

# **They're celebrating the laser, but no one's talking about the real failure!**

**By Oded Amichai, 25.9.25**

## **Summary**

The main system for defense against ballistic threats should be based on a laser, the power of which is in the MW class ( $\sim 1,000$  kW). Israel has the expertise to develop such a system. The 'Or Eitan' system is far from meeting Israel's laser needs. Our dependence on the US will also not allow us to export laser systems without its consent.

Therefore, because of the US's greater experience in integrating laser systems, I highly recommend cooperation with a leading American company in this field. This is possible and will allow the IDF to be supplied with a better system on a shorter schedule.

= = =

In September 2025, Rafael launched the laser system at the 'Festival', with the completion of the development of the 'Iron Beam' system. We are told that this is a powerful system for protection against aerial threats (rockets, mortar bombs, unmanned aerial vehicles, etc.); that it is equipped with a sight that allows for an upgraded range of action, high accuracy, and great efficiency - while maintaining its unique advantage: quickly neutralizing threats using a laser and at a negligible marginal cost. The system will be delivered in the near future for operational use in the IDF. It was also reported that the system has proven its effectiveness against a variety of threats and has successfully intercepted rockets, mortars, and drones. The first systems will be received by the IDF by the end of the year.

## **The publications praised the system**

It is said to be a technological and engineering breakthrough on a global scale, and is expected to be integrated into the State of Israel's multi-layered defense system as a complementary capability

to the Iron Dome, David's Sling, and Arrow air defense systems. The system is based on a unique use of "adaptive optics" developed by Rafael, which allows for a stable, concentrated, and precise arena. The system's developers admit that the system itself is very expensive, but the cost of each interception is very low, down to a few dollars, and therefore, despite its high cost, it is economically viable, and in the longer term will "break" the economic equation and make interception costs marginal.

Regarding the issue of its ability to deal with barrages, the developers noted that it is capable of intercepting threats as they take to the air, so that in each barrage it will be able to intercept several threats, especially since it constitutes at this stage a complementary capability to the additional air defense systems, and will be operated in the first stage from the command and control vehicles of the "Iron Dome". Regarding the issue of weather that may harm the effectiveness of the system, the developers noted that although weather may be a problem, the system will be usable 90% of the time, especially since, as mentioned, it constitutes a complementary solution to the "Iron Dome" and the additional air defense systems.

### **The truth behind this 'media festival' is much more problematic and complex**

This is a small 'fig leaf' that tries to cover up an omission that spans about thirty years, and begins with a lack of understanding of the strength of the ballistic weapon threat, which only a blind person could not have recognized in advance.

I will simplify the explanation with a parable: There are several types of lasers, just as there are several types of cars. Each has advantages and disadvantages. There is no dispute about that. But no one would buy a car with a 200 cc engine, instead of a 2,000 cc engine. This is the essence of my reservations and those of my friends from the media festival regarding this laser system.

About 20 years ago, we had the opportunity to purchase a car with a 2,000 cc engine, produced by Toyota, but we preferred to wait, and

now we are proud of the new car that we purchased from our own production, with a 200 cc engine.

Various protest organizations have been making headlines for several years now about numerous failures, such as the submarines, which, whether they existed or not, mainly involve money and procedures (which should not be underestimated). But none of those 'Zionists', who sincerely care about the security of the state, utter a word about the real security failure, one of the greatest since the establishment of the state: the abandonment of the home front to the firing of some 200,000 missiles and rockets, which covered every point in the country, and caused and are causing destruction and devastation, the likes of which we have never known.

### **"We'll knock them out"?**

The terrorist organizations and the conflicting countries surrounding us understood well in the 1980s that they would never be able to cope with the might of the Israeli Air Force, and began to equip themselves with rockets and missiles, the first example of which fell upon us in the early 1990s, during the Gulf War.

Like the Polish army, at the beginning of World War II, which went out against the German armor with a cavalry corps, the heads of the defense establishment created the illusion that the Air Force would continue to solve all the problems (it never solved all our problems!), or in the arrogant phrase of some of its leaders: "We'll knock them out."

### **"Iron Dome Festival"**

Until the Iron Swords War, the conflicts over the years with Hamas - which did not have the quantity and power of the missiles and rockets that were located to the north, and which also lacked any anti-aircraft defense - did not open the eyes of the heads of the defense establishment to understand that the Air Force alone was not capable of eliminating the threat of ballistic weapons.

At the same time, the "Iron Dome Festival" began, when the heads of the defense establishment created the baseless illusion that this tool - the creation of an Israeli genius (and one defense minister, who is proud of it as our hero) - would save us from any harm. Without going into the essential limitations of this interceptor missile - as well as its bigger brothers, the Magic Wand and the Arrow missiles - it is obvious that even a country as economically powerful as the United States is unable to equip itself with enough interceptor missiles, against the hundreds of thousands of missiles and rockets that Iran and its trailers are equipped with, even after the war.

### **The Chemical Laser Option**

In the first decade of the millennium, there was no apparent possibility of reaching the appropriate Megawatt intensities with an electric laser. While with the chemical laser, such intensities had been achieved and proven multiple times several decades earlier. The combat operational Megawatt (MW) chemical laser could have been implemented in Israel as early as 2001 (!); and if we had implemented it, the entire reality around us today would have been completely different. Maj. Gen. (Res.) David Ivri (former IAF Commander and GM of the IMOD) also expressed this assessment in 2007. I will not elaborate on this issue. I will only emphasize that we did not have the budgetary capacity to undertake a national project of such magnitude on our own; and since the US also had a need for such a MW laser, the US/IS cooperation was critical and was built to serve both sides.

The beginning of the chemical laser started in the early 1970s, when it was developed simultaneously and without any connection, both in the US and in Israel. While the activity carried out in Israel (at Rafael), on my initiative and under my direction, is still largely classified (for unknown reasons), the activity carried out in the US is open and well-known, for the most part. In the early 1980s, the US operated a chemical laser with a power of more than 1,000 KW (see MIRACL - Mid-Infrared-Chemical-Laser) at the world's most advanced testing ground in White Sands, and used it to conduct hundreds of

successful experiments in intercepting ballistic missiles, orbiting satellites, the details of which remain confidential to this day.

In the early 1990s, following the Gulf War, I initiated contacts with TRW (which was later, in 2002, purchased by Northrop Grumman, one of the world's largest arms manufacturers), which led to the Peres-Clinton agreement (1996), with a goal to defend the northern Israeli border against heavy Katusha rocket's attacks. Following this agreement, the Nautilus demonstration system was jointly developed, based on proven technologies aiming to minimize risk and shorten time to field said system, tested and carried out the shoot down of 46 successful interceptions of missiles and mortars projectiles at White Sands Proving Ground. It was an unprecedented 100% shoot down success! Which received a wall to wall standing ovation by all parties involved at that time! And then the project was canceled !!!

The production system, Skyguard, which was based on the Nautilus, was officially offered to Israel (MAFAT) in January 2007 (and even earlier, in 2003 in an airborne version), but has not been accepted (was rejected based on unfounded and irrelevant reasons) to this day. Northrop Grumman offered to supply Israel with the first Skyguard systems with a power of the order of a megawatt, in series production, within 18 months, based on a miniaturization of the Nautilus proven technology demonstrator system, which was, as mentioned, jointly developed with Israel and demonstrated a proven 100% invulnerable success rate in said experiments (results were verified by official reports by both the Israeli Defense Forces and the US military).

The chemical laser could have been at our disposal about twenty years ago. It would have provided adequate protection for the home front, changed the Second Lebanon War, and made the war of Iron Swords unnecessary.

**But, in those days in the defense establishment, mentioning the word High Power Laser and SKYGUARD was an obscene word!**

As mentioned before this proposal was rejected by the defense establishment representatives and others for irrelevant reasons, in my opinion. In order to distract attention from the real solution - the one with the MW power so much needed to deal with ballistic and very high speed maneuvering threats - the defense establishment, has elected to dramatically change its previous support and led a new campaign to fight the Laser with various spokespeople and others, to spread baseless stories about the laser, aiming at canceling the project!

Since then, the defense establishment has sobered up somewhat, and realized, very late, way too late (years...) as the threat is already operational and immanent.... **that the laser is the future.** But even today, the mention of the chemical laser is met with boos, accompanied by slanderous words as much as the imagination can handle. The defense establishment promotes the electric laser (also called a solid state laser), but its conduct in promoting it as a laser weapon is becoming excruciatingly slow, and they present it as if it is already at our disposal.

The defense establishment currently sees the place of the laser as only a complementary system to fill the "holes" in the Iron Dome, and not as a primary system. That is, destroying short-range targets that the Iron Dome is unable to deal with. It is a marginal, meaningless threat, with huge budgetary investment (of strategic volume) the result of a wrong policy that continues to ignore the main threat. And the essential thing that still exists over us: hundreds of thousands of missiles that threaten the home front.

### **The Chemical Laser Slander Campaign**

The defense establishment is busy glorifying the development of its own electric laser, at a relatively low power, for applications of marginal importance, while spreading malicious poison on the chemical laser, which could have been applied here long ago. The apparent disregard for the truth - while confusing the public with baseless nonsense - is not unique to the issue of home front defense; and my dear friend, Maj. Gen. (res.) Yitzhak Brik, like old Kato, has

been repeatedly warning with all his heart for many years about other serious security failures, which are 'spread' by the same method.

The stories of the unfounded accusations against the chemical laser go beyond imagination, and apparently stems from a combination of ignorance and a desire to hide the magnitude of the failure. I will not address all the slanders about the chemical laser here, but only the most basic and gross of them.

## **1. The laser is toxic**

This claim is pure nonsense. The chemical laser is less toxic than a car, which emits a dangerous gas (carbon monoxide, CO), or even less toxic than various missiles (like the Patriot, for example), which emit a gas called hydrochloric acid (HCl), from the same family of gases emitted by the chemical laser (HF), except that in missiles, their concentration is about 4 times greater, and they are heavier than air, so, although they present much greater danger, it is still relatively harmless, and rightly so, no one is worried about them.

And what are those toxic gases? As mentioned, hydrofluoric acid (HF), which has a concentration of about 2%, and is diluted with helium, and being lighter than air, they disperse in the atmosphere, without endangering even a fly. If all this is not convincing, these gases are very active, and it is easy to absorb them using a commercial adsorbent (based on CaO, or CaOH), without emitting them into the atmosphere at all, but this is not necessary.

## **2. The chemical laser is as big as half a football field**

I believe that whoever wrote this nonsense has never seen a chemical laser. Northrop Grumman submitted its proposal to the defense establishment (January 2007) to supply mass-produced Skyguard systems. The system is installed in 3 vehicles, one of which is the laser, the second the control system, and the third the fuel tanks.

The third vehicle (fuel) is unnecessary in my opinion, because the laser system is designed to protect the home front, stationary targets

that do not move from their place, and therefore the fuel can be stored in permanent underground tanks.

Details of the system were also published in a patent that Northrop Grumman registered for the Skyguard. No resemblance to a football field.

### **3. It takes a long time to replace the fuel tanks, between shots:**

Another fictitious story. As mentioned, the fuel can be stored in underground tanks, thus allowing the laser to work non-stop, if necessary, 24/7. This is because most of the heat, which is the ultimate enemy of any laser is released, and emitted with the exhaust gases, and does not interfere with the operation of the system.

### **4. The beam quality of the chemical laser is poor:**

Complete nonsense, resulting from professional ignorance. What affects the quality of the beam, and potentially negatively effects the beam quality is the heat emitted during the lasing process. As mentioned, in the chemical laser, most of the heat is emitted with the exhaust gases, and therefore the beam quality of the chemical laser is excellent. This has been measured and tested and verified!

### **5. The US stopped the development of SkyGuard:**

A lie and a lie. The one who stopped the implementation of SkyGuard is Israel, not the US! Unequivocally! There is plenty of evidence to prove it, which I have already cited and quoted in the past, and I will not repeat it again.

### **6. The Americans do not use SkyGuard:**

The US has different security needs than Israel. Israel is a small country, surrounded by a huge number of missiles and rockets, and it is defenseless against them. In contrast, there is no country that currently threatens the US with such missiles, and if one were to



arise, the US has the ability to wipe such a country off the face of the earth. We do not have such a capability, neither technically nor politically.

I apologize for briefly delving into technical terms, but I found it necessary to address a number of crude, baseless slanders that are being made against the chemical laser, and I will allow myself to ignore others.

### **Nevertheless, the US has also fallen asleep in protecting its interests**

The development of ballistic missiles, cruise missiles and especially hypersonic missiles in Russia and China has recently led to a dramatic decision by the US Congress to develop laser weapons against these threats. It is impossible to intercept these threats with laser powers smaller than 1,000 kilowatts (as mentioned, 1,000 kilowatts), and therefore perhaps here, the interests of the US and Israel will be combined, and we will also benefit from them.

### **Today, the future is in the electric laser, but the "do it yourself" method has gone bankrupt!**

My opposition to the electric laser for many years stemmed from the fact that its scale up to the MW class powers was theoretically blocked, and according to my professional understanding, systems with the MW class powers are the ones that are essential for our defense. However, about 5 years ago the problem was solved, simultaneously in the US and in Israel, and since then I have removed my opposition to the electric laser.

Mentioning the chemical laser failure is important in order to clarify the magnitude of the failure, which prevented the provision of laser systems for the IDF about 20 years ago. But today, both here and in the US, the future lies in the electric laser, and the skilled manpower is found there, not in the chemical laser. Therefore, despite its inferiority to the chemical laser, I am pushing for its transition towards the IDF, which is possible on the shortest schedule.

In any case, our dependence on the US will not allow us to export laser systems without its consent. Therefore, because of the US's greater experience in integrating laser systems, I highly recommend cooperation with a leading American company in this field. This is possible and will allow the IDF to be supplied with a better system on a shorter schedule.

***Dr. Oded Amichai is an expert in laser systems.***