

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

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THE UNITED NATIONS HUMAN SPACE TECHNOLOGY INITIATIVE (HSTI) SCIENCE
ACTIVITIES

Abstract

The United Nations Office for Outer Space Affairs (UNOOSA) launched the Human Space Technology Initiative (HSTI) in 2010 under the framework of the United Nations Programme on Space Applications, in response to the relevant recommendations of the United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE III) held in 1999. HSTI aims to promote international cooperation in human spaceflight and space exploration-related activities and create awareness among Member States on the benefits of human space technology and its applications.

HSTI is going to conduct various scientific activities to promote microgravity research and education and help developing countries raise awareness and build capacity in this new field of science. The first activity is called “Zero-gravity Instrument Distribution Project,” in which we are going to distribute zero-gravity simulation instruments such as clinostats and/or drop tubes to suitable institutions in developing countries.

Real microgravity conditions produced by spaceflight in orbit or a free fall on the ground are either limited in access or generally too short in duration for samples to exhibit obvious changes. Clinostats are considered to be alternatives that can be used to simulate weightlessness in long duration on Earth with almost the same effects as with real microgravity. The first instruments to be distributed world-wide will be one-axis clinostats which are expected to provide unique opportunities for students and researchers to observe the growth of indigenous plants in their countries in a simulated microgravity condition. This would provide huge ground-based data of plant growth to plan future space experiments.

The second activity is to develop a series of educational materials for microgravity science, which can be used in schools and universities in the world. The first educational material which will accompany the clinostat explained above will focus on life science, especially on plant growth in microgravity. It will not only a tutorial on basic plant growth experiments that can be easily reproduced for training purposes at schools and universities, but it will also give guidance on more advanced biological experiments.

The HSTI science activities, supported by the United Nations Member States, will continue for multiple years to build a world-wide network of institutions conducting microgravity scientific research and education to exchange information and build scientific ground-based data useful for designing future space experiments as well as for encouraging students to study space science and technology.