

25th IAA SYMPOSIUM ON SPACE ACTIVITY AND SOCIETY (E5)  
 Contemporary Arts Practice and Outer Space: A Multi-Disciplinary Approach (4)

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HOMESICKNESS KITS AND BIO-HELMETS: DEVELOPING GREEN SOLUTIONS FOR  
 ASTRONAUTICAL HEADSPACE

**Abstract**

This paper will present work-to-date on palliative olfactory kits and personal greenhouses for astronauts. The projects aim to develop concepts and technologies that could support micro (personal) and macro (colony) greenhouses in space, and to investigate scientific, medical, and technological principals related to space travel that can be experienced and tested by the average citizen on Earth.

The experience of space habitats can be improved through the use of greenhouses for alimentation, oxygen-exchange, and recreation. As discussed in *Architecture for Astronauts* by Sandra Haeuplik-Meusburger (Springer, 2011), physical wellbeing in space augmented by plant-human relationships is frequently documented in astronauts' use and design of personal space. But any trip into space—whether through space-tourism, a stay on the ISS, or an extended space mission—will require stamina to ward off psychological and existential crises, as detailed in Kanas N., Manzey D. *Space Psychology and Psychiatry* (Springer, 2003). Because of serious ramifications of such crises on other crew members, it is important to experiment with effects of plants on mental wellness in space and to devise appropriate locations for plant-human relationships to occur.

This project has developed in stages since 2011, when the first Homesickness Kit was conceived as an artwork; this multi-perfume carrying device helps spacefarers guard against dislocation/alienation from the planet and “homesickness,” just as “air sick bags” were provided to early airline travelers. Specific scents are important to the preservation and continuation of culture as well as health, so these are selected carefully. Justification is taken from research by artist/perfumer Gayil Nalls, “The Importance of Natural Olfactory Stimulation . . .” (Annals of The New York Academy of Sciences, Volume 1121, 2007). In the late 1990's, Nalls worked with 270 U.N.-member nations to determine important cultural scent-memory triggers. Using appropriate scents, I propose, can aid astronauts in relaxation, sociability, and crew relations among international teams, helping break down cultural and linguistic barriers.

A live-plant extension of the Homesickness Kits planned for 2015-2016 will incorporate the added element of sculptural hydroponic chambers, built within the requirements for successful plant feeding established in Hoehn, A., et. al. “Design, Testing, and Operation of Porous Media for Dehumidification and Nutrient Delivery . . .” (33rd ICES, 2003-01-2614). This prototype will be a type of space-helmet/biosphere, a wearable bio-dome built out with features of humidification, LED-lighting and temperature control, as well as cryotechnology to address problems of intracranial hypertension and optic nerve pressure experienced during extended periods in microgravity.