

A Good Samaritan

I am a U.S. citizen, possessing a degree in International relations, Global Security from a U.S. university 20 years ago, studying anti-terrorism, geopolitics, and international law: I could not have foreseen where I would be and what I would be doing.

According to Halo Trust, in December 2022, 60 states and territories were known to be affected by landmines. The most severely affected countries include Afghanistan, Angola, Cambodia, Iraq, Libya, Sri Lanka, Syria, Ukraine, Yemen and Zimbabwe.

I am currently in Ukraine trying to find a solution to this serious problem. Although the problem of explosives is well-known in the world, the only solution that is offered is to increase the funding and personnel. However, the technology that has been used for about the past 100 years is the same: metal detectors that search for metal components in explosives. Statistically speaking, about 99% of the time sappers just find metal shrapnel and other metal garbage and not the explosives themselves.

The sapper holds a metal detector with his hands swaying it back and forth, stops when hearing a sound, stops and pokes the soil with rods to see what is buried there. The entire process is slow, expensive, and dangerous. An estimate, depending on concentration of explosives, weather, season, etc could be \$500-\$1000 per piece of explosives. This does not include the deadly risk to the sappers.

According to a Globsec report, 174,000 sq. kilometers of Ukrainian territory that has seen combat is contaminated with explosives. As of 2023, about 234 sq kilometers was cleared, which leads to 757 years to go. Not a good prospect. After the war ends, soldiers leave and the problem remains, taking the lives of civilians, half of whom are children. For those people that think: "This isn't my country, those children aren't my children," I must say that Ukraine can produce a lot of grain: if that grain does not get to North Africa or the Near East, that causes famine for many millions of other people because of such thinking.

Going back to the solution: Is there a way to find the explosives and not just metal? BTW, many explosives now do not have a metal casing or other metal big enough to detect. I believe, there is a solution. One company I have experience with is based in the U.S. It is developing a new technology for humanitarian de-mining that uses a special scanner for explosives components, such as Nitrogen, Oxygen and other chemical elements. Great minds in nuclear science who are professors at universities and engineers think of ways to make peace, not war.

Nuclear fusion can save lives, it can provide energy and not just kill people, as nuclear weapons do. According to Clandestine Materials Detection, Inc. (CMD), this technology can identify chemical signatures of devices such as landmines, improvised explosive devices (IEDs), nuclear weapons, chemical weapons and dirty bombs. This unique technology enables detection at large distances, providing safe and actionable remediation. Simply speaking, a drone carries a source of neutron generation and sends neutron signals into the soil, then two other drones that fly nearby can detect the gamma ray response from the explosives up to two meters deep and use triangulation to transmit the location. According to CMD, the explosives in landmines have a unique "neutron fingerprint" of H, N, O, and C

and can be detected by neutron activation analysis through an analysis of the gamma-ray spectrum emitted after being bombarded with a particular neutron flux spectrum. Of particular significance is the ratio of the 10.829 MeV capture gamma-ray from Nitrogen-14 to the 2.223 MeV capture gamma-ray from Hydrogen-1. All this can be done at a 1-km. distance, without any humans being present in the area.

Imagine that, just one set of drones would be able to scan 2 sq. meters per second and mark the explosives precise location, ignoring metal shrapnel contamination that slows down sappers. Because of this unique feature, this technology will be 100 times more efficient because of the higher speed of scanning in comparison with snail's pace of a human sapper. This is the speed, what about the cost? The cost of finding one explosive per 100 sq. meter will be about \$4. And with higher concentration of explosive in the area, it will be even less.

I recently saw a notice at the Cabinet of Ministers of Ukraine, dedicated to humanitarian demining day that \$700 million will be dedicated to de-mining 2022-2027. The Ukrainian government reported as of Apr 4, 2024 that mine-related explosions had killed 296 civilians and injured 665 others. Most of this money will be used at the rate of only 235 sq. km. or a bit higher per year if they do not use this breakthrough new technology, and this applies not only in Ukraine.

Does the US Congress and State Department know about this new technology? Yes, they do. Watch **this YouTube video** from the Congressional UXO Demining Caucus, July 19, 2023, at the 30th minute. Do they continue to waste taxpayers' money on 100-year-old methods? Yes they do. Why do they do that? I do not have an answer, let them speak for themselves. As of 2024, Congress did not help any companies such as CMD with a single dollar to help procure the parts to complete a working prototype of this new, 100 times more efficient, and life-saving technology, to calibrate it, and test it in the field. Why?