

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

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INTERACTIVE EFFECTS OF AUTONOMOUS OPERATIONS AND CIRCADIAN FACTORS ON
CREW PERFORMANCE, BEHAVIOR, AND STRESS PHYSIOLOGY

Abstract

Future long-duration space exploration and colonization missions will present unique challenges to crew behavioral health and performance. Specifically, factors such as autonomous operations, compromised communications, heavy workload, and circadian disruptions may interact to effect performance, behavior, and biological function. Here, we present the results of several experiments from our laboratory-based research program on the effects of bounded autonomy, the purpose of which was to contribute experimentally derived insights on these factors to the empirical database used during mission planning. Included are measures of performance, psychosocial adaptation, group cohesion, and stress physiology in long-term mixed-gender 3-person crews engaged in repeated "missions" on an interdependent planetary exploration task. Overall, the results consistently support the potential behavioral health and performance benefits of crew autonomy, but also reveal the limitations of autonomy as a countermeasure to operational stressors and underscore the importance of crew selection/composition when planning long-duration exploratory missions.