

# ISRAEL HIGH-TECH REPORT

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## EDITORIAL

### ISRAELI SATELLITE LAUNCHED INTO ORBIT

On September 19, Offek-I, Israel's first satellite was launched into space and was completing its orbit every ninety minutes. The octagonally shaped satellite, 2.3 meters high, having a diameter of 1.2 meters at its widest point and weighing 156 kilograms, was put into orbit by a rocket launcher developed by Rafael, Israel's Armament Development Authority. Offek-I was the result of the highly dedicated effort of Israel's Space Agency and the cost of the program has been so far put at a relatively low \$200 million. The ISA chairman, a world famous scientist, has explained that Offek-I would be of major scientific importance. Israel Aircraft Industries, which was the contractor for the development and building of the satellite, has indicated that Offek-I's subsystems will be collecting data on space environmental conditions as well as the earth's magnetic field. Other important scientific aspects will involve the evaluation of the satellite's transmission systems, the use of solar power and the determination of operation capabilities in vacuum and in the condition of weightlessness.

Israel's achievement in orbiting a satellite is not as surprising as it otherwise might be because of its proven scientific infrastructure and technologically orientated engineering and scientific personnel. Yet, by virtue of the achievement, it accords the country entry into a highly exclusive space club whose membership includes Russia, the United States, Japan, France, China, Great Britain and India. Charter members were Russia and the United

States. Both these countries entered the space age within one year of each other in the late 1950's with the Sputnik 1 and the Vanguard 1. The American Vanguard and Israel's Offek-I bear a similarity in that they were both developed independently as their own national space programs.

The scientific benefits from information and data to be gathered by the Israeli satellite undoubtedly will lead to important and improved understanding of space and associated phenomena. Yet, it also provides Israel with a new "seeing" dimension of major strategic and political importance. Israel has achieved a highly developed expertise in the field of optical lenses, and a leading edge stand in infrared detectors. Both of these technologies are pre-requisites for reaping the benefits of "optical telescopes" which can focus light from objects on the earth onto highly sensitive detectors which, in turn, can provide realtime information. These abilities are critically important in terms of strategic information-gathering capabilities. They also form an underpinning for advance defense warning systems and therefore a deterrent from potential aggression on the part of Israel's neighbors.

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High-technology required for the development, launching and orbiting of a satellite, as Israel has employed with its Offek-I, is a multi-fold blessing. Practitioners of the technology have achieved and earned for their country both the prestige accorded to such successes and also elevated its standing in the international arena of science and technology. Internally it has given its four million people an additional feeling of pride and a heightened sense and awareness of a proven capability in a an unstable region of the world.

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#### AUTOMATING A STEP IN DIAMOND PRODUCTION

The Hebrew word moach means brains; that is the name of a new bruting (diamond-shaping) machine which is coming onto the market in Israel. The Moach 1 is the result of a two year development project carried out by the Israel Diamond Institute. It builds on Israeli bruting experience and is technically based on a machine invented by a South African engineer, Alec Leibowitz. According to Steven Benson of Israel Diamonds, the IDI's embellishments to the Leibowitz machine may mark significant improvements on the previously patented technology.

There appears to be a strong interest in the Moach. One company, Nir Diamonds, has already installed 50 machines. Leibowitz's original invention, as well as the Moach 1, are both capable of improving on what can be done manually; they can also complement automated systems currently in use.

Automatic machines are capable of producing polished stones of exceptional quality, but to do so they need smoothly bruted stones with a high degree of roundness. According to those close to the industry, the new bruting machine can produce evenly girdled stones consistently, eliminating the need for compensation by polishers. Thus, quality is maintained throughout the automatic production system and the rate of production is improved.

There are five steps in creating a diamond: marking, cleaving, sawing, girdling and faceting. Marking is the examination of a diamond and the determination of the direction of cleavage, or grain, in the diamond crystal. Due to its atomic structure, a diamond can be split in four directions. The "rough" is marked accordingly and in the process of cleaving, the diamond is split with a steel wedge and a mallet. Sawing is carried out with a saw whose rim has been charged with diamond dust. A saw will cut through a one carat rough diamond in four to eight hours. Bruting is also known as girdling or rounding. The diamond is fixed in a chuck in a lathe. As it spins in the lathe, a second diamond, fixed on a dop at the end of a long wooden handle, is held against it and the diamond is slowly rounded into a cone shape.

Finally, eighteen main facets are cut and then the brillianiere places and polishes the remaining forty facets. That is, if the cut is a standard fifty eight facet brilliant. Placing and polishing the facets is carried out by setting the diamond either in the lead dop, or mechanical clamp, and holding it down on a revolving caste iron lap, which has been previously charged with diamond dust. In order to achieve beauty, each step of the process must be carried out with great care and accuracy.

As diamonds produced in Israel are priced in dollars, the industry is faced with the same profitability problem as all other exporters selling in the American currency. As the Moach 1 is integrated into automatic production, and reduces the labor-intensive aspect of diamond production, it promises improved profitability for diamond manufacturers.

#### WEIZMANN INSTITUTE AND ASSAF HAROFEH FOCUS ON ASTHMA IN CHILDREN

When the outdoor temperature rises sharply or falls sharply, besides the accompanying general discomfort, the occurrence and severity of asthma attacks in children increase.

Dr. S. Beer of the Assaf Harofeh Medical Center and Professor Y. Kannai of the Weizmann Institute, studying records of nearly 9,000 hospital visits, have concluded that the detrimental effects of asthma are even greater when temporary fluctuations coincide with changes in humidity. These changes, according to Prof. Kannai, are most marked in the late afternoon and early evening, hours that find children outdoors and therefore most vulnerable to atmospheric changes.

The data for this study came from hospital records of children up to age 15 who visited the Assaf Harofeh emergency room between March 1982 and April 1985. Part of the study consisted of physicians' diagnosis of various respiratory complaints, including asthma, bronchiolitis, (bronchitis in children under two), pneumonia, and upper respiratory infections such as the common cold and acute laryngitis. On admission, the child's age and sex were recorded, as was the time of day.

The other section of the study deals with data on temperature, humidity, cloud cover, and wind speed and direction which were obtained from the Israel National Meteorological Institute at Bet Dagan.

#### **TEL AVIV UNIVERSITY PATENT CREATES EXTRA ENERGY**

An accurate state-of-charge meter for lithium-sulfur dioxide batteries has emerged from the laboratories of Tel Aviv University. Prof. Emmanuel Peled of the School of Chemistry (IHTR-10/1987) and his collaborator engineer Israel Reshef have developed an instrument in cooperation with the Israel Defense Forces Signal Corps. Chemtronics Ltd. has purchased the patent and is now planning its marketing strategy. Prof. Peled, a highly innovative researcher, previously developed a novel high-energy, high-power density calcium battery.

Lithium-sulfur dioxide batteries produce electricity for much longer than conventional batteries. They are used whenever there is a need for high-power density, high-energy

density, and a long shelf life: in military and civilian communications equipment, telephone repeaters, for surveying, in spacecraft, and in medical emergency equipment.

But they are very costly, so throwing them away before their life span is over is an enormous waste of money. On the other hand, continuing to use a lithium battery when there is a no charge left in it can sometimes be dangerous: it could explode, catch fire, or release dangerous chemicals. So ideally, one wants to use a battery up to the last minute, but not beyond.

The new meter should mean substantial savings, especially for major users, including large commercial firms and the military. It is so accurate that its error is typically lower than 10 percent; it conducts the check very quickly; and is suited to all lithium-sulfur dioxide batteries on the market.

#### **U.S. FCC OKAYS VISONIC PIR**

Mr. Yaacov Kotlicki, managing director of Visonic Ltd., (IHTR-7/1987) reports that the company has received the U.S. Federal Communications Commission's approval for its new line of alarm systems and components based on wireless passive infrared (PIR) detectors. Visonic offers buyers a choice of more than 40 changeable lenses for use with the detectors. These include wide angle lenses up to 140°, and lenses suitable for scanning corridors up to 120 feet long.

The firm's exports for 1988 should exceed \$20 million, with two-thirds of the total sales going to the U.S. and Europe. In 1987, export sales were about \$15 million: four years ago, they barely exceeded \$500,000. Productivity continues to be high and averages \$153,000 for each of the 120 employees. Sales within Israel, owing to the size of the market, represent a small percentage of total sales.

Visonic maintains sales offices in Connecticut, U.S.A. With a staff of 18, the American sales office markets to a network of exclusive distributors.

## ISRAEL HIGH-TECH SHARES TRADED IN THE USA

	<u>P-E</u> <u>Ratio</u>	<u>Price</u> <u>as of</u> <u>9/15/88</u>	<u>Change</u> <u>since</u> <u>8/15/88</u>		<u>Earnings per</u> <u>share</u>	
					<u>1986/7</u>	<u>1987/8</u>
<b>BIOTECH</b> OTC BIO-TECH GENERAL Biological products for health care	d	3 3/4	+ 1/4	3 Mo Mar	d 0.38	d 0.47
<b>ELBIT</b> OTC ELBIT COMPUTERS Defense electronics	6	4 7/8	n.o.	6 Mo Jun	0.67	0.39
<b>ECI</b> OTC ECI TELECOM LTD. Telecommunication Systems	9	3 3/8	- 3/8	6 Mo Jun	0.04	0.20
<b>ELRON</b> OTC ELRON ELECTRONICS Company investing in high technology	11	2 7/8	+ 1/2	6 Mo Jun	d 1.22	d 0.15
<b>ELSCINT</b> NYSE ELSCINT Full range medical imaging		1 1/8	n.o.	3 Mo Jun	d 0.18	d 0.02
<b>FIBRONIX</b> OTC FIBRONIX INT'L Fiberoptic communications	d	3 5/8	- 1/8	6 Mo Jun	d 0.08	d 0.09
<b>INTERPHARM</b> OTC INTERPHARM LAB. Biological products for health care		2 7/8	- 1/4	3 Mo Mar	d 0.09	0.02
<b>LASER</b> ASE LASER INDUSTRIES Surgical laser systems	d	4 1/8	+ 1/2	6 Mo Jun	0.32	d 0.47
<b>OPTROTECH</b> OTC OPTROTECH Electro-optical systems for PCB	11	3 7/8	+ 1/2	6 Mo Jun	0.23	0.22
<b>SCITEX</b> OTC SCITEX Computer graphics	5	5 1/2	+ 1/8	6 Mo Jun	d 0.68	0.49
<b>I.I.S.</b> OTC I.I.S. Computer peripheral equipment	5	5 1/8	+ 5/8	6 Mo Jun	0.37	0.46
<b>S.P.I. PARTS</b> OTC S.P.I. SUSPENSION - PARTS INDUSTRIES Military components	9	5/8	-1	3 Mo Mar	0.07	0.04

d = deficit

**OPTROTECH SALES SURGE**

Optrotech Ltd. (NASDAQ/NMS:OPTF) announced that sales for the second quarter ending June 30, 1988, surged to \$15.2 million. The sales were 60% higher than in the comparable period a year earlier, but after-tax profits declined to \$585,000 from \$731,000.

The company's six months sales of \$29.2 million point to the possible realization of \$55 million in sales for the whole of 1988. Optrotech's profits continue to be effected by competition, the relative weakness of the dollar and some losses resulting from unsuccessful foreign currency hedges. Expectations are that 1989 will see Optrotech generate sales of \$60-\$65 million and profits of under \$4 million. The results in 1988 will be marked by high sales but relatively low profits. Its current market valuation of approximately \$20 million is very modest.

**ECI IMPROVES MARGINS**

ECI Telecom Ltd. (NASDAQ:ECILF) announced total sales of \$8.4 million for the second quarter ended June 30, 1988, and profits of \$555,000. The restructuring of ECI's activities have led to the vastly improved margins. The company is positioned to maintain its sixth consecutive quarter of improvements in earnings.

ECI's digital speech processing and switching technologies are being refined and are continuing to prove their usefulness in the international world of telecommunications.

**TEVA IN MAJOR NEW FINANCING DEAL**

Teva Pharmaceutical Industries Ltd. (TEVIY: OTC) (IHTR - 5/1987) has again shown its ability to obtain international financing for its activities. A little bit more than a year ago, Teva raised \$32 million in the United States; now it has entered into an agreement with the Canadian-based Bronfman Group for the latter to invest approximately \$22 million. A key in the financing deal is the sale of 5% of Teva's total capital and voting rights. On the basis of this investment of Teva's share

capital, the valuation for the company is \$120 million.

We are lowering our expectations for Teva's sales for 1988 to approximately \$100 million. Our original estimate for \$220 million for calendar 1988 has to be lowered because of interruptions in the normal flow of orders from Kupat Holim, Israel's socialized medical service, which has been intermittently on strike throughout most of 1988.

An important factor in Teva's local sales continues to be its 28% share of the private pharmaceutical market. Teva's acquisitions within Israel and growing participation via TAG in the American generic market should, nevertheless, see them reach \$300 million by the end of 1990.

Teva's ADR shares have recently traded more widely in the U.S. and were recently quoted at nearly \$7 a share, a considerable improvement on the share performance earlier in the summer. The Teva shares traded on the Tel Aviv Stock Exchange were up sharply by approximately 20% in the first two and half weeks of the month. The movement of the shares on the two markets are linked.

**AGREEMENT ON INTERFERON**

InterPharm Laboratories Ltd. (NASDAQ: IPLLIF), Israel's leading producer of beta interferon from human fibroblast cells, will, in the near future, be able to sell its recombinant beta interferon worldwide, free from liability for infringement of

	9/15/88	8/15/88
DJIA	2100.64	2037.52
S&P 500	269.31	262.55
NYSE INDUSTRIALS	183.31	178.88
ASE MARKET VALUE	298.35	296.48
NASDAQ INDUSTR'LS	387.32	385.40
ISRAEL HIGH-TECH REPORT INDEX*	36.88	35.65

\*ISRAEL HIGH-TECH REPORT INDEX is a weighted index made up of the shares of 10 leading high-tech companies.  
Base=100 as of 9/30/84

possibly conflicting patent rights. This is the essence of an agreement reached between InterPharm, Ares Serono N.Y. and Yeda Research and Development Co. Ltd., and Kyowa Hakko Kogyo Co. Ltd., Toray Industries Inc. and Juridical Foundation, the Japanese foundation for cancer research. Each of the parties involved have agreed not to assert against the other any claims included in certain of their respective patents on this product.

This agreement is a major coup for InterPharm, since it goes a long way towards safeguarding its patent position in advance of production and marketing of its recombinant beta interferon.

#### NEW ORDERS

##### FIBRONICS BOOK EUROPEAN ORDERS FOR ITS FDDI SYSTEM FINEX

The Italian Government has placed an order of more than \$1.0 million for Fibronics International Inc's System Finex as part of a fiberoptic network for the Italian superhighway system. Fibronics' chairman Morris Weinberg and president John Hale have said that their first Italian order could lead to "becoming a major continuous business in Italy in the future".

##### NORWAY'S BIONOR IN EXCLUSIVE MANUFACTURING AGREEMENT WITH HY-LABS

Norway produces more than 50% of the total farmed salmon production in the world. It is an important growth industry. In 1987, Norwegian salmon exports of 47,000 tons were nearly twelve times the amount exported in 1979. The value of 1987 salmon exports surpassed Nkr2.0 billion, and Norway's salmon producers expect to increase their exports to 100,000 tons per annum by 1990.

The breeding of salmon creates major problems, primarily associated with a variety of diseases that can strike smolts, the young salmon. Damage and losses of tens of millions of Nkr are incurred annually. Increased analysis in the breeding stage is seen as a major means of reducing these losses.

Rapid diagnostic reagents which identify disease before it has spread are of major interest to the Norwegian hatcheries that supply fish farms. Bionor, a leading biotechnology company, has entered into an exclusive manufacturing agreement with Israel's HY-LABS - Hy-Laboratories Ltd. (IHTR-7/88) The latter is supplying microbiological control systems to detect changes in the amount of micro-organisms such as bacteria, yeast and mold, at the hatchery stage, before they can spread.

HY-LABS, a major factor on the Israeli market in the production of ready-for-use bacteriological culture media and diagnostic materials, stands to increase its export revenues considerably as a result of its entry into the fishing industry.

##### SATEC ABOUT TO UNVEIL FIRST PROTOTYPES

Less than a year since its inception, Satec Ltd. (IHTR-1/88), is about to unveil three prototype systems which monitor and control electrical power in industrial applications. Satec employs 15 scientists, most of whom are Soviet immigrants, active in researching and developing a variety of "smart" products. In addition, Satec offers contract R&D services for industry.

Satec will try to generate income by providing three products aimed at metering of electrical values; definitive analysis of the amount of energy consumed; and power-guarding machines and motors. Targeted as end users are the process control market and the industrial electrical engineer. The systems will be part of electrical control panels or machine control panels.

Australian businessman Joseph Gutnick, who has provided seed capital for Satec, continues to benefit from his Israeli connection with Prof. Herman Bravover, the head of the Liquid Metal Magneto-Hydro-Dynamics Laboratories at the Ben Gurion University of the Negev. Australia Wide Industries' U.S. subsidiary, Bayou International, as reported in the Australian Business

dated August 24, 1988, owns 51% of a British-based firm, Solmecs Corp. Solmecs, which has the rights for the development of Prof. Branover's Magneto-Hydro-Dynamics (MHD) development, won a \$200,000 contract. The contract has been extended to Solmecs by the American Department of Energy to check the feasibility of using MHD technology in flights in space. Executives at the Jerusalem-based Satec are aware that it is easier to raise funds for an alternative energy project, like MHD, than for initiating R&D projects based on the skills of Russian scientists who must find employment in Israel. This explains Satec's rush to unveil industrial prototypes which can generate cash flow.

**ROBOMATIX ENTERS FORD**

Robomatix Ltd. (IHTR - 8/1987), a supplier of systems which combine lasers and industrial robots, two months ago installed and integrated one of its systems into the production line of Ford's Arrow Star automobile plant in St. Louis, Missouri. The Robomatix system is the first employing robotics and laser technology, which is actively operational in an automobile production line. The Ford installation is valued at under \$1 million. After two months of continuous production operation, Ford is giving active consideration to ordering several additional Robomatix systems. General Motors and Chrysler are showing interest in the Israeli system. Robomatix is a partnership of Koor Industries and Clal Industries.

**RECENT APPOINTMENTS**

Barouch Bahat assumes the position of Chairman of the Board of Directors and CEO of S.P.I. - Suspension and Parts Industries Ltd. (NASDAQ:SPILF). He has also been appointed as President of Urdan Industries, S.P.I.'s parent company. He replaces Michael Tamari, who has resigned from S.P.I. Mr. Tamari is also resigning from Urdan Industries after 25 years with the company. Mr. Bahat, prior to assuming his position, served as General Manager

of Iscar Blades, one of Israel's high-technology companies.

David J. Nims has been appointed as President of Optrotech Inc. The U.S. firm is a wholly owned subsidiary of the Israeli Optrotech Ltd. (NASDAQ/NMS:OPTKF). The American company is in charge of sales and support of Optrotech's products in North America and generates more than 50% of Optrotech's total sales.

Mr. Nims, prior to joining Optrotech Inc. in September 1987, held a senior management position in MacDonald Dettwiler, a Canadian company active in scientific products.

Ruben Derderian has been appointed to the position of President of Sharplan Lasers, Inc., the wholly owned subsidiary of Laser Industries Ltd. (LAS:ASE) which is headquartered in Allendale, New Jersey.

Prior to joining Sharplan Lasers, Mr. Derderian held senior management positions with Spacelabs, Xerox Medical Systems, and Becton Dickinson. His most recent position was Vice President of Spacelabs.

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NEWS AND INVESTMENT OPPORTUNITIES

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### COULD ISRAEL EXPORT MORE TOMATOES?

Percentage-wise, growth in Israeli farmers' exports of greenhouse tomatoes is highly impressive. In consecutive seasons, on a tonnage basis, the export of these tomatoes was up 114%, and FOB revenue from the sales was up by 159%. Yet, in absolute terms, it seems that the market has been only slightly dented.

Year	Tons Exported	FOB Value
1986/87	2,150	\$3,400,000
1987/88	4,600	\$8,800,000

The U.S. export figure of 1,450 tons is sufficient proof of farming expertise, mainly growing tomatoes with an ability to ship them over vast distances and yet keep them firm and fresh. The American market is appealing due to its huge size. Most tomatoes in the U.S. are picked green and are exposed to ethylene gas to turn them red. The result is a relatively tasteless tomato of light red color.

The Israeli-developed tomato is close to "ideal" as it provides a proper sugar-acid ratio, which gives it good flavor. It can be shipped over long distances, and has a long shelf life and an attractive color. The Israeli tomato, trade named Divine Ripe, has been shipped to destinations throughout the U.S., (up to 3,000 miles by truck) and at a fairly warm temperature of 55°F. Moreover, it has a shelf life of at least two weeks. It is red in color on the outside, deep red on the inside and stays firm, at room temperature, for about 15 days after harvest.

A team of scientists from the Hebrew University of Jerusalem's agricultural faculty at Rehovot has overcome the problems of locally marketed tomatoes. Israel's hot climate, meant early softening, and a greater chance of over-ripening which led to

wastage. Cross-breeding of dozens of tomato varieties in Israel and abroad with traditional table varieties, produced 10 types that were suitable. Their improved qualities led all glasshouse tomato growers in Israel to change to these new hybrids. The problem of maintaining quality over a period of 1-4 weeks, has been overcome at the Research and Development Authority of the Ben Gurion University of the Negev. Using genetic mutants whose ripening generally takes several months, long-lasting tomatoes were obtained. They were strong red in color, gave high yields and were disease resistant. Years of research at the two universities, including cross-breeding of some 500 lines, resulted in new hybrid tomatoes which have been found acceptable by European and American consumers.

In 1986, Americans consumed 16.8 billion tomatoes. Israel exported 18.9 million tomatoes. This means that in that year Israel supplied less than one-fifth of one percent of the total consumption of American grown tomatoes, leaving an opportunity which hopefully the Israeli farmer will make use of. One of the results of the acceptability of the Israeli tomato in the United States has been a transfer of this know-how to California. The benefits of the technology transfer are considerably less to Israel than direct exports.

The question that is being asked of the Israeli tomato growing industry is: Where is the bottleneck which is holding back an explosive growth in the export of these tomatoes? Is it the grower who is responsible or is it Agrexco, which handles all export sales?

The answer appears to be in an improved relationship and increased cooperation between grower and marketer. If that does not lead to improved results, then a reevaluation of Israel's agricultural marketing system would be in order.