SPACE TRANSPORTATION SOLUTIONS AND INNOVATIONS SYMPOSIUM (D2)
Small Launchers: Concepts and Operations (7)

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# BALLOON LAUNCH - A SOLUTION FOR CHEAP LAUNCH OF MICRO/NANO/PICO-SATELLITES

**Abstract**

More than 55 years have passes since the first man-made object was launched to space on board a rocket. Space systems have drastically evolved since then and satellites have become much smaller. A lot of countries are now working on their own micro-, nano- and pico- satellites. Despite this decrease in size and increase in development of such systems, we are still relying on the same strategy to launch them into space, namely on board a rocket. Although this approach is acceptable for many missions due to the high orbital altitudes needed or the large mass being transported, our new small satellites might need a transportation solution of their own. By employing simpler launch methods, we will be able to make space access and satellite launch more cost effective and accessible.
In this paper, a novel concept is proposed for launching small satellites using a two stage approach. The first stage uses a balloon and the buoyancy force associated with it to reach a high altitude. Then the second stage, which might involve use of the gas in the balloon or a small rocket stage, increase altitude and injects the system into orbit. The feasibility of using this concept is assessed in this paper and its performance measures are identified.