Advanced Combustion via Microgravity Experiments (ACME)

GRC Project Manager: MSI/Mark Hickman
Project Chief Engineer: DT0/Alan Linne
Safety Mission Assurance Lead: QE0/Scott Darpel
DPMI: Jana Van Horn/MB; Scheduler: Paul McMasters/QinetiQ
Contractor Lead: Brian Borowski, ZIN Technologies, Inc.
NASA Customer: HEOMD/SLPS & ISS Project Office

Structure and Response of Spherical Diffusion Flames (s-Flame), PI: Prof. C. K. Law, Princeton U.; ***Co-Is:*** Prof. Stephen Tse, Rutgers U.; Dr. Kurt Sacksteder, NASA GRC

Flame Design, PI: Prof. Richard Axelbaum, Washington U., St. Louis; ***Co-Is:*** Prof. Beei-Huan Chao, U. Hawaii; Prof. Peter Sunderland, U. Maryland; Dr. David Urban, NASA GRC

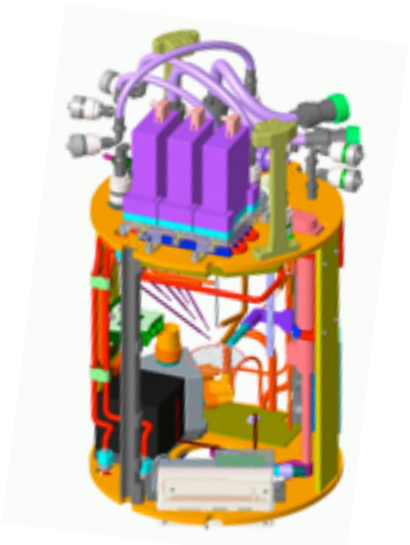
Coflow Laminar Diffusion Flame (CLD Flame), PI: Prof. Marshall Long, Yale U.; ***Co-I:*** Prof. Mitchell Smooke, Yale U.

Electric-Field Effects on Laminar Diffusion Flames (E-FIELD Flames), PI: Prof. Derek Dunn-Rankin, UC Irvine

Burning Rate Emulator (BRE), PI: Prof. James Quintiere, University of Maryland; Co-Is: Peter Sunderland, U. of Maryland

Project Scientists: Dennis Stocker, NASA GRC; Dr. Fumiaki Takahashi, NCSER/GRC

The Combustion Integrated Rack.



ACME Chamber Insert Assembly Concept.

Project Mission Statement:

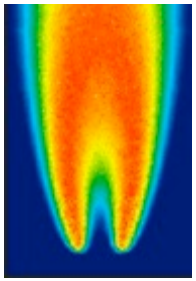
- Investigate gaseous fuel combustion by studying:
  - combustion structure and stability near flammability limits
  - soot inception, surface growth, and oxidation processes
  - emission reduction through nitrogen exchange
  - combustion stability enhancements via an electric field
  - ignition and flammability of solid spacecraft materials in realistic atmospheric conditions using a gas analog

GRC Scope:

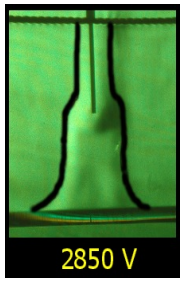
- Requirements, Design, Development, Test, Evaluation, and Operations for Project

s-Flame (drop test)

Flame Design (drop test)



CLD Flame (aircraft test)



E-FIELD Flames (1g schlieren)

BRE (1g test)

Project Life Cycle Schedule

Milestones	SCR	RDR	PDR	IDR	BRE RDR	CDR	Safety (Phase-3)	SAR	FHA	Launch	Ops	End Ops	Final Report
Actual/ Baseline	**2/2008**	**5/2010**	**01/2011**	**6/2012**	**6/2013**	11/2013	12/2015	8/2015	8/2015	12/2015	1/2016	11/2017	11/2018

October 31, 2013