

# HOW TO BUY DRONES FOR UKRAINE

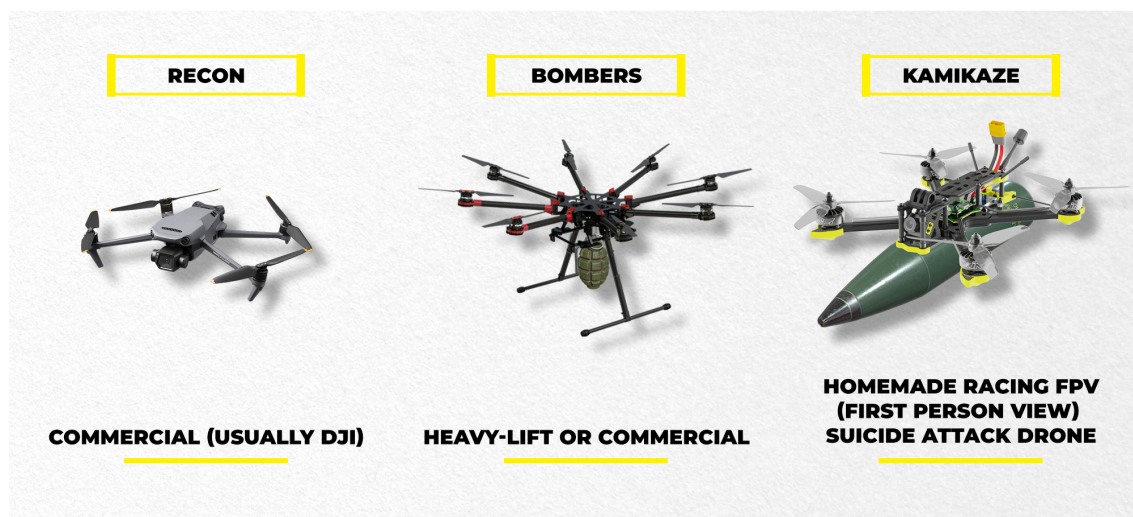


## Purpose of this document

This guide has been created to assist the purchase, modification and delivery of drones to Ukraine's military. It's written from the perspective of a civilian, US-based purchaser but should be applicable to purchasing drones anywhere.

This guide is part of a series of Equipment Guides published by [Defense Tech for Ukraine](https://www.defensetechforukraine.org). View all Guides [here](#).

## DRONE USES AND TYPES





## Types of drones used by the Ukrainian military

Military drones can be classified into several major categories:

- Air drones (Unmanned Aerial Vehicles or UAVs)
  - Fixed wing
  - Quadcopter
- Land drones (Unmanned Ground Vehicles or UGVs) - **Not covered in this guide**
  - Tracked
  - Wheeled
- Sea drones - **Not covered in this guide**
  - Surface (Unmanned Surface Vehicles or USVs)
  - Submersible (Unmanned Underwater Vehicles or UUVs)

The primary focus of this guide is airborne quadcopters. Land and sea drones will not be covered in this guide as in general they are too specialized and expensive for an ordinary person to purchase.

Military aerial drones can be separated into two types: Large, expensive, long-range drones typically provided by governments and militaries. This guide does not discuss or concern itself with these types of drones, as they are typically inaccessible to most civilian purchasers.

Of the remaining, more affordable and accessible types of drones, they can be broken down into several types: Fixed wing and quadcopter. A further classification is Recon or ISR (Intelligence, Surveillance and Reconnaissance) drones, FPV suicide “kamikaze” drones and bomber drones.

### FIXED-WING DRONES



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## COMMERCIAL QUADCOPTER DRONES







This document will focus on quadcopter and fixed wing commercial air drones, especially quadcopters manufactured by the DJI company, as they are cheapest and most useful for the majority of Ukrainian military units, as well as being the drones most commonly provided by non-military organizations supporting Ukraine.

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## TYPICAL DJI DRONES AND USES

| DJI MINI 2   | DJI AIR 2S   | DJI MAVIC 3   | DJI MAVIC 3T   | DJI MATRICE 30T   |
|--|--|---|--|---|
|                         |                         |                    |                |                        |
| TYPE: RECON<br>COST: \$360<br>(USED. UNAVAILABLE<br>NEW)<br>USE: DAYTIME<br>RANGE: SHORT RANGE<br>< 2 KM | TYPE: RECON/BOMBER<br>COST: \$1250 (NEW)<br>\$600 (USED)<br>USE: DAYTIME<br>RANGE: SHORT RANGE<br>< 3 KM | TYPE: RECON<br>COST: \$3000 (NEW)<br>\$1800 (USED)<br>USE: DAYTIME<br>RANGE: MEDIUM RANGE<br>< 6 KM | TYPE: RECON<br>COST: \$5500-\$7500<br>(NEW)<br>USE: DAY & NIGHT<br>RANGE: MEDIUM RANGE<br>< 6 KM | TYPE: RECON<br>COST: \$10000 (NEW)<br>~\$8000 (USED)<br>USE: DAY & NIGHT<br>RANGE: MEDIUM RANGE<br>< 6 KM |

## Major commercial DJI drone models

By far the most commonly requested and most useful quadcopter drone for Ukrainian military units is the DJI Mavic 3. If a Ukrainian military unit asks you for “a drone”, buy them a Mavic 3. If they ask for a “night drone”, buy them a Mavic 3T.

With the perfect combination of flight time, weather-resistance, excellent camera and gimbal system as well as reasonably good jamming resistance and carrying capacity should presents need to be dropped to welcome the invaders, the Mavic 3 is an excellent choice for platoon, company and even battalion drone teams. Buy the Pro models, preferably not Classic, and definitely not the Cine version. The Pro model has a vastly better zoom than the Classic. Used models can be found for around \$1000-1500 around the world. Oftentimes the receiving unit already has controllers and spare batteries that will work. Essential to ensure that the drone is reprogrammed before delivery to the unit. There are many program upgrades that should be made. At a minimum, DJI's RemoteID must be disabled! If the drone is used, Account Lock must be defeated to allow the drone to pair with a new controller. Contact us for details.

The Mavic 3 comes in regular Pro and Classic and thermal (Mavic 3T) models. The thermal models

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cost around twice as much (\$3000 in US, \$4000 in Europe) but are extremely useful for many units. Check with them before you buy.

Update: Unfortunately DJI has stopped selling the Mavic 3 in most markets. The replacement Mavic 4 is of mid-2025 not yet ready for the battlefield. Soon it should be able to be reprogrammed and safe for Ukrainian military units to use.

DJI makes cheaper models such as the Mini and Air but they have various flaws and are usually much less capable. We recommend buying only Mavic 3s for most units.

Unfortunately, DJI drones are at constant risk of being banned in the USA and unavailable to purchase here. In addition, certain restrictions mean it's often best to purchase drones within Ukraine, even if they are more expensive.

Buyers may be tempted to purchase cheap Chinese copies of DJI drones off of AliExpress. These drones may be suitable for early-stage training, but work for little else. Their limited range, power, signal strength, weatherproofing and other flaws will likely become apparent very quickly.

## **DJI Mavic 3 & DJI Mavic 3 fly more combo**

Medium-sized quadcopter drone with good flight time, payload and recon capabilities. The DJI Mavic 3 is the most popular consumer drone in Ukraine. The real life flight time is 30-35 minutes, zoom is 28x for all Mavic 3s except Mavic 3 Classic (that has almost no zoom, 3X). The radio signal range is very reliable. The drone can carry up to 2 grenades, but it's wasteful to use it as a bomber. They are much more useful for recon missions. Some units have been able to add extended batteries to the top.

Buy in US

- DJI Mavic 3 Pro \$2300

[https://www.amazon.com/DJI-controller-Triple-Camera-Transmission-photography/dp/B0BYHSDY4C/ref=sr\\_1\\_4](https://www.amazon.com/DJI-controller-Triple-Camera-Transmission-photography/dp/B0BYHSDY4C/ref=sr_1_4)

- DJI Mavic 3 Classic \$1300

<https://www.amazon.com/DJI-Hasselblad-Professionals-Omnidirectional-Transmission/dp/B0BGPP46FI>

Buy in Ukraine via Accumaze( a respected Polish supplier of drones and accessories) - 1500€

- DJI Mavic 3 Pro <https://order.ukrspecimport.com/catalog/items/354937000000203376>

## **DJI Mavic 3T (Thermal)**

The DJI Mavic 3T is similar to the DJI Mavic 3 but it also has a thermal camera. This drone can see in the darkness. Unlike the standard Mavic 3, RemoteID can't be disabled. There are solutions available such as spoofer boards to deal with this.

Buy in US via BH Photo (not currently available from Amazon)

- DJI Mavic 3T \$5500 [https://www.bhphotovideo.com/c/product/1730099-REG/dji\\_cp\\_en\\_00000414\\_sb2\\_mavic\\_3\\_thermal\\_with.html](https://www.bhphotovideo.com/c/product/1730099-REG/dji_cp_en_00000414_sb2_mavic_3_thermal_with.html)

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**Note warning: Special Order. Expected availability: 8-10 Months**

- Buy in Ukraine via Accumaze

DJI Mavic 3T - 3220Euro <https://order.ukrspecimport.com/catalog/items/354937000000090297>

## **DJI Matrice 30 and 30T**

The DJI Matrice is a larger drone with extended range and extremely advanced cameras.

Available in both regular and thermal (T) versions.

Buy in US

- DJI Matrice 30 \$7,500 <https://store.dji.com/product/m30-and-dji-care-enterprise-basic-m30>
- DJI Matrice 30T \$10,600 <https://store.dji.com/product/m30t-and-dji-care-enterprise-plus-m30t>

- Buy in Ukraine via Accumaze

DJI Matrice 30 3700euro <https://order.ukrspecimport.com/catalog/items/354937000000637038>

DJI Matrice 30T 5300euro <https://order.ukrspecimport.com/catalog/items/354937000000479571>

<sup>1</sup> Regarding warranties in Ukraine. Note that drones in Ukraine typically lose warranty

## **Details**

- DJI is generally agreed to be the best manufacturer for commercial drones, if buying this type for infantry units to conduct recon use of the drone.
- Max flying distance 30 km is unrealistic in practice. Mavic 3 range is 6-8 km. Longer range requires double batteries and significantly increases chances of losing the drone.

## **DJI drones to avoid**

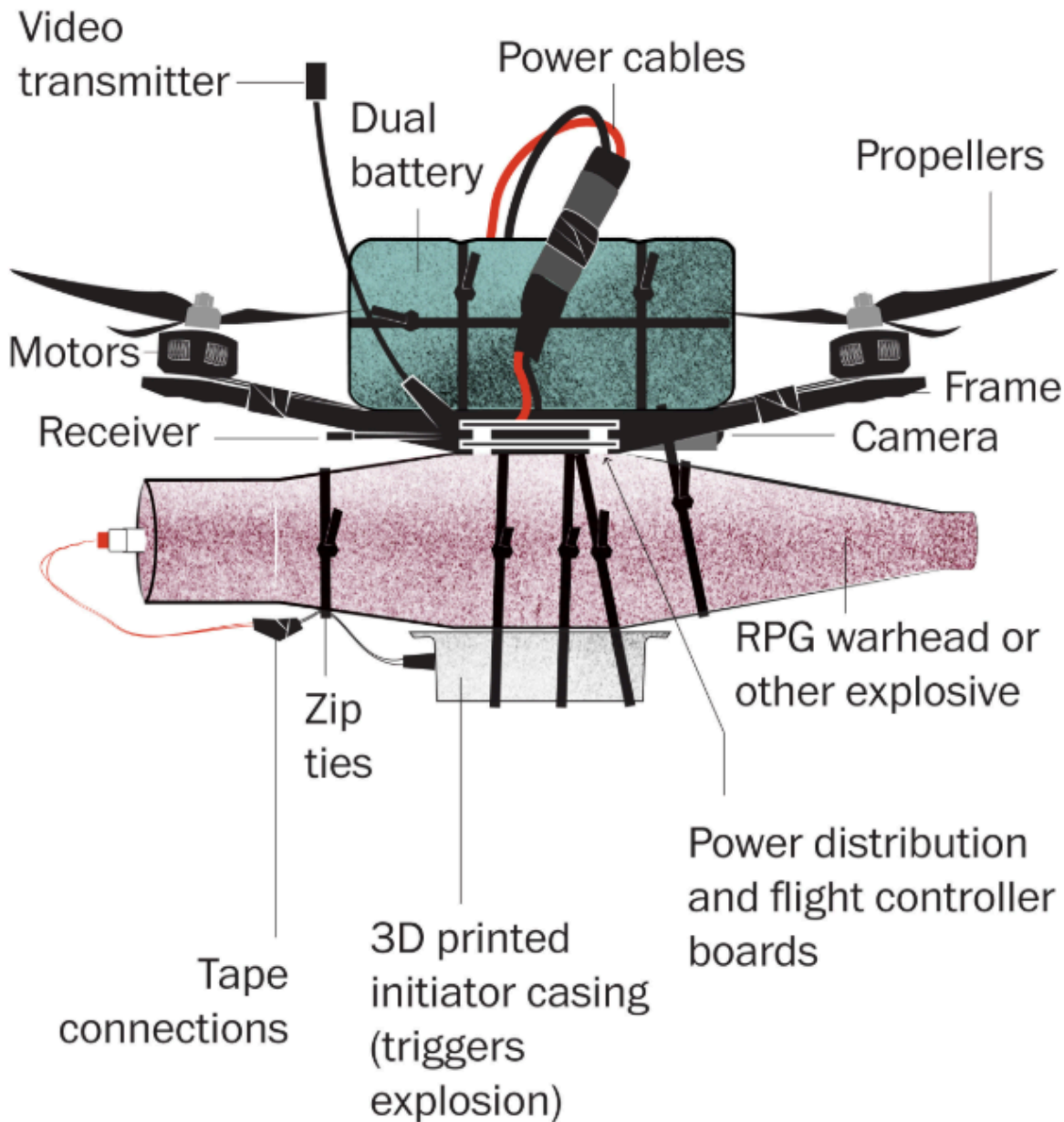
- DJI Mini 3 (RemotID can't be disabled)
- DJI Mini 3 Pro (RemotID can't be disabled)
- DJI Mini 2 Series (Poor signal range)
- DJI Mavic 3 SE - too expensive while has no night-time capabilities
- DJI Mavic 3 Classic (RemotID can't be disabled and too expensive as a bomber)
- DJI Mavic 3 CINE - too expensive for recon / fire correction
- Matrice 30E is too expensive while has no night-time capabilities

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## Basic components of a hand-built FPV war drone

### FPV Suicide “Kamikaze” drones



Source: Ukrainian military  
SAMUEL GRANADOS / THE WASHINGTON POST

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“FPV” refers to “First Person View” meaning the operator of the drone uses FPV goggles to get a first person view from the drone. These repurposed racing drones are typically cheaper, custom-made and used for strike missions to deliver explosives to a tank or bunker.



- Extremely useful. Manufactured in Ukraine and everywhere in the world including Russia and China.
- Typical role: destroying armor, weapons, personnel in range of 10-15 km.
- Carries 1-2 kg warhead customizable to the mission
- Typical cost of a single FPV drone is \$300-600. Up to \$600 for the best long-haulers. Video signal is typically analogue, as opposed to the usual digital. FPV drones with digital video signal may cost a bit more.

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- Must be accompanied by one or more ISR drones (typically Mavic 3s) to scout the enemy and confirm the kill.
- Ukraine needs 100,000+ per month.



*FPV drone manufacturing workshop in Ukraine*

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*Ukrainian soldiers attaching RPG warhead to a FPV drone*

Some popular and well known Ukraine FPV drone manufacturers are [TORO](#) and [Escadrone](#). Outside of Ukraine, many buyers use [Partizan](#) in Czechia.

Each unit uses particular FPV drones and unlike DJI drones they are more particular. It is not recommended to purchase FPV drones in a shop before making sure that the particular unit uses exactly that type of drones.

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## Fixed Wing Drones

Ukraine's military drone operators are increasingly moving from quadcopters to fixed-wing drones. Fixed-wing drones are much more expensive than FPV quadcopters and are often more difficult to learn to fly, but typically have much longer range and payload. [However, fixed-wing drones from overseas rarely meet Ukrainian needs or budgets, and it is better to assist units buying them in Ukraine].

Another often overlooked advantage of fiber optic control systems is the data throughput possibilities. For example...

## Ground Drones & Sea Drones

Ground drones (UGVs) and sea drones are complex additional topics that will be the subject of separate How to Buy Guides. Check with DTU administrators for updates on this topic.

## Fiber Optic Control

Due to the omnipresence of radio frequency (RF) jammers (KA "REB") from both sides at the battlefield, both sides are increasingly resorting to fiber optic controlled drones.



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Unjammable and difficult to detect, fiber controlled drones are much more effective, especially when hunting the RF jammer stations so that waves of follow up RF-controlled FPV drones can do their work unimpeded. Fiber control systems have some disadvantages and add ~\$500 to the cost of an FPV drone. Contact us for more details.



Fpv Drone Optical Fiber Kit 0.27mm Fiber 10km  
15km Uav Fibre Optic

Fiber optic kits can be purchased from AliExpress or directly from Ukrainian manufacturers. Contact DTU for details.

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## Repairing Drones

It is often possible to repair broken drones. Contact DTU for details

## How to know which kind of drone to buy

Key is to supply the right kind of drone to the right unit., There is no sense in supplying an expensive Mavic 3 for short-range recon missions, and none of these DJI drones are appropriate for suicide Kamikaze/FPV missions. It is critical to ask the unit which type of drone they need.

### Questionnaire

We've developed a questionnaire that we send units. It asks the following questions: (Contact us for the Ukrainian-language version of this questionnaire)

*In order to properly provide the correct drone type to the requesting Ukrainian military unit, we require some basic information about the unit and the intended use of the drone. G*

- *On which direction (military front) does the unit operate?*
- *Is the drone needed on the front line ("zero-line")? Or is it anticipated to go to the front line soon? Or is the drone needed behind the front line? Maybe for pilots training? Or for pilots training and then for the frontline?*
- *Which drone training did pilots go through? Did they receive a certificate?*
- *If they haven't, are there experienced pilots nearby who committed to train new pilots and make sure they will fly safely?*
- *Which drones have pilots worked with?*
- *What are typical planned missions for this drone?*
- *What are typical ranges of mentioned missions? In other words, how far the drone needs to fly from RC?*
- *What kind of antennas are you using if any?*
- *Which drones are needed and how many batteries per drone are needed?*
- *How urgent is the need?*

Additional purchase considerations

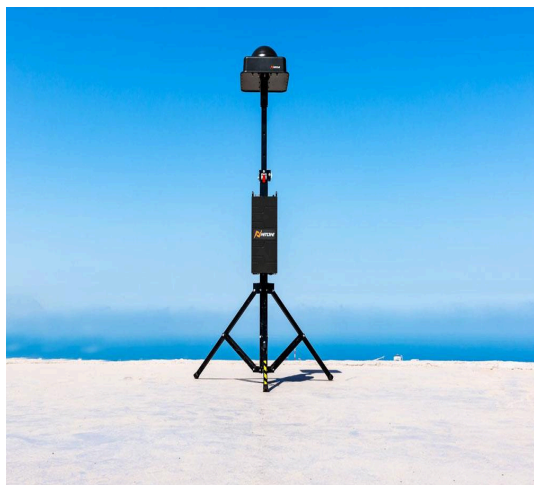
- How much Zoom is needed
- Motion-correction needed for fast flying?
- Flying in the wind? Rain? Snow?

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## Drone Jamming (C-UAS)

C-UAW (Counter-Unmanned Aerial Vehicle) weapons, also known as ECM (Electronics Countermeasures) weapons are beyond the scope of this document. Be aware that they exist and are a constant concern for drone operators. The Russians have plentiful and powerful ECM assets. To help foil this, it is important to anonymize, reprogram and signal-boost drones before delivery to the unit. Contact us for more information or a list of drone jamming manufacturers.



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## Drone Components

### OPTICS

#### Gimbal-ed cameras

All recon drones have cameras mounted on motion-stabilized gimbals. This allows them to take clear video while on flight. Whereas FPV racing drones (typically used for kamikaze or suicide missions) use cameras fixed to the drone, to be inexpensive.

#### Optical vs digital zoom

Zoom is critical for drones as it allows them to safely stay far back and still see the action

#### Night vision

We don't know of any drones using regular night vision like a PVS-14 monocle. Instead, all night vision-enabled drones seem to be equipped with thermal vision, which is better.

#### Thermal optics

Thermal cameras detect IR radiation (heat) from the ground. This allows them to sense humans or running vehicles very effectively, especially during night time or winter. This is a very efficient way to detect soldiers storming your position or to correct artillery fire. Most importantly this optic allows using the drone at night or to spot soldiers using camouflage.

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## HOW TO BUY DRONES



- Drones are typically cheaper in the US so bought here then flown to Poland, then transported to a Ukrainian city where the drones are improved (anonymized and signal boosted), then sent via Nova Posta or driven by a volunteer to the actual unit.
- Best to contact DTU first, so that you can buy the right drone and have it sent directly to the reprogramming center
- Best to buy new on Amazon or eBay. If buying on eBay, best to coordinate with us to not compete on bidding.
- With all DJI drones, check with the unit first if you should buy the “Fly More Combo” for cheaper deals on essential accessories and extra batteries. It typically consists of 2 extra batteries, 6 extra propellers, a charging hub and a bag
- Once bought, have the drone sent to be reprogrammed in the US, Ukraine or Poland.
- Once reprogrammed, the drone should be delivered to the recipient military unit in Ukraine by a trustworthy courier who will ensure it's properly delivered and that any needed receipt paperwork or photos are collected.

NOTE: Do not attempt to send drones via Meest to Ukraine! US Customs has recently been stopping the shipment of drones, presumably because of the batteries which are a fire hazard. This has been experienced on the West coast of the USA. East coast Customs may be more understanding.

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- Buying used
  - There are great deals on drones, especially ones slightly damaged. But please coordinate with us before bidding so we do not compete!
  - Sometimes used models are actually better than new as the newer ones can be harder to reprogram.
- Buying in US vs EU
  - Drone range is throttled down in Europe. Drones can have 4x the range in the US than in Europe, due to stricter regulations in the EU. There are ways to deactivate this and activate “Signal Boost Mode” in Ukraine.

## SOURCES TO PURCHASE

### • In USA

#### **New**

- Amazon
- Costco (Link) - Good prices but limited selection.
- B&H Optics

#### **Used**

- eBay
- Craigslist
- OfferUp/Facebook marketplace
- Forums
- Pawn Shops

### • In Europe

- Amazon
- Marktplaats (NL)
- eBay

### • In Ukraine

- All the above. Contact us for couriers/shipping options
- Dedicated drone shops (but prices will be higher)

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## Accessories

### Cases

Many of the cases provided with the drones are not ideal. Important to find a hard-sided and waterproof case, with good shoulder strap. Many drone operators keep the drones in the original packaging. Add foam to lightweight bags for additional impact padding.

### Batteries

Some special forces drone units have 30 batteries per drone because they fly nonstop. For normal units we suggest supplying 4-6 batteries. It is recommended that you not purchase extra batteries

### External antennas

External antennas are very important for several reasons. Most importantly, it allows the operator to safely stay under cover while piloting. Since the enemy can easily radio-triangulate the signal coming from the drone controller, this is critical to keep the operator alive. The antenna also allows for a stronger signal, allowing the drone to travel farther and reduces (but doesn't remove) the risk of jamming.



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*External antennas boost signal and allow drone pilots to fly from shelter*

## HOW TO FLY DRONES, IN UKRAINE

Learning how to fly drones in a combat environment is very different from drone piloting for fun or a civilian job. Teaching this critical skill is beyond the scope of this document. Contact us for a list of resources and flight schools.

### FURTHER RESOURCES

- Defense Tech for Ukraine <https://defensetechforukraine.org>
- Victory Drones <https://en.victory-drones.com>
- How to buy drones on eBay <https://www.youtube.com/watch?v=xTMOP7fID1s> (Ukrainian language. Turn on auto-generated English captions)

### Additional resources

- Drones are Transforming the Battlefield in Ukraine But in an Evolutionary Fashion <https://warontherocks.com/2024/03/drones-are-transforming-the-battlefield-in-ukraine-but-in-an-evolutionary-fashion/> An article from a respectable journal detailing how drones are changing combat in Ukraine, as of 2024.
- How Drone Combat in Ukraine is Changing Warfare <https://www.reuters.com/graphics/UKRAINE-CRISIS/DRONES/dwpkeyjwkpm/> A Reuters report on how drones are changing combat in Ukraine, featuring interviews with soldiers, officials, and manufacturers as well as graphics.
- Small Drones & Loitering Munitions in Ukraine - The terrifying rise of cheap precision <https://www.youtube.com/watch?v=AlpZf1hpQYM> A YouTube video from a well-respected source with knowledge of the defense industry. He discusses the rise of small drones, notably quadcopters in Ukraine, as well as loitering munitions.
- Military Drones in Ukraine – a Beginners' Guide <https://www.kyivpost.com/post/23241> The Kyiv post discusses the types of drones in use in Ukraine.
- FPV drones in Ukraine are changing modern warfare <https://www.atlanticcouncil.org/blogs/ukrainealert/fpv-drones-in-ukraine-are-changing-modern-warfare/> The Atlantic Council discusses the use of FPV drones in Ukraine.
- Cheap first-person-view drones now hunting larger prey in Ukraine <https://www.defensenews.com/global/europe/2024/08/08/cheap-first-person-view-drones-now-hunting-larger-prey-in-ukraine/> An article from DefenseNews about the use of FPV drones to hunt larger weapons systems such as attack helicopters and tanks.

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- Drones in Modern Warfare Lessons Learnt from the War in Ukraine  
<https://researchcentre.army.gov.au/library/occasional-papers/drones-modern-warfare> An exhaustive report on Drones in Ukraine from the Australian Army Research Center on the use of drones in Ukraine. Useful for those who want a more scholarly perspective.
- How Ukrainian Charity Foundations Purchased Drones  
<https://voxukraine.org/en/how-ukrainian-charity-foundations-purchased-drones>  
This article examines changes in the price of drones purchased by Ukraine's largest volunteer foundations.
- Shotgun drones  
<https://www.forbes.com/sites/davidaxe/2025/01/11/ukraines-winchester-shotgun-drones-are-hunting-individual-russian-soldiers-now/> Article describing Ukraine's shotgun armed FPV drones
- Ukraine's Night Bombers  
<https://www.forbes.com/sites/davidhambling/2025/01/15/unseen-unsung-and-underrated-ukraines-night-bombers/> An article detailing the exploits of Ukraine's heavy Baba Yaga drones.
- Ukraine and Russia battle to Jam un jamable drones  
<https://www.forbes.com/sites/vikrammittal/2025/01/19/ukraine-and-russia-battle-to-defeat-un-jammable-fiber-optic-drones/> An article on how Ukraine and Russia are attempting to jam fiber-optic drones.