



Sandia National Laboratories



U.S. DEPARTMENT OF  
**ENERGY**

# Project Accomplishment Summary

Sandia National Laboratories is a multi-mission laboratory managed and operated by National Technology and Engineering Solutions of Sandia, LLC, a wholly owned subsidiary of Honeywell International, Inc., for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-NA0003525.



**Sandia National Laboratories**

Operated for the United States Department of Energy  
by National Technology and Engineering Solutions  
of Sandia, LLC.

Albuquerque, New Mexico 87185-0101  
Livermore, California 94551-0969

## PROJECT ACCOMPLISHMENTS SUMMARY

**Cooperative Research and Development Agreement (#SC99/01573.108.00)**  
between Sandia National Laboratories and Lockheed Martin Corporation

Note: This Project Accomplishments Summary will serve to meet the requirements for a final abstract and final report as specified in Article XI of the CRADA.

Title: Silicon Photonics for Government Applications

Final Abstract:

The purpose of the PTS was to jointly develop integrated photonics for use in Lockheed Martin Corporation's (LMC's) applications. Principally, Sandia National Laboratories (SNL) assisted LMC with silicon photonics designs and fabricated and delivered silicon photonics devices and sub-systems realizing those designs for LMC to test and evaluate. The benefits of using silicon photonics in these applications is lower size, weight, power, and cost for U.S. defense systems.

Background:

At the time of the program, no U.S. commercial silicon photonics multi-project wafer foundry services were available. The chips were fabricated in SNL's silicon fabrication facilities in the MESA complex. Testing was performed predominantly by LMC.

Description:

Again, the purpose of the PTS was to jointly develop integrated photonics for use in LMC's applications. LMC owned the design of the chip. SNL assisted LMC with silicon photonics designs as required, participated in design reviews by teleconference, and discussed testing results with participants at LMC. SNL fabricated and delivered silicon photonics chips realizing those designs. A total of 56 chips were delivered over the course of the project. Many of these chips were tested at LMC. Chips worked as expected in many cases, but some anomalies were found in the testing. These are still under investigation by LMC.

Benefits to the Department of Energy:

The benefits of using silicon photonics in these applications is lower size, weight, power, and cost for U.S. defense systems using integrated photonics. This technology potentially has benefits in sensing for commercial and government markets, high performance computing and data center networks.

Economic Impact:

Silicon photonics is currently being utilized in data center networks. The research performed in the project explores its use in government applications.

Project Status:

The project has been completed.

## ADDITIONAL INFORMATION

### Laboratory/Department of Energy Facility Point of Contact for Information on Project

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### Company Size and Points of Contact

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### CRADA Intellectual Property

N/A

### Technology Commercialization

N/A

### Project Examples

N/A

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This summary has been approved for public release by Sandia and the Lockheed Martin Corporation.

Sandia National Laboratories

By Anthony L. Lentine  
Anthony Lentine  
Principal Investigator

12/7/17

Date

Sandia National Laboratories

By S. H. J.  
Manager  
WFO/CRADA Agreements

12/7/17

Date

Lockheed Martin Corporation

By Stephanie School  
Title: Contracts Administrator

10/14/2017

Date

In order to expedite the process, if we do not receive your signed reply by 12/15/17  
we will assume your concurrence for the release of this document to the public.