IVA Clothing Study

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IVA Clothing Study

- Intravehicular Activity (IVA) Clothing Study
  - A demonstration activity of the Advanced Clothing System (ACS) task
  - Part of the Logistics Reduction and Repurposing (LRR) Project at multiple NASA Centers under the Advanced Exploration Systems (AES) Program
- IVA Demonstration Goals
  - Evaluate light-weight fabrics for extended use
  - Assess garments for comfort, appearance, and odor
- An experimentally designed ground-testing study of exercise shirts and shorts has informed the planned ISS evaluation

Logistics Reduction and Repurposing

- LRR Project will utilize a cradle-to-grave approach to reduce total mission logistical up mass through:
  - Reducing logistical up-mass, volume, and disposal rates
  - Re-use and repurposing to satisfy several functions
  - Reprocessing to a secondary use, to increase habitable volume, and to enhance life support closure
  - Deconstruction of logistical materials and reconstruction to primary gases or as a means reducing waste volume through venting
- LRR Project has five areas of activity, including ACS
- ACS focuses on reducing logistical up-mass and volume
  - Longer-wear clothing to push forward the break-even point for a space laundry system

IVA Clothing Study Overview

- IVA Clothing Study has 2 components:

1. Exercise Wear (shirts and shorts)
   Engineered polyester and advanced technology, light-weight, Merino wool
2. Routine Wear (shirts only)
   Modacrylic and advanced technology, light-weight, Merino wool

- Also, ground-based Baseline Data Collection (BDC) at JSC
  - For Exercise Wear only, with the same clothing type as IVA Study
  - Completed pre-flight
  - Environment, exercise equipment, and procedures similar to IVA
  - Ground data to be compared to in-flight data

Study Procedures

- Routine-wear shirts, exercise shirts and exercise shorts will be worn in an experimentally designed sequence

Exercise-Wear

- Exercise shirts and shorts are worn only during normally scheduled cardiovascular exercise sessions
- After exercise, clothing will be mounted on a hard surface to dry for up to 3 hours and then stored in flame-retardant bags

Routine-Wear

- Routine-wear shirts will be worn during all nominal activities except exercise and sleep
- When not in use, routine-wear shirts will be stowed away in a flame-retardant bag until the next use
- Any PAO or other event shirt to be worn over routine-wear shirt

Study Procedures

- Each garment will be worn on consecutive study days until the crew member deems it no longer acceptable to wear
- If the crew member determines that a garment is no longer wearable, it will be retired from use and replaced with the next garment in the sequence
- Routine-wear shirts, exercise shirts, and exercise shorts will be assessed and tracked separately for continued wear on daily questionnaires
- A questionnaire will be taken soon after exercise to document perception of exercise clothing
- A separate questionnaire will be taken at the end of each day to document perception of routine-wear shirts

IVA Clothing Study - Summary

- Why is the research needed?
  - Clothing accounts for over 900 pounds for an ISS crew of six for a year
  - Traditional cotton garments also contribute to lint generation causing clogging of air filters and increased cleaning
- What will be accomplished?
  - Test the length of wear and crew response to light-weight, odor and odor-causing germ-resistant, commercially available clothing
- What will be the impact of the research?
  - Reduce clothing launch and trash mass as well as storage requirements
  - Provide crew with comfortable, long lasting clothing that reduces or eliminates odor problems