

MICROGRAVITY SCIENCES AND PROCESSES SYMPOSIUM (A2)  
Microgravity Sciences Onboard the International Space Station and Beyond - Part 1 (6)

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MICROGRAVITY FOR ECONOMIC GROWTH AND PUBLIC BENEFIT

**Abstract**

Research in the microgravity environment (10-6 g) of space has furthered our understanding of fundamental physical, chemical and biological processes and generated a wealth of results in areas such as material science, combustion science, fluid physics, fundamental physics and life science/biotechnology. By considering the potential for economic growth and public benefit emerging from these areas of microgravity research on the International Space Station (ISS), a broader flow of societal benefits will be achieved. Providing the right strategy is a hot topic of debate. Several questions need to be addressed. Where exactly does the value of microgravity research lie? To what extent are the techniques learned in microgravity transferrable to ground? Are there profitable systems or processes unique to microgravity? If space manufacturing is technically sound, what are corresponding economic, logistic and political aspects and possible roadblocks? Based on a recent survey, this paper discusses an alternate approach to materialize the potential benefits of microgravity research for a variety of terrestrial markets by addressing (1) the level of awareness and interest of parties from the academic, private and government sectors (2) the potential of microgravity to stimulate innovation in future product development (3) the formulation of a synergistic strategy to use microgravity for economic growth and public benefit. The proposed solution consists of taking a fresh look at the potential benefits of microgravity through the lens of the current state of the art on ground by: 1. identifying products originating from microgravity research, describing their known technological advantages over Earth manufactured counterparts and providing clear traceability from the fundamental microgravity research through product development 2. mapping specific topics in terms of their existing technical challenges, product innovation and product development plan 3. identifying microgravity based technical solutions and their ideal infusion point into the product development cycle, using products identified in step (1) to build credibility and provide realism ISS is poised to facilitate technological advance in multiple industries and to support the nation's ability to develop innovative new capabilities. However, to make this happen we need to be engaging, open and supportive and provide a realistic picture and commonly agreed path forward. The current paper outlines the necessary groundwork upon which such a path could be built.