Recent Developments in NASA Human-Rating Requirements

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Recent Developments

- Administrative change to NPR 8705.2B
- Safety goal and threshold for ISS crew transport
- Commercial Crew Transportation
Update: NPR 8705.2B w/ change 2  (1/3)

- Safety goal policy added to the Human-Rating NPR:
  - Administrator sets Agency-level safety thresholds/goals
  - Programs required to maintain continuous safety upgrade and improvement program
  - Programs to meet probabilistic criteria with high degree of certainty

- Element of certification package at milestone reviews
  - HRCP endorsement is input to Key Decision Points
Update: NPR 8705.2B w/ change 2 (2/3)

- NPR now cites NASA-STD-3001

- NASA-STD-3000 replaced by new documents
  - NASA-STD-3001 volumes 1 and 2
  - Human Integration Design Handbook (SP-2010-3407)

- The standards maintain the high level functional requirements, as well as mandatory thresholds for health, safety, and crew performance

- Updated and expanded NASA-STD-3000 data
Update: NPR 8705.2B w/ change 2 (3/3)

- Restructuring of process requirements on analysis and reporting

- Removal of term “integrated design and safety analysis”

- New requirement to evaluate the effectiveness of crew survival capabilities

- Clarification of failure tolerance requirement
ISS Crew Transport Risk Tolerance

• Administrator signed Agency-level requirements
  – Safety threshold and goals
  – Continuous safety upgrade and improvement program

• Design threshold (compared to Shuttle at end of life):
  – At least as safe for combined ascent and entry phases
  – Overall, at least as safe as Space Shuttle 12-day mission
  – With high degree of assurance

• Ultimate goal (compared to Shuttle at end of life):
  – Order of magnitude safer for ascent and entry
  – Overall, substantially safer than Space Shuttle mission
Evaluation of Safety Thresholds

• Agency has defined corresponding probabilistic criteria

• Satisfaction of criteria evaluated via probabilistic safety analyses
  – Similar to analyses used by Shuttle, ISS, Constellation
  – Must consider uncertainty associated with estimates
  – As integral part of safety oversight and insight

• Applicable to NASA developments and commercial acquisitions
Commercial Crew Transportation

• Acquisition model still being evaluated
  – Currently, fixed price contract(s) for next development phase are anticipated

• Commercial Crew Program released initial draft of certification requirements and insight/oversight plan
  – Currently being updated based on industry feedback and guidance regarding acquisition models
  – Design, process standards must be met or exceeded
  – Planned safety evaluations include probabilistic assessments and hazard control evaluations