

# Case Study of the Drone Ecosystem of Podkarpackie (Poland)

Insights from the Exploratory Research Activity Regions Dual Use Open Strategic Autonomy Exploratory (REGDUALOSA)

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## **Abstract**

This report presents the findings of a review of the Podkarpackie aerial drone and robotics ecosystem, conducted between March 2024 and November 2025 in partnership with the Regional Government of Podkarpackie. The study forms part of REGDUALOSA (Regions, Dual Use, Open Strategic Autonomy), an exploratory initiative of the European Commission's Joint Research Centre (JRC). It examines policy pathways through which Podkarpackie could strengthen its aerial drone sector as a dual-use industry, thereby enhancing regional competitiveness and contributing to European strategic autonomy. The analysis applies an adapted version of the POINT methodology, combining desk research, expert interviews, and stakeholder consultations.

Amid increasing geopolitical instability, the European Commission announced the European Drone Defence Initiative in October 2025, aimed at protecting EU borders and reinforcing defence capabilities under the ReArm Europe initiative, which mobilises up to €800 billion. Bordering Ukraine and hosting a well-established aerospace cluster, Podkarpackie is strategically positioned to advance dual-use innovation.

Based on the evidence gathered, the report formulates twelve strategic recommendations to improve governance, funding coordination, SME participation, and skills development. It also introduces the concept of Territorial Preparedness as an innovation policy framework that positions regional ecosystems at the forefront of Europe's resilience, industrial sovereignty, and long-term security.

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## Executive summary

This report analyses the regional case study of Podkarpackie, a Polish region with a long-standing aerospace tradition, as it aspires to become a European leader in aerial drones and robotics. Bordering Ukraine and shaped by the current geopolitical crisis, Podkarpackie aims to leverage drone technologies—a dual-use capability in high demand in modern warfare—as a driver of regional competitiveness and a contributor to Europe’s strategic autonomy.

This report was developed under the Exploratory Research Activity REGDUALOSA (Regions, Dual-Use, and Open Strategic Autonomy) of the Joint Research Centre (JRC) between 2024-2025. REGDUALOSA examined how regional innovation and development policies can support the development of Europe’s defence and dual-use industries and contribute to Europe’s Strategic Autonomy. It was framed within the EU priorities for 2025–2029—Sustainable Prosperity and Competitiveness, and A New Era of European Defence and Security—and aligned with the strategic vision set out in the Letta, Draghi, and Niinistö reports. The exploratory research activity focused on three case studies and three dual-use technologies: Estonia (cyberdefence), Andalusia (space), and Podkarpackie (aerial robotics). These cases highlight different geographical sensitivities (the north-eastern border with Russia and Ukraine, and the southern European border with Africa), distinct dual-use technological domains, and varying degrees of innovation (emerging, moderate, and strong) as well as development levels (less developed and transition regions).

Recent geostrategic tensions further underscore the imperative to reinforce the EU’s strategic autonomy and bolster its preparedness for emerging security challenges. As of the publication of this report in December 2025, NATO launched the operation “Eastern Sentry” following an Article 4 of NATO Treaty invocation by the Polish government in response to a Russian drone incursion into Polish territory on 10 September 2025<sup>1</sup>. The President of the European Commission called in the State of the Union address for independent defence strategic capabilities, including an ‘Eastern Flank Watch’ stretching from the Baltic to the Black Sea, and a drone wall to guard the EU’s borders. As highlighted in the European Commission’s White Paper on European Defence Preparedness 2030, the Union must build the capabilities necessary to ensure its own security and prosperity, supported by a resilient and innovative European Defence Technological and Industrial Base (EDTIB). The ReArm Europe-Readiness 2030 initiative, announced by the Commission, proposes mobilising up to €800 billion over four years to support increased defence spending among Member States. — targeting 5% of GDP for NATO members by 2035.

The Podkarpackie region covers 17,844 square kilometres and has a population of around 2.2 million. While its peripheral location has historically posed socio-economic challenges—qualifying it as a less developed region under EU cohesion policy—it has demonstrated consistent and dynamic growth over the past decade, with industry accounting for 31.7% of GVA in 2022.

The report covers the RPAS ecosystem in the Podkarpackie region. However, given that defence industrial policy is a national competence, and the highly relevant European and multilateral (NATO) dimensions of defence capability decisions add a broader perspective, the analysis extends beyond regional boundaries.

This report includes all types of RPAS<sup>2</sup> or components produced in the region, regardless of size, from micro to Medium Altitude Long Endurance class (MALE) or type of flying platform (multirotor,

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<sup>1</sup> Estonia also invoked Art 4 of the NATO Treaty on 19 September 2025 after Russian jets entered Estonia’s airspace

<sup>2</sup> Remotely Piloted Aircraft Systems

fixed-wing aircraft, helicopter, balloons, etc.) or application. The report also identifies technologies used to develop RPAS, such as software, AI, and counter-drone systems, which are of significant importance for the region.

The analysis utilises an adapted version of the POINT methodology (Projecting Opportunities for Industrial Transition), focusing on four critical subsystems: Planning, Production, Knowledge, and Users. This research employs a mixed-methods approach involving evidence collection, stakeholder consultations, and the examination of data, information, and testimonies gathered. Eighteen detailed expert interviews were conducted, along with a stakeholders' consultation session organised by the Podkarpackie regional government on 10 December 2024.

In 2022, the value of the aviation industry's revenue in Poland was PLN 14.5 billion (around €3.1 billion) (EY, 2024). The Podkarpackie region, host to the Aviation Valley cluster headquartered in Rzeszów, accounts for approximately 95% of the national aerospace industry and provides employment for over 34,000 individuals. In the same year, the national drone (RPAS) market recorded revenues of PLN 350 (around €75 million).

Podkarpackie benefits from a robust aerospace heritage, committed regional leadership, and a growing innovation ecosystem that includes RPAS integrators, specialised clusters and universities. It is well-positioned to capitalise on increased investments in unmanned systems, its location at the EU's eastern border, and cohesion policy instruments.

However, challenges persist. The regional economy is dominated by small enterprises with limited access to national and NATO defence programmes. Innovation uptake is constrained by risk-averse procurement and financing mechanisms. Outmigration of youth, dependence on EU funds, and fragmented regulatory frameworks further limit resilience. External risks include price competition from non-European manufacturers, supply chain dependencies, and limited access to critical defence technologies such as satellite communication systems.

More broadly, the development of the RPAS<sup>3</sup> ecosystem is hindered by a risk-averse regulatory environment, complex rules on dual-use innovation, and weak coordination between public authorities and industry. Funding fragmentation across EU, national, and regional levels complicates the implementation of complex or cascade-financed projects. SMEs face competitive disadvantages compared to state-backed foreign actors, and talent shortages further constrain growth.

To enhance Podkarpackie's regional innovation capacity and contribute to European strategic autonomy, the report proposes twelve strategic recommendations:

1. Embed Dual-Use in Regional Development: Promote dual-use and defence innovation as a lever for regional competitiveness. Support emerging drone technologies with civil-defence applications, improve regulatory clarity for SMEs, and foster cross-sector business models.
2. Lead Preparedness as a Driver of Transformative Innovation: Integrate a preparedness lens into the Smart Specialisation Strategy, strengthen territorial anticipation through transformative innovation, foresight, interterritorial cooperation, and systemic public-private coordination.

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<sup>3</sup> Remotely Piloted Aircraft Systems

3. Reinforce Whole-of-Government Coordination: Overcome policy fragmentation by aligning regional, national, and EU-level strategies, particularly involving defence, industry, education, and innovation authorities. Facilitate cross-sector governance and policy experimentation.
4. Streamline Multi-Instrument Funding Access: Enable better alignment of EU, national, and regional funds, leveraging new instruments like the STEP Regulation. Improve funding for strategic, high-risk innovation and infrastructure.
5. Facilitate SME and Start-Up Participation: Develop targeted R&D programmes and simplified financial tools for SMEs. Promote participation in programmes such as EUDIS (European Commission) and DIANA (NATO). Encourage cooperation, provide support for certification, audit and application processes, and integration into EU/NATO value chains.
6. Foster Interregional and Cross-Border Collaboration: Position Podkarpackie as a European reference through international engagement, shared infrastructure use, and contribution to certification and testing services.
7. Strengthen Talent and Skills: Align education and training with RPAS industry needs, from secondary to higher education and vocational tracks. Support public-private skills initiatives and retain STEM talent.
8. Empower Strategic Clusters: Build capacity in cross-sector clusters and improve engagement through collaboration funding, inclusive communication strategies, and modernised academic incentive systems.
9. Advance Innovation Procurement: Promote demand-side instruments such as pre-commercial procurement and innovation-friendly criteria beyond price. Build capacity in public procurement for dual-use solutions.
10. Support Test Beds and Certification Infrastructure: Develop test facilities like 'Drone Valley' to enable certification, R&D, and public-private investment. Ensure infrastructure supports civil-defence innovation and aligns with EU standards.
11. Promote Strategic Enabling Technologies: Invest in AI, quantum technology, and secure communication to develop advanced RPAS functionalities and position the region at the forefront of next-generation drone systems.
12. Establish Dual-Use and Defence Technology Observatories: Create a regional liaison office in coordination with the Ministry of Defence to identify needs, support participation in EU programmes, and connect regional actors with defence opportunities.

This report provides a timely foundation for Podkarpackie's next steps at the European level. The Regional Government's forthcoming participation in the Experimentation Journey on Territorial Preparedness, under the Preparatory Action "Innovation for Place-Based Transformation" led by the Joint Research Centre and financed by the European Parliament, represents a unique opportunity to translate the insights of this report into concrete pilot actions in collaboration with other European regions.

## Introduction

In the current volatile global landscape, the European Commission has placed competitiveness (Draghi, 2024; European Commission, 2025a), while introducing a renewed narrative around the concept of “preparedness” (Niinistö, 2024), defined by the ability to anticipate, absorb, and respond to complex crises. This is more relevant indeed on the Eastern border of the European Union, where the proximity to the Russian war of aggression against Ukraine, underscores the urgent need to enhance EU strategic autonomy, particularly in the realm of defence, and bolster its awareness to address emerging security challenges (Fiott, 2022; Balder et al., 2025; Ertel & Göler, 2025; Scazzieri, 2025)

Poland's decision to allocate 4.7% of its GDP to defence spending in 2025 and its commitment to increase this percentage in the future<sup>4</sup> reflects its pressing demand for enhanced strategic capabilities. At the time of the publication of this report, October 2025, NATO has launched the operation “Eastern Sentry” after Article 4 declaration by the Polish government in response to a Russian drone incursion into Polish territory<sup>5</sup> and the President of the European Commission has called in the State of the Union address for independent defence strategic capabilities, including an ‘Eastern Flank Watch’ stretching from the Baltic to the Black Sea, and a “Drone Wall” to guard the EU’s border<sup>6</sup>.

As emphasised in the European Commission's Joint White Paper for European Defence Readiness 2030 (hereinafter “White Paper”) (European Commission, 2025b) the European Union must establish an integrated European Defence Single Market, develop the capabilities needed to safeguard its security and technological sovereignty and address persistent fragmentation (Béraud-Sudreau & Scarazzato, 2023). Achieving these goals requires substantial investment in a stronger and more resilient European Defence Technological and Industrial Base (EDTIB) ((Calcara et al., 2023). These efforts must be supported by a dynamic and integrated innovation ecosystem, enabling the EU to generate added value through enhanced collaboration, economies of scale for the European defence industry, and fostering interoperability. To this end, the ReArm Europe initiative envisions mobilising €800 billion over four years to strengthen the EDTIB.

The REGDUALOSA —Regions, Dual-Use, and Open Strategic Autonomy—is an exploratory research activity led by the European Commission’s Joint Research Centre (JRC), developed between March 2024 and March 2025<sup>7</sup>. It aimed to examine how regional innovation and development policies can better support Europe’s defence and dual-use industries, contributing to the EU’s broader agenda for Open Strategic Autonomy. The project contributes to shaping evidence-based EU policy, aligned with the strategic goals outlined in the Letta (2024), Draghi (2024), and Niinistö (2024) reports, and responds to the European Commission’s priorities for 2025–2029: “Europe’s Sustainable Prosperity and Competitiveness” and “A New Era of European Defence and Security.”

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<sup>4</sup> [NATO Summit: The Alliance gets stronger - Ministry of National Defence - Gov.pl website](#)

<sup>5</sup> Estonia also invoked Art 4 of the NATO Treaty on 19 September 2025 after Russian jets entered Estonia’s airspace

<sup>6</sup> [2025 State of the Union Address by President von der Leyen](#)

<sup>7</sup> Although the fieldwork for this case study was carried out between March 2024 and March 2025, the case study publication in December 2025 reflects an updated analysis to that date. It incorporates the substantial body of new European programmes, policies, and regulatory initiatives developed in response to the rapidly changing geopolitical landscape

The central question guiding REGDUALOSA was: How can defence and dual-use industrial investment be leveraged by territorial innovation policies to promote regional development within the EU's Strategic Autonomy framework?

The project focused on three territorial case studies—Estonia, Andalusia (Spain), and Podkarpackie (Poland)—each examined through the lens of one of three socio-technical systems: space, cybersecurity, and aerial robotics. The Podkarpackie case study concentrates on drones and aerial robots, also referred as RPAS Systems, a field where the region has emerging strengths rooted in its aerospace legacy.

Podkarpackie was selected as the regional case study for aerial drones and robots due to its concentration of aerospace-related industry, research, and infrastructure, combined with its growing interest in dual-use applications. As home to the Aviation Valley, one of Europe's most dynamic aerospace clusters, the region boasts longstanding expertise in aircraft production, complemented by a dense network of SMEs, universities, and applied R&D institutions working on unmanned systems.

Several factors reinforced this selection:

- Institutional support from the Podkarpackie Regional Government and the Marshal's Office of the Podkarpackie Region for aerospace and defence innovation.
- A strategic location near the EU's eastern border, which adds geopolitical relevance in the context of evolving security needs
- The region's Smart Specialisation Strategy (S3) prioritises "Aviation and Cosmonautics," with a particular focus on unmanned systems and dual-use technologies.
- A proven track record of cross-sector collaboration among local actors—from defence to civil and academic domains.
- A strategic location near the EU's eastern border, which adds geopolitical relevance in the context of evolving security needs.
- Together, these features position Podkarpackie as a fertile testing ground for exploring how regional ecosystems can contribute to EU strategic autonomy in drone technologies.

## **Methodology**

This report applies an adapted version of the POINT methodology (Pontikakis et al., 2020). It maps the four functional subsystems of the Podkarpackie drone ecosystem: orientation and planning, production, resource mobilisation and consumers/users. It also formulates proposals to achieve the desired transformations. The findings are underpinned by a mixed-methods research approach that integrates a comprehensive literature review, stakeholder surveys, and in-depth interviews.

A pivotal component of the methodology was a stakeholder workshop held on 30th September 2024, organised by the Marshal's Office of the Podkarpackie Region. More than 20 participants, representing industry, academia, and public institutions, contributed valuable insights concerning RPAS products, partnerships, and funding sources. Subsequently, follow-up interviews were conducted between October 2024 and March 2025 to further elucidate the strengths, weaknesses, and potential for dual-use transformation within the region.

The final stakeholder consultation on the results took place on 10th December 2024, with 50 attendees participating both in person and online. Details of the participants and agendas can be found in Annex 1.

REGDUALOSA case studies publications are issued in November 2025. The present document integrates updates up to that date. In particular, it includes the significant wave of European legislative, strategic, and funding instruments produced in 2025 in reaction to the ongoing geopolitical and security context.

## Chapter 1. Scope and boundaries of the system covered by the report.

### 1.1. Podkarpackie region (Poland)

Situated on Poland's southeastern frontier with Ukraine, the Podkarpackie region covers 17,844 square kilometres and has a population of around 2.2 million. While its peripheral location has historically posed socio-economic challenges—qualifying it as a less developed region under EU cohesion policy—it has demonstrated consistent and dynamic growth over the past decade. The regional economy is based on industry (In 2022, 31.7% of GVA), positioning the region in 5<sup>th</sup> place in Poland. The proximity to Ukraine also gives the region strategic importance considering recent military developments along the EU's eastern borders (see Figure 1).

**Figure 1.** Podkarpackie region (Poland)



*Source: Encyclopaedia Britannica*

The strategic location of an international airport, major motorways, and railways connecting Podkarpackie to the European Union has transformed the region into a key communication and logistics hub. This infrastructure has spurred the growth of dual-use and military-related activities in local companies, attracting both domestic and international investors.

### 1.2. Scope and boundaries of the system

The report covers the RPAS ecosystem in the Podkarpackie region. However, given that defence industrial policy is a national competence, the highly relevant European and multilateral (NATO) dimensions of defence capability decisions, and the fact that the value chain largely exceeds regional borders, the analysis expands beyond the region.

This report includes all types of RPAS or components produced in the region, regardless of their size (from micro to Medium Altitude Long Endurance class) or type of flying platform (multirotor, fixed-wing aircraft, helicopter, balloon, etc.) or application. The report also identifies technologies used to develop RPAS, such as software, AI and counter drone systems that are the most important and significant for the region

### 1.3. Reasons for boosting Podkarpackie's Drone Ecosystem

The aviation industry took root in Podkarpackie just before World War II, with the establishment of aircraft and engine factories in Mielec and Rzeszów. After the war, this industrial base was reinforced by the creation of the Higher Engineering School, now known as Rzeszów University of Technology, which has supported aerospace research and education for over 70 years.

Today, the Podkarpackie region hosts the Aviation Valley cluster, headquartered in Rzeszów, which comprises approximately 95% of Poland's aerospace industry and employs over 34,000 individuals<sup>8</sup>. The cluster is supported by global aerospace leaders, including Borg Warner, Boeing, EME Aero Sp. z o.o., MTU Aero Engines Poland, Safran Transmission Systems Poland, Hamilton Sundstrand Poland, Goodrich Aerospace Poland, Pratt & Whitney Rzeszów, Polskie Zakłady Lotnicze – a Lockheed Martin Company, and Heli-One (Poland) Sp. z o.o. It is also home to prominent national institutions recognised internationally, such as Mielec Aviation Works, and LOTAMS, a major maintenance, repair, and overhaul (MRO) provider affiliated with the Polish Aviation Group. Together, these entities make Podkarpackie a cornerstone of both the regional and national aerospace economy.

In addition, the Cluster of Unmanned Systems<sup>9</sup> established in 2015, brings together businesses, academic institutions, and support organisations to foster innovation in drone technologies. Notable members include the Rzeszów University of Technology and the University of Rzeszów, underscoring the region's growing attention to the field of unmanned aviation systems. The value of the aviation industry's revenue in Poland was PLN 14.5 billion in 2022 ≈ €3.1 billion (EY, 2024). During the same year, the national drone (RPAS) market recorded a total revenue of about PLN 350 (around €75 million) (Fundacji Instytut Mikromakro & Sieci Badawczej Łukasiewicz, 2023)..

This industrial ecosystem linked to defence and dual-use Aerial Robotics and Drones manufacturing and use is a potential driver for competitiveness, creation of wealth and jobs for Podkarpackie for the following reasons:

- **The Russian war of aggression to Ukraine has demonstrated the critical role that drones, and aerial robotics play in modern warfare.** Drones have been used extensively for reconnaissance, surveillance, and direct combat operations. They provide real-time intelligence, enhance situational awareness, and enable precise targeting, significantly influencing the course of military engagements. The success of drone operations in Ukraine has underscored their strategic importance and highlighted the need for robust and resilient drone capabilities within the EU to ensure that its member states are prepared for similar scenarios.
- **The EU currently relies heavily on non-EU countries for both civil and military drone technologies.** China dominates the civil security market with affordable and advanced drone technology. This dependence poses several risks, including potential vulnerabilities in supply chains, cybersecurity threats, and geopolitical leverage. Any disruption in relations with China could lead to significant gaps in the availability and functionality of drones for civil applications. Additionally, the USA and Israel are leading suppliers of military drone technology. This dependency not only limits the EU's strategic

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<sup>8</sup> <https://www.dolinalotnicza.pl/en/about-us/>. Retrieved July 1, 2025

<sup>9</sup> <https://cluster.unmannedsystems.eu/o-nas/>. Retrieved July 1, 2025

autonomy but also exposes it to potential constraints or conditions imposed by these countries. Reliance on non-EU suppliers for critical military technologies can be problematic in times of geopolitical tensions or conflicts where supplier interests might not align with those of the EU.

- Due to their advanced technical capabilities, versatility in applications, payload-carrying capacity, and ability to operate in extreme weather conditions, **drones are increasingly<sup>10</sup> utilized by uniformed state services** like firefighters, mountain rescue teams, and border guards. An illustrative case is the deployment of drones by Podkarpackie's firefighters' team during the 2024 flood in Lower Silesia. The drones facilitated accurate monitoring of flooded areas, assessment of damage extent, and pinpointing individuals stranded without access to land. Additionally, drones aided in evacuating residents and transporting rescue equipment.
- Europe has strategically integrated the development of drones into its defence planning, recognising them as a critical capability both for current operations and future security scenarios. **The European Strategic Compass identifies drones as "strategic enablers"** (Council of the European Union, 2022), alongside intelligence and surveillance, essential for the EU's operational autonomy. The European Defence Industry Strategy (EDIS) (European Commission, 2024) explicitly prioritises the reallocation of spending towards emerging technologies such as drones and software, with the aim of modernising production capacities and reducing dependency on external actors. The European Defence White Paper and the Readiness 2030 (European Commission, 2025b) initiative set out the objective of supplying drones to strategic partners like Ukraine and include unmanned systems among the key investment targets within the EU's defence funding framework. Furthermore, the SAFE approved in May 2025, reinforces funding for the European production of drones, along with other critical defence technologies.
- In 2024, Polish Ministry of National Defence announced plans to create a separate new force within its armed forces system, **the Drone Forces**. It has resulted from the growing number of such systems used in the Polish military, and the analysis of the war developments in Ukraine, where RPAS systems are widely used, and where the establishment of a separate force has led to its more efficient use on the battlefield. It was finally created January 1st, 2025, Acquisitions for this new type of forces will be financed from the budget of the Ministry of National Defence.<sup>11</sup> The Polish government emphasized the importance of domestic industry in sustaining the drone and maintaining the supply chains within the country<sup>12</sup>

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<sup>10</sup> <https://www.gov.pl/web/kwpsp-rzeszow/podkarpaccy-strazacy-dzialaja-w-rejonach-dotknietych-powodzia>

<sup>11</sup> [Poland Aerospace and Defense Military Drone Force Established](#)

<sup>12</sup> [Poland to Create "Drone Army" Consisting of Unmanned Aerial, Ground and Maritime Systems](#)

- The Regional Development Strategy – Podkarpackie 2030 and the Regional Innovation Strategy of the Podkarpackie Province for 2021–2030 (RIS3 Podkarpackie), identify Aviation and cosmonautics as a **regional priority for innovation**, and identifying unmanned systems as increasingly important branch of aviation industry. The RIS3 strategy further indicates that the possibility of using drones for both civilian purposes and the growing catalogue of applications the importance of this sector could grow rapidly.
- **Podkarpackie hosts a diverse ecosystem** including equipment and component manufacturers, service providers, and end-users who integrate drones into their operations. Moreover, the experience gained over the past 2.5 years due to the war in Ukraine—with the eastern border just 90 km from Rzeszów—has highlighted the close ties between the defence industry and the region's socioeconomic life.

#### 1.4 Transition endpoint and headline target

The thematic topic for this review has implications for several elements of the Podkarpackie innovation ecosystem, in particular in the drone's production and consumption systems. The levels at which ambitions could be formulated at the start of the review were:

Multilevel governance and better-aligned policies across portfolio, including defence industrial policy, re-sulting in an overall increase of the public and private funding resources dedicated to support innovation and industrial development in the region.

- Leverage the added value of the dual-use approach in territorial development strategies
- Businesses: investing in innovation, value chain collaboration, entrepreneurship and so on are essentially tasks for the private sector
- Business-to-business and business-to-public research collaboration
- Overall, higher stakeholder coordination across the system
- Demand side: public sector investment and procurement in equipment and infrastructures can play a mobilising role.
- The Podkarpackie regional government and other stakeholders could use the findings of this review to plan their interventions under the current Multiannual Financial Framework 2021 – 2027, considering including new elements in the Smart Specialisation Strategy, under the approach of Preparedness.

## **Chapter 2. The current system: Actors, mechanisms, and framework conditions.**

The Podkarpackie region has developed a dynamic and evolving RPAS ecosystem rooted in its strong aviation heritage and shaped by innovation policies, scientific research, and rising market demand. This open ecosystem brings together manufacturers, users, research institutions, and public agencies, supported by incubators, funding schemes, and strategic public-private partnerships. With a solid R&D and educational base, modern infrastructure, Special Economic Zones, and a focus on green technologies, the region fosters high-tech investment and sustainable growth. Its strategic development is guided by the Regional Innovation Strategy of the Podkarpackie Province for 2021–2030 (Podkarpackie RIS3).

Four main subsystems are identified in RPAS ecosystem as part of the Podkarpackie' innovation ecosystem

- Orientation and Planning
- Resource Mobilisation
- Production
- Users, consumers.

For clarity, it must be stated that the report does not include all initiatives, companies, institutions, products, or projects related to the RPAS ecosystem in the region. The selected components are merely examples intended to illustrate its scope, functioning, and interaction with the environment.

### **2.1. Orientation and planning subsystem**

Podkarpackie, one of Poland's 16 voivodeships<sup>13</sup>, exercises significant competences in regional and industrial policy under the country's decentralised administrative framework. As a self-governing region, it possesses a directly elected regional assembly (sejmik) and an executive board led by a marshal, which are responsible for formulating and implementing regional development strategies, including industrial and innovation policies. These strategies are embedded within broader national objectives and closely aligned with European Union cohesion policy. As such, regional policy in Podkarpackie operates through a multi-level governance structure, where decision-making and funding are shared across local, national, and EU levels. The region administers substantial public investment programmes—particularly through EU structural funds—channelled into infrastructure, industrial modernisation, and smart specialisation.

Public administration at all levels plays a vital enabling role in shaping the environment in which the drone ecosystem operates. Effective multi-level governance—involving European, national, regional, and local bodies—is essential for the sustainable development and strategic positioning of the RPAS sector in the Podkarpackie region. (See figure 2)

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<sup>13</sup> In Poland, voivodeships are the highest-level administrative subdivision, below the national government but above counties (powiats) and municipalities (gminas).

### **2.1.1. European and NATO context**

#### 2.1.1.1 European Commission

In 2022 the European Commission adopted the Drone Strategy 2.0 (European Commission, 2022) aiming to unlock the potential of new, innovative aerial services, and to support the drone research and production in Europe. The strategy included actions to foster both technological innovations and regulatory adjustments to ensure a safe, efficient, and sustainable drone ecosystem. This strategy built on the EU's safety framework for operating and setting the technical requirements of drones and to the U-space Regulation which started to apply in 2023. In this regard, Podkarpackie's Marshal, Wladyslaw Ortyl, was appointed the European Committee of the Regions' rapporteur for the opinion on A Drone Strategy 2.0.

Since then, since the onset of Russia's war of aggression against Ukraine, the rapid transformation of the geostrategic landscape has precipitated a surge of European initiatives and the mobilization of an unprecedented level of resources. These efforts, focused on establishing a robust defence posture by 2030, underscore an urgent need for Europe to deter adversaries and effectively counter aggression. Drones have become central instruments in this evolving warfare, converting the battlefield into a hazardous testing ground for innovation. This conflict has also revealed the emergence of new defence actors, startups and innovative SMEs, whose involvement is shaping the development of the European Defence Ecosystem.

In March 2025, Commissioner Kubilius presented the Joint White paper for European defence - Readiness 2030 (European Commission, 2025b). It sets out a vision to rearm Europe by ensuring the European defence industry can produce at the requested speed and volume facilitating rapid deployment of military troops and assets across the EU and by intending that the increase in defence spending will be 'made in Europe', ensuring both our long-term security and economic benefits for all EU countries, also helping the EU to respond to the short-term urgency of supporting Ukraine. The Joint Defence White Paper came hand in hand with a powerful new instrument: the Rearm Europe 2030, with 800 billion euros to encourage Member States to invest in defence

The Niinistö report on Preparedness of the EU underlined the urgent need to strengthen Europe's civilian and military preparedness to address security challenges. To boost the EU's ability to anticipate, prevent, and respond to these threats, the Commission has presented the European Preparedness Strategy (European Commission, 2025c). Key elements of the Preparedness Strategy are whole of government, whole of society; foresight and anticipation, embedding preparedness by design into EU policies and actions and civil -military cooperation.

On 16 October 2025 the Defence Readiness Roadmap 2030 (European Commission, 2025d) was published, setting objectives and milestones for defence readiness by 2030. This Roadmap translates the White Paper and the guidance provided by the European Council into clear objectives. It proposes European flagships where urgency is greatest, to focus efforts, in accordance with international commitments, including NATO targets.

In November 2025, in the Communication "EU Defence Industry Transformation Roadmap: Unleashing Disruptive Innovation for Defence Readiness" (European Commission, 2025e) the European Commission states that Europe must learn from Ukraine's experience, strengthen its resilience and build a new defence ecosystem that unites industry leaders, new innovators and the tech community to deliver capabilities faster and more efficiently, all in close cooperation with NATO and complementary with its regional plans for territorial defence.

The Directorate-General for Defence Industry and Space (DG DEFIS) leads the European Commission's activities in the European defence industry and European space sectors. DG DEFIS enables investments to support defence supply chains and is in charge of the European Defence Industrial Strategy (EDIS) (European Commission, 2024) and the recently approved European Defence Industrial Program (EDIP).<sup>14</sup>

Under the current Multiannual Financial Framework (MFF), the European Union's instruments supporting the defence industry have demonstrated significant value. The European Defence Fund (EDF) is the Union's key programme to support collaborative defence research and development of defence capabilities. The Fund has a budget of EUR 8.8 billion for the 2021-2027 period following the mid-term revision of the MFF, which reinforced EDF by EUR 1.5 billion through the Regulation (EU)2024/795 - the Strategic Technologies for Europe Platform (STEP)<sup>15</sup>. Withing EDF, The EU Defence Innovation Scheme (EUDIS) offers a set of instruments for small and medium-sized enterprises (SMEs), including start-ups, and other non-traditional players in defence industrial ecosystem to ensure more opportunities to access the European Defence Fund.

In 2025 the Mid-Term Review (MTR) (European Commission, 2025f) acknowledges that cohesion policy is already supporting security and defence-related investments and proposes reallocating unspent ERDF resources to support SMEs involved in STEP-related initiatives. It further encourages budgetary transfers to fund Seals of Excellence and STEP-labelled projects endorsed by the European Innovation Council, particularly those contributing to productivity in the defence sector.

For the forthcoming MFF, the European Commission has proposed a substantial budget increase for defence and space sectors. The European Competitiveness Fund earmarks EUR 131 billion to bolster Member States' long-term defence readiness initiatives. Under the Horizon Europe Framework Programme, dual-use actions may avail themselves of support from a EUR 175 billion budget, and the European Innovation Council is poised to foster innovation in critical technologies relevant to defence.

#### 2.1.1.2. European External Action Service (EEAS)

The High Representative (HR) of the Union for Foreign Affairs and Security Policy manages the Common Foreign and Security Policy and Common Security and Defence Policy (CFSP/CSDP) aspects of the EU's space activities and ensures the consistency of the EU's external action in the space domain.

The EU Defence Readiness Roadmap 2030 —jointly released by the European Commission and the High Representative on 16 October 2025—sets out a coordinated framework to strengthen Europe's defence capabilities and industrial preparedness

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<sup>14</sup> [European Defence Industry Programme: Council gives final approval - Consilium](#)

<sup>15</sup> The Strategic Technologies for Europe Platform (STEP) aims to enhance EU industrial competitiveness by investing in critical technologies and reducing strategic dependencies. STEP promotes synergies across eleven EU funds, and its Sovereignty Seal allows high-quality projects to access additional funding from sources including the ERDF, CF, ESF+, Just Transition Fund, Recovery and Resilience Facility (RRF), and InvestEU. Unmanned vehicles are included in the STEP regulation since its inception.

### 2.1.1.3 European Defence Agency (EDA)

In charge of the coordinated Annual Review on Defence, or CARD (European Defence Agency, 2024), EDA supports Member States in their efforts to implement collaboratively the EU agreed Capability Development Priorities by providing them an overview and analysis of the EU defence landscape and proposing recommendations for collaborative opportunities in capability development and acquisition, synchronised the NATO Defence Planning Process (NDPP). Additionally, EDA contributes to standardisation efforts by promoting collaborative projects among EU member states, focusing on the development of common standards for defence technologies, including drones.

### 2.1.1.4 European Aviation Safety Agency (EASA)

European Aviation Safety Agency (EASA), is responsible for establishing regulatory frameworks that govern the operation of aerial systems, including drones. EASA collaborates with national aviation authorities to ensure compliance with safety standards, thereby enabling the integration of aerial robotics into civilian airspace. This regulatory oversight is essential for facilitating the safe operation of dual-use technologies, which often straddle both military and civilian applications.

### 2.1.1.5. North Atlantic Treaty Organisation (NATO)

Poland is one of the 23 European Member States participating in NATO.

Through the Defence Planning Process (NDPP), NATO identifies the capabilities that it requires and promotes their development and acquisition by Allies and provides a framework within which Allies harmonise their national defence plans with those of NATO, without compromising their national sovereignty.

NATO develops standardisation agreements known as STANAGs. These agreements are crucial for ensuring interoperability among the armed forces of NATO member countries, including the use of drones in joint operations. NATO's work on STANAGs encompasses various aspects of drone operations, including technical specifications, operational procedures, and safety standards, thereby facilitating seamless cooperation in multinational missions.

DIANA<sup>16</sup> (Defence Innovation Accelerator for the North Atlantic) is a NATO initiative designed to identify and accelerate dual-use innovation across the Alliance. It supports companies developing deep technologies to address critical defence and security challenges, providing access to expertise, networks and testing environments.

## **2.1.2. National authorities**

Several national institutions are instrumental in regulating and supporting the RPAS industry:

- Polish Ministry of National Defence. The Polish government emphasized the importance of sustaining the drone industry and maintaining supply chains within the country. The Ministry of Defence works in close coordination with NATO and aligned with European Defence capability priorities.

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<sup>16</sup> [DIANA | Home](#)

- Ministry of Development and Technology, and Ministry of Funds and Regional Policy, shape national legal frameworks, strategic programmes, and funding mechanisms that directly influence the RPAS sector's growth and innovation capacity.
- Polish Air Navigation Services Agency (PANSZA) manages airspace operations, develops rules for RPAS operators, and works to integrate unmanned and manned aircraft in shared airspace. It is under the aegis of the Ministry of Infrastructure
- Civil Aviation Authority (CAA) handles certification, licensing, and regulatory oversight for all aviation-related stakeholders, including RPAS operators, manufacturers, and training centres. It also operates under the Ministry of Infrastructure

The concept and implementation of U-Space as a dedicated airspace for RPAS operations is essential for integrating drones into transport systems and urban environments. Effective and safe utilization of U-Space requires the active participation of all level authorities. Their collaboration facilitates the planning and development of infrastructure, such as drone landing sites and air corridors, as well as the definition of clear and flexible legal regulations tailored to local conditions.

#### National Agencies with Regional Impact

- Polish Agency for Enterprise Development (PARP). PARP supports small and medium-sized enterprises (SMEs) and innovation initiatives through funding schemes and capacity-building programmes. This includes activities within the RPAS domain.
- Industrial Development Agency (ARP). ARP manages the Special Economic Zones (SEZs), which foster industrial development by providing infrastructure, innovation support, and investment incentives. A notable example is the EURO-PARK MIELEC SEZ, the first of its kind in Poland, established in 1995, which continues to attract investment in high-tech sectors.
- Polish Investment and Trade Agency (PAIH). PAIH promotes Polish enterprises internationally and facilitates foreign investment into regional industries, including the aviation and drone sectors.
- The Voivode of Podkarpackie. As the central government's representative in the region, the Voivode over-see the implementation of national policy and coordinates the activities of national institutions such as the National Police and Fire Services. Although not directly involved in industrial policy, these bodies contribute indirectly to RPAS ecosystem development through their operational use of drones, reinforcing the regional infrastructure for drone deployment and cross-sectoral integration.

#### **2.1.3. Local authorities**

At the municipal level, local governments collaborate with the regional administration to foster investment conditions and economic growth, further reinforcing the development of the RPAS ecosystem through local planning, infrastructure, and innovation-friendly environments.

**Figure 2** Podkarpackie's orientation and planning subsystem

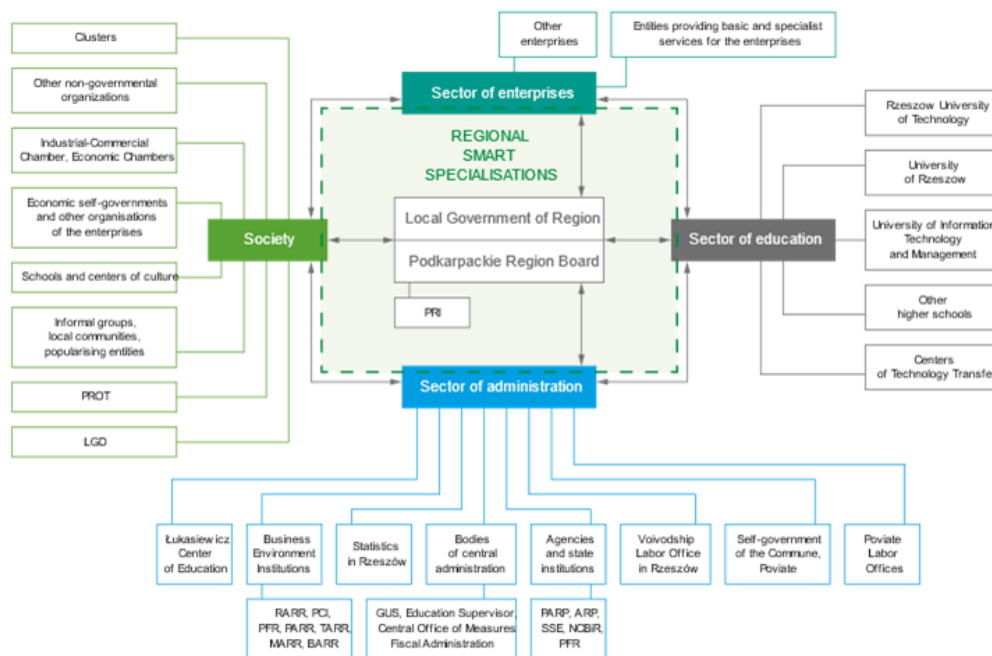


Source: Authors

### 2.1.4. Regional Planning

The Regional Innovation Strategy for the Podkarpackie Region for 2021-2030. serves as a key framework for regional innovation planning, guiding investment and development efforts toward priority sectors through the smart specialization approach. By fostering collaboration among public authorities, businesses, and research institutions, the strategy strengthens Podkarpackie's innovation ecosystem—particularly in strategic areas such as aviation and cosmonautic — leveraging regional strengths to promote sustainable economic growth and competitiveness in line with EU cohesion policies. Figure 3 presents the regions innovation ecosystem as defined by the regional stakeholders in the 'Regional Innovation Strategy for the Podkarpackie Province for 2021-2030' (RSI WP).

**Figure 3** Regional Innovation Ecosystem of Podkarpackie



Source: Regional Innovation Strategy of Podkarpackie Province 2021-2030

## 2.2. Resource mobilisation subsystem

Policies fostering innovation, industrial transformation, and dual-use RPAS development in Podkarpackie region relies on diverse regional, national and European funding mechanisms.

The European Regional Development Fund (ERDF), supports R&D, technology deployment and competitiveness; the European Social Fund (ESF+), supports employment and skills. Other funds contributing to this area in the region are the Recovery and Resilience fund. Regional and national funded investment programmes are playing an interesting role in the promotion of entrepreneurship and start-ups. The participation of Podkarpackie actors in Defence programs, funded by the Polish Ministry of Defence, NATO or European Defence Fund, is still limited but significant.

### European Structural and Investment Funds

European Funds for Podkarpackie 2021-2027 programme is managed by the Board of the Podkarpackie Region and funded by ERDF and ESF+

Focus: boosting regional innovation and technology implementation.

Resources allocated in this framework to which RPAS projects aligned with smart specialisations of the region can apply for funding

- Action 1.1 – Research and Development: €291.5M
- Action 1.3 – SME Support for R&D Results: €69.2M

European Cohesion Funds for Smart Economy (2021–2027), managed by Polish national authority and funded by ERDF and ESF+. Examples of RPAS projects supported are<sup>17</sup>:

- Intelligent engine controller for drones: 2.22M PLN (€489.000)
- Rescue and disaster response systems in Nisko: 999K PLN (€220.000)
- Purchase of rescue vehicles, trailers and drones for rescue operations by the Bieszczady Mountain Volunteer Rescue Service Regional Group": 1,040 M PLN (€ 229.000)
- "Increasing rescue capacity in the municipality of Pysznica": 999,9 K PLN (€220.000)

The European Funds for Eastern Poland 2021-2027, funded by ERDF and ESF+ which would be a source of funding for, among others, startup platforms or businesses transforming towards Industry 4.0 and circular economy.

Interreg Europe. Rzeszów Regional Development Agency (RARR) participated in the Interreg Europe project AERIAL UPTAKE – EU-wide initiative to remove barriers to drone adoption via legal harmonization and innovation support.

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<sup>17</sup> All amounts converted from PLN to EUR are approximate, indicative figures based on the average 2023 exchange rate of 1 EUR = 4.54 PLN. These estimates are for guidance purposes only and may vary depending on exchange rate fluctuations.

### **NATO Science for Peace and Security (SPS) Programme.**

Rzeszów University of Technology has participated in the projects:

- Critical infrastructure protection in response to terrorist attacks
- Energy infrastructure resilience during war or disaster.

### **European Defence Fund (EDF).**

Rzeszów University of Technology is involved in NEUMANN (Novel Energy and Propulsion Systems for Air Dominance).

### **Clean Aviation Joint Undertaking (Horizon Europe).**

Clean Aviation develops breakthrough aircraft tech to achieve climate neutrality by 2050. Rzeszów University of Technology contributes to FAME, with potential dual use applications.

### **SESAR Joint Undertaking (JU)**

SESAR modernizes EU air traffic management, including RPAS integration. RUT participated in PROSA and ToBeFree projects; both have dual-use potential.

### **Ministry of National Defence Programmes.**

Initiatives like Zefir, Gryf, and Orlik aim to modernize Poland's armed forces and include RPAS development, however regional participation remains limited.

**The National Centre for Research and Development<sup>18</sup> (NCBiR), the Military Institute of Armament Technology, the Air Force Institute of Technology and the Institute of Aviation** have financed numerous defence projects participated by Podkarpackie companies such as the Vermin system project, which imitates a flying air target, the Flying Terrain Observer project, which resulted in a flying demonstrator of the Optionally Piloted Vehicle (OPV) MALE class system based on an ultralight aeroplane and certifications projects. This project was carried out by EUROTECH in partnership with Rzeszow University of Technology.

European Defence Agency in cooperation with the Polish Ministry of Defence launched the ERA and ERA 2.1 international projects focus on developing automated take-off and landing systems, automatic taxi, and emergency recovery subsystems for MALE class RPASs. These projects are led by Rzeszow University of Technology, EUROTECH, the Institute of Aviation, and the Air Force Institute of Technology.

### **Podkarpackie Development Fund.**

The Podkarpackie Development Fund (PFR) is a regional financial institution established in 2017 by the Podkarpackie Regional Government to support the development of small and medium-sized enterprises (SMEs) in the region. It is fully owned and managed by the regional government and

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<sup>18</sup> Narodowe Centrum Badań i Rozwoju (NCBiR), strona główna - The National Centre for Research and Development - Gov.pl website ([www.gov.pl](http://www.gov.pl)) accessed 14.10.2024

operates as a non-banking entity that provides financial instruments such as loans, guarantees, and factoring services. It manages a portfolio of approximately PLN 600 million (€141.6 million euro)<sup>19</sup> sourced from regional budget contributions, returned EU funds from previous programming periods, and long-term agreements with the voivodeship, aimed at strengthening the local economy and increasing SMEs' access to capital.

**Box 1 Drones Valley**

**Polish Centre for Certification and Development of Unmanned Systems**

On June 4, 2025, the Regional Government of Podkarpackie announced the establishment of the Polish Centre for Certification and Development of Unmanned Systems, also known as 'Drone Valley'. The centre will facilitate precise testing and certification of unmanned systems in compliance with global standards. Its infrastructure will include a certification centre, a research and development centre, a business incubator, a training centre, landing pads and runways, hangars, and a flight control tower.

The project will be carried out in collaboration with local governments, clusters, Rzeszów University of Technology, and business support institutions. The financing for the establishment and operation of the Valley is planned to come from the European Funds for Podkarpacie 2021-2027 programme, with nearly EUR 10 million already allocated for this purpose.

The Podkarpackie Region, along with its partners, also initiated an application for a nation-wide competition organised by the Polish Air Navigation Services Agency as part of the Polish National Recovery and Resilience Plan. The competition aims to establish Competence Centres for unmanned aerial vehicles, with the goal of creating a safe zone for RPAS flights. In the initial stage of the competition, the region, as the project leader, proposed two potential locations for the Competence Centre. Following a positive verification, both proposed areas were qualified for stage II.

Regional entities actively collaborate with national and European manufacturers and research centres at different scientific and technological levels. While participation in national and international programmes is limited, the largest producers and research centres are actively involved in European initiatives.

Interviews with experts and the stakeholders consultations revealed a persistent gap in support for early-stage, high-risk, and dual-use innovation. Existing funding programmes remain disproportionately focused on low-risk, late-stage R&D (TRL 6+), offering limited instruments for exploratory or challenge-based initiatives that promote experimentation. This is further compounded by the lack of clear guidelines and acceptance for dual-use technologies. Additionally, the fragmentation of funding rules across European, national, and regional operational programmes makes it difficult—if not impossible—for actors to synchronise resources effectively. This complexity is exacerbated by administrative rigidity and a risk-averse culture, where public authorities are reluctant to fund initiatives that carry a higher likelihood of failure due to fears of non-compliance or audit repercussions. As a result, both private and public research actors face substantial barriers to advancing bold, high-impact innovation.

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<sup>19</sup> This value is indicative and for orientation purposes only. It was estimated based on the current mid-market exchange rate and may vary depending on the timing of the conversion.

## 2.3. Production Subsystem

At the heart of Podkarpackie's RPAS ecosystem lies its manufacturing capacity—comprising both system integrators and component suppliers. This subsystem includes a wide range of small and medium-sized enterprises (SMEs), many of which operate at different stages of maturity, from early-stage start-ups to well-established firms. Podkarpackie companies's products covers civil and defence markets. However, as stated by the business sector in the stakeholder's consultation, the unclear definitions of dual-use technologies complicate legal interpretations, in particular regarding import-export operations. Figure 4 illustrates current Podkarpackie production subsystem.

### 2.3.1. Manufacturers

Few companies in Podkarpackie produce complete RPAS platforms, including both fixed-wing and rotorcraft systems:

- EUROTECH Sp. z o.o.<sup>20</sup> is an engineering company based in the Special Economic Zone in Mielec, specialising in the development and production of RPAS. Through close collaboration with research institutions, EUROTECH has become a leading provider of tactical RPAS platforms. The company's RPAS portfolio includes aerial target drones for air defence training, a multi-RPAS target system with swarm launch capability, and HAASTA – a next-generation hybrid RPAS designed for dual-use missions such as reconnaissance, cargo delivery, and counter-drone's operations. With over 150 partners and extensive research co-operation, EUROTECH leads a dynamic micro-ecosystem focused on tactical unmanned aviation.
- PILC Sp.<sup>21</sup> z o.o. is an engineering company based in Mielec, Poland, specialising in advanced measurement, control, and avionics systems. PILC has been supplier of avionic modules for PZL Mielec (Lockheed Martin). In 2023, the company expanded its capabilities into unmanned aviation, developing a high-wing STOL (Short Take-off and Landing) electric seaplane demonstrator in collaboration with Rzeszów University of Technology, showcasing innovation in electric propulsion and vertical take-off systems.
- Trigger Composites<sup>22</sup>, headquartered in Grodzisko Dolne, is a specialist in advanced composite manufacturing and the integration of small RPAS with a maximum take-off weight (MTOW) of up to 30 kg. Trigger is best known for its in-house development of fixed-wing STOL (Short Take-Off and Landing) aircraft and advanced VTOL (Vertical Take-Off and Landing) RPAS platforms.

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<sup>20</sup> Eurotech accessed 14.10.2024

<sup>21</sup> PILC Polish Intelligent Logic Controllers – PILC Polish Intelligent Logic Controllers accessed 14.10.24

<sup>22</sup> Drony accessed 12.11.24

- FOTOACC<sup>23</sup>, headquartered in Rzeszów, produces specialized RPAS platforms such as the Heksakopter X-01, a carbon-fibre hexacopter used by uniformed services, and environmental drone systems.
- Most of the RPAS companies in Podkarpackie region, operate primarily as manufacturers of components and subsystems. These companies can be grouped into two main categories:
- RPAS platform component providers. These companies supply essential subsystems required for the construction and operation of RPASs. Their offerings include structural components, propulsion systems, flight control and navigation systems, communication systems, as well as embedded software and data analysis tools. Operating in highly specialised subfields, they contribute to both the airborne and ground-based elements of RPAS platforms. Examples include, Aeroplan, which produces innovative composite propellers, BS Labs, which supplies motor control and radio communication units essential for electric RPASs; B-Technology, specialising in the design and manufacturing of mechanical parts for RPAS systems; Rectangle<sup>24</sup>, which develops integrated hardware and software for RPAS guidance and control systems and Batteries, a company focused on advanced battery systems for both airborne and ground segments of RPAS—crucial for ensuring operational reliability.
- Mission-specific system component providers. These companies supply components that, while not directly involved in flight control, are essential for mission performance—such as sensors, cameras, and data transmission modules. Examples include: Dronehub, which develops drone docking stations for all-weather operations and provides analytical and security services; ASSECO and GZA, large IT groups involved in the development of military and dual-use software applications and Proximo Aero<sup>25</sup>, an engineering company based in Rzeszów, which develops advanced hydrogen-based propulsion systems for RPASs. It co-develops a line of hydrogen-powered drones with the Royal Netherlands Aerospace Centre (NLR).
- A new category of RPAS manufacturers has emerged, formed by or in cooperation with Ukrainian firms. These entities, produce basic, low-cost drone systems for combat applications using commercially available components. While they operate discreetly and with limited research engagement, they maintain selective cooperation with Polish suppliers.

### **2.3.2. Research, Science, and Higher Education**

The RPAS ecosystem in Podkarpackie is underpinned by a robust research and education infrastructure. The strong presence of the aviation industry in the region directly shapes the focus and priorities of local universities, vocational schools, and research centres. As unmanned systems

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<sup>23</sup> Fotoacc's key values in engineering services accessed 01.07.2025

<sup>24</sup> RECTANGLE – Nowe technologie w nawigacji accessed 12.11.24

<sup>25</sup> Proximo Aero / MRO / R&D / Supply Chain Solutions accessed 21.11.24

are an important part of the region's Smart Specialisation Strategy, there is active collaboration between academia, industry, and regional authorities.

The Rzeszów University of Technology (RUT) is the region's leading technical university and a national reference in aviation and RPAS research. With decades of involvement in unmanned aviation, RUT conducts cutting-edge work in avionics, propulsion, air traffic management, cybersecurity, and flight systems. The Faculty of Mechanical Engineering and Aeronautics leads RPAS efforts, supported by state-of-the-art facilities including dedicated labs, two airfields, and a growing RPAS research infrastructure. RUT is a frequent participant in major European programmes such as Horizon 2020, SESAR, Clean Sky, Clean Aviation, and NATO SPS.

The University of Rzeszów complements RUT with research in RPAS group coordination, human factors (e.g., pilot/operator workload), and the legal dimensions of RPAS. Recent studies include RPAS logistics optimization and the role of drones in armed conflicts, highlighting the university's contributions to both technological and regulatory aspects.

The Podkarpackie Innovation Centre (PCI) (Aridi et al., 2018) inaugurated in December 2017 in Rzeszów, is a regional innovation agency. It supports the 'third mission' of universities by translating academic R&D into commercial applications. PCI operates three integrated platforms: (1) R&D Valorisation to prepare university research for licensing and spin-off formation; (2) a Structured Contract Research Network to facilitate collaboration between university laboratories and SMEs; and (3) ProtoLab, an open-access prototyping facility supporting student entrepreneurship (Aridi et al., 2018; Suwala & Micek, 2018). Vocational schools in the region offer training closely aligned with the needs of the aerospace and drone industries, ensuring a pipeline of qualified personnel. Higher education institutions have adapted curricula and research programmes to meet growing demand in the RPAS sector.

Branch Skills Centres located in cities such as Mielec and Krosno provide modern vocational training aligned with the needs of high-tech industries, including aviation and RPAS.

Non-governmental organizations play an active role in STEM promotion and youth education: such as the Academy of Technical Skills LEONARDO (Mielec) and the Foundation for the Promotion of Education at the Aviation Valley.

Student research groups contribute actively to the RPAS ecosystem through design competitions, legal studies, and technology development. These include:

Student Academic Club of Aviators, EUROAVIA Rzeszow, Sky Control Team (SCOT), Legendary Rover Team (RUT) and Student Research Group of International and European Law (Rzeszów University) work on RPAS, legal analysis, mission planning, and even Mars rover design, often collaborating with industry partners. This interaction nurtures talent and provides companies with graduates skilled in applied drone technologies.

Science-Technology Centre for Unmanned Systems<sup>26</sup> offers a wide range of training courses aimed at obtaining RPAS operator certifications and special training programs tailored to the needs of various industries. The centre educates drone operators, preparing them to obtain the RPASO (Unmanned Aerial Vehicle Operator) certification. The centre also offers industry training aimed at specific sectors, such as agriculture, forestry, and uniformed services. In addition, it offers training

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<sup>26</sup> The Science-Technology Centre of Unmanned Systems accessed 14.11.24

in specialist software, such as those commonly used in the analysis of data obtained with the use of RPASs.

During interviews and stakeholder consultations, participants consistently highlighted the challenge of retaining and attracting skilled professionals in the Podkarpackie region, particularly in high-tech sectors such as aerospace and ICT. This concern reflects a broader pattern of outmigration of qualified youth that undermines the regional ability to leverage research capacity, attract investment, and sustain long-term innovation-driven growth.

This concern is fully aligned with the statements of the Defence-Roadmap Readiness 2030 which mentions that within the Pact for Skills, the Large-scale Skills Partnership in Aerospace and Defence is working on skills forecasting, upskilling and reskilling programmes, and talent engagement, to support Member States to reskill 600,000 people for the defence industry by 2030. The EU Skills guarantee can also help transit workers from sectors at risk to strategic sectors, such as the defence industry.

### **2.3.3 Research & Test Facilities**

Research activities extend beyond universities to industry-led initiatives. Companies like EUROTECH, FOTOACC, and Trigger Composites run dedicated R&D programmes focused on RPAS systems, components, and applications. These often occur in partnership with universities, creating a cycle of innovation and knowledge exchange.

Testing capabilities are critical. While most manufacturers have in-house testing labs, RUT remains the regional leader, with:

- Two airfields (Rzeszów-Jasionka and Bezmiechowa)
- The Aircraft and Space Research Laboratory
- An In-flight Test Laboratory
- Plans for a dedicated Unmanned Aerial Systems Research Centre

As outlined in box 1, the Marshal Office announced in June 2025 the creation of the Polish Centre for Certification and Development of Unmanned Systems, the 'Drone Valley'. The centre will facilitate precise testing and certification of unmanned systems in compliance with global standards. Its infrastructure will include a certification centre, a research and development centre, a business incubator, a training centre, landing pads and runways, hangars, and a flight control tower.

Private companies also conduct tests at facilities like Tuszów Narodowy or in military zones in Stalowa Wola. The Science-Technology Centre for Unmanned Systems operates a RPAS airfield in Sędziszów Małopolski and provides technical testing support, further expanding regional capacity.

### **2.3.4 Research and technology strengths**

The main technologies being developed by the regional industry and research sectors include:

- Integration of RPAS into the European Aviation System

A primary challenge is defining the rules, instruments, and technical solutions needed to fully integrate RPAS traffic into the civilian, non-segregated European airspace. Several manufacturers from the region are participating in projects coordinated by the European Defence Agency or SESAR JU. For example, ASSECO is involved in the ERA project ('Enhanced RPAS Automation'), EUROTECH is working on IDAAS ('Intruder Detection and Avoid System') co-financed by The National Centre for Research and Development as part of the aviation industry programme, and the Rzeszow University of Technology is participating in projects such as ERA, ERA 2, and SESAR 2020 PJ10 PROSA.

- Full Control of Electronics and Software

According to European Defence Agency recommendations, manufacturers should maintain full control over the software in critical systems, sensors, and devices to prevent deliberate failures. PILC, EUROTECH, and the Rzeszow University of Technology have adhered to these practices, developing complete RPAS and sensors while maintaining full control over source codes and using components from trusted sources.

- Navigation Systems Independent from Satellite-Based Navigation

The conflict in Ukraine has highlighted the susceptibility of modern GNSS satellite-based navigation systems to spoofing and jamming, even when only GALILEO (European) and GPS (U.S.) are employed. This has driven European agencies to research alternative navigation methods independent of space radio signals. Regional entities like the Rzeszow University of Technology, EUROTECH, and RECTANGLE are engaged in developing inertial, image-processing, and sun position-based navigation technologies.

- Aircraft Propulsion

RPASs traditionally utilise jet, piston, or electric propulsion, depending on their class and application. New developments in power systems for RPASs involve hybrid systems. For instance, HybriDrive—developed by EUROTECH—combines a piston engine and an electric motor to drive a common propeller. However, hybrid and electric drives face challenges such as low energy-to-mass ratios and lengthy recharging times. Researchers at Rzeszow University of Technology, in collaboration with other Polish universities, are exploring fuel cells as a power source, successfully testing the AOS H2 motor glider. Proximo Aero and PZL Mielec are also exploring hydrogen fuel applications for drones and aircraft.

- Hydrogen Technologies

Hydrogen has become a priority for the Podkarpackie region's industrial and scientific development. It offers opportunities to diversify the economy and attract investments. Given the region's aerospace focus, merging aviation with hydrogen technologies is a strategic priority, aligning with the EU's Green Deal. Initiatives like Proximo Aero's H2SkyBox project and Rzeszow University of Technology's hydrogen laboratories mark significant milestones.

- Counter Drone Systems:

As RPASs become more prevalent on battlefields, technologies to counter them are being developed. Rzeszow University of Technology has conducted tests focusing on locating drones using sound and image recognition (in collaboration with EUROTECH's IDAAS project). Strategies include GPS and radio signal jamming and mechanical destruction using substances from other flying objects. A technology demonstrator was shown to the local border guard around nine years ago.

The expertise of the Podkarpackie region's major manufacturers provides a promising outlook for the future. They are proving capable of following key trends and recommendations, guiding collaborators, and creating synergies to push the RPAS domain in the region toward more advanced tasks.

### **2.3.5. Other initiatives**

The region represented by regional government as well as by particular industrial, science and other entities participates in several programmes and initiatives that align European and national strategy in drone technologies. At this moment The Local Government of the Podkarpackie Region is involved in following initiatives:

- The Clean Sky 2 initiative, which aims to develop air transport technologies that reduce carbon dioxide, nitrogen oxide, and noise emissions by 20-30%. Clean Sky 2 also aims to foster a strong and globally competitive aerospace industry and supply chain in Europe.
- NEREUS Network of European Space-Based Regions- aims to leverage space technologies for the development of European regions and their citizens, as well as to promote space opportunities and applications.
- ESA BIC, with its premises in Rzeszow, aims to support the incubation process of entities with the goal of utilizing and implementing space technologies in new application areas or proposing solutions for use by the European Space Agency.
- The Podkarpackie Region has been designated as a Regional Innovation Valley in areas related to the circular economy and the transition away from fossil fuels. This initiative seeks to facilitate international cooperation and the collaborative implementation of research projects, such as in the realm of alternative energy sources and powering autonomous vehicles.

### **2.3.6 Clusters, associations and others**

The Cluster of Unmanned Systems, (Cluster Unmanned System, n.d.; Interreg Europe, 2021) established on 11 October 2015 in Rzeszów, unites companies, research institutions, and local authorities—including Rzeszów University of Technology, University of Rzeszów, and regional enterprises such as Fotoacc and Trigger Composites—under an agreement coordinated by the Science-Technology Centre for Unmanned Systems (Cluster of Unmanned Systems, n.d.). Its objectives are to promote collaboration, knowledge exchange, and joint R&D for unmanned systems, develop industry standards, support policy engagement, and facilitate training and certification activities (Cluster of Unmanned Systems, n.d.; Interreg Europe, 2021).

Aviation Valley, headquartered in Rzeszów and founded in 2003, is a major aerospace cluster comprising nearly 200 entities—including global OEMs, suppliers, and academic institutions (Aviation Valley, n.d.). Its mission is to foster regional aerospace development through university–

industry partnerships, workforce training, and policy advocacy. It currently holds the status of a “National Key Cluster”.

The Podkarpackie Hydrogen Valley is a strategic initiative aimed at promoting hydrogen-based energy solutions in the region. Its members—spanning industry, academia, and government—focus on hydrogen storage, fuel cell development, RPAS applications, and workforce training. This initiative aligns with European efforts to advance sustainable energy and positions Podkarpackie as a national hub for hydrogen innovation.

**2.3.7 Supporting Non-Technical Actors**

It should be mentioned at this point that the RPAS industry is supported by a fairly large set of companies that are engaged in non-technical activity. These work on consulting, marketing, law services, etc. areas and are player in the drone ecosystem in the Podkarpackie region.

In box 2 is presented a pilot service for cluster networking cooperation and strengthening stakeholder engagement commissioned by the regional government of Podkarpackie.

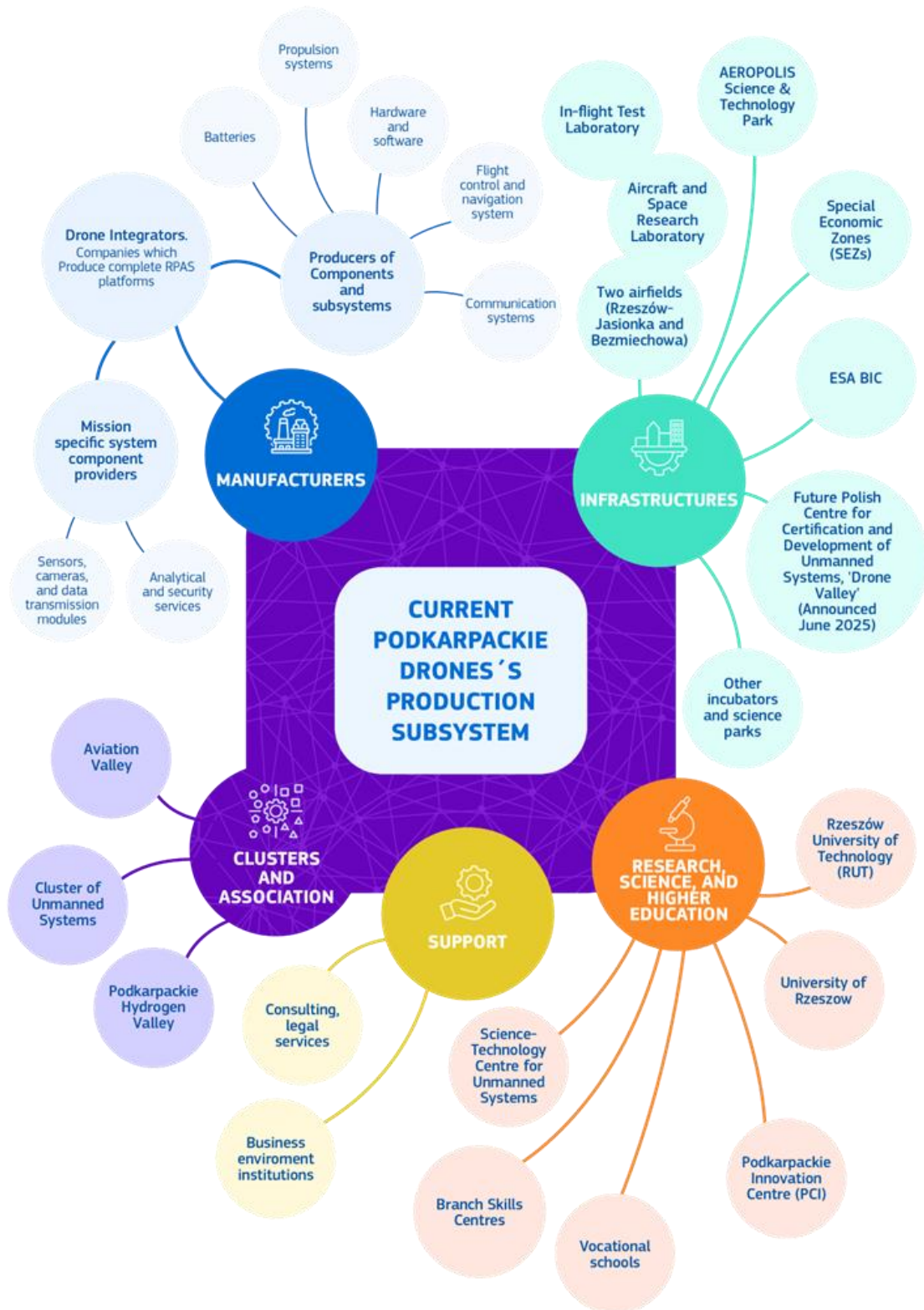
**Box 2:** Pilot service for cluster networking

**Pilot service for cluster networking cooperation and strengthening stakeholders’ engagement**

The pilot service for networking cooperation and stakeholder engagement, commissioned by the regional government of Podkarpackie and executed by clusters, exemplifies an effective model of collaborative innovation. By engaging five clusters, including the Unmanned Systems Cluster and the Hydrogen Valley Cluster, the initiative set strategic directions for innovation policy and facilitated the development of smart specialisation. These clusters supported the regional government by actively participating in the entrepreneurial discovery process, which is pivotal in identifying and exploiting new business opportunities. The successful pilot service will be continued in areas that are key to the development of specific specialisations and the identification of new economic potential. The involvement of clusters in the implementation of this service will be crucial for setting the direction of the next regional innovation strategy.

In the figure 4 is depicted the global configuration of the current Pokarpackie’s drones’ production subsystem

**Figure 4** Current Podkarpackie's production subsystem



Source; Authors

## **2.4. Users and Consumers subsystem**

The Podkarpackie region hosts a wide and diverse base of RPAS users, ranging from one-person businesses to medium-sized enterprises and institutional actors. These users form a key part of the drone ecosystem, spanning both civilian and non-civilian sectors and utilizing RPAS technologies for direct operations, data services, infrastructure support, and training.

Stakeholder consultations revealed that public administrations—including local uniformed services—often rely on cost-driven procurement practices that prioritise the lowest-price offers over strategic value or innovation. This approach discourages the uptake of advanced and dual-use technologies and limits the potential of public demand to drive innovation. Additionally, it contributes to structural vulnerabilities, including reliance on non-European manufacturers and foreign-made critical components, which threatens Europe's strategic autonomy, supply chain resilience, and capacity to maintain sovereign innovation ecosystems.

### **2.4.1. Military and Security Users**

This group comprises the Polish Armed Forces, Territorial Defence Forces, Police, Border Guard, and Fire Brigades, which use RPAS for a wide array of tasks, such as surveillance, logistics, tactical operations, and training. Their infrastructure is integrated into their own command and operations systems, reducing the need for external RPAS infrastructure support.

In January 2025, the Polish Ministry of National Defence announced created the Drones Forces, as a new separate force within its armed forces system. It has resulted from the growing number of such systems used in the Polish military, and the analysis of the war developments in Ukraine, where RPAS systems are widely used, and where the establishment of a separate force has led to its more efficient use on the battlefield.

### **2.4.2. Civilian, Institutional Users**

These are public sector entities using RPAS within their statutory missions. They use RPAS for environmental monitoring, emergency response, and operational planning. They operate drone systems and utilize the data for operational decision-making. Examples include State Forests, Volunteer Rescue Services (Mountain and Water) and Crisis Response Centres. As an example of its importance, drones were used by Podkarpackie fire brigades during the flood in 2024 in the Lower Silesia region. Specialized drones with thermal imaging and high-resolution cameras enable firefighters to efficiently assess situations and locate individuals requiring assistance.

### **2.4.3. Civilian, Non-Institutional Users**

Within this group, two main types of users have been identified. The first includes companies that directly operate RPAS and offer services based on various drone technologies. These users apply drone systems across a range of sectors: DRONEHUB specialises in inspection and monitoring services, particularly for infrastructure; Bogaczewicz Film Studio uses drones for aerial filming and visual monitoring applications and the drone service centre named Drone Space Valley, which provides drone-based solutions for agriculture, forestry, construction, and environmental protection.

The second group are consumers indirectly using RPAS technology. They are not RPAS operators themselves. They utilise services offered by the first group to support own services or products. For example, companies offering RPAS training, including system operations, planning and supervising missions, etc. e.g., RC-LIPOL RPAS TECHNOLOGY.

## 2.5. Podkarpackie’s drone ecosystem SWOT

As a result of the workshops, stakeholders’ consultations and interviews the following SWOT was agreed

**Figure 5** Podkarpackie Drone ecosystem SWOT



Source: Authors

## 2.6. Missing points

The regional government plays a pivotal role in shaping and supporting the RPAS ecosystem, and in this ambition, it has identified several structural and systemic challenges:

- While international institutions encourage policy and regulatory experimentation, regional administrations often operate under strict compliance frameworks and audit-driven environments. This creates a cautious culture where avoiding risk is prioritised, unintentionally discouraging innovative or experimental approaches.
- Complex regulatory framework for dual use research, import exports of products and services, in addition to the integration of drones in U-space. Complex and outdated regulations hinder drone innovation by blocking new technologies and services.
- Weak administrative–industry cooperation. Despite the importance of collaboration between public institutions and private-sector stakeholders, support instruments are often misaligned with real needs due to rigid administrative frameworks. This mismatch fosters mistrust and disengagement among ecosystem actors, limiting long-term cooperation.
- Stakeholder engagement and communication gaps. Efforts to onboard new ecosystem actors face low response rates, while maintaining the involvement of current stakeholders requires constant effort. A small number of committed entities carry most of the coordination burden.
- Fragmented funding streams, and policy fragmentation and multilevel cooperation. As operational programmes at European, national, and regional levels operate under different rules, synchronizing funding for integrated or cascade-financing projects is extremely difficult, limiting complex or phased innovation efforts.
- Limited SME support and competitive disadvantages. Existing regulations restrict targeted support to small innovators, especially those in early-stage development. This leaves local SMEs and startups vulnerable to dominant non-European players—particularly Chinese manufacturers—who benefit from state aid and undercut market prices.
- STEM talent development and labour market alignment. A sustainable ecosystem requires a strong STEM-skilled workforce, yet the region lacks long-term instruments to forecast labour needs and align education accordingly. Building this capacity demands coordinated efforts between business, academia, and national education policy, supported by dedicated tools for skills development and public–private partnerships.

### **Chapter 3. The desired state of the system.**

The initial purpose of this report, which started in October 2024, was to document the REGDUALOSA case study of Podkarpackie, a region that holds the regional aspiration of becoming an international hub for RPAS development and production, making the RPAS ecosystem a major driver of competitiveness for the region. The work intended to examine how regional innovation and development policies were supporting the defence and dual-use drone industry.

When, in December 2024 Podkarpackie's stakeholders were asked: 'What should the desired RPAS ecosystem in the Podkarpackie region look like to enable a rapid and effective transformation toward dual-use or even military technologies?' the answer was that the existing RPAS ecosystem in the Podkarpackie region, with the structure shown in this report and with actors and their mutual dependencies that have been identified in the research, was sufficient for the effective development of RPAS technologies in the region and could also be effective for the transformation of the branch into dual-use technologies. This is because the Regional Government already includes the ecosystem as an objective of the entrepreneurial discovery process to identify potential gaps, new actors, possible new areas of cooperation, etc., to strengthen its effectiveness.

However, in these months four new elements have titled the European landscape

- Geostrategic scenario has turned more threatening, with a clear wakeup call for Europe to give itself the means to protect itself and deter potential adversaries. Now Europe is discussing the SAFE instrument mobilising 800 billion euro for defence equipment investments. On 25 June 2025, NATO allies, committed to invest 5% of GDP annually on core defence requirements as well as defence-and security-related spending by 2035, being Poland the leading country in this commitment.
- At the same time, Europe has been grappling with a series of significant disasters, including severe floods and widespread blackouts or cybersecurity threats, which have exposed vulnerabilities in the continent's infrastructure and disaster preparedness. The Preparedness Strategy launched by the European Commission in March 2025, embed preparedness by design into EU policies and actions, foster foresight and anticipation.
- In April 2025, the Communication "A modernised cohesion policy", open the door to territories to adapt their cohesion investment to their new strategic priorities, aiming to support stronger and more resilient regional that are better prepared to address geopolitical challenges, including new areas of investment such as De-fence, Security and Eastern Border Regions (European Commission, 2025f). The Commission urges, Member States and regions, when reprogramming under the Mid Term Review, to increase support to STEP funding investment in Europe's strategic sectors and technologies and ensure that investments with cohesion funding is in line with the Preparedness Union Strategy and the concept of preparedness and security by design that should be embedded into all EU policy.

This new scenario opens the opportunity to encompass the new dimension of preparedness to the Regional Innovation policy planning of Podkarpackie. Preparedness means the ability to anticipate, prevent, and respond to threats. Security, climate or energy threats can also be understood to as "landscape shocks", that can create windows of opportunity for transformative innovation, meaning to an innovation that brings about fundamental, systemic changes in economic, social, and environmental systems. It goes beyond incremental improvements by addressing root causes of societal challenges and fostering inclusive, sustainable development through experimentation, adaptive governance, and coordinated policy efforts (Economic and Social Council, 2025). This

transformative approach would open the engaging of new stakeholders involved in the new preparedness challenges identified for the region; the development of a new vision and orchestration process, where multilevel and interdepartmental collaboration, interterritorial cooperation will drive to the design of new initiatives and policy mix.

The preparedness approach lays the foundation the creation of new value networks, to foster innovation and generate multiple value creation. Regional innovation system capable of responding to climatic and geostrategic crises must be rooted in technological integration, multi-level governance, and broad societal engagement. A clear example of this is the integration of drone and satellite systems, which together form a powerful infrastructure for real-time situational awareness, emergency response, and strategic planning. These capabilities directly reinforce ISR (Intelligence, Surveillance, and Reconnaissance) functions by enabling the continuous collection, processing, and dissemination of data critical to decision-making in both civil protection and security domains.

### **3.1. Orientation and planning**

The Regional Innovation Strategy of the Podkarpackie Province for 2021–2030 serves as a key framework for regional innovation planning, guiding investment and development efforts toward priority sectors through the smart specialisation approach. For expanding its scope to explore the opportunities derived from the Defence and Security application of the drone industry, or, going a step further, going into more a systemic preparedness by design approach, new elements need to be taken into consideration.

The multilevel nature of the security and defence domain suggests the need to engage not just with regional, but also, especially, with national authorities and, through them, being connected with the European and NATO, level building a whole of government approach. If Podkarpackie region aspire to make the most of the defence and security drivers, the coordination between the national and regional level is essential National. The Ministry of Defence, Ministry of Development and Technology, and the boundary management between government departments and policy makers. Whole of governance involves the management of the interdependencies that security, defence (e.g., education, innovation, digitalisation, industrial and regional policies).

This is not merely about coordination between regional and national authorities, but about continuous involvement and engagement at all relevant levels. One possibility is for something like an "open discovery process" for government, between various ministries/constituencies and levels of government.

### **3.2. Resources mobilisation**

The fragmentation of funding rules across European, national, and regional operational programmes makes it difficult—if not impossible—for actors to synchronise resources effectively. This complexity is exacerbated by administrative rigidity and a risk-averse culture, where public authorities are reluctant to fund initiatives that carry a higher likelihood of failure due to fears of non-compliance or audit repercussions. As a result, both private and public research actors face substantial barriers to advancing bold, high-impact innovation and specially for cooperation and ecosystem support.

The STEP regulation, the flexibilization of the Cohesion policy framework after the midterm review and the expected implementation of Defence Readiness Omnibus are expected to facilitate synergies between different regional and European funding.

In the desired system, the regional innovation ecosystem is supported by a robust and adaptive STEM-skilled workforce, underpinned by long-term instruments for forecasting labour market needs and aligning educational pathways accordingly. This vision requires sustained, coordinated efforts among industry, academia, and national education authorities, guided by a shared understanding of evolving technological and sectoral demands. Dedicated tools for skills mapping, foresight, and curriculum development, alongside public–private partnerships, play a central role in equipping future professionals with the competencies needed to thrive in security, aerospace, and dual-use technology domains. This alignment ensures that human capital becomes a strategic asset in driving innovation, resilience, and competitiveness across the ecosystem.

### **3.3 Productive system**

The current drone industrial ecosystem is characterised by a high degree of fragmentation, consisting largely of small and medium-sized enterprises (SMEs) and a limited number of integrators—both domestic and foreign-owned. These integrators act as key nodes in the value chain, establishing networks of local suppliers and promoting technical standards across their supplier and customer base. While this structure creates opportunities for local firms to engage with international markets, it lacks the coordination and critical mass needed to support strategic innovation and industrial upgrading. Facilitating greater access to integrators could incentivise local suppliers to enhance their technological and digital capabilities, thereby accelerating the transition towards a more advanced industrial ecosystem.

In a desired future system, the drone ecosystem would be reconfigured to promote greater coherence, interconnectivity, and strategic alignment across sectors. The following features would support this transformation:

- An increased number of integrators, alongside stronger collaboration between companies and research actors across domains such as artificial intelligence, quantum technologies, advanced materials, space data, GNSS navigation, and situational awareness systems. This would foster technological convergence and higher-value innovation.
- A consolidated and well-coordinated industrial cluster, supported by predictable, multi-year public funding (at least 4–5 years), to enable sustained investment in research, infrastructure, and skills development.
- A highly skilled and specialised workforce, equipped through targeted training programmes, meets the evolving needs of the drone sector and supports sustained innovation and industrial growth in the region.
- Podkarpackie companies actively participate in international security and defence projects, serving as certified and competent partners. Their integration into global consortia positions the region as a strategic hub, linking local supply chains with multinational defence and aerospace ecosystems.
- Strengthened cross-border partnerships, particularly with the aim of integrating into strategic defence value chains and participating in programmes such as the European Defence Fund (EDF), NATO innovation initiatives, and projects coordinated by the European Defence Agency (EDA).

- Targeted investment in public R&D capacity, prioritising academic–industry collaboration to ensure alignment between regional technological capabilities and the evolving needs of the drone and security industries.
- A resilient, regionally anchored European supply chain reduces dependency on Asian component manufacturers, reinforcing systemic independence and strategic security.
- A harmonised European legal framework effectively limits price dumping, safeguarding fair competition and supporting the competitiveness of regional and EU-based producers.

### **3.4. Consumers-users**

In the desired future, the Podkarpackie region features a coherent and strategically aligned subsystem of RPAS consumers and users, integrated across civilian, non-civilian, institutional, and commercial domains. This user ecosystem is no longer fragmented or driven by short-term procurement decisions. Instead, it operates as a critical driver of innovation, resilience, and strategic autonomy in both regional and national contexts.

Arm Forces and uniformed public services (e.g., Police, Border Guard, Fire Brigades, and Territorial Defence Forces) maintain advanced RPAS operational capabilities for ISR, logistics, crisis response, and tactical operations, while also sharing infrastructure and knowledge with civilian stakeholders in secure and mission-specific ways. This interoperability is supported by standardised frameworks for procurement, a training system tailored to the needs, testing, and data governance, allowing for efficient collaboration with regional innovators.

Public institutions such as the State Forests, Rescue Services, and Crisis Management Centres evolve into smart users of drone services. Procurement is reformed to include strategic and innovation-based criteria, supporting the uptake of advanced RPAS technologies and locally developed solutions. These actors form structured partnerships with local firms and universities, participating in joint demonstration projects, shared training programmes, and innovation challenges that strengthen public-sector capacity while catalysing demand for regional drone technologies.

A more mature subsystem includes non-operator consumers who integrate RPAS-enabled services into their own business models—for example, farmers using aerial analytics for crop optimisation, or construction companies relying on 3D site mapping. This group benefits from a growing base of certified training providers, ensuring skills diffusion and workforce development. These users are increasingly visible in regional innovation platforms, contributing demand-side insights to shape RPAS evolution in real-world contexts.

The entire user subsystem is enabled by coordinated governance across regional and national levels, where ministries, local governments, and innovation agencies align their strategies under a mission-oriented innovation framework. Demand-side innovation is fostered through challenge-based procurement, regulatory sandboxes, and data-sharing infrastructures, creating a feedback loop between users and producers. Podkarpackie emerges as a European reference region for drone-enabled public service delivery, civil security innovation, and strategic preparedness border territories.

## **Chapter 4. Conclusions, recommendations and next steps.**

### **4.1. Conclusions and recommendations**

The purpose of this step is to provide guidance for actions related to the definition of policies, instruments, reforms, and policy experiments. The timing of the REGDUALOSA review is highly favourable, as could serve as an opportunity to update the smart specialisation strategy for the next phase. In addition, this review suggests there is a key leverage point to consider: broadening the sectoral approach to aviation and complementing it with a more transformative perspective on preparedness—addressing defence, security, and climate risks, all while contributing to European strategic autonomy.

The following set of recommendations, drawn from stakeholder consultations and expert interviews, aims to contribute to the realisation of this long-term vision.

#### **1. Leverage the added value of the dual-use approach in territorial development strategies contributing to the European Strategic Autonomy**

Support dual-use and defence-oriented activities, business models, and investment strategies in the RPAS sector and related technologies. Particular attention should be given to high-value sub-sectors identified by the European Defence Agency, including intruder detection systems, AI-based applications, GNSS-denied navigation, and secure communications. Advancing these areas can significantly foster Podkarpackie's industrial competitiveness, drive technological innovation, and strengthen the strategic positioning of regional firms in both civilian and defence markets.

1.1 For European administration, clarify and simplify regulations related to dual-use technologies, ensuring SMEs and research institutions understand their obligations.

1.2 Promote intersectoral applications and innovative business models that link defence, civil protection, critical infrastructure monitoring, agriculture, and climate resilience, among others. The development of new business models for drone services can make the sector attractive to investors and entrepreneurs.

1.3 Recognise and define RPAS as a distinct industrial sector, separate from traditional aviation, to ensure tailored policy support and regulatory clarity.

1.4 Enhancing social awareness of RPAS. Foster a comprehensive, multi-level engagement process involving industry, policymakers, and the citizens. This inclusive approach helps build social trust, minimise risks, and promote broad support for responsible RPAS adoption.

#### **2. Revisit Smart Specialisation Strategy (S3) under the 'Preparedness by Design' approach**

The European Preparedness Strategy inspires the integration of a new dimension of preparedness into the regional innovation policy planning of Podkarpackie. Preparedness entails the capacity to anticipate, prevent, and respond to threats. Issues such as security, climate, and energy can be seen as "landscape shocks"—disruptive events that also create windows of opportunity for transformative innovation, understood as innovation that brings about fundamental and systemic changes in economic, social, and environmental systems.

2.1 Foster foresight and anticipation, aligning national and EU-level risk assessments through the integration of data-driven and expert analysis across sectors and borders

2.2 Enabling public–private cooperation

2.3 Build interterritorial partnerships in cross-border and European frameworks, to ensure a coherent and robust response to emerging threats.

2.4 Strengthen the cooperation among elements of the regional innovation ecosystem to build a more resilient, flexible and prepared regional economy and accelerate the response to emerging threats and challenges.

### **3. Reinforce whole-of-government coordination, overcoming policy fragmentation**

The security and defence domain, by its very nature, requires multilevel engagement, involving not only regional actors but also—critically—national authorities, and through them, connections to European and NATO-level frameworks. To fully leverage the strategic opportunities offered by the defence and security agenda, the Podkarpackie region must strengthen coordination mechanisms between the regional and national levels. This includes engagement with key institutions such as the Ministry of Defence, the Ministry of Development and Technology, and improved management of boundaries across government departments and policy areas. A whole-of-government approach is essential for navigating the complex interdependencies across sectors that shape security and defence policy—such as education, innovation, digitalisation, industrial strategy, and regional development.

3.1 Open discovery process for government, fostering structured dialogue and joint agenda-setting between ministries, regional institutions, and relevant stakeholders, engaging defence actors and reinforcing civil–military collaboration.

3.2 For European and national administration, facilitate European and national regulatory frameworks for dual-use Drones and in U-Space implementation. Regions can be involved in this process engaging industry experts in legislation and instituting feedback loops—including consultations, pilot schemes, and sandbox trials—to ensure regulations are workable and responsive.

### **4. Streamline access to multiple funding sources for strategic projects, making the most of the possibilities of the Strategic Technologies for Europe Platform Regulation**

The fragmentation of funding regulations across European, national, and regional operational programmes poses a significant challenge to the effective coordination and synchronisation of resources. This is further compounded by administrative rigidity and a risk-averse culture within public administrations, where concerns over non-compliance or audit sanctions discourage the support of high-risk, high-reward initiatives. As a result, both public and private research actors encounter substantial barriers to pursuing ambitious innovation agendas, particularly those requiring cross-sectoral cooperation and ecosystem development. The ongoing flexibilization of the Cohesion Policy framework following the midterm review—alongside the anticipated implementation of the Defence Readiness Omnibus—offers a timely opportunity to facilitate integrated funding approaches.

4.1. Leverage on (STEP) as a basis for designing new incentive mechanisms and fostering synergies between regional cohesion policy instruments and European strategic programmes, such as the European Defence Fund, Horizon Europe, Digital Europe, and the Innovation Fund, etc.

4.2. Reform national and EU-level financing rules to better support dual-use infrastructure and innovation projects, enabling greater alignment with long-term strategic priorities and technological sovereignty goals.

## **5. Remove access barriers for Start-ups, SMEs in regional, national transnational defence projects**

The Podkarpackie region possesses a solid foundation for research and innovation. However, despite this potential, there is currently limited participation in national and international initiatives, and a lack of coordinated mechanisms to generate collaboration between individual entities. To fully capitalise on regional capabilities, targeted support for collaboration, talent development, and strategic alignment is required.

5.1 Develop dedicated regional R&D Programmes in strategic Technologies specifically tailored to high-potential dual-use technologies. These programmes should involve close collaboration between key actors Research centres, private companies, and international partners—to jointly develop technologies with both commercial and defence applications.

5.2 Design dedicated financing instruments targeting SMEs, start-ups, and challenge-driven initiatives that promote open innovation and experimentation. Support should also be directed towards the creation of micro-consortia and industrial partnerships, enabling collaborative development, risk-sharing, and more effective integration into strategic value chains.

5.3. Encourage regional companies' participation at European and NATO level. At European level, the EU Defence Innovation Scheme (EUDIS), implemented by DG DEFIS, provides targeted instruments to support SMEs, start-ups and non-traditional actors in accessing defence funding. At NATO level, DIANA accelerates dual-use and deep-tech innovation through access to testing facilities, expert networks and tailored support to address critical defence and security challenges.

5.4 Provide technical and administrative guidance to SMEs and R&D centres on, certification process and preparing competitive applications and offers.

5.5 Streamline administrative procedures.

## **6. Fostering Interterritorial collaboration.**

To strengthen the Podkarpackie region's position within the European innovation landscape, there is a need to increase its international visibility and integration. Enhancing external engagement and leveraging regional assets in a more coordinated manner will be essential to attract investors, accelerate innovation, and align with European certification and market standards.

6.1. Enhance the international visibility and engagement of regional innovation stakeholders by supporting their participation in global exhibitions, conferences, and industry forums.

6.2. Promote the use of existing infrastructure—such as testing and certification facilities—as a platform for international cooperation in RPAS development. By offering testing services for dual-use drone systems and components, Podkarpackie can position itself as a valuable partner in national and European certification processes, while supporting product development and validation for local SMEs and international firms alike.

## **7. Address the talent and skills gap in strategic technologies**

To support the long-term development of strategic sectors such as RPAS and mitigate the outflow of qualified youth, the region may consider strengthening the alignment between education, research, and industry. This could involve:

- 7.1. Introducing RPAS-related content across secondary and higher education, as well as vocational training and specialist courses, to build relevant skills and raise early awareness of career opportunities in the sector.
- 7.2. Encouraging stronger collaboration between industry and education providers, enabling companies to share expertise and help shape training programmes that reflect evolving technological and labour market needs.
- 7.3. Facilitating student involvement in applied research and innovation activities, including internships, collaborative theses, and participation in national and European R&D projects. These experiences can improve employability, foster practical skills, and help retain young talent within the region.
- 7.4. Increasing the capacity and availability of tailor-made training courses that respond to the specific needs of individual recipients (e.g., state services).

## **8. Empower and strengthen cluster related to strategic technologies**

In the Podkarpackie region, cooperation between stakeholders is often constrained by rigid administrative structures and limited communication mechanisms. This can result in a misalignment between policy instruments and industry needs, a loss of trust, and reduced participation in collaborative initiatives. Moreover, onboarding new participants into the ecosystem is difficult, with low response rates to outreach efforts. Strengthening engagement, improving communication channels, and creating more inclusive platforms for dialogue and co-creation are necessary steps to support long-term regional development and innovation.

- 8.1. Strengthen cross-sectoral clusters and working groups that regularly bring together stakeholders from academia, business, government, and civil society. These platforms can improve coordination, encourage trust-building, and facilitate structured dialogue around shared challenges and priorities in the region.
- 8.2. To strengthen the role of regional clusters in fostering innovation and industrial cooperation, a dedicated cluster support funding scheme is proposed. This could include annual performance-based funding (linked to key KPIs) and collaboration vouchers to support joint projects between SMEs, research institutions, and universities in areas such as R&D, prototyping, and technology transfer
- 8.3. Create targeted strategies to improve outreach and long-term engagement of ecosystem actors. This includes the development of clear communication channels, inclusive consultation processes, and the equitable distribution of coordination tasks to reduce dependency on a small group of highly involved stakeholders.
- 8.4. Advocate for reforms to the academic evaluation system at the national level to better recognise and re-ward collaboration with industry. Moving beyond metrics focused solely on

teaching and publication, a more balanced evaluation framework would incentivise practical engagement and knowledge transfer between academia and the private sector.

## **9. Foster Market creation through demand-driven instruments**

Procurement procedures for high-end equipment have traditionally been constrained by price-based criteria, which tend to favour large firms—including non-European suppliers. Entrepreneurs in Podkarpackie reported the impossibility of competing on cost with non-European manufacturers and expressed concern over dependence on subassemblies and components produced by foreign entities. In this regard, it is essential from the European Commission to explore and provide recommendations to the European public procurers for the application of the “Buy European” principle enshrined in the European Defence Fund and the European Defence Industrial Strategy (EDIS).

9.1 Capacity-building for public procurers, including training on innovation procurement, legal frameworks, and technology assessment to expand innovation-oriented public procurement to reduce adoption risks. Dual-use innovation often stalls beyond TRL 6 due to limited late-stage capital and low demand-side readiness. EU institutions, nation and regions may consider revising procurement practices to move beyond lowest-price criteria by prioritising performance, innovation, security and strategic value.

9.2. Multilevel and cross border collaboration and best practices exchange in pre-commercial procurement (PCP) and pilot schemes focused on dual-use drone solutions. Strengthening institutional capabilities in public procurement will improve adoption of advanced RPAS solutions and create market opportunities for European developers and integrators.

## **10. Support dual use test beds and demonstration infrastructures**

Stakeholder consultations have highlighted a pressing need for specialised testing grounds, advanced laboratories, and dedicated investment mechanisms. A supportive physical and institutional infrastructure is crucial not only for accelerating R&D and commercialisation, but also for ensuring compliance with international standards, enabling dual-use technology development, and attracting both public and private investment. Establishing such an environment is essential to position the region as a competitive hub for drone innovation and industrial growth.

On 4 June 2025, the Regional Government of Podkarpackie announced the creation of the Polish Centre for Certification and Development of Unmanned Systems, also referred to as 'Drone Valley'. This initiative is expected to provide a central platform for research, certification, and testing of unmanned systems, thereby enhancing the region's capabilities in both civil and defence applications.

10.1 To support this infrastructure, dedicated financial instruments or public-private partnership (PPP) schemes may be developed to incentivise private sector investment in the modernisation of laboratories and research facilities within public institutions. Such mechanisms could include co-financing arrangements, tax incentives, or shared-access frameworks to ensure the long-term sustainability and quality of public research infrastructure.

## **11. Strengthen strategic enablers like quantum technologies and artificial intelligence**

To ensure the sustained competitiveness and technological leadership of the RPAS sector in Podkarpackie, it is critical to strengthen strategic enabling technologies. These include artificial intelligence (AI), quantum technologies, advanced materials, secure communications, edge computing, and embedded systems. Such technologies are fundamental to developing secure autonomous navigation, advanced sensor fusion, GNSS-denied operations, and intelligent situational awareness—capabilities essential for high-performance, dual-use drone systems.

11.1. Supporting these enablers through dedicated regional R&D programmes will allow Podkarpackie to align with national and European priorities, strengthen cross-border and inter-sectoral collaboration, and accelerate the development and commercialisation of next-generation drone technologies. These efforts will also foster deeper cooperation among regional enterprises, universities, and international research networks, enhancing the region's role as a centre for industrial innovation and strategic autonomy.

## **12. Establish observatories for dual-use technologies and defence needs in collaboration with the Ministry of Defence**

12.1. To strengthen Podkarpackie's role in national and European defence innovation, it is recommended to establish a Regional Defence & Dual-Use Technology Liaison Office. This office would act as a bridge between regional industry, research institutions, and the Ministry of Defence. It would facilitate access to relevant programmes (e.g., European Defence Fund), monitor defence technology needs, and support companies in meeting required certifications (such as AQAP or NATO Secret). It would also disseminate procurement offers, coordinate calls for proposals, and organise matchmaking events to align regional capabilities with national strategic needs, especially in dual-use RPAS and advanced technologies.

## **4.2 Next Steps**

This report provides a timely foundation for Podkarpackie's next strategic steps at the European level. The region's upcoming participation in the Experimentation Journey on Territorial Preparedness, part of the Preparatory Action Innovation for Place-Based Transformation led by the Joint Research Centre and financed by the European Parliament, offers a unique opportunity to pilot the insights and recommendations outlined here. By aligning its innovation strategy with Europe's defence and preparedness agendas, Podkarpackie can reinforce its position as a frontrunner in dual-use innovation, strengthen multilevel governance, and actively contribute to shaping Europe's strategic resilience and autonomy.

## References

- Aridi, A., Cowey, L., Kaznowski, A. J., Toborowicz, J. J., & Wiatr, D. K. (2018). *Poland catching-up regions 2: Podkarpackie center for innovation*. World Bank Group. <https://documents.worldbank.org/curated/en/848231529313676820>
- Balder, K., Kirstetter, E., Hader, M., & Dy, D. (2025). *Driving innovation and resilience on Europe's path to strategic autonomy: The defence imperative*. Roland Berger. <https://www.rolandberger.com/en/Insights/Publications/From-sleeping-giant-to-defence-superpower.html>
- Béraud-Sudreau, L., & Scarazzato, L. (2023). *Beyond fragmentation? Mapping the European defence industry in an era of strategic flux*. Brussels School of Governance. <https://www.brussels-school.be/research/publications/beyond-fragmentation-mapping-european-defence-industry-era-strategic-flux>
- Calcara, A., Gilli, A., & Gilli, M. (2023). Short-term readiness, long-term innovation: The European defence industry in turbulent times. *Defence Studies*, 23(4), 626–643. <https://doi.org/10.1080/14702436.2023.2277439>
- Council of the European Union. (2022). *A strategic compass for security and defence*. <https://data.consilium.europa.eu/doc/document/ST-7371-2022-INIT/en/pdf>
- Draghi, M. (2024). *The future of European competitiveness*. European Commission. [https://commission.europa.eu/topics/strengthening-european-competitiveness/eu-competitiveness-looking-ahead\\_en](https://commission.europa.eu/topics/strengthening-european-competitiveness/eu-competitiveness-looking-ahead_en)
- Ertel, F., & Göler, D. (2025). European defence: Developments, challenges and gaps in institutions, instruments, and strategies. En M. Jopp & J. Pollak (Eds.), *The European Union's geopolitics* (pp. 53–76). Springer. <https://doi.org/10.1007/978-3-031-74587-4>
- European Commission. (2022). *A drone strategy 2.0 for a smart and sustainable unmanned aircraft ecosystem in Europe* (COM/2022/652 final). <https://eur-lex.europa.eu>
- European Commission. (2024). *A new European defence industrial strategy: Achieving EU readiness through a responsive and resilient European defence industry* (JOIN/2024/10 final). <https://defence-industry-space.ec.europa.eu>
- European Commission. (2025a). Communication A Competitiveness Compass for the EU COM (2025) 30 final. Brussels. [https://commission.europa.eu/topics/eu-competitiveness/competitiveness-compass\\_en](https://commission.europa.eu/topics/eu-competitiveness/competitiveness-compass_en)
- European Commission. (2025b). *Joint white paper for European defence readiness 2030* (JOIN/2025/120 final). <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52025JC0120>
- European Commission. (2025c). *European preparedness union strategy* (JOIN/2025/130 final). [https://commission.europa.eu/topics/preparedness\\_en](https://commission.europa.eu/topics/preparedness_en)
- European Commission. (2025d). *Preserving peace: Defence readiness roadmap 2030* (JOIN/2025/27 final). [https://defence-industry-space.ec.europa.eu/document/download/9db42c04-15c2-42e1-8364-60afb0073e68\\_en?filename=Joint-Communication%20Defence-Readiness-Roadmap-20](https://defence-industry-space.ec.europa.eu/document/download/9db42c04-15c2-42e1-8364-60afb0073e68_en?filename=Joint-Communication%20Defence-Readiness-Roadmap-20)
- European Commission. (2025e). *EU defence industry transformation roadmap: Unleashing disruptive innovation for defence readiness* (COM/2025/845 final). <https://defence-industry-space.ec.europa.eu>

- European Commission. (2025f). *A modernised cohesion policy: The mid-term review* (COM/2025/163 final). [communication-mid-term-review-2025\\_en.pdf](#)
- European Defence Agency. (2024). *Coordinated annual review on defence (CARD) report 2024*. <https://eda.europa.eu/docs/default-source/documents/card-report-2024.pdf>
- EY. (2024). *The Polish aviation industry* (November). [https://www.dolinalotnicza.pl/wp-content/uploads/2025/02/raport\\_sppl\\_eng.pdf](https://www.dolinalotnicza.pl/wp-content/uploads/2025/02/raport_sppl_eng.pdf)
- Fiott, D. (2022). The fog of war: Russia's war on Ukraine, European defence spending and military capabilities. *Intereconomics*, 57(3), 152–156. <https://doi.org/10.1007/s10272-022-1051-8>
- Interreg Europe. (2021). *Unmanned aerial systems cluster in Podkarpackie region*. <https://www.interregeurope.eu/good-practices/unmanned-aerial-systems-cluster-in-podkarpackie-region>
- Instytut Mikromakro i Sieci Badawczej Łukasiewicz – Instytut Lotnictwa (2023) *Burza. Rynek dronów Polsce: Raport Fundacji* (Edycja 2023). Fundacja Instytut Mikromakro. [Raport BURZA – rynek dronów w Polsce. Edycja 2023 - Sieć Badawcza Łukasiewicz - Instytut Lotnictwa](#)
- Letta, E. (2024). *Much more than a market: Speed, security, solidarity*. Council of the European Union. <https://www.consilium.europa.eu/media/ny3j24sm/much-more-than-a-market-report-by-enrico-letta.pdf>
- Niinistö, S. (2024). *Safer together: Strengthening Europe's civilian and military preparedness and readiness*. European Commission. [Report: Safer Together – Strengthening Europe's Civilian and Military Preparedness and Readiness | European Commission](#)
- Pontikakis, D., Fernandez, T., Janssen, M., Guy, K., Marques Santos, A., Boden, J., & Moncada Paterno Castelo, P. (2020). *Projecting opportunities for industrial transitions (POINT): Concepts, rationales and methodological guidelines for territorial reviews of industrial transition*. Joint Research Centre. <https://doi.org/10.2760/590389>
- Scazzieri, L. (2025). *Towards an EU "defence union"?* Centre for European Reform. <https://www.cer.eu/publications/archive/policy-brief/2025/towards-eu-defence-union>
- Suwala, L., & Micek, G. (2018). Beyond clusters? Field configuration and regional platforming: The aviation valley initiative in the Polish Podkarpackie region. *Cambridge Journal of Regions, Economy and Society*, 11(2), 353–372. <https://doi.org/10.1093/cjres/rsy010>

## List of abbreviations and definitions

| <b>Abbreviations</b> | <b>Definitions</b>  |
|----------------------|---|
| ARP                  | Industrial Development Agency (Agencja Rozwoju Przemysłu)   |
| CARD                 | Coordinated Annual Review on Defence                        |
| DIANA                | Defence Innovation Accelerator for the North Atlantic       |
| EDF                  | European Defence Fund                                       |
| EDIS                 | European Defence Industrial Strategy                        |
| EDIP                 | European Defence Industrial Programme                       |
| ERDF                 | European Regional Development Fund                          |
| EUDIS                | Defence Innovation Scheme                                   |
| GNSS                 | Global Navigation Satellite System                          |
| MALE                 | Medium-Altitude Long-Endurance                              |
| PFR                  | Polish Development Fund (Polski Fundusz Rozwoju)            |
| RIS3                 | Research and Innovation Strategies for Smart Specialisation |
| RPAS                 | Remotely Piloted Aircraft Systems                           |
| SEZ                  | Special Economic Zone                                       |
| STANAG               | NATO Standardisation Agreements                             |
| STEP                 | Strategic Technologies for Europe Platform                  |
| TRL                  | Technology Readiness Level                                  |
| U-Space              | European Airspace Integration concept for Drones            |

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## Annex 1.

### Smart Specialization Panel Aviation and Cosmonautics Unmanned Aircraft Systems in the Podkarpackie Region

#### Case study REGDUALOSA project

December 10 2024.

Podkarpackie Innovation Center

**Moderation: Krzysztof Mieszkowski – Expert in regional innovation systems *in the EU***

| Time             | Programme   |
|------------------|---|
| 11:00 -<br>11:15 | <b>Opening speeches:</b> <ul style="list-style-type: none"><li>• <b>Karol Ożóg</b> - Deputy Marshal of the Podkarpackie Region</li><li>• <b>Carlos Torrecilla</b>- Head of Unit Innovation Policies and Economic Impact Joint Research Centre European Commission Seville</li></ul> |
| 11:15-11:30      | <b>EDF and RPASs- The specific case of the Technological Challenges</b><br><b>Ignacio Montiel-Sanchez</b> - Project Manager - Defence Development Programme.<br>Directorate - General for Defence Industry and Space (DG DEFIS)   |
| 11:30 –<br>11:45 | <b>Presentation of the REGDUALOSA project</b><br><b>Carmen Sillero Illanes</b> - Economic and Policy Analyst<br>Joint Research Centre. European Commission Seville  |
| 11:45 –<br>12:05 | <b>Technological Innovation System. Defence and dual use applications in the domain of Aerial robotics</b><br><b>Geert de Cubber</b> - Royal Military Academy of Belgium  |
| 12:05 –<br>12:20 | <b>Case Study development of unmanned systems and dual-use applications in the Podkarpackie Region</b><br><b>Prof. Tomasz Rogalski</b> - Rzeszow University of Technology   |
| 12:20 –<br>14:50 | <b>Consultation with stakeholders in the unmanned aircraft systems sector</b> (open discussion to develop conclusions and recommendations)<br>Moderation of the discussions: prof. Tomasz Rogalski and Krzysztof Mieszkowski:   |
| 14:50 -<br>15:00 | <b>Final conclusions and summary of the workshops</b><br><b>Krzysztof Mieszkowski</b> - <i>Expert on regional innovation systems in the EU</i>  |

## Annex 2

**Table 1** Participants at the meeting on 30/09/2024 and interviewed by the regional expert

| No. | Entity                   | Interviewed |
|-----|--------------------------|-------------|
| 1.  | EUROTECH                 | X           |
| 2.  | PPHU VACUMA              |             |
| 3.  | B-Technology sp. z o.o.  |             |
| 4.  | DRONEHUB                 |             |
| 5.  | Tomkov Sp. z o.o.        |             |
| 6.  | FOTOACC                  | X           |
| 7.  | BS Labs Sp. z o.o.       |             |
| 8.  | PnP Systems Sp. z o.o.   |             |
| 9.  | TRIGGER Composites       |             |
| 10. | PILC Józef Grzybowski    | X           |
| 11. | RC-LIPOL RPAS TECHNOLOGY |             |
| 12. | XERALL                   |             |
| 13. | RECTANGLE                |             |
| 14. | Baltic Aerospace Systems |             |
| 16. | RARR                     | X           |
| 17. | PCI                      | X           |
| 18. | MARR                     | X           |
| 19. | Inkubator KROSNO         |             |
| 20. | Politechnika Rzeszowska  |             |
| 21. | Rea Space                |             |
| 22. | Proximo Aero             | X           |

*Source: Authors*

**Table 2** Stakeholders' consultation participants 11/12/2025

| No. | Entity  |
|-----|---|
| 1   | UMWP  |
| 2   | Joint Research Centre                                     |
| 3   | Centrum Naukowo-Technologiczne Systemów Bezzałogowych     |
| 4   | Urząd Lotnictwa Cywilnego                                 |
| 5   | Podkarpacki Urząd Wojewódzki w Rzeszowie                  |
| 6   | UP Sanok  |
| 7   | Rzeszow University  |
| 8   | Akademia Sztuki Wojennej                                  |
| 9   | Drone Space Valley  |
| 10  | DG DEFIS European Commission                              |
| 11  | EUROTECH  |
| 12  | PILC  |
| 13  | Komenda Powiatowa Państwowej Straży Pożarnej w Przeworsku |
| 14  | PANS Krosno   |
| 15  | Port Lotniczy Rzeszów                                     |
| 16  | Krintech  |
| 17  | Górskie Ochotnicze Pogotowie Ratunkowe Bieszczady         |
| 18  | Polska Agencja Kosmiczna                                  |
| 19  | Bieszczadzki Oddział Straży Granicznej w Przemyślu        |
| 20  | MS Biznes   |
| 21  | Podkarpackie Centrum Innowacji                            |
| 22  | Podkarpackie Biuro Geodezji i Terenów Rolnych W Rzeszowie |
| 23  | Komenda Wojewódzka Policji w Rzeszowie                    |
| 25  | Komenda Powiatowa Państwowej Straży Pożarnej w Przeworsku |
| 26  | Proximo Aero sp. Z o.o                                    |
| 27  | Komenda Wojewódzka Państwowej Straży Pożarnej w Rzeszowie |
| 28  | Accuma sp. z o.o  |
| 29  | Podkarpackie Biuro Geodezji i Terenów Rolnych W Rzeszowie |
| 30  | Akademia Umiejętności Technicznych Leonardo               |
| 31  | Agencja Rozwoju Przemysłu S.A.                            |
| 32  | GOPR Bieszczady   |
| 33  | Bezzałogowe Systemy Lotnicze                              |
| 34  | Rzeszow University of Technology                          |

Source: Authors

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