECTOMETRY DETECTORS

Coordinating university: Lund University, www.lu.se



# **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

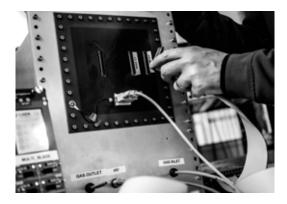
2016-2020

# **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



# PHASE REFERENCE LINE

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



#### **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

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



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 BFFR.

#### Team

Chalmers University of Technology:

 Magnus Hörngvist 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 BFFR at FSS

2017-2020

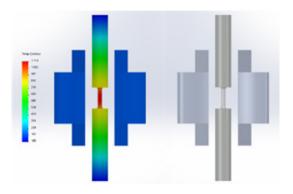
#### **Total budget** EUR 940,000

#### 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



# TEST OF THE ESS HIGH VOLTAGE PULSE **MODULATOR**



#### 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

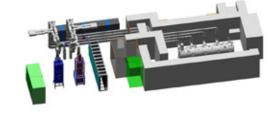
Ampegon

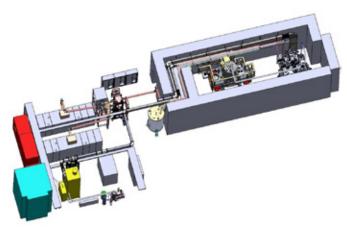
#### Year 2017-

#### **Total budget** EUR 1 million

#### Collaboration

- Uppsala University
- Lund University





# TEST OF THE FAST-NEUTRON ATTENUATION OF NOVEL SHIELDING MATERIALS



#### 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



- Information technology
- Particle and photon detectors

# TESTING OF THE ESS SUPERCONDUCTING **ELLIPTICAL CAVITY**



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
- 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

# TESTING OF THE ESS TETRODE 352 MHZ RADIOFREQUENCY POWER SOURCE



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

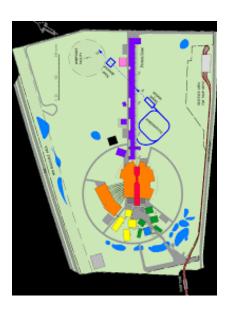
#### Year

2017-

#### Total budget EUR 1 million

#### Collaboration

- Uppsala University
- Lund University



# TESTING OF THE ESS SUPERCONDUCTING SPOKE CAVITY PROTOTYPE



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.

#### 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

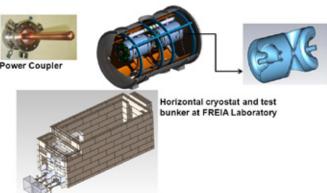
#### **Total budget**

EUR 70.000

#### **Team**

Uppsala University:

- Han Li, Researcher RF and accelerator systems
- Rolf Wedberg, researcher high power RF svstem.
- Rocio Santiago-kern, Engineer researcher cryogenic system
- · Tor Lofnes, Engineer LLRF system



- Electronics and radio frequency
- Mechanical engineering and raw materials

#### **FAIR**

# CONTRIBUTION TO THE CALIFA BARREL R3B EXPERIMENT AT FAIR



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(TI) 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

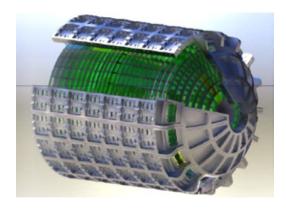
2013-2017

# Total budget

EUR 340,000

#### Collaboration

- Lund University
- KTH Royal Institute of Technology
- Chalmers University of Technology



- Particle and photon detectors
- Optics and photons

#### FAIR

# **FLECTROMAGNETIC CALORIMETER** FOR THE PANDA EXPERIMENT



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**

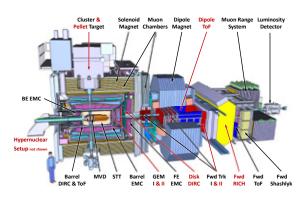
EUR 2.6 million

#### Collaboration

- Uppsala University
- Stockholm University

#### Hyper link

https://panda.gsi.de/article/electromagneticcalorimetry



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

#### **FAIR**

# PHOTON- AND PARTICLE CALORIMETER CALIFA - FRONT END SYSTEM



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

# "SEP" – backplane + I/O adapters FPGA board (commercial) (backside) Backplane Backplane

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

#### ILL

# SUPER ADAM @ ILL

#### 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
- hvdrogen 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-lavout/
- http://www.physics.uu.se/research/materialsphysics+/super-adam/



- Electrical engineering and magnets
- Mechanical engineering and raw materials

#### **ITER**

# ADDITIVE MANUFACTURING FOR FABRICATION OF 316L- GRADE COMPONENTS



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

#### **ITER**

# ITERIS - DESIGN AND IMPLEMENTATION OF AN INTEGRATED MODELLING INFRASTRUCTURE



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

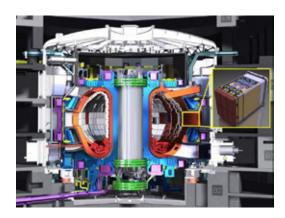
EUR 1,7 million

#### Collaborations

- CEA
- Chalmers
- FPFI

#### Hyperlink

http://iopscience.iop.org/ article/10.1088/0029-5515/55/12/123006



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#### 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

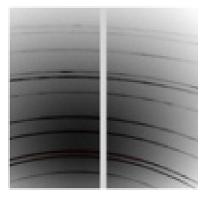
- Specification and purchasing of 2D detector
- Assembling of 2D detector and robotic arm incl. software control
- Software development for synchronous control and acquisition
- Demonstration of synchronous measurements on catalytic materials

#### Year

2018-2020

#### Total budget

EUR 500.000



First diffraction image of a Cu-block measured at Balder.

#### 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, voke length  $\leq$  300 mm, field strength B<sub>0</sub>=(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/



- Electrical engineering and magnets
- Mechanical engineering and raw materials

#### Max IV Laboratory

# SAMPLE ENVIRONMENT FOR COMBINED NANO-MECHANCIAL TESTING AND NANODIFFRACTION



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 Hörngvist 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

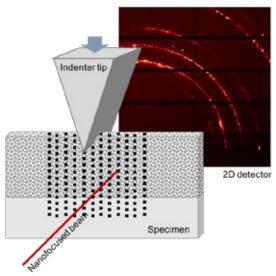
- Definition of requirements and specifications of in-situ nanoindenter equipment.
- Definition and development of approach for integration into MAX IV control and data management system
- · Acquisition and installation of nanoindenter, including commissioning at both NanoMAX beamline and Chalmers SEMs.
- Demonstration of correlated tests at MAX IV and Chalmers.

#### Year

2017-2019

# **Total budget**

EUR 370,000



#### MAX IV Laboratory

# THE VACUUM SYSTEM OF MAX IV **3 GEV STORAGE RING**



Coordinating university: Lund University, www.lu.se

#### **Project description**

Some of the characteristics of recent ultra-lowemittance (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.

Lund University, MAX IV Laboratory:

- Eshrag 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
- CFRN
- FSRF
- ALBA

#### **Hyperlinks**

www.maxiv.lu.se



- Mechanical engineering and raw materials
- Vacuum and low temperature

#### Max IV Laboratory

# **VERITAS**

Coordinating university: Uppsala University, www.uu.se



#### **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 production and installation.

#### Year

2011-2019

#### Budget

EUR 8.7 million

#### Industry involvement

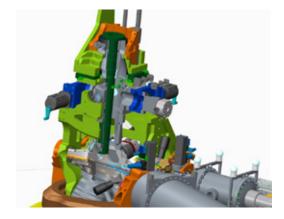
- · FMB Berlin
- Tovama
- Jtec
- Piltz Optics
- SKS
- EWCON
- Surface Concepts
- Englund Engineering
- · Pfeiffer Vacuum
- Österby Gjuteri

#### Collaboration

- Uppsala University
- Lund University
- Linköping University

#### Hyperlink

www.maxiv.lu.se/accelerators-beamlines/beamlines/veritas/



- 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



#### **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



- 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

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#### **XFEL**

# MASS SPECTROMETER AND CELL SORTER FOR BIOLOGY INFRASTRUCTURE



Coordinating university: Uppsala University, www.uu.se

#### **Project description**

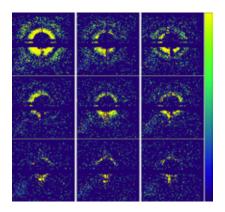
The stability of biological samples is limited, and optimal use of beam time at XFEL requires a biological sample infrastructure to provide: (i) support to the Swedish life-science community in generation and handling of challenging samples in the immediate proximity to XFEL instruments; (ii) appropriate 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

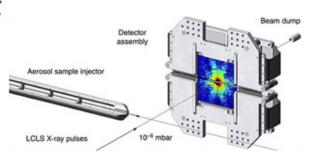
2013-

#### **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 FUROPEAN XEEL

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



- 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



#### **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 biomolecules. The project included tests of prototypes at FLASH in Hamburg and at the LCLS at Stanford.

#### 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

#### Core deliverables

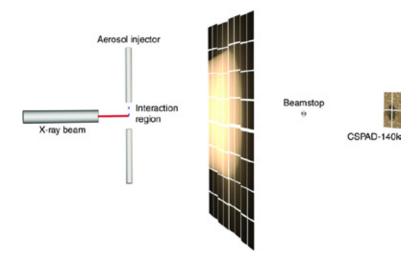
Uppsala developed a sample injector and diagnostic instrumentation for the European XFEL.

#### Year

2011-2015

#### **Total budget**

EUR 520,000



#### SKA

# BAND 1 RECEIVER FOR THE SQUARE KILOMETRE ARRAY



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

#### **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 quadridge 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 desian
- 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

- 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



#### **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 tracking of charged particles and, thanks to close cooperation with Swedish industry provided a unique solution for electronics construction in extremely thin format. Together with Swedish industrial partners 2 integrated 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



- Electronics and radio frequency
- Particle and photon detectors

# IceCube, South Pole Neutrino Observatory THE ICECUBE UPGRADE

# Coordinating university: Uppsala University, www.uu.se

# 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**

FUR 18 million

#### Industry involvement

- Fricsson
- Hudiksvall

#### Collaborations

- Uppsala University
- Stockholm university
- Michigan State University
- Munster University
- · 40 collaborating institutions worldwide

#### Hyperlink

Icecube.wisc.edu

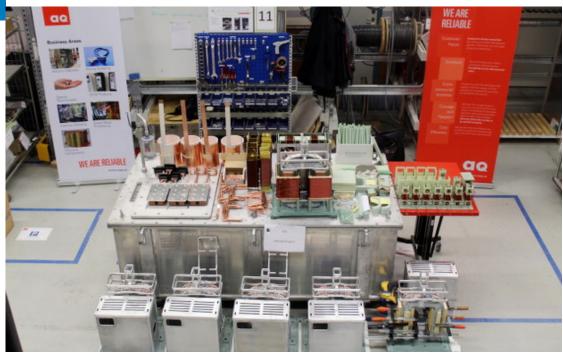


- Electrical engineering and magnets
- Electronics and radio frequency
- Mechanical engineering and raw materials









## **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.

"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.

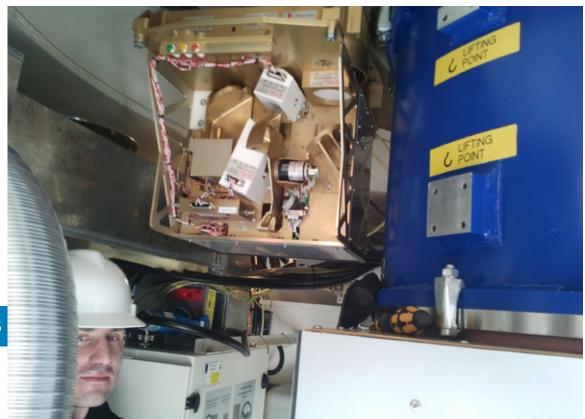
#### Entrepreneurial partner

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 120us 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.

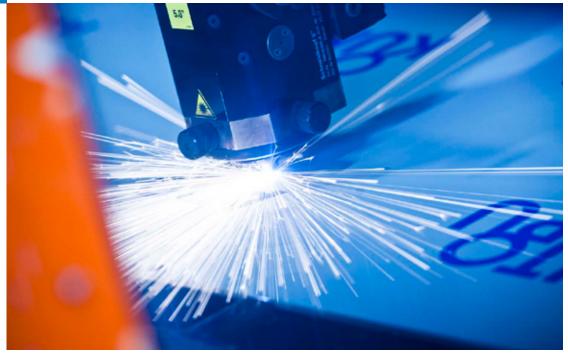
#### **Expansion opportunities**

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

"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 vears.

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 Hackas 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

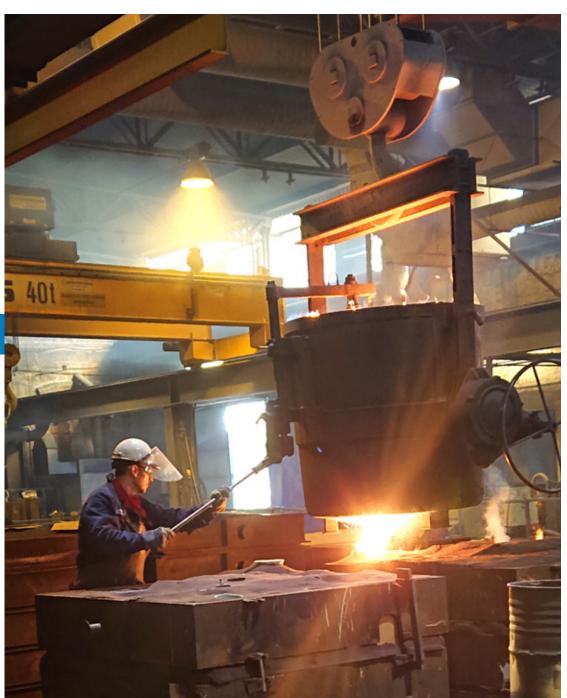
parts with geometries that are even more complex than ones that can be made through casting, 3D printed parts can be offered in other materials than aluminium, such as titanium, stainless steel and plastics.

## 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."



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 hightech 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 Al, 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 roundtable 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.





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.









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.











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 Al 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.











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.











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:

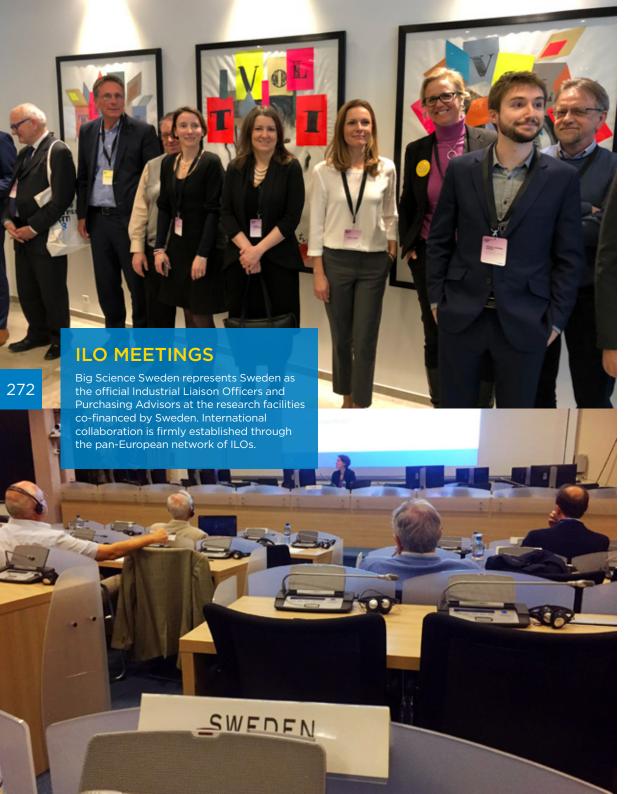
When visiting CERN, we met with a group of Swedish employees at CERN over an informal lunch. They gave us valuable information and useful leads.

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 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.







Big Science Sweden @BigScienceSWE - 5 dec. 2018 En av finansiärerna Vinnova o Natasa Pahlm om mål med Big Science Sweden. #vinnovase#vetenskapsrådet



Big Science Sweden @BigScienceSWE - 14 nov. 2018 Jerôme Pierlot, #CERN busy with one of the 54 Swedish meetings at #Elr Subcontractor, Here together with Magnus Jönsson, CEO, \$300ab already a supplier to Big Science sess and #maxIV. Evinnova evr #tibractverket



Big Science Sweden @BigScienceSWE - 13 nov. 2018 Studsvik, ny medlem i Big Science Sweden. Fyra Big Science Sweden medarbetare på rundvisning!



Studsvik on Linkedin: "Studsvik has recently become a Big Science ... November 9, 2018: Studsvik posted images on LinkedIn linkedin.com



Big Science Sweden @BigScienceSWE - 30 aug. 2018 På gårdagens Big Science Sweden-konferens och workshop på ett fullsatt AF i Lund gavs många inblickar i hur ny teknik - Artificiell intelligens - kan ôka produktiviteten i framtida produktionssystem. \*\*\*



Big Science Sweden @BigScienceSWE - 3 maj 2018 Fullt med spännande företag som Carlsson & Möller Skanska Alfalaval liedholms note o fier.



Big Science Sweden @BigScienceSWE - 28 feb. 2018 Johan Holmberg and Leif Eriksson from the Swedish Research Council (Vetenskapsrådet) are interested in what happens to Big Science Sweden and Big Science in general. #BCBF2018 #



Big Science Sweden @BigScienceSWE - 28 feb. 2018 Big Science Sweden in the Swedish stand, thank for a great conference.

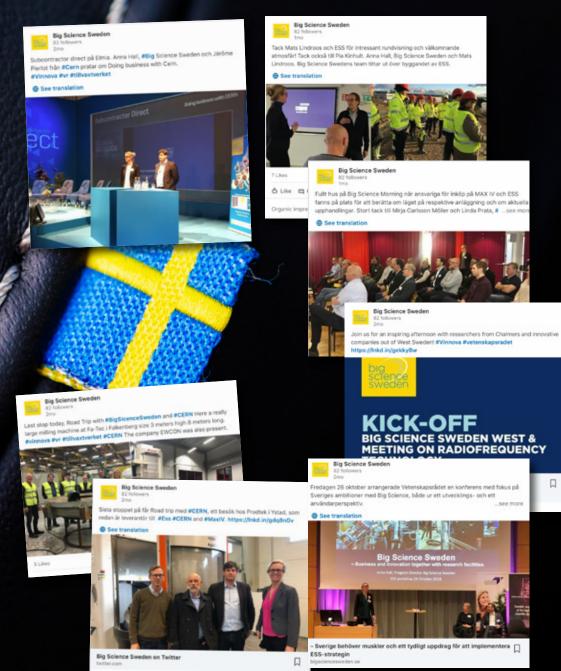


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# LINKEDIN



**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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