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Sandia National Laboratories

U.S. DEPARTMENT OF ENERGY

Project Accomplishment Summary

Sandia National Laboratories is a multi-program laboratory managed and operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corporation, for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000.

Sandia National Laboratories
Operated for the U.S. Department of Energy by
Sandia Corporation
Albuquerque, New Mexico

PROJECT ACCOMPLISHMENTS SUMMARY

Cooperative Research and Development Agreement (#1736.01)

between **Sandia National Labs** and **Northrop Grumman Systems 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: Microthruster Arrays

Final Abstract:

Sandia National Laboratories (Sandia) and Northrop Grumman Information Systems Sector (NGIS) will collaborate on the design, manufacture, testing, and study of digital microthruster arrays with the goal of advancing the field of micropropulsion in the United States. Sandia is actively pursuing advanced manufacturing technologies to advance the understanding of energetic material combustion and detonation behavior at sub-millimeter geometries. This has direct application to the field of micropropulsion. Sandia will apply understanding of manufacturing technologies and energetic material behavior to the design, manufacture, and study of digital microthruster arrays in a collaborative nature with NGIS.

Background:

Sandia and Northrop-Grumman have collaborated for years on this development. We bring to the project a diverse team with expertise spanning several disciplines. The concept of “Digital Micropropulsion” was co-invented by Dave Lewis (now with Northrop-Grumman) and we continue to team to further this concept.

Description:

Sandia and Northrop-Grumman are collaborating on this development. Sandia’s expertise in microenergetics, specifically related to fueling and combustion research at sub-millimeter scales is uniquely suited for this work. Northrop-Grumman’s manufacturing, design, and integration capabilities as well as the application space, is driving the maturation of this concept.

Benefits to the Department of Energy:

The DOE is benefiting from this collaboration on two levels. First, Sandia is furthering our technology development related to precision deposition of energetic materials and small-scale combustion research. Second, we anticipate that this CRADA will drive forward one application to the point that commercialization of a Sandia-developed technology will result.

Economic Impact:

N/A

Project Status:

Sandia and Northrop-Grumman are continuing to collaborate on this work through an umbrella CRADA, 1786 00 00 (sub-CRADA 1786 01 01). The work is progressing well and the collaboration continues to benefit all parties.

ADDITIONAL INFORMATION

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

Tappan, Alexander S
astappa@sandia.gov

Company Size and Points of Contact

Jeff Waypa
jeff.waypa@ngc.com

CRADA Intellectual Property

None beyond background intellectual property

Technology Commercialization

Discussions underway, but nothing tangible

Project Examples

Sandia has received numerous MEMS (microelectromechanical systems) Digital Thrusters from Northrop-Grumman. Sandia has fueled these devices with propellant and investigated the small-scale combustion properties of these devices. In collaboration with the US Air Force Academy, high-Mach number testing of these devices has been conducted.

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This summary has been approved for public release by Sandia and Northrop Grumman Systems Corporation

Sandia National Laboratories

By Alexander S. Tappan
Digitally signed by Alexander S. Tappan
DN: c=us, o=u.s. government, ou=department of energy, ou=sandia national laboratories, ou=employees, serialNumber=21203, cn=Alexander S. Tappan
Date: 2013.06.27 11:25:41 -06'00'

Alexander Tappan
Principal Investigator

Date

Sandia National Laboratories

By _____

Manager
WFO/CRADA Agreements

6.17.13
Date

Northrop Grumman Systems Corporation

By _____

Title:

Date

In order to expedite the process, if we do not receive your signed reply by 08/12/2013 we will assume your concurrence for the release of this document to the public.