Special Notice

High Operational Temperature Sensors (HOTS)
Proposers Day
DARPA-SN-23-59
May 3, 2023

Defense Advanced Research Projects Agency
Microsystems Technology Office
675 North Randolph Street
Arlington, VA 22203-2114

SPECIAL NOTICE DARPA-SN-23-59
High Operational Temperature Sensors (HOTS) Proposers Day
EVENT DATE: **May 31, 2023**
REGISTRATION DEADLINE: **May 22, 2023, 4:00 pm EDT**
REGISTRATION WEBSITE: **https://cvent.me/odY8Az**
TECHNICAL POC: **Dr. Benjamin Griffin, MTO Program Manager**
E-MAIL: **DARPA-SN-23-59@darpa.mil**

PROPOSERS DAY:
The Defense Advanced Research Projects Agency (DARPA) will host a Proposers Day in support of Broad Agency Announcement (BAA) HR001123S0036, HOTS program on May 31, 2023 at the Booz Allen Hamilton Auditorium located at 8283 Greensboro Drive, McLean, VA 22102 from 8:00 am to 12:00 pm. Participants must register for the HOTS Proposers Day through the registration website no later than May 22, 2023, 4:00 pm EDT. The purpose of this meeting is to provide information on the HOTS program, promote additional discussion on this topic, address questions from potential proposers, and provide an opportunity for potential proposers to share their capabilities and ideas for teaming arrangements. DARPA anticipates releasing the HOTS BAA HR001123S0036 prior to the Proposers Day.

The goals of the Proposers Day are:
(1) To introduce the science and technology community (industry, academia, and government) to the HOTS program vision and goals;
(2) To facilitate interaction between researchers with capabilities and interests relevant to the HOTS program goals; and
(3) To encourage and promote teaming arrangements among organizations that have the relevant expertise, research facilities and capabilities for executing research and development responsive to the HOTS program goals.

The Proposers Day will include overview presentations by government personnel and opportunities for team building among the participants. This meeting will be held at the **Unclassified** level.

PROGRAM OBJECTIVE AND DESCRIPTION:
Many commercial and defense systems, including oil-and-gas, geothermal, automotive, turbine, and hypersonic systems, experience thermal environments beyond the capability of today's high-performance physical sensors. Such systems must therefore be designed and operated with reduced performance and excessive margins due to uncertain conditions in harsh thermal environments. Physical sensors that can operate in the high temperature environment absent additional thermal management will enable systems to operate closed-loop and monitor state-of-health.

Microelectronic sensors are formed by transducers integrated with signal-conditioning microelectronics. High-bandwidth, large-dynamic-range sensors typically combine high electromechanical sensitivity, limited-bandgap transducers with high gain-bandwidth product, silicon complementary metal-oxide-semiconductor (CMOS) transistor signal-conditioning microelectronics using low-loss integration technology. However, these technologies are constrained by intrinsic material limitations to operate in low-temperature zones (<225 °C[1] ambient temperature) due to intrinsic material limitations at elevated temperatures of the high-temperature platforms in which they are deployed (e.g., turbine engines).

[1] B. W. Ohme and M. R. Larson, "SOI CMOS for Extreme Temperature Application," Plymouth, Minnesota, USA, 2012

The objective of the **HOTS** program is to develop sensor microelectronics consisting of transducers, signal-conditioning microelectronics, and integration that operate with high bandwidth (>1 MHz) and dynamic range (>90 dB) at extreme temperatures (i.e., at least 800 °C). Performance will be validated through the development and demonstration of a pressure sensor module consisting of integrated transducer and signal-conditioning microelectronics. To realize the program objectives, the HOTS technology will:

- Achieve both long-lifetime and large-bandwidth transistors at high temperature
- Achieve a high-sensitivity transducer at high temperature
- Integrate a high-operating temperature sensor without degrading performance

The HOTS program will leverage recent advances in wide-bandgap transistors, demonstrations of thermally robust transducer materials, and insight from heterogeneous integration techniques to overcome the technical challenges and form highly-integrated, thermally-hardened sensors.

DARPA expects that diverse expertise from across academia, small business, national laboratories, and the defense industrial base research community may be applicable to achieving all program goals. Teaming is appropriate when strategic to achieve program outcomes.

REGISTRATION INFORMATION:
Early registration is strongly recommended. Organizations are limited to four attendees. The determination of what constitutes an organization will be decided by the DARPA Program Manager. Registration may close prior to the registration deadline due to the venue capacity being met. **There will be no on-site registration.** DARPA hosts Proposer Days to promote teaming arrangements between researchers; provide potential performers with information on whether and how they might respond to the Government's research and development solicitations; and to increase efficiency in proposal preparation and evaluation. Therefore, Proposer Days are open only to registered potential proposers. The event is closed to the general public and media. An on-line registration form, preliminary agenda, citizenship verification form, foreign national visit request form, meeting details, and hotel information for the Proposers Day can be found at the registration website.

POSTERS:
There will be a poster session. Posters should highlight proposer capabilities and teaming requirements, however no template for the poster will be provided. We hope this format will lead to more interaction among proposers and give opportunity to showcase capabilities and build strong teams to solve the challenge presented in HOTS. Posters must not contain any ITAR restricted or classified information. There is a limit of one poster per organization. Proposers who will be participating in the poster session must indicate their intent to bring a poster prior to the close of registration. Any other questions should be directed to the email address listed above.

This meeting will be held at the Unclassified level. All attendees are required to present government-issued photo identification upon entry to the event. Prior to arrival, your clearance/visit request must be on file with the Visitor Welcome Center (VWC). Please fax your clearance/visit request to DARPA at (703) 528-3655 or send it via encrypted email to: VWC@DARPA.mil. Via Joint Personnel Adjudication System (JPAS), the requesting Facility Security Officer (FSO) may send a visit request using SMO Code DDAAUS4. For additional information please refer to the Visitor Information page on the DARPA website (http://www.darpa.mil/policy/visitor-information). Non-US citizens are required to submit a DARPA Form 60 "Foreign National Visit Request," which can be downloaded when registering. The completed DARPA Form 60 must be emailed in .pdf format to the email listed above prior to the close of registration.

ADMINISTRATIVE:
All administrative and technical questions should be directed to DARPA-SN-23-59@darpa.mil. Please refer to the Proposers Day Special Notice number (DARPA-SN-23-59) in all correspondence. This announcement is not a request for proposals, any so sent will be disregarded.

This Special Notice is issued solely for information and potential new program planning purposes; the notice does not constitute a formal solicitation for proposals or proposal abstracts. In accordance with FAR 15.201(e), responses to this notice are not offers and cannot be accepted by the Government to form a binding contract. Attendance is voluntary and is not required to propose to subsequent Broad Agency Announcements (if any) or research solicitations (if any) on this topic. DARPA will not provide reimbursement for costs incurred in responding to this special notice. Respondents are advised that DARPA is under no obligation to acknowledge receipt of any information received, or provide feedback to respondents with respect to any information submitted under this special notice.

NO CLASSIFIED INFORMATION SHOULD BE INCLUDED IN ANY RESPONSE TO THIS SPECIAL NOTICE.