

## David Israel Helps NASA Shoot Reach For The Stars (BJT)

By Stacy Karten, [Baltimore Jewish Times](#), December 2, 2011

Growing up in Pikesville, David Israel tended to be more interested in becoming a rock star than being involved in space exploration.

But now, Israel, 44, finds himself as the principal investigator for a \$200 million National Aeronautics and Space Administration project called the Laser Communications Relay Demonstration. According to NASA, the project gives scientists what they have long wanted — high-speed data rates and the potential streaming of high-definition video from distances beyond the moon.

The LCRD project will offer numerous benefits to space exploration, according to Israel.

“The main benefit that we can get from laser communications is increasing the bandwidth of the data rate, and that’s where people can relate to that if you think about how your Internet connection has increased in your home or your workplace,” he says. “Suddenly, things that used to take forever to do happen instantaneously. Streaming TV straight to your cellphone, which seemed impossible, is now suddenly possible and exists. Those sorts of benefits have increased with data rates.

“Another part of it is that it is the same data rate as the existing communication system as the user or spacecraft or satellite — the term we use is SWaP, size, weight and power,” he continues. “If someone wants to stay at a fixed data rate but use something smaller, that would be a benefit. It’s kind of like the basic cellphone, how the size has come down over the years, or laptop computers where there has been a reduction in the size weight power.

“Another aspect of the communication is using the light and laser that requires the precision timing operating at a higher wavelength and helps operate the spacecraft more efficiently. It will help you better know where your position is by communicating over the laser.”

For Israel, talking in such “data speak” and spewing wonky NASA jargon is now like rolling off a log.

Joining NASA as a civil service employee in 1989, Israel is currently a space communications manager. He was originally part of a group that submitted a proposal for project funding, competing against many other bids.

“Last March, there was a call for proposals that came out,” he says. “The origin of the idea for this was not mine. There are other people on the project who have been working on communications for much longer than I have, but I ended up as the principal investigator.

“It was a combination of circumstances,” Israel says. “One is the division I am in, and the other is there will be other experiments with laser communications. The goal of this experiment and mission is to be more than just about the laser communications itself. That’s the part that gets most of the press, and it’s kind of cool. We even made a video. There’s other parts — operating relays and how we would go about using them, that’s more in line with what I have been doing over the years than the laser stuff itself. There was a team of us that worked on the proposal and as the [principal investigator] I was the lead for the team. But it was quite a group of people who had to come together quickly to put together the proposal.” December 2016 is when a spacecraft is due to launch carrying the fruits of Israel’s and his team’s labors. “We’ll be flying on a commercial satellite. Once we get in orbit, we plan to have at least two years of operation and that’s when we’ll be doing all the experiments,” he says.

Five years seems like substantial lead time for a project, but Israel says he still has concerns.

“If anything, we’re worried about the schedule,” he admits. “The way these projects work, they take a number of years, especially when there is some technology being developed that’s needed. We have to build the test facilities, infrastructure and technology itself. It’s all part of it. After three years, we’ll have a

ground-based demonstration. We'll show it working in a lab at Goddard Space Flight Center [in Greenbelt]. At that point, we'll take two years to produce the space flight hardware. We'll test it all out for the environment of space flight conditions and integrate it all onto the spacecraft before it gets launched." Israel will get to work closely on this project with Bernie Edwards, a friend, colleague and previous classmate.

"Bernie is the co-investigator. He's actually the one who came up with the idea," Israel says. "He's also the chief engineer on the project. He's been working with flight demonstrations for over 10 years. The interesting thing about Bernie is that we actually met as freshmen at [Johns] Hopkins [University] in the fall of '85. We were lab partners back then, so he was the one who actually talked me into applying for NASA. He was in the Air Force ROTC so he had to go into the Air Force. He's the one who said, 'David, you should really go to work for NASA.' We sort of lost touch, then he tracked me down 10 years later and I was able to recruit him back to NASA."

### **A Perfect Fit**

While a student at Pikesville High School, Israel, a 1985 graduate, demonstrated a proficiency in math and science, and he also enjoyed tinkering.

"I was always good at math and science," he says. "What's interesting to me is, I remember knowing I was interested in computers when they first came out. I wrote some basic software for a friend in high school whose dad had a clothing store. I wrote some software to help him keep his inventory and stuff like that.

"The thing was, I didn't know what engineers were until it became time to apply for college," Israel says. "I'm different from a lot of the people I work with in that I always thought that what NASA did was cool, but I wasn't the type of kid whose dream it was to be an astronaut. I was a kid whose dream it was to be a rock star. A lot of people I work with have a background as ham radio operators. I kind of have a dream job for ham radio operators, but I was never one of them. When I was a kid in high school, I was taking apart pieces of stereo equipment and trying to put it together to try and build a home studio sort of thing." After graduating from high school, Israel attended Hopkins and earned his bachelor's degree in electrical engineering, as well as a master's degree in electrical engineering/satellite communications from George Washington University. His career with NASA to date has suitably prepared him to be the principal investigator for the LCRD.

"Since I started, I've always been working in the area related to space communications and satellite communications," Israel says. "I was the P.I. [principal investigator] for a different experiment for the Columbia mission in 2003. A big area of my work has been in the area of space Internet and networking, understanding how the Internet works and applying them to our mission."

LCRD project manager Michael Weiss says Israel is an ideal fit for this job.

"David is just the right person to define the communication systems of the future and lay out the development path that gets us there," Weiss says. "With his wealth of experience with communication systems and his extensive knowledge of network architectures and systems, Dave is blazing the trail for how NASA will enable future communication capabilities using optical laser systems." Israel notes that some other interesting highlights and projects in which he has been involved were helping to connect the South Pole with the rest of the world over the Internet. "The system we put in was the one when the doctor [Jerri Nelson in 2009] down there diagnosed herself with breast cancer," he says. "They were using that link to do that. I designed other com systems that have been used at the North Pole and South Pole, and various places I've traveled around. The common denominator is it's all related to satellite communications."

Israel's travels have taken him to Antarctica and Australia. His new project will include short visits to Huntsville, Ala. and Boston, and once the ground stations are built in a few years, he will venture to California and Hawaii.

While his day job pays the bills, Israel says he still enjoys writing and performing music. He is adept at playing the guitar, mandolin, dobro and accordion. But as a married father to a nearly 2-year-old son, Isaac, Israel says he doesn't get to play music as much as he used to while in his punk rock group, called National Razor FDIC.

"Until two years ago, and for the previous 20 years, I was living on Fort Avenue in South Baltimore," Israel says. "There was a long stretch of time, beginning in 2003, when every other Sunday a group of us would get together and play music at a corner bar. Those don't happen as often as they used to. Periodically, we'll do it at someone's house or Captain Larry's down there."

As far as his lingering rock star aspirations, Israel says, "I definitely enjoy being a NASA engineer. I did enough to understand how hard it is to make it in music. Having a kid and a good day job is a good thing. I do enjoy playing and plan on continuing playing. It would be nice to be a successful singer/songwriter, but I'm not so sure I'm into the idea of being a stadium rock star anymore."

(He notes that he is co-writing a rock opera based on the Battle of Fort McHenry and is pursuing grant funding for performances tied to the upcoming 200th anniversary.)

For the past two years, Israel and his wife, Karen, have lived in Elkridge, and they recently joined the Oseh Shalom Congregation in Laurel.

"This was a pretty big deal, particularly for me, because my family has been longtime members of Chizuk Amuno, and that's where my wife and I got married and where I was bar mitzvahed," Israel said.

### **The Big Payload**

Because of the duration of the LCRD project, Israel says he is fairly certain that he will be employed for many years. Even if a project like the LCRD becomes subject to a budget cut at some point in the future, a person with his knowledge and experience would be in great demand.

"I've been fortunate in that there has been no shortage of job security," Israel says. "The great thing about being in the communications business is, it doesn't matter whether you're going to the moon or we want to send telescopes to look at black holes or we want to send science missions to look at global warming, no matter what, they all need a communications link.

"If you're kind of part of that, you kind of have some built-in security. Everyone needs to communicate, no matter where they are going."

When the payload lifts off in 2016, Israel says it will be exciting, but the feeling will be short-lived.

"In a lot of ways, it's a big milestone when it launches, but the few years in operation when the whole new phase of the work will just be starting is the main thing," he says. "When we get the payload off the ground, when I was the P.I. for the shuttle experiment, I remember very well the moment the shuttle launched and it was exciting and I was elated when it went into space. There was a brief moment of celebration, but then it was time to get back to work. In this case, it will be very exciting to get it up on orbit, and then there will be at least two years of work after that to operate it and do all the experiments.

"That should be plenty exciting, and then when we get to 2019 or 2020 and I realize what it's done, I hope it's the experience. This is why I like working for NASA, that I can point to it and say this is something I was able to contribute, what I've been a part of."

### **The David Israel File**

- Age: 44
- Lives in Elkridge with his wife, Karen, and son, Isaac
- Members of Oseh Shalom Synagogue in Laurel

- Pikesville High School Class of 1985
- Bachelor of science degree from Johns Hopkins University, 1989
- Master's degree from George Washington University, 1996
- Space communications manager for NASA
- Principal investigator for Laser Communications Relay Demonstration project
- Specialties include spacecraft transponders and communications systems, satellite communications ground terminals, spread spectrum systems, and the extension of Internet protocols to space
- Received Space Flight Awareness Honoree award for the lead of a shuttle return link system in 1995