

# ISRAEL HIGH-TECH & INVESTMENT REPORT

A MONTHLY REPORT COVERING NEWS AND INVESTMENT OPPORTUNITIES  
July 2010 Vol. XXV Issue No.7

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## OFEK-9 Soars into Space



Towards the end of June Israel launched a spy satellite from a base in the south of the country, the defence ministry said, with the device reportedly capable of monitoring arch-foe Iran.

“A few minutes ago the State of Israel launched the Ofek-9 (Horizon-9) satellite from the Palmachim base,” the ministry said. “The results of the launch are being examined by the technical team.”

It gave no details on the satellite, but public radio said it, like its predecessors in the Ofek series, were capable of taking high resolution pictures and aimed at monitoring Iran’s nuclear programme.

The radio said the satellite was developed by Israel Aircraft Industries and launched on a Shavit rocket.

Israel, regards Iran as its principal threat after repeated predictions by the Islamic republic’s hardline President Mahmoud Ahmadinejad of the Jewish state’s demise.

Along with the West, it suspects Iran of trying to develop atomic weapons under the guise of its nuclear programme, a claim Tehran denies. Shortly after the launch the satellite began to send pictures

With the launch of Ofek-9, Israel has six spy satellites in space.

Defense News is a leading international news weekly covering the global defense industry. Barbara Opall-Rome, the Defense News’ Israeli



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based correspondent has written that “Israel’s Ministry of Defense has secured tacit U.S. government consent for a prospective remote sensing deal with China based on the Eros B, a commercial, high-resolution satellite nearly identical to the Israeli military’s Ofeq-5”.

Considering that Israel’s satellite program began only 19 years ago the proposed Chinese connection is an outstanding example of how far Israel’s satellite industry has progressed in a short period of time.

The history of Israel in space is short but remarkable. It started in 1988 with the launch of Ofeq 1 by the Shavit launcher, affiliating Israel to the very exclusive club of 7 countries, who launched a self-developed satellite with their own made launcher.

Israel often talks about maintaining a strategic edge over its neighbors in order to survive, and for this it has been developing all kinds of strategic tools and programs. Israel’s space program is one of these, and it does have a very clear edge over its neighbors and opponents.

In this respect satellite communication and observation is Israel’s major space-based strategic tool.

A consortium of Israeli defense companies, of which Israeli Aircraft Industries (IAI) is the leader, developed the most recent Ofek-7. IAI is also the manufacturer of the Shavit launching rocket. Elop, a wholly owned subsidiary of Elbit Systems, produces the imaging payload. The cost of the satellite is classified. It weighs roughly 300 kilograms and it follows an elliptical orbit at an altitude of between 300 and 600 kilometers. Only 2.3 meters long, it has a life span of about four years with a high-resolution optical imaging payload, which is far advanced over previous Ofek-class satellites. Ofek-7 was described as having notable and significant improvements over the failed Ofek-6, which in its third boost stage plummeted into the Mediterranean Sea in

September 2004. Israeli defense officials hinted that Ofek-7 would grant Israeli Defense Forces (IDF) unprecedented operational capabilities. In this context, “With this launch we have improved Israel’s operational capabilities by dozens of percentage points. This is due to improvements made to the satellite we now have better coverage in the skies” said Brig. Gen. Haim Eshed, director of Space Programming at the Defense Ministry Research and Development Directorate (MAFAT).

What Israeli defense officials mean by operational capabilities is most probably due to tactical tools to be used during all kinds of military operations. With this new capability Israel seems to have enhanced the strategic as well as the tactical capabilities of its satellites. At that time Defense Ministry Director Gen. Pinhas Buhris also hailed the successful launch of Ofek-7 and said that as a former intelligence officer he knew “firsthand” the strategic contribution the Ofek satellites made to Israeli security. What Buhris hinted at by saying “strategic contribution” is, of course, Ofek-7’s ability to spy on Iran, Iraq and Syria. In fact Ofek-7’s

<p><b>Israel High-Tech &amp; Investment Report</b>                  Published monthly since January 1985</p> <p><b>Publisher and Editor in Chief</b>                  Joseph Morgenstern, B.A. Chem.</p> <p><b>Technology Review Board</b>                  Prof. S.J. Joel-Cohen, MD, FRCS. FRCOG (1996-2002)                  Prof. Hylton Miller, M.B. Ch.B.                  Dr. Clive L. Carpel, M.B. Ch.B.</p> <p><b>Copy Chief</b>                  Debbie Mor</p> <p><b>Web Master</b>                  Marty vonBokel</p> <p><b>Graphics Consultant</b>                  Daniel Morgenstern</p> <p><b>Subscription Inquiries</b>                  Tel-. +972-3-5235279 Fax. +972 3-5227799                  E-mail: htir_1@netvision.net.il                  Annual subscription \$95.- per year, for 11 issues,                  Israeli residents add 16% VAT</p> <p><b>Web Edition and Archives</b>  <a href="http://ishitech.co.il">http://ishitech.co.il</a></p>
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orbit reportedly passes over those countries every 90 minutes and thereby collects valuable visual intelligence.

In addition to Ofek-class satellites, Israel has Eros B -- a civilian-owned satellite used by the Defense Ministry on a contract basis -- and Amos 1 and 2 communication satellites. IAI is planning to launch the Amos 3 to enhance Israel's strategic communication capabilities.

All this clearly demonstrates that Israel has a very successful satellite program, which has managed to launch close to 10 satellites so far. In fact Israel is one of only seven countries with independent satellite launch capabilities and is an important member of this exclusive club, which also includes the US, France, Japan, China, India and Russia.

### **Launch history**

Ofek 1, launched September 19, 1988, possessed a weight of 155 kg. It accomplished mainly solar cell and radio transmission tests.

Ofek 2, was launched April 23, 1990. It also accomplished communication tests.

Ofek 3, launched April 5, 1995, was the first operational Israeli satellite with reconnaissance (photography) capabilities. It weighed 225 kg and was launched on a new version of Shavit.

Ofek 4, launched January 22, 1998, did not achieve earth orbit due to a launcher failure and was lost.

Ofek 5, was launched 28 May 2002.

Ofek 6, launched September 6, 2004 encountered another launcher failure, failed to achieve low earth orbit and also crashed to the sea. The launcher failure was due to the third stage of the Shavit launcher.

Ofek 7 was successfully launched on June 11, 2007.

Ofek-7 is the latest in the Ofek (horizon in Hebrew) class of satellites and it replaced Ofek-5, which has been in orbit and functioning successfully for almost five years.

### **BiolineRX deal with Cypress Bioscience worth up to \$365m**

BiolineRX Ltd. (TASE:BLRX) has granted an out-license to Cypress Bioscience Inc. (Nasdaq: CYBP) for the company's BL-1020 drug for the treatment of schizophrenia in the US, Canada, and Mexico.

Cypress has exclusive rights to complete clinical trials and regulatory procedures of BL-1020, and will bear the full costs in these clinical trials and regulatory procedures, as well as production and marketing of the drug in the territory. The company says that these costs will, by their nature, cost hundreds of millions dollars.

BiolineRX anticipates up to \$365 million in payments from Cypress under the licensing agreement, not including royalties on sales. BiolineRX will receive \$30 million upfront payment when the contract is closed; up to \$250 million in milestone payments related to the development and approval of the drug, including use of the drug for other illnesses, and positive results of the clinical trials; and up to \$85 million in milestone payment relating to the sale of the drug.

In addition to these payments, BiolineRX expects net royalties on sales of BL-1020 in Cypress's territory of 12-18% of annual sales.

BiolineRX will pay the BL-1020 license-holder part of the proceeds from the out-license.

Closing of the deal is subject to approval by the Office of the Chief Scientist, which has supported development of the BL-1020.

### **Merck Serono to expand Israel operations**

Merck Serono wants to broaden its drug pipeline and drug discovery activities.

Merck Serono SA, Europe's largest biopharmaceutical company, plans to expand its Israeli operations. The company has called on Israeli entrepreneurs and start-ups to collaborate with it through its local R&D center, Inter Lab Ltd.

Merck Serono is a unit of Merck KGaA (XETRA: MRGG). Merck Serono believes that it is the ideal partner of choice for the development of new drugs and that it has a proven track record of developing blockbuster drugs.

Inter-Lab CEO Ms Regine Shevach said "The Israeli science has a special zest to it, one which we are thrilled to encounter time and time again. Together with Merck Serono, this special zest can create the next blockbuster drug. We are reaching out and looking for unique collaborations, also from the very early stages of drug development. In our R&D center in Yavne, we offer the best team of scientists using the most advanced laboratories in Israel.

The biggest challenge today is developing a commercial drug from a molecule in its early stages of development. We are among the very few that possess the professional know-how in the development of biotechnological drugs, and part of a larger company that is a leader in all the stages of drug development. Merck Serono has a long standing commitment to Israel, which commenced over 30 years ago.

In the call to entrepreneurs, Merck Serono said that it wants to expand its drug pipeline in a range of fields, including autoimmune and inflammatory diseases, oncology, and endocrinology. It also wants to apply new technologies to expand its drug discovery activity.

### **Collagen made from transgenic tobacco plants**

A scientist at the Hebrew University of Jerusalem's Robert H. Smith Faculty of Agriculture, Food and Environment has succeeded in producing a replica of human collagen from tobacco plants – an achievement with tremendous commercial impli-

cations for use in a variety of human medical procedures.

Natural human type I collagen is the most abundant protein in the human body and is the main protein found in all connective tissue. Commercially produced collagen (pro-collagen) is used in surgical implants and many wound healing devices in regenerative medicine. The current market for collagen-based medical devices in orthopedics and wound healing, exceeds US \$30 billion annually worldwide.

Currently, commercial collagen, is produced from farm animals such as cows and pigs as well as from human cadavers. These materials are prone to harbor human pathogens such as viruses or prions (mad-cow disease). Human cadaver is scarce, and for certain indications possesses serious ethical issues.

Producing human recombinant type I pro-collagen requires the coordinated expression of five different genes. Prof. Oded Shoseyov of the Robert H. Smith Institute of Plant Sciences and Genetics in Agriculture has established the only laboratory in the world that has reported successful co-expression of all the five essential genes in transgenic tobacco plants for the production of processed pro-collagen.

Shoseyov's invention has been patented, and the scientific findings behind it were published recently in the journal *Bio-macromolecules*. A company, ColPlant Ltd., has been established based on patents and technology that were developed in Shoseyov's laboratory. It has raised US\$15 million to establish the first commercial molecular farming company in Israel and is already manufacturing collagen-based products that



have attracted collaborative commercial interest from companies in the US, Japan Europe and Israel.

Yissum, the technology transfer company of the Hebrew University, is one of the shareholders of CollPlant.. CollPlant is a public company traded in "TASE", and the potential revenue for the Hebrew University from this invention is estimated to reach into the multi-million dollar range.

The Kaye Awards have been given annually since 1994. Isaac Kaye of England, a prominent industrialist in the pharmaceutical industry, established the awards to encourage faculty, staff, and students of the Hebrew University to develop innovative methods and inventions with good commercial potential which will benefit the university and society.

### **Economic Developments Q1 2010**

Israel's recovery from the global economic crisis continued during the period reviewed. although there were signs of a certain slowdown in the rate of growth compared to its rate in the second half of 2009.

The continued increase in economic activity, which encompassed most of the principal industries and which was driven by domestic demand, led to a halt in the downward trend in stocks and to an increase in the number of employees. Investment in the principal industries continued to decline, however, and the rate of unemployment, that fell only slightly in the period reviewed, remained above its pre-crisis level.

Tax revenues continued to increase, but at a slower rate than in the second half of 2009. The domestic deficit is still lower than in other countries, and the debt/GDP ratio is not expected to show any significant increase.

The slowdown in the rate of recovery of the euro-zone as a result of the crisis in southern Europe, which became more severe at the end of the period reviewed, could have a significant effect

on Israel's exports. This effect was reflected to some extent in the period reviewed, in the decline in exports to some of the countries affected by the crisis.

In the period from January to April 2010 (the "period reviewed"), Israel's economic recovery continued in step with the recovery of the global economy. However, there were signs of some slowdown in the rate of growth compared with the trend at the end of 2009.

The expansion of economic activity, that encompassed most of the principal industries, led to a halt in the downward trend in stocks and to a slight improvement in employment, evident from the slow increase in the number of employees which exceeded its pre-crisis level. Nevertheless, investment in the principal industries continued to decline, the real wage remained low despite the fact that its erosion halted in the period reviewed, and the unemployment rate stayed above its pre-crisis level.

The economic recovery was also reflected in an increase in tax revenues, although the rise was slower than in the second half of 2009. Tax revenues exceed the budget estimates, thus reducing the domestic deficit below the seasonal path consistent with the deficit ceiling set in the budget. Thus the deficit continues to be low compared with that in other countries (see Table 1), and no significant increase in the debt/GDP ratio is expected.

The expansion of economic activity, reflected in continued GDP growth and the rapid increase in imports, was due mainly to the rise in domestic demand, and it brought the uses to their pre-crisis level. Gross domestic investment rose, as a result of the halt in the reduction of stocks, and private consumption excluding durables also grew. The increase in domestic demand was due to greater employment security, the increase in the value of the public's assets portfolio, the low level of the interest rate, and positive expectations regarding the continued recovery of economic activity.

Nonetheless, exports declined, partly because of the slowdown in the rate of recovery in some of Israel's export targets.

The slowdown of recovery throughout the eurozone due to the crisis in southern Europe, which became more severe at the end of the period reviewed, may have implications for Israel's exports to the eurozone at large, due to their heavy exposure to the European market: about 33 percent of Israel's total exports (excluding diamonds) are directed to Europe. These implications, which manifested themselves to some extent in the period reviewed in the decline in exports to Greece and Ireland, include both a direct effect—a decline in European demand for Israeli exports—and the indirect effect on Israeli exporters' competitiveness of nominal exchange rate appreciation against the euro.

### **Computers used in drive to test stress**

A new gadget that helps computer users check their stress and mood levels was unveiled recently at Asia's biggest IT trade fair.

The BioDynamic Signature (BDS) technology, unveiled by Israeli high-tech company IDesia, uses a person's unique heartbeat to tell whether they need to take some time out to relax.

The user grasps two sensors shaped like computer mouses to measure the electric activity of the heart in minute detail.

Software then combines the measurements with prerecorded personal details such as age and sex to calculate various indicators for stress and mood.

"It's like fingerprints. Everyone's is different," said David Chang, a vice president with the company, at Computex Taipei.

And the BDS, which IDesia aims to put on sale in the fourth quarter, got the thumbs-up from members of the public who tested it at the fair.

"Understanding your mood at the start of the day

is especially critical," a 60-year-old man told AFP after trying out the technology.

"It's just like turning on a television to watch a weather forecast report so you can prepare better for work each day," he told AFP.

IDesia said the technologies have drawn interest of leading Taiwanese computer makers such as Compal Electronics and Wistron.

"They have displayed products at the show using our solution," Chang said, declining to give details of the price.

The sensors can also be linked to other devices such as mobile phones and gamepads, the company said.

More than 1,700 exhibitors are taking part in the five-day Computex Taipei, featuring 4,861 booths and expected to greet around 120,000 visitors, including 35,000 international buyers, organisers say.

They expect the fair to generate around 20 billion US dollars in business.

### **Treating desalinated water**

Prof. Ori Lahav from the Faculty of Civil & Environmental Engineering has developed an elegant method for adding magnesium to desalinated seawater - making it fit for drinking and agricultural use

About three years ago Prof. Ori Lahav of the Environmental, Water and Agricultural Engineering Division of the Faculty of Civil and Environmental Engineering was invited to a meeting at the Water Authority that focused on examining proposals for adding magnesium ions to desalinated water for agricultural purposes. While listening to the many suggestions proposed by engineers and other inventors, Lahav came up with an idea of how to solve the problem cheaply and simply. He waited until the presenters had finished and then quickly told the committee members about his idea for solving the problem.

At the end of the discussion Prof. Lahav returned to his lab in order to develop the idea into a structured process. He proposed to Ms. Liat Birnhack, who was about to complete her Master's degree in a similar area, that she take the research on as a subject for a direct track doctorate. A year after this, Prof. Lahav and Birnhack published a paper. In the near future, desalinated water will become a significant source of the domestic and agricultural water supply in Israel and in many other places in the world. In the first phase of the desalination process salts are removed from seawater using different processes such as reverse osmosis, and almost completely distilled water is produced, with very low concentrations of sodium and chloride ions remaining in the water. This type of water cannot be used and requires a supplementary or completion process, termed in the professional jargon "post treatment". Desalinated water that does not undergo post treatment is aggressive to concrete structures, accelerates corrosion of metals, is very likely to dissolve iron oxides that have deposited onto the walls of old metal pipes and thereby cause the phenomenon of red water, is not palatable when drunk, lacks the necessary minerals humans need to get from water, is not suitable for agriculture and is not suitable for use as a source of treated wastewater after being used as drinking water.

During the post treatment process, various salts are reinserted into desalinated water, which ensure that the water has several features such as alkalinity (the ability to neutralize acids), calcium ion concentration (a mineral important for human health that also enables specific sediments to deposit onto the walls of transport pipes in order to minimize corrosion), a pH balance and more. The exact composition of desalinated water has been set by new Israeli standards, the first in the world that were developed especially for desalinated water, and which were drawn up by Lahav, Birnhack and others for the Israeli Ministry of Health.

The cation exchanger in Lahav and Birnhack's facility is a resin that has a selective adsorption property for divalent cations only. First, seawater

is pumped through the resin so that the resin is charged with magnesium and calcium ions at a 4:1 ratio. In the next stage, desalinated water with  $\text{Ca}^{2+}$  ions is passed through the resin. There is an excess of  $\text{Ca}^{2+}$  concentration in this water as a result of the water hardening process in which calcium is introduced through the dissolution of quarry material called calcite (calcium carbonate). In order to maintain a chemical balance, cations are exchanged between the solution and the resin, the result of which means that magnesium ions are released into the water and an equal amount of calcium ions are adsorbed into the resin.

The process is time dependent and the final magnesium and calcium concentrations in the water, can be controlled through the amount of time, that the water with the excess calcium concentration, is pumped through the resin. At the end of the process the resin is charged mainly with calcium ions, and when the system switches back to seawater the calcium ions are exchanged by magnesium ions, etc.

### **Manufacturing and Production**

The advantage in the new method is in its simplicity, the relatively low investment in infrastructure it requires and the low cost of the process due to its use of raw material that is anyway part of the desalination process at the facility. Another great advantage is that the process does not create any waste. After the patent had been registered, the Technion Technology Transfer unit chose a private company with which to partner and establish a jointly owned company called Renewed Water Minerals, which today manufactures and markets the device. The company has to date invested a significant amount of money in development and it is reasonable to assume that in the near future the process will be integrated in desalination plants in Israel.

### **Nano-diamonds are forever**

About sixty years ago, scientist declared that they had succeeded in growing minute diamond crystals - which at that time was perceived as a totally

outrageous claim - under sub-atmospheric pressure and relatively low temperatures by depositing carbon atoms onto a surface. The standard way of forming synthetic single crystal diamonds, at the time, required tremendous pressure of approximately 70,000 kg/cm<sup>2</sup> and very high temperatures over 2300°K, and accordingly, the discovery met with the indifference usually reserved for impossible discoveries and was almost completely forgotten.

Over twenty years passed until Japanese scientists successfully replicated the experiments and removed the doubt concerning the method's feasibility. Much research was dedicated since then to clarifying the formation and growth processes of poly-crystalline diamond films under conditions of relatively low temperatures and pressure on different materials. Some of the discoveries in this area - among which was the discovery of the mechanism through which nano-diamond crystal seeds are formed via electrical discharge - occurred in the laboratory of Prof. Alon Hoffman of the Schulich Faculty of Chemistry.

Prof. Hoffman came to the field of diamond growth from the area of solid state surface and thin film research. A film is defined as a solid with a thickness of several tens up to several thousands of atomic layers. The understanding and control of surface properties is very important because the world that surrounds us is composed of the convergence of surfaces and interfaces between solid, liquid and gaseous phases. The stability of many solids, for example, is to a large extent, determined by their surface characteristics.

The properties of diamonds makes them the preferred option as a coating and protective agent for use on surfaces that must withstand extreme conditions of mechanical wear and chemical corrosion. Hoffman won a special prize from the General Motors Corporation for developments that have enabled the coating of steel with an extremely thin film of diamond crystals, thereby enhancing the steel's properties such as wear resistance and chemical stability. Hoffman antici-

pates that the use of diamond films will also be taken up by the electronics industries, utilized in bio-medical applications and in the field of space technology, and that diamonds are destined to become the ceramic material of the future.

The process of growing poly diamond films from the gaseous phase as executed in the Schulich Faculty of Chemistry at the Technion appears schematically in the following diagram:

The filament is heated to 2000° and the surface, which lies about a centimeter beneath it, has a temperature of about 700°. Diamond crystal grow from seeds as a result of differences in the radicals energetic states between the hot filament and the growing surface. Carbon atoms are adsorbed onto the growing surface, which in the presence of active hydrogen cause the diamond seeds to grow. Continuous poly crystal diamond layers grow at a rate of one micron per hour.

In order to coat a particular surface with a uniform and smooth layer of diamonds, the growing seeds must be highly dense. Hoffman and his staff studied how to control this parameter. They tried to develop a physico-chemical method for attaching the growing seeds to the surface needing to be coated, and among others, they tested an ultrasonic bath. In this process the object to be coated is inserted into an alcohol mixture containing nano-diamond dust and various different metal and ceramic particles, and then undergoes ultrasonic activity.

Prof. Hoffman and his team saw that the process greatly increases the density of the growing seeds, but their results were inconsistent. They were unable to understand the process, until unintentionally a team member (Roza Akhvlediani) added relative large alumina particles, which is a very hard and durable material, to the mixture. The result was beyond what anyone had expected: the density of the growing seeds increased by three orders of magnitude from 10<sup>8</sup> to 10<sup>11</sup> seeds per cm<sup>2</sup>. The surprised researchers understood that this wasn't a chemical process because the



alumina is inert under experimental conditions, and suggested that a mechanical process had taken place - the larger alumina particles were agitated by the ultrasonic field and hit the minute diamond particles floating in the solution fixing them to the surface.

The discovery was the result of a mistake, but Hoffman explains that an unexpected outcome in an experiment or a result that at first appears irrational often produces scientific breakthroughs. This is a message he always makes sure to convey to his students. There is no substitute for planning and hard work; nonetheless, it is also important not to ignore unusual events and results that appear at first contrary to common wisdom, because it is these incidents especially that often screen important discoveries, explains Prof. Hoffman.

### **Diamonds in space**

Hoffman is now aiming his research at new heights and is investigating the behavior of poly crystal diamond films in space. At a height of 200 to 500 km above the Earth, where satellites orbit, there are relatively high concentrations of atomic oxygen and UV rays that corrode different materials very efficiently. In a lab experiment it was found that poly crystal diamond film are very resilient in the harsh simulated space environment. Recently diamond films that were grown in Hoffman's lab were sent up into space on the Atlantis space shuttle. They will be there for about a year and when they return, the effect of this environment on them will be checked. Scientists will be looking to see if they are appropriate for use as a coating and protective material for satellite parts and if they can, therefore, significantly extend the parts' lifespan and durability.

The results described in this short article are only a short part of the much larger research work that has been going on in the Schulich Faculty of Chemistry for over two decades by many research students, research team members under the supervision of Prof. Hoffman and collaborators.

### **Electric Helmet Slows Brain Tumors Without Chemo Side Effects**

Doctors treating brain cancer have a limited toolkit. They can cut tumors out with a knife, burn them with radiation or try to poison them with drugs.

NovoCure Ltd., a closely held Israeli company, has added a fourth option for hard-to-treat tumors. It's an array of electrodes resembling a tight-fitting helmet that bathes the cancer in a faint electric field, scrambling the inner workings of the rampaging cells and preventing them from multiplying.

The helmet, powered by a 6-pound battery pack, is designed to zap deadly glioblastomas, the malignancy that killed U.S. Senator Ted Kennedy in August 2009. In a study reported today, it helped patients with recurrent tumors live 7.8 months, compared with a median 6.1 months for patients given the best available chemotherapies or Roche AG's Avastin.

The technology is so different from other treatments, it was difficult to convince patients and doctors to try it, said Philip Gutin, primary investigator for the study. "This new data actually shows that it's effective," said Gutin, the chair of neurosurgery at Memorial Sloan-Kettering Cancer Center in New York. "People will ask for this now."

The electric fields resonate at a frequency designed to do no harm to healthy brain tissue. In the test, the only side effect was mild scalp irritation, Gutin said. "If it continues to look as good as it does, it will be used in lots of different treatments. There's no downside to it."

The study, reported at the American Society of Clinical Oncology in Chicago, followed 237 very sick patients whose cancers had returned after prior treatment and whose tumors, on average, were 4 centimeters (1.57 inches) in diameter.

### **Topping Chemotherapy**

The study was designed to show that patients

using the helmet fared significantly better than those taking chemotherapy and Avastin. On this basis, it was a failure. That's because more than 50 patients either died or dropped out before they completed the first round of treatment, said Eilon Kirson, head of NovoCure's research and development.

When those patients are excluded from both arms of the analysis, the helmet performed better than other treatments, Kirson said. Under either analysis, the trial found the helmet to be at least as good as other approaches, but without the vomiting, fatigue and infections associated with chemotherapy.

While shooting electricity through the brain conjures images of Mary Shelley's "Frankenstein," or the involuntary electroshock therapy in Ken Kesey's "One Flew Over the Cuckoo's Nest," Kirson emphasized that NovoCure's technology is new. The helmet is the first cancer therapy to use alternating polarities in electric fields as a way to disrupt the cell division process known as mitosis.

### **"Bad Name"**

"Electricity has gotten a bad name in medicine in the last century or two," Kirson said in a telephone interview. "People hear 'electric fields' and of course they are skeptical. In order to cross that barrier into biology and medicine, we had to start at the end. The end is glioblastoma."

Yoram Palti, a professor of electrophysiology and biophysics at Technion-Israel Institute of Technology, started NovoCure, based in Haifa. Early funding came from Bill Doyle, founder of investment firm WFD Ventures and now chairman of NovoCure. Pfizer Inc. and Johnson & Johnson are also investors, according to a NovoCure statement.

Early prototypes were cumbersome for patients, weighing about 15 pounds, Kirson said. The current battery pack looks like a white laptop computer that slips into a shoulder bag, and the company

plans to shrink the device further.

Patients wore NovoCure's helmet for about 20 hours a day, shaving their heads twice weekly before reapplying the electrode patches. The patients were able to conduct most of their usual routine with the machine and took occasional breaks for athletic or social events.

### **"A Nice Shower"**

"We have a patient who plays tennis," Kirson said. "Whenever she replaces her electrodes, she goes and plays tennis for a couple of hours, she has a nice shower, she goes into the sauna, and when she gets out she'll put it back on and keep going." Now NovoCure is testing the helmet simultaneously with chemotherapy in early cases of glioblastoma with hope that a combination will enhance the effectiveness of both treatments.

NovoCure is using today's trial to apply for U.S. marketing approval, and the company seeks to begin U.S. sales next year, Kirson said. The helmet is already approved for use in Europe, though health plans there won't currently pay the \$10,000 to \$15,000 a month it costs to wear it.

NovoCure is testing similar devices for other types of hard-to-treat cancer. The results of a test in 42 lung cancer patients will likely be released at the European Society of Medical Oncology meeting in September, Kirson said.

"I must admit that when I first saw this I thought it was complete and utter trash -- I'm being that honest about it," Kirson said. "It's such a novel technology, you have to show that you are the real thing."

The real reason I went into this was because I had worked with Professor Palti, and I believed in him. I thought he was a brilliant man, and I still do."

### **Odds & Ends**

Scientists in Israel found that the brackish water, drilled from underground desert aquifers hundreds

of feet deep, could be used to raise warm-water fish. The geothermal water, less than one-tenth as saline as seawater, free of pollutants, and a toasty 98 degrees on average, proves an ideal environment.

Israeli-developed designer-eyeglasses, promise mobile phone and iPod users, a personalized, high-tech video display. Available to US consumers next year, Lumus-Optical's lightweight and fashionable video eyeglasses, feature a large transparent screen, floating in front of the viewer's face that projects their choice of movie, TV show, or video game.

When Stephen Hawkins recently visited Israel; he shared his wisdom with scientists, students, and even the Prime Minister. But the world's most renowned victim of amyotrophic lateral sclerosis (ALS), or Lou Gehrig's disease, also learned something, due to the Israeli Association for ALS' advanced work in both embryonic and adult stem cell research, as well as its proven track record with neurodegenerative diseases. The Israeli research community is well on its way to finding a treatment for this fatal disease, which affects 30,000 Americans.

Israeli start -up, Veterix, has developed an innovative new electronic capsule that sits in the stomach of a cow, sheep, or goat, sending out real-time information on the health of the herd, to the farmer via email or cell phone. The e-capsule, which also sends out alerts if animals are distressed, injured, or lost is now being tested on a herd of cows, in the hopes that the device will lead to tastier and healthier meat and milk supplies.

The millions of Skype users worldwide will soon have access to the newly developed KishKish lie detector. This free internet service, based on voice stress analysis (a technique, commonly used in criminal investigations) will be able to measure just how truthful that person on the other end of the line, really is.

Beating cardiac tissue has been created in a lab

from human embryonic stem cells by researchers at the Rapp port Medical Faculty and the Technion - Israeli Institute of Technology 's biomedical Engineering facility. The work of Dr. Shulamit Levenberg and Prof. Lior Gepstein, has also led to the creation of tiny blood vessels within the tissue, making possible its implantation in a human heart.

Israel 's Magal Security Systems, is a worldwide leader in computerized security systems, with products used in more than 70 countries around the world, protecting anything from national borders, to nuclear facilities, refineries, and airports. The company's latest Product, DreamBox, a state-of-the-art security system that includes Intelligent video, audio and sensor management, is now being used by a major water authority on the US east coast to safeguard the utility's sites.

8. It is common knowledge that dogs have better night vision than humans and a vastly superior sense of smell and hearing. Israel 's Bio-Sense Technologies recently delved further and electronically analyzed 350 different barks. Finding that dogs of all breeds and sizes bark the same alarm when they sense a threat, the firm has designed the dog bark-reader, a sensor that can pick up a dog's alarm bark, and alert the human operators. This is just one of a batch of innovative security systems to emerge from Israel which Forbes calls 'the go-to country for anti-terrorism technologies.'

Israeli company, BioControl Medical, sold its first electrical stimulator to treat urinary incontinence to a US company for \$50 Million. Now, it is working on CardioFit, which uses electrical nerve stimulation to treat congestive heart failure. With nearly five million Americans presently affected by heart failure, and more than 400,000 new cases diagnosed yearly, the CardioFit is already generating a great deal of excitement as the first device with the potential to halt this deadly disease.

One year after Norway 's Socialist Left Party launched its Boycott Israel campaign, the import-

ing of Israeli goods has increased by 15%, the strongest increase in many years, statistics Norway reports.

### **Medtronic invests \$70m. in cardiology co BioControl**

Medtronic Inc. (NYSE: MDT) will invest \$70 million in Israeli medical device start-up BioControl Medical Ltd. Medtronic also obtained an option to acquire BioControl for \$550 million, subject to the company obtaining approval from the US Food and Drug Administration (FDA) for its proprietary implantable nerve stimulation devices.

Medtronic also has an option, which is highly unusual: if BioControl fails to complete the clinical trials of its devices or obtain FDA approval for them, Medtronic can still acquire the company for \$350 million.

Medtronic and BioControl signed the strategic agreement a few days ago, after several months of negotiations.

BioControl's devices are designed to control muscles through nerve stimulation. In 2006, it sold its urology product to American Medical Systems Inc. for \$50 million.

Yossi Gross and brothers Eyal and Boaz Lipshitz founded BioControl in 1999. On the basis of Gross's invention, the company began developing products and raising capital. Investors include Pitango Venture Capital, GlenRock Israel, Vitalife Life Sciences Venture, Tamir Fishman Venture Capital's (TASE: TFVC) Eucalyptus Ventures, Biomedical Investments Ltd. (now owned by Clal Biotechnology Industries Ltd. (TASE: CBI)), and Switzerland's HBM BioVentures.

Since the sale of its urology product line in 2006, BioControl has focused on development of the CardioFit system, the first device in the world for treating heart failure through nerve stimulation of the heart muscle instead of directly aiding the heartbeat. CardioFit stimulates the vagus nerve in the neck with an electro-stimulator that is monitored by an intra-cardiac electrogram (EGM) sen-

sor. Preclinical trials indicate that stimulating the vagus nerve reduces heart failure and improves heart function.

BioControl still has a long way to go, with at least three years of clinical trials ahead of it. Medtronic's investment is intended to help finance the trial's and reduce the pressure on and uncertainty for BioControl.

BioControl's management deliberated between signing an investment agreement with an option to sell with Medtronic, or making a financing round. Times are hard, even for a company with a proven track record, for raising capital from new investors, so BioControl opted for the deal with Medtronic.

The investment in BioControl is Medtronic's second major move in the Israeli life sciences market, following the acquisition of Vantor Technologies Ltd. for \$325 million, and the establishment of an innovation center for seeking technologies of interest to the medical devices giant.



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