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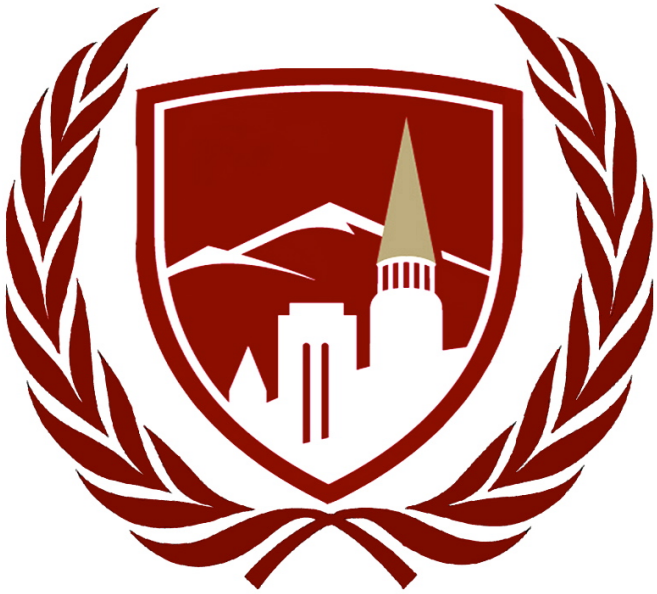

INTERMEDIATE UN COMMISSION ON SCIENCE, TECHNOLOGY, AND DEVELOPMENT

Developing Countries' Access to Space

By Lauren Pauls

Introduction

The United Nations spends massive quantities of time and resource addressing issues of economic, social, and political development. Perhaps the most pressing and persistent problem facing the international community today, the implications of development span every global concern from security to monetary stability to public health. Past UN development policies have worked with varying degrees of success; however, there remains a major, untapped forum for both international cooperation and sustainable domestic growth—outer space. It is the duty of this commission to seriously consider the promotion of space exploration and technology programs as a development tool and the impacts, positive and negative, that may result from the creation of such programs.

Historical Background

Humans have dreamed of space exploration for centuries. Ancient Western philosophers charted the position and motion of the stars. Eastern empires used crude rocket technology for ceremonial and military purposes. It was not until the 20th century, however, that rocket technology became advanced enough to break free of Earth's orbit and open space to human exploration[1].

Between 1930 and 1969, outer space was a forum for competition, not cooperation. Early space exploration originated from military innovation and research, creating a stigma of war surrounding space technology. Space innovation was first and foremost military innovation

The first modern rocket, the German V2, was born out of necessity in the early 1930's. Due to the weapon-restricting provisions of the 1919 Treaty of Versailles, Germany sought out technology that could be used for military purposes without violating the treaty, a role that a powerful rocket would easily fill. The rocket project, spearheaded by artilleryman Captain Walter Dornberger and scientist Wernher von Braun, officially began in 1932.

As World War II began, though, Hitler was not incredibly fond of the rocket program, believing that the V2 was simply a more expensive artillery shell with a longer range [2]. As the conflict progressed, Hitler warmed to the program and ordered the rockets into production for military use in 1942. Consequently, between 1942 and 1945 Germany produced approximately 5,700 V2 rockets.

American and Soviet forces took interest in rocket technology and scrambled to claim existing German V2s and parts at the end of the war[3]. Both Dornburger and von Braun surrendered to American troops and assisted in testing the rocket and bringing it back to the United States. The United States and the Soviet Union ran, albeit small, rocket research programs at the time; yet, the captured V2 became the basis for future spaceflight developments in both nations. By taking advantage of the downfall of the German government, and therefore the German space program, the Soviet Union and the United States guaranteed their monopolies over space technology for years to come.

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[1] "A Brief History of Space Exploration."
[2] "World War II: V-2 Rocket"
[3] "World War II: V-2 Rocket"

After WWII, tensions quickly rose between the United States and the Soviet Union over ideological differences, and the Cold War began. By the mid-1950s, the Cold War had woven itself into the fabric of everyday life in both countries, fueled by an arms race, multiple instances of counter-espionage, and media sensationalism. Outer space soon became yet another arena for technological and ideological competition between America and the Soviet Union[4].

In 1957, the Soviet Union successfully launched the satellite Sputnik (Russian for "traveler") using an R-7 missile. Though Sputnik's functionality was limited to emitting a rhythmic, high-pitched beeping sound via radio as it mindlessly circled the planet, its launch represented both an ideological and a military threat to the United States. The launch came as an unpleasant surprise for the Americans, who believed that space was the next logical frontier for the "grand tradition of exploration," thus, it was crucial not to lose too much ground to the Soviets[5]. Additionally, the launch of Sputnik demonstrated the vast power of the R-7 missile—if it could launch a satellite into orbit, it could deliver a nuclear warhead to US airspace. The Cold War then gave rise to the Space Race, a competition to display superiority in technological innovation, and by extension, economic ideological prowess.

In 1958, the Americans responded to Sputnik by launching their own satellite, Explorer I, created largely under the direction of Wernher von Braun. That same year, President Dwight Eisenhower created the National Aeronautics and Space Administration, or NASA, which would focus exclusively on expanding America's control over aerospace leadership through invention and innovation in space exploration.

Even with Eisenhower's expansion of the American space program, the Soviets maintained a fairly substantial lead in the Space Race. In 1959, the USSR launched Luna 2, the first probe to ever hit the moon[6]. In 1961, Soviet cosmonaut Yuri Gagarin became the first human to orbit the earth. The Americans also achieved the goal of manned spaceflight in May of 1961, but to a lesser degree of success: astronaut Alan Shepherd became the first American in space, but he did not enter orbit.

Later that month, American President John F. Kennedy boldly stated that America would land a man on the moon before the end of the decade. "1962, John Glenn became the first American to orbit Earth, and by the end of that year, the foundations of NASA's lunar landing program--dubbed Project Apollo--were in place.[7]" NASA's budget increased almost 500% between 1961 and 1964, and by 1968, the United States had launched a successful Apollo mission to orbit the moon.

Meanwhile, the Soviet Union's space program suffered serious setbacks. The program proceeded tentatively, partially due to internal debates over its necessity. Additionally, the untimely death of Sergey Korolyov, the program's chief engineer in 1966, caused research efforts to stagnate. By the time the Americans had orbited the moon, the Soviets had essentially lost the Space Race.

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[4] A&E
[5] A&E
[6] A&E
[7] A&E

In 1969, the United States successfully completed the first lunar landing mission, Apollo 11, manned by astronauts Neil Armstrong, Edwin "Buzz" Aldrin and Michael Collins. The United States had effectively "won" the Space Race; however, the United States' interest in lunar missions waned in the 1970s, partially due to President Richard Nixon's focus on more pressing economic issues facing the country.

In 1975, three American astronauts docked with a Soviet Soyuz rocket in orbit, where astronauts and cosmonauts shared a famous "handshake in space." The 1975 Apollo-Soyuz mission symbolized the end of not only the Space Race, but the end of outer space as a forum for competition. Space innovation no longer derived only from military necessity, but from the inherently human desire to explore the unknown.
The 1970s were an era of both incredible cooperation and extreme curiosity in the realm of spaceflight. "The Cold War context in which the U.S. civil space program arose… ensured that foreign policy objectives dominated the nature of the activity.[8]" Cooperation both ensured the legitimacy of space exploration projects undertaken internationally and insulated projects from short-term political or budgetary shortfalls. Kenneth Pederson observed, "international space cooperation is not a charitable enterprise; countries cooperate because they judge it in their interest to do so.[9]" Even so, access to space was still largely limited to only the global superpowers—the United States and the Soviet Union.

Artificial satellites also began to proliferate in the 1970's. Japan, China, Indonesia, the United Kingdom, and the European union all launched their first satellite during this decade. Communications satellites also became more common with more experienced spacefaring countries. The first national satellite television system, called Anik 1, was launched by Canada in 1973, and the United States launched Westar 1, the first geosynchronous communications satellite, in 1974.[10]

In the 1980s, however, the dynamic of bipolar domination of space began to change. In 1984, United States President Ronald Reagan directed NASA to develop a permanently inhabited space station in cooperation with the allies involved in the conceptual phase of the program. Intended to be a civilian parallel to the Strategic Defense Initiative (a space-based missile defense program being championed by the Reagan administration), the project was seen as a symbol of national prestige and world leadership.[11]

Starting in 1982, the International Space Station program was developed via international partnerships between space agencies in Canada, Europe, Japan, Russia, and the United States. Assembly of the ISS in space began in 1988 and was completed in 2011.[12] The ISS offers the high-visibility prestige of human spaceflight, which captures the popular imagination and carries social, emotional, cultural, symbolic and nationalistic weight.[13] The program facilitates research, development and knowledge sharing among nations.

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[8] A&E
[9] Launius
[10] "Introduction and Brief History of Satellites and Communication Satellites."
[11] Sadeh
[12] Dunbar
[13] Sadeh

Post 1990, the power dynamics in outer space have all but disappeared. With the United States' budged for NASA declining every year in real dollars since 1993 and over 70% of Russia's space program funding being put towards maintenance of the ISS, The door has opened for smaller nations to become spacefaring and gain the international prestige that accompanies that status. Most countries cannot afford the kind of major construction and maintenance costs associated with developing large-scale space programs and projects. This forces governments to cooperate, share costs and engage in the political planning and ongoing international coordination needed to accrue the political and economic benefits from participation.[14]
Even in more recent times, there remains a wide gap between the abilities of developed and developing countries in relation to space. As of 2003, nearly 60% of all satellites in orbit were owned or manufactured by Russia or the United States, and only three countries have achieved manned spaceflight[15]. Developed countries, however, no longer consider space exploration a priority, opening the door to establishing developing countries as major participants in space cooperation.

Current Status

Today, the debate over developing countries' access to space can be condensed to two major questions. First, should developing countries develop space industries, and second, is it really feasible? Though a select number of low-income countries (Nigeria, Malaysia, and Algeria for example[16]) have created small national space programs, the technology gap between developed and developing nations, spacefaring or not, grows ever larger. While developed countries reap the benefits of successful space missions (and their accompanying accidental discoveries), poorer nations continue to battle political problems, social unrest, and economic stagnation.

Spacefaring countries exist in a sort of "space pyramid," in which the number of countries possessing a certain technology grows exponentially smaller as the sophistication of the technology rises, as displayed in Figure 1 below[17]. Though countries can rise in the pyramid, as in the cases of the European Space Agency, Japan, South Korea, and Brazil, the "base" of the pyramid, which exclusively contains countries with no spacefaring capability, is incredibly large and holds the vast majority of states. It is currently relatively difficult for low-income and developing nations to improve their standing in the space pyramid.

These countries are severely restricted by financial, social, and political burdens domestically, but this does not mean that they have no desire to explore the possibility of creating a space program in the future. Nations like Brazil have been able to significantly improve their standing, but often these improvements are due to economic success in other areas, not necessarily from international cooperation in the aerospace industry. Currently, international organizations lack the bureaucratic and governmental support structure to be able to maintain a system of truly international cooperation in outer space affairs.

[14] Sadeh
[15] Legolu and Kocaoglan
[16] Legolu
[17] Legolu.

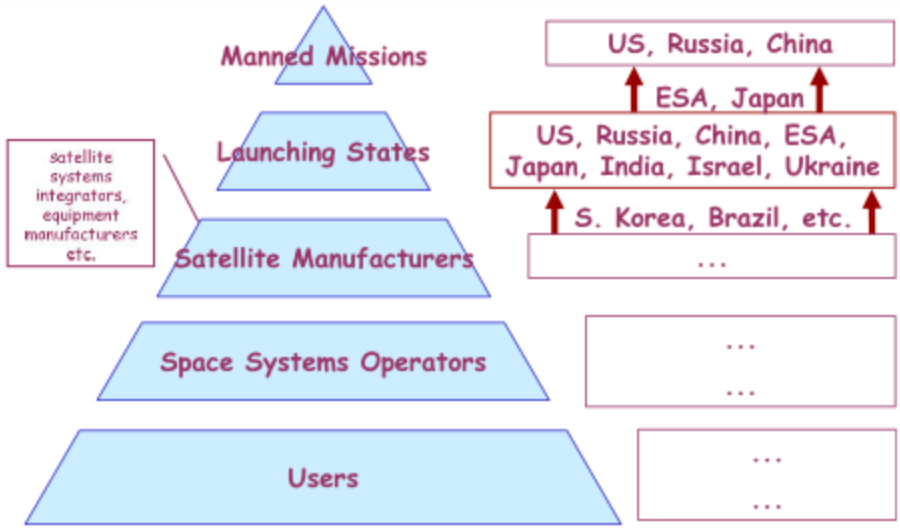

Figure 1: the "Space Pyramid"

The United Nations possesses the ability to help countries that show interest in space technology to rise in the pyramid. A few basic United Nations initiatives have already attempted to promote outer space technology as an appropriate development tool. Chiefly, the UN Office of Outer Space Affairs (UNOOSTA) began the Basic Space Technology Initiative, or BSTI, in 2008[18]. The BSTI has undertaken a few independent initiatives, like HUMSAT, since its inception.

BSTI, according to UNOOSTA has four objectives[19]. First, to respond to the growing interest in many countries to establish indigenous capacities in basic space technology. Second, to address the increasing role of small (nano-) satellites for education, basic space science and for operational applications. Third, to assist countries to ensure adherence to the relevant regulatory frameworks and promote the use of standards. Finally, to promote international cooperation and information exchange in capacity building in basic space technology. Whether or not UNOOSTA has successfully met all of these objectives is debatable. One may, yet again, observe mixed results when comparing developed countries to developing.

Though UNOOSTA holds multiple conferences on space development each year, these conferences focus on the improvement of existing small space programs, as in Japan or Mexico, instead of newly established programs (Nigeria), or the multitude of countries who have no access to space whatsoever. BSTI programs historically have not focused on developing new space industries in low-income countries, but rather have been geared towards the success of small programs in developed countries, representing a blatant failure in reaching UNOOSTA's first objective.

There exists no concrete, permanent UN initiative today that focuses exclusively on providing non-spacefaring countries the technology, support, and education they need to access the vast

[18] UNOOSTA
[19] UNOOSTA

developmental resources of the space industry. This does not, however, mean that the infrastructure or authority does not exist for such an initiative to be created. The future of the space industry rests largely in the action of this council.

The potential for space exploration as an economic development tool remains largely untapped; yet developing countries' access to the necessary resources becomes a simpler goal every day[20]. The development of small satellites has become feasible for entities and organizations with comparatively small budgets and has relatively modest infrastructure requirements. Information about space technology and its know-how, specifically also related to small satellites, is increasingly becoming publicly available. A growing private market in the space industry promises to bring more competition and better technology at lower prices, making it easier for developing countries to get the technology needed to foster a burgeoning space program.

Most importantly, however, many nations are displaying interest in the creation of domestic space programs[21]. A growing number of countries, including developing countries, have recently established or are in the process of establishing national space organizations and are contemplating national space programs or seeking to strengthen their existing space activities. The desire of space industries from established space nations to seek new markets in emerging space nations has also opened new venues for cooperation that may facilitate the development of indigenous capabilities in space technology development or even the possibility of establishing a basic space industry capacity in low income countries.

The necessity of establishing space industry is discussed against the argument that there is already an over-capacity and these nations should focus on space applications. Considering the effects of such efforts on economy, brain drain problem, other technology areas, the society, scientific development and development in general, space industry is a must for those countries that can afford to and maintain it as an integral part of space applications and space science.[22] It is clear that there are many positive impacts to using outer space technology as a development tool, yet no international body has truly taken the initiative to establish space programs in low-income countries on a global scale or to incorporate these countries into discussions about space policy and international law.

International capabilities can provide important benefits in developing science and technology capacity in developing nations. As Dr. Caroline Wagner points out in her book, The New Invisible College[23], nations must balance when to take advantage of the global science network and when to build indigenous capabilities. Indeed, the most effective way to develop indigenous capability is through the incorporation of external knowledge with indigenous knowledge and national priorities[24]. A developing nation that created a space agency with no ties to international organizations would not be very efficient. Thus, it is incredibly important for the United Nations to consider creating a supportive framework for developing countries in their quest to reach the final frontier.

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[20] Balough and Haubold
[21] Haubold and Balough
[22] Legolu
[23] Wagner
[24] John

Bloc Positions

North Atlantic Treaty Organization: NATO believes that access to space is incredibly important to the security and well being of all nations. As state dependence on satellites has become routine, NATO believes that space cooperation is vital to the interests of every country, developed or developing. Only cooperation among states will guarantee that there will be no war in space, something that NATO believes would be catastrophic for all nations. However, it should be noted that NATO is in the process of developing contingency plans if a state were to take aggressive actions in the sphere of outer space.

United States: The United States was one of the pioneers of space during the 50s and 60s in the race to reach the moon. Today the US remains a leader in space development and cooperation. It is the US view that international cooperation with regards to outer space is paramount to the wellbeing of all countries, maintaining that no one state can claim sovereignty over any region of outer space or celestial beings. The US has many different defense systems that rely on a free outer space to properly function. The US also believes that the development of a commercial industry is vital for continued progress in outer space.

Russia: Russia was another leading space pioneer that opened up the world of outer space. Russia believes that their own space activity should act in the interests of the Russian people and work to solve problems that affect their citizens in everyday life, such as improving the economy or solving scientific problems. Russia also emphasizes using outer space to house defense systems and protect the Russian people. International cooperation is fully supported by the Russian Government.

Japan: Japan recently passed a law allowing military space development. Funding for the Japanese space program is now controlled to the Ministry of Defense and the Ministry of Economy, Trade, and Industry. Officially, Japan hopes to use space development in order to help prevent natural disasters from occurring and to open a door for a commercial space industry to develop.

Prep Questions

- Should countries be able to claim celestial beings as their own if they discover/inhabit them first?
- Is the development of a space program essential for a developing country's survival?
- Will the development of commercial space programs adversely affect international cooperation? How will countries' individual economic interests affect the development of space?
- Is it important that every single country have their own infrastructure to support space development, or can countries feasibly share infrastructure to minimize costs?

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