



A Balkan Perspective: Balancing Growth Through Responsible Space Sustainability in Emerging Regions

Martina Dimoska* 

President and Founder, International Space Alliance, North Macedonia.

Abstract: Space exploration has profoundly impacted daily life, yet many developing regions, such as the Balkans, struggle to access its benefits due to corruption, brain drain, and systemic inefficiencies. This op-ed advocates for a sustainable and responsible approach to space development in emerging regions, emphasizing capacity building, space sustainability, and policy frameworks. By fostering education, technology transfer, and regional collaboration, Balkan nations can counter talent loss and contribute meaningfully to the global space sector. Additionally, integrating environmentalism into space activities and promoting green technologies can position the region as a leader in sustainable innovation. A strong policy framework, space diplomacy, and public engagement will be key to ensuring long-term success. Through these efforts, the Balkans can establish a responsible and forward-thinking space industry that balances growth with sustainability, setting a precedent for other developing regions.

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1. Introduction

The effects of space exploration are all around us — they’re in our pockets, homes, bedrooms, kitchens, and cities. Satellites help us navigate using GPS and provide remote sensing to protect crops, and predict and respond to natural disasters like floods, hurricanes, and wildfires. Space innovations are found in our phone cameras; memory foam shoes, pillows, and mattresses; and non-stick cookware. Despite this, there remains a big disconnect between space exploration and our daily life for many. Some regions still lack access to these advancements due to their developmental stage. For instance, the Balkan Peninsula, a developing region, continues to face pervasive corruption, broken processes that have resulted in dysfunctional systems and the widespread “brain drain.” These effects have led to an exodus of skilled workers who are migrating toward better opportunities. To start an admirable space exploration expansion within the region, it’s crucial to deploy capable individuals strategically and prioritize sustainability over irresponsible expansion. Amidst all the problems that developing regions like the Balkans are facing, there’s a sustainable silver lining. If developing countries choose to invest their resources and talent toward becoming emerging space nations, their advancements can showcase further significance far exceeding innovation. Significant space development can demonstrate capabilities by learning from past mistakes whilst establishing pioneering, environmentally conscious, and ethical strategies, setting a strong example for corruption-prone regions. This initial success could set a precedent, potentially influencing and improving standards in other sectors where best practices are rare due to a plethora of issues such as corruption, favouring sustainable development over negligent growth.

2. The Way Forward is Threefold

2.1 Capacity Building: Education, Technology Transfer, Collaboration

Implementing strategies to address the brain-drain epidemic prepares regional peers for the global space workforce through education and training, investing in human capital to close the skill gap. Early STEAM and space education promotion encourages creativity and responsible use of space. As regional space actors collaborate, they enhance the international footprint, potentially uniting the Balkans once again. This time, their goal has a greater purpose to establish a sustainable space terrain while maintaining distinct regional approaches.

* President and Founder of the International Space Alliance NASA Space Apps Challenge Local Lead - Mountain View, Silicon Valley, NASA Ames Research Center, California; NASA Space Apps Challenge Local City Connector. Contact: mdimoska@kent.edu.

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By working together with important bodies to enhance strategic alliances in the region, Balkan countries can improve their collective space capabilities. These include joint projects, data sharing, and technology transfer to accelerate progress in space exploration while also considering the environmental footprint. By emphasizing sustainable methods and learning from existing space nations, the Balkans can positively contribute to the global space sector. They can more easily implement guidelines and criteria for ethical design, launch, and end-of-life disposal of research, projects, and missions that are based on the knowledge of well-established space agencies, but without the layers of bureaucracy that hinder more mature space agencies.

2.2 Addressing Space Sustainability Challenges, Integrating Environmentalism in Space Activities

The Balkan region is in a unique position on the innovation stage with rich natural resources, manpower, and the ability to learn and modify from mature space programs to launch its own innovative and collaborative space force. Given these unique positions, the Balkan region can take an educated stance in substantiality and become a leader in industry and environmental protection. In the absence of a regional space industry, emerging space-focused actors can take an informed perspective on sustainability such as promoting conscious utilization and sharing of deployed satellites, preexisting insights, research, and resources in the realm of space exploration or embracing green space technologies and biodegradable materials that could position the Balkans as a pioneer in ecological sustainability. These practices can significantly boost local economic growth and regional development, minimize environmental impact, and drive innovation in green technology, positioning the Balkans as both an early adopter and an example setter.

2.3 Policy Frameworks, Space Diplomacy, and Public Engagement

It's vital to create regional and national policies that balance sustainability and growth. By acting responsibly and incorporating tools such as environmental impact studies, collaboration with surrounding nations and creating regional accords can improve regional industry stability. Being collaboratively involved in global forums and notable entities can help maintain safety and prevent regional conflicts. Success stories that improve society without compromising the environment, celebrating notable achievements, and enhancing educational capabilities are all effective ways to raise public awareness on space sustainability. The Balkans comprise many civilizations, ethnic groups, and religious beliefs. We have the opportunity to unlearn, restart, reignite, and remake if we put more emphasis on unity rather than division, forging a path toward greater regional understanding and contributing toward a collective global progress. In redefining growth and sustainability in space, we can pivot ourselves toward a future where innovation meets responsibility, ensuring that our exploration of the cosmos enhances rather than compromises life on Earth.

3. Conclusion

The Balkan region stands at a pivotal moment where it can redefine its trajectory in space exploration by prioritizing sustainability, responsible innovation, and collaboration. By addressing challenges such as brain drain and systemic inefficiencies through education, technology transfer, and strategic partnerships, the region can position itself as an emerging space actor. Integrating environmentalism into space activities and embracing green technologies will not only minimize the ecological impact but also set a global example for sustainable development. Additionally, establishing strong policy frameworks and engaging in space diplomacy will ensure long-term stability and growth. By fostering unity over division, the Balkans have the opportunity to lead by example, proving that space exploration can be both ambitious and ethical. Through strategic action, the region can contribute to a future where innovation and responsibility go hand in hand, benefiting both space advancement and life on Earth.

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5. Conflict of Interest

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