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16 maj 2023

Satellite Materials in Low Earth Orbits

Have you ever wondered why people always say rocket science is hard? The answer lies in the unforgiving conditions of space. The materials of a spacecraft must embody strength, light-weight structures, and resistance against hazards that don't exist on Earth.

In this master's thesis project I have taken on the difficult challenge of finding, and improving Beyond Gravity's satellite antenna radome materials used in space. After researching all types of materials used on rockets, satellites, moon-landers, and space stations, I found a material coating that has the potential of upgrading the satellites' antenna radomes. Space flight is not just complicated equations, formulas, and physics but also strikingly expensive. Lifting heavy, big structures of the Earth into space require powerful rocket boosters, and even the tiniest gram is considered. Therefore, extensive testing and verification are required before new spacecraft materials are ready for launch. The coating has previously proven to be efficient in a space mission to the Sun, and it holds the potential to save the company valuable time and money, all while protecting the satellite equipment from the harsh environment of space. However, the material needs to undergo further testing before it's ready for lift-off.

In space, everything is out to get you - from the tiniest of particles to the most daunting of Black Holes. In low Earth orbits, the tiny particles are the worst, especially the highly reactive atomic oxygen that eats away at surfaces and destroys vital equipment. As satellite and antennas rely on radio waves for communication, the materials and coatings used to encapsulate and shield these antennas must allow radio waves to pass through. The challenge lies in identifying materials that allows the satellites to communicate while safeguarding against freezing temperaturs, scorching heat, sun-burning UV beams, space rocks faster than a bullet, and nasty particles such as atomic oxygen.