

## **COSMIC WAR: TODAY'S MIRAGE OF TOMORROW'S NIGHTMARE**

*The basis of contemporary space science can be found in philosophy and literature from the 17<sup>th</sup> century.*

The theoretical foundations of modern space engineering – in the 19<sup>th</sup> century. Today knowledge in the sphere of technology and science have advanced enough so that one can talk about going on Mars, about stations on the Moon and even about colonizing the space in the future. Funding is essential, and would guarantee that space actions would be beneficial, and not damaging.

Space actions – more than traffic on land or at sea – hide serious dangers and have to be regulated with rules. The main tool for that is the Space Law. And contrary to the common beliefs the Space Law does not deal with property on the moon, but rather with space actions.

Star Wars and Star Trek scenarios are starting to sound less and less fictional because modern technology allows for real positioning of nuclear and other types of weapons on spaceships. In fact, even in 1957, after launching the first satellite Sputnik 1, it is clear that the Soviet Union has the capacity to use space for military purposes. Even though the space competition at first was only between the Soviet Union and the U.S., nowadays there are more countries with sufficient technological and financial resources for development of space actions. The main reason for that is the fact that all developments in space are military focused – V2 rockets, developed during WWII from Wernher von Braun, ordered by Wehrmacht. Continue being the foundation of today's rockets, shuttles, and satellite system GPS worldwide used, is developed by the Pentagon. Precisely, the dualistic nature of all programs and technologies makes the border line between peaceful and military usage of space very thin and easy to overcome.

Military actions in contemporary wars could easily be transferred from land to water and airspace into Space – therefore it is essential to have clear rules for preventing detrimental consequences of such actions. Even though founding, the five existing international space law treaties cannot guarantee compliance with the rules laid down in them.

Even the oldest international law - sea law does not provide effective opportunity for counteracting maritime piracy. How then the youngest international law - space law can deal with the new threats of our time? Space piracy, for which today very few think of as serious, is a big challenge for tomorrow. If we underestimate this danger after not very long, we will find ourselves in Space in the same situation as the one we ended up in Somalia – desperate and helpless against hopeless bandits, led by worldwide invisible criminal network.

In the twenty-first century, it became clear that ships with black sails and ruthless, hungry for treasures sea wolves on board are not a closed chapter of Rafael Sabatini and Jules Verne's books. Somalia shows us that piracy is not history,

but a contemporary issue and even a future one. But today's technology and weapons foreshadow the space pirates new unsuspected forms and shapes.

Piracy activities on the African coast force the international community to take a clear stance. A couple of resolutions of the Security Council of the UN have been adopted, and the first naval operation of the EU – “Atlanta” was launched. Despite that the effectiveness of the fight against the new maritime pirates remains unsatisfactory. From three attacks in 2005, their number has increased tremendously and each year from the beginning of 2005 until December 2010 there have been more than 170 attacks. It is clear that five years have not been enough to prevent the kidnappings. Moreover, the existing international rules obstruct pirates from being arrested and convicted because they would violate their human rights. Of course this is only one of the illustrations that law has never existed on its own and that it evolves over time and as a result of a concrete experience requiring regulation.

Returning back to Space. Twelve years between 1967 and 1979 when the international community established the 5 basic space treaties, is a period of a fight between the big powers with potential for new world war and the norms which used to unite countries then, until today they continue to be current and essential. Foresight was needed to register the rules dealing with countries' actions, which then were not technologically possible. It is necessary to create legal framework for situations which event though are not currently happening, they will be. It is essential to strive for laws, which foresee the future and successfully regulate human actions and protect people from misfortunes.

Traffic laws in Space will develop like the Traffic laws on the road, on air or at sea. Today we have a clear system of multiple obligations which if followed make traffic on roads quite safe. But this system occurs after the first car accident in London 25 February 1899 ended with death of the driver. Aviation traffic has a more stringent system of coordination rules ensuring safety for hundred thousands passengers located in the air at the same time. In space there is also traffic of expensive satellites, shuttles and telescopes moving with ten thousand kilometers per hour. But these are not the only objects, which might cause a collision.

According to space agencies, around the Earth there are 5 500 000 kg of space debris. It is considered that in the Earth's orbit there are around 600 000 objects bigger than 1 cm, from which only 19 000 can be tracked – but for now none of them can intentionally be removed from the orbit. In this way every space apparatus, including the most expensive venture so far - The International Space Station can be destroyed in a split second by a mote. Contemporary means of prevention of spaceships hips/satellites are currently beneficial only for space debris with a diameter of less than 1 cm (through building cladding - shield for populated with people modules). The only other current possibility for avoiding a collision is **manoeuvring**. However firstly, this is extremely expensive and secondly it requires previous knowledge of the orbit in which space debris moves.

Most of the space debris burns when entering the atmosphere and are not a direct danger for the Earth. But there are tremendous threats of large space objects landing - satellites, stations – damaged when collide with space debris. A satellite out of order could lead to a sweeping communication chaos on Earth.

While for many, this urgency does not sound very logical in opposition to the “Earth” problems, it is a fact from which one should not run.: the first space collision happened on the 10 February 2009, 789 km above Taymyr Peninsula in Siberia., two inactive communication satellites Iridium 33 (USA) and Cosmos – 2251 (Russia) collided with velocity 11,7 km/s or around 42 120 km/h producing hundreds thousands space debris.

It is obvious that establishing traffic rules in Space is essential and there is no time to waste.

It is important to stimulate human intelligence –in the name of better future for our planet and universe. This is the reason why in the beginning of 2010, the Atlantic club of Bulgaria took patronage over the Astronomy team of talented students in the National Astronomical Observatory and Planetarium (NAOP) in Varna, led by Dr. Veselka Radeva, which won prizes in worldwide competitions of NASA. In the past 2010, after students from NAOP- Varna became the pilot team in Atlantic club’s project “Bulgaria and the space law – future perspective”, financed by the Fund for scientific research at the Ministry of Youth, Education and Science, they brought to Bulgaria two more prizes from NASA. Thanks to the support of Vivacom, four of them visited CERN and went to space camp in the USA, where they trained in simulators for real astronauts and gathered knowledge in the field of space sciences.

The list of their accomplishments under Dr. Radeva is long: every year the National Space Agency of the U.S. holds an International Student Competition for space colonies, where in 2008 the Bulgarian team wins second place with its project on space colonies “Tangra”. The concept created entirely by the students predicts a design with all essential life support systems and energy solutions.

In 2009 the projects for international space colony – “Varna” and “Hemus” have been successfully presented. Both won second place in different categories.

The papers present concepts for building space colonies for tens of thousands of people with emphasis on astrobiological part. Especially interesting are the solutions for construction and interior design: in one, consisting of two modules in the shape of torus is projected river in the basis of biosphere and residential sections around it.

Another colony – “Varna” – is made of two toruses consisting separate modules for different usage: residential, social, business, service, entertaining which can function independently and protect the life of the colony.

In 2010 teams from the astronomy courses in NAOP-Varna are preparing three new projects: “Space Colony Posterous” with custom opportunities for growth

of the colony and the biosphere, simulation model of the Moon station and (after three years of work) a real model of the Bulgarian station on Mars – with central energy and engineering module, with the aim of gradual transformation of Mars. Scale model of the station is successfully presented in CERN in 2007.

All these accomplishments are the beginning of the path of each of these young people towards the stars –onward and upward. The work and the high grade obtained in Bulgaria and the U.S. are extremely strong motivation for fulfilment in the field of astrophysics and space science, and are compelling evidence that efforts should be put into supporting the future space scientists in Bulgaria.

It often happens that after a danger occurs, one starts looking for ways to tackle the problem and its consequences. We consider that it is right before the danger takes larger dimensions to find effective ways to prevent it - especially when it comes to large-scale risks in a specific environment such as space. This is exactly our goal – through actions to have Bulgaria contribute in Europe to timely adjustment of the questions of space debris and space traffic – in the name of more secure and safer future: to work towards solving the problem before it is too late.