

Strategies to Optimize Individual and Team Performance

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Crew Selection

- Challenges of selecting a heterogeneous crew for long-duration missions
- Multinational
- Mixed gender
- Individual factors
 - Personality
 - Cultural differences
 - Personal space, privacy, hygiene
 - Behavioral style in interacting with others

Selection Issues

- Select-Out vs. Select-In approaches
- Crew selection
 - Evaluation of current psychological/psychiatric functioning
 - Technical skills
- Long-duration missions
 - Challenge of predicting the later onset of a psychological/psychiatric disorder in initially healthy individuals

Optimizing Selection

- Consistency in crew selection criteria across international space agencies
- Standardized assessment battery consisting of personality and other measures
 - Careful translation of psychological instruments
 - Established norms for each country
 - Greater attention to possible personality disorders

Mission Features

- Asthenia/allostatic load
 - Noted in some Russian cosmonauts
 - Due to cumulative physiological strain on the body
 - Psychophysiological effects
 - Fatigue, exhaustion, loss of physical strength
 - Sleep problems, mood lability
 - Decrements in cognitive functioning

Prevention and Mitigation

- Need for active countermeasures to maintain optimal psychophysiological functioning
 - Instruction in relaxation techniques
 - Moderate heat and cold stimulation by means of a cooling/warming garment
 - Changes in light intensity
 - Broader array of exercise opportunities
 - Promotion of positive aspects of the mission

Maintaining Physical Health and Strength

- Highly important for long-duration missions
- Need to establish a habitat on planetary surface
- Strength for planetary exploration
- Importance of collaboration among different specialists to assess effectiveness of multi-targeted countermeasures

Team Performance

- Monotony and boredom
 - Coupled with periods requiring optimal crew performance
 - Rapid shift from periods of quiescence to situations requiring intense concentration and team work
 - Need to practice these scenarios in pre-flight training and practice drills during the mission

Culture and Gender

- Discussion of “Right Mix” of the “Right Stuff”
 - Difficult to generalize from group data
 - Each crew is unique
 - Short vs. long-duration missions
 - Pre-flight training and careful observation of group interactions important in anticipating potential problems
 - Leadership - task and social support roles to maintain group cohesion and optimal performance

Conflict Resolution

- Availability of different types of countermeasures
- Mission leader needs to have skills to identify emerging crew conflicts
 - Intervention by “psychosocial specialist” with specific training in group processes
 - Computer-interactive intervention programs
 - Individual psychological disturbances
 - Negative group interactions

Conclusions

- Greater priority needs to be given to psychosocial/cultural factors
 - Both positive and negative aspects
- Need for more openness among space agencies in evaluating personal and group problems
 - Informative for more effective selection and countermeasures

Research Directions

- Longitudinal studies of astronaut psychological as well as physical health
- Comprehensive research on numerous multi-national and mixed gender groups performing in extreme environments