

## ヘルムホルツ共鳴を利用した液量計測 —スピーカインピーダンス法について—

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### **Determining Liquid Volume by Using Helmholtz Resonance —Measurement Method Based on Electrical Impedance of Loudspeaker—**

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#### **Abstract**

Development of elemental technology for gauging liquid fuel in a tank under microgravity condition will be required for developing fuel station in space and orbital transfer vehicle. A closed-type Helmholtz resonator had been already developed and worked well for this purpose. However, a microphone used for detecting acoustic response cannot work when it is masked by sloshing liquid, and might be damaged by its frequent contact with liquid. In order to resolve such a problem, a new measurement apparatus was developed without a microphone. The acoustic response was detected by measuring electrical impedance of loudspeaker's voicecoil. The performance of predicting liquid volume by using the electrical impedance method was comparable with the result of the microphone method. Some results of the ground test and the microgravity test with aircraft are summarized in the present report.