

SPACE LIFE SCIENCES SYMPOSIUM (A1)  
Behavior, Performance and Psychosocial Issues in Space (1)

Author: Mr. Jisung Jang

Korea Advanced Institute of Science and Technology (KAIST), Korea, Republic of, poust@kaist.ac.kr

Prof. Duck Joo Lee

Korea Advanced Institute of Science and Technology (KAIST), Korea, Democratic People's Republic of,  
djlee@kaist.ac.kr

EXPERIMENTAL INVESTIGATION OF NOISE CHARACTERISTIC OF THE INTERNATIONAL  
SPACE STATION (ISS-RS)

**Abstract**

One of the serious problems in the ISS other than the micro gravity is the noise generated by machine inside the station. Astronauts in ISS usually suffer physically and psychologically from the noise. The noise energy may not easily be emitted or radiated from the space module to outdoor space. The objects of this paper are the measurement of noise in ISS-RS and an analysis of noise characteristics in ISS-RS. Korean astronaut scans the plans of sound sources inside the ISS -RS module by using one microphone to make sound map. The equipment saves the image of measurement locations as well as sound pressure data. The astronaut is easy to find the locations and the pressures on the computer screen during the measurement. Scanning process is recorded by camera and the sound map is simultaneously visualized in real-time. The microphone and a camera are connected to the computer. The camera can recognize the locations of microphone through a special mark on the microphone. The recorded locations and pressure data are also easy to be analyzed later on the ground. The sound map software is user-friendly and easy to use. Korean astronaut measured the noise and made sound map on 3 locations in ISS-RS. Noise level is similar to noise level of noisy laboratory. The noise sources are mechanical noise like fans, resonance frequency noise related to size of ISS-RS and tonal noise. Astronauts who stay in ISS for a long time usually can suffer physically and psychologically from the noise. Noise would also affect science, animals and plants experiment in ISS-RS. To study quantitatively psychological influence of noise on people, we are going to measure brain waves of people when they hear noise of ISS-RS or not. It can show the difference of brain waves at each frequency range which represents feeling, sensitivity, concentration and stress, etc. In conclusion, noise measurement equipment developed during The Korean Astronaut Program is good for portability and for real time visualization of the sound level and the locations of the sources. Noise sources of ISS-RS are identified by the noise measurement experiment. It can be applied to improve noise problem in ISS-RS by analyzing the sound map.