

MICROGRAVITY SCIENCES AND PROCESSES SYMPOSIUM (A2)  
Microgravity Sciences onboard the International Space Station and Beyond (6)

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CONCEPTUAL DESIGN OF SMALL MASS MEASURING SYSTEM IN MICROGRAVITY  
CONDITIONS

**Abstract**

In microgravity condition like International Space Station, the request for mass measurement was discussed several times for scientific experiments with monitoring mouse weigh, measuring sample mass, etc. In response to the needs, many methods for mass measurement in ISS were proposed. In this paper, three concepts which are possible to measure mass in microgravity environment are proposed and are analyzed by the ground experiment in terms of accuracy, efficiency, etc. In the first concept, the mass is measured based on the Newton equation of motion,  $F=ma$  and computing comparative inertia force between sample and standard object which mass is known to operator. The second concept is similar to the first concept, but the second concept uses the centrifuge force between sample and standard object. The third concept use the resonance frequency with respect to the mass by vibrator. Three concepts to be proposed were analyzed in several points of view and then the first concept have been selected as baseline system for the scientific experiment in the first Korean astronaut program which was performed from November 2005 to June 2008 and the Korean astronaut conducted the space missions and activities in April 2008 for about 10days.