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A LIFE EXTENSION MISSION FOR THE JAMES WEBB SPACE TELESCOPE

**Abstract**

The James Webb Space Telescope (JWST) is the most advanced space telescope ever deployed. Since its launch and the beginning of its observations in early 2022, it has radically changed humanity's perception of the universe. JWST was initially designed with a planned lifespan of at least a decade. Thanks to an extremely accurate launch and following maneuvers in course to its destination, that reduced considerably the propellant consumption, its expected mission duration has been significantly increased. Nevertheless, even after extending its expected lifespan, because of its high initial cost (US \$10 billion), the cost of the provided science per year remains extremely high. For the aforementioned reasons, the economic justification and motivation for a life extension mission for JWST are clear. If a way was to be found to extend JWST's lifespan, assuming it reaches its end in good health, each extended year of science (at least the first few years) could be estimated to be worth around US \$0.5 billion.

Astroscale is currently developing a life extension technology (LEX) for satellites in orbit, which could be adapted to extend JWST's life. The company's unique approach for docking with objects not designed to be docked to, which exploits the Launcher Adapter Ring (LAR) as the attachment point, makes it perhaps the most (if not the only) suitable solution to dock with the JWST and allow it to be serviced in orbit.

With careful planning and strategic decision-making, the JWST could continue to deliver groundbreaking science for many years to come, revolutionizing our understanding of the universe and inspiring the next generation of space explorers. This report will explore the different aspects of such a proposal .