Artificial Intelligence for decision making

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Resumen

La inteligencia artificial (IA) está revolucionando la toma de decisiones en diversos campos, desde la atención médica hasta la seguridad nacional. Si bien la IA ofrece oportunidades sin precedentes para mejorar la eficiencia y obtener conocimientos basados en datos, plantea importantes preocupaciones éticas, legales y humanitarias, especialmente en lo que respecta a las armas totalmente autónomas, a menudo llamadas "robots asesinos". Estas tecnologías desafían la suficiencia del derecho internacional y los principios éticos en el control de decisiones de vida o muerte. Este artículo explora las complejidades de la toma de decisiones habilitada por IA, destacando los peligros de delegar decisiones críticas a las máquinas y los dilemas morales que surgen cuando la tecnología supera el juicio y control humano. Además, examina cómo la automatización de los puestos de mando, utilizando sistemas como TAK y VR Forces integrados con IA, puede mejorar la velocidad y la calidad de la toma de decisiones militares.

Abstract

Artificial Intelligence (AI) revolutionizes decision-making across various fields, from healthcare to national security. While AI offers unprecedented opportunities for efficiency and data-driven insights, it raises significant ethical, legal, and humanitarian concerns, particularly regarding fully autonomous weapons, often called 'killer robots.' These technologies challenge the adequacy of international law and ethical principles in controlling life-and-death decisions. This article explores the complexities of AI-enabled decision-making, highlighting the dangers of delegating critical decisions to machines and the moral dilemmas that arise when

Palabras clave
Inteligência Artificial (IA)
Toma de decisiones
Armas completamente autónomas
Ética
Preocupaciones humanitarias
Tecnología

Keywords
Artificial Intelligence (AI)
Decision-making
Fully autonomous weapons
Ethics
Humanitarian concerns
Technology

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technology outpaces human judgment and control. Additionally, it examines how command post automation, using systems like TAK and VR Forces integrated with AI, can improve the speed and quality of military decision-making.

Introduction

Artificial intelligence (AI) is reshaping critical decision-making across various sectors, including healthcare, national security, and military defense. AI's ability to process and analyze vast amounts of data enables it to identify patterns and make decisions that are challenging for human cognition, especially in volatile, uncertain, complex, and ambiguous (VUCA) environments. In the military domain, AI is playing a pivotal role in redefining strategies and enhancing operational capabilities.

One prominent example of AI's impact on military strategy is the concept of Mosaic Warfare, developed by the Defense Advanced Research Projects Agency (DARPA). This strategy advocates the decentralization of military forces into smaller, specialized units connected through advanced communication networks, thus optimizing real-time decision-making and adaptability on the battlefield. Similarly, systems like Storm Cloud (Navy, 2021), developed by the Royal Navy in collaboration with technology giants, demonstrate the potential of AI to coordinate complex operations across land, air, and sea by leveraging cloud-based computing and real-time data integration.

Moreover, the U.S. Air Force's 'Artificial Intelligence and Next Generation Distributed Command and Control' project highlights the trend towards using AI to transform command and control (C2) systems. By applying AI in distributed environments, this initiative aims to improve resource allocation and decision-making speed in contested settings.

Despite these advancements, the deployment of fully autonomous weapons raises significant ethical, legal, and humanitarian concerns. These systems challenge compliance with international humanitarian law, particularly regarding the principles of distinction and proportionality. Critics argue that such weapons could lead to indiscriminate violence and lower the threshold for armed conflict, as they lack the human empathy and judgment necessary to make nuanced ethical decisions. The potential for an arms race in autonomous weaponry further underscores the need for international regulatory measures to prevent destabilization and unintended escalations.

This paper explores the integration of AI in military decision-making, examining both its transformative potential and the associated risks. By understanding these dynamics, we can better navigate the ethical and strategic implications of AI in modern warfare.

Related Work

The integration of artificial intelligence (AI) in the military domain has expanded from logistics and maintenance to autonomous systems and command and control, significantly enhancing both operational effectiveness and decision-making capabilities. Recent advancements illustrate the strategic value of AI across various military functions, providing greater adaptability and resilience in complex, high-stakes environments.

AI has proven essential in predicting maintenance needs and managing inventories, thereby reducing operational costs and improving readiness.

Research conducted by the RAND Corporation demonstrates that AI can predict equipment failures in advance, especially in complex systems like fighter aircraft, by analyzing extensive datasets from various sensors. This predictive capability allows for preemptive maintenance actions, minimizing downtime and maximizing resource efficiency.

AI-equipped drones have become vital assets in modern conflicts, providing advanced surveillance, reconnaissance, and precision strike capabilities. In conflicts such as those between Russia and Ukraine, these drones utilize AI for real-time data processing, enabling faster and more accurate mission execution compared to human-operated systems. The integration of AI in these platforms minimizes risk to personnel and significantly enhances operational impact.

Proposed Method

This section presents a comprehensive approach to integrating artificial intelligence (AI) into military command and control operations through the Tactical Assault Kit (TAK). By leveraging AI-driven simulations, data analysis, and decision-support tools, this proposed method aims to enhance situational awareness, improve decision-making, and increase operational efficiency in real-time military contexts. These advancements address the unique challenges faced by terrestrial forces in dynamic environments and ensure scalability for broader applications in joint military operations.

The Chilean Army, through its Center for Innovation and Research (CIITEC), is at the forefront of these initiatives by establishing the first AI Lab within the Army. This lab spearheads projects to integrate AI into emergency command posts using TAK, enhancing command and control capabilities.

The approach leverages practical pilot projects to modernize military operations and respond to real-world operational challenges, particularly those presented by security situations in Chile's southern regions.

Integration of AI with TAK for Enhanced Decision-Making

The Tactical Assault Kit (TAK) has proven to be an asset in military and civilian contexts, providing real-time situational awareness, communication, and coordination (AFRL, 2018a). To further enhance TAK's capabilities, the proposed approach integrates advanced AI functionalities aimed at improving decision-making processes and situational analysis. The method emphasizes two primary AI enhancements:

AI-Powered Scenario Simulation for Enhanced Predictions

Constructive simulations powered by AI will be incorporated into TAK to allow commanders to anticipate potential threats and challenges using predictive analytics. AI algorithms will process real-time data from TAK, combined with historical data and external variables, to simulate a range of potential future scenarios. These scenarios will consider various operational factors, including weather conditions, enemy movements, and logistical constraints, enabling comprehensive mission planning. For instance, the AI can assess the effectiveness of different tactical approaches and enable commanders to evaluate the risks and benefits associated with various courses of action. This proactive approach fosters better preparation and resource allocation, leading to improved mission success.
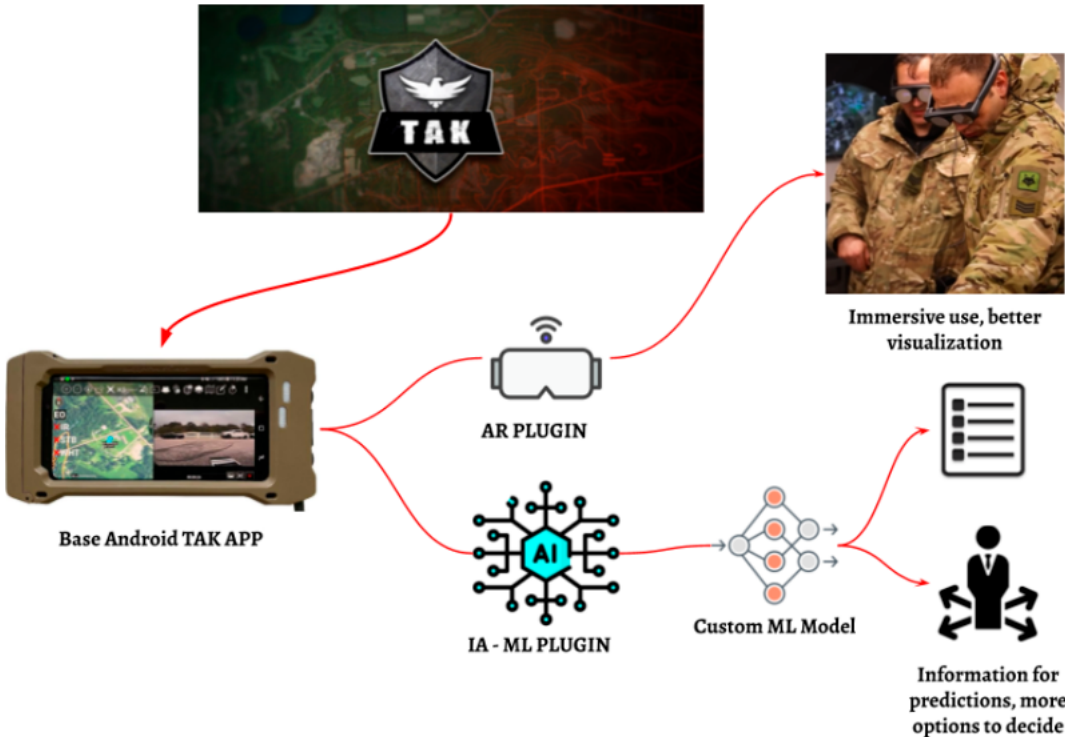
Figure N° 1: Proposed AI Integration in TAK. The diagram illustrates how AI modules interact with TAK for scenario simulation and chatbot-based decision support, enhancing situational awareness and operational efficiency.

Source: Author´s Property.

AI-Driven Decision Support through Chatbot Integration

An AI chatbot module will be integrated into TAK to serve as an interactive assistant, offering quick and well-informed responses to tactical queries. Drawing from historical data, sensor inputs, and current mission parameters, the chatbot will provide commanders with optimal strategy recommendations, tactical suggestions, and access to critical data. This AI-driven decision-support tool will minimize the cognitive load on commanders, enabling rapid and informed decision-making under high-pressure situations. In fast-evolving operational scenarios, the chatbot can highlight tactical advantages, propose defensive measures,

and offer real-time situational insights, improving the overall operational response.

Practical Applications and Implementation

The AI-enhanced TAK system is tailored for deployment in high-stress, rapidly evolving operational settings where real-time decision-making is critical. A prime example is the ongoing Estado de Excepción Constitucional de Emergencia in Chile's southern regions, where the Chilean Army is responsible for securing critical routes and ensuring public safety. By deploying AI-enhanced TAK systems, military units will gain access to real-time data feeds, leading to actionable insights and

better threat detection, which in turn improves the security of both personnel and civilians

CIITEC's AI Lab is actively developing customized versions of ATAK and WinTAK, designed to meet the specific requirements of operations in the Macrozona Sur. These adaptations will provide improved situational awareness, secure communication, and decision-making support for specialized units such as the Special Operations Brigade. Initial integration efforts will focus on pilot projects, equipping emergency command posts with AI-enhanced capabilities to enable efficient and rapid responses to challenges on the ground.

Beyond military applications, the AI-enhanced TAK system will be effective in supporting multi-agency operations, such as disaster response, border security, and counter-terrorism missions. The ability to share real-time data seamlessly across different organizations will improve inter-agency coordination and operational efficiency.
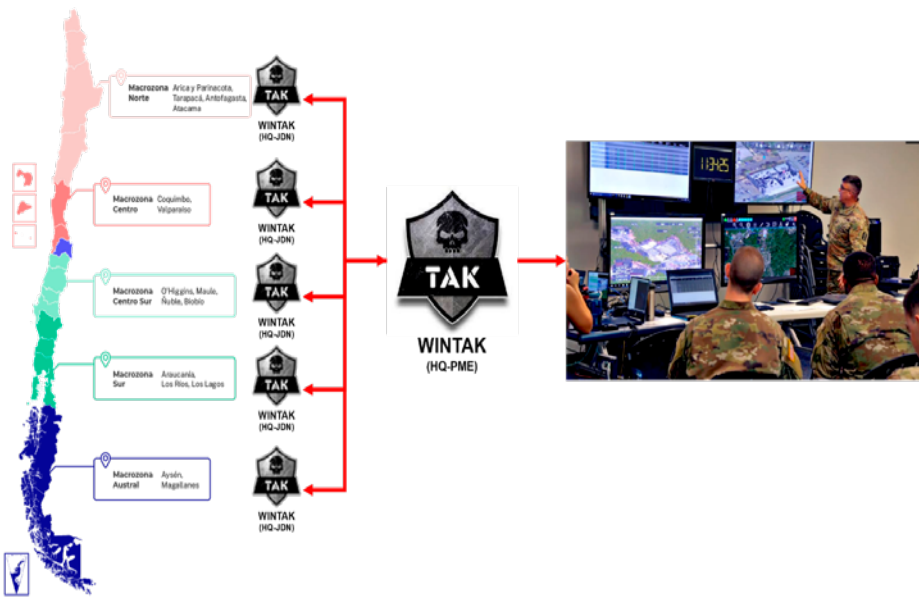

Figure N° 2: Chilean Army Operations Using TAK. This figure illustrates TAK deployment for monitoring critical infrastructure and ensuring route security in the South Macrozone.

Source: CIITEC.

Advanced AI Features for Increased Operational Capability

The integration of AI with TAK could provide the Chilean Army with advanced tools to handle complex and dynamic military challenges more effectively. These AI-enhanced features include:

1. Dynamic Mission Replanning: AI evaluates ongoing missions continuously, accounting for new data and changing battlefield conditions to dynamically adjust mission parameters. This ensures tactical decisions are informed by the most current intelligence.

2. Multi-Domain Integration: The AI-enhanced TAK system can synthesize data from various military and civilian sources across air, land, and sea domains, creating a unified operational picture that enhances strategic decision-making.

3. Adaptive Threat Detection: Advanced AI algorithms within TAK will learn and adapt based on incoming data and historical experiences, allowing for more accurate threat detection over time. This continuous learning approach reduces false positives and enhances situational awareness.

Benefits of the Proposed AI Integration

The integration of AI into TAK offers several direct benefits that enhance the operational effectiveness of the Chilean Army:

1. Enhanced Predictive Capabilities: AI simulations and real-time data analysis allow for anticipation of threats and operational challenges, enabling preemptive actions that increase the likelihood of mission success.

2. Improved Decision Support: AI-driven decision-support tools, such as scenario simulations and chatbot recommendations, provide accurate and timely insights to commanders, reducing decision-making burdens and improving responsiveness in high-pressure scenarios.

3. Increased Operational Efficiency: AI optimizes resource allocation, minimizes operational downtime, and enables rapid replanning to adapt to changing battlefield dynamics, ensuring units remain agile and resilient.

4. Real-Time Situational Awareness: The integration of AI allows for comprehensive processing of large volumes of real-time data, granting commanders an updated and clear view of the battlefield, and facilitating better coordination and tactical responses.

Discussion

The integration of artificial intelligence (AI) into military decision-making presents complex ethical and legal challenges that demand careful examination. While AI has the potential to significantly enhance efficiency, precision, and strategic capabilities in military operations, its deployment raises important questions about the implications for human rights, societal values, and the ethical conduct of warfare.

A primary concern is the concept of digital dehumanization, where AI systems —particularly autonomous weapons— reduce human beings to mere data points. This transformation risks eroding the ethical fabric of society by transferring life –and death– decisions to machines without the capacity for empathy or moral judgment. Such a shift in decision-making authority could result in situations where the humanity of individuals is disregarded. Shoshana Zuboff (2019) elaborates on this theme in The Age of Surveillance Capitalism, emphasizing that technology should be designed to empower individuals rather than diminish their humanity. The widespread deployment of autonomous military systems poses a significant risk to these values [Zuboff_2019].

Algorithmic bias is another critical issue in the military application of AI. Autonomous systems could unintentionally reinforce existing inequalities if their decision-making processes are based on biased data. Such biases could result in the unfair targeting of specific groups or incorrect identification of threats, leading to potentially

wrongful attacks and operational errors. Cathy O'Neil (2016), in her book Weapons of Math Destruction, discusses how data biases can lead to discriminatory outcomes and perpetuate systemic inequalities. In military contexts, this issue is even more acute, as AI-driven decisions could disproportionately affect marginalized communities and exacerbate social injustices.

The loss of meaningful human control over autonomous weapons represents a significant ethical and legal dilemma. As the Campaign to Stop Killer Robots argues, it is essential to maintain human oversight in warfare to ensure that ethical decision-making is upheld. Unlike humans, autonomous systems lack the capacity for nuanced moral reasoning and an appreciation for the value of human life. Consequently, a lack of meaningful human control could lead to automated decisions that fail to meet ethical standards. This argument underscores the urgency of regulating AI-driven military technologies to ensure that human values and ethical considerations remain central (to Stop Killer Robots, 2019).

The "black box" nature of AI algorithms adds another layer of complexity to these issues. As AI systems become more sophisticated, understanding their behavior and decision-making processes becomes increasingly difficult, leading to a lack of transparency and accountability. Frank Pasquale (Pasquale, 2015) in The Black Box Society, addresses how the opaque nature of AI complicates the ability to explain and justify decisions made by autonomous systems. This lack of transparency is particularly troubling in military contexts, where unexplained outcomes can leave victims without recourse to justice or clarity about the rationale behind potentially life-altering decisions. The problem of accountability is equally pres-

sing. If AI-driven systems operate beyond the control of human operators, assigning responsibility for their actions becomes challenging. This ambiguity raises significant ethical and legal questions regarding liability and accountability for autonomous military operations. As Peter Asaro (2012) suggests, ensuring human responsibility and oversight is imperative for any deployment of AI in lethal operations (Asaro, 2012).

Lowering the threshold for conflict is another unintended consequence of increased autonomy in military systems. AI-enhanced weapons and decision-support tools reduce the need for human intervention, potentially making the decision to engage in armed conflict more feasible or attractive. Research from the Stockholm International Peace Research Institute (SIPRI) highlights the risks associated with lowering barriers to war, which could result in more frequent and widespread conflicts, undermining global security (SIPRI, 2019).

The arms race in AI weaponry also presents a destabilizing risk. Major global powers are investing heavily in AI to secure strategic advantages, which could lead to an arms race in autonomous systems. Such competition may fuel global instability, as countries rush to develop and deploy advanced technologies without fully understanding the potential consequences. A report by the United Nations Office for Disarmament Affairs emphasizes the need for international dialogue and regulation to mitigate the risks associated with AI's influence on strategic stability and nuclear risk (for Disarmament Affairs, 2020).

The continued efforts by the U.S. military to explore AI integration into systems like the Tactical Assault Kit (TAK) highlight how AI is poised to transform battlefield dynamics. The use

of AI-driven simulations, real-time analytics, and decision-support tools in TAK exemplifies the drive toward enhancing situational awareness and decision-making capabilities. These advancements underscore the urgency of establishing international standards and regulations to ensure the ethical application of AI in military contexts (AFRL, 2018b).

Ultimately, these challenges point to the need for careful consideration of the evolving relationship between humanity and technology. Drawing on Heidegger's philosophical inquiries into technology, the tools we create —and the ways in which we use them— reflect our underlying values and societal priorities. Deciding to regulate or reject autonomous weapons is not simply a technical matter; it is a profound ethical choice that will shape our relationship with AI and the future landscape of global security. Balancing technological innovation with ethical responsibility is critical to ensuring that AI serves to protect human dignity and security, rather than undermining these core values.

Conclusions

Here are the conclusions from the article:

Artificial intelligence (AI) and command post automation are significantly reshaping contemporary military doctrine and strategy. By integrating systems like the Tactical Assault Kit (TAK) with AI, military forces can enhance the speed, accuracy, and efficiency of decision-making processes. These capabilities enable armed forces to respond to threats and challenges more effectively, adapting swiftly to the dynamic conditions of modern battlefields. The use of AI can substantially reduce the cognitive load on human operators, enabling

quicker analysis and execution of complex military operations.

However, as these technologies become more embedded in military practices, it is crucial to ensure their development and deployment adhere to strict ethical principles and comply with international law (Asaro, 2012). Human oversight must remain a cornerstone of all AI-driven military actions to prevent misuse and unintended consequences. This includes maintaining meaningful human control over autonomous systems to ensure that decisions about life and death are not solely left to machines (Burridge, 2022).

In this context, the implementation of robust regulatory frameworks and guidelines is essential to govern the use of AI in military operations. Such frameworks should address issues of accountability, transparency, and the ethical use of force, ensuring that technological advancements do not outpace our ability to manage their impact. As AI continues to evolve, ongoing dialogue among policymakers, military leaders, technologists, and ethicists is crucial to developing strategies that balance the benefits of AI with the need to safeguard human rights and uphold global security.

Ultimately, the successful integration of AI into military strategy will depend on our ability to balance technological innovation with ethical considerations. As we navigate this increasingly complex and technologically advanced world, striking this balance will be vital to maintaining peace, security, and stability on a global scale. By fostering a responsible approach to AI development and deployment, we can harness its potential to enhance military effectiveness while minimizing risks and ensuring that the values of humanity remain at the forefront of our technological pursuits.

Bibliography

BTR-D Transporte blindado de personal, Military Today, 2022.

CAYUELA, Aquilino. El despliegue militar de Rusia alimenta la idea de una invasión pese al discurso de Putin. Publicado el 11 de febrero de 2022. [en línea]. Disponible en: https://www.eldebate.com/internacional/20220211/despliegue-militar-rusia-alimenta-idea-invasion-pese-discurso-putin.html

COLLINS, Lian. "Los 4 factores que explican la dura resistencia militar de Ucrania ante la invasión rusa", Infobae América. Publicado el 13 de marzo 2022. [en línea]. Disponible en: https://www.infobae.com/america/mundo/2022/03/13/los-4-factores-que-explican-la-dura-resistencia-militar-de-ucrania-ante-la-invasion-rusa/

DE SANTOS, Ángel Luis. ¿Ha llegado el ocaso de los tanques? En Ucrania se han convertido en un blanco fácil y cientos han sido destruidos. LA RAZÓN Internacional. Publicado el 14 de abril 2022. [en línea]. Disponible en: https://www.larazon.es/internacional/20220413/isrvisaywr-f2jojjy7answlspu.html

DEUTSCHE WELLE. "Alemania enviará a Ucrania miles de misiles antiaéreos". Publicado el 3 de marzo 2022. [en línea]. Disponible en: https://www.dw.com/es/alemania-enviar%C3%A1-a-ucrania-miles-de-misiles-antia%C3%A9reos/a-60995688

DEUTSCHE WELLE. (HILLE, Peter). ¿Qué países envían armas a Ucrania y de qué armas se trata? Publicado el 11 de febrero de 2022. [en línea]. Disponible: https://www.dw.com/es/qu%C3%A9-pa%C3%ADses-env%C3%ADan-armas-a-ucrania-y-de-qu%C3%A9-armas-se-trata/a-60751494

EL PAÍS "¿Cuál es el origen del conflicto entre Rusia y Ucrania? Fechas clave de la guerra". El País. Publicado el 1 de marzo 2022. [en línea]. Disponible en: https://elpais.com/internacional/2022-03-01/origen-del-ataque-de-rusia-a-ucrania.html

GAZ, WIKI. Munición guiada de precisión, 2022.

GONZÁLEZ, Izan. "La última bala de Ucrania contra Rusia: misiles antitanques y antiaéreos con los que defenderse", El Español. Publicado el 25 de febrero de 2022. [en línea]. Disponible en: https://www.elespanol.com/omicrono/tecnologia/20220225/ultima-ucrania-rusia-misiles-antitanques-antiaereos-defenderse/652685062_0.html

GONZÁLEZ Vizuete, Alejandro. "La guerra de Ucrania ya ha empezado: así están desplegadas las tropas de Rusia, Kiev y la OTAN", 20 Minutos. Publicado el 24 de febrero 2022. [en línea]. Disponible en: https://www.20minutos.es/noticia/4956573/0/asi-se-encuentran-desplegadas-las-diferentes-fuerzas-militares-ante-la-posible-invasion-rusa-de-ucrania/

HERRERO, Jorge. "Estas son las armas y vehículos utilizados en la guerra entre Rusia y Ucrania", La Razón. Internacional. Publicado el 3 de marzo de 2022. [en línea]. Disponible en: https://www.larazon.es/internacional/20220303/dew7jruzt5hd-hbh2iovcwdjg6u.html

KARMANAU, Yuras; HEINTZ, Jim; ISACHENKOV, Vladimir y MILLER, Zeke. "Fuerzas ucranianas oponen tenaz resistencia al asedio ruso en Kiev", Los Ángeles Times. Publicado el 26 de febrero de 2022. [en línea]. Disponible en: https://www.latimes.com/espanol/internacional/articulo/2022-02-26/fuerzas-ucranianas-oponen-tenaz-resistencia-al-asedio-ruso-en-kiev

NAVARRO García, José. "Ucrania necesita 500 misiles al día. Pero tiene más carros de combate que al principio de la guerra". Defensa. Publicado el 29 de marzo 2022. [en línea]. Disponible en: https://www.defensa.com/rusia/ucrania-necesita-500-misiles-dia-pero-tiene-mys-carros-combate

ROZIN, Igor. El veterano tanque soviético T-72 viaja al futuro con algunas mejoras de alta tecnología. Publicado el 8 de diciembre de 2018. [en línea]. Disponible en: https://es.rbth.com/technologias/82233-tanque-sovietico-t-72-mejoras

Rusia blogspot.com. Amigos de Rusia, El T-72: La Furia Blindada. Publicado el 10 de septiembre de 2016. [en línea]. Disponible en: https://amigos-de-rusia.blogspot.com/2016/09/el-t-72-la-furia-blindada.html

SERESCO. "Del ciberespionaje al boicot a las ayudas a refugiados: la guerra cibernética en Ucrania". Defensa. Publicado el 25 de marzo de 2022. [en línea]. Disponible en: https://www.defensa.com/cyberseguridad/ciberespionaje-boicot-ayudas-refugiados-guerra-cibernytica

STEWART, Phil. "Capacidad militar de Rusia en Ucrania disminuye a medida que aumentan muertes, dice funcionario de EE.UU." CIBERCUBA. Publicado el 23 de marzo 2022. Disponible en: https://www.cibercuba.com/noticias/2022-03-23-u191208-e129488-s27061-disminuye-capacidad-militar-rusia-advierte-funcionario

TCHKUASELI, Zaal. "Ucrania-Lecciones de Historia", Military-Today. Publicado el 5 de abril de 2022. [en línea]. Disponible en: https://fdra.blogspot.com/2022/04/invasion-ucrania-lecciones-de-la.html

OLIEMANS, Joost y MITZER, Stijin. "Un llamado a las armas: las armas que Ucrania necesita", ORYX, 2022.

QUINODÓZ, Fernando. Estado del arte de sistemas de blindajes activos y reactivos. Centro de Prospectiva Tecnológica Militar General Mosconi. Publicado el 3 de septiembre de 2019. [en línea]. Disponible en: https://www.fie.undef.edu.ar/ceptm/pdf/eventos/2019/02-sistemasBlindaje.pdf