

Team 1 – Space Manufacturing - Executive Summary

Space manufacturing has the potential to radically expand the capabilities and reduce the costs of the space industry. In order to identify the specific potential capabilities and applications, more funding from government space agencies, especially NASA, is advised. Furthermore, since the demand of launch and satellite services is growing, private satellite and launch service companies are recommended to also support space manufacturing research with the goal of reducing costs and lead times.

Currently, NASA is leading the way in space manufacturing application and infrastructure planning. Its experiment in space additive manufacturing has led to the organization's demand for a FabLab onboard the ISS to support current and future ISS operation and research activities. Another development pathway for space manufacturing to grow involves the private satellite and launch industry, who are the main funders of the space economy.

Space Manufacturing activities that have been demonstrated in space include additive manufacturing and protein crystal growth for pharmaceuticals. Projects to be executed in the next year or two include space manufactured fiber optic cables to be returned to earth and a large structure generating satellite.

The cost of space launch services was found to be around \$9100/pound, which directly affects space manufacturing as raw materials must be sent up. The main stakeholders in space manufacturing are NASA/government space agencies, who fund most of space manufacturing research and early innovations. Future stakeholders who can benefit from this technology predominately involve aerospace companies, but can also include biotech and pharmaceutical companies as well.

Unfortunately, space research and development funding is decreasing. Based on the available data and projected benefits, greater funding is recommended to grow and accelerate space manufacturing to enhance the space economy.