



Glenn Research Center

*Two-phase Flow,
Fluid Stability and Dynamics Workshop
Microgravity Science Division*

Space Directorate



**Multiphase Flow in Power and
Propulsion Workshop
Fluid Stability and Dynamics
Workshop**

Sponsored by the
Office of Biological and Physical Research,
NASA HQ

Hosted by
NASA Glenn Research Center
15 May 2003



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Workshop Purpose

- Short term: Present a research plan and a “roadmap” developed for strategic research for the Office of Biological and Physical Research.
- Long term: Conduct necessary ground-based and space-flight low gravity experiments, complemented by analyses, resulting in a documented framework for parameter prediction of needed by designers.



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Motivation for this Workshop

- Research Maximization and Prioritization (ReMAP), August 2002.
- NASA Exploration Team (NExT)
- Led to OBPR's Strategic Research Initiative.

Need a Research Plan and Roadmap to
Guide the Strategic Research



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Some Previous Two-phase Flow Workshops & Studies

- 1986 - Microgravity Fluid Management Symposium
- 1989 - Workshop on Two-Phase Fluid Behavior in a Space Environment
- 1990 - The Workshop on the Commercialization of Space Fluid Management
- 2000 - Microgravity Research in Support of Technologies for the Human Exploration and Development of Space and Planetary Bodies – NRC Report
- 2000 - Workshop on Research Needs in Space Thermal Systems and Processes for Human Exploration of Space
- 2000 - Workshop on Research Needs In Fluids Management for the Human Exploration of Space

These Workshops have emphasized the importance of multiphase flow and phase change for NASA's exploration mission.



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Why are we here?

- We have provided you a “strawman” Research Plan and Roadmap
- Review Priorities and Roadmap
- Provide Feedback
 - Does the plan make sense? If not, then let us change it so it does.
 - Will the proposed space-flight experimental facilities adequately address significant questions?
 - What other facilities & tests are needed to address critical and severely-limiting issues?
 - Are there any other elements missing in the plan?



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Agenda

- 7:30-8:00 AM Continental Breakfast
- 8:00- 10:00 AM Opening Plenary
 - 8:00 -8:10 Opening Welcome (Ostrach - NCMR)
 - 8:10 - 8:20 Logistics (Kassemi - McQuillen)
 - 8:20 - 8:35 Overview Roadmap (Singh)
 - 8:35 – 8:55 Nuclear Propulsion - (Johnson - GRC)
 - 8:55 - 9:15 Advanced Life Support (Joshi - HQ)
 - 9:15 - 9:35 Strategic Research (Chiaramonte - HQ)
 - 9:35 - 9:50 Overview of Draft Document
 - 9:50 -10:05 Facility Description
 - 10:05 – 10:15 Charge to the Panels (McQuillen)
- 10:15 - 10:45 Break
- 10:45 – 2:30 Parallel Sessions
 - Multiphase Flow Session McCreedy
 - Stability & Dynamics Hochstein &
- 12:00 - 1:00 Working Lunch
- 2:30 – 4:00 Plenary Technical Discussion
- 4:00 – 5:00 Closing Plenary Session - Panel Reports
- 5:00 Dinner/Adjourn



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Workshop Deliverables

- Revised Research Plan and Roadmap Document to represent “Consensus Best Plan”
- Identified list of spaceflight and ground-based facilities and modeling that are needed to answer the key missing questions (considering limitations of budget and space access).
- Any other consensus recommendations that the community wants to include.

Workshop recommendations will be sent to HQ for their use in formulating and advocating strategic research.