# Suborbital Micro-Gravity Research: Tapping the Rich Legacy of Accomplishment for the Next-Gen Launch Vehicle Research Era

By
John M. Cassanto, CEO
Instrumentation Technology Associates, Inc.

Ronald M. Jones
Boeing Phantom Works

David Yoel, CEO
American Aerospace Advisors

## Abstract

The next generation of launch vehicles will breathe new life into the near-moribund suborbital micro-gravity research community. Traditionally plagued by high costs and a lack of launch opportunities, the µ-gravity community today stands at the threshold of resurgence when the new generation of commercial reusable higher launch rate vehicles begin routine operations. As a new generation of space researchers considers how tourism-focused suborbital missions and vehicles can be used for research and education, they need only look at the rich legacy of µ-gravity research from the '70s, '80s and '90s. NASA, academia, and the private sector have developed proven flight hardware, performed a myriad of experiments and conducted a wealth of meaningful scientific, commercial, and student experiments on aircraft, sounding rockets, suborbital and orbital platforms. This paper presents an overview of the flight hardware development experience, capabilities and micro-gravity resources available from one surviving American Commercial Space company founded in the mid 1980's, Instrumentation Technology Associates (ITA). It describes an impressive array of low cost experiment/space processing flight hardware available for lease to researchers applicable for use on aircraft, sounding rocket, nextgen suborbital or orbital platforms. Typical flight results from commercial users, Government users, and students that conducted flight experiments using this hardware on sounding rocket flights will be presented. The paper will also describe the micro-gravity experiment database (the Commercial User Requirements Database), a comprehensive compendium of the types of flight experiments that can or were conducted coupled with their requisite time in µ-gravity requirements. This database was developed under contract to NASA following the Challenger disaster to categorize and classify activity within the µ-gravity community to help determine alternate µ-gravity access options during the Shuttle stand-down.