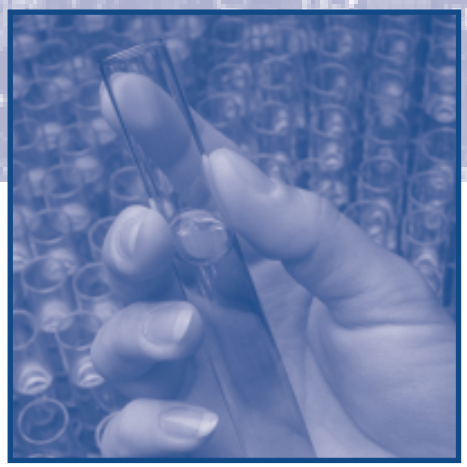
EUROPE PRIVATE EQUITY *special paper*

EUROPEAN TECHNOLOGY SUCCESS STORIES



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EUROPEAN TECHNOLOGY SUCCESS STORIES

October 1999

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FOREWORD

This is the second EVCA Special Paper on Technology Success Stories.

Although we often look for models elsewhere, it is useful to remember that Europe produces numerous examples of entrepreneurial success.

Such successful companies are essential to Europe's dynamism. Often started from scratch, they have turned into generators of wealth and employment and will hopefully continue to develop further in the coming years.

This paper does not aim to produce an exhaustive list of "successful" companies. Indeed, the question arises as to how one defines success: Return to investors? Job creation? Capacity to bring an original idea to life? Progress in a certain field? Establishment of a leadership position?

All of the examples presented hereafter are success stories in at least one and often in many ways. All of the companies profiled in this Special Paper have been venture backed. Without private equity and venture capital and the support of venture capitalists, which in most cases goes far beyond pure financial support, many of these success stories would have developed much more slowly or might not even have happened at all.

The European Private Equity and Venture Capital Association (EVCA) believes that much remains to be done to fully develop Europe's entrepreneurial potential. Policy makers should facilitate the creation of an entrepreneurial environment in numerous ways:

- More entrepreneurial-related education
- Harmonisation of registration of intellectual property and licensing rights
- More flexible labour and entrepreneurship environments (for instance, less bureaucracy for company formation, adapted bankruptcy laws,…)
- Favourable treatment of stock options for those who choose to work in smaller, non-listed companies

The European private equity and venture capital industry has demonstrated its capacity to foster the emergence of European technology success stories and will continue to support many more such successes in the years to come.

We would like to thank the members of EVCA's High-Tech Committee who have given their valuable input to this project under the leadership of Erkki Kariola (SFK) and Jim Martin (3i). We would also like to thank Marie Helsmoortel who conducted this project on behalf of EVCA. Last, but certainly not least, we would like to address our special thanks to all the entrepreneurs and fund managers who have taken the time to share their stories with us.

October 1999

Emile van der Burg
EVCA Chairman

Serge Raicher
EVCA Secretary General

SPONSOR'S NOTE

LGT Capital Management is pleased to be the sponsor of this European Technology Success Stories paper. LGT Capital Management serves as a family office investor on behalf of the Princely Family of Liechtenstein, clients of LGT Bank in Liechtenstein and selected third parties. Currently over US$1.2 billion is invested in alternative assets on a worldwide basis and is managed by a dedicated team of alternative (private equity and hedge fund) investment professionals.

LGT Capital Management is one of Europe's leading private equity investors and fund-of-fund managers. The investments are primarily made for the portfolio of the Princely Family as well as for Castle Private Equity, a Swiss investment company whose shares are traded in Swiss francs on the Zurich stock exchange and in US$ on the Luxemburg stock exchange.

Castle Private Equity has committed over US$500 million to leading private equity funds located mainly in the US and Europe. Castle provides institutional and private investors with access to the asset class, which was previously hampered by high minimum investment requirements, difficult access to top-performing partnerships, lack of liquidity and long lock-up periods.

LGT Capital Management is also active in the acquisition of secondary positions in existing partnerships and has a reputation as an active co-investor able to source transactions in Continental Europe for selected partnerships thanks to its well-established network. The co-investment program is complemented by a direct investment pool on behalf of the Princely Family.

Several factors have influenced LGT's decision to dedicate substantial resources to private equity investments in Europe, particularly:

1. Europe will play a leading role in the rapid development of global technology markets
2. European governments' growing recognition that a vibrant and successful private equity market is a catalyst to economic growth and leadership
3. A new wave of young talent and entrepreneurs looking to access capital in Europe
4. Corporate restructuring has only just begun and will set free new market forces and opportunities
5. New financing and exit routes such as the Neuer Markt, EASDAQ and others will further help to establish venture capital and private equity as a more traditional asset class.

LGT Capital Management, as a leading provider of capital and know-how, believes strongly in the future of European private equity and is dedicated to playing a leading role as an active partner.

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BROKAT INFOSYSTEMS AG

Business: Software for Internet business and commerce
Company established: 1994
Venture backers: Technologieholding, Vertex, TBG
Website: www.brokat.de

Brokat was founded in Böblingen (Stuttgart) in September 1994 by five partners that decided to ride the Internet wave by developing and marketing software enabling Internet business and commerce.

Twister is the core Brokat product on which all other solutions are based. It is a platform offering a highly modern, proven applications technology. Twister allows companies to offer customers integrated, secure and simple electronic services using a variety of channels, including the Internet, videotext systems and mobile telephony. Twister provides users with a highly secure, scaleable and robust platform on which they can build integrated but distinct electronic distributions systems. Brokat thus provides the basis for an electronic front office.

Many services today are produced within an IT infrastructure and then distributed traditionally, that is non-electronically. The Web allows the production and distribution of a whole variety of services that are conceivable only electronically at a lower cost, in less time and at a better quality. Brokat's vision is to establish Twister as the standard in this new category of "e-services platforms" and to make sure that services are not only produced but also delivered electronically. When America Online (AOL) came to Europe, they found that in order to compete with the proprietary videotext systems, they needed more than their usual "edutainment" offering. In essence, they needed banking because millions of users were doing electronic banking over videotext. AOL Bertelsmann's choice of Twister in 1996 for its AOL Banking System was a major breakthrough for Brokat. A second major breakthrough was the launch, by Deutsche Bank's Bank 24, of the world's first highly secure Java Internet banking solution based on Twister.

Very quickly, Brokat decided to expand internationally since they saw that a global presence would be essential to secure future market share. The variety of retail banking systems in Europe required an integrated product. The need to address this requirement gave Twister and Brokat a head start. If you are trading stocks on the Internet or buying theatre tickets using a personal code entered in a mobile phone, there is a very good chance, particularly in Europe, that you are using software developed by Brokat. Today, over 2000 companies worldwide successfully use Brokat solutions.

When Brokat was established in 1994, the founders came to the conclusion that venture capital was not readily available in Germany and decided to fund the business through existing software development and consulting contracts. That was more difficult, but the final result is that the founders and their family still hold more than 50% of the company. However, at the end of 1996, Technologieholding took a major stake in the company; Vertex and TBG invested a year later. All three firms are entitled to a seat on the company's supervisory board, which is chaired by Falk Strascheg of

Technologieholding. Just before the September 1998 initial public offering, Technologieholding, TBG and Vertex held 19.7%, 5.5% and 8.2% respectively of Brokat's capital, for a total of 33.4%. The remaining shares are held by the founders and their families. The initial public offering took place in difficult market conditions in September 1998 on the Neuer Markt at DM 64.00 (EUR 32.65) per share, the high end of the price range, valuing the company at DM 523 million (EUR 267.0 million) on revenues of DM 29.6 million (EUR 15.1 million). The offering was oversubscribed 24 times. Less than one year later, in August 1999, the company's market capitalisation stood at DM 830 million while revenues experience triple digit growth rates. By the year 2000, the company is expected to turn a profit.

With close to 400 employees, and operations in 11 countries on four continents, Brokat can claim a strong international presence. Some of the IPO proceeds were destined for merger and acquisition activity. In February 1999, Brokat and Micrologica established a joint consulting company, Go-Solutions GmbH. In March 1999, Brokat and MeTechnology, whose strength lies in application development, decided to merge. In May 1999, Brokat acquired Transaction Software Technologies Inc. (TST), one of the leading providers of cash management software and services in the United States. In August 1999, Brokat Financial Systems, a wholly-owned subsidiary, was established in Atlanta, Georgia to provide software to meet the needs of the North American financial services community. It will concentrate on the development, marketing and servicing of financial services software for full service corporate cash management and small business banking.

Brokat has received numerous awards and certifications. In June 1997, it was the first software company in the world to be awarded an official high security certificate by the German Federal Office for Security in Information Technology for the Twister encryption component X PRESSO Security Package. In January 1999, it won the Internet innovation prize awarded by the American Internet industrial organisation CommerceNet. In May 1999, Brokat received the "Entrepreneur of the Year 1999" award in Stuttgart. It also became the first German software company to receive the Secure Electronic Transaction (SET) Certificate for its Twister application X PAY, which allows worldwide payments to be made on the Internet using Thin-Java-Wallets in accordance with SET standards.

Only five years after its founding, motivated by the motto "winner takes all", Brokat finds itself in a key position as one of the world's leaders in software for the secure, customer-focused, e-finance/e-commerce sector.

Summer 1999

CADCENTRE GROUP PLC

Business: Supply of computer-aided design systems for process plants
Company established: 1967
Venture backers: 3i, Cambridge University
Website: www.CADcentre.com

CADcentre was founded in 1967 by the British government during the "white heat" of the 1960s technological revolution with a charter to improve the performance of British industry by applying advanced computer technologies to engineering design. It is now one of the world's leading suppliers of three-dimensional, computer-aided design software for engineering projects such as offshore oil rigs, power stations and chemical plants.

In 1983, CADcentre underwent privatisation to become a private limited company. This was done by creating a consortium of buyers that consisted of W S Atkins, Cambridge University and ICL, the major shareholder. In 1994, CADcentre was acquired by its management in a transaction that CEO Crispin Grey regards as part of the natural evolution of the company. ICL was then owned by Fujitsu, and CADcentre's activities did not fit with Fujitsu's long-term aims and objectives; an MBO was the obvious solution. Crispin Grey had long known Jim Martin at 3i's Cambridge office and they met to discuss the way forward. This concluded with 3i fully funding a bought deal, in a transaction that valued the company at £7.7 million. 3i recognised that CADcentre had a strong management team with solid experience and a niche product that had already proven itself as a market leader in its sector. Moreover, the company was profitable and had a strong order book with many opportunities. In addition, it had shaken off its government roots and was focused on creating "best of breed" products for its customers. A fundamental element of this success was CADcentre's focus on the data integrity of its solutions rather than on graphics for complex shapes and surfaces.

After purchase, 3i sold part of the equity back to Cambridge University and was left holding 38% of the company; 43% was held by the board and the balance by staff. 3i did help CADcentre find a new chairman, Richard King, but overall was not proactive in the company's management and progress. This suited Crispin Grey, who wanted financial support but also wanted to be left alone to run CADcentre as he saw fit. Since the company was already profitable and the management had good customer relationships, this arrangement also suited 3i. CADcentre continued to grow rapidly, opening offices in Seattle, Houston, Delaware, Frankfurt, Hong Kong and Paris, with exports accounting for about 80% of turnover in 1996.

Once again, natural evolution indicated that the next obvious step was an IPO. Flotation has meant that CADcentre can now accelerate international growth and company development. In addition, it has also allowed the redemption of preference shares and reduction of borrowings; long-term debt has been turned into equity financing. CADcentre's listing has also enhanced the perception of the company in the marketplace, increasing its prestige and helping customers to feel that they are dealing with a committed long-term player. In its two years of involvement, 3i helped CADcentre

expand its international reputation and obtain a full listing on the London market - and achieved a significant return on its investment. At the end of March 1999, CADcentre reported pre-tax profits of £3 million on sales of £17.9 million. These results maintain the unbroken record of profit growth that began prior to CADcentre's flotation in 1996.

CADcentre technology has been integral to the design process of industrial plants with a value in excess of £170 billion for more than 350 clients worldwide. Clients include leading plant owner/operators and engineering contractors such as the ABB Group, BASF, Du Pont, Electricité de France, Halliburton Brown & Root, Kawasaki Heavy Industries, Krupp Uhde, Kvaerner Group, Merck, Mitsubishi Group, Petronas Carigali, Shell and Stork E&C. Headquartered in Cambridge, England, CADcentre currently employs 200 staff with additional sales and technical support offices in Manchester (UK), Australia, France, Germany, Hong Kong, Japan, Norway and South Korea; the company also has two offices in the USA. Crispin Grey is set to retire in the fall of 1999.

First published in March 1997, updated Summer 1999

CHIROSCIENCE

Business: Discovery and development of novel medicines
Company established: 1992
Venture backers: Apax, 3i, Schroder Ventures, Grosvenor Venture Managers, JAFCO
Website: www.chiroscience.com

Chiroscience was formed in 1992 by Dr Chris Evans following the Chirals Division of Enzymatix model, which was set up by Dr Evans in 1987 when he was 28 years old. Many drugs use chiral molecules that contain isomers, which are identical mirror images of each other, rather like the left hand is the mirror image of the right hand. A problem occurs in that, while the right-hand isomer could be beneficial, the left-hand isomer might produce unwanted side effects. While some of the side effects are benign, others can have tragic consequences as in the case of thalidomide, for example. Drug regulators now demand full details of both the active and inactive elements of chiral drugs. Chris Evans therefore decided to found a company that would concentrate on a type of chiral technology that eliminates the potentially toxic isomer and concentrates on the isomer with beneficial effects. Chiroscience proposed to use chiral technology to supply purer intermediary products to pharmaceutical companies; to be involved in the clinical development of single-isomer versions of drugs then available only in multi-isomer form; and to develop new and safer drugs, thus relieving patients of the need to take drugs that could cause them harm.

On the basis of this proposition, Chris Evans and two other Chiroscience directors, Nowell Stebbing and Peter Keen, were able to raise £10 million. The placement of these shares, which was oversubscribed, was rightly touted in the press as "a coup that will create more than 200 new jobs…achieved without the help of banks, stock brokers or City agents". Many elements fuelled the enthusiasm of potential investors: the strength of Chiroscience's management team; a commitment of a significant amount of cash by Chris Evans and Nowell Stebbing; an investment by the founder of Amgen; existing sales of products and services to blue chip pharmaceutical companies, a US$100 million agreement with Italian pharmaceuticals giant Menarini; the determination of the founders to "build Chiroscience into the world's leading bioscience company by the end of the decade"; and last, but not least, the involvement of Chris Evans.

Professor Christopher Thomas Evans, OBE, DSc, BSc, ARCS, Cbiol, Cchem FIBiol, FRSC, FRSA, was born in 1957 and can boast a list of achievements that could make one believe he was born in 1857. He is a well respected, internationally renowned scientist who has made substantial scientific contributions and discoveries. It is said that he has always been hyperactive and driven by inexhaustible energy. He qualifies as Great Britain's first serial entrepreneur and a business archangel. Some have even called him a pathological entrepreneur. He has established 15 high quality bioscience companies, sold off one to make his first personal millions, and floated four companies on the London Stock Exchange.

Chris Evans enjoys chaotic situations and challenges. He likes to raise funds, to create

companies from scratch, to bring in vision and a good management team, to grow companies, stabilise them and lead their flotation. He is obsessed with rugby and has learned from his favourite sport that when you make the best player a captain, he often goes downhill. He therefore refuses to become the "chief" of the companies he founds. The same is true for Chiroscience: he founded it, led it to a successful flotation, remained on the Board for a while, and eventually left altogether in 1998.

Meanwhile, Chiroscience had gone public in February 1994 at a price of £1.50 per share for a total valuation of £102 million. A secondary offering followed in May 1996 at £4.10 per share. Under the management of John Padfield, who brought in big-company expertise from his years at Glaxo, Chiroscience became much more broadly based. In December 1996, Seattle-based Darwin Molecular Corporation was purchased with the objective of creating a unique international drug discovery company with a broad range of capabilities ranging from gene-based research through to clinical development. Synergies from the merger provided the potential to accelerate the drug discovery process and extend the scope of drug discovery programmes. For Chiroscience, the merger provided access to further novel drug discovery programmes; for Darwin, the merger provided access to expertise in bringing drug candidates through the development process. Bill Gates, chairman of Microsoft and also the lead investor in Darwin, strongly approved the merger and stated it was "the right move for both companies".

In December 1997, Chiroscience filed its first European Marketing Authorisation Application, for Chirocaine, a long-acting local anaesthetic. In doing so, it became one of the rare biotechnology companies to have an actual drug to sell. A filing with the US Food and Drug Administration followed in September 1998. All along, research and licensing agreements with major pharmaceutical partners were regular sources of revenues. Chiroscience is organised around three principal activities: Chiroscience R&D, Rapigene and ChiroTech. The Chiroscience R&D drug discovery and development activities concentrate on discovery and development of innovative small molecule drugs and related diagnostics with a therapeutic focus on cancer, inflammation, pain, osteoporosis and auto-immune diseases. Rapigene is involved in the creation and provision of genomic technologies and services to partner companies and to Chiroscience's drug discovery programmes. ChiroTech provides chiral technology services to customers within the pharmaceutical and related industries, including Chiroscience R&D.

In June 1999, a merger was announced between Celltech Plc and Chiroscience Group Plc. The merged company, Celltech Chiroscience Plc, will be one of the largest biopharmaceutical companies in Europe, with a broad and innovative new product portfolio and outstanding drug discovery and development capabilities. The merged entity will have over 400 research and development staff and combined annual research and development expenditures of £51 million. The merger offer values Chiroscience at approximately £331 million and Celltech at £360 million, creating a new pharmaceutical entity worth £700 million. The combination of the strengths of Celltech and Chiroscience – which are already the strongest biopharmaceutical companies in the UK – has reset the model for success and paves the way for further consolidation in the sector.

Summer 1999

COMPEX N.V.

Business: Laboratory Information Management Systems and Manufacturing Execution Systems software
Company established: 1985
Venture backers: Parnib Converging Technologies
Website: www.compex.be

Compex, headquartered in Ninove (Belgium) 20 km west of Brussels, was founded in 1985 by Guido and Wim Beazar. From the very beginning, Compex has specialised in the field of industrial computer applications. Initially this meant that the company developed tailor-made applications for data acquisition and processing in production and quality departments for major national and international industrial companies. Based on the broad experience that Compex acquired in the course of these projects, the company gradually shifted its focus to the development and implementation of standardised solutions. This has led to the development of state-of-the-art software products in the field of Laboratory Information Management Systems (LIMS) and Manufacturing Execution Systems (MES).

In 1989, Compex developed its LIMS Unilab in collaboration with a multinational food company. In 1991, this system was chosen as the worldwide preferred LIMS by this food company. In 1993, two other food concerns took a similar decision so, at this moment, Unilab is the preferred LIMS for three of four of the world's largest food concerns. In 1996, Compex released Unilab 4, an upgrade of the existing system, as the LIMS for a new generation. At an international trade fair in October 1996, Unilab 4 was awarded the title of most innovative LIMS.

In 1995, Compex brought a second standard solution, proCX, to the market. This solution is the result of Compex's years of experience with Production Supervision Systems. ProCX offers a Batch and Recipe Management solution based on the international ISA S-88 standard. Unilab 4 and proCX are Compex's response to the growing demand for truly integrated Manufacturing Execution Systems. These activities have developed in sectors such as food and beverage, chemicals, pharmaceuticals, petrochemicals, biotechnology and personal care products. Clients include such companies as Bayer Antwerpen, BF Goodrich, Interbrew, Kraft Jacobs Suchard, Kraft Foods North America, Nestlé, Tessenderlo Chemie, Unilever and Vandemoortele. Compex products are offered internationally through offices and partners in Europe, the USA and South Africa.

In October 1992, the international expansion of Compex was launched with the creation of a Dutch subsidiary, Compex Nederland BV. An American office opened near Chicago in the beginning of 1997 and Compex Deutschland GmbH was set up near Munich in May 1998. The drive to expand internationally required additional capital. Belgian banks were not yet ready to lend to a software company, despite its success, and the brothers Beazar decided to turn to venture capital. In June 1998, Parnib's Belgian arm made a BEF 100 million investment for 14% of Compex's shares. The funds would be used to finance further development of Compex's existing international

offices, establish new branches in the United Kingdom and France, and further develop the proCX and Unilab 4 products. In October 1998, Compex received the 1998 "Enterprise of the Year" award, an annual prize awarded by Ernst & Young Management Consultants to dynamic and innovative companies with the potential for significant future growth. Nomination for the award is subject to an extensive quantitative and qualitative selection procedure: only companies that have increased their turnover, added value or increased staff by at least 50% in the last five years are eligible for selection. Eligible companies have to be based in Belgium, employ at least 25 people and have management that holds a minimum of 10% of the company shares. Following Compex's increase of capital by Parnib Belgium in the summer of 1998, Denis Payre, co-founder of another venture backed success story, Business Objects in Paris, joined the Compex board as a non-executive director at the suggestion of Parnib. His experience should be of value to the further development of the company. At the same time, Charly Zwemstra also joined the board of directors on behalf of Parnib. He will contribute his personal experience and international network in the industry. An essential mission of the reinforced board is to strengthen the company's management and accelerate growth. Until 1998, growth stood at 30–40%. A shift into high gear should take growth into the 50–100% range. Acquisitions of comparable companies may help to achieve this objective. Revenues stand at slightly less than EUR 15 million and the company is expected to substantially increase profitability in the years ahead. Compex has already created 120 jobs. An initial public offering is on the horizon for 2000 or 2001.

Summer 1999

DELTRON ELECTRONICS LTD

Business: Supplier of electronic components
Company established: 1991
Venture backers: 3i, Ivory & Sime, Lloyds Development Capital
Website: www.deltron-components.co.uk

Deltron is one of the UK's fastest growing electronics companies specialising in supplying electronic components and making specialist connectors and filters. The company was formed in 1991 when Christopher Sawyer, a former management consultant, and his partner Edward Tozer, a former Guinness Mahon banker, bought Roxburgh, a private electronic component distributor. At the time, Roxburgh was a market leader in the distribution of switches, printer mechanisms and audible alarms and had also developed a range of electronic filters. Sawyer and Tozer had been looking for an electronics company on which to build a business and decided that Roxburgh had the potential to be developed and expanded since, although their products were solid and the company had good market share, it had experienced a loss of £163,000 on sales of £4.6 million.

Paul Cannings at 3i was responsible for the investment when 3i joined the syndicate led by Ivory & Sime in the second round, putting up £1.6 million in return for 8% of the equity. He was attracted by the investment since Sawyer and Tozer had achieved a difficult turnaround in a short period of time and had grown the company rapidly. The team had a highly focused strategy in terms of development and flotation and clearly knew what they wanted to achieve. The financing that they sought would allow the firm to grow rapidly through acquisition.

The new financing enabled Deltron to acquire Futters, a London-based subsidiary of Frederick Cooper Plc, and to expand their Scunthorpe-based factory. The management then focused on building the company by following a clearly defined strategy of attaining leadership positions in niche markets including switches, filters, alarms, connectors and EPOS products. This was achieved through manufacturing and distribution, which account for 35% and 65% of turnover respectively.

The company has been successful by concentrating on a few key products and by building close relationships with customers such as Bull, Lucas, Philips and Electrocomponents. In addition, Deltron is now developing their overseas operations with customers such as Alcatel, Mitsubishi, Premier Farnell and Rockwell. This expansion was clearly visible in Deltron's results, which reflect not only growth by acquisition, but strong organic growth as well. The year after the MBI, Deltron made a profit of £162,000; in 1998, they made a profit of £3.17 million on sales of £36 million.

Early in 1996, Deltron started putting into effect plans to go public; they wanted to raise further financing to fund additional overseas expansion and to allow for repayment of debt incurred in previous acquisitions. A full listing on the London stock market was the most appropriate way forward. The flotation took place in September 1996, valuing the company at £30 million. 3i exited at that time. During the two years 3i was involved, they helped Deltron

develop into a truly international business. In addition, 3i achieved a very satisfactory return on its investment.

The funds raised at the initial public offering were indeed used for acquisitions. In 1997, Deltron purchased two electronic components distributors: Coneloc in Denmark in April and Freber in Sweden in October. In July of 1998, it purchased Semap in France.

Recently, Deltron went through some difficult times. A stronger pound, tough trading conditions in the UK and an aborted attempt to expand through acquisitions hit Deltron's performance, leading to profit warnings and sinking the market capitalisation to £15 million. However, the fact that earlier this year Christopher Sawyer, chief executive, and Edward Tozer, finance director, expressed an interest in making an offer for a management buyout, gives a clear indication of the company's value and potential.

First published in March 1997, updated Summer 1999

DR SOLOMON'S GROUP PLC

Business: Anti-viral software
Company established: 1984
Venture backers: Apax, 3i
Website: www.drsolomon.com

Alan Solomon and his wife Susan started their specialist software company, S&S International, as a part-time business. Susan ran it from home while Alan worked as an economist for British Petroleum, writing software in the evening. Their first break came when the Lotus 1-2-3 spreadsheet program was launched in the UK only recognising the dollar ($) sign and not the pound (£) sign. Alan wrote the software to correct this oversight and Susan marketed it. Next, he worked out how to print 1-2-3 spreadsheets sideways on a dot-matrix printer and they sold this program. Later, when Lotus released Version 2.0 of 1-2-3 and fixed all the problems associated with the earlier version, the Solomons realised they would have to diversify. Most importantly, their experience made it clear that there was a market for small programs that solved small problems.

Further development came as a result of articles on data recovery that Alan wrote while commuting to work. A reader whose hard disk had been wiped clean called him and Alan managed to recover all the lost data. His data recovery subsidiary, Authentic, still provides this service. In 1986, Solomon left his job and joined his wife in the business full-time.

The next break for S&S came in the field that was to make the company's name. The trade press had been running articles on viruses and, despite never having seen a virus in action, Solomon wrote an anti-virus program. Soon afterward, Susan received a call from a university that had a disk problem resulting from a virus. Following various trade articles, and gaining more experience with additional viruses, Solomon quickly became known as a virus guru. By the end of 1988, other users had sent disks containing viruses but it was only when an important financial institution (whose identity remains confidential) became infected with a major outbreak of the Jerusalem virus, that Dr Solomon's Anti-Virus Toolkit was created. Five hundred copies detecting six viruses were produced at a sales price of £49 a copy. The Solomons thought they had sufficient stock to last a couple of years. In fact, the stock lasted a month.

Although the name of the company was S&S, they decided to brand the product Dr Solomon's. With the rapid growth of the PC market, and the accompanying viruses, S&S International expanded quickly. In 1991, a stake was acquired in a PC security business in Germany and since March 1995, Dr Solomon's Software GmbH has held the distribution rights for the Toolkit in Germany, Austria and Switzerland. The year 1995 also saw the establishment of the first US office; previously a distributor had been used. In 1995, the Solomons were looking for ways to realise part of their investment. They were considering flotation and various trade buyers, when management proposed a buyout. The Solomons decided to sell the anti-virus part of the company but to do this the management team needed financing.

They approached various venture capital houses and chose Apax because of their reputation for being high-tech oriented. Apax also offered the best terms. The MBO, valued at £30 million, was concluded in February 1996, financed by Apax (£13 million) and 3i (£1.75 million). Bank debt was provided by the Bank of Scotland. Dr Peter Englander was responsible for the investment and took a seat on the board. He advised on practical matters, such as an employee share option scheme, and helped introduce new customers. More importantly, he later helped with flotation plans, encouraging a dual listing on Easdaq and Nasdaq. Flotation happened much faster than anticipated due to the rapid expansion that occurred in 1996. This was partly due to the success of the US operation and partly due to additional organic growth in Europe. The management wanted to reduce borrowings as well as release capital for further development. Nasdaq was the most suitable market since there were comparable companies listed and therefore a better understanding of the product offered by Dr Solomon's. Easdaq also offered a good opportunity, since a listing on this exchange would increase the company's European exposure.

By 1998, Dr Solomon's had become known as a leading supplier of anti-virus software and as a developer of anti-virus software programs for PCs and PC networks. The products provided effective and easy-to-use software solutions to the risks posed by the proliferation of new and increasingly sophisticated computer viruses, with a well-known product line, the "Dr Solomon’s Anti-Virus Toolkit" family of anti-virus software programs. Since its introduction in 1989, the Toolkit had become one of the leading global anti-virus software programs, able to detect and identify more than 19,000 known computer viruses. This success attracted attention and, in June of 1998, Dr Solomon's Group was acquired by Network Associates Inc, at a valuation of approximately US$642 million (£393 million), with revenues of £63.1 million and net income of £6.9 million. The valuation represented an 89% increase on the December 1996 IPO share price of US$17.00.

First published in March 1997, updated Summer 1999

ELECTRO OPTICAL SYSTEMS GMBH (EOS)

Business: Rapid-Prototyping Systems for automotive and engineering business
Company established: 1989
Venture backers: Technologieholding
Website: www.zeis.com

EOS, a German company based in Planegg, supplies Rapid-Prototyping-Systems to a wide range of manufacturers. These systems significantly shorten the development cycles of models and prototypes by using laser technology to build three-dimensional objects specifically designed to meet the needs of a small number of major engineering concerns.

The company was founded by Dr Hans Langer whose original idea was that three-dimensional structures could be scanned, manipulated into a CAD system and then re-created as 3-D objects through the use of lasers. Believing in the wide application of this technology, Dr Langer left his job to start up the company in 1989, confident that he would be able to obtain financing to back his idea.

EOS had already been in existence for one year when Technologieholding became an investor in 1990. At that stage, strong patents had already been secured and the investment looked attractive since the only competitor was a US-based company. Falk Strascheg of Technologieholding therefore decided to commit DM 900,000 to EOS, a sum that was similarly leveraged by the German government. In return, Technologieholding obtained 36% of the equity, while Dr Langer continued to own 64% of the company. Later this 36% was diluted to 25% due to Dr Langer's exercise of options. Further financing was obtained from an EC support programme and EOS also negotiated an unsecured bank loan on the strength of its market position and the credibility of the other investors.

EOS was strategically placed as the only European producer in an area dominated by an American competitor with a monopoly. The goal was to challenge this monopoly on the basis of lower cost and higher product quality, and to develop products that would offer customers complete design and manufacturing solutions. EOS actually developed very much along these lines; by targeting a small number of major engineering concerns it quickly obtained 50% of the European market, selling its products to a wide range of manufacturers that required industrial prototypes, including Fiat, Mercedes-Benz, Siemens and BMW. Indeed, BMW was so impressed by the innovative nature of the product that they decided to support EOS' R&D efforts and advanced a significant sum for that purpose.

This rapid success enabled Technologieholding to consider its exit. The plan at entry had been to make a trade sale, given the options for a highly specialised firm with a turnover of about DM 20 million and gross profit of DM 10 million. But instead, a buyer who would continue to develop the company strategically and had more than a short-term interest was sought. Moreover, EOS was in a strong position since there were no pressures to sell, the business was well positioned in the market and there was a choice of interested buyers since the technology was new.

Due to the US competitor and their patent rights, sales prospects were geographically restricted to Europe and Japan. By sheer coincidence Zeiss, a German manufacturer of optical systems, had decided to diversify into this area and was on the lookout for potential targets; the synergy seemed obvious, and it was much cheaper for Zeiss to buy EOS than to develop the product themselves. The sale took place in 1993, generating DM 5 million for Technologieholding and an impressive rate of return for the fund. This case history illustrates the potential that exists when the technology and the deal are right.

March 1997

FLOMERICS GROUP PLC

Business: Computational fluid dynamics software for the thermal analysis of electronic design
Company established: 1988
Venture backers: MTI Partners
Website: www.flomerics.com

The founders of Flomerics, David Tatchell and Harvey Rosten, first worked together in the 1970s pioneering the commercial availability of computational fluid dynamics (CFD) technologies. As competition in the electronics sector increased in the 1980s, thermal issues became increasingly important, since it was necessary to know a system's precise cooling requirements at the design phase. Prior to the introduction of Flomerics products, this issue could only be addressed either at the prototype stage or by specialist CFD engineers using complex software, which was time-consuming and expensive. Taking advantage of the gap in the market, Tatchell and Rosten founded Flomerics to develop CFD software designed to simulate thermal exchange at the pre-prototyping phase of development. Initially the business operated as a partnership but, in order to fully develop the product and establish a thriving business, the founders realised that venture capital was the best way forward.

The business plan estimated that at least £250,000 was required. They approached several venture capitalists, including MTI, to obtain their first round of financing. After assessing the possibilities, MTI was chosen and, in February 1989, Ernie Richardson at MTI decided to invest £300,000 in return for a stake of 62.5% with the founders holding the balance. MTI judged that this amount would enable the development of a viable commercial product and see Flomerics through to profitability. At this point, Ernie Richardson's involvement was at a practical, hands-on level, helping introduce financial reporting systems and providing management support.

The first product, Flotherm Version 1.2, became available in September 1989 for use by electronic engineers. Its main applications are in telecommunications and computers, but it can also be used in the defence and avionics industries, as well as in consumer electronics and transportation. Flovent, the second product, was released in early 1990. This product targets the heating, ventilation and air conditioning market (HVAC), and is used to analyse a building's air circulation. All Flomerics software was designed to provide a basis for further development depending on specific requirements.

Flotherm was initially marketed in the UK, but Flomerics recognised that to achieve serious growth they had to penetrate the US market. With MTI's help, a US subsidiary was established in 1990.

By late 1991, Flomerics found themselves in need of an extra cash injection to allow further development so, at the end of 1992, Flomerics underwent a rights issue. MTI put in an additional £250,000 and its equity stake was slightly diluted to 58%; at the same time Flomerics employees invested £170,000. This additional investment allowed the business to boost its US operations and intensify its efforts in the Far East. Soon after, Flomerics began to generate

significant profits due to the success of Flotherm, which has now been adopted by most of the major electronics groups in Europe and the United States. A 1992 survey identified the potential market for Flomerics' thermal analysis software at US$50–100 million per annum, a market largely created by the product itself.

A second US office was opened in 1993. In Europe, German and French subsidiaries were established. In addition, Flomerics expanded by using local distributors in other major markets. Flomerics has four offices in North America, which continues to be Flomerics' largest market, accounting for slightly more than half of turnover.

Toward the end of the fixed-term, 10-year partnership, MTI began to look for exit possibilities. Flomerics' management wanted, if possible, to remain independent and autonomous. A full listing on the London market was not appropriate due to the company's size. But both MTI and Flomerics decided that a listing on AIM would provide the exit that MTI was looking for while at the same time leaving the company both independent and with sufficient additional funds. Since MTI had instituted financial reporting systems after the first round financing, the business was already being run in a manner that met with AIM's requirements and could comply with the necessary recommendations. By doing this MTI added enormous value since the need for expensive auditing was avoided. The company was floated on December 6th 1995, with a market capitalisation of £3.3 million, generating a very good return for MTI. At the time of admission, MTI placed approximately 25% of its shareholding, the remainder having been sold via a secondary placing in early 1996.

In July 1999, Flomerics announced a merger with Kimberley Communications Consultants (KCC) Ltd, describing it as "by far the most radical move since Flomerics' inception back in 1988". This strategic development allows Flomerics to move into the area of Electromagnetic Compatibility (EMC) in the electronics industry. The relevance of the merger is illustrated by the fact that, today, the interactivity between the EMC and the thermal engineer in a typical design project has increased dramatically. The two companies will jointly develop FLOEMC software that will be able to simulate electromagnetic emissions for electronic systems in the same way that FLOTHERM predicts the airflow and heat transfer. FLOEMC will solve EMC problems, while sharing the same geometry model and data structure with FLOTHERM. Through this common data structure and appropriate post-processing facilities, EMC engineers will be able to communicate more effectively with their thermal counterparts, leading to dramatic gains in productivity. The merger with KCC opens opportunities in new markets.

At the end of 1998, Flomerics and KCC had revenues of £6.91 million and £658,000 respectively. Over the years, and since the announcement of the merger, Flomerics' market capitalisation has risen to £6.55 million. Slowly but surely, value is being created.

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FLASHNET

Business: Internet service provider
Company established: 1994
Venture backers: 3i
Website: www.flashnet.it

Giovanni Prignano had been running Dataflash, a Rome-based family business in the computer and hardware retail sector, when, at age 33, he realised that telecommunications were undergoing a major change and that the Internet in particular would offer new opportunities. He decided to create Flashnet in September of 1994 as a telecommunications subsidiary of Dataflash. Dataflash owned 30% of Flashnet; the remaining 70% was owned by the Prignano family, the management team and a business angel/entrepreneur who was providing electronic voting systems to, among others, the Italian parliament. In the beginning, Flashnet operated out of Dataflash offices and shared its infrastructure. When business became more substantial, the operations moved into separate spaces.

Flashnet started from zero in 1994 and grew regularly. A leadership position was achieved rather quickly due to the very high qualitative standards applied to the services it provided in the integration of innovative telecommunications technologies with traditional business and management tools. Flashnet's leadership position and its understanding of the fast development of new technologies and of the advantages gained from a presence outside its home market led the company to sign a business partnership agreement with Eunet. This partnership instantly expanded the Italian Flashnet network to about 500 access points worldwide. In a short time, Flashnet made a name for itself as one of Italy's main Internet service providers. A team of competent, dynamic and motivated young managers was a major element of Flashnet's strength.

In 1997, Flashnet had revenues of more than ITL 4 billion (EUR 2.1 million), split almost equally between the consumer market and the corporate market. Up to that point, growth had been financed with family funds, the business angel's support and bank debt. Flashnet broke even, but Giovanni Prignano understood that additional funds would be necessary to accelerate growth and face the competition of Internet service providers set up by the major telecom companies, among them, Telecom Italia. Banks would not support Flashnet going forward because they considered the Internet to be a risky business. In fact, even though revenues were expected to grow from ITL 4 billion to ITL 10 billion (EUR 5.2 million) in 1998, banks still considered Flashnet's business to be insignificant and were considering pulling their money out of the company.

Looking for equity rather than debt financing, Flashnet decided to turn to venture capital. Several venture capital companies were contacted with the assistance of an intermediary. 3i won the deal because they were able to offer a solution quickly. The understanding of the sector shared by their 3i colleagues in the United Kingdom convinced the team in Milan of the opportunity, especially in a market that was poised to grow from the current ITL 160 billion (EUR 82.6 million) to ITL 2 trillion (EUR 1.033

million) by the year 2000. The decision was made quickly and 3i had money available. 3i subscribed to a capital increase and convertible bonds for a total of ITL 6 billion (EUR 3.1 million) for 40% of the company.

The objective of 3i when they provided capital to Flashnet was to support its growth, especially in the corporate market, to make additional future investments if necessary, and to assist the company in finding appropriate acquisition targets. Cybernet, a German group quoted on the Neuer Markt, also thought that making acquisitions was a good way to grow and was looking for an independent, well managed Internet service provider with a good customer base. By then, Flashnet was ranked first in consumer market share and second in business market share among independent Italian Internet service providers. All of this did not escape Cybernet's attention, and Flashnet became an obvious first-choice acquisition target. A trade sale was agreed to in May of 1999. All shareholders sold out to the German group with a good return. Giovanni Prignano stayed on and still leads Flashnet's development in Italy.

Summer 1999

GENSET S.A.

Business: Human genome mapping and production of synthetic oligonucleotic DNA
Company established: 1989
Venture backers: Sofinnova, Sudinova, Agrinova, Eurocontinental,
Financiere Immobiliere Marcel Dassault, JAFCO,
Oxford Biocience Partners, Burr Egan Deleage, SR One,
CREF (College Requirement Equity Fund)
Website: www.genset.fr & www.genxy.com

Genset is a French genomics company that aims to discover and characterise disease-related genes and to develop and market products derived from DNA and genetic research. The identification of such genes should lead to the development of new therapeutic drugs. The process of identification is known as genomics, a rapidly growing field that provides a systematic and global approach to analysing the structure and function of the human genome by means of high-scale DNA sequencing and bioinformatics. Genset is the only one out of nine major genomics companies to be based outside the US.

The company's founders, Pascal Brandys, Marc Vasseur and Luc d'Auriol, founded Genset to focus on RNA and DNA used as research tools, both as diagnostics and for therapeutic uses. Pascal Brandys, the CEO since the company's foundation, had wide experience as a venture capitalist in the biotech sector both in Europe and in the Far East. He had discussed the commercial possibilities that were opening up for genetic applications with Marc Vasseur and Luc d'Auriol, both senior molecular biologists. The three men decided to found Genset to concentrate on developing the production and marketing of synthetic oligonucleotides; since there was no European competition, the field was wide open for development.

With Pascal Brandys' broad experience in biotech venture capital, he had good contacts at Sofinnova, which he contacted at the outset. Sofinnova was immediately interested since the scope for growth was enormous. Moreover the team represented a broad spectrum of experience in both molecular biology and finance; they had a clear vision of what they wanted to achieve, and they understood their strengths and weaknesses. So, in November 1989, Sofinnova decided to invest FF 5 million for which they obtained 32% of the equity. At that time, the remaining equity was held by the founders and two other French venture capitalists. Marie-Christine Candellé-Gardenq of Sofinnova was the manager responsible for this investment and she played a very proactive role in the company's development, advising them on market positioning, financial strategy and staffing. More importantly, she led the syndicate of venture backers and helped Genset find and negotiate further rounds of financing as the need arose in 1991 and 1992.

Genset initially focused on the commercialisation, production and marketing of synthetic oligonucleotides (small DNA fragments), and subsequently became a major worldwide supplier. This was due to the huge demand created by the international efforts to map the human genome. It was this business that helped fund later research and development

activities. But as a supplier of DNA to key genome programmes, and with the advances made in mapping the human genome, Genset realised that huge markets and possibilities were available to companies that could identify disease-related genes and select appropriate commercialisation strategies for drug discovery and development. In 1994, the company therefore launched the "TGS" programme, which is dedicated to discovering disease-related genes. This programme required a huge cash injection and Sofinnova used their contacts to widen the circle of investors and help bring new money in to expand this development via three private placements.

This additional money enabled Genset to direct its research activities on diseases involving multiple genes (polygenic diseases) since most human diseases, including cancer and heart disease, are polygenic. The commercial strategy targeted prostate cancer, schizophrenia, osteoporosis and certain selected dermatological diseases. It was only recently that the genetic component of these diseases was recognised and the therapeutic significance of finding the causative genes appreciated.

Genset's research strategy is to apply large scale industrial techniques to the systematic and comprehensive analysis of the human genome. The research programme is extremely expensive and, in order to finance an expanded mapping team and increased R&D, a double IPO on NASDAQ and Le Nouveau Marché, which raised US$108 million took place in June 1996. The goal at that time was that Genset would be profitable by 1998.

Genset has now established itself as a world leader with a dynamic research programme and an international technology platform. An impressive list of major pharmaceutical companies and research centres have entered into partnerships with Genset, among which are Johnson & Johnson/Janssen Pharmaceutica, Sanofi-Synthelabo, Pharmacia & Upjohn, Wyeth-Lederle, Abbott Laboratories, Ceres, Genetics Institute, the Technion in Israel, the Royal College of Surgeons in Ireland and The Johns Hopkins University Medical School.

Genset counted 518 employees at the end of July 1999, of which about 350 are in R&D. It has locations in France, the United States, Japan, Singapore and Ireland. Despite the prediction that operations would be profitable by 1998, Genset still reports losses. This may help to explain why the market capitalisation of US$240 million today is lower than that at the IPO, in spite of all the major achievements.

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updated Summer 1999

INNOGENETICS N.V.

Business: Discovery and development of diagnostic and therapeutic products
Company established: 1985
Venture backers: GIMV, Alta Berkeley, Baring Hambrecht Ventures, Eurocontinental Ventures, JAFCO, Kredietbank
Website: www.innogenetics.com

In recent years, new diseases have emerged despite the advances of modern medicine. As disease patterns evolve, the use of diagnostics is becoming ever more important, not only for the patient, but also to use limited healthcare resources in the most efficient manner. Immunoassays (trials to determine immune function) are rapid and accurate but provide little information about disease levels, whereas DNA probe technology is more specific and sensitive, thus providing highly reliable results.

Innogenetics was founded in 1985 by Rudi Marien and Hugo Van Heuverswyn who wanted to establish a new biotechnology company focused on DNA-based diagnostic products. Rudi Marien had experience as an entrepreneur in the pharmaceutical industry, while Hugo Van Heuverswyn, one of the top biogenetic scientists at Gent University, realised the possibilities opening up in the field of new diagnostic products.

Their original goal was to establish a company that would generate cash flow by selling diagnostic equipment, ultimately enabling the research and development of therapeutic products based on similar lines of research. But to get the company up and running would require financing. Rudi Marien's experience as an entrepreneur led to contacts at GIMV and he presented them with Innogenetics' business plan. Interested in the possibilities that lay ahead in a field which at that time was undeveloped, GIMV decided to put up BEF 25 million in the first round in exchange for 25% of the equity. The remaining funds were obtained from the founding team, business angels and loan financing.

Innogenetics currently targets five disease areas: infectious disease, tissue repair, as well as immunity, neurodegenerative and genetic disorders. In these areas, the company focuses on select markets in which its innovative technologies offer high-value products. Innogenetics' two principal product areas are immunoassays and microbiology, which together represent approximately 50% of the in-vitro diagnostics (IVD) market. These diagnostic products can be used for detecting HIV, hepatitis C, tuberculosis, meningitis, STDs, cystic fibrosis, and Alzheimer's disease. At inception, Innogenetics developed diagnostic kits for HIV testing; products for other disease areas grew out of this initial success.

As is typical with rapidly expanding pharmaceutical companies, Innogenetics had a huge demand for cash, which accelerated in 1988. This meant that new investors had to be found; GIMV was instrumental in bringing them into the business.

Dirk Boogmans and Patrick Van Beneden at GIMV were responsible for the investment and decided that the size of GIMV's involvement merited two managers working on the project. Dirk took a seat on the board, advised on

strategy decisions, acted as a sounding board for further advice and helped focus on issues that would add value. As Innogenetics grew, he helped with an employee stock option plan and finally advised on the exit.

Rapid growth costs money and Innogenetics was no exception, requiring three further rounds of financing. This meant that the company could develop extensive expertise and proprietary technology in the fields of molecular biology, genetic engineering, nucleic acid chemistry and protein chemistry. Expansion has occurred through collaborative agreements such as those with Boehringer Mannheim GmbH (1994), Hoffman La-Roche Ltd (1995), and Behringwerke AG (1996). Innogenetics has also entered into over 40 agreements with universities to conduct research on its behalf.

Although revenues were increasing, Innogenetics required further capitalisation and approached Kredietbank. The plan to take the company public evolved out of this last round of mezzanine financing provided by Kredietbank, which they agreed to provide in return for managing Innogenetics' flotation on Easdaq.

The Easdaq listing would allow the company to pursue an ambitious development programme including the construction of a new manufacturing facility, increasing existing R&D, expansion of all diagnostic business departments and acceleration of therapeutic product development. Innogenetics plans to clinically develop products up to Phase II, but intends to contract production out to third parties and will not continue beyond Phase II. New products include applications for wound healing, skin graft technology, cancer immunotherapy and transplantation.

Innogenetics' proprietary technology has ensured that the company is now a market leader for multi-parameter testing for disease management. In addition, Innogenetics has developed specific Alzheimer's disease tests and has started clinical trials on novel products for wound healing and organ transplantation.

In 1998, a new test was launched making it possible to obtain an 85% reliable diagnosis of Alzheimer's disease. Innogenetics also posted its first income for two therapeutic products for the treatment of burn wounds: AutoDerm and TransDerm. These sales were made in Belgium where the authorities have approved full reimbursement of these products. Applications for further approval in Germany, France, the United Kingdom and Spain have been filed.

Innogenetics is still a growth company, which implies that investments represent a major part of its expenses. One major investment was made in a production facility that can meet all national regulations set by registration authorities worldwide. Other investments were made with the acquisition of distributors in Germany and Spain in 1998. These purchases translated into increased revenues the following year. In July 1998, an American affiliate, Innogenetics Inc, was established in Atlanta, Georgia to pave the way for the introduction of Innogenetics' products, the expansion of business opportunities and possible acquisitions in the American market.

These investments have led to further losses, despite regular growth in revenues. Investors seem to believe that the investments made will enhance long-term shareholder value: they have taken Innogenetics' market capitalisation from EUR 210.8 million at the time of the IPO to EUR 504 million in August of 1999.

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INNOMAT OY

Business: Product and sales configuration software
Company established: 1978
Venture backers: SFK Finance, IT-Ventures
Website: www.i2.com

Kalle Välimaa founded Innomat Oy in 1978 as an engineering company. Mr Välimaa's initial goal was to develop production, processes and control technology for machine shops. His customers turned out to be companies that sold products adapted to the respective needs of their customers. Mr. Välimaa therefore quickly came to the realisation that his technology needed to allow for modular production in order to cater to the requirements of businesses with variable customer needs. In the mid '80s, the first version of a modular product was developed and became the basis for a product configuration software, PM Product, and for a sales configuration software, PM Sales. The two software packages, combined with streamlining and production management consulting services, constituted the two main sources of revenue for Innomat.

Even though Innomat's business idea seemed obvious and straightforward, the company did not really grow. In 1995 it was still small, with only half a million euros in revenue and 15 employees. Its consulting activities in the area of streamlining of processes provided sufficient revenues to break even. However, Kalle Välimaa had the ambition to grow and go international, and he felt that his software products could support an international breakthrough. In search for money to finance his expansion, he went to banks but they would not lend to a small company without guarantees. He then contacted several venture capitalists and got along best with Ralf Saxén from IT-Ventures and Vesa Sadeharju from SFK Finance.

The timing for an investment in Innomat was right. The software products would take over from the lagging consulting and engineering services as a growth vector. The market was rapidly evolving as many companies were indeed making strategic investments in production and sales management software. The products developed by Innomat were based on an acute know-how of the processes involved. Significant growth could be expected from Kalle Välimaa's strong will to internationalise his company.

Despite the good timing, the due diligence and discussions took 18 months. This long period turned out to be amazingly out of proportion to the short time span the investment eventually lasted. Those 18 months were nevertheless very productive and a lot more than due diligence was done and achieved. A lot of discussions and hard work led to the definition of a growth strategy. An essential element of that strategy was to find the right partner for international growth.

The decision to invest was made in August 1997. By then, the venture capitalists had become much more than investors. They acted as consultants and had become partners and business associates.

Meanwhile, the market continued to evolve and it became clear that it would be difficult to

commercialise sales configurators such as Innomat's PM Sales independently. Instead, the market indicated that such products should be integrated into ERP (Enterprise Resource Planning), SFA (Sales Force Automation), PDM (Product Data Management) and SCM (Supply Chain Management) software packages. It was thus concluded that an international SCM software developer would be the better business partner. Seven high-potential candidates were found, out of which four made the shortlist.

A dynamic US-based SCM software company, i2 Technologies Inc, was at the top of the shortlist. i2 was founded in 1988 on a principle that came very close to Kalle Välimaa's early conclusion that production solutions needed to take into account different customer needs. Indeed, i2's founding principle was that manufacturing planning could not only be executed faster, but that it should also be based on the real business goals and conditions of the enterprise, and take into account the whole cycle going from the "suppliers' suppliers to the customers' customers". However, i2 thought that a partnership was not enough and offered to buy the company outright. By now, sales at Innomat were low and the company was running in the red. A trade sale was agreed to in the spring of 1998. Kalle Välimaa remained as a managing director of Innomat, which became i2's Finnish base under the name of i2 Technologies (Finland) Oy.

All parties involved were satisfied. Kalle Välimaa promoted the trade sale. He agreed that more value could be created by the exploitation of synergies between Innomat and i2, and he thought that the sale would be the best solution for Innomat given the Finnish context. On a personal basis, Välimaa was glad to secure some cash assets for himself after many years of a sometimes difficult work history. Innomat employees had been able to subscribe to shares a year before the trade sale at a fraction of the acquisition price. i2 acquired quality products and a base for its operations in Finland. The venture capitalists were rewarded for their hard work and advice with a significant internal rate of return.

Summer 1999

INTERSHOP COMMUNICATIONS AG

Business: e-commerce software
Company established: 1992
Venture backers: Technologieholding, Innovacom (France Telecom), T-Telematik Venture Holding (Deutsche Telekom)
Website: www.intershop.com

In 1989, the year the Berlin Wall came down, 19 year-old Stephan Schambach was a physics student in Jena, a town of 110,000 in what was then East Germany. That same year he decided to drop out of university and to give in to his passion for electronics and computers. With Karsten Schneider and Wilfried Beeck, he founded NetConsult Computersysteme GmbH in 1992, which underwent a few name changes before it finally came to be called Intershop Communications GmbH in 1997. The name Intershop can be traced back to stores that existed in the former East Germany where purchases could be made using hard western currency. Intershop initially began as a systems integrator with a particular focus on object-oriented systems such as NeXTStep. In light of the Internet's extremely high growth rates, Intershop decided only two years later to concentrate on designing Internet applications. In July 1995, the company's first prototype of an Internet sales system, an electronic catalogue containing more than 13,000 different computer products, went online. The success of this venture, which is seen as Europe's first electronic commerce installation, encouraged the company to develop standard e-commerce software that any company could use to market and sell goods and services on the Internet.

The opportunity was obvious, yet its implementation and especially the marketing of the products required capital. In spite of the fact that back in 1995 money and credits were flowing abundantly towards the former East Germany, none was available for Internet or e-commerce businesses, which were not taken seriously at all. Consequently, at the end of October 1995, Stephan Schambach decided to put an ad soliciting additional shareholders in the Frankfurter Allgemeine Zeitung. About 60 replies came in. Six potential investors were invited to Jena. A deal was struck with Technologieholding, which invested in March 1996, on the basis of Intershop's products, technology, the potential to gain market share and a good intuition about the people involved. With the investment they got a seat on the board. Stephan Schambach and his partners trusted that Technologieholding would provide a network in addition to capital, but also that the venture capital firm would help them realise their vision without unnecessary interference. Intershop became the first East German software company to receive venture capital of any kind. France's Innovacom became a shareholder a few months later. About the same time, a subsidiary was opened in France.

It was one of the major priorities of Intershop to accelerate its presence in the United States. Technologieholding helped them write a good business plan, bring on board an American business angel and further develop a network of good contacts in the United States. In April 1996, an office was established in San Francisco. In December 1996, Intershop moved its headquarters to San Francisco.

Stephan Schambach and his family followed suit. Very soon thereafter, Intershop received the 1997 Information Technology Entrepreneurial Excellence Award from California's Governor Pete Wilson – not a small feat for a German company competing with the many start-ups in California's Silicon Valley.

Hewlett Packard became the company's first corporate customer when it began operating its business-to-business e-commerce system on an Intershop base in June 1996. A list of many prestigious corporate names and telecommunications companies followed and they remain among Intershop's clients today.

INTERSHOP Online, the first packaged product, was ready for shipment in the autumn of 1996. INTERSHOP Mall, the second product, went to market in July 1997. Both products won several awards and were ranked #1 against their peers and competition. In March 1998, INTERSHOP 3, the most complete e-commerce software package available, was released. For the first time, merchants, developers, web designers and hosts had comprehensive store design and business management tools, in addition to unlimited hosting capability, together in one package.

The company had gained well-deserved recognition, its revenues were growing and it was ready to go public. The venture capitalists' experience with initial public offerings proved extremely valuable. It was decided to float the company on the Neuer Markt since valuations in Intershop's sector on Nasdaq were not very good at the time. However, one of the main reasons a European exchange was chosen was that, rather than being one of a million software companies on Nasdaq, Intershop would get the undivided attention of institutional investors in Europe, where Intershop had become a brand name: people did not say "e-commerce", they said "Intershop". However, Intershop had by then legally become an American company, and stringent SEC regulations prevented US investors from purchasing shares of a US company listed outside the United States during the IPO, and even in the secondary market, without SEC approval. Consequently, Intershop Communications AG was incorporated in Hamburg, to which most of the shares of Intershop Communications Inc were contributed. The strategy paid off. In July 1998, about one third of Intershop Communications AG was floated on the Neuer Markt. The price was set at DM 100 (EUR 51) per share, the high end of the range, and more than doubled on the first day of trading. Employees, who held more than 10% of the company's capital and were sceptical about going public at first, were quite pleased. Stephan Schambach and his co-founders instantly became multimillionaires, while Technologieholding's DM 3.8 million (EUR 1.9 million) bet on Intershop turned into DM 280 million (EUR 143 million) at the IPO. A secondary offering on Nasdaq may follow to give US investors easier access to the company's shares.

About one year after the initial public offering, Intershop's market capitalisation stands at about DM 3 billion (EUR 1.5 billion). The company employs about 500 people in its many locations on all continents. Revenues have grown at impressive double to triple digit rates. Worldwide 1998 revenues were US$20.4 million (EUR 17.4 million) compared to US$5.7 million a year earlier, an increase of more than 250%. Revenues are now increasing faster than expenses. The company expects to report lower losses and continued revenue growth for 1999, reaching the breakeven point by year-end 1999 or mid 2000.

Intershop is recognised everywhere as the leading global provider of sell-side e-commerce software. The company is bound to continue to lead development in this field and benefit from the dynamic expansion of the market for e-commerce products as companies increasingly understand the advantages of electronic commerce in terms of reduced sales and administrative expenses, faster business processing and increased market size.

Summer 1999

LERNOUT AND HAUSPIE N.V.

Business: Speech technologies
Company established in: 1987
Venture backers: GIMV, AT&T
Website: www.lhsl.com

The two company founders, Jo Lernout and Pol Hauspie, recognised the tremendous potential of applying speech products to PC technology when this field was in its infancy. At the time, the market was served by clumsy products that were expensive and limited to a number of discrete words spoken by a specific user. In addition, recognition was based on whole words, rather than phonemes, the sounds that comprise words, thus severely limiting recognition capabilities. Jo Lernout and Pol Hauspie's goal was to use speech, the easiest form of communication, to improve the interface between the product and the user with an accurate, affordable product.

The founders initially became involved with GIMV after approaching several venture capital houses for support. In 1989, GIMV led a syndicate that invested US$1.5 million for 70% of the equity, but then withdrew in 1991 amid problems. At that time, Lernout & Hauspie (L&H) was concentrating primarily on the domestic market and the scope for growth seemed limited.

But in 1992, L&H underwent a radical strategy shift, deciding to concentrate purely on licensing out their core technologies on a non-exclusive basis, aiming to market them internationally. Once again, L&H approached GIMV. Philip Vermeulen was the investment manager responsible and he decided that, while the plan was ambitious, the product was unique and offered enormous potential. The team had also gained valuable experience and was beginning to penetrate new markets, specifically the United States. L&H's greatest strength was its product and, while it did face competition, it was the only company that combined three base speech technologies: compression, text-to-speech and voice recognition. In addition, it had a multilingual approach and could develop its product for a new language in about 6-12 months. To achieve this, it had created an assembly line language development methodology, called the Language Factory, based on an expert system (artificial intelligence operating with algorithms) combined with phoneme-based technology.

In November 1992, GIMV decided to invest US$5 million in return for 18% of the equity, while the remaining equity was divided among the founders and private investors. As is so often the case with rapidly growing companies, by the summer of 1993 L&H needed more financing to fund further development. GIMV arranged a bridging facility of US$1 million until AT&T came on board as investors in a deal, concluded in October 1993, that gave AT&T 5% of the equity.

GIMV's role in this investment was highly proactive: Philip Vermeulen sat on the board, where he helped advise on and make strategy decisions. He also introduced several new investors to the company. Positioning a company in the marketplace and timing one's entry are key to a company's development; GIMV

played an instrumental role in these strategic decisions.

The goal had always been to take L&H public once a targeted stage of development had been reached. The period 1994-1995 was a time of rapid growth, during which several new licensing arrangements were negotiated leading to an expanded international presence including two crucial offices in the United States. This rapid expansion enabled the planned exit on Nasdaq to come to fruition in December 1995 at a valuation of US$160 million.

When the company went public, it was estimated that the market for speech technology would reach US$3.5 billion by 1998. In 1999, these estimates have been raised to US$7.9 billion. Since its creation, L&H has positioned itself to take a big share of that market.

L&H is now organised around three divisions that develop products incorporating the company's core technologies: automatic speech recognition (ASR); text-to-text (TTS); linguistic components; translations; and digital speech recognition. The first division focuses on technologies and solutions providing customised corporate offerings, as well as technologies and solutions for original equipment manufacturers (OEMs). The applications division develops end user applications for retail and specialty markets. This division's award winning L&H Voice Xpress family offers specialised vocabularies for the healthcare and legal markets, as well as educational software for language learning. The division focuses on services and provides document creation, human and machine translation and localisation services in 75 languages.

L&H has signed 400 OEM contracts to integrate its technology into other companies' products and has signed agreements with more than 600 blue chip customers. The most touted agreements were made with Microsoft, which also became a 7% shareholder of the company.

L&H employs approximately 1,800 people worldwide. Annual revenues have more than tripled every year since 1994, which translated into a market capitalisation of US$1.8 billion in mid 1999.

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LEXIQUEST

Business: Linguistic software
Company established: 1975
Venture backers: Apax Partners, Atlas Venture, Banexi Venture Partners, Flanders Language Valley Fund, Oak Investment Partners, Worldview Technology Partners
Website: www.lexiquest.com

In 1975, Bernard Normier completed his PhD at Paris University with a thesis on natural language access to databases. With a background in computational linguistics, database management systems and information retrieval, he joined Sema Group in Paris for a two-year stint. In 1977, he founded ERLI (Etudes et Recherches en Linguistique et Informatique) with the mission to develop Neuro Linguistic Programming (NLP) systems and applications and natural language interfaces for databases. ERLI functioned essentially as a research operation and provided consulting services for large linguistic-processing projects. During the first ten years of operations, it built the foundation of its future technology through government-funded R&D programmes. The toolkit underpinning the company's technology and success employs computational linguistic models to create a dynamic linguistic network, which defines the rules and relationships between words and concepts. This linguistic network enables a computer to make the associations needed to interpret information accurately and to respond to user requests. The computer will then be able not only to differentiate the meaning of "monitor" in sentences such as "What does a monitor cost?" and "How do you monitor costs" but also to direct the user in ways to exploit the database to deliver extremely accurate and relevant answers to the question asked.

In 1985, GSI, a Paris-based payroll management/system software publisher, purchased a 70% stake in ERLI from Bernard Normier. The deal was struck on the basis of a FF 15 million (EUR 2.3 million) valuation of the company. Bernard Normier remained in charge of daily operations.

At the beginning of 1985, ERLI signed a series of major contracts with France Telecom. Its major achievement and commercial success was to develop a natural language interface for the first online yellow pages directory, the Minitel Pages Jaunes. This directory is queried by more than five million users every day and has an amazing accuracy rate of 97%. As a consequence of this successful collaboration, Cogecom, a subsidiary of France Telecom, acquired the 30% stake in ERLI still held by Bernard Normier at a price that valued the company at FF 20 million (EUR 3 million) in 1986.

Between 1987 and 1997, ERLI was able to bank on its expertise in linguistics by developing an automatic response mail system for La Redoute (a mail order company); automatic indexing applications for Electricité de France (EDF); an authoring and translation tool for the French navy; a multilingual weather report generation system; and a natural language query interface for INPI, the French patent agency. During the same period, ERLI also led

GENELEX and GRAAL, two essential European Community projects.

In 1995, Automatic Data Processing (ADP) from New Jersey acquired GSI and started divesting all non-payroll related businesses. In January 1997, Oak Investment Partners, Atlas Venture, Apax Partners and Banexi purchased the 70% of ERLI held by ADP and simultaneously increased the capital of the company by subscribing to convertible bonds. The transactions valued the company at FF 30 million (EUR 4.6 million).

In 1997, ERLI Software Inc was created in San Francisco. The company was now in the position of a restart-up with the mission to turn the amazing tools it had developed into products. The first version of LexiWare was released in mid 1997. This product suite combines LexiQuest (intelligent language querying), LexiTrack (knowledge extraction) and LexiBuild and LexiPacks (knowledge management).

In June 1998, Bruno Henry joined ERLI as its new CEO and director. In February 1999, ERLI changed its name to LexiQuest and opened an additional office in New York. The name LexiQuest was chosen to highlight the renewed focus on developing market-proven linguistic technology into powerful market-leading products that change and simplify the way people communicate with their computers. To achieve this objective, a second round of financing was closed, raising FF 85 million (EUR 13 million) through convertible bonds subscribed by the same four venture capital firms which were joined by Worldview Technology Partners and Flanders Language Valley Fund. Together they own all of the company, except for 2.3% owned by France Telecom. Management and employees hold stock options equal to 9.1% of the company if exercised. The significant investment was also made to enable LexiQuest to reinforce its position in the Inter- and Intranet market where the need for powerful linguistic tools is obvious.

The venture capitalists are following their investment very closely. One of them directed LexiQuest toward another of his investee companies so that they could enter into a partnership agreement of value to both companies and, consequently, to him.

With the appointment of Bruno Henry as CEO, Bernard Normier was named Chairman and Chief Technological Officer. In June 1998, he was elected "Personality of the Year" in recognition of his expertise, know-how and contribution to the developments of computational linguistics at IDT/Net 98, a trade show bringing together 17,000 visitors and 166 information and technology providers of Internet and Intranet applications.

LexiQuest has 55 employees worldwide. Its portfolio of prestigious corporate clients and partners attests to the quality of its products and its recognised technological advances. Revenues stood at US$1.6 million in 1998, and should reach US$4-5 million by the end of 1999. If regular revenue growth can be established, an initial public offering may follow as soon as the year 2000.

Summer 1999

MEDI-CULT A/S

Business: Cell culture media
Company established: 1988
Venture backers: DDFC (Denmark)
Website: www.medi-cult.com

During the 1980s, Norwegian scientist Professor Kjeld Barthaeussen, based at the University of Tromso in Norway, started to develop cell culture media based on synthetic key components. This type of culture medium had previously been made of cattle blood extract that, due to various impurities, could leave traces of antibodies and proteins distorting culture results. Realising the commercial properties of his new product, Barthaeussen contacted Jens Holst of DenNorske Bank who, in 1988, arranged a development agreement with a small Danish pharmaceutical company. But this project was discontinued within a year due to lack of finances and the product not being fully developed.

In 1989, Jens Holst was introduced to DDFC, which immediately saw the exciting potential of the product. A new private limited company was established for which the inventor and two other Norwegian investors put up the patents and know-how, while DDFC invested DKr 7.5 million in return for 83% of the share capital of the new company. This investment was to finance the development process and take the product through to commercialisation via pre-established milestones set by DDFC. DDFC's Frede Mørck was the manager responsible for the project and at this point was thoroughly involved with establishing the new company. He helped find the CEO, someone who had originally been involved with the project and therefore knew it well. DDFC's involvement went further than this; Frede Mørck helped set up the accounting systems, which included hiring the right person, finding the appropriate hardware and software and instructing and training in DDFC's reporting requirements.

The following three years were spent developing the product to the point at which it was ready for marketing. By 1992, Medi-Cult had a product capable of culturing a variety of different cell types, based on synthetic key components, thus guaranteeing a material improvement in quality. This is especially important in treatments such as IVF fertilisation, one of the key product uses, since it requires an especially pure environment. By then, Medi-Cult had also obtained strong patents to protect its production process and was in a position to attempt to penetrate the market.

Medi-Cult and DDFC both knew that this would be a difficult operation since it is extremely unusual that an unknown, small Danish company would be able to introduce a product into the world market. In addition, this required financing, which was partly provided by DDFC's second round of DKr 3.5 million, used primarily to boost Medi-Cult's marketing. To facilitate this, DDFC helped Medi-Cult appoint a new marketing person who had solid experience in the pharmaceutical industry. They decided to sell this new product through agents, giving them minimum target sales requirements and providing them with support and training to increase their sales. Medi-Cult made sure that it maintained close weekly

contact with their agents, who were replaced if their sales were not up to target. In this way, they managed to establish worldwide sales via a network of 40 agents in only two years. But as the company became more and more sales oriented, a change in management was required. DDFC helped Medi-Cult find and appoint a new CEO.

During this time another product had been developed, which was also made commercially available. This consisted of hypersensitive cells that originally had been designed to test the toxicity levels in the cell culture media. It was soon realised that this had additional commercial applications in other programmes, and was therefore of interest to pharmaceutical companies.

In 1994, DDFC was approached by Jens Holst, who wanted to buy DDFC's stake in Medi-Cult. He had put together a consortium consisting of the original shareholders and additional interested parties, which included SND (the Norwegian state venture capital company) and Norwegian insurance companies. DDFC concluded an agreement to sell up front half of their shares, with a put/call option to sell the remaining 50% 12 months later. This stock option was fully utilised by DDFC in December 1995. DDFC achieved a very good return on its investment of DKr 11 million. Medi-Cult's growth has continued and, in 1996, the company raised additional capital on the Oslo Stock Exchange. The IPO valued Medi-Cult at NKr 170 million.

Since flotation, Medi-Cult has launched its first biotech products under the family name RenCyte, and established sales and marketing subsidiaries in the United Kingdom and in the United States in 1996.

In 1998, a subsidiary was established in France and a new production facility was acquired. The company is always on the lookout for new acquisitions. In January 1999, Boston-based Unisyn Technologies was purchased and will serve as a strong North American platform. Today, Medi-Cult employs 49 people worldwide. However, despite a regular increase in revenues, especially in the fertility business, the market capitalisation of NKr 132 million is lower today than it was at the time of the IPO in 1996. This would seem to indicate that, for now, investors are focusing more on the expenses related to the various acquisitions than on the future benefits Medi-Cult's management believes those acquisitions will bring.

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MICRONAS SEMICONDUCTOR HOLDING AG

Business: Analog/digital ASIC semiconductors
Company established: 1989
Venture backers: Technologieholding, CAT-Innovacom, France Telecom, Sitra, Atlas Venture
Website: www.micronas.com

In 1989, Micronas founders Jurg Stahl and Jurgen Kurb, both of whom had experience in systems development and application technology, detected an underserved niche in the semiconductor industry. To exploit this opportunity, they started Crosstec Engineering based in Switzerland and financed with personal funds. Crosstec's early success was as a custom design consultancy, winning several significant contracts. This obviously meant company growth: new staff would be needed to service the contracts and, thus, the problem of financing arose.

At this point, Gert Köhler of Technologieholding became involved with the company. He decided to purchase 66% of the equity with an initial investment of DM 500,000, leveraged by an additional DM 500,000 from the German government. This funding allowed expansion to occur and resulted in a strategic alliance with Micronas Oy in Finland, which became Crosstec's sole supplier. Micronas was wholly-owned by Nokia at that time and was the only European semiconductor company that Crosstec thought would be able to cope with the increasingly stringent requirements for precision sensor technology. In May 1992, Nokia decided to close Micronas; Crosstec's only option was to purchase their sole supplier. After three months of negotiation, they bought the company and changed their name to Micronas.

In 1992, Micronas had a small order book but, after only three months of support from Technologieholding, the company reached a manufacturing breakeven point. This was due to the restructuring of the company and replacement of management, all of which took place under Technologieholding's guidance. At the end of 1992, a second financing round took place and CAT-Innovacom and France Telecom became involved. This has resulted in growth rates of 100% annually since 1993, compared to an average semiconductor market growth rate of 20%. Micronas's success has been due to its narrow product focus: at the time of the takeover, 110 products were under manufacture; now there are only 40. These specific products mean that Micronas is often the sole supplier to large companies.

Due to increased demand for product, Micronas realised that they needed to make strategic purchases in order to add capacity. In 1994 and 1995, the company expanded production facilities and added expertise in wafer, microsensor and surface acoustic wave technology, which is primarily used in mobile telephony. The financing of this expansion was made possible by the investors who, since 1993, included Sitra and Atlas.

In 1995, two new developments occurred. First, the investors began to plan their exit and second, Micronas foresaw a requirement for additional financing. An IPO would satisfy both requirements. Moreover, the investors knew

that Micronas' competitive edge made the company an excellent candidate for stock market flotation since, by 1995, revenues were about SF 50 million and net profit was up more than 20%, to SF 2.5 million. One of the main questions was the suitability of the various exchanges, since it was possible to float on Nasdaq, Frankfurt, Zurich or a combination of two of them. In the end, Zurich was chosen due to liquidity of the market and the quality of the merchant bank. The IPO valued Micronas at SF 375 million.

In October 1997, Micronas took a quantum leap and acquired ITT INTERMETALL (Deutsche ITT Industries GmbH) in Freiburg, Germany. The acquisition quadrupled the Micronas group's turnover to SF 285 million and allowed for a substantial reduction in the Group's strong concentration on the telecommunications sector. The purchase allowed Micronas to achieve three key strategic goals: the expansion of consumer goods and automotive segments, the development of a global marketing organisation and an accelerated expansion of multi-technology module product lines.

In 1997, Micronas embarked on a refocusing of its business, which went well into 1998. Foundations were laid for a sustained positive performance in a difficult business environment. The refocusing entailed a concentration on two core businesses, consumer goods and automotive products, and a rescaling of capacities in the telecommunications division. Consolidated net sales for 1998 reached SF 280.7 million.

In 1999, Micronas opened a representative office in Singapore, which should serve as a hub for further expansion in Singapore, Malaysia, Indonesia, Thailand, Taiwan, India, and Australia. Outside Europe, the Micronas group already had established stand-alone sales and applications offices in San José (California), Seoul (Korea), Tokyo (Japan) and Hong Kong (China). Micronas employs about 1200 people today.

In mid July 1999, the shares of Micronas were launched on Frankfurt's Neuer Markt, supplementing their listing on the Swiss Stock Exchange. Regained investor confidence has brought back market capitalisation to SF 275 million after a long two-year period of disappointing share performance.

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MOBILCOM AG

Business: Telecommunications
Company established: 1991
Venture backers: 3i, TBG, Hannover Finanz
Website: www.mobilcom.de

Mobile telecommunication was launched in Germany with the A-network in 1958. The B-network followed in 1972 and the C-network in 1985, all three based on analog technology (and the alphabet). The monopoly on mobile telephony was abolished de facto in 1991 when Mannesmann rolled out its D2 digital cellular network, for which it had received a license in 1990, and entered into competition with T-Mobil (D1), the Deutsche Telekom subsidiary. For the first time, independent telephone companies were awarded licenses.

In 1991, Gerhard Schmid founded MobilCom Communicationstechnik and started negotiating service provider contracts for the D1 and D2 private mobile telephone networks. Several affiliates of regional banks and TBG provided equity to the new venture. With a small team, Gerhard Schmid started to market mobile phone connections and telephone cards. After the foundation of MobilCom Leasing in 1992, he also started marketing mobile telephones. By the end of 1992, MobilCom had 13,500 subscribers. By the end of 1993, the company achieved sales of over DM 100 million (EUR 51 million) while its capital base was only DM 700,000 (EUR 357,000). MobilCom's bankers began pointing out that it would be difficult to continue to grow without increasing the capital.

All important mobile telephone service providers in Germany belong to major German or international corporations. MobilCom is the only exception. This independence has meant that, when building its business, MobilCom was forced to cope with its own financing needs without the backing of a strong corporation. In the event of unfavourable market developments, the company, unlike most of its competitors, could not count on the financial support of a big corporation. At the same time, the company's independence allowed it to adapt to new developments and changes with great speed and flexibility, without having to go through long decision-making processes with corporate headquarters. Gerhard Schmid saw this independence as essential to further growth and success of the business, and was therefore anxious to grow on his own terms rather than be absorbed by a large corporation. He believed that venture capitalists would understand this desire to remain independent. The quest for additional capital led to Commerz Unternehmensbeteiligungs and to 3i, which each took a 12.5% stake in MobilCom Holding in 1994; Hannover Finanz also took a stake at that time.

Even though the German market for mobile telecommunications was very prolific, 3i's decision to invest in MobilCom was not automatic. However, two factors immediately set MobilCom apart from its competitors. MobilCom's services were uniquely customer-focused, giving subscribers a choice of highly flexible tariffs. Feedback from customers revealed high levels of satisfaction and the number of new subscribers was rising rapidly on the strength of innovative marketing.

In addition, Gerhard Schmid had gathered a strong management team around him, balancing experience with commercial vision. MobilCom staff throughout the organisation were highly motivated, and individuals were encouraged to contribute directly to the progress of the business.

MobilCom has been innovative in many ways. Staff motivation and appreciation for employee dedication have always been a main concern. Employees at all levels are encouraged to own shares. MobilCom also rewards its staff for continued good health: employees completing a month without absence receive an attendance bonus on top of their salaries. In addition, MobilCom provides each employee who so wishes with a company car. Of course, there's a mobile phone, free of monthly charges and at discounted tariffs. The notion of transparent work processes is a founding principle of the company: modern, open-plan offices largely dissolve the boundaries between departments and make work processes transparent in each activity for all employees, thus promoting greater understanding. All hierarchical and compartmentalised thinking has been eliminated. The effect of all these measures can be clearly seen: staff turnover and absenteeism rates at MobilCom are far below the industry average. The company counts about 1200 employees today.

MobilCom has been a trendsetter in the industry and has definitely contributed to making Germany one of the more liberalised and competitive telephone markets. MobilCom extensively used the number 19, its carrier code, for that purpose. It cut tariffs to 19 pfennig per time unit against Deutsche Telekom's 24 pfennig per time unit. Plus MobilCom offered free calls under 10 seconds, correctly predicting that very few would use the free call opportunity but that it would boost its name recognition. It subsidised handsets at symbolic prices of DM 1.95-2.95 in its nationwide chain of MobilCom Shops that it began building up in 1995.

When MobilCom launched fixed line services on January 1st 1998, it cut rates to 19 pfennig per unit for all calls within Germany at any time of the day. Deutsche Telekom was forced to cut its rates in response. A specific advertising campaign in which MobilCom used Deutsche Telekom's colours and typesetting led to rate price cuts of 40% in four weeks, and an increase in recognition for MobilCom from 65 to 85%. The cost of this ad campaign only cost Mobilcom DM 3 million (EUR 1.5 million), while Deutsche Telekom’s defence and counterattack campaign ended up costing them DM 60 million (EUR 30.6 million). With a simple, transparent, price-aggressive tariff structure, MobilCom was able to firmly establish itself as the leading competitor to Deutsche Telekom, taking a 10% market share in the fixed line business.

In 1996, MobilCom Holding GmbH reincorporated as MobilCom AG. The company decided to go public to finance further organic growth and acquisitions. On March 10th 1997, MobilCom AG became the first company to float on the Neuer Markt. The initial public offering was a huge success. The shares, issued as part of a corporate capital increase, were one hundred times oversubscribed and were priced at the opening at DM 95, or 50% above the issue price of DM 62.50. Adjusted for splits, the issue price of DM 2.55 had reached DM 86.80 by June 30th 1999, an increase of 3,300%! Market capitalisation today stands at about DM 4 billion (EUR 2.04 billion) reflecting the tremendous value creation.

With the funds raised through the various stock market capital increases, MobilCom acquired

Cellway Kommunikationsdienste GmbH, a France Telecom mobile telephony subsidiary, in the spring of 1998. MobilCom was quick to recognise the huge potential of the Internet and proceeded to make strategic acquisitions of topnet AG, one of the largest Internet providers in Germany, in the summer of 1998, and of AIS Axon Internet Services GmbH in January 1999. It took only a few months for MobilCom to become the third largest Internet service provider in Germany. Two alliances with Cisco and Inktomi, and the long-term lease of a 3400 km fiber-optic network that provides a hundredfold increase in data capacity, are clear indications that Gerhard Schmid and his motivated team are well on their way to repeating their tremendous success in telephony in the area of the Internet.

Summer 1999

NEUROTECH S.A.

Business: Cell-based gene therapies
Company established: 1995
Venture backers: 3i, Atlas Venture, CDC Innovation, Sofinnova, Banexi Ventures, GIMV, IMH, Private Equity Holding, Sudinnova, Banque de Vizille
Website: www.neurotech.fr

The driving element behind the creation of Neurotech was the friendship between John Tchelingerian, Jérôme Quinonero and Lionel Vignais. These three scientists had worked together during their doctoral studies and had a strong desire to continue their team in another context. In collaboration with Pierre-Olivier Couraud, they had already developed a technology that they believed could be commercialised and so they decided to start a company. As post-PhDs, they did not yet have the necessary credibility to create a company. The trio came to the conclusion that senior scientists such as Pierre-Olivier Couraud and his colleague Donny Strosberg would bring the needed credibility and so they convinced them to sponsor them. Neurotech was created in March 1995.

From 1995 to 1997, their main achievement was to further improve their technology. Lacking financial resources, they decided to look for a pharmaceutical partnership. A pharmaceutical company, with which discussions had gone relatively far, in the end decided to invest in and commit to an American competitor with a different technology. It also mattered that the American competitor was a "real" company, as opposed to Neurotech, which was still considered a research lab.

In 1996, John Tchelingerian read a magazine on enterprise creation and noticed an advertisement by a venture capitalist, CDC-Innovation, that was creating a fund and looking for investments. There was some initial scepticism among the scientists at Neurotech about working with venture capitalists. However, with no other choice left after the failure to attract a pharmaceutical company, Neurotech decided to contact venture capitalists. It took six to eight months of extensive due diligence and the redrafting of the business plan by one of the venture capitalists before CDC-Innovation, Atlas, Sofinnova and Banexi committed the initial funds. The main purpose of these investments was to finance the validation of the technology and the recruitment of a professional CEO. The venture capitalists also requested that Pierre-Olivier Couraud work full-time with the company, which was no small condition given that he enjoyed the safe status of a civil servant at INSERM [1].

Neurotech develops cell-based gene therapies for the treatment of serious and currently inadequately treated central nervous system and ophthalmologic diseases, with a special interest in brain tumors. Its technology is based on a "biological Trojan horse principle" of immortalised brain and retinal derived cells that have been manipulated in such a way that they are able to integrate into cerebral vessels and brain and eye tissues while secreting therapeutic active factors. In particular, the endothelial cells used by Neurotech can integrate into cancers, due to the tumor's need to attract endothelial cells to make new blood vessels. Neurotech's lead product, NTC-121, which uses this "tumor homing" principle, has completed pre-clinical testing and an

1 Institut National de la Santé et de la Recherche Médicale

IND has been filed with the French drug agency. Other applications of the Neurotech cell vectors include age-related macular degeneration (AMD), Parkinson's disease, stroke and Alzheimer's disease.

While the search for a professional CEO went on, the venture capitalists suggested John Hawken as a temporary manager; Hawken was Neurotech's financial director until recently and now performs a similar caretaker manager role for another start-up biotech company. It took one year to find Tom Shepherd, the CEO. His international background combines experience in being a scientist, the surveillance of clinical trials, R&D management, marketing, sales and licensing. The fact that he is a francophile Scotsman helped in the decision-making process, and his impressive command of the French language attests to this commitment. One of his motivations to move from the United States to France was that he liked the idea of participating in the French biotechnology industry while it was still in its early stages. He joined in March 1998, revised the business plan and personally led the effort to raise new money. He felt that it was best to communicate the Neurotech vision directly to investors rather than using a professional placement agent or bank as an intermediary. He obtained additional funding from the existing investors, but also brought in new investors from four other European countries. With the help of his own network of financial partners, he raised the significant financing necessary to conclude Phase I and II clinical trials for NTC-121.

Venture capitalists have so far provided the company with EUR 17 million in two rounds of financing and they currently own approximately 75% of Neurotech, with management and some employees owning the remainder. Committed research grants from the French government and EU authorities have provided another EUR 3 million. In order to rapidly expand its research capabilities, while saving precious cash resources to fund clinical studies, Neurotech has moved into the Genopole incubator in Evry. This research facility puts laboratories, equipment, meeting rooms and many time- and money-consuming logistic services at the disposal of the companies it tries to attract.

The first patent owned by Neurotech was abandoned by the CNRS[2] and was subsequently reassigned to the original inventors, including Couraud. Neurotech then acquired the patent from the inventors. Since then, several other patent applications have been filed in France and abroad, all of which have been financed by Neurotech. An IND has now been filed with the French drug agency to allow clinical trials to start in France.

Strong academic collaborations in Europe and in the United States have further leveraged the already strong internal research resources of Neurotech in the core areas of molecular biology, cell culture, neuro-pharmacology and in vivo testing. Manufacturing and clinical testing are outsourced. Neurotech's technology has broad applications, which should bring about multiple corporate partnerships. The development of the technology always keeps these collaborations in mind. Growth by acquisition is also seriously taken into consideration. The company has created 25 jobs so far. It expects to go public at an appropriate time within the next two to four years. In order to achieve this goal, management plans to have at least two products in clinical trials, one or more corporate partnerships and revenues by the time they take Neurotech public.

Summer 1999

2 Centre National de Recherche Scientifique

OXFORD MOLECULAR GROUP PLC

Business: Integrated software tools for drug design
Company established: 1989
Venture backers: Baring Venture Partners Limited, Edelson Technology Partners, Sofinnova , Andromede Investissements, Eurocontinental Ventures
Website: www.oxmol.co.uk

Oxford Molecular Group PLC (OMG) is a spin-off that was formed in mid 1989 to commercialise sophisticated software developed at Oxford University for computerised design of molecules for pharmaceuticals, agrochemicals and advanced materials. It was started by Dr Anthony Marchington, who put together a technical management team with nominal cash investments by the founders, which included Drs Anthony Rees, Graham Richards and James Hiddleston. The goal was to build a software business and carry out molecular design research and consulting for pharmaceutical and biotech companies.

The technology had first been created and researched in the 1960s at Oxford, whose researchers had become world leaders in the field. OMG's goal was to take this expertise to market to meet demand from the pharmaceutical industry, which was exploring how computers could be used in drug design and development. The challenge was to develop a platform that allowed the results from a researcher at one end of the development spectrum to be used by another researcher at the other end. This would help streamline the drug discovery process, making it cheaper and faster.

After formation, OMG was immediately approached with requests to commercialise molecular design software developed by other universities and companies from the United States and Europe. In order to expand and develop the products, OMG knew it would have to obtain funding so it approached Baring Venture Partners (BVP). Paul Bailey and Richard Onians of BVP had used Graham Richards's lab while at Monsanto and they met to discuss options. The investment had many of the classic elements that venture capitalists look for: the technology was very strong, and the team had a clear vision of what they wanted and how the company could grow. They also had experience in working together successfully, knew their markets and had excellent contacts throughout Europe both in industry and in academia. But there were risks: at the time, the global market was small and the company was focused on software development.

After initial consultations and four months of negotiation, in November 1990, BVP decided to make an investment of £350,000 in return for 30% of the equity. The equity was then divided among the founders (30%), institutions (30%), non-founder managers (10%) and Oxford University, through Isis Innovation Ltd (30%). Oxford University became a shareholder in exchange for exclusive rights on all of OMG's molecular design technology.

OMG knew that to expand the operation, more financing would be needed and, in 1992, it started to look for second round financing. At this point, they met Denis Lucquin from Sofinnova whose French and US operations were to play a crucial role in OMG's second

stage of development. Sofinnova came on board as an investor and shortly after played a key role in OMG's first acquisition, the purchase of its French competitor, Biostructure SA. Sofinnova provided strong support, dealing with the complexities of French law and helping with negotiations so that all Biostructure's shareholders were kept on board after the acquisition. This purchase provided access to existing products, new intellectual property, an extended academic network and a strong presence in France and Germany. It was the turning point in OMG's development.

As the company grew, 11 venture partners came on board and four rounds of financing took place prior to exit. Many of these additional venture capital houses were introduced by Sofinnova via its connections in both France and the United States. Again, Denis Luquin played an important role in assisting with these negotiations.

To obtain additional funds to pursue further growth, it was decided to list the company in 1994. The company and investors felt that the London stock market was OMG's natural market for the listing that took place in April 1994. The share placement raised £9.35 million of new equity and gave the company a post-money valuation of about £30 million. This cash injection enabled OMG to acquire IntelliGenetics Inc, one of the leading US suppliers of molecular biology software tools. This added key capabilities in handling genomic information to OMG's software integration scheme and gave the company an established US presence. The year 1995 saw increased expansion with the February acquisition of CAChe, a provider of software tools in the field of medical chemistry. In addition, OMG concluded two significant agreements with Glaxo Wellcome and Silicon Graphics, to co-develop a fully expandable software system aimed at accelerating Glaxo Wellcome's drug discovery process.

A further rights issue (seven-for-one) was completed in February 1996 at a value of £2.35 per share, raising £16 million. This allowed OMG to purchase sole product rights to sequence analysis software from Eastman Kodak and to structure searching software from PSI International Inc and Health Designs Inc. OMG aims to promote growth not only by acquisition but also organically – and by creating long-term collaborations from which it can then source intellectual property. The lock-up agreement for the institutional investors expired on April 28th 1996 and, 15 days later, BVP-advised funds sold their entire holding for £3.00 per share, securing an excellent return.

In 1997, Oxford Molecular embarked on some venturing of its own. In February 1997, it invested £2 million for a stake in Cambridge Combinatorial, whose technology is designed to rapidly make large numbers of slightly different molecules. At the end of 1997, OMG bought a 20% stake in a new company, Cambridge Drug Discovery, which specialises in rapid screening of potential drugs. In both cases, Oxford Molecular took an option to buy the entire company; the option to acquire Cambridge Combinatorial was exercised in 1999.

Oxford Molecular saw revenues increase at impressive growth rates averaging 50% over the last three years. However, the irregularity of earnings have discouraged investors who have beaten the company's market capitalisation back to £38 million in mid 1999, from a high of £217 million in 1996.

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updated Summer 1999

PEPTIDE THERAPEUTICS GROUP PLC

Business: Biopharmaceutical immunology
Company established: 1993
Venture backers: Prelude Technology Investments, British Technology Group, Ivory & Sime, Scottish Amicable, Atlas Venture, Alta Berkeley, Finovelec, Medical Science Partners, Mercury Development Capital, Mochida Pharmaceutical
Website: www.peptide.co.uk

Peptide Therapeutics was founded by Dr Denis Stanworth and Alan Goodman. They formed the company with the express business strategy of researching and developing vaccines and preventative drugs for diseases of immunological origin such as allergies, juvenile asthma and rheumatoid arthritis. Alan Goodman had considerable experience in start-up companies: he had been involved with Chiros Ltd and Medeva Plc, while Dr Stanworth had been head of Birmingham University's Rheumatology and Allergy Research Unit. Alan saw an opportunity to develop vaccines that could mediate various allergic responses while running his consultancy company, Advanced Technology Management Investments (ATM). The opportunity arose from the work of Dr Stanworth in identifying and then synthesising the part of the IgE molecule believed to be responsible for the trigger signal for an allergic reaction.

Following the founding of the company in 1993, Alan Goodman set about finding start-up financing; he had known Andy Allars from Prelude for some time, and after exploratory talks they decided to work together. For Prelude, the investment offered the classic elements that venture capitalists look for: the team had strong previous experience, the scientific basis was excellent, and management was commercially oriented, with plenty of entrepreneurial drive and a clear vision of what they wanted to achieve. In November 1993, Prelude committed £400,000 and, in addition, structured a convertible loan of £150,000 that could be drawn down as required. In return, Prelude obtained 25% of the equity.

The start-up money was to be used to develop a vaccine able to prevent allergic reactions to food, bee stings, pollen and other irritants. As part of the planned financing strategy, Prelude helped Peptide organise a first round of financing in May 1994, which added £2 million for use on R&D.

At this point in 1994, Prelude played a crucial role in building the management team, helping Alan Goodman recruit Brain Richards as the non-executive chairman. Richards was a co-founder of British Biotech, but had relinquished his job as executive chairman and was looking for new challenges. He joined Peptide convinced of the solid underlying science and the strategy to avoid manufacturing and instead take the products to market and on-sell them at the phase II stage of development. The licensees therefore complete the costly – and risky – process of clinical trials, and assume responsibility for product marketing and distribution; in return Peptide receives royalties on sales. This has meant that Peptide can have a dynamic R&D programme, and concentrate on developing new biopharmaceutical technologies.

At the end of 1994, a second round of financing was put together, again with Prelude's help. This round injected £3 million into the continuing R&D programme and was intended to last until Peptide's IPO.

At this point, Prelude's Andy Allars, who was Prelude's board member, played a strategic role in helping to build Peptide. He had been approached by someone interested in developing possibilities in combinatorial chemistry. This contact was used to help Peptide create what is now one of their key platform technologies. One hitch arose in Peptide's development. Barings Bank was advising Peptide on their projected listing, when the bank's derivative problems came to light. This delayed Peptide's IPO and meant that they had to find a third round of financing. Additional financing of £4.9 million was obtained in June 1995 from a group of venture capitalists, institutions and Mochida Pharmaceutical. A licensing agreement, worth up to £15 million, was also signed with Mochida Pharmaceutical giving them product rights in Japan. This was Peptide's first major corporate deal, and involved milestone payments on product development.

Peptide Therapeutics obtained a full market listing in November 1995, giving it £26 million of new money which was supposed to see the company through to profitability. The listing valued the company at £7.67 million. In all, Peptide received £9 million of venture capital.

At the end of 1998, Peptide Therapeutics announced the US$20 million acquisition of OraVax, a Nasdaq-listed biopharmaceutical company based in Massachusetts, USA, which was engaged in the discovery, development and commercialisation of vaccines and antibody products for the prevention and treatment of human infectious diseases. At the same time, Peptide Therapeutics and Pasteur Mérieux Connaught had entered into a number of agreements that provided for a strategic alliance between the companies relating to OraVax's Chimeri Vax™ technology. Pasteur Mérieux Connaught agreed to subscribe the pound sterling (£) equivalent of US$3 million for new ordinary shares in Peptide. The agreement opened the door for milestone and license fees of up to US$60 million (£36.3 million), as well as royalties from PMC, which is part of Rhône-Poulenc. The deal was viewed positively even though the price for OraVax was considered high. The enlarged group would have a burn rate of £1.4 million, meaning the company could last two more years. By then, revenues from a yellow fever vaccine being developed with Medeva would be kicking in. The agreements with Pasteur Mérieux Connaught, SmithKline Beecham and Novartis continued to underpin the credibility of its science. It was said at that time that "the biotech sector is still very much out of favour but Peptide looks healthier than most of its peers".

Unfortunately, in July 1999, Peptide was forced to abandon the development of a decapeptide allergy vaccine after trials suggested it had produced no statistically significant effect compared with a placebo. This was an unpleasant surprise for investors since this was the product for which they had had the highest hopes and that seemed to have the best prospects: a good partner in SmithKline Beecham; a market of some 100 million people suffering from allergies; and spending on asthma drugs alone reaching US$5.7 billion in 1998. Since the allergy vaccine accounted for about 45% of the company's value, Peptide's value was immediately knocked down one third to £30 million.

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PNA DIAGNOSTICS A/S

Business: International diagnostic applications
Company established: 1992
Venture backers: DDFC
Website: www.pnad.com

PNA Diagnostics is a Danish company established by DDFC to develop a new molecule, Peptide Nucleic Acid (PNA), specifically for diagnostic applications. Prior to DDFC's involvement, the technology had been developed by four scientists whose main area of research revolved around DNA. Initially the research project did not require any special funding since it was small-scale and was related to other projects for which grants had already been obtained. As soon as the team realised the molecule's properties, they took out the first patent in Spring 1991. A paper on the findings was delivered in July 1991 in the United States, and this resulted in several US pharmaceutical companies inquiring about licensing. Since none of the original team wanted to become involved with PNA's commercial development, license deals were completed for both the pharmaceutical and reagent markets by early 1992.

Although there were many potential uses for PNA, and pharmaceutical applications can generate the most money, it is also the area where the time scales are the longest, since rigorous testing must take place. The diagnostic business can be realised far more quickly since the molecule is used in a laboratory on patient samples. When Uffe Bundgaard-Jørgensen of DDFC first heard about the new molecule, his first reaction was that "we have to have it". Although by this time the licensing deals were close to completion, none of the opportunities to license the diagnostics had been taken up. DDFC decided to create a company purely to exploit this opportunity. The initial deal was concluded in two months and, in February 1992, DKr 300,000 was used to set up the company and the first DKr 500,000 was committed. In return the equity was split 50/50 between DDFC and the inventors.

It soon became clear that much more development work was required so a new R&D department was set up within PNA Diagnostics. This ensured that commercially oriented projects would be given priority and that a separate set of intellectual property would be created. This meant that the burn rate would increase dramatically from around DKr 100,000 per month to about DKr 1 million per month, but DDFC was convinced of the strength of the investment and agreed to additional funding. New research chemists were found, the management was restructured and DDFC helped implement a more business oriented strategy. During 1993, it transpired that the business plan had not been accurate and accounts showed that funding was out of step with requirements. DDFC realised that if the business was to move through the next growth stage to the development and production of mass market products, more investment would be required. While various possibilities were being explored, the management of PNA was now focusing on getting the business in shape for growth, and additional technical staff was hired.

The initial plan had been to grow the company

through additional outside funding in the form of new investors. DDFC felt that additional investors would probably not be able to offer enough capital at an attractive valuation because growth projections showed a need for DKr 100 million or more. Therefore two other options were considered: either a partial deal with a trade investor, or an outright sale. This latter route seemed the most straightforward way of maximising the value of the firm.

In March 1994, DDFC started to look for a trade buyer among those companies that PNA was in negotiation with for licenses; two serious buyers emerged. At this point there was a conflict of objectives: DDFC wanted to divest, while the management wanted to stay independent and intact. This situation was resolved only after the sale had taken place. A deal was finally completed in August 1994 when PNA Diagnostics became a wholly-owned subsidiary of Boehringer Mannheim Diagnostics, one of the world's largest producers of in-vitro diagnostics, and a division of Corange Ltd.

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PPL THERAPEUTICS PLC

Business: Therapeutic proteins
Company established: 1987
Venture backers: Apax, 3i, Scottish Enterprise
Website: www.ppl-therapeutics.com

PPL began operations in 1987 to commercialise the production of proteins using transgenic technology developed at the Animal Breeding Research Organisation, now the Roslin Institute, in Scotland. Venture capitalists entered the capital of PPL as early as 1988, and brought in Ronald James, formerly a venture capitalist, as the managing director. Hamish Hale from Apax took a seat on the board and remains a director of the company today. The initial objective was to modify animals genetically so that they would secrete human proteins of therapeutic value in their milk. The company set out to use a patented high-tech approach with farm animals that is less complex and less expensive than the fermentation methods used by most biotechnology companies. The endeavours of PPL would generate a whole family of farm animals with cute names and valuable odd scientific characteristics. By 1991, following the birth of its first transgenic sheep, Tracey, who was producing human protein at approximately 40g/l, PPL was clearly established as a leader in the transgenic production of human proteins. PPL decided to breed mostly sheep rather than cows, which clearly produce more milk, due to the tradeoff between breeding period and milk production, which clearly favours sheep.

A strategic merger with Virginia, USA-based TransPharm Inc provided PPL with significant facilities in the United States to serve the increasing requirements of the North American market where PPL generates about 70% of its revenues. In 1994, the company was granted a US patent for its transgenic technology. Most of the work with bovines is done in Virginia, where a calf named Mr Jefferson (in honour of the American President) was born in February 1998 having been created by a nuclear transfer from a male foetal fibroblast. PPL's facilities and geographical base were further extended with the opening of a second transgenic sheep farm facility in New Zealand.

In June 1996, PPL became a public company listed on the London Stock Exchange and achieved a turnover of £2.5 million at the end of that same year. Even more important, on July 5th 1996, Dolly, the first mammal cloned from an adult cell was born. Dolly made headlines worldwide when researchers at the Roslin Institute announced that they had produced a clone from cells taken from an adult ewe. Previous cloning had involved the simple task of creating an animal from undeveloped foetal cells inserted into a surrogate mother. Using adult cells to produce an entire organism from scratch was originally thought to be impossible since it would require "reprogramming" of an adult cell to return it to its foetal origin as a general cell that had not yet taken on special functions to produce specific material such as skin, bone and blood. The arrival of Dolly raised the specter of human cloning. The cloning of Dolly by PPL Therapeutics and the Roslin Institute was selected as the 1997 "Breakthrough of the Year" by Science, one of the world's most frequently cited peer-reviewed journals. From then

on, the company would always be referred to as "PPL Therapeutics, the Scottish company that cloned Dolly the sheep"…to be pronounced in one and the same breath. At the end of 1997, Dolly was mated with a Welsh Mountain ram and produced a female lamb, Bonnie, born on April 13th 1998; then in 1999 Dolly gave birth to triplets. They are all living happily ever after…even though it was reported that, as a consequence of the cloning, Dolly's genes are older than they should be in view of her actual age.

At the end of 1996, PPL began human clinical trials in the United Kingdom of its lead compound, Alpha-1-antitrypsin or AAT, a human protein thought to reduce the amount of elastase in the lungs of cystic fibrosis and emphysema sufferers, which should reduce lung damage. Phase II trials are well underway and licensing agreements should follow soon.

The current market capitalisation of £45 million is still far below the capitalisation of £77 million at the end of 1996, the year of the flotation. While the appetite for biotechnology shares created demand, it is obvious that the scientific progress and contributions of PPL Therapeutics have not translated into a stock market success. Rumour has it that an approval of AAT could change that.

Summer 1999

PPU MACONOMY A/S

Business: Enterprise Resource Planning Software
Company established: 1988
Venture backers: Danish Venture Finance, Gilde IT Fund, Star Ventures, Vertex, 3i
Website: www.maconomy.com

While playing in a band and longing to become a rock star, Per Tejs Knudsen also attended university, earned a master's degree in computer science during the day, a degree in business administration at night, got married, had two children and, in 1983, founded PPU Software A/S with two other associates to develop minicomputer software. However, they quickly realised that the future in minicomputer software was limited. In 1988, a spin-off was set up under the name of PPU Maconomy A/S. Today the mother company, PPU Software A/S, is a shell entity and the spin-off, PPU Maconomy, is a company ready to reap the benefits of being a worldwide leader in its field.

Traditionally, Enterprise Resource Planning (ERP) software has been designed to offer end-to-end support for business processes specific to manufacturing companies that are invoicing for goods. PPU Maconomy recognised the need for and developed a web-centric "Enterprise Project Optimisation" (EPO) software package designed to offer end-to-end support for the businesses processes within project-based service companies and organisations that bill for hours rather than for goods. PPU Maconomy A/S is the only company that focuses on the specific ERP software needs of virtual organisations managing hundreds of projects simultaneously, with employees working between satellite offices and client locations. Such virtual businesses are being required by their clients to justify in more and more detail how and where billed hours were spent. The Maconomy software is 100% standard. All research and development efforts and resources are concentrated on this product, which is based on best practice principles. PPU is constantly improving the competitiveness of the software package, which fully integrates global project planning, budgeting, time/expense reporting, requisitions, project management, billing, accounting, management reporting, project analysis, financial management, e-commerce, procurement and business functionality. Implementation of the standard product takes only three to six months, which is very fast relative to industry practices. The value of this user-friendly software has been widely recognised, and clients are expected to achieve a tenfold return on their investment in this product in less than two years.

PPU Maconomy A/S started its research and development efforts in 1988. Five to six years were spent developing the software package before it was ready for sale. Today the company has 400 satisfied international clients that are assisted locally by employees of PPU Maconomy A/S's wholly-owned subsidiaries based in Scandinavia, the United Kingdom, the Benelux and the United States.

The company has close to 200 employees. Half of those are based in Denmark, the rest are based worldwide. Fifty percent of the workforce is concentrated on marketing, 25% on R&D, 25% on administration.

PPU Maconomy A/S has shown a steady growth of more than 50–75% per year, with sales reaching approximately US$15 million (DKr 110 million) in 1998. Several factors should contribute to even more rapid growth going forward. The Internet provides an opportunity to support virtual organisations that stand to benefit most from the Maconomy package. The growth of virtual companies, and new ways of operating traditional companies, will drive the need for PPU Maconomy's Enterprise Project Optimisation software. It took a lot of effort to build awareness and credibility in the marketplace. This issue is constantly being addressed by a more competitive product offering and by increasing the quality of customer references. The penetration of international customers such as Avis Rent-a-Car was a true milestone in that respect. Today the company has an international client portfolio, an operating presence outside of Denmark and the reinforced management team has the mission to boost the efforts to “go international.” The target is to achieve a minimum revenue growth of 200% in the coming years.

Per Tejs Knudsen and Jan Alexander Johannessen believe the company has to go public to achieve the position of a global player. A listing of PPU Maconomy therefore is a stated objective and should take place as soon as the company is ready. The factors contributing to being ready are consistency of financial performance, a strengthened infrastructure, a consolidated management team and a stock market ready to welcome the company. Meanwhile, PPU Maconomy A/S's capital is 75% owned by several venture capitalists and 25% by its management and employees. Seventy percent of the employees are shareholders who have invested their own capital in a company they work for and believe in. When PPU Maconomy was created, its founders owned 70%. Their holdings have been diluted to 15% today. Danish Venture Finance was one of the first venture backers. Their support was welcomed since money had always been a scarce resource at the company. Danish Venture Finance's first investment goes back to 1990. It has since participated in several additional rounds of financing. It contributed more than EUR 5 million in total to hold about 38% of PPU Maconomy A/S today. Other venture capital backers are Holland's Gilde, Israel's Star Venture, Vertex in Singapore and 3i for which this represented its first investment in Denmark. It was difficult to attract international venture capitalists. The process took more than a year and they invested only when the company proved that it could meet its budget.

When asked whether money is the main motivation, Per Tejs Knudsen answers, "Our main goal is to have fun and to be successful, and we are convinced these two go hand in hand. Money is a by-product of those ingredients". As PPU Maconomy A/S seems ready for an explosive take-off any time now, the formula seems indeed to be a winning one for all involved.

Summer 1999

QIAGEN N.V.

Business: Products for nucleic acid separation and purification
Company established: 1985
Venture backers: TVM Techno Venture Management, RBS GmbH, Alafi Capital Company, Euroventures Benelux
Website: www.qiagen.com

Qiagen was founded by Dr Metin Colpan and Professor Detlev Reisner to take advantage of the increasingly important role that nucleic acids would play in molecular biology. These acids, the fundamental regulatory molecules of life, take two forms, RNA and DNA, which contain instructions governing cellular activity. A defect in either may disrupt cell function and result in degenerative disease such as cancer. Recently the increased understanding of nucleic acids has resulted in the rapid expansion of potential uses such as DNA sequencing, clinical diagnostics, genetic vaccination and gene therapy.

The research and growing commercial markets both require highly purified nucleic acids. Purity is critical for reliable experiments and accurate results. Traditional manufacturing has its limitations: it is time-consuming, labor-intensive, uses hazardous reagents and employs production methods that are neither suitable for high throughput processing nor easy to use. Qiagen was founded to service the research and commercial markets by producing a cheaper, safer and faster product.

The founders developed the idea of Qiagen while they were graduate students at the University of Düsseldorf. Convinced of the strength of their plan, they contacted TVM. At the time, they planned to launch products for both human and plant bio-molecular testing and nucleic acid purification. They had the support of their professor, who helped demonstrate the potential behind their proposal and its commercial possibilities. Peter Kaleschke of TVM was interested because there was little competition in the market, the field was rapidly opening up and there would be increasing demand for products based on solid technology. Although the team was young and would require management support, they knew and understood their target market and, moreover, were highly committed.

The negotiations with TVM lasted approximately six months and, in September 1986, TVM decided to invest DM 3 million to be drawn down in instalments over a three-year period. For this financing, TVM obtained one third of the equity. At the same time, RBS (formerly known as Innovatives Düsseldorf) invested a similar amount and procured one third of the equity; the remaining equity was held by the founders. In addition, Qiagen received support from the German federal government. Qiagen was able to launch a product very quickly after inception and was supplying researchers almost from inception in 1986.

TVM played an important role in Qiagen's development; one of the key jobs was supporting management. TVM took a seat on the board, and acted as a sparring partner, advising in the decision-making process. TVM was especially important in helping to source additional financing and, in 1990, helped introduced

Alafi and Euroventures Benelux for third and fourth round financing. Peter Kaleschke was also involved in the management development, helping to hire experienced personnel including the CFO, and bringing in expertise to assist in managing Qiagen's fast growth.

Although Qiagen was profitable by 1994, more cash was required to finance further R&D and to develop marketing opportunities. Qiagen accessed further development financing from both European Community R&D grants and the German federal authorities. These moneys enabled Qiagen to develop new products such as the BioRobot 9600 for automated nucleic acid preparation, as well as DNA sequencing and production services, along with protein purification products, complementing the core business of products for nucleic acid separation and purification.

As the company grew, it became clear that the next stage of development would be to achieve a listing on Nasdaq, which was clearly the most suitable market. This would not only increase Qiagen's reputation but would finance further development, to include building a manufacturing and research facility in the United States and expanding European facilities, product development and marketing. TVM was heavily involved in the preparations to take the company public and, since Qiagen was the first Germany company to achieve a Nasdaq listing, everyone wanted the process to go as smoothly as possible. This listing was achieved in July 1996, and was underwritten by Goldman Sachs, Alex Brown and Montgomery. The initial public offering implied a valuation of US$200 million.

By the end of June 1999, Qiagen had subsidiaries in Germany, the United States, Japan, the United Kingdom, Switzerland, France, Australia and Canada. It has achieved the status of the world's leading provider of innovative enabling technologies and products for the separation, purification and handling of nucleic acids. The company has developed a comprehensive portfolio of more than 280 proprietary products, which are sold in more than 42 countries to academic research markets and also to leading pharmaceutical and biotechnology companies. Qiagen employs approximately 860 people worldwide. Year-end 1998 revenues were US$110.2 million. The average growth rate was 45% over the last five years. The United States, where Qiagen derives 54% of its sales, is its biggest market with the largest client base remaining the academic research labs. At the end of June 1999, the company's market capitalisation stood at US$1.26 billion. This is quite a change from a decade ago when Carsten Claussen, head of Qiagen's supervisory board, decided it was wiser to hold board meetings outside the office to avoid the possibility that employees would overhear conversations about bankruptcy and lack of resources to pay wages….

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RHEIN BIOTECH

Business: Production of Hansenula polymorpha derived proteins
Company established: 1985
Venture backers: Euroventures Benelux, Deutsche Beteiligungsgesellschaft, S-Kapitalbeteiligungsgesellschaft Düsseldorf, ABN-AMRO Participaties
Website: www.rheinbiotech.de

The origin of Rhein Biotech goes back to 1985 when Professor Cornelis Hollenberg, Professor Hermann Sahm and Dr Alexander Strasser established Rhein Biotech GmbH in Düsseldorf. The company was established as a vehicle for the development, production and marketing of new biotechnological processes and products. The concepts for these processes had been developed by the company's founders at the Institute of Microbiology at the Heinrich-Heine University of Düsseldorf. Back then, Innovatives Düsseldorf and Krupp Industrietechnik provided seed capital. Deutsche Beteiligungsgesellschaft invested in the late '80s.

Rhein Biotech GmbH initially derived most of its revenue from research conducted for the pharmaceutical, chemical and food production industries in the area of yeast expression systems. Until 1994, the group also carried out extensive research and development on Hansenula polymorpha, which is used for the production of proteins produced by genetic engineering. In 1994, the group expanded its business to include the production of Hansenula polymorpha derived proteins. Today the group derives an increasing proportion of its revenue from license agreements on products produced using this technology. To date, hepatitis B surface antigen, phytase and hirudin have been produced at or close to industrial scale using the Hansenula polymorpha technology. Feasibility studies carried out at laboratory scale have demonstrated that insulin, a-interferon, invertase glucoamylase, b-lactamase, cellulase, lipase and glycolate oxidase can also be expressed in Hansenula polymorpha. The management of Rhein Biotech has branded its system as "the ultimate protein machine". In particular, the technology is proven to cost only 10-15% of the price of previously used methods and is capable of producing proteins safely in commercial volumes. The cost effectiveness of the technology makes it extremely interesting for commercialisation in developing economies where traditional vaccines are too expensive but in great demand.

By 1993, the company had a good product but an inappropriate sales method. It was basically on the verge of bankruptcy. Euroventures Benelux added capital in 1993 at a good valuation given the precarious situation of the company and got a seat on the board. A new chief executive officer was found in Daan Ellens who had business experience as well as a scientific background. His strategy was to strike a balance between cutting-edge research and production, working together with strong partners to grow rapidly with controlled risk. He joined in 1994, reformulated the company's business strategy and went out to find local partners.

The technology for the production of the hepatitis B vaccine was licensed to Korea Green Cross in 1992 for production in South Korea. Korea Green Cross is presently selling

tens of millions of doses of the hepatitis B vaccine per annum on which Rhein Biotech receives royalties. Rhein Biotech established joint venture companies with Laboratorio Pablo Cassará in 1995 and Wockhardt in 1996 to commercialise the hepatitis B vaccine. The joint ventures lead to the incorporation in 1995 of Rhein Americana in Argentina and Wockhardt Rein Biopharm in India, which are respectively owned 51% and 50% by Rhein Biotech, who will share in the manufacturing margins and receive royalties on sales of the products.

Rhein Biotech has collaborated with and provided contract research services to several major pharmaceutical companies, including BASF/Knoll, Bayer, Boehringer Ingelheim, E. Merck, Hoechst, Hoffman La Roche, Merck & Co. and SmithKline Beecham. The company entered into a collaboration with Linde in 1997, under which Linde provided the engineering know-how to take production of the hepatitis B vaccine up to industrial scale.

In 1997, ABN-AMRO Participaties and Industriebank LIOF (Limburgs Instituut voor Ontwikkeling en Financiering) became shareholders of Rhein Biotech.

In March 1999, Rhein Biotech and Innogenetics, another venture backed company, entered into a collaboration agreement under which the two companies intend to jointly develop products based on a number of genes, some of which are owned by Innogenetics using the Hansenula polymorpha expression system. The most advanced product is a therapeutic vaccine for the treatment of hepatitis C, which is in pre-clinical development. Innogenetics's decision to concurrently take a substantial stake in the company was based on the quality of the technology, which they had compared with other existing technologies to come to the conclusion that Rhein Biotech's was simply the best.

The management of the company has been reinforced over the years, the number of employees has grown to 80, and the redefined business strategy has clearly given results. Sales are expected to reach EUR 9 million in 1999, and it is expected that the company will break even. In April 1999, one third of Rhein Biotech was floated on the Neuer Markt, at the high end of the price range at EUR 30.00 per share, which valued the company at EUR 85.5 million based on the market potential of a cheap and efficient technology protected by patents. The venture capitalists remain as shareholders and are convinced the prospects of the company will continue to contribute to very satisfactory investment returns.

Summer 1999

SCM MICROSYSTEMS, INC.

Business: Integrated circuits
Company established: 1989
Venture backers: TVM Techno Venture Management GmbH, Alpinvest Holding, Vertex Management, Telenor Venture AS, Genevest Consulting Group
Website: www.scmmicro.com

The year 1989 saw the foundation of the PCMCIA, an international standards body and trade association with the mission to establish standards for integrated circuit cards and to promote interchangeability among mobile PCs. Robert Schneider, who had been working with Intel as its European marketing manager for 12 years, was the only European on the organisation's executive committee. With his professional background and his association with PCMCIA, he was extremely well positioned to understand the opportunities of the new technological context. In 1990, along with Bernd Meier, who had been a sales manager for Texas Instruments for 14 years, Schneider decided to create SCM Microsystems, a company that would focus on PCMCIA peripheral products.

From 1990 to 1993, Schneider and Meier financed the development of the company with their own money. They then realised that to grow quickly they would have to develop a significant presence in the United States and specifically that they would need more financing. At a time that Robert Schneider describes as "one where venture capital in Germany was nonexistent", SCM Microsystems was recommended to TVM, which committed funds and put together a consortium of venture capital investors including Alpinvest and KredietBank Luxembourg. This was considered a high-risk investment back then and the venture capitalists were rewarded for their pioneering with a very low valuation.

The urge to attack the American market was strong, and SCM Microsystems correctly saw in TVM, which had an operation in Boston, a source of support for their American conquest in particular and their international expansion in general. The venture capitalists took a seat on the board in 1993 and have never ceased to act as a sounding board to SCM Microsystems' management ever since. To give the company more credibility in the essential American market, it reincorporated in Delaware in December 1996.

Meanwhile, the importance of the PCMCIA peripheral products market materialised. However, others had had the same vision about this market and, with low barriers to entry and dozens of suppliers, pressure on margins would inevitably become unsustainable. As a consequence, in 1994 SCM Microsystems made a strategic shift in product focus from PCMCIA cards and peripheral products to security and access products. The company made its final shipment of PCMCIA products in the first quarter of 1997, thus completing its exit from its original business.

Other rounds of financing were subscribed to by the same venture capitalists mentioned above and some new ones as well. Corporate strategic investors such as Telenor, Gemplus and Intel entered into collaborative industry

relationships and took significant stakes in the company. The agreements with these companies covered such areas as research and development of new technology, joint marketing activities, common manufacturing opportunities, licensing and supply.

In 1997, SCM Microsystems turned profitable and was ready to go public. It was the third German company to list on Nasdaq and the seventh to list on the Neuer Markt, however it was the first dual listing. The venture capitalists, led by TVM, which had experience in taking a German company to Nasdaq, coached the management of SCM Microsystems through the initial public offering. About one third of the company was floated in October 1997 at US$13.00 per share, for a total market capitalisation of US$130 million on revenues of US$27.6 million and a profit of US$1.1 million at year end. This initial offering went well and was soon followed by a second offering in April 1998 at US$61.00 per share. The share price has been rather volatile ever since the initial public offering, yet the initial shareholders can only be satisfied with their return.

In 1998, SCM Microsystems acquired Intellicard Systems in Singapore, Intermart Systems in Japan and merged with Shuttle in the United Kingdom. These acquisitions have added complementary products, a strong local sales and marketing presence in Asia and low-cost engineering facilities. The deals also linked SCM Microsystems to new customers, which included an impressive collection of high brand original equipment manufacturers (OEMs) including Apple, Compaq, Dell, Hewlett Packard, Sun Microsystems, Schlumberger France Telecom and Fuji Photo Films. Today, the company has offices and research, development and support centres in the United States (California), Germany, France, India, Japan and the United Kingdom, and production and engineering facilities in Singapore and Taiwan. SCM Microsystems employs slightly less than 300 people worldwide.

SCM Microsystems has over 30 patents granted and/or pending and is a leading member of international standards committees. It has become a leading provider of products and technologies that give individuals the ability to quickly and securely control access to, and exchange, digital information. By bridging smart cards and other secure devices with PCs and workstations, SCM Microsystems provides cost-effective solutions for conditional access to mobile, handheld and desktop computers, workstations, digital video broadcasts, virtual private networks, electronic files, e-mail and Internet firewalls. Its products are geared toward the rapidly emerging and growing markets of data security, e-commerce applications and digital media. This focus is expected to translate into impressive double-digit revenue and earnings growth, and to continue to raise the company's valuation way beyond its current US$700 million market capitalisation.

Summer 1999

SEAGULL HOLDING B.V.

Business: Applications software
Company established: 1990
Venture backers: Gilde, Advanced Technology Ventures
Website: www.seagullsw.com

Seagull was founded in the Netherlands in 1990 by a group of 17 former employees of Holland Automation B.V., a privately held software company. Back then, the company focused on updating existing AS/400 applications - from translating languages for multinational distribution of applications, to adding graphical user interfaces (GUIs), to enhancing applications using the desktop power of the PC. In fulfilling client needs, the group became highly expert in helping clients migrate AS/400 applications toward client/server architectures, developing productivity tools, server software and viewer technology to assist with the job. Those tools – built in response to the practical need to deliver technically superior solutions quickly – form the basis of Seagull's software product portfolio.

As early as December 1990, Seagull became an IBM Business Partner. The privileged partnership that Seagull and IBM have nurtured over the years is an essential element in Seagull's development. To begin with, IBM is the market maker providing the foundation for Seagull's AS/400 and S/390 solutions. Today, IBM is a marketing partner, a technology partner and a customer. Some of Seagull's main products are included in cooperative IBM software marketing programmes around the world. They are strategic offerings for IBM from two perspectives: they extend the life of existing AS/400 applications, thereby extending the clients' return on investment in existing business applications, and they meet pressing needs like e-business innovation, Web-enablement, functional enhancement, integration of applications at the desktop, etc.

Seagull got involved with venture capital almost by accident. One day in 1995, a venture capitalist was discussing an additional round of funding with a Seagull competitor that wanted more financing in order to boost its sales and marketing efforts, and to ward off Seagull, "a strong competitor". In the completion of his due diligence, the venture capitalist tried to find references on Seagull and called Toon Den Heijer from Gilde who in turn called Frank van Pelt, President and CEO of Seagull, to find out more about the sector and Seagull's competitors. After a few days of further research, Den Heijer called back and proposed to take 25% of the company. Van Pelt refused with the argument that Seagull did not need any money. Den Heijer hit a weak spot by pointing out that in fact more capital would allow him to grow bigger and faster, and to raise his overall level of ambition. Gilde eventually purchased 17% and syndicated the deal with Advanced Technology Ventures (ATV), who purchased another 10% of the company. Van Pelt never regretted the decision to dilute his stake by selling out this 27% of Seagull. He realises that the contribution of the venture capitalists has created value for him, for Seagull and for its shareholders.

The involvement of US-based venture capitalists and the network they brought with them were essential in keeping Seagull abreast of

technological and market developments in the key North American market.

The venture capitalists pointed out the need for a proper supervisory board that would take its supervisory duties seriously and make sure that affairs are conducted in the best interests of the company and its shareholders. Van Pelt admits today that the regular quarterly board meetings and the accountability to the board and other shareholders has often forced him to think twice, and to define a clear vision about where the industry is going and how Seagull fits in the developments of information technology. The exercise of defending his decisions has given him more assurance in general. Today, it has become a natural reflex to ask the venture capitalists represented on the board for advice when far-reaching decisions have to be made.

With the encouragement of the venture capitalists, Seagull has strengthened its management and workforce. In the United States, there has been a complete staff turnover.

Last, but not least, the venture capitalists have acquainted Van Pelt and Seagull with the financial world and the investment community. Without them, Seagull would probably not yet have completed its flotation. The initial public offering of 43% of the capital took place in February 1999 on the Amsterdam Stock Exchange, where the company trades under the unambiguous SEAGULL ticker. The offering valued the company at approximately EUR 100 million or about four times estimated 1999 sales. Seagull has been profitable for the last eight years. Proceeds will be used to expand the business organically as well as to acquire complementary businesses, products and technology rights. The first acquisition, a Java development lab in southern California, was made in April 1999.

In January 1999, Seagull was named the fastest growing Dutch enterprise. PricewaterhouseCoopers, ABN AMRO Bank, the Amsterdam Stock Exchange and the Dutch Ministry of Economic Affairs sponsored the award, which is designed to showcase the importance of fast-growing, medium-sized enterprises for the Dutch economy. The award is intended to recognise the winning enterprise's contributions to the economy in terms of employment, innovation and economic growth.

Seagull employs about 230 people. Its headquarters are in the Netherlands; subsidiaries are located in the United States, Canada, Germany, France and Italy and the United Kingdom. The company has direct operations in these countries and in the Asia Pacific region; in addition, 30 independent software distributors represent its products in more than 50 countries. Development laboratories are located in Atlanta, Georgia; Dordrecht, the Netherlands; Dublin, Ireland; and Los Angeles, California. Primary customer support centres are in Atlanta and the Netherlands. With this worldwide presence, and with hundreds of thousands of PCs connected to AS/400s and S/390s, Seagull can truly claim that it is a global market leader in development tools for enhancing existing applications. An important market is opening up in upgrades of the applications that will give them a new life in the world of e-commerce.

Summer 1999

S.O.I.TEC SILICON ON INSULATOR TECHNOLOGIES

Business: Silicon-on-Insulator chips fabrication technology
Company established: 1992
Venture backers: Banexi Ventures (BNP), Innovacom
Website: www.soitec.com

Driven by his vision, ambition and strategy that France should become an independent nuclear power, Charles de Gaulle gave the impetus for the creation of various research centres that would exploit the best mathematical and scientific brains. De Gaulle witnessed France's nuclear capabilities, but never lived to see that his endeavours also laid the groundwork for an impressive venture capital success story. Indeed, one of the very prestigious research centres that was created thanks to his efforts was the Commissariat à l'Energie Atomique (CEA). And it was at the Laboratoire d'Electronique et de Technologie de l'Information (LETI), the microelectronics laboratory of the CEA based in Grenoble, that most of the groundwork was done on a key innovative technique, which was to become the foundation for SOITEC's future success.

The development of the technique took about 20 years of research, but it was not really a priority project for CEA. However, Jean-Michel Lamure and André-Jacques Auberton, two scientists involved in the research, recognised the potential of the SOI techniques that had been developed. They decided to set up a business that would exploit this potential commercially and created Soitec in 1992. The technology was patented by LETI in 1991 and Soitec has an exclusive license to use it. In exchange for the exclusivity, Soitec pays royalties of 1-2% of revenues to the CEA.

Like all existing Silicon-on-Insulator chips fabrication techniques, Soitec's technique consists of applying physical-chemical and mechanical treatments to silicon wafers to create a sandwich structure with an insulating layer and a useful surface on which the transistor junctions are printed. However, Soitec's innovative technique, called Smart Cut, has immense advantages in comparison with competing techniques in that it cuts electricity waste, improves the performance of circuits, allows for innovative circuit design, reduces wafer production costs and simplifies circuit design.

The expansion of the company and the need to widen and improve the product line led Soitec to seek funding. Banexi Ventures was on the lookout for investment opportunities in the Grenoble area because of the concentration of scientists and the potential for spin-offs from the research centres. Along with Innovacom, Banexi became the first venture capitalist to back Soitec in 1994. Its involvement was more than financial. It chaperoned scientists with an industrial project but no relevant business or commercial experience, facilitating the delicate transfer of technology and an appropriate team from the laboratory to the independent spin-off under the best possible circumstances. In their own words, they "organised the divorce".

A year later, Soitec announced a new generation of products at Semicon. A new round of financing was needed to make additions to the existing equipment and was obtained from the same venture capitalists. Production of the new products started in March 1996. Orders flowed in as the demand for wafers increased. Production capacity had to be increased accordingly, and again

funds were needed to create greater capacity and to pursue R&D efforts. The success of Smart Cut, which by now was clearly recognised as an important technological breakthrough, broadened the financing options. Priority was given to an industrial backer and partner. Many industrial partners stood in line as they realised that Smart Cut was a major and essential technological breakthrough with many lucrative potential applications in the areas of power components, smart cards, portable devices, mobile telephony, digital circuitry, the military and aerospace among others.

Soitec picked Shin Etsu Handotai (SEH) in Japan, the world's leading silicon maker. In 1997, SEH took a 12.5% stake in Soitec and became one of its major shareholders. Its investment was used to build state-of-the-art manufacturing facilities in Bernin, near Grenoble. Work on the facility was completed in September 1998 and the factory is already ISO 9001-certified. The partnership with SEH offered many other advantages, besides financial backing. SEH has already built a second production site in Japan, thereby avoiding a situation in which Soitec would have to bear additional heavy investment costs. As the world's number one silicon maker, SEH is a guaranteed source of long-term supply in substrates at preferential rates. R&D exchanges between the two companies are bound to refine the Smart Cut procedure. SEH promotes Smart Cut in Asia and at other international forums, and raises Soitec's profile worldwide.

Even though the venture capitalists did not invest in the SEH financing round, they played a crucial and active role in the SEH negotiations. First of all, they made sure that Soitec was properly valued. They also closely monitored licensing agreements with SEH to make sure that Soitec's technology, its subsequent improvements and the company's know-how were properly protected by patents.

Soitec's goal is to make Smart Cut the world standard. It is very likely to achieve that goal thanks to an active licensing and agreement policy, the quality of its patent portfolio, marketing contracts with high-profile components manufacturers such as Philips, Kopin, Honeywell, IBM, Motorola, Mitsubishi, Toshiba, Hitachi, Samsung and Hyundai among others, and an important production capacity able to support the expected growth. At the latest Semicon gathering, Smart Cut won the "Semi-award" for best technology of the decade.

At March 1999, sales stood at FF 7.3 million. However, major capital expenditures and other investments turned those revenues into a FF 11.3 million net loss. Sales are expected to increase dramatically going forward, reaching FF 18 million in 2000, and FF 204 million in 2005. An operating profit should be achieved in fiscal year 2000. At the end of December 1998, Soitec employed 92 people.

To raise Soitec’s profile and to increase its visibility, it was decided to take the company public. When the venture capitalists first invested in 1994, Soitec was valued at FF 45 million (EUR 6.8 million). The SEH participation in 1997 valued the company at FF 900 million (EUR 137.2 million). The IPO took place in February 1999 on the French Nouveau Marché; 30% of the company was then sold to the public at FF 300 million (EUR 45.7 million). The venture capitalists are, of course, very satisfied with the return, as are the lab technicians who took out loans to invest in the company when it was created, and who saw their stake increase from FF 100,000 (EUR 15,000) to FF 4 million (EUR 610 000) at the IPO.

Summer 1999

TAKEFIVE SOFTWARE GMBH

Business: Development, creation and distribution of software
Company established: 1992
Venture backers: Innovationsagentur
Website: www.takefive.com

TakeFive Software was conceived by five founders, including Christian Kleinferchner and Peter Bucsi. In 1992, Kleinferchner and Bucsi had been in contact with Ubilab, the software laboratory of Schweizer Bankgesellschaft (SBG), which was in the process of prototyping SNIFF+, a software support system for the object-oriented programming language, C++. This system, a known programming environment, is a kind of toolbox that assists the programmer in creating a computer program.

Ubilab had decided that they did not want to develop SNIFF+ any further or market the product, since it was outside its core business and would involve committing resources for development, marketing and support. The TakeFive founders decided to develop SNIFF+ themselves and bought the rights from SBG. They applied for funding from the Seed Financing Programme run by Innovationsagentur, which therefore became involved with TakeFive from the beginning.

To Dr Helmut Dorn at Innovationsagentur, this project did not look immediately appealing: if the product had so much potential, why was SGB selling the rights? The founders pointed out that 200 licenses had already been sold, and that there was strong interest in the product, even though it was semi-developed, and that little marketing had been undertaken. The team showed great commitment, was experienced in software development and had good product knowledge. In addition, they had a good strategy for development and marketing, with strong projections once the product was fully developed. Moreover, the technology had received highly favourable ratings from pilot users and appeared to have technological advantages over rival products. Innovationsagentur decided to invest ATS 4 million as an unsecured loan, with no asset participation but taking a profit share when available. In addition, an Austrian bank made a secured loan of ATS 7 million, and the entrepreneurs put up ATS 500,000.

The investment by Innovationsagentur was to see TakeFive through the full development period and on into the marketing phase. The target area included Europe, but was principally the United States, where there was strong demand for flexible, technically complicated solutions that can be specifically adapted for customers and subsequently used by hundreds of individuals. The target market areas include professional C++, Java and Fortran developers in general, and the telecommunications industry, engineering departments and companies, banks and insurance companies and various kinds of industrial sectors, especially aerospace and automotive as well as independent software vendors. Dr Dorn of Innovationsagentur advised TakeFive on market research and marketing strategy and helped with their first trade fair. He also helped TakeFive in forecasting their business plans and introducing financial control instruments.

Once the product was more fully developed, international sales began in earnest and TakeFive sought to develop a large US outlet. Through American contacts, TakeFive began negotiations with Integrated Systems Inc (ISI) in California. ISI is a Nasdaq-listed software company that had sales of approximately ATS 1 billion in 1996. ISI subsequently became interested in purchasing TakeFive, since the product complemented its own, while adding a previously missing tool. TakeFive was faced with two options: either sell out to ISI with its enormous distribution network, or seek further venture capital and develop its own distribution network.

TakeFive decided to negotiate a trade sale, obtaining a purchase price that was several times annual sales, and securing the retention of the Austrian management. At the same time, Innovationsagentur, which is permitted to run seed investments for a period of up to three years, began to negotiate withdrawal in 1997. The term of the loan was reduced and a premature redemption was made; Innovationsagentur was also able to participate in the profit share, which meant that Innovationsagentur received the maximum return available under its guidelines.

March 1997

UNIPALM (UUNET PIPEX)

Business: Software development
Company established: 1986
Venture backers: 3i
Website: www.uk.uu.net

Unipalm was started in 1986 by Peter Dawe, a computer scientist who had failed to persuade his employers to develop a software distribution business. Since they were not interested in his idea, he bought out the rights to a range of software and set up on his own, financing himself with £7,000 savings and a small loan.

The software business grew, providing him with experience in determining what the market needed, developing commercial products and selling them. More importantly, the business generated sufficient cash flow to allow some expansion. The catalyst, which presented huge growth opportunities, came about with the development of the Internet, which presented a new market opportunity for Unipalm.

In 1992 Peter Dawe had enough expertise to plan a major development project, which would be a quantum leap in terms of positioning the company. This project, to develop an access provision to the Net, became the Pipex service provider. It was an ambitious project, requiring a lot of cash to develop, so Unipalm began to look for funding possibilities. It contacted 3i's Cambridge office, which has a reputation for investing in successful early-stage, high-tech ventures, and they began to explore possibilities.

At this point, Unipalm was already cash positive but to take the company forward as an Internet service provider, required extra staff and more money for R&D. 3i was interested in the project even though it had the usual risks associated with an early-stage technology company. The possibilities, however, were considerable given the stage of development that the Internet had reached. In addition, Unipalm had an excellent track record and was respected in the industry. It had already penetrated the key market, the United States, where it had entered into distribution agreements with Sun Technology Systems and FTP Software, and the detailed assessment of Pipex looked viable according to projections. The most important element was the quality of the management team, which had shown innovation, vision and had already achieved many of their targets. There was a core business in place that showed good turnover and profits.

3i decided to invest £1 million, which could be drawn down as required; this sum was to cover the R&D and marketing costs associated with Pipex's development. In return, Unipalm ceded 28% of the equity. Although 3i has a reputation for hands-off management, David Brister, who was responsible for the investment, played an active role in helping to develop the company, helping them develop their board of directors, and through his contacts introduced a new chairman and appropriate non-executive directors.

The project developed very quickly, and soon more cash was required. Although neither Unipalm nor 3i had aimed at an IPO from the

outset, it was clear that this was the way forward and would provide Unipalm with more liquidity for further growth. Unipalm obtained a full listing on the London Stock Exchange in November 1994. The company's stock was one of the best performing shares and growth continued swiftly. By July 1995, the company counted 193 employees and had a turnover of £17.8 million. Visibility of the company increased to the point where UUNET, the world's first and leading Internet provider, proposed a merger, which took place at a valuation of £150 million for Unipalm Pipex. At that point, 3i divested of their stock, achieving a multiple of 20 on their investment. In December 1996, UUNET Pipex merged with WorldCom Inc, then the fourth largest fiber carrier in the United States. In September 1998, UUNET's parent company, WorldCom, completed its merger with MCI, officially forming MCI WorldCom. The rest is history.

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UNITRONICS COMUNICACIONES S.A.

Business: IT Services
Company established: 1975
Venture backers: Excel Partners S.A.
Website: www.comunicaciones.unitronics.es

Unitronics was founded in 1975 by Jaime Salama with the intention to import and sell electronic components. Subsequently, he joined forces with his brother Miguel Salama. In the beginning, business took off and revenues followed, but pressure on margins slowly increased and Jaime Salama came to the conclusion in the early '80s that there was no longer money to be made in "moving boxes", which had become the main characteristic of electronic component distribution. He decided to reinvent his trade and redefine the mission of his company. He envisioned that significant gains could only be made in the services industry, and began looking for products where services could be added.

Fortunately, the Salama brothers had from the outset looked ahead and embraced new technologies. Thanks to this attitude, they kept abreast of trends, needs and developments in the industry, which gave them a leading edge in their renewed endeavours. A transition was made from electronics towards communications. That transition coincided with the introduction in Spain, as everywhere, of the concept of networks. Back then, communications were limited to voice, while the transmission of data was still considered to be something that belonged to science fiction. Very quickly however, science fiction caught up with reality and it is now clear that businesses that lag behind the explosive developments in new technologies inevitably lose their competitive edge. The added value services that Unitronics offers today are to design, integrate, manage and maintain the appropriate multimedia communications and networking solutions for its clients' current and future needs. An important offshoot of the communications solutions is the company's special focus on videoconferencing. Unitronics has become the leading Spanish videoconferencing provider in Spain and the principal independent high-end network designer and integrator.

In order to come through on its promise to always deliver the best possible solution, Unitronics has attracted a competent team of consultants and engineers. The company counts 75 employees, of which approximately 60 are engineers. The geographical presence has been expanded to include Barcelona, Bilbao, Santiago de Compostela and Valencia. Other offices are expected to open soon in the Canary Islands and Seville. The company is convinced that a local presence is essential to offering global solutions.

Having decided on a new course of action for the company, the Salama brothers looked for funding. Banks would continue to issue debt for low margin box moving businesses, but were more reluctant to lend to innovative communication and networking companies. In December 1995, Excel Partners, then a joint venture with the Rothschild Group but independent since 1997, decided to invest and took a 30% stake in Unitronics. In order to improve the company's efficiency, certain measures were

taken to improve Unitronics' operations. The first of these measures involved simplifying an intricate corporate structure, and designing and structuring the de-merger of the company's three operating divisions into three separate companies: Unitronics S.A., Unitronics Componentes S.A. and Unitronics Communicaciones S.A. Excel Partners' initial investment of US$3 million went to the third business. By isolating the divisions into three companies, each activity can be monitored more closely and accurately. At the suggestion of the venture capitalists, a process reengineering was carried out by an independent consulting company to ensure a smooth transition following the de-merger. Expense controls are now tighter and commercial efforts more focused.

The increase in revenues of Unitronics Communicaciones confirms the positive effects of the reorganisation: revenues were Pta 2.366 million (EUR 14.2 million) in 1997; Pta 2.670 million (EUR 16.05 million) in 1998; and an estimated Pta 3.351 million (EUR 20.14 million) in 1999. Commercial cooperation agreements have been signed with Bay Networks, Cicso, Fore Systems, Nortel, and 3Com, among others. The list of clients is impressive and includes almost every major Spanish university, many official government and regional administrations, electricity and media companies, banking institutions and industrial concerns. Videoconferencing systems have been set up for major multinationals such as AT&T, Citibank, General Electric, McKinsey and Co, Hewlett Packard, Coca-Cola and Johnson & Johnson. All these clients have become references for Unitronics and their satisfaction attests to the quality of its services.

The venture capitalists would like to build on the company's reputation to exploit its seemingly unlimited growth potential, as Unitronics Comunicaciones is poised to accompany its existing clients to Latin America and expand into that continent. As a result, Excel has just organised a second round of financing, introducing Alpinvest Holding N.V. as an outside institutional investor. Alongside funds advised by Excel, a further US$7 million has been pumped into the remaining two companies, which are to be consolidated back into one entity, prior to a vigorous expansion programme. Acquisitions are likely, in Spain and abroad, and an initial public offering cannot be excluded.

Summer 1999

VISION IQ

Business: Vision technology
Company established: 1995
Venture backers: CDC Innovation, NeSBIC CTE Fund, Appolo Invest
Website: www.vision-iq.com & www.poseidon.fr

As soon as he got out of school in 1989 at the age of 24, Jérôme Menière started working in the LBO business, first for a bank, later as an LBO fund manager. When interesting deals became scarce in the early '90s, he became bored and decided to start his first business as a consultant for medium-sized companies. He operated as an outside financial officer and taught companies how to talk with their bankers. Occasionally, he handled some of their M&A activities. However, even though business was going well, he felt frustrated with consulting and wanted to push the concept of entrepreneurship further. He took a stake in Hôtesses et Grooms de Paris, which had been purchased for a symbolic French franc in 1994. The company's turnover has grown more than 10 times since then.

In that same year, 1994, he was in contact with the people that developed video surveillance systems. There was an idea to use them for bank surveillance and around swimming pools. Jérôme Menière looked into matters and, after a thorough market analysis, it became obvious to him that the electronic lifeguard was something many people had been dreaming about and were looking for. Indeed, on average, there are between two and four fatalities per month in French public swimming pools; similar statistics hold true for other Western European countries and for North America. These already alarming figures do not take into account the numerous near drownings, which sometime result in serious injuries to victims who are rescued too late and suffer permanent damage. As a consequence, the problem must be addressed by local politicians and public health officials, especially since the victims are often children.

In 1995, Jérôme Menière founded Poseidon S.A. and scraped together FF 1 million (EUR 152,400) from his savings, family and an American business angel, thinking it would take him only one year to bring the swimming pool surveillance systems to the market. Due to technical problems, however, it took him three more years and an additional FF 9 million (EUR 1.4 million) to develop the world's first automated system designed to help prevent drowning accidents in public swimming pools. The European and North American markets have been estimated at US$3 billion. It is Poseidon's intention to grab, within the next five years, at least 5% of that market, in which it faces no competition at the moment.

The first venture capitalist invested in 1996. Another round followed in 1997. In 1999, Vision IQ raised US$4 million from existing shareholders, additional international venture capitalists, a business angel and employees. These funds will allow the launch of the Poseidon system on an industrial scale. The company employs 12 people. The commercial efforts and ensuing sales are expected to lead to the creation of another dozen jobs within one year.

When asked what the contribution of the venture capitalists was besides funding,

Jérôme Menière smilingly replies that "they have this strange belief that auditing the company every two months creates more value than such mundane tasks as commercial development". He, of course, understands the need for diligence and, on a more serious note, immediately adds that the commitment by CDC Innovation in 1996 gave a tremendous boost to his confidence and that the loyalty of the venture capitalists throughout the longer than expected development process continues to amaze him. With the entrance of the new international venture capitalists, he will now also be able to leverage their networks and expertise in establishing distribution networks and marketing programs in other countries.

Behind the apparent simplicity of Poseidon's systems, there is extensive R&D conducted by a team of leading experts from several specialised fields, especially the field of mathematics. Up until now, vision systems typically used in industry relied on simple algorithms developed by electrical engineers. These systems allow for relatively simple checks of rigid objects in settings without variables. The swimming pool systems in contrast demand the ability to detect and analyse movement, or lack thereof, of random objects and shapes in variable contexts and light settings. The Poseidon systems consequently rely on complex mathematical algorithms that have been developed and financed by the company. In the process, Vision IQ has acquired state-of-the-art technology in computer vision and has developed strong partnerships with top research teams in the field of applied mathematics, laying the groundwork for the development of a totally new generation of smart vision products. The Poseidon system is the first smart video product in commercial phase. It should be followed by a complete set of scene video analysis software for the video surveillance market and for the Internet through quick-cams and spy-cams, which are currently under development. The promising ambition and mission of Vision IQ is nothing less than to "teach computers how to see".

Summer 1999

VOCALIS LIMITED

Business: Interactive voice response systems
Company established: 1993
Venture backers: Prelude Technology Investments, Providence
Website: www.vocalis.com

Accessing services, products and information over the telephone is now commonplace, and the telephone is no longer merely a means of communication, it is a business tool. Vocalis has exploited this boom in telephonic information to develop products that automate many of the routine tasks previously carried out by operators. Applications can be used for automated voice mail, charge card use, telephone banking, home shopping and secure site access, to name just a few. The products operate by listening to key words in natural language and responding, so if someone says "I think my flight number is, uhmm, zero-zero-one" the system recognises only the three relevant words and responds, for example, by announcing the flight's arrival time.

Vocalis was formed through a management buyout of part of Logica's Speech and Natural Language Division, which was involved in the development of speech understanding over the telephone. Logica decided that the exploitation of this technology was best carried out by a company whose core business interests were the development of products for voice processing and speech recognition. Jeremy Peckham led the team of 13 Logica employees to form Vocalis and, at buyout, Logica transferred its IP rights. Peckham knew that they would require financing and, while they were organising their operation, he began looking for venture capital. Bob Hook from Prelude met the team and after examining their proposal was immediately interested for several reasons: Vocalis' speech recognition technology appeared to have the performance and robustness necessary for adoption by a marketplace which hitherto had seen little in the way of reliable and useful products. The team had proprietary technology and were clearly focused on speaker-independent applications in telecommunications, which was well differentiated from speaker-dependent products such as automatic dictation and furthermore could be incorporated in products addressing potentially very large markets.

Prelude decided to invest £250,000 in this start-up and obtained 23.75% of the business in return. Since neither Jeremy Peckham nor his colleagues had run a stand-alone business before, they needed Prelude's help and expertise to develop the management team. Jeremy Peckham and Bob Hook agreed to look for an experienced chairman at an early stage and to strengthen the management team in the areas of marketing and sales. In January 1994, Bob Hook introduced Roy Cotterill as the new chairman; Cotterill had experience in high-tech and in large organisations and was therefore able to provide the expertise that Vocalis needed. An experienced marketing and sales director was also successfully recruited.

Initially Vocalis focused on selling automated systems to large organisations, e.g., telephone network operators, banks and travel organisations. This allowed the speech technology that they had developed to be proven in large, publicly-used systems, which obviously meant incurring development costs but at the same time helped the company develop a range of more standardised products. In May 1994, Prelude provided part of a further round of financing, which was needed to finance business development and losses. Prelude

invested £151,000 out of a total round of £288,000, increasing their equity to 27.3%.

This was structured partly as convertible securities since, at the time, an additional placement of £1 million was being put in place for which Prelude led the negotiations and concluded the deal for the other investors. This placement was completed in January 1995, reducing Prelude's holding to 21.4%, but valuing their total investment of £401,000 at £1.18 million. Bob Hook continued to play a proactive role in Vocalis' management development, introducing a new finance director in February 1995, and continued to be involved with additional recruitment as the need arose. Prelude acted as a Beta site for trials of Vocalis' new virtual receptionist product, Operetta. In doing this he realised that Operetta was being technology-driven rather than market-driven, an insight that helped Vocalis refocus its product strategy. The year 1995 was good for the company since they were able to penetrate both the German and Swedish markets. The latter deal was with Telia, a leading Swedish telecoms provider, for whom Vocalis installed the world's first automated directory enquires service. As is usual with fast growing companies, Vocalis needed additional financing to accelerate development, sales and marketing, and a second private placing was concluded in March 1996. In May 1996, Vocalis achieved a coup, entering into a global collaboration with Ericsson Telecom to provide the first solution for intelligent automated operator services.

Meanwhile, preparations were underway for the IPO that took place on schedule in July 1996 valuing the company at £30.5 million and Prelude's holdings at nearly 15 times cost. Vocalis achieved this in little more than three years from start-up.

Today Ericsson remains Vocalis' most important partner, leading to several lucrative collaborations. In 1997, Ericsson integrated Vocalis' systems into a new range of speech-driven telephone services. This provides more efficient customer services that people can use by speaking naturally, allowing network operators to automate the routine elements of call handling and to introduce new telephone services cost-effectively.

In November 1998, Vocalis announced an agreement to offer SpeecHTML to 1000 companies in a pilot programme, as a first step towards securing the newly identified £3 billion market opportunity for SpeecHTML, the web/telephony service. SpeecHTML allows companies to offer a telephone number, using their web pages as the source, that gives callers information and allows interactive transactions over the telephone using spoken commands. Customers need only an ordinary telephone to call these services, and to use the natural and easy interface of speech to request information. Companies can update their web pages quickly and easily, and this automatically updates the telephone service, giving a real-time service that is flexible and easy to manage. Divisions 1, 2 and 3 of the English Football League immediately announced their intention to use SpeecHTML in conjunction with their new football Internet site.

In August 1999, Vocalis announced an agreement with Freeserve to offer Vocalis' SpeechMail service to all Freeserve subscribers. This service allows users to access their mail via telephone. The revenues generated by telephone calls are to be split equally between the two companies. Since the flotation, Vocalis' revenues and earnings have been rather volatile. The most recent developments have associated Vocalis with the Internet and assimilated its valuation with the valuations of Internet companies, recently boosting its market capitalisation to £56 million.

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XEIKON N.V.

Business: Digital printing
Company established: 1988
Venture backers: Euroventures Benelux, Belgian Ventures, Isep N.V., GIMV, Electra Investment Trust Plc, Athena Finance, Sofindev, Rebelco
Website: www.xeikon.be

Xeikon was established in 1988 by Lucien de Schamphelaere. For over 35 years, he had held different positions at Agfa-Gevaert. His most recent positions were as General Manager in charge of the digital imaging division and as Managing Director of AGIF, Agfa-Gevaert's venture capital fund. His career and experience had made him aware of the technological gap that existed between copying and offset printing. Xeikon owes its foundation to his ambition to fill this gap and to profit from the trend toward shorter run lengths; greater use of colour in short run printing; printing of variable text, images, and graphics within the same print run; and the expansion of short run colour printing into new applications. The company's objective was to become a market leader in providing digital printing systems and related consumables for short run colour printing.

Managing AGIF made de Schamphelaere aware of the possibility of venture capital funding. However, Agfa-Gevaert was willing to assume only 25% of the risk of this new technology venture. He then went out and looked for a mix of industrial investors and venture capital to finance his endeavour. He always felt it was necessary to have investors who were also in the printing business. The venture capitalists understood the advantages of having shareholders from the industry, and have made sure that the equilibrium between industrial owners and financial investors remains a characteristic of Xeikon's shareholders structure today.

Lucien de Schamphelaere envisaged the development of the company in three phases, which were expected to take five years. Going from idea to feasibility was phase one and needed BEF 180 million (EUR 4.5 million). The second phase would take the company from feasibility to prototype and would require BEF 270 million (EUR 6.7 million). The bulk of financing, BEF 500 million (EUR 21.4 million), would be needed to move from prototype to product commercialisation. He never made financial forecasts. Investors were convinced primarily on the basis of the technology gap that needed filling. The fact that some prestigious names in the printing business underwrote this point of view by investing in Xeikon of course helped to convince the venture capitalists. All investors in the first round joined in the second round, which proceeded the second development phase. They saw with great satisfaction that the first two phases were accomplished with less money than forecast in more or less the predicted time span. However, the development leading to commercialisation was more expensive.

Investors had to build a strong conviction about the validity of their investment on their own because de Schamphelaere wanted to be safe and cash rich during the whole development phase, in spite of obvious, smooth progress with no significant setbacks along the way. Significantly, a private placement with US institutions in 1994 raised US$28 million, at a time

when the company had been trying to raise only US$15 million.

The actual execution followed the three-phased plan quite closely. Xeikon began development of a writing head in 1988 with the goal of developing a digital printing system to address the needs of the short run colour printing market. It produced the first feasibility model in 1990, followed by a series of pre-production models through early 1993. In the second half of 1993, it began marketing its first product, DCP-1, and also continued extensive testing of the product. In early 1994, commercial production and delivery began. Since then, Xeikon has received several highly acclaimed industry awards in recognition of its contribution to printing technology through innovations embodied in the DCP-1.

Agfa-Gevaert was the alma mater of the founders of Xeikon, a significant shareholder and a supplier as well as a client. The venture capitalists therefore watched over the relation with Agfa-Gevaert like hawks and made sure that there was never any conflict of interest between Xeikon and Agfa-Gevaert, or that Xeikon would become a subsidiary of Agfa-Gevaert.

The venture capitalists were very instrumental in the commercial set up of the company. They pushed Xeikon in the direction of adopting a third-party distribution strategy that employs original equipment manufacturers (OEMs) and value adding distributors. This strategy allows for faster market penetration at a lower cost. Today, Xeikon supplies both OEMs such as IBM, Xerox and Agfa, as well as a global network of over 30 value-added distributors operating in more than 40 countries. Venture capitalists also brought in Alfons Buts in 1990 as the company's vice president of sales and marketing even before there were products ready to be sold. Today, Buts is President and CEO of Xeikon. Lucien de Schamphelaere stayed on as Chairman of the Board until June 1999.

In 1996, Xeikon went public on Nasdaq. Easdaq did not yet exist back then and Nasdaq was reassuring for Xeikon's American institutional investors such as Fidelity and TRowe Price. The initial public offering valued the company at about US$450 million; today its market capitalisation is about US$750 million. At these valuation levels, the venture capitalists, some of whom are still shareholders, have realised superior returns.

Xeikon has been profitable since the second quarter of 1997. Revenues and net income are growing steadily, totalling US$136.1 million and US$16.2 million respectively in 1998. The company had 270 employees in 1997 and 400 in 1998. Manufacturing and office space had to be increased to accommodate continued growth and demand for products. Eleven years after its creation, and with a truly global presence, Xeikon can rightly claim that it is the world's leading supplier of digital colour printing systems for professional applications.

Summer 1999

XPEDITE SYSTEMS INC.

Business: Electronic messaging
Company established: 1993
Venture backers: Apax
Website: www.premtec.com

New Jersey-based Xpedite Systems Inc. was founded during the '80s with a strategy to hook up with all the different e-mail systems. Even though this was exactly what the Internet did with great success, this strategy turned out to be a flawed one for Xpedite, primarily due to timing. In 1992, a new manager by the name of Roy Anderson refocused the business on fax broadcasting. That same year, Apax Partners in New York made an investment in Xpedite Systems Inc. The investment was to straighten out the balance sheet and to build a war chest allowing management to acquire other companies, to open agencies in other cities and to grow the company into the leading value-added messaging company in the United States. Initially, Xpedite Systems Inc. concentrated on fax broadcast applications, allowing for the simultaneous delivery of documents from a computer or fax machine to tens, hundreds, or thousands of fax and e-mail addresses in only a few minutes.

As a matter of policy, Apax addresses the challenges of investing in a certain sector by employing managers with extensive experience in the relevant sector who will then share information between various offices worldwide. This modus operandi worked out extremely well for Xpedite's development and growth.

With previous work experience at British Telecommunications Plc (BT) in particular, and in the telecommunications industry in general, John McMonigall was one of the Apax international telecoms specialists who was called to New York to help evaluate the investment in Xpedite Systems Inc. After following the progress of the company in the United States for some months, it became clear to McMonigall that fax broadcasting was a promising international business concept, and that there was no good reason to confine it to the United States.

About the same time, David Proctor, a friend and former colleague of McMonigall's at BT, called to say that he was open for a new career opportunity. He was invited to visit Xpedite's US operations. To make sure that the motivation and commitment of all parties was in balance, it was decided that Apax London would pay half of David Proctor's economy class ticket to New York and that he would finance the other half himself. It was later found out that once he arrived in New York, he made sure the company reimbursed him for his half. He decided to make the jump from BT, the telecommunications giant, to a start-up. A business plan was prepared, Apax Partners in London funded the new venture and Xpedite Systems Ltd was founded in the United Kingdom in January 1993. David Proctor became managing director and John McMonigall chairman of the new company. The business grew very rapidly and became profitable in less than two years. Consequently, everyone agreed that Proctor's economy class ticket was an excellent investment .

In July 1995, Xpedite Systems Ltd acquired its main competitor in the City of London, Transmit International, and, in 1996, another competitor, Connaught Commercial Services Ltd, was purchased.

Meanwhile, other Apax offices had also gone to work. Apax Partners in Paris had acquired Xpedite Systems' French licensee, and Apax Partners in Germany funded the start-up of Xpedite Systems GmbH.

In reality, Apax's London, Paris and Munich offices were financing the European expansion of Xpedite Systems Inc. of the United States. From the outset, it was clear that a trade sale would be the exit strategy and that Xpedite Systems Inc. would be the purchaser. A complicated shareholders put/call agreement was signed to make sure that all parties would be treated fairly in the end. This agreement turned out to constitute a very elegant off-balance sheet financing for the American company which was able to avoid reporting the start-up losses that this international expansion entailed.

In 1997, Xpedite Systems Limited was sold to Xpedite Systems Inc. – which had gone public on Nasdaq in the meantime – for US$85.5 million, and Apax in London realised a very significant return. In recognition of this successful investment, David Proctor and John McMonigall won the prestigious 1998 "Large Start-up Venturer of the Year" award presented by Cartier, the British Venture Capital Association and the Financial Times.

In October 1997, Atlanta-based Premiere Technologies made an unsolicited acquisition offer for Xpedite Systems Inc. Premiere Technologies' ambition was to become the world's leading single source provider of integrated communications (voice mail, mobile, fax, e-mail, conference calling). It was interested in Xpedite Systems' very large client base to which it could sell its own suite of communications services. At the time, Xpedite's management was considering a buyout. Premiere had greater financial means and gained the upper hand. In 1998, Xpedite Systems GmbH of Germany was sold to Premiere; in 1999 Xpedite France went the same route.

Its new parents rebaptised Xpedite as Premiere Document Distribution. This division of Premiere is the world's leader in enhanced fax and document delivery with operating centres on four continents. It is the largest independent worldwide network for fax traffic, processing and delivering millions of fax pages every day.

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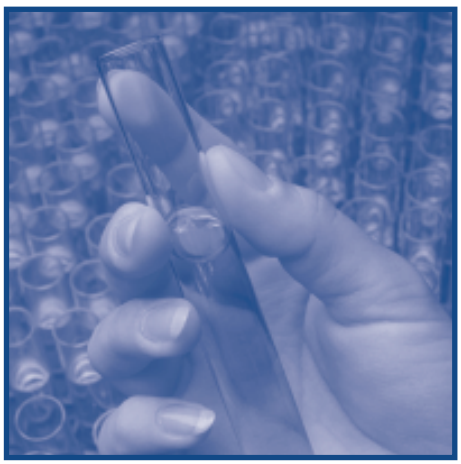

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