

Saab Ericsson Space

-an European leader within space qualified equipment

After a down, mainly in blame of a general down in the commercial satellite market and electronics for these systems, Saab Ericsson Space is now in a time with increasing sales in a generally growing market. But it is only with regards to the electronic market that the company has success. Within adapter and separation systems for satellites the company has a dominating position, and they are, through the daughter company Austrian Aerospace, suppliers of integration platforms for large satellites. In the annual report for 2004 the managing director Bengt Mörtberg writes; "2004 gave us several new commercially customs relations. We will demonstrate for them what "Made in Sweden" practically means". This year was the year the use of the Ka-band frequencies for telecommunication took a run-up with high resolution TV as the pushing factor. The result was several new orders for satellites, and consequently, also new orders for Saab Ericsson Space. The same year one also saw a series of spectacular scientific projects such as the Mars Express, Cassini-Huygens, Rosetta and Smart -1, projects that Saab Ericsson Space participated in with good end results. All in all, a good year for the company, and the good trend is followed up in 2005.

Last year the company received orders of about EUR 60 million, a market increasing from the previous year. Almost the half was connected to commercial orders, where the remaining was related to ESA- and bilateral projects. Almost 90 percent was connected to project in Europe, and not unexpected, France provides the largest customers. Digital products dominate and make up nearly half with products such as microwaves; antennas etc. thirty five percent and mechanical systems and handling equipment make the last fifteen percent of the turnover. The company today consists of the main plant in Gothenburg, where most of the electronic equipments are produced. The division in Linköping mainly produces mechanical structures such as adapters and separation equipment along with guidance, navigation and control systems for sounding rockets. In addition the company has daughter companies in Austria (Austrian Aerospace GmbH) and the USA (Saab Ericsson Space Inc.).

Reliability - an important trademark

Equipment from Saab Ericsson Space has for a long time shown an exceptional reliability. Separation devices have delivered several hundred satellites to orbit, divided in all the most known launchers and several types of separation systems, and not one has failed. The same goes for the electronic systems. Up



Preparation for launch of a Gregorian reflector antenna.

Photo: Saab Ericsson Space



Guidance & Control Computers for Vega and Ariane 5. Higher performance with lesser weight for the new version.

Photo: Saab Ericsson Space



*Adapter and separation system for satellites.
Photo: Saab Ericsson Space*

until now systems from the company had an accumulated failure-free life of more than 450 years in orbit.

Saab Ericsson Space also has another unique record. Starting in the early 70s, the company has delivered fault-tolerant on-board computers for more than fifty satellites and numerous launchers, including the guidance and control computers for the family of Ariane launchers. Not a single one of them has failed.

High technology for space

The company is ranked among the top with regards to high-tech companies in Sweden, but is some cases different in relation to many other high-tech companies. For the electronic equipment that is not only a question of the highest capacity and rate of speed; the strongest demand is set to the equipment's reliability. Equipment in space is at times expected to last a lifetime, which in space terms is about fifteen years. The fact that so many components must work perfectly in such an extended period of time, without possibilities for service, is extremely challenging for the industrial designers. To design methods, components and systems that can work perfectly year after year, takes its toll, besides, if parts fell out one must have a system that is self-repairing, or at best, other component can take over the functions. For antennas much of the challenge is

to find the best materials. Loads during launch and during stays in space set demands to the materials unknown on earth, and knowledge about characteristics and quality for different types of materials are key factors for a company that supplies satellite antennas.

An attractive working place

Saab Ericsson Space is also among the most popular workplaces in Sweden, in competition with others in the field of high technology; says Lars Norfeldt, Director of Communication and Public Affairs. Today, the company has about 410 employees divided on the divisions in Sweden. The headquarter is in Gothenburg, and the majority of the workforce work there. In addition, 115 work at the subsidiary company in Austria. About half of the



*The central cylinder for Spacebus 3000 ready for qualification test at the Linköping plant.
Photo: Saab Ericsson Space*

staff works with data related products and the rest with fields such as mechanical engineering, administration etc. To secure useful products, thirty software engineers are also to be found in the company. The company has a high level of knowledge and more than half of the employees have graduate engineer levels or PhDs.

The supply of labour for the company is good. New employees have different types of introduction to the company. The employees who work in the production unit complete different courses of training before they are regarded certified, while other employees in the field of development, mostly highly educated, mainly go through different types of internal courses to be qualified to increasingly advanced jobs in the company. "We believe that Saab Ericsson will continue to be among the most attractive working places in Sweden", Lars Norfeldt says.

Saab Ericsson Space has been, and still is, very competitive in the fields they work at and they most likely will continue to be in the forefront. In terms of the future, development and production of equipment for the Galileo system will be a great task for the company, along with a continuous participation in both scientific and commercial satellite projects. We believe that Saab Ericsson will continue to be among the most attractive suppliers of space projects, worldwide.



Photo: Saab Ericsson Space

What can Saab Ericsson offer?

Separation systems and structures

Saab Ericsson Space (SES) is the world's leading supplier of payload adapters and separation systems for launchers, and the systems have been used on almost all known launchers: Ariane, Atlas, Delta, Proton, SeaLaunch, Soyuz and Taurus.

Computers & Data Handling

Systems from SES have been taking care of the command and data handling function on more than 80 telecommunications, earth observation and scientific satellites since the late 60s. The main products at present are supplying about 20 Spacebus-3000-based telecommunications satellites, the Data Handling System of the Meteosat second generation meteorological satellites and Command & Data Handling system for the multipurpose satellite platform Proteus.

For guidance and control of launchers SES produces fault-tolerant computers, and the company has supplied more than 160 Guidance & Control computers for the Ariane 4 and 5, as well as more than 50 on-board computers for satellites. Together with the Austrian subsidiary, SES offers expertise in digital signal processing, and they have supplied the digital payload control units for the Inmarsat 4 series of broadband telecommunication satellites and are currently in the developing phase of the Navigation Signal Generator for the European global navigation satellite system, Galileo.

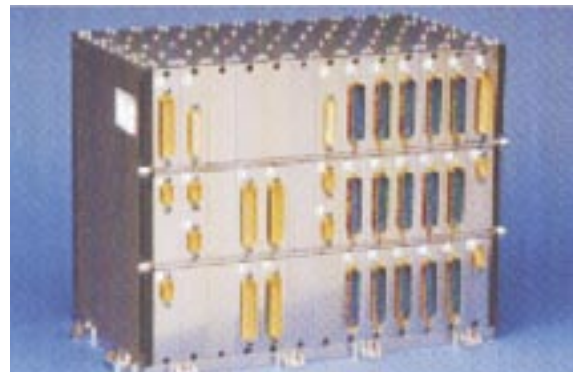
Microwave Electronics

Within the field of Microwave Electronic converters/receivers are used by major telecom service providers in payloads for Eutelsat, Intelsat, and ANIK-satellites. Frequency converters designed for mobile communications are operating on the Thuraya satellites and will also be used on the New ICO Global system. SES has also developed equipment for Broadband & Multimedia services on Ka-band for use on Spaceway, a new advanced satellite system for broadband communications. Electronics for Synthetic Aperture Radars (SAR) are used in all the major ESA SAR satellites; ERS-1, -2 and Envisat.

Antennas

For more than thirty years they have supplied antennas for scientific, earth observation and commercial satellites. Reflector antennas have been delivered for satellite data links, deep space probes, DBS applications, radio astronomy and for earth observation. For the field of array antennas Saab Ericsson Space has designed the SAR and Scatterometer

antennas for ESA's Radar satellites ERS-1 and-2 and the Scatterometer antennas for the METOP satellite. Wide coverage antennas can offer Telemetry and Telecommand, GPS receivers etc for several frequencies.



Herschel/Planck CDMU.

Guidance, Navigation and Control Systems

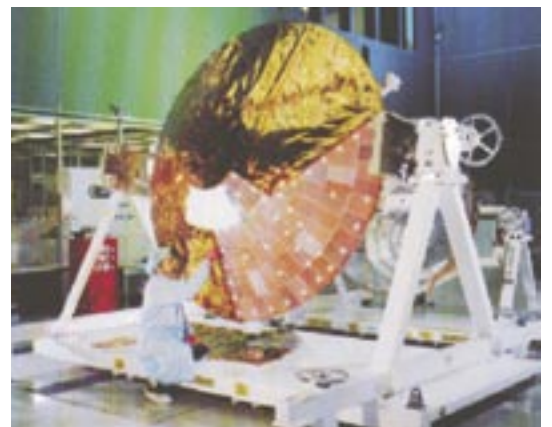
SES has provided guidance, navigation and control for more than 200 sounding rocket launches over the last decades. The systems provide accurate trajectories with low impact dispersion, and precise payload pointing and rate control, or a combination thereof.

Navigation Signal Receiver Instruments

Saab Ericsson Space is a pioneer in developing technology and instruments for the use of navigation signals to characterize atmospheric and ionospheric properties. Initially employed on experimental missions, using GPS signals to measure pressure profiles, temperature profiles, water vapour content and electron content in the atmosphere, is now maturing into a new class of operational instruments. The company has led the development of the GRAS (GNSS Receiver for Atmospheric Sounding) instrument to be flown on the European METOP satellites as well as the similar instrument, GPS Occultation Sounder, for the US NPOESS weather satellites. Beyond METOP and NPOESS, Saab Ericsson Space has studied new missions like ACE+ and SWARM on behalf of ESA. For the future, Galileosat will be an additional signal source.



Antenna for Rosetta.



*Huygens near ready for launch.
Photo: ESA*