

# BOREAS Space and the Prospects for Private Spaceflight in Bulgaria

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## ABSTRACT

*BOREAS Space is a private aerospace organisation based in Sofia, Bulgaria. It was formed around the Sofia-based core of participants in the Bulgarian Orbital REsearch And Satellites (BOREAS) initiative, which included students in Bulgaria, Canada and the United Arab Emirates. Since then, the team has launched its own private space effort, based around affordable new technologies like CubeSats. BOREAS Space aims to revitalise the domestic space technology sector with a series of pico- and nanosatellites and to promote space research as the cornerstone of a highly integrated knowledge economy.*

*Keywords: Bulgaria, CubeSat, Innovation, Lunar Nanosatellite, Observation, Private Spaceflight, Space Programme*

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## 1. INTRODUCTION

Aerospace activities in Bulgaria have traditionally been dominated by state institutes, those of the Bulgarian Academy of Sciences being at the forefront. The Astronautical Society, established in Sofia in December 1957, was the first space research organisation in the country. Throughout the 1960s, similar state-sanctioned organisations appeared in other large cities. (Mishev, 2004) In the next two decades, Bulgaria built its first satellite, the Intercosmos-1300, and a

number of joint experiments were conducted in cooperation with the Soviet Union. However, state funding for scientific activities declined drastically in the 1990s after the collapse of the Soviet Union. The public aerospace sector in Bulgaria has since remained underfunded and continues to lag behind global trends and technical requirements.

For the past decade, innovation has become the cornerstone of prosperity for both strong, export-driven economies and rapidly developing nations. Persistent and concentrated

investment in scientific research is the key to improving economic performance and quality of life.

Innovation itself is driven by a number of factors, the most important being a good educational system, a large pool of human resources, infrastructure, adequate financial capital and spending, and a relaxed legal environment. Taking all these factors into account, we see that a functioning knowledge economy – and the resulting high living standards that heavily depends on the close cooperation of the labour market, businesses and state institutions.

In this sense, it is not surprising that Bulgaria has demonstrated unbalanced economic growth and continues to lag behind other EU members on a number of economic indicators (Central Intelligence Agency, 2013). A vast portion of the technological base built during the period of planned economy between the 1950s and 1980s has long fallen into disrepair. Human capital is insufficient, and university graduates in most fields of science choose to move to other countries because of low wages and absent scientific infrastructure in Bulgaria itself. The scope of research of the scientific personnel that remains is limited by underinvestment, while the number of published and cited papers is very low. A 2004 study found that 31 countries account for 98% of the world's most cited papers; Bulgaria was among the other 162 countries that accounted for 2% or less (King, 2004). The situation has not improved since then; on the contrary, the country continues to fall in international rankings for education, scientific impact and competitiveness.

Most of these poor results stem from inadequate investment in education and R&D. Eurostat shows that Bulgaria consistently ranks at the bottom of EU-27 in terms of R&D expenditures as percentage of gross domestic product (GDP), while the bulk of available spending comes from the State. Successive governments have all shown little to no commitment or understanding of the knowledge economy and innovation. Finally, the demographic decline and brain drain only serve to exacerbate the economic situation. Bulgaria has one of the worst

population decline rates in the world; only Saint Pierre and Miquelon, Moldova and the Cook Islands lose more population annually (Central Intelligence Agency, 2013). In February 2013, the Ministry of Economy, Energy and Tourism (MEET) released a report on the “Strategy for Intelligent Specialisation”, which listed the insufficient number of qualified specialists and the lack of cooperation between businesses, universities and scientific communities as the principal obstacles to innovation (MEET, 2013).

It is obvious that such an environment offers little incentive for scientific research, especially its avant-garde – the aerospace sector. The interest towards space exploration is low for yet another reason – it is perceived as extremely costly, demanding tens of millions of euro without yielding direct results. Bulgaria's private sector is comprised either of small enterprises without the capacity to invest in innovation, or of very large enterprises in the energy, pharmaceutical and food sectors, which have expressed more interest in retaining the status quo than to expand and upgrade. Probably the most negative factor in the situation is the lack of interest towards scientific research in general. A 2007 Eurobarometer poll found that Bulgarians are at the bottom of EU-27 in terms of interest towards scientific research: only 24% of the respondents said they are interested in it. In the same poll, 47% of respondents were completely apathetic to the way scientific information is presented to them (Eurobarometer, 2007). After taking into account all these factors, it can be concluded that some of the primary non-technological tasks for any private entity in the field of aerospace technology would be to:

- Increase awareness of the purpose and benefits of aerospace technology;
- Collaborate with public institutions to lobby for increased spending in education, especially for aeronautical and space sciences;
- Demonstrate the capabilities of low-cost solutions such as CubeSats.

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