

SUMMARY

The Space industry undoubtedly has been one of the fastest growing industries over the past 60 years. Progressively larger amount of advancements in science and technology have made space more accessible than ever in the history of the space exploration. In addition to the International Space Station, big achievements were made in the exploration of planets and celestial bodies by robots, including landing on a comet.

Nevertheless, despite having considerably high advantages in different sectors, the challenges posed by such a rapid increase remain inevitable. One of the most common issue being researched and addressed by several space companies today is the space debris which are created mostly by defunct satellites, uncontrolled spacecraft, the upper stages of spent rockets, and various discarded parts of a spacecraft or items such as tiny flecks of paint from a spacecraft. On the one hand, this growing amount of space debris is a threat to current and future space missions, as well as the living organisms on Earth. On the other hand, all the satellites that re - enter the atmosphere of Earth burn and create harmful particles and threats an environmental challenge to the life on Earth in long term.

The main focus area of this study is to minimize the mentioned risk by designing and developing a new satellite structure. The research has been done on the scope of this study to select an environmentally friendly material and design a structure based on the properties of the selected material to investigate if such an object would survive in the extremely harsh condition of space.

After a broad research into the existing environmentally friendly material solutions, Plywood has been chosen as the base material of the examined structure. Having met mechanical requirements specified by launch providers, it has been concluded that it requires coatings for being feasible for future space applications. Notwithstanding that fact, the static analysis has been performed to further investigate the behaviour of the designed structure in an environment almost similar parameters to that of the launch vehicle. The structure survived the static analysis with lower stress than its yield strength, however with displacements, which can be interpreted as the structural improvements should be made in the future applications.