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## INNOVATIVE MUSICAL INSTRUMENTS DESIGNED FOR MICROGRAVITY: COSMICAL SEEDS

**Abstract**

A pair of musical instruments named “Cosmical Seeds” suitable for weightlessness, was selected by the Japan Aerospace Exploration Agency (JAXA) to represent the theme of Cultural and Artistic Utilization of the International Space Station (ISS). The instruments were successfully launched from Baikonur in Kazakhstan on October 31, 2011; and NASA astronaut Daniel C. Burbank, Expedition 30 commander, operated and played the instruments on the ISS on February 10, 2012. The Music played was a collaboration between the astronaut and ambient music specialists Akira Takahashi and Jaakko Saari.

- This paper will present:
  - The motivation which led to the creation of the musical instruments
  - The concept with history of music and music in space
  - The Parabolic flight testing
  - The Results of the mission on the ISS, difference between microgravity and Earth’s gravity (1G)
  - Future possibilities

The astronaut played with music many times for 15 mins and improved his skills beyond the procedure manual. Taking movies and sounds were very successful, even though some of steps needed to be cut as assumed in advance, and the video will be shown at this session.

**Keywords:** Space Art, musical instruments, microgravity, the ISS, cultural utilization, ambient music