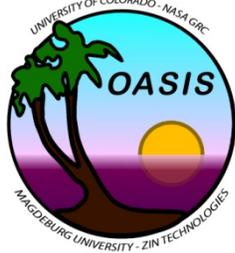




Observation and Analysis of Smectic Islands in Space (OASIS)

Glenn Research Center



PI: Prof. Noel Clark, University of Colorado
European PI Prof. Ralf Stannarius
Co-Is: Prof. Joe MacLennan, Prof. Matt Glaser,
 University of Colorado,
PS: Padetha Tin, NCSER/NASA GRC
PM: Nancy Rabel Hall, NASA GRC
Engineering Team: ZIN Technologies, Inc.

Objective:

- To exploit the unique characteristics of freely suspended liquid crystals in a microgravity environment to advance the understanding of fluid state physics.

Relevance/Impact:

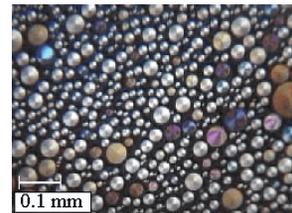
- Currently an important unsolved problem ferroelectric liquid crystal micro-displays in space helmets is the annealing of dislocations generated when the smectic layers are formed on the transparent viewing screen of the display unit. The proposed liquid crystal bubble experiments resolve the annealing dislocation problem of smectic ferroelectric liquid crystal micro-displays, one of the key aspects of generating well aligned electro-optic devices. It will improve the contrast, resolution and response time of the liquid crystal display devices that are currently used on the Helmet Mounted and Head Up display systems.

Development Approach:

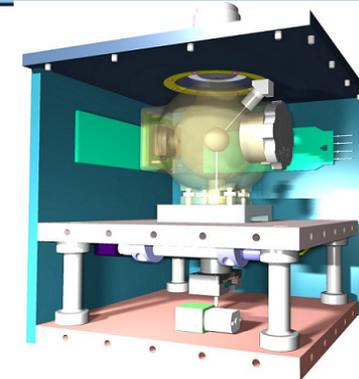
- The OASIS flight instrument will be designed to interface and operate within the MSG.
- OASIS will consist of 4 modules that will support bubble formation, ink jet island injection and illumination. It will study basic 2D hydrodynamics/fluid physics, probe droplet/island diffusion, hydrodynamic interactions, and droplet/island coalescence.



Islands on 1cm bubble



0.1 mm



OASIS Experimental Platform

ISS Resource Requirements

Accommodation (carrier)	Microgravity Science Glovebox (MSG)
Upmass (kg) (w/o packing factor)	50 Kg
Volume (m ³) (w/o packing factor)	2.0
Power (kw) (peak)	0.5kw for OASIS / MSG
Crew Time (hrs) (installation/operations)	5 Hours
Autonomous Operation	2 months
Launch/Increment	TBD

Project Life Cycle Schedule

Milestones	SCR	RDR	PDR	CDR	PIII FSR	SAR	FHA	Launch	Ops	Return	Final Report
G OASIS	5/2008	4/11	3/12	3/13	9/13	10/13	10/13	TBD	TBD	TBD	TBD