

# Outer Space as a Key Element in Securing Civilizational Resilience

## *- Presentation Notes -*

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## INTRODUCTION

I would like to start by setting the premises of my talk – which will be more philosophical than technical – within the context of this conference. First and foremost, I would like to state that I share Samuel Huntington’s view – expressed a quarter century ago – who saw NATO as “the security organization of Western civilization<sup>1</sup>”. The second premise is my view that exploration – including space exploration – is at the core of the Western civilization. As such, the preservation of the space capabilities of NATO’s member states – including the non-military ones – is a means of securing civilizational resilience.

## WHAT IS CIVILIZATIONAL RESILIENCE?

The Western Civilization is the civilization at whose core lays the “Apollonian frame of mind”. The “Apollo and Dionysus” dichotomy is an often used concept in the Western philosophy and literature – the equivalent of the “Yin and Yang” dichotomy. In the Greek mythology, Apollo and Dionysus are both sons of Zeus, who embody two different sets of values. Apollo is the god of the Sun, of rational thinking, and appeals to logic. Dionysus is the god of dance and wine, of irrationality and chaos, appealing to emotions and instincts.

Outer space exploration is an embodiment of the Apollonian frame of mind. In her own “Apollo and Dionysus<sup>2</sup>” essay, Ayn Rand contrasts the lunar landings of the appropriately named “Apollo Program” with the Dionysian “Woodstock Festival” of the same time. I share the fears that our society is losing its Apollonian, rational spirit and is becoming increasingly irrational. Space exploration is not only a means of preserving civilization, but also at the very core of our civilization.

How do we use space as a means of preserving civilization? One of the favorite tropes in the space circles has resilience – or the lack of it !- at its core. It states that the dinosaurs have perished because they did not have a space program. Terrestrial life at large is resilient, having survived the Chicxulub asteroidal impact 66 million years ago – yet the dinosaurs did not. A spacefaring civilization is more resilient than a non-spacefaring one. The evolution of our civilization into a multi-planetary one through space settlement is now at the verge between science fiction and science fact; planetary defense against earthbound asteroids is, also, about to reach escape velocity from the realm of imagination into the one of reality.

Humankind has not been spared bottleneck events, whether these apply to biological populations or to cultures. A bottleneck event can result either in extinction, or in recovery – depending on the preparedness and resilience of the said civilization. A biological bottleneck event is said to have occurred 70,000 years ago – we speak of the “Toba Catastrophe Theory” – when the eruption of a supervolcano in what is today Indonesia is said to have resulted in the reduction of the human population to 10,000-30,000 individuals.

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<sup>1</sup> Huntington, Samuel P., 1997. „The Clash of Civilizations and the Remaking of World Order”. Penguin Books, p.161

<sup>2</sup> Rand, Ayn, 1969. “Apollo and Dionysus”. *The Objectivist*. Online at <https://bit.ly/2NsJmq6> (accessed on 01.05.2018)

Eleven years ago, while at the International Space University, I was part of a working group that, prompted by the threats of supervolcanoes and asteroids and inspired by the “seed banks”, examined ways in which the Moon could serve as a knowledge repository in case of civilizational collapse – a lunar archive that would serve as a tool in rebuilding civilization.

Civilizational resilience is the ability to cope with - and bounce back from - civilizational decline. The best way for this is ensuring that an educated body exists that will preserve knowledge and rebuild the society. The theme of knowledge as a means of securing societal resilience has been used by many authors; in Walter Miller’s post-apocalyptic novel “A Canticle for Leibowitz”, the monks of the fictional Albertian Order preserve the surviving remnants of humankind’s scientific knowledge until the world is again ready to rebuild civilization; in Isaac Asimov’s *magnum opus*, the collapse of civilization is predicted and coped with through the establishment of the Foundation, an entity that preserves the knowledge of the Galactic Empire. These fictional works are rooted in reality; throughout the Dark Ages, the Western civilization was preserved in monasteries by the educated elite embodied by monks. Furthermore, the resilience of a polity is much higher if the scientific literacy is not only the province of the elites, but is prevalent throughout the public.

### **The Education System as a Critical Security Infrastructure Element**

Education is essential in securing civilizational resilience. Six decades ago, the United States went through the “Sputnik Crisis”. The launch, on October 4<sup>th</sup>, 1957, of Earth’s first artificial satellite by the Soviet Union sent shockwaves throughout the American society, triggering, less than a year later, not only the creation of NASA but also the enactment of “An Act to strengthen the national defense and to encourage and assist in the expansion and improvement of educational programs to meet critical national needs [...]” also known as the “National Defense Education Act”. The Act was triggered by the national sense that the United States were lagging behind the Soviet Union in terms of science education. Eleven years later, in the summer of 1969, the new policy of investing in science education had culminated with the winning of the Space Race by the United States as champion of the Western civilization. The West’s space capabilities –civilian but also military – would not have been enhanced without the paradigm shift in elevating science education to a core value, and by recognizing that STEM (Science, Technology, Engineering and Mathematics) is essential for national defense. Education, indeed, made the American society bounce back and take the lead, due to the realization six decades ago that an educational crisis is a defense crisis, and that the pen is mightier than the sword - being, indeed, a “weapon of mass instruction” when properly used.

The recognition back then that STEM education goes hand in hand with national defense also meant the admission that a society with low science literacy is practically an undefended society. This security hazard has been noted and addressed at that time in an effective manner. Sadly, nowadays, throughout the Western world a decreasing number of young people are taking up STEM-related studies and careers, eroding thus the resilience of our civilization; it can be said that, when it comes to STEM education, disaster has already struck, and that society needs to be resilient and find a way of coping with this crisis. In addressing this emergency, space comes to the rescue.

In Europe, ESA – the European Space Agency – has education listed in its 1975 Convention as one of its mandatory, basic activities in which all Member States participate (article V.1.a.i.). ESA’s educational activities take place at all stages, from primary and secondary to the tertiary level. While the term *sugarcoating* has a negative connotation, implying an action of making something superficially more attractive, it has been noted and recognized that children do have a genuine – not a superficial - fascination for outer space, and that space can be used as an effective means for delivering STEM education in the classroom. Therefore, ESA has created more than a decade ago a network of ESEROs – European Space Education Resource Offices – devised with the aim to reverse the negative trend in STEM education enrollment through an Education program which targets European students starting from an early age. As stated above, ESERO uses space related themes and the genuine fascination felt by youth for space to enhance school pupils’ literacy and competence in STEM-related subjects. The ESERO project highlights as

well the associated applications from space and raises awareness of the large range of career prospects in the space domain. The activities provided by the ESERO network help bring STEM subjects within the reach of the pupils, successfully challenging the misconception that science is the province of geniuses.

Outer space becomes not just a place of inspiration and future dreams, but also an everyday fact of modern life. Real space data and the application of real-life scientific methodology, accompanied by the role model support of real space experts such as scientists and astronauts, are used extensively. The ESERO project also stimulates young people's awareness of Europe's space program and of its importance for modern society and economy<sup>3</sup>.

Within the network, there are twelve tailor-made ESEROs, which are established as a collaboration between the European Space Agency and national partners who co-finance the respective national ESERO. In Romania, the national partner of ESA in the ESERO project is the Romanian Space Agency, the national coordinator of space activities.

### Space Exploration as our Civilizational Legacy

Given the importance of space in – among others – the current educational context as a way of securing civilizational resilience through STEM education, it will not be far-fetched to consider the preservation of the central place occupied by space exploration in our culture as essential for the survival of our civilization. Exploration – including space exploration – is one of the core achievements of the Western world; logical thinking and rationalism – factors without whom there would have been no space exploration – are, as stated at the beginning of this talk, central tenets of the classical Western values. Space exploration is, therefore, our civilizational legacy – perhaps the very pinnacle of the Western civilization and it needs not be renounced or slowed down as it seemed to have been after the end of the Space Race. As Charles Krauthammer said a quarter century ago, the future generations will not remember the 20<sup>th</sup> Century by its art and literature, but by the fact that –

„Ours was the generation that first escaped gravity, walked the moon, visited Saturn-and then, overtaken by an inexplicable lassitude and narrowness of vision, turned its cathedrals of flight into wind tunnels.“<sup>4</sup>

It ought to be a virtuous, rather than a vicious circle: to preserve space as a legacy – and, with it, our own civilization – we need space as an inspiration. And I will finish on this tone with a quote from Leslie Fish's song “Hope Eyrie”, showing that a spacefaring civilization is a resilient one:

“But the Eagle has landed

Tell your children when

Time won't drive us down to dust again”<sup>5</sup>.

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<sup>3</sup> European Space Agency, “European Space Education Resource Office”. Online at <https://bit.ly/2NpDjSV> (accessed on 01.05.2018)

<sup>4</sup> Krauthammer, Charles, 1995. „Clinton Makes Mistake In Cutting Nasa's Budget”, Chicago Tribune, April 7. Online at <https://trib.in/2LwF7bL> (accessed on 01.05.2018)

<sup>5</sup> Fish, Leslie, 1984. “Hope Eyrie”. Online at <https://bit.ly/2NpOECr> (accessed on 01.05.2018)