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מכון פישר לחקר החלל והתעופ - 109079					

Mission: Plant the Israeli flag on the moon

Three young scientists hope to succeed in their own private version of the Apollo program

Alon Ron

From left: Yonatan Weintraub, Kfir Damari and Lori Garver, deputy administrator at NASA. The space agency's goal: Develop cheap robotic technologies to explore space.

By Guy Grimland

If Yariv Bash, Kfir Damari and Yonatan Winetraub succeed and send a robot to the moon, they'll donate their millions in prize money to promote science among Israel youth. Yesterday the trio announced their participation in the Google Lunar X Prize competition – an effort to send an unmanned vehicle to the moon and beam back high-quality photos and short films.

The competition seeks to encourage space scientists and engineers from around the world to develop cheap technologies for robotic space exploration. To win, a team needs to raise private funding; the first team to achieve the mission gets $13 million; second prize is $5 million. The other prizes total $5 million. So far 13 groups have registered for the competition; prizes can be won up to the end of 2015.

The X Prize gained publicity in 2004 when Burt Rutan, who led a group in cooperation with Microsoft co-founder Paul Allen, built and flew the first private manned spaceship.

The Israeli group's official declaration was issued at a space conference held by Tel Aviv University's Yuval Ne'eman workshop for science and technology. The group goes by the name SpaceIL and is registered in Israel as a nonprofit organization. It's the only Israeli team in the competition.

The three young men are not motivated by money; they view the competition as a national mission to develop Israel's ability to explore space.

The group has a website, http://www.spaceil.com, in Hebrew. "Our mission is to put the Israeli flag on the moon. During the next two years, we intend to build a small space robot that will make the long journey from the earth to the moon. The vision is to promote technological education in Israel," the website states.

"America's space program excited the imagination of an entire generation in the United States. We hope that this project will inspire children of the next generation in Israel. ... The Israeli start-up nation was born as a result of civilian adaptation of military computer technology. Similarly, advancing a civil space program will boost space technology" in Israel, the site goes on to say.

"No, we're not imagining things," the site adds. "This is an initiative of a few engineers – experts in hardware, software and space technology who are considered capable, prudent people in their daily lives. We believe that with the help of an $8 million budget, it will be possible to put an Israeli flag on the moon."

Sending a satellite the size of a bottle into space

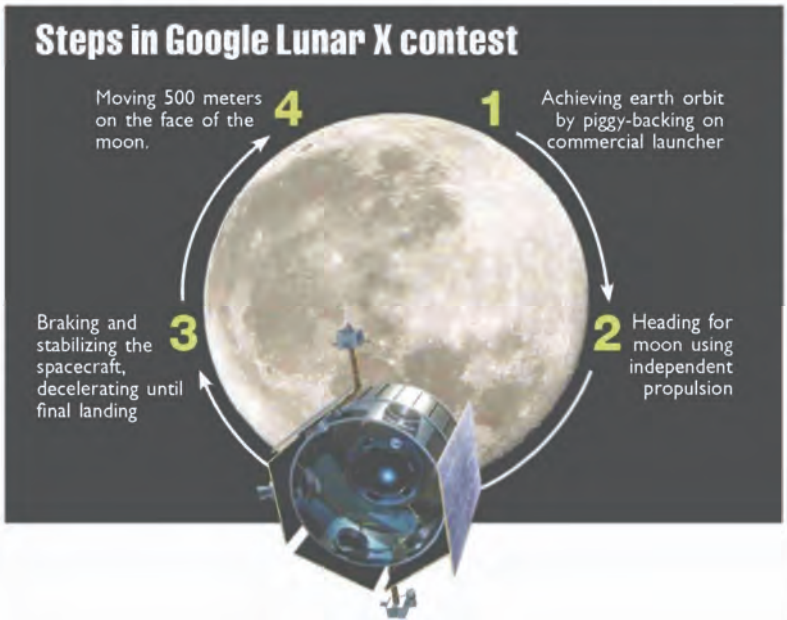
So what exactly is the project's technological concept? "The world of small satellites has changed significantly over the past decade. Today a box the size of a Coca-Cola bottle can be sent to space at a low cost of $1 million," Bash, 30 years of age, says. "We intend to use relatively cheap components and pack our entire spacecraft into one box .... That box will be put on a commercial launcher that will put the vessel into orbit around the earth. From there, we need to head toward the moon and carry out a landing.

"The main problem, of course, is how to get there," Bash goes on to say. "This same little box is really a flying gas tank with some electronics and cameras. Most of the space in our vessel is taken up by fuel needed to reach and land on the moon.

"Unlike large satellites, we plan to build a vessel that will last only two weeks to a month in space. That helps us for two reasons: There won't be a need for massive protection against the sun's rays, and there won't be a need for large battery power to drive the vessel when there is no sun .... Everything will be built from existing, cheap products," Bash says.

"We're not the first to try this. Orbiting the earth right now are dozens of such small CubeSat satellites that contain simple, cheap materials. Of course, this is our early planning, and we assume that much will change as we get to more advanced planning stages. We have a number of space experts who are working on various issues, starting with the ignition system, and including topics such as navigation, landing and flight monitoring," Bash says in conclusion.

Winetraub, 24, says that at this stage, the group is addressing planning issues that are not likely to be resolved until the end of the year – technical surveys and the like. "These are surveys in which you present your concept of a technological solution and then check to see what unresolved questions remain," he says. "At this point, we've reached decisions about the size of the satellite and how to pack the components into the vessel."



Target: $8 million. In practice: $0.5 million

The three Israelis have raised around $50,000 out of an $8 million target. Damari, 28, believes that the group will meet the target.

"We're working on several tracks to get donations. It's important to point out that any profit in the form of a prize will be donated to the education system. This isn't a challenge taken up out of business motivations. So we're working as a nonprofit organization," he says.

"And that's the reason we give lectures at schools about the project. We want young people to know about the project. Just as many people knew about the landing of the Apollo, we hope that young people in Israel will become engaged with

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this project and show interest in space."

Bash, Damari and Winetraub have different technological backgrounds. Bash is an electrical and computer engineer. He's studying for a Master's degree in business administration at the Interdisciplinary Center in Herzliya.

Damari is a communications systems engineer and a lecturer in communications and computers. He's also a consultant in communications and information security. He says he began to study computers while in nursery school; he started programming at the age of 6 and wrote his first virus when he was 11. He served as a technology officer in an elite unite at Military Intelligence.

Winetraub is a graduate of the space technology program at NASA's International Space University. He works as a systems engineer for Israel Aerospace Industries. He is also enrolled in a Master's program – at Tel Aviv University's interdisciplinary program for outstanding students. His thesis deals with issues in neurological science.

"We met at a conference on innovation sponsored by Israel Aerospace Industries. We met and we realized that it would be good to get to know one another," Winetraub says. "Then we met at another conference, this one on creativity. I had heard about this Google competition a while ago – it's pretty well known. I kept my eyes on it for a while, but it took some time to find the right friends."

Damari predicts that the group will get the job done. "I think we'll reach the moon, but we have some challenges to meet. I believe that the technological solution we chose, the nanosatellite, will reach the moon. The calculations that will help this vessel reach the moon ... these are calculations that were worked out 40 years ago.

"The biggest challenge is the landing and beaming information to earth. But we'll work hard to make that happen. I finish my degree next month. I'll devote time to this project. Yariv will too, and Yonatan has gotten Aerospace Industries to help out."

Will they make it? Wil they realize their ambition? Winetraub says Yes. He seems confident that come the year 2012, if you have a really sharp telescope, you'll be able to see that Israeli flag on the moon.