Capturing the Dynamics of Teamwork

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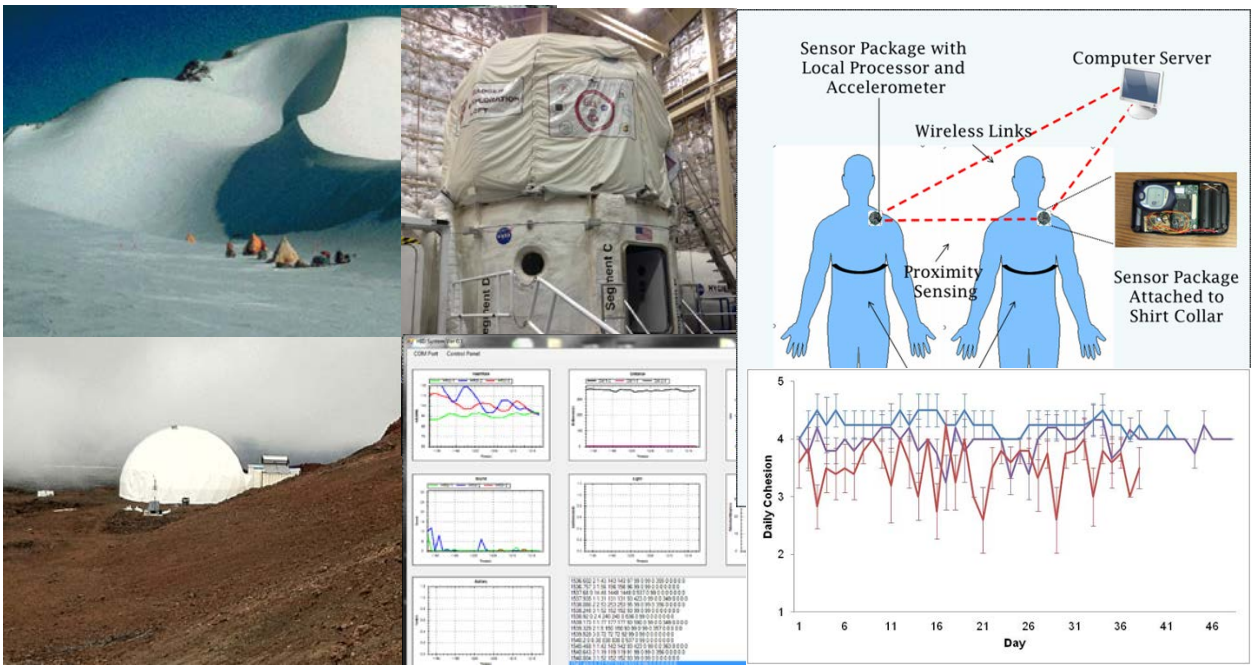
PROJECT OVERVIEW

High quality team interaction processes – teamwork – is a key contributor to team effectiveness. Good teamwork is particularly important for "high reliability" action teams like space crews that perform critical tasks under the stress of isolated, confined, and extreme (ICE) environments. Although there is considerable research on team processes and team effectiveness, it is largely based on cross-sectional, static data. Intensive longitudinal research that examines the dynamic rhythms, cycles, and patterns of teamwork and collaborative interactions among team members is virtually non-existent. *Understanding the dynamics of collaborative team interactions will be critical for supporting astronaut crews on long duration space missions.* This project is designed to: (1) benchmark the dynamic variation of team collaboration and cohesion and identify "shocks" that trigger team friction; (2) develop assessment systems to unobtrusively capture the quality of team interaction dynamics (psychological, behavioral, and physiological); and (3) develop data fusion, feedback, and regulation systems to support team cohesion.

RESEARCH APPROACH

The project is interdisciplinary, encompassing (a) human performance and team effectiveness and (b) a novel technology using wireless body-mounted sensors to capture teamwork dynamics. In prior research, we have established the reliability of the prototype technology. Ongoing research involves (1) Benchmarking team functioning in ICE analog environments (Antarctic Science Teams, Australian Antarctic Division Stations, HERA, & HI-SEAS), (2) Extending technology development, and (3) Developing teamwork metrics and support systems.



RESEARCH STATUS

(1) Prior and ongoing research indicates substantial variability in team cohesiveness across daily reports for short (six weeks) and longer duration, winter-over Antarctic missions (9 months). Moreover, there is evidence that "shocks" such as bad weather, poor performance, or difficult teammates are associated with dips in team cohesion. Additional data collections in Antarctic and simulated Mars mission analogs are in progress.
(2) Proof of concept for a prototype wireless sensor has been established. Phased validation experiments demonstrate high reliability and accuracy. Additional sensor development to capture stress and pilot evaluation of the technology system in analog environments are in progress.
(3) Development of team collaboration metrics and algorithms, information display, and feedback distribution protocols are in progress.