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Policy Brief

Is Canada's Donation of 900 Drones to Ukraine an Appropriate Response to Needs on the Ground?

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On February 19, the Department of National Defence issued a press release announcing a donation of more than 800 drones to Ukraine. This donation is intended to meet a growing need for military technology since the start of the Russian invasion two years ago. Teledyne FLIR's SkyRanger R70 Unmanned Aerial Vehicle (UAV) represents a donation of over $95 million. More recently, the April 26 press release announced an additional donation of 100 UAVs, for a total of 900 UAVs. These announcements are appropriate, as they demonstrate the adaptation of military aid to the reality on the ground. Since the Russian invasion, the increasing use of drones in warfare has been widely documented. Inexpensive commercial micro-drones have become essential artillery for the success of Ukrainian military operations.

While the April 26 press release states that delivery would begin in May 2024, the delivery plan for the 900 drones has yet to be announced by the federal government. Ottawa is often criticized for the gap between its words of support for Kyiv and its lack of concrete action. For example, the donation announced over a year ago of a surface-to-air missile defense system, NASAMS, has still not materialized. The U.S. government is responsible for producing the NASAMS system, but no delivery date has been announced yet. Canada's flowery rhetoric and subsequent delivery delays affect the government's credibility. According to Kiel Institute data published in April 2024, Canada ranks tenth among the major contributors of military aid to Ukraine in terms of millions of dollars. However, this data includes military aid whose delivery date is specified but not yet completed. In this context, does Canada's supply of drones meet Ukraine's needs, and can it make a difference on the battlefield?

Many argue that the quantity of drones is more important than their quality in the war in Ukraine, quantity being a quality in itself. While quantity is indeed imperative if Ukraine is to offset Russia's strategic advantage, this policy brief argues that Canada should focus on the technological superiority of its weapons rather than their quantity. The Russian-Ukrainian conflict is characterized by an asymmetry of military capabilities, with Russia having the means of a great power. Drones greatly enhance information-gathering, surveillance and intelligence capabilities in warfare, making a real difference on the battlefield. The technological superiority of donations is therefore a considerable advantage for Ukraine, as emerging technologies can tip the balance of power in favor of the most innovative. However, for this strategy to be effective, production and delivery speeds need to be increased.

Are SkyRanger R70s suited to Ukrainian needs?

Already in use in Ukraine, SkyRanger R70 UAVs can perform a number of functions on the battlefield, including observation, targeting, data collection and transporting military loads of up to 3.5 kilograms. These drones are equipped with thermal cameras that enable them to detect potential targets emitting heat, even at night or in bad weather. These cameras are necessary, as night-time fighting has become more widespread in the conflict between Ukraine and Russia. In addition, Teledyne FLIR claims that its product is able to operate in hostile environments where communication and GPS networks are impossible. This semi-autonomous flight capability enables the SkyRanger R70 to avoid jamming. Electronic warfare is indeed a feature of conflict, as GPS signals are frequently jammed. It is not uncommon for GPS signals to be modified in order to mislead drones and thus set traps for adversaries. Teledyne FLIR Black Hornet micro-UAVs have already been delivered to Ukraine, thanks to donations from the Norwegian and British governments, giving the company additional credibility as to the effectiveness of its products in the field.

First-person view (FPV) drones are currently the most widely used on the front line. These kamikaze drones are remotely piloted using a built-in camera, a remote control and a helmet worn by the pilot. The helmet allows the pilot to view the drone's point of view. China's Mavic quadcopter observation drones are also making their presence felt on the battlefield. These commercial drones are easy to fly, accessible and affordable, costing between $3,000 and $6,000 depending on the model. One reason for the high cost of the SkyRanger R70 is their Western production. Having been designed for Western military markets, they are not suitable for mass production, as are Mavic quadricopters. Western defense policies tend to focus on expensive, sophisticated weapons, but the production of these is not adapted to the pace demanded by a high-intensity war of attrition involving a major power. Moreover, China's Mavic drones have certain cybersecurity shortcomings. In addition to being vulnerable to jamming, their software is encrypted due to their Chinese origin. It is therefore impossible to determine what information is collected by manufacturers in China. The drones offered by Canada are made in Ontario, which avoids this issue.

The UAVs offered by Canada correspond to the reality on the ground insofar as they can perform various crucial functions, perform in night combat and avoid cyber attacks. However, production and delivery times remain much longer when compared with Ukrainian production, which can reach 150,000 UAVs per month at a more affordable cost. While the Canadian donation of 900 UAVs seems significant at first glance, it is estimated that 10,000 UAVs per month are lost at the front by Kyiv, which equates to over 300 drones per day. Although they undoubtedly include kamikaze drones, these figures underline the extent of drone use in this conflict, while also putting Canadian aid in perspective with the real need on the ground. President Volodymyr Zelensky has announced a goal of producing one million FPV drones by 2024. The donation of 900 UAVs is significant in terms of technological superiority but seems insufficient to meet Ukraine's needs. This raises the issue of drone production.

Drone production and the growing role of civil society

As a result of the war of attrition, Ukraine and Russia have developed a dependence on commercial drones for tactical purposes. Among the trends observable in Ukraine is a strong mobilization of civil society and private companies. Micro-UAVs are largely the product of civilian industry, with over a hundred start-ups operating in Ukraine to contribute to the war effort. Civilian mobilization is speeding up the supply of military equipment and drones. Faced with these innovations, the Ukrainian army has had to adapt, notably by implementing shorter certification processes that last almost three months. In other words, the Ukrainian government has adapted to this new production mode in order to supply its troops with sufficient military equipment in an emergency context. This accelerated certification process indicates a certain institutionalization of the drone within the government apparatus. On February 6, President Zelensky announced the creation of a new branch of the armed forces, the Unmanned Systems Forces. This gradual institutionalization of UAVs bears witness to the evolution of defense doctrine and opens the door to closer collaboration with Kyiv on this type of weaponry.

The NGOs Come Back Alive and Aerorozvidka embody the extent of civil mobilization for Ukrainian defense. Come Back Alive is a socio-financing platform that supplies equipment such as drones to the Ukrainian armed forces. Aerorozvidka converts commercial drones for military use and even builds its own drone model, the R18. Many civilians build FPV drones in their homes and then offer them to the Ukrainian army. Each FPV drone has an approximate value of $400, which is considerably less than the cost announced by Canada for the SkyRanger R70 (around $100,000 per unit). FPV drones are often single-purpose, which explains their affordable cost. SkyRanger R70s, on the other hand, are intended for long-term use. Furthermore, the use of 3D printers by civilian groups to create drone parts reflects their close bond with the Ukrainian armed forces and their involvement in the war. 3D printing makes it possible to supply components much faster than delivery from NATO member states.

In Ukraine, the conflict has revealed the major role of civil society and the private sector in the war effort and in the rapid production of cheap, effective drones. Large numbers of drones are essential to saturate the battlefield and to develop drone swarm systems. A drone swarm is a group of low-cost drones that work together via reliable network connections to accomplish complex tasks. Drone swarms are the result of artificial intelligence and represent a new trend in the Russian-Ukrainian conflict. SkyRanger R70s are expensive and delivered in limited quantities to meet Kyiv's needs, but their use is long-term and mainly for observation and surveillance, unlike swarm systems. While civilian industry is making a major contribution to the supply of drones, Canada can help through technological innovation.

Canada must focus on technological superiority

The donation of 900 UAVs is a first step towards greater Canadian commitment to the conflict in Ukraine. Military support for Ukraine is essential to defend its sovereignty, territorial integrity and respect for international law. The federal government strongly condemns Russia's war of aggression, which represents a danger to the security of the liberal international order. For Canada's actions to be more in line with the government's rhetoric, it is essential to capitalize on

Ukraine's technological superiority. A race for drone weapons and technological innovation is underway, and those who move fastest will enjoy considerable advantages.

Research and development

Despite substantial international support, there is a gap between the assistance provided to Ukraine and the needs on the ground. If the West wishes to keep Ukraine in the war, then it is necessary to bank on technological superiority and turn to more sustainable means. While expensive systems such as Turkey's Bayraktar TB2 drones were effective at the start of the war, Russian troops have adapted to this type of artillery. This underlines the importance of rapid technological adaptation. Moreover, this war demonstrates that the boundaries between military and civilian domains are becoming increasingly porous, which is why it is necessary to invest in research and development (R&D) into commercial drones for military use. By maximizing knowledge of Ukrainian technological innovations, it is possible to increase the effectiveness of UAVs on the front line and strengthen cyber security. Investment in R&D would enable an adaptation of Western production methods to Ukrainian ones and supply more drones at lower cost. Indeed, there is still room for improvement in the supply of military equipment, both in terms of delivery speed and production. Investing in R&D is an opportunity to take better advantage of the financial resources allocated by Canada to Ukraine's military support, while developing Canadian expertise in these emerging technologies.

Artificial intelligence

Artificial intelligence (AI) is one of Canada's comparative advantages. An important part of R&D is the incorporation of AI into UAVs. AI helps prevent jamming and autonomizes drones. For example, Reinforcement Learning is a simulation that enables AI to develop its autonomy by learning through trial and error until it is able to make the most optimal decisions for a given situation. In addition, the collection of flight data is essential to feed AI algorithms that can develop drone swarm systems. Drones that swarm onto a target are more difficult for air defense systems to intercept, increasing their performance. Since this type of attack will become more frequent, it is necessary to develop AI to be able to carry out such operations and to defend against them.

In addition, AI and drone swarms lead to battlespace saturation. The massive use of drones is increasing the intensity of combat and making the battlefield more lethal, which in turn raises the issue of protecting drone pilots. Drones are capable of destroying the enemy's heavy and expensive artillery, such as tanks or anti-aircraft missile systems, making drone pilots major targets on the front line. This underlines the importance of ensuring their protection and developing air defense systems with AI.

The private sector and the production chain

The private sector plays a major role in the innovation and production of new technologies, as demonstrated by the many start-ups in Ukraine or companies like Teledyne FLIR. The Ukrainian model shows that start-ups are key players in the creation of a drone army. To support the drone production chain, collaboration between the public and private sectors needs to be strengthened. Continued collaboration with Teledyne FLIR and support for smaller innovative companies are

therefore relevant for Canada. This could encourage the development of new technologies that would increase drone performance and efficiency, whether in terms of connectivity or navigation. The incorporation of 3D printing also has the potential to significantly accelerate the supply of drone parts.

Drone pilot training

Teledyne FLIR will be sending trainers to Kyiv to teach a number of Ukrainian armed forces pilots how to use SkyRanger R70 drones. As for the Canadian government, it is already investing in military training through Operation UNIFIER. The creation of a program dedicated to drone pilot training would be a major addition in view of the current situation at the front. In newly trained units in Ukraine, the success rate of drone strikes is often around 10-15%. In specialized units such as the Ukrainian intelligence services, the success rate can be as high as 70% or 80%. Pilot training increases drone effectiveness. KazhanFLY is a drone pilot school offering a ten-day course. KazhanFLY is also a voluntary Ukrainian civil initiative. Inspired by this type of school and in collaboration with the Unmanned Systems Forces, it could be interesting to include drone piloting training in Operation UNIFIER. While Ukrainian soldiers are learning more about handling conventional weapons, there is a gap when it comes to handling micro-drones. It is important to train a large number of pilots, given the large number of drones in the field. Investing in training, in particular through virtual reality flight simulators, will enhance the Ukrainian military's ability to deal with this field reality.

Conclusions

This policy brief has discussed Canada's donation of 900 UAVs to Ukraine, in order to put Canadian military support into perspective with the reality on the ground. The conflict between Ukraine and Russia has brought to the fore a new trend in warfare, namely the growing use of inexpensive commercial micro-UAVs for military purposes. Political considerations have been made in this regard. R&D, AI, collaboration with the private sector and drone pilot training are considerations addressed to the government so that Canada acts more in line with its words of support. In order to offer significant assistance to Ukraine, we need to focus on technological superiority and strengthen the production chain.