

IAF MICROGRAVITY SCIENCES AND PROCESSES SYMPOSIUM (A2)  
In-Space Manufacturing and Production Applications (8)

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ONE MICROGRAVITY TECHNOLOGY, THREE HUMAN HEALTH APPLICATIONS

**Abstract**

Microgravity breakthroughs have the potential to change the lives of up to 3 billion globally by fielding of human health applications. Our technology is fueled by three things: hardware, software, and automation. Hardware is the vehicle transporting us to our endpoint, software is our GPS, and automation holds the keys to scalability. Space Tango's solutions, and others in the ecosystem, must support scalable in-space manufacturing architecture in order to shorten the timelines further to field stockpiles of retinal implants, liver grafts, and stem cell-based cancer therapeutics. First, the prevalence of retinal degenerative diseases impacts a substantial percentage of the global population. Age-related macular degeneration (AMD) is estimated to grow to 288 million globally by 2040 . To ameliorate clinical visual impairment, we tested a novel technology to manufacture protein-based artificial retinal implants on the International Space Station (ISS). Our technology bolstered Current Good Manufacturing Practices (cGMP) sterilization and bioburden reduction, to support a high-throughput manufacturing process that maintains FDA compliance and Right First Time principles of quality management. Secondly, at present, 15,000 people are waiting for a liver transplant in the U.S. and at least 1,400 of them will die waiting for their transplant . On average, 25