



Preliminary Advanced Colloids Experiment – 1&2 (PACE-1 & PACE-2)

WBS: 825080.04.02.30.15



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Objective:

- ◆ PACE-1: Risk mitigation for the future Advanced Colloids Experiments (ACE). Using a fixed test target, determine and document which microscope magnifications are usable (50x, 63x, 100x air and oil immersion objectives) while running in an ISS vibration environment.
- ◆ PACE-2: View dilute solutions of different sizes and shapes of particles at different magnifications using ACE-1 sample cells.
- ◆ Develop crew procedures for mixing and changing PACE and ACE samples.

Relevance/Impact:

- ◆ Use this opportunity to characterize the capability of conducting high magnification imaging with LMM using a test target and test particles. This will be done to find what are the minimum size particles needed for ACE, given microscope vibration and magnification results.

Development Approach:

- ◆ Use Space Acceleration Measurement System (SAMS) instrument in FIR rack to correlate data quality with on orbit vibrations.
- ◆ Use typical work vibration scenarios (regular crew activity (nominal / exercise / sleep), equipment operations (pumps, actuators, thruster firing, etc.).
- ◆ Use existing imaging procedures developed for first payload (CVB).

PACE-1 test target



Installed in LMM



ISS Resource Requirements

Accommodation (carrier)	Fluids Integrated Rack (FIR)
Upmass (kg) (w/o packing factor)	5 kg for PACE test module inside Equipment Transfer Module (ETM)
Volume (m³) (w/o packing factor)	0.01 m ³ for PACE
Power (kw) (peak)	0.5 kw for PACE / LMM 1.1 kw for FIR & PACE / LMM
Crew Time (hrs) (installation/operations)	14 Hours / Autonomous
Autonomous Operation	4 months of intermittent operations
Launch/Increment	2010 PACE/ 19A, PACE-2/ULF-5 MPLM

Project Life Cycle Schedule

Milestones	SCR	RDR	PDR/CDR	VRR	Safety	FHA	Launch	Ops	Return	Final Report
PACE-1	Aug 2009	N/A	N/A	N/A	10/2010	11/09	3/2010	Inc. 23-25	N/A	2011
PACE-2	Aug 2010	N/A	N/A	N/A	1/2010	4/10	9/2010	Inc. 24-26	N/A	2011