CANZ

COMPETITIVE ADVANTAGE NEW ZEALAND

Deltec Telesystems

A Case History

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INTRODUCTION

Deltec Telesystems has come a long way since its beginnings as a team of four people working out of an old timber-door factory in the Wellington suburb of Rongotai. While its origins were in servicing the mobile radio industry, the firm now designs and manufactures base-station equipment primarily for cellular communication networks. Its manufacturing site is at Tawa and it has a product development office at Porirua, both just 10-20 km from Wellington. The team has grown to about 90 permanent staff members plus a number of contract employees, with an annual turnover in excess of $30m. Deltec exports 95 per cent of its products, and sells to countries in every continent of the world.

The company's flagship product – the Teletilt antenna system – stands acknowledged as a major innovation in its industry. Deltec has won numerous awards in recognition of its wide-ranging success, such as the 1994 Trade Development Board / Air New Zealand Award for Overall Excellence in Exporting. It was named New Zealand's High Tech Company of the Year at the Hi Tech 2000 Awards, where it also won the Investment in People Award, and the Growth Company of the Year Award. In November 2000, Unlimited Magazine named Deltec as one of the best places to work in New Zealand. However, Deltec's road to success has not always been smooth sailing.

TODAY

Deltec Telesystems designs and manufactures antenna equipment for cell phone communication networks.[1] One of the most interesting things about a cell phone is that it is actually a two-way radio -- an extremely sophisticated radio, but a radio nonetheless. The telephone was invented by Alexander Graham Bell in 1876, and wireless communication can trace its roots to the invention of the radio by Nikolai Tesla in the 1880s (formally presented in 1894 by a young Italian named Guglielmo Marconi). It was only natural that these two great technologies would eventually be combined.

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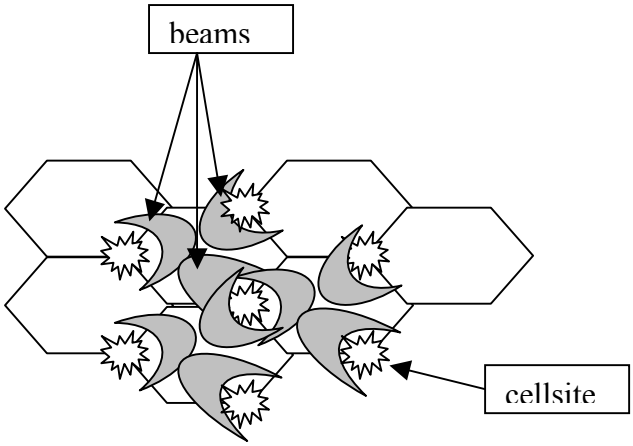
[1] 'Deltec looks to Europe, China, US for growth', NZ Infotech Weekly, 24 October 2000, edn. 2, p. 3.

Before cell phones, people who really needed mobile communications ability installed radiotelephones in their cars. In the radiotelephone system, there was one central antenna tower per city, and perhaps 25 channels available on that tower. This central antenna meant that the phone in your car needed a powerful transmitter - big enough to transmit about 70 km. It also meant that not many people could use radiotelephones - there just were not enough channels.

The genius of the cellular system is the division of a city into small cells. To transmit radio waves within such an area, both cellular phones and mobile radios require networks of cellsites, or base stations. A cellsite contains antennas and control equipment. This allows extensive frequency reuse across a city, so that thousands of people can use cell phones simultaneously. In a typical cell-phone system each cell-phone carrier receives about 800 frequencies to use across the city. The carrier, or operator, chops up the city into cells. In the CBD of Wellington, each cell is typically sized at about a city block. For a lower density New Zealand city, say the size of Lower Hutt, the distance between cell centres would be about 2km. Cells are normally thought of as hexagons on a big grid with antennas on alternate corners[2]. Each cellsite covers three cells using three banks of antennas. The interlocking or overlapping beam patterns give coverage in each cell. The size of the cell is based on the density of cell phones in the area.



Cellular phones have low-power transmitters in them and send messages in radio waves to base stations. These are also transmitting at low power, which means that

[2] http://www.howstuffworks.com/cell-phones

the transmissions of a base station and the phones within its cell do not make it very far outside that cell. Therefore the same frequencies can be reused extensively across the city. Each operator in each city also runs one central office called the Mobile Telephone Switching Office. This office handles all of the phone connections to the normal land-based phone system, and controls all of the base stations in the region.

The antennas play an important role in allowing the user to keep talking while moving from cell to cell. As the user moves towards the edge of a cell, the cell's base station notes that the user's signal strength is diminishing. Meanwhile, the base station in the cell the user is moving toward notices the user's signal strength increasing. The two base stations coordinate with each other through the MTSO, and at some point, the user's phone gets a signal telling it to change frequencies. This hand off switches the user's phone to the new cell.

There is an important distinction between mobile radios and cell phone. In most countries, mobile radiotelephones (such as walkie-talkies or CB radios) are *simplex* devices. That is the two people communicating are using the same frequency, so only one person can talk at a time. In New Zealand, there is a variant called *half duplex* that allows one person to talk but allows a group to listen. Mobile radio is therefore attractive to such services as Fire, Police, and Civil Defence who, for security or safety reasons, require a self-contained means of communication. A cell phone, however, is a *duplex* device. That means that there is one frequency for talking, and a second, separate frequency for listening. Both people can thus talk at once.

Products

Deltec designs and manufactures the "industrial accessories" of the base station. According to chairman and co-founder Peter Graham, the company's products "guide and direct the radio energy" between the base station's radio transmitter and the cellular phone or mobile radio.[3] Deltec produces a wide range of base station "accessories", including filters, combiners, duplexers, isolators and circulators, but its principal product is the antenna.[4]

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[3] Peter Graham interview, 6 March 2001.
[4] 'Companies showcase products at annual CommunicAsia fair', Export News, 8 June 1998, p. 3.

When Deltec won the Air New Zealand/Trade Development Board's Award for Overall Excellence in Exporting in 1994, the TDB's chairman and awards judge Barrie Downey stated that Deltec's success was due to "technically superior" and "innovative products developed 'in-house' ".[5]

The company's flagship product is the Teletilt antenna system that was first produced in 1995. Deltec's ultimate customers are known as operators or "telcos" (e.g. Vodafone, Telecom), who run the cellular phone networks of base stations. As the number of cellular phone users of the operator's network increases, the network's antennas must be reconfigured. The higher the demand placed upon a network, the more cellsites are required. As more cellsites are put in, the area covered by the antenna needs to be reduced, so the beam needs to be tilted downwards to avoid signal distortion and interference within the cells. However, to change the angle of the beam manually presents problems for the operator.[6] The base stations transmit at considerable power levels, and to therefore avoid what Peter Graham described as the "cooking effect of electromagnetic energy", manually changing the beam's angle requires periodically shutting the station down – resulting in lost revenue and large wage bills. Furthermore, most networks have more than one operator, and therefore shutting down a station requires permission from the other operators.[7] Moreover, it is difficult to tilt the beam manually to the optimum angle. With Deltec's Teletilt system, the beam can be adjusted with electrical phase shifters, which increases precision in finding the optimum angle. This means there is no mechanical movement of the antenna externally, but the beam footprint moves. The beam is also adjusted *remotely*, which avoids the need to shut down the base station.[8] Jim Donovan, Deltec's current CEO, recently recalled hearing of telecommunication companies "in the US which are having to adjust their antenna once every 18 months or two years" – without Teletilt, readjusting antennas is "time-consuming and awkward".[9] Sometimes the adjustment is needed only for short periods. For example in the cell containing a major sporting event like the Westpactrust Stadium in Wellington, there is a huge

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5 'Deltec a specialist in niche marketing', Export News, 31 October 1994, p. 8.
6 'Wellington firm plans more global expansion', The Dominion, 15 June 1998, edn. 2, p. 2.
7 Peter Graham interview, 6 March 2001.
8 'Wellington firm plans more global expansion', The Dominion, 15 June 1998, edn. 2, p. 2.
9 'Deltec looks to Europe, China, US for growth', NZ Infotech Weekly, 24 October 2000, edn. 2, p. 3.

increase in cell phone density when the stadium has a full house of 40000 for a big match.

Innovation

Deltec now holds more than 60 patents or patents pending on its products, including the Teletilt.[10] Peter Graham started patenting with their first product – a coaxial filter – and this was reinforced after listening to Stuart Young of Interlock (then the CEO of the Wellington window hardware company) explain their reasoning for extensive patenting. This made sense to him, because like that company, Deltec was only differentiated from its competitors by its ideas and designs.[11]

Although some competitors have attempted to offer products similar to Teletilt, according to Jim Donovan "it's safe to say [Deltec is] the market leader".[12] Argus Technologies of Australia currently manufactures and sells remote-controlled antennas that allegedly infringe upon Deltec's intellectual property rights.[13] Deltec commenced legal proceedings in late 2000, and expects its case to be heard in the Australian Federal Court by the end of 2001.[14] As Jim Donovan stated, "we've consistently and openly stated that we will vigorously protect our intellectual property rights and protect the key elements of our technology from infringement by competitors".[15]

Deltec's products stand up to some of the world's harshest environments, such as Antarctica and the most rugged mountain ranges.[16] Furthermore, the company has developed a new antenna that can withstand wind speeds of 300 km/h. This has been delivered to customers in hurricane-torn Asian regions.[17]

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[10] 'Deltec Telesystems gains US patent', Deltec News, October 2000, (www.deltec.co.nz/news.html).
[11] Peter Graham interview, 6 March 2001.
[12] 'Deltec looks to Europe, China, US for growth', NZ Infotech Weekly, 24 October 2000, edn. 2, p. 3.
[13] 'Deltec confident of court success', Deltec News, March 2001.
[14] 'Deltec fights to protect intellectual property', Deltec News, November 2000, and 'Deltec confident of court success', Deltec News, March 2001. This case was settled out of court by Andrew Corporation who bought out the Teletilt technology in July 2001 q.v. postscript
[15] 'Deltec fights to protect intellectual property', Deltec News, November 2000.
[16] 'Export commendation', Newelectronics, August 1990, p. 6.
[17] 'New Teletilt antenna for high windspeed conditions', Deltec News, November 1999.

At Deltec there is a culture that values experimentation "that helps people go forward".[18] Peter Graham believes the cellular phone industry "is changing so rapidly … [that] we've got to be flexible thinkers to stay ahead".[19]

Deltec is committed to remaining the world leader in remote electrical downtilt antennas, and becoming a global supplier to the telecommunications industry. In achieving this, Jim Donovan hopes the company will be aided by a recently undertaken "massive expansion in production capability" and heavy investment in "research and development of new products".[20] Deltec spends $1.50 in every ten dollars on, and employs one-third of its permanent staff in research, product marketing, and development.[21]

Workforce

Deltec currently employs around 90 permanent staff, and have up to 100 contract staff depending on workload.[22] Core to the company's strategy is a "continued investment in our people and processes".[23] In November 2000, when Deltec won the "Investment in People Award"[24], Jim Donovan stressed how pleased Deltec was to receive the award, because it recognised the company's focus on recruiting, training and motivating a highly skilled team.[25]

Deltec also invests in its working environment. In a survey of 100 New Zealand organisations, Deltec was voted as one of the top 16 places to work. The company's staff members believe in the firm and enjoy the freedom they receive to do their jobs – not surprisingly, staff turnover is below 5 percent.[26] Jim Donovan believes Deltec's success owes much to its skilled workforce. He added "to attract such high-calibre people, we have created a challenging and exciting working environment." Deltec's

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[18] Peter Graham interview, 6 March 2001.
[19] 'Manufacturing – today's hot job option', Management, March 1995, p. 36.
[20] 'Deltec wins Supreme Hi-Tech Award for Excellence', Deltec News, November 2000.
[21] 'Wellington firm plans more global expansion', The Dominion, 15 June 1998, edn. 2, p. 2, and 'Strugglers, achievers highlight differences', The Evening Post, 17 November 1999, edn. 3, p. 2.
[22] 'Deltec looks to Europe, China, US for growth', NZ Infotech Weekly, 24 October 2000, edn. 2, p. 3.
[23] 'Manufacturing facilities upgrade', Deltec News, December 1998.
[24] 'Deltec wins Supreme Hi-Tech Award for Excellence', Deltec News, November 2000.
[25] 'Deltec wins Supreme Hi-Tech Award for Excellence', Deltec News, November 2000.
[26] 'IT firms top best employers' list', Computerworld, 4 December 2000, p. 12.

core values are summed up in seven words: fun, respect, innovation, service, quality, value and performance.[27]

Value chain

Motorola, Nokia, Ericsson and other huge telecommunications corporations stand between Deltec, the supplier of base station components, and Deltec's end-user customer, the network operator. Deltec cannot influence such large corporations, and instead focuses on convincing the operator that Deltec's components are the best. If convinced, the operator then demands that the big corporations incorporate Deltec's components into their overall offer.[28]

Deltec's primary sales pitch is the business case for its products, i.e. to pitch its sales in more commercial, as opposed to engineering, terms, when selling to operators.[29]. It believes it has a real advantage in its sales force's understanding of the telco business. It can then help the customer's engineers sell the product within their company on the strength of the business benefits of the superior performance capability of their Teletilt over a fixed antenna.

Markets

Deltec's turnover now exceeds $30 million a year, and has increased threefold since 1998. The company's success was recognised in November 2000, when it won the Supreme High Growth Award.[30]

Deltec exports 95 percent of its products.[31] The company's main customers are in the Asia-Pacific region, and include Telstra, BellSouth, Hong Kong's Hutchison Telecom and Excel Communication, and Deltec's Chinese distributor.[32] Deltec exports to

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[27] 'Deltec voted a top place to work', Deltec News, December 2000.
[28] Peter Graham interview, 6 March 2001.
[29] Peter Graham interview, 6 March 2001.
[30] 'Deltec wins Supreme Hi-Tech Award for Excellence', Deltec News, November 2000.
[31] 'Deltec looks to Europe, China, US for growth', NZ Infotech Weekly, 24 October 2000, edn. 2, p. 3.
[32] 'Wellington firm plans more global expansion', The Dominion, 15 June 1998, edn. 2, p. 2.

countries in every continent of the world, and plans to open new sales offices in USA, Brazil, China and Europe.[33]

The bulkiness of Deltec's product increases the already significant freighting costs involved in being a New Zealand-based exporting company. Deltec is, however, unlikely to open its own factories overseas, although it plans to contract out manufacturing and develop design relationships in North America and Europe.[34] Although there are companies trying to offer products similar to that of Deltec, as Jim Donovan observed, "it's safe to say we are the market leader".[35]

Telecommunications industry

The New Zealand telecommunications industry exports products to the value of about $400 million per year.[36] New Zealand exporting telecommunications companies are at a disadvantage because, unlike many of their overseas competitors, they do not receive significant governmental support. The Australian government, for example, might offer a cheap loan to a country on the condition that, in return, Australian companies receive 'most favoured' treatment in that particular market.[37] Peter Graham described New Zealand exporting telecommunications companies as operating in 'a minefield of risks'.[38]

The Asian market accounted for 28 percent of NZ telecommunications exports in 1997, and was growing at around 30 percent a year. Remaining competitive in a crowded market provides the main test for New Zealand telecommunications companies. They are unable to compete directly with the big international corporations, and so instead NZ telecommunications companies focus on specialised products for niche markets.[39]

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[33] 'Deltec wins Supreme Hi-Tech Award for Excellence', Deltec News, November 2000.
[34] 'Research burdens small firms', The Dominion, 1 September 1999, edn. 2, p. 19.
[35] 'Deltec looks to Europe, China, US for growth', NZ Infotech Weekly, 24 October 2000, edn. 2, p. 3.
[36] 'New Zealand firms to show wares at CommunicAsia '96', Export News, 13 May 1996, p. 1+.
[37] 'Answering a tough call', The Dominion, 12 June 1995, p. 6s.
[38] 'The Asian connection', The Dominion, 14 February 1994, p. 2s.
[39] 'Tough competitors at Asia Telecom '97', Export News, 30 May 1997, pp. 1 and 3.

YESTERDAY

The beginnings

Peter Graham had the urge to start a business from an early age. He gained his electrical engineering qualifications at the University of Canterbury and then began work for the Post Office. He was aware that many start-ups fail because the entrepreneurs underestimate the need for key people and a range of skills, so he teamed up, in January 1977, with another former Post Office electrical engineer, Roger Butland, and two mechanical engineers.[40] They initially worked from an old factory in the Wellington suburb of Rongotai, and serviced the mobile radio industry.[41] After two years, they realised their two mechanical engineering partners had little understanding of how Deltec might evolve. In what Graham likened to the break-up of a marriage, he and Butland bought the other two out. The remaining duo made a good team. Butland's analytical approach and skill in mathematics complemented Grahams's practicality and enthusiasm for customer contact and selling.[42] Butland focused on the engineering side, while Graham took the position of CEO, becoming more business oriented.

In some respects, Graham initially found going into business less exciting than he hoped as the need to acquire general managerial and selling skills took him away from his passion for the engineering side. He compared starting the business to having children, in that he found it very demanding. "You can put 24 hours a day in and that won't be enough and you can't acquire skills quickly enough to match the growth of the company itself."[43] Graham learned the necessity of hiring others, and the importance of establishing business systems in the company to enable it to grow. Compliance with Government regulations provided another source of complication for a start-up business. "If there's anything that drives you crazy it is when you start business one day, and then the next day you have an army of people coming through saying 'what are you doing?' … Having to acquire all that understanding [of

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[40] Peter Graham interview, 6 March 2001.
[41] 'Deltec's export growth leads to expansion', Export News, 30 May 1994, p. 15.
[42] Peter Graham interview, 6 March 2001.
[43] Peter Graham interview, 6 March 2001.

regulations] takes you away from the focus."[44] In addition, Graham felt he and Butland lacked a good understanding of manufacturing, and found "turning a product from an idea into something to manufacture … quite a challenge as New Zealand at that stage did not have a strong history of high technology manufacturing".[45] However, they had a good understanding of the New Zealand market, and their technical knowledge gave them the confidence and flexibility with which to steer the evolution of Deltec.[46]

The company's business within the first few years was a very challenging affair. The telecommunications industry of New Zealand was in its early stages of development and was heavily regulated. Government departments, such as the Post Office, Forestry, Railways and the Ministry of Works, were among the first in the country to create communications networks.[47] Business often came Deltec's way in the form of tenders from such departments, which generally gave firms around a month to develop a product and draw up convincing proposals. Such a short time period necessitated an understanding of market direction, and Deltec's ability to anticipate the tender before its offering was key to the company's success. In addition, Deltec was often developing the product as it was producing for the order. This was generally a successful but by no means ideal strategy.[48] Most years Deltec made a profit, but one year the company made a loss due to having too much product in stock. "We learnt that stock was a bad thing and [that we] should really make to order, always."[49]

Deltec decided early on not to compete with existing manufacturers in the mobile radio industry, of which there were many, and instead focused on a specialist area of the market – the antenna. The Post Office had monopolies on the radio base stations and provided frequencies for emergency and taxi services.

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[44] Peter Graham interview, 6 March 2001.
[45] Peter Graham interview, 6 March 2001.
[46] Peter Graham interview, 6 March 2001.
[47] 'Telecoms company grows with the industry', The Dominion, 29 April 1994, p. 18.
[48] Peter Graham interview, 6 March 2001.
[49] Peter Graham interview, 6 March 2001.

From struggle to salvation – mid-1980s to mid-1990s

On April Fool's Day 1986, Deltec lost the majority of its customers. With the deregulation of the New Zealand economy, and formation of nine state-owned enterprises, Deltec lost business with the Post Office, Railways, Forestry, and the Ministry of Works. The new state-owned enterprises were more cost-conscious, and began outsourcing their engineers and engineering advice. This afforded them less understanding of the quality of Deltec's products. "Suddenly they didn't know what to do. … The place went into slow motion."[50] The lowering of tariff barriers also hit Deltec hard, as it opened the market to imported products. The telephone system now came under the new state-owned enterprise Telecom New Zealand. One of its early market developments was to begin developing cellular radio networks in New Zealand. At that stage Deltec had no experience in cellular radio and the new technology initially left them "out in the cold".[51]

So after the shock of 1986, Deltec's potential sources of business were from Telecom New Zealand and Telecom Australia, but they were hard markets to crack. Before the Australia-New Zealand Closer Economic Relations trade agreement that was signed in 1983, the Australian Federal Government (including Telecom Australia) favoured Australian suppliers. After the NZ Post Office was split, Telecom New Zealand, with its outsourced engineers, tended to favour turnkey solutions. "They wanted proven systems in a new technology and no risk".[52] However as Deltec had no track record of a proven product in a new technology to offer Telecom, they found that the cellular radio market had a huge entry cost. It took several years for Deltec's potential customers to gain confidence in their technology and give the company a chance. During that time, Deltec survived by selling mobile radio products.[53]

Although the company's technical ability was not in question, its lack of experience in the new technology made potential customers hesitant. Deltec leapt the large entry hurdle to the cellular market by licensing a product from a European company.

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[50] Peter Graham interview, 6 March 2001.
[51] Peter Graham interview, 6 March 2001
[52] Peter Graham interview, 6 March 2001.
[53] Peter Graham interview, 6 March 2001.

Although the licensed product was actually only a prototype, its European origin gave it the credibility of a proven product, and allowed Deltec to gain acceptance in the Australian market.[54]

Deltec's salvation came in 1989, when it won a deal with Telecom Australia (now Telstra). The Australian telecommunications company had not experienced the same degree of deregulation and commercialisation as its counterpart across the Tasman Sea, and consequently retained its engineering focus, making it more amenable to an appreciation of Deltec's products. Deltec won the tender by designing an electrically adjustable down-tilt antenna, which later became the company's niche in the market.[55] Operators in Hong Kong were making similar requests in their tenders, which specified the need for down-tilt antennas.[56] Although many manufacturers were already producing mechanically adjustable antennas, such products spread the beam outside of the coverage area creating an overlap, which adversely affected the frequency planning and capacity of operators. Aware of its stringent specifications, Telecom Australia opened the tender to offers from anywhere in the world. Deltec's solution was to offer stepped electrical adjustment, which avoided the pitfalls of mechanical tilting. While not technically sophisticated, the down-tilt was ingenious because it enabled the operator to alter the direction of the beam with a simple change of cables at the back of the antenna.[57] Deltec won the tender not on price, but on reliability, quality, and quick delivery and service.[58]

The deal with Telecom Australia sparked Deltec's first significant growth spurt, in which sales quadrupled in two to three years. Furthermore, Deltec's staff increased in 1990 from 36 to 60 to meet the increased demand.[59] 1990 was a very difficult year for manufacturers in the telecommunications industry, but Deltec's deal with Telecom Australia enabled the company to avoid the worst of such hardship.[60]

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[54] Peter Graham interview, 6 March 2001.
[55] Peter Graham interview, 6 March 2001.
[56] Peter Graham interview, 6 March 2001.
[57] Peter Graham interview, 6 March 2001.
[58] 'Major Australian contract', Export News, November 1989, p. 41.
[59] 'Wellington – success hard won', Newelectronics, April 1990, p. 30.
[60] Peter Graham interview, 6 March 2001.

Most of Deltec's competitors produced what Graham refers to as the 'vanilla' product: a plain, standard product designed to compete on delivery and cost. Deltec instead convinced Telecom Australia to purchase their higher priced, but higher performance product, which has since proven a key strategy to the company's success.[61] Deltec developed teaching aids to demonstrate to potential customers the benefits offered by the electrical down-tilt antenna. Although Deltec initially struggled to convince operators of the product's superiority, the niche product rapidly became the standard. As Deltec's competitors began producing similar products, electrical down-tilt antennas soon became almost mandatory in the Australasian market.[62]

Rejuvenation and expansion into Asia

Although Deltec had been selling to Taiwan, Hong Kong, and the Philippines for a number of years, the push into Asia was not a major focus until the early-nineties.[63] The company employed some native Chinese-speakers, and one of them became their agent in Hong Kong to launch into the China market. The company's distance from Asia proved a considerable problem, but Deltec was generally faster at getting its products to market than were its competitors.[64] The company secured significant business in Malaysia and Thailand in 1994.[65] That same year, Deltec leased a building across the courtyard from the original factory, and in doing so doubled its production area.[66] In 1995, the company increased its staff numbers from 90 to 150 employees.[67] By that year, Thailand had overtaken Australia as Deltec's biggest market.[68] By the mid-1990s, Deltec's sales growth began to level off, and the company was in need of reinvention and rejuvenation and Graham recognised the need to change quickly and strengthen management while the company still had forward momentum. In 1994, Jim Donovan became a non-executive director, although he had first become involved with Deltec in 1989 as an occasional consultant.

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[61] Peter Graham interview, 6 March 2001.
[62] Peter Graham interview, 6 March 2001.
[63] 'Wellington – success hard won', New Electronics, April 1990, p. 30.
[64] Peter Graham interview, 6 March 2001.
[65] 'The Asian connection', The Dominion, 14 February 1994, p. 2s.
[66] 'Deltec's export growth leads to expansion', Export News, 30 May 1994, p. 15.
[67] 'Hardware edges out software', The Independent, 10 March 1995, p. 12, and 'Antennas spell success', The Evening Post, 15 March 1995, edn. 3, p. 1.
[68] Peter Graham interview, 6 March 2001.

Deltec in crisis, 1996 and 1997

In 1996, the Thai economy collapsed, and with it went Deltec's biggest customer and $6 million in sales – one third of the company's turnover. The collapse in Thailand sparked the Asian crisis, which caused further damage to Deltec's sales. That same year, the company's presence in the Australian market contracted significantly, and the New Zealand dollar went up to US70 cents.[69] Jim Donovan described Deltec's business in South East Asia before the crisis as "very spotty", characterised by "a contract here or there".[70] According to Donovan, the most important factor in Deltec's loss of sales was not the Asian crisis, but was instead the arrival of strong European and North American competition.[71] By 1997, Deltec had installed its antennas in cellular networks in India and China.[72] However, the tide had already turned and Deltec was selling at a loss.[73]

There had been a number of factors at play. In 1995 Deltec had released the Teletilt, which was an improvement on the down-tilt antenna of 1989 because it could be adjusted remotely, and therefore enabled the operator to avoid shutting the base station down. Deltec's Teletilt was technically superior to the products of most European and North American rivals, in that many companies offered non-remotely adjustable antennas. However, by 1996 the foreign products were becoming much smaller and much, much cheaper. It was standard practice for such products to set the price point for the market place, and for Deltec to price their technically superior product relative to that price point. Deltec's price could not be too much more expensive than the 'vanilla' product. The introduction of cheaper products in 1996 made Deltec's Teletilt three to four times more expensive than the 'vanilla' product, rendering the Teletilt a less attractive option, regardless of its technical superiority.[74]

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[69] Peter Graham interview, 6 March 2001.
[70] Jim Donovan interview, 16 March 2001.
[71] Jim Donovan interview, 16 March 2001.
[72] 'Deltec and Motorola boost India launch', Deltec News, October 1997, and 'Deltec customer wins award', Deltec News, December 1997.
[73] 'Wellington firm plans more global expansion', The Dominion, 15 June 1998, edn. 2, p. 2.
[74] Jim Donovan interview, 16 March 2001.

Furthermore, the North American and European competition had technical superiority in other areas. Their cheaper products were dual polarised, which means one antenna was being placed within another to increase capacity without increasing physical size. Moreover, such products were half the size of Deltec's Teletilt, which is important to operators for reasons of visual impact, wind loading and mast strength.[75] The operators wanted to maximise the number of customers they could deal with in a cell, and they were also beginning to share cell antenna sites. Deltec was in trouble.

Peter Graham was approaching his mid-fifties, and concluded that the energy required as a CEO to turn Deltec around was beyond him. "It's already been 21 years and it's been quite exhausting."[76] Graham was aware that Donovan was planning to leave his partnership in Ernst and Young and move to Australia. He thought it would be bad to lose Donovan as his skills in marketing, sales and business processes complemented those of Graham's and together they had good synergies. Graham also realised that succession was necessary at some point and knew how hard it would be and how long it could take to find someone else who knew the business as well as Donovan. Prior to a business trip to Europe in October 1997, Graham realised it was now or never with Donovan. So on the way back from what had been a successful trip, Graham asked Donovan whether he would accept the position of CEO of Deltec. Prior to his becoming a partner at Ernst and Young, Donovan had been CEO of, and responsible for the turnaround at Electra, formerly the Horowhenua Electric Power Board. By the time their aircraft touched down at Auckland airport, he had accepted.[77] Graham made way for Donovan by moving to the position of Deltec's executive chairman.[78]

Jim Donovan takes the reins, January 1998 to present

As the new CEO of Deltec, Jim Donovan had his work cut out for him. He challenged Deltec's management to come up with what Peter Graham describes as a "big, hairy, audacious goal". They settled on three things. They intended to be a global player; they would invest heavily in research and development to produce products for the international market, and Deltec's management committed the company to a vast

[75] Jim Donovan interview, 16 March 2001.
[76] Peter Graham interview, 6 March 2001.
[77] Jim Donovan interview, 16 March 2001.
[78] 'Appointments', The National Business Review, 5 December 1997, p. 56.

increase in turnover to finance the necessary R&D budget. They envisaged Deltec being a $100M company in five years – roughly the size of Tait Electronics.[79]

However, in the short term, the company's reduced sales necessitated some hard decisions, involving redundancies and corporate restructuring. "We had to break relationships with people that had served us for quite a long time in order to survive."[80] Donovan had to let around one-third of Deltec's staff go, including a considerable number of managers. He felt there was an unusually high ratio of managers to workers. Donovan also felt that the competence of Deltec's staff lay more in mobile radio, which was not the desired direction for the company, and he therefore made a conscious effort to recruit production engineers and managers who knew the cellular phone business.[81]

Before Donovan took over, Deltec's organisational structure matched with the standard model of a collection of separate functional departments.[82] When he became CEO there were 36 different designs in the pipeline, and each of Deltec's separate departments contributed a little to each of these designs, but none were directly responsible for the development of any one of the company's products. "You had everybody working on everything … all of whom reported to different bosses."[83] Donovan therefore reshaped Deltec into a more process-oriented structure.[84] He assigned around five team members to each development team, and gave each team the responsibility of developing some products, but not others. The plethora of designs posed another problem in that they were creating a huge logjam. Furthermore, the majority of the designs, while technically competent, were uncompetitive in cost and catering to the "dying part of the market – the sub-500MHz mobile radio[85]". The

[79] Peter Graham interview, 6 March 2001.
[80] Peter Graham interview, 6 March 2001.
[81] Jim Donovan interview, 16 March 2001.
[82] Peter Graham interview, 6 March 2001.
[83] Jim Donovan interview, 16 March 2001.
[84] Peter Graham interview, 6 March 2001.

[85] The 500MHz band has never been used in NZ. The 800MHz band uses the US standards (ANSI) - AMPS/PCS. In New Zealand, the 800MHz band is either digital or analogue. Telecom New Zealand uses both the A and B band in the 800MHz AMPS band. It is split into two as most countries don't let one operator have the entire AMPS spectrum. The NZ Government has allowed it as competition comes from the GSM technology. The 900 and 1800MHz bands are GSM (Europe standard - ETSI) bands. GSM is a digital standard only. The lower the carrier frequency the better the propagation of

newer GSM digital networks operated at 900 and 1800MHz respectively. The next generation (the so-called 3G) would operate at 2100MHz. Each doubling of frequency made the manufacturing task more challenging as the tolerances halved, and this also contributed to product cost. Jim Donovan moved to cut the new product development projects from 36 down to seven over the next two years, and to kill off the sub-500MHz products that were 80 percent of the product range but only 5 percent of sales, thus freeing up the company's resources.[86]

Deltec also had to lower the price of the Teletilt, as it was not competitive with the cheaper fixed tilt antennas. The team responsible for designing a cheaper Teletilt approached their task with a certain attitude, to which Jim objected. "I said, 'what's this CNA team?' And they said, 'cheap and nasty antenna team'. I said … 'you've got a new name. You're now called the EYE team. … Elegant yet economic!' Then they got it. … It's got to be well designed, high quality and it's got to be low cost at the same time."[87] The project team's attempt to drive down the cost of the Teletilt was successful. "Now they're on a roll. They keep coming up with better and better ideas."[88] The Deltec technology had remained largely unchanged since 1995. The new ideas included more use of printed circuit boards, which reduced the amount of wiring harness, and ideas to reduce the size of components. In early 1998, a dual polarised antenna came to market. The initiative to take cost out of the products was bearing fruit and the company was able to cut its price point.

To reinforce the Teletilt's competitive advantage, Deltec recruited a team of control systems engineers. The Teletilt's control system distinguished it from competing products, in that the antenna was remotely adjustable. However, the remote control was not cost effective and it looked clunky. Donovan stipulated that the new remote control for the Teletilt had to be "small, cost effective, and … look like it's part of the high-tech era of today. … They've come up with some brilliant stuff".[89]

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the signal. Higher frequencies are used to increase the total cell capacity. This is good because in a dense user area (i.e. a CBD) signal propagation is only a city block.

[86] Jim Donovan interview, 16 March 2001.
[87] Jim Donovan interview, 16 March 2001.
[88] Jim Donovan interview, 16 March 2001.
[89] Jim Donovan interview, 16 March 2001.

Global expansion

When they set their "hairy, audacious goals", the company felt they had too much market risk and needed to be in more markets. In New Zealand the market was fairly static, though Australia was growing. In South East Asia, the Thai market had only boomed for one year. Deltec wanted to be in about 10 markets.

The company had a Chinese-speaking sales support engineer in China, who, in early 1998, insisted there were huge opportunities for Deltec in the Chinese market. Deltec assigned him as an agent to the company, and their success was "beyond our wildest dreams. We never realised it would grow so fast and be as big".[90] By June 1998, Deltec was closing a million dollar deal in China every two months, and had secured almost 20 percent of the Chinese cellular antenna market.[91] As with Telecom Australia in 1989, China was Deltec's salvation.[92]

Armed with a leaner Teletilt and a growing business in China, Deltec embarked upon a campaign of dramatically expanding its overseas markets. Ever since Donovan first met Deltec in 1989, he felt that the company was managed too cautiously in its push for markets – "they should just have moved a hell of a lot faster".[93] The new strategy was to focus on the four major economic regions of the world: Western Europe, North America, southern South America (Chile, Argentina, and especially Brazil), and East Asia (ASEAN countries, China and Australasia).[94]

As part of the increased overseas focus, Deltec changed its pricing from New Zealand to United States dollars for all its customers, except those in Australasia. Buying Deltec's products with New Zealand dollars previously required the company's customers to "get involved in customs and foreign exchange contracts and they [didn't] want to know about that".[95] Another obstacle between Deltec and its customers was the name of the company: Deltec New Zealand Ltd. The standard

[90] Jim Donovan interview, 16 March 2001.
[91] 'Deltec in demand', Export News, 22 June 1998, p. 14, and 'Wellington firm plans more global expansion', The Dominion, 15 June 1998, edn. 2, p. 2.
[92] Jim Donovan interview, 16 March 2001.
[93] Jim Donovan interview, 16 March 2001.
[94] Jim Donovan interview, 16 March 2001.
[95] Jim Donovan interview, 16 March 2001.

reaction from customers was "that's a long way away, a bit small. They don't really do technology, it's sort of sheep and bungee jumping, stuff like that".[96] The company changed its name to Deltec Telesystems to avoid this problem, and to create a stronger association in the customers' minds between the company and its leading product – the Teletilt.[97]

The heart of cellular technology was in Europe and the United States, which were also the biggest markets. Furthermore, Deltec's big customers, such as Motorola and Nokia, were saying "we like your product, but you've really got to be global if you're going to be a global partner for us. We can't keep dealing with you in New Zealand. You've got to be in the markets with product available".[98]

While Deltec had a good year in 2000, their global expansion was a bumpy ride. Deltec had chosen EMS to be its distributor in America, and Huber and Suhner to be its European distributor.[99] In America, the general manager of EMS and his product marketer were initially very interested in Deltec's products. However, when EMS's parent company got into trouble it was assigned a new senior management team, which "completely cheesed everybody off", and the two people interested in Deltec's products left the company. Deltec then closed off its distributorship with EMS and began selling to America directly, opening a sales office in Chicago. The move met with much success, and according to Donovan: "America's going to be a great market for us".[100]

Deltec's European distributor was also a disappointment. Huber and Suhner's selling approach was not suitable for the Teletilt. The European distributor instead competed with the 'vanilla' products on price. Furthermore, Huber and Suhner were in what Jim Donovan describes as "the commodity game", in which "the customer tells them the [individual] product [needed] and … they just quote. So they're order takers. … They're not selling a solution".[101] Deltec learned the lesson of Huber and Suhner's failure to sell the Teletilt in Europe. They have decided to sell directly in Europe with

[96] Jim Donovan interview, 16 March 2001.
[97] Jim Donovan interview, 16 March 2001.
[98] Jim Donovan interview, 16 March 2001.
[99] Jim Donovan interview, 16 March 2001.
[100] Jim Donovan interview, 16 March 2001.

their approach that seeks to understand the business issues for the network operator and sell them a solution, a system-selling approach. They are considering opening a sales office in Maastricht.[102]

The market in India turned out to be a "fizzer", and in South America they were getting "dribs and drabs" according to Donovan, but they had built up good relations with the big systems companies and "the Motorola and Ericsson engineers [in those countries] love our product."[103]This linkage was important to ward off competition from the biggest antenna companies, Kathrein (Germany) and Andrew (USA).

TOMORROW

Deltec has recently been building its development team to increase product development for the antenna management system. Furthermore, Deltec is broadening its product range, "because now we're very tightly defined".[104] The company is redirecting its filter business to sell alongside the Teletilt.[105] Under Donovan's leadership, Deltec had tripled sales in 3 years to over $30M. The aim is still to be a $100M company in 3 to 5 years by investing for growth in the sales team, the R&D team and by developing their facilities.

The company hopes to have a contract-manufacturer producing Deltec's goods in China, for that market, by the end of the year. Long term, Deltec hopes to be producing predominantly offshore, and to retain New Zealand manufacturing for producing prototypes and launching production.[106]

Donovan summed up the issues as he saw them at the beginning of 2001. "There are potentially 200 customers worldwide and we've been dealing with just 10, so we have a small customer base and too limited market spread. This means we face very lumpy demand. New Zealand is not our target market because it's built out with antennas and doesn't have the dense urban populations. In Australia, Telstra is built out and the

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[101] Jim Donovan interview, 16 March 2001.
[102] Jim Donovan interview, 16 March 2001.
[103] Jim Donovan interview, 16 March 2001
[104] Jim Donovan interview, 16 March 2001.
[105] Jim Donovan interview, 16 March 2001.

others have stopped till the Optus situation is resolved. China has gone quiet on us, as they are trying to conserve foreign exchange, and other markets are one-off orders. So we're very narrowly focused in our markets. If we are to grow as planned then we have a need for capital and the question is where is it going to come from? Typically, the options for a high tech company appear to be a strategic partner, a venture capital shareholder, or a stock market listing. Nevertheless, right now we need external funding to support our growth."[107]

The opportunities for Deltec seemed huge as the operators worldwide were looking to rollout the third-generation (3G) cell phone technology. The operators were planning to use this spectrum for high-speed data (2Mb per second) and multi-service networks. The first AMPS (800 MHz and 1900MHz) network had taken 12 years to build, the GSM network (900 or 1800MHz) had taken 3 years and it was estimated that the 3G network (2100MHz/2GHz) would be done in two years.

[106] Jim Donovan interview, 16 March 2001.
[107] Jim Donovan interview, 16 March 2001.

POSTSCRIPT

Media Release NZ version

Wellington New Zealand 10:30 am, 20 July 2001

Deltec sells Teletilt business to Andrew

Wellington hi-tech manufacturer Deltec Telesystems International announced today that it has agreed to sell its Teletilt™ sales and development divisions to Andrew Corporation of Orland Park, Illinois. The asset sale has Andrew taking over Deltec's product development facility at Todd Park, Porirua, together with intellectual property and other assets.

"The Andrew deal means our Teletilt technology can really take its rightful place in the global mobile telecommunications market," said Deltec chairman and co-founder Peter Graham. "We didn't have the scale or market reach to do it on our own, but Andrew does. We share a similar vision and values, and this deal means a more expansive future for our sales and development staff."

Andrew Corporation's strategy is to take Teletilt's patented Remote Electrical Downtilt antenna technology, integrate it into their existing RF subsystem product portfolio, and establish Andrew as a leader in the global rollout of 3G networks. . According to Jim Giacobazzi, Andrew Corp.'s vice president, Antenna Products, Andrew plans to develop the Wellington facility into a world-wide centre of excellence for advanced antenna systems that will complement their existing product set.

The Teletilt™ range provides mobile phone network operators with sophisticated base station antennas, which can be remotely reconfigured to handle changing network demand. Deltec has in recent years built a strong market position with this technology in Australasia and Asia. Last year it was named New Zealand's Hi-Tech Growth Company of the Year and the winner of New Zealand's Supreme Hi-Tech Award.

In a related but separate move, Deltec CEO Jim Donovan signalled the probable close later this year of its manufacturing operation in Tawa. "We have indicated for some time the likely shift towards offshore manufacture," said Mr Donovan. "We had hoped to keep a limited-scale assembly operation going here. But with over 95% of production being exported, the realities of scale, distance and tariffs mean it doesn't add up any more." Subject to how many people transfer to Andrew and the outcome of staff consultation on other alternatives, approximately 45 permanent jobs are expected to eventually go. Deltec Telesystems International Ltd will change its name to Delex International Ltd.

Press Release

Andrew and Argus Announce Licensing Agreement

ORLAND PARK, IL. . . .October 19, 2001 . . . Andrew Corporation (NASDAQ:ANDW) and Argus Technologies (Australia) Pty Ltd. announced that they have entered into a licensing agreement on the use of Andrew Corporation's remote electrical downtilt technologies and that the court dispute between Deltec Telesystems International and Argus Technologies has now been fully resolved.

Andrew Corp. acquired selected assets of Deltec Telesystems International, Ltd. of Wellington, New Zealand, in July 2001. This acquisition brought to Andrew the assets of Deltec Telesystem's International Teletilt™ sales and development division including Teletilt™ intellectual property, which is the enabling technology for remotely adjustable electrical downtilt antennas.

"Andrew has a formidable intellectual property position regarding remotely adjustable electrical downtilt antennas that is fundamental to the deployment of third generation cellular networks. The agreement with Argus signifies the strength and value of our enabling technology," said Jim Giacobazzi, VP Base Station Antennas, Andrew Corporation.

Andrew Corporation's PerforMax™ base station antenna with TeleTilt™ variable electrical downtilt system.

Andrew Corporation is a global supplier of communications systems equipment and services. Major markets are wireless communications - which includes cellular, personal communications services, and land mobile radio - broadcast, and common carrier. Andrew is an S&P 500 company whose common stock trades on The Nasdaq Stock Market ® under the symbol: ANDW.

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PerforMax and Teletilt are trademarks of Andrew Corporation.

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