

Preparing military bases for possible one-way attack drones

The North Atlantic Council



Shattered Vows: Tracing the Devastation Caused by
Violating Human Rights

Forum: The North Atlantic Council

Issue: Preparing military bases for possible one-way attack drones

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Introduction

The constant desire for increased security and development in arms worldwide has led to many nations using and coming up with new, and more effective ways to deal with conflicts. A consequence of this issue is the development of one-way attack drones. They are low-explosive missiles that are destroyed in their use (making them a sort of kamikaze drone) and can have the ability to linger in the air whilst searching or being guided toward a target. These are being used increasingly often and are becoming a greater threat to military bases, whether it be warships, airfields, or army bases. Such drones are somewhat easy to defend against for well-armed bases when they are used in smaller numbers as they are quite slow. However, the risk of damage rises if you consider them being used in greater numbers and with better coordination as they can overwhelm defenses of many military facilities. NATO, as an alliance of member states, has expressed its desire to take measures to ensure better protection for its members and their military bases; and in order for them to serve their purpose, bases need to be better prepared against drone attacks in the future. The safeguarding of military bases is very important as they are critical for the operation and organization of the armed forces. This research report aims to provide more information on the subject at hand to each member state and ensure that they possess the correct knowledge needed to make informed decisions on the issue so that they are secure when it comes to being on the receiving end of these one-way attack drones.

Definition of Key Terms

[Radar Systems]

Detection systems that find the position along with other characteristics of objects in or around an area by the use of radio waves.

[Surface to air missiles]

A missile with the purpose to destroy an aircraft or other missiles in the air after being launched from the ground.

[Automated machinery]

A machine that can run by itself without the need of a person operating it after it has been set up and given instructions.

[Perimeter security]

Measures to secure the outer boundary of a military base.

[Early warning systems]

Systems that can alert people or other systems in advance with regard to potential threats.

[Hardening]

The process of making something harder; in the particular context - fortifying buildings and facilities to resist attacks.

General Overview

In recent years there has been a switch from the use of missiles to the use of drones for weaponry. Missiles have been used by many powers as explosives that are pre-programmed to fly a specific course to a target; however, this made them predictable and relatively easy to defend. This is because they were large and heavy, meaning only one large system was needed by the defense to destroy it before it detonated. In addition, they were much easier to detect due to their size and the technology that had caught up to them. By contrast, the use of drones has been relatively new when it comes to conflict and weapon development so there is less that nations or people can do in order to protect themselves. Military bases are vital for the protection of nations and are of equal importance for the protection against these one-way drones. There are many issues that these new weapons bring to massive important facilities and a few of the reasons why such issues are present are listed below.

Properties of the drone

Many of the one-way attack drones can stay in the air for long durations before they attack an opening or a target. This means that they are more likely to cause damage where it will be most critical as, unlike other warheads, they are able to take longer to examine the base and where to attack it. This has a significant impact on the precision of the weapon, as it is more likely to hit its target. In addition, their ability to loiter means that they can also capture much information about the location and structure of a base since those controlling the drone have the chance to see what is in its surroundings.

To add, these drones can also be small in size, ranging from as tiny as a hand-carried micro drone to heavier models weighing around 150 kilograms; effectively meaning that they are able to fit in smaller areas. This can affect their detection and increase the likelihood of them penetrating a heavily defended area such as a military base. In addition, the fact that they are light might make them more maneuverable so that they can avoid being spotted.

The fact that they are single-use and they don't return to where they were sent from reduces the logistics of their use. It also means that those who wish to use these in conflict or to attack a base are more careless in the sense that they are willing to detonate such drones in remote places where they aren't retrievable. These areas are often places that are most important and protected; hence this property can make military bases more at risk of damage.

Price and swarming

Most of these one-way attack drones are cheap. This is a key quality as it means that users aren't too concerned with the detonation of the drones and can buy them in large amounts. As a result, such drones are used in large quantities at the same time, or in swarms. If they are used individually, they aren't too significant a threat as they can be shot down or destroyed quickly; however, if many are attacking at the same time, defenses can be overwhelmed. This is because multiple targets are possibly flying in different directions simultaneously, so a single bullet or explosive wouldn't deal with all at the same time. In addition, these smaller drones can also be used as a distraction for defenses in a military base for a much larger missile that is far more dangerous. These larger missiles can do far

more damage than a small explosive, meaning systems that can deal with both weapons at the same time are required to ensure safety. This is especially true because these one-way attack drones are often used to destroy radar systems. Such radar systems need maximum security as they are essential for protecting bases from other possible attacks, and upon being destroyed, they give way for much stronger munitions to attack them.

Popularity

Recently the popularity of military use of these one-way attack drones has increased drastically. For instance, governments such as those of the USA and India have expressed the desire to purchase and design more of these drones in the upcoming years. In addition, there are more producers, such as Turkey and China that are willing to make new models of these drones and expand the market. In a recent survey, over 210 types of these drones have been identified, showing the great diversity that the market for one-way attack drones possesses. It also portrays how there are many different parties that are interested in such weapons as their participation has also increased by creating more models. All of this alludes to an increase in the use of such drones in a future conflict, making it vital for military bases and governments to be well-prepared and protected against possible attacks.

Major Parties Involved

[Iran]

Iran has shown great interest in drone technology and has developed a multitude of drones in recent years. In addition, they have used such drones in conflict along with their proxy groups and allies. For instance, pro-Iran militias in Iraq and Syria have targeted US forces making the use of one-way attack drones. One of the drones produced by them, the Shahed-136, has gotten much public attention as has been used by the Russians to attack the Ukrainians in their conflict. This Iranian drone and others of Iranian origin have spread to many powers across the globe, particularly in and around the Middle East, and have enabled users to conduct strikes from long distances.

[Russia]

These drones have been famously used by the Russians to attack Ukraine in their current ongoing conflict. They haven't only been used to attack military bases, but have also been used to destroy civilian homes, civilian infrastructure and energy infrastructure.

[Ukraine]

Ukraine has been on the receiving end of these one-way attack drones sent by Russia from Iranian origin. Kyiv (the capital city of Ukraine) has been somewhat successful in intercepting many drones by the use of its air defence network; however, some munitions manage to reach their target. The damage caused by the drones in Ukraine has projected their danger and effectiveness to cause destruction to the wider world and has evoked talks of new strategies in both their use and defence.

Timeline of Events

- [1970s] [Projects in the US launched for the production of low-cost explosive drones]
- [1989] [First commercially successful one-way drone flight - Harpy, the radar-hunting drone made by Israel]

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| [2000s] | [Switchblade drone introduced with the ability to loiter and fire whilst in the air] |
| [2017] | [Around 35 different types of one-way attack drones identified] |
| [Pre 2018] | [$\frac{2}{3}$ of one-way attack drone systems produced or developed in Israel and the United States] |
| [2018-2022] | [$\frac{1}{3}$ of new models of one-way attack drones produced in Asia] |
| [2023] | [More than 210 different types of one-way attack drones identified] |
| [2023] | [US military of defence requested 622 million dollars for programs involving one-way attack drones - an 85% increase from 2023] |

Previous attempts to solve the issue

US military air bases have adopted a drone detection radar which is better prepared against one-way attack drones. It does this by having signals that are unaffected by the weather and are able to track many targets at once. This secures them against swarm attacks. They are also effective in the sense that they have a long range so that they can prepare for attacks earlier and get their defence settled.

Another attempt to solve the issue of preparing military bases for one-way attack drones was conducted by the US Army by setting up Radio Frequency (RF) Jammers. These are effective for reducing the impact of such drones because they direct lots of radio energy toward them which causes them to not reach their target and sometimes even fly off in a random direction.

The US air bases have also been using nets and guns to stop incoming one-way drones. This is so that they are unable to get past a certain point to cause damage as their blades get stuck. Once they are physically captured, they can be terminated easily.

Possible solutions

There are a few ideas that military bases could adopt to ensure better safety against these one-way attack drones. For instance, they could have training programs and better education about such drones in their facility so that personnel are more prepared when they have to face them in a possible attack. This could be done by perhaps having drone attack simulations where they have to deal with the attack as if it were real.

Another idea could be improving and investing in better research and development of these drones so that bases are up to date with the latest models and can handle them no matter the way their attack is conducted or the technology they possess. Better research could also mean finding ways to develop counter-drone technologies.

Improving surveillance of bases could also prove vital when it comes to defending against such attacks by possible one-way drones. This could mean populating areas with cameras and sensors as well as radars so that people are better informed if they are going to have to engage their defences.

Useful documents

VFS report “One-way attack drones: loitering munitions of past and present”,
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