

Analyzing our develop guideline:

The coexistence of informatics and a feasible habitat for us human being

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Increasing amounts of satellites launched

Until 1/8/2021, there are about 6250 satellite orbiting the earth(3400 still functions) [1] with various functions including navigation, information exchange, scientific investigation and space exploration. And this number will soon face a great leap within the next five to ten years and reach a rate of 1000 satellite launched per year around 2027, and our number of satellite will be over 12000. [2].

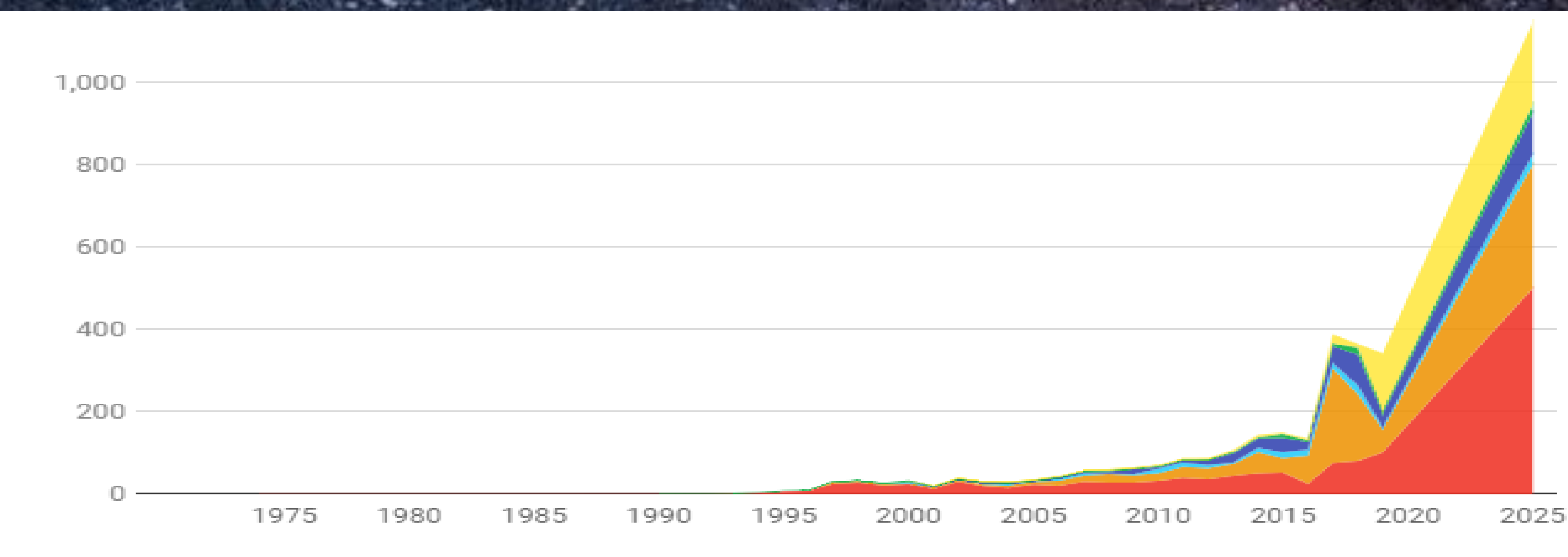


Figure1.The number of satellites orbiting Earth could quintuple in the next decade _ MIT Technology Review

Recommendations and our potential solutions

Encourage the use of recyclable rockets:

Over 30% of the falcon 9 series rocket parts can be recycled, and the first stage rocket, which is the main consistent of the recyclable part constituted most part of the present space debris. Therefore, less amounts of substances we are sending to the outer space.[10]

Keep develop the space trash recycle program:

Continue the present space debris collection projects conducted by NASA and ESA. [4]Return the mass back to the earth and reduce new spacecrafts' risk of being

References:

- [1]https://www.esa.int/Safety_Security/Space_Debris/Space_debris_by_the_numbers
- [2]<https://www.technologyreview.com/2019/06/26/755/satellite-constellations-orbiting-earth-quintuple/>
- [3]https://www.nasa.gov/centers/hq/library/find/bibliographies/space_debris
- [4] https://www.esa.int/Safety_Security/Space_Debris/Space_debris_by_the_numbers
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- [6] <https://space.stackexchange.com/questions/45846/what-is-the-average-weight-and-price-of-a-telecom-satellite>
- [7] <https://www.forbes.com/sites/startswithabang/2021/01/07/why-does-the-spinning-earth-speed-up-if-the-tides-are-slowing-us-down/?sh=30cdab1f343e>
- [8] <https://cosmosmagazine.com/geoscience/what-creates-earth-s-magnetic-field/>
- [9] <https://www.livescience.com/60989-slow-earth-rotation-triggers-earthquakes.html>
- [10] <https://www.spacex.com/>

Increasing amounts of space debris

Until January, 2021, there are over 9200 tons of space junks in low Earth orbit[4]

HEAVIER OUTERSPACE LIGHTER EARTH

Including the greatest man-made aerospace vehicle – ISS which weights 420 tons[5] and all together 6250 satellites with an average weight of 2.755 tons[6] and the space trash they left which weights about 9200 tons, we have sent incredibly **26840 tons** of substances into the outer space.

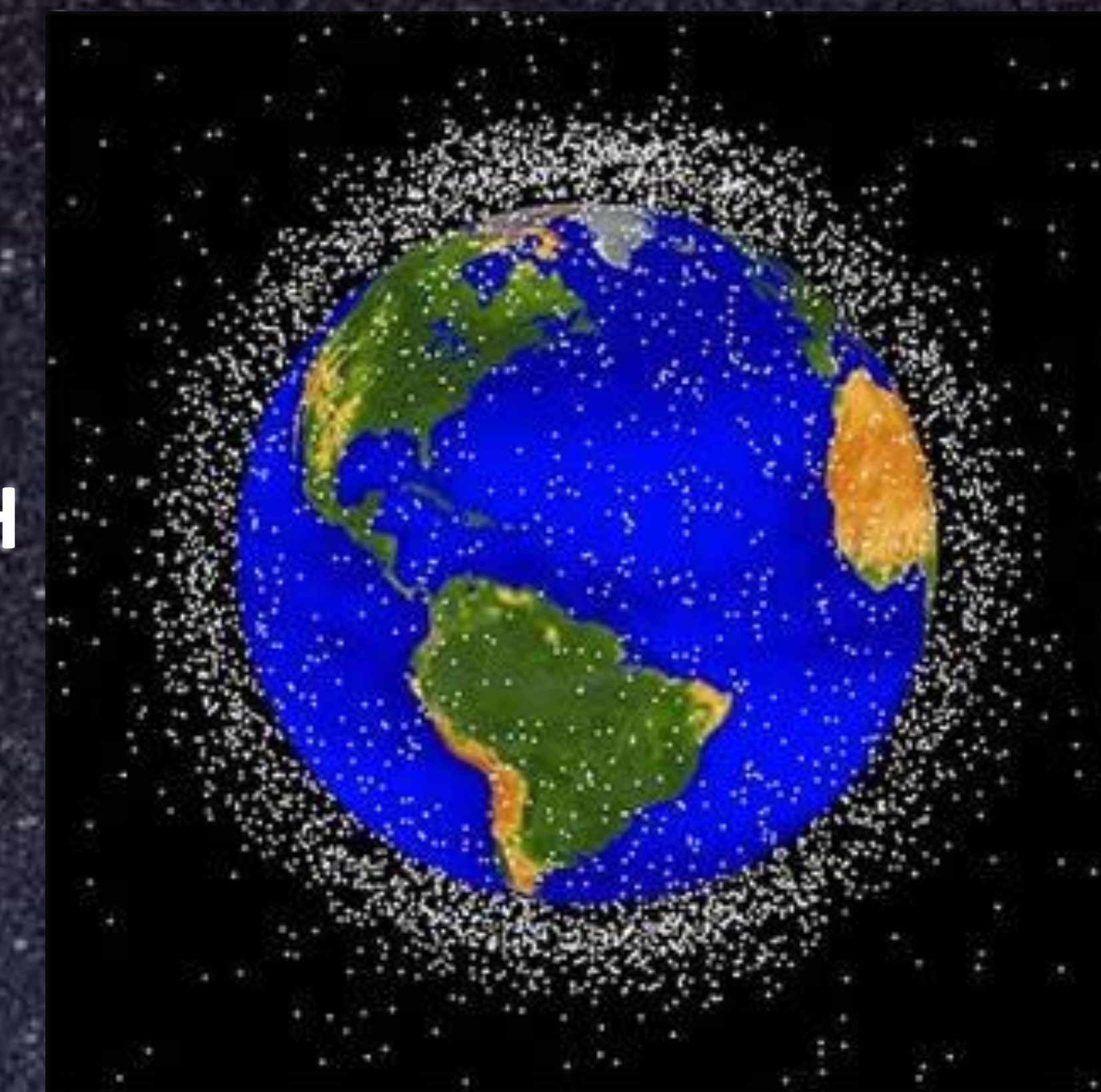


Figure 2. Edu what is orbital debris[3]

Relatively larger Earth radius and more scattered mass distribution related to slower Earth rotation – one more second every 18 month

The conservation of angular momentum:

Your moment of inertia: how large your mass is and how it's distributed, either close to or far away from the axis you're going to rotate around.

You angular velocity: how quickly, in terms like revolutions-per-second, you're actually spinning about your axis.

When the total mass remains constant but more mass are brought more far away from the rotational axis, in order to keep angular momentum conserved, the angular velocity has to go down and hence the earth spins slower. [7]

Consequences of the slower earth rotation

Weaken the earth's magnetic field:

As long as there is a rotating electric current, it will create a magnetic field. Faster the earth spins, stronger the magnetic field is, vice versa.

On Earth, flowing of liquid metal in the outer core of the planet generates electric currents. The rotation of Earth on its axis causes these electric currents to form a magnetic field which extends around the planet.

The magnetic field is extremely important to sustaining life on Earth. Without it, we would be exposed to high amounts of radiation from the Sun and our atmosphere would be free to leak into space.[8]

Unleash more potential earthquake:

as the Earth's spin slows slightly, the equator shrinks. However, tectonic plates don't shrink as easily, meaning the edges of the plates get squeezed. Although this amount of squeezing isn't huge, it does put added stress on plate boundaries that are already under stress, where earthquakes are more likely to occur.[9]