



# Science, technology and imaginable social and behavioral impacts as outer space develops



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## ABSTRACT

The main body of international law governing outer space, the Outer Space Treaty of 1967, requires that all people benefit from space activities and it mandates equality and sharing of outer space resources for all people from all nations. Yet, only a few experts have the knowledge and information regarding colonization of the final frontier. The space community is eager to engage and involve the global community in the development of outer space. However, people do not seem to have the information needed to make them care about the development of outer space. Most people still seem to view space travel, asteroid mining and other space activities as exotic and far out. Hence, the purpose of this paper is to discuss a unique pedagogical approach to help mend the knowledge gaps and to suggest the possibility of preventing inequality gaps from emerging as outer space is developed. To achieve equality in outer space for future generations, we must begin formulating a contagious desire for knowledge and a universal consciousness regarding newly emerging trends.

We are suggesting that more students, at all levels, be introduced to space studies as part of their overall required curriculum. We are further suggesting that all people in all nations be exposed to the knowledge and information concerning the development of outer space. The emerging phenomena include private space travel, asteroid mining, building architecture and infrastructure, interstellar travel, and space life support systems for off Earth habitation.

Right now, people have the power to engage themselves in meaningful ways to all the new industries that will need their necessary support. People can learn and enhance their knowledge to forge ahead in this industry by implementing their relevant skill-sets. In particular, young people and students can learn just about anything if provided the access to free and affordable information. Thus this paper suggests that a wide range of K-12 students, university students, scholars and everyday people be exposed to information in this regard. However, currently there is a tendency to expose an exclusive science, technology, engineering and mathematics (STEM) students in a few countries, to space studies themes.

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## 1. Introduction

Only a few experts within the space community are aware of the current technologies, policies, laws and economic initiatives and the recent agenda to rapidly begin the process of outer space development. Before

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institutions, social networks, economic institutions and investments, political exercises of power, representations, ideology and psychological mechanisms are cemented, we must create a sustainable, conflict free, freedom and equality based ideology to proceed with the development of outer space. The majority of people remain unaware of the newly emerging space industries and opportunities. Space experts seem willing to share their knowledge. Therefore, there is an opportunity for equality throughout the global community. Outer space development is occurring as a step by step process. The process is currently underway. This includes the geostationary orbit, low Earth orbit, near Earth orbit, asteroids and other celestial bodies. This process was not readily visible, but it can be demonstrated through compilation and review of various international and domestic laws, policies and economic initiatives, which specifically state the progress. Similar to an embryo not yet detectable to the human eye that can be seen through an ultrasound device, the first and the second wave of the development of outer space process can be explained by a method for elucidating emerging trends. This involves researching, locating and reviewing laws and politics which were enacted to foster new types of space travel, new missions, space mining projects, greater involvement of new key actors, and other activities related to expanding and sustaining human presence beyond Earth's atmosphere [33].

### 1.1. Background – sitting at the eve of outer space development

As far as we can detect without conducting further research, approximately 64 nations have established some type of space agency, space research center, remote sensing organization or some other space organization or institution for their country. We can expect this trend to continue. Only France, India, Iran, Israel, Japan, People's Republic of China, the European Space Agency, Russia, South Korea, Ukraine, United States have actual launch capacity however. Given the increased participation of key actors from the private sector, we could witness a rapid increase in nations' ability to become spacefaring if global cooperative agreements are reached in an effort to carry out new types of space missions under new types of arrangements.

A similar pattern occurred in the satellite telecommunications sphere where related products and services such as Internet, cell phones, credit and debit card services became key factors driving the global economy. Today they tend to be widely perceived as everyday and ordinary gadgets. This shift happened as a result of a process which occurred in phases or "waves". The first wave of outer space development involved building a satellite telecommunications, directly above Earth in the geostationary region. It also included the exploration of the other celestial bodies, which included the landing on the Earth's moon. It occurred from the 1960s expanding during the 1980s and 1990s when globalization was undergoing a heightened rate of speed. During the first wave, significantly, the geostationary orbit became colonized with space assets. We further suggest that a second wave of outer space development is currently underway. It, too, is expected to result in fruitful industries

with growing participation of the private sector. We can expect new space travel related resources, goods, products and services to become common and ordinary. The nature of these emerging industries and their related goods, products and connected services – faster, cheaper space travel, space mining and space habitats and life support systems, are essential to the development or colonization of outer space.

This second wave began with the legalization of private space travel with the passage of the Commercial Space Launch Amendments Act of 2004, followed by the NASA Authorization Act of 2010. In a nutshell, the agenda set forth in this Act of Congress and the 2010 U.S. Space Policy allows these for-profit entities to play a greater role in advancing plans to build advanced space systems such as: transportation systems, spacecraft development, commercial space habitats, space stations and space settlements, commercial space mining, spacecraft trajectory optimization for landing on near Earth asteroids (NEA), commercial spaceport construction, interstellar–interplanetary–international telecommunications and space exploration missions to NEA, the Moon, Mars and Mars' two moons – Phobos and Deimos. Also, greater international cooperation is being encouraged pursuant to the 2010 U.S. Space Policy.

A myriad of space laws and policies have been active in space commercialization and the international community has tended to view U.S. law as a model for industry development. If this trend continues, we should expect to see the researchable activities outlined in the NASA Authorization Act of 2010, the New Vision for U.S. An amount of \$58.4 billion dollars has been set aside for space transportation and development projects for 2011, 2012 and 2013. This does not include various other types of economic incentives such as loans, agreements, technology transfers and other forms of economic incentives to encourage the private sector to advance space activities. These economic initiatives suggest that key decision makers have determined that the U.S. must maintain its leadership in space.

The marked result has been the retirement of the NASA space shuttle fleet. Private corporations are now taking on duties and responsibilities, production and profits associated with space travel. Policies and economic initiatives have also been put into place to encourage the private sector to perfect trips beyond our solar system–interstellar travel. Once the paradigm shift occurs, the super wealthy are likely to be the real beneficiaries and most people are likely to line up to purchase consumer products or to apply for meaningless jobs. The golden global opportunity will be forever lost. Humankind will have entered into full blown spacefaringness in a manner likely to be less than what it could have been, had more minds, hearts and talents been involved.

The concept of the development, as it pertains to the outer space, is commonly understood by most people outside the space community as being beyond comprehensible. We are using this term with the intent to cause the reader to imagine past patterns of human behavior associated with development or colonization scenarios. As earlier stated, this process includes establishing a satellite

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