Multi-User Droplet Combustion Apparatus (MDCA)/ Flame Extinguishment Experiment (FLEX)

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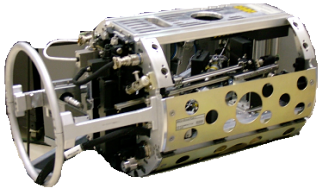

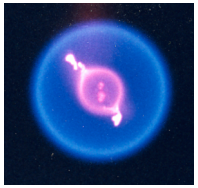

(Left) The Combustion Integrated Rack. (Top Right) FLEX Chamber Insert Assembly Apparatus. (Bottom Right) Color image of a burning droplet.

Objective:

- Modular apparatus designed for fire suppression/flame extinguishment investigations.
  - Assess the effectiveness of suppressants in microgravity.
  - Quantify the effect of candidate exploration atmospheres on fire suppression characteristics.
  - Provide data to develop of simplified combustion models.

Relevance/Impact:

- Direct the definition and development of large-scale fire suppression tests.
- Provide the direction for the selection of fire suppressant for CEV and LSAM.
- Allow the development of rational design rules for fire suppression in exploration vehicles and habitats.

Development Approach:

- Flight design leverages off previous flight design heritage (STS-83/94).
- Multi-user, re-usable apparatus minimizing up-mass/volume, costs, and crew involvement.

ISS Resource Requirements

Accommodation (carrier)	Combustion Integrated Rack
Upmass (kg) (w/o packing factor)	254 kg
Volume (m^3) (w/o packing factor)	0.48 m^3
Power (kw) (peak)	0.73 Kw
Crew Time (hrs) - Initial configuration of CIR Rack - Change-outs during experiment	 8.5 hrs 8.3 hrs
Autonomous Ops (hrs)	300 hrs
Launch/Increment	ULF-2/Increment 18/19

Project Life Cycle Schedule

Milestones	**FY95 NRA Process**	**HCR/RDR**	**CDR**	**VRR**	**Safety (PH-3)**	**PSR-2**	**Ship**	**Launch**	**Ops**	**Return**	**Final Report**
Actual/ Baseline	Nov 1998	Aug 2001	July 2003	March 2004	Oct 2005	May 2007	Feb 2008	Nov 2008	Jan 2009	Dec 2009	Dec 2010
Documentation	Website: eRoom:				SRD: EDMP:			Project Plan: SEMP:			