Office of Naval Research
Arlington, VA
Contract N00014-94-C-0241

Monthly Status Report
November 1 - November 31, 1994

DESCRIPTION

Many optical computing problems are centered around the processing of incoherent images. These images may be conventional visible light such as those taken with a CCD imager or camcorder. They may also take the form of infrared images in the case of missile seekers or x-ray images from medical or other sources. For optical processing, these images must be converted to either phase or amplitude modulated coherent light. This is typically accomplished by electronically feeding the originally captured image into a spatial light modulator (e.g., liquid crystal or deformable mirror array) and modulating a coherent reference beam with the 2 dimensional data pattern. The electrical input to the SLM creates a data flow bottleneck in the optical processing system due to the inherently serial input architecture. SMD has proposed a novel incoherent to coherent image converter which solves this problem by providing a massively parallel, optical input feed capability. The proposed architecture utilizes a novel combination of micromachining and ultra-thinned wafer technology to achieve an integrated incoherent to coherent image converter. The converter is capable of directly converting UV, IR, visible, and x-ray energy to a coherent light representation allowing for maximum utilization of downstream optical processing.

NOVEMBER ACTIVITIES

During November, ultra-thin wafers were ordered. These wafers are n-type starting material and are 10 microns thick. A preliminary process flow has been designed to wafer bond the ultra thin wafers to a thick quartz substrate. Additional wafers were ordered in a silicon on sapphire configuration to evaluate the possibility of using thinner silicon layers in the SLM architecture. Layouts have been completed for a 16 x 16 SLM array and are currently being simulated with SUPREME and PISCES process and device modeling routines. These modeling routines will provide information related to depletion region thickness and device channel potentials.

TO GO ACTIVITIES

During December, a program kickoff meeting will be held to refine program specifications. In addition, process modeling will be completed and photolithographic masks will be made. It is anticipated that device fabrication will begin in January 1995.

PROBLEMS/CONCERNS

In order to properly focus program efforts it would be very helpful to hold a program kickoff meeting.

SCHEDULE/BUDGET

The program is currently on schedule except for the program kickoff meeting. The program is within budget.