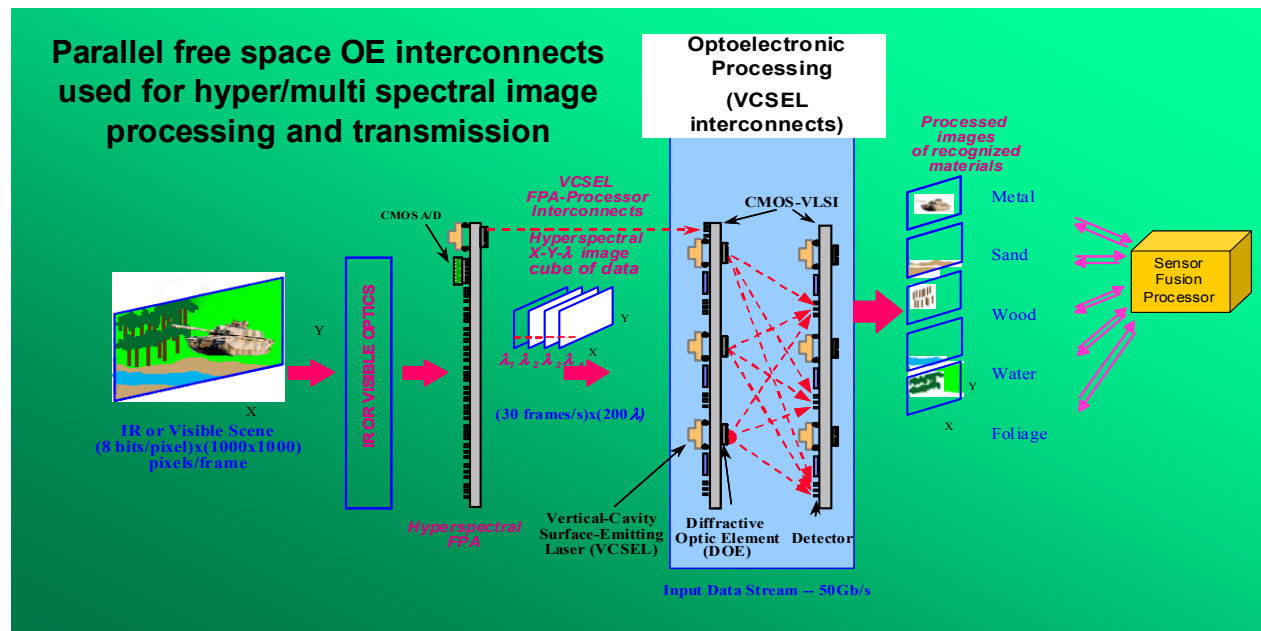


# Integration of Laser Drivers with VCSEL Arrays

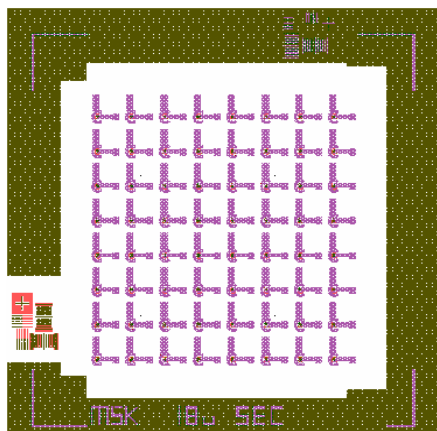
Huan Zhao, Bill Jemison, and James Hwang, Lehigh University  
Gerard Dang, Jiang Liu, and Wayne Chang, Army Research Laboratory

**Purpose :** Investigate critical issues that limit the high speed performance of vertical-cavity surface-emitting lasers (VCSELs). Optimize both VCSELs and their driver circuits for speed, efficiency, temperature range and integration level.

## I. Applications: parallel computing, data communication, and signal processing

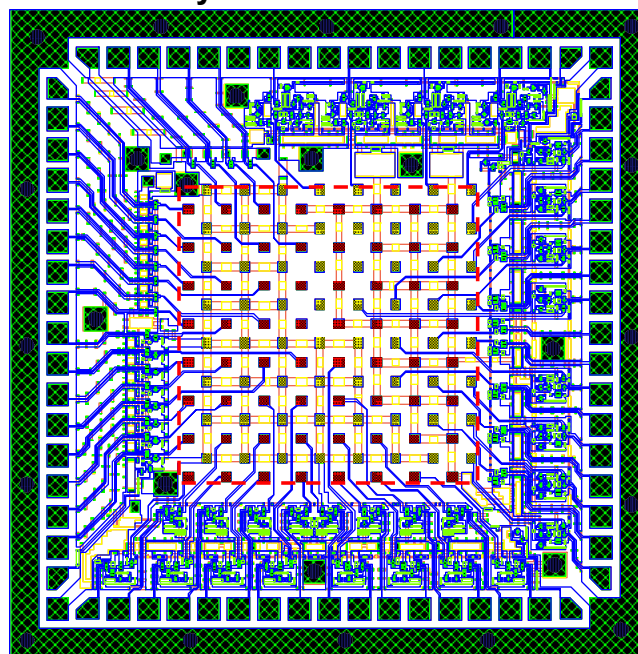


## II. Approach: Flip-chip bonding of 8x8 VCSEL array and 8x8 VCSEL Driver



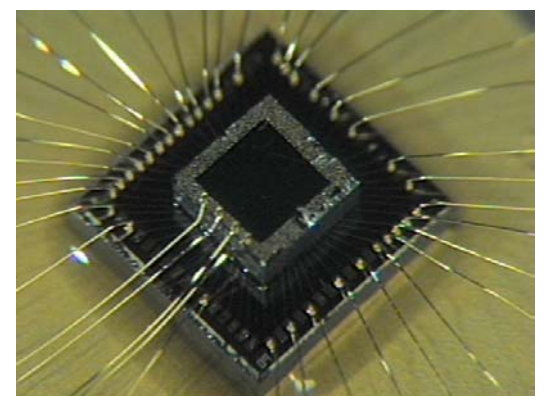
ARL 8x8 VCSEL Mask

Status: Design and Fabrication by ARL



Lehigh Univ. 8x8 VCSEL MMIC

Status: Design and Fabrication Completed; Preliminary DC Testing



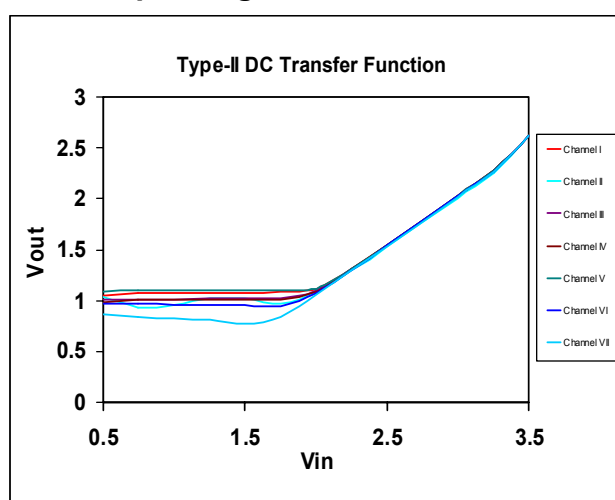
VCSEL/Driver Integration

Status: Driver Chip delivered to ARL for flip-chip bonding assessment

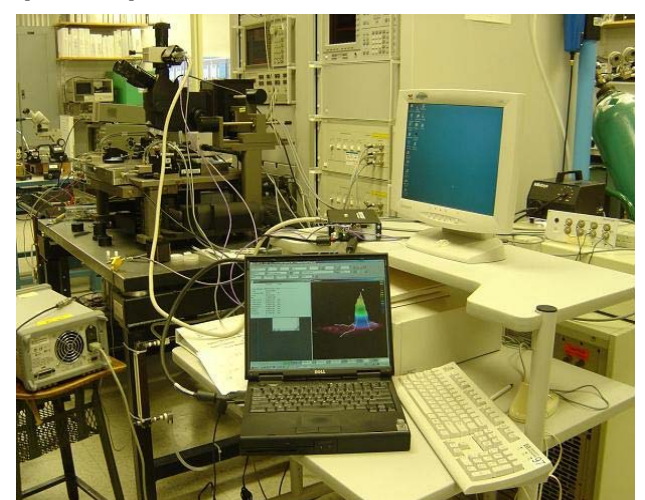
## III. Driver Testing: DC characterization via wafer probing; RF characterization; High-speed optical characterization



Wafer Probing of MMIC



DC Measurements



VCSEL/Driver Testing Station