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NO MAN ON THE MOON

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Samuel Thrope

***Tablet*, Jan. 25, 2017**

During the Holocaust, Yariv Bash's grandfather was forced to build V2 rockets for the Nazi army. Now Bash has his eyes on a rocket of his own: one that will take the first Israeli spacecraft to the moon. Bash is one of the three co-founders of SpaceIL, the Israeli entrant in the Google Lunar Xprize, an international competition to send the first civilian mission to Earth's nearest neighbor. The first team to land an unmanned spacecraft on the moon, which then travels 500 meters and broadcasts images back to Earth, will take home a purse of $20 million. With the strong support of the Israeli government and the backing of generous private donors, including billionaire investor Morris Kahn and casino magnate and political kingmaker Sheldon Adelson, SpaceIL is poised to make Israel the fourth lunar nation.

The planned SpaceIL mission, if it comes off, will also conduct a joint UCLA-Weizmann Institute of Science experiment to measure the changes in the moon's magnetic field. The end of December was the final cutoff for the competitors—scientists, engineers, and private entrepreneurs from around the world—to secure a launch contract on a rocket bound for orbit. Of the 29 teams who registered for the competition in 2010, five remain: the American Moon Express, Team Indus from India, Hakuto from Japan, the international Synergy Moon, and SpaceIL.

SpaceIL was the first team to obtain its ticket to the moon and will be launching its spacecraft on a Falcon 9 rocket produced by billionaire investor Elon Musks's private aerospace company, SpaceX , by the end of 2017. As SpaceIL CEO Eran Privman explained, the agreement with SpaceX represents more than just a means of transport. "The fact that a serious company signs a contract with a group like us means that we know what we're talking about," he said. "That we've passed all their tests and that our craft stands up to all their requirements."

However, SpaceIL's moon mission almost didn't happen, according to Bash, a bespectacled and balding 35-year-old electronics engineer and entrepreneur who recounted the story in the Tel Aviv offices of his drone-delivery startup, Flytrex. Having learned of the competition only in November 2009, two years after it began and only a few weeks before the deadline to register, he posted an invitation on his Facebook page: "Who wants to go to the moon?" Kfir Damari, 34, a friend and telecommunications engineer, answered the call. The next Saturday, the two met in a bar in Holon, just south of Tel Aviv, with aerospace engineer Yonatan Winetraub, and started plotting a way to the moon. On Dec. 31, the very last day to register, the three wired in the $50,000 entry fee and joined the competition.

"Space is the ultimate thing," Bash said when asked what inspired him to join the Xprize moon race. "It's something that is so hard to do, even today. In 2016, rockets still blow up; it's still rocket science. This is one of the ultimate technological-engineering challenges." Despite other teams' head starts, SpaceIL quickly advanced. It was the first team to design a landing craft, provisionally nicknamed "Sparrow," that could use its engines to "hop" the required 500 meters over the moon's surface rather than rely on a separate lunar rover to cover the distance. Seeing the elegance of this solution, Bash said, other teams followed suit.

One of the most important measures of SpaceIL's success is its strong financial backing. Between government support—limited by competition rules to 10 percent of the project's overall budget—and private donations, SpaceIL has raised $50 million of the $70 million that it estimates it will take to complete the mission; the launch alone costs $20 million. "Spacecraft don't fly on hydrazine," a common rocket propellant, Bash explained. "They fly on green fuel. If you look at the competition, we've raised more than double the next team."

The Sparrow spacecraft is being designed and built at Israel Aerospace Industries, the country's leading aviation and defense manufacturer. IAI, founded in 1953 by

American Jewish pilot and engineer Al Schwimmer, can be considered Israel's Lockheed Martin or Boeing, although, unlike the American companies, it is entirely government-owned. IAI produces Israel's drones, aircraft, and satellites, as well as the Iron Dome missile-defense system.

Rather than the bright, white-booted, and sterile workspace one might imagine, though, SpaceIL's electronics- and software-testing lab at IAI's campus in the city of Yehud, just north of Ben-Gurion Airport, sits in a modified trailer on a dusty patch of ground near the parking lot. While the body of the craft will be assembled in the same high-tech clean room used for Israel's Amos communication satellites, Sparrow's computing and navigational guts are put through their paces here.

On a sunny winter day, SpaceIL software manager Asaf Lewin demonstrated some of the craft's components: the 15-year-old computer, a three-tiered, functional stack of processors some 6 inches high, originally designed for a nanosatellite; a sensor to ensure the craft's solar panels are always facing the sun; and a star tracker for navigation. It amounts to several million dollars' worth of proven equipment that has already been tested in the radiation and cold of outer space.

The lab's makeshift vibe is a perfect metaphor for SpaceIL's upstart approach to the lunar mission. As Damari, the telecom engineer, explained, in order to keep costs down SpaceIL has decided to forgo IAI's usual exhaustive checks and double checks on cameras and other non-mission-critical systems, building faster and cheaper than many had thought possible. This success has shown the potential for a civilian space industry in Israel. In the wake of SpaceIL, several local companies have established the Israeli presence in this growing field, including Effective Space Solutions, which is developing technology to return wayward satellites to their correct orbits, and Spacepharma, which offers zero-gravity space labs for scientific experiments.

"Showing that you can send a deep space probe for less than $100 million, that's

breaking a glass ceiling," Bash explained. "It's not only NASA and the European Space Agency that can do deep-space missions but also smaller countries, maybe large organizations. It's opening up space a bit more to the Wild West."…

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'STARTUPS AS FAR AS THE EYE CAN SEE, ALL THE WAY TO THE SEA'

Sharon Udasin

***Jerusalem Post*, Feb. 22, 2017**

Entering the 14th-floor hotel lounge following a morning stroll along the Mediterranean Sea, an enthusiastic Randall Lane grabbed a glass of water and sat down at a small table, his trademark fedora still perched on his head. After prodding the reporter with questions – as any lifelong journalist is wont to do – the editor of *Forbes* magazine was eager to discuss a country that has "invented and is reinventing itself." "When you look at the world's great entrepreneurial cities, Tel Aviv and Jerusalem are way, way up there, and it's apparent to anyone who spends any time here," Lane said. "We were able to see that the Start-Up Nation reputation is true. The Start-Up Nation ethos is pervasive."

The *Forbes* editor spoke with *The Jerusalem Post* in Tel Aviv on Wednesday, ahead of the magazine's upcoming Under 30 Summit – an event expected to draw hundreds of the most promising young innovators to Israel this April for the second year running. In Lane's mind, Israel provides a "very natural" environment for the summit, due to the country's position as a leading entrepreneurial hot spot combined with its unique cultural ties and history. "It's an amazing event that

happens to be in Israel but also does an amazing job showcasing the Israeli start-up and tech ecosystem – which is why we're here," Lane said.

After launching its popular 30 Under 30 lists in 2011, Forbes began hosting Under 30 summits for its American honorees in 2014, with the first event occurring in Philadelphia that year. As these US events proved increasingly successful, the magazine decided to begin organizing such conventions abroad, holding the first such event – the Under 30 Summit EMEA (Europe, Middle East and Africa) – last year in Israel, followed by the Under 30 Summit Asia in Singapore.

For the second year in a row, Lane will be hosting the Under 30 Summit EMEA in Tel Aviv and Jerusalem, from April 2 to April 6. In addition to holding panels with leading global innovators, the summit promises amenities such as regional food and drink, bar crawls and group tours. Approximately 750 young entrepreneurs from 35 countries and 25 industries – 40% of whom are CEOs and founders of their ventures – are expected to attend. "They come early and they stay late and they don't sleep," Lane said.

Like last year, approximately one-third of the participants at this year's summit will come from the US, one-third from Europe and one-third from Israel and the rest of the Middle East and Africa region. While that latter third will mostly include Israelis, Lane stressed that there will be some representation from African countries, as well as Palestinian entrepreneurs. This year, *Forbes* is working with the Portland Trust, a British nonprofit that works to foster peace between Israelis and Palestinians through economic development, to host a mentoring track for Palestinian entrepreneurs during one of the middle days of the convention. "We want to be able to leave here having been a strong force for entrepreneurs in the whole region," Lane said.

In addition to the special track for Palestinian mentorship, the summit this year will also include other small group opportunities, like a visit to archeological sites, a cybersecurity gathering and a venture capitalist meeting. While last year's events only took place in Tel Aviv and Jerusalem, this year all the participants will

also have the chance to go to the Dead Sea and Masada on the final day. "We're just going to go all night," Lane said. "Think about ending this thing with the metaphorical new beginning – one of the best places for sunrises in the world."

Although Lane had done backpacking in Israel about two decades ago during his twenties, his interest in the country was rekindled only a couple years ago, when he was invited to speak at an ROI Summit, an annual convention held in Israel for young Jewish innovators. A particularly memorable portion of that trip for Lane was a visit to the SOSA (South of Salame) Tel Aviv start-up hub. "I was just absolutely struck by the entrepreneurial ethos here, and it's hard to describe if you're not here," he said. "The feeling, the eureka moment, was in SOSA. I spoke there and I went up to the roof there, and you could see start-ups as far as the eye can see, all the way to the sea. It has that Silicon Valley feel but with this incredible location and history."…

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HOW DO ISRAEL'S TECH FIRMS DO BUSINESS IN SAUDI ARABIA?

VERY QUIETLY

Jonathan Ferziger and Peter Waldman

***Bloomberg*, Feb. 2, 2017**

Over the course of 30 years working in Israeli intelligence, Shmuel Bar immersed himself in the hermeneutics of terrorism. Using techniques of literary analysis more familiar to Koranic scholars and Bible critics, he came to recognize the

distinctive language and religious phrases that suicide bombers used in their farewell videos. "Victory is with the patient" appeared frequently in the martyrdom declarations of Hamas recruits. Al-Qaeda adherents favored the call "God, count them, kill them, and don't leave any of them."

Bar, a tousle-haired 62-year-old with a wry sensibility, emerged from government service in 2003 amid the proliferation of global terrorism, and in the rising sense of doom he saw a business opportunity. He founded a company called IntuView, a miner of data in the deep, dark web—a sort of Israeli version of Palantir, the Silicon Valley security contractor. Tapping engineering talent in Israel's startup hub of Herzliya, he adapted his analyst's ear for language to custom algorithms capable of sifting through unending streams of social media messages for terrorist threats. He sold his services to police, border, and intelligence agencies across Europe and the U.S.

Then, two years ago, an e-mail arrived out of the blue. Someone from the upper echelons of power in Saudi Arabia, Bar says, invited him to discuss a potential project via Skype. The Saudis had heard about his technology and wanted his help identifying potential terrorists. There was one catch: Bar would have to set up a pass-through company overseas to hide IntuView's Israeli identity. Not a problem, he said, and he went to work ferreting out Saudi jihadis with a software program called IntuScan, which can process 4 million Facebook and Twitter posts a day. Later, the job expanded to include public-opinion research on the Saudi royal family. "It's not as if I went looking for this," Bar says, still bemused by the unexpected turn in a life spent confronting Israel's enemies. "They came to me."

Bar says he meets freely these days with Saudis and other Gulf Arabs at overseas conferences and private events. Trade and collaboration in technology and intelligence are flourishing between Israel and a host of Arab states, even if the people and companies involved rarely talk about it publicly. When a London think tank recently disinvited Bar from speaking on a panel, explaining that a senior Saudi official was also coming and it wasn't possible to have them appear together, Bar told the organizers that he and the Saudi gentleman had in fact been

planning to have lunch together at a Moroccan restaurant nearby before walking over to the event together. "They were out-Saudi-ing the Saudis," he says.

Peace hasn't come to the Middle East. This isn't beating swords into plowshares but a logical coalescence of interests based on shared fears: of an Iranian bomb, jihadi terror, popular insurgency, and an American retreat from the region. IntuView has Israeli export licenses and the full support of its government to help any country facing threats from Iran and militant Islamic groups. "If it's a country which is not hostile to Israel that we can help, we'll do it," Bar says. Only Syria, Lebanon, Iran, and Iraq are off-limits. The Saudis and other oil-rich Arab states are only too happy to pay for the help. "The Arab boycott?" Bar says. "It doesn't exist."…

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DRAFTING UP INNOVATION

Dan Senor

***Wall Street Journal*, Feb. 3, 2017**

Israel is a country of eight million people that at its narrowest point is 9 miles wide. It is surrounded on all sides by enemies who would like to see it wiped off the map: Hezbollah to the north, Hamas to the south, plus Bashar al-Assad's regime, Islamic State and Iran to the east. It wouldn't take a particularly pessimistic person to bet against this besieged slice of desert. Yet this tiny nation has also built an air force, anti-missile defense system and intelligence apparatus that is revered around the world—and relied on by the U.S. military, among many others. And it's done it with a minuscule fraction of the budget available to larger nations.

How has Israel pulled it off? In "The Weapon Wizards" Yaakov Katz and Amir Bohbot tell the story of how the Jewish state's military and defense sector became one of the most cutting-edge in the world. In chapters focused on particular technologies and weapons, such as drones, satellites and cyber warfare, the authors make the case that the same factors that have made Israel a tech giant have also allowed it to become a "high-tech military superpower." The country's military, its schools and its extracurricular institutions inculcate in its young people tenacity, insatiable questioning of authority, determined informality, cross-disciplinary creativity and tolerance of failure.

Because of its hostile neighborhood, Israel has had the unlucky distinction of being the first target of the newest terrorist innovations—which has forced it to become a kind of laboratory for militaries across the globe. Israeli commercial airline passengers, for example, were among the world's first victims of international hijacking campaigns. But elite Israeli commando units conducted the first successful airline hostage rescue in 1972, and then again at Entebbe in 1976. America's Delta Force was founded partly in response to what the U.S. learned from the IDF's operation in Uganda.

Two decades later, in the 1990s, Palestinian terror groups began deploying suicide bombers against civilians. By the time of the Second Intifada, the bombings were an almost daily occurrence. Israel responded by adapting: It built a security fence along the West Bank, equipped with sophisticated surveillance technology, which, alongside stepped-up security operations, helped drastically curtail the frequency of the bombings. It also boosted its focus on human intelligence, redeveloping sophisticated networks to track and apprehend planners and perpetrators inside the West Bank.

The Pentagon studied the IDF tactics used during the Intifada and applied lessons about effective urban warfare and the use of dogs in combat to the wars in Iraq and Afghanistan. Israel also pioneered the use of attack helicopters and UAVs,

both of which have been critical in America's targeting of terror cells in Pakistan and Yemen.

The authors, both longtime national-security reporters and IDF veterans, are particularly interested in the army's system of reserves and how it has bolstered the country's military innovations. Many other countries have reserve forces that augment the standing army, but because Israel is so territorially small and its population so outmanned by its adversaries, no standing army could ever be large enough to defend the country. Thus in the IDF reservists not only man whole units but also serve as commanders.

Messrs. Katz and Bohbot argue that a straight line can be drawn from this unique reserves system to the success of Israel's defense industry. "Israeli engineers' experiences from the battlefield, as well as their continued training and combat in the reserves, help them better understand what the IDF requires for the next war as well as how to develop it," they write. This is different from the U.S., where, the authors explain, the Pentagon "installs military officers in development teams at defense contractors, but they are often viewed as outsiders." In Israel, "the outsiders are the insiders. Military experiences become lifelong experiences. This dual identity is a national asset."

This was a big factor in the rapid development and deployment of the Iron Dome anti-missile defense system, designed to intercept rockets launched by Hezbollah from Lebanon and by Hamas from Gaza. Iron Dome was developed by Rafael Advanced Defense Systems; the company's missile factory is in the Galilee, not far from Israel's border with Lebanon. Many of Rafael's engineers live in northern Israel, fought in reserves during Israel's 2006 war against Hezbollah or spent 34 days in bomb shelters during that war. In other words, they had far more than an academic understanding of the threat that they were developing technologies to defend against.

Israel's defense industry also has a unique, export-oriented business model. For the past 30 years, for example, the country has been the world's No. 1 exporter of drones, responsible for 60% of the global market (the U.S. share of global exports is less than half that).

For its willingness to sell its drones and many other defense technology products abroad, including to China, the country has been criticized. But Israel argues that this is an existential matter. The IDF has never been a sufficiently large buyer on its own to incentivize local companies to develop new weapons or technologies, write Messrs. Katz and Bohbot. This means Israeli defense tech start-ups and larger companies need the economies of scale that can only come from selling into foreign markets to "keep production lines open and prices down for the IDF."

While "The Weapon Wizards" can be a bit technical for the lay reader, the authors have skillfully conveyed a key component of the dynamic innovation culture that has made the Jewish state one of the most important entrepreneurial and technology-driven economies in the world. Not bad for a country 9 miles wide.

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First Israeli Research Nanosatellite Launched into Space From India: Anav Silverman, *Breaking Israel News*, Feb. 15, 2017—Israeli academia's first research nanosatellite was launched into space on Wednesday, February 15. Ben Gurion University's BGUSAT nanosatellite was among the record 104 nanosatellites from five countries, which were launched on the Polar Satellite Launch Vehicle from the Satish Dhawan launching pad in India today. The Israeli nanosatellite will study climate change and scientific phenomena from space.

Apple Buys Israel's Facial Recognition Firm RealFace – Report: Shoshanna Solomon, *Times of Israel*, Feb. 19, 2017—Apple Inc. has acquired Israel's Realface, a cybertechnology startup whose facial recognition technology can be used to authenticate users. This is Apple's fourth acquisition in Israel, the financial website Calcalist reported Sunday, and the deal is estimated to be worth a couple of million of dollars.

Can a Desert Nation Solve the World's Water Shortage? (Video): Seth Siegel, *PragerU*, Oct. 17, 2016— From California to Africa, we are facing a global water shortage. But one tiny country, in the middle of a desert, has found remarkable solutions. Which country? And can we replicate its success? Businessman and *New York Times* bestselling author Seth Siegel explains.

Execs from Facebook, Google, and Microsoft Explain Why They Use Israel for Their R&D: Sam Shead, *Business Insider*, Oct. 6, 2016— Born just 68 years ago, Israel has developed a reputation as one of the world's most innovative tech hubs. Silicon Valley multinationals in particular have cottoned on, setting up offices in the region and acquiring numerous Israeli startups.