

# APPENDIX C: WORKSHOP PRESENTATION: REPORT ON STABILITY AND DYNAMICS PANEL

## Report of the Stability & Dynamics Session

Iwan Alexander  
David Chato  
Steven Collicott  
Nihad Dadzic  
Walter Duval  
Steven Garoff  
Gary Grayson

John Hochstein  
Mo Kassemi  
Emily Nelson  
David Plachta  
Enrique Rame  
Lev Slobozhanin

Organized by NASA Glenn Research Center  
Cleveland, Ohio  
May 15, 2003

## Plan for Session

1. Are issues in the Draft Document appropriate and complete?
2. Are the issues properly organized and prioritized?
3. Is the plan well defined and suitable?
4. Are the proposed facilities adequate?

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# Are issues appropriate & complete?

In addition to present critique, document should be reviewed with respect to:

1. previous workshops
2. NRC Report
3. panel of current system designers

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## Appropriate & Prioritized

### Critical Issues

- Phase Accumulation within components (C,C)\*
  - manifolds
  - porous media (i.e.. soils, packed beds)
  - wicking structures
- Contact Line Dynamics (C,C)
  - static & dynamic contact angle; values & fundamentals
  - in presence of evaporation, condensation
  - many lower priority applications need this information as an “input”

\* First letter indicates priority in draft report,  
Second letter is priority assigned by session participants.

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# Appropriate & Prioritized

## Critical Issues – cont'd

- Container Thermo/Fluid Management (L,C)
  - Pressure Control (i.e. TVS, cryocoolers, mixing & cooling times)

## Limiting

- Phase Separation (L,L)
  - active & passive systems to separate phases
  - fuel cells
- Container filling & emptying (L,L)
  - preclude gas ingestion
  - flash evaporation

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# Appropriate & Prioritized

## Enhancement Issues

- Sloshing & Vibration
  - near-term applications
  - large mass spacecraft
- Phase Change (condensation, evaporation).
  - thermal stratification & convection in  
Containers  
Heat Pipes
- Liquid Positioning
  - LAD's, Impulsive, Magnetic

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# Appropriate & Prioritized

## Awareness Issues

- micro-g instability (A, A)
- Bubble Management (E,L)
  - strategic for both missions and experiments

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# Additional Issues

## Important issues not clearly addressed in draft document:

- Mass gauging
- Stability dynamics of disconnected capillary surfaces
- Slow capillary driven flow (i.e. wicking)
- Long-term material property evolution in micro-g
  
- Dumping – problem with freezing of dump lines

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# Facilities

## Critique of Proposed Facilities:

- proposed facilities do not well address the needs of container thermal/fluid experiments
- CLiDE is worthwhile
- Faster turnaround/easier access is crucial for improving productivity of research program

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# Other Recommendations

- Review Panel composition and charge MUST clearly reflect the role of “Strategic Research”
- Roadmap development should focus on specific technology needs rather than more general phenomenological topics
- Verification & Validation of analytical and computational tools is crucial for reliable design. This will require planning and may require specialized experiments.

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