HABITABILITY AND HUMAN FACTORS ASSESSMENT (iSHORT, SHAQ, AND SHU)

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BACKGROUND

As long-duration off-planet habitats become a reality, a consideration of habitability and human factors (HF) is crucial. The habitat is more than just a place to live and work. It is also the crew's perception of the space, and the psychological impacts of size, layout, and usage over time; all of which can support or strain behavioral health and performance (BHP).

A previous International Space Station (ISS) habitability study used the iSHORT (Space Habitability Observation Reporting Tool) to collect detailed data about habitability and human factors and inform NASA Standards. Of the previous iSHORT study, only one of the six ISS subjects had a duration of one year; all other ISS and ground analog subjects had shorter mission durations from one week to six months. It is necessary to collect new data with a focus on long-duration exploration missions of > 6 months and on planetary surface habitat design. New data is also needed to compare the iSHORT to other habitability measures. One measure, the SHAQ (Subjective Habitability and Acceptability Questionnaire), assesses the intersection of psychology and habitability. Another complementary measure, the Scale for Habitat Usability (SHU), is a brief subjective scale that captures how habitat design impacts perceived usability of the built environment in relation to task performance.

OBJECTIVE

Our study aims to (1) understand how individual well-being and team dynamics may relate to HF concerns over time, (2) capture how habitability and HF change over time, (3) compare the three habitability measures (iSHORT, SHAQ, SHU), (4) assess habitats to capture HF design concerns and related BHP impacts of a planetary habitat, and (5) inform future standards for HF design.

METHOD

Data are being collected on crews living and working in long-duration spaceflight analogs. Individual-level data collections are repeated at regular intervals throughout the missions on several habitat areas, activities, and key equipment (i.e., points of interest). These points of interest (POIs) include the kitchen/galley, crew quarters, and other work and living areas. Assessments include evaluations of privacy, comfort, convenience, control, efficiency, and social density through the lens of subsequent outcomes like sleep, individual performance, group activities performance, stress, mood, and social interactions. Pre- and post-mission evaluations will also allow comparison with homes, pre- and post-mission hotels, and a retrospective reflection of living and working in a long-duration analog.

INITIAL DATA COLLECTIONS

In this poster, we will describe the measures and data yield. Since the research protocol was designed, the study team has collected iSHORT Standalone four times, nine collections of SHAQ, and three collections of iSHORT with SHAQ. Data collection is ongoing.

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SUMMARY

A novel assessment suite has been developed to further aid the comparison and complementary understanding of the habitability and human factors measures, which will allow for efficient deployment of these measures in analogs and/or spaceflight in near-term research as well as support well-being and performance through design.