



Portfolio Spotlight

TriVirix International, Inc.

Outsourcing Manufacturing Divisions in the Medical Device Industry

Rich West and Michael Labriola started TriVirix International, Inc., a contract manufacturer of complex electronic medical devices and biotech equipment, to tap into a virtually untouched niche in the medical technology industry. Shortly after founding the company in 1998, the two raised an initial seed round of \$600,000 from The Aurora Funds. The company has made strong progress this calendar year; it has received purchase orders for over \$19 million.



Rich West

Michael Labriola

“Medical devices must be exactly right, and they must work every time,” said West. “Medical technology companies feel they must control the quality of every item they produce.” This means many device makers are reluctant to out-source production. Unfortunately, most medical device companies have more expertise in design than in manufacturing, so their manufacturing processes are often quite inefficient.

West and Labriola, both veterans of the electromechanical device industry, saw an opportunity to combine the manufacturing strategy and quality control required to improve operations with an open-book policy of information sharing necessary to instill customer trust. The result was contract manufacturing services that were faster and more cost-effective while achieving the same or higher quality as in-house operations.

How do they do it? First, they design better manufacturing and quality assurance processes that move the line faster without sacrificing device quality and performance. Then they layer that with a system that integrates all the production information for a product, from costs and production status, to inventory status and quality control. This information is easily accessible by customers, who can check on production in real time via TriVirix’ Net-based proprietary customer information portal, AllianceNet®.

“We essentially become their manufacturing division,” said West. “Companies are likely to have more information on the manufacturing status faster by outsourcing to us than by using their own manufacturing facilities because we integrate and centralize the information.”

TriVirix also boasts a thorough understanding of regulatory issues and the medical device market, with both FDA registration and ISO 9001 certification. TriVirix employees have handled regulatory issues for many companies; West previously led ISO 9001 registration for a 1,200-employee plant.

Among the company’s growing customer base is Natus Medical, another Aurora Funds portfolio company. “Natus becoming our first customer was not a coincidence,” said West. “Our relationship with Aurora has opened opportunities with their portfolio companies.”

In addition to providing seed capital, The Aurora Funds led a \$3.5 million second round of financing in 2000 and was the largest investor in a \$12.0 million third round in July 2001. Proceeds from the latest round are being used to build the team, fund rapid growth and as working capital. TriVirix’ management team plans for the company to become profitable sometime in 2002.

“TriVirix has addressed a common problem in a highly fragmented multi-billion dollar market,” said Jeff Clark of The Aurora Funds. “We intend to build a large and successful company.”

Research Triangle Park, NC:
Scott Albert ♦ Jeff Clark
Rich Brown ♦ Doug Gooding
2525 Meridian Parkway, #220
Durham, NC 27713
(919) 484-0400

Birmingham, AL:
Will Brooke ♦ Tim Taylor
One Riverchase Parkway, South
Birmingham, AL 35244
(205) 987-5582

Natus Medical Goes Public

California-based Natus Medical, Inc. (NASDAQ: BABY), a medical device company focused on the development and manufacturing of non-invasive, proprietary medical devices designed to rapidly screen for common, well-defined disorders in newborns, made an initial public offering of its common stock on July 20, 2001. The deal, led by Dain Rauscher Wessels, First Union Securities and Adams, Harness & Hill, offered 5 million shares priced at \$11 per share. Natus plans to use the proceeds to fund expansion, boost research and development for new products, and to acquire complementary businesses, products or technologies.



Natus's CO-Stat End Tidal Breath Analyzer

Natus’s products allow physicians to test for hearing impairment and jaundice in newborns much sooner than other screening methods. The company is also researching and developing devices for monitoring conditions that afflict infants prior to birth, including pre-eclampsia.

Impaired hearing is believed to effect up to five babies per 1,000 newborns in the United States. “Screening every baby for hearing loss, rather than only those at high risk, is now the standard of care in the United States,” said Tim Johnson, CEO of Natus. The Company’s ALGO® Newborn Hearing Screener uses Natus’s AABR automated auditory brainstem response technology to screen the hearing of newborns hours after birth. Unlike other hearing screens, the ALGO Screener can be used only a few hours after birth and provide accurate results.

Jaundice affects nearly two-thirds of all newborns and is the single largest cause for newborn hospital readmission. Natus’s CO-Stat® End Tidal Breath Analyzer is the only device that passively and non-invasively enables doctors and nurses to screen for and monitor the rate of bilirubin production in babies, a major factor in understanding the disease state of neonatal jaundice babies. With this device, the number of newborns with jaundice released from hospitals will drop dramatically.

The Aurora Funds invested in Natus in 1998. “Aurora takes a deeper, longer view than many of the venture capital firms I’ve worked with,” said Dr. Bill New, Chairman of Natus. “They understand the challenges you face in growing a company, yet they aren’t afraid to step in and offer a good dose of reality to the entrepreneur.”

Though Aurora generally focuses its investments in the southeastern U.S., Aurora General Partner Jeff Clark says, “We won’t limit ourselves if we see a company outside the region that is a good investment opportunity and a good fit with our portfolio. Natus was one of those companies.” In addition to Natus, Aurora has invested in California-based ViroLogic (NASDAQ: VLGC)], which went public in May 2000, and privately-held Nexan, based in the United Kingdom.

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Aurora Companies in the News

Blackboard Inc., a software infrastructure company for e-Education, exceeded top line growth projections for Second Quarter ending June 30th, 2001, with total second quarter revenues of \$13.5 million. The revenues represented a 45% increase over first quarter revenues of \$9.3 million and a 480% increase year-over-year. Blackboard's e-Learning solutions are used at more than 3,000 institutions in 140 countries.



TriVirix International, a manufacturer of complex electronic and electromechanical medical device and biotech equipment headquartered in Chapel Hill, N.C., closed on \$12 million in July 2001. The Aurora Funds was the largest investor and had led the two earlier rounds of financing for the company. Frontier Capital and Envest Ventures co-led the round, which included new investors Thompson Clive & Partners, SHV Capital Ventures, Charlotte Angel Partners, and Tri-State Investment Group. All of the company's other previous investors participated as well, including Coastal Growth Partners, Cordova Ventures, Enterprise Equity and Crescent Capital.



Unitive Inc., a manufacturer and developer of wafer-level packaging solutions, promoted Ken Donahue to the position of CEO in August 2001. Donahue, previously the company's CFO, replaces Wayne Machon, who retired in August. Unitive announced the qualification of its wafer bumping technology for use in Amkor Technology's (Nasdaq: AMKR) flip chip product family, and for use in Xilinx, Inc.'s (Nasdaq: XLNX) production of its eutectic wafer bumping technology.

Porivo Technologies, a provider of end-to-end Web performance testing products, launched peerReview Transaction in September 2001. PeerReview is the first service that can measure the speed of complete, multi-page user sequences from the edge of the network, capturing all of the latencies introduced in the dynamic "last mile" of the Internet.



Nexan, Inc., a medical device company, received FDA 510k clearance for commercial distribution in the U.S. on September 4, 2001. The ClearPath System records and analyzes cardiac and pulmonary vital signs data, giving patients an unprecedented level of comfort and mobility due to the proprietary Sensor design and wireless technology.

Xanthon Inc., signed its first diagnostic collaboration agreement in August, 2001. The agreement was formed with Chiron Corporation to explore the development of a system to detect the presence of infectious agents in clinical samples utilizing the patented Xanthon technology and Chiron's proprietary nucleic acid sequences. In July, Xanthon obtained a worldwide license from Xenometrix, Inc., a wholly owned subsidiary of Discovery Partners International, Inc., (NASDAQ: DPII) for access to gene expression profiling claims in United States and European patents.

Aurora Investment Team In The Community

Jeff Clark has been named to the steering committee of the capital campaign for the Council for Entrepreneurial Development's *From Innovation to Impact* program. The \$10 million, five-year program includes a campaign to raise \$4 million to supplement existing CED revenues, as well as income generated from the CED endowment. Jeff also served on the panel for CED's *Biotechnology Roundtable: The State of Venture Capital in Biotechnology*, which focused on the current climate for venture investing and what to expect from venture capitalists who have been active in the regional biotech market.

Doug Gooding is active with area business schools, serving as a guest lecturer at Kenan Flagler Business School for its panel on *Entrepreneurship in the Biotechnology Industry*, and on a venture panel for the Entrepreneurship and Venture Capital Club Symposium at Duke University's Fuqua School of Business.

Rich Brown is a member of the CED *Capital Connections* Advisory Team. The 11-member team, which is composed of angel and venture capital investors, helps applicant companies identify CED programs that will uniquely suit their business needs, reviews their business development and funding progress, and provides ongoing mentoring and direction. Rich was a speaker for a session of CED's Entrepreneurial Symposium with Max Wallace, CEO of Aurora's portfolio company **Cogent**.

Portfolio Talk A Burgeoning Niche in Semiconductors



Unitive, Inc., a manufacturer and developer of wafer-level packaging that makes semiconductors smaller, faster and lighter, is reaping the benefits of the growing opportunity for its flip chip bonding process.

While the overall market for semiconductors is softening, consumer demand for mobile phones, laptops, personal digital assistants is actually creating a growing market for smaller, more robust semiconductors using flip chip bonding. In fact, Merrill Lynch predicts that the flip chip market will grow from \$1.5 billion in 2001 to \$10.5 billion in 2005.

"The recent downturn in the semiconductor market, caused by slackened demand in the midst of excess supply has hurt us as well as the rest of the market," said Ken Donohue, CEO of Unitive. "However, as our customers turn to flip chip as a packaging solution that enables their next generation of leading edge products, we expect to lead the early stages of the overall recovery of the semiconductor market. While there is excess capacity within the semiconductor market, there is limited supply of wafer-level packaging solutions." Unitive's growing customer list includes Amkor Technology, the world's largest provider of contract microelectronics manufacturing solutions, and Xilinx, developer of some of the most advanced platform FPGAs in the industry. Amkor is also a licensee of Unitive's technology.

Funding History

May 1998
\$11 MM First Round Funding
Investors: The Aurora Funds, N.C. Technological Development Authority, Trans Atlantic Technology Investment Fund and North American Fund

February 2001
\$30 million Second Round Financing
Lead Investor: Onex Corporation.
Other Investors: Celestica Inc., Conexant Systems, Inc., Fairchild Semiconductor International, Inc., Flextronics International LTD, MCNC and Trans Atlantic Technology Investment Fund

Wafer-level packaging involves creating the package that encapsulates the chip, or die. The packaging allows communication with the outside world while the die are still on the wafer. Flip chip bonding makes the electrical connections between a chip and an integrated circuit. The traditional process, called wirebonding, uses sewing machine technology to attach wires to the bond pad of the integrated circuit and packaging of the chip. This process limits the number and size of the wires needed to increase the speed of a semiconductor. Wirebonding can only be done after the wafer has been diced into individual chips. Unitive's flip chip builds the last layer of the chip using metal bumps to connect directly to the integrated circuit and the packaging by "flipping" the chip upside-down, eliminating the wires created by wirebonders.

The initial work for Unitive's wafer-level packaging process was conducted by MCNC, a non-profit electronics and information technologies research and development corporation. MCNC saw the strong commercial potential for the technology and spun Unitive out as a new corporation in 1996. "Our relationship with MCNC gives us a tremendous research advantage in the industry," said Donahue. MCNC continues to be a major shareholder in Unitive, which has first right of refusal on new MCNC technology.

Most recently, Unitive raised a \$30 million round of financing from financial strategic investors. "This strategic round represents a crucial step in our development," said Donahue. "We plan to work closely with our strategic investors, who are also important customers, to provide them with high quality products and services on a long-term basis." Unitive plans to use the proceeds from the round to expand its manufacturing capabilities, including building a facility in the western United States capable of quadrupling its production capacity to 400,000 wafers per year.

"Unitive's management team has incredible knowledge of the space," said Aurora General Partner Scott Albert. "Their prior experience with semiconductor giants like IBM, Mitsubishi, MCNC, Data General, Zevatech and Kyocera America, Inc., gives them the foundation to make Unitive a leader in the market."

Information Technology		Life Sciences	
Alerts, Inc. www.alerts.com	MicroMass Communications, Inc. www.micromass.com	Cogent Neuroscience, Inc. www.cogentscience.com	Nobex Corporation www.nobexcorp.com
Blackboard, Inc. www.blackboard.com	Mobile-Mind, Inc. www.mobile-mind.com	Emageon, Inc. www.emageon.com	Norak Biosciences, Inc. www.norakbio.com
Broadband Home, Inc. www.broadbandhome.com	Porivo Technologies, Inc. www.provio.com	Insect Biotechnology, Inc. www.insectbio.com	Stemco Biomedical, Inc. no web site available
Engenia Software, Inc. www.engenia.com	psiloQuest, Inc. www.psiloquest.com	Merix Bioscience, Inc. www.merixbio.com	TriVirix International, Inc. www.trivirix.com
Foresight Corporation www.foresightcorp.com	Technauts, Inc. www.technauts.com	Natus Medical, Inc. www.natusmed.com	United Emergency Services, Inc. www.unitedemergency.com
Gadgetsplace, Inc. www.gadgetsplace.com	Unitive Electronics, Inc. www.unitive.com	Nexan, PLC www.nexan.com	Xanthon, Inc. www.xanthon.com
Haht Commerce, Inc. www.haht.com	VetCentric.com www.vetcentric.com		

Aurora's Exited Portfolio Companies

Accipiter, Inc. Sold to CMGI	Oxydyn Sold to Cyclopps Corporation
Dataflux Corporation Sold to SAS Institute	Solution Technology, Inc. Sold to Rodel, Inc.
Virologic - Public Offering NASDAQ: VLGC	

The Aurora Update is a quarterly publication of The Aurora Funds, Inc., a Research Triangle Park, NC-based venture capital partnership that invests in early stage life science and information companies in the southeastern US. Aurora also has an office in Birmingham, AL. Carolyn Foy edited this edition of The Aurora Update. Harbert Management Corporation (HMC) is a merchant bank located in Birmingham, AL, that invests in a series of asset classes through the Harbinger family of funds. HMC is lead investor in Aurora's third fund, Harbinger/Aurora Ventures, LLC.