

MICROGRAVITY SCIENCES AND PROCESSES SYMPOSIUM (A2)
Facilities and Operations of Microgravity Experiments (5)

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Abstract

In April 1986 the Space Station User Development Program (UDP) of the National Research Council (NRC) Space Division (SD) requested the NRC's Flight Research Laboratory (FRL) investigate the utilization of its T-33 aircraft as a platform for microgravity experiments. After two years of preparation, the aircraft was ready for its first microgravity project flight in 1988. Canada's involvement with the ISS program grew to the point that the UDP division of the NRC spun off to become the Canadian Space Agency (CSA).

The success of the T-33 microgravity initiative prompted the NRC to acquire a surplus Department of National Defense (DND) Falcon 20 for the purpose of supporting the CSA's expanding mission in NASA's Space Shuttle program. After significant modifications the NRC Falcon 20 was made ready for microgravity operations by 1992.

Thirty years later, experience gained through the development and operation of these two platforms allows the FRL to continue to support CSA microgravity operations. This support is expanding into various other commercial ventures as the Space Program matures into private industry. The FRL is well versed in rendering guest experiments flight worthy from the point of view of airworthiness engineering, design, and instrumentation. All modifications in support of a particular experiment are accomplished in-house at the FRL, including tailoring the data acquisition suite to suit specific experiment parameters.

The aim of this paper is to provide a brief historical accounting of the development of the T-33 and Falcon microgravity aircraft microgravity systems. The current Falcon 20 configuration, and in particular the specific fluid management systems, will be covered in further detail. A summary of current projects will also be presented.

What began as four parabolas per flight has, through the continued efforts of NRC and CSA, matured into a program capable of delivering up to 40 parabolas per flight. The paper will conclude with a synopsis of the current microgravity mission profile of the Falcon 20.