ISRAEL HIGH-TECH & INVESTMENT REPORT

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"A Hit, a Very Palpable Hit!"

William Shakespeare, Hamlet

ArrowAnti-Ballistic Missile Takes Off

Prior to the opening of the Paris Air Show at Le Bourget held in the middle of June Maj.Gen. (Res.) Ilan Biran Director General of the Ministry of Defense held an in-depth briefing which covered Israel's defense capabilities.

The platforms, systems and products displayed by Israeli companies reflect the country's body of expertise and experience acquired in combat. The thrust is to offer solutions for upgrades, modernization and add-ons whose aim is to provide new generation capabilities that extend the life cycle of existing platforms. These capabilities are in line with globally shrinking defense budgets. Many countries opt for modernization at a lower cost than buying "new". Unmanned vehicles were very much on display. The Hermes-1500 pilotless vehicle offers the possibility of staying 30 hours aloft, up to 30,000 foot altitude and a range of 120 miles. Air-to-ground guided weapons and the Python-4, Rafael's air-to-air missile as well as a new generation of anti-armor Sike missiles were offered for sale. Elisra's solutions for electronic protection for an aircraft while it gathers information appeared in its most advanced form.

However, it was the mock display of the Arrow Missile, which displayed in this manner for the first time outside of Israel reportedly attracted an unusually high number of visitors. The Arrow Missile is intended as a defense system against medium-range ballistic missiles. It can intercept missiles within a wide spectrum of ranges and altitudes, and providing protection over large areas. Simultaneously the system handles dozens of threats through multi-target racking and interception capabilities. The display at the Israeli pavilion includes the Fire Control Center, the launcher and the arrow interceptor. Israel last year successfully conducted the first comprehensive test launch of the Arrow 2 system, designed to shoot down incoming missiles at speeds up to two miles per second traveling 10 or 25 miles above the earth's surface. The test launch lasted for 97 seconds, and was deemed as most successful. US officials observing the test were

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most pleased and said everything went smoothly. The new defense system is scheduled to be operational by 2000. The Arrow-2's main contractor is one of the Israel Aircraft Industries' factories. The "green pine" firing system is produced by Elta, and the "golden citron" control module is made by Tadiran. A decision was reached by the Defense Ministry for the IDF and IAF to begin preparing for use of the Arrow-2 missile. The good news is that Israel's deterrence against potential missile attack is at an advanced stage as the $2.0 billion bet on the Missile Arrow program is progressing dynamically. The Arrow-2 Interceptor is the heart of the Israeli Anti-Ballistic Missile Defense System. Final development flight tests are being conducted, which will be followed by operational tests.General Biran stressed that though it is on display at the Air Show the Arrow Missile is "not for sale". However, Moshe Arens, Israel's outgoing Defense Minister has high hopes that the US, which is partnered with Israel on the Arrow project, will allow its sale to neighboring Jordan and Turkey.Mr. Arens, an engineer and a one time Vice President of the Israel Aircraft Industries, which is the main contractor on the Arrow project, envisions the Arrow anti-ballistic missile system as having the ability to provide regional protection for Israel and areas adjoining it.

The Arrow Missile Project has acquired several dimensions, among which its deterrence aspect and political implications are high on the list. Over the past decade localized skirmishes including the bombing of Libya and the "scudding" of Israel by Iraq during Desert Sand and Iran's acknowledged missile capability have created a pressing need for a security net.

Laurie Mylroie a research associate of the Foreign Policy Research Institute, Philadelphia PA has pointed out that winning an electronic war like Desert Sand or intensive bombing as on Serbia and Southern Iraq does not remove the threat of further violence against minorities nor does it eliminate the threat of use of nuclear, biological, or chemical weapons.

Israelis are highly sensitive to loss of life and since the country's founding, have gone to great lengths to minimize threats to its population and even its existence by creating a viable defense establishment. In addition to the threat of becoming a target for ballistic missiles such as the SCUDS the United Nations inspector teams in Iraq have uncovered a major arsenal of biological and chemical weapons and a basis for creating a nuclear warhead within twelve months.These are very real concerns for Israel and all countries in the Middle East. This country is doing something to counter the threat. General Biran points out when Israel could not acquire a tank to meet the needs of its defense forces it developed the Merkava tank which became a prototype for modern armies. The parallel is seen in

Israel Aircraft Industries Reports Profit in Q1

Israel Aircraft Industries' net profit reached $10.8 million in the first quarter, a 2.2% rise. IAI General Manager Moshe Keret said at the Paris Air Show that the company's sales rose 6.6% to $497 million. Exports totaled $377 million, a 2.7% rise. In the first quarter of the year, IAI signed new contracts worth $1.1 billion, compared to $628 million for the corresponding period in 1998. The order backlog reached $3.59 billion, a 13% rise compared to the end of the first quarter last year.

"The positive results prove that we've met the strategic program objectives. Our sales were planned to reach $2 billion by the year 2000, but we're going to meet this goal already this year." He added that this is the tenth consecutive profitable quarter, and that this proves that "profitability wasn't just a one-time occurrence".

Keret disclosed that the sales of IAI's American subsidiary Commodore Aviation, which engages in civilian aircraft maintenance, are expected to rise 32% this year and reach $45 million.

the development of the Arrow Missile which began some eight years ago in cooperation with the US. By the time it is concluded in about two years it will have cost nearly $2.0 billion. The development of the Arrow has been fraught with trials, error and disappointment but the program has turned the corner and in the September 1998 trials all systems were tested together and its interceptor capability was proven effective without any doubt.

General Biran is confident of the Arrow becoming part of Israel's umbrella to protect its airspace from being invaded by missiles.

"In a few weeks operational capability tests will get underway and will prove Israel's ability to deal with ballistic missiles and to meet the challenge of the most advanced systems which are being sent to countries in the Middle East," stated General Biran. The global defense business is a major one but in recent years has been hit with regressive sales. In 1997 Israels' defense exports stood at about $2.7 billion. In 1999 the defense industry establishment is looking forward to reach $2.0 billionin exports yet it is far from clear whether it will reach this objective. Details of defense system sales by country of destination are not readily available. However, General Biran commented that sales to China are minimal and last year amounted to only several tens of millions of dollars. Trends are changing radically. " In 1982 75% of the defense industry budget for research and development was for the Israel Defense Forces and 25% for export. In 1997 the new trend was in place with 75% of the research budget for export items and 25% for the country's defense forces," according to Maj. Gen. Yosi Ben Chanan Director of SIBAT (Foreign Defense Assistance). He also pointed out that markets are shrinking, highly competitive and the demands of customers are changing. "The age of the supermarket off-the shelf sales is a thing of the past. Countries are seeking to do their own partial or full assembling of the end product. Many countries rather than buying our Uzi submachine gun or the world class Galil assault rifle are producing these items by license in their own countries".

The new government under Prime Minister elect Ehud Barak, a former chief-of-staff, is likely to further stress Israel's deterrence capability while promoting ways for resuming and advancing the peace program.

CONVERSIONS and UPGRADES

ELBIT SYSTEMS WINS EURCOPTER CONTRACT

Elbit Systems Ltd (Nasdaq: ELSTF) said it had won a contract from Eurocopter to supply digital mapping systems for 12 Super Puma MK1 helicopters on order for the Swiss Air Force. The company, a unit of Elron Electronic Indusries (Nasdaq: ELRNF), said it was also its first sale to the Swiss defense market. A company spokesman valued the contract from the Franco-German company at several million dollars but said he expected it to lead to other orders from Eurocopter. Elbit is expecting to see significant business growth from its helicopter technology, although Ackerman would not estimate how much of total sales they would comprise.

Swiss Trainer Undergoes Conversion

Peaceful Swiss see their trainer become versatile weapon. Israel's Radom, is exhibiing the prototype of an armed conversion of thre Pilatus PC-9 turboprop belonging to the Slovenian Air Force.. Radom Aviationb Systems Ltd. Is based in Petach Tikva, adjoining Tel-Aviv specilaizes in aircraft system integration and upgrading. It is also active in civil/transport aircraft conversion of Western and Eastern aircraft, among them the Swiss Pilatus PC 7 and 9.

Israeli Companies on Wall Street

Geac Launches Fusion Mark 8 Point of Sale Systems

Geac Restaurant Systems has launched the new Fusion Mark 8 Point of Sale (Nasdaq:POSI) system for the Quick Service industry. The Fusion Mark 8 was selected for Burger King's 'New Image Restaurant' project. The Fusion Mark 8 is a state-of-the-art system featuring advanced technologies coupled with industry standard peripherals.

The POSI terminals, which are designated as clients within the system, have no moving parts, and are "hot connectable". This means they can be easily swapped, and are automatically configured by the server while the system is operating," said Larry Bruder, Geac's Quick Service Product Point of Sale also announced that it has been selected by PAZ Oil Company, Ltd. to supply its POSITIVE C-Point store systems to the newly formed Yellow, Ltd. convenience store chain.

Yellow is a subsidiary of Paz, the largest petrol company in Israel with 220 retail petrol locations. The modern convenience store format is still very new in Israel and Yellow, led by Michael Dinar, General Manager, is one of the first Israeli companies to implement this concept. The first POSITIVE C-Point installation at Yellow, which includes a convenience store and a kiosk located within a Paz petrol station, was installed in Beit Kama in southern Israel in May. The system is installed on IBM touch-screen terminals with scanners at the point of sale and a personal computer for the front and back office applications. Yellow plans an aggressive rollout, opening several additional locations in this format during 1999. Yellow will manage centrally its stores using the HeadOffice system from Point of Sale, Ltd. This system will give Yellow central control of its pricing and inventories as well as a central repository for sales information. HeadOffice is expected to be installed and operational within two months completing the framework for the

Comverse Technology Announces Record Q1 Results

Comverse Technology, Inc. (Nasdaq: CMVT) announced earnings per share (diluted) of $0.48 vs. $0.34 with sales rising by 25%.

For the first quarter of fiscal year 1999, ended April 30, 1999, the company's net income growth of 53%, excluding one-time acquisition charges, to a record $36.6 million ($0.48 per diluted share), compared with $24 million ($0.34 per diluted share) for the first quarter of fiscal 1998. Sales increased 25%, to a record $200.5 million.

Net income for the first quarter was $35. mil ($0.47 per diluted share). Kobi Alexander, CEO of Comverse, stated, "Our products continue to be selected by a growing number of customers. More than 290 wireless and wireline telecommunications network operators now use Comverse Network Systems Division's enhanced services platforms, which enable the provision of revenue-generating value-added services including call answering, unified messaging (voice, fax, and e-mail in a single mailbox), short text messaging, one-touch call return, and other personal communications services as customers such as call centers, financial institutions, and law enforcement and intelligence agencies continue to replace their outdated analog equipment with Comverse's advanced digital technology."

total ``HOST to POST'' solution supplied by Point of Sale.

Koor Deal

Koor Industries (NYSE:KOR) said its wholly owned Tadiran Ltd unit had agreed to sell its 49% stake in Tadiran Information Systems to IBM Israel, which already owns the other 51%. The deal, which values the entire Tadiran Systems at 226 million shekels ($55.3 million), will bring a pretax capital gain of 71 million shekels for Koor, the Israeli holding company said.

Electric Fuel

Electric Fuel Corporation's (Nasdaq: EFCX) Safety Products Division announced that its popular Model WAB-MX8 marine lifejacket light has been re-certified by the U.S. Coast Guard (USCG) under the new 1999 testing requirements of the Safety of Life at Sea (SOLAS) Convention of the International Marine Organization (IMO). The re-certification is required for all lights approved under the 1998 SOLAS amendments, and only lights with the new certification may be deployed on ships after July 1, 1999. The Model WAB-MX8 light had been previously approved under the 1998 amendments. "Electric Fuel gains a strong competitive advantage by being one of the first companies to obtain the new certification. Our product was proven to be exceptional under the scrutiny of this tougher series of rigorous safety standards." said Binyamin Koretz, Electric Fuel vice president responsible for the Safety Products Division.

Other lifejacket lights in Electric Fuel's line include a USCG-approved light for use on inland

Government Raises EU400m in Twice Over-Subscribed Bond Offer

According to the Teasury, the government recently raised 400 million euros ($420m.) in London in its first-ever euro-denominated bond issue, after demand was double the originally offered 300m. euros. Deputy Accountant-General Eldad Fresher said that the decision to increase the issue was a direct outcome of the interest expressed in the offering by European institutional investors.

Over 70 investors from 13 European countries purchased debt in the offering. These investors included some of the large and internationally known insurance companies, pension funds and portfolio managers in Europe.

The seven-year bonds yield an annual interest rate of 4.91 percent, which is only 97 basis points more than the benchmark French government bond. The issue can be seen as a real success as the government of Cyprus, which has a better credit rating than Israel, is expected to sell bonds in the near future at a yield with is believed to be higher than that of the current issue.

Demand for the bonds - the government's first issue in the new European currency - reached over 600 million euros. Fresher described the issue as a "great success" and said that the pricing was "very good".

He added that one of the main reasons for the decision to issue on the Eurobond market was to create an Israeli benchmark for European investors and to familiarize potential investors with the Israeli market. Though the government had no intention of raising additional capital by selling debt abroad in 1999, another $100m. will be raised overseas from private investors and banks.

The world's leading rating agencies - Standard & Poor's, Moody's Investor's Service and Fitch IBCA - have assigned Israel's credit an A-rating. The issue was managed by Deutsche Bank and Morgan Stanley. The co-leads were Merrill Lynch, Goldman Sachs, Warburg Dillon-Read, Daiwa and Paribas.

Israel is one of the first non-European governments to raise money in Europe. The bond sale was the fifth Israeli issue abroad.

The government issued Eurobonds in December 1996, but that was dollar-denominated and geared towards eurodollar investors while this issue focused on European investors who invested in local European currency-denominated

waterways, as well as for pleasure craft, and lights approved by the Federal Aviation Administration (FAA) for commercial aircraft. Electric Fuel Corporation, with corporate offices in New York City and manufacturing and R&D facilities in Jerusalem, Israel and in Auburn, Alabama, is also pioneering the use of zinc-air battery technology for consumer electronic products, electric vehicles, and military applications.

Teva Receives Swiss Approval

Teva Pharmaceutical Industries Ltd., (Nasdaq: TEVIY) announced that the Swiss Intercantonal Medicines Control office, the IKS, has granted marketing clearance for Copaxone® for the treatment of Relapsing-Remitting Multiple Sclerosis (RRMS). This is Copaxone®'s first Western European approval. With the addition of Switzerland, Copaxone® is now approved in 14 countries. The approved Multiple Sclerosis therapeutic indication is for the reduction of frequency of relapses and decreasing the progression of disability. Copaxone® is the only MS-specific immunomodulator available today. In pursuing an approval in Switzerland, Teva submitted data to the IKS, which was evaluated via the fast track procedure. This includes new evidence proving that treatment with Copaxone® significantly reduces MRI measured disease activity and burden of disease in patients with RRMS.

There are approximately 3,500 people with RRMS in Switzerland, of whom only less than one-third are currently being treated. The product will be marketed by Hoechst Roussel Schweiz, pursuant to the existing agreement signed between Teva and Hoechst Marion Roussel for a strategic marketing alliance in Europe.

AudioCodes Debuts on Wall Street

Israeli AudioCodes (Nasdaq: AUDC) has raised $49 million on the US stock exchange. The flotation was managed by Oppenheimer, Piper Jaffray, and Warburg Dillon. At the close of the first day's trading, the share had risen 22% to $17.1, and the company levelled out at a value of $300 million, compared to $240 millio, at which it was priced. The company's largest shareholder is DSP Group, manufacturer of DSP chips for the conversion of analog signals into digital, with 23.7% of AudioCodes shares.

AudioCodes develops software and hardware designed for overcoming obstacles that arise where there is a need to transmit voice and facsimile messages over data communications and Internet networks, such as delay and loss of data packages. Its products includes software and chips for converting analog into digital signals (DSP), communications cards and communications software. In other words, AudioCodes equipment enables customers to transmit voice on data communications networks, on the basis of Internet protocol. The company's customers are manufacturers of equipment for telecommunications and communications companies such as Lucent, Alcatel, Cisco, the RAD group,and VocalTec. The company's performances are not less impressive than the success of its IPO. AudioCodes posted a net profit for the third quarter in succession, and impressive growth rates, and also posted, for Q1 1999, a net profit twice the amount recorded for the whole of 1998. The company's Q1 1999 sales climbed to $5.8 million compared to $3.6 million in Q4 1998, up 60%. Net profit rose even more significantly, amounting, in Q1 1999, to $1.6 million compared to $940,000 in Q4 1998, a 70% advance.

Silicom Offers Home Phone Product

Silicom Ltd. (Nasdaq: SILCF) has introduced two powerful, uniqe and simple Home Network products for USB and CardBus PCMCIA equipped PCs. This new Home Network product line uses existing phone lines to allow multiple-PC households to share Internet access, printers, scanners, file applications and games. The Silicom USB Home Phoneline Network adapter (U2P) is the first product to offer a true "plug and play" home phoneline connection. It plugs directly into the USB port of the computer and eliminates the need to open the PC when adding a phoneline network

connection. Silicom is at an excellent position to capitalize on its twelve years of networking and Integrated Circuits design expertise to introduce unique and innovative products for this huge potential. Additionally, both products are compatible with emerging, fast Internet access specifications, such as DSL and cable modems for even higher bandwidth shared Internet access performance in the future."

Gilat Communications Ltd. IUCC Contract Increased to $7.5M

Gilat Communications Ltd. (NASDAQ: GICOF) reported that Its wholly-owned subsidiary, Israsat International Communication Ltd., has been awarded an extension to its contract with Inter Universities Computation Center (IUCC). Gilat will provide a satellite link connecting IUCC to the Internet II backbone for an additional two years - for a total of three years of service. IUCC decided to commit to an additional two years following the successful completion of performance tests by IUCC, Intelsat and Gilat. IUCC plans to provide Internet II connectivity to universities and research institutes in Israel, using Israsat's enhanced satellite link solution to support the effective high speed data rate required by Internet II applications.

Shlomo Tirosh, Gilat's Chairman and CEO, said: ``We are proud of being chosen by IUCC to provide the broadest bandwidth two-directional Internet link available between Israel and the Internet II backbone. As a result of this contract we will consider the construction of a Teleport in the US which will enable us to offer improved services and end-to-end solutions between Israel and the U.S. Internet backbone and other customers.''

ECI Telecom Takes a Stake in Lipman

ECI Telecom Ltd. (Nasdaq: ECILF) announced today the signing of a Memorandum of Understanding (MOU) with Israel-based Lipman Electronic Engineering Ltd to consolidate the transaction activities of the two companies.

Under the terms of the MOU, ECI Telecom will receive 16% of Lipman shares, in exchange for ECI Telecom's transaction transmission business, located primarily in Calabasas, California, USA. The MOU includes an option for ECI Telecom to purchase up to 8.9% additional shares from Lipman upon execution of a definitive agreement by the Companies, targeted 30 days from the date of this release.

The companies will agree on ways and means of allowing Lipman to have use of ECI Telecom's worldwide offices and facilities in order to facilitate Lipman's marketing of its products.

Lipman Electronic Engineering Ltd. is a high technology publicly-held company, with its shares traded on the Tel-Aviv Stock Exchange (TASE). Lipman focuses its main business activities in two areas: electronic payment systems and solutions at the point-of-sale (POS), and innovative and highly-

Heuristic Development and Virtual Communities Reach Agreement to Merge

Heuristic Development Group Inc.(Nasdaq: IFIT) said it had reached a definitive agreement to merge in a stock deal with privately held Virtual Communities Inc., a developer of Internet-based communities. Under the agreement, a subsidiary of Heuristic Development would merge with Virtual Communities in an all stock transaction in which Virtual Communities shareholders would receive 11.5 mln shares of Heuristic common stock. Virtual Communities management would manage the merged company. The transaction was expected to close in the 3Q, the companies said. Virtual Communities is an American community with a fully-owned development facility in Jerusalem.

The company has develops and operates three virtual communities including Virtual Jerusalem, Virtual Ireland and Virtual Holyland.

technological products outside of the electronic payment/commerce line.

Lipman is a leading global provider of advanced wireless and tel-line POS terminals, cash registers, thermal and impact printers, PIN pads, smart-card readers, credit/debit/smart-chip card controllers for integration into vending machine, commercial washer/dryer payment systems or other card-type payment applications, including "electronic purse". Among Lipman's innovative developments is the Quicktionary - a hand-held scanner/dictionary, now being marketed by its subsidiary – Wizcom Technologies Ltd. Lipman's corporate headquarters are based in Israel with subsidiaries and local offices in the USA, CIS, Turkey, Spain and China.

Amdocs and Investors Sell $673.2 M Shares

Shareholders sold securities for $627 million while Amdocs received only $45 million.

Amdocs completed its second round of financing in one year, issuing securities worth a total of $673.2 million. Most of the issue, the equivalent of $627 million, was raised by way of offer to the company's substantial shareholders. This secondary issue was led by Goldman, Sachs with the underwriters including the Bank of America, Robertson Stevens, Alex Brown, and Lehman Brothers. In June 1998 Amdocs raised $252 million from it initial offer. Altogether, the company has raised $925 million, by far the largest sum an Israeli company and its controlling shareholders have raised, here or abroad.

The company's principal shareholders sold 18 million ordinary shares to the public, worth an aggregate $403.9 million, while the company issued 2 million new shares in exchange for $44.9 million. Alltogether, 20 million Amdocs shares were sold for a total of $448.8 million.

The American broker Walsh, Carson, Anderson & Stowe holds, after the offering, 27.4 percent of Amdocs' stock; it sold 2.9 million shares for a total of $64 million. The American phone company Southwestern Bell Corp. (SBC) holds 19.6 percent of the company's shares, after the issue; it sold 5.8 million shares for $130 million.

Amdocs International Limited, a private company owned by Morris S. Kahn, sold 8.3 million Amdocs shares for $187 million. A group of top Amdocs executives, Kahn's partners in Amdocs International, hold another 18.7 percent of Amdocs' stock (but have no voting rights).

A private company named Toes, registered in the Isle of Jersey and also owned by senior Amdocs executives, sold a million shares for $22 million. Amdocs International also made a separate offer of special securities called TRACES (Trust Automatic Common Exchange Securities). The company offered 10 million TRACES priced at $22.44 each, and raised a total of $224.4 million. The Amdocs TRACES are hybrid equity securities that will be automatically exchanged for ordinary shares or for cash at maturity in

BackWeb Jumps as Much as 83% in Debut

Shares of BackWebTechnologies Inc. (Nasdaq: BWEB) surged as much as 83% to $22 after its $12 per share initial public offering, marking one of the largest one-day IPO gains in the recent past.

The Internet software maker was priced at the top of its increased expected range, raising $66 million with a 5.5 million share offering. Its initial gains were among the largest seen by recent IPOS which have been negatively affected by market jitters related to interest rate concerns and unsupportably high Internet share price levels.

The Israeli company provides Internet communication infrastructure and applications software.

Marimba (Nasdaq:MRBA) is a BackWeb competitor that offers a similar type of Internet infrastructure software but it is a bit more diversified in what it can do for customers according to a securities analyst. "Marimba deals with distributing software through an organization. BackWeb does that but it also distributes information flow as well,"

three years, as the selling shareholder chooses. The TRACES, (NYSE: AAE) represent the right to receive an annual distribution (paid out quarterly) of $1.51 each. Upon maturity, the Amdocs TRACES will be exchanged for between 0.84 shares and one Amdocs ordinary share that will be provided by the participating selling shareholder.

The completion of Amdocs' secondary offer has set a new record for Israeli companies. Essentially, the public has invested almost a billion dollars in Amdocs securities. Even by American terms, this is not a small sum. But size aside, there is a difference between the Amdocs offer and that of most Israeli companies: Most of the revenue didn't go to the company's coffers. In fact, over 90 percent of the capital raised flowed directly into the bank accounts of the company's controlling shareholders. The income from the initial offering last year financed a dividend to shareholders of $479 million. This time, principal shareholders sold $403 million worth of stock and altogether have taken home $880 million. Add the income from the TRACES, which is sure to bring in another $224 million.

Internet's worth: $301 billion

A University of Texas study estimates the Internet's value to the economy was $301 billion in revenue last year and 1.2 million jobs. Sponsored by Cisco Systems (Nasdaq: CSCO), the study, which is to be repeated quarterly, found that electronic commerce worldwide generated nearly $102 billion, or roughly 1 percent of the U.S. gross domestic product, the Associated Press reported. The balance of revenues came from computer hardware and software sales, consulting work and Web-site design. UT professor Anitesh Barua said revenues attributable to the Internet have been doubling annually for the past three years. "Ultimately, the (online) will go through the roof," he said.

Foreign Investors Maintain High Profile

Manna Networks Closes $3.7 Million Financing

Management Software, Manna Networks' Internet relationship management technology, clearly recognized by investors as the new standard for building online customer relationships

Manna Network Technologies, a participant in the emerging Internet Relationship Management marketplace, announced an equity investment of $3.7 million by Advent International, a US private equity investment fund, and Gemini Capital Fund Management Ltd., an Israeli venture capital firm. The company's first product, a sophisticated e-commerce marketing application that builds and maintains online customer relationships.

Managing Director for Advent International, Stephen Kahn said, "We think Manna Networks has an unparalleled technology approach that will dramatically enhance the depth of the relationships between buyers and sellers online."

Manna's technology enables online businesses to learn in real-time about their customers' needs and buying patterns, in order to make increasingly accurate predictions about how to best meet those needs. By combining a new method of distributed computing with advanced machine learning and inference systems, Manna provides a powerful solution for building learning relationships with the end-user. In addition, Manna's technology gives business people direct control over the business logic in their sites, enabling them to create and refine business rules quickly and easily, thereby transforming Web sites from static, passive catalogs to dynamic and personalized sales and support channels.

Yahoo Founder and Netscape Chief Invest

Israel Seed Partners has announced that it has finished raising $40 million for its third venture capi-

tal fund, called ISLP III, with an impressive line-up of clients.

The new fund is a real leap in status for Israel Seed in that its first efforts were relatively small for the industry, and funded mainly by private investors.

The new fund is big, and boasts a list of renowned investors and institutionals, including BT Alex Brown, the Nomura investment bank, the Wilson Sonsini legal office, Silicon Valley Bank, and the drug giant Wellcome (in partnership with Glaxo).

The cream of the local crop is invested too: Clal Electronics and Clal Industries, to name two. The list of private investors includes Yahoo! founder Jerry Yang, Netscape founder Mark Anderson and others. One special characteristic of ISP's funds is that they target companies in their "seed" stage, which is the most dangerous for investors - it is often too early to even assess whether the company stands a chance of success.

Most VC funds enter start-ups at a later stage.ISP had previously established two venture capital funds, one worth $7 million, the other worth $11 million. Both are at full investment with no less than 18 major corporate contributors, including corporate giants such as Compugene Software, FoxCom, and Dealtime.com.

European Net

European Net use will continue to lag. Free Internet access services are helping increase European's use of the Internet, but consumers will need further motivation to spend time online, according to new research from Jupiter Communications. "Telephone usage is metered and that alone will continue to hold back the growth of online advertising, content and commerce ventures in Europe by inhibiting Internet usage," said Jupiter's European managing director Phil Dwyer. The company estimates there are 14 million European households on the Net now, and that the number will triple in five years.

Science Corner

Israeli Scientist Designs General Purpose Mechanical Computing Device for a Biological Computer

The Thefirst general-purpose mechanical computer designed for biomolecular and pharmaceutical applications has been developed by Prof. Ehud Shapiro of the Computer Science and Applied Mathematics Department at the Weizmann Institute of Science. The mechanical computer was recently presented at the Fifth International Meeting on DNA-Based Computers at the Massachusetts Institute of Technology.

In terms of the logic behind it, Shapiro's mechanical computer is very similar to biomolecular machines of the living cell such as the ribosome. Therefore, a future biomolecular version of the device may ultimately lead to the construction of general-purpose programmable computers of subcellular size. If scientists succeed to build such a computer, it may be able to operate in the human body and interact with the body's biochemical environment, thus having far-reaching biological and pharmaceutical applications. "For example, such a computer could sense anomalous biochemical changes in the tissue and decide, based on its program, what drug to synthesize and release in order to correct the anomaly," Prof. Shapiro says.

The Turing machine

Unlike existing electronic computers, which are based on the computer architecture developed by John von Neumann in the U.S. in the 1940s, the new mechanical computer is based on the Turing machine, conceived as a paper-and-pencil computing device in 1936 by the British mathematician Alan Turing. The theoretical Turing machine consists of a potentially infinite tape divided into cells, each of which can hold one symbol, a read/write head, and a control unit which can be in one of a finite number of states. The operation of the machine is governed by a finite set of rules that constitute its "software program". In each cycle the machine reads the symbol in the cell located

under the read/write head, writes a new symbol in the cell, moves the read/write head one cell to the left or to the right, and changes the control state, all according to its program rules.

Although the Turing machine is a general-purpose, universal, programmable computer and is key to the theoretical foundations of computer science, it has not been used in real applications. Shapiro's mechanical device embodies the theoretical Turing machine, and as such is a general-purpose programmable computer.

The mechanical computer

At the conference, Shapiro presented a 30-cm high plastic model of his mechanical computer. He hopes that in the future, with the advent of improved techniques for the analysis and synthesis of biomolecular machines, the actual computer could Possibly be built from biological molecules, so that it would measure about 25 millionths of a millimeter in length, roughly the size of a ribosome.

The computer and the ribosome

In fact, Prof Shapiro designed the mechanical computer with the ultimate goal of implementing it with biological molecules. The computer is not more complicated than existing biomolecular machines of the living cell such as the ribosome, and all its operations are part of the standard repertoire of these machines. These operations include the mechanical equivalents of polymer elongation, cleavage and ligation, as well as moving along a polymer and being controlled by coordinated structural changes.

The ribosome is the molecular machine of the living cell that performs the final step of interpretation of the genetic code by translating messenger RNA, which is transcribed from DNA, into protein. A key similarity between Shapiro's mechanical computer and the ribosome is that a "program rule" molecule specifies a computational step of the computer similarly to the way a transfer RNA molecule specifies a translation step of the ribosome.

The computer is similar to the ribosome in that both operate on two polymers simultaneously, and their basic cycle consists of processing an incoming molecule that matches the currently held molecules on the first polymer, elongating the second polymer, and moving sideways. However, unlike the ribosome, which only "reads" the messenger RNA in one direction, the computer edits the tape polymer and may move in either direction.

A future interactive biological computer

The computer design may allow it to respond to the availability and to the relative concentrations of specific molecules in its environment, and to construct program-defined polymers, releasing them into the environment. If implemented using biomolecules, such a device may operate in the human body, interacting with its biochemical environment in a program-controlled manner. In particular, given a biomolecular implementation of the computer that uses RNA as the tape polymer, the computer may release cleaved tape polymer segments that function as messenger RNA, performing program-directed synthesis of proteins in response to specific biochemical conditions within the cell. Such an implementation could give rise to a family of computing devices with broad biological and pharmaceutical applications.

Prof. Shapiro received his Ph.D. from Yale University and joined the Weizmann Institute in 1982. During the 1980s he was involved with the Japanese Fifth Generation Computer Project and published numer-

ous scientific papers in the area of concurrent logic programming languages. In the early 1990s, Shapiro s innovative research in programming languages led to the establishment of Ubique, a company that develops interactive online environments. Shapiro took a leave from Weizmann to establish Ubique, and when the company was bought by America Online, Inc., he moved to the U.S. to assist in incorporating Ubique's Virtual Places technology in America Online's internet services. When America Online sold Ubique to Lotus/IBM in 1998, Shapiro returned to his research post at the Weizmann Institute.

The mechanical design of Shapiro's computer model was performed by K. Karunaratne from Korteks and M. Schilling from Schilling 3D Design, both from San Diego, CA.

American Banker Interviews IHTIR

The American Banker, America's premier daily trade newspape covering the US banking industry turned interviewed us. An interesting question put to us was: "How many high-tech Israeli companies.are traded on Nasdaq or NYSE? And, in particular, how many have begun trading over the past 5 years?"

Altogether there are 106 Israeli or Israeli related companies traded on the American securities markets. Of these Elscint (ELT), Amdocs (DOX), Israel Economic (IEC) and Koor Industries (KOR) trade on the NYSE. Of the total 89 companies can be loosely termed as high-tech or better as science based industries to avoid the pitfall of just including electronics. Among the 89 there are software firms, telecommunications, biotechnology, computer graphics, holding companies investing in high-tech, electronics and others. Almost all of these trade on NASDAQ, which has been the market of choice for Israeli issuers. The market capitalization of the 89 companies, is a highly respectable $38.8 billion for Israel, a country the size of one of the small American New England States.

From 1995 we have identified 20 companies whose June 17 market capitalization is $11.1 billion or nearly 30% of the total and who have turned public since 1995. Not yet announced is an Israeli related company, currently about tto sign to be floated this year on NASDAQ with a $400 million valuation.

The seeming infatuation between Israeli companies and NASDAQ is rooted historically when US venture captalist Frederick Adler facilitated the floating of Elscint in 1972, and in the early 1980s Elron, Fibronics, Orbotech were floated and well received by the American investing public. Bear Stearns was particularly active in the mid-1980. The first chief of the Israeli Air Force Don Tolkowsky had joined the Discount Investment company and showed a a great affinity for the future of high-tech. Tolkowsky had great credibility as did Uzia Galil, the founder of Elron. At the same time ECI Telecom was floated and over the years became a major player globally in the telecom field.

Today the high-tech scene in Israel is not only large but it represents more than 40% of this country's total exports. There are many Internet or Internet related companies active and Americans are more than ever investing in their early stage of development. John Sculley, former Apple president has invested in several technology driven companies a year ago. Last week we learnedthat Yahoo! founder Jerry Yangand Netscape founder Mark Anderson invested into the Israeli high-tech universe.

Vacation Time.....

As has been our custom in recent years, with the publication of the July issue we will be taking a summer vacation and resume with the September issue. I look forward to an Eastern European trip which will include Lithuania, Latvia and St. Petersburg. I hope you will be spending equally interesting vacations.

To all our subscribers to the Israel High-Tech & Investment Report and the countless visitors to our Internet website at:
http://www.ishitech.co.il

Joseph Morgenstern
Publisher