Capillary Flow Experiments (CFE)

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(Left) Interior Corner Flow 1; (Right) Increment 12 CL2 ops with Bill McArthur.

(Left) Interior Corner Flow 2; (Right) Vane Gap1&2.

Objective:

- Investigate capillary flow in the management of fluid systems in space.
- Exploration missions assume the use of larger liquid propellant masses ever flown on interplanetary missions. Capillary forces can be exploited to control fluid orientation to enable large mission-critical system predictable performance.

Relevance/Impact:

- Technology in space uses capillary forces to position and transport fluid. CFE provides improved design knowledge in the storage and transport of liquids in space thereby increasing system reliability, decreasing system mass, and reducing overall system complexity.

Development Approach:

- CFE comprises three related experiments with two unique experimental units per experiment for a total of six units. Each test unit provides relevant capillary resulting phenomena, critical wetting in discontinuous structures, large length scale contact line damping, and capillary flow in complex containers.

ISS Resource Requirements

Accommodation (carrier)	Maintenance Work Area
Upmass (kg) (w/o packing factor)	6.37
Volume (m^3) (w/o packing factor)	0.012
Power (kw) (peak)	0
Crew Time (hrs) (installation/operations)	35
Autonomous Ops (hrs)	0
Launch/Increment	ULF1.1/Increment 13

Project Life Cycle Schedule

Milestones	SCR	RDR	PDR	CDR	VRR	Safety	FHA	Launch	Ops	Return	Final Report
Actual/ Baseline								ULF1.1 7/4/2006	Inc. 14/15	Inc. 15/16	2008