

# ISRAEL HIGH-TECH & INVESTMENT REPORT

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JOSEPH MORGENSTERN, PUBLISHER

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## Defense Innovation on Display

### 10 Most Powerful Weapons of the Military

The Israeli military known as the Israel Defense Force (IDF) is a very unique one. From the moment of its creation, it has been involved in a never ending conflict with its neighbours. To survive in such a situation, high quality weapon systems are as important as well trained military personnel. Israel receives a lot of assistance from the US and Germany to build up its arsenal. But they have a very strong local defense industry as well, which makes world class weapon systems. The Israelis don't just import stuff from US and Germany, they customize them heavily and improve them with additions of their own. This has made them a formidable military in the region which can stand up to any aggressor. In this article, I will cover the top 10 weapons used by Israel which includes indigenously developed ones and imported ones. The ranking is entirely my opinion and takes into account the combat performance of the weapon systems as well.

### Protector USV

Israel is the first nation to develop and deploy an armed unmanned boat for surveillance and protection duties. The Protector Unmanned Surface Vehicle is a very unique piece of equipment which allows its operator to do more with less. A manned 9 or 11 m patrol boat needs a crew of 6 men to operate sensors, navigate and man the weapons systems. They are also vulnerable to enemy fire as these boats generally are unprotected from small arms fire and a lot of space is wasted due to

food, water and other equipment carried on board. The Protector changes all that as it needs just 2 operators who control the boat from a control station safely away from the hostile area. This increases operational endurance by more than 4 times when compared to a manned boat. It carries an electro-optical sensor, radar, a Typhoon stabilized remote weapons station which can be fitted with any machine gun or grenade launcher and the space wasted on crew is here used to carry additional fuel and sensors.

### Typhoon remote weapons station with a 7.62 mm machine gun

These boats are deployed around harbours to conduct surveillance, investigate and engage hostile small craft. They are especially useful in Anti-Piracy duties because its high speed of

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50 kts (92 km/hr.) and wide array of sensors help to track and chase pirate boats with greater efficiency than manned boats. Singapore has purchased the Protector and deployed them for surveillance, reconnaissance and force protection duties in the Persian Gulf. The 11 m variant can be fitted with Spike missiles and a water cannon for non-lethal engagements and firefighting. It has a twin diesel engine compared which increases its efficiency and speed. These boats will continue to be improved and a new generation of larger unmanned vessels will spawn from them.

#### Delilah Cruise Missile

This is a medium range, subsonic cruise missile of the IDF which is like a mini Tomahawk missile. It is exceptionally light and compact for a missile with a 250 km range. Its 187kg weight enables it to be launched from F-15/16 and even from the UH-60 Helicopters. The missile travels at a speed of Mach 0.3-0.7 and is accurate enough to be used to destroy enemy air defense sites with 1m error. This is due to the fact that the missile can loiter around its target and a remote navigator can use the IR and optical sensors to identify the target and strike it at the right time. Its 30 kg warhead limits its usage against smaller targets like SAM sites and moving vehicles. A ground launched variant of this missile with the same 250 km range also exists. The lightweight nature, long range and pinpoint accuracy make this a very dangerous weapon. You can read this article to know how cruise missile work

#### Tavor/ Micro-Tavor Assault Rifle

The Tavor is a futuristic looking bullpup assault rifle developed by Israel Military Industries (IMI) for the IDF. It was designed to be lighter, reliable, durable and more accurate than the M4A1 carbine which is also used by the IDF. The standard caliber was the 5.56Å—45 NATO round used in a 30 round magazine. It uses the suffix 21 (TAR-21) which denotes that it is an assault rifle for the 21st century. There are several variants of this rifle and the major ones

are: GTAR- The conventional variant which is longer and designed to accommodate a 40 mm UBGL; and MTAR- The Micro variant which is extremely compact and designed for special forces

#### IDF Marksman with STAR-21

All the assault rifles are fitted with a reflex sight which provides a clear red aiming point. These rifles have seen extensive combat with the IDF infantry units and with the Indian Army commandos who use it as their standard assault rifle. India also uses the MTAR-21 which they manufacture under the name Zittara and use it with the 5.56Å—30 mm cartridge. IDF uses the MTAR-21 with the 5.56Å—45 or 9 mm pistol rounds. It is said that it has exceptional combat performance in hot desert climates.

#### Merkava 3/4 MBT

120 mm shells being loaded into a Merkava 4 The Merkava tanks were designed in the early 1980s to create a tank to suit specific Israeli requirements and make them self-sufficient in making tanks. The design evolved over the

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years and the Merkava 3 and 4 are the best variants. The latest variant is the Merkava 4 which features several improvements over its predecessors. The Mk4 features a 120 mm smoothbore gun which has a unique capability that other western tanks lack, the ability to fire an Anti-Tank missile 'Lahat' from the gun. This gives it a standoff engagement capability and allows it to destroy enemy tanks from far off

This tank has a heavy secondary armament consisting of 1Ã—12.7 mm machine gun, 2Ã—7.62 mm machine guns, 60 mm mortar and 12 smoke grenades. This kind of armament is useful in urban warfare where multiple machine guns and the mortar are necessary to engage infantry and concealed threats. A combination of 48 shells and missiles are carried in the tank. The other significant feature of this tank is the 'Trophy' Active Protection System which can intercept incoming projectiles like Anti-Tank shells and missiles using a network of tiny radars and hardkill projectile dispensers. This feature is the primary layer of defense and the secondary passive defense is provided by the thick armor of the tank.

### ATMOS 2000 Howitzer

The Advanced Truck Mounted Howitzer System (ATMOS) is the latest self-propelled artillery weapon which is going to be fielded by the IDF artillery corps. It is a 155 mm 52 caliber (52Ã—155 mm barrel length) system which is mounted on a 6Ã—6 truck which gives it excellent mobility. This advanced system has a crew of just 4 men which is possible due to the high degree of automation and the extensive use of computers. The exact firing solution can be calculated by a touchscreen computer and then the 4 men manually load the shell into the gun to fire it. It integrates data from aerial assets like UAVs in order to give precision support fire to troops. It carries 32 rounds of 155 mm shells on board and can fire them at the rate of 4-9 rounds per minute depending on necessity and crew reloading capacity. It is said that this

system can be transported by the C-130 which can enable rapid deployment to hostile areas.

### F-15I Ra'am

Israel is a very tiny country, but needs long range aircraft to penetrate deep into enemy territory to obtain air superiority and carry out strikes in case of a conflict as the F-16 Sufa is not ideal for such operations and will be in charge of homeland defense. The F-15C fighters were first obtained in the 1978 In 1998, Israel obtained 25 examples of the strike variant, designated as the F-15I Ra'am. These extremely capable multirole fighters have been customized by Israel using their own equipment. It has the ability to carry American and Israeli missiles and features an enhanced countermeasures and jamming system compared to the American variant F-15E. It also had the standard conformal fuel tanks (CFTs) which gave it the ability to carry additional fuel without sacrificing weapon carrying stations. AIM-120 and Python missiles mounted on underwing hardpoints

The main reason these F-15I's were procured was to give Israel the ability to strike targets deep inside countries like Iran without conducting half a dozen mid-air refuelings. The F-15I has enough fuel to carry a significant weapon load and strike targets inside Iran with just a single mid-air refueling. In a strike configuration, it is capable of carrying GPS, Laser guided bombs, Glide bombs, Popeye and Delilah cruise missiles along with Jamming pods and Air to Air missiles for self defense. In the future, the F-15I will be complemented by the F-35I to make a formidable ground attack combination.

### Arrow 3 ABM

There are several systems designed to intercept ballistic missiles. But the least known and probably the most powerful is the Arrow 3 Anti-Ballistic Missile (ABM) system. This missile was developed to be more effective than the famous American MIM-104 Patriot ABM system.

The Arrow is extremely vital for Israel's survival as it protects them from the range of ballistic missiles possessed by its hostile neighbors. It is integrated with the 'Green Pine' radar to provide target information. The Green Pine has a search and track range of around 400 km which can easily cover the whole of Israel.

### Green Pine radar

The Arrow 3 can intercept ballistic missile at altitudes of over 100km and a battery of these missiles is said to be capable of intercepting 5 ballistic missiles in 30 seconds.

Improvements over the Arrow 2 include a smaller size and 40% reduction in weight. It is expected that the first Arrow 3 battery of 24 missiles would be deployed by 2015. There are indications that this system can be used as an Anti-Satellite system similar to the US SM-3 missile. 6 cell Arrow-3 Launcher.

### Barak 8 SAM

This missile is the result of an Indo-Israeli joint venture to develop a next generation Surface to Air missile to equip their Navy and Air Force. It is a medium range SAM which is mainly designed for intercepting supersonic cruise missiles. It has a dual pulse rocket motor which ensures that the missile is travelling at Mach 2+ even at its last stages. The active homing radar seeker eliminates the need for constant illumination from land/ship based radars and thereby allows for quicker reactions and makes jamming it very difficult.

The Naval variant is fired from an 8 cell vertical launch module and is normally used in conjunction with the MF-STAR radar. India has adopted this missile as the standard SAM for all their warships from 2015. Israel is refitting this missile on their existing warships. Extended range variants of this missile exist. It uses an additional booster to increase the missile range from 70 to 120 km. This ER missile will be used by the Indian Air Force and in the future by the Indian Navy as well.

### Sa'ar 5 corvette

Israel has a small coastline, but it has a lot of valuable oil wells and other assets which it needs to defend. Its neighbours are acquiring powerful anti-ship missiles and submarines. The Sa'ar 5 is a multi-role corvette which is designed to carry out Anti-Submarine, Anti-Surface and Anti-Air warfare with equal ease. The best part of this ship is that it displaces around 1100 tons but has the firepower of a 4000 ton frigate. The latest upgrade include the MF-STAR radar and the armament list includes 1 Phalanx CIWS and 8 Harpoon Anti-Ship missiles

The unique feature is that it is the smallest warship in the world to be fitted with a 4 Panel AESA radar. The MF-STAR can search, track targets and guide up to 16 Barak-8 SAMs simultaneously to intercept them. This gives the Sa'ar 5, an ability to defend itself against any aerial threat. And this ship holds the unique distinction of being the most heavily armed ship in the world if you consider the Weapons-Displacement ratio of the vessel. The other feature is that this ship can operate easily in the littorals and blue water as well and attack and defend itself from any threat it faces.

### Iron Dome

The most famous weapon of the IDF which has very frequently been in the news is the Iron Dome interceptor system. This is a C-RAM (Counter-Rocket Artillery Mortar) missile system which uses the Tamir interceptor missile to carry out its duty. The reason that it is number 1 on this list is that this system is essential for protecting Israel from the smallest threats (rockets, artillery shells, mortars) which are targeted at civilians and it has successfully done its job over the past few years and remains the most combat proven modern air defense system in the world. The Tamir missile has a range of 70 km and is specifically designed to destroy short range rockets and artillery shells.

The most unique ability of the system is that it detects a set of incoming threats and then intercepts only those rockets which are going to impact on civilian populated areas. This saves a lot of money (each interceptor missile costs 50,000\$) and time as usually only 10% of the unguided rockets manage to hit their targets. The Iron Dome targets only those 10% and the remaining 90% of the rockets which fall harmlessly over open ground are left alone. Each launcher truck holds 20 missiles and a battery usually consists of 3 launch trucks, radars and a missile control unit. All these are mobile and can be quickly deployed to an area of conflict. Israel claims a successful interception rate of 87% by the Iron Dome system. This system will be supplemented by the 'Iron Beam' laser system and 'David's Sling' missile system by 2018 in order to provide 100% coverage against any sort of aerial rocket and artillery attack.

The system is intended to protect Israeli economic assets at sea, such as offshore gas rigs. The IDF has conducted a successful live-fire interception test of its Tamir weapons system, which it describes as a "sea-borne Iron Dome". The system can be installed aboard navy vessels and is intended to protect Israeli economic assets at sea, including gas rigs. The test was conducted a few weeks ago from aboard the INS Lahav naval vessel, with a number of test rockets fired from onshore and successfully intercepted by the Tamir interceptor, which works in tandem with Adir radar systems. The Tamir is capable of intercepting short range ballistic rockets from a moving vessel. The system is expected to become fully operational shortly with the recent test considered a major step forward. During the 2014 war between Israel and Hamas and other Palestinian militant groups in the Gaza Strip, Israel deployed its Iron Dome system on land to shoot down rockets fired across the border. A similar system has been in development for several years and was revealed to the public on Wednesday.

A video provided by the army showed a rocket launcher installed on a ship firing at targets in the sky and later intercepting a missile. Israel has a number of assets at sea, including a major offshore gas rig around 16 nautical miles from Gaza. Hamas has previously targeted the installation unsuccessfully. Any damage to the rig could be potentially hugely damaging to the Israeli economy, since it provides large amounts of the country's energy needs. Last month the US Army successfully tested an Israeli-made interceptor air defense missile, used by Iron Dome batteries, to bring down a target drone as part of an exercise. It was the first successful trial of an interceptor air defense missile made by Israeli defense company Rafael and it was carried out in cooperation with major US defense contractor Raytheon. The Iron Dome system was jointly developed and funded with the United States.

### Israel's top 45 greatest inventions of all time

A new exhibit pays homage to Israeli ingenuity behind gadgets like the Disk-on-Key, PillCam, solar windows and a space camera.

#### "Inventors for a Day"

One of Israel's sources of pride is the enormous number of inventions and innovations that have taken root on its soil over 63 years - despite challenges of geography, size and diplomacy. The ever-churning Israeli mind has brought us drip irrigation, the cherry tomato, the electric car grid, the Disk-on-Key and much more.

Curator Varda Gur Ben-Sheetrit said that hundreds of ingenious inventions were considered for Inventions, Inc., which offers visitors a chance to learn more and try their own hand at coming up with something new.

She emphasizes that many other Israeli inventions are deserving of being included. "We were, of course, constrained by space limitations, and also not every company we

invited to exhibit responded," she says.

Another feature of the exhibition is the Transparent Studio, where graduates of the Bezalel Academy of Arts and Design conduct a course on innovation in the area of light and lighting design. Visitors can observe their work-in-progress and share their ideas and suggestions with the designers.

1. Given Imaging, a world leader in developing and marketing patient-friendly solutions for visualizing and detecting disorders of the GI tract, is best known for its PillCam (aka capsule endoscopy), now the gold standard for intestinal visualization.

2. Netafim is a worldwide pioneer in smart drip and micro-irrigation, starting from the idea of Israeli engineer Simcha Blass for releasing water in controlled, slow drips to provide precise crop irrigation. The kibbutz-owned company operates in 112 countries with 13 factories throughout the world.

3. Ormat Technologies designs, develops, builds, owns, manufactures and operates geothermal power plants worldwide, supplying clean geothermal power in more than 20 countries.

4. Pythagoras Solar makes the world's first solar window, which combines energy efficiency, power generation and transparency. This transparent photovoltaic glass unit can be easily integrated into conventional building design and construction processes.

5. Hazera Genetics, a project of two professors at the Hebrew University Faculty of Agriculture, yielded the cherry tomato - a tasty salad fixing that ripens slowly and doesn't rot in shipment.

6. BabySense is a non-touch, no-radiation device designed to prevent crib death. Made by HiSense, the device monitors a baby's breathing and movements through the mattress

during sleep. An auditory and visual alarm is activated if breathing ceases for more than 20 seconds or if breath rate slows to less than 10 breaths per minute.

7. EpiLady, the first electric hair remover (epilator), secured its leading position in the international beauty care market and since 1986 has sold almost 30 million units.

8. 3G Solar pioneered a low-cost alternative to silicon that generates significantly more electricity than leading silicon-based PV solar modules at a lower cost per kilowatt hour.

9. MobileEye combines a tiny digital camera with sophisticated algorithms to help drivers navigate more safely. The steering system-linked device sounds an alert when a driver is about to change lanes inadvertently, warns of an impending forward collision and detects pedestrians. MobileEye has deals with GM, BMW and Volvo, among others.

10. Leviathan Energy innovated the Wind Tulip, a cost-effective, silent, vibration-free wind turbine designed as an aesthetic environmental sculpture, producing clean energy at high efficiency from any direction.

11. Rav Bariach introduced the steel security door that has become Israel's standard. Its geometric lock, whose cylinders extend from different points into the doorframe, is incorporated into doors selling on five continents.

12. BriefCam video-synopsis technology lets viewers rapidly review and index original full-length video footage by concurrently showing multiple objects and activities that actually occurred at different times. This technology drastically cuts the time and manpower involved in event tracking, forensics and evidence discovery.

13. GridON makes the Keeper, a three-phase

fault current limiter developed at Bar-Ilan University. The device, which blocks current surges and limits the current for as long as required to clear the fault, won an Innovation Award from General Electric's Ecomagination Challenge and is of interest to major utilities companies around the world.

14. Better Place electric car network, Israeli Shai Agassi's brainchild, is implementing the Israeli pilot that will provide a model for a worldwide electric car grid.

15. Intel Israel changed the face of the computing world with the 8088 processor (the "brain" of the first PC), MMX and Centrino mobile technology. Israeli engineers at Intel in the 1990s had to convince skeptical bosses to take a chance on MMX technology, an innovation designed to improve computer processing. It's now considered a milestone in the company's history.

16. Disk-on-Key, the ubiquitous little portable storage device made by SanDisk, was invented by Dov Moran as an upgraded version of disk and diskette technology through the use of flash memory and USB interface for connection to personal computers.

17. TACount real-time microbiology enables the detection and counting of harmful microorganisms in a matter of minutes, rather than the conventional method of cell culture that takes several hours to a few days. The technology applies to the fields of drinking and wastewater, pharmaceuticals and food and beverage production.

18. Solaris Synergy innovated an environmentally friendly and economically beneficial way to float solar panels on water instead of taking up valuable land, generating energy while protecting and limiting evaporation from reservoir surfaces.

19. HydroSpin is developing a unique internal

pipe generator that supplies electricity for water monitoring and control systems in remote areas and sites without accessibility to electricity.

20. The Volcani Research Center of the Ministry of Agriculture and Rural Development aims to improve existing agricultural production systems and to introduce new products, processes and equipment. Basic and applied research is conducted at six institutes and in two regional research centers by more than 200 scientists and 300 engineers and technicians.

21. Rosetta Green, a 2010 spinoff of the agro-biotechnology division of Rosetta Genomics, develops improved plant traits for the agriculture and biofuel industries, using unique genes called microRNAs.

22. Mazor Robotics' Spine Assist and other surgical robots are transforming spine surgery from freehand procedures to highly accurate, state-of-the-art operations with less need for radiation.

23. The optical heartbeat monitor developed by Bar-Ilan University's Prof. Ze'ev Zalevsky is a revolutionary medical technology using a fast camera and small laser light source.

24. Elya Recycling developed and patented an innovative method for recycling plastic based on a specialized formulation of natural ingredients. Making the new raw material for handbags, reusable totes and lumber products requires 50 percent less energy than current recycling methods and 83% less energy than virgin manufacturing.

25. Like-A-Fish unique air supply systems extract air from water, freeing leisure and professional scuba divers, as well as submarines and underwater habitats, from air tanks.

26. Itamar Medical's WatchPAT is an

FDA-approved portable diagnostic device for the follow-up treatment of sleep apnea in the patient's own bedroom, rather than at a sleep disorders clinic. WatchPAT lets patients spend the night at home.

27. Zenith Solar developed a modular, easily scalable high-concentration photovoltaic system (HCPV). The core technology is based on a unique, proprietary optical design to extract the maximum energy with minimal real estate.

28. AFC (Active Flow Control) was developed at Tel Aviv University as an intelligent gas-air mixing system to replace all existing mixing technologies.

29. The Space Imagery Intelligence (IMINT) unit of Elbit Systems makes a "space camera" a compact, lightweight electro-optic observation system for government, commercial and scientific applications.

30. Turbulence, the world's first hyper-narrative, interactive movie, is also the name of the company developed by Prof. Nitzan Ben-Shaul of Tel Aviv University. The technology allows the viewer to choose the direction of the film's plot by pressing buttons on the PC, Mac or iPad at various moments in the action.

31. Decell Technologies is a global leader in providing real-time road traffic information based on monitoring the location and movement of phones and GPS devices. Swift-i Traffic, Decell's premium product, is incorporated in leading navigation systems, fleet management services, mapping operations and media channels in several countries.

32. NDS VideoGuard technology is the pay-TV industry's advanced suite of conditional access (CA) solutions. It protects branded service from piracy and ensures that consumers will have the choice and flexibility they demand in

broadcast and on-demand content.

33. PrimeSense revolutionizes interaction with digital devices by allowing them to "see" in three dimensions and transfer control from remote controls and joysticks to hands and body. It is the leading business provider of low-cost, high-performance 3D machine vision technologies for the consumer market.

34. Takadu provides monitoring software to leading water utilities worldwide. The product offers real-time detection and control over network events such as leaks, bursts, zone breaches and inefficiencies.

35. Hewlett Packard (HP)'s Indigo digital printing presses for general commercial printing, direct mail, photos and photobooks, publications, labels, business cards, flexible packaging and folding cartons print without films and plates, allowing for personalized short runs and changing text and images without stopping the press.

36. Cubital's solid rapid prototyping machines craft 3D models of engineering parts directly from designs on a computer screen. They're used in the automotive, aerospace, consumer products and medical industries, as well as engineering firms and academic and research institutions.

37. The Zomet Institute in Jerusalem is a non-profit, public research institute where rabbis, researchers and engineers devise practical solutions for modern life without violating Sabbath restrictions on the use of electricity. Zomet technology is behind metal detectors, security jeeps, elevators, electric wheelchairs and coffee machines that can be used on Shabbat, as well as solutions requested by the Israeli ministries of health and defense, Ben-Gurion Airport, Elite Foods, Tnuva Dairies, Israeli Channel 10 Television and others.



38. The EarlySense continuous monitoring solution allows hospital nurses to watch and record patients' heart rate, respiration and movement remotely through a contact-free sensor under the mattress. The system's built-in tools include a wide range of reports on the status of patients, including alerts for falls and bedsores prevention.

39. TourEngine significantly reduces fuel consumption and harmful emissions by common engines through a sophisticated thermal management strategy. It can also be easily integrated with future hybrid engines, further improving their efficiency and environment-friendly attributes.

40. The superconducting fault current limiter (FCL), designed for limiting short currents, comes out of a \$2 million project developed over two years by RICOR Cryogenics and Vacuum Systems with the Institute of Superconductivity at Bar-Ilan University.

41. Heliocenter led an industry trend to provide solar-energy boosting for existing coal or gas power plants, reducing carbon emissions and overall costs.

42. Transbiodiesel makes enzyme-based catalysts (biocatalysts) used in the production of biodiesel.

43. SolarEdge makes a module that optimizes every link in the solar PV chain, maximizing energy production while monitoring constantly to detect faults and prevent theft.

44. The 3D tethered particle motion system developed by three professors at Bar-Ilan allows for three-dimensional tracking of critical protein-DNA and protein-RNA cell interactions in the body.

45. Panoramic Power provides a current monitor solution that enables enterprises and organizations to reduce their operational and

energy expenses using a breakthrough power flow visibility platform.

### **Israeli Company LiveU To Beam Summer Olympics Events Worldwide**

*Israeli Company LiveU To Beam Summer Olympics Events Worldwide By The Times of Israel May 29, 2016  
This article was first published by The Times of Israel and was re-posted with permission.*

The Israeli Olympic team may or may not win medals at the Summer Olympics in Brazil this year, but one Israeli startup is tapped to come home with accolades.

Israeli firm LiveU's cellular-based live video transmission technology will allow broadcasters to beam images from Brazil around the world in real time, with little latency and superb picture quality, according to customer William Albarracin, who was responsible for technology at the 2014 soccer World Cup, also in Brazil.

"LiveU exceeded our expectations," said Albarracin. "It gave us the mobility to go live from anywhere at any time. We knew the Brazilian landscape was challenging, yet we hit 9 Mbps in some areas. Also, the management system, LiveU Central, gave us flexibility and geo-location that allowed us to maximize the use of units in the field."

### Inside The Rise Of 'Meerkat': How The Israeli App Is Helming Live Mobile Broadcasting

Headquartered in the Tel Aviv suburb of Kfar Saba, with a US office in Hackensack, New Jersey, LiveU has been around since 2006, and is still the only company offering a remote uplink solution for broadcast-quality video without requiring a satellite or wired Internet connection.

LiveU is currently the only company offering a robust transmission solution for broadcasters, consisting of up to 14 cellular

(3G/4G - LTE/WiMAX) modems over multiple carriers, as well as multiple LAN and even BGAN satellite connections (as backup). The solution works with any camera, and the system's bonded modems (both 3G and 4G) aggregate all data connections simultaneously to achieve high bandwidth and smooth transmission, even as bandwidth and signal levels change across the different connections.

Even though some of the connections from some of the carriers might suffer from fluctuations and slowdowns when there is heavy traffic in the network, LiveU's software will compensate for that slowdown by drawing on other resources to keep the uplink going at the best possible quality, said LiveU CEO Samuel Wasserman.

### Recent high-tech data clouds current needs

Israel must form policy to maintain its advantage as the Startup Nation - or risk falling behind, says Dr. Esther Luzzatto.

Reports of the demise of the Startup Nation are exaggerated. The scientific and technological infrastructure of Israel remains sound, and there are thousands of startups based here, but without a careful consideration of several spoilers for the industry, the status of Israel as an innovation powerhouse might be hurt.

Recently, the public became aware of some depressing figures regarding Israeli high-tech. The Chief Economist at the Ministry of Finance, Yoel Naveh, published a survey which claimed Israel's position as a leader of global innovation is under threat and determined the high-tech sector was no longer the growth engine of the economy as it had been for the past few years. Furthermore, because of a shortage in high-tech employees, Prime Minister Benjamin Netanyahu was considering importing software engineers. It's a dire straits, indeed.

At a press conference, Minister of Finance Moshe Kahlon said he was considering relief measures to allow high-tech firms interested in merging to solve their shortage in qualified personnel. At the same time, the minister asked the Israel Tax Authority to explore a loosening of the requirements in the "Encouragement of Capital Investments Law" to expand its benefits to more high-tech companies.

With the bad news rolling in, another bombshell was dropped by the Samuel Neaman Institute for the first time, South Korea was outspending Israel in national expenditures on R&D per GDP. And the study was backed up by a new report from the OECD.

On the very day we received these worrying reports, the Mobile World Congress opened in Barcelona with dozens of Israeli startups participating. The Israeli presence was prominent at the conference, drawing the attention of serious operators, manufacturers, and integrators (the section which coordinates the integration of products into various systems) from across the world.

Israel's national pavilion emphasized the capability of Israeli companies in future tech sectors: cybersecurity, Big Data, the Internet of Things, virtualization solutions, mobile network optimization, and financial institutions.

And to top it off: a new survey by research center KPMG-IVC showed Israeli startups raised a record \$4.4 billion in 2015 a 30% rise from 2014, which was also a record year.

So what is happening? Is the negativity just background noise or a dreaded reality? Is there cause for concern for the future of the tech industry, which accounts for 40% of Israeli exports?

Understanding the strengths and weaknesses of Israeli high-tech requires a deep fundamental

analysis and a cold, sober look at reality without giving in to hysteria while undertaking a systemic approach throughout. It appears the authors of the aforementioned reports ignore several fundamental figures which reflect the tech scene. For example, the close coordination between military technology and the defense industry (think: Rafael, Israel Aerospace Industries, and Elbit) and the academy.

The complicated security existence is responsible for the continuity and the connection between the education system and the military. The military sorts at an early stage the most qualified candidates from the system, invests a fortune in their training, and places them at the forefront of technology.

No official knows exactly the cost of this investment in human capital, which later serves as a high-tech reserve, but it is clear that we must take into account. The flow of human capital, ideas, and budgets from the military to the civilian market is one of the notable multipliers of the unique ecosystem established here.

For example, the new high-tech park in Beersheva, which could easily compete with any advanced technology park in the world, shows the strengths of the foundations on which the Israeli ecosystem rests. Figures from research center IMD, which studies market conditions in countries around the world, show Israel is leading in all the essential and important parameters for the building and maintaining of a innovation-driven tech sector: tech and science infrastructure, an advanced capital market, flexibility, accessibility to the world, developed VC scene, qualified workforce, and wide-ranging scientific research.

According to the same research, Israel ranks first in its capacity for innovation, second in entrepreneurship, and third in global innovation.

Which means the country is blessed with an

entrepreneurial spirit, human capital, and exceptional innovation; and the advantages of the Israeli engineer a complicated understanding of systemic vision, efficient teamwork which disregards tank, and the aspiration to achieve the impossible are prominent.

An analysis of long term trends shows Israel is home to an immense number of startups alongside numerous R&D centers for multinational corporations. Foreign investments in Israel are on a consistent rise, as are the number of new startups established each year.

Their exits provide an evergreen source of revenue for the state, as successful entrepreneurs which sold their companies become private investors and mentor startups helping to further drive innovation. The Israeli companies mature and create added value and new business operations; and they require rounds of funding which reflect their high valuations.

For Israel to maintain its leading position, the government must formulate a long term policy to deal with the core issues facing the sector encouraging technological education, encouraging institutional investors to back high-tech ventures, designing an attractive tax policy, easing the transfer of information between local high-tech firms and international companies, and expanding the opportunities to receive the support of the Chief Scientist.

"The startup nation is resting on its laurels"

To that end, investment in R&D is critical; the contribution of the government has been a negative trend, consistently decreasing over the years down to 20% today. The drop has been balanced - fortunately - by increasing investments from businesses and multinational conglomerates; but currently less than 5% of the public investment in R&D is in the private sector, which puts Israel in a relatively weak

place compared to other Western states.

Another problem is the recruitment and training of workers for the tech sector. The outstanding workforce, who arrived from the former Soviet republics, is getting older. Israel is trailing other Asian states - with which it competes - in the training of its tech workforce. The failing state of the Israeli education system makes the issue ever more critical.

The country must prepare an emergency plan for the internal import of employees including the haredi and Arab public instead of talking about importing foreign engineers. This could be achieved by an accelerated effort to educate these sectors and by encouraging teens to study science and technology by offering scholarships and new programs as early as primary school.

Israel requires a long term tech outlook, and the government needs to play a central role in its formulation. This vision must place STEM development in Israel as a top priority and be implemented using consistent budgets and relaxed regulation, relying on inter-ministerial cooperation.

The best thing to happen in the wake of the avalanche of data is the reminder that high-tech is one of the most important drivers of the Israeli economy. Sure, Israel should develop other growth engines, including manufacturing and tourism, instead of relying on high-risk sectors like real estate and finance. But given the current situation, in which Israel's real relative advantage in the global arena is its human capital we must make every effort to utilize it.

**The Israeli company Faception says its facial-analysis technology will be used by 'a leading homeland security agency.'**

Pulling a poker face means betraying no visible

emotion, so that opponents can't tell what you're really thinking.

But a Tel Aviv startup's face-profiling technology recently proved fairly accurate at predicting which four players were most likely to beat out 46 other contenders in an amateur poker tournament. Two of those four were among the event's three finalists.

And now, the company reports that it has signed a contract with an unnamed "leading homeland security agency" to help identify terrorists through its technology, which analyzes faces shown in photos and videos and classifies them according to 15 parameters predictive of personality traits and types.

Purportedly it can detect with high accuracy if you are, say, a genius, an extrovert or a criminal.

"We understand the human much better than other humans understand each other," Faception CEO Shai Gilboa told *The Washington Post*. "Our personality is determined by our DNA and reflected in our ace. It's a kind of signal."

Gilboa said Faception evaluate faces with 80 percent accuracy for certain traits. "Utilizing advanced machine-learning techniques, we developed and continue to evolve an array of classifiers. These classifiers represent a certain persona, with a unique personality type, a collection of personality traits or behaviors. Our algorithms can score an individual according to their fit to these classifiers.

"Ultimately, we can score facial images on a set of classifiers and provide our clients with a better understanding of their customers, the people in front of them or in front of their cameras."

Faception is offering the software as one tool among many that governments can use in the

global war on terror.

Unlike face-recognition technology, which relies on matching faces to those already in a database, facial profiling relies on scientific studies suggesting that personality is determined by DNA and reflected in the face. Therefore, it can pinpoint potentially problematic people not previously known to authorities.

Only three of the 11 terrorists behind the November 2015 terror attacks in Paris had criminal records, Gilboa points out in a video about Faception. "Our technology classified nine of them as potential terrorists with no prior knowledge." Despite, or perhaps because of, the ethical controversy raised by its proprietary computer-vision and machine-learning technology, Faception has been getting a lot of press.

The company, founded in 2014, was a finalist in the LDV Vision Summit 2016 on May 25 in New York City. An alumnus of the 500 Startups accelerator in San Francisco, Faception is now a member of Sosa innovators' community in South Tel Aviv.

Banks and marketers are among other professionals who might find Faception's methodology valuable. Gilboa said he and his team believe their technology represents a multibillion-dollar opportunity.

Faception's website describes the team as including "world-class experts in the areas of computer vision, face analysis, machine learning, psychology, technology and marketing."

"Our mission is to revolutionize how companies, organizations and even robots understand people to dramatically improve public safety,

communications, decision-making, and experiences."



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