

31st IAA SYMPOSIUM ON SPACE AND SOCIETY (E5)
Space Architecture: Habitats, Habitability, and Bases (1)

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ALEXIS (ADAPTIVE LANDER EXTENSION FOR INITIAL SETTLEMENT) - A CONCEPT DESIGN
FOR A DEPLOYABLE MODULAR HABITAT TO EXTEND A CREWED LUNAR LANDER**Abstract**

With the 50th anniversary of the Moon landing in July 2019, the Moon is experiencing a new boom. Space agencies, international organisation and even the private sector are competing in what might be described as a new race to the Moon. This time, however, the goal is not only to set foot on Earth's nearest neighbour, but to establish a base for long-term research. Missions like the NASA Artemis program aim to use a lunar lander as an initial habitat. In order to support longer missions, an additional habitat of bigger dimensions would have to be brought to the Moon. The project 'ALEXIS (Adaptive Lander EXtension for Initial Settlement) - A Concept Design for a Deployable Modular Habitat to Extend a Crewed Lunar Lander' envisions a design for a habitat that will support up to six astronauts on an early lunar mission of several weeks. The design uses the Descent Stage of a Lunar Lander as part of the habitat to save valuable payload weight. A deployable extension to the lander serves as the main part of the habitat. A suitable folding and deployment technique ensures that the habitat will be as lightweight and small-scaled as possible during transportation to the Moon. The architectural composition of ALEXIS is based on a survey study done during a simulated lunar mission at the HI-SEAS simulation habitat in December 2019, which concentrated on the aspects of privacy and color application. The results were used to identify indispensable architectural elements and optimize living procedures in the lander habitat. ALEXIS creates a both liveable and sustainable alternative to traditional designs for lunar habitation and unites the technological necessities with the human factors of space architecture.