Committee On Peaceful Uses of Outer Space (COPUOS)

Regulating the commercial activities in space

Research Report

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"Out of this world"

Forum: Committee On Peaceful Uses of Outer Space (COPUOS)

Issue: Regulating commercial activities in space

Position: Deputy Chair

Introduction

Since 1965 humanity has placed almost 10000 satellites in orbit (as of 2024) around earth. The majority of these are used to connect people from all over the world, with the companies that own them making millions. Imagine what the modern world would look like without the internet, you would not even be reading this right now.

However, the potential for industries in space goes further than satellites for connections on our homeworld. As companies like ispace, blue origin and spaceX gun for the moon and beyond, the world is yet to put rules in place on how to divide territory outside of our gravity well. The dwindling of natural resources on our home planet has led to companies working on so-called: 'asteroid mining'. While it has not been done yet, the disassembling of an asteroid to mine it for desperately needed natural resources could be of huge benefit to people back home.

As humanity moves on towards the next step on the Kardashev scale (for the sci-fi nerds) it is up to us to make sure this transition runs smoothly and does not devolve into intercorporate conflict and economic free-for-all.

Definition of Key Terms

Commercial satellite:
A man-made satellite around earth (or other celestial bodies) used for a specific commercial goal, such as but not limited to: Establishing internet connections, scanning for resources or planetary features or orbital habitation (yes, that is also a satellite).

Spy satellites:
A satellite with the ability to spy on other countries, either with detailed satellite imagery (a fancy camera) or by listening to internet traffic to other satellites

Asteroid mining:
The process of mining an asteroid for valuable natural resources, such as: nickel, cobalt or even gold, platinum or rhodium.

Space probe:
A small satellite sent out at a certain trajectory that scans nearby celestial objects for potential resource deposit, could be useful in Asteroid mining

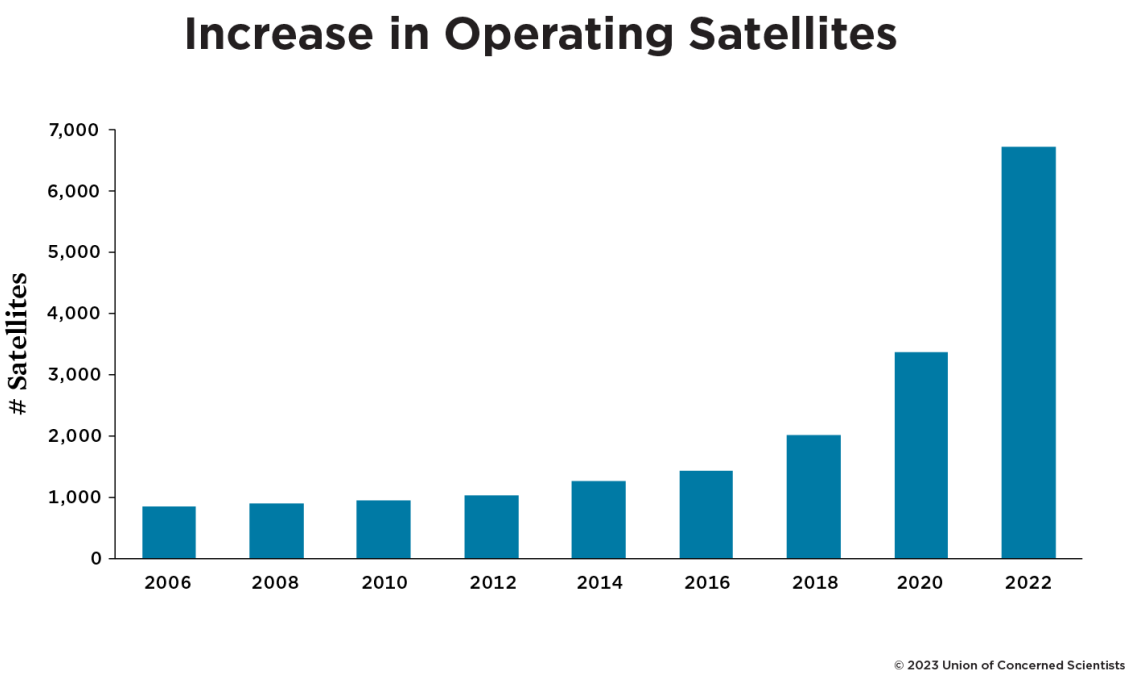
Starlink:
A network of commercial satellites made by spaceX that theoretically provides connection to the internet from anywhere in the world

Escape velocity:
The exact speed a spaceship needs to leave the gravity well it is in.

General Overview

Orbital Satellites

Whether it's being able to book a flight or a hotel for a holiday, managing a company's sales internationally or organising intercontinental supply lines, the internet is a vital part of the global economy. While the internet technically is run through data hubs on earth, the traffic is regulated by commercial satellites that relay radio waves back and forth to transfer data between continents rapidly. As said in the introduction, there are 7000 satellites in the earth's atmosphere and that number is growing fast.



Graph showing number of satellites since 2006, Union of concerned Scientists 2023

In this graph you can clearly see the exponential growth of orbital satellites over the past few years. This trend has only continued in 2023 and 2024, some have estimated that by 2031 there will be 17000 satellites in orbit. Now it is no accident that it was the 'union of ***concerned*** scientists' that published this. The area around earth is limited and too many satellites can cause severe issues in the future regarding space debris.

We cannot just stop using satellites; if you do the maths, the amount of data a satellite collects compared to the CO2 output is incredibly high, since a satellite only needs a burst of emissions and multiple satellites can be launched with one rocket. There is no real alternative to the use of satellites that is even better for the environment.

Asteroid mining

Between Mars and Jupiter there is a belt of asteroids called; the Asteroid Belt (I know, very annoying, I was hoping for a better name) that contains about 2.39x10^23 kg of mass. This is about 3% of the mass of the moon. Now while some of this mass is useless dust, there are a lot of valuable resources to be found. Using probes a company could find resource deposits and then attempt to send a spacecraft to take the asteroid into low earth orbit where it can get dismantled and its resources sold or used. This might seem like a science fiction scenario, which right now it is. However studies by the Keck Institute of Space Studies have estimated that, once the infrastructure is in place, the cost of taking a 500 ton asteroid into low earth orbit is around 2,6 billion USD. Which seems like a lot, however they also estimate that a platinum rich asteroid of that size could contain about 25-50 billion USD worth of platinum at the current market price. Which is a huge profit margin.

Now we have to think about how to get this kind of infrastructure put in place. It is still a very risky business venture since we know so little about the contents of specific asteroids or how to mine them. We also have to think about the fact that asteroids are in space, so they do not follow geopolitical borders. What stops a company from forcefully taking a returning asteroid from another company to reduce the risk of the operation failing in the early stages? What laws must be followed by workers mining the asteroid once they are in low earth orbit? What are we going to do about overmining the belt?

Space stations and bases

When we talk about space we of course cannot forget the dream of humanity living amongst the stars. It is a natural step to leave our gravity well in the near future and settle on other planets. Settlements on new worlds could serve as resupply bases for spacecraft going further into the solar system. For example, a study from Harvard analyses the value of Phobos or Deimos (moons of Mars) as bases for space ports. When sending spacecraft away from a gravity well, the most energy is spent getting to escape velocity, and since the mass of Phobos and Deimos are lower than that of Mars or earth, it is significantly easier to leave their gravity wells. On top of that Mars is the fourth planet in the solar system and so a bridge to planets further away from earth. Deimos and Phobos are also both theorised to be planets that hold water, which could make habitation easier.

The same questions arise for this as well. While it is a great way to set ourselves up to dominate the solar system, we have to think about geopolitical issues. Can countries colonise Mars as a free for all and take land? Can companies own land on Mars? How will the United Nations ensure peace and human rights for everyone living off the safety of our world?

Major Parties Involved

Private companies

Not many companies are working on space projects, but some examples are: SpaceX, Boeing, Raytheon, General Electric or virgin. These companies work towards profit and without proper regulations have nothing stopping them from harming the environment or even human life.

United States of America

Being a global superpower and the winner of the space race, America holds most of the big companies working in space. SpaceX, Boeing, Raytheon, BlueOrigin and more are American companies and America will want to protect the assets and growth of these companies in space and other worlds.

China

As the main economic competitor to the United States and a government wanting to pivot into an economy of innovation, China must ensure its ability to work towards space innovation. The lead that the United States currently has, has to be overcome in order to do this.

India

Just like China, an up and coming competitor in the field of innovation, India must also protect and grow its companies to ensure its place when we leave our gravity well.

United Nations Of Outer Space Affairs (UNOOSA)

The UNOOSA is the office which was established to assist the COPUOS. UNOOSA works towards helping companies innovate in spacefaring technologies. It has a lot of connections with the space-industry and commonly invests in these companies.

Space agencies

Around 90 countries have launched a satellite and the majority of these nations have a space agency. These agencies work on sending rockets themselves and countries with a space agency will probably want to have some territory on an extraterrestrial world if this is at all in the scope of their abilities.

Possible Solutions

Satellites

Possible solutions on the satellite issue is obviously limiting the amount of satellites that can go into the atmosphere. It is important however to keep in mind that satellites are incredibly useful for our economy and global connections, so these limitations must be clearly thought out.

For developed nations it is easier to limit the use of satellites since the majority of the country already has good satellite coverage. While developing nations in South America or Africa do not have good coverage and therefore might need more satellites to sustain their growing economies.

Asteroid mining and space colonisation

This is a more complicated issue and requires more complicated solutions. For nations with a space agency it might be useful to attempt to partition parts of celestial bodies, however keep in mind that a lot is unknown of the potential value of these pieces of land and later research could give major advantages to certain countries.

For nations such as China or India with developing space agencies, it is important not to let themselves be overshadowed by other powers such as America or Europe. Currently their influence regarding space is limited, but it is vital to ensure growth.

For nations without a space agency a choice needs to be made between supporting the interests of a more powerful nation with an agency or keeping space unoccupied altogether to allow themselves to catch up and have a shot at going to space later.

Nations will also have to decide on what to do with the power of private companies and rules of warfare, trade and sovereignty in space. Will the emptiness be under maritime law or should an entirely new book of law be set up for this environment?

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