

MATERIALS AND STRUCTURES SYMPOSIUM (C2)
Space Vehicles – Mechanical/Thermal/Fluidic Systems (7)

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LIGHTWEIGHT MEANS OF ACTUATION FOR USE IN SPACE-BASED ROBOTICS
APPLICATIONS

Abstract

In the field of robotics many researchers have devoted a large amount of time to pursuing means to reduce the weight of robotic systems. For space robotics, this becomes even more important due to launch cost being directly affected by weight. During review, potential progress involving weight reduction of actuators has been encountered, which it is necessary to investigate further in order to ascertain the potential advantages and disadvantages of such work.

The contribution to be put forth here is a review of means by which reductions in weight can be achieved, with particular emphasis on space robotic actuation sub-systems. Ideas will be posited about the possible configurations which could be explored to reduce weight whilst attempting to maintain performance. It is expected that this contribution will provide evidence-based support for some future research directions, and will also help to stimulate discussion and further work on the subject of lightweight robotics and lightweight actuators.

The next stages of this project aim to enhance some of the actuation ideas investigated so far, test these comparatively against one another, and critically review them alongside existing lightweight actuation methods. Following this, simulation of actuation concepts being applied to robotic applications will take place. This is in order to evaluate their performance in microgravity environments and to test their versatility. This process, as part of this project, will also be discussed in this paper.