

MEIR SHEETRIT

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Moving to more of the specific use, as we said, and as you heard, it is quite blurred at the moment. Basically, we must compose with the public aspects, some of the military ones, and then the civil ones. Let us now illustrate some of the public and defense part, so over to you, Meir.

Meir Sheetrit

I would like to simplify space for everyone with very simple words, not by going deep into the science and technology. 20 years ago, only two countries could really launch satellites into space, the United States and Russia. Over time, more and more countries were able to launch satellites into space and as the need for satellite services in space increased, so did the ability of many entities to launch satellites. Satellites are giving services to people who may not be aware of the many things they are using every day that come from space, so the uses are many of the things we use every day: observation, intelligence, communication, Internet, television, navigation, accurate weapon aiming. Almost all those services and many more, are used daily by most people without them knowing that they come from space.

Now, we are in a new trend or new space and things in the world have been changing very drastically. To explain it I just wanted to tell you that eight nanosatellites were constructed by students in Israeli high schools at a cost of something like USD 300,000 per satellite including building a clean room, launching, a communications station to connect with these satellites, and they have worked for eight or more years. Today, there are eight nanosatellites built by high schools and the number is growing all the time. One of the schools involved is an Arab school in Taibe, where the students said how proud they were to be part of this project of building satellites in high school, launching them into space and being connected with them all the time.

If we move on, today there are something like 10,000 satellites in space. It seems a lot but, in fact, when you consider the size of space it is really nothing and does not really interrupt anything. However, as you know, eventually many satellites disintegrate over time, so hundreds of thousands of parts are floating in space coming from satellites that have stopped working. Of course, there is a chance that some of those parts can touch and damage other satellites, therefore there is a communication station on Earth, for example, that warns the International Space Station if parts are getting close to them, so they can move into a

protected space until they have passed, and then continue their own mission. Because the space is a field with so much satellite junk, a new invention from an Israeli company aims to clean up space. With an investment of between USD 100 million and USD 200 million, the first idea was to send a satellite that would push the parts away into deep space. Then they had a better idea to build a satellite that will move close to every satellite that has stopped working and recharge it so that it can work for many more years without just being space junk. Of course, you have to know that every satellite is floating around the world, and it passes the same point every one and a half hours. However, sometimes we need satellites that stay at a certain point, which we call geosynchronous satellites, and they travel at the speed of the Earth. For example, if Israel would like to know what is happening in Iran at every moment and if a missile is being launched towards Israel, then we have satellites standing over Iran that are looking at all times and we can see immediately what is going on in exactly that point and protect ourselves if a missile is launched. The technology has become so accessible that in order to build more and more satellites, we tried to change the weight, because it costs around USD 100,000 to launch every kilo of weight into space. Therefore, if we can reduce the weight of satellites, we can save a lot of money. Private companies have started to develop much cheaper launch systems by doing something very special, using the fact that we can reduce the weight of the satellite just for example, by reducing the weight of screws. Screws seem like nothing, but if we can save a gram off every screw by making it hollow rather than solid metal, there are 100,000 thousand screws in a satellite, so it saves around 100 kilograms in weight, which if you multiply by USD 100,000, means we are saving a lot of money.

The technology has become accessible to everyone, so private companies started to launch satellites themselves at much lower prices than NASA, especially when you take into account the possibility that those companies like Tesla, etc., can reuse the missiles and significantly reduce the prices. Israel has built a spacecraft called Beresheet with an investment of only around USD 100 million, which landed on the Moon, but as a result of human mistakes it crashed on landing. We are now building Beresheet 2. In fact, we are in the same trend as many private companies, which are launching, reducing the prices and creating more and more possibilities. As far as we can use satellites for better uses, we are doing more important things. For example, Israel with France launched two big satellites called Venus 1 and Venus 2 which have a single purpose. Venus 1 is a multispectral satellite that can absorb 12 different types of radiation from around the globe and so follow the situation of agriculture, ice, water and many other things. The second one is hyperspectral, with 120 different types of possible radiation. The possibilities for Israel and France to see from space what is going on Earth in a wide range of things, which can really help human beings to change a lot of things.

Recently, Orion which was launched to the Moon as you know – with a rocket and in it there were some mannequins like humans, wearing special suits against radiation. These suits were developed by a private Israeli company. This is important because the flight from Earth to the Moon does not take a long time and therefore the radiation effect will not kill people. However, according to the Orion mission, going from the Moon to Mars would take more than a year and the radiation over that time would kill the astronauts. When these mannequins come back they will check what protection they got from radiation and, if it is really good, then that opens the way to continue the process of sending people to Mars, because it has to be viable, and the people have to stay alive to arrive there.

Space is also a protection medium that is essential now. Of course, Israel was one of the first countries in the world to use space as a way to protect our state and ourselves. For example, we are developing the Aero missiles, 1, 2, 3 and 4, which, as a matter of fact, are capable of flying at unbelievable speeds outside the atmosphere to intercept any missile launched against Israel.

This is one of the very new things we have in Israel to protect ourselves from missiles from Iran and other places, out of space. The last but not least, is a very new laser weapon developed in Israel and being developed today with the United States, which creates the possibility that we can protect Israel from any kind of weapon launched over us; missiles, mortars, etc. We can intercept them all with laser rays at the speed of light, which as you know is 360,000 kilometers per second and at very low cost. You have to understand today when we had the last clash with Gaza, they launched over 1,000 missiles at Israel blindly. Today, we need to intercept them with the Iron Dome, but each missile costs something like USD 100,000, so we need millions of dollars to protect ourselves and we intercept 95% of them. With the laser beam we can intercept them all at almost no cost because it is just a ray of light and it does not matter how many missiles are launched against you, you can intercept them all.

It is called the Light Shield and it is now at the end of development with the United States, which has joined Israel in doing this. In my opinion, it could be possible to put that sort of missile in the sky to protect us from space against enemy missiles.

Now, we have passed from cyber to Artificial Intelligence, that is the new thing in the world. Israel is one of the first, which is going to change a lot. I believe that if all the plans for Artificial Intelligence come true, it will change people's lives in very drastic ways and, I hope, for good.

Patrick Nicolet

Thank you, Meir, for this overview of the possibilities — on Earth and in space — and for connecting the two. As you showed, not only in defense, but overall, cybersecurity is a topic that has emerged, and we have addressed it a few times already at the World Policy Conference.