

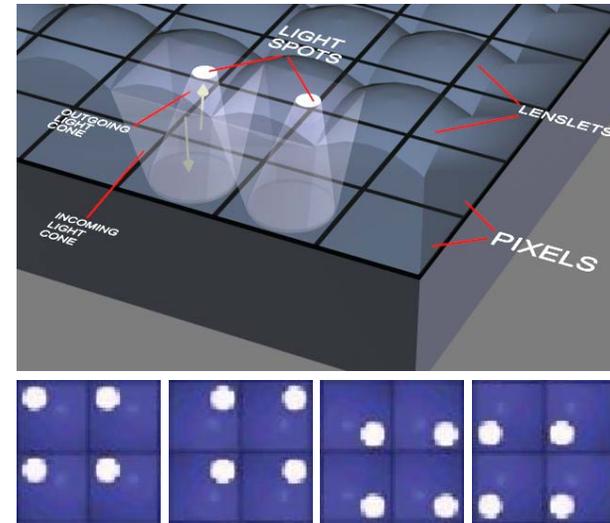
Birefringent Microlens Array for Ultra High Resolution HMDs



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 Proposal No: X4.01-8749

Identification and Significance of Innovation

- Innovative lens concept applied to microdisplays to enable ultra high resolution
- Leverages existing technology to produce a 4 to 9 times resolution increase on a single panel
- Virtual Pixels made up of light spots within real pixels
- Enables HMDs with 150° FOV and 1.5 arc minute resolution
- Potential to achieve 180° FOV with 1 arc minute



Technical Objectives

- Assess the Feasibility of a Novel Type of Lens
- Analyze, Design, Model, and Test a Birefringent Microlens Array to Qualify performance
- Develop Phase II Reference Design & Target Application

Work Plan

TASK / ACTIVITY	1	2	3	4	5	6
4.1 MODEL AND ANALYZE BIREFRINGENT FLY'S EYE LENS						
Source Epoxies	→					
Source Liquid Crystal Materials	→					
Fabricate Preliminary Test Lens		→				
Liquid Crystal Director Modeling	→	→				
Optical Modeling	→	→	→			
Test Even Illumination Concepts				→	→	
4.2 FABRICATE AND A TEST BIREFRINGENT FLY'S EYE LENS						
Select Fly's Eye Lens		→				
Fabricate Epoxy Lenses		→				
Fabricate Sample Birefringent Lenses			→	→		
Design, Fabricate Test Rig				→	→	
Bench Test Lenses					→	→
4.3 IDENTIFY A SPECIFIC APPLICATION AND DEFINE SYSTEM FOR PHASE II						
Investigate Incorporation of Lenses		→	→			
Seek Phase II Test Bed/Application			→	→		
Define user Requirements				→	→	
Develop Phase II Reference Design					→	→

NASA Applications

- Robonaut Telepresence control
- In orbit or Planetary Tele operations
- Ground Based Simulation and Scientific Visualization

Non-NASA Applications

- Aircraft and Automobile/Driving Simulation
- Tele remote Inspection
- Location Based Entertainment

Firm Contacts

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