

ARCHIVED REPORT

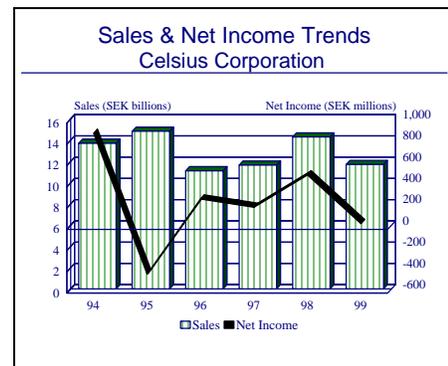
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Celsius Corporation - Archived 8/2001

Outlook

- Celsius and Saab have merged their operations to form a Nordic defense giant
- The move comes as a blessing to Celsius which had been grappling with issue of consolidation and reduced defense spending
- With Europe's industry beginning to form up behind EADS and BAE Systems, the new Saab is expected to line up behind the biggest investor, BAE Systems



Headquarters

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Celsius Corporation was originally established in 1977 under the name Swedyards. The company was formed to restructure and dispose of parts of Sweden's troubled shipyard industry. The company focused primarily on shipbuilding up until 1987, when it acquired a partially different operation and changed the company's name to Celsius Industries Corporation. In that same year, Celsius received the largest industrial export order ever recorded in Sweden. The Royal Australian Navy ordered six submarines through the Australian Submarine Corp, a company in which Celsius holds a 49 percent interest through its subsidiary, Kockums. This was a watershed event for the company, signaling the beginning of increased naval vessel production and turning the company's focus toward defense manufacturing.

In the early 1990s, this concentration on defense became even stronger. In 1991, the company acquired FFV which involved the incorporation of Telub, FFV Aerotech and a 50 percent interest in Swedish Ordnance. During 1992, the remaining 50 percent of Swedish Ordnance was acquired and the company reverted to its original name of Bofors. Also during

1992, the company sold several of its non-defense-related assets in real estate and piping insulation. The latest step in forming the current Celsius occurred in February 1993, when Celsius Industries acquired CelsiusTech (changed from NobelTech) from Nobel Industries. This agreement involved Celsius's acquisition of NobelTech Systems and NobelTech Electronics, which form the business operations of NobelTech. Following this, a new company – CelsiusTech AB – was formed. This new operation has acquired 100 percent of the two operating companies, CelsiusTech Systems and CelsiusTech Electronics, from Celsius Industries.

In June 1995, Celsius introduced a new group structure and changed its parent company name from Celsius Industries to the Celsius Corporation. During 1996, Celsius furthered its focus on defense by spinning off its IT operations, called Enator, to its shareholders.

In March 2000, Saab completed its acquisition of Celsius in a deal valued at SEK5 billion (US\$600 million), creating a Nordic defense giant. The new company is based on Saab's and Celsius' core defense businesses and together will have a strong position in the growing military support services market.

At the beginning of 2000 (and prior to the acquisition by Saab), Celsius' total employment was 9,129.

NOTE: *This is the final update of the Celsius report and will focus on the company's operations prior to the acquisition by Saab in early 2000.*

Structure and Personnel

(pre-acquisition management)

Lars G. Josefsson

President and CEO

Nils-Ove Andersson

Executive Vice President, Treasury and Finance

Krister Eriksson

Senior Vice President, Human Resources

Per-Erik Forsmark

Senior Vice President, Rationalization and Structural Matters

Lennart Hednert

Senior Vice President, Niche Companies

Per Ove Morberg

Executive Vice President, Strategic Business Development

Roger Sprimont

Executive Vice President, Marketing and Large Projects

Product Areas

Celsius's pre-acquisition management organization is illustrated below.

Celsius Corporation

1. Defense
 - 1.1 Bofors Weapon Systems
 - 1.2 Bofors Missiles
 - 1.3 Bofors Underwater Systems
 - 1.4 Bofors Anti Armor Systems
 - 1.5 CelsiusTech Systems
 - 1.6 CelsiusTech Electronics
 - 1.7 Kockums Naval Systems (sold to HDW 10/99)
 - 1.8 Celsius Aerotech
2. Commercial Aviation Services
 - 2.1 Celsius Aviation Services
3. Business Development
 - 3.1 Celsius Infomatics
 - 3.2 Bofors Explosives
 - 3.3 Celsius Materials Technology
4. Niche Companies

Major operations and their products are detailed as follows:

Bofors. Bofors is Sweden's largest manufacturer of ground-based weaponry. The firm designs, develops

and manufactures anti-armor systems, naval weapons systems, air-defense systems, underwater weapons systems, mortar/artillery systems, combat vehicle systems, small arms systems, mine systems, explosives and propellants, and protection systems.

Kockums. Kockums develops, manufactures and maintains complete submarine systems and surface vessels. The group also carries out marine maintenance on commercial vessels and is involved in heavy engineering operations. *This operation was acquired by Germany's Howaldtswerke-Deutsche Werft (HDW) shipyard effective October 1999.*

Celsius Aerotech. This company (formerly FFV Aerotech) is focused on the maintenance of military aircraft in Sweden, providing maintenance, modifications and technical services for all Swedish Air Force and the Swedish Defence Force's combat and training aircraft, helicopters and missile systems.

CelsiusTech. CelsiusTech develops, manufactures and markets electronic systems and electronic equipment for military applications.

Facilities

The headquarters for Celsius's defense-oriented operations are listed below. Overall, the company presently has more than 100 operations in Sweden and abroad.

Bofors Weapon Systems AB, S-691 80 Karlskoga, Sweden. Telephone: (46 586) 810 00.

Celsius Aerotech AB, S-732 81 Arboga, Sweden. Telephone: (46 589) 800 00.

Kockums Naval Systems, S-371 82 Karlskronavarvet, Sweden. Telephone: (46 0455) 68 30 00. *Sold to HDW in October 1999.*

CelsiusTech Systems AB, S-175 88 Järfälla, Sweden. Telephone: (46 8 580) 840 00.

Celsius Inc, 1800 Diagonal rd, Suite 230, Alexandria, VA 22314 USA. Telephone: (703) 683 0007.

Corporate Overview

The Group's primary focus is to meet the needs of the Swedish Defence Forces systems and equipment requirements. To meet these needs, the Celsius Group has, over the past several years, consolidated its position in the defense industry through the acquisition of strategically important Swedish companies.

New Products and Services

Battlefield Combat Support System. In April 1999, Celsius received an order for development and delivery of a Battlefield Combat Support System for mechanized battalions from the Swedish Defence Materiel Administration. Bofors Weapon Systems is the main contractor and the project will be carried out in cooperation with CelsiusTech Systems and Celsius Aerotech. The value of the contract is in the region of SEK 50 M. The system, designated FUM SLB in Sweden, is primarily intended for use in units equipped with Leopard 2 MBT and Combat Vehicle 90 (CV 90) and also for a portable configuration. The SW-application will be of a new design and based on a product platform developed by CelsiusTech Systems.

Torpedo 2000. The Torpedo 2000 is Bofors Underwater Systems' latest 533 mm heavyweight torpedo. Initially, it will be deployed on the A-19 class submarines. The relatively small physical size of the Torpedo 2000 will commend it to operators of small submarines, up to and including the Type 209. In December 1997, the Swedish Defence Materiel Administration (FMV) signed a contract valued at SEK 568 million for future deliveries of Torpedo 2000 to the Swedish armed forces. The new torpedo is designated Torpedo 62 in Swedish service. In May 1999, received an SEK 500 million order from Brazil for the Torpedo 2000 weapon system. The order from Brazil is the first export order for the system.

Plant Expansion/Organization Update

Celsius Restructures. In January 1998, Celsius restructured its operations into four clearly defined core business units. According to the company, this move will create a modern and efficient organization for achieving the goals established by the group's new and aggressive business strategy. The new core units of the company are defined as follows:

Defense. Defense constitutes the largest single area of operations, accounting for some 70 percent of Celsius' total business activities. Defense comprises eight business units: Weapon Systems, Missiles, Torpedoes, Ammunition & Small Arms, Command- & Information

Systems, Sensors & Countermeasures, Naval Vessels and Military Maintenance.

Commercial Aviation Support. Commercial Aviation Support is one of Celsius' growth sectors, currently accounting for approximately 16 percent of Group sales. Operations are concentrated primarily to the USA, although they are also conducted in Sweden and the Netherlands, serving airline operators throughout the world.

Business Development. Business Development is the operations area under which business units Infomatics, Explosives and Materials Technology are organized. All these business units possess considerable growth potential, although at present they jointly account for about 4 percent of Celsius' operations.

Niche Companies. Niche Companies operations are strictly commercial (non-military) in focus, and account for 10 percent of total group sales. Operations include the offshore, engineering, shipyard and environmental technology sectors.

Mergers/Acquisitions/Divestitures

Saab Acquires Celsius. In November 1999, Saab revealed plans to acquire Celsius in a transaction valued at about \$600 million. The deal, which was completed in March 2000, combines Sweden's two largest defense companies into a "new" Saab with solid market positions in guided weapons, military aircraft, defense systems, electronics and military support services.

The new Saab is structured as follows:

1. Infomatics
 - 1.1 Barracuda Technologies
 - 1.2 Celsius Communications Systems
 - 1.3 Celsius Consultants
 - 1.4 CelsiusTech Australia
 - 1.5 CelsiusTech Electronics
 - 1.6 CelsiusTech Systems
 - 1.7 Combitech Systems
 - 1.8 Ericsson Saab Avionics
 - 1.9 Saab Celsius TranspoderTech
 - 1.10 Saab Marine Electronics
2. Aerospace
 - 2.1 Commercial Programs
 - 2.2 Future Products & Technology
 - 2.3 Gripen
3. Dynamics
 - 3.1 Bofors Carl Gustaf
 - 3.2 Bofors Missiles
 - 3.3 Bofors Support

- 3.4 Bofors Test Center
- 3.5 Bofors Underwater Systems
- 3.6 Saab Dynamics
- 4. Technical Support & Services
 - 4.1 Aerotech Telub
 - 4.2 General Military Programs
 - 4.3 Saab Nyge Aero
- 5. Space
 - 5.1 Saab Ericsson Space
- 6. Aviation Services
 - 6.1 Celsius Aviation Services

Following the completion of the merger, Saab announced some initial restructuring moves regarding its incorporation of operations with Celsius. Two components of Celsius have been slated for apparent divestiture or at the least reduced ownership, Celsius Aviation Services and Bofors Weapon Systems.

According to a Saab announcement, in order to provide Celsius Aviation Services the best possibilities to develop to its full potential, Saab is seeking to broaden the ownership of the company. The intention is to seek out new majority shareholders in Celsius Aviation Services, with a long-term interest and focus on the aviation market.

The statement went on to detail the future of Bofors Weapon Systems. According to Saab, Bofors Weapon Systems has operations focusing on artillery pieces and ammunition as well as fire control, that is, the entire competence chain from target data to neutralizing the target. The intention is to seek out new majority shareholders in Bofors Weapon Systems with a long-term interest and focus on the current market.

Kockums Merged with HDW. In mid-September 1999, Celsius, Babcock Borsig and Preussag signed a contract concerning the formation of a European shipbuilding company as a result of a merger between Howaldtswerke-Deutsche Werft (HDW) and Kockums Naval Systems.

According to the terms of the agreement, Preussag will sell 25 percent plus one of its HDW shares to Celsius. At the same time, HDW will acquire all shares in Kockums Naval Systems from Celsius. The transaction was completed in January 2000 and will be effective as of October 1, 1999. HDW's new ownership structure now comprises Babcock Borsig (50 percent plus one share), Celsius (25 percent plus one share) and Preussag (25 percent minus two shares).

HDW's purchase of Kockums creates a new international company that will be a leading global player in the conventional (non-nuclear) submarine and naval surface vessel sectors. Furthermore, an agreement has been reached between Celsius and HDW settling the

acquisition of Celsius' 49 percent stake in Australian submarine builder, Australian Submarine Corporation (ASC).

The newly merged "HDW Group" will have annual sales of SEK9 billion and an order backlog exceeding SEK31.5 billion and 4,300 employees. Operations will be located in Kiel, Germany, Malmö and Karlskrona in Sweden and Adelaide in Australia, and the Group will be headquartered in Kiel.

The merger of these two shipbuilding companies creates one of the world's strongest builders of submarines, a company with the most advanced technology and a commanding position in the conventional (non-nuclear) submarine sector. The company will also be a strong player in the naval surface vessel sector. Both companies have developed advanced systems and products in their respective business sectors, and the merger will lead to strengthened research and development resources.

Aerotech and TietoEnator Merge Operations. Just prior to the Kockums deal with HDW, Celsius and TietoEnator announced the signing of an agreement to merge Celsius Aerotech and TietoEnator's Swedish defense-related operations. The merger will comprise Celsius Aerotech, including the companies Celsius Metech and Celsius Test Systems, together with Enator Communications, Enator Telub, Enator Miltest, Enator Moveo, Enator Teleanläggningar and parts of Enator Driftsentreprenader and Enator Internservice.

Celsius will have a 57 percent majority holding in the new company, while TietoEnator will control the remaining 43 percent. The new company will enjoy full operational independence from its owners. It will number some 2,500 employees, with sales in excess of SEK2.2 billion. Jan Eiborn, current president of Celsius Aerotech, is now the president of the new company which was formally established on January 1, 2000.

The Board of the new company will comprise Per Ove Morberg and Nils-Ove Andersson of Celsius, Åke Plyhm and Kenth-Åke Jönsson of TietoEnator, and Lars G. Josefsson as Chairman. The company's executive management will consist of Jan Eiborn as president, and Sune Ekfeldt, Carl Erik Johansson and Göran Danielsson as executive vice presidents.

Celsius Sells Kockums Computer Systems. In May 1999, Celsius has sold its wholly-owned Malmö-based subsidiary company Kockums Computer Systems (KCS) to 6:e AP-fonden (The Sixth Swedish Pension Insurance Fund). KCS is one of the world's leading suppliers of IT-based systems for the ship design and production, with customers throughout the global shipbuilding industry. The sale is consistent with the

Celsius Group's recent policy of strategic consolidation, and has only a marginal impact on group earnings.

Celsius/Saab acquire GP&C Sweden AB. In January 1999, Celsius and Saab each acquired a 50 percent interest in GP&C Sweden AB from the Swedish Space Corporation. GP&C Sweden AB develops and markets a system which transmits position and identity between individual ships or aircraft. The company reported sales of SEK 8 million in 1998. Terms of the acquisition were not announced.

German Surface-Engineering Specialist Acquired. In December 1998, Celsius Materials Technology acquired the German surface engineering company Nussbaum Oberflächentechnik GmbH. According to Celsius, advanced surface engineering is one of Celsius Materials Technology's core businesses. Operations are currently concentrated to Yttec, in Katrineholm and Karlstad. Yttec has the technical competence not only to solve surface engineering problems but, with access to the laboratory resources of its sister companies, can offer complete solutions in terms of material selection. Terms of the acquisition were not announced.

Nordic Companies Plan Ammunition Merger. In June 1998, the three Nordic companies – Celsius, Patria Industries Oyj in Finland and Raufoss ASA in Norway – signed a Letter of Intent with a view to forming a joint Nordic ammunition company. The new company has been assigned the working name "Nammo Group." The company will be specialized in Small Arms Ammunition, Medium Caliber Ammunition, Propulsion, Shelf-Life Improvement, Demil and Pyrotechnics. Once established, the Group will generate net annual sales of approximately NOK 1.5 billion, with some 1,400 employees. The Group will be registered as a Norwegian company, headquartered in Norway. Raufoss ASA will have 45 percent stake in the company, Patria and Celsius a 27.5 percent stake each. The new company became operational in September 1998.

Celsius Commercial Aviation Acquisitions. The company, located close to Newark Airport, New Jersey, is engaged in maintenance and stocking of replacement components for aircraft.

Celsius earlier acquired RIAS, Radio Instrument Avionics Servicecenter BV located at Amsterdam's Schiphol Airport. The company services avionics and instruments. Customers comprise airlines which operate from Schiphol, as well as the Dutch armed forces.

Celsius also recently acquired two additional companies: the Australian aviation services company Hawker Pacific, with operations in Australia, New

Zealand and Southeast Asia; and Amtec, Miami, Florida.

Teaming/Competition/Joint Ventures

Grintek Group. In February 1999, Celsius and the South African Grintek Group formed a joint venture in electronic warfare called Avitronics (Pty) Ltd. The new venture establishes a company that will be a front-runner in equipment for warning, threat evaluation and countermeasures against missiles. A collaboration agreement has been signed between Avitronics and Celsius' business unit, CelsiusTech Electronics. Celsius acquires a 49 percent interest in the company, while the Grintek Group retains a 51 percent interest.

Viking Industrial Group. In February 1999, Industrial representatives from Denmark, Norway and Sweden have signed a Letter of Intent concerning cooperation between the three countries, and have formed an industrial consortium with a view to collaborating on the Viking submarine project. The companies that form The Viking Industrial Group are Danyard Aalborg AS (Denmark); Kongsberg Defence & Aerospace AS (Norway) and Celsius (Sweden), via Kockums Naval Systems. The Project Viking concept is to coordinate the procurement of next-generation submarines for these three Nordic countries, thereby reducing costs for each country. Preliminary and feasibility studies are currently in progress.

Patria Industries. In September 1998, Celsius and Patria Industries Oyj of Finland signed an agreement to establish a propellants and explosives company, Nexplo Industries AB. The new company specializes in propellants and explosives for commercial and military applications. Propellants for hunting and sporting ammunition will account for a significant portion of commercial sector sales. The net sales of the Nexplo Industries Group are estimated at approximately SEK 400 million. The company will have approximately 400 employees. Nexplo Industries AB will have 100 percent ownership in the subsidiary companies Nexplo Vihtavuori Oy in Finland and Nexplo Bofors AB (Bofors Explosives AB) in Sweden. Celsius AB owns 60 percent of the shares of the new company while Patria Industries Oyj owns 40 percent.

DASA. In August 1998, DASA's LFK unit and Celsius' Bofors Missiles formed a joint company for the development, production and marketing of the air-to-surface missile Taurus, called Taurus Systems GmbH. Ownership in the company is distributed 67 percent LFK and 33 percent Celsius. The new venture is currently working on development of the Taurus.

DCN. In August 1998, Direction des Constructions Navales (DCN) of France, represented by its export arm DCN International, and Celsius' Kockums Naval Systems agreed to a technical cooperation in support of future submarine designs. The joint venture will bring together technical skills from both companies and will be open to teaming with other parties as well. The venture will be managed through a jointly (50:50) owned and jointly staffed company located in France.

Nordic Explosives. In June 1998, Celsius and Patria Industries Oyj in Finland signed a Letter of Intent with a view to forming a joint propellant and explosives company. The new company, which has been assigned the working name Nordic Explosives and which will be headquartered in Sweden, has annual sales of approximately SEK 450 M. The company will total some 400 employees, of whom 280 will work at Bofors Explosives in Karlskoga, Sweden. It is intended that the company be registered as a Swedish company, headquartered in Sweden. Celsius will have a 60 percent stake in the company, Patria 40 percent.

Nordic Explosives will operate units in Vihtavuori, Finland, and Karlskoga, Sweden. The company will specialize in propellants and explosives for commercial and military applications. Propellants for hunting and sporting ammunition will account for a significant portion of commercial sector sales.

Babcock CTNZ Ltd. Formed in early 1997, this is a joint venture between Babcock New Zealand Holdings Ltd and CelsiusTech AB. The venture is majority-owned by Babcock and provides design, development and support of defense software systems. The new company will assume control of CelsiusTech's New Zealand (CTNZ) operations.

Tracor. In 1992, CelsiusTech formed an alliance with Tracor Aerospace in the US and Chemring of the UK, under which Tracor will assume the role of prime

contractor for all future BOL chaff dispenser system contracts.

Hägglunds Vehicles. Bofors AB has teamed with Hägglunds Vehicles AB to form HB Utveckling AB, a joint interest company which is overseeing development of the CV 90. HB Utveckling (HB Development) is a holding company which merely issues contracts to Bofors and Hägglunds for the various production shares of the Stridsfordon 90 (Combat Vehicle 90, or CV90), an armored fighting vehicle intended for wide use in the Swedish Army.

Raufoss AS. Bofors AB signed an agreement with Norway's Raufoss AS on March 11, 1993, to merge production of conventional artillery shells. Bofors AB provides propellants while Raufoss AS is responsible for artillery shell bodies. The Bofors-Raufoss agreement is the result of a long-term push for cross-border defense cooperation between Norway and Sweden.

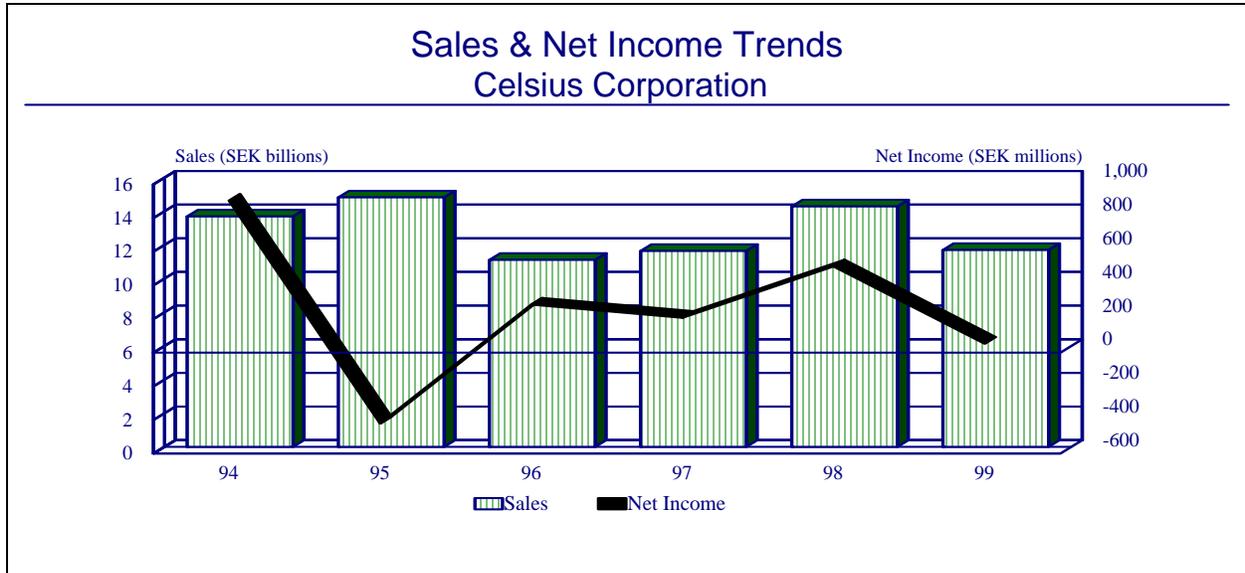
Rheinmetall. Bofors is associated with Rheinmetall of Germany in the production of the RB 63 bomblet round and, as such, was involved in the Scandinavian artillery ammunition shoot-off.

BONUS Program. Until March 1993, this submunition was being developed by Bofors AB. In March 1993, Giat Industries, Versailles, France, and Intertechnique, Plaisir, France, joined the BONUS development program. The BONUS program is now considered as being developed by a consortium of these three firms. BONUS is in full-scale engineering development with prototype submunitions being integrated with and dispensed from the associated 155 millimeter carrier projectile.

Financial Results/Corporate Statistics

Celsius reported net income of SEK53 million on consolidated sales of SEK11.7 billion in 1999. The lower sales and income are attributed to the divestiture of Kockums during the year. Latest year statistics are provided below. The loss in 1995 was due to restructuring expenses and write-downs that totaled SEK800 million. Note that figures have NOT been restated to conform to the company's current presentation. The US dollar figure, in millions, is translated as a 1999 average at the rate of US\$1 = SEK8.2624.

Y/E December 31	1995	1996	1997	1998	1999	1999
(SEK millions)						US\$
Net Sales	14826	11112	11644	14293	11700	1416
Net Income	-421	285	207	512	53	6
Backlog	21500	18900	18800	13900	9600	1162

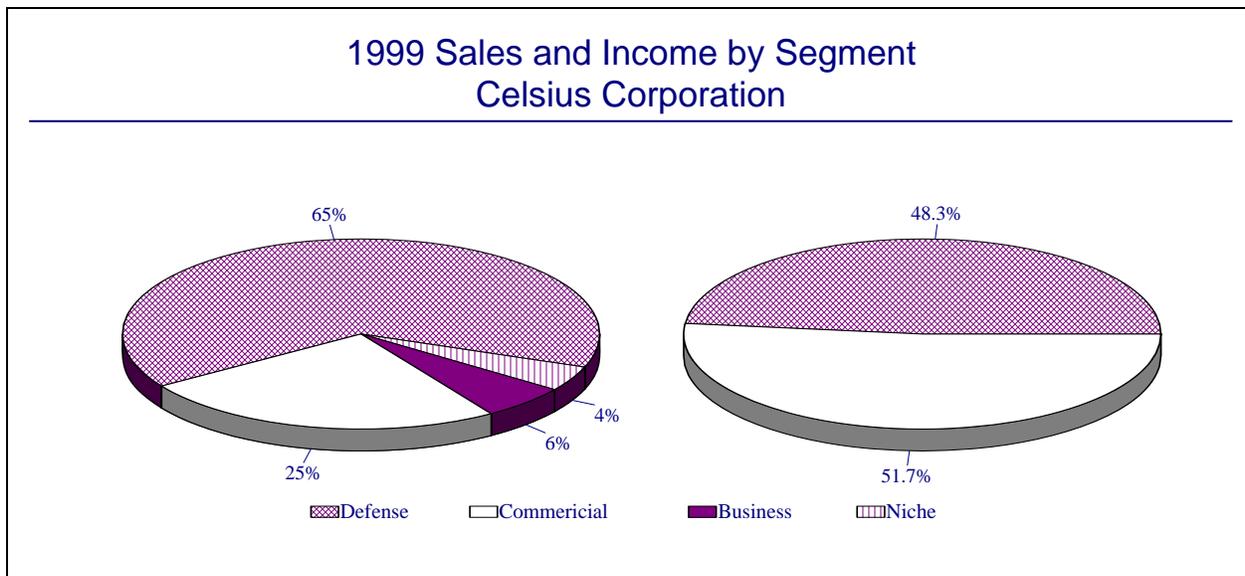


Industry Segments

A breakdown of Celsius Industries' sales by company for the years 1997 through 1999 is given below.

SALES	1997	1998	1999
(SEK millions)			
Defense	8141	9513	7808
Commercial Aviation Services	1821	2829	3009
Business Development	576	685	723
Niche Companies	1106	1653	522
Eliminations	0	-387	-362
TOTAL	11644	14293	11700

OPERATING INCOME	1997	1998	1999
(SEK millions)			
Defense	140	376	198
Commercial Aviation Services	133	209	212
Business Development	24	-53	-180
Niche Companies	-17	116	-7
Eliminations	-32	-68	-68
TOTAL	248	580	155



Strategic Outlook

Riding the wave of consolidation that has been cresting in Europe, Celsius and Saab have merged their operations to form a Nordic defense giant. The move comes as a blessing to Celsius, which had been grappling with issue of consolidation and reduced defense spending over the past years.

Prior to the Saab purchase Celsius had begun to cut operations that it no longer considered core. The biggest of these cuts was the sale of Kockums shipyard to Germany's HDW in late 1999. The move was a graceful way for Celsius to exit the shipbuilding industry. Up until this point Kockums had not had enough sales to keep up its shipbuilding business and also had its hands full with the problem-plagued Collins class submarines. The new HDW Group will combine the two shipyards into one of the world's largest diesel attack submarine manufacturers. The new company will have annual sales of about \$1 billion and an order backlog of \$3.8 billion.

Following quickly on the Kockums sale, Celsius merged its Aerotech operations with TietoEnator's Swedish defense operations. Approximately two thirds of the new company is focused on the defense sector, in areas of long-term potential that have been awarded priority in defense planning. A larger and stronger unit is now created within that part of the defense market which is expected to increase in Sweden as well as internationally. The commercial market is also expected to have good growth potential. Overall, the merged companies complement each other well.

But even with these restructuring moves Celsius still was not strong enough on its own to deal with the changing landscape of European defense procurement. With the pending formation of defense giants such as the European Aeronautics, Defense and Space (EADS) company and BAE Systems, Celsius was in position of being left out of this wider cross-border consolidation.

At the same time, Saab found itself in a similar position. Although Saab had been active prior in pursuing cross-border opportunities (the company is 35 percent owned by BAE Systems), it too lacked the mass to make it attractive to potential partners. But in light of the European defense industry's evolving consolidation, a change was needed if Sweden was to remain more than a niche player in the industry.

An all-Swedish solution was found to solve both companies' problems. Not only is the combination of Saab and Celsius complementary, but it also furthers the trend of moving from state to private ownership. In this example, the Swedish government sold its stake in Celsius as part of the deal.

The new Saab is expected to be strong player in its home market as well as an attractive partner for international consortia. With Europe's industry beginning to form up behind EADS and BAE Systems, the new Saab is expected to line up behind the biggest investor, BAE Systems.

Prime Award Summary

Unavailable

Program Activity

Business Interests. Celsius is involved in the following product areas:

- Anti-armor systems
- Naval weapons systems
- Underwater weapons systems
- Mortar/artillery system
- Combat vehicle systems
- Small arms systems
- Missiles
- Defense electronics
- Training systems
- Warships

Aircraft Programs

Saab JAS 39 Gripen

The Gripen is a single-engine, all-weather, multirole, high-performance combat aircraft. The JAS Industry Group – a Swedish consortium consisting of Saab AB, Saab Military Aircraft (65 percent); Volvo Aero Corp (16 percent); Ericsson Radar Electronics (15 percent); and FFV Aerotech (four percent) – is developing this aircraft. The JAS Industry Group is sharing the Gripen work as follows: Saab is responsible for the airframe and main systems; Volvo is responsible for the engine (in cooperation with General Electric); Ericsson Radar Electronics is responsible for the radar, cockpit displays, and electronic countermeasures; and FFV Aerotech is responsible for the maintenance equipment. Through 1999, six prototypes and approximately 84 production aircraft had been produced.

Electronic Programs

CelsiusTech BOL

This is an advanced electronic countermeasures dispenser for chaff. The BOZ family of chaff and flare launchers is designed to enhance aircraft protection by providing facilities for decoying and deflecting radar and infrared guided missiles. The BOZ-100 is deployed on Saab JAS 37 Viggen, Saab JAS 35 Draken, SEPECAT Jaguar and the Panavia Tornado. BOZ-3 is used on tactical aircraft and on the Learjet 24 for training purposes. BOP-300 is intended for use on medium-to-light tactical aircraft, while the BOH-300 is designed for rotary-wing platforms and is undergoing evaluation aboard the Vertol 107. The BOL integrated

missile launch rail/chaff dispenser equips Harrier GR.5 and F-14 aircraft.

Philax/Protean

Philax and Protean are chaff and IR flare decoy launching units designed to provide self-protection capabilities for warships or merchant shipping against radar-homing and heat-seeking missiles. CelsiusTech AB is the prime contractor on this program.

Manta/Sceptre

These are naval radar warning and electronic surveillance systems designed to provide submarines and surface craft with prior warning of hostile radar emissions, and to provide targeting data based on such intercepts. Manta and Sceptre form a family of advanced electronic support measures systems tasked with protecting surface ships and submarines operating at periscope depth by intercepting, analyzing, classifying and identifying hostile radar emissions of all types. Manta is suitable for deployment on nuclear and conventional submarines. Versions of Sceptre are available for surface warships of all types from FAC to aircraft carriers. CelsiusTech is a licensee on this program.

Matilda

This is a lightweight radar warning system tasked with platform protection by providing early warning of hostile surveillance and fire control radars. Matilda is optimized for deployment on small combatants including fast attack craft and offshore patrol vessels. CelsiusTech AB is the prime contractor on Matilda.

Scout and Pilot

These are low power-output frequency-modulated continuous wave radars, initially designed as a naval navigational radar but with the technology expandable to many other functions. Scout is the first member of a family of stealthy radars which, due to their low probability of detection by ESM techniques, will reverse the current balance of capabilities between radar range and electronic warfare systems detection capability. The initial Scout radar will be used for navigational purposes, while later members of the family will be used for target acquisition, fire control and anti-submarine warfare. CelsiusTech produces the Pilot radar, which was developed from the same

technology base as Scout and shares many features in common with it.

Signaal WM20 Series FCS

This is an I/J-band 2D radar system providing surveillance and tracking for fire control. CelsiusTech Electronics AB is working on the upgrade package for the WM-20 family. During 1991, CelsiusTech introduced a major upgrade applicable to all members of the WM-20 family. This upgrade reduces the number of printed circuit boards from 1300 to approximately 12 (the exact number depending on the version of the Egg being modernized). This modification greatly increases the availability of the system while new prediction algorithms improve reaction time by between four and eight seconds.

Military Vehicle Programs

Stridsfordon 90

HB Utveckling AB (HB Development AB) is a joint stock holding company, set up by Hägglunds Vehicles AB and Bofors AB, whose purpose is to coordinate development and production of the Stridsfordon 90 (Combat Vehicle 90/CV 90). The CV 90 is a multirole combat vehicle that is intended to meet all foreseeable future threats to Swedish territory. Bofors has supplied the 40 mm main armament of the CV 90, as well as the ammunition and turret system. Hägglunds is tasked with the supply of the chassis and automotive systems. The CV 90 was designed with the purposes of the Swedish Army in mind, and the vehicle demonstrates high-mobility, anti-armor capability, air defense capability, high levels of protection for the crew and passengers, easy maintenance and future development potential. The Swedish Army has awarded HB Utveckling a contract valued at SEK2.9 billion for delivery of an unspecified number of CV 90s, which began delivery to Army units in 1993.

Missile Programs

AGM-114A/B HELLFIRE

This is a modular laser-guided anti-tank/anti-ship missile system developed by Rockwell International. Bofors AB will undertake licensed assembly of HELLFIRE for Sweden. Sweden, in addition to deploying the missile in the anti-tank role, will deploy HELLFIRE in a coastal defense system. The Swedes have designated the HELLFIRE as the RBS17. Manufacture of the man-portable tripod launcher and specialized anti-ship warhead will take place in Sweden, as will some assembly, but a good portion of production will remain in the United States.

Penguin/AGM-119

The Penguin is a helicopter-launched, anti-ship missile system. Developed and produced by Kongsberg, the Penguin is part of the company's Guided Weapons Division. The airborne rail launcher for the Mark 3 variant has been developed by Bofors.

RBS15

This is a family of anti-ship missiles developed and produced by Saab Missiles AB and Bofors AB. In order to develop the RBS15, Saab Missiles and Bofors formed Saab Bofors Missile Corporation, Stockholm, Sweden, in 1979. The system remains in production and service with additional development continuing.

RBS23 BAMSE

This is a medium-range air defense system under development at Bofors. Bofors AB is proceeding with its BAMSE (Bofors Advanced Medium-range Surface-to-Air Evaluation) development effort and has completed the full-scale development phase during 1998. Contract for production phase awarded in late 1999. Low-rate initial production could commence by the end of this year (2000). A shortfall in funding could push back the missile's in-service date to 2003. The BAMSE is Bofors' first attempt to enter the lower end of the medium-range surface-to-air missile (MSAM) market, but it is not intended as a direct competitor to such systems.

RBS53 Bantam/RBS56 BILL

These are surface-to-surface anti-tank missiles. Bantam is the standard anti-tank missile for the Swedish and Swiss Armies. Wire-guided, it can be suitably operated by a single infantryman. The RBS56, also designated BILL for Bofors Infantry Light and Lethal, is the first weapon of its type available in the West. The Swedes, even though they are bucking the trend away from wire guidance with the RBS56, have given the missile the ability to attack tanks through the tanks' weaker *tops*. While a fire-and-forget system was contemplated for the RBS56, it was considered too expensive and Bofors opted for the tried-and-true command-to-line-of-sight wire guidance with overhead attack. RBS53 Bantam production is complete; serial production of the RBS56 BILL is under way. Deliveries to the Swedish armed forces and Austrian Army have commenced. Bofors is also developing enhancements for the RBS56 under a Pre-Planned Product Improvement Program, which may result in the production of the new BILL 2.

RBS70

This is a portable, short-range, anti-aircraft missile system developed and manufactured by Bofors. The RBS70 Missile Mark 1 is out of production; the Missile Mark 2 is in production. The Missile Mark 2 began to supersede the Mark 1 production line in 1989. The RBS70 air defense system is among Bofors' most successful missile products. The system is in service throughout the world, with production demand possibly sufficient to carry this program into the 21st century.

RBS90

This is an autonomous, short-range, anti-aircraft missile system developed and manufactured by Bofors. The Missile Mark 2 is in production. First deliveries of the RBS90 to the Swedish Army started in 1991-92. The system has been fully operational since 1993. The new BOLIDE missile could be in production in the near future. The BOLIDE (derived from the Latin word for meteorite) is new High Velocity Missile (HVM) being studied by Bofors for possible deployment with the BOSAM, BOMAC and BALTIC RBS90 launch configurations. Bofors' RBS90 air defense system is the most recent addition to its list of products in this market sector. In combination with the Missile Mark 2, the RBS90 provides a low-level air defense against airborne targets during both day and night.

Ordnance & Munitions Programs**AT-4/M136 and AT12T**

This is a man-portable anti-armor weapon developed and manufactured by Bofors AB. In Sweden, the AT-4 is replacing the earlier Miniman weapon which is obsolescent. In the United States, as the M136, it is replacing older versions of the M72. Development of the AT-4 was sponsored by the Swedish Ministry of Defense, through the Swedish Army as well as the United States Department of Defense through the United States Army. The AT12T was designed to be a greatly enhanced version of the AT4 designed to defeat heavier armored vehicles. The AT12T program has been terminated.

BONUS

This is an artillery-dispensed submunition for long-range use against massed formations of armor. Up to March 1993, this submunition was being developed by Bofors AB. In March 1993, Giat Industries, Versailles, France, and Intertechnique, Plaisir, France, joined the development program. The BONUS program is now considered as being developed by a consortium of these three firms. BONUS is in full-scale engineering development with prototype submunitions being integrated with and dispensed from the associated 155 millimeter carrier projectile. In July 1998, approval for

the production investment phase of the program was given by the Swedish and French Ministries of Defense.

Carl Gustaf

The Carl Gustaf M2/M2-550/M3 is a man-portable anti-tank/assault weapon for use by infantry on the move. Development of this system was initiated in 1959 and sponsored by the Swedish Ministry of Defense through the Swedish Army. The Carl Gustaf, which bears the manufacturer's designation of FFV 550, has proven to be among the most popular and efficient anti-tank weapons available. This weapon has been modified and supplied with enhanced projectiles to keep it abreast of the latest tank technology. In addition to the anti-tank performance, the Carl Gustaf is a true multipurpose weapon that can be used in the assault role against fortifications as well as for laying smoke and providing illumination. A new over-caliber round was developed to enable the Carl Gustaf weapon to deal with the new armor technology incorporated in tanks such as the T.72, Challenger and M1. Bofors is the prime contractor on this weapon.

L/60 AND L/70 Anti-Aircraft Artillery Systems

Although they are old systems, the L/60 and L/70 towed 40 millimeter anti-aircraft artillery systems are able and proven. The L/60 was license-produced in Austria, Belgium (by the former Fabrique Nationale), Brazil, Canada, Finland, France, Greece, Hungary, Italy, Norway, Poland, United Kingdom (Royal Ordnance) and the United States (Chrysler and Firestone, among others). Italy (Breda Meccanica Bresciana), Spain (Placencia de las Armas SA), and India (Department of Defence Production and Support through the Indian Ordnance Factories) are actively producing or have warm production facilities for the L/70 under license agreements. Previously, the Netherlands, the United Kingdom (Royal Ordnance) and the Federal Republic of Germany have license-produced the L/70. The L/60 and more recently the L/70 have seen action in almost every war that has been fought since World War II.

STRIX

This is an autonomous guided mortar projectile designed for use by the larger units of infantry organizations; the Strix will be used for the long-range destruction of tanks and other armored vehicles by the use of 120 millimeter mortars. The Strix was developed and manufactured by Bofors AB. In July 1991, an initial production contract for the Strix was placed by Sweden; the Strix is in serial production to meet that requirement, and the first export procurement was announced in early 1996.

Much of the munitions work listed below is now run by the Nordic ammunition company Nammo which was

formed in 1998 from ammunition firms in Finland, Norway and Sweden.

Air-Launched Rockets

The Bofors AB 135 millimeter rocket system was designed for use with the Saab AJ-37 Viggen fighter ground attack aircraft. Since then, the system has also been installed with success upon the F-4, A-4, A-7 and Hawker Hunter aircraft. The 135 millimeter rocket system is in production for Swedish Air Force requirements. Bofors AB also produces 75 millimeter light rockets for helicopter and light fixed-wing aircraft. Bofors mainly produces these items for Swedish requirements, although they could be made available for export where required. The CRV-7 rocket system, produced by Raufoss, has taken the light rocket market lead in the Scandinavian combined market. However, Bofors has concentrated its efforts in the heavier calibers, with a 145 millimeter system now in production. It has also been reported by other sources that Bofors has commenced development of 150-millimeter and 180 millimeter rocket systems. This remains unconfirmed. Current rocket programs at Bofors are as follows:

75 mm rockets

M57C	High Explosive Anti-Tank
M57B	High Explosive
M57	High Explosive

135 mm rockets

M56	High Explosive
M56B	Pre-Fragmented High Explosive
M60	High Explosive
M70	High Explosive Fragmentation

145 mm rocket

M49 PSRAK	High Explosive
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Artillery Ammunition

Bofors produces a full range of 105 and 155 millimeter ammunition, including 105 millimeter projectiles for the Type 4140 light howitzer and 155 millimeter projectiles for the FH-77 and FH-77B. Bofors is involved in separate projects to develop an all-Swedish Extended Range Full Bore base bleed round and an extended-range charge system for standard ammunition. Bofors produces the PRB Extended Range Full Bore Mark 10 round and the Luhaire High Explosive base bleed round under contract.

Bofors AB produces the following types of artillery ammunition:

105 mm

LUMA Mark 2	Illumination
M60	White Phosphorous/Smoke
Mona	Illumination
Type 4140	High Explosive

120 mm

SGR M/70	High Explosive
SMGR M/70	High Explosive Armor Piercing
HCER	High Explosive Armor Piercing

155 mm

Mira	Illumination
Mira ER	Illumination (extended range)
F1	High Explosive Base Bleed
M/60	High Explosive
M/77B	High Explosive
PRB Mark 10	High Explosive (Extended Range Full Bore)
BOSS	High Explosive Anti-Tank
Justus	Illumination
HEER	High Explosive Base Bleed
BONUS	Cargo (submunition dispensing)
FFV 431	Smoke
FFV 007	Smoke
FFV 007 IR	Smoke (infrared screening)
FFV 007 ER	Smoke

Military Rifles

Bofors AB produces small arms, which are constructed under license for the purposes of the Swedish military. The firm has built thousands of AK4 (Heckler & Koch G3 7.62x51 mm) infantry rifles. The Swedish Army has phased this system out in favor of the newer AK5, which is chambered for the NATO 5.56x45 mm rifle cartridge. The AK5 is a license-produced version of the Belgian Fabrique Nationale Herstal SA FNC rifle. Operating features of the AK5 are very similar to the FNC, but the AK5 has been heavily modified to suit conditions under which the Swedish Army is expected to operate in battle.

Mines

Bofors AB is a major European producer of mines. The firm has developed the following types of mine:

FFV Number 7	Off-route anti-tank mine.
FFV 016	Off-route anti-armor mine, designed for use against lighter vehicles.
FFV 028	Metallic anti-tank mine, advanced nonmagnetic design.
FFV 013	Directional, shrapnel type area defense/anti-personnel mine.
FFV 013R	Directional, shrapnel type area defense/anti-personnel mine.
LI-11	Light anti-personnel landmine.

Mortar Ammunition

Sweden imports its high-explosive mortar ammunition, with 81 millimeter ammunition being procured from Norway (Raufoss). However, Bofors AB produces smoke and illuminating ammunition for use with 120 millimeter mortars. The firm also is cooperating with SAAB in the development and production of a top-armor attacking guided bomb, named Strix. Bofors AB offerings of mortar ammunition include the following:

120 mm

Strix	Terminally guided projectile
FFV 429-S	Hexachlorethane smoke
FFV 429-T	Hexachlorethane smoke
FFV 429-IR	Aerosol/smoke
FFV 029	Illumination
FFV 266	Hexachlorethane zinc smoke

Small Arms Ammunition

Sweden produces the Soviet pattern Model 1943 cartridge as well as cartridges in all NATO-standard calibers. Sweden does not export a significant quantity of small arms ammunition, and production is largely geared towards supplying needs of the Swedish armed forces. Soviet pattern ammunition is produced for export and is an example of Western defense manufacturers capitalizing on the widespread use of Soviet-produced or -derived small arms. Bofors AB is manufacturing the advanced 5.56x45 SS109 ammunition designed by Fabrique Nationale of Belgium, which is being sold for export to avoid the licensing restrictions of Fabrique Nationale.

Tank Cannon Ammunition

Tank cannon ammunition in two calibers is manufactured by Bofors AB. High Explosive and High Explosive Anti-Tank rounds are produced for the KV90 S73 90 millimeter cannon used in the IKV 91 light tank/tank destroyer. These are unique to this weapon and not interoperable with any other 90 millimeter ammunition built in the world. Ammunition is also manufactured for the 105 millimeter cannons of the Stridsvagn 103 and Centurion tanks used by the Swedish Army. The bulk of the export marketing effort is being directed towards sales of the Target Practice Discarding Sabot-Tracer training round, but service ammunition is produced as well.

Warship Programs

Collins Class

The Collins class diesel electric submarine is designed to replace the Royal Australian Navy (RAN)'s six Oberon class submarines. Its missions will include anti-surface warfare (ASW), anti-surface ship warfare (ASuW), and surveillance of hostile surface forces. On June 2, 1987, the RAN signed a contract with the Australian Submarine Corporation Ltd for the supply of six Collins class submarines. The final agreement called for the Australian Submarine Corp to build all six submarines under the supervision of Kockums. The front and rear halves of the first two submarines will be built in Sweden, and 70 percent of each submarine's equipment is to be built in Australia. The major systems to be built outside Australia include the diesel generators, main motors and propellers, pumps and compressors, masts, weapons, sensors and control gear. Kockums's partners include Wormald, an Australian diversified engineering group with 25 percent of the program; Australian Industry Development Corp, a government-owned development bank, with 25 percent; and BI Constructors, a subsidiary of Chicago Bridge and Iron, with 20 percent. Fabrication of the systems for the first submarine began in June 1989 with construction of the bow and stern sections, taking place in Sweden. In early 1990, Strachen & Henshaw delivered the first section of the torpedo tubes. The program is on schedule with the first submarine of this class launched in 1993. The remaining five submarines are expected to enter service by the end of the century. It is estimated that one submarine will be commissioned every 14 months. Four have been launched as of January 2000; two are fully in service. The last two submarines are expected to be delivered by mid-2001. *This program is now run by HDW, which acquired Kockums in 1999.*

Torpedoes

The FFV Tp 43XO torpedo is based upon the proven FFV Tp 42. The FFV Tp 43XO is capable of engaging surface and subsurface targets and can be air, surface or subsurface launched. The FFV Tp 617 Torpedo is a long-range system for engaging surface targets, and is launched from submarines or surface ships.

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