

***Derived from Publicly Available Information (PAI)***

Red Six Solutions, LLC

# Monthly Roll Up

Summary of Worldwide UAS Incidents

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**Red Six Solutions Monthly Roll Up (MR) Report #MR042  
May 1, 2022**

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## Executive Summary

The war in Ukraine dominates our reporting for this month on UAS incidents. There was significant drone activity in the fighting there. Red Six accounted for at least eighteen losses of Orlan-10 reconnaissance drones by Russia (Item 2). Russia also lost one of its large Orion Medium-Altitude, Long-Endurance UAS (Item 5). Both the United States with Stingers and the United Kingdom with Starstreaks have sent man portable counter air systems to Ukraine and these may be having an affect on Russia's drone capabilities.



*Figure 1 – A Yemeni military officer examines a crashed Houthi large multirotor drone shot down in Taiz (top left), a Polish Warmate loitering mission, now part of Ukraine's arsenal (top right), a Russian soldier stands amongst the wreckage of a Ukraine Bayraktar TB2 drone near Kherson, Ukraine (bottom right), and a Russian Orlan-10 reconnaissance drone that crashed near Poltava, Ukraine (bottom left)*

Ukraine appeared to lose four of its Turkish-made Bayraktar TB2 drones (Item 3). Ukraine seems intent on taking the war to Russia because at least three of the four lost drones being shot down were over Russian territory. Red Six summarizes our view on the near term direction of drone operations in the Ukraine in Item 1 of this report. As a note, the popular drone maker DJI Technology Co from Shenzhen,



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China, announced it would temporarily suspend business in Russia and Ukraine. The maker of the widely sold Phantom and Mavic UAS wants to ensure its products are not used in combat.

Regarding safety, this report recounts a wildfire near Boulder, Colorado, caused by a Lithium Polymer (LiPo) battery fire from a drone being flown by university researchers (Item 14). The fire started when the battery was punctured during a crash and the chemicals inside ignited when exposed to air.

Two law enforcement items are worthy of note. In a television interview, the Director of South Carolina's prison system highlighted the challenges of combatting contraband smuggling in the state (Item 18), saying drone drops had increased significantly over the years, from just 29 detected incidents in 2017 to 166 last year. And, a report published by Judicial Watch, claimed the U.S. Customs and Border Protection recorded 9,000 drone incursions of U.S. airspace last year by Mexican drug cartels (Item 9). While some of the illegal cross-border incursions were to smuggle drugs, the majority of the flights appear to have been made to conduct reconnaissance and surveillance of U.S. law enforcement operations.



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## Red Six Solutions Monthly Roll Up Summary of Worldwide UAS Incidents

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## Item 1 – Drones and the Russian Invasion of Ukraine

**Date:** 1 March 2022

**Summary:** In April, Russia conducted a tactical withdrawal from Kyiv to concentrate its forces in the Donbas Region in Eastern Ukraine and to consolidate its efforts to gain territory in the South. The move was a strategic decision by Russia to attempt to gain territorial control of enough of Ukraine to leave the country permanently compromised. Red Six assesses Russia's tactical withdrawal into the Donbas will give its drone operations some operational advantages. Red Six also assesses Russia's drone fleet is likely performing better than generally appreciated. Kyiv had expected its Turkish-made Bayraktar TB2 drones to be decisive but their impact, so far is negligible. News of the U.S. donation of Switchblade drones is a promising development for Ukraine but Switchblades have limited range and as the Russian forces move into a defensive crouch, they will be better able to protect themselves from loitering munitions, such as the Switchblade and the Polish donated Warmate loitering munition.



*Figure 2 - Screen grab of Ukraine artillery strike on Russian logistics hub*

For sure, Ukraine has achieved tactical successes with their drones; however, so have the Russians. Russia's three primary unmanned aircraft are the Orion large drone, Zala KYB loitering munition, and Orlan-10 reconnaissance drone. Russia effectively began testing and tweaking both the Orion and Zala KYB two years ago in Syria. The Orion is a large, fixed wing drone with the same mission set as the American Reaper. On social media images have been recently posted showing Orion kills on Ukraine's tanks. The Zala KYB is a small, delta wing drone that carries a payload of plastic explosive and steel balls. Russia employs them across Ukraine from Kyiv to Mariupol as antipersonnel weapons. The Orlan-10 is the backbone of Russia's drone fleet. Unlike the Orion and Zala KUB, which act independently, the Orlan-10 is fully integrated



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into Russia's artillery corps. Russia's Krasnopol laser-guided artillery has been lethal against Ukraine armor because Orlan-10s are guiding its fires.

Looking ahead, Russia will continue to refine its doctrine with their large Orion to improve its performance. It is likely the Zala KYB drones will be increasingly used due to their low operating cost. Additionally, Orlan-10s will continue to be at the forefront of Russian drone operations.

Ukraine seems to be shifting away from large drones to smaller ones like the U.S. Switchblade, Polish Warmate, and the Turkish-made mini-Bayraktar. It is uncertain whether the shift to smaller drones is being driven by the operational considerations or for other reasons. It is possible the shift merely reflects the types of drones being given to Ukraine by donor nations. Regardless, the move to smaller drones might be a sensible choice as Russia's air defenses improve and the war increasingly becomes a battle of attrition.



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## Item 2 – Eighteen Russian Orlan-10s Lost in April

**Date:** 1-30 April 2022

**Summary:** The Orlan-10 UAS is built by Russia’s Special Technology Center Saint Petersburg for the Russian Armed Forces. It has been a workhorse for Russian fighting forces in Ukraine, as well as with the Russian-backed separatists in Donetsk and Luhansk. This month, Red Six counted eighteen Orlan-10 losses by Russia (See following images). The Orlan-10 is configurable; depending on its missions it carries different payloads. For the Russian artillery forces, Orlan-10s can carry sophisticated EO/IR cameras and laser designators. For the separatists, the drone’s payload might be an inexpensive 35 mm Sony camera. Red Six’s analysts noted some of the newer Orlan-10s are using a different engine. Orlan-10s used to use Saito 62B single cylinder engines. The Russians now appear to use twin-cylinder engines, either 61 or 100 cc (See Figure 8) The change might have been made for vibration reduction or it could be to gain more power.



*Figure 3 - Orlan-10 UAV that crashed on 1 April 2022 in Poltava Oblast in Central Ukraine*

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*Figure 4 – 3 April crash of an Orlan-10, location unknown*



*Figure 5 – An Orlan-10 shot down by Ukraine forces near Luhansk on 5 April 2022*



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Figure 6 – On 7 April 2022, Ukraine National Guard forces discovered a crashed Orlan-10

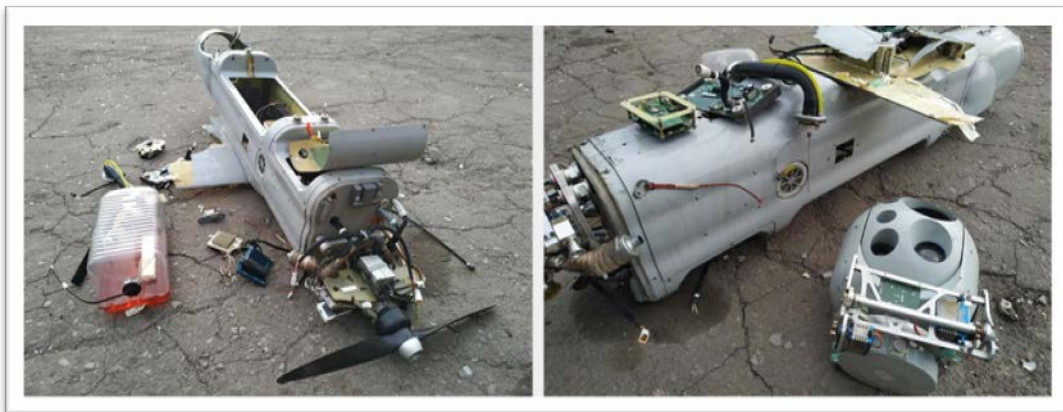


Figure 7 – An advanced Orlan-10 with the newer twin cylinder engine recovered near Luhansk on 8 April 2022



Figure 8 – An Orlan-10 recovered near Luhansk on 7 April 2022

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*Figure 9 – An Orlan-10 that made a hard landing near Luhansk on 10 April 2022*



*Figure 10 – On 11 April 2022, an undamaged Orlan-10 crashed in Eastern Ukraine*



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*Figure 11 – On 14 April 2022, an Orlan-10 was shot down in Kharkiv in Ukraine's northeast*

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*Figure 12 – A second Orlan-10 brought down on 14 April*



*Figure 13 – An Orlan-10 that crashed on 17 April near Donetsk*



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Figure 14 – Ukraine’s 28<sup>th</sup> Mechanized Infantry brought down this Orlan-10 on 20 April 2022



Figure 15 – Ukraine National Guardsmen showoff a downed Orlan-10 on 21 April 2022

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Figure 16 – A crashed Orlan-10 on 23 April 2022



Figure 17 – An Orlan-10 that crashed on 23 April 2022 being carried away in pickup truck



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*Figure 18 - An Orlan-10 crashed on 24 April 2022. Its fuel tank appears to be a recycled water bottle*



*Figure 19 - The remains of a shot down Orlan-10*

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Figure 20 -An intact Orlan-10 recovered by Ukrainian forces

**Geolocation:** Eastern Europe (Various, Ukraine)

**Importance:** High

**Sources:**

1. Ukraine Weapons Tracker (Twitter account), *A Russian Orlan-10 reconnaissance UAV was shot down/crashed in Poltava Oblast*, 1 April 2022, <https://twitter.com/UAWeapons/status/1509992155200241674/> [19 April 2022]
2. Ukraine Weapons Tracker, *Another Orlan-10 of the Russian Forces Crashed*, 3 April 2022, <https://twitter.com/UAWeapons/status/1510578487404412928/> [19 April 2022]
3. Ukraine Weapons Tracker (Twitter account), *A Russian Orlan-10 reconnaissance UAV was shot down by the Ukrainian Border Guards in Luhansk Oblast*, 5 April 2022, <https://twitter.com/UAWeapons/status/1511328066332672001/> [19 April 2022]
4. Ukraine Weapons Tracker (Twitter account), *A Russian Orlan-10 reconnaissance UAV was found by the forces of the National Guard of Ukraine, apparently it crash landed*, 7 April 2022, <https://twitter.com/UAWeapons/status/1512076268585455621/> [19 April 2022]
5. Ukraine Weapons Tracker, *A Russian Orlan-10 UAV Was Shot Down in Luhansk*, 7 April 2022, <https://twitter.com/UAWeapons/status/1512095574690091012/> [19 April 2022]
6. Ukraine Weapons Tracker, *A very modern Russian Orlan-30 reconnaissance UAV was shot down by the Ukrainian army in Luhansk Oblast*, 8 April 2022, <https://twitter.com/UAWeapons/status/1512489626367557633/> [19 April 2022]





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7. Ukraine Weapons Tracker (Twitter account), *The wreckage of a Russian Orlan-10 reconnaissance drone, shot down by a LMM Martlet, fired by the Ukrainian army*, 10 April 2022, <https://twitter.com/UAWeapons/status/1513097077647200257/> [19 April 2022]
8. Ukraine Weapons Tracker (Twitter account), *Another Orlan-10 reconnaissance UAV was lost by the Russian army somewhere in the east of Ukraine*, 11 April 2022, <https://twitter.com/UAWeapons/status/1513477272732319747/> [19 April 2022]
9. Ukraine Weapons Tracker (Twitter account), *Another Russian Orlan-10 UAV was shot down by the Ukrainian side in Kharkiv Oblast*, 14 April 2022, <https://twitter.com/UAWeapons/status/1514671842132475909/> [29 April 2022]
10. Ukraine Weapons Tracker (Twitter account), *The 28th Mechanized Brigade claimed to shoot down another Russian Orlan-10 UAV*, 14 April 2022, <https://twitter.com/UAWeapons/status/1514693381389438976/> [24 April 2022]
11. Ukraine Weapons Tracker, *Another Russian Orlan-10 reconnaissance UAV was shot down by the Ukrainian army in Donetsk Oblast*, 17 April 2022, <https://twitter.com/UAWeapons/status/1515686631122087938/> [27 April 2022]
12. Ukraine Weapons Tracker (Twitter account), *The same unit also shot down another Orlan-10*, 20 April 2022, <https://twitter.com/UAWeapons/status/1516777007849291780/> [29 April 2022]
13. Ukraine Weapons Tracker (Twitter account), *Another Russian Orlan-10 reconnaissance UAV was shot down by the Ukrainian forces on the Eastern front*, 21 April 2022, <https://twitter.com/UAWeapons/status/1517156683134373888/> [29 April 2022]
14. Ukraine Weapons Tracker (Twitter account), *The Ukraine army continues to destroy Orlan-10s*, <https://twitter.com/UAWeapons/status/1517864171496427520/photo/> [29 April 2022]
15. Ukraine Weapons Tracker (Twitter account), *Another Orlan-10 reconnaissance drone dropped*, 23 April 2022, <https://twitter.com/UAWeapons/status/1517948256071860226/> [29 April 2022]
16. Ukraine Weapons Tracker, *Another Orlan-10 that fell down a few days ago*, 24 April 2022, <https://twitter.com/UAWeapons/status/1518169838744657921>
17. Ukraine Weapons Tracker (Twitter account), *What is left of a Russian Orlan-10*, 26 April 2022, <https://twitter.com/UAWeapons/status/1518948010213920769/> [29 April 2022]
18. Ukraine Weapons Tracker (Twitter account), *Another crash landed Orlan-10*, 27 April 2022, <https://twitter.com/UAWeapons/status/1519657788703752194/> [27 April 2022]

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### Item 3 – Four Bayraktar TB2 Tactical UAVs Shot-down in Ukraine in April

**Date:** 1-30 April 2022

**Summary:** During the month of April, four Turkish-made Bayraktar TB2 drones were defeated by Russian forces in the Ukraine. At least two more were shot down in March. Of note, reports indicated several of the destroyed TB2's were shot down over Russian soil; two over Kursk and another near Belgorod about 40 miles from the Ukraine border.



*Figure 21 – Turkish Bayraktar TB2 shot down near Kherson in late March*

**Analysis:** It is estimated Ukraine had eighteen Bayraktar TB2 drones when Russia invaded and may have acquired sixteen more from Turkey since then. Many analysts expected the TB2s to be decisive against Russian armor but so far, the Russian forces have been resilient against these drones. As the war has continued, Ukraine appears to be using more loitering munitions like the U.S made Switchblade and the Polish Warmate (See Item 15, this report). There are also reports Ukraine is using mini-Bayraktar drones for reconnaissance. The mini-Bayraktar is a hand-launched drone. While it doesn't have a lethal component like the TB2, it's communications systems can communicate with the C2 nodes used by the TB2s.

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Kursk, Russia, is approximately 125 miles from the Ukraine border. The distance suggests Ukraine might be using satellite communications to provide C2 to the aircraft being used to attack targets in Russia. Of note: Russian propaganda sources moved the aircraft pictured above to a village near Kherson, Ukraine, and attempted to claim it was another shutdown (See figure 26). Their attempt was quickly debunked on social media.

It should be noted that the high loss rate of TB2s flown into Russian territory is consistent with the analysis of Red Six's own Andy Dreby (Director of Red Teaming) and Kirsten Fontenrose (President, Red Six International) as published in Defense News on 1 April 2022. The article is titled, "Turkish Drones Won't Give the Ukraine the Edge it needs." The article points out that the Bayraktar's, though effective when conducting aerial attacks over land controlled by the forces flying the TB2s, are severely limited in cross border operations for several reasons. The article can be found at the following link:

<https://www.defensenews.com/opinion/commentary/2022/04/01/turkish-drones-wont-give-ukraine-the-edge-it-needs/>



Figure 22 - Wreckage of a TB2 shot down over Russia near Kursk on 29 April 2022



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Figure 23 - Wreckage of a TB2 also shot down over Russia near Kursk on 26 April 2022



Figure 24 – Bayraktar TB2 downed near Belgorod, Russia, on 27 April 2022



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Figure 25 – Staged crash of a TB2. It is the same aircraft that appears in Figure 22

**Geolocation:** Eastern Europe (Kherson, Ukraine)

**Importance:** Medium

**Sources:**

1. Ukraine Weapons Tracker (Twitter account), *Apparently, we have the third verified loss of the Ukrainian Bayraktar TB2 UCAV, 2 April 2022*, <https://twitter.com/UAWeapons/status/1510342186189131780/> [18 April 2022]
2. Ukraine Weapons Tracker, *Whilst all of this remains unconfirmed from any side, 25 April 2022*, <https://twitter.com/UAWeapons/status/1518591515421028352/> [29 April 2022]
3. Ukraine Weapons Tracker (Twitter account), *Ukrainian Bayraktar TB-2 drone was shot down over Russian soil - claimed to be again in Kursk Oblast overnight, 26 April 2022*, <https://twitter.com/UAWeapons/status/1519305213831782400/> [29 April 2022]
4. Ukraine Weapons Tracker, *Another Ukrainian Bayraktar TB2 was shot down near Kazinka, Belgorod Oblast right on the border with Ukraine today, 27 April 2022*, <https://twitter.com/UAWeapons/status/1519307574234988545/> [29 April 2022]
5. Forbes, *The Russians got caught faking a TB-2 drone shoot-down, 26 April 2022*, <https://www.msn.com/en-us/news/world/the-russians-got-caught-faking-a-tb-2-drone-shoot-down/ar-AAW1bql?ocid=uxbndlbng/> [1 May 2022]

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## Item 4 – U.S. Army Drone Crashes and Burns at Fort Drum, New York

**Date:** 6 April 2022

**Summary:** A U.S. Army RQ-7 Shadow UAV crashed at Fort Drum in upstate New York. The incident happened shortly after takeoff at the Wheeler-Sack Army Airfield according to a news release issued by Fort Drum. The drone that crashed was assigned to the 10th Combat Aviation Brigade, 10th Mountain Division (Light Infantry). Fort Drum Emergency Services stationed at the airfield responded to the crash site and extinguished the small aircraft that was in flames.



*Figure 26 – The burnt wreckage of an RQ-7 Shadow drone at Fort Drum, New York*

**Analysis:** The RQ-7 Shadow has a range of up to 77 miles, has a wingspan of about 20 feet and a payload capacity of about 60 pounds. It has an endurance of up to nine hours from takeoff to landing. The cause of the crash is unknown, but the UAS was a total loss, Shadow drones cost approximately \$632,000 in 2020, according to federal budget documents.

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*Figure 27 – An RQ-7 drone being pushed into position (file photo)*

**Geolocation:** North America (Ft. Drum, New York USA)      **Importance:** Medium

**Source:** Syracuse.com, *Unmanned military drone crashes at Fort Drum airfield near Watertown*, 6 April 2022, <https://www.syracuse.com/crime/2022/04/unmanned-military-drone-crash-lands-at-fort-drum-airfield-officials-say.html/> [26 April 2022]



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## Item 5 – Russian Orion Drone Shot Down in Ukraine

**Date:** 7 April 2022

**Summary:** Ukraine military forces used a British-made Starstreak surface-to-air missile to shoot down a large Russian Orion UAV. The Starstreak HVM is produced by the large defense company Thales in Belfast, Northern Ireland. The HVM stands for high velocity missile. The Starstreak's dart has an explosive payload and approaches a target very fast at Mach 4 (~2500 kph or 1500 mph).



*Figure 28 – Russian Orion hits Ukraine T72 Tank*

**Analysis:** The Orion UAV is a Medium-Altitude Long-Endurance UAS. Russia has had some success with them in the war in Ukraine based on imagery provided by the Russian Ministry of Defense showing Orions attacking Ukraine command posts and armored vehicles. It is believed the Orion was launched from an airfield on the Crimean Peninsula. Russia is believed to have about thirty Orion drones, which is a comparable number to Ukraine's TB2s.

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*Figure 29 - The wreckage of a Russian Orion drone shot down by Ukraine air defenses*

**Geolocation:** Eastern Europe (Donbass, Ukraine)

**Importance:** High

**Source:** Ukraine Weapons Tracker (Twitter account), *In the 1st event of its kind in this conflict so far, a Russian Orion UAV was downed by the Ukrainian Air Defences, 9 April 2022,* <https://twitter.com/UAWeapons/status/1512566406050631684/> [29 April 2022]

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## Item 6 – Zala Aero Strike Drone Detonates over a Ukrainian Command Post in Luhansk

**Date:** 9 April 2022

**Summary:** Russian military forces in Ukraine continue to attack Ukraine positions with KYB UAVs. In one instance near Luhansk, a KYB detonated over a Ukrainian command post but no one was injured. In another incident, Ukraine forces claimed to shoot down a KYB in Luhansk.



*Figure 30 – Debris from a Zala Aero KYB UAV that detonated over a command post in Luhansk*

**Analysis:** The KYB UAV is manufactured by Russia’s ZALA Aero Group. ZALA Aero designed the KYB with a wide triangular-wing. It was built to facilitate launches from concealed locations near the target. It is a small UAV with a wingspan of 1.21m. The KYB is launched by a catapult and attacks targets vertically from the top down. The KYB payload is approximately 3 kg, so the weapon is best purposed for attacks on individual vehicles and exposed personnel.



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*Figure 31 – A Ukraine soldier shows the steel balls used in the KYB’s antipersonnel round*



*Figure 32 – A destroyed KYB. Ukraine claims was shot down but it might have detonated*

**Geolocation:** Eastern Europe (Luhansk, Ukraine)

**Importance:** High



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**Sources:**

1. Ukraine Weapons Tracker (Twitter account), *The first verified successful use of a ZALA KYB*, 6-9 April 2022, <https://twitter.com/UAWeapons/status/1512751317021822983/> [26 April 2022]
2. Ukraine Weapons Tracker, *The Russian army continues the use of loitering munitions in Ukraine*, 19 April 2022, <https://twitter.com/UAWeapons/status/1516408244658479104/> [1 May 2022]
3. Ukraine Weapons Tracker (Twitter account), *Russian ZALA KYB loitering munition was shot down by small arms fire from the Ukrainian troops in Luhansk Oblast*, 26 April 2022, <https://twitter.com/UAWeapons/status/1519288811582214144/>

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## Item 7 – A Ukrainian Tu-143 Reys Reconnaissance Drone Downed by Russians

**Date:** 12 April 2022

**Summary:** A Soviet-era Ukrainian Tupolev Tu-143 Reys reconnaissance drone was shot down by Russian forces near Kharkiv in Eastern Ukraine.



*Figure 33 – The wreckage of a Tupolev Tu-143 Reys shot down near Kharkiv, Ukraine*

**Analysis:** The Tu-143 was used by Soviet military forces in the 1970s and 80s for reconnaissance. It carried a camera from which imagery was recovered after its flight. Russia no longer flies Tu-143 drones. It is now used by Ukrainian forces and may have been flown as a decoy to cause Russian air defenses to activate and reveal their positions. This was a technique successfully used by Azerbaijan in its war against Armenia in 2020. In that conflict, Azerbaijan flew unmanned Soviet-era Antonov An-2 Colt biplanes on autopilot to draw the fire of Armenian air defense batteries.



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*Figure 34 -Image of a Tu-143 Reys (photo: Wiki commons)*

**Geolocation:** Eastern Europe (Kharkiv, Ukraine)

**Importance:** Medium

**Source:** Ukraine Weapons Tracker (Twitter account), 12 April 2022, *A Ukrainian Tu-143 Reys unmanned reconnaissance aircraft was shot down by the Russian*, 12 April 2022, <https://twitter.com/UAWeapons/status/1513924341263740947/> [19 April 2022]

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## Item 8 – Ukraine Leleka 100 Shot Down near Mariupol

**Date:** 12 April 2022

**Summary:** At a news briefing, Russian Naval Intelligence forces displayed a Ukraine Leleka-100 reconnaissance drone recovered near Mariupol. The Leleka, which means Stork, is manufactured by the Ukraine defense company UKRSPEC.



*Figure 35 – Leleka 100 downed over Luhansk*

**Analysis:** The Leleka-100 is designed for military, industrial, and commercial tasks. It has a quiet electric motor, which enables it to operate at low altitudes without detection. For navigation, Leleka uses an advanced inertial navigation system, which allows operations in harsh and GPS-denied environments. The system can be equipped with EO and IR gimbals. It can carry a 5.5 kg payload, fly for 2 ½ hours, and has a range of communications of 45 km.

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## «ЛЕЛЕКА-100»

### багатофункціональний безпілотний літальний апарат

Багатоцільовий безпілотний літальний апарат моделі «Лелека-100» був розроблений для військового застосування, причому пристрій може виконувати найрізноманітніші завдання, куди можна віднести роботи пов'язані з аерозйомкою та аерофотографуванням місцевості, проведенням наглядових, патрульних і розвідувальних місій, агітаційними роботами, забезпечення охорони кордонів і прикордонних зон, коригуванням артилерійського вогню тощо.

Цей літальний апарат має високу маневреність, тож пристрій чудово підходить для виконання поставлених цілей і завдань




<b>5 ± 0,5 кг</b>	злітна маса
<b>1500 м</b>	макс. висота польоту
<b>2-2,5 год</b>	час польоту
<b>100 км</b>	довжина маршруту
<b>120 км/год</b>	макс. швидкість
<b>60-70 км/год</b>	крейсерська швидкість
<b>Електричний</b>	тип двигуна

<b>Програмування:</b>	візуальний режим по супутникових мапах
<b>Керування:</b>	45 км двосторонній цифровий канал із шифруванням
<b>Система протидії засобам РЕБ:</b>	спеціальна анти-РЕБ система DeViRo
<b>Система забезпечення польоту:</b>	автопілот з автоматичним режимом польоту та навігації
<b>ЦІЛЬОВЕ СПОРЯДЖЕННЯ МОДУЛЬНЕ ЗМІННЕ:</b>	
• модуль F – дистанційно-керований, фіксоване 4-х кратне оптичне збільшення	
• модуль Z – дистанційно-керований, змінне 16-ти кратне оптичне збільшення	
<b>КАНАЛ ВІДЕОДАНИХ:</b>	
• аналоговий канал 720x576, стабільна передача на відстань до 40 км	
• цифровий канал 1080p full HD, стабільна передача на відстань до 15 км	

Figure 36 - Spec sheet for the Leleka-100

**Geolocation:** Eastern Europe (Luhansk, Ukraine)**Importance:** Medium

**Source:** Ukraine Military Tracker (Twitter account), *A Ukrainian Leleka-100 reconnaissance UAV was shot down by the Russian Naval Intelligence forces, 12 April 2022,*  
<https://twitter.com/UAWeapons/status/1513842719210287106/> [19 April 2021]



**SUBJECT:** Red Six Report #MR042

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## Item 9 – Mexican Cartels Fly 9,000 Drone Flights into U.S.

**Date:** 12 April 2022

**Summary:** According to a report by Judicial Watch, Mexican drug cartels have conducted more than 9,000 drone flights into U.S. airspace in the last year to surveil American law enforcement and security operations in the southern border region. The focus of Judicial Watch’s report was the Rio Grande Sector of the U.S. Customs and Border Protection (CBP) near McAllen, Texas. According to Judicial Watch’s sources, the cartels use the drones to observe the Border Patrol, Texas Department of Public Safety, Texas National Guard, and other law enforcement operations. The reports says CBP has captured about a dozen of the drones and accessed the SD-cards and flight logs to develop intelligence about the cartels.



*Figure 37 – The DJI Inspire drone is popular with drug cartels because of its speed and performance characteristics*

**Analysis:** The primary purpose of the drones by cartels is to facilitate human smuggling and drug trafficking. The drones help identify gaps in border coverage which are then exploited by the cartels. A technique used by the cartels is to overwhelm portions of the border with trafficked humans to enable the cartels to push illegal drug product across the border at other areas. Drones are also being used to carry small payloads of drugs across the border.

**Geolocation:** North America (Washington, D.C)**Importance:** Medium

**Source:** Judicial Watch, *Mexican Cartels Fly 9,000 Drone Flights into U.S. to Surveil Law Enforcement Operations*, 12 April 2022, <https://www.judicialwatch.org/cartels-fly-drones-into-us/> [27 April 2022]

SUBJECT: Red Six Report #MR042

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## Item 10 – Ukraine Multirotor Used to Attack Russian Armor

**Date:** 12 April 2022

**Summary:** The Ukraine Army and the paramilitary group *Aerorozvidka* (meaning aerial reconnaissance) are using multirotor UAS to attack Russian targets with bombs. The image below shows one such attack made by Ukraine's 59<sup>th</sup> Motorized Brigade against a Russian T-72 tank.



*Figure 38 – 59th Motorized Brigade of the Ukrainian Army dropping munitions onto a Russian T-72B3 tank*

**Analysis:** *Aerorozvidka* self-organized in 2014 after Russian-backed separatists started the war in the Donbas. Then, they were hobbyists doing their best to help the Ukraine military with reconnaissance and surveillance. It is believed the organization consists of approximately fifty drone operators. They are currently using R18 drones armed with a 1.5 kg RKG-3 explosive grenade. While lethal, the drones have limited range (approximately 1.5 – 2 km).

**Geolocation:** Eastern Europe (Donbass, Ukraine)

**Importance:** High



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**Sources:**

1. Ukraine Weapons Tracker, *Video of a drone operated by the 59th Motorized Brigade of the Ukrainian Army dropping munitions onto a Russian T-72B3 tank*, 12 April 2022, <https://twitter.com/UAWeapons/status/1513909323025551368/> [26 April 2022]
2. MSN, *Ukraine's \$10,000 Drones Are Dropping Tiny Bombs On Russian Troops*, 12 April 2022, <https://www.msn.com/en-us/news/world/ukraine-e2-80-99s-2410000-drones-are-dropping-tiny-bombs-on-russian-troops/ar-AAWb2g2?ocid=BingNewsSearch/> [30 April 2022]



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## Item 11 – Russian Eleron-3 Recon UAV Captured Near Chernihiv

**Date:** 19 April 2022

**Summary:** Near Chernihiv in north-central Ukraine, a Russian-made Eleron-3 was recovered by Ukraine forces. The Eleron-3 is a small UAS used for reconnaissance by Russian forces.



*Figure 39 – Pictures of an Elero-3 captured by Ukraine*

**Analysis:** The Eleron-3 is a short-range tactical, delta wing UAV manufactured by Russia's ZAO ENIX. It has a maximum takeoff weight of 5.3kg carrying a 1kg camera payload. It has a speed of 56 knots (104 km/h) and operates at a maximum altitude of 13,123 feet (4,000m). The Eleron-3 can perform autonomous, remote controlled and patrolling flights, and point observation missions. The UAV returns to the launch site autonomously and uses GPS and GLONASS signals for navigation.

**Geolocation:** Eastern Europe (Chernihiv, Ukraine)

**Importance:** High

**Sources:** Ukraine Weapons Tracker (Twitter account), *A crash landed Russian Eleron-3 light reconnaissance UAV was found by the forces of National Guard of Ukraine somewhere in Chernihiv Oblast, 19 April 2022,*

<https://twitter.com/UAWeapons/status/1516398408914939909/> [27 April 2022]

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## Item 12 – Russia Uses High Tech Camouflage to Conceal Artillery from Drones

**Date:** 19 April 2022

**Summary:** Russia's state-owned RIA Novosti posted video showing Iskander launchers close to Russia's border with Ukraine. Iskanders are used to launch short-range ballistic missiles. All the Iskanders shown in the video were covered with multi-spectral camouflage.



*Figure 40 – A Russian Iskander missile launcher concealed with multi-spectral camouflage*

**Analysis:** Iskanders are a target of high value for Ukraine. The multi spectral camouflage used by the Russians is intended to reduce the launchers heat signature and affect how its shape is perceived in order to fool smart munitions carried by drones

**Geolocation:** Eastern Europe (Donbas, Ukraine)

**Importance:** High

**Source:** Defense Blog, *Russia uses advanced camouflage to hide their Iskanders from Ukrainian drones*, 19 April 2022, <https://defence-blog.com/russia-uses-advanced-camouflage-to-hide-their-iskanders-from-ukrainian-drones/> [1 May 2022]

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## Item 13 – U.S. Company Donates Drones to Ukraine

**Date:** 21 April 2022

**Summary:** The U.S. company AeroVironment is donating 100 of its Quantix Recon UAS to the Ukraine military. At a presentation at Ukraine’s embassy in Washington, Wahid Nawabi, the chairman of AeroVironment, said the drones and accompanying training services are being donated to the Ukraine defense ministry. AeroVironment also manufactures the Switchblade small loitering munition that the U.S. government recently sent to Ukraine.



*Figure 41 – An AeroVironment drone operator prepares to launch a Quantix Recon UAV*

**Analysis:** The Quantix Recon is a small UAS used for reconnaissance. For a small drone, it has a relatively long range of 10 km and can operate in RF silent mode, which affords the operator better protection from detection. The drone uses an 18 megapixel camera to collect ground imagery.

**Geolocation:** North America (Arlington, Virginia USA)

**Importance:** Medium

**Source:** VC Star, *Drones partially made in Simi Valley being donated to Ukraine's military*, 21 April 2022, <https://www.vcstar.com/story/news/local/communities/simi-valley/2022/04/21/ukraine-receive-more-than-100-recon-drones-simi-valley-aircraft-firm-aerovironment/7374962001/> [29 April 2022]



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## Item 14 – Colorado Wildfire Started by Drone Crash

**Date:** 21 April 2022

**Summary:** A fire on Table Mountain in Boulder County, Colorado, burned 52 acres and forced evacuations in the area, which is approximately 30 miles north of Denver. According to a press release issued by the Boulder County Sheriff's Office, the fire was started by accident by three researchers whose drone crashed and caught fire.



*Figure 42 – Firefighters work to extinguish wildfire on Table Mountain, Colorado*

**Analysis:** The researchers were with the University of Colorado Boulder's Aerospace Engineering Department. They were at the Department of Commerce Table Mountain Radio Quiet Zone and using a drone to conduct severe weather studies. The drone crashed at a high rate of speed into the ground, causing a lithium ion battery cell to dislodge and ignite. The researchers attempted to use an on-site fire extinguisher to stop the fire but were unable to get the grass fire extinguished before it began to quickly spread due to the high winds. The incident was deemed an accident, and no charges will be filed.

**Geolocation:** North America (Boulder County, Colorado UAS)    **Importance:** Medium

**Source:** Daily Camera, *Table Mountain Fire Sparked by Drone Crash*, 21 April 2022, <https://www.dailycamera.com/2022/04/21/table-mountain-fire-sparked-by-drone-crash/> 26 April 2022]



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## Item 15 – The First Appearance of the Polish Warmate Loitering Munition

**Date:** 24 April 2022

**Summary:** A Polish made Warmate loitering munition was observed in Ukraine. Ukraine ordered 1,000 Warmate drones from Poland in 2017 and Poland is donating an additional, unspecified number of Warmates to Ukraine to help in its fight with Russia.



Figure 43 - A Polish made Warmate loitering munition observed in Ukraine

**Analysis:** Warmate is a small drone launched from a pneumatic catapult. It has several different explosive payloads. The picture posted online from Ukraine appears to be a high explosive, fragmentary round (HE-FRAG). The attack angle for a Warmate is nearly vertical from the top down. While the weapon is insufficient to defeat a tank, it is destructive against light armor and exposed personnel.

**Geolocation:** Eastern Europe (Donbass, Ukraine)

**Importance:** High

**Source:** Arslon Xudosi (Twitter account), Ukraine forces start to use suicide drones, 24 April 2022, [https://twitter.com/Arslon\\_Xudosi/status/1518172205829570560/](https://twitter.com/Arslon_Xudosi/status/1518172205829570560/) [30 April 2022]



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## Item 16 – Large Agricultural Quads Captured by Russian Forces

**Date:** 13 April 2022

**Summary:** Russian forces operating in Ukraine captured three large drones with reservoir tanks and sprayer attachments. On social media, Russia claimed the drones were intended for chemical attacks against Russian personnel. An example was the Russian ambassador in Egypt who tweeted, “These drones were presumably used to spray toxic chemicals to cause harm to both the Russian armed forces and the civilian population.” It is much more likely the drones were designed for agriculture purposes such as precision fertilizing.



*Figure 44 – Russian military technicians examine captured agricultural drones*

**Analysis:** The drones appear to be DJI Agras T30 UAVs. The Agras carries a 30-liter reservoir, which is sufficient to spray 30 acres of farmland. The Agras is electrically powered and weighs 26.4 kg empty with a maximum takeoff weight 76.5 kg.

*It should be noted that while the AeroScope drone detection system, produced by DJI, is effective at various ranges (depending on mobile and fixed configuration) for DJI’s hobbyist platforms (Phantom, Mavic, Inspire, Spark), it does not detect DJI’s fleet of industrial and commercial aircraft. Drones such as the Matrice series, Agras, and S1000 cannot be detected by the AeroScope.*



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**Geolocation:** Eastern Europe (Chernihiv, Ukraine)

**Importance: Medium**

**Source:** Polygraph.info, *Russia Misrepresents Ukraine Farm Drones as Chemical Weapon*, 13 April 2022, <https://www.polygraph.info/a/fact-check-ukraine-chemical-weapons-fake/31803455.html/> [30 April 2022]

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## Item 17 – IED Dropped from Drone During Prime Minister’s Visit in India

**Date:** 25 April 2022

**Summary:** A mysterious blast in a village in the Jammu-Kashmir region of India might have been caused by an IED dropped from a drone. The incident happened hours before a visit by India’s Prime Minister Narendra Modi. It was Modi’s first visit to the disputed region since the Indian government removed Jammu – Kashmir’s special status as semi-autonomous states.



*Figure 45 – Twigs are used to mark the spot in a field where it is believed a drone dropped an IED.*

**Analysis:** Residents in the Bishnah area of Jammu reported the explosion hours before PM Modi arrived. The blast also set-off alarms in the security grid. Locals claimed they heard a noise similar to a drone just before there was a loud blast. If the blast was an errant terror attack, it was likely made by either Jaish-e-Mohamed or Lashkar-e-Taiba, terror groups that operate from Pakistan. As India has strengthened its security systems and operations in the region, it has consequently caused terrorist groups to turn to drones for committing terror attacks and for smuggling arms and ammunition across the border.

The security measures have also led to an increased use of drones for drug smuggling. This month India’s Border Security Force announced it was offering rewards of up to \$13,000 USD for information leading to the arrests of drone drug smugglers.





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**Geolocation:** Southern Asia (Bishnah, India)

**Importance:** High

**Source:** India Today, *Explosion on day of PM Modi's Visit to Jammu*, 25 April 2022, <https://www.indiatoday.in/india/story/explosion-in-jammu-pm-modi-visit-may-be-ied-dropped-by-drone-1941490-2022-04-25/> [26 April 2022]

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## Item 18 – South Carolina Prison System Faces an Ongoing Challenge from Drones

**Date:** 28 April 2022

**Summary:** In the United States, the Director of the South Carolina Department of Corrections likens the Department’s fight against drone drug smugglers to a war. In an interview for television, Director Bryan Stirling acknowledged, “Trying to stop them from bringing this contraband in, it’s a constant battle. It’s daily for us but it’s something that we take very seriously.”



*Figure 46 – An Autel EVO drone and confiscated contraband from arrests made in Lee County, South Carolina in February 2022*

**Analysis:** In February 2022, the Sheriff’s Department in Lee County, South Carolina arrested twenty people on charges related to using drones to smuggle contraband into prisons. According to Director Stirling, the drone operations have become more sophisticated over time. He likens it to a military or paramilitary operation saying, “They’ll send a decoy in, and we’ll chase that decoy because we have systems in place that alert us to drones in the area, and we’ll chase that and then they send two in from another side, drop their load and take off.”

Although the prisons are considered restricted airspace and DJI has geofenced prison property for the State of South Carolina, the smugglers use available software, such as No Limit Dronez, to essentially jailbreak their aircraft and enable them to bypass restrictions.



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**Geolocation:** North America (Charleston, S.C. USA)

**Importance:** Medium

**Source:** WSCC Channel 5, *'This is a war': Drone-delivered contraband on the rise in South Carolina prisons*, 28 April 2022, <https://www.live5news.com/2022/04/28/this-is-war-drone-delivered-contraband-rise-south-carolina-prisons/> [1 May 2021]



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## Item 19 – An A1-C1 Fury Small Reconnaissance Drone Is Captured by the Russians

**Date:** 30 April 2022

**Summary:** Russian special operations forces operating in North-Central Ukraine captured a Ukraine A1-C1 reconnaissance drone in the vicinity of Chernihiv.



Figure 47 – An AC-C1 Fury UAV captured by Russian special operations forces

**Analysis:** The A1-C1 Fury is made by Athlon-Avia Scientific in Ukraine (website: <https://athlonavia.com/en/furia/>). The Fury was brought into military service in Ukraine in 2020. It uses an electric motor for propulsion. Athlon has field approximately one hundred systems to the Ukraine military where its primary purpose is to ‘coordinate artillery fires.’ The aircraft’s takeoff weight is 5.5 kg. Its operating radius is 50 kg and it can fly approximately 200 km with a 3 hr. flight time. Red Six assesses the Fury’s flight controller is a commercial Pixhawk PIX4 Autopilot ARM Flight Controller ([https://us.drones-xpress.com/products/pixhawk-pix4-autopilot-arm-flight-controller-flight-controllers?variant=31460408360996&gclid=CjwKCAjwloCSBhAeEiwA3hVo\\_VZnhvUDDgMS7hZRUzQZhBLf4RuhRtRSq9pYpMBRvWmARxhxUe2EkRoCJawQAvD\\_BwE/](https://us.drones-xpress.com/products/pixhawk-pix4-autopilot-arm-flight-controller-flight-controllers?variant=31460408360996&gclid=CjwKCAjwloCSBhAeEiwA3hVo_VZnhvUDDgMS7hZRUzQZhBLf4RuhRtRSq9pYpMBRvWmARxhxUe2EkRoCJawQAvD_BwE/)).

**Geolocation:** Eastern Europe (Chernihiv, Ukraine)

**Importance:** High



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**Source:** Scouting Report (Telegram channel), *Trophies of the special forces of the RF Armed Forces from Chernihiv region*, 29 March 2022, <https://t.me/milinfoive/79960/> [30 April 2022]

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## Item 20 - Other Notable Events

### a. A Drone Exploded over Baghdad

- **Date:** 13 April 2022
- **Summary:** An Iraqi security source announced that a drone exploded over the capital, Baghdad, scattering parts in the middle of the Tigris River, and over a cafe in the area. There were no reported injuries
- **Geolocation:** Middle East (Baghdad, Iraq)
- **Source:** Addus Tour, *A Drone Exploded over Central Baghdad*, 13 April 2022, <https://www.addustour.com/file.php?fileid=502603&width=1140&height=450/> [26 April 2022]

### b. Israeli Security Forces Use Drone with Tear Gas to Disperse Protestors

- **Date:** 22 April 2022
- **Summary:** Israeli police stormed the Al Aqsa Mosque in Jerusalem after Palestinian protestors pelted them with rocks. As part of the security response, Israeli police dropped tear gas from a drone to disperse the protestors.



Figure 48 – Protestors at the Al Aqsa Mosque Flee after an Israeli drone drops tear gas

- **Geolocation:** Middle East (Jerusalem, Israel)

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- **Source:** Q Net (Twitter account), *The Israeli occupation fires tear gas from a drone*, 22 April 2022, <https://twitter.com/shlony3ny1/status/1517505270297071616/> [26 April 2022]

**c. Turkish Loitering Munition Explodes in Syria**

- **Date:** 29 April 2022
- **Summary:** A Turkish antipersonnel drone was detonated near Afrin, Syria, near Syria's border with Turkey. There were no reported injuries. Based on images online, Red Six assesses the aircraft is a Kargu, which are made by the Turkish defense company STM. The Kargu is specifically designed for counterterrorism operations. Under control of its operator, the drone flies to its intended target and then is detonated.



Figure 49 – Debris for an STM Kargu drone detonation

- **Geolocation:** Middle East (Afrin, Syria)
- **Source:** Hawar News Agency, 29 April 2022, <https://hawarnews.com/en/haber/turkish-drone-falls-on-afrins-shawargha-h30452.html/> [29 April 2022]

**d. Government Forces in Yemen Shoot Down a Large Multirotor Drone**

- **Date:** 24 April 2022
- **Summary:** In Taiz, Yemen, security forces loyal to the government shot down a large Houthi Movement *Rajum* multirotor. The *Rajum*, which means stone in Arabic,



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is a Chinese-made LY 866 drone produced by the Shandong Long Yi Aviation Technology Co. It has six-rotors and is designed for industrial applications. The Houthis modify the LY 866 with a steel plate to carry three bombs.



Figure 50 – Yemeni military officer examines a Houthi Rajum

- **Geolocation:** Arabian Peninsula (Taiz, Yemen)
- **Source:** Ali Al-Sakani (Twitter account), Govt forces shot down a drone, 21 April 2022, [https://twitter.com/search?q=houthi%20drone&src=typed\\_query](https://twitter.com/search?q=houthi%20drone&src=typed_query), / [26 April 2022]

e. DJI Halts Drone Sales to Russia and Ukraine

- **Date:** 27 April 2022
- **Summary:** DJI Technology Company announced it would temporarily suspend business in Russia and Ukraine to ensure its products are not used in combat, making it the first major Chinese firm to cite the conflict in halting sales in Russia. Ukrainian officials and citizens have accused DJI of leaking data on the Ukrainian military to Russia; allegations DJI has called "utterly false." A DJI spokesperson said on Wednesday its suspension of business in Russia and Ukraine was "not to make a statement about any country, but to make a statement about our principles. DJI abhors any use of our drones to cause harm, and we are temporarily suspending sales in these countries in order to help ensure no-one uses our drones in combat."
- **Geolocation:** East Asia (Shenzhen, China)
- **Source:** Reuters, China's DJI halts Russia, Ukraine sales to prevent use of its drones in combat, 27 April 2022, <https://www.reuters.com/technology/chinese-drone-maker-dji->



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26/<https://twitter.com/UAWeapons/status/1503398103570960390/> [28 February 2022]

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### Contact Information

For answers to questions regarding the information contained in this report and inquiries related to becoming a subscriber, please contact Red Six Solutions at email: [info@red-6.com](mailto:info@red-6.com).

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