

# **ISRAEL HIGH-TECH & INVESTMENT REPORT**

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## **Early Signs of Economic Improvement**

Israel's GDP will contract by 0.1% in 2009, but will grow by 2.4% in 2010, says the International Monetary Fund in its World Economic Outlook Update, published at the end of September, to mark the IMF-World Bank Annual Meeting in Istanbul.

In late August, the Bank of Israel revised its growth forecast upwards from minus 1.5% to zero in 2009, and from 1% to 2.5% growth in 2010.

However, in an international comparison, Israel's growth forecast stands out. The IMF's forecast of a 0.1% GDP contraction is better than its forecasts for all other developed economies, including the US (-2.7%); Euro Bloc (-4.2%); Germany (-5.3%); Japan (-5.4%); South Korea (-1%), and Singapore (-3.3%). The IMF predicts an overall contraction of 3.4% for developed economies as a whole in 2009.

The IMF's growth forecast of 2.4% for Israel in 2010 is also among the fastest rates projected for next year among developed countries. Only five countries are predicted to do better: Singapore 4.1%; Slovakia and Taiwan 3.7% each; South Korea 3.6%; and Hong Kong 3.5%. The IMF predicts that the US economy will grow by 1.5% next year, the Euro Bloc will grow by 0.3%, and Japan by 1.7%.

The IMF also predicts that Israel's inflation will be 3.6% in 2009 and 2% in 2010. The Bank of Israel says that 12-month inflation rate through September 2010 will be 2.3%.

The IMF predicts that Israel's unemployment rate will be 8.2% this year, well above the 2008 rate of 6.2%. It also expects the unemployment rate to rise further, to 8.6%, in 2010. This forecast is similar to the projection by Harel Finance chief economist Michael Sarel, formerly the chief economist at the Ministry of Finance. He expects an unemployment rate of 8.1% this year and 8.5%

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next year.

Ministry of Finance representative in New York Zvi Halamish stated that the IMF forecast strengthens the optimistic responses we're getting from investors about the Israeli economy. Although exports are not reaching the level from before the crisis, they're not far off."

Perhaps most encouragement was the end of employee layoffs that had plagued the economy all of last year. Many of the unemployed came from the franks of high-tech companies, who were the first to feel the global economic pinch.

The Tel-Aviv Stock Exchange sensing a change in the direction of the economy, by the end of August had risen by 61% since the beginning of the year. By the end of September it had passed the 1,000 mark, the equivalent of 10,000 on the Dow Jones Index.

While the building industry is still in the doldrums real estate prices have risen sharply, especially in the Tel-Aviv area. A recent survey found that housing prices in Israel were 8.4% higher in the second quarter of 2009 than in the corresponding quarter of 2008 - the highest growth in any market in the survey.

## **Oracle buys Israeli business intelligence company HyperRoll**

Oracle reported that it had acquired HyperRoll Inc., which develops what are known as financial reporting acceleration solutions. This software allows an enterprise to gather data for financial reporting faster and thus produce financial statements in a shorter time. Oracle did not disclose financial details of the transaction, which is expected to close in the next few months.

HyperRoll was founded in 2000. It has its corporate headquarters in Mountain View, California, and its development center in Omer, Israel. Its field is business intelligence (BI), more specifi-

cally data warehouse performance acceleration software. The company has developed algorithms that produce analytical summaries from databases. Some \$42 million have been invested in the company, the main shareholders being Greylock Partners, Sequoia Capital, and Bessemer Venture Partners, together with Vertex Venture Capital, Exseed, Lighthouse Capital, Denali Ventures, and Eitan Wertheimer's Microdent Ventures. In addition, Hyperion Solutions Corporation (acquired by Oracle in 2007) made a strategic investment in HyperRoll in 2006.

In its announcement, Oracle said that HyperRoll's employees would be transferred to an Oracle.

Oracle Product Development senior vice president Robert Gersten said, "Oracle Enterprise Performance Management already enables rapid, accurate, and secure financial consolidation and reporting. With the addition of HyperRoll's reporting acceleration technology, customers are expected to be able to execute a faster and more compliant financial close."

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## Water desalination using new reverse osmosis method promises high recovery

Researchers at Ben-Gurion University of the Negev are developing technology to scale up a novel method for achieving very high recoveries in desalination by reverse osmosis to be used in a Jordanian desalination plant.

A team of scientists has developed a method of exploiting the finite kinetics of membrane fouling processes by periodically changing the conditions leading to membrane fouling before it can occur. The team was recently awarded grants from the NATO Science for Peace program and the Middle East Desalination Research Center (MEDRC).

Working in collaboration with colleagues from University of Colorado and the Hashemite University of Jordan, the group will be developing technology and setting up pilot facilities to produce ~120 m<sup>3</sup>/day (31,000 gallons) at desalination sites in Israel and in Jordan. Dr. Gilron explains that "the process will be tuned to reduce brine volumes to 33-50 percent of those generated in conventional reverse osmosis. This greatly reduces the environmental burden and improves the economics of the inland desalination process."

Gilron continues, "Water scarcity and the need to develop new water resources for populations away from seacoasts are driving efforts to desalinate brackish water and municipal wastewater with ever-increasing efficiencies."

'Alert status' area in brain opens door to future treatment of disorders of impaired consciousness

A new understanding of how anesthesia and anesthesia-like states are controlled in the brain opens the door to possible new future treatments of various states of loss of consciousness, such as reversible coma, according to Hebrew University of Jerusalem scientists.

In an article published in the Journal of Neuroscience, the scientists, Marshall Devor, the Cecile

and Seymour Alpert Professor of Pain Research, graduate student Ruth Abulafia and research associate Dr. Vladimir Zalkind describe their discovery of an area of the brain that participates in the control of "alert status."

Loss of response to painful stimuli and loss of consciousness are the most striking characteristics of surgical anesthesia and anesthesia-like states, such as concussion, reversible coma, and syncope (fainting). These states also exhibit behavioral suppression, loss of muscle tone, a shift to the sleep-like "delta-wave" EEG pattern, and depressed brain metabolism.

It has been widely presumed that this constellation of dramatic functional changes reflects widely distributed suppression of neuronal activity in the brain due to dispersed drug action, or to global oxygen or nutrient starvation.

However, new results revealed by the Hebrew University scientists suggest a radically different architecture -- that a small group of neurons near the base of the brain, in the mesopontine tegmentum, has executive control over the alert status of the entire cerebrum and spinal cord, and can generate loss of pain sensation, postural collapse and loss of consciousness through specific neural circuitry.

This conclusion derives from the observation that microinjection of tiny quantities of certain anesthetic drugs into this newly discovered "center of consciousness" in laboratory rats induced a profound suppressive effect on the activity of the cerebral cortex.

It is not certain that these results will translate reliably from rats to man. But if they do, there are at least two implications of considerable interest. First, this knowledge could contribute to the ability of medical science to treat disorders of consciousness and its loss, such as insomnia, excessive sleepiness and even coma. Perhaps by direct electrical stimulation of the cells in question, it might prove possible to arouse a patient from coma.

Second, the discovery of a specific cluster of neurons that control the brain's state of consciousness can be expected to lead to the beginnings of an understanding of the actual wiring diagram that permits a biological machine, the brain, to be conscious.

### **IAI unit Elta secure South Korea orders**

Israel Aerospace Industries Ltd. (IAI) (TASE: ARSP.B1) subsidiary Elta Systems has won two multiyear contracts worth \$280 million altogether to supply radar systems to the Republic of Korea Army.

IAI's usual policy is to receive a down payment of 25-35% on contracts, suggesting that it will record \$70-98 million revenue from the contracts in its consolidated financial report for 2009.

In the first contract, Elta will supply its EL/M2032 fire control radar systems for combat aircraft, for South Korea's indigenous TA/FA 50 Golden Eagle jet. The system improves the jet's air-to-air, air-to-ground, and air-to-sea combat capabilities. The system can identify and classify a range of targets at long ranges, provide high-resolution combat arena maps, and has additional applications as well. The Golden Eagle trainer and light attack strike fighter is a joint development of KAI / Lockheed Martin and Lockheed Martin Co. (NYSE: LMT). The radars will be jointly manufactured with South Korean sensors and communications equipment maker LIG Nex1 Ltd.

In the second contract, Elta will supply its advanced radar system for air defense, which is slated to become operational by the South Korean Army in 2012.

Dr. Alon Monsonego , a researcher who is working on a vaccine for Alzheimer's disease (AD) has demonstrated that it is possible to test and measure specific immune responses in mice carrying human genes and to anticipate the immune response in Alzheimer's patients. This continuing research at Ben-Gurion University of the Negev

could one day lead to specific Alzheimer's vaccines that reduce plaque, neuronal damage and inflammation associated with the disease.

Amyloid beta-peptide accumulates in the brain of AD patients where it appears to promote neuronal damage. In the article, recently published in the Journal of Immunology, BGU researcher Dr. Alon Monsonego determined that introducing A-beta into the brain triggers a natural immune response which can be detected in humans.

Importantly, the research team showed that the specificity and magnitude of this body response to A-beta depends on certain key genes of the immune system, which are highly polymorphic in the population (this means that except for identical twins, almost each of us has a different combination of genes termed "HLA alleles").

Furthermore, this research took an unusual approach combining humans and humanized mouse models. "We began with characterizing the genes in humans in a collaboration with the laboratories of Dr. Weiner and Dr. Selkoe at Harvard then did the same study in mice using a mouse model of multiple sclerosis with the laboratory of Dr. Altmann- Imperial College School of Medicine, UK," Monsonego explains. "We then generated a humanized mouse model of AD, with a specific gene that was present in approximately 30 percent of our study group (HLA DR15 allele). Conceivably, those people that have this gene could receive the same vaccine which will teach a person's immune system to better fight the disease."

Monsonego continues, "As in other mouse models of the disease, we show that with aging A-beta aggregates accumulate in brain areas of cognitive functions and stimulate an inflammatory reaction in the brain. However, stimulating an immune response to A-beta in these humanized mice not only resulted in a highly efficient clearance of A-beta (plaque) from the brain, but also in a markedly reduced inflammatory reaction. Furthermore, we were able to predict that the characteristics of

immune response in mice were the same as in the humans.

"This study thus provides the basis for developing an individual-based (personalized medicine) immunotherapeutic approach to Alzheimer's disease since different populations will respond differently to a vaccine based on their genetic background," Monsonego explains. "Now that we've proven we can anticipate the specific responses for several abundant genes in the population, further study is needed to ensure safety and efficacy in our humanized mouse model of AD."

### Inside the new Israeli Defence Forces

The platoon of Israeli soldiers surges through the city neighbourhood, in pursuit of a heavily armed insurgent team. They'd been spotted just minutes earlier by an Unmanned Aerial Vehicle orbiting high overhead. Rounding a corner, the platoon runs into the kind of low-tech obstacle that has vexed armies for thousands of years. A wall, slightly too tall to see over.

The lieutenant in charge is worried. Insurgents might be waiting to ambush his soldiers as they climb over the wall. The UAV can't get an angle on the area. Tall buildings block its line of sight. The officer needs some way to look over the wall without endangering his troops. He calls forward a four-man team.

The four troopers – two technicians and two guards – comprise the world's first dedicated combat robot team. They represent a new way of thinking for the IDF, and for the many armies that carefully follow Israeli advances in the art of war.

With the two guards covering their backs, the two robot operators reach into their backpacks. They assemble a device that looks a lot like a baseball dangling from a fishing pole. The ball is actually a self-rotating robot. It's equipped with tiny cameras, and can beam streaming video to a laptop computer that the lieutenant carries. The manufacturer, ODF Optronics, of Tel Aviv, calls the robot the EyeBall.

The operators raise their arms to extend the EyeBall over the wall until it dangles on the opposite side. The lieutenant logs onto his laptop, detects the EyeBall's signal and tells the tiny robot to peer around. The officer sees everything the EyeBall sees. Confident that the insurgents are not plotting an ambush, he orders his men to climb the wall.

This scenario is fictional, but incidents like it have played out countless times in training and combat, in the last two years. EyeBall and its operators represent a make-over of Israeli forces that was spurred by humiliating defeats in Lebanon three years ago. The revamped Israeli Defence Forces combine high technology with no-nonsense tactics. The IDF's new ways offer a tantalising glimpse of future warfare.

In 1948, the Israeli army numbered just 100,000 former militiamen and was armed with an unwieldy mix of cast-off, smuggled and locally manufactured arms. That year, this ragtag force defeated the combined armies of Egypt, Iraq, Jordan, Lebanon, Saudi Arabia and Syria, in a fight over Jewish statehood.

The first Arab-Israeli war forged a fearsome reputation for the Israeli Defence Forces. Israeli victories against Arab armies in 1956, 1967 and 1973 only boosted the IDF's status. In June 1982, the Israelis scored one of history's most lopsided military victories. In two days of fighting over Lebanon, Israeli warplanes shot down at least 64 Syrian planes – and as many as 82 – for no losses of their own.

Undefeated for decades, the IDF was confident of victory when Israeli troops invaded Lebanon again in July 2006, aiming to rescue two kidnapped Israeli soldiers and disarm Hezbollah, the Islamic extremist group that held the soldiers. But the ensuing battles proved a nasty surprise for the IDF. More than 100 Israeli troops died, some in sophisticated ambushes. After dropping thousands of bombs, to little effect, the IDF pulled out. It would be two years before Hezbollah returned

the bodies of the two captured soldiers.

Iran-backed Hezbollah fighters had surprised the IDF with a complex mix of insurgent tactics and high-tech weaponry. It was the first major example of what military thinkers call a “hybrid war.” In hybrid fighting, “you’re going to see a mix of conventional and unconventional” tactics and technology, General James Mattis of the US Marine Corps explained.

Decades without defeat had, ironically, contributed to the IDF’s poor performance. That was the conclusion of an Israeli commission that convened after the war. “Some of the political and military elites in Israel have reached the conclusion that Israel is beyond the era of wars, [that] it had enough military might and superiority to deter others from declaring war against her,” the Winograd commission reported. For that reason, Israeli leaders had felt “no urgent need” for Israel’s forces “to update in a systematic and sophisticated way.”

The 2006 Lebanon war proved that philosophy wrong. In the wake of Israel’s withdrawal from Lebanon, the IDF set about correcting its deficiencies. The reforms got the IDF “back to basics,” according to David Johnson, an analyst with the American think-tank RAND.

In December 2008, a smarter, better-trained and better-equipped IDF launched a series of air, ground and sea attacks on Gaza. The goal of Operation Cast Lead was to disarm and isolate the Iran-supported Palestinian extremist group Hamas. Hamas was just as heavily armed as Hezbollah, and used many of the same tactics. Some pundits predicted disaster. But when the IDF withdrew in January, it had lost just 13 killed.

Over Gaza, IDF pilots proved how far they’d come, since Lebanon. “The opening strikes ... involved more than 100 aircraft attacking in several waves,” wrote David Eshel, a correspondent in Tel Aviv. “The target bank of weapon caches, supply tunnels, rocket production facilities and

underground rocket launching sites, along with Hamas administration structures, were destroyed within the first four minutes of the attack.”

For Israel, Gaza represented the victory that the 2006 Lebanon war should have been. For the rest of the world, it was a vital case study in hybrid warfare.

To help us better understand how the IDF fought in Cast Lead, and how the IDF and other armies will fight in the future, Israel granted Wired.co.uk rare access to the IDF’s ground, air and sea forces.

In the years before the Lebanon conflict, the IDF’s once-vaunted fighter pilots – the force that had cleaned up against the Syrians over the Bekaa – lost their edge. Equally alarming, they lost their once-close relationship to IDF ground forces. As pilot skills deteriorated, the IDF removed from the ground forces the forward air controllers who coordinated front-line air strikes. After Lebanon, the army restored the controllers to their old positions. Meanwhile, the air force ramped up its training.

Bigger or richer air forces can afford specialised squadrons devoted to long-range bombing, attacking front-line ground targets or dogfighting. But not the IDF. All of its squadrons do a little bit of everything. While Israel’s main fighter, the American-built F-16I, is capable of every mission, the pilots are another matter. There’s only so much time to train for different tasks. The training challenge is only exacerbated by Israel’s lack of air-space. The whole country is 9,000 square miles in area. The US Air Force’s Nellis training range, by comparison, is 12,000 square miles. Between limited training space and the high demands on its pilots, the IDF must get creative to maintain its aerial advantage.

So the IDF turned to computer simulators to help boost pilot training. Israel contracted Lockheed Martin to install sophisticated simulators in the facilities of its training squadron in Hatzor. Each

simulator boasts an IMAX-like movie screen. The screen depicts a computerised world populated, Hollywood effects-style, by enemy fighters and ground targets. Every IDF pilot visits Hatzor once a year, for four days, flying three simulated missions per day. "The benefit to the simulator is that I can feel the most stressful conditions, yet not put myself or the aircraft in any danger," said "Captain G," an F-16 pilot. (The IDF air force does not disclose the identities of its pilots and ground crew.)

Many air forces have flight simulators. After all, even teenage gamers have access to realistic flying games like Microsoft Flight Simulator. A highly trained staff of young airmen act as "god" and the "brains" for the training runs. They control the weather in the simulation, cause unpredictable mechanical malfunctions in the trainees' plane and direct enemy forces on the ground and in the air. Incidentally, Hatzor's simulation staff is all female. Simulation operator is one of the "most elite positions for women in the IDF," Major E explained.

The operators – including "Corporal Ofir," who was overseeing a simulation– are "picked up straight from high school, sent to a gruelling ten-month course, and at the age of 18 or 19 are already working with our pilots," Major E said. The operators even learn fighter-pilot lingo, so they can recite realistic radio chatter for the trainees' simulated wingmen.

Turn-around is speedy, as demand for pilots is unrelenting. Two crews cycle through one simulator within just 20 minutes. Although Israel is at peace at the moment, the potential for conflict is high. The IDF air force has apparently been busy countering Iranian influence across the Middle East. In January, Israeli jets allegedly bombed an arms convoy travelling through Sudan, en route to Gaza. And in September 2007, IDF planes apparently struck a suspected Syrian nuclear facility. Both the arms convoy and the nuclear site reportedly had ties to Iran. In April, the Iranian air force cancelled a ceremonial fly-over in Tehran, over fears the IDF might bomb the assembled aircraft.

The cancellation was proof the IDF had earned back its old reputation.

For all the air force's failures during the Lebanon war, it was the Israeli navy that received the biggest shock. On July 14, 2006, a sophisticated, Iranian-made anti-ship missile, fired by Hezbollah forces, struck the Israeli corvette Hanit, killing four sailors. Missiles narrowly missed other IDF vessels. High-tech weapons in the hands of a traditionally low-tech extremist group is hallmark of hybrid warfare.

For years, the IDF had struggled to protect its ships and boats from insurgent attackers. In 2000, 2002 and again in April this year, Palestinian extremists using explosive-laden fishing boats tried to blow themselves up alongside Israeli patrol vessels. Bombers, combined with the missile threat, have made the waters off Gaza and Lebanon some of most dangerous in the world. After Lebanon, the Israeli navy realised it no longer had the upper hand.

The IDF's answer was to update its tactics and equipment. For starters, Israeli corvettes apparently now operate mostly at night, when it's more difficult for extremist missile-launchers and bombers to spot them. Also, the ships probably use more electronic jamming. When Israeli warships must operate during the day, they stay farther from land, according to a senior navy source. That means corvettes like Hanit, which has been repaired, rely heavily on missiles, rather than guns, to hit ground targets. The IDF showed a series of videos depicting a corvette firing what appear to be Spike armour-piercing missiles at targets in Gaza. The Israeli navy arms many of its vessels with highly accurate Typhoon weapons mounts that can be fitted with machine-guns, grenade launchers or Spike missiles.

To put distance between its ships and potential attackers, the IDF is buying the Protector, a robotic boat that can also carry Typhoon mounts. Built by the Israeli company Rafael, Protector can range as far as ten miles from its operators, who

might ride in a corvette or other vessel. The IDF wouldn't go into detail about its Protectors, simply stating that the robot is "operational" – meaning it has probably seen combat.

The IDF ground forces share the navy's emphasis on robots. The EyeBall robot that dangles over walls is just one of a network of small robots the IDF is adopting. The network is meant to give platoons more eyes and ears during the bloody, chaotic urban battles that characterised both Lebanon and Gaza.

Besides the EyeBall, the bots include: the Eye-Drive, which mounts the EyeBall's tiny cameras on a miniature tank chassis; the EyeFly, which fixes the camera to an arrow fired from a rifle barrel; and the EyeGuard, an adhesive camera that can be slapped onto any vertical surface. The bots automatically log onto a cellular-style data network and feed video and audio to the platoon leader's touch-screen laptop.

That simplicity is key. The new, no-nonsense IDF demands that any technology must work in even the most dire circumstances. ODF's robot network fits that bill, 2nd Lieutenant Niv Pe'er, an IDF instructor, said during Wired.co.uk's visit to a ground forces training facility. "When we train the operators, we spend very little time on the technical details, because it is so easy to learn," Pe'er said. Instead, instructors spend most of their time "teaching the soldier to see the robot as an extension of his natural senses." In other words, convincing soldiers, who might be sceptical Lebanon veterans, to trust a robot as much as a person.

For many in the IDF, the post-Lebanon revolution meant returning to traditional training, weapons and tactics. But that's not to say the IDF has abandoned high technology. Sensor networks, Hollywood-style air-combat training and robotic patrol boats are all important parts of the new IDF, which fought so hard in Gaza to restore its tarnished reputation, and to prove it could defeat the hybrid threats of today and tomorrow.

## Weizmann scientists discover protein partnership that leads to pediatric tumor regression

Why are some pediatric cancers able to spontaneously regress? Prof. Michael Fainzilber and his team of the Weizmann Institute's Biological Chemistry Department seem to have unexpectedly found part of the answer. Further research toward a better understanding of the mechanism of action might hopefully lead, in the future, to the development of drugs that will be able to induce regression of certain tumors. TrkA is a particular cell receptor well known for its "pro-life advocacies:" When nerve growth factor proteins bind to TrkA receptors, it activates the receptors into promoting the growth and survival of neurons. So when Fainzilber, together with Ph.D. student Liraz Harel, postdoctoral student Dr. Barbara Costa, technician Zehava Levy and former Ph.D. student Dr. Marianna Tcherpakov, carried out screening tests to identify other molecules involved in this signaling cascade, it took them by surprise to learn that TrkA may not be who it seems. They found that if TrkA teams up with another molecule called CCM2 – the newly-identified player in this signaling cascade – they become "partners in crime," with TrkA turning into a cell killer! However, though paradoxical, this atypical behavior may actually be rooting for life after all. This idea comes from findings concerning pediatric tumors of neural origin, specifically, medulloblastoma – the most common malignant brain tumor and the second most common malignancy among children less than 20 years of age; and neuroblastoma – the most common extracranial solid cancer in childhood. Neuroblastoma displays unusual behavior, being one of the few human malignancies known to demonstrate spontaneous regression in some cases, but nobody knows how or why. Studies have shown that the tumors with positive prognosis usually express TrkA, while aggressive forms of the tumor do not. However, how TrkA induces tumor regression is yet unknown and the mechanism was an enigma. What if CCM2 was the missing piece to the tumor regression puzzle? Together with a group of sci-

entists in Germany who were conducting a large scale gene expression study in tumors from neuroblastoma patients, they checked the expression levels of CCM2 and TrkA from the patient samples collected. The results were clear-cut: TrkA and CCM2 were always expressed together in certain tumors – those that showed the highest incidences of regression and patient survival! They confirmed their results by blocking the expression of either TrkA or CCM2 in some cells, which resulted in cell survival. On the other hand, by introducing CCM2 to cells lacking it, cell death was induced if TrkA was also present, suggesting that this mechanism could lead to tumor regression. This research, recently published in *Neuron*, is one of the first to elucidate this paradoxical “pro-cell death” behavior of TrkA and the first to identify CCM2 as a crucial accessory in this particular pathway, as well as describing in detail just how these two molecules interact.

### **Israeli team working to decipher ancient texts**

Israeli researchers said they are developing a computer program to make ancient documents more legible and easily indexed, which could eventually lead to a searchable catalog of archived historical texts.

The program, which is being developed by a team of computer scientists and historians at Ben-Gurion University of the Negev, would make the faded, smudged or overwritten words in ancient texts easier to read.

The program can also be used to determine which documents are original through a process called writer identification, said Jihad El-Sana, a researcher on the project and assistant professor of computer science.

“We are developing a kind of technology to enhance documents’ visual (properties) for two reasons — to make them easier to read and because we want to archive and index them,” El-Sana said Thursday.

As more and more documents are digitized, the kind of program the team is developing would cut the time it takes to study these ancient texts, said Daphna Weinshall, a computer science professor at the Hebrew University in Jerusalem.

“If they can just digitize these documents, machines are much more efficient than humans. Once it’s on the computer, they can do it a lot easier,” Weinshall said.

The technology could also be used to piece together fragments of texts housed in different locations throughout the world.

El-Sana said the team hopes to create a system by which historians can search through the images of a document and find the words they seek, cutting down the time it takes historians to pore over documents.

“We’re trying to ... utilize the talents of the human being better and save human hours,” El-Sana said.

The researchers have worked mainly with ancient Hebrew and Arabic texts.

An open source program could be available to researchers for download in three years, but the algorithms would need more “refinement” before they are ready for the general public, El-Sana added.

### **Israeli firm makes UAVs for U.S.**

Israel-based Aeronautics Defense Systems will build two additional demonstrators for thunmanned version of the two-engine, propeller-driven Diamond DA42 for the U.S. market, according to Flight Global.

The company’s president, Avi Leumi, was quoted as saying that the decision followed a first string of test flights in July.

“We will resume the test flights in September,”

Leumi said. But at the same time, he added, "we will prepare a marketing effort to potential customers, mainly in the USA."

In July, the prototype of the Aeronautics Dominator-2 "Oz" unmanned air vehicle flew for the first time, according to Flight Global.

The Israeli firm had converted the DA42 into a UAV powered by two Thielert diesel engines. It can be equipped with a variety of payloads.

The Dominator-2 is built to carry a payload of 400 kilograms for 28 hours, with a line-of-sight range of 300 kilometers.

Developed in less than a year by the Yavne-based Israeli firm, the Dominator is a light commercial aircraft converted into a strategic, multi-mission UAV.

With a wingspan of 13.5 meters, it is designed to fly up to 190 knots per hour at altitudes of up to 30,000 feet.

"We are very careful to work within the limitations of MTCR (the Missile Technology Control Regime)," said Itay Sherman, director for marketing and communications. "This way, the Dominator we are able to offer high performance on a proven, existing airframe to as many customers as a possible around the world."

Sherman said the size, quality and endurance of the system "is designed from the outset to operate safely and in coordination with civil aviation authorities on a full spectrum of missions."

He estimated that over the next decade, the Dominator could generate "sums of \$1 billion and above."

Leumi said the UAV was an important addition to the company's swelling portfolio of UAVs, which now span the spectrum of tactical support to long-endurance, strategic missions, according to Defense News.

In recent weeks the company has also unveiled another non-flying prototype based on a commercial helicopter by Dynali SA Helicopters of Belgium. Called Picador, the prototype is aimed at the ground and maritime defense market, Sherman said.

### **Siemens buys into Israeli solar energy co Arava Power**

Siemens AG (NYSE: SI; XETRA: SIE) had made its first solar energy investment in Israel, acquiring a 40% stake in Arava Power Company Ltd. for \$15 million. The acquisition was made while Siemens is in talks to acquire Solel Solar Systems Ltd. Siemens invested in the company through its Siemens Project Ventures unit.

Arava Power is a leader in photovoltaic systems for the generation of electricity. Kibbutz Ketura owns 40% of the company, and a group of US Jewish investors led by company president Yosef Abramowitz own the rest. The acquisition was made at a company value of \$37.5 million.

Siemens and Arava Power also signed a framework agreement to build solar power plants with a total capacity of 40 megawatts. The first project will be the construction of a 4.9-megawatt facility at Kibbutz Ketura, which already has an electricity production license from the Public Utilities Authority (Electricity).

Siemens president and CEO Peter Loscher said, "This investment is another step in the direction of strengthening our environmental and sustainable technologies. Israel is an ideal location to develop our solar business thanks to its strong sunlight and constant need for energy."

Arava Power CEO Jonathan Cohen said, "Siemens is the ideal partner for Arava Power. Our strategic partnership will enable Israel to realize its goals for clean air and renewable energy more quickly than expected."

Arava Power was founded in 2006. It is headquartered in Kibbutz Ketura, and has 20 employees.

## Wind turbines improved with use propellers

Wind turbines in Israel, such as these seen near Kibbutz Ein Zivan in the Golan Heights, are being improved by technology created for military helicopter propellers.

It's a new way of beating swords into plowshares.

Israel, which long has been a global leader in military technology, is adapting its technologies to develop green advances.

Technology borrowed from building helicopter propellers is being used to produce more efficient wind turbines. Israeli know-how constructing satellites is being applied to improve solar power.

"We definitely leverage a lot of know-how in a variety of disciplines -- including materials, chemistry, thermal dynamics -- accumulated from our experience with military and homeland security technology for developing renewable energy technologies," said Meni Maor, vice president of business development for Rotem, a Dimona-based company that commercializes technologies first used in Israel's defense industry.

The company is something of a case study on the subject. In the past three years, Rotem has begun to focus on renewable energy technology with projects on solar and hydrogen power, wind energy and bio-fuel.

BrightSource Energy, which is developing the world's largest solar thermal plant in Southern California, is piloting its technology at Rotem.

"The whole world is highly motivated to invest in the clean-tech sector as people search for interesting technologies for more effective energy generation because of the threat of global warming and cost of oil prices," said Maor, noting Israel's special security-motivated reasons to reduce the global dependence on oil, much of which comes from Arab states.

As part of that goal, Israel recently signed on to be one of the first countries to pilot the driving of environmentally clean electric cars on a large scale as part of a project sponsored by the company Better Place, in partnership with automakers Renault and Nissan. The robotics for charging the batteries in the cars is based in part on aerospace technology.

Another example of the transfer of military technology to clean tech is work being done by Israel Aeronautics Industries, one of the country's most prominent defense companies. Its researchers are tapping into their experience in aeronautics to develop wind energy and wind turbines.

One way is by using software used to calculate the optimization of the aerodynamic profile of an airplane wing to make a better turbine blade. The company hopes other research-and-development experience will lead to the creation of a higher-performance, lower-weight wind turbine that costs less.

"We are identifying the potential of IAI engineering to provide added value to the clean-tech sector in general and wind turbines in particular," said an IAI official who spoke on condition of anonymity because of the security-related nature of the work. "We are trying to identify what assets we can bring and provide on the market end."

IAI also is working to help create what is being called "clean, green aircraft" as part of a European initiative, joining forces with Airbus to develop an environmentally friendly system for airplanes taxiing at airports aimed at saving fuel and decreasing noise levels and air pollution. The technology would use a system that allows planes to taxi to and from the gate without using their jet engines.

In addition to technologies being transferred from the military world to the clean-tech sector, there is also manpower transfer. A growing number of retired army officers and scientists are playing leading roles in Israel's clean-tech industry.

Yom-Tov Samia, a retired general and former head of the Israel Defense Forces' Southern Command, handles the investment firm Israel Corp's clean-tech investments. Moshe Kaplinsky, a former IDF deputy chief of staff, is now CEO of Better Place's Israel operation.

### First Israeli snow falls on Alpine resort

Israeli desalination company IDE Technologies said it aims to capture 5 percent of the global snowmaking market after its first machine producing man-made snow went into operation.

IDE, a 50:50 venture between fertiliser maker Israel Chemicals (ICL.TA: Quote, Profile, Research) and the Delek (DELKG.TA: Quote, Profile, Research) conglomerate, inaugurated the machine in the Austrian ski resort of Pitztal and plans to start running another in Zermatt in Switzerland in the coming weeks, it said on Tuesday.

Avshalom Felber, IDE's chief executive officer, said snowmaking was a \$1 billion-a-year global industry.

"We identified significant economic and business potentials in expanding our operations in these sectors, making them one of IDE's key growth engines," he said.

"We seek to capture 5 percent of the ... market."

IDE's systems, which cost \$3 million, use Vacuum Ice Maker technology that the firm developed in the 1960s for seawater desalination in the desert resort of Eilat.

IDE said they can produce snow at the start of the season when temperatures are too high to use other machines.

Hans Rubatscher, manager of Pitztal, said the resort will be able to open slopes at lower altitudes earlier than usual. He said Austria's ski team would hold its first training session on the

man-made snow next week.

The Alpine snowline may retreat by 350 meters by 2050, according to a report by Mueller's Institute for Leisure and Tourism, leaving a fifth of Swiss resorts without reliable snow.



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