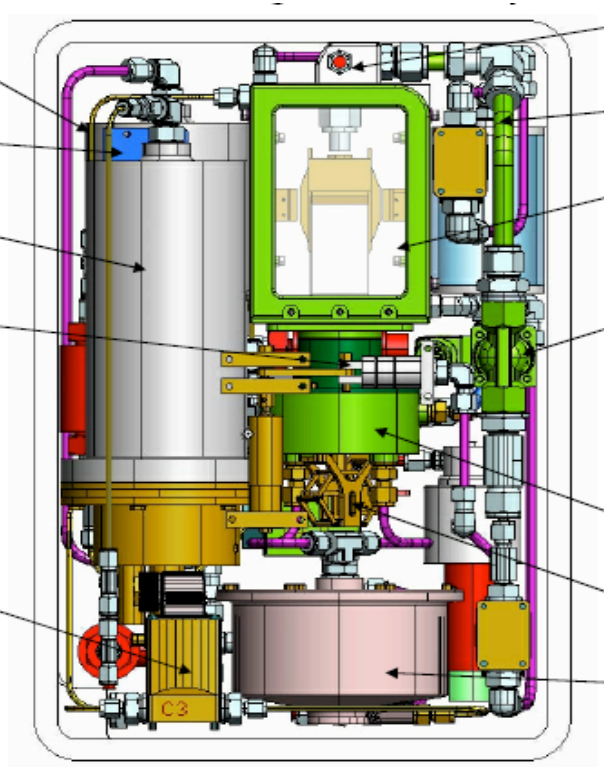
CCF Fluid Management System



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[28]

CCF Board Computer

PC/104 System

Rugged design, 95 x 90 mm (3.7" x 3.5")

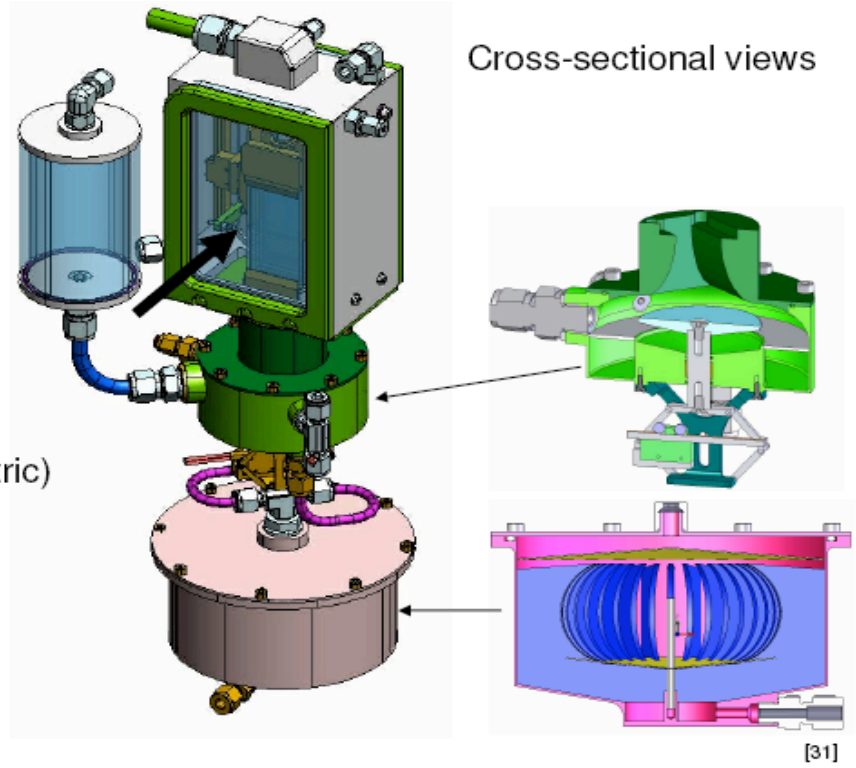
Modules:

- CPU Module
  MOPSlcdLX with 500 MHz AMD LX800 processor
  onboard RAM (1 x Ethernet, 2 x RS232, keyboard, …)
- Analog I/O Module
  - Diamond-MM-32X-AT (32/16 A/D channels, 16 bit resolution
    4 D/A channels, 12 bit resolution, 1 RS232)
  - Usage: Analog data acquisition (temp., positions, press. values
- Digital I/O Module
  - 10 counter/timer, 48 digital I/O channel
  - Usage: speed measurement, digital control
- Motion Controller Module
  tbd (oscillator requirements under review)
- Non Volatile Memory
  2 Compact Flash (CF) Cards

Glenn Research Center

CCF Test Unit, Compensation Tube, and Phase Separator

- Compensation tube
- connecting tube dia.=3/8”
  → inner dia = 7.9mm
- port for pressure sensor
- port for temperature sensor
- two connecting tubes (symmetric)



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[31]

CCF Pre-Operations Scenario

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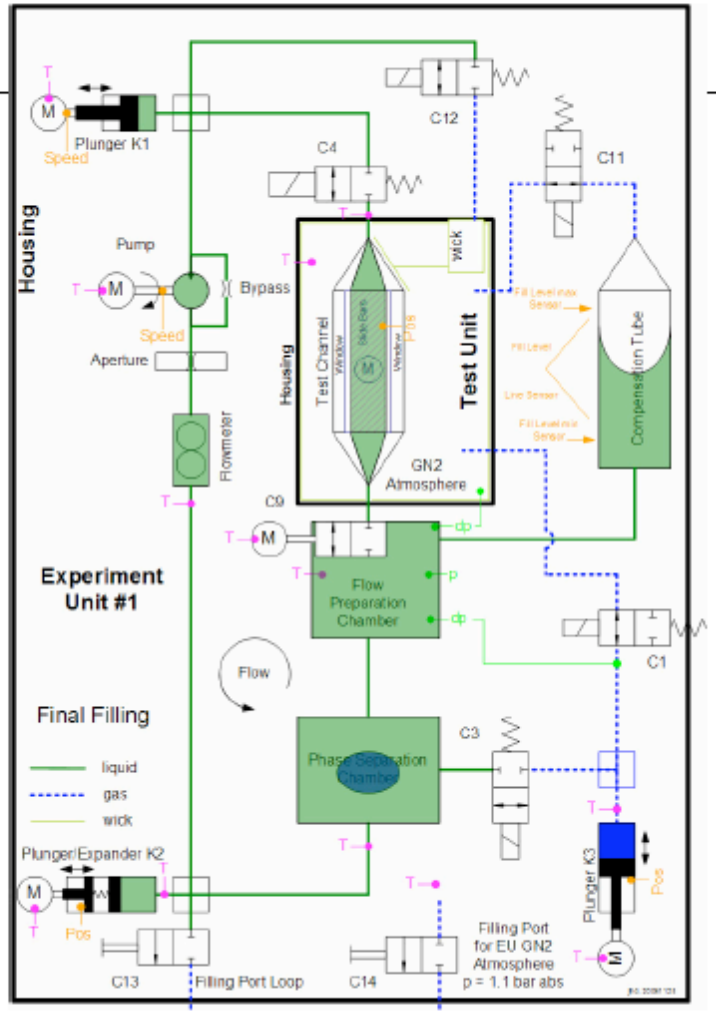
Experiment Unit #1 Fluid Loop Schematics

Status Ready for Experiment

- Bubble in the PSC generated
- Test Channel filled
- Compensation Tube filled to correct level



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[18]

CCF Pre-Operations Scenario

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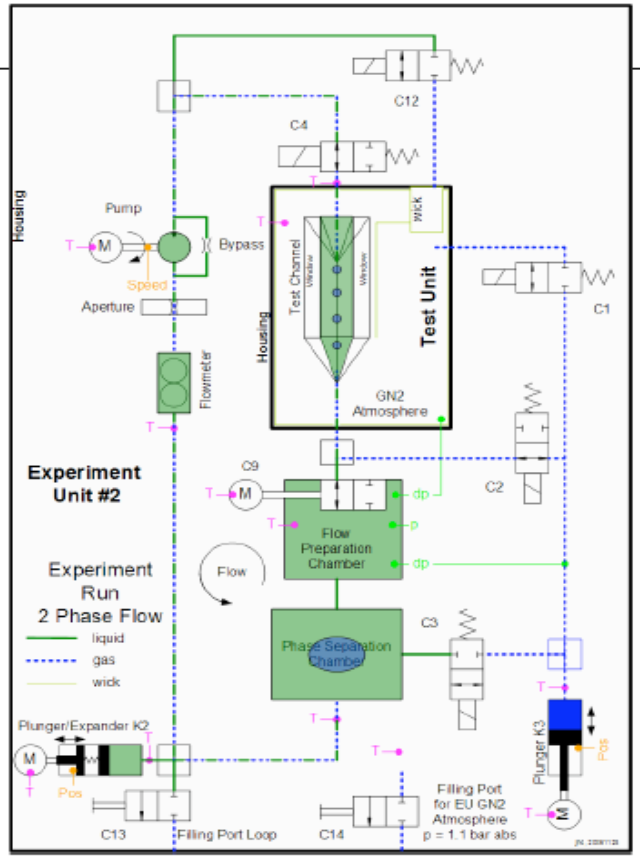
Experiment Unit #2 Fluid Loop Schematics

Status Experiment 2 Phase Flow

- Test Channel filled to requested level
- Gas Bubbles are injected as requested by plunger K3 operation

- potential 2 phase flow in the liquid loop
  - gas bubble volume added to the liquid loop will be compensated by plunger K2 operation
  - gas bubbles will be captured in the PSC
  - test channel level will be re-adjusted
  - during recovery gas is forced back to gas volume by appropriate plunger K3 operation



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[22]

CCF Capillary Channel Flow Test Unit Geometries

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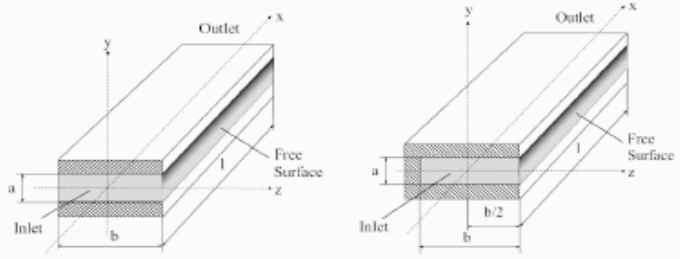
CCF EU FM Design Phase - Experiment Unit Fluid Loops

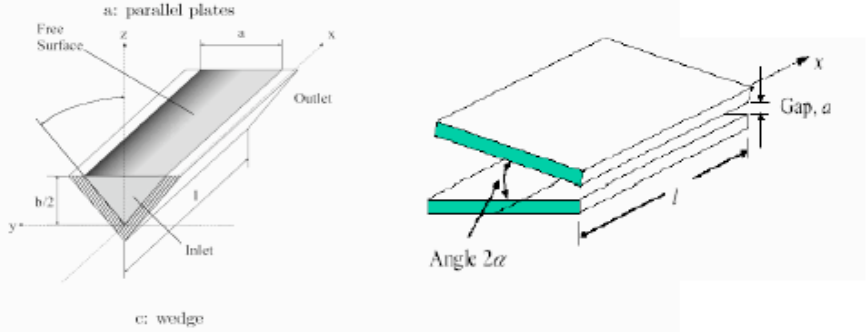
- Separate Experiment Units for EU#1 and EU#2
- Identical concept and hardware as far as reasonable → reworked fluid loop schematic

- EU#1



a: parallel plates

- EU#2



c: wedge

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[15]

CCF

Accomplishments

- PS Allen Wilkinson supported the Midterm Engineering Review (MTR) in November 2006.
- Forwarded SAMS AIDD to CCF team to identify interface requirements.
- Distributed MSG3052 document to international team as per telecon discussions with MSG Program Manager Linda Jeter.
- Identified MSG CCF PIM for team, Chris Butler.
- LOA has entered the signature cycle, currently at DLR in Germany.
- Telecon with team on 01/22/07 to discuss safety review process and planned PDR.

Planned Work

- Schedule Phase 0/I Safety Review, call into Bill Schoeren.
- Complete SRD due from CCF in January 2007.
- Support Delta PDR to include CCF ESS in February 2007