

**Special Notice 12-SN-0015**  
**Special Program Announcement for Office of Naval Research:**  
**DARPA/ONR Field-Reversible Thermal Connector (RevCon) Challenge II**

**I. INTRODUCTION:**

This announcement describes a program thrust, entitled “DARPA/ONR Field-Reversible Thermal Connector (RevCon) Challenge II,” to be launched initially under the ONR FOA12-002, ‘FY12 Funding Opportunity Announcement (FOA) for Navy and Marine Corps Science, Technology, Engineering & Mathematics (STEM) Programs’, which can be found at <http://www.onr.navy.mil/Contracts-Grants/Funding-Opportunities/Broad-Agency-Announcements.aspx>. However, proposals will be received under the new FY13 STEM Funding Opportunity Announcement (FOA), which is expected to be released in September 2012, since the requested submission date for the RevCon Challenge proposals will be after the expiration of FOA12-002. Once the new FY13 STEM FOA is released, it will be amended to require the RevCon Challenge full proposals to be submitted under that FOA number, rather than the ONR FOA 12-002. This announcement is being initially submitted under the current FOA, which is anticipated to be replaced by 30 September 2012, to allow sufficient time for potential post-secondary students interested in the program to arrange a faculty advisor before the start of the fall semester. The requirements for proposal submission, evaluation, and award of any resulting grants will ultimately be subject to the terms described in the FY13 STEM FOA. Potential Offerors may review the current FOA12-002 to get a general understanding of what the proposal requirements may be in the FY13 STEM FOA.

The purpose of this announcement is to focus attention of the scientific community on (1) the area to be studied, and (2) the planned timetable for the submission of proposals.

**II. TOPIC DESCRIPTION: FIELD-REVERSIBLE THERMAL CONNECTOR CHALLENGE**

The proposed topic will explore and exploit field-reversible, low-resistance, thermal connectors. The program will pursue novel design concepts for a field-reversible, low-resistance thermal connector which uses an applied, non-mechanical force to repeatedly assemble and disassemble an electronic module to/from an electronic enclosure, while providing a constant connector thermal resistance.

**Background:**

Thermal management of high power phased array radar and electronic warfare systems utilizes fluid flow within cold plates that interface with edge-cooled electronic assemblies in order to remove increasing amounts of heat from wide bandgap RF power amplifiers. This interface is typically a mechanical coupling (wedgelock) which results in poor thermal contact between the cold plate and electronic assembly. A typical commercial off the shelf (COTS) wedgelock has a thermal resistance about 0.5 °C/W for a 15 cm connector. Under the first RevCon Challenge, a hydraulically actuated connector was demonstrated to have a thermal resistance of 0.1 °C/W.

## **Objective:**

The Office of Naval Research (ONR) is interested in receiving proposals which demonstrate a novel design concept for a field-reversible, low-resistance thermal connector which uses an applied, non-mechanical force to repeatedly assemble and disassemble an electronic module to/from an electronic enclosure, while providing a constant connector thermal resistance. Thermal connectors should be 15 cm in length and have a contact area appropriate for the test rig shown in the schematic below. A plate made of machined aluminum will be supplied to each awarded team. The device is expected to maintain thermal resistance lower than 0.2 °C/W over multiple thermal cycles in a specified temperature range, vibration environment, and contact pressure. Detailed thermal and mechanical models will be developed by the student teams and compared to the performance of prototype device.

## **III. FULL PROPOSAL SUBMISSION AND AWARD INFORMATION**

ONR anticipates only **grants** will be issued for this effort. All full proposals **must** be submitted through [www.grants.gov](http://www.grants.gov) in accordance with the full proposal requirements of the FY13 STEM FOA. The following information must be completed as follows in the SF 424 to ensure that the application is directed to the correct individual for review: Block 4a, Federal Identifier: Enter N00014; Block 4b, Agency Routing Number, Enter the three (3) digit Program Office Code (331) and the Program Officer's name, last name first, in brackets (Spector, Mark). All attachments to the application should also include this identifier to ensure the proposal and its attachments are received by the appropriate Program Office.

In FOA 12-002, Technical Proposals (Volume 1) are limited to 19 pages (not including cover page, table of contents, reports, pending proposal submissions and qualifications). However, the description of page limitations in the FY13 STEM FOA will supersede the limitations specified in FOA 12-002.

### **Recommended sections and page limits per section are:**

- [1 page] Executive Summary
- [1 page] Problem Description
- [3 pages] RevCon Concepts: Concepts, Strengths, Weaknesses, Opportunities and Threats (SWOT) or other analysis
- [9 pages] Detailed description of selected concept: description, physical phenomena, modeling, analysis, thermal prediction, comparison to goals, failure modes
- [3 pages] Manufacturing Plan: Engineering drawings, "design for manufacturability," manufacturing processes, cost analysis - 5-10, 1000, 10,000/yr
- [2 pages] Preliminary Test Plan

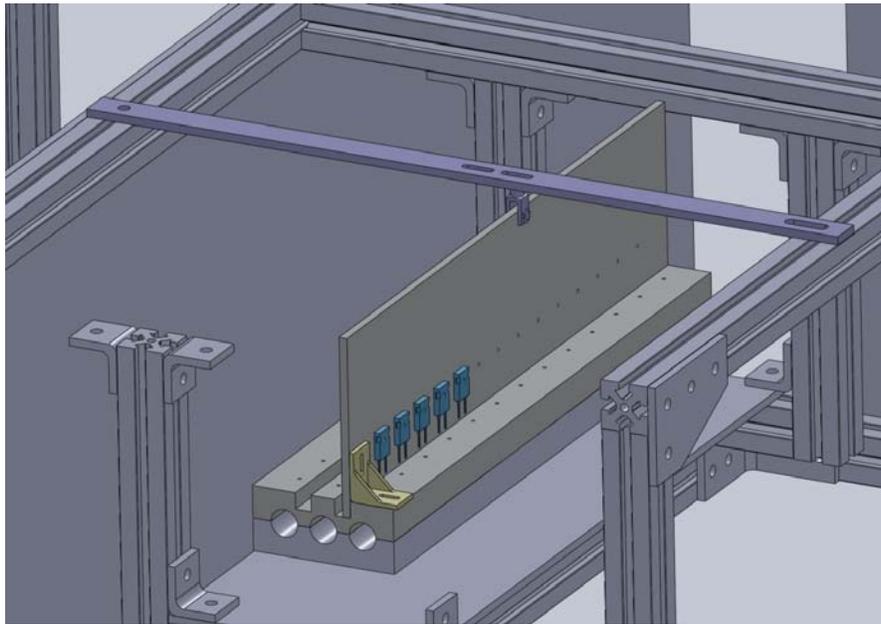
ONR plans to fund no more than fifteen individual awards with a value not to exceed \$7,500 each. ONR expects these funds will primarily cover the costs of materials, fabrication, and test of the proposed RevCon concept and optional travel to the final demonstration in Laurel, MD. Awards are expected to be primarily in the form of grants to universities with a faculty advisor. However, eligible entities that may submit proposals will be specified in the "Eligibility Information" in the FY13 STEM FOA when it is released.

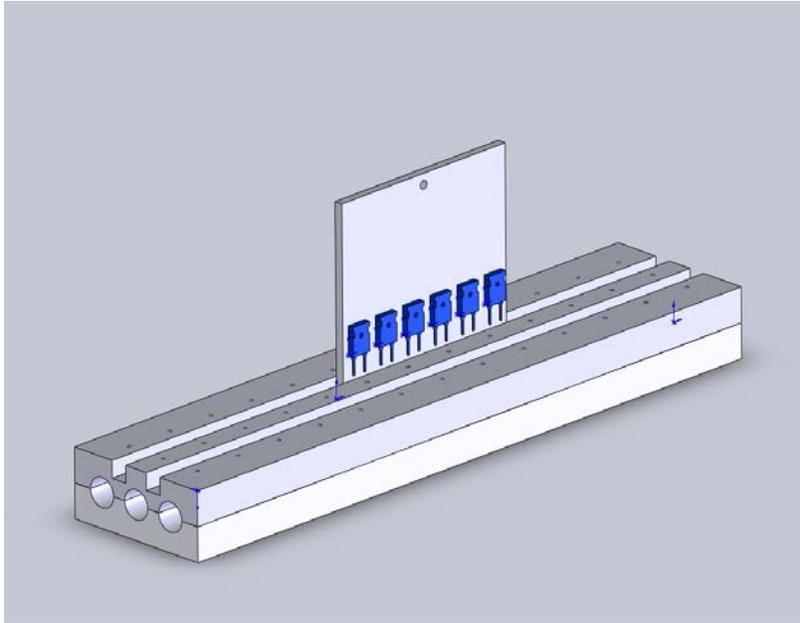
Special Notice 12-SN-0015

**Full Proposals should be submitted by 12:00PM EST on November 28, 2012.** Full Proposals received after that date will be considered as time and availability of funding permit.

Funding decisions should be made by December 21, 2012. Projects will have an estimated grant award date of February 20, 2013 in order to allow student teams to fabricate their prototypes during Spring 2013 semester. A final report documenting the design, assembly, analysis, and test of three RevCon prototypes, along with one working prototype, will be delivered by May 3, 2013. Based on the quality of their submission, up to 5 teams will be invited to travel to the Johns Hopkins University Applied Physics Laboratory (APL) in Laurel, MD to present and demonstrate their RevCons to an audience of government and corporate technologists and tour several government facilities. APL will provide the plate, test rig, cooling system, etc. for the test. Teams will only need to bring their thermal connectors. The test rig schematic is shown below.

Although ONR expects the above described program plan to be executed, ONR reserve the right to make changes.





#### **IV. POINTS OF CONTACT**

In addition to the points of contact listed in ONR FOA 12-002, the specific points of contact for this announcement are listed below:

Technical Points of Contact:

Mark Spector, Program Officer, [mark.spector@navy.mil](mailto:mark.spector@navy.mil)

Business Point of Contact:

Tracie Simmons, Contract Specialist, [tracie.simmons@navy.mil](mailto:tracie.simmons@navy.mil)