

# PANEL DISCUSSION

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David C. Hilmers

Baylor College of Medicine

NSBRI

# Personal Insights

- Psychologic stress can lead to degradation in personal performance, crew cohesiveness and affect mission outcome
  - Difficult to measure stress levels and its potential effects on performance
  - Need methods to measure accurately and non-invasively without undue impact on crew time
- Continuous, comprehensive medical data collection is informative but can have downsides
  - Alarm fatigue, information overload, over-reliance on technology
  - Need unobtrusive, accurate, appropriately filtered information

# Psychologic Stressors

- External - Family, friends, finances, relationship difficulties
- Between crewmembers
- Due to physiologic problems – lack of sleep, nagging microgravity-related discomforts, schedule shifts
- Long periods of isolation – worsened by increased distance from earth and inability for quick return, boredom
- Depression

# Concerns

- Difficult to measure internal stresses
- Can significantly degrade crew performance and alertness
- Astronauts may be unwilling to disclose feelings
- Length of mission and isolation may magnify problems, ability to compartmentalize difficulties
- Analogous to physicians who must be always at best yet can become impaired by internal stresses
- Once identified, what to do with information and how to not allow problems to progress to affect overall mission objectives?



# Social Communication

- During my missions usually only 1-2 short talks over private medical loop
- Have email now whenever TDRS is in view (nearly 100% with 3 sats), using email client
- VOIP one-way communication
- Social media started in 2009 with Twitter from ISS
- Now there are 14 different social media platforms that NASA posts on
- Instagram account has over 5 million followers
- Usually send email to earth and coordinator will post
- What happens if not available or if communication brings bad news?



NASA



NASA



DAVE HILMERS



RICK HAUCK



PAIKY NELSON









# Ben Taub General Hospital, Houston, TX



# Continuous Medical Monitoring

- Provides important information that can be analyzed and assist with accurate diagnosis and management
- Can get “information overload”
- “Alarm fatigue”
- Can cause crew actions that may waste time
- False positives must be investigated
- Over-reliance on technology
- Telemetry in hospital
  - Patient complaints about lack of freedom
  - Much of data is “noise”
  - Algorithms not always agreed upon (examples are prostate and breast cancer screening)



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# Needs

- Ways to monitor stressors and their effect on mood, impact on crew cohesiveness and individual performance
- Physiologic data monitoring should be as non-invasive as possible
- Minimize impact to crew schedule
- However, crew needs to maintain “situational awareness”
- Data must be processed to eliminate false positive and negatives
- Transparent to crew unless indication for intervention