

New Ways of Warfare and Emerging Challenges in the Russia's Aggression Against Ukraine

Japan Ministry of Defense
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The aggression against Ukraine turns to be a lengthy war and has revealed new ways of warfare and challenges.

01

Mass Deployment and Expanded Use of Unmanned Assets

- Large-scale attacks combining ballistic and cruise missiles with large numbers of unmanned systems.
- A wide variety of unmanned assets with different operational ways and purposes are emerging.

02

Building Air Defense Capabilities Against Complex Attacks

- Responses involve not only expensive interceptor missiles but also various air defense assets.

03

Network Integration and Use of Data and AI

- Connecting diverse assets through networks and collecting vast amounts of data.
- Leveraging AI for advanced data processing and analysis to accelerate decision-making.

04

Space, Cyber, and Electromagnetic Domains and Information Warfare

- Greater utilization of commercial satellites. Cyberattacks occurring even before hostilities and becoming routine. Intensification of electronic warfare.
- Sophistication of information warfare.

05

Securing and Maintaining Warfighting Sustainability

- Protracted conflicts and the importance of the defense industry.
- New tactics and speedup of updating defense assets.

06

Support from Allies and Like-minded Countries

- Importance of various forms of support from allies and partners.
- Importance of cooperation on defense equipment.

New Ways of Warfare and Challenges ① | Mass Deployment and Expanded Use of Unmanned Assets

Imposing new response costs on the opponent through unmanned assets



An apartment building in Kharkiv destroyed by Russian military UAVs.

01 Mass Deployment of Unmanned Assets

- Unmanned assets, which can be produced cheaply and in large quantities within a short time, have become the centerpiece of the battlefield. Russia has carried out **large-scale attacks on cities by combining ballistic and cruise missiles with large numbers of unmanned systems**



Shahed-type UAV
\$35,000 per unit



Cruise missile "Kalibr"
\$1M per unit

About 30 times as expensive.

02 Expanded Use Unmanned Assets

- On the Ukrainian battlefield, **the use of unmanned assets has rapidly expanded** to include reconnaissance and observation, long-range strikes, and precision attacks on the front lines. Combining traditional equipment with unmanned assets is crucial.
- The key lies in introducing a diverse range of unmanned assets with different operational ways and purposes, and being able to deploy them flexibly according to the situation.



FPV (First-Person View) Drones and Their Operation
Used for attacks on enemy trench positions, and armored vehicles, etc.



"Spider Web" Operation
Maximizing the effect of surprise deep inside enemy territory.



Ukrainian Unmanned Surface Vessel "MAGURA V"



- ✓ Successfully sank multiple Russian naval vessels.
- ✓ Also successfully shot down helicopters and fighter jets by air defense missiles.

New Ways of Warfare and Challenges ② | Building Air Defense Capabilities Against Complex Attacks

Establishing countermeasures against attacks using new ways

Building Air Defense Capabilities Against Complex Attacks

- ✓ Through measures such as **dispersed deployment of assets**, most Ukrainian military units survived the initial Russian Air Force strikes, preventing Russia from achieving air superiority. Meanwhile, Russia's **large-scale attacks using UAVs and missiles** have imposed a continuous burden on Ukraine's air defense capabilities. (The Ukrainian Air Force announced that in November 2025 alone, it intercepted 9,588 UAVs and 119 ballistic and cruise missiles.)
- ✓ Ukraine is **building air defense capabilities to counter complex attacks** without relying solely on expensive interceptor missiles.
- ✓ Additionally, decoy deployments of aircraft, tanks, and howitzers are used to provoke enemy attacks and reduce damage.



NASAMS



PATRIOT



Stinger



Portable electronic warfare system "KVERTUS AD COUNTER FPV BACKPACK F3U"



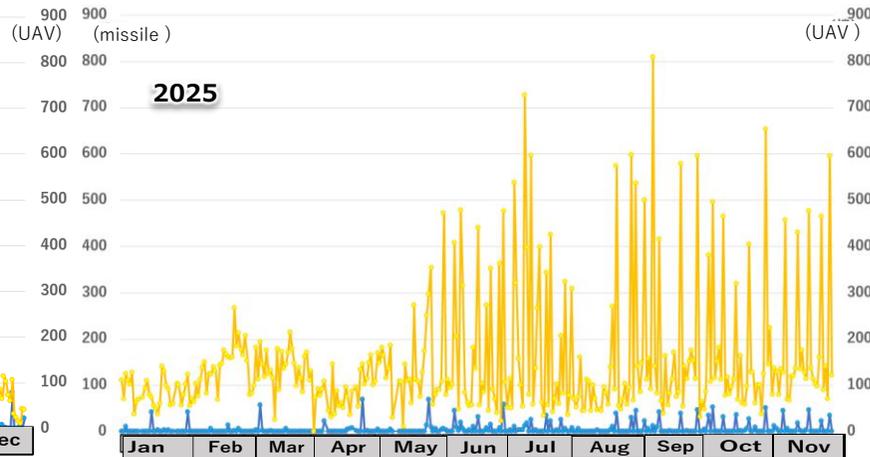
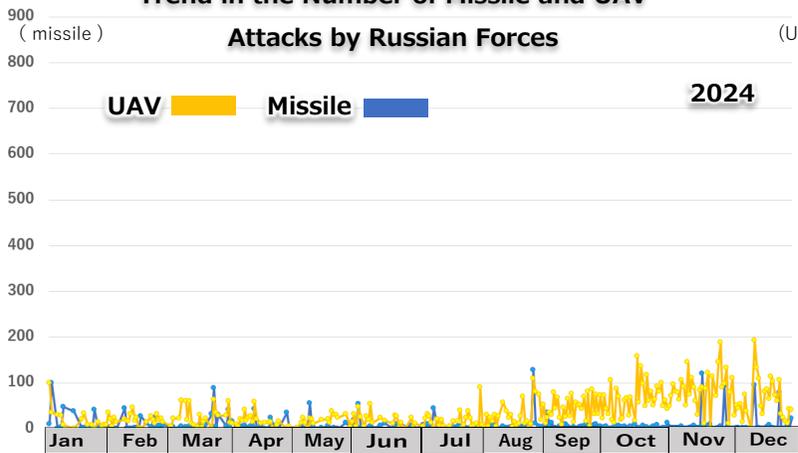
Gepard



Interceptor UAV "Sting"

Trend in the Number of Missile and UAV

Attacks by Russian Forces



(Reference: Announcement by the Ukrainian Air Force)

New Ways of Warfare and Challenges ③ | Network Integration and Use of Data and AI

AI-powered systems enable swift and precise decision-making, which is crucial.

Network Integration and Use of Data and AI Across Assets

Ukraine connects frontline units, unmanned systems, and satellites through networks, processes and analyzes vast amounts of collected data using AI, and shares it in real time (e.g., the “Delta” situational awareness system), accelerating decision-making.

On the frontlines, electronic warfare is deployed to neutralize unmanned assets. In addition to fiber-optic drones, some autonomous flight capabilities powered by AI are now observed.

◆ Concept Image: Real-Time Information Sharing and Decision Support Using AI Systems



“Delta” system



Inputting enemy ground targets (illustration)



Sharing target information with anti-aircraft weapons

New Ways of Warfare and Challenges ④ | Space, Cyber, and Electromagnetic Domains; Information Warfare [1/2]

Continuous operations in space, cyber, and electromagnetic domains, along with information warfare

01

Further Utilization of Space Domain

- Commercial satellite constellations such as Starlink by U.S. private companies have become decisive for communication and information superiority on the battlefield, enabling Ukraine to conduct rapid strikes.
- In the future, the use of commercial satellites during wartime will become standard practice.

02

Cyberattacks Before and During the War

- Even before the ground invasion, numerous cyberattacks targeted Ukraine, focusing on critical infrastructure and satellite communication networks. Ukraine has responded by strengthening its own cybersecurity measures and leveraging public-private cooperation from Western nations to counter persistent cyberattacks.
- Continuous capability building and international collaboration in the cyber domain are essential.

◆ Numerous *Starlink* satellites orbit around Ukraine



Deployment of *Starlink* ground stations

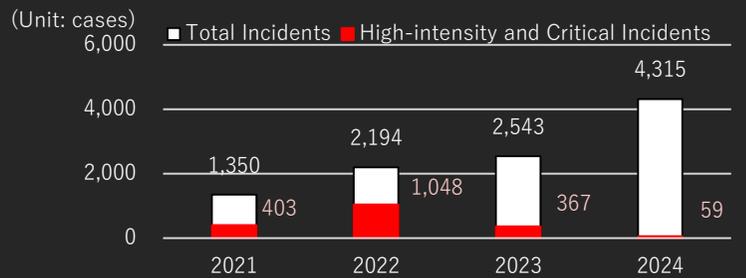


Stable communication ensured by the constant presence of multiple *Starlink* satellites in orbit

◆ Main Forms of Support from Western Nations in the Cyber Domain

- | | | |
|---|---|---|
| <p>Main forms of support from western nations</p> | <ul style="list-style-type: none"> ✓ Dispatch of experts ✓ Cloud migration ✓ Free provision of equipment | <ul style="list-style-type: none"> ✓ Capacity building ✓ Sharing of threat intelligence ✓ Free provision of services |
|---|---|---|

◆ Trend in the Number of Cyberattack Incidents Identified by Ukrainian Authorities



New Ways of Warfare and Challenges ④ | Space, Cyber, and Electromagnetic Domains; Information Warfare [2/2]

Continuous operations in space, cyber, and electromagnetic domains, along with information warfare

03

Intensification of electronic warfare

- In order to counter precision strikes and UAVs using the Satellite positioning system, the use of electronic warfare weapons has become active. The chain of technological innovations and countermeasures surrounding electronic warfare continues.
- Challenge is how to respond to this chain effectively and rapidly

◆ Major defense asset of Ukraine AFs



[KVERTUS AD COUNTER FPV BACKPACK F3U] backpack-type preventive system against FPV drones



"Vampire" Ukraine EW resistant UAV



Optical fiber FPV Drones



- ✓ Spread of Deepfake Video
- ✓ Aiming to erode international trust of Ukraine and US

- ✓ Proactive Strategic Communication by Ukraine
- ✓ Video taken at Presidential Palace in Kyiv to counter disinformation that he had fled



04

Sophistication of information warfare

- Ukraine has been actively carrying out Strategic Communications in cooperation with private companies and NGOs to counter Russian influence operations incl. the spread of disinformation.
- Narrative dominance functions as a driver of strategic advantage. The importance of public-private cooperation as well as transparency and promptness in information dissemination has become clear.

New Ways of Warfare and Challenges ⑤ | Securing and Maintaining War Sustainability

In anticipation of a prolonged conflict, it is necessary to work toward securing and maintaining sufficient endurance capabilities.

01 Prolonged conflict and importance of defense industry

- Russia has become resilient to economic sanctions. The prolonged invasion against Ukraine consumes a large amount of all types of equipment and ammunition, making the **scale and capabilities of the defense industry** all the more important
- As it is difficult to recover from the disadvantageous situation caused by the **shortage of supplies at the beginning of the war**, it is important to **stockpile weapons on a regular basis and develop a system to increase production after the war**. At the same time, **defending production bases** has become an issue.
 - ✓ Russian frontline forces are 0.6 millions whereas Ukrainian forces in total are 0.88 million. As a result, Russian forces are dominant depending on the battlefields. (Jan 2025, by President Zelenskyy)
 - ✓ As of June 2025, over 0.95 millions in Russian AFs, 0.4 millions in Ukraine AFs died/injured (CSIS)



Russia has a large number of assets, but **we have more and domestic produced UAVs** (January 2025)



- ✓ **In 2024, Ukraine announced to produce 2.3 million UAVs at least.**
- ✓ **In 2024, it is said that domestic produced equipment is \$10 billion, over tripled compared in 2023.**

Ukraine Domestic-produced Cruise missiles "Flamingo"



In 2023, 140,000 UAVs were delivered into Armed Forces **In 2024, the number becomes 10 times bigger**



- ✓ **As of June 2025, 2700 in maximum can be produced per month**

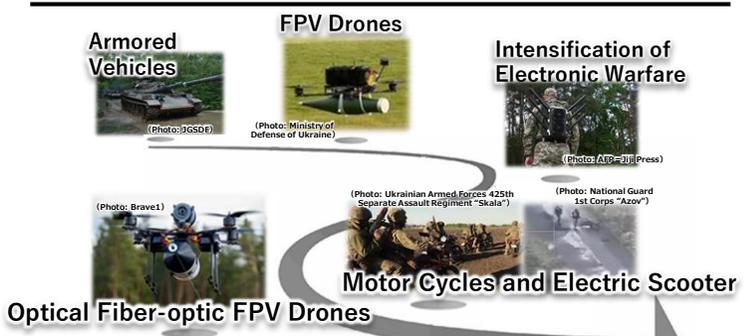
Shahed-type Drones

02 New tactics and speedup of defense asset updating

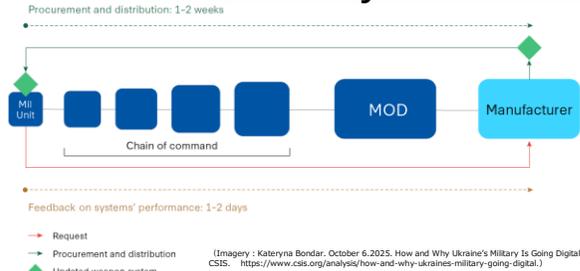
Tactics and equipment have frequently been changed /improved on the Ukrainian battlefields during the war.

- In particular, tactics using drones are updated in a short cycle, and in order to fight effectively, it is **essential to have a short feedback and procurement cycle** so that lessons learned on the battlefield can be immediately reflected in equipment and tactics.

◆ New Update Cycle of Equipment



◆ Direct Procurement by Unit



New Ways of Warfare and Challenges ⑥ | Support from Allies and Partner Countries

It is crucial to withstand the initial attacks and secure effective support from allied and partner countries.

01

Importance of Support from Allies and Partners

- Western countries have supplied large amount of equipment from man portable missile system to fighter jets as well as supporting in intelligence, education and training, strengthening combat capabilities and war sustainability.

- For prolonged war, continuous support from allies and like-minded countries is important.

Financial support by other countries(Kiel Institute)

(Jan24th 2022 ~Oct 31st 2025)



Defense assets announced to be delivered



"Javelin"



"HIMARS"



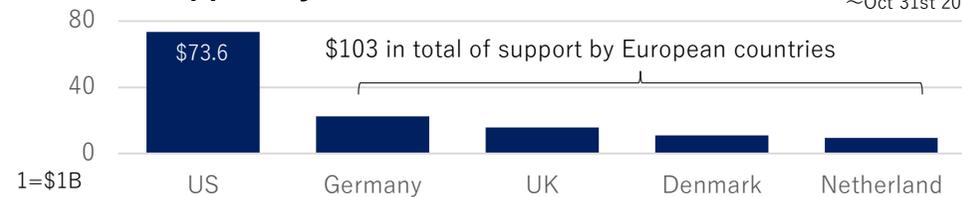
"PATRIOT"



"F-16"

Mil-support by other countries (Kiel Institute)

(Jan24th 2022 ~Oct 31st 2025)



02

Importance of Cooperation in Defense Equipment with Allies and Partners

- Ukraine has promoted initiatives toward co-production of military equipment with Western countries whereas Russia has also acquired and used foreign weapons.
- Bilateral and multilateral initiatives to share production and supply of defense equipment and to secure common maintenance and supply bases are also important concepts for strengthening war sustainability.

◆ Co-production (incl. future plan)



Ukraine x UK

- ✓ Plan to co-produce missile and its system
- ✓ Agreed on **drone co-production** initiative (June 2025)



Ukraine x Nordic countries

- ✓ **Ammo production** based on license of Norway and Finland (June 2025)



Ukraine x Germany

- ✓ Repair of military vehicles and plan for **co-production of infantry fighting vehicles** (Oct 2023)

◆ Foreign Defense Assets Used by Russia



Debris of reportedly NK missiles



Shaded-type Drones, reportedly provided by Iran

New Ways of Warfare emerging from the Aggression against Ukraine

01

Attacks are likely to occur in space and cyber domain in prior to traditional forms of military operation, such as air, maritime, and ground domains.

02

Massive use of low-cost drones has enhanced situational awareness on the battlefield. The ability to make prompt and accurate decisions through asset networking, data integration, and the use of AI-enabled systems has become critical.

03

Large scale, complex strikes combining ballistic and cruise missiles with attacks using multiple unmanned assets – impose additional cost on adversary's ability to respond. Effective countermeasures, including electronic warfare, is also required.

04

It has become essential to rapidly incorporate lessons learned and changes on the battlefield to improve defense assets and tactics.

05

Warfare by fully leveraging DIMET (Diplomacy, Intelligence, Military, Economy, Technology) has been conducted, e.g., shaping favorable information environment through the spread of disinformation and disseminating information aiming to disrupt society.

What to Consider Toward Further Strengthening Defense Capabilities of Japan

- ◆ Toward further strengthening defense capabilities, in light of the “new ways of warfare” emerging from the aggression against Ukraine and strict security environment surrounding Japan, points needed to be considered are as follows.

01

Ready for next “new ways of warfare”

02

Secure warfighting sustainability for prolonged warfare

03

Further strengthen deterrence and response capabilities in light of increasing Russo-NK and China-Russo strategic cooperation, and intensified activities of neighboring countries, including those in the Pacific front of Japan

04

Develop effectiveness of Japan-U.S. alliance and cooperation with like-minded countries from strategic point of view