

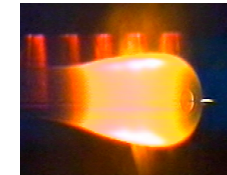
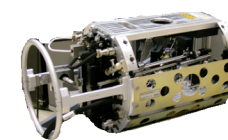
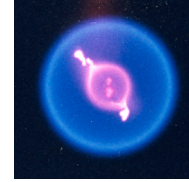
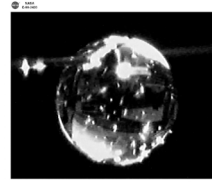


Flame Extinguishment Experiment-2 (FLEX-2)



PI Team: Prof. Forman Williams, UCSD (lead)
 Prof. Frederick Dryer, Princeton
 Prof. Mun Choi, University of Connecticut
 Prof. Benjamin Shaw, USC-Davis
 Dr. Vedha Nayagam, NCSER
 Prof. Thomas Avedisian, Cornell
 Dr. Daniel Dietrich, NASA GRC

Glenn Research Center



Left to Right: Image of Bi-component fuel droplet; color image of burning single fuel droplet; FLEX Chamber Insert Assembly Apparatus; image of burning droplet subjected to convective flows.

PS: Michael Hicks, NASA GRC

PM: Terence O'Malley, NASA GRC

Engineering Team: ZIN Technologies, Inc.

Objective:

- ◆ Modular apparatus designed for fundamental droplet combustion investigations
 - Investigate bi-component fuels
 - Examine the influence of sub-buoyant convective flows
 - Study practical fuels
 - Extend single droplet studies to binary arrays of droplets

Relevance/Impact:

- ◆ Extend single droplet combustion studies of pure fuels to consider idealized fuel mixtures and practical fuels
- ◆ Extend single droplet combustion studies to environments more relevant to engines (droplets in a flow-field and droplet-droplet interactions).
- ◆ Use experimental data to develop verified detailed and reduced-order models of droplet combustion.

Development Approach:

- ◆ PI unique fuel/gas containers built and launched to existing on-orbit Chamber Insert Assembly minimizing up-mass/volume, costs, and crew involvement

ISS Resource Requirements

Accommodation (carrier)	Combustion Integrated Rack
Upmass (kg) (w/o packing factor)	200 kg
Volume (m³) (w/o packing factor)	0.08 m ³
Power (kw) (peak)	1.5 Kw
Crew Time (hrs) - Initial configuration of CIR Rack - Change-outs during experiment	8.5 hrs 8.3 hrs
Autonomous Ops (hrs)	300hrs
Launch/Increment	19A/TBD

Project Life Cycle Schedule

Milestones	SCR	RDR/PDR	CDR	VRR	Safety (PH-3)	PSR	Ship	Launch	Ops	Return	Final Report
Actual/ Baseline	Nov 2007	Oct 2008	Dec 2008	Mar 2009	Apr 2009	Aug 2009	L-4	Feb 2010	Apr 2009	Jul 2010	Jul 2011
Documentation	Website: eRoom:				SRD: EDMP:			Project Plan: SEMP:			