

The Israel Project

Iran's Missile Program: Current Capabilities and Future Directions

Welcome and Moderator:

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EITAN LIVNE: Hello and welcome. My name is Eitan Livne, and I'm the director for Iranian affairs at The Israel Project. On behalf of our entire team I'm very pleased that such a prominent group of journalists could join us today to hear from missile expert Mr. Uzi Rubin.

For those of you who don't know, The Israel Project is an international, non-governmental, and privately funded organization dedicated to providing journalists, officials and the public with accurate information about Israel and the Middle East.

Now, without further ado, I would like to introduce our speaker. Uzi Rubin founded and was the first director of the Israel Missile Defense organization in the Israel Ministry of Defense, in which capacity he has launched and managed the nationwide effort to develop, produce and deploy Israel's Arrow missile defense system. He led this program from its conception in 1991 to the first delivery of operational of missiles in 1999.

He received his masters in aeronautical engineering from Rensselaer Polytechnic Institute in 1969, and directed several missile programs in Israel Aerospace Industries and the Israel Ministry of Defense. In 1990, he was the a visiting scholar in Stanford Center for International Security and Arms Control where he co-directed a major study on missile proliferation.

Between 1999 and 2001, he was the Senior Director for Proliferation and Technology in the Israel National Security Council. He is a twice winner of the Israel Defense Prize, in 1996 and 2003. Uzi Rubin was – has retired from Israel's Ministry of Defense at the end of 2002, and has since been heading his own defense consultancy, Rubincon, providing consulting services in military technology to the Israel Ministry of Defense and Israel's leading defense contractors. He publishes frequently in professional and international media on space and missile defense topics.

Now I'm going to turn it over to Mr. Rubin for a short introduction. After that, we will have questions. Mr. Rubin, over to you.

UZI RUBIN: Thank you. Hi, everyone. Good morning to the people overseas. I'd like to open my – this talk by a short description, overall description, of the Iranian missile and space programs. It's a very remarkable story, a quarter of a century story that started in the arms threat of the Islamic Republic in 1971. And Iran at that time had no military industry, and no missile industry whatsoever.

And at that time they didn't even like the idea that was – I guess that was in the – (inaudible) – the self-right (ph) to set up the missile industry and the nuclear program itself in the soft time (ph). And many say that's a bad thing, because the Shah – (inaudible) – so, he shunned it. Well, he changed his mind during the Iran-Iraq war, when the Iranians were heavily bombarded by Iraqi missiles. And that was when he took the strategic decision to invest heavily in setting up indigenous current capability.

First, of course, based on technology kinds of arms, the first is complete missiles and complete missile production lines from North Korea and the support from other countries. And in time they developed the capability to develop their own improvements of the missile and finally to develop whole entire missiles.

They have several outstanding achievements. I think the most outstanding achievements – two outstanding achievements. The Sejil mid-stage solid-propellant ballistic missile, this is quite a modern style ballistic missile. While it's not a Minuteman, it's not a double M, but it's something like, let's say, the early versions of the '60s. And then there's the three or two stage satellite launcher which already had successfully orbited the two Iranian-made satellites from Iran territory by an Iranian-made satellite launcher.

So it's quite impressive heights of engineering and I'm quite impressed by that. What's more impressive is – (inaudible). I mention them because you don't see them elsewhere. They're not a copy of anything; they're not an imitation of anything. They don't resemble anything abroad and I'm not seeing abroad except in Iran, which means that they are indigenous to Iran. To what degree they're supported by outside talent I don't know. But seriously, it's quite an achievement.

So I'd say the story is remarkable. And by itself would perhaps cause for coordination (ph), but this is coupled with a regime which is one of the most extreme and dictatorial regimes in the world today, with ambitions to change the world order and with some intentions toward the state of Israel. And not only the state of Israel, I think, its intentions are globally – are global wide. And – (inaudible) – with this kind of regime having this kind of capability should be a source of concern not only to Israel but I think to the entire world.

And with that, I'd be happy to answer specific questions.

MR. LIVNE: Thanks to Mr. Rubin. We've received many questions. Several people ask about the 10-day war games that just ended in Iran, during which Iran test fired several types of missiles, including an anti-ship missile, and also unveiled underground ballistic missile silos. What is the significance of these developments?

MR. RUBIN: Actually, the significance is more in the area of impression and the military preparedness. Technologically nothing new was unveiled here. All the missiles fired, the ground-to-ground missiles they fired 14 pieces or 14 units. Most of them – many of them were unguided heavy rockets with dubious accuracy. They were two Scud-Bs, they call them locally made – (inaudible) – they're called Shahab-1s and another two have Scud-Cs, locally made Scud-Cs, which they call Shahab-2, and then one of the old-style Shahab-3.

And the remarkable thing perhaps was that they fired them within a relatively short time. The whole show took – it was measured in 30 minutes, perhaps only a few minutes. So it was a mechanized and synchronized firing, although one wonders why synchronize the fire of an unguided rocket with an accuracy to 200 kilometers and no way to make ballistic missile, like the Shahab-3 to 1,200 or 1,400 kilometers. So this was a – it was a military show. So that's about that.

About anti-ship ballistic missile, again, this is not new. They fired one against a ship-based target in February and published a videotape on that where you see the missile hitting the – exactly down in the middle of the ship. But when you look really closely at the video slide frame

by frame, it seems that the ship blows first, and then the missile hits it, so I don't know exactly what happened there. Their PR guys, sometimes they run over with enthusiasm. Doesn't mean that it's fake, but somebody tried to gild the lily.

They didn't show anything from yesterday's – day before yesterday test against – (inaudible) – moving maritime targets – moving ships. But I looked at the web until about two hours ago. I didn't see any still any video footage of that experiment. I don't know whether it was successful or not. But it's remarkable, the very fact that they are dealing with anti-ship ballistic missiles is by itself remarkable. They are building (ph) in second country without that.

Though I'm obviously – I'm awaiting – the Chinese developed a DF-21D with a 2,000 kilometer range. And it's now deployed and this is aimed against the U.S. aircraft carriers in the South China Sea. Well, obviously, the Iranians are emulating this developing – well, they don't need that range; a few hundred kilometers is enough to threaten U.S. weapons within the Persian Gulf and outside – immediately outside of the Persian Gulf.

How dangerous is this missile and whether it can be defended – of course it can be defended against. There's no doubt about it. But it takes time to set up defense, and we should be – (inaudible) – defenders right now. It also takes some time for the Iranians to perfect this particular missile. But again, there's nothing new here.

The third element that was revealed, again, just at the exercises was a silo, which made the most impression. But it really didn't belong to the types of – they showed some old footage of an MX Silo. Nothing new here for two or three years – already you could see overviews – overheads from satellites showing the opening of Iranian missiles – missile silos near the town of – city of Tabriz in northeast – northwest Iran. So it was a known fact that they have silos.

The remarkable thing is that as they revealed the silo, they showed a picture of them on the inside. They look somewhat rudimentary but well made. The missiles deployed – stored in it was – (inaudible) – the Shahab-3 that flew at 1,400 kilometer version. I was not impressed by the silo itself, but was impressed by the fact that they are now advertising it. And that they are showing, look how survivable they are, and that's the way they are going. They are going to have a survival missile capability and survivability goes very well with nuclear ICBMs. So I think it's – (inaudible) – on the future. And that's the significance.

MR. LIVNE: Thank you. The British foreign secretary said last week that Iran was carrying out secret tests of a missile that could carry a nuclear warhead. What do we know about Iran's nuclear capabilities, sir, and about its efforts in this regard?

MR. RUBIN: Let me say that this stuff that the British foreign secretary was concerning a recently leaked report by the – of the United Nations that was not officially released due to the refusal of the Chinese and the Russians to allow its release. It was leaked in full length by sources. It's in the Internet, and the listeners can access it.

It talks about much more than just those tests. And the remarkable thing was – two things I think – three things. And first, that it was the British foreign secretary that

acknowledges the tests, and not the United States, it remains mum. And this is a question to me, why does the United States not release information it probably has about this test?

The second point is the fact that the Iranians have been – (inaudible) – about a year and a half ago used every – every single missile test to brag and to intimidate and to make a celebration of – all of a sudden hiding their missile tests, their long-range missile tests. This is another question. I don't have a good answer for that.

The third point, of course, about nuclear capability. And that – here let me mention that – let me make it clear that nuclear capabilities in the sense of being capable from the point of the view of the load lifting capabilities to carry a third-generation nuclear missiles – when you have capability, that means the missile has the capability – it's potentially nuclear capability. Whether the missiles already have nuclear warheads that can fit those missiles is an open question, of course. Nobody knows that, at least not in the open.

But then, let me point out from looking to history of previous nuclear programs – the U.S. early nuclear program is so well documented, there have been dozens and dozens of books on that. The Russian nuclear programs, yes, were – (inaudible) – but still well, very well documented. And I remember the failed – (inaudible) – to Dave Holloway's book, "Stalin and the Bomb" which documented the birth of the Soviet nuclear program.

You've seen all those programs; it's just three phases. The most difficult phase is acquiring the nuclear materials. This is really the hard part of it, the lengthiest part of it, the most expensive part of it. Once you have that, the next phase is to take those nuclear materials and make them into a nuclear bomb. It's complicated, but it's much shorter and much less expensive. And the third phase, which is the shortest, and the missile test is one of them, is taking the bomb and sticking into a head of missile. This is once you have the bomb, to stick it inside a missile is – I wouldn't say immediate but relatively quickly.

So the Iranian missiles of both sizes – both flavors, solid propellant Sajjil and the liquid propellant Shahab-3 – are nuclear capable in the sense that they have the well on the top of them, and load-carrying capability to carry third-generation ballistic missile nuclear devices. And once the Iranians have nuclear devices, which seems to be quite a certainty, there is no doubt that those missiles become not just nuclear capable but nuclear.

Let me point out that the sibling of the Shahab-3, which is in Pakistan – it's actually the same missile but call it Ghauri, a different name – but basically the same as North Korea and Iran. It's not just nuclear-capable, it's nuclear. It's fully armed. They have a fleet of fully armed – fully nuclear armed missiles that are indistinguishable from what the Iranians have. So in distance those missiles are – (inaudible) – being nuclear-capable and nuclear.

I hope I made myself clear in this answer.

MR. LIVNE: Yes, thank you. So let's talk a little bit about, besides nuclear, what are Iran's current missile capabilities and where is it heading in terms of increased ranges and reliability of its missiles?

MR. RUBIN: Well, I'm not just – (unintelligible) – but what payloads. Iran is very careful to deny, time after time – (unintelligible) – that they have intentions to make nuclear weapons. But I want to turn the attention of the listeners that – the audience that just less than two months ago, an amazing article appeared in the Revolutionary Guard website about the day after the first Iranian nuclear test.

So their intentions, I think, perhaps are not as clear as they try to make them. About current capabilities, this – the Iranians are now – (succeed ?) – in capability in several areas: the – (unintelligible) – capability in ballistic missiles – (unintelligible) – solid and liquid. They have now engaging in building up capability of long-range strategic cruise missiles, and they have a capability – growing capability in actual tactical missiles, and they have a proven capability in space launchings. So well, altogether taken, this is actually covering almost all bases in missile technology.

Their long (range ?) missile right now is the (Fajr-2 ?) – (unintelligible) – which is – whether it's operational, I don't know, but – (unintelligible) – conducted – (only ?) seven or eight tests with them, in flying success. Probably as the former U.S. Secretary of Defense characterized it when asked the manner of its tests, I think it was in May 2009, accelerating the range between 2025 kilometers, but experts in the West give various numbers. The lowest number is from experts in the international – (unintelligible) – Iranian missiles, really is about half a year ago and also by my good friend Mike Elleman. He's quoted the range of 2200 kilometers. Other calculations talk about up to 2600 kilometers. It depends on the calculations.

And they basically saying that an – (unintelligible) – missile is the same, but the way you calculate it, you get different results. The differences look too – (unintelligible) – but they are not. I just want to make it more tangible to the audience by pointing out that at 2200 kilometers, it will take a missile from Tabriz, where the silos are, all the way to almost to Belgrade in Serbia. And if the range is 2400 kilometers, that threatens the suburbs of Warsaw, Poland, from Tabriz; 2600 kilometers will take you all the way from Tabriz to Riga, Latvia. Just to put things in perspective, Moscow is less than 2,000 kilometers, and – (unintelligible) – of bombing of Iran. So the few variation, 200 kilometers here and 200 kilometers – they make a tremendous difference.

But this is just the beginning of the story. I'm convinced that the Iranians have the BM-25 missile, which was finally revealed by North Korea and Colombia in October of last year. It was paraded, and the (actual ?) missile that was depicted in – (unintelligible) – an improvement of an old Soviet design. The range must be at least 3500 kilometers because actually there is (other than ?) no point for the missile to be in North Korea, to threaten Japan they have their old (devil ?), you know, the – (unintelligible) – and the next regional target would be Guam, the air base in Guam, which is 3,500 kilometers away, and the missile that original, the original Soviet missile had the – (unintelligible) – range of 2500 kilometers; it was lengthened by about 20 percent. So it should have a range of about 3,500 kilometers and from clues left unintentional, I think, by the Iranians – think they had some security lapses – there is – might say indirect evidence that the missile is today in Iran. And now if the missile is in Iran and once it become

operational, it can go all the way from Tabriz to the British capital, and actually Paris, Berlin and Brussels and the various other big cities in Western Europe will be within range.

MR. LIVNE: Yes. In this regard, we have (several ?) questions regarding the threat to Europe.

Now U.S. Defense Secretary said last year that Europe could face hundreds of missiles in an Iranian attack. How do you assess the Iranian threat to Europe and the debate over the U.S. missile ships that are – (unintelligible)?

MR. RUBIN: (Unintelligible) – well, about the quantities, this is an important point because the Iranians still don't have – (unintelligible) – screening nor the reliability of well-developed Western and (rational ?) – (unintelligible) – defense. They are – they will grow; they will be there eventually, but right now they don't have it and – (unintelligible) – for that by quantities.

So if the capacity is not enough in order to hit the silo of a missile in France, but it take you (up enough ?) to hit a big city like Paris. And if you make enough of them, then just think about the shower of 10 or 12 one-ton warheads falling on a city like Paris in the middle of a business day although they are not quote, “nuclear armament warheads” yet. Even with the explosives, think about 10 or 12 one-ton explosive charges exploding in a busy city in daytime. The number of casualties is frightening and – (is ?) – enough destruction without nuclears.

So I think it's a viable threat, and the numbers now are large and growing. From the WikiLeaks we learned from – that our own Chief of Staff, General Ashkenazi, disclosed to members of Congress about two years ago that the Iranians had at that time 300 Shahabs-3 already stockpiled, and that was two years ago. So with that kind – (unintelligible) – rate of production, who knows how many they have now. Friends are talking about hundreds if not thousands of powerful missiles. So numbers finally tell and if they're in the range, in such numbers, I think the threat to Europe is real; it's – (unintelligible) – and frightening.

MR. LIVNE: Yes, and regarding defense, the U.S. missiles –

MR. RUBIN: Well, I think that defense against such missiles – I think the only problem that Americans will have to solve is (about ?) the same force, the European Phased Adaptive Approach, and phase 1, 2 and 3 are designed against exactly such rockets, form of – (sleepers ?) – from – (beyond ?) – can threaten European cities, and I think that the response that Americans are offering are adequate. (Unintelligible) – is designed to defend mostly both Europe and the United States from Europe, and here there is a bomb they have to design, develop a very worthy – (unintelligible) – missile what's – it's called a standard missile – (unintelligible) – block, IIB, and it's a controversial missile because the Russians feel that they are threatened by it. It's a political problem here, but this affects more the defense (at night ?) – (unintelligible) – defense of Europe. I think the EPAA will do a good job in defending Europe.

MR. LIVNE: OK, OK, and moving on to the U.S. from Europe: What about the evidence that Iran is working on missiles that could reach America's East Coast? And in this

context, there were media reports about an Iranian missile base being seen in Venezuela. How would you assess that threat?

MR. RUBIN: Well, there is more direct evidence of Iranian ICBM development. Of course, they wouldn't admit; on the contrary, the Iranians are saying, time after time, we are not threatening Europe. They repeat it ad nauseam; they repeat it so much – (they understand it?). They repeat it even when they are not asked the question; they start answer by, we are not threatening Europe, we are not threatening the United States – kind of future action.

But once you read – and it's very seldom translated – their internal debates and internal political statements in (Farsi ?), when you read the translations, some of them are quite frightening. They are talking about no less than Iranian world domination. (Ever since ?) because it sounds almost an hallucination, but – (in foreign language) – that's the term they describe their destiny. The regime – they describe the destiny of Iran in the future because it's on the – (unintelligible) – of the world. It's in the best place, I mean; we live in the (court ?) of the world. They got all that oil, and they are going to dominate the Islamic world with this quarter of population of the world, and so they are going to be a superpower.

And in – (which superpower ?) usually go, I should be in the nuclears. So from the point of view of intentions, I think they'd love to have nuclear ICBMs. However, there is quote, “no direct evidence.” I would still mention one interesting thing – that statement by Yuri Solomonov, he's the chief engineer of the Moscow Thermal Institute (ph) – (unintelligible) – the organization that is in charge of making Russia's nuclear ICBMs, both sea-based and land-based, the Topol-M, (silo- ?) and land-based, and the Bulava are sea-based. So he's the guy in charge of – the chief engineer of that organization, and by the way, we have Russian listeners; I beg them to convey my best regards to Mr. Solomonov, and my congratulations on his latest success in the Bulava test.

Anyway, his statement from yesterday – very interesting statement in both Iran and North Korea who could create 10,000-kilometer ICBMs. It's a – there are no showstoppers. They just have to – need to have the will and the money to fund it, and eventually they'll get there. What he said, and I fully – (agree ?) – quite a knish, and the one being good, it's like – and as good U.S. or Russian ICBMs. But to me they will be adequate to do the job. So here is an interesting view from somebody I consider really – a real expert in the – on the subject.

MR. LIVNE: And did it have any information about Iranian missiles in Venezuela?

MR. RUBIN: Well, there is smoke – I think, thickening smoke about this issue. They – news items about the – (unintelligible). It's three or four years old when they did the first – (unintelligible); they're doing some collaboration on the missiles between Venezuela and Chavez – Hugo Chavez, and Iran.

Let me say this: It makes sense. It makes sense. Chavez is – well, very adversarial regime to his neighbors, and whether that – (unintelligible) – was in the United States, and I'm sure the – (unintelligible) – remember the Cuban Missile Crisis and the situation around it, and to repeat this experience would not be very, I think, appealing, perhaps even to Chavez; but he's an

optimist. He is very anti-U.S., and he's intelligently – I'd say that he's – (unintelligible) – is going to attack Venezuela. It helps in his internal politics. I wouldn't be surprised if he would really go at it and set up a missile base of Iranian missiles in Venezuela. That may be of interest in the Caribbean or even perhaps threatening the United States itself eventually.

MR. LIVNE: Yeah. Thank you. And now we're back to Israel or to some of Iran's allies in the Middle East. What are the missile and rocket capabilities of other states and entities that threaten Israel? We have of course Hezbollah in Lebanon, Hamas in Gaza and maybe in the West Bank, and Syria.

MR. RUBIN: Well, let's start with Syria. I am – Syria has one difference – one similarity and one difference than Iran in the missile area. The difference is that they don't speak about their missiles, unlike Iranians who are making sure that the missile industry was published. And Iran had previously – I have a quotation from the Iranian general saying that we want you, the U.S., to see what we are doing; to be frightened of what we are doing. So they are using their missiles not just to build their military capability but also to deter – overtly deter the United States and Israel.

Not so the Syrians – they are opposite. The Syrians don't even admit that there are any – (inaudible). They twice admitted they had missiles, when their missiles went haywire and hit Turkish territory by mistake, so they apologized then. And they admitted that they had them. Otherwise, they don't admit, they don't disclose, they don't show pictures. You see nothing except one picture on the Google Earth, which – (chuckles) – was seen by mistake, I'm sure, was a mistake – got a hold in the frame of two Syrian missiles there being loaded on launchers.

But this is the only photo that I know of with Syrian missiles not released by the Syrians themselves. And they see themselves – Syria, compared to (China ?) has a very rough missile capability and stockpile. Actually, they started stockpiling missiles even before Iran. In 1982 they made it a Syrian national – (inaudible) – made a decision to forego air power and to build up the missile power against Israel. And by now they have hundreds of Scuds, of various Scuds, with ranges up to 700 kilometers – some of them equipped with chemical warheads – all operational, ready for use, well-established in survivable bases in the mountains in tunnels. And that's just one part of their rocket ability.

The other part is a huge amount of rockets, heavy rockets and light rockets. And now, thanks to defense pact with Iran, they are enjoying Iranian support and building their own R&D capability, which – whose first achievement was the perfection of guided heavy rockets. Iran – (inaudible) – to make the rockets. With guidance, they can control some – (inaudible) – we don't know the name, we call it M600 which means Missile 600 – (inaudible) – a single – (inaudible) – missile. We don't know the name. And we get – they're threatening almost the entire territory of Israel.

So, but that's to make a long story short. Moving toward Hezbollah, the main armament of Hezbollah are rockets. They don't have a land army, equipped with main battery battlefield weapons like tanks or aircraft, so they have a semi-guerilla kind of army. It's equipped mostly with rockets, anti-tank missiles and anti-aircraft missiles. They've an arsenal of about 45

(thousand) to 50,000 rockets, according to General Yadlin our retiring chief of intelligence, in his – (inaudible) – a couple of days ago.

And they have UAVs, some for reconnaissance which they already overflew Israel before the Second Lebanon War in 2006, and some for doing attack, you know, suicide UAVs which they tried to use during the 2006 fighting, and that attempt was foiled by the Israeli force that managed to shoot most of them down. Not surprising, they are reported to acquire – to have acquired or to have access to Syrian supplied Scud-B – Scud-B or Scud-D ballistic missiles which have a range to cover the entire region, all the way to Iraq. If it's true, it means that they can cover really all of Israel, even the desert area.

Hamas' military capability is about 5,000 rockets of all kinds. Up to now, they relied mainly on home-made rockets, made locally in the kitchens and workshops of Gaza. But those are small rockets with very small warheads, right? And they – (inaudible) – around the firing with them they are firing. Now, they have rockets which are called Katyushas with bigger warheads and longer ranges. So what, about 5,000 of them – of those kinds of rockets, some heavier, that can reach all the way to Tel Aviv. And this is give you the story – a very long and complicated story really in a nutshell.

MR. LIVNE: Yes. Well, after hearing about all the threats, it's time to talk about defense. You have worked for years on Israel's missile defense systems. And we've got questions regarding the Arrow system and Iron Dome. What can you tell us about Israel's defense against short-, medium- and long-range rockets and missiles?

MR. RUBIN: Well, you really don't want to hear the whole answer because it takes a couple of days. (Chuckles.) But let me start saying that the government of Israel, since the late '80s, were concerned by the growing arsenal and the – (inaudible) – of the Syrian missiles and decided to go, since it's – (inaudible) – Soviet – (inaudible) – the French. In the late '80s, we started cooperating United States in missile defense and the first – our first missile defense program, the Arrow, was launched – field study was, like, in 1988, the full program, 1991, which I had the honor of directing for the next – for the first decade.

And the Arrow-2 based defense system is fully established. It's now fully deployed since the year 2000, and fully operational – being upgraded all the time together with this – (inaudible). But, the scope of the – of the threat has been evolving. But then, we're not aware yet that hostile countries have really changed their military doctrine.

And we're expecting more investment in modern – on their side, modern tanks, modern aircraft. Now, they shifted their investment to asymmetric type of warfare, and they're now building missile power instead of air power and – (inaudible) – but – (inaudible). If you look at the – what they're flying, they're still flying old planes – (inaudible) – that have modern missiles.

So the missile threat has become actually one of the main threats – (inaudible) – became more complex, more numerous, and more quantity – (inaudible) – and longer distance.

So we are – Israel is now planning to deploy a four-tiered missile shield – (inaudible) – at the backbone is the Arrow-2, but with one tier – (inaudible) – above it and two tiers below it. Upper tier, uppermost tier is really based on Arrow-3. It's a brand new missile. The name remains the same, but that's only to keep the – (inaudible) – happy. But it's a new missile with – (inaudible) – actually, take the upper tier and do the first intercept of any incoming long-range incoming missile.

Arrow-2 will be the second tier behind it. It will take up the – (inaudible). All the missiles, they are not shielded by Arrow-3. (Inaudible) – by Arrow-2. Anything – anything that Arrow-2 will miss, – (inaudible) – with the next two tiers which is based on a new system called David's Sling being developed jointly with the United States. And this is optimized – (inaudible) – and also independently against heavy rockets like the M-600 and against cruise missiles. As they say, the Iranians are engaging now in building the capability for long-range cruise missile. It's the next threat.

And the lowest tier will be – consist of the Iron Dome short-range missile system which has been optimized. It is optimized against light rockets such as the Katyushas but has – (inaudible) – lethal – (inaudible) – potential.

The system recently was – (inaudible) – developments actually very successfully in record time – less than three years. And two batteries were already – the lead manufacturer delivered to the Israeli air defense command and were used in the recent outburst of rocket fire from Gaza in April where they made good record – (inaudible) – and shot overwhelming majority of the missiles. It engaged quite very satisfactory success.

All this will be integrated by joint command and control system. This is partly Arrow-2, Arrow-3 and David's Sling that are jointly funded by U.S. and Israel. Iron Dome had just one shield – (inaudible) – \$205 million for manufacturing – (inaudible) – for that division for which – (inaudible) – for all this assistance, we are very grateful to U.S. government and – (inaudible).

MR. LIVNE: Yes. We have some more questions concerning Iran – (inaudible). Many experts claim that Iran's space program, including its ability to launch satellites, which you mention, are aimed also at advancing its ballistic missile program. Tell us about the connection between Iran's space program and its missile program.

MR. RUBIN: Well, those programs are connected. They are – (inaudible). They are connected not in the middle, but in the top and the bottom, and the top because both of them are founded – they are initiated, founded and managed by the Iranian Ministry of Defense, regardless of the fact – (inaudible) – of the allegedly civilian space program. And all the engineering for that actually is done by the same – (inaudible) – the (Iranian ?) space industry.

So the program groups are separated. They have two different program managers. But they share the same management from top and they share the same infrastructure from the bottom. And there is – (inaudible) – exchange of information. Of course, you – its programs – the lessons learned from the other program – the contribution of the space program to the missile

program is invaluable. (Inaudible) – can learn from things like (stage ?) separation, – (inaudible) – separation.

But even more important, you learn about long-range testing when you test the satellite launch – launches, satellite launches. You're doing – (inaudible) – global launching here. You have to have global capability of acquiring data from your launcher and from your – from – (inaudible). This is a direct help, an advancement of long-range missile development and really, a – (inaudible) – on the way to an ICBM, although – (inaudible) – current Iranian satellite launcher, the Safir, which already two satellites, and Simorgh, the heavier 80-ton satellite launcher are not ballistic missiles. And you can – (inaudible) – your eyes and say that those are not ballistic missiles by themselves. But the development of – that development is giving valuable lessons to the ballistic missile (field ?).

MR. LIVNE: Yes, thank you. Finally, we have time for another question. Iran claims that its missile program is a fully national, domestic effort. But there are several reports according to which Iran's missile have benefited and continue to benefit from foreign assistance from countries like North Korea, China and Russia. How significant is this foreign aid to Iran's missiles?

MR. RUBIN: It's infinitely significant. (Inaudible) – start by saying that this is a claim often repeated – actually, endless repeated claim of homemade capability, which is (frequently mentioned ?) by the Iranian commentators. It's sometimes quite funny. And it has no factual base.

The latest round of missile launches two weeks ago – actually, more – last week. The (Iranian ?) commentator watched the tapes – (inaudible) – television. And again and again, he said yes, this is – what we're seeing is Iranian missiles, this is Iranian technology. People say – (inaudible) – commentator, did you import the technology from North Korea? No, no, this is Iranian technology. (Inaudible) – that point because the – (inaudible) – and saying, this is Iranian technology. So it's news for me that – (inaudible) – is a Persian invention. Move over – (inaudible). So this is ludicrous. And they started by importing the – massively importing (French ?) missiles and technology, then production lines and machinery.

But thank God, one must point out, must admit that, make the – (inaudible) – observation that eventually – it's now 25 years – they invested tremendous amount of money and energy in building up the wrong capability, in building up the wrong human resources, generation after generation of students, graduating from Iranian technological institutes filling – (inaudible) – of their development – of the – (inaudible) – branch. And – (inaudible).

I pointed in the beginning about designs – (inaudible) – designs which look – (inaudible) – you see nowhere else in the world. So our building the – (inaudible) – ability, the – (inaudible) – ability – (inaudible) – obviously – (inaudible) – they were relieved about half a year ago from footage, video clips on a new lab that they opened up, very important lab, very – (inaudible) – very – (inaudible) – you see the professional people (that ?) built it up and designed it and acquired it and furnished it with – (inaudible) – excellent equipment which mostly is – (inaudible) – controlled equipment, shouldn't have been there, but they managed to acquire it.

(Inaudible) – I'd say they're still dependent not on talent – perhaps – (inaudible) – talent – (inaudible) – talent, but the dependence shifted from complete technologies, complete factories to components and materials. And you see endless references to that thing – (inaudible) – Wikileaks revealed from U.S. diplomatic correspondence attempts of the United States to block purchase of crucial materials in China, one of them, quite surprising – (inaudible) – filament, carbon fiber – carbon fibers are used for making advanced – (inaudible) – advanced rockets, – (inaudible) – rocket motors, and if they have planned on doing – (inaudible) – motors, their performance really – (inaudible) – to getting the capability, but they try to acquire this material and perhaps they were successful. There was a reference not long ago about a shipment of tungsten copper bars caught in a Persian Gulf port destined for Iran, and this is material for making the – (inaudible) – control system for the – (inaudible) – ballistic missile. And thus, in that report that the British foreign secretary was alluding to, there was another mention of an instance of a shipment of – (inaudible) – material that was caught in Italy on its way to Iran that's among – (inaudible). This is a precursor for the – (inaudible) – that you pour into a rocket motor for either heavy rocket or ballistic missile.

And this is just a drop in the sea. There was about six years ago a report of five intelligence agencies of Western European countries – (inaudible) – that – (inaudible) – in the papers about at least one hundred case of Iranian attempts to acquire strategic missile technologies and materials in Europe.

(Inaudible) – is that there is an inadvertent, continued inadvertent U.S. support to this technology transfer, although the U.S. – (inaudible) – all those sanctions on Iran. But still they allow – to my best knowledge, perhaps I hope I'm wrong – they allow (in ?) U.S. Iranian students – they – (inaudible) – Iranian student to U.S. technological institutions and their ambitious technology transfer.

And amazing – even more amazing, they allow Iranian scientists to come and present books on missiles in U.S. – (inaudible) – conferences. I have some copies of that – (inaudible) – in 2007, Iranian scientists speaking of missile technology in Cincinnati. I really – (inaudible) – my own American friends, they have no explanation to date.

But look, all this thing, God willing, that you can – (inaudible) – stop the Iranians then by blocking all – (inaudible). Well, it's easily said, not easily done. The Iranians are masters of covert acquisitions, of (laundering ?) the acquisitions. They developed this structure – they developed this technique to an art. This is really much similar to – (inaudible). I mean, in a globalized economy, where – which – (inaudible) – transfer of – (inaudible) – technologies and money, it's really hard to block all these routes and to block every one of them. And when you block them, they can develop another one. So – (inaudible) – very hard and I'm not really optimistic that this can stop.

So that – the question is, are they dependent? Actually, to some extent, yes. Can this dependence be used in order to block their capability – (inaudible) – further building up their capability? I'm not sure about that and I'm quite pessimistic. I hope that answers the question.

MR. LIVNE: Yes, thank you. And thank you so much, Mr. Uzi Rubin, for taking the time to join us. And thanks to all our guests who participated in today's briefings. For more information about Israel and Middle East, please be sure to visit our website, theisraelproject.org. Our team is always ready to help you get the facts you need to cover the Middle East and Israel. So please, do not hesitate to contact us if we can help you in any way. Thank you again, Mr. Rubin, and thanks to all of the participants. Goodbye.

(END)