

MICROGRAVITY SCIENCES AND PROCESSES SYMPOSIUM (A2)  
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SHORT DURATION REDUCED GRAVITY DROP TOWER DESIGN AND DEVELOPMENT

**Abstract**

The industrial and commercial development of space-related activities is intimately linked to the ability to conduct reduced gravity research. Reduced gravity experimentation is important to many diverse fields of research in the understanding of fundamental and applied aspects of physical phenomena. Both terrestrial and extra-terrestrial experimental facilities are currently available to allow researchers access to reduced gravity environments. This paper discusses two drop tower designs, a 2.0 second facility built in Australia and a proposed 1.1 second facility in the United Kingdom. Both drop towers utilise a drag shield for isolating the falling experiment from the drag forces of the air during the test and a controlled venting airbag for decelerating the experiment at the conclusion of the test.

The design and development of The University of Queensland's (Australia) 2.0 second drop tower, including its specifications and operational procedures is discussed first. The design process is examined and lessons learned from the design, development and commissioning of this facility are presented.

Future plans are then presented for a new modular short duration (1.1 sec) ground-based reduced gravity drop tower. The new drop tower has been designed for Kingston University (United Kingdom) to support teaching and research in the field of reduced gravity physics. The design builds on the knowledge and experience gained from the Australian drop tower. Additionally, it incorporates features to allow participants for a variety of backgrounds (from high school students through to university researchers) to learn and experiment in reduced gravity. Operational performance expectations are also discussed.