

IAF MICROGRAVITY SCIENCES AND PROCESSES SYMPOSIUM (A2)
Interactive Presentations - IAF MICROGRAVITY SCIENCES AND PROCESSES SYMPOSIUM (IP)

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IN SPACE OPPORTUNITIES FOR BIOMEDICAL MANUFACTURING PHARMACEUTICAL
DEVELOPMENT, BIOMANUFACTURING, AND ADDITIVE MANUFACTURING

Abstract

The rise of the commercial LEO sector, decreased launch costs and access to space has created new opportunities for in-space manufacturing, and research and development across all sectors, particularly for biomedical innovation. The spaceflight environment offers unique advantages when it comes to drug development, for example: the convection-free microgravity environment permits the growth of larger, more uniform protein crystals, which can lead to advances in both pharmaceutical and drug target development. Emerging space-based biomanufacturing practices, meanwhile, have been proposed to facilitate resource reclamation, food production and increase mission sustainability. Additive manufacturing processes have advanced to the point of printing replacement tissues such as knee menisci. In this presentation, we review the current state of the art of space-based biomedical manufacturing opportunities, and discuss emerging opportunities for intersectionality between emerging technology sectors and problem spaces as they pertain to the low earth orbit and cis-lunar economies, and also for exploration-class missions.